



**WAGENINGEN EVALUATING PROGRAMS
FOR ANALYTICAL LABORATORIES**

Certificate of Analysis



International Soil-Analytical Exchange

REFERENCE MATERIAL

ISE sample 993



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.

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 993 of Sandy Soil, from Netherlands, is prepared for the WEPAL proficiency programs. The sample has been used in 9 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
2024	1	4
2023	2	2
2021	1	3
2018	4	4
2018	3	2



Consensus Values ISE 993

Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	g/kg	16.7	1.25	7.5	87	16.7	0.650	0.167	1.00
As	mg/kg	3.60	0.624	17.3	54	3.61	0.390	0.106	2.94
Ba	mg/kg	281	23.5	8.4	74	279	13.0	3.42	1.22
Br	mg/kg	7.94	1.28	16.1	33	7.80	0.800	0.278	3.50
Ca	g/kg	4.17	0.362	8.7	86	4.20	0.200	0.049	1.17
Cd	mg/kg	11.6	1.08	9.3	61	11.6	0.740	0.173	1.49
Co	mg/kg	3.18	0.770	24.3	61	3.36	0.430	0.123	3.88
Cr	mg/kg	125	17.8	14.2	95	124	10.4	2.28	1.83
Cu	mg/kg	59.5	7.74	13.0	90	60.1	5.05	1.02	1.72
Fe	g/kg	6.48	0.482	7.4	97	6.50	0.300	0.061	0.945
K	mg/kg	7888	355	4.5	100	7859	223	44.4	0.563
Mg	mg/kg	684	132	19.2	75	694	65.0	19.0	2.78
Mn	mg/kg	276	30.1	10.9	95	279	19.6	3.86	1.40
Mo	mg/kg	2.24	0.293	13.1	43	2.30	0.170	0.056	2.49
Na	mg/kg	4158	238	5.7	77	4150	143	33.9	0.816
Ni	mg/kg	35.0	4.51	12.9	93	35.3	2.90	0.585	1.67
P	mg/kg	1014	112	11.0	83	1010	67.7	15.3	1.51
Pb	mg/kg	80.0	8.87	11.1	92	79.6	5.18	1.16	1.44
Rb	mg/kg	29.1	2.11	7.3	51	29.1	1.30	0.370	1.27
S	mg/kg	1321	279	21.1	81	1320	160	38.8	2.94
Si	g/kg	406	7.07	1.7	73	406	4.00	1.03	0.255
Sn	mg/kg	14.5	1.73	11.9	43	14.5	1.10	0.329	2.28
Sr	mg/kg	46.3	4.75	10.3	61	46.2	2.70	0.760	1.64
Y	mg/kg	10.3	1.60	15.4	36	10.2	1.10	0.332	3.21
Zn	mg/kg	168	15.8	9.4	94	167	10.8	2.03	1.21
Zr	mg/kg	213	24.4	11.5	46	218	16.2	4.51	2.12
C-elementary	g/kg	26.0	1.86	7.2	148	26.0	1.13	0.191	0.736
Sb	mg/kg	4.12	0.586	14.2	44	4.20	0.361	0.110	2.68
Tl	mg/kg	0.268	0.044	16.3	19	0.277	0.027	0.013	4.67
V	mg/kg	43.1	5.04	11.7	81	43.9	3.30	0.700	1.62
Ti	mg/kg	941	101	10.8	76	929	72.0	14.6	1.55
N - elementary	g/kg	2.35	0.225	9.6	256	2.35	0.135	0.018	0.750
Ce	mg/kg	19.9	4.02	20.2	34	20.4	2.65	0.861	4.32
La	mg/kg	8.49	2.26	26.6	35	8.64	1.56	0.477	5.62
Hg	µg/kg	267	29.1	10.9	72	268	19.2	4.29	1.61



