Geopolitical Impacts of Climate Change: Arctic Case

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ABSTRACT

Climate change has long been considered a big problem by many politicians and ordinary people. This change in the world ecosystem has serious effects on world geopolitics in a global sense, as well as its effects on living things on Earth. As the effects of climate change increase in the coming years, it seems inevitable that this will cause major global geopolitical changes, especially in the seas. Undoubtedly, many problems are expected to arise from these changes, such as changes in global trade routes and people forced to migrate due to sea level rise. In addition, the possibility of experiencing hunger and food supply problems is increasing due to the decrease in agricultural areas and production. Of course, current and expected problems do not seem to be limited to these. In addition, it is expected that climate changes in the Arctic region will cause changes in global maritime trade routes, which will have serious geopolitical effects on many countries and the international political system.

In this research, the potential effects and problems caused by climate change in global and geopolitical terms are examined. In addition, the relationship between climate change and geopolitics is revealed, and the geopolitical effects of the new international trade route are expected to be formed at the North Pole after climate change is revealed. In addition, the effects of energy resources that will emerge after the melting of glaciers in the Arctic region on global politics have been analyzed.

Key Words: *Climate Change, Global Politics, Arctic Region, Northern Route, Natural Resources in the Arctic, Effects of Climate Change on Trade Routes*

JEL Classification: *F5*

İklim Değişikliğinin Jeopolitik Etkileri: Arktik Örneği

ÖZ

İklim değişikliği uzun zamandır birçok politikacı ve sıradan insan tarafından büyük bir sorun olarak kabul ediliyor. Dünya ekosistemindeki bu değişim, dünya üzerindeki canlılar üzerindeki etkilerinin yanı sıra küresel anlamda dünya jeopolitiği üzerinde de ciddi etkilere sahiptir. Önümüzdeki yıllarda iklim değişikliğinin etkileri arttıkça, bu durumun özellikle denizlerde büyük küresel jeopolitik değişimlere neden olması kaçınılmaz görünüyor. Kuşkusuz bu değişimlerin başında küresel ticaret yollarının değişmesi, deniz seviyesinin yükselmesi nedeniyle yerlerinden göç etmek zorunda kalan insanlar gibi birçok sorunun olması beklenmektedir. Ayrıca tarım alanlarının azalması ve tarımsal üretimin azalmasına bağlı olarak açlık ve gıda tedarik sorunlarının yaşanma olasılığı giderek artmaktadır. Tabii ki mevcut sorunlar ve beklenen sorunlar bunlarla sınırlı görünmemektedir. Ayrıca Arktik bölgede yaşanacak iklim değişikliklerinin küresel deniz ticaret yollarının değişmesine neden olması ve bu durumda jeopolitik açıdan birçok ülke üzerinde ve uluslararası politik sistemde ciddi etkilerinin olması beklenmektedir

Bu araştırmada İklim değişikliğinin küresel ve jeopolitik açıdan neden olduğu ve olabileceği potansiyel etkiler ve sorunları incelenmiştir. Ayrıca iklim değişikliği ile jeopolitik arasındaki ilişki ortaya konularak iklim değişikliği sonrasında Arktik bölgede oluşması beklenen yeni uluslararası ticaret yolunun jeopolitik etkileri ortaya konulmuştur. Bunun yanında Arktik bölgede

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buzulların erimesi sonrasında ortaya çıkacak enerji kaynaklarının küresel politikaya etkileri analiz edilmiştir.

Anahtar Kelimeler: *İklim Değişikliği, Küresel Politika, Arktik Bölge, Kuzey Rotası, Kuzey Kutbu'ndaki Doğal Kaynaklar, İklim Değişikliğinin Ticaret Yollarına Etkileri*

JEL Sınıflandırması: *F5*

INTRODUCTION

Climate change is essentially a man-made geopolitical problem. This problem has emerged due to the increase in greenhouse gases in the world's atmosphere, especially after the Industrial Revolution. However, there is no spatial uniformity in the possible effects of climate change in terms of type and size, which will differ from place to place and over time. Although neither the responsibility of climate change nor its possible effects are evenly distributed among countries, climate change is still a 'global' problem, where each country produces greenhouse gas emissions, these emissions are equally distributed in the atmosphere, no matter which country they live in, and people somehow feel the effects of climate change in their own lives.

Projected changes in temperature, precipitation, sea level, and extreme events pose numerous risks to ecosystems and the people who depend on them. Risks differ according to the characteristics of social and ecological systems. Some ecosystems, such as those in the Arctic and Antarctic, are susceptible to changes in temperature. The changes that will occur in these regions, which are seen as the world's refrigerators, have the potential to cause geopolitical changes and disrupt the world's climate structure.

With the effects of global climate change, the current and potential value of new energy basins, and the opening of sea passageways, the Arctic is turning into a region with a high potential for conflict rather than the cooperation of regional and non-regional actors and becoming one of the geopolitical centers of gravity of the world.

