



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Soil-Analytical Exchange

REFERENCE MATERIAL

ISE sample 910



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 910 of Clay soil, from Netherlands, is prepared for the WEPAL proficiency programs. The sample has been used in 8 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	3
2022	3	3
2019	3	1
2016	3	2
2013	4	3



Consensus Values ISE 910

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	g/kg	92.3	5.61	6.1	98	92.0	3.76	0.709	0.768
As	mg/kg	30.5	3.04	10.0	82	30.4	1.97	0.420	1.38
Ba	mg/kg	485	35.9	7.4	88	482	22.0	4.79	0.988
Br	mg/kg	7.29	1.06	14.5	37	7.30	0.490	0.217	2.98
Ca	g/kg	6.79	0.407	6.0	97	6.78	0.260	0.052	0.762
Cd	mg/kg	0.744	0.126	16.9	56	0.760	0.070	0.021	2.83
Co	mg/kg	18.1	3.18	17.6	79	18.4	1.70	0.447	2.47
Cr	mg/kg	125	11.4	9.1	107	124	7.30	1.38	1.10
Cu	mg/kg	37.6	4.85	12.9	92	37.6	2.80	0.633	1.68
Fe	g/kg	55.3	2.46	4.4	103	55.2	1.66	0.303	0.548
Ga	mg/kg	22.7	2.08	9.2	53	23.0	1.43	0.358	1.57
K	mg/kg	20342	1105	5.4	109	20233	777	132	0.650
Li	mg/kg	79.1	7.11	9.0	15	78.5	4.40	2.29	2.90
Mg	mg/kg	7805	581	7.4	97	7793	383	73.7	0.945
Mn	mg/kg	475	29.8	6.3	108	470	18.7	3.58	0.754
Mo	mg/kg	0.956	0.272	28.5	40	1.01	0.174	0.054	5.63
Na	mg/kg	2979	267	9.0	81	2980	150	37.1	1.25
Ni	mg/kg	54.6	5.25	9.6	102	54.2	3.12	0.649	1.19
P	mg/kg	1383	94.3	6.8	94	1381	61.0	12.2	0.879
Pb	mg/kg	77.7	8.13	10.5	99	77.4	5.06	1.02	1.31
Rb	mg/kg	131	6.54	5.0	65	130	4.24	1.01	0.776
S	mg/kg	570	139	24.4	78	563	90.0	19.6	3.45
Si	g/kg	247	10.5	4.2	76	249	6.93	1.50	0.609
Sn	mg/kg	3.80	0.595	15.7	44	3.84	0.425	0.112	2.95
Sr	mg/kg	85.0	6.23	7.3	78	84.3	3.80	0.882	1.04
Y	mg/kg	36.3	3.88	10.7	59	36.2	2.28	0.632	1.74
Zn	mg/kg	234	14.3	6.1	107	233	8.68	1.73	0.737
Zr	mg/kg	161	12.2	7.6	57	160	8.00	2.02	1.25
C-elementary	g/kg	37.6	1.59	4.2	144	37.5	1.13	0.165	0.440
Sb	mg/kg	1.10	0.303	27.5	40	1.18	0.200	0.060	5.44
Be	mg/kg	2.95	0.506	17.1	21	3.04	0.380	0.138	4.67
Tl	mg/kg	1.07	0.197	18.3	25	1.10	0.100	0.049	4.58
V	mg/kg	150	9.71	6.5	89	150	6.00	1.29	0.858
Ti	mg/kg	4909	273	5.6	91	4900	183	35.7	0.728
N - elementary	g/kg	4.12	0.260	6.3	245	4.10	0.176	0.021	0.505
Ce	mg/kg	96.3	11.8	12.2	53	95.0	7.20	2.02	2.10
La	mg/kg	49.1	4.17	8.5	51	49.0	2.30	0.730	1.49



