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Supplement of

Validation of 3D-CMCC Forest Ecosystem Model (v.5.1) against eddy covariance data for ten European forest sites

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Supplementary material - Table captions

Table S1 Performance statistics (r , NRMSE, MEF, and Bi) are reported as derived from daily and monthly series of GPP_{MD} vs. GPP_{EC} values operated over long-term annual scale. For the different indices, the values in bold represent the maximum, values in italics the minimum. The (*) refers to p -value < 0.0001 in correlation between GPP_{EC} and GPP_{MD} data. In addition, long term average of annual measured GPP_{EC} and GPP_{MD} values ($gC\ m^{-2}\ yr^{-1}$) are shown.

Table S2 Performance statistics (r , NRMSE, MEF, Bi) are reported as derived from daily and monthly series of GPP_{MD} vs. GPP_{EC} values operated over long-term seasonal scale. For the different indices, the values in bold represent the maximum, values in italics the minimum. For Bi, daily values are in $gC\ m^{-2}\ d^{-1}$, monthly values in $gC\ m^{-2}\ month^{-1}$. Values for DBF species in DJF are missing since the model does not produce any GPP flux during that season. The (*) refers to p -value < 0.0001 in correlation between GPP_{EC} and GPP_{MD} data.

Table S1

Site Name	DAILY				MONTHLY				YEARLY					
	r	NRMSE	MEF	Bi (gC m ⁻² d ⁻¹)	r	NRMSE	MEF	Bi (gC m ⁻² month ⁻¹)	r	NRMSE	MEF	Bi (gC m ⁻² yr ⁻¹)	GPP _{MD} (gC m ⁻² yr ⁻¹)	GPP _{EC} (gC m ⁻² yr ⁻¹)
DE-Hai	0.92*	0.4	0.85	0.10	0.97*	0.24	0.94	2.95	0.32	1.08	-0.34	-37.0	1474	1511
DK-Sor	0.89*	0.51	0.74	0.13	0.97*	0.27	0.93	3.89	-0.02	1.82	-2.72	-46.6	1901	1947
FR-Hes	0.79*	0.77	0.42	-0.85	0.94*	0.36	0.87	-8.66	0.01	1.18	-0.62	103.9	1726	1622
IT-Col	0.85*	0.59	0.66	-0.16	0.9*	0.46	0.85	-1.9	0.10	1.15	-0.44	92.6	1317	1368
FR-Pue	0.82*	0.78	0.39	-0.45	0.89*	0.67	0.58	-13.65	0.76	1.12	-0.38	157.6	1463	1305
IT-Cpz	<i>0.57*</i>	1.02	<i>-0.04</i>	0.89	<i>0.71*</i>	0.9	<i>0.18</i>	27.05	-0.46	2.43	-5.73	-317.9	1409	1727
DE-Tha (1S)	0.89*	0.48	0.80	-0.08	0.96*	0.29	0.91	-2.46	0.11	1.22	-0.49	29.5	1898	1869
FI-Hyy	0.91*	0.48	0.77	-0.14	0.96*	0.29	0.93	-4.06	0.52	<i>1.04</i>	-0.18	51.5	<i>1119</i>	<i>1068</i>
IT-Ren (2L_2C)	0.81*	0.62	0.61	-0.02	0.95*	0.3	0.91	-0.72	<i>-0.47</i>	1.43	-1.45	-14	1348	1362
BE-Bra (P_Q-3L)	0.77*	0.64	0.58	0.18	0.91*	0.42	0.82	-3.95	-0.38	1.23	-0.69	-57	1169	1112
Average	0.83	0.63	0.58	0.30	0.92	0.42	0.79	6.93	-	1.37	-1.30	90.8	1482	1489

