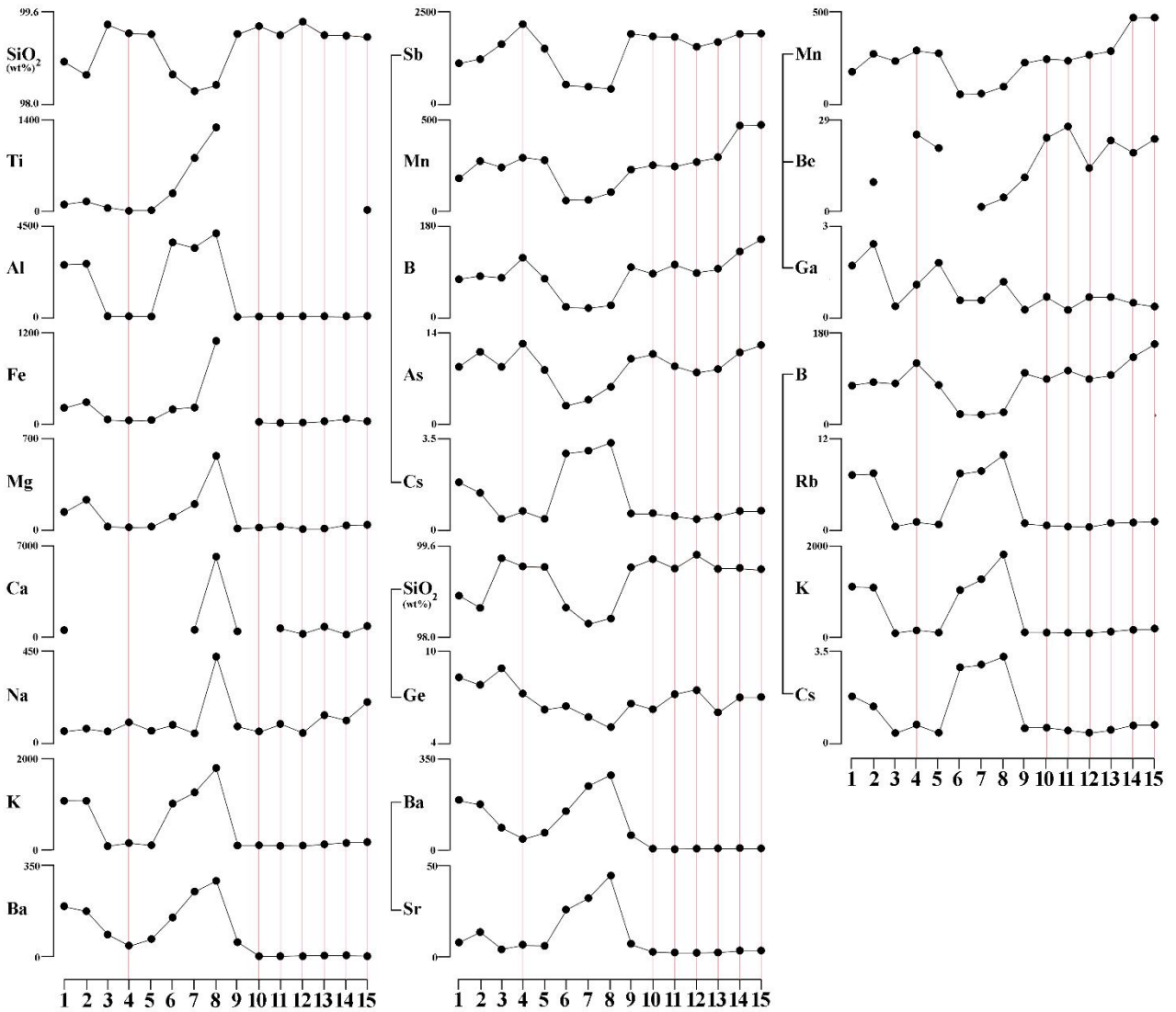
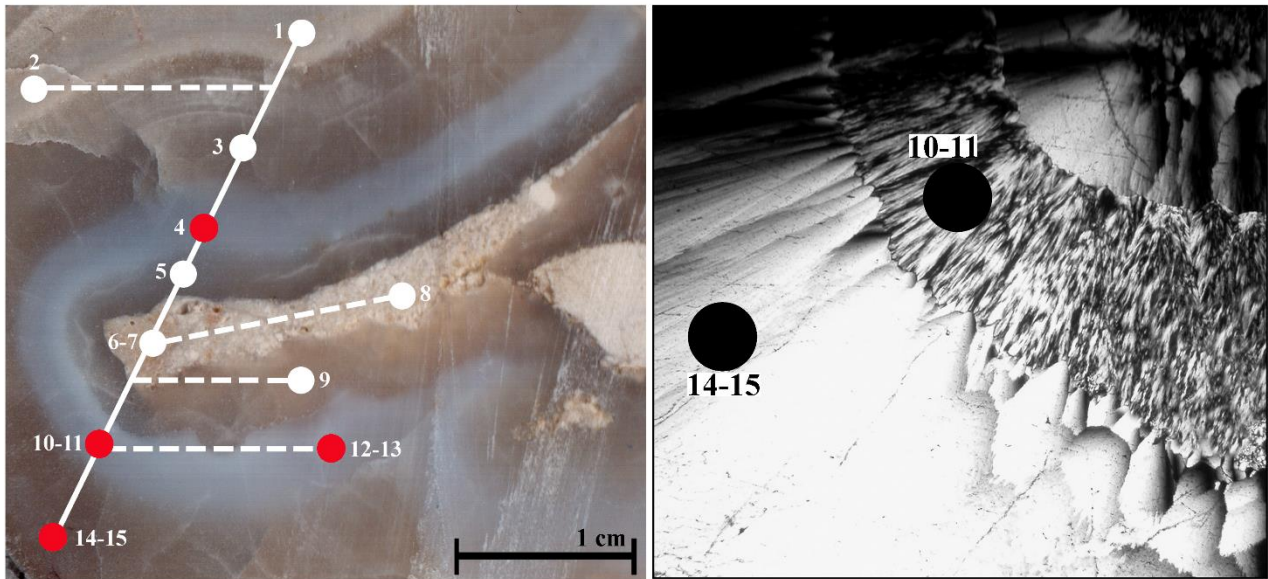


Table S1. LA-ICP-MS data for sample PP1 (data provided in ppm if not differently specified). \*measurements used to calculate the average composition of chalcedony.

	Sample PP1														
Spot no.	1	2	3	4*	5	6	7	8	9	10*	11*	12*	13*	14*	15*
Colour	Gy	Gy	Br	Bl	Br	Cw	Cw	Cw	Br	Bl	Bl	Bl	Bl	Br	Br
SiO <sub>2</sub> (wt%)	98.72	98.50	99.37	99.22	99.21	98.51	98.22	98.32	99.21	99.35	99.19	99.42	99.19	99.19	99.16
Li	13.5	23.2	12.4	2.8	2.7	62.3	48.7	50.6	-	10.5	4.0	-	4.9	-	7.1
Be	-	9.2	-	24.5	20.0	-	1.3	4.0	10.7	23.3	27.0	13.8	22.6	18.7	22.9
B	77.5	83.6	80.5	120.0	78.0	21.8	20.5	25.7	100.5	88.3	106.1	90.6	96.3	131.6	155.7
Na	58.3	70.1	56.7	102.7	61.4	87.8	48.2	422.4	81.5	56.3	93.8	51.2	138.5	112.4	203.2
Mg	137.9	231.0	22.5	16.3	21.2	102.6	197.3	571.6	9.3	16.7	25.6	5.8	6.6	34.7	38.9
Al	2567.6	2622.2	27.2	30.1	25.0	3683.4	3406.4	4105.6	6.5	22.8	32.5	10.1	19.6	8.4	17.1
K	1082.0	1071.5	81.9	144.7	96.2	1015.3	1250.8	1793.3	100.5	99.9	91.9	84.6	119.3	157.5	161.8
Ca	543.7	-	-	-	-	-	540.0	6097.4	401.5	-	617.4	224.9	744.7	185.1	785.1
Sc	2.5	2.2	1.9	2.9	1.6	4.2	2.8	2.7	1.9	2.5	4.6	2.2	4.6	2.0	3.0
Ti	98.0	140.9	46.9	0.6	1.1	266.1	792.7	1266.6	-	-	-	-	-	-	5.4
V	5.9	6.3	0.8	0.6	0.8	2.3	4.4	6.8	0.4	0.6	1.5	0.7	-	2.2	1.9
Cr	8.2	4.7	11.4	-	-	-	4.1	11.3	-	-	-	-	-	-	-
Mn	177.0	271.5	235.4	290.5	274.6	58.0	59.9	98.4	225.7	247.2	240.7	268.2	288.6	464.6	466.4
Fe	215.5	289.7	53.0	42.1	48.9	197.5	222.2	1096.6	-	20.3	11.1	17.7	33.6	64.6	32.3
Co	0.1	0.1	-	0.1	0.0	0.2	0.1	1.6	-	0.1	-	0.1	-	-	-
Ni	1.1	1.0	0.8	1.4	1.0	1.1	1.3	11.9	0.6	0.6	2.0	0.5	1.2	1.0	0.8
Cu	3.0	2.5	2.4	1.5	1.2	2.1	5.2	31.6	1.7	4.2	0.7	0.8	1.9	0.9	0.9
Zn	6.5	8.5	3.4	4.8	2.5	11.4	4.6	27.9	2.0	5.0	-	3.6	-	5.7	14.6
Ga	1.7	2.4	0.4	1.1	1.8	0.6	0.6	1.2	0.3	0.7	0.3	0.7	0.7	0.5	0.4
Ge	8.3	7.8	8.9	7.2	6.2	6.4	5.7	5.0	6.6	6.2	7.2	7.5	6.0	7.0	7.0
As	8.8	11.1	8.8	12.3	8.3	2.9	3.7	5.8	10.0	10.7	8.9	7.9	8.4	11.0	12.1
Rb	7.2	7.3	0.6	1.1	0.8	7.3	7.7	9.7	0.9	0.7	0.6	0.5	1.0	1.1	1.2
Sr	7.1	13.0	3.5	5.7	5.5	25.6	31.8	44.5	6.1	2.0	1.5	1.5	1.6	2.5	2.6
Y	0.19	0.39	0.02	0.10	0.09	0.65	1.15	2.05	0.04	-	0.01	0.03	0.06	-	-
Zr	1.7	3.5	-	0.0	0.1	6.2	10.9	20.6	-	0.0	-	0.0	-	-	-
Nb	0.27	0.47	-	0.03	0.02	0.95	1.81	4.16	-	0.02	-	-	-	0.01	-
Mo	-	0.13	-	-	-	-	0.28	0.85	-	-	-	-	-	0.26	-
Ag	3.4	2.3	0.1	2.0	19.4	8.2	7.0	10.2	0.6	-	0.1	-	0.1	0.0	-
Cd	-	-	0.55	-	0.08	-	0.32	-	-	-	-	0.37	-	0.39	-
In	0.01	0.01	-	-	0.00	-	0.02	0.03	-	-	-	0.02	-	0.01	-
Sb	1105	1223	1640	2183	1509	498	468	417	1916	1834	1822	1552	1692	1917	1918
Cs	1.8	1.4	0.4	0.7	0.4	2.9	3.0	3.3	0.6	0.6	0.5	0.4	0.5	0.7	0.7

Ba	191	174	83	40	65	151	248	290	54	1	1	3	3	3	2
La	0.050	0.142	0.179	0.405	0.420	0.785	3.668	1.512	0.511	0.227	0.270	0.267	0.334	0.293	0.213
Ce	0.169	0.313	0.290	0.615	0.888	1.564	6.986	3.140	0.486	0.420	0.343	0.365	0.420	0.174	0.215
Pr	0.021	0.039	0.020	0.076	0.086	-	0.640	0.272	0.037	0.021	-	0.031	-	0.017	-
Nd	-	-	0.103	0.278	0.214	0.515	2.415	0.965	0.435	0.133	0.123	-	0.179	0.019	0.131
Sm	0.078	0.023	-	-	-	0.173	-	0.207	0.210	0.054	-	0.064	-	-	-
Eu	-	-	-	0.059	0.023	-	0.076	0.040	-	-	-	-	-	0.035	-
Gd	0.116	0.042	-	-	-	0.151	-	0.104	-	-	-	-	0.074	0.067	-
Tb	0.004	0.007	0.011	0.013	-	-	0.026	0.011	0.012	0.008	-	0.004	-	-	-
Dy	-	-	0.058	-	-	0.093	0.113	0.127	-	-	-	0.043	-	0.028	0.051
Ho	-	0.028	-	0.009	-	-	0.039	0.071	0.013	-	-	0.011	-	-	-
Er	0.047	0.058	-	0.018	0.033	0.124	0.147	0.332	-	0.017	-	0.015	-	0.015	-
Tm	0.012	0.036	-	-	-	-	0.025	0.059	0.018	-	-	-	-	-	-
Yb	0.148	0.064	-	-	0.051	0.102	0.084	0.502	-	0.050	0.032	-	0.031	-	-
Lu	0.013	-	-	-	-	-	0.051	0.052	-	-	0.010	-	-	0.007	0.004
Hf	7.343	0.148	0.019	1.276	2.571	0.182	1.213	0.728	-	-	-	-	-	4.514	-
Ta	0.019	0.020	-	-	-	0.079	0.123	0.148	-	0.008	-	0.003	-	0.003	-
W	0.070	0.124	-	0.055	-	0.414	0.207	0.701	0.027	-	-	-	-	-	-
Au	-	-	-	-	-	-	0.056	-	-	0.072	-	-	-	-	-
Tl	0.071	0.087	0.034	0.023	-	0.127	0.074	0.146	0.034	-	-	-	0.045	0.046	-
Pb	2.659	3.638	1.722	8.008	11.764	4.702	9.070	7.554	1.782	0.502	0.275	0.833	0.714	0.991	1.533
Bi	0.087	0.352	0.102	0.111	0.146	-	0.100	0.288	-	0.045	-	1.299	-	0.192	0.044
Th	0.175	0.355	0.021	0.005	-	0.428	1.040	1.115	0.007	0.013	-	-	-	-	-
U	0.114	0.318	-	0.013	-	0.165	0.333	0.588	0.006	0.012	-	-	-	-	-



**Figure S1.** Sample PP1. All measurements and related patterns. In the central area (measurements nos. 6-8), a secondary carbonate- and a metal-oxides-rich filling are present. Similarly, the high levels of Al, Rb, Cs, K and Ba in measurements nos. 1-2 suggest the presence of feldspar inclusions. The measurements representative of chalcedony are nos. 4, 10-15 (indicated by red dots and lines).

Table S2. LA-ICP-MS data for sample PP2 (data provided in ppm if not differently specified). \*measurements used to calculate the average composition of chalcedony.

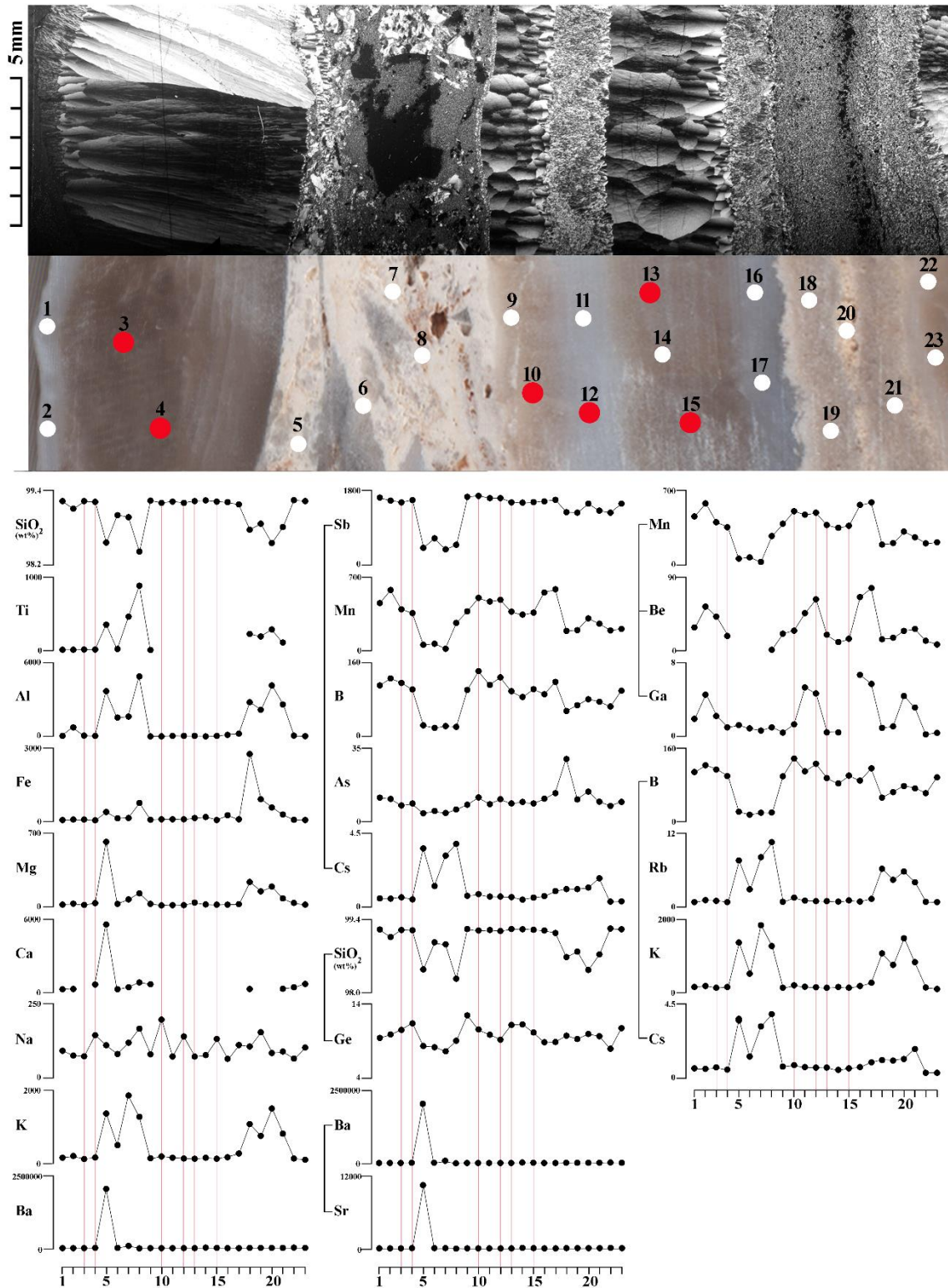
Spot no. Colour	Sample PP2											
	1 Bl	2 Bl	3* Br	4* Br	5 Bl	6 Cw	7 Cw	8 Cw	9 Br	10* Br	11 Bl	12* Bl
SiO <sub>2</sub> (wt%)	99.20	99.05	99.19	99.18	98.42	98.94	98.90	98.25	99.20	99.17	99.19	99.17
Li	8.7	-	-	6.0	127.9	87.1	124.3	176.1	-	8.0	7.4	5.9
Be	27.8	54.2	40.7	17.8	-	-	-	0.7	20.7	24.4	46.0	63.1
B	107.9	123.4	114.0	98.9	19.8	14.3	18.1	17.2	98.8	139.0	109.7	125.6
Na	92.8	76.0	73.0	146.9	110.1	80.9	119.7	169.6	80.9	200.4	71.7	141.5
Mg	18.7	23.9	12.1	30.0	631.7	24.7	64.6	129.7	24.7	9.0	15.0	9.9
Al	22.2	745.0	40.6	36.1	3645.9	1513.8	1592.4	4891.7	10.9	11.4	42.5	25.5
K	139.9	163.8	111.7	129.9	1362.2	494.0	1846.4	1262.4	106.5	172.9	137.8	120.4
Ca	239.9	211.0	-	621.8	5678.5	195.2	392.0	792.0	635.7	-	-	-
Sc	2.6	2.2	2.4	3.4	3.0	2.8	2.9	3.7	2.6	3.7	2.6	3.3
Ti	1.6	1.7	2.9	6.7	346.4	7.8	447.6	877.7	0.6	-	-	-
V	1.9	2.0	1.7	2.1	4.8	0.3	4.7	10.9	0.9	2.7	0.8	-
Cr	2.1	1.7	-	-	4.5	-	6.5	11.0	-	-	-	-
Mn	453.4	581.3	397.6	359.3	52.6	65.5	18.9	265.4	379.0	505.4	470.8	488.3
Fe	28.2	34.4	37.5	15.7	357.4	96.7	126.8	740.5	37.0	51.8	59.8	48.5
Co	0.0	0.4	-	0.3	0.1	0.3	0.2	7.9	-	-	-	-
Ni	0.7	1.5	0.7	1.4	2.1	2.0	2.2	-	1.7	1.2	1.3	1.2
Cu	1.9	11.5	9.3	5.4	3.4	2.6	2.9	2.0	1.4	0.8	1.6	-
Zn	11.4	43.4	15.2	26.3	98.1	10.3	8.6	-	20.2	18.7	12.8	8.5
Ga	1.9	4.6	2.2	0.9	1.2	0.8	0.6	1.0	0.4	1.3	5.4	4.7
Ge	7.6	8.2	9.2	10.5	6.0	5.9	5.0	7.0	11.9	9.1	8.3	7.4
As	11.3	10.9	7.7	8.3	3.8	4.8	3.9	5.7	8.0	11.4	8.4	10.6
Rb	0.7	1.1	1.0	0.8	7.6	2.8	8.1	10.5	0.7	1.4	0.9	0.9
Sr	3.4	5.0	4.2	3.8	10478.1	31.6	37.8	46.0	5.3	6.8	3.6	3.3
Y	-	0.05	-	-	4.42	0.06	0.59	1.47	-	0.01	-	-
Zr	0.1	-	0.1	-	7.1	0.2	7.3	16.5	0.1	-	0.0	-
Nb	-	0.02	-	-	1.14	-	1.49	2.63	-	-	0.01	-
Mo	-	-	-	-	0.35	0.22	0.54	0.50	-	-	-	-
Ag	0.2	0.1	0.4	0.3	4.1	19.8	3.7	4.4	1.4	1.5	-	-
Cd	-	-	0.31	-	0.26	0.45	-	-	0.43	0.54	-	-
In	-	-	0.02	0.13	-	-	0.01	-	0.02	-	-	-
Sb	1631	1569	1522	1578	400	626	356	465	1653	1688	1622	1626
Cs	0.5	0.5	0.6	0.4	3.6	1.3	3.1	3.3	0.6	0.7	0.6	0.6

