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Effects of fire intensity on soil properties in a Mediterranean area.

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The degree of change in both chemical and biological properties of soil inducted by forest fires depends on the temperature and the residence time of the fire as well as on the soil moisture content of fuel. Exposure of the mineral soil may lead to secondary effects, as a loss of nutrient and organic matter. Some of these events may be further aggravated by the environmental conditions following fire (air and soil temperatures, precipitations, dryness) . Fire spread and behaviour depends mainly on fuel characteristics (load and fuel type) and weather conditions. The effect of the different driving forces affecting the fire intensity and severity can be studied by the analysis of measured or estimated values of heat per meter of fire front that the soil is subjected to. Values of fireline intensity as well as the other parameters related to fire severity (rate of spread, heat per unit area, reaction intensity, etc.) can be estimated under different weather and fuel scenarios, using fire spread and behaviour simulators. The simulators allow the user to describe the spatial and temporal spread and behaviour of fire under different terrain, fuels and weather conditions. The aim of this study is to compare burned and unburned soil in order to evaluate the effect of fire on physical and chemical soil properties of a Mediterranean area. The analysis was carried out in a human caused fire occurred in North-West Sardinia (Italy) during the 2006 and 2007 summer seasons. The burned area is characterized by the sub-arid Mediterranean climate and mainly covered by the typical shrubland Mediterranean vegetation. Several pedological samples were collected from various depths (0-5, 5-15 and 15-25 cm) and under

different Mediterranean maquis species (*Chamaerops humilis* L., *Pistacia lentiscus* L. and *Calycotome spinosa* L.), both in burned and in unburned plots. The soil organic matter content, total and available element concentrations, and soil texture were then determined in laboratory. Spatial and temporal variations of fireline intensity were simulated using FARSITE, fire area simulator. Different statistical parameters were calculated to describe the relationships between fire intensity and soil properties in relation to burned and unburned soils and to different species composition.