



# THE AIR TEMPERATURE CHANGES IN THE IRREGATED AREAS OF THE REPUBLIC OF KARAKALPAKISTAN

**G.Kh. Kholbayev<sup>1</sup>**

<sup>1</sup>*National university of Uzbekistan*

**G. Khadjaeva<sup>2</sup>**

<sup>2</sup>*Karakalpak State University*

## ANNOTATION

*The study examined the maximum and minimum values of air temperature in January and July for years and days and seasons, based on meteorological station data in the irrigated areas of the Republic of Karakalpakstan. Changes of an average temperature by the date and finding of the changing dates of temperature to 0°, 5°, 10° 15°C are mentioned in the graphs. The average air temperature change was analyzed about the sea level.*

**KEY WORDS-** *station, data, average, maximal, minimal, temperature, agrometeorology*

## INTRODUCTION

The temperature distribution in the atmosphere is determined by the heat exchange with the absorption of the surface and the solar radiation. The lower layer of the atmosphere absorbs less solar radiation than the upper layers. The main source of the warming of the troposphere, particularly its lower layers, is the temperature of the active surface of the earth. In the daylight, the active surface radiation balance is heated, it is warmer than the air, and turbulent processes occur in the air due to temperature changes. The active substance during the night is cooler than the air under effective lightning and cools the contact layer that is touching it [Muminov F.A., Abdullaev Kh.M. 1997, Chirkov Yu.I., 1979].

For every agricultural crop, a certain amount of heat and moisture is required in accordance with its biological characteristics. Some partly studies of air and soil temperature have been conducted in the exploring areas.

More than 40 years have elapsed since the publication of the Agrocultural climatology Resources of the Region [Agroclimatic..., 1976].

During this period Aralkum was replaced by the Aral Sea and in addition to agro-climate conditions under the influence of industry, rapid agricultural development, population growth, climate change and anthropogenic factors, the agro-climate conditions have changed significantly in the global

and regional scale, and the agro-climate dimensions have changed.

It determines the importance of analysing meteorological changes in the irrigating areas of the Republic of Karakalpakstan.

## MATERIALS AND METHODS

There have been used information about meteorological (Nukus, Takhiatosh, Takhtakupir, Kungrat) stations situated in the irrigated areas of the Republic of Karakalpakstan which belonged to the Archive of Uzhydromet

These calculations were performed with mathematical statistical methods. The purpose of the study was to investigate the fluctuations of the air temperature during the dates, months, years, and seasons, and the main tasks were to analyze their value changes.

## RESULTS AND DISCUSSION

First of all, it was studied the data on the change of air temperature in January and July based on the data of the stations located in the irrigated areas over the long term (1991-2018). Picture 1 shows the year-round change in the maximum and minimum values of air temperature in January and July.

