საერთაშორისო სამეცნიერო კონფერენცია „კომპლექსური გეოფიზიკური მონიტორინგი საქართველოში: ისტორია, თანამედროვე პრობლემები, ქვეყნის მდგრადი განვითარების ხელშეწყობა“, შრომები, თბილისი, საქართველო, 17-19 ოქტომბერი, 2024 წ.
International Scientific Conference “Complex Geophysical Monitoring in Georgia: History, Modern Problems, Promoting Sustainable Development of the Country”, Proceedings, ISBN 978-9941-36-272-9, Tbilisi, Georgia, October 17-19, 2024

SOIL POLLUTION IN THE VICINITY OF AUTOMOBILE WORKSHOPS, NEAR POPULATED AREAS ACROSS TBILISI

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Abstract. *Our research concerns the radioecological issue of the soils of the automobile workshop located next to the residential areas of Tbilisi, the capital of Georgia. Specifically, soil pollution, which affects people's health. We have done a lot of research on this issue and there is unmistakable data based on research laboratory analysis.*

Key Words: *pollution, soil, automobile workshops*

Introduction

The purpose of the study is to evaluate the occupational and toxicological risk of exposure to toxic elements in the upper soil layer of automotive workshops located in residential areas.

10 composite soil samples were strategically collected in individual districts of Tbilisi and transported to the laboratory. Using a 1 kg sample of the treated sample, namely a mixture of nitric acid and hydrochloric acid, with an optimal molar ratio of 1:3. and toxic elements were analyzed using Atomic Absorption Spectrometer (AAS).

The result showed the presence of arsenic (As = 0.67 – 5.63 mg/kg), cadmium (Cd = 8.92 – 134 mg/kg), cobalt (Co = 6.21 – 71.22 mg/kg), nickel (Ni = 1 .89 – 9.18 mg/kg) and lead (Pb = 32.6 – 211 mg/kg) in the soil. The concentrations of Cd and Pb in 66.7% and 58.3% of the sample are higher than the permissible norm. (for Cd 22 and Pb 140 mg/kg) respectively. Contamination factors (CF) indicate very high soil contamination from Cd and Pb.

A significant relationship between TEs (Pb, Cd, Co, Ni and As) $p < 0.01$ indicates the occurrence of anthropogenic origin. hazard index (HI)A significant relationship between TEs (Pb, Cd, Co, Ni and As) $p < 0.01$ indicates the occurrence of anthropogenic origin. hazard index (HI)

The investigated topsoil is contaminated with Cd and Pb, and there is a non-tumor effect of long-term exposure to Pb. Therefore, AWs should be moved away from residential areas, and remediation of contaminated soil should be considered.

Study area, material and methods

These emissions. Contains cadmium (Cd), lead (Pb), nickel (Ni) and zinc (Zn), most Pb from gasoline and Zn from tires important sources of pollution.

In the workshops, various types of technical services are performed, quickly and easily, changing the oil in the engine. If needed, they offer welding, spraying, electrical and auto body repair.

During service, chemicals, paints, primers and other hazardous products are often used in the work of auto workshops. At this time, soil pollutants should be disposed of properly. Substances such as petrol, diesel, solvents, lubricants and grease can be released unintentionally or intentionally. Terrestrial Environ-

ment Many shale oil products consist of organic compounds that can cause high toxicity to soil, organisms, and humans. The term "toxic elements" (TEs) refers to heavy metals, because of their nucleon number and/or high density [1].

Fig. 1. Automobile workshops, near populated areas across Tbilisi

Results

Among the TEs, Cu, Zn, Pb, Mn, Cr, Cd, Ni and Fe are the ones that should be of most concern. The primary sources of these TE-s.

Soil is a result of various human-made activities such as urbanization, industrialization, waste disposal and incineration, vehicle emissions, fertilizer use, mining, metal and steel processing and manufacturing, and metallurgical processes. Numerous studies have determined that human exposure to particles can occur through ingestion, skin contact, or inhalation. In addition to polluting the soil, massive increases in TEs in the environment have adverse health effects impact on people. Like Zn, Cd, Pb and Cr are associated with numerous arrays

Diseases, including neurological disorders, cardiovascular disease, hematological and bone diseases, kidney. The aim of this study was to determine the TEs of topsoil (such as Cd, Co, Ni, and Pb) concentration and quality Pollution. Furthermore, since the information on these TEs is It is crucial to assess the toxicological risk of exposure as well. The health of workers at work was evaluated to meet others global goals.The study of automotive workshop areas was selected based on their location, within and close to the population. All study sites were of the same soil type (sandy-clay).

Ten composite soil samples were taken in May 2024 from ten strategically selected automotive workshops located within and very close to residences.

The sample was stored in labeled, hermetic polyethylene bags.All glassware used for the study was pretreated with 5% Trioxonitrate (IV) acid (HNO_3) and then cleaned with distilled water. Aqua regia was used to treat the prepared sample. flask, which we dried in an oven at 35 °C for 15 min. I transferred 1 g of the sample to a flask with 20 cm3 of aqua regia. The mixture is carefully stirred and then heated in a steam hood for several hours without reference to time. Samples were cooled, filtered and diluted with deionized water to 50 cm3. in a volumetric flask, then analyzed for TEs (As, Co, Cd, Pb and Ni) using AAS (model: ICE3000 series).

Contamination factor (CF)

The degree of soil contamination/pollution can be assessed using various methods. The present study adopted the contamination factor (CF), TE to assess the degree of soil contamination. The classification used

for the degree of pollution is described as: CF < 1 is low, 1 ≤ CF < 3 is moderate, 3 ≤ CF < 6 is significant, 6 ≤ CF is very high.

