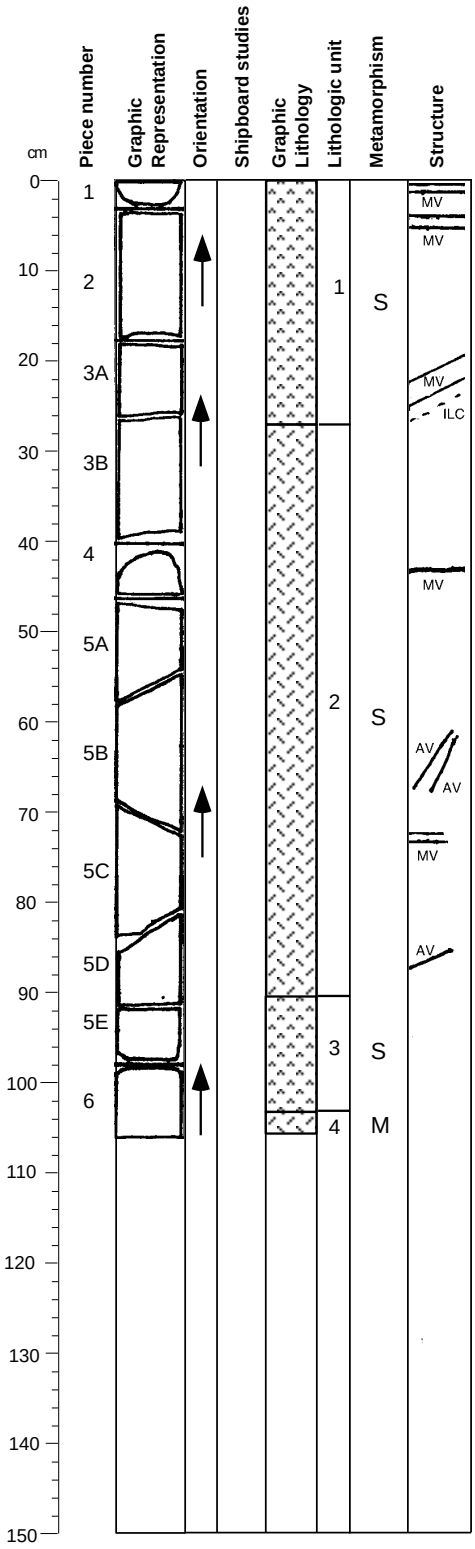
Core Photo



179-1105A-1R-1

INTERVAL: 1 OXIDE-BEARING OLIVINE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	Not recovered				
Lower contact:	1R	1	2	0.27 m	15.27 m
Thickness (m):	Not determined				
Contact Type:	Grain size, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	15	2		equant/subhedral
Clinopyroxene	35	60	2		blocky/subhedral
Olivine	10	20	2		rounded/anhedral
Fe-Ti oxide	1				angular/disseminated
Total	**101**				

GRAIN SIZE: Pegmatitic

TEXTURE: Inequigranular

ALTERATION: 7.5%

COMMENTS: Thin felsic veins in Pieces 1 and 2. 3 cm thick dipping felsic vein in Piece 3A. 1% oxides disseminated but more abundant near vein. Alteration higher near vein in Piece 3A.

INTERVAL: 2 OXIDE and OLIVINE-BEARING GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	1R	1	2	0.27 m	15.27 m
Lower contact:	1R	1	5D	0.90 m	15.90 m
Thickness (m):	0.63				
Contact Type:	Grain size, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	70	3	1	2	equant/subhedral
Clinopyroxene	30	5	1	3	tabular/subhedral
Olivine	1	1	1	1	rounded/anhedral
Fe-Ti oxide 1				angular/disseminated	
Total	**102**				

GRAIN SIZE: Medium

TEXTURE: Granular, Subophitic, Uniform Distribution

ALTERATION: 2%

COMMENTS: Massive, with thin felsic veins at 43, 73, and 90 cm.

INTERVAL: 3 OXIDE-BEARING OLIVINE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	1R	1	5D	0.90 m	15.90 m
Lower contact:	1R	1	6	1.03 m	16.03 m
Thickness (m):	0.13				
Contact Type:	Grain size, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	8	4	5	equant/subhedral
Clinopyroxene	35	20	2	10	tabular/subhedral
Olivine	5	4	2	4	rounded/anhedral
Fe-Ti oxide	1				angular/disseminated
Total	**101**				

GRAIN SIZE: Coarse

TEXTURE: Subophitic, Uniform Distribution, Inequigranular

ALTERATION: 4.5%

COMMENTS: Thin veins with an alteration patch 35 x 15 mm. Olivines pervasively altered near patch. Patch is orange-brown and follows a microfracture network.

INTERVAL: 4 OXIDE-BEARING GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	1R	1	6	1.03 m	16.03 m
Lower contact:	1R	2	4A	1.21 m	17.29 m
Thickness (m):	1.26				
Contact Type:	Grain size, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	8	2	3	equant/anbhedral
Clinopyroxene	40	5	1	3	elongate/eubhedral
Fe-Ti oxide	1				equant/disseminated
Unidentified	9				
Total	**100**				

Continued next page

Core Photo

179-1105A-1R-1 (cont'd)

GRAIN SIZE: Medium

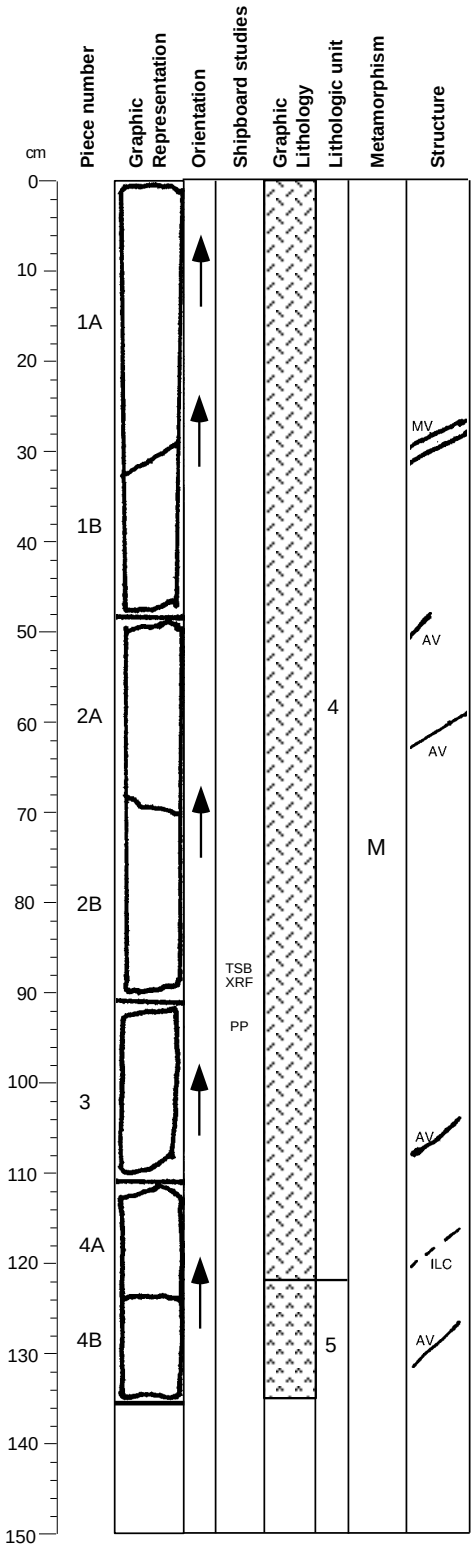
TEXTURE: Equigranular, Uniform Distribution

ALTERATION: 11%

COMMENTS: Massive, ca. 7 mm thick felsic vein at 34 cm, thin (<3mm) actinolite veins at 50.5, 61.5, 67, and 75 cm in Section 179-1105A-1R-2, Piece 2. Leucocratic vein at 109.5 cm in Section 179-1105A-1R-2, Piece 3. A thin section from the lower part of this interval contains 3-5% olivine.

STRUCTURE: The section displays igneous textures but no magmatic foliation. Felsic veins are in Pieces 1, 2, 3, 4, and 5. Alteration veins are in Piece 5.

Core Photo



179-1105A-1R-2

INTERVAL: 4 **OXIDE-BEARING GABBRO**
(see previous section)

INTERVAL: 5 **OLIVINE GABBRO**

				Depth	Depth
Interval Location:	**Core**	**Section**	**Piece**	**in Section**	**mbsf**
Upper contact:	**1R**	**2**	**4A**	**1.21 m**	**17.29 m**
Lower contact:	**1R**	**3**	**6**	**0.66 m**	**18.11 m**
Thickness (m):	**0.82**				
Contact Type:	**Grain size change, modal change**				

		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	55	15	3	8	tabular/anhedral
Clinopyroxene	35	30	3	18	elongate/subhedral
Olivine	10	10	2	7	semirounded/ anhedral
Total	**100**				

GRAIN SIZE: Coarse

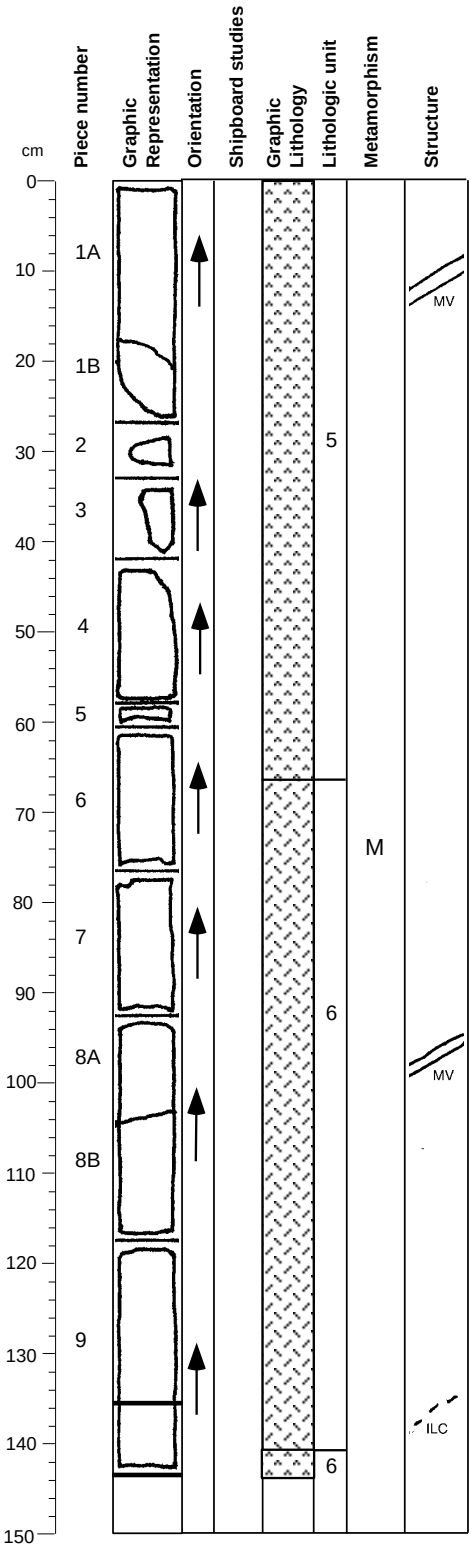
TEXTURE: Equigranular

ALTERATION: 13.75%

COMMENTS: Grain size change at upper contact (medium-coarse) and lower contact (coarse to medium), also appears more olivine rich than intervals 4 and 6. Top contact abrupt, lower contact more gradational.

STRUCTURE: This section displays igneous textures, magmatic felsic veins in Piece 1, and alteration veins in Pieces 1, 2, 3, and 4.

Core Photo



179-1105A-1R-3

INTERVAL: 5 **OLIVINE GABBRO**
(see previous section)

INTERVAL: 6 **OLIVINE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**1R**	**3**	**6**	**0.66 m**	**18.11 m**
Lower contact:	**1R**	**3**	**9**	**1.41 m**	**18.86 m**
Thickness (m):	**0.75**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	57	18	2	7	tabular/subhedral
Clinopyroxene	40	15	2	10	angular/subhedral
Olivine	3	3	2	3	rounded/anhedral
Total	**100**				

GRAIN SIZE: Coarse

TEXTURE: Subophitic

ALTERATION: 4.5%

COMMENTS: Grain size constant. Interval contains felsic vein.

INTERVAL: 7 **OLIVINE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**1R**	**3**	**9**	**1.41 m**	**18.86 m**
Lower contact:	**1R**	**4**	**2**	**0.38 m**	**19.28 m**
Thickness (m):	**0.75**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	10	1	4	equant/subhedral
Clinopyroxene	40	26	1	7	angular/subhedral
Olivine	5	3	1	2	rounded/anhedral
Total	**100**				

GRAIN SIZE: Medium

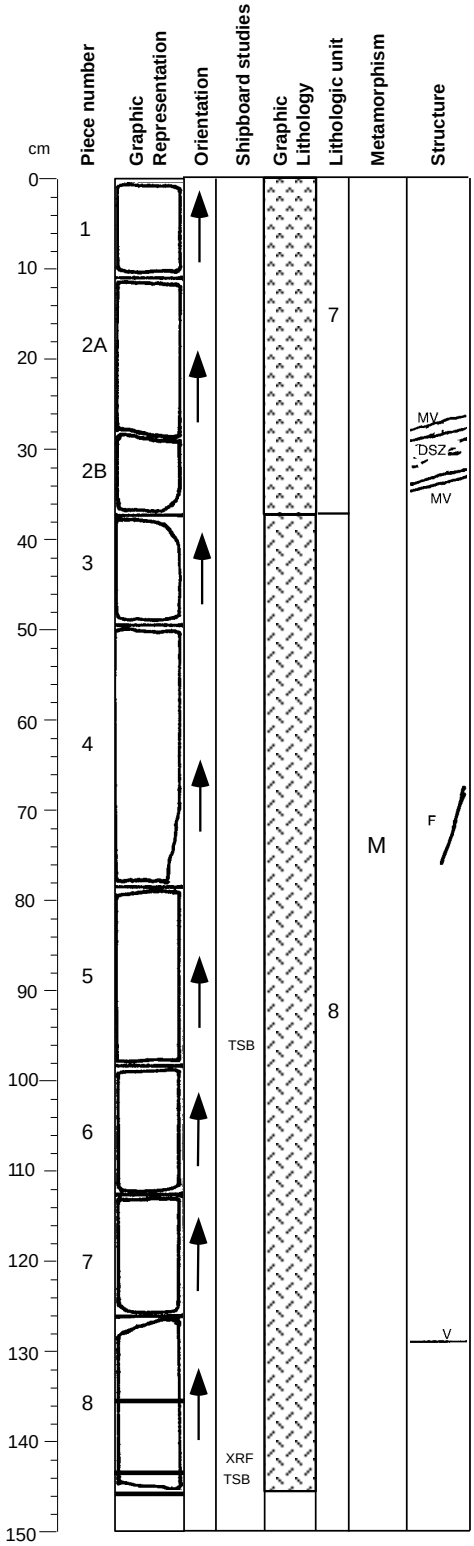
TEXTURE: Granular

ALTERATION: 8%

COMMENTS: Grain size gets coarser close to the bottom (olivine also increases). There is a felsic vein in Section 179-1105A-1R-4 (27-31 cm) and a very thin vein in Section 1R-4 (37 cm).

STRUCTURE: This section displays igneous textures with no magmatic fabric. Felsic veins are in Pieces 1A and 8A.

Core Photo



179-1105A-1R-4

INTERVAL: 7 **OLIVINE GABBRO**
(see previous section)

INTERVAL: 8 **OXIDE and OLIVINE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**1R**	**4**	**2**	**0.38 m**	**19.28 m**
Lower contact:	**1R**	**5**	**7**	**1.03 m**	**21.39 m**
Thickness (m):	**2.12**				
Contact Type:	**Grain size change**				

		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	60	20	1		tabular/subhedral
Clinopyroxene	40	40	2		blocky/subhedral
Olivine	1	4	1	2	rounded/anhedral
Fe-Ti oxide	trace				angular/disseminated
Total	**101**				

GRAIN SIZE: Medium-pegmatitic

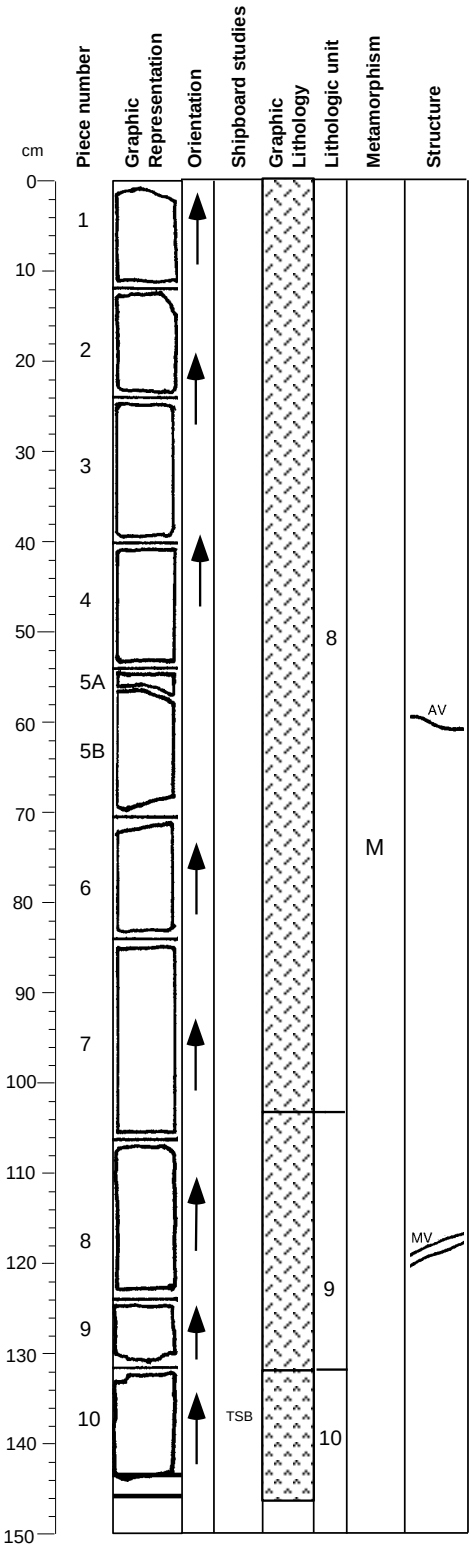
TEXTURE: Granular, Graded

ALTERATION: 2%

COMMENTS: Grain-size increases gradationally toward bottom. Olivine is irregularly disseminated and locally more abundant.

STRUCTURE: This section displays igneous textures, except in Pieces 2A and 2B in the vicinity of two felsic veins where a weak ductile foliation is associated with a shear zone. A fault with slickensides indicating dip-slip is on the edge of Piece 4.

Core Photo



179-1105A-1R-5

INTERVAL: 8 **OXIDE and OLIVINE-BEARING GABBRO**
(see previous section)

INTERVAL: 9 **OXIDE and OLIVINE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**1R**	**5**	**7**	**1.03 m**	**21.39 m**
Lower contact:	**1R**	**5**	**9**	**1.32 m**	**21.68 m**
Thickness (m):	**0.29**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	8	2	5	equant/subhedral
Clinopyroxene	35	8	1	5	blocky/subhedral
Olivine	2	5	1	3	amoeboidal/anhedral
Fe-Ti oxide	trace				angular/disseminated
Total	**101**				

GRAIN SIZE: Coarse

TEXTURE: Granular, Uniform

ALTERATION: 2%

COMMENTS: 8 mm felsic vein with a 4 cm alteration halo affecting mostly olivine. Elsewhere olivine is fresh. Pyrite and chalcopyrite present. Lower 10 cm is more highly altered along a fracture network.

INTERVAL: 10 **OXIDE-BEARING OLIVINE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**1R**	**5**	**9**	**1.32 m**	**21.68 m**
Lower contact:	**1R**	**6**	**1**	**0.03 m**	**21.85 m**
Thickness (m):	**0.17**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	10	1	8	equant/subhedral
Clinopyroxene	40	20	2	15	equant/subhedral
Olivine	10	15	2	2	rounded/anhedral
Fe-Ti oxide	1				angular/disseminated
Total	**101**				

GRAIN SIZE: Coarse

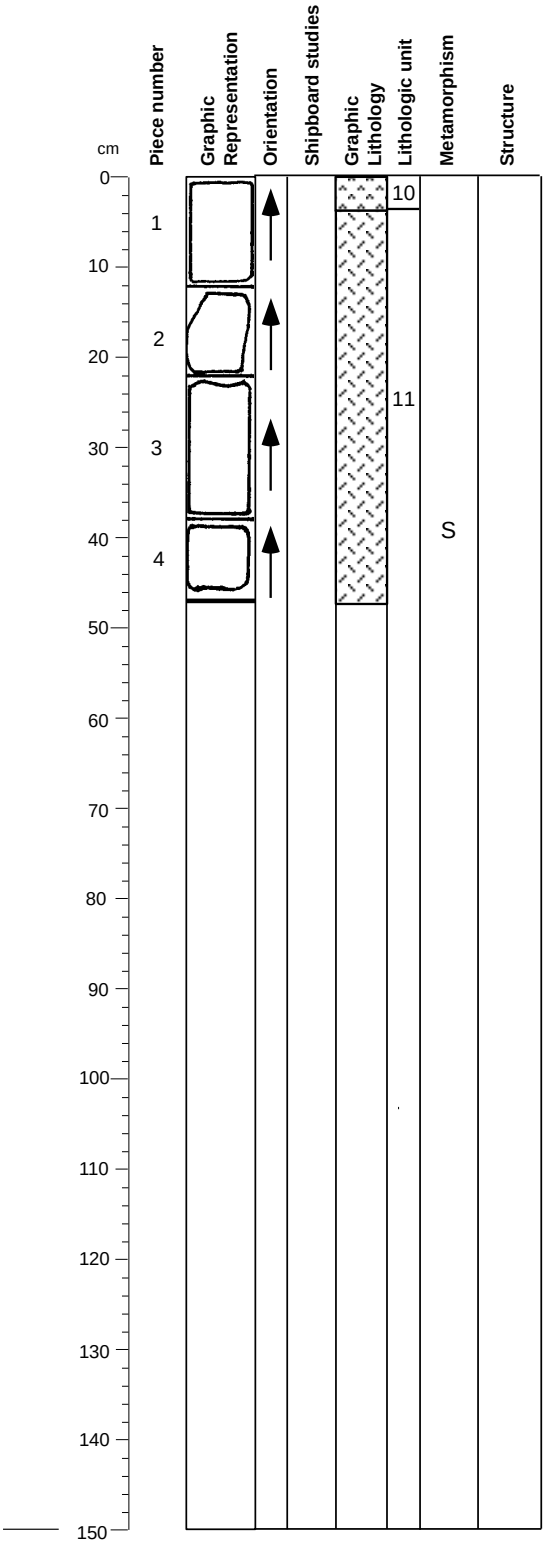
TEXTURE: Granular, Massive

ALTERATION: 6%

COMMENTS: Massive equigranular and olivine rich.

STRUCTURE: This section displays igneous textures and no magmatic fabric. There is an alteration vein in Piece 5 and a felsic vein in Piece 8.

Core Photo



CORE/SECTION

179-1105A-1R-6

INTERVAL: 10 **OXIDE-BEARING OLIVINE GABBRO**
(see previous section)

INTERVAL: 11 **OLIVINE-BEARING GABBRO**

Interval Location:	**Core**	**Section**	**Piece**	**Depth in Section**	**Depth mbsf**
Upper contact:	**1R**	**6**	**1**	**0.03 m**	**21.85 m**
Lower contact:	**3R**	**1**	**3**	**0.90 m**	**29.60 m**
Thickness (m):	**7.75**				
Contact Type:	**Grain size change, textural change, modal change**				

		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	60	10	2	6	amoeboidal/anhedral
Clinopyroxene	37	8	2	5	prismatic/subhedral
Olivine	3	7	2	4	rounded/anhedral
Total	**100**				

GRAIN SIZE: Coarse

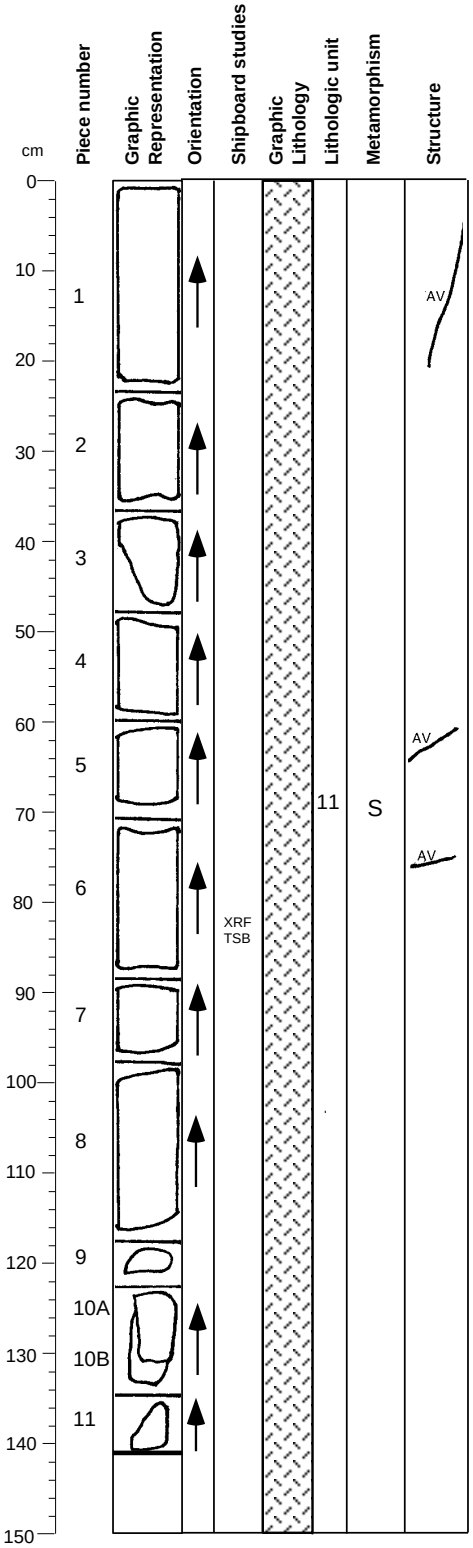
TEXTURE: Granular

ALTERATION: 1%

COMMENTS: 5 mm thick felsic vein at 58 cm in Section 179-1105A-2R-2. 10 mm thick felsic veins at 50-75, 95, 104, and 108 cm in Section 179-1105A-2R-3. Very thin felsic vein in Pieces 1, 5, Section 179-1105A-2R-1. Olivine is irregularly disseminated and locally more abundant (to 5%).

STRUCTURE: This section displays igneous textures.

Core Photo

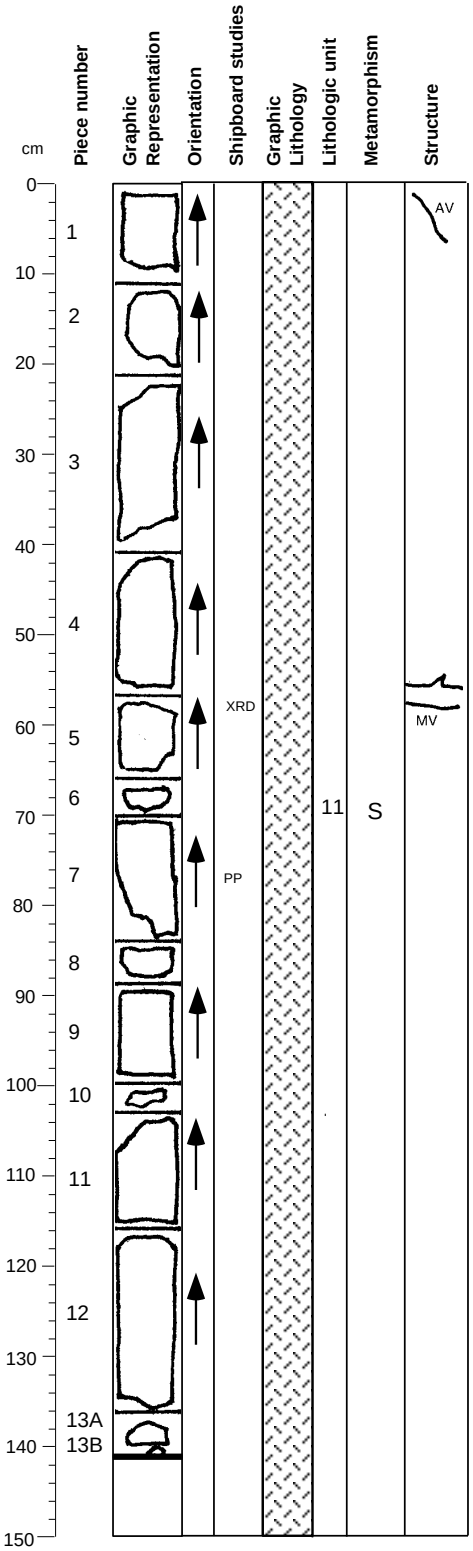


179-1105A-2R-1

INTERVAL: 11 **OLIVINE-BEARING GABBRO**
(see previous section)

STRUCTURE: This section displays igneous textures and no magmatic foliation. There are alteration veins in Pieces 1, 5, and 6.

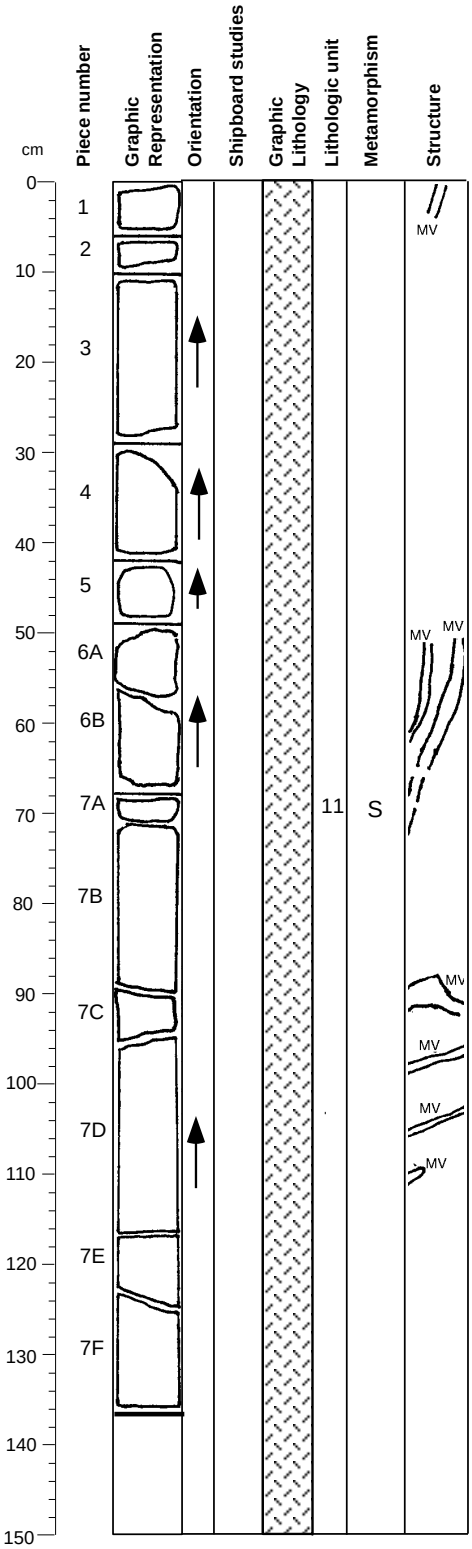
Core Photo



INTERVAL: 11 **OLIVINE-BEARING GABBRO**
(see Section 179-1105A-1R-6)

STRUCTURE: This section displays igneous textures and no magmatic foliation. There are felsic veins in Pieces 5 and 6, and an alteration vein in Piece 1.

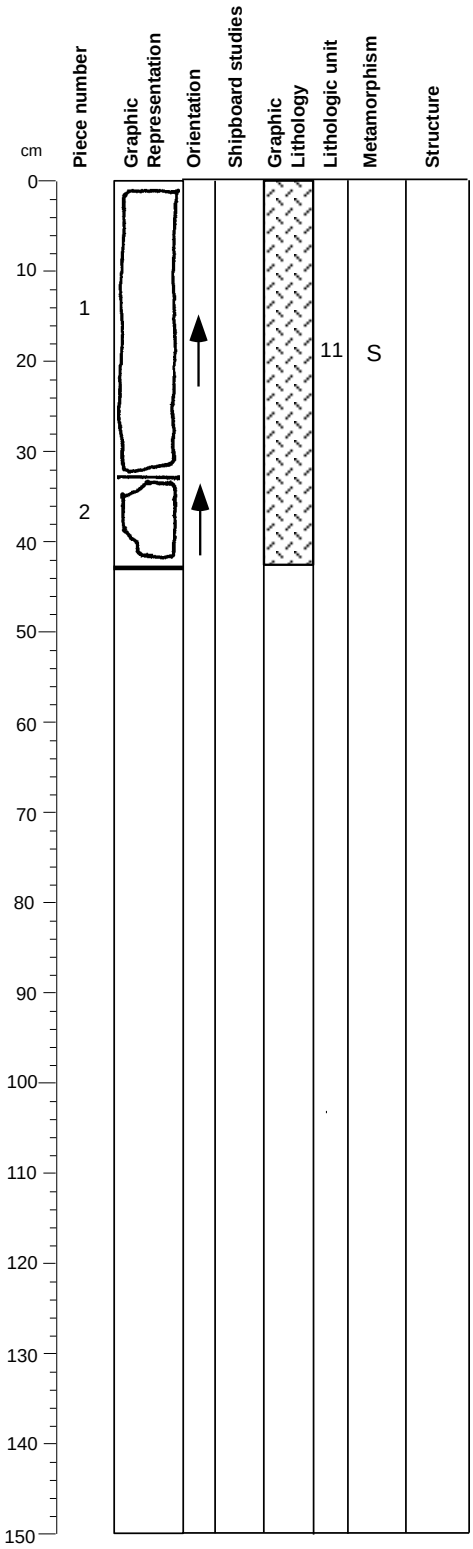
Core Photo



INTERVAL: 11 **OLIVINE-BEARING GABBRO**
(see Section 179-1105A-1R-6)

STRUCTURE: This section displays igneous textures and no magmatic foliation. There are abundant felsic veins in Pieces 1, 6, and 7. There appears to be net-vein breccias in some pieces (e.g., Piece 7D).

Core Photo



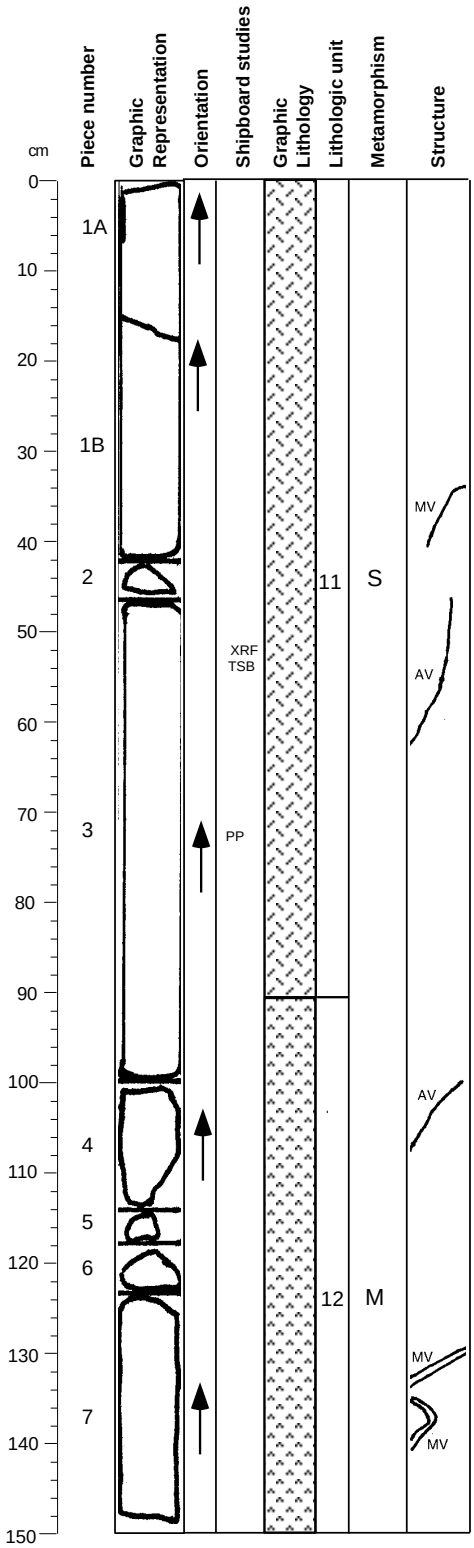
179-1105A-2R-4

INTERVAL: 11 **OLIVINE-BEARING GABBRO**
(see Section 179-1105A-1R-6)

STRUCTURE: This section displays no structural fabrics, simply igneous textures.

CORE/SECTION

Core Photo



179-1105A-3R-1

INTERVAL: 11 **OLIVINE-BEARING GABBRO**
(see Section 179-1105A-1R-6)

INTERVAL: 12 **OLIVINE GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	3R	1	3	0.90 m	29.60 m
Lower contact:	3R	2	4	0.63 m	30.67 m
Thickness (m):	1.07				
Contact Type:	Grain size change, modal change				
		Grain Size (mm):			
	Mode (%)	Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	8	1	4	tabular/subhedral
Clinopyroxene	40	15	2	6	blocky/subhedral
Olivine	5	4	1	2	rounded/anhedral
Total	100				

GRAIN SIZE: Medium

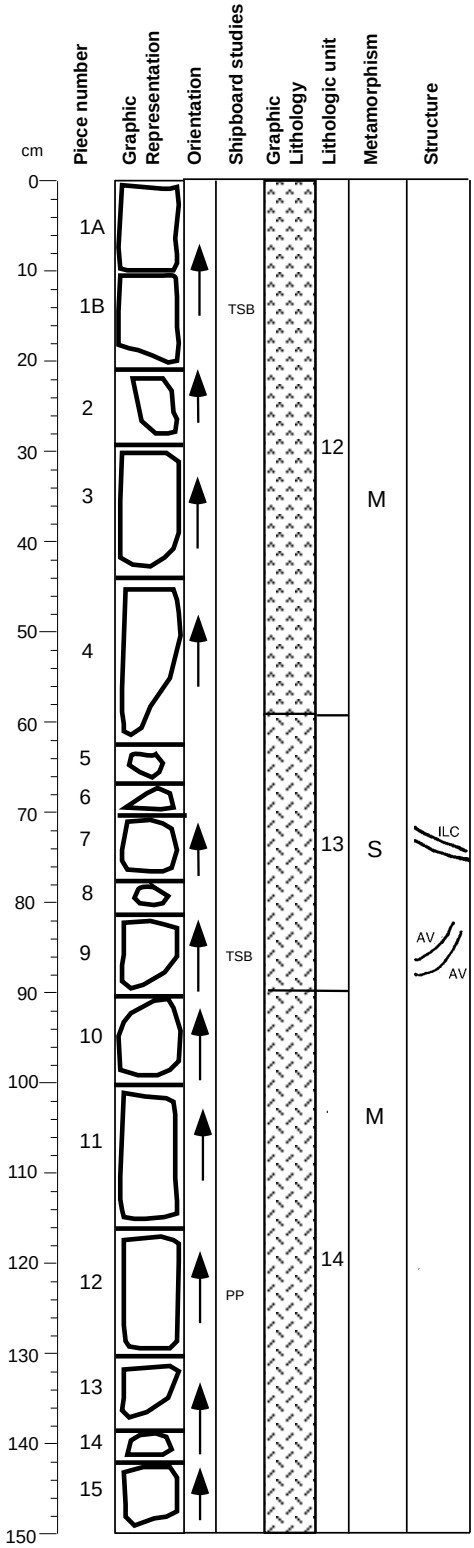
TEXTURE: Granular

ALTERATION: 7 %

COMMENTS: Massive gabbro. Felsic vein in Section 179-1105A-3R-2 (64 cm).

STRUCTURE: This section displays igneous textures with no magmatic foliation.

Core Photo



179-1105A-3R-2

INTERVAL: 12 **OLIVINE GABBRO**
(see previous section)

INTERVAL: 13 **OLIVINE-BEARING GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	**3R**	**2**	**4**	**0.63 m**	**30.67 m**
Lower contact:	**3R**	**2**	**9**	**0.91 m**	**30.95 m**
Thickness (m):	**0.28**				
Contact Type:	**Grain size change, textural change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	63	12	1	3	amoeboidal/anhedral
Clinopyroxene	35	7	1	3	prismatic/subhedral
Olivine	2	3	1	2	rounded/anhedral
Total	**100**				

GRAIN SIZE: Fine-medium

TEXTURE: Granular

ALTERATION: 1 %

COMMENTS: Alternating bands of coarse- and fine-grained gabbro. Thin chlorite veins. Oxide is locally present near veins.

INTERVAL: 14 **GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	**3R**	**2**	**9**	**0.91 m**	**30.95 m**
Lower contact:	**3R**	**3**	**8**	**0.72 m**	**32.14 m**
Thickness (m):	**1.19**				
Contact Type:	**Grain size change, textural change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	10	2	6	tabular/subhedral
Clinopyroxene	40	20	2	8	angular/subhedral
Total	**100**				

GRAIN SIZE: Medium-coarse

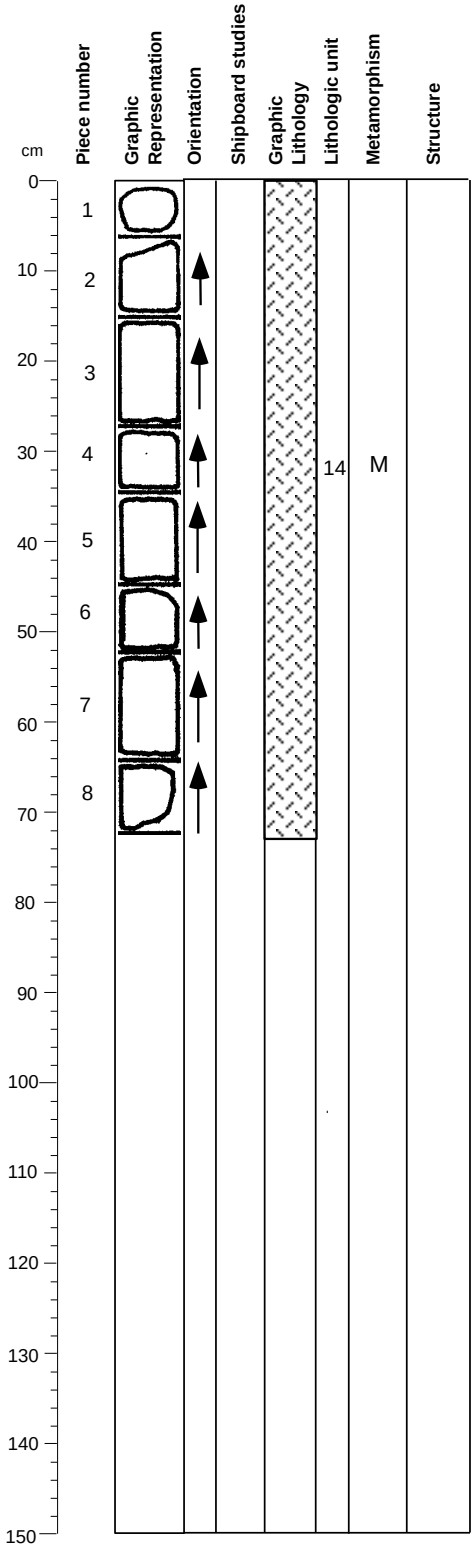
TEXTURE: Inequigranular

ALTERATION: 10 %

COMMENTS: Medium- to coarse-grained massive gabbro.

STRUCTURE: This section displays igneous textures without magmatic foliation. An igneous layer in Piece 7 has an inclination of 29 degrees. There are two alteration veins in Piece 9.

Core Photo

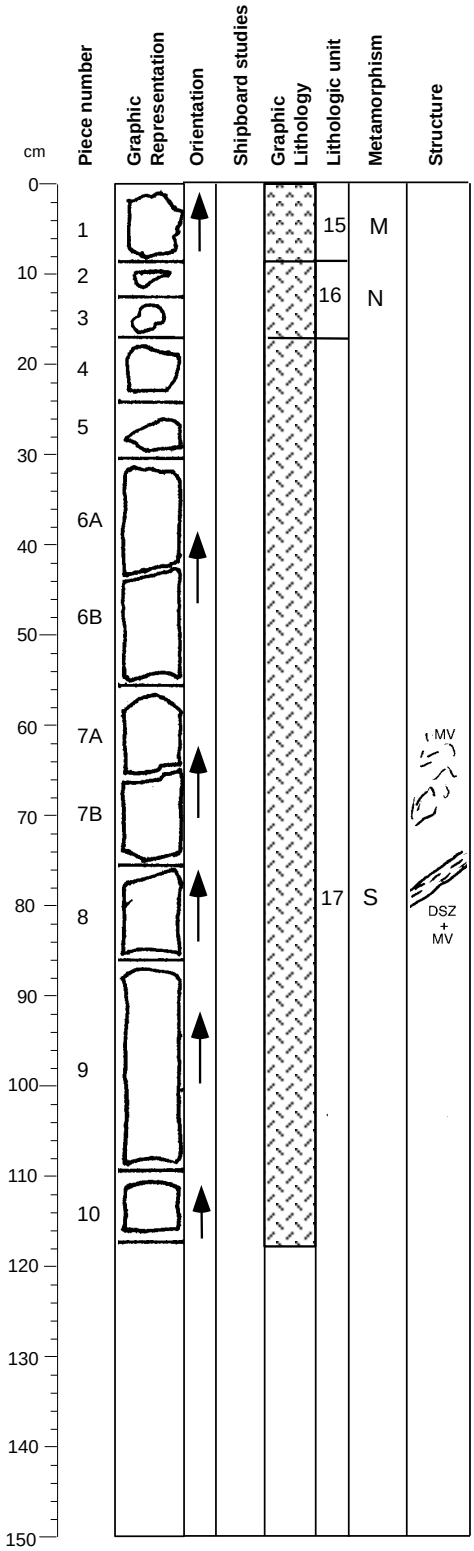


INTERVAL: 14 **GABBRO**
(see previous section)

STRUCTURE: This section displays igneous textures without magmatic foliation.

CORE/SECTION

Core Photo



179-1105A-4R-1

INTERVAL: 15 OLIVINE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	4R	1	1	0.00 m	33.30 m
Lower contact:	4R	1	1	0.09 m	33.39 m
Thickness (m):	0.09				
Contact Type:	Grain size change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	15	5	8	equant/anhedral
Clinopyroxene	40	15	2	7	elongate/subhedral
Olivine	5	5	5	5	rounded/anhedral
Total	**100**				

GRAIN SIZE: Coarse

TEXTURE: Inequigranular

ALTERATION: 8 %

COMMENTS: Massive.

INTERVAL: 16 OLIVINE-BEARING GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	4R	1	1	0.09 m	33.39 m
Lower contact:	4R	1	3	0.18 m	33.48 m
Thickness (m):	0.08				
Contact Type:	Grain size change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	57	4	1	2	equant/subhedral
Clinopyroxene	40	4	2	3	elongate/euhedral
Olivine	3	3	2	3	rounded/anhedral
Total	**100**				

GRAIN SIZE: Fine-medium

TEXTURE: Granular

ALTERATION: 0 %

COMMENTS: Massive.

INTERVAL: 17 OLIVINE-BEARING GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	4R	1	3	0.18 m	33.48 m
Lower contact:	4R	2	2A	0.71 m	35.19 m
Thickness (m):	1.72				
Contact Type:	Grain size change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	52	40	4	10	angular/subhedral
Clinopyroxene	45	40	3	15	elongate/subhedral
Olivine	3	15	2	7	rounded/anhedral
Total	**100**				

GRAIN SIZE: Coarse

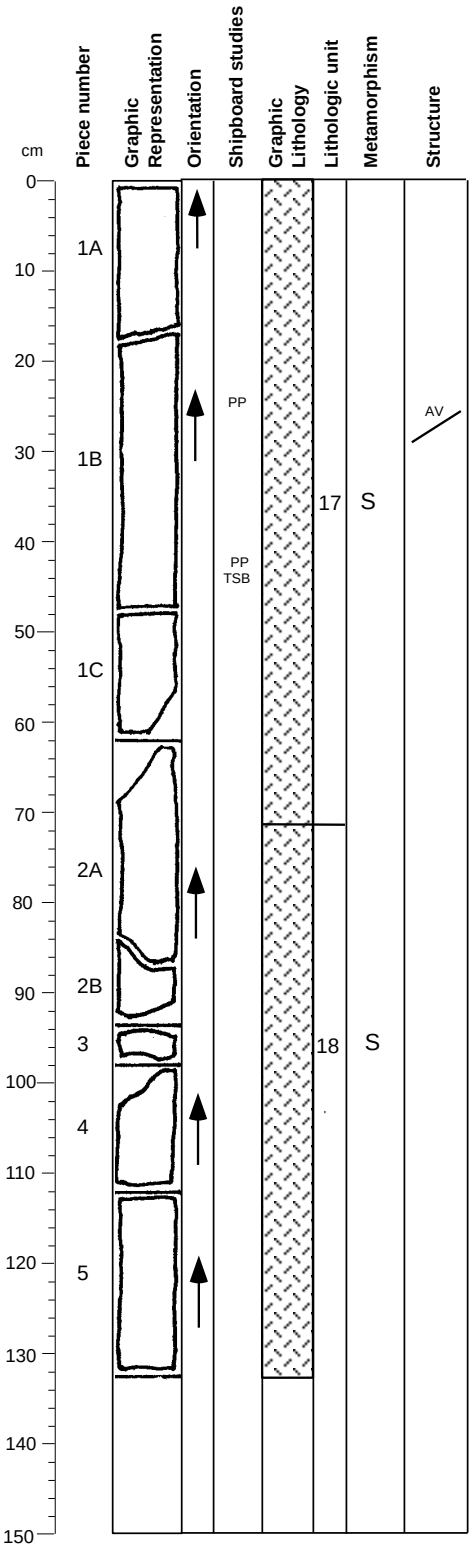
TEXTURE: Pegmatitic, Subophitic

ALTERATION: 5%

COMMENTS: A shear zone, ca. 2 cm wide, occurs at 80 cm in Section 179-1105A-4R-1, Piece 8. Slightly brecciated at 67-76 cm in Section 4R-1. The modal amount of olivine increases in the interval 47-92 cm in Section 179-1105A-4R-2.

STRUCTURE: This section displays igneous textures. Crystal-plastic fabric is present in Piece 8 where a felsic vein has infiltrated the gabbro. Pieces 7A and 7B show veining and some cataclasis.

Core Photo



179-1105A-4R-2

INTERVAL: 17 **OLIVINE-BEARING GABBRO**
(see previous section)

INTERVAL: 18 **OXIDE and OLIVINE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**4R**	**2**	**2A**	**0.71 m**	**35.19 m**
Lower contact:	**4R**	**4**	**3**	**0.26 m**	**37.48 m**
Thickness (m):	**2.29**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	8	1	4	tabular/subhedral
Clinopyroxene	35	8	1	4	elongate/subhedral
Olivine	2	2	1	1	rounded/anhedral
Fe-Ti oxide	1				irregular/disseminated
Total	**98**				

GRAIN SIZE: Medium

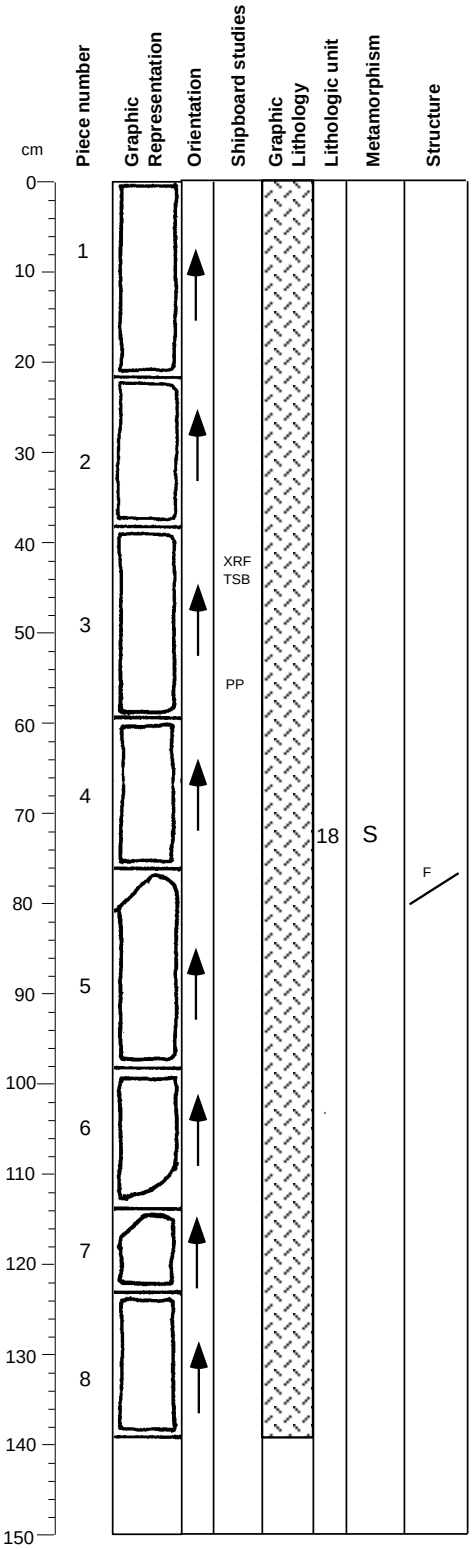
TEXTURE: Granular, Subophitic

ALTERATION: 4%

COMMENTS: Massive. Olivine is irregularly distributed.

STRUCTURE: This section displays igneous textures without magmatic foliation. There is an alteration vein in Piece 1B.

Core Photo



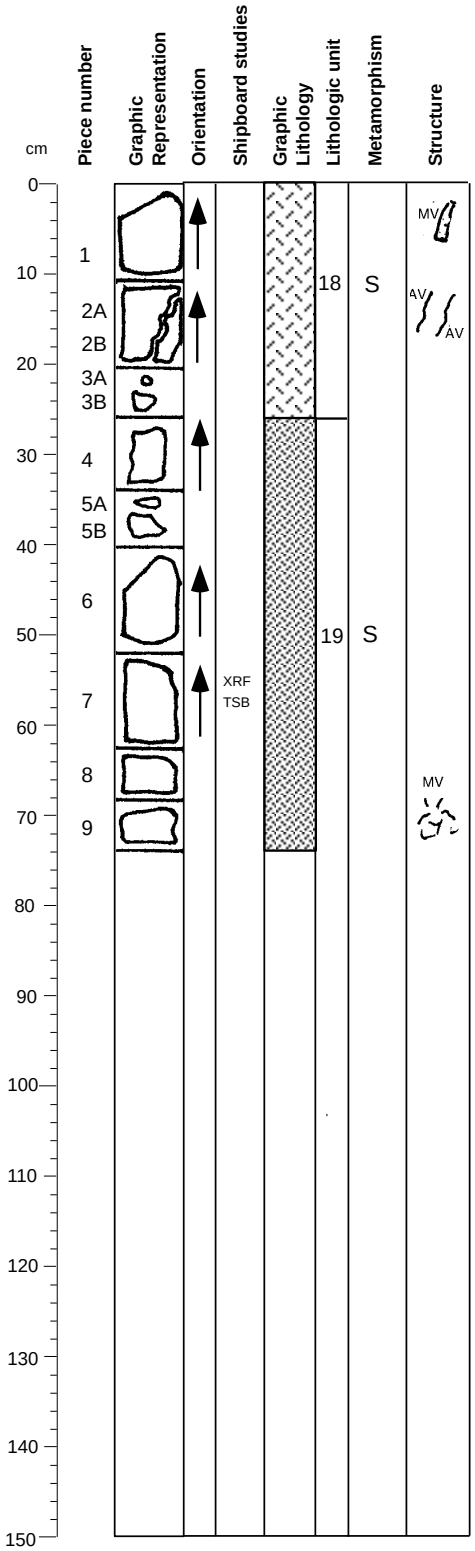
179-1105A-4R-3

INTERVAL: 18 **OXIDE and OLIVINE-BEARING GABBRO**
(see previous section)

STRUCTURE: This section displays igneous textures without magmatic foliation. There is a fault with actinolite-chlorite slickenfibers showing dip-slip displacement direction.

CORE/SECTION

Core Photo



179-1105A-4R-4

INTERVAL: 18 **OXIDE and OLIVINE-BEARING GABBRO**
(see Section 179-1105A-4R-2)

INTERVAL: 19 **OXIDE OLIVINE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**4R**	**4**	**3**	**0.26 m**	**37.48 m**
Lower contact:	**5R**	**1**	**1**	**0.10 m**	**38.40 m**
Thickness (m):	**0.92**				
Contact Type:	**Modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	5	1	3	tabular/subhedral
Clinopyroxene	35	12	1	5	angular/anhedral
Olivine	5	5	2	3	rounded/anhedral
Fe-Ti oxide	10				aggregates/ disseminated
Sulfides	0.5				angular/disseminated
Total	**100.5**				

GRAIN SIZE: Medium

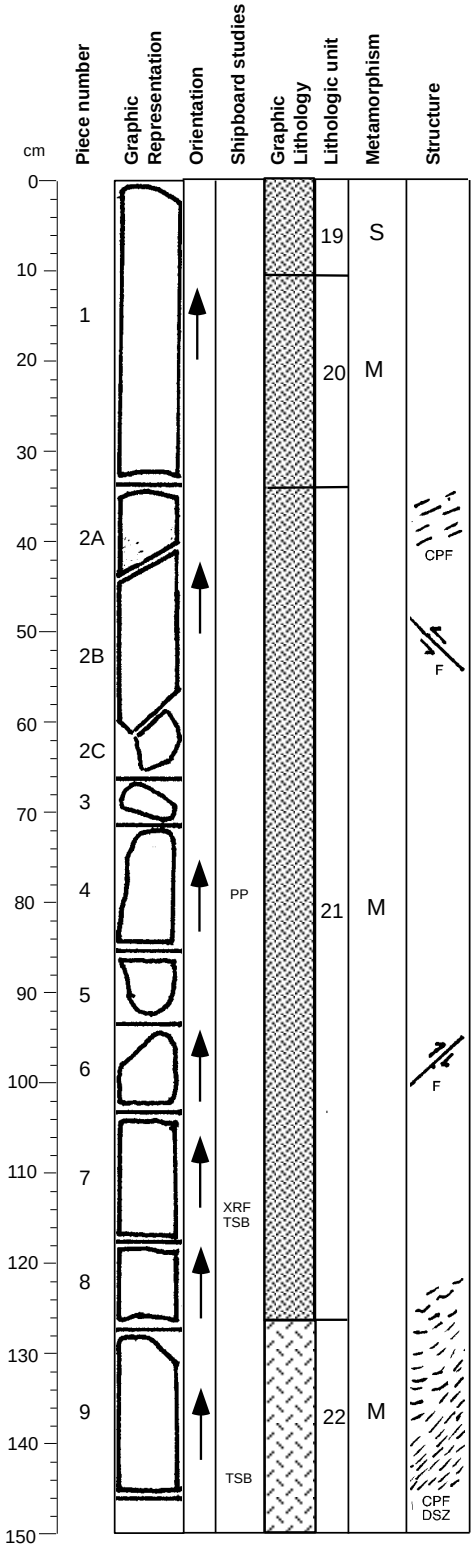
TEXTURE: Granular, Subophitic

ALTERATION: 9%

COMMENTS: Olivine is irregularly distributed. Oxides are in irregular veins and variably distributed along grain boundaries.

STRUCTURE: This section displays igneous textures. Felsic veins cross-cut Piece 1 and fine net veins (low temperature) are in Piece 2A.

Core Photo



179-1105A-5R-1

INTERVAL: 19 **OXIDE OLIVINE GABBRO**
(see previous section)

INTERVAL: 20 **OXIDE OLIVINE GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	5R	1	1	0.10 m	38.40 m
Lower contact:	5R	1	1	0.33 m	38.63 m
Thickness (m):	0.23				
Contact Type:	Modal change, grain size change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	45	15	3	8	tabular/anhedral
Clinopyroxene	30	20	3	8	elongate/subhedral
Olivine	20	25	5	10	rounded/anhedral
Fe-Ti oxide	5				aggregates/irregular
Sulfides	0.5				aggregates/irregular
Total	**100.5**				

GRAIN SIZE: Coarse

TEXTURE: Granular, Variable

ALTERATION: 11.5%

COMMENTS: Contact marked by abundant coarse-grained olivine. Sulfides occur in veins/seams.

INTERVAL: 21 **OXIDE OLIVINE GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	5R	1	1	0.33 m	38.63 m
Lower contact:	5R	1	8	1.26 m	39.56 m
Thickness (m):	0.93				
Contact Type:	Tectonic, grain size change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	40	10	1	3	tabular/subhedral
Clinopyroxene	40	10	3	5	equant/anhedral
Olivine	10	8	4	5	rounded/anhedral
Fe-Ti oxide	10				aggregates/irregular
Sulfides	0.5				
Total	**100.5**				

GRAIN SIZE: Medium

TEXTURE: Granular, Subophitic

ALTERATION: 18%

COMMENTS: Olivine is irregularly distributed. Oxides are in irregular veins and variably distributed along grain boundaries.

