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7. Data Report: Chemical Composition of Minerals from a Lava Pond, ODP Site 1256 (Leg 206)[1]

Christine Laverne,[2] Paola Tartarotti,[3] Olivier Grauby,[4] and Anthony Charles Siantonas[5]

INTRODUCTION

At Ocean Drilling Program Site 1256 (6°44.2′N, 91°56.1′W), during Leg 206, a thick massive unit was cored in two neighboring penetrations of the uppermost basement, Holes 1256C and 1256D. This thick massive lava flow, commonly referred to as the "Lava Pond," is identified as Unit 18 (>30 m thick) in Hole 1256C and Unit 1 (>74.2 m thick) in Hole 1256D (Wilson et al., 2003). In the coarse-grained basalt that comprises this lithological unit, low-temperature "background" alteration events are present. This report provides microprobe analyses of both primary and secondary minerals present in this massive lava pond. The analyses of typically magmatic minerals (titanomagnetite, plagioclase, and clinopyroxene) are given for comparison with secondary minerals.

Analytical Methods

This report is based on the study of thin sections from 27 and 44 samples from the massive unit of Holes 1256C and 1256D, respectively. Electron microprobe (EMP) analyses of primary and secondary minerals were carried out in three laboratories. Runs B1 to B5 (see Tables T1–T8) were conducted at the Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER; Brest, France) on a Cameca SX50 with correc-

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[2] Laboratoire de Pétrologie Magmatique, Case 441, Faculté des Sciences et Techniques, Université Paul Cézanne Aix-Marseille III, Avenue Escadrille Normandie Niemen, 13397 Marseille Cedex 20, France.
christine.laverne@univ-cezanne.fr
[3] Dipartimento di Scienze della Terra, Università degli Studi di Milano via Mangiagalli, 34-20133 Milano, Italy.
[4] CRMCN-CNRS, Campus de Luminy, Case 913, 13288 Marseille Cedex, France.
[5] 416 The Little Boltons, London SW10 9LP, United Kingdom.

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tion program ZAF (Pouchou and Pichoir, 1985). Operating conditions were as follows:

Accelerating voltage = 15 kV;
Specimen current = 15 nA;
Spot size = 1 µm; and
Count time = 6 s.

Runs P1 to P3 were conducted at Paris VII University on a Cameca SX50 (runs P1 and P2) and SX100 (run P3). Operating conditions were as follows:

Accelerating voltage = 15 kV;
Specimen current = 10 nA;
Spot size = 10 µm; and
Count time = 10 s.

The precision of the method used is <0.5% of the measured concentration. Runs M-oct, M-nov, and M-dec were performed on a scanning electron microscope (SEM) Cambridge System Stereoscan 360, equipped with energy dispersive spectrometry (EDS), at the Consiglio Nazionale delle Ricerche (CNR)-Department of Earth Sciences (Milano University). The correction program used is ZAF4 (Pouchou and Pichoir, 1985). Operating conditions were as follows:

Accelerating voltage = 20 kV;
Working distance = 25 mm;
Probe beam = 400 pA; and
Count time = 50 s.

RESULTS

Titanomagnetite

Titanomagnetite compositions are reported in Table T1. They show variations in TiO_2 and FeO_t proportions. Minor amounts of Al_2O_3 and MgO may indicate silicate inclusions or pollution of the analyses by surrounding silicates.

T1. Titanomagnetite composition, p. 8.

Apatite

Apatite is very common in the lava pond cored at Site 1256. It occurs as very thin needlelike crystals mainly located in late magmatic granophyric areas. Chemical analyses of apatite (Table T2) show significant amounts of Cl (1.3 wt%).

T2. Apatite composition, p. 9.

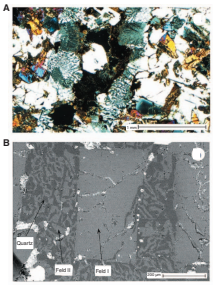
Primary and Secondary Feldspars

Secondary feldspars in the lava pond occur either as replacement of magmatic plagioclase or associated with quartz as granophyric assemblages in interstitial areas and veins and at the contact between the basalt groundmass and late magmatic veins. Their chemical compositions are given in Table T3, which include both EMP and SEM-EDS analyses. Although usually considered as semiquantitative, SEM-EDS analyses, integrated with backscattered images, were necessary to discriminate the

T3. Feldspar composition, p. 10.

mineral phases composing micrographic textures and to detect the corresponding chemical compositions (Fig. F1). Primary plagioclase composition ranges from An_{31} to An_{68}. Feldspar replacing magmatic plagioclase is either albite or K-feldspar in Hole 1256C. Both K and Na-feldspar occur in Hole 1256C in granophyric areas ($Or_{25–68}$ and $An_{0–49}$, respectively), whereas no K-feldspar was observed in Hole 1256D ($An_{1–35}$).

F1. Late magmatic vein, p. 6.



Primary and Secondary Clinopyroxenes

Secondary clinopyroxene is present in small amounts in about half of the samples from the lava pond. Two main modes of occurrence were observed: (1) as thin (0.05 mm) light green rims grown syntaxially on wallrock augite, along the walls of phyllosilicate or quartz-alkali feldpars veins, or (2) as total or partial replacement of magmatic augite when adjacent to large interstitial granophyric quartz-alkali feldpars intergrowths independent of veins. Secondary clinopyroxene is irregularly distributed with depth.

Green secondary clinopyroxene is FeO_t richer than magmatic augite (17–27 wt% and 12–20 wt% respectively; Table T4) and plots within the fields of ferroaugite, ferrosalite, and hedenbergite in the system $Ca_2Si_2O_6$-$Mg_2Si_2O_6$-$Fe_2Si_2O_6$. Some of these analyses plot in the field of aegirine-augite in the system $Ca(Mg,Fe^{2+})Si_2O_6$-$NaAlSi_2O_6$-$NaFe^{3+}Si_2O_6$. From comparison with similar occurrences of green pyroxene in DSDP/ODP Hole 504B, we propose a deuteric origin for the Site 1256 green clinopyroxene (Laverne, 1987).

T4. Clinopyroxene composition, p. 12.

Amphiboles

A single occurrence of amphibole is recorded in the Site 1256 pond. It occurs in contact with (and later than) secondary green clinopyroxene. This amphibole is particularly Fe rich (~30–34 wt%; Table T5) and plots in the field of ferro-actinolite and grunerite. We interpret it as deuteric.

T5. Amphibole composition, p. 14.

Phyllosilicates

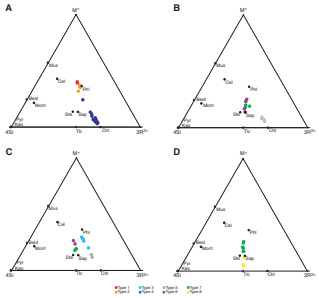
Phyllosilicates are the dominant secondary minerals in the lava pond. Brown micas, easily identified by optical features and chemical compositions, occur in small amounts, mostly associated with quartz-alkali feldspars granophyric areas. Both biotite (Type 1; FeO_t = 25.7–27.3 wt% and TiO_2 = 5.0–6.8 wt%) and phlogopite (Type 2; FeO_t = 14.8–16.5 wt% and TiO_2 = 1.6–2.8 wt%) compositions are reported (Table T6). Both types of brown mica are interpreted to be as late magmatic.

T6. Brown mica composition, p. 15.

Chemical compositions of other brown and green phyllosilicates are presented in a separate table (Table T7) because further analyses by complementary methods (e.g., XRD) are required to more definitively characterize these minerals. Nevertheless, a preliminary classification of these phyllosilicates has been established on the basis of their optical features and M^+ (= Na^+ + K^+ + 2Ca) – 4Si – $3R^{2+}$ (= Fe^{2+} + Mg^{2+} + Mn^{2+}) components (Fig. F2), following the calculation of structural formulas on the basis of 14 oxygens for chlorite and 11 oxygens for other minerals with all Fe considered as Fe^{2+} (see Table T7).

T7. Phyllosilicate composition, p. 16.

F2. Chemical classification of phyllosilicates, p. 7.



1. Type 3 is identified as a mixture or a mixed-layer chlorite/mica with a significant amount of mica (≥50% mica).

2. Type 4 is thought to be a chlorite/vermiculite or chlorite/mica mixture or mixed layered but with a greater abundance of chlorite than type 3 (≥50% chlorite).
3. Type 5 is identified as chlorite/vermiculite or chlorite/smectite mixtures (60%–40% chlorite).
4. Type 6 indicates a vermiculite-rich chlorite/vermiculite or smectite/vermiculite mixture (10%–90% vermiculite).
5. Type 7 is tentatively identified as a smectite/vermiculite mixture (10%–90% smectite).
6. Types 8 and 9 are talc/smectite and talc, respectively.

Types 5, 6, and 7 are the most common and abundant phyllosilicates in the lava pond.

The distribution of the various phyllosilicates show some variations with depth. Types 8 and 9 are restricted to the top and the bottom of the pond. The amount of type 5 decreases and the amounts of types 6 and 7 increase with depth. Further work is necessary to confirm these initial mineral classifications to determine the cooling and fluid circulation history of the Site 1256 lava pond.

Calcium Carbonates

Calcium carbonates are rare and not abundant in the lava pond. Analyzed calcite contains significant amounts of MnO (2 wt%; Table T8).

T8. Calcium carbonates, p. 18.