The Arctic is a region with unique geographical and climatic conditions, various natural resources, and strategic importance. With the melting of glaciers, this area, which has increased international interest, is becoming an important center for both scientific research and commercial activities. In this respect, the Arctic is the northernmost region in the world and has many special geographical, astronomical, and climatic features. Accordingly, the Arctic extends from 66.5° North Parallel, centering on the North Pole, to 90° North. The Arctic is located in the northern part of Asia, Europe, and North America. It surrounds the Arctic Ocean, which is an ocean covered with ice. It is the largest body of water in the Arctic; it is the smallest and shallowest ocean in the world. When evaluated according to its geographical integrity, its social and cultural integrity, the land and sea areas spread within the borders of the Arctic States. Of these, the Arctic and open seas are exceptional areas, and there are also areas of conflict and problems (Barents Sea, Lomonosov Ridge, Sea Passageways, etc.). Although it is valid for the whole world's geography, technological advances in the context of the Arctic increase the importance of the field, even if it reduces its impact. The Arctic acts as

a strategic bridge between North America and Eurasia. This location facilitates access to sea routes and natural resources, thus attracting the attention of great powers.

In this study, numerical data on climate change is presented using quantitative and qualitative research methods. Within the scope of the study, developments in the field were investigated by scanning the literature, and the effects of future developments were investigated in line with the findings. The effects of the temperature increase resulting from climate change on the seas and the possible geopolitical effects of the situation resulting from the melting of glaciers, especially in the Arctic region, are analyzed. As a result of the calculations and expectations made in this context, the possible effects of the melting in the Arctic region and the formation of new alternative sea routes to traditional sea trade routes on international trade are examined.

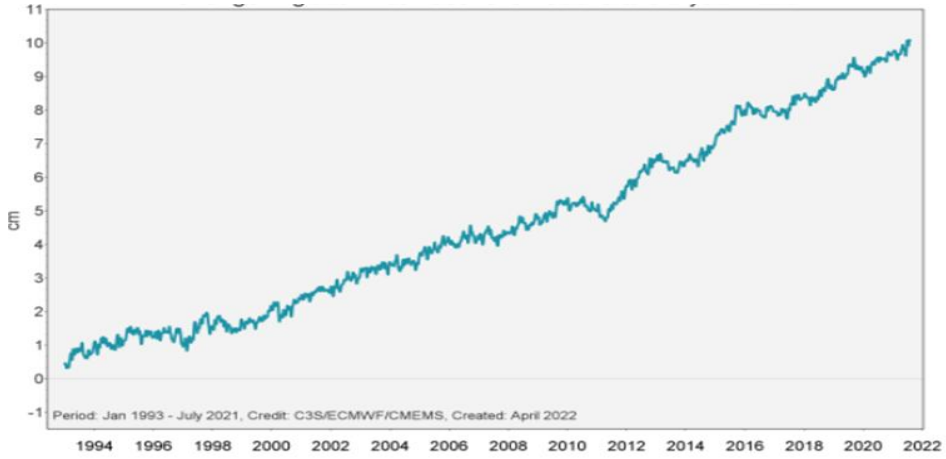
I. CLIMATE CHANGE'S RELATIONSHIP WITH GEOPOLITICS

"Climate change is caused by the emission of several gases that exacerbate the natural process whereby infrared radiation is trapped in the atmosphere, which causes increased heating of the atmosphere, land, and seas. Climate change is projected to cause global mean surface temperature to increase by between 1.1 and 6.4 °C by the year 2100, and global mean sea levels to rise by between 18 and 59 cm (although this excludes the possibility of melting from ice sheets, the consequences of which could be a sea-level rise over 1 m by the end of the century)" (Barnett, 2007: 1362).

"According to the highly anticipated latest UN Intergovernmental Panel on Climate Change (IPCC) report released in August 2021, while most of these changes have reached unprecedented levels in recent years, some changes, such as sea-level rise, have already reached the point of no return for centuries. The report shows that greenhouse gas emissions from human activities are responsible for about 1.1°C of warming between 1850 and 1900, and the average global temperature is expected to reach or exceed 1.5°C over the next 20 years. Furthermore, Scientists expect that 2°C of global warming will be exceeded in the 21st century. The scientists also note that the evidence for changes observed in extremes such as heat waves, heavy rainfall, droughts, and tropical cyclones and attributing them to human influence is strengthening" (IPCC Sixth Assessment Report Chapter 3, 2021).

Sea level averaged 1.3 millimeters per year between 1901 and 1971; and an average of 1.9 millimeters per year between 1971 and 2006; between 2006 and 2018, it increased by an average of 3.7 millimeters per year, and between 1981 and 2018 there was an total increase of 20 centimeters in sea level. On the other hand, the report predicts that every 1°C increase occurring worldwide due to global warming will cause an approximately 7% increase in daily extreme precipitation events. As a result of this change, it is expected that it will mean an increase in the destructive effect and intensity of tropical cyclones occurring on a global scale (Nguyen, et. all, 2022: 1-2).