INTERVAL: 22 **OXIDE and OLIVINE-BEARING GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	5R	1	8	1.26 m	39.56 m
Lower contact:	5R	2	2	0.10 m	38.88 m
Thickness (m):	0.32				
Contact Type:	Tectonic, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	58	20	2	5	elongate/concordant seams
Clinopyroxene	40	15	1	4	elongate/rounded
Olivine	2	15	2	1	elongate/rounded
Fe-Ti oxide	2				angular/seams
Sulfides	0.5				angular/disseminated
Total	**102**				

GRAIN SIZE: Medium

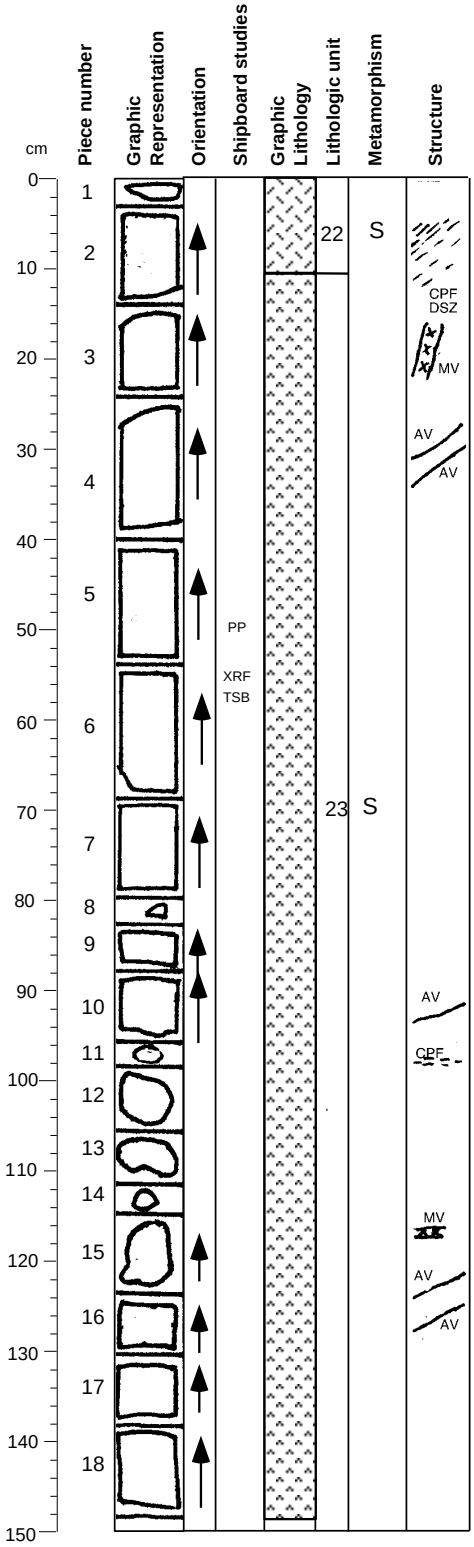
TEXTURE: Foliated, schlieren

ALTERATION: 20%

COMMENTS: Well developed foliation.

STRUCTURE: This section displays igneous textures except in Pieces 2A, 8, and 9. Piece 2A displays a weak to moderate crystal-plastic fabric, which intensifies downward. There is a fanning relationship to the foliation that suggests a normal component of displacemant across the shear zone. The shear zone is also rich in Fe-Ti oxide minerals. Two small fractures in Pieces 2B and 6 show small (<5 mm) offsets that indicate reverse slip. Both show alteration with actinolite lining fractures.

Core Photo



179-1105A-5R-2

INTERVAL: 22 **OXIDE and OLIVINE-BEARING GABBRO**

(see previous section)

INTERVAL: 23 **OXIDE-BEARING OLIVINE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**5R**	**2**	**2**	**0.10 m**	**38.88 m**
Lower contact:	**7R**	**1**	**1A**	**0.34 m**	**48.14 m**
Thickness (m):	**8.26**				
Contact Type:	**Modal change**				

		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	55	2	10	6	tabular/anhedral
Clinopyroxene	37	25	3	12	ophitic/anhedral
Olivine	5	10	2	5	rounded/anhedral
Fe-Ti oxide	0.5				angular/disseminated
Sulfides	0.5				angular/disseminated
Total	**98**				

GRAIN SIZE: Coarse

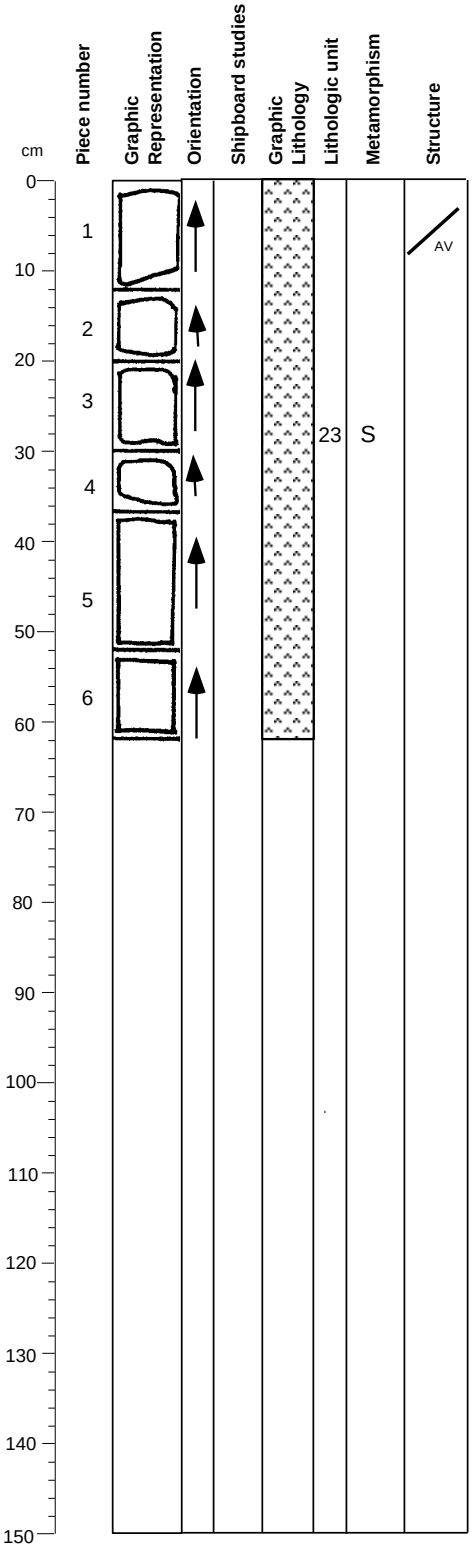
TEXTURE: Ophitic, Inequigranular

ALTERATION: 7 %

COMMENTS: Massive, nonfoliated olivine gabbro. Interval from 66 - 117 cm is more pervasively altered than most of the interval. All plagioclase alteration is along thin veins and in this interval olivine abundance is highly variable over 10 cm intervals from less than 4% to about 10%, but no part of the interval is devoid of olivine. Felsic veins (<2 cm in width) occur at 55 cm and 80 cm in Section 179-1105A-6R-2, and at 1-9 cm in Section 6R-3. Thin greenish seams (<1 mm) are associated with these felsic veins. Alteration is more extensive along the veins. The lower boundary of this interval is defined by a change in modal abundance of oxides.

STRUCTURE: This section displays igneous textures except in Pieces 2 and 11. Piece 2 shows intense foliation in the upper portion of the piece that decreases in intensity downward. Crystal-plastic fabric is most intense where oxides are most abundant. Pieces 3 and 15 contain felsic veins. Pieces 4, 10, and 16 contain thin alteration veins.

Core Photo

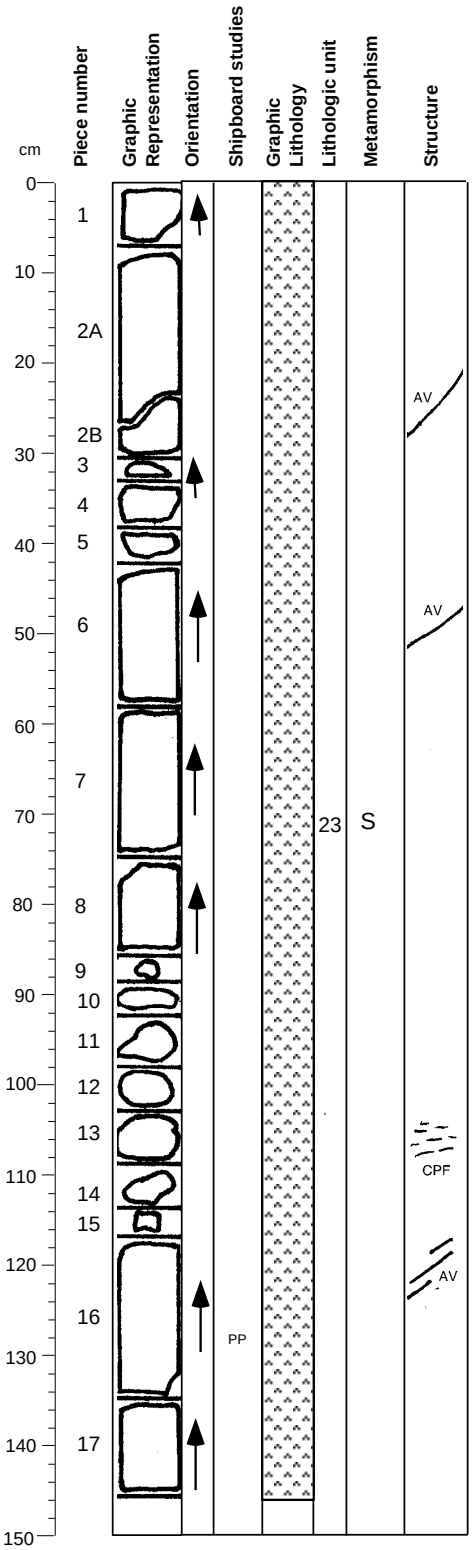


INTERVAL: 23 **OXIDE-BEARING OLIVINE GABBRO**
(see previous section)

STRUCTURE: This section displays igneous textures. There is an alteration vein in Piece 1.

CORE/SECTION

Core Photo

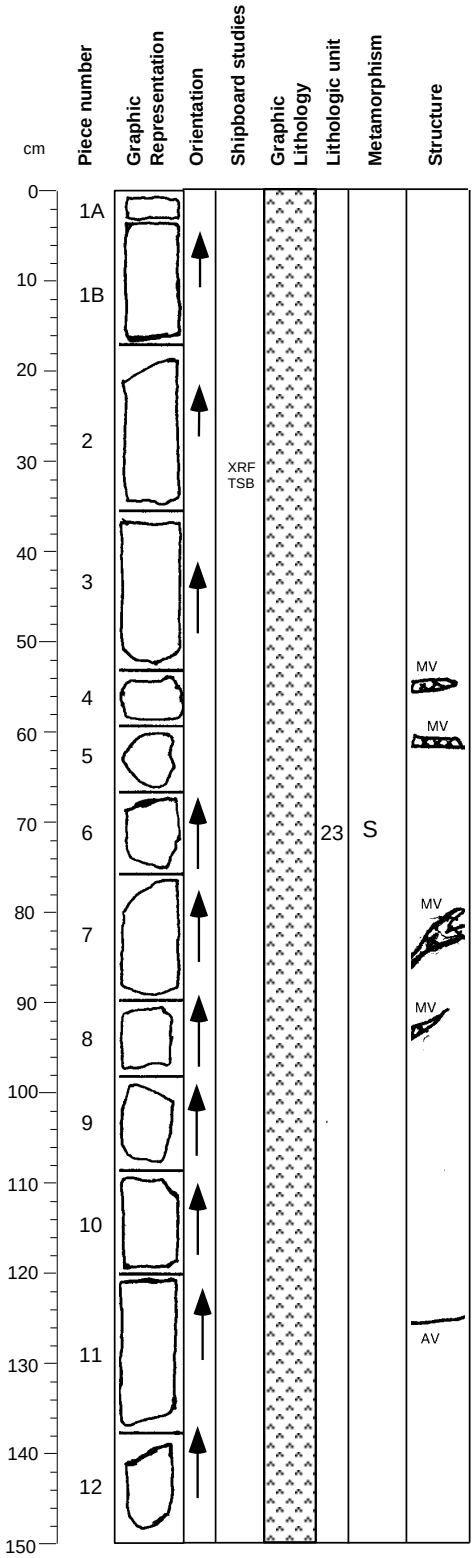


179-1105A-6R-1

INTERVAL: 23 **OXIDE-BEARING OLIVINE GABBRO**
(see Section 179-1105A-5R-2)

STRUCTURE: This section displays igneous textures, except in Piece 13 which contains crystal-plastic fabrics. Alteration veins are in Pieces 2, 6, and 16.

Core Photo



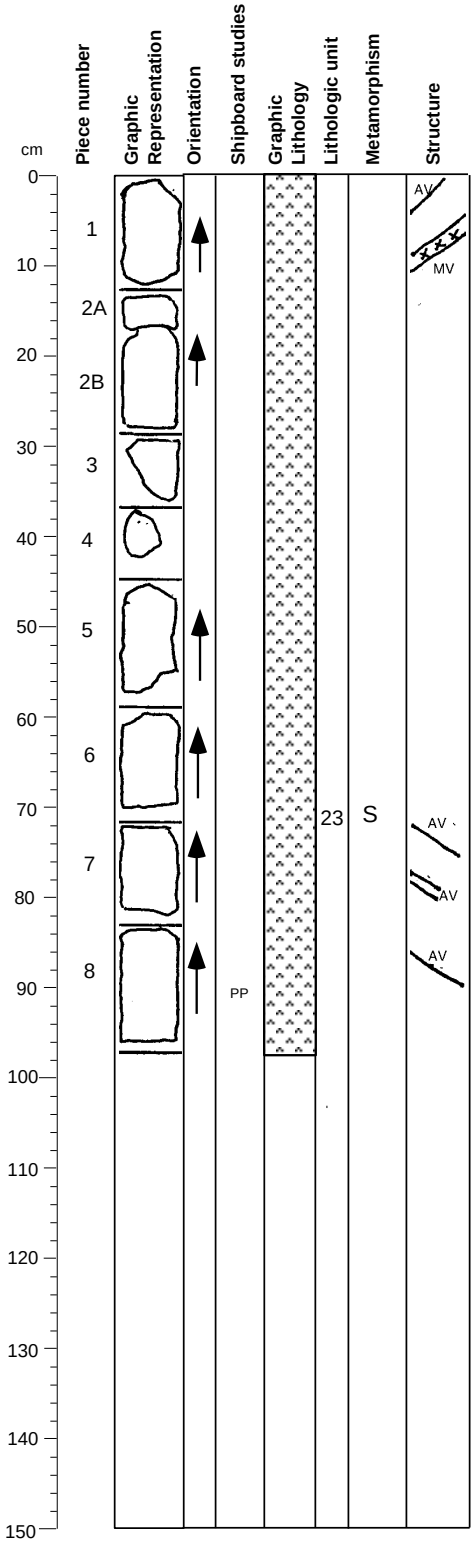
179-1105A-6R-2

INTERVAL: 23 **OXIDE-BEARING OLIVINE GABBRO**
(see Section 179-1105A-5R-2)

STRUCTURE: This section displays igneous textures with abundant felsic veins in Pieces 4, 5, 7, and 8.

CORE/SECTION

Core Photo

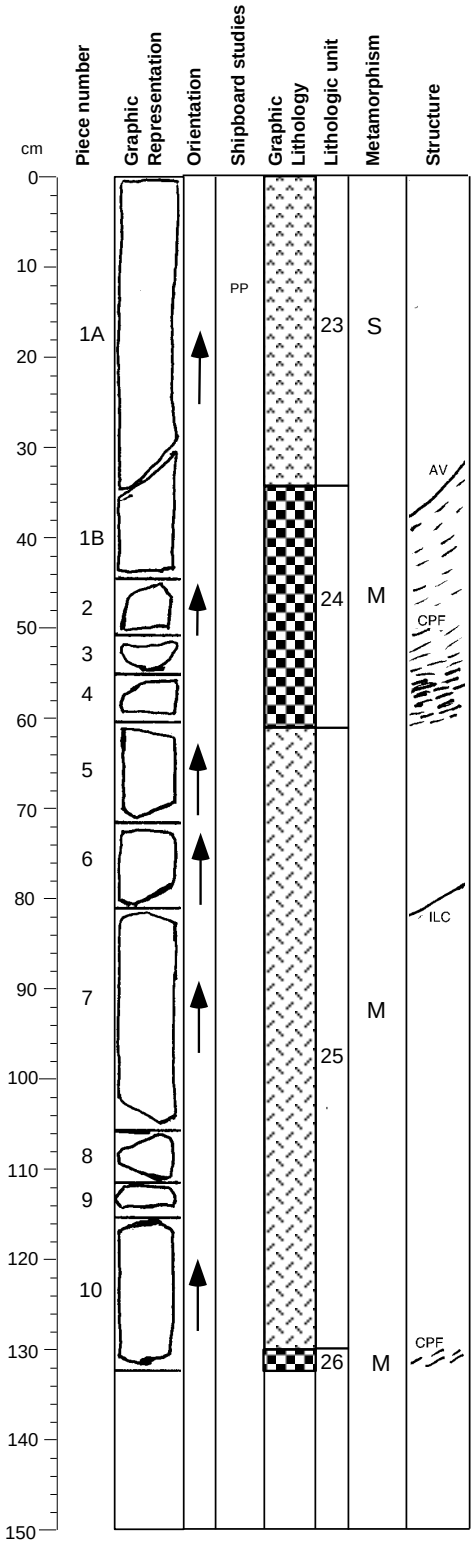


INTERVAL: 23 **OXIDE-BEARING OLIVINE GABBRO**
(see Section 179-1105A-5R-2)

STRUCTURE: This section displays igneous textures with a felsic vein 2 cm thick in Piece 1 and alteration veins in Pieces 1, 7, and 8.

CORE/SECTION

Core Photo



179-1105A-7R-1

INTERVAL: 23 OXIDE-BEARING OLIVINE GABBRO

(see Section 179-1105A-5R-2)

INTERVAL: 24 OLIVINE-BEARING OXIDE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	7R	1	1A	0.34 m	48.14 m
Lower contact:	7R	1	4	0.61 m	48.41 m
Thickness (m):	0.27				
Contact Type:	Tectonic and modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	10	3	5	elongate/subhedral
Clinopyroxene	40	15	2	5	elongate/subhedral
Olivine	0.5				
Fe-Ti oxide	5				aggregates/ disseminated
Total	**100.5**				

GRAIN SIZE: Coarse-medium

TEXTURE: Granular, Foliated

ALTERATION: 22%

COMMENTS: Interval foliated toward base. Irregular distribution of dissimilated oxides throughout.

INTERVAL: 25 OXIDE and OLIVINE-BEARING GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	7R	1	4	0.61 m	48.41 m
Lower contact:	7R	1	10	1.29 m	49.09 m
Thickness (m):	0.68				
Contact Type:	Tectonic and modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	10	1	4	tabular/subhedral
Clinopyroxene	40	17	1	8	tabular/subhedral
Olivine	2	5	1	3	rounded/anhedral
Fe-Ti oxide	0.5				interstitial
Total	**97.5**				

GRAIN SIZE: Medium-coarse

TEXTURE: Granular, Uniform

ALTERATION: 11%

COMMENTS: Massive medium-coarse grained gabbro, irregular distribution of olivine, the lower contact marked by a deformed fine-grained gabbro (2.5 cm thick).

INTERVAL: 26 OLIVINE-BEARING OXIDE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	7R	1	10	1.29 m	49.09 m
Lower contact:	7R	2	2	0.24 m	49.37 m
Thickness (m):	0.68				
Contact Type:	Modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	45	10	2	8	subequant/subhedral
Clinopyroxene	40	55	5	30	blocky/deformed
Olivine	3	5	2	3	rounded/anhedral
Fe-Ti oxide	10				aggregates/seams
Sulfides	1				angular/interstitial
Total	**99**				

GRAIN SIZE: Pegmatitic-coarse

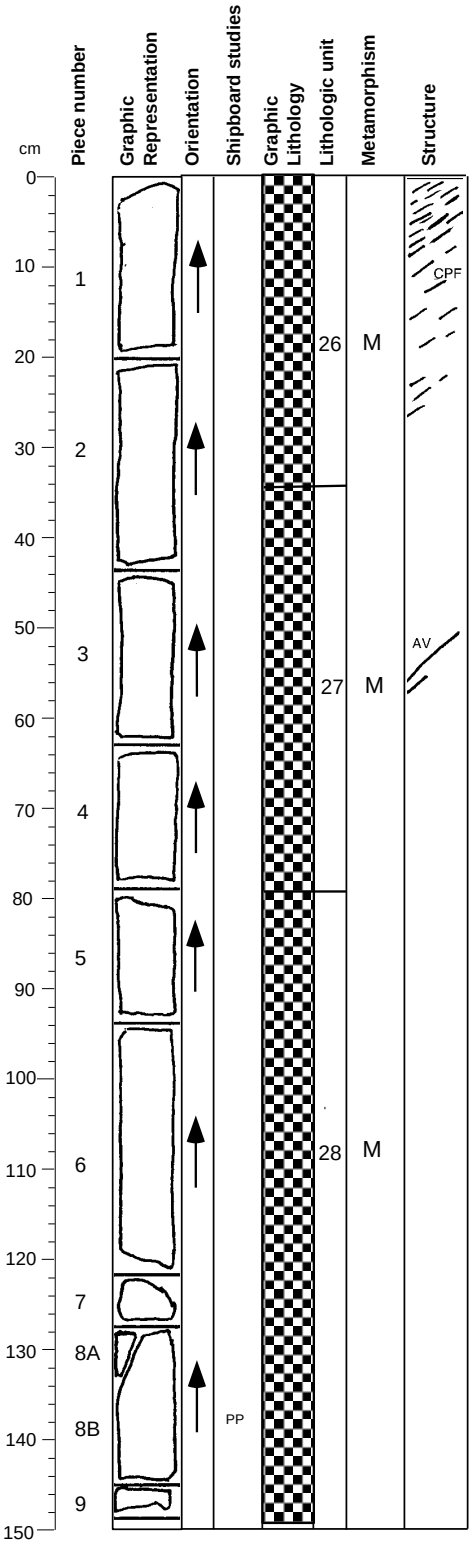
TEXTURE: Foliated

ALTERATION: 12%

COMMENTS: Oxides abundant in interstitial patches and stringers and in lenses along silicate grain boudaries. Moderately deformed with some large (70 mm long) stringers of oxides. Lower contact marked by 1 mm thick irregular planar to en echelon band of oxide.

STRUCTURE: This section displays igneous textures except in oxide-rich horizons (Pieces 1, 2, 3, 4 and 10. Crystal-plastic fabric intensifies from Piece 1B to Piece 4. Dip of foliation is in excess of 40 degrees. Piece 10 contains a weak crystal-plastic fabric at its base. Oxides are abundant at the base of Piece 10.

Core Photo



179-1105A-7R-2

INTERVAL: 26 **OLIVINE-BEARING OXIDE GABBRO**
(see previous section)

INTERVAL: 27 **OLIVINE-BEARING OXIDE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**7R**	**2**	**2**	**0.24 m**	**49.37 m**
Lower contact:	**7R**	**2**	**4**	**0.79 m**	**49.92 m**
Thickness (m):	**0.55**				
Contact Type:	**Textural and modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	10	3	6	equant/subhedral
Clinopyroxene	35	40	5	20	ophitic/subhedral
Olivine	3	5	2	3	rounded/anhedral
Fe-Ti oxide	5				aggregates/ interstitial
Total	**99**				

GRAIN SIZE: Coarse-pegmatitic

TEXTURE: Inequigranular

ALTERATION: 16 %

COMMENTS: Lower contact marked by much greater abundance of oxides. Plagioclase is slightly altered and olivine is pervasive altered in patches near thin vein networks.

INTERVAL: 28 **OLIVINE-BEARING OXIDE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**7R**	**2**	**4**	**0.79 m**	**49.92 m**
Lower contact:	**7R**	**3**	**4**	**0.62 m**	**51.25 m**
Thickness (m):	**1.33**				
Contact Type:	**Modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	10	2	5	elongate/subhedral
Clinopyroxene	35	20	2	10	elongate/subhedral
Olivine	2	10	1		rounded/anhedral
Fe-Ti oxide	10				granular aggregates
Total	**102**				

GRAIN SIZE: Coarse-pegmatitic

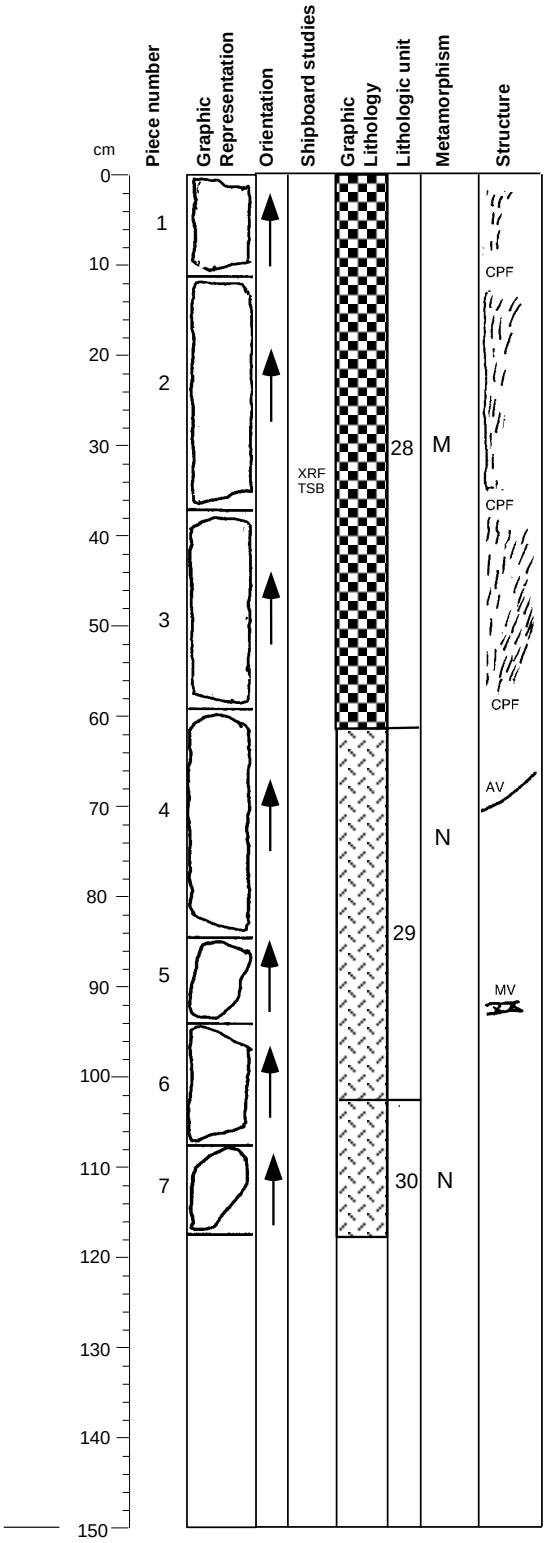
TEXTURE: Foliated to inequigranular

ALTERATION: 15%

COMMENTS: Strong foliation at 22-47 cm. Mode of oxides decreases toward bottom of interval.

STRUCTURE: This section displays igneous textures except in oxide-rich gabbro (Pieces 1 and 2. Crystal-plastic fabric is defined by elongate pyroxenes and lenses of oxide-rich schlieren. Elongate coarse clinopyroxenes contain extension cracks infiltrated by oxide minerals. Piece 3 contains two alteration veins. Contact between Intervals 27 and 28 is inclined in excess of 28 degrees.

Core Photo



CORE/SECTION

179-1105A-7R-3

INTERVAL: 28 **OLIVINE-BEARING OXIDE GABBRO**
(see previous section)

INTERVAL: 29 **GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	**7R**	**3**	**4**	**0.62 m**	**51.25 m**
Lower contact:	**7R**	**3**	**6**	**1.02 m**	**51.65 m**
Thickness (m):	**0.40**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	8	3	5	equant/subhedral
Clinopyroxene	35	7	2	5	tabular/subhedral
Olivine	4	4	1	2	rounded/anhedral
Fe-Ti oxide	1				interstitial
Total	**100**				

GRAIN SIZE: Medium

TEXTURE: Equigranular

ALTERATION: 1 %

COMMENTS: Thin actinolite seams (<1 mm) occur in Piece 4. Felsic veins occur in Piece 5. The lower boundary is defined by a change in grain size.

INTERVAL: 30 **GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	**7R**	**3**	**6**	**1.02 m**	**51.65 m**
Lower contact:	**7R**	**4**	**7**	**0.37 m**	**52.19 m**
Thickness (m):	**0.54**				
Contact Type:	**Grain size change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	12	2	5	equant/subhedral
Clinopyroxene	40	8	1	3	equant/subhedral
Total	**100**				

GRAIN SIZE: Fine-medium

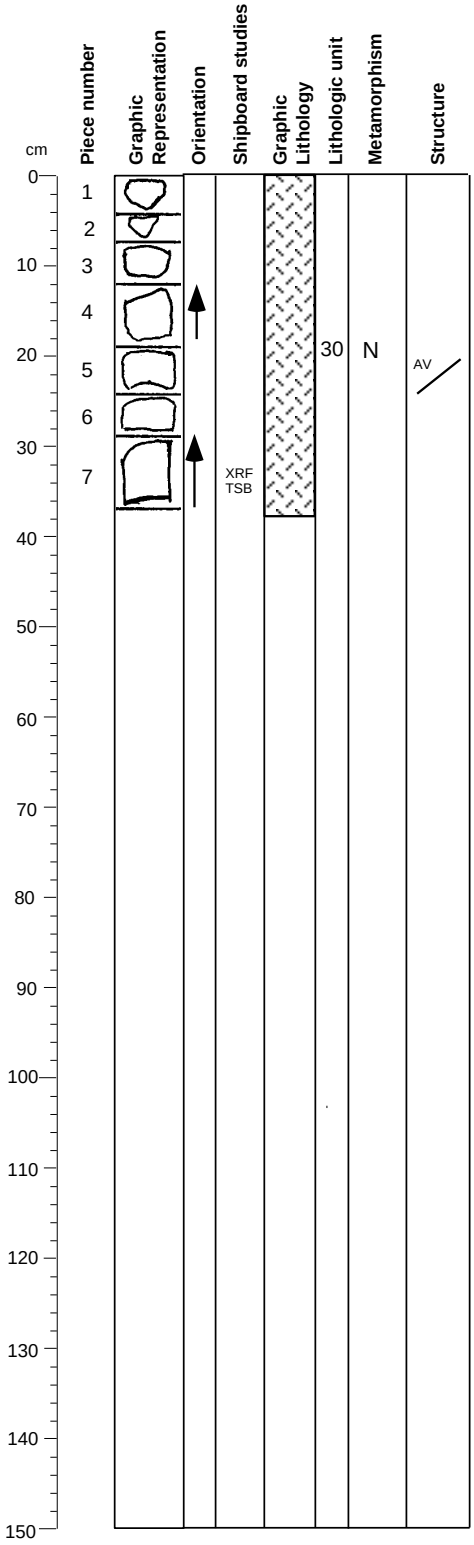
TEXTURE: Massive

ALTERATION: 0 %

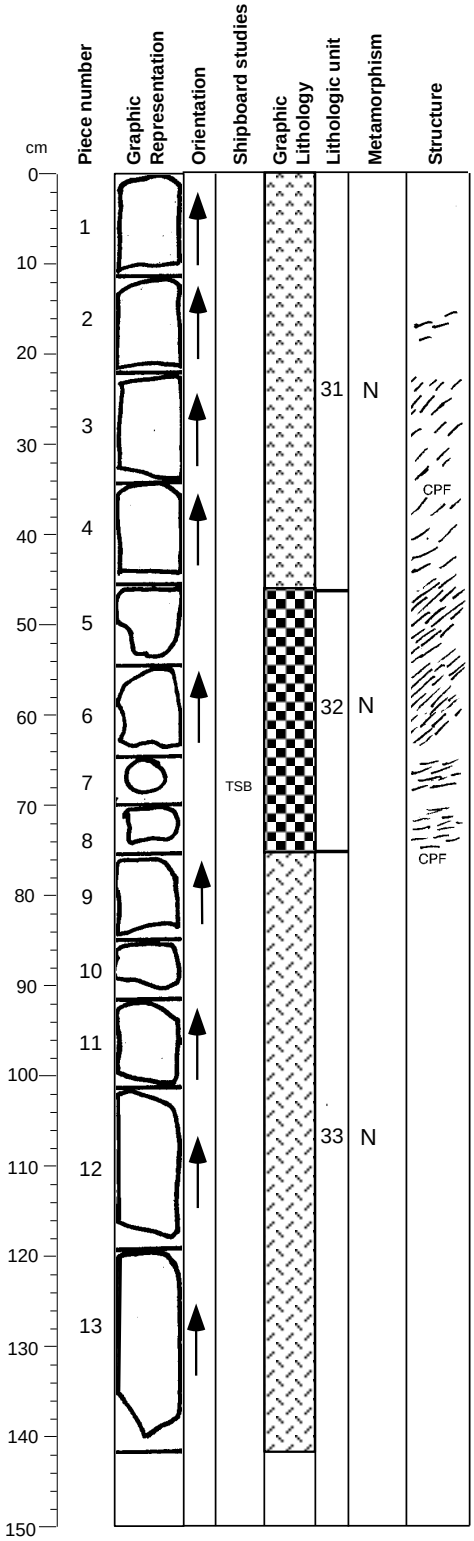
COMMENTS: Massive interval defined by finer grain size.

STRUCTURE: This section displays igneous textures except in portions of Pieces 1-3 where pegmatitic oxide gabbro has undergone ductile deformation. Crystal-plastic fabrics define a strong foliation, defined by shape-preferred orientation of elongate plagioclase, clinopyroxene, and lenses of oxide minerals. The foliation dips in excess of 75 degrees. A felsic vein is in Piece 5. Alteration veins with brown and blue green amphibole are in Piece 4.

Core Photo


179-1105A-7R-4
cm
Piece number
Graphic Representation
Orientation
Shipboard studies
Graphic Lithology
Lithologic unit
Metamorphism
Structure
INTERVAL: 30
GABBRO
(see previous section)
STRUCTURE: This section displays igneous textures. Piece 5 has an alteration vein.
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
1
2
3
4
5
6
7
XRF
TSB
30
N
AV
CORE/SECTION

Core Photo



179-1105A-8R-1

INTERVAL: 31 OLIVINE-BEARING GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	8R	1	1	0.00 m	52.40 m
Lower contact:	8R	1	3	0.47 m	52.47 m
Thickness (m):	0.47				
Contact Type:	Grain size change, textural change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	64	810	3	8	elongate/subhedral
Clinopyroxene	30	15	3	7	elongate/subhedral
Olivine	5	8	2	5	rounded/anhedral
Fe-Ti oxide	1				aggregates/seams
Total	100				

GRAIN SIZE: Coarse

TEXTURE: Slightly foliated

ALTERATION: 0 %

COMMENTS: Weakly gneissose olivine gabbro defined by changes in grain size and a sheared boundary at the bottom of the interval.

INTERVAL: 32 OXIDE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	8R	1	3	0.47 m	52.47 m
Lower contact:	8R	1	8	0.76 m	53.16 m
Thickness (m):	0.29				
Contact Type:	Grain size change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	40	5	1	2	equant/granular
Clinopyroxene	30	8	1	2	equant/granular
Fe-Ti oxide	30				granular aggregates
Total	100				

GRAIN SIZE: Fine

TEXTURE: Strongly foliated

ALTERATION: 0 %

COMMENTS: Curved and sharp contact to undeformed gabbro. Contact discordant to parallel to core length. Pophyroblasts elongated parallel to flow direction. Alteration of feldspars associated with deformation.

INTERVAL: 33 OXIDE and OLIVINE-BEARING GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	8R	1	8	0.76 m	53.16 m
Lower contact:	8R	3	5	0.71 m	55.93 m
Thickness (m):	2.77				
Contact Type:	Grain size change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	8	1	5	equant/subhedral
Clinopyroxene	35	17	1	7	angular/subhedral
Olivine	3	7	1	3	rounded/anhedral
Fe-Ti oxide	0.5				interstitial
Total	98.5				

GRAIN SIZE: Coarse-medium

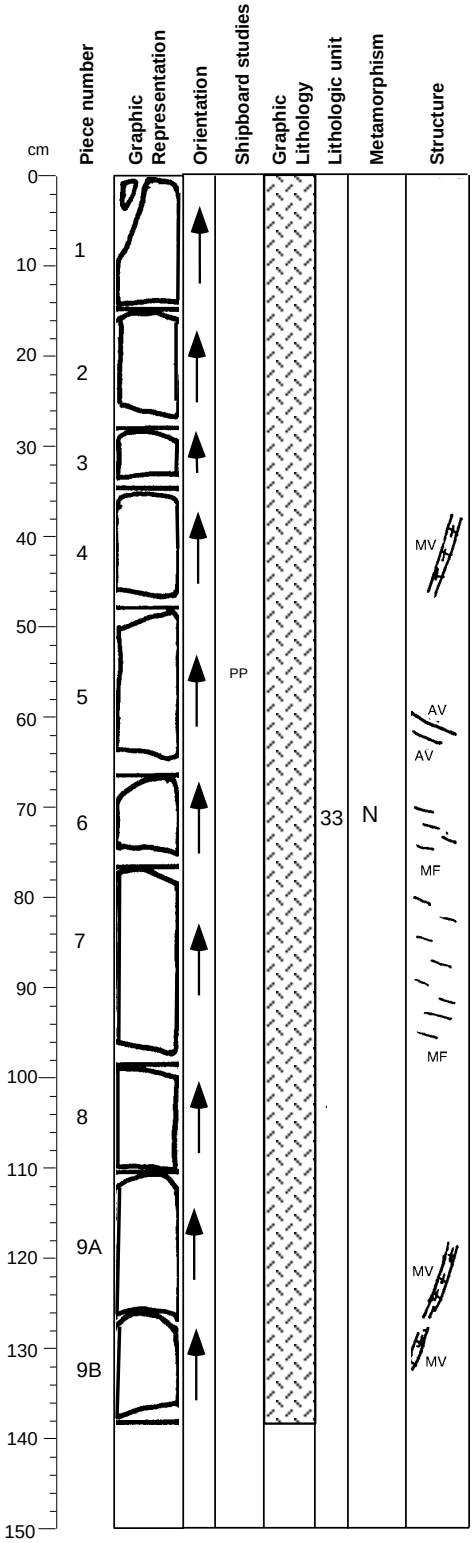
TEXTURE: Granular but variable

ALTERATION: 1 %

COMMENTS: Massive gabbro, the grain size tends to change from medium-coarse to medium-grained from top to bottom. Olivine and oxide distributed in patches. A few felsic veins are in this interval and the lower contact is marked by fine-grained gabbro.

STRUCTURE: Pieces 1 and 9-13 display igneous textures. Foliation, defined by the preferred orientation of clinopyroxene and plagioclase, becomes more intense from Piece 2 to 4. Pieces 5-8 contain intense fabrics and significant grain-size reduction. Foliation dips in excess of 60 degrees.

Core Photo

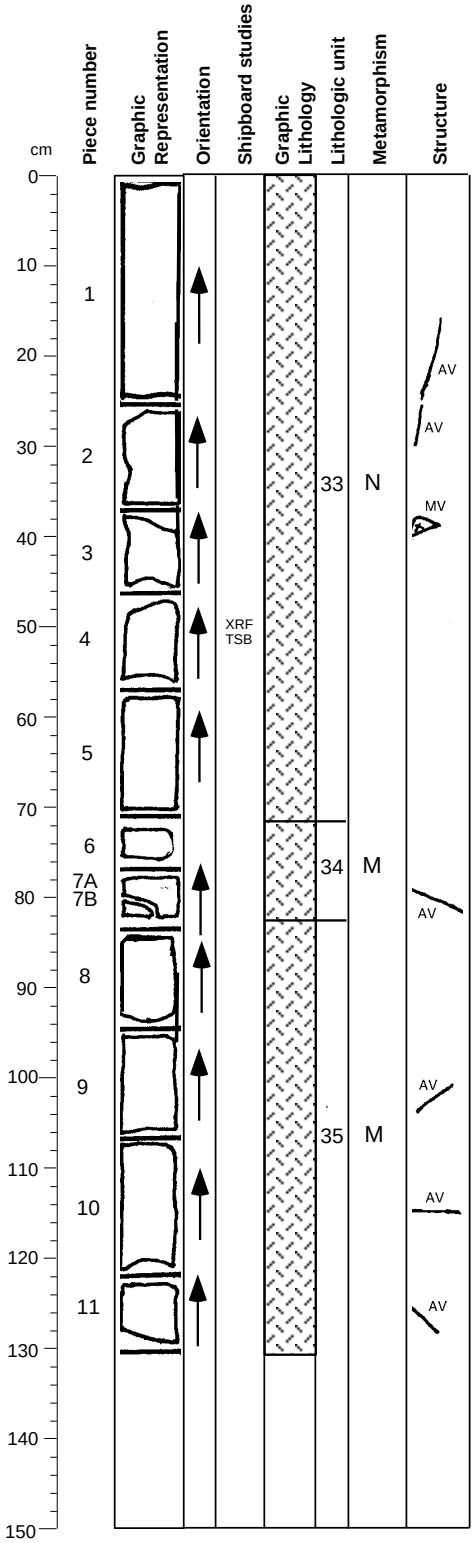


179-1105A-8R-2

INTERVAL: 33 **OXIDE and OLIVINE-BEARING GABBRO**
(see previous section)

STRUCTURE: This section displays igneous textures. Pieces 6 and 7 display a weak magmatic foliation defined by clinopyroxenes with elongate prismatic habits. Pieces 9A, 9B, and 4 contain felsic veins. Piece 5 contains two alteration veins.

Core Photo



179-1105A-8R-3

INTERVAL: 33 **OXIDE and OLIVINE-BEARING GABBRO**
(see Section 179-1105A-8R-1)

INTERVAL: 34 **OXIDE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**8R**	**3**	**5**	**0.71 m**	**55.93 m**
Lower contact:	**8R**	**3**	**7**	**0.83 m**	**56.05 m**
Thickness (m):	**0.12**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	59	8	1	2	tabular/subhedral
Clinopyroxene	40	10	1	2	rounded/subhedral
Fe-Ti oxide	1				disseminated
Total	**100**				

GRAIN SIZE: Medium

TEXTURE: Inequigranular

ALTERATION: 14 %

COMMENTS: Massive gabbro defined by fine to medium grain size.

INTERVAL: 35 **OLIVINE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**8R**	**3**	**7**	**0.83 m**	**56.05 m**
Lower contact:	**8R**	**4**	**2**	**0.26 m**	**56.80 m**
Thickness (m):	**0.75**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	8	1	3	equant/subhedral
Clinopyroxene	40	15	1	3	equant/subhedral
Olivine	1			2	rounded/anhedral
Total	**101**				

GRAIN SIZE: Medium

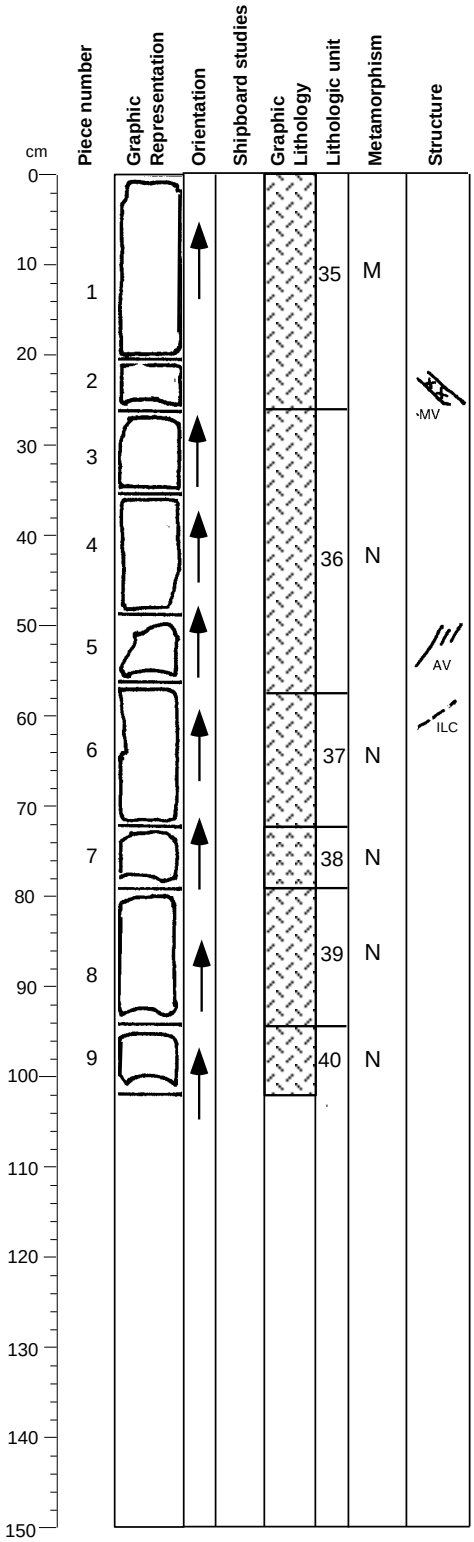
TEXTURE: Inequigranular

ALTERATION: 13 %

COMMENTS: Massive granular to subophitic gabbro with a few irregularly distributed olivines.

STRUCTURE: This section displays igneous textures. Piece 3 contains the edge of a felsic vein. Pieces 1, 2, and 9-11 contain alteration veins.

Core Photo



CORE/SECTION

179-1105A-8R-4

INTERVAL: 35 OLIVINE-BEARING GABBRO

(see previous section)

INTERVAL: 36 OXIDE and OLIVINE-BEARING GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	8R	4	2	0.26 m	56.80 m
Lower contact:	8R	4	6	0.60 m	57.13 m
Thickness (m):	0.34				
Contact Type:	Grain size change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	8	1	3	elongate/subhedral
Clinopyroxene	40	7	1	2	elongate/subhedral
Olivine	4	3	1	2	rounded/anhedral
Fe-Ti oxide	1				disseminated
Total	**100**				

GRAIN SIZE: Medium

TEXTURE: Equigranular, Uniform

ALTERATION: 0 %

COMMENTS: Massive gabbro defined by medium grain size.

INTERVAL: 37 OXIDE-BEARING GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	8R	4	6	0.60 m	57.13 m
Lower contact:	8R	4	6	0.72 m	57.25 m
Thickness (m):	0.12				
Contact Type:	Grain size change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	8	1	2	equant/subhedral
Clinopyroxene	40	10	1	3	equant/subhedral
Fe-Ti oxide	2				disseminated
Total	**101**				

GRAIN SIZE: Medium

TEXTURE: Inequigranular

ALTERATION: 1 %

COMMENTS: Large irregular grain size variation.

INTERVAL: 38 OXIDE-BEARING OLIVINE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	8R	4	6	0.72 m	57.25 m
Lower contact:	8R	4	7	0.79 m	57.32 m
Thickness (m):	0.07				
Contact Type:	Grain size change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	53	5	1	1	tabular/subhedral
Clinopyroxene	40	5	1	1	equant/subhedral
Olivine	7	1.5	0.5	1	rounded/anhedral
Fe-Ti oxide	0.5				disseminated
Total	**100.5**				

GRAIN SIZE: Fine-medium

TEXTURE: Granular, Subophitic, Uniform

ALTERATION: 1 %

COMMENTS: Massive sharp grain-size contrast at lower contact.

INTERVAL: 39 OXIDE and OLIVINE-BEARING GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	8R	4	7	0.79 m	57.32 m
Lower contact:	8R	4	8	0.93 m	57.46 m
Thickness (m):	0.14				
Contact Type:	Grain size change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	70	15	1	5	tabular/subhedral
Clinopyroxene	30	20	2	5	equant/subhedral
Olivine	1				rounded/anhedral
Fe-Ti oxide	0.5				disseminated
Total	**100.5**				

GRAIN SIZE: Medium-coarse

TEXTURE: Inequigranular

ALTERATION: 0 %

COMMENTS: Large grain-size variation with irregular distribution. Contains a trace of sulfide grains.

STRUCTURE: This section displays igneous textures. Piece 3 contains the edge of a felsic vein. Pieces 1, 2, and 9-11 contain alteration veins.

Core Photo

179-1105A-8R-4

INTERVAL: 40 **OXIDE and OLIVINE BEARING GABBRO**

				Depth	Depth
Interval Location:	**Core**	**Section**	**Piece**	**in Section**	**mbsf**
Upper contact:	**8R**	**4**	**8**	**0.93 m**	**57.46 m**
Lower contact:	**9R**	**1**	**1**	**0.09 m**	**57.49 m**
Thickness (m):	**0.14**				
Contact Type:	**Grain size change, modal change**				

		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	55	5	1	1	equant/subhedral
Clinopyroxene	40	5	1	1	equant/subhedral
Olivine	2	1	0.5	1	rounded/anhedral
Fe-Ti oxide	3				disseminated
Total	**100.5**				

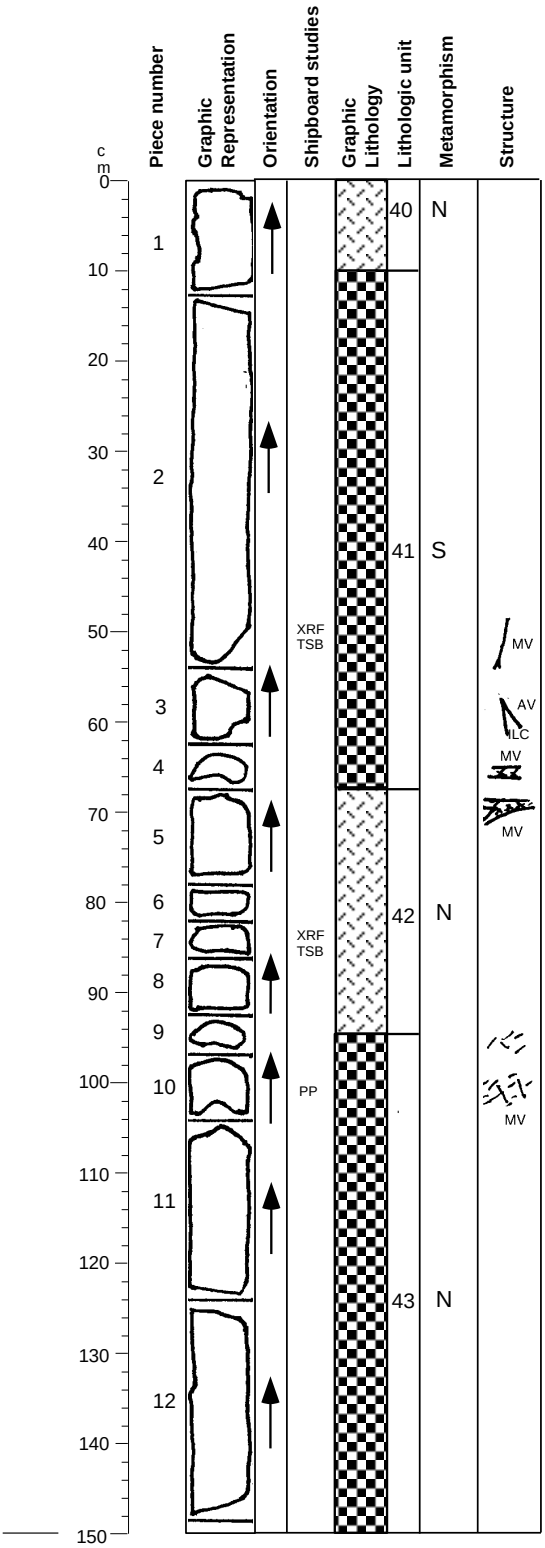
GRAIN SIZE: Fine-medium

TEXTURE: Granular, Subophitic, Uniform

ALTERATION: 2 %

STRUCTURE: This section displays igneous textures. Piece 2 contains a felsic vein. Pieces 4 and 5 contain alteration veins. Piece 6 contains an interval contact between fine-grained gabbro (Unit 36) and coarse-grained gabbro (Unit 37),that dips in excess of 40 degrees.

Core Photo



179-1105A-9R-1

INTERVAL: 40 OXIDE and OLIVINE-BEARING GABBRO

(see previous section)

INTERVAL: 41 OXIDE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	9R	1	1	0.09 m	57.49 m
Lower contact:	9R	1	4	0.67 m	58.07 m
Thickness (m):	0.58				
Contact Type:	Grain size change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	45	8	1	3	equant/subhedral
Clinopyroxene	50	12	1	4	elongate/subhedral
Fe-Ti oxide	5				aggregates/seams
Total	**100**				

GRAIN SIZE: Medium-coarse

TEXTURE: Inequigranular

ALTERATION: 7 %

COMMENTS: Up to 1 cm thick shear-controlled vein, subparallel to length of core filled with pyroxene. Grain size irregular with patches of fine-grained gabbro.

INTERVAL: 42 OXIDE-BEARING GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	9R	1	4	0.67 m	58.07 m
Lower contact:	9R	1	8	0.94 m	58.34 m
Thickness (m):	0.27				
Contact Type:	Grain size change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	2	1	1	granular/subhedral
Clinopyroxene	50	4	1	2	prismatic/subhedral
Fe-Ti oxide	1				disseminated
Total	**101**				

GRAIN SIZE: Fine-medium

TEXTURE: Inequigranular

ALTERATION: 0 %

COMMENTS: Relatively fine-grained, granular to inequigranular interval.

INTERVAL: 43 OXIDE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	9R	1	8	0.94 m	58.34 m
Lower contact:	9R	3	10	1.24 m	61.51 m
Thickness (m):	3.17				
Contact Type:	Grain size change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	20	1	10	tabular/subhedral
Clinopyroxene	40	40	4	10	angular/subhedral
Fe-Ti oxide	10				aggregates
Total	**100**				

GRAIN SIZE: Coarse-pegmatitic

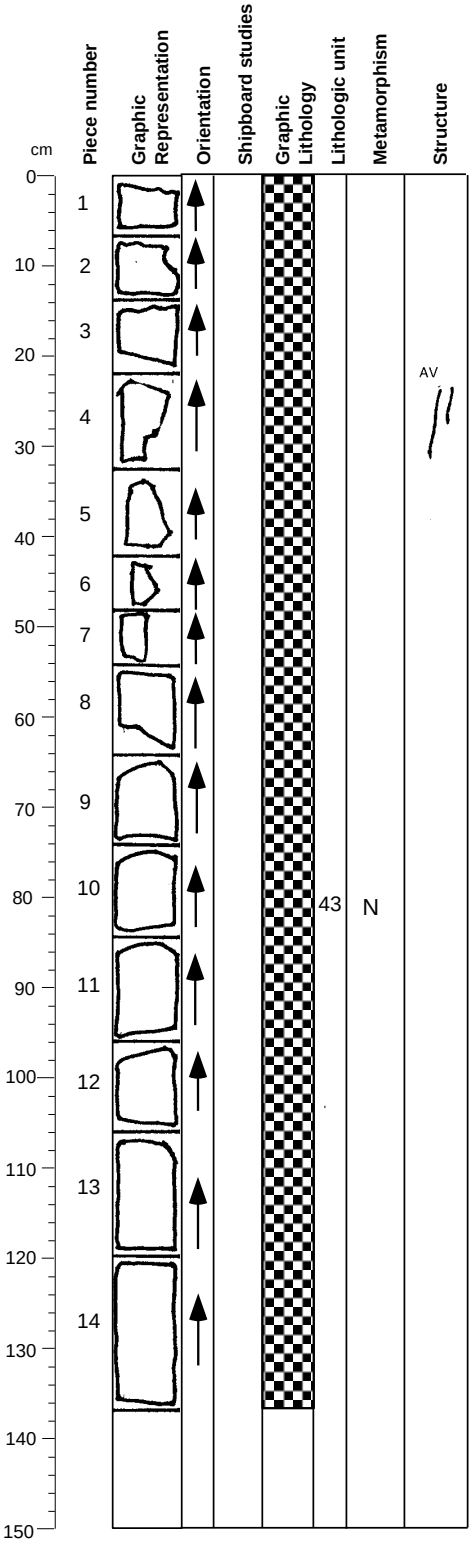
TEXTURE: Inequigranular, Massive

ALTERATION: 7 %

COMMENTS: Massive coarse to pegmatitic gabbro with oxides in interstises and irregular veins between silicates. Chlorite veins in Section 179-1105A-9R-2, 30 cm.

STRUCTURE: This section displays igneous textures. Piece 2 contains an oxide mineral vein at the base. Pieces 4 and 5 contain felsic veins. Pieces 9 and 10 contain net veins made up of very thin felsic veins. Pieces 3 and 4 contain alteration veins.

Core Photo

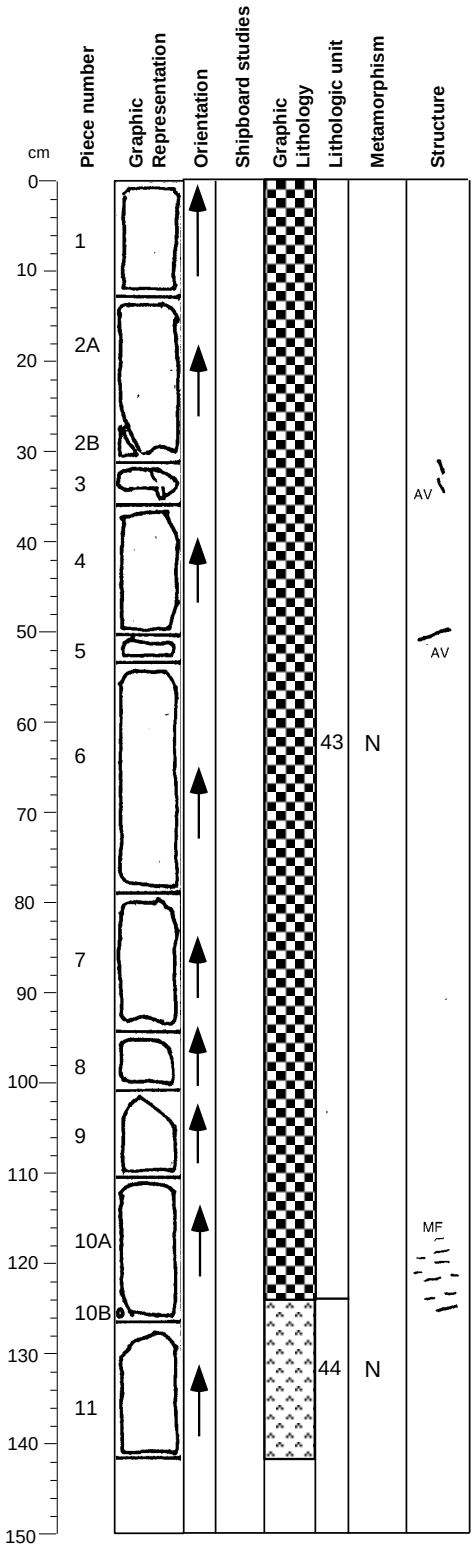


INTERVAL: 43 **OXIDE GABBRO**
(see previous section)

STRUCTURE: This section displays igneous textures. Piece 4 contains alteration veins.

CORE/SECTION

Core Photo



179-1105A-9R-3

INTERVAL: 43 **OXIDE GABBRO**
(see Section 179-1105A-9R-1)

INTERVAL: 44 **OXIDE-BEARING OLIVINE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**9R**	**3**	**10**	**1.24 m**	**61.51 m**
Lower contact:	**10R**	**2**	**3**	**0.34 m**	**63.69 m**
Thickness (m):	**2.18**				
Contact Type:	**Grain size change, modal change**				

		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	55	8	2	3	equant/subhedral
Clinopyroxene	35	10	1	3	prismatic/euhedral
Olivine	7	4	2	3	rounded/anhedral
Fe-Ti oxides	3				interstitial
Total	**100**				

GRAIN SIZE: Medium

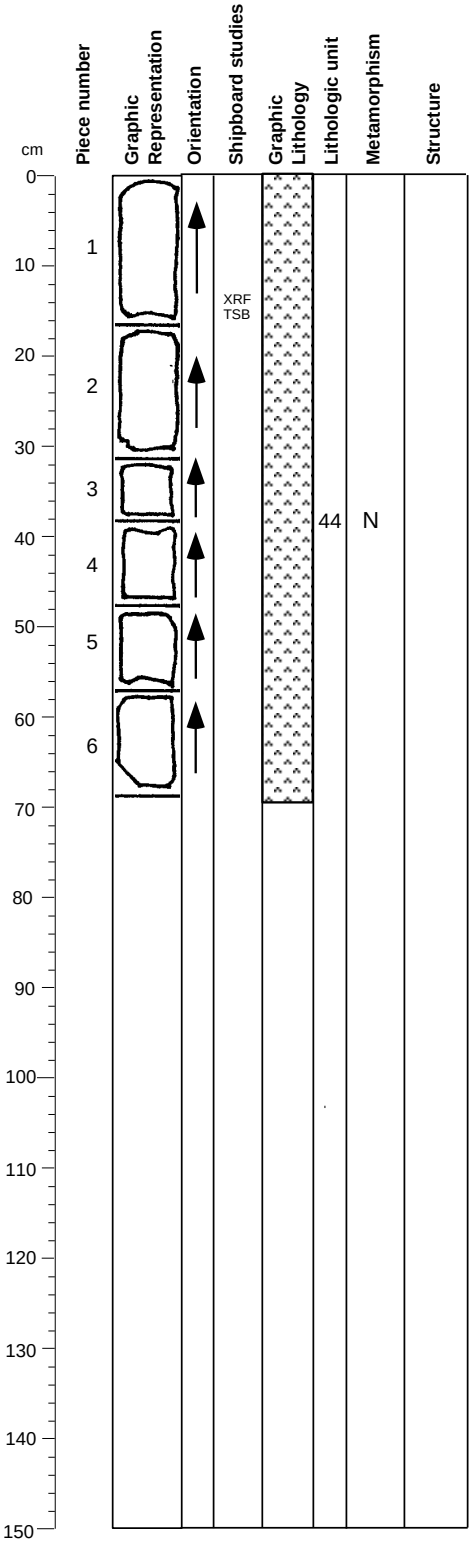
TEXTURE: Equigranular

ALTERATION: 2 %

COMMENTS: Amphibole vein, ca. 4 mm width, occurs in Section 179-1105A-10R-1, Piece 4. Leucocratic patches occur at edge of Section 10R-1, Piece 2. The lower boundary of this interval is defined by changes in oxide and olivine abundances.

