

# **SUPPLEMENTARY INFORMATION:**

## **Global forest thickening**

Marqués et al.

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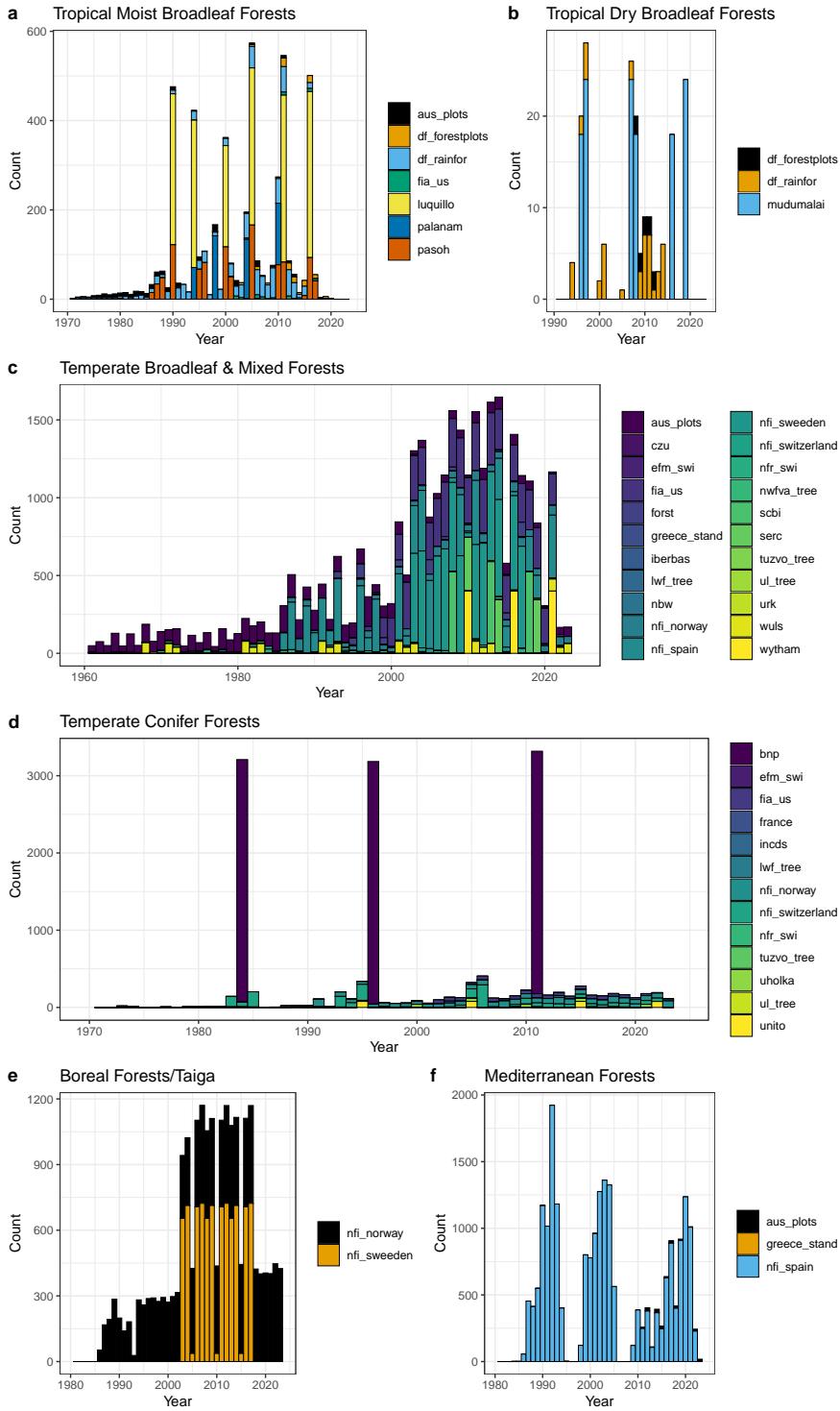
### **S1 Data**

To be added as text (and equations) here:

