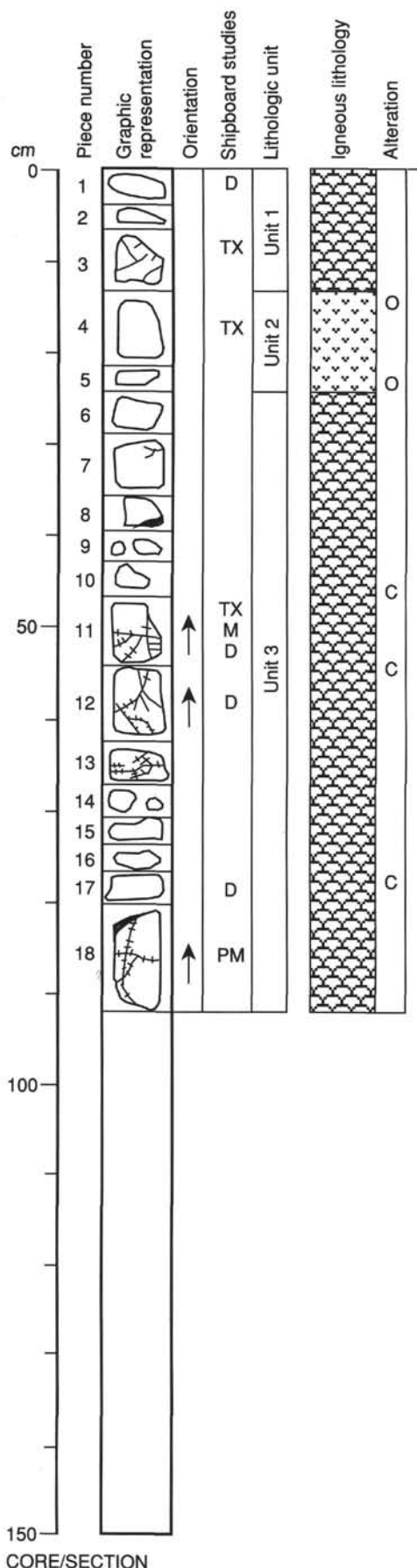


148-896A-1R-1

UNIT 1: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-3



195.1 mbsf

PHENOCRYSTS:

Plagioclase - 3%; 1 mm; euhedral to subhedral.
Olivine - 2%; 0.5; euhedral, equant.

GROUNDMASS: Texture: Microcrystalline, porphyritic. Composition: Plagioclase, clinopyroxene.

VESICLES: <1%; 0.1 mm.

COLOR: Bluish gray (5B 5/1).

STRUCTURE: Homogeneous, massive.

ALTERATION: Olivine phenocrysts are completely pseudomorphed by green clay. Groundmass is brownish gray; alteration is minimal.

VEINS/FRACTURES: Piece 1 contains clay and calcite (determined by X-ray diffraction) veins, <1 mm wide. Piece 3 contains two green clay veins. The unit contains no oriented structures.

UNIT 2: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 4-5

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 5%; 1.2 mm; euhedral to subhedral.
Olivine - 3%; 0.4 mm; euhedral to subhedral.

GROUNDMASS: Texture: Microcrystalline, subglomeroporphyritic. Composition: Plagioclase, clinopyroxene, olivine.

VESICLES: <1%; 0.1 mm

COLOR: Dark reddish gray (5Y 4/1).

STRUCTURE: Homogeneous, massive.

ALTERATION: Piece 4 contains an orange oxidation halo. Olivine is altered to clay.

VEINS/FRACTURES: The interval contains no veins or oriented structures.

UNIT 3: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 6-18

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 2%; 0.8 mm; euhedral to subhedral.
Olivine - 4%; 0.6 mm; euhedral to subhedral, equant.

GROUNDMASS: Texture: Porphyritic, microcrystalline. Composition: Plagioclase, olivine, clinopyroxene.

VESICLES: <1%; <0.1 mm.

COLOR: Bluish gray (5B 5/1).

STRUCTURE: Homogeneous, massive.

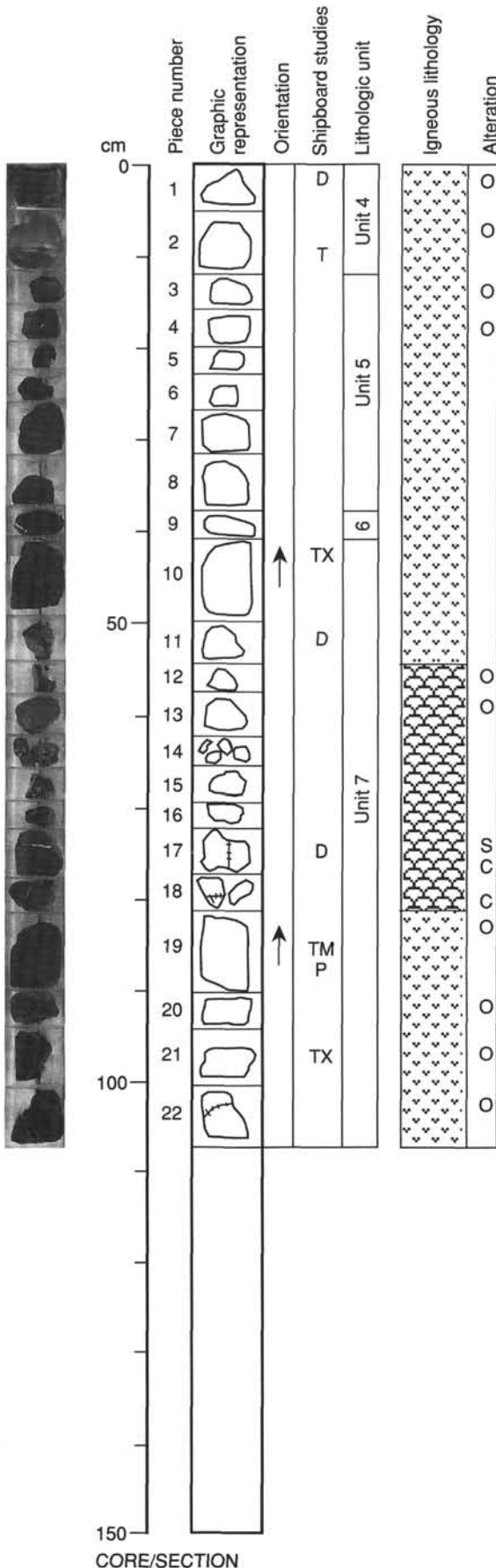
ALTERATION: Olivine is completely altered to clay.

VEINS/FRACTURES: The interval contains 28 clay, carbonate, or clay + carbonate veins. Oriented veins in Pieces 7, 11, 12, and 18 have dips that vary from 27° to 90°, but are generally >60°.

CORE/SECTION

UNIT 4: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 1-2



200.9 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 2%; 0.7 mm; euhedral to subhedral.
Olivine - 3%; 0.5 mm; euhedral to subhedral.

GROUNDMASS: Texture: Microcrystalline, porphyritic.

VESICLES: None.

COLOR: Dark reddish gray (5Y 4/1).

STRUCTURE: Homogeneous, massive.

ALTERATION: Oxidative alteration (red-orange); olivine is replaced by iddingsite and iron hydroxide.

VEINS/FRACTURES: Piece 1 contains one clay vein and Piece 2 contains one clay + carbonate vein. The interval contains no oriented structures.

UNIT 5: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 3-8

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 2%; 0.9 mm; euhedral to subhedral.
Olivine - 4%; 0.5 mm; euhedral to subhedral.

GROUNDMASS: Texture: Microcrystalline, porphyritic, trachytic.

VESICLES: None.

COLOR: Dark bluish gray (5B 4/1).

STRUCTURE: Homogeneous, massive.

ALTERATION: Pieces 3 and 4 contain oxidation halos; olivine is completely replaced by clay.

VEINS/FRACTURES: The unit contains four veins, clay + carbonate and clay, all <1 mm wide. No oriented structures are present.

UNIT 6: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Piece 9

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 4%; 0.8 mm; euhedral to subhedral.
Olivine - 0.2%; 0.8 mm; euhedral to subhedral.

GROUNDMASS: Texture: Microcrystalline, porphyritic, trachytic.

VESICLES: None.

COLOR: Bluish gray (5B 5/1).

STRUCTURE: Homogeneous, massive.

ALTERATION: Olivine is completely replaced by clay.

VEINS/FRACTURES: The interval contains two clay veins, <1 mm and 1-3 mm wide, and no oriented structures.

CORE/SECTION

148-896A-2R-1

UNIT 7: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT**Pieces 10–22****CONTACTS:** None.**PHENOCRYSTS:**

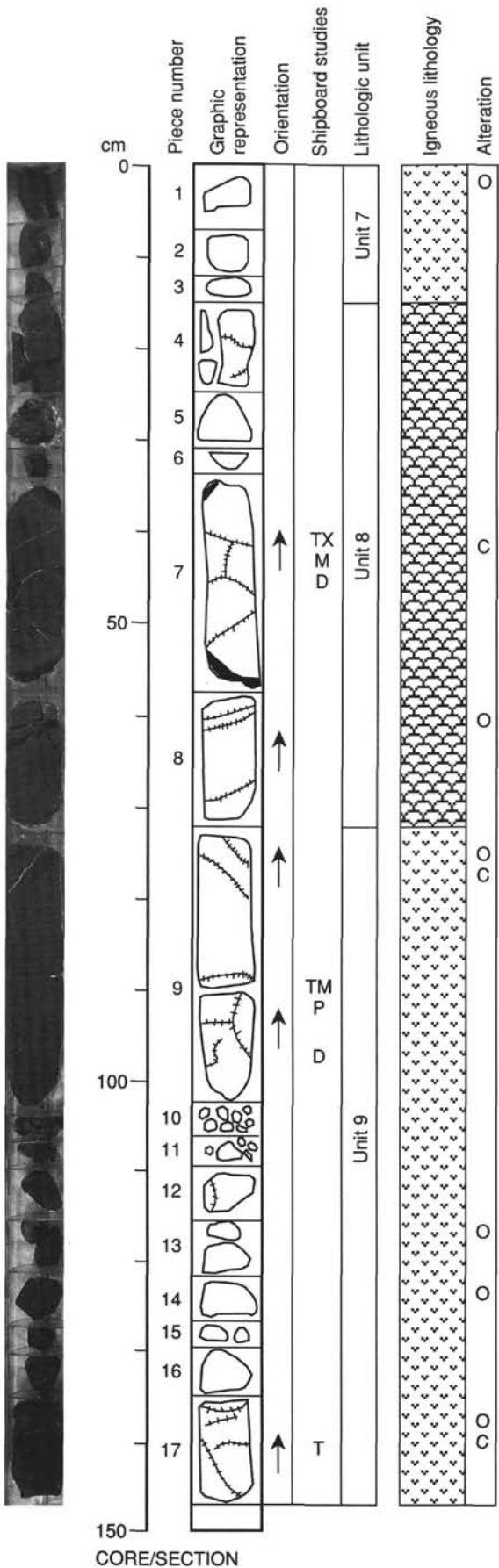
Plagioclase - 3%; 0.8 mm; euhedral to subhedral.

Olivine - 2%; 0.5 mm; euhedral.

GROUNDMASS: Texture: Microcrystalline, porphyritic.**VESICLES:** Trace.**COLOR:** Dark bluish gray (5BG 4/1) to reddish yellow (7.5YR 6/6) or weak red (5R 4/4), when altered.**STRUCTURE:** Homogeneous, massive.**ALTERATION:** Red oxidation halos have developed in Pieces 12, 13, 19–22. Olivine is completely replaced by iddingsite.**VEINS/FRACTURES:** The interval contains 16 clay or clay + carbonate veins and one iron hydroxide vein (<1 mm wide, Piece 19). Pieces 14 and 22 contain steeply dipping veins (>60°).

UNIT 7: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-3



209.9 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 3%; 0.8 mm; euhedral to subhedral.

Olivine - 2%; 0.5 mm; euhedral.

GROUNDMASS: Texture: Microcrystalline, porphyritic.

VESICLES: Trace.

COLOR: Dark bluish gray (5BG 4/1) to reddish yellow (7.5YR 6/6) or weak red (5R 4/4), when altered.

STRUCTURE: Homogeneous, massive.

ALTERATION: Red oxidation patch has developed in Piece 1.

VEINS/FRACTURES: The interval contains one clay + carbonate vein (Piece 2), and no oriented structures.

UNIT 8: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 4-8

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 3%; 0.8 mm; euhedral to subhedral.

Olivine - 2%; 0.5 mm; euhedral.

GROUNDMASS: Texture: Microcrystalline, porphyritic.

VESICLES: None.

COLOR: Bluish gray (5B 5/1) to reddish gray or reddish yellow (7.5YR 6/6).

STRUCTURE: Homogeneous, massive.

ALTERATION: Piece 8 contains a red oxidation halo; Pieces 4 and 7 contain minor halos.

VEINS/FRACTURES: The interval contains 21 carbonate or clay + carbonate veins. Most have thin (<1 mm) brown halos. Oriented veins in Pieces 4, 7, and 8 have dips varying from 17°-90°.

UNIT 9: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 9-17

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 2%; 0.9 mm; euhedral to subhedral.

Olivine - 1.5%; 0.6 mm; euhedral.

GROUNDMASS: Texture: Porphyritic, microcrystalline.

VESICLES: None.

COLOR: Main part: Bluish gray (5B 5/1), partly oxidized part: olive (5Y 4/4).

STRUCTURE: Homogeneous, massive.

ALTERATION: Pieces 9, 13, 14, and 17 have red oxidation halos.

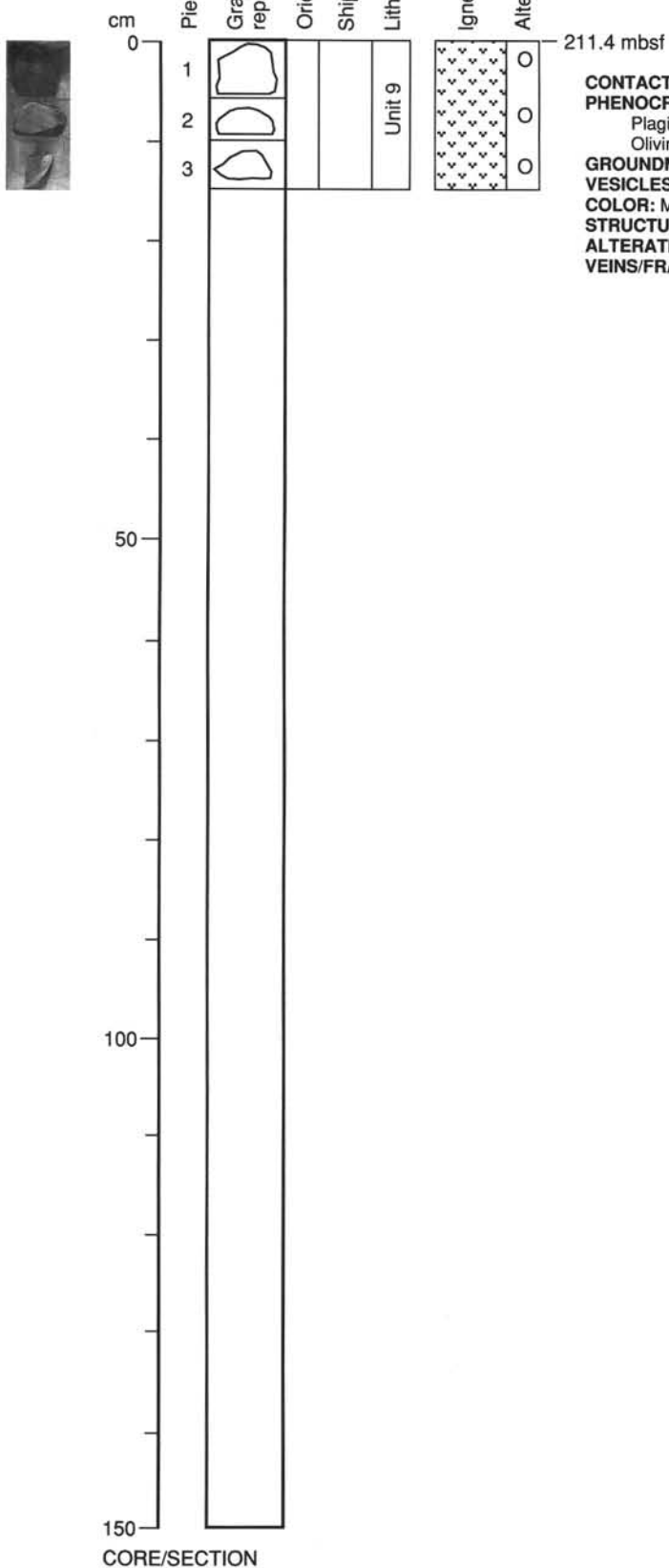
VEINS/FRACTURES: The interval contains 16 clay, carbonate, or clay + carbonate veins, mostly <1 mm wide. Oriented veins in Pieces 9A, 14, and 17 are moderately to steeply dipping (46° to 78°).

CORE/SECTION

148-896A-3R-2

UNIT 9: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-3



211.4 mbsf

CONTACTS: None.
PHENOCRYSTS:
 Plagioclase - 2%; 0.9 mm; euhedral to subhedral.
 Olivine - 1.5%; 0.6 mm; euhedral.
GROUNDMASS: Texture: Porphyritic, microcrystalline.
VESICLES: None.
COLOR: Main part: Bluish gray (5B 5/1), partly oxidized part: olive (5Y 4/4).
STRUCTURE: Homogeneous, massive.
ALTERATION: Red oxidation of the groundmass is prevalent.
VEINS/FRACTURES: The interval contains no veins.

UNIT 9: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-16

218.9 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 2%; 0.9 mm; euhedral to subhedral.
Olivine - 1.5%; 0.6 mm; euhedral.

GROUNDMASS: Texture: Porphyritic, microcrystalline.

VESICLES: None.

COLOR: Main part: Bluish gray (5B 5/1), partly oxidized part: olive (5Y 4/4).

STRUCTURE: Homogeneous, massive.

ALTERATION: Piece 8 contains a red oxidation halo.

VEINS/FRACTURES: The unit contains 33 clay, carbonate, or clay + carbonate veins. Oriented veins in Pieces 1, 9A, and 9C have dips ranging from 6° to 90°, dominantly >60°.

UNIT 10: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Piece 17

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 2%; 0.9 mm; euhedral to subhedral.
Olivine - 1.5%; 0.6 mm; euhedral.

GROUNDMASS: Texture: Porphyritic, microcrystalline.

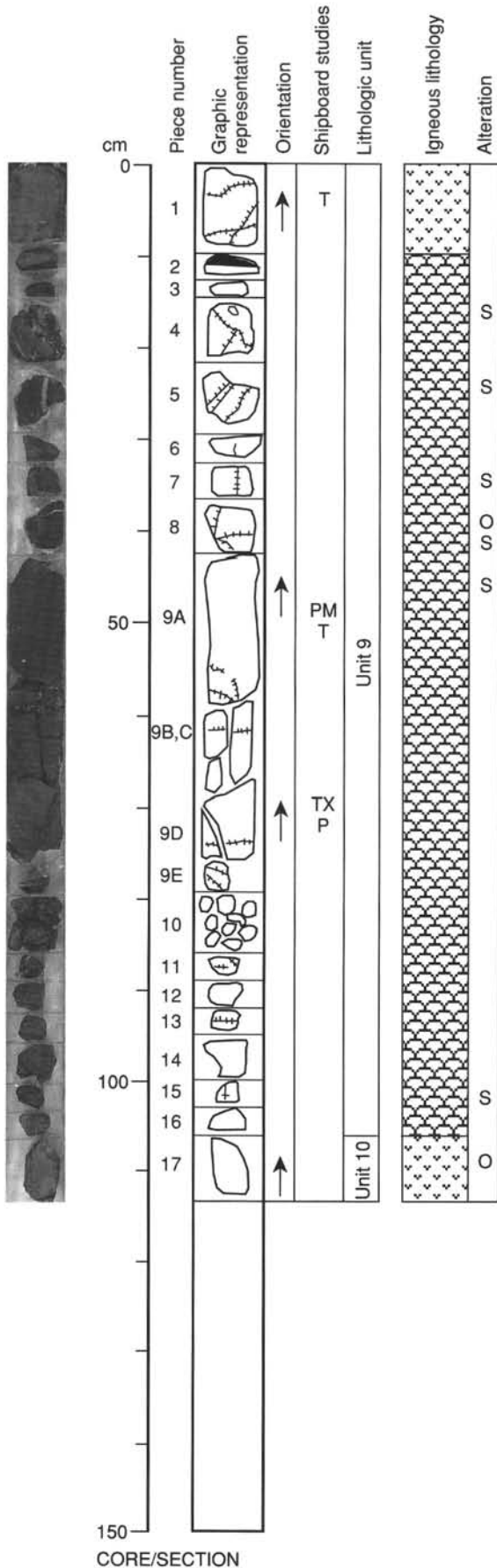
VESICLES: None.

COLOR: Main part: Bluish gray (5B 5/1), partly oxidized part: olive (5Y 4/4).

STRUCTURE: Homogeneous, massive.

ALTERATION: Red-yellow oxidation prevails.

VEINS/FRACTURES: The unit contains one black clay vein and one green clay vein, both <1 mm wide. No oriented structures are present.

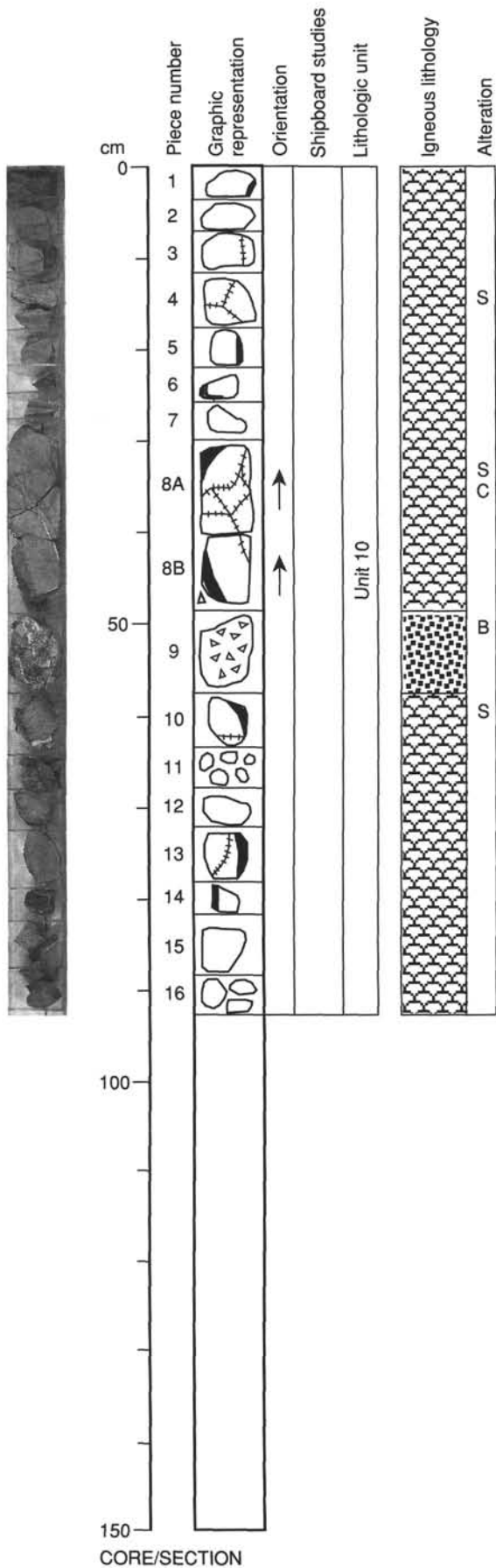


CORE/SECTION

148-896A-5R-1

UNIT 10: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-16



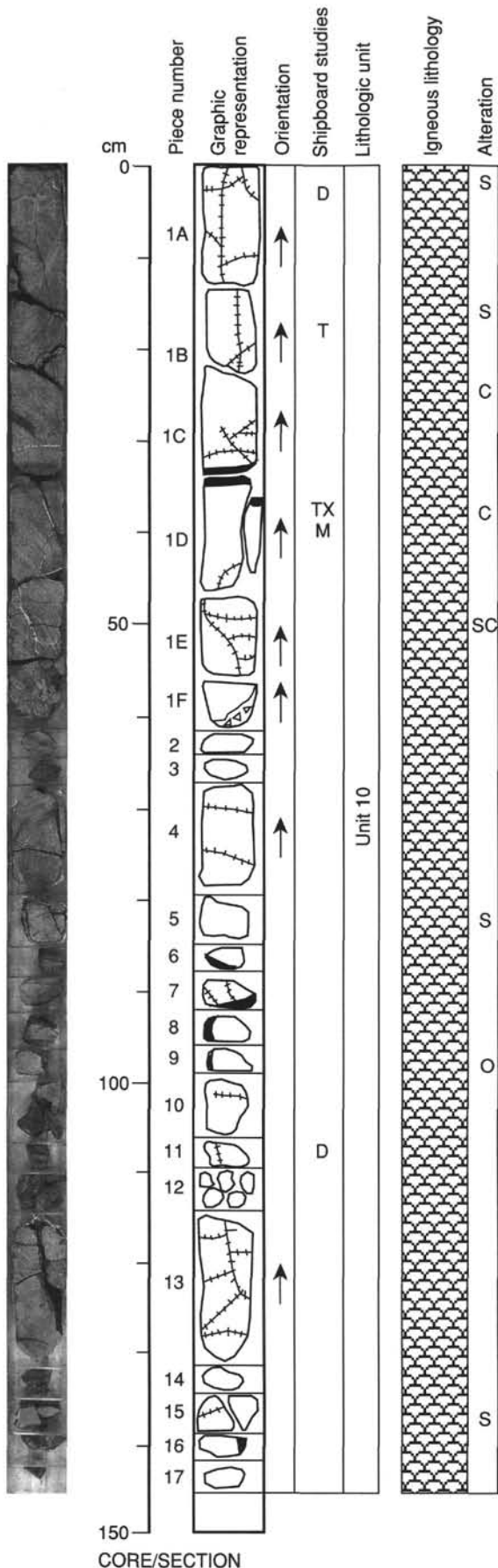
228.4 mbsf

CONTACTS: None.
PHENOCRYSTS:
 Plagioclase - 5%; 1mm; euhedral.
 Olivine - 2%; 0.4 mm; euhedral to subhedral.
GROUNDMASS: Texture: Microcrystalline, porphyritic, subglomeroporphyritic.
VESICLES: None.
COLOR: Bluish gray to dark bluish gray (5B 5/1 to 5B 4/1).
STRUCTURE: Homogeneous, massive.
ALTERATION: No significant alteration of groundmass is present.
VEINS/FRACTURES: This interval contains 17 clay or clay + carbonate veins. Oriented veins in Piece 8 have both moderate (35°-40°) and steep (73°-83°) dips.

CORE/SECTION

UNIT 10: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1A-17



229.32 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 5%; 1 mm; euhedral.

Olivine - 2%; 0.4 mm; euhedral to subhedral.

GROUNDMASS: Texture: Microcrystalline, porphyritic, subglomeroporphyritic.

VESICLES: None.

COLOR: Bluish gray to dark bluish gray (5B 5/1 to 5B 4/1).

STRUCTURE: Homogeneous, massive.

ALTERATION: Red oxidative alteration is present in Pieces 6 through 9.

VEINS/FRACTURES: This interval contains 29 clay, clay + carbonate, or carbonate veins.

Oriented veins in Pieces 1 and 4 dip at 6°-90°; dips are dominantly steep.

148-896A-5R-3

UNIT 10: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1A-1E

230.78 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 5%; 1 mm; euhedral.

Olivine - 2%; 0.4 mm; euhedral to subhedral.

GROUNDMASS: Texture: Microcrystalline, porphyritic, subglomeroporphyritic.

VESICLES: None.

COLOR: Bluish gray to dark bluish gray (5B 5/1 to 5B 4/1).

STRUCTURE: Homogeneous, massive.

ALTERATION: Red oxidative alteration is present in 65% of piece.

VEINS/FRACTURES: This piece contains two clay + carbonate veins, <1 mm wide. No oriented structures are present.

UNIT 11: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 2-8

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 4%; 1 mm; euhedral-subhedral.

Olivine - 5%; 0.3 mm; euhedral-anhedral.

GROUNDMASS: Microcrystalline.

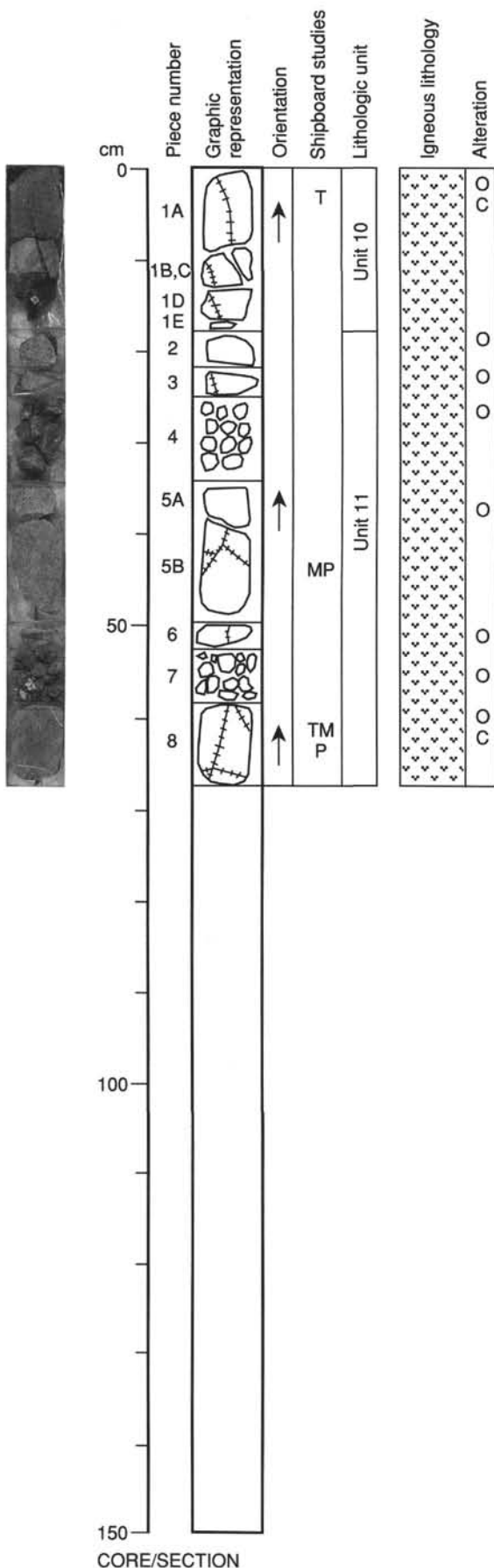
VESICLES: None.

COLOR: Bluish gray to brown (5B 5/1 to 7.5YR 5/3).

STRUCTURE: Homogeneous, massive.

ALTERATION: Red oxidized alteration is pervasive all pieces.

