



Effects of two prescribed fire on pH, phosphorous, total carbon and total nitrogen in the same Mediterranean grassland soil (Prades Mountains, north-east Spain)

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In this abstract we present results from a plot which was burned twice by the GRAF (Group of Support to Forest Actions) with a low intensity prescribed fire. This work is a part of a wide project "Effects of the prescribed fires on soil properties" which has, as one of its main objectives, to investigate the recurrence that soils can be managed by fire in terms of soil recovery. The area selected for this study is located at 760 m above sea level in the Prades Mountains, Tarragona province, north-east Spain. The first prescribed fire was carried out on 24 February 2000 in order to burn the grass around the village of Capafonts to create safe fire break zones. The second prescribed fire took place one year and half after the first burning. The mean annual precipitation is 712 mm with autumn and spring maxima. The mean annual temperature is $\sim 12^{\circ}\text{C}$. The rock type is calcareous and the soil is a Lithic Xerorthents, formerly ploughed to plant cereals but abandoned nowadays. The vegetation burned was 1-m-high grass with weeds present at the soil surface. This vegetation was quite dense and homogeneous, and is considered a risk in case of fire because it could conduct the fire from the forest to the village. The sampling design was based on a 4×18 m plot with 2% slope, with 42 sampling points at 2-m intervals with 12 intermediate sampling points. The pH was analysed following extraction with pure water (1:2.5) and measured with a pH-meter. Phosphorous was analysed using the Olson Gray method. Total carbon and total nitrogen were analysed using elemental analysis (NaA2100 Protein Nitrogen Analyzer). We show data in four moments during the study period: before burning, after burning, one year after burning and after the second burning. In terms of fuel load density, we conclude a drastic reduction of vegetation after the first prescribed

fire. Thus, the fire conduction during the second prescribed fire was less important than in the first one. The mean values for pH in every moment have the following sequence (7.83, 8.00, 7.77, and 7.71), there is not a clear increase of pH in the second burning. The phosphorus (84.66, 132.22, 137.23 and 216.53 ppm), in this case there is a notable increase, due to the accumulation of ashes that has a concentration of 1632 ppm. The total carbon (8.88, 10.20, 9.30 and 8.80%) does not experiment the same pattern than in the first prescribed fire and therefore it decreased. The ashes generated in this second burning have a 12.57% of total carbon. The total nitrogen (0.366, 0.464, 0.484 and 0.342%) show a clear decrease after the second burning and reach values even lower than before the first burning. The ashes have a low Nitrogen concentration 0.320%. One of the conclusion of the research is that the effects of the second prescribed fire is different from the first one, due to the concentration starting point is new and the fuel burnt, as we have mentioned before, is also different. It is interesting to study the spatial distribution of the different properties in the soil and also how the topography plays an important role in the distribution and concentration of the soil parameters.