173-1068A-15R-5 (Piece 10, 70-75 cm) **No. 90** OBSERVER: GAR, FRO, RUB
ROCK NAME: Meta-anorthosite.
GRAIN SIZE: Medium-grained.
TEXTURE: Inequigranular.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Plagioclase	95	0.2-3	Subhedral	IG/MET	Undulatory extinction, mechanical twins, recrystallized margins, An_{56}
Epidote	5	0.7-0.1	Granular	MET	Replacing plagioclase
Zoisite	2	0.2	Granular	MET	In fractures
Sphene	<1	0.3	Subhedral	MET	
Ilmenite	Trace			IG(?)	Partially replaced by sphene
Pyrrhotite	Trace				

STRUCTURAL COMMENTS: Weak foliation defined by alignment of slightly elongate, up to several mm long plagioclase grains. Large plagioclase grains show deformation twins tapering from grain boundaries into the grain, some subgrains along grain boundaries, deformation bands, kinked twin lamellae, and undulatory extinction. Boundaries between large plagioclase grains are moderately to strongly lobate and in some cases cuspate-lobate, indicative of grain boundary migration. Other grain boundaries are ornamented by smaller (average 0.2 mm), recrystallized plagioclase grains. Recrystallized grains are often strain-free with straight grain boundaries and grain boundary triple junctions, but strained crystals also occur. Recrystallization along grain boundaries leads to core-mantle structure in some cases. Brittle overprint includes transgranular fractures and clinozoisite(?)-filled veins, often arranged en echelon. Brittle microfracturing is pervasive in some large plagioclase grains.

173-1068A-15 R-5 (Piece 12 , 88-93 cm) **No. 91** OBSERVER: GAR, FRO, RUB

ROCK NAME: Meta-anorthosite.
GRAIN SIZE: Coarse-grained.
TEXTURE: Inequigranular.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Plagioclase	65	1.5 cm- 0.5	Anhedral	IG	Mainly undeformed, some recrystallization of margins, An_{56}
Sericite	25	0.1	Platy	MET	Replacing plagioclase (static)
Epidote	3	0.4	Granular	MET	
Zoisite(?)	4	0.2	Granular	MET	May be clinozoisite
Chlorite	1	0.1	Platy	MET	In veins
Calcite	<1	1	Euhedral		In veins
Opaque minerals	<1	0.5	Euhedral	IG(?)	

STRUCTURAL COMMENTS: No foliation visible, possibly because of strong brittle overprint and alteration. Large plagioclase grains only moderately strained (some undulatory extinction and deformation twins). Some boundaries between large grains are strongly to moderately lobate. Most boundaries between large grains exhibit small (0.1 to 0.2 mm), recrystallized, strain-free plagioclase grains. These have straight boundaries and triple junctions. Brittle deformation represented by transgranular fractures and veinlets filled by zoisite (?), plagioclase, calcite and chlorite. Composite , 0.8 mm thick vein filled with plagioclase along the margins and calcite in the center. Sericitization of plagioclase along fractures.

173-1068A-15R-6 (Piece 3, 29-31 cm) **No. 98** OBSERVER: HEB, RUB

ROCK NAME: Matrix-supported breccia with clasts of metagabbro and meta-anorthosite.
GRAIN SIZE: Clasts are fine to coarse-grained.
TEXTURE: Inequigranular to equigranular.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
1) Meta-gabbro					
Plagioclase	65	0.4	Anhedral	MET	Recrystallized
Amphibole	30	0.6	Anhedral	MET	Green-brown color
Epidote	5	0.4	Granular	MET	Replacing plagioclase
Brown amphibole	<1	0.4	Subhedral	IG(?)	Igneous relicts(?), strongly pleochroic
Opaque minerals	<1	0.4	Subhedral	IG(?)	
Clinopyroxene	<1	0.5	Anhedral	IG	Igneous relicts
2) Meta-anorthosite					
Plagioclase	90	0.2-10.0	Subhedral	IG/MET	Porphyroclasts, undulatory extinction, small recrystallized grains
Epidote	5	0.5	Granular	MET	Replacing plagioclase
Calcite	5	0.5	Granular	MET	Replacing plagioclase

STRUCTURAL COMMENTS: Breccia clasts are angular to slightly rounded and are rimmed by granular calcite. Calcite veins cut the plagioclase in the meta-anorthosite. Matrix is made of calcite, very fine grained Fe-oxides and clay. Irregularly shaped calcite veins also crosscut the matrix.

COMMENTS: Some meta-gabbro clasts contain interlayered meta-anorthosite.

173-1068-15 R-6 (Piece 1, 10-14 cm) **No. 93** OBSERVER: GAR, HEB, FRO, RUB

ROCK NAME:Metagabbro.
GRAIN SIZE: Medium-grained.
TEXTURE: Inequigranular.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Plagioclase	40	1.5-0.1	Anhedral	IG/MET	Undulatory extinction, recrystallized margins, triple junction grain boundaries, An_{56}
Clinopyroxene	40	1.2- 0.1	Anhedral	IG/MET	Undulatory extinction, some recrystallization
Chlorite	5	0.1	Platy	MET	Replacing pyroxene
Amphibole	1	0.1	Anhedral	MET	Brown hornblende
Opaque minerals	1	0.1			

STRUCTURAL COMMENTS: No foliation visible.This is probably due to the orientation of the thin section with respect to the finite strain, because there is ample evidence of ductile deformation. Plagioclase occurs as (1) up to several mm large grains with deformation twins, undulatory extinction, subgrains along margins, and moderately to strongly lobate grain boundaries, and (2) as recrystallized grains (0.05 to 0.2 mm) along grain boundaries of large grains and in aggregates with “foam texture” (straight grain boundaries, triple junctions). Some larger clinopyroxene grains show undulatory extinction. Part of the thin section is strongly fractured and has veins filled with plagioclase, epidote/clinozoisite, and composite veins with unknown mineral along the margins and carbonate in the center.

173-1068A-15 R-6 (Piece 5, 52-56 cm) **No. 92** OBSERVER: GAR, FRO, HOP, RUB

ROCK NAME: Metatonalite.
GRAIN SIZE: Fine-grained.
TEXTURE: Foliated.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Plagioclase	60	1-0.5	Anhedral	MET	Undulatory extinction, An_{22}
Quartz	10	0.2	Anhedral	MET	Undulatory extinction, in veins
Zircon	<1	0.1	Granular	IG	
Amphibole	<1	0.3	Anhedral	MET/IG	Elongate, inclusions in plagioclase
Apatite	<1	0.1	Granular	IG	
Biotite	3	0.1	Platy	MET	Replacing amphibole
Chlorite	5	0.1	Platy	MET	Replacing biotite
Sericite	5	0.1	Platy	MET	Replacing plagioclase
Calcite	10	0.2			Elongate parallel to foliation, associated with quartz and in veins
Opaque	5	0.5-0.1	Granular	MET	Elongate parallel to foliation

STRUCTURAL COMMENTS: Foliation defined by alignment of slightly elongate plagioclase grains, chlorite, opaque minerals, and by layers rich in quartz and calcite.
Plagioclase forms large porphyroclasts (0.5-1 mm) with moderately to strongly lobate grain boundaries, subgrains, undulatory extinction and some recrystallization along grains boundaries. Quartz occurs as inclusions in plagioclase and as foliation-parallel lenses and layers infiltrated by calcite. Quartz crystals, in these layers, show undulatory extinction, some deformation bands and transgranular fractures filled by calcite. Veins filled by plagioclase, calcite, Fe-oxides, and chlorite, are perpendicular to oblique with respect to the foliation.

COMMENTS: Strongly foliated metatonalite, foliation defined by elongated plagioclase, biotite + chlorite and relicts of amphibole. Calcite impregnation overprints the foliation. Veins filled by plagioclase and calcite.

173-1068A-15R-6 (Piece 4, 40-43 cm) **No. 100** OBSERVER: HEB, FRO, RUB

ROCK NAME:Sedimentary breccia with large meta-anorthosite clasts.
GRAIN SIZE: Clasts are medium to coarse-grained.
TEXTURE: Inequigranular (porphyroclastic).

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Plagioclase	90	0.2-0.8	Granular	IG/MET	Large deformed crystals surrounded by small recrystallized grains
Amphibole	5	0.3	Anhedral	MET	Green to brown, associated with opaque minerals, along cleavage in plagioclase and as interstitial crystals
Sericite	5	0.1	Platy	MET	Replacing plagioclase
Oxides	<2	0.1	Granular	IG(?)	

