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Modelling the tree height-diameter relationship of Macedonian pine (*Pinus peuce* Gris.) forests in North Macedonia

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Electronic Supplementary Material (ESM)

The authors are fully responsible for both the content and the formal aspects of the Electronic Supplementary Material. No editorial adjustments were made.

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Table S1. Model testing parameter

Model	*RMSE*	*Bias*	*MPA*	*MAE*	*AIC*	R^2	*R*	*MRE*	*MAPE*
M1	32.74	0.0119221432	6.81	0.01192	3 024.3	0.725	0.851	0.019	11.69
M2	32.75	0.0060756676	6.81	0.00608	3 025.1	0.725	0.851	0.023	11.84
M3	33.17	0.0237606869	6.99	0.02376	3 065.3	0.718	0.847	0.017	11.83
M4	32.74	0.0118676894	6.81	0.01187	3 024.3	0.725	0.851	0.019	11.69
M5	32.74	0.0118676894	6.81	0.01187	3 024.3	0.725	0.851	0.019	11.69
M6	32.72	0.0058733891	6.80	0.00587	3 023.0	0.725	0.852	0.023	11.82
M7	32.74	0.0119734846	6.81	0.01197	3 024.3	0.725	0.851	0.019	11.69
M8	32.75	0.0060779185	6.81	0.00608	3 025.1	0.725	0.851	0.023	11.84
M9	34.00	0.0473811337	7.34	0.04738	3 143.2	0.704	0.839	0.016	12.16
M10	34.00	0.0291315203	7.34	0.02913	3 143.1	0.704	0.839	0.017	12.18
M11	32.75	0.0061045691	6.81	0.00610	3 025.1	0.725	0.851	0.023	11.84
M12	34.00	0.0289406295	7.34	0.02894	3 143.1	0.704	0.839	0.017	12.18
M13	32.75	0.0061045691	6.81	0.00610	3 025.1	0.725	0.851	0.023	11.84
M14	33.19	0.0530144994	7.00	0.05301	3 067.7	0.719	0.848	0.014	11.83
M15	32.78	0.0069317283	6.83	0.00693	3 028.4	0.724	0.851	0.023	11.86
M16	32.65	0.0013085735	6.77	0.00131	3 015.6	0.726	0.852	0.021	11.72
M17	**32.65**	**0.0001169408**	**6.77**	**0.00012**	**3 015.5**	**0.726**	**0.852**	**0.021**	**11.73**
M18	32.75	0.0061120290	6.81	0.00611	3 025.1	0.725	0.851	0.023	11.84
M19	32.75	0.0059600303	6.81	0.00596	3 025.1	0.725	0.851	0.023	11.84
M20	32.65	0.0000092581	6.77	0.00001	3 016.0	0.726	0.852	0.021	11.73
M21	34.00	0.0289443305	7.34	0.02894	3 143.1	0.704	0.839	0.017	12.18
M22	32.75	0.0062287818	6.81	0.00623	3 025.1	0.725	0.851	0.023	11.84
M23	34.00	0.0300686368	7.34	0.03007	3 143.1	0.704	0.839	0.017	12.18
M24	32.75	0.0056728208	6.81	0.00567	3 025.1	0.725	0.851	0.023	11.84
M25	33.19	0.0158354325	7.00	0.01584	3 067.1	0.717	0.847	0.020	11.87
M26	32.83	0.0040224247	6.85	0.00402	3 033.5	0.723	0.850	0.022	11.86
M27	33.81	0.0311993758	7.26	0.03120	3 126.2	0.707	0.841	0.017	12.09
M28	33.23	0.0266203425	7.02	0.02662	3 071.6	0.717	0.847	0.017	11.85
M29	33.14	0.0252696603	6.98	0.02527	3 063.0	0.718	0.848	0.017	11.81
M30	34.00	0.0296624168	7.34	0.02966	3 143.1	0.704	0.839	0.017	12.18
M31	33.02	0.0229275719	6.93	0.02293	3 051.5	0.720	0.849	0.018	11.77
M32	32.74	0.0119163905	6.81	0.01192	3 024.3	0.725	0.851	0.019	11.69
M33	32.67	0.0854304627	6.78	0.08543	3 017.8	0.726	0.852	0.017	11.66
M34	32.75	0.0060866405	6.81	0.00609	3 025.1	0.725	0.851	0.023	11.84
M35	37.15	0.0003322087	8.77	0.00033	3 422.5	0.646	0.804	0.023	13.35
M36	32.79	0.0084634010	6.83	0.00756	3 030.2	0.724	0.851	0.023	11.87
M37	32.70	0.0005575782	6.79	0.00056	3 020.5	0.725	0.852	0.022	11.77
M38	32.79	0.0085259878	6.83	0.00853	3 029.5	0.724	0.851	0.023	11.87
M39	37.15	0.0000222087	8.77	0.00002	3 422.5	0.646	0.804	0.023	13.35
M40	33.61	0.0272230468	7.17	0.02722	3 106.7	0.711	0.843	0.017	12.00
Min	32.65	0.0000092581	6.77	0.00001	3 015.5	0.646	0.804	0.014	11.66
Max	37.15	0.0854304627	8.77	0.08543	3 422.5	0.726	0.852	0.023	13.35

Bold – specific model M17; *RMSE* – root mean square error; *bias* – differences between results and facts; *MPA* – model prediction accuracy; *MAE* – mean absolute error; *AIC* – Akaike information criterion; R^2 – coefficient of determination; *R* – coefficient of correlation; *MRE* – mean relative error; *MAPE* – mean absolute percent error

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Table S2. Regression coefficient with statistical data

