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5. Data Report: Fluid Inclusion Studies of Detrital Quartz from the Newfoundland Basin, ODP Leg 210, Site 1276[1]

T. Shryane[2] and M. Feely[2]

ABSTRACT

Twenty samples of siltstones and sandstones were taken from Ocean Drilling Program Site 1276 during Leg 210 for fluid inclusion studies. With the exception of one sample of vein calcite, all inclusions were in quartz grains. The results of fluid-inclusion petrology and microthermometry indicate the presence of three fluid inclusion types (Types 1, 2, and 3). Type 1 fluid inclusions are two-phase (liquid + vapor) aqueous inclusions, and Type 2 inclusions are monophase fluid inclusions (liquid or vapor). These are common in all samples and are formed either as primary isolated inclusions or as secondary inclusions as trails along annealed fractures in the grain. Type 3 fluid inclusions are three-phase (liquid + vapor + solid) inclusions. Type 3 inclusions are rare and are observed as isolated inclusions or in a cluster with other types (i.e., Types 1 and 2). The predominant population throughout the different units sampled is two-phase (liquid + vapor) aqueous fluid inclusions (i.e., Type 1). The temperature of homogenization (T_H) bivariate plots for Type 1 inclusions shows dominance throughout the hole of low- to medium-salinity fluids with minimum trapping temperatures between 150° and 400°C.

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[2] Geofluids Research Group, Department of Earth and Ocean Sciences, National University of Ireland, Galway, Ireland.
Correspondence author: **martin.feely@nuigalway.ie**

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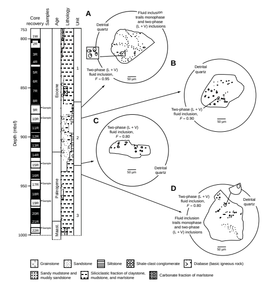
INTRODUCTION

Two holes were drilled on the Newfoundland margin during Ocean Drilling Program Leg 210 (Tucholke, Sibuet, Klaus, et al., 2004). Twenty samples representing the sedimentary units in Hole 1276A were prepared for fluid-inclusion studies. Occurrence and distribution of the fluid inclusions in detrital quartz are shown in Figure F1, and microthermometric data are presented in Table T1.

F1. Petrological observations, Hole 1276A, p. 7.



T1. Fluid inclusion sample data, p. 16.

SAMPLES AND LITHOLOGIES

The sedimentary succession recovered from Site 1276 consists of hemipelagic muds and clays that accumulated in a deep-sea environment. Episodic turbidites and mass-flow deposits introduced coarser grained sediments. Five lithographic units are recognized based on sediment types, mineralogy of biogenic and detrital components, and bedding style (Tucholke, Sibuet, Klaus, et al., 2004). The stratigraphic column (Fig. F1) shows the location of the fluid inclusion samples, the age of the unit, and the corresponding lithology. Unit 1 and 4 lithologies were not suitable for fluid-inclusion studies because the sample material proved to be too fissile for the preparation of double-polished wafers that are used for analysis.

Unit 2 samples (210-1276A-9R-2, 34–37 cm; 10R-2, 37–40 cm; and 15R-2, 41–43 cm) are grainstones, calcareous sandstones, and marlstones of late Paleocene to middle Eocene age. Graded beds of grainstone to claystone are dominant. Petrological analysis shows that within the calcareous sandstones the clasts are dominantly biogenic with abundant foraminifers, radiolarians, and fragments of mollusks and echinoderms. The nonbiogenic fraction (>20%) includes reworked detrital quartz, mica, glauconite, feldspar, and opaque minerals.

Unit 3 samples (210-1276A-17R-4, 92–95 cm; 19R-2, 102–105 cm; and 22R-1, 92–95 cm) are carbonate grainstones and siltstones. These predominantly mud-grade sediments are punctuated by episodic influxes of gravity-flow deposits showing graded units of muds, silts, and sandstones. Between these turbidity-current events, hemipelagic muds accumulated slowly in a low-energy, basin-floor type setting. This unit is of Campanian to late Paleocene age and crosses the Cretaceous/Paleocene boundary interval.

Unit 4 is Turonian–Santonian in age and is dominated by muddy sandstone and sandy mudstone. A single sample of muddy siltstone (210-1276A-27R-5, 87–90 cm) was analyzed from this unit.

The thickest lithologic unit is Unit 5, which contains a high percentage of mudrock and displays turbidite sequences with debris flows and finely laminated black shales. Subunit 5A is Cenomanian to Turonian age and is composed of a number of graded bed units that were emplaced by gravity currents. Subunit 5A samples (210-1276A-30R-5, 84–87 cm, and 34R-1, 114–117 cm) are calcareous sandstone to mudstone turbidites with minor mudrock and black shales. In Subunit 5B the percentage of mudrock increases; these Albian to Cenomanian sediments are dominantly mudrock with minor sandy turbidites and black shales. Samples 210-1276A-41R-2, 89–92 cm; 51R-1, 133–137 cm; 56R-2, 137–142 cm; 68R-4, 19–22 cm; and 73R-2, 84–87 cm (not analyzed), are all from the minor sandstone units of Subunit 5B. Subunit 5C is Albian in age and dominantly mudrock, with minor sandy turbidite units. Sample 210-1276A-79R-CC is from a calcite vein in a siderite concretion, and Samples 80R-1, 76–80 cm; 80R-5, 13–17 cm (not analyzed); 87R-3, 146–150 cm; 90R-2, 50–54 cm; and 96R, 98–101 cm, are taken from carbonate-rich sandy units. In Subunit 5C there are two diabase sills intruded into the sediments.

METHODS

Double-polished fluid-inclusion wafers were used to record the fluid-inclusion petrology and to carry out microthermometric analyses using a microscope-mounted Linkam THMS600 heating and freezing stage. Multiple grains were studied in each sample. Microthermometric analysis of the two-phase (liquid + vapor) aqueous inclusions involves measuring the temperatures at which phase transitions are observed by first cooling the sample and slowly reheating it to measure the temperature of first ice melting (T_{FM}) and the temperature of last ice melting (T_{LM}). These measurements facilitate estimation of fluid salinity expressed as equivalent weight percent of NaCl (Bodnar, 2003). Inclusions were then heated to find the temperature of homogenization (T_H) where liquid and gaseous phases homogenize to one fluid phase (either liquid or vapor); T_H is considered to be the minimum trapping temperature of the fluid. The degree of fill (F) was also estimated for each sample. F is defined as the volume of liquid/volume of liquid + volume of vapor measured at 25°C. All measurements were made by placing an inclusion-bearing sample in an enclosed heating-cooling cell under a microscope and observing phase changes by eye. The microscope is fitted with ×10, ×20, ×40, ×60, and ×100 lenses. Measurement precision is ±0.1°C, and accuracy is within ±1.0°C. The microscope was linked through a digital camera to a PC where fluid inclusion length and area are measured (calculated from plane view dimensions), the degree of fill was calculated, and images of the fluid inclusions were recorded (Shepherd et al., 1985).

RESULTS

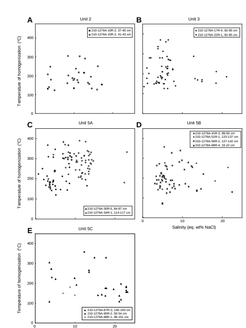
Mineral cements were not developed in any of the samples, and all fluid inclusions identified and selected as suitable for microthermometric analyses occur in detrital quartz grains. Petrological study of the samples identified different fluid inclusions in fine- to medium-grain sand-grade sediments (Fig. F1). All grains were studied in coherent wafers of rock, so where trails of inclusions occurred they could be seen to be confined to individual grains (i.e., there were no intergrain trails of inclusions). Three fluid inclusion types were recognized (i.e., Types 1, 2, and 3). Bivariate T_H-salinity plots are presented in Figure F2.

Type 1 fluid inclusions are two-phase (liquid + vapor) aqueous inclusions. Degree of fill ranges from 0.75 to 0.95. Type 1 inclusions occur in all samples and are the most abundant. They occur in detrital quartz grains as isolated inclusions, in clusters, and in inclusion trails delineating annealed fractures.

Type 2 monophase (liquid or vapor) fluid inclusions are found in all samples within the detrital quartz grains and in calcite veins. They occur as isolated inclusions, in clusters, and as part of inclusion trails in annealed fractures within the detrital grain.

Type 3 fluid inclusions are three-phase (liquid + vapor + solid) inclusions. Type 3 inclusions are rare and were observed as isolated inclu-

F2. Temperature of homogenization and salinity bivariate plots, p. 15.



sions or in a cluster with other types (i.e., Types 1 and 2). Type 3 inclusions were not analyzed in this study because they are too few and too small (<3 µm in the longest dimension) to discern microthermometric properties accurately.

For samples from Unit 2 the plots for Type 1 two-phase (liquid + vapor) aqueous fluid inclusions show that salinity ranges from 3 to 17 eq. wt% NaCl (Samples 210-1276A-10R-2, 37–40 cm, and 15R-2, 41–43 cm). Although there is a wide range in salinity values, T_H values are generally between 130° and 250°C.

Samples from Unit 3 (210-1276A-17R-4, 92–95 cm, and 22R-1, 92–95 cm) display similar T_H and salinity values. Salinity ranges between 1 and 8 eq. wt% NaCl and is notably lower than values recorded in Unit 2. T_H values range from 130° to 370°C; these values reflect a greater range of T_H than that found in Unit 2.

