



Pedogeochemical mapping of heavy metals with kriging techniques: Lead and Chromium in soils of the Barcelona province (NE Spain)

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Analysis of the spatial distribution of heavy metals in soils is of fundamental importance in a number of applications including the delineation of potentially polluted spots at unsampled sites. In this study, 316 topsoil samples (0-20 cm) located approximately in a 5 km regular grid covering the Barcelona province (7728 square km) have been examined. The geology in this area is varied: granodiorites and Paleozoic shales are predominant in the SE-E and Mesozoic and Tertiary limestones, dolomites, marlstones, gypsum and sandstones in the remainder of the province. Heavy metals considered in this paper were lead and chromium. Soil samples (<2mm fraction) were analyzed by standard methods. Aqua regia digest (ISO 11466.2002) of Pb and Cr were determined by ICP-ES (Polyscan 61E Spectrometer). Experimental variograms have been analysed, considering both omni-directional and anisotropic cases. Theoretical variograms fitted with the experimental data were used to map heavy metal concentrations at 1 km regular grid using kriging techniques. Finally, the pedogeochemical maps obtained are discussed in terms of the soil properties, human activities and geological characteristics of the region.