

Table DR1.

Locality	Name	T	K _V	N _{Pe}	N _D	ωφt (1D)	α	ωφt (3D)	C _{max}	R ²	log(D)	log(ϕ)	log(ω)	log(ωφ)	log(t)
1	Loch Stornoway E	500	2.3 ± 1.9	26.6 ± 10.8	6.7 ± 3.2	1.8 ± 1.1	25	4.3 ± 2.5	6.1 ± 0.7	0.89	-7.9	-2.0	-6.2	-8.3	1.4
2	Loch Stornoway W1	500	3.2 ± 2.5	0.7 ± 4.6	20.5 ± 131	0.5 ± 2.4	25	1.2 ± 5.8	9.0 ± 0.0	0.48	-7.9	-2.8	-7.8	-10.6	3.2
3	Loch Stornoway W2	500	5.0 ± 4.4	7.8 ± 3.3	1.8 ± 1.1	2.8 ± 0.4	25	6.6 ± 1.1	11.2 ± 3.6	0.80	-7.9	-2.3	-6.8	-9.1	2.4
4	Rudh a' Bharr Ruaidh	500	3.1 ± 2.7	0.2 ± 0.7	3.2 ± 13.2	1.3 ± 2.0	25	3.0 ± 4.8	7.4 ± 1.7	0.65	-7.9	-3.1	-8.4	-11.5	4.5
5	Sgier Maire	500	6.7 ± 6.2	0.4 ± 0.6	11.9 ± 23.2	0.6 ± 10.2	24	1.5 ± 24.7	13.2 ± 7.2	0.83	-7.9	-2.9	-8.1	-11.0	3.7
6	Kilberry Head	470	5.4 ± 5.3	0.04 ± 0.06	3.5 ± 5.6	1.7 ± 3.9	25	3.9 ± 9.1	8.8 ± 8.6	0.36	-8.0	-3.5	-9.1	-12.6	5.7
7	Port Ban A	470	4.2 ± 3.0	0.03 ± 0.02	35.8 ± 102	1.6 ± 1.7	27	3.5 ± 3.8	11.1 ± 0.6	0.89	-8.0	-3.6	-9.3	-12.9	5.9
8	Port Ban B	470	4.3 ± 3.2	0.06 ± 0.01	531 ± 630	0.3 ± 0.2	15	1.1 ± 0.6	10.8 ± 1.4	0.23	-8.0	-3.4	-8.8	-12.2	4.7
9	Stotfield Bay E	470	2.8 ± 1.9	0.6 ± 0.2	1.0 ± 0.4	4.4 ± 1.0	27	9.5 ± 2.1	7.4 ± 0.3	0.92	-8.0	-2.9	-8.0	-10.9	4.4
10	Stotfield Bay J	470	2.8 ± 1.9	2.5 ± 0.8	0.4 ± 0.1	8.3 ± 3.6	25	19.7 ± 8.4	7.4 ± 0.3	0.92	-8.0	-2.6	-7.4	-10.0	3.8
11	Stotfield Bay H	470	2.8 ± 2.1	0.1 ± 0.4	0.4 ± 1.9	10.3 ± 10.1	21	28.6 ± 28.1	6.9 ± 0.9	0.64	-8.0	-3.3	-8.6	-11.9	5.8
12	Stotfield Bay A	470	3.7 ± 2.7	1.4 ± 0.2	3.9 ± 2.0	7.1 ± 2.0	11	35.7 ± 10.0	9.6 ± 0.8	0.85	-8.0	-2.7	-7.3	-10.0	4.1
13	Stotfield Bay W	470	2.6 ± 1.9	1.2 ± 0.4	0.7 ± 0.3	6.3 ± 1.7	27	13.7 ± 3.7	6.5 ± 0.8	0.78	-8.0	-2.8	-7.7	-10.5	4.1
14	Rubha Cill Maluaig	470	4.1 ± 2.9	1.8 ± 0.1	16.3 ± 23.1	14.9 ± 7.2	17	51.1 ± 24.6	11.0 ± 0.3	0.99	-8.0	-2.7	-7.4	-10.0	4.3
15	Port Cill Maluaig A	470	3.7 ± 2.6	0.6 ± 0.3	4.8 ± 4.7	3.7 ± 2.7	23	9.5 ± 6.8	9.6 ± 0.6	0.74	-8.0	-2.9	-8.0	-10.9	4.4
16	Port Cill Maluaig B	470	5.0 ± 3.5	0.4 ± 0.1	0.6 ± 0.3	22.1 ± 3.2	23	56.5 ± 8.3	13.3 ± 0.5	0.94	-8.0	-3.0	-8.1	-11.1	5.3
17	Port Cill Maluaig C	470	14.2 ± 10.6	0.7 ± 0.4	1.8 ± 0.8	5.0 ± 0.1	23	12.7 ± 0.1	35.7 ± 4.5	0.94	-8.0	-2.9	-7.9	-10.7	4.3
