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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.

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

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

Variable	Source	Degree of freedom	F-value	P-Value
Al_o	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
$(Al_o-Al_p)/Si_o$	Intercept	1	2814.2	<0.0001
	Cluster	1	197.3	<0.0001
	Depth	9	2.2	0.020
$Al_o + 0.5Fe_o$	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 andic 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 ± 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			$(Al_o-Al_p)/Si_o$			$Al_o + 0.5\ Fe_o$ 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	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	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	1.42±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	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	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	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	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	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	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	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	1.9±1.0 c	42	18	24

Fig. 2. Table 3

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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 (Welsh, 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 (Welsh, 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

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