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Absorption capacity of soil organic carbon by degraded areas. (Southern Spain).

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According to the latest report of the Intergovernmental Panel on Climate Change (IPCC, 2007), it is essential that a series of measures be taken to reduce the emission of greenhouse gases and to increase their capture in the soil and biomass. Within the strategies related to forest areas, one of the options is based on carbon capture in the soil. The existence of organic carbon in natural soil presents a dynamic balance between the absorption of dead vegetation matter and its loss because of decomposition, but the term “carbon capture” as it is used in the Kyoto protocol is equivalent to the “storage of any form of carbon”, so there exists a very close link with the content of organic matter in the soil, and thus it is a key indicator of the quality of the soil as regards its environmental functions, among them carbon capture, and a determining factor of its biological activity.
Some authors have indicated the importance which the so-called “Mediterranean Mountain Area” could have on the storage of carbon as a sustainable alternative to deforestation. The objectives of this paper are: i) to quantify the capture of organic carbon (SOC) in the soil of southern Spain, in different climatic conditions and ii) to establish the different degrees of degradation of those environments used as indicative of cation exchange capacity (CEC).
Surface samples of disturbed and undisturbed soil (10 cm) were collected in a total of 300 georeferenced points, located in five areas with different climatic conditions (wet, semi-wet, dry, semi-arid and arid) and of biomass. Organic matter content was analysed by spectrophotometrics, calculating SOC by the method of bulk density, and CEC by the Bower et al. method (1953).
The results obtained show that with an increase in the aridity of the climate and the subsequent modifications in the vegetation cover SOC is reduced: 35037.7 kg ha-1 en Gaucín (1.000 mm year-1) y 6392.9 kg ha-1 en Gérgal (240 mm year-1). CEC may be used as an indicator of soil degradation , as its values reduce with the diminution of rainfall ($R2=0.57$; $p<0.05$, $N=300$), together with biomass and biodiversity, at the same time as its spatial change: Gaucín 33.0 meq 100 g-1 and Gérgal 8.9 meq 100 g-1, with a statistical adjustment between CEC and SOC ($r=0.80$; $p<0.05$, $N=300$).
The conclusions show that: i) the degree of SOC capture in the soil is related to rainfall, biomass and biodiversity, with a point of inflection in the dry Mediterranean climatic environments, but beneath which capture conditions are precarious; ii) the most arid areas have higher soil degradation levels, with CEC and SOC considerably lower than the wetter areas, and iii) the Mediterranean mountain area, with an adequate vegetation cover and biodiversity, plays a crucial role as a SOC drain, with positive repercussions in the Climate Change context, which should be taken into account in the management of degraded regions.