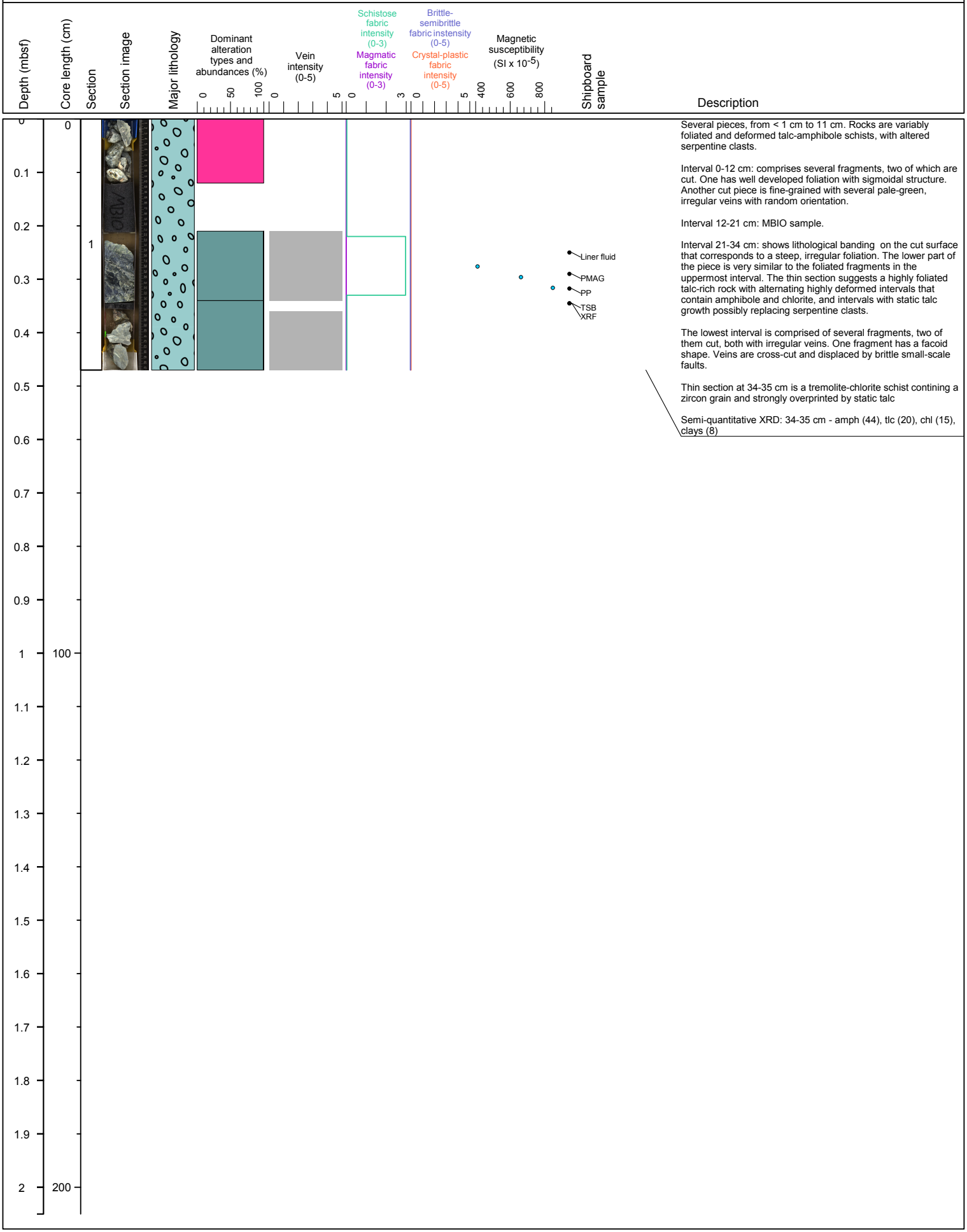
Site M0068 Hole A Core 1R Cored 0-1.965 mbsf



Several pieces, from < 1 cm to 11 cm. Rocks are variably foliated and deformed talc-amphibole schists, with altered serpentine clasts.

Interval 0-12 cm: comprises several fragments, two of which are cut. One has well developed foliation with sigmoidal structure. Another cut piece is fine-grained with several pale-green, irregular veins with random orientation.

Interval 12-21 cm: MBIO sample.

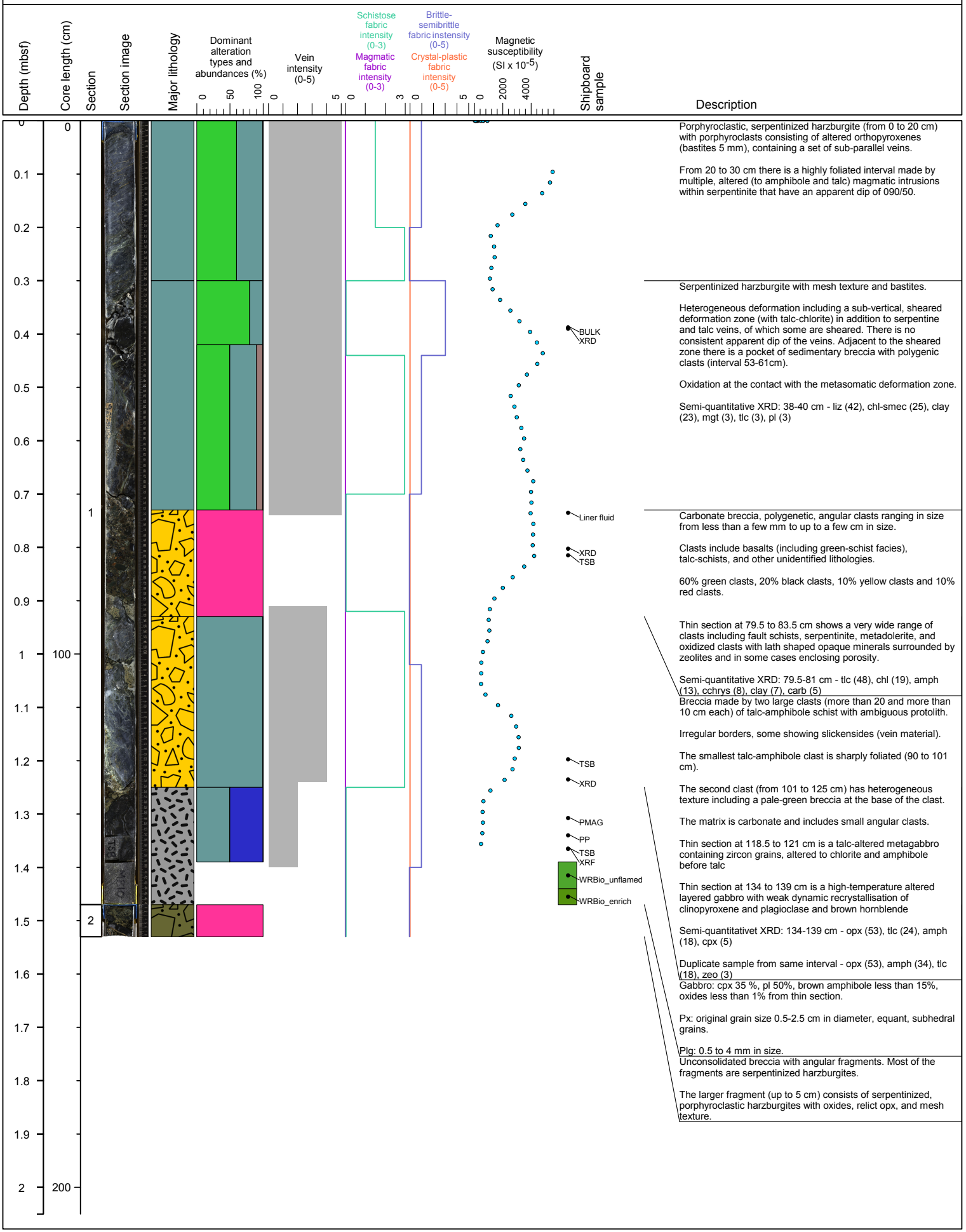
Interval 21-34 cm: shows lithological banding on the cut surface that corresponds to a steep, irregular foliation. The lower part of the piece is very similar to the foliated fragments in the uppermost interval. The thin section suggests a highly foliated talc-rich rock with alternating highly deformed intervals that contain amphibole and chlorite, and intervals with static talc growth possibly replacing serpentine clasts.

The lowest interval is comprised of several fragments, two of them cut, both with irregular veins. One fragment has a facoid shape. Veins are cross-cut and displaced by brittle small-scale faults.

Thin section at 34-35 cm is a tremolite-chlorite schist contining a zircon grain and strongly overprinted by static talc

Semi-quantitative XRD: 34-35 cm - amph (44), tlc (20), chl (15), clays (8)

Site M0068 Hole B Core 1R Cored 0-1.72 mbsf



Porphyroclastic, serpentinized harzburgite (from 0 to 20 cm) with porphyroclasts consisting of altered orthopyroxenes (bastites 5 mm), containing a set of sub-parallel veins.

From 20 to 30 cm there is a highly foliated interval made by multiple, altered (to amphibole and talc) magmatic intrusions within serpentinite that have an apparent dip of 090/50.

Serpentinized harzburgite with mesh texture and bastites.

Heterogeneous deformation including a sub-vertical, sheared deformation zone (with talc-chlorite) in addition to serpentine and talc veins, of which some are sheared. There is no consistent apparent dip of the veins. Adjacent to the sheared zone there is a pocket of sedimentary breccia with polygenic clasts (interval 53-61cm).

Oxidation at the contact with the metasomatic deformation zone.

Semi-quantitative XRD: 38-40 cm - liz (42), chl-smec (25), clay (23), mgt (3), tlc (3), pl (3)

Carbonate breccia, polygenetic, angular clasts ranging in size from less than a few mm to up to a few cm in size.

Clasts include basalts (including green-schist facies), talc-schists, and other unidentified lithologies.

60% green clasts, 20% black clasts, 10% yellow clasts and 10% red clasts.

Thin section at 79.5 to 83.5 cm shows a very wide range of clasts including fault schists, serpentinite, metadolerite, and oxidized clasts with lath shaped opaque minerals surrounded by zeolites and in some cases enclosing porosity.

Semi-quantitative XRD: 79.5-81 cm - tlc (48), chl (19), amph (13), cchrys (8), clay (7), carb (5)

Breccia made by two large clasts (more than 20 and more than 10 cm each) of talc-amphibole schist with ambiguous protolith.

Irregular borders, some showing slickensides (vein material).

The smallest talc-amphibole clast is sharply foliated (90 to 101 cm).

The second clast (from 101 to 125 cm) has heterogeneous texture including a pale-green breccia at the base of the clast.

The matrix is carbonate and includes small angular clasts.

Thin section at 118.5 to 121 cm is a talc-altered metagabbro containing zircon grains, altered to chlorite and amphibole before talc

Thin section at 134 to 139 cm is a high-temperature altered layered gabbro with weak dynamic recrystallisation of clinopyroxene and plagioclase and brown hornblende

Semi-quantitativet XRD: 134-139 cm - opx (53), tlc (24), amph (18), cpx (5)

Duplicate sample from same interval - opx (53), amph (34), tlc (18), zeo (3)

Gabbro: cpx 35 %, pl 50%, brown amphibole less than 15%, oxides less than 1% from thin section.

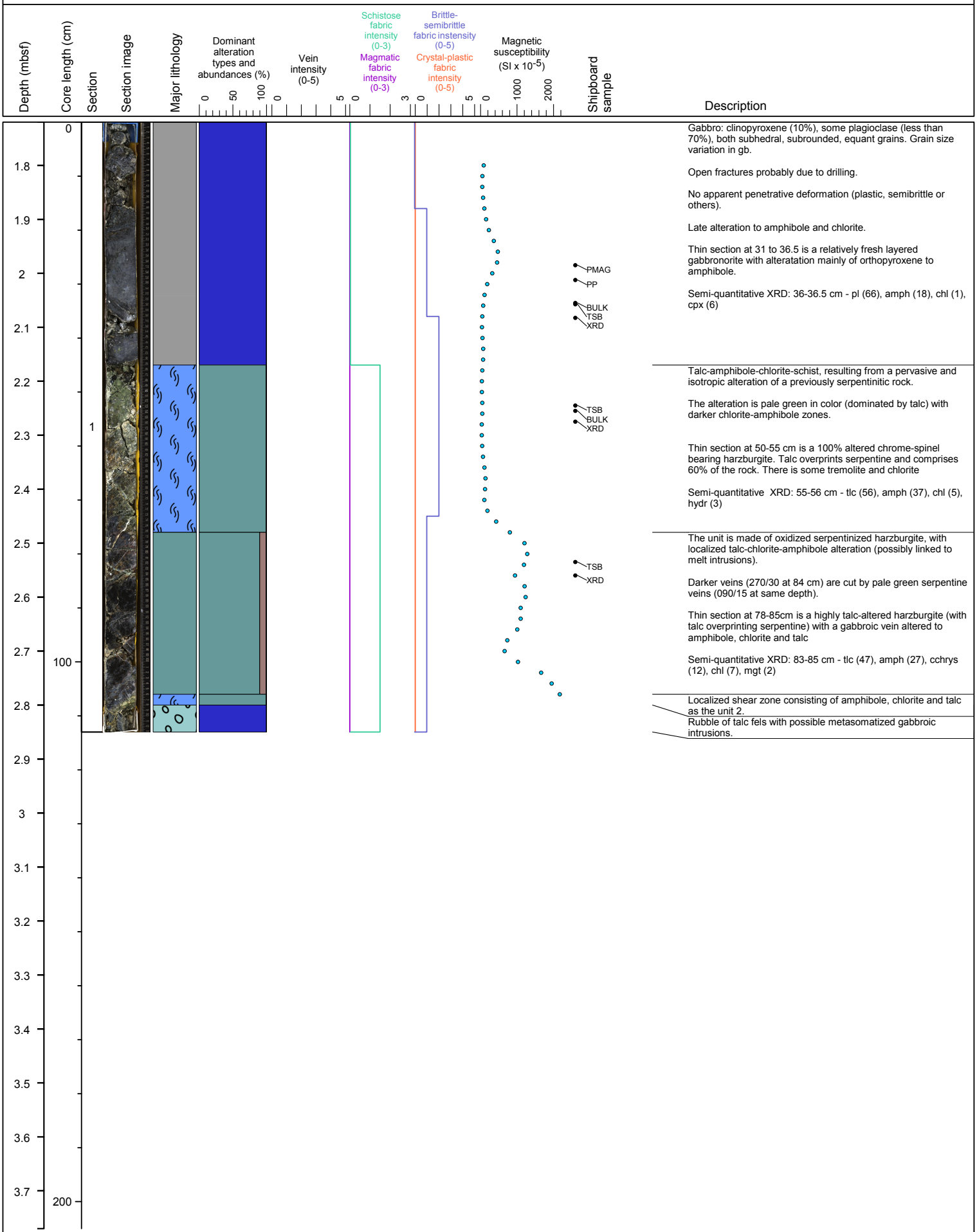
Px: original grain size 0.5-2.5 cm in diameter, equant, subhedral grains.

Plg: 0.5 to 4 mm in size.

Unconsolidated breccia with angular fragments. Most of the fragments are serpentinized harzburgites.

The larger fragment (up to 5 cm) consists of serpentinized, porphyroclastic harzburgites with oxides, relict opx, and mesh texture.

Site M0068 Hole B Core 2R Cored 1.72-3.295 mbsf



Description

Gabbro: clinopyroxene (10%), some plagioclase (less than 70%), both subhedral, subrounded, equant grains. Grain size variation in gb.

Open fractures probably due to drilling.

No apparent penetrative deformation (plastic, semibrittle or others).

Late alteration to amphibole and chlorite.

Thin section at 31 to 36.5 is a relatively fresh layered gabbronorite with alteratation mainly of orthopyroxene to amphibole.

Semi-quantitative XRD: 36-36.5 cm - pl (66), amph (18), chl (1), cpx (6)

Talc-amphibole-chlorite-schist, resulting from a pervasive and isotropic alteration of a previously serpentinitic rock.

The alteration is pale green in color (dominated by talc) with darker chlorite-amphibole zones.

Thin section at 50-55 cm is a 100% altered chrome-spinel bearing harzburgite. Talc overprints serpentine and comprises 60% of the rock. There is some tremolite and chlorite

Semi-quantitative XRD: 55-56 cm - tlc (56), amph (37), chl (5), hydr (3)

The unit is made of oxidized serpentinized harzburgite, with localized talc-chlorite-amphibole alteration (possibly linked to melt intrusions).

Darker veins (270/30 at 84 cm) are cut by pale green serpentine veins (090/15 at same depth).

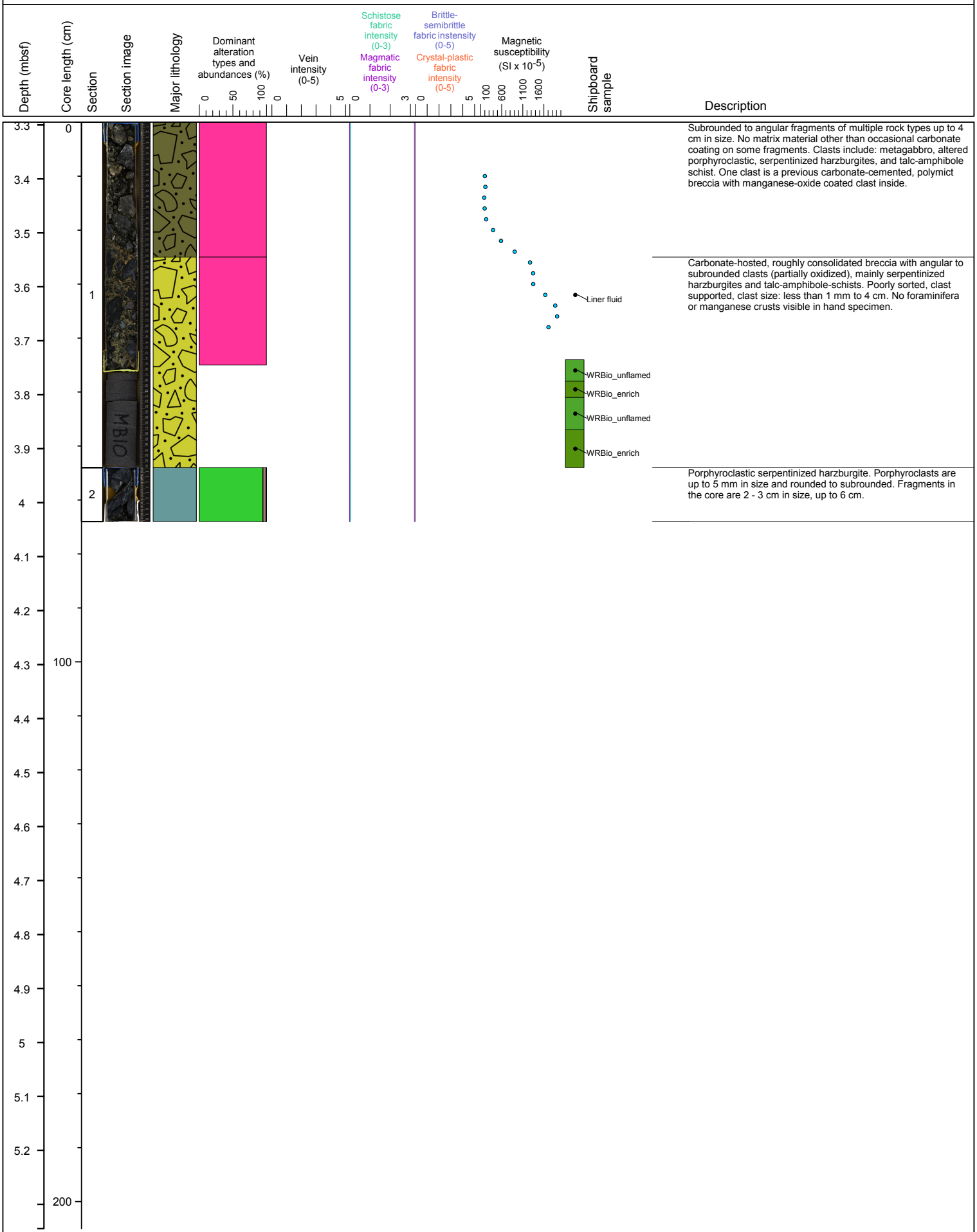
Thin section at 78-85cm is a highly talc-altered harzburgite (with talc overprinting serpentine) with a gabbroic vein altered to amphibole, chlorite and talc

Semi-quantitative XRD: 83-85 cm - tlc (47), amph (27), cchrys (12), chl (7), mgt (2)

Localized shear zone consisting of amphibole, chlorite and talc as the unit 2.

Rubble of talc fels with possible metasomatized gabbroic intrusions.

Site M0068 Hole B Core 3R Cored 3.295-4 mbsf

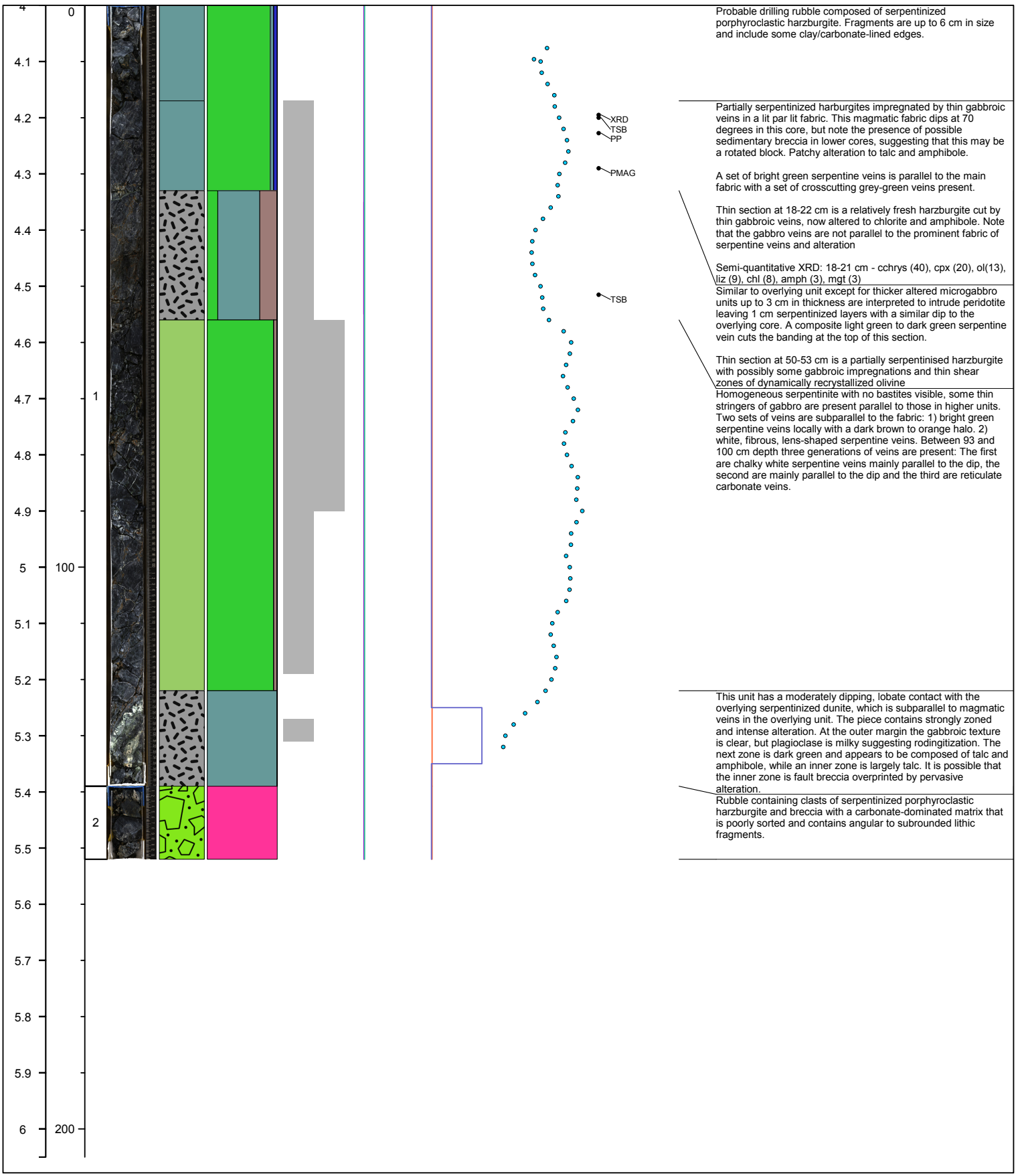


Subrounded to angular fragments of multiple rock types up to 4 cm in size. No matrix material other than occasional carbonate coating on some fragments. Clasts include: metagabbro, altered porphyroclastic, serpentinized harzburgites, and talc-amphibole schist. One clast is a previous carbonate-cemented, polymict breccia with manganese-oxide coated clast inside.

Carbonate-hosted, roughly consolidated breccia with angular to subrounded clasts (partially oxidized), mainly serpentinized harzburgites and talc-amphibole-schists. Poorly sorted, clast supported, clast size: less than 1 mm to 4 cm. No foraminifera or manganese crusts visible in hand specimen.

Porphyroclastic serpentinized harzburgite. Porphyroclasts are up to 5 mm in size and rounded to subrounded. Fragments in the core are 2 - 3 cm in size, up to 6 cm.

Site M0068 Hole B Core 4R Cored 4-5.72 mbsf



Description

Probable drilling rubble composed of serpentinized porphyroclastic harzburgite. Fragments are up to 6 cm in size and include some clay/carbonate-lined edges.

Partially serpentinized harburgites impregnated by thin gabbroic veins in a lit par lit fabric. This magmatic fabric dips at 70 degrees in this core, but note the presence of possible sedimentary breccia in lower cores, suggesting that this may be a rotated block. Patchy alteration to talc and amphibole.

A set of bright green serpentine veins is parallel to the main fabric with a set of crosscutting grey-green veins present.

Thin section at 18-22 cm is a relatively fresh harzburgite cut by thin gabbroic veins, now altered to chlorite and amphibole. Note that the gabbro veins are not parallel to the prominent fabric of serpentine veins and alteration

Semi-quantitative XRD: 18-21 cm - cchrys (40), cpx (20), ol(13), liz (9), chl (8), amph (3), mgt (3)

Similar to overlying unit except for thicker altered microgabbro units up to 3 cm in thickness are interpreted to intrude peridotite leaving 1 cm serpentinized layers with a similar dip to the overlying core. A composite light green to dark green serpentine vein cuts the banding at the top of this section.

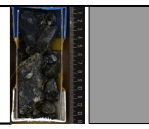
Thin section at 50-53 cm is a partially serpentinised harzburgite with possibly some gabbroic impregnations and thin shear zones of dynamically recrystallized olivine

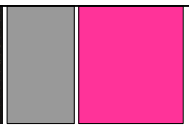
Homogeneous serpentinite with no bastites visible, some thin stringers of gabbro are present parallel to those in higher units. Two sets of veins are subparallel to the fabric: 1) bright green serpentine veins locally with a dark brown to orange halo. 2) white, fibrous, lens-shaped serpentine veins. Between 93 and 100 cm depth three generations of veins are present: The first are chalky white serpentine veins mainly parallel to the dip, the second are mainly parallel to the dip and the third are reticulate carbonate veins.

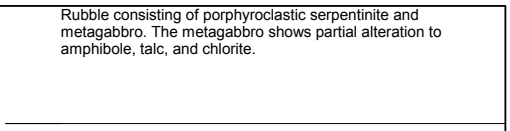
This unit has a moderately dipping, lobate contact with the overlying serpentinized dunite, which is subparallel to magmatic veins in the overlying unit. The piece contains strongly zoned and intense alteration. At the outer margin the gabbroic texture is clear, but plagioclase is milky suggesting rodingitization. The next zone is dark green and appears to be composed of talc and amphibole, while an inner zone is largely talc. It is possible that the inner zone is fault breccia overprinted by pervasive alteration.

Rubble containing clasts of serpentinized porphyroclastic harzburgite and breccia with a carbonate-dominated matrix that is poorly sorted and contains angular to subrounded lithic fragments.

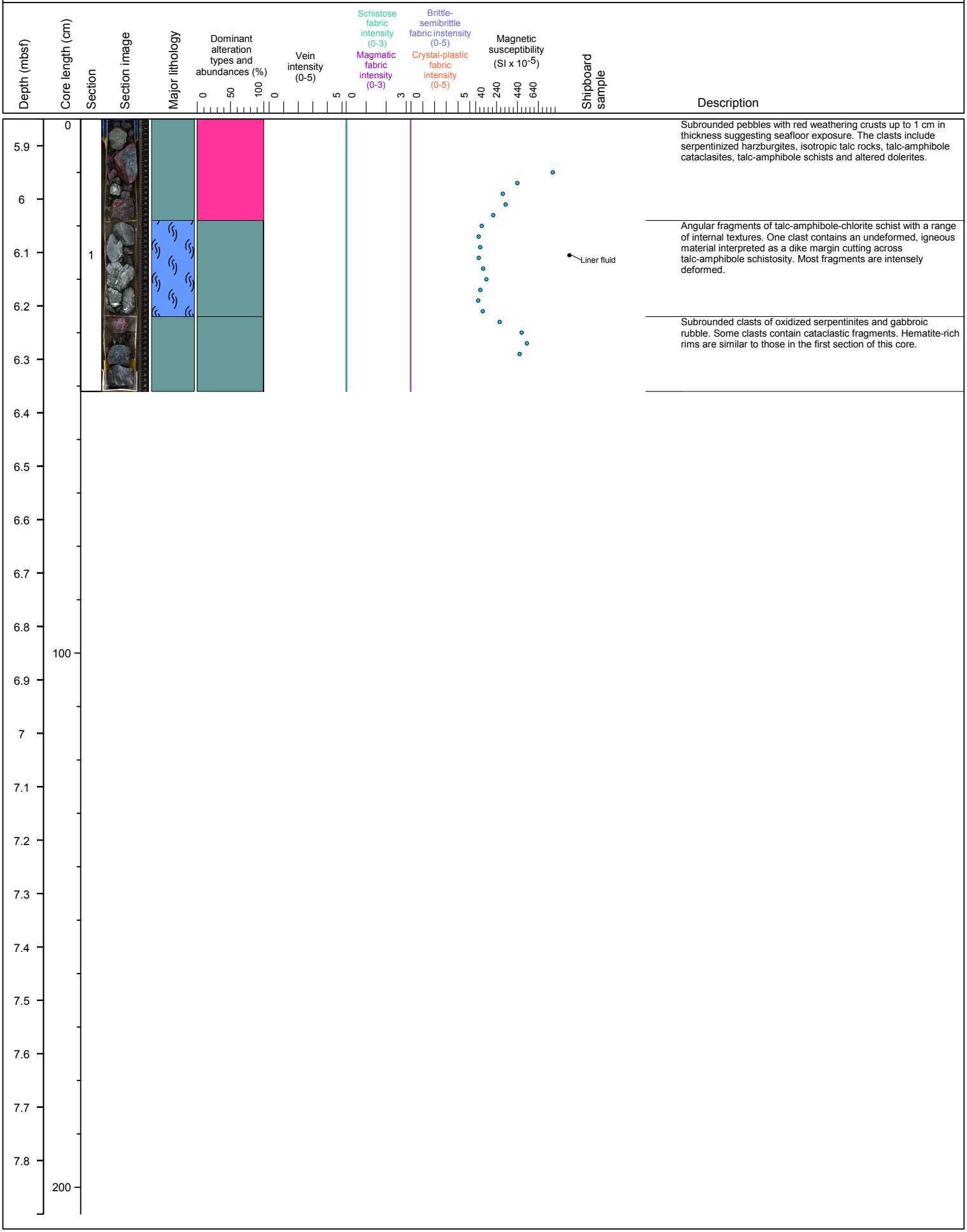
Site M0068 Hole B Core 5R Cored 4.07-5.85 mbsf



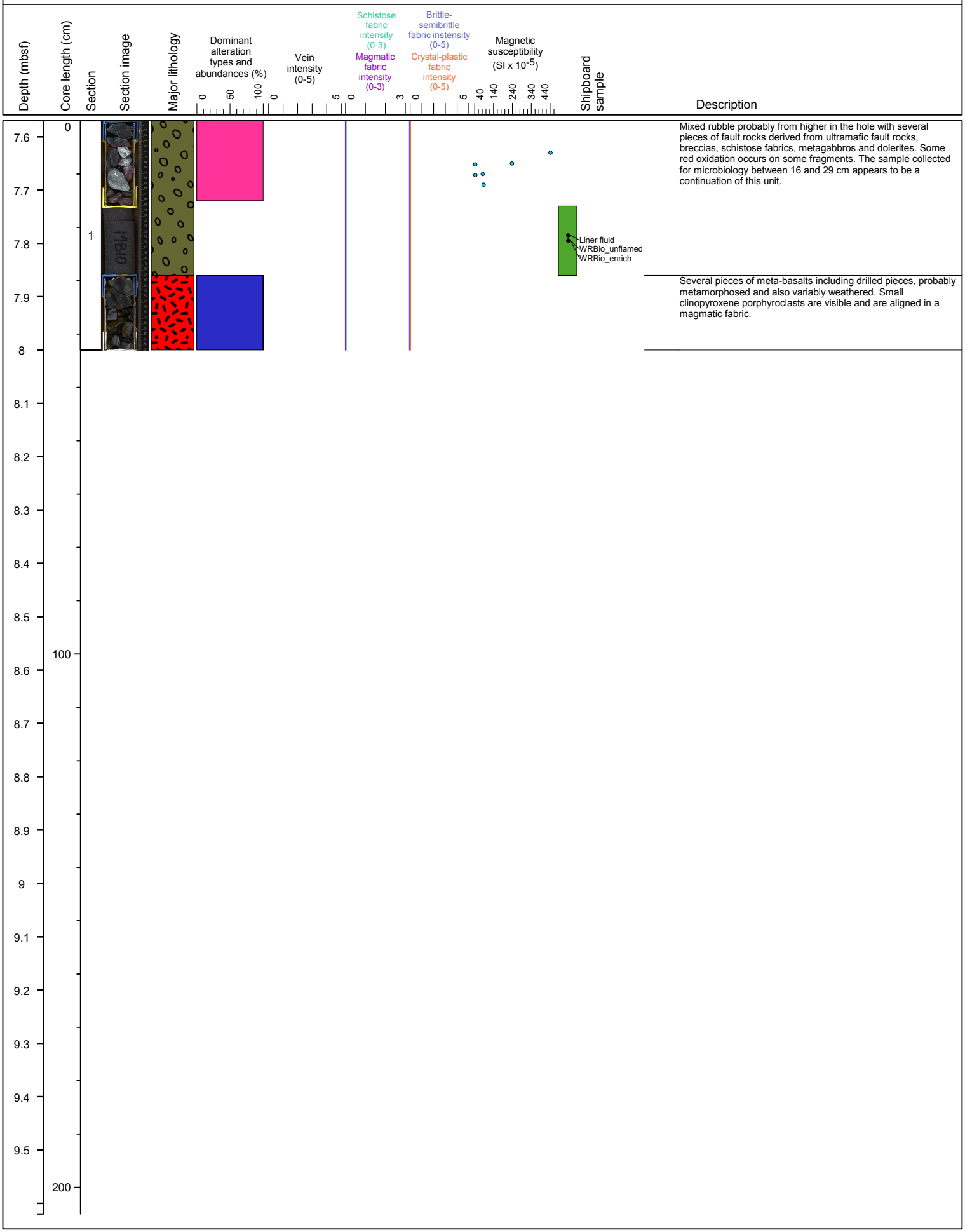




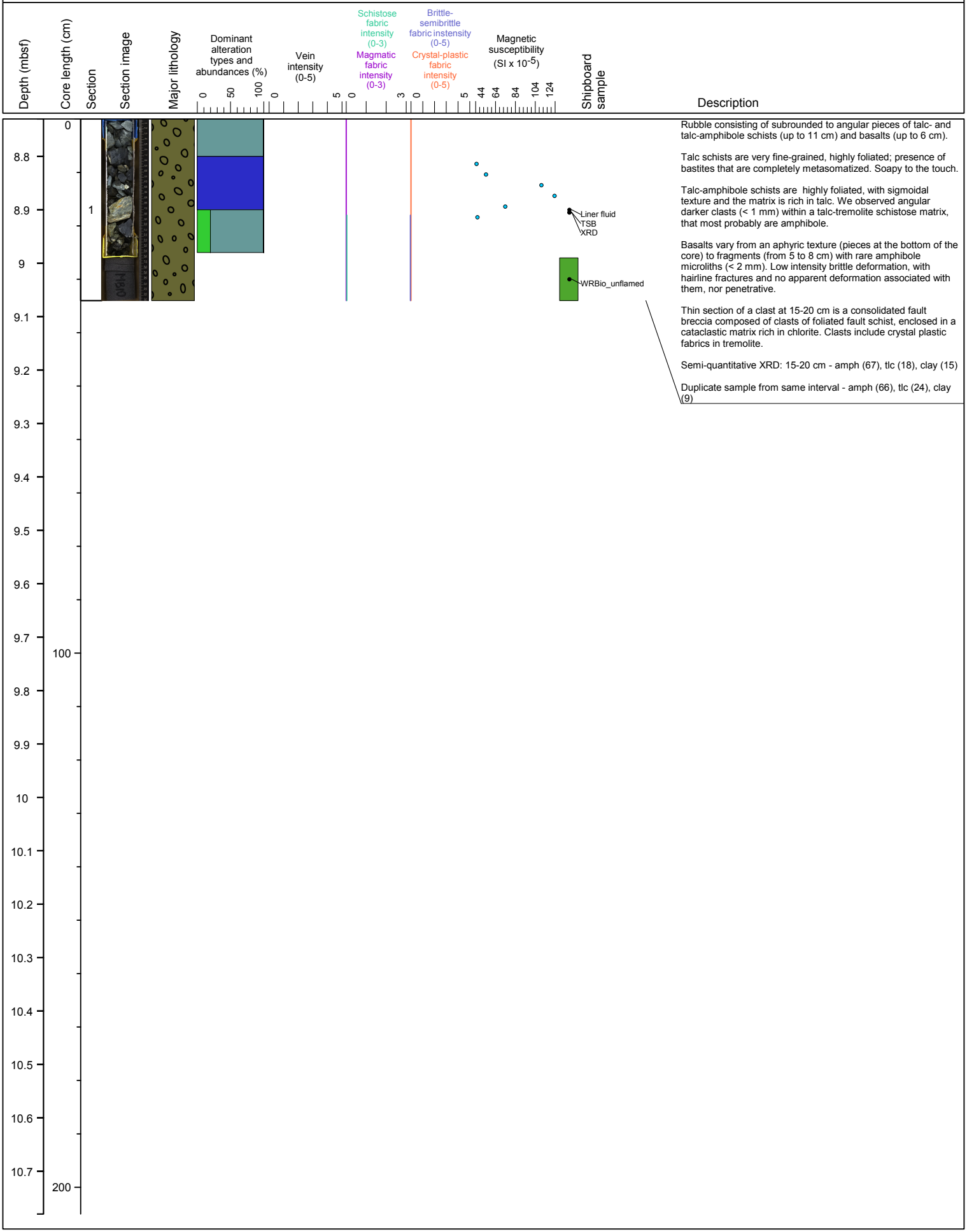
Site M0068 Hole B Core 6R Cored 5.85-7.57 mbsf



Site M0068 Hole B Core 7R Cored 7.57-8.73 mbsf



Site M0068 Hole B Core 8R Cored 8.73-9.54 mbsf



Rubble consisting of subrounded to angular pieces of talc- and talc-amphibole schists (up to 11 cm) and basalts (up to 6 cm).

