Gu, X., Zhang, Y., Ge, Z., and Chen, W., 2023, Mineralization and genesis of the orogenic gold system in the Kalamaili area, East Junggar, Xinjiang, northwestern China: GSA Bulletin, https://doi.org/10.1130/B36650.1.

Supplemental Material

Figure S1. Field photographs of regional deformation.

Figure S2. Jinshuiquan fluid inclusions.

Figure S3. Nanmingshui fluid inclusions.

Figure S4. Sujiquandong fluid inclusions.

Table S1. Concentrations of Trace Elements in Quartz from the Gold Deposits at Kalamaili

Table S2. LA-ICP-MS U-Pb Dating Results of Zircons from the Auriferous Quartz Vein in the Nanmingshui Gold Deposit

Table S3. Rare Earth Element (REE) Concentrations of Zircons from the Auriferous Quartz Vein in the Nanmingshui Gold Deposit

Figure S1. Field photographs showing three generations of deformation in the Kalamaili area. (A) Macroscopic view of the NW-trending Kalamaili fault zone, with a strike length over 150 km and a width of □100 m. (B) Intensive regional cleavages (S1) in the lower greenschist facies tuffaceous siltstones and slates of the Lower Carboniferous Jiangbasitao formation at Hongliugou, which are related to the N-S thrusting and compression during the earliest deformation (D1). (C) The auriferous quartz-tourmaline vein at the Nanmingshui deposit is hosted in the NW-trending subsidiary fault that formed during sinistral strike-slip movement (D2) of the regional Kalamaili shear zone. The ore vein crosscuts the earlier regional cleavages (S1). (D) Deformation of both earlier cleavages and auriferous quartz veins due to superimposition of the latest dextral strike-slip movement (D3).

Figure S2. Tm,CO2, Tm,cla, Th,CO2(l), and Th,tot histograms for fluid inclusions in the Jinshuiquan gold deposit.

Figure S3. Tm,CO2, Tm,cla, Th,CO2(l), and Th,tot histograms for fluid inclusions in the Nanmingshui gold deposit.

Figure S4. Tm,CO2, Tm,cla, Th,CO2(l), and Th,tot histograms for fluid inclusions in the Sujiquandong gold deposit.

