1. Empirical-statistical method based on dependencies between global temperature and regional climatic characteristics

1.1. Methodical background

IEG Technical Guideline [11] for assessment of climate changes effect in accordance with GHG emission scenarios offers to use system of models MAGICC (Model for Assessment of Greenhouse Gas Impact and Climate Change) [11], within which framework information about regional structure of climate change is integrated. It is obtained on MGC with output of number of simple models, which allow to define global temperature response for given suppositions about potential GHG concentrations. MAGICC includes, according to IEG materials, all presently available scientific knowledge, including data about payback of CO_2enrichment as well as negative effects of sulfate aerosols and stratosphere ozone concentration reduction. In MAGICC scales of emissions are transformed to concentration parameters in atmosphere by means of gas behavior models, total radiation effect is calculated, which is introduced in simple climate model. This allows to obtain global assessments of average annual temperature. And although, as it is pointed in [11], one of serious MAGICC disadvantages is inability to account processes specific for one or other region, by means of this model the most plausible, on IEG opinion, assessments of average annual global air temperature for six emission scenarios were obtained.

Initial data for climatic changes assessment over Uzbekistan and adjacent mountainous area were: global temperature changes on MAGICC under high climate sensitivity, given in [11] and data of instrumental observations of air temperature and rainfalls on support stations.

Study of climate dynamics in Uzbekistan [5, 6, 10, 12] showed that thermal regime change in the republic proceeds analogously global changes. Important statistical dependence is determined between values of average annual air temperature over stations and rayons of Uzbekistan and adjacent mountainous area with global temperature [6]. Correlation coefficients vary within from 0.56-0.58 in northern areas of Uzbekistan (Chimbay, Khiva) to 0.35-0.40 in southern areas (Denau, Guzar), i.e. statistical dependence significant at 1% level is noted. On data of mountain stations correlation coefficients turned out to be somewhat higher, but also statistically significant at 5% level.

At Figure 1 comparison of observed global and regional trends is given. Warming of 30-ties and cooling of 60-ties can be clearly seen in temporal range of average annual air temperature changes over Uzbekistan.

With regard to above said to assess potential climate changes of Uzbekistan as response for processing global warming approach based on determination of statistical dependencies between observed climatic characteristics in local and global scales can be used.

Any anthropogenic impact on climate is reflected on background “noise” of natural climatic variability related both to internal fluctuations and external factors impact, such as change of solar intensity, orbital parameters of the Earth, volcanic eruption etc.

Studies conducted on forecast and analysis of available climate changes in Central Asia provided revealing of number of cyclical fluctuations in temporal series of air temperature [4-6]. In changes of average annual air temperature, average air temperature for cold and warm half-years on the background of existing trends to warming quasi 22-year cyclicity was found, i.e. cyclicity close to so called Hale’s cycle of geomagnetic activity related to magnetic polarity of solar spots. Given cyclicity describes appropriately 24, 19 and 12% of initial series disperse. Account of natural cyclicities and tendencies will provide reduction of uncertainty of climate change assessments for the future.

On basis of analysis conducted for assessment of future changes of average climatic characteristics values of Uzbekistan and adjacent mountainous area following methodic is used:

- determination of statistical dependencies between climatic characteristics in local and global scales
- use of model global temperature assessments as future global climate forecasts for different IEG emission scenarios.
- use of existing in series climatic characteristics of Uzbekistan quasi-cyclicities and tendencies to reduce uncertainty, correct scenarios and assessment of possible course of researched values.