Ba	12	32	15	34	2036094	1872	60489	146	32	58	6	4
La	0.366	0.657	0.381	0.338	4.409	0.188	0.906	1.823	0.231	0.327	0.691	0.582
Ce	0.622	0.545	0.279	0.179	2.641	0.577	1.182	2.137	0.171	0.159	0.830	0.719
Pr	0.024	0.023	0.017	-	0.274	0.025	0.136	-	-	-	0.064	-
Nd	0.062	0.058	0.186	-	0.682	-	0.573	1.215	0.378	-	0.130	-
Sm	-	-	-	-	0.380	-	0.118	-	-	0.036	0.046	0.036
Eu	-	0.059	-	0.084	3.264	-	0.065	-	-	0.083	0.112	-
Gd	-	-	-	0.052	0.480	-	0.084	0.150	0.024	-	0.020	-
Tb	0.004	-	-	-	0.025	-	0.005	-	-	-	-	-
Dy	-	-	0.044	-	0.056	-	0.076	0.193	0.016	-	-	-
Ho	-	-	0.011	-	0.043	-	0.024	-	0.014	-	-	-
Er	-	0.044	0.015	-	0.180	-	0.084	0.261	0.033	-	0.014	-
Tm	-	0.007	-	-	0.013	-	0.020	-	0.004	-	-	-
Yb	-	-	-	-	0.158	-	0.116	0.375	-	-	0.249	0.056
Lu	-	-	-	-	-	-	0.022	0.032	-	-	-	0.015
Hf	-	-	0.247	-	11.580	11.398	1.443	0.648	-	-	0.791	0.021
Ta	0.011	-	-	-	0.054	-	0.088	0.099	-	-	0.009	-
W	0.049	-	-	-	0.287	0.054	0.501	0.507	-	-	0.041	-
Au	-	-	-	-	0.054	-	0.024	-	-	-	0.200	-
Tl	0.014	0.045	0.048	0.109	0.136	0.087	0.062	0.184	-	0.031	-	-
Pb	3.948	3.962	4.737	5.613	80.304	1.711	4.834	7.931	6.074	5.694	3.472	3.844
Bi	0.185	0.108	0.111	1.984	-	0.563	0.039	0.170	0.081	-	-	0.060
Th	-	0.004	0.008	-	0.639	0.033	0.481	1.560	-	-	-	-
U	-	0.036	-	0.009	0.590	0.052	1.096	2.319	0.004	0.004	-	0.004

(continued)

	Sample PP2										
Spot no.	13*	14	15*	16	17	18	19	20	21	22	23
Colour	Br	Br	Br	Bl	Bl	Gy	Gy	Cr	Cr	Gy	Gy
SiO <sub>2</sub> (wt%)	99.20	99.21	99.19	99.17	99.13	98.66	98.77	98.41	98.71	99.22	99.20
Li	-	6.4	9.1	-	5.1	-	16.9	-	21.3	4.3	5.2
Be	18.6	9.8	13.7	65.8	76.8	13.9	14.7	24.2	26.1	11.4	7.6
B	94.6	82.2	99.6	89.2	115.8	52.2	64.6	78.0	72.9	61.5	96.8
Na	71.6	76.2	131.8	62.5	111.5	106.1	157.0	84.7	87.6	64.2	102.8
Mg	34.9	16.0	13.2	18.2	16.9	237.5	144.7	188.2	71.7	27.9	15.7
Al	27.5	27.9	9.4	146.9	217.5	2778.0	2166.3	4128.0	2594.8	29.5	8.1
K	106.3	129.6	110.0	165.7	244.1	1062.5	734.3	1487.2	800.6	111.6	86.5
Ca	-	-	-	-	-	230.8	-	-	261.0	381.8	686.0
Sc	2.8	1.9	2.7	1.9	4.5	2.8	3.8	3.2	2.5	2.0	3.5
Ti	-	-	-	-	-	215.6	185.3	278.4	96.3	-	-
V	1.2	1.2	1.9	0.8	1.2	7.5	5.5	15.5	4.1	0.7	-
Cr	-	-	-	-	-	6.1	7.6	9.5	3.0	-	-
Mn	372.0	344.0	364.8	563.2	586.1	187.1	196.7	308.3	256.9	195.4	207.3
Fe	102.5	153.7	43.4	210.8	48.7	2835.8	912.4	566.5	234.1	35.8	15.1
Co	1.0	0.1	-	0.1	0.2	0.3	0.5	0.3	0.1	0.0	0.2
Ni	1.3	1.7	2.0	0.7	1.0	2.3	3.5	1.9	2.0	0.9	-
Cu	0.9	1.7	0.6	2.2	1.1	10.1	7.0	4.0	3.3	2.0	0.6
Zn	9.9	10.7	-	13.6	-	13.6	11.6	10.3	10.2	7.4	-
Ga	0.4	0.4	-	6.7	5.8	0.9	1.0	4.4	3.1	0.1	0.4
Ge	10.1	10.2	8.7	6.7	6.8	8.1	7.4	8.4	7.9	5.5	9.4
As	8.5	9.2	8.5	10.8	13.7	30.4	10.7	14.4	9.6	7.5	9.5
Rb	0.9	0.8	1.0	0.8	1.3	6.2	4.4	5.8	4.0	0.8	0.7
Sr	5.4	2.8	3.8	4.0	3.7	33.1	10.9	47.3	32.4	1.6	1.3
Y	0.03	-	0.01	0.03	0.05	0.85	0.98	1.00	0.38	0.03	0.01
Zr	-	0.1	-	-	-	3.6	4.3	6.4	2.7	-	-

Nb	-	-	-	0.01	0.09	0.60	0.62	0.85	0.32	-	-
Mo	-	-	-	-	-	-	-	0.12	-	0.09	-
Ag	1.3	0.1	0.6	0.2	0.4	2.2	1.4	13.8	2.5	-	-
Cd	-	-	-	-	-	0.33	-	-	-	-	-
In	0.02	-	0.01	-	-	-	0.02	-	-	0.01	-
Sb	1530	1507	1521	1553	1578	1278	1267	1485	1307	1266	1495
Cs	0.6	0.4	0.6	0.6	0.9	1.1	1.1	1.2	1.8	0.3	0.3
Ba	58	3	17	5	6	1352	113	150	359	9	2
La	0.219	0.178	0.209	0.586	0.563	2.094	1.955	5.654	1.863	0.179	0.199
Ce	0.186	0.858	0.179	0.769	0.889	3.061	2.943	9.982	2.488	0.136	0.098
Pr	0.018	0.020	-	0.045	-	0.368	-	0.897	0.277	0.020	-
Nd	-	-	0.108	0.219	0.217	1.671	1.497	2.922	1.044	-	-
Sm	0.057	0.053	-	-	-	0.330	0.232	0.672	-	-	-
Eu	0.040	0.040	-	0.195	0.168	0.081	-	0.322	0.113	-	0.149
Gd	-	-	0.033	0.022	-	0.169	0.311	0.179	-	-	-
Tb	-	0.004	-	-	-	0.022	0.061	0.034	0.017	-	0.053
Dy	-	-	-	0.029	-	0.142	0.123	0.263	0.072	-	-
Ho	-	0.019	-	-	-	0.047	-	0.034	0.018	-	-
Er	-	0.032	0.038	-	0.054	0.180	0.187	0.189	0.013	-	-
Tm	0.012	-	-	0.007	-	0.013	-	0.026	0.012	0.004	-
Yb	-	0.024	-	-	-	0.086	0.043	0.102	-	0.023	-
Lu	0.004	-	-	-	-	-	0.017	-	0.010	-	-
Hf	0.097	0.067	-	0.058	0.020	2.054	0.092	0.126	0.987	1.377	0.021
Ta	-	-	-	-	-	0.042	-	0.056	0.015	-	-
W	-	0.016	-	0.015	0.120	0.222	0.238	0.343	0.112	-	-
Au	0.055	-	-	-	-	0.038	0.113	0.042	0.057	0.123	0.103
Tl	0.044	0.138	0.075	-	-	0.117	0.064	0.122	0.088	-	-
Pb	4.586	4.758	5.031	4.058	4.016	7.943	4.358	65.031	42.154	2.015	1.074
Bi	0.029	0.167	-	-	0.088	0.075	0.168	0.053	0.087	0.125	0.094
Th	-	-	-	0.016	-	0.468	0.438	0.879	0.272	-	-
U	-	0.011	0.004	-	0.004	0.098	0.156	0.181	0.079	0.004	0.048



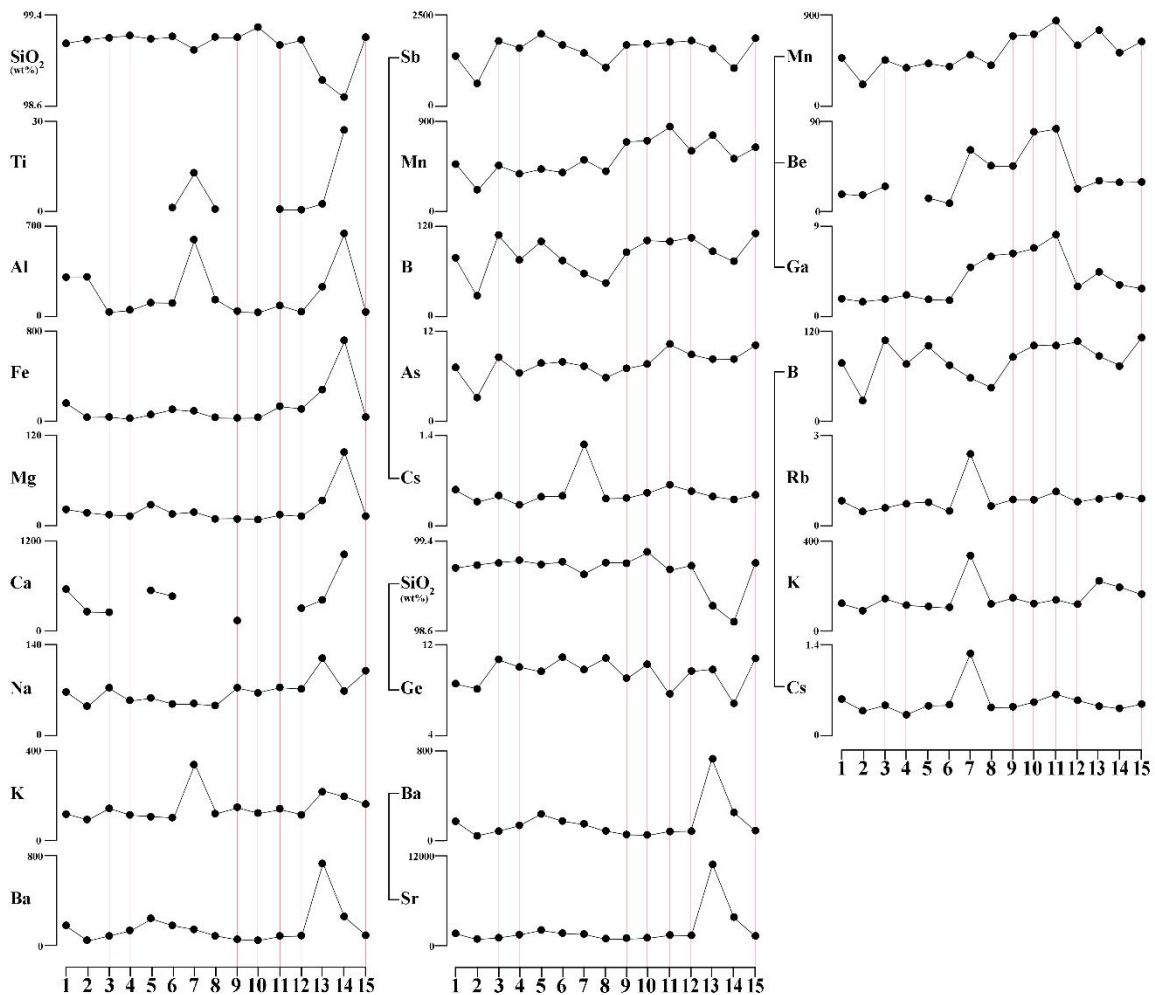
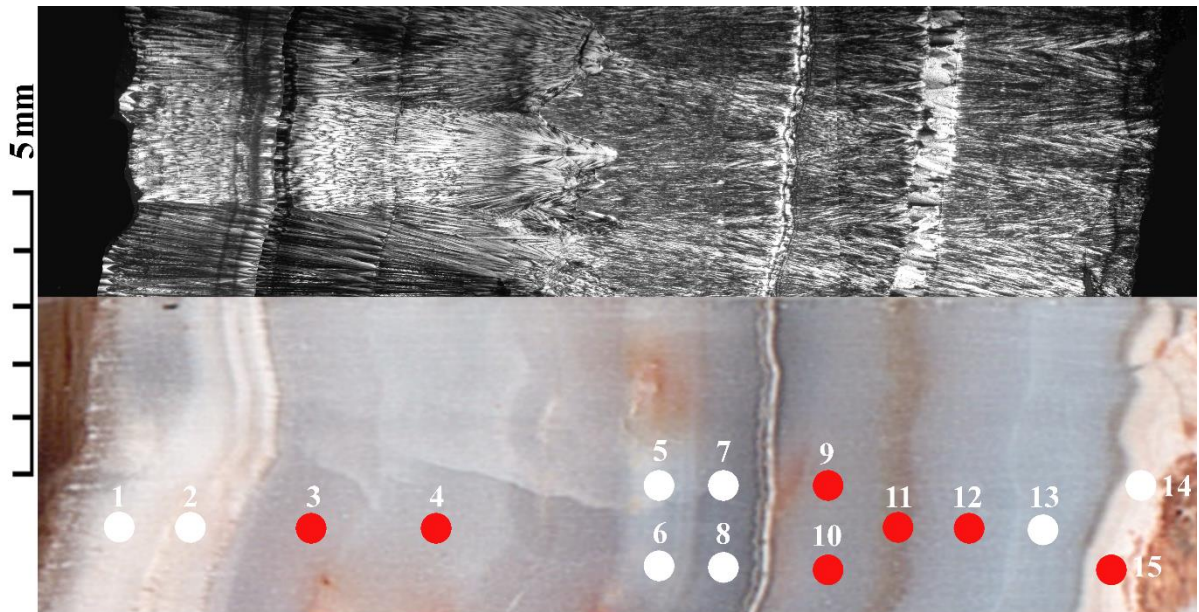
**Figure S2.** Sample PP2. All measurements and related patterns. Two bands (nos. 5-8 and 18-21) are characterised by relatively low contents of SiO<sub>2</sub>, Sb, Mn, B and Ge, and relatively high contents of Al, K, Fe, Mg, Ca, Ti, Rb, V, Cs, Y and Ni. The measurements representative of chalcedony are nos. 3-4, 10, 12-13 and 15 (indicated by red dots and lines).



Table S3. LA-ICP-MS data for sample PP4 (data provided in ppm if not differently specified). \*measurements used to calculate the average composition of chalcedony.

	Sample PP4														
Spot no.	1	2	3*	4*	5	6	7	8	9*	10*	11*	12*	13	14	15*
Colour	Cw	Cw	Bl	Bl	Bl	Bl	Bl	Bl	Bl	Bl	Br	Bl	Bl	Cw	Cw
SiO <sub>2</sub> (wt%)	99.15	99.18	99.20	99.22	99.19	99.20	99.10	99.20	99.20	99.29	99.13	99.18	98.82	98.68	99.20
Li	33.0	-	-	-	7.6	-	28.8	-	4.7	-	7.6	-	26.1	9.1	2.7
Be	18.2	16.7	26.0	-	14.4	9.1	61.5	46.0	45.9	79.3	82.4	23.2	31.0	29.8	30.0
B	77.8	27.5	108.9	76.2	100.4	75.2	57.6	44.3	86.2	101.7	100.6	105.7	86.7	73.9	110.8
Na	66.5	43.2	71.9	52.3	56.5	47.6	47.7	45.0	71.9	65.4	72.6	70.9	116.9	67.7	97.5
Mg	21.5	17.0	14.1	13.4	28.9	15.9	18.0	9.3	9.7	8.1	14.0	12.4	32.7	97.0	12.1
Al	302.5	302.1	34.2	48.3	106.5	104.7	587.0	132.4	36.5	31.6	86.1	35.6	231.3	637.8	36.1
K	119.8	94.2	144.1	114.4	108.3	101.9	338.4	120.6	146.6	121.9	138.8	116.8	221.4	195.6	163.1
Ca	543.3	250.5	243.5	-	530.0	460.7	-	-	137.6	-	-	302.4	414.7	1010.8	-
Sc	2.1	2.2	2.0	2.6	1.9	1.6	1.7	1.6	1.6	1.1	2.2	1.5	2.1	1.9	1.9
Ti	-	-	-	-	-	1.3	12.7	0.8	-	-	0.6	0.6	2.6	26.7	-
V	1.3	0.6	1.5	1.1	1.5	1.6	-	0.2	0.9	0.7	0.5	1.9	4.5	4.1	1.5
Cr	-	-	-	-	2.7	-	-	-	2.1	-	-	-	1.9	3.8	-
Mn	474.7	211.1	457.1	376.7	424.3	388.2	515.6	401.1	697.7	711.2	844.7	600.7	759.3	524.6	639.6
Fe	159.4	34.1	37.5	19.0	58.2	104.1	85.7	30.7	27.1	30.3	131.4	110.7	282.2	707.1	36.3
Co	-	-	-	-	-	-	-	0.2	-	-	-	-	0.1	0.2	-
Ni	1.1	0.6	1.1	1.9	0.7	0.9	1.6	0.3	1.6	-	0.9	1.3	3.5	2.6	1.7
Cu	1.4	2.3	1.3	0.9	3.3	3.7	1.8	5.7	0.8	0.9	2.0	0.7	5.1	8.8	1.4
Zn	9.5	7.5	28.3	12.1	16.3	14.3	15.7	14.2	9.6	7.0	15.1	17.5	35.4	60.6	17.9
Ga	1.7	1.4	1.7	2.1	1.7	1.6	4.9	6.1	6.3	6.8	8.2	2.9	4.4	3.1	2.7
Ge	6.8	6.2	10.1	9.1	8.5	10.3	8.7	10.3	7.5	9.5	5.5	8.5	8.8	4.3	10.2
As	7.2	3.2	8.5	6.4	7.7	7.9	7.4	5.8	7.1	7.6	10.3	8.9	8.2	8.3	10.1
Rb	0.8	0.5	0.6	0.7	0.8	0.5	2.4	0.7	0.9	0.9	1.1	0.8	0.9	1.0	0.9
Sr	9.0	4.7	5.7	8.3	11.6	9.2	8.5	4.9	5.0	5.6	7.8	7.5	62.9	21.4	7.1
Y	0.01	0.01	-	-	0.04	0.03	0.05	-	-	-	-	-	0.03	0.03	-
Zr	0.0	0.1	-	-	-	-	-	-	-	-	-	-	0.1	0.3	-
Nb	0.08	-	-	-	0.03	-	-	-	-	-	0.02	0.01	0.02	0.46	-
Mo	-	-	0.09	0.07	-	-	0.03	-	0.04	-	-	-	-	0.08	0.05
Ag	0.3	0.1	-	-	0.4	0.2	-	-	0.0	-	0.1	-	58.8	30.2	0.1
Cd	0.36	-	0.24	-	-	-	-	-	-	-	-	-	-	0.10	0.27
In	-	-	-	-	0.02	-	-	-	0.01	0.01	-	-	-	0.02	-
Sb	1363	617	1788	1602	1985	1686	1466	1067	1676	1705	1752	1794	1589	1035	1841