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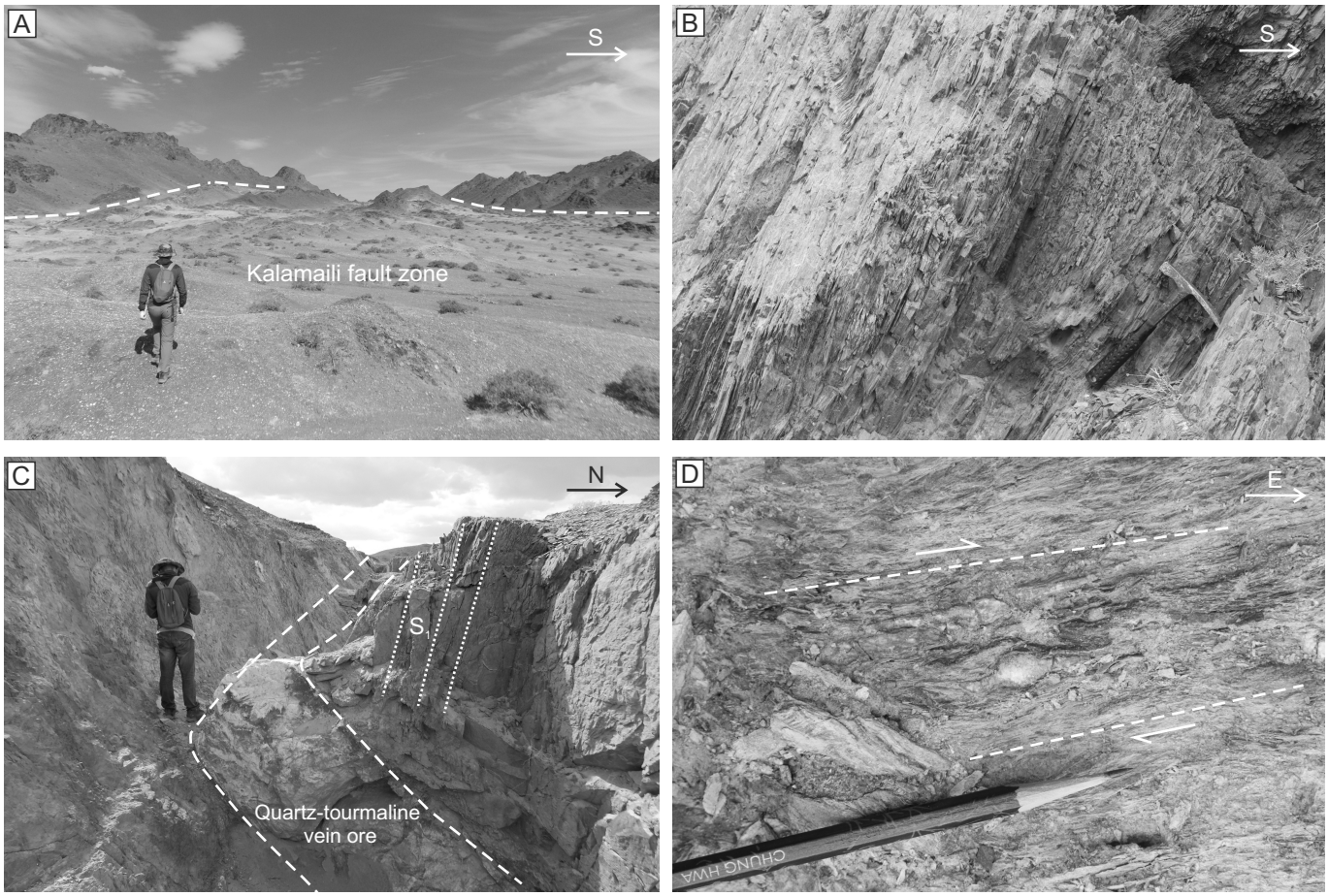
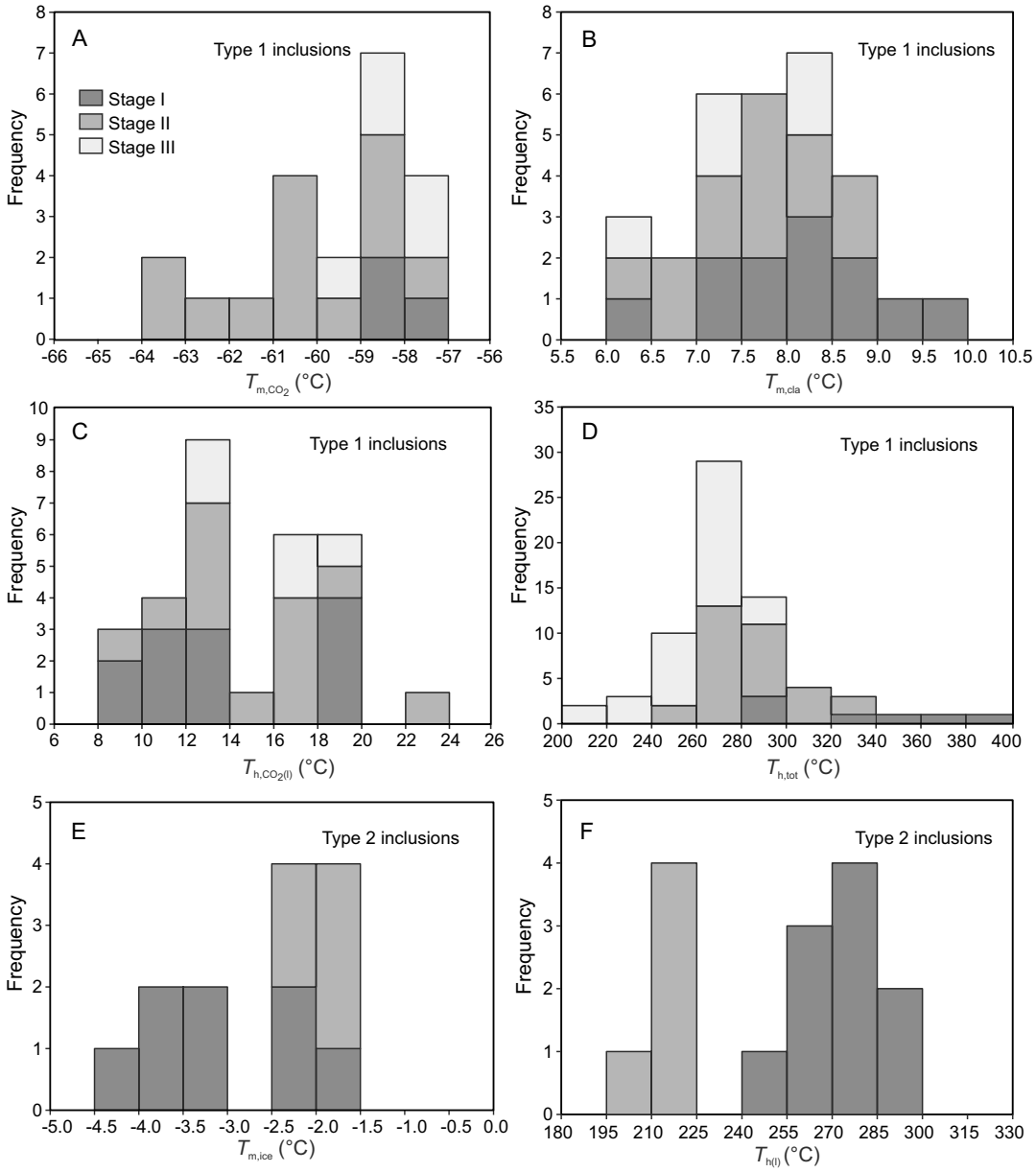