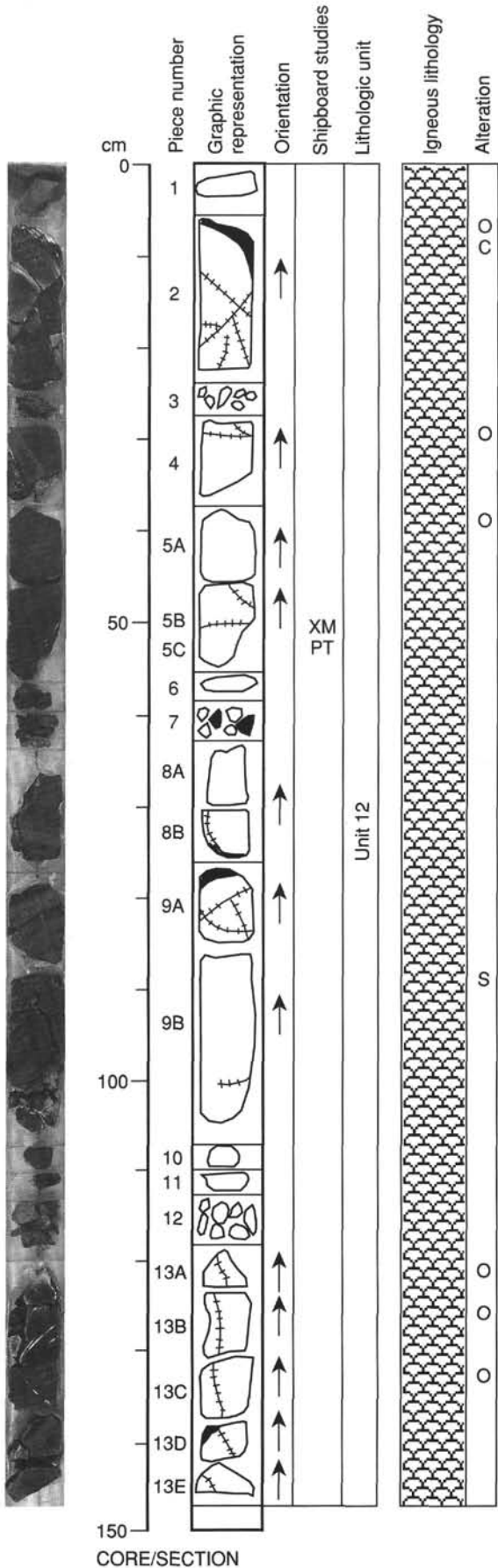
VEINS/FRACTURES: Eight veins, all <1 mm wide, consist of clay, carbonate, clay + carbonate, or iron hydroxide minerals and carbonate. An oriented vein on Piece 2 dips at 70°.



CORE/SECTION

UNIT 12: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-13E



237.9 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 6%; 1.5 mm; euhedral to subhedral.

Olivine - 1%; 0.5 mm; euhedral to subhedral, equant.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray (5B 5/1).

STRUCTURE: Pillowed, homogeneous.

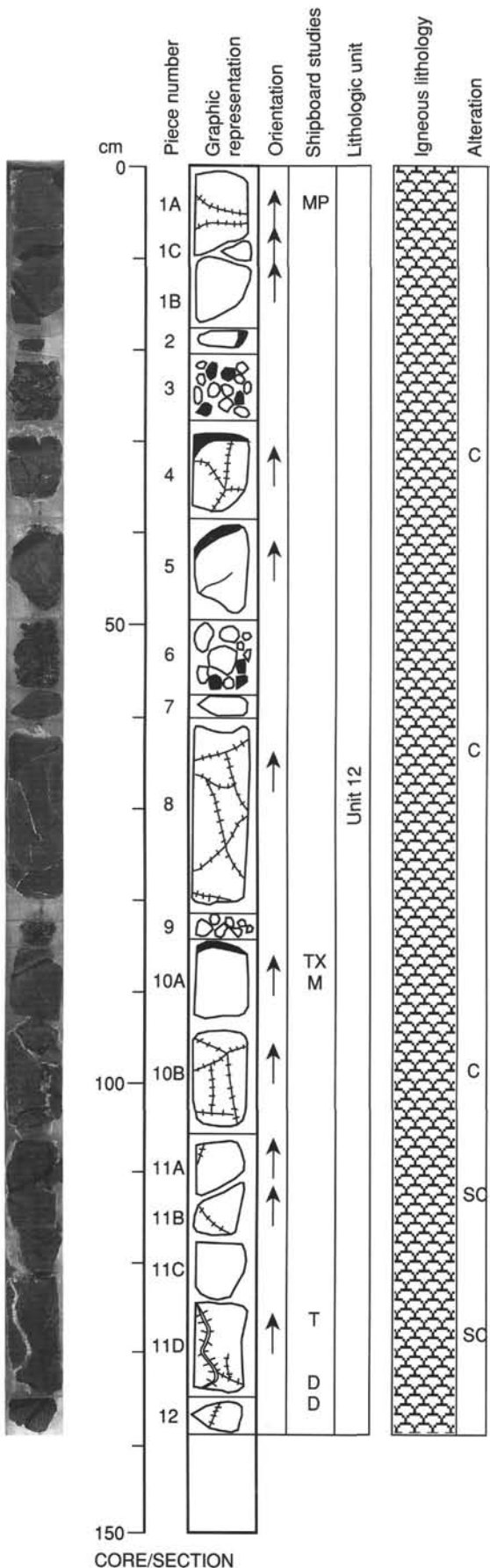
ALTERATION: Red oxidation in Pieces 2, 4, 5A, and 13A-13C.

VEINS/FRACTURES: Twenty-two veins of clay or clay + carbonate were recorded. Oriented veins in Pieces 2, 4, 5, 9, and 13 have dips ranging from 0°-88°. Dips are dominantly >40°.

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UNIT 12: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1A-12



CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 6%; 1.5 mm; euhedral to subhedral.

Olivine - 1%; 0.5 mm; euhedral to subhedral, equant.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray (5B 5/1).

STRUCTURE: Pillowed, homogeneous.

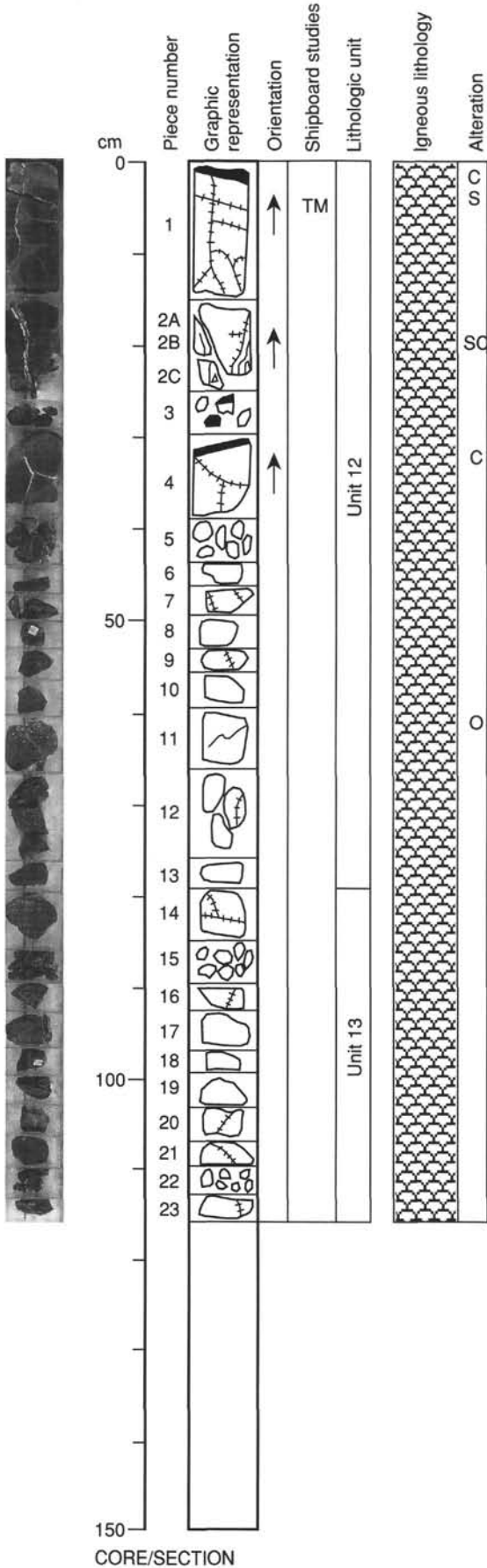
ALTERATION: No significant red oxidized alteration of the groundmass.

VEINS/FRACTURES: The interval contains 26 veins, mostly clay and clay + carbonate, but also including one carbonate and two clay + carbonate + zeolite veins. Oriented veins in Pieces 1, 5, 8, 10, and 11 have dips ranging from 0°-90°. These may be divided into two sets: shallowly dipping, <30° (6 veins), and steeply dipping, >50° (11 veins).

CORE/SECTION

UNIT 12: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-13



240.78 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 6%; 1.5 mm; euhedral to subhedral.

Olivine - 1%; 0.5 mm; euhedral to subhedral, equant.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray (5B 5/1).

STRUCTURE: Pillowed, homogeneous.

ALTERATION: Red oxidation is significant only in Piece 11.

VEINS/FRACTURES: 16 clay and clay + carbonate veins were recorded. Oriented veins in Pieces 1, 2, and 4 have variable dips of 8°-85°.

UNIT 13: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 14-23

CONTACTS: None.

PHENOCRYSTS: Glomerophyric.

Plagioclase - 5%; 1.5 mm; euhedral.

Olivine - 2%; 0.6 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray to greenish gray (5B 5/1 to 5BG 5/1).

STRUCTURE: Pillowed, homogeneous.

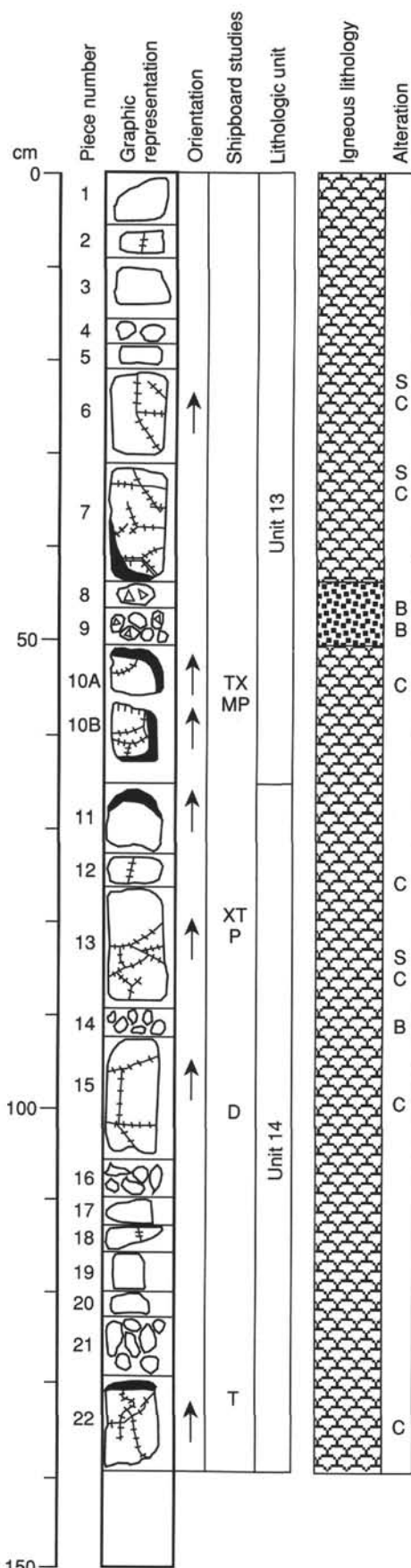
ALTERATION: No red oxidative alteration.

VEINS/FRACTURES: The interval contains three clay + carbonate veins, each <1 mm wide. No oriented structures are present.

148-896A-7R-1

UNIT 13: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-10B



247.4 mbsf

CONTACTS: None.
PHENOCRYSTS: Glomerophyric.
 Plagioclase - 5%; 1.5 mm; euhedral.
 Olivine - 2%; 0.6 mm; euhedral-subhedral.
GROUNDMASS: Texture: Microcrystalline.
VESICLES: None.
COLOR: Bluish gray to greenish gray (5B 5/1 to 5BG 5/1).
STRUCTURE: Pillowed, brecciated in Pieces 8 and 9 but otherwise homogeneous.
ALTERATION: No red oxidative alteration.
VEINS/FRACTURES: The interval contains 14 clay and clay + carbonate veins in Pieces 6 to 10. Oriented veins in Pieces 6, 7, and 9 dip at 9°-90°, but are largely dipping at >60°.

UNIT 14: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

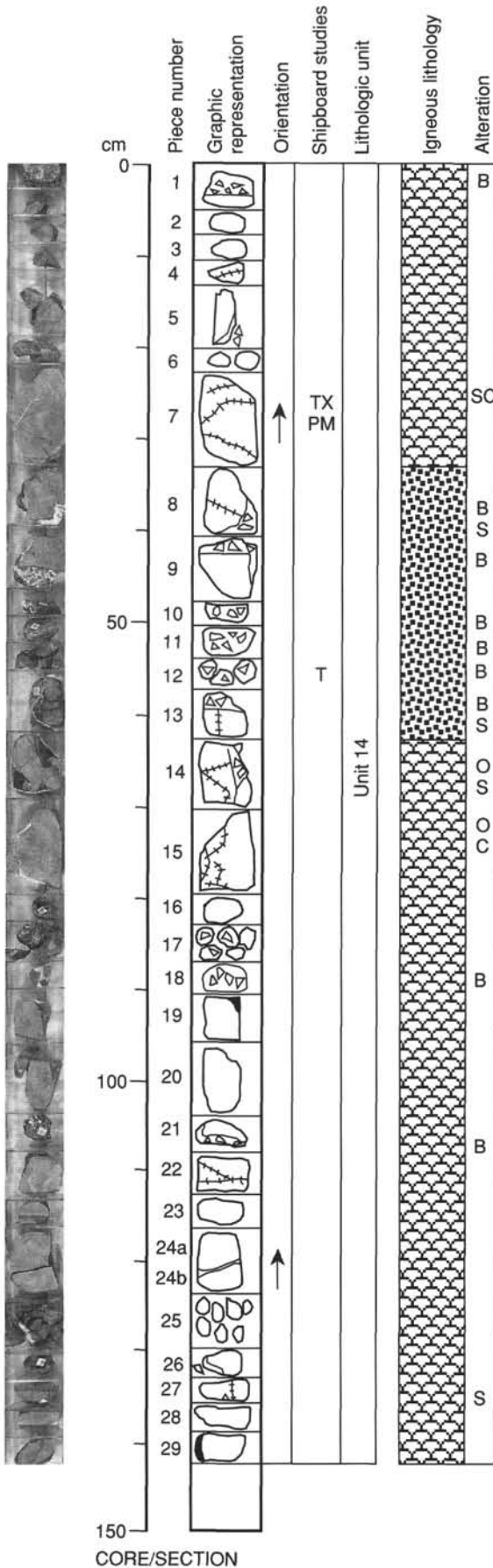
Pieces 11-22

CONTACTS: None.
PHENOCRYSTS:
 Plagioclase - 6%; 1.3 mm; euhedral-subhedral.
 Olivine - 2.5%; 0.6 mm; euhedral.
GROUNDMASS: Texture: Microcrystalline.
VESICLES: None.
COLOR: Bluish gray (5B 5/1).
STRUCTURE: Pillowed, homogeneous.
ALTERATION: No significant oxidative alteration.
VEINS/FRACTURES: The interval contains 12 clay and clay + carbonate veins. Veins in Pieces 11, 13, 15, 19, and 22 have variable dips, ranging from 8°-90°, but dominantly >60°.

CORE/SECTION

UNIT 14: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-29



257.1 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 6%; 1.3 mm; euhedral-subhedral.

Olivine - 2.5%; 0.6 mm; euhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray to reddish brown when altered (5B 5/1 to 2.5YR 5/4).

STRUCTURE: Pillowed. Brecciated in Pieces 8-13 otherwise homogeneous.

ALTERATION: Heavy red and yellow-orange-red oxidation in Pieces 14 and 15; in Piece 23, red oxidative groundmass alteration in which olivine is altered to iddingsite whereas in the gray areas nonoxidized groundmass olivine is completely replaced by clay.

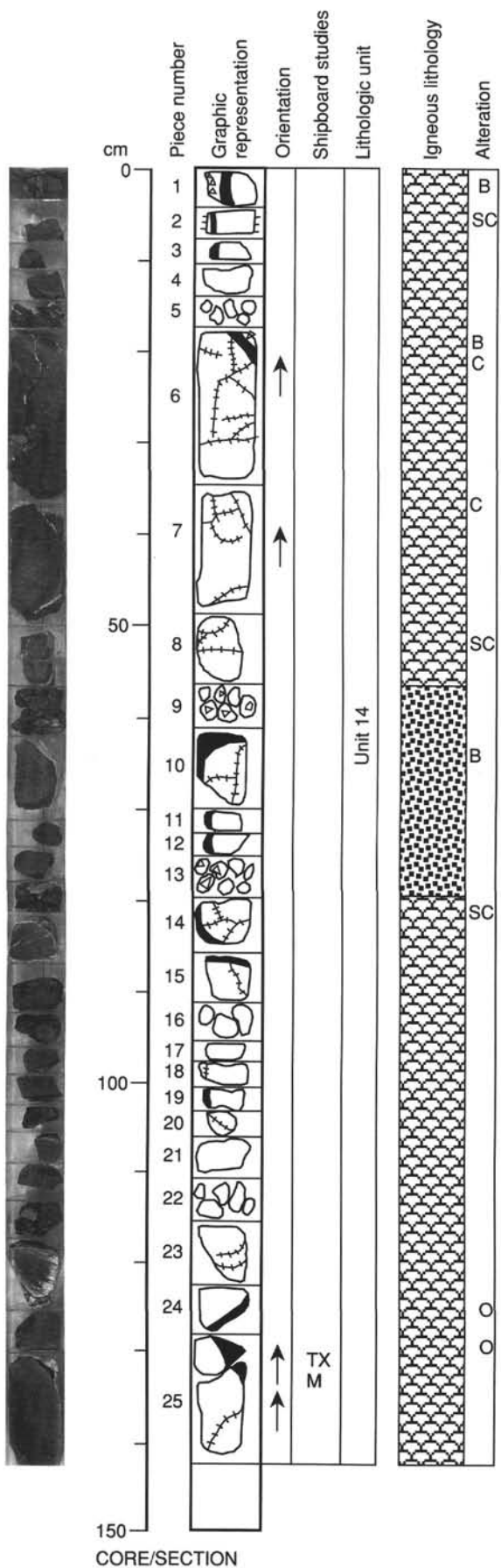
VEINS/FRACTURES: The interval contains 15 clay and clay + carbonate veins. Numerous breccias with clasts of glass shards, basalt, and carbonate cemented by green clay and white carbonate. Oriented veins in Pieces 7 and 15 have dips ranging from 15°-55°.

CORE/SECTION

148-896A-9R-1

UNIT 14: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-25



CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 6%; 1.3 mm; euhedral-subhedral.

Olivine - 2.5%; 0.6 mm; euhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray to reddish brown where altered (5B 5/1 to 2.5YR 5/4).

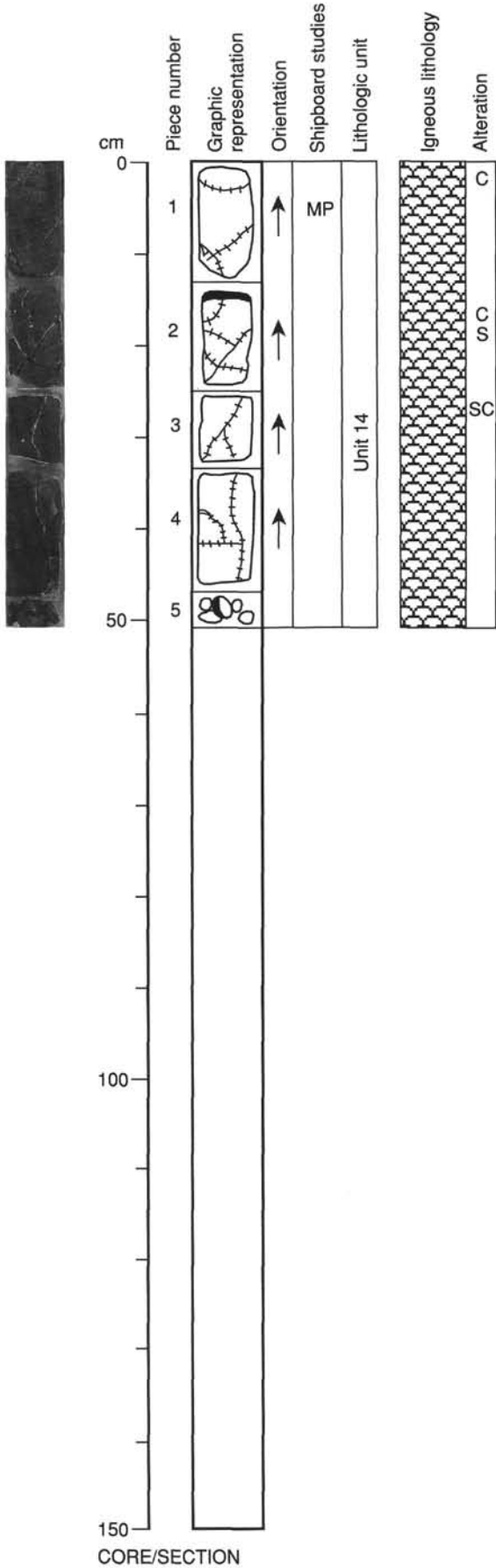
STRUCTURE: Pillowed. Brecciated in Pieces 9-13 otherwise homogeneous.

ALTERATION: Significant red oxidative groundmass alteration in Pieces 24 and 25.

VEINS/FRACTURES: The interval contains 22 clay and clay + carbonate veins, one also with Fe-hydroxide minerals. Oriented veins on Pieces 6, 7, and 10 have dips ranging from 36°-90°.

UNIT 14: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-5



268.1 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 6%; 1.3 mm; euhedral-subhedral.

Olivine - 2.5%; 0.6 mm; euhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray (5B 5/1).

STRUCTURE: Pillowed, homogeneous.

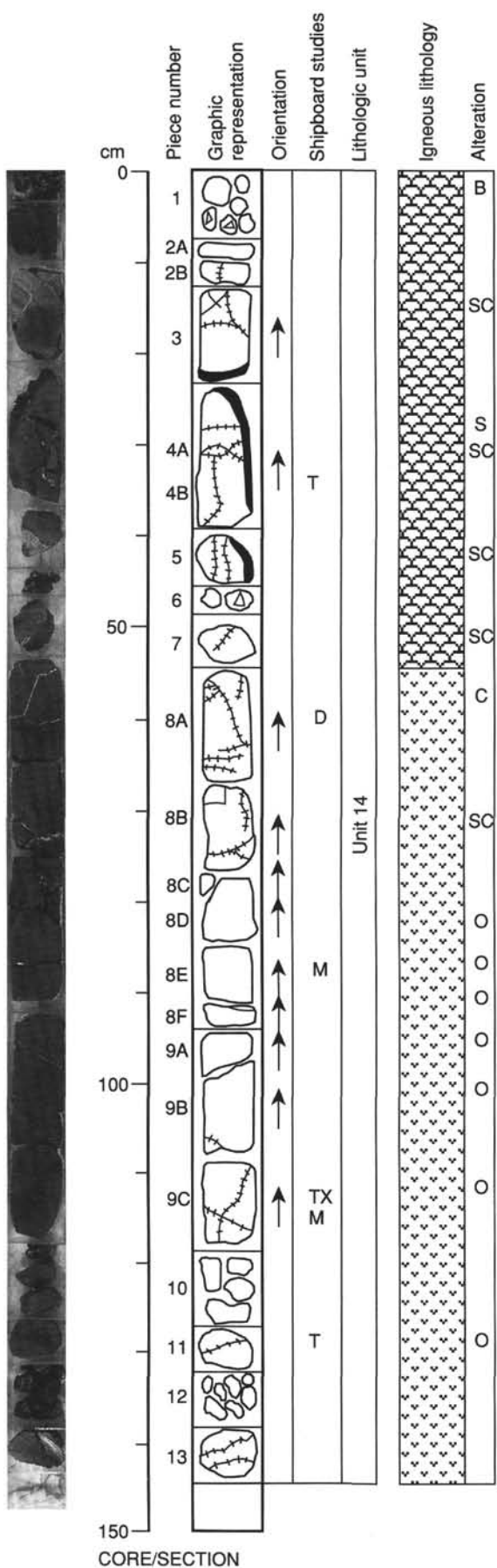
ALTERATION: No significant red oxidative groundmass alteration.

VEINS/FRACTURES: The interval contains 17 clay and clay + carbonate veins, all <1.5 mm wide. Oriented veins in Pieces 1, 2, and 4 have dips ranging from 16°-87°, but are dominantly <60°.

148-896A-10R-1

UNIT 14: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-13



276.4 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 6%; 1.3 mm; euhedral-subhedral.

Olivine - 2.5%; 0.6 mm; euhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray to reddish gray when altered (5B 5/1 to 2.5YR 5/1).

STRUCTURE: Pieces 1-7 are pillowed. Pieces 8-13 are massive and homogeneous. Minor brecciation in Piece 1.

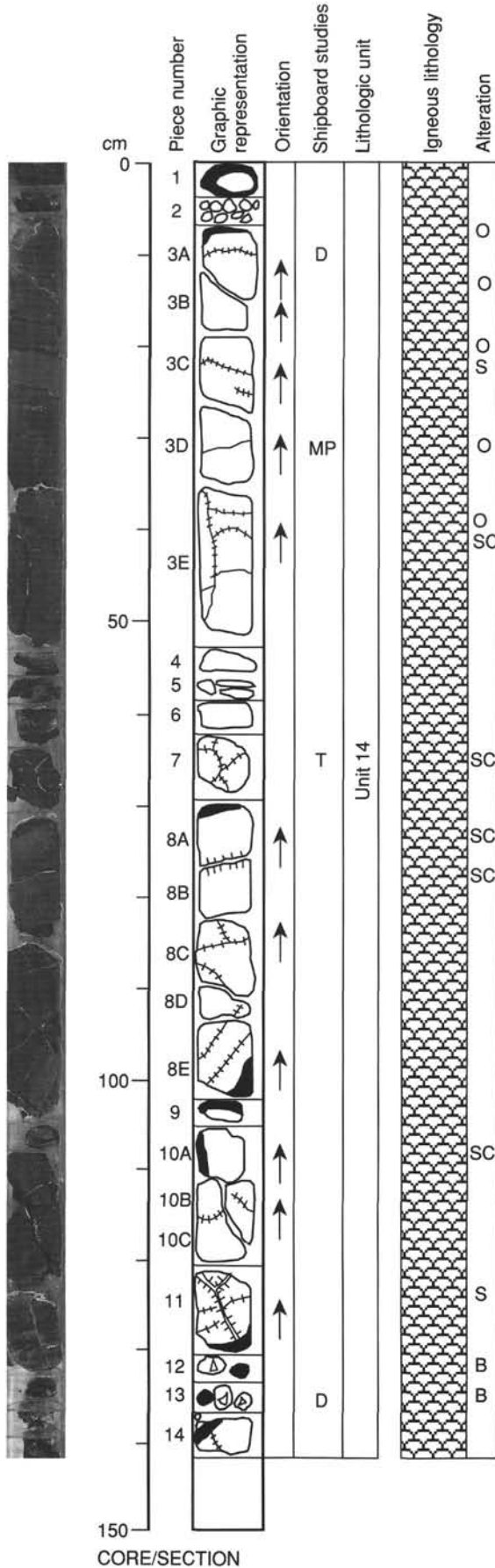
ALTERATION: Significant red oxidative groundmass alteration in Pieces 8, 9, and 10.

VEINS/FRACTURES: The interval contains 47 veins composed of clay, clay + carbonate, and Fe-hydroxide minerals (Pieces 9 and 11 only). Oriented veins in Pieces 3, 4, 9B, and 9C have dips ranging from 5°-80°.

CORE/SECTION

UNIT 14: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-14



286.0 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 6%; 1.3 mm; euhedral-subhedral.

Olivine - 2.5%; 0.6 mm; euhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray to reddish gray when altered (5B 5/1 to 2.5YR 5/1).

STRUCTURE: Pillowed, homogeneous. Minor brecciation in Pieces 13 and 14.

ALTERATION: Significant red and yellow oxidative groundmass alteration restricted to Piece 3, where it is significant (70% of piece).

VEINS/FRACTURES: The interval contains 40 veins composed of clay and clay + carbonate. Clay + carbonate cement hyaloclastic breccia in Pieces 12 and 13. Oriented veins in Pieces 8 and 11 have dips ranging from 5°-79°, but dominantly <60°.

148-896A-11R-2

UNIT 14: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1A-16

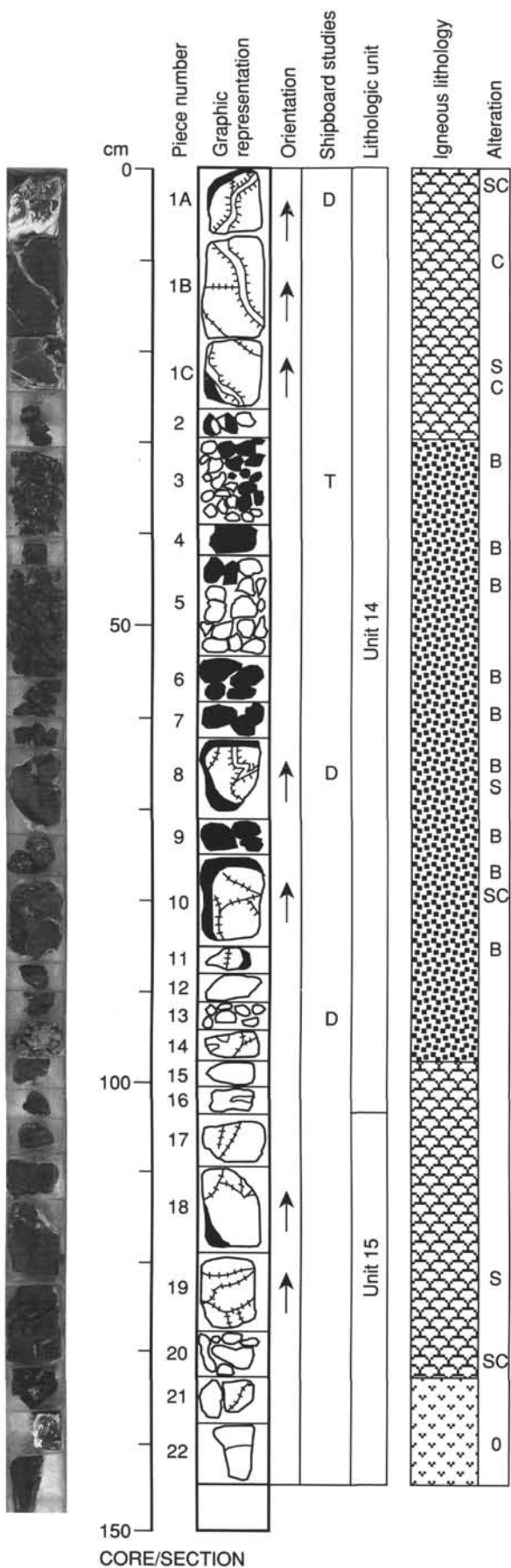
287.44 mbsf

CONTACTS: None.
PHENOCRYSTS:
 Plagioclase - 6%; 1.3 mm; euhedral-subhedral.
 Olivine - 2.5%; 0.6 mm; euhedral.
GROUNDMASS: Texture: Microcrystalline.
VESICLES: None.
COLOR: Bluish gray (5B 5/1).
STRUCTURE: Pieces 1 and 15-16 are pillowed. Pieces 2-14 are brecciated, probably after pillows.
ALTERATION: No significant oxidative alteration.
VEINS/FRACTURES: The interval contains 11 clay, carbonate, and clay + carbonate veins. Abundant rubbly breccia. Oriented veins in Piece 1 have dips ranging from 25°-84°.