Table S2

MONTHLY																
Sites	DJF				MAM				JJA				SON			
	r	NRMSE	MEF	Bi	r	NRMSE	MEF	Bi	r	NRMSE	MEF	Bi	r	NRMSE	MEF	Bi
DE-Hai	-	-	-	-	0.98*	0.48	0.87	-21.31	0.64	1.02	-0.42	28.62	0.99*	0.17	0.97	4.53
DK-Sor	-	-	-	-	0.95*	0.45	0.85	29.88	0.77*	0.64	0.28	-8.88	0.97*	0.46	0.88	-11.98
FR-Hes	-	-	-	-	0.97*	0.24	0.94	0.85	0.32	0.99	-2.13	-20.56	0.9*	0.57	0.77	-18.91
IT-Col	-	-	-	-	0.77*	0.72	0.52	19.35	0.27	1.13	-0.81	-12.43	0.71*	0.78	0.36	-19.69
FR-Pue	0.79*	1.2	-0.12	12.82	0.81*	1.19	0.18	-28.66	0.83*	0.81	0.02	-36.44	0.74*	0.84	0.53	-2.72
IT-Cpz	0.05	1.56	-8.95	37.75	0.06	1.49	-0.63	6.94	0.5	1.07	-1.84	29.69	0.58	1.15	-1.39	33.82
DE-Tha (1S)	0.88*	0.5	0.73	-1.88	0.89*	0.52	0.75	-19.5	0.57	0.88	-0.35	13.35	0.95*	0.38	0.89	-1.81
FI-Hyy	0.71*	0.94	-127	1.16	0.96*	0.63	0.76	-27.79	0.62	0.99	0.3	-7.32	0.96*	0.49	0.69	18.56
IT-Ren(2L-2C)	0.39	1.15	-0.54	-5.95	0.88*	0.42	0.79	3.44	0.69	1	-1.92	-10.32	0.94*	0.47	0.76	15.68
BE-Bra (P_Q-3L)	0.39	1.79	-0.81	-9.72	0.91*	0.58	0.46	-23.02	0.08	1.12	-5.3	17.8	0.87*	0.48	0.68	-1.08
Average	0.54	1.19	-22.78	5.70	0.82	0.67	0.55	-5.98	0.53	0.97	-1.22	-0.65	0.86	0.58	0.51	1.64
DAILY																
DE-Hai	-	-	-	-	0.88*	0.81	0.7	-0.7	0.74*	0.91	0.46	0.93	0.94*	0.36	0.88	0.15
DK-Sor	-	-	-	-	0.85*	0.73	0.7	0.83	0.48*	1.12	0.09	-0.23	0.87*	0.7	0.73	-0.3

FR-Hes	-	-	-	-	0.77*	0.84	0.58	-0.55	0.17*	1.36	-0.95	-1.77	0.71*	1.06	0.41	-1.18
IT-Col	-	-	-	-	0.69*	0.87	0.43	0.55	0.42*	1.18	-0.03	-0.44	0.72*	0.83	0.43	-0.79
FR-Pue	0.84*	0.77	0.55	0.42	0.79*	1.12	0.48	-0.93	0.72*	0.9	0.15	-1.18	0.73*	0.81	0.52	-0.09
IT-Cpz	0.21*	1.38	-3.45	1.27	0.16*	1.41	-0.47	0.19	0.36*	1.15	-1.12	0.99	0.46*	1.16	-1.03	1.14
DE-Tha (1S)	0.75*	0.85	0.55	-0.07	0.82*	0.74	0.65	-0.64	0.63*	0.92	0.31	0.44	0.89*	0.57	0.79	-0.06
FI-Hyy	0.35*	0.96	-33.28	0.04	0.86*	0.94	0.62	-0.91	0.73*	1.07	0.52	-0.24	0.91*	0.53	0.7	0.59
IT- Ren(2L- 2C)	0.23*	1.29	-0.6	-0.2	0.73*	0.77	0.5	0.07	0.31*	1.27	-0.56	-0.34	0.73*	0.79	0.4	0.57
BE-Bra (P_Q-3L)	0.38*	1.03	-1.09	-0.23	0.68*	0.86	0.28	-0.6	0.19*	1.35	-1.24	1.25	0.69*	0.74	0.2	0.18
Average	0.46	1.05	-6.22	0.21	0.72	0.91	0.45	-0.27	0.48	1.12	-0.24	-0.06	0.77	0.76	0.40	0.02