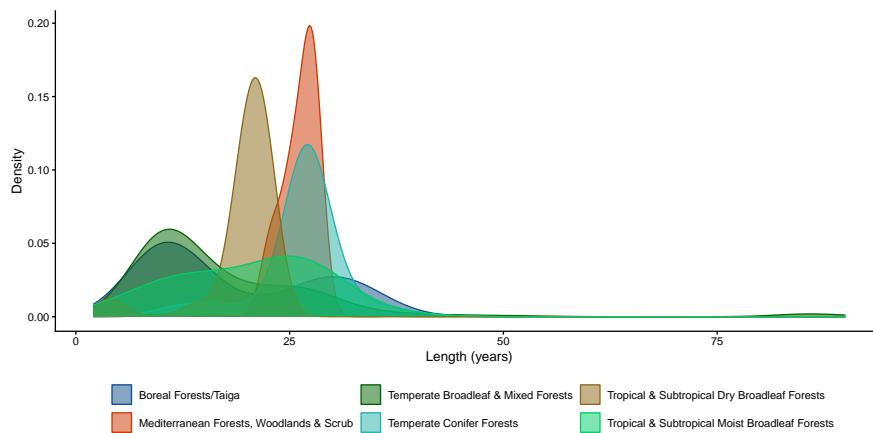
- How QMD derived if not explicitly provided in obtained dataset.

Dataset	N	Description	Filter	Reference
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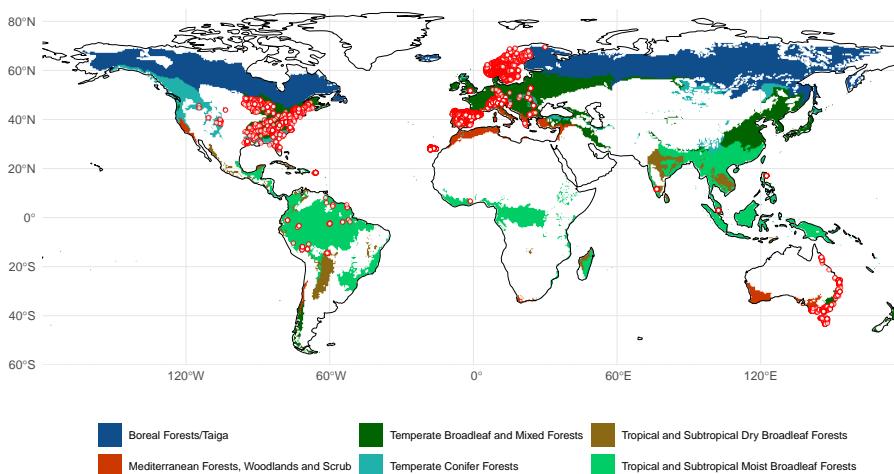
**Table S1:** Constituent forest dataset sizes and descriptions.



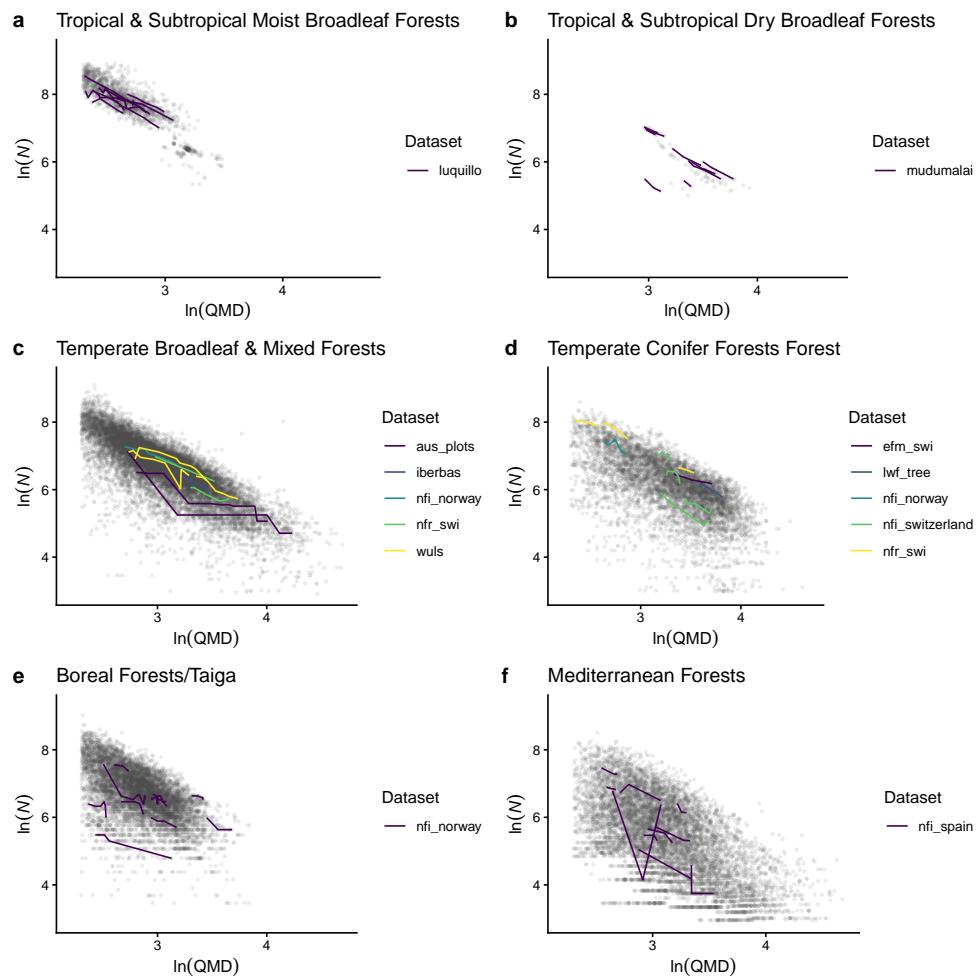
**Figure S1:** Distribution of forest census data over time, grouped by biome (a-f). Dataset names are explained in Tab. xxxx.