Consensus Values ISE 910



Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Nb	mg/kg	16.0	1.80	11.3	44	16.0	1.35	0.340	2.12
Nd	mg/kg	44.1	5.19	11.8	42	44.7	2.99	1.00	2.27
Sc	mg/kg	18.4	1.55	8.4	28	18.5	0.726	0.366	1.99
Th	mg/kg	13.6	1.55	11.4	46	13.7	0.895	0.286	2.10
U	mg/kg	3.53	0.727	20.6	35	3.60	0.433	0.154	4.35
Cs	mg/kg	10.2	2.41	23.7	26	10.1	1.65	0.591	5.80
Hg	µg/kg	91.8	9.41	10.2	72	91.4	5.60	1.39	1.51

(cont.)

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	g/kg	45.6	13.2	29.0	58	44.8	8.20	2.17	4.76
As	mg/kg	26.4	2.89	10.9	86	26.0	1.75	0.389	1.48
Ba	mg/kg	222	32.6	14.7	63	221	18.0	5.13	2.31
Ca	g/kg	6.24	0.664	10.6	72	6.15	0.430	0.098	1.57
Cd	mg/kg	0.744	0.130	17.5	96	0.740	0.077	0.017	2.23
Co	mg/kg	15.9	1.65	10.4	95	15.8	0.890	0.212	1.33
Cr	mg/kg	73.3	13.1	17.9	101	72.0	8.00	1.63	2.23
Cu	mg/kg	34.4	3.32	9.7	125	34.1	2.02	0.371	1.08
Fe	g/kg	49.5	6.70	13.5	73	49.3	4.29	0.980	1.98
Mg	mg/kg	5797	968	16.7	76	5814	656	139	2.39
Mn	mg/kg	431	51.3	11.9	84	432	28.5	7.00	1.62
Mo	mg/kg	0.746	0.156	20.9	42	0.774	0.090	0.030	4.03
N	g/kg	3.95	0.326	8.3	137	3.94	0.160	0.035	0.882
Ni	mg/kg	46.1	5.13	11.1	101	46.0	3.09	0.639	1.39
P	mg/kg	1241	132	10.7	98	1229	79.0	16.7	1.35
Pb	mg/kg	70.3	8.91	12.7	106	70.2	6.16	1.08	1.54
S	mg/kg	580	65.5	11.3	61	581	40.6	10.5	1.81
Sn	mg/kg	2.30	0.600	26.0	42	2.30	0.385	0.116	5.02
Zn	mg/kg	213	23.9	11.2	127	213	16.6	2.65	1.24
V	mg/kg	87.6	16.3	18.6	59	88.0	10.4	2.65	3.03
Be	mg/kg	2.05	0.318	15.5	51	2.06	0.200	0.056	2.71
La	mg/kg	31.7	4.93	15.6	11	31.9	2.70	1.86	5.86
U	mg/kg	1.88	0.159	8.4	8	1.89	0.081	0.070	3.73
Hg	µg/kg	96.1	15.7	16.4	62	94.1	9.55	2.50	2.60



