



Core Photo

cm	Piece Number	Graphic Representation	Orientation	Shipboard Studies	Lithologic Unit	Igneous Lithology	Hydrothermal Alteration	Mineralization
0	1			TSB	1			
10								
20								
30								
40								
50								
60								
70								
80								
90								
100								
110								
120								
130								
140								
150								

193-1190A-1R-1 (Section top: 0.0 mbsf)

ROCK NAME: Fresh, moderately vesicular, sparsely plagioclase-phyric dacite.

UNIT: 1

Piece: 1

Interval Location:	Core	Section	Piece	Depth (cm) in Section	Depth (mbsf)
Upper contact	1R	1	1	0	0
Lower contact:	1R	1	1	6	0.06
Thickness (m): 0.06					

CONTACTS: None.

PHENOCRYSTS: % Grain Size (mm):

Mineral	Mode	Max	Min	Avg.	Shape/Habit
Plagioclase	Trace	1	0.1	<1	Laths
Clinopyroxene	Trace	1	0.1	<1	Euhedral

GROUNDMASS: Glass.

VESICLES: 5%. The mm-scale vesicles have elongate tube shapes.

COLOR: Black.

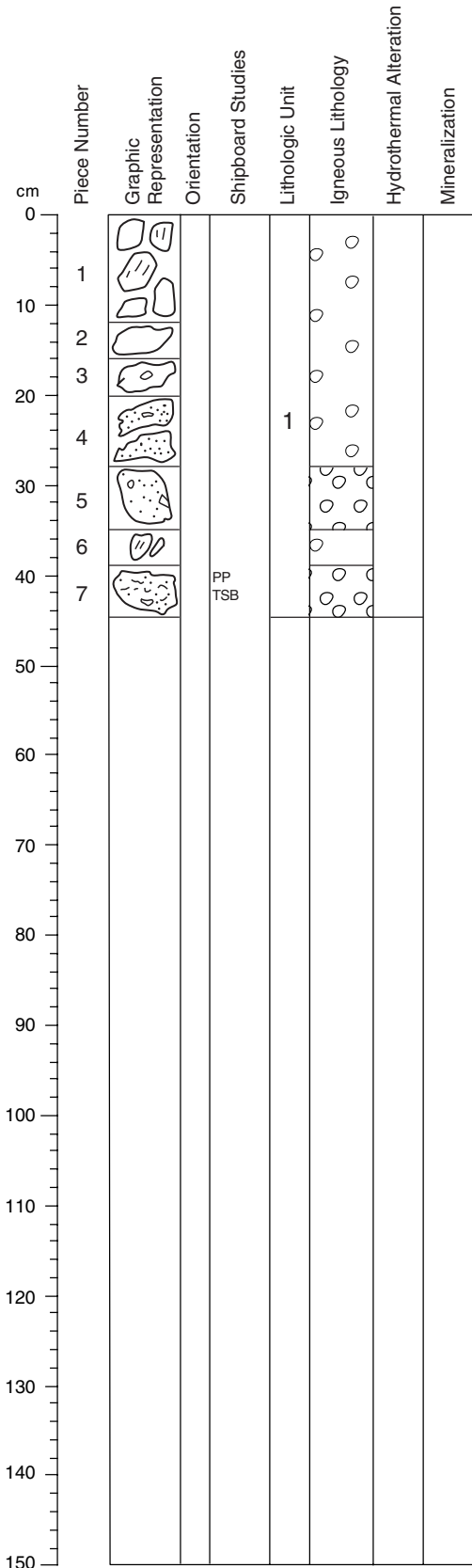
STRUCTURE: Massive.

ALTERATION: Fresh.

VEINS/FRACTURES: None.

COMMENTS: Refractive index of the glass is between 1.498 and 1.504, corresponding to about 72 ± 2 wt% SiO₂. Phenocrysts rarely exceed 1 mm in maximum diameter. In thin section: Plagioclase <2 vol%; clinopyroxene <1 vol% and rare magnetite phenocrysts.

Core Photo



193-1190B-2R-1 (Section top: 1.5 mbsf)

ROCK NAME: Fresh, moderately vesicular, sparsely plagioclase-phyric dacite.