POSSIBLE IMPLICATIONS

Felsic veins and felsic interstitial areas from the Site 1256 lava pond are composed of quartz, alkali feldspar, apatite, Fe-rich clinopyroxene, and minor brown micas. Similar felsic veins have not been yet reported in oceanic basalts but occur in oceanic gabbros (e.g., DSDP/ODP Hole 735B; Natland and Dick, 2002), where they represent an end product of magmatic differentiation. Similarly, the above-mentioned minerals from Site 1256 are interpreted as late magmatic, whereas other secondary minerals are most probably the result of later low-temperature water-rock interactions.

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Figure F1. A. Photomicrograph of late magmatic vein (Sample 206-1256C-9R-5, 125–128 cm) (cross-polarized). **B.** Backscattered image of detail from inside A. Magmatic plagioclase phenocryst (Feld I = An_{70}, Ab_{30}) is in contact with granophyric feldspar (Feld II = An_{30}, Ab_{66}, Or_2) + quartz (qtz) symplectites.

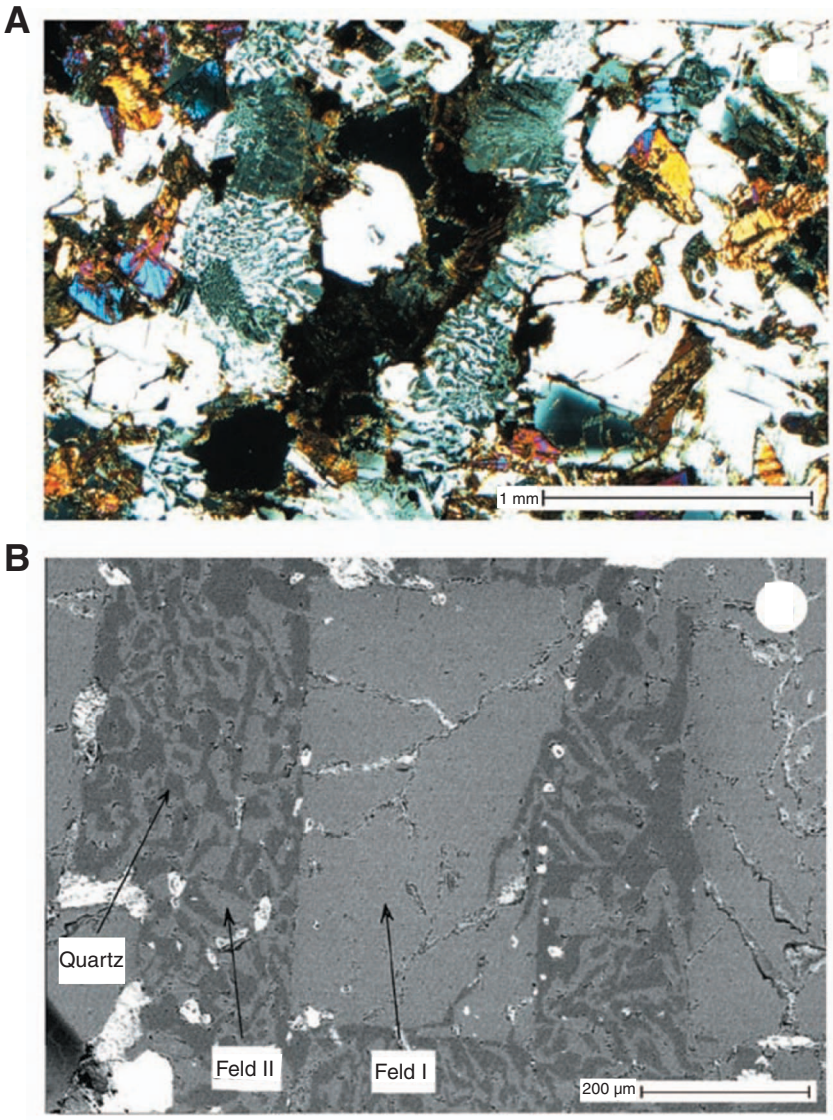

Figure F2. Ternary diagram for the chemical classification of phyllosilicates, after Meunier and Velde (1989), applied to some examples from the Hole 1256D lava pond. Vertices are defined as M+ (= Na + K + Ca), 4Si, and $3R^{2+}$ (= Fe^{2+} + Mg^{2+} + Mn^{2+}). **A.** Sample 206-1256C-10R-1, 50–54 cm. **B.** Sample 206-1256D-4R-1, 93–96 cm. **C.** Sample 206-1256D-7R-3, 24–28 cm. **D.** Sample 206-1256D-12R-8, 62–68 cm. Abbreviations of end-members: Beid = beidellite, Cel = celadonite, Chl = chlorite, Kao = kaolinite, Mont = montmorillonite, Mus = muscovite, Phl = phlogopite, Pyr = pyrophyllite, Sap = saponite, Ste = stevensite, Tlc = talc. See text for definitions of Types 1–8.

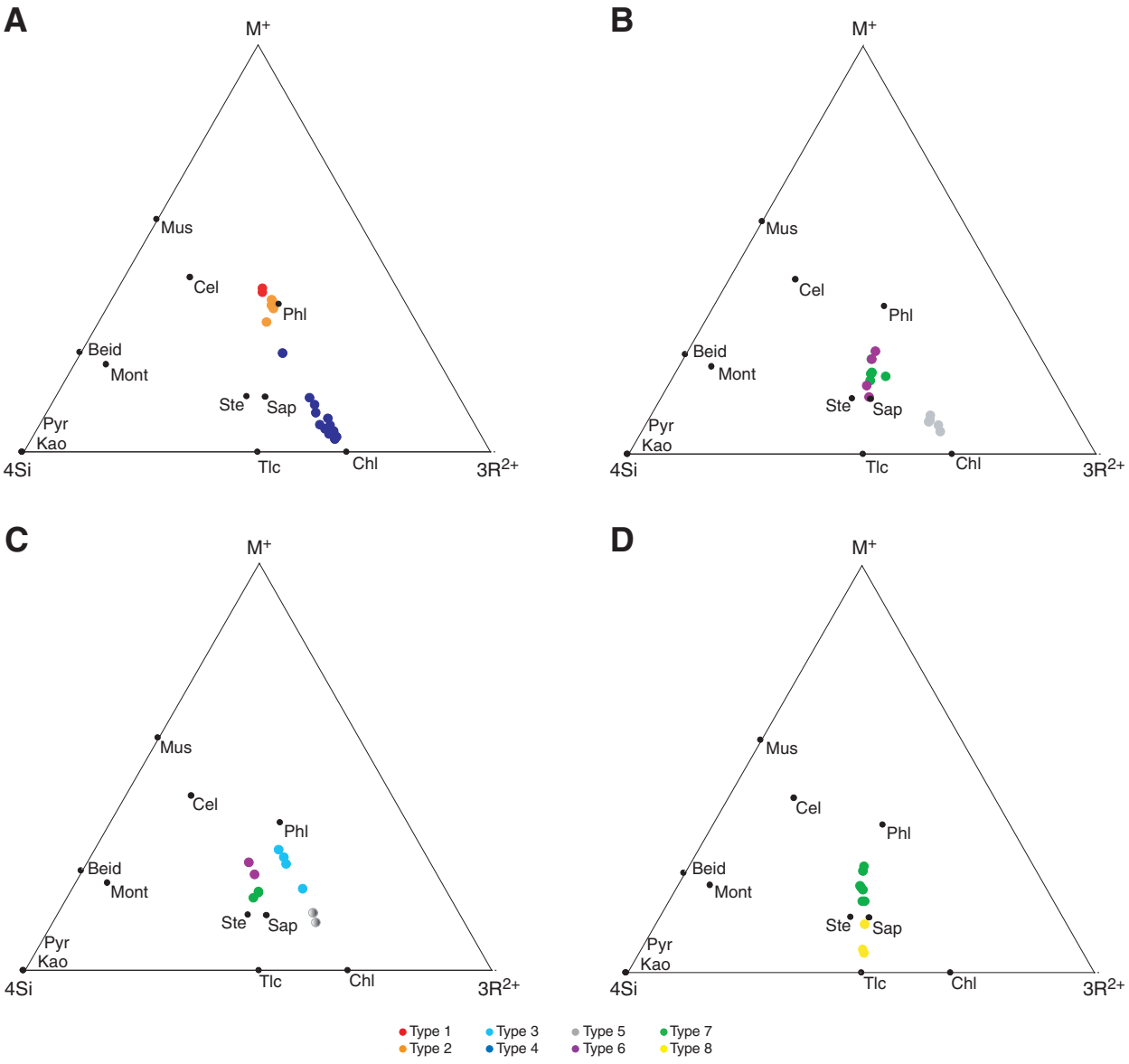

Table T1. Titanomagnetite composition, Site 1256 lava pond.

