Supplemental Information for:

Evidence of microbially accelerated weathering from a laboratory mesocosm experiment with sequential selective dissolution

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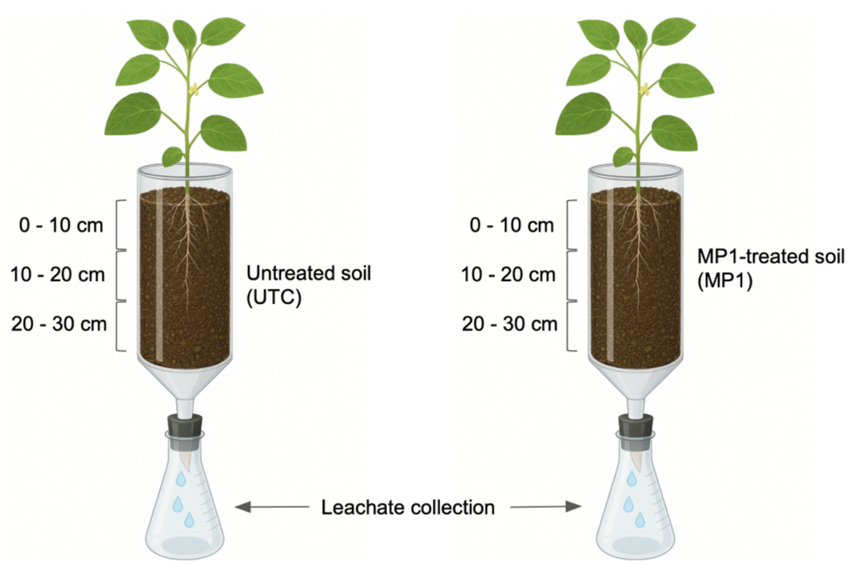
Supplemental Figures



Treatment	MP1
UTC (x 6 columns)	-
MP1 (x 6 columns)	+

Figure S1: Experimental design of mesocosm study.

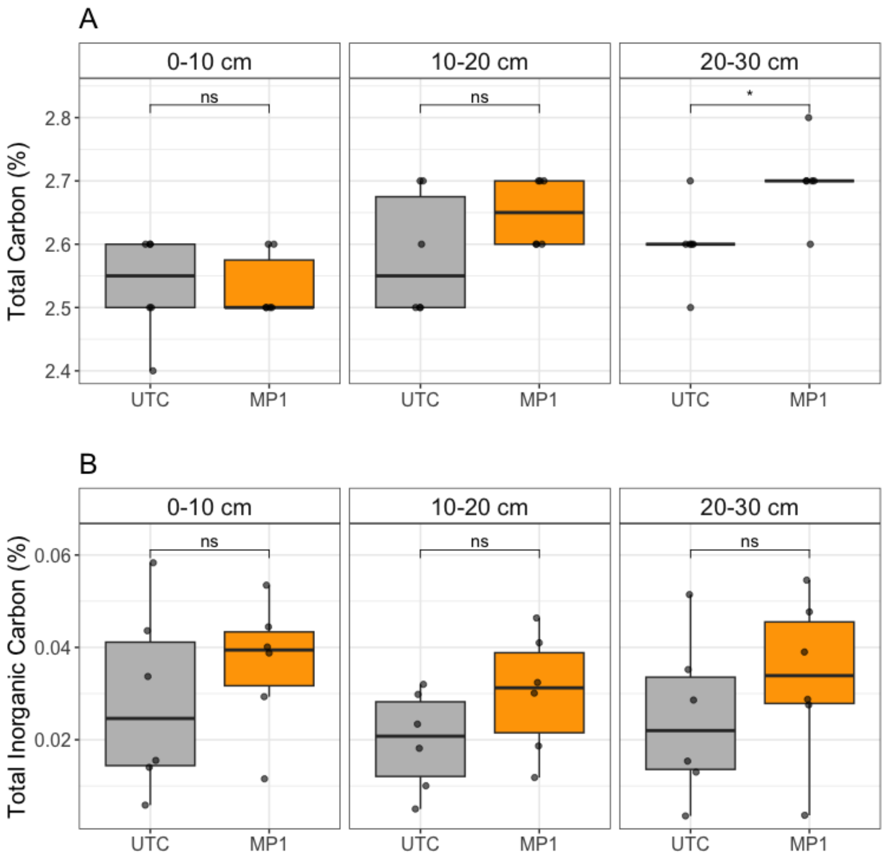


Figure S2: Total carbon (A) and total inorganic carbon (B) concentration per depth increment. Student's t-test, * $p < 0.05$, ns: not significant, $N = 6$. Note that y-axes are scaled to the data range to clearly visualize the distribution and variability across treatments.