Consensus Values ISE 993

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	g/kg	4.25	0.781	18.4	52	4.32	0.485	0.135	3.18
As	mg/kg	2.63	0.370	14.1	67	2.69	0.248	0.056	2.15
Ba	mg/kg	76.6	8.13	10.6	53	77.0	6.32	1.40	1.82
Ca	g/kg	3.30	0.293	8.9	65	3.32	0.199	0.045	1.38
Cd	mg/kg	11.4	0.965	8.5	105	11.4	0.700	0.118	1.03
Co	mg/kg	2.97	0.302	10.2	81	2.96	0.195	0.042	1.41
Cr	mg/kg	110	10.4	9.5	103	110	6.00	1.29	1.17
Cu	mg/kg	58.1	5.15	8.9	111	57.9	3.20	0.611	1.05
Fe	g/kg	5.61	0.704	12.5	66	5.63	0.404	0.108	1.93
K	mg/kg	276	101	36.5	67	276	75.0	15.4	5.57
Li	mg/kg	5.08	0.593	11.7	11	5.06	0.450	0.224	4.40
Mg	mg/kg	493	76.5	15.5	62	505	46.4	12.1	2.46
Mn	mg/kg	241	21.6	9.0	72	240	12.9	3.18	1.32
Mo	mg/kg	2.16	0.241	11.2	64	2.18	0.155	0.038	1.74
N	g/kg	2.27	0.242	10.7	127	2.25	0.150	0.027	1.18
Na	mg/kg	64.1	20.2	31.5	50	64.0	12.3	3.57	5.57
Ni	mg/kg	32.6	3.11	9.5	98	32.7	1.78	0.393	1.20
P	mg/kg	972	124	12.8	82	979	81.6	17.1	1.76
Pb	mg/kg	60.7	5.46	9.0	103	61.4	3.46	0.672	1.11
S	mg/kg	1351	156	11.6	62	1339	100	24.8	1.84
Sn	mg/kg	14.4	1.39	9.6	45	14.2	0.850	0.259	1.80
Sr	mg/kg	9.39	1.30	13.8	18	9.27	0.840	0.383	4.08
Zn	mg/kg	165	15.0	9.1	110	165	9.00	1.79	1.08
V	mg/kg	37.1	2.30	6.2	54	36.9	1.32	0.391	1.05
Sb	mg/kg	1.88	0.272	14.5	36	1.84	0.159	0.057	3.02
Be	mg/kg	0.163	0.026	15.8	26	0.159	0.017	0.006	3.87
Tl	mg/kg	0.083	0.012	13.8	10	0.084	0.006	0.005	5.47
Ag	mg/kg	2.78	0.289	10.4	22	2.75	0.193	0.077	2.76
Hg	µg/kg	252	41.2	16.4	63	251	24.6	6.49	2.58

Method: Aqua Regia (ISO 11466)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ag	µg/kg	2685	311	11.6	21	2690	177	84.7	3.16
Al	g/kg	4.21	0.594	14.1	107	4.20	0.400	0.072	1.71
As	mg/kg	2.72	0.282	10.4	118	2.73	0.150	0.032	1.20
Ba	mg/kg	77.3	9.60	12.4	46	77.4	4.60	1.77	2.29
Be	mg/kg	0.161	0.021	13.2	34	0.160	0.011	0.005	2.84



