

GSA DATA REPOSITORY 2013340

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TABLE DR1: CALCULATED MOLE % OF THE ANALYZED VOLATILES WITH SELECTED RATIOS AND THE TOTAL PRESSURE (PT) RELEASED BY FLUID INCLUSIONS.

Sample	Deposit	Host rock	Ore dip	Facies	Age	X	H ₂ O	CO ₂	N ₂	CH ₄	H ₂	C ₂ H ₆	Ar	H ₂ S	He	Pt (mbar)	C ₁ /C ₂	H ₂ O/(CO ₂ +H ₂ O)	CO ₂ /(CH ₄ +CO ₂)
DG-68-2	Detour Lake	MV-UV	V	UGS	L-Arc	CA	89.91	7.38	0.62	2.10						2.86E-05		0.92	0.78
DG-41-2	Detour Lake	MV-UV	V	UGS	L-Arc	CA	98.74	1.26								2.77E-05		0.99	1.00
DG-597-2	Detour Lake	MV-UV	V	UGS	L-Arc	CA	53.39	41.08	1.37	3.35		0.80				2.12E-05	4	0.57	0.92
DG-599-1	Detour Lake	MV-UV	V	UGS	L-Arc	CA	27.11	68.21	2.02	2.43		0.20	0.021			2.09E-05	12	0.28	0.97
DG-23-2	Detour Lake	MV-UV	V	UGS	L-Arc	CA	95.87	4.13								1.95E-05		0.96	1.00
DG-556-1	Detour Lake	MV-UV	V	UGS	L-Arc	CA	46.51	40.02	2.47	10.52		0.41	0.050		0.014	1.44E-05	26	0.54	0.79
DG-69-1	Detour Lake	MV-UV	V	UGS	L-Arc	CA	89.69	8.98		1.33					0.003	1.36E-05		0.91	0.87
DG-541-1	Detour Lake	MV-UV	V	UGS	L-Arc	CA	21.77	54.89	0.54	22.68			0.117			1.27E-05		0.28	0.71
DG-535A	Detour Lake	MV-UV	V	UGS	L-Arc	CA	68.74	27.32	0.81	3.13						9.67E-05		0.72	0.90
DG-59-2	Detour Lake	MV-UV	V	UGS	L-Arc	CA	94.78	5.22								8.94E-06		0.95	1.00
DG-16-1	Detour Lake	MV-UV	V	UGS	L-Arc	CA	0.00	97.12	2.88							6.92E-06		0.00	1.00
DG-43-2	Detour Lake	MV-UV	V	UGS	L-Arc	CA	42.79	52.98	2.73	1.24		0.25				6.11E-06	5	0.45	0.98
DG-83-2	Detour Lake	MV-UV	V	UGS	L-Arc	CA	48.63	48.36	1.93	0.84					0.245	5.30E-06		0.50	0.98
DG-38-2	Detour Lake	MV-UV	V	UGS	L-Arc	CA	100									5.12E-06		1.00	
DG-80-1	Detour Lake	MV-UV	V	UGS	L-Arc	CA	20.66	77.58		1.74					0.021	4.79E-06		0.21	0.98
DG-32-2	Detour Lake	MV-UV	V	UGS	L-Arc	CA	48.81	51.19								4.63E-06		0.49	1.00
DG-79-1	Detour Lake	MV-UV	V	UGS	L-Arc	CA	53.95	44.38		1.64					0.029	4.10E-06		0.55	0.96
DG-531-1	Detour Lake	MV-UV	V	UGS	L-Arc	CA	35.14	26.51	7.13	31.06			0.147		0.010	3.92E-06		0.57	0.46
DG-81-1	Detour Lake	MV-UV	V	UGS	L-Arc	CA	15.34	82.52		1.98					0.159	3.84E-06		0.16	0.98
DG-90-1	Detour Lake	MV-UV	V	UGS	L-Arc	CA	50.60	45.04		4.35						3.41E-06		0.53	0.91
DG-11-1	Detour Lake	MV-UV	V	UGS	L-Arc	CA		96.66		3.34						3.31E-06		0.00	0.97
DG-529-1	Detour Lake	MV-UV	V	UGS	L-Arc	CA	85.20	12.52		2.28						2.62E-06		0.87	0.85

