



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Soil-Analytical Exchange

REFERENCE MATERIAL

ISE sample 876



General Information

In this report an overview is given of analytical data for this sample collected in our proficiency testing program. The consensus values are calculated using a robust statistical model. With this NDA model, the mean and standard deviation are calculated using all reported data when at least 4 results are left after removal of reported 'lower than' (<) and 0 (= zero) values. No outliers are removed.

This report is divided into two sections: Consensus Values and Indicative Values. The division is made on the reliability of the data. Consensus Values are based on at least 8 results and a maximum relative uncertainty of 6.25%. Indicative Values are based on a maximum relative uncertainty of 35% and a minimum of 4 and maximum of 7 results, or a relative uncertainty greater than 6.25% when there are at least 8 results.

For each determinand the following parameters are given: mean, standard deviation, coefficient of variation, number of results, median, MAD (Median of Absolute Deviation), the uncertainty of the mean (consensus or indicative) value and the relative uncertainty.

Please note: Most WEPAL-QUASIMEME reference materials are found to be stable over the long term (>10 years) for most determinand/matrix combinations. There are a few exceptions known to us as being less stable over the long term. These are organotins in sediment (MS6), ASP in shellfish (BT7), some PAHs and PCBs in sediment (SETOC) and N-NH₄ (as N) in clay soils (ISE).

All values, expressed on a weight basis (kg or %), are reported as oven-dried (105°C) material. Moisture is reported in the material as received.

Sample information

WEPAL reference materials are from natural sources only. There is no spiking, mixing or other alterations of the samples. For sample preparation, the ISE samples are dried at 40°C and milled to pass a 0.5 mm sieve.

This ISE sample 876 of Clay, from Italy, is prepared for the WEPAL proficiency programs. The sample has been used in 6 periods (or rounds). Only results from the last 5 periods are used. This way, the consensus values reflect the latest 'state of the art' analytical techniques used by the laboratories. The results on which the values in this report are based were taken from the periods given in the following table:

Year	Round	Number
2025	4	4
2024	2	3
2020	4	3
2017	3	2
2014	4	1



Consensus Values ISE 876



Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	g/kg	62.9	2.82	4.5	108	62.9	1.50	0.339	0.539
As	mg/kg	8.76	1.05	12.0	95	8.74	0.600	0.135	1.54
Ba	mg/kg	342	23.6	6.9	95	341	13.2	3.03	0.886
Br	mg/kg	7.81	0.789	10.1	56	7.80	0.400	0.132	1.69
Ca	g/kg	61.0	2.94	4.8	109	61.1	1.77	0.351	0.576
Cd	mg/kg	0.175	0.044	25.2	39	0.183	0.025	0.009	5.05
Co	mg/kg	16.7	1.80	10.8	95	16.7	1.25	0.231	1.38
Cr	mg/kg	182	16.6	9.1	120	180	10.0	1.90	1.04
Cu	mg/kg	28.6	3.24	11.3	94	29.0	2.10	0.418	1.46
Fe	g/kg	33.4	1.23	3.7	124	33.3	0.765	0.138	0.413
Ga	mg/kg	15.5	1.72	11.1	55	15.3	1.30	0.290	1.87
I	mg/kg	8.27	1.54	18.6	14	8.40	1.25	0.514	6.21
K	mg/kg	16871	855	5.1	124	16871	528	95.9	0.569
Li	mg/kg	41.8	8.18	19.6	16	41.6	6.60	2.56	6.12
Mg	mg/kg	21404	1721	8.0	102	21300	989	213	0.995
Mn	mg/kg	739	46.0	6.2	119	736	31.0	5.27	0.714
Na	mg/kg	10629	669	6.3	98	10557	384	84.5	0.795
Ni	mg/kg	113	9.75	8.6	99	112	6.00	1.22	1.08
P	mg/kg	730	73.4	10.0	88	736	44.1	9.78	1.34
Pb	mg/kg	19.1	2.80	14.7	92	19.3	1.70	0.365	1.91
Rb	mg/kg	95.9	4.83	5.0	82	95.6	2.95	0.666	0.694
S	mg/kg	189	42.5	22.5	61	189	21.0	6.80	3.60
Si	g/kg	257	6.57	2.6	76	257	4.17	0.942	0.366
Sn	mg/kg	3.80	0.699	18.4	38	3.76	0.364	0.142	3.73
Sr	mg/kg	246	12.3	5.0	82	245	8.00	1.70	0.693
Y	mg/kg	26.5	2.39	9.0	58	26.5	1.31	0.391	1.48
Zn	mg/kg	78.1	6.85	8.8	120	78.2	4.20	0.782	1.00
Zr	mg/kg	211	13.6	6.4	62	212	7.50	2.16	1.02
C-elementary	g/kg	25.3	0.746	2.9	143	25.3	0.460	0.078	0.308
Sb	mg/kg	0.989	0.133	13.5	44	1.02	0.075	0.025	2.54
Be	mg/kg	1.82	0.329	18.1	19	1.83	0.200	0.094	5.20
Tl	mg/kg	0.529	0.109	20.6	18	0.552	0.061	0.032	6.08
V	mg/kg	88.9	7.12	8.0	104	88.1	4.19	0.872	0.981
Ti	mg/kg	3825	230	6.0	99	3837	143	28.9	0.756
N - elementary	g/kg	0.908	0.107	11.7	245	0.908	0.065	0.009	0.938
Ce	mg/kg	64.1	5.50	8.6	72	64.0	3.56	0.810	1.26
La	mg/kg	31.6	2.93	9.3	70	31.6	1.83	0.438	1.39