The source of elements in the soil was estimated using Pearson's correlation. $p < 0.05$. Concentration of toxic elements (TEs).

The concentration of TE in soil represented as Co, Cd, Pb and Ni from the study varies from 0.67–5.63, 6.21–71.2, 8.92–134, 32.6–211 and 1.89–9.20 mg/kg. average 3.16, 46.0, 80.0, 127 and 5.52 mg/kg.

Different types of arsenic have a significant effect on their toxicity. Absorbed and transferred into the food chain, the inorganic forms found in the soil are dangerous, affecting living species. The highest As concentration was observed in the sample taken from the Eliava area (5.63 mg/kg). The largest sample of Co level was observed in the so-called Didubi. "Eliava" area. (71.3 mg/kg), (68.9 mg/kg) [2, 3].

According to the ATSDR list, cadmium (Cd) is the sixth most hazardous element. Continuous contact with the source of infection with Cd causes cellular mutagenesis, lung and testicular damage. The highest concentration of Cd was (134 mg/kg), followed by (122 mg/kg). The burning of petroleum fuels, plastics, glass, electrode welding areas used by specialists, and paint on car bodies are usually sources of Cd. The level of Cd in 66.7% of the samples was above (22 mg/kg) [4, 5].

The concentration of Pb in 58.3% of the samples was higher than (140 mg/kg).

Nickel (Ni) Nickel has several mechanisms of toxicity, including sensitizing and allergenic properties. The highest concentration of Ni was recorded (9.18 mg/kg). Ni levels were low in 100% of samples. The factor of contamination of TEs in the soil is present. The study revealed that the soil in the studied area has low contamination with Ni (0.08), moderate Co (2.42) and very high Cd (265) and Pb (6.34). CF value decreasing Cd > Pb > Co > As > Ni.

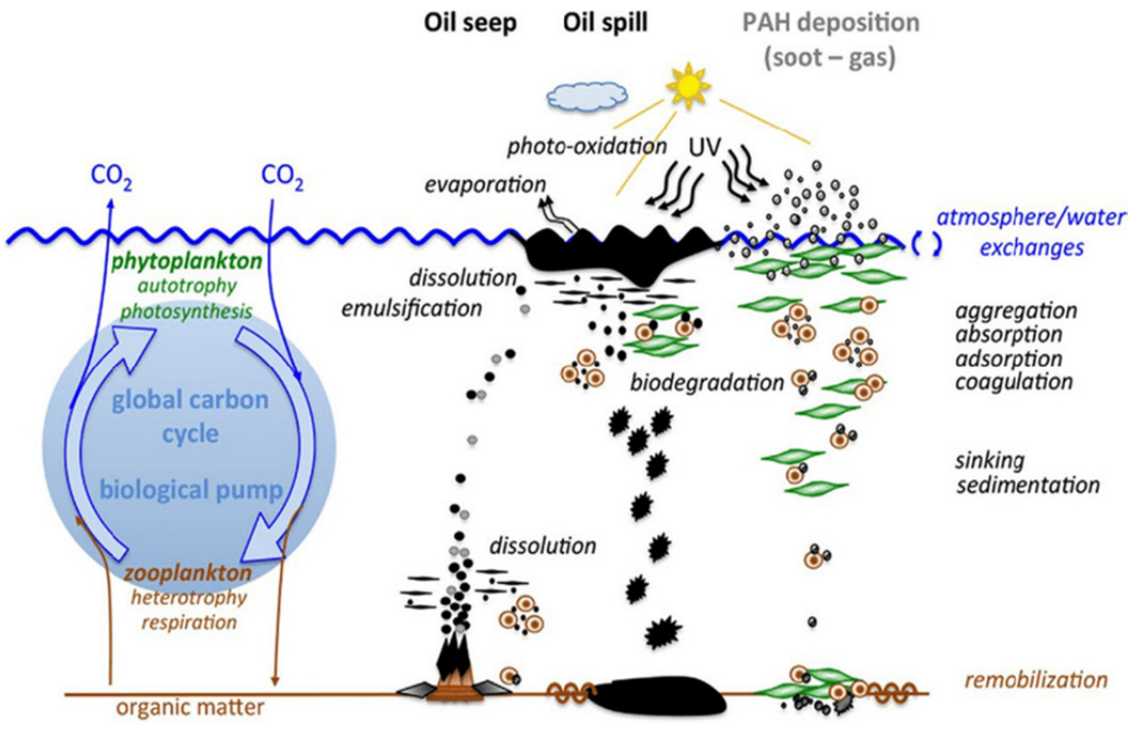

Fig. 2. Scheme of oil seepage into the soil

Conclusion

The study estimated the number of TEs present in the upper part, Soils in and around the automotive workshop environment, the soil is contaminated with Cd and Pb and is non-cancer relatedEffects on children with long-term exposure to Pb. Workers' attitudes towards vehicle maintenance and repair, as well as their carelessness and improper disposal of waste, are the main causes.

The activities significantly contribute to soil pollution, which can leach into surface and groundwater environments, causing adverse impacts.

Environment and adverse health effects. To prevent the spread of this hazardous element, automotive workshops should be located away from residential areas and soil bioremediation is possible to clean up already contaminated soil [6]

Attitudes towards vehicle maintenance and repair, as well as their carelessness and improper disposal of waste, are the main causes. Contamination of soil that can wash off the surface and groundwater does not enter the environment, which causes negative effects on the environment and harmful effects on health. in order to avoid. To spread this hazardous element, automotive workshops should be located away from residential areas and bioremediation is possible.

It is used to clean already contaminated soil.

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