# ASSESSMENT OF CLIMATE FACTORS IN THE NAKHCHIVAN AUTONOMOUS REPUBLIC

L.M. Babashova, Student
Baku State University, Azerbaijan

In this report the author characterizes elements of the climate in the territory of Nakhchivan Autonomous Republic. The influence of topography on the distribution of solar radiation, air temperature, precipitation etc., is mainly considered. The author also considers issues of air pollution under the influence of anthropogenic stress.

**Keywords:** climate, radiation, light hour, temperature, relief, radiation balance.

Conference participant

The main factors, which creates climate in the Nakhchivan Autonomous Republic is the difference if the relief, richness of the radiation, complication of the atmosphere circulation. Adjoining with relief, other factors are the geographical status and surface structure. In the result of the non-regular heating of the slopes and valleys, local air circulation with mountain-valley typed developed widely. Relief structure of the territory impresses more to the air masses, which enters the territory, besides generating the local air circulation. Mountain ranges impresses to the direction of the flow and gets direction to the near layers to the Earth. The observations done in the territory of Nakhchivan Autonomous Republic shows that, these objective laws are effective till 4 km. Higher than this height the effect of the relief gets weaker and air flow is southern-western directed according to the general circulation. Relief factors, including meteorological elements – temperature, humidity of the weather, rains, wind are subordinated to the vertical zones in the special regional territory. Average amount of the sunny hours reaches to 2400-2800 hours in the territory. The result of the richness of the sunny hours is that, amount of the general radiation and radiation balance is considerable greater. The thick relation exists between noted these elements and height. Radiation is two times more relatively with the cold period of the year in hot period of the year. The amount of the radiation forms 150-160 kkal/sm$^2$/ year in the high mountainous zone that and this is considered maximum price to the republic. It is related with the minority of the transparence an aerosol of the atmosphere in the high mountainous zones. We must note that, shown amount of the radiation is as in the equator. Depending on the period and seasons of the year, radiation balance is as maximum price 35-40 kkal/sm$^2$ in the bottom of the mountain, 20 kkal/sm$^2$ in the height. About 50% of the radiation balance falls to the share of summer months. General radiation balance possesses considerable annual movement as other elements of the climate. These elements reach to the maximum price in July, minimum price in January. Minimum indicator is observed in the sunny hours in winter. This time connected with the increasing cloudiness, sunny period decreases till 300-450 hours.

Average annual temperature of the air changes between 14-12°C in the low mountainous zone, 8-5°C in the mountainous zone, 2-1°C in 2500-3000 meters. Average monthly temperature of the coldest period of the year (January) changes 6°C in the low mountainous part, negative 10-14°C in the high mountainous zone and sometimes more. Average monthly temperature of the hot months of the year hesitate 24-28°C in the low mountainous, 16-20°C in the middle mountainous zone, 8-6°C high mountainous zone. In the result of the strong cold in the winter months, frost is observed. Average absolute minimum of the air temperature decreases negative 13-22°C, negative 30°C in the more heights.

As seen, average absolute minimum changes 13°C towards high mountainous territory. The summer months is characterized with the high termic conditions. Absolute maximum air temperature reaches 40-43°C in the low mountainous, 30-40°C in the middle mountainous, 10-20°C in the high mountainous.

It is clear from all these that, either average monthly (January, July) or minimum and maximum of the air is more sharp. Average annual maximum and average absolute minimum temperature of the air tot eh heights is determined as in the following table.

It is more important to determine the period of passing different limits of the average daily temperature for the characterizing the beginning and ending of the vegetation period in the plants. Passing time of daily average temperature from 0°C in spring falls. On 1st of March in the low mountainous zone, 20th of March in the upper part of the middle mountainous parts, 10th of April in the areas near low border of the high mountainous parts. Passing time of the daily average temperature from 0°C begins earliest on 10th of October (in the high mountainous zone), latest on 10th

| H(m) / t | 1000 | 1500 | 2000 | 2500 | 3000 | 3500 |
|---|---|---|---|---|---|---|
| Average annual | 11,8 | 8,6 | 5,4 | 2,2 | – 1,0 | – 4 , 2 |
| Average absolute maximum | 40 | 35 | 31 | 26 | 21 | 16 |
| Average absolute minimum | – 18 | – 2 0 | – 22 | – 25 | – 27 | – 29 |

of December (in the low mountainous zone). Thus, difference between beginning and ending of the transition time from 0°C in both seasons of the year (spring and summer) is equal to 40 days. Transition time of the daily average temperature from 5°C begins on 20th of March in the low mountainous zone in the summer months, 10th of April on the middle mountainous zone, 30thof April in the high mountainous zone. Transition time of the daily average temperature from 5°C begins on 20th of November, 3rd of October and 20th of October proper with the above mentioned zones in autumn. The total of the daily average temperature and temperature is more than 5-10. And 15°C change connected with the height.