Consensus Values ISE 993



Method: Aqua Regia (ISO 11466)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Bi	mg/kg	1.07	0.098	9.2	9	1.11	0.087	0.041	3.82
Ca	g/kg	3.28	0.295	9.0	101	3.29	0.170	0.037	1.12
Cd	mg/kg	11.6	0.990	8.6	160	11.5	0.609	0.098	0.846
Co	mg/kg	3.07	0.302	9.8	112	3.09	0.195	0.036	1.16
Cr	mg/kg	113	10.3	9.1	160	112	6.00	1.02	0.902
Cu	mg/kg	59.4	5.05	8.5	163	59.5	3.07	0.494	0.832
Fe	g/kg	5.54	0.511	9.2	121	5.57	0.295	0.058	1.05
Hg	µg/kg	261	28.1	10.8	76	260	18.0	4.03	1.54
K	mg/kg	288	71.4	24.8	97	287	36.2	9.06	3.14
Mg	mg/kg	496	58.4	11.8	107	498	35.0	7.06	1.42
Mn	mg/kg	238	18.0	7.6	129	237	10.7	1.98	0.831
Mo	mg/kg	2.26	0.242	10.7	85	2.26	0.140	0.033	1.45
Na	mg/kg	65.1	18.4	28.2	74	67.6	12.1	2.67	4.10
Ni	mg/kg	33.9	3.28	9.7	162	33.8	2.29	0.322	0.952
P	mg/kg	990	81.9	8.3	97	984	51.0	10.4	1.05
Pb	mg/kg	61.0	5.72	9.4	166	61.4	3.48	0.555	0.910
S	mg/kg	1368	120	8.7	81	1366	70.8	16.6	1.21
Sb	mg/kg	1.78	0.211	11.9	38	1.80	0.112	0.043	2.41
Sn	mg/kg	14.2	1.45	10.2	29	14.2	0.800	0.337	2.37
Sr	mg/kg	9.88	2.11	21.3	31	10.4	1.47	0.473	4.78
Tl	mg/kg	0.078	0.017	21.5	29	0.080	0.010	0.004	5.00
U	mg/kg	0.253	0.022	8.6	22	0.253	0.013	0.006	2.29
V	mg/kg	37.8	2.70	7.2	67	37.5	1.70	0.413	1.09
Zn	mg/kg	168	12.5	7.4	160	169	8.17	1.24	0.736

Method: Extraction with boiling 2M HNO₃

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cd	mg/kg	12.0	0.791	6.6	82	12.0	0.450	0.109	0.910
Co	mg/kg	2.75	0.143	5.2	72	2.76	0.070	0.021	0.765
Cr	mg/kg	100	6.14	6.1	86	101	3.48	0.828	0.825
Cu	mg/kg	61.0	3.33	5.5	86	61.0	1.93	0.449	0.736
Hg	µg/kg	249	15.9	6.4	65	248	9.36	2.47	0.991
Mo	mg/kg	1.87	0.236	12.6	72	1.87	0.140	0.035	1.86
Ni	mg/kg	26.6	1.72	6.4	86	27.0	1.10	0.231	0.868
Pb	mg/kg	58.7	4.33	7.4	86	58.9	2.67	0.583	0.993
Tl	mg/kg	0.057	0.004	6.8	21	0.057	0.003	0.001	1.86
Zn	mg/kg	158	8.33	5.3	86	159	4.99	1.12	0.711



Consensus Values ISE 993



Method: Extraction with 0.1M NaNO₃

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cd	µg/kg	359	27.2	7.6	28	362	13.5	6.44	1.79
Cu	µg/kg	830	74.7	9.0	29	835	53.3	17.3	2.09
Ni	µg/kg	1460	82.5	5.7	29	1459	59.0	19.1	1.31
Zn	µg/kg	5418	319	5.9	29	5428	252	74.1	1.37

Method: Extraction with 0.01M CaCl₂ 1:10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	µg/kg	259	35.7	13.8	19	262	22.3	10.2	3.95
Co	µg/kg	118	14.8	12.5	11	118	10.3	5.56	4.73
Cu	µg/kg	879	90.7	10.3	19	883	55.9	26.0	2.96
K	mg/kg	35.1	2.86	8.2	39	35.3	1.73	0.573	1.63
Mg	mg/kg	124	9.14	7.4	30	122	5.77	2.09	1.68
Mn	mg/kg	22.9	2.55	11.1	20	22.8	1.40	0.712	3.11
N - NH ₄ (as N)	mg/kg	58.2	5.77	9.9	37	58.1	2.80	1.19	2.04
N - NO ₃ (as N)	mg/kg	63.0	5.45	8.6	40	62.5	3.44	1.08	1.71
Na	mg/kg	29.4	2.54	8.6	31	29.5	1.47	0.570	1.94
P	mg/kg	4.08	0.930	22.8	39	4.01	0.681	0.186	4.56
Zn	µg/kg	12472	1334	10.7	20	12527	884	373	2.99