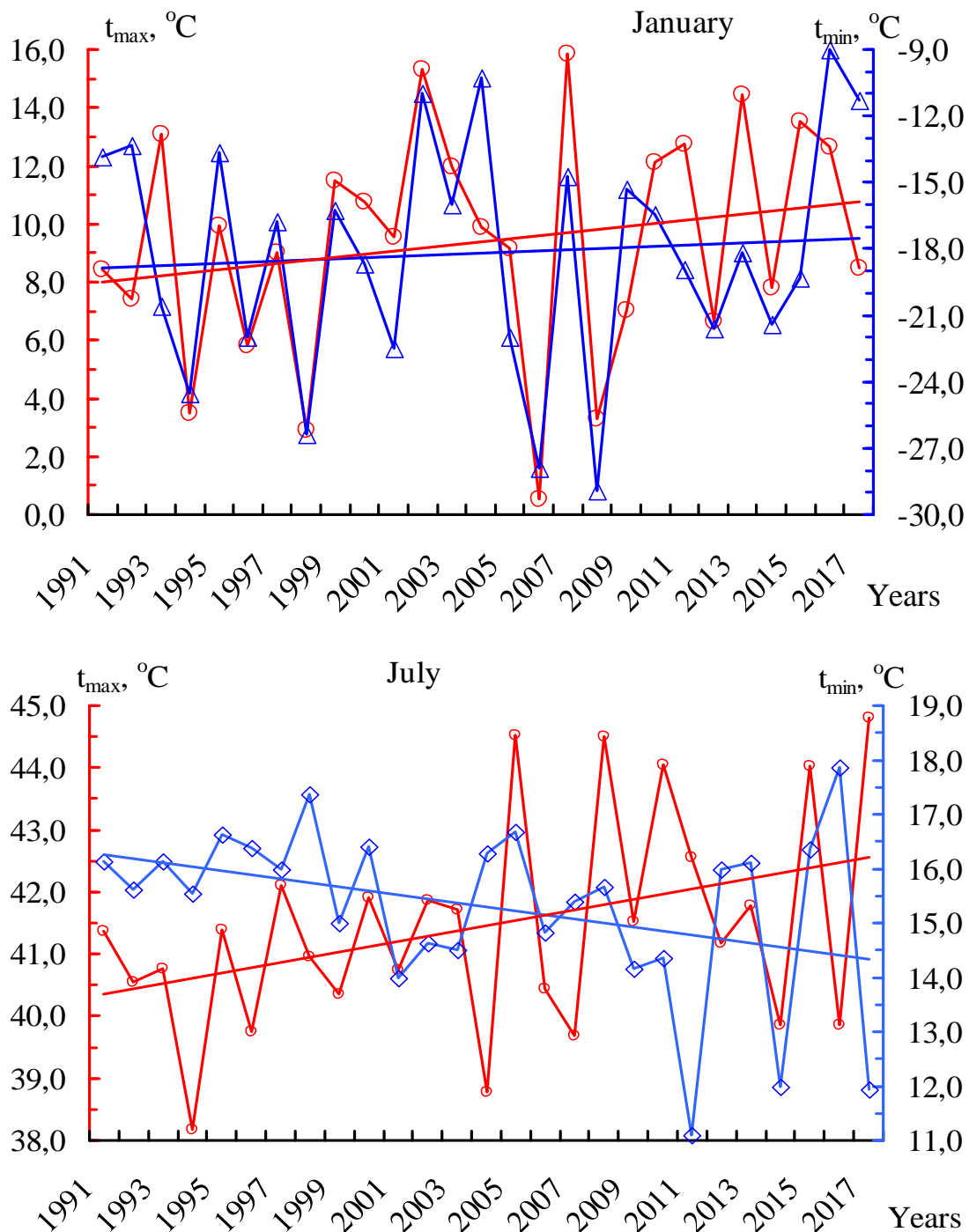
As shown in picture 1, the absolute maximal observed values of the air temperature in January in



2002 (15,3°C) and 2007 (15,9°C) expressed the warmest year, and the absolute minimal observed values in 2006 (-26,9 °C) and 2008 (-29,0 °C) expressed the coldest year.

In July, the absolute maximum values were expected to reach the maximum values in 2005 and 2008 (44,5°C) and 2017 (44,8°C) and absolute

