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Soil mapping and processes models to support climate change mitigation and adaptation strategies: a review

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As agreed in Paris in December 2015, global average temperature is to be limited to "well below 2 °C above pre-industrial levels" and efforts will be made to "limit the temperature increase to 1.5 °C above pre-industrial levels. Thus, reducing greenhouse gas emissions (GHG) in all sectors becomes critical and appropriate sustainable land management practices need to be taken (Pereira et al., 2017). Mitigation strategies focus on reducing the rate and magnitude of climate change by reducing its causes. Complementary to mitigation, adaptation strategies aim to minimise impacts and maximize the benefits of new opportunities. The adoption of both practices will require developing system models to integrate and extrapolate anticipated climate changes such as global climate models (GCMs) and regional climate models (RCMs). Furthermore, integrating climate models driven by socio-economic scenarios in soil process models has allowed the investigation of potential changes and threats in soil characteristics and functions in future climate scenarios. One of the options with largest potential for climate change mitigation is sequestering carbon in soils. Therefore, the development of new methods and the use of existing tools for soil carbon monitoring and accounting have therefore become critical in a global change context. For example, soil C maps can help identify potential areas where management practices that promote C sequestration will be productive and guide the formulation of policies for climate change mitigation and adaptation strategies. Despite extensive efforts to compile soil information and map soil C, many uncertainties remain in the determination of soil C stocks, and the reliability of these estimates depends upon the quality and resolution of the spatial datasets used for its calculation. Thus, better estimates of soil C pools and dynamics are needed to advance understanding of the C balance and the potential of soils for climate change mitigation. Here, we discuss the most recent advances on the application of soil mapping and modeling to support climate change mitigation and adaptation strategies; and These strategies are a key component of the implementation of sustainable land management policies need to be integrated are critical to. The objective of this work is to present a review about the advantages of soil mapping and process modeling for sustainable land management.

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