Supplement of Biogeosciences, 13, 1553–1570, 2016
http://www.biogeosciences.net/13/1553/2016/
doi:10.5194/bg-13-1553-2016-supplement

Biogeosciences Open Access EGU

Supplement of

Predicting biomass of hyperdiverse and structurally complex central Amazonian forests – a virtual approach using extensive field data

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Supplement

Tables

Table S1. Summary of the dataset (727 trees from 101 genera and at least 135 tree species) included in this study.

No.	Family	Species	Common name	NT	DBH range	*H* range	WD	WD level	SG	AGB range
1	Anacardiaceae	*Astronium lecointei* Ducke	muiracatiara	1	8.5	11.3	0.752	spp	lat	39.3
2	Anacardiaceae	*Thyrsodium guianense* Sagot ex Marchand	breu de leite	9	5.6-17.7	4.2-19.5	0.630	spp	mid	8.0-245.1
3	Annonaceae	*Annona neoinsignis* H.Rainer	envira bobó	10	5.4-24.3	6.9-19.8	0.430	spp	pio	5.4-288.2
4	Annonaceae	*Bocageopsis multiflora* (Mart.) R.E. Fr.	envira surucucu	2	6.0-21.4	9.0-28.5	0.643	spp	mid	22.2-712.2
5	Annonaceae	*Duguetia* spp.	envira vermelha	4	6.5-13.9	12-17.5	0.787	gen	lat	23.5-165.1
6	Annonaceae	*Duguetia surinamensis* R.E. Fr.	envira amarela	2	5.2-5.5	6.0-7.3	0.800	spp	lat	15.2-15.8
7	Annonaceae	*Guatteria olivacea* R.E. Fr.	envira fofa, envira preta lisa	13	6.8-34.2	11-25.6	0.510	spp	pio	26.6-1690.2
8	Annonaceae	*Guatteria* spp.	envira branca	3	5.9-16.6	10.8-17.8	0.556	gen	pio	14.4-206.6
9	Annonaceae	ni	envira	1	12.4	18.5	0.630	fam	mid	102.9
10	Annonaceae	*Unonopsis stipitata* Diels	envira preta cascuda	2	5.5-6.5	8.0-10.8	0.686	spp	mid	12.7-33.9
11	Annonaceae	*Xylopia benthamii* R.E. Fr.	envira taripucu, embiriba	10	6.6-17.8	5.9-19.2	0.600	spp	mid	20.7-210.2
12	Annonaceae	*Xylopia* spp.	envira pimenta	4	7.7-12.0	9.8-16.0	0.626	gen	mid	31.1-137.5
13	Apocynaceae	*Aspidosperma desmanthum* Benth. ex Müll. Arg.	pequiá marfim	1	85.0	33.0	0.610	spp	lat	7509.1
14	Apocynaceae	*Couma guianensis* Aubl.	sorvinha	1	7.0	8.9	0.560	spp	lat	27.0
15	Apocynaceae	*Couma utilis* (Mart.) Müll. Arg.	sorva	1	8.5	14.5	0.660	spp	lat	35.0
16	Apocynaceae	*Geissospermum argenteum* Woodson	acariquara branca	3	5.2-9.8	7.6-13.0	0.760	gen	lat	15.6-66.3
17	Araliaceae	*Schefflera morototoni* (Aubl.) Maguire, Steyerm. & Frodin	morototó	12	5.8-33.1	9.0-27.0	0.437	spp	pio	9.0-909.3
18	Bignoniaceae	*Jacaranda copaia* (Aubl.) D. Don	jacaranda, pará pará	1	13.5	17.8	0.348	spp	pio	69.8
19	Boraginaceae	*Cordia* cf. *naidophylla*	freijó	2	5.6-6.4	8.6-10.3	0.520	gen	mid	14.2-28.4
20	Burseraceae	*Protium decandrum* (Aubl.) Marchand	breu branco	5	5.8-9.3	9.9-15.4	0.560	spp	mid	15.3-58.5
21	Burseraceae	*Protium hebetatum* D.C. Daly	breu vermelho	11	5.2-30.0	4.2-25.0	0.579	gen	mid	7.7-1258.9
22	Burseraceae	*Protium* sp.	breu	1	10.7	15.0	0.579	gen	mid	74.7
23	Burseraceae	*Protium trifoliolatum* Engl.	breu peludo	1	6.5	12.0	0.640	spp	mid	20.8
24	Burseraceae	*Tetragastris panamensis* (Engl.) Kuntze	breu manga	13	5.0-17.5	3.9-19.0	0.742	spp	mid	7.9-159.1
25	Caryocaraceae	*Caryocar pallidum* A.C. Sm.	piquiarana	2	5.9-8.1	8.8-12.6	0.680	spp	lat	21.4-75.8
26	Chrysobalanaceae	*Acioa longipendula* (Pilg.) Sothers & Prance	castanha de galinha	1	48.3	29.2	0.940	spp	lat	3994.5
27	Chrysobalanaceae	*Licania coriacea* Benth.	marí bravo	4	5.8-10.5	10.5-12.3	0.880	spp	lat	19.9-113.7
28	Chrysobalanaceae	*Licania heteromorpha* Benth.	macucú fofo	1	7.0	14.3	0.740	spp	lat	38.8
29	Chrysobalanaceae	*Licania oblongifolia* Standl.	macucú chiador	2	5.0-13.5	8.5-17.6	0.878	spp	lat	19.1-178.6

