The Arctic and the Central Black Earth Region: from the history of natural and cultural relations

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Abstract. The article shows the role of regional offices of the Russian geographical society in providing information about the Arctic and its significance for the population of the Central black earth region. The form of presenting information to the public is a popular lecture with elements of a virtual tour. The content reveals two questions: why the weather and climate changes in the Arctic affect the weather in Central Russia; which of the representatives of the Central black earth region contributed to the study of the Arctic. The reasons and consequences of abnormal weather conditions in Central Russia as direct and indirect consequences of weather and climate conditions and changes in the Arctic region are given. The Arctic is a region of mysteries that have not yet been fully solved. The civil-Patriotic theme is revealed in the history of the conquest and exploration of the Arctic by the inhabitants of the Central black earth region. The article reveals the methods of making a virtual tour and provides fragments of the content of a popular lecture. The work was performed for two audiences: the Youth club of the RGO (Russian geographical society), where the age ranges from 15 to 30 years, and the lecture hall of the regional branch of the RGO (Russian geographical society) in the Kursk region, where the age ranges from 30 to 70 years. The article presents interactive methods of working with students and the results of the work performed.

1. Introduction
Russia – the largest country in the world by area, has a special geographical position. Its "northern" is determined not only by a large area of territory beyond the Arctic circle, but also by a wide access to the seas of the Arctic ocean. Therefore, the concept of the Arctic for Russia is both a state territory and a sphere of diverse interests: from geopolitical and socio-economic to environmental and cultural-ethnographic.

The natural resource potential of the Arctic is one of the most promising for Russia and the world as a whole. The Northern sea route is the shortest sea route between European Russia and the Far East (inner coasting). At the same time, it is an alternative to the Suez and Panama canals, and therefore of interest to the whole world [1]. Arctic - zone of development of domestic and international tourism. The Russian Arctic national Park and state reserves are located in the Arctic zone: Wrangel island, Bolshoy arkticheskiy, Taimyrsky, which is included in the list of UNESCO world natural heritage sites. The Arctic is the weather kitchen. At the same time, it is both an indicator and a factor of global climate change. It also affects weather extremes outside the Arctic region [2].

This list of the importance of the Arctic can be continued. But as far as the country's residents are aware of this significance. After all, the main band of settlement is removed from the Arctic region for many thousands of kilometers. Therefore, the majority of the population is not directly related to this interesting and important region. This is the problem: the few indigenous peoples and professional
use of the region (geologists, ecologists, meteorologists, military personnel, scientists, etc.) have a
direct interest in learning about the Arctic. Question: how can we bring the Arctic closer to a
population that is not directly related to it?

2. Method of research
The research was based on methods of an empirical nature: survey and interviewing; method of
analyzing information sources: analysis, comparison, selection of ideas, quoting; statistical method
and method of graphical analysis; methods of interactive learning and use of information and
communication technologies in the presentation of information.

3. Content
In the course of the study, a survey of residents of the city of Kursk was conducted: 100 people aged
20 to 70 years with different professional training (excluding professional geographers). This is an
object with a high population density, a fairly high scientific and educational potential (faculty of
geography, research institutes) and significantly removed from the direct influence of the Arctic. The
General ideas of citizens about this region were checked. The results were expected.

![Figure 1. Arctic through the eyes of Kursk residents](image_url)

Almost all respondents have an idea of the location of the Arctic and that Russia has large
territories there. At the same time, only 10% of respondents represent the scale of the Russian Arctic
territories. Almost everyone knows about the presence of the Northern sea route, but no one could
name its main ports. Unfortunately, only 10 people were able to name Arctic explorers in the 20th and
21st centuries, but none of them knew that our countrymen were among them. A similar situation was
observed in the field of modern economic problems, environmental problems and weather and climate
changes (Figure 1).

Of course, the main source of information for the population in this issue is school geography. And
how to work with the adult population? The Russian geographical society works very effectively by
organizing and making a nationwide educational campaign "Geographical dictation", designed to
promote geographical knowledge and increase interest in the geography of Russia among the entire
population. In the Kursk regional branch of the RGO, this initiative was continued in an open lecture hall.

The beginning of the "Arctic" theme was laid by local historian Lubentsov V. M., who in 2017 presented his collections of stamps and envelopes reflecting the history of the discovery of the Russian Arctic, including representatives of the Central Chernozem region. The envelopes and stamps depict the first conquerors of the Arctic, brave Soviet pilots who transported members of the expedition and the station to the ice floe, and various subjects united by the theme of the conquest of the North Pole. You could not only see unique exhibits from a private collection (figure 2), but also learn a lot about unique people.

