

Locality abandoned Sb-deposit Pezinok (Male Karpaty Mts.) – environmental load

Field trip (cca 2 hr.) : **Pezinok** (Kolársky vrch + Trojárová and Augustín adits + impoundment)

Short information: Abandoned Sb, Au and pyrite deposit; acidification of small creek, natural oxyhydroxides wetland, tailings impoundments – the largest sources of Sb and As contamination in the area; lecturers will perform oral and poster presentation of obtained scientific results focused on all parts of the environment, level of contamination and remediation project.

ENVIRONMENTAL HAZARDS

Abandoned Sb deposit Pezinok – Kolársky vrch is a significant source of As and Sb pollution that can be traced in the upper horizon of soils several kilometers downstream. Two tailing impoundments which hold ~380 000 m³ of mining waste and outflows from several adits are the main sources of the metalloids (**Fig. 1**). The tailings and the discharged water have circumneutral pH values (7.0 ± 0.6) because the acidity generated by decomposition of primary sulfides (pyrite, FeS₂; arsenopyrite, FeAsS; stibnite, Sb₂S₃) is rapidly neutralized by abundant carbonates (Majzlan et al., 2007).

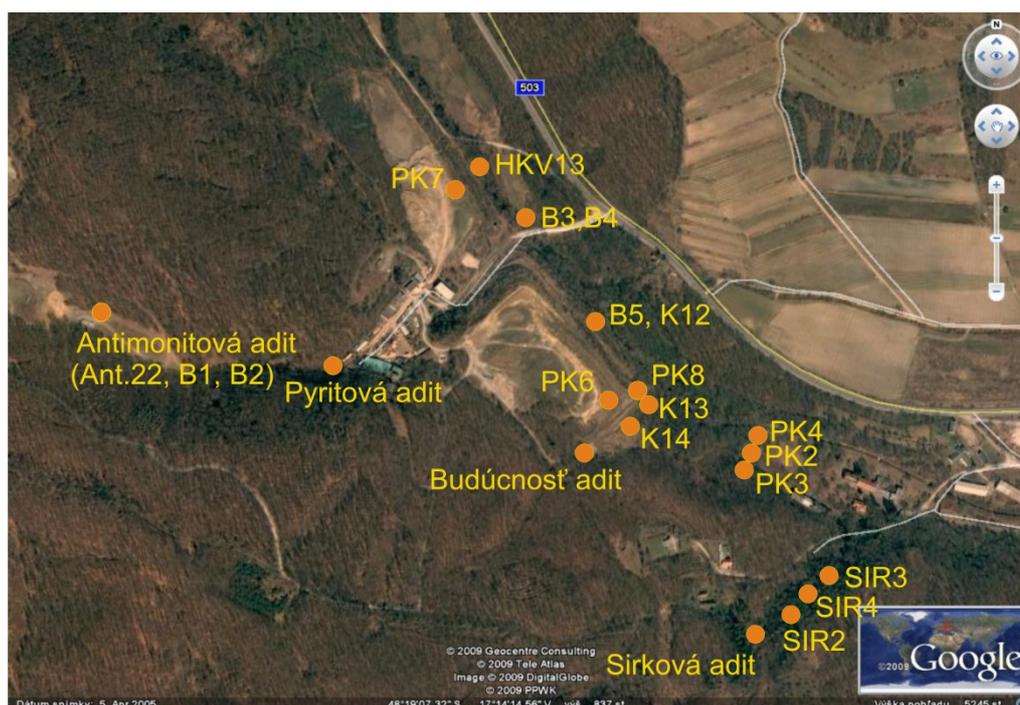


Fig. 1: Schematic map of the abandoned Sb deposit Kolársky vrch, with localization of adits, drill holes and ochre samples sites (Lalinská, 2009).

Content of dissolved arsenic in subsurface waters is highest in the area of mine tailings (up to 90 mg/l in water sample from drill hole PK7) and arsenic is predominantly pentavalent. Concentration of antimony in this sample is lower – 920 µg/l. Content of arsenic in waters from adits outflows varies from 13 µg/l to 104 µg/l (Pyritová adit), with average content 41 µg/l. Contents of arsenic and antimony in unfiltered water samples are much higher, what means that a high amount of these toxic elements is transported in the form of solid phases. Significant relationship between arsenic and iron suggests

sorption of arsenic onto iron oxyhydroxides, however, in case of antimony there are also other mineral phases expected. Fe oxyhydroxides are unstable mineral phases and already a small change in pH and Eh values of the environment could cause desorption of the contaminants. This all means that natural attenuation is not a good system for remediation of the studied area and therefore effectiveness of zero valent iron as appropriate reactive medium for Permeable Reactive Barrier (PRB) was tested (Lalinská, 2009).

LALINSKÁ, B. (2009): Mineralogical and geochemical study of contamination sources and remediation project at abandoned Sb deposit Pezinok – Kolársky vrch. PhD thesis, Comenius University in Bratislava, Department of mineralogy and petrology, PRIF, Bratislava 197p.

MAJZLAN, J., LALINSKÁ, B., CHOVAN, M., JURKOVIČ, L., MILOVSKÁ, S., GÖTTLICHER, J. (2007): The formation, structure, and ageing of As-rich hydrous ferric oxide at the abandoned Sb deposit Pezinok (Slovakia). *Geochimica et Cosmochimica Acta* 71 (2007) 4206–4220.