Petrographic details for Data Repository item 2003145

Samples with only minor retrograde features contain pale-green omphacite and red-brown garnet. The peak-metamorphism eclogite assemblage is garnet + omphacite + magnetite + rutile. Omphacite crystals are small (millimeter scale) and have equilibrated contacts with garnet but also grew along fractures within garnet. In sheared samples, omphacite is deformed and recrystallized in thin shear bands. Omphacite locally has symplectite rims of low-Na pyroxene and albite. Pyroxene + albite symplectites characterize the retrograde eclogites and, where found in amphibolites, are unequivocal indicators that the rock passed through the eclogite stage even where omphacite is absent. With increasing retrograde metamorphism, omphacite crystals become separated from garnet by plagioclase, amphibole, and magnetite; symplectites become less common; amphibole and biotite become more prevalent; and dark-green amphibole replaces clinopyroxene.

40Ar/39Ar Hornblende Data, Lofoten, Norway

J-value errors at 2-sigma, all other errors at 1-sigma.
All analyses determined by laser single crystal total fusion.

Sample: **82-91** cl4 7a hbl
J value: 0.008000 ± 0.000104 **Hornblende porphyroblasts in Leknes group schists**

Analysis	39Ar/40Ar	36Ar/40Ar	K/Ca	K/Cl	%40Ar*	Age (Ma)
1	3.29E-02 ± 2.65E-04	1.13E-04 ± 2.33E-05	0.0311	-	96.7	380.8 ± 3.1
2	3.31E-02 ± 2.04E-04	-1.49E-05 ± 5.19E-06	0.0269	2092.2	100.0	390.8 ± 2.4
3	3.26E-02 ± 2.19E-04	2.40E-04 ± 1.85E-05	0.0299	178.8	92.9	370.1 ± 2.5
4	3.26E-02 ± 8.19E-05	9.61E-05 ± 7.35E-06	0.0271	-	97.2	385.3 ± 1.0
5	3.18E-02 ± 3.35E-04	1.75E-04 ± 2.7E-05	0.0253	159.8	94.8	385.6 ± 4.1
6	3.58E-02 ± 3.11E-04	1.65E-04 ± 2.19E-05	0.0309	43.6	95.1	347.6 ± 3.0
7	3.75E-02 ± 1.06E-04	4.84E-05 ± 7.9E-06	0.0360	-	98.6	344.0 ± 1.0
8	3.53E-02 ± 8.55E-05	2.12E-05 ± 1.54E-06	0.0362	-	99.4	366.0 ± 0.9
9	3.30E-02 ± 4.20E-04	-2.44E-05 ± 1.42E-05	0.0293	-	100.0	392.0 ± 5.0
10	3.24E-02 ± 1.18E-04	-7.71E-06 ± 1.12E-06	0.0321	131.3	100.0	397.8 ± 1.4
11	3.40E-02 ± 8.24E-05	-1.14E-05 ± 1.55E-06	0.0329	201.8	100.0	381.4 ± 0.9
12	3.32E-02 ± 1.95E-04	9.54E-05 ± 1.78E-05	0.0302	63.1	97.2	380.0 ± 2.2
13	3.32E-02 ± 8.64E-05	5.12E-06 ± 7.12E-07	0.0290	43.1	99.8	389.3 ± 1.0
14	3.67E-02 ± 2.46E-04	1.76E-04 ± 1.81E-05	0.0355	18.5	94.8	338.6 ± 2.3
15	3.24E-02 ± 1.02E-04	2.58E-05 ± 1.05E-06	0.0293	125.4	99.2	395.2 ± 1.2
16	3.44E-02 ± 7.59E-05	5.43E-05 ± 2.99E-06	0.0319	37.1	98.4	371.4 ± 0.8
17	3.30E-02 ± 6.51E-05	1.24E-04 ± 3.96E-06	0.0291	53.4	96.3	378.2 ± 0.7
18	3.34E-02 ± 6.09E-05	4.56E-05 ± 1.39E-06	0.0292	54.4	98.7	382.5 ± 0.7
19	3.15E-02 ± 1.70E-04	2.45E-04 ± 7.6E-06	0.0499	12.3	92.8	381.7 ± 2.1