Talc schists are very fine-grained, highly foliated; presence of bastites that are completely metasomatized. Soapy to the touch.

Talc-amphibole schists are highly foliated, with sigmoidal texture and the matrix is rich in talc. We observed angular darker clasts (< 1 mm) within a talc-tremolite schistose matrix, that most probably are amphibole.

Basalts vary from an aphyric texture (pieces at the bottom of the core) to fragments (from 5 to 8 cm) with rare amphibole microliths (< 2 mm). Low intensity brittle deformation, with hairline fractures and no apparent deformation associated with them, nor penetrative.

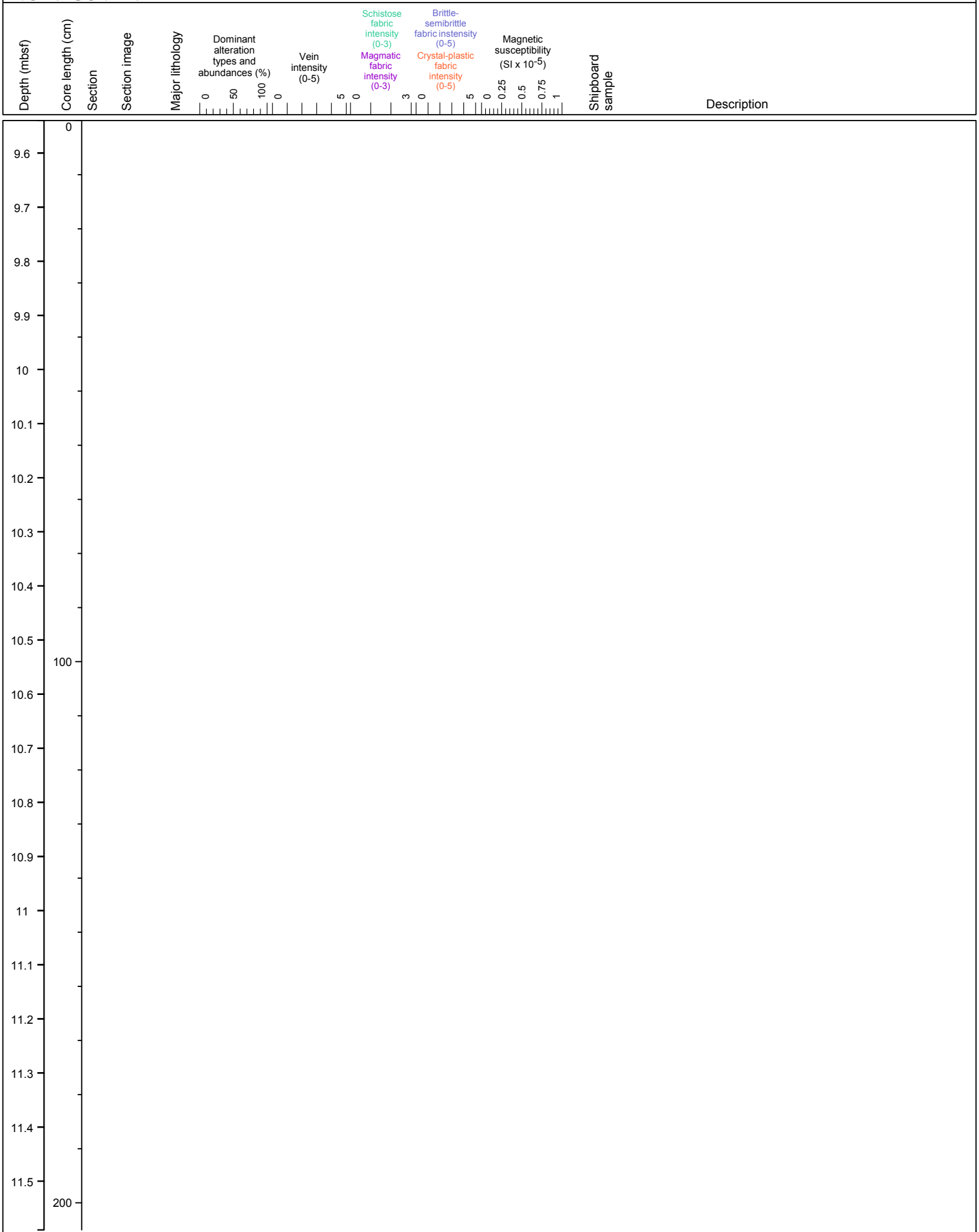
Thin section of a clast at 15-20 cm is a consolidated fault breccia composed of clasts of foliated fault schist, enclosed in a cataclastic matrix rich in chlorite. Clasts include crystal plastic fabrics in tremolite.

Semi-quantitative XRD: 15-20 cm - amph (67), tlc (18), clay (15)

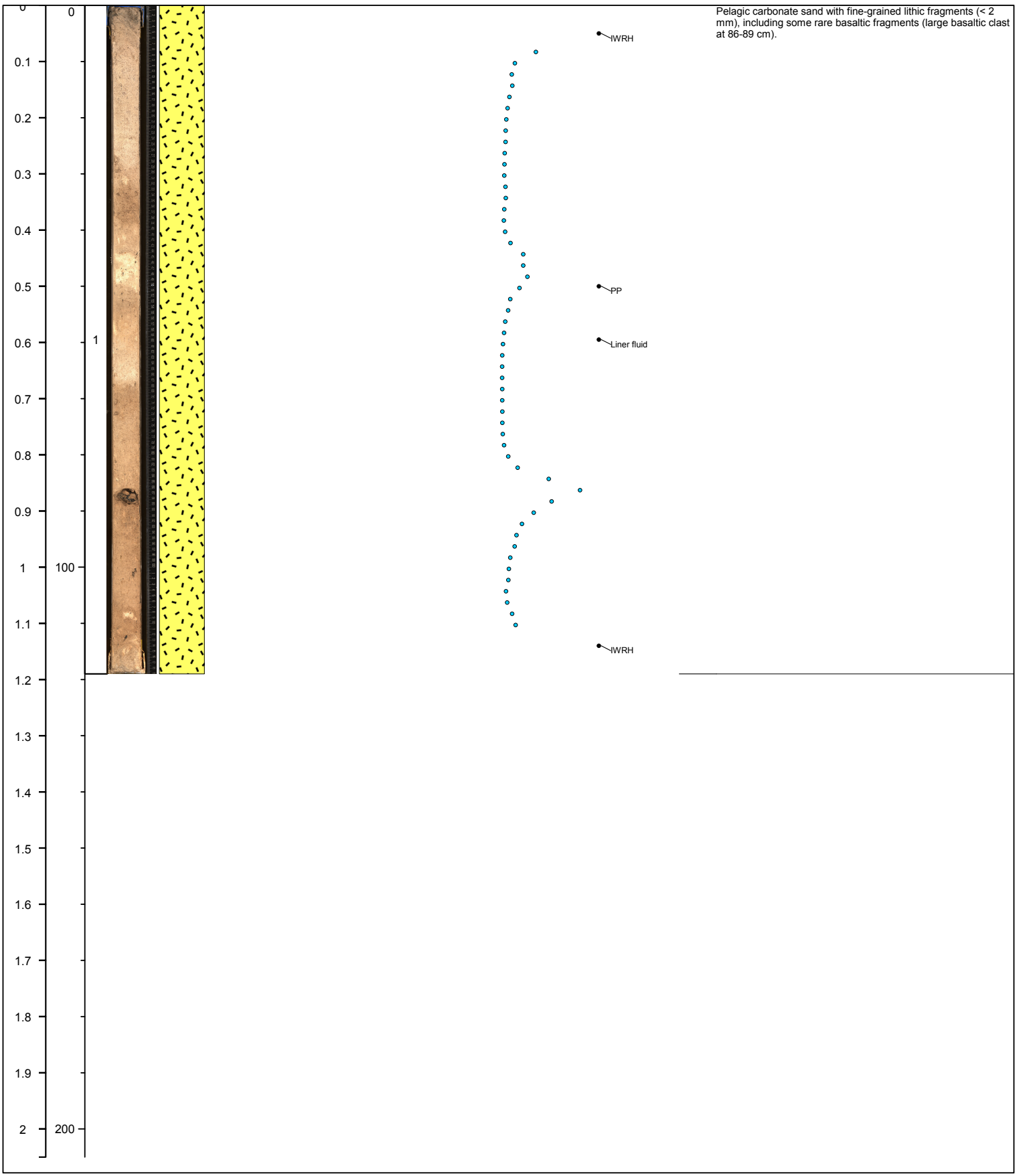
Duplicate sample from same interval - amph (66), tlc (24), clay (9)

NO RECOVERY

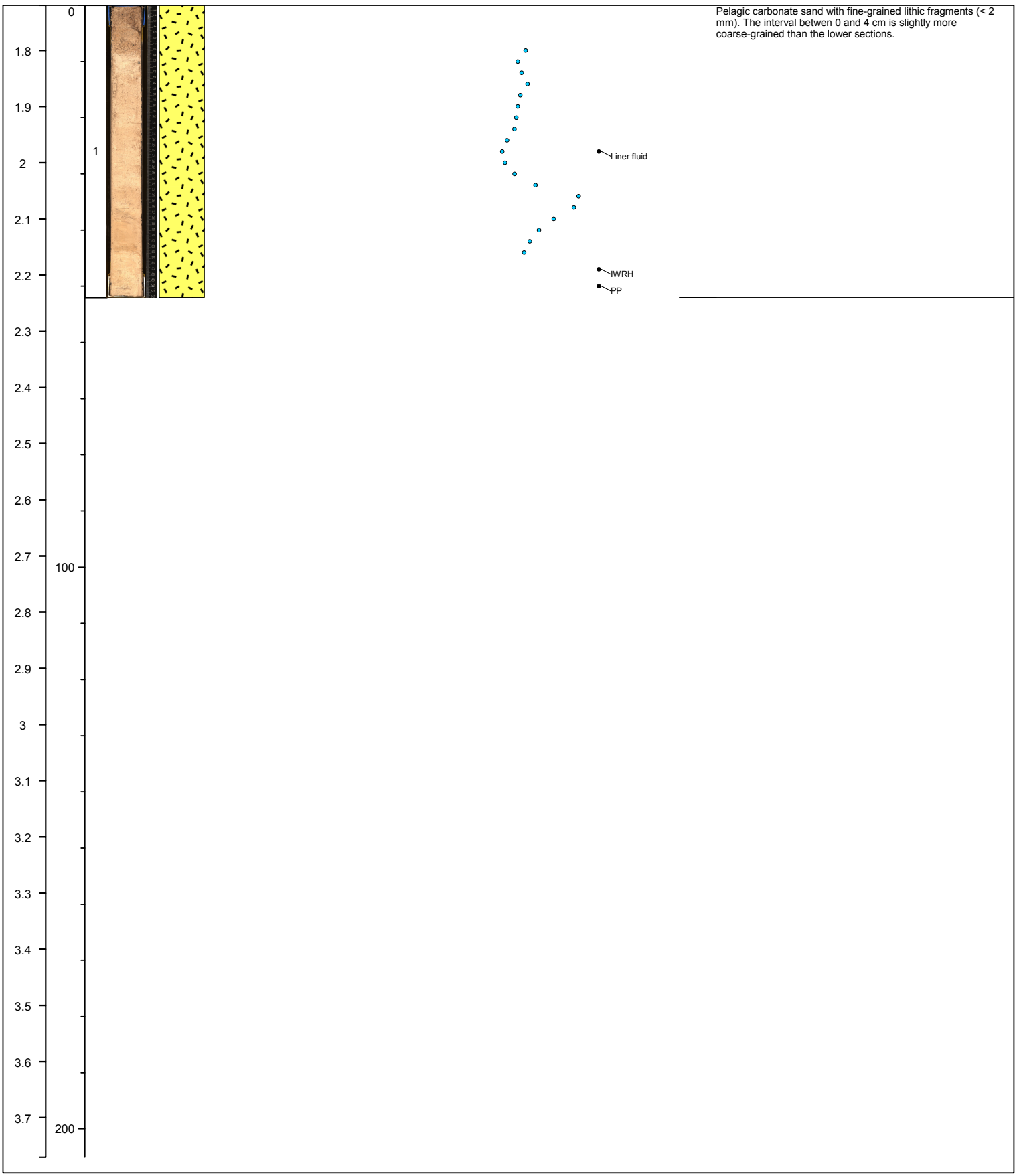
Site M0068 Hole B Core 9R Cored 9.54-9.6 mbsf



Site M0069 Hole A Core 1R Cored 0-1.72 mbsf



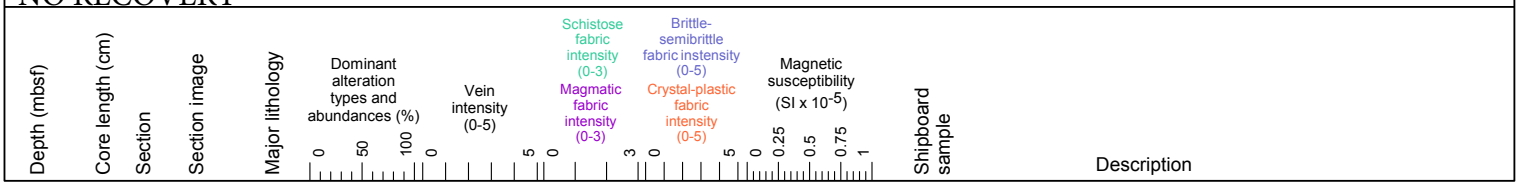
Site M0069 Hole A Core 2R Cored 1.72-3.44 mbsf

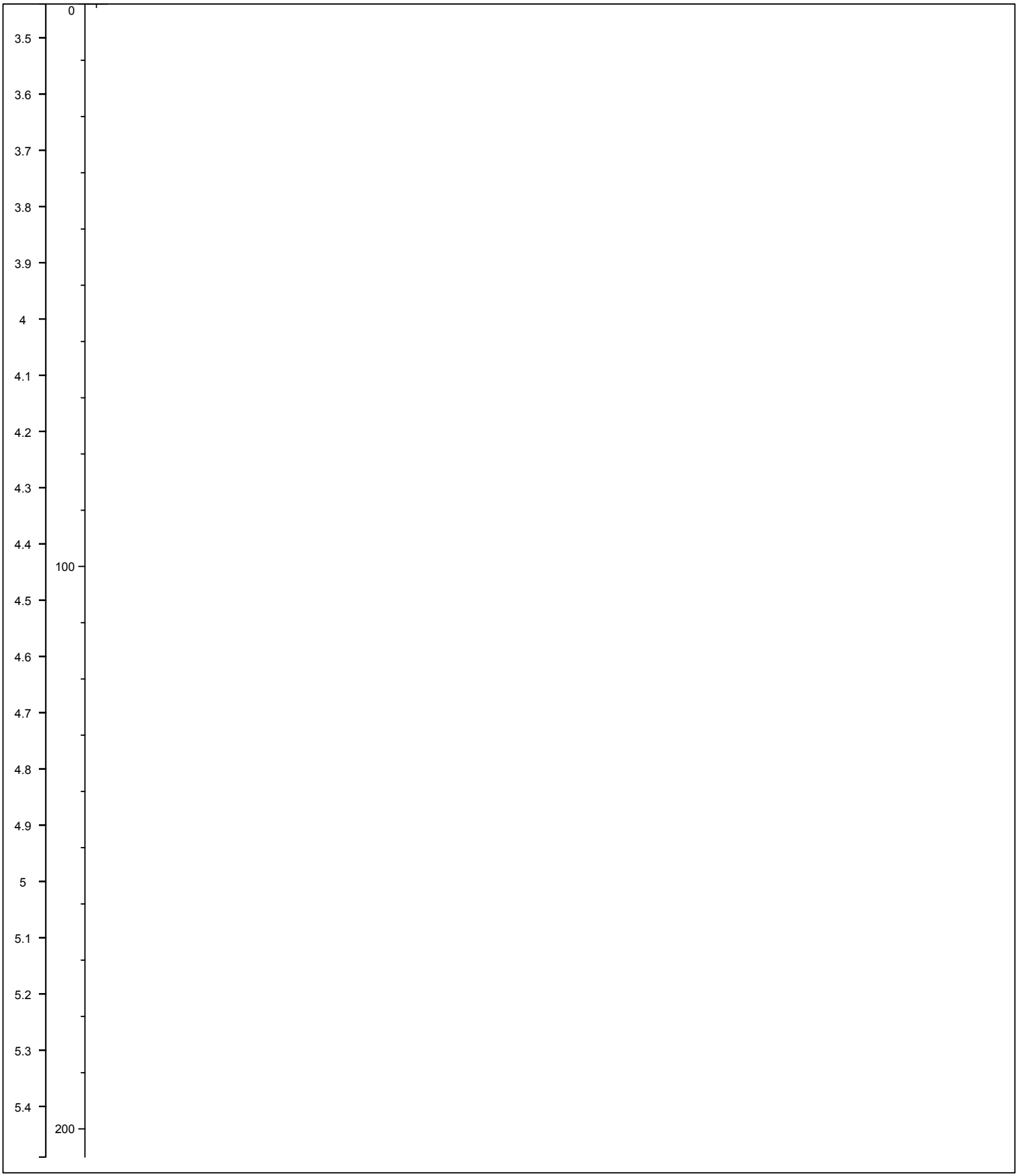


Pelagic carbonate sand with fine-grained lithic fragments (< 2 mm). The interval betwen 0 and 4 cm is slightly more coarse-grained than the lower sections.

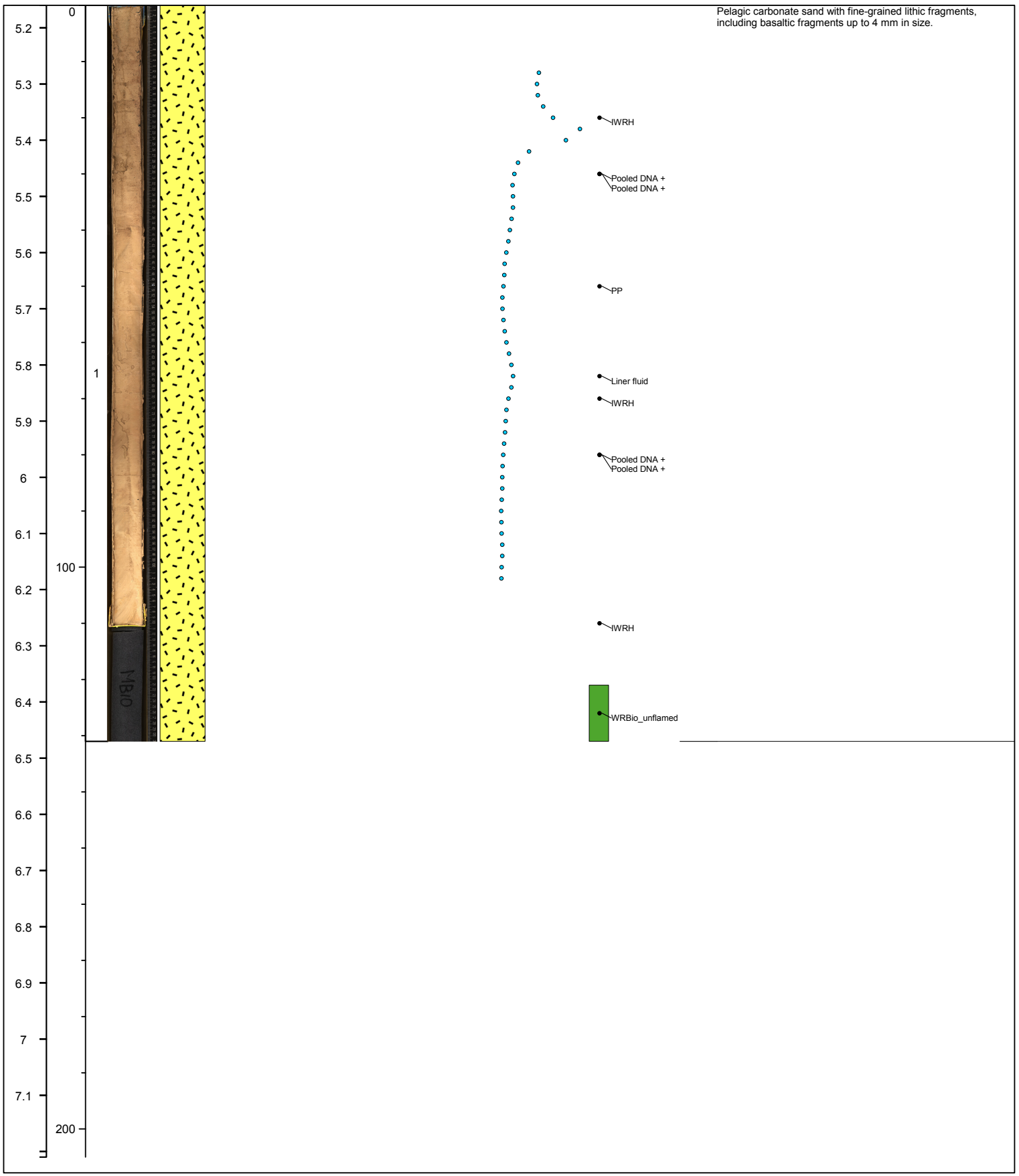
NO RECOVERY

Site M0069 Hole A Core 3R Cored 3.44-5.16 mbsf

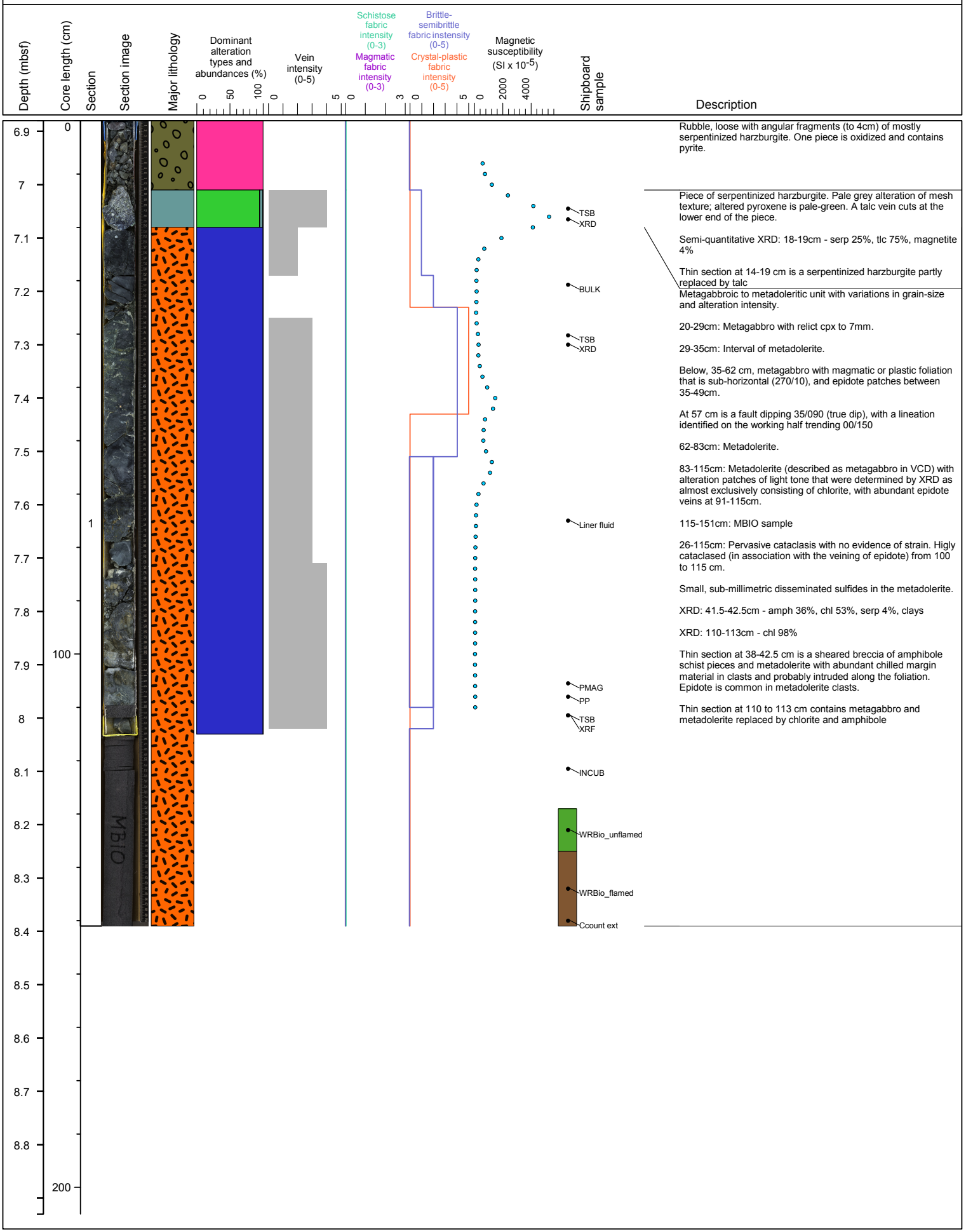




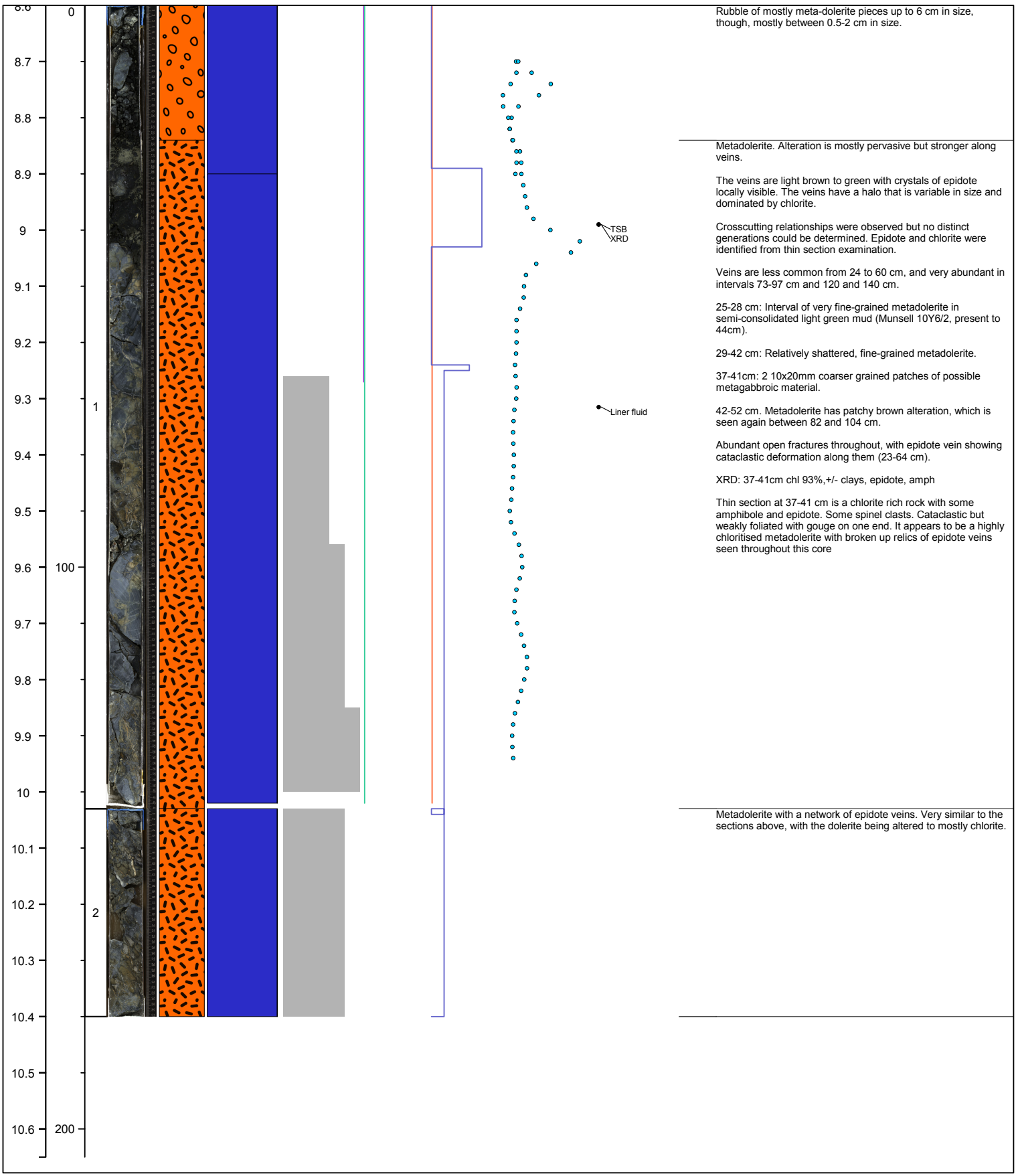
Site M0069 Hole A Core 4R Cored 5.16-6.88 mbsf



Site M0069 Hole A Core 5R Cored 6.88-8.6 mbsf



Site M0069 Hole A Core 6R Cored 8.6-10.32 mbsf



Rubble of mostly meta-dolerite pieces up to 6 cm in size, though, mostly between 0.5-2 cm in size.

Metadolerite. Alteration is mostly pervasive but stronger along veins.

The veins are light brown to green with crystals of epidote locally visible. The veins have a halo that is variable in size and dominated by chlorite.

Crosscutting relationships were observed but no distinct generations could be determined. Epidote and chlorite were identified from thin section examination.

Veins are less common from 24 to 60 cm, and very abundant in intervals 73-97 cm and 120 and 140 cm.

25-28 cm: Interval of very fine-grained metadolerite in semi-consolidated light green mud (Munsell 10Y6/2, present to 44cm).

29-42 cm: Relatively shattered, fine-grained metadolerite.

37-41cm: 2 10x20mm coarser grained patches of possible metagabbroic material.

42-52 cm. Metadolerite has patchy brown alteration, which is seen again between 82 and 104 cm.

