Submitted Abstract

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Title	Monitoring Carbon (Co2 And Ch4) Exchanges In The Main Dominant Woody Species In Sierra Nevada Mountains (Spain) Located At Different Ecological Environments.
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Abstract

The management of forests is essential to avoid biodiversity losses and maintain the ecosystem services that provide to humans under a climate change context. In this regard, thinning and clearing activities, leaving the main branches lopped off and all wood left in situ, is a common practice in Sierra Nevada Natural Park (Spain) and other Mediterranean mountains. Such managements create soil patches (e. g. biogenic refuges vs. open areas) promoting different microclimate conditions and therefore, different biotic responses. Therefore, the continuous monitoring of soil CO2 and CH4 fluxes, together with soil and air temperature and humidity in such soil patches, will provide us with very valuable knowledge about the effect of different microhabitats in the soil respiration processes.

This study is focussed on the forests and shrublands that create dominant woody species in Sierra Nevada: oak and holm oak groves and pine reforestation. These plant formations are ubiquitous in many other mountains, so the results we obtain can be generalized to other places. They are reservoirs of biodiversity and suppliers of provisioning, regulating and cultural ecosystem services. They are the result of a long history of human management, as in many other mountains, and have problems of adaptation to climate change.

In this regard, we are going to characterise the microclimatic environment (soil and air temperature and humidity) in selected microhabitats of holm oak and oak groves and pine reforestation plots in comparison with their immediate “open” environment. Our measurements are deployed in experimental parcels that were already monitored both with biophysical field measurements and satellite and in the vicinity of the meteorological stations that already exist in Sierra Nevada, which will allow us to establish a very strong spatial association, facilitating the scaling between micro and macroclimate.

Such soil fluxes are measured since March 2022, every 2 weeks, using the LI-7810 soil chamber portable system. In addition, “low cost” sensors are installed to measure soil CO2 concentration, in some of such experimental plots and estimate continuous soil CO2 emissions and also validate the measurements of the LI-7810 portable system. We hypothesize that soil respiration in such “refugees” will be greater than in open spaces due to better abiotic conditions, increasing plant activity and therefore, autotrophic respiration, and more prolonged activity of microorganisms and arthropods in the soil (heterotrophic respiration).

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