

Element Composition of Fractionated Water-Extractable Soil Colloidal Particles Separated by Track-Etched Membranes

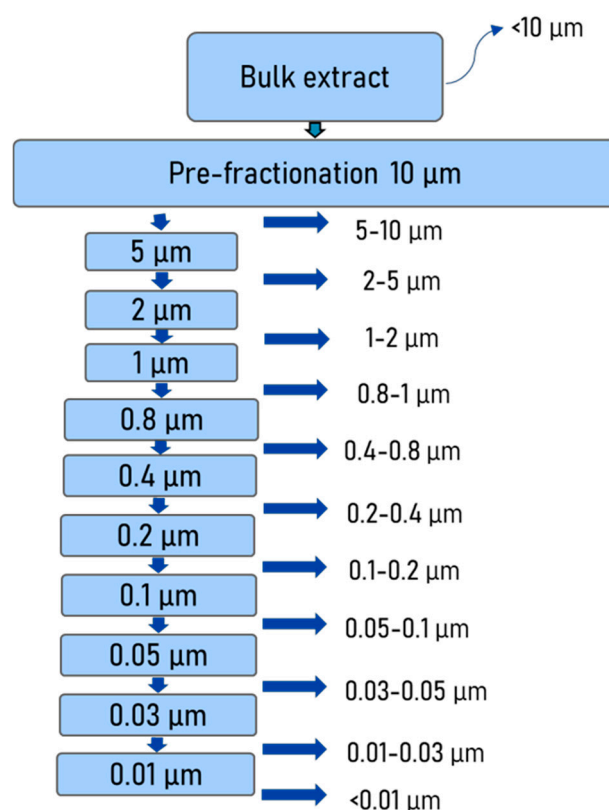


Figure S1. General scheme for sequential fractionation of water-soluble soil organic matter using a polycarbonate track-etched membrane.

Table S1. Wavelengths (nm) for ICP–AES measurements

Elements	Emission lines, nm
Ag	328.07, 338.29
Al	308.22, 394.40, 396.15
As	188.98, 193.70, 197.20, 234.98
B	182.58, 208.89, 208.96, 249.68
Ba	230.42, 233.53, 455.40, 493.41, 614.17
Be	234.86, 249.47, 313.04, 313.11
Ca	315.89, 317.93, 393.37, 396.85, 422.67
Cd	228.80
Co	230.79, 231.160, 237.863, 238.892, 258.03
Cr	267.716, 276.259, 276.653, 313.205
Cu	324.754, 327.400
Fe	238.204, 239.563, 258.590, 259.940, 263.105
K	404.72, 766.49, 769.90
Li	610.37, 670.78
Mg	277.98, 279.55, 279.80, 280.27, 285.21, 383.23, 383.83
Mn	257.61, 259.37, 260.57, 293.305, 293.931, 294.92

Mo	202.03, 281.62, 284.82, 289.10, 313.26, 379.83
Na	568.82, 589.00, 589.59
Ni	216.56, 221.65, 227.02, 230.299, 231.604, 231.10
P	185.88, 213.62, 214.91
Pb	220.35
S	180.67, 181.97, 182.56
Sb	206.83, 217.58, 231.15
Sc	357.63, 424.68, 361.38, 357.25, 335.37
Se	196.03
Si	250.69, 251.43, 251.61, 252.41, 252.85, 288.16
Sn	189.925, 283.998, 317.503, 326.233
Sr	346.445, 407.771, 416.179, 421.552
Ti	334.188, 334.941, 336.122, 337.280, 368.520
V	289.265, 292.401, 311.837
W	207.91, 216.63, 222.59, 222.96, 224.88
Zn	202.55, 206.200, 213.86, 334.56

Calculations

Based on the described sample preparation procedure, the concentrations of the detected elements were recalculated per sample of soil as follows

Recalculation for the bulk reaction

$$c(M)_{\text{soil}} = \frac{m(M)}{m_{\text{sample}}(40 \text{ g})'} \quad (\text{S1})$$

$$m(M) = c(M)_{\text{ICP}} \frac{V_{\text{ICP}}(10 \text{ mL})}{V_{\text{ICP, aliquot}}(0.2 \text{ mL})} \frac{V_{\text{sample}}(25 \text{ mL})}{V_1(24.5 \text{ mL})} \frac{V_{\text{fraction}}(365 \text{ mL})}{1000}. \quad (\text{S2})$$

Recalculation for the final fraction

$$c(M)_{\text{soil}} = \frac{m(M)}{m_{\text{sample}}(40 \text{ g})'} \quad (\text{S3})$$

$$m(M) = c(M)_{\text{ICP}} \frac{V_{\text{ICP}}(10 \text{ mL})}{V_{\text{ICP, aliquot}}(5 \text{ mL})} \frac{V_{\text{sample}}(25 \text{ mL})}{V_1(24.5 \text{ mL})} \frac{V_{\text{fraction}}(250 \text{ mL})}{1000}. \quad (\text{S4})$$

Recalculation for intermediate fractions

$$c(M)_{\text{soil}} = \frac{m(M)}{m_{\text{sample}}(40 \text{ g})'} \quad (\text{S5})$$

$$m(M) = c(M)_{\text{ICP}} \frac{V_{\text{ICP}}(10 \text{ mL})}{V_{\text{ICP, aliquot}}(0.2/5 \text{ mL})} \frac{V_{\text{sample}}(25 \text{ mL})}{1000}. \quad (\text{S6})$$

Calculation of uncertainties for obtained values of concentration c_i

$$\delta(c_i) = \pm t_{\alpha, f} \frac{s_x}{\sqrt{n}} \quad (\text{S7})$$

where $t_{\alpha, f}$ is Student's coefficient for $\alpha = 0.05$, $f = n - 1$ is the degree of freedom, n is number of measurements, and s_x is the standard deviation.