



Effects of rock fragments on water dynamics in a fire-affected soil

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Rock fragments (RF) are common in the surface of Mediterranean semiarid soils, and have important effects on the soil physical (bulk density and porosity) and hydrological processes (infiltration, evaporation, splash erosion and runoff generation) (Poesen and Lavee, 1994; Rieke-Zapp et al., 2007). In some cases, RFs in Mediterranean areas have been shown to protect bare soils from erosion risk (Cerdà, 2001; Martínez-Zavala, Jordán, 2008; Zavala et al., 2010). Some of these effects are much more relevant when vegetation cover is low or has been reduced after land use change or other causes, as forest fires. Although very few studies exist, the interest on the hydrological effects of RFs in burned areas is increasing recently. After a forest fire, RFs may contribute significantly to soil recovery. In this research we have studied the effect of surface and embedded RFs on soil water control, infiltration and evaporation in calcareous fire-affected soils from a Mediterranean area (SW Spain). For this study, we selected an area with soils derived from limestone under holm oak forest, recently affected by a moderate severity forest fire.

The proportion of RF cover showed a significant positive relation with soil water-holding capacity and infiltration rates, although infiltration rate reduced significantly when RF cover increased above a certain threshold. Soil evaporation rate decreased with increasing volumetric content of RFs and became stable with RF contents approximately above 30%. Evaporation also decreased with increasing RF cover. When RF cover increased above 50%, no significant differences were observed between burned and control vegetated plots.

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