Cs	0.6	0.4	0.5	0.3	0.5	0.5	1.3	0.4	0.4	0.5	0.6	0.5	0.5	0.4	0.5
Ba	172	42	84	131	234	173	143	84	51	47	81	84	726	251	91
La	0.157	0.342	0.119	0.220	0.087	0.053	0.140	0.173	0.150	0.137	0.223	0.107	0.313	0.197	0.184
Ce	0.826	0.880	0.266	0.578	2.571	0.172	0.701	0.132	0.161	0.029	0.321	0.145	0.407	3.544	0.241
Pr	0.010	-	-	-	-	0.012	0.026	0.015	-	0.016	0.014	-	0.023	0.014	0.018
Nd	-	-	0.120	-	-	-	-	-	-	0.101	0.086	-	0.204	-	-
Sm	0.052	-	-	0.026	-	-	0.058	-	-	0.143	0.027	-	0.092	-	-
Eu	0.025	-	-	-	-	0.020	-	0.061	0.022	-	-	0.047	-	0.042	-
Gd	0.079	0.103	-	-	-	-	-	0.071	0.069	0.046	-	-	-	0.085	-
Tb	-	-	-	-	-	-	0.016	-	0.011	-	0.012	-	0.003	0.004	-
Dy	-	-	-	-	-	0.026	-	0.030	-	-	0.025	0.045	0.026	-	0.016
Ho	0.008	-	0.004	0.008	-	-	-	0.004	0.015	0.011	-	0.008	-	0.004	0.004
Er	0.047	0.043	-	-	-	0.043	0.053	-	-	0.011	0.050	-	0.014	-	-
Tm	-	0.003	-	-	-	0.003	0.008	-	0.008	-	0.008	-	0.013	-	-
Yb	-	-	-	-	-	-	-	0.024	-	-	-	-	-	0.034	-
Lu	0.008	-	-	-	-	-	-	-	-	-	-	0.019	-	0.002	0.004
Hf	12.040	2.105	7.187	-	-	3.189	-	1.437	-	-	-	-	0.034	0.028	5.932
Ta	-	-	-	-	-	-	0.004	-	-	-	-	0.004	0.013	0.010	0.012
W	0.057	-	-	-	0.061	-	-	0.068	0.016	-	0.034	-	0.048	0.068	-
Au	-	-	-	0.045	-	-	0.065	0.061	0.044	-	-	0.044	0.026	-	-
Tl	0.037	0.045	0.020	-	-	-	0.047	0.029	-	0.048	0.037	-	0.031	0.020	0.062
Pb	3.126	0.949	2.450	1.792	3.127	1.842	2.841	2.267	2.733	2.999	4.734	4.858	11.546	7.250	4.697
Bi	0.284	0.302	-	-	0.010	-	0.024	-	-	0.042	0.032	-	-	0.231	-
Th	0.017	-	0.004	-	-	0.012	-	0.013	0.017	0.012	0.009	0.004	0.026	0.081	-
U	-	-	0.008	-	0.018	0.010	0.030	-	0.004	-	-	0.004	0.007	0.029	-

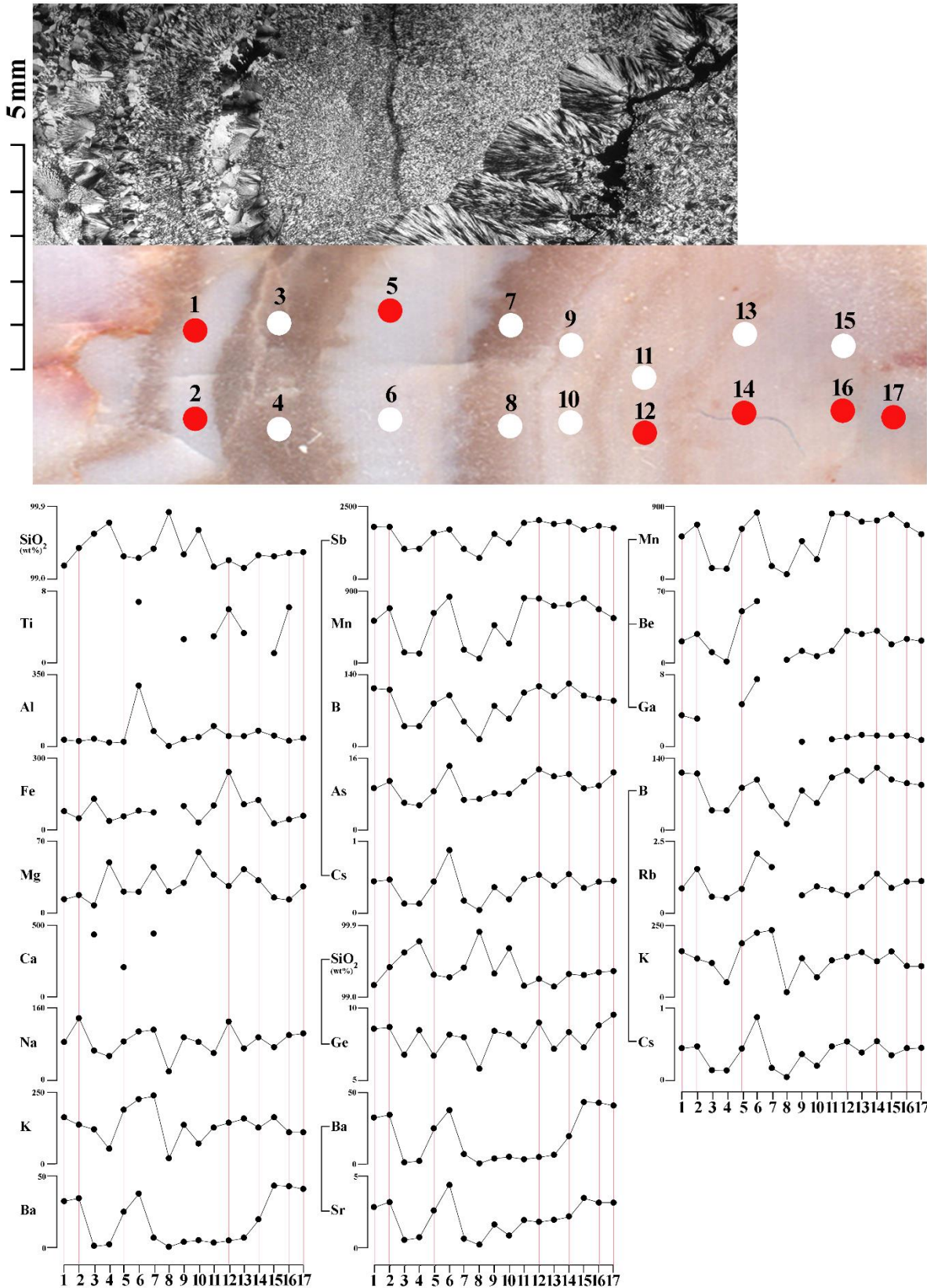


**Figure S3.** Sample PP4. All measurements and related patterns. Excluding quartz and analyses contaminated by inclusions, the measurements representative of chalcedony are nos. 3-4, 9-12 and 15.

Table S4. LA-ICP-MS data for sample PP5 (data provided in ppm if not differently specified). \*measurements used to calculate the average composition of chalcedony.

	Sample PP5																
Spot no.	1*	2*	3	4	5*	6	7	8	9	10	11	12*	13	14*	15	16*	17*
Colour	Cw	Cw	Br	Br	Cw	Cw	Br	Br	R	R	R	R	R	R	R	R	R
SiO <sub>2</sub> (wt%)	99.16	99.38	99.56	99.70	99.28	99.25	99.37	99.82	99.30	99.61	99.14	99.23	99.13	99.29	99.27	99.32	99.33
Li	6.5	10.6	9.7	5.7	-	15.4	2.9	3.3	-	4.2	-	7.0	-	5.6	-	3.8	4.5
Be	20.2	27.2	9.8	0.9	49.3	59.1	-	1.9	10.9	5.6	11.1	30.6	27.1	30.4	17.3	22.8	20.3
B	111.3	109.3	38.3	37.8	82.3	98.2	46.4	12.1	76.5	52.1	102.7	114.8	95.9	120.1	97.8	91.7	87.5
Na	83.0	136.4	63.7	51.2	84.9	106.4	110.6	17.2	93.9	83.4	57.8	128.7	69.2	94.2	71.6	98.7	102.6
Mg	13.1	17.2	7.2	49.0	20.5	20.3	44.2	20.3	29.0	58.6	37.0	25.7	42.7	32.0	14.4	12.6	25.7
Al	32.5	26.4	36.5	16.9	22.2	295.4	72.3	2.8	32.8	44.9	97.1	51.3	51.1	76.8	52.1	27.7	40.4
K	160.3	135.1	119.7	52.1	189.2	226.0	235.5	18.0	135.2	70.7	128.5	141.8	156.9	125.8	161.0	109.3	109.2
Ca	-	-	431.8	-	205.7	-	437.1	-	-	-	-	-	-	-	-	-	-
Sc	2.4	4.8	2.8	4.4	1.6	3.9	2.2	4.0	2.1	2.9	1.9	5.0	3.0	3.4	2.1	4.2	3.6
Ti	-	-	-	-	-	6.8	-	-	2.6	-	3.0	6.0	3.3	-	1.1	6.2	-
V	1.9	2.4	0.4	-	1.6	2.3	7.4	-	1.4	-	2.2	-	1.3	1.8	1.8	2.0	1.9
Cr	-	-	-	-	-	-	-	-	1.9	-	1.9	-	2.2	-	-	-	-
Mn	522.8	680.6	127.6	118.0	624.2	827.0	156.4	50.1	465.3	240.9	809.5	807.5	712.7	725.8	804.8	667.3	557.3
Fe	78.9	49.4	129.1	38.1	58.1	80.4	74.1	-	102.3	31.9	101.3	245.3	108.0	126.4	26.2	44.5	61.1
Co	-	0.1	-	-	-	0.1	0.1	-	-	0.2	-	0.2	-	0.2	0.1	-	0.1
Ni	0.4	1.9	1.4	1.3	1.4	-	2.0	1.3	0.5	-	0.9	-	2.1	-	0.6	-	-
Cu	1.2	1.6	0.9	-	0.6	0.4	4.6	0.6	1.3	0.4	0.5	0.9	1.1	-	0.5	0.6	0.2
Zn	21.7	18.9	14.6	8.8	21.1	25.4	11.8	-	14.7	13.1	12.9	24.3	13.2	-	13.1	19.2	-
Ga	3.4	2.9	-	-	4.5	7.3	-	-	0.4	-	0.7	0.9	1.2	1.1	1.0	1.1	0.6
Ge	8.6	8.6	6.7	8.4	6.7	8.1	7.9	5.8	8.4	8.2	7.3	8.9	7.1	8.3	7.3	8.8	9.5
As	9.2	10.8	5.9	5.4	8.6	14.3	6.7	6.9	8.2	8.0	10.9	13.4	11.9	12.4	9.3	9.9	12.8
Rb	0.8	1.5	0.5	0.5	0.8	2.1	1.6	-	0.6	0.9	0.8	0.6	0.9	1.4	0.9	1.1	1.1
Sr	5.0	5.7	0.9	1.2	4.6	7.9	1.1	0.3	2.8	1.5	3.4	3.2	3.4	3.8	6.1	5.6	5.6
Y	0.02	0.05	-	0.03	-	-	0.04	-	-	-	0.01	0.01	-	0.05	-	-	-
Zr	0.0	-	0.0	-	-	0.3	-	-	0.1	-	-	-	0.0	0.2	-	-	-
Nb	0.01	-	0.02	-	-	-	0.02	-	-	-	0.05	-	-	0.10	-	0.08	-
Mo	-	-	0.02	-	-	-	2.37	-	0.02	0.77	-	-	0.10	1.15	0.15	-	-
Ag	-	-	-	-	-	0.3	0.1	-	0.2	0.2	-	-	-	0.0	-	-	-
Cd	-	-	0.07	-	-	-	-	0.81	-	1.32	0.42	-	-	-	-	-	-
In	0.01	-	0.01	-	0.00	-	-	-	-	-	-	0.02	0.01	-	0.03	-	-
Sb	1767	1764	983	1017	1544	1657	985	679	1509	1193	1912	1985	1871	1935	1670	1801	1723
Cs	0.4	0.5	0.1	0.1	0.4	0.9	0.2	0.0	0.4	0.2	0.5	0.5	0.4	0.5	0.3	0.4	0.5

Ba	32	34	1	2	25	38	7	0	4	5	3	5	6	19	43	43	41
La	0.044	0.060	0.029	0.018	0.065	0.098	-	-	0.038	0.023	0.037	0.081	0.051	0.029	0.021	0.027	0.040
Ce	0.030	-	0.079	0.037	0.035	0.097	-	0.012	-	-	0.102	0.096	0.050	0.073	0.025	0.035	0.025
Pr	-	-	0.018	-	-	-	-	-	-	-	0.168	-	0.003	-	-	-	-
Nd	-	-	-	-	-	-	0.027	-	-	-	-	0.092	-	-	0.093	-	0.025
Sm	0.048	-	-	-	-	-	-	0.241	0.026	0.036	-	-	-	0.039	-	-	0.063
Eu	-	0.089	-	-	-	-	0.034	-	0.040	0.074	0.016	-	0.037	-	0.017	-	-
Gd	0.064	0.033	0.020	-	-	-	-	-	-	-	-	0.115	-	-	-	-	-
Tb	-	-	0.013	-	0.016	-	-	-	0.007	-	0.008	-	-	-	-	-	-
Dy	-	-	0.040	-	0.025	-	0.019	-	-	0.068	0.031	-	-	-	-	-	0.050
Ho	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Er	0.058	-	0.014	-	-	-	0.042	-	-	-	-	0.044	-	0.043	0.018	0.016	-
Tm	-	-	0.013	-	0.006	-	-	-	-	-	-	-	-	-	-	-	-
Yb	0.042	-	0.021	-	-	-	0.031	-	0.023	-	-	-	0.095	-	0.054	-	-
Lu	-	0.004	-	-	0.003	0.008	-	-	-	-	-	-	0.027	-	0.033	-	-
Hf	0.018	-	2.479	0.020	0.052	-	3.367	0.044	1.530	-	-	-	0.850	-	-	-	-
Ta	0.003	-	-	-	-	-	0.009	0.082	0.004	-	0.007	-	-	-	-	-	-
W	-	-	-	-	-	-	0.064	-	-	-	0.017	0.169	-	-	-	0.075	0.091
Au	-	-	0.038	-	-	0.080	-	0.121	-	-	-	-	0.014	-	-	-	-
Tl	0.046	0.080	0.012	0.006	0.024	0.023	0.018	-	0.035	-	-	-	0.030	-	-	0.049	0.024
Pb	4.816	5.112	2.144	1.326	4.336	5.147	2.829	1.122	3.881	3.522	5.665	7.058	4.764	5.886	3.414	4.188	3.635
Bi	0.073	0.248	0.123	0.170	0.051	0.113	0.217	0.099	0.148	-	0.057	0.935	0.179	0.211	-	-	0.092
Th	0.004	-	0.019	-	-	-	0.006	-	-	-	-	0.028	0.004	0.014	-	-	-
U	-	-	-	0.003	0.007	0.011	0.005	-	0.012	-	0.012	0.026	-	-	-	-	0.010



**Figure S4.** Sample PP5. All measurements and related patterns may be considered as representative of chalcedony. The measurements representative of chalcedony are nos. 1-2, 5, 12, 14, 16-17.

Table S5. LA-ICP-MS data for sample PP7 (data provided in ppm if not differently specified). \*measurements used to calculate the average composition of chalcedony.

Spot no.	Sample PP7														
	1*	2*	3	4	5*	6*	7*	8	9	10	11	12	13*	14	15
Colour	Br	Br	Bl	Bl	Bl	Bl	Bl	Bl	Bl	Bl	Br	Br	Br	Br	Bl
SiO <sub>2</sub> (wt%)	99.43	99.43	99.13	99.20	99.44	99.41	99.22	99.14	99.27	99.13	98.95	98.81	99.31	99.31	99.34
Li	5.8	7.2	3.2	3.5	2.8	3.4	3.6	8.1	7.3	6.6	10.8	15.3	7.3	5.6	5.5
Be	14.5	13.8	18.3	12.5	22.4	29.7	30.5	45.5	58.7	46.8	75.6	59.7	67.8	66.4	25.6
B	78.6	82.0	83.1	76.5	68.5	77.1	96.5	80.2	83.0	80.7	89.3	70.7	88.3	90.7	106.5
Na	174.8	139.6	158.3	169.5	89.7	104.2	110.6	119.5	137.8	138.9	102.3	108.2	166.4	157.3	137.4
Mg	26.7	35.7	12.1	20.0	8.0	29.6	9.4	28.0	15.3	12.5	17.8	21.2	24.5	15.0	10.9
Al	15.7	15.2	57.0	106.1	46.9	43.9	64.8	263.6	105.7	106.1	386.7	889.7	47.1	31.7	26.0
K	162.8	128.2	110.6	142.4	87.7	105.1	131.2	311.5	142.4	153.1	271.5	470.4	146.8	136.1	125.2
Ca	-	-	812.0	833.5	-	-	542.4	712.2	-	704.2	770.1	743.0	-	-	-
Sc	7.9	7.2	7.5	6.4	7.2	7.1	6.6	5.5	6.7	5.2	5.9	6.0	6.5	6.3	4.6
Ti	4.8	5.9	-	-	4.8	-	9.6	-	-	-	-	8.2	-	-	-
V	4.4	1.0	1.7	3.1	2.0	2.6	2.0	3.9	2.6	1.8	2.0	1.7	2.1	2.7	-
Cr	-	-	-	2.3	-	2.3	2.8	-	-	-	5.1	-	-	4.6	-
Mn	466.7	429.5	580.8	490.4	563.1	575.2	288.6	448.1	880.2	900.0	863.9	835.1	808.4	846.4	645.3
Fe	29.9	29.1	46.6	128.5	-	14.1	33.7	44.5	54.5	56.0	80.7	116.6	24.3	44.0	25.1
Co	0.2	0.1	-	0.1	0.1	-	-	-	0.1	-	-	0.3	-	0.2	0.1
Ni	0.9	1.1	-	1.1	1.6	-	1.6	2.2	-	-	-	1.0	1.6	1.7	0.9
Cu	1.1	2.3	1.7	3.0	0.5	0.5	0.6	-	0.5	1.2	1.1	2.0	0.6	0.5	0.5
Zn	-	14.6	-	-	-	-	24.4	7.5	14.5	7.5	15.6	10.9	19.0	21.1	15.9
Ga	1.3	0.8	1.5	0.7	2.3	2.3	4.5	7.1	7.2	7.2	6.7	4.3	8.5	7.4	2.1
Ge	9.7	11.7	11.1	10.9	10.3	10.0	9.2	8.0	6.7	8.0	7.4	7.6	8.7	6.5	8.8
As	7.1	8.5	8.1	6.4	6.9	8.2	9.4	11.5	11.4	9.5	10.0	8.7	11.3	12.4	10.8
Rb	1.1	0.6	1.1	0.7	0.6	1.2	1.0	1.7	0.9	1.1	2.1	4.0	1.0	1.1	1.2
Sr	4.1	4.2	23.6	9.4	2.2	2.2	3.1	3.7	4.2	4.1	21.9	22.9	6.9	6.7	3.7
Y	-	0.01	0.02	-	-	-	0.02	0.06	0.03	0.01	0.03	0.04	-	0.02	-
Zr	-	0.2	-	0.4	-	-	0.2	-	-	-	-	-	-	-	0.2
Nb	-	-	-	-	-	-	-	-	-	0.11	-	-	-	-	0.05
Mo	1.17	0.85	-	-	0.73	0.80	-	0.56	-	-	-	-	-	-	-
Ag	6.9	4.1	11.9	5.4	-	-	-	-	-	-	-	-	-	-	-
Cd	-	0.53	0.67	-	0.83	-	0.71	-	-	0.73	-	-	-	-	-
In	-	-	-	0.01	-	-	-	-	-	-	-	-	-	0.01	-
Sb	1629	1677	1635	1637	1679	1682	2049	1887	1816	1789	1745	1673	1704	1698	1920
Cs	0.4	0.4	0.5	0.4	0.3	0.4	0.4	0.6	0.4	0.5	0.9	2.0	0.6	0.6	0.6

