TABLES

Table 1. GPS location, mineralogy from XRD analysis, and density by the Archimedean method.

Sample	UTM coordinates	Mineralogy (wt.%); thickness for LFA	R_{WP}	Density (kg m^{-3})
JM14-ON-14 anorthosite	16T 0366856, 5332552	Plagioclase (92.1%), Clinozoisite (4.2%), Hornblende (3.7%) L = 0.539 mm	15.95	2707 ± 4
JM16-ON-12 carbonatite	16T 0673569, 5318391	Dolomite (~100%) L= 1.42 mm	14.88	2848 ± 38
JM16-ON-07 chloritized carbonatite	16T 0673567, 5318240	Dolomite (74.3%), Chlorite (22.7%), Goethite (3.0%) L =0.526 mm	18.83	2892 ± 10
JM16-ON-11 iron-rich carbonatite	16T 0673524, 5318258	Dolomite (45.6%), Hematite (25.4%), Goethite (15.1%), Barite (11.8%), Chlorite (2.2%) L=0.652 mm	15.15	3198 ± 62
JM16-ON-13 altered tonalite	16T 0673976, 5318240	Plagioclase (41.3%), Quartz (35.0%), Mica* (12.9%), Clinozoisite (10.9%) L = 1.255 mm	15.30	2701 ± 14

Notes: R_{WP} is the value describing the difference between observed and calculated peaks by use of the Rietveld structure refinement process for XRD analysis. L is the thickness of samples studied using LFA.

*Microprobe analysis (see below) revealed that the sample has muscovite with substantial Fe. However, the XRD data may have chlorite, which affects the proportion of the mafic minerals.

Table 2. Bulk rock compositions

Wt.% oxides	JM14-ON-14 anorthosite	JM16-ON-12 carbonatite	JM16-ON-11 chloritized carbonatite	JM16-ON-07 Fe-rich carbonatite	JM16-ON-13 altered tonalite
SiO_2	47.72	0.06	1.02	8.69	69.11
TiO_2	0.038	0.018	0.011	2.946	0.437
Al_2O_3	31.23	0.04	0.28	4.79	13.91
Fe_2O_3	0.87	5.20	45.42	14.11	4.75
MnO	0.008	0.657	0.815	0.434	0.07
MgO	0.28	18.94	7.08	13.87	1.36
CaO	16.15	29.75	12.27	20.9	4.36
Na_2O	2.39	0.05	0.01	0.04	4.42
K_2O	0.04	< 0.01	< 0.01	0.15	0.36
P_2O_5	< 0.01	0.24	1.21	1.46	0.11
LOI	0.69	43.45*	18.58*	29.28*	1.56
Total	99.42	98.41	86.70	96.67	100.45
C (wt.%)	na	12.4	4.92	7.67	0.08
Ba (ppm)	30	681	70620	520	258
Sr (ppm)	244	6847	1900	1410	199
La (ppm)	0.8	111	> 2000	768	26
Ce (ppm)	1.4	252	> 3000	1850	54.1
Pr (ppm)	0.14	28.6	> 1000	271	6.15
Nd (ppm)	0.6	113	> 2000	1330	23.8
Th (ppm)	< 0.1	20.7	623	382	8.9
U (ppm)	< 0.1	1.3	10.9	6.5	1.6
A_{rad} (μWm^{-3})	0.00156	1.91	55.6	30.8	1.05

Notes: determined by fusion ICP-OES, except Th and U by fusion ICP-MS, and carbon from combustion spectroscopy. LOI is loss on ignition, which ideally should be 47 wt% for end-member dolomite. A_{rad} is calculated present-day radiogenic heat production calculated after Turcotte and Schubert (2014). na = not analyzed. MnO and Ti_2O have more digits because of high sensitivity. The following elements were below the detection limits: Sc, Be, V, Y, Zr, Cr, Co, Ni, Cu, Zn, Ga, Ge, As, Rb, Nb, Mo, Ag, In, Sn, Sb, Cs, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Hf, Ta, W, Tl, Pb, and Bi.

