Electronic supplement 26-3-01

to the paper

Evaluation of geochemical sedimentary reference materials of the Geological Survey of Japan (GSJ) by an objective outlier rejection statistical method

by

Kailasa Pandarinath

published in

Revista Mexicana de Ciencias Geológicas, 2009, 26(3), 638-646

Tables A1-A8: Statistical parameters from the literature (Imai *et al.*, 1996) and this work for chemical data of geochemical sedimentary reference materials from the Geological Survey of Japan.

Este suplemento contiene ocho páginas

Table A1. Statistical parameters from the literature (Imai *et al.*, 1996) and this work for chemical data of the geochemical sedimentary reference material JDo-1 (dolomite).

Element	n_{lit}	x_{lit}	s_{lit}	CL_{lit} 95%	n_{tw}	x_{tw}	s_{tw}	CL_{tw} 95%	Ot%
Major element oxides (%)									
SiO_2	11	0.216	0.023	0.015	16	0.228	0.091	0.048	0
TiO_2	3	0.00133	0.000577	0.001433	7	0.0113	0.0144	0.0133	0
Al_2O_3	13	0.0174	0.00656	0.00396	16	0.0186	0.0079	0.0042	15.9
Fe_2O_3	5	0.0222	0.00438	0.00544	9	0.02094	0.00144	0.00110	25.0
Fe_2O_3T	12	0.0208	0.000718	0.000456	10	0.02060	0.00052	0.00037	41.2
MnO	15	0.00657	0.000539	0.000298	16	0.00646	0.00048	0.00026	23.8
MgO	18	18.47	0.35	0.17	23	18.74	0.53	0.23	11.5
CaO	21	33.96	0.404	0.184	23	33.873	0.419	0.181	20.7
Na_2O	13	0.0129	0.00453	0.00274	15	0.01366	0.00372	0.00206	21.0
K_2O	9	0.00232	0.000851	0.000654	13	0.00374	0.00296	0.00179	13.3
P_2O_5	13	0.0343	0.00368	0.00222	14	0.03398	0.00374	0.00216	17.6
CO_2	7	46.5	0.564	0.522	7	46.50	0.56	0.52	0
LOI					7	46.736	0.129	0.120	30.0
H_2O^+	5	0.395	0.146	0.181	5	0.395	0.146	0.181	0
H_2O^-	8	0.145	0.022	0.018	9	0.1344	0.0378	0.0290	0
Trace elements (ppm)									
La	14	7.93	0.59	0.34	13	7.872	0.443	0.268	18.8
Ce	13	2.49	0.5	0.3	14	2.404	0.416	0.240	17.6
Pr	5	0.956	0.435	0.540	5	0.932	0.423	0.526	16.7
Nd	9	5.25	0.73	0.56	12	4.90	1.08	0.69	0
Sm	11	0.788	0.141	0.095	10	0.827	0.060	0.043	28.6
Eu	11	0.176	0.042	0.028	11	0.1603	0.0219	0.0147	15.4
Tb	10	0.116	0.027	0.019	11	0.1166	0.0259	0.0174	0
Dy	7	0.814	0.293	0.271	8	0.834	0.286	0.239	11.1
Yb	9	0.323	0.067	0.052	10	0.345	0.050	0.035	23.1
Lu	9	0.0494	0.0065	0.0050	11	0.0498	0.0070	0.0047	0
B	1	1.49			6	1.3667	0.0441	0.0463	0
Ba	7	6.14	0.53	0.49	7	6.29	0.62	0.57	41.7
Co	8	0.168	0.033	0.028	7	0.1754	0.0263	0.0243	30
Cr	10	7.93	1.19	0.85	16	8.70	2.89	1.54	11.1
Cu	9	1.41	0.18	0.14	12	1.384	0.199	0.126	0
Ni	8	2.9	0.72	0.60	8	2.90	0.72	0.60	11.1
Pb					8	1.19	0.92	0.77	0
Sc	9	0.136	0.0093	0.0071	8	0.1342	0.0082	0.0068	33.3
Sr	16	116	6.12	3.26	18	116.1	5.6	2.8	14.3
Th	8	0.0429	0.0061	0.0051	8	0.0429	0.0061	0.0051	11.1
U	13	0.858	0.139	0.084	15	0.852	0.132	0.073	0
V	7	3.14	0.89	0.82	9	3.41	1.07	0.82	18.2
Y	9	10.3	0.74	0.57	13	10.95	1.46	0.88	0
Zn	15	35.4	1.63	0.90	12	35.47	1.58	1.00	20.0
Zr	5	6.21	3.2	4.0	11	6.6	5.5	3.7	0
Cd	8	0.644	0.134	0.112	7	0.6427	0.0094	0.0087	12.5
F	7	246	32.7	30.2	7	246.3	32.7	30.3	0
S	4	90.5	13.3	21.2	5	95.0	15.3	19.0	16.7

n=number of measurements; x=mean value; s=standard deviation; CL=95% confidence limit; lit=literature data (Imai *et al.*, 1996); tw=this work (results obtained from the updated database of the present work); Ot%=outliers percentage.

Table A2. Statistical parameters from the literature (Imai *et al.*, 1996) and this work for chemical data of the geochemical sedimentary reference material JLs-1 (limestone).