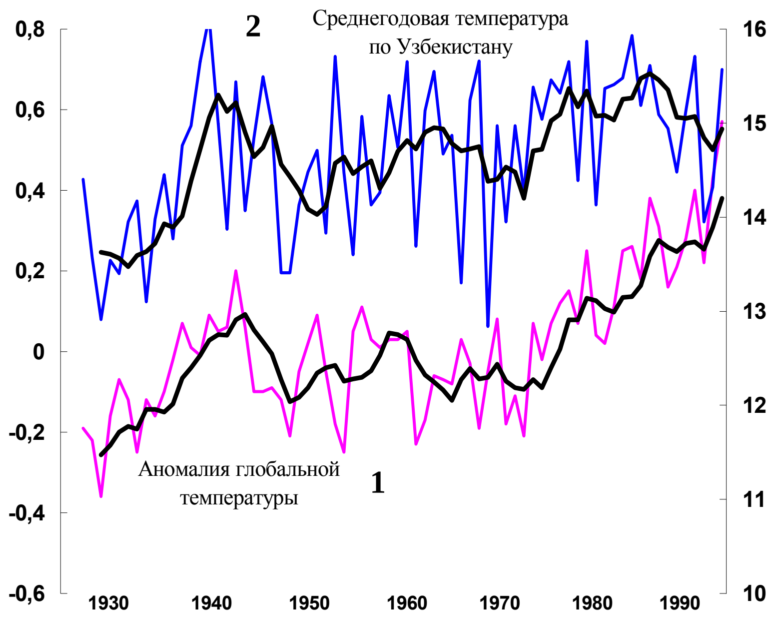

Fig. 1 | Changes of anomaly of average annual global air temperature (1) and average annual air temperature over Uzbekistan (2) stations

1.2. Assessment of air temperature changes

Calculated according to proposed model assessments of temporal course of temperature changes on specific stations were integrated in groups according to values of changes themselves. By averaging for each season sets of values were obtained, which characterize model forecast of temperature changes within 2000-2002 years under assuming high climate sensitivity. Each set characterizes physical-geographical regions according [1] (Fig.2).

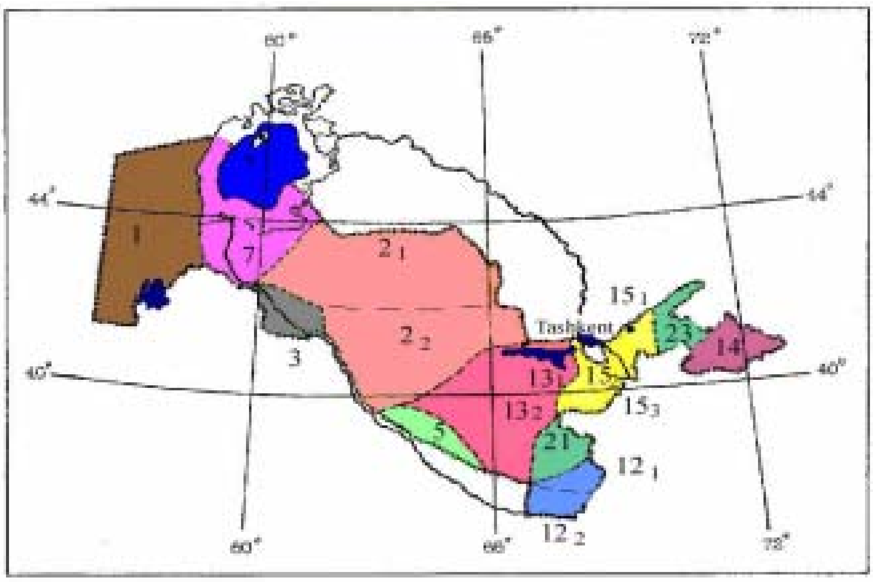

Fig. 2 | Location of climatic regions

After procedure of spatial-temporal averaging regional climatic scenarios for Uzbekistan were created. Twenty-year cyclicity under temperature change is significantly smoothed. Temporal course of average annual temperatures in accordance with emission scenarios IS92a and IS92b for various rayons of Uzbekistan is presented at Fig. 3.

