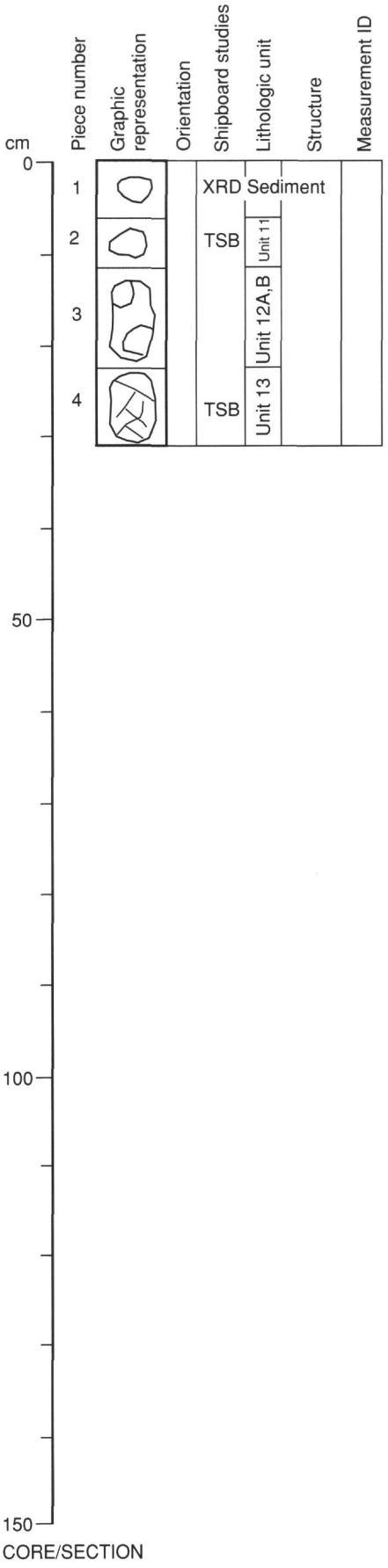
149-899B-29R-2



UNIT 11: APHYRIC BASALT

Piece 2

CONTACTS: This small basalt fragment is "armored" with a mud coating.
PHENOCRYSTS: None.
GROUNDMASS: 60% Plagioclase, with 38% altered pyroxene and minor other phases.
VESICLES: None.
COLOR: Medium gray (N5).
STRUCTURE: Not deformed, no primary flow structure.
ALTERATION: Groundmass is extensively altered.
VEINS/FRACTURES: Circular fractures parallel the margin of this cobble, indicating that this fragment is NOT the result of drilling through an "in-place" lava flow.

UNIT 12A: APHYRIC BASALT

Piece 3 (part)

CONTACTS: Fragment is within clay/serpentine matrix.
PHENOCRYSTS: None.
GROUNDMASS: Very altered with about 50% plagioclase.
VESICLES: None.
COLOR: Moderate red (5R 4/6).
STRUCTURE: Not deformed, no flow structure.
ALTERATION: Oxidized rim to fragment.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Pebble in serpentine mud (one of two). The serpentine mud displays a well-marked layering (alternating varied-colored serpentine layers) which is deformed and wrapped around the pebbles.

UNIT 12B: APHYRIC BASALT

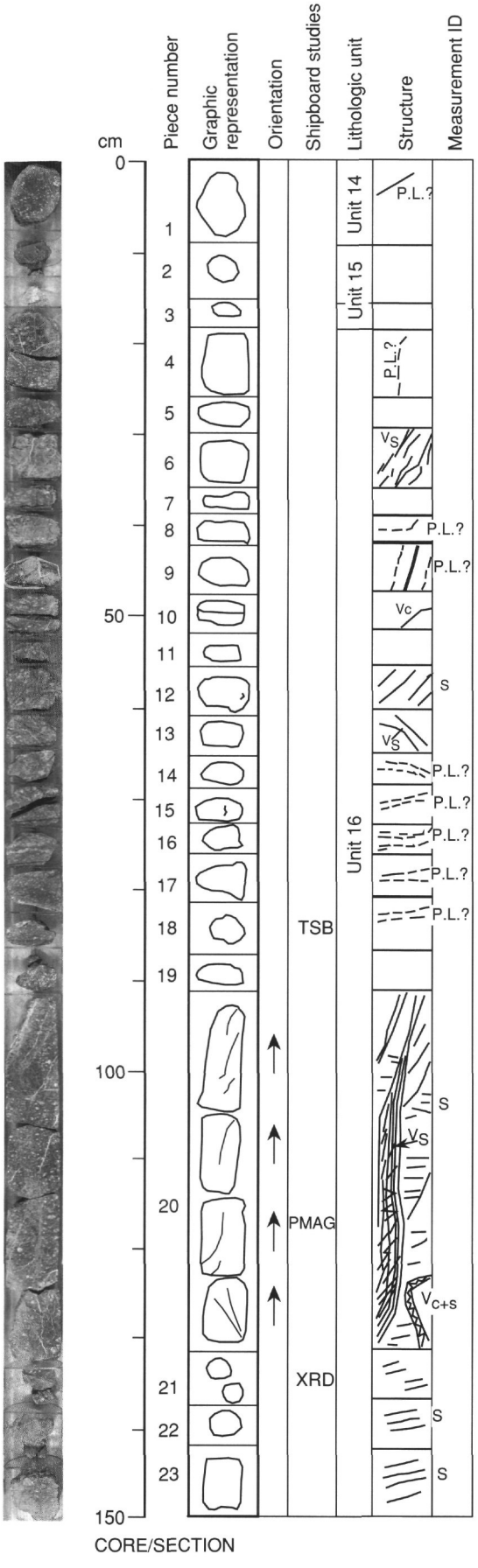
Piece 3 (part)

