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Title of article Petrogenesis of Gabbronorite at Yakobi and Northwest Chichagof Islands, Alaska

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**Table A. CHEMICAL COMPOSITIONS AND CIPW NORMS OF GABBRO-NORITES
AND TONALITE PLUTON ROCKS, YAKOBI ISLAND, ALASKA
[J.S. WAHLBERG, J. BAKER, AND J. TAGGART ANALYSTS]**

Sample No.	Gabbronorites								
	79B9	79B36	79B2	79H1	79B14	79B11	79B33	79T5	79B47 ¹
SiO ₂	50.7	50.3	54.4	49.8	52.9	53.0	55.7	48.7	50.1
Al ₂ O ₃	14.6	19.0	2.4	18.2	16.7	19.8	17.7	17.7	17.4
FeO*	7.34	6.06	11.9	5.83	8.42	6.68	7.33	12.8	5.67
MgO	15.6	10.3	18.9	9.38	8.60	4.9	5.06	4.2	9.31
CaO	9.85	11.5	10.7	13.9	9.55	9.70	8.89	8.95	12.9
Na ₂ O	1.1	1.5	0.3	1.3	2.6	3.2	3.2	3.6	1.5
K ₂ O	0.04	0.06	0.08	0.06	0.09	0.29	0.21	0.24	0.07
TiO ₂	0.19	0.25	0.34	0.18	0.35	0.95	0.65	2.78	0.33
P ₂ O ₅	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1
MnO	0.13	0.11	0.25	0.11	0.15	0.12	0.14	0.21	0.1
Sum	99.6	99.1	99.3	98.8	99.4	98.6	98.9	99.4	97.4
CIPW Norm									
Q	--	--	1.75	--	0.22	2.26	6.33	--	0.08
C	--	--	--	--	--	--	--	--	--
or	0.24	0.36	0.48	0.36	0.54	1.74	1.26	1.43	0.42
ab	9.35	12.8	2.56	11.1	22.1	27.4	27.3	30.6	13.0
an	34.9	45.4	5.00	44.2	33.8	39.3	33.7	31.6	41.6
di	11.4	9.86	39.2	20.7	11.3	7.79	9.03	9.92	19.4
hy	35.4	28.5	50.4	20.3	31.3	19.6	21.0	7.81	24.8
ol	8.42	2.64	--	2.98	--	--	--	12.8	--
il	0.36	0.48	0.65	0.35	0.67	1.83	1.25	5.31	0.64
ap	--	--	--	--	--	--	--	--	--
Mole Ratio									
100MgO (MgO+FeO)	79.1	75.2	73.9	74.1	64.5	56.7	55.2	36.9	74.5

*Total iron as FeO

1. Hornblende-plagioclase dike in gabbro-norite

Table A. Continued: CHEMICAL COMPOSITIONS AND CIPW NORMS OF GABBRONORITES AND TONALITE PLUTON ROCKS, YAKOBI ISLAND, ALASKA [J.S. WAHLBERG, J. BAKER, AND J. TAGGART ANALYSTS]

Sample No.	Tonalite Pluton					
	79T3	79B44	79B19	79B22	79B39	79T2
SiO ₂	51.6	53.0	57.3	66.2	65.6	72.7
Al ₂ O ₃	17.2	18.3	18.3	15.7	16.4	14.8
FeO*	7.04	8.42	6.43	4.39	4.58	1.84
MgO	7.21	5.92	4.2	2.1	2.0	0.80
CaO	10.6	9.75	8.18	5.34	5.37	3.10
Na ₂ O	3.1	2.9	3.3	3.5	3.8	4.0
K ₂ O	0.41	0.15	0.25	0.97	1.15	1.65
TiO ₂	0.83	0.60	0.71	0.52	0.56	0.19
P ₂ O ₅	0.1	0.1	0.1	0.1	0.1	0.1
MnO	0.12	0.13	0.1	0.08	0.07	0.04
Sum	98.1	99.2	98.8	98.8	99.6	99.1
CIPW Norm						
Q	--	1.72	9.88	25.0	21.9	34.2
C	--	--	--	--	--	0.80
or	2.47	0.89	1.50	5.80	6.82	9.84
ab	26.7	24.7	28.3	30.0	32.3	34.2
an	32.4	36.8	34.8	24.6	24.4	15.5
di	17.3	9.92	5.20	1.89	1.43	--
hy	13.1	24.8	19.0	11.8	11.9	5.18
ol	6.41	--	--	--	--	--
il	1.61	1.15	1.36	1.00	1.07	0.36
ap	--	--	--	--	--	--
Mole Ratio 100MgO (MgO+FeO)	64.6	55.6	53.8	46.0	43.8	43.7

