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Soils on mining relicts in Upper Silesia, Poland – first results from the Mala Panew River catchment and the UNESCO heritage site Tarnowskie Góry

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The mining region of Upper Silesia has a long tradition with international significance. In 2017, the historic silver mine in Tarnowsky Gory was recognized as a UNESCO World Heritage Site. With the mining of galena (PbS), the region developed into one of the most important industrial centers in Central Europe in the 16th century. In addition to the underground galleries, the historical mining has left thousands of mining shafts as small relief forms, which have not been systematically investigated so far. Partly the mining shafts are associated with Relict Charcoal Hearths (RCH), another small form which is a result of charcoal production. In the Mala Panew River valley, north of Tarnowsky Gory, several tens of thousands of these RCH are found, which could be mapped by LiDAR in recent years. More detailed pedological investigations, which would allow a systematic comparison with other known RCH sites, are missing so far.

Within the framework of a Polish-German cooperation project, we started in 2021 to investigate the mining shafts and the RCH in Tarnowsky Gory and in the Mala Panew River valley from a pedological-sedimentological point of view. At the RCH sites on the Mala Panew River, we focused on the following questions: How was the soil stratigraphy changed by the RCH construction? What are main processes of soil development before and after RCH construction? What was the role of the pits surrounding the RCH? How do the sites differ from the RCHs at Tarnowsky Gory especially with respect to soil properties and soil genesis? In Tarnowsky Gory, where a RCH was excavated directly next to a mining shaft, the following questions were in focus: How did the mining activity change soil distribution and soil properties? What are main processes of soil development on the different parts? What is the origin of the pit infill? What is the origin of the shaft rim deposits?

Our work program included the construction of excavator trenches across the mining remains, construction, description and sampling of soil profiles along the trenches, schematic drawing of the soil stratigraphy, and laboratory analyses for the determination of texture, Munsell color, pH (CaCl₂, H₂O), CaCO₃ content, C_{total} & N_{total} and total elements by FPXRF. We present the first results of the ongoing investigations.

