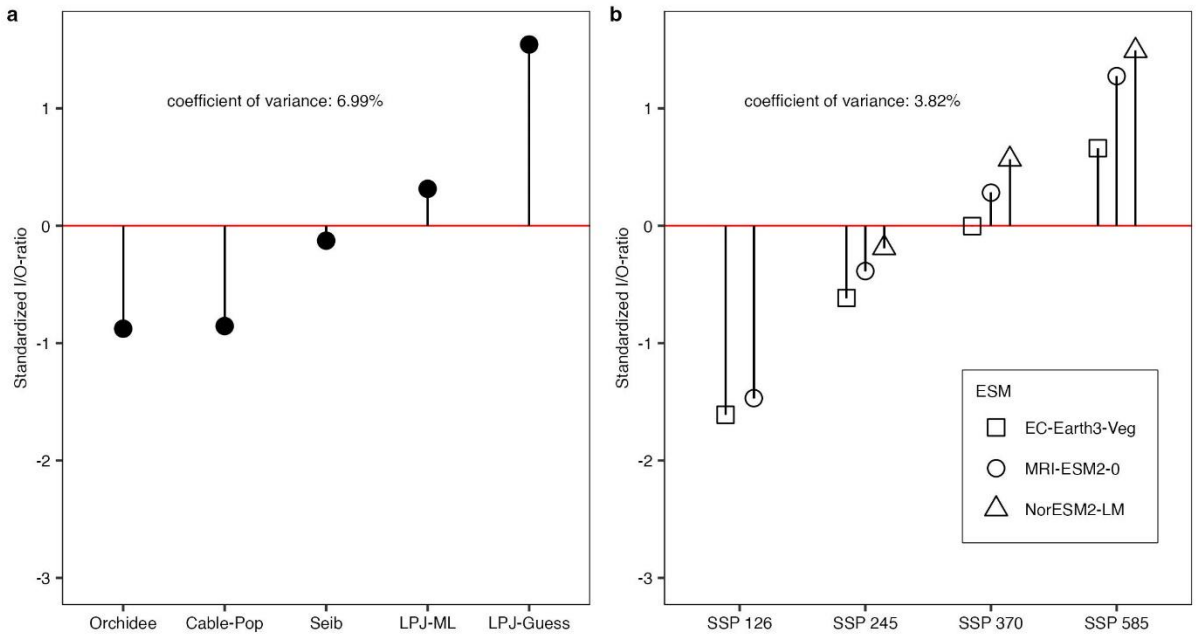
Supplementary Information for

Climate change accelerates global forest deadwood dynamics

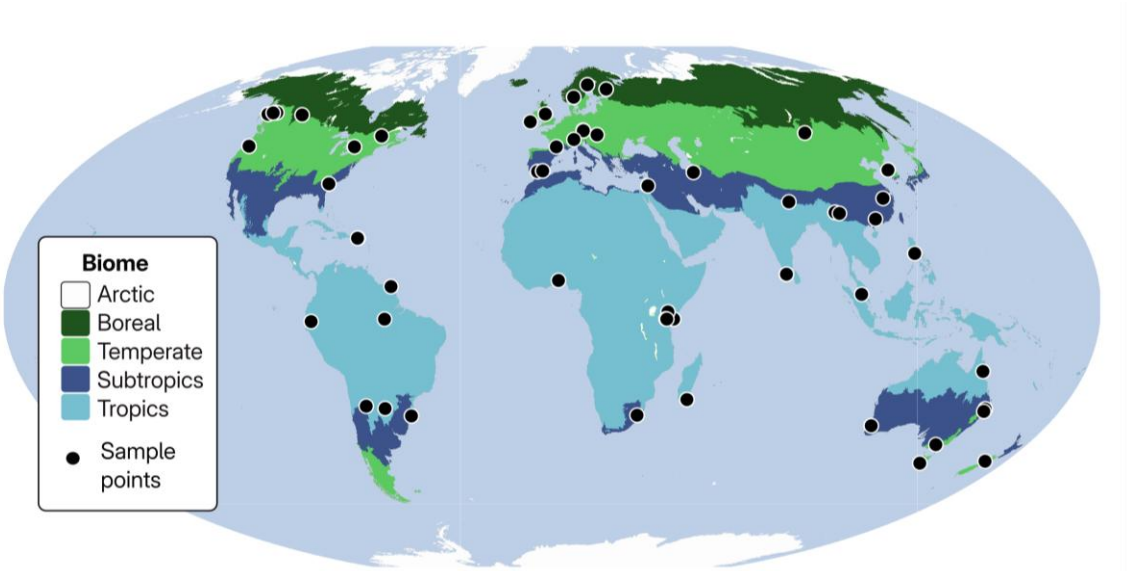
Author List:

