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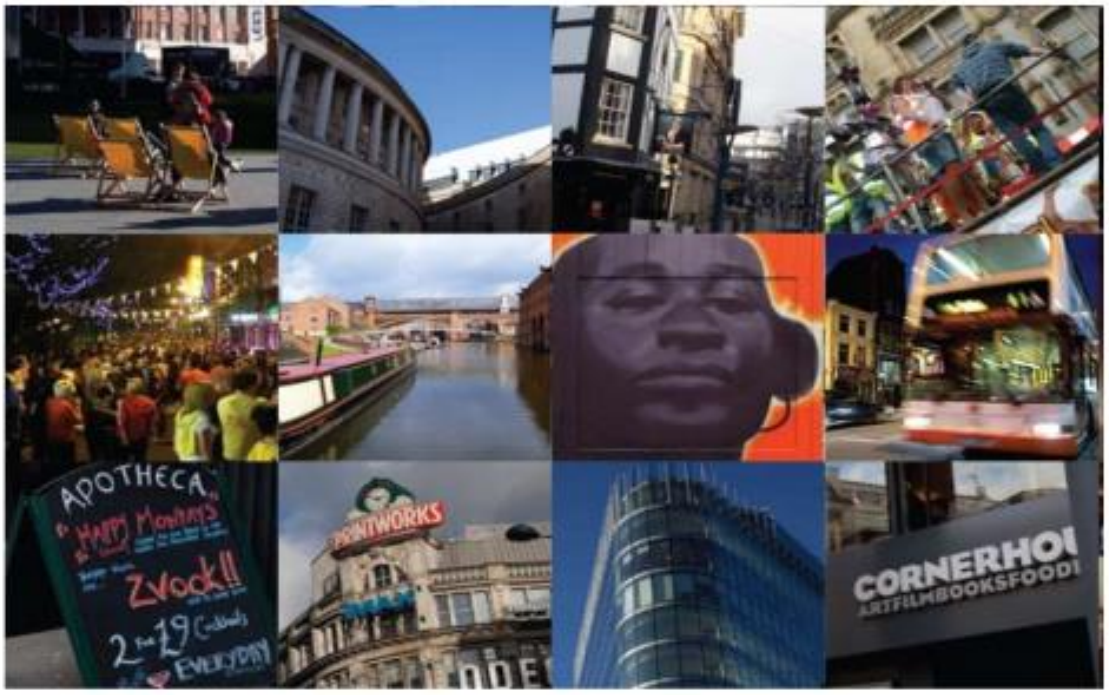

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OR30 – Stanislav Rapant: Impact Of Potential Toxic Elements On The Health Status Of The Inhabitants In The Slovak Republic.

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The impact of potentially toxic elements (PTE) on the health status of the population of the Slovak Republic has been studied both at national and regional levels (three historical mining areas – HMA). PTE contents (As, Sb, Cu, Cd, Hg, Pb, Zn, Cr) were analyzed in groundwater (20,339 analyzes) and in soil (10,738 analyzes) together with other elements/compounds/parameters. The health status of the resident population was assessed on the basis of 43 health indicators (HI) classified according to the International Classification of Diseases (ICD), including those indicating mortality rates for cardiovascular and oncological diseases. Several mathematical and statistical methods have been used to connect the PTE and the HI. Based on the linear and Spearman correlations, no significant dependence was found between the PTE and HI contents, both in the national level and in the HMA. Using Artificial Intelligence – Artificial Neural Network (ANN), it has also been confirmed that PTE contents have negligible effects on HI, both at the national level and in three HMAs. Sensitivity coefficients for PTE were generally below 1, i.e. not affecting the human health. The health status of inhabitants in three investigated HMAs was comparable to the surrounding areas. We can conclude that PTE content has much less impact on the health status of the population than previously assumed. The most important elements on human health are the Ca and Mg contents with the influence of two orders higher than PTE.

OR37 - Veronika Cveckova: Hard Water – More Elastic Arteries, A Case Study From Krupina District, Slovakia.

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The article is dealing with the impact of low Ca and Mg contents in drinking water on the arterial stiffness of resident population living in the Krupina district, Slovak Republic. The study was based on the two-phase measurement of the arterial stiffness in a sample of 144 randomly selected respondents, being divided into two groups according to Ca and Mg contents in the drinking water. One group of respondents was supplied by soft water (Ca < 25 $mg.l^{-1}$, Mg < 10 $mg.l^{-1}$) and the second group was supplied by harder water (Ca > 80 $mg.l^{-1}$, Mg > 20 $mg.l^{-1}$). Arterial stiffness was determined by measuring the aortic pulse wave velocity (PWVao). Based on the measured levels of PWVao the arterial age of respondents was calculated. Achieved results have documented higher arterial stiffness (i.e. lower elasticity of arteries) of the respondents drinking soft water deficient in Ca and Mg contents. This was reflected in higher PWVao levels, higher number of pathological cases (PWVao > 10 $m.s^{-1}$) and in higher arterial age of respondents supplied by the soft drinking water in comparison with their real age. "The absolute difference" between the real and arterial age in the case of two evaluated groups of respondents (soft vs. harder water) was in average nearly 5 years (5.5 in the 1st phase and 4.3 year in 2nd phase of measurements).