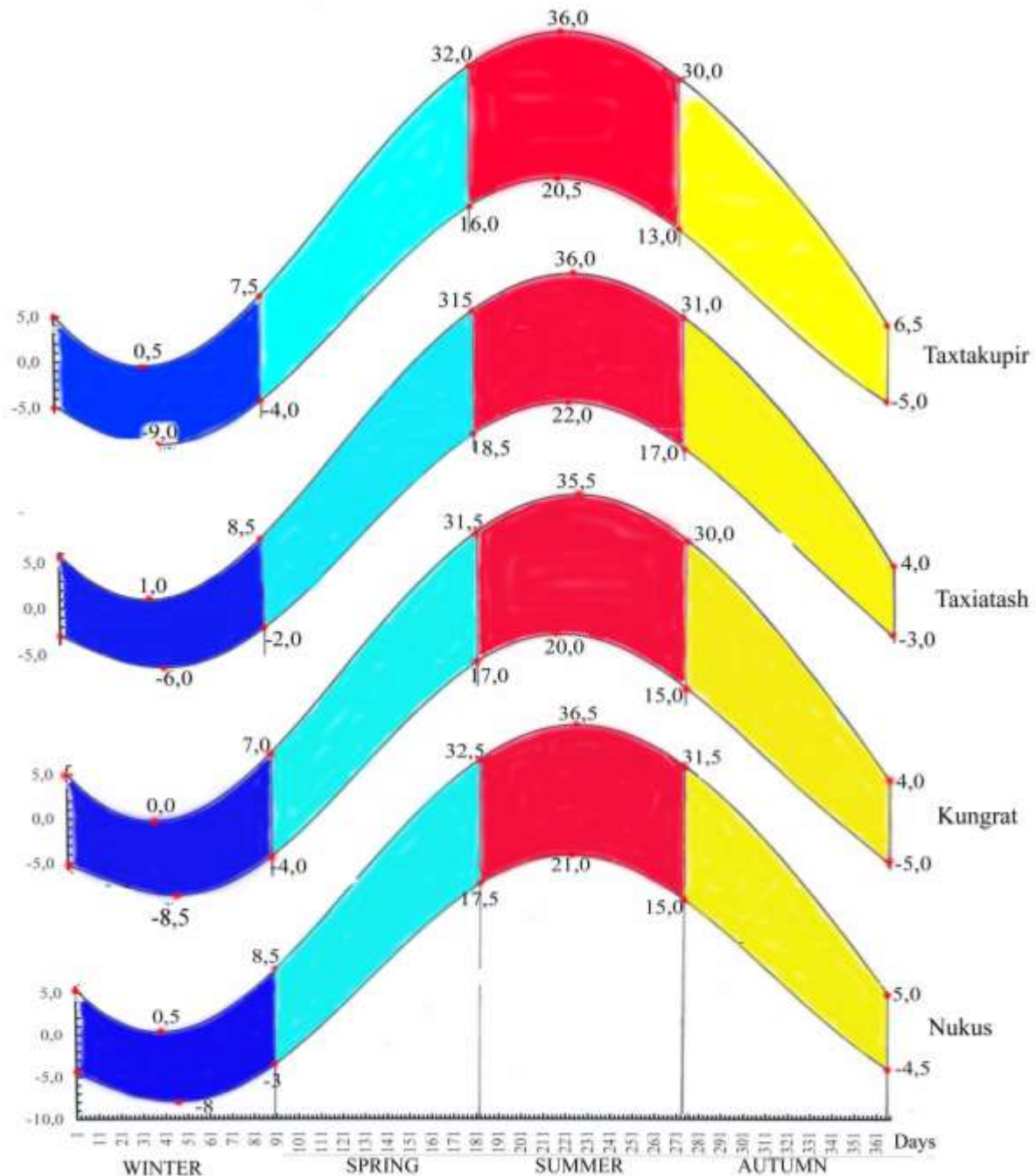
minimum values in 2011 (11,1°C), 2014 and 2017 (12,0°C). The results of the analysis show increasing of the absolute maximal and minimal values in January and July in the last 15 years and mark the corresponding synoptic processes to the conditions in the future.



**Picture 1. Changes in maximum and minimum temperatures in the irrigated areas in January and July**



Below presented a graph of change of average maximum values of maximal and minimal air temperature on each separated stations in the dates (seasons) (Pic. 2).



Picture 2. Annual change of maximal and minimal values of air temperature in irrigated areas

If we focus on picture 2 the temperature changes as follows:

- minimal - in winter (1-91 days) in Nukus -4,5°...-8,0°...-3,0°C, - Kungrat -5,0°...-8,5°...-3,0°C, Takhiatash -3,0°...-6,0°C...-2,0°C, Taxtakupir at -5,0°...-9,0°...-4°C; in spring (92-183 days) in Nukus -3,0°...+17,5°C, Kungrat -4,0°...+17,0°C, Takhiatash -2,0°...+18,5°C,

- Taxtakupir -4,6°...+16,0°C; in the summer (184-273 days) in Nukus +17,5°...+21,0°...+15,0°C, Kungrat +17,0°...+20,0°...+15,0°C, Takhiatash +18,5°...+22,0°...+17,0°C, in Taxtakupir 16,0°...+20,5°...+13,0°C; in the autumn (274-365 (366) days) in Nukus +15,0°...-4,5 ° C, in Kungrat +15,0°...-5,0°C, Takhiatash +17,0°...-3,0°C, Taxrakupir +13,0°...-5,0°C;

- maximal - in winter (1-91 days) in Nukus



+5,0°...+0,5°...+8,5°C, in Kungirat  
 +5,0°...0,0°...+7,0°C, in Takhiatash  
 +5,0°...+1,0°...+8,5°C, in Taxtakupir  
 +5,0°...+0,5°...+7,5°C; in spring (92-183 days) in Nukus +8,5°...+32,5°C, in Kungirat +7,0°...+31,5°C, in Takhiatash +8,5...+31,5°C, in Tahtakupir +7,5°...+32,0°C; in the summer (184-273 days) in Nukus +32,5°...+36,5°...+31,5°C, in Kungirat +31,5°...+35,5°...+30,0°C, in Takhiatash +31,5°...+36,0°...+31,0°C, in Taxtakupir +32,0°C...+36,0°...+30,0°C; in the autumn (274-365 (366) days) in Nukus +31,5°...+5,0°C, in Kungirat +30,0°...+5,0°C, in Takhiatash -+31,0°...+4,0°C, in Taxtakupir +30,0°...+6,5°C.

