Distribution Of Hazardous Chemical Compounds in The Middle Part of The Ohangaron Valley and Their Impact on Population Health

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Abstract
As a result of technological progress, the use of natural resources and the pollution of the environment are increasing. As a result, the natural balance is disturbed. As a result of anthropogenic influence, people, livestock, animals, plants, and soil suffer a lot from pollution of the natural environment with various wastes. As a result of this, various diseases are occurring among them, and some of them are dying. This article describes the geochemical conditions of the Angren-Almalik industrial region, the distribution of heavy metals and their effects on the human body.
Keywords: mining industry region, soil sample, gynecological situation, heavy metals, human organism, Maximum permissible concentration.

Introduction

I.N. Lozanovskaya et al. (1998) believe that the effect of chemical pollutants on the human body occurs in two types: 1) specific type, in this category certain diseases occur as a result of the effect of chemical substances on the body system and human organs; 2) in a non-specific type, those substances have a positive effect on the development of diseases caused by other factors. Specific effects occur with larger amounts of substances, and non-specific effects with smaller amounts of waste. A specific effect is attributed to most pollutant emissions, as well as mercury, cadmium, lead, arsenic, fluorine and others. For example, the presence of fluorine in a large amount in the human body damages dental tissues and causes various diseases in bone organs [4].

Research methodology.

Angren-Almalik mining industry region has been studied by many. In particular, Sh.M. Sharipov et al. [14] Karst processes in Kurama and Chotkal ridges, R.A.Ibragimova et al.[12] the natural geographical complexes in this area, Sh.M. Sharipov et al.[13] processes affecting the geoecological situation in the basin, N.E. Shukurov [9] studied soil contamination with heavy metals. In the course of the research, samples were taken from the vicinity of industrial enterprises located in the cities of Almalyk, Angren and Ohangaron. During the sampling process, soil samples were taken from the surface of the soil at 0-10 cm and at a depth of 10-20 cm. The coordinates of the sampled points were identified and recorded

by GPS. Wind directions at sampling points should also be recorded. This is because Harmful elements emitted from industrial enterprises are blown by the wind and can cause serious damage to the soil, flora and fauna of this area [5,8]. The figure below shows the location of soil sampling points (Figure 1).