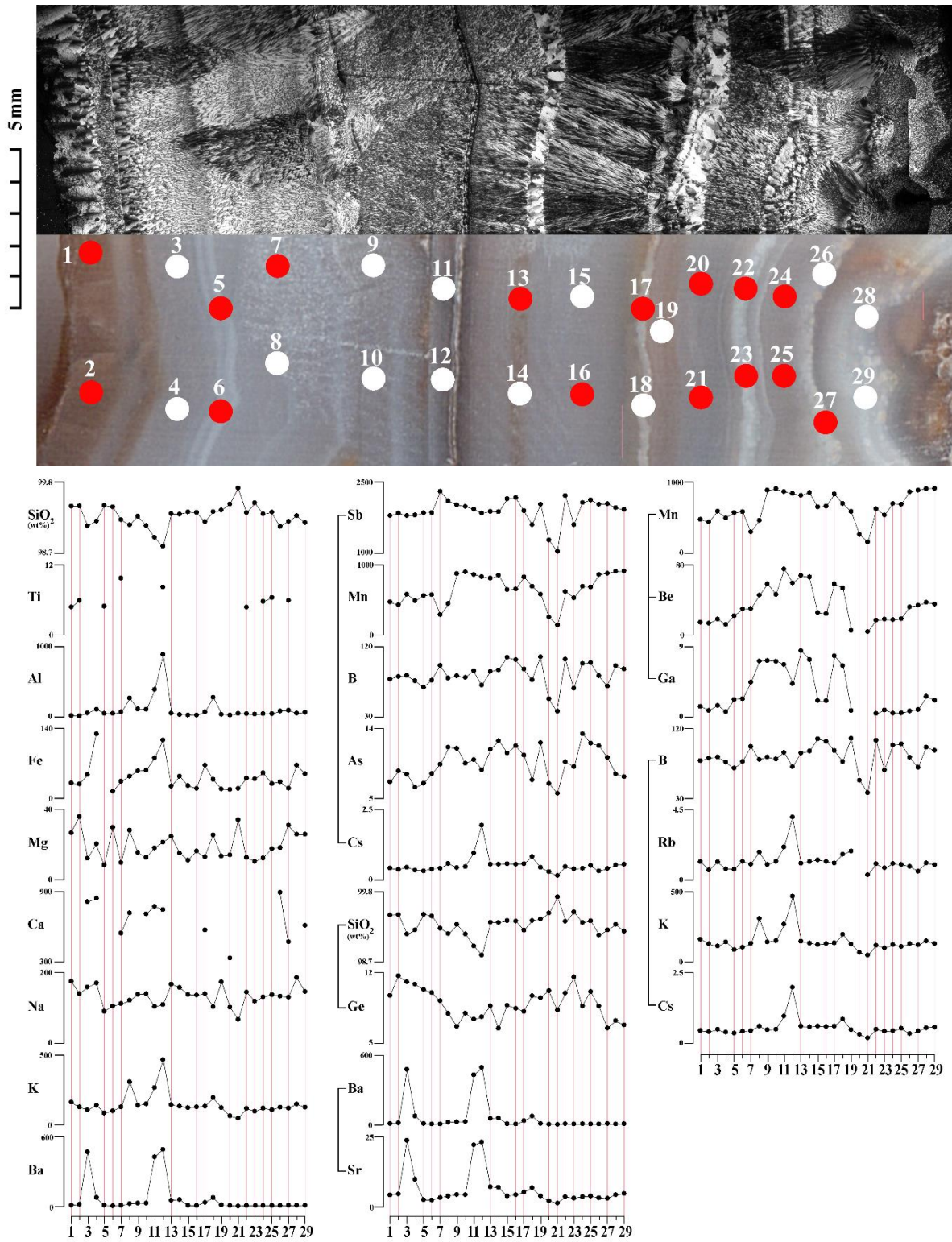
Ba	12	20	471	77	12	8	10	23	29	28	424	487	55	60	9
La	0.182	0.114	0.139	0.154	0.059	0.067	0.140	0.159	0.072	0.042	0.265	0.359	0.155	0.138	0.085
Ce	0.103	0.137	0.091	0.082	0.011	0.083	0.119	0.150	0.060	0.057	0.255	0.380	0.088	0.173	0.034
Pr	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nd	-	-	-	0.106	-	-	0.026	-	0.026	-	0.132	-	-	-	-
Sm	-	0.030	0.035	0.062	-	-	0.032	0.032	-	-	0.068	0.165	-	-	-
Eu	-	0.070	-	-	-	-	-	-	0.102	-	0.080	-	-	0.113	-
Gd	0.034	0.112	0.096	-	-	-	0.030	-	0.031	-	0.033	-	-	-	0.033
Tb	-	0.014	-	-	-	-	-	-	-	0.050	-	0.032	-	-	0.042
Dy	-	-	-	0.148	-	-	-	-	-	0.068	-	-	-	0.035	0.078
Ho	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Er	-	-	-	-	-	-	0.035	-	-	-	0.077	-	-	-	-
Tm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yb	0.058	-	-	-	-	-	0.050	-	0.027	-	-	0.026	-	-	0.029
Lu	-	-	-	-	-	0.004	-	0.004	-	-	-	0.012	-	-	-
Hf	-	-	-	-	0.040	0.019	0.019	-	-	-	-	-	0.024	-	-
Ta	-	-	0.071	-	-	-	-	-	-	-	-	-	-	-	-
W	-	-	0.020	0.076	-	-	-	-	0.054	-	-	-	-	-	-
Au	3.752	0.416	-	0.147	0.051	-	0.124	0.087	0.064	-	-	-	0.146	-	-
Tl	0.171	0.191	0.037	0.094	-	0.034	0.006	0.024	0.024	0.028	0.084	0.238	0.007	-	0.023
Pb	3.526	3.742	10.322	7.721	2.020	2.490	1.923	2.228	3.480	3.199	7.691	9.381	4.679	4.494	4.424
Bi	1.133	0.916	0.949	2.332	0.414	3.526	0.839	0.362	4.176	0.302	0.831	0.227	0.797	0.343	1.587
Th	-	0.004	-	0.037	-	-	-	-	-	-	-	0.004	0.009	-	-
U	-	-	0.007	-	-	0.020	-	0.014	0.011	-	0.004	0.007	-	-	0.008



(continued)

	Sample PP7													
Spot no.	16*	17*	18	19	20*	21*	22*	23*	24*	25*	26	27*	28	29
Colour	Bl	Gy	Gy	Bt	Gy	Gy	Bl	Bl	Gy	Gy	Gy	Gy	Bl	Bl
SiO <sub>2</sub> (wt%)	99.33	99.19	99.34	99.36	99.46	99.71	99.33	99.48	99.31	99.33	99.12	99.20	99.28	99.17
Li	4.2	6.8	8.0	2.9	4.6	3.4	3.8	3.3	2.5	1.4	3.9	2.6	4.2	3.9
Be	24.8	58.5	54.2	5.4	-	3.8	17.3	17.9	17.6	18.9	32.3	34.4	37.4	36.1
B	103.7	91.5	77.3	107.2	53.2	37.2	104.6	66.8	98.4	99.9	82.8	69.6	95.7	91.6
Na	135.5	138.9	102.0	173.8	101.1	65.4	144.0	117.8	130.6	136.3	132.1	129.4	185.2	144.8
Mg	16.0	12.7	25.3	13.3	13.8	33.9	12.4	10.2	12.1	17.5	18.0	30.8	25.6	25.6
Al	21.1	66.3	275.1	33.5	22.6	44.9	41.1	34.2	40.6	40.3	80.6	88.8	49.3	61.7
K	129.8	136.4	195.3	126.7	66.5	50.0	118.9	99.8	122.0	109.6	129.0	123.0	150.8	129.5
Ca	-	566.8	-	-	327.1	-	-	-	-	-	889.2	466.7	-	608.7
Sc	3.8	5.0	4.8	5.4	4.0	4.5	4.6	5.0	4.8	4.6	4.3	4.1	4.1	3.9
Ti	-	-	-	-	-	-	4.8	-	5.7	6.4	-	5.9	-	-
V	2.7	1.3	1.5	-	2.7	2.3	2.7	3.3	2.3	2.8	1.9	1.5	1.5	1.1
Cr	-	-	-	-	4.4	-	-	4.5	-	-	-	4.6	-	-
Mn	656.9	828.8	693.0	581.6	251.0	144.9	618.1	529.9	693.2	684.8	861.3	882.1	909.2	912.2
Fe	19.7	65.7	37.5	18.3	17.6	19.4	39.9	38.7	50.5	29.6	33.2	19.8	66.0	48.7
Co	-	-	-	-	0.1	0.2	0.2	-	-	0.1	0.2	-	-	0.2
Ni	-	1.3	-	1.2	-	1.1	-	1.5	1.2	-	0.9	-	1.6	1.2
Cu	-	-	0.5	1.1	0.4	1.0	0.5	0.6	1.0	0.4	1.0	0.5	1.8	1.6
Zn	17.1	17.0	20.3	21.9	20.5	12.8	16.5	-	21.8	14.9	-	25.8	28.1	16.1
Ga	2.1	7.8	6.6	0.8	-	-	0.4	0.9	0.5	0.5	0.7	0.9	2.6	2.1
Ge	8.5	8.2	9.7	9.5	10.2	8.3	10.0	11.5	8.7	10.1	8.7	6.5	7.2	6.8
As	11.7	10.5	7.4	12.1	6.9	5.7	9.7	9.1	13.3	12.1	11.8	10.2	8.1	7.8
Rb	1.1	1.0	1.6	1.8	-	0.3	1.0	0.7	1.0	0.9	0.8	0.5	1.0	0.9
Sr	4.1	5.1	6.5	3.6	1.9	1.1	3.4	2.9	3.5	3.6	3.0	2.8	4.2	4.5
Y	-	-	-	-	0.01	-	-	0.04	-	-	-	0.28	0.02	-
Zr	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
Nb	-	0.08	-	-	-	-	-	-	-	-	-	-	0.08	-
Mo	0.70	-	-	0.78	-	1.00	-	-	-	-	-	0.66	-	-
Ag	-	-	0.2	-	-	0.1	0.1	-	0.2	-	-	0.0	-	-
Cd	-	-	-	0.42	-	-	-	-	-	-	-	-	-	0.61
In	-	-	0.01	-	-	-	-	-	-	-	-	0.01	-	0.01

Sb	1940	1715	1477	1827	1214	1019	1972	1479	1853	1902	1826	1835	1768	1735
Cs	0.6	0.6	0.8	0.5	0.3	0.2	0.5	0.4	0.4	0.5	0.3	0.4	0.5	0.6
Ba	7	35	75	13	9	4	9	8	8	8	7	9	10	11
La	0.071	0.309	0.098	0.023	0.069	-	0.029	0.020	-	0.031	0.012	0.035	0.040	0.076
Ce	0.033	0.074	0.147	-	0.137	-	0.020	0.044	0.044	0.055	0.006	0.027	0.120	0.042
Pr	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nd	0.106	-	-	-	-	-	-	-	-	-	-	-	-	-
Sm	0.035	-	0.037	-	-	-	-	0.111	0.034	-	-	-	-	-
Eu	0.076	-	-	-	0.137	-	-	0.115	-	-	-	-	-	-
Gd	0.033	-	0.035	-	0.105	-	0.146	-	-	0.032	-	-	-	0.062
Tb	-	-	-	-	-	-	-	-	-	-	0.041	-	-	-
Dy	-	-	-	-	-	-	0.055	-	-	-	-	-	-	-
Ho	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Er	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tm	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yb	-	-	-	-	-	-	-	-	0.028	-	-	-	-	-
Lu	-	-	-	-	-	-	-	-	0.021	-	-	0.024	-	0.019
Hf	-	-	-	0.023	-	-	-	0.046	0.021	-	0.020	-	-	-
Ta	-	-	-	-	0.169	0.079	-	-	-	-	-	-	-	-
W	0.076	0.046	-	-	-	-	0.097	0.132	-	-	-	0.095	-	0.186
Au	-	0.064	-	-	-	0.088	0.238	0.178	0.993	-	0.203	0.111	0.480	0.261
Tl	0.013	0.027	0.018	0.064	-	0.013	-	0.035	-	0.042	-	0.018	0.031	0.031
Pb	4.496	5.174	4.506	5.081	3.455	2.426	4.782	3.651	4.771	4.270	4.261	4.367	5.629	5.184
Bi	0.235	0.684	0.482	1.139	0.695	0.461	0.935	1.784	5.211	0.744	1.655	0.800	2.589	2.883
Th	-	-	0.017	-	0.009	-	-	-	-	-	-	0.004	0.039	-
U	0.004	-	-	-	-	0.007	0.008	0.016	0.004	0.007	0.007	-	-	0.004

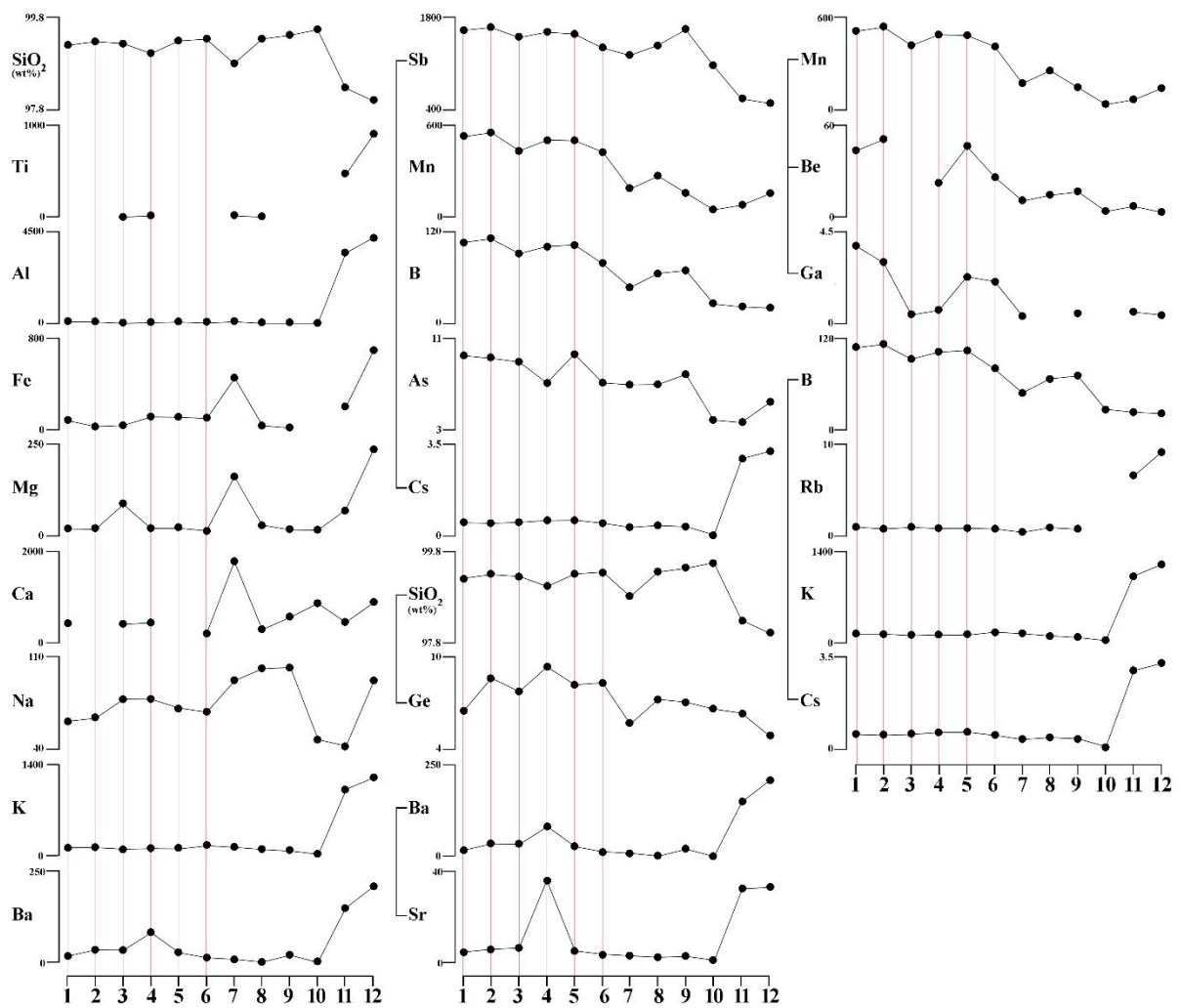
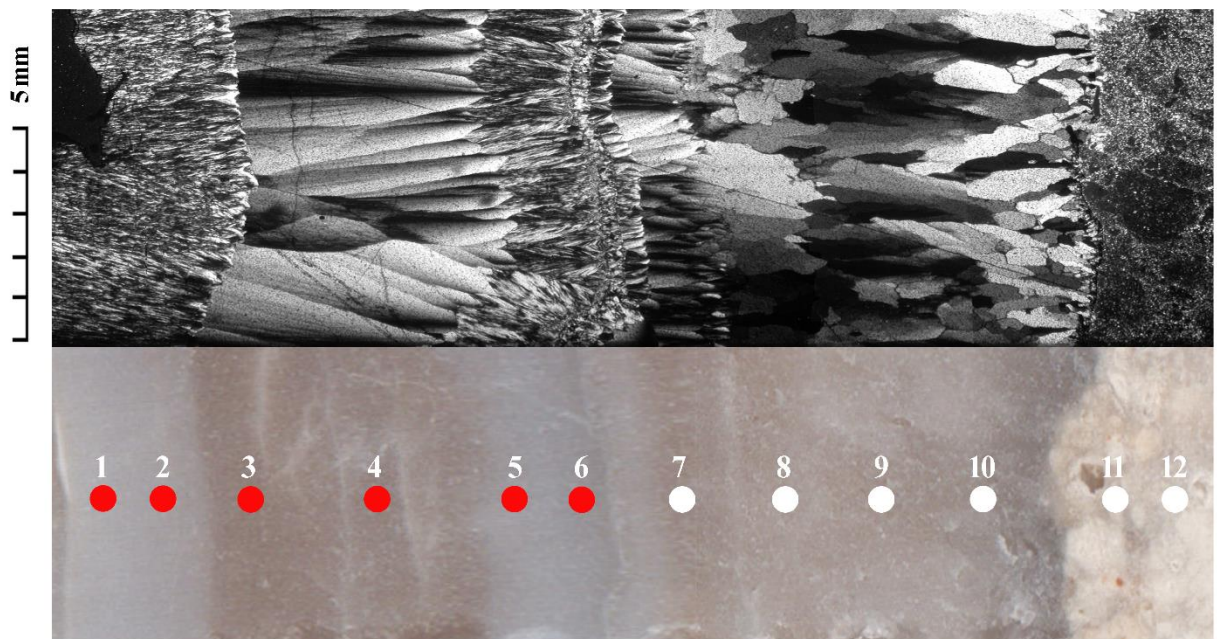


**Figure S5.** Sample PP7. All measurements and related patterns. The measurements representative of chalcedony are nos. 1-2, 5-7, 13, 16-17, 20-25, 27.

Table S6. LA-ICP-MS data for sample PP8 (data provided in ppm if not differently specified). \*measurements used to calculate the average composition of chalcedony.

