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Scenarios for the development of the Arctic region (2020–2035) *

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Abstract. The importance of selecting the development of the Arctic seems to be relevant since rapid and irreversible changes are taking place there. Climate change and globalization are their prominent examples. A complex of factors has both positive and negative impacts on the use of natural resources and the positioning of states located not only within the Arctic but also outside it. The questions arise: what is the significance of these changes for geography, politics, and the management system? How should the comprehension of these processes be built? The relevance of the topic is enhanced by the fact that Russia has the most significant Arctic sector among the states with access to the Arctic Ocean. Therefore, our country has a leading role in working out strategies for the development of the Arctic. The comprehensive approach (considering the economic and political-geographical positions) is central in the article to analyze the directions of development of the Arctic territories. The method reveals the possibilities of sustainable development, which will provide Russia with strategic benefits within the Arctic and globally. The article discusses scenarios for the development of the Arctic, including the Arctic zone of the Russian Federation, in the long-term perspective (until 2035). Substantiation of the long-term prospects for the development of the Arctic, despite Russian and foreign research, seems to be unrealistic due to lack of knowledge about the nature and consequences of climatic changes currently observed in this region and affecting global environmental management. The authors concluded that the priority directions of the Arctic development should be the ones based on positive and innovative trends.

Keywords: *the Arctic, development strategies, climate change, geopolitics, socio-ecological systems, innovation.*

Introduction

Currently, in the Arctic, we observe transformations, the full understanding of which is not formed. They are influenced by two interrelated factors: climate change and globalization, followed by technological, geopolitical, institutional, and institutional reforms. The meaning of the

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latter lies in the directions and choice of instruments for state policy in the Arctic region [1, Schach M., Madlener R., p. 440].

The Arctic is one of the regions of the world considered the most vulnerable (along with the island states, Africa and the African and Asian rivers deltas) by the experts of the UN Intergovernmental Panel on Climate Change as [2, p. 197]. The Arctic is the center of numerous and not sufficiently studied processes and feedbacks operating in the climate system with the participation of air masses, sea ice, specific stratification Arctic Ocean, cryosphere and terrestrial biota. In the 20th-21st centuries, temperature trends in the Arctic have changed repeatedly, and imperfections of instrumental weather observations did not allow to conclude the directions of climate change for a long time. The increase in air temperature in recent decades, other than natural causes, can be attributed to anthropogenic activities that take place outside the Arctic (Figure 1).

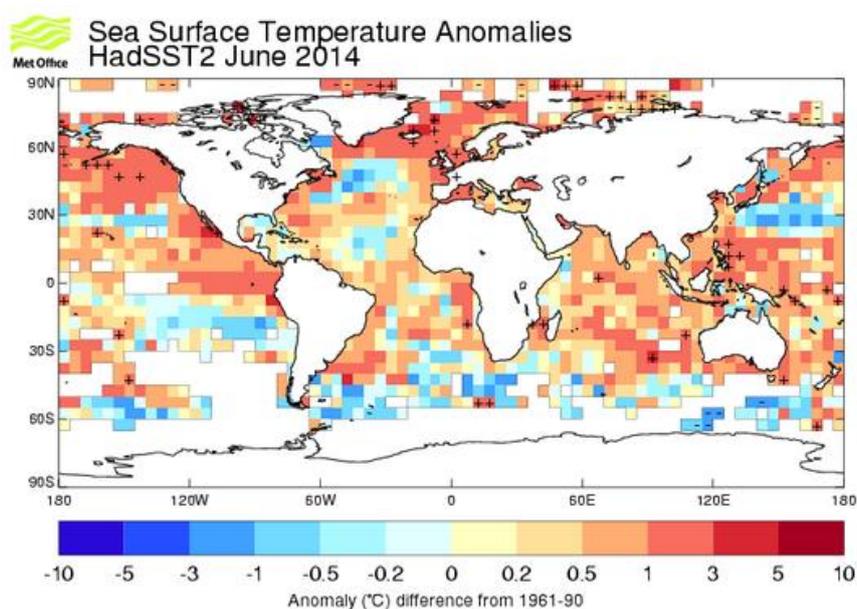


Figure 1. Temperature anomalies on the sea surface, June 2014.

The Arctic Council's report "Assessment of Climate Change in the Arctic" (ACIA, 2005)¹ provides an analysis of observed and expected climate transformations, reveals the impact of these processes on ecosystems, population (incl. indigenous peoples) and environmental management in countries with Arctic areas and territories to the south. Similar assessments are in the reports of the Arctic Council working groups published in 2010–2014. The Arctic Monitoring and Assessment Programme confirmed the data of Roshydromet². All documents emphasize that the increase in air temperature entails the most significant in the last 40 years reduction in the area of sea and land (on the islands of the Arctic ocean) ice, which has an impact on global environmental management [3, Tsaturov Yu.S., Klepikov A.V., p. 69]. The melting of ice, confirmed by the North American Aerospace Agency (NASA) (Fig. 2), contributes to the expansion of exploration and extraction

¹ Arctic Climate Issues 2011: Changes in Arctic Snow, Water, Ice, and Permafrost. Arctic Monitoring and Assessment Programme (AMAP). Gaustadalléen 21, N — 0349 Oslo. Norway. 112 p.

² The second assessment report of Roshydromet on climate change and its consequences in the Russian Federation: technical resume /Federal Service for Hydrometeorology and Environmental Monitoring (Roshydromet); [ed. Group V.V. Yasyukevich et al.]. Moscow: [Rosgidromet], 2014. 93 p. [In Russian]

of minerals, determines the change of cargo transportation in the Arctic Ocean, affects the livelihoods of indigenous communities and causes systemic shifts in natural resources management.