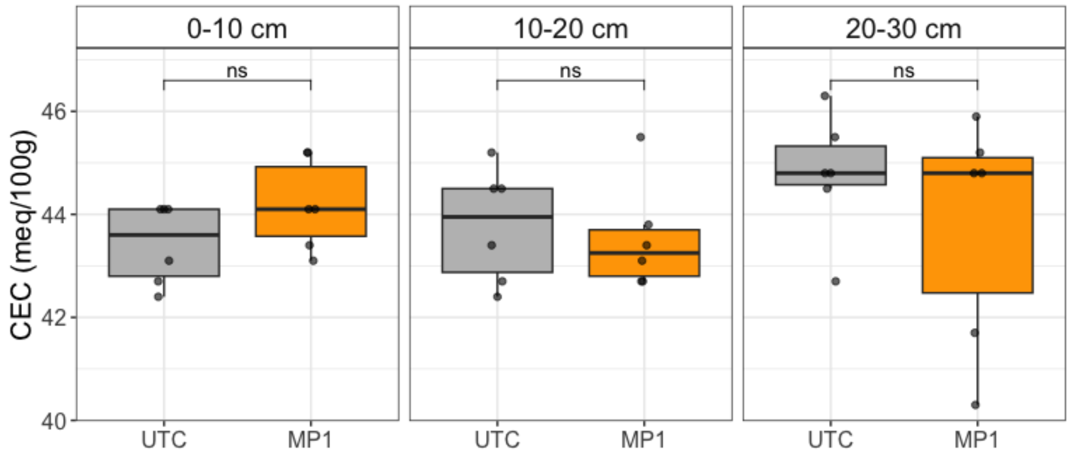


Figure S3: Soil Cation Exchange Capacity (CEC) per depth increment. Note that y-axes are scaled to the data range to clearly visualize the distribution and variability across treatments.

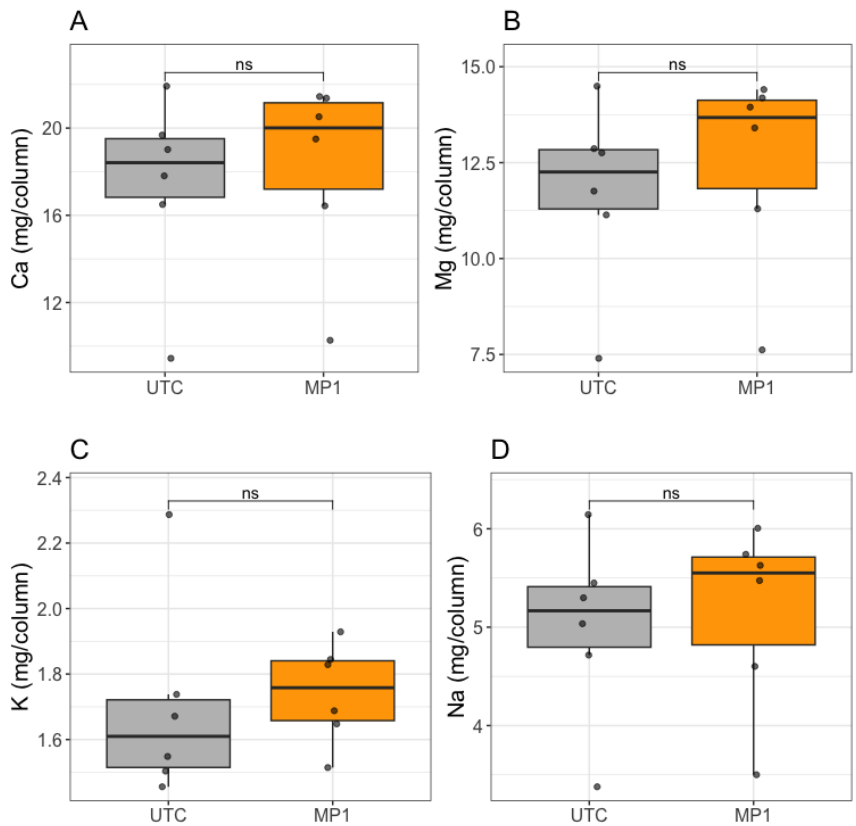


Figure S4: Base cations fluxes recovered from the leachate: Calcium (A), magnesium (B), potassium (C) and sodium (D). Note that y-axes are scaled to the data range to clearly visualize the distribution and variability across treatments.