Sample PP8												
Spot no.	1*	2*	3*	4*	5*	6*	7	8	9	10	11	12
Colour	Gy	Gy	Br	Br	Bl	Bl	Br	Br	Br	Br	Cw	Cw
SiO <sub>2</sub> (wt%)	99.20	99.29	99.24	99.03	99.30	99.34	98.81	99.34	99.42	99.54	98.28	98.00
Li	4.5	13.0	4.6	-	-	7.4	3.4	-	4.5	5.7	51.8	62.1
Be	43.7	51.2	-	22.2	46.5	26.0	10.3	14.3	16.3	3.4	6.8	2.8
B	107.7	112.3	92.8	102.3	104.4	79.7	47.9	66.6	70.5	26.0	22.4	20.5
Na	60.7	63.1	77.8	77.5	70.8	67.7	92.0	101.0	101.9	46.5	41.9	91.7
Mg	18.0	17.7	85.2	19.2	20.2	13.1	161.5	28.7	16.0	15.1	70.2	234.7
Al	75.3	72.5	14.8	38.1	69.6	30.0	83.8	15.7	13.3	7.6	3485.9	4233.5
K	132.9	131.7	108.8	118.2	115.5	161.2	138.7	103.0	81.7	34.0	1029.2	1207.6
Ca	423.9	-	401.4	433.3	-	193.6	1779.4	287.4	552.8	857.5	440.2	873.4
Sc	2.6	2.5	2.0	2.3	2.5	2.0	2.5	1.8	5.9	5.3	2.7	6.4
Ti	-	-	0.7	15.1	-	-	15.6	1.7	-	-	471.0	910.2
V	1.5	1.7	1.6	1.8	3.5	1.7	0.9	0.8	-	-	3.1	5.1
Cr	-	-	-	-	-	3.3	2.0	-	-	-	7.7	5.4
Mn	525.6	552.6	430.9	502.0	498.3	422.5	177.1	263.1	151.0	39.7	70.2	145.0
Fe	78.9	25.5	36.0	109.7	108.5	96.5	450.7	33.2	15.4	-	194.6	689.4
Co	-	-	-	-	0.1	0.0	0.3	-	-	0.1	-	0.4
Ni	0.6	1.1	0.8	1.7	1.4	1.3	2.5	1.7	1.2	0.8	1.2	2.1
Cu	0.8	1.0	2.9	2.1	3.3	9.9	18.5	1.7	1.0	0.9	2.6	11.7
Zn	11.2	11.8	6.6	9.4	13.5	10.2	31.0	3.8	13.2	10.5	4.3	20.0
Ga	3.9	3.0	0.5	0.7	2.4	2.1	0.4	-	0.5	-	0.6	0.4
Ge	6.5	8.6	7.8	9.4	8.2	8.3	5.6	7.2	7.1	6.6	6.3	4.9
As	9.5	9.3	9.0	7.2	9.7	7.1	7.0	7.0	7.9	3.9	3.6	5.4
Rb	1.0	0.8	0.9	0.8	0.8	0.7	0.4	0.9	0.7	-	6.6	9.3
Sr	3.9	5.0	5.6	35.2	4.3	2.8	2.3	1.6	1.9	0.3	31.5	32.3
Y	-	-	-	-	-	-	0.02	0.04	0.10	0.02	1.05	2.39
Zr	0.1	0.1	0.0	0.1	0.1	-	0.1	-	-	-	10.3	20.5
Nb	0.02	0.25	0.01	-	0.01	-	-	-	-	-	1.46	3.25
Mo	-	-	-	-	0.48	2.04	0.22	0.04	-	-	0.11	-
Ag	0.1	-	-	0.1	0.1	-	0.3	-	-	-	1.7	5.7
Cd	-	-	-	-	-	-	-	0.12	-	-	-	-
In	-	0.02	-	0.03	0.01	0.00	0.02	-	-	0.02	-	-
Sb	1613	1658	1504	1585	1555	1340	1224	1379	1625	1067	552	483
Cs	0.5	0.5	0.5	0.6	0.6	0.5	0.3	0.4	0.4	0.1	3.0	3.3

Ba	17	34	33	81	26	13	8	1	19	0	149	208
La	0.518	0.496	0.257	0.429	0.414	0.435	0.239	0.164	0.274	0.089	4.393	4.405
Ce	0.600	0.631	0.150	0.644	0.346	0.304	0.379	0.448	0.427	0.056	8.645	8.032
Pr	-	0.021	-	0.013	0.011	0.012	0.014	0.032	-	-	0.778	-
Nd	0.139	0.161	0.041	0.075	0.162	-	-	0.033	0.151	-	2.938	3.193
Sm	0.051	-	-	-	-	-	-	-	-	-	0.326	0.409
Eu	0.086	0.153	0.083	0.128	0.047	0.073	-	-	-	-	0.078	0.198
Gd	-	-	0.023	0.021	0.070	-	0.068	-	0.032	-	0.244	0.220
Tb	0.004	-	-	0.010	0.004	-	-	-	-	-	0.043	-
Dy	0.029	-	0.029	-	-	0.016	-	0.051	-	-	0.117	0.416
Ho	-	0.008	-	-	0.008	-	-	-	-	-	0.054	-
Er	-	-	-	-	-	-	-	-	-	-	-	0.264
Tm	-	-	-	-	-	-	-	-	-	-	0.024	-
Yb	-	-	-	-	0.093	-	-	-	0.028	0.054	0.223	0.382
Lu	-	-	-	0.004	0.020	-	-	-	0.013	-	0.049	0.055
Hf	-	0.041	5.600	-	-	7.217	-	2.443	0.022	0.022	8.093	0.631
Ta	-	-	0.007	-	-	0.004	0.005	-	-	-	0.080	0.171
W	-	-	-	0.047	-	-	-	-	-	-	0.374	0.816
Au	-	-	-	-	-	-	0.020	-	0.162	0.092	-	-
Tl	0.020	-	0.108	0.045	-	-	-	-	-	-	0.078	0.121
Pb	4.355	4.023	4.943	5.932	4.025	3.792	1.352	1.171	0.733	0.937	3.792	7.840
Bi	0.021	0.026	0.059	0.053	0.172	0.025	0.255	47.399	0.064	0.053	-	-
Th	-	-	-	0.008	0.013	0.005	-	-	-	-	0.889	1.623
U	0.029	0.035	0.008	0.007	-	0.004	0.177	-	0.004	0.004	0.190	0.509



**Figure S6.** Sample PP8. All measurements and related patterns. The measurements representative of chalcedony are nos. 1-6.







Table S8. Correlation coefficients – PP2.

	SiO2	Li	Be	B	Na	Mg	Al	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Rb	Sr	Y	Zr	Nb	Mo	Ag	Cd	In	Sb	Cs	Ba		
SiO2	1																																			
Li	-0.066	1																																		
Be	-0.185	-0.066	1																																	
B	-0.465	-0.027	-0.185	1																																
Na	-0.839	0.018	-0.018	-0.018	1																															
Mg	-0.389	-0.109	-0.038	-0.038	-0.038	1																														
Al	-0.327	-0.047	-0.019	-0.019	-0.019	-0.019	1																													
K	-0.726	-0.051	-0.051	-0.051	-0.051	-0.051	-0.051	1																												
Ca	-0.135	-0.147	-0.308	-0.364	-0.194	-0.513	-0.425	-0.092	1																											
Sc	-0.029	-0.129	-0.058	-0.138	-0.015	-0.454	-0.284	-0.028	-0.242	1																										
Ti	-0.102	-0.109	-0.186	-0.337	-0.039	-0.399	-0.678	-0.021	-0.100	-0.082	1																									
V	-0.485	-0.419	-0.362	-0.257	-0.471	-0.217	-0.070	-0.484	-0.006	-0.382	-0.021	1																								
Cr	-0.008	-0.297	-0.732	-0.070	-0.400	-0.013	-0.241	-0.289	-0.289	-0.190	-0.302	-0.111	1																							
Mn	-0.287	-0.287	-0.287	-0.287	-0.287	-0.287	-0.287	-0.287	-0.287	-0.287	-0.287	-0.287	-0.287	1																						
Fe	-0.160	-0.182	-0.426	-0.388	-0.214	-0.244	-0.352	-0.327	-0.113	-0.365	-0.073	-0.289	-0.026	-0.480	1																					
Co	-0.081	-0.117	-0.372	-0.358	-0.519	-0.473	-0.208	-0.355	-0.059	-0.134	-0.080	-0.146	-0.056	-0.454	-0.760	1																				
Ni	-0.121	-0.069	-0.542	-0.423	-0.201	-0.118	-0.654	-0.194	-0.126	-0.043	-0.157	-0.127	-0.059	-0.403	-0.004	-0.563	1																			
Cu	-0.288	-0.317	-0.036	-0.167	-0.455	-0.064	-0.688	-0.359	-0.339	-0.445	-0.008	-0.243	-0.167	-0.563	-0.167	-0.563	-0.167	1																		
Zn	-0.354	-0.409	-0.383	-0.173	-0.210	-0.377	-0.515	-0.158	-0.072	-0.508	-0.375	-0.446	-0.072	-0.487	-0.072	-0.487	-0.072	-0.487	1																	
Ga	-0.595	-0.080	-0.985	-0.561	-0.083	-0.477	-0.276	-0.027	-0.188	-0.212	-0.115	-0.701	-0.164	-0.387	-0.505	-0.013	-0.017	-0.118	-0.572	0.031	0.009	0.227	-0.211	-0.112	-0.054	-0.054	-0.054	-0.054	-0.054	-0.054	-0.054	-0.054	-0.054	-0.054	-0.054	
Ge	-0.159	-0.255	-0.045	-0.133	-0.335	-0.032	-0.247	-0.016	-0.375	-0.116	-0.475	-0.110	-0.094	-0.445	-0.110	-0.473	-0.221	-0.118	-0.054	0.001	-0.498	-0.241	-0.221	-0.370	-0.021	-0.157	-0.323	-0.267	-0.235	-0.484	-0.210	-0.498	-0.073	-0.286	-0.246	
As	-0.923	-0.327	-0.827	-0.783	-0.925	-0.589	-0.389	-0.740	-0.290	-0.033	-0.157	-0.486	-0.005	-0.427	-0.286	-0.480	-0.079	-0.477	-0.213	-0.157	-0.498	-0.241	-0.221	-0.370	-0.021	-0.157	-0.323	-0.267	-0.235	-0.484	-0.210	-0.498	-0.073	-0.286	-0.246	
Rb	-0.465	-0.402	-0.037	-0.792	-0.625	-0.226	-0.639	-0.801	-0.479	-0.390	-0.500	-0.493	-0.707	-0.309	-0.103	-0.290	-0.009	-0.035	-0.241	-0.116	-0.498	-0.241	-0.221	-0.370	-0.021	-0.157	-0.323	-0.267	-0.235	-0.484	-0.210	-0.498	-0.073	-0.286	-0.246	
Sr	-0.449	-0.481	-0.269	-0.212	-0.279	-0.490	-0.224	-0.075	-0.283	-0.254	-0.245	-0.122	-0.231	-0.172	-0.309	-0.347	-0.328	-0.333	-0.239	-0.267	-0.177	-0.041	-0.132	-0.396	-0.002	-0.053	-0.276	-0.178	-0.038	-0.182	-0.178	-0.038	-0.182	-0.178		
Y	-0.612	-0.306	-0.495	-0.363	-0.317	-0.547	-0.298	-0.166	-0.349	-0.149	-0.405	-0.027	-0.227	-0.911	-0.833	-0.204	-0.460	-0.321	-0.538	-0.370	-0.036	-0.049	-0.545	-0.140	-0.349	-0.249	-0.249	-0.249	-0.249	-0.249	-0.249	-0.249	-0.249	-0.249		
Zr	-0.270	-0.601	-0.284	-0.058	-0.545	-0.262	-0.600	-0.265	-0.200	-0.648	-0.225	-0.033	-0.128	-0.211	-0.256	-0.667	-0.850	-0.112	-0.170	-0.021	-0.500	-0.056	-0.140	-0.349	-0.249	-0.249	-0.249	-0.249	-0.249	-0.249	-0.249	-0.249	-0.249	-0.249		
Nb	-0.393	-0.103	-0.293	-0.457	-0.131	-0.308	-0.104	-0.306	-0.352	-0.082	-0.334	-0.475	-0.405	-0.344	-0.312	-0.074	-0.016	-0.416	-0.374	-0.484	-0.156	-0.458	-0.396	-0.349	-0.349	-0.349	-0.349	-0.349	-0.349	-0.349	-0.349	-0.349	-0.349	-0.349	-0.349	
Mo	-0.190	-0.018	-0.571	-0.161	-0.182	-0.154	-0.474	-0.484	-0.311	-0.185	-0.402	-0.581	-0.113	-0.113	-0.113	-0.113	-0.113	-0.113	-0.113	-0.113	-0.113	-0.113	-0.113	-0.113	-0.113	-0.113	-0.113	-0.113	-0.113	-0.113	-0.113	-0.113	-0.113	-0.113	-0.113	
Ag	-0.357	-0.050	-0.025	-0.751	-0.396	-0.526	-0.178	-0.751	-0.300	-0.239	-0.147	-0.583	-0.580	-0.086	-0.385	-0.501	-0.205	-0.349	-0.011	-0.003	-0.442	-0.862	-0.720	-0.125	-0.357	-0.545	-0.133	-0.545	-0.133	-0.545	-0.133	-0.545	-0.133	-0.545	-0.133	
Cd	-0.367	-0.050	-0.025	-0.751	-0.396	-0.526	-0.178	-0.751	-0.300	-0.239	-0.147	-0.583	-0.580	-0.086	-0.385	-0.501	-0.205	-0.349	-0.011	-0.003	-0.442	-0.862	-0.720	-0.125	-0.357	-0.545	-0.133	-0.545	-0.133	-0.545	-0.133	-0.545	-0.133	-0.545	-0.133	
In	-0.033	-0.003	-0.364	-0.485	-0.029	-0.605	-0.318	-0.051	-0.984	-0.209	-0.936	-0.289	-0.546	-0.317	-0.158	-0.088	-0.436	-0.691	-0.265	-0.609	-0.441	-0.563	-0.308	-0.275	-0.098	-0.294	-0.345	-0.131	-0.294	-0.345	-0.131	-0.294	-0.345	-0.131	-0.294	
Sb	-0.890	-0.495	-0.291	-0.846	-0.851	-0.417	-0.367	-0.892	-0.004	-0.900	-0.166	-0.153	-0.873	-0.136	-0.348	-0.181	-0.403	-0.282	-0.401	-0.294	-0.952	-0.670	-0.462	-0.224	-0.400	-0.244	-0.539	-0.131	-0.244	-0.539	-0.131	-0.244	-0.539	-0.131	-0.244	
Cs	-0.361	-0.144	-0.172	-0.789	-0.407	-0.551	-0.356	-0.634	-0.699	-0.305	-0.714	-0.175	-0.790	-0.388	-0.174	-0.260	-0.402	-0.135	-0.148	-0.353	-0.753	-0.913	-0.766	-0.244	-0.045	-0.648	-0.763	-0.763	-0.763	-0.763	-0.763	-0.763	-0.763	-0.763		
Ba	-0.177	-0.117	-0.613	-0.007	-0.163	-0.489	-0.209	-0.468	-0.066	-0.357	-0.077	-0.551	-0.011	-0.512	-0.605	-0.043	-0.218	-0.364	-0.575	-0.666	-0.210	-0.372	-0.368	-0.699	-0.337	-0.897	-0.360	-0.086	-0.258	-0.379	-0.117	-0.379	-0.117	-0.379		

	SiO2	Li	Be	B	Na	Mg	Al	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Rb	Sr	Y	Zr	Nb	Mo	Ag	Cd	In	Sb	Cs	Ba
SiO2	1	-0.06	-0.48	-0.04	-0.39	-0.57	-0.23	-0.72	-0.15	-0.76	-0.20	-0.08	-0.00	-0.00	-0.49	0.52	1.21	-0.28	-0.34	-0.95	-0.95	-0.45	-0.41	-0.12	0.70	-	-	1.90	-0.37	-0.03	-0.80	-0.31	-0.77	
N	0.06	1	0.48	0.04	0.39	0.57	0.23	0.72	0.15	0.76	0.20	0.08	0.00	0.00	0.49	-0.52	-1.21	0.28	0.34	0.95	0.95	0.45	0.41	0.12	-0.70	-	-	-1.90	0.37	0.03	0.80	0.31	0.77	
Li	-0.06	1	-0.13	-0.06	-0.32	-0.47	-0.18	-0.49	-0.17	-0.50	-0.10	-0.27	-	-	-0.27	-0.45	-0.74	0.19	-0.17	-0.80	-0.39	0.27	0.40	-0.02	-0.30	-0.60	-	-	-0.18	0.00	0.00	0.43	-0.14	
N	0.06	0.13	1	0.06	0.32	0.47	0.18	0.49	0.17	0.50	0.10	0.27	-	-	0.27	0.45	0.74	-0.19	0.17	0.80	0.39	-0.27	-0.40	0.02	0.30	0.60	-	-	0.18	0.00	0.00	-0.43	0.14	
Be	-0.48	-0.13	1	0.30	-0.04	-0.50	-0.29	-0.69	-0.30	0.88	-0.18	-0.12	-	-	-0.04	-0.09	-0.37	-0.52	0.06	-0.83	-0.95	-0.45	-0.27	-0.07	-0.39	-0.49	-	-	-0.31	0.02	-0.46	0.29	-0.17	
N	0.13	0.48	0.13	1	0.04	0.50	0.29	0.69	0.30	0.88	0.18	0.12	-	-	0.04	0.09	0.37	0.52	-0.06	0.83	0.95	0.45	0.27	0.07	0.39	0.49	-	-	0.31	-0.02	0.46	-0.29	0.17	
B	-0.04	0.06	0.30	1	0.60	-0.75	-0.29	-0.56	-0.64	2.33	-0.37	0.70	-	-	-0.08	-0.11	-0.88	-0.43	-0.16	-1.13	-0.51	-0.84	0.82	0.79	-0.47	-0.63	-	-	-0.16	0.71	-0.85	0.86	-0.07	
N	0.04	0.06	0.30	0.30	1	0.75	0.29	0.56	0.64	2.33	0.37	0.70	-	-	0.08	0.11	0.88	0.43	0.16	1.13	0.51	0.84	-0.82	-0.79	0.47	0.63	-	-	0.16	-0.71	0.85	-0.86	0.07	
Na	-0.39	0.57	-0.29	0.29	1	0.80	-0.27	-0.72	-0.49	0.71	0.31	0.42	-	-	0.05	-0.03	-0.19	0.40	0.00	-0.87	-0.22	0.78	0.65	0.30	-0.37	-0.45	-	-	-0.12	0.36	0.29	0.87	0.02	
N	0.39	0.57	0.29	0.29	0.80	1	0.27	0.72	0.49	0.71	0.31	0.42	-	-	0.05	0.03	0.19	-0.40	0.00	0.87	0.22	-0.78	-0.65	-0.30	0.37	0.45	-	-	0.12	-0.36	-0.29	-0.87	-0.02	
Mg	-0.57	-0.18	-0.29	-0.29	0.27	1	0.89	-0.60	0.61	0.39	0.13	0.39	-	-	-0.70	0.37	0.76	1.10	0.64	-0.76	-0.77	-0.85	-0.65	0.13	-0.47	-0.26	-	-	-0.15	-0.56	0.05	-0.17	-0.51	
N	0.57	0.18	0.29	0.29	0.27	0.89	1	0.60	0.61	0.39	0.13	0.39	-	-	0.70	0.37	0.76	1.10	0.64	0.76	0.77	0.85	0.65	-0.13	0.47	0.26	-	-	0.15	0.56	0.05	0.17	0.51	
Al	-0.25	-0.09	-0.29	-0.29	0.27	0.89	1	-0.36	0.42	0.29	0.67	-0.24	-	-	-0.50	-0.20	0.28	0.65	0.78	0.51	0.76	0.35	-0.59	-0.38	-0.28	0.00	-	-	-0.47	-0.18	-0.18	-0.36	-0.55	
N	0.25	0.09	0.29	0.29	0.27	0.89	0.36	1	0.42	0.29	0.67	0.24	-	-	0.50	0.20	0.28	0.65	0.78	0.51	0.76	0.35	0.59	0.38	0.28	0.00	-	-	0.47	0.18	0.18	0.36	0.55	
K	-0.10	0.49	-0.29	-0.29	0.27	0.89	0.60	1	0.92	0.82	-0.01	-0.78	-	-	-0.77	-0.35	-1.43	-1.77	0.15	0.49	0.16	0.70	0.82	0.63	-0.16	-0.26	-	-	-0.14	0.48	0.75	-0.13	0.89	
N	0.10	0.49	0.29	0.29	0.27	0.89	0.60	0.92	1	0.01	0.78	0.77	-	-	0.77	0.35	1.43	1.77	-0.15	-0.49	-0.16	-0.70	-0.82	-0.63	0.16	0.26	-	-	0.14	-0.48	-0.75	0.13	-0.89	
Ca	-0.76	0.82	-0.29	-0.29	0.27	0.89	0.60	0.92	1	0.82	-0.19	-0.82	-	-	-0.98	-0.18	-1.34	-1.44	-0.45	-0.98	-0.42	-0.78	-0.39	-0.31	-0.49	-0.20	-	-	-0.31	-0.07	0.94	0.04	-0.69	
N	0.76	0.82	0.29	0.29	0.27	0.89	0.60	0.92	0.82	1	0.19	0.82	-	-	0.98	0.18	1.34	1.44	0.45	0.98	0.42	0.78	0.39	0.31	0.49	0.20	-	-	0.31	0.07	-0.94	-0.04	0.69	
Sc	-0.58	0.28	0.13	0.13	0.27	0.89	0.60	0.92	0.82	1	0.87	-0.79	-	-	-0.21	-0.79	0.80	0.93	0.37	0.30	0.68	0.91	0.66	0.45	0.50	-0.79	-	-	-0.16	0.14	0.68	0.91	0.15	0.57
N	0.58	0.28	0.13	0.13	0.27	0.89	0.60	0.92	0.82	0.87	1	0.79	-	-	0.21	0.79	-0.80	-0.93	-0.37	-0.30	-0.68	-0.91	-0.66	-0.45	-0.50	0.79	-	-	0.16	-0.14	-0.68	-0.91	-0.15	
Ti	-0.10	0.49	-0.29	-0.29	0.27	0.89	0.60	0.92	0.82	0.87	1	-0.04	-	-	-0.06	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-	-	-0.08	-0.08	-0.08	-0.08	-0.08	
N	0.10	0.49	0.29	0.29	0.27	0.89	0.60	0.92	0.82	0.87	0.04	0.04	-	-	0.06	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	-	-	0.08	0.08	0.08	0.08	0.08	
V	-0.08	0.29	-0.29	-0.29	0.27	0.89	0.60	0.92	0.82	0.87	0.04	0.04	-	-	-0.06	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-	-	-0.08	-0.08	-0.08	-0.08	-0.08	
N	0.08	0.29	0.29	0.29	0.27	0.89	0.60	0.92	0.82	0.87	0.04	0.04	0.06	-	0.06	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	-	-	0.08	0.08	0.08	0.08	0.08	
Cr	-0.89	0.58	-0.29	-0.29	0.27	0.89	0.60	0.92	0.82	0.87	0.04	0.04	-	-	-0.06	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-	-	-0.08	-0.08	-0.08	-0.08	-0.08	
N	0.89	0.58	0.29	0.29	0.27	0.89	0.60	0.92	0.82	0.87	0.04	0.04	0.06	-	0.06	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	-	-	0.08	0.08	0.08	0.08	0.08	
Mn	-0.80	0.29	-0.29	-0.29	0.27	0.89	0.60	0.92	0.82	0.87	0.04	0.04	-	-	-0.06	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-	-	-0.08	-0.08	-0.08	-0.08	-0.08	
N	0.80	0.29	0.29	0.29	0.27	0.89	0.60	0.92	0.82	0.87	0.04	0.04	0.06	-	0.06	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	-	-	0.08	0.08	0.08	0.08	0.08	
Fe	-0.49	0.28	-0.29	-0.29	0.27	0.89	0.60	0.92	0.82	0.87	0.04	0.04	-	-	-0.06	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-	-	-0.08	-0.08	-0.08	-0.08	-0.08	
N	0.49	0.28	0.29	0.29	0.27	0.89	0.60	0.92	0.82	0.87	0.04	0.04	0.06	-	0.06	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	-	-	0.08	0.08	0.08	0.08	0.08	
Co	-0.58	0.28	-0.29	-0.29	0.27	0.89	0.60	0.92	0.82	0.87	0.04	0.04	-	-	-0.06	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-	-	-0.08	-0.08	-0.08	-0.08	-0.08	
N	0.58	0.28	0.29	0.29	0.27	0.89	0.60	0.92	0.82	0.87	0.04	0.04	0.06	-	0.06	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	-	-	0.08	0.08	0.08	0.08	0.08	
Ni	-0.12	0.49	-0.29	-0.29	0.27	0.89	0.60	0.92	0.82	0.87	0.04	0.04	-	-	-0.06	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-	-	-0.08	-0.08	-0.08	-0.08	-0.08	
N	0.12	0.49	0.29	0.29	0.27	0.89	0.60	0.92	0.82	0.87	0.04	0.04	0.06	-	0.06	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	-	-	0.08	0.08	0.08	0.08	0.08	
Cu	-0.28	0.29	-0.29	-0.29	0.27	0.89	0.60	0.92	0.82	0.87	0.04	0.04	-	-	-0.06	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-	-	-0.08	-0.08	-0.08	-0.08	-0.08	
N	0.28	0.29	0.29	0.29	0.27	0.89	0.60	0.92	0.82	0.87	0.04	0.04	0.06	-	0.06	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	-	-	0.08	0.08	0.08	0.08	0.08	
Zn	-0.34	0.28	-0.29	-0.29	0.27	0.89	0.60	0.92	0.82	0.87	0.04	0.04	-	-	-0.06	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-	-	-0.08	-0.08	-0.08	-0.08		