Albedo forms 0,19-0,22% in summer, 0,70-0,75% in winter for the tundra and alp meadows. We must note that, maximum price of Albedo is observed in the winter months. The cause of it, is to have snow cover in the winter months. As a rule, the price of Albedo increases in the areas, where the attendances of the snow cover in summer. Rainfall is distributed not equal in the territory. The amount of the rainfall changes both in the vertical direction, as from slopes towards to mountains, and horizontal, as from west towards east. In the hot and cold periods of the year, rainfall changes connected with the changing of the height. Rainfall begins to increase towards height in the hot period and decreases again maximum 2000-3000 m height. In the cold period of the year differing from hot period of the year more rainfall falls not 3000 m height but 2500 m height. In the cold periods fallen rainfall between 2000 m and 3000 m is equal each-other approximately. Depending on height, distribution of rainfall to the seasons is shown in the following table.

Rainfall in spring falls least till 1000 m height (120 mm), most in the 2500 mm height. In the same period in 3000 m rainfall decreases till 300 mm, in 3500 m till 270 mm. While the amount of rainfall reaches to maximum in 2500 mm in spring (to 320 mm), and in spring it shows itself maximum 3000 m height (130 mm).

In all seasons least rainfall falls till 1000 m height. In autumn most rainfall is observed between 2500 m (180 mm) and 3000 m (170 mm). In winter most rainfall falls between 2000 m (150 mm) and 2500. (140 mm) height. While rainfall is equal in 1500 m and 3500 m, reaches to 120 mm in 3000 m. Falling of the rainfall more in spring, as well increasing of temperature creates base for considerable extent to the vitalizing of the plant cover plant cover, increases water reservoir of the rivers. And in summer, least rainfall shortens the vegetation period of the plants, causes to the arid climate condition. In the hot period of the year, more rainfall falls in April and May, least rainfall falls in July and August. Rainfall in April and May indemnifies water need of the plants on the vegetation period and makes opportunity to gather the additional water need in the ground. Emergence of snow cover, its width and melting times are different. Emergence of snow cover begins mainly on 15th of December, on 15th of October in the highest areas. Average time of melting of durable snow cover begins on 1st of April, on 1st of May in high mountainous zone. The number of days with durable snow cover is 80 days. The number of these days is about 200 days in the high mountainous zones. During year maximum average thickness of snow cover reaches 25-30 sm, 40 sm in the high mountainous zone. Thickness and durability of the snow cover has great role in the growing of plants, forming surface and ground water, keeping wetness of soil.

Annual maximum exhalation 1120 mm in 1000 m height, 860 mm in 1500 m height, 640 mm in 2000 m height. More than it annual available exhalation decreases from 500 mm (2500) till 320 mm (3500). Available exhalation of the hot period forms the main part of the annual available exhalation. Annual exhalation amount reaches to 380 mm maximum in 2500 m, higher than 3500 m begins to decrease, in 3500 m is 280 mm. The cause of low of exhalation amount is related with the termic condition. Exhalation observed in the hot period forms 60-70% of its annual quantity. Maximum exhalation in the summer months reaches to 180-190 mm in 2500 m. Relative humidity is shown with percents being as the relative of rainfall to available exhalation. Relative humidity increases when height increases. It forms 40-50% in the middle mountainous zone, 11% in 2000 m, 15% in 2500 m. Annual relative humidity, in 1500 m and the areas higher than it, is 20-25% average more than relative humidity in the hot half of the year.

The winds observed in the investigation region are mainly local winds. In most cases their directions changes depending on complicated relief structure. Sometimes these observed laws are disordered in the result of different typed air flows to the territory. Northern-eastern, north and east winds blow in the hot period of the year in the high mountainous zone (2000-3200 m). The directions of the winds are proper with the direction of valleys. The speed of wind is 3-7 m/second in the cold period of the year in the high mountainous zone.