STRUCTURE: This section displays igneous textures. The basal half of Piece 10 contains a magmatic planar fabric defined by the preferred dimensional orientation of elongate, prismatic clinopyroxene. Pieces 3 and 5 contain alteration veins.

Core Photo

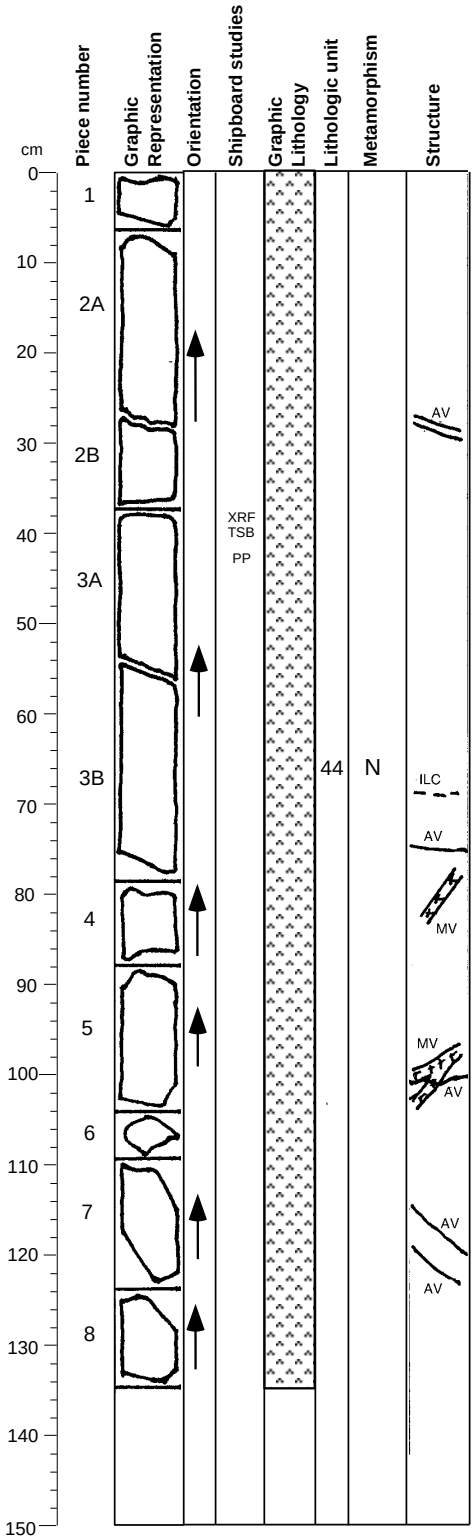


INTERVAL: 44 **OXIDE-BEARING OLIVINE GABBRO**
(see previous section)

STRUCTURE: This section displays igneous textures with no magmatic fabrics observed.

CORE/SECTION

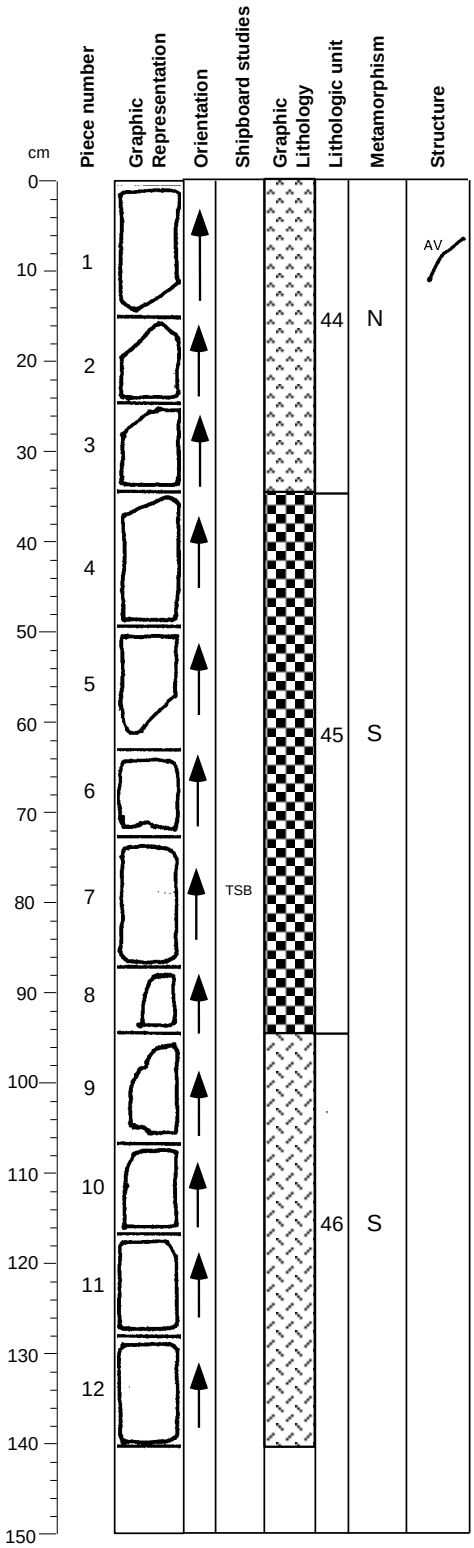
Core Photo



INTERVAL: 44 **OXIDE-BEARING OLIVINE GABBRO**
(see Section 179-1105A-9R-3)

STRUCTURE: This section displays igneous textures, and more magmatic veins than alteration veins. Pieces 4 and 5 contain felsic veins. Pieces 3A and 3B contain an amphibole alteration vein. Pieces 3B, 5, and 7 contain lower temperature veins. Piece 5 shows a crosscutting relationship between older felsic veins and younger low temperature alteration veins.

Core Photo



179-1105A-10R-2

INTERVAL: 44 **OXIDE-BEARING OLIVINE GABBRO**
(see Section 179-1105A-9R-3)

INTERVAL: 45 **OXIDE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**10R**	**2**	**3**	**0.34 m**	**63.69 m**
Lower contact:	**10R**	**2**	**8**	**0.95 m**	**64.30 m**
Thickness (m):	**0.61**				
Contact Type:	**Modal change**				

		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	50	30	1	10	prismatic/subhedral
Clinopyroxene	35	25	1	15	angular/subhedral
Fe-Ti oxide	15				interstitial
Total	**100**				

GRAIN SIZE: Coarse-pegmatitic

TEXTURE: Inequigranular

ALTERATION: 4 %

COMMENTS: Massive oxide gabbro with oxides filling interstises between silicates. Olivine not observed.

INTERVAL: 46 **OXIDE and OLIVINE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**10R**	**2**	**8**	**0.95 m**	**64.30 m**
Lower contact:	**10R**	**3**	**9**	**0.95 m**	**65.70 m**
Thickness (m):	**1.41**				
Contact Type:	**Modal change, grain size change**				

		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	62	10	3	5	tabular/euhedral
Clinopyroxene	35	20	2	6	equant/euhedral
Olivine	2	10	3	4	rounded/anhedral
Fe-Ti oxides	1				interstitial
Total	**100**				

GRAIN SIZE: Coarse

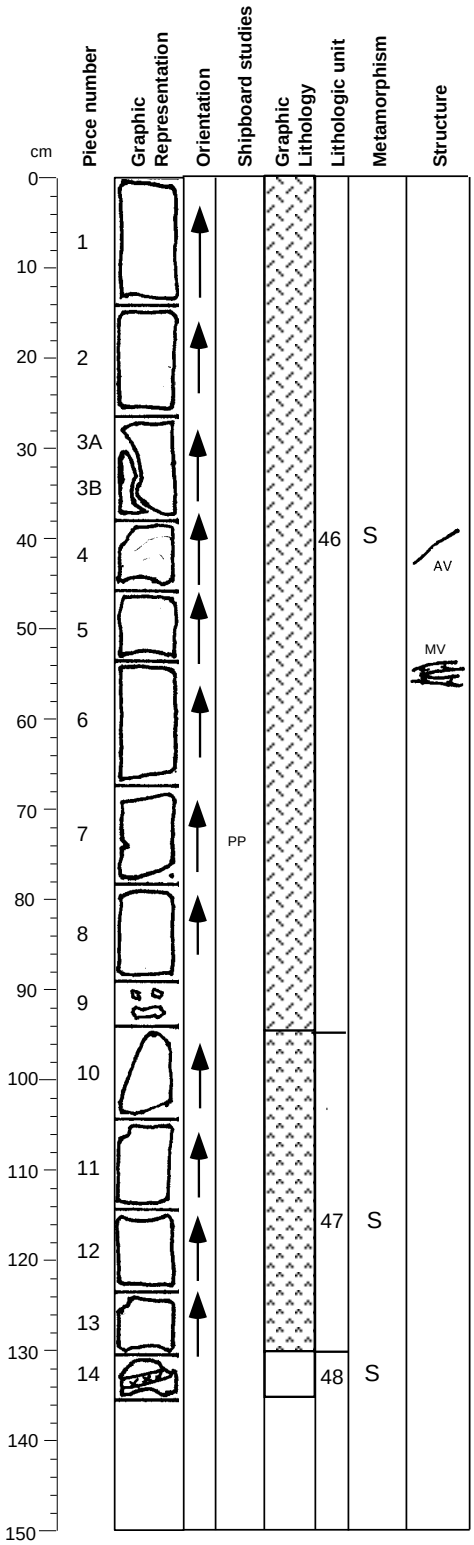
TEXTURE: Equigranular but variable

ALTERATION: 5 %

COMMENTS: Olivine and oxide are more abundant in Pieces 1, 2, and 8, respectively, in Section 179-1105A-10R-3. Felsic veins in Pieces 4 and 5 in Section 179-1105A-10R-3.

STRUCTURE: This section displays igneous textures. Piece 1 contains an alteration vein. The interval 44/45 contact shows a sharp grain size change.

Core Photo



179-1105A-10R-3

INTERVAL: 46 **OXIDE and OLIVINE-BEARING GABBRO**
(see previous section)

INTERVAL: 47 **OXIDE-BEARING OLIVINE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**10R**	**3**	**9**	**0.95 m**	**65.70 m**
Lower contact:	**10R**	**3**	**14**	**1.33 m**	**66.08 m**
Thickness (m):	**0.38**				
Contact Type:	**Modal change, grain size change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	15	2	5	equant/subhedral
Clinopyroxene	30	30	3	10	equant/euhedral
Olivine	10	12	2	7	rounded/anhedral
Fe-Ti oxide	2				interstitial
Total	**102**				

GRAIN SIZE: Coarse

TEXTURE: Inequigranular

ALTERATION: 10 %

COMMENTS: Massive coarse-grained interval with a few interstitial oxide patches and a high concentration of large olivine.

INTERVAL: 48 **APLITIC FELSIC VEIN**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**10R**	**3**	**14**	**1.33 m**	**66.08 m**
Lower contact:	**11R**	**1**	**1**	**0.03 m**	**67.03 m**
Thickness (m):	**?**				
Contact Type:	**Modal change, grain size change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	70				tabular/euhedral
Clinopyroxene	30				tabular/subhedral
Fe-Ti oxides	1				
Total	**101**				

GRAIN SIZE: Fine

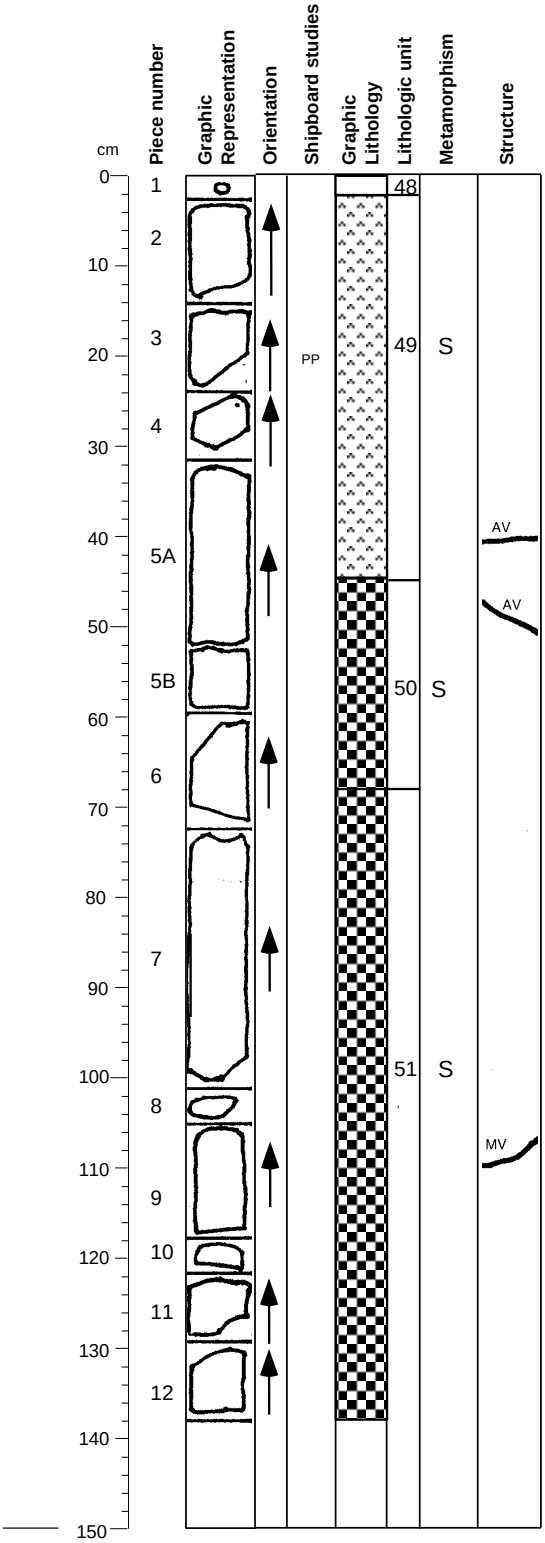
TEXTURE: Equigranular but variable

ALTERATION: 0 %

COMMENTS: Very fine-grained aplitic vein. Part of Piece 14 (Section 179-1105A-10R-3) is composed of foliated and fine-grained oxide gabbro in piece 14 with plagioclase, pyroxenes, and oxide minerals in medium-grained inequigranular texture. Thickness not reported because of only two small pieces present in the bottom of Section 179-1105A-10R-3 and the top of Section 179-1105A-11R-1.

STRUCTURE: This section displays igneous textures. Pieces 6 and 14 contain felsic veins. Piece 4 contains an alteration vein.

Core Photo



CORE/SECTION

179-1105A-11R-1

INTERVAL: 48 APLITIC FELSIC VEIN

(see previous section)

INTERVAL: 49 OXIDE-BEARING OLIVINE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	11R	1	1	0.03 m	67.03 m
Lower contact:	11R	1	5	0.44 m	67.44 m
Thickness (m):	0.41				
Contact Type:	Modal change, grain size change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	40	2	10	tabular/anhedral
Clinopyroxene	40	30	2	10	tabular/subhedral
Olivine	5	6	1	3	rounded/anhedral
Fe-Ti oxide	3				interstitial
Total	**103**				

GRAIN SIZE: Medium-pegmatitic

TEXTURE: Laminated

ALTERATION: 8 %

COMMENTS: Laminated gabbro. Irregular distribution of grain size from medium to pegmatitic.

INTERVAL: 50 OLIVINE-BEARING OXIDE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	11R	1	5	0.44 m	67.44 m
Lower contact:	11R	1	6	0.67 m	67.67 m
Thickness (m):	0.23				
Contact Type:	Modal change, grain size change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	53	10	1	3	tabular/suhedral
Clinopyroxene	35	8	3	5	prismatic/subhedral
Olivine	2	4	2	3	equant/rounded
Fe-Ti oxide	10				irregular/ disseminated
Sulfides	0.5				
Total	**100.5**				

GRAIN SIZE: Medium

TEXTURE: Equigranular but variable

ALTERATION: 3 %

COMMENTS: The upper half of this interval is slightly more coarse grained than the lower half. Coarse-grained patch occurs in Piece 5. Thin greenish vein at 50 cm in Piece 4. This interval is defined by medium grain size.

INTERVAL: 51 OLIVINE-BEARING OXIDE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	11R	1	6	0.67 m	67.67 m
Lower contact:	12R	1	4	0.40 m	71.70 m
Thickness (m):	4.03				
Contact Type:	Tectonic, textural change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	54	20	3	8	tabular/subhedral
Clinopyroxene	35	40	2	10	prismatic/subhedral
Olivine	6	18	3	10	rounded/anhedral
Fe-Ti oxide	5				irregular/interstitial
Total	**100**				

GRAIN SIZE: Medium-coarse

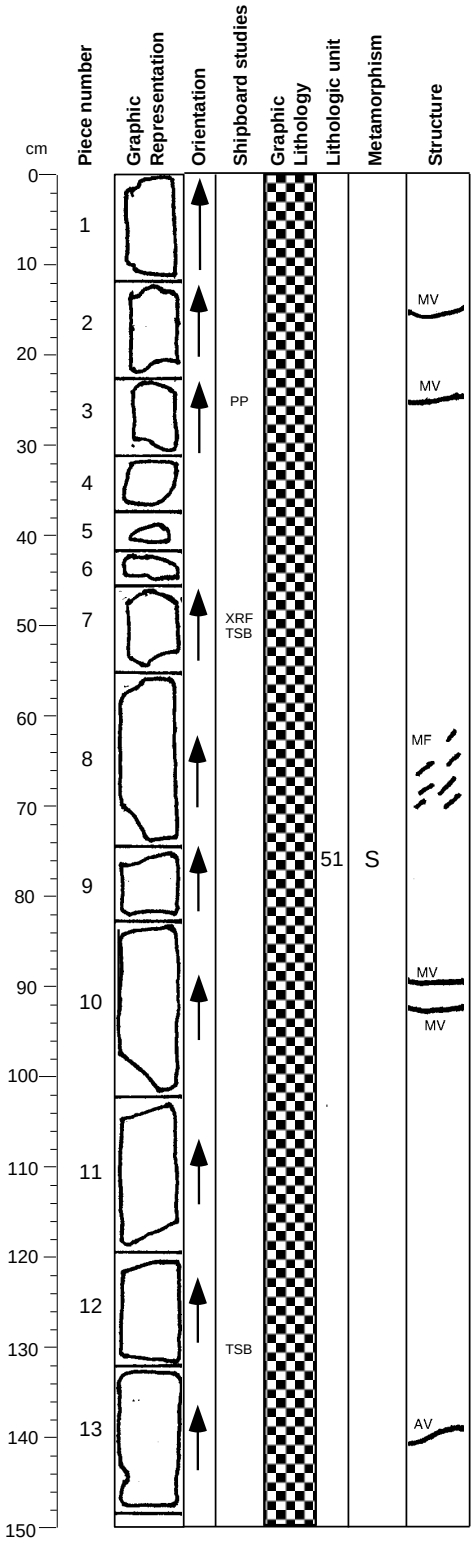
TEXTURE: Equigranular but variable

ALTERATION: 9 %

COMMENTS: Grain sizes are not uniform and vary from coarse grained to pegmatitic. Strong modal banding in Section 179-1105A-12R-1, Piece 2, at the cm scale.

STRUCTURE: This section displays coarse-grained igneous textures. Piece 5A contains a white alteration vein and an actinolite vein. Piece 9 contains an oxide vein.

Core Photo

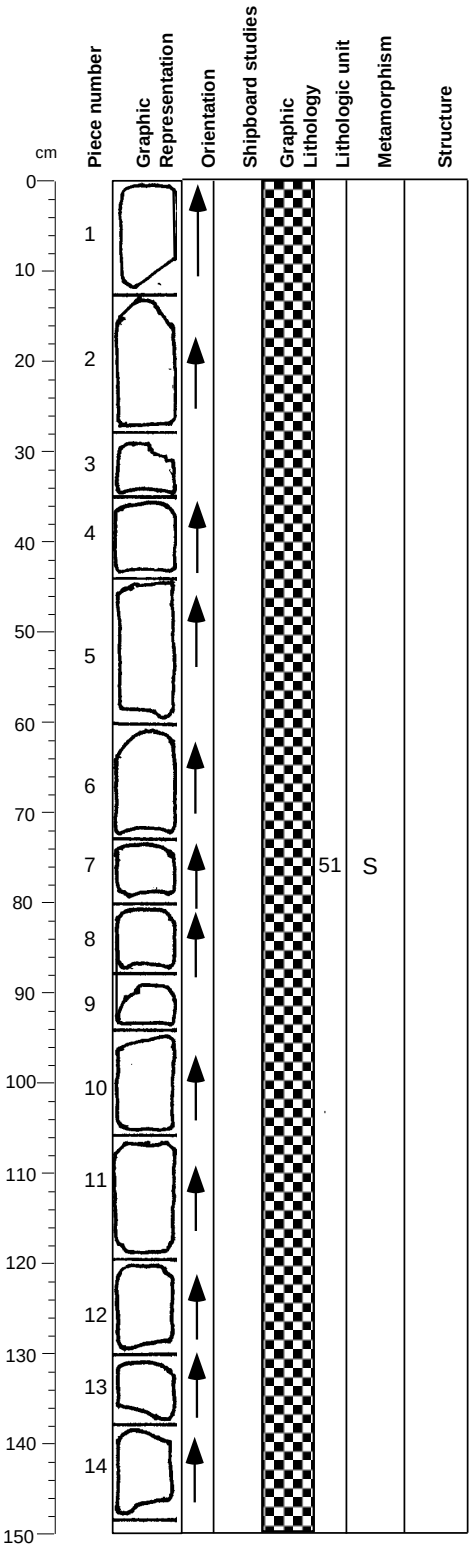


INTERVAL: 51 **OLIVINE-BEARING OXIDE GABBRO**
(see previous section)

STRUCTURE: This section displays coarse-grained igneous textures. Piece 8 contains magmatic foliation described by elongate to tabluar clinopyroxene. Pieces 2, 3, and 10 contain felsic veins. Piece 13 contains an actinolite vein.

CORE/SECTION

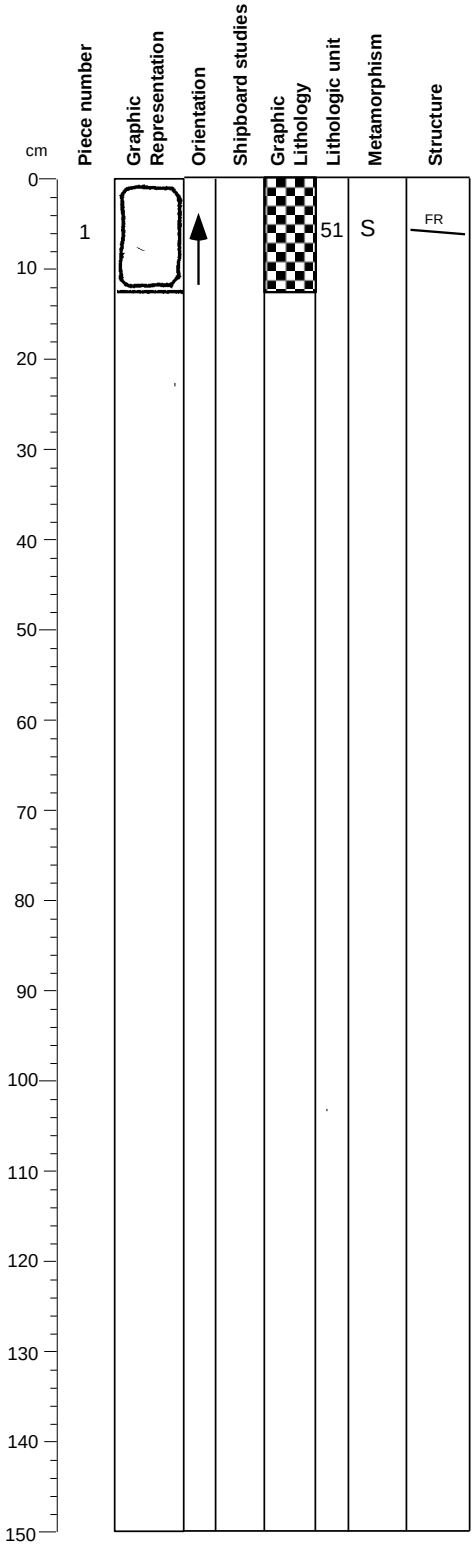
Core Photo



INTERVAL: 51 **OLIVINE-BEARING OXIDE GABBRO**
(see Section 179-1105A-11R-1)

STRUCTURE: This section displays coarse-grained igneous textures.

Core Photo

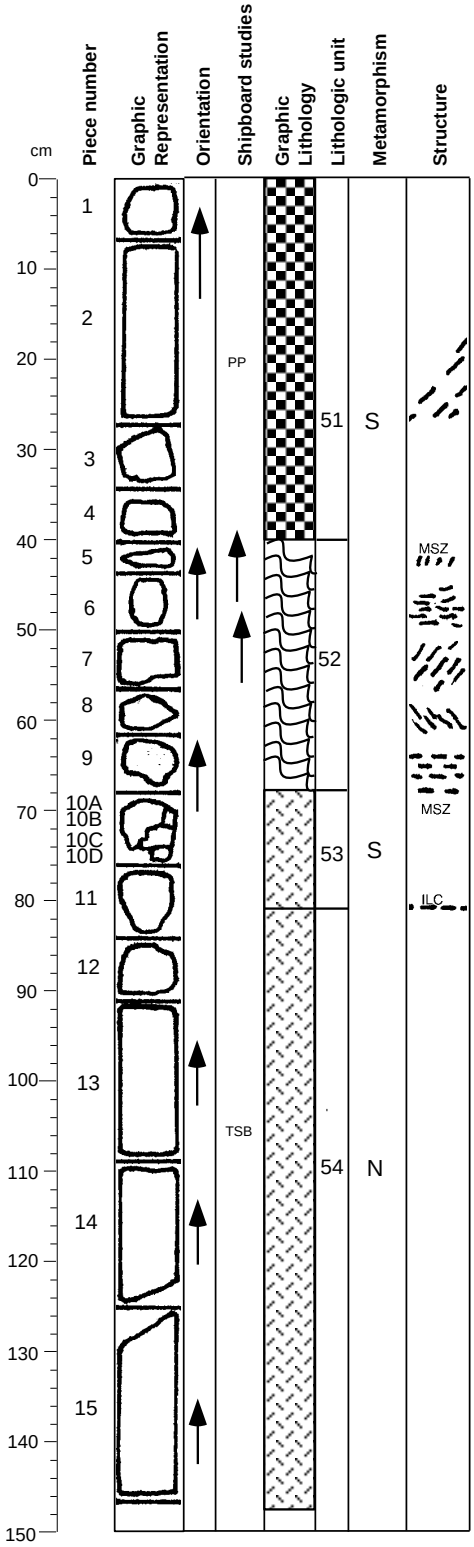


INTERVAL: 51 **OLIVINE OXIDE GABBRO**
(see Section 179-1105A-11R-1)

STRUCTURE: This section displays coarse-grained igneous textures.

CORE/SECTION

Core Photo



179-1105A-12R-1

INTERVAL: 51 OLIVINE-BEARING OXIDE GABBRO

(see Section 179-1105A-11R-1)

INTERVAL: 52 MYLONITE

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	12R	1	4	0.40 m	71.70 m
Lower contact:	12R	1	9	0.68 m	71.98 m
Thickness (m):	0.28				
Contact Type:	Tectonic, textural change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	10	3	<0.5	<0.5	elongate/subhedral
Clinopyroxene	10	7	<0.5	<0.5	elongate/subhedral
Fe-Ti oxide	3				irregular/interstitial
Sulfides	0.5				
Grain size too small to identify in hand sample	77				
Total	100.5				

GRAIN SIZE: Cataclastic with augen clasts

TEXTURE: Variable

ALTERATION: 7 %

COMMENTS: Deformed, mylonitic zone with alternating light (felsic) and dark colored layers (1-10 mm in thickness). These layers have thin extension cracks filled with green minerals (chlorite +actinolite?).

INTERVAL: 53 GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	12R	1	9	0.68 m	71.98 m
Lower contact:	12R	1	11	0.81 m	72.11 m
Thickness (m):	0.18				
Contact Type:	Grain size change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	50			1	tabular/subhedral
Clinopyroxene	50			0.5	prismatic/subhedral
Total	100				

GRAIN SIZE: Fine

TEXTURE: Equigranular but variable

ALTERATION: 0 %

COMMENTS: Part of interval (0.5 cm) composed of medium-grained oxide olivine gabbro.

INTERVAL: 54 GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	12R	1	11	0.81 m	72.11 m
Lower contact:	12R	2	3	0.36 m	73.13 m
Thickness (m):	1.02				
Contact Type:	Grain size change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	20	2	10	tabular/subhedral
Clinopyroxene	40	30	2	10	interstitial/subhedral
Total	100				

GRAIN SIZE: Coarse-pegmatitic

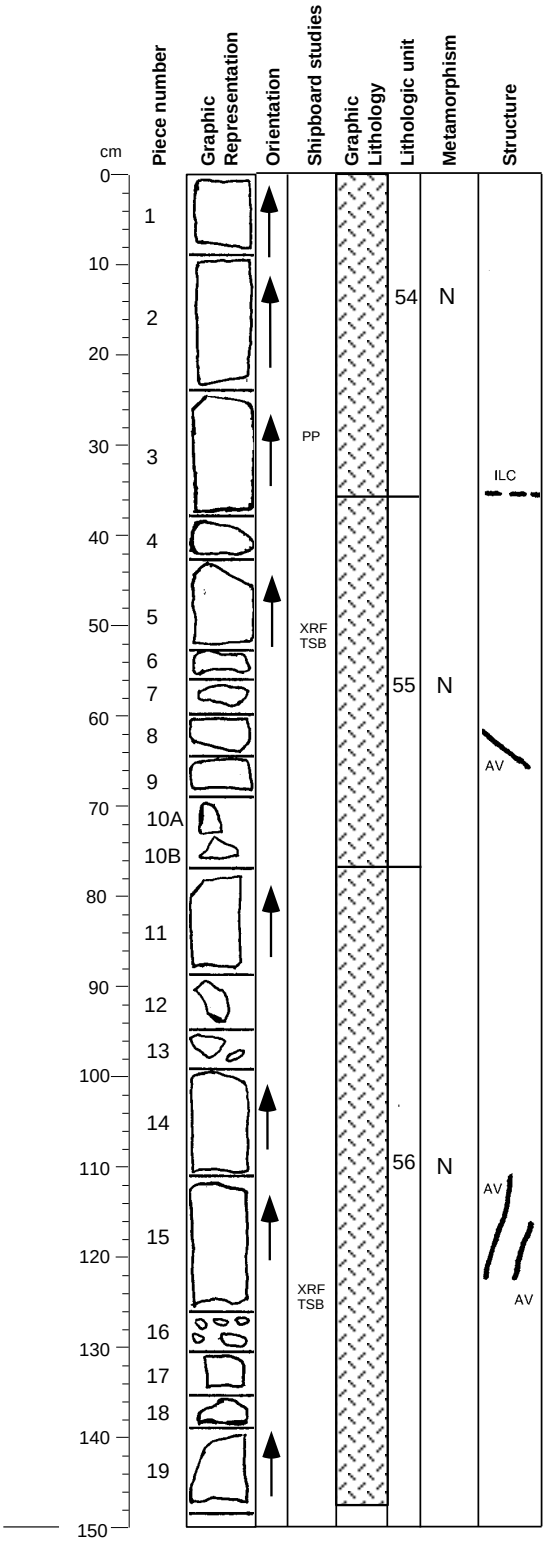
TEXTURE: Poikilitic to ophtic

ALTERATION: 0 %

COMMENTS: Pegmatitic interval characterized by poikilitic texture. Little or no oxides and olivines.

STRUCTURE: This section displays coarse-grained igneous textures except at the base of Piece 2 where an oxide-rich zone displays a weak crystal-plastic fabric. In Pieces 5-9 there is a porphyroclastic mylonite. Porphyroclasts are clinopyroxene and olivine; this zone is also rich in oxide minerals. Piece 7 may be large enough to provide orientation, and its texture has a 45 degree apparent dip. Piece 11 contains an igneous layer contact between microgabbro and coarse-grained gabbro.

Core Photo



CORE/SECTION

179-1105A-12R-2

INTERVAL: 54 **GABBRO**
(see previous section)

INTERVAL: 55 **GABBRO**

				Depth	Depth
Interval Location:	**Core**	**Section**	**Piece**	**in Section**	**mbsf**
Upper contact:	**12R**	**2**	**3**	**0.36 m**	**73.13 m**
Lower contact:	**12R**	**2**	**10**	**0.77 m**	**73.54 m**
Thickness (m):	**0.41**				
Contact Type:	**Grain size change, modal change**				

		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	50			1	prismatic/subhedral
Clinopyroxene	50			5	prismatic/subhedral
Total	**100**				

GRAIN SIZE: Fine

TEXTURE: Granular, Uniform

ALTERATION: 0 %

COMMENTS: Massive fine-grained gabbro without any exciting features. Piece 5 contains 10% olivine.

INTERVAL: 56 **OXIDE and OLIVINE-BEARING GABBRO**

				Depth	Depth
Interval Location:	**Core**	**Section**	**Piece**	**in Section**	**mbsf**
Upper contact:	**12R**	**2**	**10**	**0.77 m**	**73.54 m**
Lower contact:	**12R**	**3**	**8**	**0.61 m**	**74.86 m**
Thickness (m):	**1.32**				
Contact Type:	**Grain size change, modal change**				

		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	50	10	1	1	prismatic/subhedral
Clinopyroxene	50	15	1	1	prismatic/subhedral
Olivine	2	10	1		rounded
Fe-Ti oxides	2				interstitial
Total	**104**				

GRAIN SIZE: Fine-medium

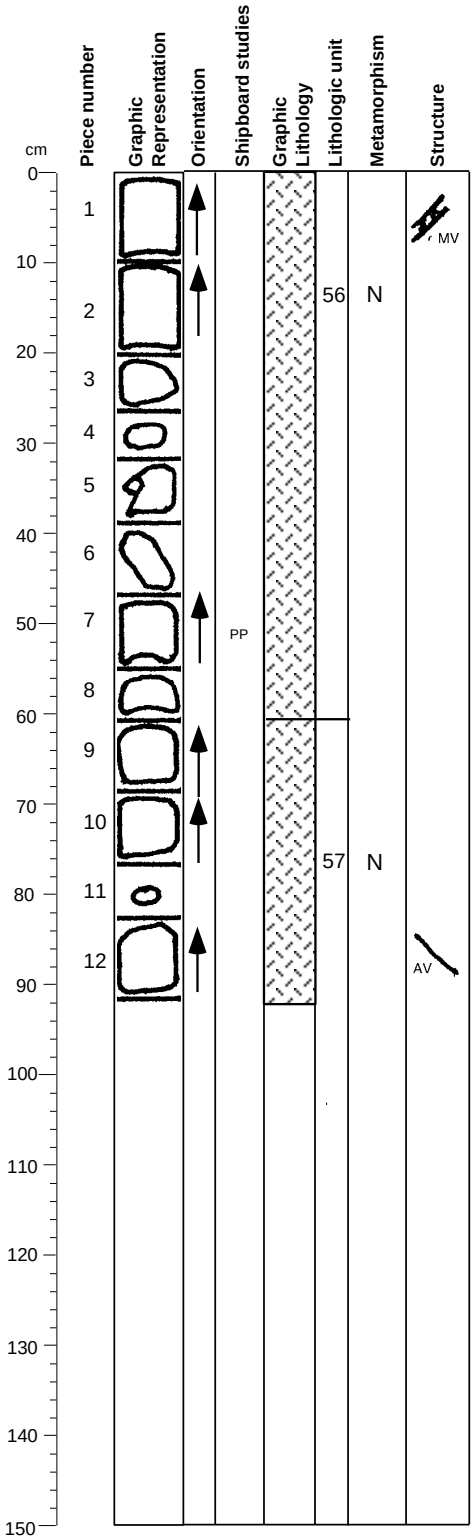
TEXTURE: Granular and variable

ALTERATION: 1 %

COMMENTS: Banded unit composed of a dominating fine-grained gabbro and a medium-grained gabbro. The latter occurs in Section 179-1105A-12R-2 (Pieces 11 and12, 78-93 cm; Piece14, 100-111 cm) and Section 179-1105A-12R-3 (Piece 1, 1-9 cm; Piece 6, 40-46). Strong banding (up to 2-3 cm scale) is present in Section 179-1105A-12R-2 (Piece 14) and Section 179-1105A-12R-3 (Piece 1). The banding can be described as rhythmic grain-size layering without significant modal variability. Bleached alteration vein present in Section 179-1105A-12R-3 (Piece 1).

STRUCTURE: This section displays coarse-grained igneous textures. Piece 3 contains an igneous layer boundary displaying a sharp contact defined by a grain-size change. Pieces 9 and 15 contain actinolite alteration veins.

Core Photo



179-1105A-12R-3

INTERVAL: 56 **OXIDE and OLIVINE-BEARING GABBRO**
(see previous section)

INTERVAL: 57 **OXIDE and OLIVINE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**12R**	**3**	**8**	**0.61 m**	**74.86 m**
Lower contact:	**13R**	**2**	**1**	**0.27 m**	**77.97 m**
Thickness (m):	**3.11 m**				
Contact Type:	**Grain size change, modal change**				

		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	60	13	2	4	tabular/subhedral
Clinopyroxene	35	12	1	3	prismatic/euhedral
Olivine	3	7	2	3	equant/rounded
Fe-Ti oxides	2				irregular/ disseminated
Sulfides	0.5				
Total	**100.5**				

GRAIN SIZE: Medium-coarse

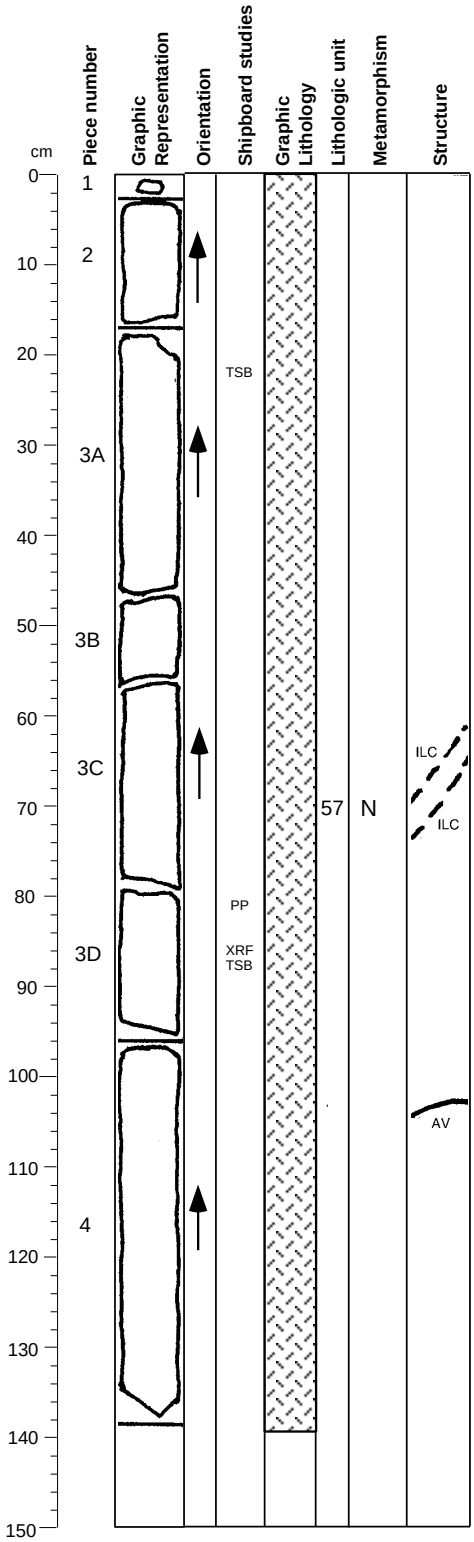
TEXTURE: Inequigranular, variable

ALTERATION: 1 %

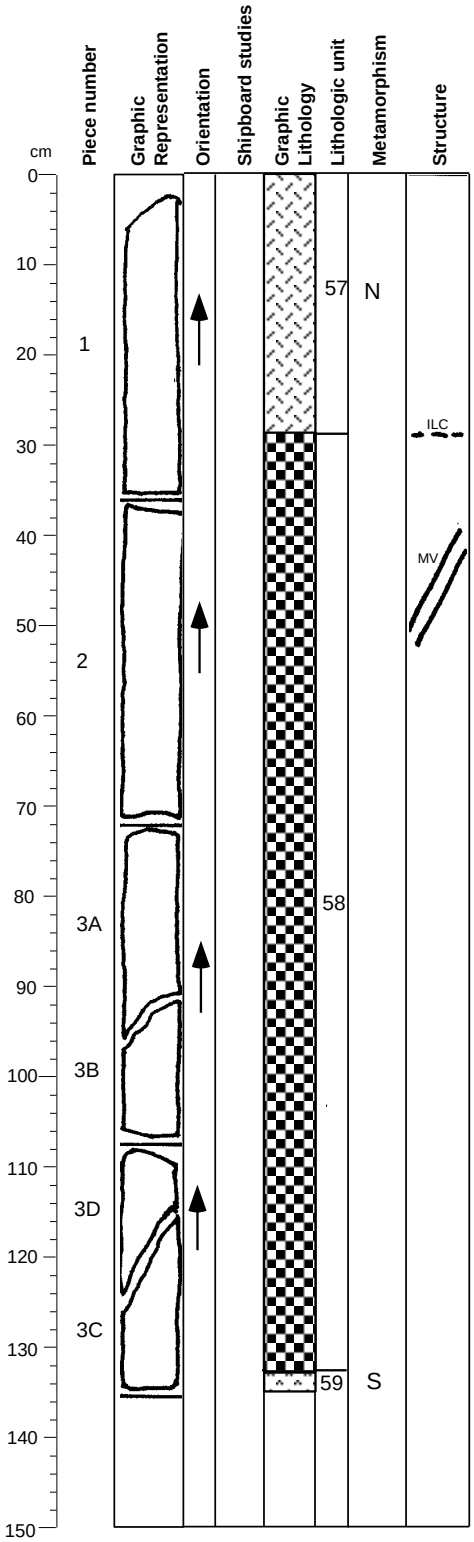
COMMENTS: A oxide + quartz-rich zone, ca. 2 cm width, occurs at 70 cm in Section 179-1105A-13R-1, Piece 3. The lower boundary is defined by changes in grain size and modal abundance of oxide.

STRUCTURE: This section displays coarse-grained igneous textures. Piece 1 contains a felsic vein. Piece 12 contains an actinolite vein.

Core Photo


179-1105A-13R-1
cm
Piece number
Graphic Representation
Orientation
Shipboard studies
Graphic Lithology
Lithologic unit
Metamorphism
Structure
INTERVAL: 57
GABBRO
(see previous section)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
1
2
3A
3B
3C
3D
4
TSB
PP
XRF
TSB
57
N
ILC
ILC
AV
STRUCTURE: This section displays coarse-grained igneous textures. Piece 3C contains an oxide-rich layer with an apparent dip of 43 degrees. Piece 4 contains an alteration vein.

Core Photo



179-1105A-13R-2

INTERVAL: 57 **OXIDE and OLIVINE-BEARING GABBRO**
(see Section 179-1105A-12R-3)

INTERVAL: 58 **OLIVINE-BEARING OXIDE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**13R**	**2**	**1**	**0.27 m**	**77.97 m**
Lower contact:	**13R**	**2**	**4**	**1.32 m**	**79.02 m**
Thickness (m):	**1.05**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	20	1	5	tabular/subhedral
Clinopyroxene	45	20	2	5	prismatic/subhedral
Olivine	1			1	rounded/resorbed
Fe-Ti oxide	5				interstitial
Total	**101**				

GRAIN SIZE: Coarse

TEXTURE: Inequigranular

ALTERATION: 5 %

COMMENTS: Massive medium- to coarse grained interval with parts containing distinct modal banding: Piece 2, 38-50 cm (mafic band); Piece 4, 110-115 cm (irregular banding).

INTERVAL: 59 **OXIDE-BEARING OLIVINE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**13R**	**2**	**4**	**1.32 m**	**79.02 m**
Lower contact:	**13R**	**3**	**3**	**0.43 m**	**79.47 m**
Thickness (m):	**0.45**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	15	2	5	tabular/subhedral
Clinopyroxene	45	10	2	5	prismatic/subhedral
Olivine	5			2	rounded/resorbed
Fe-Ti oxides	1				interstitial
Total	**101**				

GRAIN SIZE: Medium

TEXTURE: Inequigranular

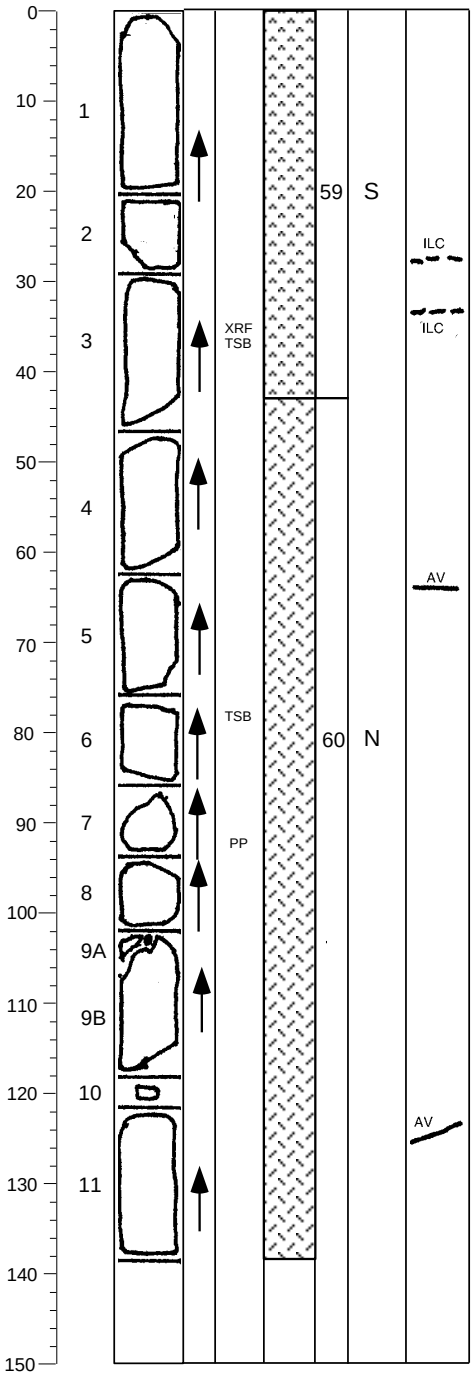
ALTERATION: 6 %

COMMENTS: Layered medium-grained interval with distinct modal banding: Section 179-1105A-13R-3, Pieces 1-3 (banding defined by extreme grain-size variation from fine-grained to pegmatitic). Particularly well developed at 27-33 cm.

STRUCTURE: This section displays coarse-grained igneous textures. Piece 2 contains a 1 cm thick oxide mineral-rich vein or layer with an apparent dip of 58 degrees. Piece 1 contains a gradational contact between Intervals 57 and 58 defined by a grain size change.

Core Photo

179-1105A-13R-3



CORE/SECTION

INTERVAL: 59 **OLIVINE GABBRO**

(see previous section)

INTERVAL: 60 **GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**13R**	**3**	**3**	**0.43 m**	**79.47 m**
Lower contact:	**13R**	**4**	**2**	**0.26 m**	**80.70 m**
Thickness (m):	**1.23**				
Contact Type:	**Grain size change, modal change**				

		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	62	15	2	4	tabular/subhedral
Clinopyroxene	35	35	2	3	prismatic/euhedral
Olivine	3	5	1	3	equant/rounded
Fe-Ti oxides	0.5				irregular/ disseminated
Sulfides	0.5				
Total	**101**				

GRAIN SIZE: Medium

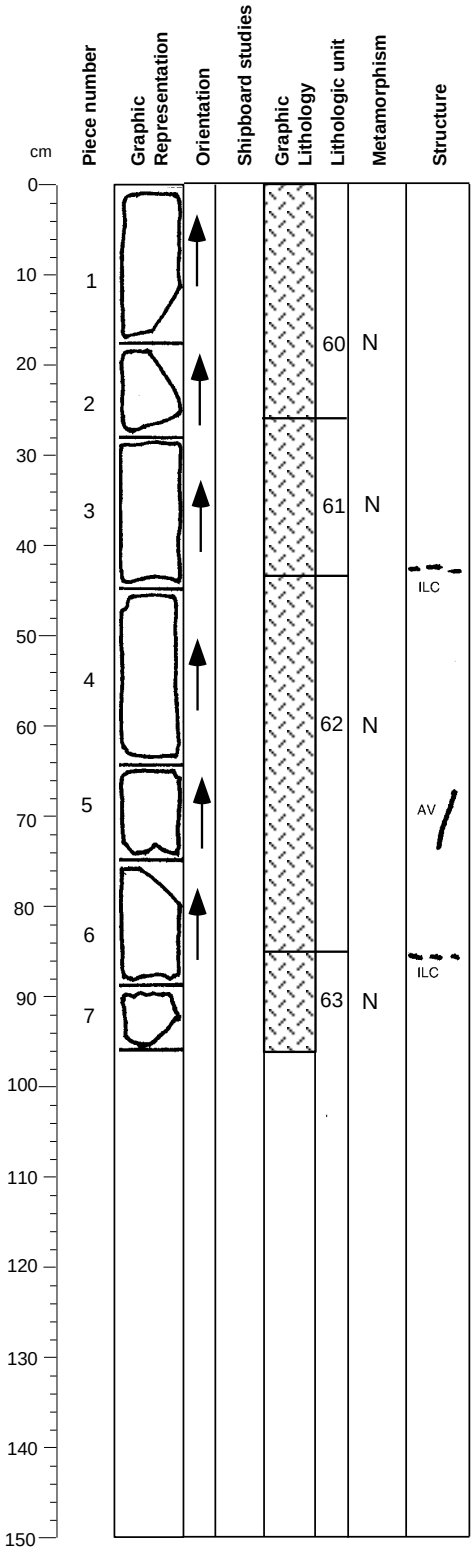
TEXTURE: Inequigranular

ALTERATION: <1 %

COMMENTS: Medium to coarse-grained massive gabbro.

STRUCTURE: This section displays coarse-grained igneous textures. Pieces 2 and 3 contain igneous layer contacts defined by sharp changes in grain size. Piece 11 contains an alteration vein.

Core Photo



179-1105A-13R-4

INTERVAL: 60 **OXIDE and OLIVINE-BEARING GABBRO**

(see previous section)

INTERVAL: 61 **OXIDE and OLIVINE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**13R**	**4**	**2**	**0.26 m**	**80.70 m**
Lower contact:	**13R**	**4**	**3**	**0.43 m**	**80.87 m**
Thickness (m):	**0.17**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	30	3	10	tabular/subhedral
Clinopyroxene	40	20	3	8	equant/subhedral
Olivine	1			2	rounded/resorbed
Fe-Ti oxide	1				interstitial
Total	**102**				

GRAIN SIZE: Pegmatitic

TEXTURE: Inequigranular

ALTERATION: <1 %

COMMENTS: Pegmatic vein/patch in medium-grained gabbro. Contact irregular and strongly discordant to length of core.

INTERVAL: 62 **OLIVINE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**13R**	**4**	**3**	**0.43 m**	**80.87 m**
Lower contact:	**13R**	**4**	**6**	**0.84 m**	**81.28 m**
Thickness (m):	**0.41**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	59	7	2	4	tabular/subhedral
Clinopyroxene	40	10	1	3	prismatic/subhedral
Olivine	1	2	1	2	rounded
Sulfides	0.5				interstitial
Total	**100.5**				

GRAIN SIZE: Medium

TEXTURE: Equigranular

ALTERATION: <1 %

COMMENTS: Massive gabbro defined by medium grain size.

INTERVAL: 63 **OXIDE and OLIVINE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**13R**	**4**	**6**	**0.84 m**	**81.28 m**
Lower contact:	**14R**	**1**	**2**	**0.27 m**	**81.27 m**
Thickness (m):					
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	53	20	2	7	prismatic/subhedral
Clinopyroxene	45	25	2	5	prismatic/subhedral
Olivine	2			1	rounded
Fe-Ti oxide	0.5				interstitial
Sulfides	0.5				irregular/ disseminated
Total	**101**				

GRAIN SIZE: Medium

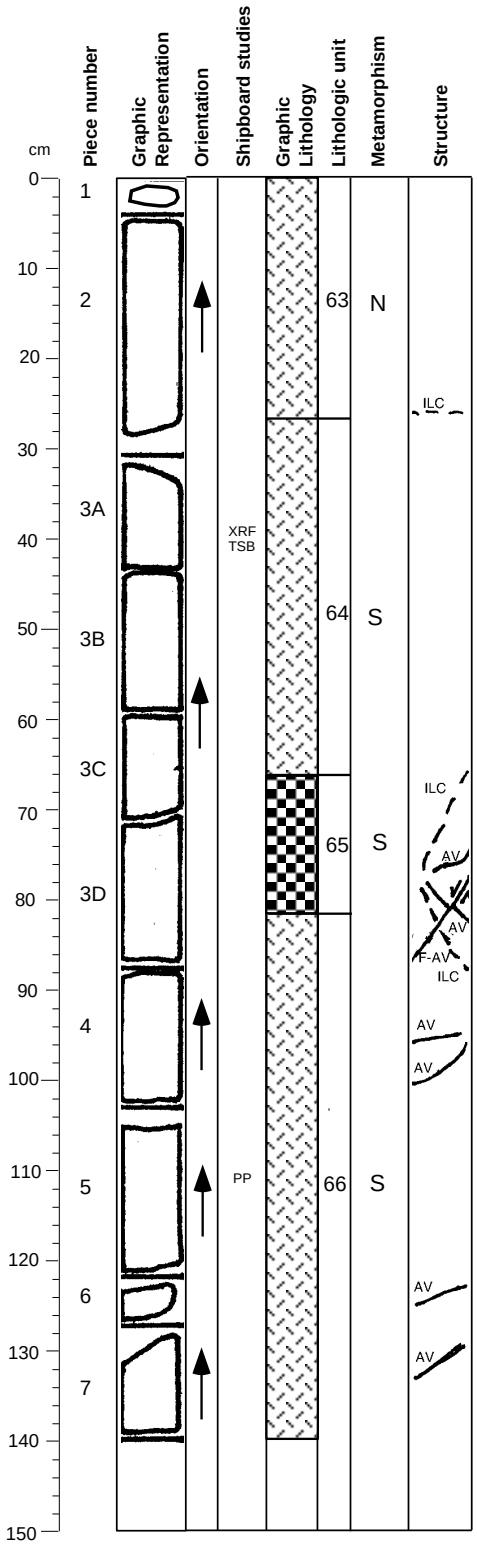
TEXTURE: Inequigranular

ALTERATION: <1 %

COMMENTS: Massive medium-grained gabbro. Piece 1 in Section 179-1105A-14R-1 is fine-grained gabbro and appears to be a rock fragment fallen off the wall.

STRUCTURE: This section displays coarse-grained igneous textures. Pieces 3 and 6 display gradational igneous contacts defined by changes in grain size.

Core Photo



179-1105A-14R-1

INTERVAL: 63 **OXIDE and OLIVINE BEARING GABBRO**
(see previous section)

INTERVAL: 64 **OLIVINE-BEARING GABBRO**

				Depth	Depth
Interval Location:	**Core**	**Section**	**Piece**	**in Section**	**mbsf**
Upper contact:	**14R**	**1**	**2**	**0.27 m**	**81.27 m**
Lower contact:	**14R**	**1**	**3C**	**0.65 m**	**81.65 m**
Thickness (m):	**0.38**				
Contact Type:	**Grain size change, modal change**				

		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	60	13	1	4	equant/subhedral
Clinopyroxene	37	16	2	5	prismatic/subhedral
Olivine	1	2	1	1	rounded
Total	**98**				

GRAIN SIZE: Medium

TEXTURE: Granular but variable

ALTERATION: 8 %

COMMENTS: Massive medium-grained gabbro.

INTERVAL: 65 **OLIVINE-BEARING OXIDE GABBRO**

				Depth	Depth
Interval Location:	**Core**	**Section**	**Piece**	**in Section**	**mbsf**
Upper contact:	**14R**	**1**	**3C**	**0.65 m**	**81.65 m**
Lower contact:	**14R**	**1**	**3D**	**0.81 m**	**81.81 m**
Thickness (m):	**0.16**				
Contact Type:	**Grain size change. modal change**				

		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	50	12	2	8	tabular/subhedral
Clinopyroxene	30	25	5	12	prismatic/subhedral
Olivine	2	3	1	2	rounded
Fe-Ti oxide	17				interstitial/seams
Sulfides	1				subrounded
Total	**100**				

GRAIN SIZE: Coarse-pegmatitic

TEXTURE: Pegmatitic

ALTERATION: 5 %

COMMENTS: Sulfides abundant near contact. Alteration is concentrated near chlorite-actinolite veins

INTERVAL: 66 **OLIVINE-BEARING GABBRO**

				Depth	Depth
Interval Location:	**Core**	**Section**	**Piece**	**in Section**	**mbsf**
Upper contact:	**14R**	**1**	**3D**	**0.81 m**	**81.81 m**
Lower contact:	**14R**	**2**	**3**	**0.37 m**	**82.78 m**
Thickness (m):	**0.97**				
Contact Type:	**Grain size change, modal change**				

		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	60	13	1	4	equant/subhedral
Clinopyroxene	37	16	2	5	prismatic/subhedral
Olivine	1	2	1	1	rounded
Total	**98**				

GRAIN SIZE: Medium

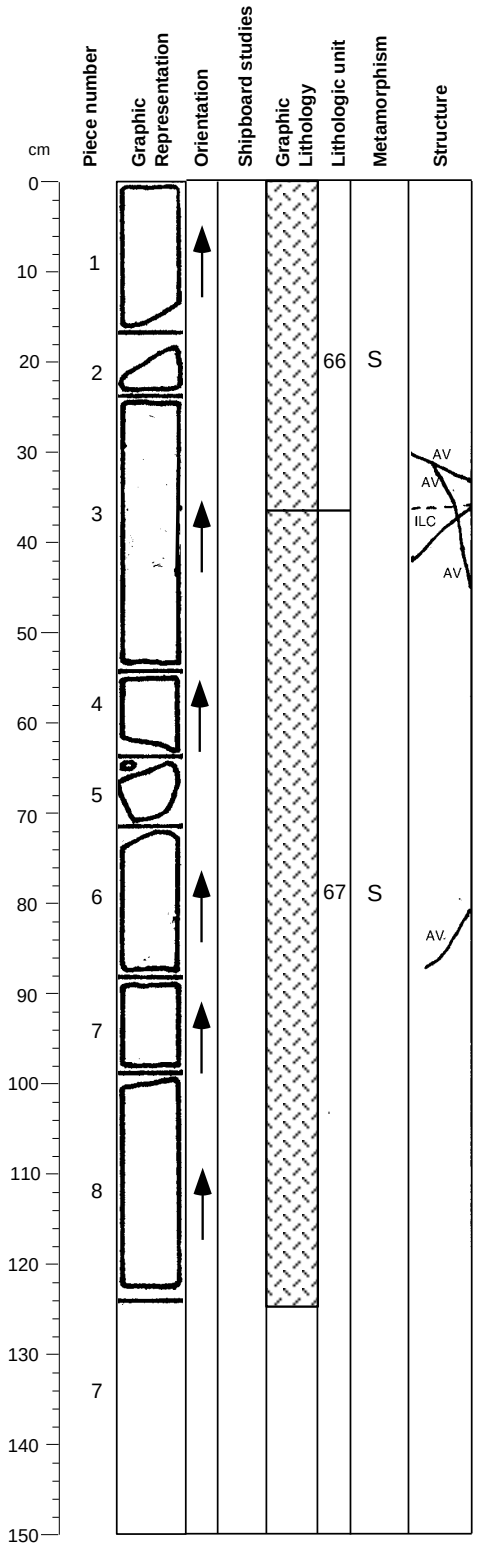
TEXTURE: Granular

ALTERATION: 8 %

COMMENTS: Massive medium-grained gabbro with occasional coarse-grained gabbro patches. Some places also show deformation and alteration bands, the lower contact is marked by sharp grain-size change.

STRUCTURE: This section displays coarse-grained igneous textures. Pieces 3D, 4, 6 and 7 contain alteration veins. Pieces 3C and 3D contain a continuous contact between medium-grained gabbro and pegmatitic oxide gabbro. There is no chilled margin at the contact. This could represent a high angle layer contact or a pegmatitic intrusion. A vein in Piece 3D shows several mm of offset along a small scale fault with vein fill, which displays a normal diplacement component.