CONTACTS: Fragment is within clay/serpentine matrix.
PHENOCRYSTS: None.
GROUNDMASS: Extremely altered. Groundmass mineralogy obscured by alteration.
VESICLES: None.
COLOR: Medium gray (N5).
STRUCTURE: No flow structure, fractures (<1 mm thick) filled with green material.
VEINS/FRACTURES: Small irregular 1–2 mm veins (not calcite) of a white mineral.
ADDITIONAL COMMENTS: Angular basalt clast in serpentine mud (one of two), see Unit 12A.

UNIT 13: BLACK RADIOLARIAN CHERT

Piece 4

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Extremely fine-grained.
VESICLES: None.
COLOR: Dark gray (N3).
VEINS/FRACTURES: 2%; Up to 1 mm wide.; random; long thin white noncarbonate veins with abundant pyrite.



149-899B-30R-1

UNIT 14: SERPENTINIZED PERIDOTITE

Piece 1

COLOR: Medium gray (N3).
LAYERING: Weak banding marked by aligned pyroxene crystals.
DEFORMATION: Slight fracturing infilled with serpentine.
PRIMARY MINERALOGY:
Olivine - Mode: 85%.
Crystal size: ?
Crystal shape: ?
Crystal orientation: None.
Percent replacement: 100%.
Pyroxene - Mode: 15%.
Crystal size: 1–5 mm.
Crystal shape: Anhedral.
Crystal orientation: None.
Percent replacement: 100%.
Spinel - Mode: <1%
SECONDARY MINERALOGY:
Total percent: 100%.
Texture: Mesh serpentinite.
Vein material: Several small serpentine veins with some magnetite.
ADDITIONAL COMMENTS: This piece has marked concentric alteration around the margin of the fragment and thus may be a cobble derived from a sedimentary unit.