For Subunit 5A the plot of T_H-salinity for Type 1 inclusions shows differences between Samples 210-1276A-30R-5, 84–87 cm, and 34R-1, 114–117 cm. T_H and salinity values for the former show a lower salinity and a lower T_H range than the latter. The plot of T_H-salinity for Subunit 5B shows a wide range of salinity values for the samples (between 3 and 22 eq. wt% NaCl) and a narrower range in T_H values (generally between 135° and 275°C). The plot for T_H and salinity for Subunit 5C shows a difference in T_H and salinity between Samples 210-1276A-87R-3, 146–150 cm; 90R-2, 50–54 cm; and 96R-1, 98–101 cm. A lower value for T_H and higher range of salinity values in Sample 210-1276A-87R-3, 146–150 cm, may be due to the proximity (~3 m) of this sample to the upper dolerite sill. Samples 210-1276A-90R-2, 50–54 cm, and 96R-1, 98–101 cm, were taken from between the upper and lower dolerite sills and show similar salinity (between 3 and 12 eq. wt% NaCl) and T_H values.

All detrital quartz–hosted fluid inclusions analyzed were trapped after quartz crystal growth and are therefore classified as secondary in nature. The provenance of the detrital quartz grains is difficult to determine because no similar studies have been done on quartz grains from elsewhere on the Newfoundland margin. However, temperature and salinity ranges for fluid inclusions in the detrital quartz are similar to those in quartz from a granite-type source area (Feely and Parnell, 2003). Therefore, we consider the trapping of all fluid inclusions to predate incorporation of their host detrital quartz grains into the sediments. These inclusions, however, may be primary or secondary with respect to the formation of the source rock (e.g., granite). Petrographic features (e.g., occurring as trails along annealed fractures) reflect trapping of fluids in the source rock after quartz crystallization. Isolated inclusions and clusters of individuals may reflect trapping of fluid during quartz crystallization in the source rock and may therefore be primary. However, all inclusions within the detrital quartz are inherited and do not reflect trapping of fluids during sedimentation.

SUMMARY

Three fluid inclusion types were recorded from detrital quartz in sediments sampled from Site 1276. The predominant population throughout the different units sampled is two-phase (liquid + vapor) aqueous fluid inclusions (i.e., Type 1). T_H-salinity plots for Type 1 inclusions show a dominance throughout the hole of low- to medium-salinity fluids with minimum trapping temperatures between 150° and 400°C. This is typical of fluid signatures recorded from detrital quartz in other

sedimentary basins and suggests a granitoid source for the quartz (Feely and Parnell, 2003, and references therein).

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Figure F1. Summary of petrological observations of samples from Hole 1276A. Sketches of single detrital quartz grains illustrate types of inclusions. Circles show field of view. **A.** Sample 210-1276A-9R-2, 34–37 cm. Not analyzed because of small size of inclusions. Calcareous sandstone with dominant organic material and common detrital quartz containing fluid inclusions. Minor minerals include rare glauconite. Grains are rounded to subrounded. Fluid inclusions are evident within detrital quartz grains, showing Type 1 two-phase (liquid + vapor [L + V]) inclusions with a high average degree of fill ($F \approx 0.95$), plus monophase inclusions. **B.** Sample 210-1276A-10R-2, 37–40 cm. Calcareous sandstone containing dominant bioclastic material and rare chert, quartz, and glauconite. Detrital quartz grains are angular to subangular in shape. Fluid inclusions observed in detrital quartz are Type 1 two-phase (L + V) inclusions with a high degree of fill ($F \approx 0.90$), Type 2 monophase inclusions, and Type 3 three-phase (L + V + solid) inclusions. Both isolated and trail-type fluid inclusions occur within the detrital quartz. **C.** Sample 210-1276A-15R-2, 41–43 cm. Bioclastic carbonate grainstone containing dominant bioclastic material and rare quartz, glauconite, feldspar, and biotite. Rounded to subrounded detrital quartz contains Type 1 ($F \approx 0.80$) and Type 2 fluid inclusions. Both isolated and trail-type fluid inclusions occur within the detrital quartz grain. **D.** Sample 210-1276A-17R-4, 92–95 cm. Laminated carbonate grainstone with fine-grained sandstone grain size. Sample contains dominant bioclastic materials, common detrital quartz, and rare glauconite and opaque minerals. Fluid inclusions are Types 1 ($F = 0.80$) and 2. Not pictured: Sample 210-1276A-19R-2, 102–105 cm. Not analyzed because of small size of inclusions. Calcite vein within a claystone containing very few, very small (<1 µm) fluid inclusions in trails. Vein has been tectonically altered, generating a distinct fabric across the vein and obscuring inclusions. Maast. = Maastrichtian. (Continued on next seven pages. **Figure shown on next page.**)

Figure F1 (continued). (Caption shown on previous page.)

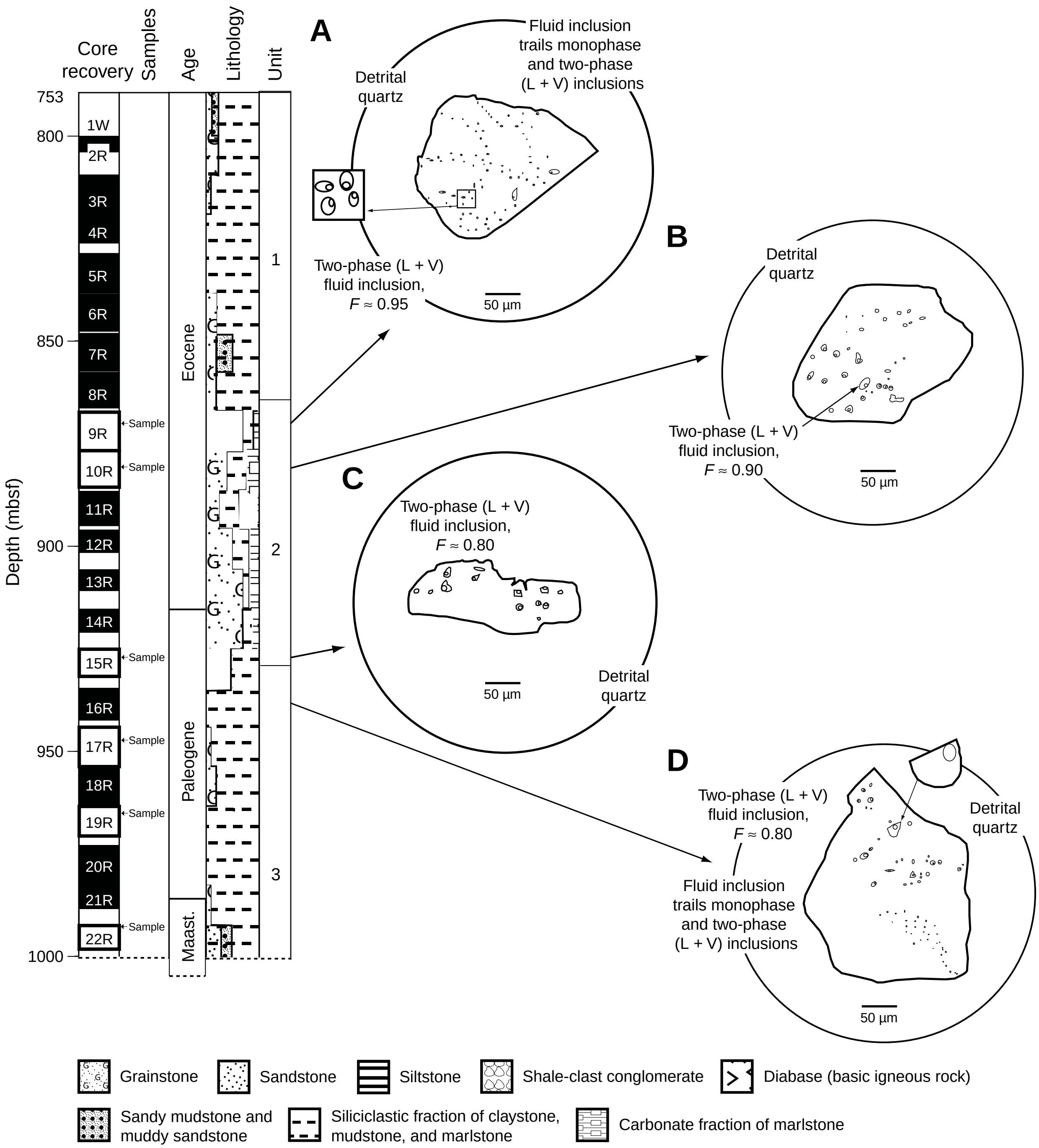

Figure F1 (continued). E. Sample 210-1276A-22R-1, 92–95 cm. Bioclastic carbonate siltstone containing dominant biogenic material and rare quartz, glauconite, opaque minerals, feldspar, and micritic cement. Detrital quartz grains are anhedral and many record different generations of fluid inclusion trails that have cross-cutting relationships developed across the grain. Arrow shows triangular-shaped two-phase (liquid + vapor [L + V]) inclusion. **F.** Sample 210-1276A-27R-5, 87–90 cm. Not analyzed because of small size of inclusions. Only sample from Unit 4 is an intensely bioturbated and fissile muddy siltstone containing common angular quartz grains in a muddy matrix. Both isolated and trail-type fluid inclusions of Types 1 and 2 are present. **G.** Sample 210-1276A-30R-5, 84-87 cm. Laminated siltstone of earliest Turonian age. Major mineralogy includes common quartz, opaque minerals, and rare glauconite. Detrital quartz grains are angular and contain Type 1 two-phase (L + V), Type 2 monophase, and Type 3 three-phase (L + V + solid [S]) inclusions. Fluid inclusions are isolated and also form trails. Arrow shows a three-phase (L + V + S) inclusion where the vapor bubble is oval and the solid is rectangular. **H.** Sample 210-1276A-34R-1, 114–117 cm. Quartz rich laminated upper-Cenomanian siltstone. Dominant mineralogy is quartz with rare biotite, opaque minerals and glauconite. Two types of quartz in this sample: rounded detrital grains containing a network of fluid inclusion trails along annealed factures in the grain, and angular detrital grains containing few fluid inclusions. Fluid inclusions are Types 1 and 2 and occur both as trails and as isolated inclusions. **I.** Sample 210-1276A-41R-2, 89–92 cm. Upper Albian laminated siltstone with interfingered mud-rich and quartz-rich layers. Muddy layers contain reworked bioclastic material. Fine-grained detrital quartz grains are rounded and common. Fluid inclusions are Type 1 & Type 2 and occur both as isolated inclusions and as trails within the detrital quartz grain. Maast. = Maastrichtian, Camp. = Campanian, Sant. = Santonian, Coniac. = Coniacian, Tur. = Turonian. (**Figure shown on next page.**)

Figure F1 (continued). (Caption shown on previous page.)