21	3.30E-02 ± 2.99E-04	3.36E-04 ± 1.5E-05	0.0478	18.2	90.1	356.7 ± 3.2
23	3.41E-02 ± 1.01E-04	1.72E-04 ± 5.74E-06	0.0538	36.0	94.9	363.1 ± 1.1
24	3.49E-02 ± 3.00E-04	2.84E-04 ± 1.69E-05	0.0553	13.1	91.6	343.8 ± 3.0
25	3.23E-02 ± 3.39E-04	4.21E-04 ± 2.45E-05	0.0483	14.6	87.6	354.0 ± 3.7
26	3.15E-02 ± 2.47E-04	2.18E-04 ± 1.15E-05	0.0502	16.5	93.6	385.0 ± 3.0
27	3.46E-02 ± 5.32E-04	3.04E-04 ± 1.88E-05	0.0534	5.5	91.0	344.5 ± 5.3
29	3.38E-02 ± 6.69E-05	6.98E-05 ± 2.97E-06	0.0510	50.8	97.9	376.4 ± 0.7
30	3.44E-02 ± 2.78E-04	5.13E-04 ± 2.28E-05	0.0418	20.3	84.8	324.6 ± 2.6
31	3.42E-02 ± 1.81E-04	1.00E-04 ± 9.69E-06	0.0478	14.3	97.0	369.1 ± 1.9
32	3.38E-02 ± 1.75E-04	2.05E-04 ± 1.36E-05	0.0520	18.3	94.0	361.8 ± 1.9
33	3.87E-02 ± 2.77E-04	1.58E-04 ± 2.2E-05	0.0591	19.4	95.3	324.5 ± 2.3
34	3.30E-02 ± 7.52E-05	1.20E-04 ± 5.22E-06	0.0525	33.5	96.4	379.4 ± 0.9
35	3.29E-02 ± 1.20E-04	8.47E-05 ± 6.48E-06	0.0498	20.7	97.5	383.6 ± 1.4
36	3.37E-02 ± 1.33E-04	2.14E-04 ± 9.78E-06	0.0511	17.5	93.7	362.0 ± 1.4
37	3.36E-02 ± 3.20E-04	2.54E-04 ± 2.59E-05	0.0555	8.0	92.5	358.7 ± 3.4
38	3.37E-02 ± 7.31E-05	8.16E-05 ± 3.41E-06	0.0517	37.6	97.6	375.8 ± 0.8
39	3.57E-02 ± 1.18E-04	1.76E-04 ± 7.88E-06	0.0572	15.6	94.8	347.2 ± 1.1
41	3.28E-02 ± 2.28E-04	2.58E-04 ± 7.9E-06	0.0708	38.9	92.4	366.7 ± 2.5
42	3.26E-02 ± 1.82E-04	3.48E-04 ± 1.29E-05	0.0469	-	89.7	358.5 ± 2.0
43	3.30E-02 ± 2.92E-04	3.69E-04 ± 1.79E-05	0.0594	-	89.1	352.8 ± 3.1
44	3.50E-02 ± 8.48E-05	1.47E-04 ± 2.2E-06	0.0670	-	95.7	357.0 ± 0.9
45	3.18E-02 ± 2.73E-04	1.91E-04 ± 1.47E-05	0.0611	258.8	94.3	384.0 ± 3.3
46	3.26E-02 ± 2.77E-04	2.65E-04 ± 2.6E-05	0.0653	-	92.2	368.1 ± 3.1
47	3.33E-02 ± 1.29E-04	1.36E-04 ± 4.25E-06	0.0590	215.7	96.0	373.9 ± 1.4
48	2.97E-02 ± 3.84E-04	3.05E-04 ± 2.23E-05	0.0631	-	91.0	395.8 ± 5.1
49	3.13E-02 ± 2.26E-04	2.07E-04 ± 1.13E-05	0.0608	78.4	93.9	388.2 ± 2.8
50	3.32E-02 ± 3.57E-04	4.59E-04 ± 1.07E-05	0.0745	-	86.4	341.7 ± 3.7
52	3.35E-02 ± 5.31E-04	6.15E-04 ± 3E-05	0.0623	-	81.8	322.4 ± 5.1
53	3.24E-02 ± 7.40E-04	6.68E-04 ± 5.37E-05	0.0691	-	80.3	326.3 ± 7.5
54	3.34E-02 ± 4.98E-04	4.77E-04 ± 4.68E-05	0.0736	-	85.9	337.6 ± 5.0
55	3.33E-02 ± 1.79E-04	2.03E-04 ± 9.92E-06	0.0731	-	94.0	367.2 ± 2.0
56	3.31E-02 ± 1.79E-04	2.13E-04 ± 1.17E-05	0.0698	-	93.7	368.4 ± 2.0
57	3.43E-02 ± 8.94E-04	6.35E-04 ± 6.84E-05	0.0846	-	81.2	312.7 ± 8.1
58	3.35E-02 ± 1.31E-04	2.31E-04 ± 1E-05	0.0658	-	93.2	362.7 ± 1.4
60	3.36E-02 ± 2.17E-04	2.14E-04 ± 1.17E-05	0.0727	-	93.7	363.3 ± 2.3
61	3.23E-02 ± 4.49E-04	4.13E-04 ± 2.95E-05	0.0709	-	87.8	355.2 ± 4.9

Mean Age: 364.9
Standard Deviation: 20.8
Standard Error: 2.67

Sample: **82-91** cl4 4a bio
J value: 0.00783 ± 0.00008 **Biotite porphyroblasts in Leknes group schists**

