



Wind erosion in sterile of mining industry in the Cartagena – La Unión area (South-east of Spain)

J. Moreno Brotons (1) A. Romero Díaz (1) F. Alonso Sarría (1) F. Belmonte Serrato (1) G. García Fernández (2)

(1) Department de Geography. University of Murcia. Campus de La Merced, 30001 Murcia (Spain). E-mail: arodi@um.es

(2) Soil Science and Agriculture Chemistry Unit. Agriculture Science and Technology Department. Technical University of Cartagena (UPCT). ETSIA-Campus Alfonso XIII, 48. E-30203 Cartagena. Spain. E-mail: gregorio.garcia@upct.es

Cartagena-La Union area has been exploited by mining industry during millenniums to obtain lead, silver and zinc. Although this activity ceased in 1991, the opencast exploitation realized during the second half of the last century, has resulted in a strongly altered and degraded landscape which contains large ponds of mining wastes. Wind erosion is one of the dominant processes that act on these ponds, due to the nature of the materials stored there. Moreover, heavy metal enrichment of these sediments makes this an area with a high contamination risk to nearby towns.

The aim of this research has been to quantify the material that is susceptible to move by wind erosion of these ponds of mining wastes and the amount of heavy metals contained on them.

The study was placed in three mining ponds: La Esperanza, El Lirio y La Rosa. All of them are close to populated areas that are susceptible of suffering pollution by wind erosion.

Studies on wind erosion in Spain are almost non-existent, therefore after using conventional deposition wind collectors (which were not very efficient), we designed a "multicollector station." This station consists on a central structure which three groups of collectors attached to three heights and oriented according to the eight main direc-

tions of wind. Thus, each station has 24 collectors, in a range of height between 20 and 100 cm. Samples collected monthly in each of the 7 stations were dried and weighed in the laboratory. Each analysis was performed using a computer granulometric laser diffraction (Coulter LS 200), and analysed for total heavy metals content (grouped by height) using X-ray fluorescence (XRF).

The results showed the validity of the sampling station designed for an area with a very high wind erosion (in the period from March to August 2007, the particulate matter mobilized by wind and deposited on the collectors exceeded 3 kg.). This design has allowed study the movement of particles to different heights, the relationship with the wind direction and the magnitude of sediments transported by wind in each case.

From the textural point of view, most of the particles mobilized belong to the sands spectrum. Besides, fine sands where the texture with a higher accumulation in the higher collectors. The fine silt size particles also showed a high percentage.

Regarding metal content, a very high concentration of heavy metals, especially zinc and lead was found; both represented 1,729% of the total. This indicates very high air pollution by heavy metals coming from the wind erosion of these soils, which can generate harmful effects on populations, agricultural fields and adjacent beaches. In addition, one of the most negative consequences is that the metal concentration is higher in samples collected at the highest wind collectors and that these concentrations are higher than those existing in the sterile ponds soil.