

## Keywords

Azerbaijan,  
Geology,  
Sanatoriums,  
Medical Treatments.

Received: February 12, 2022

Accepted: March 14, 2022

Published: April 02, 2022

# The importance of Sanatorium-resort complexes for medical treatments in Azerbaijan

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## Abstract

Azerbaijan is a country rich in its subsoil and surface natural resources. There is a colorful hydrographic network in the Greater and Lesser Caucasus, and Kur lowland that separate them. Our republic with a very fascinating landscape is more beautiful in a river, lake, waterfall, spring and others. The Caspian Sea, high mountains and green forests are further beautifying the homeland. Among such beauties, sanatorium-resort complexes are more attractive. Thermal waters with temperatures of 72 C are used for treatment purposes in the territory of Shikhov, Baku city. These waters play a big role in the treatment of spinal, skin-venereal, wind and other diseases. Everyone may use thermal waters in Goran, Samukh, Gazanbulag, Tartar, Barda, Aghjabadi, Khachmaz, Lankaran, Astara, Masalli and other places for treatment purposes. Other territories of our republic also have sanatorium-resort complexes. So, waters used in Galaalti are being for treatment of kidney stones. There is a very important resort complex in the bosom of nature. In general, Azerbaijan is a country distinguished with its beautiful resort zones. Sanatorium hospitals which operate in these zones are well-known for treatment of cardiac, cardiovascular, nervous system, gastrointestinal, chronic and other diseases. In this regard, we welcome everyone from different countries of the world to the sanatorium-resort hospitals of our republic.

## 1. Introduction

The territory of Azerbaijan Republic is 86,6 thousand km<sup>2</sup>, locates in the east of Transcaucasia, it has the same border with the countries of Russia, Georgia, Armenia, Iran and Turkey and its coasts covered completely with Caspian Sea from east. Wide Kur-Araz Lowland locates among mountain ranges of the Caucasus, Absheron Peninsula which extends along the Caspian Sea and being rich in oil and gas, Samur-Shabran in the north-east of Greater Caucasus, Lankaran plain among Caspian Sea and Talish mountains, their territory is the area of cropping and they are territories where 70-80 % of population and industry of the republic assembled (Bondarenko et al, 1971). The Gobustan foothill zone is famous for its mud volcanoes, clay karsts and badlands (Dadashov 1974).

As in the most of world countries, thermomineral water resources are limited in Azerbaijan and spread unevenly spread. There are thermal water resources in our country with a temperature of 94<sup>0</sup>C. As a result of hydrogeological researches, the spread of underground water resources on the territory of Republic of Azerbaijan and for what purposes they are used has been determined by considering their quality. The

existing and forecasting exploitation resources of fresh, mineral, thermal and industrial waters have been given on deposits of these waters, their separate areas, if possible, on watery horizons (Salakhov, 2011).

Thermomineral water deposits with therapeutic significance occur widely in Azerbaijan. Well known ones are Istisu, Sirab, Vaykhir, Gizilja and Turshsu, which are invaluable in the treatment of many diseases, are world-famous.

Healing waters have a special place and role among natural geological resources. These are spread freely in mountain rocks below the earth's surface. This feature creates geological resources of some types of thermomineral waters, they restore natural resources on the basis of regular circulation of water steams in the Earth.

As a result of hydrogeological and balneological researches conducted in the territory of the Republic, the formation and spread of these waters, their resources and areas of use have been determined. As they have different types, they also have different balenological features. They are indispensable in treatment of many diseases. These waters are found in the depths from 200-300 m up to 1000-1500 m

through wells, besides natural outputs as springs (Salakov, 2003).

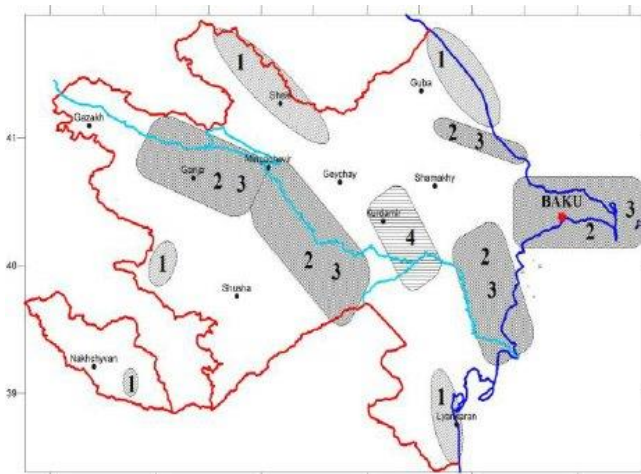


Figure 1. Map of geothermal fields in Azerbaijan (Adopted from Mukhtarov et al, 2015).

