Influence of Climate Change and Anthropogenic Impacts on Worldview of Indigenous Northern Nations (as Exemplified by the Verkhoyansk District)

G S Vasil'eva¹, V P Starostin²

¹Ecological-geographical department of the Institute of Natural Sciences, FGAOU VO North-Eastern Federal University named after M.K. Ammosova, st. Kulakovsky 48, Yakutsk, 677000, Russia;
²Department of Social and Humanitarian Disciplines, Faculty of Economics, Federal State Budgetary Educational Institution of Higher Education Arctic State Agrotechnological University, 3 km. Sergelyakhsky sh., 3/1, Yakutsk, 677021, Russia

E-mail: starost@list.ru

Abstract. This article examines global climate changes occurring in the Arctic region of Yakutia through the consciousness of the indigenous peoples of the North as expressed in their mythology. It turned out that the small numbered people native to this territory for hundreds of years preserved and continue mythologizing the changes they see in the surroundings while adapting to them and interpreting them according to the folk wisdom, mythological images, and ethnic moral standards. While the global changes have been scientifically rationalized, the locals do not see these changes as disastrous, which allows them to go on surviving in extreme climate conditions, even though adverse natural, industrial and anthropogenic impacts on their lifestyles, health, and moral standards should not be underestimated. Besides, the authors focus on the correlations between the meteorological factors and the disease rate among the local populace. The dispersion analysis methods were used and explained to illustrate this causal link. The authors pioneer in combining and comparing modern scientific knowledge of the life of the northerners, the impact of various adverse factors on their lives, and the folklore of the indigenous Northern peoples. This research used general theoretical and empirical methods, and to some extent, specialized methods including cross-subject methods to analyze the complex environmental, economic, and spiritual processes and phenomena in the lives of the indigenous peoples in the Arctic region of Yakutia.

1. Introduction

We must note that the anthropogenic impact on the environment does not have to be seen as negative only. It can also be positive: we can witness the impact of human activities in the XX and early XXI centuries has been not only destructive but also stabilizing and constructive. However, the adverse effects on the flora and fauna of the Arctic region of the Republic of Sakha (Yakutia), as well as the lifestyle, traditional trades and industries, and health of the peoples that have been inhabiting these
areas for many centuries, are more prominent. We will not stick to the legal framework in defining the “indigenous peoples”, which conventionally include so-called “small-numbered peoples”, because the local populace has long since intermingled with each other due to the active migration of the recent years. Besides, the Arctic natives, in this case, may include not only the Even, Evenki, Chukchi, Dolgan, and Yukagir but also the Yakut and Russians that have lived in the area for several generations (along the banks of the Yana, the Indigirka, and the Alazeya, and in mainly in Russkoye Ustye respectively).

**The problem statement** in this research is based on the following hypothesis. We claim that some environmental problems of the contemporary post-industrial stage of development are caused by people's relying on the outlook on nature that dominated the academic community in the late XIX century or even earlier. In the Early Modern Age, mechanistic materialists, such as Francis Bacon, Thomas Hobbes, and Rene Descartes, saw nature as just a mechanism or a device created for humanity, and mankind had to study it and tame to satisfy its needs and desires. “Let the human race recover that right over nature which belongs to it by divine bequest, and let power be given it...” is the key verdict of the great English philosopher F. Bacon [1].

**The previous studies** of the topic seem to be quite scarce; it has not been in the focus of any comprehensive monographs. Today, our view of the relationships like Nature-Human and Environment-Society have changed due to the better understanding of natural phenomena and the laws of natural sciences. The technocratic civilization development and consumerism that aggravated the problems in these relationships must yield to the moderate use of resources and the ethical attitude to the environment. In the defense of the rights of the Earth itself, our contemporary, a professor from MSU n.a. M. V. Lomonosov and doctor of biology, N. N. Marfin stresses that “...humans have no right to impose the human code on nature because this code does not comply with the environmental laws of the biosphere. In this respect, ecocentrism and biocentrism are like technocracy that claims it can replace the biosphere with the technosphere [2].