Analysis	39Ar/40Ar	36Ar/40Ar	K/Ca	K/Cl	%40Ar*	Age (Ma)
71	3.45E-02 ± 2.03E-04	1.44E-04 ± 1.11E-05	0.8964	58.8	95.7	355.0 ± 2.1
72	3.38E-02 ± 1.73E-04	1.54E-04 ± 8.29E-06	1.1405	58.8	95.5	360.2 ± 1.8
73	3.38E-02 ± 1.42E-04	1.90E-04 ± 4.92E-06	0.7320	53.9	94.4	356.6 ± 1.5
74	3.29E-02 ± 1.54E-04	2.29E-04 ± 4.62E-06	1.5103	71.7	93.2	361.8 ± 1.7
75	3.36E-02 ± 1.69E-04	1.77E-04 ± 5.87E-06	1.3945	115.3	94.8	360.0 ± 1.8
76	3.31E-02 ± 1.65E-04	2.40E-04 ± 4.96E-06	1.0871	52.2	92.9	358.4 ± 1.8
77	3.38E-02 ± 1.77E-04	2.41E-04 ± 1.21E-05	0.7204	112.2	92.9	351.8 ± 1.8
78	3.38E-02 ± 1.36E-04	2.17E-04 ± 3.46E-06	1.8836	130.8	93.6	354.5 ± 1.4
79	3.41E-02 ± 1.98E-04	1.81E-04 ± 5.07E-06	0.8097	53.4	94.7	354.4 ± 2.1
80	3.21E-02 ± 1.72E-04	3.38E-04 ± 3.2E-06	0.7561	53.7	90.0	358.5 ± 1.9

Mean Age: 357.1
Standard Deviation: 3.2
Standard Error: 1.0

Sample: **72b-91** cl4 7e hbl
J value: 0.00797 ± 0.00008 **Hornblende, Leknes Group Amphibolite**

Analysis	39Ar/40Ar	36Ar/40Ar	K/Ca	K/Cl	%40Ar*	Age (Ma)
1	2.91E-02 ± 1.03E-04	8.40E-05 ± 6.55E-06	0.0836	19.1	97.5	427.2 ± 1.5
4	2.87E-02 ± 7.18E-04	2.12E-04 ± 3.99E-05	0.0861	0.0	93.7	417.1 ± 10.4
5	2.94E-02 ± 7.81E-05	1.83E-04 ± 5.5E-06	0.0879	30.3	94.6	412.2 ± 1.1
6	3.09E-02 ± 6.87E-05	1.40E-04 ± 4.83E-06	0.1006	24.9	95.8	398.7 ± 0.9
8	2.99E-02 ± 7.16E-05	1.63E-04 ± 4.07E-06	0.1078	11.1	95.2	407.4 ± 1.0
9	2.98E-02 ± 8.29E-05	9.92E-05 ± 5.32E-06	0.0876	13.3	97.1	416.8 ± 1.2
10	3.17E-02 ± 1.60E-04	1.30E-04 ± 1.37E-05	0.0971	7.9	96.2	390.4 ± 2.0
11	3.12E-02 ± 7.14E-05	2.31E-04 ± 7.03E-06	0.1024	8.6	93.2	384.7 ± 0.9
12	3.14E-02 ± 7.03E-05	1.36E-04 ± 4.41E-06	0.0920	11.1	96.0	393.6 ± 0.9
13	3.00E-02 ± 5.83E-05	7.34E-05 ± 1.98E-06	0.0906	26.6	97.8	416.4 ± 0.8
14	3.10E-02 ± 6.96E-05	5.14E-05 ± 4.68E-06	0.1144	9.8	98.5	407.0 ± 0.9
15	3.11E-02 ± 8.41E-05	6.45E-05 ± 8.21E-06	0.0882	9.8	98.1	404.3 ± 1.1
16	2.90E-02 ± 9.55E-05	1.19E-04 ± 2.61E-06	0.1349	15.1	96.5	423.8 ± 1.4
17	3.18E-02 ± 1.02E-04	1.42E-04 ± 9.22E-06	0.1541	11.1	95.8	388.1 ± 1.2
18	3.34E-02 ± 2.41E-04	4.70E-04 ± 1.82E-05	0.1004	5.9	86.1	337.1 ± 2.4
19	3.03E-02 ± 1.15E-04	2.47E-04 ± 1.03E-05	0.1155	7.7	92.7	393.3 ± 1.5
20	2.92E-02 ± 8.53E-05	1.21E-04 ± 5.44E-06	0.0800	20.2	96.4	421.4 ± 1.2
21	3.02E-02 ± 8.85E-05	1.24E-04 ± 7.21E-06	0.1431	14.4	96.3	409.1 ± 1.2
22	3.11E-02 ± 9.25E-05	1.38E-04 ± 8.1E-06	0.1212	17.4	95.9	396.8 ± 1.2
23	3.12E-02 ± 1.10E-04	1.39E-04 ± 6.37E-06	0.1371	11.7	95.9	394.9 ± 1.4
24	3.17E-02 ± 1.10E-04	2.75E-04 ± 8.78E-06	0.1205	8.3	91.9	375.1 ± 1.3
25	3.10E-02 ± 8.72E-05	1.85E-04 ± 6.43E-06	0.1651	16.5	94.5	392.9 ± 1.1
26	3.14E-02 ± 1.24E-04	1.49E-04 ± 4.44E-06	0.1189	12.4	95.6	391.8 ± 1.6
27	2.72E-02 ± 8.29E-05	1.56E-04 ± 5.95E-06	0.1387	13.0	95.4	445.2 ± 1.4
28	3.02E-02 ± 1.66E-04	1.38E-04 ± 1.49E-05	0.1574	22.6	95.9	407.5 ± 2.2
29	3.20E-02 ± 8.47E-05	1.84E-04 ± 6.8E-06	0.1875	17.1	94.6	381.3 ± 1.0
30	3.04E-02 ± 1.30E-04	1.07E-04 ± 6.42E-06	0.1254	14.2	96.8	408.1 ± 1.7
31	3.09E-02 ± 1.33E-04	7.81E-05 ± 1.95E-06	0.1694	15.4	97.7	405.9 ± 1.8
32	2.99E-02 ± 1.41E-04	1.59E-04 ± 5.89E-06	0.1487	10.7	95.3	408.3 ± 1.9