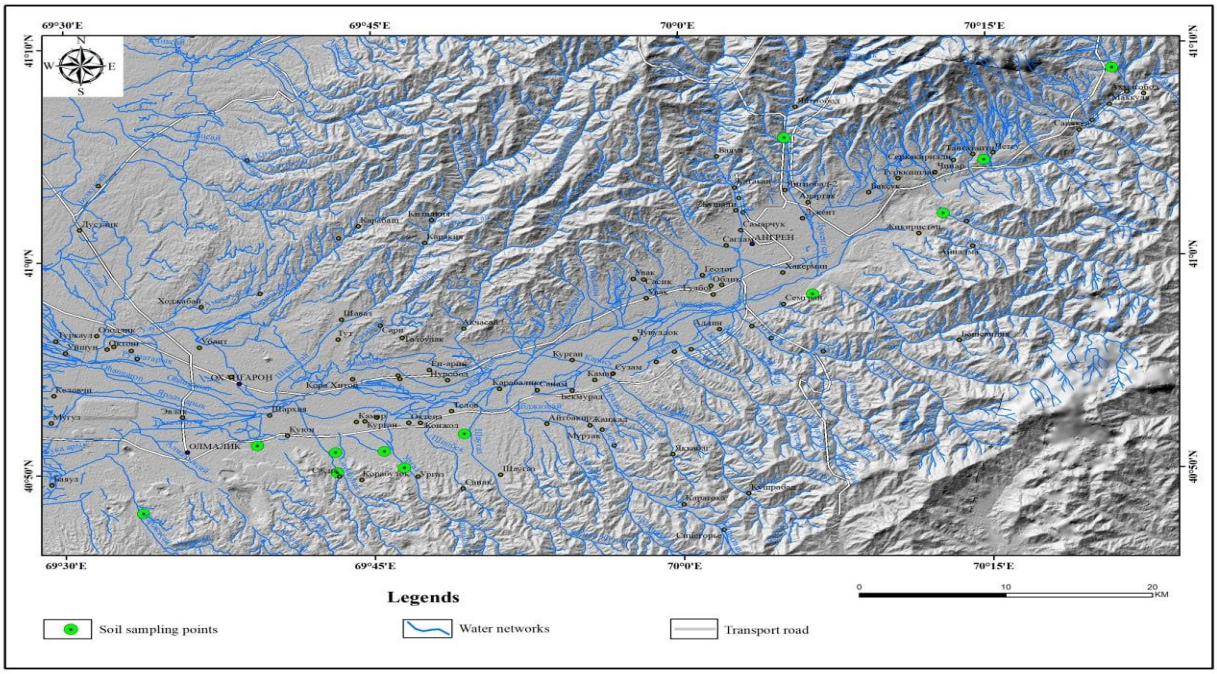

Figure 1. Location of soil sampling points in Angren-Almalik mining industry region

Research results. Soil samples were taken along the wind direction, and the amount of heavy metals in the soil was determined using the laboratory analysis method. According to the obtained profile, it was found that the amount of various harmful metals in the soil changes, and their amount gradually decreases as the distance from the source. Table 1 below shows the amount of heavy metals found in the soil as a result of the soil samples.

Table 1.

Amount of heavy metals in soil samples in Angren-Almalik mining industry region (g/t)

Serial number of the soi section (profile)	Territory	Place name	Co	Ni	Cu	Ms	Ace	Ag	Cd	Sn	Sat	Tl	Pb	Bi	Th	SHE IS
Pr-01	Ertashsoy	village	17.0	63.6	101	117	33.9	0.547	0.227	3.04	2.15	0.701	46.5	0.545	16.1	2.63
Pr-05	Chetsu	village	11.4	41.3	52	120	31.2	0.438	0.322	2.18	2.20	0.666	56.1	0.578	12.9	2.50
Pr-09	Jigaristan	village	16.1	68.9	73	190	38.3	0.660	0.566	3.45	3.22	0.994	81.8	0.823	16.3	2.96
Pr-11	Angren coal mine	industrial zone	6.87	38.9	46	93.7	28.9	0.624	0.273	1.77	1.72	0.569	51.7	0.512	8.71	2.77
Pr-32	Yangiabad	village	12.5	43.3	50	95.4	39.3	0.345	0.293	2.45	2.18	0.637	38.1	0.485	12.5	2.87
Pr-38	Shaugaz	village	14.2	62.6	129	146	38.6	0.530	0.527	2.94	2.98	0.709	59.7	3.14	13.0	2.42
Pr-42	Urgaz	village	13.2	49.1	162	147	39.0	0.489	0.620	2.44	3.11	0.617	63.1	0.769	12.3	2.36
Pr-44	Saricheku	near the mine site	12.3	70.4	102	162	32.7	0.511	0.507	2.63	3.54	0.658	88.8	0.904	12.9	2.55

Pr-46	Kalmakkir	near the mine site	12.0	50.8	158	226	42.4	0.800	1.17	2.88	4.25	0.675	113	1.18	12.6	2.60
Pr-48	Kauldi	near the mine site	13.2	47.9	164	243	44.3	0.599	1.15	3.07	4.33	0.629	100	1.14	12.0	2.25
Pr-58	Youth	near the mine site	11.3	39.0	171	260	41.8	0.599	1.21	2.45	4.59	0.641	145	1.37	12.8	2.60
Pr-72	German	industrial zone	15.0	52.0	300	560	35.0	0.680	2.20	3.20	4.90	0.630	160	4.30	10.0	2.30

Based on this table, the data was mapped using ArcGIS software.

As can be seen from the table, cobalt heavy metal is highly distributed in the villages of Ertoshsoy, Uzunbulok, Jigaristan, the vicinity of the Almalyk industrial zone, the villages of Shovgaz, Urgaz, and the Kauldi mine. Relatively less common in Angren Coal Mine, Youth Mine, and Chetsu Village.