UNIT 15: DIABASE

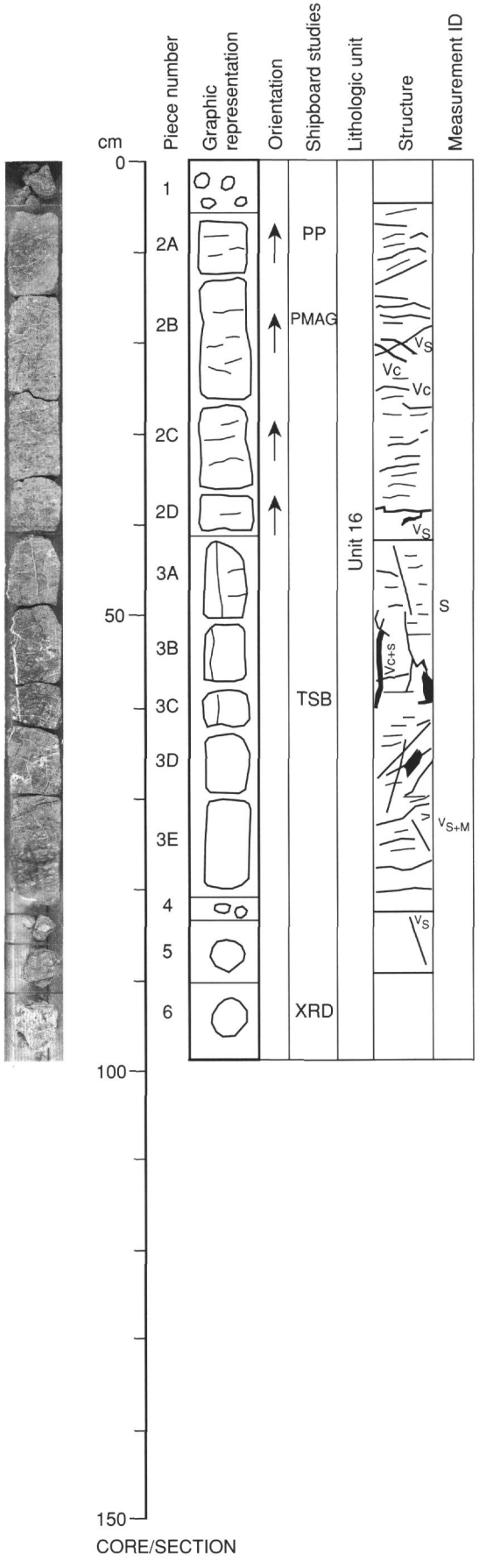
Pieces 2 and 3

COLOR: Very light gray (N8).
LAYERING: None.
DEFORMATION: None.
PRIMARY MINERALOGY:
Plagioclase - Mode: 60%.
Crystal size: 1 mm.
Crystal shape: Lath.
Crystal orientation: None.
Percent replacement: <95%.
Pyroxene - Mode: 40%.
Crystal size: 1 mm.
Crystal shape: Anhedral.
Crystal orientation: None.
Percent replacement: <95%.
SECONDARY MINERALOGY:
Total percent: <95%.
Texture: Diabasic texture.
Vein material: None.

UNIT 16: SERPENTINIZED PERIDOTITE

Pieces 4–23

COLOR: Olive gray (5Y 4/1).
LAYERING: Banding marked by aligned pyroxene crystals.
DEFORMATION: A foliation is developed in the serpentinite (Pieces 2 and 3), by the alignment of enlongated spinel crystals. Piece 2A shows that calcite fratures post-date serpentine veining. Pieces 6, 8, 9, and 20–23 are fractured.
PRIMARY MINERALOGY: Pyroxene is unevenly distributed, Pieces 1C, 1D, 2A, 2D, and 2E are pyroxene-poor peridotite.
Olivine - Mode: 70%.
Crystal size: ?
Crystal shape: ?
Crystal orientation: None.
Percent replacement: 100%
Pyroxene - Mode: 30%
Crystal size: 1–5 mm.
Crystal shape: Anhedral.
Crystal orientation: None.
Percent replacement: 100%.
Spinel - Mode: <1%.
SECONDARY MINERALOGY:
Total percent: 100%.
Texture: Mesh serpentinite.
Vein material: Serpentine veins up to 2 mm thick. Serpentinized veins likely derived from former pyroxenitic dikes with dunitic margins in the surrounding peridotite.
ADDITIONAL COMMENTS: This unit continues to 149-899B-30R-2.

