

EGU2020-18475

<https://doi.org/10.5194/egusphere-egu2020-18475>

EGU General Assembly 2020

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Soil organic carbon and soil total nitrogen stocks, soil quality and vegetation composition during natural revegetation processes in a Mediterranean mid-mountain area

Estela Nadal Romero¹, Pedro Sánchez Navarrete¹, **Makki Khorchani**¹, Luis Miguel Medrano-Moreno², and Teodoro Lasanta¹

¹Instituto Pirenaico de Ecología, Procesos Geoambientales y Cambio Global, Zaragoza, Spain (estelanr@ipe.csic.es)

²Instituto de Estudios Riojanos. Gobierno de la Rioja.

Mediterranean mid-mountain areas have been subject to significant human pressure through deforestation, cultivation of steep slopes, fires and overgrazing. However, during the 20th century, the mountainous areas of the northern rim of the Mediterranean region were affected by abandonment of cultivated fields and natural revegetation processes. Natural revegetation occurred in most of the lands where human activity (farming on steep slopes, grazing) declined in intensity or was abandoned, resulting in the expansion of shrubs, bushes and forests. What are the consequences of such processes on soil quality, soil organic carbon (SOC) and soil total nitrogen (TN) stocks and vegetation composition? What are the differences between the different land uses and land covers (LULCs)? The general aim of this study is to study the effects of natural revegetation processes after land abandonment on soil quality, SOC and soil TN stocks and vegetation composition in the Leza Valley (Iberian System, Spain). We hypothesized that natural revegetation processes improves soil quality and higher SOC and TN stocks. For this purpose, we analyzed 60 soil samples, from 5 LULCs and four depths (0-10, 10-20, 20-30, 30-40 cm): pasture, shrubs characterized by the presence of *Cistus laurifolius*, bushed characterized by the presence of *Juniperus communis*, Young forest (*Quercus faginea*), and old forest or dehesa. In addition, plant species inventories were carried out in each LULC.

The results related to physico-chemical soil properties indicated: (i) significant differences in soil quality between the first stages of natural revegetation (pasture and shrubs) and young forest (limited to the first 20 cm between shrub and young forest); (ii) significant differences in SOC stocks between the first stage of natural revegetation (pasture) and young and old forests; (iii) significant differences in soil TN stocks between pasture and shrubs and young and old forests; and (iv) significant differences between the shrub families. Final results obtained through a Principal Component Analysis with all the variables differentiate forests from shrubs, bushes and pastures confirming our first hypothesis. We can conclude that natural revegetation is an effective strategy to improve soil quality and increase SOC and soil TN stocks.