



Preferential flow as a critical parameter for the performance of covers

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Many environmental issues arising from mining activities are connected with the occurrence and flow of water, with water being the trigger for oxidation and biological processes and the medium of transport for products created from these processes. Accurately quantifying the movement of water is hence critical to assess the risk arising from water flow. Waste rock as a product available and accessible on mine sites is often used as substrate for the construction of covers for climates which are characterized as arid or semi-arid. Normally, there is sufficient capacity of this material to capture precipitation and release the infiltrated water back to the atmosphere over time to avoid deep drainage. However, for some sites in specific regions, failures have been experienced when using such cover designs. The main reason for it is the neglecting of functional properties, such as the fast flow of water through preferential pathways. While preferential pathways are not uncommon in soils and are quite typical for rock containing substrates, the occurrence of preferential flow is linked to specific rainfall events and amounts. This presentation will present data from field experiments and numerical hydrological modelling, where the phenomenon of preferential flow is further demonstrated and explained. Although preferential pathways are a common feature of constructed rock covers, preferential flow may not always be detected, and indicators will be presented to demonstrate under which rainfall conditions preferential flow is at risk to occur.