Element	n_{lit}	x_{lit}	s_{lit}	CL_{lit} 95%	n_{tw}	x_{tw}	s_{tw}	CL_{tw} 95%	Ot%
Major element oxides (%)									
SiO_2	12	0.12	0.0226	0.0144	15	0.148	0.055	0.030	11.8
TiO_2	4	0.002	0.00141	0.00224	6	0.00208	0.00125	0.0013	33.3
$Al2O_3$	12	0.0207	0.00624	0.00396	14	0.0247	0.0059	0.0034	36.4
Fe_2O_3	6	0.0178	0.0068	0.0071	8	0.01690	0.00165	0.00138	42.9
Fe_2O_3T	15	0.0168	0.00178	0.00099	16	0.01700	0.00190	0.00101	33.3
MnO	16	0.00209	0.000536	0.000286	19	0.00210	0.00049	0.00024	5.00
MgO	22	0.606	0.0626	0.0277	24	0.599	0.063	0.027	20.0
CaO	21	55.09	0.331	0.151	26	55.054	0.385	0.156	21.22
Na_2O	9	0.00194	0.000407	0.000313	10	0.001993	0.000412	0.000295	54.5
K_2O	6	0.00297	0.0000816	0.0000856	17	0.00590	0.00333	0.00171	15.0
P_2O_5	13	0.0295	0.00198	0.00120	16	0.02920	0.00224	0.00120	20.0
CO_2	7	43.58	0.532	0.492	5	43.43	0.57	0.71	0
LOI					13	43.41	0.59	0.36	
H_2O^-	8	0.105	0.02	0.02	11	0.0988	0.0321	0.0216	0
Trace elements (ppm)									
La	8	0.153	0.035	0.029	16	0.398	0.362	0.193	5.88
Ce	9	0.521	0.317	0.244	16	0.65	0.55	0.29	11.1
Pr					6	0.102	0.115	0.121	0
Nd	3	0.136	0.043	0.107	6	0.1064	0.0206	0.0216	14.3
Sm	9	0.135	0.074	0.057	9	0.109	0.085	0.066	25.0
Eu	9	0.0072	0.0025	0.0019	13	0.00720	0.00263	0.00159	0
Gd					6	0.0373	0.0191	0.0200	0
Tb	4	0.0041	0.0003	0.0005	6	0.00568	0.00337	0.00354	0
Dy	6	0.0283	0.0042	0.0044	8	0.0287	0.0065	0.0054	27.3
Ho					5	0.00664	0.00307	0.00382	0
Er					5	0.01636	0.00333	0.00414	0
Yb	5	0.0164	0.003	0.004	7	0.01591	0.00311	0.00288	12.5
Lu	7	0.022	0.0117	0.0108	11	0.0162	0.0123	0.0083	0
B	1	0.45			7	44.2	41.2	38.1	0
Ba	16	476	45.5	24.2	32	461	129	47	0
Co	9	0.0825	0.0443	0.0340	8	0.0915	0.0375	0.0314	38.5
Cr	12	3.37	0.57	0.36	18	2.95	0.95	0.47	25.0
Cs	6	0.0201	0.0115	0.0121	9	0.0264	0.0162	0.0124	0
Cu	5	0.268	0.08	0.10	9	0.573	0.417	0.321	30.8
Ga					5	1.40	0.55	0.68	0
Hf	6	0.126	0.093	0.098	8	0.099	0.093	0.077	0
Nb	2	0.7			6	0.713	0.444	0.466	0
Ni	6	0.362	0.067	0.070	6	0.3365	0.0423	0.0444	40.0
Pb	2	0.22			9	1.01	0.64	0.49	25.0
Rb					7	1.27	1.19	1.10	12.5
Sc	9	0.0307	0.0011	0.0008	7	0.03074	0.00089	0.00082	50.0
Sr	17	295	15.2	7.8	29	288.97	17.30	6.58	0
Th	9	0.0287	0.009	0.007	10	0.0298	0.0079	0.0056	16.7
U	13	1.75	0.29	0.18	17	1.706	0.227	0.117	10.6
V	5	3.59	0.99	1.23	13	5.76	2.93	1.77	0
Y	5	0.223	0.047	0.058	12	0.88	0.91	0.58	14.3
Zn	12	3.19	0.69	0.44	16	4.608	2.60	1.39	0
Zr	4	4.19	2.98	4.74	15	7.5	5.1	2.8	0
Cd	6	0.159	0.0052	0.0055	8	0.1706	0.0218	0.0182	0
S	5	123	16.8	20.9	6	124.7	15.6	16.4	14.3

n=number of measurements; x=mean value; s=standard deviation; CL=95% confidence limit; lit=literature data (Imai et al., 1996); tw=this work (results obtained from the updated database of the present work); Ot%=outliers percentage.

Table A3. Statistical parameters from the literature (Imai *et al.*, 1996) and this work for chemical data of the geochemical sedimentary reference material JSl-1 (clay slate).

