

Base from U.S. Geological Survey, Port Moller A-2 (1963) and Port Moller B-2 (1963) Quadrangles, Alaska.

This report has not received final editing and review. The author is solely responsible for its content and will appreciate candid comments on the accuracy of the data as well as suggestions to improve the report.

ALASKA  
SCALE 1:63,360  
CONTOUR INTERVAL 100 FEET  
DATUM MEAN SEA LEVEL

TRUE NORTH  
APPROXIMATE MEAN DECLINATION, 1963

MAP SYMBOLS  
▲ Sample sites

INTRODUCTION

Data for this report were collected during a DGGS reconnaissance field project on Unga and Popof Islands, Alaska Peninsula, in July 1979. The fieldwork was part of a planned two-season effort which was not continued a second year. This report is intended to make available the results of the single field effort.

The goals of the project were to study the volcanic rocks of Unga and Popof Islands, assess potential metallic mineralization, and evaluate the potential for volcanic hazards. Research focused on the relationship between occurrences of minerals and volcanic rocks. Analyses have not been performed in duplicate and should be considered as preliminary only.

Table 1. Geochemical assay values in ppm, Unga-Popof Islands. Analyses by hot-aqua-regia digestion, DGGS (April 1980).

Sample	Description	Au	Cu	Ag	Zn	Pb
79JR38A	Veins in autobrecciated lava	<1	41	<0.1	22	9
79JR38B	Veins in autobrecciated lava	<1	72	<0.1	75	4
79JR43	Veins from alteration zone in lava flow	<1	94	<0.1	7	8
79JR44	Shear zone in lava flow	<1	101	<0.1	6	4
79JR52	Alteration zone in sill or lava flow	<1	34	<0.1	51	6
79JR53	Altered lava flow (heavy K-stain)	<1	100	<0.1	89	5
79JR55	Sulfide-bearing veins in lava flow	<1	170	<0.1	10	6
79JR57	Tridymite(?) calcite-mont vein in lava flow	<1	75	<0.1	56	9
79JR59	Zeolite-biotite alteration of lava flow	<1	36	<0.1	57	4
79JR64	Altered float	<1	33	<0.1	44	8
79JR65	Altered lava flow (solution cavities?)	<1	74	0.2	37	8
79JR67A	Lava flow adjacent to alteration zone	<1	20	<0.1	105	6
79JR67D	Alteration zone in lava flow	<1	65	0.4	10	10
79JR76	Chert-calcite-pyrite vein in lava flow	<1	62	<0.1	4	6
79JR81	Green chert(?) veins in lava flow	<1	47	<0.1	40	4
79JR83	Lava flow or sill (K-stain groundmass)	<1	68	<0.1	72	2
79JR84	Jointed or foliated lava flow	<1	52	<0.1	4300	24
79JR85	Lava flow (mafics altered to biotite)	<1	110	<0.1	52	9
79JR88	Fractured, altered lava flow	<1	55	0.1	5	3
79JR105	Sulfide-bearing veins in fault zone	<1	74	<0.1	29	4
79JR107	Altered lava with disseminated sulfides	<1	86	<0.1	10	10
79JR110	Sulfide-bearing veins in lava flow	<1	70	0.2	19	15
79JR119	Float samples of veins	<1	94	<0.1	28	4
79JR121	Lava clasts (60% in clay (40%))	<1	140	0.2	150	22
79JR124	Sulfide-bearing altered lava	<1	87	<0.1	110	10
79JR125	Minor disseminated sulfides in lava	<1	81	<0.1	62	3
79JR130	Oxide(?) bearing veins in lava flow	<1	64	<0.1	35	3
79JR132	Closely fractured, altered lava flow	<1	97	<0.1	59	5
79JR142	Sill(?) in flows and breccias	<1	68	<0.1	77	5
79JR143	Veins in altered breccia	<1	66	<0.1	73	5
79JR144	Assemblage illite-fluorite-alunite qtz - ? (K-stain)	<1	99	<0.1	3	2
79JR147	Float: chert(?) with disseminated sulfides	<1	28	<0.1	27	1
79JR148	Disseminated sulfides in tuff(?)	<1	68	<0.1	64	4
79JR156	Brecciated lava; matrix and veins of qtz-Kspar-biotite-diopside(?)	<1	130	<0.1	37	8
79JR162	Alteration assemblage of qtz-kaolinite- stilbite-chlorite-illite-pyrite(?)	<1	93	<0.1	3	14
79JR164	Alteration assemblage of qtz-kaolinite calcite-montmorillonite(?)	<1	99	<0.1	5	5
79JR167	Silicified, sulfide-bearing lava	<1	24	<0.1	60	8
79JR170	Silicified, possibly leached lava	<1	10	<0.1	4	<1
79JR171	Silicified, possible sulfide enrichment below sample 79JR170	<1	58	<0.1	49	8
79JR190	Green chert veins in lava (dome?)	<1	36	<0.1	30	7

Table 2: Whole-rock analyses, Unga-Popof Islands. Analyses by atomic absorption (Sydney Abbey, Canada Geol. Survey Paper 70-23, 1970). FeO by USGS method (M.A. Wiltse, pers. commun., 1982). Analyses performed April 1980 by DGGS, except as noted.