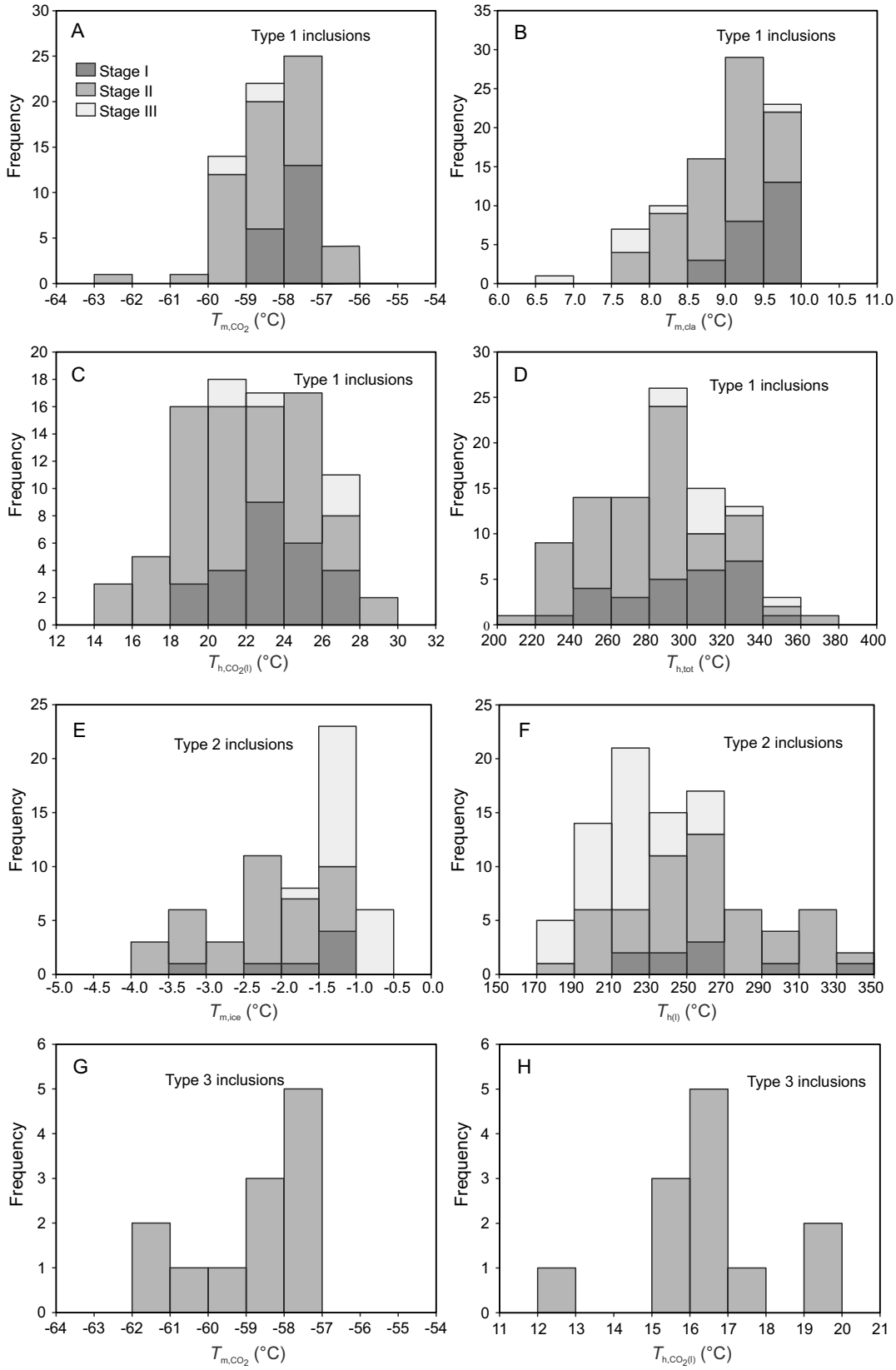