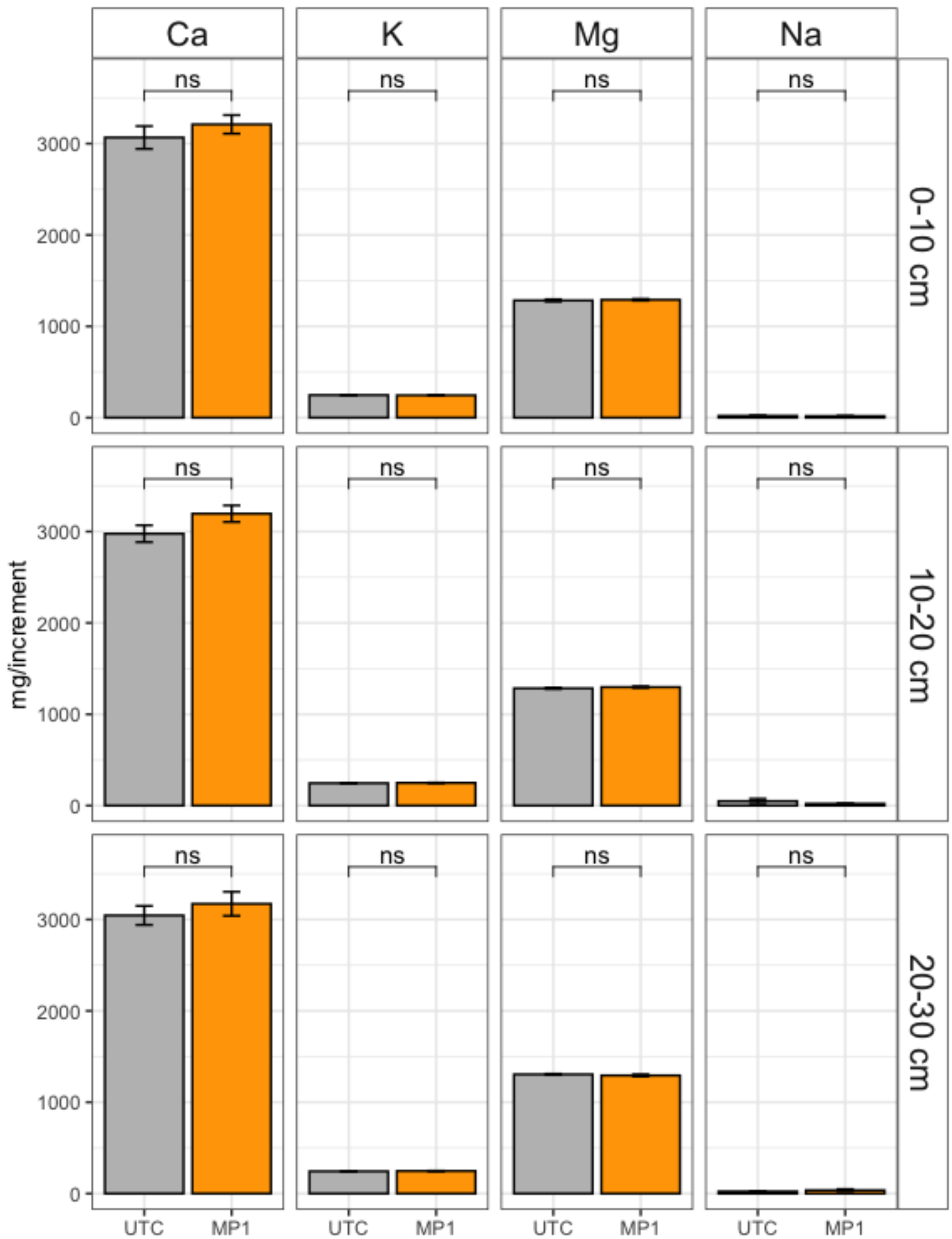


Figure S5: Concentration per depth increment of base cations in the exchangeable pool in MP1-treated and untreated control (UTC) columns.