Table 3. Microprobe data for minerals. All values reported as weight percent, with CO_2 values calculated from dolomite stoichiometry. Abbreviations na indicates not analyzed, bd indicates below detection.*indicates water contents obtained by difference. Other water contents were defined as indicated, which yielded reasonable mineral formulae.

	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	CO_2	H_2O	Total
JM14-ON-14													
Bytownite	48.48	bd	34.20	0.04	bd	0.02	16.22	2.48	0.01	bd	na	na	101. 5
Hornblende	43.51	1.24	12.76	17.45	0.11	9.28	11.77	1.09	0.44	0.01	na	1.75	99.5
Clinozoisite	38.01	0.04	25.57	10.22	0.11	0.01	23.71	bd	bd	0.03	na	1.75	99.5
JM16-ON-12													
Dolomite	bd	bd	0.05	2.21	0.61	20.72	29.99	0.02	bd	0.00	47.00	na	100.6
JM16-ON-07													
Ankerite	bd	bd	0.22	8.08	0.82	14.97	29.79	0.01	bd	0.01	45.78	na	99.7
Chlorite	28.34	0.03	16.76	27.87	0.02	13.47	0.12	bd	0.01	bd	na	10.75	97.4
JM16-ON-11													
Dolomite	bd	bd	0.02	1.73	0.63	20.63	29.57	0.04	0.00	0.03	47.26	na	99.9
Goethite	2.08	bd	0.95	83.76	0.33	bd	0.10	0.02	0.01	0.09	na	12.7*	100
Limonite	1.77	bd	2.27	73.79	0.23	0.48	0.03	0.10	bd	0.02	na	21.3*	100
JM16-ON-13													
Quartz	101.60	bd	0.06	bd	bd	0.01	bd	bd	bd	bd	na	na	101.7
Oligoclase	62.79	0.01	24.52	0.01	bd	0.02	4.90	9.26	0.06	bd	na	na	101.6
Muscovite	47.13	0.10	32.71	2.22	0.01	1.71	0.06	0.26	10.98	bd	na	4.0	99.2

Table 4. Heat capacity measurements in J $g^{-1}K^{-1}$ by differential scanning calorimetry. Temperature in K. Italicized data were not used in fitting equations.

anorthosite		carbonatite		chloritized carbonatite		Fe-rich carbonatite		altered tonalite	
T	C_P	T	C_P	T	C_P	T	C_P	T	C_P
288	0.774	288	0.847	287	0.715	289	0.812	288	0.729
312	0.818	313	0.851	312	0.783	314	0.862	313	0.774
337	0.863	337	0.872	337	0.804	339	0.915	338	0.812
362	0.901	362	0.897	362	0.827	364	0.927	363	0.845
387	0.935	387	0.922	387	0.842	389	0.934	388	0.873
412	0.966	412	0.946	412	0.852	414	0.952	413	0.898
437	0.991	437	0.969	437	0.868	439	0.969	438	0.921
462	1.015	462	0.989	462	0.882	463	0.986	463	0.944
487	1.035	487	1.011	487	0.897	489	1.004	488	0.964
512	1.054	513	1.034	512	0.913	514	1.019	513	0.982
537	1.069	537	1.044	537	0.923	539	1.041	538	0.999
562	1.083	563	1.045	*562*	*0.870*	564	1.051	563	1.013
587	1.096	587	1.093	*587*	*0.825*	588	1.063	588	1.027
612	1.109	613	1.090	*612*	*0.999*	614	1.072	613	1.044
637	1.120	638	1.104	*637*	*1.029*	638	1.089	638	1.063
662	1.136	663	1.095	*662*	*0.947*	664	1.107	663	1.075
687	1.145	*688*	*1.166*	*687*	*0.980*	688	1.130	688	1.073
712	1.160	*713*	*1.202*	*712*	*0.990*	713	1.141	713	1.074
737	1.187	*738*	*1.173*	*737*	*0.990*	*738*	*1.116*	738	1.070
762	1.209	*763*	*1.119*	*762*	*1.046*	*763*	*1.010*	*763*	*1.142*
787	1.219	*788*	*1.112*	*787*	*1.099*	*788*	*0.782*	*788*	*1.098*
812	1.216	*813*	*1.180*	*812*	*1.091*	*813*	*0.740*	*813*	*1.056*
837	1.213	*838*	*1.152*	*837*	*1.073*	*838*	*1.559*	*838*	*0.952*
862	*1.080*	*862*	*1.089*	*862*	*1.055*	*863*	*1.064*	*863*	*1.120*