Graphic 1. Global Mean Sea Level (Climate Indicators, 2021) Change in Global Mean Sea Level Relative to the Year 1993

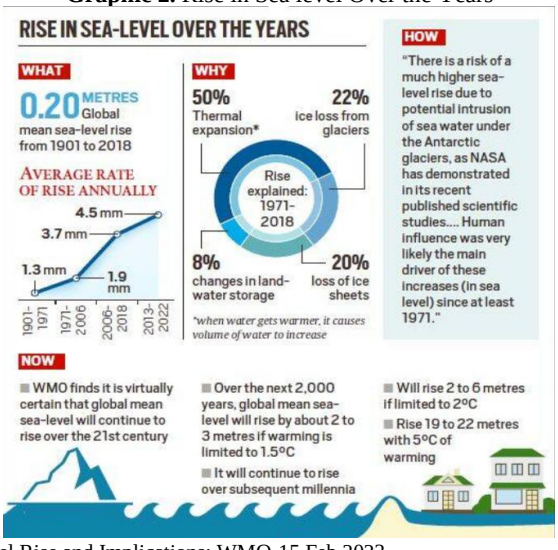


Source: IPCC Sixth Assessment Report Chapter 3, 2021.

As can be seen in Graph 1 above, the global mean sea level has continued to rise since 1993, when satellite altimeter recording began. It has been rising at a higher rate recently, in part due to the increased melting of ice sheets in Greenland and Antarctica.

"The water elevation of the sea varies in time and space due to physical processes, such as tide and waves. Mean sea level at a given position is defined as the height of the sea surface averaged over a period, such as a month or a year, long enough to essentially eliminate fluctuations caused by tide and waves" (Baede, 2007: 941-954). "It also has a spatial distribution on a global scale due to phenomena that dominate regional and local scales. As a result, local mean sea level changes usually differ from global oceans" (Nguyen, et. all, 2022: 2).

Graphic 2. Rise in Sea level Over the Years



Source: Global Sea-level Rise and Implications: WMO-15 Feb 2023

Global climate change, due to the melting of Arctic glaciers, has transformed the region from one of its primary scientific interests into a competitive one for commercial, national security, and environmental concerns. The new geopolitical situation that will emerge as a result of the melting of the glaciers causes the region to be at the center of international politics due to its potential economic and political effects. The importance of the Arctic, which is becoming increasingly accessible as the ice melts as a result of rising global temperatures, should not be underestimated. It seems inevitable that the region will be at the center of activities such as discovering gold and other precious metals, commercial shipping, tourism, and oil and gas exploration due to its changing structure.

Apart from the natural cycle and natural changes of the Earth, it is understood that human activities that disrupt the atmosphere composition also cause climate change, and the increase in Earth temperatures due to global climate change affects the ocean circulation and the global climate system. Two of the most affected by this; It is the Beaufort Cycle and the Transpolar Current which have a significant impact on the circulation of surface water and sea ice in the Arctic Ocean. It is estimated that the melting of the Greenland ice sheet alone could cause the global sea-level rise by about seven meters. Developments in the Arctic due to global climate change, in addition to its role in global sea-level rise and greenhouse gas emissions, also affect weather patterns in lower latitudes around the world (Limon, 2020: 728).

It is the author's thesis that the Arctic meltdown has and will continue to pose economic, military, and environmental challenges to the management of the region and that technological factors will likely be a barrier and facilitator for access in the short term. Declining sea ice offers greater long-term opportunities for countries to build infrastructure to exploit hydrocarbons and minerals and provide greater access to commercial shipping and fishing.

However, Willy Østreng (2010) states that the increasing interest in the Arctic on a global scale shows six geopolitical features. In this context;

1) “The short trade distance, arrival, and transit opportunities provided by the Arctic due to its geographical location between the Americas, Europe, and Asia;

2) The abundance of strategically important industrial resources and mineral deposits, especially oil and gas, in the Arctic will provide significant opportunities in terms of energy security and economics to the parties developing these resources;

3) Sea passageways, human-induced work inside and outside the region conditions; Decreased sea ice due to global warming and climate change facilitates access to and conditions of use of resources in the region;

4) The decreasing sea ice regime due to global warming and climate change offers easier access and better use of resources in the region;

5) The environmental vulnerability of the Arctic is linked to the ecosystem in southern latitudes;

6) Its proximity to the current global ocean conventions, especially to the regulation of the 1982 United Nations Convention on the Law of the Sea”

(UNCLOS), is considered the geopolitical reason for the growing interest in the Arctic.

While these six geopolitical features provide a snapshot of what the Arctic's geopolitical future will look like, this outlook is highly likely to be related to the national interests of the great powers in the region. It can be said that the developments in the Arctic will shape the age of the future and that military, economic, and political decision-makers will be more preoccupied with Arctic issues in the future. Two important changes are noteworthy here. The first of these; is the visible effect of climate change on the physical structure of the Arctic, and the second one; is the operation of new energy basins emerging in the Arctic.

In the Arctic, the region where the effects of climate change are most evident, temperatures have risen at almost twice the rate of increase in global temperature in the last century. Some studies predict that this high rate of change will lead to the melting of all glaciers in the Arctic in a period of 25-30 years (Snape and Forste, 2014: 546). In the studies, it was stated that if all the glaciers in the Arctic Region melted, the sea level would rise by more than 7 meters on average and this would negatively affect many coastal settlements (Ross, 2014: 144).

