Supporting Information

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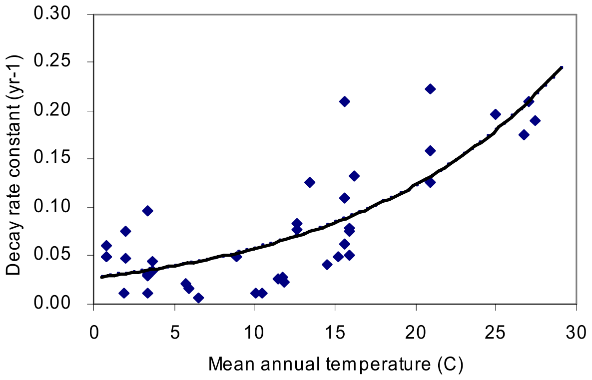

Fig. S1. The scatter plot of the decomposition rate constant of CWD and mean annual temperatures for the studies listed in Table S1. The decomposition rate constant could be expressed as an exponential function of mean annual temperature i.e., $k = 0.0271e^{0.0758T}$.

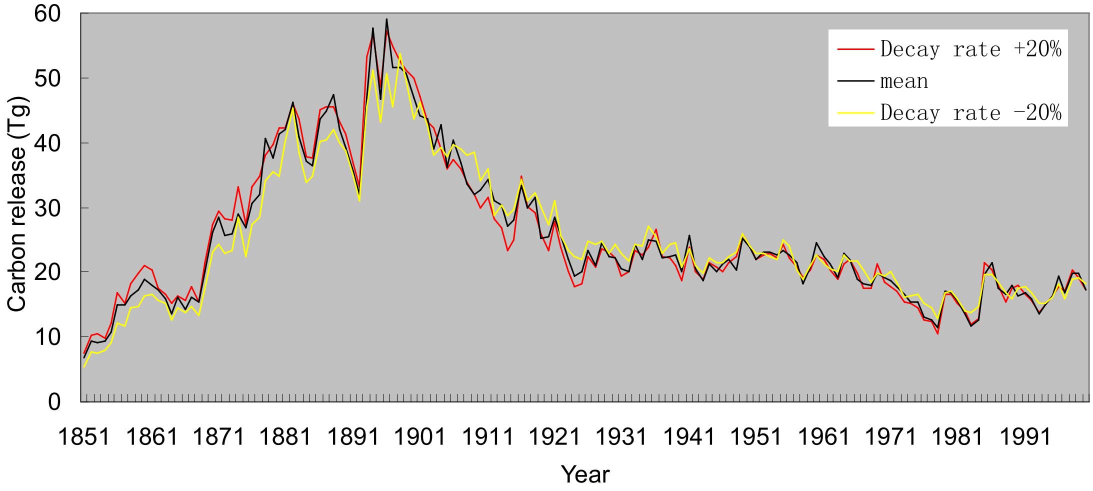

Fig. S2. Sensitivity analysis of the carbon release by changing the decay rate ±20%. The carbon release was not sensitive to the decay rate. This is mainly because the decomposition is a cumulative function. The smaller decomposition rate would make more coarse wood debris available for decomposition at the next year. Thus, the released CO_2 of each year will keep very close in different decay rate.

