It is possible to state that the questions considered by medical geology become more and more important for the mankind, and Russia is not an outsider in medical geology. Despite the great contribution and a large number of scientists working in this field, it is very important to increase a number of working opportunities and develop already existing geomedical infrastructure located in the Far East and Siberia [2].

Actually, within the framework of «The development strategy of the geological sector of the Russian Federation until 2030» the problem of population health, which is interrelated to geologic exploration and mining enterprises, becomes a strategic one. Moreover, to deal with the problem of the lack of jobs it is necessary to adjust the curriculum towards an in-depth study of Natural Sciences boundaries, such as medical geology. As for ways to increase the interest among young people, the only way is to involve teenagers in research of local territories, which allows determining the conditions of the environment.

To sum up, it is necessary to note that medical geology is able to change people's attitude to the environment. Studies of the scientists working in geomedicine area demonstrate clearly how our activities affect our health. But only extensive educational work can consolidate this effect. Eventually, only individual understanding of each person in Russia will give the opportunity to determine Russia's place in the geopolitical arena in future.

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THE ARCTIC ZONE: POSSIBILITIES AND RISKS OF DEVELOPMENT

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Nowadays, the Arctic zone is a very important subject of international geopolitics. In addition, this is an extremely important ecological and environmental subject. The Intergovernmental Panel on Climate Change has informed again about serious and irreversible effects of global warming. The ice floe melts, the inhabitants run away, the biodiversity suffers, and, often, disappears. So the threat is real [3].

The challenges are numerous: to open a new seaway, to create air stops, to exploit new hydrocarbon and gas deposits, etc. No doubt, the Arctic is a zone of technological innovations and new perspectives and possibilities. For centuries, and even in the twentieth century, the Arctic has remained almost unknown, except indigenous peoples living there for millennia. Subsequently, the increasing military build-up in the North, from Alaska to Siberia, has placed the region at the heart of the conflicts of the Cold War and made from it a forbidden zone for almost the second half of the previous century [8].

Also historically, in comparison with European and Asian civilizations, the Arctic, as cooperation territory, in the field of economic and political progress, is almost like a new planet; the region is so young in the global context that has no equivalent in the world.

One of the most important and dangerous question is the problem of the Arctic zone division between different countries. Originally, there are five countries of the polar circumference: the United States, Canada, Denmark (via Greenland), Norway, and the Russian Federation. Approximately 25% of the undiscovered reserves of natural gas and oil are supposed to be located in the Arctic[1].

But in the 1990s these five countries with the participation of another three ones situated in the Arctic zone, namely, Finland, Iceland, and Sweden, created a high-level intergovernmental forum – the Arctic Council. During the creation of the Arctic Council in the 1990s, the eight member states were still hesitant in their approach and their mandate was very limited, mainly reduced to science and the environment; a rotating presidency and no permanent secretariat.

Nevertheless, the Arctic Council has matured, has turned into an effective tool for negotiating treaties, global agreements and concrete actions. In addition, even more remarkable, since the decision of the Council of Ministers of Kiruna in 2013, more than half of the G20 countries, the main countries of Europe and Asia, will be one way or another at the Arctic table. The Arctic, yet distant and unknown to the late twentieth century, has become a new field of action where the main economic and political forces advance gradually, ensuring their presence and long-term interests [6].

The intersection of multiple factors can cause the geopolitical conflicts in the Arctic, often under the guise of legal considerations [7]. Land claims are not frozen. They are even essential, especially playing on the extension of the exclusive economic zone by extended continental shelf. There are limits of the Committee of the Continental Shelf and of the Committee of London. It is up to them to decide these claims based on rules set by the United Nations Convention on

the Law of the Sea. The treatment of territorial disputes seems to take place in serene conditions despite what the media echoes let appear.