Mean Age: 401.9
Standard Deviation: 19.6
Standard Error: 3.46

Sample: **72b-91** cl4 5g bio
J value: 0.0078 ± 0.0001 **Biotite, Leknes Group Amphibolite**

Analysis	39Ar/40Ar	36Ar/40Ar	K/Ca	K/Cl	%40Ar*	Age (Ma)
31	2.39E-02 ± 9.34E-05	1.00E-03 ± 5.78E-06	1.9558	45.6	70.3	373.2 ± 1.5
32	2.42E-02 ± 1.42E-04	1.05E-03 ± 1.54E-05	0.7842	21.2	69.0	362.8 ± 2.1
33	2.73E-02 ± 8.93E-05	7.27E-04 ± 3.89E-06	1.9430	58.5	78.5	365.7 ± 1.2
34	2.47E-02 ± 1.00E-04	9.43E-04 ± 3.96E-06	1.3612	47.1	72.1	370.2 ± 1.5
35	2.22E-02 ± 1.57E-04	1.18E-03 ± 1.24E-05	1.4311	46.9	65.0	370.5 ± 2.6
36	2.37E-02 ± 8.01E-05	1.09E-03 ± 3.81E-06	0.7565	34.6	67.9	363.7 ± 1.2
38	2.62E-02 ± 1.38E-04	6.04E-04 ± 3.79E-06	1.7179	57.8	82.1	395.0 ± 2.1
39	2.77E-02 ± 1.03E-04	6.94E-04 ± 2.57E-06	0.9494	48.4	79.5	364.8 ± 1.4
40	2.60E-02 ± 6.78E-05	7.50E-04 ± 4.17E-06	1.1755	50.8	77.9	378.2 ± 1.0

Mean Age: 371.5
Standard Deviation: 10.1
Standard Error: 3.2

Sample: **4B-93** cl19 auto1 min
J value: 0.0172 ± 0.0002 **Hornblende, Amphibolite boudinage in ky-or gneiss, Skomvær**

Analysis	39Ar/40Ar	36Ar/40Ar	K/Ca	K/Cl	%40Ar*	Age (Ma)
71	7.96E-02 ± 5.01E-04	2.11E-06 ± 1.93E-07	0.0911	24.4	99.9	352.8 ± 2.2
72	8.00E-02 ± 4.16E-04	4.40E-05 ± 4.53E-06	0.1009	22.9	98.7	347.0 ± 1.8
73	7.20E-02 ± 3.82E-04	2.25E-04 ± 1.71E-05	0.1030	18.1	93.3	363.0 ± 1.9
74	7.99E-02 ± 3.98E-04	4.85E-05 ± 4.90E-06	0.0984	28.5	98.6	347.2 ± 1.7
75	7.92E-02 ± 4.41E-04	9.01E-05 ± 1.04E-05	0.0896	26.2	97.3	346.1 ± 1.9
76	7.44E-02 ± 2.83E-04	1.03E-04 ± 9.75E-06	0.0966	20.2	96.9	364.9 ± 1.4
77	8.15E-02 ± 4.17E-04	2.98E-05 ± 2.13E-06	0.0926	27.6	99.1	342.8 ± 1.8
78	8.09E-02 ± 7.34E-04	1.14E-05 ± 9.61E-07	0.0926	25.4	99.7	346.9 ± 3.1
79	8.07E-02 ± 4.13E-04	5.09E-05 ± 3.99E-06	0.0943	21.8	98.5	343.9 ± 1.8
80	7.98E-02 ± 3.26E-04	3.97E-06 ± 6.48E-07	0.1072	20.4	99.9	351.8 ± 1.4

Mean Age: 350.6
Standard Deviation: 7.66
Standard Error: 2.42

Sample: **1E-93** cl19 auto1 min (6G)
J value: 0.0172 ± 0.0002 **Hornblende, amphibolite, N. Røst (end of airport runway).**

