

Interactive comment on “Soil andic properties as powerful factors explaining deep soil organic carbon stocks distribution: the case of a coffee agroforestry plantation on Andosols in Costa Rica” by Tiphaine Chevallier et al.

Tiphaine Chevallier et al.

tiphaine.chevallier@ird.fr

Received and published: 11 July 2019

Answer to the comment 4 of the reviewer 1: See the modifications in tables 2, 3, 7 and 8

Interactive comment on SOIL Discuss., <https://doi.org/10.5194/soil-2019-14>, 2019.

Printer-friendly version

Discussion paper



Table 2. Results of the linear mixed model testing the effect of soil depth and spectral cluster class upon the predicted acidic properties.

Variable	Source	Degree of freedom	F-value	P-Value
Al _p	Intercept	1	1387.1	<-0.0001
	Cluster	1	561.4	<-0.0001
	Depth	9	81.0	<-0.0001
Fe _o	Intercept	1	3404.3	<-0.0001
	Cluster	1	674.7	<-0.0001
	Depth	9	52.0	<-0.0001
(Al _p -Al _s)/Si _t	Intercept	1	2814.2	<-0.0001
	Cluster	1	197.3	<-0.0001
	Depth	9	2.2	0.020
Al _s + 0.5Fe _o	Intercept	1	754.3	<-0.0001
	Cluster	1	505.4	<-0.0001
	Depth	9	3.4	0.004
Allophanes	Intercept	1	636.7	<-0.0001
	Cluster	1	278.6	<-0.0001
	Depth	9	2.6	0.005

Fig. 1. Table 2

Table 3. Descriptive statistics for the predicted anodic properties of all soil samples (All) and for those in spectral clusters ALL and H. "Depth" denotes the depth range from which the sample was taken. Entries are means \pm standard deviation. Letters indicate significant differences among soil depth at $p < 0.05$.

Depth (cm)	Al _p g 100 g ⁻¹ soil			Fe _o g 100 g ⁻¹ soil			Allophanes g 100 g ⁻¹ soil			(Al _p -Al _f)/Si _o			Al _o + 0.5 Fe _o g 100 g ⁻¹ soil			Number of samples per cluster		
	All	ALL	H	All	ALL	H	All	ALL	H	All	ALL	H	All	ALL	H	All	ALL	H
0-20	0.51±0.12 a	0.54±0.11 a	0.37±0.07 a	1.6±0.21 a	1.65±0.13 a	1.33±0.33 a	12.8±6.2 b	14.5±5.3 a	4.3±2.3 ab	2.5±0.5 a	2.6±0.2 a	1.7±0.6	4.6±1.7 ab	5.1±1.4 a	2.1±0.7 a	68	57	11
20-40	0.46±0.13 b	0.5±0.11 ab	0.31±0.11 ab	1.5±0.26 ab	1.6±0.12 ab	1.15±0.34 b	12.9±6.2 ab	15.3±4.5 ab	4.1±2.1 b	2.4±0.6 ab	2.6±0.2 ab	1.6±0.9	4.5±1.8 a	5.3±1.2 abc	1.9±0.6 abc	69	54	15
40-60	0.41±0.14 c	0.46±0.1 b	0.24±0.1 bc	1.43±0.29 bc	1.56±0.13 bc	1.05±0.31 bc	12.9±6.3 ab	15.8±4.5 ab	4.6±2.0 ab	2.4±0.5 ab	2.6±0.2 bc	1.7±0.6	4.5±1.9 a	5.3±1.2 ab	1.9±0.7 ab	66	49	17
60-80	0.36±0.12 d	0.41±0.08 c	0.21±0.1 cd	1.36±0.3 cd	1.46±0.17 cd	0.97±0.28 cd	12.8±6.3 ab	15.7±4.5 ab	4.4±1.6 ab	2.4±0.5 ab	2.6±0.2 abc	1.7±0.5	4.4±1.9 abc	5.2±1.2 abc	1.8±0.6 abc	67	50	17
80-100	0.32±0.13 de	0.38±0.09 cd	0.19±0.1 cde	1.29±0.34 de	1.47±0.18 de	0.88±0.26 de	12.4±6.3 ab	15.9±3.8 ab	4.4±2.4 ab	2.3±0.5 ab	2.6±0.2 bc	1.6±0.5	4.2±1.9 abc	5.3±1.1 abc	1.7±0.7 abc	67	47	20
100-120	0.3±0.15 ef	0.37±0.11 cd	0.16±0.1 def	1.21±0.38 ef	1.41±0.19 ef	0.8±0.32 e	12.6±6.5 ab	16.3±4.0 ab	4.8±2.3 ab	2.3±0.5 ab	2.6±0.2 c	1.7±0.5	4.2±2.0 abc	5.3±1.1 abc	1.8±0.7 abc	62	42	20
120-140	0.27±0.13 fg	0.34±0.09 de	0.15±0.09 efg	1.17±0.38 ef	1.41±0.17 ef	0.79±0.31 ab	12.4±6.6 a	16.7±3.8 ab	5.4±3.1 ab	2.3±0.6 ab	2.6±0.1 bc	1.7±0.6	4.1±2.0 abc	5.4±1.1 abc	1.9±1.0 abc	55	34	21
140-160	0.23±0.13 fgh	0.34±0.09 de	0.14±0.08 fg	1.11±0.39 fg	1.4±0.19 f	0.84±0.34 ef	11.9±6.4 a	17.3±3.9 b	7.2±3.9 a	2.2±0.6 ab	2.6±0.1 bc	1.9±0.7	3.9±2.0 abc	5.6±1.1 abc	2.4±1.3 ab	53	25	28
160-180	0.2±0.13 gh	0.3±0.11 e	0.12±0.08 g	1.00±0.39 gh	1.31±0.19 f	0.73±0.3 ef	10.8±6.3 ab	16.6±3.7 ab	6.0±3.2 ab	2.2±0.7 ab	2.6±0.1 abc	1.8±0.7	3.5±1.9 bc	5.3±1.0 bc	2.0±1.0 bc	48	22	26
180-200	0.19±0.12 h	0.31±0.08 e	0.1±0.06 g	0.98±0.38 g	1.33±0.18 f	0.71±0.26 f	10.4±6.5 ab	16.9±3.8 ab	5.6±3.0 a	2.1±0.7 b	2.6±0.2 abc	1.7±0.7	3.4±2.0 c	5.4±1.0 c	1.9±1.0 c	42	18	24

