Geophysical Research Abstracts,
Vol. 11, EGU2009-3788, 2009
EGU General Assembly 2009

Heavy metal pollution in soils of abandoned mining areas (SE, Spain)

M.J. Martínez-Sánchez (1), C. Pérez-Sirvent (1), J. Molina (2), M.L. Tudela (2), M.C. Navarro (1), and M.L. García-Lorenzo (2)

(1) Faculty of Chemistry, Department of Agricultural Chemistry, Geology and Pedology, University of Murcia, Spain (melita@um.es, 34 968 364148), (2) Department of Geography, University of Murcia

Elevated levels of heavy metals can be found in and around disused metalliferous mines due to discharge and dispersion of mine wastes into nearby agricultural soils, food crops and stream systems.

Heavy metals contained in the residues from mining and metallurgical operations are often dispersed by wind and/or water after their disposal. These areas have severe erosion problems caused by wind and water runoff in which soil and mine spoil texture, landscape topography and regional and microclimate play an important role.

The present study was carried out in the *Cabezo Rajao* (*La Unión, Murcia*) mining area. It is a good example of a PSG (pyrite, sphalerite, galene) mineralometallic outcrop associated with an intrusion of volcanic rock of intermediate basicity and hydrothermic alteration with deposited metallic ores (sulfides). There was a mine in the area for many years, but this was abandoned several decades ago.

In present days there are a number of slagheaps placed in topographical positions with a high slope and containing both fine and coarse materials. In the middle of the hillside as well as at the foot of the hill, there are “jales” for containing the residues of the mining activities.

The processes governing metal transfer from the element-rich zone to the neighbouring soils are strongly influenced by the semi-aridic climate. The fate and transfer pathway of heavy metals are complex. Climatic and weather conditions other than rainfall may also influence the fate. The soils have been and continue to be subjected to strong water erosion phenomena, judging from the large cracks which are visible. Wind erosion also plays an important role since the materials are very fine in texture and loosely compacted, which means they can be dispersed over a wide area.The fate, the proximity of urban areas (La Unión) and the Mar Menor and Mediterranean Sea increasing the risks associated to contamination.

The general characteristics of soil samples and total metal content (Zn, Pb and Cd) were determined. Selective extractants (water, HNO_3) were used, and heavy metal content was determined in each fraction and in the raw samples by atomic absorption spectometry. The application of geographical information systems to the obtained results by physical and chemical determination has made it possible to draw graphical representations of the spatial variability of pH, granulometry, heavy metals.