Core, section, interval (cm)	Depth (mbsf)	Run number	Analysis number	Major element oxides (wt%)											
				SiO_2	TiO_2	Al_2O_3	CaO	Na_2O	K_2O	FeO	MgO	MnO	P_2O_5	Cr_2O_3	Total
206-1256C-															
9R-4, 134–138	290.04	B3	33	0.04	20.91	1.10	0.00	0.00	0.06	73.25	0.29	0.82	0.00	0.07	96.54
9R-4, 134–138	290.04	B3	34	0.00	17.57	0.79	0.00	0.02	0.00	76.56	0.20	0.41	0.00	0.16	95.70
9R-4, 134–138	290.04	B3	83	0.05	16.47	1.09	0.01	0.01	0.00	75.91	0.21	0.72	0.01	0.01	94.49
9R-7, 89–93	293.98	P1	41	0.40	16.32	0.51	0.58	0.04	0.00	73.56	0.33	1.30	0.10	NA	93.14
9R-7, 89–93	293.98	P1	49	0.40	18.19	0.85	0.11	0.01	0.01	74.93	0.40	1.13	0.01	NA	96.04
10R-1, 50–54	294.40	B3	95	0.13	34.96	0.94	0.02	0.00	0.03	58.73	0.52	0.50	0.00	0.07	95.90
10R-1, 50–54	294.40	B3	132	0.05	50.16	0.00	0.05	0.04	0.00	47.21	0.64	0.71	0.01	0.01	98.88
10R-1, 50–54	294.40	B3	133	0.07	22.34	1.11	0.02	0.01	0.00	71.27	0.30	0.64	0.03	0.00	95.80
10R-1, 50–54	294.40	B3	183	0.00	50.96	0.02	0.10	0.04	0.00	45.01	1.32	0.55	0.00	0.14	98.14
206-1256D-															
4R-1, 89–92	285.99	B3	150	0.00	23.96	1.10	0.04	0.09	0.00	68.68	0.39	0.68	0.00	0.08	95.03
4R-1, 89–92	285.99	B3	151	0.31	21.77	1.37	0.00	0.04	0.00	71.87	0.42	0.77	0.00	0.01	96.55
4R-1, 89–92	285.99	B3	167	0.03	50.88	0.00	0.10	0.00	0.00	47.87	0.21	0.48	0.00	0.00	99.58

Notes: NA = not analyzed. Run numbers: B3 = IFREMER, P1 = Paris VII University.

Table T2. Apatite composition, Site 1256 lava pond.

Core, section, interval (cm)	Depth (mbsf)	Run number	Analysis number	Major element oxides (wt%)												
				SiO_2	TiO_2	Al_2O_3	CaO	Na_2O	K_2O	FeO	MgO	MnO	P_2O_5	Cl	Cr_2O_3	Total
206-1256C-																
10R-3, 13–16	296.93	B1	106	0.32	0.00	0.02	54.11	0.06	0.00	0.90	0.06	0.32	41.93	1.30	0.00	99.02
206-1256D-																
4R-1, 89–92	285.99	B3	154	0.35	0.00	0.02	54.98	0.01	0.00	0.88	0.05	0.16	43.01	NA	0.07	99.54
4R-1, 89–92	285.99	B3	155	0.24	0.00	0.01	55.26	0.03	0.03	0.76	0.08	0.10	43.15	NA	0.05	99.73

Notes: NA = not analyzed. Run numbers: B1 and B3 = IFREMER.

Table T3. Primary and secondary feldspar composition, Site 1256 lava pond. (**See table notes.** Continued on next page.)

Core, section, interval (cm)	Depth (mbsf)	Occurrence	Type	Run number	Analysis number	Major element oxides (wt%)												An	Ab	Or
						SiO_2	TiO_2	Al_2O_3	CaO	Na_2O	K_2O	FeO	MgO	MnO	P_2O_5	Cr_2O_3	Total			
206-1256C-																				
9R-4, 134–138	290.04	Phenocryst	Magmatic	B3	50	56.45	0.01	26.47	10.23	5.39	0.10	0.58	0.08	0.06	0.04	0.02	99.43	50.9	48.5	0.6
9R-4, 134–138	290.04	Phenocryst	Magmatic	B3	81	53.53	0.08	27.80	12.33	4.53	0.07	0.63	0.17	0.00	0.06	0.00	99.19	59.8	39.8	0.4
9R-4, 134–138	290.04	Phenocryst	Magmatic	B3	82	54.12	0.12	27.46	11.99	4.74	0.05	0.74	0.18	0.00	0.06	0.04	99.49	58.1	41.6	0.3
9R-5, 54–58	290.71	Interstitial	[qz-F]	B3	16	63.86	0.00	22.07	4.01	8.74	0.70	0.29	0.04	0.04	0.00	0.04	99.79	19.4	76.6	4.0
9R-5, 54–58	290.71	Interstitial	[qz-F]	B3	17	63.24	0.00	22.63	5.19	8.60	0.38	0.36	0.01	0.00	0.00	0.00	100.42	24.5	73.4	2.1
9R-5, 54–58	290.71	Interstitial	[qz-F]	B3	18	65.05	0.04	21.78	3.59	8.99	0.96	0.44	0.00	0.04	0.00	0.00	100.89	17.1	77.5	5.4
9R-5, 125–128	291.42	Phenocryst	Magmatic	M-oct	62	54.08	0.00	26.82	11.01	5.84	0.07	0.87	0.19	0.07	NA	NA	98.95	48.6	46.6	0.4
9R-5, 125–128	291.42	Phenocryst	Magmatic	M-oct	64	56.17	0.00	26.50	9.57	6.79	0.04	0.61	0.25	0.00	NA	NA	99.92	42.1	54.1	0.2
9R-5, 125–128	291.42	Interstitial	[qz-F]	M-oct	66	59.15	0.06	24.21	6.68	8.27	0.28	0.63	0.13	0.00	NA	NA	99.42	29.5	66.0	1.5
9R-5, 125–128	291.42	Interstitial	Magmatic	M-oct	68	55.40	0.12	26.29	9.86	6.48	0.08	0.49	0.15	0.01	NA	NA	98.86	44.3	52.6	0.5
9R-5, 125–128	291.42	Phenocryst	Magmatic	M-oct	71	54.40	0.00	27.02	10.58	5.76	0.04	0.94	0.23	0.00	NA	NA	98.97	47.9	47.1	0.2
9R-5, 125–128	291.42	Interstitial	Magmatic	M-oct	78	53.58	0.00	28.00	11.93	5.68	0.00	0.85	0.20	0.00	NA	NA	100.24	51.5	44.4	0.0
9R-5, 125–128	291.42	Phenocryst	Magmatic	M-oct	82	53.76	0.08	28.11	11.57	5.80	0.00	0.75	0.13	0.14	NA	NA	100.34	50.5	45.7	0.0
9R-6, 123–126	292.89	Phenocryst	Magmatic	B1	14	56.81	0.08	25.77	9.55	5.97	0.07	0.63	0.06	0.14	0.02	0.03	99.15	46.7	52.9	0.4
9R-6, 123–126	292.89	Microcrystal	Magmatic	B1	27	58.98	0.01	24.79	7.74	6.96	0.07	0.39	0.02	0.00	0.00	0.00	98.98	37.9	61.7	0.4
9R-6, 123–126	292.89	Interstitial	[qz-F]	B1	17	66.71	0.00	19.41	1.02	8.49	4.68	0.05	0.02	0.00	0.07	0.00	100.48	4.6	70.0	25.4
9R-6, 123–126	292.89	Interstitial	[qz-F]	B1	18	65.77	0.00	18.16	0.13	3.73	12.74	0.00	0.00	0.05	0.00	0.04	100.63	0.6	30.6	68.8
9R-6, 123–126	292.89	Interstitial	[qz-F]	B1	19	64.54	0.04	18.94	1.01	3.85	9.28	0.92	0.05	0.10	0.02	0.00	98.80	5.3	36.6	58.1
9R-6, 123–126	292.89	Interstitial	[qz-F]	B1	20	60.17	0.00	24.10	7.02	7.44	0.11	0.41	0.03	0.07	0.00	0.00	99.35	34.1	65.3	0.6
9R-6, 123–126	292.89	Interstitial	[qz-F]	B1	21	60.43	0.00	24.45	7.10	7.23	0.14	0.48	0.01	0.00	0.00	0.04	99.95	34.9	64.3	0.8
9R-7, 89–93	293.98	Phenocryst	Magmatic	P1	27	53.07	0.04	28.36	12.15	4.18	0.03	0.87	0.19	0.06	0.03	NA	99.00	61.5	38.3	0.2
9R-7, 89–93	293.98	Phenocryst	r B1-27	P1	28	64.86	0.06	18.32	0.00	0.11	16.68	0.00	0.01	0.03	0.00	NA	100.09	0.0	1.0	99.0
9R-7, 89–93	293.98	Phenocryst	r B1-27	P1	29	64.79	0.02	17.90	0.06	0.10	16.65	0.11	0.01	0.00	0.00	NA	99.66	0.3	0.9	98.8
9R-7, 89–93	293.98	Phenocryst	Magmatic	P1	30	52.48	0.13	28.47	12.76	4.14	0.07	0.89	0.19	0.08	0.00	NA	99.24	62.7	36.8	0.4
9R-7, 89–93	293.98	Phenocryst	Magmatic	P1	47	54.49	0.00	27.08	11.51	5.02	0.07	0.91	0.12	0.04	0.00	NA	99.24	55.6	43.9	0.4
9R-7, 89–93	293.98	Interstitial	[qz-F]	P1	37	63.54	0.09	21.93	4.23	8.74	0.40	0.29	0.03	0.00	0.00	NA	99.27	20.6	77.1	2.3
9R-7, 89–93	293.98	Interstitial	[qz-F]	P1	38	63.97	0.00	21.84	4.07	8.57	0.44	0.27	0.02	0.02	0.02	NA	99.23	20.3	77.2	2.6
10R-1, 50–54	294.40	Microcrystal	Magmatic	B3	115	52.61	0.00	28.32	12.79	4.14	0.14	0.88	0.15	0.02	0.01	0.15	99.21	62.5	36.7	0.8
10R-1, 50–54	294.40	Phenocryst core	Magmatic	B3	134	53.08	0.04	27.58	12.34	4.61	0.07	0.93	0.09	0.03	0.00	0.16	98.94	59.4	40.2	0.4
10R-1, 50–54	294.40	Phenocryst rim	r B3-134	B3	135	58.73	0.09	24.54	7.59	7.14	0.02	0.75	0.06	0.00	0.06	0.06	99.03	37.0	62.9	0.1
10R-1, 50–54	294.40	Phenocryst	Magmatic	B3	139	53.42	0.00	27.82	12.64	4.56	0.02	0.93	0.12	0.00	0.03	0.00	99.53	60.4	39.5	0.1
10R-1, 50–54	294.40	Interstitial	[qz-F]	B3	89	67.91	0.02	18.48	0.20	6.95	6.25	0.56	0.06	0.02	0.00	0.00	100.45	1.0	62.2	36.8
10R-1, 50–54	294.40	Interstitial	[qz-F]	B3	98	69.10	0.07	19.44	0.32	11.17	0.41	0.38	0.00	0.02	0.00	0.00	100.91	1.5	96.1	2.3
10R-1, 50–54	294.40	Interstitial	[qz-F]	B3	109	65.20	0.00	17.86	0.01	0.11	17.29	0.16	0.02	0.00	0.00	0.00	100.66	0.0	1.0	99.0
10R-3, 13–16	296.93	Phenocryst	Magmatic	B1	87	53.43	0.00	28.37	12.63	4.25	0.07	0.92	0.16	0.00	0.02	0.00	99.87	61.9	37.7	0.4
10R-3, 13–16	296.93	Phenocryst	Magmatic	B1	88	51.82	0.08	28.44	13.43	4.16	0.02	0.85	0.11	0.00	0.02	0.00	99.02	64.0	35.9	0.1
10R-3, 13–16	296.93	Microcrystal	Magmatic	B1	89	57.05	0.07	25.38	9.18	6.32	0.08	0.74	0.05	0.15	0.00	0.03	99.14	44.3	55.2	0.5
10R-3, 13–16	296.93	Phenocryst core	r B1-92	B1	91	64.19	0.00	17.84	0.02	0.09	17.75	0.16	0.00	0.00	0.01	0.05	100.22	0.1	0.8	99.1
10R-3, 13–16	296.93	Phenocryst rim	Magmatic	B1	93	50.75	0.05	29.51	14.18	3.65	0.00	0.78	0.15	0.04	0.02	0.00	99.13	68.2	31.8	0.0
10R-3, 13–16	296.93	Phenocryst	Magmatic	B1	95	51.97	0.08	28.92	13.62	3.79	0.07	0.75	0.12	0.04	0.03	0.06	99.58	66.3	33.3	0.4
10R-3, 13–16	296.93	Phenocryst	r B1-104	B1	103	64.60	0.00	17.52	0.00	0.07	17.43	0.06	0.00	0.00	0.04	0.00	99.74	0.0	0.6	99.4
10R-3, 13–16	296.93	Phenocryst	Magmatic	B1	104	54.13	0.11	27.41	11.41	5.04	0.07	0.66	0.15	0.00	0.00	0.11	99.08	55.4	44.3	0.4
10R-3, 13–16	296.93	Microcrystal	Magmatic	B1	111	55.98	0.02	26.25	10.10	6.01	0.05	0.88	0.08	0.01	0.00	0.00	99.42	48.0	51.7	0.3
10R-6, 53–56	300.66	Phenocryst rim	r P2-13	P2	15	65.94	0.03	17.90	0.11	0.06	16.46	0.00	0.00	0.05	0.08	NA	100.83	0.5	0.6	98.9
11R-5, 63–66	309.85	Phenocryst	Magmatic	B2	16	53.33	0.07	27.64	12.09	4.77	0.06	0.83	0.11	0.02	0.02	0.00	98.94	58.1	41.5	0.3
11R-5, 63–66	309.85	Phenocryst	Magmatic	B2	21	57.72	0.06	25.37	9.01	6.26	0.07	0.41	0.08	0.00	0.00	0.04	99.04	44.1	55.5	0.4
11R-7, 24–28	312.28	Interstitial	[qz-F]	M-dec	14	53.32	0.23	27.80	11.28	5.75	0.20	0.92	0.00	0.09	NA	NA	99.59	49.7	45.8	1.1
11R-7, 24–28	312.28	Interstitial	[qz-F]	M-dec	25	53.82	0.19	26.90	10.69	6.14	0.09	0.87	0.07	0.00	NA	NA	98.75	47.1	49.0	0.5

