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Fire effect on soil water repellency in different ecosystems of NE-Spain

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Water repellency is a soil property that affects its hydrological response and its erodibility. It is a property that varies depending on the soil biological properties, soil organic matter, soil moisture, and even on perturbations as fire (Jordan et al., 2010). The fire incidence on soil water repellency varies according to fire severity, the soil sampling depth or the presence of ashes and litter (Cerdá and Doerr, 2008). In this work, the effect of an experimental fire is studied on the soil water repellency of three different ecosystems. Three experimental areas have been selected in the NE of Spain with different land-use types and soil properties: an Aleppo pinewood on a Rendzic Phaeozem; an Evergreen oakwoodon a Hypercalcic Calcisol and a Meadow ona a Eutric Cambisol.
Non-altered blocks of soil have been obtained in the field in every area. Once in the laboratory, every type of soil has been air-dried and burnt according to the Llovet et al. (2008) method. All the blocks have been burnt with the same intensity up to reaching a maximum of 250ºC at 1 cm depth (moderate intensity). All treatments have been carried out three times. In order to evaluate the soils' water repellency, the water drop penetration time (WDPT) and ethanol tests have been used, applying three drops per soil. In addition, the water repellency variation is assessed in three different levels of depth (at the surface, at 2 cm and 5 cm-depth). The water repellency classification criterion is the one used by Doerr (1998).

Water repellency tends to reach a maximum on soil surface and decreases with depth (Table 2). Forest soils show higher water repellency than meadow soil. In both, forest soils as well as the meadow soil, fire decreased significantly its water repellency. Moreover, soil water repellency in evergreen oak wood and pine wood decreased significantly at all studied soil depths because fire treatment.

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