30	Chrysobalanaceae	*Licania* spp.	macucú	5	5.2-9.9	7.5-17.8	0.822	gen	lat	16.7-121.3
31	Clusiaceae	*Tovomita* spp.	sapateiro	2	8.7-37.0	17.2-28.4	0.799	gen	mid	69.0-1624.7
32	Combretaceae	*Buchenavia* sp.	tanimbuca	1	33.8	17.9	0.719	gen	lat	1801.4
33	Connaraceae	*Connarus perrottetii* (DC.) Planch.	sacaca brava	28	5.2-8.9	6.2-12.3	0.450	gen	pio	15.0-69.0
34	Dichapetalaceae	*Tapura amazonica* Poepp.	tapura	2	20-21.2	18.9-21.2	0.711	gen	mid	355.8-599.8
35	Elaeocarpaceae	*Sloanea* sp.	urucurana	1	5.8	7.6	0.827	gen	lat	21.2
36	Euphorbiaceae	*Alchorneopsis* sp.	supiarana	1	19.5	23.0	0.390	gen	pio	336.5
37	Euphorbiaceae	*Croton draconoides* Müll. Arg.	sacaca	6	5.1-7.9	5.7-12.0	0.626	gen	pio	9.0-20.5
38	Euphorbiaceae	*Croton matourensis* Aubl.	dima	69	5.4-28.7	8.7-26.5	0.620	spp	pio	12.9-1066.6
39	Euphorbiaceae	*Hevea guianensis* Aubl.	seringa vermelha	1	8.0	11.6	0.575	spp	lat	39.1
40	Euphorbiaceae	*Mabea angularis* Hollander	taquari branco	4	7.0-11.8	10.0-16.2	0.634	gen	mid	20.6-105.0
41	Euphorbiaceae	*Mabea piriri* Aubl.	taquari vermelho	21	5.3-16.5	6.4-24.2	0.617	spp	mid	13.5-321.5
42	Euphorbiaceae	*Mabea* spp.	taquari	5	6.2-9.3	11.8-15.0	0.634	gen	mid	22.6-58.2
43	Euphorbiaceae	*Micrandra* spp.	seringarana	12	5.1-35.0	7.4-27.5	0.848	gen	lat	15.9-1677.5
44	Euphorbiaceae	*Micrandropsis scleroxylon* (W.A. Rodrigues) W.A. Rodrigues	piãozinho	11	5.7-32.4	7.2-25.0	0.880	spp	lat	22.9-1235.5
45	Euphorbiaceae	*Pogonophora schomburgkiana* Miers ex Benth.	amarelinho	1	5.6	10.0	0.833	spp	lat	48.2
46	Fabaceae	*Andira micrantha* Ducke	sucupira preta	2	6.0-8.1	7.5-12.3	1.000	spp	lat	19.0-45.1
47	Fabaceae	*Andira* spp.	sucupira	3	5.2-35.0	10.0-30.0	0.730	gen	lat	15.4-2012.2
48	Fabaceae	*Bocoa viridiflora* (Ducke) R.S. Cowan	muirajiboia preta	1	22.6	20.8	0.835	spp	lat	1165.0
49	Fabaceae	*Cedrelinga cateniformis* (Ducke) Ducke	cedrorana	1	55.0	34.1	0.480	spp	lat	3754.2
50	Fabaceae	*Dipteryx magnifica* Ducke	cumarurana	1	7.0	16.0	0.940	gen	lat	43.3
51	Fabaceae	*Eperua glabriflora* (Ducke) R.S. Cowan	muirapiranga	3	7.5-30.5	9.4-20.5	0.759	spp	lat	23.8-1304.4
52	Fabaceae	*Inga* cf. *pezizifera*	ingá vermelha	14	5.5-31.3	7.0-23.0	0.650	spp	pio	14.0-1562.8
53	Fabaceae	*Inga* spp.	ingá branca	11	5.3-24.9	5.9-22.5	0.614	gen	mid	8.3-485.8
54	Fabaceae	*Inga thibaudiana* DC.	ingá peluda	5	9.231.9	15-22.7	0.657	spp	mid	62.2-1509.0
55	Fabaceae	*Macrolobium* spp.	ingarana	3	10.3-19.5	14.3-17.0	0.606	gen	mid	78.3-374.9
56	Fabaceae	*Ormosia* spp.	tento	5	8.0-37.5	12.7-25.4	0.676	gen	mid	30.5-1606.9
57	Fabaceae	*Parkia* sp.	fava parkia	2	6.5-9.5	9.0-12.5	0.532	gen	lat	10.6-85.0
58	Fabaceae	*Pterocarpus rohrii* Vahl	mututí	2	29.8-35.5	27.3-34.5	0.550	spp	mid	1240.0-1740.6
59	Fabaceae	*Stryphnodendron guianense* (Aubl.) Benth.	fava camuzé	14	5.5-32.9	9.5-27.0	0.650	spp	mid	7.5-1120.5
60	Fabaceae	*Swartzia ingifolia* Ducke	acapú amarelo, ingá ferro	1	40.4	21.6	0.815	spp	lat	1345.3
61	Fabaceae	*Swartzia* cf. *recurva*	muirajiboia amarela	2	7.7-12.0	11.7-17.2	0.883	gen	lat	39.7-155.5
62	Fabaceae	*Tachigali setifera* (Ducke) Zarucchi & Herend.	tachi preto	1	7.0	17.2	0.670	spp	pio	36.5
63	Fabaceae	*Zygia racemosa* (Ducke) Barneby & J.W. Grimes	angelim pedra	3	6.2-10.7	9.0-15.5	0.748	spp	lat	23.9-82.9
64	Fabaceae	*Zygia ramiflora* (F. Muell.) Kosterm.	ingá copaiba	2	7.2	8.4-11.3	0.727	gen	mid	16.8-33.0
65	Goupiaceae	*Goupia glabra* Aubl.	cupiúba	17	5.1-14.2	7.7-17.0	0.730	spp	mid	12.9-216.4
66	Humiriaceae	*Endopleura* spp.	uchí amarelo	1	9.0	16.8	0.775	gen	lat	72.0
67	Humiriaceae	ni.2	uchí preto	1	14.0	18.5	0.819	fam	lat	281.2