Table T3 (continued).

Core, section, interval (cm)	Depth (mbsf)	Occurrence	Type	Run number	Analysis number	Major element oxides (wt%)												An	Ab	Or
						SiO_2	TiO_2	Al_2O_3	CaO	Na_2O	K_2O	FeO	MgO	MnO	P_2O_5	Cr_2O_3	Total			
11R-7, 61–64	312.65	Interstitial	[qz-F]	M-oct	2	49.79	0.10	29.73	13.66	4.36	0.13	0.85	0.18	0.00	NA	NA	98.80	60.4	34.9	0.7
11R-7, 122–125	313.26	Interstitial	[qz-F]	M-oct	46	58.51	0.00	25.10	7.32	7.61	0.44	0.55	0.17	0.01	NA	NA	99.73	32.8	61.8	2.4
11R-7, 122–125	313.26	Interstitial	[qz-F]	M-oct	50	58.87	0.13	24.22	6.92	8.26	0.39	0.70	0.18	0.07	NA	NA	99.73	29.9	64.5	2.0
11R-7, 122–125	313.26	Interstitial	[qz-F]	M-oct	55	55.35	0.15	26.94	10.23	6.30	0.09	0.90	0.12	0.16	NA	NA	100.23	45.0	50.2	0.5
11R-7, 122–125	313.26	Interstitial	[qz-F]	M-oct	56	60.03	0.03	23.61	5.88	8.45	0.28	0.67	0.05	0.04	NA	NA	99.04	26.6	69.1	1.5
11R-7, 122–125	313.26	Microcrystal	[qz-F]	M-oct	60	54.27	0.00	27.05	10.25	6.20	0.24	0.98	0.06	0.09	NA	NA	99.14	45.2	49.4	1.3
206-1256D-																				
3R-3, 109–113	281.61	Phenocryst	Magmatic	B5	99	55.71	0.03	27.29	11.15	5.33	0.04	0.75	0.09	0.00	0.00	0.00	100.38	53.5	46.2	0.3
3R-3, 109–113	281.61	Phenocryst	Magmatic	B5	104	53.83	0.15	27.56	12.04	5.13	0.05	0.93	0.14	0.00	0.08	0.00	99.91	56.3	43.4	0.3
3R-3, 109–113	281.61	Phenocryst	Magmatic	B5	105	54.34	0.02	28.18	11.91	4.70	0.04	0.71	0.13	0.00	0.05	0.11	100.20	58.2	41.6	0.3
3R-3, 109–113	281.61	Phenocryst	Magmatic	B5	106	54.00	0.09	27.84	12.14	4.82	0.07	0.90	0.15	0.00	0.00	0.10	100.10	57.9	41.6	0.4
4R-1, 89–92	285.99	Microcrystal	[qz-F]	B3	166	64.06	0.04	22.05	4.24	8.93	0.39	0.44	0.00	0.00	0.00	0.04	100.19	20.3	77.5	2.2
4R-1, 89–92	285.99	Interstitial	[qz-F]	B3	143	69.80	0.06	19.51	0.25	9.62	0.30	0.44	0.00	0.00	0.01	0.06	100.06	1.4	96.6	2.0
4R-1, 89–92	285.99	Interstitial	[qz-F]	B3	153	60.33	0.07	24.92	7.26	7.33	0.12	0.41	0.00	0.01	0.02	0.07	100.54	35.1	64.2	0.7
4R-1, 89–92	285.99	Interstitial	[qz-F]	B3	156	66.09	0.00	19.96	3.25	9.00	0.65	0.38	0.02	0.00	0.05	0.00	99.40	16.0	80.2	3.8
4R-1, 89–92	285.99	Interstitial	[qz-F]	B3	157	59.37	0.04	24.39	7.68	7.41	0.08	0.56	0.00	0.03	0.00	0.00	99.57	36.3	63.3	0.5
4R-1, 89–92	285.99	Interstitial	[qz-F]	B3	166	64.06	0.04	22.05	4.24	8.93	0.39	0.44	0.00	0.00	0.00	0.04	100.19	20.3	77.5	2.2
4R-2, 43–46	286.92	Interstitial	[qz-F]	M-nov	74	60.43	0.01	23.24	5.75	8.69	0.23	0.72	0.15	0.01	NA	NA	99.21	25.5	69.8	1.2
4R-2, 43–46	286.92	Phenocryst	Magmatic	M-nov	75	57.58	0.00	26.06	8.82	7.09	0.11	0.49	0.10	0.00	NA	NA	100.24	39.6	57.5	0.6
4R-2, 43–46	286.92	Microcrystal	Magmatic	M-nov	78	56.06	0.11	26.96	10.53	6.39	0.00	0.60	0.09	0.05	NA	NA	100.79	46.3	50.9	0.0
4R-2, 43–46	286.92	Interstitial	[qz-F]	M-nov	79	59.58	0.03	24.26	6.54	8.28	0.04	0.32	0.06	0.00	NA	NA	99.11	29.9	68.4	0.2
4R-2, 43–46	286.92	Phenocryst	Magmatic	M-nov	80	59.00	0.00	24.73	7.13	8.26	0.14	0.45	0.16	0.00	NA	NA	99.88	31.2	65.5	0.7
4R-2, 43–46	286.92	Phenocryst core	Magmatic	M-nov	81	54.23	0.12	27.04	10.94	6.08	0.07	0.73	0.18	0.01	NA	NA	99.40	47.9	48.1	0.4
4R-2, 43–46	286.92	Interstitial	[qz-F]	M-nov	84	63.26	0.14	21.83	3.39	9.83	0.60	0.31	0.07	0.00	NA	NA	99.44	15.3	80.0	3.2
12R-8, 62–68	351.12	Phenocryst	Magmatic	P1	81	52.21	0.09	28.80	13.04	3.96	0.01	0.76	0.26	0.00	0.01	NA	99.13	64.5	35.4	0.0

Notes: [qz-F] = quartz + secondary feldspar granophyric intergrowth, r B1-23 = replacing mineral analysis B1-23. Run numbers: B3, B1, B2, B5 = IFREMER, M-oct, M-dec, M-nov = CNR-Department of Earth Sciences, P1, P2 = Paris VII University. NA = not analyzed.