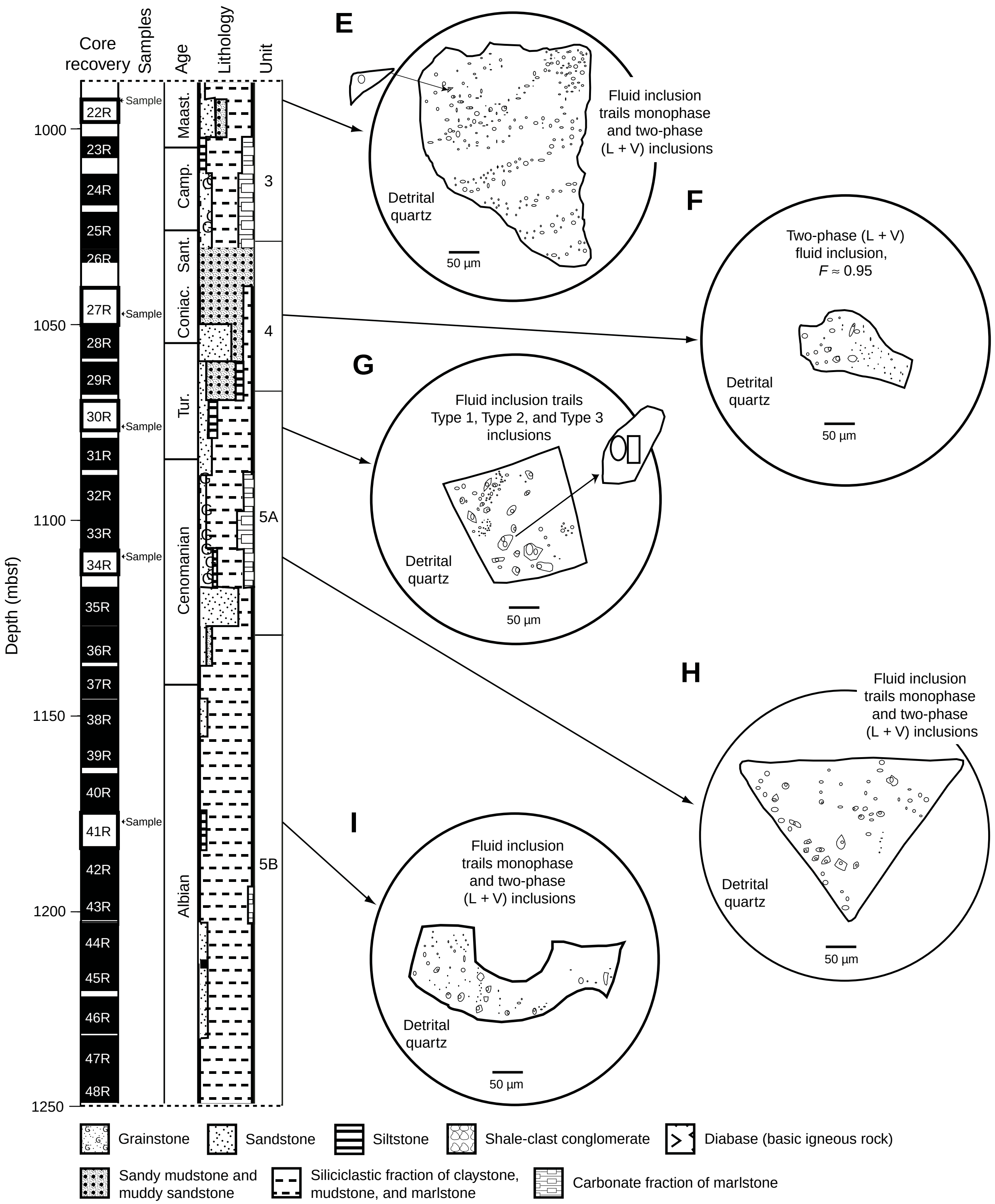

Figure F1 (continued). J. Sample 210-1276A-51R-1, 133–137 cm. Cenomanian to Albian medium-grained grainstone to carbonate siltstone containing dominant biogenic material including foraminifer, calcareous nannofossils, and plant debris. Major mineralogy includes abundant quartz and common glauconite. In angular detrital quartz grains, fluid inclusions show Type 1 and Type 2 inclusions that are isolated or occur as a trail of inclusions along an annealed fracture in the grain. **K.** Sample 210-1276A-56R-2, 137–142 cm. Medium- to fine-grained grainstone containing abundant rounded bioclasts and rare detrital quartz. In detrital quartz grains Type 1 and Type 2 fluid inclusions are evident. **L.** Sample 210-1276A-68R-4, 19–22 cm. Medium-grained sandstone to grainstone with a dominant angular quartz mineralogy. Fluid inclusions are observed as isolated inclusions and as a network of trails of Types 1 and 2. The average degree of fill (F) for the two-phase inclusions is 0.88. Arrows show individual two-phase (liquid + vapor [L + V]) inclusions. Not pictured: Sample 210-1276A-73R-2, 84–87 cm. Not analyzed because of small size of inclusions. Very fine-grained sample of muds and fine siltstone showing slump structures and common opaque minerals. Detrital mineral grains are too small to determine the quartz or calcite composition in the thin section, and no fluid inclusions are detected. (**Figure shown on next page.**)

Figure F1 (continued). (Caption shown on previous page.)