Consensus Values ISE 876



Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Nb	mg/kg	11.7	1.60	13.7	45	11.9	0.900	0.299	2.54
Nd	mg/kg	28.0	4.42	15.8	50	28.3	2.95	0.782	2.79
Sc	mg/kg	12.7	1.38	10.8	52	12.8	0.965	0.239	1.87
Th	mg/kg	10.4	1.04	10.0	69	10.3	0.600	0.156	1.51
U	mg/kg	2.77	0.558	20.1	42	2.77	0.315	0.108	3.89
Cs	mg/kg	5.44	0.696	12.8	47	5.44	0.404	0.127	2.33
Hg	µg/kg	37.5	4.01	10.7	64	37.9	2.39	0.627	1.67

(cont.)

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	g/kg	20.3	4.70	23.2	53	20.6	2.94	0.808	3.99
As	mg/kg	7.89	0.970	12.3	88	7.80	0.613	0.129	1.64
Ba	mg/kg	92.1	11.9	12.9	60	91.4	7.74	1.92	2.08
Ca	g/kg	56.2	4.09	7.3	75	55.5	2.60	0.590	1.05
Cd	mg/kg	0.165	0.041	24.7	76	0.170	0.027	0.006	3.54
Co	mg/kg	13.8	1.46	10.6	99	13.8	1.03	0.184	1.33
Cr	mg/kg	108	16.4	15.2	114	107	9.42	1.93	1.78
Cu	mg/kg	27.1	2.72	10.1	131	27.1	1.69	0.297	1.10
Fe	g/kg	26.5	3.00	11.3	75	26.5	1.70	0.433	1.64
Mg	mg/kg	16160	1825	11.3	75	16010	1252	263	1.63
Mn	mg/kg	621	75.3	12.1	83	613	41.4	10.3	1.66
N	g/kg	0.918	0.150	16.3	134	0.912	0.092	0.016	1.76
Na	mg/kg	379	121	32.0	56	373	75.5	20.3	5.34
Ni	mg/kg	92.6	10.5	11.4	110	92.9	6.86	1.25	1.35
P	mg/kg	655	59.5	9.1	96	654	32.0	7.59	1.16
Pb	mg/kg	14.4	2.49	17.3	115	14.4	1.47	0.290	2.02
S	mg/kg	183	27.4	15.0	58	183	17.0	4.49	2.46
Sr	mg/kg	185	23.4	12.7	18	189	12.9	6.88	3.73
Zn	mg/kg	64.0	6.99	10.9	129	63.7	4.05	0.769	1.20
V	mg/kg	39.6	8.27	20.9	65	39.8	4.81	1.28	3.24
Be	mg/kg	0.697	0.136	19.5	41	0.720	0.094	0.027	3.81
Hg	µg/kg	37.6	6.54	17.4	50	37.9	4.57	1.16	3.08