Core Photo



179-1105A-14R-2

INTERVAL: 66 **OLIVINE-BEARING GABBRO**

(see previous section)

INTERVAL: 67 **OLIVINE-BEARING GABBRO**

				Depth	Depth
Interval Location:	**Core**	**Section**	**Piece**	**in Section**	**mbsf**
Upper contact:	**14R**	**2**	**3**	**0.37 m**	**82.78 m**
Lower contact:	**14R**	**3**	**3**	**0.43 m**	**84.07 m**
Thickness (m):	**1.29**				
Contact Type:	**Modal change, Grain size change**				
		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	50	20	1	5	prismatic/subhedral
Clinopyroxene	50	15	2	5	prismatic/subhedral
Olivine	1	3	1	2	rounded
Total	**101**				

GRAIN SIZE: Medium-coarse

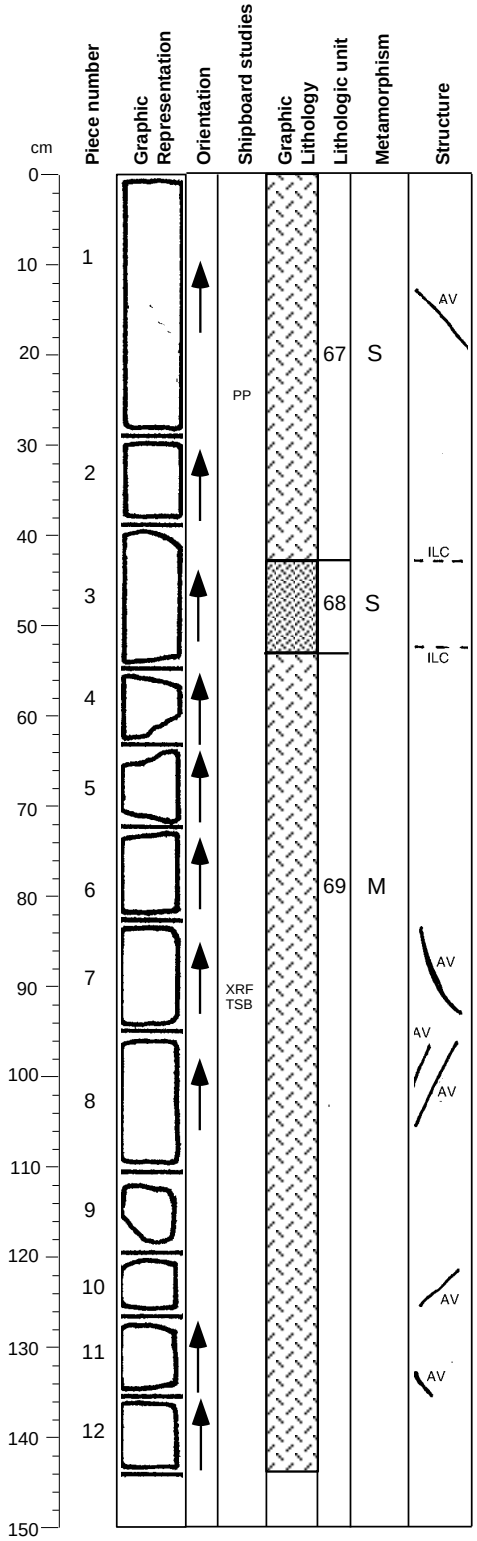
TEXTURE: Poikilitic

ALTERATION: 6 %

COMMENTS: Massive interval characterized by a relatively coarse grain size and poikilitic pyroxenes.

STRUCTURE: This section displays coarse-grained igneous textures. Pieces 3 contains a gradational igneous contact between medium to coarse-grained gabbro. Pieces 3 and 6 contain alteration veins.

Core Photo



179-1105A-14R-3

INTERVAL: 67 **OLIVINE-BEARING GABBRO**
(see previous section)

INTERVAL: 68 **OXIDE OLIVINE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**14R**	**3**	**3**	**0.43 m**	**84.07 m**
Lower contact:	**14R**	**3**	**3**	**0.53 m**	**84.17 m**
Thickness (m):	**0.10 m**				
Contact Type:	**Modal change, grain size change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	48	10	2	5	tabular/subhedral
Clinopyroxene	40	10	10	10	blocky/subhedral
Olivine	5	8	5	3	rounded/anhedral
Fe-Ti oxide	7				patchy aggregates
Sulfides	0.5				interstitial
Total	**100.5**				

GRAIN SIZE: Coarse

TEXTURE: Deformed

ALTERATION: 6 %

COMMENTS: Lower contact marked by 0.5 cm thick oxide band, upper contact by abundant but patchy oxides. Oxides occur in irregular patches. Distinct fabric in elongation of silicate phases.

INTERVAL: 69 **OXIDE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**14R**	**3**	**3**	**0.53 m**	**84.17 m**
Lower contact:	**14R**	**3**	**12**	**1.45 m**	**85.09 m**
Thickness (m):	**0.92 m**				
Contact Type:	**Grain size change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	10	3	6	tabular/subhedral
Clinopyroxene	40	10	3	6	prismatic/subhedral
Fe-Ti oxide	0.5				irregular/interstitial
Total	**100.5**				

GRAIN SIZE: Coarse

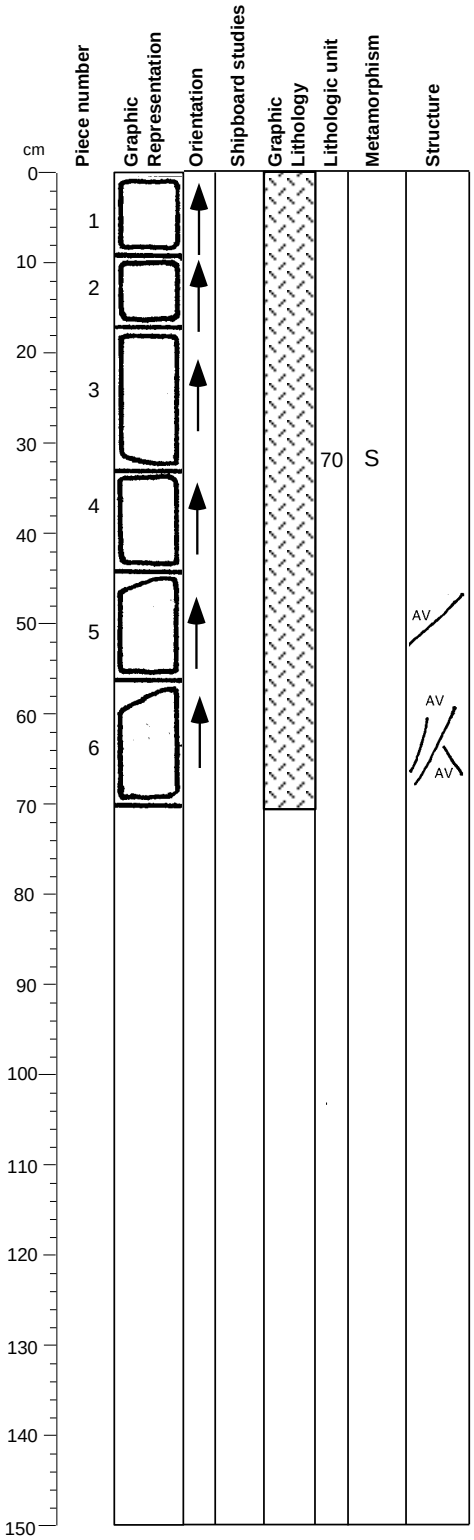
TEXTURE: Equigranular

ALTERATION: 11 %

COMMENTS: Cross-cutting cracks filled with chlorite in Pieces 7, 8, and 10. Massive gabbro with medium to coarse grain size.

STRUCTURE: This section displays coarse-grained igneous textures. Pieces 1, 7, 8, 10, and 11 contain chlorite veins. Piece 3 contains two subhorizontal igneous layer contacts.

Core Photo



179-1105A-14R-4

INTERVAL: 70 **OLIVINE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**14R**	**4**	**1**	**0.00 m**	**85.09 m**
Lower contact:	**15R**	**1**	**2**	**0.09 m**	**86.09 m**
Thickness (m):	**1.00**				
Contact Type:	**Modal change, grain size change**				

		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	60	15	2	4	equant/subhedral
Clinopyroxene	40	20	3	6	prismatic/euhedral
Olivine	0.5	8	1	4	rounded/anhedral
Total	**100.5**				

GRAIN SIZE: Coarse-medium

TEXTURE: Inequigranular, Poikilitic

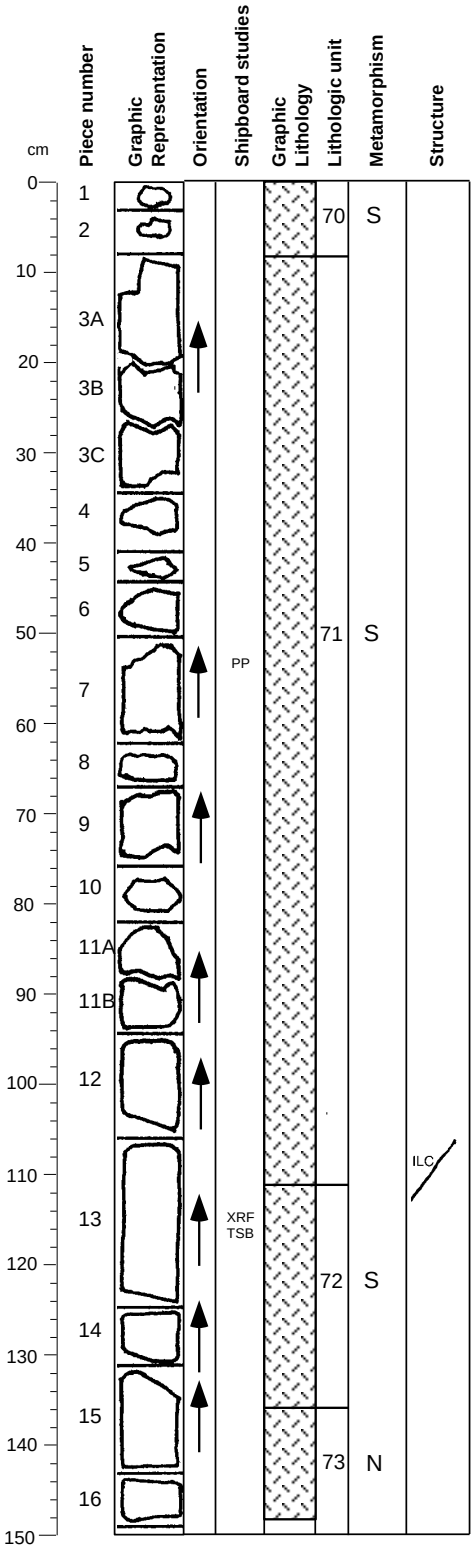
ALTERATION: 5 %

COMMENTS: Pocket of pegmatic gabbro at 46-69 cm (Section 179-1105A-14R-4, Pieces 5-6) with chlorite veins and associated oxide minerals.

STRUCTURE: This section displays coarse-grained igneous textures. Pieces 5 and 6 contain chlorite alteration veins. Piece 6 is highly altered and riddled with alteration veins.

CORE/SECTION

Core Photo



179-1105A-15R-1

INTERVAL: 70 OLIVINE-BEARING GABBRO

(see previous section)

INTERVAL: 71 OXIDE-BEARING GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	15R	1	2	0.09 m	86.09 m
Lower contact:	15R	1	13	1.11 m	87.11 m
Thickness (m):	1.03				
Contact Type:	Modal change, grain size change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	70	40	10	15	prismatic/subhedral
Clinopyroxene	30	30	10	20	prismatic/subhedral
Fe-Ti oxide	3				irregular/ interstitial veins
Total	**103**				

GRAIN SIZE: Coarse-pegmatitic

TEXTURE: Equigranular

ALTERATION: 7%

COMMENTS: Uniform coarse-pegmatic interval with the oxides primarily concentrated between 8-35 cm (Section 179-1105A-15R-1, Piece 3).

INTERVAL: 72 OXIDE and OLIVINE-BEARING GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	15R	1	13	1.11 m	87.11 m
Lower contact:	15R	1	15	1.36 m	87.36 m
Thickness (m):	0.25				
Contact Type:	Modal change, grain size change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	63	10	2	4	equant/subhedral
Clinopyroxene	35	10	3	4	prismatic/euhedral
Olivine	1	3	1	2	equant/rounded
Fe-Ti oxide	1				irregular/interstitial
Sulfides	0.5				irregular/ disseminated
Total	**100.5**				

GRAIN SIZE: Medium

TEXTURE: Equigranular but variable

ALTERATION: 4%

COMMENTS: Coarse-grained gabbro at the bottom of this interval (ca. 5 cm).

INTERVAL: 73 GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	15R	1	15	1.36 m	87.36 m
Lower contact:	15R	3	2	0.29 m	89.26 m
Thickness (m):	1.90				
Contact Type:	Grain size change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	5	0.1	0.5	equant/subhedral
Clinopyroxene	40	5	0.1	0.5	equant/subhedral
Total	**100**				

GRAIN SIZE: Fine

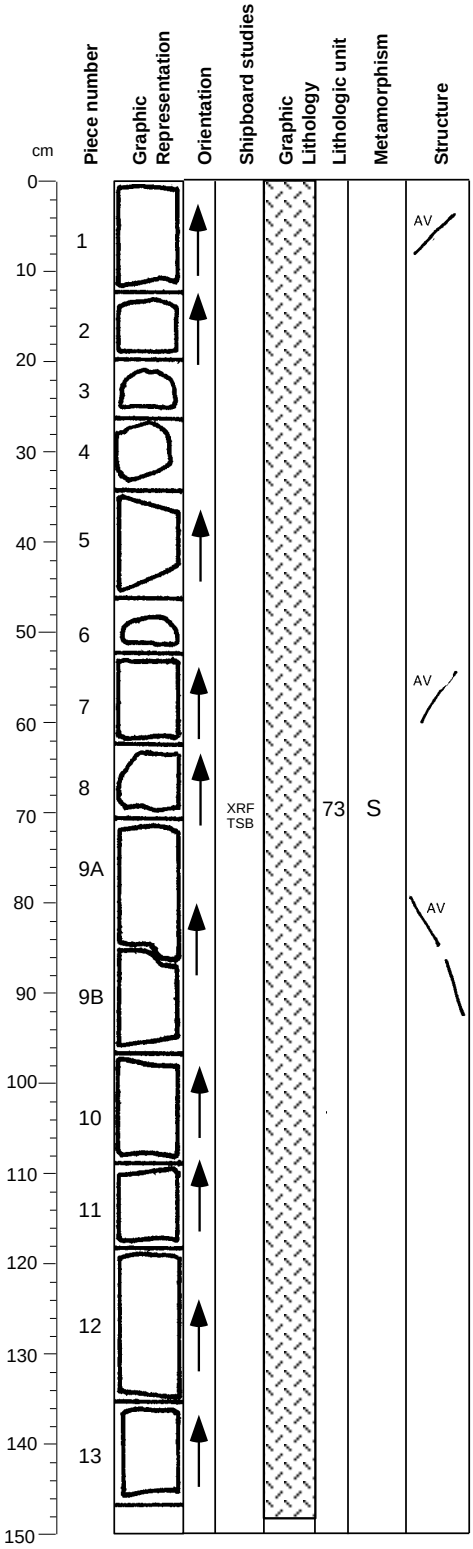
TEXTURE: Equigranular

ALTERATION: 0%

COMMENTS: Coarse-grained olivine gabbro patch at 111-140 cm in Section 179-1105A-15R-3. Cracks filled with chlorite occur in Section 15R-3, Pieces 7, 9A, and Section 15R-4, Piece 1. This interval is characterized by fine grain size.

STRUCTURE: This section displays igneous textures. The contact between a pegmatitic gabbro (Interval 71) and a fine to medium-grained gabbro (Interval 72) is exposed in Piece 13 with an apparent dip of 62 degrees.

Core Photo

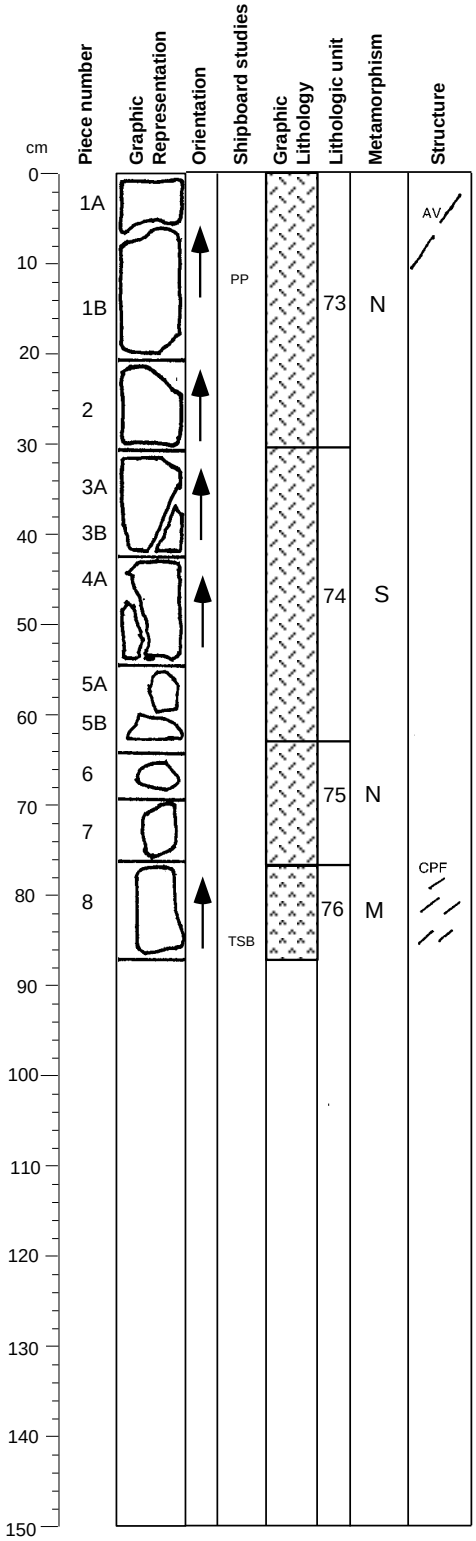


INTERVAL: 73 **GABBRO**
(see previous section)

STRUCTURE: This section displays coarse-grained igneous textures with alteration veins in Pieces 1, 7, 9A, and 9B.

CORE/SECTION

Core Photo



179-1105A-15R-3

INTERVAL: 73 **GABBRO**

(see Section 179-1105A-15R-1)

INTERVAL: 74 **OXIDE and OLIVINE-BEARINGGABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**15R**	**3**	**2**	**0.29 m**	**89.26 m**
Lower contact:	**15R**	**1**	**5**	**0.63 m**	**89.60 m**
Thickness (m):	**0.34**				
Contact Type:	**Grain size change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	15	3	5	equant/subhedral
Clinopyroxene	40	30	2	10	prismatic/subhedral
Olivine	0.5	8	1	4	rounded
Fe-Ti oxide	0.5				irregular/interstitial
Total	**101**				

GRAIN SIZE: Coarse

TEXTURE: Inquigranular, Poikilitic

ALTERATION: 4%

COMMENTS: Coarse-grained uniform interval.

INTERVAL: 75 **OXIDE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**15R**	**1**	**5**	**0.63 m**	**89.60 m**
Lower contact:	**15R**	**1**	**8**	**0.76 m**	**89.73 m**
Thickness (m):	**0.13**				
Contact Type:	**Grain size change, textural change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	5	0.1	0.5	equant/subhedral
Clinopyroxene	39	3	0.1	0.5	prismatic/euhedral
Fe-Ti oxide	1				irregular/ disseminated
Sulfides	0.5				irregular/ disseminated
Total	**100.5**				

GRAIN SIZE: Fine

TEXTURE: Equigranular, Uniform

ALTERATION: 0%

COMMENTS: Massive gabbro interval characterized by fine grain size.

INTERVAL: 76 **OXIDE-BEARING OLIVINE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**15R**	**1**	**8**	**0.76 m**	**89.73 m**
Lower contact:	**16R**	**1**	**5**	**0.64 m**	**91.24 m**
Thickness (m):	**1.51**				
Contact Type:	**Textural change, grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	30	1	5	tabular/anhedral
Clinopyroxene	45	15	1	5	elongated/anhedral
Olivine	5			1	elongated/anhedral
Fe-Ti oxide	0.5				irregular/interstitial
Total	**100.5**				

GRAIN SIZE: Medium

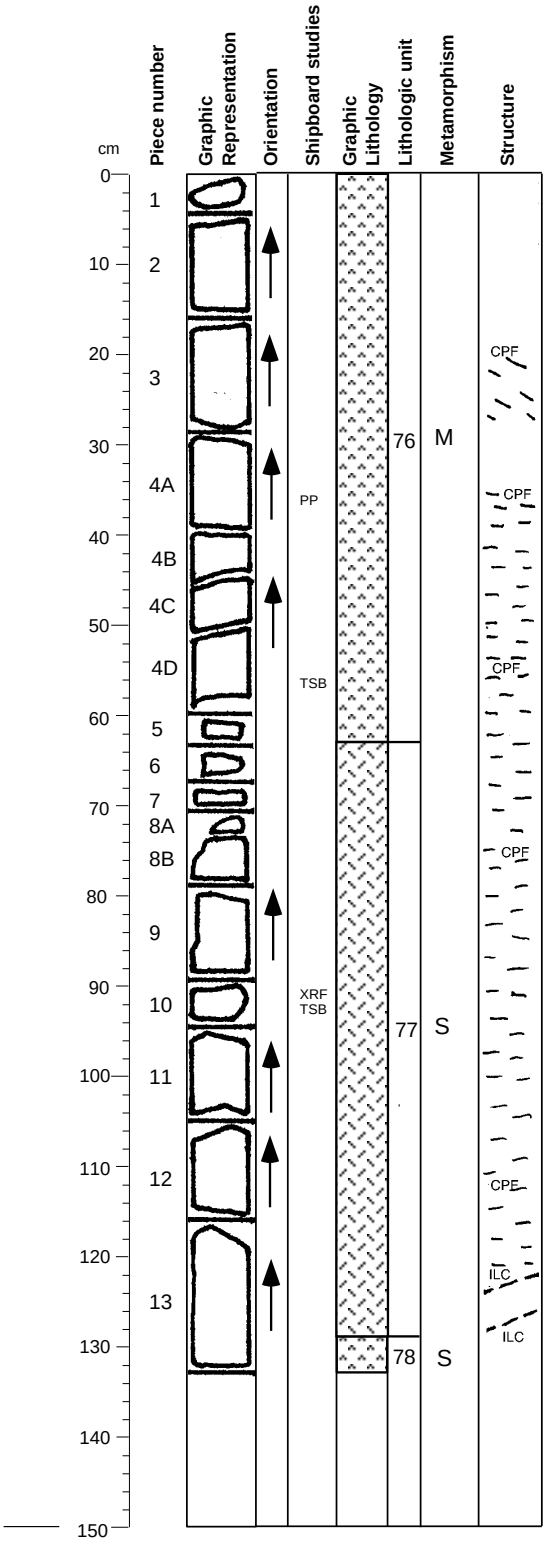
TEXTURE: Foliated

ALTERATION: 11%

COMMENTS: Foliated and banded interval with porphyroblastic pyroxenes. Mafic band (3 cm thick) at 20-26 cm (Section 179-1105A-16R-1, Piece 3).

STRUCTURE: This section displays igneous textures except in Piece 8 which is characterized by a weak crystal-plastic fabric. Pieces 1A and 1B contain an alteration vein.

Core Photo



179-1105A-16R-1

INTERVAL: 76 **OXIDE-BEARING OLIVINE GABBRO**
(see previous section)

INTERVAL: 77 **GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	16R	1	5	0.64 m	91.24 m
Lower contact:	16R	1	13	1.29 m	91.89 m
Thickness (m):	0.65				
Contact Type:	Grain size change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	5	1	2	tabular/subhedral
Clinopyroxene	40	7	0.5	2	elongated/subhedral
Sulfides	0.5				irregular/ disseminated
Total	**100.5**				

GRAIN SIZE: Fine-medium

TEXTURE: Foliated

ALTERATION: 4%

COMMENTS: Fine- to medium-grained gabbro with moderately developed foliation.

INTERVAL: 78 **OXIDE-BEARING OLIVINE GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	16R	1	13	1.29 m	91.89 m
Lower contact:	16R	2	10	0.86 m	92.79 m
Thickness (m):	0.90				
Contact Type:	Grain size change, textural change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	6	1	3	granular/anhedral
Clinopyroxene	45	30	1	4	prismatic/subhedral
Olivine	5			1	rounded
Fe-Ti oxide	1				irregular/interstitial
Total	**101**				

GRAIN SIZE: Medium-coarse

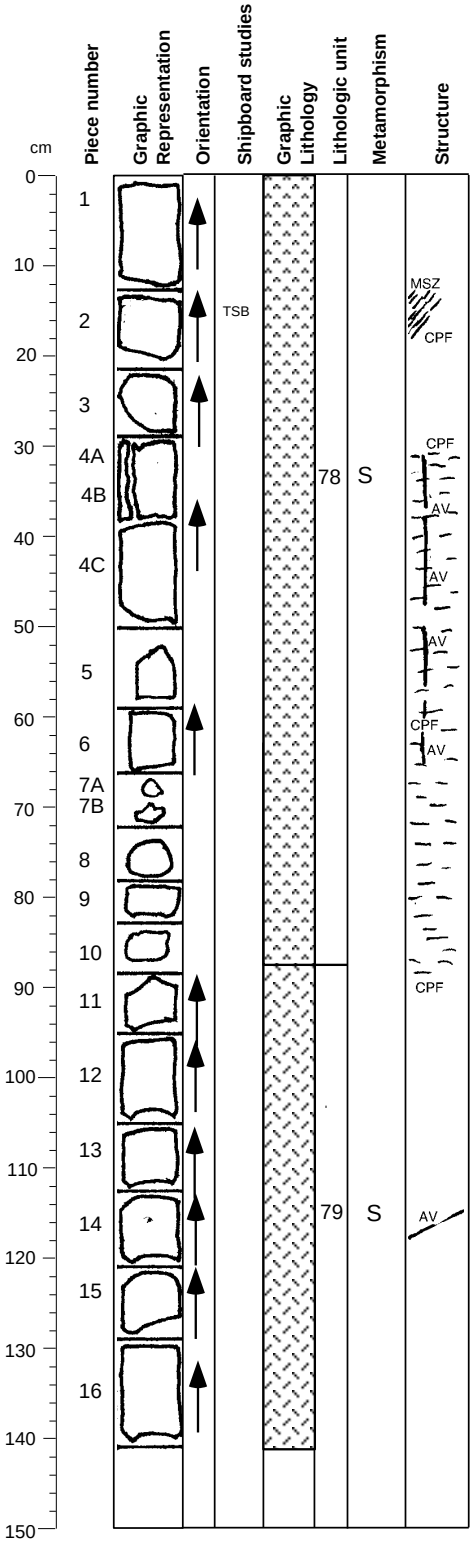
TEXTURE: Granular, Foliated

ALTERATION: 5%

COMMENTS: Medium-coarse variably foliated and sporadically banded interval. Strong foliation and banding in Piece 2 (Section 178-1105A-16R-2) associated with an increasing amount of oxides and porphyroblastic pyroxenes.

STRUCTURE: This section consists of dominantly weakly foliated gabbroic rocks with crystal-plastic fabrics. Igneous textures are preserved in Pieces 1 and 2, the top of Piece 4A, and the base of Piece 13. The base of the foliated zone is in Piece 13 and is marked by a layer contact between foliated coarse-grained gabbro above and unfoliated fine-grained gabbro directly below. The fine-grained gabbro layer is marked by a sharp basal contact underlain by a coarse-grained gabbro with igneous textures.

Core Photo



179-1105A-16R-2

INTERVAL: 78 **OXIDE-BEARING OLIVINE GABBRO**
(see previous section)

INTERVAL: 79 **OXIDE-BEARING GABBRO**

				Depth	Depth
Interval Location:	**Core**	**Section**	**Piece**	**in Section**	**mbsf**
Upper contact:	**16R**	**2**	**10**	**0.86 m**	**92.79 m**
Lower contact:	**16R**	**3**	**2**	**0.16 m**	**93.50 m**
Thickness (m):	**0.71**				
Contact Type:	**Grain size change, modal change**				

		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	59	20	5	10	tabular/subhedral
Clinopyroxene	40	20	3	8	tabular/subhedral
Fe-Ti oxide	0.5				irregular/interstitial
Sulfides	0.5				irregular/ disseminated
Total	**100**				

GRAIN SIZE: Coarse

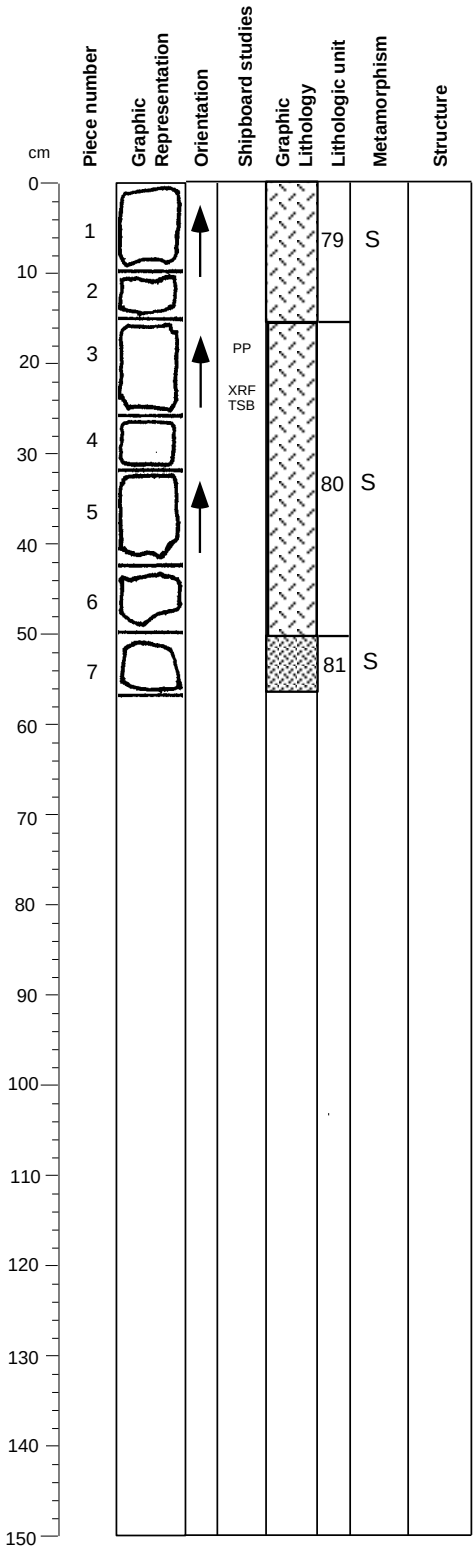
TEXTURE: Granular, Subophitic

ALTERATION: 4%

COMMENTS: Piece 2 in Section 179-1105A-16R-3 at the bottom of this interval is richer in oxide.

STRUCTURE: This section displays both igneous textures (Pieces 1 to 3 and 11 to 16) and crystal-plastic fabrics (Pieces 4A, 4B, and 5 to 10). Foliation is generally weak except in Piece 2 which contains part of an intensely foliated chlorite-rich mylonite. Pieces 4A, 4B, 4C, 5 and 6 contain a vertical chlorite filled fracture that appears continuous through each piece. Piece 14 contains an alteration vein.

Core Photo



179-1105A-16R-3

INTERVAL: 79 **OXIDE-BEARING GABBRO**

INTERVAL: 80 **OLIVINE-BEARING GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	**16R**	**3**	**2**	**0.16 m**	**93.50 m**
Lower contact:	**16R**	**3**	**6**	**0.50 m**	**93.84 m**
Thickness (m):	**0.34 m**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	10	1	3	tabular/subhedral
Clinopyroxene	40	15	1	3	tabular/subhedral
Olivine	4	2	0.5	1	irregular/anhedral
Total	**104**				

GRAIN SIZE: Medium

TEXTURE: Equigranular, Poikilitic

ALTERATION: 4%

COMMENTS: Massive equigranular to poikilitic gabbro.

INTERVAL: 81 **OXIDE OLIVINE GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	**16R**	**3**	**6**	**0.50 m**	**93.84 m**
Lower contact:	**16R**	**3**	**7**	**0.56 m**	**93.90 m**
Thickness (m):	**0.34**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	8	2	4	tabular/subhedral
Clinopyroxene	35	12	2	6	tabular/subhedral
Olivine	5	6	1	3	irregular/anhedral
Fe-Ti oxide	10				
Sulfides	2				
Total	**102**				

GRAIN SIZE: Coarse

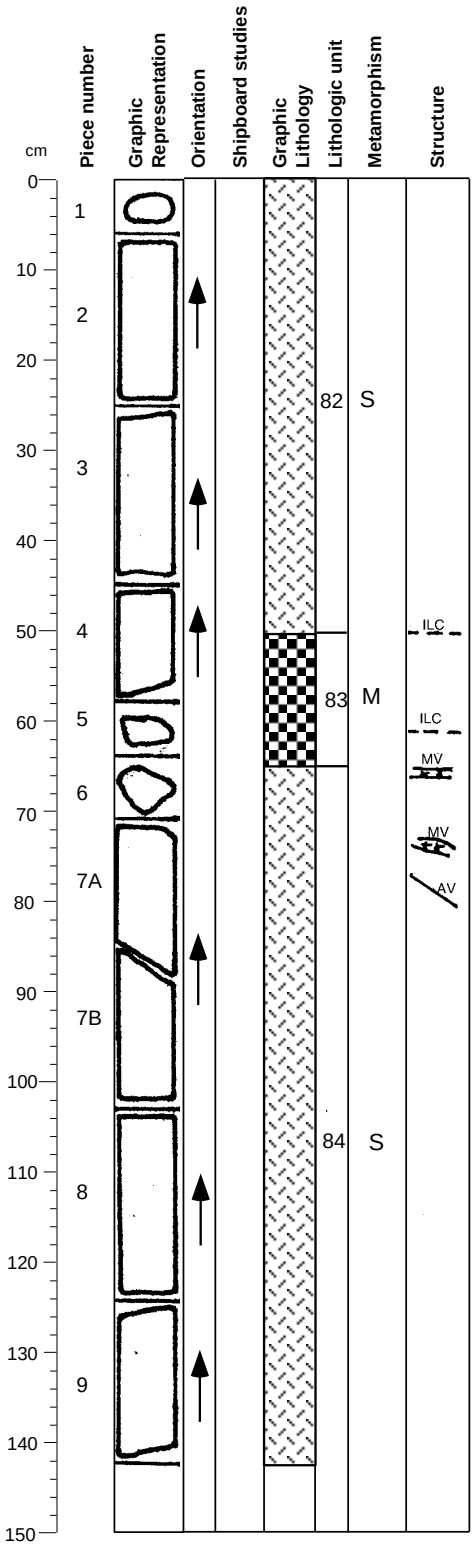
TEXTURE: Inequigranular, Poikilitic

ALTERATION: 6%

COMMENTS: Equigranular gabbro with several sulfide grains, including deposition along alteration cracks in pyroxene(?).

STRUCTURE: This section displays igneous textures.

Core Photo



179-1105A-17R-1

INTERVAL: 82 GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	17R	1	1	0.00 m	95.60 m
Lower contact:	17R	1	4	0.49 m	96.09 m
Thickness (m):	0.49				
Contact Type:	Grain size change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	10	1	4	tabular/subhedral
Clinopyroxene	40	5	1	3	prismatic/subhedral
Sulfide	0.5				irregular/ disseminated
Total	100.5				

GRAIN SIZE: Medium

TEXTURE: Equigranular but variable

ALTERATION: 0%

COMMENTS: A 4 cm thick interval of pegmatitic gabbro with 1-2 % oxide occurs at the bottom of this interval. The rest is composed of medium-grained, massive gabbro.

INTERVAL: 83 OLIVINE-BEARING OXIDE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	17R	1	4	0.49 m	96.09 m
Lower contact:	17R	1	5	0.64 m	96.24 m
Thickness (m):	0.15				
Contact Type:	Modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	37	12	2	3	deformed/anhedral
Clinopyroxene	35	12	2	5	deformed/anhedral
Olivine	2	2	1	1	rounded/anhedral
Fe-Ti oxide	25				aggregates/ seams and patches
Sulfide	1				intersitial
Total	101				

GRAIN SIZE: Medium

TEXTURE: Deformed, subophitic

ALTERATION: 24%

COMMENTS: Upper contact marked by a continuous oxide seam, but oxides appear in 3-5 cm above. Oxide abundance is highly variable (20%-90% locally). Plagioclase is locally altered to milky white secondary plagioclase. There is a moderately strong deformational fabric reflected in grain size reduction and streched grains.

INTERVAL: 84 OLIVINE-BEARING GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	17R	1	5	0.64 m	96.24 m
Lower contact:	17R	3	3	0.21 m	98.66 m
Thickness (m):	2.42				
Contact Type:	Grain size change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	10	2	3	tabular/subhedral
Clinopyroxene	40	15	2	4	prismatic/subhedral
Olivine	1	2	0.5	1	irregular/anhedral
Total	101				

GRAIN SIZE: Medium

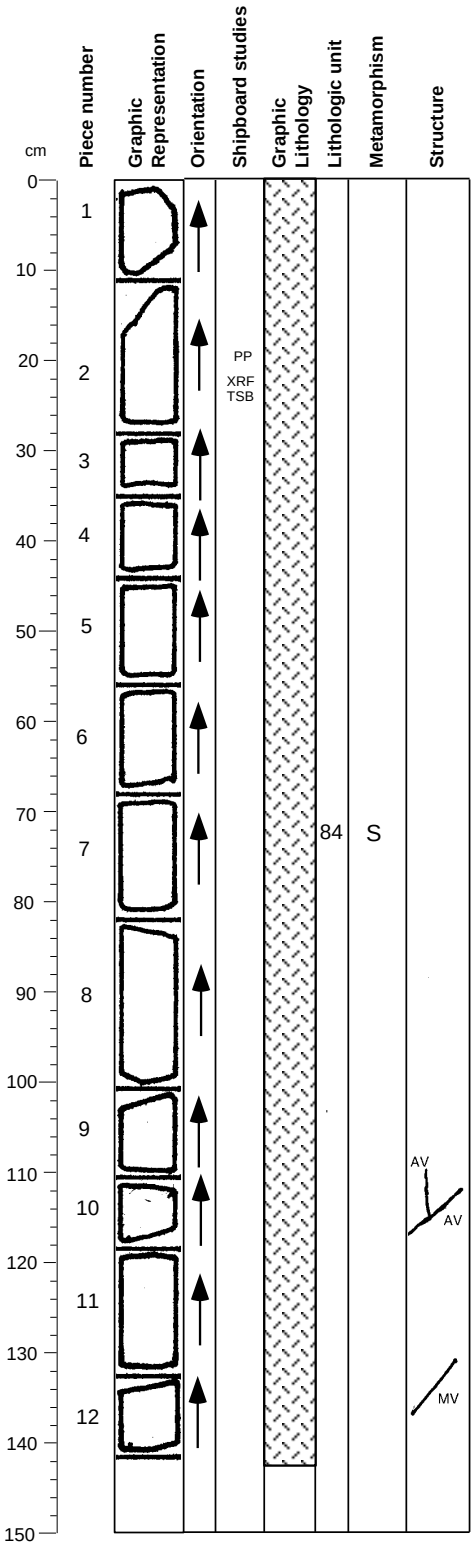
TEXTURE: Equigranular, Subophitic

ALTERATION: 5%

COMMENTS: Homogeneous gabbro with modally defined layering/banding at 65-78 cm (Section 179-1105A-17R-1, Piece 7A). Chlorite veins at 80 cm (Section 179-1105A-17R-1, Piece 7A).

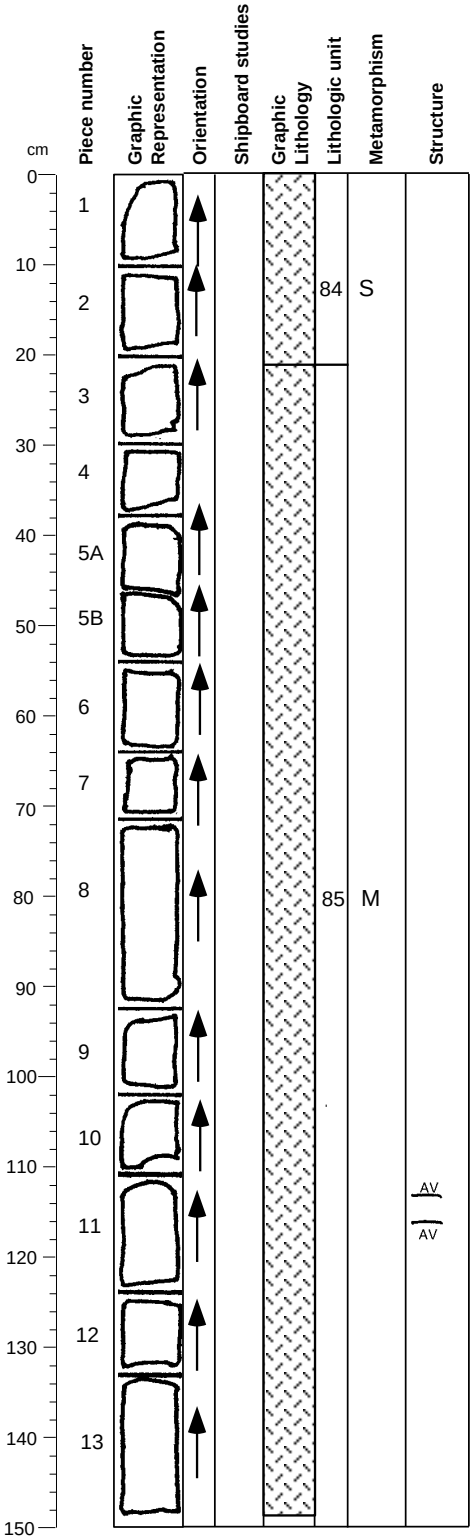
STRUCTURE: This section displays coarse-grained igneous textures. Igneous layer contacts are preserved in Pieces 4 and 5 by the appearance of oxide gabbro. The boundary in Piece 4 is particularly sharp but oxide pervades across the boundary. Felsic veins are preserved in Pieces 6 and 7. Piece 7 contains and actinolite alteration vein.

Core Photo



STRUCTURE: This section displays coarse-grained igneous textures. Piece 10 contains alteration veins. Piece 12 contains a thin oxide mineral vein.

Core Photo



179-1105A-17R-3

INTERVAL: 84 **OLIVINE-BEARING GABBRO**
(see Section 179-1105A-17R-1)

INTERVAL: 85 **OXIDE and OLIVINE-BEARING GABBRO**

				Depth	Depth
Interval Location:	**Core**	**Section**	**Piece**	**in Section**	**mbsf**
Upper contact:	**17R**	**3**	**3**	**0.21 m**	**98.66 m**
Lower contact:	**17R**	**3**	**15**	**1.47 m**	**99.92 m**
Thickness (m):	**1.26 m**				
Contact Type:	**Grain size change, modal change, textural change**				
		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	57	40	3	15	blocky/subhedral
Clinopyroxene	40	40	3	15	blocky/subhedral
Olivine	2	20	5	8	rounded/subhedral
Fe-Ti oxide	1				irregular/interstitial
Sulfide	0.5				irregular/ disseminated
Total	**100.5**				

GRAIN SIZE: Coarse

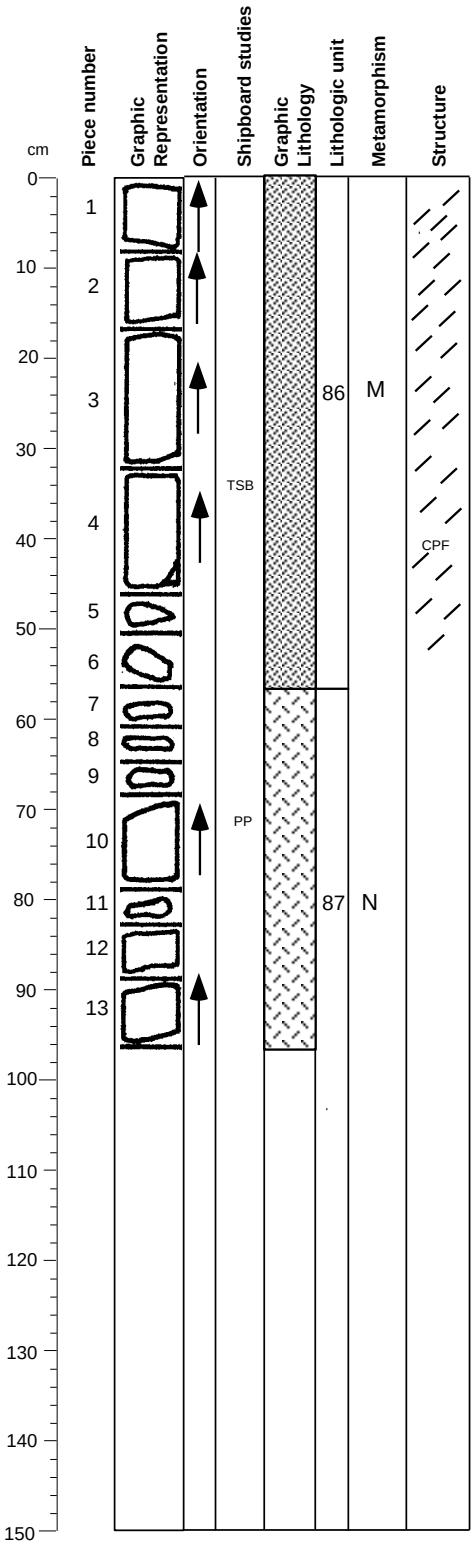
TEXTURE: Granular, Subophitic

ALTERATION: 10%

COMMENTS: Olivine is not evenly distributed throughout, occurring mainly at 30-41 cm, 89-92 cm, and 129-144 cm in Section 179-1105A-17R-3.

STRUCTURE: This section displays coarse-grained igneous textures. Piece 11 contains two thin alteration veins.

Core Photo



179-1105A-17R-4

INTERVAL: 86 OXIDE OLIVINE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	17R	4	1	0.00 m	99.95 m
Lower contact:	17R	4	6	0.56 m	100.51 m
Thickness (m):	0.56				
Contact Type:	Grain size change, modal change, textural change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	35	5	1	3	recrystallized
Clinopyroxene	40	40	3	10	deformed
Olivine	5	7	3	1	deformed
Fe-Ti oxide	20				aggregates/ seams and patches
Sulfide	1				interstitial
Total	**101**				

GRAIN SIZE: Medium-coarse

TEXTURE: Deformed to pegmatitic

ALTERATION: 24%

COMMENTS: Contacts not recovered. Strongly deformed fabric, olivines nearly completely altered and stretched. Modes highly variable (plagioclase 20-50%, oxides 80% to 10%). Plagioclase recrystallized in places, also altered to milky white secondary plagioclase. Intensity of alteration increases downward.

INTERVAL: 87 GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	17R	4	6	0.56 m	100.51 m
Lower contact:	17R	4	13	0.97 m	100.92 m
Thickness (m):	0.41				
Contact Type:	Grain size change, modal change,				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	10	1	2	tabular/subhedral
Clinopyroxene	50	12	1	2	prismatic/subhedral
Total	**100**				

GRAIN SIZE: Medium

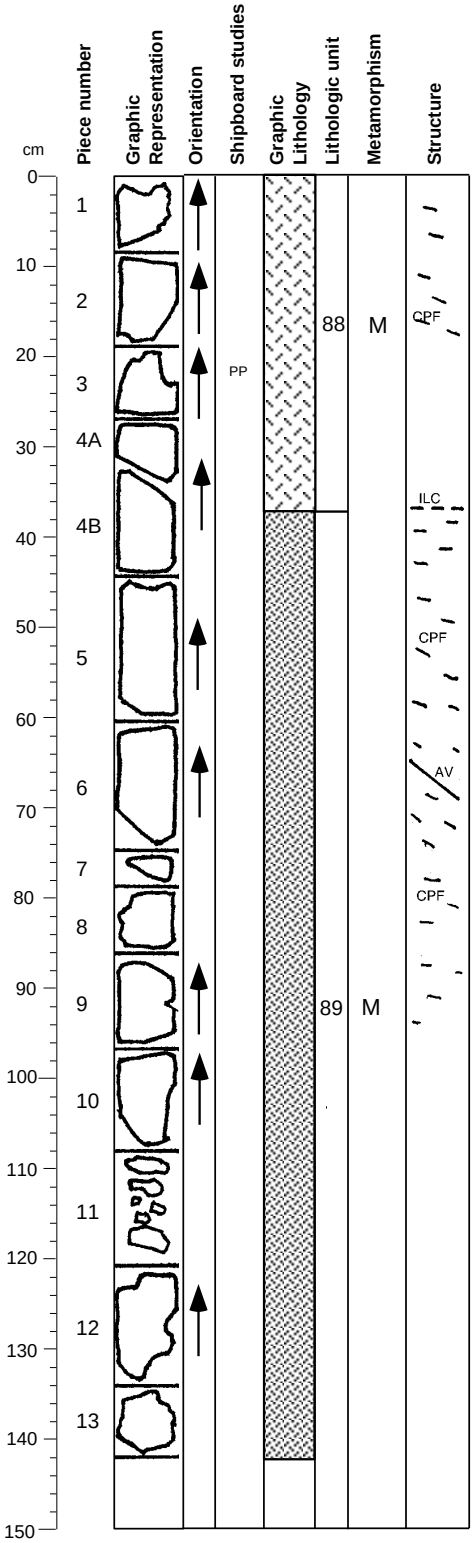
TEXTURE: Equigranular, Uniform

ALTERATION: 0%

COMMENTS: Massive equigranular gabbro interval.

STRUCTURE: The upper part of this section is strongly deformed. The lower part exhibits igneous textures.

Core Photo



179-1105A-18R-1

INTERVAL: 88 OXIDE and OLIVINE-BEARING GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	18R	1	1	0.00 m	100.20 m
Lower contact:	18R	1	4B	0.37 m	100.57 m
Thickness (m):	0.37 m				
Contact Type:	Modal change, textural change, grain size change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	58	15	3	7	blocky/subhedral
Clinopyroxene	40	20	2	5	blocky/subhedral
Olivine	1	5	1	4	rounded/subhedral
Fe-Ti oxide	0.5				irregular/seams
Sulfide	0.5				irregular/ disseminated
Total	**100**				

GRAIN SIZE: Coarse

TEXTURE: Granular, Subophitic

ALTERATION: 10%

COMMENTS: Grain sizes are 10-20 mm in Piece 1, less than 8 mm in Pieces 2, 3, and 4. The lower contact is defined by a sharp increase in oxide abundance.

INTERVAL: 89 OXIDE OLIVINE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	18R	1	4B	0.37 m	100.57 m
Lower contact:	18R	2	8	0.69 m	102.31 m
Thickness (m):	1.74				
Contact Type:	Modal change, textural change, grain size change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	45	20	2	8	tabular/subhedral
Clinopyroxene	35	35	2	8	prismatic/subophitic
Olivine	8	14	3	6	rounded/anhedral
Fe-Ti oxide	15				irregular/seams
Total	**103**				

GRAIN SIZE: Fine-coarse

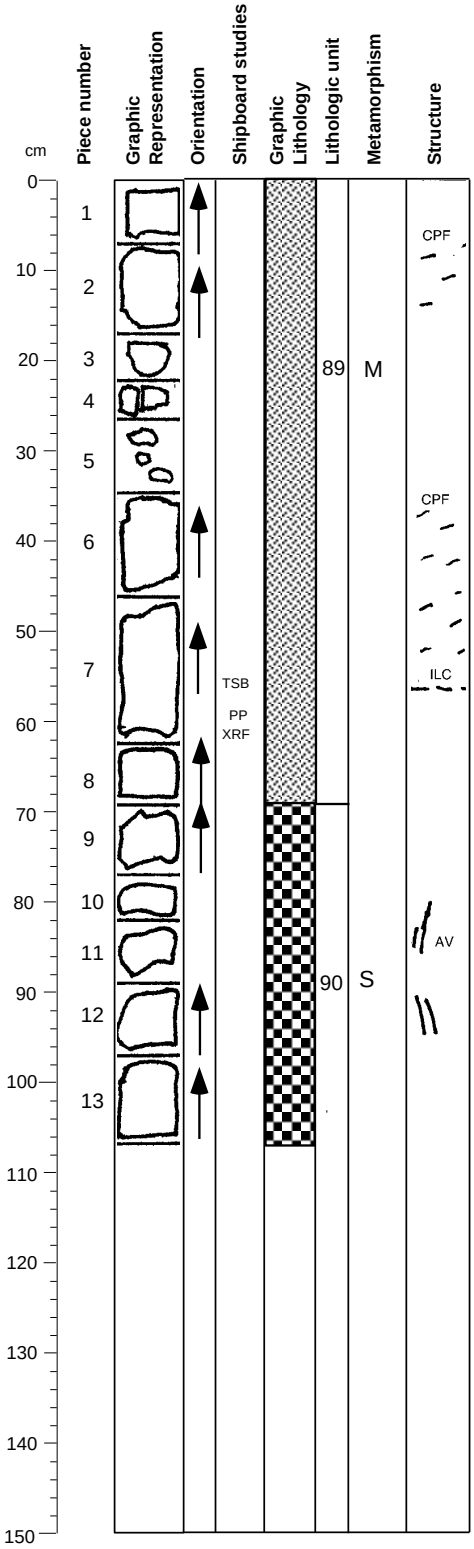
TEXTURE: Equigranular and irregularly foliated

ALTERATION: 18%

COMMENTS: Highly variable interval of oxide gabbro. Variably foliated and altered. Oxides in seams and veins between silicates. Highly variably grain size from 'bands' of fine-grained gabbro at 17-26 cm (Section 179-1105A-18R-2, Pieces 3-4) and 56-69 cm (Section 179-1105A-18R-2, Piece 8). Orange alteration product after mainly olivine and pyroxene (low-Ca pyroxene?) related to oxide net veining. Calcite vein at 85 cm (Section 179-1105A-18R-1, Piece 8).

STRUCTURE: This section displays weak to very weak crystal-plastic fabrics in Pieces 1, 2, 4B, and 5-9. Pieces 4B to 9 are an oxide-rich interval. Piece 4B contains a layer contact between gabbro and oxide olivine gabbro. Piece 8 contains smectite veins.

Core Photo



179-1105A-18R-2

INTERVAL: 89 **OXIDE OLIVINE GABBRO**
(see previous section)

INTERVAL: 90 **OLIVINE-BEARING OXIDE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**18R**	**2**	**8**	**0.69 m**	**102.31 m**
Lower contact:	**19R**	**2**	**8A**	**0.95 m**	**107.65 m**
Thickness (m):	**5.34**				
Contact Type:	**Grain size change, textural change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	20	2	6	prismatic/subhedral
Clinopyroxene	45	25	2	5	prismatic/subhedral
Olivine	1	3	1	2	angular/anhedral
Fe-Ti oxide	5				irregular/seams
Total	**101**				

GRAIN SIZE: Coarse

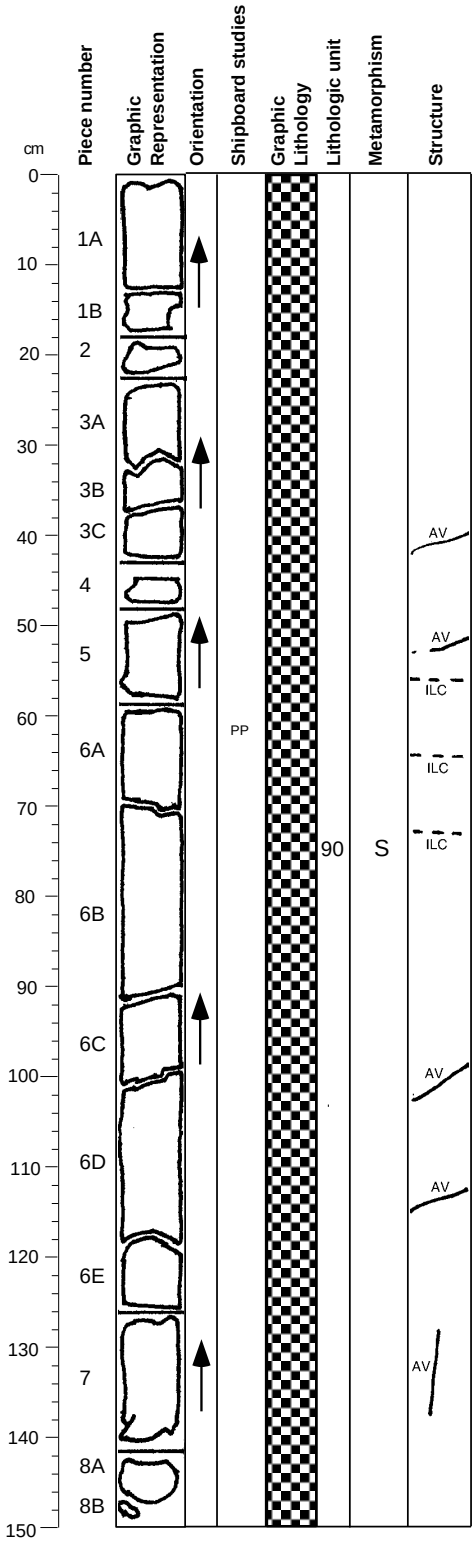
TEXTURE: Equigranular, Poikilitic

ALTERATION: 8%

COMMENTS: Variable oxide gabbro interval with irregular distribution of oxide seams and sparse olivine grains. Oxide minerals increases markedly from Section 179-1105A-19R-1 (Piece 1, 1 cm).

STRUCTURE: This section displays coarse-grained igneous textures except for Pieces 2, 6, and 7 which contain weak crystal-plastic fabrics. Piece 7 contains an igneous layer contact between mildly foliated coarse-grained olivine gabbro and finer-grained olivine-poor gabbro. Pieces 11 and 12 contain amphibole veins.

Core Photo

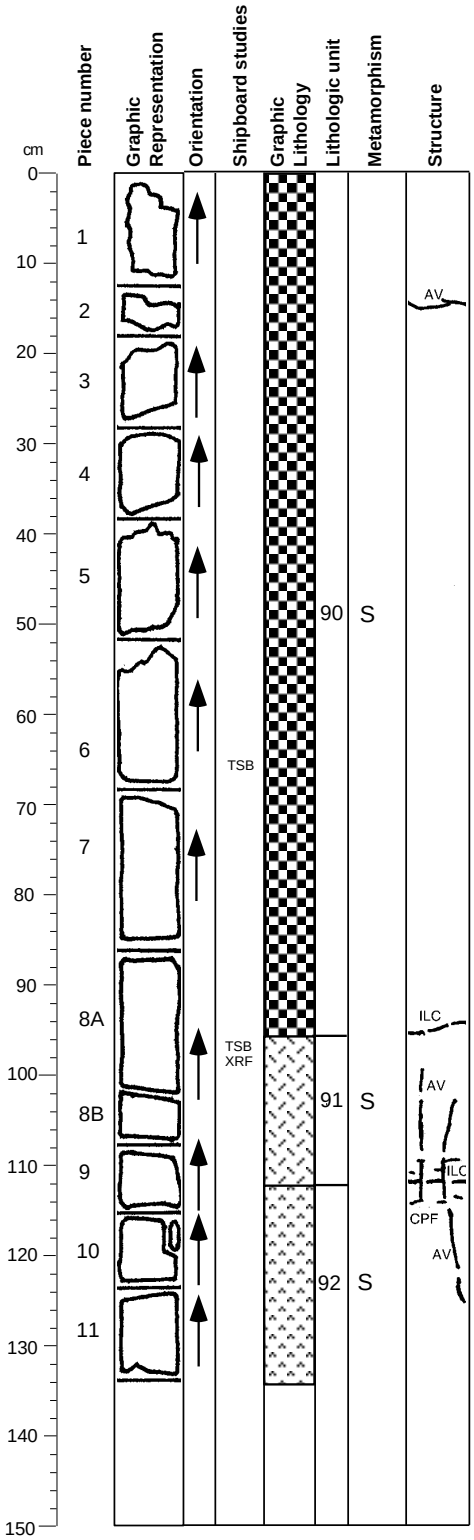


INTERVAL: 90 **OLIVINE-BEARING OXIDE GABBRO**
(see previous section)

STRUCTURE: This section displays coarse-grained igneous textures. Igneous layer contacts are located in Pieces 5, 6, and 7A. Alteration veins are present in Pieces 3C, 7B, and 8. Layer contacts are defined by changes in modal mineralogy or proportions.

CORE/SECTION

Core Photo



179-1105A-19R-2

INTERVAL: 90 **OLIVINE-BEARING OXIDE GABBRO**
(see Section 179-1105A-18R-2)

INTERVAL: 91 **OXIDE and OLIVINE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**19R**	**2**	**8A**	**0.95 m**	**107.65 m**
Lower contact:	**19R**	**2**	**9**	**1.12 m**	**107.82 m**
Thickness (m):	**0.17**				
Contact Type:	**Grain size change, textural change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	56	3	0.5	1	equant/subhedral
Clinopyroxene	40	3	0.5	1	equant/subhedral
Olivine	3	3	0.5	1	rounded
Fe-Ti oxide	1				irregular/seams
Total	**100**				

GRAIN SIZE: Fine

TEXTURE: Equigranular, Uniform

ALTERATION: 10%

COMMENTS: Massive olivine gabbro interval defined by fine grain size.