Analysis	39Ar/40Ar	36Ar/40Ar	K/Ca	K/Cl	%40Ar*	Age (Ma)
81	7.88E-02 ± 9.19E-04	9.54E-05 ± 3.88E-06	0.1061	17.6	97.2	346.9 ± 4.0
82	7.88E-02 ± 1.12E-03	7.54E-05 ± 2.88E-06	0.1145	14.6	97.8	349.0 ± 5.0
83	8.13E-02 ± 7.78E-04	6.54E-05 ± 2.81E-06	0.1147	13.1	98.1	340.1 ± 3.3
84	8.06E-02 ± 9.04E-04	4.35E-05 ± 2.42E-06	0.1127	15.2	98.7	344.7 ± 3.9
85	7.94E-02 ± 1.11E-03	3.85E-05 ± 1.72E-06	0.1066	15.6	98.9	350.0 ± 4.9
86	7.88E-02 ± 8.52E-04	5.38E-05 ± 1.75E-06	0.1072	14.2	98.4	350.9 ± 3.8
87	7.28E-02 ± 7.72E-04	1.53E-04 ± 5.07E-06	0.1104	13.8	95.5	366.8 ± 3.9
88	7.96E-02 ± 6.04E-04	3.34E-05 ± 7.21E-07	0.1117	15.8	99.0	349.6 ± 2.7
89	7.50E-02 ± 8.59E-04	7.31E-05 ± 1.51E-06	0.1061	14.3	97.8	365.2 ± 4.2
90	7.81E-02 ± 1.10E-03	7.14E-05 ± 1.75E-06	0.1041	17.1	97.9	352.1 ± 5.0

Mean Age: 351.5
Standard Deviation: 8.39
Standard Error: 2.65

Sample: **GM 299** cl63 auto1 min

J value: 0.0145 ± 0.00018 **Hornblende, from amphibolite mantling eclogite shear zone**

Analysis	39Ar/40Ar	36Ar/40Ar	K/Ca	K/Cl	%40Ar*	Age (Ma)
1	5.39E-02 ± 4.71E-04	6.90E-05 ± 5.52E-05	0.0624	-	98	422 ± 1.8
2	4.96E-02 ± 7.83E-04	6.68E-05 ± 6.81E-06	0.0597	22.8	98	454 ± 3.6
3	5.47E-02 ± 9.33E-04	5.17E-05 ± 2.55E-05	0.0694	-	98	418 ± 3.6
4	4.96E-02 ± 6.08E-04	2.32E-05 ± 1.38E-05	0.0625	15.8	99	460 ± 2.8
5	5.38E-02 ± 7.87E-04	-2.96E-05 ± 1.74E-05	0.0734	22.7	101	434 ± 3.2
*6	4.34E-02 ± 6.02E-04	-4.32E-05 ± 5.16E-05	0.0692	109.1	101	526 ± 3.6
7	4.59E-02 ± 4.78E-04	1.33E-05 ± 1.94E-05	0.0709	-	100	494 ± 2.6
8	5.16E-02 ± 7.72E-04	4.86E-05 ± 7.81E-06	0.0769	60.4	99	441 ± 3.3
9	0.053848 ± 1.43E-03	6.46E-05 ± 1.20E-05	0.0690	23.3	98	423 ± 5.6
10	5.54E-02 ± 9.81E-04	9.22E-05 ± 2.31E-05	0.0669	56.3	97	409 ± 3.6
11	5.57E-02 ± 7.96E-04	-2.61E-05 ± 2.58E-05	0.0657	31.9	101	421 ± 3.0
12	5.27E-02 ± 6.02E-04	-9.18E-05 ± 6.73E-04	0.0672	19.0	103	449 ± 2.6
13	4.96E-02 ± 4.45E-04	6.58E-05 ± 7.91E-05	0.0750	48.5	98	455 ± 2.0
14	5.41E-02 ± 4.69E-04	1.00E-04 ± 1.83E-04	0.0682	14.7	97	417 ± 1.8
15	5.38E-02 ± 5.64E-04	1.88E-05 ± 2.78E-05	0.0680	12.6	99	429 ± 2.3
16	4.71E-02 ± 3.73E-04	-5.87E-05 ± 4.10E-04	0.0724	24.4	102	491 ± 1.9
17	5.55E-02 ± 5.03E-04	4.83E-05 ± 6.10E-05	0.0704	18.0	99	413 ± 1.9
18	5.47E-02 ± 4.80E-04	-8.43E-05 ± 5.99E-04	0.0689	52.5	102	433 ± 1.9
19	0.050852 ± 5.67E-04	2.83E-05 ± 3.02E-05	0.0721	9.0	99	449 ± 2.5
20	5.57E-02 ± 1.41E-03	4.75E-05 ± 1.49E-05	0.0791	21.4	99	412 ± 5.2
21	5.29E-02 ± 2.64E-04	9.43E-05 ± 1.51E-04	0.0704	21.4	97	426 ± 1.1
22	5.73E-02 ± 5.09E-04	-1.69E-05 ± 1.70E-05	0.0694	22.3	100	409 ± 1.8
23	5.76E-02 ± 1.00E-03	-2.14E-05 ± 6.05E-06	0.0754	16.9	101	407 ± 3.6
*24	3.15E-02 ± 5.17E-04	-5.52E-05 ± 2.56E-04	0.0693	8.4	102	692 ± 5.7
*25	4.30E-02 ± 4.69E-04	1.36E-05 ± 1.03E-05	0.0660	11.8	100	522 ± 2.8
*26	3.94E-02 ± 3.89E-04	1.75E-05 ± 2.17E-05	0.0754	9.8	99	562 ± 2.8
27	4.77E-02 ± 6.25E-04	-3.60E-05 ± 5.99E-05	0.0634	11.1	101	483 ± 3.2
28	5.22E-02 ± 4.95E-04	-7.63E-05 ± 2.55E-04	0.0638	7.9	102	451 ± 2.1
29	5.89E-02 ± 3.82E-04	-8.75E-05 ± 4.64E-04	0.0645	9.7	103	406 ± 1.3
30	5.43E-02 ± 2.91E-04	-7.57E-05 ± 3.60E-04	0.0669	6.2	102	436 ± 1.2
31	5.00E-02 ± 3.46E-04	2.80E-04 ± 7.55E-05	0.0653	5.5	92	426 ± 1.5
32	4.99E-02 ± 6.22E-04	-3.83E-05 ± 6.27E-05	0.0708	11.5	101	465 ± 2.9
33	5.16E-02 ± 2.82E-04	2.57E-04 ± 5.86E-05	0.0701	6.8	92	416 ± 1.1
34	0.052228 ± 7.25E-04	1.23E-04 ± 2.85E-05	0.0693	8.8	96	428 ± 3.0
35	5.39E-02 ± 6.69E-04	-5.22E-05 ± 4.67E-05	0.0728	9.9	102	435 ± 2.7
36	5.61E-02 ± 4.60E-04	-5.99E-05 ± 1.82E-04	0.0697	4.5	102	422 ± 1.7
37	5.72E-02 ± 9.63E-04	1.75E-05 ± 4.26E-06	0.0652	10.9	99	406 ± 3.4
38	5.42E-02 ± 6.62E-04	-9.36E-05 ± 4.97E-04	0.0697	60.0	103	438 ± 2.7
39	5.80E-02 ± 7.67E-04	3.68E-04 ± 6.01E-05	0.0665	8.7	89	363 ± 2.4

