

Work Package 2. Surface processes that control the mobilisation and transfer of metalloids and metals

Quantification & evaluation of the three main types of parameters that control the mobilisation and transport of metalloids in the supergene environments

The mobilisation and transport of metalloids and metals from ore deposits in the supergene environments is controlled by three main types of parameters: i) those related with the nature of the ore and accompanying minerals: some metals are easily released from the ores and are easily transported away, on the bases of different mechanisms; ii) environmental parameters, including geomorphology, local geology including edaphology, weather/climate, typology of surficial water, etc.; and iii) organic-matter based processes, including bacterial activity. The sum of these processes conditions the extend of decomposition of the original paragenesis forming the ore deposits; Its most important effect is the formation of the so-called Acid Mine Drainage (AMD) (Colmer & Hinkle 1947), characterised by the incorporation of waters around the mine of acidity and salts, and particularly of metal ions, some of them of high to extreme toxicity (Pavoni et al. 2017), and usually triggered by the weathering of pyrite (FeS_2), the most frequent metallic mineral in most metallic ore deposits of any typology. Other possibilities to affect the ecosystems in the surrounding of mines include a large number of these, including chemical processes of lesser importance than that of AMD but with possibilities of toxification of surface- and ground waters; physical transport of particulate matter from the dumps or wastes ponds, by wind or waters; or emissions to the atmosphere, particularly important in mercury deposits (Tejero et al. 2015).

Task 2.1 - Physical processes (geomorphology, supergene weathering, climate) that promote the mobilisation and transport of metals. Lead: J. Rodríguez, IGeA-UCLM.

Task 2.2 - Organic processes (plants, land uses, organic matter) that promote the mobilisation and transport of metals. Lead: F. J. García, IGeA-UCLM.

Task 2.3 - Bacterial processes that promote the mobilisation and transport of metals. Lead: F. Battaglia-Brunet, BRGM.

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