68	Humiriaceae	*Sacoglottis ceratocarpa* Ducke	uchí coco	1	9.5	12.5	0.807	gen	lat	109.9
69	Humiriaceae	*Vantanea* sp.	uchirana	1	19.0	17.6	0.857	gen	lat	324.8
70	Hypericaceae	*Vismia guianensis* (Aubl.) Pers.	lacre branco	15	6.1-23.8	8.6-23.5	0.475	spp	pio	12.0-508.1
71	Lauraceae	*Aniba ferrea* Kubitzki	louro chumbo	1	29.8	26.6	0.709	gen	lat	1484.5
72	Lauraceae	ni.3	louro amarelo	1	9.2	14.5	0.656	fam	mid	58.1
73	Lauraceae	ni.4	louro fofo	1	5.2	7.8	0.656	fam	mid	21.6
74	Lauraceae	*Ocotea* spp.	louro preto	4	7.0-36.2	10.0-27.0	0.598	gen	lat	25.2-2162.6
75	Lauraceae	*Rhodostemonodaphne* spp.	louro peludo	1	6.5	12.2	0.395	gen	mid	35.6
76	Lecythidaceae	*Cariniana integrifolia* Ducke	tauarí	6	5.0-7.5	6.4-10.0	0.490	spp	lat	12.2-29.1
77	Lecythidaceae	*Couratari* sp.	tauarí vermelho	1	5.2	10.5	0.549	gen	lat	19.9
78	Lecythidaceae	*Eschweilera atropetiolata* S.A. Mori	castanha vermelha	1	20.4	25.5	0.753	spp	lat	715.2
79	Lecythidaceae	*Eschweilera collina* Eyma	ripeiro branco	2	7.7-15.7	11.2-17.7	0.778	spp	lat	20.5-178.0
80	Lecythidaceae	*Eschweilera* spp.	matamata	8	5.1-34.3	8.6-28.0	0.810	gen	lat	19.6-2588.0
81	Lecythidaceae	*Gustavia* cf. *elliptica*	mucurão	3	7.0-10.2	8.2-13.1	0.648	gen	mid	22.3-93.9
82	Lecythidaceae	*Lecythis barnebyi* S.A. Mori	castanha jarana	2	7.0-31.0	8.3-24.7	0.821	gen	lat	22.9-1785.8
83	Lecythidaceae	*Lecythis gracieana* S.A. Mori	castanha jarana folha miúda	1	16.5	18.0	0.830	spp	lat	348.6
84	Lecythidaceae	*Lecythis* sp.	ripeiro vermelho	1	42.4	27.6	0.821	gen	lat	3999.8
85	Lecythidaceae	ni.5		1	5.5	9.5	0.713	fam	lat	18.0
86	Malpighiaceae	*Byrsonima duckeana* W.R. Anderson	murici vermelho	23	5.6-25.7	9.0-22.1	0.671	gen	pio	21.9-1036.6
87	Malvaceae	*Scleronema micranthum* (Ducke) Ducke	cardeiro	2	11.5-38.4	13.2-27.6	0.595	spp	mid	75.2-2298.9
88	Malvaceae	*Theobroma sylvestre* Aubl. ex Mart.	cacauí	1	5.3	10.4	0.470	spp	mid	20.4
89	Melastomataceae	*Bellucia dichotoma* Cogn.	goiaba de anta	7	6.3-24.5	9.0-21.8	0.607	gen	pio	30.5-775.6
90	Melastomataceae	*Miconia argyrophylla* DC.	buxuxu canela de velho	3	5.1-26.0	8.2-22.0	0.637	gen	pio	14.1-426.0
91	Melastomataceae	*Miconia minutiflora* (Bonpl.) DC.	tinteira, tintarana	4	6.0-13.3	6.3-18.2	0.637	gen	mid	32.5-219.2
92	Melastomataceae	*Miconia* spp.	buxuxu	24	5.3-13.7	7.8-15.6	0.637	gen	pio	13.9-198.4
93	Melastomataceae	*Mouriri* sp.	mamãozinho	1	63.2	32.0	0.740	gen	mid	6655.1
94	Meliaceae	*Guarea* spp.	gitó vermelho	8	5.2-7.3	7.2-11.4	0.652	gen	lat	12.9-30.7
95	Meliaceae	*Trichilia* sp.	gitó branco	1	5.5	10.7	0.740	gen	lat	17.2
96	Moraceae	*Brosimum rubescens* Taub.	pau rainha	1	10.5	14.8	0.878	spp	lat	101.9
97	Moraceae	*Brosimum* spp.	muiratinga	4	6.1-8.5	8.1-11.0	0.666	gen	mid	14.2-57.2
98	Moraceae	*Helianthostylis sprucei* Baill.	falsa rainha	1	9.8	10.4	0.628	spp	mid	63.1
99	Moraceae	*Pseudolmedia* sp.	muiratinga	1	13.7	19.0	0.630	gen	mid	182.9
100	Moraceae	*Sorocea guilleminiana* Gaudich.	jaca brava	2	5.3-5.7	8.0	0.612	gen	mid	11.8-12.2
101	Myristicaceae	*Iryanthera juruensis* Warb.	ucuúba punã	3	10.1-22.0	12.85-22.0	0.663	spp	mid	65.1-544.5
102	Myristicaceae	*Iryanthera lancifolia* Ducke	ucuúba vermelha	1	8.5	10.9	0.634	gen	mid	38.1
103	Myristicaceae	*Iryanthera* sp.	ucuúba	1	32.0	25.0	0.634	gen	mid	1036.6
104	Myristicaceae	*Virola michelii* Heckel	ucuúba preta	1	8.7	13.0	0.529	spp	mid	58.8
105	Myrtaceae	*Eugenia* spp.	araçá	3	5.9-6.8	8.4-9.8	0.742	gen	mid	21.3-24.7

