



Status of riverine soils, waters and sediments of a Mediterranean river catchment (the Turia river, Spain) regarding heavy metals potential contamination

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One important source of freshwater to population are fluvial courses, but they receive contaminants by different ways, usually from wastewaters and diffuse pollution. The fluvial sedimentary phase can act as reservoir that accumulate contaminants fixing them or allowing their decomposition or metabolization. However, environmental changes or human induced ones, could favour their release to the environment.

In this work, seven heavy metals were monitored in soils, waters and sediments of the Turia River catchment. Along the river, 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 soils, water and sediments. Total content of metals was extracted by microwave acid digestion and the extractable fraction in soils and sediments by treatment with EDTA. Atomic Absorption Spectrometry, using graphite furnace when necessary, was used for the determination of all metals.

Metal values in waters are below the limits established by the EU legislation. As in waters, the sediments show highest values mainly 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, and supposedly of reference for the River authorities, shows the highest values of zinc (96.96 mg/kg). Regarding the available/extractable fraction of the metals, the maximum values were observed in zone 22 too, reaching 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.

In soils, the highest 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 levels 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. The textural distribution of the sediments, particularly the clay content, also influences this last factor in the case of Ni. For soils and sediments, clear trend towards enrichment in heavy metals is observed in the Turia River from the headwater to the stuary, with the exception of the possible existence of a contamination source in zone 2.

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