1224A-1X No Recovery

1224A-2X Core Not Described; BIO, XRD Samples Taken (See **Core Photo**)

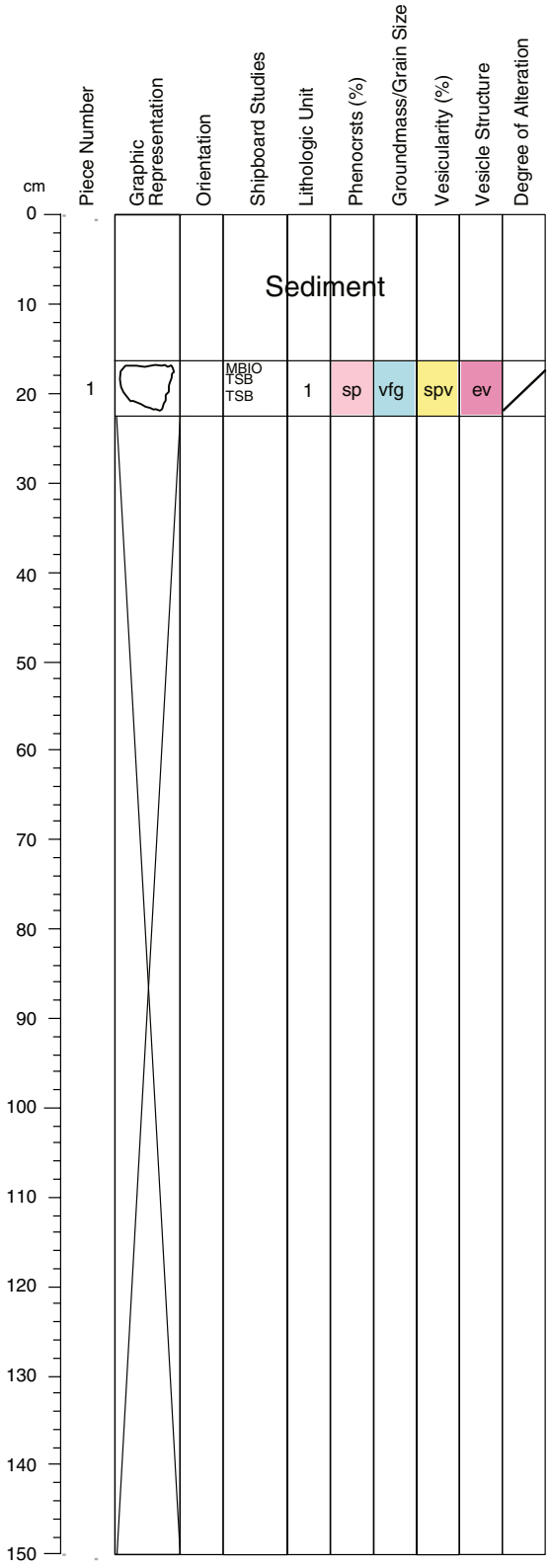
1224A-3X Core Not Described; SS Samples Taken (No Core Photo Available)

Core Photo

Site 1224 Hole A Core 4X Cored 25.2-30.7 mbsf

METERS	SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	ICHNO.	FOSSILS	DISTURB.	SAMPLE	COLOR	DESCRIPTION
1	1								SS SS SS SS SS SS SS	vdk BR BR	DARK BROWN AND DARK REDDISH BROWN CLAY and BASALT Section 1, 0-101 cm: Very soupy dark reddish brown clay. Highly disturbed by drilling, some clumps of different color: Section 1, 4.5 cm: brown (10YR 4/3) Section 1, 32 cm: very dark brown (7.5YR 2.5/3) Section 1, 70 cm: dark yellowish brown (10YR 4/4) Section 1, 87 cm: very dark brown (10YR 2/2) Core Catcher, 0-16: Highly disturbed, very dark brown (7.5YR 2.5/2) clay with basaltic pebbles and granules. Core Catcher, 16-21 cm: One piece of basalt.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224A-4X-CC (Section top: 26.22 mbsf)

Aphyric basalt

Pieces: 1

Thin Section(s) #: 24 and 52

CONTACTS: None

PHENOCRYSTS: Plagioclase (1-2%)

GROUNDMASS: Very fine grained (avg. size 0.2 mm)

VESICLES: Rare (~2%)

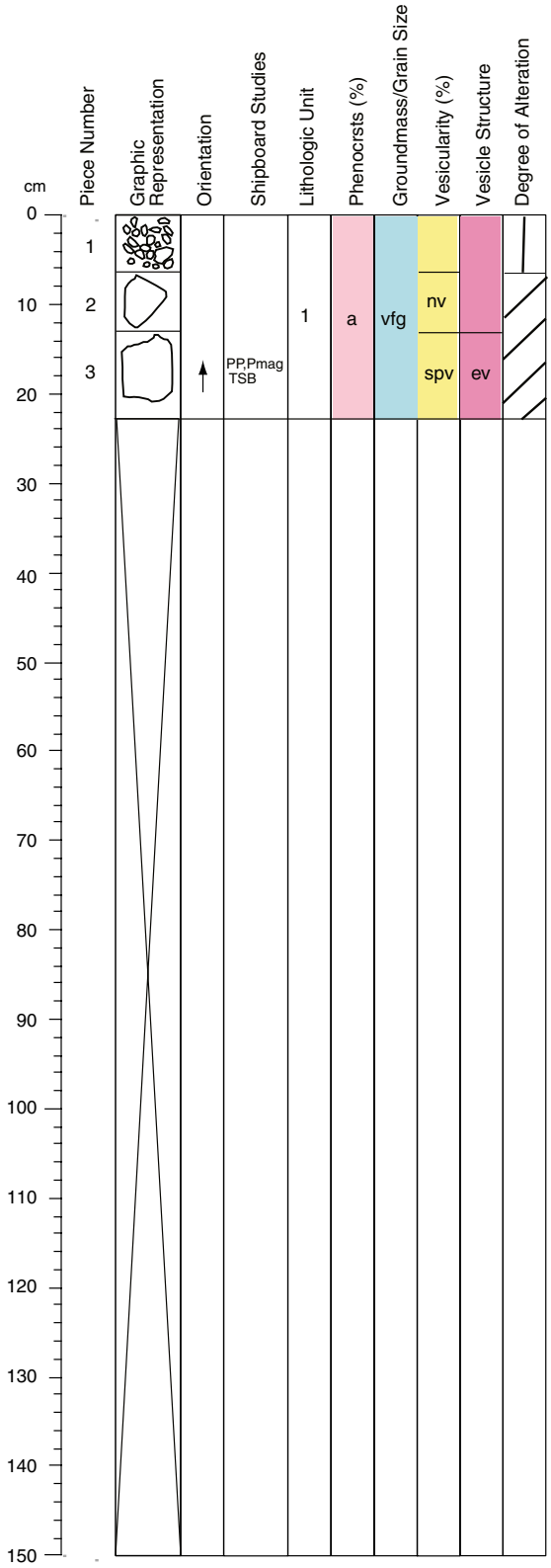
COLOR: Brownish gray

STRUCTURE: Massive with no veins nor fractures

ALTERATION: Low grade altered, dark colored

ADDITIONAL COMMENTS An approximately 2 mm thick, i cm wide rind of black glass with brown alteration coating

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224A-5X-1 (Section top: 30.70 mbsf)

Aphyric basalt

Pieces: 1 - 3

Thin Section(s) #: 25

CONTACTS: None

PHENOCRYSTS: Plagioclase (<1%)

GROUNDMASS: Very fine grained (avg. size 0.2 mm)

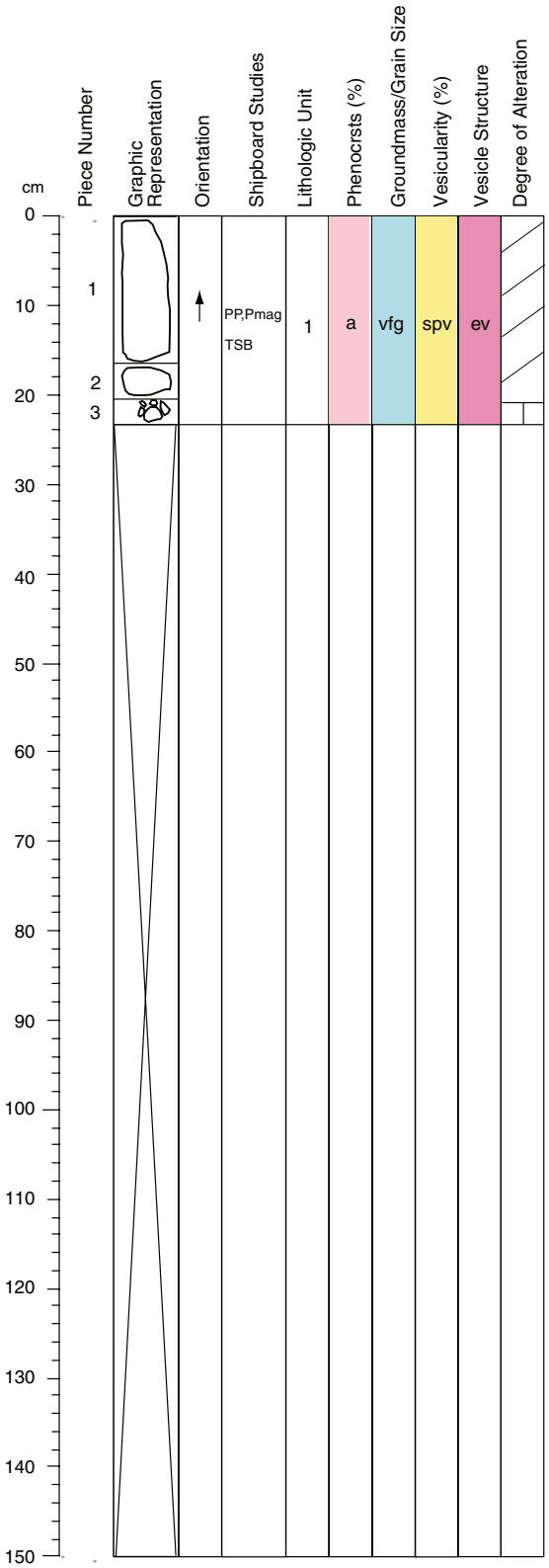
VESICLES: Low vesiculation. 0.1 - 1.5 mm in size. No grading of vesicle size

COLOR: gray

STRUCTURE: Massive. Some veining present

ALTERATION: Green coloration on uncut surface in places: 0.2 mm wide by 3 mm long, 2 mm wide by 12 mm long

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224A-6N-1 (Section top: 32.00 mbsf)

Aphyric basalt

Pieces: 1 - 3

Thin Section(s) #: 26

CONTACTS: None.

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained (avg. size 0.2 mm).

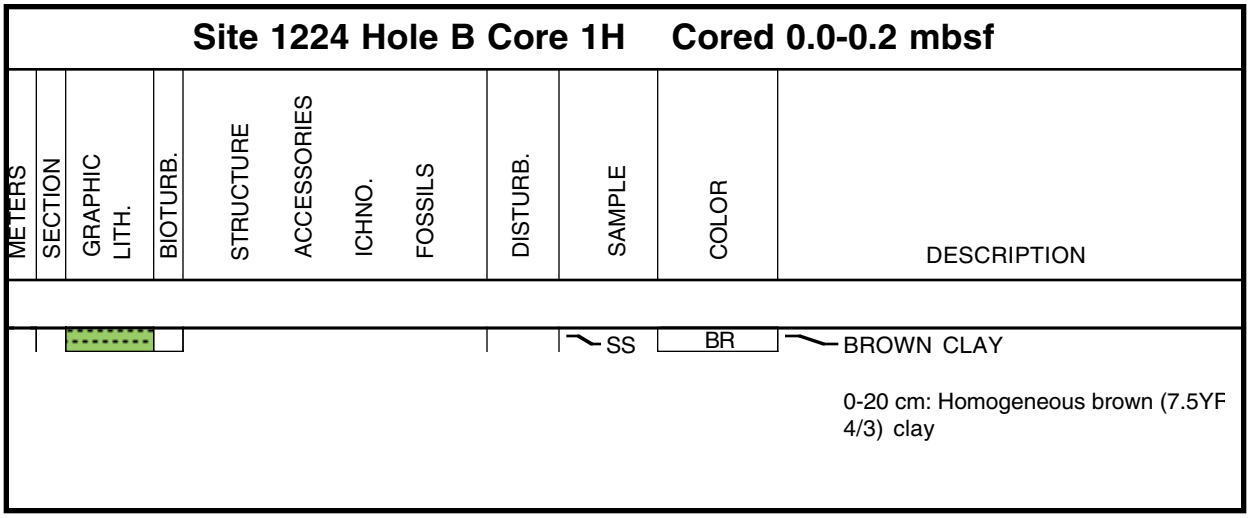
VESICLES: 0.1 - 1.5 mm in size. No grading of vesicles size.

COLOR: gray

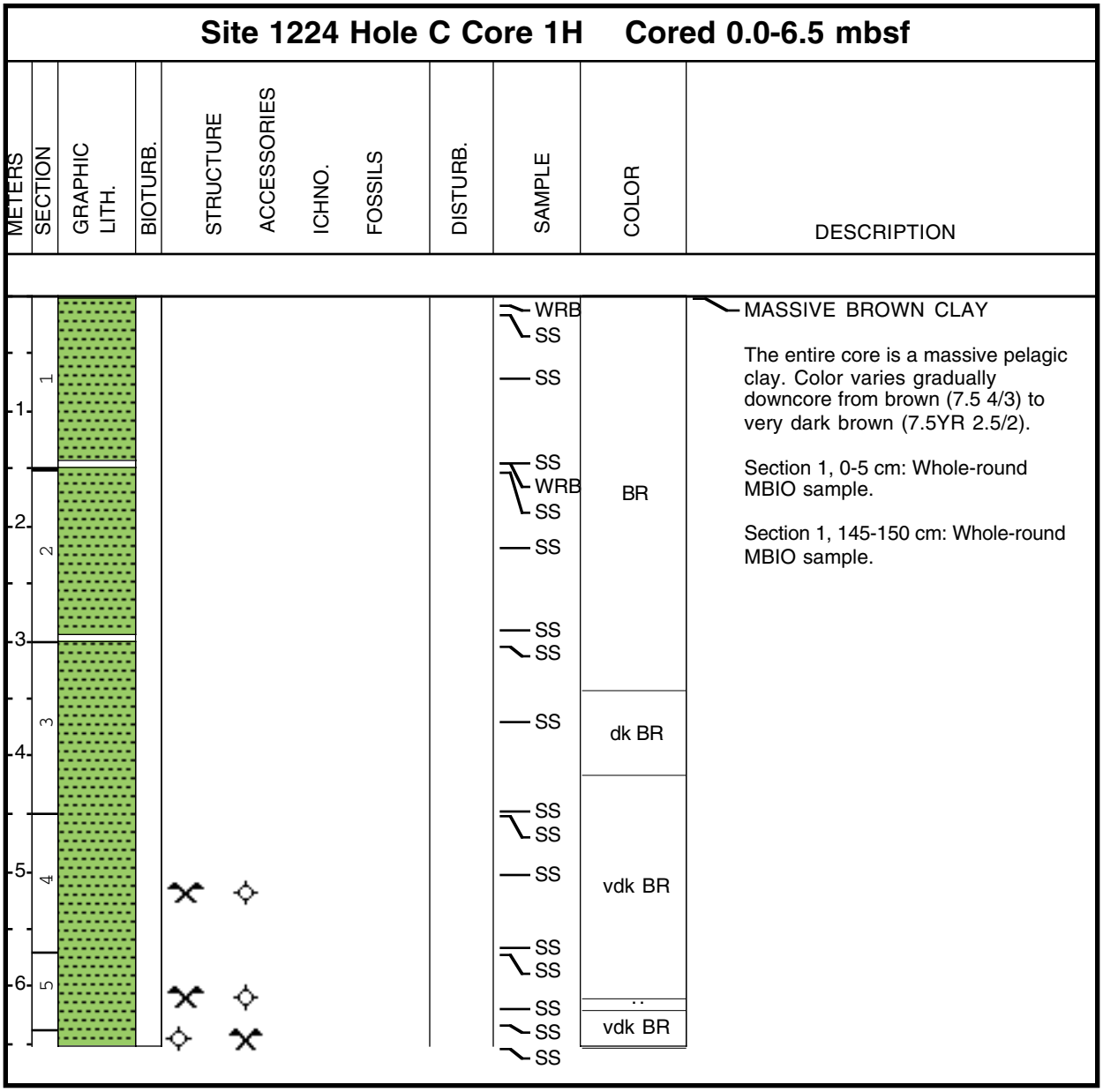
STRUCTURE: Massive. Pyrite deposited vein 2 - 5 mm wide by 5 - 20 mm long. A small greenish/green-white deposited vein.

ALTERATION: Slightly altered.

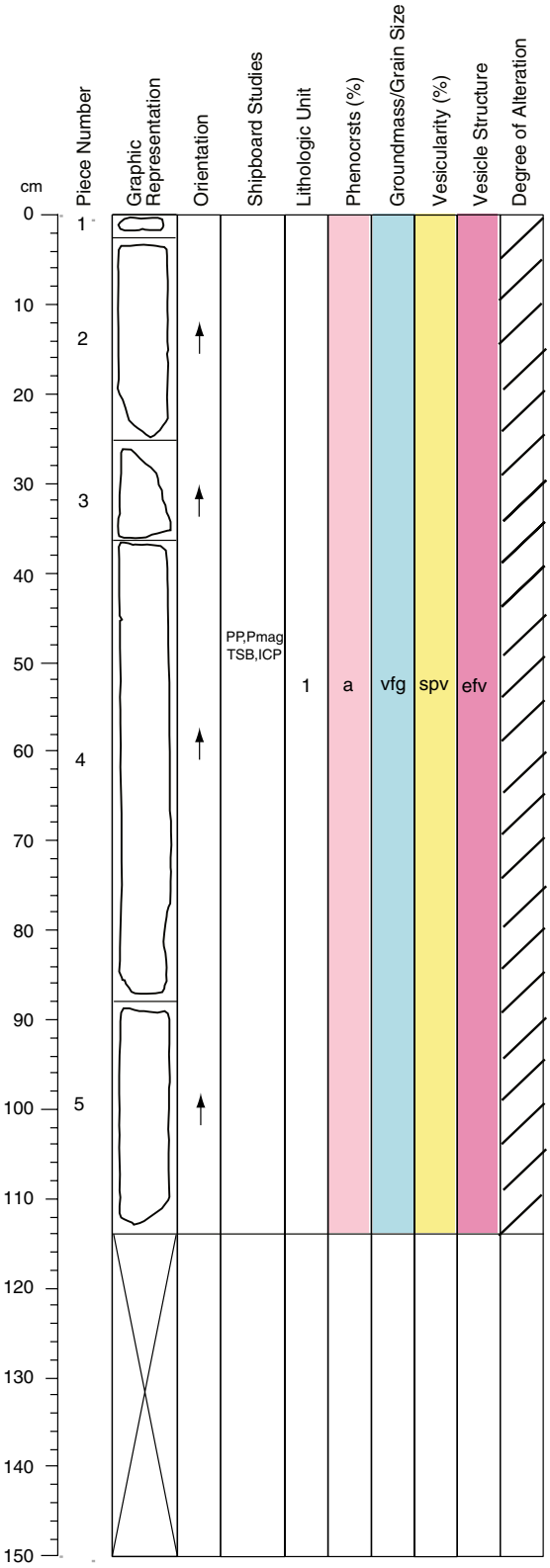
Core Photo


Site 1224 Hole B Core 1H Cored 0.0-0.2 mbsf
METERS
SECTION
GRAPHIC LITH.
BIOTURB.
STRUCTURE
ACCESSORIES
ICHNO.
FOSSILS
DISTURB.
SAMPLE
COLOR
DESCRIPTION
SS
BR
BROWN CLAY
0-20 cm: Homogeneous brown (7.5YF 4/3) clay

Core Photo


Site 1224 Hole C Core 1H Cored 0.0-6.5 mbsf
METERS
SECTION
GRAPHIC LITH.
BIOTURB.
STRUCTURE
ACCESSORIES
ICHNO.
FOSSILS
DISTURB.
SAMPLE
COLOR
DESCRIPTION
WRB
SS
BR
dk BR
vdk BR
MASSIVE BROWN CLAY
The entire core is a massive pelagic clay. Color varies gradually downcore from brown (7.5 4/3) to very dark brown (7.5YR 2.5/2).
Section 1, 0-5 cm: Whole-round MBIO sample.
Section 1, 145-150 cm: Whole-round MBIO sample.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224D-1R-1 (Section top: 25.5 mbsf)

Aphyric basalt

Pieces: 1-5

Thin Section(s)#: 34

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Very fine grained (avg. size 0.3 mm). Appears to be a textural change at 74 - 79 cm.

VESICLES: ~3% vesicles, rounded, size range is 0.5 - 1.5 mm, usually with green clays or carbonate, irregularly distributed.

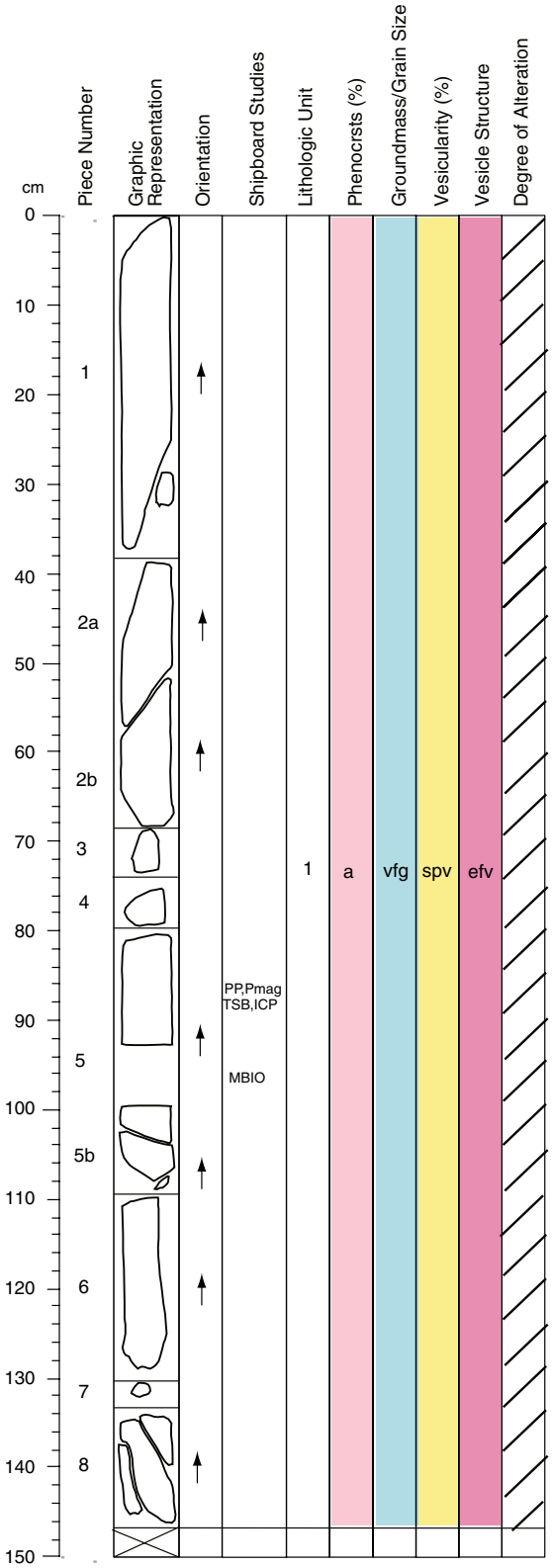
COLOR: N5, gray

STRUCTURE: Some pieces bounded by fracture surfaces. Piece 3 has 3 small hairline cracks on the working half. Veins and fractures are hairline and aligned with clays and carbonate. No alteration halos present.

ALTERATION: Slight alteration, vesicle are both empty and filled. Those that are filled contain clays and carbonate. Green clay and sulfides from 77 to 87 cm along concave side. Pyrite is also along cracks elsewhere in section.

ADDITIONAL COMMENTS: This is the top of cooling unit that ends in Section 3R-3.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224D-1R-2 (Section top: 26.64 mbsf)

Aphyric basalt

Pieces: 1-8

Thin Section(s)#: 35

CONTACTS: None

PHENOCRYSTS: Plagioclase (~1%)

GROUNDMASS: Very fine grained (avg. size 0.3 mm).

VESICLES: < 5 % vesicles, rounded, irregularly displaced filled and empty vesicles. Filled with carbonate and clays. Vesicles become larger at 77 cm, up to 2 mm.

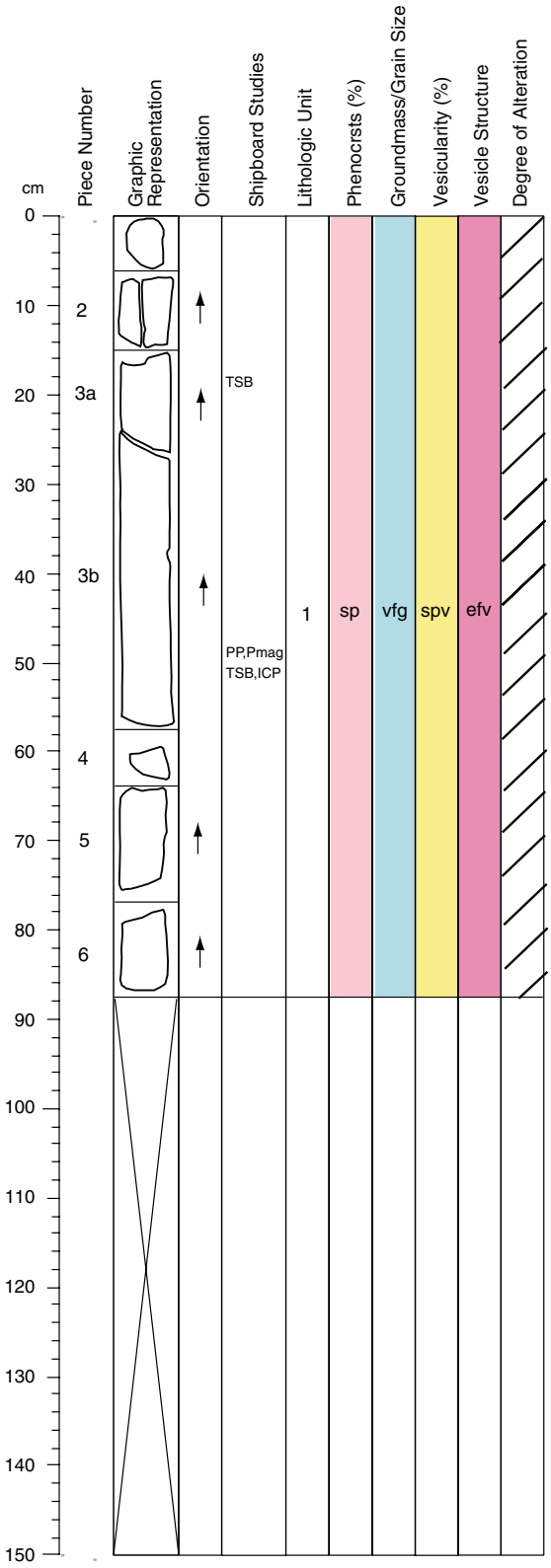
COLOR: N5, gray

STRUCTURE: No veins going through section, however, there is a carbonate vein along the side of peice 6.

ALTERATION: Carbonate and clay filling vesicles. Carbonate along side of peice 6 and middle part of peice 8. Pyrite along broken pieces. In addition, green clays along cracked surfaces and outside of core.

ADDITIONAL COMMENTS: Continuation of cooling unit that ends in Section 3R-3

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224D-1R-3 (Section top: 28.1 mbsf)

Aphyric to sparsely phyric basalt

Pieces: 1-6

Thin Section(s)#: 36 and 37

CONTACTS: None

PHENOCRYSTS: Clinopyroxene (~1%) and Plagioclase (~1%).

GROUNDMASS: Very fine grained (avg size ~0.3 mm).

VESICLES: < 5 % vesicles, rounded, irregularly displaced filled and empty vesicles. Filled with carbonate and clays. Size range < 1 mm.

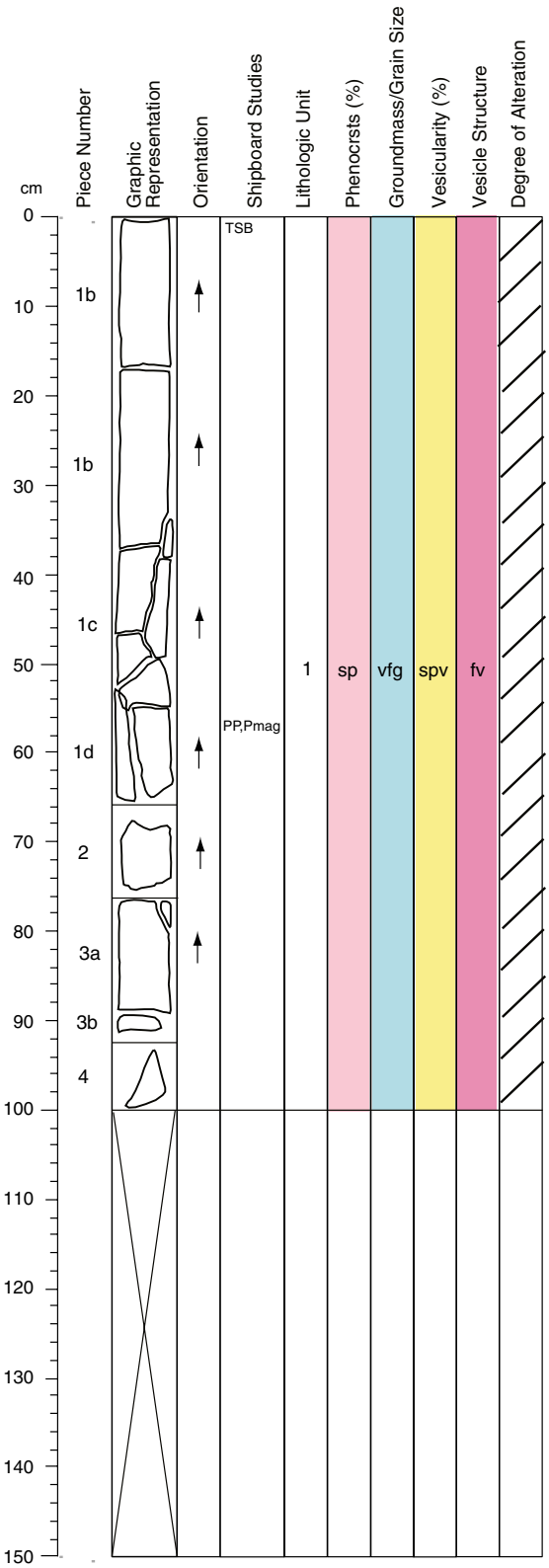
COLOR: N5, gray

STRUCTURE: Veins and fractures in pieces 2 and 3, filled with carbonate, clays and suflide minerals (pyrite?).

ALTERATION: Veins in pieces 2 and 3 are of carbonate and clays. Vesicles are filled with clays and carbonate. Green clays and pyrite aplong cracked pieces. No alteration halos apparent.

ADDITIONAL COMMENTS: Continuation of cooling unit that ends in Section 3R-3

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224D-1R-4 (Section top: 28.99 mbsf)

Sparsely phyric basalt

Pieces: 1-4

Thin Section(s)#: 38

CONTACTS: None

PHENOCRYSTS: Plagioclase (<2%)

GROUNDMASS: Very fine grained (avg. size 0.3 mm). Maybe slightly grading to coarser downward.

VESICLES: < 5 % vesicles, rounded, irregularly displaced filled and empty vesicles. Filled with carbonate and clays. Size range up to 2.8 mm.

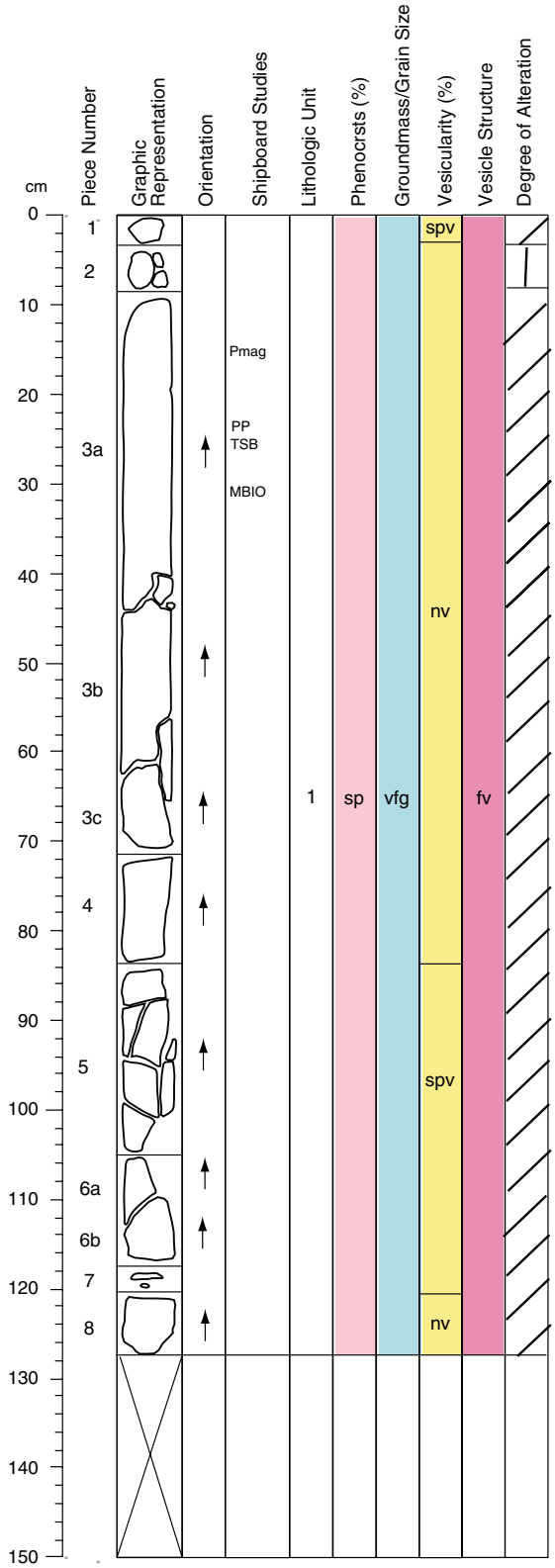
COLOR: N5, gray

STRUCTURE: Fractures in piece 1 and filling of fractures with clays and carbonate l pieces 2 and 4. Veins are <1 mm wide.

ALTERATION: Vesicles and veins contain carbonate and clays. Green clays and pyrite present along fractures.

ADDITIONAL COMMENTS: Needle-like mineral (aragonite?) in fractures. Continuation of cooling unit that ends in Section 3R-3

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224D-2R-1 (Section top: 35.1 mbsf)

Sparsely phyric basalt

Pieces: 1-8

Thin Section(s)#: 39

CONTACTS: None

PHENOCRYSTS: Plagioclase (<2%) and clinopyroxene (<1%)

GROUNDMASS: Very fine grained (avg. size 0.4 mm), with no apparent changes in grain size, but section is coarser grained than near top of cooling unit. Glass in piece two (see additional comments).

VESICLES: < 1 % vesicles, rounded.