According to Kobalt (Co) P.O. Borisov (2019), somehas an active effect on enzymes, participates in the formation of blood (erythrocytes and hemoglobin). When it is lacking in the body, it is dangerouscauses anemia in tumor disease. Anemia (anemia), in excess of the norm, develops muscle and tissue metabolic disorders (dystrophy), endemic goiter (Fig. 3.3), vitamin B12 deficiency (7 mg per 1 kg) [3].

Copper (Cu)and heavy metal is widely distributed around Almalyk industrial zone, Yoshlik, Kalmoqkir and Kauldi mines, Urgaz village. It is less common around Angren coal mine, Yangiabad, Chetsu villages.

Copper (Cu)–the amount of clay in the soil is set to 20 g/t, in plant ash 200 g/t. Copper has been found to be higher in the ashes of many plants than in the soil. Most of the copper is absorbed into the clay particles and migrates together with them. The rest of it migrates as a copper colloid mixture. There are colloidal copper minerals in nature. In dry climates, it migrates weakly in continental deposits and waters, in neutral and alkaline water conditions. Copper in the soilpermissible limit amount (REChM)value is 55 g/t, this amount is close to the Clark content of copper in sedimentary rocks (57 g/t) [5,9].2-3 mg per 1 m3 of soil per day is REChM. It is found in more than 30 proteins and enzymes. According to P.O. Borisov, it participates in the production of hemoglobin, affects the formation of the skeleton [3]. When it exceeds the norm, it leads to liver dysfunction (acute hepatitis), brain function failure, mental (schizophrenia), brain (epilepsy), development of malignant tumors and hormonal system disorders. These diseases begin when its norm in the human body exceeds 60 mg per 1 kg. It also affects anemia, disorders of the central nervous system, disorders of elasticity of blood vessels, development of diseases of the digestive tract (the limit of influence is 15 mg per 1 kg). In the human body, copper is found in brain tissue, liver, pancreas, myocardium,Wilsoncauses disease. According to I. V. Yakushevskaya [10], endemic anemia and liver tissue disorders are observed in livestock (sheep) due to excessive accumulation of copper.

Nickel(Ni)heavy metal is more distributed around the villages of Saricheku, Turk, Chetsu around the Ohangaron reservoir, Ertoshsoy and Shovgaz. Angren coal mine, Yoshlik mine are relatively less common around Chetsu mine (Figure 2).