		SiO2	Li	Be	B	Na	Mg	Al	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Sb	Sr	Y	Zr	Nb	Mo	Cd	In	Sb	Cs	Ba		
SiO2	Pearson correlation Sig. (2-tailed) N	1																																		
Li	Pearson correlation Sig. (2-tailed) N	-.632 .126 7	1																																	
Be	Pearson correlation Sig. (2-tailed) N	-.557 .126 7	-.040 .126 7	1																																
B	Pearson correlation Sig. (2-tailed) N	-.099 .932 7	-.040 .932 7	-.099 .932 7	1																															
Na	Pearson correlation Sig. (2-tailed) N	-.242 .486 7	.318 .486 7	.151 .486 7	.708 .486 7	1																														
Mg	Pearson correlation Sig. (2-tailed) N	-.731 .790 7	.125 .790 7	-.425 .790 7	.082 .790 7	.010 .790 7	1																													
Al	Pearson correlation Sig. (2-tailed) N	-.673 .988 7	.747 .988 7	.409 .988 7	-.145 .988 7	-.107 .988 7	.497 .988 7	1																												
K	Pearson correlation Sig. (2-tailed) N	-.258 .576 7	.487 .576 7	.152 .576 7	.431 .576 7	.847 .576 7	.075 .576 7	-.006 .576 7	1																											
Ca	Pearson correlation Sig. (2-tailed) N	-.129 .782 7	-.076 .782 7	-.221 .782 7	.035 .782 7	-.007 .782 7	.006 .782 7	-.397 .782 7	-.206 .782 7	1																										
Sc	Pearson correlation Sig. (2-tailed) N	-.498 .252 7	.172 .252 7	-.492 .252 7	-.384 .252 7	-.176 .252 7	.819 .252 7	.507 .252 7	.059 .252 7	-.184 .252 7	1																									
Ti	Pearson correlation Sig. (2-tailed) N	-.698 .081 7	.392 .081 7	.282 .081 7	.241 .081 7	.000 .081 7	.377 .081 7	.617 .081 7	-.265 .081 7	-.140 .081 7	.004 .081 7	1																								
V	Pearson correlation Sig. (2-tailed) N	-.151 .747 7	-.529 .747 7	-.691 .747 7	.406 .747 7	.329 .747 7	.293 .747 7	-.539 .747 7	.041 .747 7	.041 .747 7	-.033 .747 7	.082 .747 7	1																							
Cr	Pearson correlation Sig. (2-tailed) N	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	1																						
Mn	Pearson correlation Sig. (2-tailed) N	-.231 .617 7	.746 .617 7	.888 .617 7	.300 .617 7	.380 .617 7	-.357 .617 7	.452 .617 7	.291 .617 7	-.189 .617 7	-.464 .617 7	.003 .617 7	-.485 .617 7	1																						
Fe	Pearson correlation Sig. (2-tailed) N	-.723 .066 7	.464 .066 7	.368 .066 7	.511 .066 7	.106 .066 7	.405 .066 7	-.656 .066 7	-.136 .066 7	-.139 .066 7	.003 .066 7	.985 .066 7	.043 .066 7	.532 .066 7	1																					
Co	Pearson correlation Sig. (2-tailed) N	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	1																					
Ni	Pearson correlation Sig. (2-tailed) N	-.439 .325 7	.085 .325 7	-.766 .325 7	-.398 .325 7	.136 .325 7	.456 .325 7	-.017 .325 7	.255 .325 7	-.183 .325 7	.635 .325 7	-.461 .325 7	-.466 .325 7	-.198 .325 7	-.466 .325 7	1																				
Cu	Pearson correlation Sig. (2-tailed) N	-.555 .196 7	.850 .196 7	.439 .196 7	.301 .196 7	.338 .196 7	.528 .196 7	.457 .196 7	-.358 .196 7	-.461 .196 7	-.333 .196 7	-.406 .196 7	-.427 .196 7	-.095 .196 7	-.095 .196 7	-.466 .196 7	1																			
Zn	Pearson correlation Sig. (2-tailed) N	-.412 .359 7	-.093 .359 7	-.384 .359 7	.558 .359 7	.324 .359 7	.479 .359 7	.065 .359 7	-.052 .359 7	-.052 .359 7	-.344 .359 7	-.388 .359 7	-.389 .359 7	-.659 .359 7	-.659 .359 7	-.466 .359 7	-.466 .359 7	1																		
Ga	Pearson correlation Sig. (2-tailed) N	-.052 .911 7	.696 .911 7	-.079 .911 7	-.042 .911 7	-.042 .911 7	.519 .911 7	.025 .911 7	-.204 .911 7	-.373 .911 7	-.319 .911 7	-.165 .911 7	-.885 .911 7	-.339 .911 7	-.339 .911 7	-.616 .911 7	-.616 .911 7	-.616 .911 7	1																	
Ge	Pearson correlation Sig. (2-tailed) N	.645 .118 7	-.024 .118 7	.236 .118 7	.579 .118 7	.720 .118 7	.735 .118 7	.022 .118 7	.879 .118 7	.913 .118 7	-.777 .118 7	-.089 .118 7	-.226 .118 7	-.117 .118 7	-.088 .118 7	-.123 .118 7	-.123 .118 7	-.123 .118 7	-.123 .118 7	1																
As	Pearson correlation Sig. (2-tailed) N	-.571 .181 7	.024 .181 7	.350 .181 7	.784 .181 7	.053 .181 7	.407 .181 7	-.357 .181 7	.231 .181 7	.614 .181 7	.987 .181 7	-.198 .181 7	-.575 .181 7	-.223 .181 7	-.104 .181 7	-.793 .181 7	-.793 .181 7	-.793 .181 7	-.793 .181 7	-.793 .181 7	1															
Rb	Pearson correlation Sig. (2-tailed) N	-.070 .415 7	.826 .415 7	.004 .415 7	.252 .415 7	.586 .415 7	.781 .415 7	.073 .415 7	.697 .415 7	.233 .415 7	.895 .415 7	.253 .415 7	.177 .415 7	-.180 .415 7	-.180 .415 7	-.180 .415 7	-.180 .415 7	-.180 .415 7	-.180 .415 7	-.180 .415 7	1															
Sr	Pearson correlation Sig. (2-tailed) N	-.468 .289 7	.052 .289 7	-.315 .289 7	-.149 .289 7	.749 .289 7	.127 .289 7	.207 .289 7	.463 .289 7	.122 .289 7	.126 .289 7	.246 .289 7	.761 .289 7	-.700 .289 7	-.700 .289 7	-.700 .289 7	-.700 .289 7	-.700 .289 7	-.700 .289 7	-.700 .289 7	1															
Y	Pearson correlation Sig. (2-tailed) N	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	1														
Zr	Pearson correlation Sig. (2-tailed) N	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	-.7	1													
Nb	Pearson correlation Sig. (2-tailed) N	-.738 .058 7	.576 .058 7	.426 .058 7	.197 .058 7	.010 .058 7	.414 .058 7	.799 .058 7	-.154 .058 7	-.225 .058 7	.115 .058 7	.960 .058 7	-.147 .058 7	-.564 .058 7	-.564 .058 7	-.564 .058 7	-.564 .058 7	-.564 .058 7	-.564 .058 7	-.564 .058 7	-.564 .058 7	1														
Mo	Pearson correlation Sig. (2-tailed) N	.601 .897 7	-.291 .897 7	-.673 .897 7	-.209 .897 7	-.015 .897 7	.383 .897 7	-.312 .897 7	.325 .897 7	-.387 .897 7	.185 .897 7	.096 .897 7	.476 .897 7	-.755 .897 7	-.755 .897 7	-.755 .897 7	-.755 .897 7	-.755 .897 7	-.755 .897 7	-.755 .897 7	-.755 .897 7	1														
As	Pearson correlation Sig. (2-tailed) N	-.961 .190 7	.928 .190 7	.427 .190 7	.098 .190 7	.660 .190 7	.683 .190 7	.324 .190 7	-.190 .190 7	-.190 .190 7	-.190 .190 7	-.190 .190 7	-.190 .190 7	-.190 .190 7	-.190 .190 7	-.190 .190 7	-.190 .190 7	-.190 .190 7	-.190 .190 7	-.190 .190 7	-.190 .190 7	1														
Cd	Pearson correlation Sig. (2-tailed) N	-.023 .961 7	-.162 .961 7	-.290 .961 7	.606 .961 7	.683 .961 7	.324 .961 7	-.153 .961 7	-.153 .961 7	-.153 .961 7	-.153 .961 7	-.153 .961 7	-.153 .961 7	-.153 .961 7	-.153 .961 7	-.153 .961 7	-.153 .961 7	-.153 .961 7	-.153 .961 7	-.153 .961 7	-.153 .961 7	1														
In	Pearson correlation Sig. (2-tailed) N	.591 .162 7	.729 .162 7	.470 .162 7	-.265 .162 7	-.149 .162 7	.779 .162 7	.127 .162 7	.207 .162 7	.463 .162 7	.122 .162 7	.246 .162 7	.761 .162 7	-.700 .162 7	-.700 .162 7	-.700 .162 7	-.700 .162 7	-.700 .162 7	-.700 .162 7	-.700 .162 7	-.700 .162 7	-.700 .162 7	1													
Sb	Pearson correlation Sig. (2-tailed) N	-.316 .490 7	.878 .490 7	.115 .490 7	.566 .490 7	.743 .490 7	.004 .490 7	-.439 .490 7	.976 .490 7	.606 .490 7	.089 .490 7	-.375 .490 7	.279 .490 7	-.415 .490 7	-.356 .490 7	-.387 .490 7	-.387 .490 7	-.387 .490 7	-.387 .490 7	-.387 .490 7	-.387 .490 7	-.387 .490 7	1													
Cs	Pearson correlation Sig. (2-tailed) N	-.402 .372 7	.504 .372 7	.745 .372 7	.655 .372 7	.020 .372 7	.824 .372 7	.470 .372 7	.158 .372 7	-.152 .372 7	-.375 .372 7	-.735 .372 7	-.766 .372 7	-.554 .372 7	-.375 .372 7	-.375 .372 7	-.375 .372 7	-.375 .372 7	-.375 .372 7	-.375 .372 7	-.375 .372 7	-.375 .372 7	1													
Ba	Pearson correlation Sig. (2-tailed) N	-.291 																																		

Table S10. Correlation coefficients – PP5

	SiO <sub>2</sub>	Li	Be	B	Na	Mg	Al	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Rb	Sr	Y	Zr	Nb	Mo	Ag	Cd	In	Sb	Cs	Ba		
SiO <sub>2</sub>	1																																			
Pearson correlation		0.125	0.038	0.249	0.444	0.131	-0.119	-0.470	-0.745	0.375	-0.109	-0.482	-	0.156	-0.444	0.100	0.365	-0.108	-0.386	-0.204	0.111	0.156	0.749	0.488	0.119	-0.027	-0.153	0.056	0.056	-	-0.646	-0.186	-0.411	0.420		
Sig. (1-tailed)		0.394	0.468	0.249	0.159	0.390	0.400	0.143	0.027	0.204	0.408	0.137	-	0.156	0.159	0.415	0.211	0.409	0.196	0.331	0.406	0.369	0.026	0.134	0.409	0.477	0.372	0.452	0.452	-	0.058	0.345	0.107	0.174		
Li		1																																		
Pearson correlation			-0.552	0.716	0.727	-0.050	0.164	-0.339	-0.192	0.698	-0.016	0.059	-	0.246	0.216	0.372	0.178	0.612	0.067	-0.230	0.583	0.393	0.415	0.050	0.669	0.036	-0.134	0.019	0.019	-	0.148	0.547	0.425	-0.074		
Sig. (1-tailed)			0.394	0.100	0.035	0.032	0.458	0.363	0.228	0.340	0.440	0.486	0.450	-	0.297	0.321	0.206	0.051	0.072	0.442	0.318	0.085	0.192	0.177	0.458	0.500	0.470	0.387	0.484	0.484	0.477	0.376	0.102	0.171	0.438	
Be			1																																	
Pearson correlation				-0.286	0.150	0.232	-0.110	0.329	0.055	-0.454	-0.140	-0.218	-	0.274	0.086	-0.034	0.462	-0.134	0.246	0.570	-0.895	-0.316	-0.215	-0.395	-0.127	0.035	-0.130	0.076	0.076	-	0.102	-0.424	-0.027	-0.454		
Sig. (1-tailed)				0.468	0.100	0.077	0.267	0.170	0.031	0.452	0.153	0.383	0.320	-	0.276	0.427	0.471	0.148	0.388	0.298	0.091	0.003	0.245	0.321	0.190	0.393	0.470	0.391	0.436	0.436	0.477	0.414	0.172	0.477	0.153	
B				1																																
Pearson correlation					0.340	0.290	0.651	-0.111	-0.020	-0.413	0.025	-0.249	-	0.468	0.582	0.649	-0.156	0.230	-0.009	-0.239	0.284	0.427	0.157	-0.530	0.794	0.558	0.340	0.523	0.523	-	0.368	0.805	0.815	-0.539		
Sig. (1-tailed)					0.249	0.035	0.267	0.728	0.479	0.482	0.179	0.479	0.249	-	0.145	0.085	0.057	0.310	0.492	0.311	0.268	0.170	0.368	0.110	0.017	0.096	0.202	0.114	0.114	0.114	0.114	0.209	0.014	0.015	0.106	
Na					1																															
Pearson correlation						0.112	0.018	-0.316	-0.620	0.876	0.306	-0.256	-	0.605	0.367	0.433	0.267	0.497	0.189	-0.307	0.437	0.538	0.238	-0.072	0.265	-0.261	-0.278	-0.209	-0.209	-	0.293	0.431	0.394	-0.249		
Sig. (1-tailed)						0.406	0.485	0.245	0.069	0.005	0.252	0.290	0.290	-	0.075	0.209	0.166	0.282	0.128	0.343	0.251	0.164	0.304	0.439	0.283	0.286	0.273	0.327	0.327	0.262	0.262	0.167	0.191	0.295		
Mg						1																														
Pearson correlation							0.826	0.1	-0.336	-0.480	-0.107	-0.181	-0.386	-	0.452	0.529	0.872	-0.326	-0.649	-0.058	-0.455	0.062	0.739	0.087	-0.623	0.256	0.629	0.207	0.673	0.673	-	0.110	0.404	0.727	-0.567	
Sig. (1-tailed)							0.011	0.7	0.230	0.224	0.214	0.040	0.023	0.023	0.111	0.005	0.005	0.028	0.057	0.054	0.152	0.448	0.029	0.427	0.068	0.289	0.065	0.328	0.049	0.049	0.049	0.407	0.184	0.032	0.092	
Al							1																													
Pearson correlation								0.826	0.1	-0.336	-0.480	-0.107	-0.181	-0.386	-	0.452	0.529	0.872	-0.326	-0.649	-0.058	-0.455	0.062	0.739	0.087	-0.623	0.256	0.629	0.207	0.673	0.673	-	0.110	0.404	0.727	-0.567
Sig. (1-tailed)								0.011	0.7	0.230	0.224	0.214	0.040	0.023	0.023	0.111	0.005	0.005	0.028	0.057	0.054	0.152	0.448	0.029	0.427	0.068	0.289	0.065	0.328	0.049	0.049	0.049	0.407	0.184	0.032	0.092
K								1																												
Pearson correlation									0.679	-0.663	-0.320	-0.165	-	-0.144	0.040	-0.344	0.530	0.293	0.545	0.880	-0.825	-0.585	-0.445	-0.287	-0.067	-0.164	-0.469	-0.309	-0.309	-	0.309	-0.500	-0.223	-0.375		
Sig. (1-tailed)									0.047	0.002	0.242	0.362	0.723	0.723	0.466	0.225	0.111	0.262	0.103	0.005	0.011	0.084	0.159	0.266	0.443	0.363	0.144	0.335	0.335	0.335	0.335	0.335	0.335	0.335	0.203	
Ca									1																											
Pearson correlation										0.470	-0.369	-0.121	-	-0.643	-0.198	-0.576	0.157	0.306	0.390	0.691	-0.383	-0.622	-0.412	0.060	-0.064	-0.143	-0.332	-0.238	-0.238	-	0.146	-0.407	-0.147	0.068		
Sig. (1-tailed)										0.027	0.208	0.398	0.723	0.060	0.335	0.088	0.368	0.252	0.193	0.043	0.198	0.053	0.179	0.450	0.466	0.380	0.234	0.304	0.304	0.304	0.304	0.304	0.304	0.304	0.304	
Sc										1																										
Pearson correlation											0.562	-0.269	-	0.632	0.408	0.494	-0.156	0.275	0.039	-0.662	0.699	0.663	0.230	-0.068	0.207	-0.106	0.081	-0.059	-0.059	-	0.249	0.693	0.483	-0.141		
Sig. (1-tailed)											0.094	0.280	0.723	0.062	0.182	0.130	0.369	0.275	0.467	0.053	0.040	0.052	0.310	0.442	0.328	0.411	0.432	0.450	0.450	0.450	0.450	0.450	0.450	0.450		
Ti											1																									
Pearson correlation												0.566	-0.566	-	0.566	0.456	0.053	-0.456	0.060	0.439	-0.475	0.284	-0.223	-0.436	-0.257	-0.421	-0.290	-0.226	-0.258	-0.258	-	0.496	0.485	0.173	-0.219	
Sig. (1-tailed)												0.092	0.092	0.723	0.152	0.455	0.152	0.449	0.162	0.141	0.269	0.316	0.164	0.289	0.173	0.264	0.313	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.288	
V												1																								
Pearson correlation													0.597	-0.597	-	0.597	0.924	-0.597	-0.597	-0.597	-0.597	-0.597	-0.597	-0.597	-0.597	-0.597	-0.597	-0.597	-0.597	-	0.597	0.924	0.597	0.924		
Sig. (1-tailed)													0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	
Cr													1																							
Pearson correlation														0.597	-0.597	-	0.597	0.924	-0.597	-0.597	-0.597	-0.597	-0.597	-0.597	-0.597	-0.597	-0.597	-0.597	-	0.597	0.924	0.597	0.924	0.597		
Sig. (1-tailed)														0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	
Mn														1																						
Pearson correlation															0.712	0.682	-0.105	-0.024	0.148	-0.379	0.020	0.529	-0.025	-0.673	0.245	0.258	0.288	0.245	0.320	0.320	-	0.451				

