Effects of a prescribed fire on pH, total carbon and total nitrogen in a Mediterranean forest at the wildland urban interface: one year study.

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The study area is located in Tarragona province, Northeast Iberian Peninsula. The plot, named "Reus" (18x4m), is placed on an exposed and moderate steep slope ladder between the forest interface and a residential area. This prescribed fire would serve for two main objectives, 1) to reduce fuel from the wild land urban interface, thus reducing fire risk, and 2) to investigate the effects of the prescribed fire on soil properties, quantifying in this case, the concentration and spatial variation of pH, total Carbon (C) and total Nitrogen (N). The location of the plot at the natural terrace of a ladder plays an important role when spatial variability of the Carbon and Nitrogen are explained. This fact would potentially provoke organic matter accumulation in some of the plot samplings points, and it would eventually force to leach some others. Our plot lies in a regionally composed schist bedrock, taking into account mineralization rates by weathering processes. Forest vegetation is characterized by the Pine tree, especially Aleppo pine (*Pinus halepensis*), and within this layer we can find *Quercus ilex* and *Quercus coccifera*. The typical Mediterranean shrubland vegetation layer is quite model in this area, namely we found *Asparagus accutifolius L., Olea europaea L., Clemantis flammula, Erica multiflora* and *Brachypodium retusum.* Mean annual rainfall (156 m.a.s.l. and UTM coordinates x 336711, y 4556266) is 600.5 mm. The mean of the temperature above the soil during the prescribed fire reached the 368˚C (CV=40.71%) measured with a laser thermometer. Our analyses are focused on pH, total Carbon content and total Nitrogen. The pH was analyzed following extraction with pure water (1:2.5) and measured with a pH-meter. Total carbon and total nitrogen were analyzed using elemental analysis (NaA2100 Protein Nitrogen Analyzer). pH values

before the prescribed fire were 6.48 (C.V.=5.70), mean pH after 6.95 (C.V.=5.96), Total carbon mean before the prescribed fire was 3.99% (CV=51.5%), whereas just after fire 4.91% (CV= 37.75, and one year after 6.40 (CV=65.8%), meanwhile Nitrogen values showed this sequence: mean before=5.238% (CV=49.36%), mean after fire=5.927% (CV=27.41%), mean one year after=6.727% (CV=33.72%). ANOVA analyses made between the three moments for pH, N and C showed statistically significant difference at 95% confidence level for the follow groups; pre-post pH (p-value 0.0000), pre-one year pH (p-value 0.0000), pre-post C (p-value 0.0354), post-one year C (p-value 0.0340), pre-one year C (p-value 0.0022), pre-post N (p-value 0.0003), post-one year N (p-value 0.0042). Geostatistical analyses showed an important spatial independence of the three data samplings moments. This geostatistical spatial roughness in our plots is significatively related with the redistribution of the surface organic matter after fire due to the slope angle and microrelief of the area. These results are important to assess the role that low intensity prescribed fire would play in two limiting nutrients in the soil system; total Carbon and Nitrogen. At the same time these results enable us to study the N and C responses to fire just immediately and one year after. This fact constitutes with further research, a key answer in order to conclude a short term effects in the soil system after the low intensity prescribed fire.