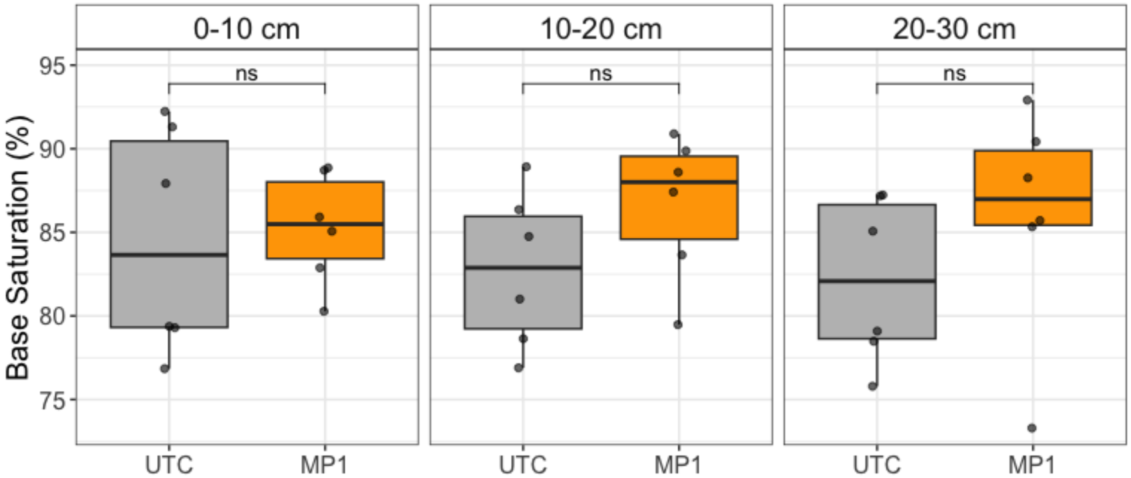


Figure S6: Base Saturation per depth increment. Calculated as the ratio of exchangeable base cations to total cation exchange capacity (both in units of mEq/100 g soil). Note that y-axes are scaled to the data range to clearly visualize the distribution and variability across treatments.

