



Enhancing soil carbon sequestration in the parks of the city of Barcelona

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Climate change is progressing at an alarming pace. In order to limit global warming to the agreed-upon 2°C in the United Nations Paris Agreement, we require both rapid decarbonization and the implementation of negative emissions technologies (NETs), that actively remove carbon dioxide (CO₂) from the atmosphere and ensure stable long-term carbon storage. In this context, enhanced silicate weathering (ESW) has been proposed as a NET based on a nature solution. ESW aims to accelerate the natural uptake of atmospheric CO₂ during the weathering of silicate rocks by grinding them, increasing their reactive surface and speeding up the process. This NET is particularly interesting as it does not compete for space with other economical activities. For instance, in agroecosystems, ESW is already considered a promising NET, offering multiple co-benefits for crop production when spreading silicate minerals on arable soils (i.e. increase in crop yields, restoration of soil base cations and micro- and macronutrient stocks). Besides agricultural land, urban soils can also be suitable for ESW. The application of ESW in city parks and gardens presents an opportunity to increase the capture of atmospheric CO₂, while also favoring vegetation growth (lawn, shrubs and flowers) and potentially enhancing resistance to drought and pests.

EMBARCARB is a pilot project that aims to increase soil carbon sequestration and improve the vegetation status in two parks of the city of Barcelona (SE Iberian Peninsula), during an extremely dry year. Moreover, the project also aims to compare the carbon sequestration capacity of soils with weathering of silicate rocks and concrete demolition fines, thus reusing construction debris and strengthening the circular economy of the region. Here, we explore the preliminary results of the project and give a first estimation of the weathering rates and the capacity of such NETs to enhance soil carbon sequestration in the green areas of the cities.