Method: Aqua Regia (ISO 54321) (replacing former ISO 11466)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ag	µg/kg	61.8	9.63	15.6	13	64.0	6.00	3.34	5.40
Al	g/kg	19.7	3.96	20.1	102	20.2	2.35	0.491	2.49



Consensus Values ISE 876



Method: Aqua Regia (ISO 54321) (replacing former ISO 11466)									(cont.)
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
As	mg/kg	7.81	0.893	11.4	108	7.80	0.550	0.107	1.38
Ba	mg/kg	92.4	13.4	14.5	51	91.9	8.12	2.34	2.53
Be	mg/kg	0.737	0.114	15.5	44	0.747	0.087	0.021	2.91
Bi	mg/kg	0.264	0.031	11.6	9	0.261	0.019	0.013	4.85
Ca	g/kg	54.7	4.18	7.6	102	54.7	2.51	0.518	0.946
Cd	mg/kg	0.167	0.038	22.8	111	0.170	0.020	0.005	2.71
Co	mg/kg	13.8	1.47	10.6	117	13.9	1.00	0.170	1.23
Cr	mg/kg	110	15.9	14.5	154	109	9.15	1.60	1.46
Cu	mg/kg	27.7	2.74	9.9	154	27.8	1.75	0.276	0.994
Fe	g/kg	26.5	2.39	9.0	113	26.4	1.45	0.281	1.06
Hg	µg/kg	38.0	7.27	19.1	53	38.0	3.85	1.25	3.28
K	mg/kg	3084	823	26.7	104	3127	518	101	3.27
Li	mg/kg	28.1	4.31	15.3	35	28.0	2.20	0.911	3.24
Mg	mg/kg	16098	1780	11.1	110	16030	1078	212	1.32
Mn	mg/kg	609	54.7	9.0	124	612	32.6	6.14	1.01
Mo	mg/kg	0.553	0.127	23.0	68	0.575	0.063	0.019	3.49
Na	mg/kg	354	54.5	15.4	86	359	33.0	7.35	2.08
Ni	mg/kg	94.3	10.1	10.7	154	94.1	6.22	1.02	1.08
P	mg/kg	662	63.3	9.6	97	662	38.0	8.04	1.21
Pb	mg/kg	14.7	2.74	18.7	151	15.0	1.73	0.279	1.90
S	mg/kg	181	23.8	13.2	70	181	14.0	3.56	1.97
Sb	mg/kg	0.541	0.103	19.0	33	0.567	0.061	0.022	4.13
Sn	mg/kg	1.90	0.487	25.6	34	1.90	0.385	0.104	5.48
Sr	mg/kg	175	14.0	8.0	41	176	8.00	2.73	1.55
Tl	mg/kg	0.188	0.047	24.8	27	0.194	0.024	0.011	5.96
U	mg/kg	1.06	0.136	12.9	23	1.05	0.070	0.036	3.37
V	mg/kg	38.2	7.18	18.8	65	38.7	4.90	1.11	2.91
Zn	mg/kg	64.7	6.13	9.5	156	64.8	3.86	0.614	0.949

Method: Extraction with boiling 2M HNO₃

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cd	mg/kg	0.161	0.042	25.8	62	0.169	0.028	0.007	4.09
Co	mg/kg	12.3	1.19	9.6	68	12.3	0.600	0.180	1.46
Cr	mg/kg	59.4	7.42	12.5	78	59.8	3.85	1.05	1.77
Cu	mg/kg	26.6	2.26	8.5	78	26.5	1.41	0.320	1.20
Hg	µg/kg	35.1	3.96	11.3	56	35.4	2.31	0.662	1.88
Ni	mg/kg	77.0	8.25	10.7	78	77.0	4.65	1.17	1.52

Method: Extraction with boiling 2M HNO ₃									(cont.)
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Pb	mg/kg	14.5	1.82	12.5	78	14.7	1.14	0.257	1.77
Tl	mg/kg	0.110	0.015	13.3	20	0.110	0.008	0.004	3.72
Zn	mg/kg	53.1	5.29	10.0	77	53.1	3.00	0.754	1.42

Method: Extraction with 0.1M NaNO ₃									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cu	µg/kg	111	14.0	12.7	31	111	9.00	3.15	2.84

