



Geochemical and mineralogical characterisation of mine waste materials submitted to semiaridic climatic conditions

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A chemical and mineralogical characterisation of the mine waste materials present at an abandoned mining area (SE Spain) in which sulphides have been extracted for centuries has been carried out. To this end, the major elements, mineralogical composition and metal content (Pb, Cd, Zn, Cu and As) were determined in the materials and compared with unaltered rocks present at the site. A study of the relations existing between the above parameters permitted analysis of the different processes involved in the primary and secondary alterations that the materials had undergone. The surface materials are undergoing a process of meteorisation, which is producing a series of final products of supergenic alteration, including iron and manganese oxides and hydroxides, carbonates, hydrated sulphates and jarosites. Oxidation-reduction, dissolution and evaporation, are the most active processes in the mobilisation and dispersion of the metals.

A statistical study by means of Pearson's correlation matrix and Principal Components Analysis showed no correlation between rock-forming minerals and the level of metals. However, there was a good correlation between the metals and the minerals resulting from supergenic alteration, which together with the heterogeneity of the materials, revealed the alteration processes that had occurred and the antropogenic influence of mining activity on the studied materials. The data demonstrated that supergenic alteration processes have occurred, leading to the formation of new mineral

phases that play an important role in the mobility of metals released during the alteration processes.