DG-25-1	Detour Lake	MV-UV	V	UGS	L-Arc	CA	100				2.32E-06	0.00	1.00					
DG-12-1	Detour Lake	MV-UV	V	UGS	L-Arc	CA	67.95	30.58	1.44	0.032	2.10E-06	0.69	0.95					
DG-92-1	Detour Lake	MV-UV	V	UGS	L-Arc	CA	29.51	70.49			1.87E-06	0.30	1.00					
DG-55-1	Detour Lake	MV-UV	V	UGS	L-Arc	CA	86.56	13.44			1.36E-06	0.87	1.00					
DG-46-2	Detour Lake	MV-UV	V	UGS	L-Arc	CA	100				1.25E-07	0.00	1.00					
INC-35	Siou	MV-FI	M	GS	Bir	BF	58.41	37.68	2.90	0.69	0.016	8.48E-06	0	0.61	1.00			
INC-34	Siou	FI	M	GS	Bir	BF	59.53	36.41	1.52	2.53		2.64E-05	0	0.62	1.00			
513C-2	Siou	MV	M	GS	Bir	BF	77.42	19.28	1.11	1.63	0.47	0.091	2.06E-05	0	0.80	1.00		
513B-4	Siou	MV	M	GS	Bir	BF	83.73	14.76	0.56	0.95			1.52E-05	0	0.85	1.00		
INC-32-2	Siou	FI	M	GS	Bir	BF	90.63	9.37					3.55E-06	0.91	1.00			
INC-36-1	siou	FI	M	GS	Bir	BF	89.93	9.29	0.37	0.41			1.79E-05	0	0.91	1.00		
INC-37-2	siou	FI	M	GS	Bir	BF	97.68	1.75	0.31	0.23	0.008	0.018	2.53E-05	0	0.98	1.00		
INC-33	Siou	FI	M	GS	Bir	BF	62.44	31.70	1.54	1.92	2.38	0.016	3.16E-05	0	0.66	1.00		
450C-1	Yaho	DS	V	GS	Bir	BF	58.41	30.34	5.41	2.15	2.85	0.82	0.013		2.45E-05	3	0.66	0.93
450B-1	Yaho	DS	V	GS	Bir	BF	46.75	50.24	2.58	0.43			1.07E-05	0	0.48	1.00		
301A-1	Yaho	DS	V	GS	Bir	BF	33.75	50.71	6.68	7.58	1.28		1.02E-05	6	0.40	0.87		
301B-2	Yaho	DS	V	GS	Bir	BF	55.14	39.17	3.55	1.69	0.44		1.15E-05	4	0.58	0.96		
447A-1	Yaho	DS	V	GS	Bir	BF	55.06	41.65	2.49	0.80			7.12E-06	0.57	0.98			
445C-1	Yaho	DS	V	GS	Bir	BF	83.35	16.65					7.11E-06	0.83	1.00			
449A-1	Yaho	DS	V	GS	Bir	BF	47.80	42.71	6.53	2.96			6.84E-06	0.53	0.94			
303C	Yaho	DS	V	GS	Bir	BF	28.79	69.72		0.65	0.85		5.40E-06	1	0.29	0.99		
447C-1	Yaho	DS	V	GS	Bir	BF	51.02	45.94	2.53	0.51			5.32E-06	0.53	0.99			
303A-2	Yaho	DS	V	GS	Bir	BF	75.44	24.56					2.39E-06	0.75	1.00			
303B-1	Yaho	DS	V	GS	Bir	BF	37.22	62.78					2.31E-06	0.37	1.00			
445B-1	Yaho	DS	V	GS	Bir	BF	100						7.69E-07	0.00	1.00			
450A-1	Yaho	DS	V	GS	Bir	BF	1						1.61E-07	0.00	1.00			
305A-2	Yaho	DS	V	GS	Bir	BF	58.27	38.78		2.95			5.65E-06	0.60	0.93			
449B-2	Yaho	DS	V	GS	Bir	BF	65.34	30.62	1.33	2.71			5.11E-06	0.68	0.92			
Filon-67	Filon-67	MV	V	GS	Bir	BF	82.89	14.76	0.66	1.20	0.44	0.041	3.94E-05	3	0.85	0.92		
Fobiri	Fobiri	MV	V	GS	Bir	BF	92.32	5.78	1.91				1.48E-05	0.94	1.00			
Fofina	Fofina	DS, MV, GR	V	GS	Bir	BF	85.32	12.83	0.88		0.96		4.93E-06	0	0.87	1.00		
Mouni	Mouni	DS	V	GS	Bir	BF	85.23	11.47	1.39	1.53	0.34	0.040	2.10E-05	5	0.88	0.88		
Nyafé	Nyafé	MV	V	GS	Bir	BF	38.05	55.11	4.90	1.38	0.53	0.037	1.33E-05	3	0.41	0.98		

