

Supporting Information

allob: An R package for biomass estimation at globally distributed extratropical forest plots

Erika Gonzalez-Akre, Camille Piponiot, Mauro Lepore, Valentine Herrmann, James A. Lutz, Jennifer L. Baltzer, Christopher Dick, Gregory S. Gilbert, Fangliang He, Michael Heym, Alejandra I. Huerta, Patrick Jansen, Daniel Johnson, Nikolai Knapp, Kamil Kral, Dunmei Lin, Yadvinder Malhi, Sean McMahon, Jonathan A. Myers, Dave Orwig, Diego I. Rodriguez-Hernandez, Sabrina Russo, Jessica Shue, Xugao Wang, Amy Wolf, Tonghui Yang, Stuart J. Davies, Kristina J. Anderson-Teixeira

Table S1. Focal sites that served as the basis for compiling the allometric equations currently included in *allobd*.

Site	Country	Biogeographic zone	Latitude	Longitude	Elevation (m)	Area (ha)	N Species	Dominant vegetation*	Köppen**	References
Changbaishan	China	Palaearctic	42.38	128.08	785	25.00	52	NE; BcD	Dwb	Wang et al. 2009; Yuan et al. 2019
Gutianshan	China	Palaearctic	29.25	118.12	448	24.00	159	BE; BdD	Cfa	Chen et al. 2010; Lin et al. 2012
Harvard Forest	USA	Nearctic	42.54	-72.18	371	35.00	60	BdD	Dfb	Orwig et al. 2018
Heishiding	China	Indo-Malay	23.27	111.53	128	50.00	245	BE	Cfa	Yin & He, 2014
Indian Cave	USA	Nearctic	40.25	-95.54	285	28.00	43	BcD	Dfa	
Lilly Dickey Woods	USA	Nearctic	39.24	-86.22	275	25.00	35	BcD	Cfa	Johnson et al. 2014
Michigan Big Woods	USA	Nearctic	42.47	-84.00	270	23.00	41	BcD	Dfa	Allen et al. 2020
Niobrara	USA	Nearctic	42.78	-100.02	694	20.16	26	BcD	Dfa	
Ordway-Swisher	USA	Nearctic	29.69	-81.99	51	17.25	9	NE; BE	Cfa	Johnson et al. 2021
SCBI	USA	Nearctic	38.89	-78.15	350	25.60	64	BcD	Cfa	Bourg et al. 2013
Scotty Creek	Canada	Nearctic	61.30	-121.30	165	21.00	11	NE	Dfc	Baltzer et al. 2014
SERC	USA	Nearctic	38.89	-76.56	29	16.00	79	BcD	Cfa	McMahon et al. 2015
Speulderbos	Netherlands	Palaearctic	52.25	5.70	63	27.00	13	BcD	Cfb	
Tiantongshan	China	Palaearctic	29.81	121.78	344	20.00	153	BE	Cfa	Bar-Massada et al. 2018; Yang et al. 2011
Traunstein	Germany	Palaearctic	47.94	12.67	606	25.00	29	BcD	Dfb	
Tyson	USA	Nearctic	38.52	-90.56	221	20.00	42	BcD	Cfa	LaManna et al. 2016
UCSC	USA	Nearctic	37.01	-122.08	311	16.00	33	BE; NE	Csb	Gilbert et al. 2010
UMBC	USA	Nearctic	39.25	-76.71	48	6.25	68	BcD	Cfa	
Utah	USA	Nearctic	37.66	-112.85	3013	13.64	17	NE	Cfb	Furniss et al. 2017; Lutz et al. 2021
Wabikon	USA	Nearctic	45.55	-88.79	494	25.60	42	BcD	Dfb	Wang et al. 2011
Wind River	USA	Nearctic	45.82	-121.96	404	27.20	26	NE	Csb	Lutz et al. 2013
Wytham Woods	UK	Palaearctic	51.77	-1.34	162	18.00	23	BcD	Cfb	Butt et al. 2009
Yosemite	USA	Nearctic	37.77	-119.82	1796	25.60	23	NE	Csb	Lutz et al. 2012
Zofin	Czech Republic	Palaearctic	48.66	14.71	814	25.00	12	BcD; NE	Cfb	Janik et al. 2016

These sites provided species lists and local expertise on available allometries. They also served as test cases for *allobd*. All sites are part of the Forest Global Earth Observatory (ForestGEO), and additional information on study sites can be found in Anderson-Teixeira et al. (2015), Davies et al. (2021), and on the ForestGEO website (<https://forestgeo.si.edu/>).