UNIT 15: SPARSELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 17-22

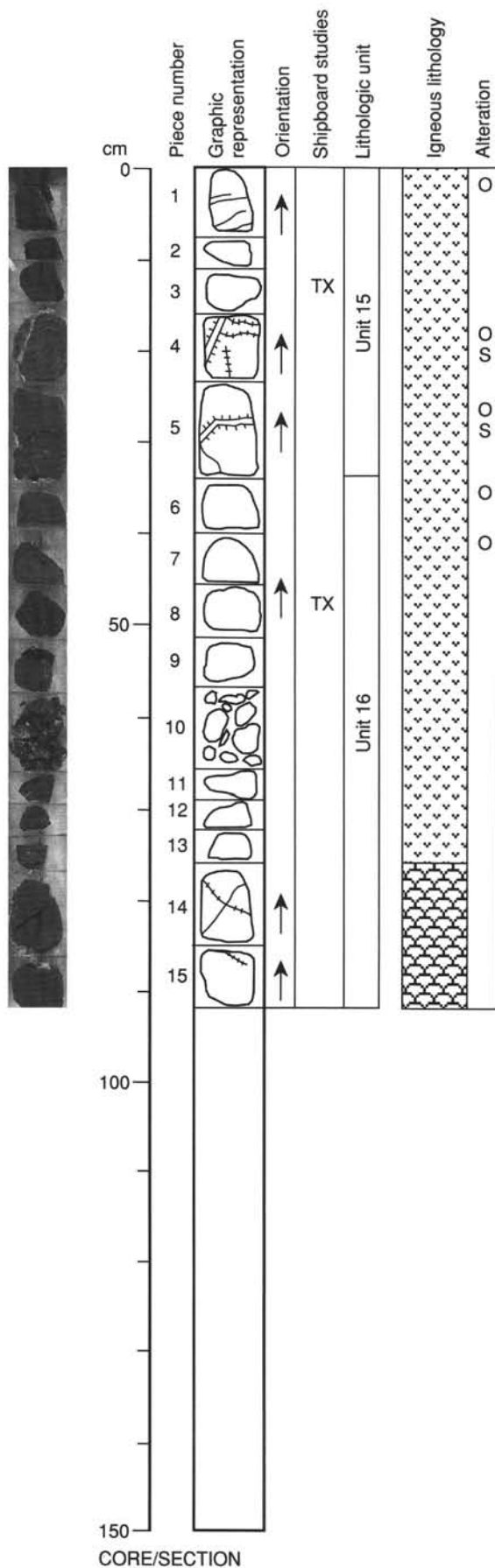
CONTACTS: None.
PHENOCRYSTS:
 Plagioclase - 0.6%; 0.5; euhedral to subhedral.
 Olivine - 1%; 0.35; euhedral.
GROUNDMASS: Microcrystalline.
VESICLES: None.
COLOR: Bluish gray to olive gray (5B 5/1-5Y 5/2)
STRUCTURE: Homogenous, massive.
ALTERATION: Significant red oxidative alteration, Piece 22.
VEINS/FRACTURES: The interval contain 9 clay and clay + carbonate veins. Two oriented veins in Piece 21 dip at 24° and 85°.



CORE/SECTION

UNIT 15: SPARSELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 1-5



288.9 mbsf

CONTACTS: None.
PHENOCRYSTS:
 Plagioclase - 0.6%; 0.5; euhedral to subhedral.
 Olivine - 1%; 0.35; euhedral.
GROUNDMASS: Microcrystalline.
VESICLES: None.
COLOR: Bluish gray to olive gray (5B 5/1-5Y 5/2).
STRUCTURE: Homogenous, massive.
ALTERATION: Strong red and yellow oxidative alteration in Pieces 1, 4, and 5.
VEINS/FRACTURES: The interval contains six clay, carbonate, clay + carbonate, or clay + Fe-hydroxide veins. Two oriented veins dip at >70°, and two dip at 47°.

UNIT 16: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

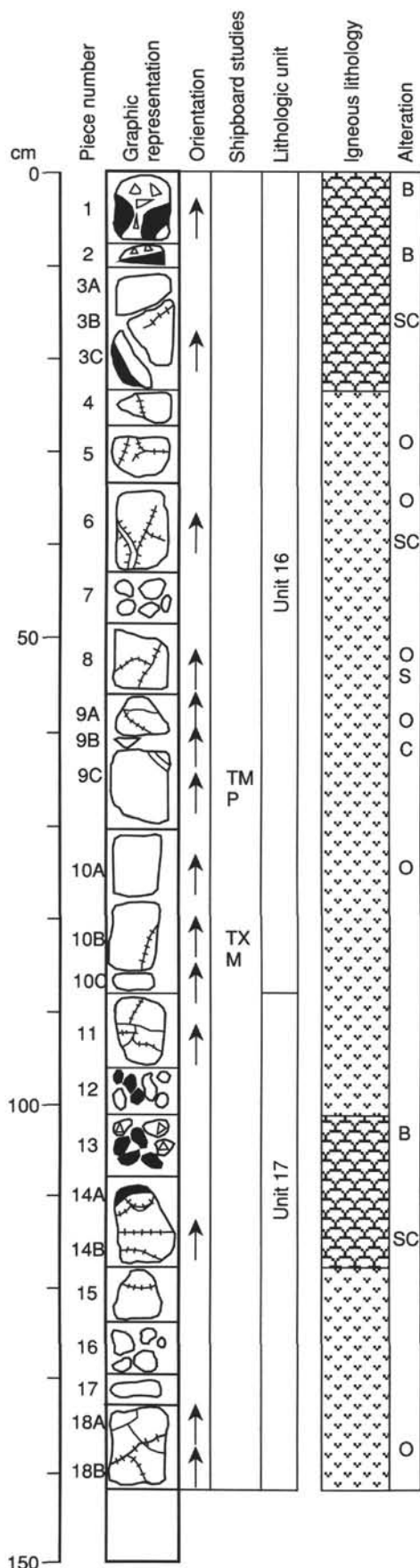
Pieces 6-15

CONTACTS: None.
PHENOCRYSTS:
 Plagioclase - 3.3%; 1; euhedral to subhedral.
 Olivine - 2%; 0.5; euhedral.
GROUNDMASS: Microcrystalline.
VESICLES: None.
COLOR: Bluish gray to grayish brown (5B 5/1-2.5Y 5/2).
STRUCTURE: Homogenous, massive.
ALTERATION: Strong red and yellow alteration in Pieces 6 and 7.
VEINS/FRACTURES: The interval contains nine veins, all <1 mm, that consist of clay, carbonate, clay + carbonate, clay + Fe-hydroxide, and carbonate + Fe-hydroxide veins. Oriented veins are in Pieces 14 and 15.

148-896A-12R-1

UNIT 16: MODERATELY PHYRIC PLAGIOCLASE- OLIVINE BASALT

Pieces 1-10C



295.6 mbsf

CONTACTS: None.
PHENOCRYSTS:
 Plagioclase - 3.3%; 1; euhedral to subhedral.
 Olivine - 2%; 0.5; euhedral.
GROUNDMASS: Microcrystalline.
VESICLES: None.
COLOR: Bluish gray to grayish brown (5B 5/1-2.5Y 5/2).
STRUCTURE: Homogenous, massive.
ALTERATION: Significant red and yellow oxidation in Pieces 5, 6, 8, 9, and 10.
VEINS/FRACTURES: The interval contains 19 veins (clay, carbonate, clay + carbonate, clay + Fe-hydroxide), and hyaloclastite breccias in Piece 1 and 2. Ten oriented veins in Pieces 3, 6, 8, 9, and 10 are shallowly dipping (<20°), one vein is steeply dipping (76°), and the remaining have dips ranging from 37° to 66°.

UNIT 17: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

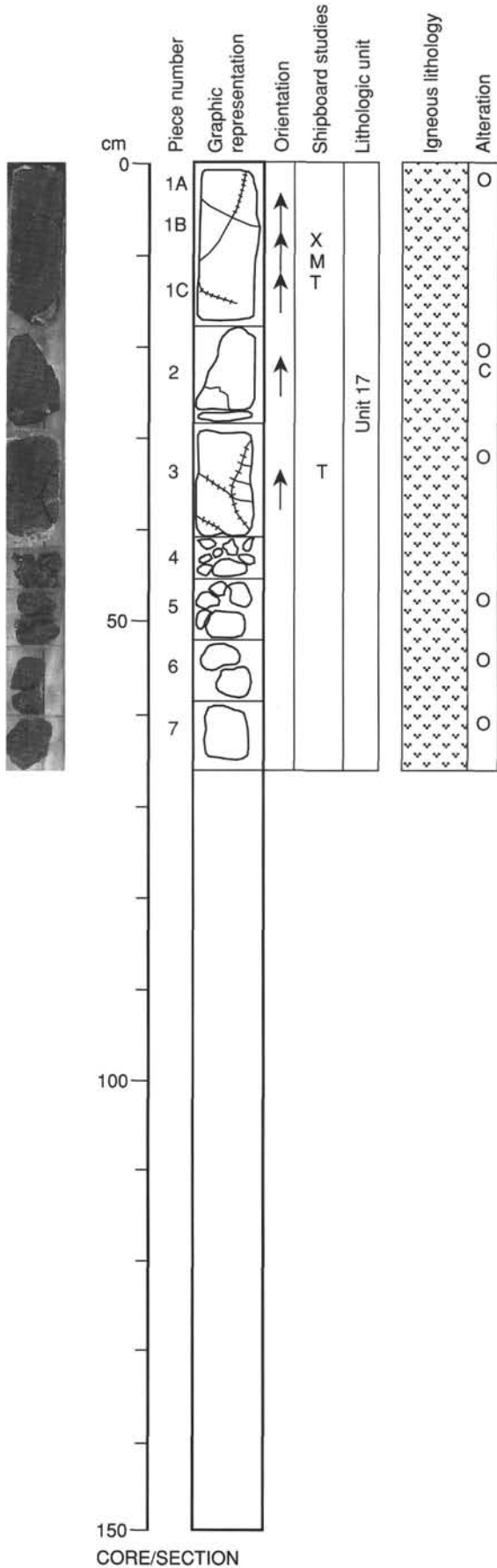
Pieces 11-18B

CONTACTS: None.
PHENOCRYSTS:
 Plagioclase - 3.5%; 0.5; euhedral to subhedral.
 Olivine - 3.5%; 0.4; euhedral.
GROUNDMASS: Variolitic to microcrystalline.
VESICLES: None.
COLOR: Bluish gray to light olive brown (5B 5/1-2.5Y 5/3).
STRUCTURE: Pillow.
ALTERATION: Red oxidative alteration present only in Piece 18.
VEINS/FRACTURES: The interval contains 15 veins, all <1 mm, consisting of clay + carbonate or clay + Fe-hydroxide. Five oriented veins in Piece 10 and 12 have variable dips ranging from 13° to 75°.

CORE/SECTION

UNIT 17: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1A-7



CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 3.5%; 0.5; euhedral to subhedral.
Olivine - 3.5%; 0.4; euhedral.

GROUNDMASS: Variolitic to microcrystalline.

VESICLES: None.

COLOR: Bluish gray to light olive brown (5B 5/1-2.5Y 5/3).

STRUCTURE: Pillow, massive.

ALTERATION: Whole interval contains significant strong red and yellow oxidative alteration.

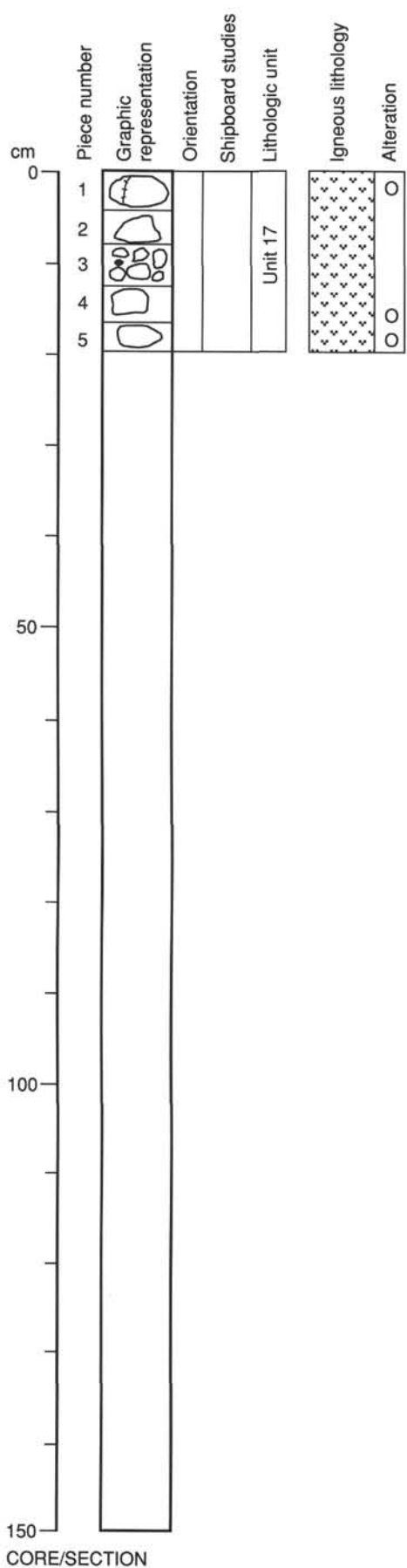
Piece 3 contains mm-scale green clay patches.

VEINS/FRACTURES: The interval contains seven clay, clay + carbonate, and clay + carbonate + Fe-hydroxide veins, all <1 mm. Nine oriented veins in Pieces 1, 2, and 3 have variable dips ranging from 16° to 19°.

148-896A-13R-1

UNIT 17: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-5



305.1 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 3.5%; 0.5; euhedral to subhedral.

Olivine - 3.5%; 0.4; euhedral.

GROUNDMASS: Variolitic to microcrystalline.

VESICLES: None.

COLOR: Bluish gray to light olive brown (5B 5/1-1.5Y 5/3).

STRUCTURE: Pillow, massive.

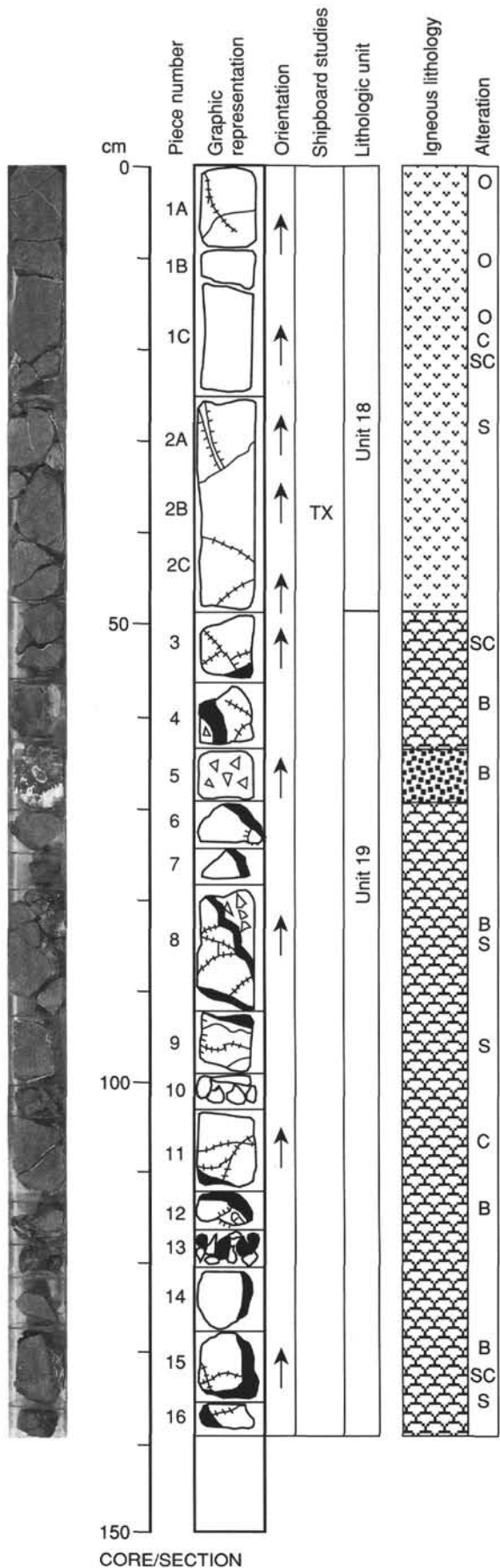
ALTERATION: Red oxidative alteration in Pieces 2, 4, and 5.

VEINS/FRACTURES: The interval contains one clay + carbonate vein in Piece 1 and no oriented structures.

CORE/SECTION

UNIT 18: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1A-2C



314.6 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 5%; 1 mm; euhedral to subhedral.

Olivine - 1%; 0.3 mm; euhedral.

GROUNDMASS: Texture: Microcrystalline, porphyritic.

VESICLES: None.

COLOR: Dark bluish gray (5B 4/1) to strong brown (7.5Y 5).

STRUCTURE: Massive.

ALTERATION: Piece 1 contains red and yellow oxidation halos.

VEINS/FRACTURES: The interval contains 12 clay, carbonate, and clay + carbonate, and iron hydroxide veins.

UNIT 19: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 3-16

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 5.3%; 1 mm; euhedral to subhedral.

Olivine - 4.5%; 0.45 mm; euhedral.

GROUNDMASS: Texture: Microcrystalline, porphyritic.

VESICLES: None.

COLOR: Dark bluish green (5B 4/1) to bluish green (5B 6/1).

STRUCTURE: Pillow, breccia.

ALTERATION: No oxidation alteration is present in any piece.

VEINS/FRACTURES: The interval contains clay and clay + carbonate veins, and several hyaloclastic breccias.

148-896A-14R-2

UNIT 19: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-5

316.0 mbsf

CONTACTS: None.
PHENOCRYSTS:
 Plagioclase - 5.3%; 1 mm; euhedral to subhedral.
 Olivine - 4.5%; 0.45 mm; euhedral.
GROUNDMASS: Texture: Microcrystalline, porphyritic.
VESICLES: None.
COLOR: Dark bluish green (5B 4/1) to bluish green (5B 6/1).
STRUCTURE: Pillow, breccia.
ALTERATION: No red oxidative halos are present.
VEINS/FRACTURES: The interval contains nine clay + carbonate and one clay vein.

UNIT 20: MODERATELY PHYRIC OLIVINE BASALT

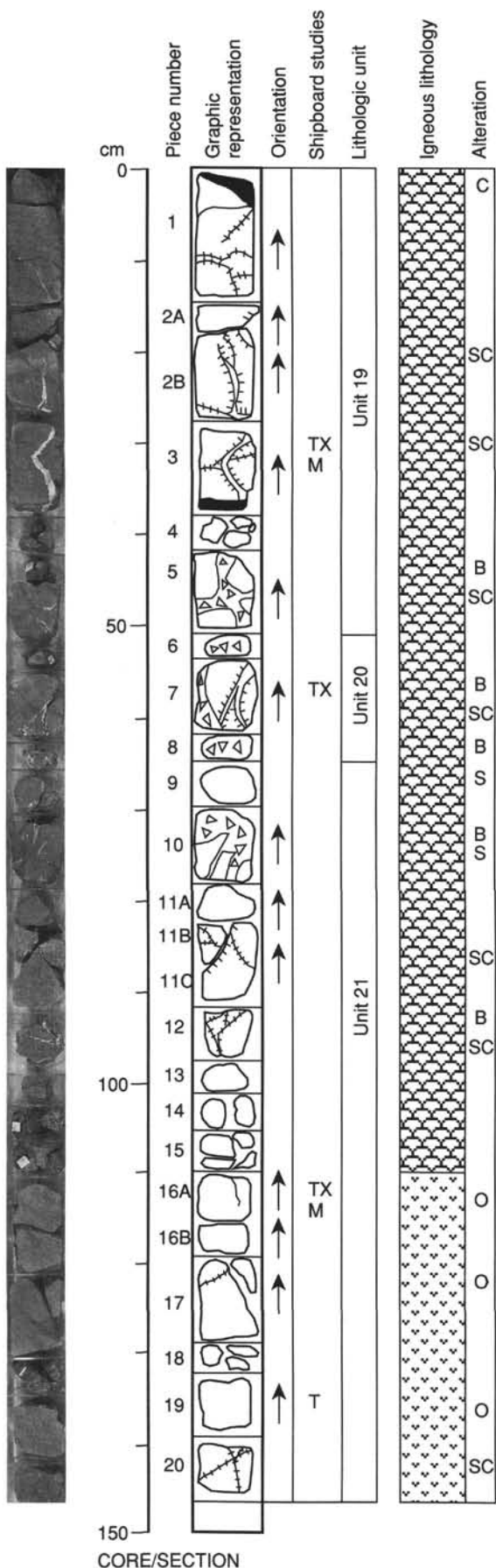
Pieces 6-8

CONTACTS: None.
PHENOCRYSTS:
 Olivine - 6.5%; 0.15 mm; euhedral.
GROUNDMASS: Texture: Microcrystalline.
VESICLES: None.
COLOR: Dark bluish gray (5B 4/1).
STRUCTURE: Massive, homogeneous; all pieces contain breccia cemented by clay + carbonate.
ALTERATION: The interval contains no oxidative alteration.
VEINS/FRACTURES: The intervals contains no veins.

UNIT 21: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 9-20

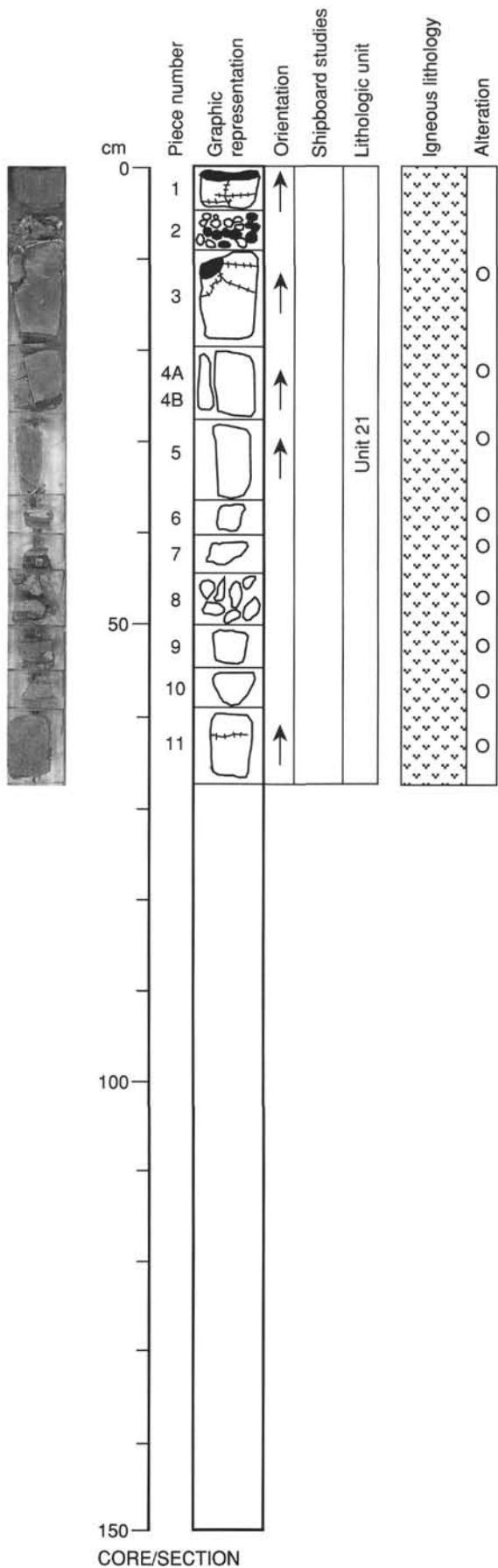
CONTACTS: None.
PHENOCRYSTS:
 Plagioclase - 4%; 1 mm; euhedral to subhedral.
 Olivine - 5%; 0.3 mm; euhedral.
GROUNDMASS: Texture: Microcrystalline, porphyritic.
VESICLES: None.
COLOR: Bluish gray (5B 5/1) to reddish brown (7.5YR 6/8) to red (2.5YR 4/8).
STRUCTURE: Pillow, massive.
ALTERATION: Pieces 16-20 contain significant, strong, red and yellow oxidative ground-mass alteration.
VEINS/FRACTURES: The interval contains clay, clay + carbonate, or clay + iron hydroxide veins.



CORE/SECTION

UNIT 21: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 1-11



CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 4%; 1 mm; euhedral to subhedral.

Olivine - 5%; 0.3 mm; euhedral.

GROUNDMASS: Texture: Microcrystalline, porphyritic.

VESICLES: None.

COLOR: Bluish gray (5B 5/1) to reddish brown (7.5YR 6/8) to red (2.5YR 4/8).

STRUCTURE: Pillow, massive.

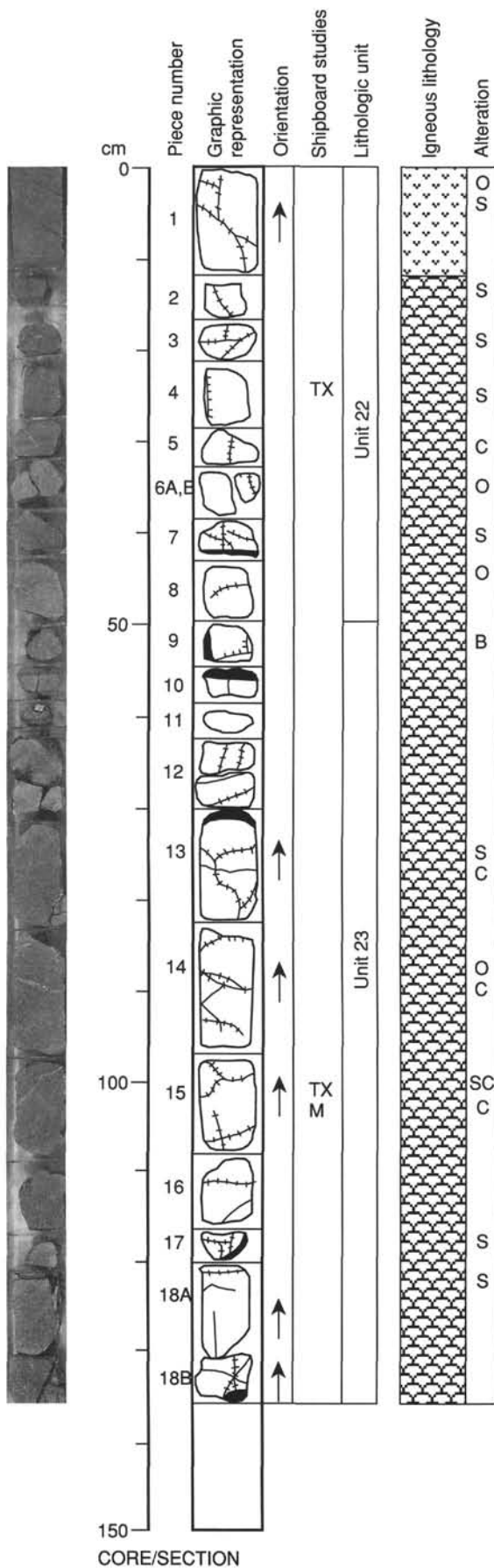
ALTERATION: Pieces 3-11 contain strong red oxidative alteration.

VEINS/FRACTURES: The interval contains 11 clay and clay + carbonate veins, all <1 mm wide.

148-896A-15R-1

UNIT 22: HIGHLY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 1-8



324.3 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 5%; 1.1 mm; euhedral to subhedral.

Olivine - 5%; 0.7 mm; euhedral.

GROUNDMASS: Texture: Intergranular, porphyritic.

VESICLES: None.

COLOR: Bluish gray (5B 5/1) to reddish yellow (7.5YR 5/8) to red (2.5YR 4/8).

STRUCTURE: Massive, pillow.

ALTERATION: Piece 8 contains significant red alteration: Pieces 1 and 6 contain minor oxidation alteration.

VEINS/FRACTURES: The interval contains one clay, one clay + carbonate, and one iron hydroxide vein.

UNIT 23: HIGHLY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 9-18B

PHENOCRYSTS:

Plagioclase - 7%; 1 mm; euhedral to subhedral.

Olivine - 3%; 0.5 mm; euhedral to subhedral.

GROUNDMASS: Texture: Microcrystalline, porphyritic.

VESICLES: None.

COLOR: Bluish gray (5B 5/1) to reddish yellow (7.5YR 5/8) to red (2.5YR 4/8).

STRUCTURE: Pillow.

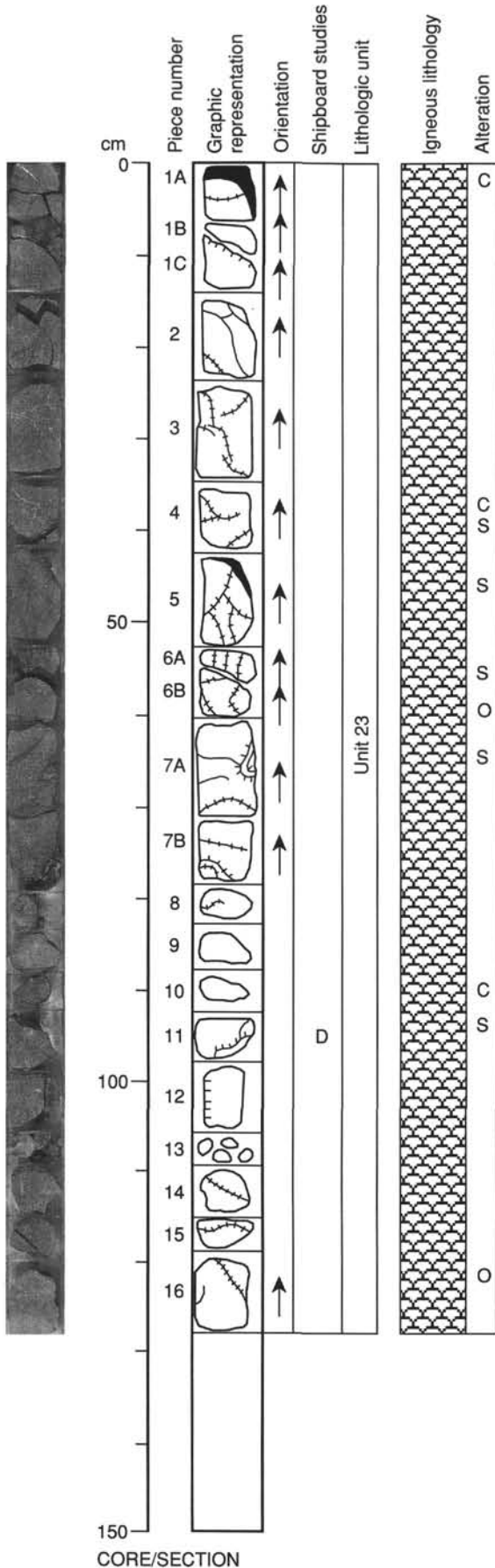
ALTERATION: Piece 14 contains red and yellow oxidative alteration.