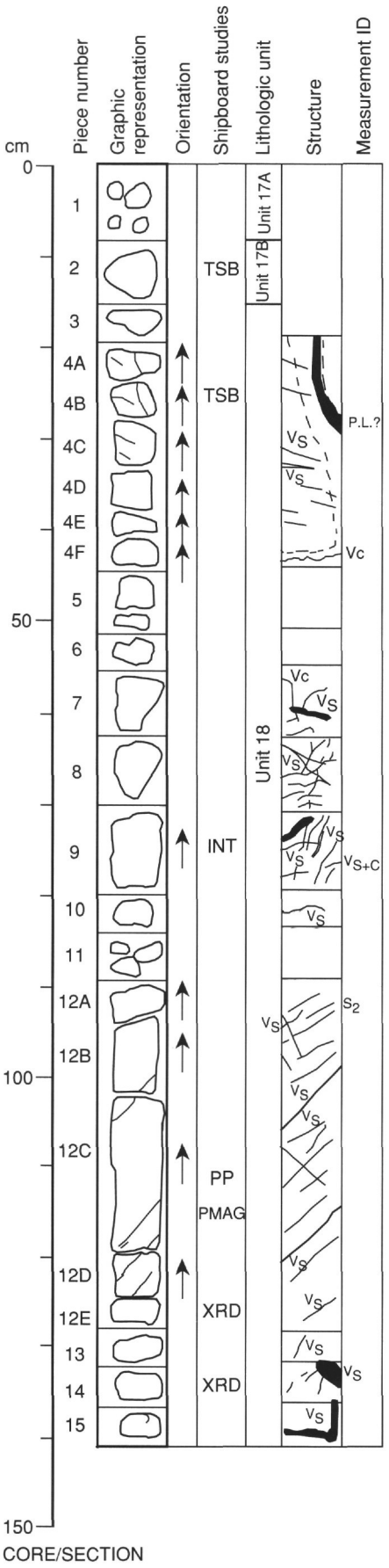


149-899B-30R-2

UNIT 16: SERPENTINIZED PERIDOTITE

Pieces 1–6

COLOR: Greenish gray (5GY 6/1).
LAYERING: None.
DEFORMATION: Elongated spinel crystals mark a foliation which is overprinted by fracturing filled in by serpentine and calcite.
PRIMARY MINERALOGY:
Olivine - Mode: 75%
Crystal size: ?
Crystal shape: ?
Crystal orientation: None.
Percent replacement: 100%.
Pyroxene - Mode: 25%.
Crystal size: 1–5 mm.
Crystal shape: Anhedral.
Crystal orientation: None.
Percent replacement: 100%.
Spinel - Mode: <1%.
SECONDARY MINERALOGY:
Total percent: 100%.
Texture: Mesh serpentinite.
Vein material: Serpentine veins up to 2 mm or more thick.
ADDITIONAL COMMENTS: This unit continues from 149-899B-30R-1.



149-899B-31R-1

UNIT 17A: APHYRIC BASALT

Piece 1

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Altered, perhaps plagioclase (50%) and pyroxene (50%).
VESICLES: 0%–3%; <1 mm; circular; random; very circular vesicles.
COLOR: Dark gray (N3).
STRUCTURE: None.
VEINS/FRACTURES: Fracture with green secondary mineral (?prehnite).
ADDITIONAL COMMENTS: Several basalt fragments, each somewhat different.

UNIT 17B: VARIOLITIC BASALT

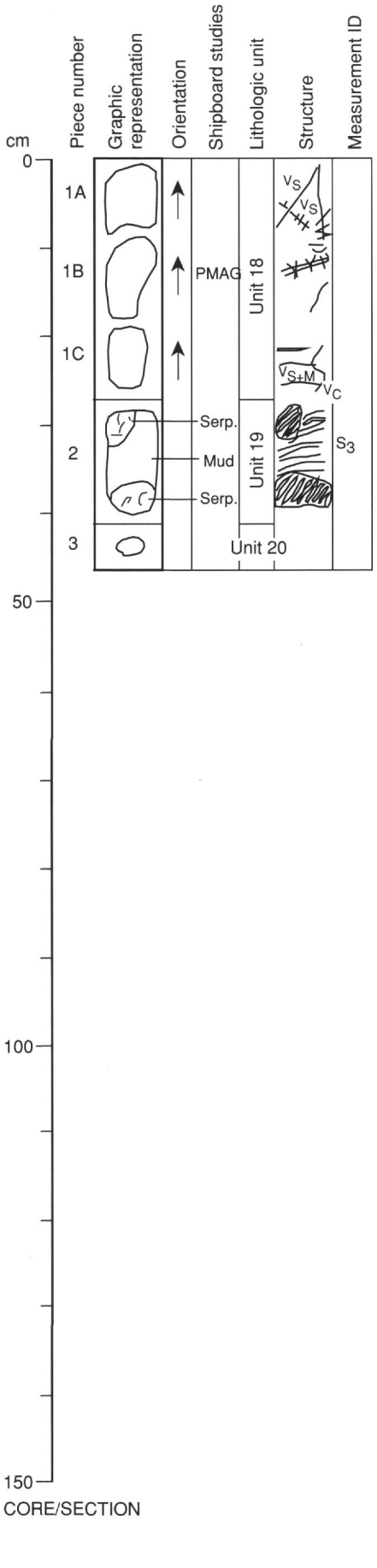
Piece 2 only

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Plagioclase in radiating aggregates (Variolites). Other phases not visible in hand specimen. Altered.
VESICLES: None.
COLOR: Medium gray (N4).
STRUCTURE: Not deformed, no flow structure.
ALTERATION: Highly altered.
ADDITIONAL COMMENTS: Piece 2 is probably a basaltic cobble.