106	Myrtaceae	ni.6	araçá bravo	3	8.0-14.1	14.1-17.0	0.788	fam	mid	64.8-230.7
107	Nyctaginaceae	*Neea* spp.	joão mole	5	5.9-9.3	6.8-9.0	0.631	gen	mid	17.3-38.4
108	Ochnaceae	*Ouratea* cf. *dischophora*	uchí de morcego	2	5.3-11.1	12.3-14.8	0.743	gen	mid	35.0-123.0
109	Olacaceae	ni.7		1	27.0	24.0	0.692	fam	lat	926.3
110	Peraceae	*Pera schomburgkiana* (Klotzsch) Müll. Arg.	pera	1	6.2	11.0	0.590	spp	mid	30.4
111	*Rubiaceae*	*Amaioua guianensis Aubl.*	muiraximbé	1	6.0	8.3	0.670	spp	mid	19.8
112	Rubiaceae	*Faramea* spp.	taboquinha	3	6.0-15.0	7.7-17.9	0.618	gen	mid	23.9-134.7
113	Rubiaceae	*Psychotria* spp.	taboca mata gado	2	6.2-6.9	8.5-10.6	0.564	gen	mid	29.5-39.0
114	Rutaceae	*Zanthoxylum* sp.	limãozinho	1	6.1	7.0	0.602	gen	mid	13.5
115	Salicaceae	*Casearia arborea* (Rich.) Urb.	piabinha	4	5.5-9.5	9.4-15.0	0.535	spp	pio	37.9-93.0
116	Salicaceae	*Laetia procera* (Poepp.) Eichler	periquiteira	86	5.2-15.8	4.9-20.3	0.664	spp	pio	7.8-244.7
117	Sapindaceae	*Toulicia guianensis* Aubl.	pitomba da mata	3	7.8-9.7	13.0-14.7	0.756	spp	mid	33.5-80.0
118	Sapotaceae	*Chrysophyllum* cf. *prieurii*	abiurana sabiá, abiurana roxa	1	38.6	28.8	0.715	gen	lat	2890.4
119	Sapotaceae	*Micropholis guyanensis* subsp. *guyanensis* (Baehni) T.D. Penn.	maparajuba, balata brava	1	19.4	23.3	0.663	spp	lat	445.7
120	Sapotaceae	*Micropholis* sp.	balata rosada, chiclete bravo	1	31.0	27.0	0.676	spp	lat	1535.2
121	Sapotaceae	*Pouteria anomala* (Pires) T.D. Penn.	abiurana olho de veado	1	45.0	32.7	0.765	spp	lat	3729.8
122	Sapotaceae	*Pouteria manaosensis* (Aubrév. & Pellegr.) T.D. Penn.	abiurana roxa	1	6.2	8.3	0.640	spp	lat	21.7
123	Sapotaceae	*Pouteria oblanceolata* Pires	cucutiriba folha peluda	2	8.8-13.7	11.8-21.0	0.790	spp	lat	79.4-234.9
124	Sapotaceae	*Pouteria* spp.	abiurana	5	7.3-44.0	12.2-24.0	0.801	gen	lat	45.4-2934.2
125	Simaroubaceae	*Simarouba amara* Aubl.	marupá	1	27.5	21.5	0.404	spp	pio	555.6
126	Siparunaceae	*Siparuna* cf. *guianensis*	caápitiú	10	5.4-9.3	4.5-13.0	0.593	gen	mid	15.9-92.2
127	Urticaceae	*Cecropia purpurascens* C.C. Berg	imbaúba roxa	3	11.8-15.5	14.8-16.5	0.430	spp	pio	63.9-106.4
128	Urticaceae	*Cecropia sciadophylla* Mart.	imbaúba gigante	33	8.4-37.2	10.9-23.0	0.412	spp	pio	21.6-1543.6
129	Urticaceae	*Pourouma* sp.	imbaubarana	1	17.3	18.0	0.389	gen	pio	125.9
130	Urticaceae	*Pourouma tomentosa* Mart. ex Miq.	imbaubarana	4	5.7-29.7	8.5-20.0	0.395	spp	pio	8.5-797.8
131	Verbenaceae	*Aegiphila* sp.	tabaco bravo	2	18.4-20.0	12.4-20.1	0.555	gen	pio	113.3-253.2
132	Violaceae	*Leonia cymosa* Mart.	mucurão	1	11.4	11.1	0.673	gen	mid	85.0
133	Violaceae	*Rinorea racemosa* (Mart.) Kuntze	branquinha, canela de jacamim	9	5.0-10.5	8.0-18.0	0.682	spp	mid	14.6-114.8
134	Violaceae	*Rinorea* cf. *guianensis*	falsa cupiúba	5	5.3-23.4	9.4-24.0	0.709	gen	mid	18.1-751.9
135	Vochysiaceae	*Erisma bracteosum* Ducke	quaruba	3	5.4-7.1	7.0-8.9	0.533	gen	lat	15.2-27.0

Species' attributes: botanic family (Family) and species' name (Species) accordingly to the APGIII system (Stevens, 2012); species' common name in Central Amazon (Common name); number of trees (NT); diameter at breast height (DBH) (cm); tree total height (*H*) (m); wood density (WD) (g cm^{-3}); wood density assignment level (WD level) (value at species level [spp], value at genus level [gen] and value at family level

[fam]); species' successional group (SG) (pioneer species [pio], mid-successional species [mid] and late-successional species [lat]); and aboveground biomass (AGB) (dry mass in kg).

Table S2. Attributes used to assign tree species into successional groups.

