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Incidence and distribution of heavy metals in soils of a Mediterranean coastal wetland (L'Albufera de Valencia, Spain)

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One of the most important issues in environmental conservation nowadays is the preservation of wetlands, mainly the coastal ones. This becomes more imperative in the Mediterranean. These particular ecosystems have suffered during the last decades an increasing human pressure. This has been reflected through the intensification of agriculture and construction of infrastructures in their surroundings or even draining part of them. As a result, the density of population and its residues affect them in a first place.
This work has been developed in the Natural Park of La Albufera (Valencia, Spain), which includes a coastal lagoon, marshlands, dunes and pinewoods, surrounded by rice fields in its not urbanized part. In spite of this great ecological value, it suffers impacts derived from the high human and industrial occupation, and of the hydrological contributions from the connected irrigation systems. In addition, this park is one of the most important wetland in Europe, included in the RAMSAR agreement, being a key point for migratory birds and contains in its area one of the most important zones on rice production in Europe.
In the park area, 28 sampling zones were selected to determine the degree of heavy metals incidence in soils. Total concentrations of Cd, Co, Cr, Cu, Ni, Pb, and Zn were evaluated. Their distribution in the surficial and sub-surficial horizons was determined together with their spatial distribution, and the possible sources of contamination. Zn, Cr and Cu show the highest concentrations in all land uses and zones. Cr is the metal that present maximum concentration in the studied area (254.93 ppm), being almost the only metal studied that exceeds the limits established by the Spanish an EU legislation. Co and Ni shows a tendency to accumulate below the 30 cm depth, the other metal studied continue with the cumulative trend in surface horizons. All the studied metals, except Co have highly significant correlations with the available phosphorous, which indicates a possible influence of fertilizers and organophosphorous pesticides as main input ways, mainly in the case of rice farming soils.
This study shows that inside the Natural Park, the northern zone is the most contaminated one in all cases and soil uses. In this zone, the sampling points closer to the coast are those that present higher concentrations of metals, mainly the sampling zones 11 and 15

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