

Application of a Monte Carlo Framework with Bootstrapping for Quantification of Uncertainty in Baseline Map of Carbon Emissions from Deforestation in Tropical Regions

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Abstract

This presentation will provide an overview of an approach for quantifying uncertainty in spatial estimates of carbon emission from land use change. We generate uncertainty bounds around our final emissions estimate using a randomized, Monte Carlo (MC)-style sampling technique. This approach allows us to combine uncertainty from different sources without making assumptions about the distribution of the underlying data. We incorporate uncertainty from the following components: Estimates of forest loss; Estimates of aboveground biomass; and Estimates of belowground biomass. In each scenario of the MC simulation, forested pixels (1-km) within each 18.5-km block (the scale of MODIS-derived deforestation data) are selected randomly until the total cleared area estimated within the block is reached. Carbon stock information for the cleared pixels is then used to calculate an emissions estimate associated with forest loss for that scenario. Iterating through scenarios for each block results in a distribution of emissions associated with the estimated level of forest loss. This distribution is then used to define uncertainty based on a set confidence level.

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