	Architecture, morphology and anatomy						Ecology and life history		
SG	BFo	CPo	CSi	CCo	mDBH	mWD	GAs	NRe	DMo
pio	pla, ort	can, eme	med, lar	rou, ell, irr	12.4 (5.1,37.2)	0.573 (0.348,0.671)	yes	BW4, BW7, BW14, BW17, SE14, SGa	ane, zoo
mid	ort	und, can	sma, med	elo, con, irr	9.8 (5.0,35.5)	0.656 (0.395,0.833)	yes	BW17, BW24, BW27, SE23, OG, SGa	zoo, ane
lat	unb	can, eme	med, lar	rou, ell	14.0 (5.0,85.0)	0.735 (0.480,1.000)	no	BW24, BW27, OG	aut, zoo

Attributes$_{[references]}$: species' successional group (SG) (pioneer species [pio], mid-successional species [mid] and late-successional species [lat])$_{[1]}$; predominant branch form (BFo) (plagiotropic [pla], orthotropic [ort] and unbranched [unb]) $_{[2,3]}$; general vertical crown position of a mature tree (CPo) (understory/supressed crown [und], canopy/co-dominant crown [can] and emergent crown [eme]) $_{[2,3]}$; relative crown size of a mature tree (CSi)(small-sized crown [sma], mediun-sized crown [med] and larged-size crown [lar])$_{[2,3]}$; general crown contour of a mature tree (CCo) (round [rou], elliptic [ell], elongated [elo], conic [con] and irregular [irr])$_{[2,3,4]}$; mean diameter at breast height (DBH) (cm) (minimum and maximum) of the trees included in this study (mDBH)$_{[5]}$; mean wood density (g cm^{-3}) (minimum and maximum) of the tree species included in this study (mWD)$_{[5]}$; gap-associated species (GAs)$_{[3]}$; natural regeneration niche mostly observed (NRe)$_{[3]}$; major seed dispersion mode (DMo) (anemochory [ane], autochory [aut] and zoochory [zoo])$_{[6]}$. References: [1] Amaral et al., 2009; Chambers et al., 2009; Kammesheidt, 2000; Marra et al., 2014; Saldarriaga et al., 1998; Swaine and Whitmore, 1988; [2] Hallé, 1974; Hallé et al., 1978; allometric data from this study (Table S1); [3] Network of permanent plots including an old-growth (OG) forest (LMF unpublished data [census from 1996 to 2012] and Silva et al., 2002), a four year-old blowdown (BW4) (Marra et al., 2014), a seven year-old blowdown (BW7), a 14 year-old blowdown (BW14), a 17 year-old blowdown (BW17), a 24 year-old blowdown (BW24), a 27 year-old blowdown (BW27) (LMF unpublished data), a 14 year-old slash

and burn secondary forest (SE14), a 23 year-old clear cut secondary forest (SE23) (Lima et al., 2007; Silva, 2007) and small (< c. 2000 m^2) canopy gaps (SGa) (LMF unpublished data [1996-2012 census]); [4] Myers, 1982; Trichon, 2001; [5] Dataset from this study (Table 1 and Table S1); [6] Camargo et al., 2008; Ferraz et al., 2004; Ribeiro et al., 1999; Saravy et al., 2003; Silva Junior and Pereira, 2009; Stefanello et al., 2009, 2010; Terborgh et al., 2008.

Table S3. Parameters (low [2.5%] and high [97.5%] confidence interval) of the 24 tree aboveground biomass estimation models fit in this study. See the Table 2 for checking the equations and variance modeling approaches, and the Table 3 for checking models' statistics.

Model series	Model	SG	b1	b2	b3	b4	c1	c2
1	M11		1.010 (0.858,1.179)	2.052 (2.012,2.093)			190.5 (180.8,200.4)	
	M12		-1.148 (-1.262,-1.031)	2.338 (2.289,2.386)			0.359 (0.341,0.378)	
	M13		0.336 (0.299,0.377)	2.339 (2.290,2.387)			0.106 (0.085,0.132)	2.374 (2.285,2.464)
2	M21	pio	0.496 (0.262,0.835)	2.191 (2.018,2.371)			148.8 (141.6,156.7)	
		mid	0.248 (0.082,0.521)	2.499 (2.243,2.795)				
		lat	4.284 (3.632,4.989)	1.714 (1.675,1.754)				
	M22	pio	-0.874 (-1.049,-0.705)	2.203 (2.133,2.274)			0.345 (0.328, 0.365)	
		mid	-1.296 (-1.544,-1.053)	2.400 (2.290, 2.512)				
		lat	-1.335 (-1.535,-1.140)	2.481 (2.402,2.562)				
	M23	pio	0.445 (0.375,0.522)	2.202 (2.135,2.271)			0.151 (0.107,0.209)	2.199 (2.061,2.335)
		mid	0.297 (0.235,0.377)	2.394 (2.289,2.487)			0.234 (0.138,0.372)	2.038 (1.820,2.264)
		lat	0.269 (0.228,0.314)	2.489 (2.422,2.554)			0.060 (0.037,0.092)	2.574 (2.401,2.756)
3	M31		1.714 (1.502,1.953)	2.036 (2.002,2.069)	1.035 (0.944,1.126)		144.3 (137.1,152.0)	
	M32		-0.869 (-0.986,-0.753)	2.375 (2.329,2.420)	0.749 (0.624,0.876)		0.329 (0.313,0.347)	