INTERVAL: 92 **OXIDE-BEARING OLIVINE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**19R**	**2**	**9**	**1.12 m**	**107.82 m**
Lower contact:	**20R**	**1**	**9**	**0.74 m**	**110.54 m**
Thickness (m):	**2.72**				
Contact Type:	**Modal change, textural change, grain size change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	25	3	5	equant/subhedral
Clinopyroxene	40	12	3	5	prismatic/subhedral
Olivine	5	4	1	2	irregular/anhedral
Fe-Ti oxide	1				irregular/seams
Total	**101**				

GRAIN SIZE: Medium

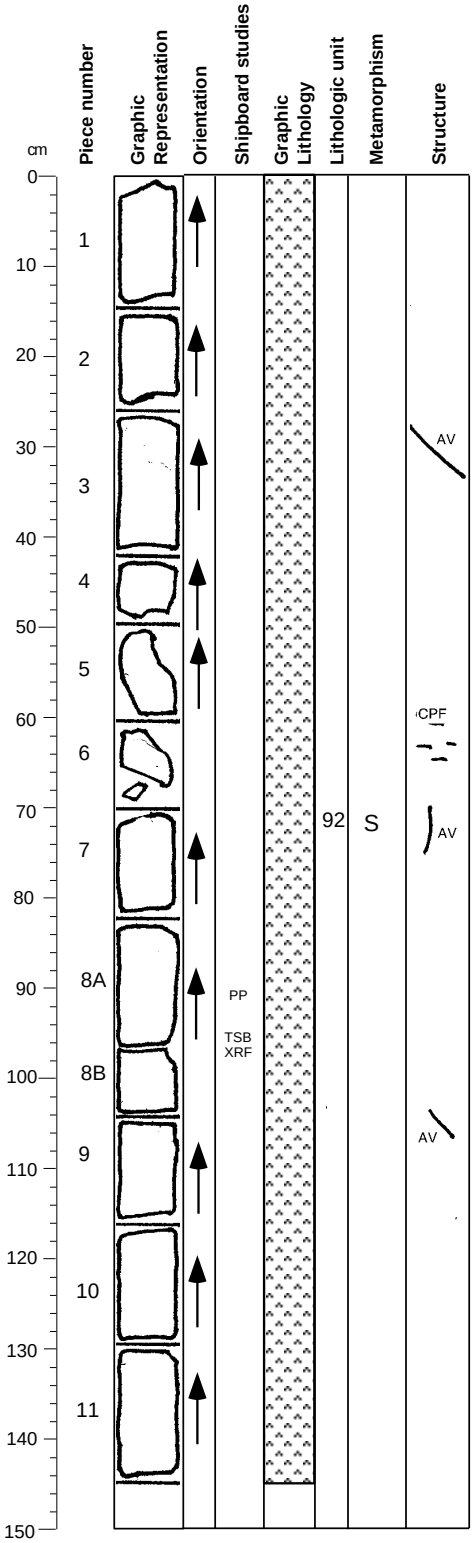
TEXTURE: Equigranular, Uniform

ALTERATION: 7%

COMMENTS: Massive olivine gabbro with an uneven distribution of oxide seams and veinlets throughout the interval.

STRUCTURE: This section displays coarse-grained igneous textures except in Piece 9 which has a weak foliation. Piece 8A displays an igneous layer contact defined by the disappearance of olivine and reduced grain size. Alteration veins are present in Pieces 8-10.

Core Photo

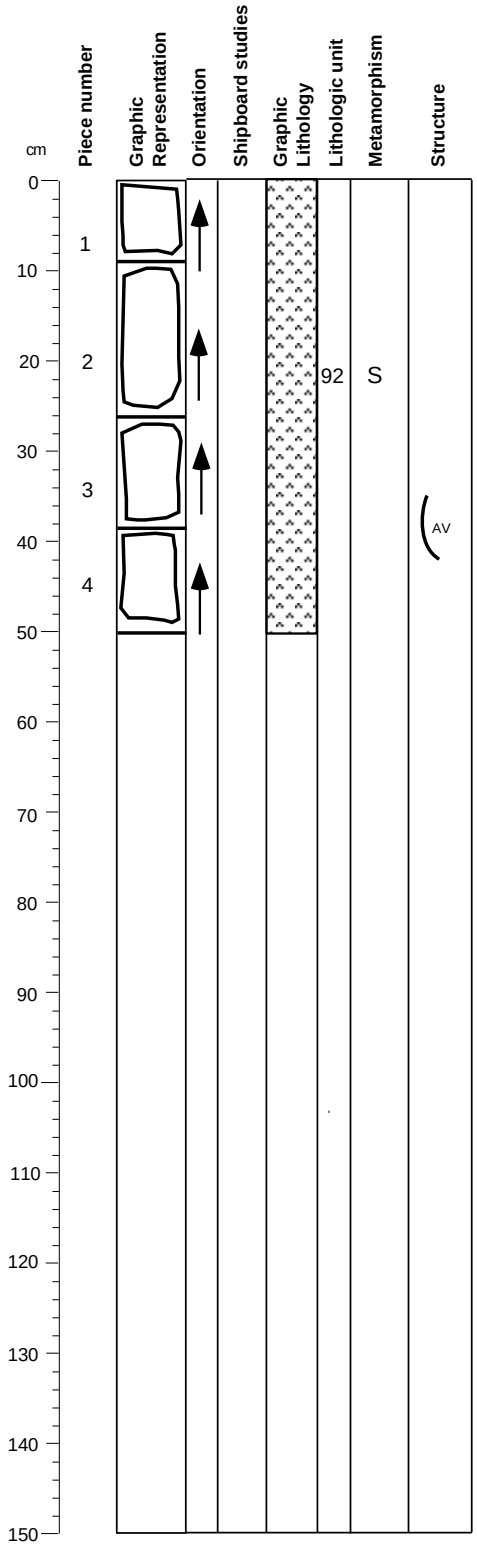


INTERVAL: 92 **OXIDE-BEARING OLIVINE GABBRO**
(see previous section)

STRUCTURE: This section displays coarse-grained igneous textures except in Piece 6 which has a weak crystal-plastic foliation. Alteration veins are present in Pieces 3, 7, and 9.

CORE/SECTION

Core Photo


179-1105A-19R-4
cm
Piece number
Graphic Representation
Orientation
Shipboard studies
Graphic Lithology
Lithologic unit
Metamorphism
Structure
INTERVAL: 92
OXIDE-BEARING OLIVINE GABBRO
(see Section 179-1105A-19R-2)
STRUCTURE: This section displays coarse-grained igneous textures. An alteration vein is present in Piece 4.
0
10
20
30
40
50
60
70
80
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100
110
120
130
140
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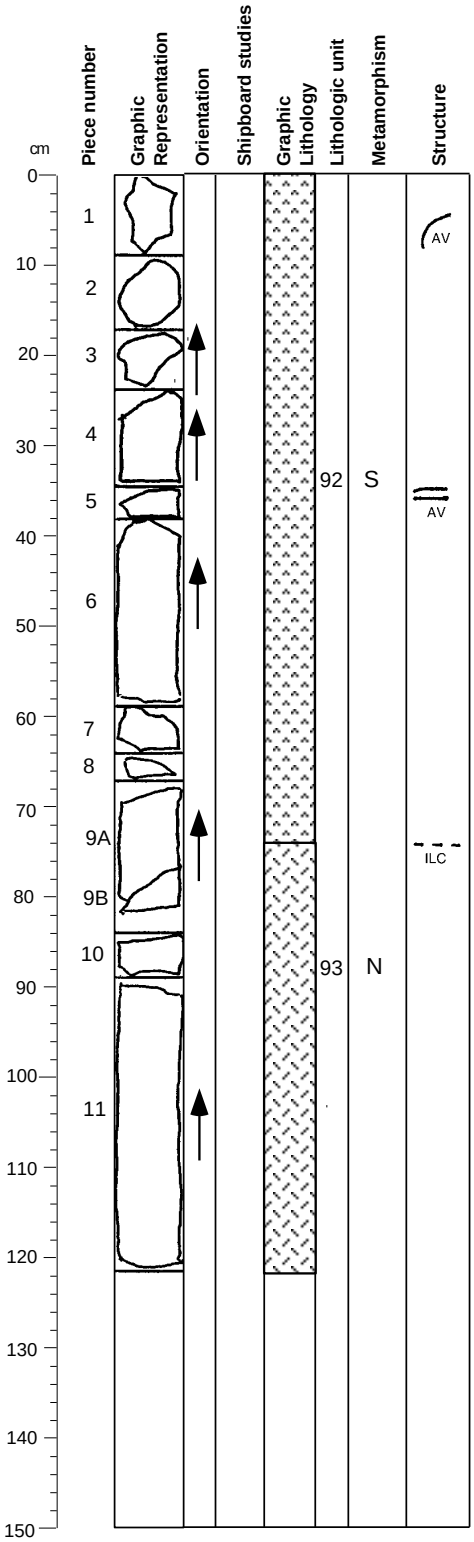
Core Photo



179-1105A-20R-1

INTERVAL: 92 **OXIDE-BEARING OLIVINE GABBRO**
(see Section 179-1105A-19R-2)

INTERVAL: 93 **OXIDE and OLIVINE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**20R**	**1**	**9**	**0.74 m**	**110.54 m**
Lower contact:	**21R**	**1**	**7**	**0.81 m**	**111.61 m**
Thickness (m):	**1.07**				
Contact Type:	**Modal change, grain size change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	58	20	3	10	tabular/subhedral
Clinopyroxene	40	20	2	12	prismatic/subhedral
Olivine	1	7	3	5	rounded/subhedral
Fe-Ti oxide	0.5				equant/rounded
Sulfides	0.5				irregular/ disseminated
Total	**100**				

GRAIN SIZE: Coarse

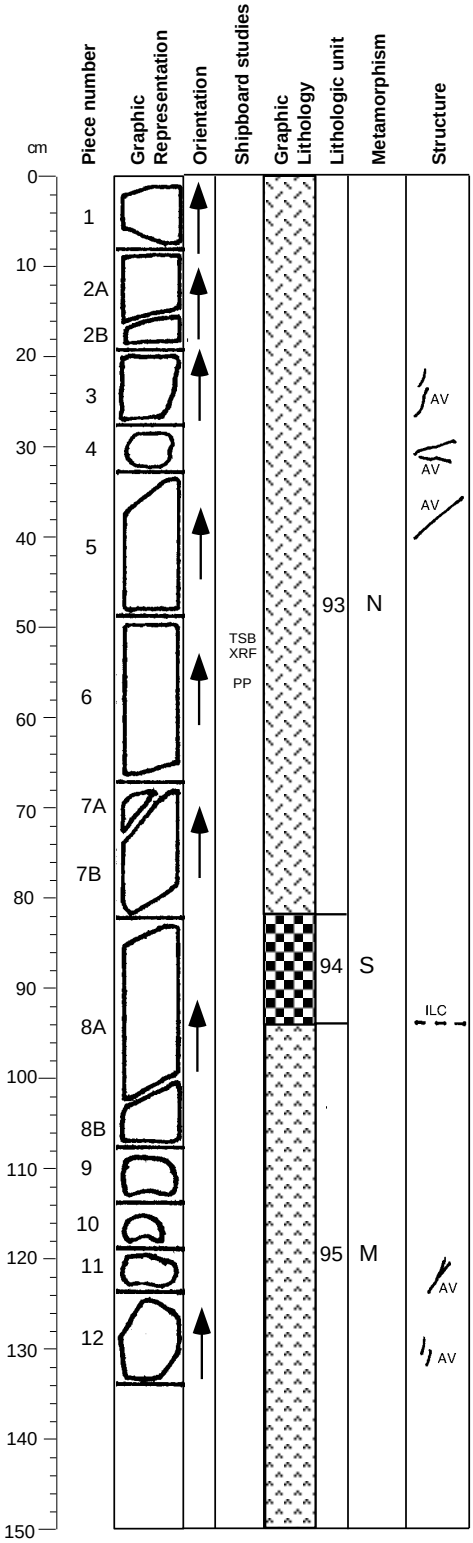
TEXTURE: Granular, Subophitic

ALTERATION: 0.1%

COMMENTS: Massive gabbro interval defined by coarse grain size. Olivine is more abundant in Section 179-1105A-21R-1, Piece 3 (ca. 3%). Thin calcite veins occur in Section 179-1105A-21R-1, Pieces 3 and 4, and thin chlorite veins in Section 179-1105A-21R-1, Pieces 5 and 7. Rusty brown alteration zone (5 mm wide) along the calcite veins.

STRUCTURE: This section displays coarse-grained igneous textures. An igneous layer contact is present in Piece 9A. The contact is defined by a textural change and the disappearance of olivine. Alteration veins are in Pieces 1 and 4.

Core Photo



179-1105A-21R-1

INTERVAL: 93 **OXIDE and OLIVINE BEARING GABBRO**
(see previous section)

INTERVAL: 94 **OLIVINE-BEARING OXIDE GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	21R	1	7	0.81 m	111.61 m
Lower contact:	21R	1	8	0.94 m	111.74 m
Thickness (m):	0.13				
Contact Type:	Modal change				

		Grain Size (mm):			
	Mode (%)	Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	15	1	4	tabular/subhedral
Clinopyroxene	30	14	1	3	prismatic/subhedral
Olivine	3	8	0.5	1	irregular/anhedral
Fe-Ti oxide	20				irregular/seams and veins
Total	**103**				

GRAIN SIZE: Medium

TEXTURE: Inequigranular, Poikilitic

ALTERATION: 9%

COMMENTS: Oxide-rich interval with irregular modal distribution.

INTERVAL: 95 **OXIDE-BEARING OLIVINE GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	21R	1	8	0.94 m	111.74 m
Lower contact:	21R	2	12	0.96 m	113.10 m
Thickness (m):	1.36				
Contact Type:	Modal change, grain size change				

		Grain Size (mm):			
	Mode (%)	Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	15	2	4	tabular/subhedral
Clinopyroxene	40	15	2	4	blocky/subhedral
Olivine	7	10	2	4	rounded/subhedral
Fe-Ti oxide	3				irregular/ concordant seams
Sulfides	0.5				irregular/ disseminated
Total	**100.5**				

GRAIN SIZE: Medium

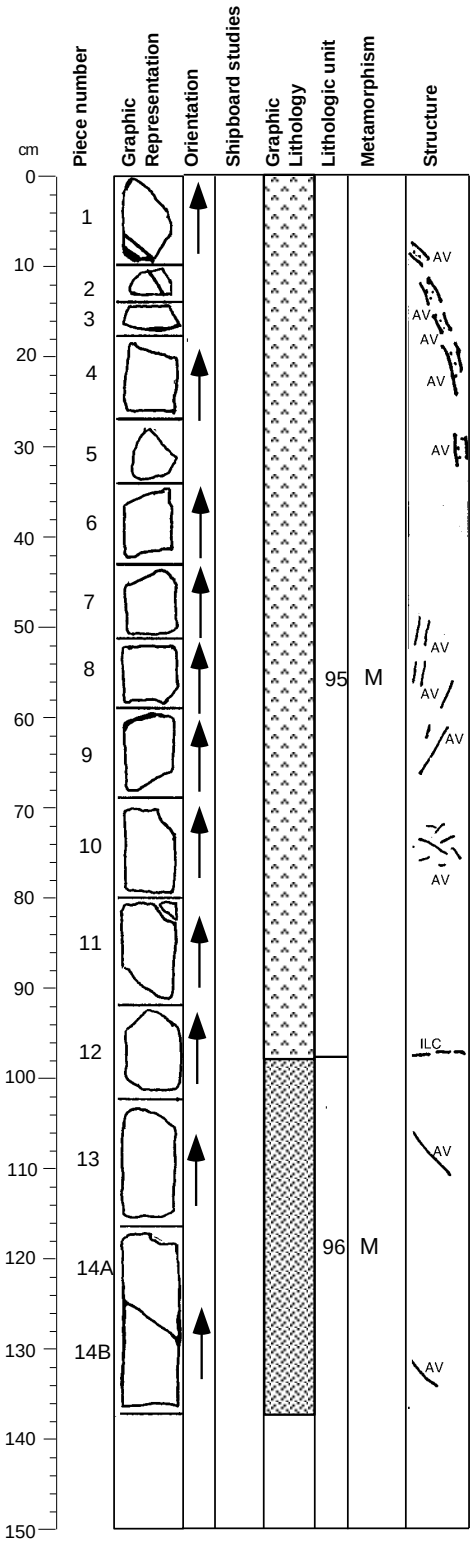
TEXTURE: Inequigranular

ALTERATION: 33%

COMMENTS: Felsic vein (ca. 1 cm wide) occurs in Section 179-1105A-21R-2, Pieces 2, 3, 4, and 5. These four pieces and Piece 1 in Section 21R-2 have thin layers or cracks filled with altered, rusty brown material.

STRUCTURE: This section displays coarse-grained igneous textures. Piece 8A contains an igneous layer contact defined by the disappearance of oxide minerals and the appearance of olivine. Alteration veins are present in Pieces 3, 4, 11, and 12.

Core Photo



179-1105A-21R-2

INTERVAL: 95 **OXIDE-BEARING OLIVINE GABBRO**
(see previous section)

INTERVAL: 96 **OXIDE OLIVINE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**21R**	**2**	**12**	**0.96 m**	**113.10 m**
Lower contact:	**22R**	**1**	**5**	**0.32 m**	**115.42 m**
Thickness (m):	**2.32**				
Contact Type:	**Grain size change, texture change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	45	30	2	5	tabular/subhedral
Clinopyroxene	40	20	3	8	prismatic/subhedral
Olivine	15	1.5	0.5	1	irregular/anhedral
Fe-Ti oxide	5				irregular/seams and veins
Total	**105**				

GRAIN SIZE: Coarse

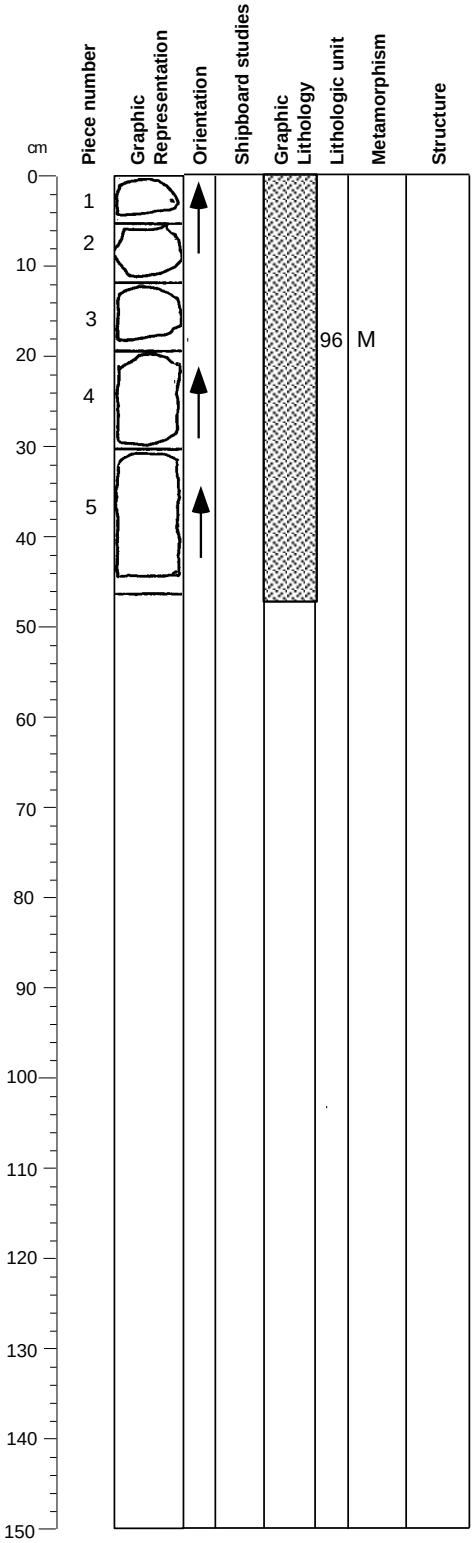
TEXTURE: Inequigranular

ALTERATION: 22%

COMMENTS: Massive coarse-pegmatic interval of oxide gabbro. Extensive alteration of pyroxenes to chlorite. Felsic veins in Section 179-1105A-22R-1, Piece 5.

STRUCTURE: This section displays coarse-grained igneous textures. A ~3 cm thick alteration vein with calc-silicate and smectite fill appears continuous through Pieces 1-5. Other thin alteration veins are present in Pieces 7-10, 13, and 14. An igneous layer contact defined by a grain size change is in Piece 12.

Core Photo

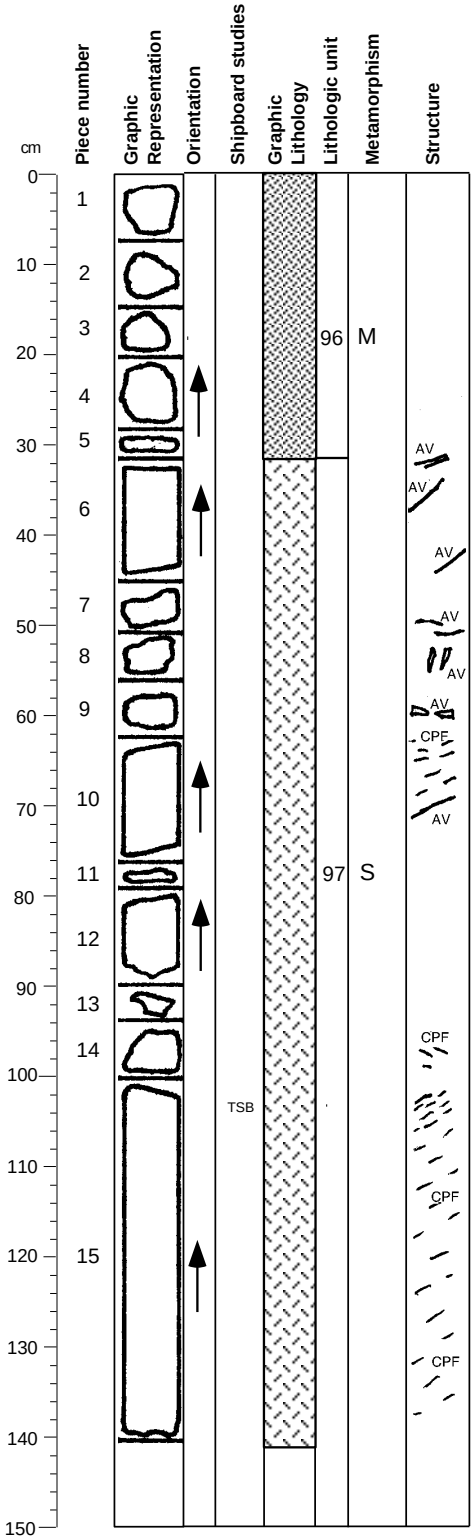


INTERVAL: 96 **OXIDE OLIVINE GABBRO**
(see previous section)

STRUCTURE: This section displays coarse-grained igneous textures. Alteration veins are in Pieces 4 and 5.

CORE/SECTION

Core Photo



179-1105A-22R-1

INTERVAL: 96 **OXIDE OLIVINE GABBRO**
(see Section 179-1105A-21R-2)

INTERVAL: 97 **OXIDE and OLIVINE-BEARING GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	**22R**	**1**	**5**	**0.32 m**	**115.42 m**
Lower contact:	**22R**	**3**	**4**	**0.71 m**	**118.39 m**
Thickness (m):	**2.97**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	30	2	5	tabular/subhedral
Clinopyroxene	40	20	1	4	equant/subhedral
Olivine	2	4	1	2	irregular/anhedral
Fe-Ti oxide	3				irregular/seams and interstitial
Total	**100**				

GRAIN SIZE: Medium-coarse

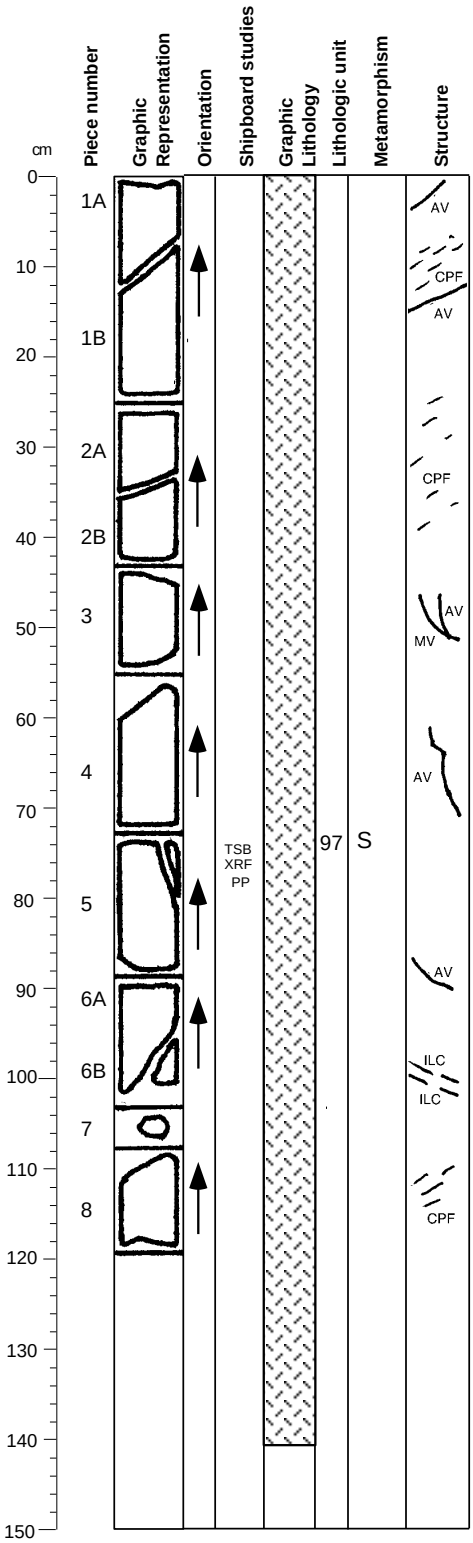
TEXTURE: Inequigranular, Foliated

ALTERATION: 8%

COMMENTS: Highly heterogeneous interval composed of medium- to coarse-grained gabbro with localized intense foliation and fining at 100-126 cm (Section 179-1105A-22R-1, Piece 15); 48-56 cm (Section 179-1105A-22R-2, Piece 4); 76-93 cm (Section 179-1105A-22R-2, Pieces 5 and 6); 32-39 cm (Section 179-1105A-22R-3, Piece 1A); 46-50 cm (Section 179-1105A-22R-3, Piece 3). Irregular veins of oxide minerals at 128-130 cm (Section 179-1105A-22R-1, Piece 15); 34-36 cm (Section 179-1105A-22R-2, Piece 2); 96-100 cm (Section 179-1105A-22R-2, Piece 6): 109-120 cm (Section 179-1105A-22R-2, Piece 8); 0-2 cm (Section 179-1105A-22R-3, Piece 1); 29-31 cm (Section 179-1105A-22R-3, Piece 1); and 64-67 cm (Section 179-1105A-22R-3, Piece 4).

STRUCTURE: This section displays coarse-grained igneous textures with the exception of Pieces 10, 14, and 15 where weak crystal-plastic fabrics are present. The topmost part of Piece 15 displays a more intense crystal-plastic fabric. Actinolite and calc-silicate alteration veins are in Pieces 5-10 and 15.

Core Photo

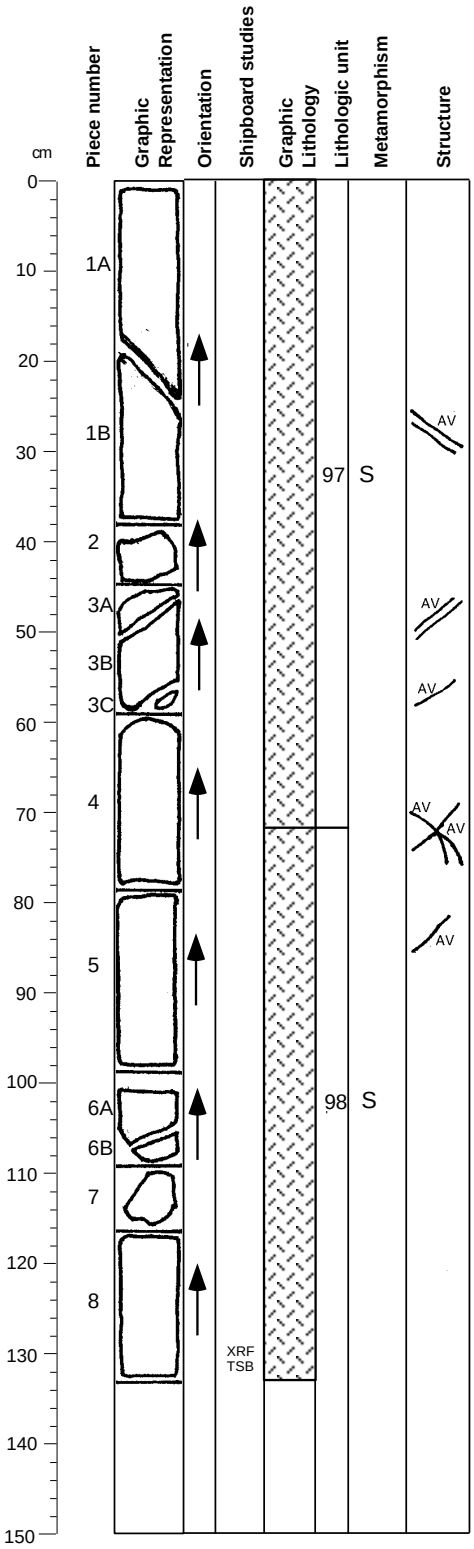


INTERVAL: 97 **OXIDE and OLIVINE-BEARING GABBRO**
(see previous section)

STRUCTURE: This section displays igneous textures. Crystal-plastic fabrics are present in Pieces 1B, 2, 4, and 8, but are generally weak. An oxide-rich band is present in Piece 6. Alteration veins in Pieces 1 and 3-5 are filled with actinolite.

CORE/SECTION

Core Photo



179-1105A-22R-3

INTERVAL: 97 **OXIDE and OLIVINE-BEARING GABBRO**
(see Section 179-1105A-22R-1)

INTERVAL: 98 **OXIDE and OLIVINE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**22R**	**3**	**4**	**0.71 m**	**118.39 m**
Lower contact:	**22R**	**4**	**3**	**0.32 m**	**119.34 m**
Thickness (m):	**2.97**				
Contact Type:	**Textural change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	56	6	2	3	tabular/subhedral
Clinopyroxene	40	7	1	2	blocky/subhedral
Olivine	3	5	1	2	rounded/subhedral
Fe-Ti oxide	0.5				irregular/ disseminated
Sulfides	0.5				irregular/ disseminated
Total	**100**				

GRAIN SIZE: Medium

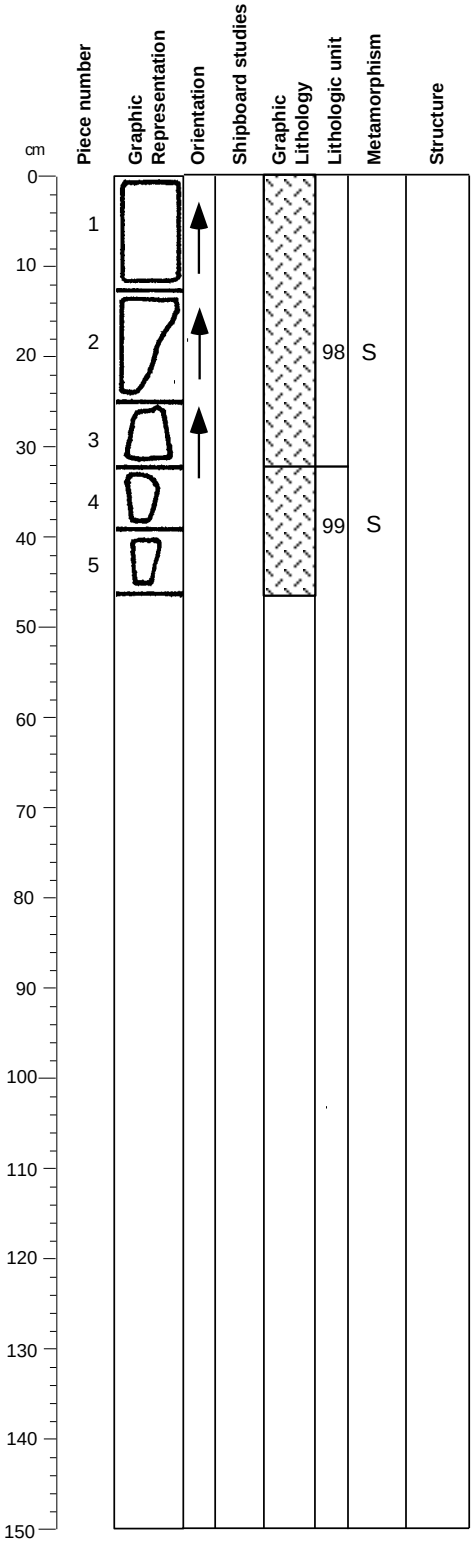
TEXTURE: Equigranular but variable

ALTERATION: 6%

COMMENTS: Thin chlorite-filled veins occur throughout. Mineral grains coarsen downward in Piece 1. Massive, medium-grained gabbro interval.

STRUCTURE: This section displays coarse-grained igneous textures. Amphibole veins are present in Pieces 1B, 3, 4, and 5.

Core Photo



179-1105A-22R-4

INTERVAL: 98 **OXIDE and OLIVINE-BEARING GABBRO**
(see previous section)

INTERVAL: 99 **OXIDE and OLIVINE-BEARING GABBRO**

				Depth	Depth
Interval Location:	**Core**	**Section**	**Piece**	**in Section**	**mbsf**
Upper contact:	**22R**	**4**	**3**	**0.32 m**	**119.34 m**
Lower contact:	**23R**	**1**	**9**	**1.19 m**	**120.59 m**
Thickness (m):	**2.97**				
Contact Type:	**Textural change, grain size change**				
		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	55	20	1		equant/subhedral
Clinopyroxene	40	20	1		equant/deformed
Olivine	2	2	0.5		deformed
Fe-Ti oxide	2				irregular/ interstitial veins
Total	**99**				

GRAIN SIZE: Fine-coarse

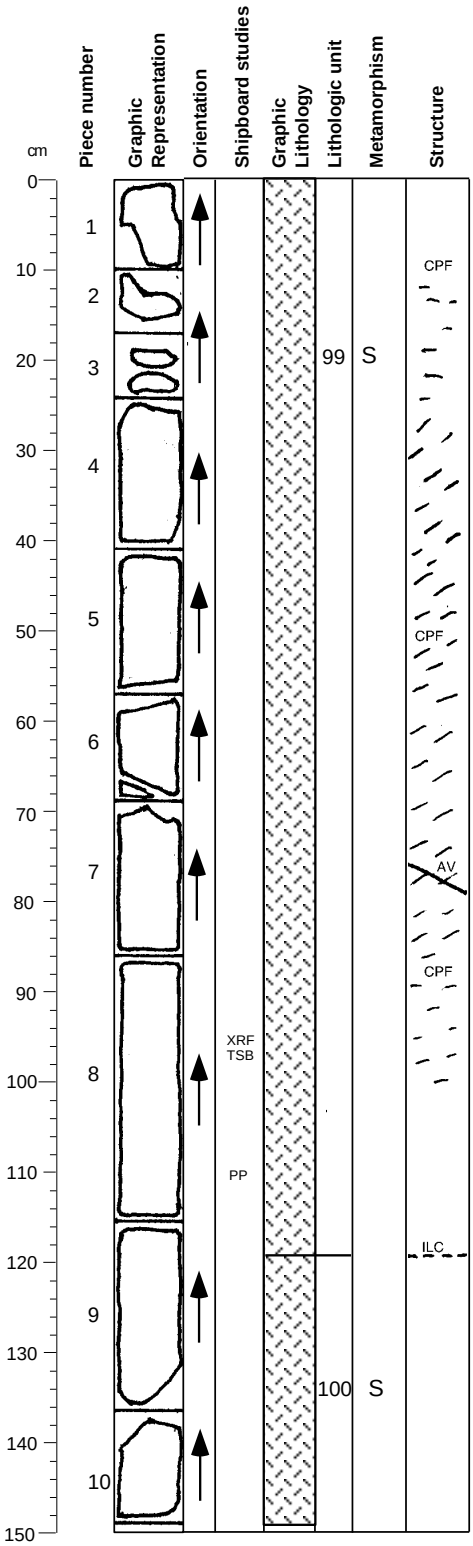
TEXTURE: Foliated porphyroblatic ferromagnesian minerals.

ALTERATION: 8%

COMMENTS: Interval characterized by varibly developed foliation and grain size. Porphyroblastic texture well developed for pyroxene throughout interval. Bands composed of mafic minerals occur occasionally. The oxide minerals are distributed and localized in irregular vein fillings interstitial to the silicate minerals and largely arranged parallel to foliation.

STRUCTURE: This section displays igneous textures.

Core Photo



179-1105A-23R-1

INTERVAL: 99 **OXIDE and OLIVINE-BEARING GABBRO**
(see previous section)

INTERVAL: 100 **OXIDE and OLIVINE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**23R**	**1**	**9**	**1.19 m**	**120.59 m**
Lower contact:	**23R**	**3**	**8**	**0.61 m**	**122.88 m**
Thickness (m):	**2.29**				
Contact Type:	**Textural change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	57	30	2	8	equant/subhedral
Clinopyroxene	38	80	1	10	blocky/subhedral
Olivine	1	20	2	3	rounded/subhedral
Fe-Ti oxide	3				irregular/interstitial
Sulfides	1				irregular/ disseminated
Total	**100**				

GRAIN SIZE: Coarse-pegmatitic

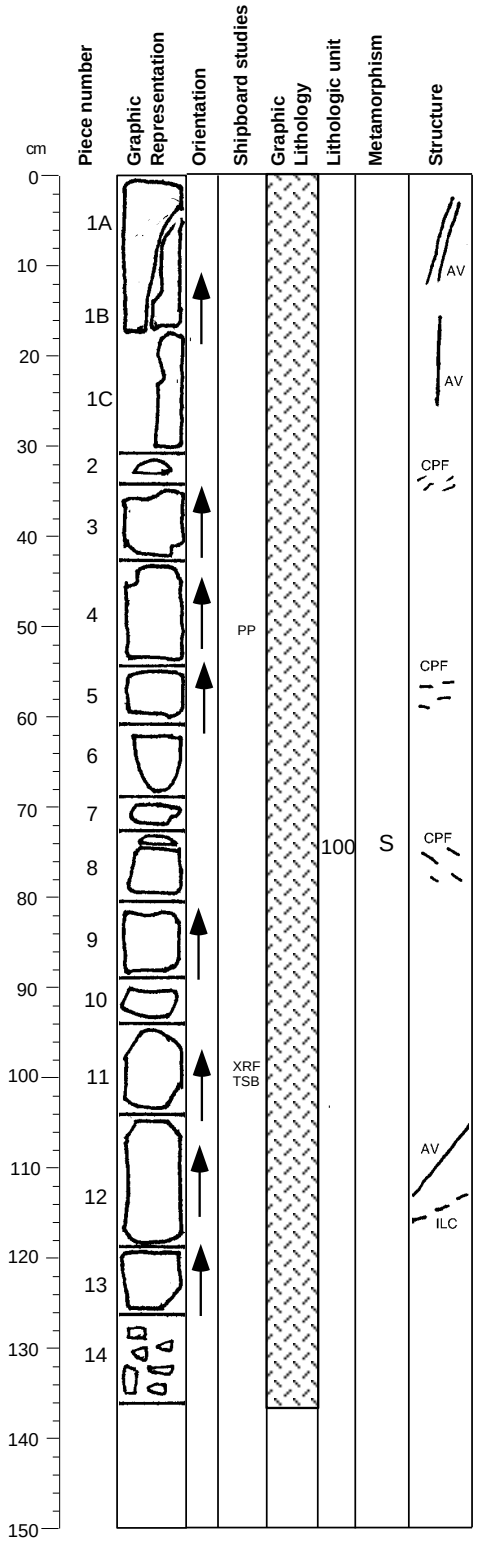
TEXTURE: Inequigranular and variable

ALTERATION: 7%

COMMENTS: Pegmatitic to coarse grained gabbro interval. Fine-grained massive gabbro occurs at 61-73 cm in Section 179-1105A-23R-2.

STRUCTURE: This section displays dominantly weak crystal-plastic fabrics with the exception of Pieces 9 and 10, and the lower half of Piece 8. Piece 7 contains an actinolite alteration vein.

Core Photo

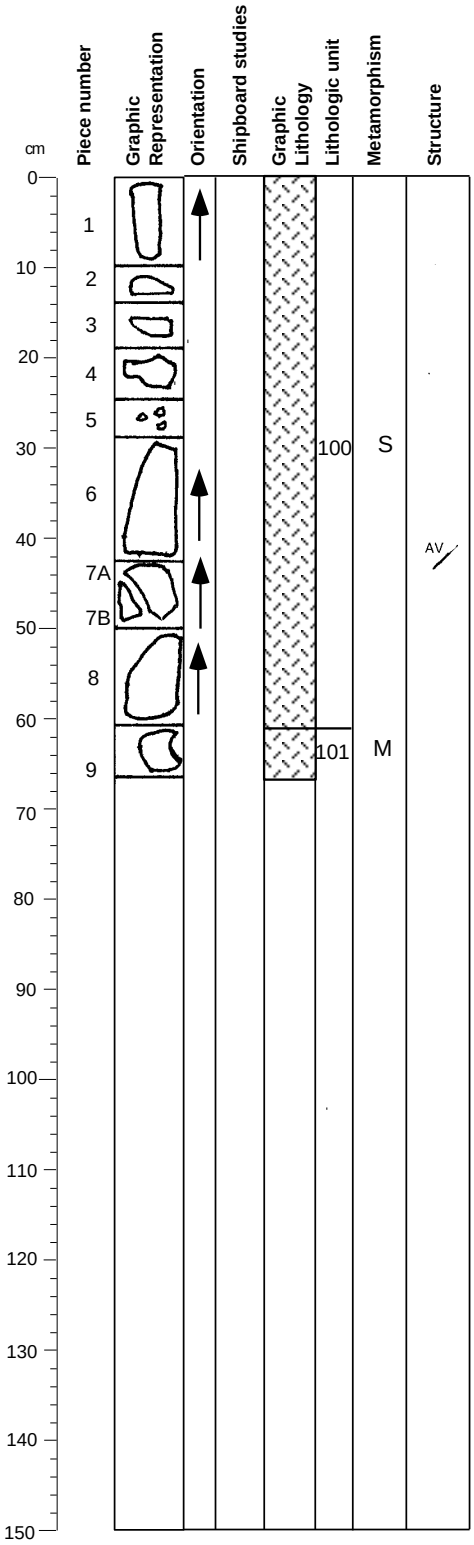


INTERVAL: 100 **OXIDE and OLIVINE BEARING GABBRO**
(see previous section)

STRUCTURE: This section displays igneous textures except in Pieces 3, 5, and 8 which have weak crystal-plastic fabrics. Amphibole alteration veins are present in Pieces 1 and 12.

CORE/SECTION

Core Photo



179-1105A-23R-3

INTERVAL: 100 **OXIDE and OLIVINE-BEARING GABBRO**
(see Section 179-1105A-23R-1)

INTERVAL: 101 **OXIDE and OLIVINE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**23R**	**3**	**8**	**0.61 m**	**122.88 m**
Lower contact:	**24R**	**1**	**2**	**0.10 m**	**124.50 m**
Thickness (m):	**2.29**				
Contact Type:	**Grain size change, textural change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	56	5	2	4	equant/subhedral
Clinopyroxene	40	12	4	8	prismatic/subhedral
Olivine	3	10	2	4	amoeboidal/anhedral
Fe-Ti oxide	1				aggregates/ granular
Total	**100**				

GRAIN SIZE: Medium-coarse

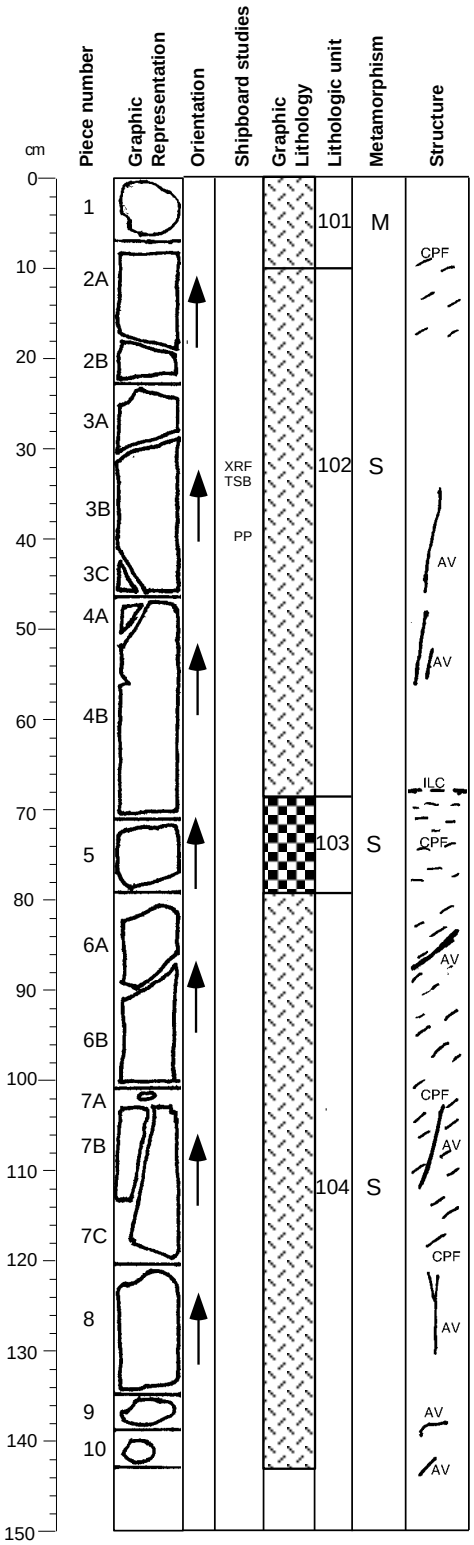
TEXTURE: Inequigranular

ALTERATION: 24%

COMMENTS: Lowermost piece in Section 179-1105A-23R-3 contains a 1 cm thick felsic vein and is pervasively altered. The lower contact of this interval is marked by abundant oxide minerals.

STRUCTURE: This section displays coarse igneous textures. An amphibole alteration vein is present in Piece 6.

Core Photo



179-1105A-24R-1

INTERVAL: 101 **OXIDE and OLIVINE GABBRO**
(see previous section)

INTERVAL: 102 **OXIDE and OLIVINE GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	24R	1	2	0.10 m	124.50 m
Lower contact:	24R	1	4	0.68 m	125.08 m
Thickness (m):	0.58				
Contact Type:	Grain size change, modal change, textural change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	59	20	3	10	equant/subhedral
Clinopyroxene	35	40	3	8	blocky/subhedral
Olivine	4	5	2	3	rounded/subhedral
Fe-Ti oxide	2				irregular/interstitial
Sulfides	0.5				irregular/ disseminated
Total	**100.5**				

GRAIN SIZE: Coarse

TEXTURE: Inequigranular and variable

ALTERATION: 6%

COMMENTS: Piece 2 is rich in oxide. Pegmatitic to coarse-grained gabbro interval with variable mineral distribution.

INTERVAL: 103 **OLIVINE-BEARING OXIDE GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	24R	1	4	0.68 m	125.08 m
Lower contact:	24R	1	5	0.77 m	125.17 m
Thickness (m):	0.09				
Contact Type:	Grain size change, modal change, textural change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	65	15	1	4	equant/subhedral
Clinopyroxene	30	18	1	3	prismatic/subhedral
Olivine	1	3	0.5	2	irregular/subhedral
Fe-Ti oxide	5				irregular/interstitial veins
Total	**101**				

GRAIN SIZE: Medium

TEXTURE: Inequigranular and variable

ALTERATION: 8%

COMMENTS: Medium grained oxide gabbro with irregular distribution of grain size and oxide minerals.

INTERVAL: 104 **OXIDE-BEARING GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	24R	1	5	0.77 m	125.17 m
Lower contact:	24R	2	5	0.37 m	126.20 m
Thickness (m):	1.02				
Contact Type:	Grain size change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	63	20	3	5	equant/subhedral
Clinopyroxene	35	15	3	5	subhedral
Fe-Ti oxide	2				irregular/interstitial
Total	**100**				

GRAIN SIZE: Medium-coarse

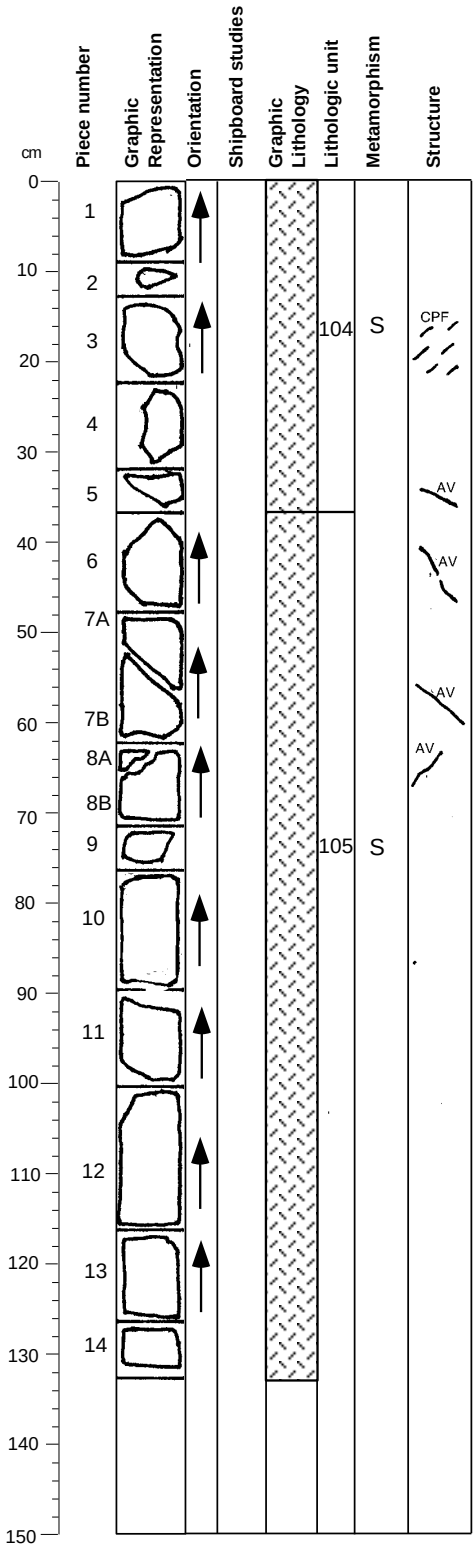
TEXTURE: Inequigranular and foliated

ALTERATION: 12%

COMMENTS: Weakly foliated, coarse-grained gabbro interval.

STRUCTURE: This section displays igneous textures in Pieces 1, 2B, 3A, 3B, 4, and 8-10. Crystal-plastic fabrics are present in Pieces 2A, the base of Piece 4, and Pieces 5-7, but are generally weak. Amphibole alteration veins are present in Pieces 3B, 4B, 6A, 7B, 7C, and 8-10.

Core Photo



179-1105A-24R-2

INTERVAL: 104 **OXIDE-BEARING GABBRO**
(see previous section)

INTERVAL: 105 **OXIDE and OLIVINE-BEARING GABBRO**

				Depth	Depth
Interval Location:	**Core**	**Section**	**Piece**	**in Section**	**mbsf**
Upper contact:	**24R**	**2**	**5**	**0.37 m**	**126.20 m**
Lower contact:	**24R**	**3**	**3**	**0.26 m**	**127.42 m**
Thickness (m):	**1.23**				
Contact Type:	**Grain size change, modal change**				
		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	65	20	2		equant/subhedral
Clinopyroxene	30	30	3		prismatic/subhedral
Olivine	2	4	1		irregular/anhedral
Fe-Ti oxide	3				irregular/interstitial veins
Total	**100**				

GRAIN SIZE: Coarse-pegmatitic

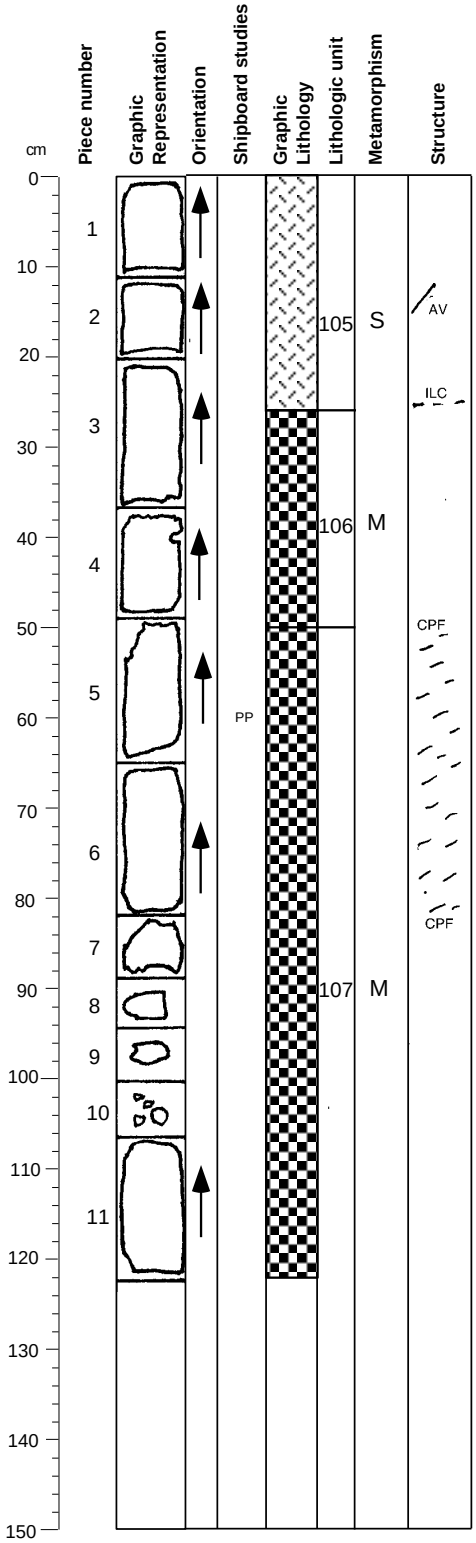
TEXTURE: Inequigranular and variable

ALTERATION: 7%

COMMENTS: Coarse to pegmatic oxide-bearing gabbro with variable distribution of olivine and interstitial oxide mineral veins. Coarsening in grain size downward in the interval. Alteration intensive at 4-6 cm in Section 179-1105A-24R-3, Piece 1.

STRUCTURE: This section displays igneous textures except in Piece 3 which contains a weak crystal-plastic fabric. Amphibole alteration veins are present in Pieces 5-8.

Core Photo



179-1105A-24R-3

INTERVAL: 105 **OXIDE and OLIVINE-BEARING GABBRO**
(see previous section)

INTERVAL: 106 **OXIDE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**24R**	**3**	**3**	**0.26 m**	**127.42 m**
Lower contact:	**24R**	**3**	**5**	**0.50 m**	**127.66 m**
Thickness (m):	**0.24**				
Contact Type:	**Grain size change, modal change, textural change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	70	30	2	10	equant/subhedral
Clinopyroxene	25	60	8	2	prismatic/subhedral
Fe-Ti oxide	5				irregular/interstitial veins
Total	**100**				

GRAIN SIZE: Pegmatitic

TEXTURE: Foliated

ALTERATION: 12%

COMMENTS: Foliation (lamination?) defined of upto 6 cm long pyroxenes. Variably altered along veining parallel to foliation (chlorite). Orange staining and whitening of feldspars related to alteration.

INTERVAL: 107 **OLIVINE-BEARING OXIDE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**24R**	**3**	**5**	**0.50 m**	**127.66 m**
Lower contact:	**25R**	**1**	**1**	**0.01 m**	**129.01 m**
Thickness (m):	**1.35**				
Contact Type:	**Grain size change, modal change, textural change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	65	50	2	10	equant/subhedral
Clinopyroxene	30	25	1	10	elongated/deformed
Olivine	2	8	1	5	deformed
Fe-Ti oxide	5				irregular/interstitial veins
Total	**102**				

GRAIN SIZE: Coarse

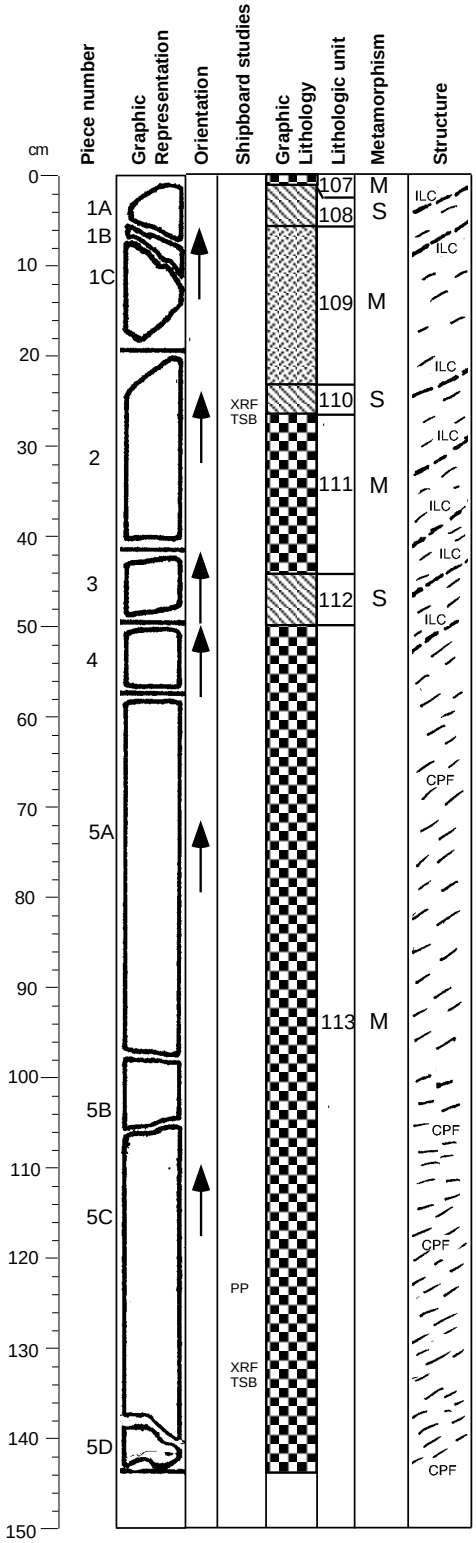
TEXTURE: Foliated

ALTERATION: 12%

COMMENTS: Variably foliated coarse-grained gabbro. Olivine and oxide seams variably distributed. Whitening of feldspars related to alteration veining.

STRUCTURE: This section displays igneous textures in Pieces 5 and 6 which display a weak crystal-plastic fabric. Piece 3 includes an igneous layer contact defined by a change in modal abundance and grain size. Piece 2 includes an amphibole alteration vein.

Core Photo



179-1105A-25R-1

INTERVAL: 107 OLIVINE-BEARING OXIDE GABBRO

(see previous section)

INTERVAL: 108 OXIDE OLIVINE MICROGABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	25R	1	1	0.01 m	129.01 m
Lower contact:	25R	1	1	0.05 m	129.05 m
Thickness (m):	0.04				
Contact Type:	Grain size change, modal change, textural change				

		Grain Size (mm):			
	Mode (%)	Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	0.5	0.5	0.5	equant/euhedral
Clinopyroxene	20	1	0.5	0.5	equant/euhedral
Olivine	15	0.5	0.5	0.5	irregular/anhedral
Fe-Ti oxide	15				granular/ disseminated
Total	100				

GRAIN SIZE: Equigranular

TEXTURE: Massive to very weakly foliated

ALTERATION: 2%

COMMENTS: Foliation is weakly developed. Lower contact is marked by a Fe-Ti oxide seam and coarse grains of interval below.

INTERVAL: 109 OXIDE OLIVINE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	25R	1	1	0.05 m	129.05 m
Lower contact:	25R	1	2	0.23 m	129.23 m
Thickness (m):	0.18				
Contact Type:	Grain size change, modal change, textural change				

		Grain Size (mm):			
	Mode (%)	Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	8	2	5	recrystallized/ deformed
Clinopyroxene	20	25	5	10	blocky/subhedral
Olivine	10	12	3	5	deformed
Fe-Ti oxide	15				aggregates/ in seams and patches
Total	100				

GRAIN SIZE: Coarse

TEXTURE: Foliated

ALTERATION: 19%

COMMENTS: Plagioclase recrystallized and altered to secondary plagioclase. Clinopyroxene altered to green amphibole. Sharp basal contact against microgabbro.

