Table 3. *Chemical, normative, and modal data for granite and selective rhyolitic volcanic rocks, Silver City, 1° × 2° quadrangle, New Mexico and Arizona*

[Major-element oxide data given in weight percent; *, loss on ignition at 900°C. Tr, trace amount present; ?, presence uncertain; <, less than. Modal composition given in volume percent; v, indicates presence, but modal value not established]

	Pinaleno Mountains											Dos Cabezas Mountains			Pat Hills	Gila Mountains		
	Greasewood Mountain eruptive center					Gillespie Mountain pluton					Circle I Hills pluton	Nine Mile pluton	Cowboy pluton	Silver Camp pluton	Pat Hills pluton	Lone Star pluton	San Juan pluton	Horseshoe pluton
	Dome flow	Dome flow	Vitric flow	Ash flow	Ash flow													
Sample number---	79-T-81	79-T-82A	79-T-61	80-T-60	80-T-67	78-T-24	78-T-43	79-S-121	78-T-120	78-T-45	78-S-50	78-S-44	78-S-47	78-S-29	78-S-49	78-S-3	78-S-5	78-S-125
Rock name-------	rhyolite	latite	rhyolite	rhyo-dacite	rhyolite	alkali granite		granite	granite	granite	granite	grano-diorite	gabbro diorite	grano-diorite	grano-diorite	quartz monzonite	quartz monzonite	granite
MAJOR-ELEMENT COMPOSITION																		
SiO_2	74.5	62.4	76.7	66.1	71.5	75.4	77.9	71.6	72.3	73.0	70.6	72.8	52.8	63.6	66.4	60.0	64.9	65.8
Al_2O_3	12.6	16.4	11.4	15.1	15.8	13.3	12.3	13.8	14.2	14.3	13.9	14.5	16.1	15.0	14.4	16.1	14.7	16.1
Fe_2O_3	1.50	4.47	0.81	3.57	0.43	1.66	.63	1.3	2.11	1.86	1.7	.85	3.0	2.3	2.5	3.7	3.6	2.3
FeO								.62			.58	1.10	4.6	2.2	1.1	1.9	.82	1.1
MgO	.3	1.73	.12	.64	.17	.41	.20	.40	.51	.51	.50	.67	6.0	1.9	1.6	2.5	1.4	1.5
CaO	.21	2.54	.29	.58	.33	.33	.12	.98	1.03	1.11	1.5	2.04	7.9	3.8	3.0	5.2	3.1	1.5
Na_2O	1.32	3.71	1.51	1.77	4.29	1.73	1.81	3.9	3.27	3.35	4.4	3.88	3.7	4.2	3.6	4.1	3.8	4.6
K_2O	7.90	5.40	7.36	9.60	4.90	6.73	6.78	5.6	5.40	5.36	4.6	3.26	1.8	3.7	4.2	3.0	4.1	2.6
H_2O^+								.48			.59	.35	1.4	.66	1.7	1.7	1.4	2.0
H_2O^-	1.04*	1.49*	.84*	.75*	1.22*			.08			.18	.06	.09	.10	.18	.23	.44	.63
TiO_2	.33	.68	.10	.62	.48	.28	.11	.39	.40	.37	.41	.27	1.1	.74	.47	.67	.42	.50
P_2O_5	.10	.27	<0.05	.19	<0.05	.10	.10	.08	.10	.10	.12	.11	.22	.23	.13	.20	.15	.14
MnO	.03	.06	<0.02	.05	<0.02	.02	.02	.05	.05	.04	.07	.09	.13	.10	.08	.17	.08	.04
CO_2								.01			.01	<.01	.03	.02	.07	.64	.01	
Total						99.96	99.97	99.0	99.37	100.0	99.0	99.94	99.0	99.0	99.0	100.0	99.0	99.0
NORMATIVE MINERAL COMPOSITION																		
Quartz	36.04	13.01	39.41	17.59	27.20	38.56	41.14	25.11	30.12	30.14	24.50	32.39	.36	15.90	22.21	12.27	20.50	24.33
Corundum	1.74	.48	.55	1.21	2.98	2.81	1.98		1.35	1.21		1.17						3.37
Orthoclase	46.76	32.18	43.84	57.32	29.19	39.78	40.08	33.66	32.11	31.67	27.77	19.34	11.23	22.43	25.41	18.31	24.87	15.55
Albite	11.19	31.66	12.88	15.13	36.60	14.64	15.32	33.83	27.84	28.35	38.07	32.97	32.17	36.35	31.31	35.51	33.07	39.39
Anorthite	.39	10.93	1.12	1.61	.43	.98		3.41	4.48	4.85	4.39	9.38	22.36	11.21	11.08	17.00	11.04	6.60
Nephelite																		
Wollastonite								.41			.94		6.82	2.73	1.44	3.30	1.62	
Enstatite	.75	4.35	.30			1.02	.50	1.02	1.28	1.27	1.27	1.68	15.45	4.73	3.98	6.47	3.49	3.78
Ferrosilite												1.04	4.50	1.17				
Hyperstene																		
Magnetite								1.03			.91	1.24	4.50	3.48	2.41	5.00	1.73	2.25
Hematite	1.50	4.51	0.82	3.61	.43	1.66	.63	.59	2.12	1.86	1.07				.93	.35	2.52	.77
Ilmenite	.06	.13	.04	.11	.04	.04	.04	.76	.11	.09	.80	.51	2.09	1.44	.91	1.31	.82	.96
Thenardite																		
Rutile	.30	.62	.08	.57	.46	.26	.09		.35	.32								
Apatite	.24	.65	.12	.45	.12	.24	.22	.19	.24	.24	.28	.26	.54	.57	.31	.50	.36	.34
Calcite												.02						
Total	98.97	98.51	99.16	99.25	98.77	100.01	100.00	100.01	100.01	100.01	100.01	100.01	100.01	100.01	100.01	100.01	100.01	97.35
Salic	96.12	88.25	97.80	92.90	97.29	96.79	98.52	96.01	95.91	96.23	94.73	95.25	66.12	85.89	90.01	83.09	89.48	89.24
Femic	2.85	10.26	1.36	6.35	1.48	3.22	1.48	4.00	4.00	3.78	5.28	4.76	33.89	14.12	9.90	16.92	10.53	8.11
MODAL COMPOSITION																		
Quartz	V	V	V	V	V	34.0	13.3	25.7	19.5	26.8	33.9	20.3	2.0	19.8	10.3	9.4	7.8	6.6
Plagioclase		V	?	V	V	28.0	26.2	22.4	22.0	31.8	35.9	34.7	54.6	45.0	18.3	66.6	65.0	29.6
K-feldspar	V	V	V	V	V	38.0	55.2	47.1	56.1	37.2	21.6	40.0		25.2	23.9	12.8	19.0	
Biotite	V	V	V	V	?	V	3.4	3.0	1.7	2.6	7.0	3.8	21.8	2.4	5.1	3.2	7.2	8.6
Fayalite																		
Muscovite								.4			.8							
Amphibolite		V								Tr		(opaques)	3.2	6.4				
Magnetite		V	V				1.2	.7	.3	1.4	.4	.9	4.2	1.0	.1	2.3	1.0	0.2
Apatite				V					.2									
Zircon						V		.1		Tr	.2			.2			Tr	Tr
Sphene				V			.7	.8	.3	.2	.2			Tr			Tr	Tr
Allanite										Tr						2.2		
Chlorite												.3						
Olivine																2.6		
Clinopyroxene													14.2			.4		
Epidote																		
Matrix		50		60	60										41.4			55.0
Total						100.0		100.2	100.1	100.0	100.0		100.0	100.0		100.0	100.0	100.0