Method: Soil characteristics

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
pH - H ₂ O	...	5.56	0.147	2.6	443	5.57	0.090	0.009	0.157
pH - KCl	...	5.46	0.125	2.3	204	5.47	0.070	0.011	0.200
pH - CaCl ₂	...	5.47	0.124	2.3	148	5.49	0.090	0.013	0.233
Fraction < 2 µm	%	4.25	1.73	40.6	120	4.30	1.20	0.197	4.64
EC-SC (ISO 11265)	mS/m	114	12.4	10.9	193	113	7.70	1.12	0.984
Fraction < 63 µm	%	19.5	3.83	19.7	85	19.3	2.26	0.520	2.67
Fraction > 63 µm	%	80.1	3.93	4.9	80	80.1	2.37	0.549	0.686
Org.matter (L.O.I.)	%	4.98	0.315	6.3	171	5.00	0.190	0.030	0.603
TC=Total C (org.+inorg.)	g/kg	25.5	1.78	7.0	189	25.5	1.10	0.162	0.637
TOC=Total Org. C	g/kg	25.2	2.39	9.5	202	25.1	1.61	0.211	0.835
C - org others (W&B a.o.)	g/kg	23.8	3.80	16.0	234	23.9	2.44	0.311	1.31



Consensus Values ISE 993

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Moisture-content	%	1.21	0.212	17.5	209	1.23	0.140	0.018	1.51
delta 13C	‰ V-PDB	-28.5	0.180	0.6	19	-28.5	0.130	0.051	0.180
delta 15N	‰ Air	4.87	0.234	4.8	19	4.93	0.200	0.067	1.38

Method: Fluoride (Swiss standard procedure)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
F - Total	mg/kg	73.2	6.69	9.1	13	75.0	3.80	2.32	3.17

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	8.40	2.04	24.3	157	8.46	1.24	0.204	2.43
Na	cmol+/kg	0.147	0.041	27.8	206	0.150	0.024	0.004	2.42
K	cmol+/kg	0.138	0.025	18.1	248	0.140	0.015	0.002	1.44
Mg	cmol+/kg	1.11	0.184	16.6	251	1.13	0.111	0.015	1.31
Ca	cmol+/kg	11.1	1.78	16.1	239	11.1	1.09	0.144	1.30

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. %
Mg	cmol+/kg	0.944	0.122	12.9	9	0.996	0.066	0.051	5.38

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	14.4	0.676	4.7	11	14.3	0.550	0.255	1.77
Na	cmol+/kg	0.145	0.020	14.0	25	0.140	0.020	0.005	3.50
K	cmol+/kg	0.141	0.015	10.5	25	0.141	0.009	0.004	2.63
Mg	cmol+/kg	1.15	0.077	6.7	25	1.16	0.050	0.019	1.67
Ca	cmol+/kg	11.7	1.45	12.4	25	11.4	1.01	0.362	3.10
Al	cmol+/kg	0.054	0.009	16.1	12	0.053	0.006	0.003	5.82
Mn	cmol+/kg	0.153	0.026	16.8	19	0.153	0.015	0.007	4.83

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Na	cmol+/kg	0.144	0.019	13.3	9	0.140	0.010	0.008	5.55
Mg	cmol+/kg	1.14	0.036	3.1	9	1.15	0.020	0.015	1.30
Ca	cmol+/kg	9.11	0.963	10.6	9	9.17	0.670	0.401	4.40



Consensus Values ISE 993



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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	6.98	1.21	17.3	46	6.89	0.726	0.223	3.20
Na	cmol+/kg	0.139	0.016	11.2	37	0.137	0.009	0.003	2.31
K	cmol+/kg	0.114	0.017	15.1	37	0.114	0.011	0.004	3.10
Ca	cmol+/kg	11.8	0.744	6.3	39	11.7	0.384	0.149	1.26
Mg	cmol+/kg	1.14	0.076	6.6	39	1.14	0.039	0.015	1.33
Mn	cmol+/kg	0.099	0.011	11.1	13	0.100	0.007	0.004	3.85

