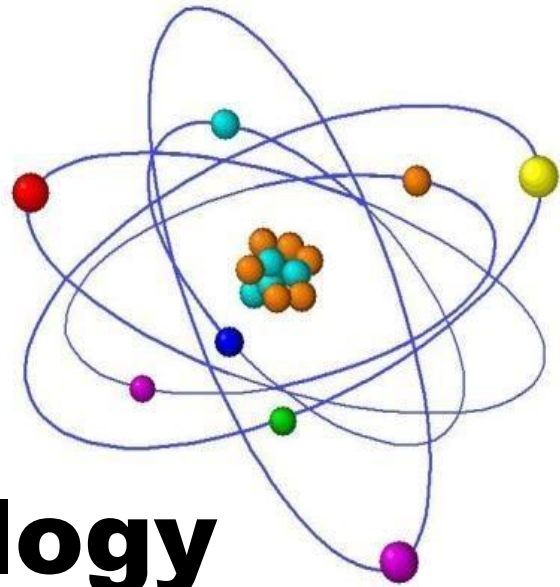


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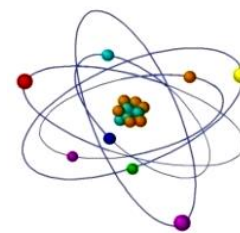
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OVERVIEW OF GARDABANI, RUSTAVI AND MAKHATA MAUNTIAN RADIOLOGICAL SURVEYS



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ABSTRACT

Environmental pollution and its monitoring have been urgent and intensified in recent times. Environmental pollution is a characteristic feature of the last century. Its large scale dates back to the 30s of the century. Industry and road transport play an important role in environmental pollution, while agriculture and soil erosion occupy a relatively small share. The role of radioactive sources in environmental pollution is great. It is necessary to develop and implement investigations and monitoring to protect against radioactive contamination of environmental factors and work facilities.

Key words: environment, radiological research, radioactive contamination, radionuclides.

INTRODUCTION

In terms of environmental impact, according to the International Convention, ecologically dangerous productions and facilities include: Nuclear industry, energy (nuclear, hydraulic and Thermal power plants), Ferrous and non-ferrous metallurgy, petro chemistry, chemical Industry, Mining, Cellulose production, transportation of waste, storage-disposal and burial, Construction of roads, railways, highways, airports, dams and reservoirs, deforestation, light industry and more. In pollution no less role is played by transport as well. Pollution in any environment represents new physical, chemical and biological agents to them, or their natural average perennial content Overcoming the level override.[1] As a result of pollution occurs soil loss, as a result, the productivity of the ecological system and the biosphere is falling apart. Environment transformation begins at a high stage of public development; Every product of labor represents man and nature The result of joint action.[2] Environmental pollution is the loss of substances and energy Undesirable process caused by human economic action As a result, Such as the extraction and processing of raw materials, whatever Accompanied by waste separation and dispersal in the biosphere. Environmental pollution includes individual ecosystems as well as the entire biosphere Irreversible decay, changing their physical and chemical parameters. Contamination directly or indirectly worsens the conditions of human as a core of society the physical and moral condition of the force produced. Monitoring Explained in the literature as elements of the environment Objectives defined in time and space by an observation system, it complies with a pre-prepared program. In order to evaluate the results, Study of different anthropogenic impacts on the environment A comprehensive tool is its comprehensive analysis. Environmental pollution can be of two types: I) natural, of which the cause may be natural disasters. II) Anthropogenic-caused (by) as a result of human activity. They are attributed to various anthropogenic impacts on the biosphere Systems analysis methods. The main feature of the analysis is detailed discussion of the main aspects of the impact. If we divide it into stages, it can be said that the first stage of comprehensive analysis represents the study of the impact of various factors on the environment Issue. If we divide it into stages, it can be said that the first stage of comprehensive analysis represents the study of the impact of various factors on the environment Issue, Which is defined by the detection of such rings Analysis of reactions of biosphere elements for which impact is critical. The role of radioactive sources in environmental pollution is huge: Explosion of atomic bombs, scattered in the environment by nuclear power plants Radionuclides and heavy metals, during Other-radiological accidents Radionuclides emitted into the environment, Human production Activities of radionuclides of natural and artificial origin Distribution in the environment: fertilizer application, ore extraction, etc.[3] The largest share of pollution comes from industry and transport. It is known that the planet consumes 2.4 billion tons of coal, of which As a result, 280 thousand tons of arsenic and 224 thousand tons of uranium are scattered on the earth every day. At this time the world produces 40 thousand tons

