

Dataset S1. Measured and calculated endmember concentrations of dissolved species

<u>SITE (depth, location)</u>		Mg	Cl	pH	H ₂	H ₂ S	ΣCO ₂	CO	CH ₄	NH ₄ ⁺	Measured CH ₃ SH	Predicted CH ₃ SH	
Vent (Max. temp. °C)		Sample	(mm)	(mm)	(25°C)	(mM)	(mM)	(mm)	(μM)	(mM)	(μM (±2s))	(nM (±2s, n))	nmolal
RAINBOW (2300m, 36°13.80'N–33°54.15'W)													
<i>Endmember Fluids</i>													
PP27/Exo2/Padraig/Termitiere (350°C)	J2-353-IGT-3	6.90	732	3.35	10.7	2.7	19.6	4.5	1.73	1.8(±0.28)	6.7(±0.3, 1)	-	
	J2-353-CGT-R	7.05	728	3.59	10.6	3.0	17.8	4.4	1.76	2.9(±0.15)	6.5(±0.3, 1)	-	
	Endmember	0	758	3.35	12.3	3.3	21.3	5.1	2.01	2.7	7.7	8.0x10²	
Stylo 1 (367°C)	J2-354-IGT-5	4.17	746	3.31	15.0	1.9	23.4	6.6	1.95	1.9(±0.21)	7.6(±0.8, 4)	-	
	J2-354-CGT-B	3.92	750	3.39	14.8	2.3	22.3	6.8	1.93	2.3(±0.23)	6.1(±0.9, 3)	-	
	Endmember	0	765	3.31	16.1	2.3	24.6	7.2	2.10	2.3	7.4	4.0x10²	
CMSP&P (365°C)	J2-354-IGT-3	3.49	751	3.36	14.8	1.8	20.6	6.9	1.91	2.0(±0.23)	7.2(±1.0, 3)	-	
	J2-354-CGT-Y	49.5	nd	6.20	1.5	0.09	nd	0.4	0.18	0.74(±0.38)	1.1(±0.1, 3)	-	
	Endmember	0	766	3.36	15.9	2.0	21.9	7.4	2.05	2.2	7.8	3.5x10²	
Stylo 2 (X11) (364°C)	J2-355-IGT-4	3.97	743	3.12	15.4	1.8	19.7	6.3	1.94	2.4(±0.37)	12.0(±2.4, 3)	-	
	J2-355-CGT-R	9.11	729	3.67	13.6	1.7	17.4	5.9	1.73	1.7(±0.09)	5.7(±0.5, 3)	-	
	Endmember	0	763	3.12	16.5	2.0	20.9	7.0	2.10	2.4	10.3	4.0x10²	
<i>Low Temperature Fluids</i>													
Ecurie (191°C)	J2-354-IGT-4	33.8	631	5.05	4.8	0.6	11.2	2.7	0.88	2.4(±0.18)	93.3(±6.2, 4)	-	
	J2-354-IGT-8	13.2	717	3.23	9.4	1.4	18.7	5.9	1.79	2.4(±0.36)	223(±11, 3)	1.3x10⁶	
Mussel Beach (180°C)	J2-355-IGT-8	7.18	728	3.00	13.4	1.5	21.8	7.3	1.80	1.6(±0.14)	47.7(±4, 3)	1.5x10⁶	
Bottom Seawater		52.5	547	~8	0	0	2.2	0	0	0.1	0 (nd‡)	-	
LOST CITY (750m, 30°07.4'N–42°07.2'W)													
<i>Endmember Fluids</i>													
Poseidon Beehive (94°C)	J2-361-CGT-B	6.50	nd §	10.2	9.1	0.21	nd	BD	0.93	3.2(±0.34)	1.6(±0.6, 3)	-	
	J2-361-CGT-W	2.30	nd §	10.5	10.1	0.47	0.19	BD	1.04	3.3(±0.17)	2.5(±1.5, 4)	-	
	J2-361-IGT-5	1.40	nd §	10.5	10.1	0.07	0.32	BD	1.06	3.3(±0.16)	1.4(±0.9, 4)	-	
	Endmember	0	nd §	10.2	10.4	0.27	0.18	BD	1.08	3.5	1.9	nd*	
Marker 6 (96°C)	J2-362-IGT-4	1.23	nd §	10.5	10.3	0.22	0.15	BD	1.10	3.4(±0.17)	1.3(±0.4, 3)	-	
	Endmember	0	nd §	10.5	10.5	0.22	0.10	BD	1.13	3.5	1.4	nd*	
Bottom Seawater		53.3	547	~8	0	0	2.2	0	0	0.1	0 (nd‡)	-	
LUCKY STRIKE (1700m, 37°17.5'N–32°16.7'W)													
<i>Endmember Fluids</i>													
