Table S1. Mean (±1 SD, *n* = 9) values of coarse fragments > 2 mm (CF), sand (SD), silt (SI), clay (CL), pH, organic carbon (orgC), base cations and sum of bases (SB), phosphorus by Olsen test (P_{OL}), iron and aluminium determined by the dithionite-sodium citrate method in the samples from the vineyards of Algeruz (AL), Quinta de São Francisco (SF), Quinta do Sanguinhal (SA), and Quinta de Carvalhais (QC) at 0–20, 40–60 and 60–80 cm depth.

Depth	**CF**	**Granulometry**			**pH**		**org C**	**Base Cations**				**SB**	**P_{OL}**	**Fe_d**	**Al_d**	**Ca^{2+}/K^+**
		SD	**SI**	**CL**	**H_2O**	**KCl**		**Ca^{2+}**	**Mg^{2+}**	**Na^+**	**K^+**					
cm		g kg^{-1}			-	-	g kg^{-1}	cmol$_c$ kg^{-1}					g g^{-1}	g kg^{-1}		-
							AL vineyard									
0–20	135	886	78	36	6.46	5.46	5.08	1.72	0.22	0.13	0.13	2.19	8.2	1.88	0.8	13.9
-	(34)	(46)	(41)	(8)	(0.26)	(0.32)	(1.11)	(0.65)	(0.09)	(0.01)	(0.07)	(0.79)	(1.4)	(0.67)	(0.2)	(3.2)
40–60	151	887	80	33	6.76	5.90)	3.59	1.95	0.14	0.13	0.08	2.29	4.8	1.95	0.9	24.9
-	(65)	(50)	(41	(13)	(0.22)	(0.35)	(1.46)	(1.46)	(0.04)	(0.01)	(0.02)	(1.49)	(3.4)	(1.02)	(0.4)	(14.5)
60–80	141	892	76	31	6.79	5.84	3.19	1.59	0.11	0.13	0.06	1.90	4.7	1.64	0.9	26.7
-	(55)	(42)	(34)	(11)	(0.21)	(0.31)	(1.47)	(0.65)	(0.05)	(0.01)	(0.02)	(0.70)	(2.7)	(0.77)	(0.4)	(12.5)
							SF vineyard									
0–20	267	633	172	196	6.78	5.66	6.77	5.06	1.89	0.20	0.46	7.61	17.4	12.19	1.3	11.1
-	(50)	(143)	(42)	(115)	(0.49)	(0.83)	1.77)	(3.05)	(1.38)	(0.03)	(0.12)	(4.30)	(12.7)	(5.57)	(0.5)	(7.1)