	SiO2	Li	Be	B	Na	Mg	Al	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Rb	Sr	Y	Zr	Nb	Mo	Ag	Cd	In	Sb	Cs	Ba	
SiO2	1																																		
Li	0.08	1																																	
Be	-0.25	0.08	1																																
B	-0.31	-0.25	0.08	1																															
Na	-0.42	-0.31	-0.25	0.08	1																														
Mg	-0.49	-0.42	-0.31	-0.25	0.08	1																													
Al	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1																												
K	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1																											
Ca	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1																										
Sc	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1																									
Ti	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1																								
V	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1																							
Cr	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1																						
Mn	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1																					
Fe	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1																				
Co	-0.79	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1																			
Ni	-0.82	-0.79	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1																		
Cu	-0.85	-0.82	-0.79	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1																	
Zn	-0.88	-0.85	-0.82	-0.79	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1																
Ga	-0.91	-0.88	-0.85	-0.82	-0.79	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1															
Ge	-0.94	-0.91	-0.88	-0.85	-0.82	-0.79	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1														
As	-0.97	-0.94	-0.91	-0.88	-0.85	-0.82	-0.79	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1													
Rb	-1.00	-0.97	-0.94	-0.91	-0.88	-0.85	-0.82	-0.79	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1												
Sr	-1.03	-1.00	-0.97	-0.94	-0.91	-0.88	-0.85	-0.82	-0.79	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1											
Y	-1.06	-1.03	-1.00	-0.97	-0.94	-0.91	-0.88	-0.85	-0.82	-0.79	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1										
Zr	-1.09	-1.06	-1.03	-1.00	-0.97	-0.94	-0.91	-0.88	-0.85	-0.82	-0.79	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1									
Nb	-1.12	-1.09	-1.06	-1.03	-1.00	-0.97	-0.94	-0.91	-0.88	-0.85	-0.82	-0.79	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1								
Mo	-1.15	-1.12	-1.09	-1.06	-1.03	-1.00	-0.97	-0.94	-0.91	-0.88	-0.85	-0.82	-0.79	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1							
Ag	-1.18	-1.15	-1.12	-1.09	-1.06	-1.03	-1.00	-0.97	-0.94	-0.91	-0.88	-0.85	-0.82	-0.79	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1						
Cd	-1.21	-1.18	-1.15	-1.12	-1.09	-1.06	-1.03	-1.00	-0.97	-0.94	-0.91	-0.88	-0.85	-0.82	-0.79	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1					
In	-1.24	-1.21	-1.18	-1.15	-1.12	-1.09	-1.06	-1.03	-1.00	-0.97	-0.94	-0.91	-0.88	-0.85	-0.82	-0.79	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1				
Sb	-1.27	-1.24	-1.21	-1.18	-1.15	-1.12	-1.09	-1.06	-1.03	-1.00	-0.97	-0.94	-0.91	-0.88	-0.85	-0.82	-0.79	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1			
Cs	-1.30	-1.27	-1.24	-1.21	-1.18	-1.15	-1.12	-1.09	-1.06	-1.03	-1.00	-0.97	-0.94	-0.91	-0.88	-0.85	-0.82	-0.79	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1		
Ba	-1.33	-1.30	-1.27	-1.24	-1.21	-1.18	-1.15	-1.12	-1.09	-1.06	-1.03	-1.00	-0.97	-0.94	-0.91	-0.88	-0.85	-0.82	-0.79	-0.76	-0.73	-0.70	-0.67	-0.64	-0.61	-0.58	-0.55	-0.52	-0.49	-0.42	-0.31	-0.25	0.08	1	







Table S12. Correlation coefficients – PP8

	SiO2	Li	Be	B	Na	Mg	Al	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ge	As	Rb	Sr	Y	Zr	Nb	Mo	Ag	Cd	In	Sb	Cs	Ba				
SiO2	1																																				
Pearson correlation		-.506	.240	-.309	-.425	.009	.110	.435	-.671	-.097	-.909	.242	.470	-.266	-.282	-.518	-.301	.481	.294	-.380	-.284	-.341	-.212	-.914	-.444	-.244	.550	-.333	.a	-.629	-.419	-.483	-.905				
Significance		.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6			
N		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6			
Li		1																																			
Pearson correlation		.506	.129	.053	-.573	-.077	.151	.491	-.386	-.004	-.497	-.504	-.247	-.191	-.745	-.356	-.376	-.059	.025	.404	-.044	.116	-.279	-.484	-.181	.806	.135	-.755	.a	-.121	.053	-.885	-.486				
Significance		.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6			
N		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6		
Be			1																																		
Pearson correlation		.240	.259	.1	.629	-.979	-.778	.955	.252	-.634	.868	-.279	.356	-.142	.781	.101	.296	-.027	-.276	.941	.848	-.104	.440	-.267	-.256	.a	.642	.514	-.055	.415	.a	.156	.486	-.008	-.240		
Significance		.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6		
N		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
B				1																																	
Pearson correlation		-.309	.053	.629	1	-.344	-.225	.782	-.478	-.192	.874	.087	.182	-.835	.947	-.233	-.230	-.178	.914	.476	.445	-.081	.634	.220	.135	.a	.916	.547	-.808	.445	.a	.347	.982	.250	.113		
Significance		.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	
N		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
Na					1																																
Pearson correlation		-.425	-.573	-.779	-.344	1	.579	-.751	-.566	.343	-.624	.572	.149	-.130	-.525	.183	.018	.506	.100	-.608	-.975	.515	-.401	-.001	.567	.a	-.168	-.469	-.112	-.025	.a	.292	-.240	.552	.549		
Significance		.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	
N		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Mg						1																															
Pearson correlation		.009	-.077	-.778	-.225	.379	1	-.631	-.375	.374	-.543	-.123	-.172	-.279	-.493	-.321	-.289	-.370	-.131	-.783	-.603	-.183	.199	-.351	-.118	.a	-.418	-.179	-.322	-.367	.a	-.395	-.100	-.033	-.157		
Significance		.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	
N		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Al							1																														
Pearson correlation		.110	-.151	.955	-.782	-.751	-.631	1	-.037	-.470	.971	-.264	-.337	-.381	-.864	.036	-.175	-.199	-.508	.867	.852	-.275	.613	.012	-.234	.a	-.735	.460	-.300	.532	.a	.082	.661	.075	-.228		
Significance		.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	
N		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
K								1																													
Pearson correlation		.435	.491	.252	-.478	-.566	-.575	.037	1	-.181	-.152	-.285	-.342	.866	-.190	.155	-.107	.006	.691	.215	.439	-.060	-.440	-.180	-.319	.a	-.455	.070	.805	-.363	.a	-.171	-.550	-.646	-.277		
Significance		.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	
N		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Ca									1																												
Pearson correlation		-.671	-.386	-.634	-.192	-.343	-.374	-.470	-.181	1	-.306	.475	-.584	-.115	-.271	.104	-.614	-.329	-.140	-.706	-.362	-.271	-.339	.615	.453	.a	-.243	-.568	-.354	.014	.a	-.081	-.055	.040	.446		
Significance		.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	
N		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Sc										1																											
Pearson correlation		-.097	-.004	.868	.874	-.624	-.543	.971	-.152	-.306	1	-.106	.328	-.558	.908	.065	.074	-.194	-.665	.777	.750	-.276	.627	.153	-.073	.a	.834	.377	-.384	.639	.a	-.154	.780	.221	-.074		
Significance		.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6
N		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Ti											1																										
Pearson correlation		-.909	-.497	-.279	.087	-.572	-.123	-.264	-.285	.475	-.106	-.126	-.212	-.100	-.428	-.311	.653	-.182	-.253	-.552	.624	-.614	-.174	.998	.a	.347	-.249	-.267	.227	.a	.308	.178	.528	.999			
Significance		.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6
N		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
V												1																									
Pearson correlation		.232	-.504	.356	-.182	.149	-.172	.337	-.412	-.584	.328	-.126	1	-.197	.093	.488	.871	-.390	-.001	.616	.307	.149	.362														

		SiO2	Li	Be	B	Na	Mg	Al	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Rb	Sr	Y	Zr	Nb	Mo	Ag	Cd	In	Sb	Cs	Ba		
SiO2	Pearson correlation	1																																			
	Sig. (2-tailed)	.305																																			
	N	6																																			
Li	Pearson correlation	-.505	1																																		
	Sig. (2-tailed)	.259																																			
	N	6																																			
Be	Pearson correlation	-.210	-.259	1																																	
	Sig. (2-tailed)	.646	.620																																		
	N	6	6																																		
B	Pearson correlation	-.309	.053	.629	1																																
	Sig. (2-tailed)	.951	.921	.181																																	
	N	6	6	6																																	
Na	Pearson correlation	-.425	-.573	-.779	-.344	1																															
	Sig. (2-tailed)	.401	.234	.008	.504																																
	N	6	6	6	6																																
Mg	Pearson correlation	.009	-.077	-.778	-.225	.579	1																														
	Sig. (2-tailed)	.987	.885	.009	.669	.229																															
	N	6	6	6	6	6																															
Al	Pearson correlation	.110	.151	.955	.782	-.751	-.631	1																													
	Sig. (2-tailed)	.835	.775	.003	.066	.085	.179																														
	N	6	6	6	6	6	6																														
K	Pearson correlation	.435	.491	.252	-.478	-.566	-.575	.037	1																												
	Sig. (2-tailed)	.389	.322	.629	.238	.241	.232	.945																													
	N	6	6	6	6	6	6	6																													
Ca	Pearson correlation	-.671	-.386	-.634	-.192	.343	.374	-.470	-.181	1																											
	Sig. (2-tailed)	.144	.450	.177	.716	.505	.465	.347	.223																												
	N	6	6	6	6	6	6	6	6																												
Sc	Pearson correlation	-.097	-.004	.868	.874	-.624	-.543	.971	-.132	-.306	1																										
	Sig. (2-tailed)	.885	.993	.025	.023	.186	.001	.774	.555	.256																											
	N	6	6	6	6	6	6	6	6	6																											
Ti	Pearson correlation	-.909	-.497	-.279	.087	.572	-.123	-.264	-.285	.475	-.106	1																									
	Sig. (2-tailed)	.012	.316	.592	.870	.232	.816	.614	.884	.341	.841																										
	N	6	6	6	6	6	6	6	6	6	6																										
V	Pearson correlation	.242	-.504	-.356	.182	.149	-.172	-.337	-.342	-.584	.328	-.126	1																								
	Sig. (2-tailed)	.664	.308	.488	.730	.777	.744	.513	.507	.222	.526	.812																									
	N	6	6	6	6	6	6	6	6	6	6	6																									
Cr	Pearson correlation	.470	.247	-.142	-.835	-.130	-.279	-.381	.866	-.115	-.558	-.212	-.197	1																							
	Sig. (2-tailed)	.347	.637	.789	.038	.806	.592	.456	.026	.822	.250	.687	.708																								
	N	6	6	6	6	6	6	6	6	6	6	6	6																								
Mn	Pearson correlation	-.266	.191	.781	.947	-.525	-.493	.864	-.190	-.271	.908	.100	.093	-.625	1																						
	Sig. (2-tailed)	.611	.716	.067	.004	.283	.320	.027	.719	.604	.012	.851	.861																								
	N	6	6	6	6	6	6	6	6	6	6	6	6																								
Fe	Pearson correlation	-.282	-.745	.101	-.233	.183	-.521	.036	-.155	.104	.065	.428	-.458	.275	-.147	1																					
	Sig. (2-tailed)	.588	.089	.849	.657	.729	.289	.947	.770	.845	.902	.397	.361	.598	.781																						
	N	6	6	6	6	6	6	6	6	6	6	6	6	6	6																						
Co	Pearson correlation	.518	-.356	.296	-.230	.018	-.289	.175	-.107	-.614	.074	-.311	.871	.298	-.220	.559	1																				
	Sig. (2-tailed)	.292	.489	.569	.661	.973	.579	.701	.840	.195	.889	.549	.024	.566	.676	.249																					
	N	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6																					
Ni	Pearson correlation	-.301	-.376	-.027	-.178	.306	-.370	-.199	.006	-.229	-.194	.653	.390	.207	-.147	.319	.169	1																			
	Sig. (2-tailed)	.562	.463	.960	.736	.305	.470	.705	.991	.662	.612	.159	.445	.694	.865	.209	.452																				
	N	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6																				
Cu	Pearson correlation	.481	.059	-.276	.914	.100	-.131	-.508	.691	-.140	-.665	-.182	-.001	.956	-.769	.653	.461	.319	1																		
	Sig. (2-tailed)	.335	.912	.596	.011	.851	.805	.304	.129	.792	.149	.730	.998	.003	.074	.492	.358	.538																			

## NOTE 1. THE ROCKS

### Samples V9, V4 and V5 (Figure S7)

The dolostones no. V9 is almost exclusively constituted by dolomite (XRD). OM observations revealed the rare presence of post-dolomitization quartz-filled fracturing, which explains SiO<sub>2</sub> contents up to 3.1 wt% (XRF; Table S13). While the small amounts of Al<sub>2</sub>O<sub>3</sub>, K<sub>2</sub>O, Fe<sub>2</sub>O<sub>3</sub>, SO<sub>3</sub> and Ba can be related to the sporadic presence of albite, K-feldspar, barite and iron oxides, low contents of Sr indicate the lacustrine origin of these rocks (*i.e.* they are low enough to exclude a seawater source; see, e.g. Wallace 1990). SEM-EDS analyses further revealed that dolomite Ca:Mg ratio is generally non-stoichiometric, showing a typical few percent Ca-surplus corresponding to a Mg-deficit (Goldsmith & Graf 1958). Sb and Au amounts were below the detection limit of the LA-ICP-MS.

In the dolostone no. V4, dolomite neatly prevails over gypsum (6.4%) and trace amounts of calcite have been further detected (XRD). Satin spar filled fractures of secondary origin (OM). Apart from CaO, MgO and SO<sub>2</sub>, the sum of the other major elements (SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub> and Fe<sub>2</sub>O<sub>3</sub>) does not exceed 1 wt%, suggesting however the presence of a minor siliciclastic content (XRF; Table S13). The high Sr contents worth mentioning as they are indicative of weak diagenetic effects (dissolution and recrystallisation); the latter being generally responsible for a progressive Sr depletion. Sb and Au amounts were below the detection limit of the LA-ICP-MS.

The sample V5 is almost entirely constituted by prismatic crystals of gypsum. Minor dolomite amounts have been observed by OM and confirmed by low amounts of MgO measured by XRF (Table S13). The Sr content falls within the range of values determined for Roccastrada gypsum (Barbieri et al. 1976). Sb and Au amounts were below the detection limit of the LA-ICP-MS.

### Samples nos. V1-3 and V6-8 (Figure S7)

The coarse-grained sample V1 is mainly characterised by sub-angular to sub-rounded quartz clasts immersed in a quartzose-micaceous matrix. Quartz aggregates can reach large dimensions (up to 4 mm) and frequently shows irregular subgrain boundaries. Quartz clasts are constantly bordered by iron oxides, among which, hematite has been further identified by XRD (Figure S8). White mica (*esp.* muscovite) represents the main phase of the matrix, together with quartz, while detritic K-feldspar crystals has been rarely observed. Heavy minerals are mainly represented by rutile and zircon. This quartz-dominated mineralogy is reflected in the major element composition obtained by XRF (Table S13). SiO<sub>2</sub> is the major component (93 wt%), followed by the other major oxides (Al<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub>, K<sub>2</sub>O, Na<sub>2</sub>O, TiO<sub>2</sub>, MgO and SO<sub>3</sub> in decreasing order), which contents are clearly related to the subordinate presence of phyllosilicates and feldspars. The bulk chemical composition of this sample is comparable with that of the “Anageniti grossolane” provided for the “Mt. Pisani Sequence” by Franceschelli et al. (1987). Extremely low amounts of Sb and Au have been measured by LA-ICP-MS (Table S13).

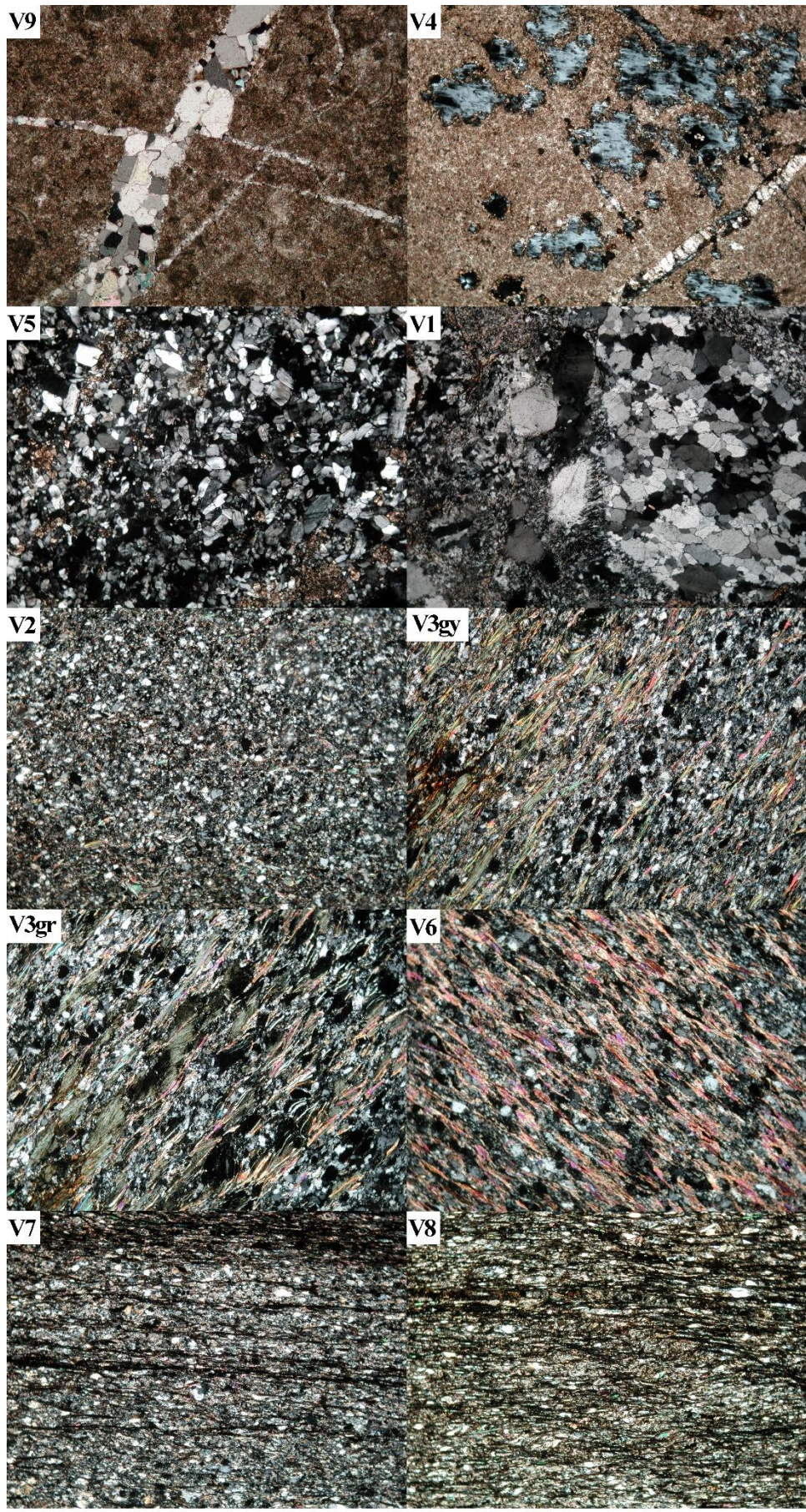


Figure S7. OM images of the rock samples (crossed polarised light). Scale bar of 1 mm.

The metapelite V2 is a fine-grained rock, mainly composed of quartz (52%), mica (phengitic muscovite, 19%), chlorites (clinochlore and sudoite, 13%), feldspars (mainly albite, 13%), and minor clay minerals and hematite (below 2%) (XRD, Figure S8). Major element constituents are SiO<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub>, followed by equal amounts of Fe<sub>2</sub>O<sub>3</sub> and MgO and lower contents of K<sub>2</sub>O and Na<sub>2</sub>O (XRF; Table S13). Among minor elements contents, the amounts of elements frequently included in micas such as Zn and Cr are relatively high, as well as minor components of feldspars such as Ba, Rb, Y and Zr. Sb contents are relatively high (3.6 ppm) while Au is lacking (LA-ICP-MS; Table S13).

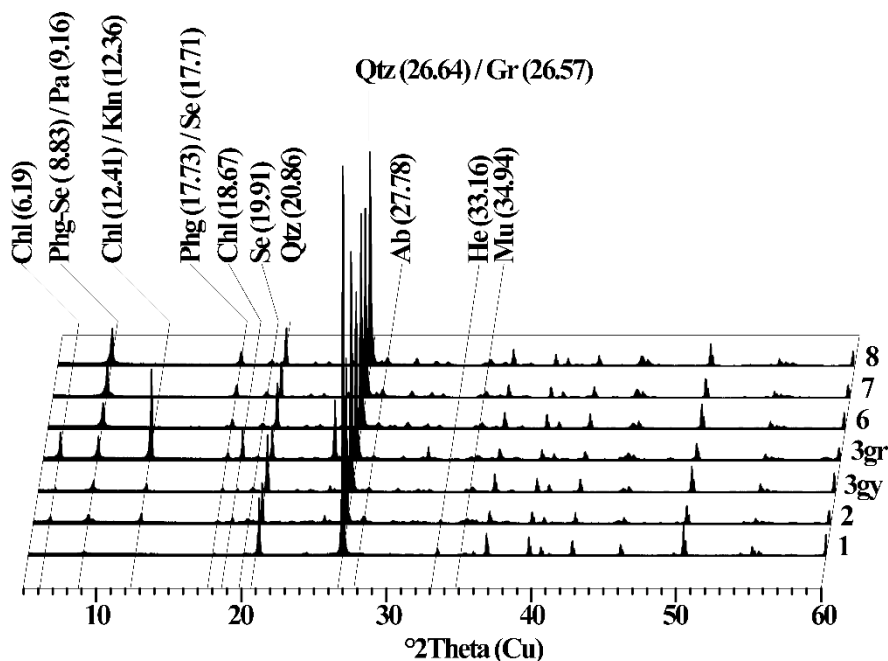


Figure S8. XRD patterns of the metamorphic rocks.

