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Effect of Crop cultivation after Mediterranean maquis on soil carbon stock, δ13C spatial distribution and root turnover

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The aim of this work was investigate the effect of land use change on soil organic carbon (SOC) stock and distribution in a Mediterranean succession. A succession composed by natural vegetation, cactus pear crop and olive grove, was selected in Sicily. The land use change from mediterranena maquis (C3 plant) to cactus pear (C4 plant) lead to a SOC decrease of 65% after 28 years of cultivation, and a further decrease of 14% after 7 years since the land use from cactus pear to olive grove (C3 plant). Considering this exchange and decrease as well as the periods after the land use changes we calculated the mean residence time (MRT) of soil C of different age. The MRT of C under Mediterranean maquis was about 142 years, but was 10 years under cactus pear. Total SOC and δ13 C were measured along the soil profile (0-75cm) and in the intra-rows in order to evaluate the distribution of new and old carbon derived and the growth of roots. After measuring of weight of cactus pear root, an approach was developed to estimate the turnover of root biomass. Knowledge of root turnover and carbon input are important to evaluate the correlation between carbon input accumulation and SOC stock in order to study the ability of C sink of soils with different use and managements.