



Land abandonment, fire recurrence and soil carbon content in the Macizo del Caroig, Eastern Spain

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During the last 50 years two main forces have driven the fate of Mediterranean landscapes: land abandonment and forest fires (MacDonald et al., 2000; Moreira et al., 2001). Due to the economical changes suffered by the of the Mediterranean countries after the Second World War, the population migrated from the rural to the urban areas, and from South to North Europe. The land abandonment allowed the vegetation to recover and, as a consequence, an increase in forest fire took place. The soils of the abandoned land recovered the vegetation and litter layers, and consequently changes in soil properties have being found. One of these changes is the increase of soil carbon content, which is due both to vegetation recovery and to fire occurrence that increases the ash and pyrogenic carbon content in soils.

Twenty plots were selected in the Macizo del Caroig in Eastern Spain on soils developed on limestone. The period of abandonment and the forest fires that had affected each plot were determined by interviews with the owners, farmers and shepherds. In addition, six (three + three) plots were selected as forest (no plough) and cultivated control plots. Each plot was sampled (10 random samples) and the organic carbon content determined.

The results show that the cultivated plots have organic matter contents of 1.02 %, and the forest (*Quercus ilex* sp.) plots reach the highest value: 14.98 %. Within those we found values that range from 2.34 %, in the recently abandoned plots (10 year abandonment), to values of 8.23 % in the 50 year old abandoned fields. The results demonstrate that there is a recovery of the organic carbon in abandoned soils and that the forest fires do not affect this trend.

The increase of soil organic matter after abandonment is a result of the recovery of vegetation (Debussche et al., 2001), which is the consequence of the end of the disturbance of forest that have affected the Mediterranean for millennia (Barbero et al., 1990). The colonization of the abandoned fields by the vegetation is very efficient (Ne'eman and Izhaki, 1996) and fire adapted species are the main types, which demonstrates that fire is part of the Mediterranean ecosystems (Pausas, 1999). The fire was not found here as a factor increasing the organic carbon in the abandoned soils, although it was found in a nearby area (Novara et al., 2011). This research confirms that the soil development in Mediterranean Type-Ecosystems (Cerdà et al., 2010) is being affected by land abandonment and fire (Doerr and Cerdà, 2005).

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