UNIT: 1

Pieces: 1-7

Interval Location:	Core	Section	Piece	Depth (cm) in Section	Depth (mbsf)
Upper contact:	1R	1	1	0	1.50
Lower contact:	1R	1	7	45	1.95
Thickness (m): 0.45					

CONTACTS: None.

PHENOCRYSTS: % Grain Size (mm):

Mineral	Mode	Max	Min	Avg.	Shape/Habit
Plagioclase	Trace	1	0.1	<1	Laths
Clinopyroxene	Trace	1	0.1	<1	Euhedral

GROUNDMASS: Glass.

VESICLES: 5%, except 15% in Pieces 5 and 7. The mm-scale vesicles generally have elongate tube and flattened shapes.

COLOR: Black.

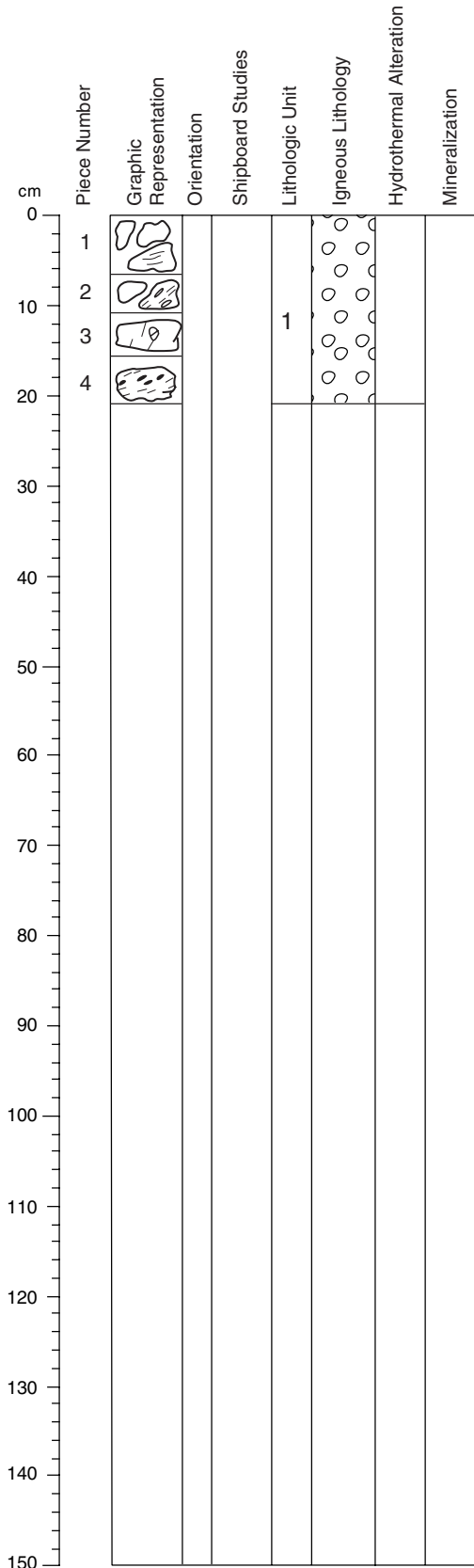
STRUCTURE: Massive.

ALTERATION: Generally very fresh. A small amount of pale blue alteration is visible along some broken surfaces (typically inside of broken vesicles) in Piece 1. A thin patchy alteration crust is visible on Piece 6, consisting of tiny rod-shaped white crystals, dark red-brown spots, and rare white hemispheres. This assemblage fizzes gently in HCl, suggesting, possibly, aragonite + silica + FeO(OH)_x.

VEINS/FRACTURES: None.

COMMENTS: Refractive index of the glass is close to 1.500, corresponding to about 72 ± 2 wt. % SiO₂. Piece 7 contains a 2 x 4-mm oval patch of light green porous material that could be an alteration patch, an inclusion of pumice(?), or something else. Phenocrysts rarely exceed 1 mm in maximum diameter. In thin section: Plagioclase <2 vol%; clinopyroxene <1 vol% and rare magnetite phenocrysts.

Core Photo



193-1190C-1R-1 (Section top: 0.0 mbsf)

ROCK NAME: Fresh, moderately vesicular, sparsely plagioclase-phyric dacite.

UNIT: 1

Pieces: 1-4

	Core	Section	Piece	Depth (cm) in Section	Depth (mbsf)
Upper contact:	1R	1	1	0	0
Lower contact:	3R	1	6	20	13.40
Thickness (m): 13.40					

CONTACTS: None.

