



Soil organic carbon response to land abandonment along a pluviometric gradient in Mediterranean conditions (South of Spain).

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Land abandonment has been the most important land use change in Mediterranean region over the last decades. After this conversion, a secondary succession process begins, during which soil organic carbon (SOC) is usually assumed to increase. However, the rate of accumulation strongly depends on climatic conditions and the extent to which precipitation and temperature determine SOC dynamics is largely unknown. The objective of this study is the estimation of SOC dynamic after land abandonment along a pluviometric gradient (1085-650-350 mm y⁻¹). Plots abandoned in different periods (chronosequence) were selected on each site. SOC was determined using a spectrometer and dry combustion, vegetation cover was described, and NDVI, used as indicator of organic matter input to soils, was calculated from LANDSAT images. SOC increased following a logistic model in the two wettest sites, with decreasing accumulation rates as SOC stock approached a plateau. Accumulation rates were proportional to precipitation, being 0.16 for the wettest and 0.03 kg C m⁻² y⁻¹ for the intermediate site until reaching the long-term state, in 8 and 49 years respectively. In the driest site no SOC accumulation was measured. SOC and NDVI followed parallel trends along the gradient, so SOC stocks were mainly driven by inputs from vegetation. In addition, on the driest extreme of the gradient, another chronosequence was sampled at high altitude and low temperature. In this case, NDVI evolved following a logistic function but values were not high enough and organic matter input to soil did not trigger SOC accumulation.