	M33		0.415 (0.373,0.460)	2.401 (2.361,2.439)	0.755 (0.631,0.881)		0.150 (0.119,0.186)	2.189 (2.097,2.282)
4	M41	pio	0.332 (0.181,0.548)	2.577 (2.398,2.767)	1.233 (0.981,1.492)		130.5 (124.1,137.6)	
		mid	0.244 (0.097,0.479)	2.484 (2.238,2.760)	-0.070 (-0.582,0.458)			
		lat	3.293 (2.797,3.832)	1.848 (1.804,1.893)	0.716 (0.591,0.841)			
	M42	pio	-0.552 (-0.724,-0.378)	2.279 (2.211,2.346)	0.875 (0.692,1.055)		0.323 (0.307,0.341)	
		mid	-1.193 (-1.465,-0.913)	2.408 (2.306,2.510)	0.284 (-0.125,0.683)			
		lat	-1.141 (-1.364,-0.919)	2.468 (2.394,2.544)	0.510 (0.185,0.829)			
	M43	pio	0.539 (0.454,0.640)	2.326 (2.251,2.397)	0.880 (0.687,1.079)		0.217 (0.151,0.300)	2.005 (1.868,2.150)
		mid	0.362 (0.268,0.490)	2.395 (2.285,2.494)	0.464 (0.054,0.956)		0.211 (0.205,0.329)	2.082 (1.874,2.304)
		lat	0.323 (0.270,0.386)	2.475 (2.409,2.538)	0.481 (0.222,0.750)		0.059 (0.037,0.090)	2.561 (2.389,2.744)
5	M51		0.078 (0.051,0.114)	1.561 (1.492,1.636)	1.347 (1.152,1.527)		164.3 (156.2,173.0)	
	M52		-2.098 (-2.290,-1.912)	1.928 (1.847,2.010)	0.735 (0.615,0.856)		0.329 (0.312,0.346)	
	M53		0.147 (0.117,0.179)	1.971 (1.884,2.057)	0.650 (0.523,0.781)		0.092 (0.073,0.116)	2.405 (2.310,2.501)
6	M61	pio	0.029 (0.007,0.076)	1.926 (1.729,2.125)	1.252 (0.860,1.632)		134.1 (127.2,141.1)	
		mid	0.144 (0.052,0.316)	2.173 (1.822,2.543)	0.508 (0.036,0.900)			
		lat	0.697 (0.454,1.041)	1.414 (1.343,1.482)	0.896 (0.709,1.077)			
	M62	pio	-1.946 (-2.238,-1.663)	1.820 (1.713,1.930)	0.751 (0.583,0.921)		0.314 (0.298,0.331)	
		mid	-2.101 (-2.405,-1.799)	1.900 (1.740,2.062)	0.762 (0.562,0.958)			
		lat	-2.223 (-2.665,-1.814)	2.099 (1.914,2.271)	0.688 (0.406,1.001)			
	M63	pio	0.170 (0.118,0.234)	1.870 (1.757,1.984)	0.664 (0.471,0.863)		0.140 (0.098,0.192)	2.202 (2.067,2.341)
		mid	0.147 (0.101,0.207)	1.970 (1.796,2.149)	0.655 (0.414,0.883)		0.193 (0.112,0.309)	2.090 (1.866,2.328)
		lat	0.120 (0.083,0.169)	2.141 (2.000,2.288)	0.626 (0.379,0.861)		0.056 (0.035,0.084)	2.563 (2.388,2.742)
7	M71		0.143 (0.099,0.192)	1.577 (1.517,1.631)	1.273 (1.136,1.435)	0.955 (0.881,1.028)	118.0 (112.1,124.2)	
	M72		-1.733 (-1.921,-1.541)	2.010 (1.934,2.085)	0.643 (0.530,0.756)	0.654 (0.537,0.769)	0.305 (0.290,0.321)	
	M73		0.186 (0.149,0.227)	2.096 (2.017,2.170)	0.706 (0.584,0.831)	0.573 (0.449,0.698)	0.143 (0.112,0.181)	2.183 (2.083,2.285)

8	M81	pio	0.062 (0.023,0.135)	2.318 (2.121,2.512)	0.802 (0.485,1.121)	1.010 (0.785,1.239)	108.4 (103.0,114.4)	
		mid	0.074 (0.019,0.175)	2.078 (1.760,2.385)	0.933 (0.409,1.516)	0.658 (0.063,1.294)		
		lat	0.243 (0.168,0.345)	1.479 (1.422,1.539)	1.224 (1.061,1.368)	0.851 (0.754,0.948)		
	M82	pio	-1.403 (-1.718,-1.397)	1.981 (1.873,2.092)	0.555 (0.385,0.731)	0.713 (0.534,0.886)	0.300 (0.284,0.317)	
		mid	-2.011 (-2.323,-1.685)	1.909 (1.757,2.065)	0.757 (0.566,0.948)	0.225 (-0.145,0.600)		
		lat	-1.982 (-2.447,-1.450)	2.133 (1.954,2.335)	0.609 (0.259,0.909)	0.362 (0.054,0.676)		
	M83	pio	0.254 (0.175,0.344)	2.082 (1.958,2.192)	0.760 (0.570,0.954)	0.479 (0.311,0.683)	0.209 (0.145,0.295)	2.005 (1.860,2.151)
		mid	0.175 (0.113,0.255)	1.971 (1.791,2.137)	0.446 (0.074,0.872)	0.661 (0.445,0.901)	0.178 (0.103,0.286)	2.124 (1.899,2.362)
		lat	0.150 (0.116,0.214)	2.173 (2.033,2.314)	0.364 (0.117,0.617)	0.558 (0.321,0.798)	0.058 (0.035,0.088)	2.538 (2.362,2.730)

Model series predictors: 1 (diameter at breast height [DBH]); 2 (DBH and species' successional group [SG]); 3 (DBH and wood density [WD]); 4 (DBH, WD and SG); 5 (DBH and tree total height [*H*]); 6 (DBH, *H* and SG); 7 (DBH, *H* and WD); and 8 (DBH, *H*, SG and WD). Species' successional group: pioneer species (pio), mid-successional species (mid) and late-successional species (lat).

Table S4. Root-mean-square error (RMSE) and bias (absolute and relative values) from tree aboveground biomass predictions made by using the Chave et al. (2014)'s pantropical estimation model. Predictions were made for all the six different successional scenarios included in this study. The Chave et al. (2014)'s pantropical estimation model has diameter at breast height (DBH), tree total height (*H*) (estimated from a DBH: *H* relationship), wood density (WD) and environmental stress as predictors.