UNIT 18: SERPENTINIZED PERIDOTITE

Pieces 3–15

COLOR: Dark greenish gray (5GY 4/1).
LAYERING: None.
DEFORMATION: Piece 12 is foliated. Late fractures filled with serpentine or calcite.
PRIMARY MINERALOGY: Pyroxene is unevenly distributed.
Olivine - Mode: 70%.
Crystal size: ?
Crystal shape: ?
Pyroxene - Mode: 30%.
Crystal size: 1–5 mm.
Spinel - Mode: <1%.
SECONDARY MINERALOGY:
Total percent: <95%.
Texture: Mesh serpentinite.
Vein material: Many serpentinite veins up to 3 or 4 mm wide. Some having dark borders and light interiors may be derived of former pyroxenithic dike intrusive in locally dunitic surrounding peridotite.
ADDITIONAL COMMENTS: This unit continues into 149-899B-31R-2. Pyroxene-rich bands are observed in Pieces 4A, 4B, 4C, and 8.



149-899B-31R-2

UNIT 18: SERPENTINIZED PERIDOTITE

Pieces 1A to 1C

COLOR: Dark greenish gray (5G Y4/1).
LAYERING: None.
DEFORMATION: Late fractures mainly infilled with serpentine.
PRIMARY MINERALOGY:
Olivine - Mode: 70%.
Crystal size: ?
Pyroxene - Mode: 30%.
Crystal size: 1–5 mm.
Spinel - Mode: <1%.
SECONDARY MINERALOGY:
Total percent: <95%.
Texture: Mesh serpentinite.
Vein material: Serpentine veins up to 2 mm thick.
ADDITIONAL COMMENTS: This unit continued from 149-899B-31R-1. Piece 1C is a pyroxene-poor peridotite.

UNIT 19: SERPENTINE/SEDIMENT COMPLEX

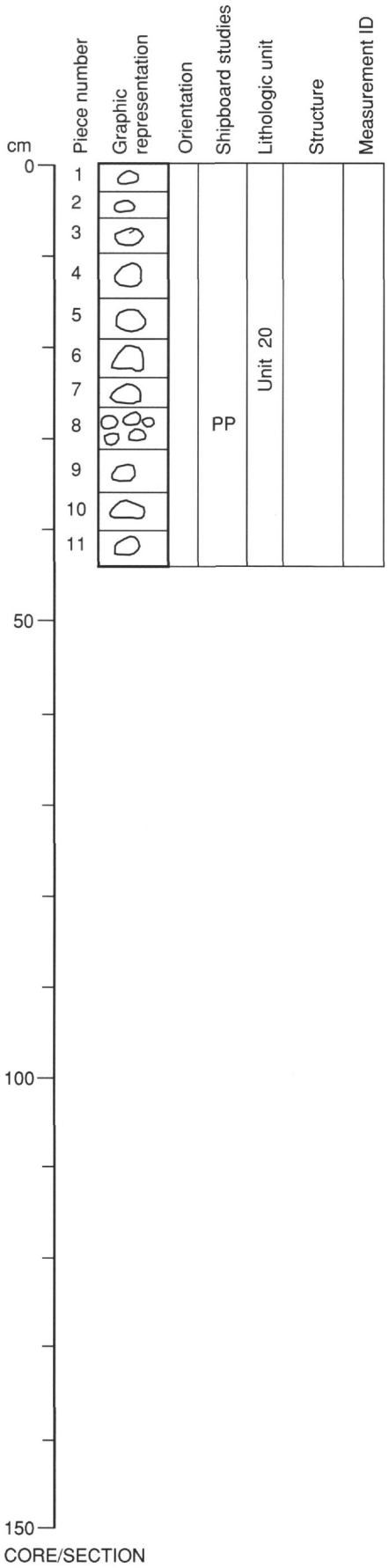
Piece 2

ADDITIONAL COMMENTS: This unit is a complex "sandwich" with two large peridotite fragments and an intervening mud-sand layer. The sandwich is interpreted to be "in-place" and not the result of drilling brecciation. The serpentine fragments show foliation and the intervening mud-serpentinite sand marked layering.

UNIT 20: SERPENTINIZED PERIDOTITE

Piece 3

COLOR: Dark greenish gray (5GY 4/1).
LAYERING: None.
DEFORMATION: None observed.
PRIMARY MINERALOGY:
Olivine - Mode: 70%.
Pyroxene - Mode: 25%–30%.
SECONDARY MINERALOGY: Form more than 95% secondary minerals.
ADDITIONAL COMMENTS: Unit continues in 149-899B-32R-1.