Consensus Values ISE 910



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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ag	µg/kg	135	17.1	12.6	12	132	11.5	6.16	4.56
Al	g/kg	43.4	8.58	19.8	109	42.9	5.58	1.03	2.37
As	mg/kg	26.2	2.73	10.4	132	26.0	1.90	0.297	1.13
Ba	mg/kg	214	29.3	13.7	52	223	23.5	5.07	2.37
Be	mg/kg	2.06	0.253	12.3	53	2.08	0.190	0.043	2.11
Bi	mg/kg	0.331	0.017	5.1	9	0.333	0.008	0.007	2.14
Ca	g/kg	6.26	0.532	8.5	113	6.27	0.340	0.063	0.998
Cd	mg/kg	0.778	0.091	11.7	154	0.780	0.055	0.009	1.18
Co	mg/kg	15.8	1.55	9.8	126	15.7	1.06	0.172	1.09
Cr	mg/kg	71.7	10.9	15.1	164	71.7	7.02	1.06	1.48
Cu	mg/kg	35.8	3.37	9.4	170	35.9	2.16	0.323	0.901
Fe	g/kg	49.4	4.16	8.4	130	49.2	2.48	0.456	0.925
Hg	µg/kg	97.1	11.2	11.5	73	96.0	6.20	1.64	1.68
K	mg/kg	4908	1618	33.0	106	4932	1095	196	4.00
La	mg/kg	29.2	3.98	13.6	10	29.2	2.24	1.57	5.38
Mg	mg/kg	5942	691	11.6	113	5919	446	81.3	1.37
Mn	mg/kg	433	35.7	8.2	137	432	23.0	3.81	0.880
Mo	mg/kg	0.811	0.202	24.9	68	0.823	0.124	0.031	3.77
Na	mg/kg	206	56.4	27.4	85	217	27.1	7.65	3.72
Ni	mg/kg	45.8	5.05	11.0	167	45.3	3.40	0.489	1.07
P	mg/kg	1221	106	8.6	111	1212	59.0	12.5	1.03
Pb	mg/kg	71.1	8.15	11.5	173	71.5	5.64	0.774	1.09
S	mg/kg	583	46.6	8.0	83	584	28.5	6.39	1.10
Sn	mg/kg	2.17	0.452	20.8	33	2.26	0.290	0.098	4.53
Sr	mg/kg	34.4	7.25	21.1	42	34.9	5.40	1.40	4.07
U	mg/kg	1.98	0.203	10.2	25	2.02	0.108	0.051	2.56
V	mg/kg	83.3	14.3	17.2	73	83.5	9.00	2.09	2.51
Zn	mg/kg	215	19.5	9.1	171	215	12.1	1.86	0.867

Method: Extraction with boiling 2M HNO₃

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cd	mg/kg	0.799	0.074	9.2	80	0.797	0.044	0.010	1.29
Co	mg/kg	13.3	0.951	7.1	77	13.3	0.640	0.135	1.02
Cr	mg/kg	41.0	4.26	10.4	85	40.7	2.62	0.577	1.41
Cu	mg/kg	32.9	2.27	6.9	85	32.9	1.60	0.307	0.933
Hg	µg/kg	90.0	10.7	11.9	71	90.0	6.09	1.59	1.77
Mo	mg/kg	0.315	0.058	18.5	45	0.317	0.028	0.011	3.45

Method: Extraction with boiling 2M HNO ₃									(cont.)
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ni	mg/kg	34.7	3.00	8.7	85	34.2	2.10	0.407	1.17
Pb	mg/kg	70.7	4.49	6.4	84	70.4	2.94	0.612	0.866
Tl	mg/kg	0.139	0.016	11.3	24	0.137	0.010	0.004	2.88
Zn	mg/kg	167	12.7	7.6	85	165	9.37	1.73	1.03

Method: Extraction with 0.1M NaNO ₃									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cd	µg/kg	8.20	0.707	8.6	29	8.33	0.430	0.164	2.00
Cu	µg/kg	77.4	11.3	14.6	29	78.8	7.20	2.63	3.40
Ni	µg/kg	113	8.21	7.3	29	114	4.00	1.90	1.68
Zn	µg/kg	160	20.2	12.6	26	158	13.7	4.96	3.10

Method: Extraction with 0.01M CaCl ₂ 1:10									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cu	µg/kg	120	19.5	16.3	18	119	15.5	5.75	4.80
K	mg/kg	59.1	4.41	7.5	35	59.0	2.56	0.931	1.58
Mg	mg/kg	272	18.2	6.7	25	270	12.6	4.56	1.67
Mn	mg/kg	16.9	1.32	7.8	17	17.0	0.970	0.399	2.37
N - NH ₄ (as N)	mg/kg	11.6	3.01	25.8	41	12.0	2.18	0.587	5.05
Na	mg/kg	59.8	3.57	6.0	24	60.5	1.70	0.910	1.52
P	mg/kg	1.07	0.238	22.4	34	1.10	0.162	0.051	4.79
Zn	µg/kg	431	69.9	16.2	19	420	37.6	20.0	4.66

