ЕУРАЗИЯ ҰЛТТЫҚ УНИВЕРСИТЕТІ

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ТҰҢҒЫШ ПРЕЗИДЕНТІ - ЕЛБАСЫНЫҢ ҚОРЫ

«ҒЫЛЫМ ЖӘНЕ БІЛІМ – 2017»

студенттер мен жас ғалымдардың
XII Халықаралық ғылыми конференциясының
БАЯНДАМАЛАР ЖИНАҒЫ

СБОРНИК МАТЕРИАЛОВ
XII Международной научной конференции
студентов и молодых ученых
«НАУКА И ОБРАЗОВАНИЕ – 2017»

PROCEEDINGS
of the XII International Scientific Conference
for students and young scholars
«SCIENCE AND EDUCATION - 2017»

14th April 2017, Astana

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ БІЛІМ ЖӘНЕ ҒЫЛЫМ МИНИСТРЛІГІ
Л.Н. ГУМИЛЕВ АТЫНДАҒЫ ЕУРАЗИЯ ҰЛТТЫҚ УНИВЕРСИТЕТІ

«Ғылым және білім - 2017»
студенттер мен жас ғалымдардың
XII Халықаралық ғылыми конференциясының
БАЯНДАМАЛАР ЖИНАҒЫ

СБОРНИК МАТЕРИАЛОВ
XII Международной научной конференции
студентов и молодых ученых
«Наука и образование - 2017»

PROCEEDINGS
of the XII International Scientific Conference
for students and young scholars
«Science and education - 2017»

2017 жыл 14 сәуір

Астана

УДК 378

ББК 74.58
Ғ 96

Ғ 96
«Ғылым және білім – 2017» студенттер мен жас ғалымдардың XII Халықаралық ғылыми конференциясы = The XII International Scientific Conference for students and young scholars «Science and education - 2017» = XII Международная научная конференция студентов и молодых ученых «Наука и образование - 2017». – Астана: http://www.enu.kz/ru/nauka/nauka-i-obrazovanie/, 2017. – 7466 стр. (қазақша, орысша, ағылшынша).

ISBN 978-9965-31-827-6

Жинаққа студенттердің, магистранттардың, докоранттардың және жас ғалымдардың жаратылыстану-техникалық және гуманитарлық ғылымдардың өзекті мәселелері бойынша баяндамалары енгізілген.

The proceedings are the papers of students, undergraduates, doctoral students and young researchers on topical issues of natural and technical sciences and humanities.

В сборник вошли доклады студентов, магистрантов, докторантов и молодых ученых по актуальным вопросам естественно-технических и гуманитарных наук.

УДК 378

ББК 74.58

ISBN 978-9965-31-827-6

УДК 551.58 (574.12)

THE ANTHROPOGENIC IMPACT ON THE ATYRAU REGIONAL CLIMATE CHANGE

Nabidolla Yersultan
nabidolla_yersultan@mail.ru
2nd year student of the specialty Geodesy and Cartography of L.N.Gumilyov Eurasian National University, Astana, Kazakhstan
Scientific supervisor – Idrissova Mapruza

Introduction

Climate change has become a global issue nowadays. It is literally traced in all corners of the planate. It seems climate change is becoming a trigger to dangers. That is to say, it is turning to the most effective factor to cause various disasters.

While to the climate change, a series of anthropogenic factors has greater impact, such as oxocarbons, sulfur oxides, tropospheric ozone etc.

First, let's dwell on the impact of greenhouse gases on the climate change.

The first international documentation aimed at conducting cooperative solution on greenhouse gases impact, Kyoto Protocol included in its appendix A the following greenhouse gases: carbon dioxide (CO_2), methane (CH_4), nitrogen oxide (N_2O), hydrofluorocarbon (HFC), perfluorocarbons (pfcs), Sulfur hexafluoride (SF_6).

The greenhouse gases, namely CO_2, CH_4, N_2O are responsible for 98% of the economical factors which cause climate change.