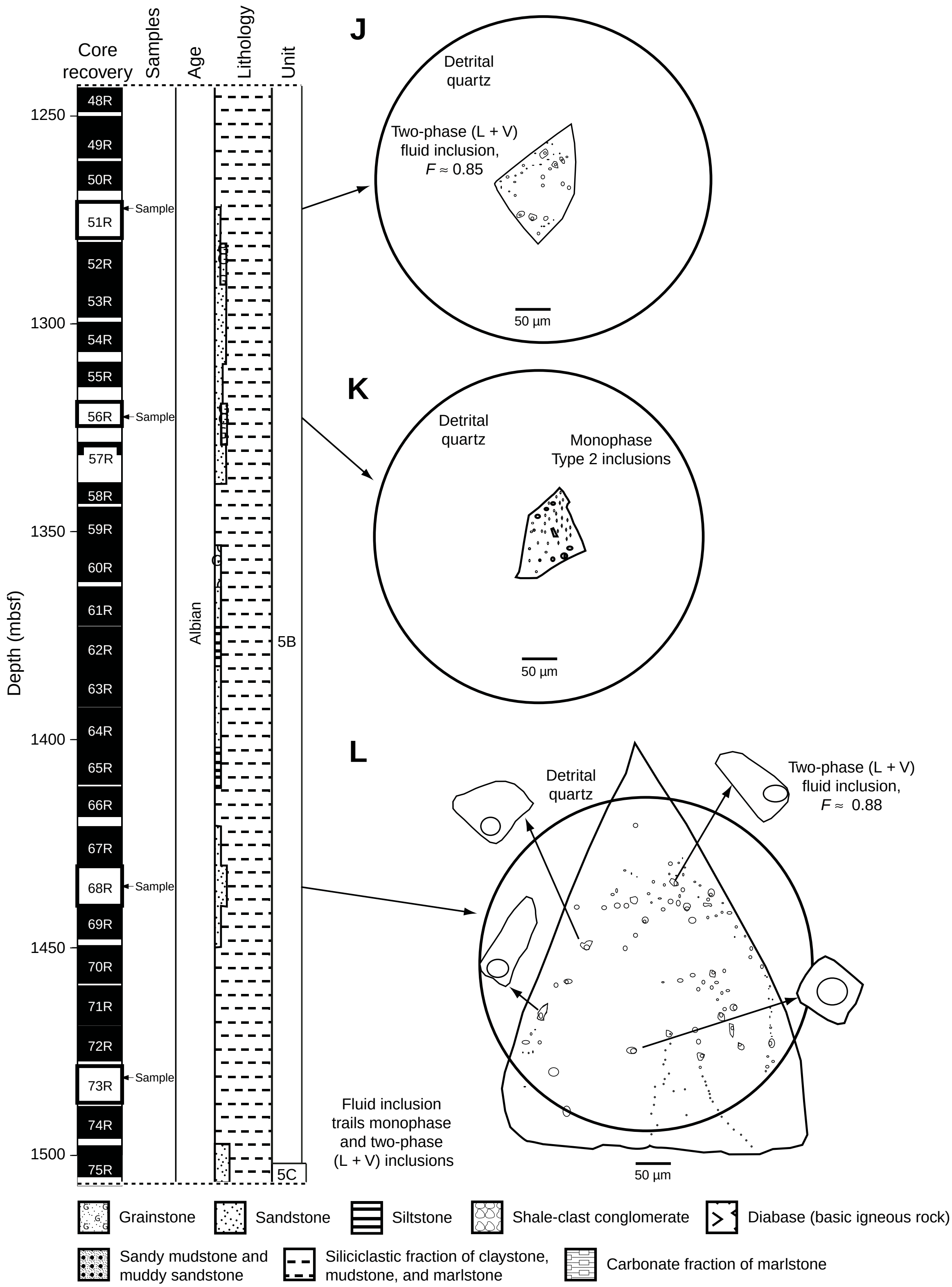

Figure F1 (continued). Not pictured: Sample 210-1276A-80R1, 76–80 cm. Sample from a calcite vein in a siderite concretion within mudstone bands. Fluid inclusions are very small and mostly monophase inclusions. **M.** Sample 210-1276A-87R-3, 146–150 cm. Medium-grained sandstone with abundant quartz grains and containing fluid inclusions. Also contains common bioclastic material, rare pyrite, feldspar, and rock fragments in a clayey matrix. Fluid inclusions in detrital quartz are mostly Type 2 inclusions and are developed in trails along annealed fractures in the grain. **N.** Sample 210-1276A-90R-2, 50–54 cm. Fine- to medium-grained quartz-rich sandstone. Major mineralogy includes abundant angular detrital quartz grains, rare organic debris, and biotite. There are rare metamorphic rock fragments. Fluid inclusions are Types 1 and 2 and occur as isolated inclusions or as a trail of inclusions along an annealed fracture in the grain. **O.** Sample 210-1276A-96R, 98–101 cm. Medium-grained siltstone containing abundant quartz and rare biotite, organic material, and opaque minerals. Type 1 and Type 2 fluid inclusions are evident within the detrital quartz grains. (**Figure shown on next page.**)

Figure F1 (continued). (Caption shown on previous page.)

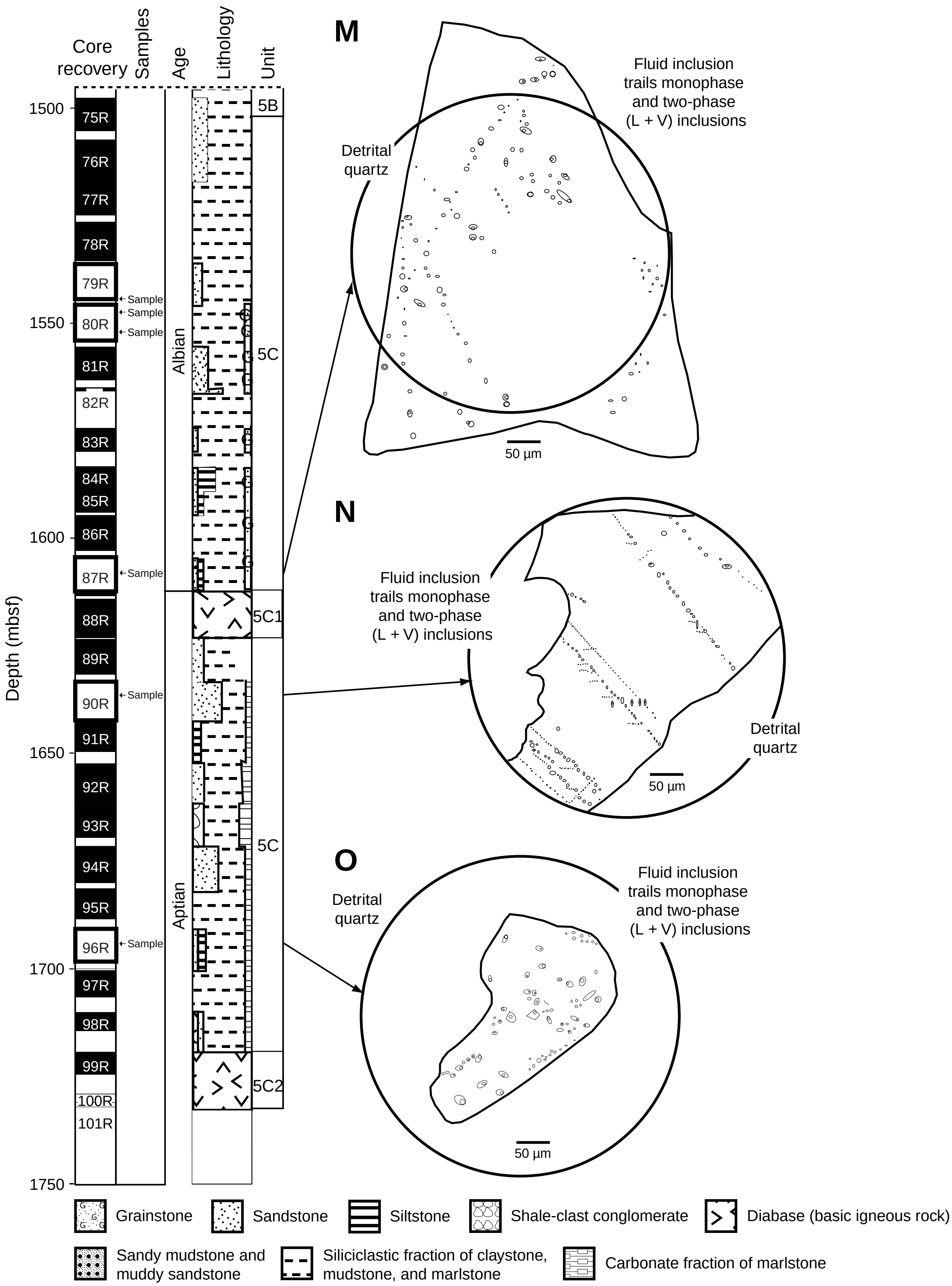

Figure F2. Temperature of homogenization (T_H) and salinity bivariate plots, Hole 1276A.

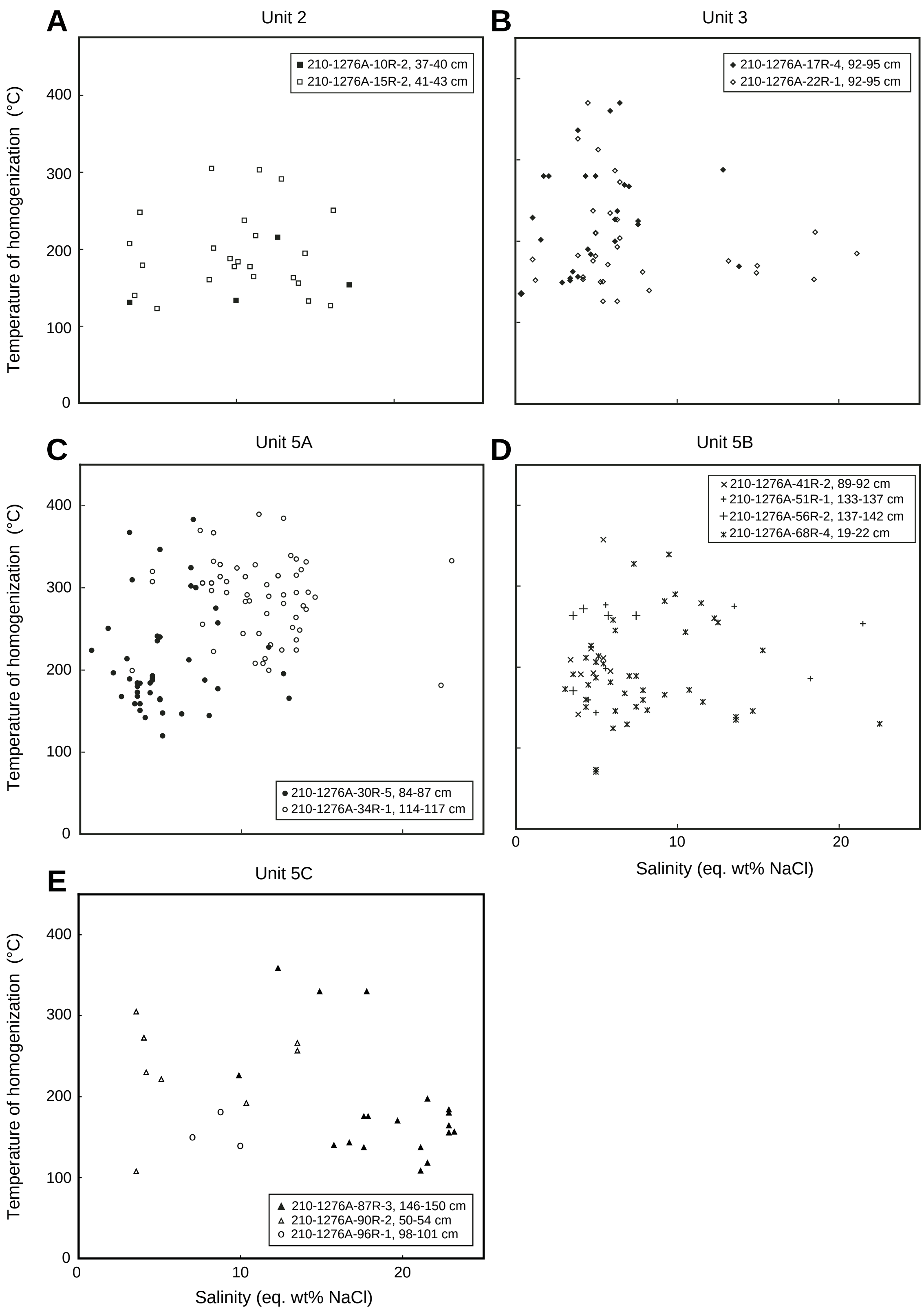

Table T1. Fluid inclusion sample data. (See table notes. Continued on next five pages.)