40–60	229	659	146	195	6.47	5.06	3.84	3.49	1.42	0.21	0.21	5.34	5.2	11.93	1.4	14.9
-	(40)	(106)	(36)	(83)	(0.77)	(0.98)	(0.92)	(2.91)	(1.26)	(0.03)	(0.06)	(3.83)	(3.6)	(4.68)	(0.4)	(8.5)
60–80	223	657	148	196	6.48	5.16	3.63	3.21	1.58	0.21	0.18	5.19	3.8	12.04	1.3	17.4
-	(47)	(125)	(39)	(96)	(0.89)	(1.03)	(1.52)	(2.20)	(1.58)	(0.05)	(0.07)	(3.67)	(3.6)	(5.30)	(0.4)	(8.0)
							SA vineyard									
0–20	240	849	89	62	6.52	5.62	5.10	2.45	0.37	0.16	0.39	3.36	22.3	3.19	0.58	6.4
-	(64)	(24)	(20)	(9)	(0.27)	(0.21)	(1.35)	(0.43)	(0.07)	(0.02)	(0.06)	(0.52)	(6.5)	(0.35)	(0.12)	(1.1)
40–60	254	848	93	59	6.68	5.50	2.93	2.18	0.16	0.14	0.22	2.70	14.0	3.22	0.57	10.5
-	(107)	(28)	(24)	(11)	(0.40)	(0.45)	(0.55)	(0.47)	(0.04)	(0.02)	(0.05)	(0.53)	(6.7)	(0.34)	(0.06)	(3.1)
60–80	250	853	84	63	6.90	5.63	2.47	2.03	0.15	0.14	0.17	2.49	11.8	3.08	0.51	12.2
-	(90)	(30)	(24)	(13)	(0.19)	(0.25)	(1.51)	(0.64)	(0.04)	(0.02)	(0.05)	(0.67)	(6.9)	(0.39)	(0.05)	(4.2)
							QC vineyard									
0–20	351	702	167	131	6.54	5.29	9.56	7.39	0.63	0.16	0.43	8.61	9.7	10.85	1.8	18.2
-	(50)	(23)	(21)	(18)	(0.38)	(0.35)	(2.79)	(1.78)	(0.23)	(0.02)	(0.10)	(1.72)	(5.4)	(2.71)	(0.2)	(6.1)
40–60	364	700	172	128	5.62	3.97	4.54	2.10	0.63	0.14	0.24	3.11	6.0	10.70	2.1	9.1
-	(65)	(36)	(20)	(23)	(0.28)	(0.12)	(1.34)	(0.85)	(0.46)	(0.02)	(0.07)	(1.29)	(4.4)	(2.64)	(0.3)	(2.7)
60–80	335	710	162	128	5.34	3.90	3.82	1.66	0.56	0.15	0.22	2.59	4.0	11.50	2.0	7.2
-	(55)	(46)	(31)	(19)	(0.19)	(0.11)	(0.77)	(1.35)	(0.41)	(0.02)	(0.07)	(1.52)	(2.8)	(3.76)	(0.3)	(3.1)

