



Supplement of

Modelling the effect of catena position and hydrology on soil chemical weathering

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Table S1: Profile SC4. Description of the horizons^a.

Depth (cm)	Horiz.	Description
0-18	A	Colour 7,5YR 4/3; Brown; Sandy clay; structure granular, size very fine to fine; soft; few pores, very fine, irregular; few roots, very fine, distributed throughout the horizon; boundary abrupt and smooth.
18-44	B	Colour 10YR 5/8; Yellowish Brown; Sandy clay; structure granular, size very fine to fine; soft; few pores, very fine, irregular; few roots, very fine to coarse, distributed throughout the horizon; boundary gradual to wavy; 2% igneous rocks fragments partly weathered, discoidal and subangular, size gravel; mottles of krotovina 2-3 cm diameter; preferential routes of infiltration.
44-110	C	Colour 10YR 6/6; Brownish Yellow; unweathered parent material with oxidation of manganese, some yellow-grey mottles, abundant dark Mn mottles.

^a Munsell reading was taken on moist soil.

Table S2: Profile SC5. Description of the horizons^a.

Depth(cm)	Horiz.	Description
0-18	A	Colour 7,5YR 3/4; Dark Brown; Sandy loam; structure subangular, size very fine to coarse; soft; few pores, very fine, irregular; common roots, very fine to very coarse, distributed throughout the horizon; boundary abrupt and wavy; 2% igneous rocks fragments, subprismatic and angular, fine-medium gravel.
18-60	B	Colour 5YR 4/6; Yellowish Red; Sandy loam; structure granular, size medium to coarse; soil loose; no pores; common roots, very fine to very coarse, distributed throughout the horizon; boundary abrupt and wavy; horizon very weathered, no igneous rocks fragments.
60-100	C	Colour 10YR 5/6; Yellowish Brown; unweathered parent material; mottles of manganese; very few roots, very fine to very coarse, between peds.

^a Munsell reading was taken on moist soil.

Table S3: Profile SC6. Description of the horizons^a.

Depth (cm)	Horiz.	Description
0-55	A	Colour 7,5YR 2,5/2; Very Dark Brown; Sandy loam; structure granular, size médium to coarse; soft; moderately few pores, very fine to medium, irregular; common roots, very fine to very coarse, distributed throughout the horizon; boundary clear and wavy; 2% igneous rocks fragments, discoidal and angular, gravel to cobbles.
55-95	B	Color 7,5YR 4/3; Brown; loamy sand; structure granular, size medium to very coarse; slightly hard; moderately few pores, very fine to medium, irregular; moderately few roots, very fine to very coarse, distributed throughout the horizon; 20-25% igneous rocks fragments, subdiscoidal and angular, gravel to boulders.

^a Munsell reading was taken on moist soil.

Table S4: Profile SC7. Description of the horizons^a.

Depth (cm)	Horiz.	Description
0-45	A	Colour 7,5YR 2,5/2; Very Dark Brown; loamy sand; structure subangular, size fine to medium; soft; moderately few pores, very fine to medium, irregular; common roots, very fine to very coarse, distributed throughout the horizon, boundary diffuse and smooth; 5-10% igneous rocks fragments, discoidal and very angular, gravel.
45-97	B	Colour 7,5YR 4/3; Brown; loamy sand; structure granular, size medium to very coarse; soft; moderately few pores, very fine to medium, irregular; moderately few roots, very fine to coarse, distributed throughout the horizon; boundary gradual and wavy; 15-20% igneous rocks fragments, discoidal and very angular, gravel to stones; two large stones, spherical and subangular, the first (30x25 cm) between 45-60 cm depth, the second (40x22 cm) between 60-83 cm depth.
97-160	C	Colour 2,5Y 5/3; Light Olive Brown; sand; soil loose; no pores; very few roots, medium, between peds; very weathered horizon, igneous rocks fragments laminated; mottles black and orange.

^a Munsell reading was taken on moist soil.

Tables S5: Profile SC8. Description of the horizons^a.

Depth (cm)	Horiz.	Description
0-14	A	Colour 7,5YR 3/1; Very Dark Gray; loamy sand; structure subangular, size fine to medium; slightly hard; few pores, very fine to very coarse, irregular; common roots, very fine to very coarse, distributed throughout the horizon; boundary clear and wavy; 15% igneous rocks fragments, discoidal and very angular, coarse gravel.
14-47	B	Colour 10YR 5/6; Yellowish Brown; Sandy loam; structure subangular; size medium to coarse; slightly hard; few pores, very fine to very coarse, irregular; common roots, very fine to very coarse, distributed throughout the horizon; boundary abrupt and irregular; 2-5% igneous rocks fragments, discoidal and very angular, medium gravel.
47-240	C	Colour 7,5YR 5/8; Strong Brown; sand; moderately hard; few pores, very fine to very coarse, irregular; common roots, very fine to very coarse, distributed throughout the horizon; slightly weathered igneous rocks fragments, coarse to very coarse, manganese coating between the fragments.

