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Water erosion processes in an olive orchard catchment using a multidisciplinary approach

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The implementation of soil and water conservation measures in agricultural areas such as, buffer strips, cover crops or check dams, is an important issue in order to maintain soil quality. As these measures involve a significant maintenance and investment, their efficiency must be optimized as much as possible.

La Conchuela is an olive orchard catchment of 8.0 ha located in Córdoba (southern Spain) where runoff and sediment losses have been measured at hillslope and catchment scale since 2006. Three different approaches were used to evaluate the behavior of sediment displacement within and from the catchment: soil properties and water erosion and, sediment tracers. During the hydrological year 2010-2011, runoff and soil loss were measured at plot and catchment scale. Chemical (organic carbon and available phosphorus) and physical (particle size distribution) properties were determined in the top 5 cm of the soil and in the sediment collected at plot and catchment scale. Both set of measures were grouped and compared distinguishing between zones (lanes and tree rows) and scales (plot and catchment scale). Finally, these results were compared to the ones obtained using magnetite at hillslope scale regarding soil redistribution after rainfall events during 2008-2010.

This study presents a preliminary characterization of the environmental processes occurring during water erosion events to identify significant sources of sediment at hillslope scale and their comparison to the catchment outlet in order to implement local soil and water conservation measures improving their efficiency and therefore reducing the costs associated to them.