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Estimation of above ground forest biomass from airborne discrete return laser scanner data using canopy-based quantile estimators

Kevin S. Lim & Paul M. Treitz

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Abstract

A conceptual model describing why laser height metrics derived from airborne discrete return laser scanner data are highly correlated with above ground biomass is proposed. Following from this conceptual model, the concept of canopy-based quantile estimators of above ground forest biomass is introduced and applied to an uneven-aged, mature to overmature, tolerant hardwood forest. Results from using the 0th, 25th, 50th, 75th and 100th percentiles of the distributions of laser canopy heights to estimate above ground biomass are reported. A comparison of the five models for each dependent variable group did not reveal any overt differences between models with respect to their predictive capabilities. The coefficient of determination (r^2) for each model is greater than 0.80 and any two models may differ at most by up to 9%. Differences in root-mean-square error (RMSE) between models for above ground total, stem wood, stem

bark, live branch and foliage biomass were 8.1, 5.1, 2.9, 2.1 and 1.1 Mg ha^{-1}, respectively.

Keywords:

Above ground forest biomass | airborne laser scanning | forest structure | laser altimetry | LIDAR | quantile estimators | remote sensing

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Notes

Lim, K. S. and Treitz, P. M. (Department of Geography, Faculty of Arts and Science, Queen's University, Kingston, Ontario, Canada, K7L 3N6). Estimation of above ground forest biomass from airborne discrete return laser scanner data using canopy-based quantile estimators.

Additional information

Notes on contributors

Kevin S. Lim
Lim, K. S. and Treitz, P. M. (Department of Geography, Faculty of Arts and Science, Queen's University, Kingston, Ontario, Canada, K7L 3N6).
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