The melting ice will also bring opportunities for mineral and petroleum extraction in areas that were previously covered by permafrost. However, although the oil and natural gas reserves of the region are not at the highest level in the world at this stage, they still correspond to a significant rate. "According to the 2008 US Geological Survey, one of the most comprehensive studies on the Arctic, there are 90 billion barrels of oil, 47 trillion cubic meters of natural gas, and 44 billion barrels of natural gas liquid reserves in this region. These figures correspond to approximately 6% of the world's proven oil reserves (1.7 trillion barrels) as of 2013, and more importantly, a quarter of the world's proven natural gas reserves (187 trillion cubic meters)" (Kazokoglu, 2014). Of course, this rate will become accessible as a result of climate change while fossil fuels continue to decrease day by day in the world, and the reserves of the region will correspond to a very large proportion in time. The region is also rich in metal and mineral resources such as gold, diamonds, copper, iron, zinc, and uranium (Perry and Andersen, 2012).

Examining the connection between countries' geographical features and policies, geopolitics began to evolve scientifically in the 20th century. It prioritizes geographical conditions in international conflicts as well as the challenges and advantages provided by these geographical conditions. In this context, certain geopolitical advantages of a country have not been sufficient to turn its geopolitical advantage into power. As for countries not having economic and political potential, such advantages became a threat, and resulted in the exploitation of those countries (İşcan, 2004: 48-49). The most obvious example of such a disadvantage was experienced internationally in the field of energy; thus, the geopolitical approach towards energy resources began to develop. Energy geopolitics, in addition to its logistical and economic dimensions such as availability of energy resources, reserve volume, transportation options, and market potential, has also been

developed as a political concept such as ensuring control of energy supply and turning energy supply into a diplomatic weapon (Harunoğulları, 2020: 182).

Another consequence of global warming and climate change is the transition to a green economy in the world, increasing the use of renewable energy resources, and expanding electrification in transportation. This new energy infrastructure, by its nature, increases the demand for critical minerals such as lithium, copper, and rare earth elements astronomically, and currently, 80% of the control of these critical minerals is in the hands of China. (Kakışım, 2021: 14-16). Japan, the EU, and the USA consider this situation as a primary threat to their national interests. Because there is currently a race between China and the USA in terms of access to mineral resources in Greenland. Global tensions regarding critical minerals are not only caused by China. The US, accusing China of imposing trade restrictions and embargoes, has undertaken similar initiatives reminiscent of its past interventions in the Middle East (Kakışım, 2021: 18-19).

Therefore, it is possible to say this very clearly. "Geopolitics and commodities have long been interlinked. Oil has dominated such interactions for the past 100 years or so and has contributed—if not directly, then indirectly—to too many conflicts, particularly in the Middle East. Water, on the other hand, is arguably the most critical resource for human survival and its scarcity is driving up political tensions, particularly in Asia. This is intensifying tensions between Russia and the United States, with other large powers such as China also vying for resources above the Arctic Circle. For decades, the policy of the United States towards the Arctic has been characterized by indifference. The offer to purchase Greenland—an acknowledgment of the island's strategic importance—and its blocking of a joint declaration from the Arctic Council (due to the inclusion of a reference to climate change) are examples of the recent reversal of this policy stance" (Palacios, 2020).

Another consequence of the melting of the glaciers is that the region can be used as a new route for intercontinental trade. "The melting of the Arctic sea ice is opening up new shipping routes such as the Northern Sea Route—often referred to as the Polar Silk Road—connecting Asia and Europe, which will dramatically reduce distances traveled and journey times" (Palacios, 2020). Considering that the change of trade routes in the historical process has caused very serious changes in the economic and political relations of the world, it will not be a surprise to say how much of a change routes will occur in the existing maritime trade.

II. POSSIBLE EFFECTS OF NORTHERN TRADE ROUTES ON INTERNATIONAL TRADE AND GEOPOLITICS

It is estimated that approximately 41 % of the permanent ice in the Arctic region has completely disappeared. (Perry and Andersen, 2012:7) It is expected that increasing global warming will cause seasonal snow cover and melting of glaciers in the poles, and the Arctic will disappear in September completely before 2050. Of course, this situation will cause geopolitical and political effects on the international system together with climatic effects.

By the middle of this century, the fact that the Arctic region, like the Baltic Sea, is fully open to marine traffic all year round, could save the shipping industry billions of dollars in terms of large tankers and other vehicles as sea ice melts. Large tankers and other gigantic ships that cannot pass through the Arctic region, especially through the Suez or Panama Canals during the winter months, will pass all year round when the ice sheet disappears, resulting in a reduction in transportation costs. In addition, the opening of "Arctic region sea passageways can greatly reduce the need for commercial and military vessels in the dangerous waters of the Middle East, Indian Ocean, and the South China Sea around the Horn of Africa and the Strait of Malacca between the Gulf of Aden" (Ruske and Kauschke, 2011: 14-18).

It is estimated that approximately 41% of permanent ice in the Arctic has now completely disappeared. According to many forecasts and scientific calculations, the Arctic will likely not be seasonally iced until the middle of this century, with the Arctic Ocean sea passageways becoming more suitable for international navigation. It will significantly shorten ship transit times between Canada via the Northwest Passage and Russia via the Northern Sea Route and between Asia, Europe, and North America. Navigation over both sea passageways is at least 5,000 nautical miles shorter than conventional routes (Limon, 2020: 735-736).