Arsenic and 30 thousand tons of uranium. From this it is clear how much Pollution of the environment with these substances prevails. With coal and its recycling and also using it to pollute the environment is real and accountable. In the 80s of the 20th century, In the Georgia Radio ecological and Radiobiological studies have been given special importance. The existence of global radioactive contamination is well known as well as Distributions of its Geo ecological regularities.[5] After Chernobyl accident the radiation background in Georgia increased a lot. Common the radiation background increased 20 times more than the norm. Soil, as a variety of natural resources, is characterized by a number of features. It is a product of long biological transformation of different types of a rock layer. Conditions in which modern soil is formed, has been changed partially or completely. Land is an invaluable treasure of nature; it is the indefinable wealth of the people! Biologically, as a result of Sr₉₀ and Cs₁₃₇ atomic explosions, among the generated radioactive substances, great danger produces those that accumulate in the bones, tissues and organism as well, and forming the main source of damage to the genetic apparatus.[6]

The 1986 Chernobyl nuclear power plant disaster was significantly changed radiation in Condition Georgia, particularly in western Georgia, Which had a significant impact on the Cs-137 and Sr-90 On the ratio. Increase in pollution levels after Chernobyl nuclear power plant accident mainly is caused by quantifying excess of radioactive cesium. As is well known, one of the main factors in the distribution of radionuclides is Atmospheric Precipitation, wind direction and more.

In Georgia particularly industrialized was and still is city Rustavi zone, as well as Zestaponi zone.(re It is known that these wastes, along with heavymetals, often contain radioactive elements in excessive concentrations.As for Rustavi, this time on the territory of the park located in the center of the city for years



Fig.1.The slag produced in Rustavi Metallurgical Plant was being poured.

It is in this sense that the laboratory conducted by us According to the analysis the inspected part of Rustavi territory for today, Radiation contamination levels (Cs-137 and Sr-90, K-40) radioactive elements are not alarming. However radiation vitreous Reliable representation of the retrospective image requires soil Comparison of changes in pollution levels over time and space. Technogenic contaminant of origin can be

deposited on the Earth's surface, Occur due to both airborne and unsystematic dumping of solid waste. As a result of the Chernobyl accident, for example, radiation Pollution norms have been tightened enough. We can say that, the territory of Rustavi, which has been inspected so far, Radiation pollution levels in places based on radioactive elements are not alarming (Cs -137 and Sr-90, K-40). But radiation vitreous Reliable representation of a retrospective image requires level of soil pollution changes over time.[7] In addition the analysis was done by a metallurgical plant Research on recycled slag, In terms of radiation pollution.

In a similar sense. We conducted research in some of Gardabani and In the current area as well, Including on agricultural soils. On the left side of the Mtkvari , there is Gardabani plain as a narrow strip. This plain is connected to the alluvial terraces of the Mtkvari. Based on the above, Peculiar regularity of wind and precipitation distribution in the zone is manifested.[8] A similar pattern was s found in the radiation background as well. 2018-2019 Was conducted Study of natural radiation background, on soils of Gardabani district, where the largest annual dose Accounted for 120 ng / h, 1.06 mzv / yr. It is known that the so-called Average of “normal ” regions the data are 0.7 mzv per year. If we compare this figure with the Gardabani zone data, we will see that the Gardabani district is included in the number of regions with increased radiation zone.

Exposure of a polluting agent to the earth can occur both from the air. Chemical contamination in the soil Migration is mainly determined by the slow movement of groundwater, so-called the filtration process. Studies have shown that, in the soil Radionuclides are absorbed by the plant and become its various organs by accumulation. A radiological study conducted in the Gardabani district showed Radionuclide condition of soil, heavy metal content assessed in the soil[4].