**Figure S2:** Distribution of the total length of the time series per forest plot, separated by biomes. The total length corresponds to the difference in the observation year of the first and last available forest inventory for each plot.

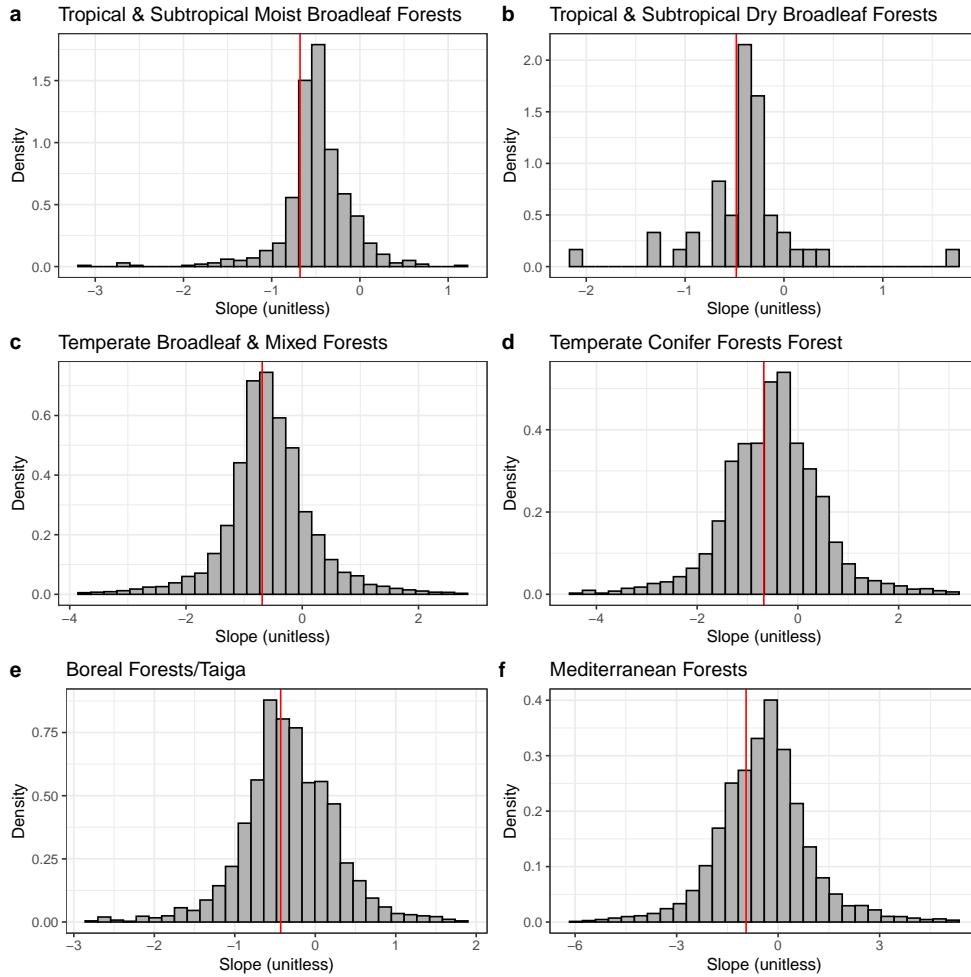


**Figure S3:** Distribution of forest plots (red circles) and forest biomes.



