The mining industry in Upper Silesia, Poland, has a long tradition of international significance. The exploitation of galena (PbS) led to the region's development into one of the most important industrial centers in Central Europe during the 16th century. Although UNESCO recognized the outstanding value of the Tarnowskie Góry mining region in 2017, research on its cultural and environmental legacies remains in its infancy. Thousands of mining shafts and heap structures, with heights and depths of up to several meters, are visibly present but have not been systematically investigated, either archaeologically, sedimentologically, geomorphologically, or pedologically. A major challenge lies in differentiating and identifying the complex, overlapping shaft-heap structures to classify and map the full spectrum of individual mixed-aged mining relics, such as single shafts, multiple shafts, single heaps, and reworked heaps. Additionally, the presence of small relief features resulting from pre-industrial charcoal production further complicates this already chaotic landform assemblage. This Polish-German cooperation project is the first of its kind to undertake a sophisticated study of the structures and properties of the unique cultural landscape of Tarnowskie Góry using a multi-methodological approach.

The area may be one of the most extensive and longest-exploited mining fields in Europe. However, the detailed chronology of mining in the Tarnowskie Góry UNESCO area, particularly its onset, as well as the mining techniques used, types of deposits and ores mined over the centuries, and the amounts of material excavated during different historical periods, all remain unknown. Moreover, as the area also features an outstandingly high concentration and spatial density of post-mining landforms (mining shaft remains), it has also been subjected to exceptionally high human pressure on the environment and landscape. The Tarnowskie Góry UNESCO area is, thus, a unique natural laboratory for research on the impact of extensive mining on relief, drainage, soil (and therefore vegetation) development, and soil contamination. The mining field was abandoned over 100 years ago or earlier (depending on which part) and has already undergone a process of renaturalization. Thus, it also offers a perfect opportunity to study the long-term transformation of post-mining landscapes, e.g. the denudation of mining landforms and pollution migration in soils. Addressing the described research issues with a comprehensive approach planned in the proposed project will provide novel findings from the fields of geoarchaeology, history, geomorphology, soil and environmental sciences, that could serve as a reference for other historical and contemporary mining areas.