Table S2 (a). Effect of depth level on soil multi-element composition (μg/g)—Algeruz (AL) vineyard.

Element	Depth Effect	0–20 cm	40–60 cm	60–80 cm
Li	n.s.	22 ± 3	21 ± 8	25 ± 6
Be	n.s.	1 ± 0.1	1 ± 0.4	1 ± 0.3
Na	n.s.	4168 ± 772	4181 ± 1645	3779 ± 870
Mg	*	682 ± 128 a	647 ± 242 a	881 ± 196 b
Al	n.s.	46,280 ± 9768	38,168 ± 10464	41,512 ± 5255
Ca	*	1499 ± 220 a	1842 ± 447 ab	1937 ± 473 b
Ti	**	4 ± 1 a	6 ± 2 b	6 ± 2 b
V	*	17 ± 3 a	20 ± 7 ab	23 ± 7 b
Cr	n.s.	15 ± 3	16 ± 5	19 ± 4
Mn	**	69 ± 4	86 ± 27	107 ± 16
Fe	*	5784 ± 996 a	5824 ± 2451 a	7981 ± 1801 b
Co	**	2 ± 1 a	2 ± 1 a	3 ± 1 b
Cu	**	81 ± 17 ab	111 ± 39 b	55 ± 36 a
Ga	n.s.	10 ± 2	9 ± 3	9 ± 2
Ge	n.s.	0.3 ± 0.04	0.3 ± 0.1	0.2 ± 0.1
As	**	8 ± 3	6 ± 4	4 ± 1
Rb	**	201 ± 32 b	154 ± 45 a	141 ± 27 a
Sr	**	72 ± 14 b	54 ± 15 a	52 ± 7 a
In	n.s.	0.01 ± 0.01	0.01 ± 0.01	0.002 ± 0.001
Sn	n.s.	7 ± 1	8 ± 3	7 ± 4
Sb	**	2 ± 1 b	1 ± 1 ab	1 ± 1 a
I	n.s.	0.2 ± 0.05	0.3 ± 0.2	0.2 ± 0.1
Cs	n.s.	5 ± 1	5 ± 2	5 ± 1
Ba	**	964 ± 236	596 ± 315	429 ± 46
La	n.s.	18 ± 4	19 ± 7	21 ± 3
Ce	n.s.	42 ± 9	43 ± 15	46 ± 6
Pr	n.s.	5 ± 1	5 ± 2	6 ± 1
Nd	n.s.	19 ± 4	19 ± 6	22 ± 3
Sm	*	3 ± 1 a	4 ± 1 ab	4 ± 1b
Eu	n.s.	1 ± 0.1	1 ± 0.1	1 ± 0.1
Gd	n.s.	3 ± 0.5	3 ± 1	3 ± 0.4
Tb	*	0.3 ± 0.1 a	0.4 ± 0.1 ab	0.4 ± 0.04 b
Dy	*	2 ± 0.3 a	2 ± 0.5 ab	2 ± 0.2 b
Ho	**	0.2 ± 0.1 a	0.3 ± 0.1 b	0.4 ± 0.04 b
Er	**	1 ± 0.2 a	1 ± 0.2 b	1 ± 0.1 b
Tm	**	0.1 ± 0.03 a	0.1 ± 0.04 b	0.2 ± 0.02 b
Yb	**	1 ± 0.2 a	1 ± 0.3 b	1 ± 0.1 b
Lu	**	0.1 ± 0.03 a	0.1 ± 0.04 b	0.2 ± 0.02 b
W	n.s.	0.004 ± 0.001	0.004 ± 0.001	0.004 ± 0.001
Tl	**	1 ± 0.2 b	1 ± 0.3 a	1 ± 0.2 a

