



Geochemical background of antimony and thallium and its possible relation to soil properties

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Background value for trace elements in soils can act as a true reference level for estimating the extent of soil pollution with these elements. Background value is highly dependent on the mineralogical composition of the parent material and on the weathering processes that have led to the formation of the soil clay, and organic matter content. In recent years, environmental geochemical mapping has assumed an increasing relevance. Geochemical maps are of great interest because they constitute an effective tool for environmental planning, and for promoting sustainable development. This explains why, in recent years, many governments have promoted research to define geochemical background and baseline levels to serve as a basis for legislation to diagnose, prevent and reduce soil contamination. The objective of this study was to determine the selenium background and baseline values in agricultural soils or abandoned agricultural soils with natural vegetation not subjected to particular point contamination sources, in the Region of Murcia (SE, Spain). Moreover, the purpose of this paper was to study the possible relationship between soil properties, mineralogical composition and selenium content in soil samples.

This work seeks to establish the geochemical background for thallium and antimony in the province of Murcia. The possible relationship between soil properties and target metals concentration has been studied. In the present study, background concentrations were established by analysing a large number of samples soils considered unaffected, or at least minimally affected, by human activities. Samples were analysed for antimony content by atomic fluorescence spectrometry (AFS) and by inductively coupled plasma spectrometry (ICP-MS) for thallium content. Other soil characteristics such as electrical conductivity (EC), organic matter (OM), pH, soluble salts, granulometry and calcium carbonate content were also measured to determine their influence on trace element content. Four different areas were established according to geological composition, and the results suggested that thallium and antimony were positively correlated with calcium carbonate content and pH. Moreover, metal concentration was positively correlated with fine soil fraction. Finally, both metals were positively correlated. Background level for thallium and antimony, showed as the median, was 0.35 mg kg^{-1} and 1.15 mg kg^{-1} respectively.