PHENOCRYSTS: % Grain Size (mm):

Mineral	Mode	Max	Min	Avg.	Shape/Habit
Plagioclase	Trace	1	0.1	<1	Laths
Clinopyroxene	Trace	1	0.1	<1	Euhedral

GROUNDMASS: Glass.

VESICLES: 15%. The mm-scale vesicles generally have elongate tubular and flattened shapes.

COLOR: Black.

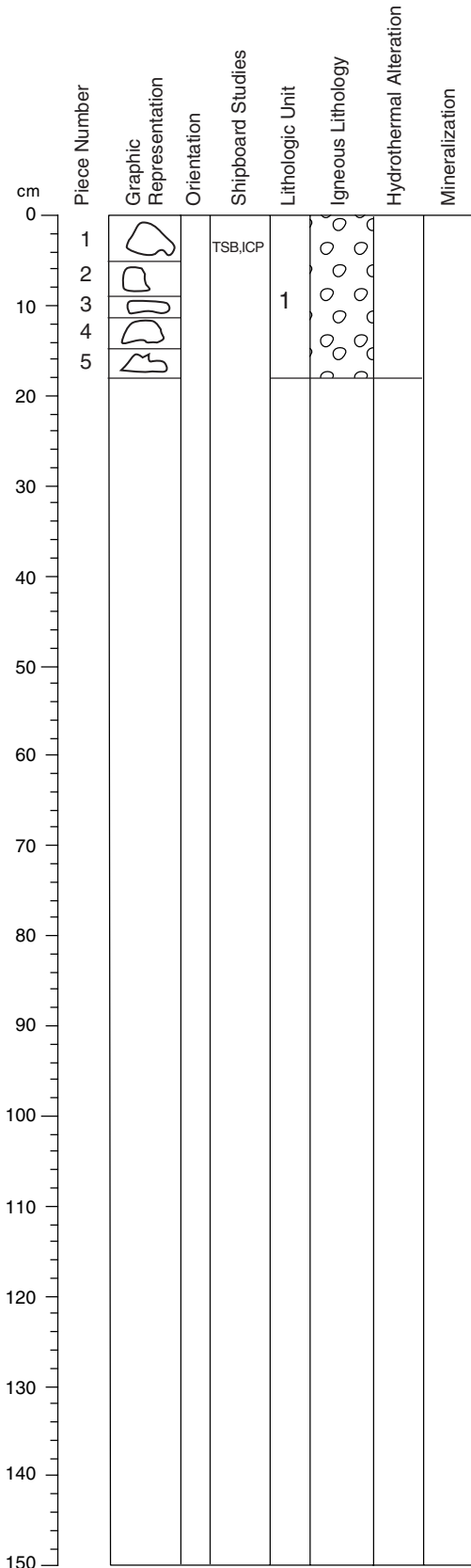
STRUCTURE: Massive.

ALTERATION: Generally very fresh. A small amount of pale blue alteration is visible along some broken surfaces in Pieces 3 and 4.

VEINS/FRACTURES: None.

COMMENTS: Piece 2 contains a rare 14 mm-long, 0.5 mm-across, acicular plagioclase phenocryst. Phenocrysts rarely exceed 1 mm in maximum diameter. In thin section: Plagioclase <2 vol%; clinopyroxene <1 vol% and rare magnetite phenocrysts.

Core Photo



193-1190C-2R-1 (Section top: 3.5 mbsf)

ROCK NAME: Fresh, moderately vesicular, sparsely plagioclase-phyric dacite.

UNIT: 1

Pieces: 1-5

Interval Location:	Core	Section	Piece	Depth (cm) in Section	Depth (mbsf)
Upper contact:	1R	1	1	0	0
Lower contact:	3R	1	6	20	13.40
Thickness (m): 13.40					

CONTACTS: None.

PHENOCRYSTS: % Grain Size (mm):

Mineral	Mode	Max	Min	Avg.	Shape/Habit
Plagioclase	Trace	1	0.1	<1	Laths
Clinopyroxene	Trace	1	0.1	<1	Euhedral

GROUNDMASS: Glass.

VESICLES: 10%-20%. The mm-scale vesicles generally have elongate tubular and flattened shapes.

COLOR: Black.