Element	n_{lit}	x_{lit}	s_{lit}	CL_{lit} 95%	n_{tw}	x_{tw}	s_{tw}	CL_{tw} 95%	Ot%
Major element oxides (%)									
SiO_2	12	59.47	0.263	0.167	21	59.73	0.46	0.21	12.5
TiO_2	16	0.725	0.0231	0.0123	22	0.7286	0.0229	0.0102	18.5
$Al2O_3$	18	17.6	0.183	0.091	24	17.609	0.188	0.079	0
Fe_2O_3	6	1.875	0.385	0.404	10	3.16	2.40	1.71	0
FeO	8	4.523	0.546	0.456	9	4.46	0.55	0.42	0
Fe_2O_3T	14	6.764	0.135	0.078	23	6.770	0.303	0.131	8.00
MnO	18	0.0599	0.00544	0.00270	28	0.06133	0.00474	0.00184	0
MgO	17	2.413	0.0721	0.0371	25	2.413	0.070	0.029	13.8
CaO	17	1.479	0.0529	0.0272	24	1.486	0.064	0.027	20.0
Na_2O	20	2.184	0.118	0.055	30	2.229	0.112	0.042	0
K_2O	13	2.845	0.038	0.023	20	2.8544	0.0398	0.0186	20
P_2O_5	15	0.202	0.0275	0.0152	18	0.1994	0.0264	0.0131	0
LOI					14	5.610	0.335	0.194	0
H_2O^+	5	3.92	0.401	0.498	6	3.828	0.423	0.444	0
H_2O^-	8	0.654	0.171	0.143	9	0.622	0.187	0.144	0
Trace elements (ppm)									
La	13	29.3	1.7	1.0	22	28.45	2.62	1.16	0
Ce	14	60.6	3.36	1.94	22	58.87	3.13	1.39	15.4
Pr	5	6.07	1.61	2.00	8	6.28	0.51	0.42	20.0
Nd	10	28.8	2.56	1.83	16	27.76	2.63	1.40	0
Sm	10	6.02	0.63	0.45	14	5.731	0.339	0.196	12.5
Eu	8	1.22	0.053	0.044	12	1.227	0.053	0.034	14.3
Gd	4	4.84	0.83	1.32	7	4.993	0.066	0.061	22.2
Tb	8	0.717	0.099	0.083	11	0.760	0.061	0.041	8.33
Dy	4	5.11	0.63	1.00	8	4.878	0.183	0.153	27.3
Ho	5	0.688	0.244	0.303	8	0.809	0.250	0.2091	0
Er	3	1.15	0.04	0.10	7	2.16	0.95	0.88	0
Tm					5	0.4284	0.0068	0.0085	16.7
Yb	9	2.81	0.156	0.120	13	2.822	0.118	0.071	23.5
Lu	7	0.442	0.025	0.023	10	0.4402	0.0127	0.0090	23.1
B					7	76.56	1.65	1.52	0
Ba	15	305	17.4	9.6	22	305.0	17.4	7.7	12.0
Be	5	2.28	0.19	0.24	6	2.400	0.341	0.357	0
Co	16	15.5	0.63	0.34	16	15.76	0.61	0.32	23.8
Cr	20	60.9	5.47	2.56	25	60.2	5.9	2.4	0
Cs	9	7.6	1.31	1.01	9	8.059	0.345	0.266	18.2
Cu	12	40.8	1.91	1.21	19	38.42	3.83	1.84	0
Ga	4	20.7	0.91	1.45	8	21.18	0.63	0.53	27.3
Hf	7	4.63	0.25	0.23	7	4.603	0.153	0.141	30.0
Li	4	50.7	3.79	6.03	5	48.6	5.8	7.2	0
Nb	9	9.53	0.625	0.480	15	9.60	0.49	0.27	16.7
Ni	13	37.6	2.42	1.46	19	37.23	2.20	1.06	13.6
Pb	10	17.4	3.5	2.5	16	17.18	2.01	1.07	11.1
Rb	17	117	6.41	3.30	21	116.6	5.6	2.6	16.0
Sb	4	0.933	0.047	0.075	5	0.954	0.063	0.078	0
Sc	13	16.7	1.14	0.69	16	17.01	0.74	0.39	20.0
Sr	13	193	4.22	2.55	20	193.5	4.8	2.2	16.7
Ta	6	0.842	0.181	0.190	7	0.806	0.164	0.152	30.0
Th	13	9.97	0.7	0.4	19	9.94	0.69	0.33	0
U	8	2.63	0.079	0.066	8	2.566	0.135	0.113	27.3
V	13	131	8.22	4.97	16	131.3	7.7	4.1	11.1
Y	11	30	2.35	1.58	18	30.24	1.70	0.85	0
Zn	15	108	6.1	3.38	21	107.4	5.2	2.4	19.2
Zr	10	174	5.25	3.76	18	172.1	9.8	4.9	21.7
As	8	14.9	1.09	0.91	11	14.54	1.42	0.95	8.30
Bi					7	0.589	0.331	0.306	0
C	4	9213	523	832	5	9310	1340	1660	0
Hg	3	67	11.3	28.1	5	66.2	8.8	10.9	16.7
Mo	3	0.823	0.24	0.60	6	0.765	0.177	0.185	0
S	5	1467	213	264	7	1100	650	600	0
Sn	3	2.5	0.5	1.2	6	3.02	0.83	0.87	14.3

n=number of measurements; x=mean value; s=standard deviation; CL=95% confidence limit; lit=literature data (Imai et al., 1996); tw=this work (results obtained from the updated database of the present work); Ot%=outliers percentage.

Table A4. Statistical parameters from the literature (Imai *et al.*, 1996) and this work for chemical data of the geochemical sedimentary reference material JSl-2 (clay slate).