For each element and depth level, the results are based on average values of nine sampling sites, in a total of 9 samples, analysed in duplicate. * Significant effect ($p < 0.05$); ** significant effect ($p < 0.01$); n.s. without significant difference. Means followed by the same letter are not different at $p < 0.05$.

Table S2 (b). Effect of depth level on soil multi-element composition (μg/g)—Quinta de S. Francisco (SF) vineyard.

Element	Depth Effect	0–20 cm	40–60 cm	60–80 cm
Li	**	37 ± 4 b	33 ± 7 b	27 ± 4 a
Be	**	3 ± 1 c	2 ± 1 b	1 ± 1 a
Na	**	1310 ± 178 a	1549 ± 347 a	1805 ± 191 b
Mg	**	4733 ± 1618 c	3458 ± 1096 b	1487 ± 1075 a
Al	**	91,591 ± 10,978 b	80,876 ± 15,158 b	56,523 ± 11,397 a
Ca	n.s.	1801 ± 709	1925 ± 923	1598 ± 1282
Ti	**	12 ± 2 b	11 ± 2 b	6 ± 3 a
V	**	100 ± 17 b	81 ± 19 b	46 ± 23 a
Cr	**	87 ± 19 c	68 ± 13 b	36 ± 21 a
Mn	**	1453 ± 445 b	1560 ± 465 b	430 ± 366 a
Fe	**	36,669 ± 7714 b	29,806 ± 7540 b	15,695 ± 8605 a
Co	**	21 ± 5 c	16 ± 4 b	8 ± 6 a
Cu	*	77 ± 26 a	107 ± 31 b	77 ± 18 a
Ga	**	23 ± 3 b	20 ± 4 b	14 ± 3 a
Ge	**	0.3 ± 0.02	0.3 ± 0.1	0.3 ± 0.02
As	**	13 ± 3 b	12 ± 3 b	7 ± 3 a
Rb	n.s.	195 ± 21	195 ± 31	179 ± 9
Sr	n.s.	59 ± 5	58 ± 8	54 ± 3
In	**	0.1 ± 0.02 c	0.04 ± 0.02 b	0.02 ± 0.01 a
Sn	*	6 ± 1 ab	6 ± 2 b	5 ± 1 a
Sb	**	1 ± 0.2 b	1 ± 0.2 b	1 ± 0.1 a
I	n.s.	1 ± 0.4	1 ± 0.5	0.4 ± 0.3
Cs	**	11 ± 2 b	9 ± 2 b	7 ± 1 a
Ba	n.s.	529 ± 60	510 ± 73	734 ± 64
La	**	25 ± 6 b	26 ± 5 b	15 ± 9 a
Ce	**	57 ± 14 b	58 ± 10 b	32 ± 19 a
Pr	**	7 ± 1 b	7 ± 1 b	4 ± 2 a
Nd	**	25 ± 4 b	26 ± 4 b	15 ± 9 a
Sm	**	5 ± 1	5 ± 1	3 ± 2
Eu	**	1 ± 0.2 b	1 ± 0.2 b	1 ± 0.3 a
Gd	**	5 ± 1 b	5 ± 1 b	3 ± 1 a
Tb	**	1 ± 0.1 b	1 ± 0.1 b	0.4 ± 0.2 a
Dy	**	4 ± 0.5 b	4 ± 1 b	2 ± 1 a
Ho	**	1 ± 0.1 b	1 ± 0.1 b	0.4 ± 0.2 a
Er	**	2 ± 0.3 b	2 ± 0.4 b	1 ± 0.5 a
Tm	**	0.3 ± 0.04 b	0.3 ± 0.05 b	0.2 ± 0.1 a
Yb	**	2 ± 0.3 b	2 ± 0.3 b	1 ± 0.4 a
Lu	**	0.3 ± 0.04 b	0.3 ± 0.04 b	0.2 ± 0.1 a
W	**	0.01 ± 0.002 b	0.01 ± 0.002 b	0.005 ± 0.001 a
Tl	n.s.	1 ± 0.1	1 ± 0.2	1 ± 0.1

