PR104-SH2

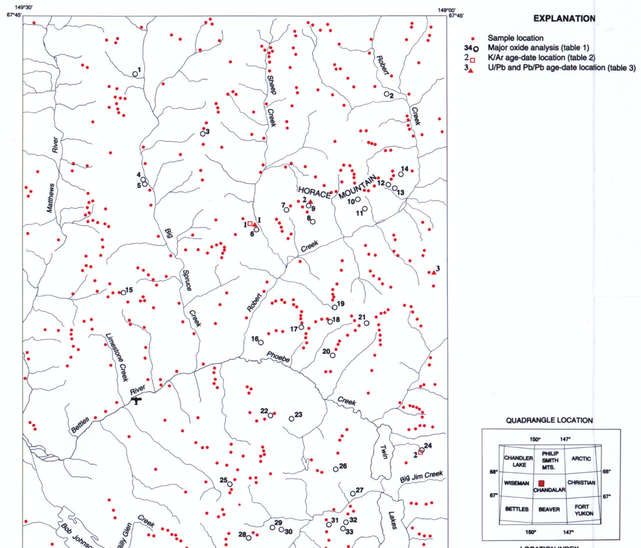

Figure 1. *Station and sample location map. Dots represent field stations; circles, major oxide localities (table 1, fig 2); squares, K/Ar age-date localities (table 2); and triangles, U/Pb and Pb/Pb age-date localities (table 3; fig 4). Stream-net from U.S. Geological Survey Chandalar Quadrangle, Alaska, 1:63,360, 1971.*

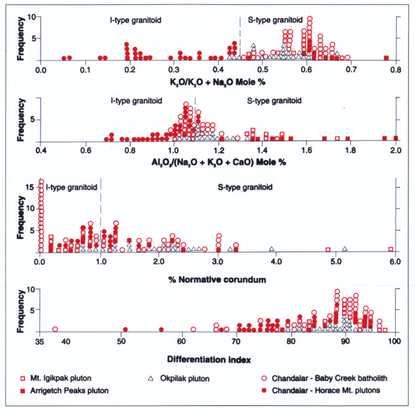

Figure 2. *Frequency diagrams of selected major oxide ratios and normative values from selected Brooks Range plutons (from Newberry and others, 1986). Fields for I-type and S-type granitoids from Takahashi and others (1980) and White and Chappell (1977). $K_2O/K_2O + Na_2O$ and $Al_2O_3/Na_2O + K_2O + CaO$ ratios for the Arrigetch, Igikpak, Okpilak, and Baby Creek batholiths plot largely in the fields characteristic of S-type granitoids, whereas those for the Horace Mountain plutons plot largely in the fields characteristic of I-type granitoids. Although normative corundum percentages and differentiation indices for the plutons show significant overlap, many of these values for the Arrigetch, Igikpak, Okpilak, and Baby Creek batholiths are considerably larger than most for the Horace Mountain plutons. Data from Sable (1977), Nelson and Grybeck (1980), Adams (1983), Brosgé and Reiser, unpub. data (1983), and this study. Complete data set in Newberry (1986).*

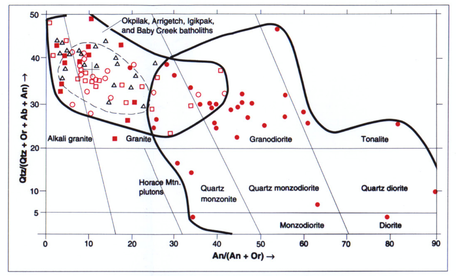

Figure 3. *Normative quartz-feldspar ratio diagram, after Streckeisen and LeMaitre (1979) for selected Brooks Range plutonic rocks (from Newberry and others, 1986). Most of the values for the Arrigetch, Igikpak, Okpilak, and Baby Creek batholiths fall in the granite and alkali-granite fields; those for the Horace Mountain plutons cluster in the granodiorite field. Furthermore, values for the Sn-bearing Brooks Range plutons fall mostly within the field for average values from 14 tin-bearing granitic provinces and near the point for the mean composition of 185 tin-bearing granites, both derived from Taylor (1979). Complete data set given in Newberry (1986).*

