



soil carbon pools within oak forest is endangered by global climate change in central mexico

Felipe García-Oliva (1), Agustín Merino (2), Antonio González-Rodríguez (1), Bruno Chávez-Vergara (3), Yunuen Tapia-Torres (4), and Ken Oyama (5)

(1) UNAM, IIES, Morelia, Mexico (fgarcia@cieco.unam.mx), (2) USC, Dep. Soil Sciences and Agricultural Chemistry, Lugo, Spain, (3) UNAM, Instituto de Geología, México, Mexico., (4) UNAM, Instituto de Geofísica, Morelia, Mexico , (5) UNAM, ENES-Morelia, Morelia, Mexico

Forest soil represents the main C pool in terrestrial ecosystems. In particular, temperate forest ecosystems play an important role in the C budget among tropical countries, such as Mexico. For example, the temperate forest ecosystem contains higher C contents on average (295 Mg C ha⁻¹) than the soil C associated with other ecosystems in Mexico (between 56 to 287 Mg C ha⁻¹). At a regional scale, oak forest has the highest C content (460 Mg C ha⁻¹) among the forest ecosystem in Michoacán State at Central Mexico.

At the local scale, the soil C content is strongly affected by the composition of organic matter produced by the plant species. The oak species are very diverse in Mexico, distributed within two sections: *Quercus sensu stricto* and *Lobatae*. The oak species from *Quercus s.s.* section produced litterfall with lower concentrations of recalcitrant and thermostable compounds than oak species from *Lobatae* section, therefore the soil under the former species had higher microbial activity and nutrient availability than the soil under the later species. However, the forest fragment with higher amount of oak species from *Quercus s.s.* section increases the amount of soil C contents.

Unfortunately, *Quercus* species distribution models for the central western region of Mexico predict a decrease of distribution area of the majority of oak species by the year 2080, as a consequence of higher temperatures and lower precipitation expected under climate change scenarios. Additionally to these scenarios, the remnant oak forest fragments suffer strong degradation due to uncontrolled wood extraction and deforestation. For this reason, the conservation of oak forest fragments is a priority to mitigate the greenhouse gases emission to the atmosphere. In order to enhance the protection of these forest fragments it is required that the society identify the ecosystem services that are provided by these forest fragments.