Mean Age (*excluded): 433

Standard Deviation (*excluded): 26

Standard Error (*excluded): 4.6

Comments about the data tables:

— K/Cl ratios are ommitted if the 38ArCl was below detection limits;

— 36Ar/40Ar ratios were 'allowed' to be negative if the measured 36Ar was less than
the blank; such negative ratios are to be expected if there is essentially no 36Ar(atm) in most of the crystals, and measurements are normally distributed about a value of zero; in such cases the radiogenic 40Ar yield will appear

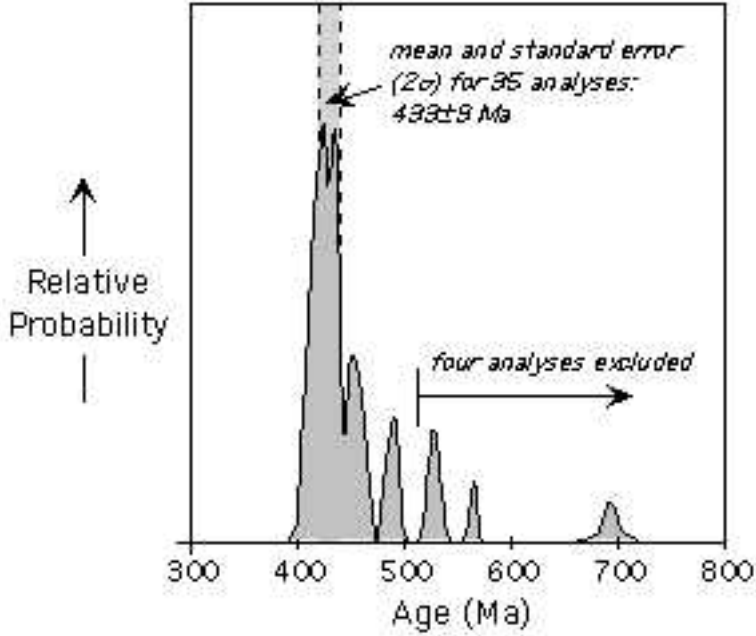
Incremental heating results for an aliquot of sample GM299.

Sample: GM 299
Irradiation: GL71
J-Value: 0.01039 ± 0.00011

Errors are stated at two standard deviations.