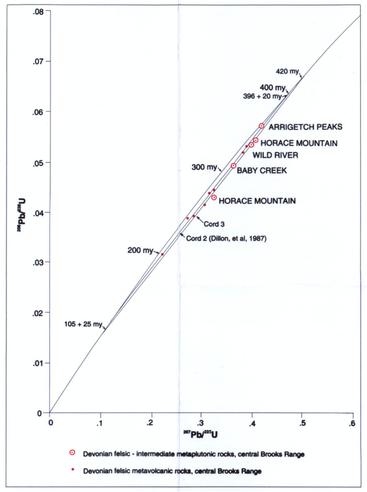

Figure 4. *Concordia diagram of U-Pb analyses of three metamorphosed plutonic rock samples from the Chandalar C-5 Quadrangle and of eight samples of felsic metavolcanic schist from the Brooks Range 'schist belt' in the Wiseman, Survey Pass, and Amber River Quadrangles (Dillon and others, 1987a; this study). Cord 2 (Dillon and others, 1987a) is based on eight samples of felsic schist from Wiseman, Survey Pass, and Amber River Quadrangles and indicates zircons crystallized about 396 ± 20 Ma and lost lead during a metamorphic event ending about 105 ± 25 Ma. Cord 3 (this study) is based on three granitic orthogneiss samples from the Horace Mountains plutons and Baby Creek batholith in the Chandalar C-5 Quadrangle (table 3) and one sample of granitic orthogneiss from the Wild River pluton in the Wiseman B-3 Quadrangle (Dillon and others, 1980). Cord 3 indicates zircon crystallization at about 100 Ma. Also shown is one concordant sample (367 ± 1 Ma) of granitic orthogneiss from the Upper Devonian Arrigetch Peaks pluton in the Survey Pass Quadrangle.*

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Table 1. *Major-oxide analyses and CIPW norms of rocks in the Chandalar C-5 Quadrangle, northern Alaska*

Sample	81DN311	82DN270	82DN167	82DN276	82DN277A	79DN57	82DN244C	82DN247A	79DN59	82DN259	82DN261A	82DN254A	82DN256C	82DN251A	82AD340	82DN213	82DN209C
Map unit	Dg	OEcc	Da	Dfs	Dfs	Dhgr	Dhgr	Dhgr	Dhgr	Dhgr	Dhgr	Dhgr	Da	Dhgr	OEcc	Dhgr	Dhgr
Map number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Rock type	diorite	chlorite calc-schist	aplite	felsite	epidote-albite schist	granite	granite	granite	granite	granite	granite	granite	aplite	granite	chlorite calc-schist	granite	granite
Major oxides (weight percent)																	
SiO_2	63.87	56.21	60.89	63.12	43.71	65.37	66.55	67.99	75.95	79.83	63.24	82.01	77.92	77.61	68.84	68.73	59.59
Al_2O_3	16.94	18.53	15.12	15.44	14.88	14.56	14.99	15.59	11.60	10.36	16.72	10.48	12.16	12.36	15.07	14.72	17.38
Fe_2O_3	2.09	1.50	3.01	0.80	1.74	1.59	1.59	1.61	0.52	1.92	1.74	0.54	0.39	0.60	0.33	1.20	1.48
FeO	3.36	6.88	ND	3.58	8.73	2.85	2.56	2.65	0.69	ND	3.78	0.39	0.51	0.43	0.87	2.46	6.70
MgO	2.11	4.60	2.67	2.06	8.35	2.44	1.14	1.03	ND	0.07	1.23	0.18	0.10	0.09	1.48	0.75	3.47
CaO	3.93	1.19	5.31	3.27	11.70	3.38	2.65	1.05	0.41	0.62	2.16	0.10	0.26	0.13	3.77	1.78	1.23
Na_2O	4.70	1.34	5.27	4.25	2.71	3.47	3.80	2.54	3.56	3.20	5.08	2.43	3.23	3.53	3.85	4.56	1.31
K_2O	0.73	3.46	5.20	1.59	0.06	3.47	3.00	4.56	4.56	3.38	3.26	2.70	4.37	4.27	2.06	3.54	3.95
TiO_2	0.73	0.83	0.52	0.58	1.58	0.56	0.59	0.55	0.08	0.06	0.75	0.08	0.09	0.07	0.44	0.51	1.04
P_2O_5	0.18	0.27	0.21	0.23	0.24	0.18	0.27	0.29	0.05	0.03	0.33	0.03	0.03	0.05	0.11	0.21	0.22
MnO	0.08	0.07	0.07	0.08	0.19	0.10	0.12	0.08	0.03	0.05	0.10	0.01	0.02	0.02	0.04	0.09	0.21
Total	98.72	94.88	98.27	95.00	93.89	97.97	97.11	97.94	97.45	99.52	98.39	98.95	99.08	99.16	96.86	98.55	96.58
*FeOx	5.24	8.23	2.71	4.30	10.30	4.28	3.99	4.10	1.16	1.73	5.35	0.88	0.86	0.97	1.17	3.54	8.03
CIPW norms (weight percent)																	
Quartz	21.41	NA	NA	21.65	NA	20.88	25.90	32.20	37.67	46.54	13.88	57.68	41.95	40.71	NA	23.36	26.12
Corundum	1.73	NA	NA	1.40	NA	NA	1.20	5.37	0.19	0.38	1.72	3.49	1.73	1.83	NA	0.66	9.57
Orthoclase	4.37	NA	31.33	9.89	0.38	20.93	18.25	27.51	27.65	20.09	19.58	16.12	26.06	25.45	NA	21.23	24.17
Albite	40.28	NA	44.89	37.85	18.24	29.97	33.11	21.94	30.91	27.24	43.69	20.78	27.58	30.12	NA	39.15	11.48
Anorthite	18.56	NA	2.29	15.50	30.10	14.19	11.72	3.39	1.75	2.90	8.70	0.30	1.10	0.32	NA	7.57	4.83
Nepheline	NA	NA	0.31	NA	3.35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wollastonite	NA	NA	0.37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diopside	NA	NA	17.74	NA	24.45	1.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hypersthene	8.75	NA	NA	10.77	NA	8.77	5.64	5.45	0.78	1.68	7.64	0.61	0.76	0.44	NA	4.79	19.05
Olivine	NA	NA	NA	NA	17.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnetite	3.07	NA	1.56	1.22	2.69	2.35	2.37	2.38	0.77	0.98	2.56	0.79	0.57	0.88	NA	1.77	2.22
Hematite	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ilmenite	1.40	NA	1.01	1.16	3.20	1.09	1.15	1.07	0.16	0.11	1.45	0.15	0.17	0.13	NA	0.98	2.05
Apatite	0.42	NA	0.50	0.56	0.59	0.43	0.64	0.69	0.12	0.07	0.78	0.07	0.07	0.12	NA	0.49	0.53
Wollastonite (diopside)	NA	NA	9.31	NA	12.55	0.72	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Enstatite (diopside)	NA	NA	6.78	NA	7.47	0.44	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrosilite (diopside)	NA	NA	1.66	NA	4.43	0.23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Enstatite (hypersthene)	5.32	NA	NA	5.40	NA	5.76	2.92	2.62	NA	0.18	3.11	0.45	0.25	0.23	NA	1.90	8.95
Ferrosilite (hypersthene)	3.43	NA	NA	5.37	NA	3.01	2.71	2.83	0.78	1.51	4.52	0.16	0.51	0.22	NA	2.89	10.10
Forsterite (olivine)	NA	NA	NA	NA	10.29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ferrosilite (olivine)	NA	NA	NA	NA	6.72	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Normative plagioclase	31.54	NA	4.80	29.05	55.82	32.14	26.15	13.37	5.36	9.61	16.61	1.44	3.85	1.06	NA	16.20	29.62
Differentiation index	66.07	NA	76.53	69.39	21.97	71.78	77.26	81.65	96.23	93.87	77.15	94.58	95.59	96.28	NA	83.74	61.76

