

## Supplementary Information

Table 1. Major and trace element geochemistry of the San Cayetano Quartz Monzonite (SC) and Saldaña Formation (SF).

Sample		I388851	I388852	I388858	I388859	I388860	I388861	I388862	I388864	I388865	I388881	I388902	I388903	I388904	I388905	I388913	I388916	I388917	I388918	I388960	I388962	I388976	I388977	I388978	I388979	I388863	I388868	I388874	I388884	I388951	I388953	I388954	I388956	I388969	I388974		
Pluton		SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SF-Tuff	SF-Tuff	SF-Por-phyry	SF-Por-phyry	SF-Tuff	SF-Por-phyry	SF-Por-phyry	SF-Por-phyry	SC	Detection Limit
West		75° 11' 00.43"	75° 11' 54.41"	75° 11' 31.29"	75° 11' 08.86"	75° 11' 26.95"	75° 11' 30.51"	75° 09' 59.45"	75° 10' 10.19"	75° 09' 42.22"	75° 10' 35.95"	75° 10' 53.67"	75° 11' 02.43"	75° 11' 21.29"	75° 11' 31.72"	75° 10' 50.13"	75° 10' 34.54"	75° 10' 32.21"	75° 10' 26.48"	75° 11' 30.11"	75° 10' 04.02"	75° 10' 29.32"	75° 10' 13.75"	75° 10' 13.75"	75° 09' 53.50"	75° 09' 58.02"	75° 10' 34.38"	75° 10' 44.12"	75° 14' 11.88"	75° 12' 45.59"	75° 12' 29.94"	75° 11' 47.82"	75° 12' 00.67"	75° 10' 01.79"	75° 10' 29.02"		
North		3° 39' 57.71"	3° 40' 50.73"	3° 40' 38.95"	3° 40' 51.28"	3° 41' 04.11"	3° 41' 04.31"	3° 39' 19.83"	3° 39' 07.68"	3° 39' 28.87"	3° 38' 49.23"	3° 39' 45.29"	3° 39' 50.71"	3° 39' 18.09"	3° 40' 48.41"	3° 39' 03.69"	3° 38' 59.45"	3° 38' 58.80"	3° 39' 00.07"	3° 38' 59.99"	3° 39' 26.34"	3° 38' 53.63"	3° 39' 10.57"	3° 39' 10.57"	3° 39' 35.17"	3° 39' 17.75"	3° 38' 13.81"	3° 37' 58.08"	3° 42' 04.90"	3° 40' 12.45"	3° 40' 12.02"	3° 40' 18.09"	3° 41' 21.81"	3° 38' 11.74"	3° 38' 52.46"		
SiO <sub>2</sub>	%	58.0	60.0	54.4	53.0	56.0	52.3	58.0	54.9	60.9	59.8	50.7	51.0	53.3	53.8	59.8	65.7	51.8	65.5	53.8	50.3	54.9	56.1	52.8	68.6	54.0	61.0	61.5	51.8	56.8	61.5	60.9	55.3	54.8	55.9	0.01	
Al <sub>2</sub> O <sub>3</sub>	%	17.95	14.35	18.80	17.80	20.8	18.90	15.95	14.80	15.00	14.25	17.95	18.00	18.85	19.10	14.70	14.45	18.65	15.50	16.40	16.00	17.55	15.95	16.75	13.45	17.45	16.05	17.50	16.60	18.15	14.80	15.35	19.35	19.10	18.90	0.01	
Fe <sub>2</sub> O <sub>3</sub>	%	6.45	9.19	7.68	7.99	5.39	7.86	9.26	8.06	7.13	6.99	9.42	9.07	7.13	6.84	7.06	4.07	7.86	6.96	9.57	8.53	7.43	7.74	8.34	2.17	8.07	7.51	4.19	7.09	6.50	6.67	7.45	5.10	6.23	6.24	0.01	