Industrial toxic gases also contribute to the climate change, whereas a rapid change in climate is also caused by the increasing concentrates of greenhouse gases. The increase of the earth temperature due to the increasing amount of green house gases is called greenhouse effect. The main greenhouse gas is oxocarbons, or more specifically carbon dioxide (CO_2). The change of the pureness of the air basin significantly depends on the amount of the oxocarbons in the air. Oxocarbons absorb infrared. When their concentrate in the air exceeds certain limit they may cause global warming. According to divers statistics, the contribution of oxocarbons on greenhouse effect takes up 50%-65%. Other greenhouse gases are methane (approx. 20), nitrogen oxide (5%), ozone, and so on freon (their contribution to the greenhouse effect takes up about 1-25%).

The aim of this paper is to study the effect of the anthropogenic factors on climate change in a possible wide range and find ways to avoid it.

The data concerning changes in air temperature and rainfalls in Atyrau oblast are taken as the main research material for this paper. And a conclusion is drawn about the expected consequences due to the climate change.

1. Geographical depiction of Atyrau oblast

Atyrau oblast is located in west part of Kazakhstan and was founded as an oblast in 1938. The area of the oblast is 118.6 thousand square kilometers.

The administrative divisions of the oblast are as followings: 2 cities (one oblast level, one county level), 6 towns, 7 counties (Zhyluoi, Inder, Isatay, Kyzylkogha, Kurmanghazy. Makhat and Makhambet) and 170 permanent settlements and the Atyrau municipal.

According to the data due to January 1, 2016 the population of the Oblast is 575 198 people.

The territory of the oblast is mainly located in the big Caspian basin. Half of the oblast territory is taken up by sodic and saline lands, as well as small hills and gravel coverings (Naryn, Toisoighan, Karakhum). In the north-east part of the oblast, there is small ranges of Caspian shore highland mountains.

Atyrau oblast is classified as desert area. The gray earth with desert plants are dominant. The river banks are usually flourished with forest plants such as aspens and willows.

The big rivers crossing the oblast territories are Zhaiyk (the overall length is 2428 km, the length in Kazakhstan territories is 1082 km), Zhem (712 km), Saghyz (511 km), Oiyl (800 km). The biggest salt lake in the oblast is Inder (110.5 square km).

2. Analysis on the Atyrau regional climate change

2.1 Effecting factors of Atyrau regional climate in the fond of Global climate change

Here we try to prove the interlink between human factors and global warming with some concrete facts.

The human factor causing negative effects on Atyrau regional climate is the burnt associated petroleum gas in oil and gas sector by EmbaMunaigas Joint Stock Company, NCOC and Tengizchevroil companies, which are located in the territory of the Oblast. According to the result of several midnight examinations, certain companies have spared the associated petroleum gas without burning.

However, this fact is not the only problem in this sector of the economy. The emissions from the stations of the energy and communal enterprises in the oblast are also bringing negative effects on the atmospheric conditions of the Oblast. Almost no enterprisers in the oil and gas sector are following the requirements of Code of Ecology. None of the subsoil users' stationary sites is equipped with cleaning devices. This is to say, all the emissions are emitted directly into the air without sieving the toxic ingredients. The Code of Ecology prohibits the enterprises to start their work if not being equipped with proper cleaning sets. However, no one has ever bothered to lay an eye on the Code.

The total annual emission of the main industrial enterprises of the Oblast (42 main enterprises) consists of a hundred tons. And oil and gas sector shares a 80-85% of the total amount. So, the present day air pollution is directly linked with oil and gas producing and processing companies.

In 2016, in all oblast approximately 136.1 thousand tons of gas and fluid pollutions are spared into open air.

Table 1 – Gas and fluid pollutions emission amount: thousand tons.

	2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Atyrau oblast	89,6	87,5	93,1	105,7	104,8	98,1	95,6	105,4	131,3	136,1

In the Atyrau oblast, the amount of pollution emitted into open air is 242 kg on each resident. While this indication is much higher than the average amount of pollution in whole republic, 142 kg/person.

Table 2 – The amount of pollution emitted from stationary sites for each resident. kg

	2012	**2013**	**2014**	**2015**	**2016**
Atyrau oblast	214 kg	197 kg	186 kg	200 kg	242 kg

Most of the pollution emitted into air is from these regions: Zhyloi region, Makhat, Makhambet, Isatai regions and Atyrau city with polluting industries such as oil and gas mining fields, oil processing plants, Thermal Power Plants, Chemistry plants and so on.