Table 5. Thermal diffusivity measurements by laser-flash analysis.

anorthosite no. 1		anorthosite no. 2		carbonatite		chloritized carbonatite		Fe-rich carbonatite		altered tonalite	
T (K)	*D* mm^2s^{-1}	*T* (K	*D* mm^2s^{-1}	*T* (K)	*D* mm^2s^{-1}	*T* (K)	*D* mm^2s^{-1}	*T* (K)	*D* mm^2s^{-1}	*T* (K)	*D* mm^2s^{-1}
298	0.715	295	0.760	295	1.277	296	0.968	295	1.001	295	1.810
368	0.644	336	0.712	335	1.132	335	0.883	335	0.885	335	1.578
		382	0.667	377	1.014	377	0.817	377	0.799	377	1.422
		428	0.637	429	0.887	423	0.759	429	0.705	426	1.239
		480	0.615	480	0.793	475	0.708	480	0.634	476	1.096
		532	0.598	527	0.720	543	0.678	525	0.578	526	0.968
		588	0.580	583	0.650	606	0.661	588	0.517	583	0.848
		659	0.560	648	0.559	671	0.627	648	0.475	644	0.769
		727	0.540	716	0.503	731	0.604	715	0.440	713	0.681
		797	0.533	777	0.458	796	0.584	778	0.404	774	0.624
		877	0.524								
		977	0.516								
		1077	0.517								
		1176	0.501								
		1276	0.462								

* The accuracy is 2-3% for each point, due to uncertainties mostly in determining thickness. Because this contribution to the experimental error is a constant, the temperature derivatives for each sample are more accurate , and so three digits are reported.

Table 6. Fits to C_P (J g^{-1} K^{-1}), D (mm^2 s^{-1}), and calculated K (W m^{-1} K^{-1}).). Properties for tonalite and granulite are from Merriman et al. (2013), who use a four parameter fit for their heat capacity data where the fourth term is o$T^{(-1/2)}$.

	anorthosite	carbonatite	chloritized carbonatite	Fe-rich carbonatite	granite	tonalite	granulite
				$C_p = a + bT + cT^{-2} + oT^{(-1/2)}$			
a	0.9499	0.8551	0.8377	0.9356	0.9232	1.633	1.618
b	0.0003713	0.0004413	0.0004454	0.00009002	0.0002876	-0.0000438	-0.0000210
c	-23731	-14761	-11405	-19128	-23568	0.000008999	0.000008999
o	-	-	-	-	-	-15.18	-14.05
RMSD	0.00723	0.00899	0.00939	0.00798	0.00800	-	-
				$D = d + (fe^{-T/g})$			
d	0.4178	0.2887	0.5732	0.3198	0.4254	0.558	0.593
f	1.088	2.839	2.025	2.335	4.507	7.862	2.773
g	236.7	277.6	179.2	238.2	248.6	176.5	171.8
RMSD	0.000451	0.00621	0.00879	0.00381	0.00795	-	-
				$D = hT^j$			
h	11.84	467.8	16.75	212.5	948.4	-	-
j	-0.4920	-1.036	-0.5068	-0.9421	-1.099	-	-
RMSD	0.00630	0.0121	0.0178	0.00343	0.0146	-	-
				$k = mT^n$			
m	2.213	138.4	5.752	101.5	181.0	-	-
n	-0.05887	-0.6703	-0.1621	-0.6552	-0.6806	-	-
RMSD	0.0231	0.0557	0.0390	0.0360	0.0952	-	-

Notes: The number of places reported are those needed to reproduce the data.

Table 7. Surface heat flow values in mW m^{-2}.

	Model A	Model B	Model C	Model D
Tonalite Minimum	57.1	59.6	56.7	58.0
Tonalite Maximum	97.9	122.8	58.2	63.1
Intrusion Minimum	61.0	76.4	42.4	32.3
Intrusion Maximum	65.1	80.6	42.5	34.5