	Peloncillo Mountains																		Pyramid Mountains		Summit Mountains	Victorio Mountains	Big Burro Mountains					
	Tollgate Wash eruptive center		Ash Peak-Rhyolite Peak eruptive center		Dry Mountain eruptive center	Porphyry dike	Granite Gap pluton, Dark dike	Granite Gap pluton, Pluton		Orange Butte dome	McKenzie Peak dome	Horseshoe eruptive center dike	Steins eruptive center: Ring dome	Ring dome	Ring-fracture rhyolite	Ash flow	Ash flow	Core plug	Lordsburg pluton	Lightning Dock pluton	Saddleback Mountain flow	Granite	Tyrone pluton			Shrine plug	Twin Peaks pluton (Blackhawk)	
Sample number---	77-Rh-34[1] (Ttd)	77-Rh-36[1] (Ttr)	78-DR-83[1] (Tap)	78-DR-3[1] (Tar)	78-DR-60[2] (Tdr)	78-S-17	78-S-16	77-T-61 78-S-14	78-T-60 78-S-15	78-S-55	78-S-52	8F-4	8F-28	8F-13	75-D-298 (81-DHR-308)	8F-14	80-DR-142	75-D-293	78-S-20	78-S-22	79-S-116	77-T-109	79-S-111	79-S-112	BP-271-78	WM-1-78	80-S-302	80-S-303
Rock name-------	rhyolite	rhyolite	rhyolite	rhyolite	rhyolite	granite	quartz monzonite	granite	granite	quartz-syenite	quartz monzonite	rhyolite	dacite	dacite	rhyolite	andesite	andesite	rhyolite	quartz monzonite	quartz monzonite	alkali granite	granite	granite	grano-diorite	grano-diorite	rhyolite	quartz monzonite	quartz monzonite
MAJOR-ELEMENT COMPOSITION																												
SiO_2	77.4	70.5	71.2	74.0	77.6	74.6	62.6	73.0	76.0	67.1	65.8	71.0	68.6	64.1	73.1	62.5	62.9	74.5	64.1	64.1	72.9	76.3	69.0	67.9	67.5	76.5	61.8	65.1
Al_2O_3	12.3	14.5	14.3	12.0	12.1	13.7	16.9	14.8	12.7	14.8	15.2	14.3	15.3	16.8	14.0	16.7	17.3	13.0	14.5	15.3	12.4	12.7	16.2	15.3	16.2	13.0	16.5	17.3
Fe_2O_3	1.2	3.3	2.1	1.1	1.0	.30	2.9	.81	.56	2.4	2.5	2.09	2.58	4.22	1.20	4.51	4.81	1.22	2.0	2.6	2.1	.43	1.5	1.5	1.7	.99	2.09	2.35
FeO	0.0	0.08	0.68	0.0	0.0	1.00	1.10	.72	.20	.18	.86	.48	.43	.54	.13	.48	.13	.22	1.6	2.2	.10	.30	.42	.10	1.0	1.2	1.69	1.71
MgO	0.03	0.04	0.41	0.04	0.08	.41	1.12	.37	.09	.64	.87	.74	.81	1.11	.39	1.45	1.16	.23	1.8	1.8	.18	.17	.47	.68	1.1	.32	1.34	1.36
CaO	0.07	0.0	0.77	0.28	0.78	1.50	2.70	1.20	.68	.90	2.1	1.24	2.03	2.84	.41	3.83	3.32	.66	2.8	3.8	.46	.87	1.9	2.1	2.6	.29	3.89	3.20
Na_2O	4.0	4.6	4.5	3.3	3.2	3.50	3.80	3.80	3.40	2.7	4.6	2.59	3.85	4.49	3.12	3.94	4.06	3.12	4.0	3.9	2.6	4.4	5.3	4.2	5.0	.17	3.67	5.27
K_2O	4.6	5.3	4.9	4.9	5.0	4.50	4.60	4.20	4.50	8.9	5.0	6.07	4.35	4.13	5.95	3.43	3.80	5.95	4.8	3.8	7.2	4.5	3.0	3.3	3.3	5.3	2.56	2.30
H_2O^+	0.51	0.84	0.44	3.4	0.64	.49	1.30	.50	.44	.68	.62	.68	0.88	.69	.85	.63	.77	.85	1.5	1.4	.45	.38	.68	1.7	1.6	1.8	2.48	1.17
H_2O^-	0.18	0.34	0.33	1.2	0.12					.12	.20	.78	0.60	.52	.66	.97	1.07	.66	.13	.10	.09	.09	.24	1.9	.34	.25	.95	.46
TiO_2	0.04	0.24	0.31	0.05	0.15	.07	.86	.06	.03	.49	.68	.26	0.41	0.52	.22	.75	.67	.22	.51	.67	.34	.06	.25	.24	.41	.10	.27	.38
P_2O_5	0.04	0.11	0.10	0.05	0.02	.05	.35	.09	.03	.19	.20	.09	0.10	0.26	<.05	.25	.22	.05	.19	.19	.11	.03	.11	.08	.24	.07	.11	.23
MnO	0.03	0.05	0.07	0.06	0.01	.05	.06	.07	.07	.07	.08	<.02	0.08	0.08	.06	.08	.03	0.06	.10	.08	.04	.10	.01	.02	.03	.15	.09	.12
CO_2	0.02	0.01	0.02	0.01	0.02	.07	.62	.02	.03	.03	.35	<.01	0.36	<0.01	.01	<.01	0.01	0.01	1.6	.02	.01	.01	.01	.04	.06	.02	1.64	.11
Total	100.42	99.91	100.13	100.39	100.7	100.2	99.0	99.6	98.7	99.0	99.0							100.0	100.0	99.0	100.0	99.0	99.0	101.08	100.16	99.08	101.06	100.0
NORMATIVE MINERAL COMPOSITION																												
Quartz	36.7	23.3	24.8	37.5	38.1	32.7	18.2	31.8	38.1	15.52	15.61	29.40	24.28	15.13	30.82	16.87	16.48	31.73	15.36	17.14	10.19	31.98	22.55	26.65	19.5	55.5	26.07	17.48
Corundum	0.7	1.1	0.5	1.0	0.1	.63	3.07	2.09	1.16			1.51	.81	.40	1.80	.14	1.0	.34					1.07	1.16		6.8	5.18	1.13
Orthoclase	27.2	31.9	29.0	30.1	29.6	26.5	27.5	24.9	26.9	53.77	30.12	35.77	25.70	24.33	35.11	20.37	22.40	34.90	29.51	23.06	43.16	26.60	18.32	20.67	19.7	31.9	13.77	13.67
Albite	33.9	39.8	38.1	28.8	27.1	29.5	32.5	32.3	29.1	22.85	39.75	21.43	32.57	37.88	26.36	33.50	34.27	26.21	35.49	33.86	22.01	37.25	45.70	37.21	42.6	1.4	32.38	44.85
Anorthite	0.1	0.0	3.2	1.1	3.7	6.66	7.26	5.26	3.03	2.21	6.13	5.55	9.42	12.35	1.70	17.45	15.00	2.93	7.30	12.83	1.15	1.61	8.71	10.38	11.2	.94	7.74	13.76
Nephelite																												
Wollastonite	0.0	0.0	0.0	0.0						.12	1.45								2.41	2.21		1.05						
Enstatite	1.9	0.0	0.0	0.0		1.02	3.02	.93	.23	1.62	2.22	1.84	2.02	2.76	.97	3.63	2.88	.57	4.73	4.48	.45	.42	1.20	1.77	2.8	.83	3.48	3.41
Ferrosilite	0.0	0.0	0.0	0.0		1.56		.69											.70	.92		.28			.4	1.23	1.01	.73
Hyperstene	0.1	0.1	1.0	0.1	0.2								.46	.49				.26	3.04	3.77		.62	.69		2.5	1.47	3.16	3.43
Magnetite	0.0	0.0	1.5	0.1		.43	1.27	1.18	.80		1.10	.86	2.26	3.87	1.20	4.53	4.80	1.03			2.10		1.02	1.60				
Hematite	1.2	3.3	1.1	1.2	1.0		2.06		.02	2.40	1.84	1.49	.78	.98	.40	1.20	.34	.41	1.00	1.29	.30	.11	.47	.25	.8	.19	.75	.76
Ilmenite	0.1	0.3	0.6	0.1		.13	1.65	.11	.06	.53	1.31	.49										.33						
Thenardite	0.0	0.0	0.0	0.0						.54					.01	.13	.49				.06			.12				
Rutile	0.0	0.1	0.0	0.0	0.1								.24	.61	.12	.59	.52	.12	.47	.45	.26	.07	.26	.19	.5	.15	.57	.55
Apatite	0.1	0.0	0.2	0.1	0.1	.11	.84	.21	.07	.45	.47	.21													.14	.04	3.89	.25
Calcite						.16	1.42	.05	.07															.9				
Total	100.1	99.9	100.0	100.1	100.0	99.4	98.79	99.52	99.54	100.01	100.01	99.55	98.53	98.81	98.49	98.41	98.18	98.50	100.01	100.01	100.01	100.00	100.01	100.00	100.14	100.4	100.01	100.01
Salic										94.35	91.62	93.66	92.77	90.09	95.80	88.33	89.15	96.11	87.66	86.88	96.51	97.44	96.36	96.08			87.15	90.89
Femic										5.66	8.39	4.89	5.76	8.72	2.69	10.08	9.03	2.39	12.35	13.13	3.50	2.56	3.65	3.92			12.86	9.12
MODAL COMPOSITION																												
Quartz	V	V	?	V	V	15.2	3.8	31.8	25.6	8.4		V	V	?	V	V	V	V	12.3	16.2	21.4	9.4	28.0	3.2	19.12	1.0	.5	0.
Plagioclase		V	V		V	8.4	23.0	25.0	13.1	3.6	28.8	V	V	V	V	V	V		49.6	46.6	12.0	12.9	50.8	24.9	66.2		12.3	13.7
K-feldspar	V	V	V	V	V	20.6		13.4	60.2	17.2	7.4	V	V	?	V	V	V	V	25.2	26.0	9.2	21.8	17.4	5.3	10.12	1.7	11.4	13.5
Biotite				V	V		4.0	.8	.8	4.0	3.2	V	V		V	V	V	?	3.8	7.6	.6		2.6	1.8	3.96		1.8	
Fayalite	V	V														V			6.9	1.4	Tr	1.1						
Muscovite								Tr						V					1.5	1.6	.4						5.4	5.7
Amphibolite		V					(opaques)		(opaques)																			
Magnetite	V	V	V	V			1.2		.4	.8	1.8	V	V		V	V					Tr		Tr	0.8	.616	.1	1.1	1.9
Apatite																												
Zircon		V									Tr								.3		Tr		.4					
Sphene		V						Tr			Tr			V					Tr		Tr		Tr					
Allanite		V				.2	.2												.35				.4		Tr	4.4		
Chlorite								Tr											.05									
Olivine		V	V	V																.2								
Clinopyroxene																												
Epidote																				.4			.4					
Matrix						56.0	68.0	28.8		66.0	58.8		50				20				56.4	54.7		64.1		92.8	67.4	65.2
Total								99.0		100.0	100.0									100.0	100.0		100.0		100.016	100.0	99.9	100.0