18	Lochead	470	5.5 ± 4.5	0.03 ± 0.08	0.09 ± 0.15	62.5 ± 24.3	25	148 ± 58	12.7 ± 3.6	0.61	-8.0	-3.5	-9.3	-12.8	7.5
19	Rubha Garbh	470	6.3 ± 4.6	0.006 ± 0.002	0.3 ± 0.2	25.7 ± 0.3	30	51.8 ± 8.6	16.2 ± 1.4	0.57	-8.0	-3.9	-10.1	-14.0	8.2
20	Point of Knap 1	470	4.0 ± 3.2	0.6 ± 0.5	0.8 ± 1.2	7.4 ± 6.9	25	17.5 ± 16.3	9.3 ± 2.3	0.77	-8.0	-2.9	-8.0	-10.9	4.6
21	Point of Knap 2	470	4.6 ± 3.6	0.1 ± 0.2	5.4 ± 8.1	1.2 ± 1.4	25	2.8 ± 3.4	11.2 ± 2.2	0.82	-8.0	-3.2	-8.6	-11.9	4.8
22	Bagh an Doide A	440	8.0 ± 5.4	0.13 ± 0.04	0.3 ± 0.1	49.5 ± 5.6	25	117 ± 13	14.2 ± 0.5	0.95	-8.1	-3.3	-8.8	-12.1	6.7
23	Bagh an Doide B	440	8.0 ± 5.5	0.027 ± 0.002	19.4 ± 12.0	1.9 ± 0.5	25	4.5 ± 1.1	14.2 ± 0.5	0.90	-8.1	-3.5	-9.2	-12.7	6.3
24	Port Ellen PR	470	3.4 ± 2.5	1.8 ± 0.8	19.6 ± 44.1	5.1 ± 1.7	25	12.1 ± 4.0	8.8 ± 0.8	0.91	-8.0	-2.7	-7.5	-10.2	3.8
25	Port Ellen GJ	470	3.6 ± 2.5	0.11 ± 0.02	1754 ± 1576	0.17 ± 0.02	25	0.39 ± 0.04	9.4 ± 0.4	0.96	-8.0	-3.3	-8.7	-12.1	4.2
26	Port Ellen NO	470	4.8 ± 3.7	18.2 ± 7.3	0.3 ± 0.1	18.7 ± 3.5	25	44.3 ± 8.2	12.0 ± 1.8	0.75	-8.0	-2.2	-6.5	-8.7	2.8
27	Port Ellen MK	470	4.3 ± 3.2	4.0 ± 1.3	2.5 ± 2.9	10.3 ± 4.1	25	24.4 ± 9.7	11.0 ± 1.2	0.91	-8.0	-2.5	-7.2	-9.7	3.6
28	Port Ellen LD	470	3.0 ± 2.1	0.2 ± 0.1	15.2 ± 12.7	4.6 ± 0.3	25	10.9 ± 0.8	8.0 ± 0.2	0.97	-8.0	-3.1	-8.4	-11.5	5.0
29	Port Ellen IE	470	3.8 ± 3.0	0.8 ± 0.4	0.6 ± 0.6	11.7 ± 6.3	25	27.7 ± 15.0	8.9 ± 2.0	0.74	-8.0	-2.9	-7.9	-10.8	4.7
30	Port Ellen AC	470	2.8 ± 1.9	7.1 ± 1.7	1.5 ± 0.5	4.0 ± 1.0	25	9.4 ± 2.3	7.5 ± 0.0	0.96	-8.0	-2.4	-6.9	-9.3	2.8
31	Jura 9	500	3.6 ± 2.9	0.2 ± 0.1	48.1 ± 54.3	0.3 ± 0.2			9.2 ± 1.2	0.70	-7.9	-3.2	-8.9	-12.0	4.0
32	Jura 10	500	4.3 ± 3.5	0.2 ± 0.2	6.5 ± 9.4	1.0 ± 0.4			11.0 ± 1.3	0.75	-7.9	-3.1	-8.8	-11.9	4.4
33	Jura 11	500	3.8 ± 3.2	0.08 ± 0.01	73.8 ± 46.2	0.2 ± 0.1			9.7 ± 1.5	0.84	-7.9	-3.3	-9.1	-12.4	3.3
Mean (all data)		4.5 ± 2.3	2.4 ± 1.5	79 ± 179	9.0 ± 3.4	18.0 ± 6.9		10.8 ± 1.5		-2.6 ± 0.4	-7.7 ± 0.3	-10.4 ± 0.7	3.8 ± 0.7		
Mean (filtered data)		4.4 ± 1.8	3.4 ± 1.6	86 ± 187	8.3 ± 1.9		15.4 ± 3.5	10.8 ± 0.9		-2.6 ± 0.2	-7.3 ± 0.2	-10.2 ± 0.4	3.6 ± 0.1		