Method: Extraction with 0.01M CaCl ₂ 1:10									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	µg/kg	281	29.7	10.6	14	280	14.1	9.92	3.53
K	mg/kg	40.6	3.93	9.7	37	39.8	2.80	0.807	1.99
Mg	mg/kg	291	24.5	8.4	30	287	17.0	5.59	1.92
N total soluble	mg/kg	44.5	2.07	4.6	9	44.3	1.22	0.861	1.93
N - NH ₄ (as N)	mg/kg	4.09	0.930	22.7	43	4.08	0.680	0.177	4.33
N - NO ₃ (as N)	mg/kg	30.7	1.66	5.4	41	30.8	0.792	0.324	1.05
Na	mg/kg	165	10.4	6.3	24	164	6.20	2.66	1.61

Method: Soil characteristics									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
pH - H ₂ O	...	8.18	0.300	3.7	471	8.17	0.190	0.017	0.211
pH - KCl	...	7.58	0.263	3.5	193	7.59	0.190	0.024	0.312
pH - CaCl ₂	...	7.62	0.148	1.9	150	7.61	0.090	0.015	0.198
Fraction < 2 µm	%	20.5	4.10	20.0	146	20.4	2.39	0.424	2.07
TIC=Tot.Inorg C(as CaCO ₃)	%	14.4	1.55	10.8	169	14.3	1.00	0.149	1.04
EC-SC (ISO 11265)	mS/m	24.8	3.37	13.6	180	24.9	2.01	0.314	1.27
Fraction < 63 µm	%	84.1	3.25	3.9	99	83.9	1.89	0.408	0.485
Fraction > 63 µm	%	16.0	2.82	17.6	88	16.0	1.75	0.375	2.35
Org.matter (L.O.I.)	%	3.31	0.692	20.9	178	3.36	0.410	0.065	1.96
Fraction < 16 µm	%	47.2	7.31	15.5	48	47.0	4.50	1.32	2.80
TC=Total C (org.+inorg.)	g/kg	25.3	0.737	2.9	184	25.2	0.415	0.068	0.268
TOC=Total Org. C	g/kg	7.57	1.07	14.2	212	7.57	0.680	0.092	1.22
C - org others (W&B a.o.)	g/kg	7.52	1.42	18.9	226	7.61	0.900	0.118	1.57



Consensus Values ISE 876



Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Moisture-content	%	1.59	0.307	19.3	200	1.58	0.206	0.027	1.71
delta 13C	‰ V-PDB	-7.23	0.591	8.2	17	-7.24	0.430	0.179	2.48
delta 15N	‰ Air	6.17	0.700	11.3	15	6.40	0.480	0.226	3.66

Method: Pot. CEC using 1M NH4-acetate at pH=7

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	10.5	2.89	27.5	156	10.6	1.72	0.289	2.75
Na	cmol+/kg	0.751	0.144	19.1	203	0.750	0.087	0.013	1.68
K	cmol+/kg	0.231	0.042	18.0	247	0.230	0.028	0.003	1.43
Mg	cmol+/kg	3.71	0.621	16.7	241	3.69	0.370	0.050	1.35
Ca	cmol+/kg	30.4	11.8	38.7	231	31.4	8.22	0.969	3.19

Method: Pot. CEC using 1M or 0.1M BaCl2-TEA at pH=8.1 (ISO 13536 OR BZE)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	14.3	2.12	14.8	25	14.5	1.34	0.529	3.69
Na	cmol+/kg	0.812	0.063	7.8	12	0.805	0.040	0.023	2.81
K	cmol+/kg	0.325	0.054	16.7	12	0.330	0.039	0.020	6.04
Mg	cmol+/kg	3.52	0.349	9.9	12	3.49	0.255	0.126	3.58

Method: Pot. CEC using 1M NH4Cl (BZE)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Na	cmol+/kg	0.770	0.092	11.9	14	0.751	0.049	0.031	3.99
K	cmol+/kg	0.225	0.024	10.6	14	0.227	0.013	0.008	3.55
Ca	cmol+/kg	18.1	2.07	11.4	14	18.2	0.956	0.691	3.81

