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Distribution of heavy metals in riverine soils and sediments of the Turia River basin.

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Water is a scarce and contested good, and a primary need for the population all over. Rivers are one of the mainsources of freshwater to people but, in the same way, receive both point source and difuse pollution, usually frorm wastewaters and agriculture. However, they are not independent bodies but they influence different associated ecosystems that compound the catchment. Soils of the river banks often acts as the last phase of the diffuse contamination pathways, favouring the contaminants input to the river waters. In this sense, the fluvial sedimentary phase usually acts as a sink of pollutants. Sediments can work as resevoirs that accumulate contaminants fixing them or allowing their decomposition or metabolization. However, environmental or human induced, such as variations in water pH, increases in the turbulence or intensity of the water flow, etc.could favour their release to the environment.

In this work, the incidence and distribution of seven heavy metals was monitored in riverine soils and sediments of the Turia River. Along the river course, 22 zones were selected for sampling according different lithologies, land uses, size of populations and the proximity to waste waters treatment plants (WWTPs), from the headwaters to the mouth. The selected metals (Cd, Co, Cr, Cu, Pb, Ni and Zn) were analysed to determine its total and extractable contents in the sediments. Total content of metals was extracted by microwave acid digestion and the extractable fraction by treatment with EDTA. Atomic Absorption Spectrometry, using graphite furnace when necessary, was used for the determination of all metals.

Highest values for sediments were mainly observed in zones 10 and 22, close to urban areas, reaching values of 172.86 mg/kg for Pb, or 58.34 mg/kg for Cr. However, zone 2 near in the headwaters of the Alfambra River and supposedly of reference for the River authorities shows the highest values of zinc with 96.96 mg/kg. Regarding the available/extractable fraction of the metals, Cd, Co and Cr were under the detection limitswith maximum values in zone 22 too, reching in the case of Pb 59.60 mg/kg. The percentage of available metal in the sediments of the studied zones vary between 15 and 40% for Cu, Pb and Zn, being the higher than 60% for Pb and Zn in zone 8 near the city of Teruel.

Regarding soils, the higest levels of total and extractable Cd, Co, Cr and Ni were determined in the zones 11 and 12, near the Benageber reservoir where an important forest fires occurred a year ago. In the same way that was observed for sediments high lvels of metals, mainly Cr and Zn, appeared in the reference zone of the Alfambra River.

The organic matter content of soils and sediments is the parameter most strongly related with all the forms of metals, mainly for Cu, Ni, Pb and Zn, and is a key factor in the availability of them. It has to be noted that the textural distribution of the sediments, particularly the clay content, also influences this last factor in the case of Ni.

A strong tendency towards enrichment of the sediments in heavy metals is observed in the Turia River from North to South, from the headwater to the stuary, with the exception of the possible existence of a contamination source in zone 2.

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