British Journal of Global Ecology and Sustainable Development
Volume-15, April, 2023
ISSN (E): 2754-9291

ATMOSPHERIC AIR OF THE CITY OF NAVOI: QUALITY ASSESSMENT

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Annotation:
The article presents the results of the analysis of data on atmospheric air pollution in the city of Navoi based on the reporting data of the Monitoring Service for Atmospheric, Surface Water and Soil Pollution of the Center for Hydrometeorological Service of the Republic of Uzbekistan. Analyzed data on the study of the concentration of the main pollutants: dust, sulfur dioxide, carbon monoxide, nitrogen dioxide and oxide, as well as specific impurities and heavy metals.

Keywords: air quality, air pollution, concentration of harmful substances in the air.

Relevance

Atmospheric air is an important element of the environment, which has a direct impact on human health [1]. Atmospheric pollution leads to the development of various diseases of the respiratory and cardiovascular systems, and also worsens the quality of life of the population [2]. In the city of Navoi, located in the Republic of Uzbekistan, there is also the problem of air pollution, which is necessary for further study and improvement of the situation [3].

One of the main sources of air pollution is emissions from vehicles, industrial enterprises and heating systems. In the city of Navoi, the main source of air pollution is industrial enterprises that are located within the city and release a large amount of pollutant emissions. In addition, seasonal dust storms and smoke from garbage burning are also significant sources of air pollution.

The Purpose of the Study:

To assess the air quality of the city of Navoi based on data received from monitoring stations for 2018. The study is aimed at determining the level of air pollution by various substances, such as: dust, sulfur dioxide, carbon monoxide, nitrogen dioxide and oxide, as well as specific impurities (ozone, phenol, ammonia) and heavy metals (cadmium, lead, copper, zinc).

Materials and Methods

To conduct this study, data on the concentration of various pollutants in the air of the city of Navoi for 2018 were used (Table). The data was obtained using automatic air quality monitoring posts located in different parts of the city.

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Table. Characteristics of air pollution in Navoi for 2018

Admixture	Fast	$q_{cp.}$	G	q_m	q	q_i	n
Dust	1	0,1	0,072	0,5	0,0	0,0	846
Sulfur dioxide	1	0,003	0,002	0,014	0,0	0,0	846
	2	0,003	0,002	0,010	0,0	0,0	684
	3	0,003	0,001	0,009	0,0	0,0	405
Carbon monoxide	1	1	0,653	4	0,0	0,0	774
Nitrogen dioxide	1	0,05	0,013	0,10	1,1	0,0	846
	2	0,05	0,014	0,11	1,3	0,0	684
	3	0,04	0,011	0,09	0,5	0,0	405
Nitric oxide	1	0,05	0,015	0,12	0,0	0,0	846
Ozone	1	0,014	0,005	0,04	0,0	0,0	297
Phenol	3	0,002	0,001	0,005	0,0	0,0	405
Ammonia	1	0,03	0,013	0,09	0,0	0,0	846
	2	0,04	0,014	0,11	0,0	0,0	684
Metals (μg/m3)							
Lead	1	0,03	-	0,08	-	-	12
Cadmium	1	0	-	0	-	-	12
Copper	1	0,02	-	0.06	-	-	12
Zinc	1	0,15	-	0,33	-	-	12

q_{cp} - average concentration of impurities in the air, mg/m3;
$q_м$ - maximum concentration of impurities in the air, mg/m3;
q - the frequency of impurity concentrations in the air above the maximum allowable concentration of mpc m.r., in%;
q_i – the frequency of impurity concentrations in the air above 5 mpc m.r., in%;
n - number of observations;
G - standard deviation

Among the pollutants monitored were dust, sulfur dioxide, carbon monoxide, nitrogen dioxide, nitrogen oxide, ozone, phenol and ammonia, as well as heavy metals: cadmium, lead, copper and zinc. The concentration of each pollutant was measured as an average value for a year and a maximum one-time value. To assess the compliance of the obtained data with regulatory requirements, the maximum allowable concentration (MPC) established for each pollutant was used. Statistical processing was used to analyze the data, including calculations of the average and maximum values, as well as correlations with MPC.