	Pinos Altos Range																	Reading Mountain				
	Silver City pluton						Sanatorium pluton	Round Mtn. pluton	Gomez Peak pluton	Copper Flat pluton	Pinos Altos alkalic complex: Whiskey Creek pluton	Flow breccia	Alkalic phonolite	Alkalic phonolite	Pinos Altos granite pluton	Fierro-Hanover pluton	Santa Rita pluton	Juniper Hill pluton			Bear Creek pluton	Saw Mill pluton
Sample number---	78-S-24	81F-DR-25	81F-DR-26	81F-DR-27	81F-DR-28	81F-DR-29	81F-DR-30	81F-DR-31	78-S-25	L-2-50	JC-10-62[3] (Tpc)	JC-107-54[3] (TKab)	JC-105a-54[3] (Tpa)	JC-104-54[3] (Tpa)	JC-1-53	P-19	JC-110-54	79-S-107	79-S-109	T-123-76	T-23-73 79-S-108	79-S-110
Rock name-------	quartz monzonite porphyry	quartz monzonite porphyry	quartz monzonite porphyry	quartz monzonite porphyry	quartz monzonite porphyry	quartz monzonite porphyry	quartz monzonite porphyry	quartz monzonite porphyry	quartz monzonite	granite	syeno-diorite	trachy-andesite	syeno-diorite	monzo-diorite	quartz monzonite	grano-diorite	grano-diorite	granite	grano-diorite	granite	grano-diorite	granite
MAJOR-ELEMENT COMPOSITION																						
SiO_2	65.6	66.6	65.7	65.7	64.9	66.7	63.4	64.3	64.2	70.33	51.80	59.1	52.3	59.0	66.7	65.36	65.7	69.7	66.5	69.9	64.0	71.9
Al_2O_3	15.7	16.7	17.0	16.5	16.2	16.6	16.7	16.5	16.0	15.89	15.11	17.5	16.0	16.4	15.7	16.29	16.0	14.5	14.9	14.8	15.2	14.1
Fe_2O_3	2.0	2.57	2.69	2.49	2.36	2.45	3.96	3.78	3.1	.36	5.85	3.7	3.5	3.3	2.7	1.94	2.5	1.9	1.9	1.8	4.9	1.1
FeO	.58								.94	.29	4.09	2.3	5.3	3.2	1.4	1.88	1.8	.46	.54	.52	.08	.14
MgO	.71	.90	.98	.94	.83	.90	.91	.95	.70	.57	4.06	1.7	3.5	2.6	1.2	1.76	1.5	.55	.99	.87	1.3	.32
CaO	2.8	2.68	3.10	2.72	3.05	2.76	4.00	4.31	3.3	1.65	6.24	4.1	5.0	5.7	3.5	4.05	2.5	1.6	2.5	1.1	2.3	1.0
Na_2O	5.5	5.14	5.17	5.32	4.57	4.89	3.79	3.74	4.9	4.60	2.97	4.6	2.7	3.9	3.8	3.90	3.4	4.4	3.5	3.7	1.2	4.1
K_2O	3.2	2.90	2.78	2.81	3.02	2.92	3.65	3.49	3.7	3.31	5.45	5.1	6.7	3.0	4.1	3.29	4.2	4.7	4.3	4.6	5.0	4.7
H_2O^+	1.3								.38	.93	1.73	.59	1.6	1.6		.52	1.3	.69	1.5	1.1	2.0	.74
H_2O^-	.25	1.10	1.09	2.41	3.87	1.52	2.23	1.31	.62	1.40	0.37	—	—	—	.53	.20	nd	.18	.99	.34	.93	.51
TiO_2	.39	.44	.42	.42	.40	.36	.45	.42	.44	.20	1.07	.54	1.1	.70	.43	.45	.42	.41	.42	.10	.46	.25
P_2O_5	.19	.18	.19	.16	.17	.17	.21	.19	.22	.06	.88	.52	.92	.62	.36	.24	.31	.13	.14	.19	.28	.08
MnO	.11	.03	.03	.03	.03	.02	.14	.14	.10	.02	.18	.14	.18	.16	.13	.04	.04	.09	.04	.03	.00	.02
CO_2	1.3	—	—	—	—	—	—	—	.02	.09	.03	<.05	.84	.06	<.05	.06	.06	.02	1.2	.02	.87	.01
Total		99.24	99.15	99.5	99.39	99.29	99.44	99.13	99.0	99.70	99.18	99.89	99.64	100.25	101.0	99.98	100.0	99.0	99.0	99.0	99.0	99.0
NORMATIVE MINERAL COMPOSITION																						
Quartz	16.24	19.17	17.57	17.31	19.58	20.45	18.30	19.72	15.38	26.9		3.79		10.69	20.87	19.4	22.5	22.66	24.09	27.97	34.70	28.41
Corundum		0.67	0.31	0.14	0.28	0.79				1.9							1.63		.27	2.26	6.41	.67
Orthoclase	19.65	17.27	16.57	16.69	17.95	17.38	21.69	10.80	22.44	19.5	32.27	30.17	40.07	17.69	24.08	19.5	22.05	28.37	26.57	27.44	29.99	28.38
Albite	47.76	43.83	44.12	45.24	38.90	41.67	32.25	31.92	42.28	38.8	25.18	38.97	22.61	32.94	31.96	33.0	28.82	38.09	31.28	31.60	10.31	35.56
Anorthite	9.12	12.21	14.26	12.51	14.10	12.67	17.88	18.08	11.08	7.8	11.82	12.05	11.89	18.35	13.59	17.0	11.40	5.74	11.91	4.13	4.14	4.44
Nephelite													.28									
Wollastonite	1.72							0.55	1.79		5.61	2.05	2.98	2.44	.42			.56				
Enstatite	1.83	2.26	2.46	2.35	2.08	2.26	2.28	2.39	1.79	1.9	7.24	4.24	1.75	6.46	2.97	5.2	4.46	1.39	2.49	2.19	3.29	.82
Ferrosilite											.89	0.54	1.08	2.29								
Hyperstene	1.11								2.11	.2	8.50	5.37	5.14	4.78	3.67	2.8	3.71	.59	.66	1.50		
Magnetite	1.35	2.59	2.71	2.50	2.37	2.47	3.98	3.81	1.74	.3					.15			1.49	1.54	.78	4.97	1.10
Hematite	.77	.06	.06	.06	.06	.04	.30	.30	.85	.5	2.04	1.03	2.11	1.33	.81	.8	.76	.80	.83	.19	.17	.34
Ilmenite											(fo 2.02)		(fo 4.95)									
Thenardite											(fa 0.27)		(fa 3.36)								.38	.08
Rutile	.45	0.41	.39	.39	.37	.34	.09								.85	.3	.67	.31	.35	.45	.67	.19
Apatite		.43	.45	.38	.40	.41	.50	.45	.54		2.09	1.23	2.21	1.47	.11	.2	.2			.05	2.01	
Calcite										.2						.9						
Total	100.01	98.90	98.91	97.59	96.12	98.48	97.77	98.69	100.01	98.0	97.94	99.44	98.43	98.44	99.49	99.10	96.2	100.01	100.01	98.56	97.04	100.00
Salic	92.77	93.15	92.83	91.90	90.82	92.96	90.12	90.54	91.18		69.28	84.98	74.86	79.68	90.50			94.86	94.13	93.40	85.55	97.47
Femic	7.24	5.75	6.08	5.69	5.30	5.52	7.65	8.15	8.83		28.66	14.46	23.57	18.76	8.99			5.15	5.88	5.16	11.49	2.53
MODAL COMPOSITION																						
Quartz	36.5	V	V	V	V	V	V	V	.6	4.6				V	19.7	Tr	24.8	Tr	V	V	V	
Plagioclase		V	V	V	V	V	V	V	29.0	37.8	V	V	V	V	49.8	39.0	34.0	10.8	V	V	32.2	16.4
K-feldspar	3.90	V	V	V	V	V	V	V	3.8	1.8	V	V	V	V	25.0		24.5		V	V	V	
Biotite		V	V	V	?	V				.6	V	V	V	V	1.5	1.2	8.0	.8	V	V	.8	1.4
Fayalite																						
Muscovite	1.61	V	V	V	?	V	V	V	3.2													
Amphibolite																						
Magnetite	.4	V	V	V			V	V	1.6	.4	V	V	V	V		7.4	Tr				V	
Apatite																						
Zircon	.134		V	V	V	V	V			Tr	V		V	V	1.22	1.4	1.5	1.0	V	V	.2	Tr
Sphene							V		Tr	Tr												
Allanite		V		V	V	V	V	V	.4				V	V		.2	.3		V	V	V	Tr
Chlorite			V														Tr		V	V	V	Tr
Olivine	calcite?															.2	Tr					
Clinopyroxene	.22					V	V				V	V	V	V	2.93		1.0		V	V	2.4	
Epidote																.2	Tr				.8	
Matrix	57.50								61.4	54.8						50.4		87.4			63.6	82.2
Total	100.264								100.0	100.0					100.15	100.0	101.1	100.0			100.0	100.0