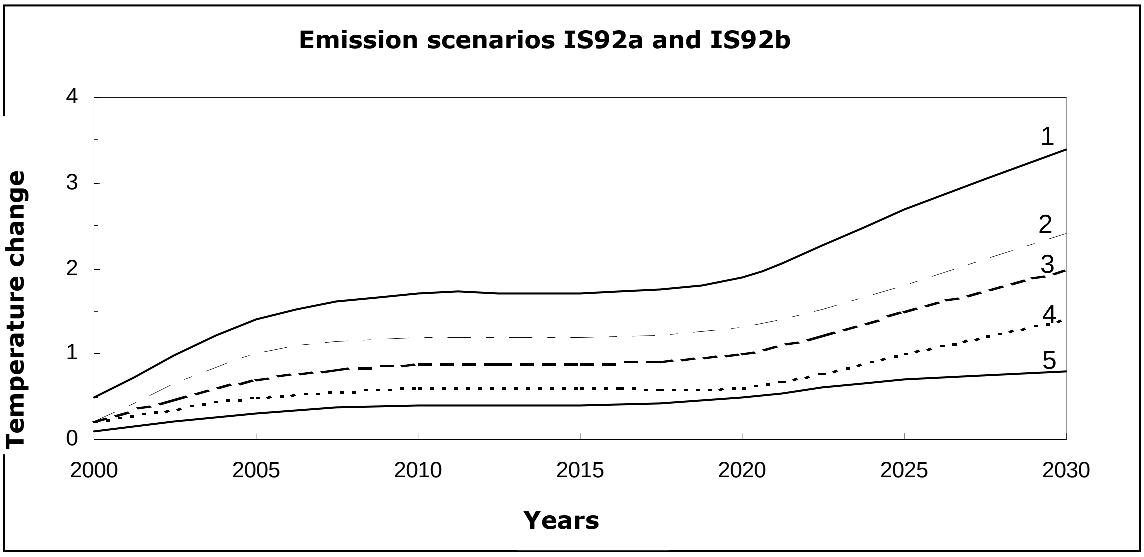

Fig. 3 | Assessments of potential changes of average annual air temperature anomalies for selected groups of regions

1 - climatic regions 1, 7; 2 - climatic regions 2, 3, 12, 13, 14 и 15;
3 - large depressions of Tyan-Shan and Pamir-Alay; 4 - climatic regions 5, 23;
5 - climatic regions 21 and Pamir

In Tables 1-5 assessments of potential changes of average annual air temperature and average temperatures over seasons, obtained with assuming that above pointed GHG emission scenarios, integrated in couple: IS92c and IS92d (characterizes minimal emissions), IS92a and IS92b (characterizes medium emissions), IS92e and IS92f (characterizes maximal emissions) are given. In further integrated scenarios will be called cd, ab, and ef.

Outside Uzbekistan, in south mountain regions of Central Asia (Gorbunov's station, Karakul Lake, Khorog Lake), expected warming doesn't exceed in summer 0.5°C, in winter 1°C. In high mountain vast depressions of Tyan-Shan and Pamir-Alay (Naryn, Sary-Tash) in summer temperature reaches 1°C, in winter - 2°C. On average during the year warming values in given region don't exceed1°C.

1.3. Assessment of precipitation changes

Atmosphere warming leads to its humidity increase and water vapor transportation increase to high latitudes. In result of CO_2 content increase all models give average global precipitation increase. On model assessments precipitation increases in high latitudes in winter, mostly precipitation increase covers middle latitudes as well. However some models for specific regions give even some decrease of precipitation.

Model assessments of regional precipitation changes for moment of CO_2 doubling are within –20% - +20% of control value. For many regions there is no even agreement in sign of model changes assessments. Under including in model aerosol impact calculations show less values of global rainfalls. Precipitation increase weakens in zone of Asian monsoon, because negative aerosol impact reduces contrasts of system ocean-land and weakens monsoon circulation as well.

As potential precipitation changes scenario in Central Asia in given paper expert assessment is used, based on numerous model calculations, available regional climatic tendencies in precipitation regime and above mentioned empirical-statistical method, which takes into account response of regional climate changes for proceeding global warming.

To create precipitation regime scenario for Uzbekistan and adjacent mountain area linear trends are distinguished in temporal series of total precipitation sums over support stations, and assessments were calculated for its potential changes with account for response for global warming under realization of different GHG emission scenarios. Analysis of obtained result showed that linear tendencies extrapolated by 2030 correspond to designed precipitation values for emission scenarios IS92c and IS92d (cd) under assuming low climate sensitivity. Therefore values obtained by means of these two approaches are taken as minimal assessment values by 2030. When realizing rest emission scenarios additional precipitation increase is expected that corresponds to global model assessments. So these assessments of potential total precipitation sums regime changes of researched region for different GHG emission scenarios are given at Fig.4.