STRUCTURAL COMMENTS: Structure of anorthosite fragments: Weak foliation defined by elongate plagioclase porphyroclasts. Plagioclase occurs as large, highly strained porphyroclasts (up to 3 mm, strongly undulatory extinction, deformation twins) surrounded by smaller recrystallized grains (0.1 to 0.3 mm, strain-free to undulatory, often straight boundaries and triple junctions, crystallographic preferred orientation) in a typical core-mantle structure. Static sericitization of plagioclase along veins and fractures.
Structure of breccia: Breccia consists of angular fragments of meta-anorthosite, chloritized igneous rocks, and single grains of plagioclase in a calcite matrix. The thin section contains portions of two large clasts of meta-anorthosite that are as much as 2.5 cm in length. Some clasts are partially lined by granular calcite rims or veins, large clasts having thick rims, smaller ones thinner rims. The clasts are crosscut by calcite veins and are in part broken into jigsaw-style along calcite veins which are continuous with the rim calcite.

173-1068A-16R-1 (Piece 5C, 66-68 cm) **No. 101** OBSERVER: GAR, FRO, RUB

ROCK NAME: Amphibolite.
GRAIN SIZE: Fine-grained.
TEXTURE: Mylonitic.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Plagioclase	60	0.1-0.5	Anhedral	MET	Mosaic of plagioclase with triple junctions, An_{36}
Amphibole	30	0.1-0.5	Anhedral	MET	Elongate parallel to foliation
Ilmenite	<5	0.2	Granular	MET	Elongate parallel to foliation
Limonite	<2	0.1	Granular	MET	Replacing amphibole and in veins
Chlorite	<1	0.1	Platy	MET	Replacing amphibole
Sericite	<1	0.1	Platy	MET	Replacing plagioclase
Calcite	<1	0.1-0.2			Replacing plagioclase and in veins

STRUCTURAL COMMENTS: Foliation defined by alternating plagioclase-rich and amphibole +ilmenite-rich layers and alignment of many amphibole grains. Plagioclase completely recrystallized to 0.1-0.5 mm-sized, partly twinned grains with mostly straight grain boundaries and boundary triple junctions. Strong crystallographic preferred orientation of plagioclase grains. Amphibole occurs as larger (0.5 mm), elongate crystals with lobate grains boundaries against plagioclase, and as small (0.1 mm) grains dispersed in plagioclase aggregates and forming straight boundaries and triple junctions with plagioclase. Transgranular veinlet infilled by calcite and limonite, slightly oblique to the foliation. Overall, the brittle overprint is rather weak.

173-1068A-16R-2 (Piece 9B,118-119 cm) **No. 102** OBSERVER: BEA, FRO, RUB

ROCK NAME: Amphibolite with local cataclastic zone.
GRAIN SIZE: Medium-grained.
TEXTURE: Weak to moderate foliation, mostly equigranular, locally cataclastic.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Plagioclase I	50	0.5-1.5	Anhedral to subhedral	IG(?)/MET	Equant to tabular, mostly turbid and weakly zoned
Plagioclase II	5	<0.5	Anhedral	MET	Clear rims on plagioclase, may be late-stage overgrowths
Amphibole	40	0.5-1.5	Anhedral to subhedral	IG/MET	Tabular to equant crystals locally interstitial to plagioclase. Medium to pale green /blue green. Nearly colorless in some orientations. Rare inclusions of plagioclase, chlorite, epidote. One large, tabular crystal 3.5 mm. Locally elongate parallel to foliation.
Epidote	2	<0.1-0.3	Anhedral to euhedral	MET/VEIN	Commonest in veins. Some occurs along grain boundaries and (very rarely) included in amphibole.
Chlorite	2	<0.1-0.3	Anhedral	MET	Pale green with brownish interference colors. Occurs in anhedral sheafs in the foliation . Locally replaces amphibole and, perhaps, plagioclase. May be fine-grained matrix of cataclastic zone.
Apatite	<1	<0.1	Subhedral to euhedral	IG	Very scarce, included in plagioclase.
Opaque minerals	<1	<0.1	Anhedral		Now mostly hematite/limonite. Appears to replace original opaque phase.

STRUCTURAL COMMENTS: Foliation defined by alternating plagioclase- and amphibole-rich layers, and by alignment of elongate amphibole grains. Undulatory extinction and some marginal recrystallization in plagioclase. Probable cataclastic shear zone, 0.6 mm wide, is parallel to the foliation, with fine grained, weakly foliated matrix (mostly plagioclase and epidote) and sub-angular to rounded plagioclase and rarely amphibole clasts (average 0.1 mm). Epidote vein oblique to the foliation.

173-1068A-16R-3 (Piece 4 ,106-111 cm) **No. 103** OBSERVER: GAR, FRO, RUB
ROCK NAME: Metagabbro.
GRAIN SIZE: Coarse to fine-grained.
TEXTURE: Inequigranular.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Plagioclase	60	5-0.4	Anhedral	IG/MET	Porphyroclast, undulatory extinction, small recrystallized grains, triple junctions, An_{58}
Clinopyroxene	15	0.4	Anhedral	IG/MET	Elongated into foliation plane
Amphibole	10	0.4	Anhedral	MET	Replacing pyroxene, synkinematic, green color
Sericite	10	0.1	Platy	MET	Replacing plagioclase
Chlorite	5	0.1	Platy	MET	Replacing amphibole and clinopyroxene
Apatite	<1	0.2	Euhedral	IG	
Opaque minerals	<1				Magnetite and pyrrhotite

STRUCTURAL COMMENTS: Foliation defined by elongate amphibole, clinopyroxene grains, and ribbons of recrystallized plagioclase. Plagioclase occurs as large (up to 5 mm) crystals, showing some deformation twins, slightly undulatory extinction, and fractures. Most of the plagioclase is recrystallized to finer grain size (average 0.2 to 0.3 mm). Recrystallized plagioclase grains are partly elongate, have straight boundaries and triple junctions, and show pronounced crystallographic preferred orientation. Veins filled with plagioclase and epidote perpendicular to the foliation. Thin veinlets filled with calcite and sericite(?), partly arranged en echelon, subparallel to the foliation. In the vicinity of these veinlets, amphibole is largely replaced by chlorite.

173-1068A-16R-4 (Piece 1B, 30-33 cm) **No. 104** OBSERVER: HEB, RUB
ROCK NAME: Metagabbro.
GRAIN SIZE: Coarse-grained..
TEXTURE: Inequigranular, poikilitic.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Pseudomorphs		1-3	Anhedral	IG/MET	Olivine (?), replaced by a mixture of smectite, iron oxides, chlorite and calcite
Clinopyroxene	30	1	Anhedral	IG	
Plagioclase	25	1	Anhedral	IG	Partly replaced by kaolinite, sericite, secondary plagioclase, Fe-oxides
Brown amphibole	5	0.5	Subhedral	IG(?)	Inclusions in, and rims around clinopyroxene
Chlorite/smectite	5	0.5	Anhedral	MET	Replacing former olivine(?)
Calcite	15	0.3	Anhedral	MET	Replacing former olivine(?)
Opaque minerals	<1	0.6	Subhedral	IG	Associated with brown amphibole
Fe-oxides	5	<0.3	Granular	MET	Red brown limonite, replacing former olivine(?)
Apatite	<1	0.3	Euhedral	IG	Included in clinopyroxene and plagioclase
Carbonate	5	0.3	Granular	MET	Filling veins cutting olivine, and replacing olivine(?)

STRUCTURAL COMMENTS: Essentially undeformed, only minor carbonate veins.

COMMENTS: The altered ferromagnesian mineral is interpreted as olivine on the basis of shape and the fact that the alteration assemblage comprise the assemblage of chlorophaeite (Deer, Howie, and Zussman, 1978).[1] Plagioclase in contact with the pseudomorphed olivine(?) grains is partly weathered to kaolin, and contains intergowths which appear to be altered amphibole and biotite. Away from the pseudomorphs the plagioclase is fresh and contains abundant minute inclusions of green spinel. It appears that the material around the altered olivine may represent a corona, formed by olivine-plagioclase reaction. Much of the pyroxene in the rock is poikilitic, with inclusions of the altered olivine(?). Note that the Pseudomorphed modal olivine is 30%.

