

Supplementary Material

Tab. S1 - The methods used for determination of content of bound forms of oxides of chemical elements (tFe, tAl, tCa, tMg, tK, tMn, tP) and other parameters (BS, pH, C/N), according to FMI methodology at the FMI pedological laboratory in Brandýs nad Labem (FMI 2005).

Chemical element/parameter	Year	Method according to FMI (2005): Standard Operational Procedures of Pedological Laboratory (SOP)	Final units
Total content of Fe (Fe ₂ O ₃)	until 1983	Chelatometry (leachate of Aqua regia or 2M nitric acid)	mg kg ⁻¹
	since 1983	Leachate of 20% HCl and subsequent determination by flame atomic absorption spectroscopy (FAAS)	mg kg ⁻¹
Total content of Al (Al ₂ O ₃)	until 1983	Calculation	mg kg ⁻¹
	since 1983	Leachate of 20% HCl and subsequent determination by flame atomic absorption spectroscopy (FAAS)	mg kg ⁻¹
Total content of Ca (CaO)	until 1983	Chelatometry	mg kg ⁻¹
	since 1983	Leachate of 20% HCl and subsequent determination by flame atomic absorption spectroscopy (FAAS)	mg kg ⁻¹
Total content of Mg (MgO)	until 1983	Chelatometry	mg kg ⁻¹
	since 1983	Leachate of 20% HCl and subsequent determination by flame atomic absorption spectroscopy (FAAS)	mg kg ⁻¹
Total content of K (K ₂ O)	until 1983	Flame atomic emission spectroscopy (FAES)	mg kg ⁻¹
	since 1983	Leachate of 20% HCl and subsequent determination by flame atomic absorption spectroscopy (FAAS)	mg kg ⁻¹
Total content of Mn (MnO)	until 1983	Colorimetry	mg kg ⁻¹
	since 1983	Leachate of 20% HCl and subsequent determination by flame atomic absorption spectroscopy (FAAS)	mg kg ⁻¹
Total content of P (P ₂ O ₅)	continuously	Spectrometric determination (FAAS) in the form of a phosphomolybdate blue (leachate of 20% HCl)	mg kg ⁻¹
Total content of N (ammonia-N, nitrate-N, nitrite-N and organic nitrogen)	continuously	Kjeldahl method (Bremner 1960, ISO 1995)	%
Base saturation	continuously	BS (base saturation) = (CEC-EA)/CEC · 100 (%) CEC = cation exchange capacity (mg kg ⁻¹ units) calculation formula: CEC = $\Sigma Ca^{2+} + Mg^{2+} + K^{+} + Na^{+} + H^{+} + Al^{3+}$ EA = extractable acidity (mg kg ⁻¹ units) calculation formula: EA = $\Sigma H^{+} + Al^{3+}$	%
pH (pH/H ₂ O)	until 1983	pH meter, quinhydrone and calomel electrodes	-
	since 1983	pH meter and a glass electrode	-
C/N	continuously	Ratio parameter (SOC/tN)	-

Tab. S2 - Descriptive statistics of a dataset of 81 samples for all input variables.

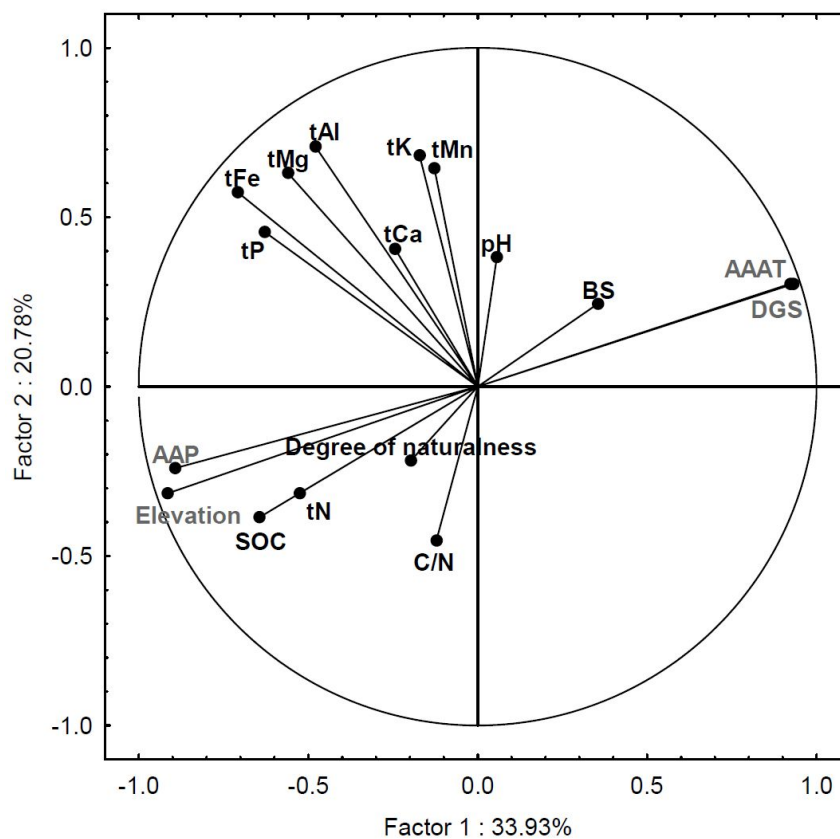
Variable (units)	Mean	Median	SEM	Min	Max	SD
Elevation (m a. s. l.)	627.75	540.00	27.99	320.00	1318.00	251.90
AAAT (°C)	6.23	6.73	0.17	2.10	8.13	1.56
AAP (mm)	767.39	716.50	14.68	621.10	1105.90	132.13
DGS (days)	161.70	172.00	2.82	93.00	191.00	25.34
pH	3.36	3.32	0.04	2.62	4.71	0.37
C/N	15.60	16.30	0.49	4.50	26.90	4.45
BS (%)	23.58	15.53	2.60	2.83	93.14	22.48
tFe (mg kg⁻¹)	28616.13	24700.00	2339.86	7260.00	90700.00	20263.77
tAl (mg kg⁻¹)	29299.20	28200.00	1752.30	3220.00	72400.00	15175.35
tMn (mg kg⁻¹)	680.80	380.00	89.71	40.00	5090.00	776.89
tCa (mg kg⁻¹)	1775.73	1200.00	203.70	200.00	9500.00	1764.05
tMg (mg kg⁻¹)	6320.40	4470.00	774.39	370.00	37000.00	6706.42
tK (mg kg⁻¹)	1850.93	1780.00	138.97	550.00	8900.00	1203.54
tP (mg kg⁻¹)	777.08	590.00	73.87	160.00	4438.00	639.71
tN (%)	0.26	0.21	0.02	0.04	1.40	0.20
SOC (t ha⁻¹)	27.06	18.60	2.78	3.68	150.48	24.99
Depth of horizon (cm)	7.72	6.00	0.66	1.00	35.00	5.95

