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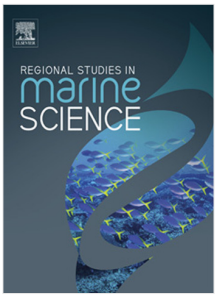


Carbon stocks in aboveground biomass for Colombian mangroves with associated uncertainties

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# Carbon stocks in aboveground biomass for Colombian mangroves with associated uncertainties

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**Abstract**

Decision-making process, as well as the implementation of future climate change mitigation strategies for mangrove ecosystems, need the availability of reliable base information and tools to estimate the carbon stocks at regional and national levels. We estimated carbon (C) stocks in aboveground biomass (AGB) for mangroves in the Caribbean and Pacific coasts of Colombia. Using available data on AGB density and mangrove area for the whole country (excluding islands) and each coast independently, we estimated a national carbon stock in AGB for Colombian mangroves as 14.95 ± 2.72 TgC (mean ± SE), with 2.20 ± 0.86 TgC in the Caribbean coast and 9.61 ± 2.78 TgC in the Pacific coast. Uncertainty for total carbon in AGB in Colombian mangroves, reported as SE/mean in percentage, was 18% at the national level, 39% in the Caribbean coast, and 29% in the Pacific coast. This uncertainty was more influenced by uncertainties associated with the estimation of mangrove area for the Caribbean coast, while for the Pacific coast it was more influenced by the uncertainties associated with AGB density. This difference is the result of a contrasting availability of AGB density data for both coasts. Comparison between observed AGB density data and predictions from large-scale models showed that these models underestimate AGB density for Colombian mangroves. We reparameterized these models with our data, but found poor goodness-of-fit statistics for these model structures. We propose therefore three new statistical models to predict AGB density in Colombian mangroves based on climatic and vegetation data. In all cases, the best models included the enhanced vegetation index (EVI) and the mean temperature of driest quarter (BIO9).

*Keywords:* Blue carbon, uncertainty analysis, aboveground biomass, EVI, national carbon inventory



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