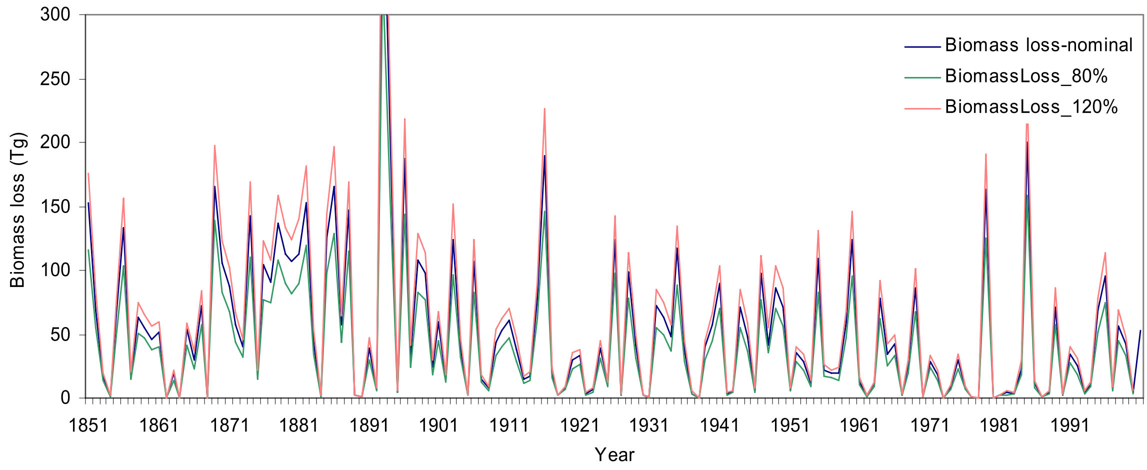

Fig. S3. Sensitivity analysis of the biomass loss regarding tree size of the forests. The tree size was changed in terms of the mean values of the biomass distribution ±20%. The annual biomass loss was sensitive to the changes of tree size because it had approximately ±20% changes with the ±20% changes of the mean tree biomass.

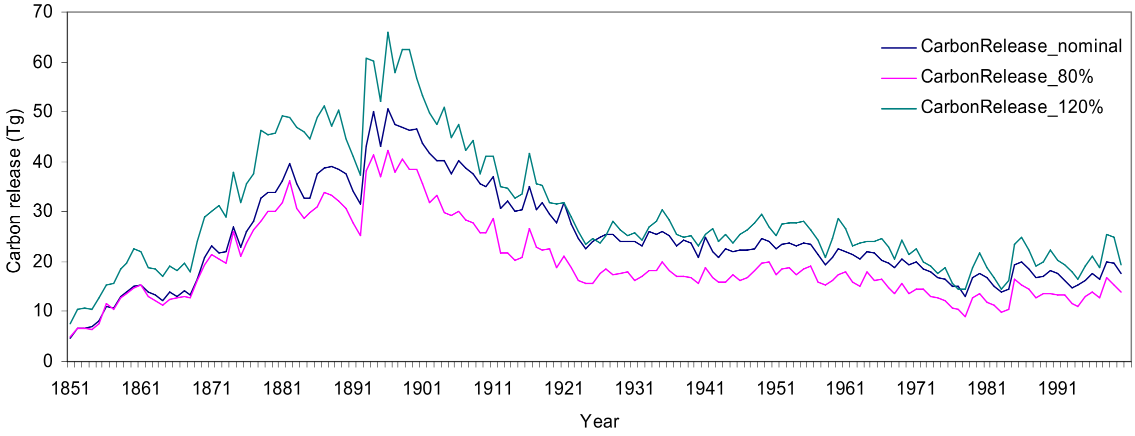

Fig. S4. Sensitivity analysis of the carbon loss regarding tree size of the forests. The tree size was changed in terms of the mean values of the biomass distribution ±20%. The carbon release was sensitive to the changes of the tree size, i.e., it had 15% less carbon released when the mean values of tree biomass was decreased by 20% and 20% increase when the tree biomass increased by 20%.

Table S1. The decay rate constant of coarse woody debris (CWD) from previous studies

