

Improving the Accuracy of the Results Obtained on the Basis of the use of Physical Research Methods in the Study of Environmental Problems

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Abstract

In the study of environmental problems in the southern regions of the Republic of Uzbekistan, based on the use of physical research methods, scientifically based results are presented on the causes of environmental problems and their consequences.

Keywords: Ecology, harmful substances, atoms, ions, region, local, gas phase, global, aerosol, heavy elements, compounds, migration, fluorine compounds.

It is well known that there is a lot of information about environmental change and its role in human development under the influence of the process of occurrence of environmental problems that have the same duration as human history, and its tendency to continue to grow is constant. Surkhandarya region, the southern region of the Republic of Uzbekistan, also has a number of environmental problems of a regional nature, due to which the development parameters of the region lag far behind other regions of the Republic of Uzbekistan due to changes in the pace and volume of economic development. Therefore, the results of this research are to develop the necessary recommendations to ensure the development of the national economy, taking into account the environmental problems in the southern region, and to recommend ways to use it in the national economy.

It should be noted that the main source of environmental problems in the current situation is man himself. As a result of global, regional and local environmental problems, humanity is once again facing problems. At the same time, there are natural environmental problems in the region, and its impact on the national economy must be taken into account.

Atmospheric pollution is mainly caused by the emission of various wastes from factories and mills. Sudden changes in nature under human influence are also a source of environmental problems. An example of this is the emergence of the ecological problem of the Aral Sea and the Aral Sea Basin on the basis of unplanned consumption of Amudarya and Syrdarya waters, based on the concept of agricultural development of the Central Asian states in the 60-80s of the XX century. This environmental problem is global in nature, leading to a sharp increase in land and atmospheric salinity in many countries other than Central Asia. The Aral Sea maintained its dimensions when the Amudarya and Syrdarya supplied 50 ÷ 55 cubic kilometers of water to the Aral Sea each year. For the past 50 years, the Amudarya and Syrdarya have supplied the Aral Sea with 6 ÷ 8 cubic kilometers of water per year, and now the Aral Sea has shrunk by 70 ÷ 75%. As a result, about 5

million hectares have been separated from the seabed and become a source of ecological environment. The reason for all this is that humanity itself is to blame.

Another similar environmental problem arose in the southern part of Uzbekistan in the Surkhandarya region at the end of the last century under the influence of the human factor. This is due to the fact that harmful substances emitted from the Tajik aluminum plant pollute the atmosphere, soil and water of Uzun, Sariosiya, Denau, Altynsay, Shurchi districts in the northern part of Surkhandarya region. This environmental problem has been the basis for many scientific studies as an object.

It is known that analytical research methods used in environmental control are the most basic physical methods of studying the atmosphere, groundwater and surface water, soil and mountain bodies, living and plant life. The physical methods used in the study of environmental problems are diverse. The most important of these methods with a high degree of accuracy are neutron-activation analysis and nuclear gamma-resonance spectroscopy. Also, some of the potentiometric method and chemical analysis methods are widely used in research.

Using these methods, changes in the quantitative value of substances in the atmosphere, air, water, soil, living organisms and plants can be measured with great accuracy. The analysis of the state of the ecological environment in the studied areas, the presence of excess and foreign elements in the soil, water and atmosphere using both physical and qualitative methods allows to obtain data with a high degree of accuracy, both qualitatively and quantitatively. Therefore, only physical research methods are used in the study of global, regional or local environmental problems [1].

Surkhandarya region, the southernmost part of the Republic of Uzbekistan, has regional problems of both natural and artificial origin. Climatic conditions and geographical environment in the northern region of Surkhandarya region are very different from the southern region. Due to the subtropical climate in the northern districts of Denau and Sariosiya, these regions have the conditions for the growth of all plants in the world. Similar climatic conditions are in Shurchi, Altynsay and Uzun districts. That is why the area is densely populated. These regions also have their own environmental problems, the solution of which remains a topical issue today. The main source of environmental problems that threaten the northern regions is the Tajik aluminum plant.

Built just 10 km from the region's border with Tajikistan, the plant is located at an altitude of 500 to 600 meters above sea level, and emissions of toxic gases in the form of gas, aerosols and vapor-gas phases spread throughout the year to Surkhandarya region. At present, these toxins have poisoned most of Sariosiya and Uzun districts, as well as a large part of Altynsay and Shurchi districts [2].

As a result, there are serious negative effects on agricultural crops and livestock. Horticulture and vegetable growing failed. Even a small crop to be harvested is poisoned. Livestock productivity declined sharply.

The most dangerous aspect is that this environmental problem has a drastic impact on human health. The incidence rate of the population has increased and these toxins are having a negative impact on the human race.

Among the harmful substances emitted from the plant, along with the atoms and ions of heavy elements, the toxic hydrogen fluoride compound also poses a threat to human health [3-4].

In the study of this environmental problem, the migration of harmful substances based on the application of physical methods, the regularity of their distribution over long distances was studied. The results of neutron-activation analysis, nuclear gamma resonance spectroscopy and

potentiometric research showed that the amount of harmful substances emitted from the Tajik aluminum plant in the northern region of Surkhandarya region exceeded the permissible level (REM) by 4 to 12 times in water, soil and atmosphere. The results showed that the harmful substances were found to have spread over a distance of 25 km to 60 km.

Experiments show that the NF compound reached all areas of Sariosiya and Uzun districts. In the area of 40-50% of Denau and Oltinsoy districts, the HF concentration was found to be much higher than the allowable amount. Experiments have also shown an increase in the amount of HF in the northern part of Shurchi district. This means that the health of the local population, as well as the development of the national economy in the area is affected by this toxin.

Based on the experiments, the annual migration of HF compound and other harmful substances was also determined. The results show that the migration of harmful substances is influenced by climatic conditions and meteorological conditions. Wind direction and speed, humidity, precipitation and, most importantly, air temperature have a major impact on the migration of harmful substances.

Experiments show that in the warmer months of the year (June-July-August) harmful substances are spread over long distances. Given that the summer temperature in the northern regions of the region is higher than $[35-40]^{\circ}$, it is possible to observe that the harmful gases emitted from the Tajik aluminum plant are poisoning many areas in the northern region.

Also, the harmful substances emitted from this plant include atoms of heavy elements (for example: Rv) in the Mendeleev periodic table, various heavy ions, as well as aerosol-vapor emissions from the plant, which cause great damage to agricultural crops and livestock, as well as the local population. experiments have shown that it has a severe effect on health.

The following table shows the distance distribution of harmful substances emitted from the plant in the aerosol-vapor state in the territory of Surkhandarya region.

Condition of harmful substances emitted from the Tajik aluminum plant:

No	Location of control	Aerosol phase	Par-gas phase
1.	Around the factory	65%	35%
2.	10 km from the factory	18%	82%
3.	25 km from the factory	15%	85%
4.	40 km from the factory	10,5%	89,5%
5.	55 km from the factory	5,7%	94,3%

It shows how far the harmful substances can reach and in what condition. Regardless of the circumstances, the study of the ecological problems created by the Tajik aluminum plant, which continues to poison 1.5 million people in different parts of Surkhandarya region, restores the natural environment in the southern region of Uzbekistan. Giving full information about the source of this environmental problem that affects us is the most important information for our future generations.

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