Table S1. Estimates of AGB_{live} (mean ± SE in forest and oil palm stands) from tree structure using two global and three regional allometric algorithms. We used two global algorithms for moist and wet tropical forests (Chave *et al* 2005), ‘chave_moist’ and ‘chave_wet’, assuming a mean oven-dry wood specific gravity of $wd = 0.64$ (g cm^{-3}), estimated for species in the nearby Lambir Hills National Park (King *et al* 2006). Regional algorithm ‘kenzo’ was developed for logged over old growth forest in Malaysian Sabah (Kenzo *et al* 2009) (Sabal Forest Reserve, 01 03’ N, 110 55’ E; Balai Ringin Protected Forest, 00 55’ N, 110 43’ E). Regional algorithm ‘niiyama’ was developed for old growth forest in Malaysia for forests 110 km south-east of Kuala Lumpur (Niiyama *et al* 2010) (Pasoh Forest Reserve, 2 58’ N, 102 18’ E). Regional algorithm ‘basuki’ was developed for mixed-species forest stands in East Kalimantan, Indonesia (Basuki *et al* 2009) (1 45’ to 2 20’ N, 116 55’ to 118 11’ E).

	AGB (± SE) [Mg / 0.0625 ha]				
stand	**chave_moist**	**chave_wet**	**basuki**	**kenzo**	**niiyama**
OG2	28.20 ± 5.43	22.25 ± 3.99	40.88 ± 5.82	9.87 ± 1.49	35.32 ± 6.85
OG1	22.90 ± 4.81	18.09 ± 3.71	30.16 ± 3.20	8.02 ± 1.55	28.68 ± 6.03
OG3	27.45 ± 4.06	22.18 ± 3.04	45.91 ± 3.91	10.37 ± 1.18	34.31 ± 5.11
VJR	10.73 ± 1.60	8.92 ± 1.26	32.54 ± 1.96	4.48 ± 0.56	13.38 ± 2.00
F	6.39 ± 0.94	5.48 ± 0.77	24.81 ± 2.17	2.94 ± 0.38	7.95 ± 1.18
LF3	8.48 ± 0.74	7.35 ± 0.59	30.60 ± 1.62	4.01 ± 0.28	10.54 ± 0.92
LFE	8.48 ± 2.07	7.42 ± 1.81	32.55 ± 6.12	4.13 ± 1.01	10.54 ± 2.57
B	4.39 ± 0.80	3.88 ± 0.67	25.69 ± 3.15	2.25 ± 0.34	5.45 ± 0.99
LF2	9.15 ± 0.79	8.03 ± 0.65	39.20 ± 2.75	4.51 ± 0.31	11.36 ± 0.99
E	2.58 ± 0.62	2.27 ± 0.53	14.89 ± 2.54	1.29 ± 0.28	3.21 ± 0.77
A	3.39 ± 0.88	3.06 ± 0.76	22.30 ± 4.21	1.83 ± 0.42	4.21 ± 1.09
D	2.96 ± 0.58	2.65 ± 0.50	21.10 ± 2.90	1.57 ± 0.28	3.67 ± 0.72
C	3.46 ± 0.82	3.10 ± 0.71	20.48 ± 3.67	1.82 ± 0.39	4.30 ± 1.02
LF1	4.68 ± 0.74	4.22 ± 0.62	31.82 ± 1.77	2.53 ± 0.31	5.81 ± 0.92
OP3	0.67 ± 0.29	0.67 ± 0.29	0.67 ± 0.29	0.67 ± 0.29	0.67 ± 0.29
OP2	0.89 ± 0.48	0.89 ± 0.48	0.89 ± 0.48	0.89 ± 0.48	0.89 ± 0.48
OP1	0.27 ± 0.07	0.27 ± 0.07	0.27 ± 0.07	0.27 ± 0.07	0.27 ± 0.07

