Arctic tourism in the Barents Sea Region: current status and boundaries of the possible

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Abstract. Russia faces a promising task of integrated use of various resources of the Arctic, including tourism and recreation. In order to provide a sustainable socio-economic development of the polar regions and the country as a whole, it is necessary to conduct interdisciplinary studies of the resources and assimilation capacity of geographical systems based on methods used in socio-economic and physical geography, as well as in cultural geography. In the article the present conditions and trends in the tourism development of the Arctic Zone of the Russian Federation (AZRF) are considered as well as the features of its organization in the Barents Sea Region. The existing problems and prospects of the tourism development in the Arctic under modern conditions are discussed on the example of actively increasing cruise tourism in the region. Moreover, the factors limiting the development of Arctic tourism in the Russian Federation are considered. Conclusions based on comprehensive analysis of current opportunities and constraints in the Barents Sea region are drawn about the need for reconstruction and development of maritime transport and navigation infrastructure throughout the planned ship corridor along the Northern Sea Route (NSR) and the resumption of the ports of Dudinka, Dikson, Tiksi, Pevek and Provideniya. Further progress of mass ecological and cruise tourism in the Barents Sea basin requires scientific rationing of visits to protected areas and the organization of environmental events in places of excursions.

1. Introduction
Russia is the northern country that has the longest coast line in the Arctic seas (more than 20,000 km) and the biggest territory of the adjoining shelf and waters of the seas of the Arctic Ocean. Therefore, the present political and economic interests of Russia in the polar zone are evident. However, in comparison with the neighboring Arctic countries, the potential of Arctic tourism in Russia is poorly fulfilled. Its current state and further development are influenced by various natural and anthropogenic factors.

The current decade was marked by a significant expansion of the space of recreational nature usage and international tourism in the Arctic zone of the Russian Federation (AZRF). Here, ecological and cruise tourism has intensified significantly, as well as new Specially Protected Natural Areas (SPNAs) have appeared such as nature reserves and national parks. The Barents Sea region, covering the European territories of the Arctic, remains the most developed.

The purpose of the article is to show the special opportunities for the development of the Barents Sea region related to its position in the geographical space - a system of natural and economic connections. The following factors are considered as the most important determining the specifics of
the region: natural processes, including the intense manifestation of the results of global warming, proximity to economically developed regions of Europe, great historical experience of development and a variety of unique cultural heritage sites.

2. Objects and methods

The territory of the Barents Sea region is the extreme western part of the AZRF, which has a high potential for the dynamic development of tourism due to a range of recreational resources and a very favorable geographical location.

The assessment of climatic conditions for the development of the region’s natural-economic complex is based on the figures of average annual temperature according to long-term monitoring, the results of statistical processing of the geo-data base and the use of cartographic modeling methods.

The characteristics of the economic factors of the tourism infrastructure development are given on the basis of an analytical review of scientific publications, reports on the implementation of the AZRF development program, and a comparative analysis of the development rates of various zones and regions.

The possibilities of increasing the resource base of recreational nature management and attracting tourist interest were studied using a complex of methods of cultural geography, astroarchaeology and geoarchaeology, as well as the navigation concept of information modeling of geospace.

3. Conditions for the development of tourism within the Barents Sea region

The natural and socio-economic conditions of the Barents Sea region against the background of other regions of the AZRF can be described as the most favorable.

3.1. Natural and climatic factors of development of the Barents Sea region

During recent decades warming has occurred in the Barents Sea region, as well as on the planet as a whole, the active phase of it falls on the period from the mid-1970s [1]. Over the course of 40 years, the average annual coastal air temperature has risen mainly by 1.5-2.5 °C (Figure 1). In high latitudes, even higher rates of warming are observed. During a forty-year period there has been an increase of the average annual air temperature in the Novaya Zemlya archipelago which amounted about 3.0 °C, and in Svalbard (Barentsburg) reached 3.7 °C.