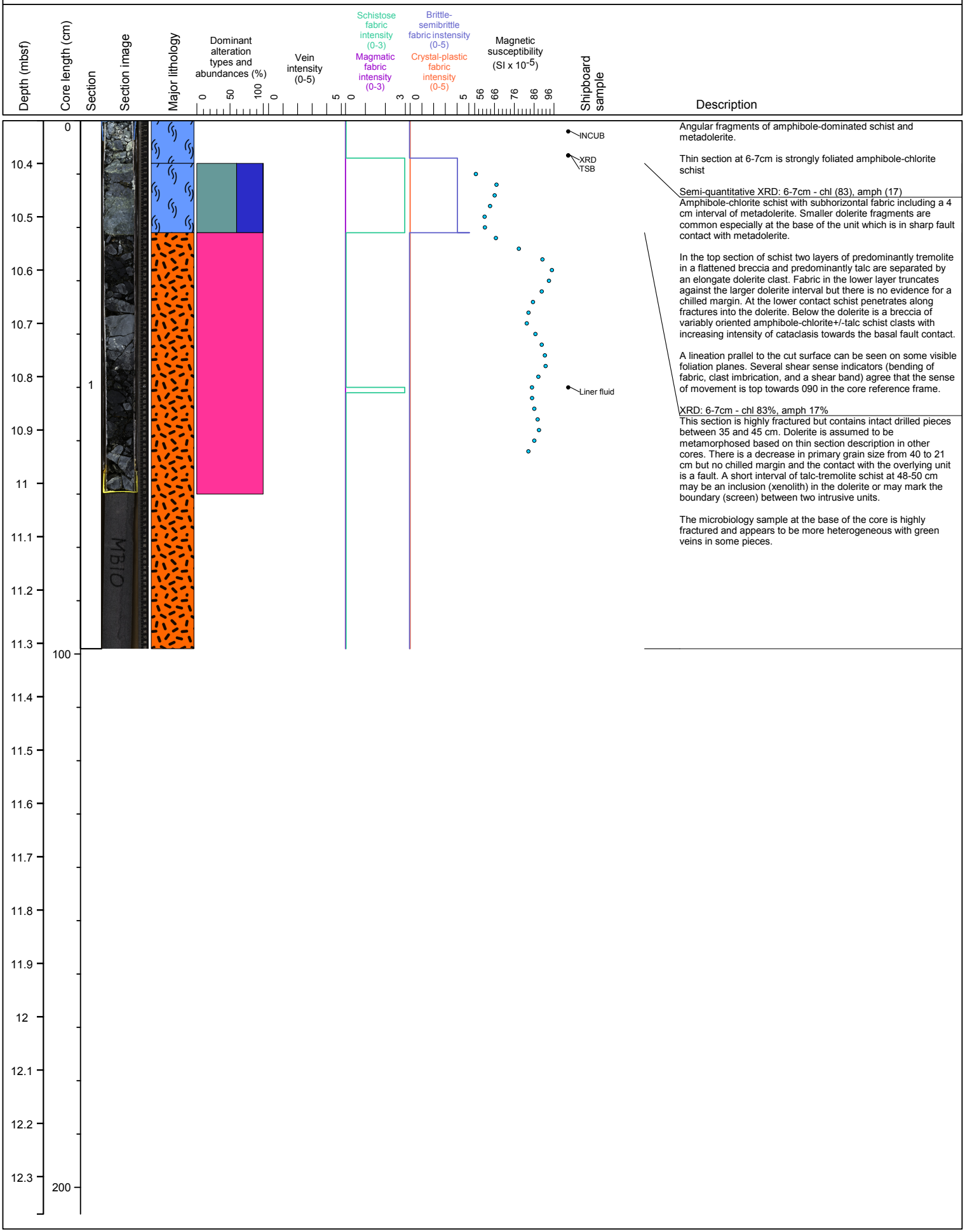
Abundant open fractures throughout, with epidote vein showing cataclastic deformation along them (23-64 cm).

XRD: 37-41cm chl 93%,+/- clays, epidote, amph

Thin section at 37-41 cm is a chlorite rich rock with some amphibole and epidote. Some spinel clasts. Cataclastic but weakly foliated with gouge on one end. It appears to be a highly chloritised metadolerite with broken up relics of epidote veins seen throughout this core

Metadolerite with a network of epidote veins. Very similar to the sections above, with the dolerite being altered to mostly chlorite.

Site M0069 Hole A Core 7R Cored 10.32-11.32 mbsf



Angular fragments of amphibole-dominated schist and metadolerite.

Thin section at 6-7cm is strongly foliated amphibole-chlorite schist

Semi-quantitative XRD: 6-7cm - chl (83), amph (17)

Amphibole-chlorite schist with subhorizontal fabric including a 4 cm interval of metadolerite. Smaller dolerite fragments are common especially at the base of the unit which is in sharp fault contact with metadolerite.

In the top section of schist two layers of predominantly tremolite in a flattened breccia and predominantly talc are separated by an elongate dolerite clast. Fabric in the lower layer truncates against the larger dolerite interval but there is no evidence for a chilled margin. At the lower contact schist penetrates along fractures into the dolerite. Below the dolerite is a breccia of variably oriented amphibole-chlorite+/-talc schist clasts with increasing intensity of cataclasis towards the basal fault contact.

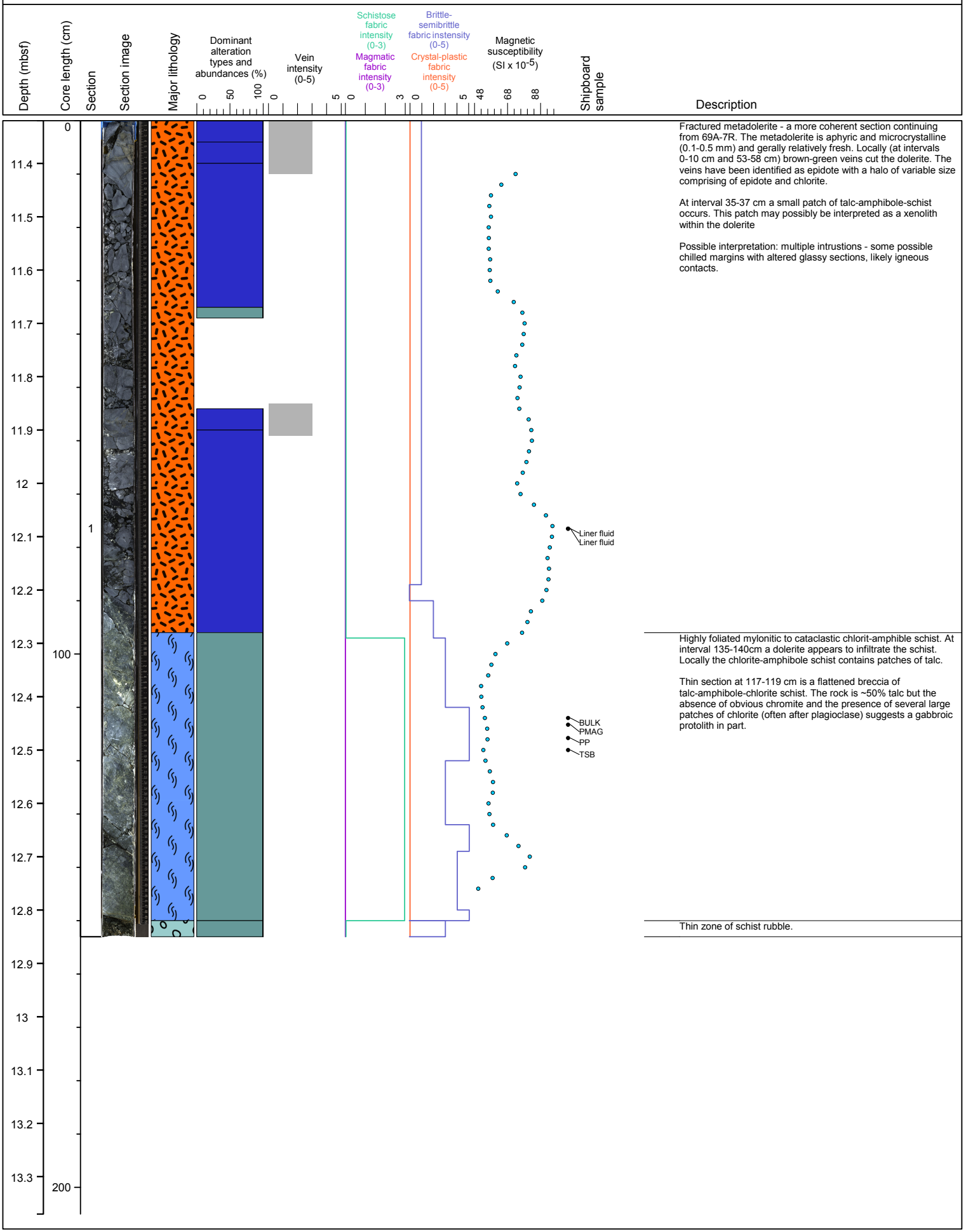
A lineation prallel to the cut surface can be seen on some visible foliation planes. Several shear sense indicators (bending of fabric, clast imbrication, and a shear band) agree that the sense of movement is top towards 090 in the core reference frame.

XRD: 6-7cm - chl 83%, amph 17%

This section is highly fractured but contains intact drilled pieces between 35 and 45 cm. Dolerite is assumed to be metamorphosed based on thin section description in other cores. There is a decrease in primary grain size from 40 to 21 cm but no chilled margin and the contact with the overlying unit is a fault. A short interval of talc-tremolite schist at 48-50 cm may be an inclusion (xenolith) in the dolerite or may mark the boundary (screen) between two intrusive units.

The microbiology sample at the base of the core is highly fractured and appears to be more heterogeneous with green veins in some pieces.

Site M0069 Hole A Core 8R Cored 11.32-13.04 mbsf



Fractured metadolerite - a more coherent section continuing from 69A-7R. The metadolerite is aphyric and microcrystalline (0.1-0.5 mm) and gerally relatively fresh. Locally (at intervals 0-10 cm and 53-58 cm) brown-green veins cut the dolerite. The veins have been identified as epidote with a halo of variable size comprising of epidote and chlorite.

At interval 35-37 cm a small patch of talc-amphibole-schist occurs. This patch may possibly be interpreted as a xenolith within the dolerite

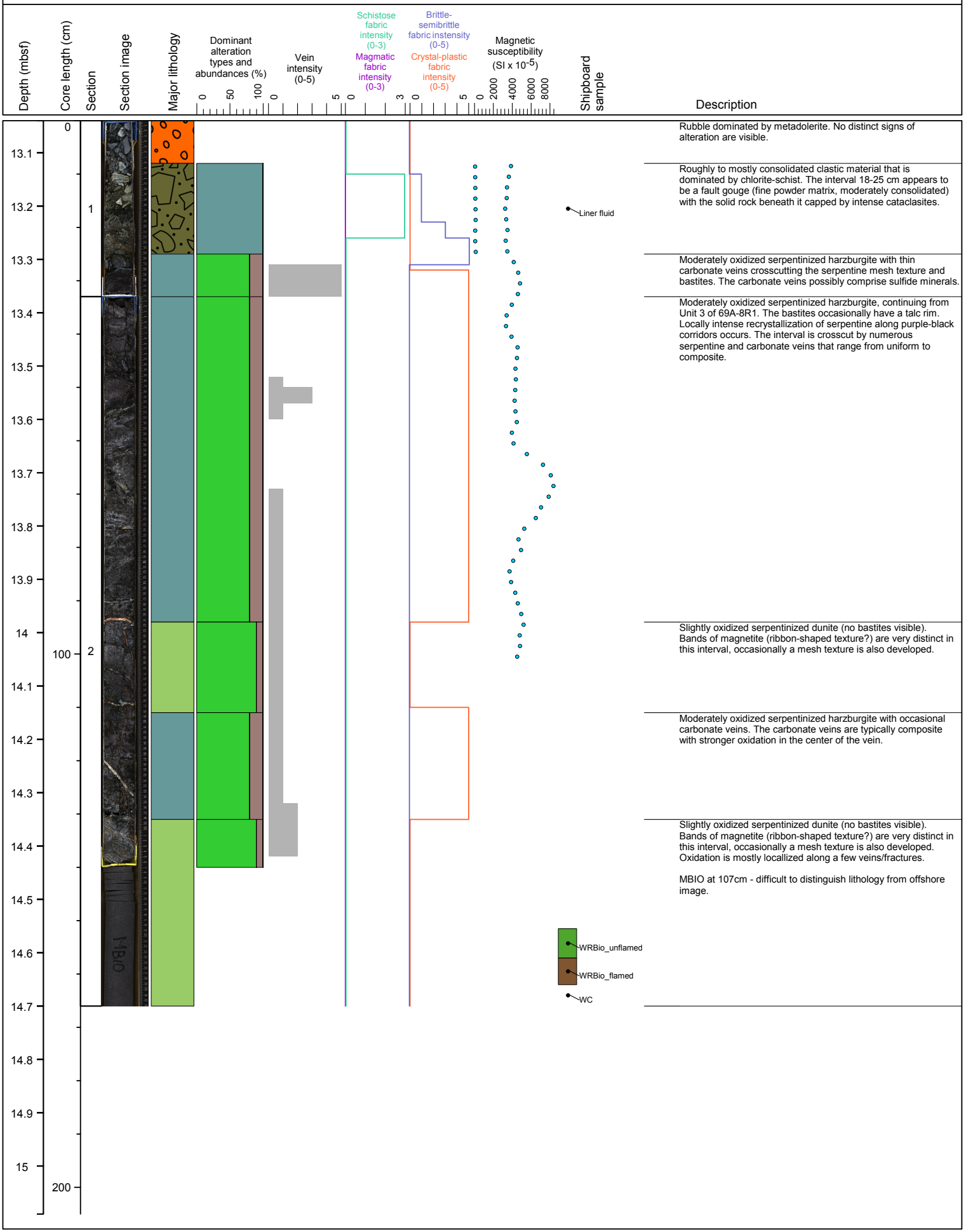
Possible interpretation: multiple intrustions - some possible chilled margins with altered glassy sections, likely igneous contacts.

Highly foliated mylonitic to cataclastic chlorit-amphible schist. At interval 135-140cm a dolerite appears to infiltrate the schist. Locally the chlorite-amphibole schist contains patches of talc.

Thin section at 117-119 cm is a flattened breccia of talc-amphibole-chlorite schist. The rock is ~50% talc but the absence of obvious chromite and the presence of several large patches of chlorite (often after plagioclase) suggests a gabbroic protolith in part.

Thin zone of schist rubble.

Site M0069 Hole A Core 9R Cored 13.04-14.72 mbsf



Rubble dominated by metadolerite. No distinct signs of alteration are visible.

Roughly to mostly consolidated clastic material that is dominated by chlorite-schist. The interval 18-25 cm appears to be a fault gouge (fine powder matrix, moderately consolidated) with the solid rock beneath it capped by intense cataclasites.

Moderately oxidized serpentinized harzburgite with thin carbonate veins crosscutting the serpentine mesh texture and bastites. The carbonate veins possibly comprise sulfide minerals.

Moderately oxidized serpentinized harzburgite, continuing from Unit 3 of 69A-8R1. The bastites occasionally have a talc rim. Locally intense recrystallization of serpentine along purple-black corridors occurs. The interval is crosscut by numerous serpentine and carbonate veins that range from uniform to composite.

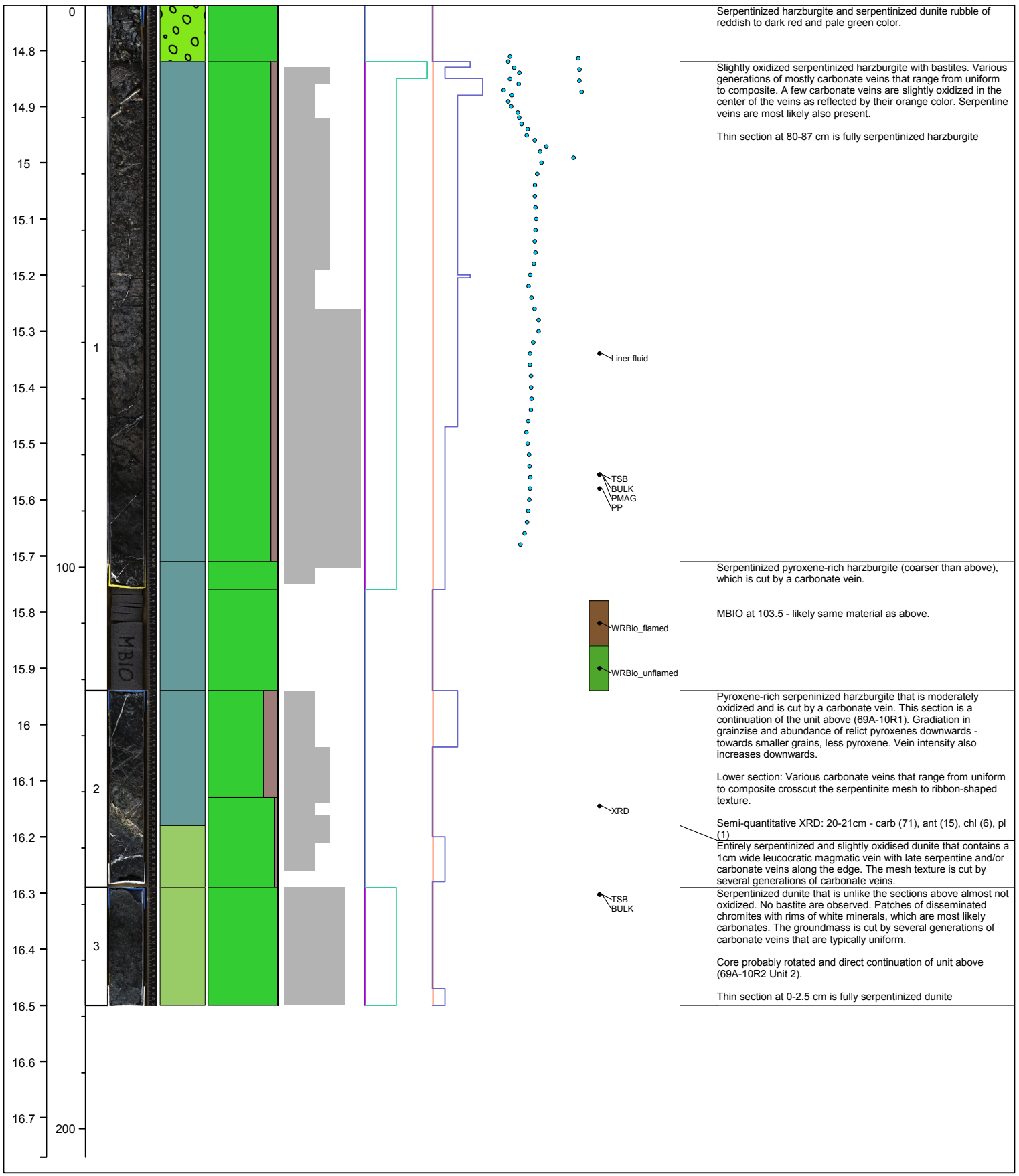
Slightly oxidized serpentinized dunite (no bastites visible). Bands of magnetite (ribbon-shaped texture?) are very distinct in this interval, occasionally a mesh texture is also developed.

Moderately oxidized serpentinized harzburgite with occasional carbonate veins. The carbonate veins are typically composite with stronger oxidation in the center of the vein.

Slightly oxidized serpentinized dunite (no bastites visible). Bands of magnetite (ribbon-shaped texture?) are very distinct in this interval, occasionally a mesh texture is also developed. Oxidation is mostly localized along a few veins/fractures.

MBIO at 107cm - difficult to distinguish lithology from offshore image.

Site M0069 Hole A Core 10R Cored 14.72-16.44 mbsf



Serpentinized harzburgite and serpentinized dunite rubble of reddish to dark red and pale green color.

Slightly oxidized serpentinized harzburgite with bastites. Various generations of mostly carbonate veins that range from uniform to composite. A few carbonate veins are slightly oxidized in the center of the veins as reflected by their orange color. Serpentine veins are most likely also present.

Thin section at 80-87 cm is fully serpentinized harzburgite

Serpentinized pyroxene-rich harzburgite (coarser than above), which is cut by a carbonate vein.

MBIO at 103.5 - likely same material as above.

Pyroxene-rich serpeninized harzburgite that is moderately oxidized and is cut by a carbonate vein. This section is a continuation of the unit above (69A-10R1). Gradiation in grainzise and abundance of relict pyroxenes downwards - towards smaller grains, less pyroxene. Vein intensity also increases downwards.

Lower section: Various carbonate veins that range from uniform to composite crosscut the serpentinite mesh to ribbon-shaped texture.

Semi-quantitative XRD: 20-21cm - carb (71), ant (15), chl (6), pl (1)

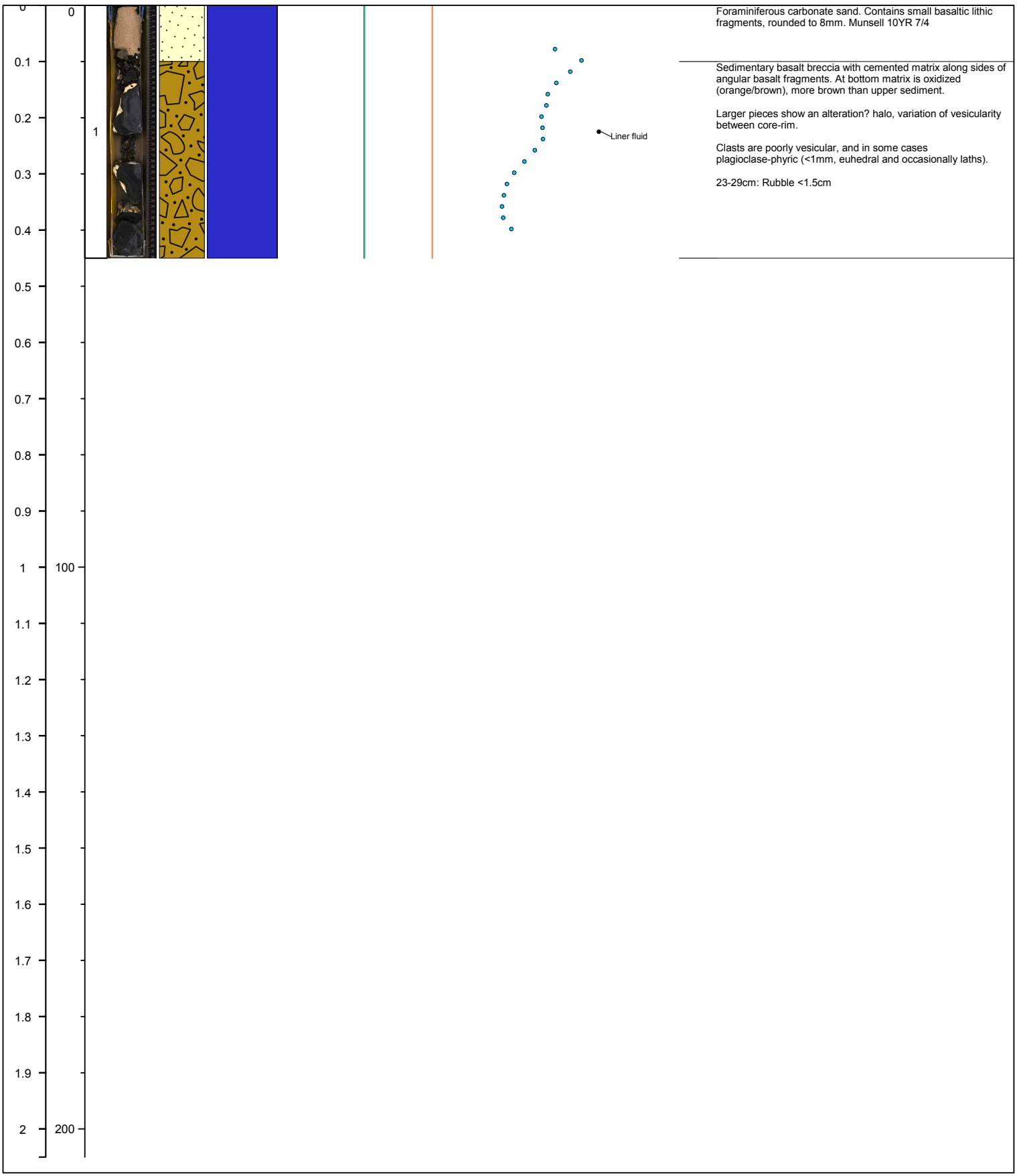
Entirely serpentinized and slightly oxidised dunite that contains a 1cm wide leucocratic magmatic vein with late serpentine and/or carbonate veins along the edge. The mesh texture is cut by several generations of carbonate veins.

Serpentinized dunite that is unlike the sections above almost not oxidized. No bastite are observed. Patches of disseminated chromites with rims of white minerals, which are most likely carbonates. The groundmass is cut by several generations of carbonate veins that are typically uniform.

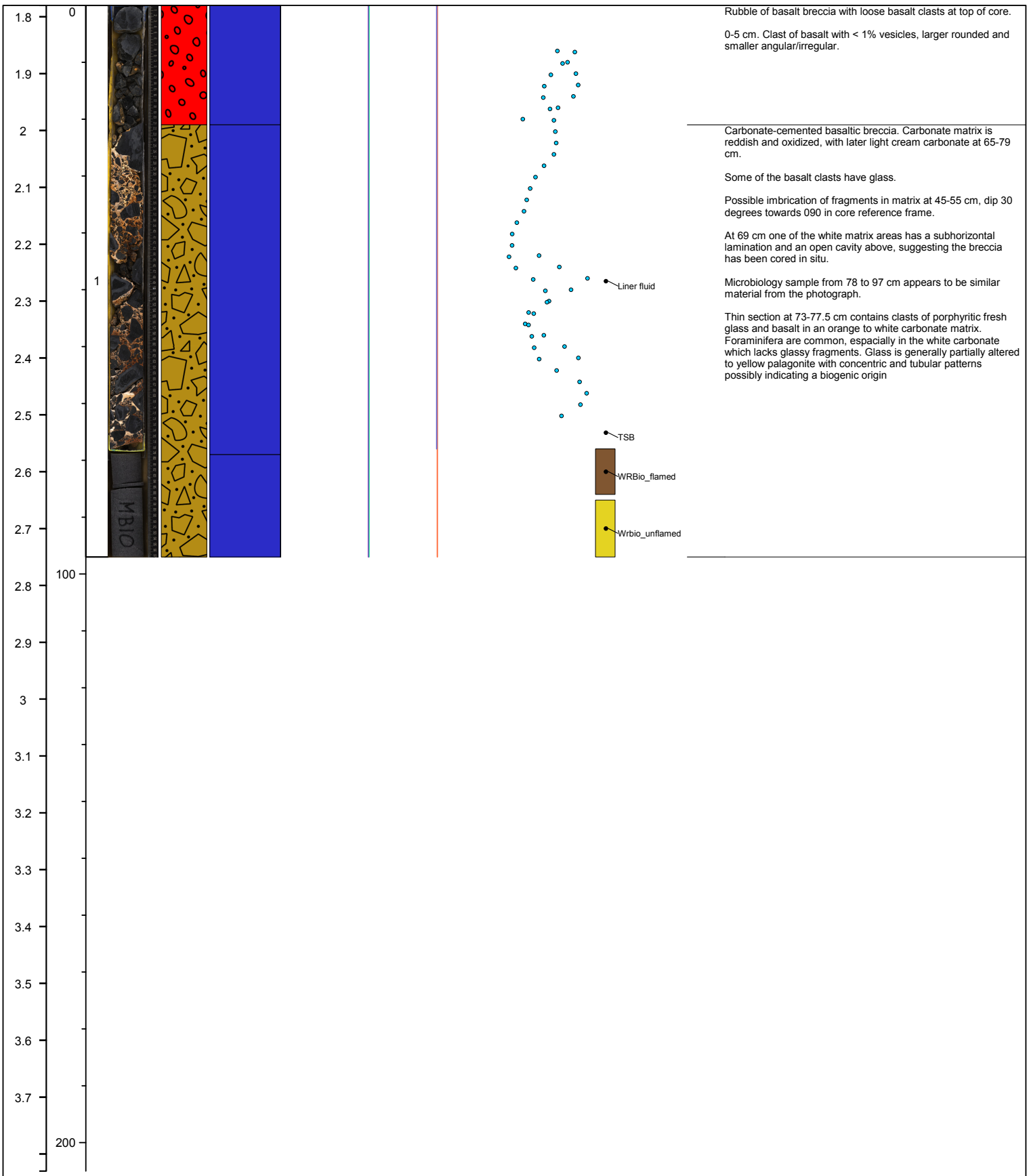
Core probably rotated and direct continuation of unit above (69A-10R2 Unit 2).

Thin section at 0-2.5 cm is fully serpentinized dunite

Site M0070 Hole A Core 1R Cored 0-1.78 mbsf



Site M0070 Hole A Core 2R Cored 1.78-2.86 mbsf



Rubble of basalt breccia with loose basalt clasts at top of core.

0-5 cm. Clast of basalt with < 1% vesicles, larger rounded and smaller angular/irregular.

Carbonate-cemented basaltic breccia. Carbonate matrix is reddish and oxidized, with later light cream carbonate at 65-79 cm.

Some of the basalt clasts have glass.

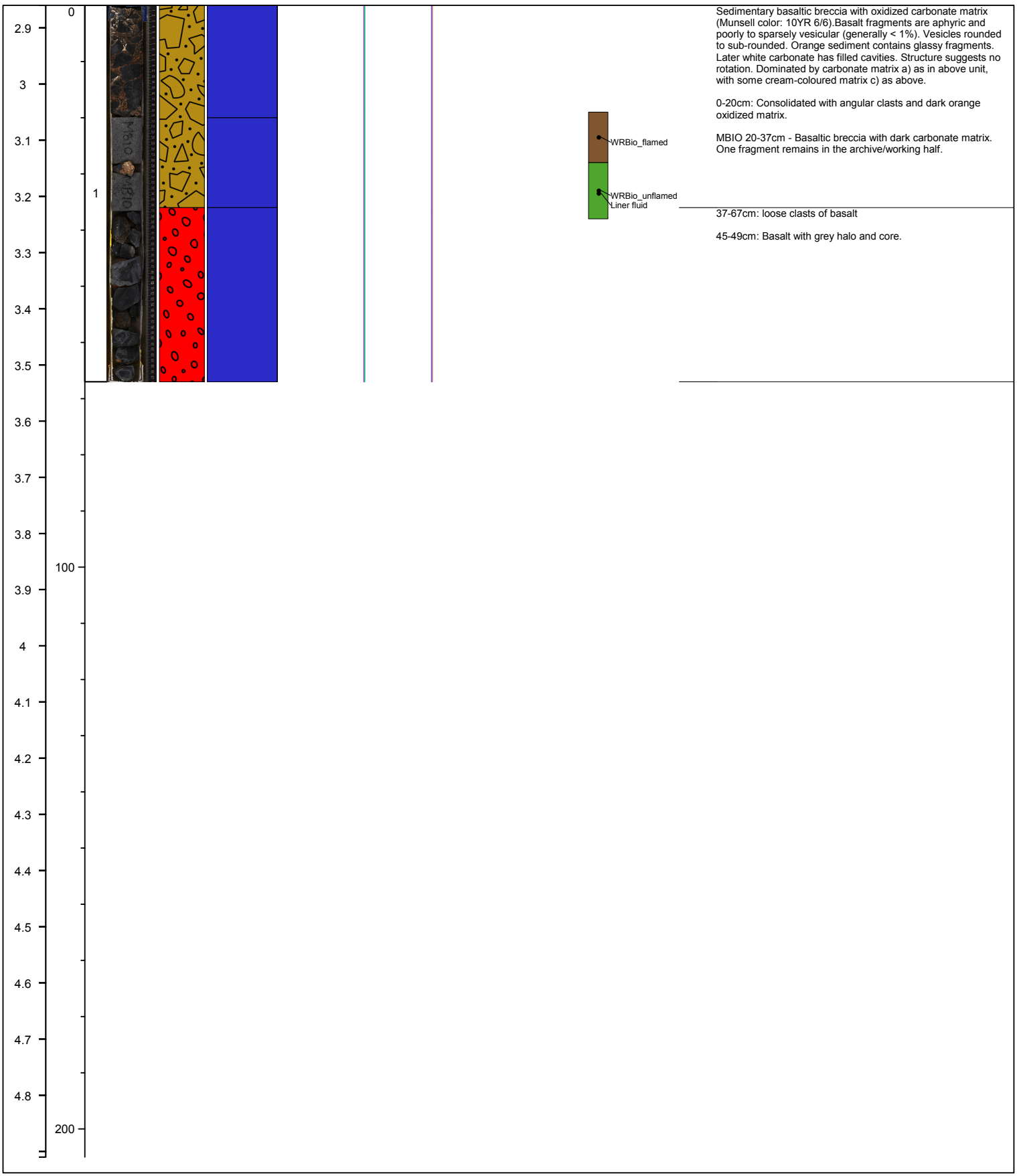
Possible imbrication of fragments in matrix at 45-55 cm, dip 30 degrees towards 090 in core reference frame.

At 69 cm one of the white matrix areas has a subhorizontal lamination and an open cavity above, suggesting the breccia has been cored in situ.

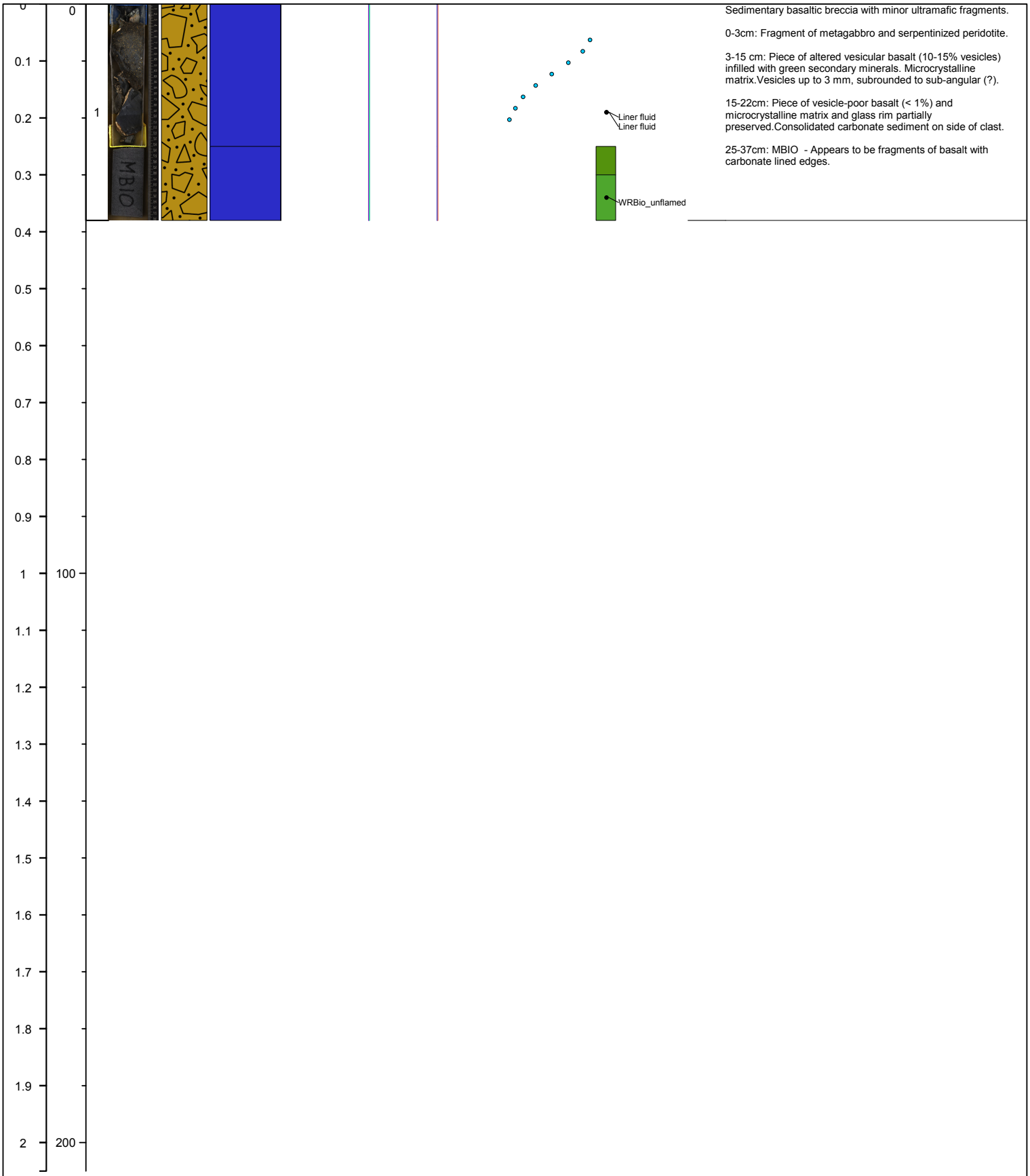
Microbiology sample from 78 to 97 cm appears to be similar material from the photograph.

Thin section at 73-77.5 cm contains clasts of porphyritic fresh glass and basalt in an orange to white carbonate matrix. Foraminifera are common, espacially in the white carbonate which lacks glassy fragments. Glass is generally partially altered to yellow palagonite with concentric and tubular patterns possibly indicating a biogenic origin

Site M0070 Hole A Core 3R Cored 2.86-4 mbsf



Site M0070 Hole B Core 1R Cored 0-1.3 mbsf



Sedimentary basaltic breccia with minor ultramafic fragments.