The consequences of climate change concern challenging to calculate in the ultra-long term (50–100 years) risks of management of the northern territories [4, Leksin V.N., Porfiryev B.N., pp. 645], put forward the issues related to the organizing scientific research based the network observations of weather and climate in Russia and abroad: precipitation in the Far North, permafrost behavior on land and in the Arctic Ocean [5, Roberts C.D., Senan R., Molteni F., et al., pp. 3685–3690; 6, Bring A., Shiklomanov A., Lammers R., pp. 78–80; 7, Kaverin D.A., Melnichuk E.V., Shiklomanov N.I. et al., p. 50], interaction models of the “atmosphere-ocean” system for 50–100 years (Climate Forecast System, version 2, CFSv2) [8, Liu Y.Y., Wang W.Q., Kumar A., p. 1460]. Modeling of climate change is carried out at the Institute of Computational Mathematics of the Russian Academy of Sciences, where the models INMCM3.0, INMCM4 (Institute of Numerical Mathematics Climate Model, versions 3.0 and 4) and others [9, Dymnikov V.P., Lykosov V.N., Volodin E.M., p. 231] are developed.

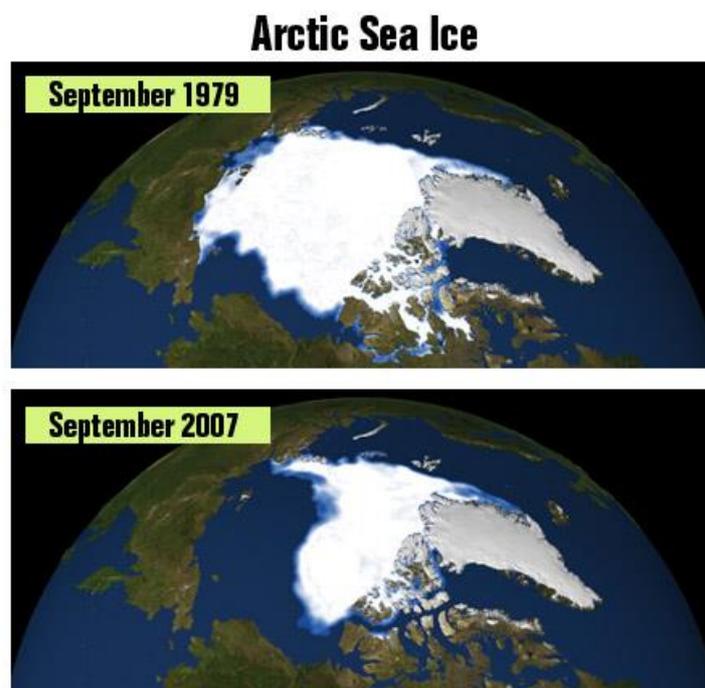


Figure 2. Changes in the Arctic sea ice area in September 1979 and September 2007, according to NASA.

Some questions arose: how significant are the changes in the Arctic? How should they be understood by geography, ecology, politics, and governance? Should we prepare for the “war for resources” — the concept used by some authors of popular scientific articles on the Arctic issues to frighten their audience? Is there a possibility of mutually beneficial cooperation to solve problems or even challenges in the Arctic region? What will contribute to making the Arctic an example for those seeking a constructive approach to natural and social and environmental change in other regions? Answers to the questions raised will allow us to come closer to understanding the ways of sustainable socio-economic development of the Arctic zone, where the priority will be human

well-being, economic progress, and environmental safety based on advanced research with international participation [10, Dodin D.A., pp. 16–17].

At the beginning of the 21st century, several foreign countries and their corporations worked out strategies for the development of the Arctic areas. Strategies adopted in Denmark³, Canada⁴, Iceland⁵, Norway⁶, USA [11], Finland⁷, Sweden⁸, China⁹, India¹⁰. Countries that have developed strategies differ in size, location, historical development, and state structure (federal and unitary ones). In the Arctic areas of foreign countries specific economic systems have formed: American, Canadian, European (island and continental), and Russian. Strategies differ, but still, share several features. The continued decades of interest in the Arctic is dictated by the increasing activity of Russia in the Arctic (especially after the 2007 expedition to the North Pole). It is due to the growing demand for raw materials and fuel and. At the same time, we see the depletion of mineral resources in the old mining sites, caused by the desire to control intercontinental transport routes — Northern sea route (NSR) and Northwest Passage (NWP), to develop tourism in the North and the Arctic, to preserve indigenous peoples, to form scientific consortia and to study.

European countries that have developed Arctic strategies proceed from the fact that the problems of vast and non-standard natural and socio-economic conditions of the Arctic are impossible to solve without involving the most significant countries — world leaders. They are the leading emitters of greenhouse gases (China and India), as well as the countries importing hydrocarbons, considered technological leaders of the world economy (Japan and the Republic of Korea). Regional strategies focused on solving the issues of the Arctic development without involvement of non-Arctic states have no chance of success [12, Govorova N.V., Zhuravel V.P., p. 98; 13, Chistobaev A.I., Kondratov N.A., p. 85].

Factors influencing the choice of scenarios

The search for answers to the challenges of Arctic development is complicated by a high degree of uncertainty occurring in this region, due to the lack of our knowledge about their nature and consequences. Russian and foreign Arctic strategies have a time limit — the year 2020. In this regard, it is advisable to analyze several ready-made scenarios describing the directions of the Arctic development and its natural resources from interdisciplinary positions: geography, Economics, Ecology, Geopolitics [14, Young O.R., p. 22].

³ Denmark, Greenland and the Faroe Islands: Kingdom of Denmark Strategy for the Arctic 2011—2020. 58 p.

⁴ Canada's Northern Strategy. Our North, Our Heritage, Our Future / Government of Canada, Ottawa, 2009. 8 p.

⁵ Studneva E. Russia and Iceland: Arctic attraction. URL: <http://russiancouncil.ru/inner/> (Accessed: 08 September 2018).

⁶ Northern regions. Prospects and decisions / Ministry of Foreign Affairs of Norway. 2011, 48 p.

⁷ Finland's Strategy for the Arctic Region / Prime Minister Offices. 2010. 98 p.