VEINS/FRACTURES: The interval contains 37 clay and clay + carbonate veins, almost all <1 mm.

CORE/SECTION

UNIT 23: HIGHLY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1A-16



PHENOCRYSTS:

Plagioclase - 7%; 1 mm; euhedral to subhedral.

Olivine - 3%; 0.5 mm; euhedral to subhedral.

GROUNDMASS: Texture: Microcrystalline, porphyritic.

VESICLES: None.

COLOR: Bluish gray (5B 5/1) to reddish yellow (7.5YR 5/8) to red (2.5YR 4/8).

STRUCTURE: Pillow.

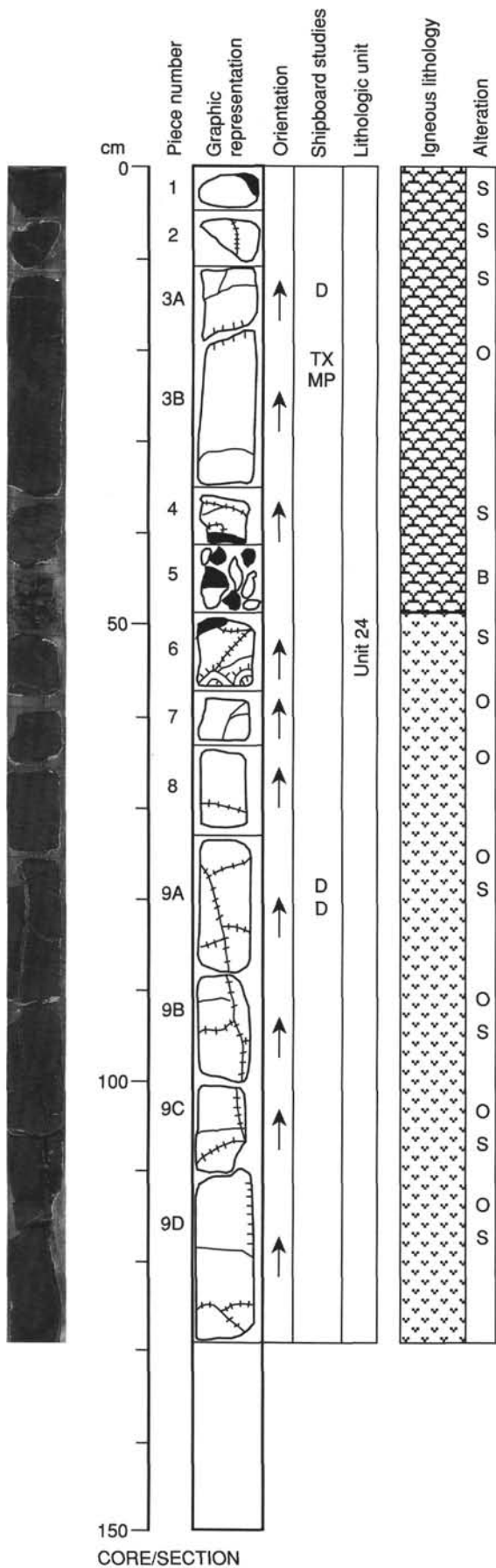
ALTERATION: Pieces 6, 7, and 16 contain red and yellow oxidative alteration.

VEINS/FRACTURES: The interval clay and clay + carbonate veins, mostly <1 mm wide.

148-896A-16R-1

UNIT 24: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-9D



CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 6%; 1.3 mm; euhedral to subhedral.

Olivine - 3.5%; 0.5 mm; euhedral.

GROUNDMASS: Texture: Microcrystalline, porphyritic, intergranular.

VESICLES: None.

COLOR: Dark bluish gray (5B 4/1) to red (2.5YR 4/8).

STRUCTURE: Homogeneous, massive.

ALTERATION: Pieces 3, 7, 8, and 9 contain significant red and yellow oxidative alteration.

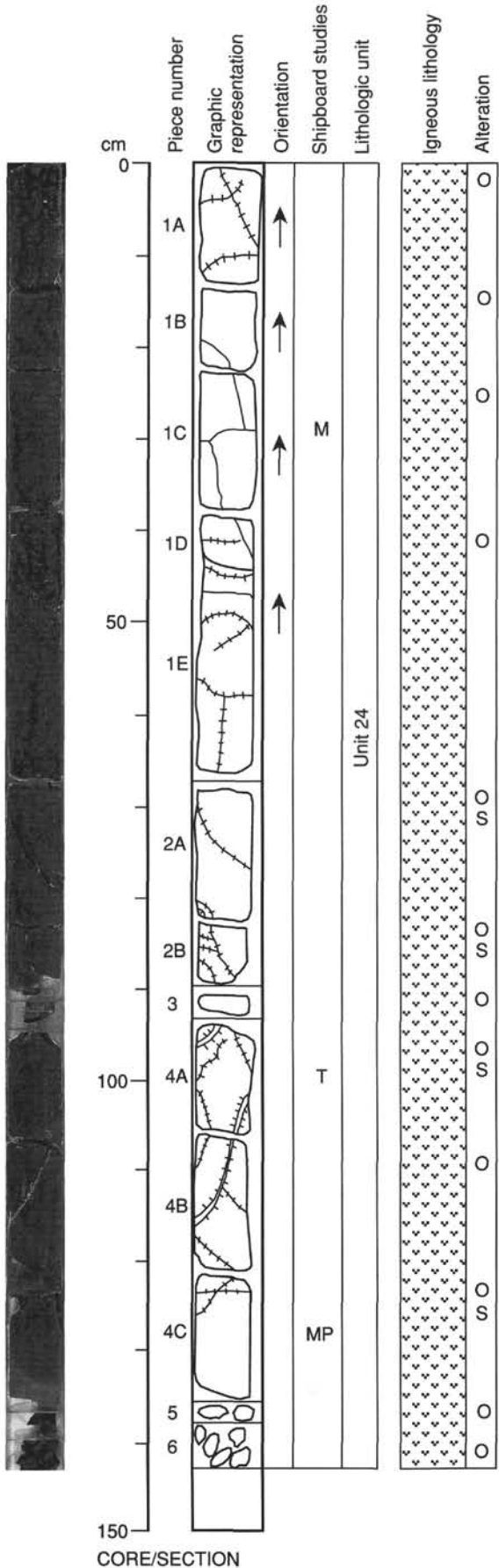
VEINS/FRACTURES: The interval contains 36 clay, clay + carbonate, and clay + iron hydroxide veins, mostly <1 mm wide.

ADDITIONAL COMMENTS: Piece 1C contains a plagioclase megacryst, 20 mm long.

CORE/SECTION

UNIT 24: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1A-6



CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 6%; 1.3 mm; euhedral to subhedral.

Olivine - 3.5%; 0.5 mm; euhedral.

GROUNDMASS: Texture: Microcrystalline, porphyritic, intergranular.

VESICLES: None.

COLOR: Dark bluish gray (5B 4/1) to red (2.5YR 4/8).

STRUCTURE: Massive.

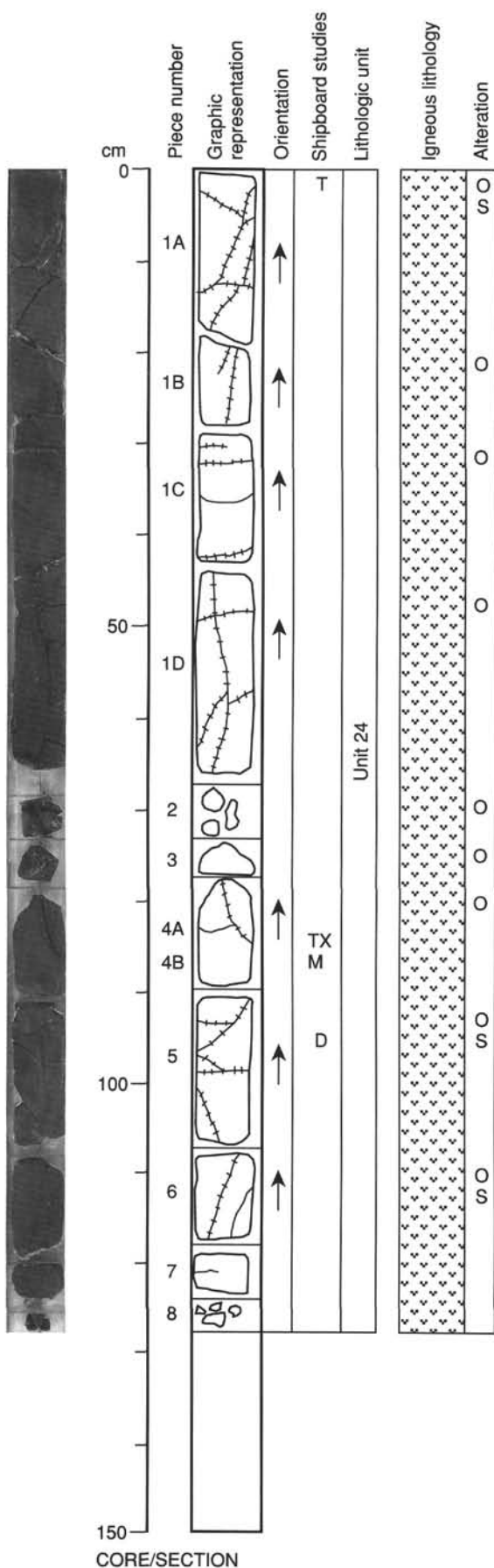
ALTERATION: Pieces 1, 2, and 3 contain strong red and yellow oxidative alteration. Similar, but weaker, alteration is present in Pieces 4-6.

VEINS/FRACTURES: The interval contains 29 clay, carbonate, and clay + iron hydroxide, and iron hydroxide veins, mostly <1 mm wide.

148-896A-16R-3

UNIT 24: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1A-8



336.7 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 6%; 1.3 mm; euhedral to subhedral.

Olivine - 3.5%; 0.5 mm; euhedral.

GROUNDMASS: Texture: Microcrystalline, porphyritic, intergranular.

VESICLES: None.

COLOR: Dark bluish gray (5B 4/1) to red (2.5YR 4/8).

STRUCTURE: Massive.

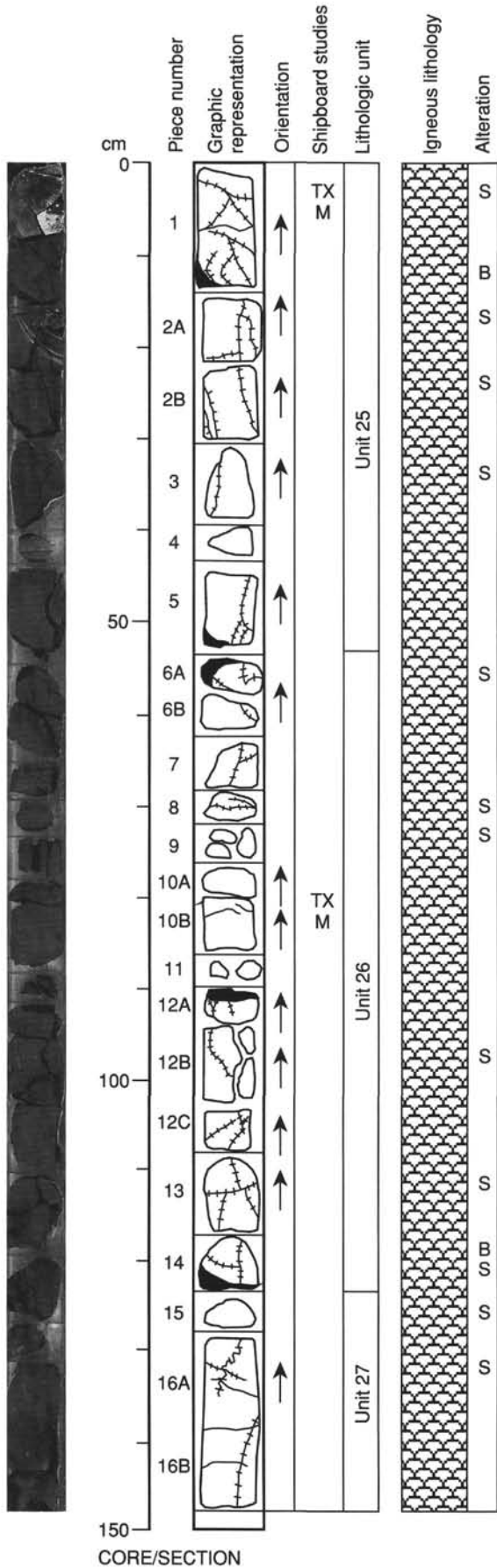
ALTERATION: All but Piece 7 contain strong red and yellow oxidative alteration. Piece 7 contains microscopic pyrite.

VEINS/FRACTURES: The interval contains 24 clay veins, one carbonate vein, and one clay + pyrite vein (Piece 7).

CORE/SECTION

UNIT 25: HIGHLY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-5



343.5 mbsf

CONTACTS: None.
PHENOCRYSTS:
 Plagioclase - 9%; 1.5 mm; euhedral-subhedral.
 Olivine - 2.5%; 0.4 mm; euhedral.
GROUNDMASS: Texture: Microcrystalline.
VESICLES: None.
COLOR: Dark bluish gray to bluish gray (5B 4/1 to 5B 5/1).
STRUCTURE: Pillowed, homogeneous.
ALTERATION: No oxidative alteration.
VEINS/FRACTURES: The interval contains 21 clay, and one clay + Fe-hydroxide mineral veins.

UNIT 26: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 6A-14

CONTACTS: None.
PHENOCRYSTS:
 Plagioclase - 4.5%; 1.0 mm; euhedral-subhedral.
 Olivine - 2.5%; 0.4 mm; euhedral.
GROUNDMASS: Texture: Microcrystalline.
VESICLES: None.
COLOR: Dark bluish gray to bluish gray (5B 4/1 to 5B 5/1).
STRUCTURE: Pillowed, homogeneous.
ALTERATION: No oxidative alteration.
VEINS/FRACTURES: The interval contains 17 clay veins, all <1 mm wide.

UNIT 27: HIGHLY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 15-16B

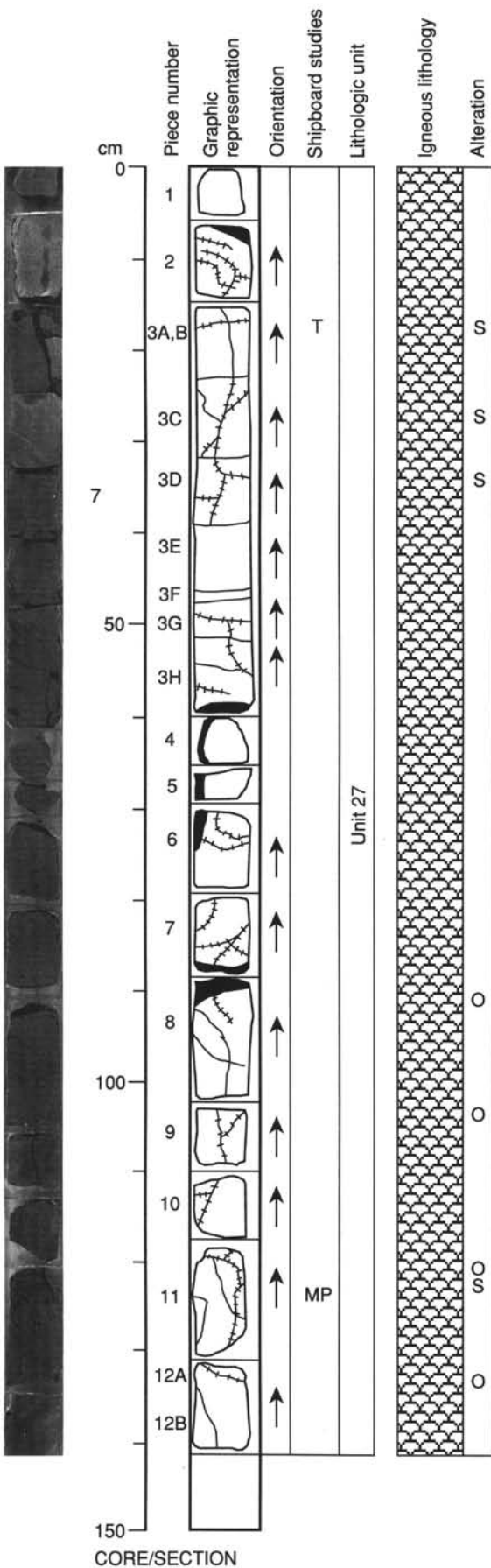
CONTACTS: None.
PHENOCRYSTS:
 Plagioclase - 9%; 1.5 mm; euhedral-subhedral.
 Olivine - 3%; 0.6 mm; euhedral.
GROUNDMASS: Texture: Microcrystalline.
VESICLES: None.
COLOR: Dark bluish gray to bluish gray (5B 4/1 to 5B 5/1).
STRUCTURE: Pillowed, homogeneous.
ALTERATION: Minor (<1%) oxidative alteration only.
VEINS/FRACTURES: The interval contains four <1 mm wide clay veins, and one clay + Fe-hydroxide mineral vein.

CORE/SECTION

148-896A-17R-2

UNIT 27: HIGHLY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-12B



345.0 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 9%; 1.5 mm; euhedral-subhedral.

Olivine - 3%; 0.6 mm; euhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Dark bluish gray to bluish gray (5B 4/1 to 5B 5/1).

STRUCTURE: Pillowed, homogeneous.

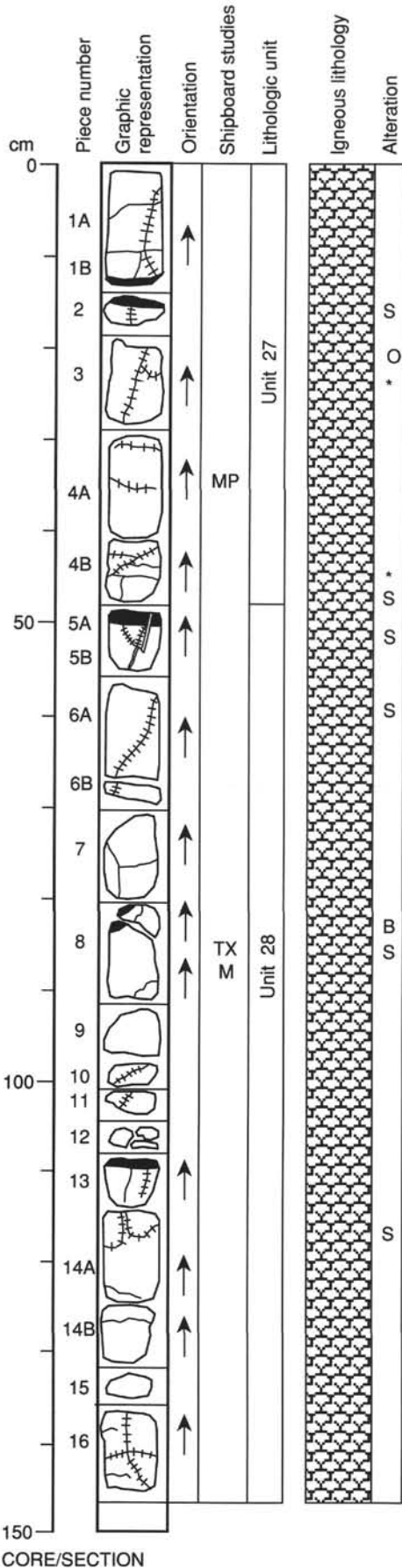
ALTERATION: Significant red oxidative groundmass alteration in Pieces 3, 8, 9, 11, and 12.

VEINS/FRACTURES: The interval contains 44 clay, clay + Fe-hydroxide mineral, and clay + carbonate veins, all but two are <1 mm wide. Oriented veins in Pieces 2, 3, 6, 10, and 12 have dips ranging from 12°-86°.

CORE/SECTION

UNIT 27: HIGHLY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1A-4B



346.4 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 9%; 1.5 mm; euhedral-subhedral.

Olivine - 3%; 0.6 mm; euhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Dark bluish gray to bluish gray (5B 4/1 to 5B 5/1).

STRUCTURE: Pillowed, homogeneous.

ALTERATION: Pieces 3 and 4 contain dark gray alteration halos containing yellow and red groundmass alteration ("black halos").

VEINS/FRACTURES: The interval contains 12 clay and clay + Fe-hydroxide mineral veins, all <1 mm wide. Oriented veins in Pieces 3 and 4 have dips varying from 26°-70°, but predominantly >50°.

UNIT 28: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 5A-16

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 1.5%; 0.9 mm; euhedral-subhedral.

Olivine - 5.5%; 0.4 mm; euhedral-subhedral.

GROUNDMASS: Texture: Fine-grained intergranular.

VESICLES: None.

COLOR: Bluish gray (5B 5/1).

STRUCTURE: Pillowed, homogeneous.

ALTERATION: No significant oxidative alteration.

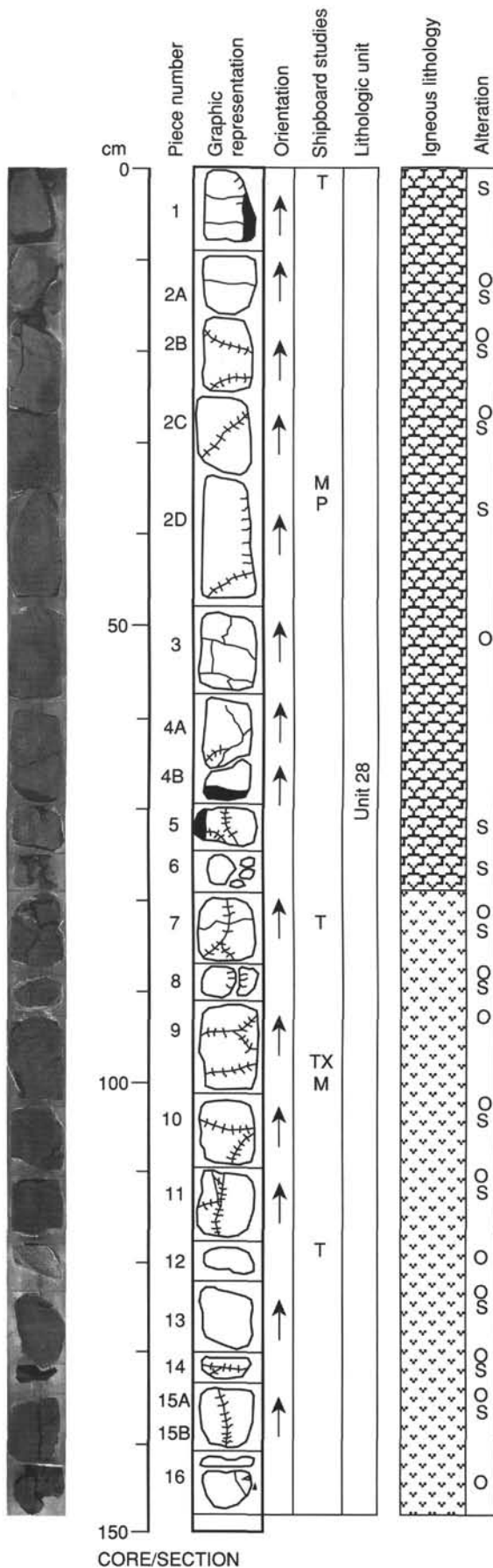
VEINS/FRACTURES: The interval contains 20 clay and clay + Fe-hydroxide mineral veins, all but one are <1 mm wide. An oriented vein on Piece 7 dips at 74°.

CORE/SECTION

148-896A-17R-4

UNIT 28: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 1-16



347.9 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 1.5%; 0.9 mm; euhedral-subhedral.

Olivine - 5.5%; 0.4 mm; euhedral-subhedral.

GROUNDMASS: Texture: Fine-grained intergranular.

VESICLES: None.

COLOR: Bluish gray to red when altered (5B 5/1 to 2.5YR 5/8).

STRUCTURE: Pieces 1-6 are pillowed, Pieces 7-16 are massive and homogeneous.

ALTERATION: Red oxidative alteration in Pieces 2, 3, and 6-15.

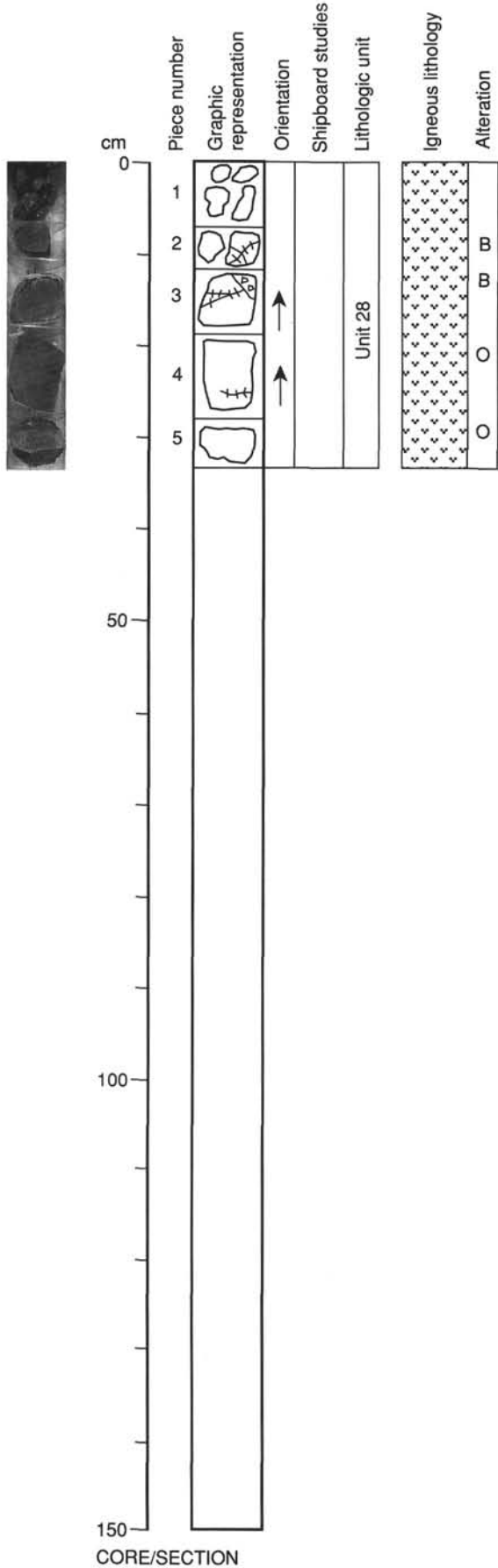
VEINS/FRACTURES: The interval contains 32 clay, Fe-hydroxide mineral and clay + Fe-hydroxide mineral veins. Oriented veins on Pieces 2, 3, 4, 10, 11, 13, and 15 have variable dips from 4°-88°, with no discernible pattern.

CORE/SECTION

148-896A-17R-5

UNIT 28: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 1-5



349.4 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 1.5%; 0.9 mm; euhedral-subhedral.

Olivine - 5.5%; 0.4 mm; euhedral-subhedral.

GROUNDMASS: Texture: Fine-grained intergranular.

VESICLES: None.

COLOR: Bluish gray to red when altered (5B 5/1 to 2.5YR 5/8).

STRUCTURE: Massive, homogeneous. Minor hyaloclastic breccias in Pieces 2 and 3.

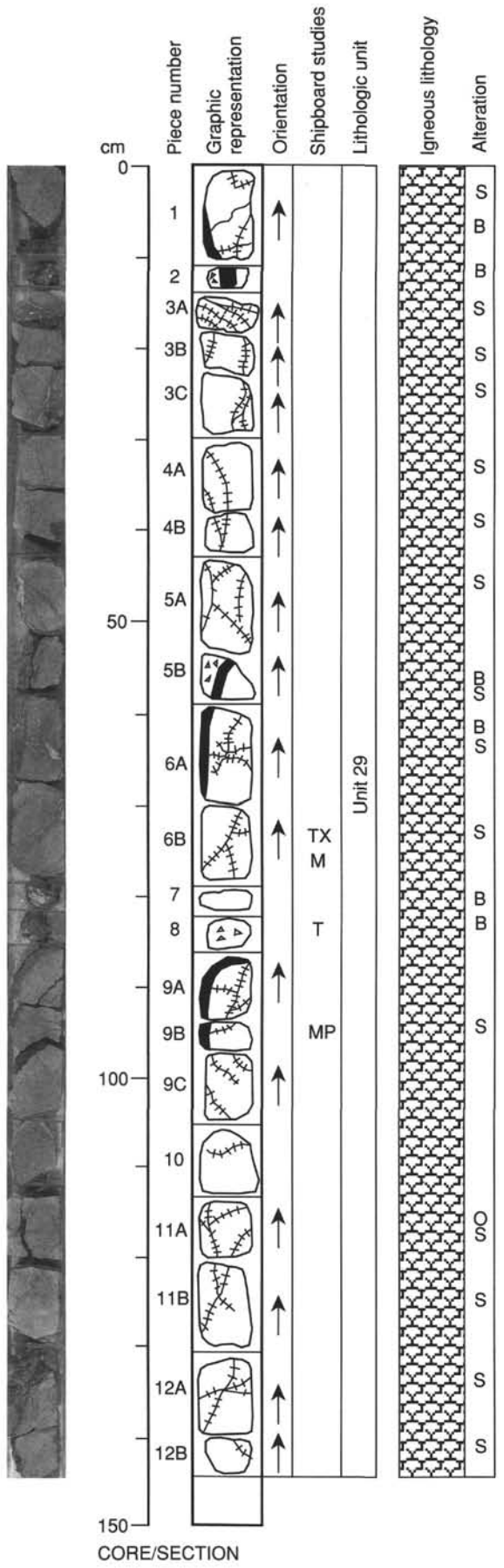
ALTERATION: Red oxidative alteration in Pieces 4, and 5.

VEINS/FRACTURES: One clay vein, <1 mm wide, in Piece 3. This vein was oriented and dips at 36°.

148-896A-18R-1

UNIT 29: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-12B



353.1 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 3.5%; 0.8 mm; euhedral-subhedral.
Olivine - 3%; 0.6 mm; euhedral-subhedral.

Clinopyroxene - 0.2%; 1.0 mm; subhedral-anhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray (5B 5/1).

