

GEOLOGICAL AND ENVIRONMENTAL SUSTAINABILITY

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Current and future trends in environmental geochemistry and health

The contribution of environmental geochemistry is to demonstrate the impact of geochemistry to a variety of societal and economic areas such as the sustainable exploitation of natural resources, the assessment of environmental problems within cities and the sustainable remediation of contaminated land. The discipline of environmental geochemistry and ecological health explains links between the disturbed chemical composition and the health of plants, animals and people. This presentation discusses some of the more salient current trends and future direction in environmental geochemistry and health problems. Considerable research is now being undertaken in critical areas such as environmental quality and protection, more collaborative, inter-disciplinary research is needed to ensure long-term environmental sustainability. Geochemical mobilization of heavy metals in water has been cited as an important factor in many diseases of Sohag Governorate, Egypt. 42 groundwater samples were collected from the quaternary aquifer and eight samples from surface water of Sohag governorate. The results recorded high contamination with cadmium and lead. Besides, about 50% of samples are contaminated with iron and manganese at an alert level. All the metals under study exhibited an asymmetric statistical distribution in the investigated area. The study identified positive relationship between contaminated water (surface and groundwater) of Sohag with Cd ($r_s=0.43$) as well as Pb ($r_s=0.21$) and Renal Failure Rate (RFR=26 patients/105 capita). The spatial distribution of these two metals (Cd and Pb) showed that they accumulated in the southern part of Sohag Governorate around Albalina district and in the north western part at Gehina district, which have the highest RFR. This study highlighted the need for more detailed research to assess the different pollutants and their relation to chronic diseases. Hazardous metal cations enter water through the natural geochemical route or from the industrial wastes. Their separation and removal can be achieved by adsorptive accumulation of the cations on a suitable adsorbent. Future direction in environmental geochemistry and health problems is applying by removing of toxic ions were from water using geological material such as natural zeolite and coal samples. X-ray Photoelectron Spectroscopy (XPS) is used to act as efficient adsorbents for removing dissolved Pb (II) and Zn (II) in alkaline medium. Studies on soils and sediments contamination by Polycyclic Aromatic Hydrocarbons (PAHs) are necessary to minimize the risk of human exposure and environmental pollution. Soil samples and stream sediments from the river Nile were studied in El-Tabbin and Shubra El-Kheima (Great Cairo, Egypt). PAHs are ubiquitous environmental pollutants and have been studied. Some PAHs are well known as carcinogens, mutagens and teratogens and therefore pose a serious threat to the health and the well-being of humans. The most significant health effect to be expected from inhalation exposure to PAHs is an excess risk of lung cancer. In the studied areas, more than two-thirds of soil and sediment samples exceeded established (based on literature data) risk limit values for non-polluted environment. Contamination by petroleum products and incomplete combustion are other supplies to the soils and sediments that were affected by microbial degradation and the evolution of the contamination in these soils.

Biography

Ahmed A Melegy has his expertise in Environmental Geology in improving understanding of how the environmental enhances. He has completed his PhD degree from Charles University-Czech Republic in 1998. Currently, he is a Professor and Head of Geological Sciences, Department in National Research Centre- Dokki- Cairo- Egypt. He has many experiences in calculating mass balances in different catchments, monitoring inputs and outputs of heavy metals, remediation and using XPS through Nano surface. He is Reviewer for many international journals. He has 15 international projects. He has participated in 30 conferences. He has more than 70 publications in international journals.

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