Method: Soil characteristics									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
pH - H ₂ O	...	5.99	0.214	3.6	444	6.00	0.140	0.013	0.212
pH - KCl	...	4.96	0.104	2.1	209	4.97	0.060	0.009	0.181
pH - CaCl ₂	...	5.46	0.101	1.8	165	5.47	0.058	0.010	0.180
Fraction < 2 µm	%	53.2	13.6	25.6	150	53.6	9.90	1.39	2.62
EC-SC (ISO 11265)	mS/m	13.7	2.52	18.4	180	13.7	1.58	0.235	1.72
Fraction < 63 µm	%	97.8	2.80	2.9	100	97.3	1.96	0.350	0.358
Org.matter (L.O.I.)	%	11.4	1.09	9.6	175	11.2	0.676	0.103	0.906
Fraction < 16 µm	%	86.2	8.93	10.4	52	85.3	5.54	1.55	1.80
TC=Total C (org.+inorg.)	g/kg	37.1	1.67	4.5	182	37.0	1.13	0.155	0.418
TOC=Total Org. C	g/kg	36.6	2.43	6.6	198	36.4	1.56	0.216	0.590
C - org others (W&B a.o.)	g/kg	33.8	5.31	15.7	228	33.9	3.51	0.439	1.30



Consensus Values ISE 910

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Moisture-content	%	5.64	0.558	9.9	214	5.61	0.365	0.048	0.846
delta 13C	‰ V-PDB	-27.5	0.253	0.9	17	-27.6	0.180	0.077	0.279
delta 15N	‰ Air	6.88	0.347	5.0	18	6.87	0.222	0.102	1.49

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	33.9	7.94	23.4	157	34.1	4.38	0.792	2.34
Na	cmol+/kg	0.302	0.083	27.5	191	0.300	0.050	0.008	2.49
K	cmol+/kg	0.622	0.095	15.2	239	0.620	0.060	0.008	1.23
Mg	cmol+/kg	4.37	0.580	13.3	234	4.33	0.328	0.047	1.09
Ca	cmol+/kg	26.4	4.58	17.4	226	26.7	2.85	0.381	1.44

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	47.9	4.31	9.0	15	46.8	2.80	1.39	2.90

Method: Pot. CEC using 1M NH₄Cl (BZE)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	34.5	2.28	6.6	11	34.6	1.11	0.859	2.49
Na	cmol+/kg	0.320	0.046	14.5	25	0.314	0.024	0.012	3.61
K	cmol+/kg	0.677	0.079	11.6	25	0.668	0.042	0.020	2.91
Mg	cmol+/kg	4.61	0.424	9.2	25	4.57	0.272	0.106	2.30
Ca	cmol+/kg	28.2	2.59	9.2	25	28.7	1.41	0.648	2.30
Mn	cmol+/kg	0.186	0.025	13.3	19	0.187	0.023	0.007	3.83

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Na	cmol+/kg	0.306	0.028	9.1	8	0.313	0.016	0.012	4.03
Mg	cmol+/kg	5.08	0.517	10.2	8	5.01	0.225	0.229	4.50
Ca	cmol+/kg	32.4	2.76	8.5	8	31.7	1.36	1.22	3.76

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	31.4	1.49	4.8	12	31.6	0.795	0.538	1.72
Na	cmol+/kg	0.285	0.035	12.4	14	0.284	0.023	0.012	4.15
K	cmol+/kg	0.443	0.041	9.3	15	0.443	0.023	0.013	3.01
Ca	cmol+/kg	26.1	1.08	4.2	14	26.2	0.498	0.362	1.39