Figure 2. Philately on the conquest of the Arctic

He also organized an exhibition in the building of the Kursk post office in honor of the polar Explorer's Day, which is celebrated on May 21. The exhibition includes thematic envelopes, stamps and postcards that were issued at different times. More than a thousand people were able to learn interesting facts about the discovery of the Arctic, which brought it closer to the distant steppe region. Here are some of them [6].

In 1912, three brave polar explorers Rusanov V., Brusilov and Sedov G. rushed to the North, hoping to lead Russia in the race to conquer the North Pole. The loyalty of Imperial officials to the desperate initiatives of the three pioneers was explained by the fact that in 1913 the 300th anniversary of the house of Romanov was celebrated. This was the prospect of a "gift" to the crown in the form of a vast Arctic. Unfortunately, the ice situation in the Arctic seas in 1912 was one of the most severe in all the years of observation. The tragic fates of the three captains who set out in the harsh summer of 1912 to conquer the Arctic would most likely remain a topic far from detailed study. But their stories were immortalized in his novel "Two captains" by the writer Benjamin Caverin. The writer artistically processed and compiled the real stories of three polar explorers into one. The appearance of captain Tatarinov and his biography, from of Georgy Sedov. The route of the ship "Saint Mary" in the novel exactly follows the path of the schooner "Saint Anna" of Lieutenant Brusilov. The tragic ending—the death somewhere in the snow near the Taimyr Peninsula after the discovery of uncharted lands—echoes the story of Vladimir Rusanov [10].

Information about Rusanov became especially interesting to Kursk listeners. Rusanov V. A. was born on November 3, 1875 in the city of Orel. Since childhood, he was fond of reading books describing adventures and travel, country walks, during which his first "geological collections" were collected. Rusanov V. A. studied a lot and hard. Specializing in Geology, he excelled in the study of extinct volcanoes in France and the eruption of Vesuvius in 1906. Success in his studies and research allowed him to prepare for his doctoral dissertation. In an effort to benefit his homeland, Rusanov decided to collect material for a dissertation on Novaya Zemlya, the Geology of which was almost not studied, and minerals were not explored. It was the expedition to Novaya Zemlya that determined the direction of his further scientific activity. He rightly assumed that Novaya Zemlya should eventually become one of the hub bases serving the Northern sea route, and considered it necessary to find out
the conditions for sailing along the Western coast of the island, which, in his opinion, would be an integral part of the Northern Sea Route.

![Figure 3. Commemorative envelopes about the activities of V. A. Rusanov](image)

In 1912, he was appointed head of the Svalbard expedition. According to the plan, it was to be completed in October of the same year. However, the supply of food and the abundance of polar equipment indicated that Rusanov had other intentions. This is noted by him in the final part of the plan of the expedition: "in conclusion, I find it necessary to state openly that, having a vessel of a higher type than the intended, I would look at the survey of Svalbard as a small first test. With such a vessel, it will be possible to cover the issue of the Great Northern sea route to Siberia and to come by the Siberian sea from the Atlantic to the Pacific ocean" [8].

Unfortunately, the plans did not come true. And Rusanov's expedition, as well as Sedov and Brusilov, was declared missing in 1914.

In 2000, an expedition of the Oryol state television and radio company found traces of Parking and human remains on the Taimyr Peninsula. It is assumed that they may belong to members of the Rusanov expedition.

The heroic theme of discoveries in the Arctic was received with great interest. The theme continued with an open lecture on the Arctic—the weather kitchen. The lecture was based on interactive learning techniques and elements of a virtual tour.

Interactive techniques contribute to: developing the right decision based on the analysis of information; the ability to show tolerance to another point of view; the ability to formulate and defend your own opinion based on the available facts. The most commonly used techniques are brainstorming, discussions, business games, project methods, and techniques for working with electronic manuals and GIS technologies [5], [7].

The virtual tour can be performed in the form of audio, video, or graphic materials enclosed in a software and information product. These can be sites on the Internet (video, infographics, animation, panoramas, multimedia presentations in PowerPoint, or a site created with multimedia content (for example, on the resource Ucoz) [11].

| Table 1. Fragment of the lecture |
|----------------------------------|
| **Content**                      | **Techniques and technologies** |
| **Climate warming—the Arctic and our weather** | Video demonstration. |
| At the beginning of autumn 2019, the minimum area of Arctic glaciers was registered—4.15 million km². The previous minimum was set in 2012, but then it was explained by the arrival of warm air masses from the South. This year, this circulation is not | The video shows changes in the amount of long-term and young ice in the Arctic. Note that in recent years, long-term ice is |
Statistics stubbornly confirm this "in September 2019, in the 38th week, the area of long-term sea ice in the Arctic increased by 53,000 km2. In September 1984, at week 38, the same area was 51 times larger. It's only been 35 years. Warming in the Arctic is higher than natural changes in the climate: in the winter of 2016-2018, the temperature was 6°C higher compared to 1980-2010" [3], [9].

