



Preliminary evaluation of sediment loss and runoff in an abandoned mine tailing using a portable rainfall simulator

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Several mines in Central Portugal were abandoned in the last century because of difficulties originated by lack of natural resources or economic factors. In those places, no measures were taken to restrain heavy metals dispersion and, eventually, the contamination of downstream areas and water resources. Abandoned mine soils and tailings usual have high concentrations of heavy metals that could increase the risk of ecosystems pollution and endangering human health; moreover, these sights also exhibit great vulnerability to water erosion.

One of such example is the abandoned mine of Sanguinheiro, near Coimbra, that was used in the past to explore lead and zinc minerals. This poster presents a preliminary evaluation, in situ, of sediment loss and runoff from this mining area. Complementary laboratory experiments using a rainfall simulator and soil flumes are also described.

The field experiments were conducted in small plots using a portable Kamphorst rainfall simulator (0.26x0.26 m²). The characteristics of the experimental setting restrict the duration and intensity of the simulated rain. In the field experiments reported in this work the equipment was used to simulate extreme short duration rain events, of around 3-5 min, having intensities in the range of around 200-300 mm/h. The experiments were carried out in the main mine tailing, in the secondary mine tailing and in a non-mine area (near the main mine tailing), which was considered as the control reference area. Runoff hydrographs and sediment graphs were obtained in order to provide insight into the vulnerability of the mine soil to water erosion. The understanding of the dynamics of the overland flow processes and of the sediment transport mechanisms in the study areas are essential steps to proceed investigating the drainage basin, which includes the abandoned mine tailings, and the mechanisms of dispersion of heavy metals and contamination of downstream areas.