

Losses of soil organic carbon with deforestation in mangroves of Madagascar

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Mangrove deforestation has occurred globally resulting in CO₂ emissions, but the extent of soil organic carbon (C) losses has not often been assessed. We sampled 5 intact and 5 deforested mangrove soils in Tsimipaika Bay, Madagascar, to assess the fate of soil C after clearing. We analysed ²¹⁰Pb, sediment grain size, C and nitrogen (N) content. There was no significant soil erosion with deforestation: average excess ²¹⁰Pb inventories were similar (intact: 2200 ± 800 Bq m⁻²; deforested: 1900 ± 300 Bq m⁻²) and deforested soils contained twice as much clay as intact soils (28 ± 1% and 13 ± 1%, respectively). In contrast, the magnitude of soil mixing was 4 times greater in deforested plots supported by ²¹⁰Pb profiles. Evidence of soil C losses were observed in the upper 10 g cm⁻² (fig. 1) where C stocks in deforested soils were half those in intact soils. Conservation of forests would therefore avoid these emissions. Currently the IPCC has an emission factor of zero for soils with deforestation.

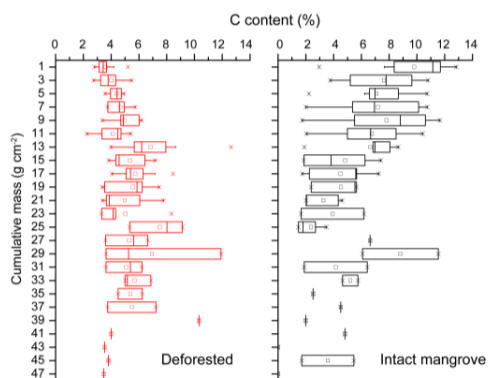


Figure 1. Carbon content (%) depth profiles observed in intact and deforested mangrove soils.