Global warming in the Arctic is dangerous not only for the 4 million inhabitants of the North. The loss of ice is changing the weather in an area where hundreds of millions of people live. Arctic air is increasingly breaking into the middle zone of Russia, and if it is warm for the Arctic, it is very cold for us. The Kursk region also gets its own portion of cold, which can lead to frosts.

The Arctic is not accidentally called the "weather kitchen". This region plays an important role in the processes of formation and change of natural features and climate of the Earth. For example, in the Arctic, fresh water is formed and accumulated (in the form of ice and Arctic surface water mass), which then flows to the North Atlantic. These waters affect the circulation of water masses not only in the Atlantic, but also throughout the planet. Moreover, the Arctic ice sheet helps to cool the entire earth's climate, and the Arctic ocean plays the role of an important natural heat exchanger, absorbing solar energy in the summer and releasing it in the winter [9].

Increase in the frequency of natural hazards. Scientists are increasingly explaining the growth of natural hazards (OPAS) by climate change in the Arctic. Here is an example presented by Tatyana Pozdnyakova, a specialist at the Moscow meteorological Bureau. Usually, the polar jet stream in the atmosphere "flows" from Newfoundland to Europe, from there to the Black sea, the Caspian sea and Siberia. It occurs at the junction of air masses. These are streams that rush at high speed up to 300 kilometers per hour at an altitude of 10-15 kilometers. Where and how the polar jet stream "flows" depends on the temperature contrast between the Arctic and middle latitudes. The ice is melting, the Arctic is warming. It turns out that the temperature difference has become smaller. As a result, the polar jet stream weakens, it begins to shake from side to side. And, most importantly for us, there are long waves that "flow" from North to South, along the Meridian, straight from the Arctic to us. If clearly: the weather we have is in a horizontal stripe, like a vest. And vertical-like a mattress. "Horizontal" is familiar to residents of the middle zone: a cyclone came from the Atlantic-brought rain with a cool summer or snow with a thaw in the winter, then clear dry weather was established for a few days, before a new cyclone. The cycle lasts 6 to 7 days, which is called a "natural SYNOPTIC process" by meteorologists [4].

But there is also an unnatural - "vertical" weather, when the air moves along the Meridian. In this case, the so-called blocking rapidly shrinking — they are shown in bright white. This is the thickest ice that lives for 9 years and does not melt during the warm season. Young ice grows in one winter, it is twice as thin, which means that it melts and breaks faster.

Demonstration of a photo. Age (white ice — old) and the position of ice in the Arctic ocean according to earth sensing data from space (https://22century.ru/popular-science-publications/climate-myths-2/attachment/k8)/

Demonstration of photos and video clips of changes in the Arctic ice area over the past 30 years based on remote sensing data https://meteo59.ru/articles/002-led-arktiki.php

Video demonstration-NASA distribution of jet streams in the atmosphere http://dailym.ai/1fuQ1ur#v-2687464353001

Demonstration Presentation by I. I. Mokhov Atmospheric blocking and related climate anomalies Page 3 Temperature anomalies associated with atmospheric blocking http://www.nonlinearwaves.sci-nnov.ru/www_2016/materials/Mokhov1.pdf

Demonstration Presentation by I. I. Mokhov Atmospheric blocking and related climate anomalies Page 4. Repeatability of atmospheric blocking at different longitudes in summer in the Northern hemisphere http://www.nonlinearwaves.sci-
occurs. The nature of blocking depends on the time of year: in winter it brings severe cold, in summer—scorching heat, can turn into a long drought or abnormally heavy rains. In General, the weather becomes extreme and "stuck" for a long time. In the summer of 2010, Kursk for more than 50 days "melted" from the wild heat just because of such a blocking anticyclone. For the same reason, in February 2012, the frost cracked for a month.[4]. Hence the conclusion of scientists from the National ice and snow center: "warming in the Arctic leads to an increase in the frequency of extreme weather in low and middle latitudes" [10].

Open lectures are becoming popular. Members of the RGO invite everyone to attend them. But the effectiveness of solving the task can only be achieved on the basis of a systematic approach. In our case, this is a series of events that increase interest in the object under consideration. Two years of work gave positive results. They are shown in figure 4.

4. Conclusion

Modern man lives in a dense stream of various information. It seems to us significant or completely unnecessary. What is important is how and for what purpose it is presented to us. Knowledge about the modern Arctic and the history of its discovery becomes necessary and significant, because it helps us explain many changes that occur in the world around us. This applies to changes in weather and climate conditions, and the importance of solving geopolitical and economic, environmental, cultural and tourist problems facing Russia.

Figure 4. Results of the survey of active participants of the lecture hall

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