[1]Deer, Howie, and Zussman, 1978. *Rock Forming Minerals* (Vol. 2A): *Single-chain Silicates* (2nd ed.): London (Longman), 9.

173-1068A-16R-5 (Piece 3B , 63-68 cm) **No. 105** OBSERVER: HEB, FRO, RUB

ROCK NAME: Micro-amphibolite.
GRAIN SIZE: Fine-grained.
TEXTURE: Foliated equigranular.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Amphibole	50	0.5	Anhedral	MET	Green-brown, strongly pleochroic
Plagioclase	35	0.4	Anhedral	MET	Triple junctions
Epidote	5	0.3	Anhedral	MET	Replacing plagioclase
Chlorite	2	0.3	Platy	MET	Replacing amphibole
Sericite	2	0.3	Platy	MET	Replacing plagioclase
Opaque minerals	2	0.3	Anhedral	MET	Associated with amphibole
Apatite	<1	0.2	Subhedral	IG	

STRUCTURAL COMMENTS: Foliation defined by alignment of elongate amphibole, plagioclase, and opaque minerals. Relatively large (up to 1 mm) amphibole grains are poikilitic, smaller grains (0.1 to 0.4 mm) form a mosaic with plagioclase. Amphibole-plagioclase grain boundaries are commonly convex towards amphibole and concave towards plagioclase. Most plagioclase grains are about 0.2 mm and appear strain-free, some have undulatory extinction. Plagioclase aggregates have straight grain boundaries and triple junctions. Vein with epidote and cryprocrystalline material is oblique to the foliation.

COMMENTS: Late quartz veins less than 0.3 mm thick cutting the foliation.

173-1068A-16R-5 (Piece 5, 91-95 cm) **No. 106** OBSERVER: RUB, FRO

ROCK NAME: Sedimentary breccia, with leucocratic metagabbro and amphibolite clasts.
GRAIN SIZE: Medium-grained
TEXTURE: Granular, poikilitic

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Main clast (leucocratic gabbro):					
Plagioclase	70	1-4	Anhedral	IG	Stubby prisms to granular, An_{63}, partly replaced by untwinned plagioclase
Clinopyroxene	25	0.5-4	Anhedral	IG	Interstitial, partly enclosing plagioclase
Amphibole	3	0.2-0.8	Anhedral	IG/MET	Partly rims and replaces clinopyroxene
Epidote/clinozoisite	<1	0.2	Anhedral	MET	Partly replaces plagioclase
Opaque minerals	<1	0.1	Anhedral	MET	Associated with plagioclase
Clast 2 (amphibolite):					
Plagioclase	60	0.2-0.4	Granular	MET	Polygonal, An_{50}
Amphibole	35	0.1-0.2	Anhedral	MET	Brown
Opaque minerals	5	0.05-0.5	Anhedral	MET	
pseudomorphs	1	1	Anhedral	MET	Pyroxene(?) replaced by actinolite and chlorite, porphyroclastic

STRUCTURAL COMMENTS:
Clast 2 shows a granular texture, but with alignment of former pyroxene(?) porphyroclasts, and to a less extent opaque minerals and amphibole, to form a foliation.

COMMENTS: The above clasts, plus some smaller subangular amphibolite and metagabbro clasts occur in a very fine limestone matrix. Thin rims of coarser calcite partly fringe the clasts, and a calcite vein is present.

173-1068A-17R-2 (Piece 1A, 1- 6 cm) **No. 107** OBSERVER: GAR, FRO

ROCK NAME: Foliated amphibolite.
GRAIN SIZE: Medium-grained.
TEXTURE: Inequigranular.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Amphibole	60	up to 1	Anhedral	MET	Elongated in foliation plane
Plagioclase	20	up to 2	Anhedral	MET	Elongated in the foliation plane, undulatory extinction
Chlorite	10	0.1	Platy	MET	Replacing amphibole
Sericite	2	0.1	Platy	MET	Replacing plagioclase
Clinopyroxene	<1	0.4	Anhedral	IG	Replaced by amphibole
Epidote	5	0.2	Granular	MET	In veins
Opaque minerals	<2	0.1	Granular	IG/MET	Included in amphibole, aggregates elongated into the foliation

STRUCTURAL COMMENTS: Foliation defined by elongate amphibole and plagioclase grains, and by ribbons of recrystallized plagioclase. Plagioclase forms (1) a few elongate, up to 2 mm porphyroclasts with undulatory extinction and recrystallization at the margins, and (2) ribbons and aggregates of fine-grained (typically 0.1 to 0.2 mm) recrystallized grains with straight boundaries, triple junctions, and crystallographic preferred orientation. Some amphibole grains are slightly undulatory. Epidote veins are partly parallel, partly oblique to the foliation.

173-1068A-17R-4 (Piece 1A , 26-28 cm) **No. 108** OBSERVER: GAR, FRO
ROCK NAME: Leucocratic metagabbro
GRAIN SIZE: Medium-grained.
TEXTURE: Inequigranular.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Plagioclase	70	0.2	Anhedral	MET	Recrystallized grains, triple junctions, Undulatory extinction
Pseudomorphs	20	1.2	Anhedral	MET	Elongated in the foliation, crystallization tails, replaced by actinolite and chlorite. Retrograde amphibole or pyroxene
Chlorite	<1	0.2	Platy	MET	In fractures
Epidote	5	0.3	prismatic, Granular	MET	In veins and replacing plagioclase
Opaque minerals	2	0.5	Granular	MET	Elongated in the foliation
Calcite	<1	1	Euhedral		In veins

STRUCTURAL COMMENTS: Foliation defined by alignment of elongate amphibole porphyroclasts, alignment of opaque minerals, and by plagioclase ribbons. Apart from a few larger (up to 1 mm) elongate grains, plagioclase is almost completely recrystallized to ribbons and aggregates of 0.1 to 0.3 mm-sized grains, often showing straight grain boundaries, triple junctions (foam texture), and crystallographic preferred orientation. Pseudomorphs exhibit porphyroclasts with asymmetric recrystallized tails. The microstructure is typical for a high-temperature mylonite. Veins of epidote, partly with fibre growth, parallel and oblique to the foliation.

173-1068A-17R-4 (Piece 1B , 76-80 cm) **No. 109** OBSERVER: GAR, FRO, RUB

ROCK NAME: Sedimentary breccia containing amphibolite clasts.
GRAIN SIZE: Medium to fine-grained.
TEXTURE: Amphibolite is foliated

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Clasts of amphibolite					
Amphibole	45	1.5	Anhedral	MET	Elongated in foliation
Plagioclase	50	0.2	Anhedral	MET	Elongated in foliation
Opaque minerals	<1	0.5	Granular	MET	
Biotite	<1	0.1	Platy	MET	Replacing amphibole
pseudomorphs	5	0.8	Anhedral	MET	Retrograded and weathered pyroxene or amphibole
Metagabbro					
Plagioclase	70	1	Anhedral	MET	Elongated in foliation
Clinopyroxene	20	0.5	Granular	MET	Aggregates elongated in foliation
Opaque minerals	10	0.3	Granular	MET	Elongated in foliation
Amphibole	<1	0.1	Anhedral	MET	
Chlorite	<1	0.2	Platy	MET	Replacing amphibole
Epidosite					
Epidote	100	0.2	Granular	MET	
Chloritite	100	0.04	Platy	MET	
Matrix: Calcite	100	0.02-5			

STRUCTURAL COMMENTS: Structures within fragments:The large amphibolite fragment has a foliation defined by elongate amphibole crystals, aggregates of amphibole, biotite, and opaque minerals, and ribbons of recrystallized plagioclase. Biotite appears to have grown in pressure-shadow tails of large (1 to 1.5 mm) amphibole porphyroclasts. Plagioclase is completely recrystallized (grain size 0.1 to 0.2 mm) and has straight grain boundaries, triple junctions, and strong crystallographic preferred orientation. Small (0.05 mm) amphibole grains are dispersed in the plagioclase ribbons. The chloritite fragment has a strong foliation and a possible S/C fabric. Structure of breccia: all fragments are angular to slightly rounded. Matrix consists of small rock and crystal (plagioclase, amphibole, epidote, chlorite) fragments, cemented by very fine-grained (0.05 mm and smaller) calcite. An interpreted geopetal structure is present: 5 mm high space under the large amphibolite clast which remained free of matrix. This space was later filled with coarse-grained (3 mm), blocky calcite cement .
COMMENTS: One amphibolite has a layer containing porphyroclasts, probably originally clinopyroxene, which have weathered to clays(?) with a network of limonite veins