The continental conditions of the climate of the Nakhchivan Autonomous Republic, as we noted above, creates base for the regulation of the regularly and speedy of the air climate in the territory. We must take into consideration that, there is no heavy industrial enterprises, which populates the atmosphere air

| Seasons | 1000 | 1500 | 2000 | 2500 | 3000 | 35000 |
|---|---|---|---|---|---|---|
| Spring | 120 | 200 | 260 | 320 | 300 | 270 |
| Summer | 40 | 60 | 80 | 110 | 130 | 100 |
| Autumn | 90 | 110 | 140 | 180 | 170 | 150 |
| Winter | 70 | 100 | 150 | 140 | 120 | 100 |

unbearably. Industrial and energetic enterprises, existed in the territory, have a great role that in the local population of the atmosphere air that, these kinds of energetic enterprises don't create danger.

Almost, it doesn't make suspicion average temperature in the investigations done in the Earth to be increased to the dangerous degree. It is true; the speed and geographical scale of heat hasn't been calculated yet. But it is undoubted this danger to be brought to the destroying disasters. Specialists consider that, in **15-50 km** height in the atmosphere, usually the amount of the low quantity gas increases now and these regulates the temperature of the low layers of the atmosphere as thermostat. In the result of the useful fluid products in the anthropogenic impacts, atmosphere pollution also impresses to the changing of the heat balance of the Earth.

In the result of economic activity of human, emission of the ozone-destroyer substances to the atmosphere increases more. The importance and role of the ozone layer absorbs the ultraviolet rays from Sun, prevents their reach to the earth. The role of the "anthropogenic factors" in the riddling of the ozone layer is discussed as the danger source more in the scientific circles. At present this problem emerged as political, economic and ecological problem from scientific and technological aspect. For preventing riddling of the ozone layer, Azerbaijan Republic supports all the efforts of the world publicity to the ozone layer and fulfills all the obligations, which was accepted in the base of international agreement. We participate in this kind of events, in the events hold by world championship to the preventing the emission of the same substances to the atmosphere and extracting the ozone destroyer substances from usage in the Nakhchivan Autonomous Republic which is the integral part of the Azerbaijan Republic.

In the frame of realized events we must note that, Azerbaijan Republic, as an independent state joined to the leading states line of the world, participates in the solution of the world ecological problem. The results of all the realized events considered in the region.

**References:**

1. Constructive Geography of Azerbaijan Baku, 1996. - 320 p.

2. Babayev S.Y., Babayev N.S. Rational methods of using natural resources of the Nakhchivan Autonomous Republic. Azerbaijan in the edge of the XXI century. Materials of the II Republican Scientific and Practical Conference. – Baku, 1998, pp 44-47.

3. Alirzayev G.A. Land erosion in the Nakhchivan Autonomous Republic. – Baku., Baku State University., Series: News about the nature of science, 2005, No. 1, pp. 29-31.

4. Garibov Y.A., Guliyeva S.Y. Development features of the desert processes and desert factors (on the example of the Nakhchivan). News of the Azerbaijan Academy of National Sciences. – Baku., Earth sciences series, 1998, No. 3, pp. 29-32.

5. Museyibov M.A. Physical geography of Azerbaijan. - Baku., Maarif, 2008. - 399 p.

6. Suleymanov M.A. Geographical objective patterns of natural and anthropogenic landscapes of Azerbaijan. – Baku., 2005. - 248 p.

7. Aliyev G.A., Zeynalov A. Lands of the Nakhchivan Autonomous Soviet Socialist Republic., B. Azerneshr. – 1988. - 236 p.

8. Gul G.A. Physical Geography of Azerbaijan. – Baku., 1968. - 342 p.

9. Mammadova Sh.I. Learning and forecasting the pollution degree in the atmosphere depending on meteorological conditions. Materials of the Republican Conference of Young Scientists and Aspirants. – Baku.,1995, pp. 78-80.

10. Nadirov V.A. Climate of Azerbaijan. - Baku 1987. - 132 p.

**Information about author:**

Leyla Babashova - Student, Baku State University; address: Azerbaijan, Baku city; e-mail: leylageograf@yandex.ru