⁸ Sweden's Strategy for the Arctic region /Government Offices of Sweden. Ministry for Foreign Affairs. Department for Eastern Europe and Central Asia. Arctic Secretariat, Stockholm, Sweden. 2011. 52p.

⁹ Karlusov V. Arctic vector of globalization of China. URL: <http://russiancouncil.ru/inner/> (Accessed: 08 September 2018).

¹⁰ Lunev S. India has rushed into the Arctic. URL: <http://russiancouncil.ru/inner/> (Accessed: 08 September 2018).

The authors proposed options for the development of the Arctic in the long-term perspective. They based them on the scientific foundation presented in scientific articles and the Arctic strategies, considering the willingness to create the specific Arctic oriented management and to develop international relations [15, Zagorsky A., p. 45; 16, Kharevsky A.A., p. 98].

Several factors influence the content of the Arctic development scenarios.

1. Physical and geographical features of the region: extreme climatic conditions and climate change dynamics.

A long period with negative air temperatures, short vegetation period, specific photoperiodicity, the spread of perennial rocks increases the cost of development industry and infrastructure, cause increased energy costs, and impose special requirements for municipal systems of settlements. Almost 70% of the Russian Arctic is constantly under the ice. It necessitates the development of special measures to ensure safety in the extraction of minerals, the functioning of infrastructure, and support of defense capability of the state in the northern (Arctic) direction [17, Barsegov Yu.G., Korzun V.A., Mogilevkin I.M., p. 18].

Natural extremality is enhanced by the peripheral location of the Russian Arctic, dispersal and low degree of study of raw materials and fuel deposits on land and in the waters of the Arctic Ocean, the remoteness of industrial centers from coastal supply bases and national and foreign markets, the insufficient development of transport, energy and communications.

In the Russian Arctic, the natural challenges of resource development are evident in the eastern sector. It is proved by the absence of significant investment projects there for several years. Eastern regions, islands, and archipelagos in the west of the Russian Arctic are characterized by dependence of the economic activity on the supply of fuel, food, and essential goods from other territories, the need to create a stock of goods there, considering the limited transport accessibility, i.e., a short navigation period.

Geographical location, natural conditions and economic development of the Arctic (historically formed raw material and almost mono-resource nature of the local economy) make local nature vulnerable. Low biodiversity and the speed of biological processes determine the weak resilience of the Far North ecosystems and their high susceptibility to the pollutants from the outside of the Arctic.

This issue attracts international attention and forms the basis of the activities of the Arctic Council. Efforts to overcome natural extremes, incl. the development of transport, substitutes for traditional energy carriers, and the development of information and communication technologies can be undertaken to base an innovative scenario for the Arctic development. Insufficient efforts in these areas will be the hallmark of the inertial scenario.

Many factors influencing climatic processes, a small period of weather observations, physical and geographical positions of the Arctic considering the water area of the Arctic Ocean allows long-term forecasts of climate change. We can talk about the trends emerged in the past 40 years: an increase in air temperature, a decrease in the ice area, and a decrease in the power of perenni-

al rocks. International scientific research to fill the vacuum of knowledge about the nature of high latitudes and the use of indigenous knowledge are found in the Arctic strategies of many states. It is relevant for Russia. After the collapse of the USSR, the country lost leadership in Arctic research, especially in climate issues [3, Tsaturov Yu.S., Klepikov A.V., p. 71].

2. The world economy and the demand for hydrocarbon resources. On the one hand, the growing need of different countries (esp. Asian) for fuel, and the desire of corporations to increase the profitability of its transportation (e.g., when using NSR) make the Arctic attractive for supporters of developments from the geopolitical standpoint. The desire to control the hydrocarbon production in the Arctic and fuel delivery dictated the development of the US Arctic strategy [11]. On the other hand, raw material orientation creates dependence on world energy prices. We will add that a part of the unique deposits of Alaska and Western Siberia has passed the peak of production, and another part of the reserves belongs to the category of potential, i.e., their role may grow up later.

3. Technology status and its possession by a limited number of countries. In the medium term, this factor will not allow to organize and develop cost-effective and environmentally safe production of oil and natural gas in the Arctic. The high cost of production and processing, technological unpreparedness of sites, low quality of seismic exploration (in Russia), need to adjust geological models and ecological restrictions have become major for BP, Shell, and Gazprom when deciding to suspend mining near Greenland, Alaska, and the Kara Sea. It should be remembered that some of the promising oil and gas fields are in disputed areas.

4. The state of international relations and the role of Russia. The system of international relations is currently experiencing a crisis that manifests itself with varying degrees of severity in different parts of the world and involves many countries and regions. The well-being of the population living in the Arctic depends on the degree of negotiability of the leading Arctic countries, esp. the USA and Russia, the reliance of governments on the norms of international law, “freedom” from considering factors indirectly related to the Arctic (e.g., exclusion from the bilateral relations between Russia and Canada, Russia and the USA, the “Ukrainian issue”, etc.), completeness of use the capacity of organizations of intergovernmental dialogue. Against the background of the progress achieved in relations between Russia and foreign countries in preparation for the Arctic resource use, North European countries, Canada and the United States imposed restrictions on cooperation with Russia, thereby calling into question mutual obligations to ensure security in the Far North and the Arctic.

Scenarios of the Arctic development

Formulating scenarios of the Arctic development, it is advisable to refer to the article by Young O.R. “Future of the Arctic: the role of ideas” [14], where the prospects of the Arctic development were considered in an uncertain period from two positions: geopolitical and socio — environmental systems.

Young O. R. wrote that most authors of popular scientific books described the changes considering the Arctic from a geopolitical perspective. It was suggested that we were witnessing a new phase of the “big game” for resources, another round of the Arctic “gold rush”, which would entail an increased clash of interests of different countries, but primarily the USA and Russia [18, Borgerson S., p. 21; 19, Howard R., p. 57].