*Total iron as FeO

Table B. CHEMICAL COMPOSITIONS AND STRUCTURAL FORMULAS OF OLIVINE IN GABBRO-NORITE, YAKOBI ISLAND, ALASKA

Sample No.	79B43	79B46	79B9
SiO ₂	38.9	39.0	38.7
FeO*	17.2	19.3	20.7
MnO	0.24	0.24	0.26
MgO	43.2	41.7	40.3
NiO	0.11	0.17	0.12
Sum	99.65	100.41	100.08
Cations per 4 Oxygens			
Si	0.992	0.996	0.998
Fe ²⁺	0.367	0.413	0.446
Mn	0.005	0.005	0.006
Mg	1.642	1.586	1.549
Ni	0.002	0.003	0.002
Sum Cations	3.008	3.003	3.001
100Mg (Mg+Fe+Mn)	81.5	79.1	77.4

*Total iron as FeO

Table C. CHEMICAL COMPOSITIONS AND STRUCTURAL FORMULAS OF
ORTHOPYROXENE IN GABBRONORITE, YAKOBI ISLAND, ALASKA

Sample No.	79B43	79B46	79B1	79B27	79B9	79B29	79B15	79B16	79B25
SiO ₂	54.7	53.6	54.2	53.6	54.1	54.2	54.5	54.4	54.0
TiO ₂	0.16	0.14	0.10	0.14	0.20	0.15	0.14	0.09	0.15
Al ₂ O ₃	1.83	2.89	1.66	2.38	2.22	1.84	1.81	1.13	2.11
Cr ₂ O ₃	0.28	0.18	0.37	0.47	0.23	0.11	0.06	--	0.11
FeO*	10.5	11.0	11.7	11.9	12.4	13.3	14.1	14.8	14.3
MnO	0.26	0.22	0.22	0.25	0.25	0.24	0.30	0.32	0.30
MgO	31.6	30.4	29.8	29.8	29.8	28.9	28.4	29.0	28.0
CaO	1.78	1.80	1.95	1.91	2.03	1.61	1.99	0.97	1.78
Na ₂ O	0.05	0.06	0.05	0.04	0.06	0.04	0.04	0.03	0.07
Sum	101.16	100.29	100.05	100.49	101.29	100.39	101.34	100.74	100.82
Cations per 6 oxygens									
Si	1.916	1.898	1.931	1.905	1.910	1.934	1.935	1.944	1.928
Al ^{IV}	0.076	0.102	0.069	0.095	0.090	0.066	0.065	0.048	0.072
Sum T	1.992	2.000	2.000	2.000	2.000	2.000	2.000	1.992	2.000
Al ^{VI}	--	0.019	--	0.004	0.002	0.011	0.010	--	0.017
Ti	0.004	0.004	0.003	0.004	0.005	0.004	0.004	0.002	0.004
Cr	0.008	0.005	0.010	0.013	0.006	0.003	0.002	--	0.003
Fe ²⁺	0.308	0.326	0.348	0.354	0.366	0.397	0.419	0.442	0.427
Mn	0.008	0.007	0.007	0.008	0.008	0.007	0.009	0.010	0.009
Mg	1.650	1.605	1.582	1.578	1.568	1.537	1.503	1.545	1.490
Ca	0.067	0.068	0.074	0.073	0.077	0.062	0.076	0.037	0.068
Na	0.003	0.004	0.004	0.003	0.004	0.003	0.003	0.002	0.005
Sum M	2.048	2.038	2.055	2.037	2.036	2.024	2.026	2.038	2.023
100Mg (Mg+Fe+Mn)	83.9	82.8	81.7	81.3	80.7	79.2	77.8	77.4	77.4
Mg	81.5	80.3	78.9	78.7	78.0	77.0	75.2	76.4	75.1
Fe	15.2	16.3	17.4	17.7	18.2	19.9	21.0	21.8	21.5
Ca	3.3	3.4	3.7	3.6	3.8	3.1	3.8	1.8	3.4

*Total iron calculated as FeO; --, not detected.