Wona	Wona	DS, MV, GR	V	GS	Bir	BF	20.66	74.25	2.79	0.69		1.52		0.083	8.63E-06	0	0.22	0.99	
KU-12	Klipwal ¹	MV, DS, GR	V	UGS	M-Arc	SA	75.84	13.87	0.93	2.31	6.29	0.72	0.021	0.024	3.11E-05	3	0.85	0.86	
264-1	Joanna	DS, MV	V	UGS	L-Arc	CA	28.86	60.81	2.32	2.20	3.56	2.21	0.015	0.021	0.006	2.19E-05	1	0.32	0.97
Vezza	Vezza	DS, MV, GR	V	GS	L-Arc	CA	33.80	30.48	2.17	32.84		0.69	0.019		0.003	3.16E-05	48	0.53	0.48
Casa	Casa Berardi	DS, MV, GR	V-M	GS	L-Arc	CA	1.93	78.65	2.16	16.75		0.47	0.012		0.025	2.46E-05	36	0.02	0.82
Joemann	Joe Mann	MV	V	GS	L-Arc	CA	19.11	75.68	3.03			2.19			9.32E-06	0	0.20	1.00	
05GS	Red Lake ²	MV	V	UGS	L-Arc	CA		94.38	5.08			0.54			2.61E-05	0	0.00	1.00	
BE1	Ballarat ³	DS, GR	V-M	GS	Paleo	AU	77.77	3.31	1.05	13.98	3.69	0.19		0.011	4.48E-05	73	0.96	0.19	
NZ-2B	Rise & Shine ⁴	DS	S	GS	Cre	NZ	89.29	6.33	1.05	0.37	2.51	0.43		0.018	5.37E-05	1	0.93	0.94	

Note: SO₂ analyzed but not detected. Samples from Detour Gold are from drill cores distributed along 3 sections. Samples from Mana district mostly come from drill cores, as well as pit faces. Samples from Detour Lake, Mana district and most other sites were mostly analyzed as part of MSc studies under my supervision (Detour Lake: G. St-Pierre, ongoing; Wona mine: Augustin, 2011; Yaho: M. Sinaré, 2013; Joanna deposit: P. Bedeaux, 2012 and Vezza mine: M. Bouchard, ongoing). Other samples were provided by M. Demers (Casa Berardi Mines), P. Barbe (Joanna project), G. Chi (Red Lake), B. Fu (Ballarat Mine), S.S. Chinnasamy (Klipwal Mine) and D. MacKenzie (Rise & Shine deposit).

Host rock: MV – mafic volcanic; UV – ultramafic volcanic; DS – detritic sedimentary rocks; GR – graphitic-bearing rocks (shale); FI – felsic intrusive rocks.

Facies (Metamorphic facies): GS – greenschist; UGS – upper greenschist.

Ore pip (Ore zone dipping): V – vertical to subvertical; M – moderate dipping (75–45°); S – shallow dipping (<45°).

Age: M-Arc – Meso-Archean; L-Arc – Late-Archean; Bir – Birimian (Paleoproterozoic); Paleo – Paleozoic; Cre – Cretaceous.

X (Country): CA – Canada; BF – Burkina Faso; SA – South Africa; AU – Australia; NZ – New-Zealand.

Reference: 1 – Chinnasamy et al., 2011; 2 – Chi et al., 2009; 3 – Bierlein et al., 1999; 4 – MacKenzie and Craw, 2007; Mortensen et al., 2010.