Isabel (292°C)	J2-357-IGT-5	2.75	490	3.81	0.032	3.5	106	BD	0.82	5.8(±0.31)	6.1(±1.7, 3)	-	
	Endmember	0	487	3.81	0.034	3.7	112	BD	0.86	6.2	6.5	1.1x10⁻²	
US4 (299°C)	J2-357-IGT-3	2.32	418	3.89	0.051	3.6	127	BD	0.71	8.9(±0.45)	5.3(±1.3, 4)	-	
	Endmember	0	414	3.89	0.053	3.8	133	BD	0.74	9.3	5.6	2.6x10⁻²	
Crystal (308°C)	J2-358-IGT-8	2.85	538	4.43	0.037	3.7	110	BD	0.77	16.1(±0.80)	23.0(±3.0, 3)	-	
	J2-358-CGT-R	31.2	544	4.72	0.020	2.0	48.9	BD	0.33	4.2(±0.21)	7.5(±0.9, 4)	-	
	Endmember	0	538	4.43	0.041	4.1	117	BD	0.82	16.0	23.4	4.3x10⁻³	
Medea (270°C)	J2-359-IGT-2	4.17	552	3.81	0.060	2.5	90.3	BD	0.82	6.2(±0.52)	5.4(±0.7, 3)	-	
	J2-359-CGT-Y	3.82	553	3.90	0.056	2.9	91.2	BD	0.82	5.6(±0.28)	5.6(±0.7, 3)	-	
	Endmember	0	554	3.81	0.063	2.9	98.0	BD	0.89	6.4	5.9	3.5x10⁻¹	
Bottom Seawater		52.5	547	~8	0	0	2.2	0	0	0.1	0 (nd‡)	-	
TAG (3600m, 26°08'N–44°49'W)													
<i>Endmember Fluids</i>													
Black Smoker Complex (363°C)	J2-363-IGT-5	3.93	nd §	3.28	0.095	4.7	4.94	BD	0.13	4.0(±0.65)	11.6(±2.5, 3)	-	
	J2-363-CGT-R	5.93	nd §	4.09	0.088	4.5	4.47	BD	0.13	4.4(±0.23)	10.2(±0.5, 2)	-	
	Endmember	0	nd §	3.28	0.10	5.1	4.97	BD	0.14	4.6	12.0	5.8x10⁻⁵	
Bottom Seawater		52.5	547	~8	0	0	2.2	0	0	0.1	0 (nd‡)	-	
9°50'N EPR (2500m, 9°50.3'N–104°17.5'W)													
<i>Endmember Fluids</i>													
Bio9 (HOBO) (363°C)	4469-IGT-4	3.27	375	3.50	0.92	10.2	86.9	1.6	0.076	3.2(±0.16)	4.3(±0.8, 3)	-	
	4469-IGT-5	3.04	378	3.55	0.87	11.0	86.7	nd	0.075	2.3(±0.17)	3.2(±0.3, 3)	-	
	Endmember	0	366	3.50	0.95	11.3	92.1	1.8	0.081	2.9	4.0	2.0	
Trick or Treat (Marker 28) (281°C)	4469-IGT-1	5.73	195	3.94	1.0	17.1	60.4	nd	0.058	1.9(±0.09)	11.1(±3, 3)	-	
	4469-IGT-3	2.45	169	3.83	1.2	18.3	66.1	1.9	0.066	2.5(±0.24)	10.0(±0.8, 3)	-	
	Endmember	0	152	3.83	1.2	19.2	68.3	2.0	0.067	2.4	11.4	4.1x10³	
Tica (275°C)	4464-IGT-1	4.08	335	3.83	0.37	8.2	92.5	0.81	0.091	2.1(±0.15)	3.6(±0.6, 3)	-	
	4464-IGT-6	14.4	377	4.32	0.29	6.8	72.4	0.64	0.095	2.2(±0.44)	2.9(±0.5, 3)	-	
	Endmember	0	318	3.83	0.40	9.0	99.3	0.9	0.11	2.6	4.0	1.8x10²	
L Vent (246°C)	4467-IGT-1	4.29	567	3.83	0.72	5.2	8.81	0.20	0.071	3.1(±0.31)	7.8(±0.4, 2)	-	
	4467-IGT-5	8.89	559	4.31	0.70	4.6	8.18	0.18	0.070	2.6(±0.24)	9.8(±0.6, 3)	-	
	Endmember	0	567	3.83	0.81	5.6	9.38	0.22	0.080	3.2	9.9	1.5x10³	
L Vent (Marker 8) (221°C)	4468-IGT-4	9.11	558	4.20	0.63	4.7	8.19	BD	0.066	4.0(±0.20)	7.5(±0.6, 3)	-	
	Endmember	0	562	4.20	0.75	5.7	9.43	BD	0.080	4.9	9.0	1.3x10⁴	