^a Munsell reading was taken on moist soil.

Table S6: Profile SC9. Description of the horizons^a.

Depth (cm)	Horiz.	Description
0-19	A	Colour 7,5YR 2,5/3; Very Dark Brown; Sandy loam; structure subangular, size medium to coarse; slightly hard; few pores, very fine, irregular; common roots, very fine to coarse, distributed throughout the horizon, boundary abrupt and wavy; 2-5% igneous rocks fragments, discoidal and very angular, size gravel to cobbles.
19-57	B	Colour 7,5YR 4/6; Strong Brown; loamy sand; structure subangular; size very fine to fine; soft; few pores, very fine, irregular; common roots, very fine to coarse, distributed throughout the horizon; boundary abrupt and irregular; 2-5% igneous rocks fragments, discoidal and very angular, fine gravel,
57-137	C	Colour 7,5YR 6/8; Reddish Yellow; sand; structure massive; size medium; slightly hard; few pores, very fine, irregular; common roots, very fine to coarse, distributed throughout the horizon; very weathered igneous rocks fragments (parent material).

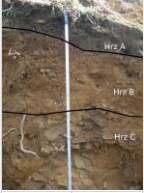
^a Munsell reading was taken on moist soil.

Table S7: Profile SC10. Description of the horizons^a.

Depth (cm)	Horiz.	Description
0-12,5	A	Colour 7,5YR 3/4; Dark Brown; loamy sand; structure subangular, size medium to coarse; soft; few pores, very fine, irregular; common roots, very fine to fine, distributed throughout the horizon; boundary very abrupt and wavy; 0-2% igneous rocks fragments, discoidal and very angular, gravel.
12,5-51	B	Colour 7,5YR 7/8; Reddish Yellow; Sandy clay; structure massive, size medium to coarse; moderately hard; few pores, very fine, irregular; few roots, very fine to coarse, distributed throughout the horizon.
51-73	C1	Colour 7,5YR 5/6; Strong Brown; sand; structure massive; unit soil loose; few pores, very fine, irregular; few roots, very fine to coarse, distributed throughout the horizon; boundary gradual and smooth; 0-2% igneous rocks fragments, discoidal and very angular, gravel, clay accumulation surfaces above fragments, accumulation of roots in water channels.
73-100	C2	Colour 7,5YR 6/8; Reddish Yellow; sand; structure massive; unit soil loose; few pores, very fine, irregular; few roots, very fine to coarse, distributed throughout the horizon; 0-2% igneous rocks fragments, discoidal and very angular, parental material; clay accumulation surfaces above fragments, preference routes roots accumulation presence of water canals.

^a Munsell reading was taken on moist soil.

Table S8: Physical and Chemical characteristics of soil profiles (SC4-SC10).

Profile	Profile Photo	Horizon	Depth cm	pH _{1:2.5}	CaCO ₃ %	OC%	Exchangeable cations (cmol _c kg ⁻¹)				CECcmol _c kg ⁻¹	Sand	Silt %	Clay
							Ca	Mg	Na	K				
SC4		A	0-18	5.7	0	1.3	6.9	1.1	0.38	0.24	8.7	73.2	20.9	5.9
		B	18-44	5.9	0	0.28	6.2	1.3	0.36	0.15	7.9	73.7	19.5	6.8
		C	44-110	6.1	0	0.1	5.8	1.9	0.37	0.12	8.3	77.1	15.7	7.2
SC5		A	0-18	6.0	0	0.66	8.7	1.6	0.4	0.2	10.9	75.7	18.1	6.2
		B	18-60	6.2	0	0.19	11.0	2.4	0.4	0.15	14.0	85.7	9.6	4.7
		C	60-100	5.9	0	0.12	10	3	0.5	0.15	13.6	86.4	9.9	3.7
SC6		A	0-55	6.6	0.1	0.7	10.5	2.6	0.5	0.2	13.7	69.5	22.4	8.1
		B	55-95	7.4	0.05	0.2	9.2	1.7	0.7	0.1	11.7	74.9	17.8	7.3
SC7		A	0-45	6.3	0	0.9	9.2	2.3	0.9	0.2	12.7	73.3	17.9	8.8
		B	45-97	6.7	0	0.3	8	2.6	0.9	0.1	11.7	78.9	13.3	7.8
		C	97-160	7.0	0	0.1	12.4	5.1	0.6	0.1	18.3	74.8	12.6	12.6
SC8		A	0-14	6.21	0	1.6	12.3	0.98	0.7	0.35	14.4	75.7	18	6.3
		B	14-47	6.4	0	0.3	20.4	3.4	0.7	0.2	24.7	56.5	32.6	10.9
		C	47-240	6.1	0	0.2	20.4	5.6	0.8	0.2	27	52.4	35.7	11.9
SC9		A	0-19	5.8	0	1.5	10.3	2.4	0.7	0.3	13.7	71.7	22.4	5.9
		B	19-57	6.3	0	0.3	9.1	2.1	0.7	0.2	12.2	76.1	18.4	5.5
		C	57-137	6.7	0	0.1	8.2	1.9	0.7	0.2	11	81.1	13.6	5.3
SC10		A	0-12.5	5.8	0	2.75	14.4	1.6	0.6	0.5	6.3	68.5	24.9	6.6
		B	12.5-51	6.2	0	0.24	9.5	1.3	0.7	0.3	11.8	84.2	12.1	3.7
		C1	51-73	6.6	0	0.18	9.2	1.8	0.7	0.2	11.9	86.3	11.2	2.5
		C2	73-100	6.7	0	0.1	8.13	2.7	0.6	0.2	11.6	89.5	8	2.5