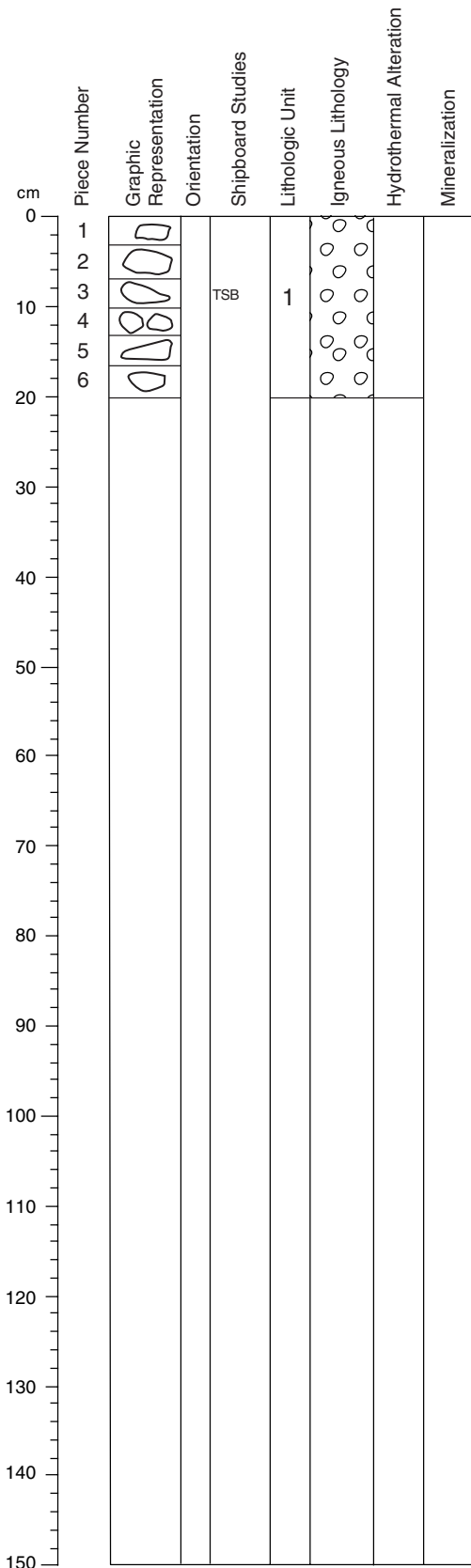
STRUCTURE: Massive.

ALTERATION: Generally very fresh. A small amount of pale blue alteration is visible along some broken surfaces. Piece 1 also has small red [FeO(OH)x?] spots associated with the alteration.

VEINS/FRACTURES: None.

COMMENTS: Phenocrysts rarely exceed 1 mm in maximum diameter. In thin section: Plagioclase <2 vol%; clinopyroxene <1 vol%, and rare magnetite phenocrysts.

Core Photo



193-1190C-3R-1 (Section top: 13.2 mbsf)

ROCK NAME: Fresh, moderately vesicular, sparsely plagioclase-phyric dacite.

UNIT: 1

Pieces: 1-6

Interval Location:	Core	Section	Piece	Depth (cm) in Section	Depth (mbsf)
Upper contact:	1R	1	1	0	0
Lower contact:	3R	1	6	20	13.40
Thickness (m): 13.40					

CONTACTS: None.

PHENOCRYSTS: % Grain Size (mm):

Mineral	Mode	Max	Min	Avg.	Shape/Habit
Plagioclase	Trace	1	0.1	<1	Laths
Clinopyroxene	Trace	1	0.1	<1	Euhedral

GROUNDMASS: Glass.

VESICLES: 10%-20%. The mm-scale vesicles generally have elongate tubular and flattened shapes.

COLOR: Black.

STRUCTURE: Massive.

ALTERATION: Generally very fresh. A small amount of pale blue alteration is visible along some broken surfaces.

VEINS/FRACTURES: None.

COMMENTS: Piece 1 has a trace of pyrite in the groundmass. Piece 3 has clear honey-colored frothy glass along one edge, which grades into the black glass composing the bulk of the piece. A tiny (<1 mm) example of pyroxene + magnetite occurs in this clear glass. Phenocrysts rarely exceed 1 mm in maximum diameter. In thin section: Plagioclase <2 vol%; clinopyroxene <1 vol%; there are rare magnetite phenocrysts.