Method: Act. CEC using 0.01M BaCl2 (ISO 11260)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Na	cmol+/kg	0.772	0.028	3.6	9	0.770	0.020	0.012	1.51
Mg	cmol+/kg	3.64	0.295	8.1	11	3.53	0.270	0.111	3.06
Ca	cmol+/kg	14.1	1.63	11.6	11	14.2	0.990	0.614	4.36

Method: Act. CEC using 0.1M BaCl2 (UNEP-UN/EC 91065A)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	15.8	1.15	7.3	11	15.6	0.895	0.433	2.74
Na	cmol+/kg	0.714	0.028	3.9	13	0.715	0.015	0.010	1.35
K	cmol+/kg	0.205	0.017	8.1	13	0.200	0.009	0.006	2.80
Ca	cmol+/kg	11.4	0.648	5.7	13	11.5	0.410	0.225	1.96



Consensus Values ISE 876



Method: Act. CEC using 0.1M BaCl ₂ (UNEP-UN/EC 91065A)									(cont.)
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mg	cmol+/kg	3.45	0.295	8.5	13	3.42	0.171	0.102	2.96

Method: Act. CEC using cobaltihexamine (AFNOR NFX 31 130)									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	14.3	1.25	8.7	39	14.2	0.737	0.250	1.75
Na	cmol+/kg	0.764	0.060	7.9	31	0.769	0.049	0.014	1.77
K	cmol+/kg	0.267	0.034	12.7	35	0.271	0.021	0.007	2.69
Ca	cmol+/kg	11.8	1.39	11.8	36	12.0	0.894	0.290	2.46
Mg	cmol+/kg	3.50	0.307	8.8	36	3.48	0.196	0.064	1.83

Method: Mehlich-3									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	1.44	0.162	11.2	58	1.43	0.090	0.027	1.85
Ca	mg/kg	8622	1370	15.9	105	8496	892	167	1.94
Cu	mg/kg	5.50	0.624	11.3	99	5.47	0.460	0.078	1.42
Fe	mg/kg	160	27.7	17.3	101	161	17.8	3.44	2.15
K	mg/kg	88.9	9.56	10.7	107	88.5	5.20	1.15	1.30
Mg	mg/kg	511	36.3	7.1	105	513	21.4	4.43	0.866
Mn	mg/kg	141	26.4	18.7	105	143	17.9	3.22	2.28
Na	mg/kg	176	16.5	9.4	68	175	11.0	2.50	1.42
P	mg/kg	16.8	3.09	18.4	117	17.0	1.87	0.357	2.13
Zn	mg/kg	1.56	0.369	23.6	88	1.58	0.241	0.049	3.15

Method: Extraction with 0.01M CaCl ₂ - 0.005M DTPA 1:10 (w/v)									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cu	mg/kg	3.63	0.508	14.0	80	3.65	0.269	0.071	1.96
Fe	mg/kg	20.0	6.54	32.7	77	20.2	3.91	0.932	4.66
Mn	mg/kg	13.3	4.67	35.1	79	13.6	3.24	0.657	4.93
Zn	mg/kg	0.498	0.155	31.2	73	0.510	0.090	0.023	4.56

Method: Extraction with 1M KCl 1:10 (w/v)									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
N - NH ₄ (as N)	mg/kg	7.35	2.33	31.7	48	7.41	1.40	0.420	5.72
N - NO ₃ (as N)	mg/kg	29.9	3.00	10.1	53	29.7	2.06	0.516	1.73



Consensus Values ISE 876

Method: Phosphorus and related analysis

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
P - Olsen (as P)	mg/kg	8.95	2.40	26.8	189	9.00	1.40	0.218	2.44
Al - Ox	mg/kg	481	62.2	12.9	16	468	28.3	19.4	4.04
Fe - Ox	mg/kg	1583	312	19.7	16	1563	165	97.6	6.17
P - Ox	mg/kg	247	22.0	8.9	15	240	17.8	7.09	2.87
P - AL (as P)	mg/kg	55.3	10.5	18.9	42	55.9	6.40	2.02	3.65