It is well-known that automobiles are also one of the main sources of oxocarbons to pollute the air. This is a severe problem in the capital city. The share of automobiles in air pollution there is higher than 50%. The total number of the automobiles in Atyrau oblast in 2010 was 65 400, while it reached 151 800 in 2016. Each automobile gives out 3 kg of incompletely burned exhaust like oxocarbons every day. In this case, in a single year, the whole numbers of the automobiles emit about 445 tons of pollution into open air.

Meanwhile, the main way of emitting the oxocarbons is burning organic fuels. Generating power requires tons of such organic fuels. These fuels are usually oil and coal. As a result, oxocarbons get into the atmosphere in large amount.

In the following table, we can see the growing power generation in the Thermal power

stations of Atyrau oblast during 2012 and 2016. And it is fact that the more power is generated the more greenhouse gases are emitted into atmosphere.

Table 3 – Electricity and heat generation

	2012	2013	2014	2015	2016
Electricity, mln.kvt/hour					
Atyrau oblast	2970	3201	3404	3460	3531,2

The next pollution to the ecology is the household wastes. Their volume is growing year by year. Unfortunately, millions of tons of wastes are cumulated in the trash fields in the territory of the oblast. Only in 2016, 154 700 tons of wastes are cumulated in the oblast. Out of the total amount, 132 600 tons are of industrial wastes, while the rest 22 100 tons are from household. The accumulated average amount of household and industrial wastes on per citizen is 297 kg. The wastes are often burnt and this led to the pollution of the atmospheric basin of the city.

2.2 The traced changes of the atmospheric temperature

The conducted research work has shown us that climate of the Atyrau oblast is getting warm significantly. Every 10 years, the winter average temperature of the region is rising by 0.60-0.65°C. While the summer average temperature is rising by 0.10 °C at the same rate. And in the transit seasons, the temperature kept a 0.2 °C per decade growth rate. However the spring temperature did not rise significantly.

The rising of the maximum of the whole day temperature on the ground level of the atmosphere in the Atyrau oblast is shown in the following chart. The maximum of the whole day temperature of the atmosphere has been rising by 0.21 °C to 0.40 °C every ten years.

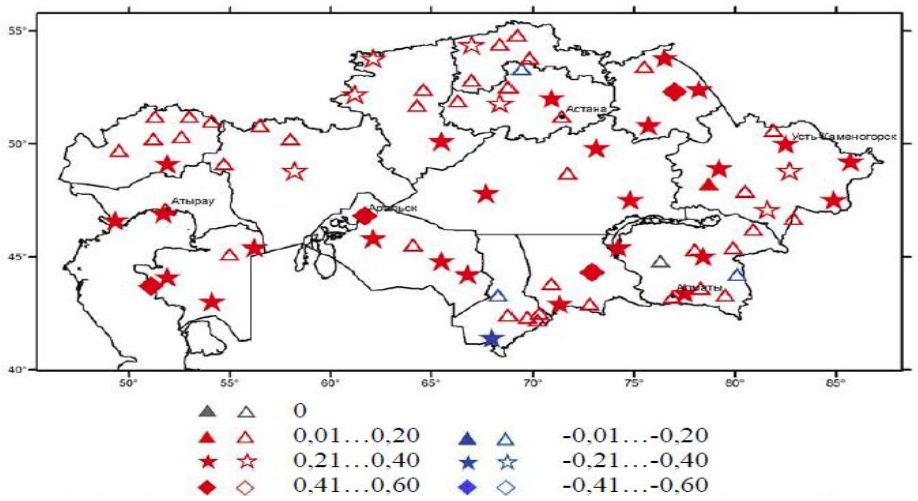

Chart 1. The whole day maximum of the temperature of the atmosphere (°C/10 years) changes in 1941 ... 2016 years

Significant changes can be traced in the appearance of the days with over 35°C (2-3 more days in every 10 years). The following chart shows the growing number of such days.