173-1068A-17R-4 (Piece 1B , 85-89 cm) **No. 110** OBSERVER: HEB, FRO, RUB

ROCK NAME: Sedimentary breccia with leucocratic metagabbro clasts.
GRAIN SIZE: Variable, fine to medium-grained.
TEXTURE: Clasts are equigranular to inequigranular and foliated.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Plagioclase	75	0.1-1	Granular	IG/MET	Undulatory extinction, small recrystallized grains, An_{51}
Pseudomorph	15	0.5-2	Anhedral	MET	Green-brown, elongated, kinked actinolite, probably after clinopyroxene
Epidote	5	0.3	Granular	MET	Replacing plagioclase
Smectite	5	?	Platy	MET	Pseudomorphs after amphibole
Opaque minerals	<2	0.1-0.3	Holly-leaf	IG/MET	Associated to amphibole

STRUCTURAL COMMENTS: Structures in the large fragment of anorthositic amphibolite: Foliation defined by alignment of elongate amphibole porphyroclasts, opaque minerals, and plagioclase ribbons. Plagioclase is largely recrystallized to ribbons and aggregates of 0.1 to 0.3 mm-sized polygonal grains with crystallographic preferred orientation. Some larger (1 mm) relict plagioclase grains with slightly undulatory extinction. Amphibole forms large, strained porphyroclasts with recrystallized tails. Structure of the breccia: The clasts are angular. They are set in a calcite matrix containing also small miscellaneous fragments, e.g. smectized amphibole and plagioclase. Veins of medium-grained calcite along the boundaries of the clasts.

173-1068A-18R-2 (Piece 10, 135-139 cm) **No. 111** OBSERVER: GAR, FRO, RUB

ROCK NAME: Micro-amphibolite.
GRAIN SIZE:Fine-grained.
TEXTURE: Equigranular.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Amphibole	60	0.2	Anhedral	MET	Not oriented, partly weathered to clays
Plagioclase	35	0.2	Anhedral	MET	Not oriented, triple junctions, recrystallization
Sericite	<2	0.1	Platy	MET	Replacing plagioclase
Chlorite	<1	0.1	Platy	MET	Replacing amphibole
Epidote	<2	0.2	Granular	MET	Replacing plagioclase
Opaque mineral	<1	0.2	Granular		Aggregates

STRUCTURAL COMMENTS: No foliation visible. One large plagioclase crystal (1.8 mm) with undulatory extinction and sericitization along microfractures. Otherwise, plagioclase and amphibole form a fine-grained (0.05 to 0.2 mm) aggregate. Triple junctions between plagioclase grains. Thin veinlets of calcite and epidote+plagioclase.

173-1068A- 18R-4 (Piece 4 ,60-64 cm) **No. 112** OBSERVER: HEB, FRO, RUB
ROCK NAME: Amphibolite.
GRAIN SIZE: Medium-grained.
TEXTURE: Porphyroclastic.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Plagioclase	50	0.1-3	Granular	IG/MET	Porphyroclasts, recrystallized small grains
Amphibole	40	0.1-2	Euhedral	MET	Green-brown, kinks, Undulatory extinction
Chlorite	5	0.3	Platy	MET	Undulatory extinction
Smectite	3	<0.3	Anhedral	MET	Pseudomorphs after amphibole, mesh-like texture
Fe-oxide	2	0.2	Granular	MET	

STRUCTURAL COMMENTS: Foliation defined by alignment of domains relatively enriched in plagioclase and amphibole, respectively, and by alignment of elongate amphibole and plagioclase porphyroclasts. Up to 3 mm-sized, old plagioclase grains exhibit strongly undulatory extinction and are surrounded by recrystallized grains (core-mantle structure). Recrystallized plagioclase is typically 0.1 to 0.2 mm-sized and has straight boundaries, triple junctions, and crystallographic preferred orientation. Amphibole forms large (up to 2 mm), poikilitic, strained crystals, and smaller recrystallized ones, partly dispersed in plagioclase aggregates. Late fibrous calcite filling veins along with Fe-oxides.

COMMENTS: Smectite replacing former amphibole or pyroxene.

173-1068A-18R-4 (Piece 6, 97-100 cm) **No. 113** OBSERVER: HEB, FRO, RUB

ROCK NAME: Sedimentary breccia with amphibolite clasts.
GRAIN SIZE: Medium-grained.
TEXTURE: Inequigranular to porphyroclastic.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Plagioclase	55	<0.2-2	Granular	MET	Porphyroclasts, undulatory extinction, small recrystallized grains
Amphibole	30	0.3-1	Anhedral to prismatic	MET	Green-brown, anhedral grains are recrystallized along with plagioclase
Chlorite	10	0.2-0.5	Platy	MET	Pseudomorphs after amphibole and pyroxene
Carbonates	5	0.3	Anhedral	MET	Replacing plagioclase
Opaque minerals	<2	0.1-0.3	Euhedral	IG(?)	Reddish edges, associated with amphibole
Epidote	<1	0.3	Granular	MET	Replacing plagioclase

STRUCTURAL COMMENTS: Structure of the amphibolite fragment: Foliation defined by alignment of domains relatively enriched in plagioclase and amphibole, respectively, and by alignment of elongate amphibole and plagioclase porphyroclasts. Up to 2 mm-sized, old plagioclase grains , partly undulatory, are surrounded by recrystallized grains (core-mantle structure). Recrystallized plagioclase is typically 0.1 to 0.2 mm-sized and has straight boundaries, triple junctions, and crystallographic preferred orientation.
Structure of the breccia: 10% of the thin section is matrix of the breccia, made of brown calcite, epidote and fragments of amphibolite. The matrix is impregnated with Fe oxide. Thin calcite veins along the margins of the larger clasts. Breccia clasts are angular to rounded. One of the clasts is a large (1.5 mm) carbonate crystal intergrown with chlorite.

COMMENTS: The main clast is described above. Other clasts include a small amphibole-rich micro-amphibolite and a very small plagioclase rich metabasic.

173-1067A-19R- 2(Piece 7, 104- 108 cm) **No. 116** OBSERVER:RUB

ROCK NAME: Sedimentary breccia, with amphibolite and anorthosite clasts.
GRAIN SIZE: Most clasts are fine-grained.
TEXTURE: Clastic.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Amphibole	40	0.5	Anhedral	MET	Green-brown
Plagioclase	50	0.5	Anhedral	MET	Turbid
Epidote	10	1.0	Acicular	VEIN	

STRUCTURAL COMMENTS: The largest clast has a week foliation defined by elongate hornblende, the overall texture being granular. The other clasts show no preferred orientation, or are too small to determine if one exists.

COMMENTS: The largest of the clasts (0.8 cm in length) is described above. The rock is a sedimentary breccia, consisting of about 60% poorly sorted subangular clasts of amphibolite and anorthosite in a matrix of altered plagioclase and hornblende fragments, calcite, chlorite, limonite, and cloudy material. Amphibole and plagioclase in the matrix and other clasts have been variably altered to chlorite, epidote and calcite.

173-1068A-19R-33 (Piece 1E , 100-105 cm)No. 117 OBSERVER: GAR, FRO, RUB
ROCK NAME:Foliated metagabbro
GRAIN SIZE: Fine- to medium-grained.
TEXTURE: Inequigranular.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Clinopyroxene	10	0.1-0.5	Anhedral	IG	
Hornblende	30	0.2-0.7	Anhedral	MET	Replacing clinopyroxene
Plagioclase	60	0.1-1.5	Anhedral	MET	An_{50}
Sericite	<1	0.1	Platy	MET	Replacing plagioclase
Chlorite	<1	0.1	Platy	MET	Replacing plagioclase and hornblende
Ilmenite	<1	1.5	Granular	IG	

STRUCTURAL COMMENTS: Foliation defined by layers rich in plagioclase and amphibole+clinopyroxene, respectively. Plagioclase forms aggregates of commonly twinned and in average 0.5 mm-sized grains. Plagioclase-plagioclase boundaries and, to a lesser extent, also plagioclase-amphibole boundaries, are straight and form triple junctions. Strong crystallographic preferred orientation of plagioclase.

