



Characterizing the hydrological system in Rosia Montana mining area (Romania) for AMD mitigation

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Rosia Montana is one of the most important European gold fields, with a long history of mining. The extraction of gold started on site during the Roman age, and the mining operations that spanned over almost two millennia have produced a visible environmental footprint. More than 140 km of mining galleries are documented by historical sources and recent surveys. Water streams are the main vectors spreading the pollution outside the mining area. The main streams, Rosia, Corna, and Saliste, tributaries of Abruzel River are significantly impacted by the acid waters issued by adits, exposed rock surfaces, or rock waste heaps, and tailings depots. Low contamination has been observed in the streams outside the mining area, artificial ponds, and shallow groundwater. Excepting the shallow groundwater system that can be sampled in domestic wells and some springs, the circulation of groundwater is largely unknown. An important amount of the infiltration water is channelled through galleries. The waters sampled at the galleries outlets have low pH, generally between 2 and 3, and very high content of heavy metals. A systematic approach based on monthly sampling and chemical analyses, and isotopic measurements, has been initiated, in order to better understand the underground itinerary of water and the chemical transformations that occur. A sampling network of 28 water points, including streams, ponds, dug wells, springs, and gallery outlets has been setup. Beyond producing a water circulation model in the mining area, the main purpose of the research is to identify ways of decreasing the acid water production and to design low cost techniques for the AMD mitigation. The deposit still hosts about 300 tonnes of gold, and 1600 tonnes of silver. A new large scale mining project is currently under permitting. Cost-effective solutions for the water treatment would be beneficial, especially for the post-mining stage of any future operation.

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