Method: UK Soil Methods

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
P – NaHCO ₃ (1/20)	mg/l	8.27	2.07	25.0	59	8.30	1.30	0.336	4.07
K - NH ₄ NO ₃ (1/5)	mg/l	82.5	9.64	11.7	65	82.1	5.58	1.49	1.81
Mg - NH ₄ NO ₃ (1/5)	mg/l	383	44.5	11.6	65	386	29.2	6.90	1.80
pH - H ₂ O (2/5)	...	8.24	0.171	2.1	65	8.25	0.100	0.026	0.321

Method: PEP-Ammoniumacetate-EDTA extraction

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
AAE10-Ca	mg/kg	44212	2315	5.2	9	43820	1370	965	2.18
AAE10-Mg	mg/kg	850	30.0	3.5	9	851	15.8	12.5	1.47
AAE10-K	mg/kg	89.6	8.37	9.3	9	89.4	3.36	3.49	3.89

Method: PEP-Test measurements

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
pH-H ₂ O	...	7.95	0.131	1.6	12	7.95	0.060	0.047	0.594



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Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	81.1	36.2	44.6	5	75.6	17.6	20.2	25.0
F	mg/kg	939	141	15.0	5	909	84.0	78.8	8.39
Mo	mg/kg	0.648	0.227	35.0	35	0.643	0.123	0.048	7.40
Se	mg/kg	0.984	1.07	108.6	14	1.07	0.740	0.357	36.3
Ag	mg/kg	0.462	0.314	67.9	6	0.439	0.184	0.160	34.7
Ge	mg/kg	1.34	0.708	53.0	6	1.50	0.340	0.361	27.1
W	mg/kg	2.24	0.964	43.1	21	2.41	0.590	0.263	11.8
Yb	mg/kg	2.29	0.653	28.5	6	2.24	0.361	0.333	14.6
Sm	mg/kg	5.07	1.20	23.6	7	4.77	0.770	0.566	11.2
Pr	mg/kg	6.07	1.85	30.5	6	5.95	0.933	0.944	15.5
Gd	mg/kg	4.25	0.674	15.9	5	4.09	0.440	0.377	8.87
Dy	mg/kg	3.66	0.688	18.8	5	3.55	0.433	0.385	10.5

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	17.4	9.56	55.0	39	18.5	6.05	1.91	11.0
K	mg/kg	3118	1351	43.3	75	3300	933	195	6.26
Li	mg/kg	29.3	6.30	21.5	14	29.6	2.55	2.10	7.19
Mo	mg/kg	0.470	0.170	36.2	35	0.490	0.137	0.036	7.64
Se	mg/kg	0.261	0.433	166.2	16	0.327	0.222	0.135	51.9
Si	g/kg	0.302	0.180	59.8	7	0.340	0.115	0.085	28.3
Sn	mg/kg	1.83	0.789	43.2	48	1.96	0.473	0.142	7.80
Y	mg/kg	13.8	2.46	17.8	6	13.6	1.09	1.25	9.07
Zr	mg/kg	3.37	0.799	23.7	6	3.45	0.555	0.408	12.1
Sb	mg/kg	0.564	0.304	54.0	25	0.580	0.150	0.076	13.5
Tl	mg/kg	0.272	0.081	29.8	11	0.260	0.042	0.031	11.2
Ti	mg/kg	493	224	45.4	18	481	130	66.0	13.4
Bi	mg/kg	0.257	0.015	5.8	4	0.255	0.008	0.009	3.61
Ce	mg/kg	34.2	7.35	21.5	6	33.3	5.13	3.75	11.0
La	mg/kg	15.6	4.58	29.4	9	15.4	3.17	1.91	12.3
Sc	mg/kg	5.85	1.32	22.6	6	5.68	0.565	0.674	11.5
U	mg/kg	0.953	0.072	7.6	7	0.950	0.040	0.034	3.57

Method: Aqua Regia (ISO 54321) (replacing former ISO 11466)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	15.2	5.56	36.5	42	15.7	3.13	1.07	7.05
Ce	mg/kg	35.3	4.74	13.4	5	36.1	2.87	2.65	7.51