Table T4. Primary and secondary clinopyroxene composition, Site 1256 lava pond. (See table notes. Continued on next page.)

Core, section, interval (cm)	Depth (mbsf)	Type	Run number	Analysis number	Major element oxides (wt%)												
					SiO_2	TiO_2	Al_2O_3	CaO	Na_2O	K_2O	FeO	MgO	MnO	P_2O_5	Cl	Cr_2O_3	Total
206-1256C-																	
9R-4, 134–138	290.04	Secondary	B3	22	50.27	0.48	0.71	18.43	2.22	0.00	22.58	4.67	0.13	0.05	NA	0.15	99.70
9R-4, 134–138	290.04	Secondary	B3	23	50.13	0.51	0.81	19.75	1.51	0.00	21.85	5.47	0.32	0.00	NA	0.10	100.45
9R-4, 134–138	290.04	Secondary	B3	24	49.77	0.29	0.52	19.19	1.32	0.02	21.57	6.15	0.36	0.49	NA	0.05	99.74
9R-4, 134–138	290.04	Secondary	B3	25	50.77	0.13	0.90	19.45	1.91	0.06	22.34	5.02	0.27	0.02	NA	0.00	100.86
9R-4, 134–138	290.04	Secondary	B3	26	49.86	0.10	0.62	19.19	1.78	0.00	23.37	4.46	0.38	0.04	NA	0.00	99.81
9R-4, 134–138	290.04	Secondary	B3	27	50.59	0.20	0.32	18.61	1.47	0.00	23.29	5.01	0.28	0.23	NA	0.09	100.09
9R-4, 134–138	290.04	Secondary	B3	28	50.71	0.06	0.60	17.37	1.46	0.04	23.25	5.48	0.29	0.22	NA	0.00	99.49
9R-4, 134–138	290.04	Secondary	B3	29	49.52	0.07	0.54	19.19	1.61	0.00	24.32	4.74	0.29	0.18	NA	0.00	100.46
9R-4, 134–138	290.04	Secondary	B3	30	50.38	0.13	0.41	18.52	1.33	0.00	23.43	4.86	0.35	0.18	NA	0.04	99.65
9R-4, 134–138	290.04	Magmatic	B3	35	50.93	0.82	1.62	16.91	0.25	0.00	15.57	13.57	0.34	0.01	NA	0.04	100.06
9R-4, 134–138	290.04	Magmatic	B3	36	51.12	0.94	1.64	15.73	0.28	0.01	16.01	13.94	0.38	0.00	NA	0.00	100.06
9R-4, 134–138	290.04	Magmatic	B3	37	50.97	0.81	1.54	14.42	0.17	0.00	16.73	14.79	0.56	0.02	NA	0.00	100.03
9R-4, 134–138	290.04	Secondary	B3	38	49.45	0.19	0.15	20.99	0.72	0.00	27.30	1.68	0.17	0.03	NA	0.00	100.67
9R-4, 134–138	290.04	Secondary	B3	39	49.35	0.07	0.24	20.96	0.70	0.00	26.97	1.54	0.54	0.06	NA	0.00	100.44
9R-4, 134–138	290.04	Secondary	B3	40	50.01	0.01	0.03	22.71	0.28	0.00	22.65	4.12	0.45	0.00	NA	0.00	100.28
9R-4, 134–138	290.04	Secondary	B3	44	49.70	0.05	0.11	21.18	0.56	0.00	23.66	2.86	0.59	0.00	NA	0.10	98.80
9R-4, 134–138	290.04	Magmatic	B3	45	51.23	0.81	1.32	13.52	0.22	0.00	18.62	14.04	0.60	0.03	NA	0.02	100.42
9R-4, 134–138	290.04	Magmatic	B3	46	50.78	0.73	1.21	13.91	0.17	0.00	20.13	12.62	0.44	0.00	NA	0.02	100.03
9R-4, 134–138	290.04	Secondary	B3	49	48.96	0.07	0.12	21.74	0.59	0.00	27.57	0.90	0.45	0.00	NA	0.00	100.41
9R-4, 134–138	290.04	Secondary	B3	53	49.41	0.86	0.52	19.51	1.05	0.02	23.47	3.89	0.38	0.07	NA	0.00	99.18
9R-4, 134–138	290.04	Secondary	B3	54	49.40	0.96	0.64	18.85	1.62	0.02	23.12	4.87	0.53	0.42	NA	0.04	100.47
9R-4, 134–138	290.04	Secondary	B3	55	49.57	0.50	0.58	18.52	1.25	0.04	22.42	6.04	0.25	0.50	NA	0.06	99.75
9R-4, 134–138	290.04	Secondary	B3	56	50.50	0.13	0.62	20.42	1.32	0.00	21.81	5.54	0.24	0.22	NA	0.14	100.95
9R-4, 134–138	290.04	Secondary	B3	59	49.66	0.11	0.33	21.13	0.79	0.00	22.78	4.45	0.27	0.04	NA	0.04	99.61
9R-4, 134–138	290.04	Secondary	B3	60	48.99	0.13	0.23	21.20	0.91	0.00	27.33	1.10	0.32	0.00	NA	0.12	100.34
9R-4, 134–138	290.04	Secondary	B3	61	49.75	0.01	0.12	21.16	0.85	0.01	25.74	2.77	0.34	0.04	NA	0.03	100.80
9R-4, 134–138	290.04	Magmatic	B3	62	51.55	0.89	1.77	15.56	0.28	0.00	15.06	14.91	0.40	0.02	NA	0.00	100.45
9R-4, 134–138	290.04	Magmatic	B3	63	51.60	0.71	1.43	15.29	0.18	0.00	16.47	14.25	0.48	0.05	NA	0.07	100.52
9R-4, 134–138	290.04	Secondary	B3	65	50.16	0.08	0.12	20.96	0.78	0.02	23.59	3.55	0.34	0.00	NA	0.00	99.60
9R-4, 134–138	290.04	Secondary	B3	66	49.33	0.14	0.12	20.95	0.65	0.00	26.31	1.78	0.34	0.00	NA	0.10	99.73
9R-4, 134–138	290.04	Secondary	B3	67	50.24	0.00	0.27	21.09	0.95	0.01	22.02	4.52	0.25	0.10	NA	0.02	99.48
9R-4, 134–138	290.04	Magmatic	B3	68	51.38	0.61	1.19	15.89	0.20	0.00	18.05	13.19	0.58	0.00	NA	0.02	101.11
9R-4, 134–138	290.04	Magmatic	B3	69	52.72	0.71	2.14	13.17	0.15	0.00	12.76	18.57	0.33	0.00	NA	0.00	100.56
9R-4, 134–138	290.04	Magmatic	B3	70	52.65	0.57	2.08	14.70	0.20	0.01	12.24	17.53	0.28	0.03	NA	0.06	100.35
9R-4, 134–138	290.04	Secondary	B3	71	48.70	0.16	0.14	20.85	1.15	0.00	23.81	3.23	0.18	0.02	NA	0.01	98.25
9R-4, 134–138	290.04	Secondary	B3	72	48.81	0.11	0.23	21.13	0.90	0.00	27.46	0.89	0.41	0.00	NA	0.01	99.96
9R-4, 134–138	290.04	Secondary	B3	73	50.65	0.02	0.02	21.02	0.46	0.00	22.77	4.42	0.54	0.00	NA	0.00	99.90
9R-4, 134–138	290.04	Secondary	B3	76	50.22	0.05	0.06	21.71	0.39	0.00	23.66	3.89	0.46	0.00	NA	0.00	100.45
9R-4, 134–138	290.04	Secondary	B3	77	50.75	0.08	0.09	19.84	0.72	0.00	22.67	6.40	0.43	0.00	NA	0.07	101.06
9R-4, 134–138	290.04	Magmatic	B3	79	52.16	0.62	2.04	14.91	0.23	0.00	12.82	17.58	0.43	0.00	NA	0.00	100.79
9R-4, 134–138	290.04	Magmatic	B3	80	51.96	0.62	1.86	14.62	0.18	0.00	12.60	17.82	0.43	0.00	NA	0.00	100.10
9R-4, 134–138	290.04	Magmatic	B3	84	52.51	0.68	2.34	13.93	0.23	0.00	12.60	17.99	0.40	0.00	NA	0.00	100.69
9R-4, 134–138	290.04	Magmatic	B3	85	53.69	0.10	27.61	11.97	4.72	0.07	0.96	0.16	0.00	0.00	NA	0.00	99.29
9R-6, 123–126	292.89	Secondary	B1	24	49.49	0.94	0.59	20.46	0.93	0.00	22.33	4.49	0.31	0.00	0.00	0.10	99.65
9R-6, 123–126	292.89	Secondary	B1	25	50.38	0.74	0.76	19.76	1.17	0.00	22.71	4.70	0.34	0.00	0.00	0.00	100.58
9R-6, 123–126	292.89	Secondary	B1	26	48.76	0.64	0.45	19.45	1.00	0.00	24.60	4.03	0.30	0.18	0.00	0.06	99.47
9R-6, 123–126	292.89	Secondary	B1	28	50.88	0.55	0.99	12.23	0.20	0.00	21.09	12.90	0.69	0.00	0.00	0.00	99.69
9R-6, 123–126	292.89	Secondary	B1	29	50.63	0.81	1.64	16.33	0.23	0.00	15.46	14.31	0.32	0.00	0.01	0.00	99.75

Table T4 (continued).