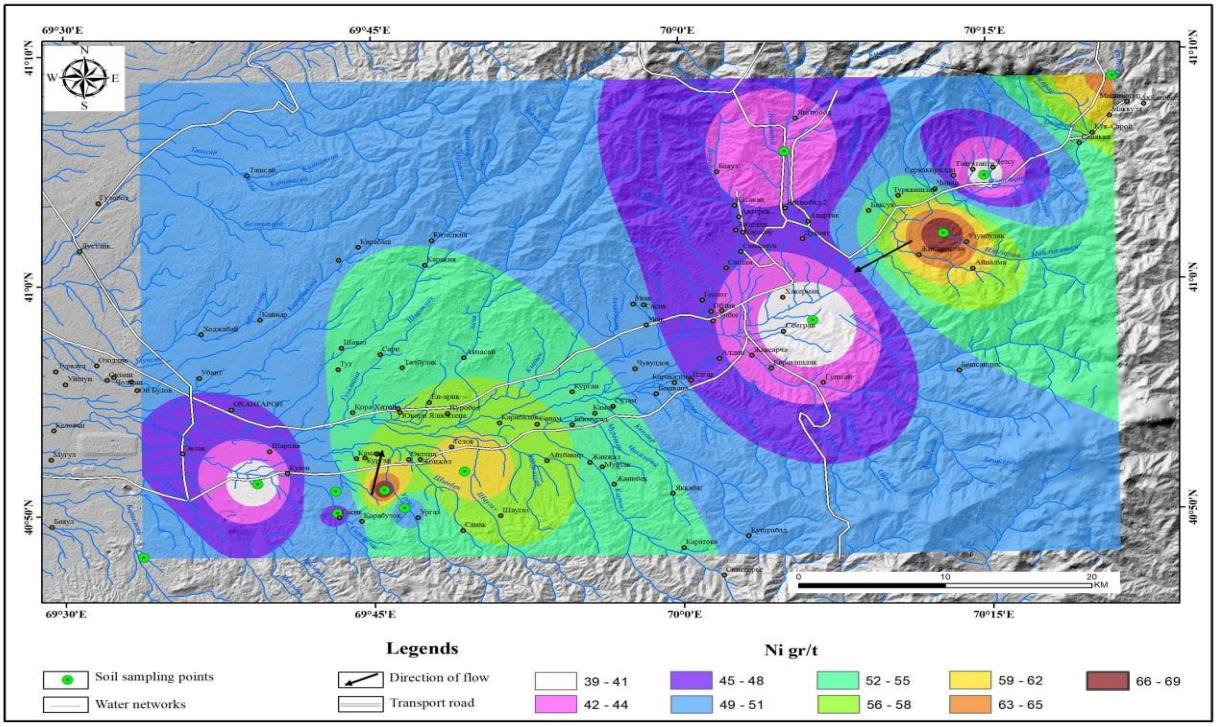

Figure 2. Distribution of nickel heavy metal across the Ohangaron Basin**.**

Nickel (Ni) – controls the activity of ribonucleic acid (RNA), activates some enzymes, participates in blood formation. When it is more than the norm, mouth cavity and colon ulcer, kidney cold, lung fibrosis, and eye diseases appear. It can cause diseases such as cardiovascular disease and respiratory tract cancer [19]. Based on the observations made in the research area, a map of the distribution of cardiovascular system diseases in the Ohangaron basin was made in this area (Fig. 3). When it is less than the norm, the appetite worsens. I.V. Yakushevskaya [10] determined that the accumulation of nickel in the cornea of the eye leads to endemic eye diseases.

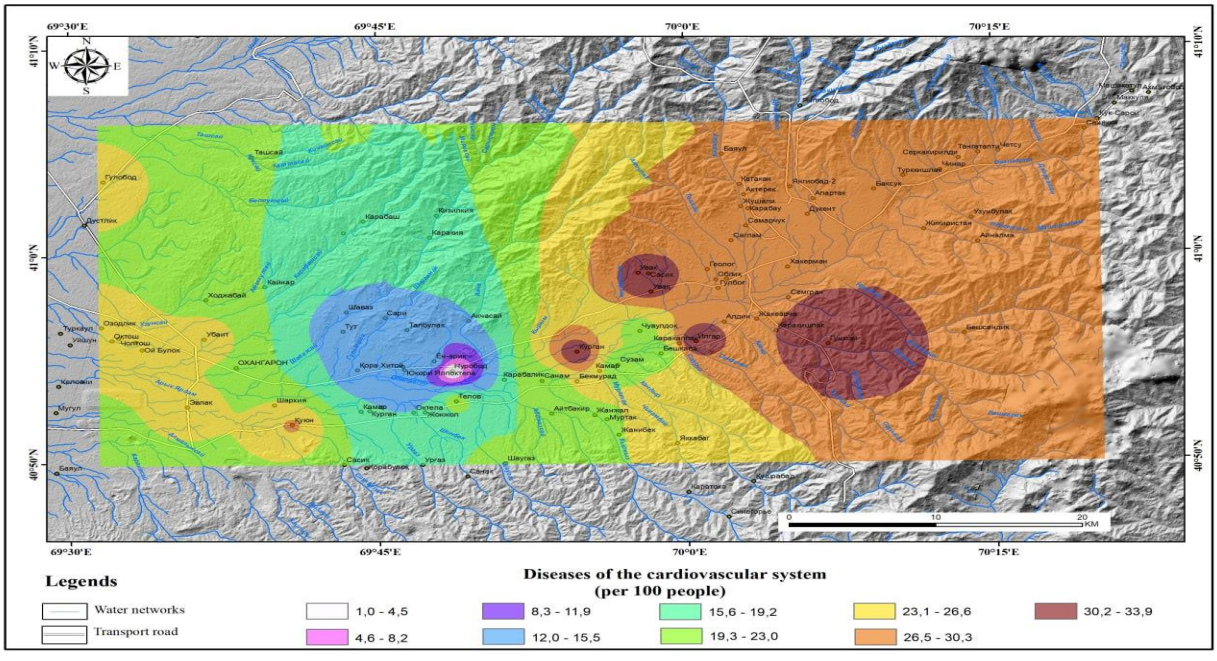

Figure 3. Distribution of diseases of the cardiovascular system along the Ohangaron basin