Table C. Continued: CHEMICAL COMPOSITIONS AND STRUCTURAL FORMULAS OF
ORTHOPYROXENE IN GABBRONORITE, YAKOBI ISLAND, ALASKA

Sample No.	79B49	79B36	79B2	79H1	79B14	79B11	79B33	78B64	79T5
SiO ₂	53.5	53.3	53.3	53.6	52.4	52.7	50.9	51.1	48.7
TiO ₂	0.14	0.17	0.25	0.18	0.20	0.20	0.18	0.29	0.20
Al ₂ O ₃	2.12	2.14	1.22	1.44	1.48	1.04	1.24	1.01	0.80
Cr ₂ O ₃	0.12	0.36	--	--	--	--	0.05	--	--
FeO*	15.7	15.7	17.6	18.4	21.4	26.1	27.7	27.5	34.5
MnO	0.32	0.30	0.38	0.36	0.37	0.68	0.57	0.58	0.92
MgO	27.2	26.6	26.0	26.0	23.3	19.4	18.7	18.5	13.3
CaO	1.53	1.67	1.39	0.97	1.91	1.35	1.00	1.63	1.28
Na ₂ O	--	0.06	0.05	0.04	0.08	0.04	0.06	0.08	0.07
Sum	100.63	100.30	100.19	100.99	101.14	101.51	100.40	100.69	99.77
Cations per 6 oxygens									
Si	1.926	1.927	1.941	1.943	1.932	1.971	1.946	1.949	1.948
Al ^{IV}	0.074	0.073	0.053	0.057	0.064	0.029	0.054	0.045	0.038
Sum T	2.000	2.000	1.994	2.000	1.996	2.000	2.000	1.994	1.986
Al ^{VI}	0.016	0.018	--	0.004	--	0.017	0.011	--	--
Ti	0.004	0.005	0.007	0.005	0.006	0.006	0.005	0.008	0.006
Cr	0.003	0.010	--	--	--	--	0.001	--	--
Fe ²⁺	0.473	0.475	0.539	0.558	0.660	0.817	0.886	0.877	1.154
Mn	0.010	0.009	0.012	0.011	0.012	0.021	0.018	0.019	0.031
Mg	1.459	1.434	1.419	1.405	1.280	1.083	1.065	1.052	0.793
Ca	0.059	0.065	0.055	0.038	0.075	0.054	0.041	0.067	0.055
Na	--	0.004	0.004	0.003	0.006	0.003	0.004	0.006	0.005
Sum M	2.024	2.020	2.036	2.024	2.039	2.001	2.031	2.029	2.044
100Mg (Mg+Fe+Mn)	75.1	74.8	72.0	71.2	65.6	56.4	54.1	54.0	40.1
Mg	73.2	72.6	70.5	70.2	63.5	55.4	53.4	52.7	39.6
Fe	23.8	24.1	26.8	27.9	32.8	41.8	44.5	43.9	57.7
Ca	3.0	3.3	2.7	1.9	3.7	2.8	2.1	3.4	2.7

*Total iron calculated as FeO; --, not detected.

Table D. CHEMICAL COMPOSITIONS AND STRUCTURAL FORMULAS OF
AUGITE IN GABBRONORITE, YAKOBI ISLAND, ALASKA

Sample No.	79B46	79B1	79B27	79B9	79B29	79B15	79B16	79B25	79B49
SiO ₂	53.5	53.4	53.2	52.8	53.4	53.2	53.7	52.9	52.8
TiO ₂	0.14	0.27	0.33	0.45	0.42	0.37	0.21	0.24	0.33
Al ₂ O ₃	2.11	3.19	2.93	3.03	2.49	3.09	1.78	3.43	2.84
Cr ₂ O ₃	0.20	0.22	0.57	0.26	0.16	0.36	--	0.58	0.17
FeO*	5.31	6.33	5.51	5.36	5.95	5.66	6.08	6.24	7.88
MnO	0.16	0.16	0.16	0.17	0.20	0.20	0.15	0.17	0.26
MgO	16.0	17.4	17.5	16.2	16.5	15.9	16.3	17.2	16.4
CaO	23.2	19.4	19.2	21.7	20.0	21.6	22.3	18.2	19.5
Na ₂ O	0.27	0.31	0.40	0.34	0.36	0.34	0.27	0.35	0.25
Sum	100.89	100.68	99.80	100.31	99.48	100.72	100.79	99.31	100.43
Cations per 6 oxygens									
Si	1.949	1.935	1.940	1.928	1.959	1.936	1.958	1.938	1.935
Al ^{IV}	0.051	0.065	0.060	0.072	0.041	0.064	0.042	0.062	0.065
Sum T	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
Al ^{VI}	0.039	0.072	0.066	0.059	0.067	0.068	0.035	0.086	0.058
Ti	0.004	0.007	0.009	0.012	0.012	0.010	0.006	0.007	0.009
Cr	0.006	0.006	0.016	0.008	0.005	0.010	--	0.017	0.005
Fe ²⁺	0.162	0.192	0.168	0.164	0.183	0.172	0.185	0.191	0.242
Mn	0.005	0.005	0.005	0.005	0.006	0.006	0.005	0.005	0.008
Mg	0.869	0.940	0.951	0.882	0.902	0.862	0.886	0.939	0.896
Ca	0.905	0.753	0.750	0.849	0.786	0.842	0.871	0.714	0.766
Na	0.019	0.022	0.028	0.024	0.026	0.024	0.019	0.025	0.018
Sum M	2.009	1.997	1.993	2.003	1.987	1.994	2.007	1.984	2.002
100Mg (Mg+Fe+Mn)	83.9	82.7	84.6	83.9	82.7	82.9	82.3	82.7	75.4
Mg	44.9	49.9	50.9	46.5	48.2	45.9	45.6	50.9	47.1
Fe	8.4	10.2	9.0	8.7	9.8	9.2	9.5	10.4	12.7
Ca	46.7	39.9	40.1	44.8	42.0	44.9	44.9	38.7	40.2