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	4.33	0.285	6.6	14	4.34	0.164	0.095	2.20
Mn	cmol+/kg	0.151	0.017	11.5	13	0.150	0.011	0.006	4.00

Method: Act. CEC using cobaltihexamine (AFNOR NFX 31 130)									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	34.4	2.92	8.5	39	34.4	1.69	0.585	1.70
Na	cmol+/kg	0.305	0.027	8.9	31	0.307	0.020	0.006	2.01
K	cmol+/kg	0.594	0.053	8.9	34	0.598	0.030	0.011	1.90
Ca	cmol+/kg	28.8	2.16	7.5	36	28.5	1.47	0.450	1.56
Mg	cmol+/kg	4.84	0.248	5.1	35	4.83	0.128	0.052	1.08
Mn	cmol+/kg	0.171	0.019	11.3	10	0.169	0.012	0.008	4.48

Method: Mehlich-3									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	0.649	0.212	32.6	57	0.662	0.122	0.035	5.39
Ca	mg/kg	5160	331	6.4	100	5145	193	41.4	0.802
Cu	mg/kg	4.47	1.20	26.7	95	4.39	0.850	0.153	3.43
Fe	mg/kg	489	57.5	11.8	97	487	38.0	7.30	1.49
K	mg/kg	227	13.5	6.0	101	227	8.54	1.68	0.741
Mg	mg/kg	530	38.4	7.2	100	528	27.1	4.80	0.906
Mn	mg/kg	48.9	5.37	11.0	97	48.8	3.40	0.681	1.39
Na	mg/kg	67.5	7.59	11.2	65	67.4	4.22	1.18	1.74
P	mg/kg	64.8	9.21	14.2	116	64.7	5.50	1.07	1.65
Zn	mg/kg	7.90	0.982	12.4	98	7.92	0.770	0.124	1.57
Al	mg/kg	1038	91.3	8.8	59	1030	60.0	14.9	1.43

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	8.55	1.68	19.6	79	8.80	1.18	0.236	2.76
Fe	mg/kg	304	107	35.4	80	303	64.7	15.0	4.94
Mn	mg/kg	50.7	7.54	14.9	80	50.6	5.20	1.05	2.08
Zn	mg/kg	6.76	1.17	17.3	81	6.94	0.740	0.162	2.40

Method: Phosphorus and related analysis									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
P - Bray (as P)	mg/kg	35.6	14.2	40.1	127	36.3	10.6	1.58	4.44
P - Olsen (as P)	mg/kg	51.7	13.5	26.1	171	52.1	7.65	1.29	2.50

Method: Phosphorus and related analysis									(cont.)
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al - Ox	mg/kg	1897	221	11.7	15	1865	112	71.4	3.76
Fe - Ox	mg/kg	15826	2711	17.1	15	15599	1518	875	5.53
P - Ox	mg/kg	835	65.5	7.8	14	835	34.8	21.9	2.62
P - AL (as P)	mg/kg	95.5	11.8	12.4	41	95.3	7.03	2.31	2.42

Method: UK Soil Methods

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
P – NaHCO ₃ (1/20)	mg/l	43.9	7.46	17.0	65	45.6	5.92	1.16	2.63
K - NH ₄ NO ₃ (1/5)	mg/l	187	23.7	12.7	72	189	17.6	3.49	1.87
Mg - NH ₄ NO ₃ (1/5)	mg/l	409	50.9	12.5	71	410	33.7	7.56	1.85
pH - H ₂ O (2/5)	...	6.02	0.181	3.0	64	6.03	0.105	0.028	0.470

Method: PEP-Ammoniumacetate-EDTA extraction

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
AAE10-Ca	mg/kg	5506	432	7.8	9	5494	336	180	3.27
AAE10-Mg	mg/kg	523	8.30	1.6	9	523	3.30	3.46	0.662
AAE10-K	mg/kg	223	8.18	3.7	9	222	6.30	3.41	1.53
AAE10-P	mg/kg	49.0	6.68	13.6	9	49.0	4.00	2.78	5.68

