C-CO$_2$ stocks and variations in Mediterranean fruit orchards: a chronosequence approach

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Land management causes changes in soil physical, chemical and biological properties that in turn affect soil organic carbon (SOC) stocks. The estimation of SOC stocks is necessary to assess the impact of land management practices on the emission of greenhouse gases (GHGs). As a matter of fact, SOC showed an important spatial and temporal variation which allow to evaluate the effect of different soil management approaches in potentiating/reducing the capacity of fruit orchards in C-CO$_2$ storage. A survey was carried out in Basilicata Region to identify pedo-climatic homogeneous areas in which fruit orchards of different Mediterranean species (kiwifruit, stone fruits, olive) were identified. The orchards were managed, from different times (medium-long term scales), according to diverse soil management systems (conventional by tillage versus sustainable by no-tillage, cover crops, pruning material recycling within the grove, green manure and compost input). Soil was sampled according to the European official soil sampling methodology and SOC determinations were performed. Analytical data were then compared to SOC data estimated by means of the RothC and ICBM models which were linked to GIS database to map existing C stocks soils and assess future SOC changes. The prediction efficiency of such models under Mediterranean pedo-climatic conditions is discussed as well as the possibility to use them as a decision support tool for long-term strategies within the national and international agricultural policies.
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