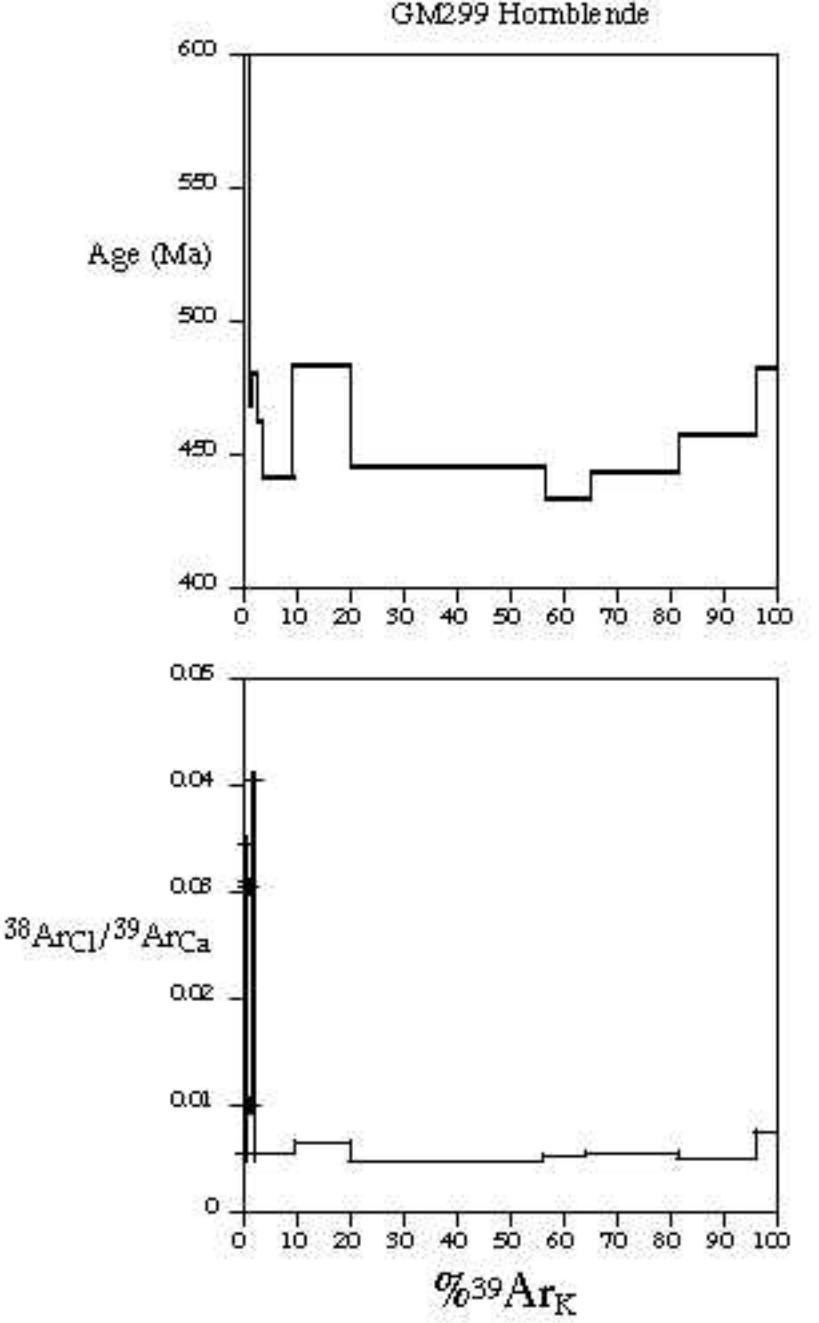
T (°C)	40Ar(Rad.+atm.)	39ArK	38ArCl	37ArCa	36Ar Atm.	Cum.% 39Ar	40Ar*%	Age (Ma)
600	0.1081 ± 0.0554	0.00029 ± 0.00003	0.000039 ± 0.000034	0.00233 ± 0.00009	0.000005 ± 0.000075	0.08	98.73	2835 ± 334
650	0.0314 ± 0.0781	0.00013 ± 0.00002	0.000024 ± 0.000029	0.00095 ± 0.00012	0.000034 ± 0.000080	0.11	67.84	1771 ± 518
700	0.0514 ± 0.0075	0.00027 ± 0.00002	0.000029 ± 0.000052	0.00147 ± 0.00012	0.000049 ± 0.000009	0.18	71.87	1608 ± 115
750	0.1079 ± 0.0040	0.00053 ± 0.00003	0.000000 ± 0.000064	0.00278 ± 0.00008	0.000226 ± 0.000006	0.31	38.2	1073 ± 55
800	0.0821 ± 0.0040	0.00061 ± 0.00006	0.000018 ± 0.000057	0.00325 ± 0.00011	0.000037 ± 0.000006	0.47	86.67	1432 ± 100
850	0.0656 ± 0.0044	0.00071 ± 0.00006	0.000019 ± 0.000039	0.00399 ± 0.00007	0.000024 ± 0.000014	0.66	88.99	1117 ± 89
880	0.0325 ± 0.0024	0.00074 ± 0.00008	0.000019 ± 0.000023	0.00420 ± 0.00008	0.000019 ± 0.000016	0.85	82.34	578 ± 105
910	0.0901 ± 0.0027	0.00267 ± 0.00003	0.000024 ± 0.000040	0.02102 ± 0.00006	0.000048 ± 0.000055	1.54	84.36	468 ± 89
930	0.0595 ± 0.0017	0.00180 ± 0.00003	0.000069 ± 0.000026	0.01408 ± 0.00011	0.000023 ± 0.000013	2.00	88.52	480 ± 32
960	0.1543 ± 0.0016	0.00516 ± 0.00004	0.000025 ± 0.000056	0.05065 ± 0.00014	0.000032 ± 0.000031	3.34	93.88	462 ± 27
990	0.5789 ± 0.0009	0.02161 ± 0.00010	0.000111 ± 0.000071	0.18370 ± 0.00028	0.000012 ± 0.000027	8.93	99.37	440 ± 7
1025	1.2107 ± 0.0008	0.04071 ± 0.00016	0.000254 ± 0.000112	0.33330 ± 0.00038	0.000033 ± 0.000037	19.46	99.18	482 ± 6
1060	3.7087 ± 0.0004	0.13800 ± 0.00052	0.000647 ± 0.000313	1.08000 ± 0.00160	-0.000015 ± 0.000115	55.15	100	445 ± 6
1100	0.7763 ± 0.0011	0.02967 ± 0.00014	0.000152 ± 0.000080	0.24630 ± 0.00018	0.000007 ± 0.000030	62.83	99.72	433 ± 6
1150	1.7401 ± 0.0006	0.06489 ± 0.00026	0.000338 ± 0.000148	0.52890 ± 0.00038	0.000004 ± 0.000057	79.62	99.92	443 ± 6
1200	1.4852 ± 0.0014	0.05353 ± 0.00021	0.000258 ± 0.000126	0.44190 ± 0.00074	0.000004 ± 0.000046	93.47	99.9	456 ± 6
1350	0.5122 ± 0.0059	0.01726 ± 0.00012	0.000126 ± 0.000098	0.16920 ± 0.00061	0.000011 ± 0.000025	97.94	99.36	482 ± 9
1650	0.1674 ± 0.0090	0.00775 ± 0.00010	0.000046 ± 0.000056	0.05797 ± 0.00044	0.000056 ± 0.000023	99.94	90.04	332 ± 15
1651	0.0078 ± 0.0274	0.00023 ± 0.00003	0.000023 ± 0.000048	0.00174 ± 0.00011	0.000034 ± 0.000117	100.00	-26.91	-181 ± 388

