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# Transport and deposition of carbon at catchment scale: stabilization mechanisms approach

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Terrestrial sedimentation buries large amounts of organic carbon (OC) annually, contributing to the terrestrial carbon sink. The temporal significance of this sink will strongly depend on the attributes of the depositional environment, but also on the characteristics of the OC reaching these sites and its stability upon deposition. The fate of the redistributed OC will ultimately depend on the mechanisms of its physical and chemical protection against decomposition, its turnover rates and the conditions under which the OC is stored in sedimentary settings. This framework is more complex in Mediterranean river basins where sediments are often redistributed under a range of environmental conditions in ephemeral, intermittent and perennial fluvial courses, sometimes within the same catchment. The OC stabilization mechanisms and their relations with aggregation at different transport and sedimentary deposits is under those conditions highly uncertain.
The main objective of this work was to characterize the stabilization and mineralization of OC in sediments in transit (suspended load), at a range of depositional settings (alluvial bars, reservoir sediments) and soils from the source areas in a sub-catchment (111 km2) at the headwaters of the Segura catchment in South East Spain.
In order to obtain a deeper knowledge on the predominant stabilization mechanism corresponding to each erosional phase, the following organic carbon fractionation method was carried out: Four aggregate size classes were distinguished by sieving (large and small macroaggregates, free microaggregates, and free silt plus clay fraction), and the microaggregates occluded within macroaggregates (SMm) were isolated. As a further step, an oxidation of the OC occluded in silt plus clay fraction and that of the free silt plus clay fraction was performed to estimate the oxidant resistant OC pool. Measured OC in these fractions can be related to three functional pools: active (free particulate organic matter), slow (carbon associated to clay and silt or stabilized in aggregates) and passive (oxidation-resistant OC). In addition, the potential mineralized C (incubation method) in each deposit and soil was determined.
Preliminary results indicate a higher OC content in the suspended sediments in transit and in the reservoir deposited sediments than in the alluvial bars, being in all sediments the total OC content lower than in the source soils. Slow and passive pools prevailed in suspended sediments and in reservoir sediments compared to alluvial bars, indicating different OC stabilization mechanisms. In addition, in the alluvial bars, mineralization rates were higher in bars located in channels with ephemeral flow conditions and vegetated areas than in bars located in channels with perennial flow conditions.