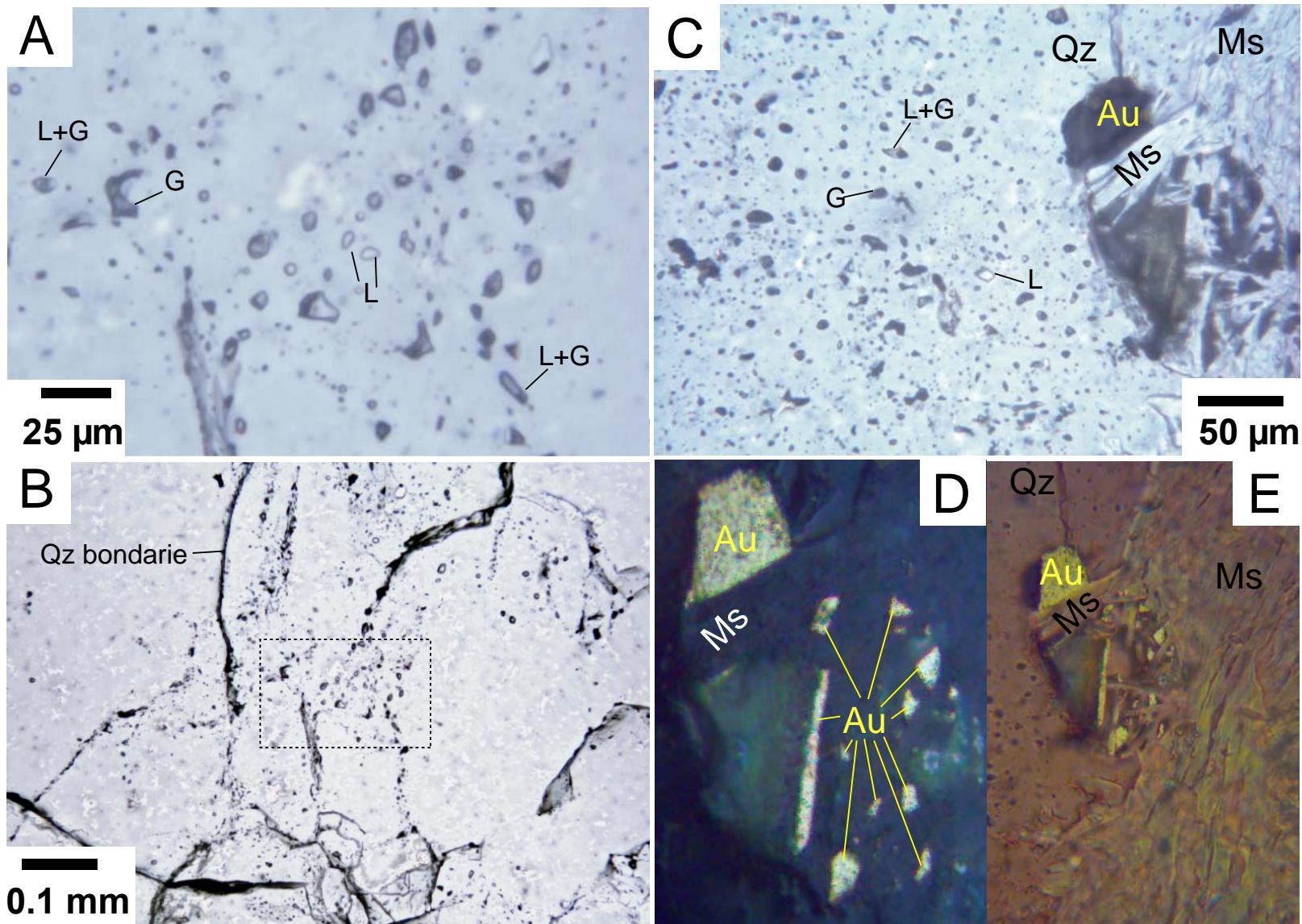


Figure RD1. A-C: Photomicrographs generated by focus stacking images (Zerene Stacker) showing assemblages of various fluid inclusions occurring in trails (A-B) and cluster (C) with free gold grains. Note the various shapes and darkness of fluid inclusions indicating variable volatile components, occurring as one phase liquid (L) or gas (G) or two-phase (L+G). A-B: Sample DG-43 from Detour Lake. The dashed box in B shows the location of picture A along trails of secondary fluid inclusions. Sample 513B from Siou deposit, Mana district (Qz – Quartz; Ms – Muscovite; Au – gold). D-E: Photomicrographs of the gold relationships. D: Close-up view of the gold grains from C, under reflected light, to highlight the distribution of very fine gold grains. E: Combined reflected and transmitted polarized lights showing that gold co-precipitated with fine flakes of muscovite. The preservation of this delicate texture, with abundant fluid inclusions strongly suggests that fluid inclusions are genetically related to gold mineralization.

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