



Age of organic carbon of sediments flowing through an intermittent Mediterranean river basin

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Fluvial sediments have the potential to bury 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 sediment sources, that partially determine the characteristics of OC in sediments, and on the depositional environment, which influences the stability of sediments upon deposition. Knowledge of the age of the redistributed organic carbon could give us an indication of its origin and potential stability, however, little is known about the characteristics and age of organic carbon (OC) flowing through Mediterranean intermittent rivers.

Several studies undertaken in an intermittent medium sized catchment (111 km²) in SE Spain showed how sediments flowing through the catchment, that were sampled during transport (suspended sediments) and at different depositional settings (sediment wedges, alluvial bars, delta, reservoir sediments), showed an OC content of approximately half of that in the soils of the drainage area (9.42±9.01 g kg⁻¹ versus 20.45±7.71 g kg⁻¹, respectively), with important variation between the explored sediment deposits. Selective sorting of mineral and organic material during transport and deposition increased from upstream towards downstream. A characterization of carbon ages from radiocarbon analysis showed much younger organic carbon in soils related directly to the vegetation cover (547±380 years BP with large variations between forest and agricultural soils) than in fluvial sediments. The sediments transported in suspension showed the oldest average age (7396±1640 years BP) coming probably from bedrock sources and petrogenic origin, compared to the sediments deposited in the delta-alluvial plain (3999±365 years BP) and compared to the relatively young carbon found in the reservoir-lake at the outlet of the catchment (1838±2000 BP with large variations depending on the sediment depth). Variation of organic carbon age with sediment depth in the reservoir can possibly be related to different hydrological events and to the in-situ formation of organic carbon by lake ecological processes. Complementary information on stable isotopes ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$) could possibly give more insight in the processes concerning the redistribution of organic carbon by fluvial processes in intermittent rivers.