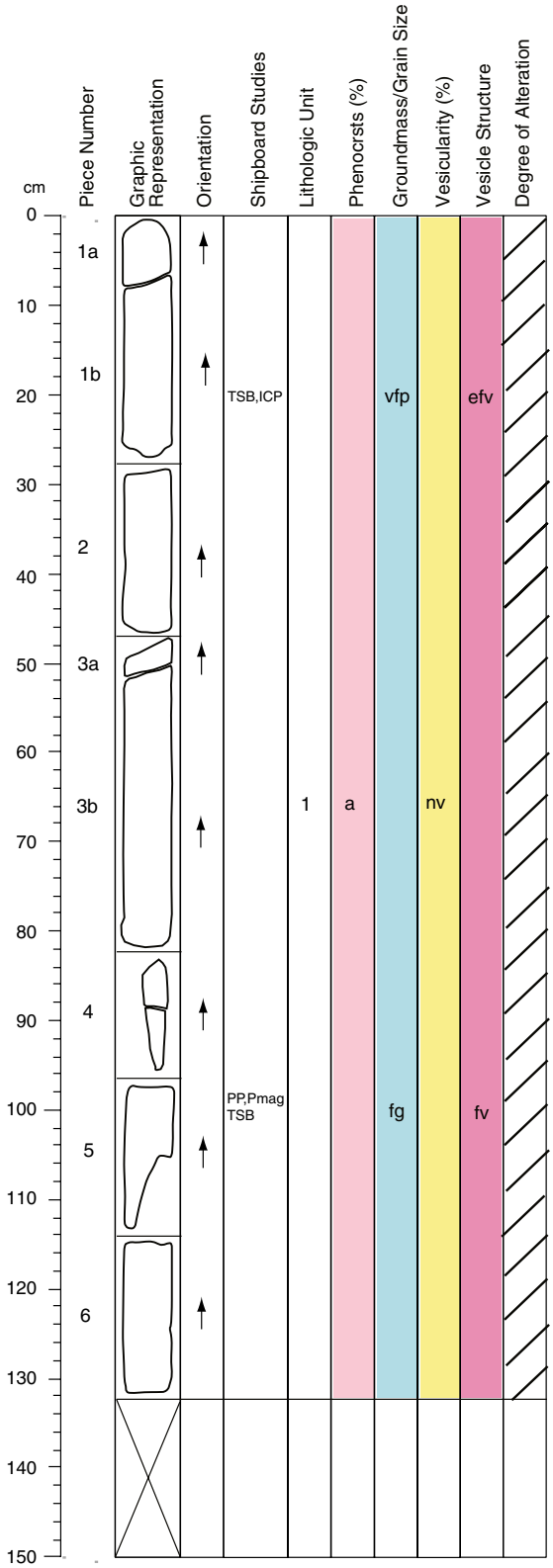
COLOR: N5, gray.

STRUCTURE: Fractures throughout. Filled with carbonate and clays.

ALTERATION: Fractures are filled with carbonate and clays, alteration of piece two is moderate with Fe-oxides and carbonates. Vesicles are filled with clays and carbonate. Pyrite and green clay along fractures.

ADDITIONAL COMMENTS: Pieces 1 and 2 may have fallen down the hole. Continuation of cooling unit that ends in Section 3R-3

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224D-2R-2 (Section top: 36.39 mbsf)

Aphyric basalt

Pieces: 1-6

Thin Section(s)#: 40 and 41

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: From very fine grained (avg. size 0.3 mm) to fine grained (avg. size 0.5 mm). Coarsest grained portion of cooling unit.

VESICLES: < 1 % vesicles.

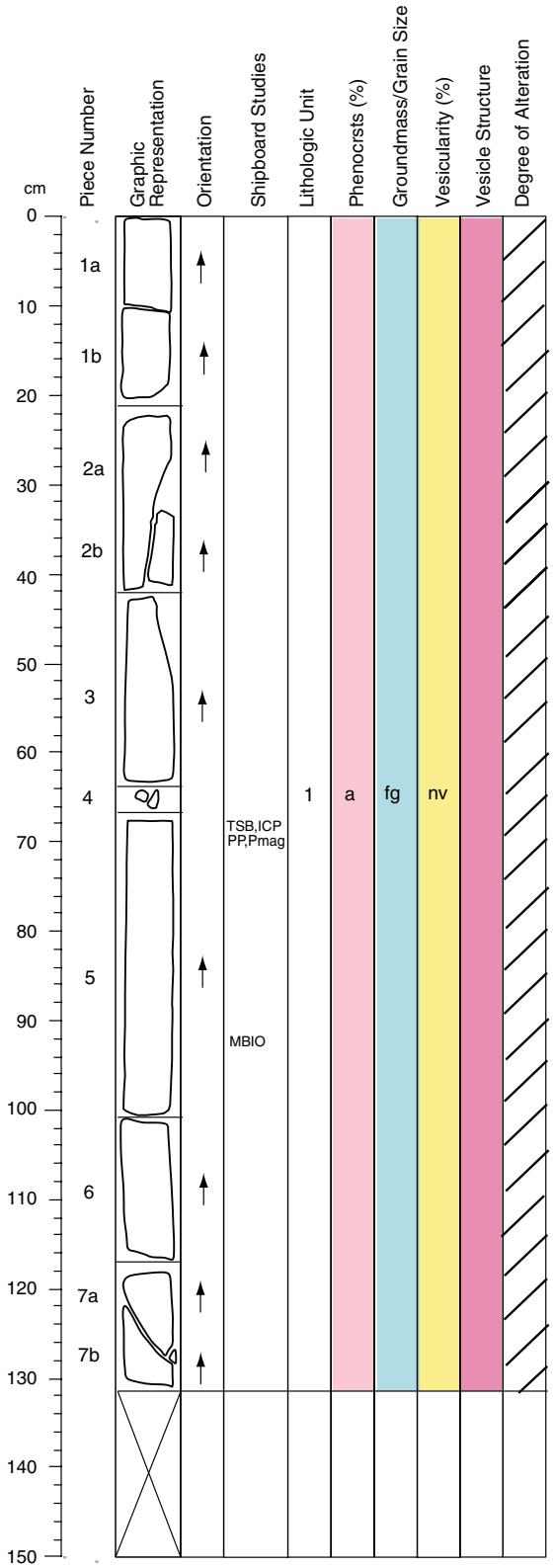
COLOR: 5B 5/1. Bluish gray.

STRUCTURE: Some fractures in pieces 3A and 5.

ALTERATION: Some of the vesicles are filled with clays and carbonates. Veins are of carbonate and clays with alteration halo (0.5 mm) around vein at 102 cm. Some fractures contain pyrite.

ADDITIONAL COMMENTS: Continuation of cooling unit that ends in Section 3R-3

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224D-2R-3 (Section top: 37.71 mbsf)

Aphyric basalt

Pieces 1-7

Thin Section(s)#: 42

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Fine grained (avg. size 0.5 mm), but coarser than in 200-1224D-2R-2. Nearly coarsest grained portion of cooling unit.

VESICLES: None

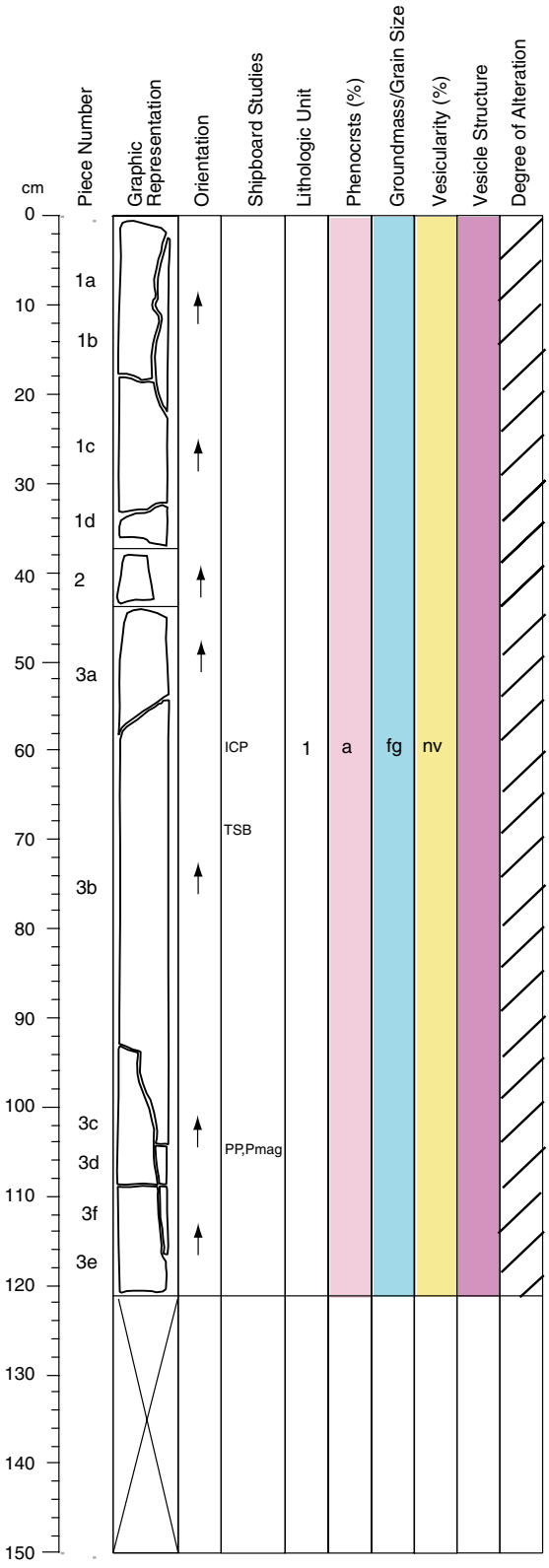
COLOR: SB 5/1; Bluish gray

STRUCTURE: Some pieces (#2and #7) have fractures filled with clay and oxides.

ALTERATION: Alteration -1cm, in 2A; greenish and brownish in color. Some pyrite along fractures.

ADDITIONAL COMMENTS: Continuation of cooling unit that ends in Section 3R-3.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224D-2R-4 (Section top: 39.03 mbsf)

Aphyric fine grained basalt

Pieces 1-3

Thin Section(s)#: 43

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: fine grained (avg. size 0.6 mm) with no apparent change in grain size.

VESICLES: <1 %, rounded

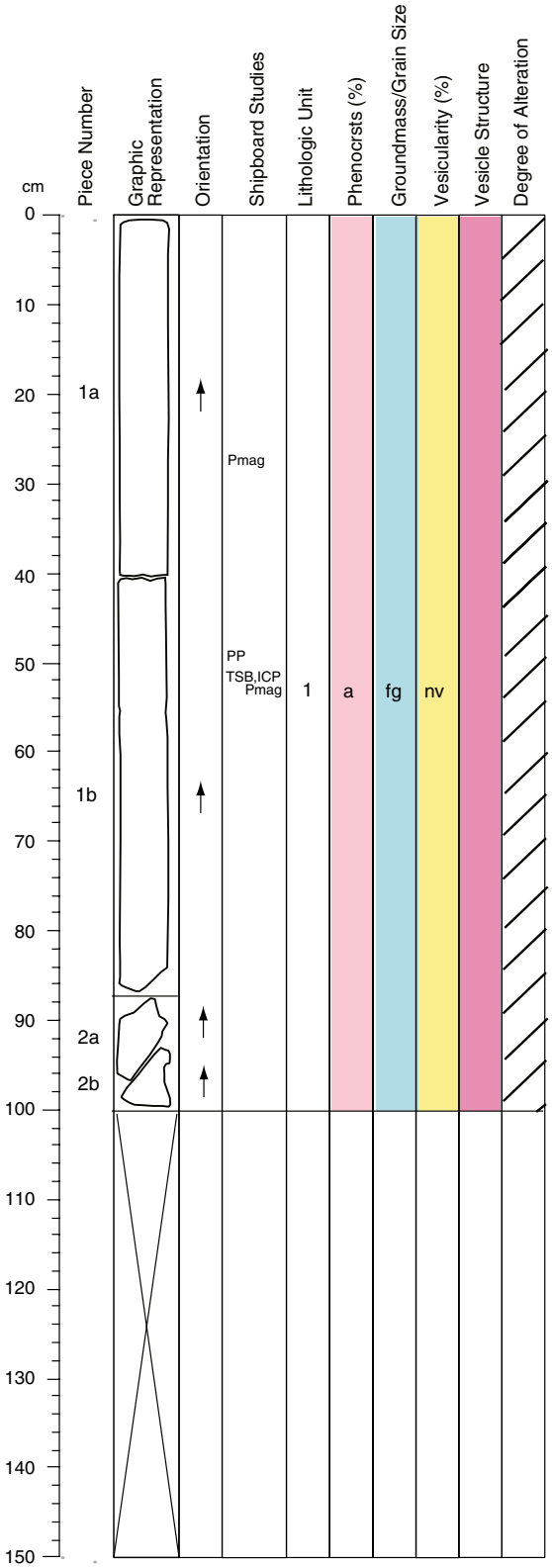
COLOR: N5; gray

STRUCTURE: fractures throughout..

ALTERATION: Slightly altered with minor clays filling fractures, alteration halos –1-1.5cm (brown-green) in color, slight clay + pyrite in fractures, plus oxide.

ADDITIONAL COMMENTS: A continuation of cooling unit that ends in Section 3R-3

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224D-3R-1 (Section top: 44.7 mbsf)

Aphyric basalt

Pieces 1-2

Thin Section(s)#: 44

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Fine grained (avg. size 0.6 mm).

VESICLES: None

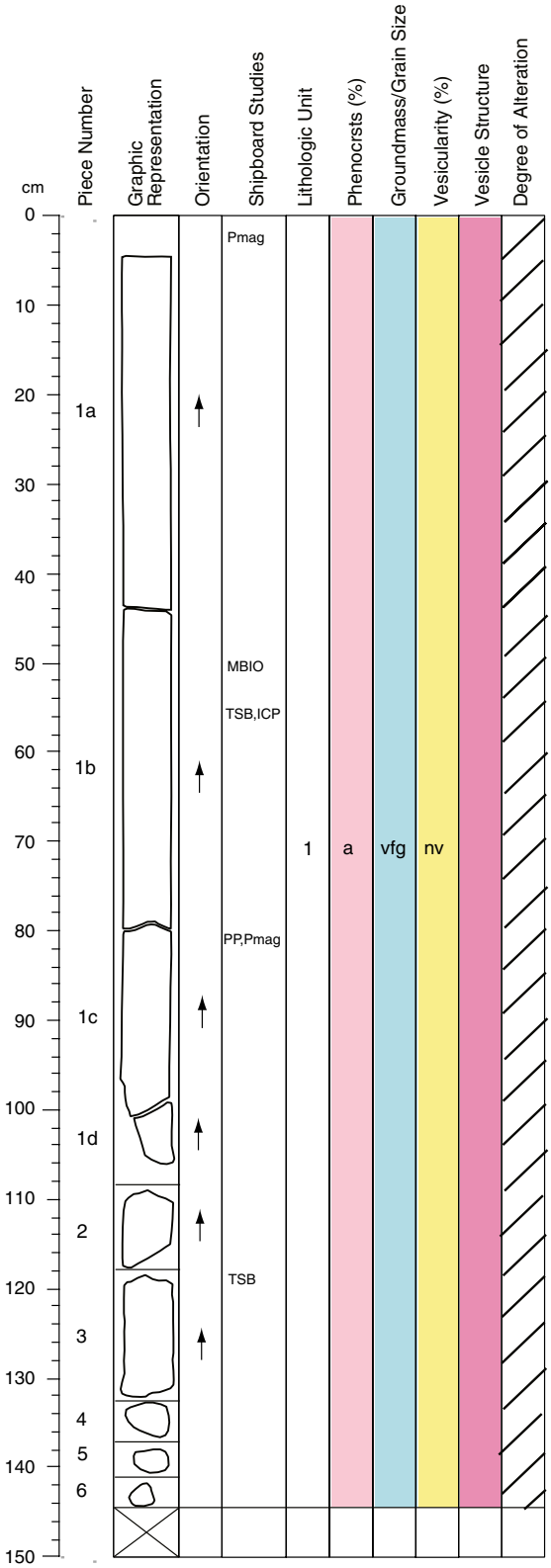
COLOR: N5: gray

STRUCTURE: Massive, fractures are rare in the core. On the vein surfece, greenish clay and trace pyrite are deposited.

ALTERATION: Low grade, slightly more altered along the vein, ~3mm width.

ADDITIONAL COMMENTS: A continuation of cooling unit that ends in Section 3R-3.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224D-3R-2 (Section top: 45.7 mbsf)

Aphyric basalt

Pieces: 1-6

Thin Section(s)#: 45 and 48

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Very fine grained (avg. size <0.4 mm), appears to become slightly finer grained towards the bottom.

VESICLES: None

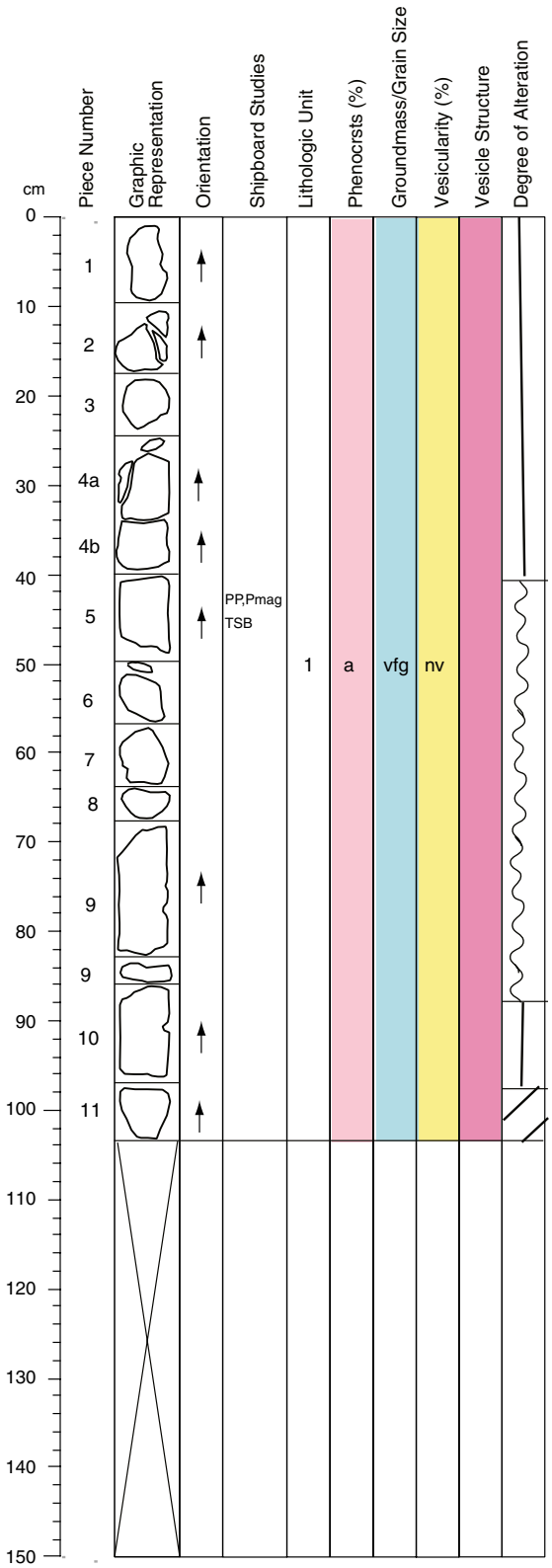
COLOR: N5, gray

STRUCTURE: Fractures in piece 1, hairline fractures in piece 3 (orthogonal horizonta and verical fractures)

ALTERATION: Slight alteration. Clays and pyrite along fractures. Bottom of piece 1 there is a 0.5 cm alteration halo of Fe-oxides (brown). Piece 3 has a 1 cm Fe-oxide (brown) alteration halo around orthogonal fractures, beyond this 1 cm halo is a 1-2 cm dark gray green alteration halo.

ADDITIONAL COMMENTS: Continuation of cooling unit that ends in Section 3R-3.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224D-3R-3 (Section top: 47.14 mbsf)

Aphyric basalt

Pieces: 1-12

Thin Section(s)#: 49

CONTACTS: None

PHENOCRYSTS: Plagioclase (~1 %)

GROUNDMASS: Very fine grained (avg. size 0.2 mm), however, it does become coaser grained at lower 20 cm.

VESICLES: < 1% vesicles, rounded, size is < 1 mm, filled with green clays and carbonate.

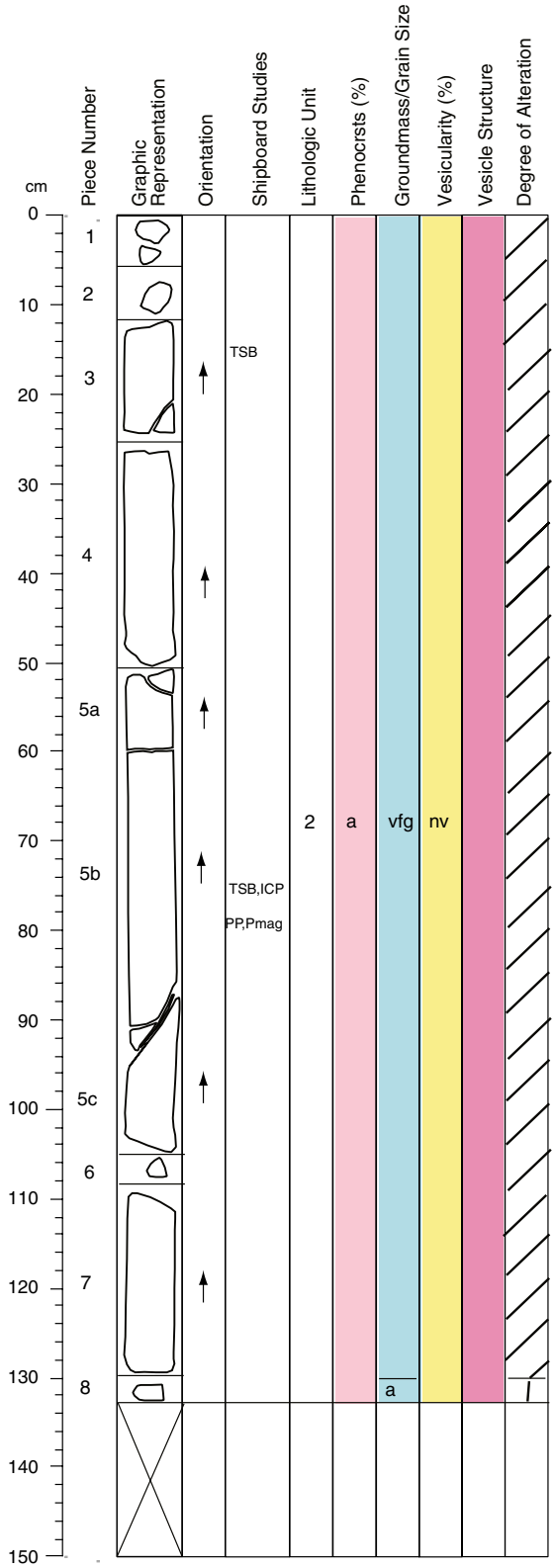
COLOR: Mixture of browns and grays 0 - 65 cm, with brown being the dominant color. 65-103, mixture of gray, brown, and green, with gray being the dominant color.

STRUCTURE: Fractures are abundant, some are filled with vein material. No orientation of fractures.

ALTERATION: Altered to brownish gray 0 - 65 cm, alteration continues, but not as intense. Alteration halos 1 - 2 cm throughout. Calcite and Fe - oxides in veins.

ADDITIONAL COMMENTS: Top of unit two. Spherulitic textures from 0 - 65 cm.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224D-4R-1 (Section top: 49.3 mbsf)

Aphyric basalt

Pieces 1-8

Thin Section(s)#: 46 and 50

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Very fine grained (avg. size 0.3 mm).

VESICLES: Some small vesicles are observed in piece 5B to 5c, <1 %, round, >0.5 mm diameter, filled with calcite.

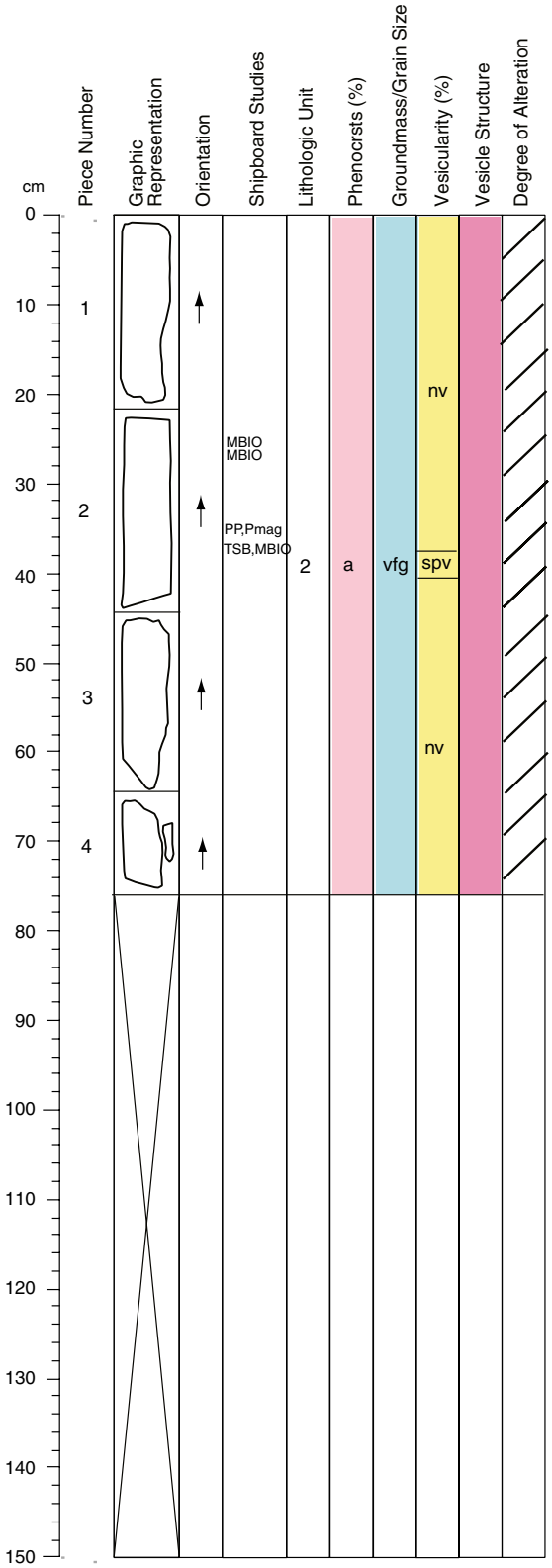
COLOR: 5BG 5/1: greenish gray (#1, 2, 3). 5G 5/1: greenish gray (#4, 5, 6, 7). 5/2: olive gray (#8).

STRUCTURE: Massive. Pieces #4 and #5 have some fractures. One vein (under part of #5) is 2 mm width and filled with calcite and clay. Some veins have pyrite deposit.

ALTERATION: Low grade, piece #8 is brownish color, under hydrothermal effect.

ADDITIONAL COMMENTS: Presence of carbonate-filled gas pipes in piece 5B.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224D-4R-2 (Section top: 50.62 mbsf)

Aphyric basalt

Pieces 1-4

Thin Section(s)#: 51

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Very fine grained (avg. size 0.4 mm)

VESICLES: Piece #2 has horizontal distributed voids (< 2 mm), dip at 20 degrees. These voids are filled with calcite.

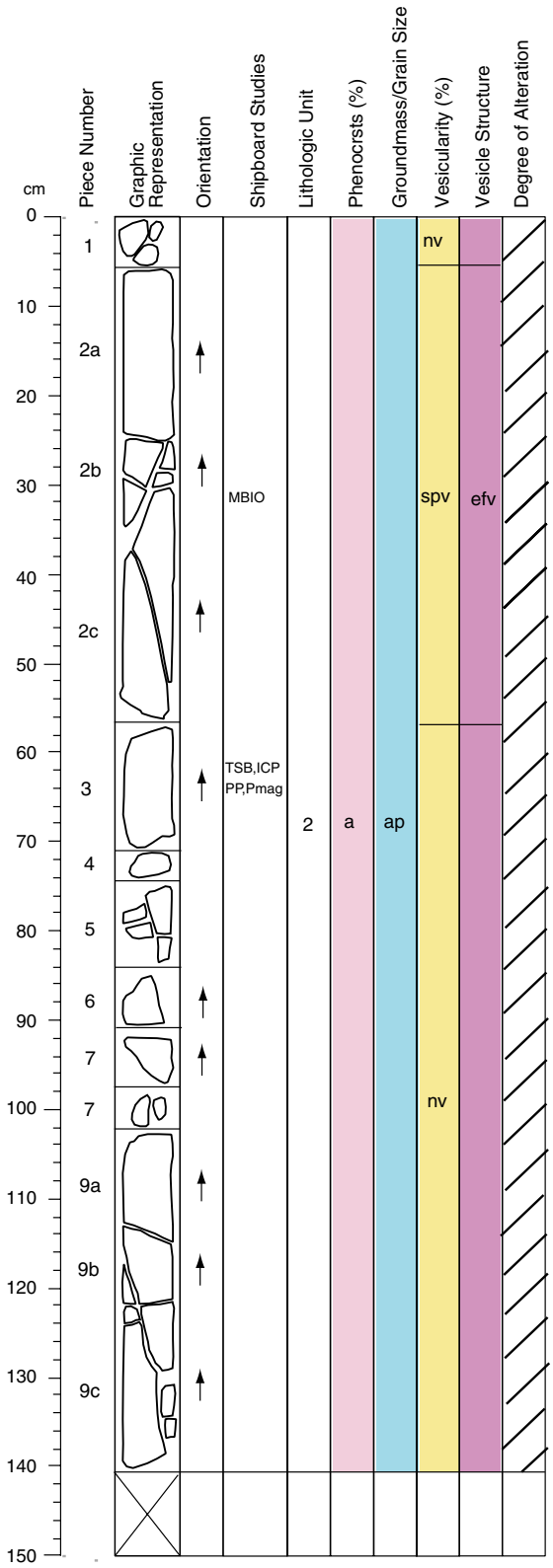
COLOR: 5G 5/1: Greenish gray.

STRUCTURE: Massive. Deposited material in veins is mainly oxide mineral. Some veins have trace pyrite deposits.

ALTERATION: Low grade

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224D-5R-1 (Section top: 51.3 mbsf)

Aphyric basalt

Pieces: 1 - 9

Thin Section(s)#: 47

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Very fine grained (avg. size 0.4 mm).

VESICLES: Pieces 2A and 2C are slightly more vesicular than the pieces in the rest of the section.

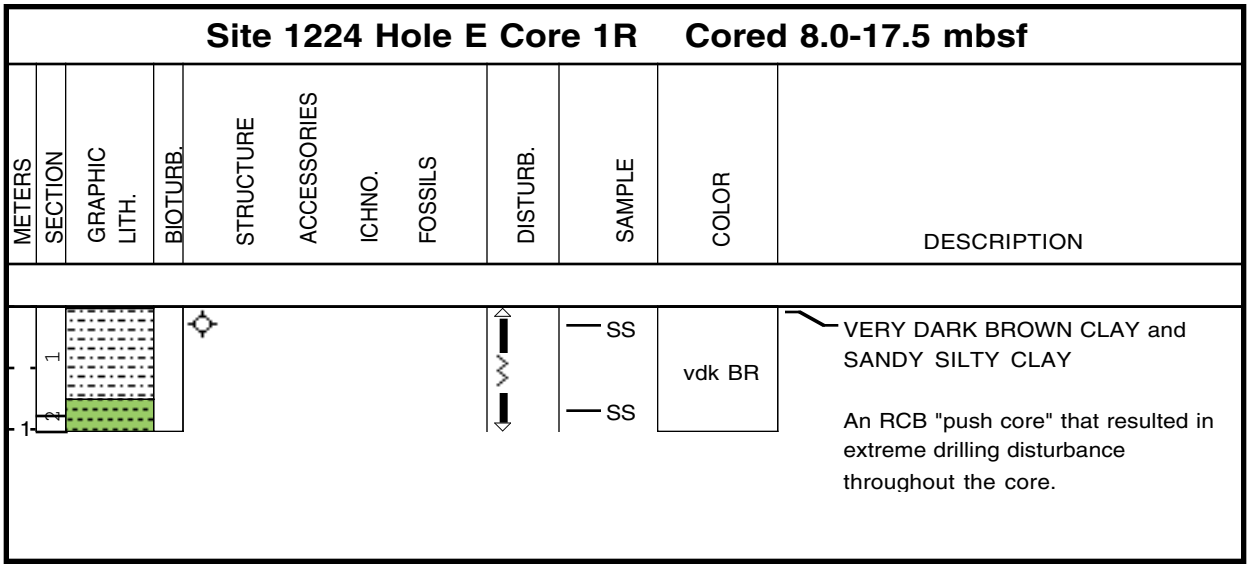
COLOR: 5BG 5/1 Greenish gray

STRUCTURE: Fractures in pieces 2B and 2C and 9B and 9C. Veins in pieces 9B and 9C are vertical and are filled with carbonate, green clay, and minor amounts of pyrite.

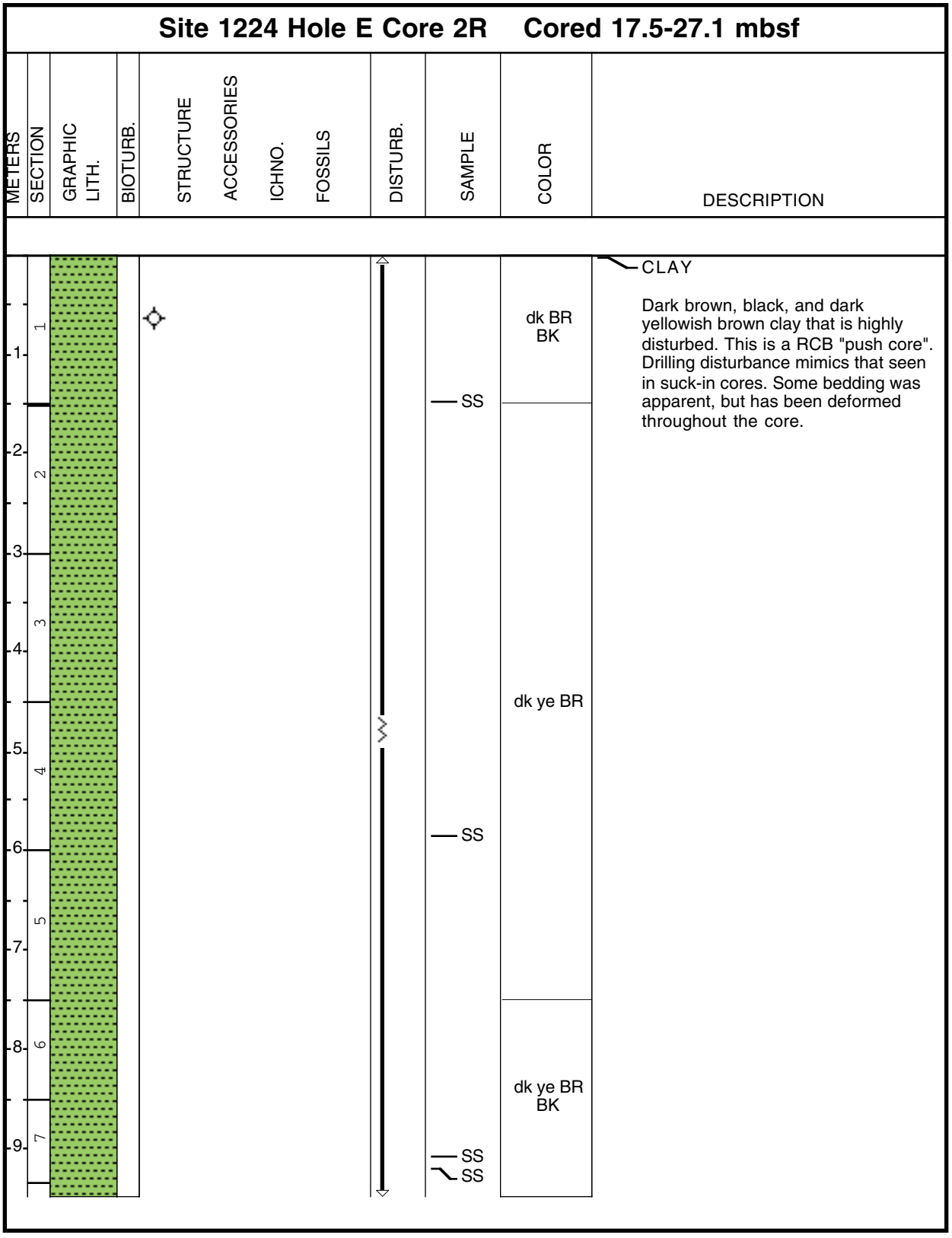
ALTERATION: Mostly carbonate filling the vesicles and a few are filled with clays. Minor amounts of pyrite on edges of many of the pieces.