Fig. 2. Table 3

Printer-friendly version

Discussion paper



Table 7 Descriptive statistics for bulk densities with depth and with their spectral cluster. P-value express results from t-test between samples from the two cluster classes (Welch, two sided alternative). For a given cluster, means followed by the same letters do not differ significantly at $p=0.05$.

Bd g cm ³	All soil samples		ALL Cluster (398 soil samples)		H Cluster (199 soil samples)		p-value
	Mean	Sd	Mean	Sd	Mean	Sd	
0-20	0.68 f	0.14	0.65 a	0.11	0.87 c	0.11	<0.0001
20-40	0.70 ef	0.15	0.65 de	0.12	0.87 bc	0.12	<0.0001
40-60	0.72 ef	0.16	0.66 de	0.12	0.88 bc	0.15	<0.0001
60-80	0.74 de	0.15	0.69 cd	0.12	0.89 bc	0.13	<0.0001
80-100	0.77 cd	0.17	0.71 bc	0.13	0.93 abc	0.14	<0.0001
100-120	0.80 abc	0.16	0.73 ab	0.11	0.94 abc	0.15	<0.0001
120-140	0.81 abc	0.16	0.73 ab	0.12	0.93 ab	0.13	<0.0001
140-160	0.82 bc	0.16	0.72 ab	0.10	0.91 abc	0.14	<0.0001
160-180	0.87 ab	0.15	0.76 a	0.11	0.96 a	0.12	<0.0001
180-200	0.88 a	0.15	0.75 ab	0.11	0.98 a	0.09	<0.0001

Table 8. Descriptive statistics (predictive data) for SOC stocks with depth and with their spectral cluster. P-value express results from t-test between samples from the two cluster classes (Welch, two sided alternative). For a given cluster, means followed by the same letters do not differ significantly at $p=0.05$.

SOC kgC m ²	All soil samples		ALL Cluster (398 soil samples)		H Cluster (199 soil samples)		p-value
	Mean	Sd	Mean	Sd	Mean	Sd	
0-20	8.8 a	2.0	9.4 a	1.3	5.4 a	1.0	<0.0001
20-40	7.6 b	2.0	8.5 b	1.1	4.6 b	1.4	<0.0001
40-60	6.6 c	2.1	7.6 c	1.0	3.7 c	1.3	<0.0001
60-80	6.2 cd	2.1	7.2 c	1.1	3.2 cd	1.5	<0.0001
80-100	5.8 de	2.2	7.0 cd	1.1	3.0 d	1.3	<0.0001
100-120	5.3 ef	2.4	6.5 de	1.7	2.7 de	1.4	<0.0001
120-140	5.0 efg	2.4	6.5 de	1.4	2.5 ef	1.4	<0.0001
140-160	4.2 fg	2.3	6.3 e	1.2	2.3 ef	1.3	<0.0001
160-180	3.8 g	2.3	5.8 e	1.7	2.2 f	1.2	<0.0001
180-200	3.8 g	2.2	6.0 e	1.3	2.1 f	0.9	<0.0001

Fig. 3. Table7 and 8