



## **Land use change impacts on soil organic carbon in the tropics and sub-tropics - a meta analysis**

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Around 20% of the anthropogenic greenhouse gas emissions are caused by land use changes in the tropics and sub-tropics. Major carbon emissions stem from the deterioration of biomass during deforestation and forest degradation. The impact of tropical and sub-tropical deforestations and other land use changes on soil organic carbon (SOC) are less clear and insufficiently quantified. Most tropical and subtropical soils are characterised by highly weathered soils with low capacity to stabilize soil carbon. We conducted a meta-analysis on land use change effects on SOC, comprising more than 210 publications, most of them published during the last ten years. A meta-analysis is able to account for the high variability of land use types, soil types and climate regimes and to improve our understanding of land use change impacts. We found bulk density and the correction for bulk density changes to be pivotal for the estimated SOC stock change. Conversion of forest into different agricultural systems always caused SOC losses accompanied by increases in the bulk density. There were almost as high relative SOC stock changes in the subsoil as compared to the topsoil, stressing the importance of subsoils for the SOC balance. Implications for the detectability of SOC stock changes and consequences for the reporting under the framework of UNFCCC will be discussed.