173-1068A-19R-4 (Piece 1B , 23-27 cm) **No. 118** OBSERVER: GAR, MAN, FRO, RUB

ROCK NAME: Sedimentary breccia, with metagabbro and amphibolite clasts.
GRAIN SIZE: Coarse-grained.
TEXTURE: Inequigranular.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Clasts	80	0.6-2 cm	Angular		
Clinopyroxene	40	up to 3	Anhedral	IG/MET	Replaced by amphibole.
Hornblende	20	up to 0.5	Anhedral	MET	Replacing Clinopyroxene at the borders and along cleavages.
Plagioclase	35	0.5-1	Anhedral	MET	Undulatory extinctions, zonation, recrystallization, $An_{56.}$
Epidote	<1	0.1	Granular	MET	Replacing plagioclase.
Apatite	<1	0.2	Euhedral	IG	
Ilmenite	5	0.5	Granular	IG(?)/MET	
Sericite	<1	0.1	Platy	MET	Replacing plagioclase.
Chlorite	<1	0.1	Platy	MET	Replacing amphibole.
Matrix	20				
Calcite	90	0.1			In matrix of the breccia and in veins.
Clay	5	0.01			
Chlorite	5	0.1			

STRUCTURAL COMMENTS: Structure of the metagabbro: No foliation visible. Plagioclase occurs as relict, large (up to 3 mm) grains with undulatory extinction and deformation twins, and as aggregates of 0.3 to 0.5 mm-sized recrystallized grains with straight boundaries, triple junctions, and crystallographic preferred orientation. Large clinopyroxene crystals are marginally replaced by hornblende. Small (0.1 mm) hornblende grains also occur within the aggregates of recrystallized plagioclase.
Structure of the breccia: Clasts are commonly angular regardless of the grain size. No preferred orientation observed in the matrix. Calcite veins occur in the matrix and along the boundaries of clasts.

COMMENTS: Other clasts in the breccia include leucocratic amphibolites, the hornblende being replaced by chlorite in one such clast. Accessory apatite is present in one.

173-1068A-19R-4 (Piece 3 ,130-135 cm) **No. 120** OBSERVER: HEB, MAN, FRO, RUB

ROCK NAME: Foliated amphibolite.
GRAIN SIZE: Fine-grained.
TEXTURE: Equigranular.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Plagioclase	65	0.2-0.6	Granular	MET	Triple junctions, An_{49}
Amphibole	30	0.2-0.4	Subhedral	MET	Green-brown, interstitial,
Chlorite	3	0.2-0.4	Platy	MET	Pale green, replacing amphibole
Fe-oxide	2	0.1-0.4	Subhedral to euhedral	IG(?)	Associated with amphibole

STRUCTURAL COMMENTS: Structure of the amphibolite: Foliation defined by alignment of amphibole-rich and plagioclase-rich layers, and alignment of elongate amphibole grains and opaque minerals. Plagioclase crystals range between 0.2 and 0.6 mm and have triple junctions. They form mosaic-like aggregates together with amphibole grains of the same size or smaller. Thin epidote veins are crosscut by calcite veins. Array of parallel fractures partly filled with calcite. Structure of the breccia: Clasts are angular, matrix of the breccia consists of calcite and crystals of amphibole and plagioclase. In the matrix no preferred orientation is observed.

COMMENTS: Late carbonate vein (0.3 mm in thickness).

173-1068A-19R-4 (Piece 1C, 56-60 cm) **No. 119** OBSERVER: GAR, MAN, FRO, RUB

ROCK NAME: Metagabbro .
GRAIN SIZE: Medium-grained.
TEXTURE: Inequigranular.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Clinopyroxene	50	up to 5	Anhedral	IG/MET	Partly replaced by hornblende
Plagioclase	30	up to 5	Subhedral	IG/MET	Undulatory extinctions, recrystallization at the margin, zoned An_{58} (core) to An_{37} (rim)
Hornblende	10	0.5	Anhedral	MET	Green hornblende, replaced clinopyroxene, margin and certain crystallographic orientations
Opaque mineral	<1	0.5	Granular	IG	
Epidote	<1	0.1	Granular	MET	Partly replaced plagioclase
Chlorite	<3	0.1	Platy	MET	Partly replaced hornblende and plagioclase
Calcite		0.1-0.5	Anhedral		In veins

STRUCTURAL COMMENTS: Structure of metagabbro fragments: No foliation. Igneous texture preserved (zoned, euhedral plagioclase). Large plagioclase grains have deformation twins, undulatory extinction, and deformation bands. Subgrains and recrystallized grains (0.1 to 0.3 mm) along the margins of large plagioclase grains. Aggregates and ribbons of plagioclase neoblasts have triple junctions and crystallographic preferred orientation. Large primary clinopyroxene crystals are replaced by amphibole along fractures and margins. Small (about 0.1 mm) amphibole grains are distributed in the recrystallized plagioclase aggregates and form triple junctions with the latter. Structure of the breccia: Clasts are angular, matrix is represented by calcite veins (0.5 cm wide).

COMMENTS: Clasts of meta-gabbro (90%), matrix (or calcite veins) = 10%

173-1068A-20R-1 (Piece 3D, 77-78 cm) **No. 121** OBSERVER: GAR, MAN, FRO, RUB

ROCK NAME: Sedimentary breccia, with leucocratic amphibolite clasts.
GRAIN SIZE Medium-grained.
TEXTURE:

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Clasts					
Plagioclase	80	0.1-1.5	Anhedral	MET	Partly replaced by calcite
Amphibole	10	0.2	Anhedral	MET	Partly replaced by chlorite
Chlorite	2	0.1	Platy	MET	Partly replacing amphibole
Epidote	<1	0.2	Granular		
Opaque mineral	5	0.1-1.5	Granular	MET	
Matrix					
Calcite	80	0.2	Granular		
Epidote	5	0.1	Granular	MET	
Quartz	<1	0.1-0.3	Angular		
Plagioclase	10	0.05-0.2	Anhedral		
Chlorite	5	0.1	Platy	MET	Partly replacing amphibole
Veins: Calcite	100	0.2			

STRUCTURAL COMMENTS: The rock consists of fragments, cataclastic material, and veins. Fragments are angular to rounded and include metabasic rocks, plagioclase, amphibole (slightly bent crystals), and epidote. Metabasic rock fragments are strongly altered amphibolite/metagabbro to meta-anorthosite, in which the polygonal texture and partly even the crystallographic preferred orientation of dynamically recrystallized plagioclase aggregates is still visible. The plagioclase is replaced by calcite to variable extent. One fragment consists of coarse-grained, twinned calcite and a mineral with grey interference color (? zeolite). Amphibole grains in the matrix. Cataclastic material is cryptocrystalline and dark brown in plane-polarized light, and slightly foliated in places. Clasts and cataclastic material are crosscut by calcite-filled veins. Other veins follow the margins of clasts.
COMMENTS: Two stages of calcite formation occurred in the rock; the first one is pervasive, the calcite developing at the expense of plagioclase, and form, along with plagioclase, epidote and chlorite, the very fine grained matrix of the breccia. The second generation of calcite formation is associated with the fracturing, with calcite II occurring in veins. The clasts (0.5 mm up to 1.5 cm) represent = 20% of the thin section, the matrix= 60% and the veins = 20%.

173-1068A- 20R-5 (Piece 4 , 57-60 cm) **No. 122** OBSERVER: HEB, RUB, MAN, FRO

ROCK NAME: Metasomatized anorthosite or leucocratic metagabbro.
GRAIN SIZE: Coarse to fine-grained.
TEXTURE: Porphyroclastic for the plagioclase.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Plagioclase	60	0.1-2	Granular , Anhedral	IG/MET	Porphyroclasts, small recrystallized veins, undulatory extinction, deformed twins, kinks
Amphibole	30	<0.3	Fibrous	MET	Veins
Chlorite	10	<0.2	Platy	MET	Colorless, associated with amphibole and recrystallized plagioclase
Epidote	<2	<0.3	Granular	MET	Replacing plagioclase
Prehnite	<1	.03-1	Platy	VEIN	In thin veins, in places with tremolite

STRUCTURAL COMMENTS: Foliation defined by elongate plagioclase porphyroclasts and ribbons of recrystallized plagioclase alternating with amphibole-rich layers. Large porphyroclasts of plagioclase are highly strained (undulatory extinction, deformation bands, deformation lamellae) and surrounded in core-mantle structure by recrystallized smaller (0.1 to 0.2 mm) grains with straight boundaries, triple junctions, and crystallographic preferred orientation. Plagioclase is invaded by statically grown fibrous amphibole. Veins cross-cutting the foliation are filled with prehnite containing needles of amphibole.
COMMENTS:The amphiboles are mainly tremolite and are randomly oriented. They occur in irregular interconnected veins which have overprinted the original rock. Some of the veins form tongues parallel to the foliation, so that some of the amphiboles may have replaced frerromagnesians in the original rock, making it a leucocratic gabbro. Otherwise it was an anorthosite. Rarer greenish amphibole has probably pseudomorphed igneous pyroxene.