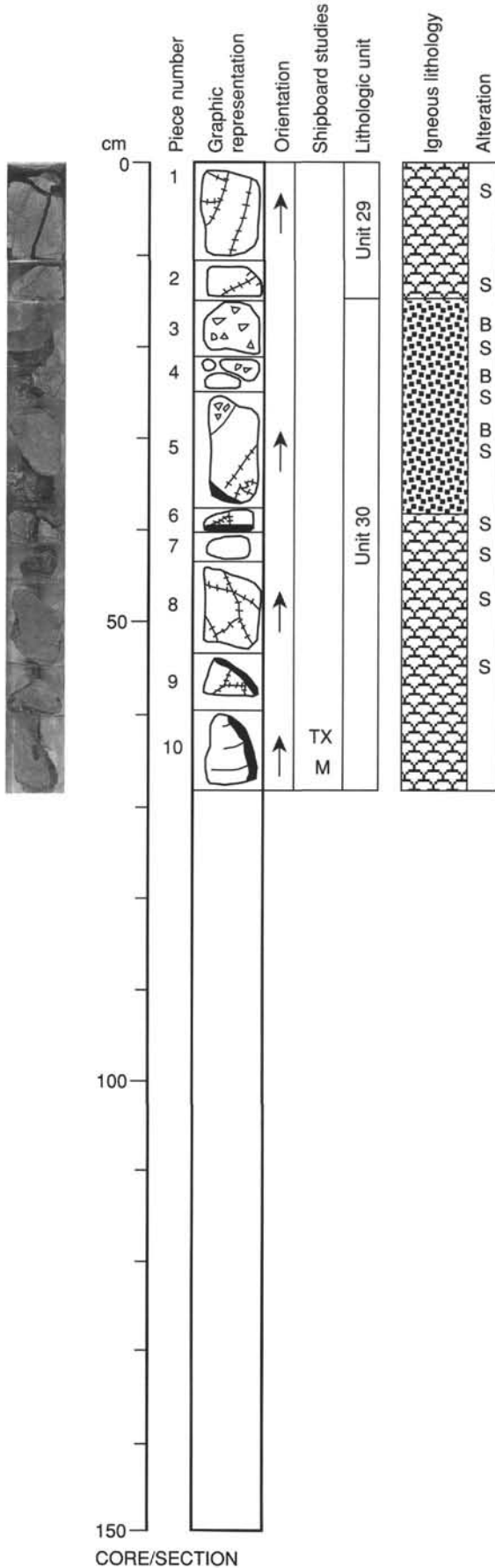
STRUCTURE: Pillowed and homogeneous. Hyaloclastite breccias in Pieces 2, 5, 7, and 8.

ALTERATION: Red oxidative alteration in Pieces 3 and 11.

VEINS/FRACTURES: The interval contains 39 clay veins and two clay + Fe-hydroxide mineral veins. Oriented veins in Pieces 11 and 12 dip at 43°-72°.

UNIT 29: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-2



CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 3.5%; 0.8 mm; euhedral-subhedral.
 Olivine - 3%; 0.6 mm; euhedral-subhedral.
 Clinopyroxene - 0.2%; 1.0 mm; subhedral-anhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray (5B 5/1).

STRUCTURE: Pillowed and homogeneous.

ALTERATION: No red oxidative alteration.

VEINS/FRACTURES: The interval contains six clay veins, <1 mm wide. Oriented veins in Piece 1 dip at 44°-78°.

UNIT 30: HIGHLY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 3-10

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 6.5%; 1.0 mm; euhedral-subhedral.
 Olivine - 4%; 0.6 mm; euhedral-subhedral.
 Clinopyroxene - 0.2%; 1.0 mm; subhedral-anhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray (5B 5/1).

STRUCTURE: Hyaloclastic breccia in Pieces 3-5. Remainder is pillowed and homogeneous.

ALTERATION: No red or yellow oxidative alteration.

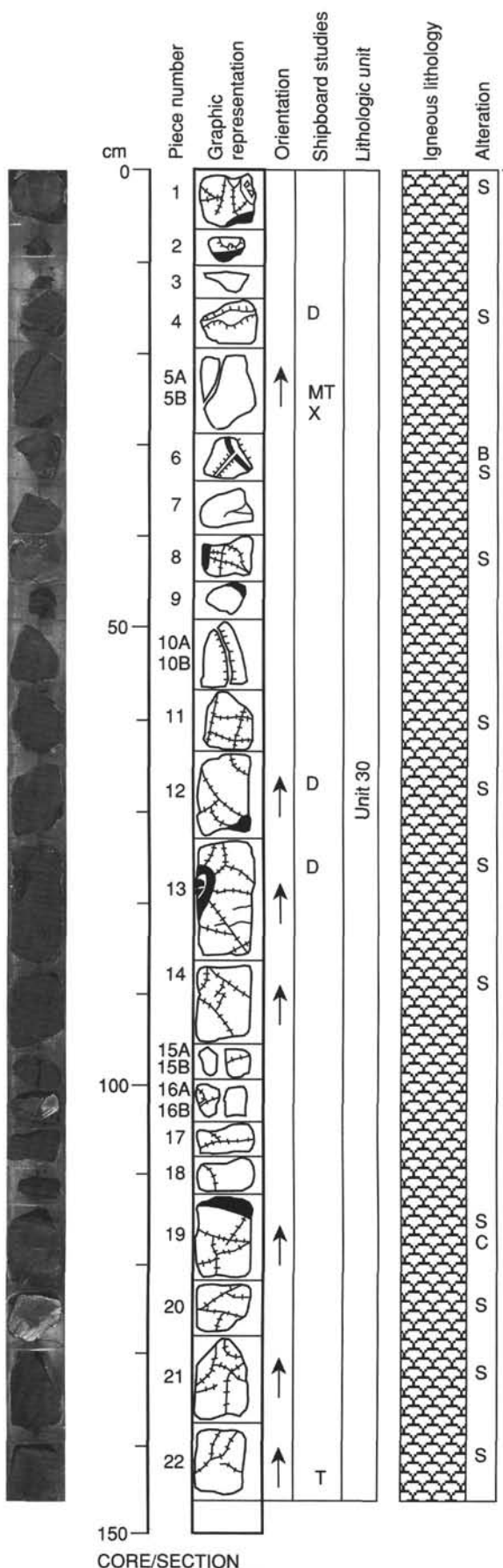
VEINS/FRACTURES: The interval contains 27 clay veins, those on Pieces 5 and 10 are oriented and have dips ranging from 38°-66°.

CORE/SECTION

148-896A-19R-1

UNIT 30: HIGHLY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-22



356.0 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 7.5%; 1.2 mm; euhedral-subhedral.

Olivine - 3%; 0.8 mm; euhedral-subhedral.

Clinopyroxene - Trace; 1.0; mm euhedral-anhedral.

GROUNDMASS: Texture: Microcrystalline porphyritic.

VESICLES: None.

COLOR: Bluish gray to patchy red where olivine is oxidized (5B 5/1 to 5R 4/6).

STRUCTURE: Pillowed, homogeneous.

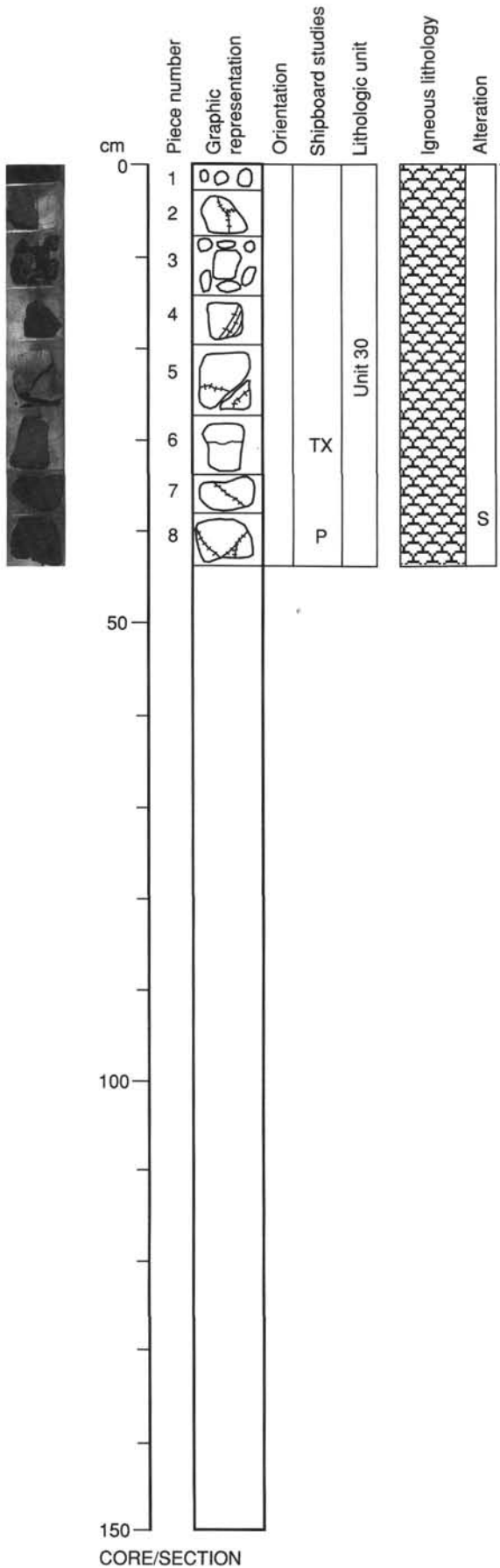
ALTERATION: Predominantly gray background alteration. Olivine and interstitial material altered to green smectite. At base of section groundmass and olivine are partially oxidized (approximately 5%).

VEINS/FRACTURES: Green smectite veins, from <0.1-3.0 mm thick, in anastomosing and bifurcating patterns. Several mixed smectite and fibrous carbonate veins on Pieces 13, 14, 17, and 19. Oriented veins on Pieces 5, 10, 11, 12, 13, 14, 16, 19, 21, and 22 have variable dips, ranging from 9°-88°, but predominantly moderately dipping, i.e., 35°-65°.

CORE/SECTION

UNIT 30: HIGHLY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-8



357.5 mbsf

CONTACTS: None.

PHENOCRYSTS:

- Plagioclase - 7.5%; 1.2 mm; euhedral-subhedral.
- Olivine - 3%; 0.8 mm; euhedral-subhedral.
- Clinopyroxene - Trace; 1.0 mm; euhedral-anhedral.

GROUNDMASS: Texture: Microcrystalline porphyritic.

VESICLES: None.

COLOR: Bluish gray (5B 5/1).

STRUCTURE: Pillowed, homogeneous.

ALTERATION: Predominantly gray background alteration. Olivine and interstitial material altered to green smectite. Only very weak oxidative alteration, <1%.

VEINS/FRACTURES: Green smectite veins, generally <1 mm thick, and rare mixed smectite and fibrous carbonate veins. Oriented veins on Pieces 5 and 8 dip at 45°-83°.

CORE/SECTION

148-896A-20R-1

UNIT 30: HIGHLY PHYRIC PLAGIOCLASE-OLIVINE BASALT.

Pieces 1-14

UNIT 31: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 15-27

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 7%; 1.0 mm; euhedral-subhedral.
Olivine - 4%; 0.6 mm; euhedral-subhedral.

Clinopyroxene - Trace; 1.0 mm; euhedral-anhedral.

GROUNDMASS: Texture: Microcrystalline, intergranular-subophitic.

VESICLES: None.

COLOR: Bluish gray to red, where altered (5B 5/1 to 5R 4/6).

STRUCTURE: Pillowed. Breccia in Pieces 1-5.

ALTERATION: Significant oxidative alteration only in Piece 15. Most olivine is completely replaced by green clay, however some olivine has Fe-oxyhydroxide staining.

VEINS/FRACTURES: 14 veins, all <1 mm wide, contain clay. One of these also contains carbonate. Breccia in Pieces 1-5 and Piece 13. No oriented structures.

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 6.0%; 1.5 mm; euhedral-subhedral.
Olivine - 2.0%; 0.6 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline, intergranular.

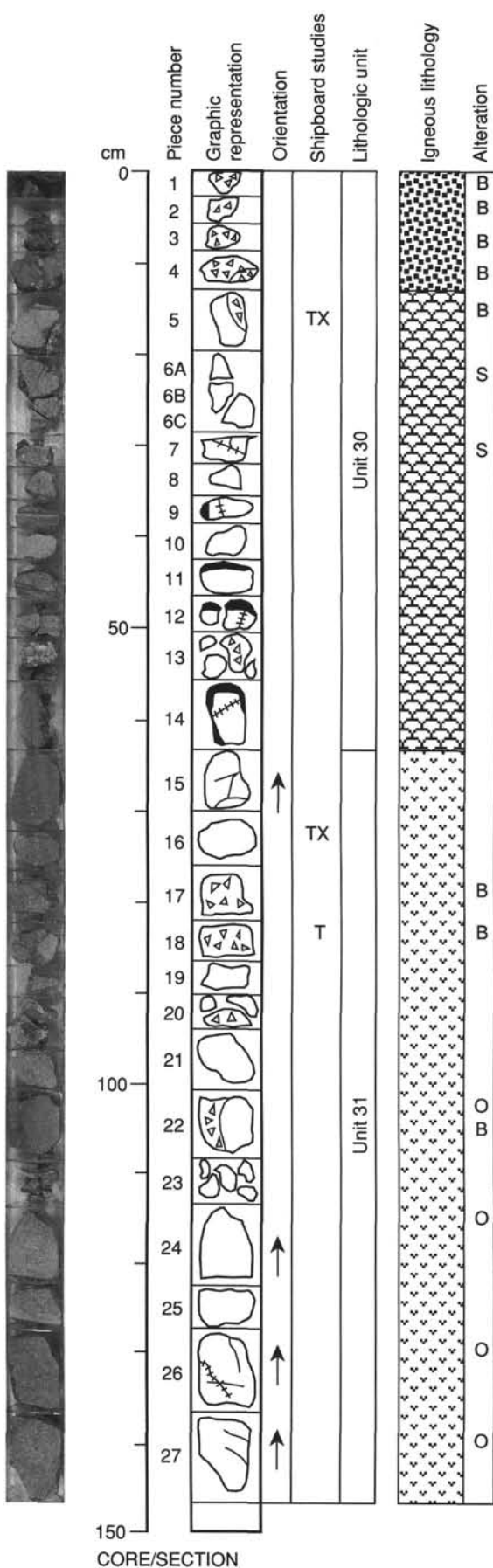
VESICLES: None.

COLOR: Bluish gray to red, where altered (5B 5/1 to 5R 4/6).

STRUCTURE: Massive. Brecciated in Pieces 17 and 18. Breccia in Piece 18 is polymict, with microcrystalline and fine-grained clasts.

ALTERATION: Slight to moderate oxidative alteration, especially in coarser grained pieces (e.g. Pieces 22, 24, and 27) and in brecciated material, Pieces 17 and 22.

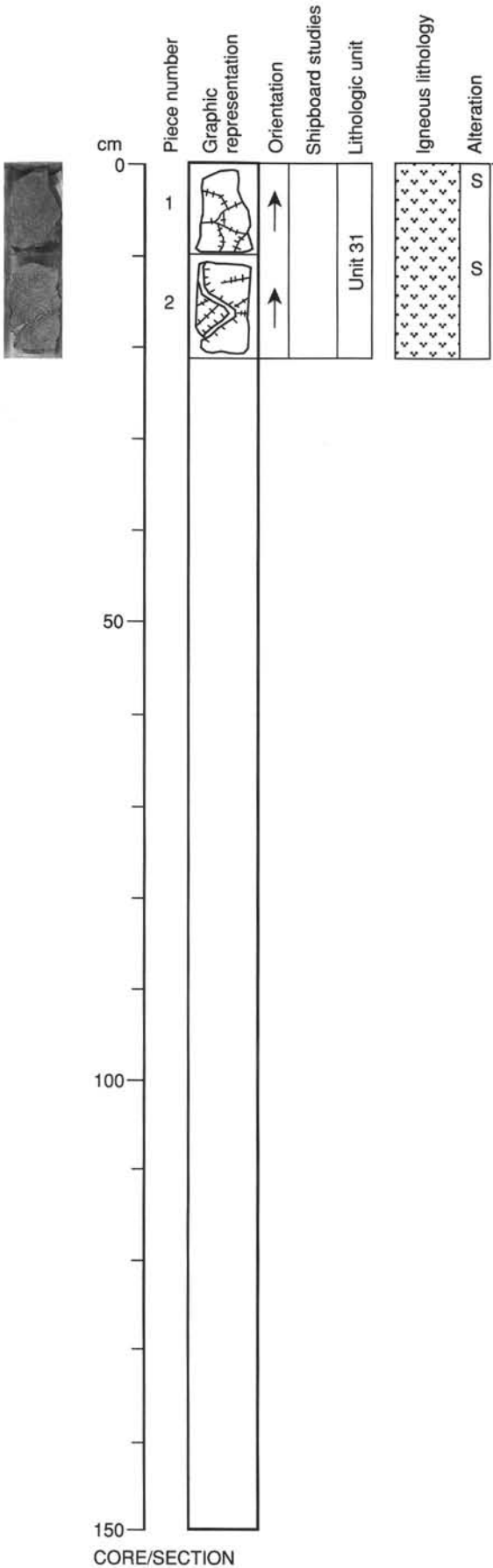
VEINS/FRACTURES: Seven clay veins, two Fe-oxyhydroxide veins, and two Fe-oxyhydroxide + clay veins. All are <1 mm wide. An oriented vein on Piece 26 dips at 19°, while an open fracture, on the same piece dips at 81°.



CORE/SECTION

UNIT 31: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-2



365.0 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 6.0%; 1.5 mm; euhedral-subhedral.

Olivine - 2.0%; 0.6 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline, intergranular.

VESICLES: None.

COLOR: Bluish gray to red when altered (5B 5/1 to 5R 4/6).

STRUCTURE: Massive.

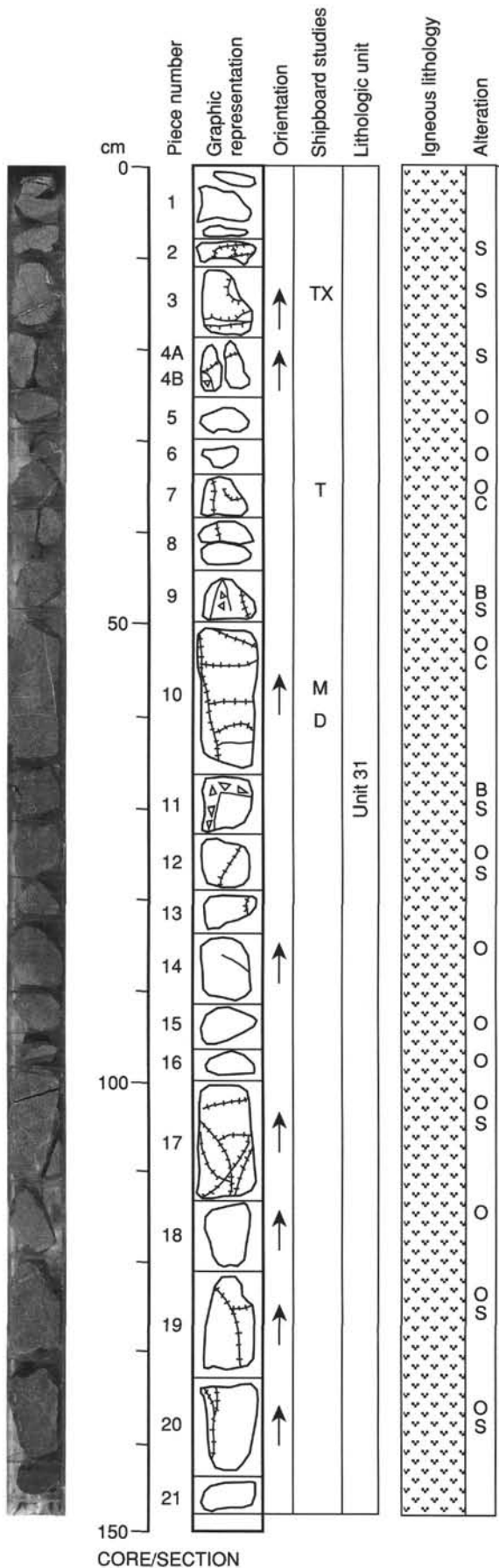
ALTERATION: Strongly oxidized, >80%.

VEINS/FRACTURES: Fourteen clay veins are all <1 mm wide except for two in Piece 2 (2 mm and 4 mm wide). Oriented veins on Pieces 1 and 2 have dips ranging from 16°–81°, but predominantly <40°.

148-896A-21R-1

UNIT 31: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-21



373.0 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 6.0%; 1.5 mm; euhedral-subhedral.

Olivine - 2.0%; 0.6 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline, intergranular.

VESICLES: None.

COLOR: Bluish gray to red when altered (5B 5/1 to 5R 4/6).

STRUCTURE: Massive.

ALTERATION: Variable, although predominantly intense, oxidative alteration. Complex red-yellow-red black halos developed in Pieces 3, 7, 12, 14, 15, 17, 19, and 20.

VEINS/FRACTURES: Twenty-nine clay veins, five clay + Fe-oxyhydroxide veins, two clay + carbonate veins and eight carbonate veins are present. Oriented veins on Pieces 2, 3, 10, 12, 17, 19, and 20 have dips ranging from 2°-78°, but are predominantly <40°.

CORE/SECTION

148-896A-21R-2

UNIT 31: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-9C

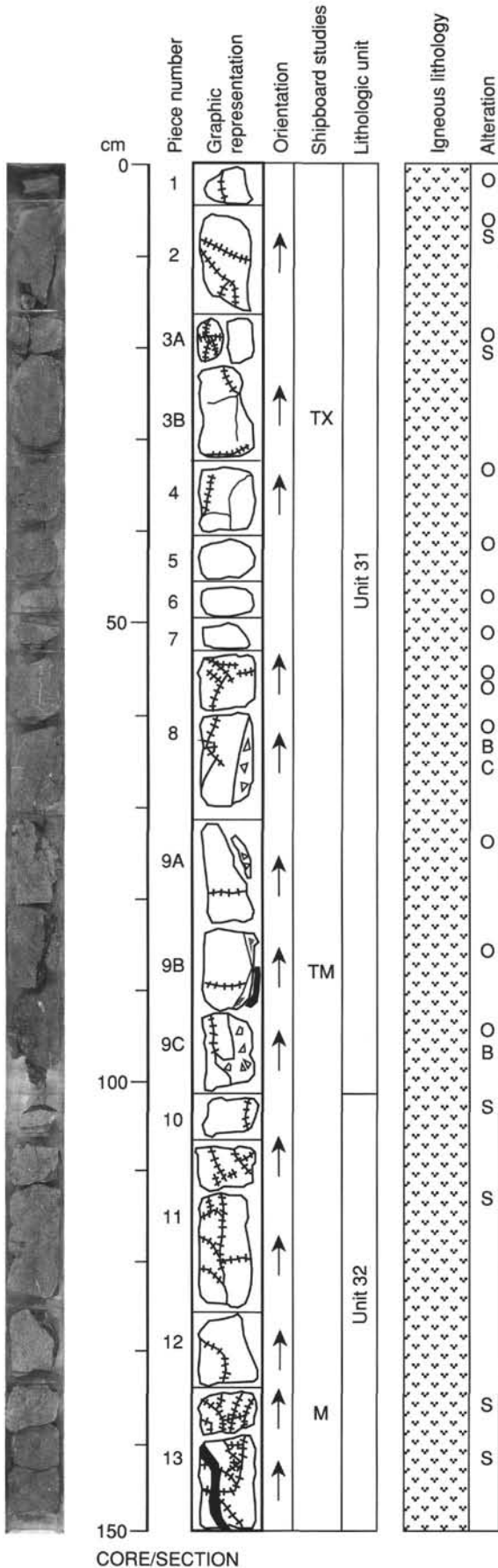
374.5 mbsf

CONTACTS: Chilled margin of Unit 32 in Piece 9C. Dips at 78°.
PHENOCRYSTS:
 Plagioclase - 6.0%; 1.5 mm; euhedral-subhedral.
 Olivine - 2.0%; 0.6 mm; euhedral-subhedral.
GROUNDMASS: Texture: Microcrystalline, intergranular.
VESICLES: None.
COLOR: Bluish gray to red when altered (5B 5/1 to 5R 4/6).
STRUCTURE: Massive. Brecciation associated with chilled margin in Pieces 8B, 9A-9C.
ALTERATION: Intense alteration and development of complex oxidation halos.
VEINS/FRACTURES: Twenty-one clay veins, two clay + carbonate veins and four carbonate veins. Oriented veins on Pieces 1, 8A, 9A, 9B, and 9C have dips ranging from 2°-88°.
ADDITIONAL COMMENTS: Chilled margin in Piece 9C is brecciated, as is the host rock. Brecciation extends from Piece 9A-9C. The roughly planar margin of the brecciated zone dips at approximately 78°. Unit becomes more coarse-grained downhole from Piece 1 to 9C.

UNIT 32: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 10-13

CONTACTS: Chilled against Unit 31.
PHENOCRYSTS:
 Plagioclase - 6.0%; 1.1 mm; euhedral-subhedral.
 Olivine - 2.0%; 0.6 mm; euhedral-subhedral.
GROUNDMASS: Texture: Microcrystalline to intergranular.
VESICLES: None.
COLOR: Bluish gray to red when altered (5B 5/1 to 5R 4/6).
STRUCTURE: Massive.
ALTERATION: Patchy oxidation of green smectites, after olivine phenocrysts, to red spots. Bulk rock is nonoxidized.
VEINS/FRACTURES: Six clay veins, <2 mm wide. Oriented veins in Pieces 11B, 12, and 13B have dips ranging from 0°-90°, but are predominantly steeply dipping, i.e. >70°.
ADDITIONAL COMMENTS: Unit becomes coarser-grained downhole, from Pieces 10-13B. Piece 13 hosts an 6-mm-wide internal chilled zone, with sharp boundaries, that dips at 82°.

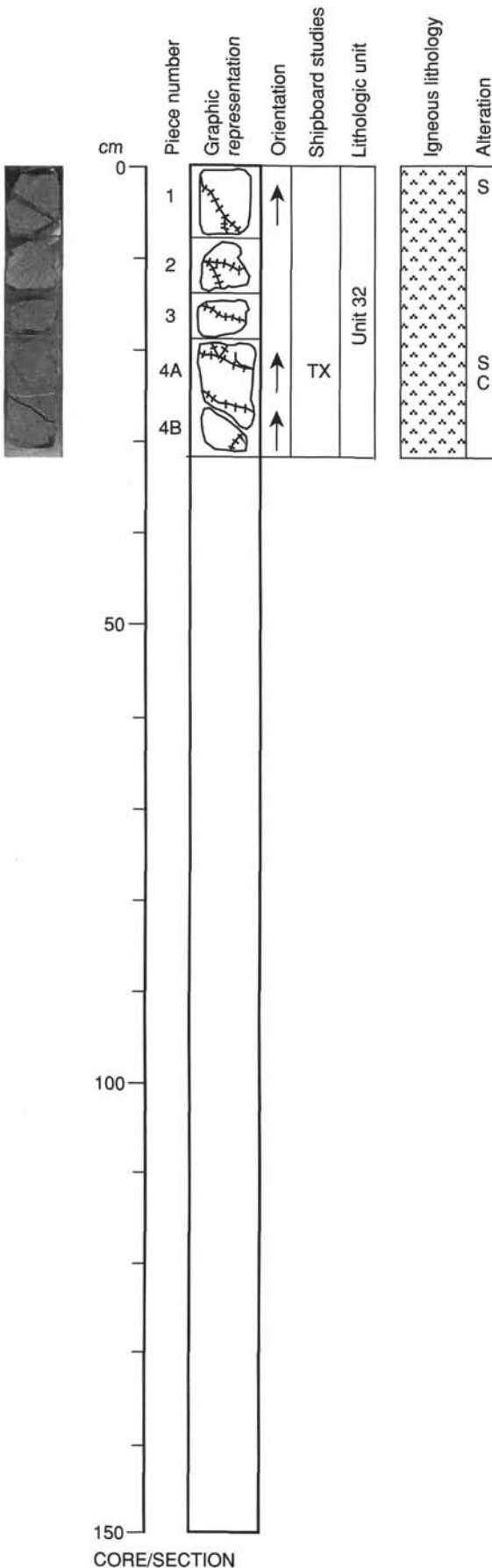


CORE/SECTION

148-896A-21R-3

UNIT 32: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-4B



376.0 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 6.0%; 1.1 mm; euhedral-subhedral.

Olivine - 2.0%; 0.6 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline to intergranular.

VESICLES: None.

COLOR: Bluish gray to red when altered (5B 5/1 to 5R 4/6).

STRUCTURE: Massive.

ALTERATION: Nonoxidized. Olivine replacement products partially oxidized to Fe-oxyhydroxide mineral in Piece 1.

VEINS/FRACTURES: Nine clay clay + carbonate, and Fe-oxyhydroxide + clay + carbonate veins, all <1 mm wide. Oriented veins on Pieces 1, 2, and 3 have dips ranging from 7°-68°, predominantly <50°.

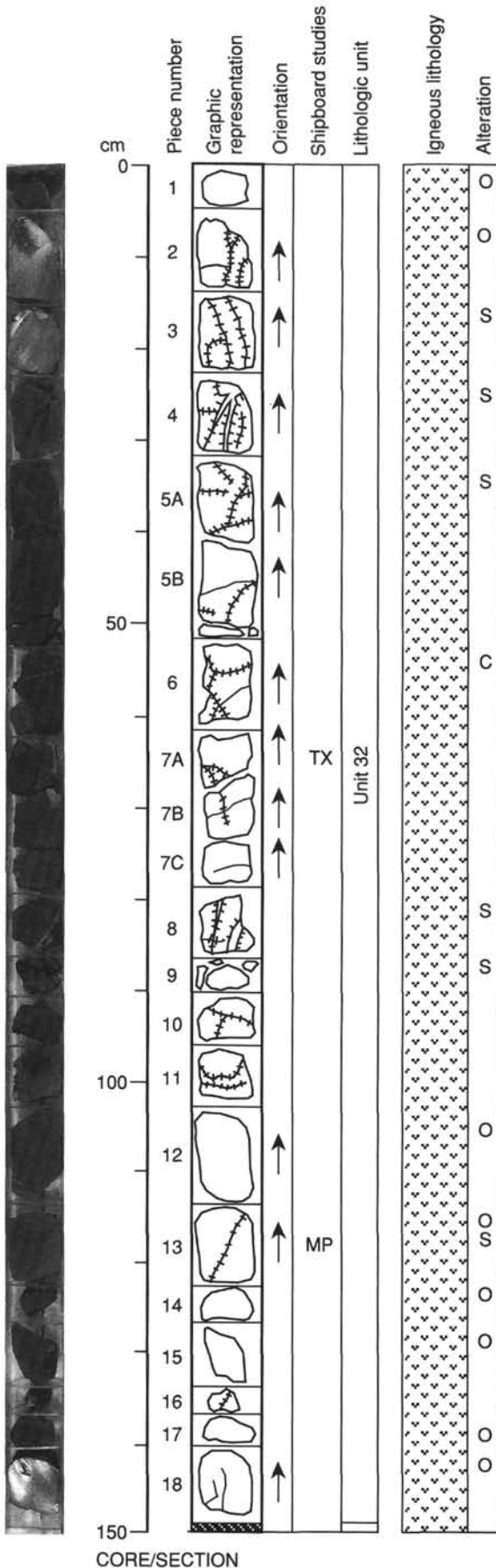
ADDITIONAL COMMENTS: None.

CORE/SECTION

148-896A-22R-1

UNIT 32: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-18



382.6 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 6.0%; 1.1 mm; euhedral-subhedral.

Olivine - 2.0%; 0.6 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline to intergranular.

VESICLES: None.

COLOR: Bluish gray to red when altered (5B 5/1 to 5R 4/6).

STRUCTURE: Massive.

