

Table 1. Total concentrations of Si, Al and Ge, Al/Si and Ge/Si molar ratio in the individual components phytolith, kaolinite, quartz and goethite, and in aggregates with increasing goethite concentration from 0 to 80 g kg⁻¹.

Material	Si	Al	Al/Si	Ge	Ge/Si
	g kg ⁻¹		mol mol ⁻¹	μg kg ⁻¹	μmol mol ⁻¹
phytolith ¹	381.29	nd ¹	nd	403.07	0.41
kaolinite ¹	204.10	197.98	1.01	2302.92	4.36
quartz ¹	444.11	nd	nd	2419.41	2.10
goethite	nd ²	nd	-	nd	nd
³ aggregate-0	332.07	73.21	0.23	2147.30	2.50
aggregate-10	327.65	73.20	0.23	2126.11	2.51
aggregate-20	323.21	73.21	0.24	2104.92	2.52
aggregate-40	314.33	73.23	0.24	2062.53	2.54
aggregate-60	305.44	73.22	0.25	2020.12	2.65
aggregate-80	296.56	73.21	0.26	1977.71	2.57

¹ the Si, Al and Ge concentrations are taken from Li et al. (2022) for ease of comparison

² nd: not detected

³ 0 – 80 for aggregate refers to the goethite concentration expressed in g kg⁻¹

Table 2. Estimated contents of amorphous Si (ASi) and Al (AAI) (and standard deviation s.d.), as quantified following DeMaster (1981) from Na₂CO₃ extractable Si (Na₂CO₃-Si) and Al (Na₂CO₃-Al) concentrations in the unaggregated mixtures and aggregates (Fig. S1) as compared to individual components. Different lowercase letter (a, b) resulting from the independent samples *t*-separation test, indicates a significant difference between unaggregated mixtures and aggregates at each given goethite content ($p < 0.05$); different uppercase letter (A, B, C) resulting from *LSD*'s multiple comparison test, indicates a significant difference among unaggregated mixtures and, separately among aggregates ($p < 0.05$).

	ASi (g kg ⁻¹)		AAI (g kg ⁻¹)		AAI/ASi
	mean	s.d.	mean	s.d.	mol mol ⁻¹
phytolith ¹	271.91	15.63	nd ²	nd	nd
kaolinite ¹	1.16	0.04	0.98	0.12	0.91
quartz ¹	nd		nd		nd
³ mixture-0	5.93Cb	0.24	0.67Aa	0.08	0.12Aa
mixture-10	5.40Cb	0.14	0.58Aa	0.07	0.11Aa
mixture-20	7.63Aa	1.47	0.42Ba	0.06	0.06Bb
mixture-40	7.75Ba	0.33	0.64Aa	0.09	0.09Bb
mixture-60	9.01Aa	0.42	0.76Aa	0.08	0.09Bb
mixture-80	9.20Aa	0.78	0.44Ba	0.12	0.05Cc
⁴ aggregate-0	6.53Aa	0.39	0.28Ab	0.09	0.04Ac
aggregate-10	6.05Aa	0.52	0.23Ab	0.07	0.04Ac
aggregate-20	6.65Aa	1.01	0.19Bb	0.04	0.03Bc
aggregate-40	6.87Aa	0.61	0.17Bb	0.04	0.03Bc
aggregate-60	6.26Ab	0.55	0.11Bb	0.03	0.02Bc
aggregate-80	6.38Ab	0.54	0.18Bb	0.02	0.03Bc

¹ the ASi and AAI concentrations are taken from Li et al. (2022) for purposes of comparison and easy reading.

² nd: not detected

³ 0 – 80 for mixture refers to the goethite concentration expressed in g kg⁻¹

⁴ 0 – 80 for aggregate refers to the goethite concentration expressed in g kg⁻¹

Table 3. Time evolution of the Al/Si (mol mol⁻¹) and Ge/Si (μmol mol⁻¹) molar ratios (and standard deviation s.d. into brackets) in 0.01 M CaCl₂ extracts for the individual components (kaolinite and phytolith), and for unaggregated mixtures and aggregates with various goethite contents (0-80 g kg⁻¹).

Note: for Al/Si, 3 decimals were used when required.