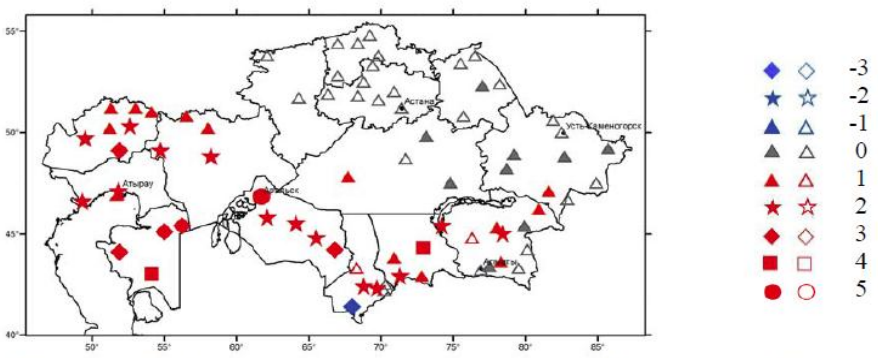

Chart 2. The changes of the numbers of the days with temperature over 35°C
in period 1941...2016 years

The appearance of the days with below 0°C minimum of the whole day temperature and frosty days are getting less by 3-5 days for every decade. This is shown in the following chart.

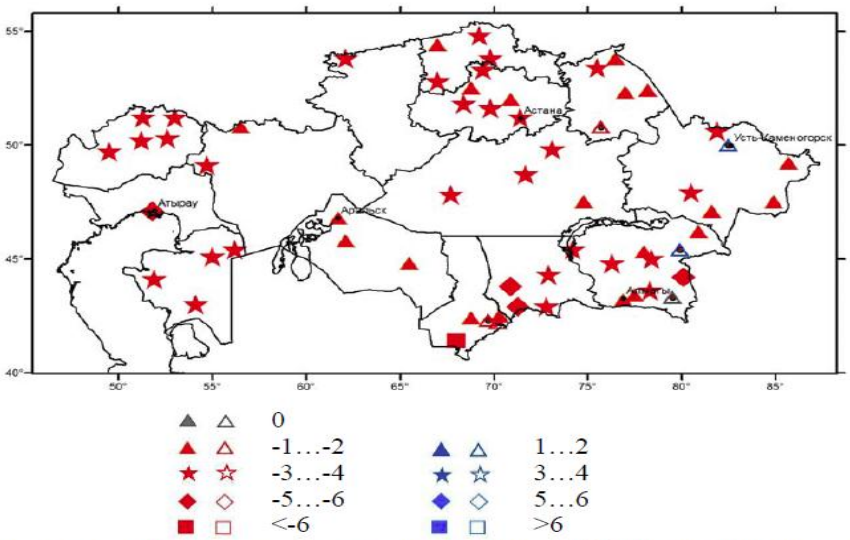

Chart 3. The changes of the numbers of the days with temperature below 0°C
in period 1941...2016 years

As it is shown that the atmospheric temperature of the Atyrau region is shifting to the above part of the zero scale of the thermometer. And we can conclude that the growing emission of the greenhouse gases from the local industry can be the main reason for this.

2.3 The traced changes in the amount of rainfalls

In the above part of the paper, we mentioned that the rising temperature of atmosphere in the Atyrau oblast can result in several problems. One of these problems is the reducing amount of the moisture in the atmosphere and rainfalls in consequence.