ALTERATION: Minor oxidation of green clays, after olivine and groundmass, to Fe-oxyhydroxide minerals. Centimeter-scale red-yellow alteration patches in Pieces 2, 12, 13, 14, 15, 17, and 18.

VEINS/FRACTURES: Twenty-eight clay veins, one clay + Fe-oxyhydroxide, and one clay + carbonate vein. All veins <2 mm wide. Oriented veins in Pieces 2-8, and 13 have dips ranging from 0°-84°, but are predominantly <50°.

ADDITIONAL COMMENTS: Unit becomes coarser grained down hole, from Pieces 10-13B. Piece 13 hosts an 6 mm wide internal chilled zone, with sharp boundaries, that dips at 82°.

CORE/SECTION

148-896A-22R-2

UNIT 32: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-17

384.1 mbsf

CONTACTS: Glassy and chilled zone at base of Piece 16 and on Piece 17.

PHENOCRYSTS:

Plagioclase - 6.0%; 1.1 mm; euhedral-subhedral.

Olivine - 2.0%; 0.6 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline to intergranular.

VESICLES: None.

COLOR: Bluish gray to red when altered (5B 5/1 to 5R 4/6).

STRUCTURE: Massive.

ALTERATION: Moderate oxidative alteration manifest by the development of complex multicolored halos. Oxidation zones (red, yellow, and red-brown) are commonly concentric.

VEINS/FRACTURES: Twenty-seven clay veins, four of which also contain Fe-oxyhydroxide, and one Fe-oxyhydroxide + carbonate vein. Oriented veins in Pieces 1, 4, 6, 12, and 16 have dips ranging from 14°-89°, but are predominantly >50°.

ADDITIONAL COMMENTS: Unit becomes finer grained downhole, from Pieces 1-16.

UNIT 33: HIGHLY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 18-19B

CONTACTS: None

PHENOCRYSTS:

Plagioclase - 6%; 1.5 mm; euhedral-subhedral.

Olivine - 4%; 0.8 mm; euhedral-subhedral.

Clinopyroxene - 0.5%; 1.5 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline to intergranular.

VESICLES: None.

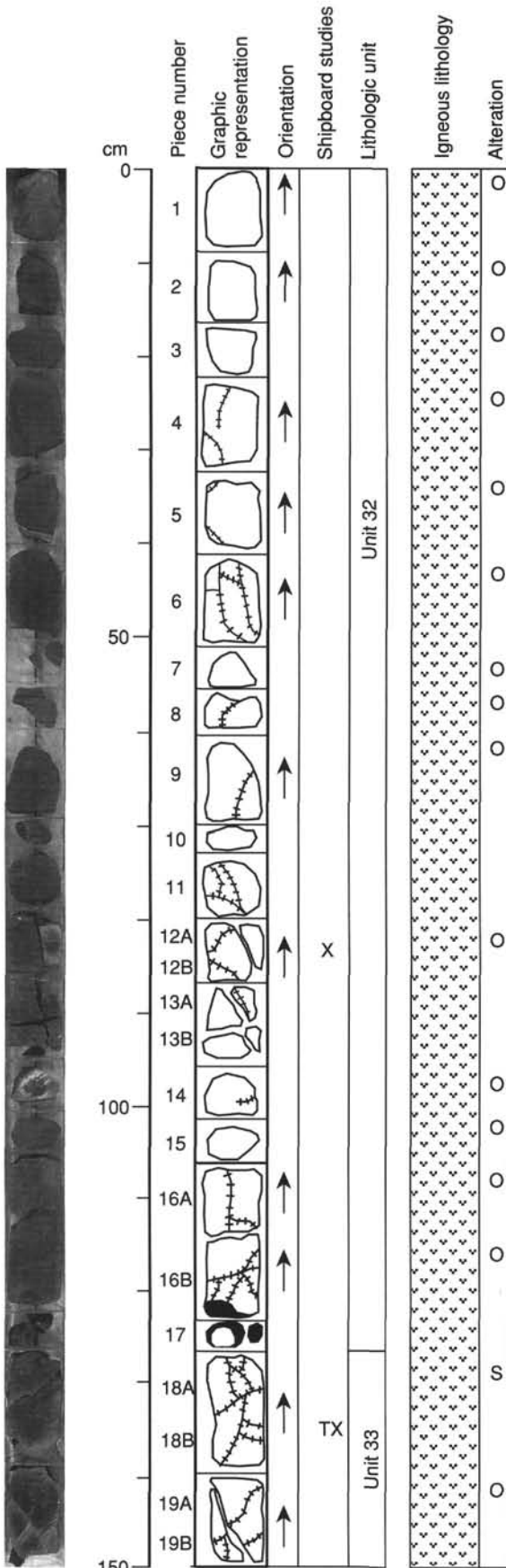
COLOR: Bluish gray to red when altered (5B 5/1 to 5R 4/6).

STRUCTURE: Massive.

ALTERATION: Minor oxidation of green clays, after olivine and groundmass, to red Fe-oxyhydroxide minerals.

VEINS/FRACTURES: Ten clay veins, all <1 mm wide. Two oriented veins on Piece 19 dip at 57° and 60°.

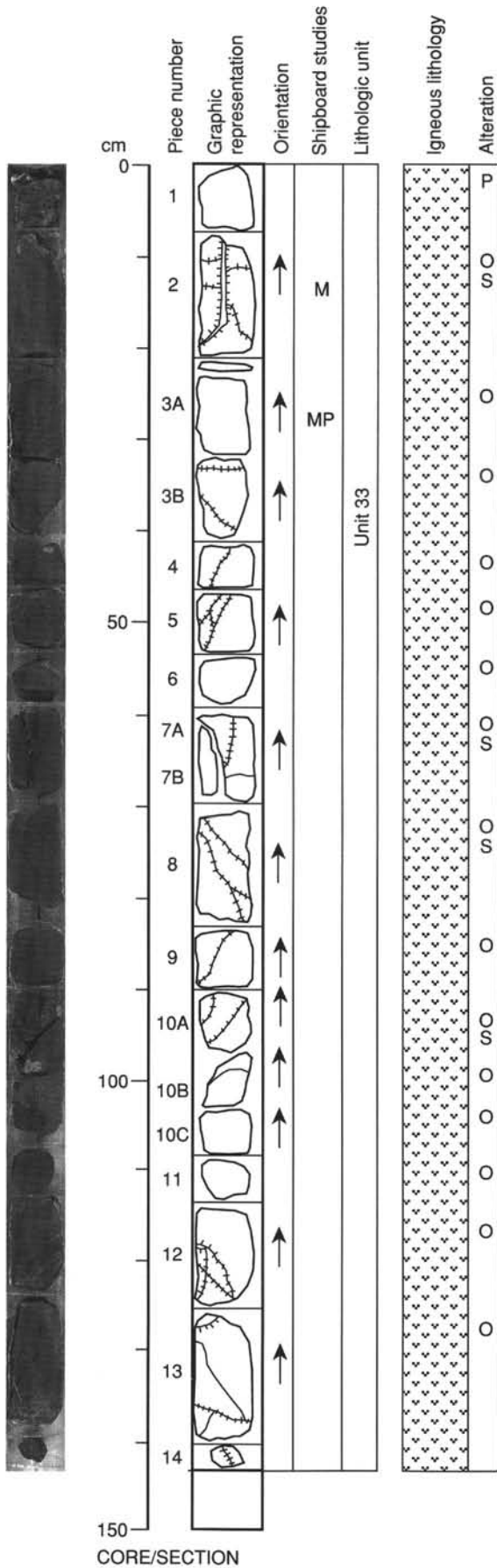
ADDITIONAL COMMENTS: Unit becomes coarser grained downhole.



CORE/SECTION

UNIT 33: HIGHLY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-14



385.6 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 6%; 1.5 mm; euhedral-subhedral.

Olivine - 4%; 0.8 mm; euhedral-subhedral.

Clinopyroxene - 0.5%; 1.5 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline to intergranular.

VESICLES: None.

COLOR: Bluish gray to red when altered (5B 5/1 to 5R 4/6).

STRUCTURE: Massive.

ALTERATION: Minor oxidation of groundmass clay minerals (approximately 10%). Red-yellow oxidation halos developed in Pieces 5, 7, 9, 10, 11, and 13.

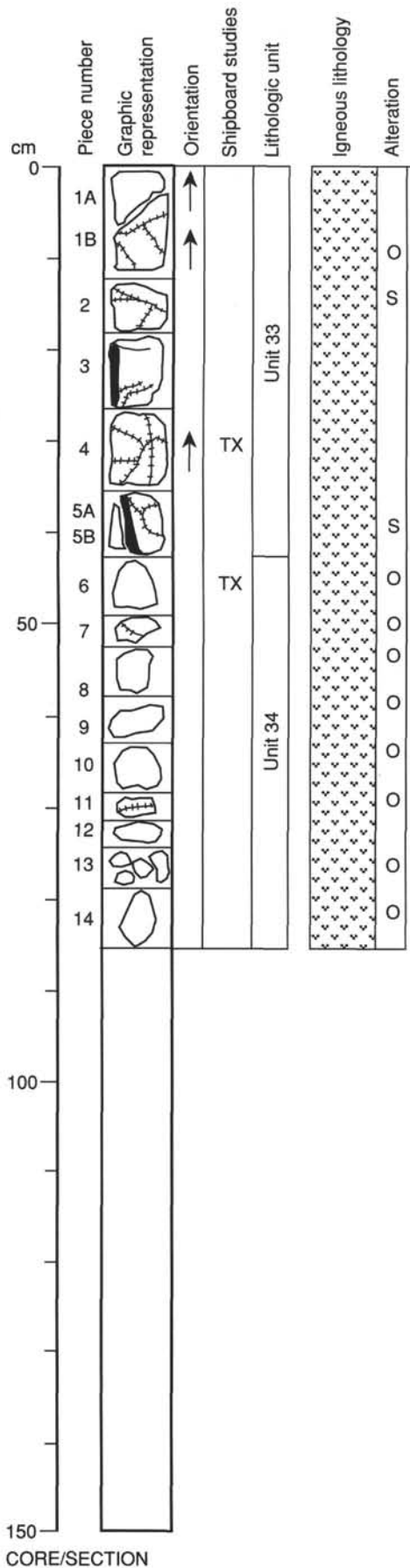
VEINS/FRACTURES: Thirty-three clay veins, all <1 mm wide, of which three also contain Fe-oxyhydroxide, and one of which also contains carbonate. Two veins contain an unidentified white noncarbonate mineral. Oriented veins on Pieces 1, 2, 3, 7, and 8 have variable dips ranging from 15°-90°, however the majority of veins have dips >60°.

ADDITIONAL COMMENTS: Unit becomes coarser grained downhole.

148-896A-22R-4

UNIT 33: HIGHLY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1A-5B



387.1 mbsf

CONTACTS: Chilled margin in Piece 5.

PHENOCRYSTS:

Plagioclase - 6%; 1.5 mm; euhedral-subhedral.

Olivine - 4%; 0.8 mm; euhedral-subhedral.

Clinopyroxene - 0.5%; 1.5 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline to intergranular.

VESICLES: None.

COLOR: Bluish gray to red when altered (5B 5/1 to 5R 4/6).

STRUCTURE: Massive.

ALTERATION: Minor oxidation of green clays after groundmass and olivine. Narrow red halo developed in Piece 1.

VEINS/FRACTURES: Two clay veins and seven clay + Fe-oxyhydroxide veins, all <1 mm wide. Oriented veins in Pieces 1, 4, and 5 have dips ranging from 55°-83°, but are predominantly dipping at >70°.

ADDITIONAL COMMENTS: Grain size decreases down hole toward the chilled margin. Two pieces making up Piece 5 do not obviously join. The chilled margin dips at 74°.

UNIT 34: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 6-14

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 2%; 1.0 mm; euhedral-subhedral.

Olivine - 1%; 0.6 mm; euhedral-subhedral.

GROUNDMASS: Texture: Intergranular to subophitic.

VESICLES: None.

COLOR: Bluish gray to red when altered. (5B 5/1 to 5R 4/6).

STRUCTURE: Massive.

ALTERATION: Moderate but variable oxidative alteration with complex red-yellow alteration halos/patches developed in Pieces 6, 8, 9, 10, and 14.

VEINS/FRACTURES: Nine clay veins, two carbonate veins, and one clay + Fe-oxyhydroxide vein, all <1 mm wide. No oriented structures.

UNIT 35: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT BRECCIA

Pieces 1A-4

392.1 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 3.0%; 1.2 mm; euhedral-subhedral.

Olivine - 4.0%; 0.5 mm; euhedral-subhedral.

GROUNDMASS: Texture: Intergranular.

VESICLES: None.

COLOR: Bluish gray (5B 5/1).

STRUCTURE: Pieces 1-4 are all brecciated.

ALTERATION: Partial oxidation of groundmass clays to Fe-oxyhydroxide minerals in basalt clasts. Cement/matrix is partially oxidized (drab brown) clay in Piece 2. Two clasts in Piece 4 are intensely oxidized.

VEINS/FRACTURES: No veins. Dark green clay cements the breccia. No oriented structures.

UNIT 36: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 5-21

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 4.0%; 1.3 mm; euhedral-subhedral.

Olivine - 3.0%; 0.5 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline to intergranular.

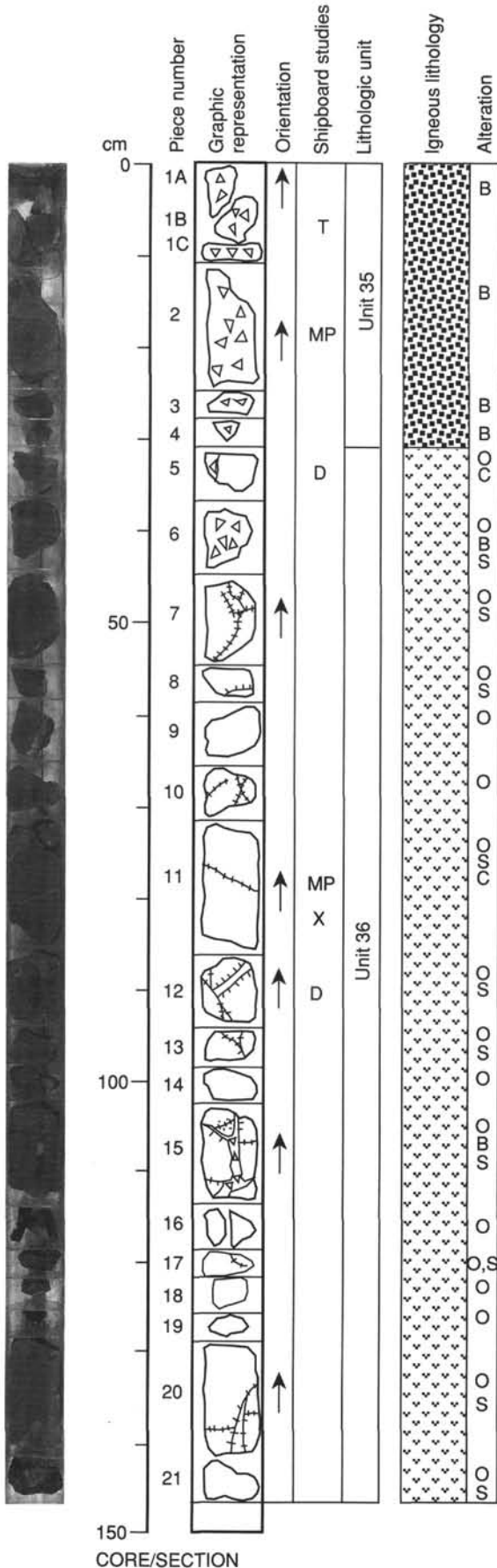
VESICLES: None.

COLOR: Bluish gray to red, when altered (5B 5/1 t 5R 4/6).

STRUCTURE: Massive. Breccias in Pieces 5, 6, and 15. Breccia in Piece 15 is associated with intense veining.

ALTERATION: Moderate to intense oxidative alteration with the development of complex red-yellow-red brown halos. Commonly groundmass clays are thoroughly oxidized but green clays, after olivine, are unaffected (e.g. Piece 12).

VEINS/FRACTURES: Forty-one clay veins and seven clay veins with either Fe-oxyhydroxide minerals and/or carbonate. Oriented veins in Pieces 7, 11, 15, and 20 have variable dips, ranging from 9°-65°.



CORE/SECTION

148-896A-23R-2

UNIT 36: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-16

393.6 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 4.0%; 1.3 mm; euhedral-subhedral.

Olivine - 3.0%; 0.5 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline to intergranular.

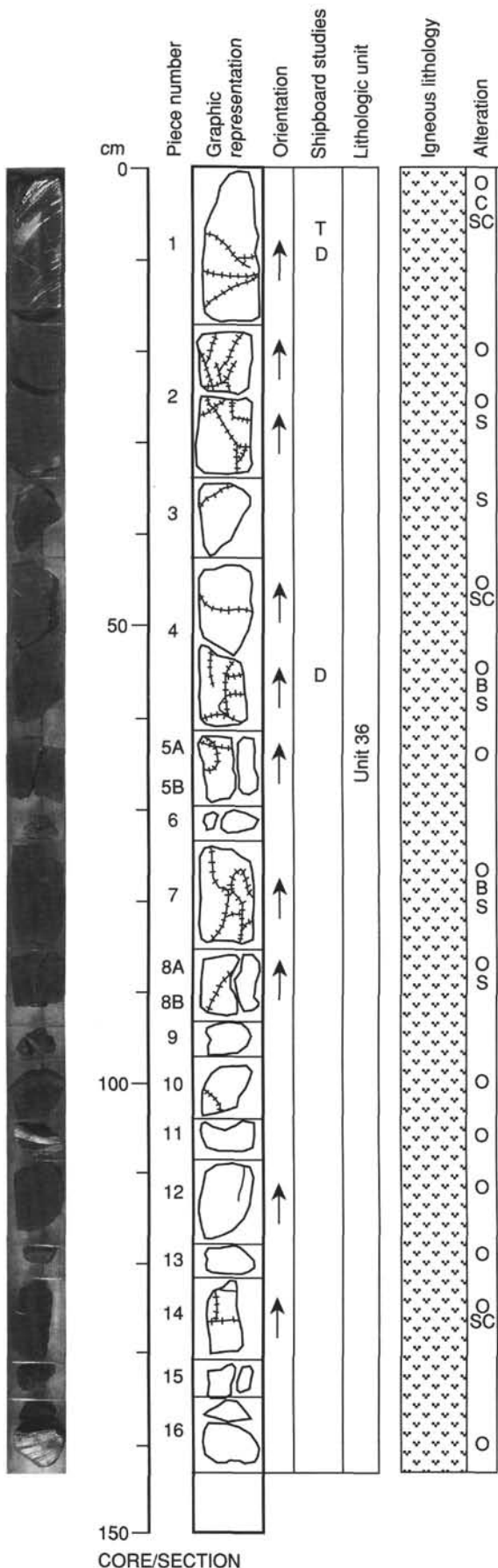
VESICLES: None.

COLOR: Bluish gray to red, when altered (5B 5/1 to 5R 4/6).

STRUCTURE: Massive.

ALTERATION: Variable but generally moderate oxidation. Complex multiple halos are developed with dark red-brown alteration associated with very fine brown clay veinlets. Carbonate veins in nonoxidized zones are filled by green smectite in the oxidized zones.

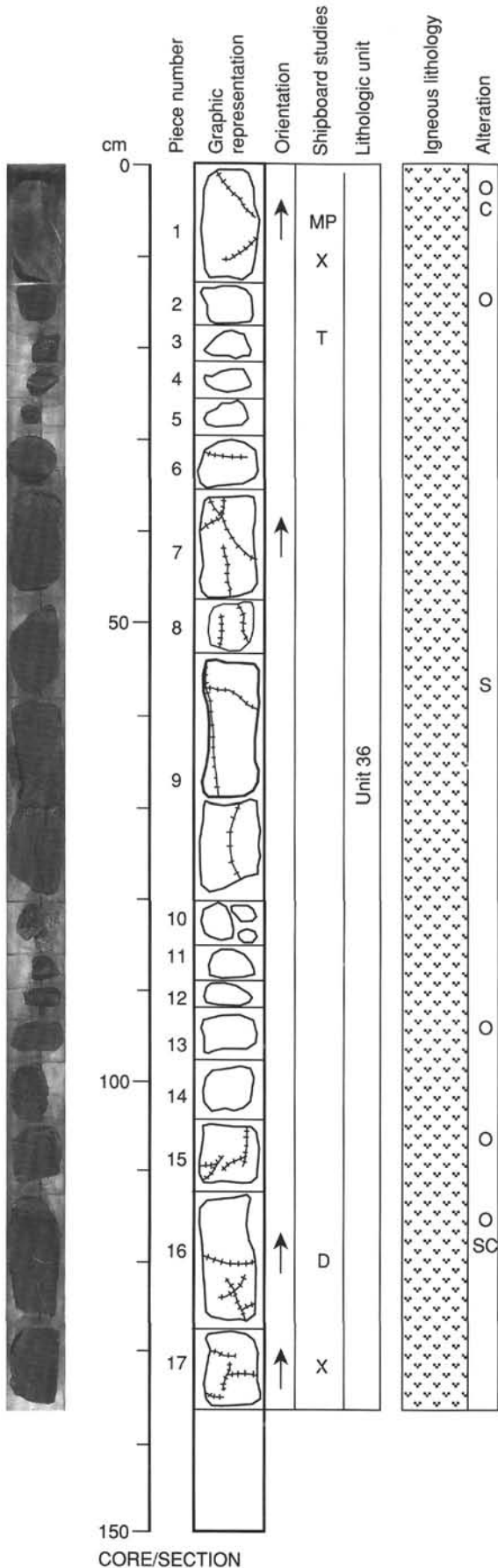
VEINS/FRACTURES: Thirty-three clay, five clay + carbonate, and one carbonate vein were recorded. Oriented veins in Pieces 1, 2, 4, 5, 12, and 14 have dips ranging from 7°-87°, but are predominantly <40°.



CORE/SECTION

UNIT 36: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-17



395.0 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 4.0%; 1.3 mm; euhedral-subhedral.

Olivine - 3.0%; 0.5 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline to intergranular.

VESICLES: None.

COLOR: Bluish gray to red, when altered (5B 5/1 t 5R 4/6).

STRUCTURE: Massive.

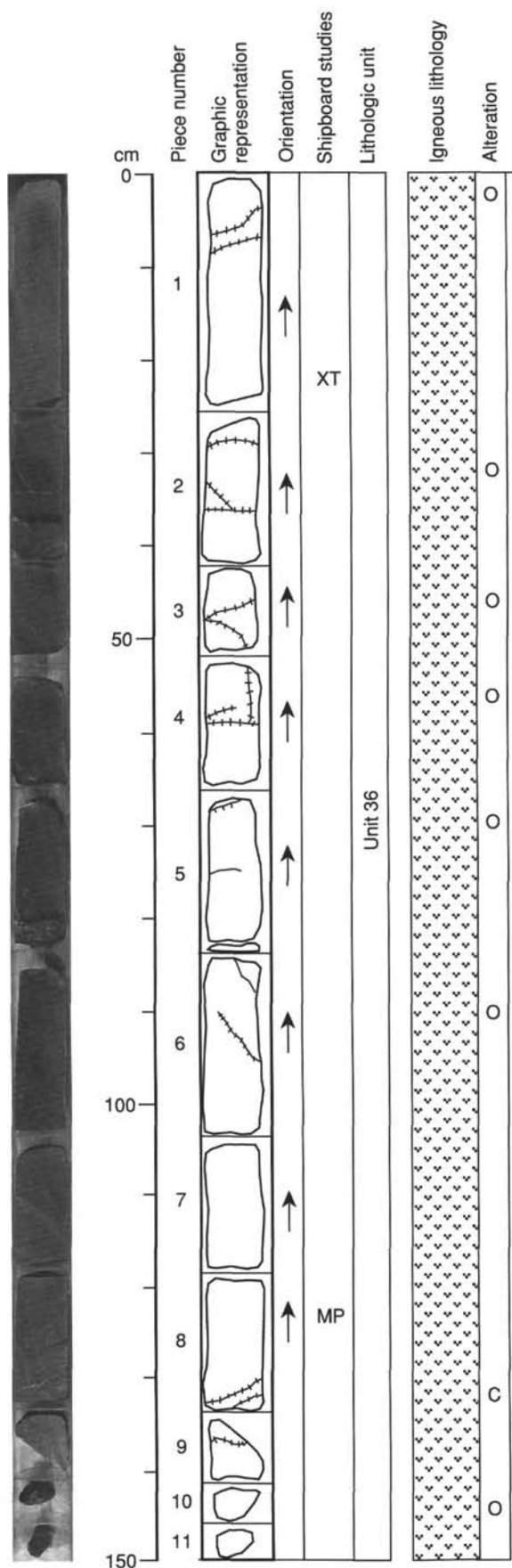
ALTERATION: Moderate oxidative alteration and complex halos are developed in Pieces 1, 2, 3, 15, and 16. Green clays, after olivine and groundmass, are the only visible alteration for much of this section.

VEINS/FRACTURES: Twenty-four clay, six carbonate, and one clay + Fe-oxyhydroxide vein, all <1 mm wide, were recorded. Oriented veins in Pieces 1, 7, 9, 16, and 17 have variable dips ranging from 16°-86°, but are predominantly dipping at <60°.

148-896A-24R-1

UNIT 36: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-11



401.8 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 5%; 1.0 mm; euhedral-subhedral.

Olivine - 4%; 0.4 mm; euhedral-subhedral.

GROUNDMASS: Texture: Intergranular.

VESICLES: None.

COLOR: Bluish gray to red when altered (5B 5/1 t 5R 4/6).

STRUCTURE: Massive.

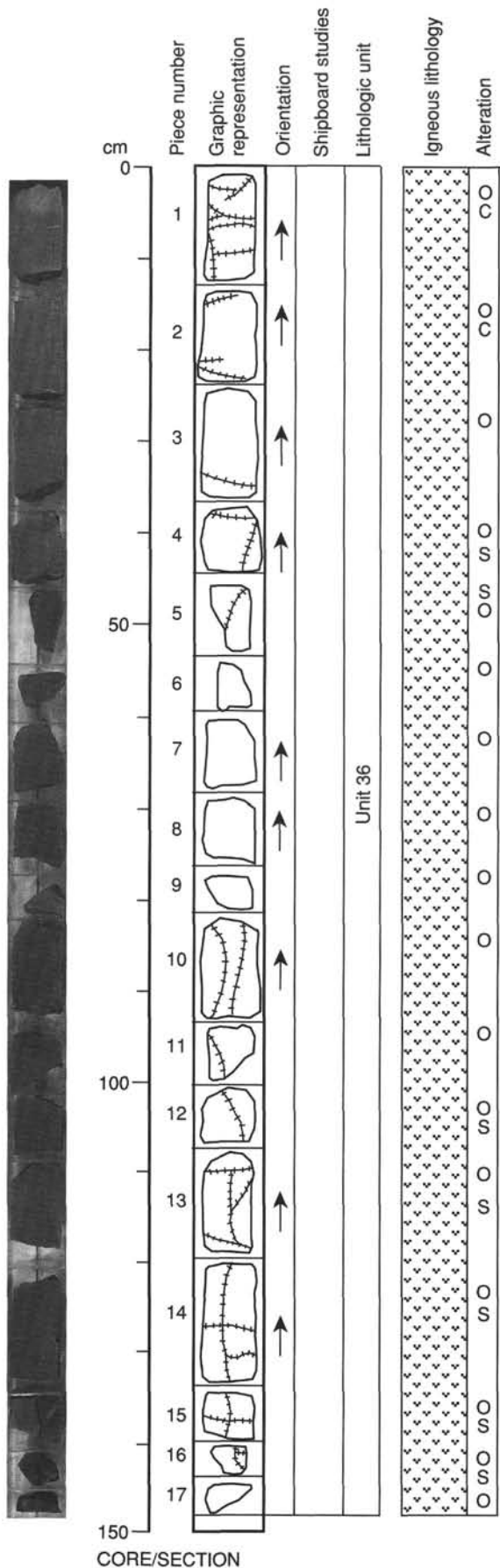
ALTERATION: Significant red and yellow oxidative alteration in Pieces 2-4, and 6.

VEINS/FRACTURES: Twenty-one clay, six clay + carbonate, and one carbonate vein are present. Oriented veins in Pieces 1-6, 8, and 9 have dips ranging from 4°-80°, but are predominantly dipping at <40°. Fibers in a dark green clay vein, on Piece 9, suggest oblique reverse movement.

CORE/SECTION

UNIT 36: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-17



403.3 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 5%; 1.0 mm; euhedral-subhedral.

Olivine - 4%; 0.4 mm; euhedral-subhedral.

GROUNDMASS: Texture: Intergranular.

VESICLES: None.

COLOR: Bluish gray to red when altered (5B 5/1 t 5R 4/6).

STRUCTURE: Massive.

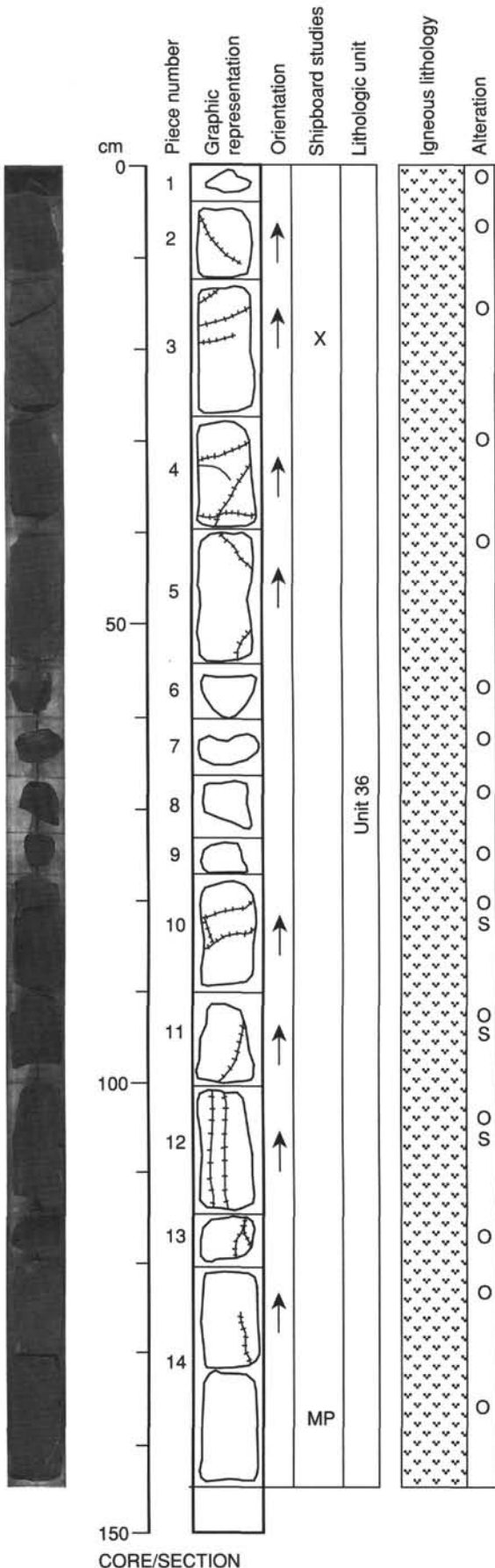
ALTERATION: Zones of red and yellow oxidative alteration (halos) in every piece. Piece 1 is relatively nonoxidized.