Dataset S1. (continued)

SITE (depth, location)		Mg	Cl	pH	H ₂	H ₂ S	ΣCO ₂	CO	CH ₄	NH ₄ ⁺	Measured CH ₃ SH	Predicted CH ₃ SH
Vent (Max. temp. °C)	Sample	(mm)	(mm)	(25°C)	(mM)	(mM)	(mm)	(μM)	(mM)	(μM (±2s))	(nM (±2s, n))	molal
9°50'N EPR (continued)												
<i>Low Temperature & Mixed Fluids</i>												
L. Vent Fissure (78°C)	4467-IGT-6	41.1	543	5.77	0.028	1.0	3.93	BD	0.037	7.6 (±0.61)	17.8 (±1.3, 3)	7.5x10³
	4467-IGT-8	49.0	nd	6.43	0.013	nd	2.96	BD	0.010	1.4 (±0.07)	6.5 (±0.3, 3)	-
Crab Spa (23°C)	4464-IGT-4	50.3	525	5.74	0.0032	0.17	7.26	BD	0.010	8.6 (±0.72)	6.1 (±0.3, 3)	9.4x10²
	4464-IGT-5	50.5	528	5.87	0.0028	0.19	7.26	BD	0.012	10.0 (±0.67)	5.7 (±0.3, 3)	-
	4466-IGT-3	50.0	526	5.79	0.0058	0.29	7.47	BD	0.009	8.7 (±0.44)	5.9 (±0.3, 1)	-
Bottom Seawater		53.5	538	~8	0	0	2.18	0	0	0.1	0 (nd‡)	-
GUAYMAS BASIN (2000m, 27°02'N–111°24'W)												
<i>Endmember Fluids</i>												
Theme Park (251°C)	4458-IGT-1	3.46	598	5.78	0.50	6.4	43.9	nd	41.5	12.3x10 ³ (±0.62x10 ³)	15.3x10 ³ (±0.76x10 ³ , 2)	-
	4458-IGT-8	31.9	564	5.73	0.23	2.8	21.1	nd	18.8	5.2x10 ³ (±0.26x10 ³)	6.52x10 ³ (±0.80x10 ³ , 3)	-
	Endmember	0	602	5.73	0.54	6.8	47.1	nd	44.7	13.1x10 ³	16.3x10³	nd*
Cathedral Hill (172°C)	4459-IGT-5	41.0	555	5.73	0.12	1.8	9.85	6.3	10.3	2.8x10 ³ (±0.14x10 ³)	3.49x10 ³ (±0.20x10 ³ , 3)	-
	Endmember	0	611	5.73	0.52	7.9	35.0	27	44.2	11.8x10 ³	14.9x10³	nd*
Sulfide Spires (218°C)	4461-IGT-5	12.9	588	5.75	0.42	5.3	31.8	76	32.8	10.5x10 ³ (±0.53x10 ³)	12.9x10 ³ (±1.9x10 ³ , 3)	-
	4461-IGT-8	32.3	567	4.48	0.24	2.9	21.0	26	19.3	5.4x10 ³ (±0.27x10 ³)	6.14x10 ³ (±0.80x10 ³ , 3)	-
	Endmember	0	605	4.48	0.56	7.1	42.9	92.4	44.4	13.8x10 ³	16.7x10³	nd*
Toadstool (288°C)	4462-IGT-5	11.3	583	6.13	2.1	6.1	41.8	nd	49.7	12.7x10 ³ (±0.64x10 ³)	8.5 (±1.0, 2)	-
	4462-IGT-6	2.42	595	6.09	2.6	7.9	47.6	nd	61.0	15.2x10 ³ (±0.76x10 ³)	6.1 (±2.0, 2)	-
	Endmember	0	597	6.09	2.7	8.0	50.8	nd	63.5	16.0x10 ³	8.1	nd*
Rebecca's Roost (299°C)	4462-IGT-1	3.12	597	6.14	3.1	7.5	45.8	nd	54.5	14.6x10 ³ (±0.73x10 ³)	14.1 (±0.7, 1)	-
	4462-IGT-4	5.64	592	6.09	3.0	7.3	43.6	nd	53.6	13.8x10 ³ (±0.69x10 ³)	5.1 (±0.3, 1)	-
	Endmember	0	600	6.09	3.3	8.0	48.5	nd	58.8	15.5x10 ³	11	nd*
Bottom Seawater		53.5	538	~8	0	0	2.18	0	0	0.1	0 (nd‡)	-
VON DAMM (2300m, 18°22.6'N–81°47.9'W)												
<i>Endmember Fluids</i>												
East Summit (226°C)	J2-616-IGT8	2.43	653	5.56	18.3	3.1	2.75	nd	2.71	17.1 (±0.85)	21 (±8.0, 2)	-