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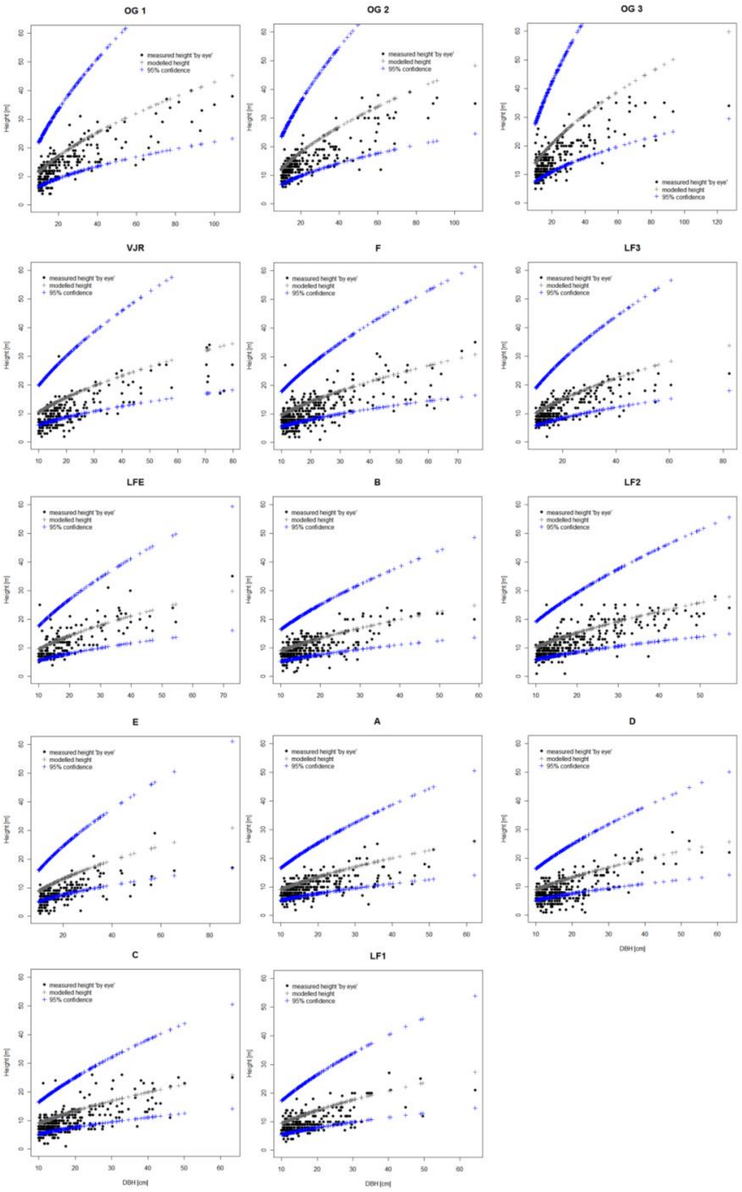
Table S2. Estimates of aboveground live tree carbon (C_{sim}), and importance of deadwood carbon (C_{sim_imp}) with wood specific gravity adjusted to disturbance at plot level versus live tree carbon (C_{live}) and deadwood importance (AGB_{sim}) using constant wood gravity values for estimating aboveground biomass (AGB_{live}). For each tree, we computed AGB_{sim}, by randomly drawing 100 wood specific gravity estimates from a normal distribution of wood specific gravity values, defined by its maximum and standard deviation for primary forests (0.64 ± 0.18) (King et al 2006), lightly logged forests (0.57 ± 0.02), twice logged forests (0.54 ± 0.03), and salvage logged forests (0.41 ± 0.05) (Slik et al 2008). We converted AGB_{sim} to C_{sim} using conversion factor 0.474. For further details see text. The increase in the importance of deadwood carbon in response to levels of past disturbance was more pronounced, when varying wood specific gravity of live trees depending on the disturbance level of the forest stand. See also figure S2.