Method: Mehlich-3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	0.642	0.202	31.4	53	0.640	0.140	0.035	5.39
Ca	mg/kg	2525	232	9.2	107	2522	142	28.0	1.11
Cu	mg/kg	18.7	3.72	19.9	104	18.9	2.37	0.456	2.44
Fe	mg/kg	546	71.1	13.0	103	544	44.4	8.75	1.60
K	mg/kg	54.5	6.34	11.6	109	55.0	4.15	0.759	1.39
Mg	mg/kg	146	16.1	11.0	108	145	9.80	1.93	1.32
Mn	mg/kg	52.9	8.19	15.5	108	53.1	5.95	0.985	1.86
Na	mg/kg	33.0	5.83	17.7	65	32.8	3.21	0.904	2.74
P	mg/kg	324	42.9	13.3	124	322	29.7	4.81	1.49
Zn	mg/kg	72.3	9.82	13.6	104	73.1	6.28	1.20	1.67
Al	mg/kg	554	89.1	16.1	57	555	58.5	14.8	2.66

Method: Extraction with 0.01M CaCl2 - 0.005M DTPA 1:10 (w/v)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cu	mg/kg	19.5	3.80	19.4	82	19.7	2.39	0.524	2.68
Fe	mg/kg	161	52.6	32.8	86	164	27.5	7.09	4.41
Mn	mg/kg	32.4	5.59	17.3	86	32.5	3.34	0.754	2.33
Zn	mg/kg	49.6	10.2	20.5	85	49.9	5.73	1.38	2.78

Method: Extraction with 1M KCl 1:10 (w/v)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
N - NH4 (as N)	mg/kg	70.9	11.0	15.6	56	69.1	5.76	1.85	2.60
N - NO3 (as N)	mg/kg	60.8	10.4	17.0	71	59.4	5.89	1.54	2.53

Method: Phosphorus and related analysis

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
P - Olsen (as P)	mg/kg	61.9	16.2	26.2	195	61.9	9.97	1.45	2.35
Al - Ox	mg/kg	657	77.4	11.8	15	654	64.5	25.0	3.81



Consensus Values ISE 993

Method: Phosphorus and related analysis									(cont.)
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Fe - Ox	mg/kg	2880	277	9.6	15	2893	200	89.5	3.11
P - Ox	mg/kg	803	52.1	6.5	14	805	27.5	17.4	2.17
P - AL (as P)	mg/kg	370	45.4	12.3	52	371	24.4	7.87	2.12
P - w (as P)	mg/l soil	15.6	3.18	20.4	21	16.5	1.82	0.867	5.58

Method: UK Soil Methods

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
P – NaHCO ₃ (1/20)	mg/l	72.0	12.5	17.4	58	72.6	8.96	2.06	2.86
K - NH ₄ NO ₃ (1/5)	mg/l	72.2	7.19	10.0	62	72.3	5.03	1.14	1.58
Mg - NH ₄ NO ₃ (1/5)	mg/l	172	21.8	12.7	62	172	15.6	3.46	2.01
pH - H ₂ O (2/5)	...	5.53	0.102	1.8	65	5.52	0.060	0.016	0.285



Indicative Values ISE 993



Method: Real totals

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Ga	mg/kg	4.21	1.52	36.0	39	4.19	0.890	0.304	7.21
I	mg/kg	0.892	0.408	45.8	5	0.900	0.320	0.228	25.6
Li	mg/kg	11.2	1.84	16.5	7	11.7	1.00	0.872	7.79
Se	mg/kg	0.721	0.587	81.4	10	0.692	0.334	0.232	32.2
Be	mg/kg	0.489	0.187	38.3	9	0.540	0.060	0.078	15.9
Ag	mg/kg	2.47	1.03	41.9	16	2.79	0.585	0.323	13.1
Bi	mg/kg	2.87	1.85	64.4	11	3.40	1.00	0.696	24.3
Nb	mg/kg	4.10	2.06	50.2	27	4.00	1.00	0.495	12.1
Nd	mg/kg	6.51	2.01	30.8	23	6.36	1.36	0.523	8.03
Sc	mg/kg	2.60	1.81	69.6	18	2.00	1.00	0.533	20.5
Th	mg/kg	2.69	0.842	31.3	21	2.80	0.600	0.230	8.53
U	mg/kg	0.846	0.269	31.8	21	0.900	0.171	0.073	8.67
Cs	mg/kg	1.39	1.22	87.7	11	1.89	0.890	0.459	33.0
W	mg/kg	2.54	1.51	59.5	13	2.20	0.800	0.525	20.6