![Figure 1](image-url) - Changes in the average annual air temperature in the Barents Sea region of the Russian Federation in 1976-2015 [1]

In the Barents Sea region, the warmest in the Arctic, all attractive natural phenomena and objects characteristic of the Arctic region are accessible: polar days and nights, northern lights; landscape complexes of the Arctic desert, tundra and forest-tundra; glacial and permafrost landforms.
3.2. Place of the Barents Sea region in state plans for strategic territorial development of the Russian Arctic

In 2014, the “Strategy for the Development of the Arctic Zone of the Russian Federation until 2020” was adopted, it sets the tasks for the comprehensive - economic, defense and social development of the Arctic zone of the Russian Federation (AZRF). Including “the development of a unified transport system as a national sea route, oriented to year-round functioning (including the Northern Sea Route and river and railway communications gravitating towards it, as well as a network of airports)”, “the development of Arctic tourism and the expansion of environmentally friendly types of tourism activities in the Arctic, promoting regional tourism clusters, promoting Arctic tourism to national and international markets”[2].

The second no less important document was the state program on the “Socio-economic development of the Arctic zone of the Russian Federation for the period until 2020” established by the Government in 2014. In its new version (No. 1064 dated August 31, 2017), the implementation period has been extended to 2025, the membership has been expanded, the list of subprograms has been actualized, their main tasks and targets have been updated. It is assumed that this will create the conditions for accelerated socio-economic development of the Arctic zone, achieving strategic interests and ensuring Russia's national security in the Arctic.

As a subprogram, the sphere “Development of Culture and Tourism for 2013–2020” was designated, it anticipates expanding the opportunities for tourists to visit marine areas on the northern coast of Russia and creating conditions for welcoming tourists on the insular northern territories of the Russian Federation. The federal target programs such as “Culture of Russia (2012-2018)” and “Development of domestic and inbound tourism in the Russian Federation (2011-2018)” are integrated and extended in it.

However, the adopted documents and the design of the regulatory framework for the organization of tourism in the AZRF do not reflect a single economic concept and system of actions but offer point solutions that seem clearly insufficient.

3.3. Economic conditions for the development of tourism in the Barents Sea region

Currently, there is a revival of economic activity in the Arctic sector of the Russian Federation and active “re-development” of the marine and coastal Arctic regions, especially in the western part of AZRF, where Russia is successfully mastering new technologies for offshore hydrocarbon production. The importance of the entire territory of the AZRF for the Russian economy is growing. It produces 72% of all oil and gas condensate; 93% of natural gas; almost all diamonds; 37% of wood is harvested here; it produces a huge capacity of non-ferrous and rare metals, gold, platinum and many other important types of products, which together provide up to 60% of the country's exports. The North provides 15-20% of the total GRP, which is essential for the formation of the federal budget [3].

With the climate warming in the Arctic and a decrease in the ice cover of the seas, plans to modernize the Northern Sea Route begin to work. This project includes reconstruction plans of the ports of Dudinka, Dikson, Tiksi, Pevek and Provideniya. The route will connect European and Far Eastern Russian ports, as well as the mouths of navigable Siberian rivers into a single transport system.

According to the press, in order to develop the Arctic shipping along the NSR, it is planned to build 8 new large icebreakers. In 2017, the largest nuclear-powered icebreaker *Ilya Muromets* and the icebreaker *Sibir* were launched at the shipyards of St. Petersburg. In addition, in October 2019, the icebreaker *Ivan Papanin*, the lead ship of the series for the Russian Navy, descended from the slipways, the second one – *Nikolay Zubov* – is being built. These vessels are designed to organize patrols of the Northern Sea Route and ensure the safety of Arctic shipping. An important achievement in the energy supply of the eastern Arctic regions in 2019 was the commissioning of the first floating nuclear power station of the *Akademik Lomonosov* nuclear thermal power station (NTPS), which was delivered and installed in the port of Pevek in Chukotka. It is designed to produce electrical and
thermal energy and can be used to desalinate sea water. Of course, this station will become a popular tourist attraction when organizing cruises on the Northern Sea Route in the Arctic.