Sample inclusion (cm)	Sample grain number	Inclusion number	Length (µm)	Area inclusion (µm^2)	Degree of fill	Salinity (eq. wt% NaCl)	T_{FM} (°C)	T_{LM} (°C)	T_H (°C)	Phase changes	Host mineral
210-1276A-10R-2, 37–40	1	1	6.38	16.76	0.93	17.2	–27.7	–13.3	153.6	L+V→L	Quartz
	2	1	7.28	24.76	0.91	12.6		–8.5	215.3	L+V→L	Quartz
	2	2	5.34	12.02	0.90	10.0		–6.6	133.3	L+V→L	Quartz
	2	3	4.82	8.69	0.92	3.2		–9.1	130.7	L+V→L	Quartz
	2	4	5.38	12.72	0.91	10.0		–6.6		L+V→L	Quartz
210-1276A-15R-2, 41–43	1	1	7.19	26.98	0.76	3.9		–2.3	248.0	L+V→L	Quartz
	1	2	10.48	48.54	0.88	3.2		–1.9	207.4	L+V→L	Quartz
	1	3	4.61	13.14	0.81	4.0		–2.4	179.2	L+V→L	Quartz
	1	4	6.27	14.06	0.75	3.6		–2.1	140.0	L+V→L	Quartz
	1	5	3.63	9.95	0.88				168.1	L+V→L	Quartz
	1	6	3.69	7.00	0.72				138.0	L+V→L	Quartz
	1	8	6.60	25.74	0.71	8.4		–5.4	305.1	L+V→L	Quartz
	1	9	4.57	10.95	0.75	9.6		–6.3	187.8	L+V→L	Quartz
	1	10	2.63	6.13	0.84				138.6	L+V→L	Quartz
	1	11	4.57	14.15	0.77	8.6		–5.5	201.4	L+V→L	Quartz
	1	12	9.34	42.32	0.84				185.0	L+V→L	Quartz
	2	2	8.05	23.63	0.86	14.4		–10.4	194.7	L+V→L	Quartz
	2	3	3.21	5.48	0.88	11.1		–7.5	164.2	L+V→L	Quartz
	2	4	2.74	5.95	0.85	10.1		–6.7	183.7	L+V→L	Quartz
	2	5	2.77	4.21	0.84	8.3		–5.3	160.2	L+V→L	Quartz
	3	1	7.11	18.80	0.76	11.2		–7.6	217.7	L+V→L	Quartz
	3	2	2.91	5.63	0.88	14.0		–10.1	155.9	L+V→L	Quartz
	3	3	3.71	7.21	0.91	13.6		–9.7	163.0	L+V→L	Quartz
	3	4	2.72	4.44	0.85	14.6		–10.6	132.6	L+V→L	Quartz
	3	5	3.11	4.06	0.84	16.0		–12.0	126.7	L+V→L	Quartz
	4	1	3.71	9.48	0.88	10.9		–7.3	177.3	L+V→L	Quartz
	4	2	3.01	4.40	0.85	5.0		–3.0	122.7	L+V→L	Quartz
	5	1	3.29	6.75	0.83	10.5		–7.0	237.5	L+V→L	Quartz
	5	2	8.72	31.91	0.90	16.2		–12.2	250.7	L+V→L	Quartz
	5	3	3.62	6.42	0.90	9.9	–38.7	–6.5	177.3	L+V→L	Quartz
	5	4	7.80	19.04	0.78	12.9		–9.0	291.2	L+V→L	Quartz
	5	5	5.03	13.02	0.87	11.5	–34.7	–7.8	303.0	L+V→L	Quartz
210-1276A-17R-4, 92–95	1	1	3.39	7.39	0.84	12.9	–22.0	–9.0	287.8	L+V→L	Quartz
	1	2	3.68	5.55	0.88	13.8		–9.9	169.0	L+V→L	Quartz
	2	1	4.12	6.92	0.83	14.5		–10.5	183.8	L+V→L	Quartz
	3	1	2.77	4.89	0.87	3.4		–2.0	154.4	L+V→L	Quartz
	3	2	3.86	9.90	0.93				151.7	L+V→L	Quartz
	3	3	2.33	4.23	0.84	3.4		–2.0	151.6	L+V→L	Quartz
	3	4	2.91	7.23	0.91	0.4		–0.2	135.5	L+V→L	Quartz
	3	5	2.69	5.78	0.89	3.9		–2.3	156.2	L+V→L	Quartz
	3	6	4.41	12.34	0.91	3.6	–23.0	–2.1	162.5	L+V→L	Quartz
	3	7	4.02	6.70	0.90	2.9		–1.7	149.1	L+V→L	Quartz
	4	1	19.91	291.92	0.86						Quartz
	4	2	20.28	317.68	0.80						Quartz
	4	3	19.95	356.20	0.83						Quartz
	4	4	8.79	72.12	0.85						Quartz
	4	5	8.48	68.39	0.80						Quartz
	5	1	4.94	10.97	0.90	4.5		–2.7	190.0	L+V→L	Quartz
	5	2	5.12	6.79	0.83	1.6		–0.9	201.8	L+V→L	Quartz
	5	3	3.11	6.43	0.82	2.1		–1.2	280.0	L+V→L	Quartz
	5	4	5.82	12.32	0.86	2.7		–1.6	229.0	L+V→L	Quartz
	5	5	5.86	16.67	0.80	5.0		–3.0	280.0	L+V→L	Quartz
	5	6	3.99	7.19	0.76	4.3		–2.6	280.0	L+V→L	Quartz
	5	7	3.26	6.81	0.83	1.7		–1.0	280.0	L+V→L	Quartz
	6	1	4.49	12.32	0.86	5.9	–18.1	–3.6	360.3	L+V→L	Quartz
	6	2	6.81	9.95	0.82	6.5		–4.0	>370	L+V→L	Quartz
	7	1	3.54	9.43	0.88	6.2		–3.8	227.0	L+V→L	Quartz
	7	2	6.95	26.28	0.87	6.2		–3.8	200.0	L+V→L	Quartz
	7	3	3.78	7.48	0.69	6.7		–4.2	269.4	L+V→L	Quartz
	7	4	5.15	10.20	0.83	7.6		–4.8	225.0	L+V→L	Quartz
	7	5	4.19	11.08	0.79	6.3		–3.9	237.0	L+V→L	Quartz
	8	1	3.84	10.93	0.64	3.9		–2.3	336.6	L+V→L	Quartz
	8	2	4.86	7.81	0.85					L+V→L	Quartz
	8	3	3.20	3.31	0.65	0.5		–0.3		L+V→L	Quartz
	8	4	2.35	3.46	0.81				347.4	L+V→L	Quartz
	8	5	3.77	6.59	0.73	7.6		–4.8	220.5	L+V→L	Quartz
	8	6	3.02	3.73	0.69	7.0		–4.4	267.7	L+V→L	Quartz

Table T1 (continued).