INTERVAL: 110 OXIDE OLIVINE MICROGABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	25R	1	2	0.23 m	129.23 m
Lower contact:	25R	1	2	0.26 m	129.26 m
Thickness (m):	0.03				
Contact Type:	Grain size change, modal change, textural change				

		Grain Size (mm):			
	Mode (%)	Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	0.5	0.5	0.5	equant/euhedral
Clinopyroxene	20	5	0.5	0.5	equant/euhedral
Olivine	15	0.5	0.5	0.5	irregular/anhedral
Fe-Ti oxide	15				granular/ disseminated
Total	100				

GRAIN SIZE: Equigranular

TEXTURE: Weakly foliated

ALTERATION: 3%

COMMENTS: Olivine distribution is highly variable, otherwise like Interval 108.

Core Photo

179-1105A-25R-1

INTERVAL: 111 OLIVINE-BEARING OXIDE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	25R	1	2	0.26 m	129.26 m
Lower contact:	25R	1	3	0.43 m	129.43 m
Thickness (m):	0.17				
Contact Type:	Grain size change, modal change, textural change				

		Grain Size (mm):			
	Mode (%)	Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	1	0.5	0.5	recrystallized/ deformed
Clinopyroxene	35	30	3	10	blocky/subhedral
Olivine	2	0.5	0.5	0.5	deformed
Fe-Ti oxide	8				aggregates/ in seams and patches
Total	**100**				

GRAIN SIZE: Coarse

TEXTURE: Foliated

ALTERATION: 28%

COMMENTS: Like Interval 109 but less abundant olivine. Plagioclase and clinopyroxene even more altered.

INTERVAL: 112 OXIDE OLIVINE MICROGABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	25R	1	3	0.43 m	129.43 m
Lower contact:	25R	1	4	0.49 m	129.49 m
Thickness (m):	0.06				
Contact Type:	Grain size change, modal change, textural change				

		Grain Size (mm):			
	Mode (%)	Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	0.5	0.5	0.5	equant/euhedral
Clinopyroxene	30	2	0.5	0.5	equant/euhedral
Olivine	5	0.5	0.5	0.5	irregular/anhedral
Fe-Ti oxide	15				granular and in seams/disseminated
Total	**100**				

GRAIN SIZE: Equigranular

TEXTURE: Distinctly foliated

ALTERATION: 1%

COMMENTS: Lower contact marked by abundant Fe-Ti oxides. Like Intervals 108 and 110, but much stronger foliation.

INTERVAL: 113 OLIVINE-BEARING OXIDE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	225R	1	4	0.49 m	129.49 m
Lower contact:	25R	2	1	0.20 m	130.64 m
Thickness (m):	1.15				
Contact Type:	Grain size change, modal change, textural change				

		Grain Size (mm):			
	Mode (%)	Max	Min	Avg. Size	Shape/Habit
Plagioclase	47	15	3	10	elongate/deformed
Clinopyroxene	45	20	3	10	elongate/deformed
Olivine	3	15	2	8	elongate/deformed
Fe-Ti oxide	5				irregular/ concordant seams
Total	**100**				

GRAIN SIZE: Inequigranular

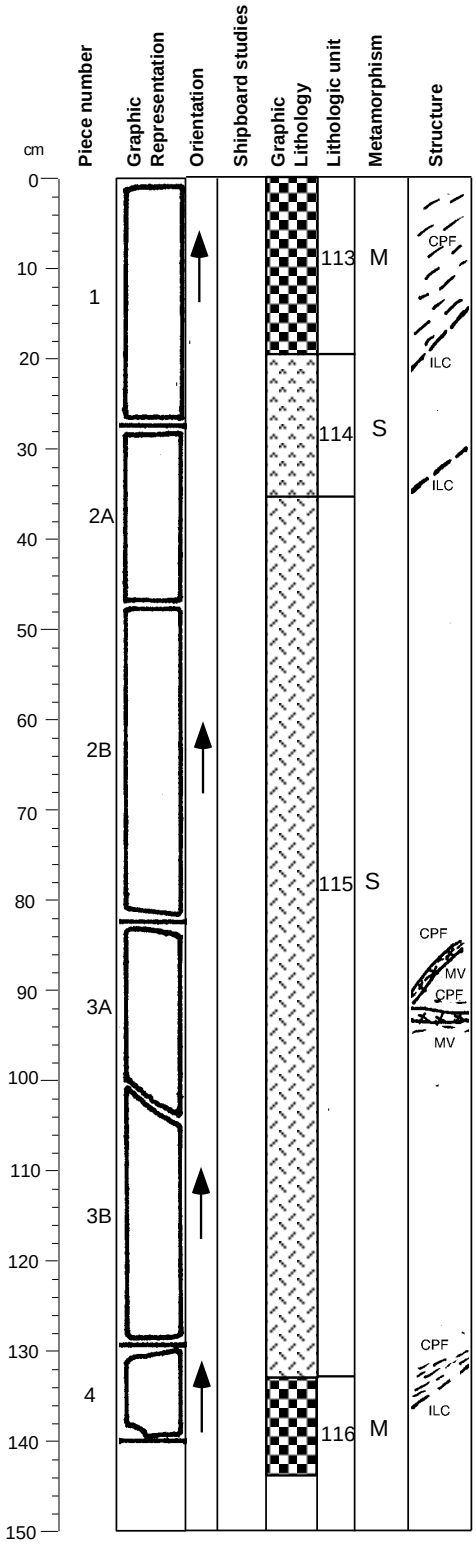
TEXTURE: Foliated

ALTERATION: 12%

COMMENTS: Well-developed foliation is observed throughout. Augen clasts of pyroxene, olivine, and plagioclase align parallel to the foliation. Banded or strongly foliated gneissose gabbro interval.

STRUCTURE: This section displays weak to moderately strong crystal-plastic fabrics defined by a well-developed foliation apparent in the preferred dimensional orientation of clinopyroxene, plagioclase, and lenses of recrystallized opaque minerals. The section also displays well-developed igneous layering (albeit somewhat modified due to deformation). Sharp contacts are present in Pieces 1-4. The top of Piece 1 does not display a ductile deformation fabric. Alteration veins are absent.

Core Photo



179-1105A-25R-2

INTERVAL: 113 **OLIVINE-BEARING OXIDE GABBRO**
(see previous section)

INTERVAL: 114 **OLIVINE GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	25R	2	1	0.20 m	130.64 m
Lower contact:	25R	2	2	0.35 m	130.79 m
Thickness (m):	0.15				
Contact Type:	Modal change, grain size change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	70	12	1	3	equant/subhedral
Clinopyroxene	25	40	1	10	equant/subhedral
Olivine	5	5	1	2	equant/subhedral
Total	**100**				

GRAIN SIZE: Coarse

TEXTURE: Inequigranular

ALTERATION: 8 %

COMMENTS: Massive olivine gabbro defined by high modal olivine content.

INTERVAL: 115 **OLIVINE-BEARING GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	25R	2	2	0.35 m	130.79 m
Lower contact:	25R	2	4	1.32 m	131.76 m
Thickness (m):	0.97				
Contact Type:	Grain size change, modal change, textural change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	30	2	12	equant/subhedral
Clinopyroxene	40	50	3	10	equant/euhedral
Olivine	1	8	3	4	irregular/subhedral
Total	**101**				

GRAIN SIZE: Pegmatitic

TEXTURE: Poikilitic to subophitic

ALTERATION: 4%

COMMENTS: Massive pegmatic interval with poikilitic/subophitic texture (plagioclase laths included in pyroxene). Olivine unevenly distributed with highest concentration at 92-120 cm (Section 179-1105A-25R-2, Piece 3). Alteration intense at 94 cm (Section 179-1105A-25R-2, Piece 3).

INTERVAL: 116 **OLIVINE-BEARING OXIDE GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	25R	2	4	1.32 m	131.76 m
Lower contact:	25R	3	5	0.57 m	132.40 m
Thickness (m):	0.64				
Contact Type:	Grain size change, modal change, textural change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	20	0.5	10	equant/euhedral
Clinopyroxene	35	45	0.5	8	equant/euhedral
Olivine	2	10	2	6	elongate/rounded
Fe-Ti oxide	8				irregular/concordant seams
Sulfides	0.5				irregular/ disseminated
Total	**100.5**				

GRAIN SIZE: Inequigranular to mylonitic

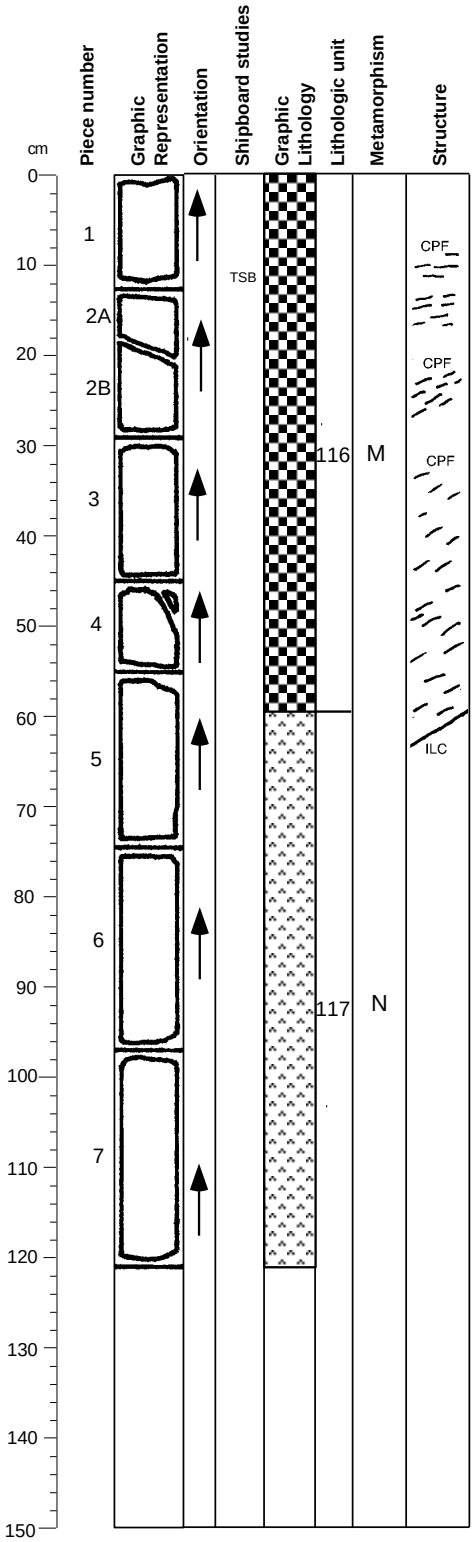
TEXTURE: Foliated

ALTERATION: 17 %

COMMENTS: Foliation is well developed except the interval 19-35 cm in Section 179-1105A-25R-3. Piece 4 in Section 179-1105A-25R-2 is fine grained. Strongly foliated gabbro interval.

STRUCTURE: This section dispalys coarse-grained igneous textures except locally in Pieces 1, 3A, and 4. Ductile deformation in Pieces 1 and 4 abruptly ceases at an igneous layer contact and ductile deformation in Piece 3A is localizedf within or adjacent to felsic magmatic veins. Piece 4 is intensely foliated. There is a distinct absense of alteration veins.

Core Photo



179-1105A-25R-3

INTERVAL: 116 **OLIVINE-BEARING OXIDE GABBRO**
(see previous section)

INTERVAL: 117 **OXIDE-BEARING OLIVINE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**25R**	**3**	**5**	**0.57 m**	**132.40 m**
Lower contact:	**26R**	**1**	**1**	**0.07 m**	**134.07 m**
Thickness (m):	**1.67**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	59	15	3	10	equant/subhedral
Clinopyroxene	35	21	2	7	blocky/euhedral
Olivine	5	10	2	6	equant/subhedral
Fe-Ti oxide	1				irregular/interstitial
Total	**100**				

GRAIN SIZE: Coarse

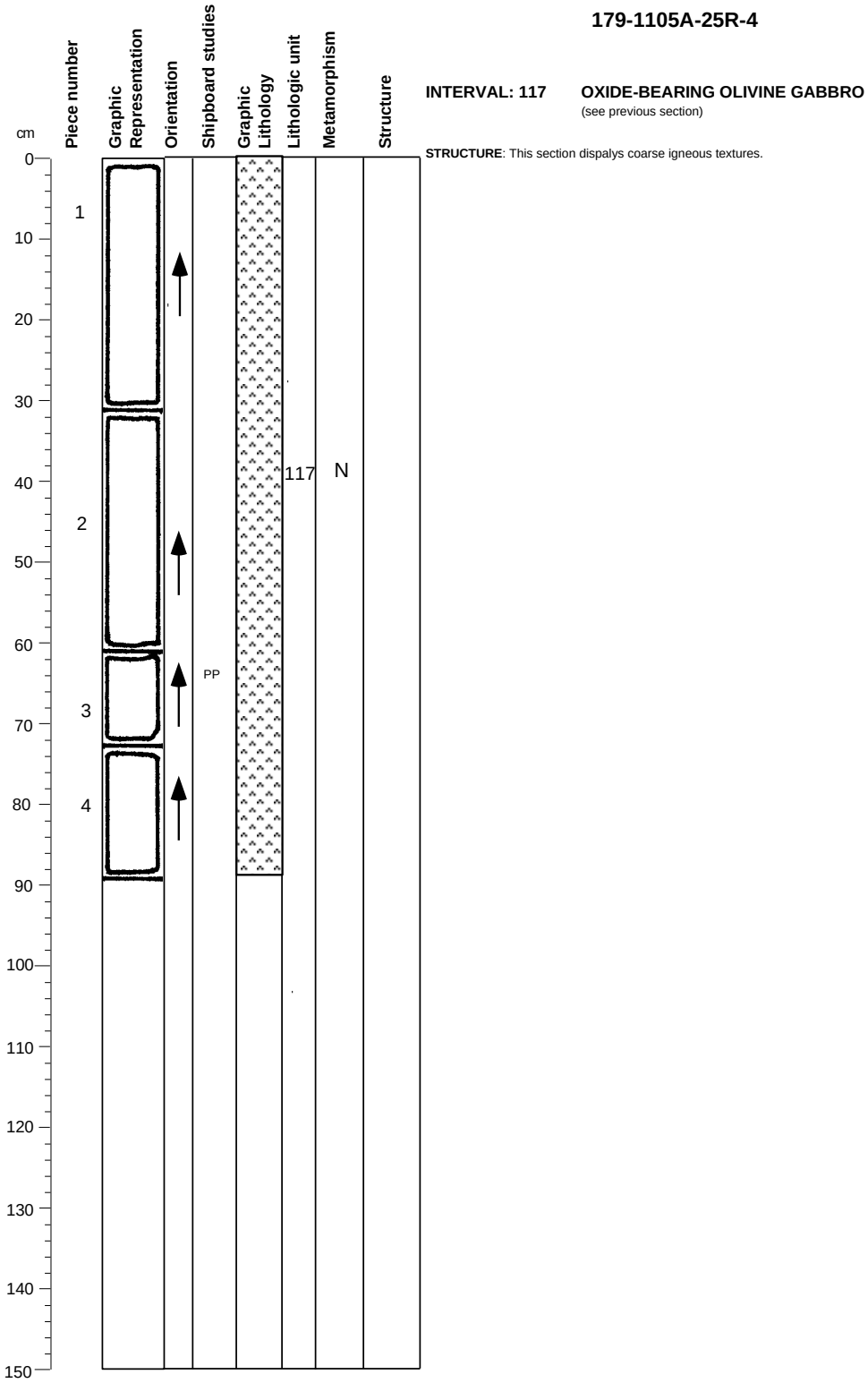
TEXTURE: Equigranular, Subophitic

ALTERATION: 1 %

COMMENTS: Homogeneous, massive gabbro interval defined by coarse grain size.

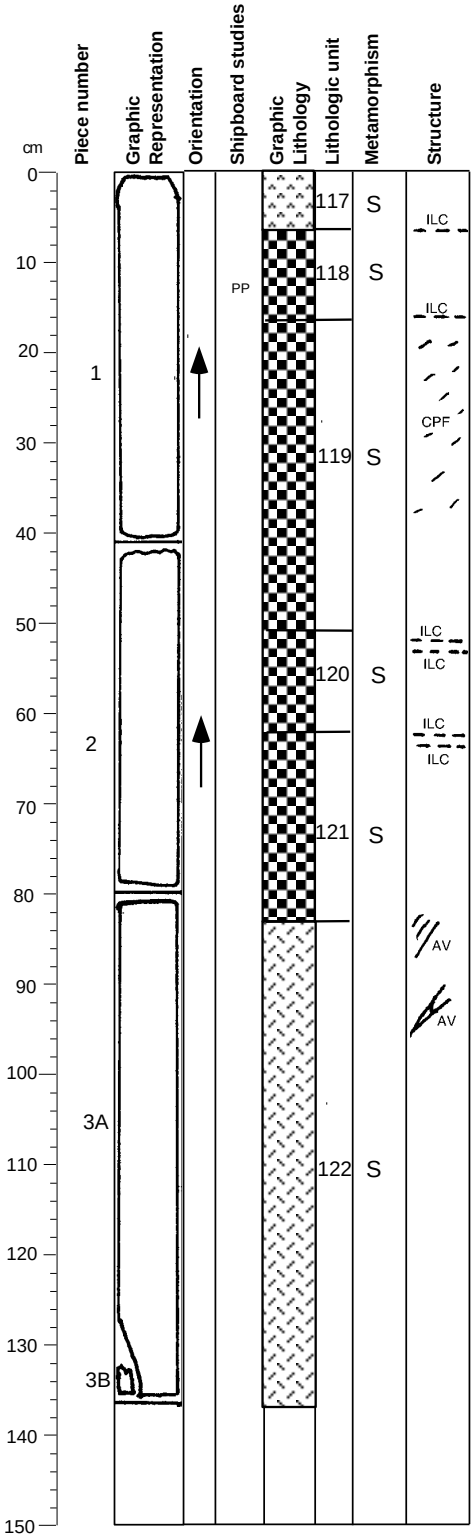
STRUCTURE: This section dispalys nonpenetrative crystal-plastic fabrics in Pieces 1-4 and the top of Piece 5. The ductile foliation terminates below and oxide-rich zone marked by an igneous layer contact with olivine gabbro. The lower part of the section (Pieces 5-7) is devoid of crystal-plastic fabrics and displays coarse igneous textures.

Core Photo



CORE/SECTION

Core Photo



179-1105A-26R-1

INTERVAL: 117 **OXIDE-BEARING OLIVINE GABBRO**

(see Section 179-1105A-25R-3)

INTERVAL: 118 **OLIVINE-BEARING OXIDE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**26R**	**1**	**1**	**0.07 m**	**134.07 m**
Lower contact:	**26R**	**1**	**1**	**0.17 m**	**134.17 m**
Thickness (m):	**0.10**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	3	1	2	equant/subhedral
Clinopyroxene	35	4	1	2	prismatic/subhedral
Olivine	1			0.5	rounded/anhedral
Fe-Ti oxide	10				irregular/interstitial seams
Total	**100**				

GRAIN SIZE: Fine-medium

TEXTURE: Equigranular

ALTERATION: 5 %

COMMENTS: Weakly foliated and fine-grained interval.

INTERVAL: 119 **OLIVINE-BEARING OXIDE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**26R**	**1**	**1**	**0.17 m**	**134.17 m**
Lower contact:	**26R**	**1**	**2**	**0.49 m**	**134.49 m**
Thickness (m):	**0.32**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	15	3	15	equant/subhedral
Clinopyroxene	40	40	3	10	prismatic/subhedral
Olivine	3	2	0.5	0.5	rounded/anhedral
Fe-Ti oxide	10				irregular/interstitial seams
Total	**103**				

GRAIN SIZE: Coarse

TEXTURE: Inequigranular

ALTERATION: 8%

COMMENTS: Variable oxide gabbro showing modal increase in pyroxene and oxides near upper contact.

INTERVAL: 120 **OLIVINE-BEARING OXIDE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**26R**	**1**	**2**	**0.49 m**	**134.49 m**
Lower contact:	**26R**	**1**	**2**	**0.63 m**	**134.63 m**
Thickness (m):	**0.14**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	65	3	1	2	equant/subhedral
Clinopyroxene	25	4	1	2	prismatic/subhedral
Olivine	3			0.5	rounded/anhedral
Fe-Ti oxide	10				irregular/interstitial seams
Total	**103**				

GRAIN SIZE: Fine-medium

TEXTURE: Equigranular

ALTERATION: 6 %

COMMENTS: Weakly foliated and fine-grained oxide gabbro. Felsic-mafic banding at upper and in lower boundaries associated with the strongest deformation and granoblastic textures.

Core Photo

179-1105A-26R-1

INTERVAL: 121 OLIVINE-BEARING OXIDE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	**26R**	**1**	**2**	**0.63 m**	**134.63 m**
Lower contact:	**26R**	**1**	**3**	**0.82 m**	**134.82 m**
Thickness (m):	**0.19**				
Contact Type:	**Modal change, grain size**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	15	3	5	equant/subhedral
Clinopyroxene	40	40	3	10	prismatic/subhedral
Olivine	3	2	0.5	0.5	rounded/anhedral
Fe-Ti oxide	10				irregular/interstitial seams
Total	**103**				

GRAIN SIZE: Coarse

TEXTURE: Inequigranular

ALTERATION: 8 %

COMMENTS: Variable oxide gabbro with large grains of pyroxene at the upper boundary grading toward the finer grained Interval 120.

INTERVAL: 122 OXIDE-BEARING OLIVINE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	**26R**	**1**	**3**	**0.82 m**	**134.82 m**
Lower contact:	**26R**	**2**	**1**	**0.02 m**	**135.58 m**
Thickness (m):	**0.56**				
Contact Type:	**Modal change, textural change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	56	20	5	10	equant/euhedral
Clinopyroxene	35	40	5	10	blocky/euhedral
Olivine	8	15	3	7	rounded/subhedral
Fe-Ti oxide	1				irregular/interstitial
Sulfides	0.5				irregular/ disseminated
Total	**100.5**				

GRAIN SIZE: Equigranular, Subophitic

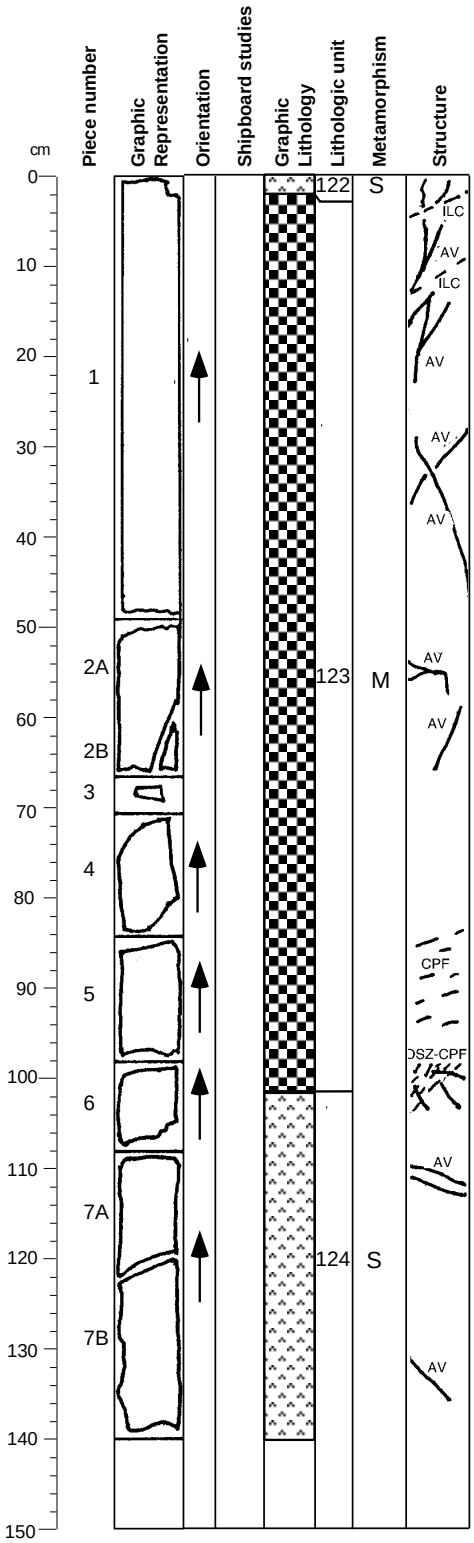
TEXTURE: Massive

ALTERATION: 5 %

COMMENTS: Homogeneous, massive olivine gabbro.

STRUCTURE: This section dispalys coarse-grained igneous textures except in the lower portion of Piece 1 where a weak crystal-plastic fabric is present. The section displays several well-defined igneous layer contacts in Pieces 1 and 2 defined by changes in grain size or mode. Alteration veins in Piece 3 are calcite-smectite filled and one is vuggy.

Core Photo



179-1105A-26R-2

INTERVAL: 122 OXIDE-BEARING OLIVINE GABBRO

(see previous section)

INTERVAL: 123 OLIVINE-BEARING OXIDE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	26R	2	1	0.02 m	135.38 m
Lower contact:	26R	2	6	1.02 m	136.38 m
Thickness (m):	0.10				
Contact Type:	Textural change, modal change, grain size change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	25	3	7	equant/subhedral
Clinopyroxene	39	30	3	10	blocky/deformed
Olivine	3	13	2	4	rounded/deformed
Fe-Ti oxide	7				irregular/interstitial seams
Sulfides	1				irregular/ disseminated
Total	**100**				

GRAIN SIZE: Coarse

TEXTURE: Inequigranular, Foliated

ALTERATION: 18 %

COMMENTS: Foliation is moderately developed in Pieces 4 and 5, and is well developed in Piece 6. This interval shows varied textural and modal distribution, and is characterized by abundant oxide.

INTERVAL: 124 OLIVINE GABBRO

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	26R	2	6	1.02 m	136.38 m
Lower contact:	26R	3	6B	1.28 m	138.04 m
Thickness (m):	1.66				
Contact Type:	Grain size change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	50	3	15	equant/subhedral
Clinopyroxene	30	30	2	10	equant/subhedral
Olivine	10	10	2	4	equant/subhedral
Total	**100**				

GRAIN SIZE: Coarse-pegmatitic

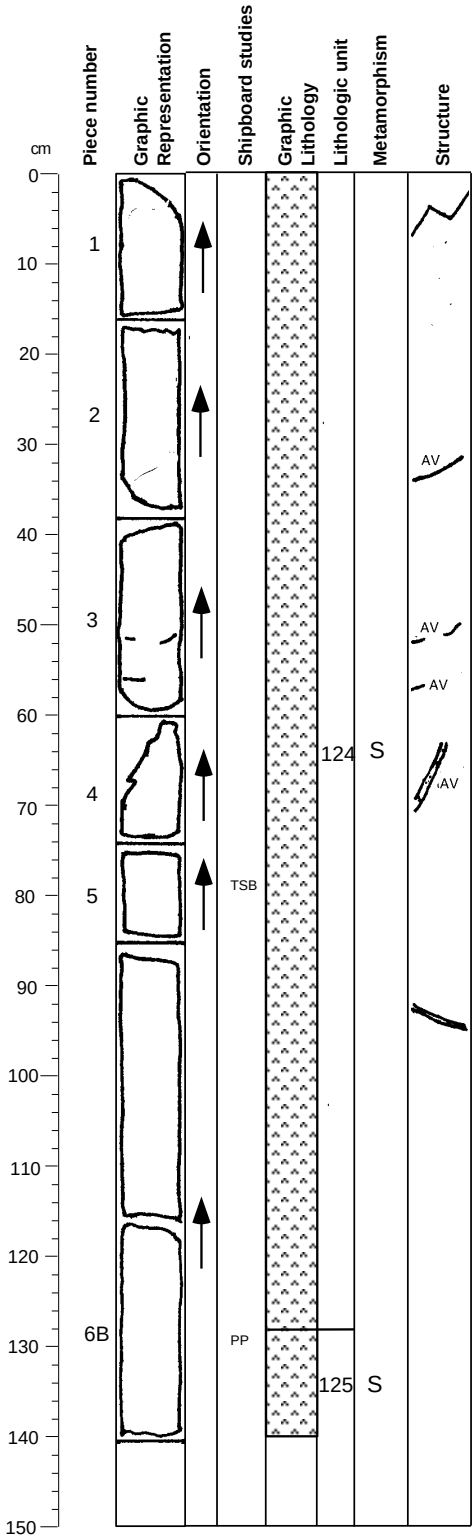
TEXTURE: Inequigranular, poikilitic

ALTERATION: 8%

COMMENTS: Variable grain size distribution and subophitic/poikilitic texture.

STRUCTURE: This section displays igneous textures except for Pieces 5 and 6. Piece 5 contains a weak crystal-plastic fabric. piece 6 shows a more intense crystal-plastic fabric and a sharp sheared contact with undeformed gabbro below. The section is pervasively infiltrated by low temperature smectite-calcite alteration veins.

Core Photo



179-1105A-26R-3

INTERVAL: 124 **OXIDE-BEARING OLIVINE GABBRO**
(see previous section)

INTERVAL: 125 **OXIDE-BEARING OLIVINE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**26R**	**3**	**6B**	**1.28 m**	**138.04 m**
Lower contact:	**27R**	**1**	**1**	**0.42 m**	**139.12 m**
Thickness (m):	**0.10**				
Contact Type:	**Textural change, modal change, grain size change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	23	2	4	tabular/euhedral
Clinopyroxene	40	20	3	8	prismatic/subhedral
Olivine	5	10	3	7	rounded/anhedral
Fe-Ti oxide	0.5				interstitial/ disseminated
Total	**100.5**				

GRAIN SIZE: Medium to coarse

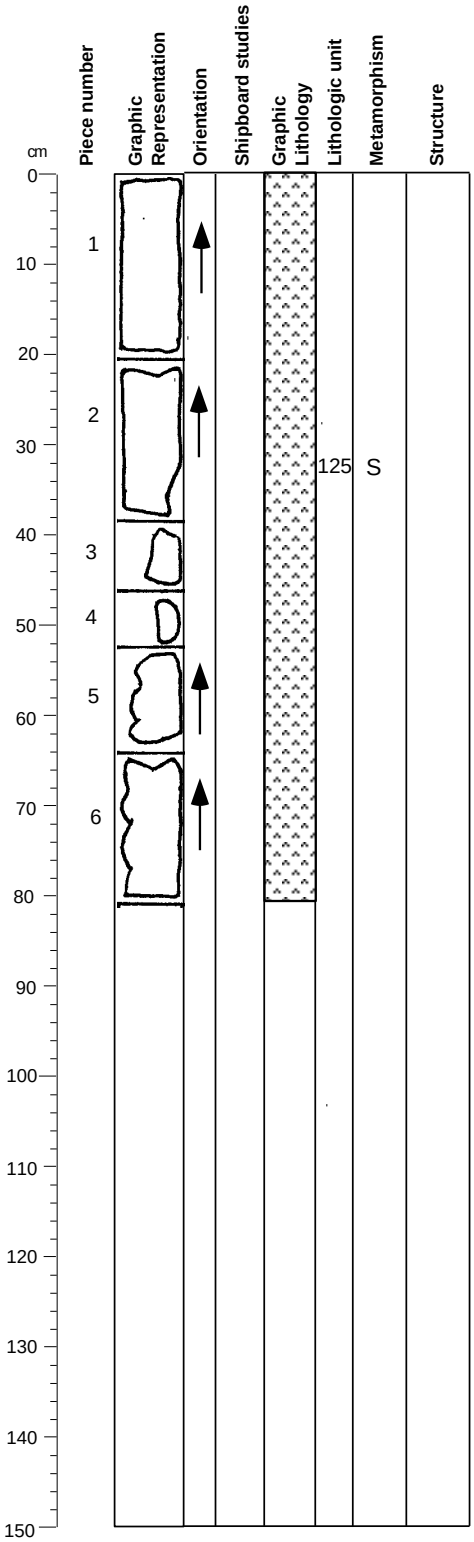
TEXTURE: Equigranular to ophitic

ALTERATION: 3 %

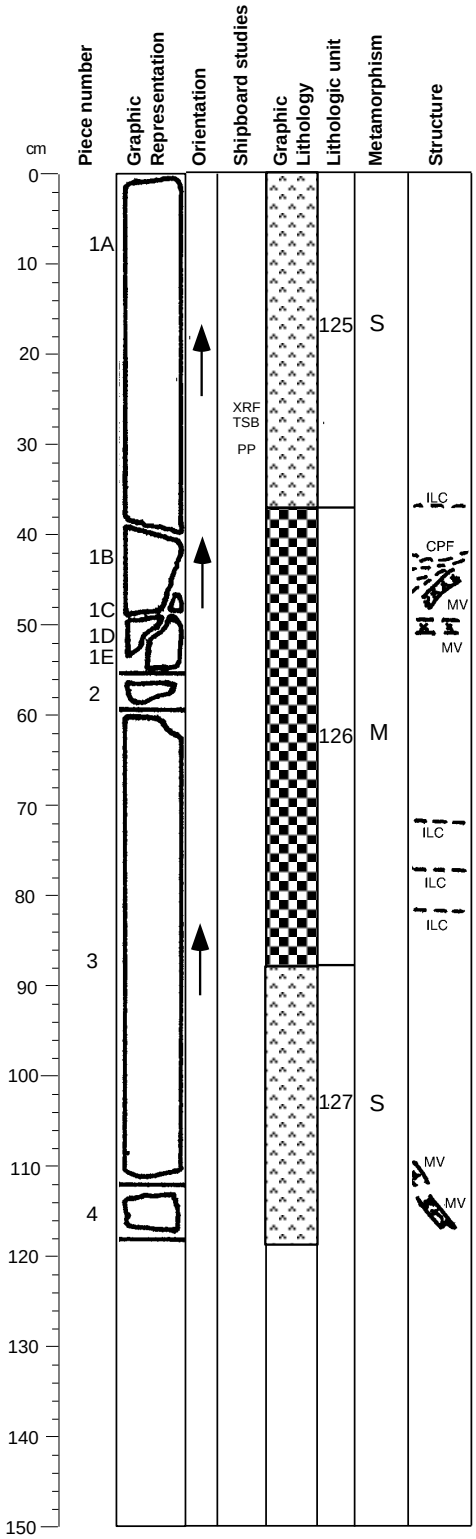
COMMENTS: Olivine content is not constant, rare very large clinopyroxene grains. Lower contact marked by pegmatitic clinopyroxene and abundant oxide in deformed interval below. Low temperature alteration in haloes around veins.

STRUCTURE: This section displays coarse-grained igneous textures. Calcite-smectite alteration veins are present in Pieces 1-4 and 6A.

Core Photo


179-1105A-26R-4
INTERVAL: 125
OXIDE-BEARING OLIVINE GABBRO
(see previous section)
STRUCTURE: This section displays igneous textures.
cm
Piece number
Graphic Representation
Orientation
Shipboard studies
Graphic Lithology
Lithologic unit
Metamorphism
Structure
125
S
CORE/SECTION

Core Photo



179-1105A-27R-1

INTERVAL: 125 **OXIDE-BEARING OLIVINE GABBRO**
(see Section 179-1105A-26R-3)

INTERVAL: 126 **OLIVINE-BEARING OXIDE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**27R**	**1**	**1**	**0.42 m**	**139.12 m**
Lower contact:	**27R**	**1**	**3**	**0.86 m**	**139.56 m**
Thickness (m):	**0.44**				
Contact Type:	**Textural change, modal change, grain size change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	57	25	0.5		deformed
Clinopyroxene	30	33	3		deformed
Olivine	3	12	2		rounded/anhedral
Fe-Ti oxide	10				aggregates/ in seams and patches
Total	**100**				

GRAIN SIZE: Fine to coarse

TEXTURE: Foliated

ALTERATION: 31 %

COMMENTS: Variably foliated, highly variable grain size. Moderately to intensely altered (plagioclase recrystallized and altered to secondary plagioclase, pyroxene altered to green amphibole). Oxide abundance is highly variable.

INTERVAL: 127 **OXIDE-BEARING OLIVINE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**27R**	**1**	**3**	**0.86 m**	**139.56 m**
Lower contact:	**29R**	**1**	**4**	**1.02 m**	**149.42 m**
Thickness (m):	**9.86**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	25	5	12	tabular/euhedral
Clinopyroxene	40	55	3	12	prismatic/subhedral
Olivine	5	15	5	8	rounded/anhedral
Fe-Ti oxide	0.5				interstitial/ disseminated
Total	**100.5**				

GRAIN SIZE: Coarse to pegmatitic

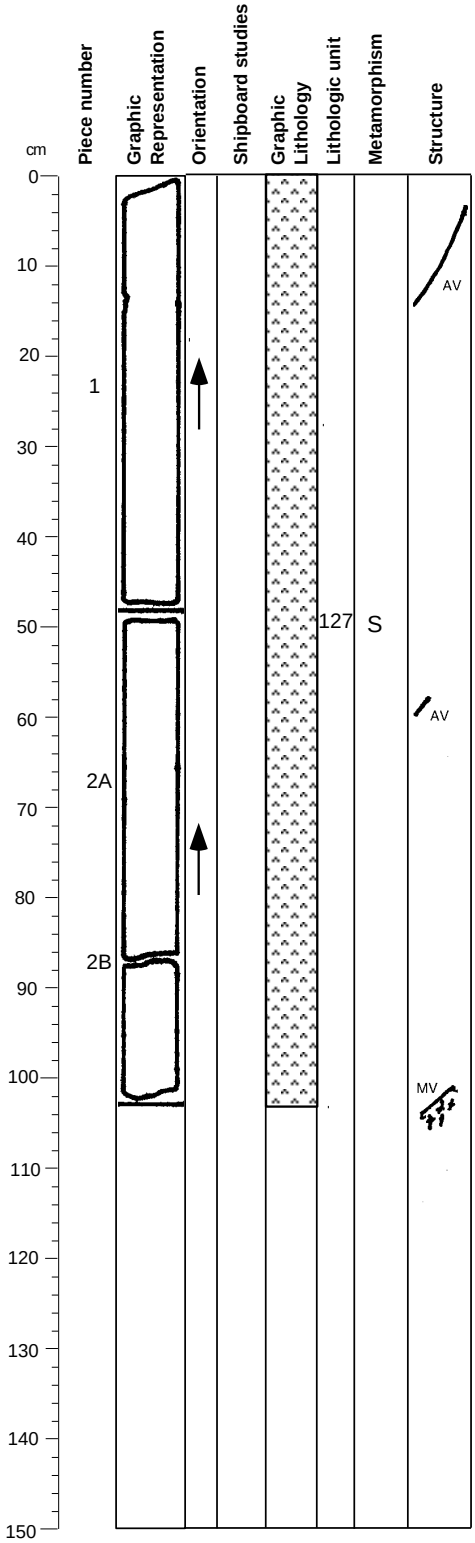
TEXTURE: Inequigranular, ophitic to subophitic

ALTERATION: 3 %

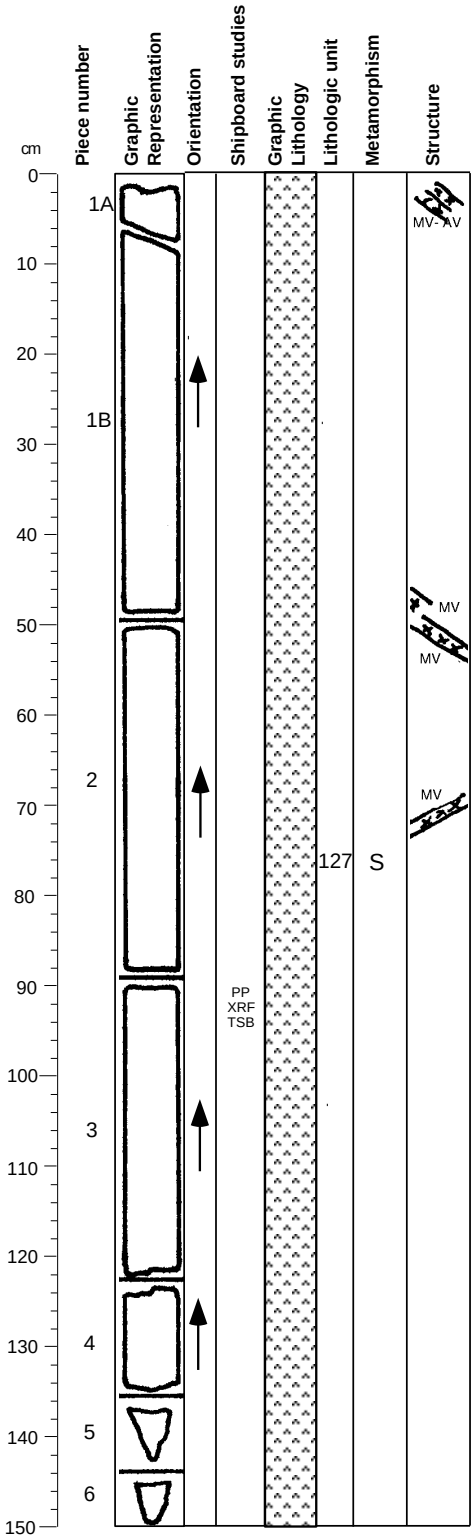
COMMENTS: Massive, thick olivine gabbro. Similar to Interval 125 but coarser grained. Rare very large clinopyroxene crystals, more common than in Interval 125. Olivine abundance is variable (as high as 10% locally, indistinct elsewhere) but over any few cm olivine is present throughout.

STRUCTURE: This section displays coarse-grained igneous textures except in Piece 1B, which is characterized by crystal-plastic fabrics. Felsic veins are present in Pieces 1B, 1C, 3, and 4. Igneous layer contacts are in Pieces 1 and 3.

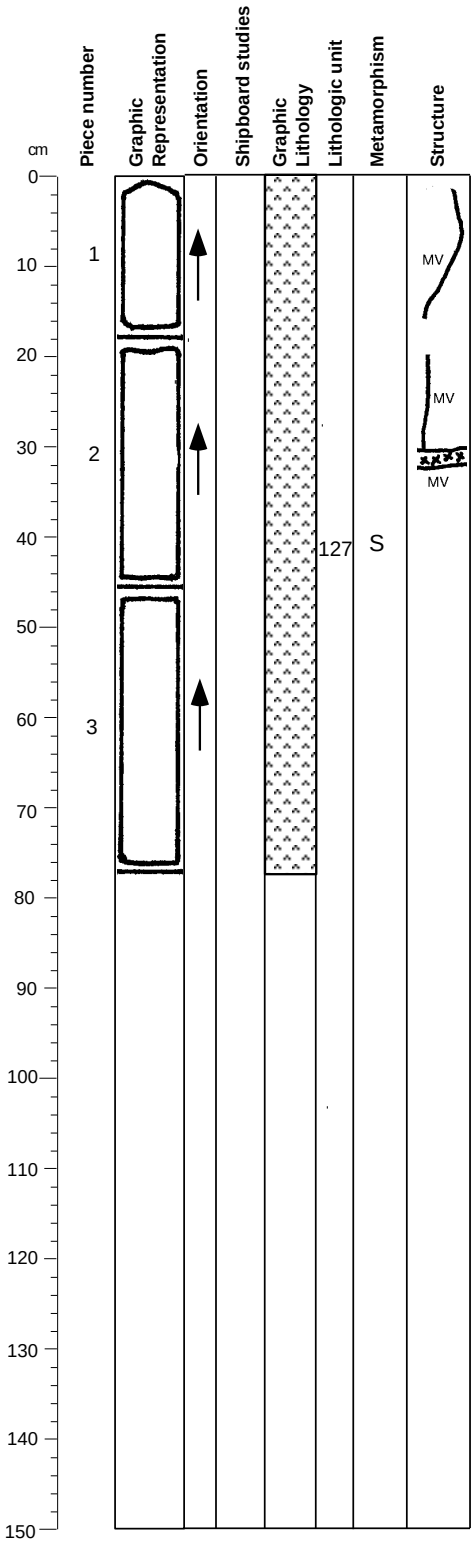
Core Photo


179-1105A-27R-2
INTERVAL: 127
OXIDE-BEARING OLIVINE GABBRO
(see previous section)
Piece number
Graphic Representation
Orientation
Shipboard studies
Graphic Lithology
Lithologic unit
Metamorphism
Structure
cm
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
1
2A
2B
127
S
AV
AV
MV
STRUCTURE: This section displays coarse-grained igneous textures. A felsic vein is at the base of Piece 2B. Alteration veins are in Pieces 1 and 2.

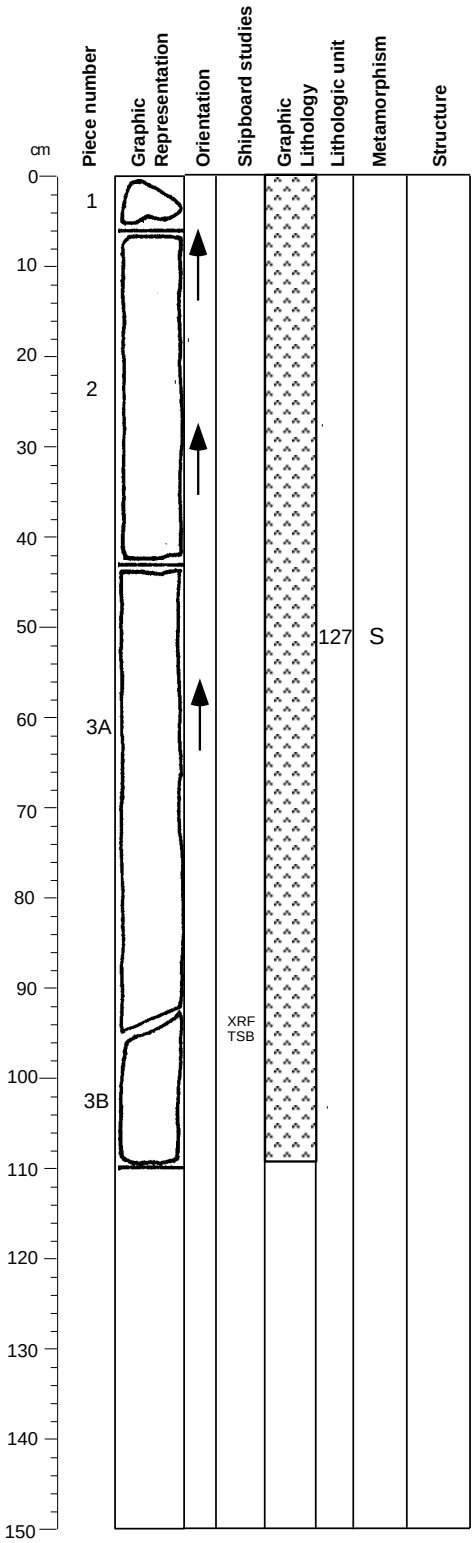
Core Photo


179-1105A-27R-3
INTERVAL: 127
OXIDE-BEARING OLIVINE GABBRO
(see Section 179-1105A-27R-1)
Piece number
Graphic Representation
Orientation
Shipboard studies
Graphic Lithology
Lithologic unit
Metamorphism
Structure
cm
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
1A
1B
2
3
4
5
6
PP
XRF
TSB
127
S
MV- AV
MV
MV
MV
STRUCTURE: This section displays igneous textures. Felsic veins are present in Pieces 1 and 2. The vein in Piece 1A is highly altered.

Core Photo


179-1105A-27R-4
INTERVAL: 127
OXIDE-BEARING OLIVINE GABBRO
(see Section 179-1105A-27R-1)
Piece number
Graphic Representation
Orientation
Shipboard studies
Graphic Lithology
Lithologic unit
Metamorphism
Structure
cm
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
1
2
3
127
S
MV
MV
MV
STRUCTURE: This section displays coarse-grained igneous textures. Felsic veins are present in Pieces 1 and 2.

Core Photo

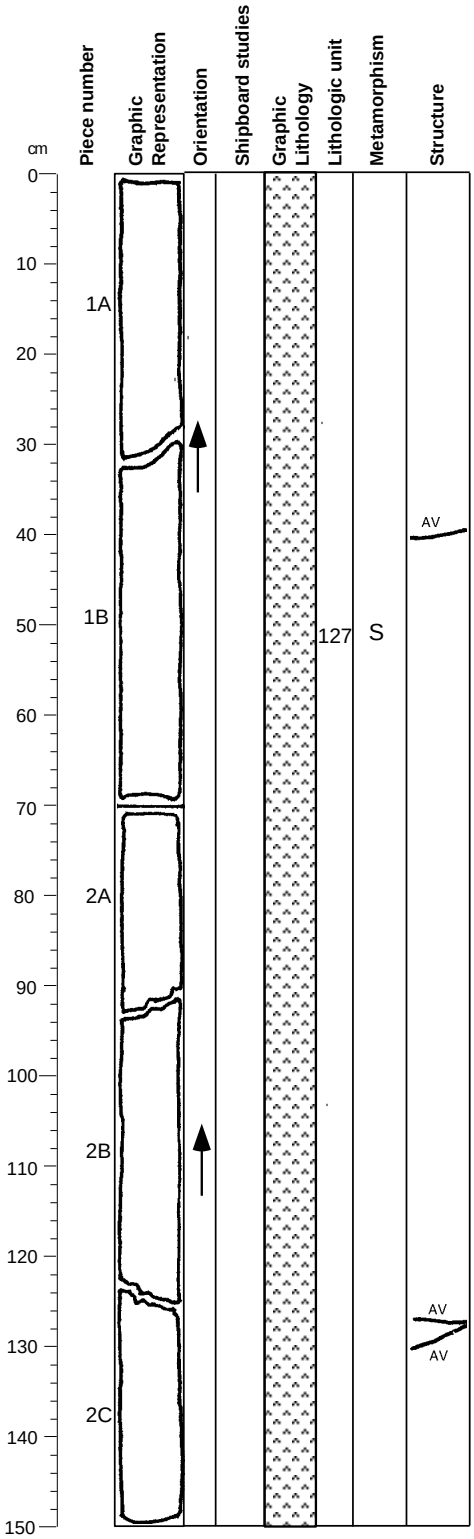


INTERVAL: 127 **OXIDE-BEARING OLIVINE GABBRO**
(see Section 179-1105A-27R-1)

STRUCTURE: This section displays coarse-grained igneous textures.

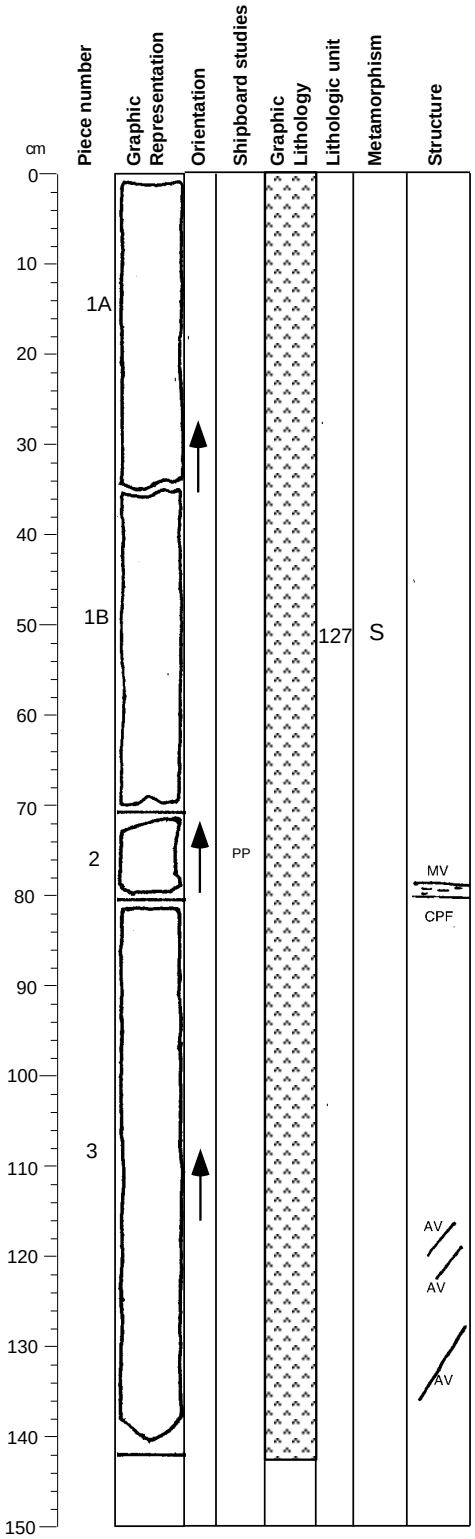
CORE/SECTION

Core Photo



CORE/SECTION

Core Photo



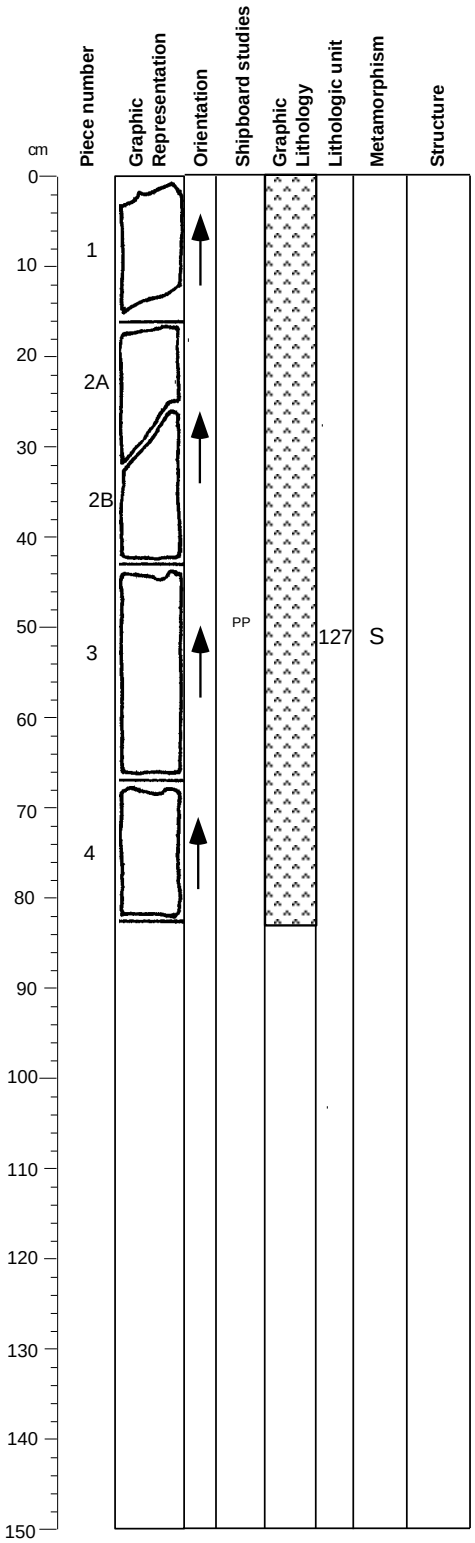
179-1105A-28R-3

INTERVAL: 127 **OXIDE-BEARING OLIVINE GABBRO**
(see Section 179-1105A-27R-1)

STRUCTURE: This section displays coarse-grained igneous textures. Alteration veins are present in Piece 3. vein filling is calcite-smectite.

CORE/SECTION

Core Photo



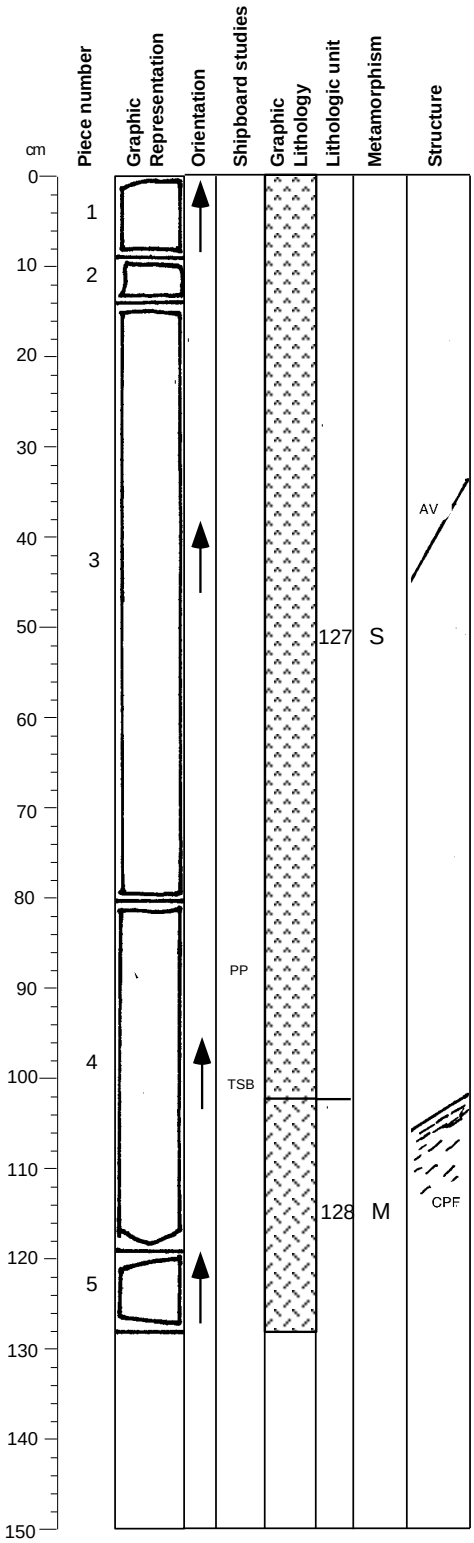
179-1105A-28R-4

INTERVAL: 127 **OXIDE-BEARING OLIVINE GABBRO**
(see Section 179-1105A-27R-1)

STRUCTURE: This section displays coarse-grained igneous textures.

CORE/SECTION

Core Photo



179-1105A-29R-1

INTERVAL: 127 **OXIDE-BEARING OLIVINE GABBRO**
(see Section 179-1105A-27R-1)

INTERVAL: 128 **OXIDE and OLIVINE-BEARING GABBRO**

				Depth	Depth
Interval Location:	**Core**	**Section**	**Piece**	**in Section**	**mbsf**
Upper contact:	**29R**	**1**	**4**	**1.02 m**	**149.42 m**
Lower contact:	**29R**	**2**	**3**	**0.93 m**	**150.60 m**
Thickness (m):	**1.18**				
Contact Type:	**Modal change**				

		Grain Size (mm):			
	Mode (%)	**Max**	**Min**	**Avg. Size**	**Shape/Habit**
Plagioclase	62	60	5	10	tabular/euhedral
Clinopyroxene	35	50	5	10	blocky/subhedral
Olivine	2	25	4	7	rounded/anhedral
Fe-Ti oxide	1				irregular/interstitial
Total	**100**				

GRAIN SIZE: Coarse

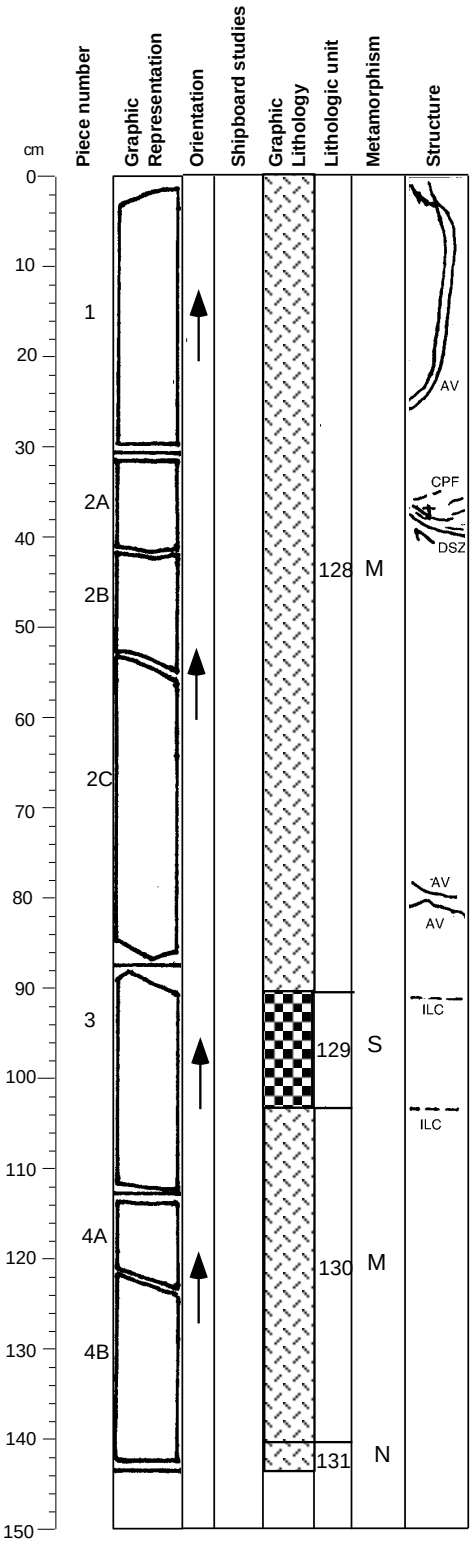
TEXTURE: Equigranular

ALTERATION: 10 %

COMMENTS: Olivine is more abundant in the interval 56-66 cm in Section 179-1105A-29R-2 (ca 10%). Mineral grain size fines downward in Section 29R-2, Piece 2B and 2C. Weakly foliated pegmatitic to coarse-grained gabbro interval.

STRUCTURE: This section displays coarse-grained igneous textures. Pegmatitic gabbro is present at the base of Piece 4 and in Piece 5. The contact between Intervals 127 and 128 is marked by crystal plastic fabric. The fabric of the ductile shear zone becomes most intense at the contact. An amphibole alteration vein is in Piece 3.

