



Carbon Losses due to Tropical Forest Fragmentation: A Forgotten Process in the Global Carbon Cycle?

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Tropical forests play an important role in the global carbon cycle. Thereby, deforestation is not only responsible for direct carbon emissions but also alters the forest structure and extends the forest edge area in which trees suffer increased mortality due to altered microclimatic conditions. Our aim is to quantify the global amount of anthropogenically created forest edge area and the resulting additional CO₂-emissions by combining remote sensing data with previous empirical and modelling results. We found that 1,106 million ha and thereby 10% of the global tropical forested area lies within the forest edge area and that 84% of this area is anthropogenically created. From this area, a total amount of 8 Gt C is emitted due to tropical forest fragmentation, which accounts for an annual loss of 0.25 Gt C equalling 17% of the annual carbon losses due to deforestation. Fragmentation in the tropics hence augments carbon loss from deforestation substantially and should be taken into account both when analysing the role of vegetation in the global carbon balance and when adopting new management strategies in tropical forests.