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Distribution of soil organic carbon in two small agricultural Mediterranean catchments.

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Soil organic carbon (SOC) is a key indicator of soil quality and a major factor for evaluating carbon sequestration schemes in forest and agricultural soils. However, at the farm or catchment scale SOC presents a large spatial variability which complicates the evaluation of soil quality (Gomez et al., 2009) and the certification of the potential for carbon sequestration. We hypothesize that the typical row crop configuration of olive orchards, with cover crops or bare soil in-between the rows, can explain a vast proportion of this variability. However, it is also expected that agricultural activities and topography-driven erosion processes at different scales (Van Oost et al., 2007) will contribute to SOC variability. Given the complexity of this problem and the important experimental effort required to resolve it, there are to our knowledge relatively few studies that have addressed this issue, especially in agricultural soils under Mediterranean conditions.

This communications presents a preliminary evaluation of the top 1-m SOC content at two small, 8 and 6.7-ha, catchments in Southern Spain, covered by olive groves, that were intensively sampled in 2011. Spatial variability of SOC is analyzed across tree rows, areas in-between tree rows, and at different depths. The SOC distribution is evaluated against the topography of the catchment and the intensity of the water erosion processes analyzed by a simple model, such as SEDD, as used by Ferro and Porto (2000) and Taguas et al. (2011).

The results of this communication will explore and discuss the differences between both catchments, and suggest guidelines for further exploring the sources of SOC variability, while providing guidelines to improve SOC estimation at the field scale for certification purposes.

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