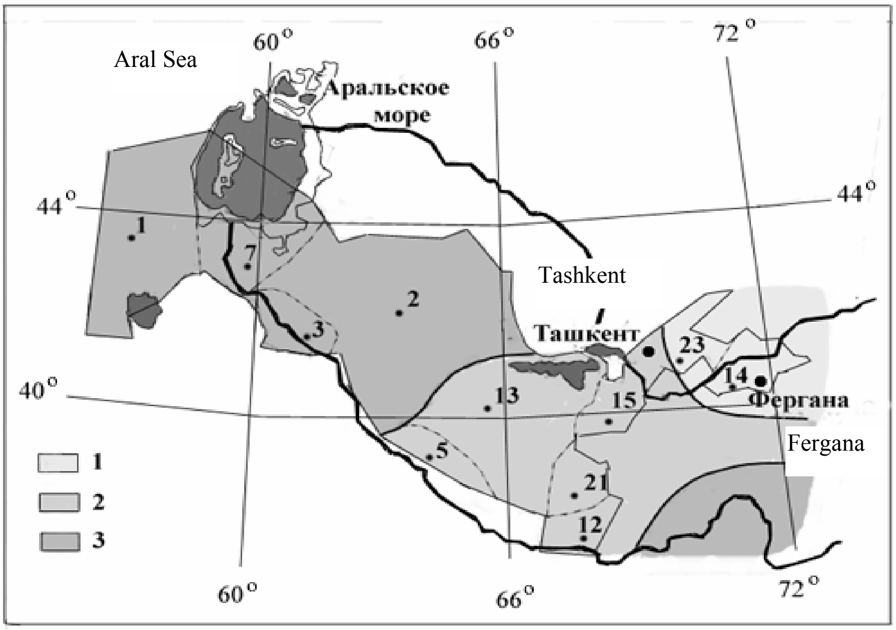

Fig. 4 | Variation (%) of total precipitation sums by 2030 in Uzbekistan and adjacent mountain area against 1961-1990 years

for emission scenarios cd: **1** - 100-105%; **2** - 105-110%; **3** - 110-115%;
for emission scenarios ab: **1** - 105-110%; **2** - 110-115%; **3** - 115-120%;
for emission scenarios ef: **1** - 110-115%; **2** - 115-120%; **3** - 120-125%.

Table 1 | Assessment of average annual air temperature changes on climatic regions of Uzbekistan under realization of different GHG emission scenarios (IS92a -IS92f)

Number and name of climatic region	Administrative area	Basic period scenario	Regional climatic scenario II for 2015-2030 years			Regional climatic scenario I for 2020-2050 years		
			ab	cd	ef	ab	cd	ef
1. Ustyurt	Karakalpakstan	9,0	1,5	1,0	2,0	2,5	2,0	2,3
7. Priaralie	Karakalpakstan	10.0	2.5	2.0	3.0	3.0	2.1	3.6
2. Kyzylkum, North (2_1)	Navoy	11,8	1,0	1,0	1,5	1,7	1,4	2,5
Central (2_2)		13,8	2,0	1,0	2,0	1,2	0,8	1,2
3. Amudarya lower reaches	Khorezm	12,3	2,0	1,5	2,5	1,7	1,2	1,9
5. South-east Karakums	Bukhara	13,8	1,0	1,0	1,5	1,7	1,3	1,8
12. Verkhne-Amudarya	Surkhan-Darya							
South (12_2)		17,4	1,0	1,0	1,5	0,6	0,5	0,8
North (12_1)		16,8	1,0	1,0	1,5	1,2	1,0	2,3
13. Zerafshano-Kashkadarya								
Zerafshan (13_1)	Samarkand	13,8	1,5	1,0	2,0	1,8	1,1	2,1
Kashakadarya (13_2)	Kashakadarya	15,7	1,5	1,0	2,0	2,1	1,2	2,5
14. Fergana	Fergana Namangan Andizhan	13,3	1,5	1,0	2,0	2,8	2,2	2,9
15. Tashkent-Golodnostep								
Tashkent (15_1)	Tashkent	14,2	2,0	1,0	1,5	2,0	1,4	3,0
Golodnostep (15_2)		14,4	1,0	1,0	1,5	1,2	1,0	1,8
Jizak (15_3)	Jizak	13,0	1,0	1,0	1,5	1,2	1,0	1,8
21. South Tyan-Shan 1000-2000 m below sea level (21_1)	Surkhan-Darya	9,6	1,0	0,5	1,0	0,5	0,3	0,5
2100-3000 m b.s.l.. (21_2)		5,2	1,0	0,5	1,0	0,5	0,3	0,5
23. West Tyan-Shan								
1000-1500m b.s.l. (23_1)	Tashkent	9,5	1,0	0,5	1,0	0,6	0,4	0,7
1600-2100m b.s.l. (23_2)		2,8	1,0	0,5	1,0	0,9	0,6	1,1