For each element and depth level, the results are based on average values of nine sampling sites, in a total of 9 samples, analysed in duplicate. * Significant effect ($p < 0.05$); ** significant effect ($p < 0.01$); n.s. without significant difference. Means followed by the same letter are not different at $p < 0.05$.

Table S2 (c). Effect of depth level on soil multi-element composition (µg/g)—Quinta do Sanguinhal (SA) vineyard.

Element	Depth Effect	0–20 cm	40–60 cm	60–80 cm
Li	**	41 ± 3 b	43 ± 7 b	33 ± 5 a
Be	**	2 ± 0.2 b	2 ± 0.3 b	1 ± 0.2 a
Na	*	2610 ± 251 ab	2841 ± 482 b	2232 ± 460 a
Mg	**	1812 ± 283 b	1871 ± 323 b	1153 ± 244 a
Al	*	52,056 ± 4185 b	52,287 ± 6412 b	45,604 ± 7790 a
Ca	n.s.	1176 ± 558	1035 ± 411	926 ± 582
Ti	**	8 ± 1 b	9 ± 2 b	7 ± 1 a
V	**	46 ± 6 b	43 ± 7 b	32 ± 6 a
Cr	**	33 ± 4 b	32 ± 6 b	22 ± 4 a
Mn	*	1419 ± 513	1296 ± 440	784 ± 164
Fe	**	14,706 ± 1605 b	12,679 ± 3210 b	10,355 ± 1831a
Co	**	9 ± 2	9 ± 1	6 ± 1
Cu	n.s.	108 ± 66	135 ± 68	107 ± 49
Ga	**	14 ± 1 b	14 ± 2 b	11 ± 2 a
Ge	*	0.3 ± 0.02 b	0.3 ± 0.04 ab	0.3 ± 0.1 a
As	**	11 ± 3 b	9 ± 2 ab	7 ± 2 a
Rb	n.s.	198 ± 16	189 ± 26	176 ± 34
Sr	n.s.	57 ± 6	64 ± 27	50 ± 7
In	*	0.04 ± 0.02 b	0.03 ± 0.01 b	0.01 ± 0.01 a
Sn	*	7 ± 2 b	7 ± 2 b	5 ± 1 a
Sb	*	1 ± 0.5	1 ± 0.1	1 ± 0.1
I	n.s.	1 ± 0.3	1 ± 0.4	0.4 ± 0.1
Cs	**	9 ± 1 b	8 ± 1 b	6 ± 1 a
Ba	**	527 ± 52 b	520 ± 37 b	456 ± 55 a
La	n.s.	18 ± 5	16 ± 8	14 ± 8
Ce	n.s.	42 ± 10	37 ± 15	34 ± 18
Pr	n.s.	6 ± 2	5 ± 2	4 ± 2
Nd	n.s.	22 ± 6	19 ± 7	16 ± 7
Sm	*	5 ± 1 b	4 ± 1 ab	3 ± 1 a
Eu	**	1 ± 0.1 b	1 ± 0.1 b	0.5 ± 0.1 a
Gd	*	4 ± 1 b	4 ± 1 ab	3 ± 1 a
Tb	*	1 ± 0.1 b	0.5 ± 0.1 ab	0.4 ± 0.1 a
Dy	**	3 ± 1 b	3 ± 0.4 b	2 ± 1 a
Ho	**	1 ± 0.1 b	0.5 ± 0.1 b	0.4 ± 0.1 a
Er	**	2 ± 0.3 b	2 ± 0.2 b	1 ± 0.2 a
Tm	**	0.2 ± 0.04 b	0.2 ± 0.03 b	0.2 ± 0.02 a
Yb	**	2 ± 0.3 b	2 ± 0.2 b	1 ± 0.2 a
Lu	**	0.2 ± 0.04 b	0.2 ± 0.03 b	0.2 ± 0.02 a
W	**	0.01 ± 0.001 b	0.01 ± 0.001 b	0.01 ± 0.001 a
Tl	*	1 ± 0.1 b	1 ± 0.2 ab	1 ± 0.2 a