Zinc (Zn)element has the highest index (560) in Olmalik industrial zone, it is widely distributed in Yoshlik, Kauldi, Kalmoqkir, and Saricheku mines. Angren coal mine, Yangiabad, Chetsu, Jikiristan, Uzunbulok are less common.

Zinc (Zn**)**–the amount of calcium in sedimentary rocks is 80 g/t, in soils 50 g/t, and in plant ash this indicator is 900 g/t. REChM value for soil is 100 g/t.10-20 mg per 1 m3 of air per day is considered normal. It is part of 80 enzymes, participates in the synthesis of insulin and sex hormone enzymes, participates in the alkali balance in the body, ensures the normal function of the pituitary gland and pancreas, which is actively involved in the hormonal management (regulation) of the body, reduces the amount of cholesterol in the blood, and enhances cell division. . Blocks viruses that cause diseases caused by affecting RNA and protects the body. When it is less than the norm, diabetes, beriberi disease (deficiency of vitamin V1), body growth and sexual immaturity, depression, inflammation of the main glands, decreased initiative, sense of smell and taste (their starting norm is 30 mg per 1 kg constitutes) is observed.

Arsenic (As)Kauldi, Kalmokgyr, Yoshlik mines have a relatively high index. It is less common around Angren coal mine, Chetsu, Ertoshsoy village, Saricheku mine.

The amount of arsenic in sedimentary rocks and soil is 6.6 and 5 g/t. Amount of REChM for soil – 2 is equal to g/t. It has a relatively high amount of calcium in the lithosphere - 1.7 g/t [5,9].

Arsenic participates in the synthesis of protein and hemoglobin in the body. Reduces the toxicity of the element selenium. At 1.2-2.0 mg per liter in water, it affects tissue drying (gangrene). It also affects weight loss and exacerbation of gastrointestinal diseases (gastroenteric type). It causes encephalopathy, liver disease and bone loss.

CadmiumMetal (Cd) was detected in small quantities in the research process, it is relatively more widespread in the Almalyk industrial zone, around the Yoshlik, Kalmoqkir, and Kauldi mines.

Cadmium is a scattered element, its Clark number is 0.3 g/t in sediments, 0.5 g/t in soil, and 0.01 g/t in plant ash. The REChM value of cadmium for soil has not been determined.

One of the metals that strongly affects the human body is cadmium. Cadmium is found in various alloys, nickel-cadmium batteries, waste water, household waste, phosphorus fertilizers. According to P.O.Borisov [3], cadmium accumulates in the tissues of the human body, mainly in the adrenal cortex and liver. Cadmium accumulates in organisms for a long time, and this process occurs more in bones. Under the influence of cadmium ions added instead of calcium in the bone, the bone system completely fails, the human skeletal system is completely destroyed. Consequently, there is also a risk of carcinogenic effects of active biological ions of cadmium. Cadmium, entering the protein complex, regulates blood sugar and increases blood pressure. When it is more than the norm, central nervous system, liver cirrhosis, nephritis, pulmonary emphysema, causes hypertension. It slows down the exchange of phosphorus, calcium, iron, and copper in the body, and reduces the synthesis of hemoglobin. It is 10 times more toxic than lead. Due to its high toxicity and activity, its REChM is 0.05 mg per 1 m^3 of air. The amount consumed through food should not exceed 0.5 mg per week.

Tin (Sn)It is more common around Ohangaron reservoir, Almalyk industrial zone, Kauldi mine. It is less identified around Angren coal mine, Yangiabad, Yoshlik mine.