Sample inclusion (cm)	Sample grain number	Inclusion number	Length (µm)	Area inclusion (µm^2)	Degree of fill	Salinity (eq. wt% NaCl)	T_{FM} (°C)	T_{LM} (°C)	T_H (°C)	Phase changes	Host mineral
210-1276A-22R-1, 92–95	1	2	4.48	7.53	0.91	8.3		–5.3	139.5	L+V→L	Quartz
	1	5	2.06	3.05	0.90	4.2		–2.5	153.2	L+V→L	Quartz
	1	6	3.85	6.77	0.85	7.9		–5.0	162.3	L+V→L	Quartz
	1	7	3.18	4.70	0.86	1.1		–0.6	177.6	L+V→L	Quartz
	2	2	2.11	5.53	0.92	13.2		–9.3	175.7	L+V→L	Quartz
	2	3	3.10	4.05	0.72	2.9		–2.3	325.9	L+V→L	Quartz
	2	4	6.14	20.49	0.84	18.6	–41.90	–14.9	211.1	L+V→L	Quartz
	2	5	2.34	3.35	0.89	21.2		–18.3	184.8	L+V→L	Quartz
	2	6	2.60	3.23	0.89	18.5		–14.8	152.9	L+V→L	Quartz
	2	7	2.13	3.52	0.90	14.9		–10.9	161.1	L+V→L	Quartz
	3	1	3.99	7.51	0.91	1.2		–0.7	151.9	L+V→L	Quartz
	4	2	3.81	5.57	0.69	4.8		–2.9	175.8	L+V→L	Quartz
	4	3	3.19	7.15	0.84	4.8		–2.9	237.5	L+V→L	Quartz
	4	4	3.68	4.95	0.65	5.0		–3.0	210.6	L+V→L	Quartz
	4	5	3.80	2.92	0.77	5.0		–3.0	181.9	L+V→L	Quartz
	5	1	4.34	6.21	0.81	5.9		–3.6	234.5	L+V→L	Quartz
	5	2	3.07	6.77	0.74	5.0		–3.0	209.9	L+V→L	Quartz
	5	3	3.50	7.17	0.84	3.9		–2.3	182.5	L+V→L	Quartz
	6	1	10.07	31.99	0.90	6.2		–3.8	286.8	L+V→L	Quartz
	6	2	6.86	19.49	0.94	5.4		–3.3	125.9	L+V→L	Quartz
	6	3	4.45	14.73	0.88	5.7		–3.5	171.3	L+V→L	Quartz
	6	5	2.89	3.59	0.92	5.4		–3.3	150.4	L+V→L	Quartz
	6	6	2.45	5.25	0.87	4.2		–2.5	155.7	L+V→L	Quartz
	6	8	3.84	8.94	0.87	5.3		–3.2	149.9	L+V→L	Quartz
	6	9	2.97	4.61	0.86	6.3		–3.9			Quartz
	6	10	4.00	6.08	0.89	6.3		–3.9	125.9	L+V→L	Quartz
	6	11	3.96	8.50	0.72	6.5		–4.0	272.8	L+V→L	Quartz
	6	13	2.97	4.16	0.84	6.3		–3.9	226.5	L+V→L	Quartz
	6	14	4.53	10.52	0.78	6.3		–3.9	192.9	L+V→L	Quartz
	7	1	6.14	17.97	0.87	4.5		–2.7			Quartz
	7	2	6.20	15.03	0.88	6.5		–4.0	203.9	L+V→L	Quartz
	7	3	8.68	26.87	0.76	5.1		–3.1	312.7	L+V→L	Quartz
210-1276A-30R-5, 84–87	1	1	2.69	5.91	0.81	8.0		–5.1	144.2	L+V→L	Quartz
	1	3	3.95	10.35	0.86	8.6		–5.5	177.0	L+V→L	Quartz
	2	1	6.06	20.79	0.86	2.9	–51.1	–1.7	213.5	L+V→L	Quartz
	3	1	4.33	7.64	0.85	5.0		–3.0	164.6	L+V→L	Quartz
	3	2	2.62	4.84	0.86	5.1		–3.1	147.4	L+V→L	Quartz
	3	3	4.27	9.46	0.82	3.1		–1.8	188.9	L+V→L	Quartz
	4	1	8.17	26.04	0.80	4.8		–2.9	241.1	L+V→L	Quartz
	4	2	3.40	6.17	0.89	12.6		–8.8	195.1	L+V→L	Quartz
	4	4		6.34	0.82	11.7		–8.0	227.5	L+V→L	Quartz
	4	5		3.39	0.91	0.7		–0.4	223.8	L+V→L	Quartz
	5	1	3.73	6.85	0.90	6.9		–4.3	324.4	L+V→L	Quartz
	5	2	3.78	5.14	0.78	6.9		–4.3	302.3	L+V→L	Quartz
	5	3	2.53	3.33	0.92	5.0		–3.0	240.0	L+V→L	Quartz
	5	4	2.40	4.91	0.87	3.2		–1.9	309.6	L+V→L	Quartz
	5	5	3.21	3.26	0.94	1.7		–1.0	250.5	L+V→L	Quartz
	5	6	2.64	3.50	0.91	5.0		–3.0	346.6	L+V→L	Quartz
	6	1	5.57	11.36	0.85	7.7		–4.9	187.6	L+V→L	Quartz
	6	2	3.69	6.21	0.81	5.1		–3.1	119.7	L+V→L	Quartz
	6	3	5.08	10.33	0.89	2.1		–1.2	196.2	L+V→L	Quartz
	6	4	3.54	8.98	0.93	4.3		–2.6	172.2	L+V→L	Quartz
	6	5	3.30	4.38	0.91	3.7		–2.2	183.6	L+V→L	Quartz
	6	6	3.05	5.96	0.89	3.4		–2.0	158.6	L+V→L	Quartz
	7	1	16.06	135.04	0.83	4.8		–2.9	235.4	L+V→L	Quartz
	8	1	12.78	58.54	0.82	8.6		–5.5	257.3	L+V→L	Quartz
	8	2	4.99	12.49	0.86	8.4		–5.4	275.1	L+V→L	Quartz
	9	1	6.46	25.25	0.91	6.7		–4.2	212.3	L+V→L	Quartz
	9	2	3.01	8.11	0.86	5.0		–3.0	163.6	L+V→L	Quartz
	9	3	1.78	3.29	0.80	3.7		–2.2	150.6	L+V→L	Quartz
	10	1	3.47	5.70	0.88	13.0		–9.1	165.5	L+V→L	Quartz
	11	2	12.72	51.33	0.73	7.2		–4.5		L+V→L	Quartz
	12	1	6.36	18.27	0.82	3.1		–1.8	367.2	L+V→L	Quartz
	12	2	3.39	5.42	0.73	7.0		–4.4	383.2	L+V→L	Quartz
	13	1	4.42	12.57	0.91	4.5		–2.7	192.8	L+V→L	Quartz
	13	2	2.43	3.44	0.81	4.3		–2.6	184.0	L+V→L	Quartz
	13	3	4.26	7.68	0.85	3.7		–2.2	158.6	L+V→L	Quartz
	13	4	2.95	3.89	0.80	3.6		–2.1	184.0	L+V→L	Quartz

Table T1 (continued).

Sample inclusion (cm)	Sample grain number	Inclusion number	Length (µm)	Area inclusion (µm²)	Degree of fill	Salinity (eq. wt% NaCl)	T_{FM} (°C)	T_{LM} (°C)	T_H (°C)	Phase changes	Host mineral
	13	5	3.58	5.64	0.80	4.5		–2.7	187.4	L+V→L	Quartz
	13	6	2.36	2.94	0.91	2.6		–1.5	167.6	L+V→L	Quartz
	13	7	2.40	2.62	0.90	3.6		–2.1	172.9	L+V→L	Quartz
	13	8	2.88	2.88	0.91	3.6		–2.1	167.7	L+V→L	Quartz
	13	9	2.53	3.35	0.92	3.6		–2.1	179.9	L+V→L	Quartz
	13	10	3.51	9.13	0.81	4.5		–2.7	189.8	L+V→L	Quartz
210-1276A-34R-1, 114–117	1	1	2.62	5.21	0.78	3.2		–1.9	199.0	L+V→L	Quartz
	2	1	4.96	17.71	0.87	8.1		–5.2	305.6	L+V→L	Quartz
	2	2	5.62	26.55	0.84	8.1		–5.2	296.5	L+V→L	Quartz
	2	3	6.95	25.68	0.91	7.6		–4.8	305.6	L+V→L	Quartz
	2	4	11.11	48.02	0.78	10.2	–24.8	–6.8	313.5	L+V→L	Quartz
	2	5	4.25	11.33	0.90	9.1		–5.9	294.1	L+V→L	Quartz
	2	6	3.32	5.70	0.80	9.1		–5.9	307.6	L+V→L	Quartz
	2	7	6.39	16.76	0.90	4.5		–2.4	307.6	L+V→L	Quartz
	2	8	9.58	51.93	0.79	8.7	26.1	–5.6	328.1	L+V→L	Quartz
	2	9	4.99	12.74	0.82	8.7		–5.6	313.4	L+V→L	Quartz
	2	10	5.55	17.22	0.81	8.3		–5.3	367.0	L+V→L	Quartz
	2	11	7.69	28.11	0.81	12.3		–8.5	314.4	L+V→L	Quartz
	3	1	6.42	18.27	0.90	9.2		–6.0			Quartz
	3	2	3.40	12.06	0.85	10.2		–6.8			Quartz
	3	4	7.69	21.34	0.81	8.4	–41.5	–5.4			Quartz
	4	1	21.00	221.67	0.78	23.1	–40.0	–21.0	333.0	L+V→L	Quartz
	4	2	9.66	25.06	0.87	22.8	–40.0	–20.6			Quartz
	4	3	5.41	12.31	0.90			–22.3	131.4	L+V→L	Quartz
	4	4	3.50	7.47	0.91	22.4		–20.0	181.3	L+V→L	Quartz
	4	5	16.69								Quartz
	4	6	3.56	6.66	0.90				157.2	L+V→L	Quartz
	4	7				16.0		–12.0			Quartz
	5	1	12.12	102.09	0.84	10.2	–25.0	–6.8	283.4	L+V→L	Quartz
	5	2	15.18	105.33	0.81	10.4	–29.1	–6.9	291.3	L+V→L	Quartz
	5	3	4.66	8.18	0.92	10.6		–7.1			Quartz
	5	4	5.77	21.77	0.92	8.4		–5.4			Quartz
	6	2	3.63	7.88	0.75	12.5		–8.7			Quartz
	6	3	4.47	7.07	0.84	6.5		–4.0			Quartz
	6	4	4.82	6.13	0.81	7.5		–4.7			Quartz
	6	5	4.69	7.89	0.85	12.3		–8.5			Quartz
	6	6	6.21	20.66	0.89	9.9		–6.5			Quartz
	7	1	4.76	12.47	0.74	4.5		–2.6	319.7	L+V→L	Quartz
	8	1	3.75	6.66	0.83	0.9		–0.5			Quartz
	8	2	2.78	5.21	0.78	2.7		–1.6			Quartz
	9	1	17.83	85.33	0.86	13.8	–37.5	–9.9	277.9	L+V→L	Quartz
	9	2	7.33	23.97	0.83	13.1		–9.2	339.0	L+V→L	Quartz
	9	3	7.49	33.51	0.93	13.4	–30.0	–9.5	224.0	L+V→L	Quartz
	9	5	24.81	129.28	0.98	14.6		–10.6			Quartz
	9	6	5.44	17.05	0.92	12.5		–8.7	224.0	L+V→L	Quartz
	9	7	4.05	13.02	0.87	13.4		–8.6	264.0	L+V→L	Quartz
	9	8	3.95	7.04	0.84						Quartz
	9	9	4.66	15.24	0.78	13.4		–9.5	335.0	L+V→L	Quartz
	10	1	13.07	106.60	0.79	10.5		–7.0	284.0	L+V→L	Quartz
	10	2	14.72	96.37	0.74	12.6		–8.8	291.3	L+V→L	Quartz
	11	1	4.96	17.71	0.87	8.1		–5.2	305.6	L+V→L	Quartz
	11	2	5.63	26.55	0.84	8.1		–5.2	296.5	L+V→L	Quartz
	11	3	6.95	25.68	0.91	7.6		–4.8	305.6	L+V→L	Quartz
	11	4	11.11	48.02	0.78	10.2	–28.8	–6.8	313.5	L+V→L	Quartz
	11	5	4.25	11.33	0.90	9.1		–5.9	294.1	L+V→L	Quartz
	11	6	3.32	5.70	0.80	9.1		–5.9	307.6	L+V→L	Quartz
	11	7	6.39	16.76	0.90	4.5		–2.4	307.6	L+V→L	Quartz
	11	8	9.58	51.93	0.79	8.7	–26.1	–5.6	328.1	L+V→L	Quartz
	11	9	4.99	12.74	0.82	8.7		–5.6	313.4	L+V→L	Quartz
	11	10	5.55	17.22	0.81	8.3		–5.3	367.0	L+V→L	Quartz
	11	11	7.69	28.11	0.81	12.3		–8.5	314.4	L+V→L	Quartz
	12	1	8.26	22.11	0.92	13.2	–21.9	–9.3	251.7	L+V→L	Quartz
	12	2	4.91	15.71	0.79	11.6		–7.9	303.5	L+V→L	Quartz
	12	3	4.37	8.96	0.80	11.1		–7.5	244.0	L+V→L	Quartz
	12	4	2.84	8.09	0.86	11.5		–7.8	213.6	L+V→L	Quartz
	12	5	2.73	6.13	0.89	11.7		–8.0	289.7	L+V→L	Quartz
	12	6	4.37	11.97	0.90	14.6		–10.6	288.5	L+V→L	Quartz