[1]See Richter, Houser, and Damon, 1983.
[2]See Richter, Shafiquallah, and Lawrence, 1981.
[3]Jones, Moore, Pratt, 1970.

Table 4. *Accessory mineral assemblages in various igneous rocks in the Siver City 1° × 2° quadrangle, New Mexico and Arizona*

[Presence of mineral shown by X; X* indicates mineral is abundant ; element symbol (Nb) indicates important substitution in chemical composition (microprobe data); leaders (---) indicate not deter-

Eruptive center or pluton	Sample No.	Biotite	Pyroxene	Amphibole	Magnetite	Ilmenite	Hematite	Zircon	Apatite	Fayalite	Allanite	Rutile	Sphene	Fluorite	Other minerals present and remarks
Victorio Mountains															
Granite porphyry	77-T-109	X	---	X	X(Ti)	X	X	X	X	---	X	---	---	X(Th,Y)	Fluorides(Ce,La,F); xenotime; Mn,Fe garnet; Li mica; aeschylite complex Ti, oxides
Gila Mountains															
Bear Springs volcano	78-S-2	X	(epid)	---	X(ti)	X	X(Mn)	X	X(F,Cl)	---	X	X	---	X	---
	79-S-123	---	---	---	X*(Ti)	---	X*	---	---	---	---	---	---	---	---
	79-S-124	X	X	X	X*(Ti)	---	X	---	X	---	---	---	---	---	---
Lone Star pluton	78-S-3	---	X*	X	X(Ti)	X	X(Ti)	X	X	---	---	---	X	---	---
	78-S-4	---	X	X	X	X	X	X	X	---	---	X	---	---	---
San Juan pluton	78-S-5	X(Mg,Ti)	X	---	X	X	X	X	X(Cl)	---	X	X	X	---	---
Horseshoe pluton	79-S-125	X	---	---	X(Ti)	X	X	X	X	---	---	X	X	---	---
Summit Mountains															
Steeple Rock-York Valley rhyolite system	78-S-7	X(F,Ti)	---	---	X(Ti)	X	X	X	X(F)	---	---	X(Nb,Fe)	X	---	---
	79-S-116	X(Ti)	---	---	X*(Ti)	X	X*	X	X	X	---	X	X	---	---
	79-S-117	---	(epid)	---	X(Ti)	X	X	X	---	---	---	---	X	---	Olivine (Mg>Fe)
Northern Peloncillo Mountains															
Tollgate Wash eruptive center	78-S-6	---	X(Mg,Mn)	(actin)	X(Ti)	X(Mn.Nb)	---	X	X(F)	X	---	---	---	---	---
	78-S-8	---	---	(actin)	X(Ti)	X	---	X	X(F,Ce)	X*(Mn)	---	---	---	---	Various phases-glass
	79-S-118	---	X*(Mg)	---	X	X	---	X	X	X(Mn)	X	---	---	---	---
Dry Mountain and Powerline Pass eruptive centers	78-S-9	X	X	---	X	X*	X	---	X(F,Cl,OH)	X	X*	---	---	---	---
	78-DR-9	X	X	---	X(Ti)	X	X	X	---	X*(Ti,Mn)	X	X	X	X	Various phases-glass
	79-S-119	X(Ti)	---	---	X*(Ti)	X	X	X	---	X	X*	---	---	X	---
Ash Peak-Rhyolite Peak eruptive center	78-S-27	---	---	---	X	---	X	X(Th)	X(+Mn)	---	---	---	---	---	---
	78-DR-17	X(Ti)	X	---	X	X(Mn)	---	X	---	---	X	X	---	---	---
	78-DR-18	X	X	X	X(Ti)	X	X	X	X	X	X	---	---	---	---
Pinaleno Mountains															
Greasewood Mountain eruptive center	78-S-11	X(Ti)	---	X	X(Ti)	---	X	---	X	---	---	---	---	X	Fluorides (Ce,La)
	79-S-120	---	---	---	X	X	X	X	X	---	X	---	X	---	---
Gillespie Mountain pluton	78-S-13	X*(Ti)	---	---	X(Ti)	X(Mn)	X	X	X	---	X	X(Fe,Mn)	X	---	Thorite
	79-S-121	X(Ti)	---	---	X(I,Ti)	X(Mn)	X	X	X	---	X	---	X*	---	Thorite
Circle I Hills pluton	78-S-50	X(Mg,Ti)	X(epid)	---	---	X(Mn,Nb)	X	X	X	---	X	X(Fe)	X*(Nb)	---	---
Central Peloncillo Mountains															
Granite Gap pluton	77-T-60	X	---	---	X	X(Mn)	---	X	---	---	X	X	---	---	Monazite, xenotime; ilmenorutile; thorite, uraninite; muscovite
	77-T-61	X(Cl)	---	---	X	X(Mn)	---	X(+U,Th)	X	---	X	X	---	---	Monazite, xenotime; ilmenorutile; thorite, uraninite; wulfenite thortveitite
	78-S-14	X	---	---	---	X(Mn)	---	X(Th,K)	---	---	X	X	---	---	Monazite, xenotime; ilmenorutile; thorite; muscovite; euxenite, fergusonite, samarskite, columbite
	78-T-15	X	---	---	X	X(Yb)	X	X	X	---	X	X	---	---	Monazite(+Th); ilmenorutile(Nb); thorite; euxenite, furgusonite
	78-T-16	X	---	---	X	X	---	X	X*	---	---	---	---	X(REE)	Ilmenorutile(Ti,Fe,Nb)
	78-T-17	X	---	---	X	X	---	X	X	---	X	X	X	X	Ca,Fe garnet
Lordsburg pluton	77-D-197	X*	---	X*(actin)	X*	X(Mn)	---	X	X	---	X	X(Fe)	X*	x	Various phases-(Th>>P; Th>Ca>P>Si); auerlite?; chalcopyrite
