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Mineralogical evolution of the northern Bossoroca ophiolite, São Gabriel terrane

Amanda Juliano Massuda, Léo Afraneo Hartmann<sup>1</sup>, Gláucia Nascimento Queiroga, Marco Paulo de Castro, Carolina Gonçalves Leandro, Jairo Francisco Savian

Supplementary Table 7. Electron microprobe analyses of chlorite.

Chloritite, sample BO17

Analysis	4	5	6	7	8	9	18	19
SiO <sub>2</sub>	29.37	30.37	30.91	30.47	29.68	30.35	30.82	29.30
Al <sub>2</sub> O <sub>3</sub>	19.50	19.61	20.03	20.19	19.51	20.10	19.54	19.90
FeO	6.31	6.25	6.46	6.40	6.33	6.47	6.19	6.53
MgO	29.69	30.69	29.98	30.52	29.92	27.92	30.54	29.88
Total	84.87	86.92	87.38	87.58	85.44	84.84	87.09	85.61
Structural formulae based on 28 oxygen								
Si	5.735	5.795	5.849	5.750	5.759	5.852	5.823	5.684
Al (iv)	2.265	2.205	2.151	2.250	2.241	2.148	2.177	2.316
Al (vi)	2.230	2.208	2.326	2.250	2.222	2.438	2.182	2.238
Fe (iii)	0.000	0.000	0.109	0.000	0.000	0.156	0.075	0.000
Fe (ii)	1.051	0.999	0.913	1.025	1.027	0.887	0.903	1.070
Mg	8.642	8.730	8.456	8.585	8.655	8.025	8.602	8.641
OH*	15.993	15.994	15.988	15.982	16.000	15.975	15.988	15.975
Total	35.916	35.931	35.792	35.842	35.904	35.481	35.750	35.924
Fe/Fe+Mg	0.108	0.103	0.108	0.107	0.106	0.115	0.102	0.110

Chloritite, sample BO17

Analysis	20	21	22	23	24	25	26
SiO <sub>2</sub>	30.24	30.01	30.55	30.41	30.56	30.00	30.28
Al <sub>2</sub> O <sub>3</sub>	18.55	19.58	20.17	20.25	19.01	19.15	19.07
FeO	6.44	6.21	6.11	6.17	6.11	6.22	6.24
MgO	29.70	30.69	29.12	29.73	30.69	29.95	30.17
Total	84.93	86.49	85.95	86.56	86.37	85.32	85.76
Structural formulae based on 28 oxygen							
Si	5.901	5.754	5.851	5.804	5.847	5.831	5.838
Al (iv)	2.099	2.246	2.149	2.196	2.153	2.169	2.162
Al (vi)	2.174	2.183	2.419	2.369	2.143	2.222	2.179
Fe (iii)	0.054	0.000	0.169	0.099	0.031	0.038	0.037

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Fe (ii)	0.997	1.013	0.809	0.886	0.947	0.974	0.969
Mg	8.640	8.772	8.314	8.458	8.753	8.679	8.670
OH*	15.993	15.993	15.994	15.994	15.885	16.000	15.908
Total	35.858	35.961	35.705	35.806	35.759	35.913	35.763
Fe/Fe+Mg	0.108	0.104	0.105	0.104	0.100	0.104	0.104

Chloritite, sample BO17

Analysis	28	35	36	37	38	39	40
SiO <sub>2</sub>	31.37	29.32	30.32	28.87	29.59	30.35	29.78
Al <sub>2</sub> O <sub>3</sub>	19.54	20.25	18.84	19.91	19.80	20.40	19.23
FeO	6.51	6.54	6.24	6.70	6.37	6.33	6.39
MgO	31.39	29.69	30.10	29.25	29.51	29.49	29.86
Total	88.81	85.8	85.50	84.73	85.27	86.57	85.26