	Endmember	0	658	5.56	19.2	3.2	2.78	nd	2.84	17.9	22	1.6x10⁶
<i>Low Temperature & Mixed Fluids</i>												
Arrow Loop #1 (134°C)	J2-616-IGT6	18.5	615	5.86	10.8	1.9	2.27	nd	1.73	14.4 (±0.72)	91.6 (±6.3, 3)	1.8x10⁶
White Castle (151°C)	J2-616-IGT1	13.5	631	5.77	13.1	2.1	2.51	nd	2.08	14.5 (±0.73)	152 (±9.2, 3)	2.0x10⁶
Ginger Castle (128°C)	J2-617-IGT4	18.0	624	6.06	11.3	2.1	2.35	nd	1.91	15.6 (±0.78)	104 (±11, 3)	2.0x10⁶
Ravelin #1 (145°C)	J2-617-IGT2	16.8	618	5.93	13.1	1.7	2.40	nd	1.98	14.2 (±0.71)	57.4 (±4.4, 2)	-
	J2-617-IGT6	15.0	625	5.83	13.4	2.5	2.52	nd	2.06	14.6 (±0.73)	52.5 (±3.0, 3)	2.3x10⁶
Ravelin #2 (116°C)	J2-621-IGT2	13.4	640	5.88	13.6	2.2	1.98	nd	2.14	nd	206 (±10, 2)	1.9x10⁶
	J2-621-IGT8	22.0	609	6.12	10.9	1.9	1.88	nd	1.73	11.2 (±0.56)	154 (±11, 2)	-
West Summit (126°C)	J2-621-IGT1	24.0	607	6.00	9.9	1.9	2.08	nd	1.64	14.1 (±0.71)	142 (±7.1, 2)	-
	J2-621-IGT4	23.2	611	6.01	9.9	1.8	2.11	nd	1.67	13.7 (±0.68)	138 (±6.9, 2)	1.7x10⁶
Bottom Seawater		52.4	545	~8	0	0	2.2	0	0	0.1	0 (nd‡)	-
PICCARD (4960m, 18°32.8'N–81°43.1'W)												
<i>Endmember Fluids</i>												
Beebe 3 (397°C)	J2-619-IGT4	1.26	363	3.23	20.2	11.9	25.7	nd	0.120	33.6 (±2.2)	10.2 (±2.3, 3)	-
	J2-619-IGT8	1.59	363	3.17	20.1	11.4	25.0	nd	0.119	33.8 (±1.7)	15.5 (±8.4, 3)	-
	Endmember	0	358	3.17	20.7	12.0	26.0	nd	0.123	34.7	13.2	5.3x10²
Beebe Woods (354°C)	J2-618-IGT2	2.95	nd	3.24	19.6	11.6	24.5	nd	0.122	35.1 (±1.8)	9.9 (±0.49, 2)	-
	J2-618-IGT8	2.97	365	3.18	19.4	11.6	24.7	nd	0.120	35.0 (±1.8)	10.1 (±0.81, 3)	-
	Endmember	0	354	3.18	20.7	12.3	25.9	nd	0.128	37.2	10.6	1.3x10⁴
<i>Mixed Fluids</i>												
Hot Chimlet #1 (149°C)	J2-619-IGT6	35.4	487	5.06	2.0	2.7	9.09	nd	0.054	14.2 (±0.71)	1.76x10 ³ (±0.11x10 ³ , 3)	-
	J2-619-IGT3	33.4	479	4.97	2.1	2.3	10.1	nd	0.060	16.9 (±0.85)	1.76x10³ (±0.21x10 ³ , 3) 6.1x10⁵	-
Hot Chimlet #2 (95°C)	J2-620-IGT4	45.4	527	5.67	0.70	0.98	4.89	nd	0.022	6.2 (±0.31)	430 (±22, 2)	2.2x10⁵
	J2-620-IGT8	47.8	524	5.94	0.53	0.79	4.08	nd	0.016	2.5 (±0.33)	292 (±15, 2)	-
Shrimp Gulley (45°C)	J2-618-IGT1	47.4	530	5.95	0.12	0.72	3.39	nd	0.011	2.9 (±0.58)	50.4 (±2.5, 3)	3.9x10⁴
	J2-618-IGT3	48.9	533	5.94	0.13	1.0	3.64	nd	0.011	0.53 (±0.48)	44.0 (±7.1, 3)	-
Near Shrimp Gulley (111°C)	J2-620-IGT1	42.4	515	5.49	0.41	1.7	5.95	nd	0.025	7.7 (±0.85)	144 (±7.2, 2)	1.2x10⁵
	J2-620-IGT2	44.8	519	5.58	0.28	1.4	5.56	nd	0.021	3.4 (±0.76)	83.4 (±4.2, 2)	-
Bottom Seawater		52.4	545	~8	0	0	2.2	0	0	0.1	0 (nd‡)	-