Sample	Lab	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	FeO	MnO	MgO	CaO	Na <sub>2</sub> O	K <sub>2</sub> O	TiO <sub>2</sub>	LOI <sup>a</sup>	H <sub>2</sub> O	Sum
79JR32	614	49.2	17.8	4.01	5.08	0.16	5.70	9.1 <sup>b</sup>	2.4 <sup>b</sup>	0.55 <sup>b</sup>	0.91	0.56	1.66	97.13
79JR45	615	55.8	15.7	3.41	4.09	0.17	4.66	8.47	2.73	1.91	0.76	0.50	0.77	98.97
79JR48	616	49.4	15.2	3.58	4.90	0.16	7.85	9.8 <sup>b</sup>	2.2 <sup>b</sup>	1.1 <sup>b</sup>	0.77	0.80	1.68	97.44
79JR62	617	59.3	17.5	3.91	1.44	0.13	2.76	5.8 <sup>b</sup>	3.4 <sup>b</sup>	0.65 <sup>b</sup>	0.43	0.69	1.35	97.36
79JR77	618	54.7	15.9	3.23	4.54	0.13	4.67	7.4 <sup>b</sup>	2.6 <sup>b</sup>	2.05 <sup>b</sup>	0.80	0.21	0.70	96.93
79JR82	619	63.1	15.4	2.51	2.70	0.14	1.96	4.60	4.07	1.12	0.54	1.17	1.05	98.36
79JR87	620	60.0	17.3	2.66	2.97	0.13	2.64	5.50	3.33	1.10	0.44	2.18	0.70	98.95
79JR116	621	56.4	16.3	3.98	3.06	0.15	3.66	6.55	2.94	1.37	0.59	1.32	1.97	98.29
79JR129	622	54.5	16.3	1.94	5.85	0.16	3.96	8.03	2.62	0.98	0.82	1.55	1.00	97.70
79JR134	623	59.5	17.0	2.43	3.51	0.14	2.61	6.75	3.61	0.91	0.42	1.20	0.38	98.46
79JR152	624	58.9	17.7	3.51	2.23	0.11	1.62	6.54	4.04	0.80	0.64	0.82	1.17	98.08
79JR155	625	59.7	16.1	3.47	2.83	0.16	3.06	6.33	3.06	1.38	0.60	1.03	1.22	98.94
79JR159	626	56.6	16.6	2.90	4.02	0.14	4.20	7.27	2.67	2.00	0.67	0.55	1.00	98.62

<sup>a</sup>Loss on ignition.  
<sup>b</sup>Analyses by Bondar-Clegg and Co. Ltd., North Vancouver, B.C. (April 1980).

Table 3. Petrographic description of analyzed samples in Table 2, Unga-Popof Islands. Volcanic classification of rocks with >10% normative quartz is according to O'Conner (USGS Professional Paper 525-B, 1965, p. 79-84), based on CIPW norms. Volume percentages are estimates.

**79JR32:** Basalt (normative qtz = 5%; normative An/Ab/Or = 38.1/21.4/3.4). Holocrystalline, seriate. 55% plagioclase to 2 mm; clinopyroxene 10% to 1 mm; opaques 3%; alteration of pyroxene and possible olivine, 10% (goethite-iddingsite?); groundmass (fine plagioclase, pyroxene, alteration), 20%; secondary calcite and chlorite, 2%. Occurs as massive flow or dome. Not stained for potassium.

**79JR45:** Andesite (normative qtz = 9.9%; normative An/Ab/Or = 25.6/23.6/11.7). Porphyritic, possibly relict vitrophyric. Plagioclase 20%, to 3 mm; pyroxene 15% (cpx > opx), to 2 mm; opaques 1%; alteration patches, 5% (calcite, chlorite/montmorillonite?; after mafics?); groundmass 59% (pliotaxitic, plagioclase/augeite and secondary alteration). Occurs as flow-banded lava. (K-stain occurs as groundmass specks and in one small feldspar grain.)

**79JR48:** Basalt (normative qtz = 1.9%; normative An/Ab/Or = 29.9/19.6/6.9). Subseriate to porphyritic. Plagioclase to 1 mm, 10%; pyroxene (single or glomeroporphyritic) to 2 mm, 20% (cpx>opx); opaques, 2%; alteration patches (uralite and biotite), 10%; groundmass (interlocking plagioclase/augeite to 0.3 mm), 58%. Occurs as massive flow or dome. (K-stain occurs distinctly around uralite patches and to a lesser degree in large and small plagioclase grains.)