CaO	%	5.84	2.19	7.48	6.82	6.10	8.25	5.61	11.95	10.50	3.70	8.41	8.07	7.23	6.89	1.81	0.84	4.94	0.15	16.00	14.90	3.99	11.60	4.76	1.04	5.57	0.19	0.02	5.37	3.79	2.36	0.31	4.68	6.66	7.44	0.01	
MgO	%	1.44	1.30	3.17	3.11	1.29	3.32	2.41	0.81	1.35	2.12	3.64	3.41	3.00	2.73	0.99	0.72	2.54	0.54	0.06	2.06	1.99	1.16	2.07	0.39	3.08	1.81	0.88	1.92	1.47	1.11	0.58	1.44	1.77	1.75	0.01	
Na <sub>2</sub> O	%	3.74	2.54	3.88	3.88	4.37	3.83	5.26	1.89	1.96	2.27	3.61	3.65	3.87	3.97	3.97	2.79	4.33	2.38	0.41	1.26	4.28	3.41	4.28	4.38	4.06	2.96	0.04	5.98	4.11	4.34	3.30	3.97	3.22	3.79	0.01	
K <sub>2</sub> O	%	3.59	5.18	3.07	3.35	3.74	2.54	2.00	0.76	1.13	4.08	2.44	2.60	3.04	3.15	4.60	2.64	2.32	2.52	0.04	1.06	4.63	0.08	3.32	5.34	3.86	1.67	4.17	2.97	4.30	4.11	3.08	3.83	3.95	2.51	0.01	
Cr <sub>2</sub> O <sub>3</sub>	%	<0.01	<0.01	0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	
TiO <sub>2</sub>	%	1.06	1.46	0.91	0.99	0.74	0.97	1.08	0.90	0.80	0.99	1.22	1.17	0.85	0.85	1.21	0.56	0.91	0.86	0.81	0.76	0.98	0.91	1.08	0.42	1.03	0.94	0.90	0.89	1.11	1.06	0.92	0.70	0.82	0.94	0.01	
MnO	%	0.11	0.15	0.14	0.15	0.10	0.14	0.17	0.14	0.12	0.15	0.16	0.16	0.13	0.12	0.08	0.12	0.15	0.13	0.21	0.17	0.17	0.15	0.16	0.04	0.16	0.13	0.14	0.14	0.11	0.13	0.13	0.07	0.11	0.11	0.01	
P <sub>2</sub> O <sub>5</sub>	%	0.53	0.41	0.49	0.57	0.49	0.69	0.32	0.51	0.50	0.48	0.89	0.80	0.42	0.51	0.52	0.13	0.51	0.08	0.26	0.47	0.56	0.43	0.53	0.07	0.58	0.04	0.02	0.56	0.56	0.45	0.27	0.52	0.52	0.43	0.01	
SrO	%	0.08	0.03	0.15	0.14	0.16	0.16	0.10	0.51	0.40	0.05	0.16	0.15	0.15	0.14	0.03	0.01	0.08	0.01	0.94	0.42	0.11	0.45	0.10	0.02	0.13	0.04	0.01	0.04	0.06	0.06	0.02	0.15	0.15	0.08	0.01	
BaO	%	0.12	0.15	0.16	0.17	0.19	0.14	0.15	0.03	0.02	0.20	0.23	0.31	0.16	0.17	0.15	0.04	0.11	0.04	<0.01	0.03	0.27	<0.01	0.17	0.06	0.18	0.07	0.13	0.12	0.15	0.15	0.06	0.17	0.17	0.12	0.01	
C	%	0.01	0.11	0.04	0.09	0.06	0.05	0.04	0.04	0.03	0.02	0.03	0.03	0.03	0.02	0.03	0.16	0.08	0.06	0.03	0.43	0.01	0.02	0.06	0.01	0.05	0.06	0.02	0.84	0.04	0.04	0.06	0.16	0.04	0.01	0.01	
S	%	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	0.01	