Element	n_{lit}	x_{lit}	s_{lit}	CL_{lit} 95%	n_{tw}	x_{tw}	s_{tw}	CL_{tw} 95%	Ot%
Major element oxides (%)									
SiO_2	11	59.45	0.223	0.150	17	59.41	0.54	0.28	19.0
TiO_2	14	0.754	0.0145	0.0084	26	0.7550	0.0344	0.0139	13.3
$Al2O_3$	16	18.17	0.319	0.170	25	18.101	0.341	0.141	13.8
Fe_2O_3	7	0.959	0.297	0.275	7	0.959	0.297	0.275	0
FeO	8	5.048	0.254	0.212	8	5.048	0.254	0.212	0
Fe_2O_3T	15	6.65	0.238	0.132	24	6.63	0.340	0.143	0
MnO	17	0.0818	0.00591	0.00304	27	0.08344	0.00409	0.00162	6.90
MgO	16	2.385	0.0614	0.0327	25	2.386	0.070	0.029	10.7
CaO	16	1.885	0.0588	0.0313	27	1.901	0.093	0.037	15.6
Na_2O	17	1.344	0.06	0.03	31	1.3536	0.0800	0.0294	0
K_2O	16	3.008	0.136	0.072	25	2.988	0.101	0.042	10.7
P_2O_5	13	0.164	0.021	0.013	19	0.1692	0.0237	0.0114	0
CO_2	4	1.236	0.103	0.164	7	2.70	1.83	1.69	0
LOI					13	5.977	0.280	0.169	0
H_2O^+	5	4.158	0.161	0.200	5	4.158	0.161	0.200	0
H_2O^-	6	0.362	0.12	0.13	9	0.367	0.148	0.114	0
Trace elements (ppm)									
La	11	32.7	1.54	1.03	17	32.35	1.67	0.86	10.5
Ce	11	69.6	3.75	2.52	22	67.65	4.29	1.90	4.30
Pr	4	6.44	0.91	1.45	8	6.80	0.82	0.68	0
Nd	8	32	2.05	1.71	12	30.77	2.77	1.76	0
Sm	8	5.95	0.546	0.456	12	5.958	0.436	0.277	0
Eu	7	1.14	0.1	0.1	9	1.1678	0.0363	0.0279	18.2
Gd	3	4.9	1.15	2.86	5	5.266	0.156	0.193	28.6
Tb	6	0.727	0.086	0.090	7	0.779	0.108	0.100	0
Dy	6	4.71	0.89	0.93	9	4.66	0.98	0.76	0
Ho	4	0.671	0.223	0.355	7	0.867	0.291	0.269	0
Er	3	2.24	0.55	1.37	8	2.76	0.57	0.48	0
Yb	8	3.15	0.44	0.37	11	3.028	0.218	0.147	15.4
Lu	6	0.404	0.139	0.146	5	0.4836	0.0142	0.0177	50.0
Ba	13	302	17.2	10.4	20	298.9	12.4	5.8	17.0
Co	16	15.7	1.24	0.66	17	15.82	1.02	0.52	19.0
Cr	16	64.7	4.63	2.47	26	65.8	6.3	2.5	0.0
Cs	7	8.24	1.59	1.47	11	8.10	1.41	0.95	0.0
Cu	12	44.5	2.61	1.66	17	42.88	3.66	1.88	15.0
Ga	4	22.8	5.38	8.56	8	20.78	2.14	1.79	20.0
Hf	6	5.54	0.74	0.78	6	5.112	0.079	0.082	25.0
Nb	8	32	2.05	1.71	14	12.30	1.23	0.71	17.6
Ni	12	40.6	2.45	1.56	18	41.35	2.43	1.21	18.2
Pb	10	19.7	3.14	2.25	17	19.33	1.83	0.94	19.3
Rb	12	118	3.96	2.52	18	117.13	3.12	1.55	18.2
Sb	3	0.907	0.14	0.35	6	0.833	0.330	0.347	0
Sc	11	16.8	0.749	0.503	15	16.87	1.00	0.55	11.8
Sr	12	230	3.57	2.27	18	231.44	3.34	1.66	21.7
Ta	5	1.04	0.178	0.221	7	1.000	0.161	0.149	12.5
Th	10	11.5	0.83	0.59	16	11.58	1.36	0.72	0
U	7	2.92	0.15	0.14	8	2.682	0.320	0.267	0
V	13	122	9.47	5.72	19	122.3	8.6	4.2	0
Y	10	31.3	1.62	1.16	17	31.30	1.28	0.66	22.7
Zn	13	101	7.12	4.30	18	101.3	5.0	2.5	21.7
Zr	7	191	5.12	4.74	15	192.6	10.0	5.5	20.0
As	8	11.4	1.35	1.13	13	10.51	1.85	1.12	0
Mo					5	1.36	0.59	0.74	0
Sn					7	4.61	3.18	2.94	0

n=number of measurements; x=mean value; s=standard deviation; CL=95% confidence limit; lit=literature data (Imai et al., 1996); tw=this work (results obtained from the updated database of the present work); Ot%=outliers percentage.

Table A5. Statistical parameters from the literature (Imai *et al.*, 1996) and this work for chemical data of the geochemical sedimentary reference material JLk-1 (lake sediment).