**79JR62:** Dacite (normative qtz = 21.5%; normative An/Ab/Or = 30.2/30.2/4.0). Porphyritic. Plagioclase 30%, to 4 mm; hornblende (and opaque relicts) to 3 mm, 10%; orthopyroxene to 1 mm, 3% (commonly occur as inclusions in hornblende); opaques 0.5%; groundmass (fine grained plagioclase, opaques, mafics altering to ?; rare veinlets of amphibole and opaque brown), 56.5%. Occurs as slightly foliated flows. (Possible albite rims on plagioclase grains; possible trace epidote as alteration of plagioclase; rare K-stain in groundmass.)

**79JR77:** Andesite (normative qtz = 9.6%; normative An/Ab/Or = 26.7/22.9/12.6). Porphyritic. Plagioclase to 5 mm, 25%; pyroxene (cpx>opx) to 3 mm, 15% (plagioclase and pyroxene commonly glomeroporphyritic.); opaques 1%; replacement of pyroxene by amphibole or biotite, 10%; groundmass (slightly foliated, mostly plagioclase/augeite/opaques), 49%. Occurs in lava flows with flaggy partings. (K-stains occur in grains dispersed in groundmass.)

**79JR82:** Dacite (normative qtz = 23%; normative An/Ab/Or = 21.4/35.7/6.7). Porphyritic, probably relict vitrophyric. Plagioclase (irregular grains and glomeroporphyritic clots), to 2 mm, 20%; pyroxene (rarely to 1 mm; cpx>opx), 10%; opaques 1%; groundmass (perlitic cracks, spherulitic patches, plagioclase microlites), 59%. Occurs as flow-banded lava. No visible K-stains.

**79JR87:** Dacite (normative qtz = 20.4%; normative An/Ab/Or = 28.4/29.4/6.7). Porphyritic. Plagioclase to 2 mm, 45%; pyroxene (cpx only?) to 1 mm, 5%; trace hornblende; opaques 2%; alteration patches (calcite, chlorite, montmorillonite? after mafics; possible epidote, biotite) 5%; groundmass (equidimensional plagioclase/chlorite), 43%. Occurs as massive, isolated outcrop. (K-stain at borders or in veinlets in plagioclase; also associated with chlorite in groundmass.)

**79JR116:** Dacite (normative qtz = 13.5%; normative An/Ab/Or = 28.6/26.2/8.4). Porphyritic. Plagioclase (to 3 mm), 30%; pyroxene (to 2 mm; cpx>opx), 10%; groundmass 40%. Replacement of cpx by pseudomorphic mineral (pleochroic tan to dark green-brown, one good cleavage, parallel extinction, high birefringence) tentatively identified as biotite; similar mineral occurs as fine grains in groundmass. Occurs as dense, probable lava flow. Not stained for potassium.

**79JR129:** Andesite or dacite (normative qtz = 11.7%; normative An/Ab/Or = 31.4/23.1/6.1). Porphyritic, possibly relict vitrophyric. Plagioclase (to 2 mm), 20%; pyroxene (to 2 mm; cpx>opx), 15%; opaques, 2%; groundmass (foliated plagioclase microlites, remainder isotropic to subopaque brown), 63%. Occurs as dense lava flow. Not stained for potassium.

**79JR134:** Dacite (normative qtz = 16.8%; normative An/Ab/Or = 28.4/31.5/5.6). No thin section. Occurs as massive, isolated outcrop.

**79JR152:** Dacite (normative qtz = 17.4%; normative An/Ab/Or = 28.9/35.7/5.0). Porphyritic. Plagioclase (to 2 mm), 20%; pyroxene (to 1 mm; only cpx?), 5%; opaques, 1%; groundmass (foliated plagioclase microlites; secondary uralite, biotite?), 74%. Replacement rims on pyroxene of possible biotite; veinlets of calcite, possible zeolite, quartz (cristobalite?), montmorillonite (?). Occurs as dense lava flow. Not stained for potassium.

**79JR155:** Dacite (normative qtz = 19.7%; normative An/Ab/Or = 27.0/26.7/8.4). Porphyritic, possibly relict vitrophyric. Plagioclase (to 4 mm), 25%; pyroxene (to 2 mm; cpx>opx), 5%; quartz (to 2 mm), 2%; groundmass (scattered plagioclase grains; areas of coarse qtz-Kspar in finer, vaguely spherulitic mass of montmorillonite?), 68%. Locally, a trachytic texture. Possible secondary montmorillonite (groundmass, plagioclase grains); calcite veinlet in groundmass; possible trace biotite replacing pyroxene. Aggregate of plagioclase - augeite - biotite, may be lithic inclusion. Occurs as massive flow or dome. Not stained for potassium.