Method: PEP-Test measurements

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
pH-H ₂ O	...	5.89	0.080	1.4	12	5.91	0.040	0.029	0.492

Method: PEP-Physical parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
C-org	%	3.13	0.199	6.4	8	3.16	0.139	0.088	2.81
Humus	%	5.33	0.295	5.5	8	5.32	0.155	0.130	2.45



Indicative Values ISE 910

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
I	mg/kg	2.42	0.754	31.1	11	2.54	0.440	0.284	11.7
Se	mg/kg	1.40	1.08	77.3	18	1.62	0.686	0.318	22.8
Ag	mg/kg	0.573	0.881	153.8	10	0.660	0.490	0.348	60.8
Ge	mg/kg	1.22	0.891	73.0	11	1.56	0.860	0.336	27.5
W	mg/kg	2.90	1.91	66.0	22	2.92	1.13	0.510	17.6
Yb	mg/kg	3.35	0.793	23.7	4	3.39	0.380	0.495	14.8
Sm	mg/kg	7.87	1.24	15.7	6	7.80	0.475	0.632	8.04
Pr	mg/kg	9.47	1.53	16.2	5	9.24	0.940	0.856	9.03
Gd	mg/kg	6.71	0.599	8.9	4	6.70	0.350	0.374	5.58
Dy	mg/kg	5.44	1.12	20.6	4	5.36	0.638	0.700	12.9

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	22.9	16.6	72.3	37	26.9	11.1	3.41	14.9
K	mg/kg	5095	2502	49.1	72	5352	1600	369	7.23
Li	mg/kg	54.3	15.9	29.3	19	51.6	8.30	4.56	8.40
Na	mg/kg	254	143	56.3	55	275	104	24.1	9.49
Rb	mg/kg	49.2	31.3	63.5	6	52.2	23.7	16.0	32.4
Se	mg/kg	1.05	0.595	56.7	27	1.25	0.304	0.143	13.6
Sr	mg/kg	37.7	9.14	24.2	18	36.0	5.27	2.69	7.14
Y	mg/kg	24.2	4.03	16.7	8	24.0	3.08	1.78	7.36
Zr	mg/kg	21.4	5.18	24.2	5	21.2	2.96	2.90	13.5
Sb	mg/kg	0.746	0.526	70.4	28	0.825	0.247	0.124	16.6
Tl	mg/kg	0.666	0.183	27.5	16	0.678	0.091	0.057	8.58
Ag	mg/kg	0.152	0.051	33.6	6	0.165	0.030	0.026	17.1
Ti	mg/kg	203	137	67.2	17	190	115	41.5	20.4
Bi	mg/kg	0.289	0.043	14.8	4	0.293	0.020	0.027	9.22
Ce	mg/kg	70.2	1.91	2.7	5	70.3	0.700	1.07	1.53
Nd	mg/kg	35.3	1.23	3.5	4	35.7	0.656	0.767	2.17
Sc	mg/kg	11.3	1.80	15.9	5	11.2	1.02	1.00	8.88
Th	mg/kg	9.39	1.11	11.8	4	9.34	0.540	0.695	7.40

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	17.8	8.78	49.4	41	19.1	5.60	1.71	9.64
Ce	mg/kg	63.3	8.36	13.2	7	61.2	6.70	3.95	6.23
Li	mg/kg	49.4	15.4	31.1	36	51.2	12.1	3.20	6.48