Table T1 (continued).

Sample inclusion (cm)	Sample grain number	Inclusion number	Length (µm)	Area inclusion (µm²)	Degree of fill	Salinity (eq. wt% NaCl)	T_{FM} (°C)	T_{LM} (°C)	T_H (°C)	Phase changes	Host mineral
	12	7	3.86	7.30	0.84	10.9		–7.3	208.0	L+V→L	Quartz
	12	8	3.51	8.30	0.86	11.8		–8.1	230.3	L+V→L	Quartz
	12	9	3.88	7.86	0.85	11.6		–7.9	268.4	L+V→L	Quartz
	12	10	4.86	11.20	0.84	7.5		–4.7	369.9	L+V→L	Quartz
	12	11	3.90	10.97	0.84	11.3		–7.7	208.0	L+V→L	Quartz
	12	12	4.20	8.79	0.80	10.1		–6.7	244.3	L+V→L	Quartz
	12	13	10.31	58.55	0.66	8.3	–32.7	–5.3	332.2	L+V→L	Quartz
	12	14	4.80	8.28	0.86	10.9		–7.3	328.0	L+V→L	Quartz
	12	15	3.95	8.13	0.86	8.3		–5.3	222.4	L+V→L	Quartz
	13	1	9.28	43.26	0.63	11.3	–22.7	–7.7		L+V→L	Quartz
	13	2	6.03	14.73	0.78	13.4		–9.5		L+V→L	Quartz
	13	3	7.11	23.03	0.77	13.7		–9.8	321.8	L+V→L	Quartz
	13	4	4.85	6.53	0.82	11.1		–7.5	389.4	L+V→L	Quartz
	13	5	6.02	15.71	0.79	12.6		–8.8	398.5	L+V→L	Quartz
	13	6	5.55	10.42	0.83	12.6		–8.8	384.6	L+V→L	Quartz
	13	7	3.73	12.42	0.91	14.2	–31.0	–10.2	294.5	L+V→L	Quartz
	13	9	6.47	19.47	0.83	13.4		–9.5	315.1	L+V→L	Quartz
	13	10	3.47	6.72	0.83	9.7		–6.4	324.2	L+V→L	Quartz
	13	11	7.76	18.38	0.78	14.0		–10.1	331.5	L+V→L	Quartz
	13	12	7.03	16.05	0.85	13.4		–9.5	294.3	L+V→L	Quartz
	14	1	4.92	14.07	0.88	13.4		–9.5	236.5	L+V→L	Quartz
	14	2	4.97	12.78		14.0		–10.1	273.7	L+V→L	Quartz
	14	3	5.92	16.35	0.89	12.6		–8.8	280.9	L+V→L	Quartz
	14	4	6.47	19.35	0.73	7.6		–4.8	255.5	L+V→L	Quartz
	15	1	4.66	10.74	0.84	11.7	–21.9	–8.0	199.6	L+V→L	Quartz
	16	1	8.56	20.40	0.88	13.6		–9.7	248.5	L+V→L	Quartz
	16	2	6.33	19.89	0.91	13.5	–25.8	–9.6			Quartz
	16	3	5.72	17.87	0.87	13.7		–9.8			Quartz
	16	4	5.94	20.10	0.91	13.7		–9.8			Quartz
	16	5	9.57	42.32	0.94	13.4	–25.8	–9.5			Quartz
210-1276A-41R-2, 89–92	1	1	8.35	25.46	0.91		–50.8				Quartz
	2	1	3.83	10.56	0.83	5.4		–3.3	357.6	L+V→L	Quartz
	2	3	2.92	5.50	0.68	3.4		–2.0	209.0	L+V→L	Quartz
	2	4	3.63	9.58	0.82	3.9		–2.3	141.4	L+V→L	Quartz
	2	5	4.67	18.23	0.90	2.4		–1.4			Quartz
	3	1	6.92	25.38	0.87	4.7		–2.8	222.8	L+V→L	Quartz
	3	2	4.20	6.87	0.75	4.0		–2.4	190.9	L+V→L	Quartz
	3	3	3.26	7.73	0.85	4.8		–2.9	192.4	L+V→L	Quartz
	3	4	3.27	7.98	0.86	3.4		–2.0			Quartz
	3	5	3.40	6.96	0.83	2.4		–1.4			Quartz
	4	1	7.01	15.84	0.85	10.6	–25.0	–7.1	388.5	L+V→L	Quartz
	4	2	3.83	8.41	0.86				388.5	L+V→L	Quartz
	4	3	2.76	4.67	0.75	15.8		–11.8			Quartz
	5	1	4.07	6.68	0.90	5.9		–3.6	195.0	L+V→L	Quartz
	5	2	3.84	6.68	0.90	5.4		–3.3	211.0	L+V→L	Quartz
210-1276A-51R-1, 133–137	1	1	2.61	4.16	0.72	13.5		–9.6	275.1	L+V→L	Quartz
	1	2	3.58	3.29	0.80	13.5		–9.6			Quartz
	1	3	2.61	2.35	0.72	7.6		–4.8			Quartz
	1	4	2.62	3.29	0.80	11.5		–7.8			Quartz
	1	5	2.64	3.29	0.80	7.7		–4.9			Quartz
	2	1	3.27	6.45	0.82	5.6		–3.4	277.0	L+V→L	Quartz
	2	2	2.92	5.40	0.66	5.6		–3.4	198.0	L+V→L	Quartz
	2	3	3.39	7.96	0.86	4.7		–2.8		L+V→L	Quartz
	2	4	2.88	6.60	0.83	5.0		–3.0	143.6	L+V→L	Quartz
	3	1	9.43	50.14	0.72			–25.5	281.0	L+V→L	Quartz
	4	1	5.79	9.65	0.88	18.2		–14.5	185.9	L+V→L	Quartz
	4	2	3.30	4.20	0.84	21.5		–18.7	253.6	L+V→L	Quartz
	5	1	2.26	3.41	0.84	4.5		–2.7	159.5	L+V→L	Quartz
210-1276A-56R-2, 137–142	1	1	2.89	5.21	0.78	5.7		–3.5	263.4	L+V→L	Quartz
	1	2	3.52	4.95	0.77	3.6		–2.1	263.6	L+V→L	Quartz
	1	3	2.95	5.53	0.79	7.5		–4.7	263.6	L+V→L	Quartz
	1	4	2.65	2.58	0.85	3.6		–2.1	170.5	L+V→L	Quartz
	2	1	6.69	20.10	0.94	4.7		–2.8			Quartz
	3	1	7.32	29.25	0.65		–62.5		257.0	L+V→L	Quartz
	3	2	6.62	26.50	0.75	4.2		–2.5	272.0	L+V→L	Quartz
210-1276A-68R-4, 19–22	1	1	7.29	34.19	0.93		–22.9		175.8	L+V→L	Quartz

Table T1 (continued).

