
SUMMARY OF RASPAS METAMORPHIC COMPLEX PHASE ASSEMBLAGES

Predominant prograde lithologies (and mineral phase assemblages) comprise (where abbreviations are: py, pyrope %; al, almandine; gr, grossular, sp, spessartine; jd,jadeite; ac, acmite (balance in omphacite is Ca-Mg-Fe components):

- i. *pelitic schist* – quartz + phengite + paragonite + garnet ($\text{py}_{20}\text{al}_{65}\text{gr}_{13}\text{sp}_2$) + chloritoid + rutile + graphite \pm kyanite \pm pyrite with accessory zircon;
- ii. *eclogite* - omphacite ($\text{jd}_{36-47}\text{ac}_{0-12}$) + garnet ($\text{py}_{17-22}\text{al}_{48-56}\text{gr}_{22-31}\text{sp}_{1-4}$) + barroisite + clinozoisite + rutile + quartz + apatite + pyrite;
- iii. *garnet amphibolite* - barroisite/hornblende + garnet ($\text{py}_{36}\text{al}_{41}\text{gr}_{21}\text{sp}_2$) + zoisite + kyanite + rutile + pyrite \pm omphacite \pm paragonite \pm quartz \pm apatite.

The retrogressed lithologies include:

- i. *glaucophane schist* - glaucophane + garnet ($\text{py}_{12}\text{al}_{61}\text{gr}_{24}\text{sp}_3$) + epidote + phengite + paragonite + rutile \pm quartz \pm apatite \pm pyrite;
- ii. *greenschist* - actinolite + zoisite + albite+ chlorite + titanite + \pm white mica \pm quartz.