A number of leading expert economists note that the provision of shipping along the NSR and the large rivers of the Russian North in the future opens up the opportunity not only for industrial transportation development and raise in the economy of the remote regions of the north of Siberia, but also the implementation of international cruise and ecological tourism routes in the polar and arctic latitudes. All this should contribute to the development of the socio-economic base of the northern regions, the creation of new jobs and the consolidation of people in the settlements of the North of the Russian Federation [4].

The increase in oil and gas production in new fields (Shtokman field, Prirazlomnoye field, etc.), the organization of the new port of Sabetta and the liquefied gas plant necessitate further development of not only the transport infrastructure of the Northern Sea Route, but also measures to prevent related pollution problems natural environment [5].

4. Prospects for the development of tourism within the Barents Sea region

The prospects for tourism development in the region are determined by a set of factors, among which the geographical position, resources, and state strategy are of the utmost importance.

4.1. The position of the Barents Sea region in the system of support zones for the development of AZRF

Currently, in order to accelerate the socio-economic development of the Arctic and the Russian North, support zones of development are being formed on the basis of existing development cores [6]. It is planned that by 2025 supporting zones will begin full-fledged work as complex territorial units (Figure 2).

Figure 2. Support zones of the Arctic development (http://porarctic.ru/blog2017/11/10).

According to experts, in recent years there has already been a revival of the socio-economic sphere in some northern regions of the Russian Federation. First of all, this refers to the Barents Sea, White Sea and Kara basins of the Arctic Ocean, where the main areas of the existing and planned production of hydrocarbons, metallurgical raw materials and forests are located. This western sector of the Russian Arctic is not only rich in natural resources, the economic interest of which is of paramount importance, but also by the presence of many natural and cultural heritage objects (siedidis, labyrinths, petroglyphs, objects of Pomeranian culture) that are associated with the ancient and modern stages of economic development coasts and islands of the Barents Sea region. Here on the northern coast of the Kola Peninsula are located the most famous ice-free seaport of Murmansk and a variety of natural, historical and cultural tourism objects [7, 8, 9].
4.2. Development of the tourism resource potential of the Barents Sea region

This polar region has the most significant tourist and recreational potential and is becoming increasingly popular as an area of international ecological and cruise tourism. The scientific and educational element in ecological tourism is becoming increasingly popular, due to the emergence of new ideas and new attractions in the region.

4.2.1. Kola Peninsula. On the Kola Peninsula, traces of human prehistoric development of this territory (petroglyphs, siedís, labyrinths, megalithic monuments) and heritage monuments of later historical eras are revealed [10]. Comprehensive interdisciplinary studies have shown the navigational purpose of prehistoric objects [11], [12]. Orientation of landscape and artificial objects along the East-West line allows you to define the period of the equinoxes - the boundaries of winter and summer. Orientation along the South-North line allows you to determine the noon and the beginning of the polar day and polar night. Objects of different ages show a variety of orientation technologies: by sunrise / sunset points on the horizon and by the shadow of an object (gnomon), the length of which reflects the height of the Sun above the horizon. In the labyrinths oriented along the South-North line, the scale for measuring the midday shadow is stone arcs, summer shadows fall on the first arc from the center, winter shadows reach and can cross an arc of the largest diameter. The shadow of the gnomon (stick, pole, staff, figure) helps to decipher - drawings on the rocks. These ancient tools helped the ancient people to develop the Arctic, and today they can be interesting and useful for tourists.