**The relevance of this research** is thus justified by the complexity of interrelations between the human and nature, the insufficiency of the academic knowledge of the human acclimation and adaptation processes in the Arctic and the North. The interest of the federal government in the potential industrial development of the Far North of the Russian Federation and the problems of the northern territories make our research significant in both theoretical and practical terms.

**The methods and methodologies** we used were based on the logic of processing the goals set. The scientific research in this cross-subject area cannot always rely on generic theoretical and empirical methods, including description, comparative, field, historical, and statistical. To analyze the environmental, economical, ethical, and ethnological views of the northern peoples in detail, it is necessary to apply specialized and specific methods. These must include unique scientific research methods that can determine the quantitative impact of living organisms on the qualitative status rating for the Far North that would stipulate the detailed analysis of traditional trades and industries of the northern peoples. This research also aims at identifying the values, behavior motivations, and judgments.

### 2. The impact of climate change on the indigenous people of Verkhoyansk district

The Verkhoyansk district is one of the largest administrative territories in the Republic of Sakha (Yakutia). Its overall area is 137.4 thousand square km; the majority of which is the mountain taiga landscape. The absolute elevation of the highland area is 2000-3000 m above the sea level. The entire territory of the district has permafrost of between 300 and 500 m thick.

The district is located in the northwestern part of the republic, north of the Arctic Circle, in the Yana river basin. It belongs to the Far North and Arctic district groups. Its administrative center is Batagay township located 1723 km from the regional capital by land, 2785 km by water, and 705 km
by air. Due to the lack of all-year land overland routes, winter roads are used in winters. There are 14 naslegs and 29 settlements in the district that include 26 rural and 2 industrial settlements, and 1 town under regional jurisdiction. The population density in the district is 0.09 people per 1 square km. [3]

The first frosts begin from the middle of August, which can be seen as the beginning of autumn. The cold spells are, however, possible throughout the entire year, even during summers. On average, vegetation ends by September 6th, and the snow cover sets approximately by September 23. The transition of daily mean temperature to -5°C happens approximately on October 4th.

Winters last for 7 months on average. In October, when the season starts, the mean temperature is -15°C, and in November, it is -30°C. Further on, up to the end of February, the daily temperature averages remain below -40°C. The snow cover is relatively small. It persists for 215-235 days every year, although the snowfall is not large: the average is 30 cm. The Yana highland sees only about 300 mm of precipitation per year, which allows us to classify this area as arid.

The upper Yana region is located near the border with temperate and subtropical zones; its climate is sharply continental: winters are extremely harsh, long, cold, and dry, and summers are warm and relatively dry with possible cold waves and snow during summertime. Verkhoyansk, where weather observation began in the 60es of the XIX century, is a settlement with the largest amplitude of the highest and the lowest temperatures, and the largest monthly average temperature drop in Russia. The lowest temperature in the Northern hemisphere was also registered in Verkhoyansk, and it was -67.8°C (1892).

The summer of 2020 was also record-setting for this old town established in 1637: on June 20th, it was +38°C, which the highest temperature throughout the whole history of observations in Verkhoyansk.

The number of companies, organizations, and institutions of various forms of ownership is over 200 in the entire Verkhoyansk district. The areas of employment are dominated by mining and geological companies, aviation, housing and utility sector, telecommunications, power, postal service, agriculture, forestry, road industry, healthcare, culture, sports and fitness, trade, etc.

The scientific study of the impacts of climate on the economic activities, lives, and health of the local populace became a pressing problem since the early XX century. The main reason for that was the growth of the urban population, the increase in industrial development, and other urbanization processes, which led to the pollution of the environment with the wastes from mining and processing industries due to the extensive production. These changes became the key factors in breaking the environmental balance in the world.

Research works primarily focused on the impact the climate had on people's health that considered the simultaneous influence of various and constantly shifting conditions: air temperature and pollution, solar radiation, humidity, atmospheric pressure, wind direction, and force, etc. It was noticed that these factors influence the depth and frequency of breathing, the blood flow velocity, oxygen supply to body cells and tissues, lipid exchange, and muscle tonus [4]. This interest was ignited due to the employers’ interest in increasing the performance of the labor resources.

