



Environmental geochemistry on La Nueva Concepción mercury mining area, a comparison with the metallurgical complex of Almadenejos.

Washington Castillo (1), Edison Herrera (1), Alba Martínez-Coronado (2), Roberto Oyarzun (3), Pablo Higueras (2), and José María Esbri (2)

(1) Instituto de Investigación Geológico Minero Metalúrgico – INIGEMM, Quito –Ecuador, (2) Universidad Castilla-La Mancha, Instituto de Geología Aplicada, Almadén, Spain (pablo.higueras@uclm.es), (3) Dpt. Cristalografía y Mineralogía, Universidad Complutense. Madrid, Spain.

Almadenejos is a small town located some 14 km East of Almadén, and was the main mining and metallurgical complex of an area comprising the Vieja Concepción (1699-1800), Nueva Concepción (1794-1965), and El Entredicho (Middle Age s.l., and 1981-1997) mines as well as the old Almadenejos metallurgical precinct (1700?-1860). This combination makes the area one of the most contaminated in the Almadén district. This study covers the Nueva Concepción mine area, a sector that lacked geochemical data before this study.

We here present the results of a survey including soils ($n = 80$), lichens (*Evernia prunastri*) ($n = 73$) and total gaseous mercury ($n = 61$). The analyses of soils and lichens were carried out using an atomic absorption spectrometer AMA254, while total gaseous mercury determinations were in-situ obtained using a portable Lumex RA-915+. We used Surfer 8 for the kriging and subsequent mapping of geochemical data.

Mercury contents in soils are in the range of 6 – 721 mg kg⁻¹, clearly higher than critical concentrations in soils by Kabata-Pendias (2001) (0.3 – 5 mg kg⁻¹). This mercury levels are higher in the metallurgical facility of Almadenejos (range = 25 – 15900 mg kg⁻¹), putting forward that the main pollution legacy relates to the metallurgical activities and not to the mining operations. The statistical distribution of data is log-normal and as shown by the kriging Hg shows a remarkable E-W spatial component which closely matches the structural pattern of the main Hg hosting bed: the Criadero Quartzite.

On the other hand, total gaseous mercury shows a WNW-ESE tendency most probably controlled by the local main wind direction. A similar spatial trend was found for the lichen's Hg contents. Mercury contents in these lichens are 103 times higher than in pristine areas but lower than those from the abandoned (and highly polluted) Almadenejos metallurgical complex.