4.2.2. Spitsbergen Archipelago (Svalbard). On the border of the Murmansk region with Norway and Finland, Pasvik-Inari Trilateral national park is organized. In the Barents Sea, the Spitsbergen archipelago (Grumant) is situated where the tourist and recreational cluster is successfully developing combining the Norwegian and Russian parts of the territory. The Norwegian part of Svalbard with its center in Longyearbyen (Longyear City) is visited by up to 80 thousand tourists annually, mainly from Norway and other European countries. The Russian part of Svalbard with the villages of Barentsburg and Pyramiden is significantly behind in terms of the organization of tourist infrastructure and transport support. However, recently there has been an increase of tourist attendance (short excursions) in Barentsburg in the period from April to August (2,500 – 3,000 people per year, of these, only 20-30 tourists are Russian) [9].

4.2.3. The White Sea. In the White Sea there are unique objects of different ages - prehistoric and medieval. The most widely known is the Solovetsky State Historical Architectural and Natural Museum-Reserve and the monastery complex. According to the Agency of the Development of the Solovetsky Archipelago, in 2015 Solovki was given a special status of “Religiously Historical Place”, which makes the islands even more attractive to visitors. According to local statistics, this national shrine is visited annually by an average of 30 thousand tourists and pilgrims.

The new Onegskoye Pomorye National Park Organized in 2013 at the Onega Peninsula (the White Sea) has become a branch of Kenozersky National Park since 2016 for several reasons. Here unique sea dunes and indigenous taiga forests overlooking the White Sea, rare sea animals, as well as cultural monuments of Pomors, objects of Christian wooden temple architecture are preserved, prehistoric megalithic monuments and archaeological sites are found. The expansion of the Kenozersky NP on the Pomeranian territories of the Onega Peninsula will probably contribute to the reconstruction and preservation of the objects of northern wooden architecture, strengthening the position of historical and cultural tourism.

Of significant interest to tourists is Kiy Island in the Onega Bay (the White Sea), located 15 km from town Onega. In the summer, the Kiyiskiy Holiday House operates on the island, in which up to 2,000 tourists annually relax. On this island the Kia Monastery of the Cross is situated founded in 1656 by Patriarch Nikon and of interest for historical and cultural tourism, however, requiring restoration.
4.2.4. **Novaya Zemlya Islands.** Since 2011, in the northern end of Novaya Zemlya, the largest Russian Arctic National Park has been operating, and since 2016 includes the Franz Josef Land archipelago. The islands of the Russian Arctic store traces of the ancient sites of Pomors and heroic expeditions associated with the discovery and exploration of the archipelago. It is here the largest habitats of the polar bear and other specially protected species of fauna and flora are located [13].

4.2.5. **Vaygach Island.** To the south of Novaya Zemlya there is Vaygach Island, characterized by the presence of numerous attractive objects of arctic nature and monuments of the ancient culture of the Nenets. Currently, the administration of the YaNAO are drawing plans to organize a new National Park on the territory of Vaygach Island. This sacred island of the peoples of the North, it has picturesque natural landscapes, with lakes, canyons, waterfalls, with a unique historical and cultural heritage of the Nenets ethnic group. The island provides ample opportunities for observing wildlife, can become one of the key tourist brands of the Nenets Autonomous District [14].

All the listed tourist and recreational territories of the Arctic, despite their inaccessibility, annually receive hundreds of tourists and become more and more popular among both domestic and foreign travelers. With the development of transport infrastructure in the NSR, these facilities of the Russian North will become more accessible for tourists, which will contribute to the creation of new jobs, improvement of local socio-economic conditions and an improvement in the quality of life.

5. **A comparative analysis of the economic effects of tourism development according to region**

It should be noted that in the Arctic countries neighboring Russia - the USA and Canada, Iceland, Norway and Denmark, tourism developing is significantly supported by the public sector and brings considerable profit. In general, for the last 20 years there has been an increase in the flow of tourists to the foreign Arctic in more than 18 times, exceeding the number of Inuit and Danes living here permanently. In other regions of the foreign Arctic (Alaska, the Canadian archipelago, Iceland, Svalbard) tourism growth rates are similar to world average and ranged from 42 to 84%. In 2015 the number of tourists who visited the foreign Arctic and subpolar regions (excluding Russia) exceeded 700 thousand people [15], [16], [17].