LOI	%	1.40	2.20	1.11	0.80	1.10	2.08	1.00	2.90	1.90	2.40	1.39	1.80	2.00	1.80	2.80	3.71	3.71	4.29	1.80	4.50	3.50	2.40	4.90	0.70	1.99	5.30	5.58	3.50	2.09	1.39	3.42	2.79	1.50	1.40	0.01	
Total	%	100.5	99.2	101.5	98.8	100.5	101.0	101.5	98.2	101.5	97.5	100.0	100.0	100.0	100.0	97.7	95.8	97.9	99.0	100.5	100.5	100.5	100.5	99.3	96.7	100.0	97.7	95.1	97.0	99.2	98.1	95.8	98.1	99.0	99.6	0.01	
Ba	ppm	935	1265	1270	1395	1570	1190	1170	217	196.0	1720	2050	2760	1430	1520	1285	330	979	320	16.8	228	2230	37.9	1525	498	1495	576	1070	1000	1390	1315	542	1680	1460	1050	0.5	
Ce	ppm	83.3	92.4	65.0	77.7	74.4	68.9	44.0	67.4	61.6	52.8	72.0	64.3	57.1	62.6	101.5	62.4	57.3	45.2	91.9	58.0	69.3	59.0	70.2	101.5	77.2	47.7	80.4	46.7	87.3	74.3	74.8	75.4	56.6	61.6	0.5	
Cr	ppm	10	<10	40	40	10	30	10	20	20	<10	30	30	30	30	<10	<10	20	<10	10	20	20	30	30	10	20	10	<10	20	10	10	<10	10	10	20	10	
Cs	ppm	1.36	2.02	1.79	2.15	1.65	1.43	0.58	0.23	0.15	0.42	0.90	1.10	1.15	1.01	1.11	2.93	0.59	3.33	0.06	0.22	1.17	0.04	0.99	0.82	1.60	1.55	6.82	2.19	1.24	0.68	1.56	1.43	0.88	1.43	0.01	
Dy	ppm	6.27	7.64	3.94	4.55	3.68	3.82	4.52	4.05	3.60	5.45	4.61	4.10	3.60	3.69	8.10	4.18	4.45	3.84	5.14	3.60	4.19	3.93	4.61	5.31	4.57	3.33	7.74	3.90	6.87	6.80	6.24	3.87	4.07	5.33	0.05	
Er	ppm	3.82	4.91	2.27	2.53	2.12	2.06	2.75	2.28	1.98	3.32	2.50	2.24	2.02	2.09	5.00	3.21	2.72	2.65	3.09	1.95	2.32	2.17	2.50	3.38	2.57	2.26	4.98	2.35	4.21	4.22	4.09	2.14	2.29	3.05	0.03	
Eu	ppm	1.66	1.67	1.82	1.94	1.82	1.90	1.41	2.11	1.52	1.64	2.30	2.37	1.81	1.82	1.90	1.03	1.47	1.08	1.37	2.10	1.88	1.35	2.00	0.67	1.87	0.99	2.35	1.19	1.75	1.95	1.68	2.00	1.53	1.67	0.03	
Ga	ppm	20.8	22.1	21.7	21.9	23.4	22.3	19.3	34.1	23.2	16.1	21.0	21.1	21.3	21.7	18.5	16.6	20.3	18.9	53.0	31.2	21.1	29.8	21.9	18.6	21.8	18.9	22.6	13.3	20.5	18.3	18.9	24.5	22.4	22.5	0.1	
Gd	ppm	7.39	8.30	5.22	6.25	5.19	5.51	4.85	5.41	4.94	5.80	6.57	5.82	4.75	5.02	9.07	4.15	5.28	3.85	6.21	4.70	5.74	5.14	6.10	6.00	6.23	3.43	8.41	4.19	7.96	6.97	6.51	5.28	4.83	5.92	0.05	
Hf	ppm	8.0	13.8	4.3	4.3	4.1	3.4	4.0	4.2	3.4	4.9	2.2	2.3	3.7	4.0	10.9	7.3	4.6	4.9	8.8	2.8	4.2	4.0	3.9	11.5	3.9	4.7	8.0	4.5	9.0	7.6	7.3	4.5	4.5	6.0	0.2	

**Table 1.** Major and trace element geochemistry of the San Cayetano Quartz Monzonite (SC) and Saldaña Formation (SF) (*continued*).