	78-S-19	X(Al)	X*	X	X	X*	X*	X	---	---	---	X(Fe)	X	---	---
	78-S-20	X(Ti)	---	---	X(Ti)	X(Mn)	---	X	X(Cl)	---	---	---	X	X	Alunite?
	78-S-21	---	X*	X	X(Ti)	X	X	X	---	---	---	---	---	---	---
	78-S-22	---	X	(actin)	X(Ti)	X	---	X(Th)	X(Cl)	X	X	X(Fe)	X	---	---
McKenzie Peak dome	78-S-52	X*(Mg,Ti)	X*	---	X	X(Mn)	X	X	X	---	---	---	---	X	Pyrite
Steins eruptive center	78-S-54	---	---	---	X(Ti)	X(Mn)	X	X	X	---	---	---	---	---	---
Orange Butte dome	78-S-55	X(Ti)	X*	---	X	X*(Mn)	---	X	X	---	---	X(Fe,Mn)	---	---	---
Horseshoe eruptive center	8-F-4	X	---	---	---	---	---	---	---	---	---	---	---	---	---
Dos Cabezas-Chiricahua Mountains															
Pyramid Pass pluton	78-S-18	X(Cl)	(epid)	---	---	X(Mn)	X	X*	X	---	X	X	X	X(Y)	Monazite, xenotime; ilmenorutile; thorite; topaz, anatase; various phases-(Ca,Th,U,Y,Si); (Th,Ca,Y,Si)
Silver City pluton	78-S-24	X	X	(actin)	X(Ti)	X	X	X	X(Cl)	---	---	X(Fe)	X	X	Various phases-(Th>Y,Si)
Silver Camp pluton	78-S-29	X(Ti)	X	X	---	X	X	X	X	---	X	X	X*	---	---
Turkey Creek eruptive center	78-S-32	---	---	---	X(Ti)	X	X(Ti)	X	---	X	X(Th)	---	---	X	---
	78-S-56	X(Ti)	X	X	---	X(Nb)	X(Mn,Ti)	X	---	---	---	X	---	X	Ilmenorutile
Whitetail pluton	78-S-39	---	X*	---	---	X(Mn)	X	X	---	---	---	X	X	---	---
Nine Mile pluton	78-S-44	X	---	X	---	X(Mn)	X(Ti)	X	X	---	X(Y)	X(Fe)	X	---	Fluoride(Th,Ce,Y); monazite*(Th); thorite; uraninite(Th)-2 phases
Cowboy pluton	78-S-47	X(Ti)	X*	---	X	X	X(Ti)	X	X	---	---	---	X	---	---
Pat Hills pluton	78-S-49	X	X	---	---	X(Mn)	X	X*	X	---	X	X	X	X	---
Big Burro Mountains															
Tyrone pluton	79-S-111A	X	---	(actin)	X(Ti)	X	---	X	X(Cl)	---	X	---	X	---	---
	79-S-111B	---	---	---	X(Ti)	X	X	X	---	---	X	---	X	---	---
	79-S-112	X	---	---	X(Ti)	X	X	X	X	---	X	---	X	---	---
	BF-120-76	X	---	X	X(Ti)	X(Mn)	---	X	X(Cl)	---	X	X	---	X(REE)	Xenotime; Ca,Fe garnet; pyrite, chalcopyrite
Bessie Rhodes eruptive center	79-S-200	X(Ti)	---	---	X(Ti)	X	X	X	X	---	---	X	---	---	---
	79-S-201	X(Ti)	---	---	X*	---	X*	X	X(Cl)	---	---	X	---	---	---
Burro Cienaga eruptive center	79-S-205	X(Ti)	---	X*	X*	X(Mn)	---	X	X	---	---	X(Fe)	---	---	---
Pinos Altos Range															
Gomez Peak pluton	78-S-25	---	---	X*	X	---	---	X	X(Cl)	---	X	---	X	---	---
Santa Rita pluton	78-SR-1	---	---	---	X(Ti)	X*	X	X	X(Cl)	---	---	X(+Fe)	X	---	Monazite; pyrite, chalcopyrite
Pinos Altos pluton	78-PA	X(Ti)	---	X*(actin)	X*	X(Mn)	---	X	X	X	---	X(Fe,Mn)	X*	---	Pyrite, chalcopyrite, molybdenite
	79-S-100	X(Ti)	---	X*	X	X(Mn)	X	X	X(Cl)	---	---	---	X	X	---
Fierro-Hanover pluton	78-UVI	X	---	X*	X	X*(Mn)	---	X	X	---	---	---	X	---	Pyrite, chalcopyrite
	79-S-103	X*(Ti)	---	X*	X	X	---	X(Th)	X(Cl)	---	---	---	X*	X	---
	79-S-104	---	---	X*	X*(Ti)	X(Mn)	---	X	---	---	---	---	X*	---	---
	79-S-105	X(Ti)	---	X	X	X	X	X	X(Cl)	---	---	---	X*	---	---
	F-1-76	X	---	X	X	X(La,Mn)	---	X	X(Cl)	---	---	---	X	---	Pyrite, chalcopyrite; Ca, Fe, Mg garnet
Reading Mountain															
Rhyolite of Twin Sisters	79-S-101	X(Ti)	---	---	X*	X*(Mn)	X(+Ti)	X	X	---	X(La)	---	---	---	Pyrite
	79-S-102	X(Ti)	---	---	X	X*(Mn)	X(+Ti)	X	X	---	X	---	---	---	---
Jupiter Hill pluton	79-S-107	X(Ti)	---	---	X(Ti)	X*(Mn)	X	X	X	---	---	---	---	---	---
	79-S-109	X(Ti)	(epid)	---	X*(Ti)	X(Mn)	X*	X	X	---	---	X	X*	X	---
Bear Creek pluton	79-S-108	X	*(epid)	---	X*(Ti)	X(Mn)	X	X	X	---	---	X	X*	---	---
	79-S-110	X	---	(actin)	X(Ti)	X(Mn)	---	X	X	---	---	---	X	---	---

Table 5. *Minor element analyses of igneous rocks in the Silver City 1° × 2° quadrangle, New Mexico and Arizona*

[Analyses by energy dispersive x-ray spectrometry; all values in ppm except FeO, given in weight percent. Leaders (--) indicate not determined; O, below measurable limit]