Indicative Values ISE 910

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

(cont.)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Nd	mg/kg	31.1	2.28	7.3	4	31.4	1.05	1.43	4.59
Rb	mg/kg	30.6	17.3	56.7	8	29.0	10.7	7.66	25.1
Sb	mg/kg	0.654	0.224	34.3	37	0.694	0.132	0.046	7.05
Sc	mg/kg	6.62	0.993	15.0	9	6.57	0.580	0.414	6.25
Se	mg/kg	1.13	0.450	39.7	48	1.18	0.279	0.081	7.16
Th	mg/kg	5.76	1.26	21.8	7	5.54	0.720	0.594	10.3
Ti	mg/kg	191	131	68.8	37	200	90.0	27.0	14.1
Tl	mg/kg	0.548	0.163	29.7	34	0.555	0.096	0.035	6.36
Y	mg/kg	20.9	0.488	2.3	5	21.0	0.200	0.273	1.30
Zr	mg/kg	2.86	0.676	23.6	7	2.96	0.320	0.319	11.1

Method: Extraction with 0.01M CaCl2 1:10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	µg/kg	212	49.1	23.1	15	216	29.9	15.9	7.46
Co	µg/kg	58.8	15.7	26.7	11	62.7	12.9	5.91	10.0
Fe	mg/kg	1.67	2.11	126.4	13	2.30	1.65	0.732	43.8
N total soluble	mg/kg	53.3	1.91	3.6	6	53.1	1.05	0.974	1.83
N - NO3 (as N)	mg/kg	4.98	4.13	83.0	36	5.10	3.24	0.861	17.3
SO4	mg/kg	73.3	16.1	22.0	6	70.0	9.86	8.24	11.2
Ni	µg/kg	272	73.1	26.8	4	269	42.8	45.7	16.8

Method: Soil characteristics

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
TIC=Tot.Inorg C(as CaCO3)	%	0.295	0.373	126.6	65	0.390	0.283	0.058	19.6
Fraction > 63 µm	%	1.91	1.83	95.5	91	2.20	1.20	0.240	12.5

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B - Hot water	mg/kg	0.892	0.374	41.9	42	0.915	0.221	0.072	8.08

Method: Fluoride (Swiss standard procedure)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
F - Total	mg/kg	508	170	33.5	19	533	121	48.8	9.61



Indicative Values ISE 910

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	cmol+/kg	0.096	0.166	172.3	9	0.140	0.110	0.069	71.8

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. %
Na	cmol+/kg	0.400	0.146	36.4	9	0.400	0.101	0.061	15.2
K	cmol+/kg	0.615	0.196	31.8	10	0.645	0.115	0.077	12.6
Mg	cmol+/kg	4.37	0.714	16.3	10	4.41	0.457	0.282	6.45
Ca	cmol+/kg	26.6	5.81	21.9	10	26.6	3.32	2.30	8.64

Method: Pot. CEC using 1M NH₄Cl (BZE)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	cmol+/kg	0.015	0.024	159.5	8	0.012	0.010	0.011	70.5
Fe	cmol+/kg	0.003	0.005	172.8	8	0.004	0.003	0.002	76.4

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	35.5	1.14	3.2	7	35.8	0.400	0.536	1.51
K	cmol+/kg	0.694	0.068	9.9	7	0.710	0.020	0.032	4.66

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	cmol+/kg	0.021	0.017	79.7	9	0.023	0.007	0.007	33.2
Fe	cmol+/kg	0.004	0.005	133.3	9	0.004	0.003	0.002	55.5
H	cmol+/kg	0.011	0.003	26.1	4	0.012	0.002	0.002	16.3

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	cmol+/kg	0.043	0.023	53.9	11	0.047	0.014	0.009	20.3

Method: Mehlich-3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
As	mg/kg	0.333	0.094	28.1	5	0.341	0.053	0.052	15.7
Cd	mg/kg	0.292	0.013	4.5	5	0.293	0.006	0.007	2.53
Cr	mg/kg	0.310	0.060	19.4	5	0.317	0.037	0.034	10.8
Pb	mg/kg	2.21	1.50	67.9	6	2.10	0.903	0.766	34.6