Table DR1. Best fit and calculated parameters for metabasaltic sills 1-33, which are located in figure 1. T is the temperature of metamorphism in degrees Celsius (used when calculating K_v and D) from Skelton et al. (1995). K_v is the volumetric partition coefficient for CO_2 between the rock and fluid. The Peclet number (N_{Pe}), Damköhler number (N_D), 1-dimensional time-integrated fluid flux ($\omega\phi t(1D)$) and maximum modal calcite (C_{max}), which were obtained for the best fit of equation [3] to modal calcite data, are shown. The 3-dimensional time-integrated fluid flux ($\omega\phi t(3D)$) was calculated from $\omega\phi t(1D)$ and α , which is the angle between the regional 3-D fluid flow vector (calculated by Skelton et al. (1995)) and the sill margin. The coefficient of multiple determination (R^2) which was calculated using the computer program DATAFIT (Oakdale Engineering), provides an indication of the goodness-of-fit ($R^2=1$ denotes a perfect fit). The logarithms of diffusivity (D), time-averaged porosity (ϕ), time-averaged fluid velocity (ω), time-averaged fluid flux ($\omega\phi$) and the timescale of metamorphic fluid flow (t), which were calculated using equations [5] and [11], are shown. Standard deviations on fitted parameters were calculated using the computer program DATAFIT. Large errors on N_D occur for sharp fronts. This is because, for a sharp front, a small shift in the position of the fitted curve will cause a large shift in N_D . Mean estimates of fitted and calculated parameters are shown for all data and filtered data. Omitted data are shown in italics. These had $R^2 < 0.65$ and/or standard deviations greater than estimated values of N_{Pe} or $\omega\phi t$. No significant difference is seen between mean estimates based on filtered data and estimates based on all data. Confidence intervals (95%) for mean estimates were calculated from the summed variance of the fitted values and the number of data points. Confidence intervals of the calculated parameters were obtained by propagating these errors through the entire calculation.