Thus, climate change is not only the problem of our age, its relevance is connected with the increase of knowledge in this area and the amount of physical data recorded with modern devices. The increase in the processing rate for huge amounts of information led to its accumulation and problems with analyzing the input data. This is one of the causes of their variance and probabilistic interpretations. When analyzing the impact the climate has on the lives and health of people, we can speak of the “environmental burden” of various problems that become harder to control and evaluate.

The climate change today caused up to 150 thousand deaths and the loss of about 5.5 million years of living due to acute intestinal diseases, malaria, insufficient and unhealthy eating, as well as deaths and injuries resulting from floods. Today, this factor is analyzed along with other health risks, such as smoking, alcohol, obesity, low physical activity, etc. [5].
This complex analysis of climate influencing the health and lives of peoples of the Arctic and the North can yield a more or less satisfactory answer to our question. That being said, it is necessary to find the criteria that would help separate the natural impacts from anthropogenic and industrial impacts: we often cannot change the impacts of the first type, while the second type can be controlled or eliminated.

3. The impact of climate warming on the health of the local populace

The climate warming registered in recent years directly influences the economic activities of the local populace. That and the regular flooding of the tundra, waterlogging in the area, permafrost deterioration, water, and soils pollution put at risk the opportunity to practice the traditional economy, national industries, etc. For example, nomad camping grounds are constantly reduced due to the development of oil and gas fields located in the migration routes of the wild deer, which as a natural resource for the development of domestic deer farming. This correlation between the economy of intensive exploitation of subsoil resources and the preservation of territories where small-numbered peoples live and conduct economic activities presents a pressing problem of today.

Despite the sharply continental climate of the Verkhoyansk district, it must be admitted that climate warming has a negative impact on the health of the local populace. The vulnerability of the northerners’ health under the increase of average summer and winter temperatures is beyond doubt. “Climate warming results in an increase in the number of days with excessive temperature. Even a short-term temperature rise can lead to increased mortality among the population due to the disease flares (coronary heart disease, diabetes, respiratory diseases), accidents, suicides, and murders” [6]. Such increases in daily average temperatures are especially dangerous for the elderly, disables, children, and the poor, who cannot afford a comfortable place for living and other activities. The increase in temperature is often complemented with the increase of the atmospheric pressure and air pollution.

It is only natural that these problems are aggravated by the possibility of infection spread: in Yakutia, many diseases are transferred by mosquitoes and ticks. In recent years, our region saw a real threat due to the tick bites: these insects are not typical of the majority of Yakutia's territories, especially in the Arctic zone. Nowadays, however, ticks go further north, and the associated diseases are registered almost every year.

Hypothetically, we can imagine even worse developments if the climate in the Arctic and the North continues to warm up: in the old days, permafrost was a natural protector for burial sites of animals and people who died of plague, anthrax, and leprosy. With the large-scale melting of the permafrost, these diseases might come up and the consequences of that are hard to predict. This can present a threat to the entire planet.

Besides, we shall consider the following factor: in the past, all social organization and spiritual life of the Northern peoples used to be strictly determined by both the social regulations and the specific ecological conditions. The formation and operation of social institutions in each of the communities, in their turn, were unique due to their ethnic background. The most interesting and difficult to comprehend phenomenon associated with the peoples and ethnic groups of the Arctic is the traditional worldview that reflects and explains the surrounding nature and social realia in peculiar ways. The study of the origins of traditions and beliefs of these peoples can extend our knowledge of the Earth, identify the constants of spiritual life based on the careful attitude to nature, protecting and facilitating the biological diversity.

If we address the ancient layers of folklore, the bases of religious beliefs and mythology, “we’ll see that the world, according to the early beliefs, was created in a fierce struggle of the polar elements and forces, and the ordered cosmos was preceded by chaos and violent battles between gods, heroes, and
monsters" [7]. Many myths state that our universe plunges into chaos once in a while, it has been destroyed and revived from the ashes of non-existence multiple times.