*Total iron calculated as FeO; --, not detected

Table D. Continued: CHEMICAL COMPOSITIONS AND STRUCTURAL
FORMULAS OF AUGITE IN GABBRONORITE, YAKOBI ISLAND, ALASKA

Sample No.	79B36	79B2	79H1	79B14	79B11	79B33	78B64	79T5
SiO ₂	52.5	53.7	53.4	53.2	52.4	51.4	51.9	51.2
TiO ₂	0.38	0.18	0.28	0.27	0.29	0.44	0.30	0.23
Al ₂ O ₃	3.19	1.09	1.87	1.23	2.36	2.49	2.89	1.25
Cr ₂ O ₃	0.32	0.09	0.08	0.05	0.41	0.11	0.51	--
FeO*	6.95	7.04	7.07	9.41	12.2	13.7	12.9	16.6
MnO	0.18	0.25	0.21	0.25	0.28	0.33	0.30	0.46
MgO	16.2	15.0	15.4	14.8	13.9	13.2	13.7	10.6
CaO	20.3	22.9	21.6	21.2	18.8	17.1	18.0	19.0
Na ₂ O	0.37	0.22	0.34	0.27	0.38	0.40	0.41	0.31
Sum	100.39	100.47	100.25	100.68	101.02	99.17	100.91	99.65
Cations per 6 oxygens								
Si	1.923	1.978	1.964	1.968	1.946	1.950	1.933	1.973
Al ^{IV}	0.077	0.022	0.036	0.032	0.054	0.050	0.067	0.027
Sum T	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
Al ^{VI}	0.061	0.025	0.045	0.022	0.049	0.062	0.060	0.030
Ti	0.010	0.005	0.008	0.008	0.008	0.013	0.008	0.007
Cr	0.009	0.003	0.002	0.002	0.012	0.003	0.015	--
Fe ²⁺	0.213	0.217	0.217	0.291	0.379	0.435	0.402	0.535
Mn	0.006	0.008	0.007	0.008	0.009	0.011	0.009	0.015
Mg	0.884	0.823	0.844	0.816	0.770	0.747	0.761	0.609
Ca	0.797	0.904	0.851	0.840	0.748	0.695	0.718	0.785
Na	0.026	0.016	0.024	0.019	0.027	0.029	0.030	0.023
Sum M	2.006	2.001	1.998	2.006	2.002	1.995	2.003	2.004
100Mg (Mg+Fe+Mn)	80.1	78.5	79.0	73.2	66.5	62.6	64.9	52.5
Mg	46.7	42.3	44.1	41.9	40.6	39.8	40.4	31.6
Fe	11.2	11.2	11.3	14.9	20.0	23.2	21.4	27.7
Ca	42.1	46.5	44.6	43.2	39.4	37.0	38.2	40.7

*Total iron calculated as FeO; --, not detected

Table E. CHEMICAL COMPOSITIONS AND STRUCTURAL FORMULAS OF
HORNBLENDE IN GABBRO-NORITE AND TONALITE PLUTON ROCKS,
YAKOBI ISLAND, ALASKA