Scenarios	RSME (Mg)	Bias (Mg)	Bias (%)
Early-succession	73.3	-73.2	-30.7
Mid-succession	81.7	-80.9	-29.2
Late-succession	115.0	-114.1	-27.9
Small-sized	99.5	-99.3	-30.7
Mid-sized	116.0	-115.4	-30.2

Large-sized	130.2	-130.2	-29.6
Mean	102.6	-102.2	-29.7

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Figures

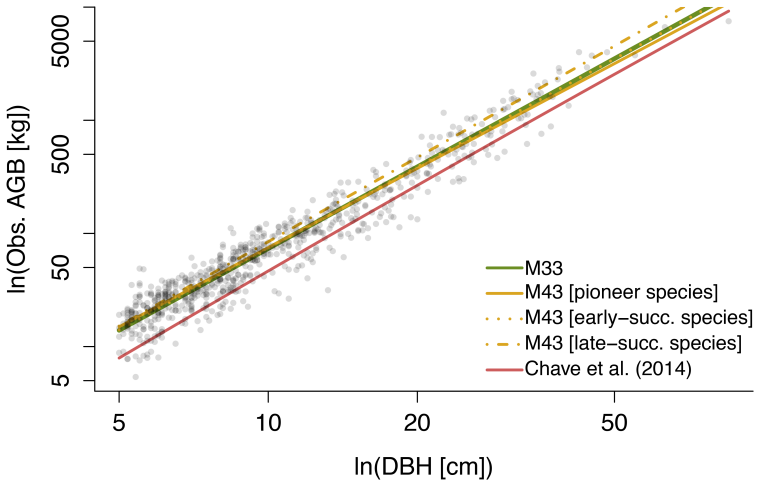

Figure S1. Fit of the two best tree aboveground estimation models parameterized in this study (M33 and M43) and that from Chave et al. (2014)'s pantropical model. Note that the pantropical model underestimates the biomass of the small-sized trees (diameter at breast height < 21 cm). This pattern was also observed at the landscape-level (Fig. S2).

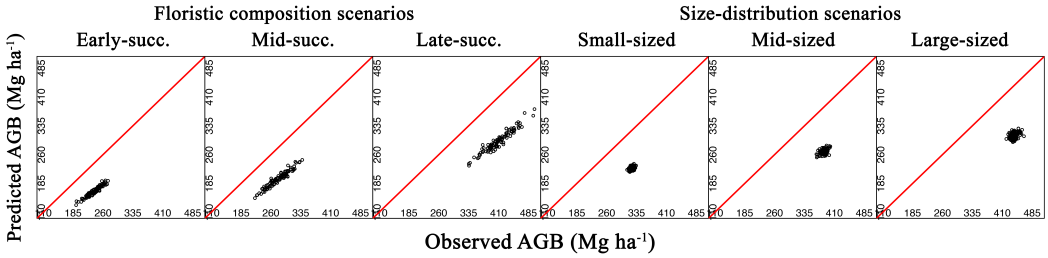

Figure S2. Predicted vs. observed aboveground biomass (AGB) along six forest-scenarios composed of 100 1-ha plots. The line of equality (1:1 line) is shown as a red/straight line. Forest scenarios were designed to reflect landscape-level variations in floristic composition and size-distribution of trees, typical of Central Amazon terra firme forests. Floristic composition and size-distribution scenarios followed the sampling scheme described in section 2.4.2 (Fig. 2) of this study. Here, the predictions were made by using the Chave et al. (2014)'s pantropical model, which has diameter at breast height (DBH), tree total height (*H*) (estimated from a DBH: *H* relationship), wood density (WD) and environmental stress as predictors.

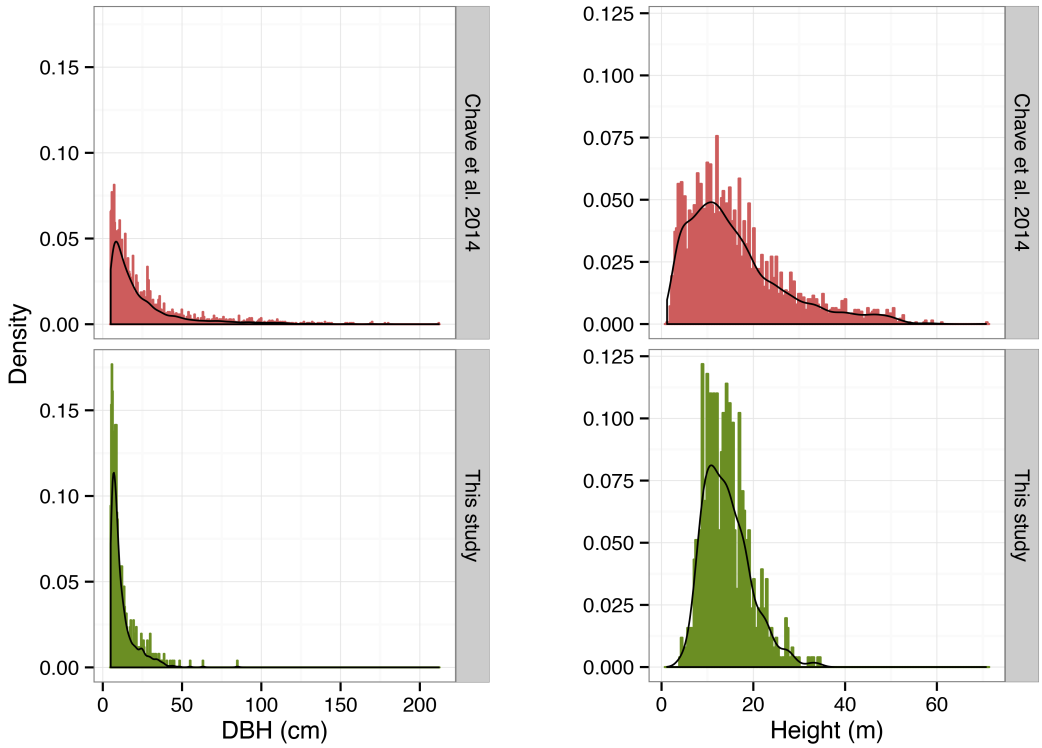

Figure S3. DBH- (diameter at breast height) and height-distribution of trees included in Chave et al. (2014)'s pantropical model (n = 4004) and those from this study (n = 727). Note the great density/probability difference for small- and large-sized trees between the two datasets.