Results

As part of this review, an assessment was made of the state of air pollution in the city of Navoi for 2018. For this, data from the Center for Hydrometeorological Service under the Ministry of Emergency Situations of the Republic of Uzbekistan, obtained using monitoring stations located in different parts of the city, were used. Analysis of the data

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showed that the concentration of pollutants in the atmosphere is at the MPC level, but in the future it can lead to the development of various diseases.

In the city of Navoi, a monitoring study of air quality was carried out throughout the year. The average dust concentration for the year was 0.1 mg/m3, while the maximum single concentration reached 0.5 mg/m3. But all values remained within MPC. The average concentration of sulfur dioxide for the year was 0.003 mg/m3, the maximum of the one-time concentrations was 0.014 mg/m3. But even here the maximum concentration limit was not exceeded. The average concentration of carbon monoxide for the year was 1 mg/m3, and the maximum of the one-time concentrations was 4 mg/m3. However, even here the values remained within the MPC. The average annual concentration of nitrogen dioxide was 0.05 mg/m3, which was 1.3 times higher than the MPC d.s. The maximum concentration was recorded at post No. 2 in July and amounted to 0.11 mg/m3. The average concentration of nitric oxide was 0.05 mg/m3, and the maximum concentration was 0.12 mg/m3. But in this case, the MPC did not exceed.

In addition to the main parameters of atmospheric air quality, such as the content of hydrogen sulfide, carbon oxides, nitrogen dioxide and dust, concentrations of specific impurities such as ozone, phenol and ammonia, as well as heavy metals were measured. The average annual concentration of ozone was 0.014 mg/m3, and the maximum single concentration reached 0.035 mg/m3. Ozone is a strong oxidizing agent that can have a negative impact on the respiratory system, so its level is also an important indicator of ambient air quality. The average annual concentration of phenol was 0.002 mg/m3, and the maximum single concentration reached 0.005 mg/m3. Phenol can cause irritation to the skin and respiratory tract, as well as adversely affect the liver and kidneys, so its level is also an important indicator of air quality.

The average annual concentration of ammonia was 0.03 mg/m3, and the maximum single concentration reached 0.11 mg/m3. Ammonia can irritate the eyes and respiratory tract, as well as adversely affect the body of animals, so its level is also an important indicator of air quality [4]. All these values also did not exceed MPC.

The concentrations of heavy metals such as cadmium, lead, copper and zinc did not exceed the MPC. Heavy metals are hazardous air pollutants that can be toxic to humans and animals.

Conclusions

In general, based on the monitoring data, it can be concluded that the air quality in the city of Navoi is satisfactory and is in line with the established MACs.

Basically, air pollution in the city of Navoi is associated with emissions of nitrogen oxides, sulfur and carbon, as well as dust and smoke. In addition to emissions from industrial enterprises and vehicles, there are other sources of air pollution in the city of Navoi. For example, during dust storms that occur from autumn to spring, the concentration of dust in the atmosphere increases significantly. In addition, landfill burning is also a significant source of air pollution, especially in summer.

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To improve the situation with air pollution in the city of Navoi, it is necessary to take a number of measures aimed at reducing emissions of pollutants into the atmosphere. For example, it is necessary to develop environmentally friendly modes of transport, such as electric vehicles, as well as to modernize equipment in industrial enterprises to reduce emissions into the atmosphere. In addition, it is necessary to develop a garbage disposal system and take measures to reduce the dust load in the city.

Thus, despite the positive results, air pollution is a serious problem in the city of Navoi, which has a negative impact on the health of the population. To improve the situation, it is necessary to take measures aimed at reducing emissions of pollutants into the atmosphere, as well as carry out work to clean the air and reduce dust load.

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