*Dominant vegetation types: BE, broadleaf evergreen; BdD, broadleaf drought deciduous; BcD, broadleaf cold deciduous; NE, needleleaf evergreen.

**Köppen climate zones: Cfa: Humid subtropical/mid-latitude climate with significant precipitation year-round; Cfb: Oceanic with significant precipitation year-round; Csb-Dry-summer subtropical/mid-latitude climate with dry summers; Dfa: Humid Continental with no significant precipitation difference between seasons, hot summer; Dfb: Humid Continental with significant precipitation year round, warm summer; Dfc: Subarctic; Dwb: Humid continental with dry winters.

Figure S1. Map of locations from which allometries were compiled



Figure S1. Map of locations from which allometries were compiled. Each dot represents a location at which allometries included in *allobd* were built. Details are available in the *allobd* equations table. For 23% of equations in *allobd*, we were unable to determine specific location from original publications, the areas referred in publications were too broad to define coordinates, or it was rather difficult to obtain the original publication.

Figure S2. Illustration of the taxonomic weighting scheme

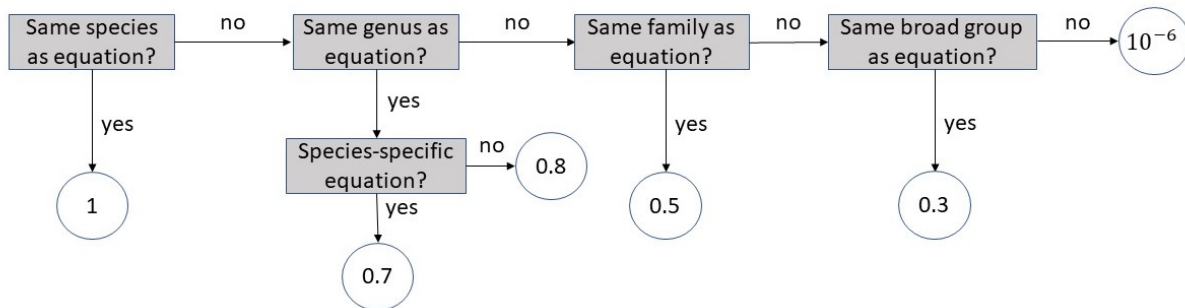


Figure S2. Illustration of the taxonomic weighting scheme. Equations calibrated with trees from a similar taxonomic group as the target taxon are given a higher weight.

Figure S3. Examples of graphs built per participant sites to detect equation transcription errors