Core, section, interval (cm)	Depth (mbsf)	Type	Run number	Analysis number	Major element oxides (wt%)												
					SiO_2	TiO_2	Al_2O_3	CaO	Na_2O	K_2O	FeO	MgO	MnO	P_2O_5	Cl	Cr_2O_3	Total
9R-6, 123–126	292.89	Secondary	B1	30	49.06	1.18	0.61	19.37	1.14	0.00	22.32	4.82	0.42	0.13	0.02	0.00	99.19
9R-6, 123–126	292.89	Secondary	B1	31	49.64	0.66	0.31	18.15	1.00	0.00	23.42	5.69	0.37	0.00	0.11	0.04	99.49
9R-7, 89–93	293.98	Magmatic	P1	22	51.75	0.45	1.85	18.15	0.26	0.03	9.29	16.25	0.32	0.03	0.02	NA	98.40
9R-7, 89–93	293.98	Secondary	P1	23	51.07	0.14	0.20	21.04	0.91	0.00	18.24	7.67	0.36	0.00	0.02	NA	99.63
9R-7, 89–93	293.98	Secondary	P1	24	50.52	0.18	0.23	20.49	1.09	0.00	19.04	7.69	0.40	0.01	0.00	NA	99.64
9R-7, 89–93	293.98	Secondary	P1	31	52.62	0.05	0.48	19.34	0.62	0.00	13.92	12.36	0.49	0.00	0.00	NA	99.87
9R-7, 89–93	293.98	Secondary	P1	39	51.49	0.05	0.20	19.05	0.88	0.04	17.67	9.39	0.50	0.00	0.06	NA	99.32
9R-7, 89–93	293.98	Secondary	P1	18	51.47	0.12	0.27	18.22	0.95	0.00	16.96	10.26	0.58	0.01	0.00	NA	98.84
9R-7, 89–93	293.98	Secondary	P1	19	51.48	0.20	0.21	20.04	1.06	0.03	18.63	8.63	0.41	0.00	0.02	NA	100.70
10R-1, 50–54	294.40	Secondary	B3	86	50.20	0.81	1.92	12.77	1.34	0.24	22.66	9.51	0.46	0.00	NA	0.00	99.91
10R-3, 13–16	296.93	Magmatic	B1	85	50.71	0.70	1.32	14.71	0.23	0.00	16.82	14.42	0.44	0.00	0.00	0.00	99.37
10R-3, 13–16	296.93	Magmatic	B1	90	52.88	0.47	1.76	18.52	0.24	0.00	8.82	16.59	0.35	0.00	0.01	0.06	99.69
10R-6, 53–56	300.66	Magmatic	P2	10	53.40	0.53	1.93	17.55	0.21	0.05	10.19	17.34	0.20	0.03	0.00	NA	101.44
10R-6, 53–56	300.66	Secondary	P2	11	51.40	0.07	0.22	19.21	1.18	0.05	21.22	6.86	0.28	0.05	0.05	NA	100.59
206-1256D-																	
3R-3, 109–113	281.61	Magmatic	P3	14	51.52	0.71	1.57	17.05	0.25	0.01	14.64	14.45	0.38	NA	0.00	NA	100.57
4R-1, 89–92	285.99	Secondary	B3	141	50.67	0.04	0.07	19.11	0.95	0.00	22.90	5.99	0.28	0.00	NA	0.00	100.00
4R-1, 89–92	285.99	Secondary	B3	142	49.65	0.11	0.22	19.85	0.26	0.00	25.51	4.47	0.63	0.06	NA	0.01	100.76
4R-1, 89–92	285.99	Secondary	B3	144	49.67	0.18	0.29	19.18	1.31	0.00	25.09	3.53	0.36	0.03	NA	0.00	99.63
4R-1, 89–92	285.99	Secondary	B3	145	49.84	0.25	0.28	19.61	1.15	0.02	24.41	3.27	0.33	0.01	NA	0.00	99.17
4R-1, 89–92	285.99	Secondary	B3	146	49.63	0.17	0.32	19.19	1.31	0.00	25.71	3.11	0.41	0.00	NA	0.00	99.84
4R-1, 89–92	285.99	Magmatic	B3	147	50.65	0.78	1.36	17.37	0.20	0.00	17.19	11.94	0.53	0.06	NA	0.02	100.09
4R-1, 89–92	285.99	Magmatic	B3	148	51.51	0.80	2.18	16.97	0.25	0.00	13.26	14.48	0.38	0.00	NA	0.00	99.83
4R-1, 89–92	285.99	Secondary	B3	158	49.64	0.08	0.13	18.14	1.20	0.02	25.09	4.60	0.75	0.00	NA	0.01	99.67
4R-1, 89–92	285.99	Secondary	B3	159	49.31	0.32	0.24	18.24	1.10	0.00	26.94	3.50	0.56	0.00	NA	0.00	100.21
4R-1, 89–92	285.99	Secondary	B3	161	49.79	0.20	0.28	18.53	1.33	0.00	24.68	4.30	0.72	0.00	NA	0.13	99.95
4R-1, 89–92	285.99	Secondary	B3	162	49.26	0.15	0.13	18.39	0.91	0.00	26.70	3.79	0.52	0.00	NA	0.00	99.86
4R-1, 89–92	285.99	Secondary	B3	163	49.36	0.50	0.34	19.01	1.31	0.00	25.24	3.61	0.22	0.00	NA	0.00	99.59
4R-1, 93–96	286.00	Magmatic	P1	103	50.48	0.83	1.29	17.02	0.25	0.00	18.26	11.32	0.58	0.01	0.02	NA	100.06
4R-1, 93–96	286.00	Magmatic	P1	104	51.04	1.00	1.72	18.35	0.27	0.00	14.33	13.05	0.40	0.05	0.01	NA	100.22
4R-1, 93–96	286.00	Secondary	P1	105	50.00	0.19	0.21	20.89	0.89	0.00	24.61	3.78	0.28	0.00	0.00	NA	100.85
4R-1, 93–96	286.00	Secondary	P1	108	49.30	0.00	0.05	21.26	0.64	0.00	23.91	4.46	0.20	0.00	0.01	NA	99.84
4R-1, 93–96	286.00	Secondary	P1	109	48.80	0.23	0.14	19.99	0.47	0.00	27.40	2.42	0.48	0.00	0.02	NA	99.94
4R-1, 93–96	286.00	Magmatic	P1	110	50.79	0.83	1.04	15.64	0.18	0.00	17.70	13.05	0.42	0.00	0.00	NA	99.64
4R-1, 93–96	286.00	Secondary	P1	116	47.47	0.24	1.02	21.07	0.86	0.00	27.72	0.99	0.27	0.00	0.01	NA	99.65
4R-1, 93–96	286.00	Secondary	P1	120	50.01	0.28	0.60	20.12	0.69	0.00	21.83	6.04	0.43	0.02	0.00	NA	100.01
4R-1, 93–96	286.00	Secondary	P1	126	48.59	0.30	0.44	19.45	1.16	0.00	26.28	3.09	0.14	0.14	0.00	NA	99.58
4R-1, 93–96	286.00	Secondary	P1	129	48.00	0.04	0.64	19.04	1.47	0.00	25.73	3.94	0.30	0.25	0.00	NA	99.39
7R-3, 24–28	306.92	Magmatic	P3	35	52.12	0.49	0.67	4.24	0.07	0.02	20.27	22.09	0.49	NA	0.00	NA	100.58
12R-8, 62–68	351.12	Magmatic	P1	82	49.50	0.99	2.55	15.60	0.25	0.00	16.11	14.23	0.30	0.00	0.00	NA	99.54

Notes: B3, B1 = IFREMER, P1, P2, P3 = Paris VII University. NA = not analyzed.

Table T5. Amphibole composition, Site 1256 lava pond.

Core, section, interval (cm)	Depth (mbsf)	Run number	Analysis number	Major element oxides (wt%)											
				SiO_2	TiO_2	Al_2O_3	CaO	Na_2O	K_2O	FeO	MgO	MnO	P_2O_5	Cl	Total
206-1256D-															
4R-1, 93–96	286.00	P1	111	47.98	0.19	2.32	8.96	0.36	0.17	32.44	3.75	0.55	0.00	0.06	96.77
4R-1, 93–96	286.00	P1	112	48.54	0.05	2.16	8.94	0.31	0.14	31.99	3.84	0.44	0.00	0.03	96.43
4R-1, 93–96	286.00	P1	113	46.74	0.12	2.21	11.52	0.47	0.17	29.94	3.58	0.35	0.02	0.03	95.16
4R-1, 93–96	286.00	P1	117	47.11	0.10	2.02	8.01	0.40	0.24	33.82	3.25	0.36	0.00	0.07	95.37

Note: Run number: P1 = Paris VII University.