**Figure S4:** Self-thinning relation across biomes with example long-term forest monitoring plots highlighted.

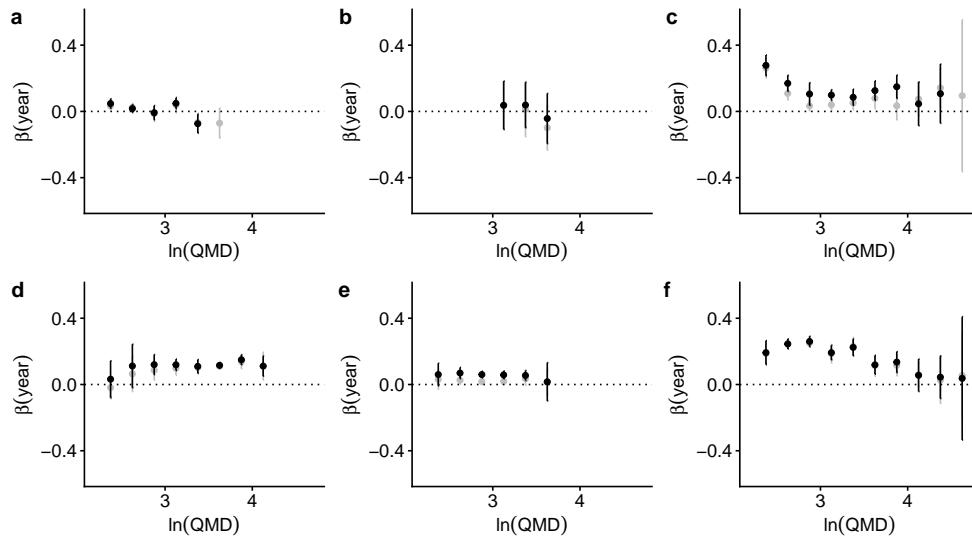
## S2 Self-thinning trends



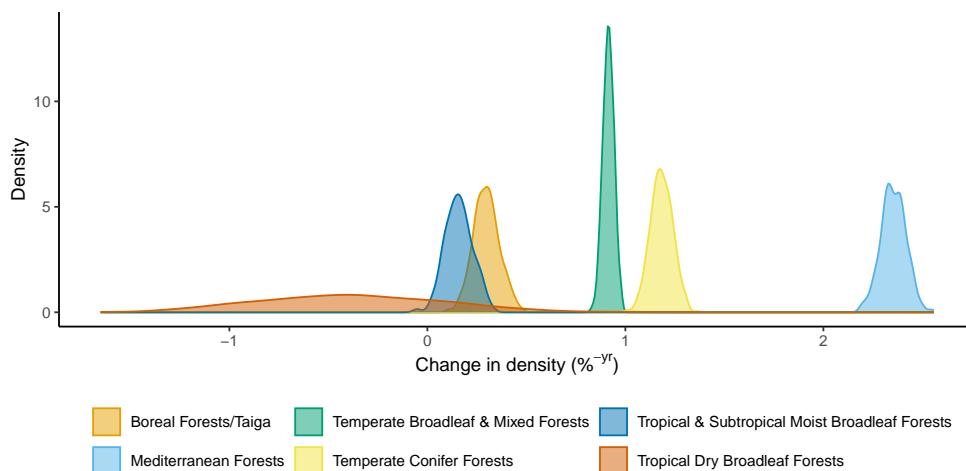
**Figure S5:** Self-thinning relation across biomes with example long-term forest monitoring plots highlighted.