Core Photo



179-1105A-29R-2

INTERVAL: 128 **OXIDE and OLIVINE-BEARING GABBRO**
(see previous section)

INTERVAL: 129 **OLIVINE-BEARING OXIDE GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	29R	2	3	0.93 m	150.60 m
Lower contact:	29R	2	3	1.03 m	150.70 m
Thickness (m):	0.10				
Contact Type:	Modal change, grain size change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	70	30	5	10	tabular/euhedral
Clinopyroxene	20	12	5	8	blocky/subhedral
Olivine	0.5			1	rounded/anhedral
Fe-Ti oxide	10				irregular/interstitial seams
Total	**100.5**				

GRAIN SIZE: Coarse

TEXTURE: Inequigranular

ALTERATION: 3 %

COMMENTS: Uniform leucocratic band.

INTERVAL: 130 **OXIDE and OLIVINE-BEARING GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	29R	2	3	1.03 m	150.70 m
Lower contact:	29R	2	4	1.39 m	151.06 m
Thickness (m):	0.36				
Contact Type:	Grain size change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	58	20	4	8	tabular/subhedral
Clinopyroxene	40	20	3	8	blocky/subhedral
Olivine	1	10	3	6	rounded/anhedral
Fe-Ti oxide	1				irregular/interstitial
Total	**100**				

GRAIN SIZE: Coarse

TEXTURE: Equigranular

ALTERATION: 10 %

COMMENTS: Massive gabbro interval characterizerd by coarse grain size.

INTERVAL: 131 **OLIVINE-BEARING GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	29R	2	4	1.39 m	151.06 m
Lower contact:	29R	3	2	0.23 m	151.32 m
Thickness (m):	0.26				
Contact Type:	Grain size change, textural change, modal change				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	60	20	1	5	tabular/subhedral
Clinopyroxene	40	15	1	3	prismatic/seuhedral
Olivine	0.5	3	2	2	rounded/subhedral
Total	**100.5**				

GRAIN SIZE: Medium

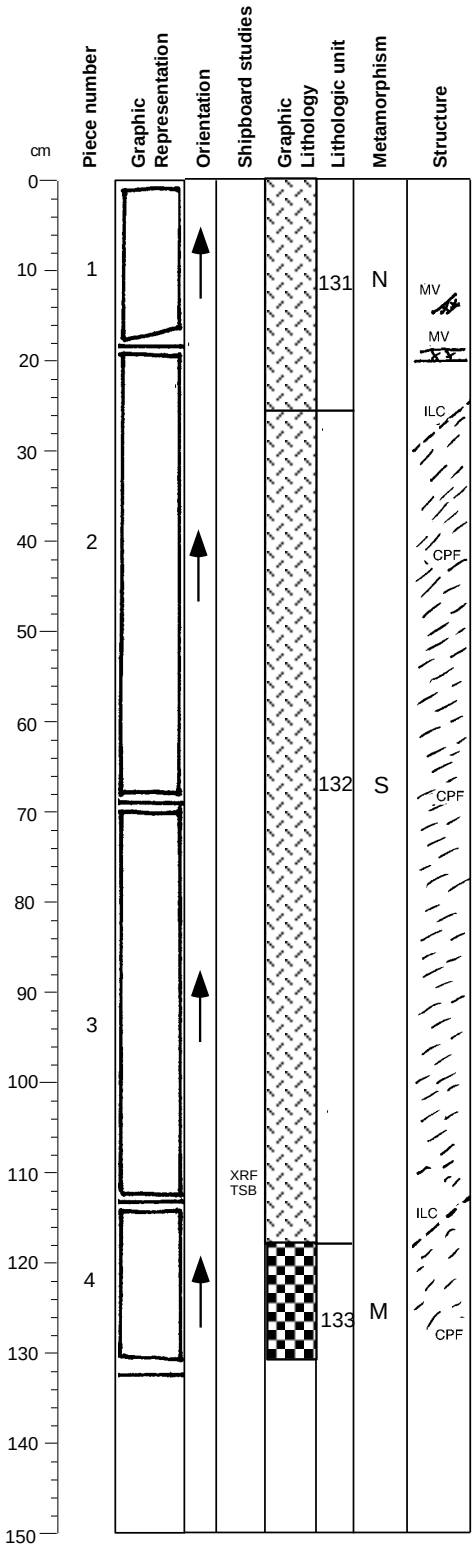
TEXTURE: Equigranular

ALTERATION: 0 %

COMMENTS: Coarse-grained, massive gabbro. Felsic vein occurs at 16-22 cm in Section 179-1105A-29R-3, Pieces 1 and 2.

STRUCTURE: This section displays igneous textures. Igneous layer contacts are present in Piece 4 defined by grain size and modal proportion changes. A ductile shear zone in Piece 2 indicates a normal component of shear displacement. Calc-silicate alteration veins are present in Pieces 1 and 2C.

Core Photo



CORE/SECTION

179-1105A-29R-3

INTERVAL: 131 **OLIVINE-BEARING GABBRO**

(see previous section)

INTERVAL: 132 **OLIVINE-BEARING GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**29R**	**3**	**2**	**0.23 m**	**151.32 m**
Lower contact:	**29R**	**3**	**4**	**1.18 m**	**152.27 m**
Thickness (m):	**0.95**				
Contact Type:	**Modal change, grain size change, textural change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	25	0.5	2	tabular/subhedral
Clinopyroxene	45	12	0.5	2	blocky/subhedral
Olivine	3	8	0.5	4	rounded/anhedral
Total	**100.5**				

GRAIN SIZE: Fine-medium

TEXTURE: Inequigranular, Granoblastic

ALTERATION: 7 %

COMMENTS: Variably foliated gabbro with strong fabric defined by elongated to blastic pyroxenes. Olivine is evenly distributed over the interval.

INTERVAL: 133 **OLIVINE-BEARING OXIDE GABBRO**

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**29R**	**3**	**4**	**1.18 m**	**152.27 m**
Lower contact:	**30R**	**1**	**2**	**0.27 m**	**153.67 m**
Thickness (m):	**1.41**				
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	20	1	3	equant/anhedral
Clinopyroxene	45	20	1	3	blocky/anhedral
Olivine	0.5			1	rounded/anhedral
Fe-Ti oxide	5				irregular/interstitial seams
Total	**105.5**				

GRAIN SIZE: Fine-coarse

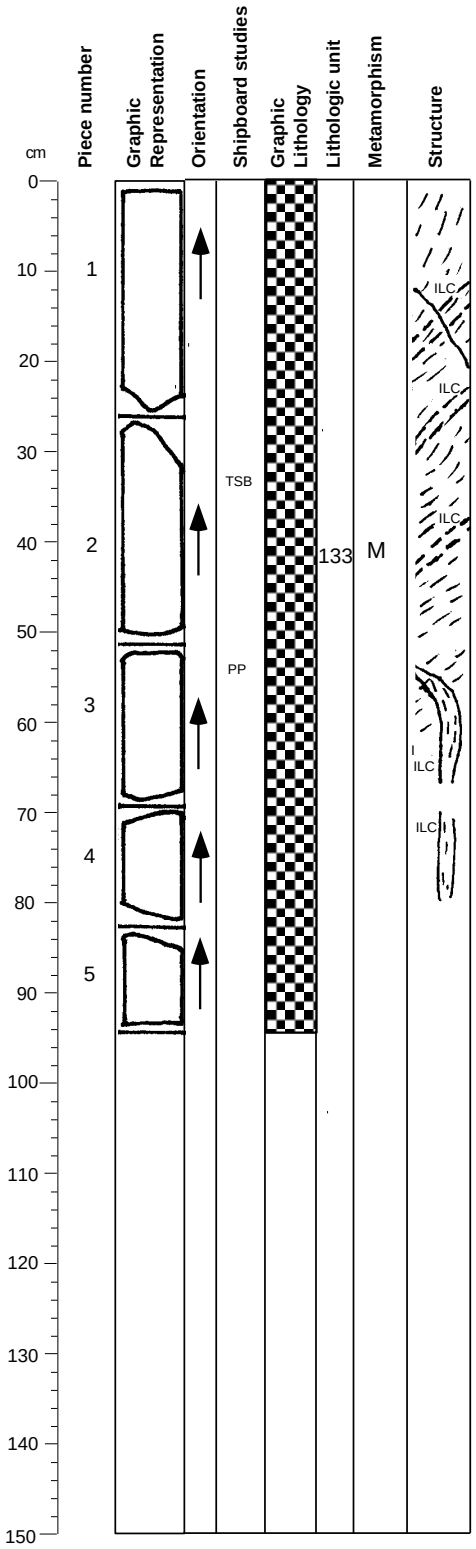
TEXTURE: Foliated , Granoblastic

ALTERATION: 15 %

COMMENTS: Highly and variably deformed oxide gabbro with blocky to elongated porphyroblastic texture. The interval varies from coarse-foliated to fine-grained bands (particularly at 118-130 cm, Section 179-1105A-29R-3, Piece 4) and occasionally leucocratic bands (32-45 cm, Section 179-1105A-29R-3, Piece 2).

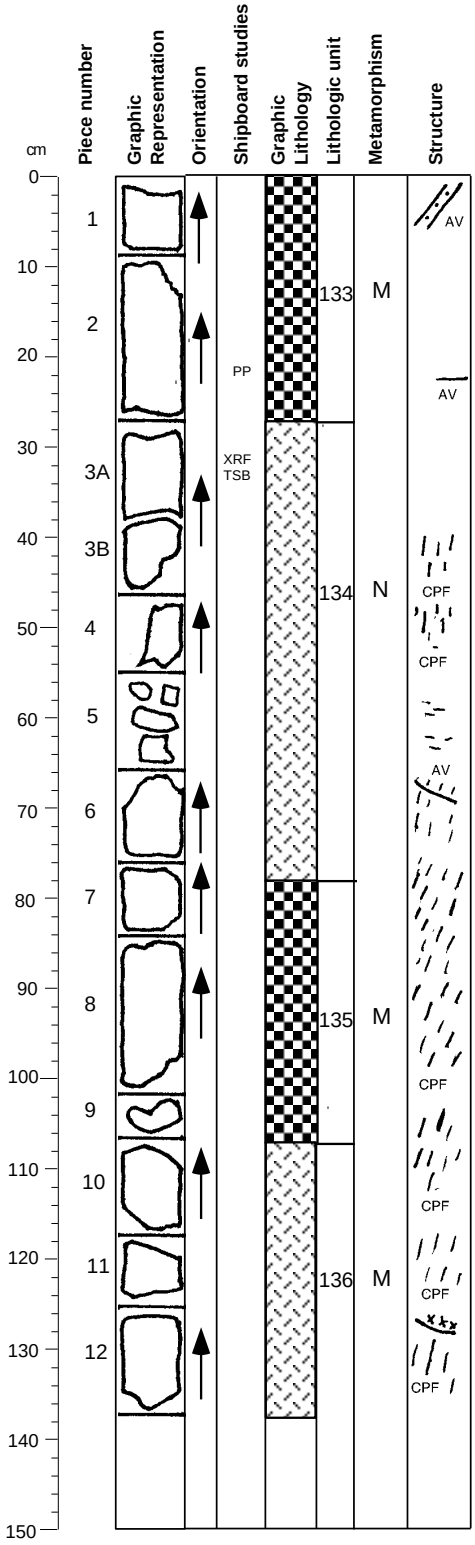
STRUCTURE: Except for Piece 1 and the top of Piece 2, the section is dominated by crystal-plastic fabrics that start abruptly at an oxide-rich zone near the top of Piece 2 and continue downward through the section. The foliation inclines ~45 to 55 degrees throughout the section. Layer contacts are present in Pieces 2 and 4. Felsic veins are present in Pieces 1 and 2.

Core Photo



CORE/SECTION

Core Photo



179-1105A-30R-1

INTERVAL: 133 OLIVINE-BEARING OXIDE GABBRO

(see Section 179-1105A-29R-3)

INTERVAL: 134 OXIDE and OLIVINE-BEARING GABBRO

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**30R**	**1**	**2**	**0.27 m**	**153.67 m**
Lower contact:	**30R**	**1**	**7**	**0.79 m**	**154.19 m**
Thickness (m):	**0.52**				
Contact Type:	**Modal change, grain size change, textural change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	59	5	0.1	0.5	deformed
Clinopyroxene	40	3	0.1	0.5	deformed
Olivine	0.5	2	0.5	1	deformed
Fe-Ti oxide	1				irregular/seams
Total	**100.5**				

GRAIN SIZE: Fine

TEXTURE: Inequigranular, Cataclastic, Foliated

ALTERATION: 0 %

COMMENTS: Fine-grained to aphanitic interval with moderately developed foliation. Thin chlorite vein in Piece 6.

INTERVAL: 135 OXIDE GABBRO

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**30R**	**1**	**7**	**0.79 m**	**154.19 m**
Lower contact:	**30R**	**1**	**9**	**1.06 m**	**154.46 m**
Thickness (m):	**0.27**				
Contact Type:	**Grain size change, modal change, textural change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	15	1	2	equant/anhedral
Clinopyroxene	45	20	1	2	blocky/anhedral
Fe-Ti oxide	5				irregular/ disseminated
Total	**100**				

GRAIN SIZE: Medium-fine

TEXTURE: Foliated, Granoblastic

ALTERATION: 12 %

COMMENTS: Foliated and weakly banded oxide gabbro interval. Granoblastic foliation accentuated by grain size and modal variation giving the appearance of weak banding on the centimeter scale. Dissiminated to interstitial veining of the oxide minerals.

INTERVAL: 136 OXIDE-BEARING GABBRO

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**30R**	**1**	**9**	**1.06 m**	**154.46 m**
Lower contact:	**30R**	**2**	**3**	**0.31 m**	**155.07 m**
Thickness (m):	**0.61**				
Contact Type:	**Grain size change, modal change, textural change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	50	20	0.5	1	equant/subhedral
Clinopyroxene	50	25	0.5	2	blocky/anhedral
Fe-Ti oxide	3				irregular/ disseminated
Total	**100**				

GRAIN SIZE: Fine-medium

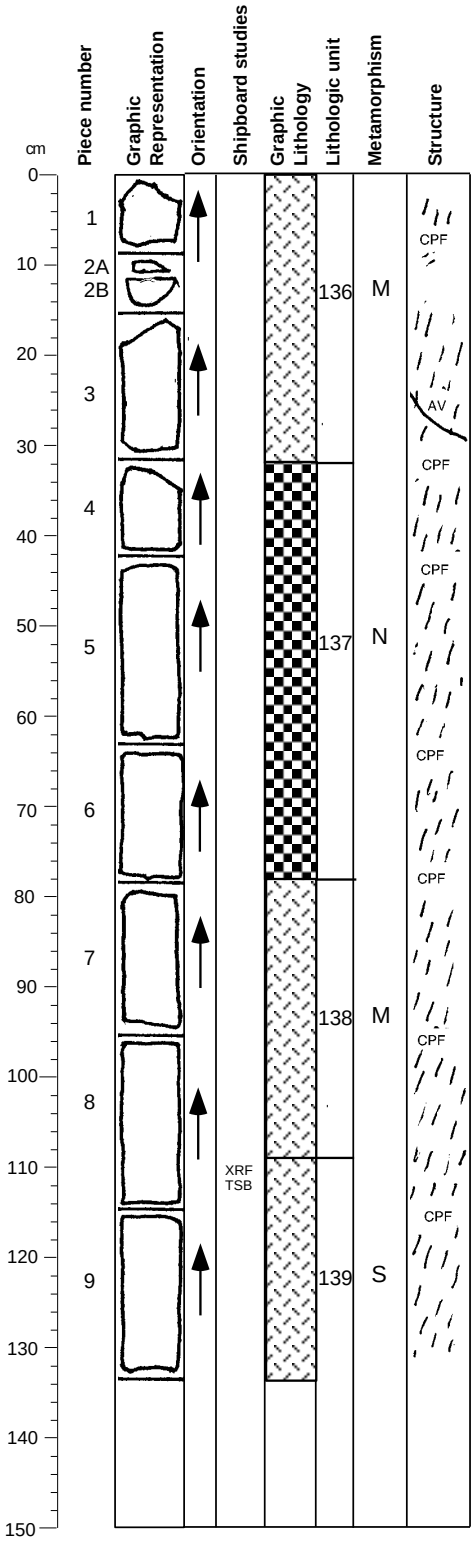
TEXTURE: Foliated and weakly banded

ALTERATION: 13 %

COMMENTS: Foliated and weakly banded oxide-bearing gabbro. The banding is accentuated by grain size variation from fine to coarse on the 1-2 cm scale. Felsic veins at 125-126 cm (Section 179-1105A-30R-1, Piece 12) and 30-31 cm (Section 179-1105A-30R-2, Piece 3). Whitening of feldspars at 21-31 cm (Section 179-1105A-30R-2, Piece 3).

STRUCTURE: This section displays coarse igneous texture in Pieces 1-3A, but is dominated by crystal-plastic fabrics in Pieces 3B-12. Felsic layering is present in Piece 8 and is parallel to the foliation plane. A felsic vein crosscuts the foliation in Piece 12. A calcite vein is present in Piece 1, and amphibole veins are in Pieces 2 and 6.

Core Photo



179-1105A-30R-2

INTERVAL: 136 **OXIDE-BEARING GABBRO**

(see previous section)

INTERVAL: 137 **OLIVINE-BEARING OXIDE GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	30R	2	3	0.31 m	155.07 m
Lower contact:	30R	2	6	0.78 m	155.54 m
Thickness (m):	0.47				
Contact Type:	Modal change, grain size change				

		Grain Size (mm):			
	Mode (%)	Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	25	2	7	deformed
Clinopyroxene	35	15	2	5	deformed
Olivine	2	15	2	5	deformed
Fe-Ti oxide	8				irregular/seams
Total	**100**				

GRAIN SIZE: Medium

TEXTURE: Inequigranular, Foliated

ALTERATION: 0 %

COMMENTS: Olivine is more abundant at 35-50 cm in Pieces 4 and 5 (ca 8%). Foliation is well developed throughout. Felsic vein occurs at the top of this interval.

INTERVAL: 138 **OXIDE-BEARING GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	30R	2	6	0.78 m	155.54 m
Lower contact:	30R	2	8	1.06 m	155.82 m
Thickness (m):	0.28				
Contact Type:	Grain size change, modal change				

		Grain Size (mm):			
	Mode (%)	Max	Min	Avg. Size	Shape/Habit
Plagioclase	61	2	0.5	1	equant/elongate
Clinopyroxene	35	2	0.5	1	equant/elongate
Fe-Ti oxide	4				irregular/interstitial seams
Total	**100**				

GRAIN SIZE: Fine

TEXTURE: Foliated, Equigranular

ALTERATION: 0 %

COMMENTS: Weakly foliated interval characterized by fine-grain size. Both the upper and lower boundaries are gradational.

INTERVAL: 139 **OXIDE-BEARING GABBRO**

Interval Location:	Core	Section	Piece	Depth in Section	Depth mbsf
Upper contact:	30R	2	8	1.06 m	155.82 m
Lower contact:	30R	2	9	1.33 m	156.09 m
Thickness (m):	0.27 m				
Contact Type:	Grain size change, textural change, modal change				

		Grain Size (mm):			
	Mode (%)	Max	Min	Avg. Size	Shape/Habit
Plagioclase	55	50	1	5	equant/subhedral
Clinopyroxene	45	15	1	5	blocky/subhedral
Fe-Ti oxide	3				irregular/interstitial
Total	**103**				

GRAIN SIZE: Medium

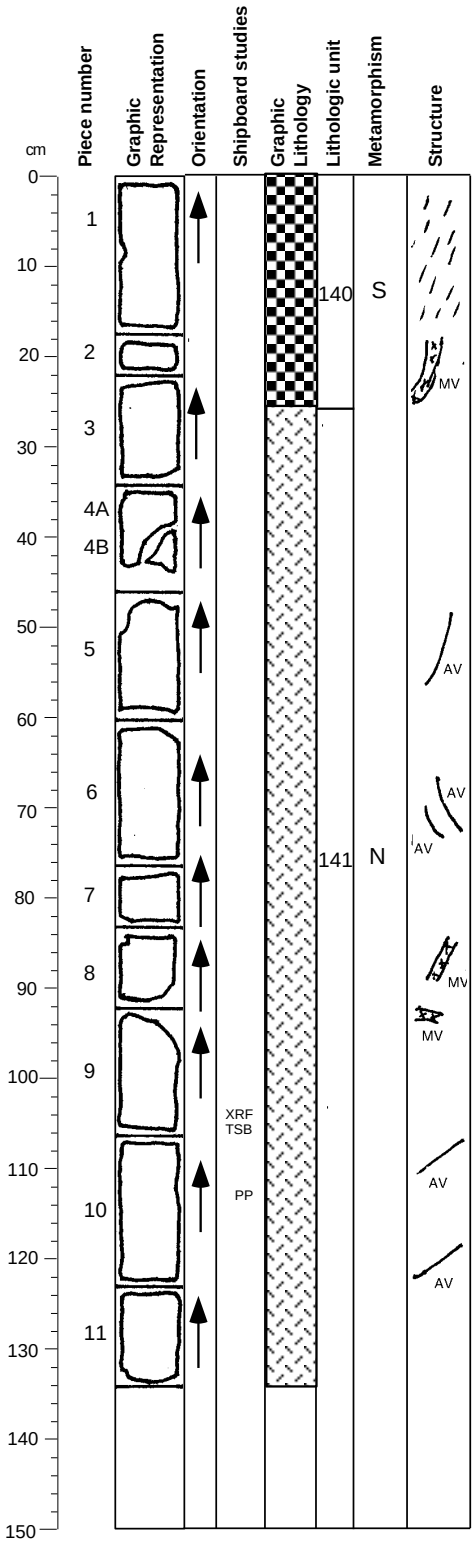
TEXTURE: Inequigranular

ALTERATION: 7 %

COMMENTS: Massive medium-coarse interval with foliation.

STRUCTURE: This section displays a tectonic fabric with strong, steeply dipping foliation defined by the preferred dimensional orientation of clinopyroxene and plagioclase grains or recrystallized aggregates. An alteration vein is present in Piece 2.

Core Photo



179-1105A-30R-3

INTERVAL: 140 OLIVINE-BEARING OXIDE GABBRO

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**30R**	**3**	**1**	**0.00 m**	**156.10 m**
Lower contact:	**30R**	**3**	**3**	**0.25 m**	**156.35 m**
Thickness (m):	**0.25**				
Contact Type:	**Modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	57	10	1	5	deformed
Clinopyroxene	35	10	1	3	blocky/subhedral
Olivine	0.5	1	1	1	rounded
Fe-Ti oxide	8				irregular/interstitial
Total	**100.5**				

GRAIN SIZE: Medium

TEXTURE: Foliated, Inequigranular

ALTERATION: 7 %

COMMENTS: Zoned vein with light-greenish mineral at the center and felsic mineral at the rim occurs at 13-28 cm in Section 179-1105A-30R-3. Weakly foliated, medium-grained interval.

INTERVAL: 141 OXIDE and OLIVINE-BEARING GABBRO

	Core	Section	Piece	Depth in Section	Depth mbsf
Interval Location:					
Upper contact:	**30R**	**3**	**3**	**0.25 m**	**156.35 m**
Lower contact:	**Not recovered, bottom of core**				**157.44 m**
Thickness (m):					
Contact Type:	**Grain size change, modal change**				

	Mode (%)	Grain Size (mm): Max	Min	Avg. Size	Shape/Habit
Plagioclase	64	13	0.5	5	equant/subhedral
Clinopyroxene	35	10	1	3	blocky/subhedral
Olivine	0.5	1	1	1	rounded
Fe-Ti oxide	0.5				irregular/interstitial
Total	**100**				

GRAIN SIZE: Medium

TEXTURE: Equigranular

ALTERATION: 0 %

COMMENTS: Felsic vein occurs at 90-93 cm, and thin chlorite veins in Pieces 5, 7, and 10 in Section 179-1105A-30R-3. Massive gabbro interval with variable grain size distribution.

STRUCTURE: This section displays igneous texture except for Piece 1 where a steep foliation is present. Felsic veins are present in Pieces 2, 3, 8, and 9. Alteration veins are in Pieces 5, 10, and 11.

179-1105A-1R-2 (Piece 2B, 88.0 - 91.0 cm)
Thin section #: 83
ROCK NAME: Olivine gabbro
GRAIN SIZE: Fine-medium
TEXTURE: Xenomorphic granular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	3.6	7.5	<2		subhedral	deformation lamellae and kink banding locally
Plagioclase	60.1	60.6	<10		subhedral	granular, undulose extinction, deformation twinning and mild strain
Clinopyroxene	28.4	30.9	<8	augite	subhedral	exsolution lamellae
Opaque Minerals	trace	trace	<0.1		anhedral	interstitial
Hornblende	trace	trace	<0.1			corona

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite	3		
Talc	2	olivine	
Actinolite	2	olivine	
Magnetite	1	olivine	

COMMENTS:
Mode point counted, 1800 points, 0.5 mm interval. Igneous Texture. Granular plagioclase with pyroxene and olivine in a granular to interstitial texture. Grain boundaries and lack of zoning suggest equilibrium between olivine, plagioclase, and augite. Green to brown hornblende occurs in reaction coronas between plagioclase and principally olivine. Secondary replacement of olivine and augite by talc, actinolite, and magnetite. Point count of primary phases, 1000 points. Plagioclase-58.3%, clinopyroxene-35.4%, olivine-6%, amphibole-trace.

Digital Photomicrograph #1: Typical texture of olivine gabbro.

179-1105A-1R-4 (Piece 5, 95.0 - 98.0 cm)
Thin section #: 84
ROCK NAME: Olivine gabbro
GRAIN SIZE: Coarse
TEXTURE: Subhedral granular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	4	7	1-6		subhedral	deformation bands
Plagioclase	62	62	0.5-10		euhedral-subhedral	deformation twins, undulose extinction locally
Clinopyroxene	29	30	1-10		subhedral	oikocrystic to intersertal, undulose extinction
Opaque Minerals	<1	<1				
Brown Hornblende	<1	<1				coronas around clinopyroxene

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Serpentine	1.5	olivine	
Talc	1.5	olivine	
Calcite trace	olivine		
Actinolite	1	olivine/clinopyroxene	fibrous needles
Plagioclase	trace	plagioclase	vein

COMMENTS:
Igneous texture. Plagioclase and olivine are subophitically intergrown. Olivine is penetrated by veins composed of talc + brown smectite. Plagioclase is slightly zoned and partly cloudy with numerous, minute inclusions. Clinopyroxene is rimmed by amphibole. Point count of primary phases, 1000 points. Plagioclase-62.1%, clinopyroxene-31.6%, olivine-4.6%, oxide minerals-1%.

Digital Photomicrograph #4: Deformation bands of olivine

179-1105A-1R-4 (Piece 8, 141.0 - 144.0 cm)
Thin section #: 85
ROCK NAME: Gabbro
GRAIN SIZE: Pegmatitic
TEXTURE: Poikilitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Plagioclase	50	50	<20		Subhedral-anhedral	in part included in pyroxene, deformation twins, undulose extinction
Clinopyroxene	50	50	>30		Euhedral-subhedral	poikilitic
Brown Hornblende	trace	trace				
Opaque minerals	trace	trace				

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS

No significant secondary replacements.

COMMENTS:
Igneous texture. Large poikilitic augite grains with included plagioclase. Thin section composed of large augite oikocrysts with several included plagioclase grains. Incipient replacement of augite by brown amphibole and oxides. Fine-scale exsolution of low-Ca pyroxene in augite. Point count of primary phases, 1000 points. Plagioclase-78%, clinopyroxene-21.3%, amphibole-0.6%, oxide minerals-0.1%.

Digital Photomicrograph #2: Brown hornblende x 10

179-1105A-1R-5 (Piece 10, 137.0 - 141.0 cm)
Thin section #: 86
ROCK NAME: Olivine gabbro
GRAIN SIZE: Coarse
TEXTURE: Granular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine		11.2	4-12		anhedral	dominantly strain-free, but locally deformation banded
Plagioclase		29.0	2-8		anhedral	granular intergrowth, deformation twins locally
Clinopyroxene		55.3		augite	anhedral	exsolution lamellae
Orthopyroxene		4.2				
Amphibole		0.2				
Opaque Minerals	trace	trace				inclusions
Sulfidestrace	trace					intergrown with oxides

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	trace	olivine	
Talc	trace	olivine	
Magnetite	trace	olivine	
Brown hornblende	trace	augite and opaque oxide	

COMMENTS:
Mode-point counted. 2000 points, 0.5 mm interval. Igneous texture. Granular intergrowth of olivine, augite, and plagioclase with incipient alteration of particularly olivine. Deformation bands in olivine. Oxide minerals are intergrown with sulfides and included in mostly olivine. Fine-scale exsolution of low-Ca pyroxene in augite. Some plagioclase grains show undulose extinction and deformation twins. Lack of zoning in plagioclase.

Digital Photomicrograph #3: Deformation bands in olivine x 2.5, x-nicols

179-1105A-2R-1 (Piece 6, 79.0 - 82.0 cm)
Thin section #: 87
ROCK NAME: Gabbro
GRAIN SIZE: Coarse
TEXTURE: Subhedral granular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	2	4	1-5		subhedral	
Plagioclase	57	59	0.5-6		euhedral-subhedral	lath-shaped, common deformation twins
Clinopyroxene	31	36	1-10		subhedral	oikocrystic
Opaque Minerals	0.5	0.5	0.2-0.5		anhedral	
Brown Hornblende	0.5	0.5	0.2		anhedral	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite	3	plagioclase/olivine/vein	
Smectite	3	plagioclase/olivine/clinopyroxene/vein	
Talc	1	olivine	
Actinolite	2	clinopyroxene	fibrous needles

COMMENTS:
Igneous texture. Lath-shaped plagioclase chadocrysts enclosed in large augite oikocrysts. Chadocrysts show plagioclase growth twins, whereas non-included plagioclase show predominantly deformation twins.

179-1105A-3R-1 (Piece 3, 51.0 - 54.0 cm)
Thin section #: 88
ROCK NAME: Olivine gabbro
GRAIN SIZE: Medium
TEXTURE: Granular to poikilitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	1	5	2-3		anhedral	granular
Plagioclase	50	60	1-8		subhedral	granular-included
Clinopyroxene	15	30	2-8	augite	subhedral	poikilitic

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Talc	5	olivine	
Chlorite	15	olivine, plagioclase, augite	
Actinolite	5	olivine	
Hornblende	9	augite	

COMMENTS:
Poikilitic augite with inclusions of subhedral plagioclase laths. Fine exsolution lamellae in augite. Felsic vein contains strongly zoned plagioclase and truncations followed by zoning of pre-existing plagioclase along vein margins. Recrystallization of augite to secondary augite is accompanied by a coarsening of the exsolution lamellae to irregular patches. Olivine is mostly replaced by chlorite, and amphiboles. Alteration of plagioclase to chlorite occurs along and as filling of penetrating cracks. Point count of primary phases, 1000 points. Plagioclase-65.8%, clinopyroxene-30.5%, olivine-2.6%, amphibole-1.1%.

Digital Photomicrograph #5: Sutured intergrowth of clinopyroxene x 5, x-nicols.
Digital Photomicrograph #6: Alteration of plagioclase along cracks x 10, x-nicols.
Digital Photomicrograph #12: Zoned plagioclase with bent twin lamellae.
Digital Photomicrograph #13 Zoned plagioclase with bent twin lamellae.
Digital Photomicrograph #14: Plagioclase within a vein with relict anorthitic cores with sodic rims.

179-1105A-3R-2 (Piece 1B, 16.0 - 20.0 cm)
Thin section #: 89
ROCK NAME: Olivine gabbro
GRAIN SIZE: Coarse
TEXTURE: Granular to poikilitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	0	7	10	4-10		subhedral-anhedral
Plagioclase	52	58	1-6		euhedral-subhedral	common deformation twins, undulose extinction
Clinopyroxene	30	34	1-8		anhedral	poikilitic
Opaque Minerals	trace	trace	<0.3		anhedral	
Brown Hornblende	1	1	0.1-0.2		anhedral	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Smectite	3	olivine/vein	
Chlorite	4	olivine/vein	
Actinolite	4	olivine/clinopyroxene	
Epidote	trace	vein	
Serpentine	3	olivine	
Talc	3	olivine	

COMMENTS:
Igneous texture. Olivine includes anhedral, rounded plagioclase grains (<0.8 mm). Olivine is completely replaced by alteration assemblages. Plagioclase is generally slightly zoned and is penetrated by thin veins of smectite plus chlorite. Brown hornblende generally fringes around the rim of clinopyroxene, but in places it is formed as patches in clinopyroxene. Clinopyroxene ranges from granular to poikilitic with euhedral to subhedral chadocrysts of plagioclase. Point count of primary phases, 1000 points. Plagioclase-62.3%, clinopyroxene-30.0%, olivine-7%, oxide minerals-0.7%.

Digital Photomicrograph #15 Oikocrystic twinned augite enclosing slender plagioclase laths.

179-1105A-3R-2 (Piece 9, 87.0 - 91.0 cm)
Thin section #: 90
ROCK NAME: Oxide gabbro
GRAIN SIZE: Fine
TEXTURE: Granular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Plagioclase	45	50	0.2-1.2		anhedral	granular
Clinopyroxene	10	40	0.2-4		subhedral	granular
Opaque Minerals	10	10	0.4		anhedral	interstitial

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Actinolite	30	pyroxene	
Hornblende	5	pyroxene and plagioclase	

COMMENTS:
Part of the primary pyroxene replaced by fine-grained, fibrous actinolite and relatively massive brown-green hornblende. Locally poikilitic texture with enclosed plagioclase laths. Recrystallized blocky pyroxene with little or no exsolution and oxide lamellae and unaffected by actinolitization. The oxide minerals occur interstitially with respect to silicates. Point count of primary phases, 1000 points. Plagioclase-55.7%, clinopyroxene-41.4%, oxide minerals-2.9%.

Digital Photomicrograph #7: Typical texture observed in thin section #90, x 10

179-1105A-4R-2 (Piece 1B, 43.0 - 46.0 cm)
Thin section #: 91
ROCK NAME: Olivine gabbro
GRAIN SIZE: Coarse
TEXTURE: Granular-poikilitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	5	10	4-6		anhedral	granular-interstitial
Plagioclase	70	70	4-8		anhedral-subhedral	granular to subhedral chadocrystic, significant zoning
Clinopyroxene	15	20	<8	augite	anhedral-subhedral	granular-interstitial to poikilitic to poikilitic
Opaque Minerals	trace	trace				spatially associated with pyroxene

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite	3	pyroxene, olivine	
Talc	2	olivine	
Actinolite	trace	chlorite, olivine	
Magnetite	trace	olivine	
Green Hornblende	trace		

COMMENTS:
Coarse-grained poikilitic mesocumulate. Extensive alteration of olivine and pyroxene not accompanied by deformation and recrystallization. Occasionally weak to strong core-rim zoning of plagioclase. Point count of primary phases, 1000 points. Plagioclase-69.4%, clinopyroxene-28.5%, olivine-2.9%.

179-1105A-4R-3 (Piece 3, 46.0 - 60.0 cm)
Thin section #: 92
ROCK NAME: Olivine gabbro
GRAIN SIZE: Medium
TEXTURE: Granular-poikilitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	15	20	0.5-5		anhedral	granular-poikilitic
Plagioclase	60	60	0.5-12		anhedral-subhedral	granular, included in poikilitic pyroxene
Clinopyroxene	20	20	0.5-8	augite	anhedral-subhedral	granular-poikilitic
Opaque Minerals	trace	trace	<0.1		anhedral	

SECONDARY MINERALOGY	PERCENT	REPLACING FILLING	COMMENTS
Actinolite1		olivine	
Talc	3	olivine	
Magnetite	1	olivine	
Chloritetrace		vein	

COMMENTS:
Granular to poikilitic texture without indication of mineral zoning. Augite and, to a lesser extent, olivine appear in granular to poikilitic textures. Fine lamellae of low-Ca pyroxene and Fe-Ti oxides were found in augite. Little recrystallization of augite to secondary pyroxene and actinolite occurs. Olivine is in part replaced by talc and magnetite. Point count of primary phases, 1000 points. Plagioclase-63.9%, clinopyroxene-22.6%, olivine-13.3%.

Digital Photomicrograph #8: Subhedral plagioclase included in poikilitic augite, x 2.5, x-nicols.
Digital Photomicrograph #16: Oikocryst of clinopyroxene with chadocrysts significantly smaller than adjacent plagioclase grains forming the bulk of the rock.

179-1105A-4R-4 (Piece 7, 57.0 - 62.0 cm)
Thin section #: 93
ROCK NAME: Oxide gabbro
GRAIN SIZE: Medium to coarse
TEXTURE: Subhedral granular with neoblastic growth of plagioclase along the grain boundaries

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	0	2	4-5		subhedral	
Plagioclase	52	56	0.4-13		euhedral-subhedral	deformation twins, undulatory extinction
Clinopyroxene	30	35	0.1-8		subhedral	
Opaque Minerals	6	5	1-5		anhedral	
Hornblende	2	2	1-4		anhedral	brownish to greenish
Apatite	3		1			

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Smectite	2	olivine/vein	
Plagioclase	trace	vein	
Actinolite	2	clinopyroxene	pale greenish to colorless
Talc	1	olivine	
Chlorite	1	olivine/vein	
Serpentine	1	olivine	

COMMENTS:
Largely igneous texture, but slightly recrystallized during ductile deformation. Plagioclase is penetrated by irregular veins composed mainly of green amphibole. Also, it is replaced along cleavages by amphibole and locally smectite. Deformation twins of plagioclase are widespread. Plagioclase shows strong undulose extinction and incipient recrystallization to small neoblasts nucleated along grain boundaries and subgrain boundaries in plagioclase porphyroclasts. Olivine is completely altered to talc+serpentine+opaque mineral ± chlorite. Fibrous, pale greenish to colorless amphibole replaces clinopyroxene extensively. Point count of primary phases, 1000 points. Plagioclase-47.9%, clinopyroxene, 36.3%, olivine 1.6%, oxide minerals-11.6%, apatite 2.3%.

Digital Photomicrograph #17: Neoblastic growth of plagioclase along the grain boundaries, x 2.5, crossed nicols.
Digital Photomicrograph #48: Apatite included in hornblende, x 5
Digital Photomicrograph #66: Titanite in vein in apatite x 40
Digital Photomicrograph #67: Titanite intergrown with magnetite x 40
Digital Photomicrograph #68: Titanite intergrown with magnetite x 40
Digital Photomicrograph #69: Fluid inclusion with vapor bubble adn halite daughter x 80

179-1105A-5R-1 (Piece 7, 115.0 - 118.0 cm)
Thin section #: 94
ROCK NAME: Porphyroclastic meta-oxide olivine gabbro
GRAIN SIZE: Fine to pegmatitic
TEXTURE: Porphyroclastic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	0	10	2-6		anhedral	granular, completely replaced
Plagioclase	74	77	0.05-40		anhedral	porphyroclasts and neoblasts, bimodal grain size
Clinopyroxene	5	5	4-10	augite	anhedral	granular
Opaque Minerals	5	5	<4	magnetite, ilmenite		interstitial
Hornblende	trace	trace				interstitial associated with oxide minerals
Apatite	3	3				

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite	4	augite, plagioclase	
Green hornblende	1	plagioclase	
Actinolite	1	olivine	
Talc	5	olivine	
Magnetite	2	olivine	

COMMENTS:
The section displays a tectonite texture. The section is dominated by large pegmatitic-sized grains of plagioclase that are highly strained, and show undulose extinction . Very fine neoblastic plagioclase is found in the matrix, which represents approximately 20% of the section. Olivine is completely replaced by talc, actinolite, and magnetite. Chlorite and hornblende are filling several generations of crosscutting veins in plagioclase. The primary oxide minerals occur along grain boundaries or orientated in irregular seams. Compositionally, they are magnetite with exsolved ilmenite and few grains of granular ilmenite. Disseminated sulfide is found associated with the oxides. Point count of primary phases, 1000 points. Plagioclase-81.6%, clinopyroxene, 9.1%, oxide minerals-7.6%. apatite 1.3%, amphibole-0.4%.

Digital Photomicrograph #9: Pyroxene-pyroxene replacement texture, x 5, x-nicols
Digital Photomicrograph #10: Exsolution lamellae of ilmenite in magnetite, x 10
Digital Photomicrograph #11: Granular intergrowth of ilmenite, x 20
Digital Photomicrograph #49: Deformation band, x 2.5, x-nicols

179-1105A-5R-1 (Piece 9, 144.0 - 147.0 cm)
Thin section #: 95
ROCK NAME: Mylonitic meta-oxide olivine gabbro
GRAIN SIZE: Bimodal
TEXTURE: Porphyroclastic mylonitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	3	5	0.02-.05		equant	neoblasts
Plagioclase	58	58	0.01-2.0		equant to elongate	neoblasts and porphyroclasts
Clinopyroxene	20	25	0.02-2.8	augite	equant to subrounded	neoblasts and porphyroclasts
Opaque Minerals	12	12	0.01-.4		equant	neoblasts

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Brown-green amphibole	5	clinopyroxene	
Chlorite	2	olivine	

COMMENTS:
The thin section displays a tectonite texture, a porphyroclastic mylonitic texture. The composition of the protolith is likely to have been an oxide-gabbro although the igneous texture is no longer present, except as relics in some larger porphyroclasts. The recrystallized matrix consists dominantly of plagioclase and opaque oxide minerals with lesser amounts of olivine, pyroxene, and brown and green amphibole. The porphyroclasts consist of dominantly clinopyroxene and some plagioclase. Porphyroclasts are generally not highly strained. Some porphyroclasts are marginally recrystallized into coarser neoblasts than those that reside in the fine-grained matrix. In some cases relict porphyroclasts forms are discernable even though the porphyroclasts have recrystallized to a mosaic of equant plagioclase neoblasts. These are coarser neoblast sizes than in the remaining matrix. Neoblasts of plagioclase generally show undulose extinction. Some of the opaque oxides are found as subhedral inclusions (chadocrysts) and as exsolution lamellae in porphyroclastic plagioclase and clinopyroxene indicating that opaque oxides were formed together in equilibrium with the silicate minerals and were not introduced later.

Digital Photomicrograph #19. Clinopyroxene porphyroclasts in the finer grained matrix of recrystallized plagioclase and opaque oxides (color, x2.5, polarized light).
Digital Photomicrograph #20. Clinopyroxene porphyroclasts in the finer grained matrix of recrystallized plagioclase and opaque oxides showing high proportion of oxides in matrix (black and white, x 2.5,transmitted light).
Digital Photomicrograph #21. Coarser plagioclase neoblasts with finer neoblasts (color, x 2.5, polarized light).
Digital Photomicrograph #22. Marginally recrystallized porphyroclast of plagioclase (color, x 2.5, polarized light).
Digital Photomicrograph #23. Slippage between recrystallized porphyroclasts, also magnetite. x 2.5

179-1105A-5R-2 (Piece 6, 55.0 - 58.0 cm)
Thin section #: 96
ROCK NAME: Gabbro
GRAIN SIZE: Medium
TEXTURE: Granular-poikilitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Plagioclase	54.8	55.2	2-8		anhedral	mild zoning in rims
Clinopyroxene	42	44.8	2-12	augite	anhedral	granular-poikilitic
Opaque Minerals	trace	trace	<0.2		anhedral	disseminated along grain boundaries
Brown Hornblende	trace	trace	<0.2		anhedral	along oxide-pyroxene grain boundaries and in-cluded in pyroxene

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite		plagioclase, pyroxene	filling several generations of thin veins
Talc		pyroxene, olivine	
Magnetite		pyroxene	
Actinolite		pyroxene	

COMMENTS:
Point counted mode, 1800 points, 0.5 mm interval. All the secondary minerals constitute 3.2% in mode. The section displays an igneous texture. Granular texture of augite and plagioclase with larger poikilitic pyroxene. Plagioclase is zoned locally and show minor coarse recrystallization. Marginal replacements of pyroxene (and olivine?) by a fine intergrowth of chlorite, talc, and magnetite.

179-1105A-6R-2 (Piece 2, 32.0 - 36.0 cm)
Thin section # 97
ROCK NAME: Olivine gabbro
GRAIN SIZE: Coarse
TEXTURE: Granular to slightly poikilitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	0	5	8		anhedral	completely replaced
Plagioclase	70	70	<12		anhedral	granular texture with marginal neocrystallization
Clinopyroxene	25	25	2-12	augite	anhedral	granular to slightly poikilitic
Opaque Minerals	trace	trace	<0.5			
Brown Hornblende	trace	trace	<0.1			

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite	3	plagioclase, olivine	
Actinolite	0.5	chlorite	
Talc	1	olivine	
Magnetite	0.5	olivine	

COMMENTS:
The section largely displays igneous textures, but shows some recrystallization of plagioclase to fine neoblasts (< 5% of plagioclase). Plagioclase characterized by undulose extinction and bent deformation twins. Augite commonly characterized by bent exsolution lamellae and undulose extinction. The oxide minerals occur interstitially along grain boundaries. Brown hornblende is found as minute replacements of augite and along margins not always located with the oxides. Olivine is completely replaced by a chlorite - clay intergrowth. Point count of primary phases, 1000 points. Plagioclase-67.3%, clinopyroxene-31.7%, olivine-0.1%, oxide minerals-0.9%.

179-1105A-7R-3 (Piece 2, 33.0 - 36.0 cm)
Thin section #: 98
ROCK NAME: Porphyroclastic meta-oxide gabbro
GRAIN SIZE: Fine to coarse, bimodal
TEXTURE: Porphyroclastic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Plagioclase	30	53	8-0.3		elongate-equant	highly strained porphyroclasts, strong undulatory extinction
Clinopyroxene	22	30	8-0.3		anhedral	mildly strained
Orthopyroxene	1	2	1-3		anhedral	undulatory extinction, clinopyroxene exsolution lamellae
Hornblende	5	5	<2		anhedral	brownish
Opaque Minerals	10	10	<5		anhedral	
Apatite	trace	trace	1		anhedral	
Zircon	trace					

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Smectite	2		
Plagioclase	23	plagioclase	
Amphibole	5		greenish
Talc	1	orthopyroxene	

COMMENTS:
The section displays tectonite textures. Large porphyroclasts of plagioclase and clinopyroxene are set in a fine-grained, foliated groundmass of plagioclase, clinopyroxene and magnetite neoblasts. Plagioclase porphyroclasts show deformation twins and strong undulatory extinction and define a strong shape-preferred orientation and fabric, while the smallest neoblasts are relatively unstrained and equant. Clinopyroxene porphyroclasts are relatively strain free and define only a weak shape-preferred orientation and fabric. Porphyroclasts make up approximately 50% of the thin section, the remainder is a fine-grained recrystallized matrix. Point count of primary phases, 1000 points. Plagioclase-65.9%, clinopyroxene-19.5%, oxide minerals-14.4%.

179-1105A-7R-4 (Piece 7, 30.0 - 33.0 cm)
Thin section #: 99
ROCK NAME: Meta-olivine gabbro
GRAIN SIZE: Medium
TEXTURE: Equigranular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	3.6	3.9	2-4		anhedral-interstitial	kink-banded
Plagioclase	65.0	68.3	<6		anhedral	granular, undulose extinction, locally neoblastic
Clinopyroxene	23.2	27.8	<4	augite	anhedral	
Opaque Minerals	trace	trace				
Brown hornblende	trace	trace				
Zircon trace						

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Mica	trace		Orange-brown phlogopite?
Actinolite	1	olivine, pyroxene	
Chlorite	3	olivine, pyroxene, plagioclase	
Magnetite	1	olivine, pyroxene	
Serpentine	3	olivine	

COMMENTS:
Mode point counted, 1800 points, 0.5 mm interval. The section displays tectonite textures. Intensely deformed and recrystallized with localized veins and zones of very fine-grained neoblastic plagioclase (10.4% of the section, 15% of the plagioclase). Plagioclase and olivine show sutured grain boundaries. Olivine characterized by kink banding. Plagioclase shows undulatory extinction and bent deformation twins. Rims around most mafic phases are replaced with secondary minerals including actinolite, chlorite, magnetite, and mica. Point count of primary phases, 1000 points. Plagioclase-66.4%, clinopyroxene-28.3%, olivine-5.0%.

Digital Photomicrograph #24: Mica, x 10

179-1105A-8R-1 (Piece 7, 68.0 - 70.0 cm)
Thin section #:100
ROCK NAME: Gabbro/ Foliated meta-orthopyroxene oxide microgabbro
GRAIN SIZE: Fine to medium (bimodal)
TEXTURE: Subhedral granular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	0	trace	1		subhedral	completely altered to talc+opaque mineral
Plagioclase	60	61	0.05-6		subhedral-anhedral	undulatory extinction, deformation twins
Clinopyroxene	19	22	0.05-4		subhedral-anhedral	
Orthopyroxene	4	5	0.05-2		subhedral	exsolution lamellae and blebs of clinopyroxene
Hornblende	5	5	0.1-1		subhedral	brownish
Opaque Minerals	7	7	<0.2		anhedral	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Talc	2	orthopyroxene/olivine	
Amphibole	3	orthopyroxene/clinopyroxene	colorless, fibrous

COMMENTS:
This thin section is made across two distinct portions with different grain size distributions; i.e., fine- and medium-grained portions. The contact between them is sharp, but there is no significant difference in mineralogy, except that there are ore oxide minerals in the finer grained portion. The coarser grained portion shows remnant igneous textures, whereas the finer grained portion is a tectonite with fine-grained equigranular texture with some smaller remnant porphyroclasts. It has a well-defined foliation subparallel to the contact. The foliation is defined by the preferred dimensional orientation of plagioclase, pyroxene, and lenses of opaque minerals.

179-1105A-8R-3 (Piece 4, 53.0 - 56.0 cm)
Thin section #: 101
ROCK NAME: Gabbro with anorthositic layer
GRAIN SIZE: Medium-grained
TEXTURE: Granular to poikilitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Plagioclase	50	50	<4		subhedral to anhedral	granular to interlocking
Clinopyroxene	40	50	<5	augite	anhedral-subhedral	granular-poikilitic, recrystallization
Opaque minerals	trace	trace				interstitial
Brown hornblende	trace	trace				

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Green-brown hornblende	10	pyroxene, plagioclase	

COMMENTS:
The section displays igneous textures. The thin section shows a contact between medium-grained melanocratic and coarse-grained leucocratic layer (~8 mm average grain size for the latter). The leucocratic layer is a granular anorthosite with few interstitial to irregular oxide minerals. The feldspar is highly clouded. The melanocratic layer is a mafic layer with granulate to interstitial textures. Plagioclase shows mutual interlocking grain boundaries and is commonly strongly zoned with more albitic rims. Pyroxene shows neocrystallization and some pyroxene grains are composed of complex granular intergrowths of two clinopyroxenes. Symplectic decomposition of pyroxene (or reaction between pyroxene and plagioclase) are often seen (undetermined phases). Extensive replacement of augite to green-brown hornblende. Point count of primary phases, 1000 points. Plagioclase-49.1%, clinopyroxene-49.0%, oxide minerals-0.7%, amphibole-1.2%.

Digital Photomicrograph #25: Symplectic replacement of augite x 10, x-nicols
Digital Photomicrograph #26: Two pyroxene intergrowth x 2.5, x-nicols

179-1105A-9R-1 (Piece 7, 82.0 - 86.0 cm)
Thin section #: 102
ROCK NAME: Gabbro
GRAIN SIZE: Fine to medium
TEXTURE: Subhedral granular, weakly foliated

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	0.5	1	1		subhedral	
Plagioclase	61	61	0.2-3		subhedral	deformation twins, undulatory extinction
Clinopyroxene	30	35	0.5-5		subhedral	exsolution lamellae
Opaque Minerals	2	2	<0.3		anhedral	
Hornblende	1	1	<0.4		anhedral	brownish

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Smectite	2	olivine, clinopyroxene	
Actinolite	3	clinopyroxene	colorless to pale greenish
Talc	0.5	olivine	
Serpentine	trace.	olivine	

COMMENTS:
The section displays igneous textures with some local recrystallization. This sample is inequigranular and shows weakly developed foliation with subparallel alignment of plagioclase and clinopyroxene crystals. Also, it shows alternating fine-grained and medium-grained layers. Only a few grains of clinopyroxene are ophitically intergrown with plagioclase. Olivine is extensively altered to talc+smectite+opaque minerals; in many places, this alteration assemblage is charged with nearly opaque, dusty cryptocrystalline material. An aggregate of olivine crystals (ca. 3 mm across) occurs at the edge of thin section. Clinopyroxene shows a fringe of brown hornblende and colorless to pale greenish amphibole. Some grains of the opaque mineral is rimmed with brown hornblende. Plagioclase shows moderate zoning. Point count of primary phases, 1000 points. Plagioclase-50.3%, clinopyroxene-48.5%, oxide minerals-0.6%, amphibole-0.6%.

Digital Photomicrograph #30: An aggregate of olivine crystals.

179-1105A-9R-4 (Piece 1, 12.0 - 16.0 cm)
Thin section #: 103
ROCK NAME: Oxide-bearing olivine gabbro
GRAIN SIZE: Medium
TEXTURE: Granular to slightly poikilitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	20	20	<10		anhedral	granular to interstitial
Plagioclase	60	60	<6		anhedral	granular
Clinopyroxene	20	20	<10		anhedral	granular to interstitial
Opaque Minerals	<1	<1	<0.5			disseminated

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite	trace		

COMMENTS:
The section displays an igneous texture. Oxide minerals are disseminated throughout the section as <0.5 mm grains. Plagioclase shows undulatory extinction and some extensive core-rim zoning. Deformation twins are present. The mafic phases often occur interstitially between plagioclase crystals. Little secondary replacements. The texture indicates a meso- to orthocumulate texture. Point count of primary phases, 1000 points. Plagioclase-61.6%, clinopyroxene-20.5%, olivine-16.9%, oxide minerals-1.0%.

179-1105A-10R-1 (Piece 3A, 38.0 - 42.0 cm)
Thin section #: 104
ROCK NAME: Gabbro
GRAIN SIZE: Medium
TEXTURE: Granular to poikilitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	1	2	<1		anhedral	granular intergrowth
Plagioclase	60	60	<6		anhedral	
Clinopyroxene	37	37	4-10	augite	anhedral	magmatic twinning
Opaque Minerals	trace	trace				disseminated
Brown Hornblende	trace	trace			interstitial	corona

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite	trace	pyroxene, plagioclase	
Green Hornblende	1	pyroxene	
Iddingsite	trace	olivine	
Talc	trace	olivine, pyroxene	
Actinolite	trace	chlorite	
Magnetite	1	olivine	

COMMENTS:
The thin section displays an igneous texture with some local deformation and alteration induced recrystallization. Olivine-bearing gabbro with augite ranging texturally from granular to interstitial and showing sign of neocrystallization to a secondary pyroxene. Plagioclase often has interlocking plagioclase-plagioclase boundaries and is granular and distinctly finer grained than pyroxene. Weak core-rim zonation is present in both plagioclase and clinopyroxene. Olivine is replaced with an aggregate of granular and fine-grained olivine. Moderate metamorphism and deformation evidenced by the recrystallization of olivine and plagioclase. The texture appears to be mesocumulate. Point count of primary phases, 1000 points. Plagioclase-61.0%, clinopyroxene-37.1%, olivine-1.5%, oxide minerals-0.4%.

Digital Photomicrograph #28: Corona reactions around pyroxene, x 10
Digital Photomicrograph #29: Recrystallization of olivine to granular aggregate, x 5, x-Nicols

179-1105A-10R-2 (Piece 7, 85.0 - 88.0 cm)
Thin section #: 105
ROCK NAME: Oxide gabbro
GRAIN SIZE: Medium to coarse
TEXTURE: Subhedral granular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Plagioclase	51	52	0.3-16		subhedral-anhedral	deformation twins, undulatory extinction
Clinopyroxene	34	40	0.4-8		subhedral-anhedral	exsolution lamellae
Opaque Minerals	8	8	<8			

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Smectite	1	plagioclase, clinopyroxene	
Plagioclase	1	plagioclase	
Amphibole	5	clinopyroxene	colorless, greenish, brownish

COMMENTS:
The thin section displays an igneous texture. Large crystals of clinopyroxene are rimmed with and penetrated by greenish to colorless amphibole; in places, the amphibole shows a brownish tint. Patchy brown hornblende occurs within clinopyroxene grains. A few crystals of clinopyroxene show a herringbone texture with {001} exsolution lamellae. Plagioclase shows veins and cracks filled with green amphibole, smectite, and plagioclase. Point count of primary phases, 1000 points. Plagioclase-37.1%, clinopyroxene-49.3%, oxide minerals-12.8%, amphibole-0.8%.

Digital Photomicrograph #34: Clinopyroxene with {001} exsolution lamellae.

179-1105A-11R-2 (Piece 7, 51.0 - 54.0 cm)
Thin section #:106
ROCK NAME: Oxide olivine gabbro
GRAIN SIZE: Fine to medium
TEXTURE: Granular, weakly foliated

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	3	5	0.2-4		subhedral-anhedral	deformation bands, undulatory extinction
Plagioclase	48	50	0.2-10		subhedral-anhedral	deformation twins, undulatory extinction
Clinopyroxene	30	32	02-6		subhedral-anhedral	exsolution lamellae
Opaque Minerals	10	10	0.1-0.5		anhedral	
Hornblende	2	2	0.1-0.5		anhedral	
Apatite	1	1	0.2-1		subhedral	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Smectite	2	olivine, vein	
Plagioclase	2	plagioclase	
Talc	1	olivine	
Amphibole	2	clinopyroxene, vein	pale green to colorless

COMMENTS:
The thin section displays an igneous texture with local recrystallization. Recrystallized plagioclase crystals (neoblasts) occur along the boundaries between strained plagioclase grains. Clinopyroxene shows a fringe of brown hornblende. Also, patchy hornblende replaces the interior of clinopyroxene grains. Brown hornblende is rimmed with fibrous, colorless amphibole. There is an aggregate (ca. 5 mm across) composed of many olivine grains at the edge of thin section. Point count of primary phases, 1000 points. Plagioclase-44.7%, clinopyroxene-36.1%, olivine-5.6%, oxide minerals-12.5%, amphibole-0.3%, apatite-0.8%.

179-1105A-11R-2 (Piece 12, 129.0 - 133.0 cm)
Thin section #: 107
ROCK NAME: Oxide olivine gabbro
GRAIN SIZE: Medium
TEXTURE: Equigranular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	5.3	14.9	10		anhedral	fractured and altered along fractures and grain boundaries
Plagioclase	44.8	47.4	10		subhedral	drusy alteration, also altered along fractures
Clinopyroxene	19.8	16.1	10		anhedral	moderately altered
Fe-Ti oxide	11.6	11.6				ilmenite exsolution in blebs and lamellae

SECONDARY MINERALOGY	REPLACING/ FILLING	COMMENTS
Clays	plagioclase	
Plagioclase	plagioclase	
Blue green amphibole	clinopyroxene and plagioclase	acicular blades
Brown amphibole	clinopyroxene	with blue green amphibole
Chlorite	olivine and plagioclase	in sheaves and fans
Magnetite	olivine	
Talc	olivine	
Iddingsite	olivine	red brown alteration associated with magnetit and talc

COMMENTS:
The thin section displays an igneous texture. Point-counted mode, 1800 points, 0.5 mm interval. All the secondary minerals constitute 18.5% in mode. Olivine is moderately altered. Where fresh it has distinct undulose extinction but no distinct subgrain development. Olivine occurs in clusters and as individual crystals. The clusters are relatively fresh, but most of the individual grains are pervasively altered. Oxides occur in seams, both mimicking silicate grain boundaries and replacing apparently resorbed parts of silicate grains. One grain of plagioclase shows sector zoning.

Digital Photomicrograph # 18 shows ilmenite exsolution.

179-1105A-12R-1 (Piece 13, 106.0 - 108.0 cm)
Thin section #: 108
ROCK NAME: Olivine gabbro
GRAIN SIZE: Medium
TEXTURE: Inequigranular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	7.0	8.8	14		amoeboidal	fractured, very fine grained magnetite along fractures
Plagioclase	60.8	61.1	12			very fresh, some subophitically enclosed in clinopyroxene
Clinopyroxene	28.2	29.7	24		subophitic	fresh, only minor alteration along grain boundaries
Fe-Ti oxide	trace					
Sulfides	trace					along fractures as rounded to acicular grains pyrite>chalcopyrite>pyrrhotite

SECONDARY MINERALOGY	REPLACING/ FILLING	COMMENTS
Clays	plagioclase	
Plagioclase	plagioclase	
Brown-green amphibole	clinopyroxene, olivine	along fractures and grain boundaries
Chlorite	plagioclase, olivine, clinopyroxene	in fans along grain contacts

COMMENTS:
Point-counted mode, 1690 points, 0.5 mm intervals. All the secondary minerals constitute 4.0% in mode. The thin section displays an igneous texture (i.e., medium-grained mesocumulate texture). Plagioclase shows significant zoning locally and twin planes rarely exhibit some evidence of strain. Olivine exhibits alteration rims and patches and development of subgrain boundaries.

179-1105A-12R-2 (Piece 5, 50.0 - 53.0 cm)
Thin section #: 109
ROCK NAME: Olivine gabbro
GRAIN SIZE: Fine
TEXTURE: Granular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	10	10	<1		anhedral	granular
Plagioclase	60	60	<3		anhedral	granular-elongated
Clinopyroxene	30	30	<2	augite	anhedral	granular
Brown Hornblende	trace	trace				reaction coronas

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite	trace		

COMMENTS:
The thin section displays an igneous texture. Fine-grained gabbro with distinct igneous lamination defined by both plagioclase and mafic minerals (microgabbro). The general texture is granular with a relatively even distribution in grain size. Plagioclase is generally unzoned, but examples of complex zoning patterns occur. Little alteration and recrystallization effect is seen. Point count of primary phases, 1000 points. Plagioclase-55.4%, clinopyroxene-24.3%, olivine-16.9%.