TS: 43 193-1190A-1R1-0-2 #1		UNIT: 1			OBSERVERS: DAV WB AP SDS	
ROCK NAME:	Moderately plagioclase-clinopyroxene phyric sparsely vesicular rhyodacite					
TEXTURE:	Porphyritic					
PRIMARY MINERALOGY	PERCENT	SIZE (mm)			COMMENTS	
		min.	max.	av.	MORPHOLOGY	
PHENOCRYSTS						
Plagioclase	3	0.2	1.8	0.8	Euhedral to subhedral blocky and elongate laths	Contain melt inclusions and partially enclose magnetite.
Clinopyroxene	1	0.2	1.4	0.8	Euhedral to subhedral elongate prisms and equant stubby prisms.	Enclose magnetite.
Magnetite	1	0.06	0.15	0.1	Euhedral to subhedral	Often as inclusions within plagioclase and clinopyroxene.
GROUNDMASS						
Plagioclase	35				Laths	Define trachytic texture.
Interstitial glass	55					
Magnetite	Trace	0.001	0.01		Subhedral to euhedral	Disseminated.
Vesicles	5					Irregular shapes common.
ALTERATION MINERALOGY	PERCENT	SIZE (mm)			COMMENTS	
		min.	max.	av.	MORPHOLOGY	
None						
SULFIDE MINERALOGY	PERCENT	SIZE (mm)			COMMENTS	
		min.	max.	av.	MORPHOLOGY	
Pyrite						
	Trace		0.01		Discrete grains.	Very rare anhedral pyrite crystals in groundmass or associated with magnetite and plagioclase (one example).
COMMENTS:	Irregularly shaped vesicles. Phenocrysts may form clusters (plagioclase + pyroxene + magnetite + vesicle). See photomicrograph 1190A_01					

TS: 44 193-1190B-2R1-40-43 #7		UNIT: 1			OBSERVERS: DAV/AP/SDS WB	
ROCK NAME:	Moderately plagioclase-clinopyroxene phyric highly vesicular rhyodacite					
TEXTURE:	Porphyritic					
PRIMARY MINERALOGY	PERCENT	SIZE (mm)			MORPHOLOGY	COMMENTS
		min.	max.	av.		
PHENOCRYSTS						
Plagioclase	3	0.1	1.5	0.8	Euhedral to subhedral laths	Contains melt inclusions, and encloses or partially encloses both magnetite and clinopyroxene. Not significantly zoned.
Clinopyroxene	1	0.2	0.8	0.5	Euhedral to subhedral stubby prisms	
Magnetite	1	0.04	0.3	0.2	Euhedral to anhedral	Often as inclusions within plagioclase and clinopyroxene.
GROUNDMASS						
Plagioclase	35				Microlites 1-2 x 25 microns	Flow banding: Dark layers rich in microlites, lighter layers are glass-rich
Interstitial glass	53					
Vesicles	7					
Magnetite	Trace	0.001	0.01		Equant 1-10 micron grains	Disseminated.
ALTERATION MINERALOGY	PERCENT	SIZE (mm)			MORPHOLOGY	COMMENTS
		min.	max.	av.		
None						
SULFIDE MINERALOGY	PERCENT	SIZE (mm)			MORPHOLOGY	COMMENTS
		min.	max.	av.		
Pyrite	Trace		0.1		Euhedral Grains	Associated with magnetite. Pyrite partially replaces the magnetite after the replacement of plagioclase (?) by the magnetite, in one example.
COMMENTS:						
Glomerophytic aggregates of phenocrysts are often associated with virtually microlite-free glass or glass is entrapped in between phenocrysts. Matrix of rock shows pronounced flow banding of dark layers rich in microlites and lighter layers that are glass rich. Vesicles are markedly flattened and stretched. See Chapter 5, Figure F2; see photomicrograph 1190B_02						