Pascal Edelmann[1,2]*, Werner Rammer[1], Thomas A. M. Pugh[3,4,5], Adrian Gustafson[3], Sebastian Seibold[6,1,7], Wolfgang W. Weisser[2], Jörg Müller[8, 9], Rupert Seidl[1,7]

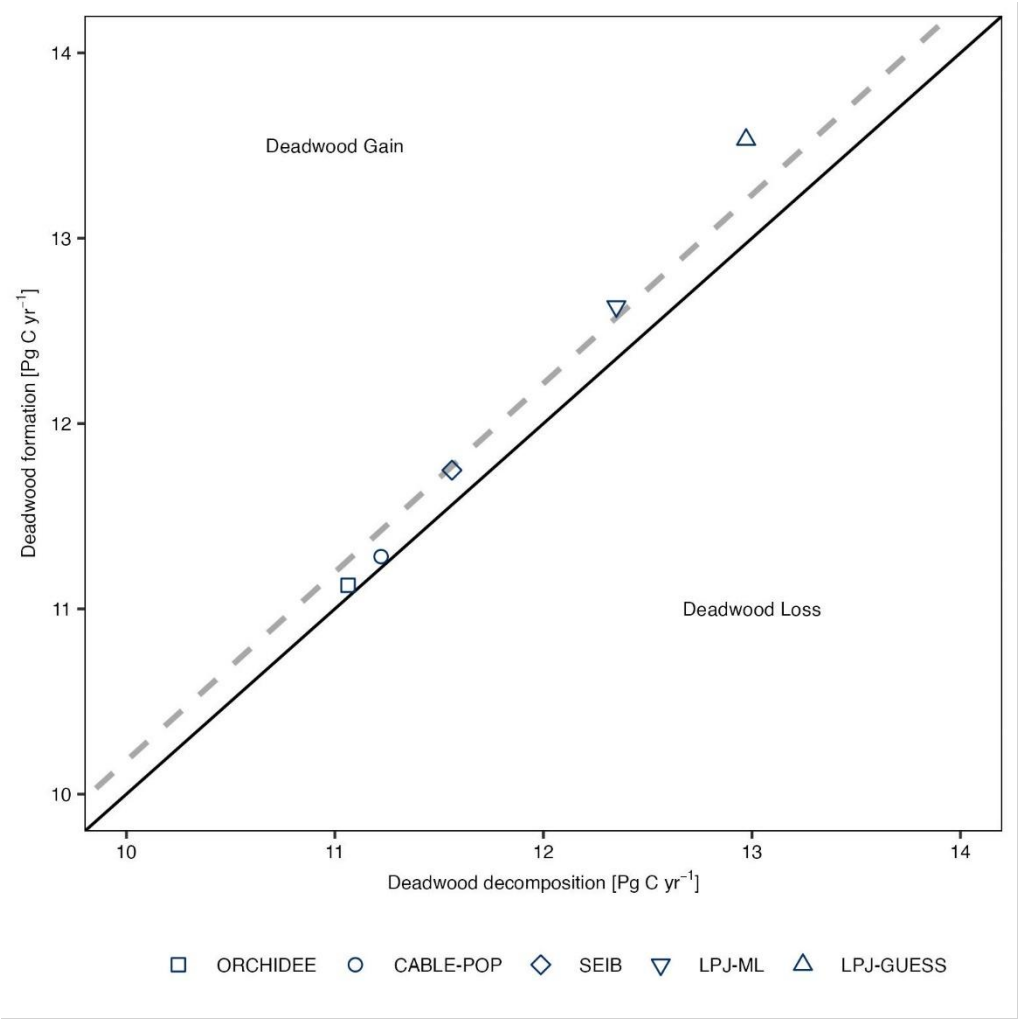
Supplementary Information



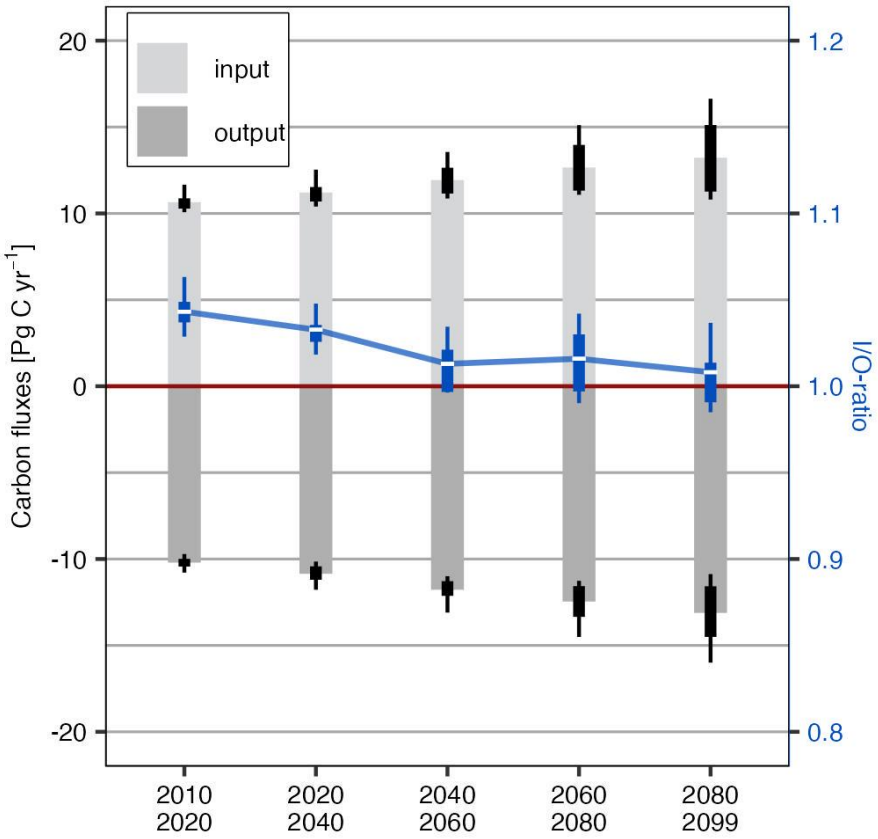
Supplementary Figure 1. Comparison of model and scenario uncertainties. Panel (a) displays the standardized input/output ratio (standardized to a mean of 0 and standard variation of 1) for the model ensemble. Panel (b) presents the standardized input/output ratio (standardized to a mean of 0 and standard variation of 1) for the climate ensemble, representing each Earth System Model (ESM) with different symbols. The coefficient of variance is provided for both panels. The red line marks the average standardized I/O-ratio.



Supplementary Figure 2. Location of the sample plots used for deadwood decomposition modeling. Background color shows biomes following FAO Ecological Zones.



Supplementary Figure 3: Contrasting global deadwood formation and decomposition for the 21st century (2010-2099) for the model ensemble only (climate scenario RCP8.5), with each DGVM receiving the same weight. The solid black line represents the 1:1 line, separating the figure in an area of deadwood gain (above) and loss (below). The dashed grey line represents a linear model with a fixed intercept of 0 and a slope of 1.018. See Figure 1 for a version including also the climate ensemble, simulated with LPJ-GUESS.