Table 2 | Assessment of average winter air temperature changes (December-February) over climatic regions of Uzbekistan under realizing different GHG emission scenarios (IS92a -IS92f)

Number and name of climatic region	Administrative area	Basic period scenario	Regional climatic scenario II for 2015-2030 years			Regional climatic scenario I for 2020-2050 years		
			ab	cd	ef	ab	cd	ef
1. Ustyurt	Karakalpakstan	-6,3	1,5	1,0	2,0	2,0	1,6	2,6
7. Priaralie	Karakalpakstan	-4,3	2,0	1,5	2,5	2,8	2,2	3,6
2. Kyzylkum, North (2_1)	Navoy	-4,0	3,0	1,5	2,5	2,5	2,0	3,2
Central (2_2)		-0,7	2,5	2,0	2,5	2,7	2,1	3,5
4. Amudarya lower reaches	Khorezm	-1,5	2,0	1,5	2,5	2,5	2,0	3,2
6. South-east Karakums	Bukhara	2,8	2,0	1,5	2,5	1,9	1,5	2,4
12. Verkhne-Amudarya	Surkhan-Darya							
South (12_2)		5,6	1,0	1,0	1,5	0,9	0,7	1,2
North (12_1)		4,7	1,0	1,0	1,5	1,5	1,2	1,9
13. Zerafshano-Kashkadarya								
Zerafshan (13_1)	Samarkand	1,4	2,0	1,5	2,0	1,0	0,8	1,3
Kashakadarya (13_2)	Kashakadarya	3,7	2,0	1,5	2,5	1,2	1,0	1,6
14. Fergana	Fergana Namangan Andizhan	0,3	3,0	2,5	3,5	1,5	1,2	1,9
15. Tashkent-Golodnostep								
Tashkent (15_1)	Tashkent	1,8	2,5	2,0	3,0	1,7	1,4	2,2
Golodnostep (15_2)		1,5	3,0	2,0	3,5	1,5	1,2	2,9
Jizak (15_3)	Jizak	0,4	2,0	1,5	2,5	1,2	1,0	1,6
21. South Tyan-Shan								
1000-2000m b. s. l. (21_1)	Surkhan-Darya	-1,0	1,0	0,5	1,0	0,9	0,7	1,2
2100-3000m b. s. l. (21_2)		-4,5	1,0	0,5	1,0	0,3	0,2	0,4
23. West Tyan-Shan								
1000-1500m b. s. l. (23_1)	Tashkent	-2,2	1,5	0,5	2,0	0,6	0,5	0,8
1600-2100m b. s. l. (23_2)		-10,8	1,5	0,5	2,0	0,9	0,7	1,2

Table 3 | Assessment of average spring air temperature changes (March-May) over climatic regions of Uzbekistan under realizing different GHG emission scenarios (IS92a -IS92f)