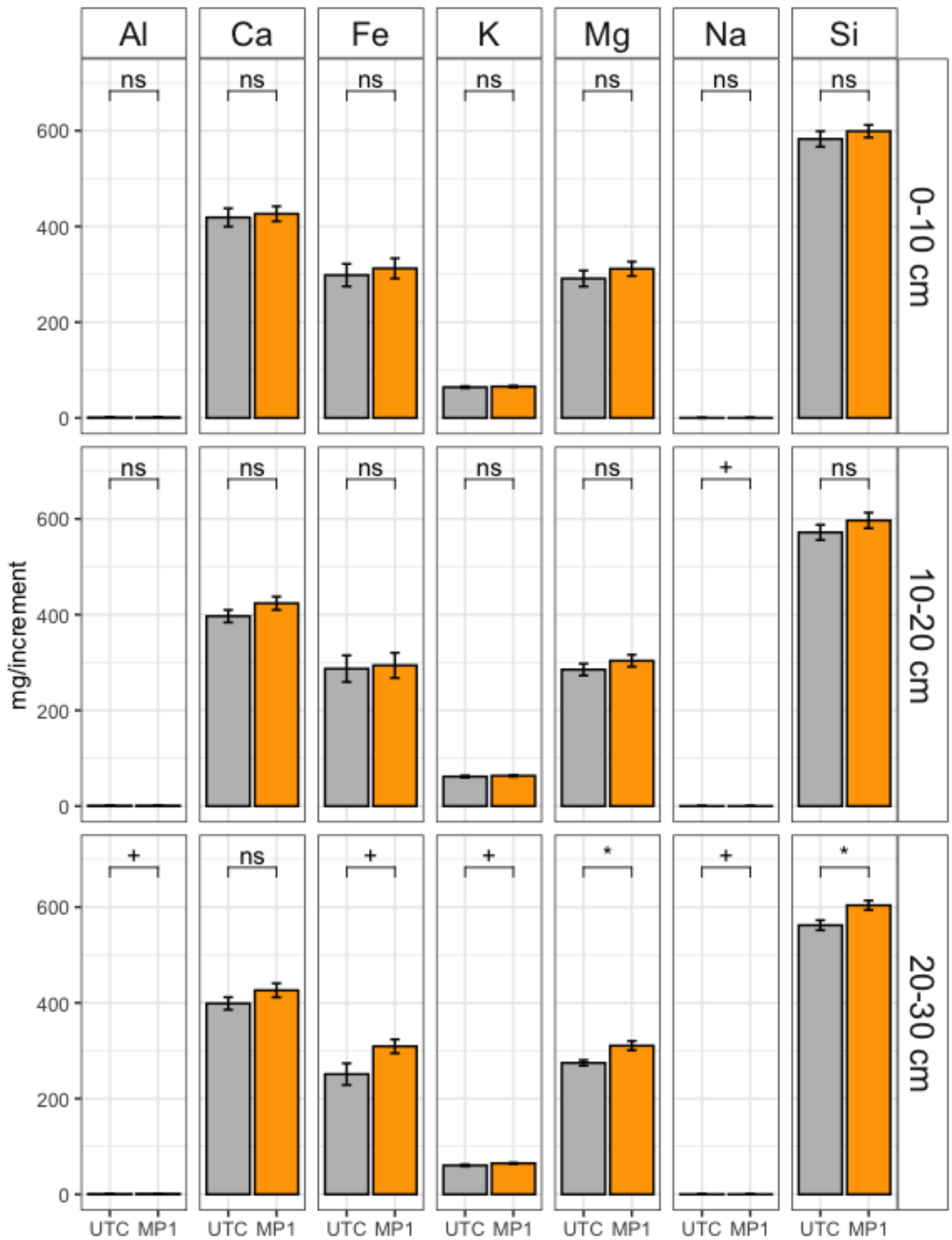


Figure S7: Concentration per depth increment of base cations in the reducible pool in MP1-treated and untreated control (UTC) columns. Student's t-test, * *p* < 0.05, + *p* < 0.1, ns: not significant, *N* = 6.