173-1067A- 20R-7 (Piece 5, 56-59 cm) **No. 123** OBSERVER: RUB
ROCK NAME: Breccia
GRAIN SIZE: Fine -grained.
TEXTURE: Cataclastic .

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Chlorite I	50	0.02	Flakes	MET birefringence	Matrix mineral. Light green pleochroism, anomalous blue-grey
Chlorite II	10	0.08	Flakes	MET	Mainly replacement of ferromagnesian minerals and/or plagioclase in clasts, light green color, anomalous blue birefringence
Chlorite III	10	0.08	Flakes	MET anomalous gray	Replacement of igneous clast minerals, some in matrix, light green,
Unknown	5	<0.01		MET hydrogarnet	Cloudy, almost isotropic, fairly high relief, possibly epidote group or
Clinopyroxene	2	0.4	Granular	IG	Relict igneous, mainly in clasts
Serpentine	20	<0.05		VEIN birefringence	Veins of colorless mineral, near isotropic with deep blue-grey

STRUCTURAL COMMENTS: The rock is a cataclastic, matrix-supported breccia with subangular to well-rounded clasts (20% of the rock), a chloritized matrix (60%), and serpentine veins (20%). Preferred orientation of chlorite in the matrix and some elongated clasts define a weak foliation. The clasts (from 0.5 mm up to 1.5 cm) are altered meta-gabbro (containing pyroxene) to meta-anorthosite. Anastomosing serpentine veins are subparallel to the foliation.

173-1068A- 20R-7 (Piece 7A , 82-85 cm) **No. 124** OBSERVER: HEB, MAN, FRO, RUB

ROCK NAME: Breccia, with clasts of serpentinized dunite, serpentinized peridotite.
GRAIN SIZE: The original dunite and peridotite were medium-grained.
TEXTURE: Mesh texture in serpentinized dunite, mesh and bastites in the serpentinized peridotite.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Dunite					
Serpentine	99	<<1	Fibrous	MET/VEIN	Pseudomorphs after olivine and <1% pyroxene.
Spinel	1	0.3	Anhedral	IG	Red brown, wormy.
Peridotite					
Serpentine	95	<<1	Fibrous	MET/VEIN	Pseudomorphs after olivine and pyroxene
Tremolite	1	0.2	Fibrous	MET	
Spinel	<1	1	Subhedral	IG	Opaque mineral to dark red.

STRUCTURAL COMMENTS: The rock is a matrix-supported fault(?) breccia with (mainly) serpentinite fragments in a matrix of fine-grained cataclastic material.
Fragments are angular to rounded, some fragments are elongate. Weak foliation defined by alternating finer- and coarser-grained layers and alignment of elongate clasts. This foliation curves around clasts. The largest clast (serpentinized dunite) has typical mesh texture.The second largest clast (serpentinized peridotite) has partly mesh texture, partly polygonal texture formed by 0.5 to 0.8 mm-sized grains replaced by serpentine.

COMMENTS: Few chrysotile veinlets cutting serpentinized peridotite and dunite. Matrix is heterogeneous and made of smaller fragments of serpentinized peridotites and dunites, single pseudomorphs after pyroxene, brown spinels, brown carbonate magnetite.

1fragment,2 cm across, serpentinized dunite (less than 5% pyroxene pseudomorphs)
1 fragment, 1 cm across, serpentinized peridotite (with more than 5% pyroxene pseudomorphs)

173-1068A- 22R- 1 (Piece 9A , 75-78 cm) **No. 125** OBSERVER: GAR, FRO, RUB

ROCK NAME: Serpentinized dunite(?).
GRAIN SIZE: The original peridotite was medium grained.
TEXTURE: Mesh texture.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Serpentinite	85		Mesh	MET	Replacing olivine , pyroxene, and in veins
Magnetite	1	<0.01	Granular	MET	Replacing spinel and in matrix
Chlorite	3	0.1	Platy	MET	
Carbonate	1	0.02	Granular		
Sulphide	10	<0.01	Aggregates	MET	In veins and aggregates up to 5 mm in size

STRUCTURAL COMMENTS: No foliation visible. Mesh-textured serpentinite, cut by veins of several different types. Some veins are filled with opaque mineral and chlorite. In addition, the opaque mineral occurs in patches. Veins and patches are deformed and crosscut by later veins filled with fibrous serpentine. Bastite pseudomorphs are kinked or slightly folded and have undulatory extinctions.

COMMENTS: The rock has an unusual mesh texture, with some chrysotile veins. The sulfide appears to be fine grained aggregates, and is veined by serpentine. As no bastite pseudomorphs are present, the original rock may have been a dunite.

173-1068A- 23R-1 (Piece 3C, 28-32 cm) **No. 142** OBSERVER: GAR, FRO, RUB

ROCK NAME: Serpentinized peridotite.
GRAIN SIZE: Fine-grained.
TEXTURE: Mesh with minor bastite.

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Serpentine	90	0.1	Mesh	MET	Replacing olivine and pyroxene and in veins
Spinel(?)	1	0.3-0.7	Subhedral	IG	Replaced by magnetite
Opaque minerals	3	0.2-0.5		MET	Replacing spinel, and in serpentine matrix
Tremolite	2	0.2	Fibers	MET	Replacing pyroxene
Chlorite	2	0.1	Platy	MET	Patches and veins

STRUCTURAL COMMENTS: The foliation is defined by alignment of spinel relics. Mesh texture, especially well-developed in former olivine. Several generations of veins filled with serpentine, chlorite and opaque minerals. Bastite pseudomorphs with undulatory extinctions and bent cleavage.

COMMENTS: No relics of plagioclase around spinel. Bastite pseudomorphs are only 5-10%, but patches of cloudy material may be pseudomorphing clinopyroxene. Cores in some of the mesh-texture serpentine are replaced by a brown mineral with low birefringence. Opaque minerals are concentrated in clusters and veins, and include sulphide and magnetite.

173-1068A-24R-1 (Piece 6H , 71-75 cm) **No. 114** OBSERVER: HEB, FRO, RUB

ROCK NAME: Serpentinized plagioclase peridotite.
GRAIN SIZE: Fine to medium-grained.
TEXTURE: Equigranular, mesh texture.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Serpentine	85	0.2-0.5	Fibrous	MET	Replacing former olivine (80%) as mesh texture, and pyroxene (<10%) as mainly bastite pseudomorphs
Chlorite	10	<0.1-0.2	Platy, flaky	MET	Replacing plagioclase and pyroxene, bright green color
Spinel	<1	0.2	Holly-leaf	IG	Opaque to red brown, wormy, largely altered to magnetite
Magnetite	<1	<0.1	Dust	MET	
Tremolite	<1	0.1	Anhedral	MET	Lining pseudomorphs after pyroxene

STRUCTURAL COMMENTS: Foliation defined by alignment of spinel relics. Mesh texture. Bastite pseudomorphs with undulatory extinction. Different generations of veins filled with serpentine, chlorite, and opaque minerals. Large vein along the edge of the thin section shows internal “folding and thrusting”.

COMMENTS: Spinel is enclosed in chlorite, interpreted as having replaced plagioclase which in turn had partly replaced spinel. The chlorite is possibly the Cr chlorite, kammererite. Chrysotile fibers with transverse texture are present(<5% in volume, counted as serpentine).