Structural formulae based on 28 oxygen

Si	5.834	5.683	5.878	5.665	5.757	5.794	5.787
Al (iv)	2.166	2.317	2.122	2.335	2.243	2.206	2.213
Al (vi)	2.128	2.311	2.188	2.276	2.303	2.395	2.197
Fe (iii)	0.027	0.001	0.041	0.000	0.039	0.111	0.011
Fe (ii)	0.986	1.059	0.971	1.123	0.998	0.900	1.028
Mg	8.703	8.579	8.699	8.555	8.559	8.393	8.649
OH*	15.864	16.000	15.987	15.993	15.981	15.994	15.925
Total	35.708	35.950	35.886	35.947	35.880	35.793	35.810
Fe/Fe+Mg	0.104	0.110	0.104	0.116	0.108	0.107	0.107

Chloritite, sample BO17

Analysis	50	51	52	53	54	55	56	57
SiO <sub>2</sub>	30.79	29.51	30.07	29.33	29.91	30.40	30.05	30.14
Al <sub>2</sub> O <sub>3</sub>	17.67	19.09	18.65	19.55	17.92	18.07	18.14	18.17
FeO	6.52	6.51	6.35	6.43	6.68	6.29	6.70	6.89
MgO	31.14	29.86	30.28	29.74	30.05	29.74	30.19	30.15
Total	86.12	84.97	85.35	85.05	84.56	84.50	85.08	85.35

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Structural formula of chlorite based on 28 oxygen

Si	5.906	5.737	5.815	5.701	5.851	5.894	5.832	5.833
Al (iv)	2.094	2.263	2.185	2.299	2.149	2.106	2.168	2.167
Al (vi)	1.909	2.112	2.070	2.185	1.987	2.035	1.987	1.983
Fe (iii)	0.000	0.000	0.008	0.000	0.000	0.068	0.000	0.000
Fe (ii)	1.080	1.061	1.019	1.060	1.111	0.952	1.111	1.131
Mg	8.904	8.653	8.729	8.617	8.763	8.595	8.734	8.699
OH*	15.957	15.993	15.976	15.987	15.993	15.870	16.000	15.993
Total	35.850	35.819	35.802	35.849	35.854	35.520	35.832	35.806
Fe/Fe+Mg	0.108	0.109	0.105	0.110	0.112	0.106	0.113	0.115

Tourmalinite, sample BO19

Analysis	11	12	13	14	15	16	17	29
SiO <sub>2</sub>	26.54	26.97	26.51	26.61	26.50	26.17	26.51	26.10
Al <sub>2</sub> O <sub>3</sub>	21.58	20.78	21.31	20.98	21.26	21.58	21.57	21.93
FeO	18.06	17.65	17.59	17.97	17.81	17.97	17.59	18.34
MgO	19.44	20.04	19.47	19.58	19.45	20.39	19.87	20.15
Total	85.62	85.44	84.88	85.14	85.02	86.11	85.54	86.52

Structural formulae based on 28 oxygen

Si	5.467	5.544	5.495	5.516	5.493	5.369	5.449	5.344
Al (iv)	2.533	2.456	2.505	2.484	2.507	2.631	2.551	2.656
Al (vi)	2.718	2.597	2.715	2.652	2.698	2.592	2.685	2.638
Fe (iii)	0.105	0.120	0.124	0.095	0.114	0.007	0.075	0.000
Fe (ii)	3.006	2.915	2.926	3.020	2.973	3.076	2.949	3.141
Mg	5.969	6.141	6.016	6.050	6.010	6.236	6.089	6.150
OH*	15.993	15.876	15.993	15.993	15.993	15.935	15.993	15.993
Total	35.791	35.649	35.774	35.810	35.788	35.846	35.791	35.922
Fe/Fe+Mg	0.343	0.331	0.336	0.340	0.339	0.331	0.332	0.338