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As a result of hydrogeological researches, the spread of underground water resources on the territory of Republic and for what purposes they are used has been determined by considering their quality. The existing and forecasting exploitation resources of fresh, mineral, thermal and industrial waters have been given on deposits of these waters, their separate areas, if possible, on watery horizons (Salakov, 2011a).

Thermomineral water deposits with therapeutic significance are spread widely in Azerbaijan. "Istisu", "Sirab", "Vaykhir", "Gizilja", "Turshsu" and others, which are invaluable in the treatment of many diseases, are world famed.

Healing waters have a special place and role among natural geological resources. They are located in mountain rocks below the earth's surface. This feature creates geological resources of some types of thermomineral waters, they restore natural resources on the basis of regular circulation of water steams in the Earth (Salakov, 2011b).

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Thermal waters differ in their temperatures, chemical and gas composition and other features. They are found especially in fracture, fracture-vein and layer-type structures, in many different depths (2000-3000 m, deeper) through springs and wells. The use of these waters having great resources and high temperature meets great part of demand to thermal energy of the Republic. But its use has not been solved in the republic (Salakov, 2011d).

Industrial waters in Azerbaijan are spread widely in Lower Kur Lowland, in Absheron Peninsula, the Caspian-Guba and in the zones of other oil and gas deposits. High quantity of iodine and bromine is found in these waters and on this basis, Baku and Neftchala iodine plants act. It has been determined that, many other useful microelements (cesium, rubidium, strontium, germanium, tungsten, lithium, arsenic, etc.) are available in the composition of industrial waters (7). Underground waters spread in the territory of the Republic are great wealth of the population, they will take a special place at the time of purposeful use of them in all periods in the health of population and in development of the country's economy.

The organized arrangement of the network of resorts in Azerbaijan has been carried out since XX century. Depending on useful climate condition, different mineral waters, healing mud and oil resources, the classification of natural resorts having rich healing significance located in separate climate zones of the republic has been determined and proper infrastructure in this regard has been created.

There was a network of resorts already formed in Azerbaijan in the second half of XX century. The system of sanatorium, pension and rest homes established at that period almost covered all territories of Azerbaijan. The necessary condition was created for treatment and recreation in Nakhichevan Autonomous Republic, Absheron Peninsula, Ganja-Hajikand-Goygol, Shaki-Zagatala, Shusha-Turshsu, Guba-Khachmaz-Nabran, Lankaran-Astara and other digor regions which had very wide resort-treatment opportunities.

The territory of Azerbaijan is rich in resorts. In such territories, institutions providing recreation and treatment (sanatoriums, rest homes, pension, balneological and mud treatment centers, resort policlinic, rehabilitation centers, etc.), sanatorium defense zones and other resort infrastructure are organized.

Resorts have types such as balneological. Climate, healing mud resorts and Naftalan oil resort in Azerbaijan according to natural treatment resources. Balneological resorts include resorts used of natural mineral waters. Each of eight group mineral waters recognized in the world for healing feature exists in the territory of Azerbaijan. Climate resorts have healing specification. Healing factors (seawater, sunbaths, hot sand bath, mountain climate, etc.) which are characteristic for climate resorts are important for prophylactics and treatment



of many diseases. Treatment by the way of use of mud, especially ooze mud (muds of Masazir and Zigh lakes) and hill (volcano) muds is conducted in healing mud resorts (see examples in Figure 2). Figure 2a refer to land of fires. Figure 2b is photo of "Galaalti" resort complex that situated at a height of 700 meters above sea level, in the foothills of the Greater Caucasus is operating from 1976. "Galaalti" water has magnesium, soluble organic matter - phenol, aliphatic acids, bitumen and other contents (<https://news.milli.az/society/174541.html>).



Figure 2a - The "land of fires" (AzerbaijanTravel, 2022).



Figure 2b - Galaalti Sanatorium (Qalaalti, 2022).

Treatment is conducted with Naftalan oil which has unique treatment factor and high effect in Naftalan oil resort.