Table T6. Brown mica composition, Site 1256 lava pond.

Core, section, interval (cm)	Depth (mbsf)	Type	Run number	Analysis number	Major element oxides (wt%)												
					SiO_2	TiO_2	Al_2O_3	CaO	Na_2O	K_2O	FeO	MgO	MnO	P_2O_5	Cl	Cr_2O_3	Total
206-1256C-																	
9R-6, 123–126	292.89	Biotite	B1	34	36.24	6.08	11.17	0.00	0.51	9.00	27.31	6.58	0.11	0.00	0.79	0.00	97.80
9R-6, 123–126	292.89	Biotite	B1	36	37.25	5.71	11.17	0.00	0.75	8.58	25.43	6.55	0.11	0.01	0.73	0.10	96.39
9R-6, 123–126	292.89	Biotite	B1	37	38.11	4.99	10.97	0.19	1.20	7.80	24.48	7.30	0.06	0.04	0.81	0.00	95.96
10R-1, 50–54	294.40	Biotite	B3	90	37.60	6.80	11.96	0.00	0.60	8.94	25.91	6.85	0.16	0.00	NA	0.00	98.82
10R-1, 50–54	294.40	Biotite	B3	91	36.61	6.68	11.38	0.00	0.67	8.95	25.65	7.14	0.00	0.00	NA	0.00	97.07
10R-1, 50–54	294.40	Phlogopite	B3	169	40.29	2.16	10.84	0.13	0.58	8.75	14.79	16.54	0.02	0.00	NA	0.03	94.12
10R-1, 50–54	294.40	Phlogopite	B3	170	40.35	2.62	10.92	0.15	0.65	8.54	16.00	16.18	0.08	0.00	NA	0.05	95.54
10R-1, 50–54	294.40	Phlogopite	B3	171	39.29	2.84	11.55	0.11	0.72	8.90	15.29	15.78	0.06	0.06	NA	0.00	94.60
10R-1, 50–54	294.40	Phlogopite	B3	172	39.31	2.01	11.26	0.09	0.58	8.80	16.41	15.72	0.13	0.00	NA	0.00	94.31
10R-1, 50–54	294.40	Phlogopite	B3	173	39.60	2.26	11.09	0.16	0.66	8.93	15.70	16.11	0.07	0.03	NA	0.00	94.61
10R-1, 50–54	294.40	Phlogopite	B3	174	39.59	2.28	11.25	0.15	0.63	8.67	16.53	15.69	0.00	0.00	NA	0.00	94.79
10R-1, 50–54	294.40	Phlogopite	B3	184	40.84	1.62	10.78	0.18	0.60	8.49	15.20	17.08	0.06	0.00	NA	0.00	94.87

Notes: Run numbers: B1, B3 = IFREMER. NA = not analyzed.

Table T7. Phyllosilicate composition other than brown micas, Site 1256 lava pond. (**See table notes.** Continued on next page.)

Core, section, interval (cm)	Depth (mbsf)	Color	Occurrence	Run number	Analysis number	Major element oxides (wt%)														Type
						SiO_2	TiO_2	Al_2O_3	CaO	Na_2O	K_2O	FeO	MgO	MnO	P_2O_5	Cl	ZnO	Cr_2O_3	Total	
206-1256C-																				
9R-4, 134–138	290.04	Brown	Vein	B3	32	44.04	0.08	5.09	2.65	0.53	0.58	24.88	10.90	0.24	0.01	NA	NA	0.00	89.01	7
9R-4, 134–138	290.04	Brown	Vein	B3	31	35.29	0.00	8.92	1.10	0.40	1.48	33.70	7.18	0.40	0.02	NA	NA	0.08	88.59	5
9R-4, 134–138	290.04	Brown	Vein	B3	64	40.97	0.00	6.66	1.96	0.74	0.76	24.81	11.87	0.31	0.10	NA	NA	0.06	88.24	6
9R-4, 134–138	290.04	Brown	Vein	B3	74	43.40	0.00	4.85	2.54	0.66	0.37	24.30	9.06	0.30	0.08	NA	NA	0.00	85.56	6
9R-4, 134–138	290.04	Brown	Vein	B3	75	46.83	0.17	3.56	4.10	0.50	0.33	25.35	9.69	0.33	0.03	NA	NA	0.00	90.89	6
9R-5, 54–58	290.71	Brown pleocroic	Interstitial	B3	6	30.39	0.04	9.10	0.48	0.25	0.23	40.63	5.73	0.61	0.00	NA	NA	0.00	87.47	5
9R-5, 54–58	290.71	Brown pleocroic	Interstitial	B3	7	29.91	0.00	9.11	0.42	0.28	0.29	41.39	5.69	0.58	0.03	NA	NA	0.01	87.71	5
9R-5, 54–58	290.71	Brown pleocroic	Interstitial	B3	8	29.90	0.07	10.16	0.43	0.33	0.26	40.44	5.02	0.62	0.01	NA	NA	0.00	87.25	5
9R-5, 54–58	290.71	Brown pleocroic	Interstitial	B3	9	30.85	0.02	9.42	0.45	0.28	0.23	39.66	5.20	0.42	0.01	NA	NA	0.00	86.56	5
9R-5, 54–58	290.71	Brown pleocroic	Interstitial	B3	10	30.32	0.03	9.61	0.45	0.20	0.28	41.42	5.37	0.46	0.00	NA	NA	0.05	88.19	5
9R-5, 54–58	290.71	Brown pleocroic	Interstitial	B3	11	30.30	0.03	9.36	0.44	0.29	0.34	40.03	5.25	0.55	0.00	NA	NA	0.00	86.60	5
9R-5, 54–58	290.71	Brown pleocroic	Interstitial	B3	12	30.34	0.04	9.35	0.46	0.19	0.32	40.21	5.29	0.70	0.07	NA	NA	0.05	87.03	5
9R-5, 54–58	290.71	Brown	Interstitial	B3	1	46.81	0.00	4.03	2.51	0.20	0.44	23.83	10.07	0.32	0.00	NA	NA	0.01	88.23	7
9R-5, 54–58	290.71	Brown	Interstitial	B3	2	46.56	0.00	3.95	2.34	0.15	0.45	24.39	9.97	0.56	0.00	NA	NA	0.00	88.38	7
9R-5, 54–58	290.71	Brown	Interstitial	B3	3	46.88	0.01	4.12	2.42	0.19	0.46	24.18	9.92	0.44	0.00	NA	NA	0.00	88.62	7
9R-5, 54–58	290.71	Brown	Interstitial	B3	4	43.64	0.00	4.60	1.47	0.55	0.45	22.60	12.52	0.22	0.05	NA	NA	0.10	86.18	7
9R-5, 54–58	290.71	Brown	Interstitial	B3	14	47.07	0.00	4.19	2.44	0.20	0.61	23.99	10.43	0.45	0.06	NA	NA	0.00	89.44	7
9R-6, 123–126	292.89	Brown	Interstitial	B1	32	39.10	0.10	7.81	2.49	0.13	0.21	26.31	9.05	0.28	0.01	0.13	0.19	0.00	85.81	6
9R-6, 123–126	292.89	Brown	Interstitial	B1	33	40.90	0.12	7.72	2.54	0.20	0.18	24.58	9.31	0.12	0.02	0.10	0.00	0.00	85.79	6
9R-6, 123–126	292.89	Green	Interstitial	B1	15	28.96	0.08	11.06	0.71	0.06	0.06	37.68	7.03	0.43	0.03	0.00	0.06	0.04	86.22	5
9R-6, 123–126	292.89	Green	Interstitial	B1	16	29.09	0.11	10.30	0.98	0.04	0.07	36.88	6.69	0.48	0.01	0.00	0.00	0.00	84.65	5
9R-7, 89–93	293.98	Brown	Green clinopyroxene	P1	32	39.95	0.04	5.23	3.09	0.53	0.41	21.41	11.02	0.21	0.00	0.11	NA	NA	82.01	6
9R-7, 89–93	293.98	Brown	Green clinopyroxene	P1	34	40.90	0.16	4.81	4.22	0.59	0.22	16.96	11.95	0.00	0.01	0.20	NA	NA	80.02	6
9R-7, 89–93	293.98	Brown	Green clinopyroxene	P1	35	42.14	0.16	3.91	4.25	0.62	0.70	18.84	12.09	0.07	0.00	0.11	NA	NA	82.88	6
9R-7, 89–93	293.98	Brown	Interstitial	P1	53	45.13	0.21	4.77	4.22	0.37	0.23	21.50	12.37	0.10	0.03	0.07	NA	NA	88.99	6
10R-1, 50–54	294.40	Brown	Interstitial	B3	100	37.59	0.53	7.49	3.21	0.82	0.68	26.11	6.42	0.34	0.03	NA	NA	0.02	83.24	?
10R-1, 50–54	294.40	Blue green	Interstitial	B3	105	32.49	0.12	11.33	0.55	0.10	0.01	27.03	16.45	0.64	0.05	NA	NA	0.00	88.78	4
10R-1, 50–54	294.40	Blue green	Interstitial	B3	112	33.64	0.05	11.33	0.89	0.28	0.01	25.23	15.11	0.91	0.08	NA	NA	0.00	87.52	4
10R-1, 50–54	294.40	Blue green	Interstitial	B3	113	32.43	0.00	12.06	0.58	0.14	0.07	23.83	15.49	0.75	0.02	NA	NA	0.07	85.45	4
10R-1, 50–54	294.40	Blue green	Interstitial	B3	118	29.74	0.00	11.58	0.27	0.15	0.00	28.20	14.96	0.48	0.00	NA	NA	0.00	85.39	4
10R-1, 50–54	294.40	Blue green	Interstitial	B3	119	28.99	0.06	10.83	0.29	0.10	0.00	26.16	15.30	0.34	0.00	NA	NA	0.07	82.14	4
10R-1, 50–54	294.40	Blue green	Interstitial	B3	120	32.09	0.06	12.70	0.36	0.14	0.00	27.41	15.50	0.78	0.00	NA	NA	0.04	89.07	4
10R-1, 50–54	294.40	Blue green	Interstitial	B3	122	30.85	0.00	12.30	0.32	0.28	0.01	26.77	16.42	0.47	0.00	NA	NA	0.00	87.42	4
10R-1, 50–54	294.40	Blue green	Interstitial	B3	125	32.98	0.00	10.95	0.73	0.60	0.18	26.80	13.84	0.58	0.00	NA	NA	0.10	86.76	4
10R-1, 50–54	294.40	Blue green	Interstitial	B3	126	30.03	0.07	13.28	0.71	0.24	0.00	30.19	12.39	1.00	0.00	NA	NA	0.08	87.99	4
10R-1, 50–54	294.40	Blue green	Interstitial	B3	128	31.08	0.00	11.85	0.23	0.11	0.02	28.21	15.61	0.66	0.00	NA	NA	0.00	87.77	4
10R-1, 50–54	294.40	Blue green	Interstitial	B3	129	32.79	0.00	13.05	0.50	0.16	0.01	26.63	15.60	0.87	0.07	NA	NA	0.00	89.67	4
10R-1, 50–54	294.40	Blue green	Interstitial	B3	130	36.41	0.12	9.58	2.12	0.54	0.95	31.00	6.86	0.23	0.01	NA	NA	0.07	87.89	4
10R-1, 50–54	294.40	Blue green	Interstitial	B3	175	34.50	0.72	11.65	1.45	0.16	0.11	20.66	17.40	0.62	0.02	NA	NA	0.00	87.29	4
10R-1, 50–54	294.40	Blue green	Interstitial	B3	176	30.52	0.56	11.59	0.65	0.09	0.00	23.51	16.92	0.76	0.00	NA	NA	0.03	84.62	4
10R-1, 50–54	294.40	Blue green	Interstitial	B3	177	32.79	0.07	11.47	0.60	0.07	0.00	26.28	16.42	0.75	0.00	NA	NA	0.00	88.47	4
11R-5, 63–66	309.85	Blue green	Interstitial	B2	17	31.33	0.02	9.19	0.36	0.16	0.58	35.68	10.02	0.42	0.00	0.10	0.00	0.00	87.84	4
11R-5, 63–66	309.85	Blue green	Interstitial	B2	18	33.83	0.19	8.55	0.67	0.21	1.41	34.42	9.72	0.41	0.03	0.12	0.01	0.02	89.61	4
11R-5, 63–66	309.85	Blue green	Interstitial	B2	23	37.57	0.02	7.97	1.09	0.12	0.03	25.83	12.90	0.43	0.00	0.00	0.00	0.06	86.03	4
206-1256D-																				
2R-1, 37–40	276.47	Pale green	Interstitial	P3	60	29.23	0.00	12.10	0.40	0.04	0.10	35.89	9.22	0.14	NA	0.04	0.00	NA	87.16	4
2R-1, 37–40	276.47	Pale green	Interstitial	P3	61	28.39	0.00	11.03	0.35	0.08	0.22	36.63	8.44	0.11	NA	0.02	0.00	NA	85.27	4