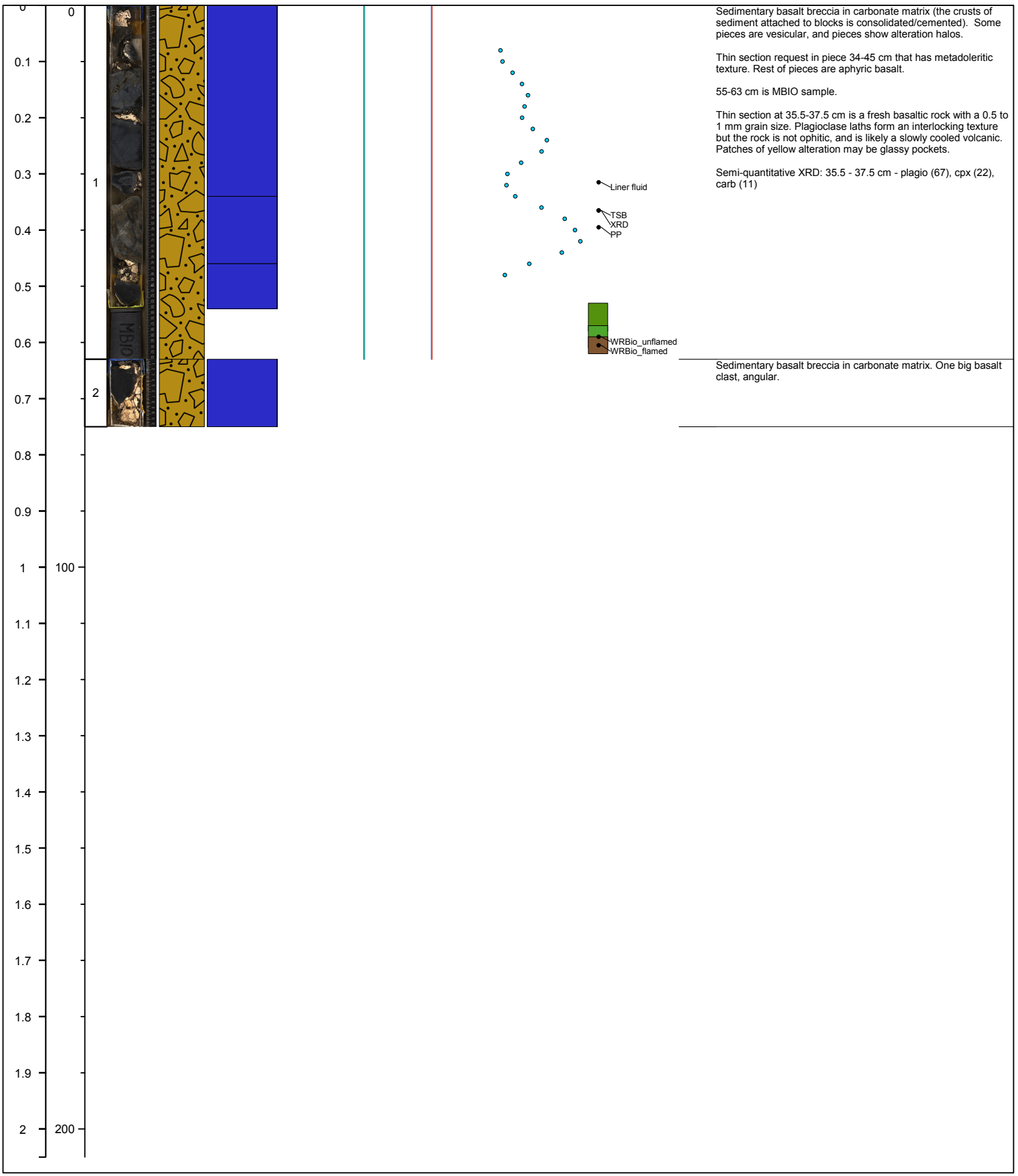
0-3cm: Fragment of metagabbro and serpentinized peridotite.

3-15 cm: Piece of altered vesicular basalt (10-15% vesicles) infilled with green secondary minerals. Microcrystalline matrix.Vesicles up to 3 mm, subrounded to sub-angular (?).

15-22cm: Piece of vesicle-poor basalt (< 1%) and microcrystalline matrix and glass rim partially preserved.Consolidated carbonate sediment on side of clast.

25-37cm: MBIO - Appears to be fragments of basalt with carbonate lined edges.

Site M0070 Hole C Core 1R Cored 0-1.17 mbsf



Sedimentary basalt breccia in carbonate matrix (the crusts of sediment attached to blocks is consolidated/cemented). Some pieces are vesicular, and pieces show alteration halos.

Thin section request in piece 34-45 cm that has metadoleritic texture. Rest of pieces are aphyric basalt.

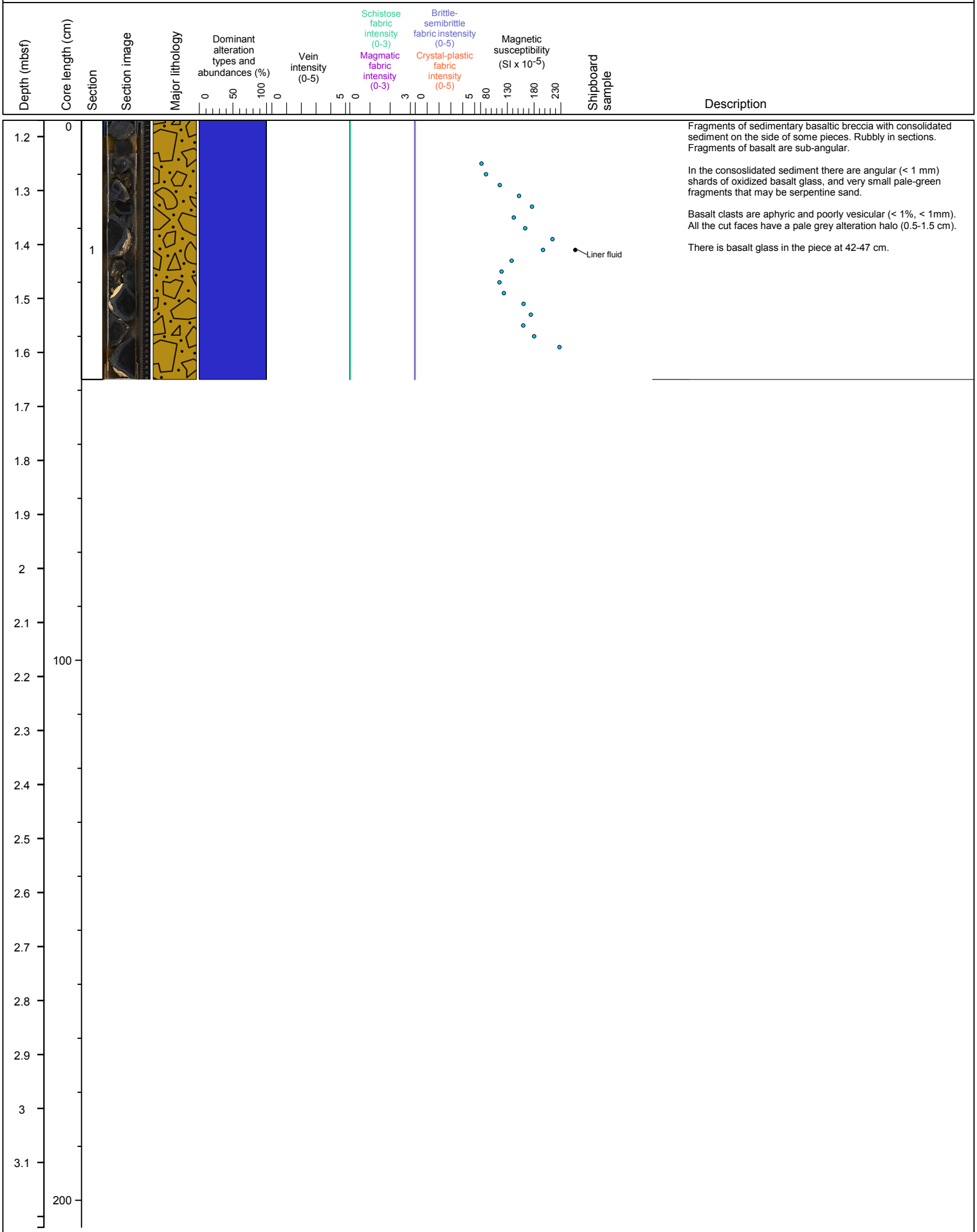
55-63 cm is MBIO sample.

Thin section at 35.5-37.5 cm is a fresh basaltic rock with a 0.5 to 1 mm grain size. Plagioclase laths form an interlocking texture but the rock is not ophitic, and is likely a slowly cooled volcanic. Patches of yellow alteration may be glassy pockets.

Semi-quantitative XRD: 35.5 - 37.5 cm - plagio (67), cpx (22), carb (11)

Sedimentary basalt breccia in carbonate matrix. One big basalt clast, angular.

Site M0070 Hole C Core 2R Cored 1.17-2.7 mbsf



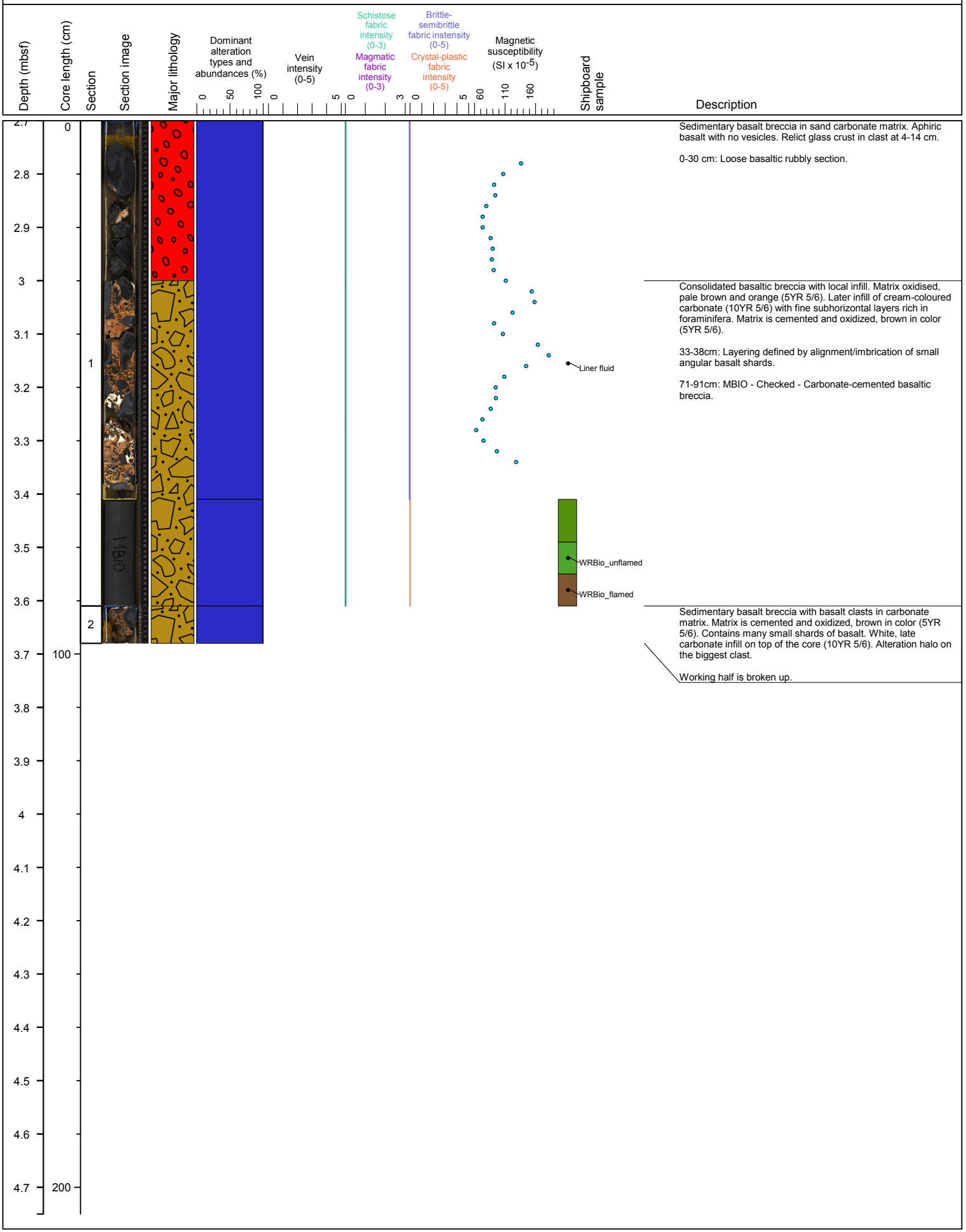
Fragments of sedimentary basaltic breccia with consolidated sediment on the side of some pieces. Rubbly in sections. Fragments of basalt are sub-angular.

In the consoslidated sediment there are angular (< 1 mm) shards of oxidized basalt glass, and very small pale-green fragments that may be serpentine sand.

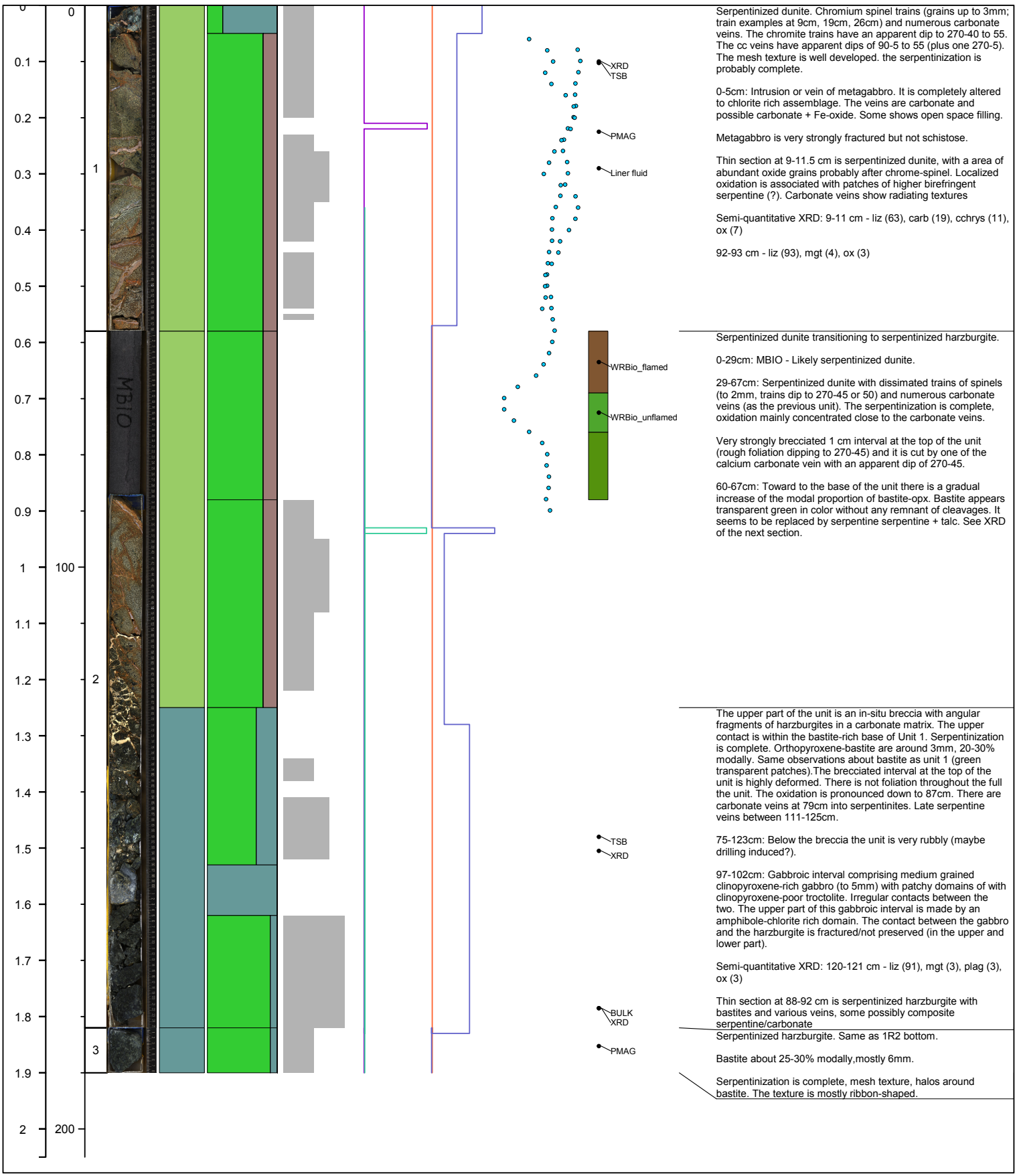
Basalt clasts are aphyric and poorly vesicular (< 1%, < 1mm). All the cut faces have a pale grey alteration halo (0.5-1.5 cm).

There is basalt glass in the piece at 42-47 cm.

Site M0070 Hole C Core 3R Cored 2.7-5.21 mbsf



Site M0071 Hole A Core 1R Cored 0-2.72 mbsf



Serpentinized dunite. Chromium spinel trains (grains up to 3mm; train examples at 9cm, 19cm, 26cm) and numerous carbonate veins. The chromite trains have an apparent dip to 270-40 to 55. The cc veins have apparent dips of 90-5 to 55 (plus one 270-5). The mesh texture is well developed. the serpentinization is probably complete.

0-5cm: Intrusion or vein of metagabbro. It is completely altered to chlorite rich assemblage. The veins are carbonate and possible carbonate + Fe-oxide. Some shows open space filling.

Metagabbro is very strongly fractured but not schistose.

Thin section at 9-11.5 cm is serpentinized dunite, with a area of abundant oxide grains probably after chrome-spinel. Localized oxidation is associated with patches of higher birefringent serpentine (?). Carbonate veins show radiating textures

Semi-quantitative XRD: 9-11 cm - liz (63), carb (19), cchrys (11), ox (7)

92-93 cm - liz (93), mgt (4), ox (3)

Serpentinized dunite transitioning to serpentinized harzburgite.

0-29cm: MBIO - Likely serpentinized dunite.

29-67cm: Serpentinized dunite with dissimated trains of spinels (to 2mm, trains dip to 270-45 or 50) and numerous carbonate veins (as the previous unit). The serpentinization is complete, oxidation mainly concentrated close to the carbonate veins.

Very strongly brecciated 1 cm interval at the top of the unit (rough foliation dipping to 270-45) and it is cut by one of the calcium carbonate vein with an apparent dip of 270-45.

60-67cm: Toward to the base of the unit there is a gradual increase of the modal proportion of bastite-opx. Bastite appears transparent green in color without any remnant of cleavages. It seems to be replaced by serpentine serpentine + talc. See XRD of the next section.

The upper part of the unit is an in-situ breccia with angular fragments of harzburgites in a carbonate matrix. The upper contact is within the bastite-rich base of Unit 1. Serpentinization is complete. Orthopyroxene-bastite are around 3mm, 20-30% modally. Same observations about bastite as unit 1 (green transparent patches).The brecciated interval at the top of the unit is highly deformed. There is not foliation throughout the full the unit. The oxidation is pronounced down to 87cm. There are carbonate veins at 79cm into serpentinites. Late serpentine veins between 111-125cm.

75-123cm: Below the breccia the unit is very rubbly (maybe drilling induced?).

97-102cm: Gabbroic interval comprising medium grained clinopyroxene-rich gabbro (to 5mm) with patchy domains of with clinopyroxene-poor troctolite. Irregular contacts between the two. The upper part of this gabbroic interval is made by an amphibole-chlorite rich domain. The contact between the gabbro and the harzburgite is fractured/not preserved (in the upper and lower part).

Semi-quantitative XRD: 120-121 cm - liz (91), mgt (3), plag (3), ox (3)

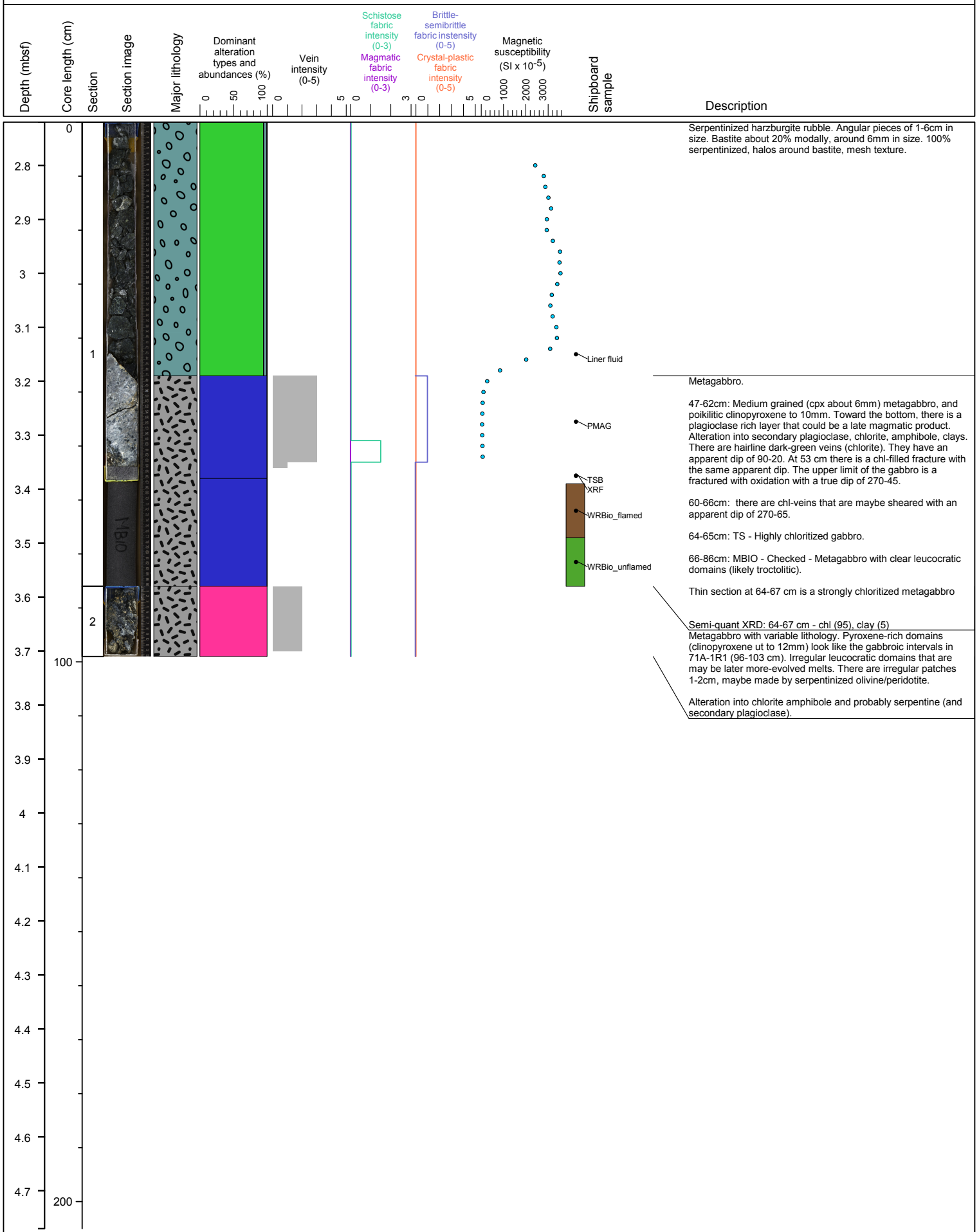
Thin section at 88-92 cm is serpentinized harzburgite with bastites and various veins, some possibly composite serpentine/carbonate

Serpentinized harzburgite. Same as 1R2 bottom.

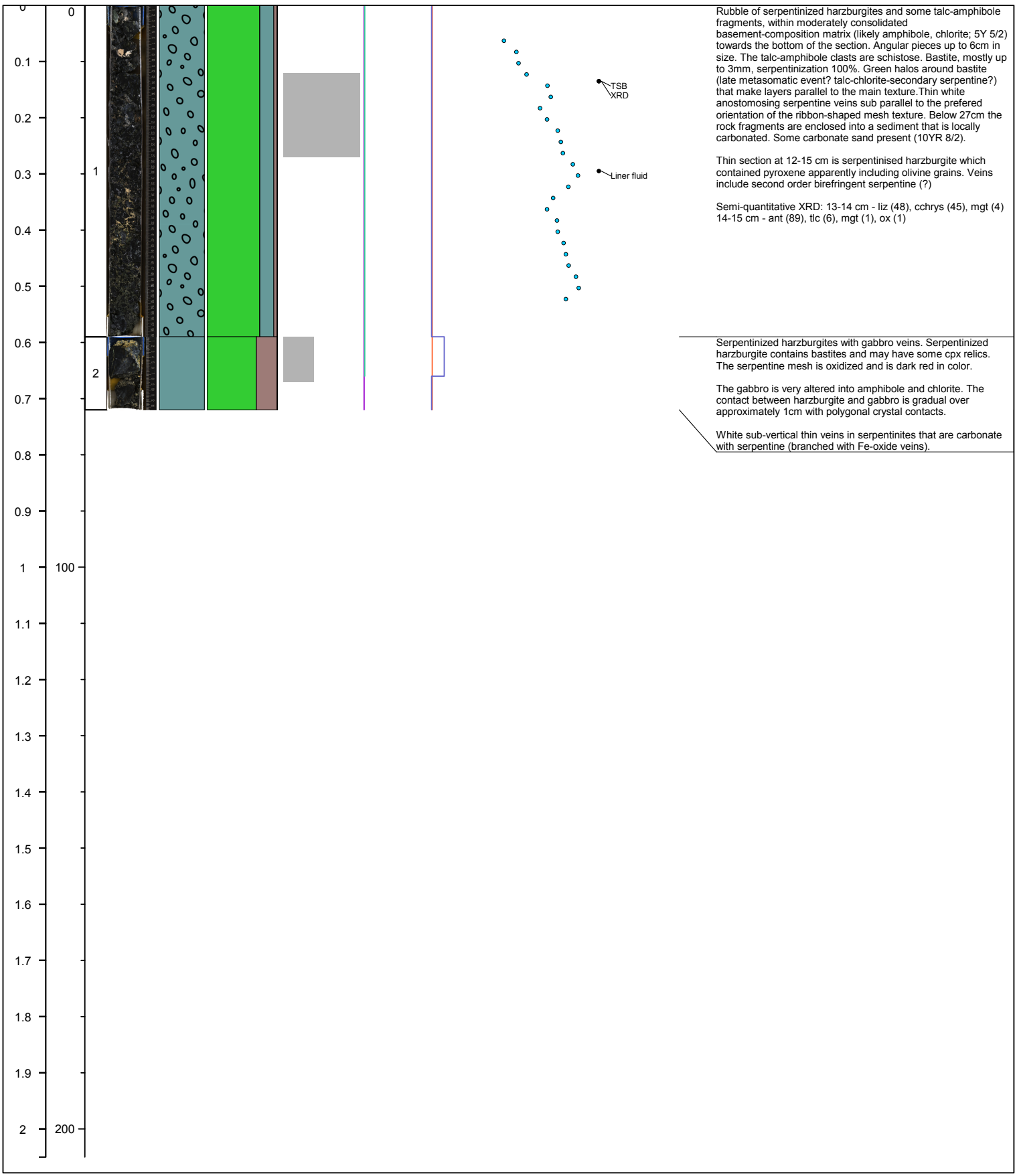
Bastite about 25-30% modally,mostly 6mm.

Serpentinization is complete, mesh texture, halos around bastite. The texture is mostly ribbon-shaped.

Site M0071 Hole A Core 2R Cored 2.72-5.22 mbsf



Site M0071 Hole B Core 1R Cored 0-1.72 mbsf



Rubble of serpentinized harzburgites and some talc-amphibole fragments, within moderately consolidated basement-composition matrix (likely amphibole, chlorite; 5Y 5/2) towards the bottom of the section. Angular pieces up to 6cm in size. The talc-amphibole clasts are schistose. Bastite, mostly up to 3mm, serpentinization 100%. Green halos around bastite (late metasomatic event? talc-chlorite-secondary serpentine?) that make layers parallel to the main texture.Thin white anostomosing serpentine veins sub parallel to the prefered orientation of the ribbon-shaped mesh texture. Below 27cm the rock fragments are enclosed into a sediment that is locally carbonated. Some carbonate sand present (10YR 8/2).

Thin section at 12-15 cm is serpentinised harzburgite which contained pyroxene apparently including olivine grains. Veins include second order birefringent serpentine (?)

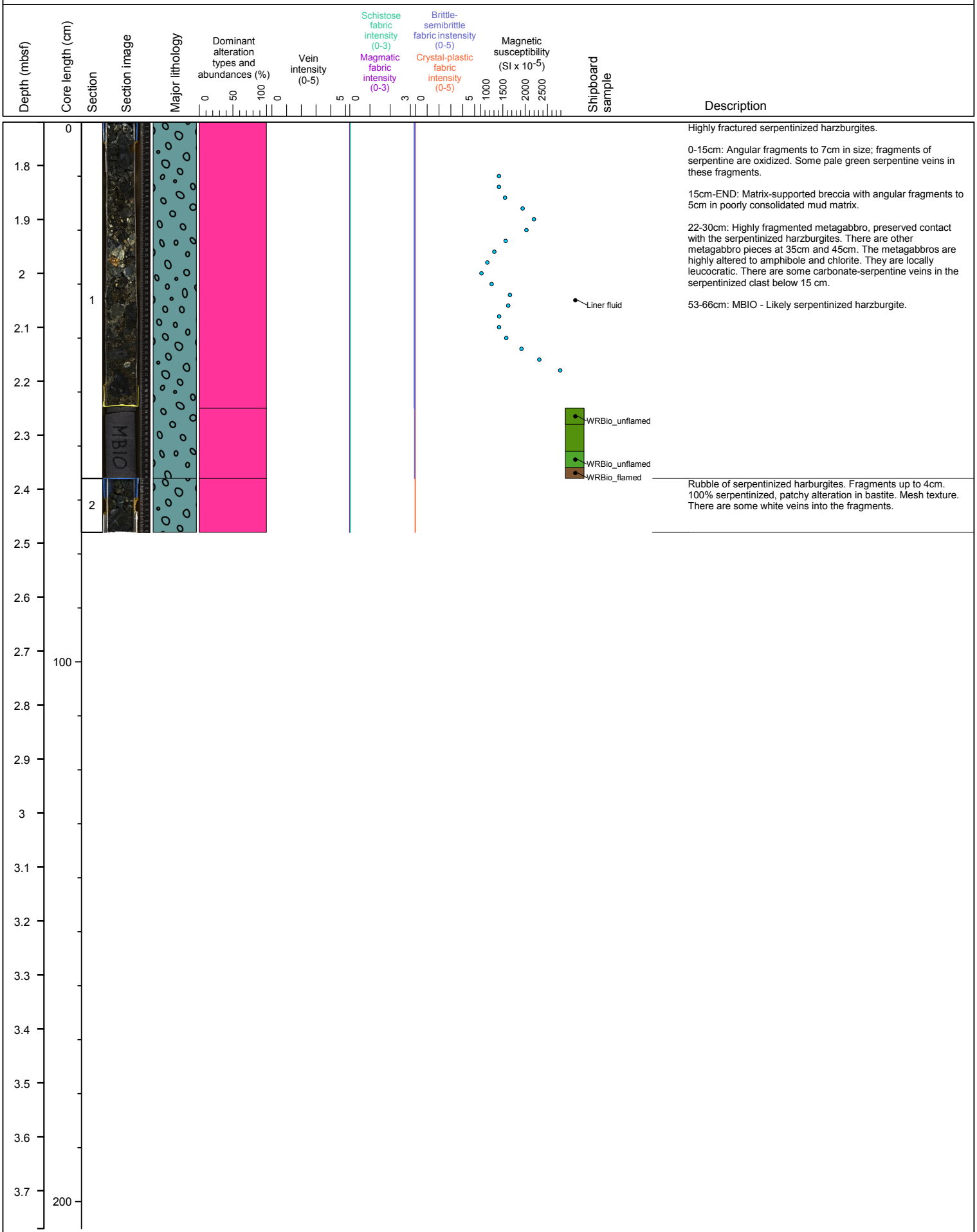
Semi-quantitative XRD: 13-14 cm - liz (48), cchrys (45), mgt (4)
14-15 cm - ant (89), tlc (6), mgt (1), ox (1)

Serpentinized harzburgites with gabbro veins. Serpentinized harzburgite contains bastites and may have some cpx relics. The serpentine mesh is oxidized and is dark red in color.

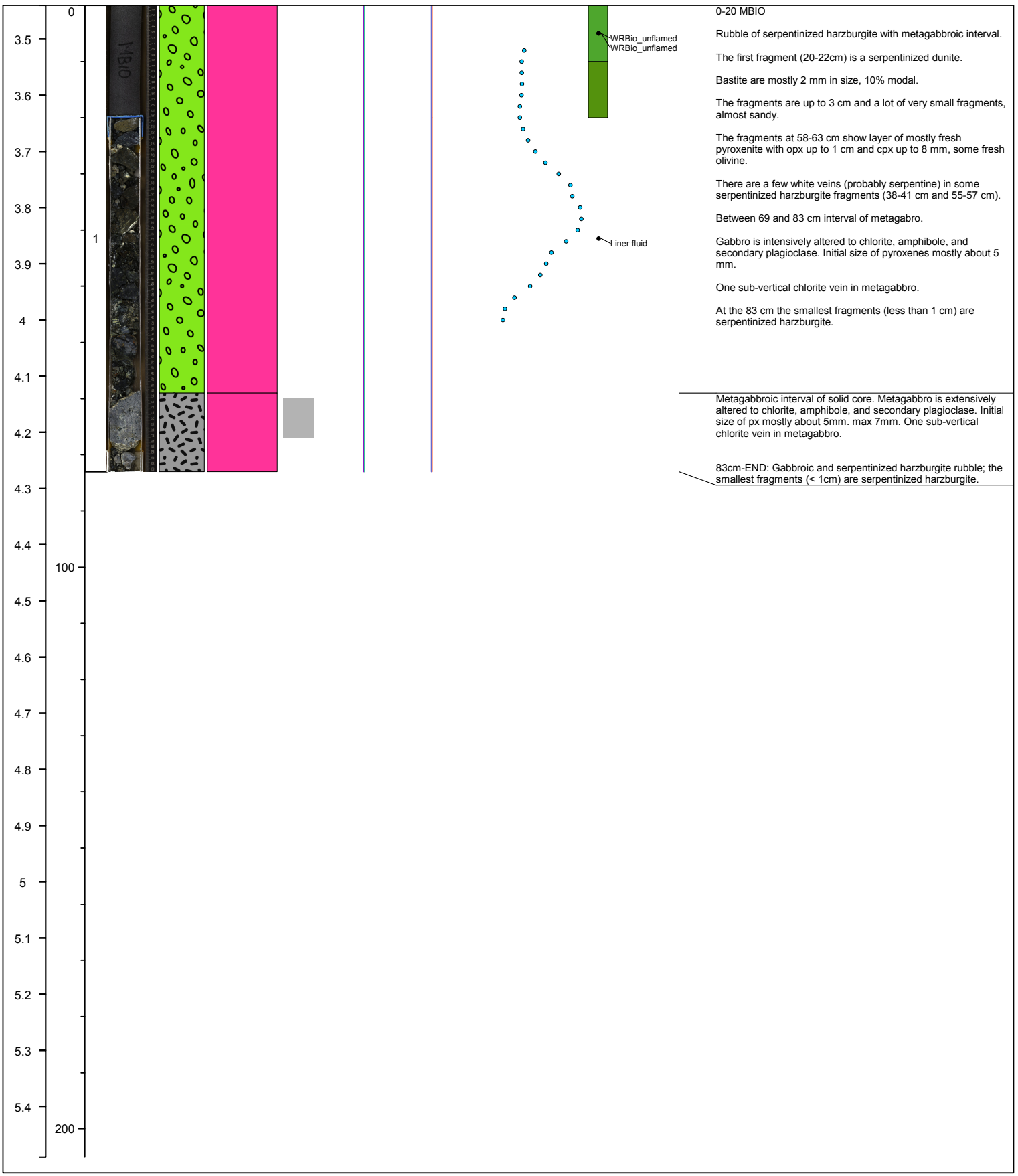
The gabbro is very altered into amphibole and chlorite. The contact between harzburgite and gabbro is gradual over approximately 1cm with polygonal crystal contacts.