The roots of the “power division of the Arctic” ideas contribute to the media, forming the public consciousness, which introduces visual images of such changes, e.g., the reduction of area and capacity of sea ice, and attempts to declare ownership of previously unowned territories.

An important sign of the geopolitical scenario, according to Young O. R., is the expected escalation of territorial claims in the Arctic. Examples include Denmark and Canada, negotiating the affiliation of Hans Islands between Greenland and Baffin Land, i.e., a few uninhabited ice-like rocks about 1.5 km²; Great Britain, Denmark and Iceland are arguing about 570 m² of uninhabited Rocall rock located in the Norwegian Sea north of the Shetland Islands¹¹; Greenland is discussing the idea of separation from continental Denmark. Russia, Canada, the USA, Denmark and Norway continue to study the Arctic Ocean floor, collect information on the outer limits of the continental shelf, prepare applications to the UN specialized Commission about the belonging of Lomonosov and Mendeleev ridges to land structures (Fig. 3).

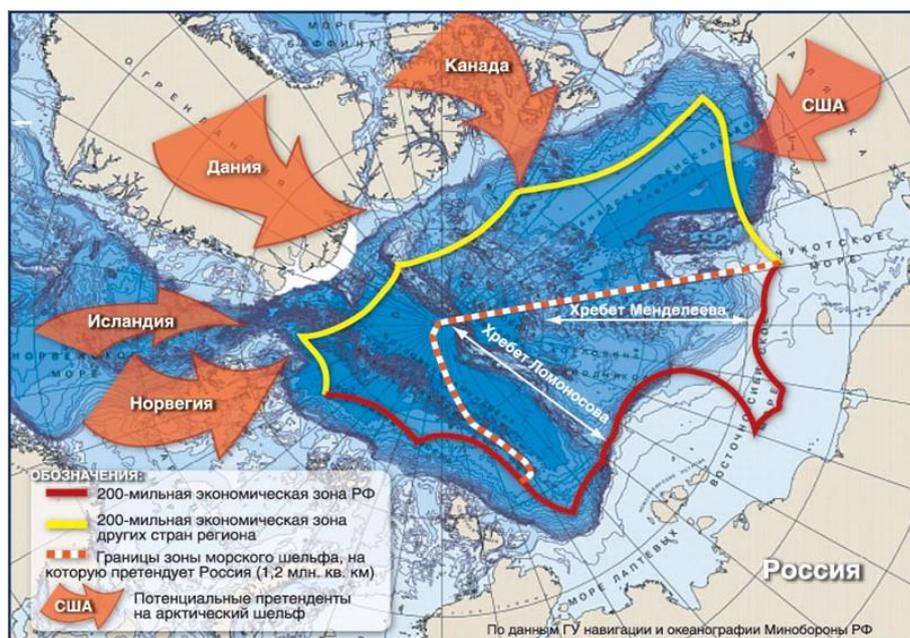


Figure 3. Applicants for the waters in the Arctic Ocean.

A peculiar situation persists around Svalbard. In 1920, in Paris, 40 States signed a treaty under which Norway was granted sovereignty over the archipelago but with the right of access for all interested states. The Soviet Union carried out scientific research on Svalbard (now there is a Russian scientific center there). In several villages, the extraction of hard coal for the needs of NSR was organized. Ensuring the Russian presence on the archipelago is one of Russia's political priori-

¹¹ The UK's Arctic claims may push similar actions in France. The French islands of Saint Pierre and Miquelon located near the North Atlantic coast of Canada and the UK's areas (Orkney and Shetland islands) make these two countries owners of a significant North Atlantic water area bordering the Arctic.

ties in the Arctic¹². In 1976, Norway has established a conservation zone around the archipelago, detaining fishing vessels in the exclusive economic zone (EEZ) of the archipelago, which is contrary to the Treaty 1920.

Considering the future of the Arctic from the standpoint of the world power division, some authors predict a catastrophe that will lead to "... brutal bloody clashes between the great powers, desperately fighting each other for the right to possess the declining world reserves of natural resources" [19, Howard R., p. 10]. Indeed, the reasons for territorial claims stem from the presence (or foreseeable availability) of mineral and fish resources in the Arctic and Atlantic Oceans, the passage of strategic maritime communication routes.

In the developed Arctic strategies, esp. the US one, a special place is occupied by a block of military-strategic issues reflected from the positions of NATO. Military preparations of foreign countries in a strategically important region of the Earth are considered a destabilizing factor in the international situation. The US has not ratified the UN Convention on the Law of the Sea. It has declared the interests in the Arctic through the strengthening of military groups, readiness to act unilaterally outside the national Arctic zones. In the Arctic strategies of foreign countries, we see the need to organize exercises of fleets and land mobile parts, modernization of transport infrastructure, airfields on land and water area of the Arctic Ocean. In Northern Europe, the possibility of creating a "mini-NATO" based on the military infrastructure located behind the Arctic Circle in Norway is being explored.

It should be noted an important, if not the main, feature of the geopolitical approach to understanding the processes in the Arctic region: the categorical thinking of supporters of this scenario and their desire to draw attention to their works is to a small extent true. The Russian position is that in the Arctic, the situation is positive, stable and predictable, and it has no need to connect new military-political structures to the solution of development issues [20, Vasiliev A.V., p. 20]. However, in response to the challenges and in the interest of defending sovereignty, the AZRF is strengthening the state border, placing the forces of the Ministry of Defense and the Ministry of Civil Defense, Emergency Situations and Disaster Management. The Northern Fleet has established a Joint Strategic Command. The Arctic Ocean coast is developing a system of emergency and rescue centers. Relevant tasks: ensuring national security in the Russian Arctic, improving the effectiveness of interaction between military and special services with border departments of neighboring states, protecting bioresources, assistance to ships in distress, and disaster management.