Number and name of climatic region	Administrative area	Basic period scenario	Regional climatic scenario II for 2015-2030 years			Regional climatic scenario I for 2020-2050 years		
			ab	**cd**	**ef**	**ab**	**cd**	**Ef**
1. Ustyurt	Karakalpakstan	9,8	1,0	1,0	1,5	1,0	0,8	1,3
7. Priaralie	Karakalpakstan	10,5	1,0	1,0	1,0	0,9	0,7	0,9
2. Kyzylkum, North (2_1)	Navoy	12,0	0,0	0,0	0,0	1,3	1,0	1,7
Central (2_2)		14,6	1,0	0,5	1,0	0,6	0,5	0,8
5. Amudarya lower reaches	Khorezm	14,0	0,5	0,5	1,0	0,2	0,1	0,1
7. South-east Karakums	Bukhara	16,5	1,0	0,5	1,0	0,2	0,1	0,1
12. Verkhne-Amudarya	Surkhan-Darya							
South (12_2)		18,0	0,5	0,0	0,5	0,5	0,5	0,6
North (12_1)		18,2	0,5	0,0	0,5	0,4	0,3	0,4
13. Zerafshano-Kashkadarya								
Zerafshan (13_1)	Samarkand	14,2	0,0	0,0	1,0	1,0	0,8	1,0
Kashakadarya (13_2)	Kashakadarya	16,4	1,0	0,5	2,0	1,4	1,1	1,8
14. Fergana	Fergana Namangan Andizhan	14,9	0,5	0,5	1,0	0,8	0,6	0,8
15. Tashkent-Golodnostep								
Tashkent (15_1)	Tashkent	14,5	1,0	0,5	1,5	0,4	0,3	0,4
Golodnostep (15_2)		15,6	0,5	0,0	0,5	0,3	0,22	0,2
Jizak (15_3)	Jizak	13,6	0,0	0,0	0,0	0,4	0,3	0,4
21. South Tyan-Shan								
1000-2000m b. s. l. (21_1)	Surkhan-Darya	8,0	0,5	0,0	0,5	0,6	0,5	0,6
2100-3000m b. s. l. (21_2)		4,0	0,5	0,0	0,5	0,2	0,3	0,4
23. West Tyan-Shan								
1000-1500m b. s. l. (23_1)	Tashkent	9,0	0,0	0,0	0,0	0,5	0,4	0,5
1600-2100m b. s. l. (23_2)		3,3	0,0	0,0	0,0	0,5	0,4	0,5

Table 4 | Assessment of average summer air temperature changes (July-August) over climatic regions of Uzbekistan under realizing different GHG emission scenarios (IS92a -IS92f)

Number and name of climatic region	Administrative area	Basic period scenario	Regional climatic scenario II for 2015-2030 years			Regional climatic scenario I for 2020-2050 years		
			ab	cd	ef	ab	cd	Ef
1. Ustyurt	Karakalpakstan	25,0	2,0	1,5	2,5	1,8	1,0	1,5
7. Priaralie	Karakalpakstan	25,6	2,5	2,0	3,0	1,6	1,2	2,1
2. Kyzylkum, North (2_1)	Navoy	27,6	2,0	1,5	2,5	0,9	0,7	1,2
Central (2_2)		28,5	2,0	1,5	2,0	1,0	0,8	1,3
6. Amudarya lower reaches	Khorezm	26,8	1,5	1,0	2,0	0,7	0,6	0,9
8. South-east Karakums	Bukhara	27,9	0,5	0,5	0,5	0,3	0,2	0,4
12. Verkhne-Amudarya	Surkhan-Darya							
South (12_2)		28,5	2,0	1,5	2,5	0,2	0,1	0,3
North (12_1)		29,0	2,0	1,5	2,5	0,0	0,0	0,0
13. Zerafshano-Kashkadarya								
Zerafshan (13_1)	Samarkand	26,4	2,0	2,0	2,5	1,0	0,8	1,3
Kashakadarya (13_2)	Kashakadarya	28,3	1,5	1,0	2,0	0,8	0,6	1,0
14. Fergana	Fergana Namangan Andizhan	26,2	1,0	0,5	1,3	1,0	0,8	1,3
15. Tashkent-Golodnostep								
Tashkent (15_1)	Tashkent	26,0	2,0	1,5	2,5	0,8	0,6	1,0
Golodnostep (15_2)		26,7	1,0	1,0	1,5	0,7	0,6	0,9
Jizak (15_3)	Jizak	25,2	0,0	0,0	0,0	0,2	0,2	0,2
21. South Tyan-Shan								
1000-2000m b. s. l. (21_1)	Surkhan-Darya	22,0	1,0	0,5	1,0	0,2	0,1	0,3
2100-3000м b.s.l. (21_2)		16,0	1,0	0,5	1,0	0,2	0,1	0,3
23. West Tyan-Shan								
1000-1500m b. s. l. (23_1)	Tashkent	20,8	0,0	0,0	0,0	0,3	0,2	0,4
1600-2100m b. s. l. (23_2)		15,0	0,0	0,0	0,0	0,4	0,3	0,5