TS: 45 193-1190C-2R1-3-5 #1		UNIT: 1			OBSERVERS: DAV WB / AP	
ROCK NAME:	Moderately plagioclase-clinopyroxene phyric highly vesicular rhyodacite					
TEXTURE:	Porphyritic					
PRIMARY MINERALOGY	PERCENT	SIZE (mm)			MORPHOLOGY	COMMENTS
		min.	max.	av.		
PHENOCRYSTS						
Plagioclase	3	0.2	1.2	0.8	Euhedral to subhedral	One large crystal is about 30% melt inclusions.
Clinopyroxene	1	0.3	0.8	0.5	Euhedral	
Magnetite	Trace	0.04	0.16	0.1	Euhedral	
Apatite	Trace				Euhedral	Trace apatite in some of the glomerocrysts.
GROUNDMASS						
Plagioclase	35				Laths	Aligned.
Interstitial glass	54					
Vesicles	7					
ALTERATION MINERALOGY	PERCENT	SIZE (mm)			MORPHOLOGY	COMMENTS
		min.	max.	av.		
None						
SULFIDE MINERALOGY	PERCENT	SIZE (mm)			MORPHOLOGY	COMMENTS
		min.	max.	av.		
Pyrite	Trace	0.005	0.01			Extremely rare and fine anhedral crystals in groundmass.
COMMENTS:	Glomerophytic aggregates of phenocrysts are often associated with virtually microlite-free glass or glass is entrapped in between phenocrysts. One glomerophytic assemblage contains three apatite crystals. See photomicrograph 1190C_03					

TS: 46 193-1190C-3R1-7-9 #3		UNIT: 1			OBSERVERS:		
ROCK NAME:		Moderately plagioclase-clinopyroxene phyric highly vesicular rhyodacite				DAV	
TEXTURE:		Porphyritic, flow banding.				WB	
						AP/SDS	
PRIMARY MINERALOGY	PERCENT	SIZE (mm)			MORPHOLOGY	COMMENTS	
		min.	max.	av.			
PHENOCRYSTS							
Plagioclase	3	0.1	2	1	Euhedral to subhedral		
Clinopyroxene	1	0.05	0.7	0.5	Euhedral	Melt inclusion preserved within clinopyroxene crystals	
Magnetite	Trace	0.04	0.16	0.08	Euhedral to anhedral		
GROUNDMASS							
Plagioclase	35				Laths	Aligned.	
Interstitial glass	51						
Vesicles	10						
Magnetite	Trace	0.001	0.01		Euhedral to subhedral		
ALTERATION MINERALOGY	PERCENT	SIZE (mm)			MORPHOLOGY	COMMENTS	
		min.	max.	av.			
None							
SULFIDE MINERALOGY	PERCENT	SIZE (mm)			MORPHOLOGY	COMMENTS	
		min.	max.	av.			
Pyrite	Trace					Extremely rare pyrite partially replaces the magnetite.	
COMMENTS:		Flow banded structure produced by dark, microlite-rich and light, glass rich layers. There is also a difference in vesicularity between these layers. See Chapter 5, Figure F3					

Leg 193 Igneous Log - Hole 1190B																							
Identifiers							Phenocrysts												Gms	Vesicles			
Unit	Core	Sec	Pc #	Inter.		meas. length (cm)	Depth core top	Depth Piece Top	Olivine				Plagioclase				Clinopyroxene				Type	(%)	Comments
				top	bot				%	2nd minl	Size min	Size max	%	2nd minl	Size min	Size max	%	2nd minl	Size min	Size max			
1	2R	1	1	0	12	10															Glass.	5	Mm-scale vesicles are very flattened and elongate. RI(meas.) is close to 1.500, corresponding to 71-72 wt.% SiO ₂ . Pale blue alteration on some broken vesicle surfaces.
1	2R	1	2	12	16	2															Glass.	5	
1	2R	1	3	16	20	4							Tr.		0.1	1	Tr.		0.1	1	Glass.	5	Mm-scale elongate vesicles.
1	2R	1	4	20	28	6							Tr.		0.1	1	Tr.		0.1	1	Glass.	5	Do.
1	2R	1	5	28	35	6							Tr.		0.1	1	Tr.		0.1	1	Glass.	15	Do.
1	2R	1	6	35	39	2															Glass.	5	Rubble. Trace of alteration crust on one surface consist of rod-shaped white crystals, dark red-brown spots, and scarce white hemispheres. Fizzes gently with HCl. Possibly aragonite + silica + FeO(OH)x.
1	2R	1	7	39	45	5							Tr.		0.1	1	Tr.		0.1	1	Glass.	15	Mm-scale elongate vesicles. Contains a 2x4-mm patch of light green porous material. Alteration? Pumice inclusion?

