

Driving Forces of Net Carbon Emissions in a Tropical Dry Forest, Oaxaca, México

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Abstract : The Tropical Dry Forest not only is one of the most important tropical ecosystems in terms of area, but also it is one of the most degraded ecosystems. However, little is known about the degradation impacts on carbon stocks, therefore in carbon emissions. There are different studies which explain its deforestation dynamics, but there is still a lack of understanding of how they correlate to carbon losses. Recently different authors have built current biomass maps for the tropics and Mexico. However, it is not clear how well they predict at the local scale, and how they can be used to estimate carbon emissions. This study quantifies the forest net carbon losses by comparing the potential carbon stocks and the different current biomass maps in the Southern Pacific coast in Oaxaca, Mexico. The results show important differences in the current biomass estimates with not a clear agreement. However, by the aggregation of the information, it is possible to infer the general patterns of biomass distribution and it can identify the driving forces of the carbon emissions. This study estimated that currently ~44% of the potential carbon stock estimated for the region is still present. A total of 6,764 GgC has been emitted due to deforestation and degradation of the forest at a rate of above ground biomass loss of 66.4 Mg ha⁻¹. Which, ~62% of the total carbon emissions can be regarded as being due to forest degradation. Most of carbon losses were identified in places suitable for agriculture, close to rural areas and to roads while the lowest losses were accounted in places with high water stress and within the boundaries of the National Protected Area. Moreover, places not suitable for agriculture, but close to the coast showed carbon losses as a result of urban settlements.

Keywords : above ground biomass, deforestation, degradation, driving forces, tropical deciduous forest

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