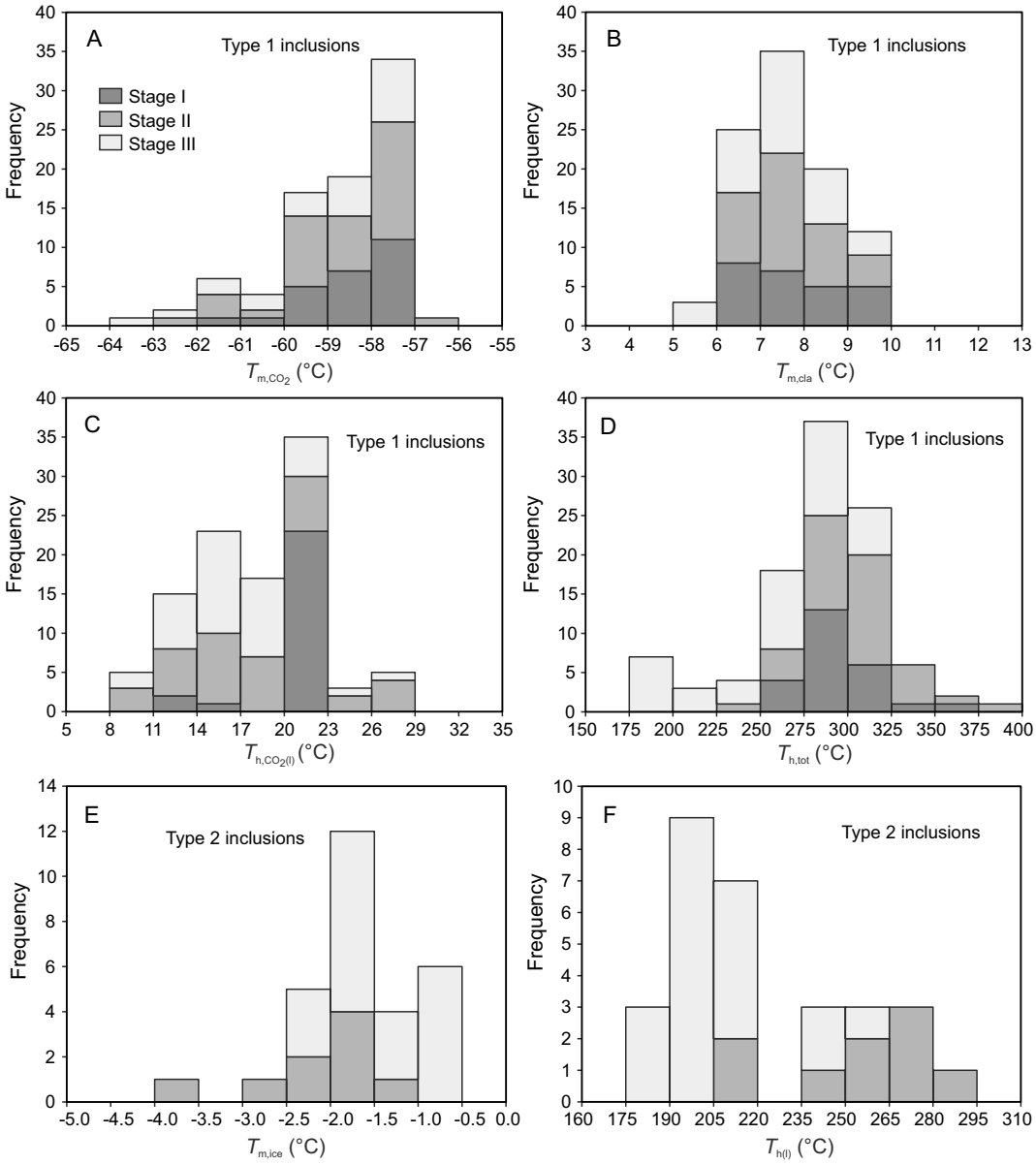
Gu et al., Figure S1, B36650



Gu et al., Figure S2, B36650



Gu et al., Figure S3, B36650



Gu et al., Figure S4, B36650

Table S2. LA-ICP-MS U-Pb Dating Results of Zircons from the Auriferous Quartz Vein in the Nanmingshui Gold Deposit

Grains	Th	U	Th/U	Isotope ratios						Age (Ma)					
	(ppm)	(ppm)		$^{207}Pb/^{206}Pb$	1σ	$^{207}Pb/^{235}U$	1σ	$^{206}Pb/^{238}U$	1σ	$^{207}Pb/^{206}Pb$	1σ	$^{207}Pb/^{235}U$	1σ	$^{206}Pb/^{238}U$	1σ
Type 1 Zircons (Magmatic)															
1	120	294	0.41	0.05476	0.00317	0.50706	0.02623	0.06678	0.00106	403	87	416	18	417	6
2	23	324	0.07	0.05524	0.0031	0.50259	0.02612	0.06566	0.00103	422	88	413	18	410	6
3	100	180	0.56	0.0553	0.00363	0.50635	0.03299	0.06684	0.00123	424	113	416	22	417	7
4	85	166	0.51	0.05997	0.00475	0.56159	0.04445	0.06718	0.00158	602	131	453	29	419	10
5	330	349	0.95	0.0546	0.00261	0.50572	0.02258	0.06672	0.0011	396	70	416	15	416	7
6	63	223	0.28	0.05331	0.00367	0.46377	0.02878	0.06177	0.00135	342	101	387	20	386	8
7	110	221	0.5	0.05183	0.00421	0.44588	0.03895	0.06059	0.00122	278	161	374	27	379	7
8	75	154	0.49	0.05898	0.0049	0.50026	0.04141	0.06164	0.00148	566	139	412	28	386	9
Type 2 Zircons (Hydrothermal)															
9	174	339	0.51	0.05335	0.0032	0.36637	0.02043	0.05036	0.00088	344	94	317	15	317	5
10	230	490	0.47	0.0563	0.00271	0.38555	0.01826	0.04882	0.00076	464	77	331	13	307	5
11	113	213	0.53	0.05209	0.00929	0.40477	0.10439	0.04966	0.00451	289	360	345	75	312	28
12	151	291	0.52	0.05852	0.00333	0.40967	0.02334	0.05039	0.00099	549	90	349	17	317	6
13	197	260	0.76	0.06019	0.00552	0.39964	0.0311	0.04944	0.00118	610	127	341	23	311	7
14	162	457	0.36	0.05801	0.00271	0.39922	0.01775	0.04976	0.00072	530	72	341	13	313	4