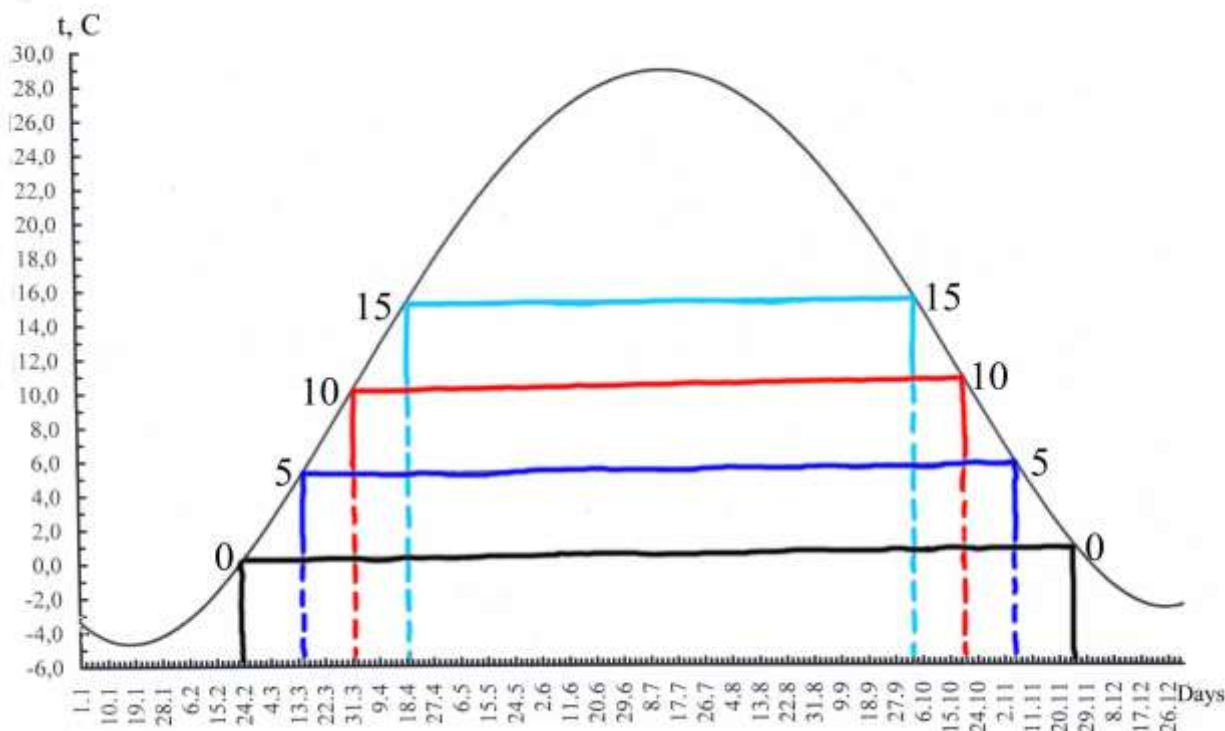
In general, according to the multi-year data (1991-2018), the minimum value of air temperature in Nukus, Takhiatash, Kungirat and Takhtakupir stations indicates January and the maximum value in July.

The main focus of agricultural services is the study and evaluation of thermal resources of the

regions [Sultosheva OG, Kutlimuratov Kh.R., 2008, Satimova L.F., Yuldasheva G.B., Kholbaev G.X. 2017]. Usually, there is used average air temperature. Therefore, the 3rd picture shows the change of the multi-year value of the average and transition temperature to 0°, 5°, 10° and 15°C in the irrigated areas of the Republic of Karakalpakstan

As you can see from 3rd picture, the minimal value of an average temperature refers on 15-16th January, and the maximum value is 15-16 July. This picture shows the average temperature of an annual observation.

Agrotechnical arrangements are carried out at positive temperatures. The results of the analysis show that the temperature variation in spring and autumn is as follows: 0°C – 24 February - 29 November, 5°C – 13 March - 8 November, 10°C – 31 March - 21 October and 15°C – April 18 to October 4 change. The duration of the cycle is 0°C – 278 days, 5°C – 240 days, 10°C – 204 days, and 15°C – 170 days.



