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Soil Carbon Sequestration along a Mediterranean pluviometric gradient. (South of Spain)

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Changes in land use and vegetation cover affect various soil properties, including the soil organic carbon (SOC) pool and the transfer of atmospheric CO2 to terrestrial landscapes.
In natural or quasi-natural conditions a reduction in biomass increases the risk of erosion, and can reduce the stored soil organic matter content. This can cause (i) consolidation of low levels of organic carbon stored in the soil; (ii) reduction in the levels of organic carbon because of the onset of erosion processes; and (iii) differing rates of recovery of the soil in response to environmental factors including precipitation, which is a principal agent of indirect recharge of soil organic matter.
Few comparable studies have analyzed the reduction of SOC because of erosion, and assessed how this contributes to the loss of soil as vegetation cover decreases. This is particularly the case in semiarid Mediterranean environments, where erosion is one of the main causes of soil degradation.
This study presents the results of an experiment carried out along a pluviometric gradient from humid to semiarid Mediterranean conditions, in southern Spain. The study involved two soil depths at five field sites having similar lithology, slope and aspect, but differ in vegetation cover and composition related to their location along the gradient. We used soil cation exchange capacity (CEC) as an indicator of soil degradation.
The results showed that: a) SOC decreased with decreasing rainfall ; b) SOC is greater at the soil surface than at depth; c) CEC is a good indicator of the degradation of soil surface formations, as it is directly related to the SOC storage capacity; and d) the so-called "Mediterranean mountain" landscape, with sparse and mixed vegetation composed of scrubland and woodland species, is a good organic carbon sink with direct implications in relation to climate change.