White sub-vertical thin veins in serpentinites that are carbonate with serpentine (branched with Fe-oxide veins).

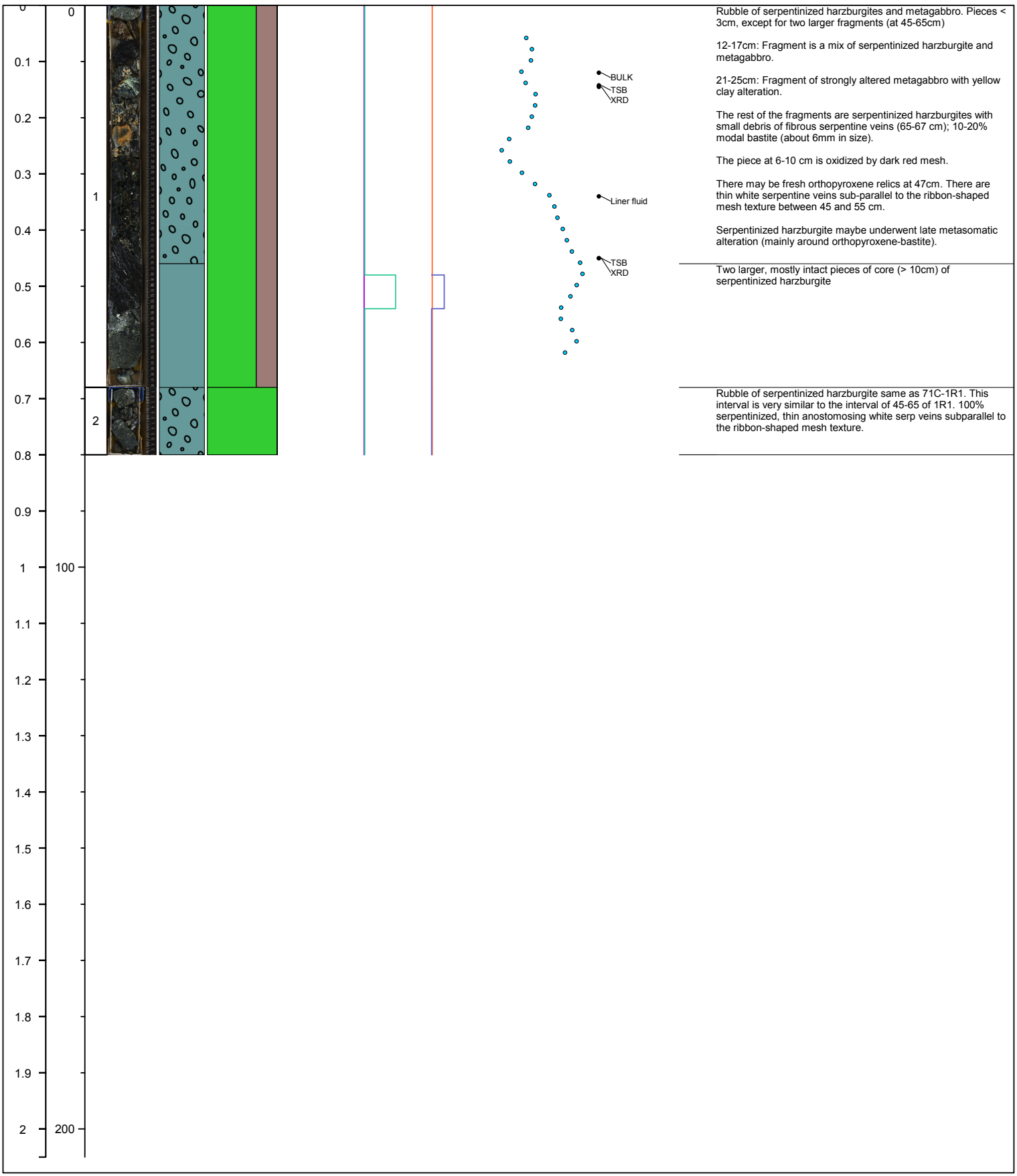
Site M0071 Hole B Core 2R Cored 1.72-3.44 mbsf



Site M0071 Hole B Core 3R Cored 3.44-4.308 mbsf



Site M0071 Hole C Core 1R Cored 0-2.68 mbsf



Description

Rubble of serpentinized harzburgites and metagabbro. Pieces < 3cm, except for two larger fragments (at 45-65cm)

12-17cm: Fragment is a mix of serpentinized harzburgite and metagabbro.

21-25cm: Fragment of strongly altered metagabbro with yellow clay alteration.

The rest of the fragments are serpentinized harzburgites with small debris of fibrous serpentine veins (65-67 cm); 10-20% modal bastite (about 6mm in size).

The piece at 6-10 cm is oxidized by dark red mesh.

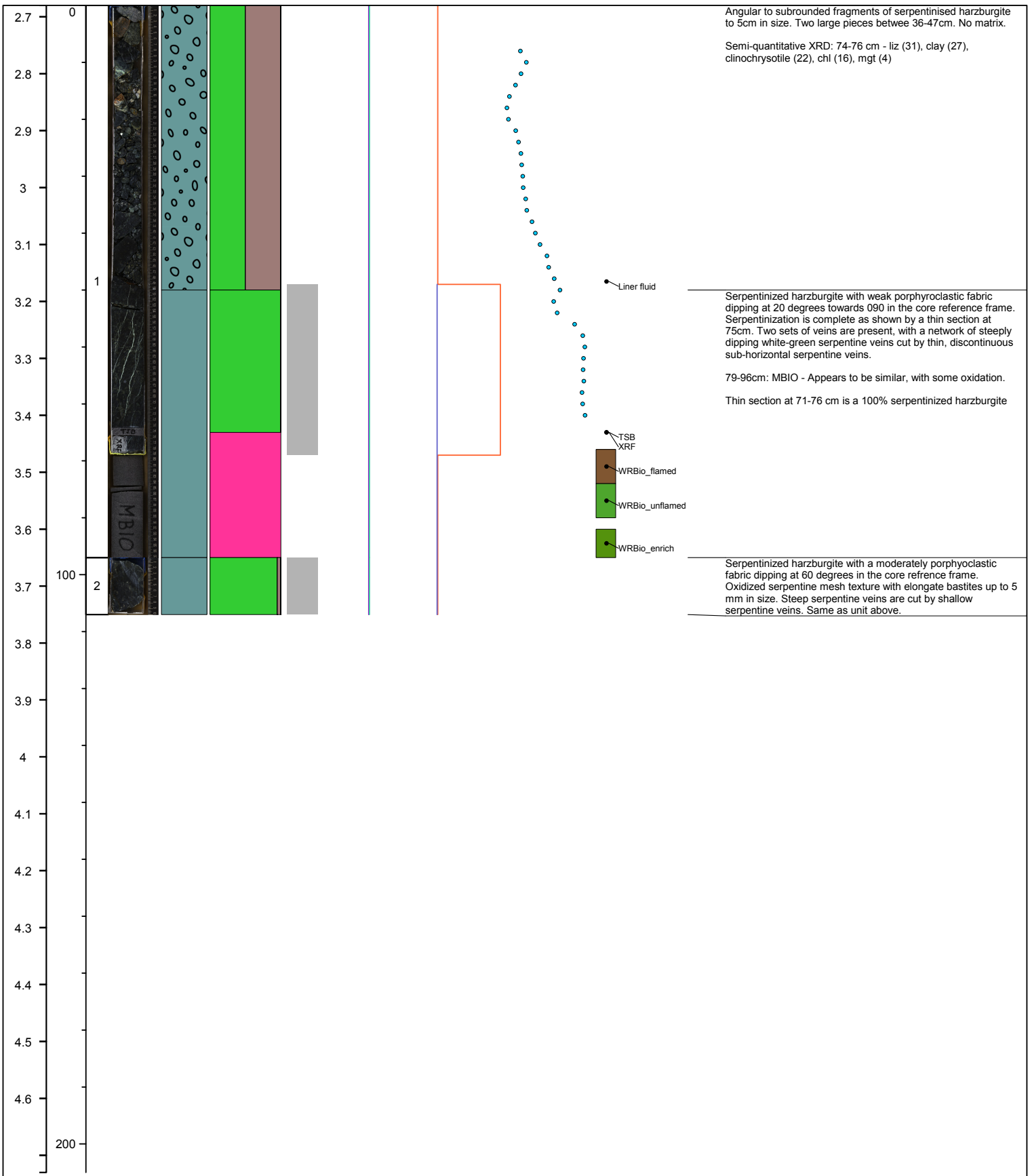
There may be fresh orthopyroxene relics at 47cm. There are thin white serpentine veins sub-parallel to the ribbon-shaped mesh texture between 45 and 55 cm.

Serpentinized harzburgite maybe underwent late metasomatic alteration (mainly around orthopyroxene-bastite).

Two larger, mostly intact pieces of core (> 10cm) of serpentinized harzburgite

Rubble of serpentinized harzburgite same as 71C-1R1. This interval is very similar to the interval of 45-65 of 1R1. 100% serpentinized, thin anostomosing white serp veins subparallel to the ribbon-shaped mesh texture.

Site M0071 Hole C Core 2R Cored 2.68-5.02 mbsf



Angular to subrounded fragments of serpentinised harzburgite to 5cm in size. Two large pieces betwee 36-47cm. No matrix.

Semi-quantitative XRD: 74-76 cm - liz (31), clay (27), clinochrysotile (22), chl (16), mgt (4)

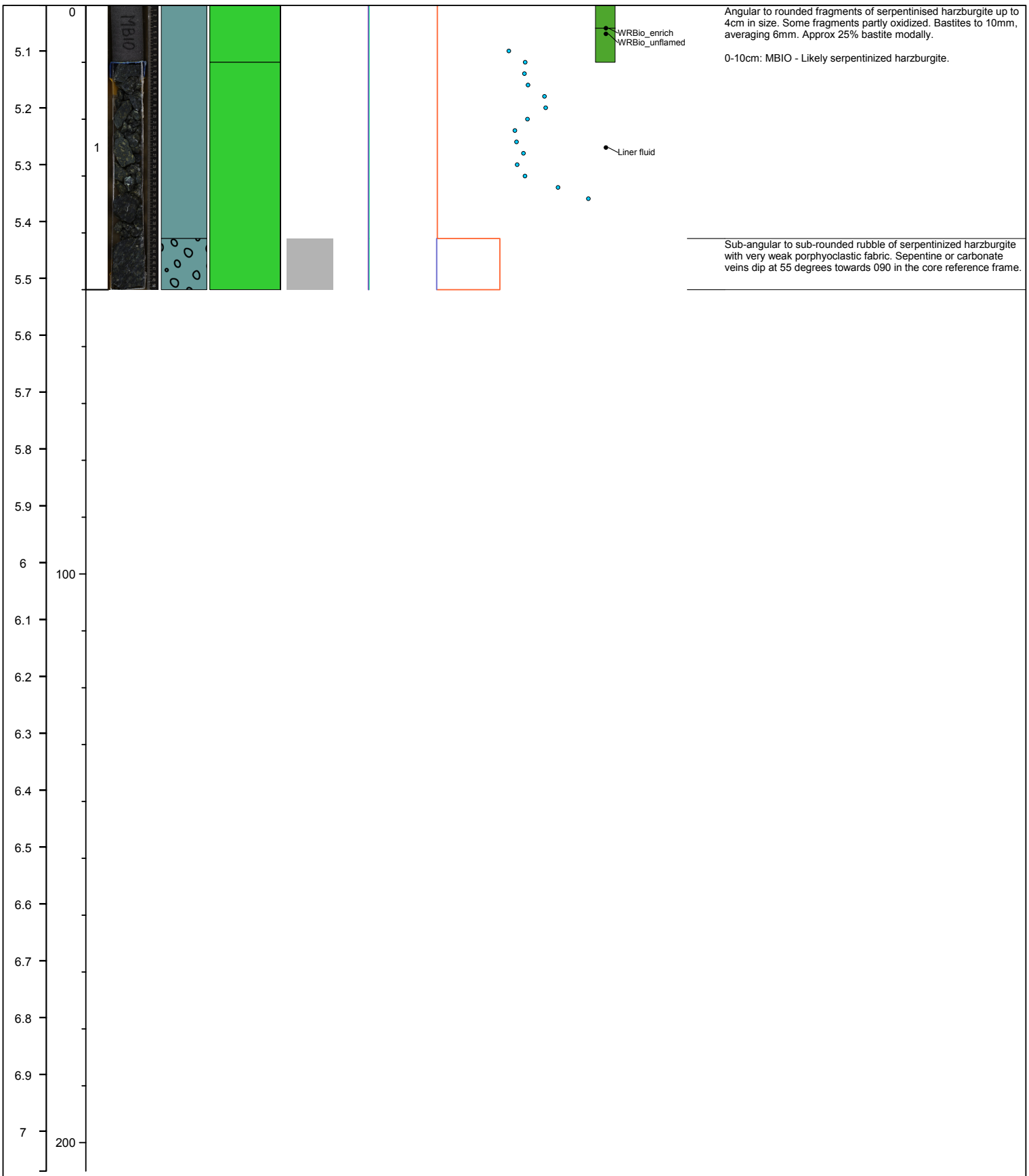
Serpentinized harzburgite with weak porphyroclastic fabric dipping at 20 degrees towards 090 in the core reference frame. Serpentinization is complete as shown by a thin section at 75cm. Two sets of veins are present, with a network of steeply dipping white-green serpentine veins cut by thin, discontinuous sub-horizontal serpentine veins.

79-96cm: MBIO - Appears to be similar, with some oxidation.

Thin section at 71-76 cm is a 100% serpentinized harzburgite

Serpentinized harzburgite with a moderately porphyoclastic fabric dipping at 60 degrees in the core refrence frame. Oxidized serpentine mesh texture with elongate bastites up to 5 mm in size. Steep serpentine veins are cut by shallow serpentine veins. Same as unit above.

Site M0071 Hole C Core 3R Cored 5.02-6.93 mbsf

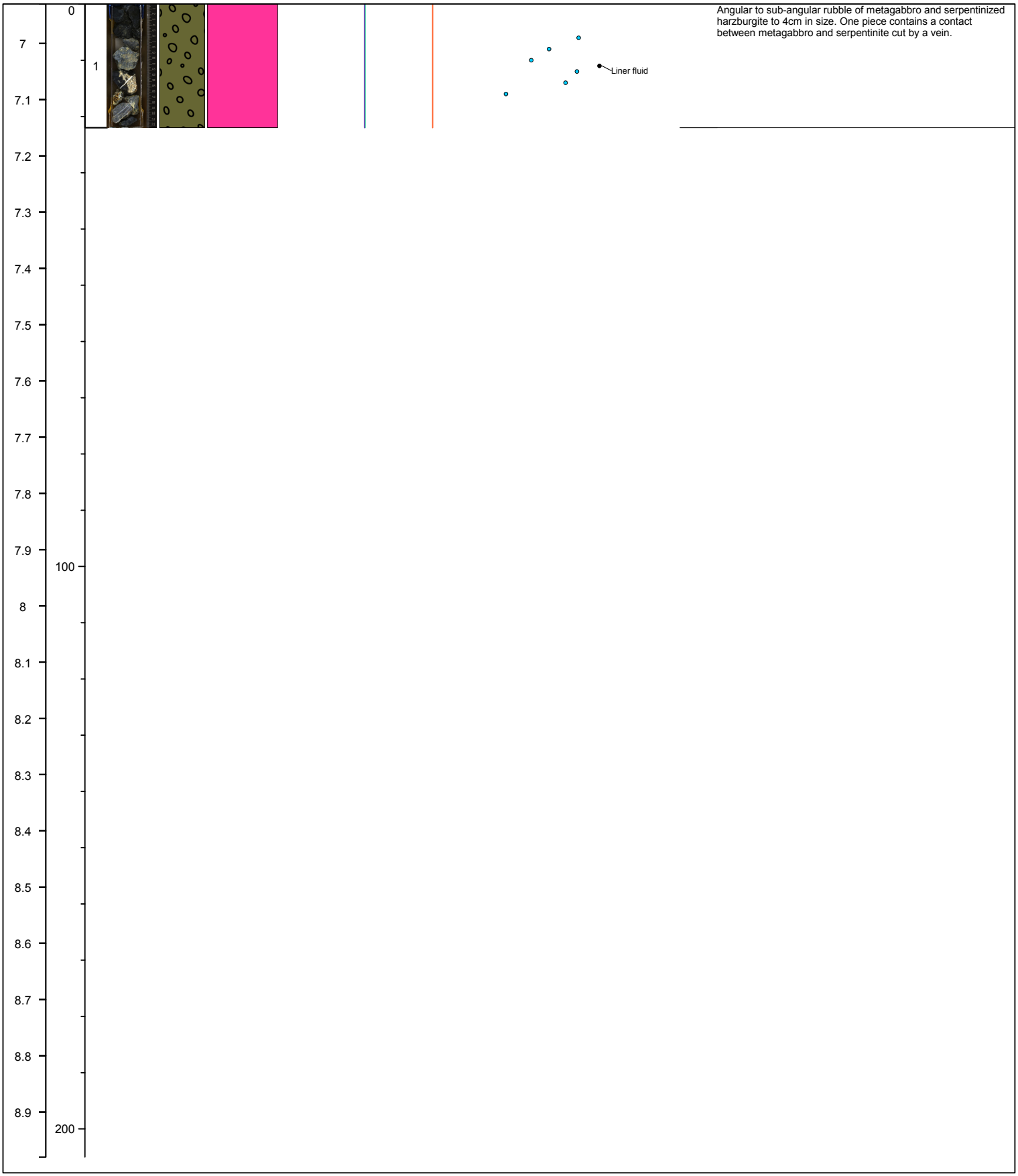


Angular to rounded fragments of serpentinised harzburgite up to 4cm in size. Some fragments partly oxidized. Bastites to 10mm, averaging 6mm. Approx 25% bastite modally.

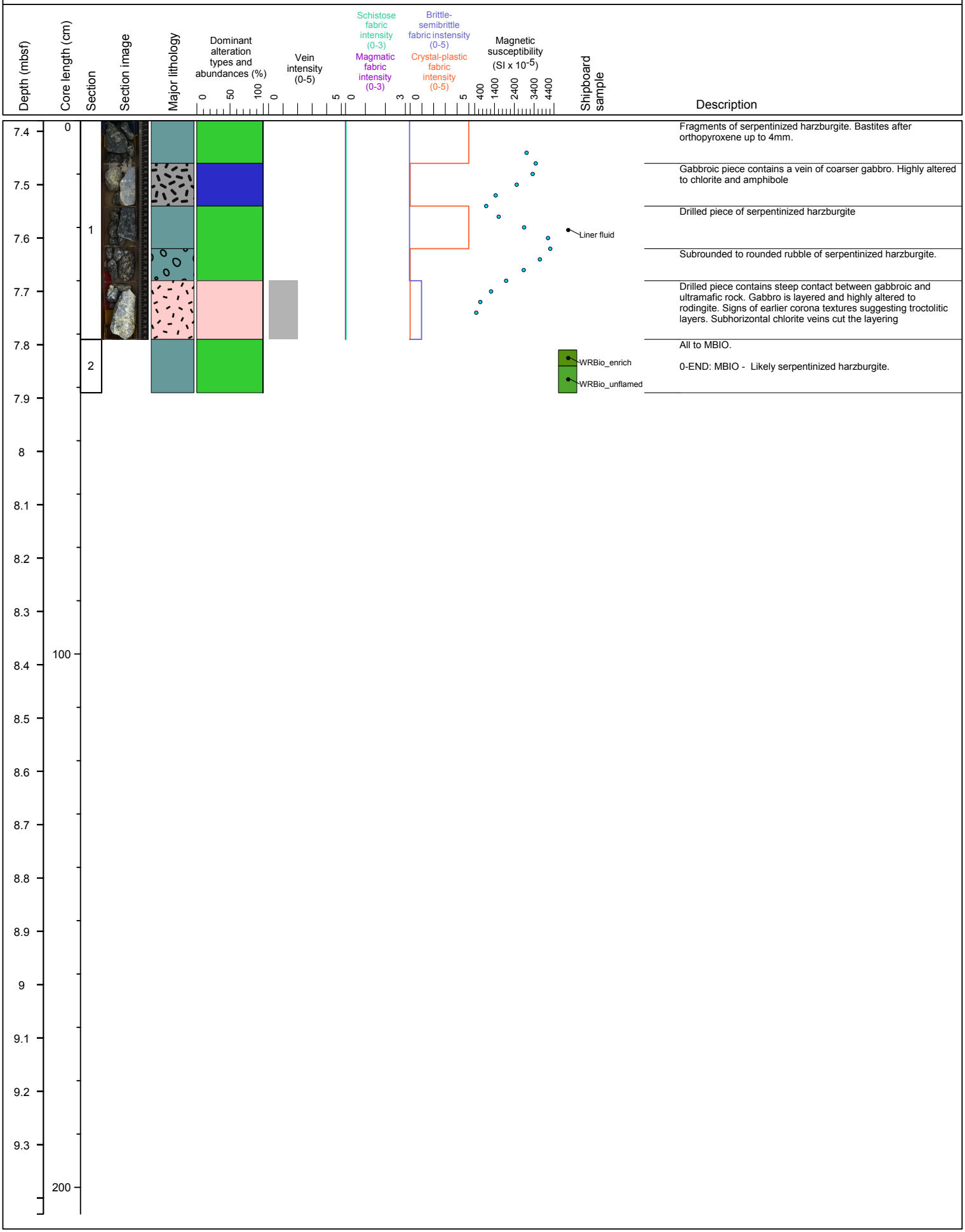
0-10cm: MBIO - Likely serpentinized harzburgite.

Sub-angular to sub-rounded rubble of serpentinized harzburgite with very weak porphyoclastic fabric. Sepentine or carbonate veins dip at 55 degrees towards 090 in the core reference frame.

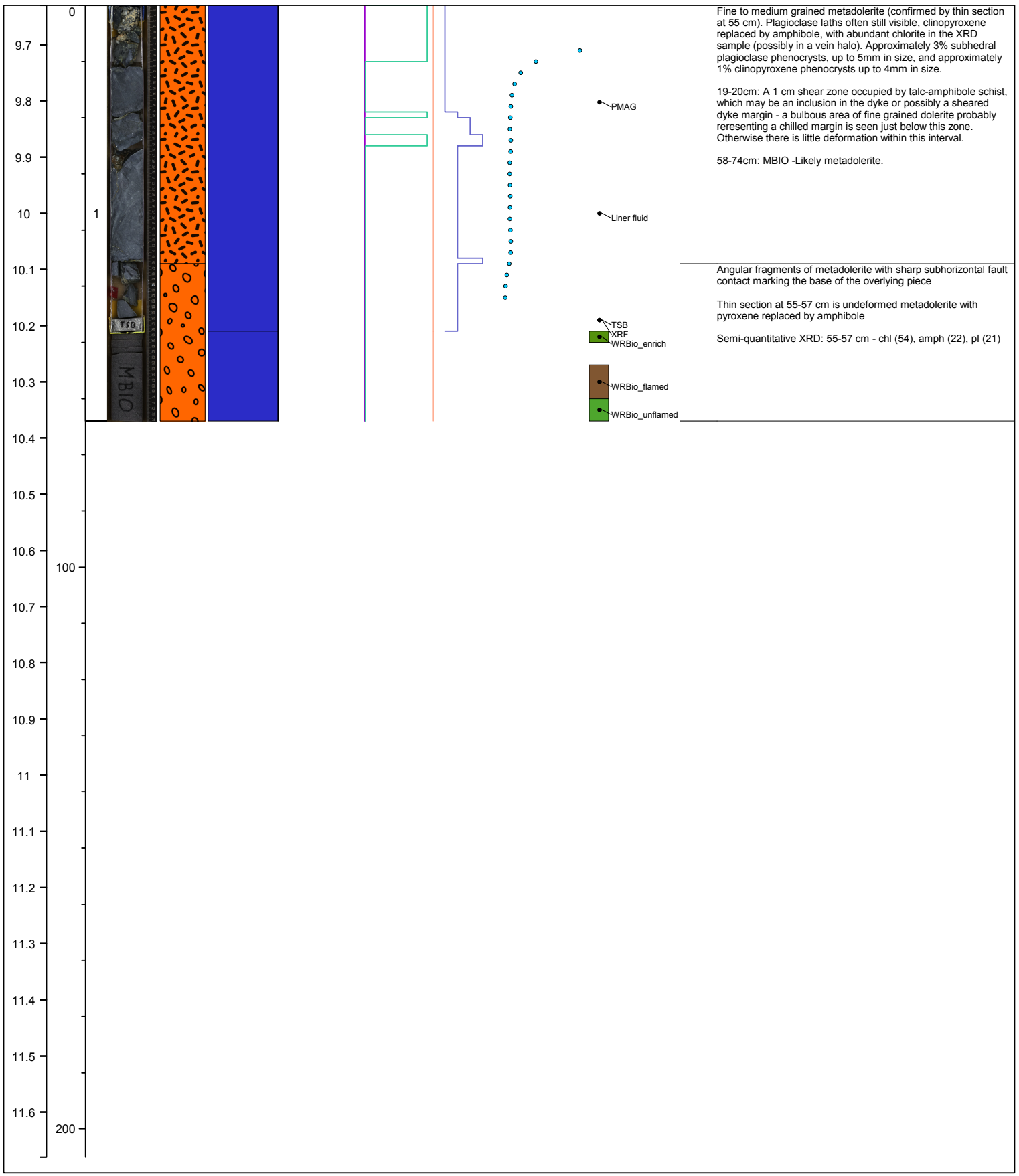
Site M0071 Hole C Core 4R Cored 6.93-7.38 mbsf



Site M0071 Hole C Core 5R Cored 7.38-9.63 mbsf



Site M0071 Hole C Core 6R Cored 9.63-11.69 mbsf



Fine to medium grained metadolerite (confirmed by thin section at 55 cm). Plagioclase laths often still visible, clinopyroxene replaced by amphibole, with abundant chlorite in the XRD sample (possibly in a vein halo). Approximately 3% subhedral plagioclase phenocrysts, up to 5mm in size, and approximately 1% clinopyroxene phenocrysts up to 4mm in size.

19-20cm: A 1 cm shear zone occupied by talc-amphibole schist, which may be an inclusion in the dyke or possibly a sheared dyke margin - a bulbous area of fine grained dolerite probably reresenting a chilled margin is seen just below this zone. Otherwise there is little deformation within this interval.

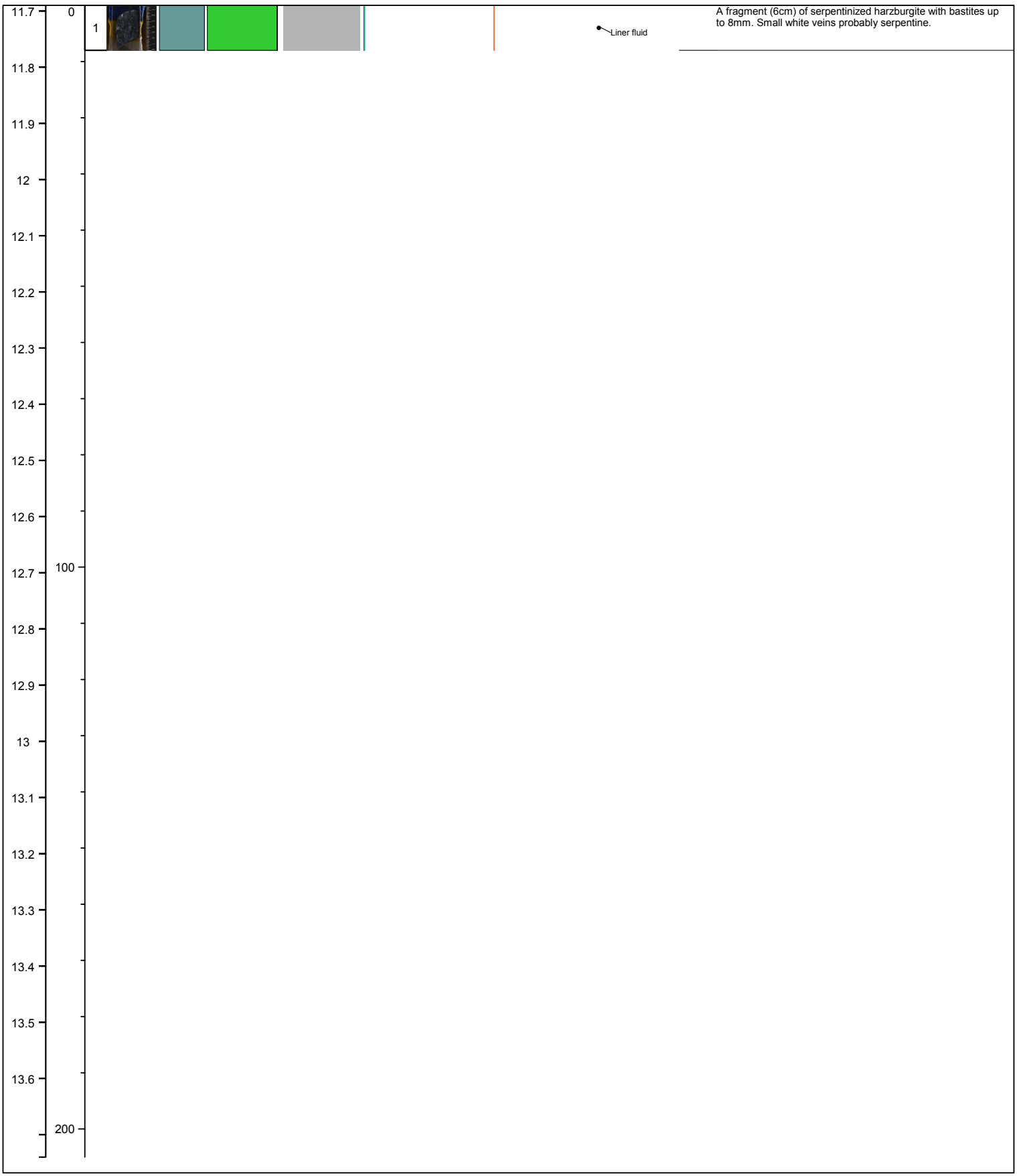
58-74cm: MBIO -Likely metadolerite.