Sample No.	79B9 ¹	79B2 ¹	79H1 ¹	79B25b ¹	79B25g ¹	79B11 ²	78B64 ²
SiO ₂	43.5	47.3	47.3	43.2	47.7	46.5	44.5
TiO ₂	2.68	2.23	2.08	3.15	1.11	1.79	1.57
Al ₂ O ₃	13.2	8.41	9.93	11.9	7.68	8.87	10.0
FeO*	8.06	9.58	10.1	11.9	10.8	15.0	17.4
MnO	0.11	0.14	0.13	0.16	0.16	0.17	0.19
MgO	15.7	16.5	15.6	14.0	16.8	13.2	11.3
CaO	11.2	10.6	11.0	11.0	10.7	10.3	10.8
Na ₂ O	2.30	1.63	1.39	2.02	1.18	1.42	1.44
K ₂ O	0.51	0.28	0.31	0.30	0.20	0.47	0.93
Sum	97.26	96.67	97.84	97.63	96.33	97.72	98.13
Cations per 23 oxygens							
Si	6.286	6.857	6.781	6.326	6.962	6.836	6.639
Al ^{IV}	1.714	1.143	1.219	1.674	1.038	1.164	1.361
Sum T	8.000	8.000	8.000	8.000	8.000	8.000	8.000
Al ^{VI}	0.535	0.294	0.460	0.380	0.283	0.373	0.398
Ti	0.291	0.243	0.224	0.347	0.122	0.198	0.176
Fe ²⁺	0.793	0.898	0.983	1.218	0.941	1.537	1.913
Mn	--	--	--	--	--	--	--
Mg	3.381	3.565	3.333	3.055	3.654	2.892	2.513
Sum C	5.000	5.000	5.000	5.000	5.000	5.000	5.000
Fe ²⁺	0.181	0.263	0.228	0.239	0.377	0.307	0.258
Mn	0.014	0.017	0.016	0.020	0.020	0.021	0.024
Ca	1.734	1.647	1.690	1.726	1.673	1.622	1.726
Na	0.071	0.073	0.066	0.015	--	0.050	--
Sum B	2.000	2.000	2.000	2.000	2.070	2.000	2.008
Na	0.574	0.385	0.320	0.559	0.332	0.355	0.417
K	0.094	0.052	0.057	0.056	0.037	0.088	0.177
Sum A	0.668	0.437	0.377	0.615	0.369	0.443	0.594
100Mg (Mg+Fe+Mn)	77.4	75.2	73.1	67.4	73.2	60.8	53.4

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1. Interstitial postcumulus grains.
 2. Thick mantles about pyroxene
 3. Discrete grains. b, brown; g, green.
- * Total iron calculated as FeO
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Table E. Continued: CHEMICAL COMPOSITIONS AND STRUCTURAL FORMULAS OF HORNBLENDE IN GABBRO-NORITE AND TONALITE PLUTON ROCKS, YAKOBI ISLAND, ALASKA

Sample No.	79B19 ³	79B44b ³	79B44g ³	79B22 ³	79B39 ³	79T5 ³
SiO ₂	45.7	47.2	48.5	46.4	44.8	43.8
TiO ₂	1.35	2.15	1.04	1.52	1.31	2.48
Al ₂ O ₃	8.31	9.59	7.76	8.23	9.75	10.3
FeO*	17.1	15.6	16.2	18.6	20.1	20.6
MnO	0.28	0.20	0.26	0.34	0.60	0.27
MgO	12.3	12.2	12.9	10.8	9.41	8.45
CaO	10.6	10.3	9.84	10.0	10.2	9.96
Na ₂ O	1.12	1.18	0.80	1.25	1.32	1.94
K ₂ O	0.29	0.23	0.20	0.25	0.99	0.49
Sum	97.05	98.65	97.50	97.39	98.48	98.29
Cations per 23 oxygens						
Si	6.842	6.857	7.117	6.945	6.735	6.608
Al ^{IV}	1.158	1.143	0.883	1.005	1.265	1.392
Sum T	8.000	8.000	8.000	8.000	8.000	8.000
Al ^{VI}	0.309	0.500	0.460	0.397	0.463	0.439
Ti	0.152	0.235	0.115	0.171	0.148	0.281
Fe ²⁺	1.795	1.624	1.604	2.023	2.281	2.380
Mn	--	--	--	--	--	--
Mg	2.744	2.641	2.821	2.409	2.108	1.900
Sum C	5.000	5.000	5.000	5.000	5.000	5.000
Fe ²⁺	0.346	0.271	0.384	0.305	0.246	0.219
Mn	0.035	0.025	0.032	0.043	0.076	0.034
Ca	1.700	1.603	1.547	1.604	1.643	1.610
Na	--	0.101	0.036	0.047	0.035	0.137
Sum B	2.081	2.000	2.000	2.000	2.000	2.000
Na	0.325	0.232	0.192	0.315	0.350	0.432
K	0.055	0.043	0.037	0.048	0.190	0.094
Sum A	0.380	0.275	0.229	0.363	0.540	0.526
100Mg (Mg+Mn+Fe)	55.8	57.9	58.3	50.4	44.8	41.9

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1. Interstitial postcumulus grains
 2. Thick mantles on pyroxene
 3. Discrete grains. b, brown; g, green
- * Total iron calculated as FeO
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