For each element and depth level, the results are based on average values of nine sampling sites, in a total of 9 samples, analysed in duplicate. * Significant effect ($p < 0.05$); ** significant effect ($p < 0.01$); n.s. without significant difference. Means followed by the same letter are not different at $p < 0.05$.

Table S2 (d). Effect of depth level on soil multi-element composition (μg/g)—Quinta dos Carvalhais (QC) vineyard.

Element	Depth Effect	0–20 cm	40–60 cm	60–80 cm
Li	n.s.	240 ± 46	205 ± 57	227 ± 44
Be	n.s.	34 ± 7	29 ± 13	29 ± 8
Na	n.s.	2795 ± 1242	2071 ± 602	2845 ± 1212
Mg	n.s.	5638 ± 1127	6013 ± 842	5419 ± 661
Al	n.s.	149,447 ± 21715	154,474 ± 9367	144,583 ± 6637
Ca	n.s.	1732 ± 698	1918 ± 1380	1902 ± 1306
Ti	n.s.	8 ± 1	9 ± 1	9 ± 1
V	n.s.	68 ± 11	70 ± 12	69 ± 15
Cr	n.s.	52 ± 12	50 ± 13	54 ± 13
Mn	n.s.	555 ± 83	514 ± 121	474 ± 104
Fe	n.s.	39,512 ± 6952	42,047 ± 4961	39,791 ± 4749
Co	n.s.	9 ± 2	8 ± 2	8 ± 2
Cu	**	105 ± 27 b	67 ± 25 a	65 ± 21 a
Ga	**	39 ± 5	39 ± 2	35 ± 2
Ge	n.s.	1 ± 0.1	1 ± 0.1	1 ± 0.1
As	n.s.	39 ± 12	48 ± 14	50 ± 9
Rb	n.s.	354 ± 61	322 ± 60	323 ± 28
Sr	n.s.	34 ± 5	34 ± 3	34 ± 3
In	**	0.1 ± 0.01 b	0.1 ± 0.01 a	0.1 ± 0.01 a
Sn	*	27 ± 4 b	24 ± 2 a	24 ± 3 a
Sb	*	0.4 ± 0.1 b	0.4 ± 0.1 ab	0.4 ± 0.04 a
I	n.s.	1 ± 0.2	1 ± 0.3	1 ± 0.2
Cs	n.s.	60 ± 10	56 ± 12	50 ± 4
Ba	n.s.	302 ± 44	302 ± 50	311 ± 31
La	n.s.	20 ± 11	24 ± 12	23 ± 11
Ce	n.s.	57 ± 28	60 ± 27	61 ± 27
Pr	n.s.	6 ± 3	8 ± 3	8 ± 3
Nd	n.s.	25 ± 13	30 ± 13	29 ± 13
Sm	n.s.	5 ± 2	6 ± 3	7 ± 2
Eu	*	1 ± 0.2 a	1 ± 0.4 b	1 ± 0.3 ab
Gd	n.s.	5 ± 2	7 ± 2	6 ± 2
Tb	n.s.	1 ± 0.3	1 ± 0.3	1 ± 0.2
Dy	*	4 ± 1 a	6 ± 2 b	5 ± 1 ab
Ho	*	1 ± 0.2 a	1 ± 0.4 b	1 ± 0.2 ab
Er	*	2 ± 1 a	3 ± 1 b	2 ± 1 ab
Tm	*	0.3 ± 0.1 a	0.4 ± 0.1 b	0.4 ± 0.1 ab
Yb	n.s.	2 ± 0.5	3 ± 1	2 ± 0.5
Lu	n.s.	0.3 ± 0.1	0.4 ± 0.1	0.4 ± 0.1
W	n.s.	0.04 ± 0.01	0.05 ± 0.02	0.05 ± 0.01
Tl	n.s.	3 ± 0.3	2 ± 0.2	2 ± 0.4