Element	n_{lit}	x_{lit}	s_{lit}	CL_{lit} 95%	n_{tw}	x_{tw}	s_{tw}	CL_{tw} 95%	Ot%
Major element oxides (%)									
SiO_2	13	57.16	0.275	0.166	19	57.78	1.02	0.49	20.8
TiO_2	18	0.668	0.0301	0.0150	26	0.6702	0.0362	0.0146	18.8
$Al2O_3$	16	16.73	0.184	0.098	25	16.782	0.314	0.130	13.8
Fe_2O_3	7	4.251	0.262	0.242	15	5.62	1.41	0.78	0
FeO	9	2.191	0.269	0.207	10	2.154	0.279	0.200	0
Fe_2O_3T	18	6.929	0.219	0.109	26	6.955	0.249	0.100	7.14
MnO	20	0.266	0.0174	0.0081	31	0.2629	0.0126	0.0046	16.2
MgO	19	1.736	0.0548	0.0264	25	1.757	0.052	0.021	19.4
CaO	18	0.686	0.0324	0.0161	26	0.6770	0.0403	0.0163	18.8
Na_2O	21	1.051	0.0482	0.0219	32	1.065	0.050	0.018	15.8
K_2O	21	2.805	0.0544	0.0248	35	2.815	0.110	0.038	0
P_2O_5	12	0.208	0.00622	0.00395	22	0.2002	0.0141	0.0063	15.4
LOI					13	10.10	1.76	1.07	0
H_2O^+	7	6.372	0.354	0.327	8	6.351	0.333	0.278	0
H_2O^-	8	3.701	0.329	0.275	10	3.55	0.48	0.34	0
Trace elements (ppm)									
La	14	40.6	1.33	0.77	25	39.30	3.51	1.45	10.7
Ce	17	87.9	9.49	4.88	31	86.4	7.6	2.8	0
Pr	9	8.53	1.64	1.26	16	8.72	1.27	0.68	0
Nd	9	35.7	5.24	4.03	15	35.32	2.29	1.27	21.0
Sm	12	7.87	0.45	0.29	16	7.776	0.395	0.211	15.8
Eu	10	1.27	0.069	0.049	16	1.259	0.067	0.036	11.1
Gd	5	6.02	0.82	1.02	14	6.60	0.78	0.45	0
Tb	10	1.23	0.12	0.09	16	1.205	0.107	0.057	0
Dy	9	6.57	0.79	0.61	14	6.87	0.69	0.40	12.5
Ho	5	1.06	0.42	0.52	9	1.373	0.164	0.126	18.2
Er	7	3.59	0.42	0.39	11	3.937	0.303	0.203	15.4
Tm	4	0.531	0.097	0.154	10	0.5689	0.0714	0.0511	0
Yb	11	3.99	0.34	0.23	18	3.930	0.310	0.154	0
Lu	11	0.571	0.079	0.053	17	0.571	0.066	0.034	0
B					8	44.2	13.5	11.3	0
Ba	17	574	43.8	22.5	27	590	50.	19	10.0
Be	4	3.31	0.48	0.76	5	3.344	0.426	0.529	0
Co	19	18	0.72	0.35	24	18.03	1.10	0.47	14.3
Cr	18	69	3.4	1.7	24	68.88	4.46	1.88	14.3
Cs	13	10.9	1.89	1.14	18	11.10	1.67	0.83	0
Cu	14	62.9	4.92	2.84	22	62.9	4.8	2.1	0
Ga	4	21.4	2.73	4.34	9	22.13	1.54	1.19	25.0
Hf	10	3.78	0.28	0.20	9	3.814	0.198	0.152	30.8
Li	4	51.5	2.79	4.44	5	49.2	5.7	7.1	0
Nb	9	15.8	1.35	1.04	16	15.57	0.86	0.46	11.1
Ni	14	35	3.12	1.80	20	36.40	3.47	1.62	0
Pb	13	43.7	3.69	2.23	18	44.69	2.25	1.12	18.2
Rb	19	147	10.8	5.2	29	144.5	10.7	4.1	0
Sb	4	1.68	0.53	0.84	8	1.60	0.55	0.46	0
Sc	14	15.9	0.44	0.25	22	16.18	1.68	0.74	0
Sr	18	67.5	4.56	2.27	29	68.34	4.46	1.70	0
Ta	9	1.57	0.37	0.28	12	1.560	0.362	0.230	0
Th	17	19.5	0.92	0.47	28	19.56	1.31	0.51	0
U	12	3.83	0.4	0.2	15	3.837	0.346	0.192	16.7
V	14	117	7.55	4.36	19	116.2	6.7	3.2	9.50
Y	14	40	5.52	3.19	25	41.4	5.1	2.1	0
Zn	16	152	10	5	24	151.0	7.6	3.2	17.2
Zr	12	137	8.72	5.54	26	134	18	7	0
Au	4	5.42	1.98	3.15	5	4.44	2.79	3.46	0
As	7	26.8	0.99	0.92	8	26.625	0.443	0.370	33.3
Bi					7	1.67	0.70	0.65	0
C	4	15025	206	328	5	15000	205	254	16.7
F	5	589	82.1	102.0	5	590	82	100	17.0
Hg	3	142	13.3	33.0	5	120	57	71	17.0
Mo	3	2.19	0.41	1.02	8	2.064	0.377	0.315	0
S	6	1052	89.8	94.2	7	780	460	430	0
Sn					9	5.88	0.79	0.61	0
Tl	5	1.17	0.32	0.40	10	1.024	0.084	0.060	0
W	3	3.99	1.18	2.93	5	3.58	1.04	1.29	0

n=number of measurements; x=mean value; s=standard deviation; CL=95% confidence limit; lit=literature data (Imai et al., 1996); tw=this work (results obtained from the updated database of the present work); Ot%=outliers percentage.