Sample	I388851	I388852	I388858	I388859	I388860	I388861	I388862	I388864	I388865	I388881	I388902	I388903	I388904	I388905	I388913	I388916	I388917	I388918	I388960	I388962	I388976	I388977	I388978	I388979	I388863	I388868	I388874	I388884	I388951	I388953	I388954	I388956	I388969	I388974			
Pluton	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SF-Tuff	SF-Tuff	SF-Por-phyry	SF-Por-phyry	SF-Tuff	SF-Por-phyry	SF-Por-phyry	SF-Por-phyry	SC	Detection		
West	75° 11' 00.43"	75° 11' 54.41"	75° 11' 31.29"	75° 11' 08.86"	75° 11' 26.95"	75° 11' 30.51"	75° 09' 59.45"	75° 10' 10.19"	75° 09' 42.22"	75° 10' 35.95"	75° 10' 53.67"	75° 11' 02.43"	75° 11' 21.29"	75° 11' 31.72"	75° 10' 50.13"	75° 10' 34.54"	75° 10' 32.21"	75° 10' 26.48"	75° 11' 30.11"	75° 10' 04.02"	75° 10' 29.32"	75° 10' 13.75"	75° 10' 13.75"	75° 09' 53.50"	75° 09' 58.02"	75° 10' 34.38"	75° 10' 44.12"	75° 14' 11.88"	75° 12' 45.59"	75° 12' 29.94"	75° 11' 47.82"	75° 12' 00.67"	75° 10' 01.79"	75° 10' 29.02"	Limit		
North	3° 39' 57.71"	3° 40' 50.73"	3° 40' 38.95"	3° 40' 51.28"	3° 41' 04.11"	3° 41' 04.31"	3° 39' 19.83"	3° 39' 07.68"	3° 39' 28.87"	3° 38' 49.23"	3° 39' 45.29"	3° 39' 50.71"	3° 40' 18.09"	3° 40' 48.41"	3° 39' 03.69"	3° 38' 59.45"	3° 38' 58.80"	3° 39' 00.07"	3° 38' 59.99"	3° 39' 26.34"	3° 38' 53.63"	3° 39' 10.57"	3° 39' 10.57"	3° 39' 35.17"	3° 39' 17.75"	3° 38' 13.81"	3° 37' 58.08"	3° 42' 04.90"	3° 40' 12.45"	3° 40' 12.02"	3° 40' 18.09"	3° 41' 21.81"	3° 38' 11.74"	3° 38' 52.46"			
Tb	ppm	1.09	1.31	0.73	0.84	0.68	0.73	0.75	0.74	0.67	0.94	0.94	0.82	0.70	0.71	1.42	0.73	0.83	0.65	0.94	0.68	0.82	0.76	0.89	0.95	0.84	0.54	1.29	0.75	1.27	1.27	1.07	0.77	0.73	0.96	0.01	
Th	ppm	10.35	16.05	6.57	7.15	7.85	6.45	4.27	6.14	5.74	4.67	3.14	3.37	5.77	5.08	12.25	7.53	5.66	4.96	16.65	4.36	6.71	6.50	6.47	32.0	5.80	5.64	8.96	5.15	10.20	8.16	8.25	8.52	6.96	7.16	0.05	
Tl	ppm	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
Tm	ppm	0.58	0.77	0.32	0.37	0.31	0.29	0.42	0.32	0.29	0.47	0.33	0.30	0.30	0.30	0.71	0.51	0.39	0.39	0.48	0.28	0.34	0.31	0.35	0.55	0.37	0.37	0.78	0.36	0.59	0.61	0.61	0.31	0.34	0.46	0.01	
U	ppm	2.83	4.18	1.72	1.98	2.02	1.48	1.11	1.40	1.49	1.24	0.84	0.91	1.47	1.25	3.30	1.43	1.54	1.24	4.47	1.42	1.52	1.49	1.32	7.75	1.50	1.45	2.33	1.59	2.81	2.20	1.95	2.09	1.81	1.90	0.05	
V	ppm	106	73	195	215	113	242	252	234	174	108	270	251	184	174	66	251	176	113	122	223	174	205	190	18	202	203	29	141	106	48	70	97	132	96	5	