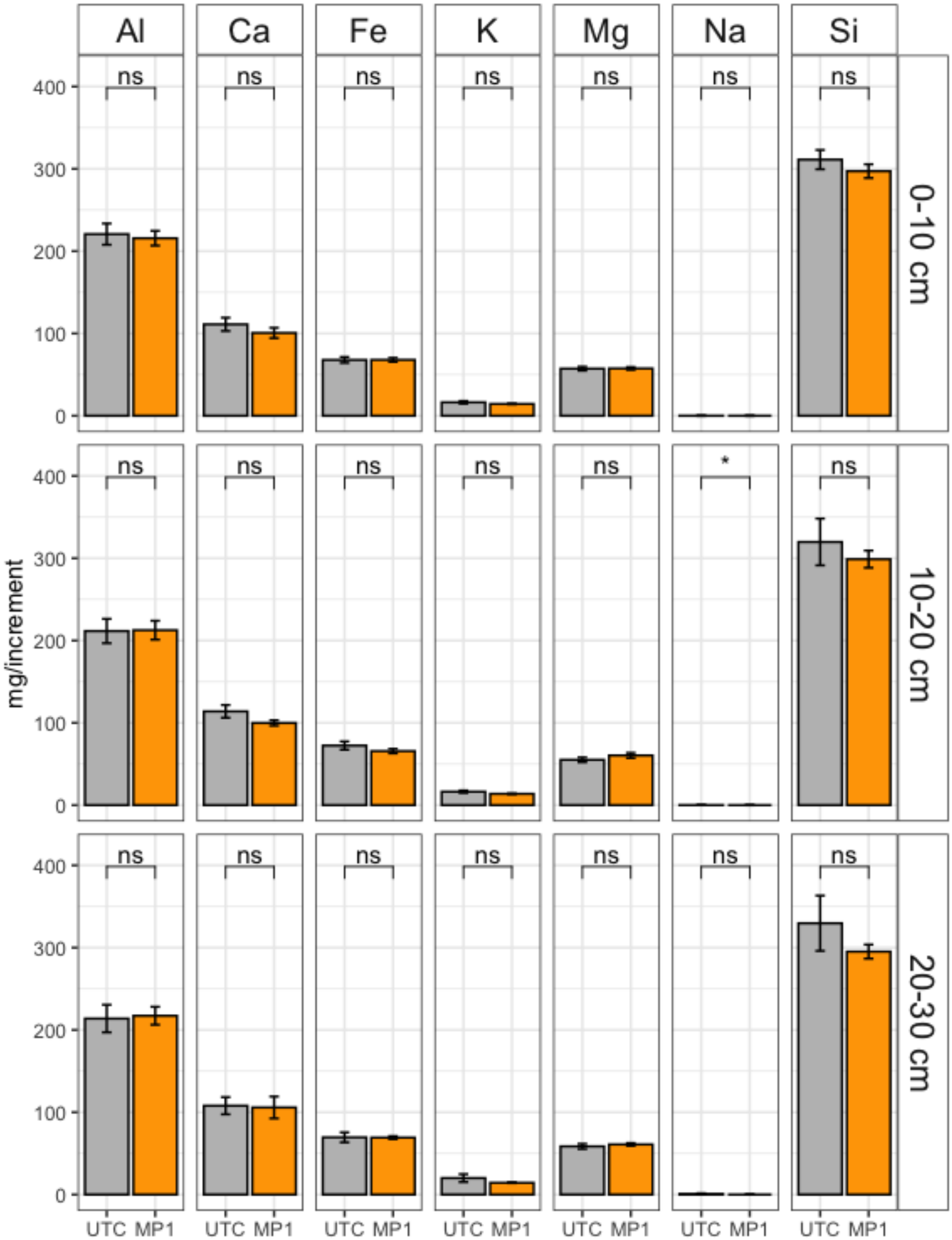


Figure S8: Concentration per depth increment of base cations in the oxidizable pool in MP1-treated and untreated control (UTC) columns. Student's t-test, * $p < 0.05$, ns: not significant, $N = 6$.

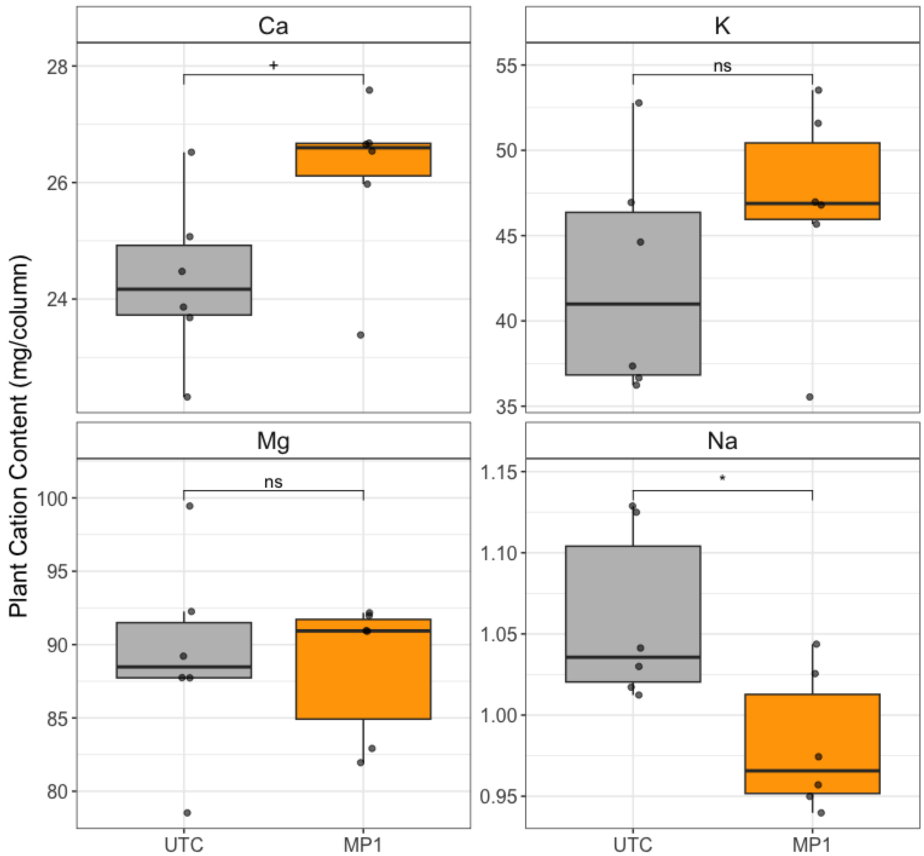


Figure S9: Plant pool cation content per column. Student's t-test, * $p < 0.05$, + $p < 0.1$, ns: not significant, $N = 6$.

