



Geochemical and geophysical characterization of two representative mining ponds from Cartagena-Union (SE, Spain) by using geochemical and geophysical techniques

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According to the I.T.G.M.E., there are 85 mining ponds coming from the treatment and exploitation of metallic sulphurs in Murcia Province, SE Spain. Due to the environmental characteristics of this Province, those silt ponds are present and potential focuses of environmental pollution. The Technical University of Cartagena has been carrying out an integral study of these structures from 2003 to the present, with the support of the Mining Department from the Local Government of Murcia.

We present in this paper the results obtained for the “El Lirio” and “Brunita” silt ponds. The aim of this study is to characterize these mining ponds and to establish the present and potential risk assessment. To reach this objective geochemical and geophysical techniques have been used.

The data show that the electric tomography 2D and 3D is an effective technique to cube the volume of these mining ponds and to visualize the areas that have higher concentration of heavy metals (Pb, Zn, Cu, Cd) and sulphates; this fact has been corroborated with the physico-chemical analysis, since those areas showed low values of resistibility through geophysics, around 2-4 ohm-m. The geostability of those ponds may also be pointed out.

Finally, both techniques, geochemical and geophysical, allow us characterizing the pond composition and, therefore, the estimation of the potential mobility of heavy metals through the determination of soluble heavy metals.

In order to establish a reclamation plan, both techniques could be really useful to predict whose of those silt ponds should be removed and those than may be preserved. For the last case, a reclamation plan with reforestation could be arranged using residues as soil organic an inorganic amendments.