Current and future shipments across the Arctic Ocean can benefit fishing, natural resource extraction, trade, and tourism, as well as reduce energy consumption and therefore CO_2 emissions. Currently, there are two sea routes in the Arctic region. These ways; it is the route to Canada via the Northwest Passage and the route to Asia, Europe, and North America via the Northern Sea Route to Russia. It is very useful in both ways and has the potential to significantly shorten ship transit times. In time, this can save shipping companies thousands of kilometers of travel and time loss.

Table 1: Distances and Travel Times for Direct and Alternative Sea Routes

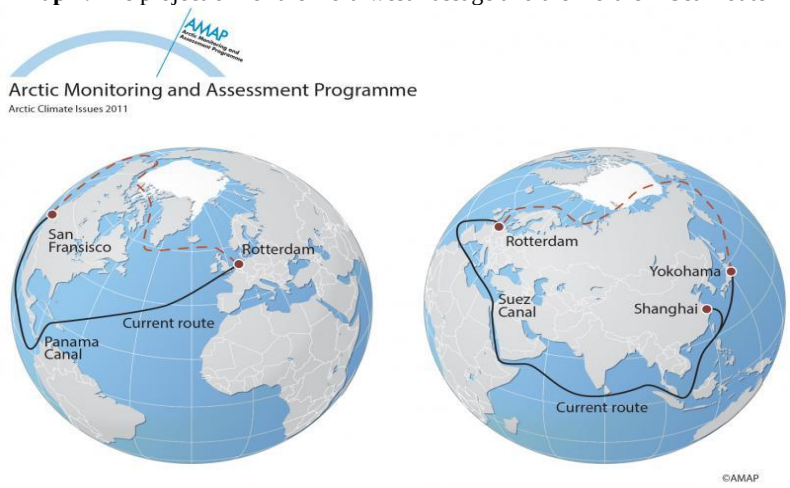
(Cruising speed of 25 knots (~29 mph), nautical mile (nm)=1.852 kilometers)				
Departure	Destination	Route: Direct (D) /Alternative (A)	Distance	Travel time
Los Angeles	Barcelona	D: Panama Canal	7821 nm	13 days
		A: Cape Horn	12967 nm	22 days
		A: via Indian Sea	14320 nm	24 days
Rotterdam	Singapore	D: Suez Canal	8302 nm	14 days
		A: Cape of Good Hope	11759 nm	20 days
Abadan (Iran)	Hong Kong	D: Strait of Malacca	5274 nm	9 days
		A: Sunda Strait (along Jakarta)	5843 nm	10 days
Hamburg	Shanghai	D: Suez Canal	10734 nm	18 day
		A: Northern Route	6440 nm	11 days

Source: Ruske and Kauschke, 2011: 20

It will significantly shorten ship transit times between Canada, Asia, Europe, and North America via the Northwest Passage, which will be formed as a result of melting glaciers in the Arctic region, and Russia over the Northern Sea Route. The distance from Hamburg (Germany) to Shanghai (China) alone in about

18 days over the Suez Canal can be completed in about 11 days using the Northern Sea Route. Similarly, "the distance from Yokohama (Japan) to Rotterdam is approximately 40% shorter than the traditional route via the Suez Canal" (McCannon 2012: 281 and Bekkers et al. 2015: 2).

Map 1. The projection for the Northwest Passage and the Northern Sea Route



Source: Arctic Monitoring and Assessment Program (AMAP), 2013

Considering the political instability of the Suez Canal and the surrounding region, which is the most used trade route in the current situation, the use of new alternative routes will be inevitable. "As well as shorter shipping times, the potential benefits of an ice-free Arctic throughway include the ability to avoid dangerous chokepoints beset by piracy, and lower transportation costs" (Ebinger and Zambetakis 2009: 1221-1222).

While the supply and demand balance on energy is developing in the direction of supply, it is expected that the new energy basins discovered in the Arctic will have a disruptive effect on the geopolitical balances in the world, and also, with the development of the Arctic Ocean sea passageways, the global interest in the region is expected to increase even more.

When it comes to energy, just having resources is not enough. It is also important to have ways to reach it. In this context; Apart from waterways such as the Babel-Mandeb Strait, the Strait of Hormuz, the Strait of Malacca, the Panama Canal, and the Suez Canal, the Arctic Ocean sea passageways are gaining importance. Making the Arctic Ocean sea passageways more suitable for international navigation is important in terms of reducing costs, saving time, reducing energy consumption and therefore carbon dioxide emissions, as well as maritime transport over the Arctic Ocean, extraction of natural resources, trade, and tourism.

The constantly melting glaciers of the Arctic region are increasing the geopolitical and economic importance of the region. This situation brings important dynamics that need to be taken into account in both international relations and environmental issues.

In addition to providing access to natural resources such as oil, gas, and minerals in the region, the melting of glaciers has great economic potential and encourages countries to invest more in the region. Newly opened sea routes can contribute to the acceleration of trade, especially between Asia and Europe. This situation will be effective in increasing the strategic importance of the region. The US, Russia, China, and other Arctic countries are competing to increase their military and economic presence in the region. This situation seems to have the potential to increase geopolitical tensions. Tensions between the US and Russia and conflicts between the US and China can create similar dynamics in the Arctic region. This has the potential to have negative effects on international relations.