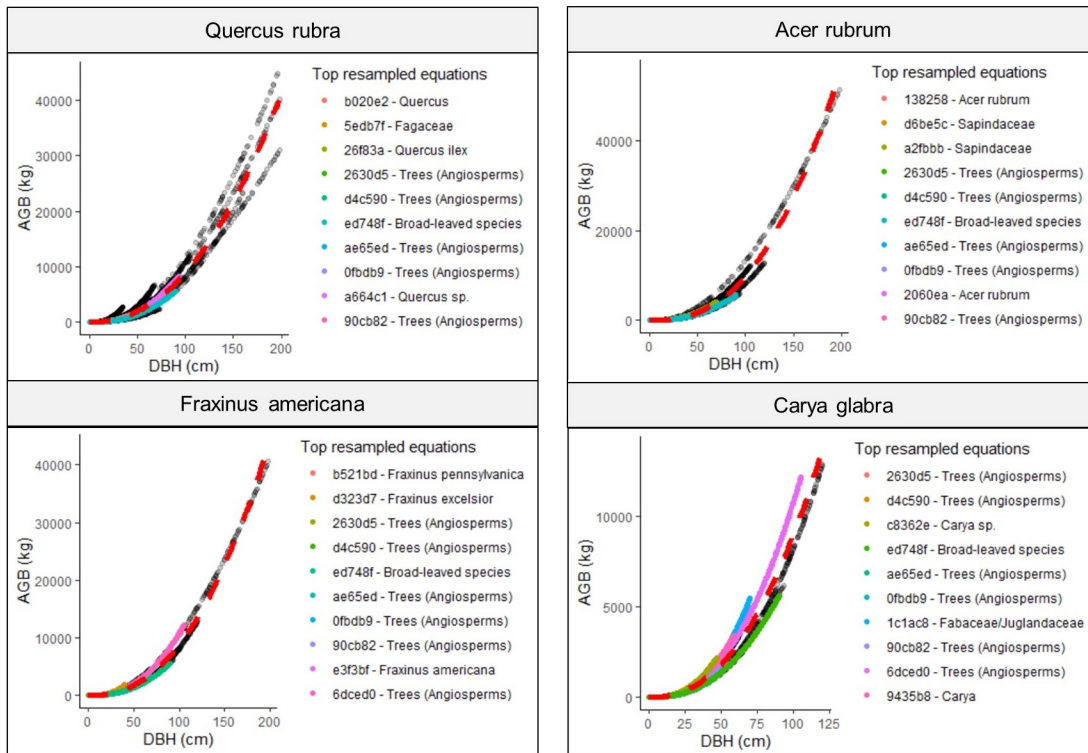


Figure S3. Examples of graphs built per participant sites to detect equation transcription errors. The example features four species at the Smithsonian Conservation Biology Institute (SCBI). These plots are built using the function `illustrate_allodb()`. The top ten allometries (specifying equation ID and taxa/taxonomic group), after applying the weighting process, can be seen as a side panel. The red curve represents the final fitted equation.

Figure S4. Evaluation of *allob* results against a widely used regional allometric model

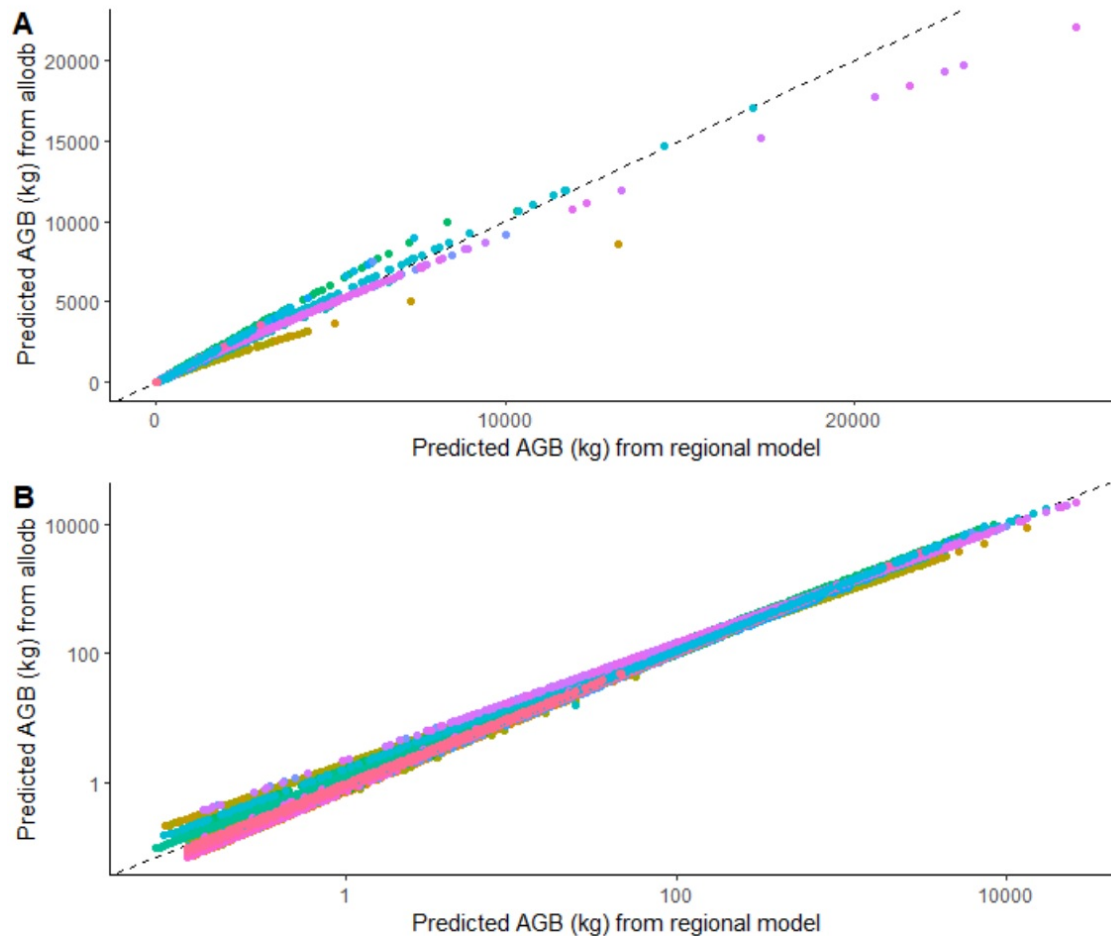


Figure S4. Evaluation of *allob* results against a widely used regional allometric model. Specifically, we assessed all stems in the ForestGEO plot at the Smithsonian Conservation Biology Institute (SCBI) in its 2008 census, comparing *allob* predictions against those of the Chojnacky, Heath, and Jenkins (2014) equations for North America. Each dot represents one stem, with colors varying by species. The most notable differences occur among the largest trees within a few species (most notably *Quercus velutina*; purple dots). A. Values represented on a linear scale. B. Values represented in a log-scale for better visualization of smaller DBH sizes. RMSE=86.02, RMSE(log)=0.23.