Acknowledgments

This research has been performed within the projects LIFE – Water and HEALTH (LIFE 17 ENV/SK000036) and LIFE FOR KRUPINA (LIFE12 ENV/SK/000094) which is financially supported by the EU's funding instrument for the environment: Life + programme and Ministry of the Environment of the Slovak Republic.

Session 2: Environmental change: impact on the environment & human health

Life – water and health

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The negative impact of drinking water with low Ca and Mg contents on cardiovascular diseases has been known approximately since the middle of the last century. Recently, several research papers have been published that present the relation between increased incidence/mortality on oncological diseases, the gastrointestinal system, the respiratory system and the endocrine system (diabetes) with the low Ca and Mg contents in drinking water. According to the results of two previous LIFE GEOHEALTH and LIFE FOR KRUPINA projects, a new LIFE – WATER and HEALTH project has been prepared and is realized since September 2018 at the Faculty of Natural Sciences of Comenius University in Bratislava.

Project title: Improvement of health status of population of the Slovak Republic through drinking water re-carbonization. Duration: September 2018 – December 2022. Project goal: The main objective of the project is to improve the health status of the population in two towns/villages of the Slovak Republic based on improved drinking water quality by re-carbonization. Main investigation: Risk analysis, Selection of two drinking water sources for water re-carbonization, Laboratory tests, Biomonitoring, Construction of prototypes, Installation of two prototypes into testing operation, Installation of two prototypes for water re-carbonization into continuous operation.

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This research has been performed within the projects LIFE – Water and HEALTH (LIFE 17 ENV/SK000036) that is financially supported by the EU's funding instrument for the environment: Life + program and Ministry of the Environment of the Slovak Republic.

Groundwater quality and risk perception of water users in cr(vi) affected areas of Greece

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Hexavalent chromium impacted aquifers are a global environmental concern as consumption of Cr(VI) contaminated water potentially has widespread health implications. This study presents data collected during CrITERIA, an EU-ERANETMED project on water management of Cr(VI) impacted water bodies in the Mediterranean. One of the project's objectives is to enable participation of stakeholders in finding the most appropriate option for tackling the problem, by involving them in dialogue and support, during data collection and development of a water use demand driven management process.

Within this frame the Greek project team has performed 4 periodic groundwater sampling surveys and collected 157 groundwater samples during the wet and dry seasons of 2017 and

2018 from selected areas where the problem had previously been identified. Concentrations of Cr(VI) ranged from < 2 µg/L to 62 µg/L in drinking water samples and reached 131 µg/L in irrigation water. The origin of elevated Cr(VI) in water in most instances has been attributed to natural processes linked with the presence of Cr-bearing rocks in the aquifers. Feedback on water analysis results has been provided to stakeholders including water managers and users, aiming to build trust but also raise awareness on the Cr(VI) problem. Furthermore, a public survey based on questionnaires was utilised in order to understand and detect how the water users perceive the risk and value improvements in the quality of water, as well as how far they are ready to pay for environmental improvements. The involvement of water administrators from local authorities during the 2-year monitoring period of the project enabled to detect the challenges of translating policy implementation into outcomes on the ground.

Overall, the project provided integration and guidance on active involvement of stakeholders as well as capacity building on best practices for collection and analysis of water samples for Cr speciation. It also set the ground for informed decision-making and operational water management in the study areas.

Aquaculture around Lake Victoria, Kenya: considerations for food security and environmental geochemistry?

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Lake Victoria plays a vital role in Kenya's inland fish production, providing a major food source for communities around the lake. However, demand exceeds supply and Kenya's huge aquaculture potential is increasingly being explored as a way of alleviating problems associated with overfishing of 'wild' fish. With 10 million people in Kenya suffering chronic food insecurity and poor nutrition, the contribution of aquaculture to future food security cannot be overstated.

However, aquaculture has associated environmental consequences, including the discharge of particulates such as uneaten feed, faecal and excretory products (including antibiotics) which could negatively affect the ecosystem of the lake. Furthermore, increased anthropogenic activity has had adverse effects through run-off into the lake-basin, including discharge of raw sewage, domestic and industrial waste and fertiliser/chemicals from farms and contamination from both commercial and artisanal mining. Anthropogenic pollutants, such as metals, can bioaccumulate in fish with implications for human health.