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Medium-long term soil resilience against different disturbances: wildfires, silvicultural treatments and climate change

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Soils of semiarid Mediterranean forest ecosystems are very fragile and sensitive to changes due to different anthropogenic and natural disturbances. The increasing vulnerability of semiarid lands within this world framework has generated growing awareness in the field of research, with highly intensified study into soils properties. One of the main problems of Mediterranean forests is wildfire disturbance. Fire should be considered more an ecological factor but, in contrast to the role of fire, it is now a closely related factor to human action. On the other hand, to improve the recovery of forest communities after fire, silvicultural treatments are needed and, for that matter, another disturbance is added to the ecosystem. By last, climate change is also affecting the fire regime increasing fire frequency and burned area, enhancing the destructiveness to Mediterranean ecosystems. After all of these three disturbances, changes in vegetation dynamics and soil properties are expected to occur due to the plant-soil feedback. Soil plays an essential role in the forest ecosystem's fertility and stability and specifically soil microorganisms, which accomplish reactions to release soil nutrients for vegetation development, for that is essential to enlarge knowledge about soil properties resilience in semiarid forest ecosystems. Physico-chemical and microbiological soil properties, and enzyme activities have been studied in two Aleppo pine forest stands that have suffered three disturbances: 1) a wildfire event, 2) silvicultural treatments (thinning) and 3) an artificial drought (simulating climate change) and results showed that soil recovered after 15 years. Final results showed that soils have been recovered from the three disturbances at the medium-long term.