Tourmalinite, sample BO19

Analysis	30	31	32	33	40	41	42	43	44
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SiO <sub>2</sub>	26.17	26.71	27.30	27.02	26.97	26.01	26.36	26.23	25.47
Al <sub>2</sub> O <sub>3</sub>	20.85	19.92	20.40	20.40	21.48	21.82	22.24	21.29	22.07
FeO	17.83	18.05	17.07	17.70	17.44	18.56	17.52	18.33	17.89
MgO	19.62	20.13	20.79	20.19	20.52	19.22	19.74	19.59	19.18
Total	84.47	84.81	85.56	85.31	86.41	85.61	85.86	85.44	84.61
Structural formulae based on 28 oxygen									
Si	5.461	5.564	5.597	5.576	5.473	5.377	5.391	5.432	5.316
Al (iv)	2.539	2.436	2.403	2.424	2.527	2.623	2.609	2.568	2.684
Al (vi)	2.599	2.464	2.535	2.546	2.626	2.702	2.764	2.637	2.754
Fe (iii)	0.034	0.049	0.084	0.071	0.099	0.045	0.087	0.046	0.049
Fe (ii)	3.077	3.096	2.843	2.983	2.861	3.163	2.909	3.129	3.073
Mg	6.103	6.251	6.354	6.210	6.207	5.923	6.018	6.048	5.967
OH*	15.965	15.933	15.986	15.986	15.884	15.972	15.979	15.961	15.953
Total	35.778	35.793	35.802	35.796	35.677	35.805	35.757	35.821	35.796
Fe/Fe+Mg	0.338	0.335	0.315	0.330	0.323	0.351	0.332	0.344	0.344

#### Tourmalinite sample BO19, mount 2

Analysis	28	29	30	31	32	45	46
SiO <sub>2</sub>	26.18	25.72	26.69	26.56	24.58	26.58	26.52
Al <sub>2</sub> O <sub>3</sub>	21.21	21.71	21.75	20.79	20.65	22.31	21.81
FeO	17.90	18.08	17.88	21.16	20.93	17.80	17.90
MgO	19.56	19.31	19.84	17.78	15.82	20.11	20.26
Total	84.85	84.82	86.16	86.29	81.98	86.80	86.49
Structural formula based on 28 oxygen							
Si	5.451	5.363	5.457	5.509	5.396	5.387	5.406
Al (iv)	2.549	2.637	2.543	2.491	2.604	2.613	2.594
Al (vi)	2.663	2.704	2.707	2.605	2.749	2.726	2.651
Fe (iii)	0.066	0.045	0.096	0.100	0.093	0.081	0.044
Fe (ii)	3.051	3.108	2.961	3.571	3.750	2.936	3.007
Mg	6.071	6.002	6.046	5.498	5.177	6.076	6.156
OH*	16.000	15.993	16.000	15.927	15.993	15.962	15.974
Total	35.851	35.852	35.810	35.701	35.762	35.781	35.832

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Fe/Fe+Mg 0.339 0.344 0.336 0.400 0.426 0.332 0.331

Tourmalinite, sample BO19, mount 2

Analysis	47	48	49	50	51	52	53	54
SiO <sub>2</sub>	26.16	26.48	26.39	26.32	26.22	26.46	26.51	29.57
Al <sub>2</sub> O <sub>3</sub>	21.79	21.64	21.93	21.82	21.81	21.64	22.01	18.84
FeO	17.99	17.77	17.93	17.93	17.85	17.99	17.76	17.72
MgO	19.67	19.95	20.15	19.93	19.74	19.84	19.93	19.24
Total	85.61	85.84	86.40	86.00	85.62	85.93	86.21	85.37
Structural formulae based on 28 oxygen								
Si	5.395	5.432	5.389	5.395	5.402	5.434	5.408	6.024
Al (iv)	2.605	2.568	2.611	2.605	2.598	2.566	2.592	1.976
Al (vi)	2.697	2.676	2.671	2.677	2.705	2.678	2.713	2.578
Fe (iii)	0.058	0.091	0.046	0.067	0.067	0.069	0.094	0.341
Fe (ii)	3.045	2.958	3.016	3.007	3.009	3.021	2.936	2.679
Mg	6.047	6.101	6.133	6.090	6.062	6.074	6.061	5.843
OH*	16.000	15.935	16.000	15.935	16.000	16.000	15.948	16.000
Total	35.847	35.761	35.866	35.776	35.843	35.842	35.752	35.441
Fe/Fe+Mg	0.339	0.333	0.333	0.335	0.337	0.337	0.333	0.341