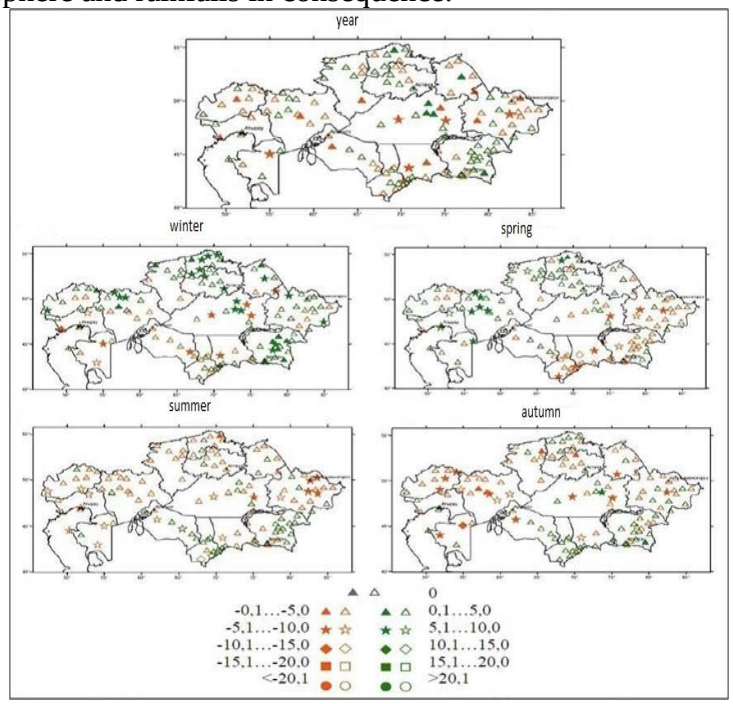

Chart 5. The changes in the rainfalls in seasons of the years from 1941 to 2016

We can see that rainfalls in the winter and summer months of the years from 1941 to 2016 have been reducing by -5.0% to -10% for per decade. While in the autumn months they reduced by -0.1%to -5.0% for per decade. But only in the spring months the amount of the rainfalls rose by

5.0% to 10% for per decade. So the whole yearly reduction of the rainfalls are around -5 to 0.1% .

The reducing rate of the rainfalls amount in the Atyrau oblast is about 1,3% for per decade for the last 75 years.

3. The consequences of the climate changes and anticipated aftereffects

What can we expect from the climate changes which have been considered one of the global problems nowadays? What are human race expecting in the coming future?

We may expect volatile weather and boiling summers and frosty winters. While in the transitive seasons, the boiling and frosty temperatures may appear in a single day, at noon and at night. Some experts even expect that spring and autumn seasons may just become history. While this changes in the climate in turn can cause food reduction.

The global climate changes are going to have a severe impact on the agriculture. The shortage in water resources can cause the degradation of the pastures. It will also affect the agriculture in a negative way. As the agricultural productiveness goes lower and lower, the challenged layers of the population will suffer the most and farmers are also going to have a harsh time. Other groups of citizens will also suffer from the rising prices of food. The draught will also cause drinking water problems. Dried wells can be found here and there and price of the bottled water will go up. The big rivers which often flood may also face pollution problems and the water quality there may become too poor as a result of the global climate warming.

What human race expects in the coming days is the change of the river flows. The repetition of the extreme natural phenomena will become more frequent. New abnormal natural phenomena will appear. There will be more hurricanes and the forests might be burnt often as a result of dry climate. The extreme phenomena caused by the change of the climate may result in the people's suffering. The impact of the climate change may have even harsher on the rainfalls and agriculture.

It is apparent that the climate changes will affect home economy of Kazakhstan. This is because to rebuild the regions suffered from draught or flooding the government needs to put aside a large amount money from national budget.

The main way out of this dilemma is to solve the major problem we face now - to reduce the emission of greenhouse gases for 80 percent.

However, is our economy ready to stop the work of the enterprises to reduce the emission of the toxic exhausts? To what extent should the toxic exhausts be controlled? Unfortunately, we have no answers to these questions yet.

Conclusion

It is a well known fact that the climate change is a serious global problem we are facing nowadays. And climate change is accelerating in the twenty first century. We are to see the consequences in the near future. And the change will also continue in the future.

We have learnt a lot through divers studies and researches. And this research shows us that the anthropogenic factors have much stronger impact on the climate change than the natural ones. As the nation's living standard is going up and needs are becoming more various, their energy consumption is also rising. However, the rising emission of the oxocarbons cannot be a triggering factor for new technological advancement. And the greenhouse gases are to have negative effect on the environment. The rainfalls will reduce; the lasting hot days will continue to grow; draughts and field fires will become more often; and the more agricultural lands will be desertified and so on. All these are happening already.

As this research has shown, the climate in Atyrau oblast has been going through a gradual warming period. The warming rate is approximately 0.23 - 0.25°C. The hot days with 35°C or above are appearing more often. It is proven that the atmosphere temperature in the oblast is getting higher. The rainfalls in the Atyrau region have been decreasing for 1,3% for per decade.