The metapelite V3 is characterised by grey and green overlying layers, whose main differences regard the relative abundance and dimensions of quartz, micas and chlorites. Based on XRD data (Figure S8), the grey layer is characterised by high quartz (71 wt%), phengitic muscovite (22%) and minor chlorites (clinochlore and sudoite, 4.5 wt%) and feldspars (2.5 wt%). Conversely, the green layer shows smaller amounts of quartz (48 wt%) and phengitic muscovite (12%) and greatly higher amounts of chlorites (sudoite and esp. clinochlore, 36 wt%), with minor phases represented by feldspars (2.5 wt%) and kaolinite (1.5 wt%). A weak peak of hematite was clearly observable in the grey layer. Rutile and zircon were frequent accessory minerals. As for crystal dimensions, major difference are noted in relation to clinochlore. The latter reaches up to 2 mm length within the green layer while it is averagely 200 µm long within the grey layer. The sample analysed by XRF included both the grey and the green portions (Table S13). The bulk composition is rather similar to that of sample V2, except for higher K<sub>2</sub>O and Fe<sub>2</sub>O<sub>3</sub> contents. The former evidence is easily explained by the higher average presence of phyllosilicates in this sample with respect to sample V2. Among minor and trace element

contents, Ni, Cr, Zn, Ba and Rb show high amounts, Sb is present with relatively intermediate amounts (1.4 ppm) while Au is lacking (LA-ICP-MS; Table S13).

Samples V6, V7 and V8 are quartz-rich sericite phyllites mainly constituted by quartz and highly birefringent, fine-grained sericite, followed by phengitic muscovite, minor feldspars and sulphates. Based on XRD data (Figure S8), quartz contents are comparable among the three samples: 61.5% in V6, 57% in V7 and 59.5% in V8. The amounts of sericite range between 16.5% (no. V6), 19% (no. V8) and 22% (no. V7); those of phengitic muscovite stood at around 15% in all samples. Feldspars (mainly plagioclases) were ~2% in sample no. V6, ~4% in no. V7, and ~5% in no. V8. Sulphates of the isostructural alunite-jarosite group are further present, together with barite and pyrite (total of ~4% in sample no. V6, 2.5% in sample V7, 1% in sample no. V8). In sample V6, the sulphates are mainly found in the sericitic interlayers, likely substituting pyrite. Heavy minerals are mainly represented by rutile and zircon and a few monazite crystals have been further observed. The major chemical composition varies according to the different abundance of the above listed mineralogical phases. Trace elements contents (LA-ICP-MS; Table S13) are relatively depleted in V7 and to a lesser extent, in V6. The sample V8 shows the highest values of V, Cr, Ga, Zr, Pb and REEs. Lastly, in all three samples, Sb contents range between 0.8 and 1.6 ppm, while extremely low amounts of Au are present in samples 7 and 8 only.

Table S13. The chemical composition of the investigated rocks.

Sample		V1					V2					V3				
<b>XRF</b>	SiO <sub>2</sub> wt%				93.1					70.1					65.7	
	TiO <sub>2</sub> wt%				0.1					0.8					0.6	
	Al <sub>2</sub> O <sub>3</sub> wt%				3.4					15.1					15.9	
	MgO wt%				0.1					3.6					3.8	
	MnO wt%				0					0					0.1	
	Fe <sub>2</sub> O <sub>3</sub> wt%				1.4					4.8					6.7	
	Na <sub>2</sub> O wt%				0.2					0.3					0.5	
	CaO wt%				0					0.1					0.1	
	K <sub>2</sub> O wt%				0.9					2.4					3	
	P <sub>2</sub> O <sub>5</sub> wt%				0					0.1					0.1	
	SO <sub>3</sub> wt%				0.1					0.5					0.7	
	L.O.I. wt%				0.8					2.7					3.4	
<b>LA-ICP-MS</b>	n=	V1	V1	V1	n=3	sd	V2	V2	V2	n=3	sd	V3	V3	V3	n=3	sd
	Li ppm	2.9	12.5	-	7.7	6.8	41.9	31.9	37.2	37.0	5.0	25.4	41.3	18.5	28.4	11.7
	Be ppm	-	-	-	-	-	4.1	4.0	-	4.1	0.0	-	2.5	-	2.5	-
	B ppm	2.9	4.6	10.4	5.9	3.9	96.2	46.7	8.3	50.4	44.0	13.7	58.0	32.5	34.8	22.2
	Sc ppm	3.0	3.5	3.1	3.2	0.3	7.4	8.2	4.8	6.8	1.8	3.6	8.9	4.5	5.7	2.8
	V ppm	-	-	9.7	9.7	-	38.3	67.3	22.1	42.6	22.9	19.7	51.4	33.9	35.0	15.9
	Cr ppm	-	-	11.7	11.7	-	31.9	42.7	20.8	31.8	10.9	19.8	52.0	19.4	30.4	18.7
	Mn ppm	0.6	1.0	0.8	0.8	0.2	25.8	32.4	41.3	33.1	7.8	45.8	13.5	36.2	31.8	16.6
	Co ppm	0.1	-	-	0.1	-	6.7	4.5	9.4	6.8	2.4	9.3	2.2	4.4	5.3	3.7
	Ni ppm	1.0	0.8	1.0	0.9	0.2	14.4	18.9	23.4	18.9	4.5	25.7	6.0	14.8	15.5	9.9
	Cu ppm	0.7	0.7	0.8	0.7	0.1	2.1	3.1	1.4	2.2	0.9	12.3	18.7	204.3	78.4	109.0
	Zn ppm	-	-	-	-	-	31.3	41.7	57.5	43.5	13.2	88.7	35.3	47.7	57.2	27.9
	Ga ppm	-	0.1	-	0.1	-	11.2	17.1	4.9	11.0	6.1	5.7	21.4	9.9	12.3	8.1
	Ge ppm	1.98	-	1.97	1.98	0.0	3.77	1.13	1.48	2.13	1.4	1.23	1.86	1.38	1.49	0.3
	As ppm	3.12	0.99	4.88	3.00	1.9	29.60	10.11	10.15	16.62	11.2	0.81	8.68	2.98	4.15	4.1
	Rb ppm	0.2	0.1	0.4	0.2	0.1	67.9	84.0	15.6	55.8	35.8	34.7	100.1	79.9	71.6	33.5
	Sr ppm	1	2	3	2	0.8	46	50	8	35	23.2	4	37	14	18	16.6
	Y ppm	0.02	-	0.05	0.04	0.0	0.93	1.60	2.68	1.74	0.9	0.25	2.77	0.78	1.27	1.3
	Zr ppm	-	0.03	0.92	0.48	0.6	6.12	15.95	32.08	18.05	13.1	0.93	18.99	4.96	8.29	9.5
	Nb ppm	-	-	0.36	0.36	-	4.48	10.92	8.08	7.82	3.2	0.30	12.63	2.16	5.03	6.6
	Mo ppm	0.029	0.031	-	0.030	0.0	-	0.083	-	0.083	-	0.034	-	0.139	0.087	0.1
	Ag ppm	-	-	-	-	-	-	0.092	0.038	0.065	0.0	0.072	-	0.218	0.145	0.1
	Cd ppm	-	-	-	-	-	-	-	0.751	0.751	-	0.508	0.448	-	0.478	0.0
	In ppm	0.02	-	-	0.02	-	0.02	0.03	0.01	0.02	0.0	0.04	0.07	0.04	0.05	0.0
	Sb ppm	0.18	0.14	0.61	0.31	0.3	2.09	4.01	4.61	3.57	1.3	0.38	3.10	0.86	1.45	1.4
	Cs ppm	0.17	0.18	0.16	0.17	0.0	4.40	5.05	1.02	3.49	2.2	2.08	5.91	4.25	4.08	1.9
	Ba ppm	2	2	4	2	1.1	180	251	43	158	105.6	116	383	195	231	137.3
	La ppm	-	0.041	0.139	0.090	0.1	70.670	30.283	7.380	36.111	32.0	0.715	35.955	7.685	14.785	18.7
	Ce ppm	0.071	-	0.110	0.091	0.0	111.188	41.489	12.027	54.901	50.9	0.752	75.236	15.290	30.426	39.5
	Pr ppm	-	-	0.009	0.009	-	10.605	4.056	1.333	5.331	4.8	0.038	8.362	2.260	3.553	4.3
	Nd ppm	0.081	-	-	0.081	-	36.632	15.342	3.835	18.603	16.6	0.286	33.696	6.510	13.497	17.8
	Sm ppm	-	-	0.067	0.067	-	4.907	2.574	1.762	3.081	1.6	0.041	4.539	2.927	2.502	2.3
	Eu ppm	0.020	-	-	0.020	-	0.465	0.332	0.261	0.353	0.1	-	1.186	0.222	0.704	0.7
	Gd ppm	-	-	-	-	-	0.961	0.951	1.442	1.118	0.3	0.143	1.871	0.578	0.864	0.9
Tb ppm	-	-	0.028	0.028	-	0.070	0.140	0.140	0.117	0.0	-	0.085	0.054	0.069	0.0	
Dy ppm	-	-	-	-	-	0.295	0.601	0.831	0.576	0.3	0.046	0.291	0.750	0.362	0.4	
Ho ppm	-	0.005	-	0.005	-	0.035	0.116	0.182	0.111	0.1	0.029	0.160	0.022	0.070	0.1	
Er ppm	0.042	0.022	-	0.032	0.0	0.048	0.107	0.367	0.174	0.2	0.049	0.331	0.041	0.140	0.2	
Tm ppm	-	-	0.012	0.012	-	0.022	-	0.023	0.023	0.0	-	0.027	0.028	0.027	0.0	
Yb ppm	-	-	0.081	0.081	-	-	0.179	0.541	0.360	0.3	-	0.274	0.151	0.213	0.1	
Lu ppm	-	-	-	-	-	0.017	0.088	0.072	0.059	0.0	-	0.043	-	0.043	-	
Hf ppm	22.574	14.856	55.509	30.980	21.6	0.196	1.051	0.539	0.596	0.4	20.118	0.375	0.352	6.949	11.4	
Ta ppm	-	0.010	0.040	0.025	0.0	0.382	0.906	0.568	0.619	0.3	-	0.733	0.243	0.488	0.3	
W ppm	0.021	-	0.284	0.153	0.2	0.847	2.574	2.604	2.008	1.0	2.608	1.832	0.203	1.548	1.2	
Au ppm	0.037	0.020	-	0.029	0.0	-	-	-	-	-	-	-	-	-	-	
Tl ppm	-	0.009	0.034	0.022	0.0	0.272	0.430	0.096	0.266	0.2	0.212	0.706	0.355	0.424	0.3	
Pb ppm	0.823	1.281	2.593	1.566	0.9	4.166	8.642	12.548	8.452	4.2	3.852	10.761	8.730	7.781	3.6	
Bi ppm	0.038	-	0.041	0.040	0.0	0.069	0.237	0.583	0.296	0.3	0.111	0.295	0.594	0.333	0.2	
Th ppm	-	-	0.942	0.942	-	5.167	4.927	8.482	6.192	2.0	0.154	9.407	2.449	4.003	4.8	
U ppm	0.015	-	0.149	0.082	0.1	0.557	0.881	2.504	1.314	1.0	0.246	1.010	0.440	0.565	0.4	

(continued)

Sample		V6					V7					V8					V4	V5	V9
XRF	SiO <sub>2</sub> wt%	68.5					59.7					64					0.4	tr.	3.1
	TiO <sub>2</sub> wt%	1.1					1.4					1.3					0	0	0
	Al <sub>2</sub> O <sub>3</sub> wt%	17.8					26.2					23.6					0.1	tr.	1.5
	MgO wt%	0.6					0.6					0.6					20.2	1.1	18
	MnO wt%	0					0					0					0	tr.	0
	Fe <sub>2</sub> O <sub>3</sub> wt%	2					1.1					1.3					0.1	0	0.1
	Na <sub>2</sub> O wt%	0.3					0.8					0.5					tr.	tr.	tr.
	CaO wt%	0.6					0.2					0					33.5	49.7	30.1
	K <sub>2</sub> O wt%	4.6					5.8					5.3					0	0	0.2
	P <sub>2</sub> O <sub>5</sub> wt%	0.1					0.1					0					0	0	0
	SO <sub>3</sub> wt%	1.7					1.4					0.9					1.2	46	0.2
	L.O.I. wt%	3					3.5					2.9					44.5	3.1	46.8
LA-ICP-MS	n=	V6	V6	V6	n=3	sd	V7	V7	V7	n=3	sd	V8	V8	V8	n=3	sd	0.92	-	-
	Li ppm	2.1	17.5	13.3	11.0	8.0	9.1	13.2	-	11.2	2.9	31.3	25.5	32.1	28.8	4.7			
	Be ppm	-	-	-	-	-	-	-	1.4	1.4	-	6.1	-	4.7	4.7	-			
	B ppm	22.8	59.5	44.1	42.1	18.5	25.4	7.7	50.9	28.0	21.7	139.3	70.0	77.0	73.5	4.9			
	Sc ppm	6.1	11.5	13.6	10.4	3.9	6.6	3.1	8.8	6.2	2.9	19.8	9.5	11.8	10.6	1.7			
	V ppm	43.7	76.6	68.4	62.9	17.1	40.5	10.1	69.9	40.2	29.9	151.1	69.1	107.5	88.3	27.1			
	Cr ppm	19.8	50.5	28.7	33.0	15.8	21.2	7.4	35.5	21.3	14.0	84.3	44.0	52.6	48.3	6.0			
	Mn ppm	20.7	63.5	36.8	40.3	21.6	8.2	12.6	18.9	13.2	5.4	26.7	16.8	26.9	21.8	7.1			
	Co ppm	3.6	5.0	3.4	4.0	0.8	0.8	1.0	1.8	1.2	0.5	2.7	1.8	2.2	2.0	0.2			
	Ni ppm	4.2	9.7	3.9	5.9	3.3	3.0	1.0	2.9	2.3	1.1	5.8	3.6	3.5	3.5	0.0			
	Cu ppm	43.5	45.0	7.4	32.0	21.3	2.5	1.9	4.6	3.0	1.4	12.4	4.8	10.1	7.5	3.8			
	Zn ppm	17.0	60.7	17.9	31.8	25.0	8.5	7.0	11.5	9.0	2.3	29.4	13.1	15.9	14.5	2.0			
	Ga ppm	13.0	27.8	19.8	20.2	7.4	10.0	4.0	18.0	10.7	7.0	47.2	22.1	34.0	28.1	8.4			
	Ge ppm	1.29	2.11	1.98	1.79	0.4	1.17	0.52	2.17	1.29	0.8	2.48	2.77	3.38	3.07	0.4			
	As ppm	21.64	81.35	24.51	42.50	33.7	3.55	2.53	8.43	4.84	3.2	17.14	14.74	19.54	17.14	3.4			
	Rb ppm	209.4	222.8	186.8	206.3	18.2	70.8	24.0	125.3	73.3	50.7	275.7	122.1	186.2	154.1	45.3			
	Sr ppm	91	91	35	72	32.4	20	12	25	19	7.0	89	47	62	55	10.7			
	Y ppm	1.10	6.23	0.84	2.72	3.0	0.62	1.57	3.25	1.82	1.3	7.52	3.18	5.21	4.19	1.4			
	Zr ppm	3.53	45.88	3.52	17.64	24.5	4.57	0.57	28.76	11.30	15.3	44.54	11.44	31.12	21.28	13.9			
	Nb ppm	1.65	2.05	2.10	1.93	0.2	3.98	0.16	7.88	4.01	3.9	34.00	7.28	8.38	7.83	0.8			
	Mo ppm	0.129	1.500	0.148	0.592	0.8	0.090	0.044	0.092	0.075	0.0	0.244	0.162	0.577	0.369	0.3			
	Ag ppm	0.119	1.570	0.039	0.576	0.9	0.043	-	0.057	0.050	0.0	0.122	-	0.302	0.302	-			
	Cd ppm	-	-	0.224	0.224	-	-	-	-	-	-	-	0.250	-	0.250	0.0			
	In ppm	0.04	0.15	0.09	0.09	0.1	0.02	-	0.02	0.02	0.0	0.14	0.07	0.12	0.10	0.0			
	Sb ppm	0.90	1.26	0.68	0.95	0.3	0.52	0.59	1.17	0.76	0.4	2.12	0.78	1.66	1.22	0.6			
	Cs ppm	8.09	10.97	8.94	9.33	1.5	3.87	1.60	5.85	3.77	2.1	16.80	8.12	11.99	10.05	2.7			
	Ba ppm	1100	695	473	756	317.8	222	73	389	228	157.9	1122	410	524	467	80.9			
	La ppm	1.640	25.980	5.390	11.003	13.1	2.696	9.582	8.040	6.773	3.6	35.512	19.520	13.000	16.260	4.6			
	Ce ppm	2.930	39.390	8.880	17.067	19.6	8.248	21.711	18.198	16.053	7.0	66.714	34.160	28.410	31.285	4.1			
	Pr ppm	0.296	3.440	0.945	1.560	1.7	0.549	1.831	1.554	1.311	0.7	63.141	3.350	2.640	2.995	0.5			
	Nd ppm	1.280	13.400	3.170	5.950	6.5	2.527	5.164	5.821	4.504	1.7	18.731	13.690	9.430	11.560	3.0			
	Sm ppm	0.296	2.610	0.509	1.138	1.3	0.415	1.244	0.624	0.761	0.4	6.250	2.010	1.860	1.935	0.1			
	Eu ppm	0.062	0.430	0.105	0.199	0.2	0.068	0.250	0.253	0.190	0.1	0.921	0.288	0.366	0.327	0.1			
	Gd ppm	0.093	0.960	0.311	0.455	0.5	0.301	0.647	0.360	0.436	0.2	4.067	1.330	1.460	1.395	0.1			
Tb ppm	0.029	0.146	0.049	0.075	0.1	0.038	0.095	0.096	0.076	0.0	0.356	0.181	0.176	0.178	0.0				
Dy ppm	0.168	1.190	0.167	0.508	0.6	-	0.634	0.538	0.586	0.1	5.457	0.578	1.190	0.884	0.4				
Ho ppm	0.031	0.284	0.008	0.108	0.2	0.035	0.091	0.106	0.077	0.0	0.475	0.087	0.238	0.162	0.1				
Er ppm	0.157	0.790	0.142	0.363	0.4	0.065	0.159	0.393	0.206	0.2	0.998	0.214	0.553	0.383	0.2				
Tm ppm	0.018	0.149	0.032	0.066	0.1	0.009	0.025	0.063	0.033	0.0	0.150	0.030	0.119	0.075	0.1				
Yb ppm	0.196	1.050	0.248	0.498	0.5	-	0.094	0.635	0.364	0.4	1.362	0.364	1.010	0.687	0.5				
Lu ppm	0.023	0.194	0.023	0.080	0.1	-	-	0.080	0.080	-	0.165	0.035	0.171	0.103	0.1				
Hf ppm	1.990	14.830	0.222	5.681	8.0	4.517	8.985	1.075	4.859	4.0	0.895	0.465	0.653	0.559	0.1				
Ta ppm	0.162	0.133	0.175	0.157	0.0	0.237	-	0.607	0.422	0.3	2.089	0.656	0.532	0.594	0.1				
W ppm	0.795	1.256	0.680	0.910	0.3	0.692	-	2.249	1.470	1.1	4.925	1.910	1.730	1.820	0.1				
Au ppm	-	-	-	-	-	0.018	0.028	0.029	0.025	0.0	0.118	-	0.072	0.072	-				
Tl ppm	1.650	1.410	0.867	1.309	0.4	0.512	0.287	1.022	0.607	0.4	1.903	0.738	1.013	0.875	0.2				
Pb ppm	2.050	88.069	15.140	35.086	46.3	0.979	5.035	3.602	3.205	2.1	23.544	15.390	28.160	21.775	9.0				
Bi ppm	0.018	1.770	0.039	0.609	1.0	0.071	0.016	0.334	0.140	0.2	0.361	0.543	0.532	0.537	0.0				
Th ppm	2.480	6.460	1.950	3.630	2.5	0.922	2.567	3.751	2.414	1.4	17.593	6.640	5.860	6.250	0.6				
U ppm	0.861	1.910	0.280	1.017	0.8	0.160	0.127	1.414	0.567	0.7	6.240	1.950	4.000	2.975	1.4				