149-899B-32R-1

UNIT 20: BASALT

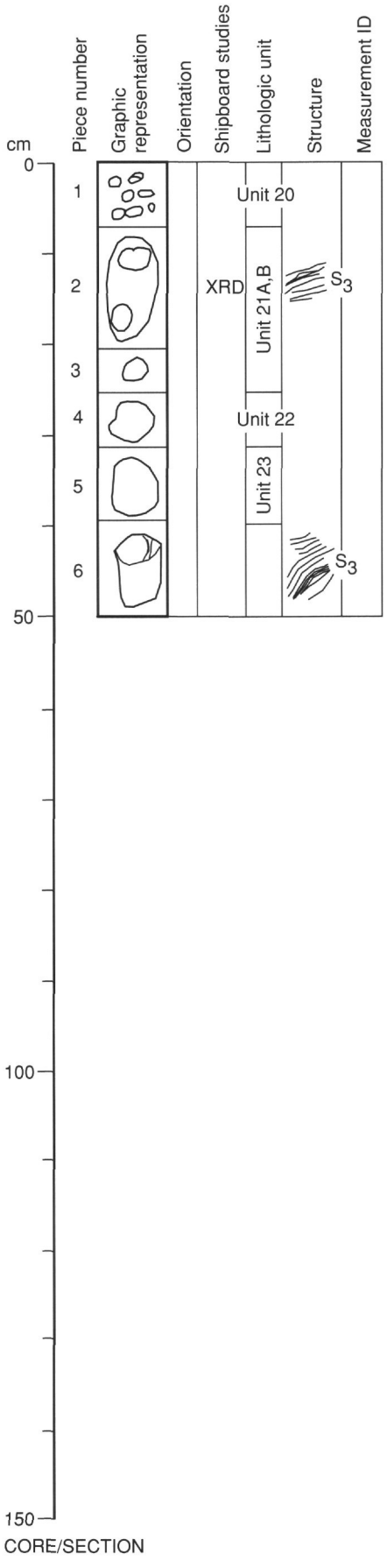
Piece 1

CONTACTS: None.
GROUNDMASS: Plagioclase (70%) and pyroxene (30%).
VESICLES: 0%.
COLOR: Light gray (N7).
STRUCTURE: Aphanitic.
ALTERATION: Alteration has destroyed much of the primary mineralogy.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Small clast or more likely drilling dropstone at top of section.

UNIT 20: SERPENTINIZED PERIDOTITE AND BRECCIA

Pieces 2–11

COLOR: Dark gray (N3).
LAYERING: None visible.
DEFORMATION: Late fractures.
PRIMARY MINERALOGY:
Olivine - Mode: 70%.
Crystal size: ?
Pyroxene - Mode: 30%.
Crystal size: .1–1 cm.
Crystal shape: Anhedral.
Crystal orientation: None.
Spinel - Mode: <1%.
SECONDARY MINERALOGY:
Total percent: >95%.
Texture: Mesh serpentinite.
Vein material: Serpentine veins up to 1 mm thick.
ADDITIONAL COMMENTS: The dominant lithology is a dark gray serpentinized peridotite described above. Pieces 2, 4, 6, 7, and 11 are of this type. Pieces 3, 5, 8 (some fragments), 9, and 10 are breccias. Piece 8 also contains a sediment "clast." These pieces are small! Disturbed by drilling. Significance uncertain. This unit continues into 149-899B-33R-1.



149-899B-33R-1

UNIT 20: SERPENTINIZED PERIDOTITE

Piece 1

COLOR: Dark gray (N3).
LAYERING: None.
DEFORMATION: None.
PRIMARY MINERALOGY:
Olivine - Mode: 70%.
Crystal size: ?
Pyroxene - Mode: 30%.
Crystal size: 1–5 mm.
Crystal shape: Anhedral.
Crystal orientation: None.
Spinel - Mode: <1%.
SECONDARY MINERALOGY:
Total percent: >95%.
Texture: Mesh serpentinite.
Vein material: Thin serpentine veins.
ADDITIONAL COMMENTS: This unit continues from 149-899B-32R-1.

UNIT 21A: FELDSPATHIC BASALT

Piece 2

CONTACTS: None.
GROUNDMASS: Plagioclase (70%) and acicular pyroxene (30%).
VESICLES: 1%.
COLOR: Light gray (N7).
STRUCTURE: None.
ALTERATION: Primary minerals largely altered.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Clast in sediment. The sediments are sheared.

UNIT 21B: APHYRIC BASALT

Piece 3

CONTACTS: None.
PHENOCRYSTS:
GROUNDMASS: Plagioclase (50%) and acicular pyroxene (50%).
VESICLES: 0%.
COLOR: Medium light gray (N6).
STRUCTURE: None.
ALTERATION: Primary minerals partly altered.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Clast in sediment.