In this context, it is very important that the economic interest is a powerful engine of compromise. In this regard, the relationship between Russia and Norway can be a good example. The land border between Russia and Norway was conformed in 1944, at the end of World War II. A treaty was signed between the two countries, to the detriment of Finland, which lost its access to the Barents Sea. Nowadays, Norway and Russia are active and well represented in a multitude of organizations: the Arctic Council, the Euro-Arctic Barents Council, and the Council of Baltic Sea States. This institutional overlapping is also established at the regional level. For example, the county of Finnmark and Murmansk Oblast have cooperation agreements, either economical or institutional. Another example of this stability: economic interdependence.

This interdependence between Oslo and Moscow is also found on the capital and financial plan. The Norwegian pension fund, very powerful, has a varied portfolio of shares in major companies in the world and especially in major Russian companies in the banking and energy sectors. For example, Tele North Norwegian Telecommunications Company owns 33% of the Public joint-stock company "VimpelCom", one of the three largest Russian telecommunications companies. It should be added that in September 2010 the Treaty of Murmansk was signed, to resolve a long border conflict between Russians and Norwegians. This treaty, signed between Russian President and Norwegian Prime Minister perfectly illustrates this stability [5].

Note, that the Barents region is the most populous of all the Arctic area. There are nearly 3 million between Murmansk Oblast, Arkhangelsk Oblast and the Republic of Karelia. The three most populated cities are Murmansk, 300 000 inhabitants, Arkhangelsk 350 000, and Petrozavodsk, capital of Karelia 270 000. The Russian side represents the largest population. On the Norwegian side, Tromsø is situated, the largest city in northern Norway with 70 000 inhabitants. Then we may say about indigenous people, Fennoscandia and the Kola Peninsula are home to around 40,000 Sami, Norway is home to half of this population. For Russia, although there are no official figures, the population of the Sami could remain around 2000 inhabitants [5].

The bilateral relationships between some Arctic riparian countries are very good organized. But as for the eight member states of the Arctic Council one of the basic document that regulates their relationships in the Arctic region is the Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic (see the Figure), signed on 12 May 2011 in Nuuk, Greenland [4].

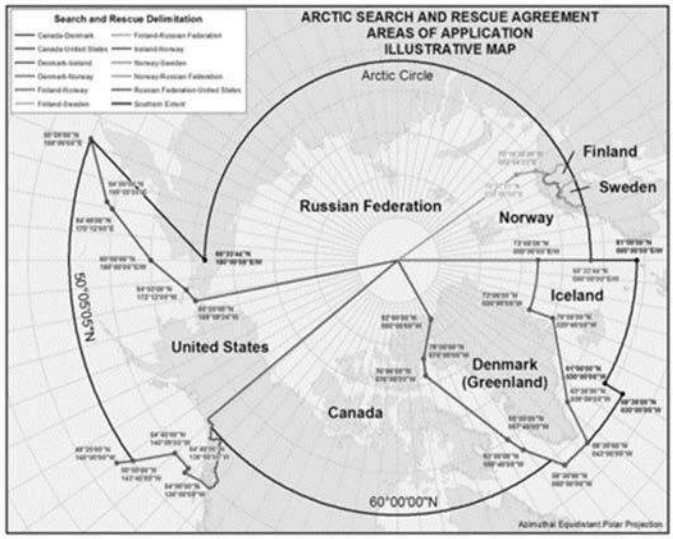

Fig. Map of the Arctic search and rescue areas, the Agreement of 2011 [4]

The modern Arctic is the crossing point of scientific parameters, technical, diplomatic considerations and legal questions. At present, it is accepted that global warming contributes to lower limits of the polar caps, opening up new opportunities in navigation, which would constitute a new ocean permanently ice-free. Conventionally distinguished, among the so-called Arctic seaways, the most important are the Northern Sea Route along the Russian coast, and the Northwest Passage that borrows multiple straits and bypasses in the Canadian archipelago of islands. The only uncertainty concerns the date on which a track is navigable throughout the year. Over the decades, these two Arctic sea-lanes were completely ice-free, but only for very short periods, especially in September. Moreover, it is not sure that the appropriate port infrastructure already exist, including the Canadian side. However, the riparian States have begun to develop these Arctic waterways. Russia uses it more than any other country. In 2010, four ships passed through the Northern Sea Route; the following year thirty-four ships passed along the Russian coast. Another important issue leads us to emphasize the global dimension of the Arctic fate: the continued protection of its ecosystem [2]. Any human intervention is likely to disturb the balance between plant and animal species. The Arctic is a very vulnerable region. Take the example of migratory species arriving in the Arctic summer, precisely when routes are the most feasible. Ships