SILICIC ERUPTIVE CENTERS AND PLUGS

Area	Sample no.[1]	FeO	Cu	Zn	As	Rb	Sr	Y	Zr	Nb	Mo	Pb
	Element and limit of detection	0.0	49	28	13	6	5	4	3	3	3	18
	Greasewood Mountain eruptive center											
Pinaleno Mountains	79-T-119	3.2	9	38	12	108	609	10	190	12	0	6
	79-T-121	3.2	19	44	3	97	820	10	193	15	0	15
	79-T-57	1.4	15	43	7	446	272	49	287	24	2	25
	79-T-61	0.7	0	46	8	308	28	7	74	13	1	14
	79-T-62	1.5	38	18	76	367	56	38	294	21	1	26
	80-T-60	3.2	3	91	37	550	257	37	275	14	0	24
	80-T-62	4.3	48	88	4	130	571	14	203	12	2	18
	80-T-63	4.1	51	105	3	132	547	21	208	8	0	0
	80-T-64	3.7	22	89	17	141	422	12	178	12	2	0
	80-T-65	2.8	3	40	81	171	358	13	165	10	0	0
	80-T-66	4.3	23	87	6	114	435	23	216	10	0	6
	80-T-67	0.4	3	26	14	208	356	37	189	14	0	1
	80-T-68	2.5	10	20	11	173	386	13	166	10	0	4
	78-S-11	0.8	53	36	12	402	18	59	123	50	0	16
	79-S-120	1.2	79	0	0	324	104	49	193	16	4	33
	79-T-1B	0.7	26	35	4	391	75	6	73	7	5	15
	79-T-2B	0.5	10	28	12	284	64	19	81	14	5	9
	79-T-2C	0.8	0	39	7	285	62	15	90	14	6	21
	79-T-4	1.0	43	29	5	291	68	12	113	16	4	15
	79-T-6A	0.7	68	25	7	323	35	20	110	20	3	8
	79-T-13A	0.6	41	223	10	523	41	20	94	24	6	16
	79-T-15	0.8	3	34	8	794	19	28	129	19	4	40
	79-T-16A	0.5	0	31	14	585	45	2	73	7	5	7
	79-T-17	0.8	25	42	13	248	340	24	121	24	2	20
	79-T-19A	1.0	0	41	4	246	118	12	92	12	6	20
	79-T-29	0.6	24	66	8	553	35	21	88	21	5	21
	79-T-31	1.1	53	19	11	173	128	19	156	21	6	2
	79-T-35	1.4	3	44	14	218	162	18	150	8	2	8
	79-T-38	3.1	0	53	15	314	127	38	228	17	5	3
	79-T-41	0.5	32	14	9	285	41	26	56	20	6	8
	79-T-82B	0.9	29	16	20	348	183	8	119	15	6	26
	79-T-89	0.7	42	26	24	339	37	14	83	13	9	10
	79-T-90	0.7	21	36	14	473	23	37	113	15	7	4
	79-T-95	0.7	37	59	2	433	62	9	90	16	8	37
	79-T-109	0.8	19	56	15	493	20	31	116	26	8	19
	79-T-120	3.0	0	21	8	97	552	21	169	11	2	32
	79-T-42	1.6	30	56	3	214	102	53	270	25	5	17
	79-T-81	1.3	0	52	41	523	48	48	294	20	6	29
	79-T-82A	4.3	0	69	28	270	388	19	231	9	0	6
	79-T-83	2.9	176	76	28	373	148	39	234	16	5	81
	Turkey Creek eruptive complex											
Chiricahua Mountains	78-S-32	0.9	58	56	6	415	8	74	266	53	9	31
	78-S-56	0.5	42	58	7	572	17	52	159	26	3	31
	Bear Springs volcano											
Gila Mountains	79-S-123	0.8	33	17	4	128	215	19	184	13	0	16
	79-S-124	1.6	92	44	0	118	538	15	230	9	0	23
	79-DR-45	2.4	0	44	0	126	401	13	109	13	9	23
	Tollgate Wash eruptive center											
Northern Peloncillo Mountains	79-S-118	1.9	48	90	12	189	22	57	576	52	4	16
	78-DR-34	0.6	52	52	5	380	8	90	190	111	4	26
	78F-DR-9	1.8	0	77	1	250	258	72	271	47	10	21
	78F-DR-55A	0.7	42	59	1	594	5	102	146	103	4	38
	78F-DR-55B	0.6	62	55	6	428	17	104	138	109	4	30
	78F-DR-65	0.5	90	31	2	393	14	59	193	116	2	44
	Ash Peak eruptive center											
	78-S-27	1.7	4	72	5	290	5	59	243	53	7	14
	79-S-119	0.9	43	22	8	171	25	26	163	17	0	14
	78-DR-17	1.5	0	28	2	221	16	31	168	26	6	7
	78-DR-18	1.3	0	42	11	132	13	38	139	22	6	16
	Yv-12-80	1.3	35	85	6	280	7	66	244	54	0	7
	Horsecamp volcano											
Central Peloncillo Mountains	80-DR-124	5.4	0	75	13	84	550	14	220	7	0	0
	Orange Butte dome											
	78-S-55	1.5	63	22	13	694	216	52	349	12	0	18
	Mckenzie Peak dome											
	78-S-52	2.1	51	44	8	189	233	41	458	21	1	22
	Steins eruptive center											
	80-DR-142	4.2	0	74	9	128	322	34	333	4	0	8
	80-VL-49	1.2	0	38	10	267	52	51	171	16	2	11
	8F-9A	1.9	0	39	9	167	116	28	203	13	5	0
	75-D-298	1.1	20	57	7	377	71	53	214	17	6	25
	81-DHR-308	1.1	0	44	14	408	36	34	167	7	0	0
	8F-26	1.0	0	32	15	226	58	46	183	19	2	0
	8F-64	1.4	0	33	0	188	164	45	225	15	5	15
	8F-56	4.7	0	64	4	132	460	29	255	7	1	11
	75-D-293	1.3	22	50	7	168	67	47	184	17	8	35
	8F-11	1.8	36	37	6	179	217	30	188	6	4	5
	8F-12	2.0	0	31	12	171	157	31	221	8	3	11
	8F-28	2.6	20	72	6	197	212	35	241	11	1	19
	Muir eruptive system											
Pyramid Mountains	76-D-15A	2.1	0	56	3	171	227	64	470	22	4	25
	76-D-20	1.4	0	63	2	193	114	52	266	22	2	26
	76-D-25	3.8	7	37	16	66	574	11	132	3	1	0
	76-D-26A	4.4	0	73	5	202	502	34	275	8	0	18
	76-D-26B	3.9	0	84	6	115	505	28	262	13	3	17
	76-D-61	0.8	13	29	0	123	63	6	66	9	8	14
	York Valley-Steeple Rock eruptive center											
Summit Mountains	YV-14-79	1.4	33	54	8	169	68	25	158	24	2	7
	YV-26-79	1.2	65	57	4	162	77	23	259	25	2	14
	YV-27-79	1.1	27	48	5	269	67	22	147	24	3	5
	YV-60-79	1.6	46	37	19	364	37	23	167	20	2	2
	YV-62-79	1.5	64	30	46	295	95	24	187	22	3	4
	YV-72-79	5.6	26	69	9	184	277	27	524	28	0	3
	YV-80-79	1.7	48	52	2	205	148	18	183	18	3	15
	YV-89-79	1.5	48	34	10	299	80	17	176	16	1	3
	YV-155-79	1.3	65	39	11	355	45	16	130	18	3	0
	79-S-116	1.1	69	0	8	310	53	25	195	18	0	10
	SR-4-77	1.7	43	26	8	215	243	25	193	24	0	5
	T-23-78	0.6	0	34	4	175	64	20	96	9	4	12
	Canador Peak plug											
	CP-24-79	3.4	20	81	4	50	1349	26	166	1	0	0
	Tyrone eruptive system											
Big Burro Mountains	80-S-305	3.4	0	1802	5	275	76	18	229	0	3	3
	80-S-306	2.0	0	644	7	325	34	17	88	9	5	71
	80-S-307	0.7	0	205	4	194	267	23	241	8	4	0
	79-S-114	7.7	4114	26	6	452	48	77	169	2	0	11
	79-S-115	3.3	78	0	11	226	8	17	78	8	0	0
	80-S-308	1.9	0	0	5	223	37	5	69	7	50	2

SILICIC ERUPTIVE CENTERS AND PLUGS

Area	Sample no.[1]	FeO	Cu	Zn	As	Rb	Sr	Y	Zr	Nb	Mo	Pb
	Element and limit of detection	0.0	49	28	13	6	5	4	3	3	3	18
	Burro Cienaga eruptive center											
Big Burro Mountains	79-S-205	0.4	52	7	0	149	296	20	81	10	0	18
	79-S-206	0.4	33	13	3	200	102	25	90	12	2	24
	79-S-207	0.7	56	13	3	179	130	28	181	12	4	10
	79-S-208	4.7	36	64	7	166	374	22	217	10	2	11
	79-S-209	0.4	58	21	0	171	75	19	72	12	0	24
	79-S-210	0.5	18	17	9	169	216	19	97	10	0	11
	Bessie Rhodes eruptive center											
	79-S-200	0.8	50	31	12	114	138	30	173	19	2	10
	79-S-201	2.1	80	84	0	87	234	31	570	17	4	21
	Soldiers Farewell dome											
	79-S-203	4.1	117	51	17	49	560	14	167	6	0	15
	79-S-204	2.8	67	69	1	87	361	24	181	12	0	20
	Rhyolite of Brockman Hills											
Cedar Mountain Range Brockman Hills	75-T-38	7.0	—	45	7	102	1326	22	179	7	0	9
	77-T-45A	5.2	—	30	9	44	563	19	233	13	2	6
	77-T-45B	5.0	—	45	10	50	720	22	221	10	0	0
	Rhyolite of Cedar Mountain Range											
	75-T-145	1.0	—	53	2	191	139	47	244	19	5	17
	76-T-146	1.2	—	50	8	198	154	38	176	17	5	14
	Gillespie Mountains pluton											
Pinaleno Mountains	78-S-13	—	0	15	0	239	109	37	274	24	1	23
	79-S-121	1.1	50	33	10	247	90	49	293	26	0	21
	Circle I Hills pluton											
	78-S-50	1.3	47	40	9	225	156	39	245	22	4	16