According to N.A. Chernykh, Yu.I. Baeva (2019), some organic tin compounds are toxic. Any tin compound of this element in the amount of 2 g is toxic to humans. When poisoned with tin and its compounds, weakness, nausea, diarrhea, loss of appetite, decreased vision, headache, increased blood sugar, and enlarged liver are observed. Excessive accumulation of tin in the body can also lead to mental disorders. Tin in the body accumulates in the skeleton (10 μmol/kg), liver (2.7), lungs (2.4), kidneys (1.6), skin (1.3). It causes breathing and heart failure [7].

Lead (Pb)It is one of the most dangerous and toxic metals. It has the highest value in Almalyk industrial zone (160 g/t), followed by Yoshlik, Kalmokgyr and Kauldi mines. The lowest rate is found around Yangiabad village and Angren coal mine.

In lead casting workshops, there are special standards in which REChM is specified. According to REChM, 1 m³ of air can contain up to 0.1 μg of lead.Clark content of lead is 20 and 10 g/t in sedimentary rocks and soil, and 10 g/t in plant ash. Lead for soilREChMvalue is 30 g/t.In this case, the concentration of lead in the blood reaches 0.6 μg per ml. The symptoms of the disease are found in every ml of blood in a person. at 1 μg, or per ml of urine. at 0.1 μg. starts when it matches . Symptoms of poisoning are expressed in soft muscle tissue, hemosynthesis in bones, nervous system disorders, their mental development is slow in children. 90-95% of it accumulates in bones.

According to Korghoshin, V.G. Ignatov and A.V. Kokin (1997), the amount in 1 m³ of air per day should not exceed 0.35 mg. It damages the central nervous system, liver, lungs, actively affects the brain (encephalopathy) and eye diseases, and increases sclerosis. It causes kidney and gastrointestinal diseases [15]. The amount of lead in the blood is 100 ml. At 80 μg, muscle pain begins to increase.

It was found that skin diseases are abnormally manifested around aluminum, steel casting, and superphosphate producing enterprises [1,2].

Bismuth (Bi)metal has the highest index (4.30 g/t) in the Almalyk industrial zone, then it is relatively more common around the village of Shovgaz (3.14 g/t), Yoshlik, Kauldi, and Kalmokgyr mines. The lowest indicator was found near the town of Yangiabad.

Bismuth is most likely to enter the human body through the mouth or skin. In general, it enters the human body with food, as well as with air and water in the amount of 5-20 μg per day. After being absorbed in the body, bismuth forms a compound with proteins in the blood and becomes a part of red blood cells. It is equally distributed among organs and tissues. It can accumulate in the liver, kidney (up to 1 kg/t), spleen and bones, and it can also be found in the brain. Bismuth is a moderately toxic element that is considered less harmful. Poisoning or skin diseases are rare when working with bismuth. [17,18].

Conclusion

From the above, it can be concluded that the presence or absence of chemical elements, especially heavy metals, in the human body changes the metabolism in various organs, disrupts the necessary vital processes, and eventually causes various diseases. The balance of heavy metals in nature is favorable for human life, but their increase or decrease harms the quality of life, the types of diseases increase, human life is shortened, and it becomes a factor in the occurrence of serious diseases among young children, the elderly, and women.

In this regard, the middle part of Ohangaron Valley can serve as an "ecological model" within the country. Because the existing industrial enterprises, mines, waste rock piles, overturnings, spent ore residue warehouses, motor vehicles and other sources of environmental pollution are the sources of release of the above-mentioned elements into the natural environment [1, 2, 6].

The toxic effects of large amounts of heavy metals in humans or livestock cause damage to certain organs of the body, such as central and peripheral internal secretion of the nervous system, organs of blood production. Pollutants are distinguished by their effects on reproductive functions, in addition to their general toxicity [11].

Chemical pollutants circulate in the human body and accumulate not in all its parts, but only in some organs and tissues. They usually accumulate in human organs where strong biochemical processes occur: liver, kidney, endocrine glands. The danger of collecting them is that these substances can show their negative effects after several years.

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