ADDITIONAL COMMENTS:

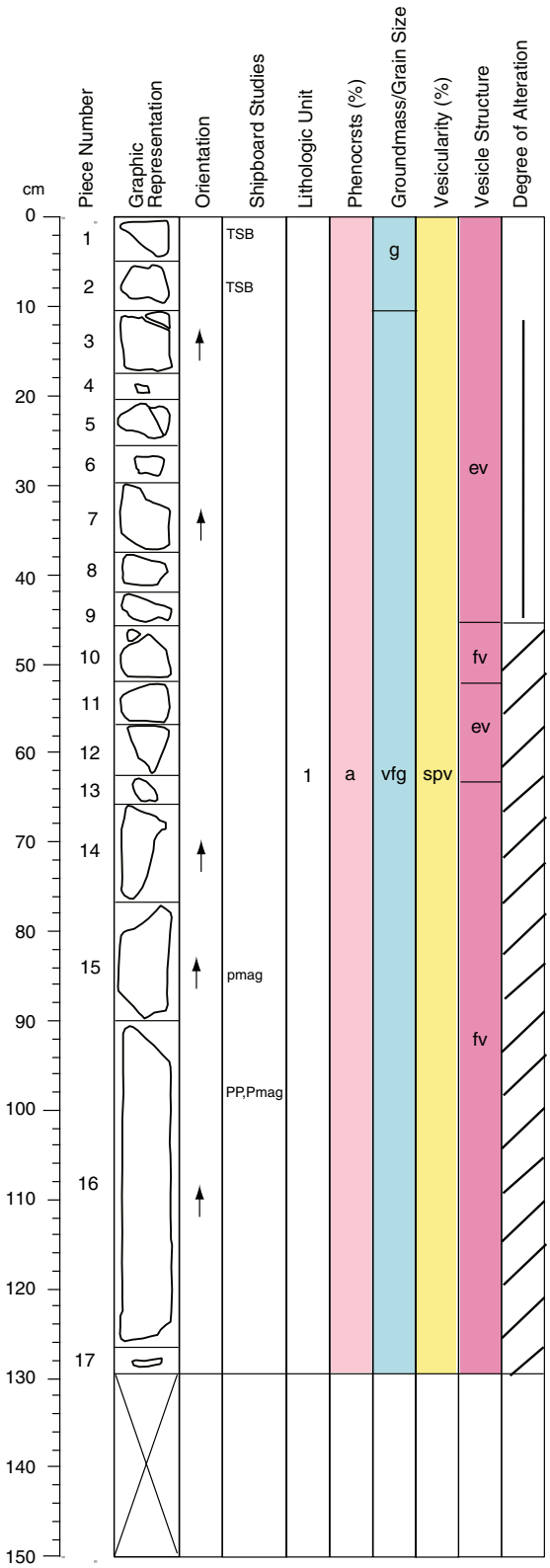
Core Photo


Site 1224 Hole E Core 1R Cored 8.0-17.5 mbsf
METERS
SECTION
GRAPHIC LITH.
BIOTURB.
STRUCTURE
ACCESSORIES
ICHNO.
FOSSILS
DISTURB.
SAMPLE
COLOR
DESCRIPTION
1
1
2
SS
SS
vdk BR
VERY DARK BROWN CLAY and SANDY SILTY CLAY
An RCB "push core" that resulted in extreme drilling disturbance throughout the core.

Core Photo


Site 1224 Hole E Core 2R Cored 17.5-27.1 mbsf
METERS
SECTION
GRAPHIC LITH.
BIOTURB.
STRUCTURE
ACCESSORIES
ICHNO.
FOSSILS
DISTURB.
SAMPLE
COLOR
DESCRIPTION
CLAY
Dark brown, black, and dark yellowish brown clay that is highly disturbed. This is a RCB "push core". Drilling disturbance mimics that seen in suck-in cores. Some bedding was apparent, but has been deformed throughout the core.
dk BR BK
dk ye BR
dk ye BR BK
SS
SS
SS
SS
1
2
3
4
5
6
7
8
9

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224E-3R-1 (Section top: 27.10 mbsf)

Aphyric basalt

Pieces: 3 - 17

Thin Section(s) #: 53 and 54

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Very fine grained

VESICLES: Sparsely vesicular, round. Some are filled with greenish clay and carbonate. Vesicularity increases with depth. Size ~ 0.5 mm

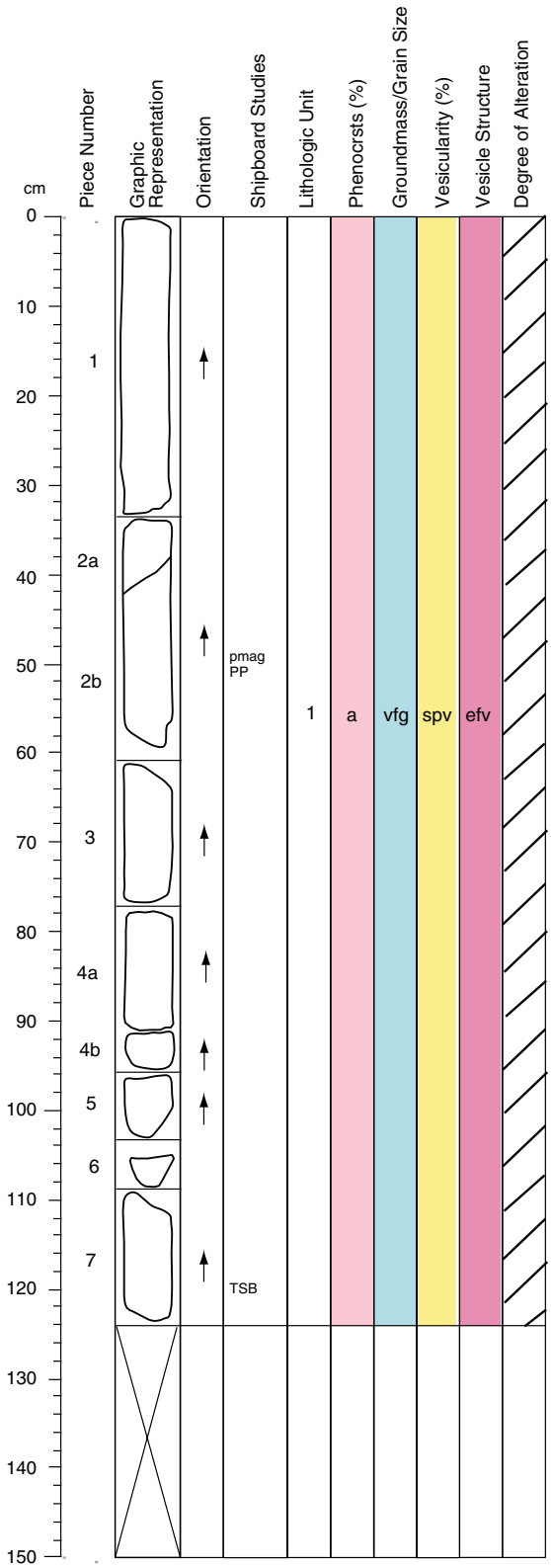
COLOR: Pieces 1 - 9 5GY 5/1, greenish gray. Pieces 10 - 17 N5, gray

STRUCTURE: Fracture in pieces 3 - 9 with no orientation and filled with Fe oxyhydroxides and green clay. Pieces 10 - 17 are massive

ALTERATION: Moderate alteration in # 3 - 9 with Fe oxyhydroxides, green clays, and alteration halos, 1 - 3 cm in width

ADDITIONAL COMMENTS: Pieces 1 and 2 are hyaloclastitic breccia with carbonate cement.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224E-3R-2 (Section top: 28.39 mbsf)

UNIT 1: Aphyric basalt

Pieces: 1 - 17

Thin Section(s) #: 55

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Very fine grained (avg. size 0.3 mm).

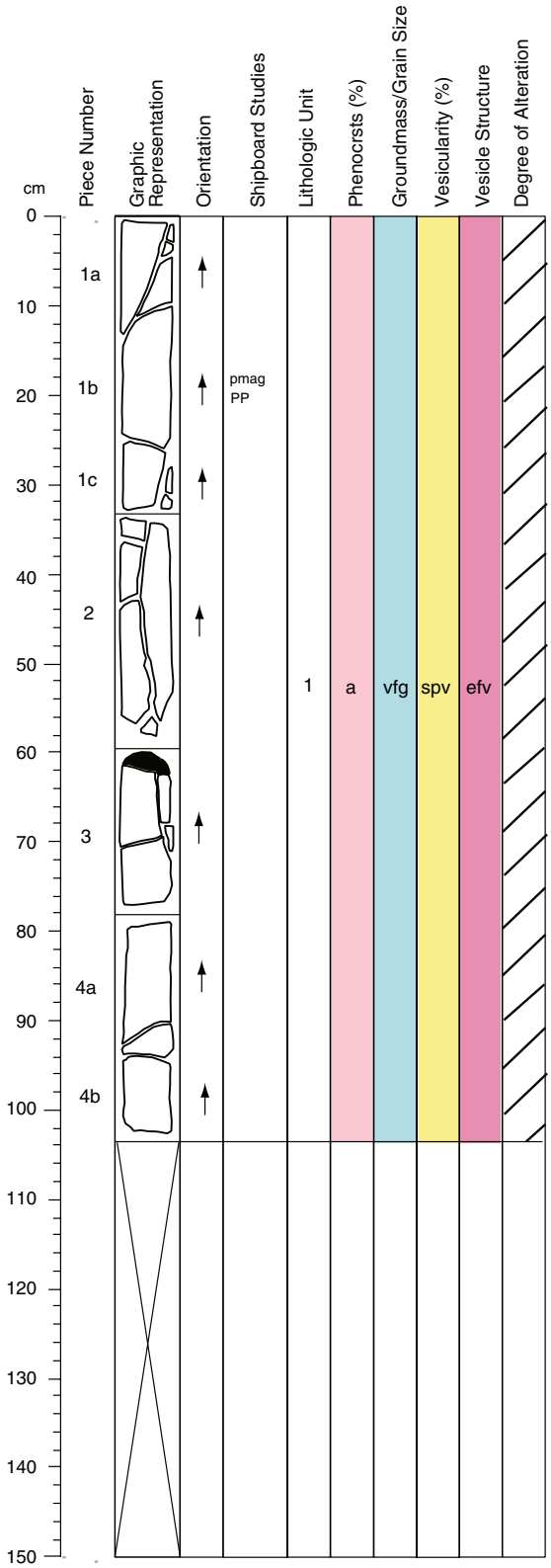
VESICLES: Sparsely vesicular, ranging in size from 1 mm, round, some are filled with clays, carbonate, and sulfides. The size of the vesicles becomes larger in piece 2 - 5.

COLOR: N5, gray.

STRUCTURE: Mainly massive, some fractures filled with carbonates, clays, and sulfides.

ALTERATION: Slightly altered in fractures and veins.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224E-3R-3 (Section top: 29.63 mbsf)

Aphyric basalt

Pieces: 1 - 4

Thin Section(s) #: None

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Very fine grained.

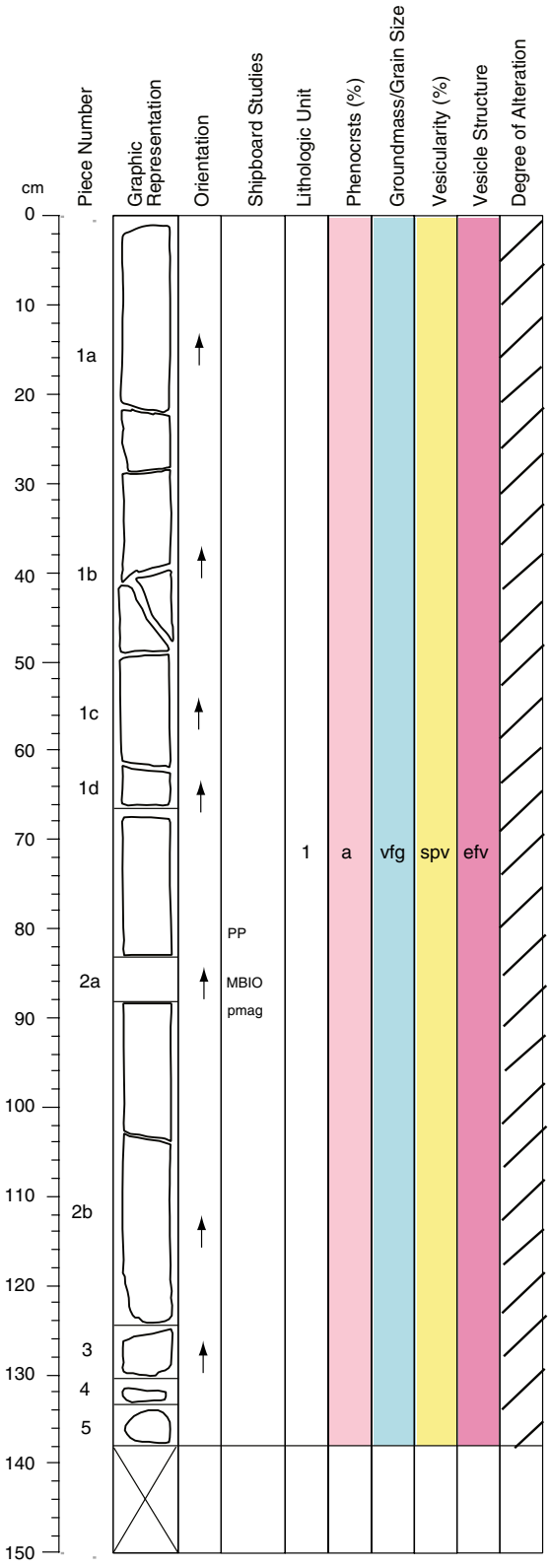
VESICLES: Sparsely vesicular to non-vesicular. Some vesicles are filled with carbonate and clay, rounded, and the size is 1 - 3 mm.

COLOR: N5, gray.

STRUCTURE: Fractured throughout. Fractures contain mainly green clays and some sulfides.

ALTERATION: Slightly altered along fractures with Fe-oxyhydroxides, green clay, carbonates, alteration halos 1 - 2 mm.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224E-3R-4 (Section top: 30.66 mbsf)

Aphyric basalt

Pieces: 1 - 5

Thin Section(s) #: None

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Very fine grained.

VESICLES: Sparsely vesicular, round, size 1 - 2 mm.

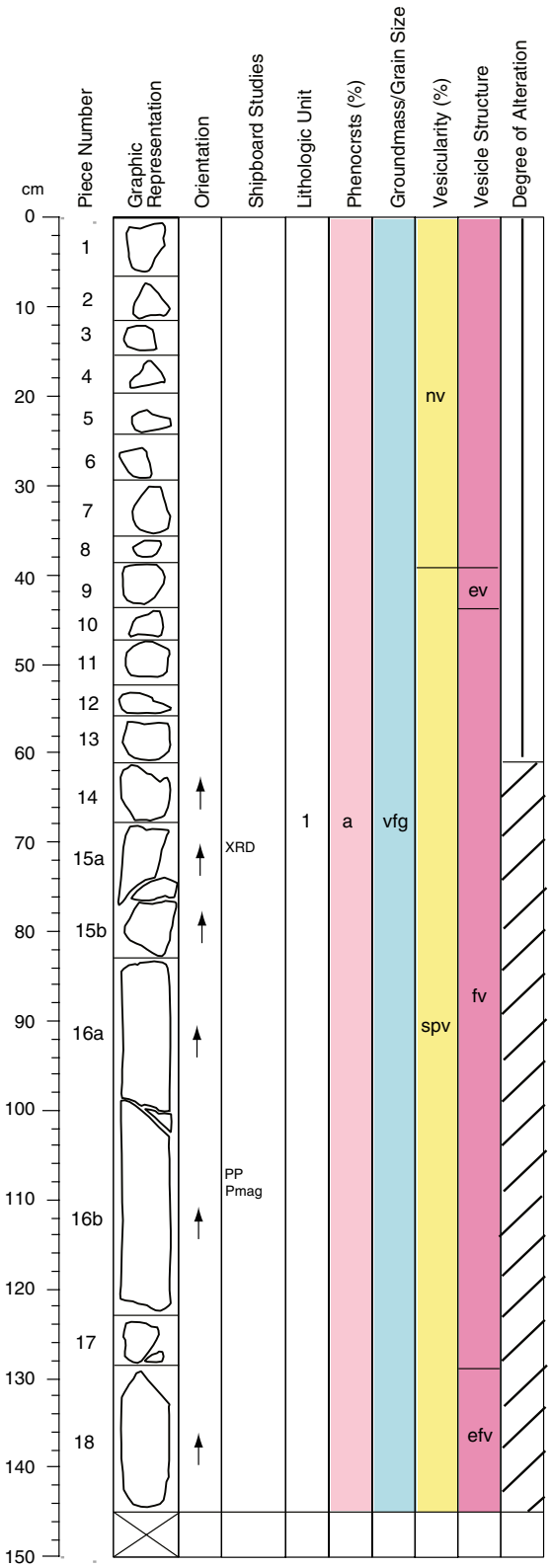
COLOR: N5, gray, but Piece # 5 is 10YR 5/1, gray.

STRUCTURE: Piece #1 is fractured and Pieces # 2 - # 5 are massive. Piece # 1 has fractures filled with carbonate, greenish clay, and some sulfides.

ALTERATION: Slightly altered along fractures: green clays, Fe-oxyhydroxides, calcite, alteration halos ~ 1 cm.

ADDITIONAL COMMENTS: Piece 5 is similar to the pieces 3 - 9 in Core 1224E-3R.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-1R-1 (Section top: 27.7 mbsf)

Aphyric basalt

Pieces : 1 - 18

Thin Section(s) #: none

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Very fine grained.

VESICLES: Sparcely vesicular. Round. Many pieces lower than piece 11 are filled with greenish clay and some are filled with carbonate. Size is ~ 0.5 mm.

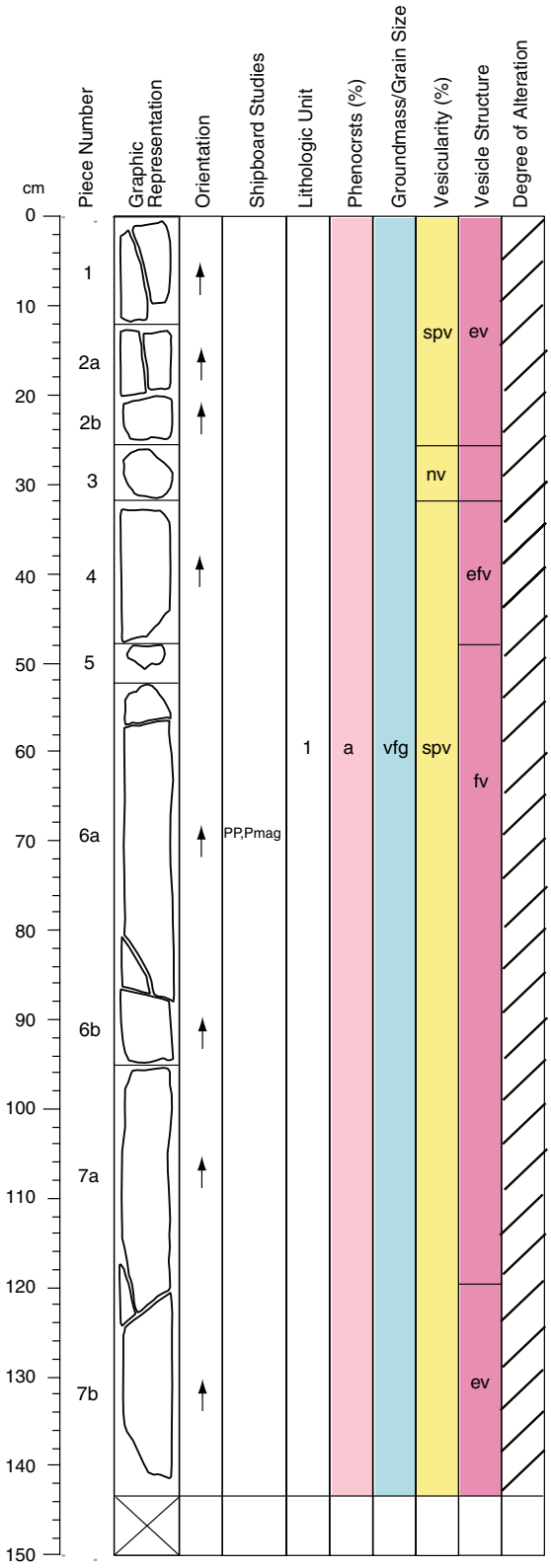
COLOR: 5GY 6/1: greenish gray for pieces 1 - 13. 5BG 5/1: greenish gray for pieces 14 - 18.

STRUCTURE: Pieces 1 - 13 are fragmented. Pieces 14 - 18 are massive with some fractures with thin greenish clay deposit.

ALTERATION: Low-grade altered (Pieces 1 - 13) and some pieces have dark-color altered rind (~1 cm thick). Slightly altered (Pieces 14 - 18).

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-1R-2 (Section top: 29.14 mbsf)

Aphyric basalt

Pieces: 1 -7

Thin Section(s)#: none

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Very fine grained.

VESICLES: Sparsely vesicular, round, size is ~ 2 mm. Vesicles in pieces # 1 - 3 are empty, those in pieces # 4 - 7 are filled with greenish clay, but some vesicles in pieces # 4 and 5 are filled with carbonate.

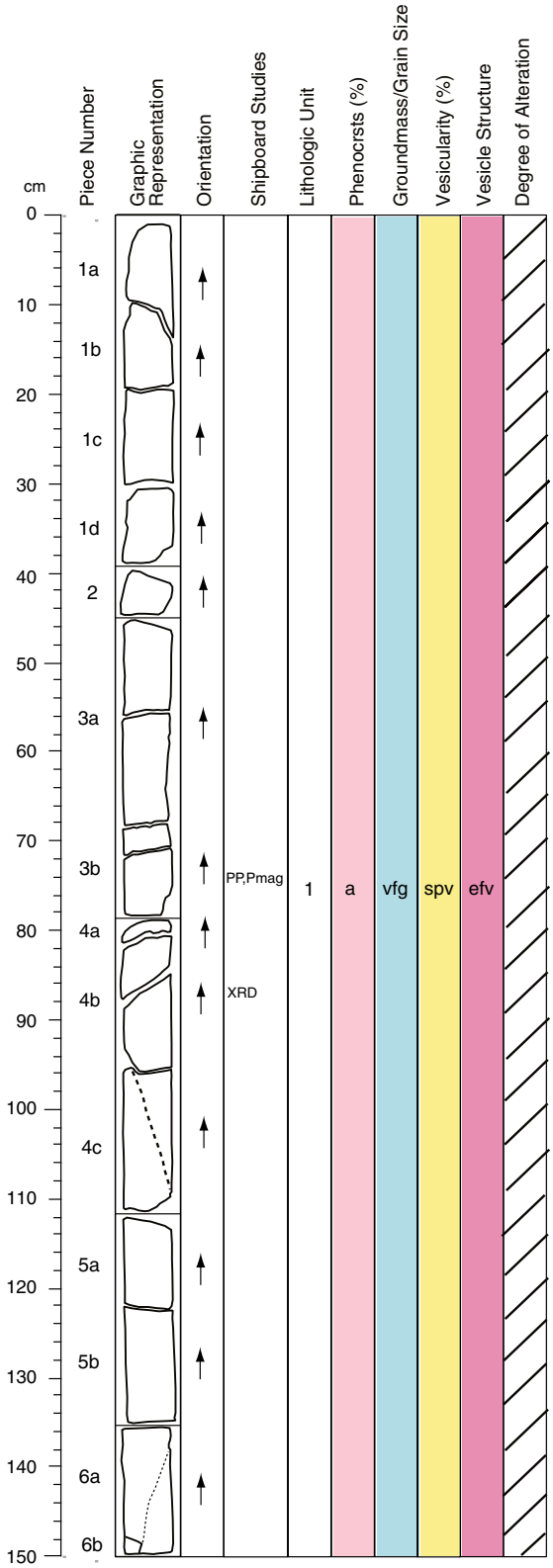
COLOR: 5B 5/1: bluish gray.

STRUCTURE: Massive with some fractures filled with thin greenish clay deposited. Piece 5 has a 2 mm thick calcite vein.

ALTERATION: Slightly altered.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-1R-3 (Section top: 30.58 mbsf)

Aphyric basalt

Pieces: 1 - 6

Thin Section(s)#: none

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Very fine grained.

VESICLES: Sparsely vesicular, rounded, ~ 1 mm, some are filled with clays.

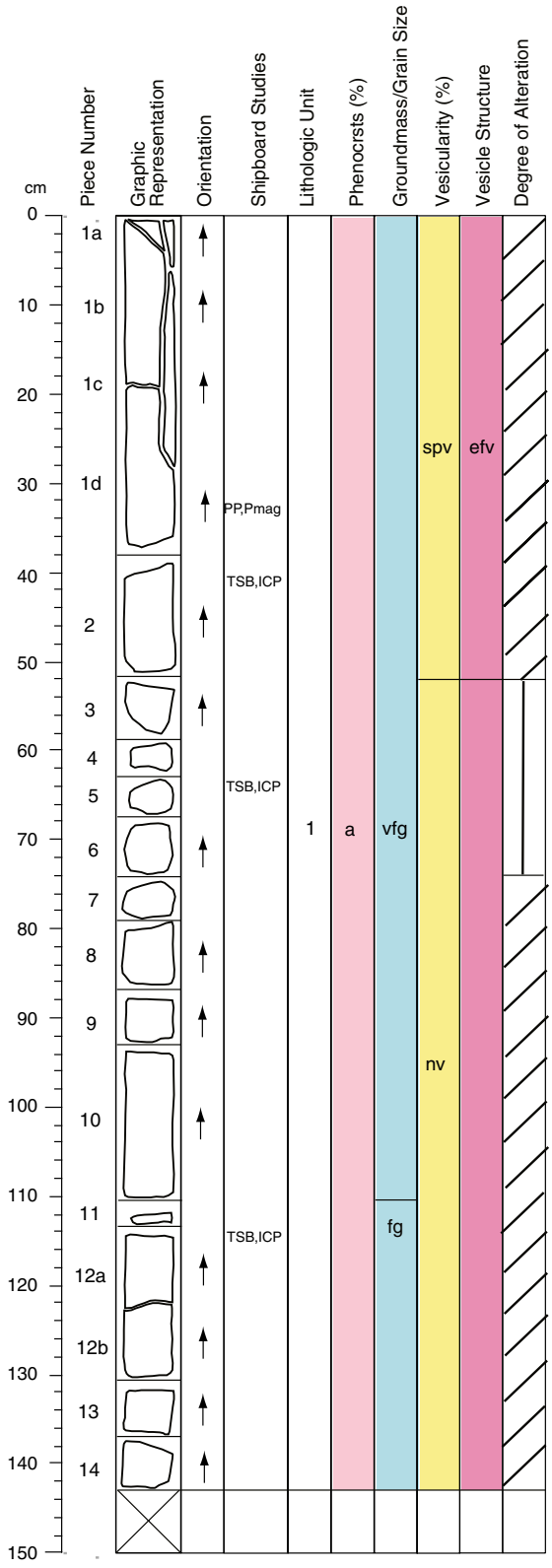
COLOR: N5: gray.

STRUCTURE: Fractures throughout. Veins of carbonate, Fe-oxyhydroxides and clays. Fractures contain clays and pyrite. No preferred orientation of fractures.

ALTERATION: Slightly altered. Vesicles and fractures have green clays. Veins have carbonate clays, pyrite and some Fe-oxyhydroxides. Alteration haloes ~ 0.5 cm

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-1R-4 (Section top: 32.09 mbsf)

Aphyric basalt

Pieces: 1 - 14

Thin Section(s)#: 56, 57, and 58

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: From very fine grained (avg. size 0.4 mm) to fine grained (avg. size 0.5 mm) downcore.

VESICLES: Sparsely vesicular in pieces 1 and 2, rounded and some are filled with clays. Pieces 3 - 14 are non-vesicular.

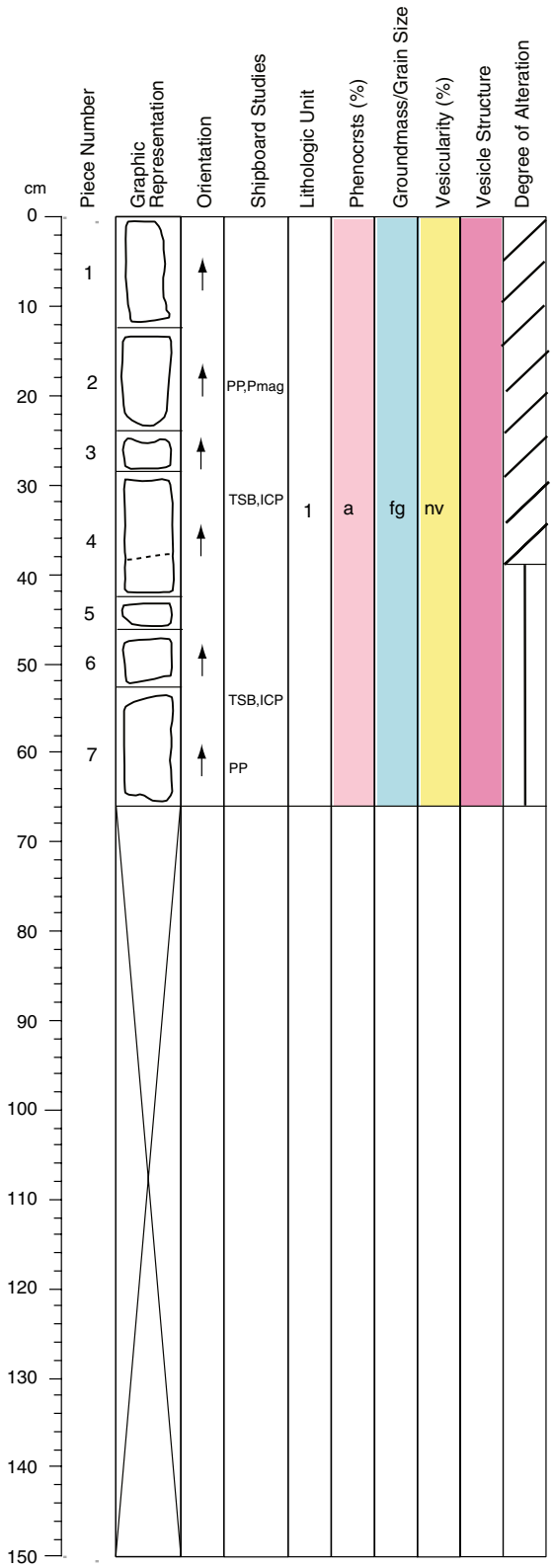
COLOR: In slightly altered pieces N5: gray, in moderately altered pieces color varies from brown gray to yellowish brown.

STRUCTURE: Fractured. Alteration halos in Pieces 7 and 8 are ~0.5 cm. Pieces 3 - 6 have a high amount of alteration haloes. Veins are filled with carbonate; fractures have clays and pyrite.

ALTERATION: Slightly to moderate alteration with green clays and Fe-oxyhydroxides throughout. Pieces 3 - 6 are bleached with carbonate and Fe-oxyhydroxides.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-1R-5 (Section top: 33.52 mbsf)

UNIT 1: Aphyric basalt

Pieces: 1 - 7

Thin Section(s)#: 59 and 60

CONTACTS: None

PHENOCRYSTS: Plagioclase and clinopyroxene (~1%).

GROUNDMASS: Fine grained (avg. size 0.5 mm).

VESICLES: None.

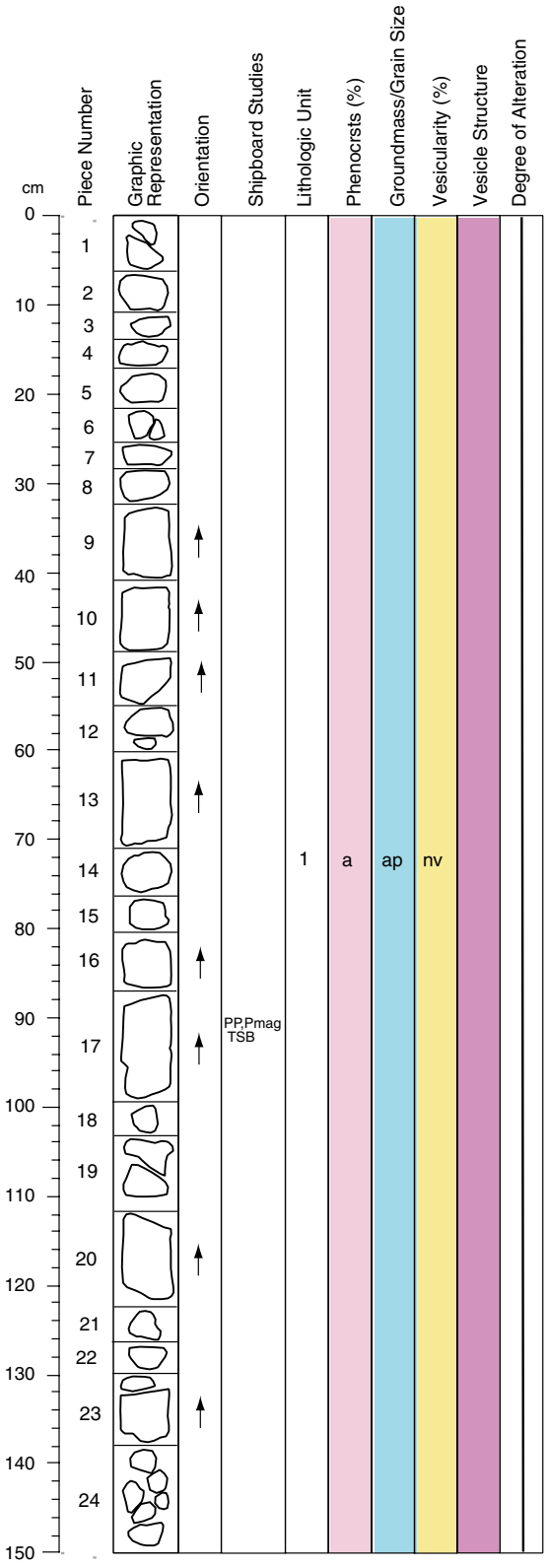
COLOR: N5: gray in slightly altered pieces, moderatly altered pieces range in color from yellow brown to red brown.

STRUCTURE: One vein in # 4 filled with Fe oxyhydroxides.

