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DIFFERENCES ON LOAM SOIL THERMAL PROPERTIES AFTER PRESCRIBED FIRE (Montgri Massif, Spain)

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On the whole of the literature, many researchers have studied the variations on the chemical and physical properties on or above burnt soils, but there are other physical properties as thermal properties that govern the heat flow transport inside the soil, and affect the aspects mentioned above. The purpose of this research is to explore the variability in the soil thermal properties (thermal conductivity -λ-, thermal diffusivity -α- and volumetric specific heat –**Cv**-) after a prescribe fire. Sampling plot was located in the Montgrí Massif (NE, Spain). The vegetation in the area was a Pinus plantation (*Pinus halepensis*) with shrubland of *Quercus coccifera, Cistus albidus, Rosmarinus officinalis* and *Pistacea lentiscus*. A set of 42 soil samples between surface and 5 cm depth was collected before and after the fire. To characterize the soil chemical and physical variables, particle size distribution, bulk density, total organic matter content, electrical conductivity, pH, phosphorous content and nitrogen were analyzed. To determine the variability on the soil λ, α and **Cv** a dry-out (relationship between thermal properties and water content) curve was calculated using a compound sample on the whole of the set samples per scenario (before and after fire). Dry-out curves on soil columns device were determined. Water content was calculated by dried sample in the oven. To determine the λ, α and **Cv** a SH-1 small dual-needle sensor was employed. The method is based on ASTM D-5334-08. The SH-1 thermal sensor combined with KD2-Pro reader-logger to obtain reliable and accuracy soil thermal values, allowing to obtain a continuous large soil thermal data-set. The soil from this plot in the Montgrí massif was classified as loam textural class (USDA, 1975). Mean bulk density was around 1.1 g·cm^{-3}. The chemical and physical properties values before and after prescribed fire were, respectively: mean total organic carbon content were about 14.7% and 17.2%. The mean calcium content was 5225 and 4056 ppm. Magnesium and potassium decreased slightly, meanwhile the electric conductivity increased. On the other hand, the pH of the media did not shown any change. Respect to soil thermal properties, all of them λ, α and **Cv** shown changes in their values. Indeed, in all cases the values of soil λ, α and **Cv** decreased after soil was burnt, especially the thermal conductivity values on the whole of the dry curve out. The critical point in the relationship $\theta(\lambda)$ always was stronger when soil samples were burnt than soil before prescribed fire, starting a critical reaction at 8% of water content for samples no fired, and 6% of water content for burnt samples. Probably, this situation could be explained by the incorporation of organic matter on the soil after the prescribed fire, such that organic matter behaviour does not transmit well the heat pulse; among other changes in the variables. As summary, we could say that thermal properties can present changes when the scenario changes, i.e. before and after a prescribed fire.