Figure S5. Comparison of *allobb* biomass estimates against raw data

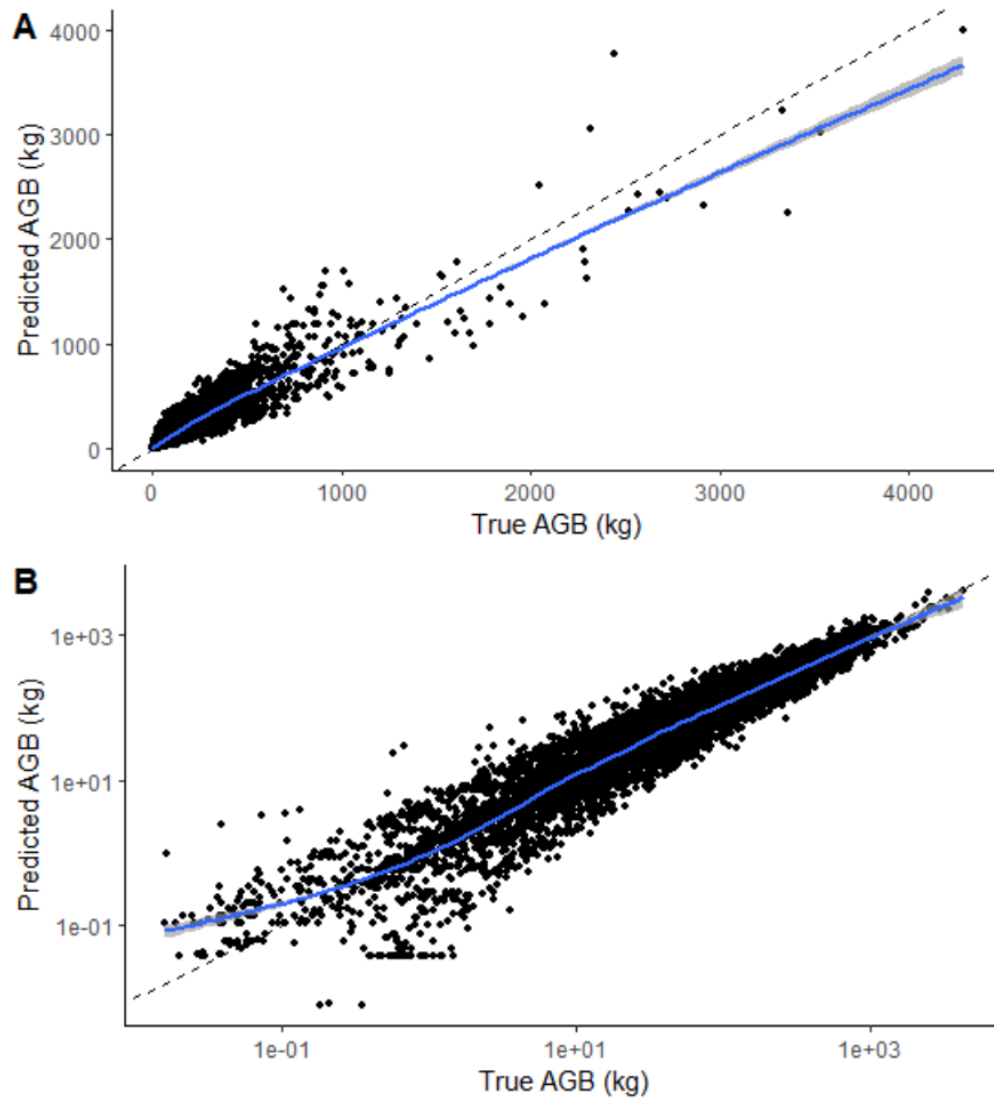


Figure S5. Comparison of *allobb* biomass estimates against raw data against raw data. Comparison draws on 6,266 trees representing 85 species at 176 sites distributed in Eurasia (Schepaschenko et al. 2017). The dotted line is the $y = x$ line: values above and below that line are over- and under-estimated, respectively. The blue line is a smoothing line using a loess regression. A. Values represented on a linear scale. B. Values represented in a log-scale for better visualization of smaller DBH sizes. RMSE=87.016, RMSE(log)= 0.71.

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