GRANITIC PLUTONS, PLUGS, DIKES

Area	Sample no.	FeO	Cu	Zn	As	Rb	Sr	Y	Zr	Nb	Mo	Pb
	Nine Mile pluton											
Dos Cabezas Mountains and Chiricahua Mountains	78-S-44	1.6	0	51	7	127	314	20	132	7	1	18
	Pat Hills pluton											
	78-S-49	2.3	71	23	8	281	305	28	219	15	1	12
	Whitetail pluton											
	78-S-39	1.7	487	180	21	141	160	48	177	24	20	124
	Cowboy pluton											
	78-S-47	6.0	437	57	1	57	546	15	106	3	0	10
	Silver Camp pluton											
	78-S-29	3.6	37	59	0	148	494	30	240	9	1	39
	Pyramid Pass pluton											
	78-S-18	—	21	0	0	556	39	38	97	9	0	26
	Lone Star pluton											
Gila Mountains	78-S-3	3.6	138	72	4	78	618	14	109	4	0	19
	78-S-4	—	56	132	0	71	510	8	88	4	0	12
	San Juan pluton											
	78-S-5	2.8	747	275	0	75	522	8	94	3	1	6
	Dos Pobres pluton (not exposed)											
	79F-DR-55	4.6	455	252	17	55	855	35	103	17	15	132
	79F-DR-99	5.3	997	238	13	82	626	24	85	19	21	133
	Horsehoe pluton											
	79-S-125	2.5	2301	48	3	51	597	41	92	3	0	20
	Granite Gap pluton											
Central Peloncillo Mountains	78-S-14	—	0	1	0	289	33	11	53	13	2	25
	78-S-15	1.9	44	7	7	339	23	25	47	15	2	21
	78-S-16	15.2	67	28	0	282	167	33	288	12	0	14
	78-S-17	—	0	8	0	216	87	13	79	4	0	29
	Mineral Mountain eruptive center											
	75-D-225B	1.8	0	41	18	236	102	56	304	31	4	5
	75-D-230	1.6	0	60	14	242	92	19	281	29	7	11
	75-D-270	4.3	1	106	8	137	375	37	653	17	0	17
	75-D-272	1.1	0	41	4	162	68	21	101	10	7	24
	75-D-223A	1.2	0	37	9	245	89	49	189	16	6	12
	75-D-227B	1.6	57	72	0	234	113	49	245	16	5	30
	75-D-238B	1.0	5	45	9	260	51	11	141	20	2	13
	Lordsburg pluton											
	77-D-190	3.2	66	52	8	70	649	14	135	8	0	5
	78-S-19	—	118	98	0	166	491	15	256	7	0	24
	78-S-20	2.4	89	131	4	232	328	20	192	6	2	49
	78-S-22	3.3	61	34	4	187	308	34	218	13	0	21
	Tyrone pluton											
Big Burro Mountains	79-S-111	1.0	20	3	1	81	590	11	113	3	0	0
	79-S-112	0.9	137	350	8	90	465	13	126	3	0	8
	Twin Peaks pluton (Black Hawk)											
	80-S-302	3.6	41	67	9	58	835	14	124	2	0	4
	80-S-303	3.8	0	57	5	51	781	14	108	2	0	0
	R-4-79	5.2	20	75	7	74	549	23	131	5	1	0
	Granite of Victorio Mountains											
Victorio Mountains	77-T-109	0.3	0	39	2	952	23	121	84	36	1	46
	79-S-212	0.4	50	24	0	160	125	15	53	2	0	15
	79-S-213	1.8	35	13	8	131	416	25	214	10	2	5
	79-S-214	0.2	43	8	0	716	28	107	72	41	0	45

GRANITIC PLUTONS, PLUGS, DIKES

Area	Sample no.	FeO	Cu	Zn	As	Rb	Sr	Y	Zr	Nb	Mo	Pb
	Silver City pluton											
Pinos Altos Range	78-S-24	1.9	5	89	8	84	655	10	122	2	0	16
	80-S-301	2.3	0	64	5	58	1000	3	97	0	0	0
	81F-DR-25	2.3	0	39	7	57	1047	3	111	3	0	0
	81F-DR-26	7.4	0	29	3	59	1071	3	117	0	0	0
	81F-DR-27	2.1	0	36	Q	68	992	5	113	3	0	0
	81F-DR-28	2.1	0	54	0	64	692	5	114	1	0	0
	81F-DR-29	2.2	0	37	2	65	956	4	113	0	0	0
	Round Mountain pluton											
	81F-DR-31	3.6	18	50	8	122	899	13	119	3	0	0
	Gomez Peak pluton											
	78-S-25	2.7	46	48	11	143	800	22	142	5	0	6
	Sanitorium pluton											
	81F-DR-30	3.7	0	43	12	124	957	19	110	3	0	1
	Fierro-Hanover pluton											
	79-S-103	3.6	421	192	30	91	922	34	121	17	17	99
	79-S-104	5.9	712	230	12	69	1040	55	206	26	17	132
	79-S-105	2.8	484	194	28	104	955	41	171	22	17	106
	Santa Rita pluton											
	78-SR-Co-1	3.9	343	94	2	56	687	10	109	5	17	0
	78-SR-1	3.3	78	71	5	54	581	0	88	3	0	0
	Copper Flat pluton											
	79-S-106	1.6	605	212	19	77	556	29	119	17	20	113
	Pinos Altos alkalic complex											
	JC-8-54	11.3	202	95	2	247	1850	23	79	3	0	5
	JC-10-54	9.9	162	120	9	200	963	19	142	2	0	9
	JC-15-54	9.8	233	87	2	93	1160	17	84	3	0	11
	JC-20-54	5.6	64	119	7	126	798	26	210	6	0	0
	JC-23-54	9.3	201	107	2	144	870	20	197	6	0	14
	JC-25-54	8.9	105	90	5	115	1276	24	136	3	0	13
	FS-2-82	10.3	174	97	22	209	1034	26	130	10	0	18 ?
	JC-60-54	12.3	178	120	1	184	889	27	138	2	0	11
	JC-29-54	12.0	132	111	0	146	1272	20	95	2	0	12
	JC-36-54	8.6	160	78	18	181	981	23	131	2	0	3
	JC-38-54	13.4	130	101	10	193	876	31	181	6	0	0
	JC-12-54	13.5	148	70	13	82	829	14	67	2	0	5
	FS-3-82	12.1	173	99	8 ?	195	712	30	168	8	0	13 ?
	Pinos Altos granite pluton											
	79-S-100	4.0	81	34	25	146	756	16	155	0	0	0
	Rhyolite of Twin Sisters											
Reading Mountain	79-S-101	1.7	0	79	23	87	558	42	304	14	0	22
	79-S-102	1.5	0	57	11	149	148	40	278	15	6	24
	73-T-26	1.6	38	30	12	118	247	12	142	7	0	12
	Bear Creek pluton											
	79-S-108	2.0	54	29	0	125	274	26	253	11	1	24
	Juniper Hill pluton											
	79-S-107	1.5	70	36	1	141	204	30	291	10	0	26
	79-S-109	1.5	67	14	0	140	206	24	246	8	0	21
	Saw Mill Mountain pluton											
	79-S-110	0.7	62	12	4	168	118	33	227	13	2	17

[1]Sample locations are given on sheet 1, table 2.