UNIT 22: DIABASE

Piece 4

COLOR: Light gray (N7).
LAYERING: None.
DEFORMATION: None.
PRIMARY MINERALOGY: Most minerals appear altered.
Plagioclase - Mode: 60%.
Crystal size: 1–2 mm.
Pyroxene - Mode: 40%.
Crystal size: 1–2 mm.
SECONDARY MINERALOGY:
Vein material: None.

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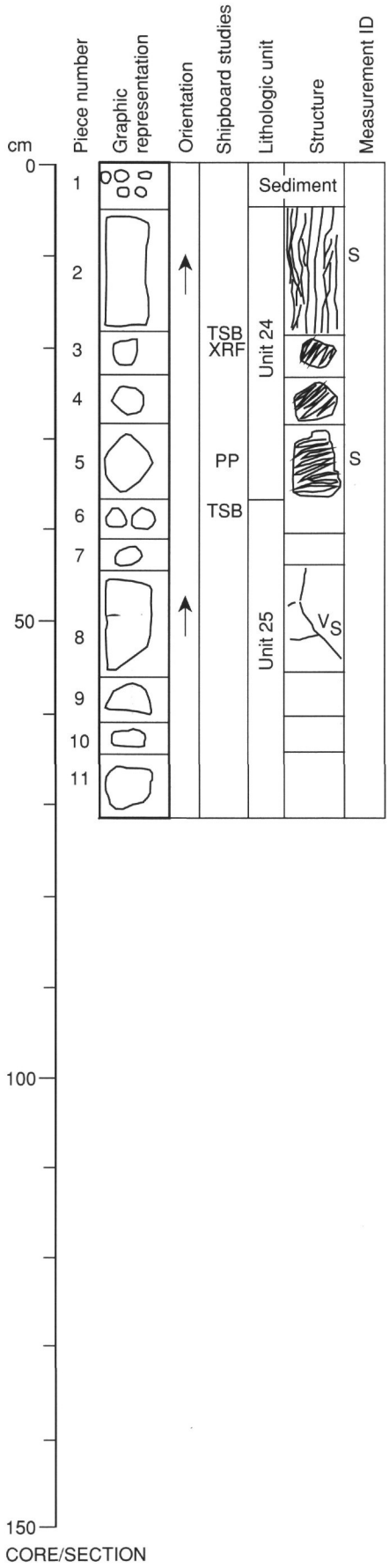
UNIT 23: APHYRIC BASALT

Piece 5

CONTACTS: None.
GROUNDMASS: Plagioclase laths (60%) and pyroxene (40%).
VESICLES: 1%; <2 mm; circular; random; filled.
COLOR: Medium light gray (N6).
STRUCTURE: None.
ALTERATION: Most minerals appear altered.
VEINS/FRACTURES: None.