The authors of the article conducted research, whose results were presented in a collective monograph entitled Society. Culture. Education (1917) [6]. To identify and record the correlations between the meteorological factors and the specific diseases, we carried out a comparative analysis and some calculations using the method of pairwise correlation for both primary and overall disease incidence among children and adults from the Verkhoyansk district for 9 years, 2005 to 2014. The obtained 266 correlation coefficient indicators gave us 24 parameters signifying a clear connection of diseases with climate conditions, in which the people live. The results obtained are presented in Table 1.

Table 1

| Overall disease rate among children | Wind velocity and infectious diseases | -0.79 |
|------------------------------------|-------------------------------------|-------|
| Overall disease rate among adults  | Air humidity and nervous system disorders | +7.6 |
|                                    | Wind velocity and nervous system     | -0.69 |
|                                    | Precipitation and skin and hypoderm diseases | +0.61 |
| Overall disease rate among adults  | Clouds and nervous system disorders  | -0.81 |
|                                    | Humidity and eye diseases            | +0.6  |
|                                    | Clouds and eye diseases              | -0.7  |
|                                    | Clouds and circulatory system diseases | -0.67 |
|                                    | Precipitation and digestive system diseases | +0.62 |
|                                    | Clouds and ear diseases              | +0.79 |
|                                    | Humidity and ear diseases            | -0.71 |
|                                    | Precipitation and skin diseases      | +0.74 |
|                                    | Precipitation and locomotor system diseases | +0.74 |
| Primary disease rate among children | Wind velocity and infectious diseases | -0.81 |
| Primary disease rate among adults  | Wind velocity and respiratory diseases | +0.63 |
|                                    | Precipitation and infectious diseases | +0.84 |
|                                    | Clouds and tumors                    | -0.6  |
|                                    | Humidity and eye diseases            | +0.8  |
|                                    | Humidity and ear diseases            | +0.67 |
|                                    | Clouds and ear diseases              | -0.67 |
|                                    | Clouds and circulatory system diseases | -0.62 |
|                                    | Air temperature and locomotor system diseases | -0.69 |

A simple example explaining the methodology of dispersion analysis is a single factor analysis of various autonomous groups consolidated under one parameter. To confirm the equality of the dispersions, Levene's test is conventionally used. If the dispersions are univalent and equal, the analysis and evaluation of the correlation between the in-group and cross-group dispersions are carried out using the so-called Fisher's F-test that can explain the existing correlation more objectively.

Thus, to increase the validity of the obtained data, we had to perform a single-factor dispersion analysis. The results for Fisher’s F-test had to be over F critical. We also analyzed the variance of value investment both after a specified time and across categories, which produced the results that completely corresponded with the correlation coefficient. The table shows that the locomotor diseases among adults completely correlate with the precipitation. It is confirmed by the correlation coefficient, which, in this case, equals 0.74, which indicated a moderately genuine link.

We also identified the link between precipitation and the primary incidence of infectious diseases among adults. It has a correlation coefficient of 0.84, which also indicates a moderately genuine link.
The closest connections between specific diseases and weather conditions were found for eye diseases and humidity: \( r = 0.82 \); as well as precipitation and some infectious and parasitic diseases: \( r = 0.84 \).

Thus, our research methods showed genuine connections between various classes of overall disease incidence among both adults and children and weather parameters, which are confirmed by doctors and ecologists. Weather conditions are not the only causes of disease incidence and progression but they are among the key dominants that increase or decrease the statistics for the causes of disease and mortality among the local populace.

4. Lessons of history and folk wisdom

Everyone in Yakutia knows the story of Zashiversk, a town that disappeared due to the spread of black smallpox during the two epidemics of 1773 and 1883: this once rich and affluent settlement ceased to exist for several years twice. It is believed, that some of the locals left for the Upper Yana region, Abyi and Khonuu, and the Russian cossacks mainly relocated to Russkoye Ustye. Settled Russians and Yukagirs suffered the most casualties: once numerous Yukagir tribes were mown out so much that even today there are only several hundred people of them.