Method: Acid extractable (So-called totals)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	2.57	1.84	71.5	23	2.92	1.37	0.478	18.6
Rb	mg/kg	3.10	0.132	4.3	4	3.06	0.070	0.082	2.66
Se	mg/kg	0.237	0.096	40.6	16	0.229	0.051	0.030	12.7
Si	g/kg	0.377	0.084	22.4	4	0.371	0.038	0.053	14.0
Y	mg/kg	5.67	1.00	17.7	6	5.76	0.595	0.511	9.01
Ti	mg/kg	73.8	36.5	49.5	17	70.2	23.4	11.1	15.0
Ce	mg/kg	10.1	0.803	8.0	4	10.2	0.415	0.502	4.98
La	mg/kg	4.52	0.421	9.3	6	4.56	0.331	0.215	4.74
Sc	mg/kg	0.747	0.046	6.2	4	0.748	0.022	0.029	3.87
U	mg/kg	0.250	0.055	21.9	8	0.249	0.039	0.024	9.69

Method: Aqua Regia (ISO 11466)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
B	mg/kg	3.48	2.90	83.3	36	3.91	1.80	0.604	17.3
Ce	mg/kg	9.50	0.963	10.1	6	9.57	0.713	0.491	5.17
Ga	mg/kg	1.27	0.319	25.1	4	1.33	0.155	0.199	15.7
La	mg/kg	4.41	0.732	16.6	8	4.48	0.505	0.323	7.33
Li	mg/kg	4.45	1.45	32.4	27	4.69	0.920	0.348	7.80
Nd	mg/kg	4.06	0.520	12.8	5	4.06	0.330	0.291	7.17
Rb	mg/kg	2.29	0.570	24.9	7	2.37	0.321	0.269	11.8



Indicative Values ISE 993

Method: Aqua Regia (ISO 11466)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Sc	mg/kg	0.196	0.077	39.4	6	0.221	0.056	0.039	20.1
Se	mg/kg	0.228	0.070	30.8	35	0.236	0.036	0.015	6.50
Ti	mg/kg	85.3	31.2	36.6	36	88.3	15.8	6.49	7.62
Y	mg/kg	5.82	0.263	4.5	7	5.80	0.090	0.124	2.14

(cont.)

Method: Extraction with 0.1M NaNO₃

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Pb	µg/kg	10.9	2.08	19.1	6	11.1	1.35	1.06	9.72

Method: Extraction with 0.01M CaCl₂ 1:10

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Fe	mg/kg	5.26	3.32	63.1	20	5.30	1.79	0.927	17.6
N total soluble	mg/kg	152	31.6	20.9	8	149	13.2	14.0	9.22
SO ₄	mg/kg	2476	604	24.4	14	2306	397	202	8.15
Ni	µg/kg	2579	290	11.3	5	2488	122	162	6.30

Method: Soil characteristics

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
TIC=Tot.Inorg C(as CaCO ₃)	%	0.226	0.360	159.0	55	0.340	0.280	0.061	26.8
Fraction < 16 µm	%	9.30	4.20	45.2	43	10.0	3.57	0.801	8.61

Method: Other determinations

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CN - Total	mg/kg	3.12	0.419	13.4	5	3.10	0.160	0.234	7.51
B - Hot water	mg/kg	0.822	0.361	43.9	59	0.900	0.210	0.059	7.14

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	0.027	0.023	85.0	10	0.038	0.021	0.009	33.6

