

Supplementary materials

Model evaluation

Daily model outputs were evaluated against eddy-covariance and measured structural data at the site level, in terms of percentage root mean squared error (RMSE%) and Pears's correlation coefficient (r). The GPP evaluation for simulations forced with observed site-specific daily weather data (1997-2005 for FI-Hyy, and DK-Sor, and 2000-2005 for CZ-BK1) resulted in an RMSE% of 1.05, 1.52, and 1.43, with r values of 0.92, 0.87 and 0.94 for FI-Hyy, CZ-BK1 and DK-Sor, respectively (Table 1). Similar results were obtained for NPP_{woody} in the site of DK-Sor and CZ-BK1 (351 ±61 gC m⁻² year⁻¹ vs. 346 ±36 gC m⁻² year⁻¹ measured, and 442 ±79 gC m⁻² year⁻¹ vs. 380 ± 38 gC m⁻² year⁻¹ measured, respectively). At FI-Hyy, modeled NPP_{woody} data was overestimated in respect to the measured values (317 ±21 gC m⁻² year⁻¹ vs. 228 ±23 gC m⁻² year⁻¹ measured).

Table S1 | Performance statistics (coefficient of determination R², relative root mean square error RMSE (gC m⁻² day⁻¹) and Fractional Mean Bias, FMB) computed from monthly seasonal values and annual series of model gross primary productivity, GPP, against eddy covariance estimated and diametric annual increment data, DBH increment, against measured data. Results are reported for simulations forced with local and modeled climate (i.e., ESM) (ESM1, 2, 3, 4, 5 refer to HadGEM2-ES, IPSL-CM5A-LR, MIROC-ESM-CHEM, GFDL-ESM 2M, and NorESM1-M, respectively).

	CLIMATE	GPP SEASONAL		GPP ANNUAL			DBH increment	
		F MB	R MSE	R ²	F MB	R MSE	F MB	R MSE
CZ-BK1		-	17.	0.	-	180	-	0.2
	Local	0.06	92	95	0.06	.96	0.17	6
		-	28.	0.	-	161	-	0.2
	ESM1	0.22	68	38	0.07	.16	0.29	4
		-	25.	0.	-	150	-	0.2
	ESM2	0.22	56	65	0.07	.29	0.31	5
		-	21.	0.	-	180	-	
	ESM3	0.16	78	009	0.01	.68	0.22	0.2
		-	28.	0.	-	187	-	0.2
FI-Hyy		-	24.	0.	-	131	-	0.2
	ESM5	0.17	15	97	0.02	.99	0.28	3
		-	340	0.	-	99.	0.	0.2
	Local	0.02	56	74	0.03	62	02	3
		-	440	0.	-	166	-	0.2
	ESM1	0.2	51	23	0.16	046	0.02	6
		-	390	0.	-	182	-	0.2
	ESM2	0.22	23	13	0.17	.23	0.05	6

D K-Sor	ESM3	-	350	0.	-	124	0.	0.2
		0.13	53	06	0.09	.75	09	6
		-	43.	0.	-	191	-	0.2
	ESM4	0.23	76	18	0.19	.98	0.03	6
		-	43.	0.	-	199	-	0.2
	ESM5	0.24	66	18	0.2	.04	0.1	5
	Local	0.	24.	0.	0.	122	-	0.7
		01	56	75	009	.61	0.47	7
		-	19.	0.	-	210	-	0.6
	ESM1	0.12	01	22	0.07	.27	0.8	2
		-	23.	0.	-	173	-	0.5
	ESM2	0.7	63	21	0.02	.82	0.61	7
	ESM3	-	33.	0.	-	150	-	0.6
		0.7	46	46	0.02	.62	0.6	0.6
	ESM4	-	26.	0.	-	195	-	0.6
		0.12	55	55	0.07	.54	0.7	1
	ESM5	-	27.	0.	-	168	-	0.5
	ESM5	0.09	69	41	0.05	.62	0.65	9

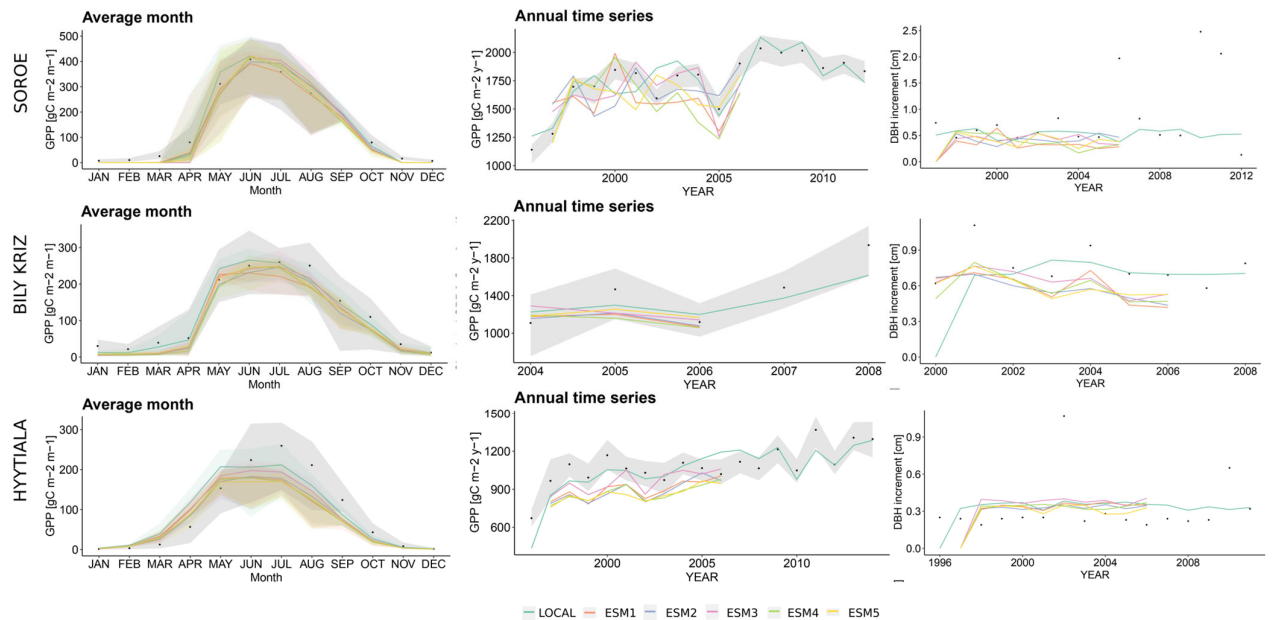


Figure S11| Evaluation of monthly seasonal GPP ($\text{gC m}^{-2} \text{ month}^{-1}$) fluxes (left column) and annual ($\text{gC m}^{-2} \text{ year}^{-1}$) fluxes (central column) for the sites of Sorø, Bily Kriz, and Hyttiala (rows). Quality-checked and -filtered GPP values evaluated at the sites by the eddy covariance technique are reported as black dots. The shaded area for seasonal values reports the maximum and minimum monthly values recorded in the time series. The shaded area for annual data represents the relative uncertainty bounds. In the third column, a comparison of the predicted annual DBH increment (cm y^{-1}) with site observations at the three sites is reported. Measured data are shown as black dots. Simulated data are reported as continuous lines.