According to geographical location, resort resources of Azerbaijan divide into following zones:

There are low-mineralized mineral water deposits with different concentrations more than thirty, Sulphur and organic substances in the zone of Greater Caucasus. Mud volcanoes which spread widely in Azerbaijan also locate in this zone.

The zone of Lesser Caucasus differs with balneological resorts which are rich in mineral waters with carbonic acid. It has healing climate. There are Naftalan oil fields known as rare natural healing factor in this zone.

The coastal zone of the Caspian Sea is divided into three resort areas according to climatic and balneological characteristics. Khudat-Yalama strip (Nabran resort) is rich in sandy beaches, forests, iodine-bromine water resources. The Absheron Peninsula covers Mardakan, Bilgah, Zugulba, Buzovna and Surakhani resorts. At that territory along with the sea water, the treatment is done by Shikh thermal sulfide,

iodine-bromine waters, in number of different mineral waters. Surakhani sulfurous waters, the muds of Masazir and Zigh are also used for treatment.

Subtropical Lankaran-Astara strip is rich in thermal mineral water springs. In mineral-rich region (150 water springs), which is important for spa treatment resorts like Sirab, Badamli, Vaykhir, Daridagh and Batabat are situated in Nakhchivan Autonomous Republic.

Balneological resorts are located in the Kur-Araz lowland and existing methane, nitrogen, high and very high-mineralized, cesium, iodine-bromine thermal water resources have healing effects.

There are many thermomineral springs in Azerbaijan to increase the number of Galaalti type treatment centers: "It is possible to create treatment institutions around these springs. There is Istisu treatment source in Masalli and Daridagh thermal water in Julfa region of Nakhchivan. It is possible to use of these minerals in treatment of different diseases. There is a sanatorium in Daridagh. Many ill persons visit here from Iran and Turkey to be healed. On the other hand, unique mud volcanoes of Azerbaijan are to be mentioned especially. The establishment of treatment institutions to use of medicines made of underground mud should give great push to the development of tourism in Azerbaijan ([http://www.azerbajians.com/content\\_892\\_az.html](http://www.azerbajians.com/content_892_az.html)).

Mineral waters are using widely in medicine. The treatment features of different mine water in Azerbaijan were clear to people from ancient times. The ancient people who didn't use of medicines considered the water, air and light as the main means of treatment. Stone ponds which remain up today around these waters also prove it.

Azerbaijan is rich in thermomineral waters having the importance of healing. There are mineral water springs more than 1000 in the territory of our country. The most of these springs spread in mountainous regions of our republic. Natural water springs are rarely found in plain regions.

First of all, the sources of many healing springs in Absheron Peninsula which is famous with its sandy coasts and sea are to be mentioned. Mineral waters extracted in the cape of Surakhani, Sabunchu and Shikh have a great importance of healing. These waters are used only for treatment purpose. There are mineral water springs more than 200 in the territory of Nakhchivan Autonomous Republic. Mineral waters of this mysterious land resemble the museum with its variety. Healing waters such as "Badamli" and "Sirab" flow from Nakhchivan, one of the most scenic and healing places of Azerbaijan.

One of the miraculous waters of our republic is the famous "Istisu" in Masalli. This natural healing spring locates at a distance of 13 kilometer from Masalli city, at the bottom of Dambalov Mountain in the height if 1650 meters from sea-level and on the bank of Vilash River. This water flows from the deepest layers of space in a hot condition upper from 60°C. In ancient times, domestic people accepted this water as miracle as a remedy of thousands of griefs.

That's pity that, "Istisu" mineral water resources, which have indispensable healing importance in Kalbajar - the most

miraculous center of healing of our country is now under occupation of Armenia.

Of course, all of these are one part of healing springs in Azerbaijan. Our aim to enumerate them is to bring into consideration the inexhaustibility of thermomineral waters in our country.

The new mine water was found in 20 kilometers from Shabran region over the village of Galaalti in the foothills - one of the most healing places in 1969. Seven sources of that water were defined in the wood. Those possess a large supply. The output of water is more than 10.000 liters per a minute. That water has a stone smelting property by means of chemical substances in its composition, also it has anti-inflammatory effect. Thanks to these effect features, “Galaalti” mine water has very good result in melting of stones found in gallbladder, bile ducts, kidney basin, urinary bladder and urinary tracks, also in treatment of inflammatory diseases of liver, bile ducts, kidneys, urinary bladder, urinary flows and gastroenterostomy. This water has a feature to substitute completely the water of “Naftusya”.