The nomadic tribes of the Even and Yakut suffered less as they borrowed the lifestyle of the northern peoples and were half nomadic: they lived in naslegs during winters and in sayyluks during summers. This helped them to promptly migrate to new smallpox-free habitats. The fact that they lived at some distance from each other also helped escape the spreading infection.

The folk legends say that the black smallpox was only stopped by Sargyl, the shaman who set protection hear the estuary of the Eheleekh river (Medvezhye, bear-place) and on the Ynyyr Taas (Stone Saddle) mountain. This protection is known as the “shaman arbalest”. The shaman proclaimed: “No one shall defuse this arbalest, only smallpox but it will be scared of it”. This invisible arbalest, the river itself (the bear is a force of nature), the mentioned mountain (as the basis of life) - all of these things have a special meaning, which can be interpreted as “the source of evil is humans, their lives and mind. It the mankind controls itself, the arbalest will not will it, and if mankind does not rely on the natural and social bases of its existence, any disease will defeat it. Zashiversk was not just any town. It was the center of civilization, filled with people of different origins, a place for trading and commerce. It was naturally filled with the social “diseases” typical of such trading posts: hoarding and fraud, “nothing but business”, gambling and alcohol, profiteering, and fornication. People from other towns envied Zashiversk. Mayor Ivan Rebrov wrote: “The land of the Yukagir is densely populated, and the Indigirka river is full of fish; the land of the Yukagir is abundant in sables; many rivers flow into the Indigir river, and along all those rivers, numerous unmounted and reindeer-breeding people live; and the Yukagir have silver” [8].

The Yakut, Even, Evenki, Yukagir, and other northern peoples have always believed that nature can both punish people for their obvious and covert mistakes and revive, restore the flow of their lives. Life itself appears from nothing, from the “smallest small”. “There was no land. The Even sailed across the sea in a raft...”. Another Even myth says that originally all the land was covered in ice. “The sky shaman made disobedient and stubborn heroes (sevuyker) descent onto the ice. Because of the cold, these heroes grew hair on their bodies. When it got warmer, the ice started to melt and the heroes started to raft. There appeared animals, fishes...” [9]. “...The diver brought a tiny bit of clay from the seafloor and put it on a young man's palm. “Oh, how could one make land from such a tiny fleck?” – he thought. With his fingertip, God picked up the fleck of clay and put it on his left palm. The young man saw that the fleck of clay in God's palm became a lump the size of a squirrel's stomach (kebel din). He put this lump on the edge of the raft. The young man turned around and saw that the lump became the size of a deer's hoof (oran kokchinni din). In the evening, it was already the size of an elk's stomach (egdete uran din). In the morning, he saw that his raft is moored on the shore of some island (egden bukchen selilen) ...”. Similar plots can be found in the myths of the Evenki [9, 10] and
Chukchi. They all state that the world was created from the tiniest piece of matter. The depth of this assumption about the origin of their land, which is widely spread among the people in question, is amazing.

One of the authors talked to one of the district elders during the field study. It was an old Even who roamed with his herd in the Arctic tundra. The old man, despite not being able to obtain proper education due to the Great Patriotic War, was very interested in what was going on in the world and knew well about the politics and economics in the country. When asked about the causes of the environmental problems in his area of residence he thought for a little and replied that many current mischiefs were probably sent by the Mother Earth to the local Even for their predatory hunting and reckless attitude to the game during the 90es. Despite the seeming primitivism of this interpretation, it contains the homespun truth, expressed in the folklore. It states that one should take responsibility for their life rather than searching for the guilty somewhere else.