Analysis of Arctic strategies of Russia and foreign countries shows that all countries approach the Arctic from the standpoint of the development of international cooperation. The recent shift from the confrontational rhetoric of the Cold War to the growing of convergence has

¹² Osnovy gosudarstvennoj politiki Rossijskoj Federacii v Arktike na period do 2020 goda i dal'nejshuyu perspektivu [Fundamentals of the State Policy of the Russian Federation in the Arctic for the period up to 2020 and further perspective]. URL: <http://www.rg.ru/2009/03/30/> (Accessed: 10 August 2018). [In Russian]

broadened the range of technological and educational interaction between the Arctic states. A typical example is their participation in the development of Arctic Council agreements on cooperation in aviation and maritime search and rescue in the Arctic (Nuuk, 2011) and on preparedness and rescue when responding to marine oil pollution in the Arctic (Kiruna, 2013). Within the framework of the International Maritime Organization (IMO), in accordance with the Convention for the Safety of Life at Sea (SOLAS) and the Convention for the Prevention of Pollution from Ships (MARPOL), the Polar Code (Polar Code) was developed, i.e., rules of navigation for the countries using the Arctic Ocean. Despite the sanctions imposed against Russia, in the Arctic, enterprises with foreign participation are operating. It is, e.g., the Yamal-LNG project, which involves more than 40 countries and aimed at extracting unique hydrocarbons, while simultaneously developing industry and infrastructure in the Yamal-Nenets Autonomous District. Vietnam is producing hydrocarbons in the Nenets Autonomous District. China is interested in the Belkomur project aimed at connecting the Arkhangelsk Oblast and the Perm Krai and to continue it until Asia.

States interested in the sustainable development of the Arctic and the use of its resources recognize the leading role of the Arctic Council, Council of the Barents Euro-Arctic Region, "Northern Dimension" of the European Union, and the University of the Arctic as platforms for policy development regarding resources, transport and logistics, protection of nature, support of indigenous peoples, science and education, esp. in weather (e.g., polar cyclones) and climate issues. In those few areas of the Arctic where disputes over territory and water ownership take place, the parties either make efforts to settle the relationship through negotiations, as it may be seen in the UN Convention on the Law of the Sea, establishing jurisdiction over parts of the continental shelf (beyond the 200-mile EEZ, but not more than 350 nautical miles). The Russian-Norwegian Treaty on Maritime Delimitation and Cooperation in the Barents Sea and the Arctic Ocean (2010) is another example of the alternative "soft power" option expressed in non-military instruments. According to the Agreement, the delimitation of the Russian-Norwegian border in the Barents Sea has been carried out. It means the demarcation of the disputed area of 175 thousand km² or about 12% of the sea area formed by the western border of the Arctic sector of Russia (Russian version) and the median line (Norwegian version), drawn at an equal distance from the archipelagos of Svalbard, Novaya Zemlya and Franz Josef Land. The sovereignty over maritime areas in the western Arctic sector is relevant for Russia from the perspective of exercising the right of free access to the Atlantic, the development of fisheries, the maintenance of commercial, civil and naval communications, the development of mineral fuel, the solution of applied and fundamental scientific issues.

Why, despite the obvious examples of active interstate dialogue in the Arctic, the ideas of geopolitical confrontation are viable and dominate political forums? The answer may be that such interpretations are easily picked up by the media and quickly rooted in the public consciousness formed by the Second World War, division of the world, and military confrontation between the USSR and the US. An equally important reason for the confrontational "pictures" may be the con-

tinued fragmented view of the Arctic, the weak elaboration of the alternative paradigm, which would demonstrate a more logical and scientifically sound interpretation of changes in the Arctic at the beginning of the 21st century.

Turning to the second direction of development of the Arctic, Young O.R. writes: “The changes that occur today in the Arctic are systemic, non-linear, rapid and irreversible” [14, p. 24]. On Earth, anthropogenic ecosystems play an important role. There, natural biogeophysical processes are superimposed on socio-economic transformations of the environment. In some regions, this leads to complex dynamic systems in which traditional methods and methods of management do not work. An approach to the future of the Arctic, i.e. an alternative to the geopolitical one, which could contribute to the development of new options for managing the region, could be a scenario based on social and ecological systems understood as interconnected social and environmental factors of development [14, Young O.R., p. 32].

Nowhere on Earth is the anthropogenic factor manifested as vividly but in the Arctic: climate change and globalization are anthropogenic and mutually influence each other. Climate warming, according to the Arctic Council and Roshydromet, is mainly due to human activity. Moreover, outside the Arctic, in countries those emit greenhouse gases, warming leads to the expansion of economic activity. Such states shift to previously inaccessible areas, e.g., the Arctic. However, in a socio-ecological system, the anthropogenic factor has a comparable, and sometimes more significant effect than the natural one. Therefore, attempts to understand what is happening in the Arctic should focus primarily on human activity, and the development of change management measures should consider their impact on nature and human activities in the future. Success in the development of the Arctic can be achieved by modernizing the management system. It means turning it into a set of problem-oriented blocks (a part of a multidimensional geographical location, geopolitical status, natural resource potential, socio-economic development, transport and logistics, socio-cultural, and environmental potentials), which could function separately, but, at the same time, be interconnected to solve various tasks and adapt to changes in the Arctic. Effective, safe and conflict-free interaction of the subjects of socio-economic development in the territories of the Arctic zone can be achieved within the framework of the Arctic partnerships at the international, regional, and local levels. Their content is well known [21, A. Pilyasov, p. 15]. Foreign experience in the development of the Far North demonstrates the benefits of partnerships between the federal and regional authorities, between the governments of the Arctic and corporations, between civil and military structures, between government and indigenous peoples, between government, corporations and indigenous peoples, between universities (scientific centers) and industrial enterprises (corporations). It can be stated that the potential of such interaction in the Russian Arctic is not fully used. The Arctic development scenarios based on socio-ecological systems, starting from the idea of responsible management, bring to the fore the agencies and organizations responsible for the control of the environment and managing land and marine biore-sources. A task is to ensure the safety of the population, to use the indigenous knowledge for the

development of environmental management in the Arctic. The relationship between social and ecological systems in the Arctic is manifested in the analysis of Arctic strategies. Abroad, they lay down the principles of rational nature management and reliable consolidation of the polar countries. These ideas are shared in the Russian Arctic strategy.