Natural outlet areas of thermomineral waters in the territory of the Republic are spread in the following regions. Sanatorium complex was built from thermomineral waters which reach the thermal to 720C on the earth's surface in the territory of Shikhov, Absheron and are currently using by the population. Thermomineral waters which reach the thermal to 600C in the Caspian-Guba region are associated with Aalen sediments with its depth of 3-5 km and such sulfur-containing waters play an important role in the treatment of the population. Alasha, Meshasu, Ibadisu, Gavzavua, Haftoni and other thermomineral springs in Lankaran region are operating as a treatment-sanatorium. Arsenic-containing thermomineral waters in Daridagh, Nakhchivan is of a great importance in the treatment of wind and skin diseases. The temperature of waters flowing from research-exploratory wells drilled up to its depth 3000 m in the territory of Khudat, Khachmaz and Nabran is above 800C. These waters are chlorinated sodium and sulphate-chlorinated sodium for chemical composition. Thermomineral waters are mainly iodine-bromine, the quantity of iodine and bromine are more than the norm. Population use for treatment purposes by taking thermomineral waters by the ways of internal and external at the sanatoriums locating in Khachmaz, Sabiroba, Palchigoba, Gusarchay, Khudat, Dorduncu shoba and other areas. These waters play a big role in the treatment of motion-support system, cardiovascular, gastrointestinal, wind disease, skin-venereal, nervous system and other diseases. In light of all this, we invite everyone to use these waters to our republic.

## 5. Acknowledgments

This work benefited from suggestions by the editorial staff of IJTHFA.

## References

Azerbaijan.travel, 2022. The “land of fires”. Available at: <<https://azerbaijan.travel/fit1492x852/center/pages/188/d3cf7af2-c23d-429a-b00f-7021a8867b6f.jpg>>. Accessed 12 February 2022.

- Bondarenko S.S., Efremochkin N.V., Borevsky L.V., 1971. Survey and assessment of reserves of industrial groundwater. VSEGINGEO, Nedra, p. 478.
- Dadashov F.G., Dadashov A.M., Kabulova A.Y. 1994. Natural Gases of Thermal and Iodine-Bromine Waters of Azerbaijan and Development of Search Criteria with Radiometric Studies Report (1991-1993), Baku, p. 108.
- Mukhtarov, A.Sh., Nadirov, R.S., Mammadova, A.V. (Asadova), V.A. Mammadov, 2015, Geological Conditions and Business opportunities for geothermal energy development in Azerbaijan. Proceedings of Azerbaijan National Academy of Sciences, The Sciences of Earth, №3.
- Qalaalti Hotel & SPA, 2022. Recreation & therapy. Available at: <<https://galaalti.az/en>>. Accessed 12 February 2022.
- Salakhov S. Sh., 2011a. Inhibitor corrosion protection of equipment when using thermal waters of Azerbaijan. Moscow, Actual Problems of the Humanities and Natural Sciences, No. 2, p. 268-270.
- Salakhov S. Sh., 2011b. Iodine-bromine waters of Shemakha-Gobustan region of Azerbaijan. Kursk: Editorial office of journals of scientific publications of graduate students and doctoral candidates, Journal of scientific publications of graduate students and doctoral candidates, No.1. p. 82-85.
- Salakhov S. Sh., 2011c. Corrosion protection of equipment operating in the thermal waters of Azerbaijan. RF, Lipetsk: Gravis, III International Scientific Correspondence Conference Actual Issues of Modern Technology and Technique, a collection of reports, Part II, p. 81-82.
- Salakhov S. Sh., 2011d. Corrosion protection of equipment operating in the thermal waters of Azerbaijan. RF, Lipetsk: Gravis, III International Scientific Correspondence Conference Actual Issues of Modern Technology and Technique, a collection of reports, Part II, p. 81-82.
- Salakhov S. Sh., 2003. Natural gases of Caspian and Guba region as a result of peculiarities of tectogenesis. Theses of reports. Geodynamics and oil and gas systems of the Black Sea and Caspian region. - Crimea, p. 141.
- Zaharova V.A., Minchuk M.A., Huseynov R.I., 1986. et al. Report on the results of prospecting and assessment work on hydro-mineral raw materials and soda waters of the Azerbaijan SSR. Baku.