

THE HISTORY AND GEOLOGY OF THE RUDABÁNYA ORE BEARING COMPLEX (HUNGARY) AND THE GEOPHYSICAL INVESTIGATION OF WASTE ROCK PILES

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ABSTRACT

The Rudabánya Ore Bearing Complex (NE Hungary) contains base metal sulfide mineralizations and siderite, hosted by Lower Triassic carbonate and siliciclastic succession of the Silicikum in the Western Carpathians. The deposit is located inside a Neogene sinistral strike slip fault zone (Darno Zone), bordered by master faults. The ore bodies are dissected blocks in a stack of horses structure.

The silver and copper mines of Rudabánya are known from medieval times. Iron ore was mined from the 19th century until 1985, based on limonitic and siderite iron ore, including several open pits and underground workings. The mines after the suspension of operation still have identified lead and copper ore resources. Recently, additional zones of zinc and lead ores have been discovered representing two genetic types. The first one is stratiform, bound to reductive facies pelitic siliciclastic rocks. The second one is a hydrothermal mineralization, controlled by faults and siderite block boundaries.

During the mining activity, millions of tonnes of waste rock material were deposited on the surface near the villages of Rudabánya and Felsőtelekes. Because of technological developments and new ideas the material of the spoil tips - iron oxides and remaining sulphides, barite - can be utilised. The aim was to identify the site boundary and the inner structure of the heaps. Considering the extent of fields and quality of materials in the subsurface several geophysical surveying methods were combined such as, multielectrode profiling, VES sounding, IP sounding, total magnetic field and gradient measurements and GPR. During the processing of measured data, near-surface resistivity distributions were determined by utilizing the multi-electrode and the VES data. With the help of the IP data the types of contamination were determined. Based on the geophysical measurements described here we were able to provide information on the boundary of mining waste heaps, their inner structure/stratification and in some cases the types of deeper layers. IP sounding clearly indicates the polluted zones and allows us to estimate the kinds of pollutants.

Keywords: Rudabánya, waste rock piles, multielectrode, VES, IP