

Quantifying branch architecture of tropical trees using terrestrial LiDAR and 3D modelling

Alvaro Lau^{1,2,*}, Lisa Patrick Bentley³, Christopher Martius², Alexander Shenkin⁴, Harm Bartholomeus¹, Pasi Raunonen⁵, Yadvinder Malhi⁴, Tobias Jackson⁴, and Martin Herold¹

¹Wageningen University & Research, Laboratory of Geo-Information Science and Remote Sensing, Droevendaalsesteeg 3, 6708 PB Wageningen, the Netherlands.

*corresponding author: alvaro.lausarmiento@wur.nl

²Center for International Forestry Research (CIFOR). Situ Gede, Sindang Barang, Bogor 16680, Indonesia.

³Department of Biology, Sonoma State University, 1801 East Cotati Avenue, Rohnert Park, CA 94928, USA.

⁴Environmental Change Institute, School of Geography and the Environment, South Parks Road, University of Oxford OX1 3QY, UK

⁵Laboratory of Mathematics, Tampere University of Technology Korkeakoulunkatu 10, 33720 Tampere, Finland

Online Resource 4: Measured branches

Table OR4.1: Average absolute error and average relative error for QSM branches by diameter classes. Our analysis was based on the QSM branches which paired a manually measured branch. Negative values indicated a model underestimation while positive values indicate a model overestimation compared to the manually measured branches.

Diameter class (cm)	Length of branches (m)		Diameter of branches (cm)	
	Average $\pm$ SD		Average $\pm$ SD	
	Modelled	Measured	Modelled	Measured
10–20	2.09 $\pm$ 1.23	3.12 $\pm$ 2.13	19.25 $\pm$ 5.17	14.10 $\pm$ 2.50
20–30	1.94 $\pm$ 0.77	2.62 $\pm$ 1.59	23.97 $\pm$ 5.12	24.62 $\pm$ 2.92
30–40	2.18 $\pm$ 0.83	2.59 $\pm$ 2.32	29.41 $\pm$ 5.14	34.75 $\pm$ 2.47
40–50	2.57 $\pm$ 0.72	2.78 $\pm$ 1.68	39.94 $\pm$ 7.05	44.16 $\pm$ 3.07
50–60	10.53 $\pm$ 7.80	10.63 $\pm$ 7.60	49.44 $\pm$ 9.15	53.05 $\pm$ 2.56
50–60	11.56 $\pm$ 7.78	11.22 $\pm$ 7.54	56.88 $\pm$ 7.03	62.21 $\pm$ 1.95
≥ 70	21.62 $\pm$ 4.65	21.23 $\pm$ 4.46	73.86 $\pm$ 0.82	75.40 $\pm$ 1.04