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	11.0	3.03	27.7	18	10.6	1.80	0.893	8.15
Na	cmol+/kg	0.148	0.020	13.3	7	0.150	0.012	0.009	6.29
K	cmol+/kg	0.143	0.052	36.2	9	0.140	0.039	0.022	15.1
Ca	cmol+/kg	9.43	2.92	31.0	9	8.68	2.05	1.22	12.9



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Method: Pot. CEC using 1M NH₄Cl (BZE)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Fe	cmol+/kg	0.030	0.017	58.2	16	0.030	0.010	0.005	18.2

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
CEC	cmol+/kg	6.83	1.16	17.0	8	7.12	0.960	0.512	7.50
K	cmol+/kg	0.142	0.040	27.9	9	0.150	0.014	0.017	11.6
Fe	cmol+/kg	0.144	0.016	11.3	5	0.140	0.010	0.009	6.34
Al	cmol+/kg	0.045	0.022	48.6	4	0.045	0.015	0.014	30.4

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	10.8	1.02	9.5	6	10.8	0.514	0.522	4.83
Na	cmol+/kg	0.134	0.007	5.4	6	0.134	0.007	0.004	2.74
K	cmol+/kg	0.113	0.006	5.7	6	0.113	0.003	0.003	2.90
Ca	cmol+/kg	9.14	0.863	9.4	6	9.29	0.436	0.441	4.82
Mg	cmol+/kg	1.20	0.105	8.7	6	1.19	0.062	0.053	4.43
Al	cmol+/kg	0.028	0.013	45.4	4	0.028	0.006	0.008	28.4
Fe	cmol+/kg	0.089	0.039	43.7	6	0.086	0.027	0.020	22.3
Mn	cmol+/kg	0.133	0.014	10.5	6	0.133	0.007	0.007	5.35

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Al	cmol+/kg	0.040	0.038	93.9	11	0.052	0.032	0.014	35.4
Fe	cmol+/kg	0.005	0.007	131.6	10	0.007	0.004	0.003	52.0

Method: Mehlich-3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cd	mg/kg	7.03	0.984	14.0	6	7.15	0.432	0.502	7.14

Method: Extraction with Ca-lactate (VDLUFA, Germany)

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
K	mg/kg	46.6	15.5	33.3	7	50.7	9.15	7.33	15.7
P	mg/kg	80.8	43.3	53.6	8	92.5	28.0	19.1	23.7



Indicative Values ISE 993

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	16.0	8.16	50.9	6	16.7	6.32	4.16	26.0
N - NO3 (as N)	mg/kg	60.5	11.4	18.9	8	60.8	8.30	5.05	8.33

Method: Phosphorus and related analysis

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
P - Bray (as P)	mg/kg	209	124	59.4	126	210	82.4	13.8	6.61

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
SO4	mg/kg	2256	1195	53.0	11	2549	931	450	20.0

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Cr	mg/kg	40.6	1.99	4.9	4	40.2	0.985	1.24	3.06
Cu	mg/kg	46.5	9.30	20.0	7	48.0	4.79	4.40	9.45
Ni	mg/kg	20.2	2.56	12.6	4	20.4	1.56	1.60	7.90
Zn	mg/kg	97.8	18.5	18.9	7	96.2	9.60	8.72	8.92
Al	g/kg	0.702	0.045	6.5	4	0.704	0.028	0.028	4.04
Fe	g/kg	1.70	0.395	23.3	7	1.73	0.286	0.187	11.0
K	mg/kg	58.9	6.73	11.4	7	59.2	4.30	3.18	5.40
Mg	mg/kg	138	15.9	11.5	7	132	9.00	7.51	5.44
Mn	mg/kg	150	21.7	14.5	6	146	16.3	11.1	7.39
P	mg/kg	652	123	18.9	6	654	73.8	62.8	9.63
Na	mg/kg	36.1	15.9	44.0	7	36.5	8.50	7.52	20.8
S	mg/kg	868	247	28.4	6	897	92.8	126	14.5
Ca	g/kg	2.89	0.305	10.6	7	2.93	0.240	0.144	5.00