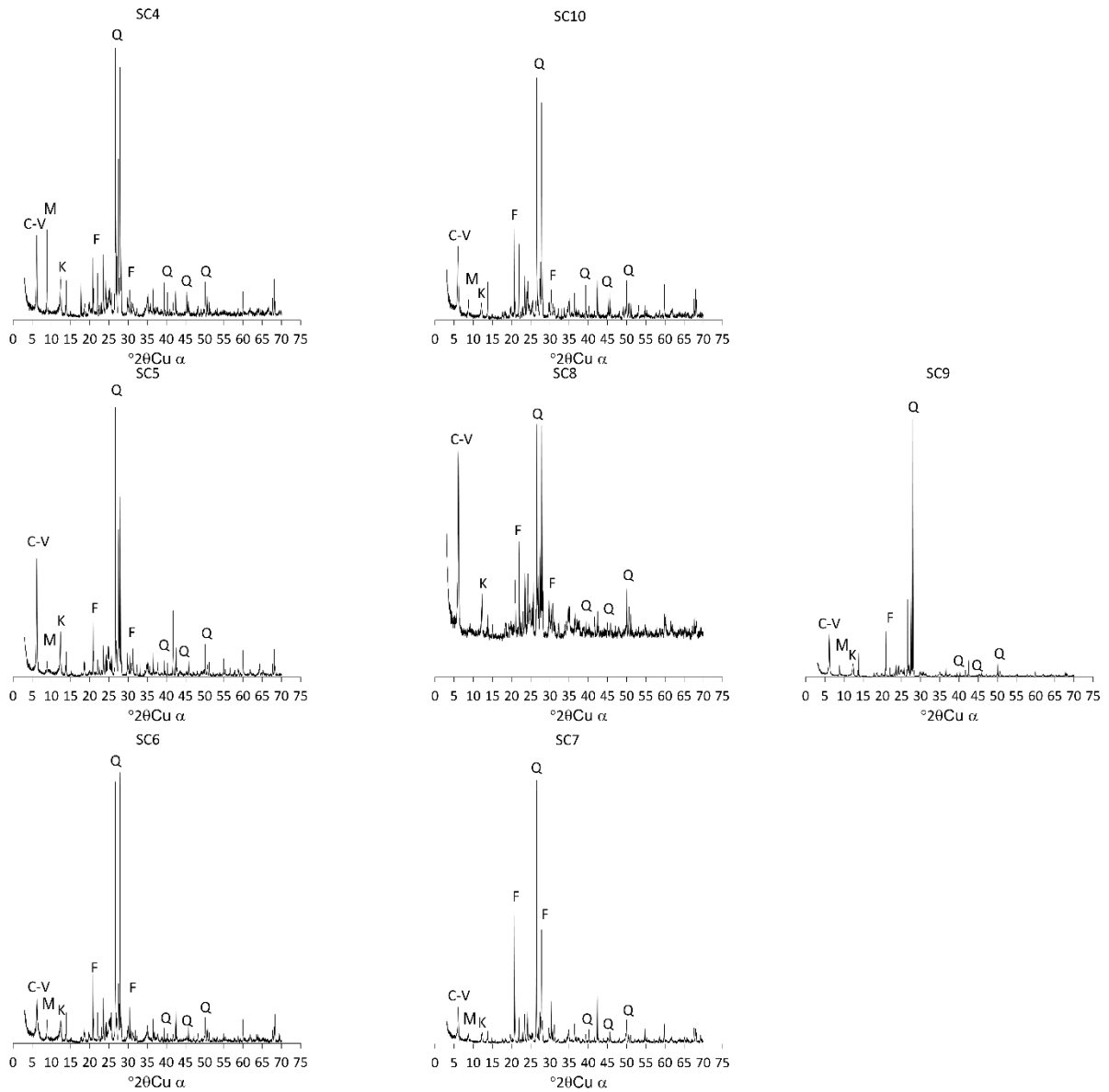


Figure S1: X-ray patterns of the powdered rock samples. C-V: Chlorite-Vermiculite intergrade; F: Feldspar (Orthoclase, Plagioclase); K: Kaolinite; M: Mica; Q: Quartz.