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Evidence for large microbial-mediated losses of soil carbon under anthropogenic warming

Pablo García-Palacios

Institute of Agricultural Sciences - CSIC, Madrid, Spain (pablo.garcia.pala@gmail.com)

Anthropogenic warming is expected to accelerate global soil organic carbon (SOC) losses via microbial decomposition, yet, there is still no consensus on the loss magnitude. Here we argue that, despite the mechanistic uncertainty underlying these losses, there is confidence that a strong, positive land carbon–climate feedback can be expected. Two major lines of evidence support net global SOC losses with warming via increases in soil microbial metabolic activity: the increase in soil respiration with temperature and the accumulation of SOC in low mean annual temperature regions. Warming- induced SOC losses are likely to be of a magnitude relevant for emission negotiations and necessitate more aggressive emission reduction targets to limit climate change to 1.5 °C by 2100. We suggest that microbial community–temperature interactions, and how they are influenced by substrate availability, are promising research areas to improve the accuracy and precision of the magnitude estimates of projected SOC losses.