

THE GRAPHITE MINE OF ZETTLITZ, DROSENDORF (BOHEMIAN MASSIF, AUSTRIA)

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graphite, Zettlitz, Bohemian Massif, digital elevation model

Within the Waldviertel Region, organic-rich black slates of the Proterozoic Variegated Sequence host graphite deposits of economic importance. Due to the similarity of the Bites and Dobra gneiss series, new theories see the Variegated Sequence as part of the Moravian complex experiencing a Variscan metamorphic overprint under conditions of 700 – 800 °C and 8 – 11 kbar. The open pit Zettlitz deposit is the major graphite exposure in this region and more than 350.00 t graphite were mined and processed until mining activities ceased in 1967. The deposit was investigated by airborne surveying, geological mapping, geochemical investigations (AAS, XRF, ICP-MS, Leco combustion, SEM) and Raman spectroscopy on carbonaceous materials (RSCM). Drone-supported photogrammetric surveying established a high-resolution digital elevation model (DEM) of the mine. Together with structural data, the DEM estimates the present resources. Within the pit, carbonate-poor graphitic slates with a TOC up to 61 weight% are found in a normal fault-bounded block. RSCM data characterize the carbonaceous materials as well-crystallized within the amphibolite facies. Pyrite, kyanite, dravite, micas and amphibole are enriched in thin schistosity-parallel layers in a matrix of orthoclase, oligoclase, quartz and graphite. The black slates are underlain by scapolite bearing calcite marbles and overlain by thin quartzite layers and pegmatite bearing gneisses and micaschists. This association indicates the formation in a small sapropelitic basin, evolving on a coastal carbonate system. The local presence of quartzite layers indicates temporary (tempestitic?) input of fine-grained quartz into this basin. XRF and ICP-MS data show low Ni, V and Mo contents and a typical continental crust REE pattern with an extreme negative Eu anomaly. The overall low sulfur-content (2 weight%) and distinct geochemical proxies indicate a prevailing oxic environment. Pyrite accumulations in thin layers indicate short euxinic periods during the lifetime of the basin.