Angular fragments of metadolerite with sharp subhorizontal fault contact marking the base of the overlying piece

Thin section at 55-57 cm is undeformed metadolerite with pyroxene replaced by amphibole

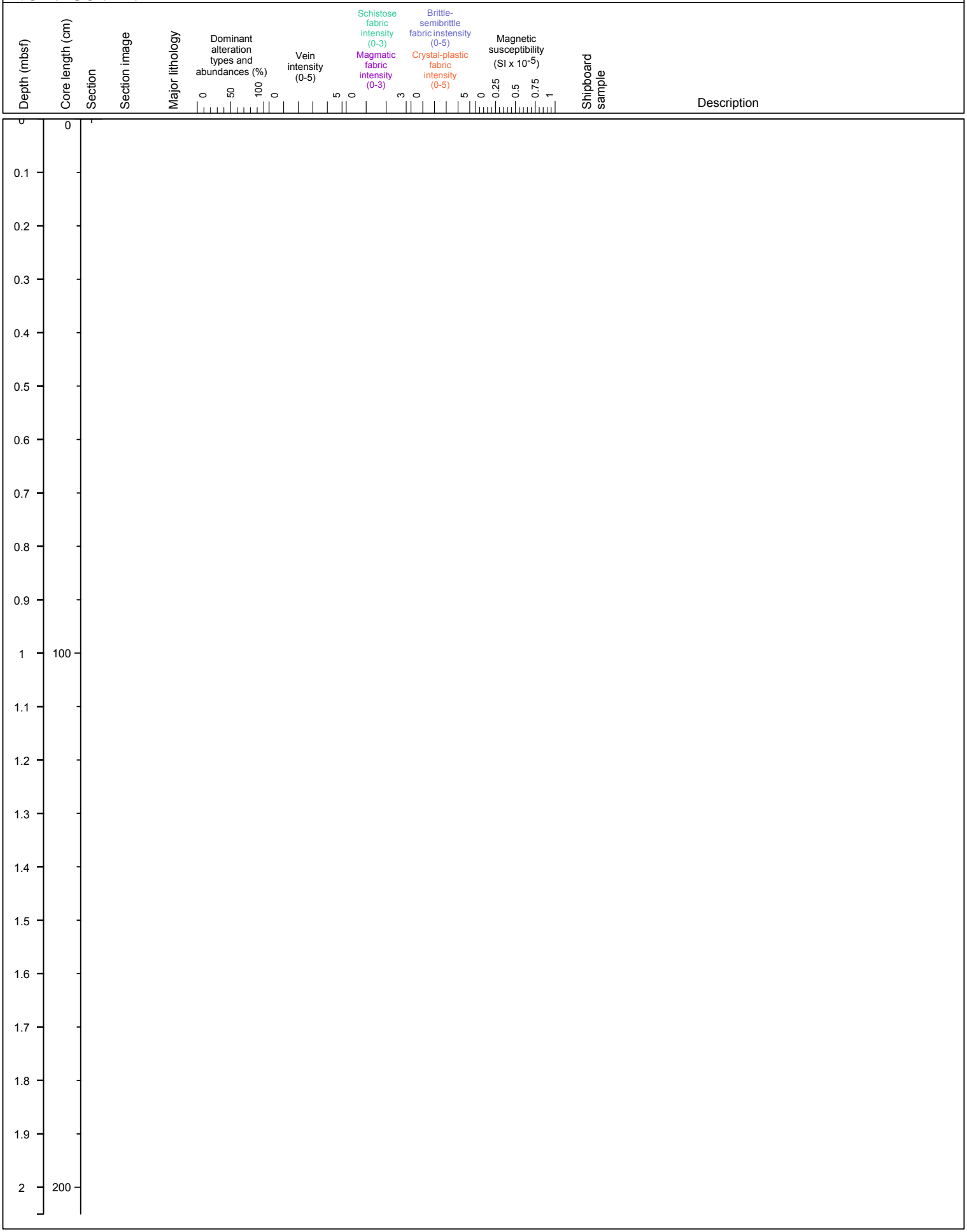
Semi-quantitative XRD: 55-57 cm - chl (54), amph (22), pl (21)

Site M0071 Hole C Core 7R Cored 11.69-11.78 mbsf

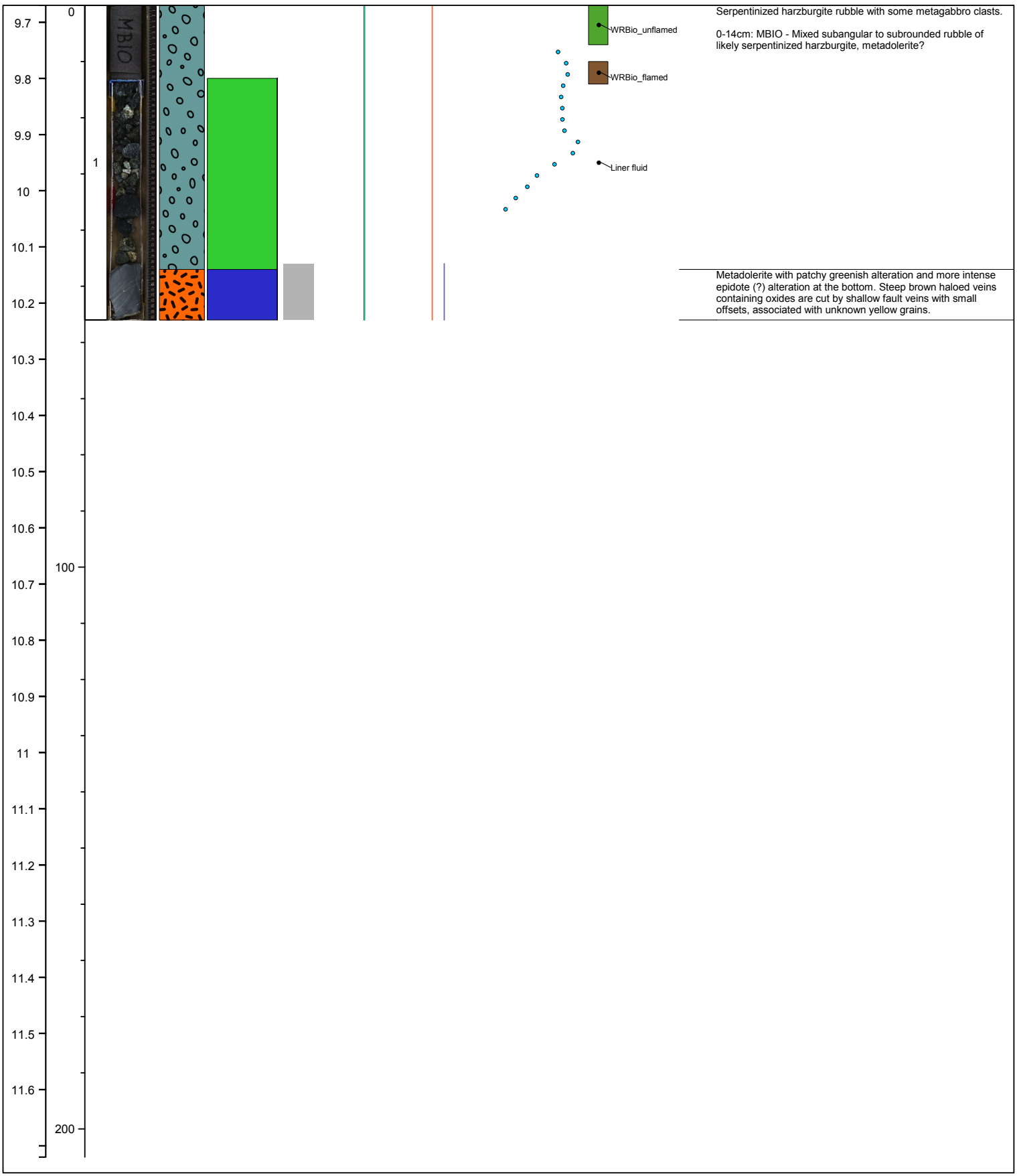


NO RECOVERY

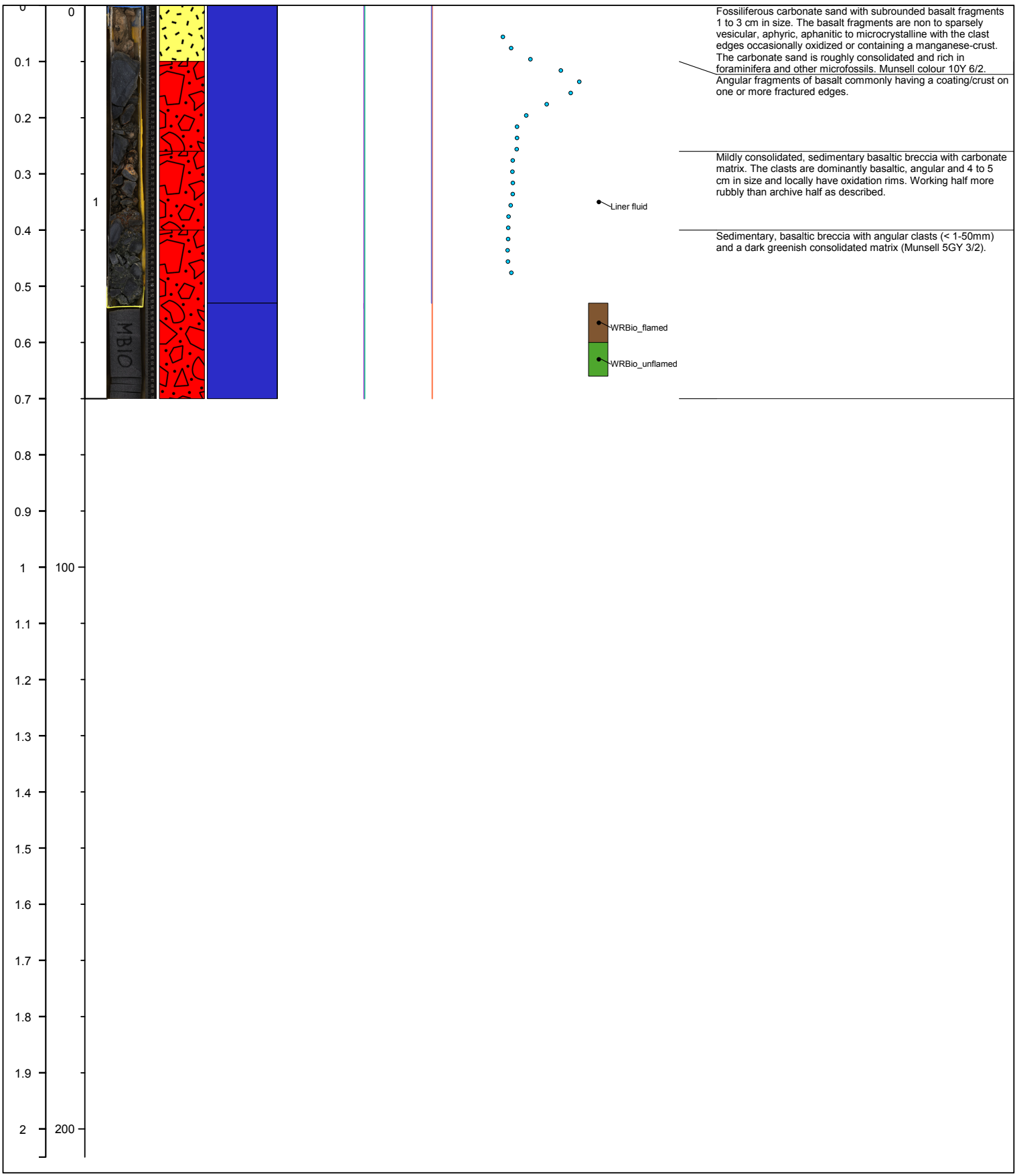
Site M0071 Hole C Core 8O Cored 0-0 mbsf



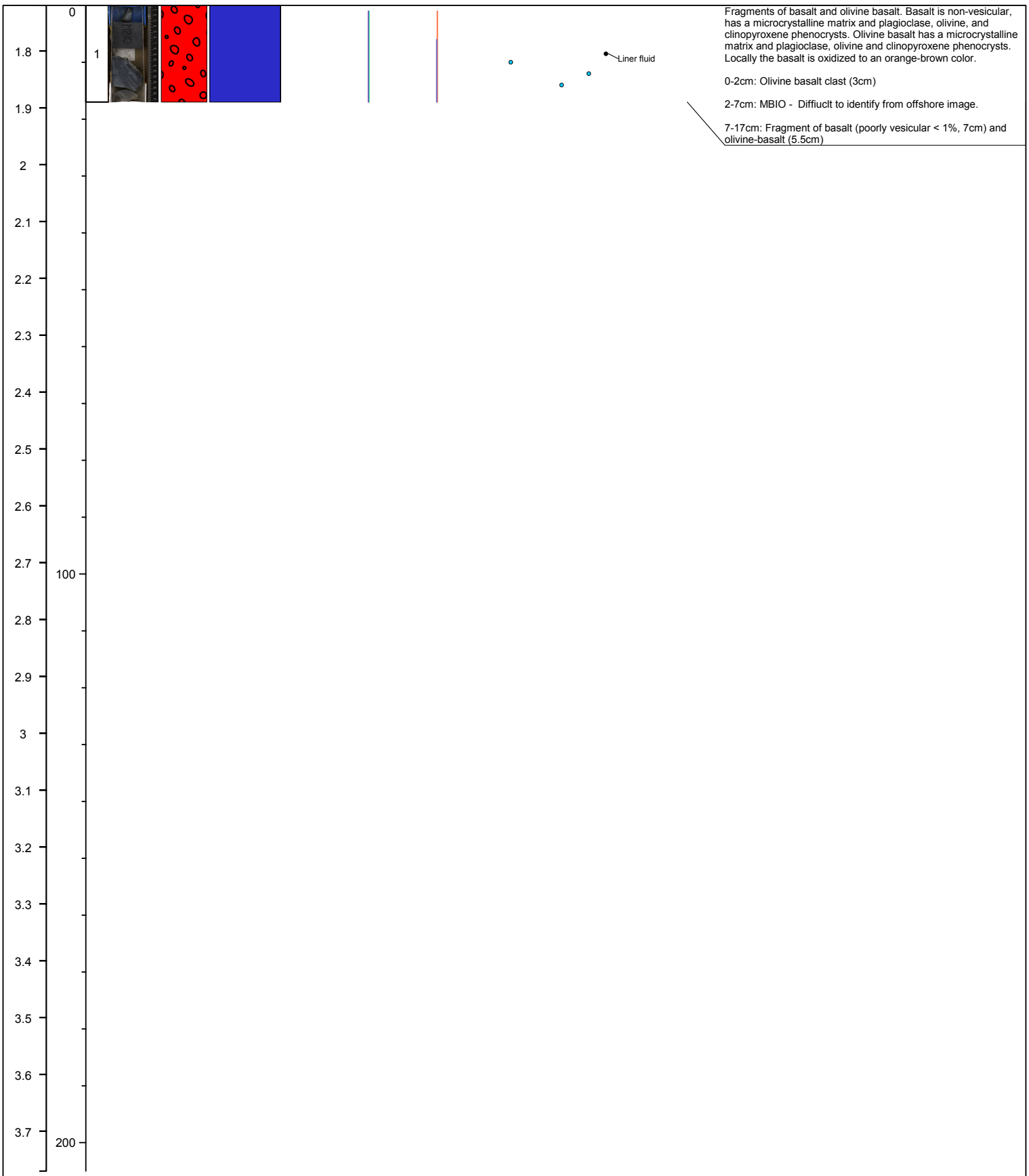
Site M0071 Hole C Core 9R Cored 9.67-12.15 mbsf



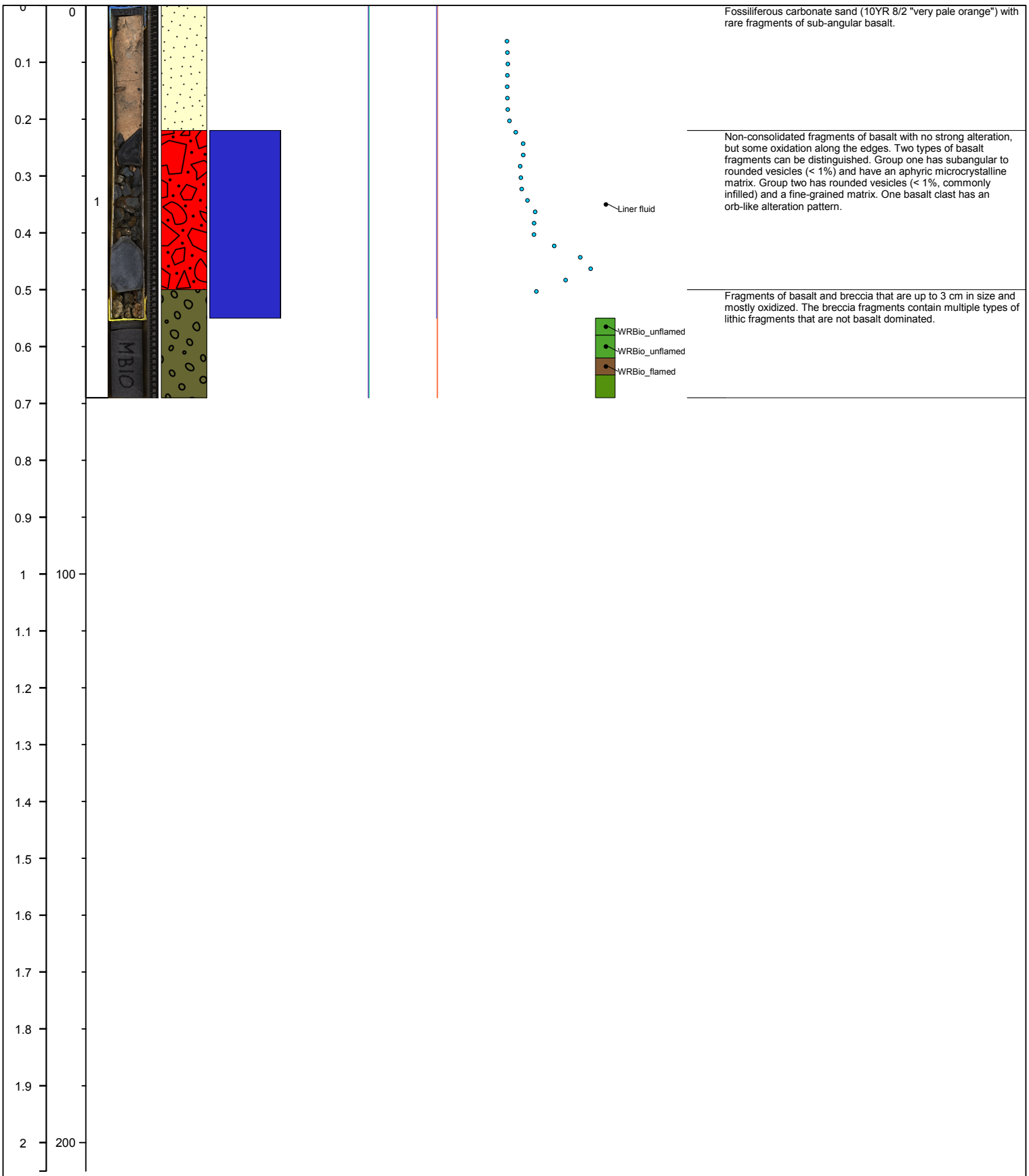
Site M0072 Hole A Core 1R Cored 0-1.72 mbsf



Site M0072 Hole A Core 2R Cored 1.72-2.225 mbsf



Site M0072 Hole B Core 1R Cored 0-1.72 mbsf

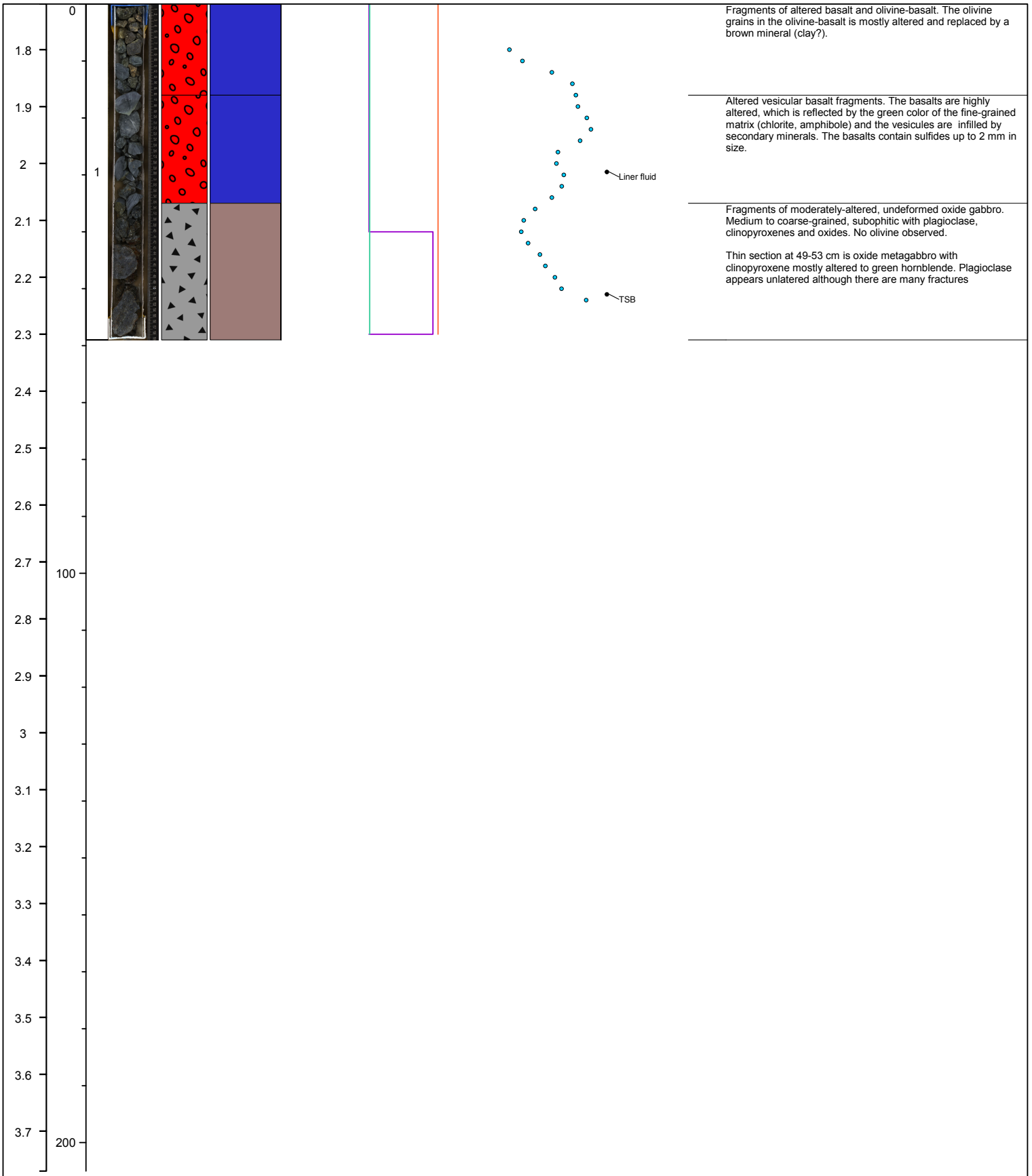


Fossiliferous carbonate sand (10YR 8/2 "very pale orange") with rare fragments of sub-angular basalt.

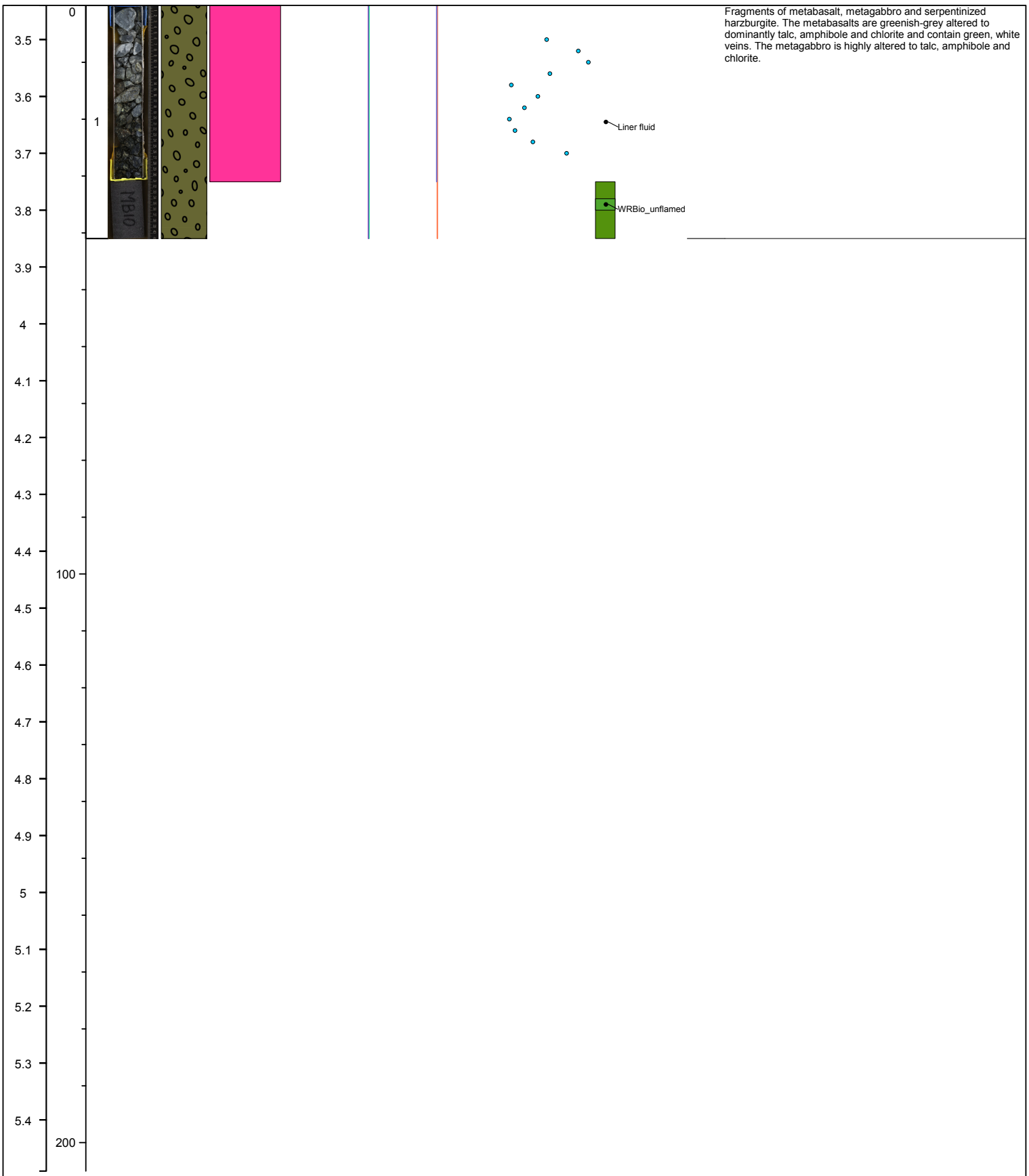
Non-consolidated fragments of basalt with no strong alteration, but some oxidation along the edges. Two types of basalt fragments can be distinguished. Group one has subangular to rounded vesicles (< 1%) and have an aphyric microcrystalline matrix. Group two has rounded vesicles (< 1%, commonly infilled) and a fine-grained matrix. One basalt clast has an orb-like alteration pattern.

Fragments of basalt and breccia that are up to 3 cm in size and mostly oxidized. The breccia fragments contain multiple types of lithic fragments that are not basalt dominated.

Site M0072 Hole B Core 2R Cored 1.72-3.44 mbsf

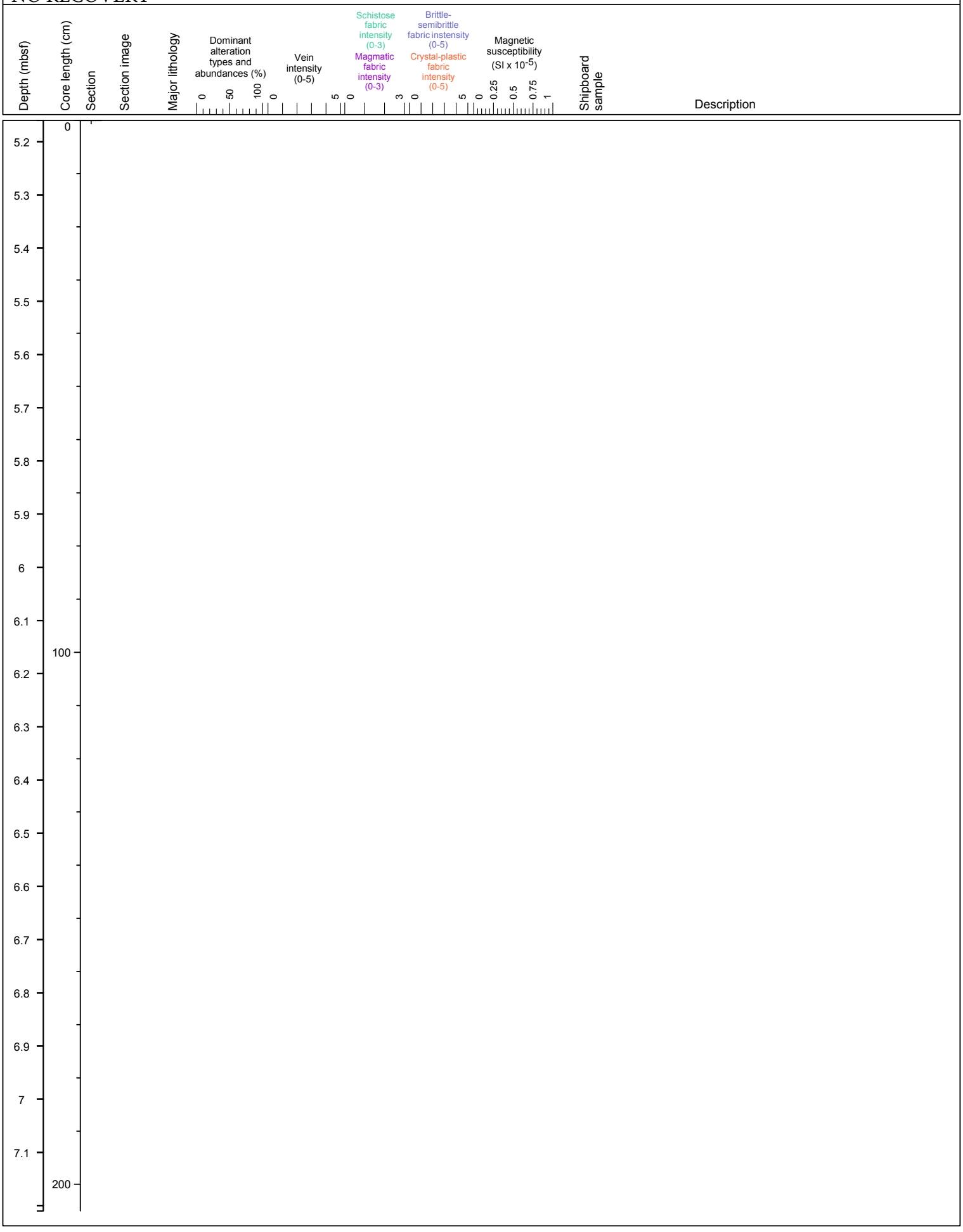


Site M0072 Hole B Core 3R Cored 3.44-5.16 mbsf

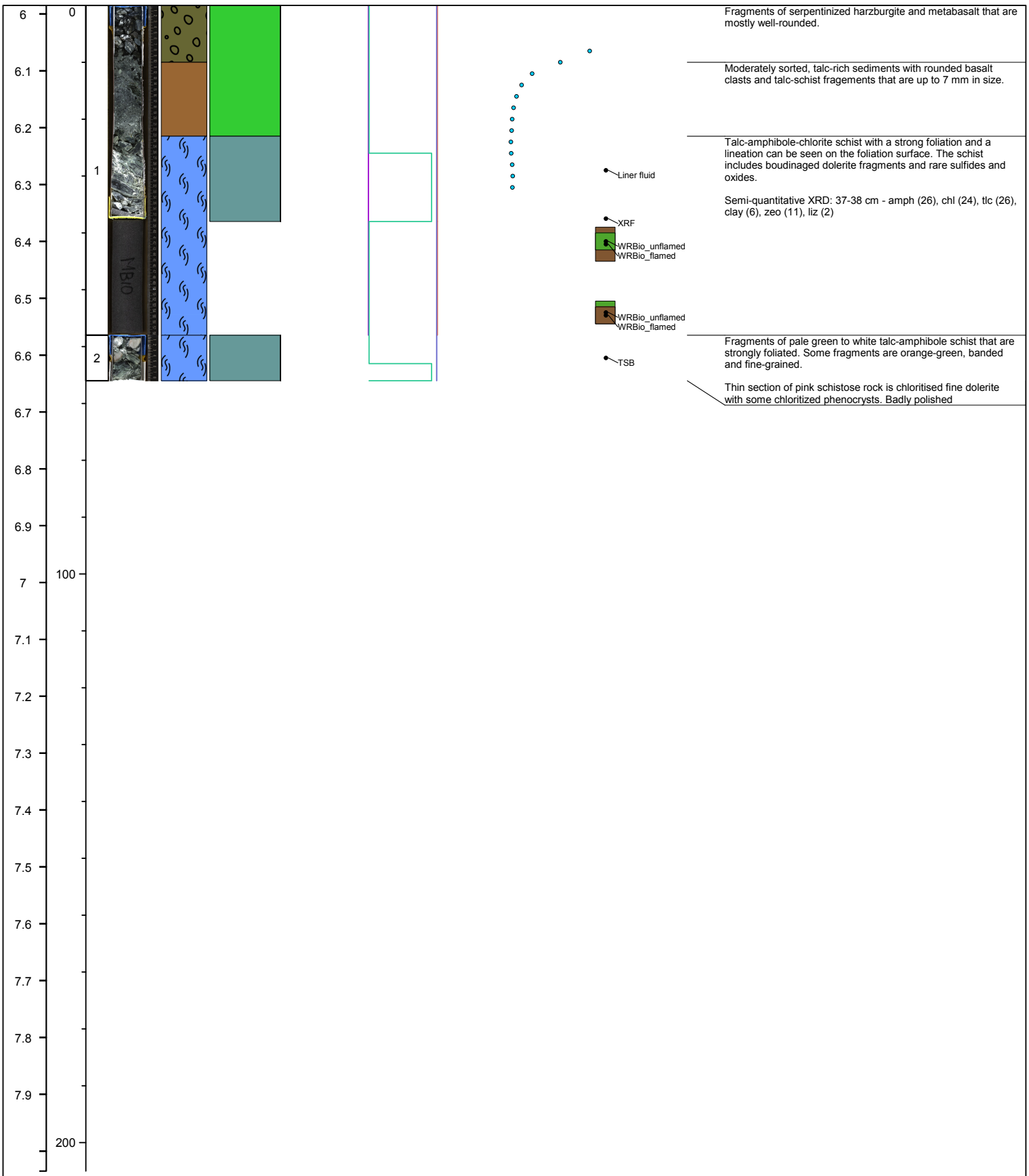


NO RECOVERY

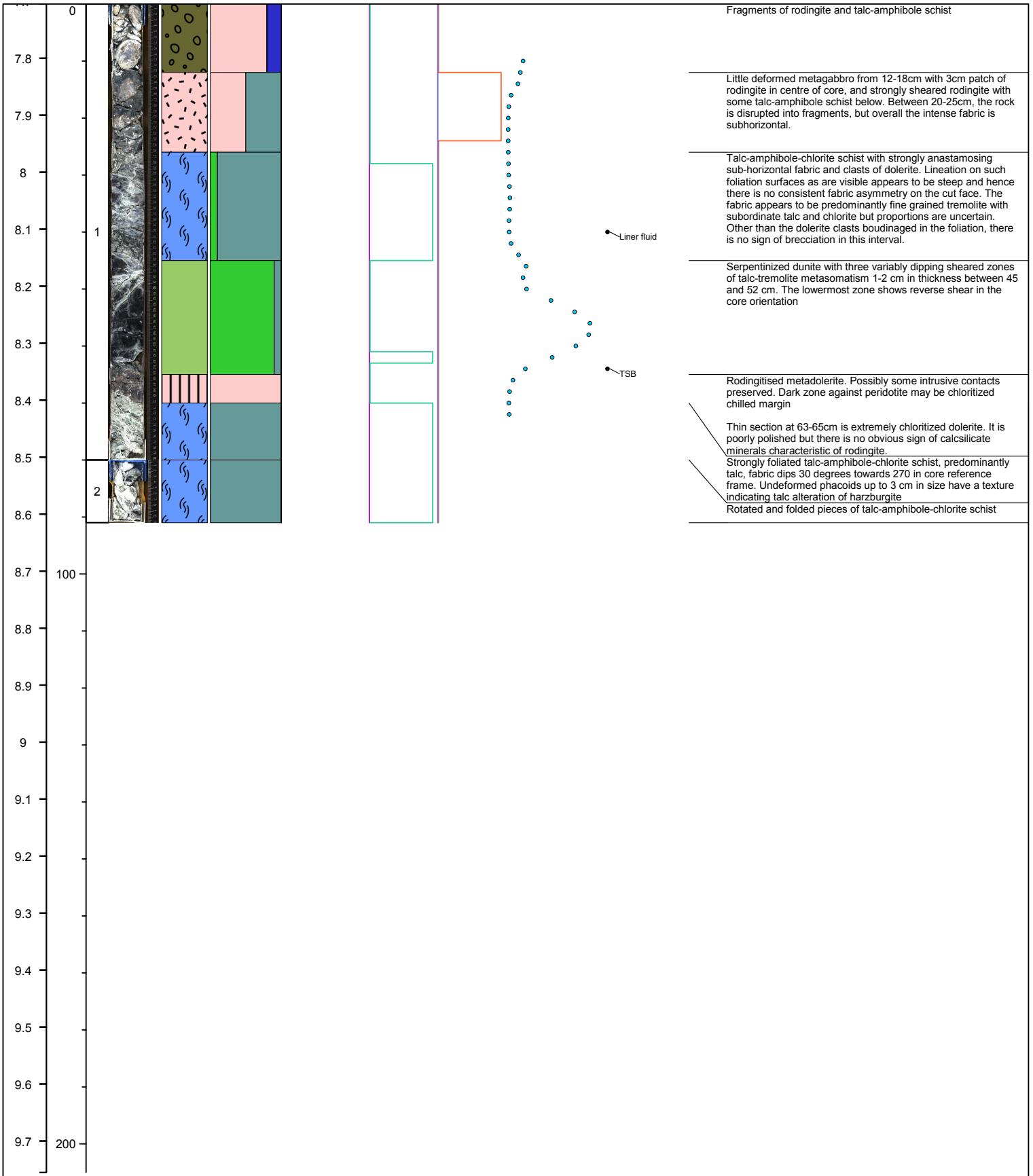
Site M0072 Hole B Core 4O Cored 5.16-5.985 mbsf



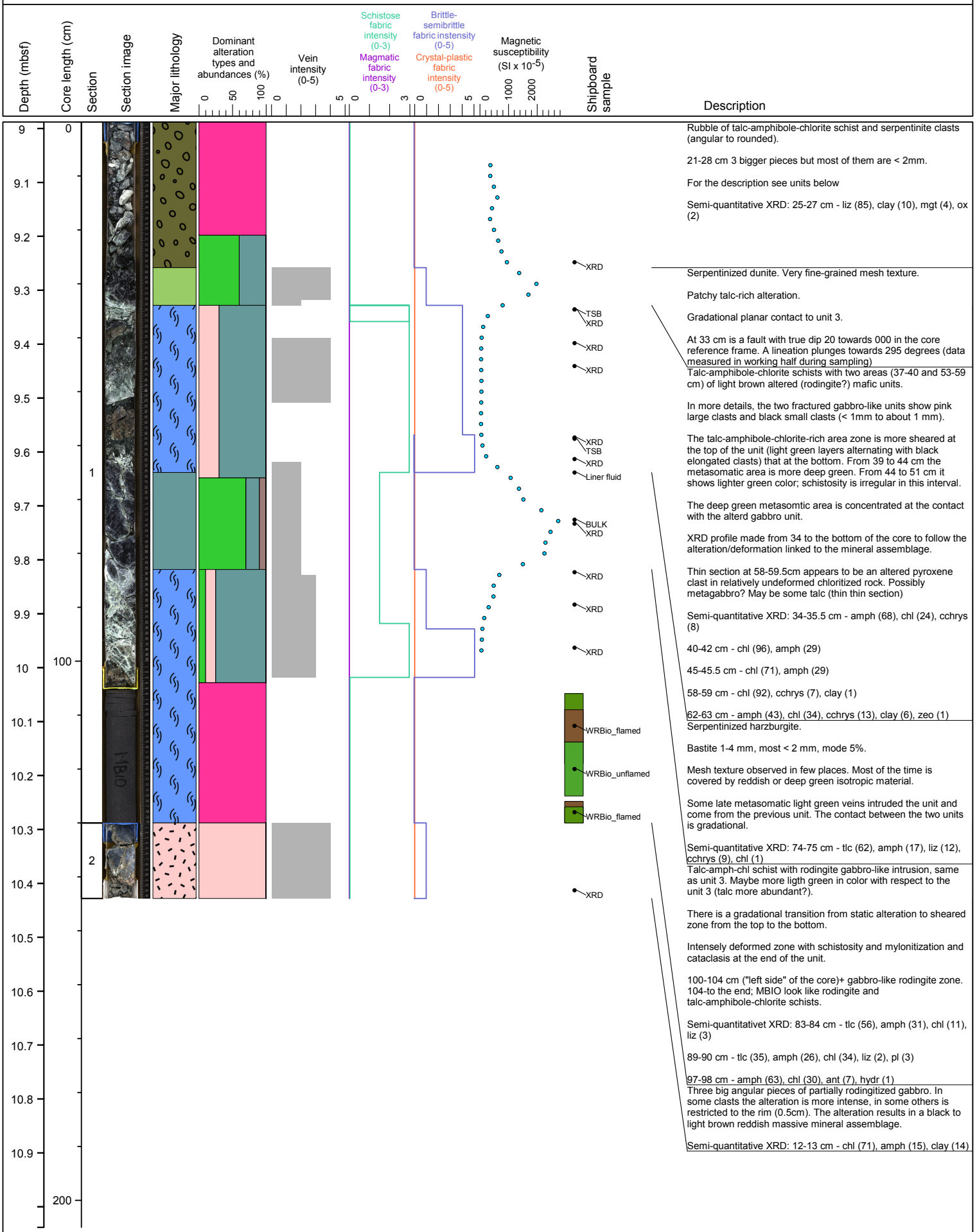
Site M0072 Hole B Core 5R Cored 5.985-7.705 mbsf



Site M0072 Hole B Core 6R Cored 7.705-8.988 mbsf



Site M0072 Hole B Core 7R Cored 8.988-10.708 mbsf



Rubble of talc-amphibole-chlorite schist and serpentinite clasts (angular to rounded).