Time		16h	4d	8d	16day	32d	64d
phytolith	Al/Si	0.00	0.00	0.00	0.00	0.00	0.00
	Ge/Si	3.13(0.37)	0.60(0.07)	0.83(0.03)	0.33(0.05)	0.24(0.09)	0.27(0.04)
kaolinite	Al/Si	1.15(0.24)	0.52(0.01)	0.36(0.02)	0.21(0.01)	0.15(0.00)	0.16(0.00)
	Ge/Si	20.9(1.01)	9.15(0.32)	6.56(0.42)	3.60(0.02)	2.76 (0.04)	1.78 (0.05)
mixture-0	Al/Si	0.57(0.014)	0.19(0.016)	0.20(0.029)	0.11(0.000)	0.03(0.002)	0.03(0.003)
	Ge/Si	10.07(1.01)	3.21(0.32)	1.92(0.42)	1.15(0.02)	0.12(0.04)	0.11(0.05)
mixture-10	Al/Si	0.48(0.090)	0.12(0.003)	0.14(0.012)	0.15(0.012)	0.01(0.001)	0.06(0.006)
	Ge/Si	7.33(0.59)	2.72(0.05)	1.78(0.07)	0.92(0.07)	0.25(0.09)	0.29(0.02)
mixture-20	Al/Si	0.39(0.003)	0.01(0.000)	0.003(0.001)	0.004(0.001)	0.003(0.000)	0.02(0.001)
	Ge/Si	5.25(0.33)	1.81(0.05)	1.01(0.05)	0.66(0.03)	0.92(0.01)	0.37(0.04)
mixture-40	Al/Si	0.27(0.061)	0.05(0.000)	0.001(0.000)	0.04(0.000)	0.002(0.000)	0.04(0.001)
	Ge/Si	8.14(0.37)	1.94(0.07)	1.61(0.03)	0.96(0.05)	1.02(0.09)	0.62(0.04)
mixture-60	Al/Si	0.17(0.034)	0.002(0.000)	0.002(0.000)	0.001(0.000)	0.001(0.000)	0.04(0.002)
	Ge/Si	6.48(0.11)	2.05(0.06)	1.53(0.03)	1.10(0.07)	2.01(0.11)	1.28(0.02)
mixture-80	Al/Si	0.18(0.026)	0.003(0.000)	0.001(0.000)	0.001(0.001)	0.001(0.000)	0.09(0.011)
	Ge/Si	6.11(0.09)	2.29(0.37)	1.59(0.05)	1.11(0.11)	1.57(0.03)	1.42(0.76)
aggregate-0	Al/Si	0.51(0.004)	0.06(0.006)	0.02(0.004)	0.008(0.001)	0.004(0.002)	0.03(0.001)
	Ge/Si	5.84(0.63)	2.33(0.29)	1.77(0.41)	1.18(0.00)	0.28(0.03)	0.15(0.08)
aggregate-10	Al/Si	0.20(0.036)	0.006(0.001)	0.004(0.000)	0.003(0.001)	0.002(0.000)	0.03(0.005)
	Ge/Si	2.45(0.37)	0.99(0.01)	0.84(0.06)	0.52(0.06)	0.40(0.09)	0.12(0.02)
aggregate-20	Al/Si	0.14(0.005)	0.008(0.001)	0.017(0.0001)	0.001(0.007)	0.001(0.000)	0.02(0.003)
	Ge/Si	2.35(0.21)	0.88(0.06)	0.77(0.06)	0.53(0.02)	0.35(0.01)	0.17(0.04)
aggregate-40	Al/Si	0.008(0.005)	0.001(0.000)	0.001(0.001)	0.001(0.000)	0.001(0.000)	0.02(0.001)
	Ge/Si	1.35(0.23)	0.59(0.06)	0.65(0.11)	0.53(0.05)	1.00(0.09)	0.40(0.00)
aggregate-60	Al/Si	0.003(0.000)	0.002(0.000)	0.002(0.000)	0.001(0.000)	0.001(0.000)	0.02(0.006)
	Ge/Si	1.10(0.07)	0.58(0.06)	0.74(0.01)	0.53(0.05)	0.64(0.11)	0.50(0.03)
aggregate-80	Al/Si	0.006(0.001)	0.001(0.000)	0.001(0.000)	0.001(0.000)	0.001(0.000)	0.02(0.009)
	Ge/Si	1.86(0.06)	0.92(0.04)	0.97(0.04)	0.70(0.10)	0.74(0.03)	0.56(0.05)