Biome	Mean	SE
Boreal Forests/Taiga	0.30	0.06
Mediterranean Forests	2.35	0.06
Temperate Broadleaf & Mixed Forests	0.91	0.03
Temperate Conifer Forests	1.18	0.06
Tropical & Subtropical Moist Broadleaf Forests	0.16	0.07
Tropical Dry Broadleaf Forests	-0.38	0.46

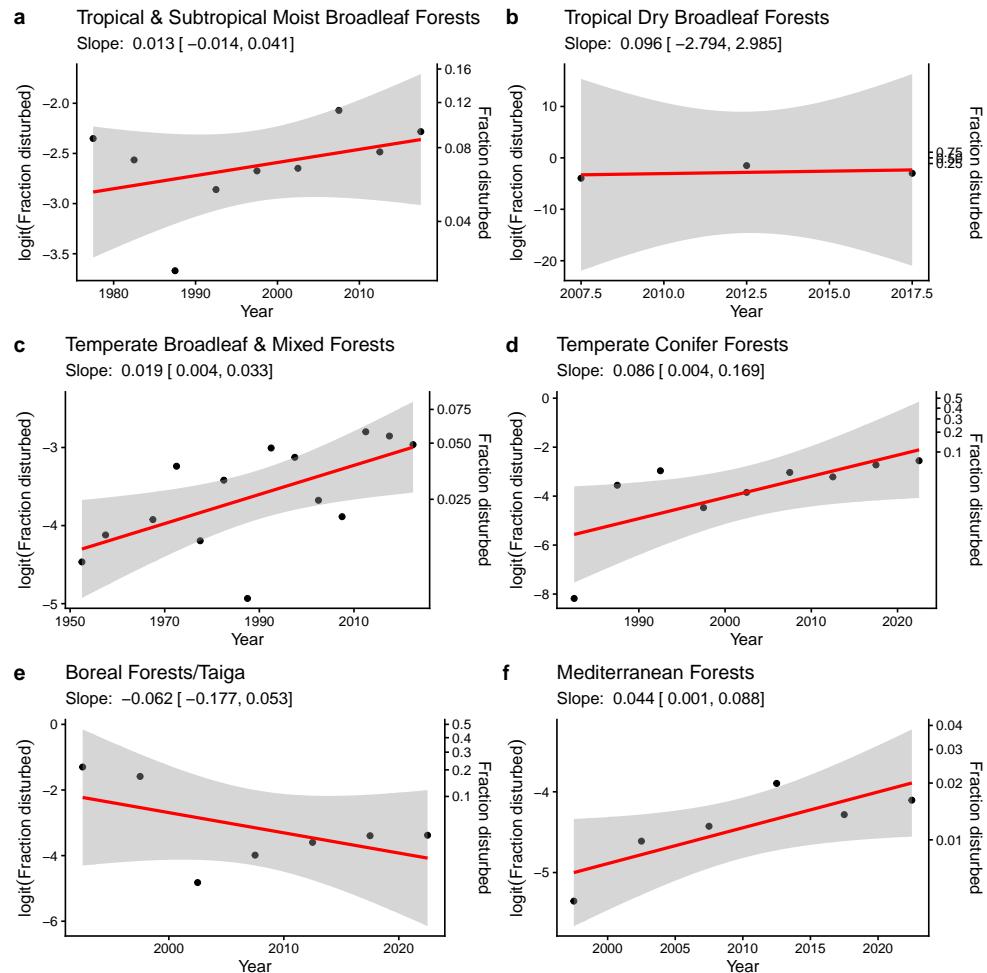
**Table S2:** Mean estimate and standard error (SE) of percentage change (%/yr) of forest stand density (number of trees per ha) by biome, determined from quantile regressions on bootstrapped data samples.



**Figure S6:** Effect size of 'year' within bins of quadratic mean diameter for individual biomes (a: Tropical and Subtropical Moist Broadleaf Forests, b: Tropical and Subtropical Dry Broadleaf Forests, c: Temperate Broadleaf and Mixed Forests, d: Temperate Conifer Forests Forest, e: Boreal Forests/Taiga, f: Mediterranean Forests). Grey points represent the same derived from data before the filtering of disturbance-affected plots were removed. Error bars indicate 95% confidence intervals for the coefficient.