Supplementary Figure 4. Deadwood-related carbon fluxes and the input/output (I/O) ratio to global deadwood pools throughout the 21st century for the model ensemble only (i.e., giving equal weights to all five models). Grey bars represent the average input (lighter grey) and output (darker grey) for each time period, while the blue line and white horizontal tick marks indicate the average input/output ratio. Bold whiskers represent the interquartile range, light whiskers give the 5th – 95th percentile interval across the results from all models. See Figure 2 for a version including also the climate ensemble, simulated with LPJ-GUESS.

Supplementary Table 1. Scaling factors *SF* (Eq. 1) for harmonization of DGVM carbon fluxes with current stocks and fluxes for the years 2000-2020. For each ecozone and tree functional type (TFT), individual values were calculated. For the climate ensemble, the averaged scaling factors of all SSP 585 scenarios was used while each DGVM has its own factor in the model ensemble.

Model	TFT	Ecozones				
		Tropic	Subtropic	Temperate	Boreal	Arctic
SSP 585	gymno	1	0.967	0.305	1.112	1.326
	angio	1.030	0.405	0.136	2.253	1
LPJ-GUESS	gymno	1	3.447	1.190	0.938	1.123
	angio	3.324	0.594	0.213	0.762	1
LPJmL	gymno	2.302	0.310	0.190	0.386	0.356
	angio	2.556	1.068	0.355	0.428	0.136
SEIB-DGVM	gymno	13.261	0.213	0.072	0.245	0.141
	angio	0.859	0.156	0.960	1	1
CABLE-POP	gymno	1	5.483	0.662	0.807	0.866
	angio	2.986	0.524	0.377	8.058	1
ORCHIDEE	gymno	10.127	0.055	0.020	0.051	0.033
	angio	1.122	0.082	0.106	0.109	0.016

Supplementary Table 2. Model, tree functional type, and ecozone combinations with non-existent inputs or inputs equal zero.

Models	Tree functional type	Ecozone
LPJ-GUESS	gymno	tropics
LPJ-GUESS	angio	arctic
SEIB-DGVM	angio	boreal
SEIB-DGVM	angio	arctic
CABLE-POP	gymno	tropics
CABLE-POP	angio	arctic
SSP	gymno	tropics
SSP	angio	arctic