III. GEOPOLITICAL IMPACTS OF NEW ENERGY BASINS IN THE ARCTIC REGION

The Arctic Circle encompasses about 6 percent of the Earth's surface, an area of more than 21 million km^2 (8.2 million mi2), of which almost 8 million km^2 (3.1 million mi^2) is onshore and more than 7 million km^2 (2.7 million mi^2) is on continental shelves under less than 500 m of water. The extensive Arctic continental shelves may constitute the geographically largest unexplored prospective area for petroleum remaining on Earth (US Geological Survey 2008: 1).

Changes and transformations in the Arctic, the last border of the world, due to global climate change, make it necessary to reevaluate the value of the Arctic in geopolitical terms. The geopolitical value of the Arctic for today; while maintaining its military-strategic importance for the major nuclear powers, the USA and Russia, the increased availability of the Arctic Ocean sea passageways, and the increasing global interest in new energy basins increase the geostrategic importance of the Arctic in world politics and the globalized world economy.

With the effect of global climate change, the Arctic is expected to be a region where the world's newest energy basins and resources begin to emerge today and in the future. The fact that the Arctic has become more accessible due to global climate change increases the geopolitical importance of the region. Thus, the line between the Arctic and the rest of the world is blurring. With this aspect, the Arctic, which has been in the outer circle of events in the national and international arena for a long time, is losing the sustainability of this position. It is assumed that approximately 30% of the oil and natural gas reserves, which have not been discovered in the world as a result of research on the effect of global warming, but whose existence is calculated as a result of technical research, are located in the Arctic Region (Yılmaz and Çiftçi, 2013: 4).

Due to the high prices for energy and minerals, the potential for rapid economic development in the Arctic, as well as the fact that global climate change provides easier access to resources, whet the appetite of global powers. However, it also brings with it many problems related to the environmental, social, and cultural effects of development in an ecologically and culturally sensitive region. Policymakers seek to advance research and development with more advanced fuels and technologies, while at the same time combining various policies and objectives

to expand access to renewable energy and energy efficiency, provide more reliable energy services, and meet growing energy demand (Hsu, et al. 2017: 14). Although today's technological developments provide faster access to resources in the Arctic, the important thing is how important the new energy basins in the Arctic and their potential are in terms of global energy resources. (McPherson, 2015: 11).

Studies conducted by the US Geological Research Center (USGS) in the areas to the north of the Arctic Circle show that there is a significant amount of oil and natural gas reserves (As seen in Table 2.).

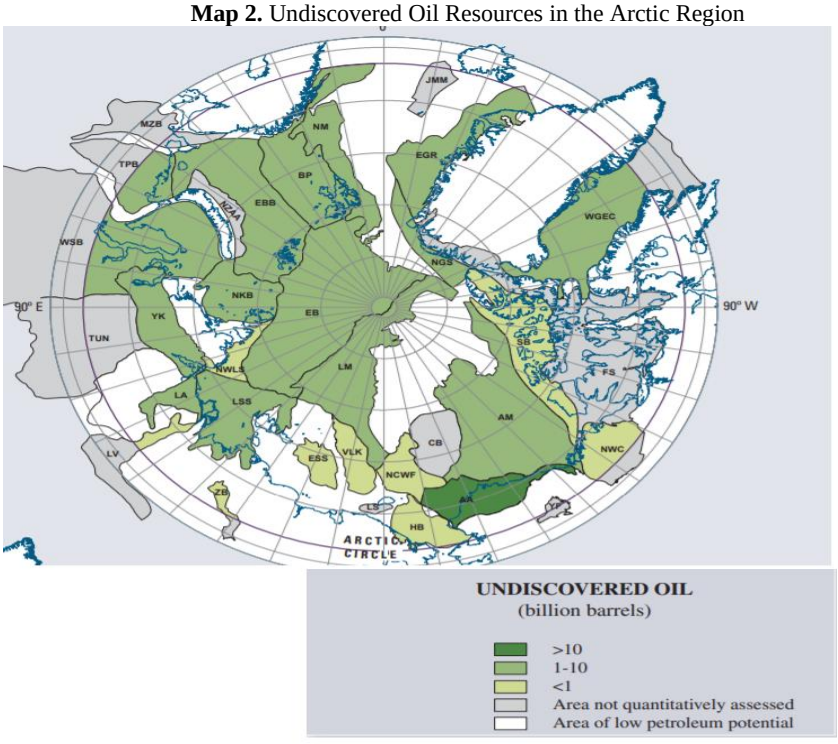
Table 2. Undiscovered Oil and Gas Reserves in the Arctic Region

Oil	90 billion barrels (14.3 billion cubic meters)
Natural Gas	47.3 trillion cubic meters (1,669 trillion cubic feet)
Liquefied Natural Gas	44 billion barrels (7 billion cubic meters)

Source: (US Geological Survey 2008: 4)

This means that undiscovered oil and gas reserves in the Arctic account for almost 25 % of the world's undiscovered oil and gas reserves. (US Geological Survey 2008: 4-5). Of course, this energy source in a region that has such a huge energy potential and that does not belong to anyone legally attracts the attention of global powers. Because having the energy resources in this region or having the right to control it will give it a great advantage in terms of geopolitics, no matter which country controls it.

