



Vertical distribution of soil organic carbon in limestone Mediterranean mountains areas, southern Spain

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Normally, soil organic carbon (SOC) investigations are related to fertility and/or soil quality so refer to surface horizon. In other cases, soil control sections or soil horizons are used to study soil carbon pool, especially in forest areas. In this line, in order to provide quantitative data of organic carbon in soils and sediments in relation to depth, the organic carbon vertical distribution was studied in selected areas of southern Spain. Significant variations in depth of organic carbon may be related with different vegetation and/or land use changes, so it can be used to select sampling points for studying these changes through pollen analysis.

For this study, ten sinkholes in hard limestone Mediterranean mountains areas of southern Spain have been selected following scientific interest criteria and/or minimal human influence. Soil and sediment samples extraction was carried out using tensile steel drills up to four meters in deep driven by an electric striking hammer. Once extracted the soil columns, soil control sections are taken every 5 cm, obtaining 470 samples in the ten sinkholes selected and making four replications for each soil control section.

The soil and sediments exploration in different sinkholes highlights the karst heterogeneity formations, especially in terms of its depth. Thus, it was possible to take samples of varying depth, ranging between 1 and 5 m, being the limiting factor the hard pan forming which can be soil nature (petrocalcic horizon) or lithological nature (hard limestone). SOC in every sampling point varied between 2.5 and 16.7 g kg⁻¹. In general, SOC concentrations decreases progressively in depth, although in some sampling point 10 g kg⁻¹ were obtained at 200 cm in depths. On the other hand, it had been observed significant increases at 100 cm in deep, sometimes repeating at high deep, which could be related to ancient sedimentary past or with edaphogenic processes past. Definitely more comprehensive studies could shed new insights on geomorphological and edaphogenetic evolution of these areas.