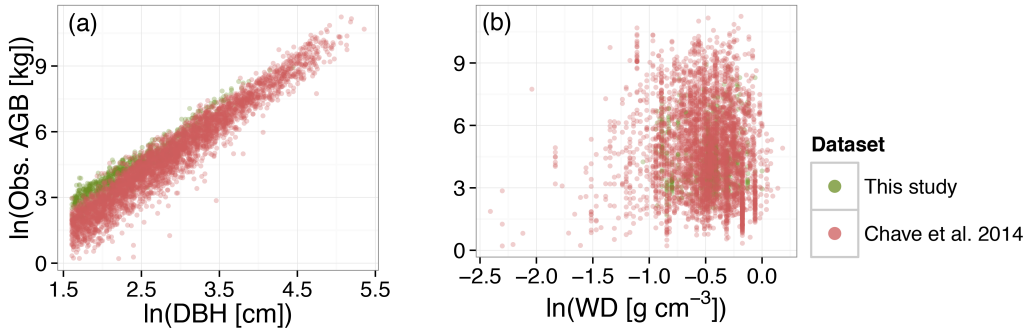

Figure S4. Relationship between predictors (diameter at breast height [DBH] and wood density [WD]) and aboveground biomass (AGB) of the trees included in this study (n = 727) and those included in Chave et al. (2014)'s pantropical model (n = 4004).

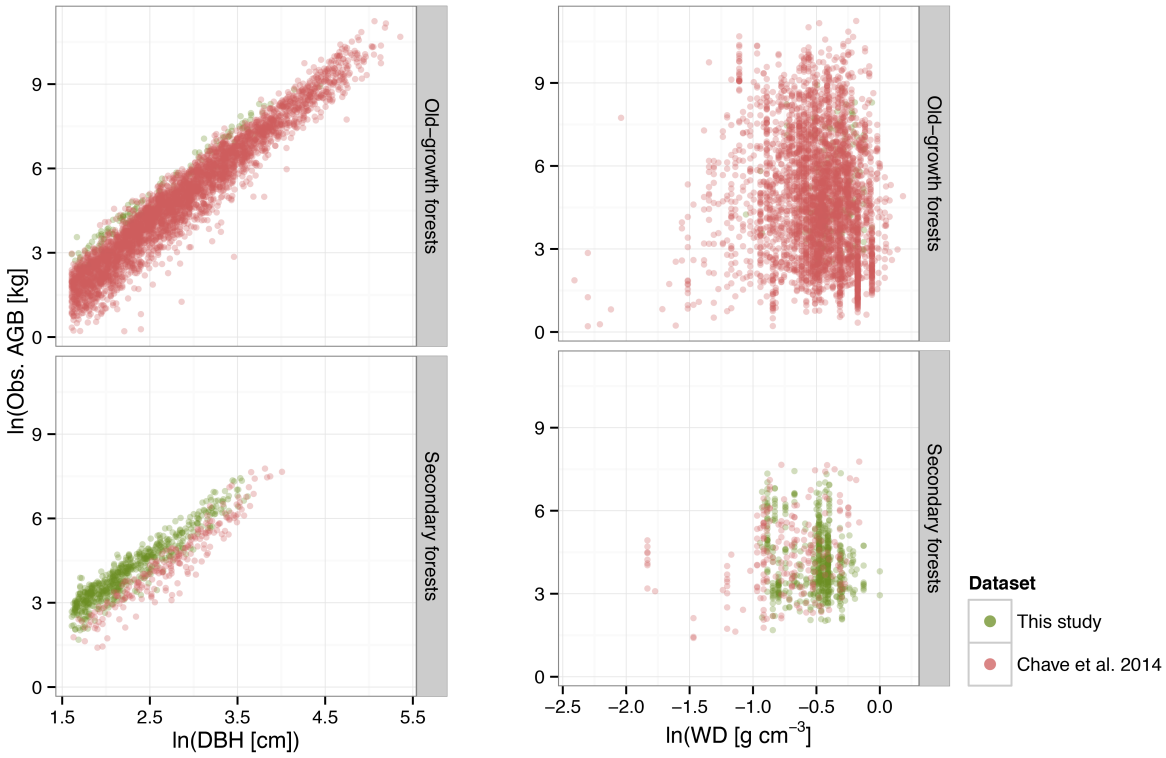

Figure S5. Relationship between predictors (diameter at breast height [DBH] and wood density [WD]) and the observed aboveground biomass (AGB) of the trees from old-growth and secondary forests used to parameterize the biomass estimation models fit in this study and Chave et al. (2014)'s pantropical model. Note that this study included 596 trees (82% of the total) harvested in secondary forests, while Chave et al. (2014) included only 220 (5% of the total). In this study, the representative amount of trees and species from different successional stages of the same forest type allowed for the inclusion of a wide range of tree architecture and thus allometries (i.e. from slender to stout trunks, from suppressed or emergent late-successional species typical of old-growth forests, up to competing or canopy/emergent pioneer species typical of large treefall gaps created by wind-disturbance.

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