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# Estimating above-ground biomass in young forests with airborne laser scanning

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## **Abstract**

Total above-ground biomass of spruce, pine and birch was estimated in three different field datasets collected in young forests in south-east Norway. The mean heights ranged from 1.77 to 9.66 m. These field data were regressed against metrics derived from canopy height distributions generated from airborne laser scanner (ALS) data with a point density of  $0.9-1.2 \text{ m}^{-2}$ . The field data consisted of 79 plots with size 200-232.9 ge size of 3742 m<sup>2</sup> Total abo ground biomass ranged  $m^2$  and  $2^n$ 

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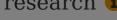
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significant influence on the models. For given values of the ALS-derived metrics related to canopy height and canopy density, spruce tended to have higher above-ground biomass values than pine and deciduous species. There were no clear effects of model form and canopy threshold on the accuracy of predictions produced by cross validation of the various models, but there is a risk of heteroskedasticity with linear models. Cross validation revealed an accuracy of the root mean square error (RMSE) ranging from  $3.85 \text{ to } 13.9 \text{ Mg ha}^{-1}$ , corresponding to 22.6% to 48.1% of mean field-measured biomass. It was concluded that airborne laser scanning has a potential for predicting biomass in young forest stands (> 0.5 ha) with an accuracy of 20-30% of mean ground value.

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