ALTERATION: Slightly altered in pieces 1 to top of piece 4. Pieces 4 - 7 are moderately altered and bleached to yellow brown. Fe-oxyhydroxdes with clays and carbonate. Alteration halo measuring ~ 3 cm.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-2R-1 (Section top: 39.70 mbsf)

Aphyric basalt

Pieces: 1 - 24

Thin Section(s)#: 61

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Fine grained.

VESICLES: None

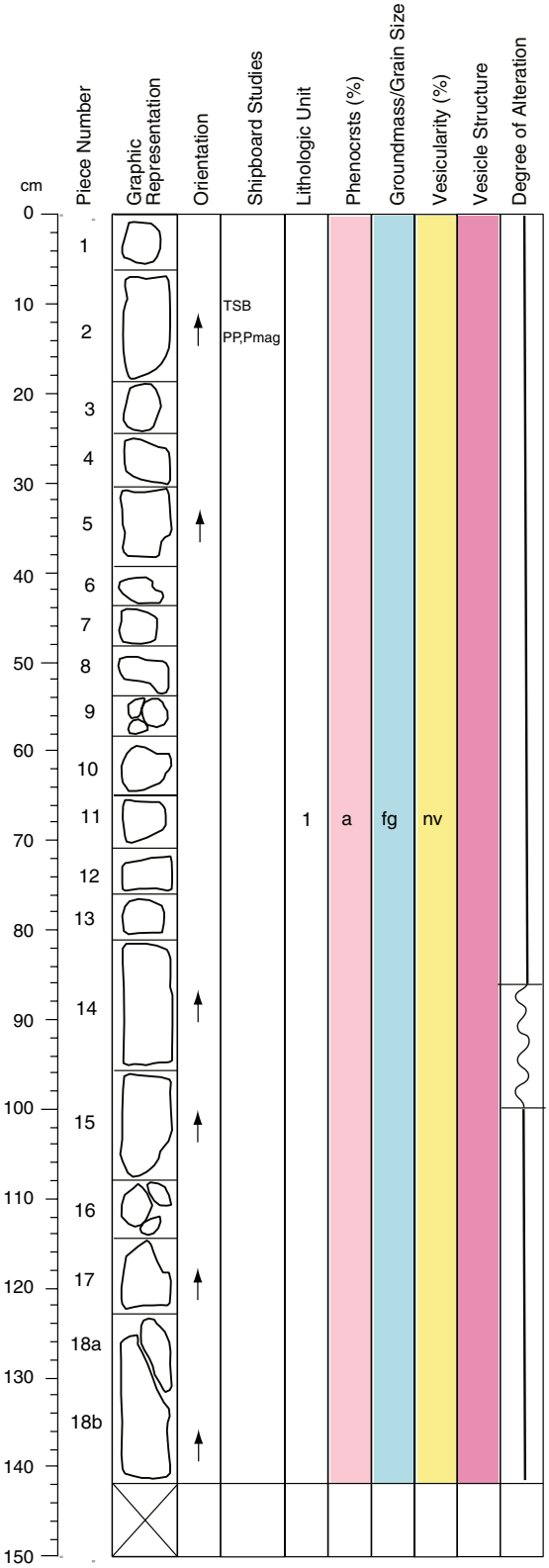
COLOR: Gray to yellowish brown.

STRUCTURE:

ALTERATION: Moderately altered and bleached to yellow brown.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-2R-2 (Section top: 41.2 mbsf)

Aphyric basalt

Pieces: 1 - 18

Thin Section(s)#: 62

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Fine grained.

VESICLES: Non-vesicular.

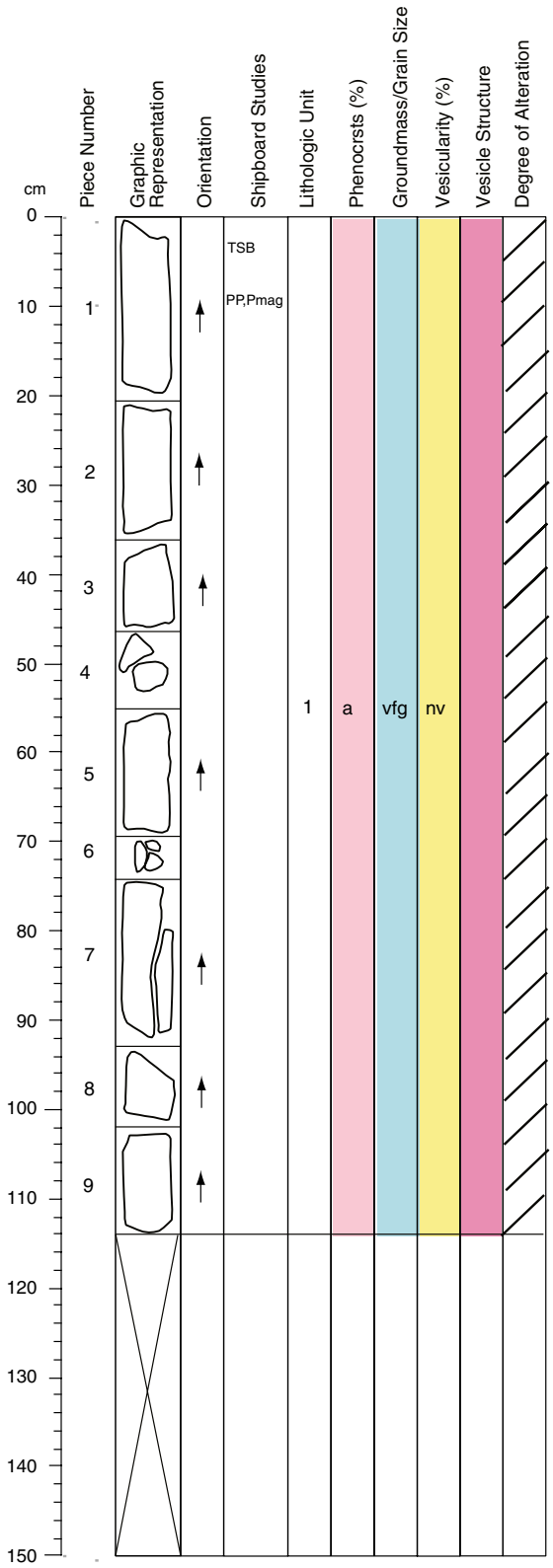
COLOR: Varies from gray to brown due to alteration.

STRUCTURE: Fractured, no orientation. Fractures are thin and filled with Fe-oxyhydroxides and green clays.

ALTERATION: Moderately altered from piece 1 to piece 13. Fe-oxyhydroxides and clays, bleaching, alteration haloes throughout, some pieces have large haloes that are filled with orange red material. Maybe some carbonate in piece 15.

ADDITIONAL COMMENTS: Average size of groundmass crystals in thin section #62 changes from 0.8 mm (top) to 0.3 mm (bottom).

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-2R-3 (Section top: 42.62 mbsf)

Aphyric basalt

Pieces: 1 - 9

Thin Section(s)#: 63

CONTACTS: None

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained.

VESICLES: None.

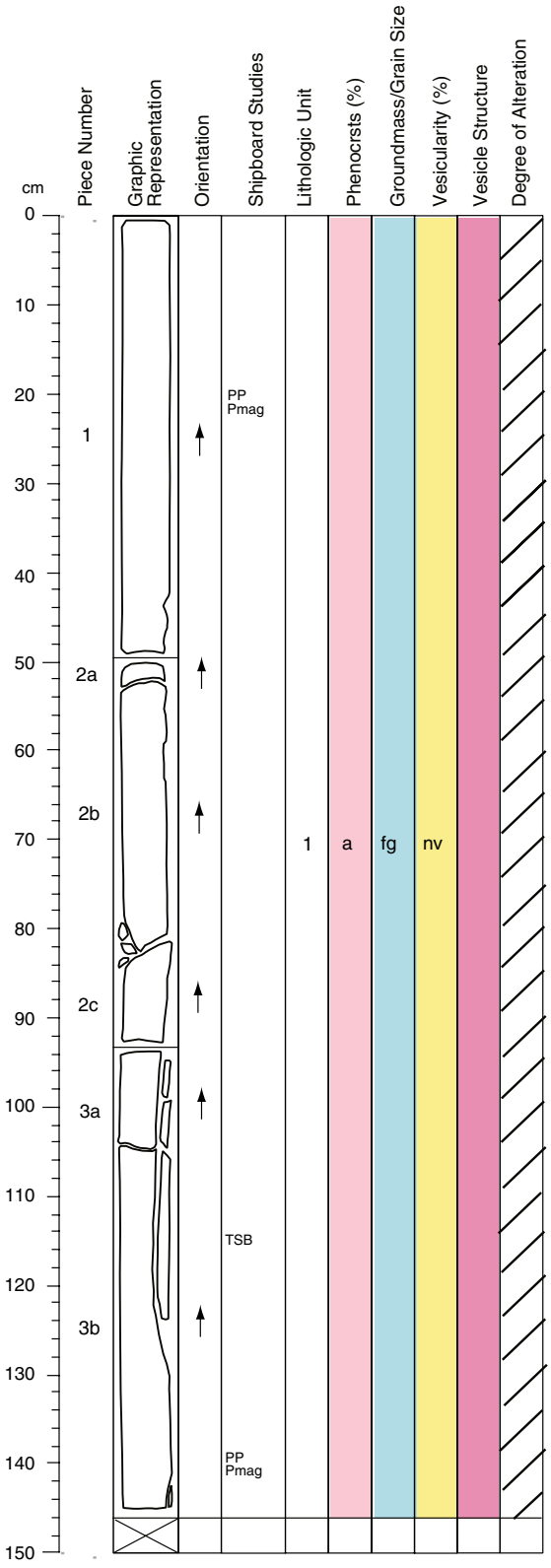
COLOR: N5: gray.

STRUCTURE: massive with one fracture in # 7.

ALTERATION: Slightly alteration with pyrite, clays, and blackish blue material in fracture. No alteration haloes. Pieces 1 - 5 have holes (<1 mm - 3 mm) that appears to have formed during alteration.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-2R-4 (Section top: 43.76 mbsf)

UNIT 1: Aphyric basalt

Pieces: 1 - 3

Thin Section(s)#: 64

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Fine grained (avg. size 0.5 mm).

VESICLES: None.

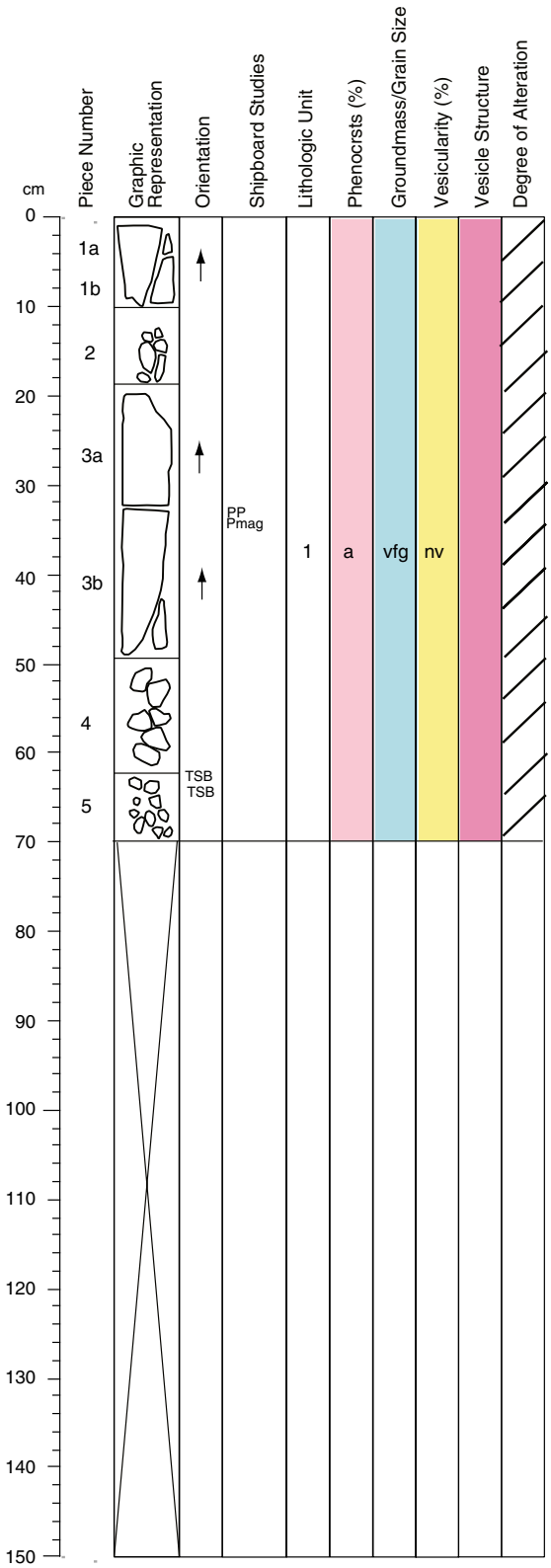
COLOR: N5: gray.

STRUCTURE: Fractured. Multiple hairlike fractures in piece 2. Veins of oxyhydroxides and fractures have green clays in them.

ALTERATION: Slightly altered with an increase in alteration along piece # 2. Alteration halos measuring about 1 cm in thickness. Fe-oxyhydroxides and green clay material along fractures.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-2R-5 (Section top: 45.21 mbsf)

Aphyric basalt

Pieces: None

Thin Section(s)#: 65 and 66

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Very fine grained.

VESICLES: None.

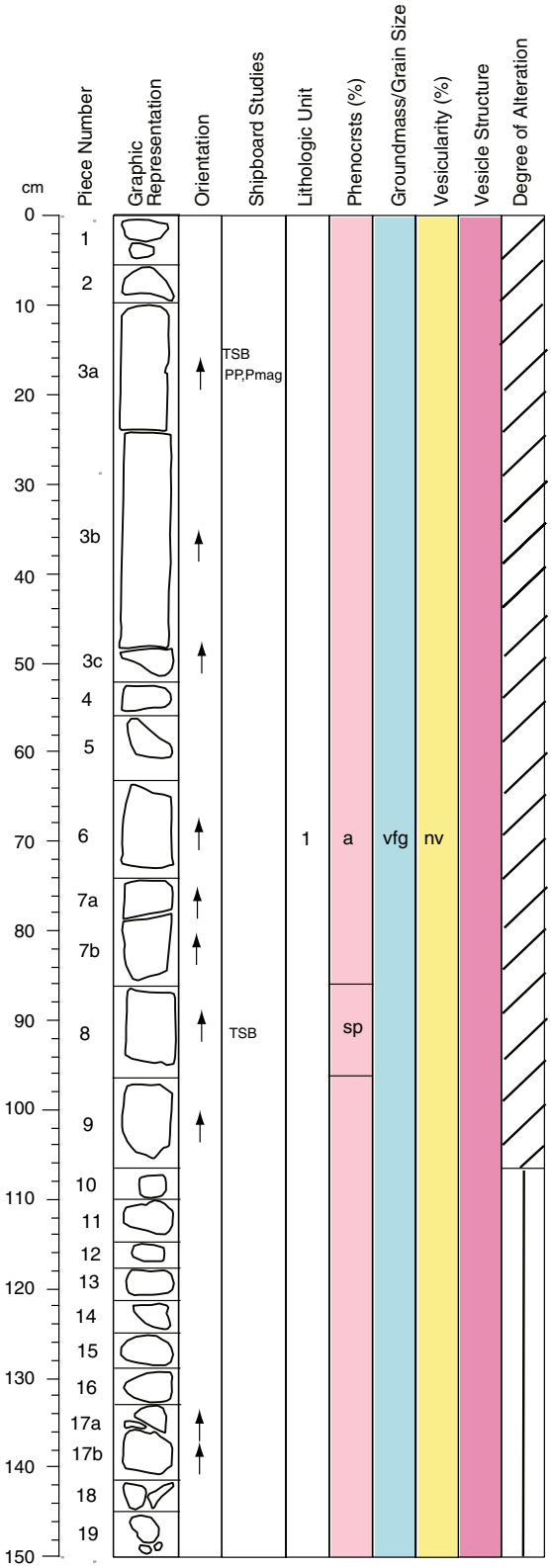
COLOR: N5: gray.

STRUCTURE: Fractured, hairlike fractures in pieces 1 and 2. Fractured have green clay material and Fe-oxyhydroxides.

ALTERATION: Slightly altered, pieces 1 and 2 have alteration halos ~ 1 cm. Fe-oxyhydroxides with green clay.

ADDITIONAL COMMENTS :

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-3R-1 (Section top: 47.3 mbsf)

Aphyric to sparsely phyric basalt
Pieces: 1 - 19

Thin Section(s)#: 67 and 68

CONTACTS: None

PHENOCRYSTS: Plagioclase (<2%) and Clinopyroxene (<2%) in piece #8

GROUNDMASS: Very fine grained (avg. size <0.4 mm)

VESICLES: < 1 % vesicles to non-vesicular. In pieces 5 - 19, those vesicles that do exist are filled with clays

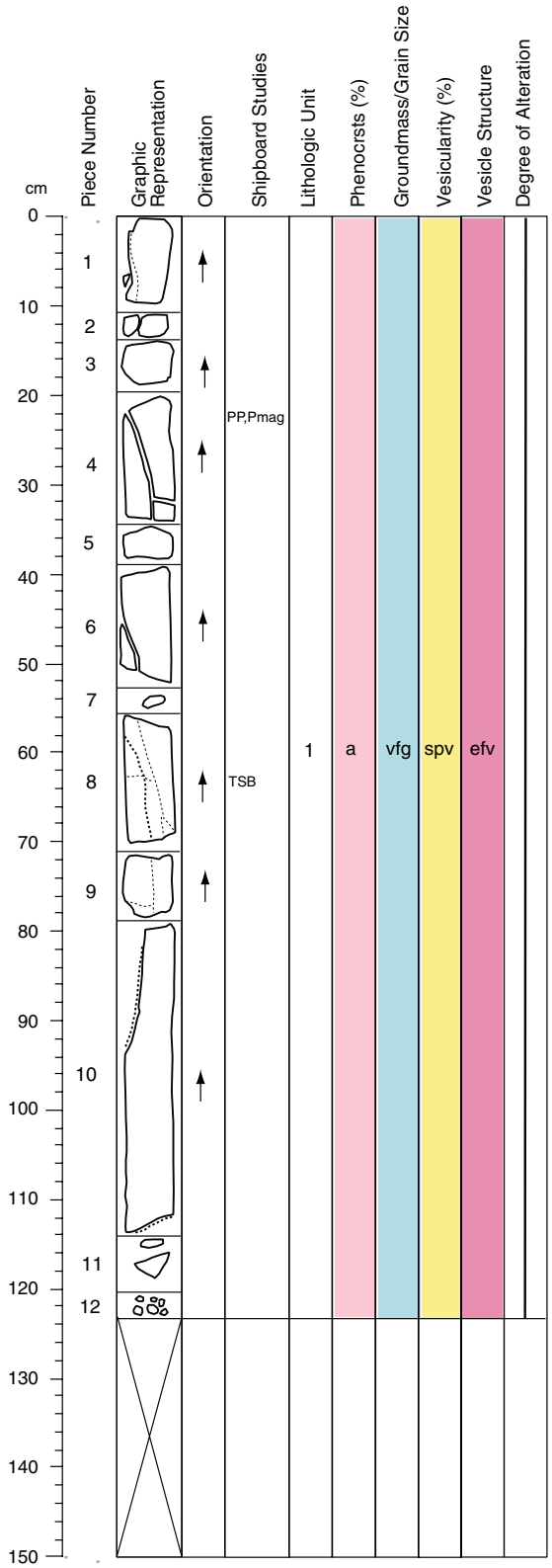
COLOR: 5Y 5/1: gray (# 1), N5: gray (# 2 - 8), 5G 5/1: greenish gray (# 9 - 12) and 5Y 5/1: gray (# 13 - 19)

STRUCTURE: Fractured throughout with hairlike fractures in # 8 - 19

ALTERATION: Slightly alteration, however piece 1, and 13 - 19 are more altered then the rest of the section. Alteration halos exist throughout pieces 1, 13 - 19, with Fe-oxyhydroxides and carbonate. Green clays in vesicles. Pieces 1, 13 - 19 are slightly bleached to a lighter color

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-3R-2 (Section top: 48.8 mbsf)

Aphyric basalt

Pieces: 1 - 12

Thin Section(s)#: 69

CONTACTS: None

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained (avg. size 0.3 mm).

VESICLES: Sparsely vesicular, round, ≤1 mm, some are filled and some are empty.

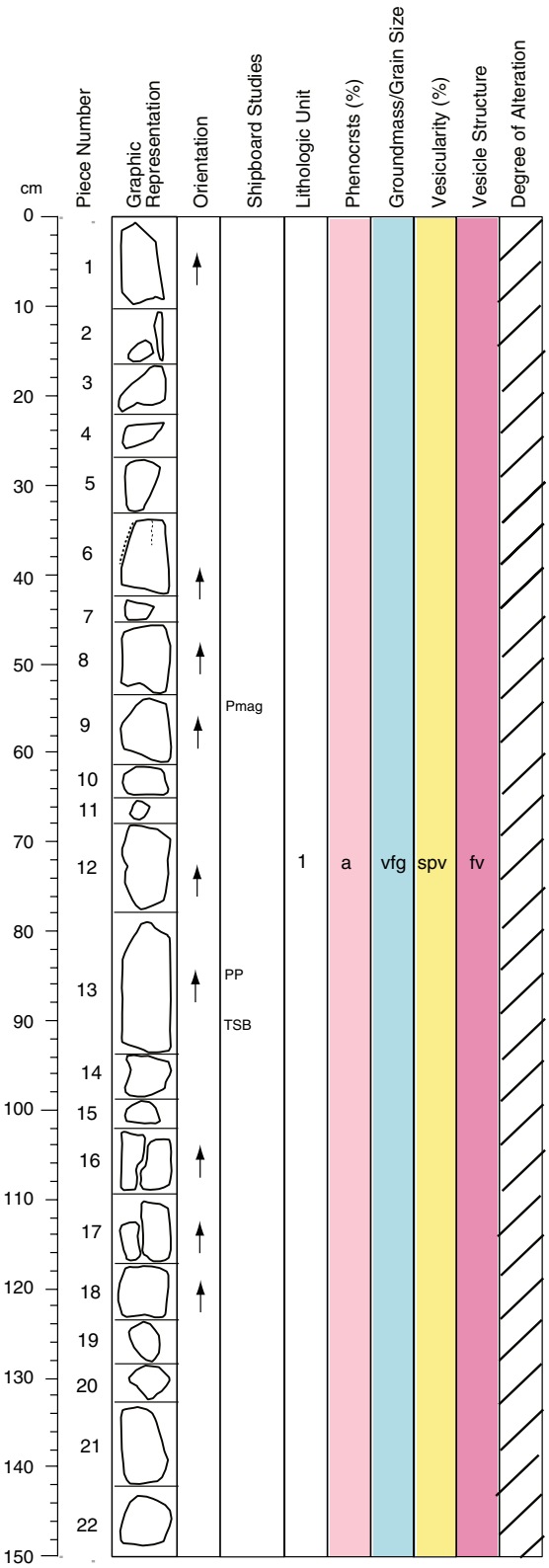
COLOR: 5Y 7/1 to 5Y 5/1, grays, varies throughout due to alteration.

STRUCTURE: Fractured throughout. They are subvertical to horizontal in direction. Fractures and vein are filled throughout with calcite and Fe oxyhydroxides.

ALTERATION: Moderately altered with alteration haloes throghout. Fe oxyhydroxides and carbonates in veins and vesicles.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-3R-3 (Section top: 50.03 mbsf)

Aphyric basalt

Pieces: 1 - 22

Thin Section(s)#: 70

CONTACTS: None

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained.

VESICLES: Sparsely vesicular filled vesicles, rounded, filled with color carbonates and clays. Color of filling ranges from green to yellow to white.

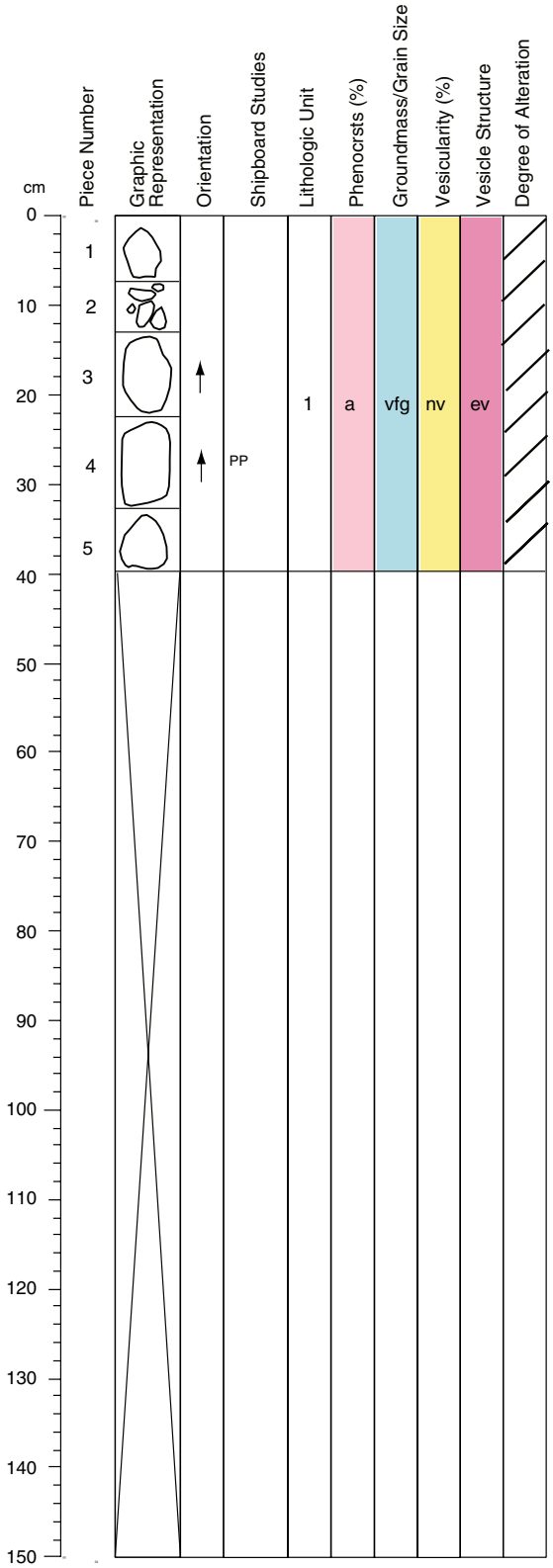
COLOR: Color varies due to alteration, ranges from 5Y 7/1 to 5Y 5/1: gray.

STRUCTURE: Few hairlike fractures, no preferred orientation.

ALTERATION: Slightly altered, alteration haloes throughout. Fe oxyhydroxides and carbonates filling veins and vesicles.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-3R-4 (Section top: 51.53 mbsf)

Aphyric basalt

Pieces: 1 - 5

Thin Section(s)#: none

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Very fine grained.

VESICLES: Trace

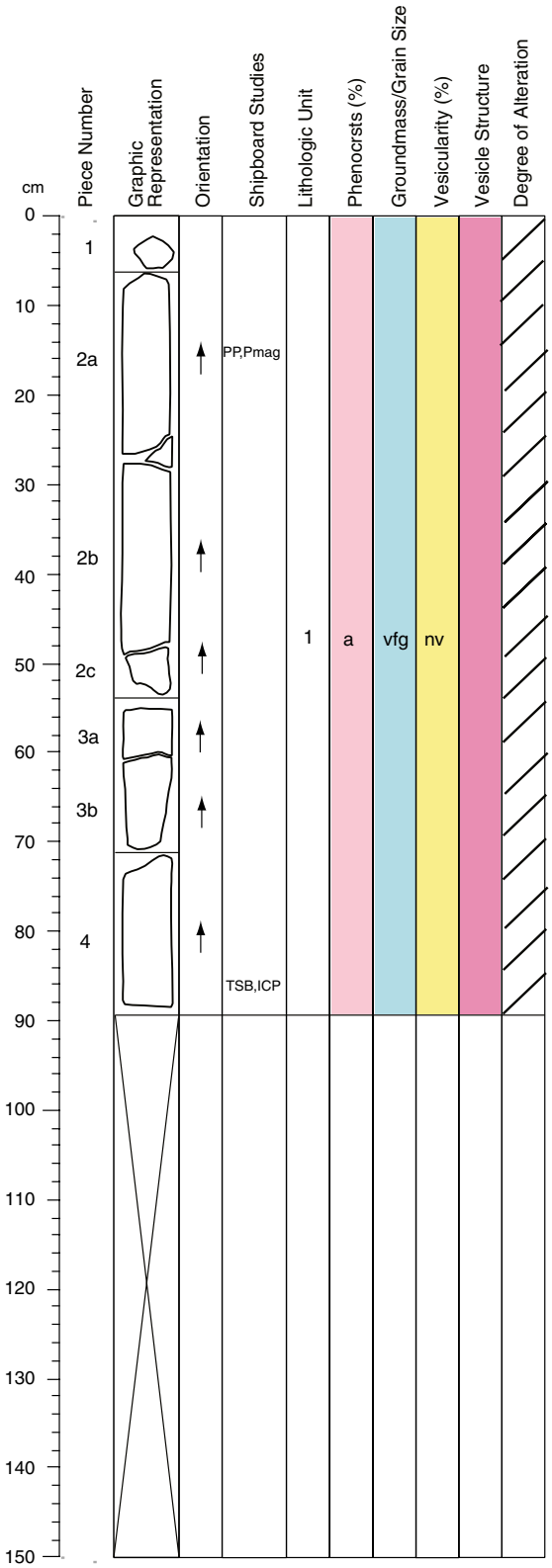
COLOR: Bluish gray

STRUCTURE: Massive with some empty vesicular veins and fractures. Trace of oxide and sulfide in ores, deposited on surface

ALTERATION: Slightly.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-4R-1 (Section top: 56.4 mbsf)

Aphyric basalt

Pieces: 1 - 4

Thin Section(s)#: 71

CONTACTS: None

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained (avg. size 0.3 mm).

VESICLES: None.

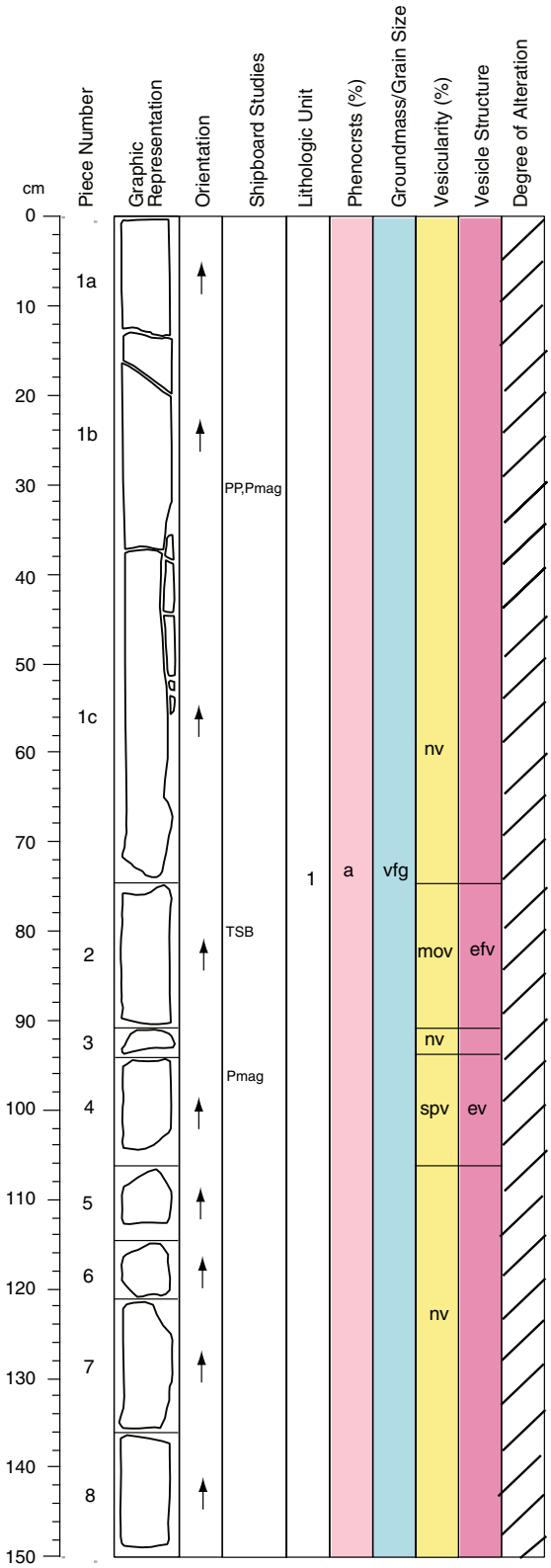
COLOR: N5: gray.

STRUCTURE: Minor amount of fractures without any orientation.

ALTERATION: Slightly with green clays and carbonates, pyrite and dark blue-black material in fractures. No alteration haloes.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-4R-2 (Section top: 57.3 mbsf)

Aphyric basalt

Pieces: 1 - 8

Thin Section(s)#: 72

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Very fine grained (avg. size 0.3 mm)

VESICLES: Pieces 2 and 4 have some high vesicle zones. Other pieces are non-vesicular

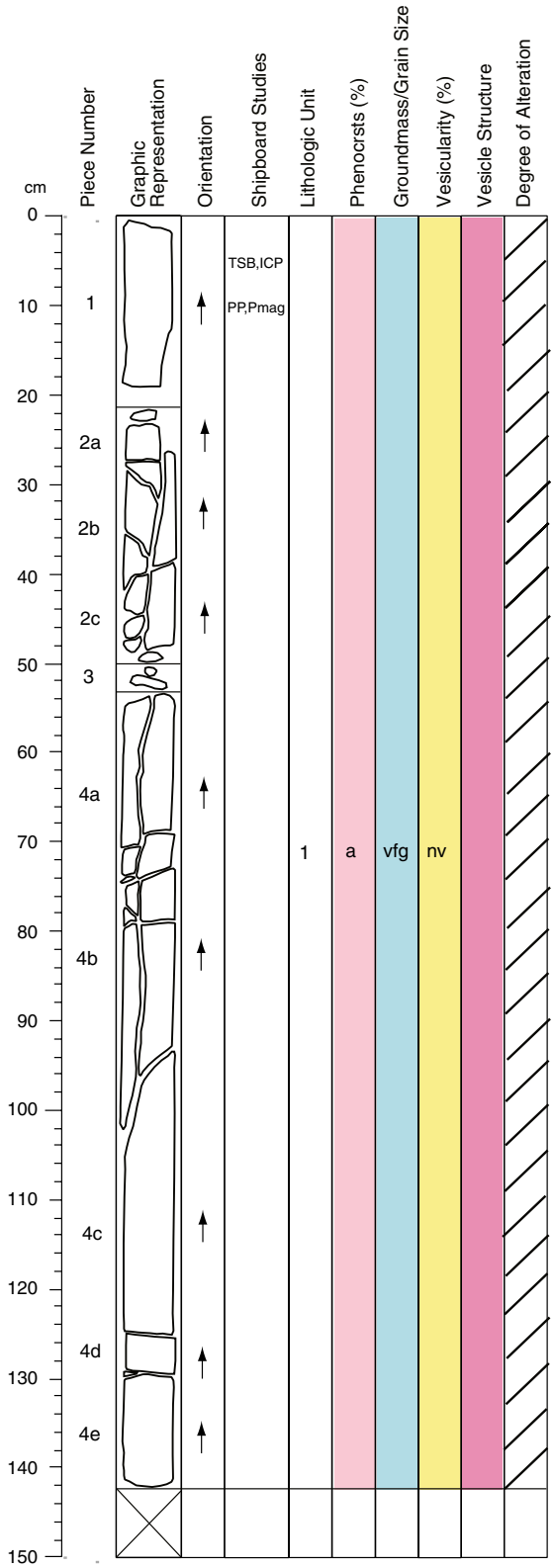
COLOR: N5: gray

STRUCTURE: Minor amount of fractures in piece # 1

ALTERATION: Slightly, with green clays, carbonate and dark blue-black material in fractures. Alteration halos ~ 0.5 cm around area with holes that appear to have been caused by alteration

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-4R-3 (Section top: 58.8 mbsf)

UNIT 1: Aphyric basalt

Pieces: 1 - 4

Thin Section(s)#: 73

CONTACTS: None

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained (avg. size 0.4 mm).