Indicative Values ISE 910

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
F	mg/kg	5.14	5.10	99.1	8	5.59	2.58	2.25	43.8

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	25.6	9.66	37.8	52	25.0	7.45	1.67	6.55
N - NO ₃ (as N)	mg/kg	4.46	3.54	79.4	57	4.69	2.62	0.587	13.1

Method: Phosphorus and related analysis

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
P - w (as P)	mg/l soil	12.7	5.04	39.7	15	12.7	2.79	1.63	12.8
K - AL (as K)	mg/kg	200	9.72	4.9	4	202	5.00	6.08	3.04

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	8.22	4.22	51.4	5	8.40	2.50	2.36	28.7
SO ₄	mg/kg	71.9	18.1	25.2	11	74.2	12.3	6.84	9.51

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cu	mg/kg	18.6	4.94	26.6	5	17.8	2.70	2.76	14.9
Zn	mg/kg	26.6	2.30	8.6	5	26.3	1.21	1.29	4.83
Fe	g/kg	4.35	1.22	28.1	5	4.53	0.763	0.682	15.7
K	mg/kg	222	60.0	27.0	5	209	27.0	33.6	15.1
Mg	mg/kg	626	36.3	5.8	5	625	21.1	20.3	3.24
Mn	mg/kg	120	16.0	13.3	5	121	10.0	8.97	7.45
P	mg/kg	218	25.8	11.8	4	220	13.8	16.2	7.40
Na	mg/kg	58.0	4.33	7.5	5	58.0	2.53	2.42	4.18

Method: PEP-Water extraction

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
H ₂ O ₁₀ -Mg	mg/kg	20.4	1.80	8.8	7	21.0	1.66	0.850	4.16
H ₂ O ₁₀ -K	mg/kg	20.3	3.92	19.3	7	19.6	1.90	1.85	9.11
H ₂ O ₁₀ -P	mg/kg	4.83	0.419	8.7	7	4.71	0.180	0.198	4.09



Indicative Values ISE 910

Method: PEP-Test measurements

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CO2-K	K-test	1.07	0.109	10.2	7	1.06	0.070	0.052	4.84
CO2-P	P-test	6.96	0.410	5.9	7	6.95	0.317	0.194	2.78
CC-Mg	Mg-test	29.9	1.62	5.4	7	29.7	0.820	0.764	2.55
pH-CC	...	5.41	0.033	0.6	4	5.41	0.015	0.021	0.387

Method: PEP-Physical parameters

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ton (clay)	%	57.4	0.636	1.1	6	57.6	0.507	0.324	0.565
Schluff (silt)	%	29.6	3.09	10.5	6	29.6	1.16	1.58	5.34
TOC_400	%	3.21	0.262	8.2	7	3.24	0.110	0.124	3.86
ROC_600	%	0.529	0.122	23.1	4	0.495	0.062	0.076	14.4
TIC_900B	%	0.345	0.057	16.6	4	0.343	0.030	0.036	10.3

Method: PEP-Cation Exchange Capacity

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ca	cmol+/kg	23.6	4.77	20.2	5	22.7	4.34	2.67	11.3
Mg	cmol+/kg	3.79	0.466	12.3	5	3.89	0.320	0.260	6.88
Na	cmol+/kg	0.267	0.034	12.8	5	0.253	0.017	0.019	7.16
K	cmol+/kg	0.564	0.195	34.5	5	0.590	0.100	0.109	19.3
H	cmol+/kg	15.8	0.712	4.5	4	15.7	0.380	0.445	2.81
KAK	cmol+/kg	42.6	11.1	26.1	4	43.7	5.76	6.96	16.3
S-Wert	cmol+/kg	28.7	8.41	29.4	4	29.0	4.48	5.26	18.3
BAS	%	69.2	8.16	11.8	4	69.4	4.79	5.10	7.37