21-28 cm 3 bigger pieces but most of them are < 2mm.

For the description see units below

Semi-quantitative XRD: 25-27 cm - liz (85), clay (10), mgt (4), ox (2)

Serpentinized dunite. Very fine-grained mesh texture.

Patchy talc-rich alteration.

Gradational planar contact to unit 3.

At 33 cm is a fault with true dip 20 towards 000 in the core reference frame. A lineation plunges towards 295 degrees (data measured in working half during sampling)

Talc-amphibole-chlorite schists with two areas (37-40 and 53-59 cm) of light brown altered (rodingite?) mafic units.

In more details, the two fractured gabbro-like units show pink large clasts and black small clasts (< 1mm to about 1 mm).

The talc-amphibole-chlorite-rich area zone is more sheared at the top of the unit (light green layers alternating with black elongated clasts) that at the bottom. From 39 to 44 cm the metasomatic area is more deep green. From 44 to 51 cm it shows lighter green color; schistosity is irregular in this interval.

The deep green metasomtic area is concentrated at the contact with the alterd gabbro unit.

XRD profile made from 34 to the bottom of the core to follow the alteration/deformation linked to the mineral assemblage.

Thin section at 58-59.5cm appears to be an altered pyroxene clast in relatively undeformed chloritized rock. Possibly metagabbro? May be some talc (thin thin section)

Semi-quantitative XRD: 34-35.5 cm - amph (68), chl (24), cchrys (8)

40-42 cm - chl (96), amph (29)

45-45.5 cm - chl (71), amph (29)

58-59 cm - chl (92), cchrys (7), clay (1)

62-63 cm - amph (43), chl (34), cchrys (13), clay (6), zeo (1)

Serpentinized harzburgite.

Bastite 1-4 mm, most < 2 mm, mode 5%.

Mesh texture observed in few places. Most of the time is covered by reddish or deep green isotropic material.

Some late metasomatic light green veins intruded the unit and come from the previous unit. The contact between the two units is gradational.

Semi-quantitative XRD: 74-75 cm - tlc (62), amph (17), liz (12), cchrys (9), chl (1)

Talc-amph-chl schist with rodingite gabbro-like intrusion, same as unit 3. Maybe more ligth green in color with respect to the unit 3 (talc more abundant?).

There is a gradational transition from static alteration to sheared zone from the top to the bottom.

Intensely deformed zone with schistosity and mylonitization and cataclasis at the end of the unit.

100-104 cm ("left side" of the core)+ gabbro-like rodingite zone. 104-to the end; MBIO look like rodingite and talc-amphibole-chlorite schists.

Semi-quantitativet XRD: 83-84 cm - tlc (56), amph (31), chl (11), liz (3)

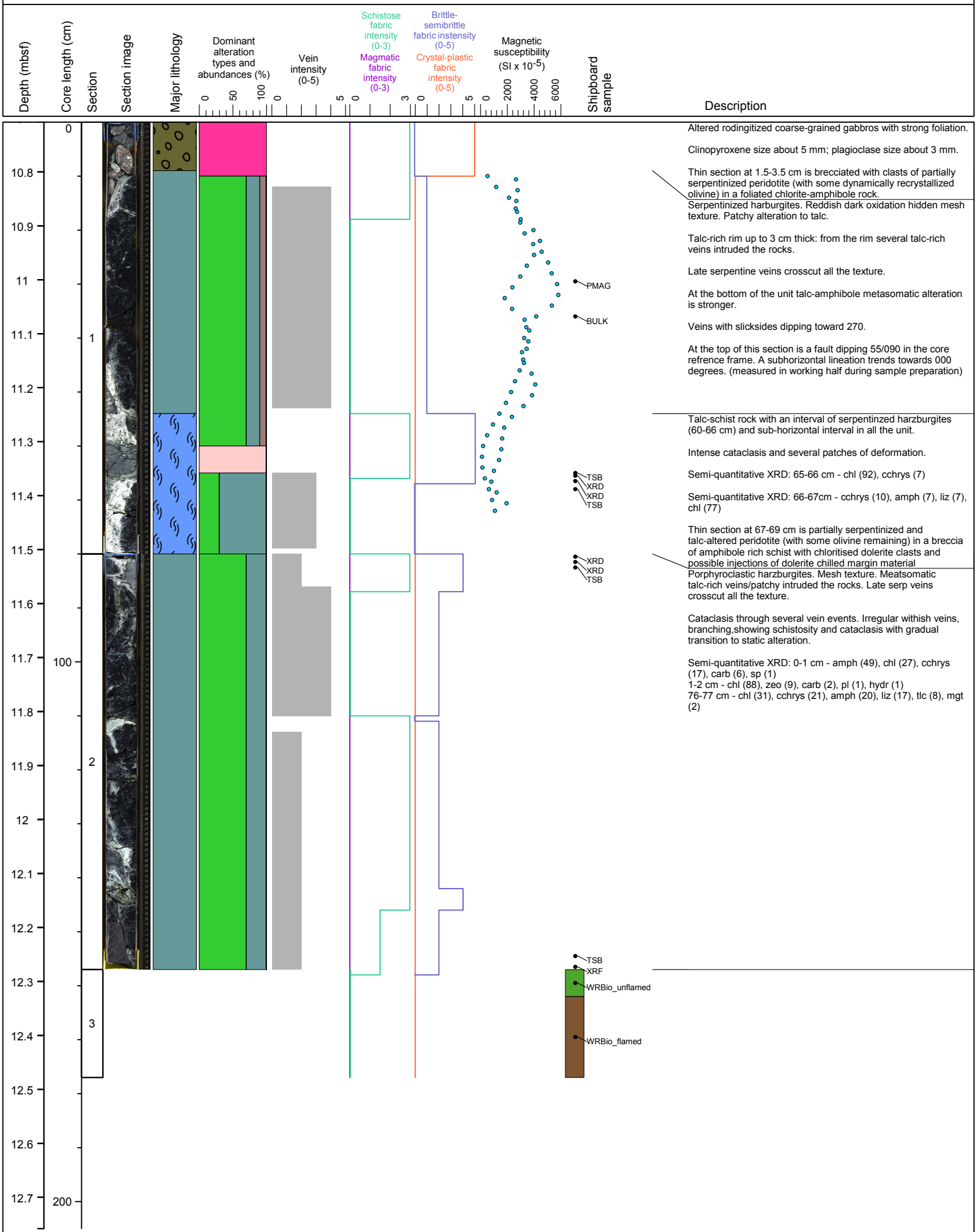
89-90 cm - tlc (35), amph (26), chl (34), liz (2), pl (3)

97-98 cm - amph (63), chl (30), ant (7), hydr (1)

Three big angular pieces of partially rodingitized gabbro. In some clasts the alteration is more intense, in some others is restricted to the rim (0.5cm). The alteration results in a black to light brown reddish massive mineral assemblage.

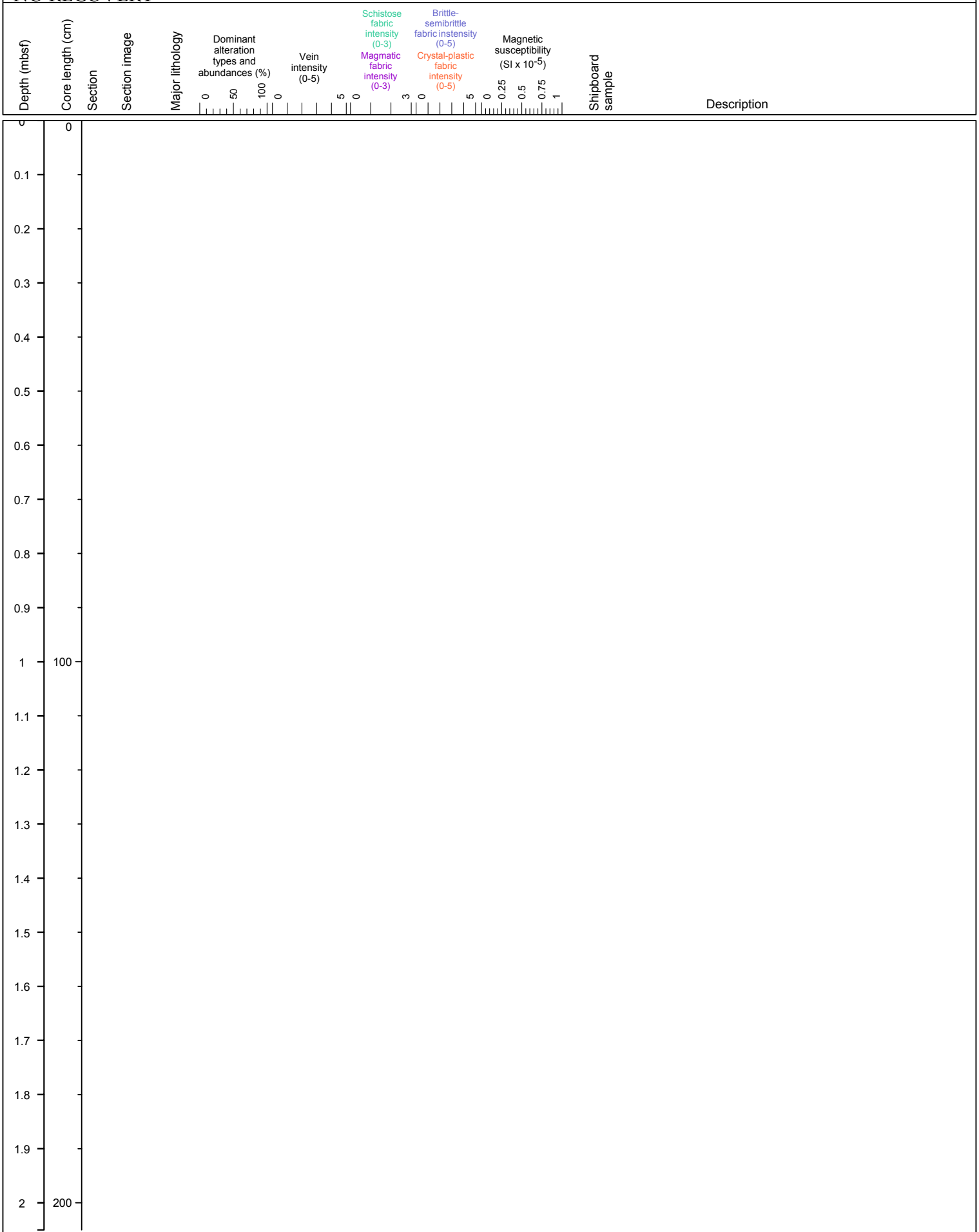
Semi-quantitative XRD: 12-13 cm - chl (71), amph (15), clay (14)

Site M0072 Hole B Core 8R Cored 10.708-12.428 mbsf

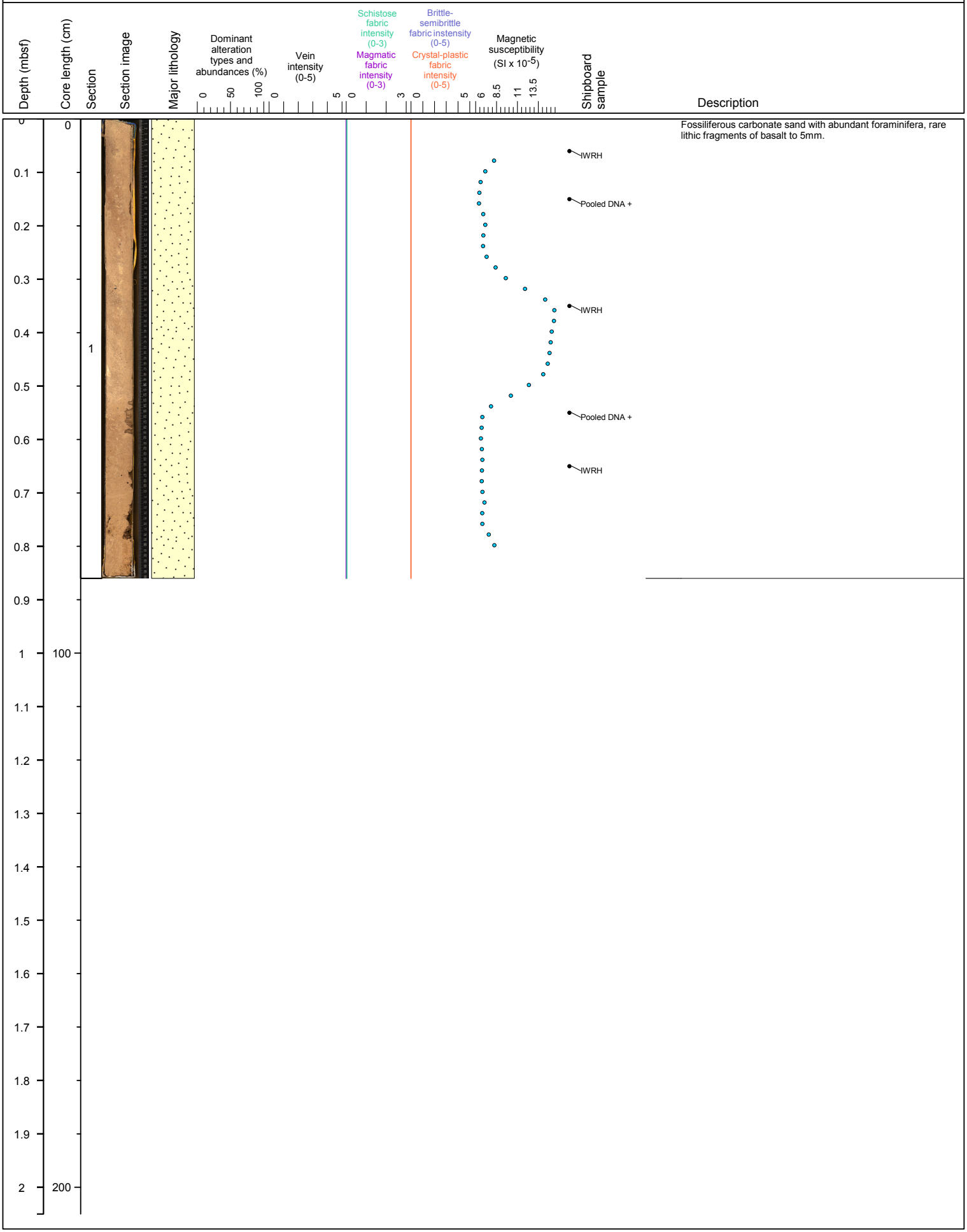


NO RECOVERY

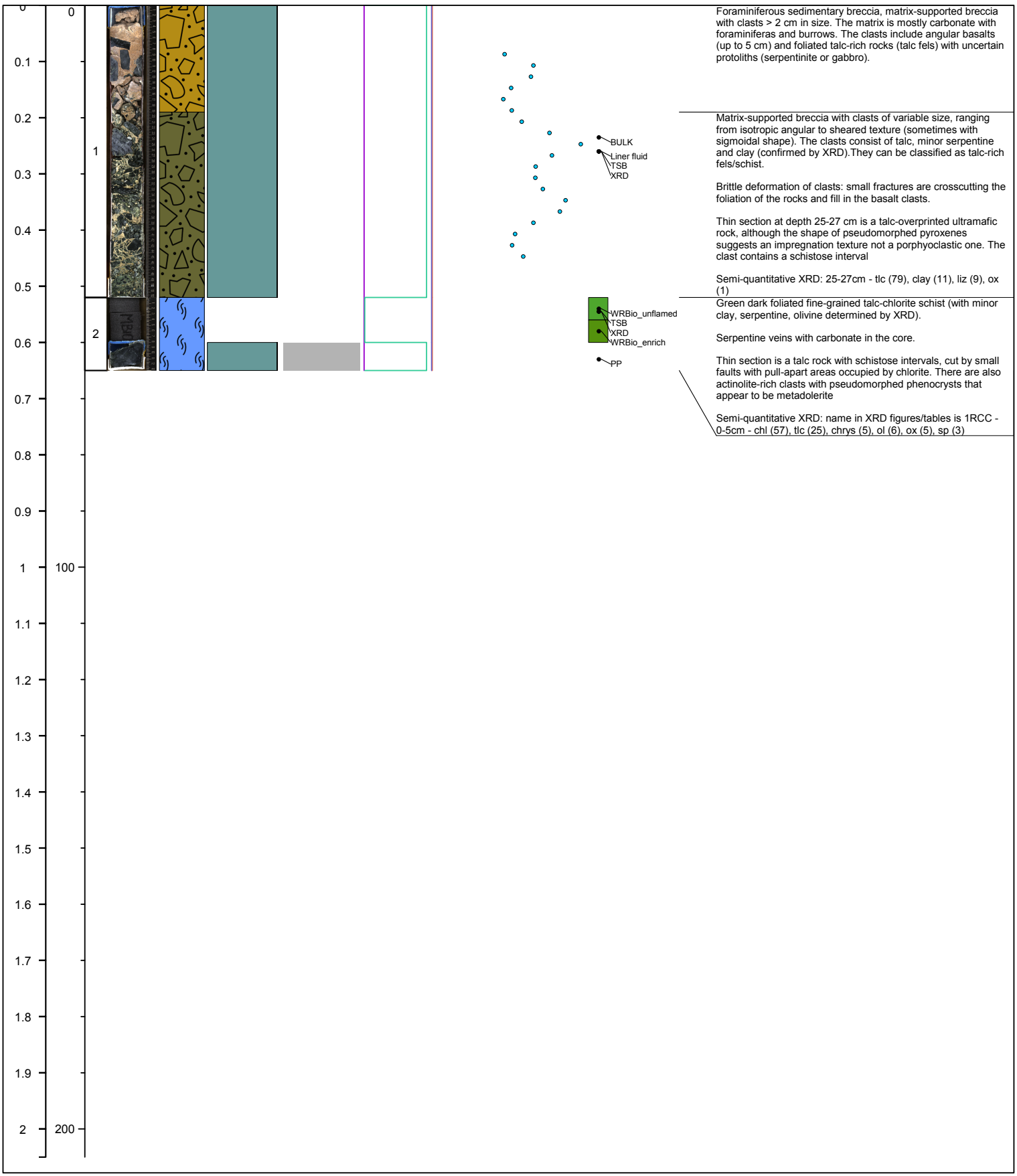
Site M0073 Hole A Core 1R Cored 0-2.2 mbsf



Site M0074 Hole A Core 1R Cored 0-2.68 mbsf



Site M0075 Hole A Core 1R Cored 0-1.72 mbsf



Foraminiferous sedimentary breccia, matrix-supported breccia with clasts > 2 cm in size. The matrix is mostly carbonate with foraminiferas and burrows. The clasts include angular basalts (up to 5 cm) and foliated talc-rich rocks (talc fels) with uncertain protoliths (serpentinite or gabbro).

Matrix-supported breccia with clasts of variable size, ranging from isotropic angular to sheared texture (sometimes with sigmoidal shape). The clasts consist of talc, minor serpentine and clay (confirmed by XRD).They can be classified as talc-rich fels/schist.

Brittle deformation of clasts: small fractures are crosscutting the foliation of the rocks and fill in the basalt clasts.

Thin section at depth 25-27 cm is a talc-overprinted ultramafic rock, although the shape of pseudomorphed pyroxenes suggests an impregnation texture not a porphyoclastic one. The clast contains a schistose interval

Semi-quantitative XRD: 25-27cm - tlc (79), clay (11), liz (9), ox (1)

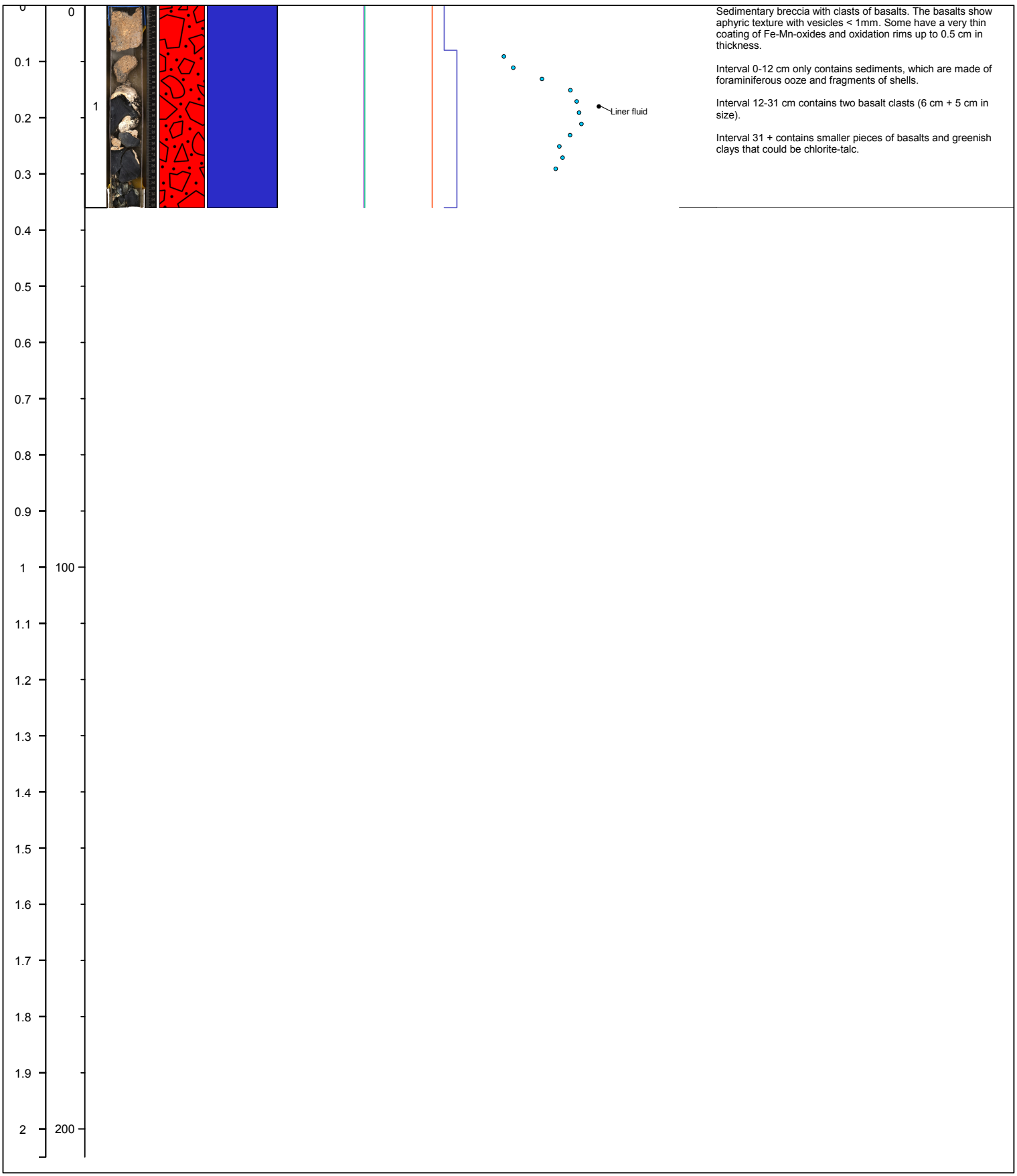
Green dark foliated fine-grained talc-chlorite schist (with minor clay, serpentine, olivine determined by XRD).

Serpentine veins with carbonate in the core.

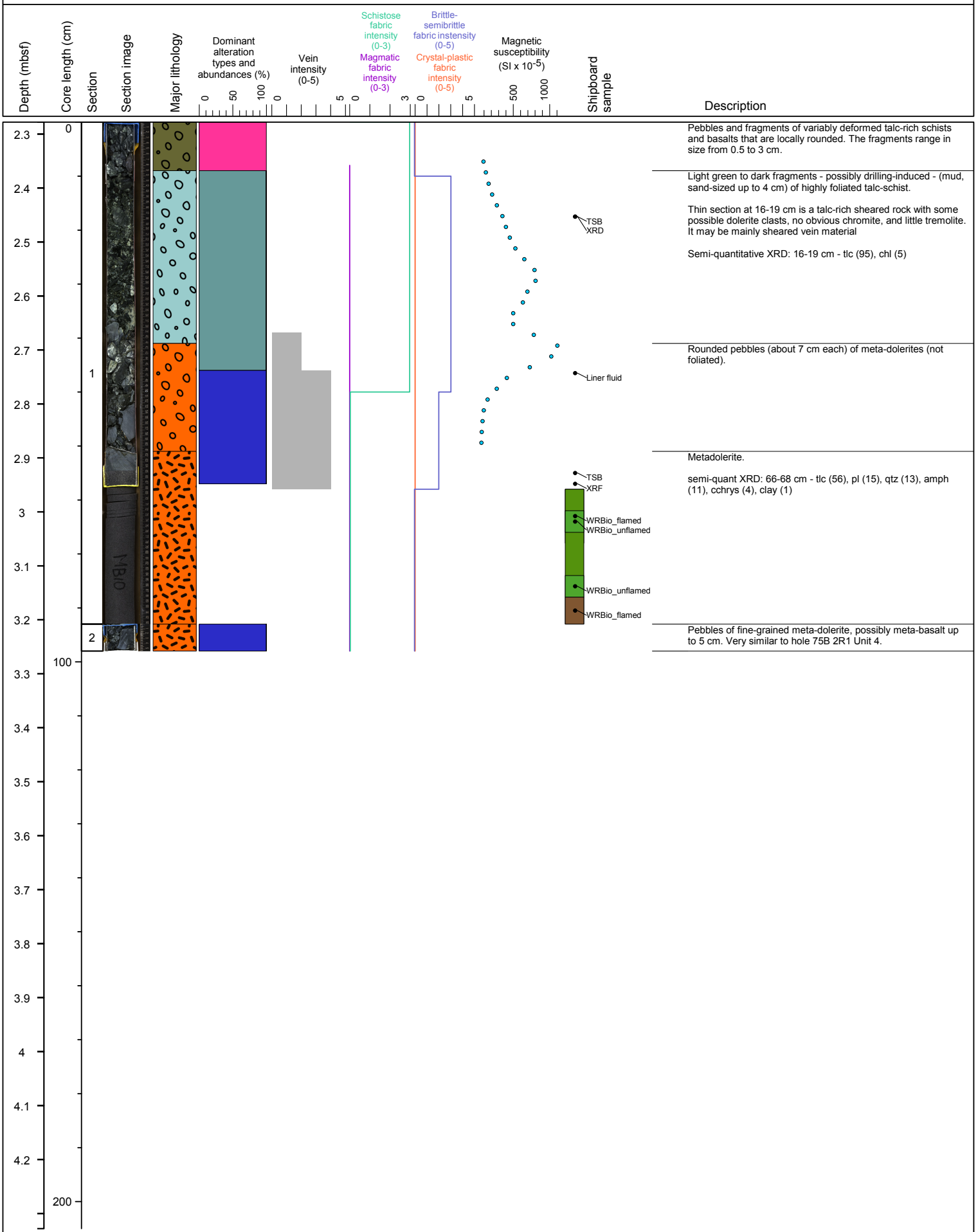
Thin section is a talc rock with schistose intervals, cut by small faults with pull-apart areas occupied by chlorite. There are also actinolite-rich clasts with pseudomorphed phenocrysts that appear to be metadolerite

Semi-quantitative XRD: name in XRD figures/tables is 1RCC - 0-5cm - chl (57), tlc (25), chrys (5), ol (6), ox (5), sp (3)

Site M0075 Hole B Core 1R Cored 0-2.278 mbsf



Site M0075 Hole B Core 2R Cored 2.278-3.982 mbsf



Pebbles and fragments of variably deformed talc-rich schists and basalts that are locally rounded. The fragments range in size from 0.5 to 3 cm.

Light green to dark fragments - possibly drilling-induced - (mud, sand-sized up to 4 cm) of highly foliated talc-schist.

Thin section at 16-19 cm is a talc-rich sheared rock with some possible dolerite clasts, no obvious chromite, and little tremolite. It may be mainly sheared vein material

Semi-quantitative XRD: 16-19 cm - tlc (95), chl (5)

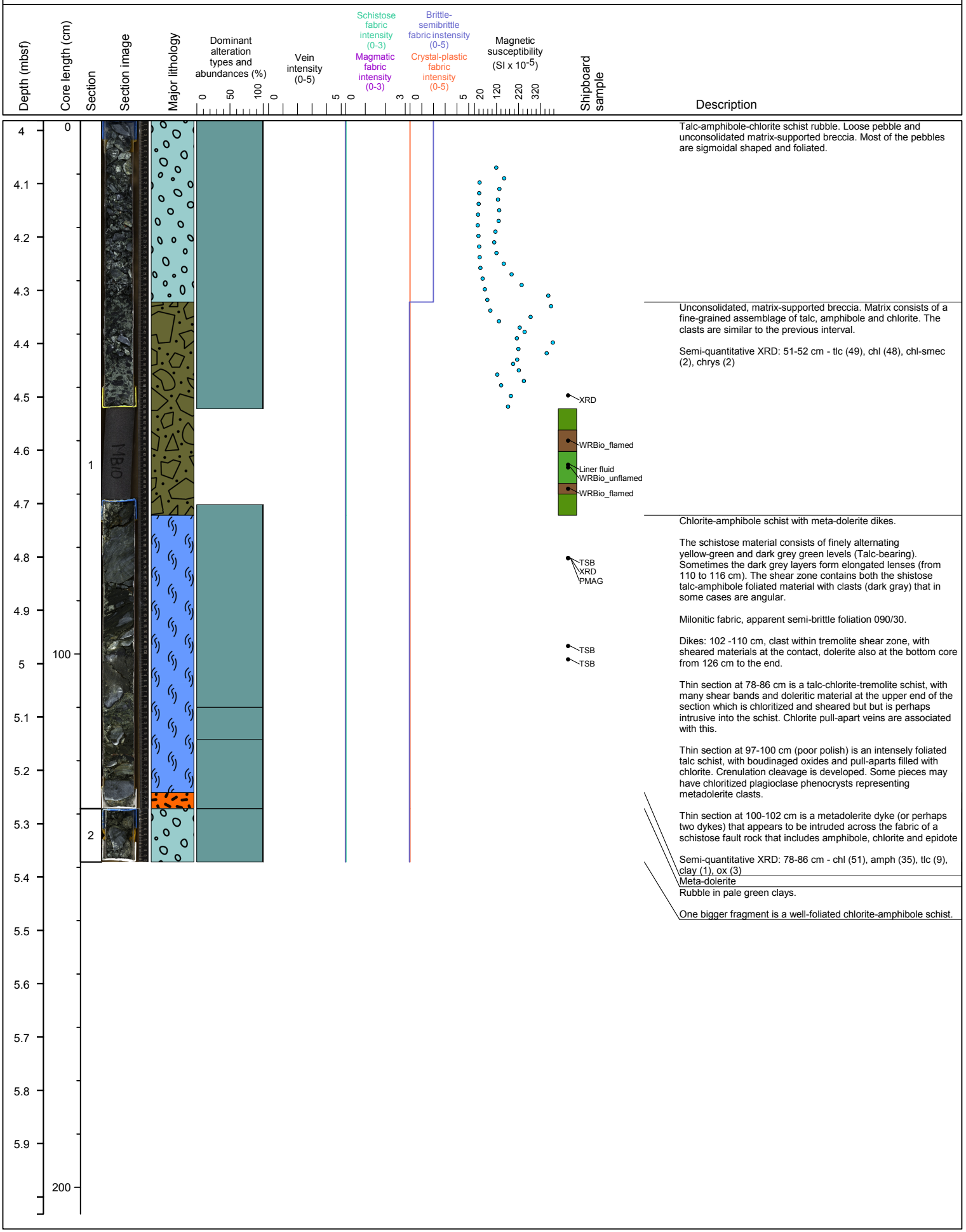
Rounded pebbles (about 7 cm each) of meta-dolerites (not foliated).

Metadolerite.