The foreign strategies are not focused on the conservation of the natural environment of the Arctic. It was typical, e.g., 25–30 years ago. Now, their focus is on non-exhaustive environmental management with international participation, the development of alternative energy, the use of advanced standards for the development of natural resources, environmental management, safe and consistent with the international law use of energy resources with a gradual transition to the development of deposits located in more severe conditions [21, Pilyasov A.N., p. 15]. In the institutional sphere, unique structures are being created that will monitor profound changes in the Arctic and perform an early warning function, improving the safety of enterprises and the population living in the Arctic. Marine (aqua-territorial) clusters will be based at universities and research centers in the Arctic. The priority is a gradual transition to the development of offshore fields while observing high environmental standards to use it later when moving to considerable depths.

In the Development Strategy of the Arctic zone of the Russian Federation and National Security for the period up to 2020, approved by the President of Russia V.V. in 2013, two scenarios of socio-economic development of the Russian Arctic are preset.¹³ They considered the scenario conditions for the functioning of the Russian economy and the socio-economic development forecast parameters worked out by the Ministry of Economic Development, as well as scenarios generated by the Arctic Council, e.g., the Scenario Narratives Report “The Future of the Arctic Marine Navigation in Mid-Century”, etc.

The innovation scenario will be, on the one hand, consistent with the competitive advantages of the Russian Arctic, the use of its natural resource potential, and, on the other hand, a manifestation of the new quality of economic growth, the use of advanced technologies in various sectors of the economy, development of the information and communication. This scenario implies the renewal of the institutional environment, the formation of specific Arctic governments, the advanced development of the service economy, the modernization of the industrial and energy infrastructure, the creation of deep processing facilities aimed at obtaining high value-added products, the introduction of technological and organizational innovations, the development of universities, which produce globally competitive knowledge. These aims will be equally effective in both civil and defense-industrial segments of the economy.

The innovation scenario is based on optimistic assessments of the development of critical sectors of the Arctic economy. It is associated with the start of megaprojects (Shtokman and Bovanenkovskoye fields, Pomorskoye and Dolginsky fields, the Varandey-Sea and Medynskoe-Sea

¹³ Strategiya razvitiya Arkticheskoy zony Rossijskoj Federacii i obespechenie nacional'noj bezopasnosti na period do 2020 goda [The Development Strategy of the Arctic Zone of the Russian Federation and National Security for the period up to 2020]. URL: <http://правительство.рф/docs/22846/> (Accessed: 08 September 2018). [In Russian]

sections, the development of pipeline transportation, an increase in freight traffic along the NSR) in the Russian Arctic, cooperation between the Russian Arctic territories to use each other's development potential. The inter-subject investment projects "Ural Industrial — Ural Polar" and "Belkomur" will begin.

The innovative scenario proceeds from the cooperation of the circumpolar countries in the development of the Arctic shelf and therefore at a much faster rate than in the inertial scenario. Pilyasov A.N. calls such a phenomenon "the Arctic Mediterranean," considers the Arctic region "... just as the Mediterranean was ... a center of international cooperation during antiquity" [21, p. 13]. Russia will continue to work on the delimitation of maritime spaces and ensuring the mutually beneficial presence of Russia on Spitsbergen, which meets Russia's policy in the Arctic until 2020 and for the future.¹⁴

The inertial scenario reflects the prolongation of current trends in critical sectors of the Arctic economy. It is based on conservative estimates of the growth of key indicators. It is assumed that the growth rates of the gross regional product of the Arctic territories, the real income of the population, the growth of labor productivity will be lower than the average for Russia. Structural shifts and the growth of private investment will occur slowly. The resource orientation of the Russian Arctic in the system of the geographical division of labor will remain. The conjuncture of world prices for natural resources will be favorable but unstable. The outflow of the population will continue, and the quality of life will decline. Due to the delay, megaprojects have little effect on the economical parameters of the territories' development. There will be a drop in the volume of cargo transportation along the NSR, fishing, and the research fleet will remain in crisis. Contrasts between the dynamic western and depressive eastern sectors of the Arctic will intensify. Concerning international cooperation in the Arctic, the inertial scenario reflects the conflict of interests of the circumpolar countries and the intensification of the struggle between them for natural resources, incl. an increase in pressure on the Russian Federation in Spitsbergen¹⁵.

Using the author's approach to the development of scenarios for the development of the Arctic until 2035, the prospects for its future are optimistic, pessimistic, and intermediate. The object of the study — socio-economic and political factors, since the development of the Arctic is possible with the participation of the Arctica and non-Arctic states in the sustainable use of the natural resource and its transport capabilities.

Signs of an optimistic scenario for the development of the Arctic:

- progressive (despite cyclical) development of the global economy; the demand for natural resources of the Arctic and transport routes of the Arctic Ocean (primarily the NSR, although it remains low compared to the Suez Canal). All this and international partici-

¹⁴ Osnovy gosudarstvennoj politiki Rossijskoj Federacii v Arktike na period do 2020 goda i dal'nejshuyu perspektivu [Fundamentals of the State Policy of the Russian Federation in the Arctic for the period up to 2020 and further perspective]. URL: <http://www.rg.ru/2009/03/30/> (Accessed: 10 August 2018). [In Russian]

¹⁵ Strategiya razvitiya Arkticheskoy zony Rossijskoj Federacii i obespechenie nacional'noj bezopasnosti na period do 2020 goda [The Development Strategy of the Arctic Zone of the Russian Federation and National Security for the period up to 2020]. URL: <http://правительство.рф/docs/22846/> (Accessed: 08 September 2018). [In Russian]

pation help to continue the geological exploration of hydrocarbons in new areas of the Arctic;