5. National cuisine as the health indicator for the indigenous people of the Arctic and the North

The uniqueness of the Yakut cuisine is in the abundance of food rich in proteins and fats that make it most suitable for survival in the climate conditions of the Arctic and the North. In the Arctic, the impact of cosmic rays and solar radiation is more prominent than closer to the equator. This is due to the features of the Earth's magnetosphere. Solar radiation is materialized through numerous types of electromagnetic radiation and other meteorological phenomena that can be registered by scientific instruments in the territory. The native people of the Upper Yana region have a specific metabolic mechanism, the so-called “polar metabolic type” that determines the respective diet. The consumption of large amounts of proteins and a minimum of carbohydrates is necessary for better adaptation to the surrounding conditions. The role of carbohydrate in the nutrition of the people of the Far North is reduced, while the importance of fats and, to a lesser extent, protein products, i.e. the bodies of northerners rely on lipidic, rather than on the carbohydrate metabolism. We can say that the indigenous people of the North shift to the lipidic metabolism when endogenic fat is burned faster than exogenic. That is why the indigenous locals involved in traditional industries can consume large amounts of meat and fats and maintain low rates of coronary heart disease and arterial hypertension. On the contrary, those who migrated north of the Arctic Circle and those who live in industrial settlements or study in boarding schools often have these diseases and consume a lot of carbohydrates.

National cuisine, ethical and ethnical bases of food preferences of the indigenous people have always reflected the traditional forms and standards of consumption. Indigenous people maintaining traditional lifestyles, national economy type, and involved in traditional industries normally hunt wild game and fish. That being said, they all understand the norms that regulate the amounts they can take from nature: a local will never kill an animal or catch a fish ‘for sport’ but rather take as much as they and their family need from mother nature.

The Yakutian Expedition of the Academy of Sciences of the USSR was initiated by the government of the young autonomous republic 95 years ago [11]. At the time, it was the most comprehensive research aimed at obtaining exact data on the status of natural, biological, and human resources in the region and identifying key areas of economic and social development for Yakutia. Key areas, among others, included the statistics for disease rate, mortality, and population growth, cattle breeding experience, food preferences, and the ethnographical profile of the local populace.

The scientifically rationalized and practical results and recommendations obtained by the expedition determined the development of this former province of the Russian Empire for many years to come. Some of the recommendations from this research have been in use up to recent times. The experience of this expedition became the basis for the arrangement and fielding of the Kazakhstan expedition of 1926, the Turkestani-Siberian expedition of 1927, and the Chuvash and Bashkir expeditions of 1928.
Apart from purely practical goals and objectives, the Commission for the study of Yakutia, established at the same time by the Academy of Sciences of the USSR, solved personnel issues as well: it trained academics, established schools and scientific institutions in the republic, and identified new areas in geosciences.

We believe now is the time to arrange a new comprehensive expedition in the Arctic regions of the Russian Federation with similar goals. It must involve both scientific practitioners and sociologists, ecologists, psychologists, philosophers, folklorists, etc. We can conclude that only comprehensive and multidimensional research can yield help explain the dependencies determining the further development of environment and social life in the Arctic and the North. It will be a powerful impulse for further cross-subject research in this territory.

6. Conclusion: research results
We are certain that without the consideration of the traditional views of nature, analyzing ethnic mythological and pre-religious worldview bases, studying the ethical bases of people’s lives, our knowledge of the Earth will be incomplete. Folklore and mass consciousness often reflect, sometimes modified, the laws and dependencies regulating the relations between nature and society. The academic knowledge of the surrounding world provides the mankind with the opportunity to efficiently use these forces for its benefit and to satisfy their needs. Besides, reckless and uncontrolled use of resources leads to their depletion.

In the Republic of Sakha (Yakutia), there are areas of pristine nature. The Far North and the Arctic territories of our region are a single huge nature reserve that can be used to trace the climatic changes on Earth through the study of karstic deposits and glacial breaks in the tundra. We could have assumed that environmental problems will have a minimum impact on these territories. However, this is a mistake, since any economic activity using modern methods and mechanisms can lead to disastrous consequences for the unique flora and fauna of the Arctic. It is so fragile that even the smallest change or impact can lead to irreversible losses for the environment of the entire region. The key feature of all animal and plant species in this region is their ability to survive in extreme conditions. It is, however, not enough to overcome the adverse anthropological impacts.