This data was obtained through standard, resistance-furnace incremental heating methods as described previously for the CLAIR facility. The incremental heating data for this sample was ***not*** used in the assessment of absolute ages reported in the accompanying paper. However, this data does illustrate the nature of excess argon in the amphiboles and their unsuitibility for conventional incremental heating analysis: there is a release of copious unsupported 40Ar in the low temperature steps, followed by a minimum that approximates the inferred geologic age of the amphibole, with successive higher-temperature steps that release more unsupported 40Ar. Overall, this is a classic 'saddle-shaped' release spectrum; the unsupported 40Ar is well correlated with the 38ArCl/37ArCa ratio. (Note that the irradiation for this sample - and the laser fusion results reported in the paper – was shielded with Cd, and not optimized for the measurement of Cl-derived argon.) As discussed in the paper, we feel that the unsupported 40Ar is heterogeneously distributed and cited in fluid inclusions, and that superior results were obtained through single-crystal laser fusion analysis.



Age probability distribution based on single-crystal total fusion analyses (SCTF) for hornblende of sample GM299. Relative probabilities are dimensionless; the curve was generated from the individual age determinations and their standard deviations (descriptions of this statistical treatment are included in, for example: Adams, C.J., and Kelley, S., 1988, Provenance of Permian-Triassic and Ordovician metagreywacke terranes in New Zealand; evidence from 40Ar/39Ar dating of detrital micas: Geological Society of America Bulletin, v. 110, #4, p. 422-432). The hornblende crystals for GM299 utilized for SCTF were irradiated in a package different from other hornblende analyses of this study and different from the furnace heating sample; in addition to the obvious effect on J-values, the Cd shielding used in this particular irradiation may have lowered production of 38Ar from chlorine.

Excluding four results older than 500 Ma, we calculate an average age of 433±9 Ma (n=35) as discussed in the text. Clearly, some effect of excess argon are likely to persist in this result, although we feel this effect is relatively minor; excluding two additional analyses with ages of ca. 491 and 494 Ma — likely the result of crystals with a small proportion of unsupported 40Ar in fluid inclusions — yields a mean of 429±8 Ma. Our interpretation is that the mode at ca. 430 Ma corresponds to retention of radiogenic argon in these amphiboles.


GM299 Hornblende
Age (Ma)
600
550
500
450
400
0 10 20 30 40 50 60 70 80 90 100
$^{38}Ar_{Cl}/^{39}Ar_{Ca}$
0.05
0.04
0.03
0.02
0.01
0
0 10 20 30 40 50 60 70 80 90 100
$\%^{39}Ar_K$