Modeling mangrove aboveground biomass using LiDAR derived metrics

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# Introduction

Mangroves are tropical forests that occur under brac

Mangroves’ and Tropical Swamp Forests’

# Methods

## Data

The model with the lowest average RMSE obtained from the cross validation procedure was regarded as the best model and selected to be fitted using all the training data and evaluated using the test set.

## Algorithms

Three types of algorithms were used to train the models: a linear regression and two machine learning algorithms, random forest and XGBoost.

All models were fitted in two different stages: 1) cross-validation models (CV-models) to identify the best combination of predictive variables with the cross validation dataset and 2) final models (F-models) trained with the complete

### Linear model

Linear models is a simple model that considers only linear relations between predictive and response variables that has been used to model AGB using remote sensing metrics.

# Results

## Field data

The AGB data of the Mangrove and TSF plots showed a mea

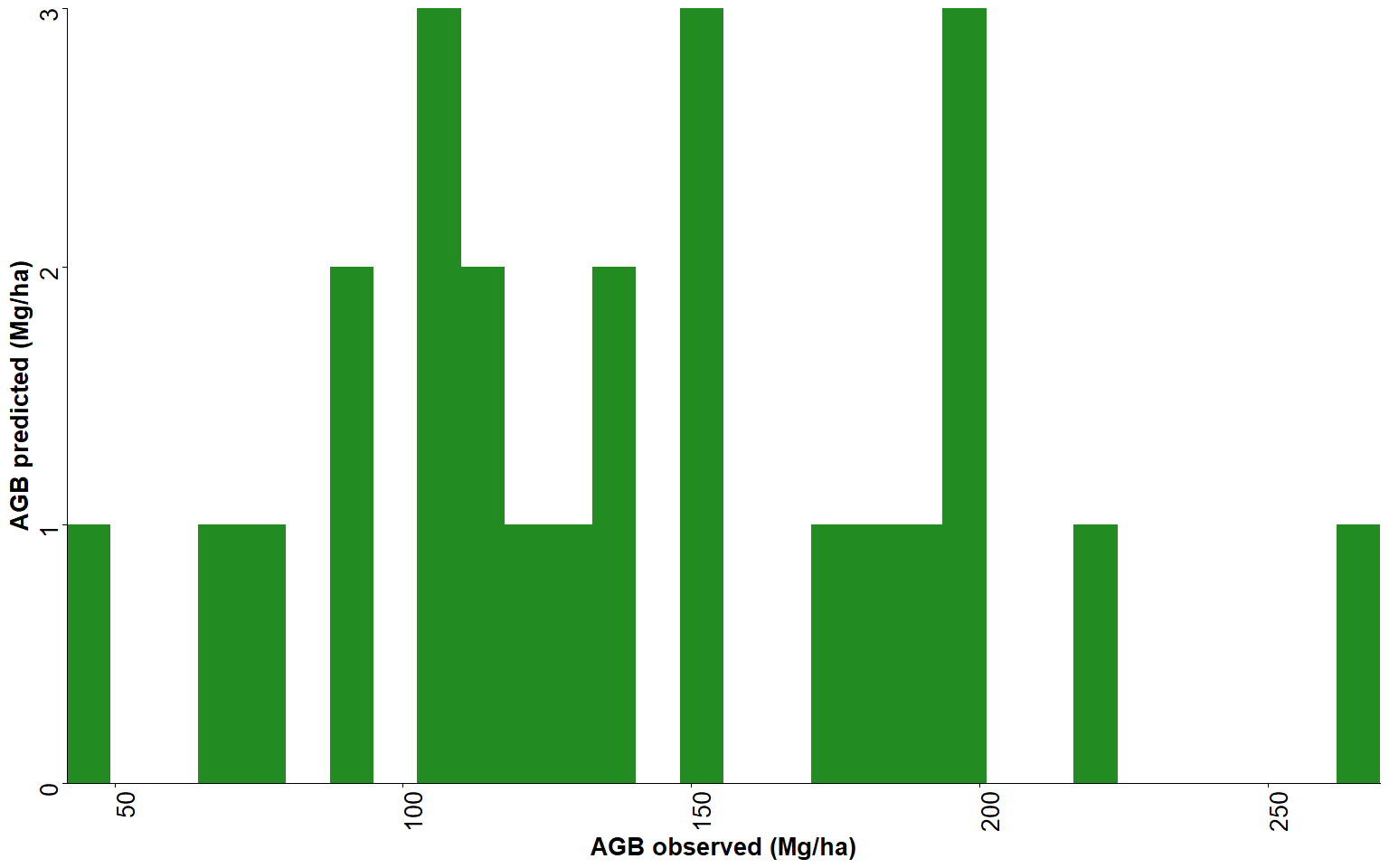


Figure 1. Histogram of the AGB values in the sampling plots.

## Model

The model that achieved the lowest error on th

Table 1. Models that achieved the lowest RMSE on the test data for Random forest, XGBoos and Linear

| Model | Var 1 | Var 2 | Var 3 | RMSE train | RMSE test | *R2* train | *R2* test |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Random forest | zq35 | zmean | p4th | 14.50 | 21.43 | 0.93 | 0.69 |
| XGBoost | zq55 | p4th | zq95 | 5.88 | 36.71 | 0.99 | 0.09 |
| Linear | zmean | p5th | p2th | 19.74 | 33.21 | 0.86 | 0.26 |

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