- rallying the international community around the values of the Arctic region (territorial integrity, respect for the norms of international law, sustainable socioeconomic growth, the well-being of the population, high quality of the environment, production of new knowledge and joint scientific research — these postulates are in every Arctic strategy of Europe and North America);
- development of “public diplomacy” — cooperation between municipalities in the Barents Euro-Arctic Region and the transfer of knowledge and experience;
- increasing the role of the Arctic Council, which takes binding decisions for other countries, invites new states interested in the use of resources and sustainable development of the Arctic region to its work;
- the United States ratify the United Nations Convention on the Law of the Sea and, as a result, prepare an application for an increase in the EEZ; growing activities of American corporations in the Arctic;
- the mutual understanding between the Russian Federation and the principal countries of the region — the United States, Canada, and Norway — in subsoil use and transport routes; it will reduce the political and military tension in the area;
- Russia's initiatives to find new partners for the environmentally safe and economically profitable development of natural resources in the Arctic among non-Arctic states, primarily Asian and Latin American ones through public-private partnerships.

An illustration of the pessimistic scenario will be, in contrast to the previous one, the deterioration of bilateral and multilateral relations between states in the Arctic. Signs of such a scenario:

- the tense nature of interstate cooperation due to territorial disputes (incl. the “Spitzbergen issue”); the willingness of countries to protect their interests outside the national Arctic areas; promotion of the idea of free borders in the Arctic; seeking a UN ban on exploration and extraction of minerals in the Arctic; defending the right to free navigation in the Arctic Ocean;
- the growth of the military presence; involvement of the foreign Arctic states via NATO. Militarization does not meet the interests of Russia in the Arctic region;
- The Arctic Council like a discussion club; its role in solving the problems of the Arctic is declining;
- cyclical moderate growth of the world economy replaced by stagnation; the demand for the Arctic oil and natural gas decreases against the development of shale energy; production at developed fields in the Arctic is falling; geological exploration rates are declining; transportation along the NSR remains uncompetitive; North-West passage is increasingly free of ice during the period of navigation;
- against international isolation, Russia is searching for new partners in the development of hydrocarbon deposits among Asian companies; anxiety of environmental organizations associated with the exacerbation of the ecological situation in the Arctic due to poor readiness of fields for development; the activity of ecological organizations near mining sites and transportation routes for natural resources is interpreted as environmental terrorism.

In the case of the moderate scenario, the development of the Arctic will balance between optimistic and pessimistic scenarios. Territorial disagreements and the desire to control shipping routes will remain, but these processes will not be sharp with the expressed desire of states to

find a solution based on international law. The state of bilateral relations with the participation of the Russian Federation and Western states remains tense. Sanctions pressure from European and North American states will continue; Asian countries will be key partners in the Arctic projects. Assuming that, the risk of losing control of shipping routes in the Indian Ocean and representation in the scientific community in Svalbard, will make India promoting its interests in the Arctic carefully with a steady interest in the region. The development of the world economy stimulates economic activity in the Arctic, which contributes to maintaining attention to the region from international environmental organizations. North American oil and gas companies, combining the technology and financial resources, will actively pursue their interests in the exploration and extraction of mineral resources on land and the shelf of the Arctic Ocean.

For the moderate scenario, implicit and random factors should be considered. By implicit factors, we understand the unpredictable aspects of development, i.e., they depend on events that do not directly affect the Arctic. E.g., the successes of the oil shale revolution and, in the long-term perspective, of hydrogen energy, albeit for a short time, can change the attitude towards the Arctic resources, which will have different directions for the development of the region. Signs of negative consequences include conserving Arctic projects for the development of natural resources and their export to foreign markets, a decline in the standard of living of the local population and, as a result, the desertion of the Arctic spaces. The positive significance lies in the conservation of resources for future generations, the reduction of anthropogenic pressure on ecosystems, and the preservation of a favorable environment. Neither positive nor negative aspects can currently be accepted unambiguously due to the lack of our knowledge of such processes.

Among the random factors that can influence the choice of scenarios are the natural disasters, technological accidents, acute and protracted financial crises, an arms race, information wars, terrorist attacks, the discovery of new deposits, unexpected technological innovations, increasing market volatility, or an increase in the rate of climate change.

Conclusion

At the beginning of the 21st century, the attention of governments and the scientific community in many countries of the world is in the Arctic region. It is due to the unique and not adequately studied natural resources, socio-economic, transport and logistics, environmental, tourist, and socio-cultural potential. All these points cause global geopolitical (incl. military-strategic) significance [17, Barsegov Yu.G., Korzun V., Mogilevkin I., p. 17]. In the Arctic, one can find successful examples of international dialogue, as well as disagreements. The peculiarities of the geographical position of the Arctic, the ongoing changes in this region, caused by climate change and against the struggle of various countries for resources and communications, are the ground for the Arctic development scenarios. Both basic geopolitical and socio-ecological scenarios call for the development of a global approach to the management of the Arctic. They make choosing the priorities: resolving territorial and legal disputes, responding (possibly aggressive) actions of states when try-

ing to limit their sovereignty in the Arctic, or focusing on international cooperation, building trust between the Arctic states, ensuring the ecological well-being of the region, applying the principles of a precautionary approach and preserving biodiversity, or combining these two paradigms. The solution should consider the results of scientific research and the involvement of highly qualified specialists in the extreme Arctic conditions.

The prospects for the sustainable development of the Arctic and subarctic territories form the positioning of states and their corporations. The region's competitive advantages determine the aims and directions of their activities. A practical solution of the territorial and environmental problems of the Arctic can be provided using experience (but without mechanical transfer) and knowledge accumulated in the main sectors of the northern economy in different countries. The controversial issues arising from this should be resolved using the principles of international law. The priority should be the sustainable development of the Arctic: the preservation of its environment, the use of natural resources without threats to the future generations. Such a socially and ecologically responsible approach, implemented through an innovative scenario and a scenario of socio-ecological systems, seems to us more realistic than the theses on "war for resources", "crisis of management", "re-division of the world", underlying geopolitical scenario.