Table A6. Statistical parameters from the literature (Imai *et al*., 1996) and this work for chemical data of the geochemical sedimentary reference material JSd-1 (stream sediment).

Element	n_{lit}	x_{lit}	s_{lit}	CL_{lit} 95%	n_{tw}	x_{tw}	s_{tw}	CL_{tw} 95%	Ot%
Major element oxides (%)									
SiO_2	14	66.55	0.354	0.204	18	66.678	0.413	0.205	18.2
TiO_2	15	0.643	0.0138	0.0076	22	0.6479	0.0165	0.0073	18.5
$Al2O_3$	13	14.65	0.0951	0.0575	22	14.560	0.194	0.086	18.5
Fe_2O_3	7	3.526	0.209	0.193	12	4.01	0.73	0.46	0
FeO	8	1.363	0.111	0.093	9	1.346	0.116	0.089	0
Fe_2O_3T	15	5.059	0.101	0.056	20	5.086	0.103	0.048	20.0
MnO	19	0.0924	0.00595	0.00287	25	0.09298	0.00375	0.00155	16.7
MgO	17	1.813	0.046	0.024	23	1.8027	0.0400	0.0173	11.5
CaO	16	3.034	0.0509	0.0271	24	3.020	0.071	0.030	14.3
Na_2O	16	2.727	0.0546	0.0291	31	2.745	0.084	0.031	0
K_2O	15	2.183	0.0381	0.0211	25	2.162	0.069	0.028	10.7
P_2O_5	13	0.122	0.0127	0.0077	20	0.1252	0.0167	0.0078	0
CO_2					6	0.302	0.240	0.252	0
LOI					14	2.787	0.377	0.217	0
H_2O^+	4	2.301	0.272	0.433	6	2.04	0.63	0.66	0
H_2O^-	7	0.836	0.117	0.108	9	0.760	0.201	0.155	0
Trace elements (ppm)									
La	14	18.1	1.28	0.74	22	17.75	1.21	0.54	0.0
Ce	14	34.4	2.6	1.5	22	33.82	2.08	0.92	12.0
Pr	5	4.05	1.3	1.6	7	4.051	0.238	0.220	30.0
Nd	9	17.6	0.69	0.53	14	17.00	1.25	0.72	0.0
Sm	10	3.48	0.17	0.12	12	3.506	0.104	0.066	20.0
Eu	10	0.925	0.078	0.056	14	0.937	0.072	0.041	0
Gd	5	2.71	0.69	0.86	9	2.91	0.54	0.42	0
Tb	8	0.431	0.063	0.053	10	0.437	0.057	0.041	0
Dy	8	2.23	0.35	0.29	11	2.420	0.394	0.265	0
Ho	4	0.318	0.111	0.177	8	0.422	0.134	0.112	0
Er	5	0.906	0.377	0.468	9	1.145	0.389	0.299	0
Yb	9	1.18	0.18	0.14	16	1.299	0.435	0.232	0
Lu	7	0.186	0.035	0.032	10	0.1865	0.0269	0.0193	23.1
B					6	7.443	0.263	0.276	0
Ba	15	520	16.5	9.1	24	528.9	26.4	11.2	11.0
Be	5	1.4	0.28	0.35	6	1.513	0.384	0.403	0
Co	20	11.2	1.36	0.64	19	11.16	0.87	0.42	17.4
Cr	16	21.5	2.03	1.08	24	22.98	4.06	1.72	0
Cs	10	1.89	0.39	0.28	11	2.042	0.097	0.065	15.4
Cu	14	22	2.07	1.20	17	22.17	1.79	0.92	15.0
Hf	6	3.55	0.27	0.28	8	3.510	0.238	0.199	11.1
Li	6	22.8	1.99	2.09	6	23.00	1.61	1.70	0
Nb	9	17.6	0.69	0.53	16	11.06	0.72	0.39	15.8
Ni	9	7.04	0.73	0.56	16	8.17	1.36	0.72	15.8
Pb	13	12.9	3.15	1.90	18	12.43	3.01	1.50	0
Rb	17	67.4	3.03	1.56	22	67.83	3.24	1.44	15.4
Sc	13	10.9	0.6	0.4	21	11.36	1.40	0.64	0
Sr	17	340	11.4	5.9	22	339.5	11.2	5.0	15.0
Ta	6	0.893	0.146	0.153	8	0.870	0.130	0.109	0
Th	13	4.44	0.39	0.24	18	4.541	0.387	0.193	14.3
U	9	1	0.064	0.049	8	1.020	0.049	0.041	27.3
V	14	76	8.49	4.90	20	79.0	10.7	5.0	0
Y	14	14.8	1.77	1.02	21	14.90	1.40	0.64	8.70
Zn	19	96.5	9.64	4.65	28	96.8	9.9	3.8	0
Zr	11	132	6.89	4.63	19	131.6	7.5	3.6	17.4
As	7	2.42	0.46	0.42	12	2.58	1.04	0.66	0
C	4	1112	143	227	5	1270	374	464	0
Hg	3	15.5	4.5	11.2	5	13.70	4.09	5.07	0
Sn	3	2.77	1.08	2.68	6	2.59	0.78	0.82	14.3
Tl	4	0.407	0.017	0.027	6	0.3980	0.0064	0.0068	14.3

n=number of measurements; x=mean value; s=standard deviation; CL=95% confidence limit; lit=literature data (Imai et al., 1996); tw=this work (results obtained from the updated database of the present work); Ot%=outliers percentage.