173-1068A- 24R-2 (Piece 4A, 57-61 cm) **No. 115** OBSERVER: HEB, FRO

ROCK NAME: Serpentinized plagioclase peridotite.
GRAIN SIZE: Fine to medium-grained.
TEXTURE: Inequigranular, mesh texture.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Serpentine	95	0.3-0.8	Fibrous	MET	Pseudomorphs after olivine (85%) and pyroxene (bastite; <10%)
Tremolite	1	0.2-0.4	Fibrous	MET	Lining pyroxene pseudomorphs
Spinel	3	0.1-0.7	Elongated	IG	Wormy, holly leaf
Chlorite	2	0.3	Platy, flaky	MET	Bright apple green
Magnetite	<1	<<1	Dust	MET	

STRUCTURAL COMMENTS: Foliation defined by elongate spinel and plagioclase pseudomorphs. Cleavage planes of bastite pseudomorphs subparallel to the foliation. Bastite partly with undulatory extinctions.

COMMENTS: Spinel is interpreted as having been replaced by plagioclase,which in turn has been replaced G-chloride (kammererite?). Some chrysotile veins, <0.3 mm in width.

173-1068A-25R-2 (Piece 8A, 96-100 cm) **No. 126** OBSERVER: GAR, MAN, FRO, RUB

ROCK NAME: Serpentinized plagioclase peridotite.
GRAIN SIZE: Original peridotite was medium-grained.
TEXTURE: Mesh texture and bastites.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Serpentinite	90	0.01	Mesh	MET	Replacing olivine and pyroxenes
Tremolite	1	0.1	Fibers	MET	
Chlorite	3	0.1	Mesh	MET	As corona surrounding spinel, replacing plagioclase
Spinel	<1	0.5	Granular	IG	
Magnetite	<1	0.01	Granular	MET	

STRUCTURAL COMMENTS: Relict high-T foliation parallel to the length of the section defined by alignment of elongate spinel relics and their coronas, and of elongate bastite pseudomorphs. Mesh texture in former olivine.

COMMENTS: The original was a spinel peridotite, interpreted as having been transformed into serpentinized plagioclase peridotite. Pyroxene (3-4 mm) is replaced by bastite (20%). The spinel is interpreted as having been replaced by plagioclase, the plagioclase in turn being replaced by chlorite.

173-1068- 25R-3 (Piece 8B, 116-120 cm) **No. 127** OBSERVER: ABE, FRO, RUB

ROCK NAME: Serpentinized peridotite.
GRAIN SIZE: Original peridotite was medium-grained.
TEXTURE: Mesh structure and bastites.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Spinel	<1	<0.8	Anhedral	IG	Brown.
Serpentine	90			MET	
Chlorite	5		Flakes	MET	
Tremolite	<1	<0.1	Fibers	MET	
Magnetite	<1			MET	Some replacing chromian spinel.
Weathered material	5			MET	Brown to pale brown.
Sulphide	<1	<0.01		MET	

STRUCTURAL COMMENTS: No foliation visible, spinel relicts and bastite pseudomorphs are randomly oriented. Mesh structure in former olivine.

COMMENTS: 1-5 mm size bastite pseudomorphs after pyroxene comprise 10% of the rock.

173-1068A-25R-3 (Piece , 43-47 cm) **No. 128** OBSERVER: GAR, MAN, FRO, RUB

ROCK NAME: Serpentinized peridotite.
GRAIN SIZE: The original peridotite was medium grained.
TEXTURE:Mesh texture and bastites.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Serpentine	90	0.1	Mesh	MET	Replacing olivine and pyroxenes, and in veins
Chlorite	5	0.3	Platy	MET	
Tremolite	1	0.2		MET	
Magnetite	1	<0.5	Anhedral	MET	Replacing spinel , olivine and orthopyroxene.
Spinel	<1	0.2	Anhedral	IG	Wormy shapes, red brown to brown, partly replaced by magnetite.

STRUCTURAL COMMENTS: Relict high-T foliation defined by alignment of spinel. Mesh texture in former olivine. Several generations of veins crosscutting each other. Youngest generation is represented by antitaxial veins with transverse fibers. Microthrusting and folding within one vein.

COMMENTS: Bastite pseudomorphs after pyroxene average 1.5 mm, and comprise 15% of the rock. Brown cloudy material in patches and mesh cores.

173-1068A-26-1 (Piece 2 , 11-14 cm) **No. 129** OBSERVER: HEB, MAN, FRO, RUB

ROCK NAME: Foliated serpentinized peridotite.
GRAIN SIZE: Original peridotite was medium-grained.
TEXTURE: Equigranular.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Serpentine	95	0.2-0.5	Mesh	MET/VEIN	Pseudomorphs after olivine (original mode 75%) and pyroxene (bastite; original mode 20%)
Spinel	<1	0.1-0.4	Elongated	IG	Holly leaf, red brown, red-brown
Chlorite	5	0.3	Platy	MET	
Tremolite	<2	0.2	Fibrous	MET	Partly replacing pyroxene pseudomorphs
Magnetite	<1	<0.2	Anhedral	MET	
Sulphide	<1	<0.01	Anhedral	MET	

STRUCTURAL COMMENTS: Relict high-T foliation defined by elongated spinel. Bastite pseudomorphs often oriented with their cleavage planes parallel to the foliation. Mesh texture of serpentine replacing olivine.

COMMENTS: Some clusters of serpentinized pyroxene. Minor carbonate filling core of mesh textures. A few veins of chrysotile 0.3 mm wide cutting foliation.

173-1068A-26R-1 (Piece 4B, 120-124 cm) **No. 130** OBSERVER: HEB, RUB

ROCK NAME: Serpentinized lherzolite.
GRAIN SIZE:The original peridotite was medium-grained.
TEXTURE: Mesh texture and bastites.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Serpentine	85	0.3-3	Mesh, fibrous	MET/VEIN	Replacing olivine (former percentage 65%), pyroxene (bastite; former percentage 30%)
Chlorite	5	0.2	Platy	MET	
Magnetite	5	0.2	Granular Dust	MET	Associated with serpentine
Clinopyroxene	<2	0.3	Anhedral	IG	Relicts within larger pseudomorphed grains
Spinel	<2	0.1-0.7	Anhedral	IG	Some euhedral and wormy shapes, red brown to brown

STRUCTURAL COMMENTS: Foliation is well defined by elongated spinel. Cores of mesh texture filled with amorphous serpentine and/or dark carbonate. Dark irregular isotropic minerals forming patches could be pseudomorphs after plagioclase. Clinopyroxene is irregular in shape (lobate) while orthopyroxene? pseudomorphs are euhedral to subhedral showing preserved plastic deformation features. Initial orthopyroxene mode was around 20% and 10% for clinopyroxene. Chrysotile veins 0.1-0.3 mm in width, filled with transversal fibers (at high angle to the walls).

COMMENTS: The original orthopyroxene content was about 20%, and clinopyroxene 10%. The average size of pyroxene pseudomorphs is 2 mm.

173-1068A- 26R-2 (Piece 1B, 51-56 cm) **No. 132** OBSERVER: ABE, MAN, RUB

ROCK NAME: Serpentinized plagioclase peridotite.
GRAIN SIZE: Medium-grained.
TEXTURE: Mesh.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Serpentine	90	<0.2	Fibrous	MET/VEIN	Pseudomorphs after olivine and pyroxene
Chlorite	<3	0.2	Platy	MET	Surrounding spinel and pseudomorph after spinel
Magnetite	<5	<0.1		MET	Pseudomorph after spinel, included in serpentine
Spinel	<1	<1	Holly leaf	IG	Brown, surrounded by chlorite
Isotropic material	<3			MET	Forms pyroxene pseudomorphs
Brown cloudy material	7			MET	Associated with serpentine

STRUCTURAL COMMENTS: Relics of spinel show a weak preferred orientation. Several generations of veins.

COMMENTS: The rock contains about 25% pseudomorphs after pyroxenes, averaging 1.5 mm in size; these include bastite, largely after orthopyroxene, and an isotropic serpentine and cloudy material which may have replaced clinopyroxene. The chlorite surrounding spinel is interpreted as having replaced plagioclase.

173-1068A-26R-4 (Piece 2B , 4-48 cm) **No. 131** OBSERVER: GAR, RUB

ROCK NAME: Serpentinized plagioclase lherzolite.
GRAIN SIZE: The original peridotite was medium grained.
TEXTURE:Mesh texture and bastites.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Serpentinite	85	0.1	Mesh and bastites	MET	Replacing olivine (former percentage 75%), and in veins
Chlorite	5	0.1	Platy	MET	Apple-green chlorite (kammererite?), pseudomorphs after plagioclase.
Magnetite	5	0.5	Anhedral	MET	Replacing spinel and in serpentine
Spinel	1	0.2	Anhedral	IG	Subhedral and wormy shapes, largely replaced by magnetite
Sulphide	1	<0.1		MET	

STRUCTURAL COMMENTS: Foliation is well defined by elongated spinel and pyroxenes pseudomorphed into Cr-chlorite. One pyroxene pseudomorph is kinked. Chrysotile veins 0.1-0.3 mm in width, filled with transversal fibers (at high angle to the walls).