Mean: arithmetic mean; Median: median value; SEM: standard error of the mean; Min: minimum value; Max: maximum value; SD: standard deviation.

Potential relationships of selected abiotic variables, chemical elements and stand characteristics with soil organic carbon in spruce and beech stands

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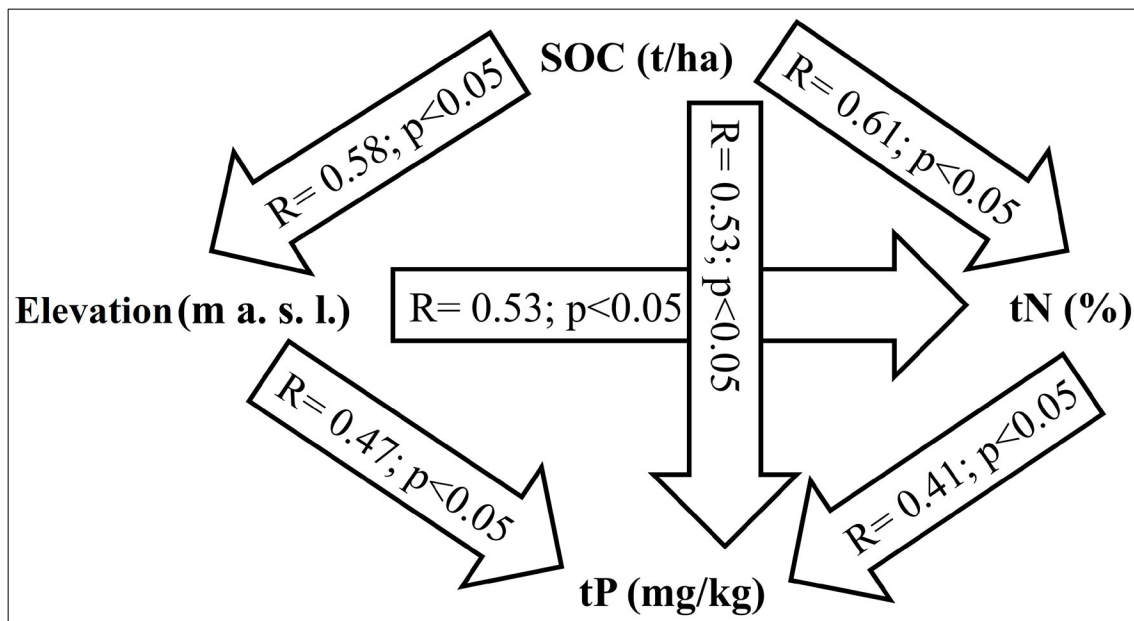
Fig. S1 - Biplot – Projection of input variables. Variables relating to site conditions are marked in grey. Other variables (chemical elements but also forest naturalness) are marked in black. Abbreviations used: AAP – average annual precipitation (mm); DGS – duration of growing season (days); AAAT – average annual air temperature (°C); BS – base saturation (%); pH – pH/H₂O; tMn – content of bound forms of manganese oxides (mg kg⁻¹); tK – content of bound forms of potassium oxides (mg kg⁻¹); tCa – content of bound forms of calcium oxides (mg kg⁻¹); tAl – content of bound forms of aluminium oxides (mg kg⁻¹); tMg – content of bound forms of magnesium oxides (mg kg⁻¹); tFe – content of bound forms of iron oxides (mg kg⁻¹); tP – content of bound forms of phosphorus oxides (mg kg⁻¹); tN – total content of nitrogen (%); C/N – ratio of carbon to nitrogen; SOC – soil organic carbon (t ha⁻¹).



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Fig. S2 - Diagram of mutual positive correlations among elevation, content of bound forms of oxides of phosphorus (tP), total content of nitrogen (tN) and soil organic carbon (SOC). (R): Spearman's correlation coefficient; (p): p-value associated to correlation coefficient.



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Fig. S3 - Distribution of samples with information about the SOC content attributed to represented soil groups at different elevations.