Table T7 (continued).

Core, section, interval (cm)	Depth (mbsf)	Color	Occurrence	Run number	Analysis number	Major element oxides (wt%)														Type
						SiO_2	TiO_2	Al_2O_3	CaO	Na_2O	K_2O	FeO	MgO	MnO	P_2O_5	Cl	ZnO	Cr_2O_3	Total	
2R-1, 37–40	276.47	Pale green	Interstitial	P3	62	31.10	0.04	10.82	1.74	0.81	0.40	27.84	8.94	0.09	NA	0.09	0.00	NA	81.85	4
2R-1, 37–40	276.47	Colorless	Vein	P3	65	51.49	0.06	2.03	0.86	0.23	0.08	10.51	20.35	0.05	NA	0.17	0.13	NA	85.96	8
2R-1, 37–40	276.47	Colorless	Vein	P3	66	55.52	0.04	1.52	0.59	0.23	0.07	8.62	23.85	0.00	NA	0.08	0.07	NA	90.58	8
2R-1, 85–87	276.95	Pale brown/Dark green	Interstitial	P3	72	27.60	0.12	9.15	0.38	0.11	0.06	41.34	5.51	0.46	NA	0.05	0.03	NA	84.79	5
2R-1, 85–87	276.95	Pale brown/Dark green	Interstitial	P3	74	27.14	0.10	9.90	0.43	0.10	0.04	43.03	4.70	0.49	NA	0.01	0.20	NA	86.14	5
2R-1, 85–87	276.95	Pale brown/Dark green	Interstitial	P3	76	27.41	0.20	9.50	0.52	0.16	0.14	40.56	6.22	0.39	NA	0.04	0.18	NA	85.30	5
2R-1, 85–87	276.95	Pale brown/Dark green	Interstitial	P3	77	35.00	0.05	6.77	1.04	0.28	0.11	37.16	8.28	0.23	NA	0.00	0.20	NA	89.12	5
2R-1, 85–87	276.95	Pale brown/Dark green	Interstitial	P3	78	27.89	0.06	9.50	0.59	0.15	0.05	41.70	5.91	0.29	NA	0.04	0.12	NA	86.29	5
3R-3, 109–113	281.61	Brown	Green clinopyroxene	P3	15	45.61	0.37	4.01	2.61	0.25	0.36	19.24	13.60	0.06	NA	0.02	0.00	NA	86.13	6
3R-3, 109–113	281.61	Brown	Green clinopyroxene	P3	16	46.52	0.59	3.36	4.28	0.30	0.46	19.67	13.45	0.08	NA	0.03	0.11	NA	88.85	6
3R-3, 109–113	281.61	Pale green	Interstitial	P3	10	30.41	0.03	12.30	0.52	0.03	0.04	28.52	14.30	0.07	NA	0.00	0.08	NA	86.29	4
3R-3, 109–113	281.61	Pale green	Interstitial	P3	11	31.26	0.05	12.47	0.42	0.06	0.04	27.17	14.70	0.09	NA	0.02	0.04	NA	86.32	4
3R-3, 109–113	281.61	Brown	Interstitial	P3	13	38.70	0.19	10.11	1.84	0.12	0.29	21.97	14.26	0.12	NA	0.02	-0.05	NA	87.61	4
3R-3, 109–113	281.61	Colorless	Vein	P3	2	57.55	0.14	0.11	0.06	0.07	0.04	17.24	19.63	0.03	NA	0.01	0.06	NA	94.95	9
3R-3, 109–113	281.61	Colorless	Vein	P3	3	57.70	0.15	0.36	0.11	0.09	0.04	16.92	19.93	0.03	NA	0.00	0.06	NA	95.39	9
3R-3, 109–113	281.61	Colorless	Vein	P3	4	57.13	0.09	0.53	0.05	0.09	0.01	15.86	20.50	0.03	NA	0.01	0.00	NA	94.29	9
3R-3, 109–113	281.61	Colorless	Vein	P3	6	59.37	0.08	0.44	0.07	0.09	0.03	9.75	24.87	0.02	NA	0.00	0.16	NA	94.88	9
3R-3, 109–113	281.61	Colorless	Vein	P3	7	56.84	0.10	0.40	0.07	0.10	0.04	17.37	19.46	0.03	NA	0.01	0.00	NA	94.43	9
3R-3, 109–113	281.61	Colorless	Vein	P3	8	58.37	0.24	0.40	0.07	0.06	0.05	15.10	21.09	0.01	NA	0.01	0.01	NA	95.40	9
4R-1, 89–92	285.99	Brown	Interstitial	B3	165	35.27	0.00	8.06	1.38	0.43	0.49	34.25	6.10	0.23	0.00	NA	NA	0.00	86.23	6
4R-1, 89–92	285.99	Brown	Interstitial	B3	168	39.90	0.03	7.61	1.10	0.56	0.66	33.39	8.39	0.16	0.06	NA	NA	0.00	91.86	6

Notes: NA = not analyzed. Run numbers: B3, B1, B2 = IFREMER, P1, P3 = Paris VII University.

Table T8. Calcium carbonate, Site 1256 lava pond.

Core, section, interval (cm)	Depth (mbsf)	Run number	Analysis number	Major element oxides (wt%)										
				SiO_2	TiO_2	Al_2O_3	CaO	Na_2O	K_2O	FeO	MgO	MnO	Cl	Total
206-1256D-														
2R-1, 37–40	276.47	P3	63	0.00	0.00	0.00	52.96	0.00	0.00	0.16	0.16	2.38	0.03	55.69
2R-1, 37–40	276.47	P3	64	0.05	0.02	0.00	56.88	0.01	0.00	0.12	0.06	2.12	0.01	59.28

Note: Run number: P3 = Paris VII University.