For each element and depth level, the results are based on average values of nine sampling sites, in a total of 9 samples, analysed in duplicate. * Significant effect ($p < 0.05$); ** significant effect ($p < 0.01$); n.s. without significant difference. Means followed by the same letter are not different at $p < 0.05$.

Table S3. Multi-element composition of grape berries (corresponding musts) collected the vineyards of Algezuz (AL), Quinta de São Francisco (SF), Quinta do Sanguinhal (SA), and Quinta de Carvalhais (QC)-2009 vintage. Results are expressed as ng/L (± SD), with exception of Na, Mg, Al, Ca, Mn, Fe, Cu, Zn, Rb, Sr e Ba (μg/L).

Element	Vineyard Effect	AL Vineyard Palmela	SF Vineyard Óbidos	SA Vineyard Óbidos	QC Vineyard Dão
Li	**	3083 ± 592	3266 ± 3367	9536 ± 7735	8663 ± 2790
Be	n.s.	210 ± 46	200 ± 109	276 ± 182	258 ± 147
Na	**	5188 ± 1237	12,778 ± 8616	11,647 ± 642	2663 ± 440
Mg	**	80,298 ± 8060 a	93,913 ± 9883 b	102,254 ± 10,064 b	76,251 ± 7342 a
Al	**	3050 ± 406 c	835 ± 243 a	1125 ± 360 ab	1294 ± 217 b
Ca	**	53,205 ± 3594	43,109 ± 4070	46,312 ± 10,225	36,153 ± 3564
Cr	**	13,751 ± 1463	9617 ± 1099	14,772 ± 3134	11,368 ± 1646
Mn	**	139 ± 19	725 ± 459	893 ± 300	632 ± 288
Fe	**	1599 ± 302 d	320 ± 157 a	852 ± 292 c	599 ± 153 b
Ni	**	7684 ± 4080	12,710 ± 4564	17,270 ± 16224	5604 ± 2349
Cu	**	1076 ± 994 a	2819 ± 513 b	2439 ± 583 b	1576 ± 511 a
Zn	*	536 ± 70 b	574 ± 78	513 ± 80 ab	454 ± 73 a
Ga	**	1330 ± 184	727 ± 112	907 ± 313	985 ± 162
Rb	**	3825 ± 729	2016 ± 361	2554 ± 479	5607 ± 1129
Sr	n.s.	81 ± 6	102 ± 23	75 ± 8	81 ± 26
Mo	**	814 ± 144	384 ± 170	805 ± 333	935 ± 140
Sn	**	1152 ± 102	388 ± 88	2674 ± 873	441 ± 56
Sb	**	814 ± 120	666 ± 1305	387 ± 64	337 ± 89
Cs	**	3381 ± 1076	1575 ± 226	2242 ± 967	37,957 ± 27,918
Ba	n.s.	146 ± 15	200 ± 67	150 ± 31	137 ± 32
La	*	1805 ± 223 b	1274 ± 359 a	1622 ± 332 b	1630 ± 332 b
Ce	**	4225 ± 662 c	2063 ± 666 a	2706 ± 702 b	2337 ± 418 ab
Pr	*	566 ± 53	318 ± 98	442 ± 104	532 ± 262
Nd	**	2094 ± 194 c	1221 ± 421 a	1777 ± 426 bc	1641 ± 428 b
Sm	**	382 ± 52 c	214 ± 82 a	317 ± 66 bc	294 ± 84 b
Eu	n.s.	100 ± 10	81 ± 23	95 ± 22	84 ± 23
Gd	*	386 ± 39	250 ± 91	344 ± 90	365 ± 126
Tb	**	46 ± 6	30 ± 11	43 ± 9	47 ± 18
Dy	**	229 ± 23	147 ± 49	192 ± 48	250 ± 113
Ho	*	40 ± 4	27 ± 10	37 ± 9	47 ± 20
Er	**	100 ± 10	60 ± 19	86 ± 25	116 ± 58
Tm	**	14 ± 2	8 ± 3	11 ± 3	15 ± 7
Yb	**	74 ± 10	36 ± 12	56 ± 14	69 ± 34
Lu	**	12 ± 2 c	7 ± 2 a	9 ± 3 ab	11 ± 4 bc
W	*	5 ± 6	2 ± 1	4 ± 3	4 ± 2
Tl	*	1760 ± 268	441 ± 277	1060 ± 434	1380 ± 736

For each vineyard and element, the results are based on average values of nine sampling sites. Means followed by the same letter are not significantly different at 0.05 * or 0.01 ** level of significance; n.s. without significant difference. Means followed by the same letter are not different at $p < 0.05$.

Table S4. Multi-elemental composition of wines (2010 vintage) from the different vineyards. (AL) Vinha de Algeruz; (SF) Quinta de S. Francisco; (SA) Quinta do Sanguinhal; (CQ) Quinta dos Carvalhais.

