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Forest fire induced changes in chemical and mineralogical properties of Mediterranean soils

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Many soils of the Mediterranean region are subjected to progressive degradation as a result of fire and water erosion. The study was conducted to determine in the south-face of Sistema Central (Spain) the effect of a forest fire on soil chemical and mineralogical properties.

We observed ten months after the fire, significantly high surface soil pH ($p< 0,001$), exchangeable cations Ca2+ ($p< 0,05$), K+ ($p< 0,001$) and cation exchange capacity in burnt plots compared with unburnt plots. The concentration of organic C was also higher in burnt soils as compared with unburnt soils.

Total amounts of macro and microelement contents in soils affected by forest fire beneath Pinus pinaster Ait., respect to control soils have been studied. Higher proportions of Mn, Zn and Ca, fundamentally Mn, were found in burnt soils. The concentrations of Mno (extracted by oxalate) and Feo (extracted by oxalate) increased also in burnt soils, mostly Mno. This increase must be due to different inputs of plant ashes.

The parent material (schist) contained the following components: gibbsite, chlorite, mica-illite, interstratified mica-vermicullite, interstratified mica-dioctaedrical chlorite, quartz and feldspars. The mineralogy of sand in the upper layer of burnt and unburnt soils was similar to that of the parent material.

The clay fraction of unburnt soils was composed by: gibbsite, 1:1 minerals, micas-illite, chlorite, vermiculite and interstratified mica-vermicullite. The mineralogy of the upper layer of burnt soils exhibited the following changes: gibbsite disappeared from the upper layer of severely burnt soils, the proportion of minerals 1:1, vermiculite and

traces of interstratified mica-vermiculite decreased or disappeared in the upper layer of burnt soils.

Key words: Forest fire, Mediterranean area, soil chemistry, soil mineralogy