SOURCES OF DATA FOR FIGURE 1

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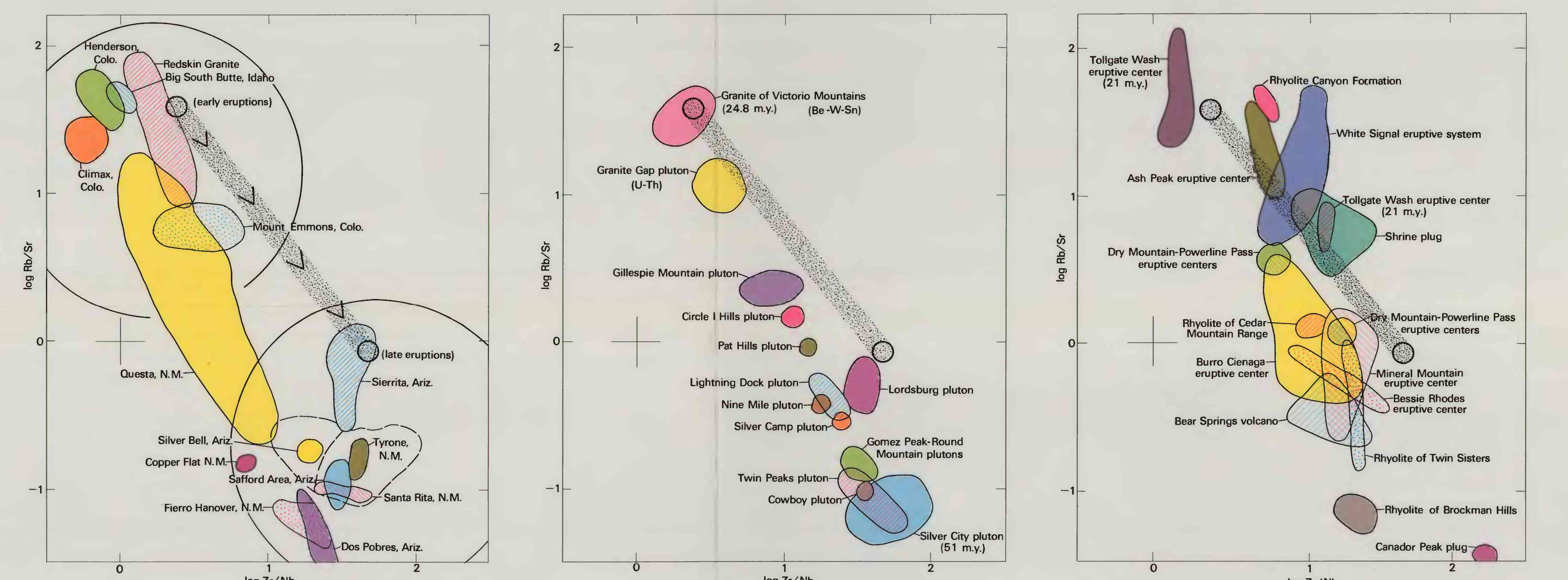
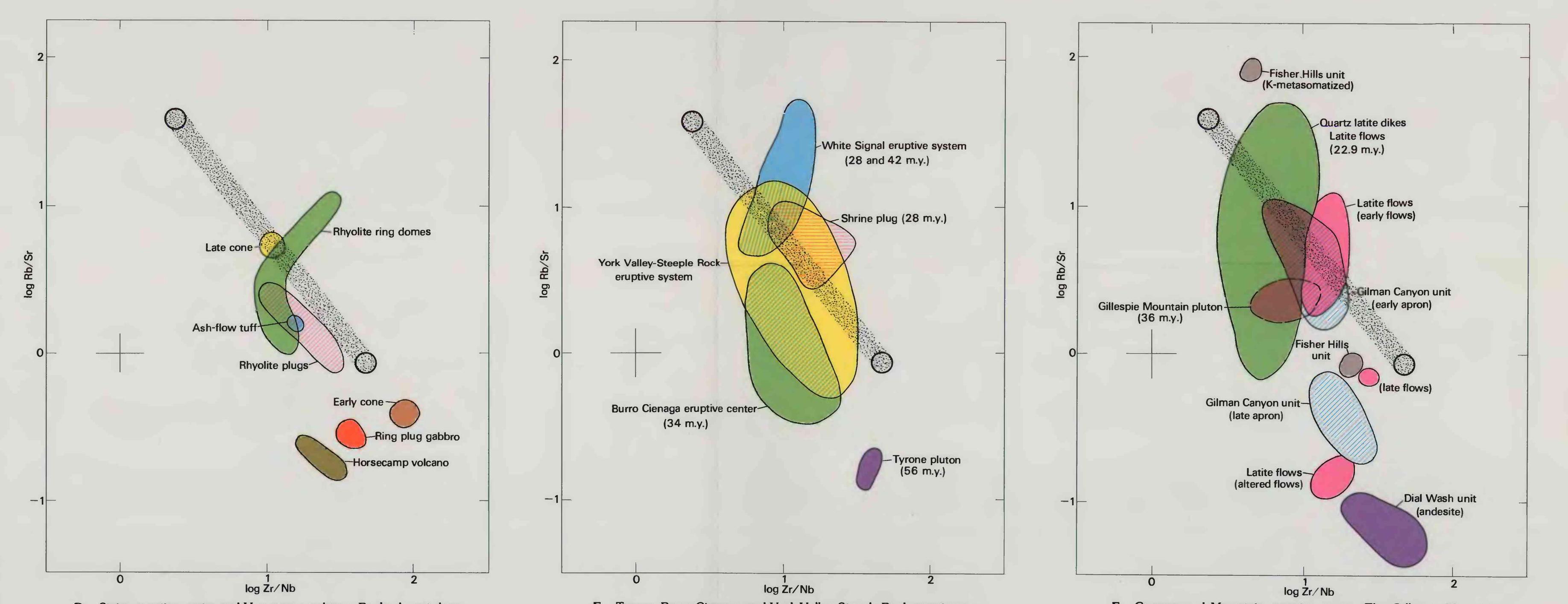


A. Intrusive and subvolcanic rocks associated with known ore deposits (molybdenum stockwork, tin granite, copper porphyry). Some plutons associated with copper deposits in the Silver City quadrangle are included.

B. Granitic rocks in the Silver City quadrangle. Ratio plots form an array subparallel to the trend of an evolved, zoned magma. The granitic rocks in the Victorio Mountains and in Granite Gap appear to be excellent targets for further resource investigations.

C. Silicic eruptive and subvolcanic rocks in the Silver City quadrangle. Ratio plots appear to represent a spectrum of magmas ranging from possible local crustal melts to magmas from upper parts of compositionally zoned chambers. Rocks from the Tollgate Wash, Ash Peak-Rhyolite Peak, and White Signal eruptive centers are suggestive of derivation from evolved, zoned magma chambers and warrant further study.



D. Steins eruptive center and Horsecamp volcano. Rocks do not show evidence of compositional zoning in an upper level magma chamber.

E. Tyrone, Burro Cienaga, and York Valley-Steeple Rock eruptive systems. Early Tyrone pluton (56 m.y.) shows ratios (low Nb, high Sr) typical of granitic rocks associated with copper porphyry deposits. Later activity (White Signal and Shrine plug, 42–28 m.y.) shows ratios more typical of the upper parts of zoned magma chambers. The York Valley-Steeple Rock rhyolitic rocks have ratios indicative of a developed, or partially developed, zoned, silicic magma system. The Burro Cienaga eruptive center rocks are probably derived from a Ca-granite magma system; they do not show ratios typical of a zoned magma chamber.

F. Greasewood Mountain eruptive center. The Gillespie Mountain pluton (36 m.y.) and associated extrusive rocks of the Greasewood Mountain center have ratios of low Ca-granites. Late, quartz latite dikes (22.9 m.y.), however, apparently tap a different magma which was derived from a compositionally zoned chamber.

Figure 1. Plots of log Rb/Sr vs log Zr/Nb ratios for granitic, volcanic, and hypabyssal rocks.

Broad shaded line represents a smoothed trend of ratios for the Bishop Tuff (Hildreth, 1979). Arrows in this trend (fig. 1A) indicate direction from most-evolved, shallow, cool, magma zones to least-evolved, deeper, hotter magma zones.

PETROCHEMISTRY OF IGNEOUS ROCKS, SILVER CITY 1° × 2° QUADRANGLE, NEW MEXICO AND ARIZONA

By
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1991