stand	**n**	C_{sim}		C_{live}		C_{sim_imp} **[%]**		C_{dead_imp} **[%]**	
		mean	**se**	**mean**	**se**	**mean**	**se**	**mean**	**se**
OG2	9	14.3	2.6	14.4	2.7	5.4	2.2	5.4	2.2
OG1	9	11.9	2.5	11.9	2.4	14.7	4.6	14.7	4.6
VJR	8	3.8	0.5	5.9	0.8	21.9	6.0	16.1	4.7
OG3	9	12.8	1.7	14.3	1.9	9.9	2.6	9.0	2.4
LF1	9	2.3	0.3	2.7	0.4	32.3	8.4	29.7	8.2
D	16	1.1	0.2	1.7	0.3	37.8	8.7	32.5	8.0
F	16	2.3	0.3	3.6	0.5	36.6	6.6	29.7	6.2
E	16	1.0	0.2	1.5	0.3	50.0	6.5	42.0	6.4
LF2	9	4.3	0.3	5.1	0.4	22.1	4.2	19.6	3.8
LFE	8	4.1	1.0	4.8	1.1	23.8	7.8	21.6	7.4
LF3	9	4.0	0.3	4.7	0.4	23.0	3.7	20.4	3.4
C	16	1.3	0.3	2.0	0.5	47.6	5.8	39.2	5.8
A	16	1.4	0.3	2.0	0.5	63.9	6.7	59.0	7.0
B	16	1.6	0.3	2.5	0.4	48.6	5.0	39.5	5.1

Figure S1. Comparison of tree heights measured in the field ‘by eye’ with heights modelled using the Feldpausch *et al.* (Feldpausch *et al* 2011) region-environment-structure model for height-DBH relationships for forests in Asia: H_{mod} = exp (0.2797 + 0.5736*ln(*DBH*) + 0.0120**A* + 0.0034**PV* + -0.0449**SD* + 0.0191**TA*). Climatic parameters (Mean Annual Temperature *TA* = 24.8 ◦C, Dry Season Length *SD* = zero months with rainfall < 100 mm, Annual precipitation Coefficient of Variation *PV* = 10.27 %) were extracted from the WORDCLIM datasets (Hijmans *et al* 2005). Basal area *A* (m^2 / ha) was derived from tree DBH measurements at plot level averaged within forest stands. Blue: 95 % confidence bands for modelled tree heights.



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Hijmans R J, Cameron S E, Parra J L, Jones P G and Jarvis A 2005 WORLDCLIM - a set of global climate layers (climate grids) *Int. J. Climatol.* **25** 1965–78

Figure S2. Scale of bias in live tree carbon (C_{live}) and importance of deadwood carbon (C_{dead_imp}) estimates based on wood gravity (at plot level) adjusted for disturbance compared to constant wood gravity typical for unlogged forest stands. **Top panel**: Comparing estimates of C_{live} (left) and C_{dead_imp} (right) when using wood gravity adjusted for level of disturbance versus estimates using non-adjusted wood gravity. Live tree carbon is underestimated, especially in more disturbed plots. This underestimate is significant compared to using a constant wood gravity of 0.64. Subsequently, the importance of deadwood carbon is higher using disturbance adjusted wood gravity values compared to using a constant wood gravity of 0.64. **Bottom panel**: C_{live} decreased exponentially (a*exp(b*x) and C_{dead_imp} increased logistically (A = Asymptote, I = Curve inflection point, S = Scaling factor) with disturbance, when using estimates based on disturbance adjusted wood gravity values. Hence, estimating carbon based on disturbance adjusted woody gravity yields similar trends compared to using non-adjusted wood gravity values. But, using disturbance adjusted wood gravity values indicates a more rapid decline of C_{live} (at plot level: a = 6.97***, b = -9.81***, $Pseudo\text{-}R^2 = 0.33$; at stand level: a = 11.68***, b = -14.38**, $Pseudo\text{-}R^2 = 0.74$) and a more rapid increase in C_{dead_imp} (at plot level: A = 0.67***, I = 0.08***, S = 0.08***, $Pseudo\text{-}R^2 = 0.39$; at stand level: A = 0.66**, I = 0.13**, S = 0.10**, $Pseudo\text{-}R^2 = 0.76$) with increasing disturbance.