**Figure S7:** Distribution of percentage change ( $\%/\text{yr}$ ) in stand density (number of trees per ha) by biome.



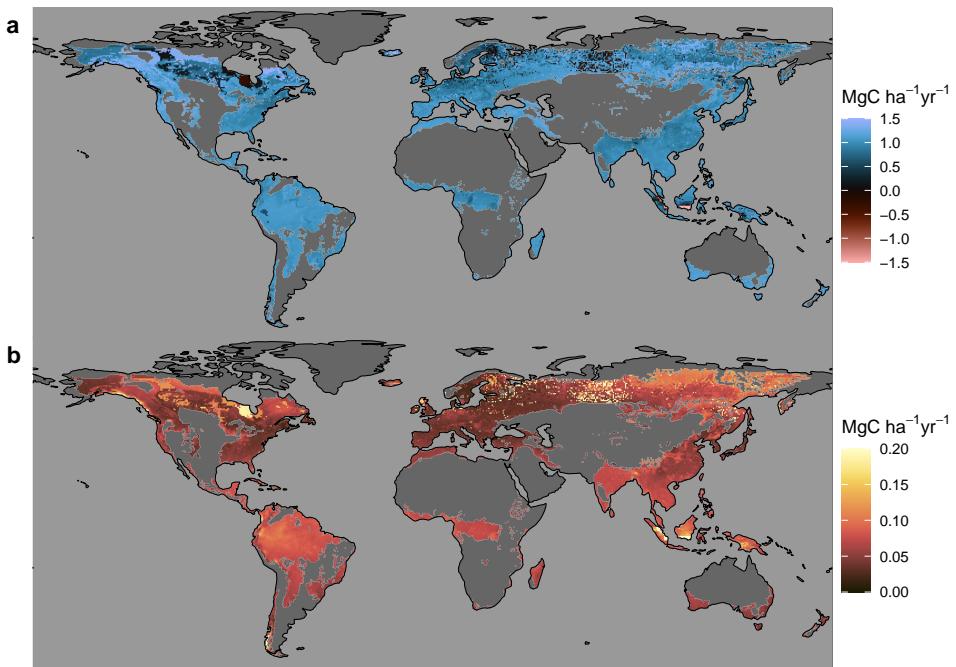
**Figure S8:** Trends in the fraction of disturbed forest plots, by biome. Fraction values are logit-transformed. The corresponding un-transformed values are indicated by the right y-axis in each plot. No regression fit is shown for tropical dry broadleaf forests (b) as only two points are available with non-zero values for the disturbed fraction.

### S3 Environmental drivers

Table S3: Regression Results

	Complete	No PBR	No PBR, ORGC	No PBR, C:N
scale(logQMD)	-0.861*** (0.002)	-0.862*** (0.002)	-0.862*** (0.002)	-0.864*** (0.002)
scale(year)	0.129*** (0.001)	0.130*** (0.001)	0.130*** (0.001)	0.132*** (0.001)
scale(tavg)	-0.033* (0.015)	-0.026+ (0.015)	-0.007 (0.014)	-0.018 (0.015)
scale(ai)	0.086*** (0.010)	0.095*** (0.009)	0.097*** (0.009)	0.087*** (0.009)
scale(ndep)	0.153*** (0.010)	0.140*** (0.010)	0.146*** (0.010)	0.131*** (0.010)
scale(ORG C)	-0.039** (0.013)	-0.048*** (0.012)		-0.001 (0.009)
scale(PBR)	0.004 (0.008)			
scale(CNrt)	0.057*** (0.011)	0.060*** (0.011)	0.031*** (0.008)	
scale(year) × scale(tavg)	0.006** (0.002)	0.009*** (0.002)	0.013*** (0.002)	0.006** (0.002)
scale(year) × scale(ai)	-0.022*** (0.002)	-0.018*** (0.001)	-0.018*** (0.001)	-0.017*** (0.001)
scale(year) × scale(ndep)	-0.016*** (0.002)	-0.015*** (0.002)	-0.015*** (0.002)	-0.011*** (0.001)
scale(year) × scale(ORG C)	-0.012*** (0.002)	-0.011*** (0.002)		-0.028*** (0.002)
scale(year) × scale(PBR)	0.006*** (0.002)			
scale(year) × scale(CNrt)	-0.021*** (0.002)	-0.023*** (0.002)	-0.028*** (0.001)	
SD (Observations)	0.176	0.178	0.178	0.178
Num.Obs.	36133	37652	37652	37652
R2 Marg.	0.521	0.530	0.531	0.527
R2 Cond.	0.980	0.980	0.980	0.980
AIC	17693.1	19142.8	19162.9	19315.9
BIC	17846.0	19279.3	19282.4	19435.4
ICC	1.0	1.0	1.0	1.0
RMSE	0.15	0.15	0.15	0.15

## S4 Global C sink



**Figure S9:** (a) C sink in aboveground biomass due to temporal changes in the self-thinning relationship. (b) Standard deviation of estimates across bootstraps. Values are expressed per unit forest area ( $\text{gC m}^{-2} \text{yr}^{-1}$ ).

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