Table 1. *(Continued)*

Sample	82DN198	82DN197	82PA163	82DN193A	82DN320A	82DN321	82DN286	82AD200	82DN290B	82DN303B	82DN304A	82DN307	82DN308	82AD220A	82DN298	82DN297B	82DN295
Map unit	Dhgr	Da	Da	Da	Da	OEifq	Dhgr	Dfs	Ps	Ps	Dfs	Da	Da	Dg	Ps	Pzgs	Pzgn
Map number	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Rock type	granite	aplite	aplite	aplite	aplite	feldspar-quartz schist	granite	felsite	amphibolite	amphibolite	felsite	aplite	aplite	gabbro	amphibolite	feldspar-quartz schist	gneiss
Major oxides (weight percent)																	
SiO_2	72.95	88.55	80.75	76.57	72.77	65.12	71.74	73.91	53.48	54.87	63.18	78.77	77.55	50.64	68.77	61.44	86.12
Al_2O_3	4.44	5.39	8.23	12.27	13.90	15.23	13.50	13.81	14.71	15.76	10.42	8.96	12.68	18.14	11.38	18.63	6.42
Fe_2O_3	1.87	0.60	1.05	0.69	2.02	1.42	3.66	1.02	1.61	2.90	1.49	1.11	0.62	2.21	1.22	1.39	0.63
FeO	1.68	1.56	3.28	0.87	0.71	5.15	NA	1.34	8.56	5.11	3.40	3.17	0.65	6.22	3.90	5.53	2.78
MgO	1.11	0.86	1.64	0.21	0.51	3.13	0.75	0.31	5.15	5.20	5.45	1.92	0.25	6.36	1.85	2.46	0.92
CaO	12.18	0.50	1.03	0.26	0.41	0.52	1.29	0.19	6.46	5.71	10.91	0.68	0.22	6.59	2.62	1.08	0.45
Na_2O	0.06	2.06	1.77	3.03	3.24	2.75	3.30	4.46	3.67	5.49	2.91	1.20	4.23	4.50	4.63	0.88	0.73
K_2O	ND	0.49	1.08	4.56	3.93	2.63	4.30	2.27	0.34	1.13	1.31	1.56	1.66	0.35	1.82	3.24	0.78
TiO_2	0.87	0.71	0.91	0.15	0.39	0.80	0.36	0.26	1.24	1.03	0.39	0.76	0.06	0.95	1.35