Indicative Values ISE 876

Method: Aqua Regia (ISO 54321) (replacing former ISO 11466)									(cont.)
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
La	mg/kg	15.9	2.67	16.8	10	16.3	1.50	1.06	6.65
Rb	mg/kg	23.3	6.73	28.9	4	23.0	4.40	4.21	18.1
Sc	mg/kg	4.71	0.807	17.1	6	4.73	0.450	0.412	8.74
Se	mg/kg	0.271	0.282	104.3	39	0.373	0.233	0.056	20.9
Th	mg/kg	5.99	0.472	7.9	7	5.89	0.250	0.223	3.72
Ti	mg/kg	626	216	34.5	37	656	99.0	44.3	7.08
Y	mg/kg	11.2	1.91	17.0	4	11.2	1.29	1.19	10.6
Zr	mg/kg	1.01	0.068	6.7	4	1.02	0.020	0.042	4.20
Method: Extraction with boiling 2M HNO ₃									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mo	mg/kg	0.161	0.085	52.5	34	0.161	0.045	0.018	11.3
Method: Extraction with 0.1M NaNO ₃									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ni	µg/kg	21.5	7.58	35.3	20	26.9	2.92	2.12	9.87
Method: Extraction with 0.01M CaCl ₂ 1:10									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Co	µg/kg	2.62	0.111	4.2	5	2.65	0.038	0.062	2.36
Cu	µg/kg	98.7	21.2	21.5	15	100	12.0	6.85	6.94
Mn	mg/kg	0.562	0.126	22.4	12	0.588	0.095	0.045	8.07
P	mg/kg	0.153	0.154	100.9	24	0.184	0.103	0.039	25.8
SO ₄	mg/kg	80.9	6.11	7.6	7	81.8	2.75	2.89	3.57
Method: Soil characteristics									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Active Lime (as CaCO ₃)	%	3.36	1.07	31.9	24	3.70	0.495	0.274	8.15
Method: Other determinations									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B - Hot water	mg/kg	0.853	0.371	43.5	43	0.940	0.241	0.071	8.30
Method: Fluoride (Swiss standard procedure)									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
F - Total	mg/kg	575	117	20.3	16	561	79.5	36.5	6.35



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Method: Pot. CEC using 1M or 0.1M BaCl₂-TEA at pH=8.1 (ISO 13536 OR BZE)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ca	cmol+/kg	12.0	2.85	23.8	12	12.1	2.00	1.03	8.60

Method: Pot. CEC using 1M NH₄Cl (BZE)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mg	cmol+/kg	3.42	1.11	32.5	14	3.44	0.538	0.372	10.9
Mn	cmol+/kg	0.014	0.005	37.2	9	0.015	0.003	0.002	15.5

Method: Act. CEC using 0.01M BaCl₂ (ISO 11260)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	15.8	0.531	3.4	7	15.7	0.310	0.251	1.59
K	cmol+/kg	0.315	0.051	16.3	10	0.323	0.025	0.020	6.46

Method: Act. CEC using 0.1M BaCl₂ (UNEP-UN/EC 91065A)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mn	cmol+/kg	0.002	0.000	21.4	4	0.002	0.000	0.000	13.4

Method: Act. CEC using cobaltihexamine (AFNOR NFX 31 130)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Mn	cmol+/kg	0.001	0.000	2.3	5	0.001	0	0.000	1.30

Method: Mehlich-3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	mg/kg	84.1	37.9	45.1	55	89.6	20.4	6.40	7.60
As	mg/kg	0.535	0.123	22.9	4	0.534	0.053	0.077	14.3
Cd	mg/kg	0.057	0.010	17.5	6	0.060	0.008	0.005	8.93
Cr	mg/kg	0.415	0.054	13.1	5	0.430	0.033	0.030	7.31
Pb	mg/kg	4.91	0.418	8.5	6	4.98	0.266	0.214	4.35
Co	mg/kg	1.20	0.614	51.4	5	1.20	0.200	0.343	28.7

Method: Water soluble 1:10 (w/v) (EN-12457-4)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cl	mg/kg	22.9	19.2	83.9	9	26.0	12.2	8.00	34.9
N - NO ₃ (as N)	mg/kg	23.5	21.0	89.5	8	24.7	10.3	9.29	39.6



Indicative Values ISE 876

Method: Phosphorus and related analysis

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
P - Bray (as P)	mg/kg	3.06	5.30	173.3	114	4.57	4.23	0.620	20.3
P - w (as P)	mg/l soil	3.13	1.36	43.4	13	3.48	0.679	0.470	15.0
K - AL (as K)	mg/kg	82.5	22.2	26.9	4	81.9	10.8	13.9	16.8