Table 5 | Assessment of average fall air temperature changes (September-November) over climatic regions of Uzbekistan under realizing different GHG emission scenarios (IS92a -IS92f)

Number and name of climatic region	Administrative area	Basic period scenario	Regional climatic scenario II for 2015-2030 years			Regional climatic scenario I for 2020-2050 years		
			ab	cd	ef	ab	cd	Ef
1. Ustyurt	Karakalpakstan	9,0	1,5	1,0	2,0	1,5	1,2	2,0
7. Priaralie	Karakalpakstan	10,7	1,0	0,5	1,5	1,3	1,0	3,9
2. Kyzylkum, North (2_1)	Navoy	11,0	1,0	0,5	1,0	0,5	0,4	0,6
Central (2_2)		13,0	1,0	0,5	1,0	1,0	0,8	1,3
7. Amudarya lower reaches	Khorezm	17,8	1,5	1,0	1,5	1,2	1,0	1,6
9. South-east Karakums	Bukhara	14,7	1,0	0,5	1,0	1,4	1,1	1,8
12. Verkhne-Amudarya	Surkhan-Darya							
South (12_2)		16,1	0,5	0,5	1,0	0,6	0,5	0,8
North (12_1)		16,8	0,5	0,5	1,0	0,8	0,6	1,0
13. Zerafshano-Kashkadarya								
Zerafshan (13_1)	Samarkand	13,3	1,5	1,0	1,5	0,9	0,7	1,7
Kashakadarya (13_2)	Kashakadarya	15,2	1,0	1,5	1,5	2,2	1,7	2,8
14. Fergana	Fergana Namangan Andizhan	12,8	1,5	1,0	2,0	2,0	1,6	2,6
15. Tashkent-Golodnostep								
Tashkent (15_1)	Tashkent	13,6	2,0	0,5	2,0	1,9	1,5	2,5
Golodnostep (15_2)		13,7	1,0	1,0	1,0	1,1	0,9	1,4
Jizak (15_3)	Jizak	12,8	0,5	0,5	0,5	0,7	0,7	0,7
21. South Tyan-Shan								
1000-2000m b. s. l. (21_1)	Surkhan-Darya	10,0	1,0	1,0	1,0	1,1	0,9	1,4
2100-3000m b. s. l. (21_2)		6,0	1,0	1,0	1,0	0,6	0,5	0,8
23. West Tyan-Shan								
1000-1500m b. s. l. (23_1)	Tashkent	10,0	1,0	1,0	1,5	0,8	0,6	1,0
1600-2100m b. s. l. (23_2)		3,7	1,0	1,0	1,5	1,1	0,9	1,4

Table 6 | Norms and potential air temperature changes by 2030 (°C) in winter and summer over stations of mountain area for different emission scenarios

Station	Climatic scenarios							
	Winter				Summer			
	Norm	IS92ab	IS92cd	IS92ef	Norm	IS92ab	IS92cd	IS92ef
Pskem	-2.3	1.3	1.1	1.4	20.8	0.1	0.1	0.1
Charvak reservoir	-0.2	1.0	1.0	1.0	23.2	0.1	0.0	0.2
Tos River mouth	-2.9	1.4	1.1	1.5	18.1	0.1	0.0	0.3
Chatkal	-12.0	2.3	1.8	2.6	16.1	0.7	0.5	0.8
Naryn	-13.3	2.0	1.2	2.4	16.5	0.7	0.4	0.8
Sary-Tash	-15.1	1.1	0.7	1.3	8.9	0.3	0.1	0.4
Tyan-Shan	-20.2	0.5	0.4	0.6	3.6	0.8	0.5	1.0
Khaydarkan	-4.0	2.2	1.6	2.4	18.0	0.0	0.0	0.1
Khujand	1.1	2.0	1.5	2.2	27.1	0.6	0.5	0.6
Gorbunov's	-16.1	1.1	0.8	1.2	2.5	0.6	0.3	0.7
Khorog	-4.8	1.3	0.8	1.5	21.5	0.1	0.0	0.2
Karakul	-15.5	1.0	0.7	1.2	7.3	0.4	0.2	0.4