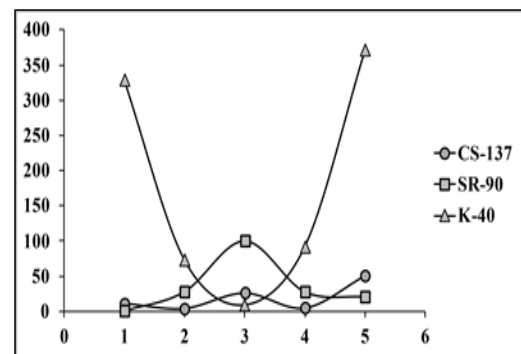
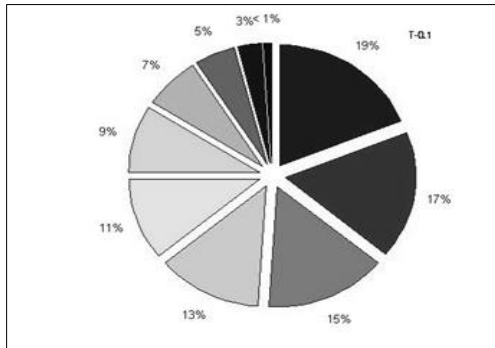


Fig.2 Distribution of Cs -137 and Sr-90, K-40 in soil.

Samples were taken in the villages that were few kilometers away from Gardabani thermal power plant, as the table shows the ^{40}K natural radionuclides in the soils of Gardabani was shown in all samples. Natural radionuclide in soils of ^{40}K Existence is due to the composition of the soil capillaries as well as using phosphorus fertilizers.

#	Radionuclide	Activity Bq/kg	T.1	Stat.error %	Uncertainty Bq/kg	Maximum Alloeabie Concentration Br/kg
1	CS-137	11	3,9	25,7	4,35	50
2	SR-90	0	27,4	100	27,4	20
3	K-40	328	72,5	8,6	91,1	370

Table.1

We also analyzed the heavy metal content of Gardabani For some areas;

As a result of the research we can conclude: the soils of the area adjacent to the Gardabani district thermal power plant are affected by it (heavy metals), which is reflected in the increase of the permissible level of heavy metals in the soils. And finally in one of the most important districts of Tbilisi, Makhata, We conducted a radiation study of the mountain area. There was over 100 more soil sample. Laboratory analysis was performed in rural areas At the Scientific Research Center for Agriculture and Radiology. Data showed that Pollution levels are Cs-137 and Sr-90, In this case, their increase in intensity is not observed.

CONCLUSION

In the future, we plan to study the following radiologically active areas and to continue the analysis of radionuclide research and to contact more detailed studies in this direction for different regions of Georgia.

Table.2.

Place of sampling	Heavy metal content in soils of Gardabani district		
	Zn	Pb	Fe
41,450905 45,093319	770	360	3492
41,450857 45,093072	260	320	3426
41,450431 45,093351	920	280	3105
41,499659 45,093394	650	220	2988
41,470604 45,083255	910	280	3534
41,469832 45,083255	850	240	3447
41,470308 45,071133	750	220	3360
MPN	300	130	420

Table 3

Sampling coordinates GPS	Deths of radionuclides	Radionuclides					
		⁴⁰ K	¹³⁷ Cs	²⁰⁸ Ti	²¹¹ Bi	²¹² Pb	²¹⁴ Pb
41,450905 45,093319	0-20sm	1414			91		73
41,450857 45,093072	20-40sm	1033		18	119	24,6	68
41,450431 45,093351	0-20sm	1332	11	31	114	30	79
41,450270 45,093404	20-40sm	1258	3				52
41,499659 45,093394	0-20sm	1471	19				80
41,463770 45,084757	20-40sm	1377	13			46	63
41,470604 45,083255	0-20sm	1519	25				56
41,469832 45,083255	20-40sm	919	20				46
41,470435 45,083652	0-20sm	1286	47	41	211	34	117
41,468064 45,083587	20-40sm	1273	17			22	103
41,470308 45,071133	0-20sm	1262	29	23	146	27	60

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