![Figure 3](image.png)

**Figure 3.** The growth dynamics of tourist visits to the Arctic (1993-2014) [16]

As a result of the Arctic climate warming observed over the past 20 years, an ever-increasing area of polar ice in the summertime disappears and frees up the spaces of the northern seas for navigation. Not only the main land, but also island territories become more accessible. The interest of representatives of different countries, and especially China, in cruises along the northern seas and the North Pole is growing. In groups of tourists participating in cruises to the North Pole and in the Russian Arctic NP, representatives of China make up 30%.
In recent years, China and Japan, which have the greatest economic weight in Southeast Asia, have shown an increased interest in polar research, in the development of transport and cruise capabilities of the NSR. The largest Chinese diesel-powered research icebreaker Xue Long (Snow Dragon) has already completed several flights from Shanghai to Svalbard and back. In China, the second, even more powerful icebreaker Xue Long-2 was launched for the future escort of transport caravans and the accompaniment of cruise ships along the NSR.

Note that the advantages of transport using the NSR are obvious: the corridor is almost twice shorter than other sea routes from Europe to the Far East. For example, from St. Petersburg to Vladivostok there are 14,280 km along the Northern Sea Route, and 23,200 km via the Suez Canal, and 29,400 km around the Cape of Good Hope. The length of the sea route along the NSR from Murmansk to the port Provideniya is about 7100 km. However, the passage of vessels through the NSR, especially in the eastern sector, even in conditions of modern warming, without icebreaker escort is still problematic [18].

6. Restrictions on tourism development within the Barents Sea region

The limiting factor of tourism development in the Arctic is the extreme climate and the high sensitivity of natural systems to an increase in anthropogenic pressure. The consequences of disturbing highly vulnerable Arctic ecosystems, which have a low self-healing potential, can become a real threat to nature and mankind - not only in this region, but throughout the planet. The harsh climate requires significant investments for the development of territories. The general concept and infrastructure of nature management and nature protection are still not sufficiently developed. Here are some examples.

6.1. Economic restrictions on tourism development in the Barents Sea region

In the Barents Sea region, where the ice-free port of Murmansk is located, international marine cruise routes have been actively developing lately. But so far it has not received wide development and is carried out only by private firms and individual representatives of shipping companies and airlines. As the Minister of Economic Development of the Murmansk Region Yuriy Efremov mentioned in an interview, cruise ship calls at the seaport of Murmansk have been carried out for the past 12 years. The Murmansk tour operator Nordmorservis Travel in recent years has been accepting 3 to 8 medium-sized cruise liners per season at the fishing port. In addition, the Moscow company “Special Travel Club” provides sea cruises to the Arctic, offering cruises to Greenland, Iceland, Svalbard and the North Pole, with a visit to Franz Joseph Land. But, unfortunately, still in the port of Murmansk there are no special deep-sea berths suitable for receiving large cruise liners, which could give additional income to the local budget [19].

Especially popular among foreign tourists are cruises from Murmansk across the Barents Sea on the Russian nuclear icebreaker 50 Let Pobedy (50 Years of Victory) to the North Pole with the approach to Franz Josef Land archipelago and the Russian Arctic NP. Indicative is the statistics of cruise tourists visiting this new national park, presented on the NP “Russian Arctic” website. For the period 2011-2018 NP "Russian Arctic” was visited by more than 6.5 thousand tourists from 70 countries of the world. It is noteworthy that of the total number of cruise tourists who visited the Russian Arctic NP for all these years, only about 5-8% are Russian citizens and about 30% are Chinese tourists. In the summer of 2018, tourists from 41 countries were represented here. The share of tourists from China amounted to 33% (354 people), in second place - tourists from Germany and Switzerland - 13% (144 and 143 people), in third place US citizens - 12% (136 people). The dynamics of visits is presented in the Table 1. The tourist season of 2019 in the Russian Arctic National Park was a jubilee. The park is 10 years old. For the first time in ten years of the park’s existence Russian citizens were on the first place counting the number of visits. In 2019, 1306 people visited this protected area, including 262 Russians [20].
Table 1. NP "Russian Arctic, the dynamics of tourists visiting

| Years of visiting | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|-------------------|------|------|------|------|------|------|------|------|------|
| Number of tourists| 865  | 1005 | 636  | 738  | 1225 | 954  | 1142 | 1079 | 1306 |