**Picture3. The multi-year value changes of an average temperature in the irrigated areas of the Republic of Karakalpakstan**

As you know, the stations are located at different altitudes of sea level and in different soil contours. Therefore, the table shows the change of annual average air temperature in the territory of the Republic of Karakalpakstan relatively to the sea level. By using this table data, it is possible to know the average air temperature at various altitudes. Here the differences of temperature are ±1,5°C.

**CONCLUSION**

In summary, we can say that here is specified the maximal and minimal values of air temperature of the meteorological stations Nukus, Taxiatah, Kungirat and Takhtakupir.

The annual average temperature change for the irrigated area has been analyzed.

There were observed duration of the cycle



and the changes of the air temperature in spring and autumn to the different degrees.

The average air temperature change values were calculated for the sea level.

Provides the thermal resources needed for cultivation of agricultural crops in the regions.

Can be used in the placement of agricultural crops and agrometeorological services in irrigated areas of the Republic of Karakalpakstan.

**Table**

**Change of average air temperature (°C) to sea level (h, m)**

h, m	Winter			Spring			Summer			Autumn		
	Months											
	XII	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
	Average air temperature, °C											
50	-3,9	-6,2	-3,9	3,7	13,5	20,5	25,6	27,3	25,1	17,7	9,6	1,9
55	-3,3	-5,5	-3,1	4,4	14,0	21,0	26,1	27,7	25,6	18,4	10,3	2,6
60	-2,7	-5,0	-2,4	5,0	14,4	21,4	26,6	28,2	26,0	19,1	10,9	3,2
65	-2,3	-4,5	-1,8	5,5	14,8	21,8	26,9	28,5	26,4	19,6	11,4	3,7
70	-1,9	-4,1	-1,4	5,9	15,1	22,0	27,2	28,8	26,7	20,1	11,8	4,1
75	-1,7	-3,9	-1,1	6,2	15,2	22,2	27,4	29,1	27,0	20,5	12,2	4,4
80	-1,5	-3,7	-0,9	6,4	15,4	22,3	27,5	29,3	27,2	20,8	12,4	4,6
85	-1,5	-3,7	-0,8	6,5	15,4	22,4	27,5	29,4	27,3	21,0	12,5	4,8
90	-1,5	-3,7	-0,9	6,5	15,4	22,3	27,5	29,5	27,4	21,2	12,5	4,8
95	-1,7	-3,9	-1,1	6,4	15,2	22,2	27,3	29,6	27,4	21,2	12,4	4,8
100	-1,9	-4,1	-1,4	6,2	15,0	22,0	27,1	29,5	27,4	21,1	12,2	4,6

## REFERENCES

1. *Agroclimatic resources of Karakalpakstan. - L.: Gidrometeoizdat, 1976. - 206 p.*
2. *Muminov F.A., Abdullaev Kh.M. Agroclimatic resources of the Republic of Uzbekistan. Tashkent: - SANIGMI, 1997. - 178 p.*
3. *Sultosheva OG, Kutlimuratov Kh.R. The results of comparison of air temperature and soil in the conditions of Uzbekistan. The role of women in the development of science and technology. Scientific-practical conference. Tashkent, February 14-15, 2008 -B.94-97.*
4. *Chirkov Yu.I. Agrometeorology - L.: Gidrometeoizdat, 1979 y., - 320 b.*
5. *Chub V.E. Climate change and its impact on hydrometeorological processes, agroclimatic and water resources of the Republic of Uzbekistan. - Tashkent, NIGMI. 2007. -132 p.*
6. *Kholbaev G.Kh, Kurganov R.N, Rasulov A. Evaluation of thermal resources of the regions (in the example of the Republic of Karakalpakstan) / The role of talented youth in the development of physics / scientifically-practical conferences. Volume 2. IAK-VIII. April 24-25, 2015 Tashkent - 2015. - 359-364 b.*
7. *Satimova L.F., Yuldasheva G.B., Kholbaev G.Kh. Changes in air and soil temperature (on the example of Nukus and Takhtakupir stations). / PHYSICS FAMOUS PROBABLIDS AND THEIR CHILDREN*

*INSTEAD OF HUMAN DEVELOPMENT. Materials of the Republican Scientific Conference. May 19-20, 2017. Tashkent, 2017 - p.161-163.*