Leg 193 Igneous Log - Hole 1190C																							
Identifiers							Phenocrysts												Gms	Vesicles			
Unit	Core	Sec	Pc #	Inter.		meas. length (cm)	Depth core top	Depth Piece Top	Olivine				Plagioclase				Clinopyroxene				Type	Vesicles (%)	Comments
				top	bot				%	2nd minl	Size min	Size max	%	2nd minl	Size min	Size max	%	2nd minl	Size min	Size max			
1	1R	1	1	0	7	6															Glass.	5	Elongate mm-scale vesicles.
1	1R	1	2	7	11	3							Tr.		0.1	1.4					Glass.	15	An acicular plagioclase phenocryst on the surface is 14 mm long and only 0.4 mm across.
1	1R	1	3	11	16	3							Tr.		0.1	1	Tr.		0.1	1	Glass.	15	Elongate mm-scale vesicles. Blue alteration film on inside of some exterior vesicles.
1	1R	1	4	16	21	4							Tr.		0.1	1	Tr.		0.1	1	Glass.	15	Do.
1	2R	1	1	0	5	4							Tr.		0.1	1	Tr.		0.1	1	Glass.	10	Do. Also has some red FeO(OH)x spots on altered surfaces.
1	2R	1	2	5	9	2							Tr.		0.1	1	Tr.		0.1	1	Glass.	10	Do.
1	2R	1	3	9	12	2							Tr.		0.1	1	Tr.		0.1	1	Glass.	15	Do.
1	2R	1	4	12	15	2							Tr.		0.1	1	Tr.		0.1	1	Glass.	20	Do.
1	2R	1	5	15	18	2							Tr.		0.1	1	Tr.		0.1	1	Glass.	15	Do.
1	3R	1	1	0	3	2							Tr.		0.1	1	Tr.		0.1	1	Glass.	15	Do.
1	3R	1	2	3	7	4							Tr.		0.1	1	Tr.		0.1	1	Glass.	20	Do. Also has a trace of pyrite in groundmass.
1	3R	1	3	7	10	2							Tr.		0.1	1	Tr.		0.1	1	Glass.	10	Do. The black glass grades at one edge to a clear honey-colored frothy glass, which contains a <1-mm clot of cpx+mt.
1	3R	1	4	10	13	2							Tr.		0.1	1	Tr.		0.1	1	Glass.	10	Do.
1	3R	1	5	13	17	2							Tr.		0.1	1	Tr.		0.1	1	Glass.	20	Do.
1	3R	1	6	17	20	2							Tr.		0.1	1	Tr.		0.1	1	Glass.	20	Do.

Leg 193 Alteration/Mineralization Log - Hole 1190A																							
Identifiers								Color			Alteration							Sulfide Mineralization					
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Curated Depth (mbsf)	Dom.	Sec.	Inten-sity	Style	Type	Grain Size	Mineralogy (non sulfides)			Style	Grain Size	Mineralogy				
														Dominant (%)	Secondary (%)	Others (%)			Dominant (%)	Secondary (%)	Others	Comments	
1	1R	1	1	0	6	3	0	Blk		Fr												Unaltered glassy rhyodacite	

Leg 193 Alteration/Mineralization Log - Hole 1190B																											
Identifiers								Color			Alteration										Sulfide Mineralization					Comments	
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Curated Depth (mbsf)	Dom.	Sec.	Inten- sity	Style	Type	Grain Size	Mineralogy (non sulfides)						Style	Grain Size	Mineralogy					
														Domi- nant (%)	Sec- ond- ary (%)	Others (%)						Domi- nant (%)	Sec- ond- ary (%)	Others			
1	2R	1	1	0	12	6	1.5	Blk	Wht	Fr	Vn/ Vf	Sil	vfg	Si	1	Cl	tr	FeOx	tr								Glassy fresh volcanic rock with rare fine white si-cl veinlets and bluish films. Tr FeOx
1	2R	1	2	12	16	2	1.62	Gr		Sl	Pv	Bl	vfg	Si	5	Cl	4									Slightly bleached rock	
1	2R	1	3	16	19	3	1.66	Blk	Wht	Fr	Vn/ Vf	Sil	vfg	Si	1	Cl	tr	FeOx								Glassy fresh volcanic rock with rare fine white si-cl veinlets and bluish films.	
1	2R	1	4	19	28	5	1.69	Gr		Sl	Pv	Bl	vfg	Si	3	Cl	2	Zeol	tr							Slightly bleached rock with fine zeolites in vesicles.	
1	2R	1	5	28	34	6	1.78	Blk	Wht	Fr	Vn/ Vf	Sil	vfg	Si	1	Cl	tr									Glassy fresh volcanic rock with rare fine white si-cl veinlets and bluish films.	
1	2R	1	6	34	38	2	1.84	Blk	Wht	Fr	Vn/ Vf	Sil	vfg	Si	1	Cl	tr	CO3(tr), FeOx (tr)								Glassy fresh volcanic rock with rare fine white si-cl veinlets and bluish films. Alteration crust with rod-shaped white crystals, dark red-brown oxide spots and rare white botryoids. Fizzes gently in HCl, suggesting the presence of calcium carbonate.	
1	2R	1	7	38	45	6	1.88	Blk	Wht	Fr	Vn/ Vf	Sil	vfg	Si	1	Cl	tr									Glassy fresh volcanic rock with rare fine white si-cl veinlets and bluish films.	