VESICLES: None.

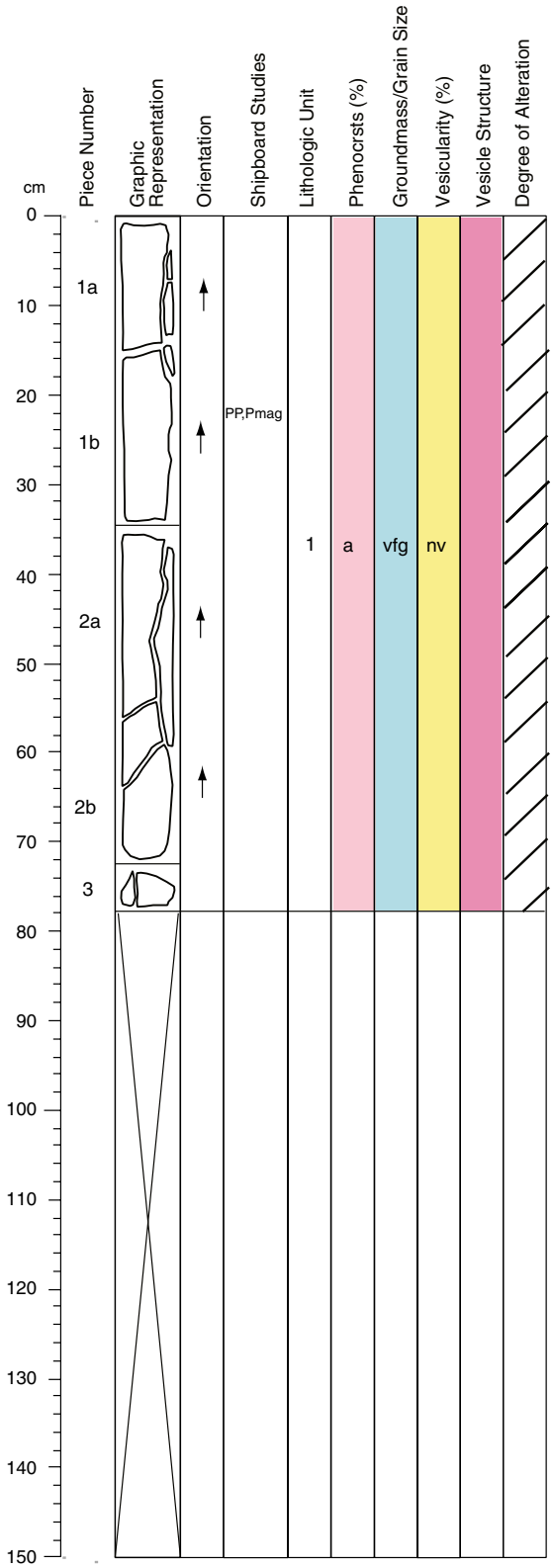
COLOR: N5: gray.

STRUCTURE: Fractureal throughout, orientation is almost horizontal and vertical. Alteration material is green clays and minor Fe oxyhydroxides, minor pyrite, and carbonate in fractures.

ALTERATION: Altered with green clays and minor Fe oxyhydroxides, minor pyrite, and carbonate, alteration haloes ~ 0.5 cm

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-4R-4 (Section top: 60.23 mbsf)

Aphyric basalt

Pieces: 1 - 3

Thin Section(s)#: none

CONTACTS: None

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained.

VESICLES: None.

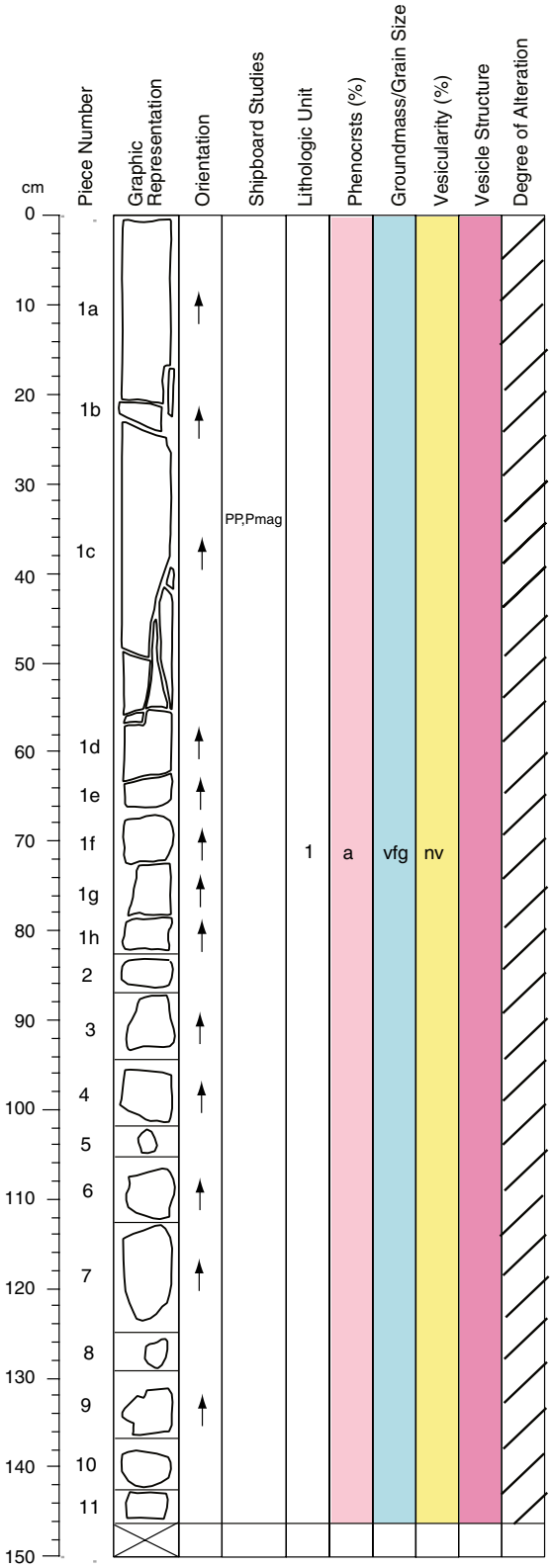
COLOR: N5: gray.

STRUCTURE: Fractures without any preferential orientation.

ALTERATION: Slightly altered with green clays, carbonate, and pyrite. Alteration halo in piece # 2 is ~ 0.5 cm. Minor amounts of oxyhydroxides in alteration halo.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-4R-5 (Section top: 61.01 mbsf)

Aphyric basalt

Pieces: 1 - 11

Thin Section(s)#: none

CONTACTS: None

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained.

VESICLES: None.

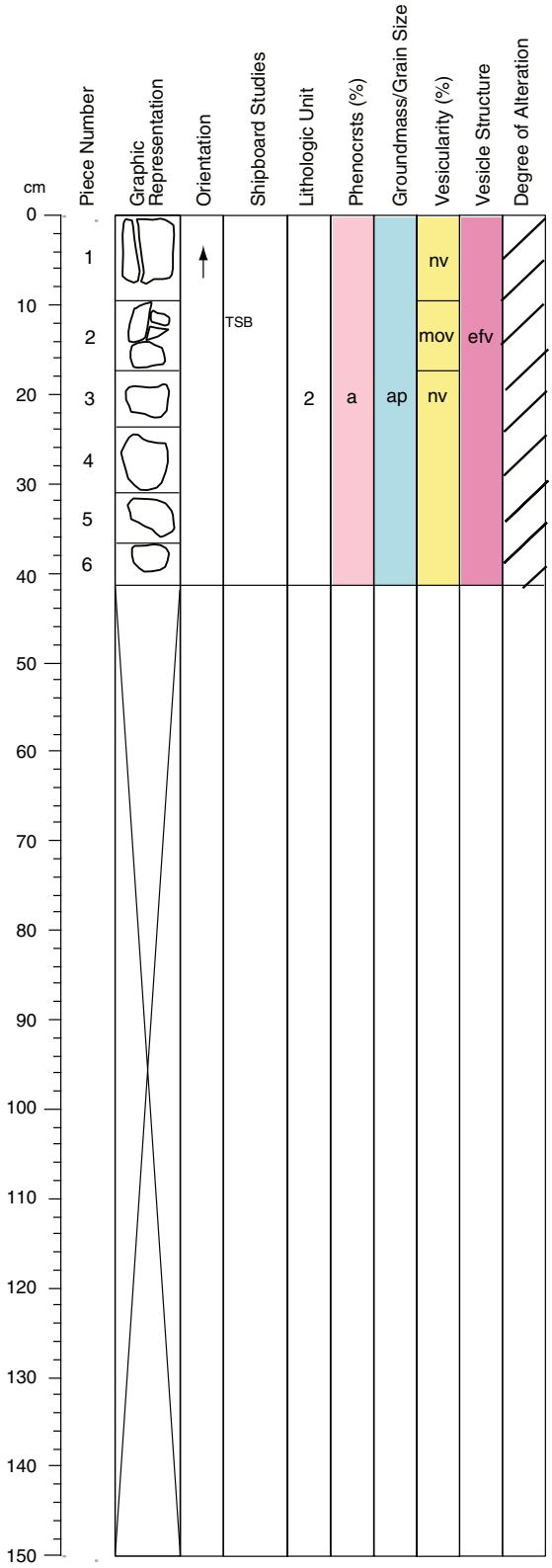
COLOR: N5: gray.

STRUCTURE: Fractures. Vein deposit is transparent to translucent needle like crystals.

ALTERATION: Slightly altered with green clays, carbonate, and pyrite. Alteration halo in piece # 2 is ~ 0.5 cm. Minor amounts of oxyhydroxides in alteration halo.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-4R-6 (Section top: 62.48 mbsf)

Aphyric basalt

Pieces: 1 - 6

Thin Section(s)#: 74

CONTACTS: Chilled margin in # 2.

PHENOCRYSTS: Plagioclase (<1 %).

GROUNDMASS: Very fine grained (avg. size <0.1 mm).

VESICLES: ~ 7 % in piece 2, absent in the rest of the section.

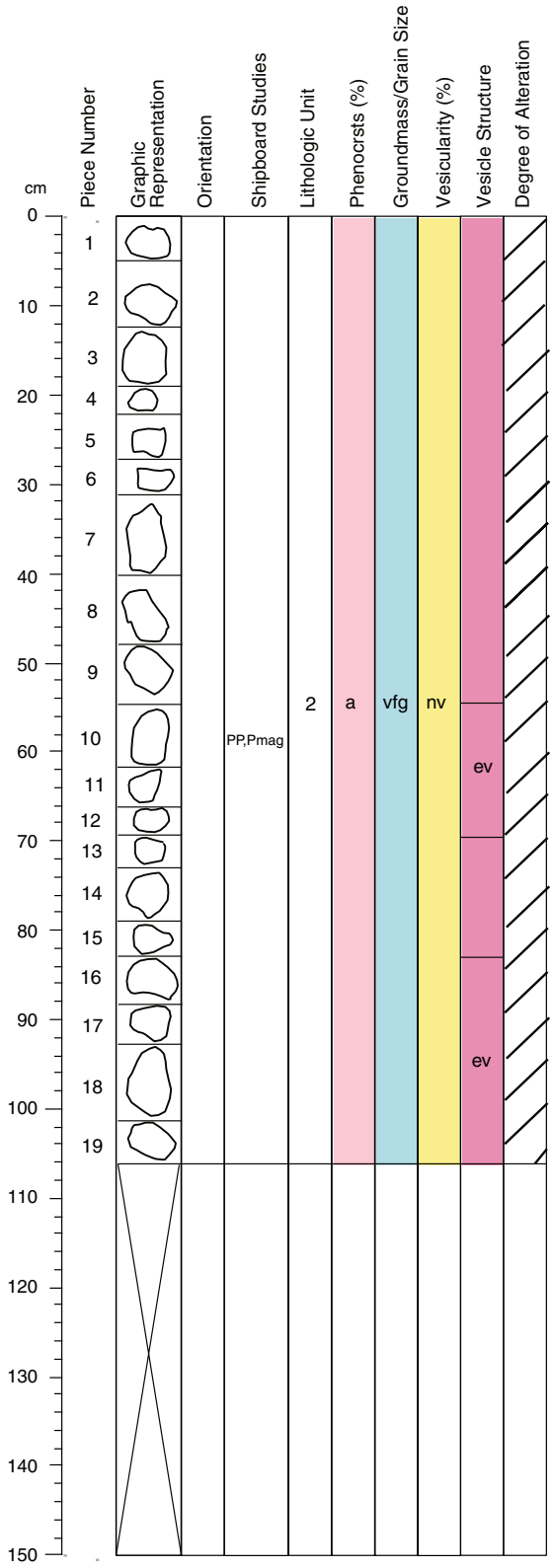
COLOR: Varies throughout due to alteration. 5Y 6/1: gray.

STRUCTURE: Minor hairlike fractures without any preferential orientation.

ALTERATION: Slightly alterated, halos range in size up to 3 cm. Fe oxyhydroxides and clay.

ADDITIONAL COMMENTS: These pieces are pillow breccia. New unit.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-5R-1 (Section top: 65.9 mbsf)

Aphyric basalt

Pieces: 1 - 19

Thin Section(s)#: none

CONTACTS: None

PHENOCRYSTS: None

GROUNDMASS: Very fine grained.

VESICLES: Sparsely vesicular, rounded, < 1 mm, empty and filled with clays.

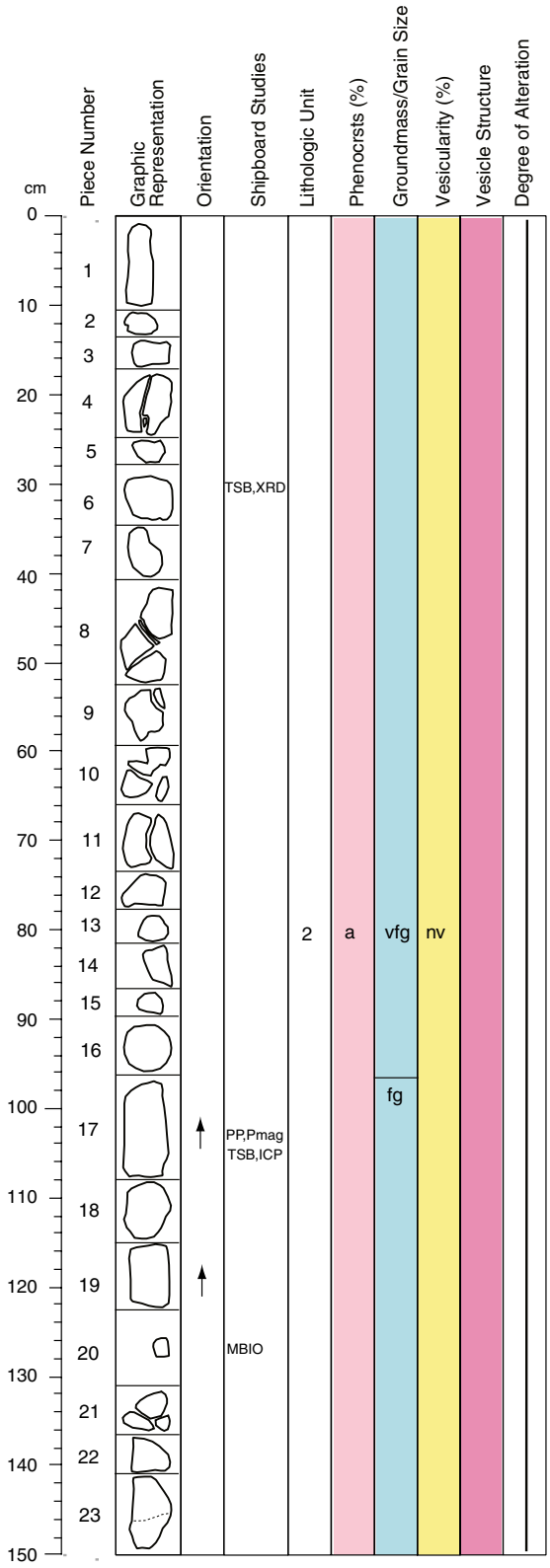
COLOR: 5Y 5/1; gray, color varies slightly due to alteration.

STRUCTURE: No fracture.

ALTERATION: Slightly altered, alteration halos surrounding each piece ~ 1 cm in thickness, Fe-oxyhydroxides.

ADDITIONAL COMMENTS: Pieces 3 and 4 have carbonate deposits (< 1 mm) on surface.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-6R-1 (Section top: 75.0 mbsf)

Pillow basalt and Aphyric basalt

Pieces: 1 - 23

Thin Section(s)#: 75 and 80* oversized.

CONTACTS: Glass on pieces 2 and 3 (bottom of unit).

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained to fine grained with glassy rinds on # 2 and 3.

VESICLES: Non-vesicular.

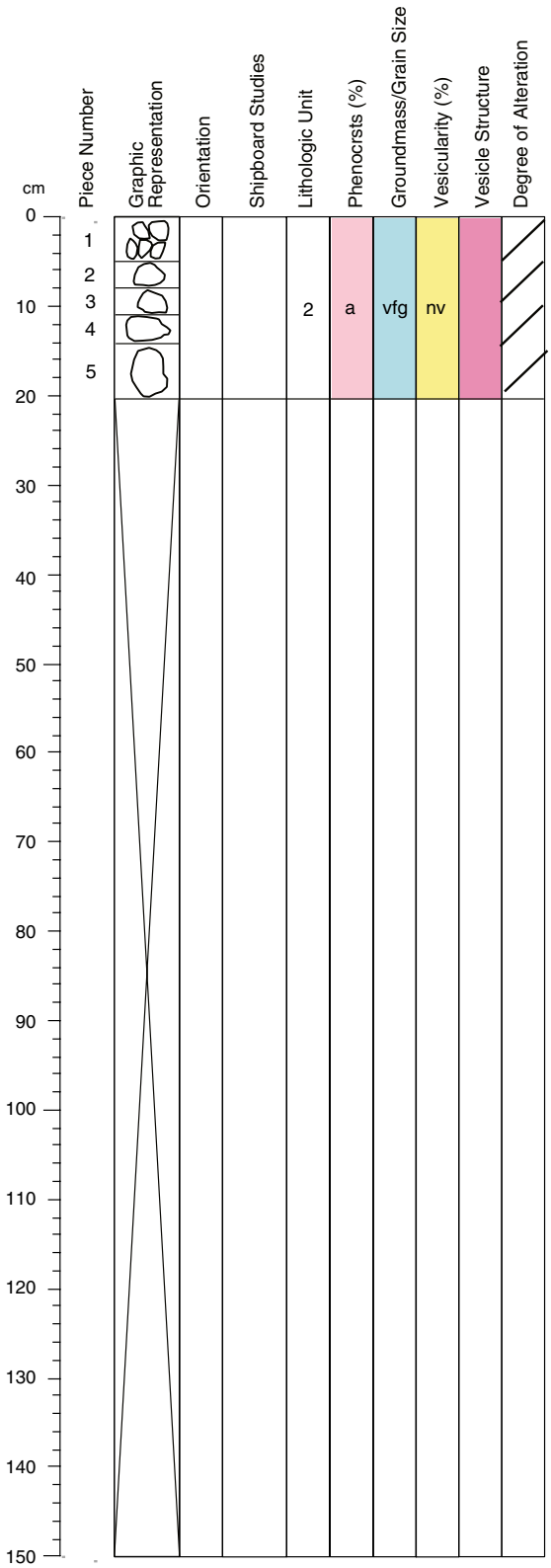
COLOR: Color ranges due to alteration, 2.5Y6/1, 2.5Y 5/1, and 2.5Y 5/3, gray to light olive brown on the alteration rims.

STRUCTURE: Pillows, broken into 23 pieces. Slightly fractured with hairlike fractures in some pieces. No orientation. Veins in pieces 5, 8, 9, and 23 are of clays and carbonate.

ALTERATION: Moderately altered. Carbonates and clays filling fractures. Alteration halos, ~ 1 cm, throughout all pieces. Fe oxyhydroxides.

ADDITIONAL COMMENTS: The color on the sections outside may be from the drilling pipe, because it was sleeveless. Piece # 6 is a hyoloclastite breccia with carbonate cement.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-6R-2 (Section top: 76.5 mbsf)

Pillow basalt

Pieces: 1 - 5

Thin Section(s)#: None

CONTACTS: None.

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained.

VESICLES: Non-vesicular.

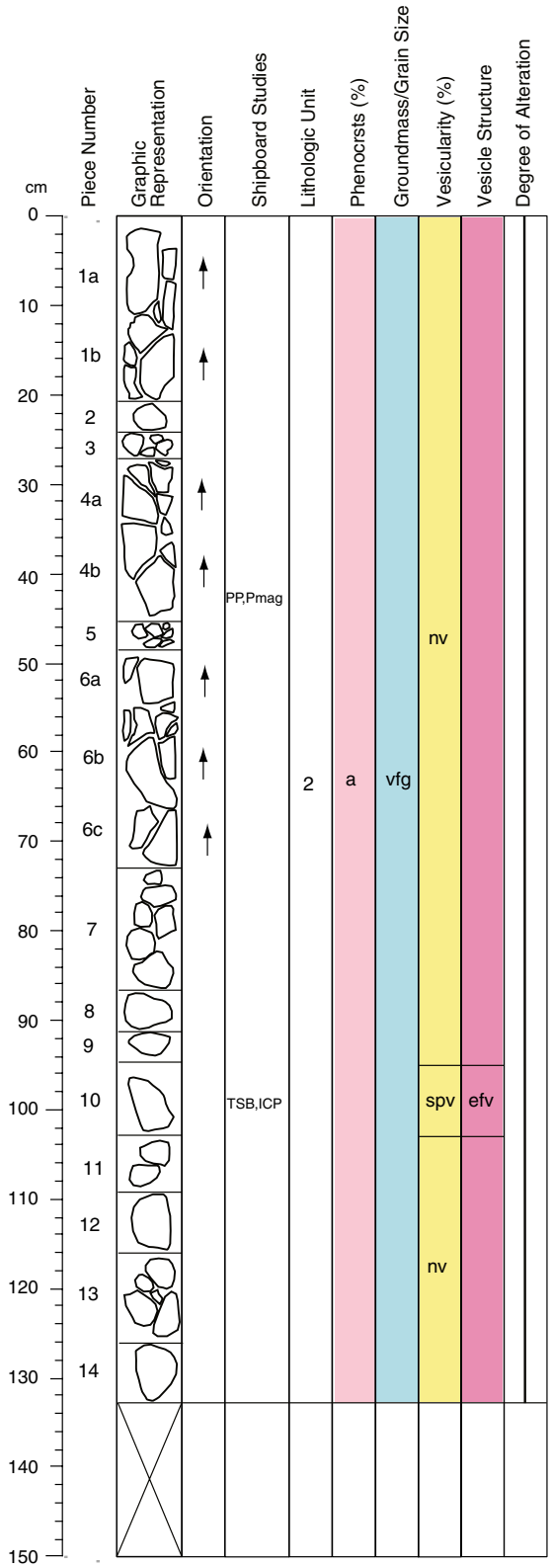
COLOR: Ranges due to alteration from 2.5Y 6/1, 2.5Y 5/1 and 2.5Y 5/3, gray to light olive gray on the alteration rims.

STRUCTURE: Pillow basalt. Hairlike fractures in pieces 2 and 4.

ALTERATION: Slight alteration, with alteration halos ~ 1 cm, with Fe oxyhydroxides. Some sub-pieces in piece 1 have calcite in them.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-7R-1 (Section top: 84.5 mbsf)

Pillow basalt

Pieces: 1 - 14

Thin Section(s)#: 76

CONTACTS: One, piece 10 has glass.

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained (avg. size <0.1 mm).

VESICLES: Non-vesicular, however, piece 10 is sparsely vesicular, some filled and some empty.

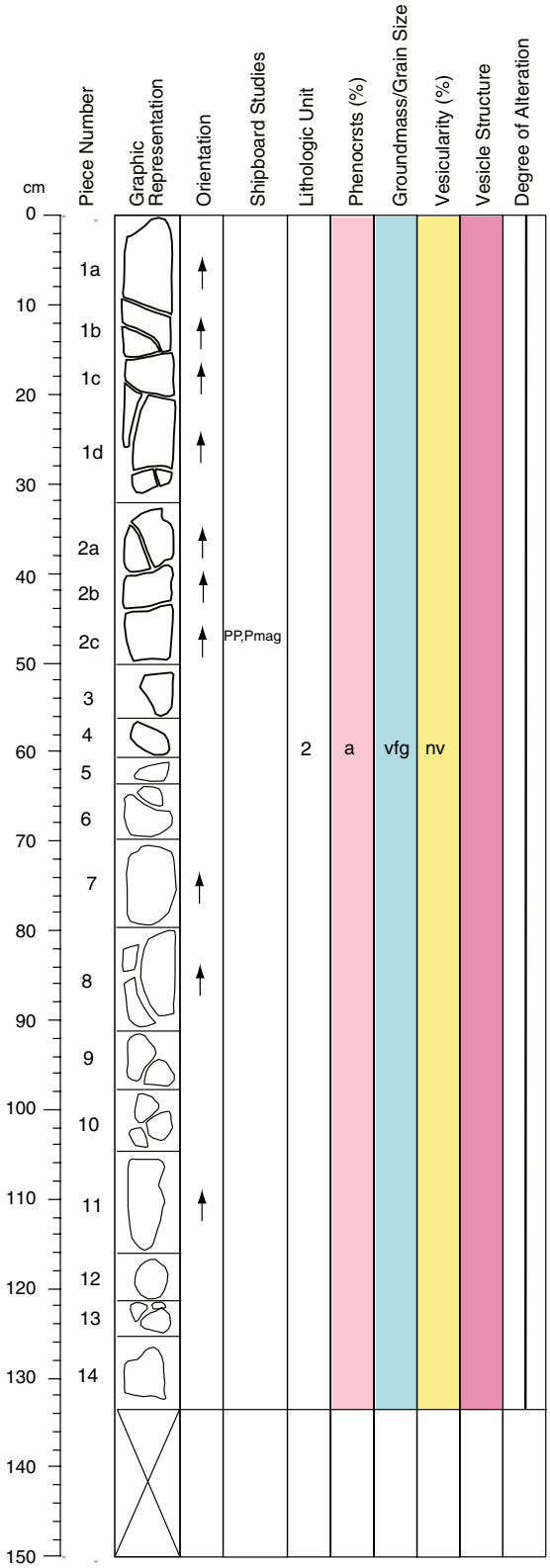
COLOR: Varies due to alteration, 2.5Y 6/1 to 2.5Y 6/4, gray to light yellowish brown.

STRUCTURE: Pillow basalt, broken into many pieces, some small hairlike fractures in pieces 1 - 6. Veins contain carbonate, clays and Fe oxyhydroxides. No orientation.

ALTERATION: Moderately altered. Carbonates, clays, and Fe oxyhydroxides in fractures and on outside of section. Alteration halos up to 1.5 cm.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-8R-1 (Section top: 93.5 mbsf)

Pillow basalt

Pieces: 1 - 14

Thin Section(s)#: none

CONTACTS: None.

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained with glass rind on piece 7.

VESICLES: < 1% vesicles, those that are there < 1 mm.

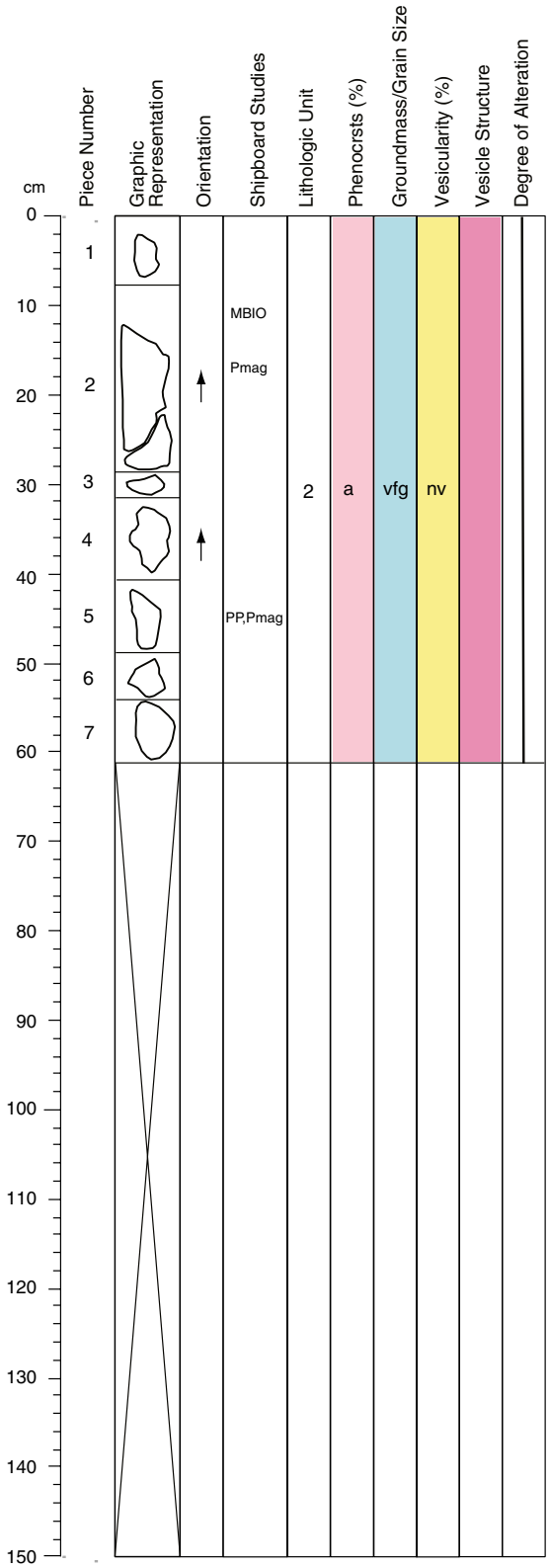
COLOR: Color ranges due to alteration, 2.5Y 6/1, 2.5Y 6/2, gray to light brownish gray.

STRUCTURE: Pillow basalt, broken into pieces. Vein fractures throughout, filled with the alteration material, carbonates, clays, and Fe oxyhydroxides.

ALTERATION: Moderate alteration, alteration halos up to 2 cm thick. Carbonates, clays, and Fe oxyhydroxides.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-9R-1 (Section top: 102.7 mbsf)

Pillow basalt

Pieces: 1 - 7

Thin Section(s)#: none

CONTACTS: Pieces 1 and 7 have chilled glass rind.

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained with glass rind on pieces 1 and 7.

VESICLES: < 1% vesicles, the vesicles that are there are round, < 1 mm and some are filled with clays.

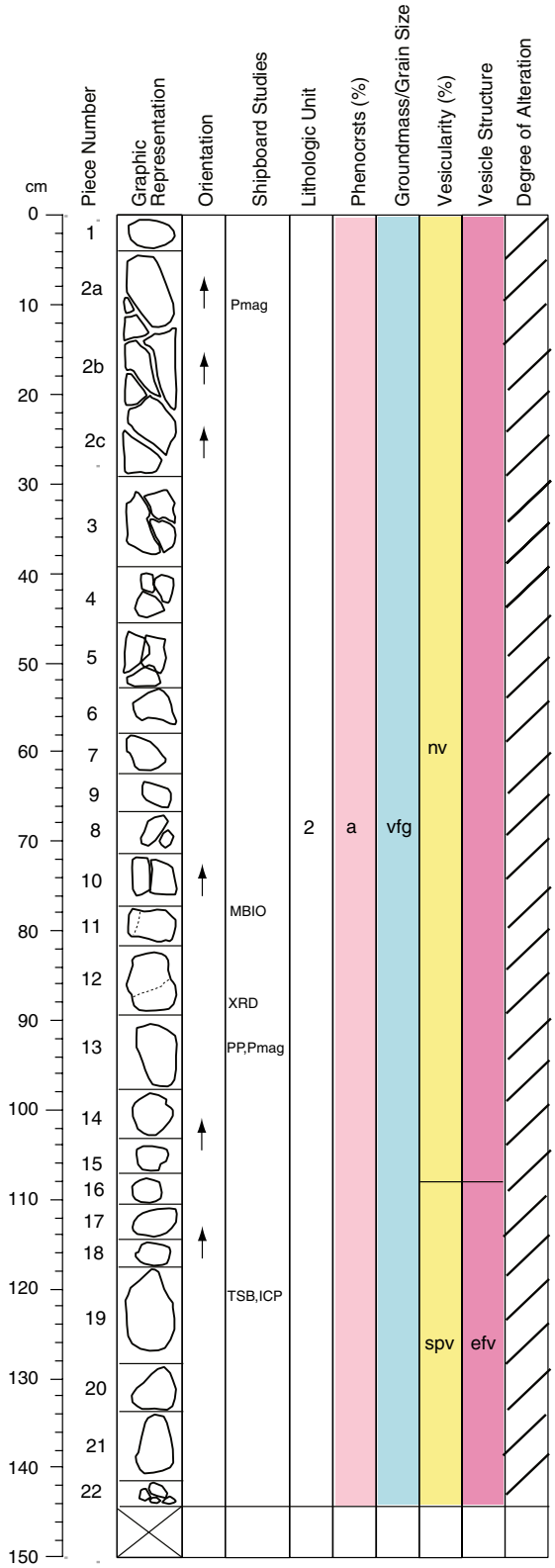
COLOR: Color varies due to alteration, from 2.5Y 6/1 to 2.5Y 5/1, gray.

STRUCTURE: Pillow basalts, some hairlike fractures. Veins in pieces 2 and 4, filled with carbonate and clays. No orientation.

ALTERATION: Moderately altered, carbonates, clays, Fe-oxyhydroxides, epidote along piece 2, and blue material on piece 4. Alteration halos ≤ 0.7 cm.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-10R-1 (Section top: 111.8 mbsf)

Aphyric basalt and pillow basalt

Pieces: 1 - 22

Thin Section(s)#: 77

CONTACTS: Pieces 4 and 14 have chilled glass rind.

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained; pieces 4 and 14 have glass rinds.

VESICLES: Pieces 1 - 13 are non-vesicular and pieces 14 - 22 are sparsely vesicular, rounded, some are filled and some are empty.

