Abstract

Climate change is the main cause of rising global temperatures around the world. Carbon sequestration in terrestrial ecosystems is considered one of the main tools for climate change mitigation, but current estimates of sequestration potential do not include the impacts of future climate change. The aim of this thesis is to summarize our current knowledge on the response of soil organic carbon to warming, alone as well as in combination with other drivers of climate change. A complementary aim is to compare the different methods used to study the impact of warming on soilIncreased temperature causes significant losses of soil carbon, but no consistent effect has been observed in combination with other aspects of climate change. Research suggests that carbon losses depend on the stability of soil fractions, with warming leading to greater decreases in particulate organic matter (POM). The combination of warming with rising CO_2 concentration has led to an overall increase in soil carbon, although losses have been observed in combination with drought. When studying the effects of warming on soil carbon stocks, selecting the appropriate method is crucial. Active methods offer precise control but are more expensive and can impact soil biota, whereas passive methods are cheaper but require more time. These findings highlight the importance of comprehensive research involving combinations of different climate change aspects, in different ecosystems, accounting for different soil fractions and the need for long-term studies to understand the full extent of the impact of warming on soil carbon stocks.

Keywords: soil organic matter, carbon dioxide, global warming, priming effect, stability, fire