TABLE A. ANALYTICAL DATA FOR SELECTED RASPAS METAMORPHIC COMPLEX LITHOLOGIES

	Eclogite*		Amphibolite		Clinoptyroxene		Garnet amphibolite*		Peltic Schist 1*		Schist 2*		Serpentinite*		Basalt 1*		Basalt 2*		Basalt 3*		Gabbro 1* Gabbro 2*	
SiO ₂	49.600	nd	nd	nd	47.57	72.14	76.86	40.08	46.76	48.85	50.59	49.92	50.39									
TiO ₂	1.48	nd	nd	nd	0.46	0.46	0.88	0.09	2.16	1.41	1.42	0.77	0.56									
Al ₂ O ₃	15.08	nd	nd	nd	17.11	12.9	12.45	2.81	13.56	14.91	13.96	17.42	17.3									
Fe ₂ O ₃	12.44	nd	nd	nd	8.12	5.26	4.68	8.25	14.16	10.62	10.31	7.35	7.16									
MnO	0.21	nd	nd	nd	0.17	0.14	0.03	0.1	0.24	0.19	0.17	0.11	0.1									
MgO	7.58	nd	nd	nd	10.36	1.26	0.54	37.04	7.19	8.02	7.51	7.65	8.4									
CaO	10.68	nd	nd	nd	12.29	0.51	0.28	2.5	10.63	10.22	10.5	10.07	10.3									
Na ₂ O	2.32	nd	nd	nd	2.28	0.84	0.58	0.05	1.76	2.89	3.01	3.28	2.3									
K ₂ O	0.08	nd	nd	nd	0.08	2.22	1.27	0.01	0.15	0.13	0.1	0.18	0.83									
P ₂ O ₅	0.15	nd	nd	nd	0.02	0.18	0.1	0.01	0.19	0.13	0.14	0.08	0.08									
LOI	0.31	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd									
Total	100.01	nd	nd	nd	98.47	96.17	97.58	99.78	99.49	99.41	99.27	99.49	99.27									
Sc	75.000	nd	nd	nd	50	24	18	11.325	41.69	27.07	40.265	27.07	30.315									
V	602.2	nd	nd	nd	180.7	27.8	71	81.31	533.32	210.515	365.65	210.515	179.59									
Cr	172.61	nd	nd	nd	54.28	12.8	61.3	2614.01	46.76	48.95	199.34	396.1	448.19									
Ni	58.67	nd	nd	nd	51.8	8.6	7.8	72.941	nd	nd	nd	nd	nd									
Rb	0.55	0.14	0.14	0.035	1.3	0.8	0.8	0.354	1.727	1.071	1.134	2.504	21.109									
Sr	88.000	28	9.82\$	0.01	9.21	132	97.7	12.458	119.512	119.891	124.902	206.699	208.788									
Ba	90.555\$	0.07	0.07	0.07	22.8	36.35	154.7	334.3	8.923	10.382	10.833	8.309	115.433									
Th	0.476	0.012	0.012	0.026	9.83	16.19	12.73	12.262	3	66.63	2.72	3.19	6.48									
Pb	0.547	0.26	0.34	0.035	0.39	4.93	8.67	0.074	44.551	22.305	32.049	17.284	22.904									
Hf	2.31	3.07	4.25	0.065	32.67	159.8	318.3	2.168	0.182	0.815	1.028	0.698	0.817									
Zr	90.550	0.067	0.065	0.02	0.17	1.802	0.154	0.035	0.055	0.182	0.173	0.023	0.062									
Ta	0.48	1.1	1.11	0.29	10.18	14.02	0.434	0.434	2.308	1.011	2.496	0.376	0.846									
Nb	8.5	6.5	5.7	13.44	34.42	17.3	2.266	51.227	3.025	31.178	14.529	16.594										
Y	35.83	3.14	1.99	0.91	21.08	16.89	0.527	4.048	4.654	3.744	1.192	2.732										
La	6.39	4.897	2.33	2.33	38.11	29.07	0.893	13.928	12.885	12.3	3.872	7.808										
Ce	15.53	0.41	0.752	0.120	nd	nd	0.097	2.418	2.088	2.047	0.684	1.234										
Pr	2.29	2.41	0.41	0.20	3.602	20.95	13.57	0.403	13.494	10.076	10.379	3.97	6.019									
Nd	10.79	0.600	0.225	1.129	1.03	4.32	2.73	0.143	4.707	3.269	3.447	1.375	1.934									
Sr	3.43	0.086	0.412	0.6	0.96	0.65	0.106	1.698	1.366	1.365	0.585	0.899										
Gd	3.91	0.368	1.528	1.43	4.16	3.06	0.234	6.415	4.161	4.333	1.836	2.473										
Tb	0.8	0.091	0.260	0.3	nd	nd	0.047	0.047	1.23	0.762	0.787	0.342	0.425									
Dy	5.44	0.812	1.499	2.02	5.4	3.45	0.33	8.344	5.079	5.152	2.308	2.743										
Ho	1.21	0.224	0.267	0.46	nd	nd	0.077	4.762	1.094	1.123	0.502	0.584										
Er	3.37	0.672	0.534	1.28	3.47	1.93	0.239	5.187	3.148	3.169	1.467	1.663										
Tm	0.53	0.09	0.05	0.19	nd	nd	nd	3.588	2.929	2.279	2.209	2.424										
Yb	3.54	0.552	0.241	1.21	3.54	2.08	0.249	4.909	3.025	3.002	1.399	1.587										
Lu	0.526	0.075	0.032	0.176	0.55	0.32	0.04	0.709	0.437	0.443	0.211	0.236										
⁸⁷ Sr/ ⁸⁶ Sr	0.70683 ± 15	0.70388 ± 14	0.704180 ± 12	0.705226 ± 12	0.705226 ± 6	0.705266 ± 6	0.703355 ± 6	0.704019 ± 7	0.703355 ± 6	0.703355 ± 6	0.703355 ± 6	0.703355 ± 6										
⁷ Li/ ⁶ Li	0.51279	0.51285	0.51286	0.51286	0.51286	0.51286	0.51286	0.51286	0.51286	0.51286	0.51286	0.51286										
¹⁴³ Nd/ ¹⁴⁴ Nd	0.51286	0.51286	0.51286	0.51286	0.51286	0.51286	0.51286	0.51286	0.51286	0.51286	0.51286	0.51286										
Nd	8.27	6.82	7.96	+12.2	+12.2	+12.2	+12.2	+12.2	+12.2	+12.2	+12.2	+12.2	+7.05									

*Major and trace elements analyses performed at the Département de Géologie and Research School of Earth Sciences, ANU.

\$Trace element analysis performed at the Laboratoire des Chaînes Alpines, Université Joseph Fourier (Grenoble, France).

#All data are corrected for in situ decay assuming an age of 150 Ma for the Raspas Formation. abbreviations: nd, not determined; bdl, below detection limit.

TABLE B. RARE EARTH ELEMENT ABUNDANCES OF GARNET IN ECLOGITE

La					
Ce	0.001	0.024	0.007	0.003	0.002
Pr					
Nd	0.01				
Sm	0.047	0.115	0.149		
Eu	0.203	0.115	0.203	0.333	
Gd	0.805	0.603	0.93	1.484	0.161
Tb					
Dy	9.372	6.292	7.987	8.981	4.352
Ho					
Er	28.711	27.577	24.332	22.419	20.824
Tm					
Yb	40.6	65.449	39.831	38.082	47.104
Lu	45.074	82.527	44.963	44.314	57.22

Note: Analyses performed by LA-ICP-MS at the Department of Geology at the Australian National University.