Table A7. Statistical parameters from the literature (Imai *et al*., 1996) and this work for chemical data of the geochemical sedimentary reference material JSd-2 (stream sediment).

Element	n_{lit}	x_{lit}	s_{lit}	CL_{lit} 95%	n_{tw}	x_{tw}	s_{tw}	CL_{tw} 95%	Ot%
Major element oxides (%)									
SiO_2	13	60.78	0.411	0.248	16	60.68	0.53	0.28	11.1
TiO_2	15	0.614	0.0466	0.0258	23	0.621	0.067	0.029	0
$Al2O_3$	15	12.31	0.164	0.091	18	12.311	0.142	0.070	18.2
Fe_2O_3	6	4.552	0.672	0.705	9	6.80	3.42	2.63	0
FeO	6	5.955	0.263	0.276	7	6.13	0.51	0.48	0
Fe_2O_3T	15	11.65	0.386	0.214	19	11.540	0.361	0.174	13.6
MnO	16	0.12	0.00815	0.0043	23	0.1224	0.0054	0.0023	11.5
MgO	15	2.731	0.0717	0.0397	20	2.737	0.069	0.032	20.0
CaO	12	3.658	0.0534	0.0339	22	3.587	0.147	0.065	15.4
Na_2O	14	2.438	0.0841	0.0486	28	2.479	0.106	0.041	0
K_2O	12	1.145	0.0275	0.0174	24	1.129	0.076	0.032	7.7
P_2O_5	13	0.105	0.0222	0.0134	18	0.1052	0.0198	0.0099	0
CO_2	4	0.501	0.144	0.229	7	0.85	0.46	0.43	0
LOI					13	3.40	0.57		0
H_2O^+	5	2.554	0.21	0.26	5	2.554	0.210	0.261	0
H_2O^-	8	0.451	0.17	0.14	8	0.451	0.170	0.142	0
Trace elements (ppm)									
La	10	11.3	0.9	0.6	15	11.187	0.787	0.430	11.8
Ce	11	23.4	2.02	1.4	18	22.79	1.87	0.93	10.0
Pr	5	2.4	1.02	1.36	8	2.61	0.83	0.69	0
Nd	9	13.2	2.81	2.16	12	13.37	1.87	1.19	14.3
Sm	8	2.68	0.22	0.18	9	2.744	0.163	0.125	25.0
Eu	8	0.81	0.049	0.041	12	0.828	0.054	0.034	0
Gd	4	2.67	0.57	0.91	8	2.879	0.450	0.376	0
Tb	7	0.44	0.036	0.033	11	0.4524	0.0338	0.0227	0
Dy	5	2.86	0.35	0.43	6	2.832	0.232	0.244	40.0
Ho	4	0.678	0.24	0.38	7	0.608	0.056	0.052	12.5
Er	5	1.48	0.27	0.34	6	1.595	0.337	0.354	0
Tm					5	0.2632	0.0341	0.0423	0
Yb	10	1.67	0.31	0.22	12	1.754	0.217	0.138	20.0
Lu	8	0.252	0.054	0.045	12	0.262	0.046	0.029	0
B					6	36.67	0.58	0.612	0
Ba	13	1199	53.7	32.4	21	1212	99	45	16.0
Be	3	1.04	0.25	0.62	5	0.924	0.296	0.368	0
Co	13	48.4	2.27	1.37	19	48.32	2.19	1.06	13.6
Cr	14	108	4.54	2.62	21	109.5	10.	4.6	12.5
Cs	8	1.07	0.24	0.20	10	1.083	0.216	0.155	0
Cu	10	1117	76.8	54.9	15	1100	80	40	6.00
Hf	6	2.7	0.2	0.2	8	2.715	0.180	0.150	11.1
Nb	9	4.56	1.42	1.09	10	4.81	1.00	0.72	9.10
Ni	10	92.8	3.33	2.38	16	91.1	6.2	3.3	0
Pb	9	146	9.11	7.00	13	143.6	14.8	8.9	0
Rb	13	26.9	1.46	0.88	16	27.09	1.24	0.66	15.8
Sb					6	11.70	1.13	1.19	14.3
Sc	11	17.5	0.95	0.64	11	17.63	0.83	0.5594	21.4
Sr	10	202	6.12	4.38	14	201.9	6.6	3.8	17.6
Th	8	2.33	0.16	0.13	8	2.388	0.086	0.072	27.3
U	7	1.1	0.065	0.060	8	1.110	0.066	0.0558	11.1
V	8	125	4.17	3.49	11	124.3	9.8	6.7	21.4
Y	12	17.4	1.65	1.05	12	17.81	1.12	0.71	25.0
Zn	14	2056	190	110	19	1990	210	101	0
Zr	11	111	20	13	13	103.4	9.1	5.5	13.3
Ag					5	2.41	1.77	2.20	0
As	9	38.6	3.19	2.45	14	37.8	3.5	2.0	0
Cd	3	3.06	0.098	0.243	6	2.965	0.288		14.3
F	5	259	99.3	123.3	5	260	99	120	0
Mo	5	11.5	2.24	2.78	10	13.15	2.83	2.02	0.0
S	5	13146	640	790	6	12800	1080	1130	14.0
Sn	3	32.5	3.14	7.80	5	30.78	3.37	4.18	16.7

n=number of measurements; x=mean value; s=standard deviation; CL=95% confidence limit; lit=literature data (Imai et al., 1996); tw=this work (results obtained from the updated database of the present work); Ot%=outliers percentage.