VEINS/FRACTURES: Thirty-eight clay, two clay + Fe-oxyhydroxide, and one carbonate vein, are all <1 mm wide, except for one clay vein that is 2 mm wide. Oriented veins in Pieces 1, 2, 4, and 10-15 have dips ranging from 7°-83°.

148-896A-24R-3

UNIT 36: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-14



404.8 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 5%; 1.0 mm; euhedral-subhedral.

Olivine - 4%; 0.4 mm; euhedral-subhedral.

GROUNDMASS: Texture: Intergranular.

VESICLES: None.

COLOR: Bluish gray to red when altered (5B 5/1 to 5R 4/6).

STRUCTURE: Massive.

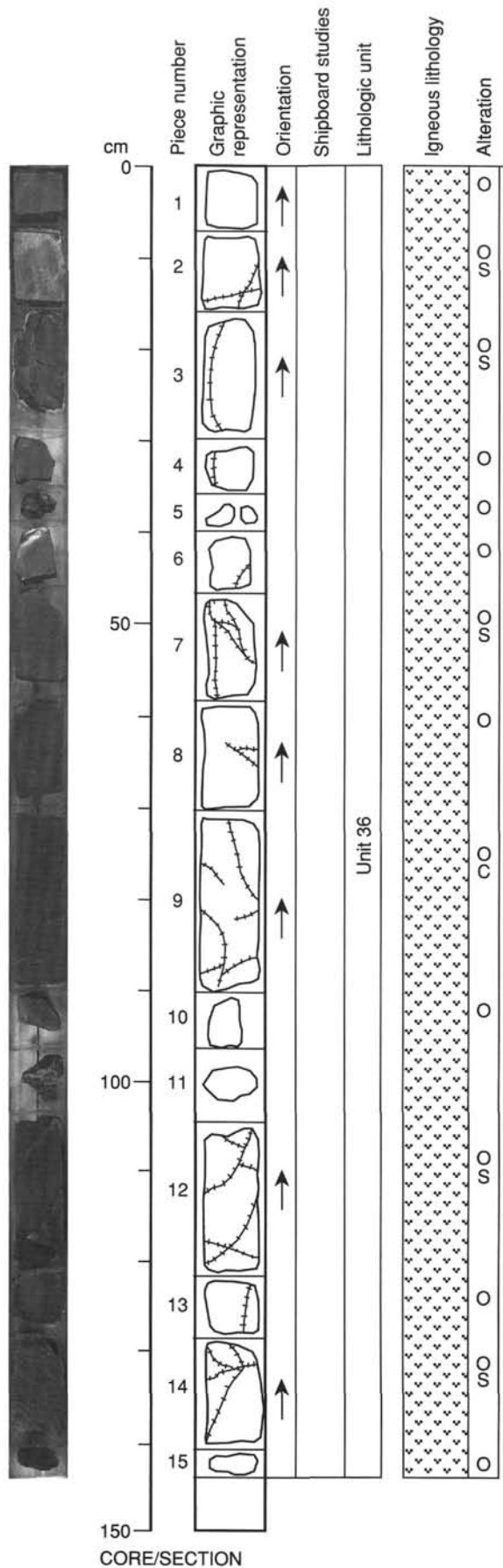
ALTERATION: Nearly the whole section exhibits abundant oxidative alteration. Only Piece 3 is mostly gray, nonoxidized basalt.

VEINS/FRACTURES: Eighteen clay, six clay + carbonate, and eight carbonate veins, most <1 mm wide oriented veins in Pieces 2-7, 10-12, and 14 have dips ranging from 12°-90°, but are dipping at predominantly <60°.

150
CORE/SECTION

UNIT 36: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-15



406.2 mbsf

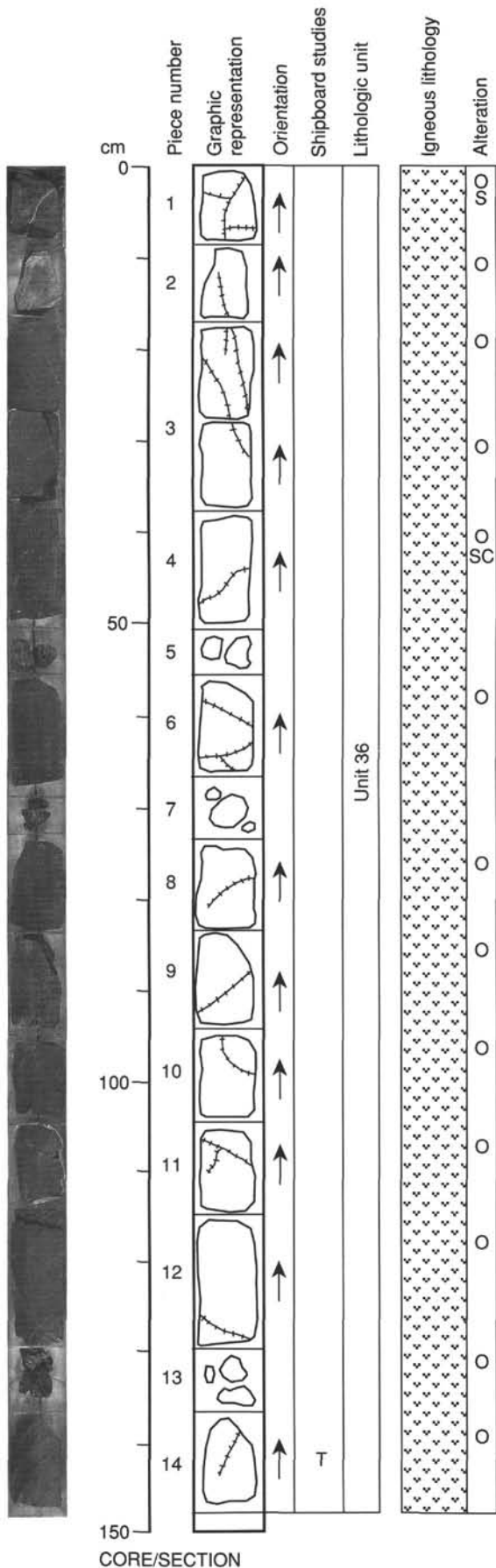
CONTACTS: None.
PHENOCRYSTS:
 Plagioclase - 5%; 1.0 mm; euhedral-subhedral.
 Olivine - 4%; 0.4 mm; euhedral-subhedral.
GROUNDMASS: Texture: Intergranular.
VESICLES: None.
COLOR: Bluish gray to red when altered (5B 5/1 to 5R 4/6).
STRUCTURE: Massive.
ALTERATION: All pieces are predominantly altered by oxidative red, yellow, or black alteration.
VEINS/FRACTURES: Thirty-one clay, two clay + carbonate, eight Fe-oxyhydroxide + carbonate and one Fe-oxyhydroxide vein, most <1 mm wide are present. Oriented veins in Pieces 2, 3, 7-9, 12, and 14 have dips ranging from 15°-83°, but are dipping at predominantly >60°.

CORE/SECTION

148-896A-24R-5

UNIT 36: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-14



407.7 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 5%; 1.0 mm; euhedral-subhedral.

Olivine - 4%; 0.4 mm; euhedral-subhedral.

GROUNDMASS: Texture: Intergranular.

VESICLES: None.

COLOR: Bluish gray to red when altered (5B 5/1 to 5R 4/6).

STRUCTURE: Massive.

ALTERATION: Most pieces are highly altered to oxidized red or black (with red-brown interstices) zones, with significant nonoxidized gray zones in Pieces 2, 4, 6, and 14.

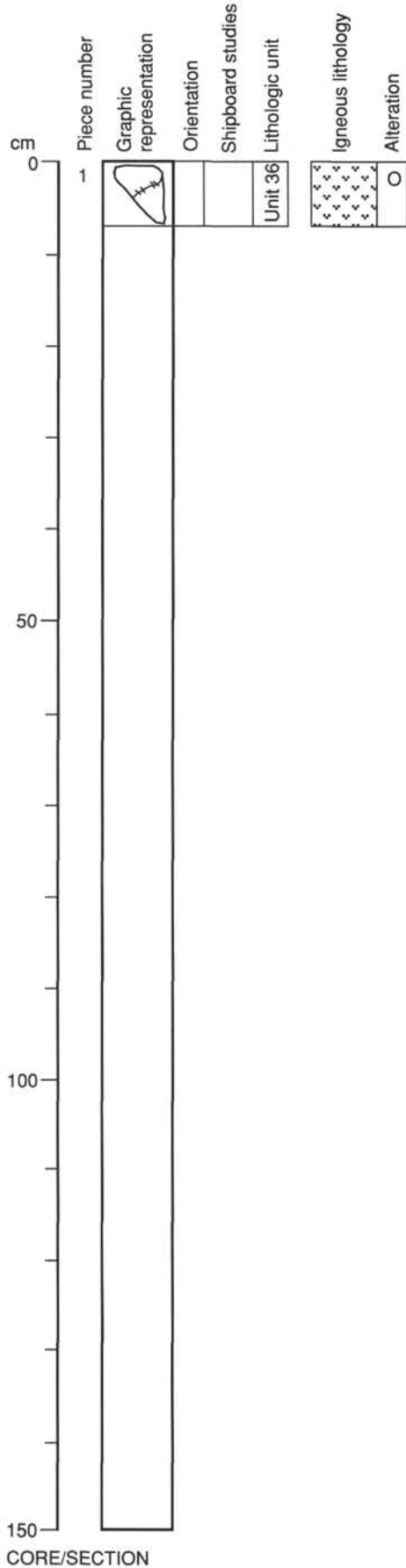
VEINS/FRACTURES: Ten clay, seven carbonate, two clay + carbonate, and one clay + Fe-oxyhydroxide + zeolite? veins occur. Oriented veins on Pieces 1-4, 6, 8-12, and 14 have dips ranging from 21°-85°, but are predominantly dipping at >40°.

CORE/SECTION

148-896A-24R-6

UNIT 36: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Piece 1



409.2 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 5%; 1.0 mm; euhedral-subhedral.

Olivine - 4%; 0.4 mm; euhedral-subhedral.

GROUNDMASS: Texture: Intergranular.

VESICLES: None.

COLOR: Bluish gray to red when altered (5B 5/1 to 5R 4/6).

STRUCTURE: Massive.

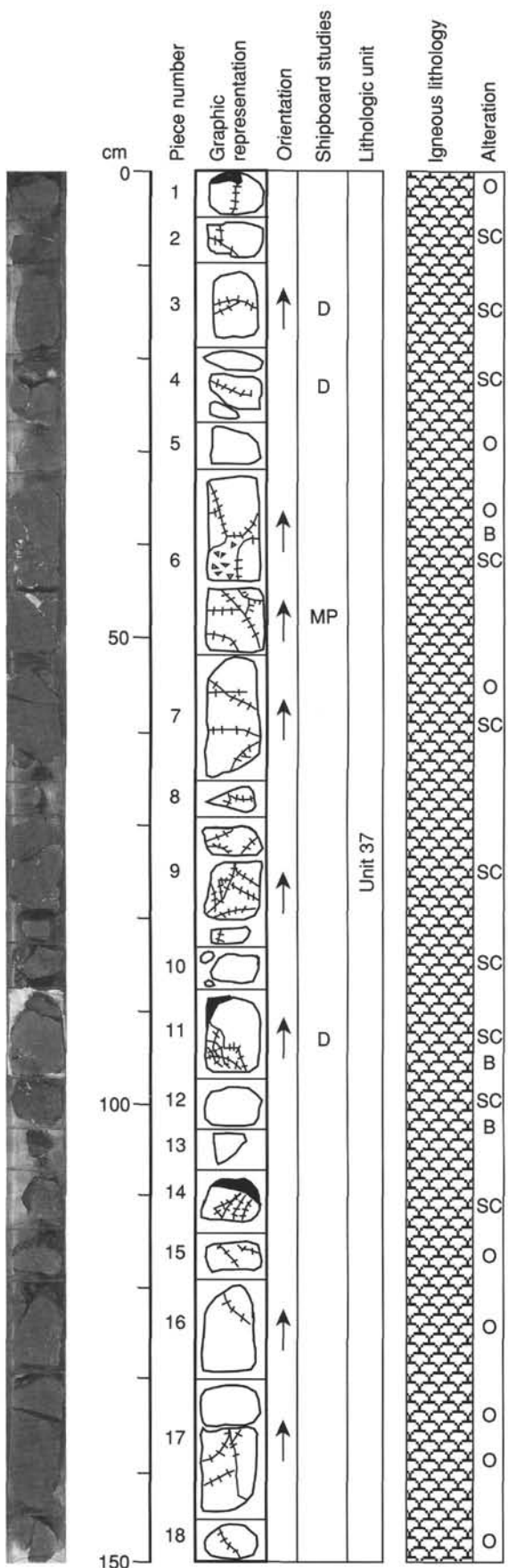
ALTERATION: Oxidized; olivine replaced by Fe-oxyhydroxide minerals and carbonate.

VEINS/FRACTURES: One clay + carbonate vein, 1 mm wide, dips at 48°.

148-896A-25R-1

UNIT 37: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-18

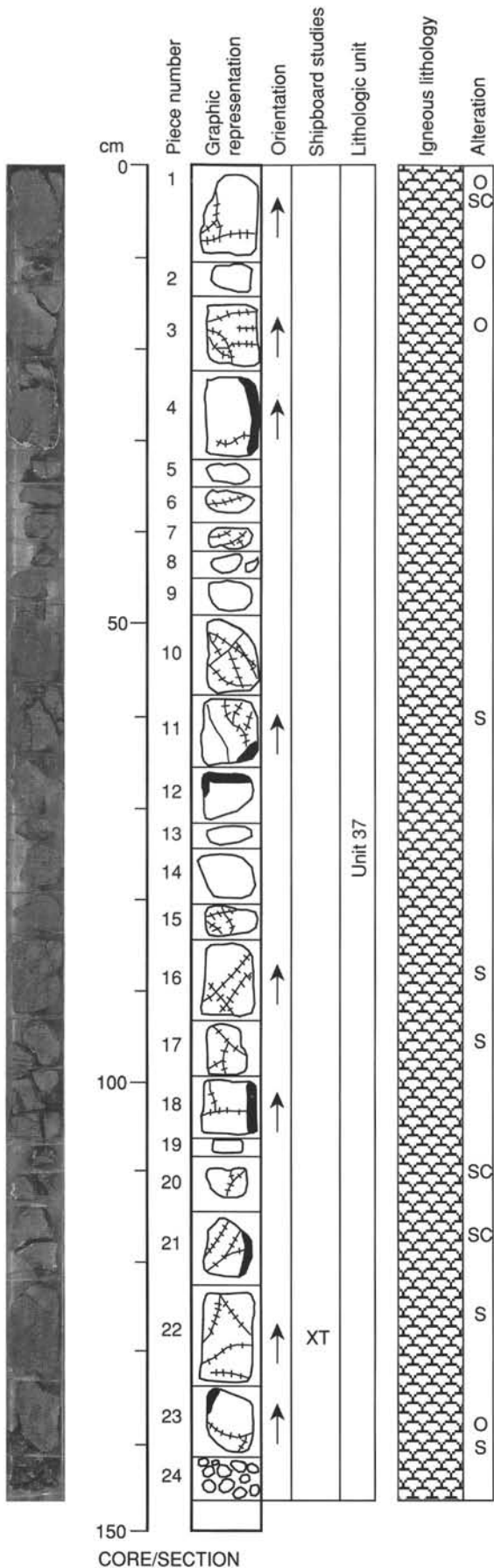


CONTACTS: None.
PHENOCRYSTS:
 Plagioclase - 4.0%; 1.0 mm; euhedral-subhedral.
 Olivine - 4.0%; 0.6 mm; euhedral-subhedral.
GROUNDMASS: Texture: Microcrystalline.
VESICLES: None.
COLOR: Bluish gray to red when altered (5B 5/1 to 2.5YR 4/6).
STRUCTURE: Pillowed.
ALTERATION: Significant oxidative alteration in Pieces 1, 7, and 15-18.
VEINS/FRACTURES: Twenty-seven clay + carbonate, twenty-one clay, one Fe-oxyhydroxide + clay + carbonate, and two carbonate veins, all <1 mm wide. Oriented veins on Pieces 3, 4, 6, 7, 9, 11, 16, and 17 have dips ranging from 16°-90°.

CORE/SECTION

UNIT 37: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-24



412.8 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 4.0%; 1.0 mm; euhedral-subhedral.

Olivine - 4.0%; 0.6 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray to red when altered (5B 5/1 to 2.5YR 4/6).

STRUCTURE: Pillowed.

ALTERATION: Significant oxidative alteration in Pieces 1-3, 12, 16, 18, 20, and 23.

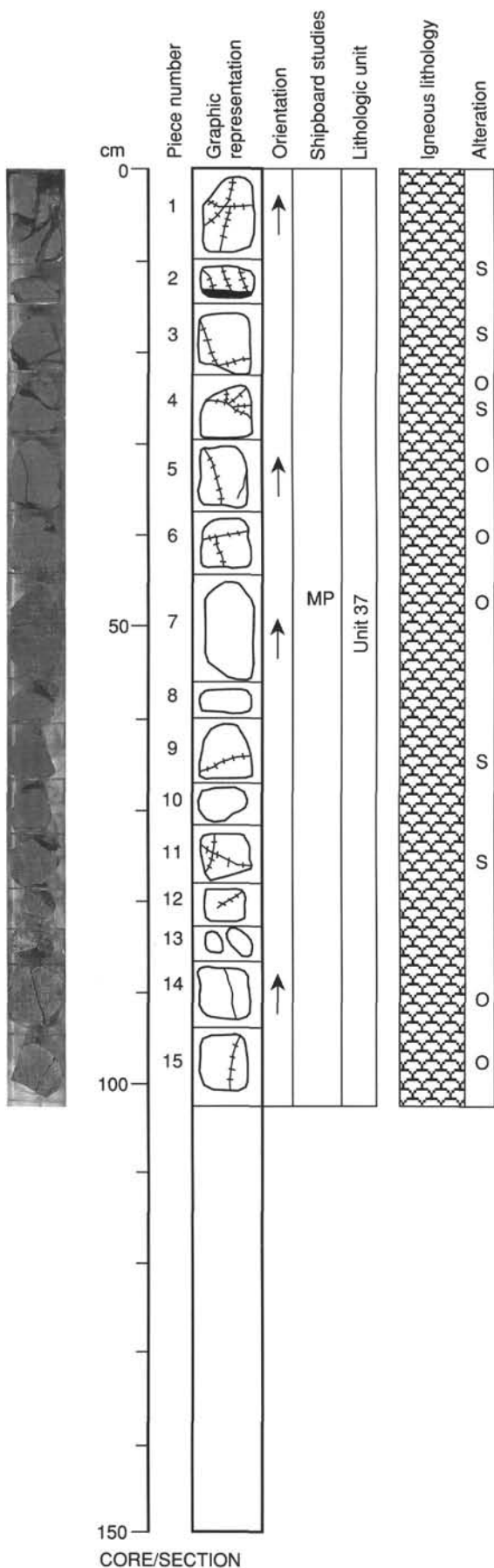
VEINS/FRACTURES: Fifty-one clay veins, seventeen clay + carbonate, two carbonate, and one Fe-oxyhydroxide + clay + carbonate vein, almost all are <1 mm wide. Oriented veins in Pieces 1, 3, 4, 10, 11, 15, 16, 18, and 21-23 have dips ranging from 10°-85°, but are predominantly dipping at >40°.

CORE/SECTION

148-896A-25R-3

UNIT 37: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-15



CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 4.0%; 1.0 mm; euhedral-subhedral.

Olivine - 4.0%; 0.6 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray to red when altered (5B 5/1 to 2.5YR 4/6).

STRUCTURE: Pillowed.

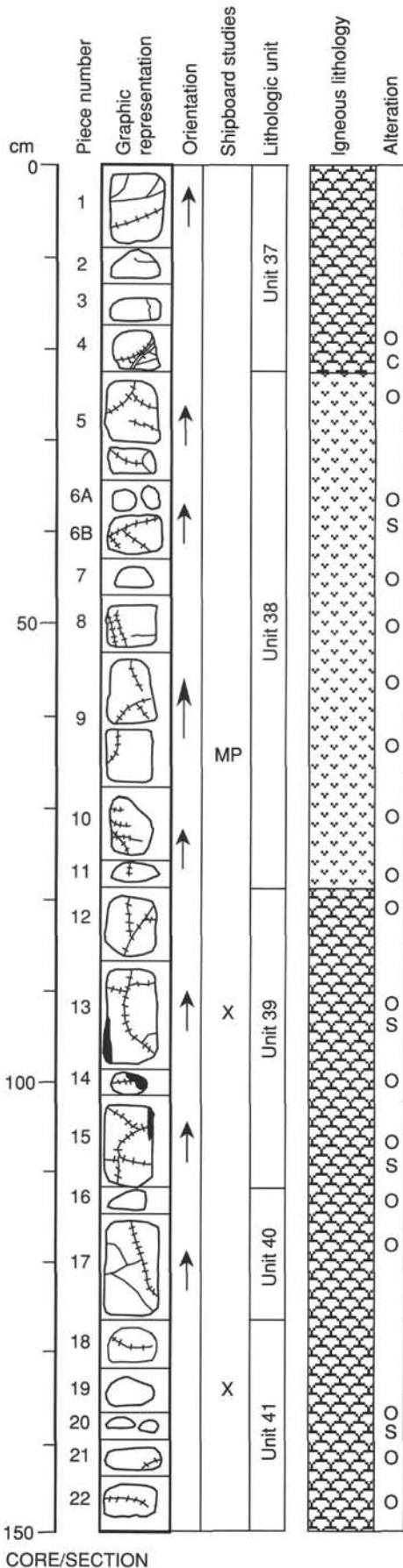
ALTERATION: Significant oxidative alteration in Pieces 1, 4-7, and 11-15.

VEINS/FRACTURES: Twenty-one clay veins, two carbonate, two Fe-oxhydroxide + clay, and five carbonate veins, are almost all <1 mm wide.

CORE/SECTION

UNIT 37: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-4



CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 4.0%; 1.0 mm; euhedral-subhedral.

Olivine - 4.0%; 0.6 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray to red when altered (5B 5/1 to 2.5YR 4/6).

STRUCTURE: Pillowed.

ALTERATION: Significant oxidative alteration in Pieces 4 only.

VEINS/FRACTURES: Five clay veins, and three clay + carbonate veins are all <1 mm wide.

Oriented veins on Piece 1 dip at 53°-76°.

UNIT 38: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 5-11

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 2.0%; 1.1 mm; euhedral-subhedral.

Olivine - 2%; 0.5 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline to intergranular.

VESICLES: None.

COLOR: Reddish brown (5YR 4/4).

STRUCTURE: Massive.

ALTERATION: Nearly completely affected by red and black oxidative alteration.

VEINS/FRACTURES: Two clay veins, three clay + carbonate, and six carbonate veins are all <1.5 mm wide. Oriented veins on Pieces 5, 6, 9, and 10 have variable dips ranging from 6°-74°.

UNIT 39: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 12-15

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 3.0%; 1.5 mm; euhedral-subhedral.

Olivine - 4.0%; 0.7 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Greenish gray to reddish brown (5BG 5/1 to 5YR 5/4).

STRUCTURE: Pillowed.

ALTERATION: Yellow oxidative alteration zone in Piece 15.

VEINS/FRACTURES: Six clay veins and two Fe-oxyhydroxide + clay veins are all <1 mm wide. Oriented veins on Pieces 12, 13, and 15 have dips ranging from 12°-85°, but are predominantly dipping at >40°.

CORE/SECTION

148-896A-26R-1

UNIT 40: SPARSELY PHYRIC OLIVINE-PLAGIOCLASE BASALT**Pieces 16–17****CONTACTS:** None.**PHENOCRYSTS:**

Plagioclase - 1.0%; 0.5 mm; euhedral-subhedral.

Olivine - 2.0%; 0.4 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.**VESICLES:** None.**COLOR:** Greenish gray to reddish brown (5BG 5/1 to 5YR 5/4).**STRUCTURE:** Pillowed.**ALTERATION:** Significant zones of red and yellow oxidative alteration in Piece 17.**VEINS/FRACTURES:** One clay and one clay + carbonate vein, both <1 mm wide, on Piece 17 dip at 75° and 47° respectively.**UNIT 41: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT****Pieces 18–22****CONTACTS:** None.**PHENOCRYSTS:**

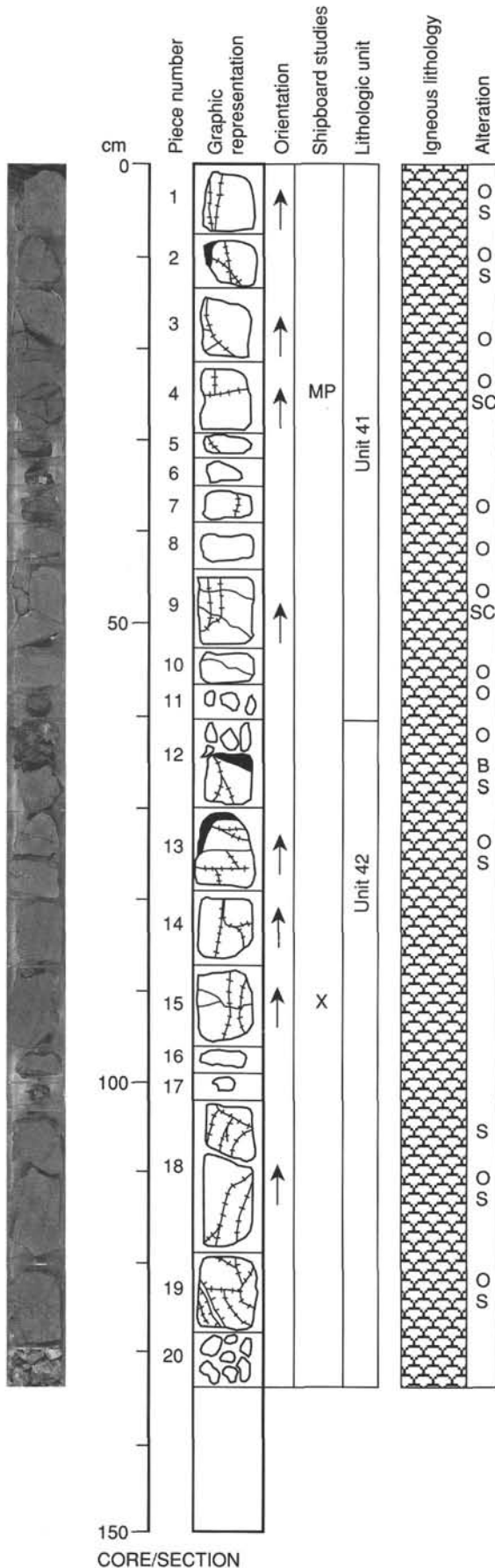
Plagioclase - 2.0%; 1.2 mm; euhedral-subhedral.

Olivine - 3%; 0.8 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.**VESICLES:** None.**COLOR:** Greenish gray to strong brown (5BG 5/1 to 7.5YR 4/6).**STRUCTURE:** Pillowed.**ALTERATION:** Pieces 20–22 contain zones of oxidative alteration.**VEINS/FRACTURES:** Five clay veins are all <1 mm wide. No oriented structures.

UNIT 41: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 1-11



CONTACTS: None.

PHENOCRYSTS:

Plagioclase- 2.0%; 1.2 mm; euhedral-subhedral.

Olivine - 3%; 0.8 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Greenish gray to strong brown when altered (5BG 5/1 to 7.5YR 4/6).

STRUCTURE: Pillowed.

ALTERATION: Significant zones of oxidative alteration in Pieces 1 and 8-10.

VEINS/FRACTURES: Five clay veins, five clay + Fe-oxyhydroxide, and six clay + carbonate veins are all <1 mm wide. Oriented veins on Pieces 1, 3, and 4 have dips ranging from 19°-87°.

UNIT 42: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 12-20

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 2.0%; 0.8 mm; euhedral-subhedral.

Olivine - 3.0%; 0.6 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Greenish gray to reddish brown when altered (5BG 5/1 to 5YR 4/4).

STRUCTURE: Pillowed.

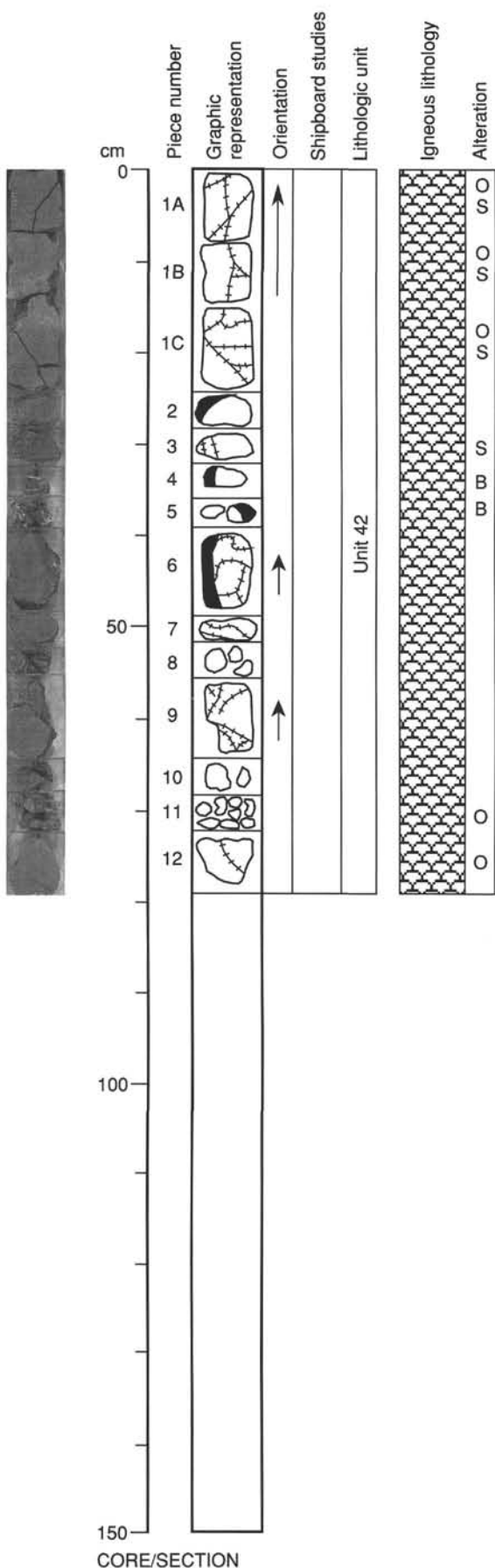
ALTERATION: Significant zones of oxidative alteration in Pieces 12, 18B, 19, and 20.

VEINS/FRACTURES: One clay + carbonate and fifteen clay veins are all <1 mm wide.

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UNIT 42: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 1A-12



423.9 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 2.0%; 0.8 mm; euhedral-subhedral.

Olivine - 3.0%; 0.6 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Greenish gray to reddish brown when altered (5BG 5/1 to 5YR 4/4).

STRUCTURE: Pillowed.

