



Spatial distribution and transport of soil organic matter through a semi-arid catchment

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Soil erosion and deposition plays an important role in the transport and reallocation of organic matter in terrestrial carbon dynamics. This study discusses the production, transport and storage of organic material in semi-arid, semi-natural shrubland and forest ecosystem in SE Spain. Goal is to study the fate of organic matter in these land use systems and to reveal their possible importance within the terrestrial carbon cycle and the importance of the spatial redistribution of organic matter through the landscape.

The study was carried out at the Alquería field station in the Guadalentín basin in SE Spain on calcareous soils. Measurements were carried out at plant, plot and (sub-) catchment scale incorporating *Stipa tenacissima* tussock dominated shrublands, *Pinus halepensis* open forests and almond and cereal fields.

The determination of organic matter was based on the production and presence of organic matter on the soil surface, the amount of organic matter incorporated in the soil as present under and around individual plants and scaled up using high resolution aerial photographs and remote sensing images. The standing biomass was determined as well, using allometric methods and scaled up also using high resolution aerial photographs to estimate total plant cover. The transport of organic matter is determined using organic matter collected in classical unbounded plots that have been monitored also for runoff and sediment yield. Sediment stored in a 60 year old retention basin was also studied to reveal the sediment and organic matter fluxes at broader spatio-temporal scales. Furthermore also soil material accumulated behind bench terraces was evaluated for soil organic carbon.

The results will be discussed in the context of the sources and sinks of organic matter as well as to their linkage to erosion and hydrological processes. The spatial heterogeneity of the accumulated and transported organic matter is strongly related to the frequency-magnitude of rainfall events, as well as the trapping efficiency of plants, vegetation structure and bench terraces and has strong implications for up-scaling organic carbon contents from the fine to broader scale.