



Organic matter characteristics and distribution in Atlantic mountain soils affected by wildfires

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Under Atlantic climatic conditions (Cantabrian Range, NW Spain) mobilization of soil from hillslopes takes place mainly by soil creep. This erosion process is enhanced by wildfire, which is the main perturbation agent in the mountain soils of the Cantabrian Range. Moreover, fire also affects soil organic matter (SOM) accumulation and composition, both directly (e.g. combustion of organic matter and black carbon production) and indirectly (e.g. increase of soil erosion by creeping).

The main aim of this project (Ref.: PCTI IB09-024) was to compare rates of soil creep in hillslopes of the Cantabrian Range between areas that are affected and are not affected by fires. Besides, investigating SOM accumulation and composition, we examined potential relationships amongst SOM properties and with soil creep. The study area is located in Somiedo Natural Park (Asturias, NW of Spain) and is characterized by an abrupt relief and a high variability of both the bedrock geology and the vegetation cover. Three locations differing in vegetation and geological conditions were chosen and, at each location, soil transects were sampled in fire-affected hillslopes and their unburned counterparts. Samples of the surface soil (0-5 cm) and the whole profile (<30 cm) were taken and, density, texture and organic carbon content were determined. In selected samples, SOM was characterized by thermogravimetry-differential scanning calorimetry and black carbon content was estimated by chemical oxidation.

In this contribution, results regarding SOM accumulation and composition are presented and possible relationships among SOM features, soil creep and fire effects discussed. A key outcome is the need for considering the whole soil profile, and not only the surface soil, when examining SOM accumulation and black carbon estimations in mountain soils where high rates of soil mobilization occur due to post-fire erosion by creeping.