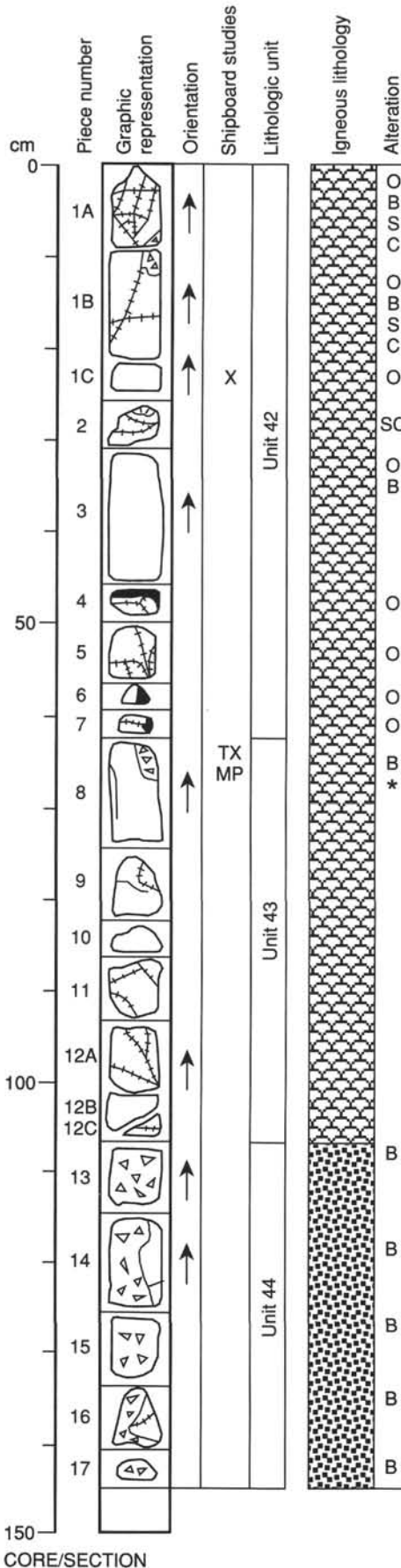
ALTERATION: Significant amounts of oxidative alteration in Pieces 1A-1C.

VEINS/FRACTURES: Sixteen clay veins, three clay + carbonate, one carbonate, and one Fe-oxyhydroxide vein are all <1 mm wide.

CORE/SECTION

UNIT 42: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 1A-7



430.5 mbsf

CONTACTS: None.
PHENOCRYSTS:
 Plagioclase - 2.0%; 0.8 mm; euhedral-subhedral.
 Olivine - 3.0%; 0.6 mm; euhedral-subhedral.
GROUNDMASS: Texture: Microcrystalline.
VESICLES: None.
COLOR: Greenish gray to reddish brown when altered (5BG 5/1 to 5YR 4/4).
STRUCTURE: Pillowed. Partly brecciated.
ALTERATION: Only minor development (<10 vol.%) of oxidative alteration zones, in Pieces 1-3.
VEINS/FRACTURES: Five clay and four clay + carbonate veins are nearly all <1 mm wide.

UNIT 43: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 8-12C

CONTACTS: None.
PHENOCRYSTS:
 Plagioclase - 5.0%; 1.0 mm; euhedral-subhedral.
 Olivine - 4.0%; 0.7 mm; euhedral.
GROUNDMASS: Texture: Microcrystalline.
VESICLES: None.
COLOR: Bluish gray (5B 5/1).
STRUCTURE: Pillowed. Breccia in Piece 8.
ALTERATION: Significant oxidative alteration in Piece 8, the breccia.
VEINS/FRACTURES: Seven clay veins, one carbonate, and five clay + Fe-oxyhydroxide veins are almost all <1 mm wide.

UNIT 44: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT BRECCIA

Pieces 13-17

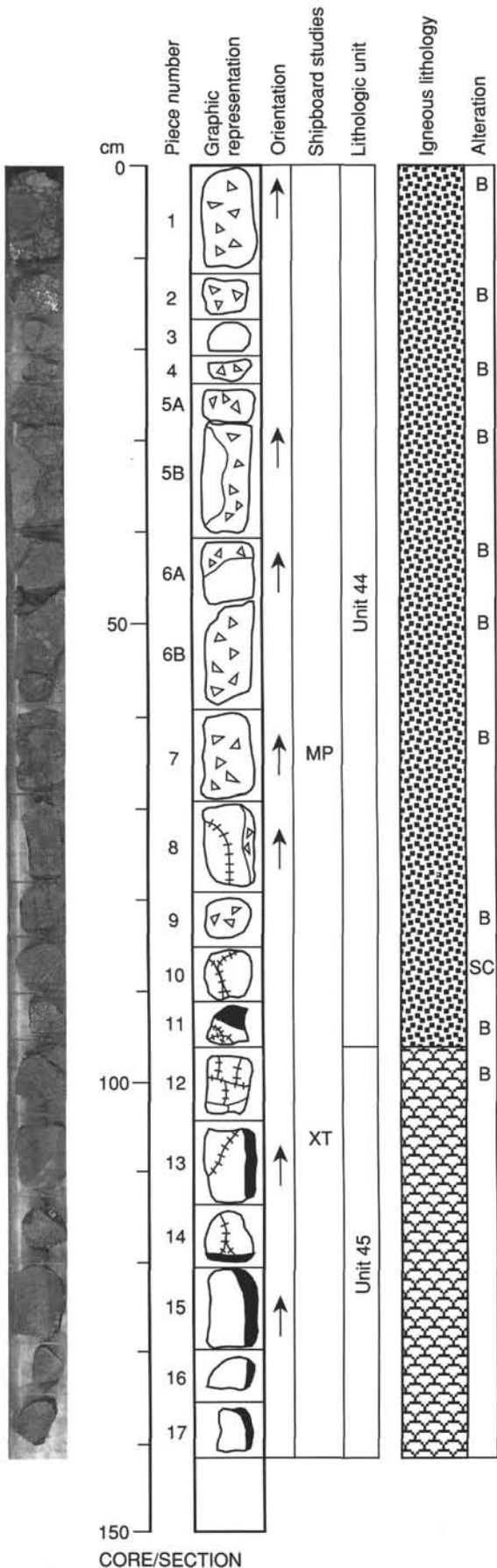
CONTACTS: None.
PHENOCRYSTS:
 Plagioclase - 2.0%; 1.0 mm; euhedral-subhedral.
 Olivine - 3.0%; 0.5 mm; euhedral-subhedral.
GROUNDMASS: Texture: Microcrystalline.
VESICLES: None.
COLOR: Greenish gray to reddish brown when altered (5BG 5/1 to 5YR 4/4).
STRUCTURE: Brecciated.
ALTERATION: Only very minor (<1 vol. %) oxidative alteration.
VEINS/FRACTURES: No veins. Abundant clay +/- carbonate breccia cement.

CORE/SECTION

148-896A-27R-2

UNIT 44: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT BRECCIA

Pieces 1-11



CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 2.0%; 1.0; mm euhedral-subhedral.

Olivine - 3.0%; 0.5 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Greenish gray to reddish brown when altered (5BG 5/1 to 5YR 4/4).

STRUCTURE: All pieces brecciated except Pieces 2, 10, and 11. Piece 11 has a glassy pillow rind.

ALTERATION: Minor (<10%) oxidative alteration in nearly all pieces.

VEINS/FRACTURES: Two clay + analcime veins; abundant clay +/- carbonate breccia cement.

UNIT 45: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 12-17

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 3.0%; 1.0 mm; euhedral-subhedral.

Olivine - Trace; 0.15 mm; euhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray (5BG 5/1).

STRUCTURE: Pillowed.

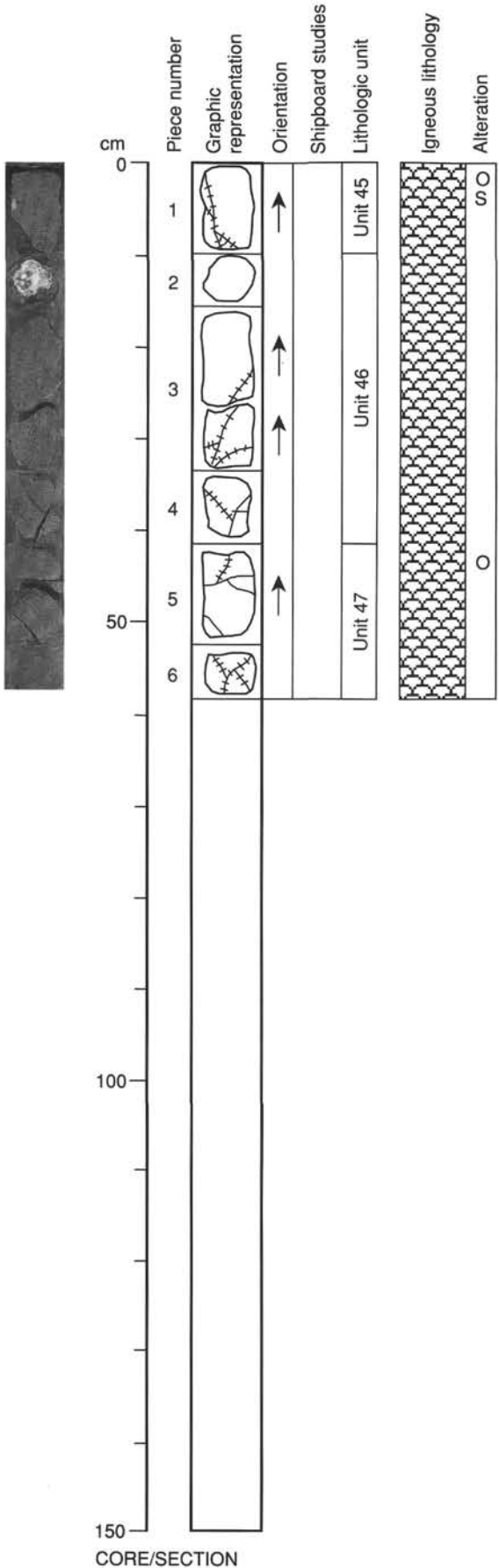
ALTERATION: Very minor (2%) oxidative alteration in Piece 13 only.

VEINS/FRACTURES: Seven clay veins are all <1 mm wide.

CORE/SECTION

UNIT 45: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Piece 1



433.4 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 3.0%; 1.0 mm; euhedral-subhedral.

Olivine - Trace; 0.15 mm; euhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray (5BG 5/1).

STRUCTURE: Pillowed.

ALTERATION: Intensely oxidized, with 25% of the piece exhibiting oxidative alteration.

VEINS/FRACTURES: Three clay + analcime veins are all <1 mm wide.

UNIT 46: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 2-4

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 4.0%; 1.5 mm; euhedral-subhedral.

Olivine - 3.0%; 0.8 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray to red when altered (5B 5/1 to 2.5YR 4/6).

STRUCTURE: Pillowed.

ALTERATION: Only minor (approximately 5%) zones of oxidative alteration.

VEINS/FRACTURES: Three clay and two clay + analcime veins are <1 mm wide.

UNIT 47: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 5-6

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 2.0%; 1.0 mm; euhedral-subhedral.

Olivine - 4.0%; 0.5 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Greenish gray to reddish brown when altered (5BG 5/1 to 5YR 5/4).

STRUCTURE: Pillowed.

ALTERATION: Only minor oxidative alteration zones.

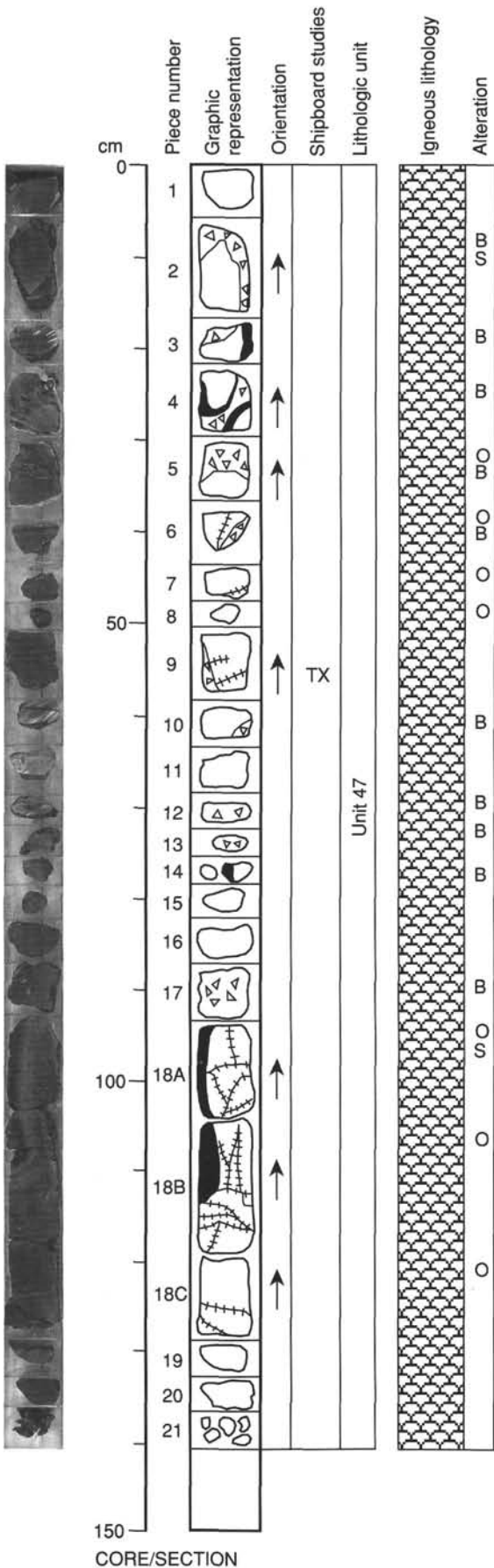
VEINS/FRACTURES: Two clay and three clay + Fe-oxyhydroxide veins, all <1 mm wide, are present.

CORE/SECTION

148-896A-28R-1

UNIT 47: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 1-21



CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 2.0%; 1.0 mm; euhedral-subhedral.

Olivine - 4.0%; 0.5 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Greenish gray to reddish brown when altered (5BG 5/1 to 5YR 5/4).

STRUCTURE: Pillowed. Brecciated in Pieces 2-6, 9, 10, 12, 13, and 17.

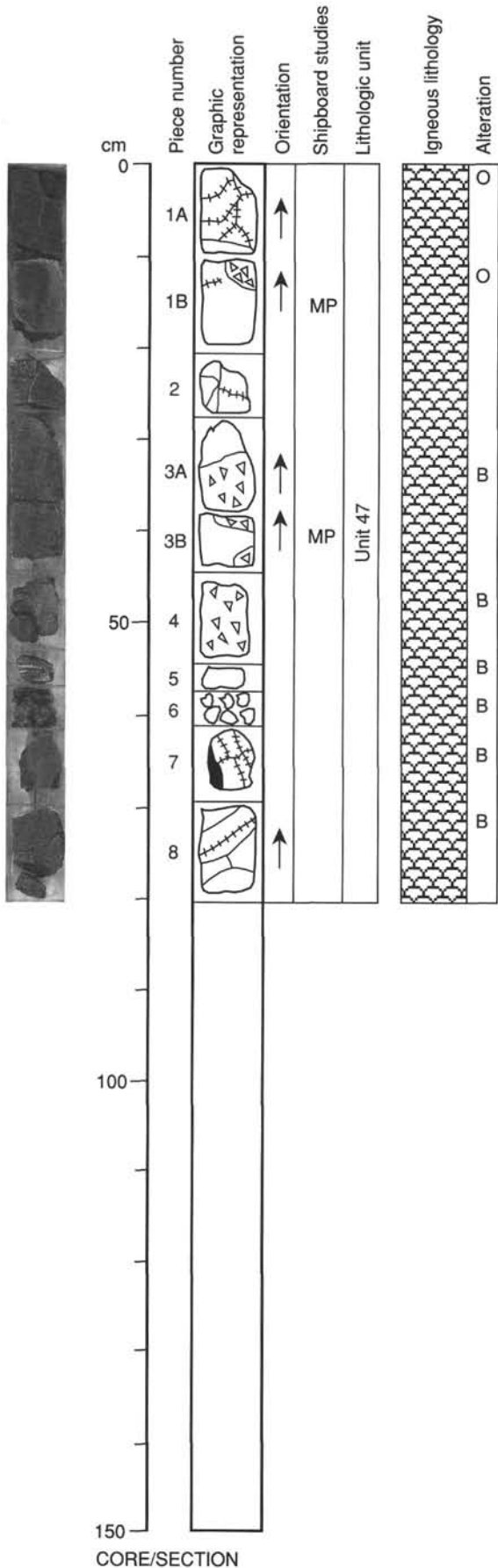
ALTERATION: Significant oxidative alteration zones in Pieces 5-10, 16, and 18-21.

VEINS/FRACTURES: Two clay + analcime veins, one clay + carbonate, and twenty-two clay veins are all <1 mm wide. Clay cement to brecciated pieces.

CORE/SECTION

UNIT 47: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 1A-8



CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 2.0%; 1.0 mm; euhedral-subhedral.

Olivine - 4.0%; 0.5 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Greenish gray to reddish brown when altered (5BG 5/1 to 5YR 5/4).

STRUCTURE: Pillowed. Brecciated in Pieces 1, 3, and 4.

ALTERATION: Slight to moderate oxidative alteration. Olivine and interstitial groundmass altered to green smectite.

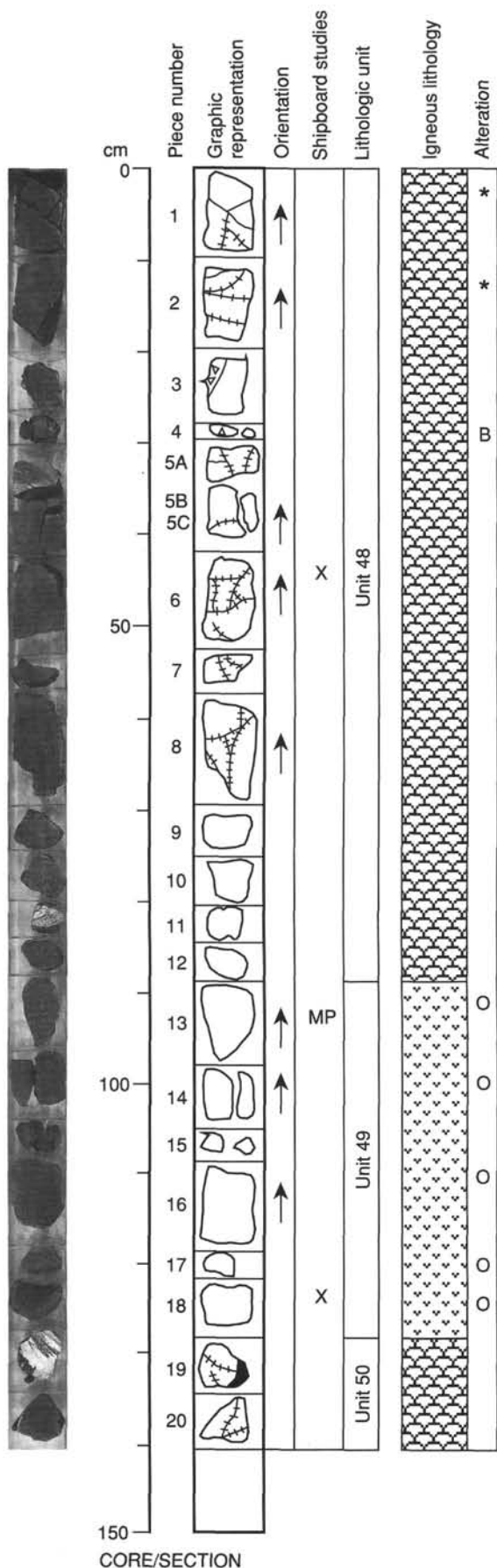
VEINS/FRACTURES: Seven clay and six clay + carbonate veins are all <1 mm wide. Clay cement to brecciated pieces.

CORE/SECTION

148-896A-29R-1

UNIT 48: MODERATELY PHYRIC PLAGIOCLASE-OLIVINE BASALT

Pieces 1-12



449.7 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 2.0%; 1.0 mm; euhedral-subhedral.

Olivine - 1.0%; 0.4 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray to red (5B 5/1 to 2.5YR 4/6).

STRUCTURE: Pillowed. Brecciated in Pieces 3 and 4.

ALTERATION: Slight to moderate oxidative alteration. Minor to partial oxidation of olivine to Fe-oxyhydroxides and clays. Generally olivine is replaced by green smectite. Gray-green halos developed around red halos (Piece 2).

VEINS/FRACTURES: Sixteen clay veins, two clay + Fe-oxyhydroxide veins, mostly <1 mm wide, and clay cement to the brecciated pieces.

UNIT 49: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 13-18

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 2.0%; 1.0 mm; euhedral-subhedral.

Olivine - 4.0%; 0.5 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Greenish gray to reddish brown (5BG 5/1 to 5YR 4/4).

STRUCTURE: Massive.

ALTERATION: Minor red/yellow alteration halos, in which olivine is partially replaced by Fe-oxyhydroxide minerals (e.g., Piece 16), otherwise gray background alteration.

VEINS/FRACTURES: No veins.

UNIT 50: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 19-20

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 4.0%; 1.0 mm; euhedral-subhedral.

Olivine - 5.0%; 0.5 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray (5B 5/1).

STRUCTURE: Pillowed.

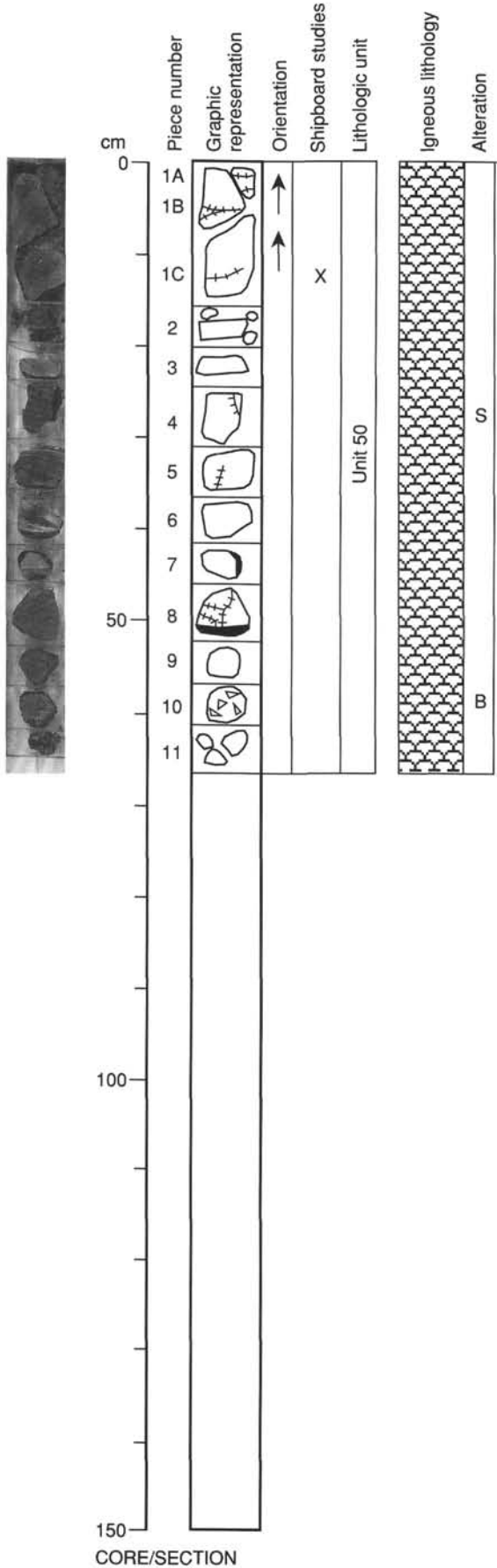
ALTERATION: Gray alteration. Olivine replaced by green smectite. Very minor red alteration halos.

VEINS/FRACTURES: Three clay veins, all <1 mm wide, and clay matrix to breccia in Piece 20.

150
CORE/SECTION

UNIT 50: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 1A-11



451.1 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 4.0%; 1.0 mm; euhedral-subhedral.
Olivine - 5.0%; 0.5 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Bluish gray (5B 5/1).

STRUCTURE: Pillowed. Breccia in Piece 10.

ALTERATION: Minor red alteration halos.

VEINS/FRACTURES: Thirteen clay veins, mostly <1 mm wide, and clay cement to the breccia in Piece 10.

148-896A-30R-1

UNIT 50: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 1-16

459.3 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 4.0%; 1.0 mm; euhedral-subhedral.

Olivine - 5.0%; 0.5 mm; euhedral-subhedral.

GROUNDMASS: Texture: Microcrystalline.

VESICLES: None.

COLOR: Greenish gray (5BG 5/1).

STRUCTURE: Pillowed. Brecciated in Pieces 4-11.

ALTERATION: Gray alteration. Olivine is replaced by green smectite. Red oxidized halos in Piece 12.

VEINS/FRACTURES: Twenty-one clay veins, one carbonate vein, two clay + carbonate, and four clay + Fe-oxyhydroxide veins are mostly <1 mm wide, and clay + carbonate cement to brecciated pieces.

UNIT 51: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 17-20

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 2.0%; 1.5 mm; euhedral-subhedral.

Olivine - 3.0%; 0.5 mm; euhedral-subhedral.

GROUNDMASS: Texture: Intergranular to subophitic.

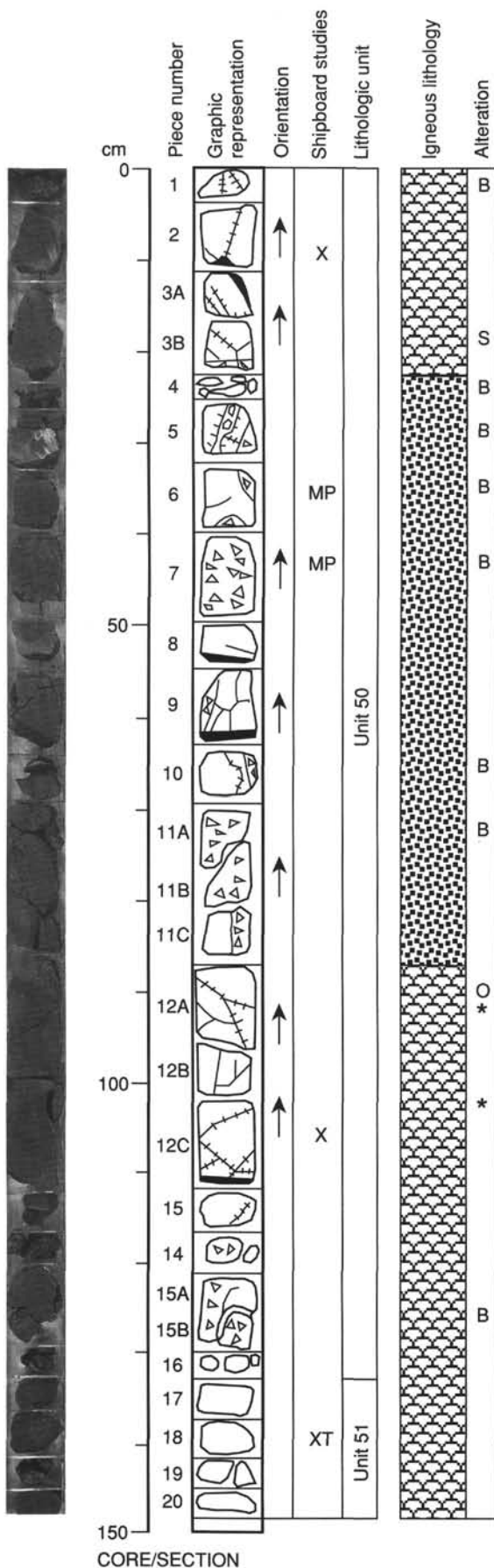
VESICLES: None.

COLOR: Greenish gray (5BG 5/1).

STRUCTURE: Pillowed.

ALTERATION: Olivine and groundmass altered to green smectite. Very minor oxidation to Fe-oxyhydroxide minerals.

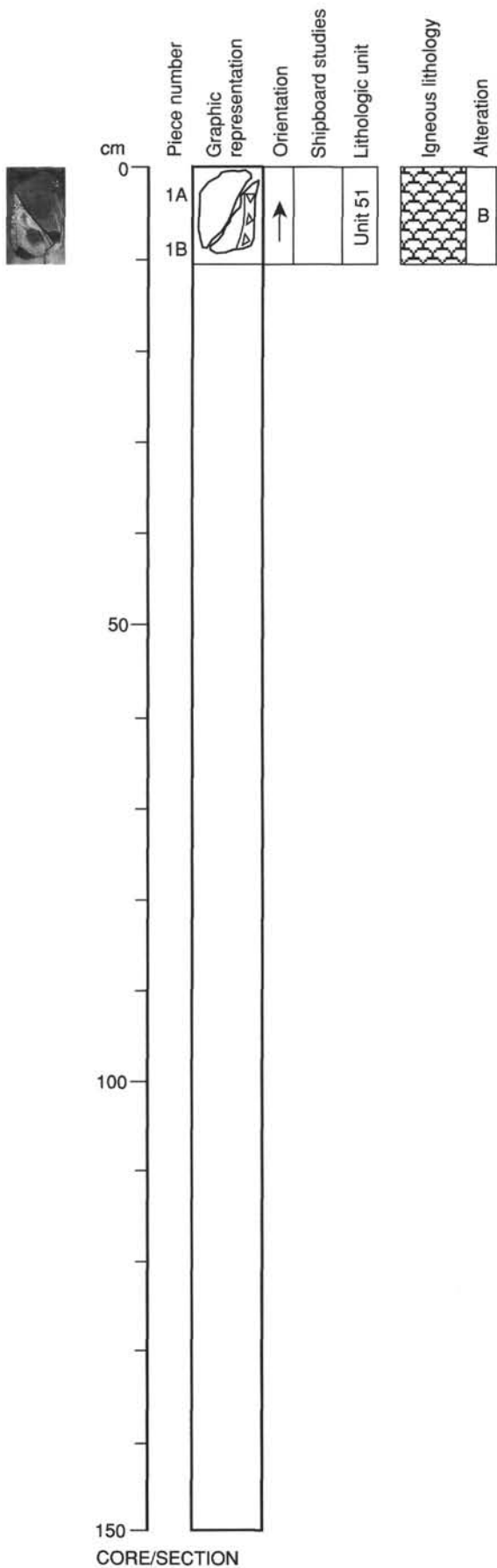
VEINS/FRACTURES: No veins.



CORE/SECTION

UNIT 51: MODERATELY PHYRIC OLIVINE-PLAGIOCLASE BASALT

Pieces 1A-1B



460.8 mbsf

CONTACTS: None.

PHENOCRYSTS:

Plagioclase - 2.0%; 1.5 mm; euhedral-subhedral.

Olivine - 3.0%; 0.5 mm; euhedral-subhedral.

GROUNDMASS: Texture: Intergranular to subophitic.

VESICLES: None.

COLOR: Greenish gray (5BG 5/1).

STRUCTURE: Pillowed and brecciated.

ALTERATION: Partial oxidation of interstitial groundmass and olivine to Fe-oxyhydroxide minerals.

VEINS/FRACTURES: One clay + Fe-oxyhydroxide vein, <1 mm wide, and clay cement to the breccia.