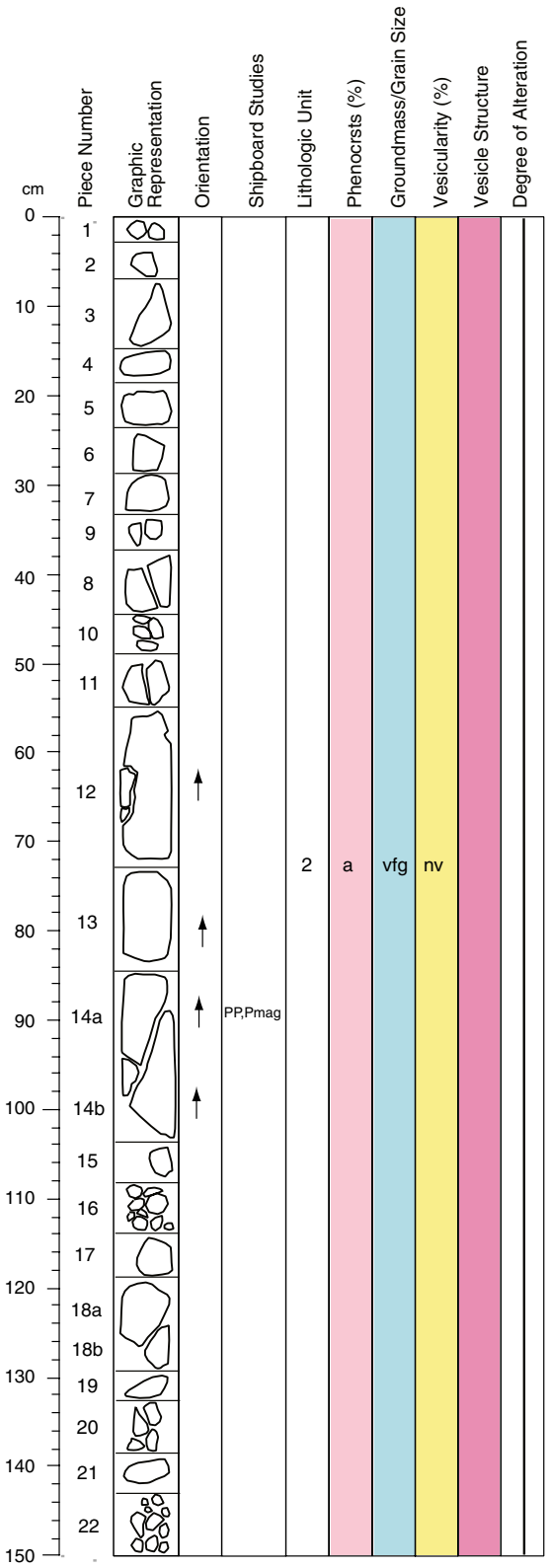
COLOR: Color varies due to alteration, from 2.5Y 6/1 to 2.5Y 5/1, gray.

STRUCTURE: Pillow basalt broken into pieces. Veins are filled with Fe oxyhydroxides, minor carbonate, and clays; no orientation of fractures.

ALTERATION: Moderately altered with Fe oxyhydroxides, clays, and minor carbonate. Alteration halos about 1 cm. There are holes (vesicles ?) About 1 mm in size or larger that appears to have been caused by alteration.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-11R-1 (Section top: 121.1 mbsf)

Pillow basalt

Pieces: 1 - 22

Thin Section(s)#: none

CONTACTS: Piece 4 has chilled glass rind.

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained piece 4 has glass.

VESICLES: Non-vesicular.

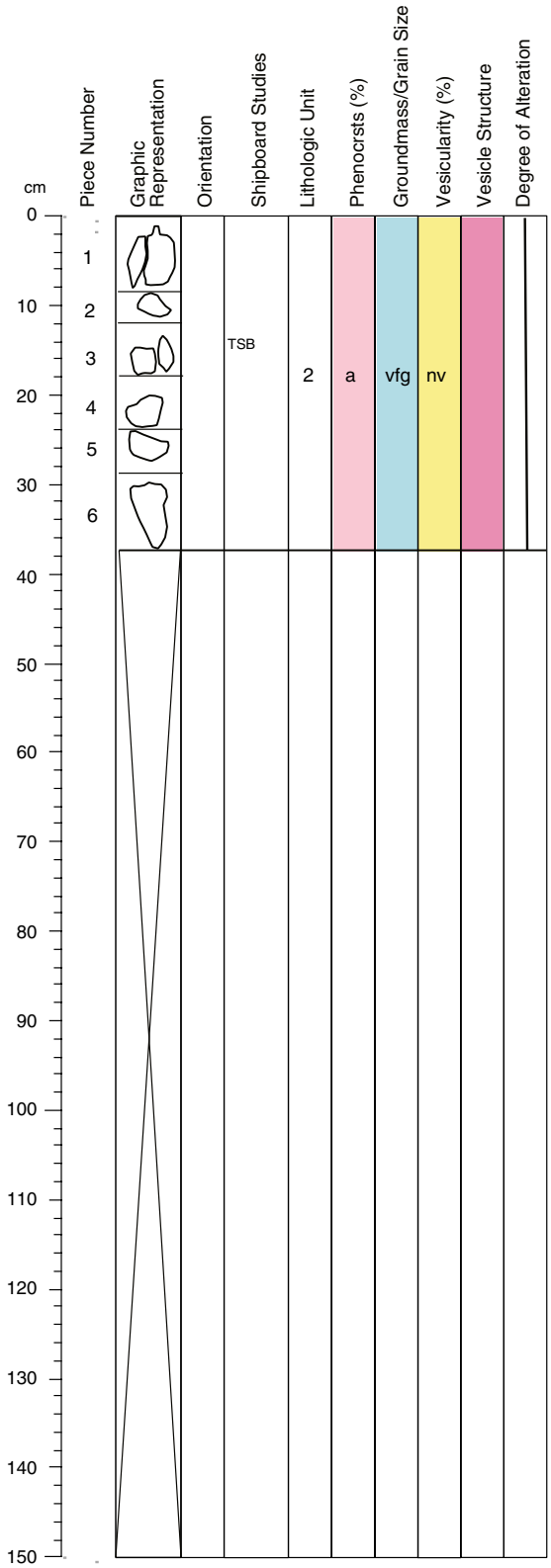
COLOR: Color ranges due to alteration, 2.5Y 6/1, 2.5Y 6/2, 2.5Y 6/3, gray, light brownish gay, light yellowish brown respectively.

STRUCTURE: Pillow basalt. Fractures throughout with vein filling (Fe oxyhydroxides, carbonate, and clays).

ALTERATION: Moderately altered with Fe oxyhydroxides, carbonate, and clays. Alteration halos throughout, measuring about ≤ 2 cm.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-11R-2 (Section top: 122.6 mbsf)

Pillow basalt

Pieces: 1 - 6

Thin Section(s)#: 78

CONTACTS: Pieces 1, 4, and 6 have chilled glass rinds.

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained (avg. size <0.1 mm) with glass on pieces 3, 4 and 6.

VESICLES: Non-vesicular (< 1 %).

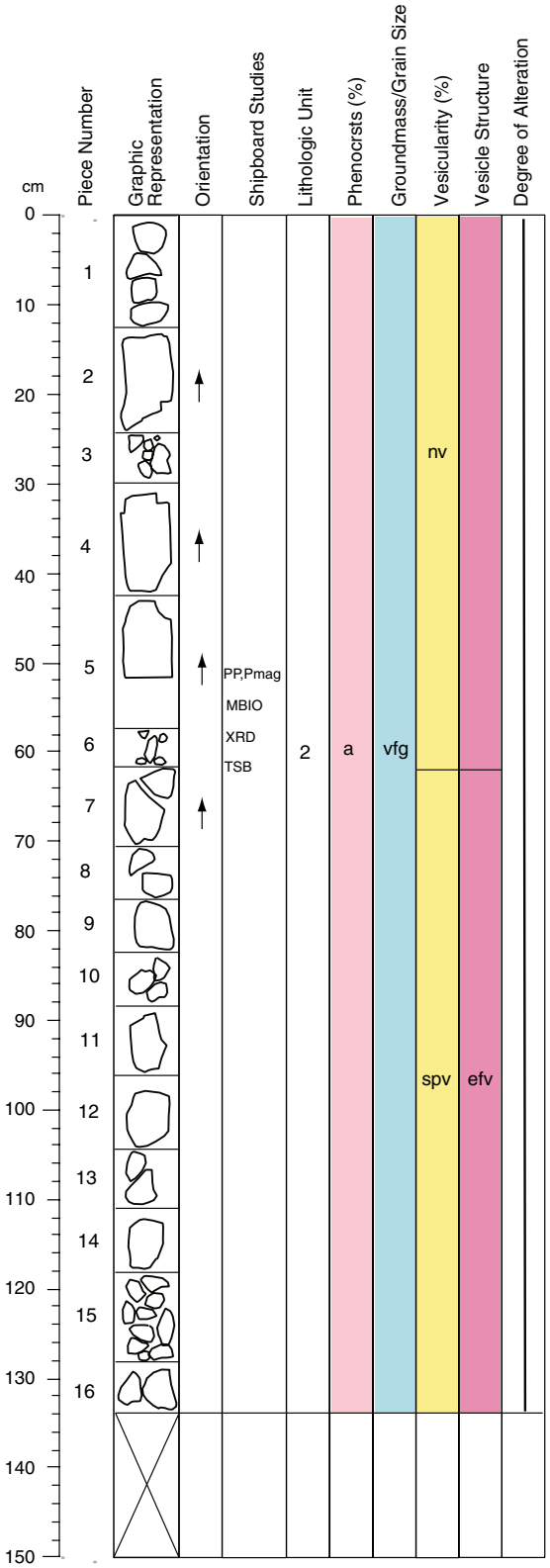
COLOR: Color varies due to alteration from 2.5Y 6/1 to 2.5Y 5/1, gray.

STRUCTURE: Pillow basalt, minor fractures throughout. Fractures have Fe oxyhydroxides and veins have clays and carbonate.

ALTERATION: Moderately altered with Fe oxyhydroxides, carbonates, and clays in fractures and veins. Alteration halos ~ 1 cm.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-12R-1 (Section top: 128.5 mbsf)

Pillow basalt

Pieces: 1 - 16

Thin Section(s)#: 79

CONTACTS: One hyaloclastite in piece 7.

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained.

VESICLES: None vesicular from piece 1 - 6, sparsely vesicular from piece 7 - 16, rounded and ~ 1 mm; some are filled, others are empty.

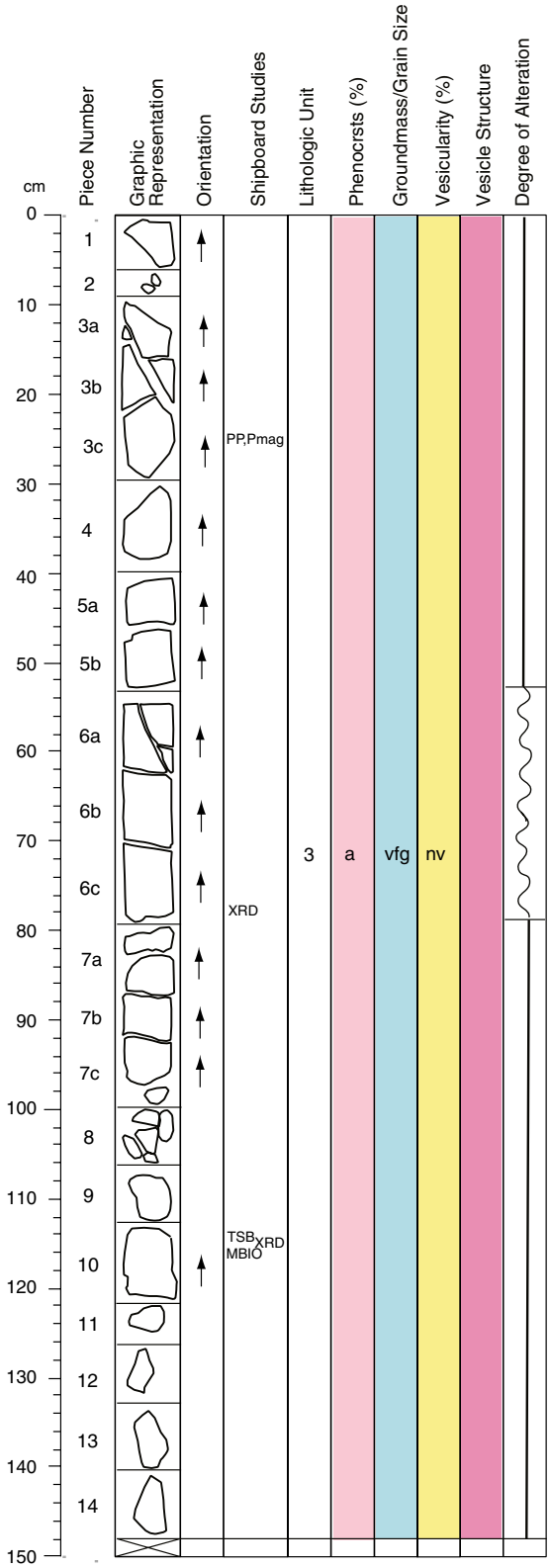
COLOR: Varies due to alteration, from 2.5Y 5/1 to 2.5Y 5/2, gray to grayish brown.

STRUCTURE: Section is broken into many pieces.

ALTERATION: Moderately alteration, vesicles and veins are filled with, Fe oxyhydroxides, clays and minor carbonate alteration material. The section is yellow/green (epidote ?) on the outside. Alteration halos ~ 1 cm around several pieces and veins. Hyaloclastite has carbonate matrix, pieces of glass ~ 1 - 2 mm.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-13R-1 (Section top: 133.5 mbsf)

Aphyric basalt

Pieces: 1 - 14

Thin Section(s)#: 81

CONTACTS: None.

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained (avg. size 0.3 mm).

VESICLES: Non-vesicular.

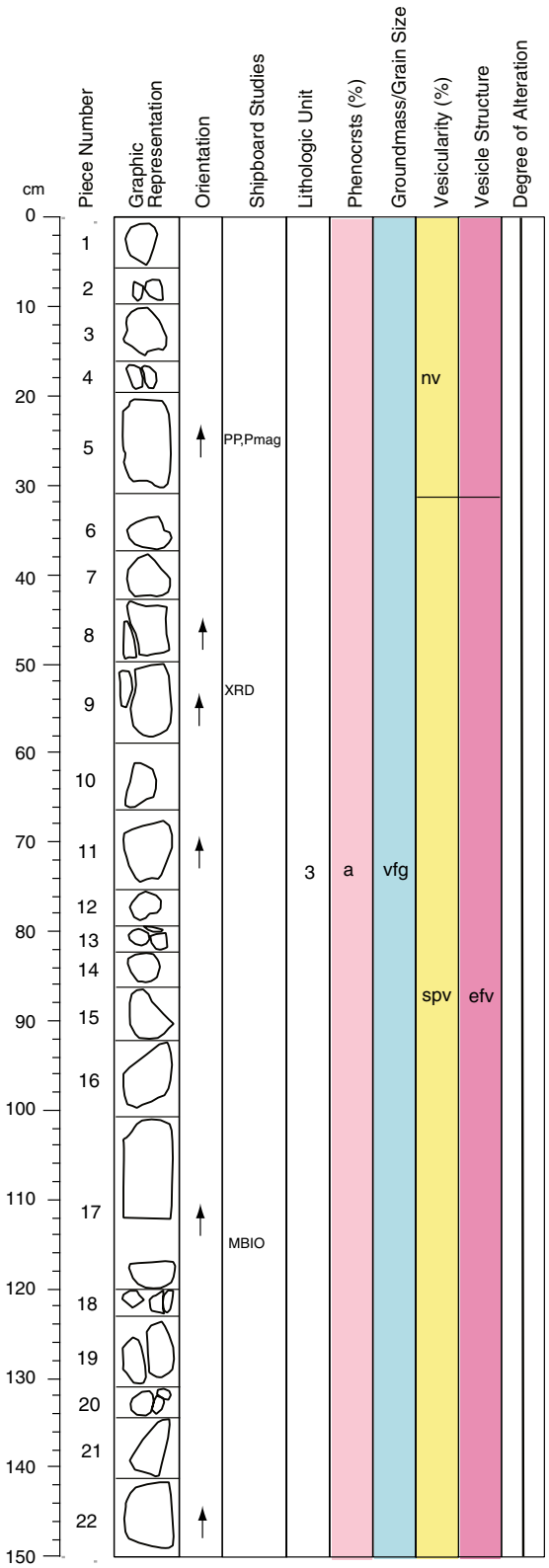
COLOR: Varies due to alteration, 2.5Y 5/1, 2.5Y 5/2, 2.5Y 5/3, gray, grayish brown, light olive brown respectively.

STRUCTURE: Fractures and veins. Every piece is fractured. Veins throughout with the alteration material is Fe oxyhydroxides, clay, and a green material (epidote ?).

ALTERATION: Moderately to high alteration. Abundant Fe oxyhydroxides throughout, clay material throughout. High amount of carbonate in pieces 9 and 10. Green material (epidote ?) Is abundant in pieces 1 - 7.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-13R-2 (Section top: 134.98 mbsf)

Aphyric basalt

Pieces: 1 - 22

Thin Section(s)#: None

CONTACTS: None

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained.

VESICLES: Non-vesicular in pieces 1 - 5, sparsely vesicular in pieces 6 - 22, rounded, ≤ 1 mm, some are filled and some are empty.

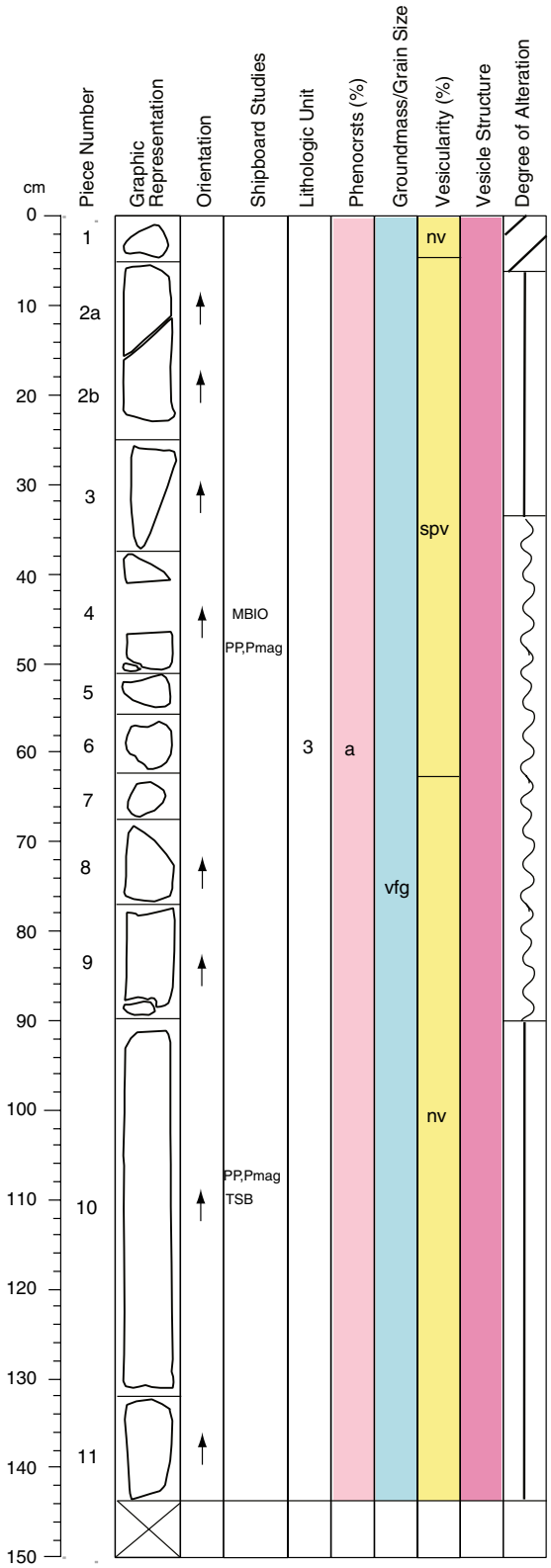
COLOR: Varies due to alteration, 2.5Y 6/1, 2.5Y 5/1, 2.5Y 5/2, gray to grayish brown.

STRUCTURE: Veins. Section is broken into pieces, hairlike fractures in pieces 9, 11, 16, 17, and 19. No preferred orientation. Filling is Fe oxyhydroxides, carbonate and clays.

ALTERATION: Moderately altered, Fe oxyhydroxides, carbonate and clays throughout. Green material (epidote ?) on the outside of pieces 8 - 11. Alteration halos throughout ≤ 2.5 cm.

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-14R-1 (Section top: 143.2 mbsf)

Aphyritic basalt

Pieces: 1 - 11

Thin Section(s)#: 82

CONTACTS: Maybe one between pieces 1 and 2, as piece 1 is different from the rest of the section

PHENOCRYSTS: None.

GROUNDMASS: Very fine grained (avg. size 0.4 mm).

VESICLES: Non-vesicular in pieces 1 and 7- 11. Sparsely vesicular in pieces 2 - 6. Rounded, some empty.

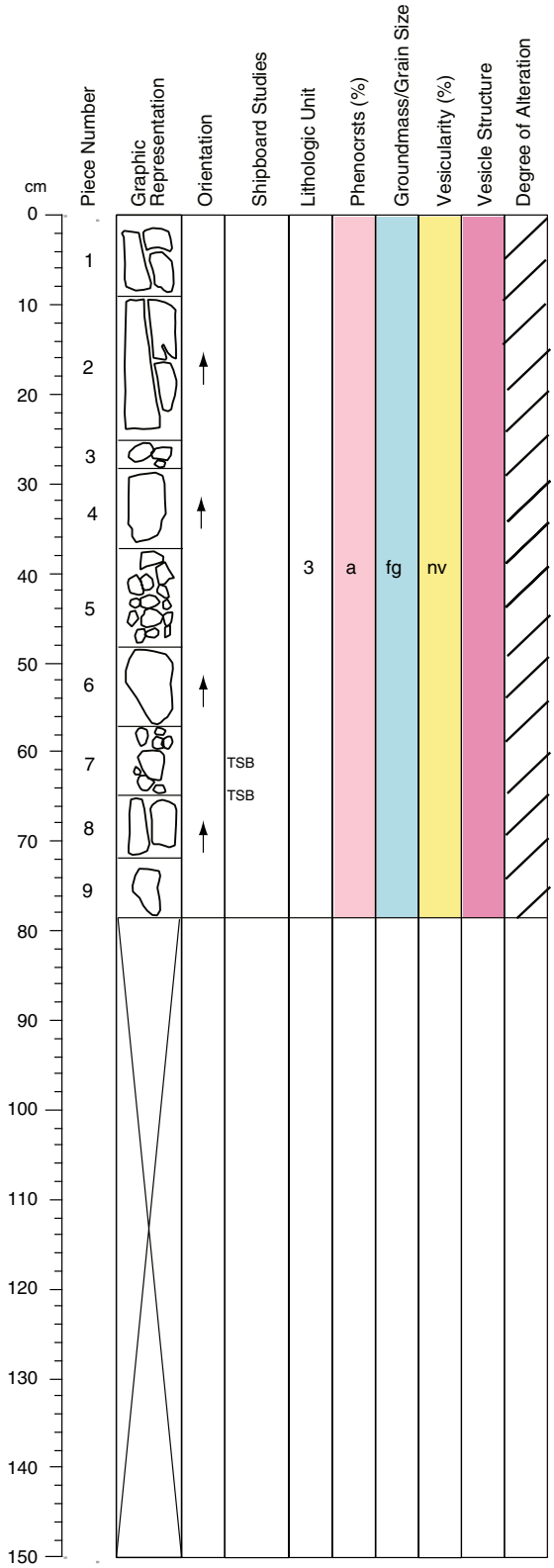
COLOR: Varies due to alteration, 2.5Y 5/1, 2.5Y 5/2, 2.5Y 5/3, 2.5Y 5/4, gray grayish brown, light olive brown.

STRUCTURE: Appears that fractures and veins in pieces 5 - 8 have a preferred orientation, (diagonal, subparallel).

ALTERATION: Alteration ranges from slightly in piece 1, to moderate in pieces 2, 10, and 11, to high in pieces 3 - 9. Fe oxyhydroxides, carbonates, and clays fill veins and vesicles. Alteration halos are large ranging from 0.5 cm - 6 cm.

ADDITIONAL COMMENTS: Piece 1 may be out of place (fallen downcore).

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-14R-2 (Section top: 144.62 mbsf)

Fine grained basalt

Pieces: 1 - 9

Thin Section(s)#: 83 and 84

CONTACTS: None.

PHENOCRYSTS: None.

GROUNDMASS: Fine grained (avg. size 0.8 mm).

VESICLES: None.

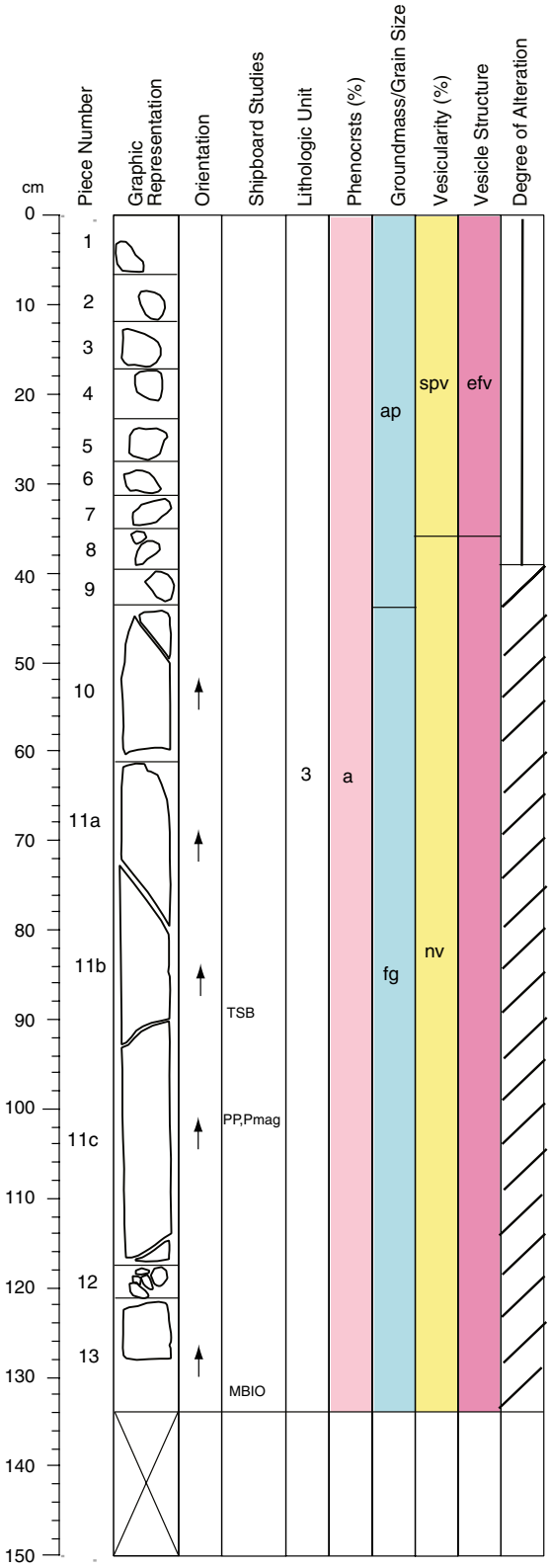
COLOR: Varies around veins due to alteration. The area with no halos is 5BG 4/1, dark greenish gray. The section is more bluish than any other.

STRUCTURE: Section fractured. Veins and fractures in pieces 1 - 6. Veins are subvertical.

ALTERATION: Slight alteration. Pieces 1 - 6 have alteration halos measuring about 0.5 cm - 1.0 cm. Green gray material throughout; and Fe oxyhydroxides and carbonates filling fractures. Pieces 7 - 9 are less altered (contain no green gray material, Fe oxyhydroxides or carbonate).

ADDITIONAL COMMENTS:

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

200-1224F-15R-1 (Section top: 152.4 mbsf)

Basalt

Pieces: 1 - 13

Thin Section(s)#: 85

CONTACTS: None.

PHENOCRYSTS: None.

GROUNDMASS: Pieces 1 - 9 are very fine grained, pieces 10 - 13 are fine grained (avg. size 0.8 mm).

VESICLES: Non-vesicular in pieces 4 and 7 - 13, sparsely vesicular in pieces 1 - 3, 5 and 6. Rounded, some are filled, some are empty.

COLOR: Pieces 1 - 9 are 2.5Y 5/1, gray. Pieces 10 - 13 are 5B 5/1, bluish gray.

STRUCTURE: Pieces 1- 9 are more fractured than pieces 10 - 13, which are basicall massive.

ALTERATION: Pieces 1 - 9 are moderately altered, contain clays, Fe oxyhydroxides alteration halos measuring about 1 cm. Pieces 10 - 13 are slightly altered and only have minor clays and some pyrite in fracture.

ADDITIONAL COMMENTS:

1224F-16R No Recovery

1224F-17R No Recovery

Site 1224

Sample						Texture			Mineral			Biogenic			
Core	Core Type	Section	Top Inteval (cm)	Depth (mbsf)	Lithology	Sand	Silt	Clay	Olivine	Plagioclase	Volcanic Glass Shard	Discoaster	Radiolarians	Siliceous Sponge Spicules	Comments
Hole A															
3	X	CC	0.0	15.60	D		40	60					20		2 slides
3	X	CC	0.0	15.60	D			100						20	
4	X	1	4.0	25.24	D			100						5	
4	X	1	32.0	25.52	D			100					5	20	
4	X	1	70.0	25.90	D			100						10	
4	X	1	87.0	26.07	D			100					20	5	
4	X	CC	0.0	26.22	D		40	60					5	25	
4	X	CC	1.0	26.23	D			100					15	5	
4	X	CC	7.0	26.29	D			100					20	5	
4	X	CC	8.0	26.30	D			100					25	5	
Hole B															
1	H	CC	6.0	0.06	D			100						1	
Hole C															
1	H	1	16	0.16	D			100						10	
1	H	1	70	0.7	D			100					10		
1	H	1	143	1.43	D			100					5		
1	H	2	2	1.52	D			100						5	
1	H	2	139	2.89	D			100					5	15	
1	H	3	3	3.03	D			100						20	
1	H	3	70	3.7	D			100					30	5	
1	H	3	147	4.47	D			100					50	5	spicules common
1	H	4	1	4.51	D			100					55	5	spicules common
1	H	4	50	5	D			100					40	5	spicules common
1	H	4	114	5.64	D			100					50	5	spicules common
1	H	5	1	5.71	D			100					45	5	spicules common
1	H	5	47	6.17	D			100					45	1	spicules common
1	H	5	60	6.3	D			100					40	1	spicules common
1	H	CC	12	6.51	D			100					30	5	spicules common
Hole E															
1	R	1	15	8.15	D			100					50	15	spicules common
1	R	1	83	8.83	D			100							
2	R	1	146	18.96	D			100							
2	R	4	134	23.34	D		40	60				1	1	1	
2	R	7	57	26.57	D		40	60				1	1	5	
2	R	7	75	26.75	D			100				10	5	10	

THIN SECTION:	**200-1224A-4X-CC 16-19 cm (24)**	**OBSERVER: ML**
ROCK NAME:	**Plagioclase-clinopyroxene sparsely phyric basalt**	
GRAIN SIZE:	**Very fine grained**	
TEXTURE:	**Intersertal, intergranular (rarely subophitic); isotropic, equigranular, holocrystalline (glass < 5 %)**	

PRIMARY MINERALOGY	Percent Present	Percent Original	Size (mm) min.	Size (mm) max.	Size (mm) av.	Approximate composition	Morphology	Comments
Phenocrysts								
Plagioclase	~ 1-2	~ 1-2	0.2	1.2	0.5	Bytownite	Euhedral, columnar	% An > 80 (max extintion angle measured = 40; 2Vα ~ 90°). Fresh, with no signs of alteration.
Clinopyroxene	~ 1	~ 1		3	1.2	Augite	Euhedral, prismatic, pseudo-octagonal	c^γ ~ 46°. Pale yellow. Partially fractured. With melt inclusions. Textural relationships indicate contemporaneous crystallization with plagioclase. Two only phenocrysts in this thin section.
Groundmass/matrix								
Groundmass	~ 90		0.1	0.3	0.1	pl, cpx, op	Hypidiomorphic	Main constituents: pl (often skeletal), pale yellow anhedral cpx, equant to acicular skeletal mt. Average dimension of the minerals in the groundmass ~ < 0.1 mm. Variable amount of glass (generally > 50 %) partially devitrified. Abundant presence of pl spherulite in the glassy matrix. The bands of different color are related to the percentage of glass in the groundmass.

SECONDARY MINERALOGY	Percent	Size (mm) min.	Size (mm) max.	Size (mm) av.	Replacing/filling	Morphology	Comments
Clay minerals	~ 2-3						
Iddingsite	~ 2-3	0.05	0.3	0.15	Replacing groundmass olivine ?	Anhedral	Reddish to brownish. Iddingsite is a mixing of goethite plus layer silicates (e.g., smectites).
Vesicles/cavities							
Vesicles	~ 2	0.15	0.5	0.3		Subrounded to spherical	In some cases the vesicles are partially filled with an unidentified yellowish mineral with high birefringence and globular texture.

COMMENTS :

Microphotos? Yes

LEGEND: ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite

THIN SECTION:	**200-1224A-4X-CC 19-21 cm (52)**							**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Hyalopilitic; isotropic, equigranular, hypohyalyne (~ 90 % glass)**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Plagioclase	~1		0.20	0.5	0.4		Euhedral, columnar	Fresh, microphenocrysts.
Groundmass/matrix								
Groundmass	~ 7		<0.1	0.3	0.2	pl, cpx, op	Hypidiomorphic	Pl: euhedral to subhedral with columnar habit; cpx: pale yellow, anhedral to subhedral with equant habit; op: tiny elongated and skeletal.
Glass	~ 90							From orange yellow to black.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Vesicles/cavities								
Cavities	< 1							~90 % filled by brownish to yellowish clay minerals.
COMMENTS :	Relatively common presence (~ 4 %) of reddish granules, some of which have rhombic shape. Possibly iddingsite after olivine.							
Microphotos?	Yes							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224A-5X-1 17-20 cm (25)**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**	
GRAIN SIZE:	**Very fine grained**	
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**	

PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Plagioclase	< 1	< 1	0.3	1.1	0.6	Bytownite	Euhedral to subhedral. Tabular	2V ~ 90°. Fresh. Mainly microphenocrysts.
Groundmass/matrix								
Groundmass	~ 60		0.1	0.4	0.2	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx (augite; 2Vγ ~ 60°) in intergranular to subophitic relationship with subhedral to euhedral skeletal pl and anhedral to euhedral equant mt. The space between skeletal pl is filled by microlites of cpx and dendritic op.
Segregation vesicles	~ 30							Dark brown to black. These vesicles are made up by acicular to skeletal pl, equant cpx and tiny elongated op (ilmenite?) in a devitrified glassy matrix. These vesicles represent late stage magmatic melt. The rapid cooling is responsible for the skeletal shape of pl and mt crystals.

SECONDARY MINERALOGY	**Percent**	**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	~ 5						Possibly replaces former gl and cpx. Brownish, associated with segregation vesicles.
Nontronite	~ 1				Fills cavities and vescicles	Subspherical (filling cavities) to anhedral (filling vesicles)	Green. Concentrated toward the bottom of the Unit (oriented section at ~ 20 cm). Distinguished from chlorite for the higher birefringence.
Vesicles/cavities							
Cavities	~ 3	0.15	1.1	0.5		Subspherical	~ 60 % empty; ~ 15 % partially filled; ~ 25 % totally filled. The filling material can be 1) nontronite, 2) microlitic intergrowth of pl, cpx, elongated op (all with size < 0.1 mm) plus possibly glass and clay minerals or 3) both.