Table 7 | Norms and potential air temperature changes by 2030 (°C) in transit seasons over station of mountain area for different emission scenarios

Station	Climatic scenarios							
	Spring				Fall			
	Norm	IS92ab	IS92cd	IS92ef	Norm	IS92ab	IS92cd	IS92ef
Pskem	9.1	0.0	0.0	0.1	10.0	0.8	0.5	1.0
Charvak reservoir	11.5	0.4	-0.3	-0.5	12.1	1.0	0.7	1.3
Tos River mouth	8.2	-0.2	-0.1	-0.2	8.3	0.9	0.6	1.1
Chatkal	2.9	0.2	0.0	0.4	4.2	1.1	0.5	1.4
Naryn	5.7	0.7	0.3	0.9	5.1	0.8	0.6	1.2
Sary-Tash	-2.3	0.5	0.2	0.7	-1.4	1.0	0.3	1.1
Tyan-Shan	-6.8	0.0	-0.1	0.0	-6.9	0.8	0.5	1.0
Khaydarkan	6.6	0.0	-0.1	0.0	7.7	1.6	1.0	1.7
Khujand	15.4	-0.5	-0.4	-0.6	14.0	0.8	0.4	1.0
Gorbunov’s	-7.9	-0.1	-0.1	-0.1	-6.0	0.5	0.3	.6
Khorog	8.9	0.3	0.1	0.3	10.6	0.3	0.1	.5
Karakul	-3.9	0.3	0.2	0.4	-2.3	0.9	0.5	1.0

Given paper presents amplification of climatic scenarios for stations located in flow use and formation zone. In Tables 6-9 potential changes of climatic characteristics (air temperature and precipitation) are given on stations in annual and seasonal temporal scales.

Table 8 | Potential changes of average annual air temperature by 2030 over mountain area stations for different emission scenarios

Station	Norm, mm	Climatic scenarios		
		IS92ab	IS92cd	IS92ef
Pskem	9.4	1.2	0.9	1.5
Charvak reservoir	11.6	0.9	0.6	1.1
Tos River mouth	7.9	0.7	0.5	0.8
Chatkal	2.7	1.3	0.9	1.5
Naryn	3.5	1.6	1.0	1.8
Sary-Tash	-2.4	1.3	0.8	1.5
Tyan-Shan	-7.6	0.3	0.1	0.3
Khaydarkan	7.1	1.1	0.7	1.3
Khujand	14.4	1.5	1.1	1.7
Gorbunov’s	-6.9	0.8	0.6	0.9
Khorog	9.0	0.8	0.5	0.9
Karakul Каракуль	-3.6	0.8	0.5	0.9

Table 9 | Potential changes of total precipitation sums by 2030 (in % of norm) over mountain area stations for different emission scenarios

Station	Norm, mm	Climatic scenarios		
		IS92ab	IS92cd	IS92ef
Andizhan	252	114	116	117
Guzar	323	121	117	125
Pskem	823	109	107	111
Tos River mouth	715	119	112	123
Chatkal	437	105	103	108
Naryn	295	115	111	117
Khaydarkan	517	121	118	126
Sary-Tash	360	107	105	109
Khorog	268	119	114	124
Dekhauz	305	105	104	106
Iskanderkul	283	108	104	110
Gorbunov’s	1927	124	120	128

Assessment of climatic conditions’ changes over Central Asia territory with account for available model assessments, regional analogous scenario and empirical-statistical approach show that we should expect some increase (from 0 to 20%) of total precipitation sums and temperature increase in all seasons of the year over Central Asia area, including flow formation zone, under realizing different GHG emission scenarios by 2030 [10].