Table A8. Statistical parameters from the literature (Imai *et al*., 1996) and this work for chemical data of the geochemical sedimentary reference material JSd-3 (stream sediment).

Element	n_{lit}	x_{lit}	s_{lit}	CL_{lit} 95%	n_{tw}	x_{tw}	s_{tw}	CL_{tw} 95%	Ot%
Major element oxides (%)									
SiO_2	12	76	0.606	0.385	14	75.93	0.59	0.34	17.6
TiO_2	16	0.403	0.0299	0.0159	23	0.4076	0.0379	0.0164	0
$Al2O_3$	16	9.908	0.225	0.120	24	9.899	0.342	0.145	0
Fe_2O_3	7	3.057	0.0976	0.0903	9	3.46	0.61	0.47	0
FeO	8	1.161	0.0919	0.0768	8	1.161	0.092	0.077	0
Fe_2O_3T	13	4.368	0.187	0.113	20	4.325	0.295	0.1385	0
MnO	16	0.148	0.0097	0.0052	22	0.1466	0.0064	0.0028	15.4
MgO	14	1.17	0.0333	0.0192	19	1.1603	0.0380	0.0183	20.8
CaO	15	0.56	0.0407	0.0225	20	0.549	0.0422	0.0197	16.7
Na_2O	17	0.411	0.0476	0.0245	28	0.419	0.048	0.018	0
K_2O	15	1.971	0.0625	0.0346	21	1.974	0.063	0.0288	16.0
P_2O_5	12	0.0817	0.0159	0.0101	14	0.0839	0.0122	0.0070	12.5
CO_2					5	1.48	1.13	1.40	0
LOI					10	4.385	0.371	0.266	0
H_2O^+	5	2.838	0.419	0.520	5	2.838	0.418	0.520	0
H_2O^-	7	0.964	0.232	0.215	8	0.945	0.222	0.185	0
Trace elements (ppm)									
La	12	19.8	1.81	1.15	12	20.01	2.03	1.29	0
Ce	14	42	3.49	2.01	14	42.30	2.54	1.47	17.6
Pr	5	3.09	0.94	1.17	5	4.00	1.62	2.01	16.7
Sm	8	3.26	0.2	0.2	8	3.264	0.201	0.168	20.0
Eu	9	0.686	0.024	0.018	8	0.681	0.019	0.016	0
Tb	6	0.368	0.047	0.049	6	0.368	0.047	0.049	0
Dy	5	2.22	0.25	0.31	7		0.66	0.61	0
Er	5	1.07	0.27	0.34	5	1.068	0.270	0.336	0
Yb	9	1.4	0.189	0.145	8	1.369	0.180	0.150	27.3
Lu	8	0.196	0.051	0.043	7	0.2114	0.0299	0.0276	12.5
Ba	15	462	24.8	13.7	21	462.2	34.0	15.5	0
Be	4	9.08	1.08	1.72	5	8.76	1.17	1.45	0
Co	16	12.7	0.86	0.46	17	12.70	0.81	0.42	19.0
Cr	15	35.3	2.31	1.28	19	35.19	3.56	1.72	13.6
Cs	6	30.6	1.11	1.16	9	26.7	6.0	4.6	0
Cu	11	426	10.4	7.0	16	415.5	20.5	10.9	11.0
Nb	7	7.8	0.656	0.6	7	7.900	0.450	0.417	12.5
Ni	10	19.6	0.472	0.338	10	19.51	0.68	0.48	28.6
Pb	11	82.1	4	3	14	82.9	5.3	3.0	0
Rb	14	285	8.87	5.12	16	282.9	7.6	4.0	15.8
Sb					6	2.34	0.78	0.82	0
Sc	13	10.5	0.69	0.42	15	10.86	1.08	0.60	0
Sr	13	58.7	2.3	1.4	13	58.53	2.34	1.41	13.3
Ta	6	0.687	0.176	0.185	6	0.687	0.176	0.185	0
Th	11	7.79	2.13	1.43	8	6.83	0.54	0.45	20.0
U	8	1.66	0.174	0.145	8	1.655	0.174	0.146	0
V	10	70.4	3.42	2.45	11	71.7	4.8	3.2	0
Y	14	14.9	4.29	2.55	16	15.06	4.04	2.15	0
Zn	12	136	3.47	2.20	13	136.46	4.20	2.54	23.5
Zr	8	124	7.75	6.48	11	125.7	8.7	5.8	21.4
Ag	4	3.38	0.48	0.76	7	2.88	0.94	0.871	0
As	8	252	16.3	13.6	13	248.3	19.5	11.8	0
Bi					7	13.83	3.11	2.88	0
F	5	3204	1345	1670	6	3230	120.	1260	0
Sn	4	195	19.6	31.2	6	185.5	25.1	26.4	0

n=number of measurements; x=mean value; s=standard deviation; CL=95% confidence limit; lit=literature data (Imai et al., 1996); tw=this work (results obtained from the updated database of the present work); Ot%=outliers percentage.