However, for Russian tourists, cruises to the North Pole and to Franz Josef Land are not in high demand yet because of their high price (up to 1.5-2 million rubles for 7-10 days of a cruise on a nuclear icebreaker). A sea cruise to Iceland or Svalbard will cost a little less, the price of which will be about 250 thousand rubles, which is explained by the more developed infrastructure and the sophistication of these tourist destinations. Thus, for most Russian citizens, Arctic tourism is still difficult to access.

6.2. **Environmental restrictions of tourism in the Barents Sea region**

According to the press release of the Solovetsky Museum-Reserve, for the season of 2018, the Solovetsky Museum served 62,325 visitors, of which 49,259 were tourists with excursions. Compared to 2017, revenue from the sale of entrance tickets increased by 7.4%, because of the raise in the number of visitors of museum objects. However, environmental experts note that restrictions on visiting the Solovetsky Islands are already required, as the limit of ecological capacity of this protected natural area (SPNA) has been reached [8].

7. **Conclusions**

Based on the analysis of materials characterizing the modern development of Arctic tourism in general and in the Barents Sea basin in particular, the following general conclusions can be drawn. At numerous international forums, where various problems of rational use of natural resources of the Arctic are discussed, it is invariably noted that AZRF is "a region of promising tourist development." However, along with some successes in the development of tourism in the polar and Arctic regions of the Russian Federation, there are a number of objective and subjective restrictions that do not allow us to hope for a significant expansion of the Arctic segment of tourism in the foreseeable future outside the Barents Sea [21], [22], [23].

1. First of all, the difficulties associated with the harsh climatic conditions of shipping at high latitudes are obvious: long, cold winters and heavy floating ice, which outside the Barents Sea do not completely disappear even in the warmest months of the year. Current popular forecasts for prolonged climate warming in the Arctic are controversial and may not be justified.

2. Passage of transport and cruise ships via the NSR through ice massifs is possible only with the help of icebreakers. The use of the nuclear icebreaker fleet is a complex and expensive event that significantly increases transport costs and the cost of cruise tourism, which does not allow to make it massive.

3. According to the deputy head of the Federal Agency for Tourism of the Russian Federation, Roman Skoryi, not a single concept and strategy for the development of the Arctic zone adequately provides for a stable income from Arctic tourism. To date, Arctic tourism is not considered an important factor and an integral part of the integrated socio-economic development of the northern regions. Tourism exist in the Arctic not thanks to, but contrary to the organizing and regulatory role of the state.

4. With all the diversity and attractiveness of tourism facilities in the Arctic, the inaccessibility of the Arctic regions and the high cost of travel even within the Barents Sea basin are the main regulatory factors for domestic tourism. The Arctic is completely inaccessible to people with average incomes. Amid falling purchasing power of the main population of the Russian Federation, the number of tourists who can afford a trip to the Arctic is declining.
5. The attraction of foreign tourists to the Russian Arctic is fraught with a number of difficulties in the visa regime and border control; therefore, it is still difficult to guarantee constant demand for Arctic tourism and its mass character.

6. In the Arctic zone of the Russian Federation, the necessary tourism infrastructure is still lacking, the level of service provision is low and there is a shortage of professional personnel, there is no possibility of developing mass international cruise tourism even on the basis of the largest port of Murmansk.

7. Despite the adopted “Development Strategy of the AZRF until 2025”, Arctic tourism is still not economically connected with the plans and programs of integrated targeted socio-economic development of the polar regions. This explains the weak state support and insufficient funding of tourism projects, which limits development prospects.

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