COMMENTS: The rock contains about 25% bastite pseudomorphs after pyroxenes, grain size averaging 2.5 mm. The chlorite surrounding former spinels is interpreted as having replaced plagioclase.

173-1068A- 28R-2 (Piece 1B, 42-46 cm) **No. 133** OBSERVER: ABE, MAN, RUB

ROCK NAME: Serpentinized plagioclase lherzolite.
GRAIN SIZE: Original peridotite was medium-grained..
TEXTURE: Mesh texture and bastites.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Serpentine	85	<0.2	Fibrous	MET/VEIN	Pseudomorphs after olivine and pyroxene
Chlorite	<5	<0.2	Platy	MET	Surrounding spinel and pseudomorph after spinel
Magnetite	<5		Granular	MET	Pseudomorph after spinel, included in serpentine
Spinel	<1	<1	Holly leaf	IG	Brown, surrounded by chlorite
Isotropic material	10			MET	Forms clinopyroxene pseudomorphs
Carbonate (calcite or hydromagnesite?)		2			MET

STRUCTURAL COMMENTS: Foliation plane is defined by spinel with a chlorite corona. Some of the pyroxene are aligned parallel to the foliation.
Several generations of veins crosscut the sample.

COMMENTS: The rock contains about 25% bastite pseudomorphs after orthopyroxene, with sizes mainly in the range 1.2-5.5 mm. About 20%, 1.5-2.5 mm grains of clinopyroxene have been replaced by cloudy material, serpentine and minor tremolite. The original clinopyroxene grains are irregular in shape and some were poikilitic, enclosing former olivine grains. The chlorite surrounding the spinels is interpreted as having pseudomorphed plagioclase.

173-1068A- 28R- 3 (Piece 1, 2-5 cm) **No. 134** OBSERVER: GAR, MAN, FRO, RUB

ROCK NAME: Serpentinized peridotite.
GRAIN SIZE: Original peridotite was medium grained.
TEXTURE: Mesh texture, with bastite pseudomorphs.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Serpentinite	90	0.1	Mesh	MET	Replacing olivine and veins
Chlorite	1	0.2	Platy	MET	Surrounding some spinel grains and in veins
Tremolite	5	0.3	Platy	MET	Replacing orthopyroxene
Magnetite	<1	<0.01		MET	
Sulphide	<1	<0.01		MET	
Spinel	1	0.2-0.5	Anhedral	MET	Brown, partly replaced by magnetite

STRUCTURAL COMMENTS: Mesh texture in former olivine, bastite replacing pyroxene. Several generations of veins. Large vein along the edge of the thin section shows internal “folding and thrusting”. This vein and the wallrock are partly overgrown by unknown mineral(?) with blue-green color in reflected light and brown color in transmitted light.

COMMENTS: Mesh textured) serpentinite after olivine and bastite pseudomorphs after pyroxene (20% of original peridotite). Cloudy brown material, possibly clay, is associated with the mesh serpentine. Veins make up 50% of the thin section, and include thinner normal cross-fibre chrysotile veins, and a wide vein of low birefringent and “laminated” serpentinite, in part replaced or pseudomorphed by an unusual brown mineral, the boundaries of which are sharp and transect the laminations

173-1068A- 29R-3 (Piece 1C, 62- 66 cm) **No. 135** OBSERVER: HEB, MAN, RUB

ROCK NAME: Serpentinized plagioclase lherzolite.
GRAIN SIZE: Medium-grained (original peridotite).
TEXTURE: Mesh-textured, with bastite pseudomorphs.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Serpentine	80	<<0.2	Fibrous	MET/VEIN	Pseudomorphs after olivine (original 70%) and pyroxene (original 30%)
Chlorite	5	<0.3	Platy	MET	Replacing former plagioclase and pyroxene pseudomorphs
Amphibole	5	0.1-0.5	Prismatic	MET	Replacing pyroxene
Magnetite	5	0.1	Granular	MET	Filling cores of mesh texture associated to clays and carbonate
Spinel	<2	0.1-1	Holly leaf	IG	Surrounded by chlorite
Sulphide	<1	0.01	Anhedral	MET	

STRUCTURAL COMMENTS: Foliation clearly defined by alignment of spinel and plagioclase pseudomorphs. Pyroxene pseudomorphs have their cleavage aligned parallel to the foliation.

COMMENTS: Orthopyroxene (10% of original peridotite) has been pseudomorphed by bastite, with the originally grain size in the range 2-4 mm. Flakes of slightly higher birefringent serpentine fringe the pseudomorphs and occur within them. Tremolite fibers within the bastites may represent pseudomorphed clinopyroxene exsolution lamellae. Clinopyroxene grains (20% of original peridotite and 2-4 mm in length) have been pseudomorphed by tremolite, cloudy material and serpentine, and occur as aligned poikilitic irregular grains.

173-1068A- 29R-3 (Piece 1F, 99-103 cm) **No. 136** OBSERVER: HEB, MAN, RUB

ROCK NAME: Serpentinized plagioclase peridotite (lherzolite).
GRAIN SIZE: Medium grained (original peridotite).
TEXTURE: Mesh textured, with bastite pseudomorphs.

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Serpentine	80	0.2-4	Pseudomorphs Mesh	MET/VEIN	Pseudomorphs after olivine (originally 55%) and pyroxene (originally 25%)
Isotropic mate-	10	<<0.1	-		Filling cores of mesh texture and pseudomorphs after pyroxene; mixture of carbonate and clays (smectite)
Tremolite	5	<0.1-0.2	Fibrous	MET	Lining pyroxene pseudomorphs
Chlorite	5	0.2	Platy	MET kammererite(?)	Elongate, Mg-rich, replacing former plagioclase: colorless; apple-green:
Spinel	<2	0.-0.7	Anhedral	IG	Holly leaf, wormy, surrounded by mixture of Mg-chlorite and Cr-chlorite(?).
Magnetite	<2	<0.2	Dust	MET	Associated with serpentine
Sulphide	1	<0.01	Dust	MET	

STRUCTURAL COMMENTS: Well developed high-T foliation defined by alignment of spinel and plagioclase pseudomorphs. Pyroxene pseudomorphs aligned parallel to the foliation. Several generations of veins.

COMMENTS: Nice coronitic texture around spinel made of colorless Mg-rich chlorite variety in turn replaced by another (possibly Cr-chlorite,kammererite).-Chlorite is also replacing pyroxene pseudomorphs. Brown isotropic and typical bastites may correspond to pseudomorphism of orthopyroxene and clinopyroxene respectively.

173-1068A- 28R, CC OBSERVER:RUB

ROCK NAME: Serpentinized plagioclase lherzolite.
GRAIN SIZE: Original peridotite was medium grained.
TEXTURE: Mesh texture and bastite

MINERALOGY:

NAME	MODE (%)	SIZE (mm)	SHAPE	IG/MET/VEIN	COMMENTS
Serpentine	95		Mesh	MET	Replacing olivine as mesh and pyroxenes as bastite, and in a vein
Spinel	2	0.8-1.5	Vermicular	IG	Brown, partly replaced by magnetite
Magnetite	1	0.01	Anhedral	MET	In serpentine, and replacing spinel
Chlorite	1	0.04	Flakes	MET	Concentrated around spinel, probably replacing plagioclase
Sulphide	<1	<0.01	Anhedral	MET	

STRUCTURAL COMMENTS: No obvious relict foliation. One vein is composed of an isotropic serpentine with a central zone containing low birefringent rosettes of serpentine(?).

COMMENTS: Bastite pseudomorphs of orthopyroxene, averaging 2 mm in length,comprise 15% of the rock. Other pseudomorphs, 2 mm in length, are comprised of isotropic serpentine and brown cloudy material, and are interpreted as replacement of clinopyroxene (10% of the rock). The latter pseudomorphs in places poikilitically enclose olivine pseudomorphs, and also occur in some clusters of orthopyroxene pseudomorphs.

Prior Chapter Contents Next Chapter