COMMENTS :	- Nontronite has been distinguished by chlorite for the higher birefringence, and by glauconite for the weak pleochroism (green to pale yellow) - Possible presence of pyrite (pale yellow in reflected light) associated with chlorite at cm 20 of the unit - Microlitic intergrowth partially filling cavities is the same material of segregation vesicles and may represent late stage magmatic melt
Microphotos?	Yes
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite

THIN SECTION:	**200-1224A-6N-1 12-16 cm (26)**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**	
GRAIN SIZE:	**Very fine grained**	
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**	

PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Groundmass/matrix								
Groundmass	~ 85		0.05	0.4	0.2	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx (augite; 2Vγ ~ 60°) in intergranular to subophitic relationship with subhedral to euhedral skeletal pl and equant mt. The space between skeletal pl is filled by microlites of cpx and dendritic op. Rare presence (< 1%) of bytownite (2Vα ~ 90°) microphenocrysts.
Segregation vesicles	~ 10							Dark brown to black. These vesicles are made up by acicular to skeletal pl, equant cpx and tiny elongated op (ilmenite?) in a devitrified glassy matrix. These vesicles represent late stage magmatic melt. The rapid cooling is responsible for the skeletal shape of pl and mt crystals.

SECONDARY MINERALOGY	**Percent**	**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	< 5						Possibly replace former volcanic glass. Brownish, found with segregation vesicles and in cavities.
Vesicles/cavities							
Cavities	~ 2	0.15	1.1	0.5		Subspherical	~ 60 % empty; ~ 15 % partially filled; ~ 25 % totally filled. The filling material can be 1) brownish clay minerals, 2) microlitic intergrowth of pl, cpx, elongated op (all with size < 0.1 mm) plus possibly glass and clay minerals, 3) pyrite or 4) the previous ones in variable amount.
Vesicles	< 1					Irregular	

COMMENTS :
- Great (1 mm) grain of pyrite partially filling one cavity
- In some cases brownish clay minerals are pseudomorph of crystalline phases (former olivine?)
- Microlitic intergrowth partially filling cavities is the same material of segregation vesicles and may represent late stage magmatic melt patches

Microphotos? Yes

LEGEND: ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite

THIN SECTION:	**200-1224D-1R-1 47-50 cm (34)**						**Unit: 1**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Plagioclase	~ 1	~ 1	0.3	0.7	0.5	Bytownite	Subhedral to euhedral. Columnar to equant	% An > 80 %. Microphenocrysts. Fresh. Max extinction angle measured ~ 40°; 2Vα ~ 80°.
Groundmass/matrix								
Groundmass	~ 80		0.1	0.4	0.3	pl, cpx, op	Hypidiomorphic	Anhedral pale yellow cpx (augite; 2Vγ ~ 60°) in intergranular to subophitic relationship with subhedral to euhedral pl. In some cases pl is skeletal and the space between its arms is filled by microlites of cpx and skeletal op. Interstitial euhedral to anhedral op indicates its late appearance as liquidus phase.
Segregation vesicles	~ 10							Dark brown to black. These vesicles are made up by acicular to skeletal pl, equant cpx and tiny elongated op (ilmenite?) in a devitrified glassy matrix. These vesicles represent late stage magmatic melt. The rapid cooling is responsible for the skeletal shape of pl and mt crystals.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	< 5							Possibly replace former volcanic glass. Brownish, found in segregation vesicles and in cavities.
Vesicles/cavities								
Cavities	~ 3		0.3	1	0.5		Subspherical	~ 5 % empty; ~ 45 % partially filled; ~ 50 % totally filled. The filling material can be 1) brownish clay minerals, 2) microlitic intergrowth of pl, cpx, elongated op (all with size < 0.1 mm) plus possibly glass and clay minerals, 3) (?) chalcedony or 4) clay minerals plus aragonite.

COMMENTS :
- In some cases, op in segregation vesicles or in groundmass shows iso-orientation and skeletal acicular (i.e. needle-like) shapes.
- Microlitic intergrowth partially filling cavities is the same material of segregation vesicles and may represent late stage magmatic melt patches.

Microphotos? Yes

LEGEND: ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite

THIN SECTION:	**200-1224D-1R-2 86-89 cm (35)**						**Unit: 1**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Plagioclase	~ 1	~ 1	0.5	1.8	1.0	Bytownite	Euhedral to anhedral. Columnar to equant	% An > 80 %. Fresh. Max extinction angle measured ~ 40°; 2Vα ~ 80°. Some pl may be clasts of larger crystals.
Groundmass/matrix								
Groundmass	~ 80		0.1	0.4	0.3	pl, cpx, op	Hypidiomorphic	Anhedral pale yellow cpx (augite; 2Vγ ~ 65°) in intergranular to subophitic relationship with subhedral to euhedral pl. In some cases pl is skeletal and the space between its arms is filled by microlites of cpx and skeletal op. Interstitial euhedral to anhedral op indicates its late appearance as liquidus phase.
Segregation vesicles	~ 10							Dark brown to black. These vesicles are made up by acicular to skeletal pl, equant cpx and tiny elongated op (ilmenite?) in a devitrified glassy matrix. These vesicles represent late stage magmatic melt. The rapid cooling is responsible for the skeletal shape of pl and mt crystals.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	~ 5							Possibly replace former volcanic glass. Brownish, found in segregation vesicles and in cavities.
Vesicles/cavities								
Cavities	~ 4		0.8	1.2	1		Spherical	~ 50 % empty; ~ 35 % partially filled; ~ 25 % totally filled. The filling material can be 1) brownish clay minerals, 2) microlitic intergrowth of pl, cpx, elongated op (all with size < 0.1 mm) plus possibly glass and clay minerals, 3) brownish (?) chalcedony or 4) the previous ones in variable amount.

COMMENTS :
- In some cases, op in segregation vesicles or in groundmass shows iso-orientation and skeletal acicular (i.e. needle-like) shapes.
- Microlitic intergrowth partially filling cavities is the same material of segregation vesicles and may represent late stage magmatic melt patches.

Microphotos? Yes

LEGEND: ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite

THIN SECTION:	**200-1224D-1R-3 17-20 cm (36)**					**Unit: 1**	**OBSERVER: ML**
ROCK NAME:	**Clinopyroxene-plagioclase sparsely phyric basalt**						
GRAIN SIZE:	**Very fine grained**						
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**						

PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Clinopyroxene	~ 1	~ 1	0.4	1.5	0.6	Augite (?)	Subhedral	Pale yellow. Partially fractured. Textural relationships indicate contemporaneous crystallization with plagioclase. The only phenocrysts come from a cpx-pl glomerule.
Plagioclase	~ 1	~ 1	0.7	1.2	0.8	Bytownite	Subhedral to euhedral	% An > 80 %. Fresh. Max extinction angle measured ~ 25°; 2Vα ~ 80°. Some pl are stressed and show ondulate extintion.
Groundmass/matrix								
Groundmass	~ 60		0.1	0.5	0.3	pl, cpx, op	Hypidiomorphic	Anhedral pale yellow cpx (augite; 2Vγ ~ 60°) in intergranular to subophitic relationship with subhedral to euhedral pl. In some cases pl is skeletal and the space between its arms is filled by microlites of cpx and skeletal op. Interstitial euhedral to anhedral op indicates its late appearance as liquidus phase.
Segregation vesicles	~ 30							Dark brown to black. These vesicles are made up by acicular to skeletal pl, equant cpx and tiny elongated op (ilmenite?) in a devitrified glassy matrix. These vesicles represent late stage magmatic melt. The rapid cooling is responsible for the skeletal shape of pl and mt crystals.

SECONDARY MINERALOGY	**Percent**	**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	~ 5						Possibly replace former volcanic glass. Brownish, found in segregation vesicles and in cavities.
Cavities/veins							
Cavities	~ 3	0.3	1	0.5		Subspherical	~ 25 % empty; ~ 35 % partially filled; ~ 40 % totally filled. The filling material can be 1) brownish clay minerals, 2) microlitic intergrowth of pl, cpx, elongated op (all with size < 0.1 mm) plus possibly glass and clay minerals, 3) (?) chalcedony, 4) aragonite or 5) the previous ones in variable amount.
Veins	~ 2-3	0.5	1.5	0.7		Cutting at ~ 90°	Filled with aragonite festoons and anhedral to euhedral sulfide minerals (pyrite?). Possible presence also of serpentine minerals.

COMMENTS :
- Aragonite is distinguished by calcite by its higher birefringence and its negative biaxial (2Vα ~ 15°) character.
- Microlitic intergrowth partially filling cavities is the same material of segregation vesicles and may represent late stage magmatic melt patches.

Microphotos? Yes

LEGEND: ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite

THIN SECTION:	**200-1224D-1R-3 50-53 cm (37)**						**Unit: 1**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Groundmass/matrix								
Groundmass	~ 75		0.1	0.3	0.2	pl, cpx, op	Hypidiomorphic	Anhedral pale yellow cpx (augite; 2Vγ ~ 60°) in intergranular to subophitic relationship with subhedral to euhedral pl. In some cases pl is skeletal and the space between its arms is filled by microlites of cpx and skeletal op. Interstitial euhedral to anhedral op indicates its late appearance as liquidus phase. Rare presence (< 1%) of bytownite (2Vα ~ 90°) microphenocrysts (size < 0.6 mm).
Segregation vesicles	~ 20							Dark brown to black. These vesicles are made up by acicular to skeletal pl, equant cpx and tiny elongated op (ilmenite?) in a devitrified glassy matrix. These vesicles represent late stage magmatic melt. The rapid cooling is responsible for the skeletal shape of pl and mt crystals.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	~ 5							Possibly replace former volcanic glass. Brownish, found in segregation vesicles and in cavities.
Vesicles/cavities								
Cavities	~ 3		0.6	0.8	0.7		Spherical	~ 20 % empty; ~ 60 % partially filled; ~ 20 % totally filled. The filling material can be 1) brownish clay minerals, 2) microlitic intergrowth of pl, cpx, elongated op (all with size < 0.1 mm) plus possibly glass and clay minerals or 3) both.

COMMENTS :
- In some cases, op in segregation vesicles or in groundmass shows iso-orientation and skeletal acicular (i.e. needle-like) shapes.
- Microlitic intergrowth partially filling cavities is the same material of segregation vesicles and may represent late stage magmatic melt patches.

Microphotos? No

LEGEND: ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite

THIN SECTION:	**200-1224D-1R-4 1-4 cm (38)**						**Unit: 1**	**OBSERVER: ML**
ROCK NAME:	**Plagioclase sparsely-phyric basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Plagioclase	~ 1-2	~ 1-2	0.4	3	0.8	Bytownite	Euhedral, columnar	% An > 80 (2Vα ~ 85°). Fresh, with no signs of alteration. Presence of one anhedral crystal ~ 0.9 mm long.
Groundmass/matrix								
Groundmass	~ 60		0.1	0.6	0.3	pl, cpx, op	Hypidiomorphic	Anhedral pale yellow cpx (augite; 2Vγ ~ 65°) in intergranular to subophitic relationship with subhedral to euhedral pl. In some cases pl is skeletal and the space between its arms is filled by microlites of cpx and skeletal op. Interstitial euhedral to anhedral op indicates its late appearance as liquidus phase. Rare presence (< 1%) of bytownite (2Vα ~ 90°) microphenocrysts (size < 0.6 mm).
Segregation vesicles	~ 25							Dark brown to black. These vesicles are made up by acicular to skeletal pl, equant cpx and tiny elongated op (ilmenite?) in a devitrified glassy matrix. These vesicles represent late stage magmatic melt. The rapid cooling is responsible for the skeletal shape of pl and mt crystals.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	~ 5							Possibly replace former volcanic glass. Brownish, found in segregation vesicles and in cavities.
Vesicles/cavities								
Cavities	~ 5-6		0.4	2.8	1.1		Spherical	All the cavities are totally filled. The filling material can be 1) brownish clay minerals (< 1 %), 2) microlitic intergrowth of pl, cpx, elongated op (all with size < 0.1 mm) plus possibly glass and clay minerals (~ 10 %) or 3) aragonite plus microlitic material (~ 90 %). Aragonite is always present in the biggest cavities, whereas microlitic material is the only filling only in the smallest cavities.
Vesicles	~ 1							Aragonite.
COMMENTS :	- Microlitic intergrowth partially filling cavities is the same material of segregation vesicles and may represent late stage magmatic melt patches							
Microphotos?	Yes							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224D-2R-1 15-18cm (39)**						**Unit: 1**	**OBSERVER: ML**
ROCK NAME:	**Plagioclase clinopyroxene sparsely phyric basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Plagioclase	~ 1-2	~ 1-2	0.4	1.5	0.9	Bytownite	Euhedral, columnar	% An > 80 (2Vα ~ 90°). Relatively fresh, with few signs of alteration. Some phenocrystals are acicular.
Clinopyroxene	< 1	< 1			0.3	Augite (?)		Pale yellow. Max extintion angle measured c^γ ~ 37°. Only two microphenocrysts associated with larger pl.
Groundmass/matrix								
Groundmass	~ 40		0.2	0.6	0.4	pl, cpx, op	Hypidiomorphic	Anhedral pale yellow cpx (augite; 2Vγ ~ 60°) in intergranular to subophitic relationship with subhedral to euhedral pl. In some cases pl is skeletal and the space between its arms is filled by microlites of cpx and skeletal op. Pl is elongated to acicular (average size 0.4 x 0.02 mm). Interstitial euhedral to anhedral op indicates its late appearance as liquidus phase. Rare presence (< 1%) of bytownite (2Vα ~ 90°) microphenocrysts (size < 0.6 mm).
Segregation vesicles	~ 40							Dark brown to black. These vesicles are made up by acicular to skeletal pl, equant cpx and tiny elongated op (ilmenite?) in a devitrified glassy matrix. These vesicles represent late stage magmatic melt. The rapid cooling is responsible for the skeletal shape of pl and mt crystals.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	~ 10							Possibly replace former volcanic glass. Brownish, found in segregation vesicles and in cavities.
Vesicles/cavities								
Cavities	~ 2						Spherical	Totally filled. The filling material is microcrystalline overgrowth (95 %) and calcite (5 %).
Veins	~ 10		0.3	3.5	2			Veins filled by calcite (uniaxial negative) festoons, anhedral to euhedral sulfide minerals (pyrite?), low birefringence minerals (zeolites?), Fe-oxyhydroxides and acicular colorless mineral with high birefringence and parallel extinction (lawsonite?).
COMMENTS :	- The mineral identified as calcite filling the cavities can be also aragonite, because it has a very small 2Vα angle (< 5°). - Microlitic intergrowth partially filling cavities is the same material of segregation vesicles and may represent late stage magmatic melt patches.							
Microphotos?	Yes							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224D-2R-2 19-22 cm (40)**						**Unit: 1**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Groundmass/matrix								
Groundmass	~ 65		0.1	0.4	0.3	pl, cpx, op	Hypidiomorphic	Anhedral pale yellow cpx (augite; 2Vγ ~ 60°) in intergranular to subophitic relationship with subhedral to euhedral pl. In some cases pl is skeletal and the space between its arms is filled by microlites of cpx and skeletal op. Interstitial euhedral to anhedral op indicates its late appearance as liquidus phase. Rare presence (< 1 %) of pl microphenocrystals (average size 0.6 mm).
Segregation vesicles	~ 25							Dark brown to black. These vesicles are made up by acicular to skeletal pl, equant cpx and tiny skeletal from acicular to equant op (ilmenite?) in a devitrified glassy matrix. These vesicles represent late stage magmatic melt. The rapid cooling is responsible for the skeletal shape of pl and mt crystals.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	~ 10							Possibly replace former volcanic glass. Brownish, found in segregation vesicles and in cavities.
Vesicles/cavities								
Cavities	~ 1						Spherical	More than 90 % of the cavities are filled. The filling material can be 1) brownish clay minerals or Fe-oxyhydroxides (~ 70 %), 2) microlitic intergrowth of pl, cpx, elongated op (all with size < 0.1 mm) plus possibly glass and clay minerals (~ 20 %) or 3) calcite/aragonite plus brownish clay minerals or Fe-oxyhydroxides (~ 100 %).
COMMENTS :	- Microlitic intergrowth partially filling cavities is the same material of segregation vesicles and may represent late stage magmatic melt patches.							
Microphotos?	No							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224D-2R-2 100-103 cm (41)**						**Unit: 1**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Groundmass/matrix								
Groundmass	~ 70		0.2	0.7	0.5	pl, cpx, op	Hypidiomorphic	Texture: intergranular and, less common, subophitic. Main constituents: anhedral to subhedral pl, pale yellow anhedral cpx, equant anhedral to euhedral small mt. Pl and cpx often fracturated and with signs of incipient alteration. About 10% of cpx is rimmed by discrete small opaque mineral trial. Abundant presence of equant to elongated anhedral to euhedral op with relatively large size (avg. 0.25 mm) associated with the altered zones.
Segregation vesicles	~ 20							Dark brown to black. These vesicles are made up by acicular to skeletal pl, equant cpx, tiny elongated op (ilmenite?) and equant euhedral to anhedral op (? mt) in a devitrified glassy matrix. More than 50% of this microcrystalline overgrowth is altered in clay minerals.These vesicles represent late stage magmatic melt.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals + Fe-oxyhydroxides	~ 10							Brownish. Clay minerals and Fe-oxyhydroxides probably replace some interstitial glass.
Zeolites?	~ 3						Needle-like (acicular)	Low birefringence, colorless to pale yellow minerals found in groundmass, partially replacing cpx.
Vesicles/cavities								
Veins	~ 5		2	2.3	2.2			Veins filled by calcite festoons, Fe-oxyhydroxides and possibly clay minerals. The narrower veins (~ 0.4 mm wide) are almost totally filled by Fe-oxyhydroxides. A large pale brownish halo of ~ 1.5 cm is present on both sides of the veins. This is due to the presence of a brown film possibly made up of Fe-oxyhydroxides coating mineral grains.
COMMENTS :	- Calcite in veins is anomalously biaxial with $2V\alpha < 5°$. Perhaps it is aragonite. - Maximum size of anhedral to euhedral op in groundmass is ~ 0.5 mm.							
Microphotos?	No							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224D-2R-3 65-69 cm (42)**						**Unit: 1**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Groundmass/matrix								
Groundmass	~ 70		0.1	1.2	0.5	pl, cpx, op	Hypidiomorphic	Texture: intergranular and, less common, subophitic. Main constituents: subhedral pl (rarely skeletal), pale yellow anhedral cpx (2Vγ ~ 65°), equant to skeletal mt. About 10% of cpx is rimmed by discrete small opaque mineral trial. Rare presence ~ 2-3% of pl microphenocrystals with an average size ~ 1.5 mm
Segregation vesicles	~ 20							Dark brown to black. These vesicles are made up by acicular to skeletal pl, equant cpx, tiny elongated op (ilmenite?) and equant euhedral to anhedral op (mt ?) in a devitrified glassy matrix. More than 50% of this microcrystalline overgrowth is altered in clay minerals. These vesicles represent late stage magmatic melt.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals + Fe-oxyhydroxides	~ 10							Brownish. Clay minerals and Fe-oxyhydroxides probably replace some interstitial glass. In some cases skeletal equant opaque are aligned following the shape of a former pl. This overgrowth of op is associated with the presence of high birefringence mineral (epidote?). These alteration zones are associated with spherical drops of sulfide minerals (pyrite ?).
COMMENTS :	- Op in segregation vesicles seems to grow at the expence of cpx. Pl is much less sensible to alteration with respect to cpx. Skeletal op in altered zones are always associated to cpx relicts or are in the same intergranular position of the former cpx. - In altered brownish zones a skeletal to euhedral pl (2Vγ ~ 75°) is found. It seems a new phases grown from the altered mesostasis. - Two sizes of mineral grains (pl and cpx) in the groundmass. One ~ 0.3 and the other ~ 0.6 mm							
Microphotos?	Yes							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224D-2R-4 68-71 cm (43)**						**Unit: 1**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Fine grained**							
TEXTURE:	**Intergranular, intersertal, subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Groundmass/matrix								
Groundmass	~ 70		0.1	1.5	0.6	pl, cpx, op	Hypidiomorphic	Main constituents: anhedral to subhedral columnar pl, pale yellow anhedral to subhedral equant cpx, anhedral to euhedral small equant mt. Pl and cpx often fresh with no signs of alteration. Rare presence (< 1 %) of subhedral to anhedral pl (~ 2 mm) and cpx (~ 1.2 mm) microphenocrysts. Small intersertal patches of brownish volcanic glass partially devitrified and partially altered in clay minerals. Cpx microphenocrysts show c^γ ~ 46° indicating augitic composition.
Segregation vesicles	~ 25							Dark brown. These vesicles are made up by acicular to skeletal pl, equant cpx, tiny elongated op (ilmenite?) and equant euhedral to anhedral op (mt?) in a devitrified glassy matrix. These vesicles represent late stage magmatic melt.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals + Fe-oxyhydroxides + zeolites	~ 5-7						Anhedral	Brownish. Elongated op (ilmenite?) and skeletal pl is often associated to these alteration zones. In some cases skeletal equant opaque are aligned following the shape of a former (?) cpx. These alteration zones are associated with spherical drops of sulfide minerals (pyrite?) and with zeolites.
COMMENTS :	- The alteration zones possibly represent late stage liquid pools rapidly crystallized (skeletal op and pl). The following alteration by clay minerals is more effective on these glassy or fine grained zones rather than on the other coarser groundmass minerals.							
Microphotos?	No							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224D-3R-1 50-53 cm (44)**						**Unit: 1**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Groundmass/matrix								
Groundmass	~ 70		0.1	1.5	0.6	pl, cpx, pgn, op	Hypidiomorphic	Texture: intergranular and, less common, subophitic. Main constituents: anhedral to subhedral columnar pl, pale yellow euhedral to anhedral equant cpx and subhedral to euhedral prismatic pigeonite. Pigeonite distinguished by cpx on the basis of 2Vγ (~ 0°) and euhedral shape. Pl and cpx relatively fresh with rare signs of alteration. Less than 10 % of cpx is altered in brownish clay minerals.
Segregation vesicles	~ 25							Brownish. These vesicles are made up by acicular to skeletal pl, equant cpx, large equant euhedral to anhedral op (mt?) (avg size 0.6 mm) and tiny elongated op (ilmenite?) in a devitrified glassy matrix. Less than 5 % of this microcrystalline overgrowth is altered in clay minerals. Rare (~ 1%) presence of spherical drops of sulfide mineral (pyrite?). These vesicles represent late stage magmatic melt.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals + Fe-oxyhydroxides + zeolites	~ 5						Anhedral	Brownish. Often a rim of tiny subhedral to euhedral opaque crystals border the cpx in alteration zones. These alteration zones are associated with zeolites.
COMMENTS :	-Pl and cpx are associated in the groundmass with 1) brownish clay minerals (~ 5 %), in intergranular relation with pl, and generally in reaction with cpx and 2) microcrystalline overgrowth constituted by a) acicular low-birefringence mineral with roughly parallel extinction, 2V ~ 90° and radiate texture (albite-oligoclase ?), b) high birefringence mineral with columnar shape (epidote ?), c) large (avg. size ~ 0.5 mm) skeletal rhombohedral opaque mineral (Ti-mt ?), d) acicular opaque mineral (ilmenite ?), e) rare zeolites and f) drops of pyrite(?).							
Microphotos?	Yes							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224D-3R-2 54-57 cm (45)**						**Unit: 1**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Intergranular; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Groundmass/matrix								
Groundmass	~ 90		0.1	0.8	0.4	pl, cpx, op	Hypidiomorphic	Texture: intergranular. Main constituents: anhedral to subhedral pl and pale yellow subhedral to anhedral cpx and subhedral to euhedral pigeonite. Pigeonite distinguished by cpx on the basis of 2Vγ (~ 0°) and euhedral shape. Pl and cpx relatively fresh with rare signs of alteration. Less than 10 % of cpx is associated with brownish clay minerals.
Segregation vesicles	~ 5							Brownish. These vesicles are made up by acicular to skeletal pl, equant cpx, large equant euhedral to anhedral op (mt?) (avg size 0.5 mm) and, rarely, elongated op (ilmenite?) in a devitrified glassy matrix. About 50 % of this microcrystalline overgrowth is altered in clay minerals. Rare (~ 1%) presence of spherical drops of opaque mineral (pirite?). These vesicles represent late stage magmatic melt.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals + Fe-oxyhydroxides + zeolites	~ 10						Anhedral	Brownish. Rare presence of zeolites. Probably the presence of clay minerals is related to the former existence of interstitial glass pools
Vesicles/cavities								
Vesicles	~ 1						Anhedral	Filled with chlorite and clay minerals.
COMMENTS :	-Pl and cpx are associated in the groundmass with 1) brownish clay minerals (~ 2-3 %), in intergranular relation with pl, and generally in reaction with cpx and 2) microcrystalline overgrowth constituted by a) acicular low-birefrengence mineral with roughly parallel extinction, 2V ~ 90° and radiate texture (albite-oligoclase?), b) colorless isotropic skeletal mineral with rhombic shape, c) skeletal rhombohedral opaque mineral (avg. size ~ 0.3 mm) (Ti-mt?), d) acicular opaque mineral (Ilmenite?), e) rare zeolites and f) drops of (?) pyrite.							
Microphotos?	Yes							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224D-3R-2 118-120 cm (48)**						**Unit: 1**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Intergranular to intersertal; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Clinopyroxene-Plagioclase	~ 1						subhedral	Glomerocrysts of cpx and pl. The cpx is poikilitic and with subhedral to anhedral equant shape. Pl is subhedral to euhedral with columnar habit.
Groundmass/matrix								
Groundmass	~ 80		<0.1	0.3	0.15	pl, cpx, op	Hypidiomorphic	Main constituents: fresh subhedral to euhedral columnar pl (~ 60 %), anhedral equant cpx (~ 30 %), anhedral to euhedral equant rarely skeletal op (~ 10 %). Cpx (2Vγ ~ 65°) is in intergranular relationship with pl together with ~ 15 % brownish clay mineral. Op mineral are larger than cpx.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	~ 15							Brownish. Possibly replace intersertal glass pools.
Nontronite	~ 2							Nontronite is present both as subangular to subrounded discrete granules (avg. size ~ 0.3 mm) and as small veins (< 0.1 mm wide).
Vesicles/cavities								
Vein	~ 1							A vein cut the thin section parallel to the shorter edge. It is made up of Fe-oxyhydroxides with high reflectance under reflected light examination. This vein is associated with a brownish halo ~ 12 mm wide. The halo is due to the presence of a diffuse brownish Fe-oxyhydroxides film around groundmass minerals.
COMMENTS :	-Possible presence of gibbsite in the brownish halo. Gibbsite identified on the basis of hexagonal shape, color (colorless) low birefringence and positive biaxial character with 2Vγ < 20°.							
Microphotos?	Yes							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224D-3R-3 45-48 cm (49)**						**Unit: 1**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Intergranular to intersertal; isotropic, equigranular, hypohyaline (~ 90 % glass)**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Plagioclase	~1			2.5	1.8		Euhedral, columnar	Fresh and fractured. Fractures filled by a colorless mineral with high birefringence.
Groundmass/matrix								
Plagioclase-Clinopyroxene	~ 7		<0.1	0.6	0.2			Pl: euhedral to subhedral with columnar habit; cpx: pale yellow, anhedral to subhedral with equant habit. Often in glomerophyric relations.
Glass	~ 90							From dark brown to black.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Calcite	~ 2		0.1	0.6	0.2		Subrounded to irregular	Calcite is present as discrete granules (possibly cavities). The smallest commonly it hosts euhedral pale yellow crystallites with prismatic to pseudoctagonal and rhombic habit, high birefringence and inclined extinction (cpx ?).
Vesicles/cavities								
COMMENTS :								
Microphotos?	No							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224D-4R-1 15-17 cm (50)**						**Unit: 1**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Fine grained**							
TEXTURE:	**Intergranular; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Groundmass/matrix								
Groundmass	~ 90					pl, cpx, op	Hypidiomorphic	Main constituents: euhedral to subhedral columnar to acicular pl (avg size ~ 0.3 mm) and pale yellow anhedral equant cpx (avg. size ~ 0.1 mm) glomerocrystals set in a very fine grained groundmass (avg. size < 0.05 mm) made up of anhedral cpx, small euhedral to subhedral equant op and subhedral columnar pl. The avg. size of glomerules is ~ 0.4 mm. N-S oriented bands (~0.5-5 mm wide) of the same minerals but with coarser size (max pl size ~ 0.6 mm) are interpreted as gas pipes. Rare presence (< 1%) of pl microphenocrysts (avg. size ~ 0.7 mm).
Segregation cavities	~ 2							Dark brown. Made up by acicular to columnar pl, equant anhedral cpx, small acicular oriented op in a devitrified glassy matrix. Less than 10 % is altered in brownish clay minerals. This cavity is within a gas pipe associated with a large (~ 6x3 mm) calcite aggregate.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Carbonate minerals	~ 3							Carbonate mineral aggregate of prismatic shape (~ 6x3 mm) made up of single calcite crystals optically oriented with granoblastic texture and size ranging from 0.9 to < 0.1 mm. 2Vα ~ 0 (calcite ?).
Clay minerals	~ 5							Brownish clay minerals occur both in groundmass and associated with gas pipes (of which they form ~ 20 %).
Vesicles/cavities								
Veins	< 1							Narrow (< 0.1 mm wide) brownish vein filled with clay.
Cavities	< 1		0.2	0.4	0.3		Suspherical	Filled with brownish to pale greenish clay minerals.
COMMENTS :								
Microphotos?	Yes							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224D-4R-1 74-77 cm (46)**						**Unit: 1**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Groundmass/matrix								
Groundmass	~ 60		0.1	0.4	0.3	pl, cpx, op	Hypidiomorphic	Texture: intergranular and, less common, subophitic. Main constituents: subhedral columnar pl (in some cases skeletal), pale yellow anhedral equant cpx and anhedral mt. Rare presence (<< 1 %) of pl microphenocrysts (average size 0.4 mm). Presence of "open" pl spherulites.
Segregation vesicles	~ 25							Made up by acicular to skeletal, often hollow columnar pl, equant subhedral to anhedral cpx, small elongated to equant op in a devitrified glassy matrix. About 50 % is altered in brownish clay minerals. These vesicles represent late stage magmatic melt. The rapid cooling is responsible for the skeletal shape of many microlites.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	~ 15							From brownish to greenish. They are found both as intersitial pools among plagioclase laths in groundmass and within segregation vesicles between skeletal pl.
Vesicles/cavities								
Calcite	~ 1						Anhedral	Associated to clay minerals in altered zone of segregation vesicles.
Cavities	~ 3						Spherical	More than 90 % of the cavities are filled. The filling material can be 1) brownish clay minerals or Fe-oxyhydroxides (~50%), 2) microlitic intergrowth of pl, cpx, elongated op (all with size < 0.1 mm) plus possibly glass and clay minerals (~30%) or 3) both (~20%).
COMMENTS :	-The "open" pl spherulites are composed of columnar to acicular pl radiating from a center. The space between each pl crystal is occupied by smaller cpx and smaller pl spherulites.							
Microphotos?	Yes							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224D-4R-2 36-38 cm (51)**						**Unit: 1**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Groundmass/matrix								
Groundmass	~ 60		0.1	0.7	0.4	pl, cpx, op	Hypidiomorphic	Pale yellow anhedral equant cpx (augite; 2Vγ ~ 60°) and small subhedral to euhedral equant op in intergranular to subophitic relationship with subhedral to euhedral columnar pl. In some cases pl is skeletal and the space between its arms is filled by microlites of cpx and skeletal op.
Segregation vesicles	~ 30							Dark brownish. These vesicles are made up by acicular to skeletal pl, anhedral to subhedral equant cpx and subhedral to euhedral skeletal elongated to equant op in a devitrified glassy matrix. These vesicles represent late stage magmatic melt. The rapid cooling is responsible for the skeletal shape of pl and op crystals.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	< 5							Possibly replaces former glass. Brownish, associated with segregation vesicles and in cavities.
Vesicles/cavities								
Cavities	~ 10		0.3	3.5	1		Subspherical	~ 95 % totally filled. The filling material can be 1) calcite (~ 75 %), 2) microlitic intergrowth of pl, cpx, elongated op (all with size < 0.1 mm) plus possibly glass and clay minerals, the same of the segregation vesicles (~10 %) , 3) calcite (~80 % relative) and microlitic material (~20 % relative) (~ 15 %). Occasional presence of single grains euhedral (?) pyrite.
COMMENTS :	- Many calcite-filled cavities are aligned and all have a dark brown clayey rim. Calcite inside cavities shows filamentous structure up to 0.4 mm long and < 0.01 mm wide radiating from the outer portions toward the center of the cavity. This vermicular material does not reflect light and is strongly pleochroic from colorless to gray-brownish. However, this last feature can be related to the strong birefringence of the host calcite. Their shape resemble organic material.							
Microphotos?	Yes							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224D-5R-1 60-63 cm (47)**						**Unit: 1**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Plagioclase	< 1				2	Bytownite ?	Subhedral, columnar	Fresh. Only one phenocryst found.
Groundmass/matrix								
Groundmass	~ 65		0.1	0.9	0.4	pl, cpx, op	Hypidiomorphic	Texture: intergranular and, less common, subophitic. Main constituents: subhedral columnar pl (in some cases skeletal), pale yellow anhedral equant cpx and anhedral mt. Presence of "open" pl spherulites made up of acicular to columnar pl radiating from a center composed by cpx and pl.
Segregation vesicles	~ 15							From black to dark brown. Made up by acicular to skeletal, often hollow columnar pl, equant subhedral to anhedral cpx, small elongated to equant op in a devitrified glassy matrix. Less than 10 % is altered in brownish clay minerals. These vesicles represent late stage magmatic melt. The rapid cooling is responsible for the skeletal shape of many microlites.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	~ 5							Brownish. Found both as interstitial pools among plagioclase laths in groundmass, within segregation vesicles and segregation cavities associated with microlitic pl, cpx and op.
Vesicles/cavities								
Cavities	~ 3		0.4	2	1		Spherical	More than 60 % of the cavities are filled. The filling material can be 1) brownish clay minerals or Fe-oxyhydroxides (~50%), 2) microlitic intergrowth of pl, cpx, elongated op (all with size < 0.1 mm) plus possibly glass and clay minerals (~10%) or 3) both (~40%).
COMMENTS :								
Microphotos?	No							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**1224E-3R-1 1-4 cm (53)**							**OBSERVER: ML**
ROCK NAME:	**Hyaloclastite**							
GRAIN SIZE:								
TEXTURE:								
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Glassy shards	~ 5	~ 40	0.6	30	10		Subangular, rectangular	Grayish to light brownish. Some of the glassy shards are totally altered in palagonite, whereas in other cases the alteration is limited to the rim. The glass has euhedral to subhedral microlites of plagioclase, clinopyroxene and iddingsitized olivine. The development of acicular spherulites of plagioclase around all these microlites is very common, thought that some shard are virtually spherulite-free and show only few microlites. In few cases euhedral microphenocrysts of plagioclase (max size ~ 0.8 mm) have been found.
Groundmass/matrix								
Fe-oxyhydroxides	~ 2							From reddish to black. Found both as discrete grains within the calcitic matrix and, sometime, as a tiny film around glassy shards.
Calcite	~ 60							From microcrystalline to coarse grained. Generally, coarser calcite ($2V\alpha \sim 0$) forms a rim around the glassy shards.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Palagonite	~ 35							Orange-yellow. Replaces in part or totally the glassy shards.
Zeolites?	~ 5							Colorless with low relief and extremely low birefringence, rhombic to prismatic habit and multiple twinning. Confined in calcite veins and at the contact with the glassy shards.
Vesicles/cavities								
COMMENTS :								
Microphotos?	Yes							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION: 1224E-3R-1 6-10 cm (54)
ROCK NAME: Hyaloclastite
GRAIN SIZE:
TEXTURE:
OBSERVER: ML

PRIMARY MINERALOGY	Percent Present	Percent Original	Size (mm) min.	Size (mm) max.	Size (mm) av.	Approximate composition	Morphology	Comments
Phenocrysts/clasts								
Glassy shards	~ 10	~ 45	0.6	20	10		Subangular	Grayish to light brownish. Some of the glassy shards are totally altered in palagonite, whereas in other cases the alteration is limited to the rim. The glass has euhedral to subhedral microlites of plagioclase, clinopyroxene and iddingsitized olivine. The development of acicular spherulites of plagioclase around all these microlites is very common, thought that some shard are virtually spherulite-free and show only few microlites. The abundance of microlites and spherulites generally increase from the rim to the core and this change the color of the shard from yellow-orange to dark brown. Some glassy shards are mostly holohyaline with less than 5% microlites, whereas in other cases microlites and spherulites are more than 60% of the shard. In few cases euhedral microphenocrysts of plagioclase (max size ~ 1mm) has been found.
Plagioclase	<1				0.3	Bytownite?	Anhedral	A single clast. 2Vα ~ 70°.
Groundmass/matrix								
Fe-oxyhydroxides	~ 2							From reddish to black. Found both as discrete grains within the calcitic matrix and, sometime, as a tiny film around glassy shards.
Calcite	~ 50							From microcrystalline to coarse grained. Generally, coarser calcite (2Vα ~ 0°) forms a rim around the glassy shards.