Model	Regresion coefficient				
	parameter	value	standard error	*t*-ratio	*P*-value
M1	*a*	45.574	0.99	45.85	0.00
	b	43.156	1.68	25.64	0.00
M2	*a*	2.665	0.09	30.91	0.00
	b	0.568	0.01	62.60	0.00
M3	*a*	2.016	0.04	56.10	0.00
	b	0.163	0.00	147.84	0.00
M4	*a*	0.947	0.02	56.15	0.00
	b	0.022	0.00	45.85	0.00
M5	*a*	0.022	0.00	45.85	0.00
	b	0.947	0.02	56.15	0.00
M6	*a*	2.844	0.10	29.65	0.00
	b	0.447	0.01	47.63	0.00
M7	*a*	1.056	0.02	56.14	0.00
	b	−0.977	0.00	−1 080.74	0.00
M8	*a*	0.426	0.01	30.29	0.00
	b	0.568	0.01	62.59	0.00
M9	*a*	3.510	0.01	351.55	0.00
	b	−16.703	0.30	−55.56	0.00
M10	*a*	2.510	0.01	251.38	0.00
	b	−16.703	0.30	−55.55	0.00
M11	*a*	0.980	0.03	30.29	0.00
	b	0.568	0.01	62.59	0.00
M12	*a*	33.448	0.33	100.16	0.00
	b	−16.703	0.30	−55.55	0.00
M13	*a*	0.980	0.03	30.29	0.00
	b	0.568	0.01	62.59	0.00
M14	*a*	0.902	0.01	93.50	0.00
	b	0.012	0.00	44.58	0.00
M15	*a*	0.911	0.05	0.00	0.00
	b	0.586	0.01	0.00	0.00
M16	*a*	−2.711	0.88	−3.07	0.00
	b	1.134	0.06	17.86	0.00
	c	0.019	0.00	18.64	0.00
M17	*a*	0.786	0.07	11.08	0.00
	b	0.576	0.09	6.38	0.00
	c	0.014	0.00	4.27	0.00
M18	*a*	2.665	0.09	30.66	0.00
	b	−0.372	61 987.23	0.00	1.00
	c	−0.939	61 987.23	0.00	1.00

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Table S2. To be continued

Model	Regresion coefficient				
	parameter	value	standard error	*t*-ratio	*P*-value
M18	*a*	2.665	0.09	30.66	0.00
	b	–0.372	61 987.23	0.00	1.00
	c	–0.939	61 987.23	0.00	1.00
M19	*a*	0.191	0.00	0.00	0.00
	b	–0.432	0.00	0.00	0.00
	c	–2.638	0.00	0.00	0.00
M20	*a*	–9.642	4.81	–2.00	0.05
	b	0.127	0.05	2.56	0.01
	c	–0.375	0.06	–5.85	0.00
M21	*a*	–7.818	0.00	0.00	0.00
	b	–16.703	0.00	0.00	0.00
	c	11.328	0.00	0.00	0.00
M22	*a*	–7.906	3 087.94	0.00	1.00
	b	2.665	0.91	2.91	0.00
	c	0.568	0.07	8.63	0.00
M23	*a*	0.497	0.00	0.00	0.00
	b	–16.703	0.30	0.00	0.00
	c	4.208	0.00	0.00	0.00
M24	*a*	0.497	0.02	0.00	0.00
	b	–1.680	0.00	0.00	0.00
	c	–0.568	0.01	0.00	0.00
M25	*a*	151.822	103.93	1.46	0.14
	b	–0.132	0.12	–1.14	0.25
	c	–0.078	0.06	–1.21	0.23
M26	*a*	9.224	0.40	23.26	0.00
	b	0.310	0.01	31.08	0.00
	c	0.055	0.00	21.43	0.00
M27	*a*	32.671	0.35	93.27	0.00
	b	18.231	0.33	55.48	0.00
M28	*a*	2.410	0.04	55.83	0.00
	b	0.304	0.00	227.73	0.00
M29	*a*	2.401	0.04	55.88	0.00
	b	0.237	0.00	180.82	0.00
M30	*a*	3.521	0.01	351.55	0.00
	b	–16.754	0.30	–55.56	0.00
M31	*a*	2.267	0.04	55.91	0.00
	b	0.163	0.00	133.77	0.00
M32	*a*	45.574	0.99	45.85	0.00
	b	43.156	1.68	25.64	0.00

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Table S2. To be continued

Model	Regresion coefficient				
	parameter	value	standard error	*t*-ratio	*P*-value
M33	*a*	–1.810	1.08	–1.68	0.09
	b	1.220	0.08	16.14	0.00
	c	0.019	0.00	16.16	0.00
M34	*a*	0.314	4 590.71	0.00	1.00
	b	–0.396	6 622.99	0.00	1.00
	c	0.965	6 622.99	0.00	1.00
M35	*a*	28.006	0.19	145.88	0.00
	b	–253.753	4.74	–53.53	0.00
M36	*a*	1.407	0.06	23.93	0.00
	b	0.609	0.01	62.24	0.00
M37	*a*	4.602	0.41	11.22	0.00
	b	0.553	0.02	22.77	0.00
	c	–0.003	0.00	–9.26	0.00
M38	*a*	2.147	0.08	28.55	0.00
	b	0.609	0.01	62.24	0.00
M39	*a*	35.560	6 219 874.17	0.00	1.00
	b	–253.753	4.75	–53.47	0.00
	c	–7.554	6 219 874.15	0.00	1.00
M40	*a*	3.510	0.01	319.84	0.00
	b	–19.614	0.35	–56.27	0.00