Method: Water soluble 1:10 (w/v) (Neth standard VPR C85-06)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cl	mg/kg	20.5	12.0	58.2	5	20.5	3.51	6.68	32.5
SO4	mg/kg	93.3	25.7	27.6	10	98.7	16.2	10.2	10.9

Method: Extraction with dilute nitric acid (0.43 Mol/l) ISO 17586

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
As	mg/kg	1.09	0.341	31.1	4	1.11	0.188	0.213	19.5
Cr	mg/kg	3.51	1.16	33.1	4	3.78	0.619	0.727	20.7
Cu	mg/kg	10.6	3.63	34.1	7	12.0	2.61	1.71	16.1
Ni	mg/kg	11.9	3.07	25.8	4	12.8	1.64	1.92	16.1
Pb	mg/kg	9.96	1.96	19.7	4	9.98	0.890	1.23	12.3
Zn	mg/kg	7.89	1.48	18.7	7	7.80	0.820	0.698	8.85
Al	g/kg	1.37	0.478	35.0	4	1.49	0.256	0.299	21.9
Fe	g/kg	1.34	0.540	40.4	7	1.47	0.455	0.255	19.1
K	mg/kg	110	58.2	52.8	7	133	33.7	27.5	24.9
Mg	mg/kg	4681	783	16.7	7	4980	460	370	7.90
Mn	mg/kg	379	48.4	12.7	7	394	21.6	22.8	6.02
P	mg/kg	403	80.3	19.9	6	408	66.9	41.0	10.2
Na	mg/kg	203	29.7	14.6	7	201	16.5	14.0	6.89
S	mg/kg	119	67.2	56.3	5	130	60.0	37.6	31.5
Ca	g/kg	52.1	3.61	6.9	7	52.4	1.90	1.70	3.27

Method: PEP-Ammoniumacetate-EDTA extraction

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
AAE10-P	mg/kg	19.7	3.23	16.4	9	20.2	1.60	1.35	6.82

Method: PEP-Water extraction

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
H2O10-Mg	mg/kg	37.8	3.22	8.5	7	37.6	1.80	1.52	4.02
H2O10-K	mg/kg	17.7	0.525	3.0	7	17.5	0.330	0.248	1.40
H2O10-P	mg/kg	0.805	0.019	2.3	7	0.810	0.010	0.009	1.11

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Method: PEP-Test measurements

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CO ₂ -K	K-test	2.13	0.135	6.3	7	2.15	0.110	0.064	3.00
CO ₂ -P	P-test	1.90	0.398	21.0	7	1.96	0.260	0.188	9.92
CC-Mg	Mg-test	30.0	2.80	9.3	7	29.6	1.60	1.32	4.40
CaCO ₃	%	14.2	0.552	3.9	7	14.1	0.265	0.261	1.83
pH-CC	...	7.39	0.158	2.1	4	7.38	0.075	0.099	1.34

Method: PEP-Physical parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ton (clay)	%	20.6	2.11	10.2	6	20.0	0.958	1.08	5.22
Schluff (silt)	%	54.7	2.40	4.4	6	54.0	1.53	1.22	2.24
Sand	%	24.8	5.72	23.0	6	24.4	3.84	2.92	11.7
C-org	%	0.646	0.131	20.3	8	0.685	0.078	0.058	8.95
Humus	%	1.11	0.179	16.2	8	1.12	0.090	0.079	7.18
TOC_400	%	0.629	0.179	28.4	7	0.650	0.108	0.085	13.4

Method: PEP-Cation Exchange Capacity

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ca	cmol+/kg	12.7	6.88	54.0	5	13.4	4.24	3.84	30.2
Mg	cmol+/kg	3.29	0.367	11.1	5	3.34	0.210	0.205	6.23
Na	cmol+/kg	0.594	0.189	31.8	5	0.620	0.150	0.106	17.8
KAK	cmol+/kg	15.5	4.66	30.2	4	15.7	2.52	2.91	18.8
S-Wert	cmol+/kg	15.5	4.66	30.2	4	15.7	2.52	2.91	18.8
BAS	%	100.0	0.003	0.0	4	100	0	0.002	0.002