Supplemental Tables

Table S1. Quantitative mineralogy for the SBX70 soil. Estimates of mineral classification and corresponding abundances are based on data from quantitative x-ray diffraction (qXRD) and scanning electron microscopy energy dispersive x-ray spectroscopy (SEM-EDS). Note that the total feldspar abundance represents the sum of individual feldspar types (italicized).

Mineral Type	Abundance (%)
Quartz	65
Total Feldspars	28
Albite	*10*
Oligoclase/Andesine	*9*
Orthoclase	*8*
Other Feldspars	*1*
Phyllosilicates	5
Other/Unidentified	2

Table S2. Abundance of major oxides measured by XRF in the SBX70 soil. Loss-on-ignition (LOI) represents the mass of volatile compounds in the sample, including organic matter and structural water in clays.

Elemental Oxide	Soil (wt %)
SiO_2	62.5
TiO_2	0.6
Al_2O_3	11.7
FeO	3.8
MnO	0.1
MgO	1.6
CaO	1.3
Na_2O	1.0
K_2O	2.0
P_2O_5	0.1
LOI	*15.0*

Table S3. Concentration and percentages of cations present in each pool at the end of the 63-day experimental period. The concentrations represent the mean of six columns and ± standard error.

	Ca		Mg		K		Na	
POOL (mg/column)	**UTC**	**MP1**	**UTC**	**MP1**	**UTC**	**MP1**	**UTC**	**MP1**
Carbonate	2196 ± 129 (17.1%)	2474 ± 142 (18.1%)	643 ± 28 (11.4%)	705 ± 28 (12.2%)	76 ± 1 (6.9%)	81 ± 1 (7.4%)	11 ± 1 (9.6%)	20 ± 8 (19.6%)
Exchangeable	9089 ± 289 (70.6%)	9579 ± 303 (70.0%)	3872 ± 289 (68.7%)	3881 ± 303 (67.0%)	736 ± 4 (67.2%)	741 ± 3 (66.9%)	93 ± 28 (83.8%)	74 ± 13 (74.0%)
Reducible	1214 ± 41 (9.4%)	1276 ± 40 (9.3%)	851 ± 30 (15.1%)	926 ± 26 (16.0%)	187 ± 5 (17.0%)	194 ± 3 (17.5%)	<1 (0.4%)	<1 (0.4%)
Oxidizable	333 ± 21 (2.6%)	306 ± 11 (2.2%)	171 ± 5 (3.0%)	179 ± 4 (3.1%)	53 ± 6 (4.8%)	42 ± 1 (3.8%)	1 (0.8%)	0 (0.0%)
Plant	24 ± 1 (0.2%)	26 ± 1 (0.2%)	89 ± 3 (1.6%)	88 ± 2 (1.5%)	42 ± 3 (3.9%)	47 ± 3 (4.2%)	1 (1.0%)	1 (1.0%)
Leachate	17 ± 2 (0.1%)	18 ± 2 (0.1%)	12 ± 1 (0.2%)	12 ± 1 (0.2%)	2 (0.2%)	2 (0.2%)	5 (4.5%)	5 (5.1%)
TOTAL (mg/col)	**12874 ± 320**	**13680 ± 338**	**5638±46**	**5792 ± 45**	**1096 ± 9**	**1108 ± 5**	**111 ± 28**	**101 ± 15**
Δ (mg/col)		**+806**		**+154**		**+12**		**-10**
TOTAL (mEq/col)	**642.4**	**682.6**	**463.9**	**476.5**	**28.0**	**28.3**	**4.8**	**4.4**
Δ (mEq/col)		**+40.2**		**+12.6**		**+0.3**		**-0.4**