References

1. Schlach M., Madlener R. Impacts of an ice-free Northeast Passage on LNG markets and geopolitics. *Energy Police*, 2018, no. 122, pp. 433–448.
2. *Rossiyskaya Arktika: sovremennaya paradigma razvitiya* [The Russian Arctic: the modern paradigm of development] / Ed. by A.I. Tatarin. SPb., Nestor — Istorija Publ., 2014, 844 p. (In Russ.)
3. Caturon Yu.S., Klepikov A.V. Sovremennoe izmenenie klimata Arktiki: rezul'taty novogo otsenoch'nogo doklada Arkticheskogo Soveta [Current Arctic climate change: results of the new Arctic Council assessment report]. *Arktika: ekologiya i ekonomika* [Arctic: ecology and economy], 2012, no. 4 (8), pp. 68–82.
4. Laksin V.N., Porfiryev B.N. Specificities of Spatial System Transformation and Strategies of the Russian Arctic Redevelopment under the Conditions of Climate Changes. *Ekonomika regiona — economy of region*, 2017, 13 (3), pp. 641–657.
5. Roberts C.D., Senan R., Molteni F., Boussetta S., Mayer M., Keelye S.P.E. Climate model configurations of the ECMWF Integrated Forecasting System (ECMWF-IFS cycle 43r1) for HighResMIP. *Geoscientific model development*, 2018, vol. 11, no. 9, pp. 3681–3712.
6. Bring A., Shiklomanov A., Lammers R.B. Pan-Arctic river discharge: Prioritizing monitoring of future climate change hot spots. *Earths Future*, 2017, vol. 5, no. 1, pp. 79–92.
7. Kaverin D.A., Melnichuk E.B., Shiklomanov N.I., Kakunov N.B., Pastukhov A.V., Shiklomanov A.N. Long-term changes in the ground thermal regime of an artificially drained thaw-lake basin in the Russian European north. *Permafrost and Periglacial Processes*, vol. 29, no. 1, pp. 49–59.
8. Liu Y.Y., Wang W.Q., Kumar A. Multiweek Prediction Skill Assessment of Arctic Sea Ice Variability in the CFSv2. *Weather and Forecasting*, vol. 33, no. 5, pp. 1453–1467.
9. Dimnikov V.P., Likosov V.P., Volodin E.M. Modelirovanie klimata i ego izmeneniy: sovremennye problemy [Modeling of climate and climate change: current issues]. *Vestnik Rossiyskoy Akademii nauk* [Herald of the Russian Academy of Sciences], 2012, vol. 82, no. 3, pp. 227–236.
10. Dodin D.A. *Ustoychivoe razvitie Arktiki (problemy i perspektivy)* [Sustainable development of the Arctic: problems and prospects]. SPb., Nauka Publ., 2005, 283 p. (In Russ.)
11. Conley H., Craut J. *US Strategic Interests in the Arctic. An assessment of current Challenges and New Opportunities for Cooperation*, 2013, 33 p.

12. Govorova N.V., Zhuravel' V.P. Mnogolikaya Arktika: gorizonty razvitiya [The many faces of the Arctic: perspectives of development]. *Arktika i Sever* [Arctic and North], 2018, no. 31, pp. 98–104.
13. Chistobaev A.I., Kondratov N.A. Ekonomicheskoe razvitie Arktiki: priority Rossii i zarubezhnykh gosudarstv [Economic development of the Arctic: priorities of Russia and foreign States]. *Geopolitika i bezopasnost'*, 2013, no. 2 (22), pp. 84–91.
14. Jang O.R. Budushchee Arktiki: rol' idey [The future of the Arctic: the role of ideas]. *Vestnik Moskovskogo universiteta. Ser. 25. Mezhdunarodnie otnosheniya i mirovaya politika*, 2011, no. 2, pp. 84–91.
15. Zagorski A. Security in the Arctic. *Contemporary Europe — Sovremennaya Evropa*, 2017, no. 4, pp. 40–49.
16. Kharevskiy A.A. Arkticheskaya politika Kanady: transformatsiya podkhoda k upravleniyu severnymi territoriyami [Canada's Arctic policy: transforming the approach to Northern territory management]. *Vestnik Komi nauchnogo tsentra Uro RAN* [Vestnik of the Institute of Geology of the Komi Science Centre UB RAS], 2011, no. 26, pp. 97–102.
17. *Arktika: interesy Rossii i mezhdunarodnye usloviya ikh realizatsii* [The Arctic: Russia's interests and international conditions for their implementation]. Ed by Barsegov Yu.G., Korzun V.A., Mogilevkin I.M. Moscow, Nauka Publ., 2002, 356 p. (In Russ.)
18. Borgerson S. The Great Game Moves North: As the Arctic Melts, Countries Vie for Control. *Foreign Affairs*, 2009, no. 14, pp. 14–29.
19. Howard R. *The Arctic Gold Rush: The New Race for Tomorrow's Natural Resources*. L., N.Y.: Continuum Publ., 2009, 318 p.
20. Vasiliev A.V. Arktika: novyy vektor razvitiya [The Arctic: a new vector of development]. *Arktika: ekologiya i ekonomika* [Arctic: ecology and economy], 2011, no. 1, pp. 20–25.
21. Pilyasov A.N. Prognoznoe razvitie rossiyskoy Arktiki: transformatsiya prostranstva, vneshnie svyazi, uroki zarubezhnykh strategiy [Forecast development of the Russian Arctic: transformation of space, external relations, lessons of foreign strategies]. *Arktika: ekologiya i ekonomika* [Arctic: ecology and economy], 2011, no. 2, pp. 10–17.