Map 2. Undiscovered Oil Resources in the Arctic Region



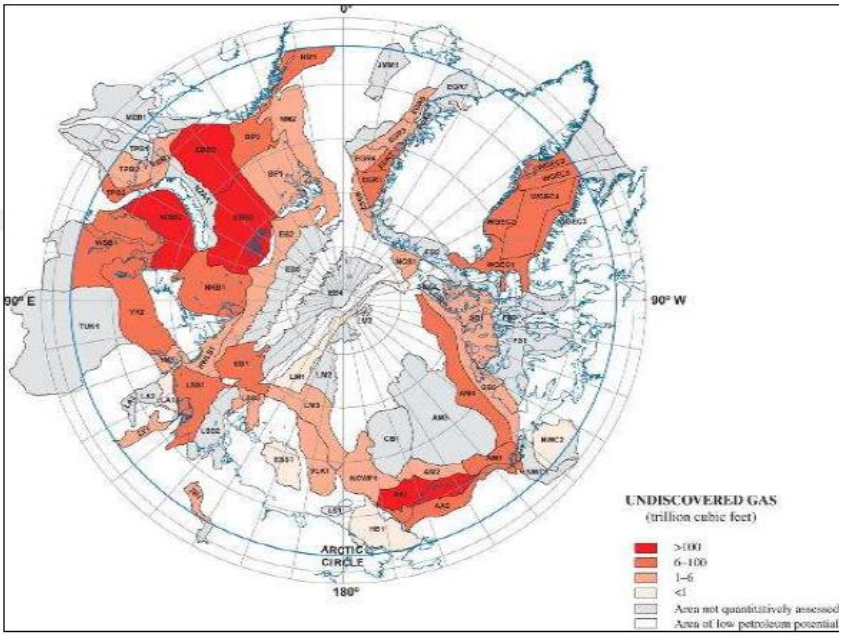
Source: US Geological Survey, 2008: 4

Map 2 above shows the unexplored oil fields and reserves in the Arctic. Accordingly, the geologically most likely locations for significant amounts of undiscovered oil are estimated to be in the following regions. (Limon, 2020: 350)

- Northern Slope of Alaska,
- The Chukchi Sea and Beaufort Sea areas of the USA,
- Mackenzie River Delta in Northwest Canada,
- Offshore areas of Northeast Greenland,
- West Siberian areas of Russia

Considering that the cost of oil extraction in coastal areas in the Middle East is about 27 dollars per barrel, the cost of shale oil extraction in the USA is about 65 dollars per barrel, and the cost of oil extraction in offshore areas in the Arctic is about 75 dollars per barrel. It is understood that production costs are more than twice the cost in the Middle East. In the coming years, Arctic Ocean sea ice can be expected to continue to recede and oil prices to rise again. It may be inevitable that the investment feasibility of energy resources in the Arctic, especially fossil fuels, will increase and attract more interest in the future, unless the Arctic States, in particular, do not refrain from adopting policies that put aside ecologically important areas recently.

Map 3. Undiscovered Natural Gas Resources in the Arctic Region



Source: US Geological Survey, 2008: 5

The Eurasia region has about 63% of the total Arctic resource base, North America 36%, and the area between the two basins about 1%. The resource base is predominantly gas in Eurasia, and oil in North America. As seen in Map 1 and Map 2 above, petroleum resources are mostly located in the regions claimed by Canada, Denmark, and the USA. Natural gas resources are mostly located in the regions claimed by Russia. (Gül, 2014: 1167) Russia, which already has enormous gas

reserves, will most likely be the country with the largest undiscovered conventional gas reserves in the Arctic region in the future. In addition, when evaluated in the energy equivalent ratio, it can be said that the gas is much more than the oil in the Arctic (Limon, 2020: 351).

Although the extent of the resources under the glaciers is unknown at this stage, increasing temperatures in the Arctic Region due to climate change as a result of global warming will allow the extraction of raw materials from these regions. In this context, it is expected that minerals such as gold, diamond, lead, zinc, iron, copper, silver, coal, uranium, and nickel will be extracted and bring income to the mining countries.

CONCLUSION

Today, the perception of accessible Arctic due to global climate change firmly links the region to the global geopolitical agenda. Environmental changes in the Arctic will not only force a geopolitical re-examination of access to maritime passageways and new energy basins, but such changes will also involve systems of critical importance based on the security of states. The Arctic region offers the world potential for energy resources and the possibility to change the direction of maritime trade. While this situation has the potential to affect the current sovereignty in the region, it motivates the efforts of the riparian states to protect and increase their interests in the region. While seeing economic and strategic gains as opportunities, it should not be overlooked that the melting of glaciers, which have provided natural shelters to riparian states throughout history, together with global warming also has negative implications for the countries of the region.

There is a possibility that the melting glaciers will transform the region into an area that needs to be controlled more by all the countries of the region, thus transforming the riparian states into actors that strive to develop their measures to meet the increasing risk of mutual distrust.

The Arctic region, with its large reserves of strategic resources such as oil, natural gas, diamonds, and lithium, represents a very important area for future developments. The use of natural resources in this region is closely linked to the advances in technology and the evolving impact of climate change. The rapid melting of Arctic glaciers, a direct result of climate change, is not only reshaping the physical environment but also changing global trade dynamics, especially the shipping sector.