**79JR159:** Dacite or andesite (normative qtz = 12.1%; normative An/Ab/Or = 28.4/23.1/12.3). Porphyritic. Plagioclase (to 2 mm), 25%; pyroxene (cpx>opx, to 1 mm), 10%; opaques, 1%; groundmass (plagioclase as foliated microlites; scattered alteration patches of montmorillonite?), 64%. Alteration of plagioclase (montmorillonite?) and pyroxene (biotite?, calcite). Occurs as massive, columnar jointed lava flows or dome. Not stained for potassium.

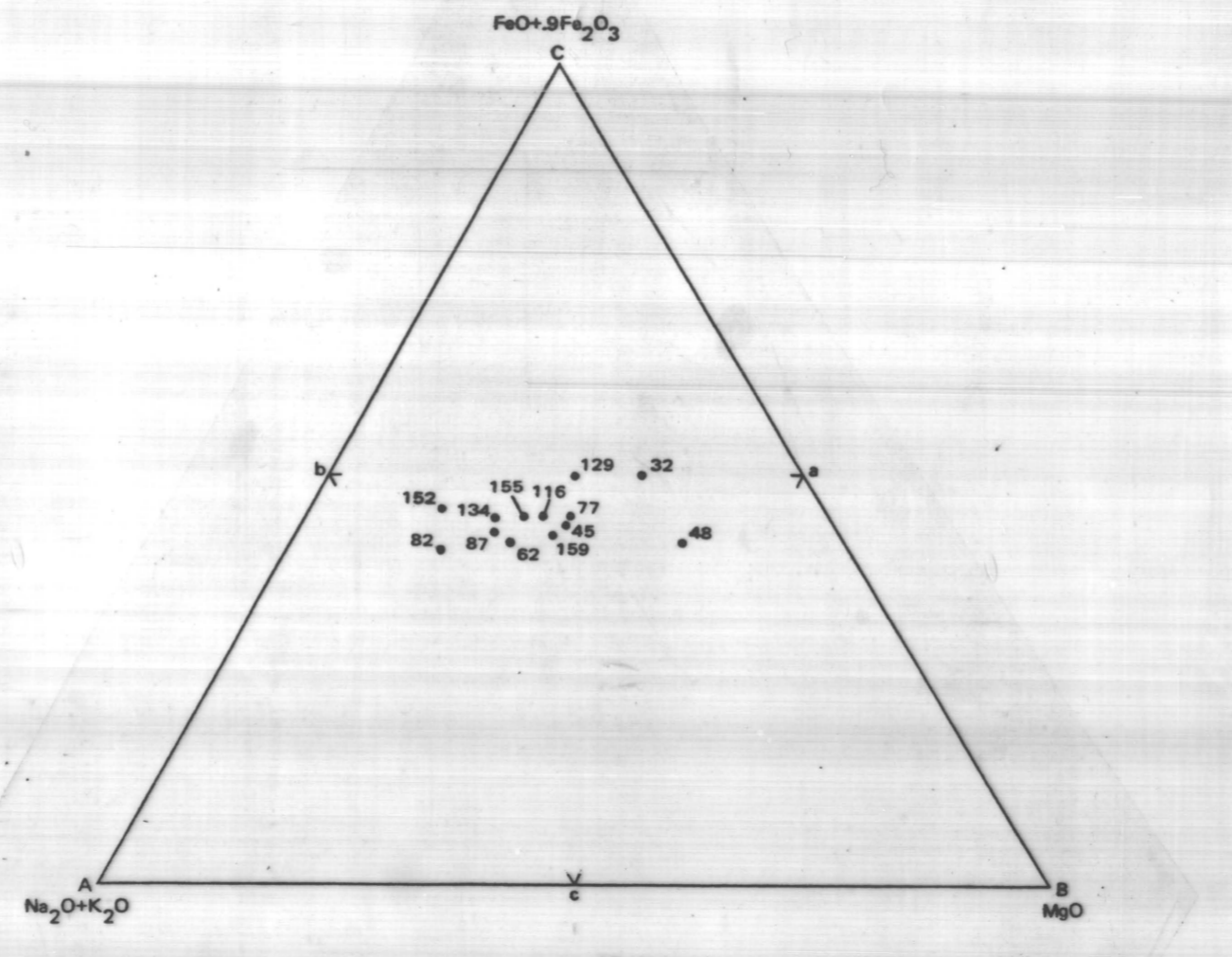


Figure 1. AFM diagram of whole-rock analyses, Unga-Popof Islands.

Whole-rock and geochemical analyses, part of Unga and Popof Islands, Alaska

by  
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1982