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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 dat… …ights ranged f… …s derived from car… …S) data with a point d… … 200–232.9 m^2 and … …mass ranged from 2… …) canopy thres… …and ALS-derived … …ear models, models … …riables, and models … …by threshol… …imit betwee… …explained

variability of the estimated models ranged from 60% to 83%. Tree species had a 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 to 13.9 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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