As the Arctic ice recedes, access to previously inaccessible resources becomes more possible. However, the harsh conditions of the Arctic environment require the most advanced technologies for resource extraction. Innovations in deep-sea drilling, icebreaking vessels, and environmental monitoring are crucial to safely and efficiently exploit the Arctic's resource potential.

International interest in the Arctic is increasing due to the impact of global climate change. The impact of climate change on the Arctic is expected to be profound, especially in terms of changes in sea routes and geopolitical impact. Melting glaciers in the region are opening new sea routes such as the Northwest Passage, the Northern Sea Route, the Transpolar Sea Route, and the Arctic Bridge.

These routes are expected to make maritime transportation between Europe, Asia, and North America more direct and cost-effective, reducing the need for traditional shipping routes.

The emergence of Arctic sea routes could potentially diminish the strategic importance of traditional chokepoints like the Panama Canal, Suez Canal, and Strait of Malacca. These waterways have long been critical for global trade, particularly for the countries that control or have significant influence over them. However, with the Arctic routes offering shorter and less congested alternatives, the geopolitical balance of power could shift. Countries bordering the Arctic, such as Russia, Canada, and the United States, may gain increased strategic and economic importance as they control these new trade corridors.

The rise of sea lanes in the Arctic region is expected to have profound effects on global trade patterns. Thanks to these new routes, shipping times between major economic centers in Europe, Asia, and North America can be significantly shortened, leading to reduced shipping costs and increased trade efficiency. This shift may also challenge the dominance of traditional maritime powers and require new security and diplomatic strategies to manage competition over Arctic resources and routes.

Professor Myers' prediction that there will be 200 million climate migrants by 2050 has become an accepted figure, quoted in reputable publications. To put this figure into perspective, it means that by 2050, one in every 45 people in the world will be displaced by climate change. This would also exceed the current global immigrant population. According to the International Organization for Migration (IOM), approximately 192 million people, or a percentage of the world's population, now live outside their place of birth. However, this prediction does not mean that this will happen. Professor Myers admits that his estimation, although calculated from the best available data, requires some "heroic guesswork". No criticism is implied; the simple truth is that no one knows for sure what climate change will mean for the distribution of the human population. Current estimates range from 25 million to 1 billion people by 2050 (Brown, 2008: 11-12).

The extraordinary increase in northward migration projections shows that while the south of the world is experiencing drought, the icy and permafrost soils of the north are starting to turn greener than ever before. In addition, the geopolitical sensitivity of the Arctic may become part of global geopolitics centered on the Arctic Ocean in the short term. It is understood that the effects of global climate change on the Arctic are also global.

Environmental changes in the Arctic will not only force a geopolitical re-examination of access to sea passageways and new energy basins, but such changes will also involve systems of critical importance based on the security of states. While only the melting of glaciers affects coastal energy infrastructure, changes in global ocean currents or the emergence of large-scale methane releases can lead to food insecurity. The melting of the glaciers means that almost 99% of the freshwater resources in the world will disappear, including groundwater, and will face the risk of salinization when the sea level rises (Tendon, 2021).

Today, depending on global climate change, the geostrategic importance of the Arctic in world politics and the globalized world economy is increasing. In addition to the region's continuing military-strategic importance to the major nuclear powers, the increasing interest in the Arctic Ocean sea passageways and new energy basins makes it necessary to reevaluate the geopolitical sensitivity of the Arctic. No state is outside or beyond geography, nor is it independent of the struggle for geography. The Arctic, once the end of the world, has the potential to become a new geopolitical hub today. The Arctic will become one of the focal points of world politics in the 21st century due to the effects of climate change and geopolitical competition in the region. Russia's strategic moves and the reactions of the USA and NATO countries will be decisive in shaping the dynamics in the region. In this process, it will be of critical importance for both regional and global security that all parties observe the principles of sustainability and cooperation. It is considered that the relationship will be the front and center of international diplomacy.

Beyond economic motivations, countries such as the United States, Russia, and China are competing for military supremacy and greater power in the region. The Arctic also occupies a critical position between North America and Eurasia, which has the potential to make the region a militarily strategic location in the future. With the liberal international order increasingly under threat from great power conflict (a scenario in which the already contentious relationship between the United States, Russia, and China could escalate into war), the Arctic faces a crossroads: will simmering underlying tensions erupt into a larger global conflict, or could diplomatic tools be the key to achieving peace in the region?

The melting of glaciers increases the economic and strategic importance of the Arctic, which in turn triggers competition and cooperation in the region. While tensions between the United States Russia and China are at the center of these discussions, the importance of the Arctic Circle and the potential challenges it may face must be considered.

The development of the Arctic's strategic resources, coupled with the region's evolving role in global maritime trade, underscores the need for careful consideration of both technological advancements and the far-reaching effects of climate change. The geopolitical landscape is poised for transformation as the Arctic becomes increasingly accessible, potentially altering the global balance of power in maritime trade and resource control.

Araştırma ve Yayın Etiği Beyanı

Makalenin tüm süreçlerinde Yönetim ve Ekonomi Dergisi'nin araştırma ve yayın etiği ilkelerine uygun olarak hareket edilmiştir.

Yazarların Makaleye Katkı Oranları

Makalenin tamamı Yazar tarafından kaleme alınmıştır.

Çıkar Beyanı

Yazarın herhangi bir kişi ya da kuruluş ile çıkar çatışması yoktur

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