Tourmalinite, sample BO19, mount 3

Analysis	20	21	23	24	25	26	27	28	29	30
SiO <sub>2</sub>	25.62	26.07	25.73	24.58	26.48	25.91	24.46	26.23	25.78	25.44
Al <sub>2</sub> O <sub>3</sub>	21.20	21.84	23.62	23.07	21.81	22.13	23.83	22.54	21.35	21.37
FeO	18.81	18.93	19.20	19.41	18.84	18.18	19.68	19.15	18.84	18.50
MgO	18.94	19.22	18.28	17.86	19.26	19.13	17.84	19.32	18.39	19.16
Total	84.57	86.06	86.83	84.92	86.39	85.35	85.81	87.24	84.36	84.47
Structural formulae based on 28 oxygen										
Si	5.386	5.377	5.248	5.163	5.425	5.364	5.087	5.321	5.419	5.343
Al (iv)	2.614	2.623	2.752	2.837	2.575	2.636	2.913	2.679	2.581	2.657
Al (vi)	2.643	2.692	2.940	2.879	2.700	2.773	2.931	2.720	2.718	2.637
Fe (iii)	0.024	0.042	0.117	0.026	0.082	0.087	0.018	0.055	0.080	0.010

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Fe (ii)	3.283	3.224	3.158	3.384	3.146	3.060	3.405	3.194	3.232	3.239
Mg	5.935	5.910	5.558	5.592	5.882	5.904	5.531	5.842	5.763	5.999
OH*	15.980	16.000	15.980	16.000	15.980	15.986	16.000	15.916	16.000	15.953
Total	35.865	35.868	35.753	35.881	35.790	35.810	35.885	35.727	35.793	35.838
Fe/Fe+Mg	0.358	0.356	0.371	0.379	0.354	0.348	0.382	0.357	0.365	0.351

Amphibolite, sample C3P2

Analysis	18	19	20	21	22	54	55
SiO <sub>2</sub>	26.65	27.76	27.11	27.59	27.48	26.97	27.13
Al <sub>2</sub> O <sub>3</sub>	21.86	21.11	21.28	21.46	21.26	21.72	21.67
FeO	16.43	16.34	16.33	16.40	16.54	16.10	16.30
MgO	21.21	21.89	21.75	20.94	20.95	21.29	21.02
Total	86.15	87.10	86.47	86.39	86.23	86.08	86.12
Structural formulae based on 28 oxygen							
Si	5.405	5.556	5.476	5.560	5.548	5.470	5.486
Al (iv)	2.595	2.444	2.524	2.440	2.452	2.530	2.514
Al (vi)	2.644	2.547	2.553	2.676	2.629	2.672	2.666
Fe (iii)	0.074	0.062	0.053	0.140	0.134	0.079	0.069
Fe (ii)	2.713	2.673	2.705	2.624	2.659	2.652	2.688
Mg	6.413	6.531	6.549	6.291	6.306	6.437	6.336
OH*	15.884	15.966	15.910	15.960	15.876	16.000	15.986
Total	35.728	35.779	35.770	35.691	35.604	35.840	35.745
Fe/Fe+Mg	0.303	0.295	0.296	0.305	0.307	0.298	0.303

Amphibolite, sample C3P2

Analysis	56	57	58	59	60	61
SiO <sub>2</sub>	27.02	27.75	27.54	27.05	27.07	27.11
Al <sub>2</sub> O <sub>3</sub>	21.09	21.73	21.91	21.62	21.65	21.46
FeO	16.36	16.05	16.08	16.21	16.24	16.13
MgO	21.28	21.21	21.09	21.17	21.38	21.22
Total	85.75	86.74	86.62	86.05	86.34	85.92

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Structural formulae based on 28 oxygen

Si	5.508	5.550	5.526	5.472	5.459	5.486
Al (iv)	2.492	2.450	2.474	2.528	2.541	2.514
Al (vi)	2.585	2.693	2.727	2.646	2.617	2.621
Fe (iii)	0.057	0.128	0.143	0.098	0.031	0.078
Fe (ii)	2.732	2.556	2.556	2.645	2.708	2.652
Mg	6.467	6.324	6.308	6.384	6.427	6.401
OH*	15.986	15.959	15.974	15.890	15.966	15.920
Total	35.827	35.660	35.708	35.663	35.749	35.672
Fe/Fe+Mg	0.301	0.298	0.300	0.300	0.299	0.299

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