Sample inclusion (cm)	Sample grain number	Inclusion number	Length (µm)	Area inclusion (µm^2)	Degree of fill	Salinity (eq. wt% NaCl)	T_{FM} (°C)	T_{LM} (°C)	T_H (°C)	Phase changes	Host mineral
	1	2	6.62	30.25	0.89	11.6		–7.9	156.9	L+V→L	Quartz
	1	3	3.61	10.91	0.89	22.5		–20.2	129.9	L+V→L	Quartz
	2	1	8.79	44.84	0.91	5.1		–3.1	213.7	L+V→L	Quartz
	2	2	8.92	44.52	0.91	5.0		–3.0	187.0	L+V→L	Quartz
	2	3	3.50	8.56	0.80	4.7		–2.8	226.5	L+V→L	Quartz
	2	4	3.73	8.82	0.93	5.0		–3.0	206.3	L+V→L	Quartz
	2	5	5.96	19.25	0.88	4.5		–2.7	178.1	L+V→L	Quartz
	2	6	6.03	12.46	0.91	5.0		–3.0	206.3	L+V→L	Quartz
	3	1	10.07	61.98	0.74	9.5	–36.0	–6.2			Quartz
	3	2	13.24	91.63	0.78	9.5	–36.0	–6.2			Quartz
	3	3	19.98	213.71	0.71	7.3	–20.2	–4.6	327.6	L+V→L	Quartz
	3	4	31.44	302.95	0.91	9.5		–6.2	339.1	L+V→L	Quartz
	4	1	4.39	7.04	0.91	5.9		–3.6	181.1	L+V→L	Quartz
	4	2	5.16	5.10	0.87	6.0		–3.7	258.2	L+V→L	Quartz
	4	3	3.43	8.45	0.86	3.6		–2.1	191.1	L+V→L	Quartz
	4	4	2.61	10.42	0.94	3.1		–1.8	172.9	L+V→L	Quartz
	4	5	2.97	9.39	0.93	6.0		–3.7	124.2	L+V→L	Quartz
	5	1	13.14	48.37	0.93	12.3		–8.5	260.5	L+V→L	Quartz
	5	2	4.24	12.51	0.91	9.9		–6.5	290.0	L+V→L	Quartz
	5	3	7.41	21.22	0.95	12.5		–8.7	255.1	L+V→L	Quartz
	5	4	3.02	7.30	0.92	10.5		–7.0	243.1	L+V→L	Quartz
	6	1	7.12	26.15	0.88	11.5		–7.8	279.1	L+V→L	Quartz
	6	2	4.25	9.52	0.88	15.3		–11.3	220.7	L+V→L	Quartz
	7	1	7.88	29.28	0.92	8.1	–38.0	–5.2	146.7	L+V→L	Quartz
	7	2	5.16	13.47	0.91	14.7		–10.7	145.7	L+V→L	Quartz
	7	3	6.14	23.24	0.92	13.6		–9.7	134.9	L+V→L	Quartz
	7	4	6.36	21.64	0.95	13.6		–9.7	138.3	L+V→L	Quartz
	8	1	6.47	15.71	0.93	3.6		–2.1			Quartz
	8	2	5.82	18.46	0.94	2.6		–1.5			Quartz
	8	3	3.81	7.45	0.91	6.9		–4.3	129.1	L+V→L	Quartz
	8	6	6.28	24.55	0.95	6.2	–47.1	–3.8	245.1	L+V→L	Quartz
	9	1	8.26	36.73	0.91	7.9	–25.0	–5.0	159.5	L+V→L	Quartz
	9	2	4.47	10.03	0.89	5.0		–3.0	73.1	L+V→L	Quartz
	9	3	6.33	21.50	0.92	6.7		–4.2	167.5	L+V→L	Quartz
	9	4	7.77	24.50	0.83	5.0		–3.0	70.2	L+V→L	Quartz
	9	5	3.95	14.60	0.92	6.2	–25.0	–3.8	145.5	L+V→L	Quartz
	9	6	10.95	62.22	0.93	7.9		–5.0	171.4	L+V→L	Quartz
	10	1	13.01	65.42	0.84	5.4	–21.0	–3.3	204.1	L+V→L	Quartz
	10	2	8.26	22.20	0.97	4.3		–2.6	159.7	L+V→L	Quartz
	10	3	4.04	7.81	0.92	4.3		–2.6	150.7	L+V→L	Quartz
	10	4	8.73	27.15	0.94	4.3		–2.6	211.3	L+V→L	Quartz
	11	1	6.29	25.68	0.93	10.7	–43.8	–2.7	171.8	L+V→L	Quartz
	11	2	3.61	10.76	0.89						Quartz
	11	4	5.55	15.11	0.88		–43.8		227.8	L+V→L	Quartz
	11	5	3.44	9.18	0.87						Quartz
	12	1	16.11	96.52	0.89	9.2	–15.6	–6.0	281.4	L+V→L	Quartz
	12	2	5.64	13.45	0.87	7.5		–4.7	189.0	L+V→L	Quartz
	12	3	5.77	12.83	0.91	7.0		–4.4	189.0	L+V→L	Quartz
	12	4	5.10	13.34	0.91	7.5		–4.7	151.1	L+V→L	Quartz
	12	5	4.00	7.73	0.85	9.2		–6.0	165.6	L+V→L	Quartz
210-1276A-80R-1, 76–80	1	1	4.61	10.97	0.90	8.3		–5.3			Vein calcite
	1	2	5.33	16.12	0.93	8.3		–5.3			Vein calcite
	1	3	3.79	6.62	0.74	7.7		–4.9			Vein calcite
	2	1	5.55	26.33	0.76	7.5		–4.7			Vein calcite
	2	2	5.24	11.32	0.79	3.4		–2.0			Vein calcite
	2	3	4.68	12.21	0.86	2.7		–1.6			Vein calcite
	3	1	7.11	25.44	0.68	1.2		–0.7			Vein calcite
	3	2	3.43	7.58	0.77	0.2		–0.1			Vein calcite
	4	1	4.39	9.97	0.88	2.1		–1.2			Vein calcite
	4	2	2.92	4.37	0.84	5.3		–3.2			Vein calcite
210-1276A-87R-3, 146–150	1	1	9.02	22.96	0.90	14.9	–52.5	–14.2	330.0	L+V→L	Quartz
	1	2	7.49	19.32	0.91	17.9	–53.5	–14.2	175.5	L+V→L	Quartz
	1	3	4.51	7.70	0.86	17.6		–13.8	137.2	L+V→L	Quartz
	1	5	6.43	18.42	0.94	16.7	–52.5	–12.8	143.2	L+V→L	Quartz
	1	6	5.78	19.55	0.87	17.8	–54.6	–14.1	330.0	L+V→L	Quartz
	1	7	4.94	7.56	0.85	17.6		–13.8	175.4	L+V→L	Quartz
	1	8	4.79	7.45	0.91	15.8		–11.8	140.0	L+V→L	Quartz

Table T1 (continued).

Sample inclusion (cm)	Sample grain number	Inclusion number	Length (µm)	Area inclusion (µm^2)	Degree of fill	Salinity (eq. wt% NaCl)	T_{FM} (°C)	T_{LM} (°C)	T_H (°C)	Phase changes	Host mineral
	2	1	6.78	24.07	0.95	23.2		–21.3	156.4	L+V→L	Quartz
	2	2	15.01	77.92	0.95	22.9	–38.2	–20.7	184.1	L+V→L	Quartz
	2	3	12.23	67.66	0.94	22.9	–36.9	–20.7	180.1	L+V→L	Quartz
	2	4	5.90	21.76	0.89	22.9		–20.7	155.4	L+V→L	Quartz
	2	5	6.79	12.06	0.95	21.5		–19.8	197.3	L+V→L	Quartz
	2	6	21.37	233.20	0.50	14.2	–36.4	–10.2			Quartz
	2	7	7.12	17.82	0.90	22.9		–20.7	164.3	L+V→L	Quartz
	2	8	10.13	29.20	0.94	19.7		–16.3	170.3	L+V→L	Quartz
	2	9	7.96	18.38	0.90	21.1		–18.2	108.3	L+V→L	Quartz
	2	10	4.23	9.46	0.93	21.1		–18.2	137.3	L+V→L	Quartz
	2	11	5.53	10.31	0.94	21.5		–19.8	118.3	L+V→L	Quartz
	3	1	15.79	85.84		12.3		–8.5	358.8	L+V→L	Quartz
	3	2	4.20	10.50		9.9		–6.5	226.1	L+V→L	Quartz
210-1276A-90R-2, 50–54	1	1	23.03	315.78	0.81	13.5	–23.1	–9.6	256.7	L+V→L	Quartz
	1	2	6.15	33.49	0.84	13.5		–9.6	266.3	L+V→L	Quartz
	1	3	11.77	67.27	0.89		–32.0				Quartz
	1	4	8.78	30.74	0.94	3.6	–32.0	–2.1	107.8	L+V→L	Quartz
	2	1	3.64	10.99	0.90	4.0		–2.4	272.5	L+V→L	Quartz
	2	2	9.54	40.49	0.94	4.0	–29.0	–2.4	272.5	L+V→L	Quartz
	2	3	6.89	34.85	0.91	5.1	–29.0	–3.1	221.5	L+V→L	Quartz
	2	4	10.55	49.22	0.92	4.2		–2.5	230.1	L+V→L	Quartz
	2	5	4.99	19.66	0.88	3.6		–2.1	305.1	L+V→L	Quartz
	3	1	27.21	133.77	0.92	10.4	–39.5	–6.9	192.2	L+V→L	Quartz
210-1276A-96R-1, 98–101	1	1	10.97	26.44	0.91	8.7	–34.7	–5.6	181.1	L+V→L	Quartz
	1	2	6.46	19.74	0.88	7.0	–34.7	–4.4	150.1	L+V→L	Quartz
	1	3	3.13	5.19	0.78	3.4		–2.0			Quartz
	1	4	4.80	10.46	0.89	10.0		–6.6	140.0	L+V→L	Quartz

Notes: Fluid inclusion length refers to longest direction. For degree of fill, F = volume of liquid/(volume of liquid + volume of vapor). Salinity estimated using T_{LM}. T_{FM} = temperature of first ice melting, T_{LM} = temperature of last ice melting, T_H = temperature of homogenization. L + V → L indicates homogenization of the liquid (L) and vapor (V) phases to the liquid phase (i.e., by the disappearance of the vapor bubble). Blank cells = not measured.