Leg 193 Alteration/Mineralization Log - Hole 1190C																												
Identifiers									Color			Alteration										Sulfide Mineralization						
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Curated Depth (mbsf)	Dom.	Sec.	Inten-sity	Style	Type	Grain Size	Mineralogy (non sulfides)						Style	Grain Size	Mineralogy						
														Dominant (%)	Secondary (%)	Others (%)					Dominant (%)	Secondary (%)	Others	Comments				
1	1R	1	1	0	6	4	0	Blk	Br	Fr	Vf/Vn	Si	vfg	Si	tr	FeOx	tr								Unaltered glassy rhyodacite with rare fine white siliceous veinlets and bluish films, tr FeOx.			
1	1R	1	2	6	11	3	0.06	Blk	Wht	Fr	Vf/Vn	Si	vfg	Si	tr										White veinlets			
1	1R	1	3	11	16	3	0.11	Blk	Wht	Fr	Vf/Vn	Si	vfg	Sf	1	Si	tr								Tr sulfate crust, white silica veinlets			
1	1R	1	4	16	21	4	0.16	Blk	Wht	Fr	Vf/Vn	Si	vfg	Sf	tr	Si	tr								Tr sulfate crust, white silica veinlets			
1	2R	1	1	0	5	3	3.5	Blk	Wht	Fr	Vf/Vn	Si	vfg	Sf	tr	Si	tr	FeOx	tr						Tr sulfate crust, white silica veinlets, Fe-Ox spots			
1	2R	1	2	5	8	2	3.55	Blk	Wht	Fr	Vf/Vn	Si	vfg	Sf	tr	Si	tr								Tr sulfate crust, white silica veinlets			
1	2R	1	3	8	12	3	3.58	Blk	Wht	Fr	Vf/Vn	Si	vfg	Sf	tr	Si	tr								Tr sulfate crust, white silica veinlets			
1	2R	1	4	12	15	3	3.62	Blk	Wht	Fr	Vf/Vn	Si	vfg	Sf	tr	Si	tr								Tr sulfate crust, white silica veinlets			
1	2R	1	5	15	18	3	3.65	Blk	Wht	Fr	Vf/Vn	Si	vfg	Sf	tr	Si	tr								Tr sulfate crust, white silica veinlets			
1	3R	1	1	0	3	2	13.2	Blk		Fr	Vf/Vn	Si	vfg												Tr sulfate crust, white silica veinlets			
1	3R	1	2	3	7	3	13.23	Blk		Fr	Vf/Vn	Si	vfg												Tr sulfate crust, white silica veinlets			
1	3R	1	3	7	10	3	13.27	Blk		Fr	Vf/Vn	Si	vfg												Tr sulfate crust, white silica veinlets			
1	3R	1	4	10	13	2	13.3	Blk		Fr	Vf/Vn	Si	vfg												Tr sulfate crust, white silica veinlets			
1	3R	1	5	13	17	2	13.33	Blk		Fr	Vf/Vn	Si	vfg												Tr sulfate crust, white silica veinlets			
1	3R	1	6	17	20	2	13.37	Blk		Fr	Vf/Vn	Si	vfg												Tr sulfate crust, white silica veinlets			