So, we conclude that the growing emission of the greenhouse gases as a result of quick industrialization polluted the atmosphere and consequently led to these phenomena.

While comparing the close interrelations of the two factors affecting climate change, anthropogenic and natural, we discovered that the anthropogenic factors usually fold on the natural factors to affect the climate change. Human is not able to resist the natural factors, however, we can

reduce the effect of the anthropogenic factors. In order to reduce the anthropogenic factors we can carry out cooperation in the following spheres:

- Toxic gases can only be absorbed by plankton and plants, so we should protect all green covers of the earth.
- Stop burning fossil fuels.
- Stop burning associated petroleum gases.
- Develop eco-friendly energy resources, for instance, solar energy and wind energy.
- Every person can do his/her contribution in improving ecology. We can start this by planting trees and economizing energy.

Literature

1. The Agency of Statistics of the Republic of Kazakhstan/Environment protection and Sustainable development of Kazakhstan. 2012 -2016/ Statistic collection/ Astana
2. The Republican State Enterprise "Kazgidromet": Annual Bulletin of Climate Change Monitoring of Kazakhstan: 2016 / Astana, 2016
3. The Republican State Enterprise "Kazgidromet": Annual Bulletin of Climate Change Monitoring of Kazakhstan: 2016 YEAR / Astana, 2016
4. The Republican State Enterprise "Kazgidromet": Annual Bulletin of Climate Change Monitoring of Kazakhstan: 2012 YEAR / Astana, 2016
5. Statistics Department of Atyrau region / Environmental Protection and Atyrau Regional Sustainable Development: 2012 - 2016 / Statistical Yearbook / Berlin 2016
6. Environmental Chemistry / Master of Chemistry Primov ER
7. http://www.atyrau.stat.kz/bulleteny2016/OOS.htm
8. http://www.kazhydromet.kz/files/bulleten/
9. http://www.atmosphera.kz/ Geo-portal for Atmosphere quality monitoring
10. TY Amihmina "School ecological monitoring" Agar. 1999

УДК 502.53

ЖАЙЫҚ ӨЗЕНІНІҢ ЭКОЛОГИЯЛЫҚ ЖАҒДАЙЫН ЖАҚСАРТУ ЖОЛДАРЫ

Аманқосова Ақмарал Есетқызы

akmaral_amankosova@mail.ru

Х.Досмұхамедов атындағы Атырау мемлекеттік университеті

Жаратылыстану және ауыл шаруышылық ғылымдары факультеті

5В060800-Экология мамандығының 3-курс студенті

Атырау, Қазақстан

Ғылыми жетекші - М.С. Есенаманова, тех.ғ.к., қауымдастырылған профессор м.а.

Батыс Қазақстан территориясы бойынша 196 өзен ағады, оның ішінде тек сегізінің ағыны тұрақты, ұзындығы 200 км - ден асады. Осы өзендердің ішінде ең маңыздысы, Қазақстандағы ұзындығы 1000 км - ден асатын ірі 7 өзеннің бірі - Жайық өзені болып табылады. Ал осы Жайық өзенінің қазіргі таңдағы экологиялық жағдайы күннен күнге төмендеп барады. Мемлекет үшін аса маңызды өзендердің бірі болып отырған Жайықтың бұл проблемаларына көз жұма қарамауымыз керек.

Жайық – Ресей Федерациясы (Башқұртстан, Челябі, Орынбор облыстары) мен Қазақстан Республикасы (Ақтөбе, Атырау, Батыс Қазақстан облыстары) жеріндегі өзен.

Өзен 1991 жылы мемлекетаралық трансшекаралық су объектісі статусын алды. Жайыққа оң жағынан Кіші Қызыл, Үлкен Қызыл, Сақмар, Таналық. Жайық өзені алабы - Шаған; сол жағынан Шыңғырлау (Утва), ның орналасуы. Гумбейка, Үлкен Қараған, Сүйіндік, Қомақ, Ор, Елек, Барбастау салалары құяды. Орал қаласынан төменгі бөлігінде Жайықтың аңғары тағы да кеңейіп, жайылмасы тармақталады. Орал қаласынан жоғарыда