W	ppm	2	3	1	2	2	2	2	2	1	<1	<1	<1	<1	<1	1	<1	1	1	1	1	1	1	2	2	2	1	3	1	1	2	1	1	1	1	1	
Y	ppm	36.5	46.1	22.2	25.2	21.1	21.2	26.4	22.8	19.5	30.1	23.4	21.1	19.1	20.7	44.6	25.3	24.7	24.4	29.3	19.0	22.1	20.3	22.7	29.9	25.7	20.3	48.3	22.9	39.3	39.5	36.2	20.0	21.0	28.9	0.5	
Yb	ppm	3.58	5.00	2.04	2.28	1.94	1.81	2.63	1.97	1.74	3.09	2.03	1.77	1.82	1.95	4.64	3.49	2.52	2.69	3.27	1.79	2.15	2.03	2.27	3.97	2.37	2.37	4.89	2.26	3.98	4.06	3.96	2.02	2.33	3.05	0.03	
Zr	ppm	317	546	183	178	167	146	161	177	137	181	81	81	140	156	416	275	179	186	367	114	171	158	156	425	161	191	317	166	342	285	273	182	189	243	2	
As	ppm	1.2	2.4	1.3	2.2	1.5	1.7	5.2	1.4	5.6	1.4	4.7	1.1	1.1	1.5	4.8	0.5	1.4	0.1	1.8	1.6	1.8	2.2	2.0	1.5	2.8	0.6	<0.1	12.1	1.7	4.4	1.8	0.5	1.6	0.7	0.1	
Bi	ppm	0.02	0.02	0.01	0.01	0.01	<0.01	0.02	0.01	0.04	0.03	0.02	0.01	0.01	0.03	0.04	0.01	<0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.05	0.02	0.01	<0.01	<0.01	0.02	0.02	<0.01	0.02	0.01	
Hg	ppm	<0.005	0.009	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005
Sb	ppm	0.06	0.13	0.05	0.08	0.08	0.06	0.23	0.18	0.14	0.11	0.07	0.05	0.05	0.07	0.13	0.11	0.10	0.19	0.36	0.15	0.06	0.16	0.08	0.13	0.05	0.18	<0.05	0.53	0.20	0.16	0.11	0.09	0.11	0.05	0.05	
Se	ppm	0.6	0.9	0.4	0.5	0.5	0.5	0.4	0.6	0.3	0.8	0.6	0.5	0.3	0.4	0.6	0.4	0.6	0.3	0.4	0.5	0.7	0.5	0.7	0.4	0.5	0.3	0.6	0.6	0.7	0.9	0.5	0.6	0.6	0.7	0.2	
Te	ppm	<0.01	0.01	<0.01	<0.01	<0.01	0.01	0.01	<0.01	0.01	0.14	0.01	0.01	<0.01	0.01	0.01	<0.01	0.01	<0.01	0.02	0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.01	0.01	0.01	0.03	<0.01	<0.01	0.01	
Ag	ppm	<0.5	<0.5	1.0	0.9	1.2	1.4	0.9	3.7	2.8	0.6	1.3	1.0	1.2	1.1	<0.5	<0.5	0.6	<0.5	7.1	3.2	<0.5	1.3	0.6	<0.5	1.2	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	1.1	<0.5	<0.5	<0.5	0.5
Cd	ppm	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
Co	ppm	10	10	18	19	10	19	17	5	10	11	21	20	18	16	8	3	18	11	<1	13	18	10	20	4	18	15	1	14	10	7	4	10	15	12	1	
Cu	ppm	97	64	142	144	130	195	94	132	49	26	223	193	131	130	15	11	317	195	3	32	175	96	192	29	137	94	11	28	168	8	<1	118	213	86	1	
Mo	ppm	3	2	1	2	2	1	1	2	1	1	1	2	2	3	<1	1	1	3	2	1	<1	1	7	2	1	<1	1	1	2	<1	2	1	<1	1		
Ni	ppm	4	<1	16	15	4	17	3	3	8	<1	16	13	16	14	<1	<1	10	<1	<1	11	15	15	20	3	15	2	<1	7	5	2	<1	5	11	9	1	
Pb	ppm	14	20	15	16	12	11	15	28	110	17	9	9	11	13	10	5	14	15	17	33	15	72	12	43	20	9	9	8	17	18	9	16	18	10	2	
Zn	ppm	82	75	80	92	70	81	88	34	101	120	99	100	77	76	64	27	86	80	4	72	96	54	106	24	101	105	138	80	81	97	82	63	80	79	2	