and animals are concentrated in the same places, and that increases the risks. Now it is known that the disappearance of species in a chain influences others, especially in an environment where the number of species is relatively small, that is the case of the Arctic. There is no need to mention the risks of pollution because of the oil and gas development.

The above-mentioned examples show that the issues of the Arctic cannot be treated in small groups. It interests worldwide and not only the riparian states. It is in this context that the continued active engagement of all the countries is of particular importance. The risks of the Arctic zone can be transformed into new possibilities not only for the Arctic region but also for the whole world. And in this situation the most important and fundamental efforts should be done by the key players of the international geopolitics of our days, namely the Russian Federation, the United States, the European Union, and the People's Republic of China.

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ASSESSMENT OF RESERVOIR TEMPERATURES OF TARYS AND CHOYGAN GEOTHERMAL SYSTEMS (EASTERN TUVA)

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The territory of the eastern Tuva refers to the continuation of the Baikal seismogenic Rift Zone and has significant reserves of geothermal resources. These hydrotherms formed due to the numerous deep faults and the presence of faults in rocks. The thermal and sub-thermal springs manifest by the high temperatures and active depth heat and mass transfer in the bowels of the Eastern Tuva[3].

One of the interesting aspects of the geothermal system study is to determine the subsurface reservoir temperatures, as one of the factors in the groundwater formation. Geothermometers are the most important and universal geochemical tool for the evaluation of reservoir temperatures. The first geothermometers developed by Bodvarsson and Palmason in 1961 were exclusively empirical and based on the link between the silicon content and the contents of some the cations with the reservoir temperature [2]. Using geothermometers involves the establishment of the chemical equilibrium in the geothermal system between a mineral and fluid

In this regard, the aim is to study the thermal conditions of the geothermal system in the Eastern Tuva.

The study of thermal waters in the Baikal Rift Zone was conducted by Lomonosov I.S. (1974), Lisak S.V. (1976), Polyak B.G. (1992), Zaman L.V. (2000), Plyusnin A.M. (2000), Golubev V.A. (2007), Shvartsev S.L. (2015) et al. Badminov P.S., Orgilyanov A.I., Ganchimeg D. (2011) studied subsurface temperature in this territory. Rychkova K.M., Duchkov A.D., Lebedev V.I. and Kamensky I.L. etc. (2007, 2010) carried out the assessment of the heat flow in the Tyva region. In Polyak's works (1994) isotopic composition, heat, and mass transfer of fluids for the Baikal Rift Zone were recorded.

The thermal springs of natural spa complexes Choygan and Tarys were selected for the geothermometric evaluation of the Eastern Tuva geothermal system. Choygan is located in the East Sayan in the north-east of the Republic of Tyva on the border with Buryatia. This is a reservoir of carbonic cold and thermal waters. Groundwater is discharged in the form of springs with the temperature on the surface of up to 39 °C, but the deep water temperature is much higher.

Tarys sources are located on the border with Mongolia, in 300 kilometers southwest from Choygan in outskirts of the Prehubsugul's plateau, it is a province of nitrogen water. The water temperature in Tarys springs reaches 50 °C. The water is considered as medicinal and used by local residents.

Hydrothermal springs of Choygan and Tarys are the hydrothermal system belongs to the southwestern flank of the Baikal Rift Zone, which is formed by heating groundwater of the regional thermal field in the process of deep circulation. The formation of these sources is associated with areas of young volcanism in the Eastern Tuva and, probably, is controlled by a large single submeridional fault [1, 5]. According to the helium isotope, the heat flow rate is 68 mW/m^2 in Tarys and 84 mW/m^2 in Choygan [3].