

A GLMER-based pedotransfer function expressing the relationship between total organic carbon and bulk density in forest soils

VÁCLAV ZOUHAR^{1*}, ALEŠ KUČERA², KAREL DRÁPELA³

¹Forest Management Institute – Brandýs nad Labem, Brno branch, Brno, Czech Republic

²Department of Geology and Soil Science, Faculty of Forestry and Wood Technology, Mendel University in Brno, Brno, Czech Republic

³Institute of Forest Management and Applied Geoinformatics, Faculty of Forestry and Wood Technology, Mendel University in Brno, Brno, Czech Republic

*Corresponding author: zouhar.vaclav@uhul.cz

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Table S1. Relative elevation classes for Czech natural forest areas (NFAs) used in this study

No.	Name of NFA	Relative elevation class
1	Ore Mountains	mountains
2	Podkrušnohorské Basins	lowlands
3	Karlovy Vary Highlands	highlands
4	Doupov Mountains	uplands
5	Central Bohemian Highlands	highlands
6	West Bohemian Uplands	uplands
7	Brdy Highlands	highlands
8	Křivoklát region and the Bohemian Karst	uplands
9	Rakovník-Kladno Uplands	uplands
10	Central Bohemian Uplands	uplands
11	Bohemian Forest	highlands
12	Foothills of the Šumava and Novohradské Mountains	highlands
13	Šumava Mountains	mountains
14	Novohradské Mountains	mountains
15	South Bohemian Basins	lowlands
16	Bohemian-Moravian Highlands	highlands
17	The Polabí region	lowlands
18	The North Bohemian Sandstone Plateau and Bohemian Paradise	uplands
19	Lusatian Sandstone Highlands	highlands
20	Lusatian Uplands	uplands
21	Jizera Mountains and Ještěd	mountains
22	Krkonoše Mountains	mountains
23	Podkrkonoší region	uplands
24	Sudeten Intermountains	highlands
25	Orlické Mountains	mountains
26	Foothills of the Orlické Mountains	uplands
27	Hrubý Jeseník Mountains	mountains
28	Foothills of the Hrubý Jeseník Mountains	highlands
29	Nízký Jeseník Mountains	highlands
30	Drahan Highlands	highlands
31	Bohemian-Moravian Intermountains	uplands
32	Silesian Lowland	lowlands
33	Foothills of the Bohemian-Moravian Highlands	uplands
34	Upper Moravian Basin	lowlands
35	South Moravian Basins	lowlands
36	Central Moravian Carpathians	uplands
37	Kelečská Uplands	uplands
38	White Carpathians and Vizovice Hills	highlands
39	Podbeskydská Uplands	uplands
40	Moravian-Silesian Beskydy Mountains	mountains
41	Hostýnskovsetínské and Javorníky Mountains	highlands

Lowlands = 0–30 m a.s.l.; uplands = 30–150 m a.s.l.; highlands = 150–300 m a.s.l.; mountains = 300–600 m a.s.l.

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Table S2. Generalised linear model (GLM) and generalised linear mixed-effects (GLMER) model parameters for the relationship between soil bulk density (BD) and total organic carbon (TOC) concentration, based on the 41 Czech national forest areas (NFAs)

Model	Model syntax	NFA	Intercept	Slope	AIC	R^2_{marg}	R^2_{cond}
GLM	$BD \sim \text{TOC}$	–	0.650684	0.080824	–682.99	0.548	–
GLMER	$BD \sim \text{TOC} + \frac{1 + \text{TOC}}{\text{NFA}}$						
Fixed effect		–	0.668562	0.088349	–850.40	0.613	0.647
		1	0.643540	0.096885	–	–	–
		2	0.667726	0.053518	–	–	–
		3	0.670454	0.082997	–	–	–
		5	0.698505	0.073144	–	–	–
		6	0.664660	0.089288	–	–	–
		7	0.672257	0.083486	–	–	–
		8	0.664415	0.096476	–	–	–
		9	0.645254	0.103876	–	–	–
		10	0.640821	0.077066	–	–	–
		11	0.667535	0.088104	–	–	–
		12	0.654179	0.098737	–	–	–
		13	0.687579	0.085300	–	–	–
		14	0.663599	0.112088	–	–	–
		15	0.644581	0.063203	–	–	–
		16	0.617941	0.087455	–	–	–
		17	0.624358	0.086453	–	–	–
		18	0.675964	0.072056	–	–	–
		19	0.663122	0.076257	–	–	–
		20	0.690718	0.109810	–	–	–
Random effect		21	0.678531	0.090056	–	–	–
		22	0.718637	0.072455	–	–	–
		23	0.666684	0.086245	–	–	–
		24	0.640147	0.083123	–	–	–
		25	0.680331	0.083480	–	–	–
		26	0.665539	0.084773	–	–	–
		27	0.677059	0.086695	–	–	–
		28	0.668662	0.077734	–	–	–
		29	0.660415	0.088405	–	–	–
		30	0.654111	0.075211	–	–	–
		31	0.679680	0.078016	–	–	–
		32	0.678569	0.093177	–	–	–
		33	0.641481	0.069469	–	–	–
		34	0.666840	0.115392	–	–	–
		35	0.692352	0.037170	–	–	–
		36	0.643872	0.081661	–	–	–
		37	0.642732	0.089476	–	–	–
		38	0.661599	0.096020	–	–	–
		39	0.675124	0.074639	–	–	–
		40	0.664636	0.089957	–	–	–
		41	0.674204	0.088578	–	–	–

AIC – Akaike's information criterion; R^2_{marg} – marginal coefficient of determination; R^2_{cond} – conditional coefficient of determination