The peoples of the North still maintain protective traditional economic methods. These unique hunting and fishing practices are designed to provide for oneself and the family while inflicting minimum damages to the surroundings that are perceived as kindred and reasonable. Nature or the Earth itself for them is a temple that cannot be subject to human regulations because it will have its revenge and defeat the humans. Thus, a special type of human was formed in this region, i.e. the northern human, a representative of the circumpolar culture. It values spirituality above all and sees all living beings as having the same rights and obligations. “It is a special type of biospheric equality. This type of human admits acknowledges the intrinsic value of life on Earth. The combination of all that led to the emergence of signature tolerance to everything: nature as the object of worship, imitation, and protection” [12]. In folklore consciousness, nature always cares about humans. Nowadays, there is a modern mythological idea that nature always comes to humans’ aid. The people of Verkhoyansk district still keep the memory that during the Great Patriotic War there were so many hares that people hunted them with simple sticks. In the 90es of the twentieth century, many families were saved by the herds of wild reindeer grazing near settlements.

The northern humans have always been substantial in their worldview and unhasty in activities. Other specific features include exceptional optimism and believing in nature, people, and human. You will not find disastrous predictions in their myths: all hardships are perceived as natural and temporary.

As a result of the research conducted, we came to these conclusions: the overall degree of environmental tensions in the Verkhoyansk district is quite low. Natural and biological complexes see
little changes in the traditional economic activities of the local populace, and recent years saw the comeback to traditional industries and the associated reduction of economic activities. The results of the research also show that there are dependencies between the changes in climate conditions and both economic and social life. The mass consciousness in recent years has created new mythological views of the development prospects for families and entire nations that undertake to explain and interpret the changing climate and social standards.

We claim that the current conditions call for the further development of comprehensive approaches to the study of the impact of changes in climate and nature on the lives of the people of the Arctic and the North, along with satisfying the social, environmental, and spiritual needs of the people.

7. References
[1] Bacon F 2002 Great Organon of Sciences (Moscow: Directmedia Publishing) p 19
[2] Marfin N N 2007 Ecology and Ethics (Moscow: Publishing House MNEPU-Avant) p 166
[3] Ghazaryan P P 2003 History of Verkhoyansk (Yakutsk: YAF publishing house SB RAS) p 36
[4] Trufaktin V A, Khasnulin V I 1998 Medico-ecological problems of health protection of the population of the northern regions Complex social and hygienic research in the territories of Siberia A look into the XXI century (Novokuznetsk: Research Institute of Complex Problems of Hygiene and Occupational Diseases of the Siberian Branch of the Russian Academy of Medical Sciences) pp 3-16
[5] Revich B A 2008 Predictions of changes in the health of the population of Russia in a changing climate Problem of forecasting 3 pp 140-150
[6] Vasilieva G S, Vladimirova E L, Vladimirova S A et al 2017 Society. Culture. Education Book 3 (Moscow: Publishing House of the Academy of Natural Sciences) p 19
[7] Evsyukov V V 1988 Myths about the Universe (Novosibirsk: Science) p 6
[8] Okladnikov A P et al. 1977 Ancient Zashiversk: an ancient Russian polar city (Moscow: Nauka) p 38, 74
[9] Robbek V A, Dudkin Khl 1978 The myth of the origin of the earth and man in Even folklore Epic creativity of Siberia and the Far East. Materials of the All-Union Conference of Folklorists (Yakutsk: Yakutsk Branch of the Siberian Branch of the USSR Academy of Sciences) p 157
[10] Romanova A V, Myreeva A N 1971 Folklore of the Evenks of Yakutia (Leningrad: Nauka) p 71
[11] Yakut expedition (1925-1931) 1936 Yakut expedition of the USSR Academy of Sciences (Moscow - Leningrad: Printing house of the Museum of the Peoples of the USSR) 23 p
[12] Robbek V A 1996 Tolerance - the basis of the circumpolar culture of the peoples of the North and the Arctic Tolerance and the peoples of the North (Yakutsk: Severoved) p 7