Element	Vineyard Effect	AL Vineyard/Palmela	SF Vineyard/Óbidos	SA Vineyard/Óbidos	QC Vineyard/Dão
Li	**	6982 ± 423 a	6363 ± 516 a	10,698 ± 422 b	14,653 ± 279 c
Be	**	105 ± 32 a	445 ± 33 b	602 ± 24 c	872 ± 9 d
Na	**	22,628 ± 851 c	23,599 ± 1446 c	19,976 ± 577 b	9904 ± 204 a
Mg	*	132,149 ± 5611b	123,475 ± 8609 a,b	113,907 ± 7736 a	114,079 ± 4086 a
Al	**	626 ± 39 a,b	752 ± 190 b	1001 ± 110 c	496 ± 35 a
Ca	**	72,532 ± 1808 a	97,823 ± 11,681 c	88,971 ± 4652 b,c	83,543 ± 3449 a,b
Ti	*	467 ± 38 a	635 ± 79 b,c	646 ± 91 c	520 ± 37 a,b
V	*	619 ± 20 b	1544 ± 101 c	1951 ± 111 d	313 ± 105 a
Mn	**	956 ± 32 a	1334 ± 77 b	2550 ± 151 d	2121 ± 125 c
Fe	**	1494 ± 86 b	2150 ± 231 c	3200 ± 187 d	577 ± 85 a
Co	**	2253 ± 106 a,b	2830 ± 243 b	4234 ± 203 c	2088 ± 615 a
Cu	*	33,173 ± 2421	690,657 ± 16852	638,121 ± 2792	900,532 ± 42,623
Zn	*	582,012 ± 28,155 b,c	387,307 ± 56,296 a	589,882 ± 61,073 c	434,797 ± 134,125 a,b
Ga	**	1380 ± 117 b	1247 ± 132 b	1249 ± 41 b	969 ± 15 a
Ge	n.s.	1.5 ± 1.2	3 ± 3	2.4 ± 1.5	n.d.
As	*	3275 ± 291	1767 ± 162	2077 ± 179	1327 ± 12
Rb	**	1,260,727 ± 34042 a	3,427,728 ± 173,985 b	3,329,416 ± 117,556 b	8,045,560 ± 49,253 c
Sr	**	173,827 ± 5803 a	368,867 ± 18,245 b	343,796 ± 12,753 b	465,801 ± 40,155 c
Sb	*	2489 ± 113 b	2159 ± 540 a	1533 ± 219 a	448 ± 33 a
I	**	2797 ± 99 a	5782 ± 1107 b	6120 ± 473 b	2628 ± 343 a
Cs	**	3435 ± 123 a	4502 ± 102 c	4071 ± 115 b	121,678 ± 183 d
Ba	**	118,855 ± 7619 a	270,265 ± 21,777 b,c	255,758 ± 3479 b	280,369 ± 10,603 c
La	**	1090 ± 90 b	1527 ± 104 c	2207 ± 208 d	653 ± 45 a
Ce	*	91 ± 8	2162 ± 88	2822 ± 24	413 ± 18
Pr	*	11.5 ± 0.7	363 ± 16	482 ± 16	92 ± 18
Nd	**	45 ± 6 a	1602 ± 30 c	2154 ± 17 d	383 ± 46 b
Sm	**	3 ± 5 a	273.0 ± 0.0 c	403 ± 20 d	54 ± 14 b
Eu	**	10 ± 2 a	99 ± 3 c	128 ± 4 d	44 ± 5 b
Gd	*	6 ± 1	269 ± 8	422 ± 41	112 ± 13
Tb	**	0.9 ± 0.7 a	33 ± 1 c	57 ± 2 d	13 ± 4 b
Dy	*	8 ± 3	169 ± 5	303 ± 18	115 ± 1
Ho	**	6.6 ± 0.8 a	28 ± 6 b	58 ± 4 c	30 ± 4 b
Er	*	20.6 ± 0.7	80 ± 2	159 ± 3	97 ± 16
Tm	**	0.5a ± 0.5	9 ± 2 b	20 ± 5 c	15 ± 2 c
Yb	**	27 ± 6 a	42 ± 7 b	115 ± 5 d	85 ± 6 c
Lu	**	5.6 ± 0.8 a	7 ± 3 a	17.7 ± 0.6 c	14 ± 2 b
W	**	0.9 ± 0.2 a	0.5 ± 0.2 a	0.6 ± 0.1 a	1.7 ± 0.4 b
Tl	**	173 ± 10 a	628 ± 54 b	679 ± 31 b	861 ± 16 c
Pb	**	7760 ± 151 b	7067 ± 674 b	14,494 ± 1229 c	5597 ± 651 a
U	**	Nd	49 ± 15	193 ± 63	44 ± 21

* Significant effect ($p < 0.05$); ** significant effect ($p < 0.01$); n.s. without significant difference; means followed by the same letter are not different at $p < 0.05$. n.d. not detected. For each vineyard and element, the average of the three replicates (considering the final winemaking step: after alcoholic fermentation and first racking) was calculated. The results are expressed as ng/L, with exception of Na, Mg, Al, Ca, Mn, and Fe, expressed as μg/L.