149-899B-34R-1



UNIT 24: MYLONITIZED GABBRO

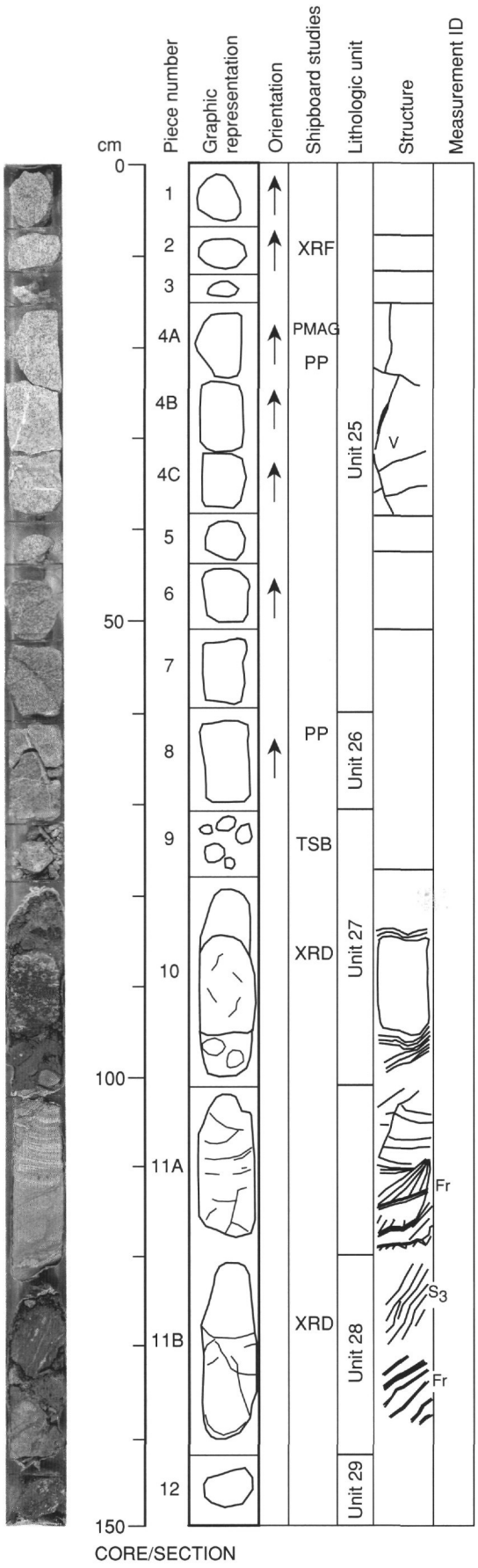
Pieces 2–5

CONTACTS: None.
GROUNDMASS: Sheared and broken crystals stretched into a mylonitic fabric.
VESICLES: None.
COLOR: Dark greenish gray (5GY 4/1) to light gray (N7).
STRUCTURE: Mylonization resulting from high shear deformation expressed by C-S fabric and rotational structures around porphyroclasts.
ALTERATION: Largely altered to serpentine.
VEINS/FRACTURES: <1mm; none; late pale green veins with pyrite cut mylonitic fabric.

UNIT 25: GABBRO

Pieces 6–11

COLOR: Medium light gray (N6).
LAYERING: None.
DEFORMATION: None.
PRIMARY MINERALOGY:
Plagioclase - Mode: 60%.
Crystal size: 1–3 mm.
Crystal shape: Lath.
Crystal orientation: None.
Pyroxene - Mode: 40%.
Crystal size: 1–3 mm.
Crystal shape: Anhedral.
Crystal orientation: None.
SECONDARY MINERALOGY:
Vein material: Late pale green veins up to 2 mm wide.
ADDITIONAL COMMENTS: Most minerals are altered. This unit continues into 149-899B-35R-1.



149-899B-35R-1

UNIT 25: GABBRO

Pieces 1–7

COLOR: Medium light gray (N6).
LAYERING: None.
DEFORMATION: None.
PRIMARY MINERALOGY:
Plagioclase - Mode: 60%.
Crystal size: 1–3 mm.
Crystal shape: Lath.
Crystal orientation: None.
Pyroxene - Mode: 40%.
Crystal size: 1–3 mm.
Crystal shape: Anhedral.
Crystal orientation: None.
SECONDARY MINERALOGY:
Vein material: Late light green veins cut by red-brown breccia vein up to 0.8 mm wide.
ADDITIONAL COMMENTS: Most minerals are altered. This unit continues from 149-899B-34R-1.

UNIT 26: EPIDOTIZED GABBRO?

Piece 8

COLOR: Greenish gray (5GY 6/1)
LAYERING: None.
DEFORMATION: None.
PRIMARY MINERALOGY: Primary minerals totally destroyed by alteration to epidote and (?).
Plagioclase - Mode: 50%.
Crystal size: 1–5 mm.
Crystal shape: Anhedral.
Pyroxene - Mode: 40%.
Crystal size: ?
SECONDARY MINERALOGY:
Total percent: 100%.
Texture: Hypidiomorphic, intergranular.
Vein material: Thin calcite veins.
ADDITIONAL COMMENTS: Distinguished from the gabbro unit above on the basis of grain size and totally different alteration mineralogy.

UNIT 27: SERPENTINITE/BLOCK/SEDIMENT COMPLEX

Pieces 9 and 10

ADDITIONAL COMMENTS: Piece 9 and the upper part of Piece 10 are green soft serpentinite. The middle portion of Piece 10 is a serpentinite block. The lower part is a mud/silt sediment containing a red/brown basalt and a second breccia clast. The association of soft green serpentinite and mud was also noted in Section 149-899B-27R-1.

UNIT 28: SERPENTINITE/BLOCK/SEDIMENT COMPLEX

Pieces 11A and 11B

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ADDITIONAL COMMENTS: Piece 11A is a 20 cm section of quartz/feldspar-bedded sandstone. The upper part of Piece 11B is fragment of bedded sediment with a thin mud coating. A small area of serpentinite mud(?) separates this upper block from a piece of veined basalt which forms the lower part of Piece 11B.