SECONDARY MINERALOGY	Percent	Size (mm) min.	Size (mm) max.	Size (mm) av.	Replacing/filling	Morphology	Comments
Palagonite	~ 35						Orange-yellow. Replaces in part or totally the glassy shards.
Zeolites?	~ 5						Colorless with low relief and extremely low birefringence, rhombic to prismatic habit and multiple twinning. Confined in calcite veins and at the contact with the glassy shards.

Vesicles/cavities

COMMENTS :

Microphotos? Yes

LEGEND: ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite

THIN SECTION:	**1224E-3R-2 119-122 cm (55)**
ROCK NAME:	**Aphyric basalt**
GRAIN SIZE:	**Very fine grained**
TEXTURE:	**Intergranular to intersertal, rarely subophitic; isotropic, equigranular, holocrystalline**

OBSERVER: ML

PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Groundmass	~ 60		0.1	0.4	0.3	pl, cpx, op	Hypidiomorphic	Anhedral pale yellow cpx (augite; 2Vγ ~ 65°) in intergranular to subophitic relationship with subhedral to euhedral pl. In some cases pl is skeletal and the space between its arms is filled by microlites of cpx and skeletal op. Interstitial euhedral to anhedral op indicates its late appearance as liquidus phase. Rare presence (< 1 %) of pl microphenocrysts (max size ~ 2.2 mm)
Segregation vesicles	~ 30							Dark brownish. These vesicles are made up by acicular to skeletal pl, equant cpx and acicular to equant skeletal op set in a devitrified glassy matrix This is generally fresh and alteration in brownish clay is generally <10%. These vesicles represent late stage magmatic melt. The rapid cooling is responsible for the skeletal shape of pl and mt crystals.

SECONDARY MINERALOGY	**Percent**	**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	< 5						Possibly replace former volcanic glass. Brownish, found in segregation vesicles and in cavities.
Vesicles/cavities							
Cavities	~ 3	0.3	1	0.5		Subspherical	Totally filled. The filling material can be 1) brownish clay minerals, 2) microlitic intergrowth of pl, cpx, elongated op (all with size < 0.1 mm) plus possibly glass and clay minerals, 3) calcite (?) (2Vα ~ 0°) or 4) the previous ones in various amount.

COMMENTS :

Microphotos? No

LEGEND: ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite

THIN SECTION:	**200-1224F-1R-4 40-43 cm (56)**							**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Groundmass/matrix								
Groundmass	~ 70		0.05	1.1	0.4	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx (augite; 2Vγ ~ 60°) in intergranular to subophitic relationship with subhedral to euhedral skeletal pl and equant mt. The space between skeletal pl is filled by microlites of cpx and dendritic op. Rare presence (< 1%) of bytownite (2Vα ~ 90°) microphenocrysts (max size ~ 1.2 mm).
Segregation vesicles	~ 20							Dark brown to black. These vesicles are made up by acicular to skeletal pl, equant cpx and tiny elongated op (ilmenite?) in a devitrified glassy matrix altered in brownish-yellowish clay minerals. These vesicles represent late stage magmatic melt. The rapid cooling is responsible for the skeletal shape of pl and mt crystals.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	~ 10							Brownish, found in interstitial relation with groundmass pl, possibly replacing former glass and associated both with segregation vesicles/cavities.
Vesicles/cavities								
Cavities	~ 10		0.20	1.2	0.5		Subspherical	~ 80 % empty; ~ 10 % partially filled; ~ 10 % totally filled. The filling material is brownish clay minerals and possibly Fe-oxyhydroxides.
COMMENTS :								
Microphotos?	No							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224F-1R-4 63-65 cm (57)**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**	
GRAIN SIZE:	**Very fine grained**	
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**	

PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Groundmass/matrix								
Groundmass	~ 70		0.1	0.6	0.4	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx (augite; 2Vγ ~ 600) in intergranular to subophitic relationship with subhedral to euhedral skeletal to columnar pl and subhedral to euhedral equant mt. The space between skeletal pl is filled by microlites of cpx and dendritic op. Rare presence (< 1%) of pl microphenocrysts (max size ~ 1.4 mm).
Segregation vesicles	~ 15							Dark brown to black. These vesicles are made up by acicular to skeletal pl, equant cpx and tiny elongated op (ilmenite?) in a devitrified glassy matrix strongly altered in brownish-yellowish clay minerals. These vesicles represent late stage magmatic melt. Some pl in the clayey matrix have low 2Vγ (< 70°), suggesting labradoritic composition.

SECONDARY MINERALOGY	**Percent**	**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals + Fe-oxyhydroxides	~ 20						Brownish, found in interstitial relation with groundmass pl, possibly replacing former glass, and associated both with segregation vesicles.
Vesicles/cavities							
Cavities	~ 2	0.3	0.5	0.4		Subspherical	Always empty. It is possible that the filling was lost during the thin section preparation. Possible original filling were clay minerals and Fe-oxyhydroxides.

COMMENTS :	-The yellowish color of the sample is due to a yellowish-brownish film coating pl and cpx in groundmass and to the alteration of the segregation vesicles.
Microphotos?	No
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite

THIN SECTION:	**200-1224F-1R-4 115-117 cm (58)**							**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Groundmass/matrix								
Groundmass	~ 80		0.1	1.2	0.5	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx (augite; 2Vγ ~ 65°) in intergranular to subophitic relationship with subhedral to euhedral skeletal to columnar pl and subhedral to euhedral equant mt. The space between skeletal pl is filled by cpx. Rare presence of pl microphenocrysts (max size ~ 1.1 mm).
Segregation vesicles	~ 20							Brownish to yellowish. These vesicles are made up by skeletal pl, equant cpx and and large equant skeletal op in a devitrified glassy matrix almost totally altered in brownish-yellowish clay minerals.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals + Fe-oxyhydroxides	~ 10							Brownish, found associated with segregation vesicles. Rare presence (<<1 %) of green grains in groundmass, possibly nontronite.
Vesicles/cavities								
Vein	<< 1		0.1	0.3	0.2			Reddish vein of Fe-oxyhydroxides.
COMMENTS :								
Microphotos?	No							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224F-1R-5 31-33cm (59)**	**OBSERVER: ML**
ROCK NAME:	**Aphyric Basalt**	
GRAIN SIZE:	**Fine grained**	
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline.**	

PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Groundmass/matrix								
Groundmass	~ 80		0.2	1.2	0.5	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx (augite; 2Vγ ~ 60°) and small subhedral to euhedral equant op in intergranular to subophitic relationship with subhedral to euhedral skeletal to columnar pl. Pl and cpx often fractured. Rare presence (<1%) of bytownite (2Vα ~ 80-85) microphenocrysts (max size 1.2 mm). Rare presence of anhedral quarz microcrysts.
Segregation vesicles	~ 10							Brownish to yellowish. These vesicles are made up by hollow pl, equant cpx and tiny elongated and equant op in a devitrified glassy matrix almost totally altered in brownish-yellowish clay minerals and Fe-oxyhydroxides.

SECONDARY MINERALOGY	**Percent**	**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals + Fe-oxyhydroxides	~ 15						Brownish, found associated both with segregation vesicles.
Vesicles/cavities							

COMMENTS :	Rare presence of anhedral quartz microcrysts and open spherulites made up by radiating pl and intergranular cpx.
Microphotos?	No
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite

THIN SECTION:	**200-1224F-1R-5 53-56 cm (60)**							**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Pyroxene + plagioclase	~ 1							Only one subhedral prismatic phenocryst of cpx (max size ~ 3 mm) (c^γ ~ 33°) associated with a smaller subhedral columnar pl (~ 1.8 mm).
Groundmass/matrix								
Groundmass	~ 80		0.1	1.2	0.5	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx (augite; 2Vγ ~ 60°) in intergranular to subophitic relationship with subhedral to euhedral skeletal to columnar pl and subhedral to euhedral equant mt. The space between skeletal pl is filled by cpx and pl microphenocrysts (max size ~ 1.1 mm).
Segregation vesicles	~ 15							Brownish to yellowish. These vesicles are made up by acicular to skeletal pl, equant cpx and tiny elongated and large equant op in a devitrified glassy matrix almost totally altered in brownish-yellowish clay minerals and Fe-oxyhydroxides.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	~10							Brownish, found associated both with segregation vesicles. Rare presence of subspherical sulfide drops (pyrite?) associated with clay minerals.
Vesicles/cavities								
Cavity	<< 1						Subspherical	Filled with calcite or aragonite.
COMMENTS :	~ 15 % of cavities. These are probably produced during thin section preparation. They are associated with altered segregation vesicles.							
Microphotos?	Yes							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224F-2R-2 9-12 cm (62)**							**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, inequigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Groundmass/matrix								
Groundmass	~ 80		0.2	2.2		pl, cpx, op	Hypidiomorphic	Main constituents: euhedral to subhedral columnar pl, pale yellow anhedral cpx and subhedral to euhedral equant mt. The average size of crystals changes from top (0.8 mm) to bottom (0.3 mm). This is probably due to different cooling rates.
Segregation vesicles	~ 20							Brownish. These vesicles are made up by acicular to skeletal pl, equant cpx and anhedral to euhedral, acicular (ilm?) to equant (mt?) op in a devitrified altered glassy matrix. These vesicles represent late stage magmatic melt.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals + Fe-oxyhydroxides	~ 15							Brownish, found in interstitial relation with groundmass pl, possibly replacing former glass of segregation vesicles. In some cases pale yellow clay mineral partially substitutes cpx in segregation vesicles.
Vesicles/cavities								
COMMENTS :	The average size of crystals changes from top to bottom, this is probably due to different cooling rate. Altered segregation vesicles often show small equant op around cpx and/or pl rim.							
Microphotos?	Yes							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224F-2R-4 141-143 cm (64)**							**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Groundmass/matrix								
Groundmass	~ 80		0.1	1.2	0.5	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx (augite; 2Vγ ~ 65°) in intergranular to subophitic relationship with subhedral to euhedral skeletal to columnar pl and subhedral to euhedral equant mt. The space between skeletal pl is filled by cpx. Rare presence of pl microphenocrysts (max size ~ 1.1 mm).
Segregation vesicles	~ 10							Brownish to yellowish. These vesicles are made up by skeletal pl, equant cpx and and large equant skeletal op (up to 0.5 mm) in a devitrified glassy matrix almost totally altered in brownish-yellowish clay minerals.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals + Fe-oxyhydroxides	~ 10							Brownish, found in interstitial relation with groundmass pl, possibly replacing former glass, and associated both with segregation vesicles.
Vesicles/cavities								
COMMENTS :								
Microphotos?	No							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224F-2R-5 63-65 cm (65)**							**OBSERVER: ML**
ROCK NAME:	**Brecciated aphyric basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Groundmass/matrix								
Groundmass	~ 80		0.1	0.6	0.2	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx (augite; 2Vγ ~ 60°) in intergranular to subophitic relationship with subhedral to euhedral skeletal to columnar pl and subhedral to euhedral equant mt. Presence of pillow fragments made up by altered glassy shards with pl microlites. Possible presence of iddingsitiged olivine.
Segregation vesicles	~ 5							Brownish. These vesicles are made up by acicular to skeletal pl, equant cpx and anhedral to euhedral op in a devitrified glassy matrix. These vesicles represent late stage magmatic melt.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	~ 15							Brownish, found in segregation vesicles. Presence of green minerals, probably nontronite, distinguished from chlorite for the higher birefringence.
Vesicles/cavities								

COMMENTS :	Impregnated thin section. The original material is incoherent breccia made up by very fine-grained lava flow and pillow fragments.
Microphotos?	No
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite

THIN SECTION:	**200-1224F-2R-5 66-68 cm (66)**
ROCK NAME:	**Brecciated aphyric basalt**
GRAIN SIZE:	**Very fine grained**
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**

OBSERVER: ML

PRIMARY MINERALOGY	Percent Present	Percent Original	Size (mm) min.	Size (mm) max.	Size (mm) av.	Approximate composition	Morphology	Comments
Phenocrysts/clasts								
Groundmass/matrix								
Groundmass	~ 80		0.1	0.5	0.3	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx (augite; 2Vγ ~ 60°) in intergranular to subophitic relationship with subhedral to euhedral skeletal to columnar pl and subhedral to euhedral equant op.
Segregation vesicles	~ 10							Brownish. These vesicles are made up by acicular to skeletal pl, equant cpx and anhedral to euhedral op in a devitrified glassy matrix. These vesicles represent late stage magmatic melt.

SECONDARY MINERALOGY	Percent	Size (mm) min.	Size (mm) max.	Size (mm) av.	Replacing/filling	Morphology	Comments
Clay minerals	~ 5						Brownish, found in segregation vesicles. Presence of green minerals, probably nontronite, distinguished from chlorite for the higher birefringence.
Vesicles/cavities							

COMMENTS :	Impregnated thin section. The original material is incoherent breccia made up by very fine-grained lava flow and pillow fragments.
Microphotos?	No
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite

THIN SECTION:	**200-1224F-3R-1 14-16 cm (67)**							**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Fine grained**							
TEXTURE:	**Intersertal to subophitic; isotropic, inequigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Groundmass/matrix								
Groundmass	~ 80		0.1	1.0	0.4	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx (augite; 2Vγ ~ 60°) in intergranular to subophitic relationship with subhedral to euhedral skeletal to columnar pl and subhedral to euhedral equant op. Rare presence (~1 %) of pl microphenocryst with an average size ~ 1.4 mm.
Segregation vesicles	~ 5							Brownish. Made up by acicular to skeletal pl, equant cpx and anhedral to euhedral op in a devitrified altered glassy matrix. These vesicles represent late stage magmatic melt.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	~ 5							Brownish. Found both as interstitial pools among groundmass pl, within segregation vesicles between skeletal pl and in cavities.
Vesicles/cavities								
Cavities	~ 1							Almost totally filled by brownish clay minerals
COMMENTS :	Groundmass pl rims in some cases are transformed in a vermicular overgrowth.							
Microphotos?	Yes							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224F-3R-1 90-92 cm (68)**	**OBSERVER: ML**
ROCK NAME:	**Glomeroporphyric basalt**	
GRAIN SIZE:	**Very fine grained**	
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline, glomeroporphyritic**	

PRIMARY MINERALOGY	Percent Present	Percent Original	Size (mm) min.	Size (mm) max.	Size (mm) av.	Approximate composition	Morphology	Comments
Phenocrysts/clasts								
Plagioclase	< 2		0.4	2.4	1.2	Bytownite	Subhedral to euhedral. Columnar to equant	% An >80. Fresh. Phenocrysts are part of a gabbroic glomerule. Max angle extinction measured =39°; 2Vα ~90°.
Clinopyroxene	< 2		0.2	2.2	0.8	Augite	Subhedral	c^γ ~ 48°. Pale yellow. Partially deformed. Textural relationships indicate contemporaneous crystallization with plagioclase.
Groundmass/matrix								
Groundmass	~ 80		<0.1	0.3	0.2	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx (augite; 2Vγ ~ 60°) in intergranular to subophitic relationship with subhedral to euhedral skeletal to columnar pl and subhedral to euhedral equant op.
Segregation vesicles	~ 15							Brownish. These vesicles are made up by columnar pl, equant cpx and anhedral to subhedral op in a devitrified altered glassy matrix. These vesicles represent late stage magmatic melt.

SECONDARY MINERALOGY	Percent	Size (mm) min.	Size (mm) max.	Size (mm) av.	Replacing/filling	Morphology	Comments
Clay minerals	~ 5						Brownish. Found both as interstitial pools among groundmass pl, within segregation vesicles and in cavities.
Vesicles/cavities							
Cavities	~ 1						Partially filled by clay minerals.

COMMENTS :	Probably the glomerules represent cognate xenoliths.
Microphotos?	No
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite

THIN SECTION:	**200-1224F-3R-2 62-64 cm (69)**							**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Groundmass/matrix								
Groundmass	~ 60		0.1	0.7	0.3	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx (augite; 2Vγ ~ 60°) in intergranular to subophitic relationship with subhedral to euhedral skeletal pl and equant mt. Rare presence (< 1%) of euhedral to subhedral columnar pl microphenocrysts (max size ~ 1 mm).
Segregation vesicles	~ 25							These vesicles are made up by skeletal pl, equant cpx and large equant skeletal op in a devitrified glassy matrix. These vesicles represent late stage magmatic melt. The rapid cooling is responsable for the skeletal shape of pl and mt crystals.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals + Fe-oxyhydroxides	~ 2							Brownish, found in interstitial relation with groundmass pl, possibly replacing former glass and associated both with segregation vesicles.
Vesicles/cavities								
Cavities	~ 1-2		0.3	0.8	0.6		Subspherical	~ 60 % empty; ~ 13 % partially filled; ~ 27 % totally filled. The filling material can be 1) calcite, 2) brownish clay minerals or Fe-oxyhydroxides.
Veins	~ 10		0.1	3.5	1.4			Filled by calcite festoons, Fe-oxyhydroxides and anhedral op (?)
COMMENTS :								
Microphotos?	No							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224F-4R-1 87-89 cm (71)**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**	
GRAIN SIZE:	**Very fine grained**	
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**	

PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts								
Groundmass/matrix								
Groundmass	~ 55		0.05	0.6	0.3	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx (augite; 2Vγ ~ 60°) in intergranular to subophitic relationship with subhedral to euhedral skeletal pl and equant mt. The space between skeletal pl is filled by microlites of cpx and dendritic op. Rare presence (< 1%) of euhedral to subhedral columnar pl microphenocrysts (max size ~ 1.2 mm).
Segregation vesicles	~ 30							Brownish. These vesicles are made up by acicular to skeletal pl, equant cpx and tiny skeletal equant op in a devitrified glassy matrix slightly altered in brownish-yellowish clay minerals. These vesicles represent late stage magmatic melt. The rapid cooling is responsible for the skeletal shape of pl and mt crystals.

SECONDARY MINERALOGY	**Percent**	**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals + Fe-oxyhydroxides	~ 15						Brownish, found in interstitial relation with groundmass pl, possibly repalacing former glass, and associated both with segregation vesicles.
Calcite	<< 1		0.2				Rare small calcite vesicles.
Vesicles/cavities							

COMMENTS :	
Microphotos?	No
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite

THIN SECTION:	**200-1224F-4R-2 79-82 cm (72)**	**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**	
GRAIN SIZE:	**Very fine grained**	
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**	

PRIMARY MINERALOGY	Percent Present	Percent Original	Size (mm) min.	Size (mm) max.	Size (mm) av.	Approximate composition	Morphology	Comments
Phenocrysts/clasts								
Groundmass/matrix								
Groundmass	~ 50		0.1	0.7	0.3	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx (augite; 2Vγ ~ 60°) in intergranular to subophitic relationship with subhedral to euhedral skeletal pl and equant mt. Rare presence (< 1%) of euhedral to subhedral columnar pl microphenocrysts (max size ~ 1.3 mm). Presence of "open" pl spherulites.
Segregation vesicles	~ 20							These vesicles are made up by skeletal pl, equant cpx and large equant skeletal op in a devitrified glassy matrix. These vesicles represent late stage magmatic melt. The rapid cooling is responsable for the skeletal shape of pl and mt crystals.
Clay minerals	~ 20							Brownish, found in interstitial relation with groundmass pl, possibly replacing former glass and associated both with segregation vesicles.

SECONDARY MINERALOGY	Percent	Size (mm) min.	Size (mm) max.	Size (mm) av.	Replacing/filling	Morphology	Comments
Vesicles/cavities							
Calcite	<< 1	0.1	0.6	0.2		Subspherical to irregular	Rare small calcite vesicles.
Vesicles	~ 10					Irregular	More than 90% are empty. The filling material is brownish and greenish (nontronite?) clay minerals and calcite.

COMMENTS :	Wide (~ 2 cm) vesicular area toward the top of the thin section.
Microphotos?	Yes
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite

THIN SECTION:	**200-1224F-4R-3 4-6 cm (73)**							**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Groundmass/matrix								
Groundmass	~ 80		0.1	1.0	0.4	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx in intergranular to subophitic relationship with subhedral to euhedral skeletal to columnar pl and subhedral to euhedral equant op. Presence of "open" pl spherulite.
Segregation vesicles	~ 10							Brownish. These vesicles are made up by acicular to skeletal pl, equant cpx and anhedral to euhedral op in a devitrified glassy matrix. These vesicles represent late stage magmatic melt.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	~ 10							Brownish. Found both as interstitial pools among plagioclase laths in groundmass and within segregation vesicles between skeletal pl.
Vesicles/cavities								
COMMENTS :								
Microphotos?	Yes							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224F-4R-6 11-13 cm (74)**	**OBSERVER: ML**
ROCK NAME:	**Plagioclase sparsely phyric pillow basalt**	
GRAIN SIZE:	**Very fine grained**	
TEXTURE:	**Intergranular; isotropic, equigranular, hypocrystalline (glass ~ 10 %)**	

PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Plagioclase	~ 1		0.6	1.2	0.8	Bytownite	Euhedral, columnar	% An >80 (2Vα ~ 90°). Fresh, with no signs of alteration.
Groundmass/matrix								
Groundmass	~ 90					pl, cpx, ol	Hypidiomorphic	Mainly constituents: pl (often skeletal), pale yellow anhedral cpx, equant to acicular skeletal op. Average dimension of the minerals in the groundmass ~ < 0.1 mm. Pale yellow glass content decreases upward. The bands of different colors are related to the percentage of glass and microcrysts in the groundmass. Presence of euhedral to skeletal iddingsitized olivine.
Clay minerals + Fe-oxyhydroxides	~ 5							Brownish, found in cavities.

SECONDARY MINERALOGY	**Percent**	**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Vesicles/cavities							
Cavities	~ 7	0.1	0.8	0.3		Subspherical	~ 10 % empty; ~ 75 % partially filled; ~ 15 % totally filled. The filling material can be clay minerals, Fe-oxyhydroxides and low birefringence minerals.

COMMENTS :

Microphotos? No

LEGEND: ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite

THIN SECTION:	**200-1224F-6R-1 29-34 cm (80)**							**OBSERVER: ML**
ROCK NAME:	**Hyaloclastite**							
GRAIN SIZE:								
TEXTURE:	**Holohyaline to hypohyaline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Glassy shards	~ 20	~ 45	4.0	23.0	12.0		Subangular, rectangular	Grayish to pale brownish. Some of the glassy shards are totally altered in palagonite, whereas in other cases the alteration is limited to the rim. The glass has euhedral to subhedral microlites of pl, cpx and iddingsitized ol. Acicular pl spherulites around all these microlites are common, thought that some shards are virtually spherulite-free and show only few microlites. In few cases euhedral pl microphenocrysts (max size ~ 1 mm) have been found.
Groundmass/matrix								
Calcite	~ 40							From microcrystalline to coarse grained. Generally, coarser calcite (2Vα ~ 0°) forms a rim around the glassy shards.
Palagonite	~ 25							Orange-yellow. Replaces in part the glassy shards.
Zeolites?	~ 15							Colorless with low relief and extremely low birefringence, rhombic to prismatic habit and multiple twinning. Confined in calcite veins and at the contact with the glassy shards.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Vesicles/cavities								
Cavities	~ 1		<0.1	0.7	0.2		Subspherical	Found in the glassy shards. ~ 40 % empty; ~ 60 % partially filled. The filling material can be low birefringence mineral arranged in concentric shells.
COMMENTS :	Oversized thin section.							
Microphotos?	No							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224F-6R-1 105-107 cm (75)**
ROCK NAME:	**Aphyric basalt**
GRAIN SIZE:	**Fine grained**
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**

OBSERVER: ML

PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Groundmass/matrix								
Groundmass	~ 60		0.1	0.9	0.5	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx in intergranular to subophitic relationship with subhedral to euhedral skeletal pl and equant mt. Rare presence (< 1%) of euhedral to subhedral columnar pl microphenocrysts (max size ~ 1.6 mm).
Segregation vesicles	~ 30							Brownish. These vesicles are made up by acicular to skeletal pl, equant cpx and anhedral to euhedral op in a devitrified glassy matrix. These vesicles represent late stage magmatic melt.
Clay minerals	~ 20							Brownish, found in interstitial relation with groundmass pl, possibly replacing former glass and associated both with segregation vesicles and cavities.

SECONDARY MINERALOGY	**Percent**	**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Vesicles/cavities							
Cavities	~ 3	0.1	0.6	0.3		Irregular to subspherical	~ 40 % empty; ~ 55 % partially filled; ~ 5 % filled. The filling material can be brownish clay minerals.

COMMENTS :

Microphotos? No

LEGEND: ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite

THIN SECTION:	**200-1224F-7R-1 98-100 cm (76)**	**OBSERVER: ML**
ROCK NAME:	**Pillow basalt**	
GRAIN SIZE:	**Very fine grained**	
TEXTURE:	**Intergranular to subophitic; isotropic, inequigranular, hypocrystalline (glass ~ 10 %)**	

PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Groundmass/matrix								
Groundmass	~ 90					pl, cpx, ol	Hypidiomorphic	Mainly constituents: pl (often skeletal), pale yellow anhedral cpx, euhedral to skeletal iddingsitized ol also in glomerophyric relationships. Average dimension of the minerals in the groundmass ~ < 0.1 mm. Pale yellow glass decreases upward. The bands of different colors are related to the percentage of glass and microcrysts. Rare presence of pl microphenocrysts (max size ~ 0.9 mm).

SECONDARY MINERALOGY	**Percent**	**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Vesicles/cavities							
Cavities	~ 2	0.1	1.2	0.4		Subspherical	More than 95 % of the cavities are empty. The filling material are brownish clay minerals.
Veins	~ 2	<0.1	0.7	0.3		Irregular	The veins are empty.

COMMENTS :	
Microphotos?	Yes
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite

THIN SECTION:	**200-1224F-10R-1 120-122 cm (77)**							**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Groundmass/matrix								
Groundmass	~ 95		<0.1	1.0	0.3	pl, cpx, ol	Hypidiomorphic	Anhedral to subhedral pale yellow cpx in intergranular to subophitic relationship with subhedral to euhedral skeletal to columnar pl and euhedral to skeletal iddingsitized ol microphenocrysts in a fine grained groundmass. Very small skeletal op confined in the groundmass. Presence of "open" pl spherulites.
Clay minerals	~ 2							Brownish to yellowish, found in interstitial relation with groundmass pl, possibly replacing former glass.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Vesicles/cavities								
Cavities	~ 1-2		0.1	0.6	0.3		Subspherical	More than 95 % of the cavities are empty.
COMMENTS :								
Microphotos?	Yes							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224F-11R-2 13-15 cm (78)**							**OBSERVER: ML**
ROCK NAME:	**Pillow basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, inequigranular, hypocrystalline (glass ~ 10 %)**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Groundmass/matrix								
Groundmass	~ 90		<0.1	0.7	<0.1	pl, cpx, ol	Hypidiomorphic	Mainly constituents: pl (often skeletal), pale yellow anhedral cpx and euhedral to skeletal iddingsitized ol. Average dimension of the minerals in the groundmass ~ < 0.1 mm. Pale yellow glass content decreases from the rim inward. The bands of different colour are related to the percentage of glass and microcrysts. Glass rim is altered in palagonite. Presence of "open" pl spherulites.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Vesicles/cavities								
Cavities	~ 1-2		0.1	0.3	0.1		Subspherical	More than 95 % of the cavities are partially filled. The filling material can be low birefringence mineral arranged in concentric shells.
COMMENTS :								
Microphotos?	No							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224F-12R-1 61-64 cm (79)**							**OBSERVER: ML**
ROCK NAME:	**Hyaloclastite breccia**							
GRAIN SIZE:								
TEXTURE:	**From hypohyaline to holohyaline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Glassy shards	~ 2	~ 50	0.1	3.4	1.4		Subangular, rectangular	Grayish to pale brownish. Most of the glassy shards are totally altered in palagonite, whereas in few cases an unaltered core is found. Some of the glassy shards are totally aphanitic, whereas in other cases pl, cpx, iddingsitized ol microlites have been found. Rare presence of relatively large pl and cpx microphenocrysts.
Groundmass/matrix								
Calcite	~ 40							Microcrystalline
Palagonite	~ 48							Orange-yellow. Replaces in part or totally the glassy shards.
Fe-oxyhydroxides	~ 2							Brownish, found in the matrix and as a film around palagonized glassy shards.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Zeolites?	< 1							Colorless with low relief and extremely low birefringence, acicular habit and multiple twinning. Confined at the contact with the glassy shards.
Vesicles/cavities								
Cavities	< 1						Subspherical	Rare small subspherical cavities (average size < 0.1 mm) partially filled found in the glassy shards.
COMMENTS :								
Microphotos?	No							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224F-13R-1 113-116 cm (81)**							**OBSERVER: ML**
ROCK NAME:	**Vesicular aphyric basalt**							
GRAIN SIZE:	**Very fine grained**							
TEXTURE:	**Intersertal to intergranular; isotropic, equigranular, hypocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Groundmass/matrix								
Groundmass	~ 50		<0.1	0.5	0.3	pl, cpx, op, ol	Hypidiomorphic	Skeletal and acicular pl microphenocrysts; small pale yellow equant intergranular cpx, small equant to acicular op and small euhedral to subhedral iddingsitized ol set in a glassy, partially devitrified and altered, brownish groundmass.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Aragonite	~ 45							Anhedral large (~ 1.5 mm) to small (< 0.1 mm) aragonite ($2V\alpha < 10$) filling subparallel veins.
Zeolites?	~ 2-3							Colorless with low relief and extremely low birefringence, rhombic to prismatic habit and multiple twinning. Confined in aragonite veins.
Vesicles/cavities								
Veins	~ 45		1.0	10.0			Subparallel	Filled by aragonite and zeolites.
Cavities	~ 1		0.2	0.3	0.3		Subspherical	~ 20 % empty, ~ 80 % totally filled. The filling material can be aragonite and clay minerals.
COMMENTS :	The carbonate material filling veins has been identified as aragonite on the bases of its biaxial character; however it is worth of note that also calcite (uniaxial) can be anomalously biaxial under certain circumstances.							
Microphotos?	Yes							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224F-14R-1 109-112 cm (82)**							**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Groundmass/matrix								
Groundmass	~ 80		0.1	1.0	0.4	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx in intergranular to subophitic relationship with subhedral to euhedral skeletal to columnar pl and subhedral to euhedral equant (mt?) and acicular (ilm?) op. Pl and cpx often fractured .
Segregation vesicles	~ 20							Brownish. These vesicles are made up by acicular to skeletal pl, equant cpx and anhedral to euhedral op in a devitrified glassy matrix. These vesicles represent late stage magmatic melt.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Vesicles/cavities								
Cavities	~ 1		0.2	1.5	0.6		Subspherical	More than 95 % of the cavities are empty.
COMMENTS :								
Microphotos?	No							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224F-14R-2 60-61 cm (83)**							**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Groundmass/matrix								
Groundmass	~ 65		0.2	1.3	0.8	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx in intergranular to subophitic relationship with subhedral to euhedral skeletal to columnar pl and subhedral to euhedral equant mt. The space between skeletal pl is filled by microlites of cpx and dendritic op. Rare presence of pl microphenocrysts (max size ~ 2 mm).
Segregation vesicles	~ 30							Brownish. These vesicles are made up by acicular to skeletal pl, equant cpx and anhedral to euhedral, skeletal to acicular (often iso-oriented) op in a devitrified glassy matrix. These vesicles represent late stage magmatic melt.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	~ 2-3							Brownish, found in interstitial relation with groundmass pl, possibly replacing former glass, associated both with segregation vesicles and in cavities.
Vesicles/cavities								
Cavities	< 1						Subspherical	30 % empty; 70 % totally filled. The filling material can be clay minerals.
COMMENTS :								
Microphotos?	Yes							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224 F-14R-2 65-68 cm (84)**							**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Fine grained**							
TEXTURE:	**Intergranular to subophitic; isotopic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	Comments
Phenocrysts/clasts								
Groundmass/matrix								
Groundmass	~ 65		0.2	1.4	0.8	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx in intergranular to subophitic relationship with subhedral to euhedral skeletal to columnar pl and subhedral to euhedral equant mt.
Segregation vesicles	~ 30							Grey to brown. These vesicles are made up by acicular to skeletal pl, equant cpx and tiny elongated op (ilmenite?) in a devitrified glassy matrix altered in brownish clay minerals. These vesicles represent late stage magmatic melt. The rapid cooling is responsible for the skeletal shape of pl and mt crystals.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	~ 2-3							Brownish, found in interstitial relation with groundmass pl, possibly replacing former glass and associated both with segregation vesicles and in some small veins.
Vesicles/cavities								
Veins	< 1				0.2			Brownish vein of clay minerals.
COMMENTS :								
Microphotos?								
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							

THIN SECTION:	**200-1224F-15R-1 88-90 cm (85)**							**OBSERVER: ML**
ROCK NAME:	**Aphyric basalt**							
GRAIN SIZE:	**Fine grained**							
TEXTURE:	**Intergranular to subophitic; isotropic, equigranular, holocrystalline**							
PRIMARY MINERALOGY	**Percent Present**	**Percent Original**	**Size (mm) min.**	**max.**	**av.**	**Approximate composition**	**Morphology**	**Comments**
Phenocrysts/clasts								
Groundmass/matrix								
Groundmass	~ 60		0.2	1.4	0.8	pl, cpx, op	Hypidiomorphic	Anhedral to subhedral pale yellow cpx (augite; 2Vγ ~ 60°) in intergranular to subophitic relationship with subhedral to euhedral skeletal pl and equant op. Rare presence (< 1%) of bytownite (2Vα ~ 90°) phenocrysts (max size ~ 3.2 mm).
Segregation vesicles	~ 35							Grey to brown. These vesicles are made up by acicular to skeletal pl, equant cpx and tiny elongated op (ilmenite?) in a devitrified glassy matrix altered in brownish clay minerals. These vesicles represent late stage magmatic melt. The rapid cooling is responsible for the skeletal shape of pl and mt crystals.
SECONDARY MINERALOGY	**Percent**		**Size (mm) min.**	**max.**	**av.**	**Replacing/filling**	**Morphology**	**Comments**
Clay minerals	~ 3							Brownish, found in interstitial relation with groundmass pl, possibly replacing former glass and associated both with segregation vesicles and in some small veins.
Vesicles/cavities								
Veins	< 1				< 0.1			Brownish narrow veins filled by clay minerals.
COMMENTS :								
Microphotos?	No							
LEGEND:	ol = olivine; cpx = clinopyroxene; pl = plagioclase; op = Fe-Ti oxides; mt = magnetite							