

# Non-parametric predictions of tropical forest attribute for multi-source forest inventory

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## Oral presentation

### **Abstract**

This study evaluated the performance of airborne laser scanning (ALS) and RapidEye data to estimate stem volume and above-ground biomass in the southern part of Nepal. Sparse Bayesian, k-Nearest Neighbor, Random Forest, Euclidean distance and Mahalanobis distance were tested using independent validation dataset and the performance was evaluated by assessing bias and the root mean square error (RMSE). We also tested the effect of reduced number of training plots on the prediction accuracy. The sparse Bayesian method provided the best accuracy for both stem volume and above-ground biomass (RMSE 31% for both) using the ALS data. The ALS model showed better performance than RapidEye for stem volume (RMSE 44 vs. 78 m<sup>3</sup>/ha, respectively) and above-ground biomass (RMSE 56 vs. 93 tons/ha, respectively). The hybrid models of ALS and RapidEye were improved prediction for stem volume and above-ground biomass when using the above mentioned non-parametric methods. Lastly, the testing of reduced number of training plots was successful.

**Keywords:** Remote sensing, Biomass, Non-parametric method, Forest inventory.