Ecosystem	Location	Temp, °C	k	Source
Southern Taiga	Northwestern Russia, St. Petersburg	3.7	0.0340	Krankina and Harmon (1)
Southern Taiga	Northwestern Russia, St. Petersburg	3.7	0.0450	Krankina and Harmon (1)
Temperate coniferous	Calgary, Canadian Rocky Mountains	1.9	0.0112	Johnson and Greene (2)
Temperate coniferous	Central OR, near LaPine	11.4	0.0270	Busse (3)
Temperate coniferous	Olympic National Park	10.5	0.0110	Graham and Cromack (4)
Temperate coniferous	Sequoia National Park	8.9	0.0500	Harmon et al. (5)
Temperate coniferous	Pacific Northwest	11.7	0.0280	Sollins (6)
Temperate coniferous	Cascade Head, OR	10.1	0.0118	Grier (7)
Temperate coniferous	H. J. Andrews	6.5	0.0063	Means et al. (8)
Temperate coniferous	Near Laramie, WY	5.9	0.0163	Fahey (9)
Temperate coniferous	NH, Mt. Moosilauke	3.4	0.0299	Lambert et al. (10)
Temperate coniferous	NH, Mt. Moosilauke	3.4	0.0122	Lambert et al. (10)
Temperate coniferous	NH, White Mountains	3.4	0.0310	Foster and Lang (11)
Temperate coniferous	NH, White Mountains	3.4	0.0290	Foster and Lang (11)
Temperate mixed	Northern WI & MI	5.7	0.0210	Tyrell and Crow (12)
Temperate mixed	North central MN	2	0.0480	Alban and Pastor (13)
Temperate mixed	North central MN	2	0.0760	Alban and Pastor (13)
Temperate mixed	North Carolina, Southern Appalachian	12.6	0.0770	Mattson et al. (14)
Temperate mixed	North Carolina, Southern Appalachian	12.6	0.0830	Mattson et al. (14)
Temperate deciduous	Hubbard Brook, NH	3.4	0.0960	Arthur et al. (15)
Temperate deciduous	Lawrence County, IN	11.8	0.0236	MacMillan (16)
Temperate deciduous	Nashville, TN; Radnor Lake	15.6	0.2100	Onega and Eikmeier (17)
Temperate deciduous	Nashville, TN; Radnor Lake	15.6	0.1100	Onega and Eikmeier (17)
Temperate deciduous	Nashville, TN; Radnor Lake	15.6	0.0620	Onega and Eikmeier (17)
Mediterranean	Southwest Western Australia	16.2	0.1322	Brown et al. (18)
Dry tropical	Yucatan	25	0.1972	Harmon et al. (19)
Wet tropical	West Malaysia, Pasoh Forest	27.4	0.1900	Kira (20)
Wet tropical	Barro, CO	20.2	0.4610	Lang and Knight (21)
Wet tropical	West Sumatra	27	0.2100	Yoneda et al. (22)
Tropical evergreen	Manaus, Brazil	26.7	0.176	Chambers et al. (23)
Subtropical evergreen	Dinghushan, China	20.9	0.2225	Lv Minghe et al. (24)
Subtropical evergreen	Dinghushan, China	20.9	0.1588	Lv Minghe et al. (24)
Subtropical evergreen	Dinghushan, China	20.9	0.1257	Lv Minghe et al. (24)
Temperate conifer	ACT Canberra, Australia	13.4	0.1270	Mackensen & Bauhus (25)
Temperate deciduous	Central Highlands, Australia	14.5	0.0410	Mackensen & Bauhus (25)
Temperate deciduous	South coast, Australia	15.2	0.0490	Mackensen & Bauhus (25)
Boreal conifer	Thompson, Manitoba, Canada	0.8	0.0600	Bond-Lamberty & Gower (26)
Boreal conifer	Thompson, Manitoba, Canada	0.8	0.0500	Bond-Lamberty & Gower (26)
Boreal conifer	Thompson, Manitoba, Canada	0.8	0.0500	Bond-Lamberty & Gower (26)
Pine plantation	Pickens & Anderson, SC	15.88	0.0510	Barber & Van-Lear (27)
Pine plantation	Pickens & Anderson, SC	15.88	0.0790	Barber & Van-Lear (27)
Pine plantation	Pickens & Anderson, SC	15.88	0.0750	Barber & Van-Lear (27)

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Table S2. The correlation between the annual forest damages and annual tropical cyclones

Period	1851–1900	1901–1950	1951–2000	1871–2000*
No. of tropical cyclones	0.39 (0.005)	0.49 (0.0003)	0.29 (0.04)	0.26 (0.0024)
No. of hurricanes	0.47 (0.0005)	0.67 (<0.0001)	0.31 (0.03)	0.42 (<0.0001)

The forest impacts (number of damaged trees) and the biomass loss had the same correlation and *P* values (in parentheses).

*The correlation was calculated for the period 1871–2000.