Digital Photomicrograph #35: Igneous lamination, x 2.5
Digital Photomicrograph #36: Complex zoning of plagioclase, x 5, x-nicols
Digital Photomicrograph #52: Igneous lamination, x 2.5
Digital Photomicrograph #53: Plagioclase zoning and igneous lamination, x 2.5
Digital Photomicrograph #54: Igneous lamination, x 2.5

179-1105A-12R-2 (Piece 15, 123.0 - 127.0 cm)
Thin section #: 110
ROCK NAME: Gabbro and olivine gabbro (two components)
GRAIN SIZE: Fine to medium
TEXTURE: Subhedral granular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	2	3	0.1-1.5		subhedral-anhedral	deformation bands, undulatory extinction
Plagioclase	62	62	0.2-2		subhedral-anhedral	rare deformation twins
Clinopyroxene	33.5	34	0.1-2		subhedral-anhedral	exsolution lamellae
Opaque Minerals	1	1	<0.3		anhedral	
Hornblende	trace	trace	0.3		anhedral	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Serpentine	0.5		
Talc	1		

COMMENTS:
The thin section displays an igneous texture. This sample is very fresh; alteration is mostly confined to olivine crystals. Clinopyroxene shows a fringe of pale brownish amphibole. The specimen from which the thin section made is composed of two domains (i.e., fine- and medium-grained domains). The boundary between them is rather sharp. The fine-grained domain shows weak foliation with subparallel alignment of olivine, clinopyroxene, and plagioclase, while the medium-grained domain is isotropic. Point count of primary phases, medium-grained domain, 1000 points. Plagioclase-59.9%, clinopyroxene-35.4%, olivine-4.7%; fine-grained domain, 518 points. Plagioclase-61.0%, clinopyroxene-20.1%, olivine-15.4%, amphibole-3.5%.

179-1105A-13R-1 (Piece 3A, 24.0 - 26.0 cm)
Thin section #: 111
ROCK NAME: Olivine gabbro
GRAIN SIZE: Medium with fine-grained layer
TEXTURE: Granular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	5	15	2-4		anhedral	granular, highly replaced by secondary minerals
Plagioclase	60	60	1-4		anhedral	granular
Clinopyroxene	20	25	2-3	augite	anhedral-subhedral	granular to slightly poikilitic
Brown Hornblende	trace	trace				rims around pyroxene

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite	7	olivine, pyroxene, plagioclase	
Talc	3	olivine	
magnetite	2	olivine	
Actinolite	3	chlorite	

COMMENTS:
Composite thin section of medium-grained olivine gabbro in contact with a 15 mm thick (maximum) band or lens of fine-grained olivine gabbro (<0.5 mm average grain-size). The contact between the two parts are gradational. Alteration is more extensive for olivine and clinopyroxene in the coarser gabbro. The thin section displays an adcumulus texture with lack of zoning in plagioclase. Very mild crystal-plastic deformation displayed by undulose extinction and deformation twins in plagioclase.

179-1105A-13R-1 (Piece 3D, 87.0 - 90.0 cm)
Thin section #: 112
ROCK NAME: Olivine gabbro
GRAIN SIZE: Medium
TEXTURE: Subhedral granular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	8	10	0.8-4		subhedral-anhedral	undulatory extinction, 2Vx=ca. 85°
Plagioclase	54	55	0.2-6		subhedral-anhedral	rare deformation twins
Clinopyroxene	30	31	0.4-4		subhedral-anhedral	exsolution lamellae
Opaque Minerals	3	3	0.2-0.4		anhedral	
Hornblende	1	1	0.2-0.4			

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Talc	2	olivine	
Chlorite	0.5	vein, plagioclase	
Smectite	0.5	olivine, vein	
Actinolite	1	clinopyroxene, olivine, plagioclase	

COMMENTS:
This specimen shows weak alteration; alteration is mostly confined to olivine crystals. Fractures and cleavages in olivine grains are filled by opaque mineral along with talc and smectite. The opaque mineral in the olivine pseudomorphs tend to be finer grained. Plagioclase is slightly zoned. Some clinopyroxene crystals are poikilitically enclosing olivine and plagioclase crystals. The section displays an adcumulus texture with magmatic twins in plagioclase preserved. There is no clear magmatic lamination. Mild undulose extinction and deformation twinning of plagioclase is locally present. Point count of primary phases, 1000 points. Plagioclase-56.7%, clinopyroxene-32.8%, olivine-10.0%, oxide minerals-0.5%.

179-1105A-13R-3 (Piece 3, 38.0 - 42.0 cm)
Thin section #: 113
ROCK NAME: Gabbro
GRAIN SIZE: Fine
TEXTURE: Granular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	1	2	<2		anhedral	granular
Plagioclase	70	70	<2		anhedral	granular
Clinopyroxene	30	30	<1.5	augite	anhedral	granular
Opaque Minerals	trace	trace				disseminated
Brown Hornblende	trace	trace				reaction rims, included in pyroxene

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Green-brown Hornblende	trace	pyroxene	
Chlorite	trace	pyroxene, olivine, plagioclase	
Magnetite	trace	olivine	

COMMENTS:
Composite thin section mainly with a fine-grained olivine gabbro with granular texture on which the description is based. The rest is a medium-grained granular to intergranular oxide olivine gabbro. The oxides in the latter occur as interstitial phases and are dominantly ilmenite with subordinate titanomagnetite (with ilmenite exsolution lamellae). Plagioclase in both parts shows granular neocrystallization, interlocking grain boundaries, and some degree of undulatory extinction and deformation twinning. The plagioclase neocrystallization is localized along shear bands in the oxide gabbro. Recrystallized plagioclase shows serrated grain boundaries. The thin section displays an igneous texture overall, but with highly strained plagioclase and incipient recrystallization where oxide minerals are present. Point count of primary phases, 1000 points. Plagioclase-57.4%, clinopyroxene-39.6%, olivine-1.9%, oxide minerals-0.9%, amphibole-0.2%.

179-1105A-13R-3 (Piece 6, 79.0 - 82.0 cm)
Thin section #: 114
ROCK NAME: Olivine gabbro
GRAIN SIZE: Medium
TEXTURE: Equigranular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	6.5	7.7	10		rounded, anhedral	fresh, some fractures lined with very fine grained oxides
Plagioclase	56.2	56.4	40		tabular to equant	An 50 (Michel-Levy)
Clinopyroxene	35	35.8	40		ophitic to subophitic	
Fe-Ti oxides	trace				interstitial	
Sulfidestrace					interstitial, inclusions	pyrrhotite>chalcopyrite>pyrite by volume

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Magnetite	trace	Olivine	
Chlorite	trace	Plagioclase and clinopyroxene	

COMMENTS:
Point-counted mode, 1800 points, 0.5 mm interval. Olivine poikilitically encloses small chadacrysts of plagioclase. Rare subgrain development, only minor alteration along fractures. Olivine occurs in clusters and as single grains, some approaching subhedral habit. Clinopyroxene encloses plagioclase grains which are smaller and more tabular than the average plagioclase in the section (see Digital Photomicrograph #27). Some plagioclase has vague radial extinction. The section displays a pristine igneous texture with random orientation of elongate plagioclase laths. Minor undulose extinction and lack of zoning in plagioclase.

179-1105A-14R-1 (Piece 3A, 42.0 - 45.0 cm)
Thin section #: 115
ROCK NAME: Olivine gabbro
GRAIN SIZE: Medium
TEXTURE: Granular-poikilitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	10	10	1-2		anhedral	granular-rounded
Plagioclase	60	60	1-4		anhedral	granular
Clinopyroxene	30	30	1-6	augite	anhedral-subhedral	granular-interstitial
Opaque Minerals	trace	trace				disseminated

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS

Little secondary replacements

COMMENTS:
Poikilitic olivine gabbro without significant visible zoning (poikilitic adcumulate). Olivine is distinctly smaller than plagioclase and pyroxene and have dominantly a rounded habit. Thin section shows a lack of alteration and deformation features. Lack of zoning in plagioclase suggests an adcumulate texture with random orientation of plagioclase laths. There is a general lack of undulose extinction or deformation twins in plagioclase. Point count of primary phases, 1000 points. Plagioclase-54.7%, clinopyroxene-34.7%, olivine-10.6%.

179-1105A-14R-3 (Piece 7, 91.0 - 94.0 cm)
Thin section #: 116
ROCK NAME: Foliated meta-olivine gabbro
GRAIN SIZE: Fine to medium
TEXTURE: Granular-mildly porphyroclastic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	11	15	0.1-0.5		anhedral	deformation bands, recrystallized
Plagioclase	60	60	0.2-0.6		anhedral	undulose extinction and deformation twinning
Clinopyroxene	15	25	0.2-4.0		anhedral	undulose extinction, two directions of exsolution
Opaque Minerals	1	<1	0.01-0.2		anhedral	mainly alteration product of olivine

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Magnetite	1	olivine	
Serpentine	2	olivine	
Actinolite	8	clinopyroxene	
Brown hornblende	3	clinopyroxene	

COMMENTS:
This specimen appears almost entirely recrystallized. Plagioclase shows undulose extinction, deformation twinning and neoblastic mosaic texture. Olivine has recrystallized to equant fine -grained clusters and most of the clinopyroxene has also recrystallized. Some clinopyroxene porphyroclasts with {100} magmatic twins are present, but minor. Point count of primary phases, 1080 points. Plagioclase-56.4%, clinopyroxene-33.9%, olivine-8.4%, amphibole-1.0%.

179-1105A-15R-1 (Piece 13, 113.0 - 116.0 cm)
Thin section #: 117
ROCK NAME: Olivine gabbro and oxide gabbro (two components)
GRAIN SIZE: medium to coarse
TEXTURE: Granular-poikilitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	10	10	0.5-1		anhedral	granular-rounded
Plagioclase	55	55	1-5		anhedral	granular
Clinopyroxene	35	35	1-4	augite	anhedral-subhedral	granular-poikilitic

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS

Little secondary replacements

COMMENTS:
The section is composed of two different rocks types and displays a layer contact. The primary and secondary mineralogy described above are based on the most abundant medium-grained olivine gabbro (poikilitic adcumulate). The medium-grained olivine gabbro shows little secondary replacements and deformation. The less abundant (~10 mm) of the section is a coarse-grained oxide gabbro without olivine (typical grain-sizes are plagioclase 2-8 mm, pyroxene 2-8 mm, oxides 2-8 mm). The coarse-grained part is modally 40 % pyroxene, 40 % plagioclase, 20 % Fe-Ti oxides, and minor sulfides. The Fe-Ti oxides are composed of a granular intergrowth of 70 % ilmenite (without hematite lamellae) and 30 % titanomagnetite (with abundant ilmenite lamellae). The oxides occur as interstitial growths with pyroxene and plagioclase. Some secondary replacements occur in the coarse layer as actinolite and chlorite. Olivine in the medium-grained part is near the contact with the coarse-grained part replaced by iddingsite. Deformation is minimal and restricted to undulose extinction of plagioclase. Localized recrystallization of plagioclase in oxide -rich zones. Plagioclase shows a lack of core-rim zoning. Point count of primary phases in olivine gabbro domain, 917 points. Plagioclase-53.4%, clinopyroxene,-35.7%, olivine-10.7%.

179-1105A-15R-2 (Piece 9A, 71.0 - 74.0 cm)
Thin section #: 118
ROCK NAME: Porphyroclastic microgabbro
GRAIN SIZE: Fine
TEXTURE: Porphyroclastic with a granular matrix

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	3	5	0.2-0.5		subhedral-anhedral	
Plagioclase	50	50	0.1-1.5		subhedral-anhedral	
Clinopyroxene	37	40	0.2-6		subhedral-anhedral	
Opaque Minerals	4	4	<1.5		anhedral	
Hornblende	1	1	<1		anhedral	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Smectite	1	olivine, clinopyroxene	
Talc	2	olivine	
Actinolite	2	clinopyroxene	pale green

COMMENTS:
The thin section displays a weak tectonite texture consisting of a coarse bimodal grain sizes. The texture consists of coarse (up to 6 mm) porphyroclasts of nearly nondeformed clinopyroxene with a dominantly coarsely recrystallized (~1 mm) plagioclase neoblast matrix. Plagioclase shows a coarse mosaic texture with polygonal grains and many 120° triple junctions. Clinopyroxene occurs both as porphyroclasts and groundmass mineral. All the three phases (i.e., olivine, plagioclase, and clinopyroxene) occur in the groundmass. Clinopyroxene porphyroclasts are subhedral, but do not show planar crystal faces. Some of the clinopyroxene porphyroclasts ophitically enclose euhedral to subhedral plagioclase laths that do not show deformation effects. The rock possesses little preferred dimensional orientation even though recrystallized to a bimodal grain size texture. Point count of primary phases, 1042 points. Plagioclase-53.3%, clinopyroxene-38.8%, olivine-3.6%, oxide minerals-3.8%, amphibole-0.2%.

179-1105A-15R-3 (Piece 8, 83.0 - 86.0 cm)
Thin section #: 119
ROCK NAME: Gneissic oxide olivine gabbro
GRAIN SIZE: Fine to coarse: bimodal
TEXTURE: Porphyroclastic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	8	12	0.3-0.5			anhedral neoblasts
Plagioclase	60	60	0.2-5		anhedral	porphyroclasts and neoblasts
Clinopyroxene	20	23	0.2-3		anhedral	pink, pleochroic, {100} magmatic twins in porphyroclasts
Opaque Minerals	5	5	0.3-.0.5		anhedral	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Talc	1	olivine	
Serpentine	3	olivine	
Actinolite	3	clinopyroxene	
Brown hornblende	Trace	clinopyroxene	

COMMENTS:
Porphyroclastic texture represented by porphyroclasts of clinopyroxene and plagioclase surrounded by a fine-grained matrix of plagioclase, olivine, clinopyroxene and opaque oxide minerals. Plagioclase porphyroclasts are highly strained with strong undulose extinction, lack of magmatic twins, but show deformation twinning and bent twin lamellae. Coarser plagioclase neoblasts also show significant strain features. Clinopyroxene porphyroclasts are less strained; undulose extinction is not strong and many preserve {100} magmatic twins. Opaque oxides are spatially close to clinopyroxene. Clinopyroxene is pleochroic with pink tint indicating that it is probably a Ti-rich augite. Olivine is completely recrystallized in the section. Point count of primary phases, 1000 points. Plagioclase-68.5%, clinopyroxene-18.9%, olivine-10.0%, oxide minerals-2.6%.

179-1105A-16R-1 (Piece 4D, 56.0 - 59.0 cm)
Thin section #: 120
ROCK NAME: Foliated oxide gabbro
GRAIN SIZE: .Fine to course: bimodal
TEXTURE: Porphyroclastic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Plagioclase	58	58	0.25		anhedral	undulose extinction, deformation twins
Clinopyroxene	30	37	2.5-.2		anhedral	weak undulose extinction, pinkish , slightly pleochroic
Opaque Minerals	5	5	0.25-0.50		anhedral	commonly spatially associated with clinopyroxene

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Actinolite	6	clinopyroxene	
Brown hornblende	<1	clinopyroxene	
Opaque oxides	<1	clinopyroxene	

COMMENTS:
Plagioclase shows complete recrystallization with pervasive undulose extinction and common deformation twinning. Examples of subgrain rotation recrystallization present in plagioclase. It forms a dominant matrix component with opaque oxides and recrystallized pyroxene. Pyroxene forms porphyroclasts, but some has recrystallized to fine-grained neoblasts. Strong foliation defined by the preferred dimensional orientation of clinopyroxene porphyroclasts and larger plagioclase grains and recrystallized aggregates of plagioclase, clinopyroxene, or opaque oxides. Postkinematic replacement of clinopyroxene by actinolite and some brown hornblende. An actinolite vein crosscuts the section. Point count of primary phases, 1000 points. Plagioclase-56.4%, clinopyroxene-40.8%, oxide minerals-2.8%.

179-1105A-16R-1 (Piece 10, 91.0 - 94.0 cm)
Thin section #: 121
ROCK NAME: Foliated olivine gabbro
GRAIN SIZE: Fine
TEXTURE: Granular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	7	10	0.1-.2		anhedral	
Plagioclase	59	59	0.2-0.5		anhedral	strongly undulose extinction, deformation twinning
Clinopyroxene	24	30	0.2-0.8		anhedral	exsolution lamellae, undulose extinction
Opaque Minerals	2	2	0.05-0.1		anhedral	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Actinolite	5	clinopyroxene + vein fill	
Opaque Oxides	<1	clinopyroxene	
Brown Hornblende	<1	clinopyroxene + olivine	
Serpentine	2	olivine	
Iddingsite			

COMMENTS:
The specimen is well foliated and almost completely recrystallized. A few remnant clinopyroxene porphyroclast with magmatic twins are present, but generally clinopyroxene is recrystallized. Plagioclase shows strong undulose extinction, deformation twins and recrystallization texture with preferred dimensional orientation. Clinopyroxene shows undulose extinction as well. Point count of primary phases, 1000 points. Plagioclase-58.4%, clinopyroxene- 33.0%, olivine-8.4%, oxide minerals-0.2%.

179-1105A-16R-2 (Piece 2, 14.0 - 17.0 cm)
Thin section #: 122
ROCK NAME: Mylonitic olivine gabbro
GRAIN SIZE: Fine to coarse: bimodal
TEXTURE: Porphyroclastic to mylonitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	0	25	unknown			completely altered
Plagioclase	63	63	0.01-0.5			dominantly neoblasts, but some porphyroclasts
Clinopyroxene	10	10	4.0-2.0			porphyroclasts and neoblasts
Opaque Minerals	2	2	0.1-0.3			discrete grains and skeletal forms

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Serpentine	17	olivine	
Smectite5	olivine		
Opaque Oxides	2	olivine	
Epidote	1	olivine	

COMMENTS:
The section has a porphyroclastic mylonite texture with clinopyroxene and plagioclase as the porphyroclast phases and plagioclase, clinopyroxene and possibly olivine as the neoblast phases. Plagioclase show strongly undulose extinction in porphyroclasts and evidence of marginal and internal recrystallization by subgrain rotation. Clinopyroxene porphyroclasts show only mild strain, and some undulose extinction.

Photomicrograph #39: Plagioclase porphyroclast showing evidence of subgrain rotation, marginal recrystallization, strong undulose extinction, and deformation twins.
Photomicrograph #40: Clinopyroxene and plagioclase porphyroclasts surrounded by fine neoblasts.

179-1105A-16R-3 (Piece 3, 22.0 - 25.0 cm)
Thin section #:123
ROCK NAME: Olivine gabbro
GRAIN SIZE: Medium
TEXTURE: Subhedral granular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	12	13	1-5		subhedral-anhedral	undulatory extinction
Plagioclase	51	51	1-6		subhedral-anhedral	
Clinopyroxene	34	35	1-6		subhedral-anhedral	exsolution lamellae
Opaque Minerals	0.5	0.5	<0.5		anhedral	
Hornblende	0.5	0.5	<0.5		anhedral	brown

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Smectite	0.5	olivine	
Talc	1	olivine	
Actinolite	0.5		pale green to colorless

COMMENTS:
Pristine igneous adcumulate texture. Lacks preferred dimensional orientation. This specimen is nearly unaltered; alteration is confined only to the peripheries of olivine crystals. Plagioclase is slightly zoned. Clinopyroxene shows a fringe of pale brown hornblende. Some crystals of clinopyroxene poikilitically enclose olivine and plagioclase crystals.

179-1105A-17R-2 (Piece 2, 23.0 - 26.0 cm)
Thin section #: 124
ROCK NAME: Olivine gabbro
GRAIN SIZE: Medium
TEXTURE: Granular-poikilitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	5	5	<3		anhedral	granular
Plagioclase	55	55	<5		subhedral l	granular
Clinopyroxene	40	40	<4	augite	anhedral	granular-interstitial
Opaque Minerals	trace	trace				
Brown Hornblende	trace	trace				

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS

Little alteration

COMMENTS:
Typical adcumulate texture with little zoning and equilibrium phase boundaries. Random orientation of elongate laths of plagioclase. Some replacement of primary augite (with fine exsolution lamellae) by secondary pyroxene (coarsening of the lamellae to irregular patches and blebs). Otherwise, the rock is virtually unaffected by secondary replacements. Some clinopyroxene show magmatic twins. Plagioclase shows undulose extinction and deformation twins, but no signs of recrystallization. Point count of primary phases, 1000 points. Plagioclase-56.1%, clinopyroxene- 37.1%, olivine-6.8%.

Photomicrograph #38: Poikilitic augite, x 2.5, x-nicols

179-1105A-17R-4 (Piece 4, 35.0 - 39.0 cm)
Thin section #: 125
ROCK NAME: Porphyroclastic gabbro
GRAIN SIZE: Medium to coarse
TEXTURE: Porphyroclastic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	1	4	0.1-8		anhedral	deformed, undulatory extinction
Plagioclase	35	40	0.05-16		anhedral	deformed, deformation twins
Clinopyroxene	40	44	0.3-10		subhedral-anhedral	exsolution lamellae
Opaque Minerals	10	10	<4		anhedral	
Hornblende	1.5	2	<1		anhedral	brown

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Talc	1.5	olivine	
Smectite	2	olivine, vein	
Serpentine	2	olivine	
Amphibole	2	clinopyroxene, olivine, hornblende, vein	pale green to colorless
Plagioclase	5	plagioclase	

COMMENTS:
This specimen displays a tectonite texture. This specimen is moderately foliated with alternating mafic mineral-rich and plagioclase-rich layers. Strong foliation defined by elongate neoblasts of plagioclase, clinopyroxene, and olivine with preferred dimensional orientation. Some of the porphyroclasts now consist of several domains (subgrains). Neoblasts of plagioclase and possibly clinopyroxene occur between the porphyroclasts. Olivine shows kink bands and extensive fractures that are filled with opaque minerals, smectite, and serpentine. Strongly bimodal grain sizes. Plagioclase is most extensively recrystallized when in association with opaque oxide minerals. Clinopyroxene porphyroclasts display magmatic twins. Point count of primary phases, 1000 points. Plagioclase-44.6%, clinopyroxene- 40.1%, olivine-2.4%, oxide minerals-12.9%.

179-1105A-18R-2 (Piece 7, 53.0 - 57.0 cm)
Thin section #: 126
ROCK NAME: Olivine gabbro and oxide olivine gabbro (two components)
GRAIN SIZE: Medium to coarse
TEXTURE: Granular to inequigranular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Medium-grained olivine gabbro						
Olivine	3.0	5.6	1		anhedral	fractured and altered
Plagioclase	68.0	68.0	1		anhedral	moderately to strongly zoned, subgrain boundary development
Clinopyroxene	21.0	23.4	1		anhedral	almost interstitial appearance
Coarse-grained oxide olivine gabbro						
Olivine	1.8	5.0	5		anhedral	pervasively altered, interstitial habit
Plagioclase	43.9	43.9	5		anhedral	altered to chlorite along thin fractures
Clinopyroxene	42.0	42.3	10		anhedral	almost interstitial appearance
Orthopyroxene	3.0	4.0	3		subhedral	pale pink to green pleochroism
Fe-Ti oxide	4.8	4.8	8		anhedral	interstitial

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Iddingsite		olivine	
Magnetite		olivine, clinopyroxene	
Talc		olivine	
Chlorite		olivine, clinopyroxene, plagioclase	
Brown amphibole		clinopyroxene	

COMMENTS:
Point counted modes. Medium grained portion-600 points, coarse grained portion 1300 points, both 0.5 mm interval. The secondary minerals constitute 8% and 4.5% for the medium-grained and coarse-grained portion, respectively. This section contains a contact between medium-grained olivine gabbro and coarse-grained oxide olivine gabbro. The contact is marked by a sharp grain size change, recrystallized plagioclase, some secondary clinopyroxene, oxide seams, and intensely altered olivine. In the medium-grained olivine gabbro, plagioclase is vaguely to moderately zoned and shows evidence of strain in the development of some subgrain boundaries. Olivine is altered along margins and fractures, with rare orthopyroxene rims present. Pyroxene is predominantly fresh, but commonly has a nearly interstitial appearing habit. In the coarse-grained oxide olivine gabbro, orthopyroxene is present, distinguished by its pale pink to green pleochroism and low birefringence. On one corner of the section, clinopyroxene exsolution lamellae form subparallel but roughly optically continuous stripes through orthopyroxene (Digital photomicrograph #45) although an adjacent grain shows blebs and seams of optically continuous clinopyroxene enclosed in orthopyroxene (Digital photomicrograph # 46). Overall the texture is igneous, but approximately 10% of the plagioclase is marginally recrystallized. This is most pronounced in plagioclase spatially associated with oxide minerals. Plagioclase is characterized by undulose extinction, deformation twinning, bent twin lamellae, and strong kinking, especially prominent in oxide-rich zones. Olivine is pervasively altered and contains inclusions of clinopyroxene, as well as rare inclusions of plagioclase armored by clinopyroxene. Large clinopyroxene grains contain inclusions of plagioclase. Fe-Ti oxides show regions of grains that are pink pleochroic ilmenite, but lamellarexsolution is rare.

179-1105A-19R-2 (Piece 6, 65.0 - 68.0 cm)
Thin section #: 127
ROCK NAME: Troctolitic gabbro
GRAIN SIZE: Coarse
TEXTURE: Inequigranular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	20.0	26.8	5		euhedral-subhedral	bimodal, fractured, moderately to pervasively altered
Plagioclase	67.5	67.5	12		subhedral-anhedral	fresh, bimodal grain size
Clinopyroxene	5.5	5.5	5		anhedral	minor alteration
Fe-Ti oxide	trace				interstitial	
Sulfide	trace				interstitial	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Amphibole		clinopyroxene	brown and blue green
Chlorite		olivine, plagioclase	
Iddingsite		olivine	
Antigorite		olivine	
Talc		olivine	
Magnetite		olivine	

COMMENTS:
Point-counted mode, 2000 points, 0.5 mm interval. The secondary minerals as a whole constitute 7% in mode. Largely igneous mesocumulate textures. Plagioclase shows strongly zoned rims locally, typical of mesocumulates. Plagioclase grain size, however, is bimodal. Plagioclase shows minor marginal recrystallization locally. Predominantly it is coarse grained but chains and clusters of 1-2 mm grains are common. Plagioclase occurs rarely as inclusions in olivine and clinopyroxene. Plagioclase shows strong zoning. Minor alteration to chlorite along fractures. Olivine is bimodal as well. 1-2 mm euhedral crystals occur as inclusions in plagioclase, nearly completely altered to magnetite, rusty brown iddingsite, chlorite, small blades of antigorite, and chlorite. Coarser olivines show distinct development of subgrain boundaries and are altered along fractures to magnetite, chlorite, talc, chlorite, and iddingsite. Thin orthopyroxene and clinopyroxene rims on olivine are rare but present Sulfides are rare and poorly polished, but appear to be predominantly pyrite. Olivine is highly strained and kinked.

179-1105A-19R-2 (Piece 8A, 95.0 - 98.0 cm)
Thin section #: 128
ROCK NAME: Oxide-bearing gabbro
GRAIN SIZE: Medium
TEXTURE: Weak Porphyroclastic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	0.3	4.1	2		anhedral	pervasively altered
Plagioclase	57.2	59.5	1		anhedral	bimodal grain size distribution
Clinopyroxene	28.5	30.3	2		anhedral	bimodal grain size distribution
Orthopyroxene	1.3	3.0	2		anhedral	highly altered
Fe-Ti oxide	2.8	2.8	1		interstitial	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Iddingsite		olivine	
Magnetite		olivine, pyroxene	
Talc		olivine	
Chlorite		pyroxene, plagioclase	
Clay		plagioclase	
			Total alteration >10%

COMMENTS:
Mode point counted- 2000 points, 0.5 mm interval. The secondary minerals as a whole constitute 9.9% in mode. Olivine is pervasively altered to rusty red brown iddingsite, very fine-grained aggregates of magnetite, and talc. Olivine has a very irregular to amoeboidal habit, and alteration pervades into surrounding phases. Only rare small kernels of fresh olivine are remaining. Plagioclase has a bimodal grain size distribution. Most is fine grained (less than or equal to 1 mm) but there are rare large crystals. Vague zoning and radial undulose extinction are common in both large and small crystals. Plagioclase is altered to clays and chlorite along fractures and along grain margins in contact with altered ferromagnesian phases. A significant portion of the section (20-30 sq. mm) is anorthosite with small interlocking crystals of plagioclase. Clinopyroxene in moderately altered and also has a bimodal grain size distribution. Large grains have mutually interfering grain boundaries with surrounding phases. Clinopyroxene is altered to splotchy but minor brown amphibole, acicular blue green amphibole,chlorite, and clay minerals, Ilmenite exsolution lamellae in Fe-Ti oxides are common. Pale pink regions of ilmenite are also abundant. Rare very fine grained sulfide minerals appear to be exclusively pyrite. Orthopyroxene is altered, but there are some large crystals (2-3 mm) with abundant, subparallel exsolution lamellae of clinopyroxene. Clinopyroxene porphyroclasts show magmatic twinning, but is locally recrystallized. Plagioclase is dominantly recrystallized . Neoblasts of plagioclase and clinopyroxene make up 50% of the rock; the remainder are remnant igneous grains.

179-1105A-19R-3 (Piece 8A, 94.0 - 97.0 cm)
Thin section #: 129
ROCK NAME: Olivine gabbro
GRAIN SIZE: Medium
TEXTURE: Granular-porphyroclastic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	15	20	0.1-8		subhedral-anhedral	neocrystallization to a fine-grained granular aggregate
Plagioclase	60	60	1-6	augite	anhedral	strong signs of recrystallization
Clinopyroxene	20	20	0.1-4		anhedral	tend to be undeformed porphyroblastic
Opaque Minerals	trace	trace				

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Smectite	2	olivine	
Talc	1	olivine	
Magnetite	2	olivine	
Chlorite			
Green Hornblende		pyroxene	
Brown Hornblende		pyroxene	

COMMENTS:
Specimen shows development of porphyroclastic to coarse granular texture. Plagioclase porphyroclasts dominated by undulatory extinction, deformation twins and kinking. Approximately 60% of plagioclase is recrystallized. Olivine is strongly strained, kinked and in places forms subgrains or is recrystallized to polygonal clots. Very locally clinopyroxene is strained with bent lamellae and can also be partly recrystallized . Pyroxene show little sign of replacements. Part of the olivine is altered to fine-grained clays and magnetite. Igneous grains of plagioclase preserved, show strong core-rim zoning. Point count of primary phases, 1000 points. Plagioclase-62.9%, clinopyroxene- 24.7%, olivine-11.6%, oxide minerals-0.8%.

Photomicrograph # 47: Two exsolution lamellae ‘generations’ in augite, x 5

179-1105A-21R-1 (Piece 6, 49.0 - 52.0 cm)
Thin section #: 130
ROCK NAME: Olivine gabbro
GRAIN SIZE: Coarse
TEXTURE: Inequigranular-poikilitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	15	15	3-8		anhedral	
Plagioclase	65	65	0.5-8		anhedral	
Clinopyroxene	20	20	1-12	augite	subhedral	mostly as large oikocrysts
Opaque Minerals	trace	trace				included and interstitial
Brown Hornblende	trace	trace				associated with oxides

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite	trace	plagioclase, pyroxene, olivine	
Magnetite	trace	olivine	
Talc	trace	olivine	
Smectitetrace	olivine		

COMMENTS:
The specimen displays an igneous texture. Coarse-grained and poikilitic olivine gabbro with olivine, plagioclase and augite as major constituents. Augite grains poikilitically include euhedral to subhedral plagioclase and olivine. Some plagioclase grains included in augite show recrystallization. Moderate extent of alteration with some minor crystal-plastic deformation. Olivine is kinked, but not recrystallized. Elongate plagioclase igneous grains show random orientation. Plagioclase shows moderate marginal and intergrain deformation and recrystallization. Approximately 10% of plagioclase shows marginal recrystallization resulting in fine neoblasts. Point count of primary phases, 1000 points. Plagioclase-62.4%, clinopyroxene- 27.9%, olivine-9.2%, oxide minerals-0.5%.

Photomicrograph # 50: Plagioclase chadacrysts in pyroxene oikocryst, x 2.5, x-nicols

179-1105A-22R-1 (Piece 15, 103.0 - 106.0 cm)
Thin section #: 131
ROCK NAME: Mylonite
GRAIN SIZE: Fine
TEXTURE: Porphyroclastic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Plagioclase	65	65	0.1-1		anhedral	granular neoblasts
Clinopyroxene	15	30	0.1-10	augite	anhedral	granoblastic to porphyroclastic
Opaque Minerals	5	5	0.1-1		anhedral	interstitial

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Green Hornblende	9	pyroxene	
Chlorite	5	pyroxene, plagioclase	
Actinolite	1	pyroxene	
Magnetite	trace	pyroxene	

COMMENTS:
Porphyroclastic texture with very strong foliation defined by the preferred dimensional orientation of elongate plagioclase neoblasts and elongate clinopyroxene porphyroclasts. Grain size is strongly bimodal. Plagioclase is completely recrystallized. Clinopyroxene consists of stretched and elongate porphyroclasts and is locally recrystallized. A well-developed planar fabric is also defined by alternating (1-5 mm scale) mafic horizons/bands (pyroxene and oxides) and neoblasts of fine-grained plagioclase with undulatory extinction. The oxide minerals (aggregate of ilmenite and dominating magnetite) and minor sulfides occur from disseminated interstitial aggregates to strong alignments along the flow direction and as inclusions in pyroxene. The pyroxene are highly replaced by secondary phases, principally actinolitic amphibole, and minor chlorite, and brown hornblende. Point count of primary phases, 1000 points. Plagioclase-43.3%, clinopyroxene- 28.7%, oxide minerals-3.1%, amphibole and chlorite-24.8%.

179-1105A-22R-2 (Piece 5, 74.0 - 78.0 cm)
Thin section #: 132
ROCK NAME: Oxide and olivine-bearing gabbronorite
GRAIN SIZE: Variable, fine to coarse
TEXTURE: Varitextured, incipient porphyroclastic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	0.3	2.3	1			pervasively altered
Plagioclase	61.9	63.2	0.1-5		anhedral	abundant grain size reduction
Clinopyroxene	20.8	23.4	1-4		anhedral	subophitic
Orthopyroxene	5.9	7.8	1-6		bladed	high aspect ratio
Fe-Ti oxide		3.3	to 1		interstitial	in seams and interstitial patches

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Iddingsite		olivine	
Magnetite		olivine	very fine granular
Chlorite		clinopyroxene, plagioclase	sheaves and rare vague Berlin blue birefringence
Amphibole		clinopyroxene, orthopyroxene	

COMMENTS:
Mode point counted, 1900 points, 0.5 mm spacing. The secondary minerals as a whole constitute 8.8% in mode. Olivine is nearly all altered to iddingsite and magnetite with more rare talc, only rarely very small kernels left. Plagioclase shows common but no ubiquitous grain size reduction, primarily in subhorizontal stringers that tend to wrap around larger crystals. Plagioclase is altered to chlorite along fractures and where in contact with altered ferromagnesian minerals. Clinopyroxene is variably altered (i.e., some grains completely fresh, but pervasively altered) along margins and in wholesale patches. Orthopyroxene included subequant plagioclase grains and is altered along fractures and margins to blue green amphibole and lesser chlorite. Texture is incipiently porphyroclastic. Plagioclase shows strong undulatory extinction, deformation twinning, bent twins, and kinking. Marginal recrystallization of plagioclase is present along most grains. Grain sizes are strongly bimodal with very fine neoblasts of plagioclase, typical of mylonitic grain sizes. Approximately 30% of plagioclase is recrystallized. Plagioclase porphyroclasts define moderately strong foliation. Pyroxene is locally strained, especially where associated with oxide minerals. Plagioclase neoblasts show serrated grain boundaries.

179-1105A-22R-3 (Piece 8, 130.0 - 133.0 cm)
Thin section #: 133
ROCK NAME: Olivine gabbro
GRAIN SIZE: Medium
TEXTURE: Equigranular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	7.2	8.5	1.5		irregular, anhedral	fractured and slightly altered
Plagioclase	63.8	64.0	1			
Clinopyroxene	25.0	26.5	1		anhedral	
Fe-Ti oxide	0.9	0.9	<1		interstitial	
Sulfidestrace						

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Iddingsite		olivine	
Magnetite		olivine, clinopyroxene	
Chlorite		olivine, clinopyroxene, plagioclase	
Talc		olivine	
Amphibole		clinopyroxene	

COMMENTS: Mode point counted, 1800 points, 0.5 mm interval. The secondary minerals as a whole constitute 3.1% in mode. Olivine is fresh, but alteration is present. Alteration most intense adjacent to interstitial Fe-Ti oxides. Plagioclase has an anhedral, granular texture with mutually interfering grain boundaries where in contact with other plagioclase grains. Clinopyroxene is slightly altered to acicular blue green amphibole near margins, brown amphibole in minute patches particularly along cleavage and where in contact with Fe-Ti oxides, and to chlorite in contact with plagioclase. Minor sulfides occur generally in association with Fe-Ti oxides where pyrite>chalcopyrite. Chalcopyrite occurs as thin bands in pyrite. The section is modally layered on a cm scale. The central portion of the section is plagioclase-rich. One side exhibits incipient magmatic foliation defined by preferential alignment of ferromagnesian phases. Texture is largely igneous, but overprint of strong crystal-plastic strain effect observed. Olivine is strongly kinked, but not recrystallized. Plagioclase shows undulose extinction, deformation twins, and subgrain development. Clinopyroxene shows magmatic twinning.

179-1105A-23R-1 (Piece 8, 94.0 - 98.0 cm)
Thin section #: 134
ROCK NAME: Oxide-bearing olivine gabbro
GRAIN SIZE: Fine - medium
TEXTURE: Equigranular-coarse porphyroclastic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	4.9	7.2	1		anhedral	in clusters and single grains
Plagioclase	52.7	54.2	4		anhedral	wide range in grain size from 0.1 mm to 4 mm
Clinopyroxene	32.8	36.0	3		anhedral	wide range in grain size from 0.2 mm to 3 mm
Fe-Ti oxide	2.0	2.0	1		interstitial	in stringers and disseminated
Orthopyroxene	0.5	0.5	1			
Sulfides	trace					

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Green amphibole		clinopyroxene	
Magnetite		clinopyroxene, olivine	
Chlorite		clinopyroxene, olivine, plagioclase	
Clay		clinopyroxene, plagioclase	
Talc		olivine	

COMMENTS: Mode point counted, 1800 points, 0.5 mm interval. The secondary minerals as a whole constitute 7.1% in mode. This section shows a distinct grain size change, without a distinct modal change. Three-fourths of the section is medium grained, one-fourth is finer grained. The contact between the two section is oblique to the horizontal axis of this oriented section, dipping about 20 degrees.

Medium grained portion: Contains very irregularly shaped clinopyroxene oikocrysts enclosing equant to lath shaped plagioclase, irregular shaped clusters of olivine that show an interstitial appearance, highlighted by their alteration habit, and large plagioclase grains. There is a wide range of plagioclase grain size even in this part of the section, with distinct grain size reduction evident along the margins of coarser grains as well as simply finer grained plagioclase. Oxides are predominantly ilmenite, and rare sulfides are almost exclusively pyrite.

Finer grained portion: Although the contact between these two is sharp and at an oblique angle, there is a distinct subparallel preferred orientation to small plagioclase laths in the finer grained part of the slide. Oxides in this portion of the slide are more disseminated, and grain size is more regular, although grain morphologies (except plagioclase)_ are still irregular.

Overall olivine is altered to very fine grained magnetite and talc, clinopyroxene to predominantly green amphibole, chlorite, and clay; plagioclase is altered along a microfracture network to chlorite. The contact between the two grain size is marked primarily by coarse grains abutting finer grains, but along the contact is some evidence of grain size reduction.

Texture ranges from an equigranular to coarsely recrystallized porphyroclastic texture. Olivine is coarsely recrystallized to polygonal clots. Plagioclase porphyroclasts show strong undulatory extinction, deformation twinning, subgrain development and recrystallization to coarse polygonal neoblasts. Most pyroxene porphyroclasts show little strain and enclose plagioclase; some clinopyroxene show recrystallization effects.

179-1105A-23R-2 (Piece 11, 98.0 - 101.0 cm)
Thin section #: 135
ROCK NAME: Gabbro
GRAIN SIZE: Variable, fine to coarse
TEXTURE: Inequigranular, some recrystallization

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Plagioclase	44.5	49.0	0.2-10		anhedral	some grain size reduction
Clinopyroxene	36.7	48.0	10		anhedral	large anhedral to subhedral crystals
Opaque Minerals	3.0	3.0	2		interstitial	
Sulfides	trace					

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Amphibole		clinopyroxene, plagioclase	green and some minute brown splotches
Chlorite		clinopyroxene, plagioclase	
Clay		clinopyroxene, plagioclase	

COMMENTS:
Mode point counted, 1900 points, 0.5 mm interval. The secondary minerals as a whole constitute 15.8% in mode. Plagioclase shows evidence of strain in large crystals (erratic undulose extinction behavior and bent twins), and also shows grain size reduction in this stringers that tend to wrap around coarser grains. Clinopyroxene shows extensive alteration to acicular green amphibole, and also some very small brown amphibole patches along cleavage planes. Oxides show large subgrains of ilmenite (pale pink pleochroism) with lesser subgrains of magnetite. Sulfide are almost exclusively pyrite. Overall, the rock displays an igneous texture, with significant crystal-plastic overprint and some recrystallization of plagioclase. Plagioclase is extensively strained and shows strong undulose extinction, deformation twinning, formation of subgrains, and very fine recrystallization along margins of grains. Igneous plagioclase shows some strong compositional zoning at the rims where they are preserved, especially near oxide zones. Clinopyroxene shows little effect of strain and has magmatic twins, but when in contact with oxide shows corroded outlines. Olivine is generally recrystallized to polygonal aggregate.

179-1105A-24R-1 (Piece 3B, 32.0 - 36.0 cm)
Thin section #: 136
ROCK NAME: Olivine gabbro
GRAIN SIZE: Medium
TEXTURE: Granular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	3	4	0.3-1.5		subhedral	extensive alteration
Plagioclase	55	55	0.01-4.8		subhedral-anhedral	undulatory extinction, some recrystallization
Clinopyroxene	38	40	0.1-5.3		anhedral-subhedral	pinkish, undulose exttinction
Opaque Minerals	1	1	0.1-0.5			

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Hornblende	1	pyroxene	brown
Actinolite	1	pyroxene	green
Talc	1	olivine	anhedral
Magnetite	trace	olivine/pyroxene	

COMMENTS: Overall, igneous texture, but strongly overprinted with crystal-plastic deformation. Plagiolcase shows extreme undulose extinction, deformation twinning, formation of subgrains, and fine grained recrystallization of grain margins and along subgrain boundaries. Recrystallization of plagioclase ~20%. Larger clinopyroxene strains are relatively unstrained with magmatic twins, but smaller grains show bent exsolution lamellae. Point count of primary phases, 1000 points. Plagioclase-54.0%, clinopyroxene- 38.7%, olivine-7.1%.

179-1105A-25R-1 (Piece 2, 26.0 - 30.0 cm)
Thin section #: 137
ROCK NAME: Olivine-bearing oxide gabbro and oxide-bearing gabbro (two components)
GRAIN SIZE: Fine and medium
TEXTURE: Variable - porphyroclastic to equigranular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Fine-grained portion						
Olivine	0.6	4.6	0.3		anhedral	pervasively altered
Plagioclase	61.1	64.8	0.1-1		subhedral	incipiently aligned laths
Clinopyroxene	21.3	24.8	0.1-1		anhedral	
Fe-Ti oxide	5.8	5.8	0.3		interstitial	disseminated
Medium-grained portion						
Olivine	trace	0.2			rounded	rare small grains
Plagioclase	71.9	73.5	0.1-5		anhedral	some grain size reduction and strained extinction patterns
Clinopyroxene	16.8	22.0	0.1-5		anhedral	variably altered
Fe-Ti oxide		4.5	2		interstitial	in seams and patches

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Amphibole		clinopyroxene	green acicular and brown patches
Iddingsite		olivine	rusty red brown
Magnetite		olivine	very fine granular

COMMENTS:
Point counted mode, 1500 points, 0.5 mm interval. The secondary minerals as a whole constitute 11.2% and 6.8% inmode for the fine-grained and medium-grained portion, respectively. This section contains a sharp contact between a medium-grained oxide bearing gabbro and a fine-grained olivine-bearing oxide gabbro. The contact dips about 40-45 degrees and is marked by a very sharp change in grain size, locally by grain size reduction of plagioclase, and by local accumulation of Fe-Ti oxide. Fine grained portion shows distinct preferred orientation of plagioclase and aligned clinopyroxene parallel to the contact. In the fine grained portion, olivine is pervasively altered. The medium-grained potion shows evidence of deformation in slightly stretched clinopyroxene, and stringers of oxides that roughly parallel the contact (although this is not distinct). Clinopyroxene appears to be concentrated into two zones (along the contact and near the end of the section, and the rest of the section is plagioclase with a hint of preferred orientation parallel to the contact. Plagioclase is highly strained in both medium and coarse grained areas, shows undulose extinction, formation of subgrains, and recrystallization of grain margins in the coarse grained gabbro. The texture in the coarse grained gabbro is incipiently porphyroclastic with the matrix having the same texture as the adjacent equigranular medium grained gabbro. Clinopyroxene shows distinct preferred dimensional orientation in the equigranular gabbro.

179-1105A-25R-1 (Piece 5C, 133.0 - 137.0 cm)
Thin section #: 138
ROCK NAME: Oxide gabbro
GRAIN SIZE: Bimodal: find and medium
TEXTURE: Porphyroclastic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine1	5	0.1 - 0.5		anhedral		
Plagioclase	50	50	0.1 - 10.1		subhedral - anhedral	
Clinopyroxene	35	40	0.3 - 8		anhedral - subhedral	
Opaque Minerals	10	5	0.1 - 3		anhedral	anhedral elongated
Hornblende	2	1	0.1 - 3			one large 3 mm hornblende grain

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Actinolite	2	pyroxene	greenish - colorless

COMMENTS:
Porphyroclastic texture with groundmass of pyroxene, plagioclase, and oxides. Plagioclase is almost completely recrystallized with a few remaining porphyroclasts. These porphyroclasts show strongly undulose extinction, deformation twins, and marginal recrystallization. Clinopyroxene generally shows little strain, preserves magmatic twins in places, although portions of the rock show recrystallized clinopyroxene porphyroclasts where strain is high. Point count of primary phases, 1000 points. Plagioclase-43.7%, clinopyroxene- 37.5%, olivine-0.1%, oxide minerals-15.6%, hornblende-1.0%, actinolite-2.1%.

Digital photomicrograph #61: two types of hornblende

179-1105A-25R-3 (Piece 1, 10.0 - 13.0 cm)
Thin section #:139
ROCK NAME: Mylonitic gabbro
GRAIN SIZE: Bimodal: fine and medium
TEXTURE: Porphyroclastic to mylonitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	trace		0.01 - 0.3		anhedral	extensive alteration
Plagioclase	70		0.01 - 8		anhedral	kinked, undulatory extinction
Clinopyroxene	20		0.01 - 5.1		anhedral	undulatory extinction
Opaque Minerals	1				anhedral	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Magnetite	4	pyroxene/olivine	
Actinolite	4	pyroxene	
chlorite	1		
Talc	trace	olivine	

COMMENTS:
Porphyroclastic mylonite with extreme grain size reduction of plagioclase and pyroxene. Stretched and highly deformed ribbon grains with very strong undulose extinction, kinking, and formation of subgrain boundaries. Clinopyroxene porphyroclasts show recrystallization around margins, sometimes with asymmetric tails yielding dextral shear (see Photograph 63 and 64). Some clinopyroxene porphyroclasts are completely recrystallized. Pyroxene tends to show extensive internal strain with bent exsolution lamellae. Point count of primary phases, 1000 points. Plagioclase-52.2%, clinopyroxene- 43.0%, olivine-4.5%, oxide minerals-0.3%.

Digital microphotograph #63:deformation of pyroxene
Digital microphotograph #64: deformation of pyroxene
Digital microphotograph #65: deformation of plagioclase

179-1105A-26R-3 (Piece 5, 81.0 - 81.0 cm)
Thin section #:140
ROCK NAME: Olivine gabbro
GRAIN SIZE: Coarse
TEXTURE: Granular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	10	12	0.8 - 9.3		subhedral	fresh
Plagioclase	65	65	0.3 - 16.2		subhedral - anhedral	
Clinopyroxene	20	22	1.1 - 13.2		subderal - anhedral	
Opaque Minerals	tr.	tr.	0.2 - 0.5		subhedral	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Talc	2	olivine	
Magnetite	1	olivine	
Serpentine	trace	olivine	
Chlorite	1	pyroxene/plagioclase	distributed along crystal margins
Actinolite	1	pyroxene	along the rim of pyroxene

COMMENTS:
Prestine igneous texture. Clinopyroxene shows magmatic twins. Plagiolcase shows some minor undulose extinction, but twins are magmatic with blunt ends. Locally olivine shows kink bands.

Digital microphotograph #62: Raindrop plagioclase texture

179-1105A-27R-1 (Piece 1A, 27.0 - 28.0 cm)
Thin section #:141
ROCK NAME: Olivine gabbro
GRAIN SIZE: Coarse
TEXTURE: Equigranular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	6.0	7.4	4		anhedral	some subgrain development, kink-banded
Plagioclase	56.3	56.6	5		anhedral	broad grain size range, most is 5 mm but as small as <1 mm
Clinopyroxene	32.2	36	5		anhedral	
Fe-Ti Oxide		trace			interstitial	
Sulfides		trace				

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Magnetite		olivine	very fine grained, along fractures and grain margins
Talc		olivine	
Serpentine		olivine	
Brown amphibole		clinopyroxene	
Green amphibole		clinopyroxene	
Chlorite		clinopyroxene, plagioclase	
Clay		clinopyroxene, plagioclase	

COMMENTS:
Mode point counted, 1800 points, 0.5 mm interval. The secondary minerals as a whole constitute 5.5% in mode. Olivine is the most altered phase, but it is mostly fresh except along a microfracture network where it is intensely altered. Along the same fracture network, plagioclase is altered to chlorite and clay. Clinopyroxene contains small tabular plagioclase inclusions (ophitic texture). Clinopyroxene is altered along cleavage planes and margins to brown amphibole, and more rarely green amphibole, particularly in association with oxides. Sulfides occur as rare interstitial grains and as tabular crystals in clinopyroxene cleavage. Predominantly pyrite with some chalcopyrite and rare three phase grains where pyrrhotite>chalcopyrite>pyrite. Igneous texture. Plagioclase shows strong core-rim zoning locally, but in part may be masked by strong undulose extinction. The plagioclase twinning is magmatic in origin. Olivine and clinopyroxene are relatively strain free.

179-1105A-27R-3 (Piece 2, 93.0 - 94.0 cm)
Thin section #: 142
ROCK NAME: Anorthositic gabbro
GRAIN SIZE: Coarse
TEXTURE: Equigranular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	0.7	1.1	2		subhedral	interstitial, altered
Plagioclase	91.2	91.2	>15		anhedral	coarse grained, zoned, interlocking framework
Clinopyroxene	7.4	7.4	4		anhedral	interstitial
Fe-Ti oxide	0.2	0.2	<1			interstitial
Sulfide	trace					interstitial

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Brown amphibole	trace	clinopyroxene	in rare minute blotches
Green amphibole	trace	clinopyroxene	along cleavage, fractures, and margins
Chlorite	trace	clinopyroxene, plagioclase	
Actinolite	trace	clinopyroxene	
Magnetite	trace	olivine	very fine grained, granular, along fractures and margins

COMMENTS:
Mode point counted, 1900 points, 0.5 mm interval. Olivine and clinopyroxene are clearly interstitial. Although there is one large clinopyroxene crystal, most occurs as small anhedral crystals along grain boundary contacts in plagioclase. Plagioclase is complexly and radially zoned. Extinction behavior highlights possibly embayed cores with subsequent overgrowth. Section contains 12 mm long, three-phase sulfide grain (pyrrhotite>chalcopyrite>pyrite). Igneous texture, little signs of strain, except slight undulose extinction of plagioclase. Core-rim zoning is most extensively developed near oxide minerals.

179-1105A-28R-1 (Piece 3B, 98.0 - 99.0 cm)
Thin section #:143
ROCK NAME: Gabbro
GRAIN SIZE: Coarse
TEXTURE: Granular to poikilitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	4	4	0.3 - 7		subhedral	
Plagioclase	55	55	0.3 - 11		subhedral	
Clinopyroxene	30	30	0.1 - 16		subhedral - ahedral	
Opaque Minerals	tr.	tr.	0.5		anhedral	
Hornblende	tr.	tr.	0.5		anhedral	brown color

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS

COMMENTS:
Typical coarse-grained gabbro with granular to poikilitic texture, rare alteration and almost completely fresh. Point count of primary phases, 1000 points. Plagioclase-52.2%, clinopyroxene- 43.0%, olivine-4.5%, oxide minerals-0.3%.

179-1105A-29R-1 (Piece 4, 102.0 - 106.0 cm)
Thin section #: 144
ROCK NAME: Porphyroclastic meta-olivine gabbro and mylonitic meta-oxide-olivine gabbro (two components)
GRAIN SIZE: Fine to medium:bimodal
TEXTURE: Coarse porphyroclastic to porphyroclastic mylonitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	5	8	0.01-1.5		anhedral	kink banding, mosaic texture
Plagioclase	58	60	0.01-1.5		anhedral	undulose extinction, deformation twins, subgrain rotation
Clinopyroxene	23	28	0.01-.3.0		anhedral	dominant porphyroclast phase
Opaque Minerals	4	4	0.01-0.5		anhedral	dominatly within an oxide-rich band

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Brown hornblende	4	clinopyroxene and veins	appears concentrated in fine-grained mylonite, but also partailly replaces some clinopyroxene porphyroclasts; also some vein material cutting pyroxene
Magnetite	3	olivine	
Actinolite	3	clinopyroxene	

COMMENTS:
The section displays a tectonite texture. A portion of the section consist of a medium to coarse-grained porphyroclastic meta-olivine gabbro. This is cut by a porphyroclastic mylonitic rock. The contact between the mylonite and the coarser porphyroclastic metagabbro is marked by a thin band (~5 mm) of oxide-rich (~35%) mylonite which seems to localize deformation along the contact; however, it grades downward into a mylonitic meta-olivine gabbro lacking abundant oxides. Recrystallization is intense locally, especially within and at the edge of the mylonite. Foliations are approximately parallel in each rock type. The order and propensity for recrystallization appears to be plagioclase, olivine, and finally clinopyroxene. Clinopyroxene tend to form larger remnant porphyroclasts and commonly contain euhedral chadacrysts of plagioclase. Porphyroclasts of clinopyroxene, olivine and plagioclase in the mylonitic zones are highly strained with subgrain boundaries, dislocation walls, kink bands, deformation twins, and highly undulose extinction. In the coarser porphyroclastic part of the section, the porphyroclasts are strained less than in the mylonitic zones. Highly strained porphyroclasts show marginal to almost complete recrystallization (most commonly with the mylonite). Plagioclase neoblasts show higher strain than olivine or pyroxene neoblasts. Point count of primary phases, 1000 points. Plagioclase-39.2%, clinopyroxene- 36.9%, olivine-15.3%, oxide minerals-1.7%, amphibole-8.9%.

Digital photomicrograph #41 Contact between oxide band and porphyroclastic meta-olivine gabbro, showing strain localization.
Digital photomicrograph #42 Lens of olivine neoblast completely recrystallized from an olivine porphyroclast.
Digital photomicrograph #43 Boundary between clinopyroxene porphyroclast and mylonite zone showing recrystallization of marginal clinopyroxene.
Digital photomicrograph #44 Oxide band at mylonitic contact with porphyroclasts of clinopyroxene.

179-1105A-29R-3 (Piece 3, 112.0 - 114.0 cm)
Thin section #:145
ROCK NAME: Olivine-bearing oxide gabbro
GRAIN SIZE: Fine to medium
TEXTURE: Granular to porphyroclastic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	2	2	0.3 - 2		subhedral	recrystallization
Plagioclase	60	60	0.1 - 5.5		subhedral	undulatory extinction, recrystallization
Clinopyroxene	33	38	0.1 - 5		subhedral - anhedral	undulatory extinction
Opaque Minerals	5	4	0.1 - 1		anhedral	anhedral elongated
Hornblende	trace	trace	0.5		anhedral	brown tint

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Actinolite	1.5	augite	anhedral, green to little ink blue in color

COMMENTS:
The rock, overall, shows porphyroclastic texture with a groundmass of pyroxene, plagioclase, oxide, olivine, and hornblende, and a large amount of porphyroclasts of pyroxene and plagioclase. In some places, granular texture is present. Some magmatic twins are preserved. Point count of primary phases, 1000 points. Plagioclase-52.1%, clinopyroxene- 35.2%, olivine-4.5%, oxide minerals-8.2%.

Digital photomicrograph #55: Recrystallized texture of olivine (all olivine grains in the view field)

179-1105A-29R-4 (Piece 2, 31.0 - 33.0 cm)
Thin section #:146
ROCK NAME: Oxide gabbro
GRAIN SIZE: Medium-coarse
TEXTURE: Porphyroclastic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Plagioclase	55	55	0.05 - 12		subhedral	highly recrystallized
Clinopyroxene	35	38	0.05 - 13		subhedral	highly recrystallized
Opaque Minerals	7	7	0.05 - 19		anhedral	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Actinolite	2	pyroxene	surround pyroxene or penetrate along cleavage
Chlorite	1	pyroxene/plagioclase	develop along fissures

COMMENTS:
Minerals in the section show porphyroclastic texture and uneven distribution both in type and grain size. Much of the plagioclase and pyroxene have recrystallized. Large plagioclase and clinopyroxene show undulatory extinction and are porphyroclasts. Oxides show elongated anhedral textures. Point count of primary phases, 1000 points. Plagioclase-57.1%, clinopyroxene- 33.0%, oxide minerals-9.9%.

179-1105A-30R-1 (Piece 3A, 27.0 - 31.0 cm)
Thin section #:147
ROCK NAME: Gneissic oxide gabbro
GRAIN SIZE: Fine
TEXTURE: Gneissic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine						
Plagioclase	50	55	0.1 - 1		anhedral-subhedral	undulatory extinction
Clinopyroxene	35	43	0.1 - 2.2		subhedral-anhedral	most very fine grained with a few medium grains
Opaque Minerals	5	3	0.1 - 0.5		anhedral	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Actinolite	8	pyroxene	greenish-colorless in color
Chlorite	1	pyroxene/plagioclase	

COMMENTS:
Many pyroxenes have been replaced by actinolite. Tectonite texture, mostly equigranular, but some porphyroclasts of clinopyroxene retain magmatic twins. Recrystallized and porphyroclastic clinopyroxene show preferred dimensional orientation and define the foliation. Plagioclase is entirely recrystallized and shows significant undulose extinction and formation of subgrain boundaries.

179-1105A-30R-2 (Piece 8, 109.0 - 113.0 cm)
Thin section #: 148
ROCK NAME: Foliated Meta-Oxide Gabbro
GRAIN SIZE: Fine
TEXTURE: Equigranular, weakly oriented

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine						
Plagioclase	55	55	0.1-3		subhedral	
Clinopyroxene	35	40	0.1-1.5		subhedral	
Opaque Minerals	7	7	0.3-0.7		anhedral	
Hornblende	0.5	0.5			anhedral-subhedral	brown tint

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Actinolite	2.5	pyroxene	colorless - greenlish

COMMENTS:
Clinopyroxenes are often rimmed or penetrated along cleveage by actinolite. Oxides show elongated anhedral structure. Strongly foliated gneissic texture with preferred dimensional orientation of clinopyroxene and plagioclase. Larger plagioclase is highly strained and with complex subgrain structure. Finer plagioclase also shows complex subgrain structure. Locally in oxide zones clinopyroxene shows magmatic twinning. Clinopyroxene and plagioclase tends to be elongate and shows strong foliation (see Photomicrograph #57)

179-1105A-30R-3 (Piece 9, 102.0 - 106.0 cm)
Thin section #:149
ROCK NAME: Foliated Meta-Olivine-bearing gaabbro
GRAIN SIZE: Medium
TEXTURE: Granular to porphyroclastic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	3	3	0.3 - 2.5		subhedral	
Plagioclase	55	55	0.01 - 2.2		subhedral	undulatory extinction
Clinopyroxene	38	40	0.2 - 4.5		subhedral	many recrystallized, undulatory extinction, kinked
Opaque Minerals	trace	trace	0.1 - 0.3			

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Magnetite	1.5	olivine	anhedral
Hornblende	1	pyroxene	brown to greenish in color
Talc	0.5	olivine	
Chlorite	1		developed along fissures

COMMENTS:
Pyroxene and plagioclase often show undulatory extinction; most show porphyroclastic texture where olivine, recrystallized plagioclase and clinopyroxene form a matrix with porphyroclasts of plagioclase and pyroxene. Porphyroclastic texture. All phases (plagioclase, clinopyroxene and olivine) show marginal recrystallization with subgrain development. Approximately 70% of plagioclase has recrystallized. Olivine porphyroclasts are highly strained and contain kink bands. Clinopyroxene shows bent lamellae and significant internal strain. Clinopyroxene commonly preserves magmatic twinning and includes plagioclase chadacrysts. Approximately 35-40% of the rock has recrystallized.