Table S3. Rare Earth Element (REE) Concentrations of Zircons from the Auriferous Quartz Vein in the Nanmingshui Gold Deposit

Grains	La (ppm)	Ce (ppm)	Pr (ppm)	Nd (ppm)	Sm (ppm)	Eu (ppm)	Gd (ppm)	Tb (ppm)	Dy (ppm)	Ho (ppm)	Er (ppm)	Tm (ppm)	Yb (ppm)	Lu (ppm)	Ce/Ce^*	Eu/Eu^*	ΣLREE	$(Sm/La)_N$	$(Sm/Ce)_N$	$(Tb/Yb)_N$
Type 1 Zircons (Magmatic)																				
1	0.19	5.96	0.18	3.38	8.65	1.38	64.27	27.21	385.44	155.66	724.96	168.60	1584.96	255.51	7.80	0.18	18.36	72.90	18.36	6.01
2	0.01	1.30	0.01	0.50	2.14	0.36	21.26	12.96	203.63	89.43	468.37	122.96	1293.87	221.39	31.45	0.16	3.96	342.69	3.96	6.82
3	0.01	14.17	0.03	0.96	2.21	0.42	16.65	6.13	82.67	33.03	155.11	37.13	363.37	62.97	197.92	0.21	17.38	353.90	17.38	0.65
4	0.28	8.84	0.15	2.43	5.04	0.97	36.89	17.06	232.19	90.87	426.65	99.78	943.05	148.58	10.44	0.22	16.74	28.82	16.74	2.36
5	0.47	29.42	0.52	5.98	11.35	1.97	65.89	23.59	295.88	110.14	465.69	98.65	889.19	140.23	14.40	0.22	47.74	38.67	47.74	1.60
6	0.02	4.28	0.04	1.30	4.91	0.84	37.81	17.02	230.96	95.91	438.47	103.68	977.34	158.28	36.61	0.19	10.55	393.13	10.55	4.75
7	0.07	5.89	0.22	2.75	8.66	1.56	60.73	24.03	306.84	117.16	514.87	116.07	1070.14	170.42	11.48	0.21	17.59	198.11	17.59	6.09
8	0.01	16.2	0.08	1.68	3.98	1.35	32.24	12.08	167.85	65.49	306.38	74.72	728.45	117.11	138.57	0.36	21.95	637.34	21.95	1.02
Type 2 Zircons (Hydrothermal)																				
9	1.41	12.39	0.40	1.86	2.21	0.37	11.50	4.84	63.80	25.97	127.28	32.02	335.73	56.68	3.99	0.22	18.27	2.51	18.27	0.74
10	59.10	141.18	15.99	74.95	17.48	1.15	33.19	8.71	104.17	41.59	207.67	51.86	532.74	92.34	1.11	0.15	308.70	0.47	308.70	0.51
11	1.08	21.17	0.43	3.23	3.93	0.76	23.77	9.47	123.50	46.37	209.87	47.78	452.31	73.15	7.52	0.24	29.84	5.83	29.84	0.77
12	0.82	13.60	0.30	2.54	3.64	0.75	21.41	8.62	108.12	44.59	210.00	51.37	509.32	90.08	6.63	0.26	20.90	7.11	20.90	1.11
13	38.36	104.40	11.40	58.75	21.16	3.05	84.65	26.19	296.53	106.92	455.84	98.33	883.75	144.69	1.21	0.22	234.07	0.88	234.07	0.84
14	9.20	50.75	2.83	14.50	4.80	0.37	15.38	6.20	80.90	34.93	184.86	49.47	518.54	93.40	2.41	0.13	82.08	0.84	82.08	0.39

Note: $Ce/Ce^* = (Ce)_N/[(La)_N \times (Pr)_N]^{1/2}$, $Eu/Eu^* = (Eu)_N/[(Sm)_N \times (Gd)_N]^{1/2}$, ΣLREE = Σ(La−Sm), chondrite-normalizing values from McDonough and Sun (1995).