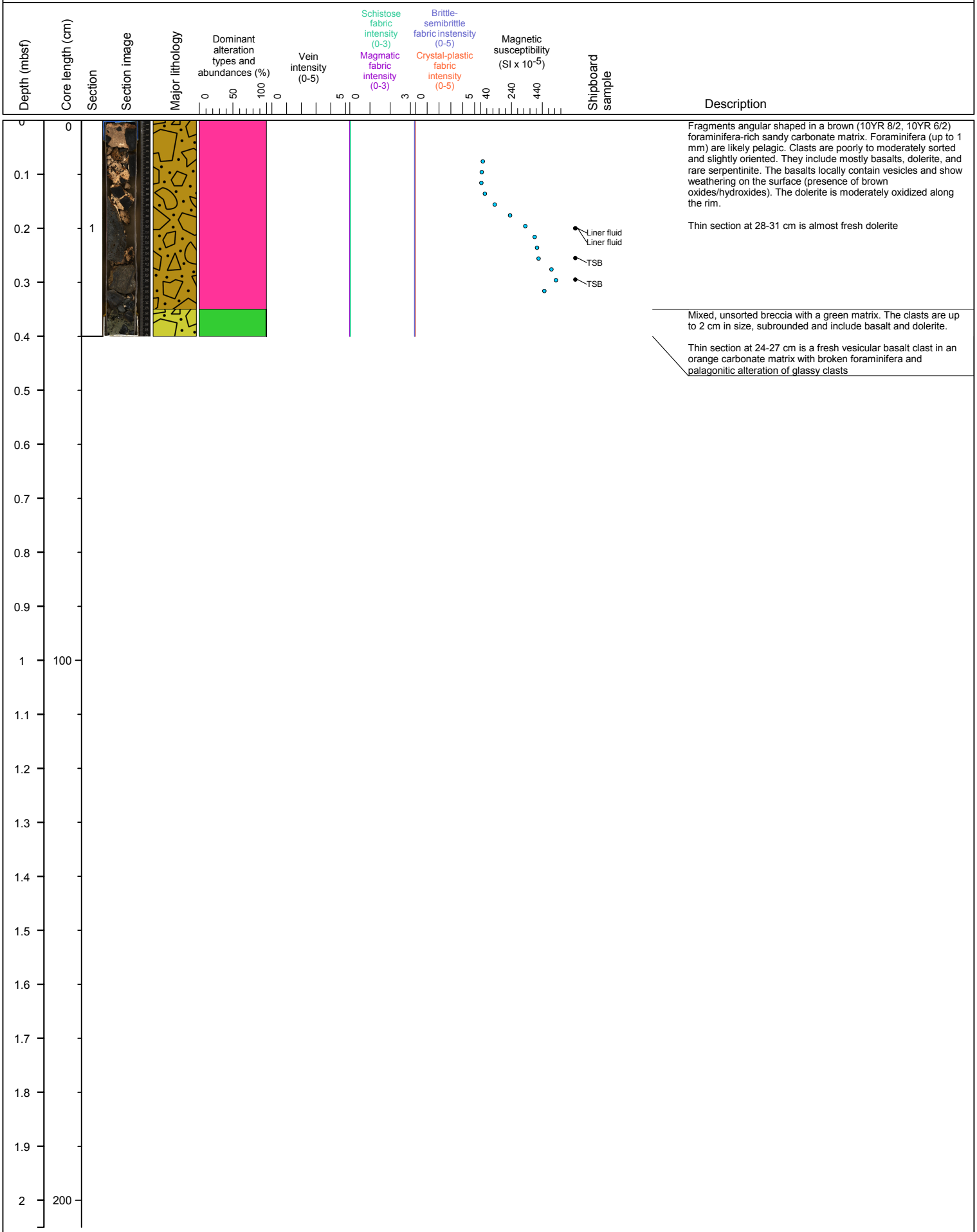
semi-quant XRD: 66-68 cm - tlc (56), pl (15), qtz (13), amph (11), cchrys (4), clay (1)

Pebbles of fine-grained meta-dolerite, possibly meta-basalt up to 5 cm. Very similar to hole 75B 2R1 Unit 4.

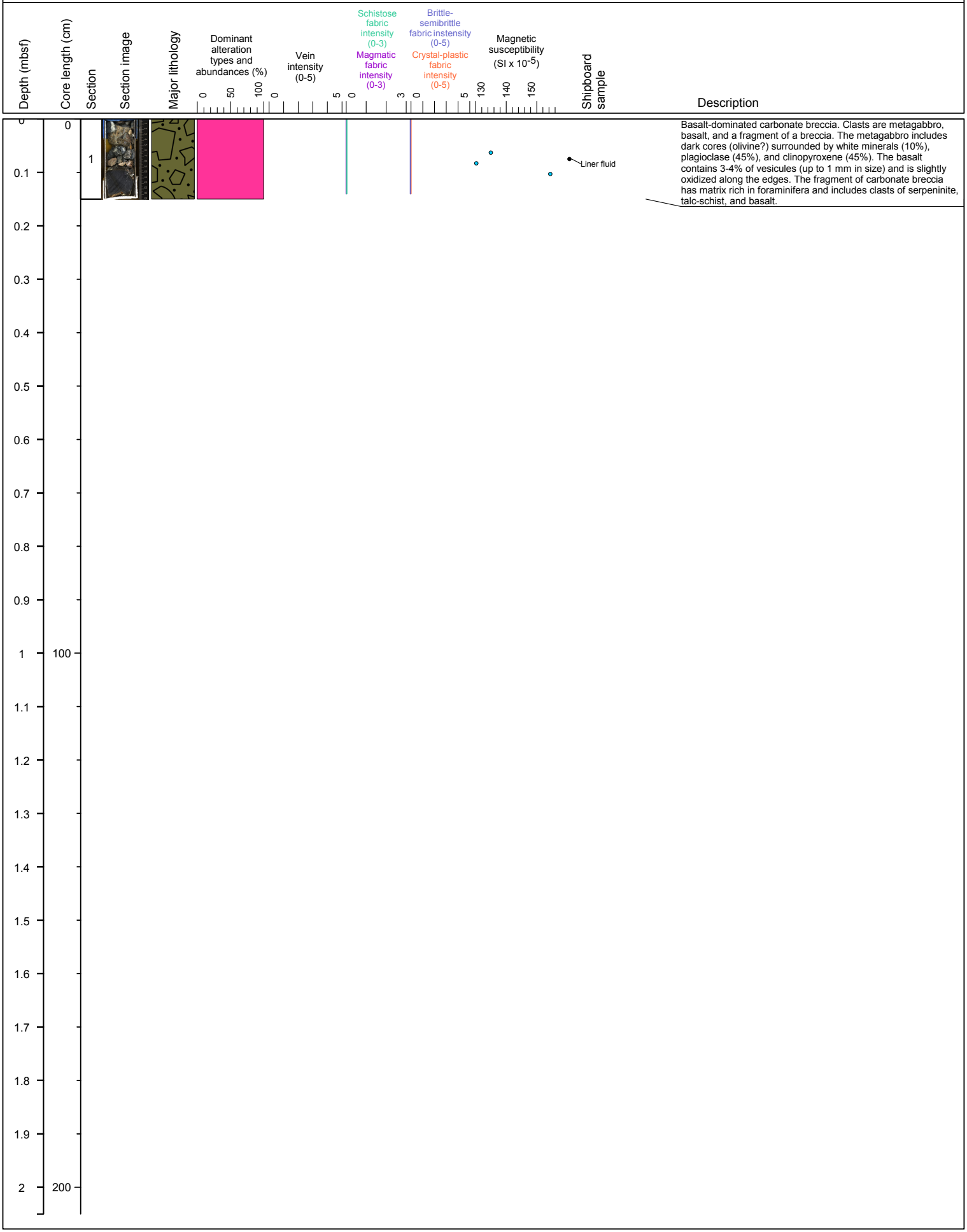
Site M0075 Hole B Core 3R Cored 3.982-5.702 mbsf



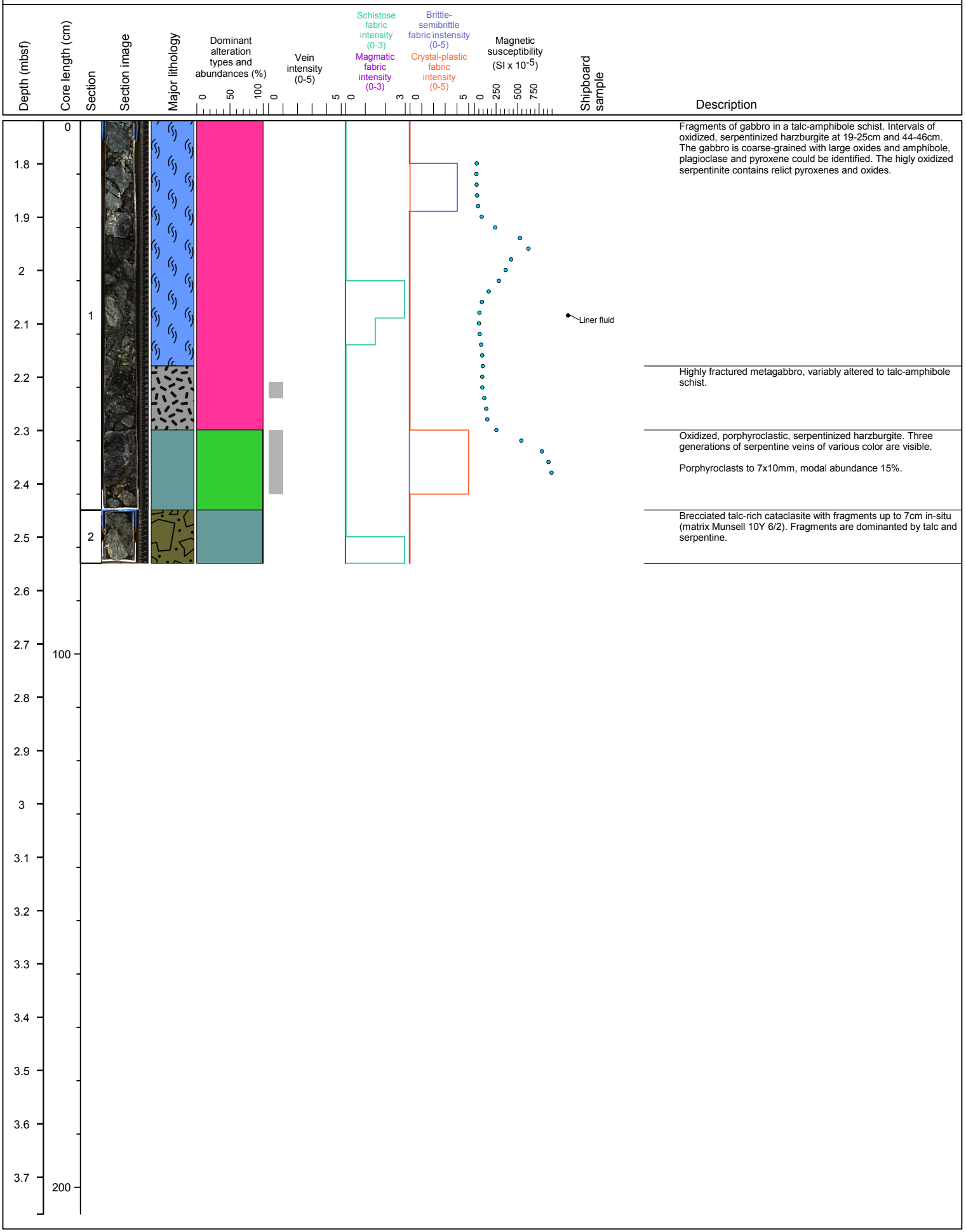
Site M0076 Hole A Core 1R Cored 0-1.72 mbsf



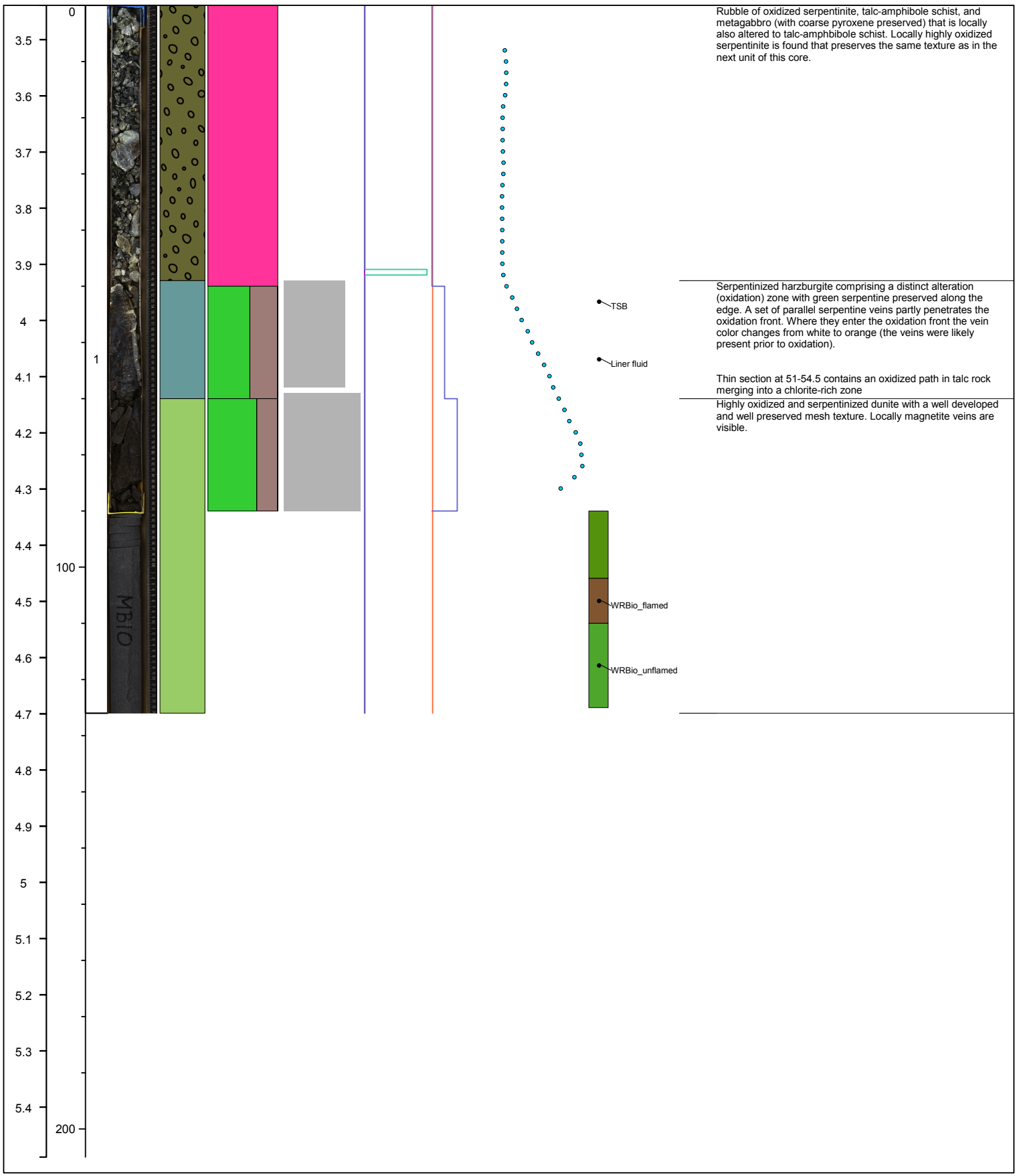
Site M0076 Hole B Core 1R Cored 0-1.719 mbsf



Site M0076 Hole B Core 2R Cored 1.719-3.439 mbsf



Site M0076 Hole B Core 3R Cored 3.439-5.159 mbsf



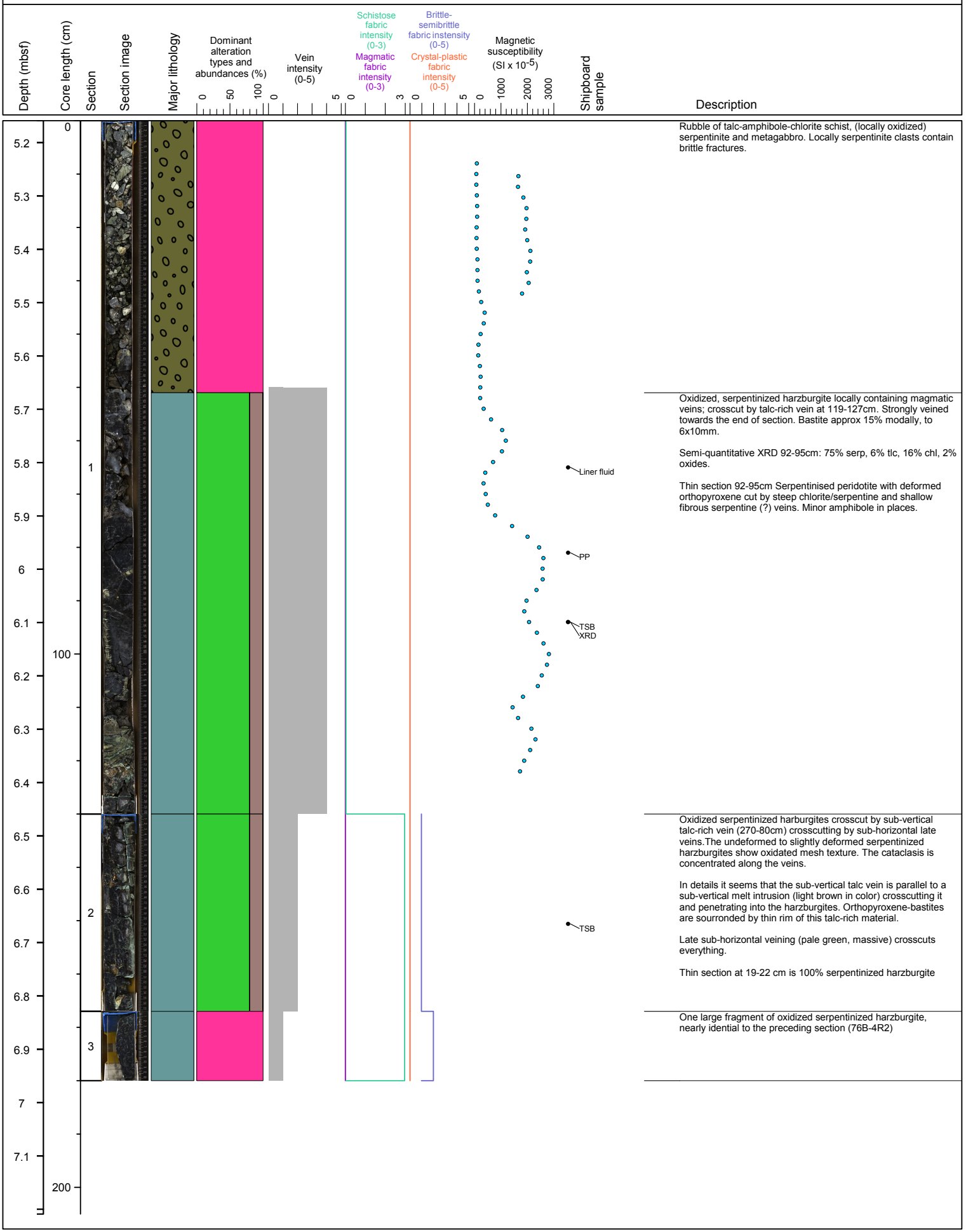
Rubble of oxidized serpentinite, talc-amphibole schist, and metagabbro (with coarse pyroxene preserved) that is locally also altered to talc-amphbibole schist. Locally highly oxidized serpentinite is found that preserves the same texture as in the next unit of this core.

Serpentinized harzburgite comprising a distinct alteration (oxidation) zone with green serpentine preserved along the edge. A set of parallel serpentine veins partly penetrates the oxidation front. Where they enter the oxidation front the vein color changes from white to orange (the veins were likely present prior to oxidation).

Thin section at 51-54.5 contains an oxidized path in talc rock merging into a chlorite-rich zone

Highly oxidized and serpentinized dunite with a well developed and well preserved mesh texture. Locally magnetite veins are visible.

Site M0076 Hole B Core 4R Cored 5.159-6.729 mbsf



Rubble of talc-amphibole-chlorite schist, (locally oxidized) serpentinite and metagabbro. Locally serpentinite clasts contain brittle fractures.

Oxidized, serpentinized harzburgite locally containing magmatic veins; crosscut by talc-rich vein at 119-127cm. Strongly veined towards the end of section. Bastite approx 15% modally, to 6x10mm.

Semi-quantitative XRD 92-95cm: 75% serp, 6% tlc, 16% chl, 2% oxides.

Thin section 92-95cm Serpentinised peridotite with deformed orthopyroxene cut by steep chlorite/serpentine and shallow fibrous serpentine (?) veins. Minor amphibole in places.

Oxidized serpentinized harburgites crosscut by sub-vertical talc-rich vein (270-80cm) crosscutting by sub-horizontal late veins.The undeformed to slightly deformed serpentinized harzburgites show oxidated mesh texture. The cataclasis is concentrated along the veins.

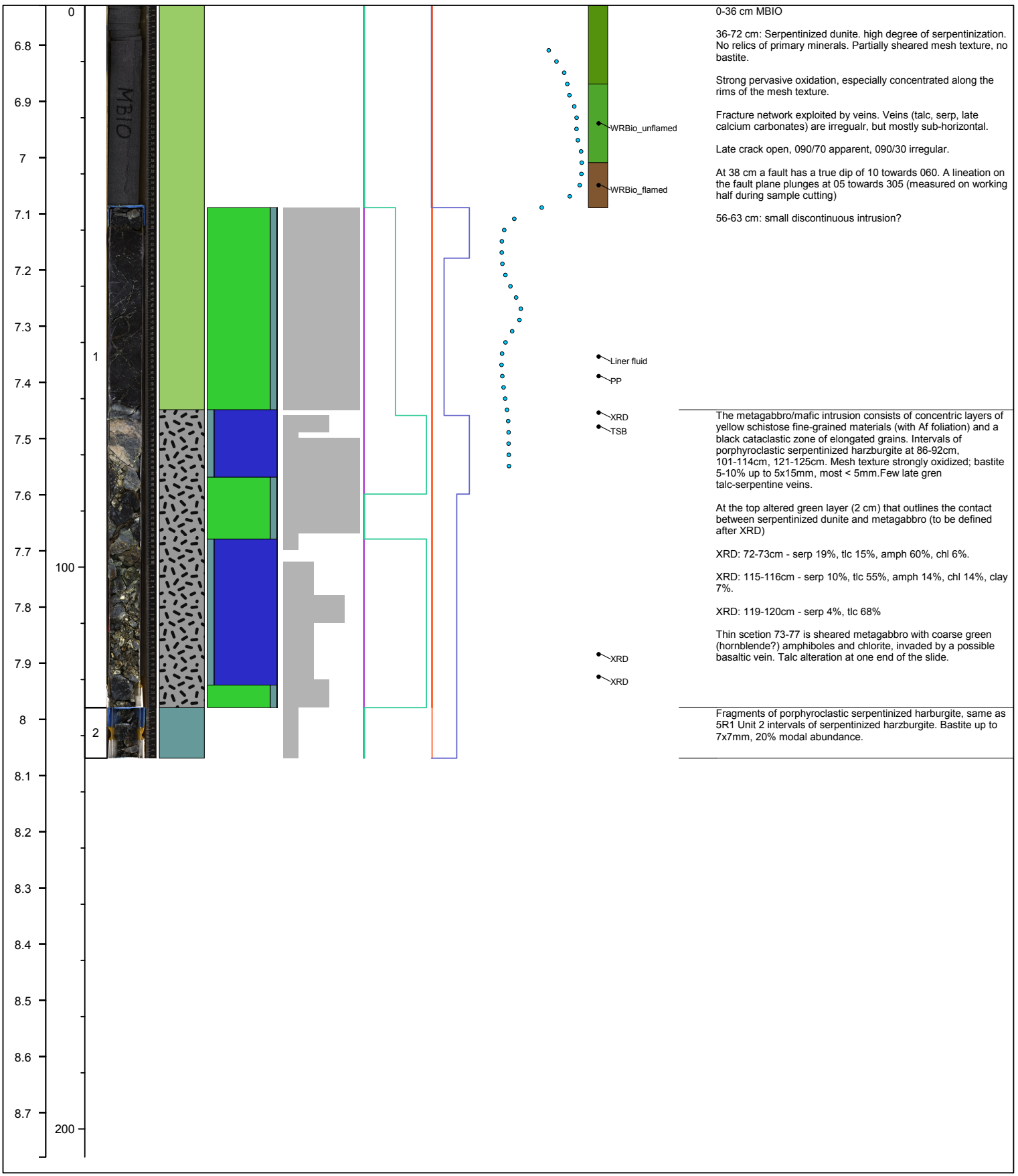
In details it seems that the sub-vertical talc vein is parallel to a sub-vertical melt intrusion (light brown in color) crosscutting it and penetrating into the harzburgites. Orthopyroxene-bastites are sourronded by thin rim of this talc-rich material.

Late sub-horizontal veining (pale green, massive) crosscuts everything.

Thin section at 19-22 cm is 100% serpentinized harzburgite

One large fragment of oxidized serpentinized harzburgite, nearly idential to the preceding section (76B-4R2)

Site M0076 Hole B Core 5R Cored 6.729-7.984 mbsf



0-36 cm MBIO

36-72 cm: Serpentinized dunite. high degree of serpentinization. No relics of primary minerals. Partially sheared mesh texture, no bastite.

Strong pervasive oxidation, especially concentrated along the rims of the mesh texture.

Fracture network exploited by veins. Veins (talc, serp, late calcium carbonates) are irregualr, but mostly sub-horizontal.

Late crack open, 090/70 apparent, 090/30 irregular.

At 38 cm a fault has a true dip of 10 towards 060. A lineation on the fault plane plunges at 05 towards 305 (measured on working half during sample cutting)

56-63 cm: small discontinuous intrusion?

The metagabbro/mafic intrusion consists of concentric layers of yellow schistose fine-grained materials (with Af foliation) and a black cataclastic zone of elongated grains. Intervals of porphyroclastic serpentinized harzburgite at 86-92cm, 101-114cm, 121-125cm. Mesh texture strongly oxidized; bastite 5-10% up to 5x15mm, most < 5mm.Few late gren talc-serpentine veins.

At the top altered green layer (2 cm) that outlines the contact between serpentinized dunite and metagabbro (to be defined after XRD)

XRD: 72-73cm - serp 19%, tlc 15%, amph 60%, chl 6%.

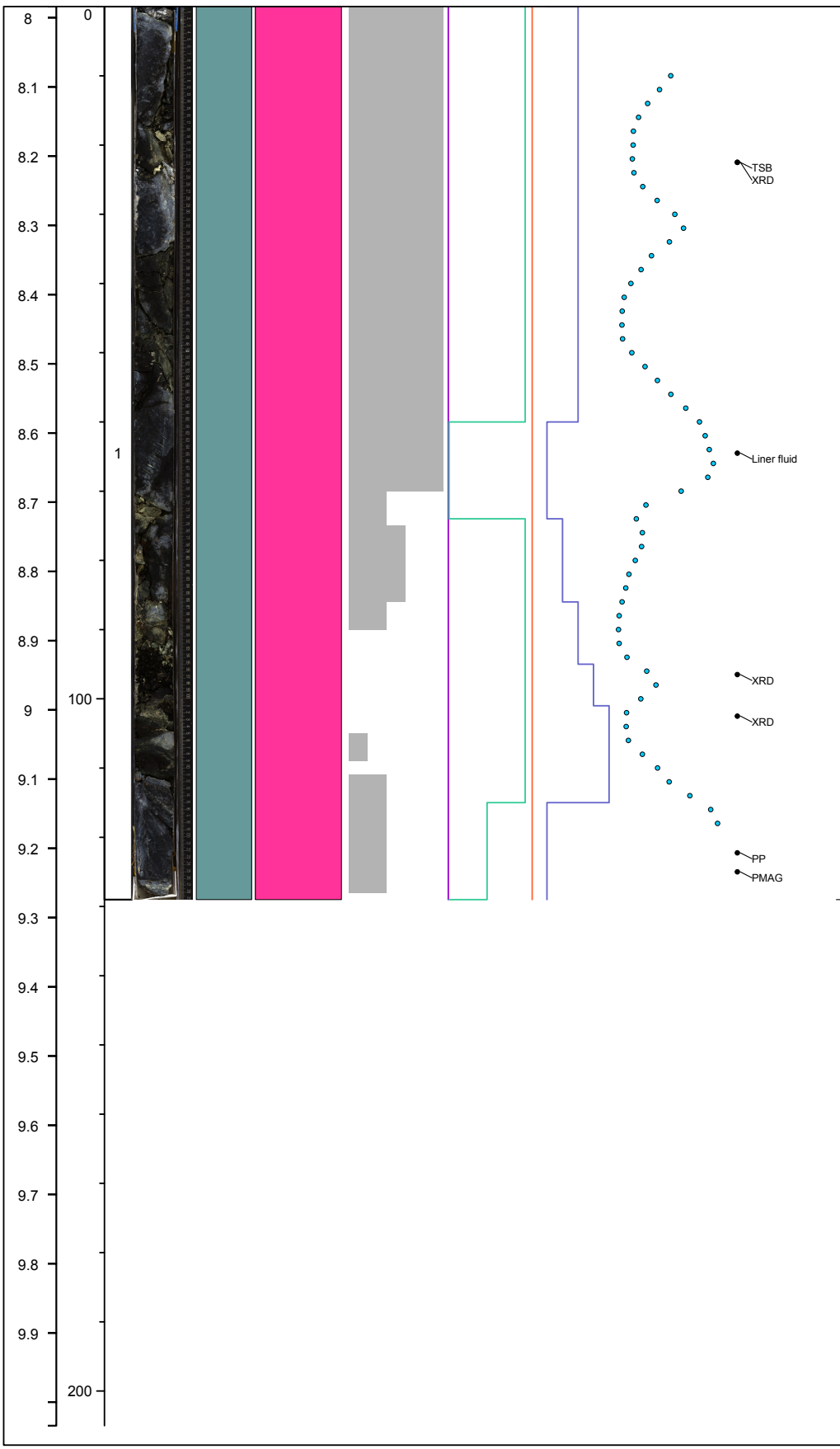
XRD: 115-116cm - serp 10%, tlc 55%, amph 14%, chl 14%, clay 7%.

XRD: 119-120cm - serp 4%, tlc 68%

Thin scetion 73-77 is sheared metagabbro with coarse green (hornblende?) amphiboles and chlorite, invaded by a possible basaltic vein. Talc alteration at one end of the slide.

Fragments of porphyroclastic serpentinized harburgite, same as 5R1 Unit 2 intervals of serpentinized harzburgite. Bastite up to 7x7mm, 20% modal abundance.

Site M0076 Hole B Core 6R Cored 7.984-9.724 mbsf



Description

Serpentinized harzburgite with some melt intrusions and localized talc-rich metasomatic alteration.

The unit is strongly fractured (drilling induced?); the fracturation is mainly concentrated in the talc-rich metasomatic rims/areas.

Serpentinites harzburgites: opx 3-5 mm, mode 5-10 %. Mesh texture after olivine is very oxidized (no oxidation on bastite).

1-5 cm metasomatic talc-rich sheared rim to most of the serpentinite clasts.

75cm-END, different melt intrusions intruded the harzburgites.

Deformation
Sub-vertical shear zone along talc-tremolite veins with shistose texture and cataclastic deformation (clast reworked in shear zone).

Broad talc-tremolite shear zone at 72-110 cm, possibly deformed later with possible fault gouge and broken-up peridotite.

Overall vein intensity 5. Mm size pale green talc-amph veins (usually crosscutting vertical)

A faulted vein between 6 and 30 cm dips at 75 towards 090, with chrystotile fibres plunging at 10 towards 010.

A shear zone between 33 and 38 cm dips at 60 towards 325 and a lineation plunges at 20 towards 245 (measurements made on working half during sampling)

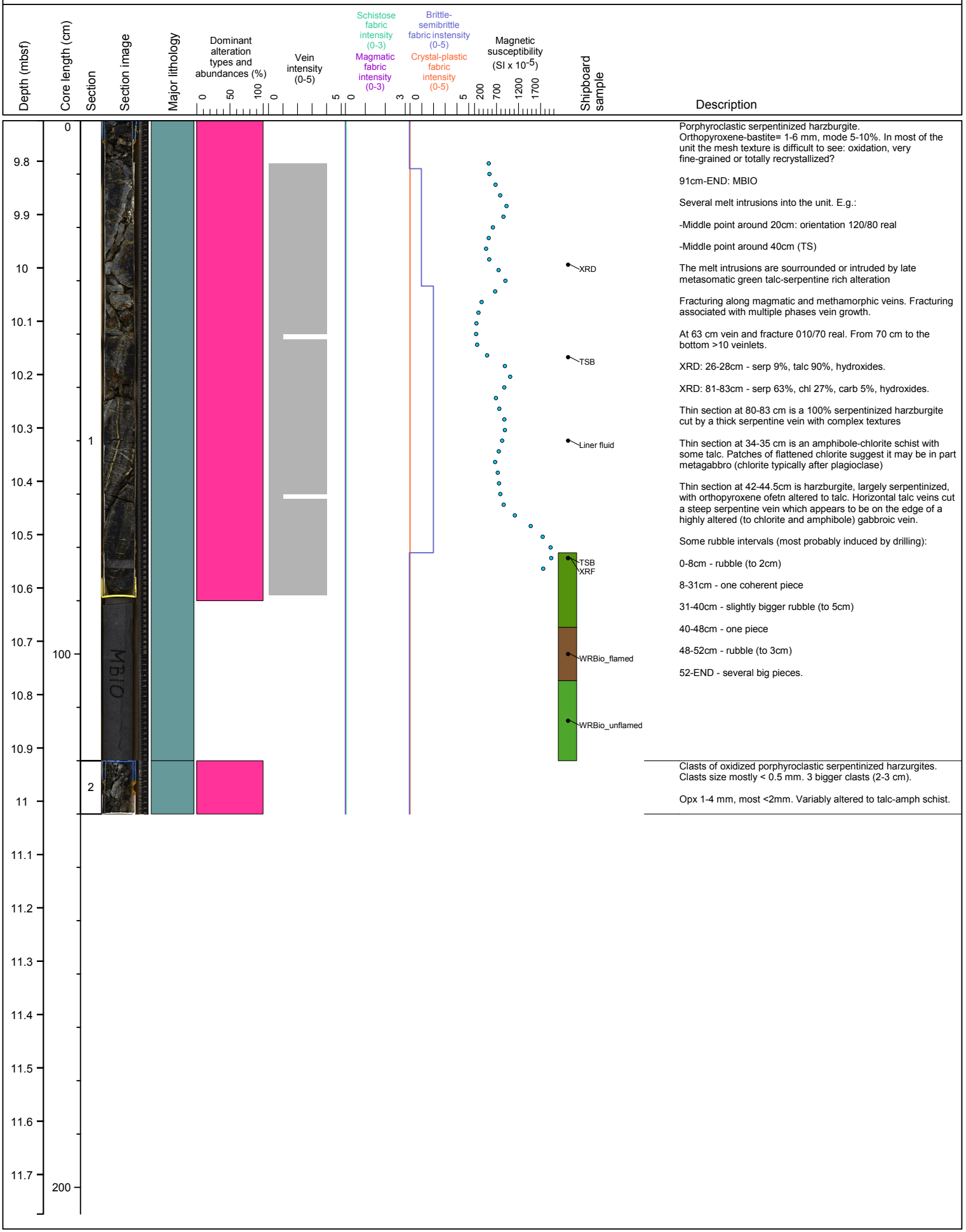
XRD: 21-24cm - serp 10%, tlc 47%, amph 23%, chl 10%, clay 11%.

XRD: 96-97cm - serp 68%, chl 15%, clay 6%, oxides, hydroxides.

XRD: 102-103cm - serp 17%, tlc 70%, chl 13%.

Thin section at 21-24cm is a highly oxidized talc-rich fault rock of uncertain protolith.

Site M0076 Hole B Core 7R Cored 9.724-11.154 mbsf



Porphyroclastic serpentinized harzburgite. Orthopyroxene-bastite= 1-6 mm, mode 5-10%. In most of the unit the mesh texture is difficult to see: oxidation, very fine-grained or totally recrystallized?

91cm-END: MBIO

Several melt intrusions into the unit. E.g.:

-Middle point around 20cm: orientation 120/80 real

-Middle point around 40cm (TS)

The melt intrusions are sourrounded or intruded by late metasomatic green talc-serpentine rich alteration

Fracturing along magmatic and methamorphic veins. Fracturing associated with multiple phases vein growth.

At 63 cm vein and fracture 010/70 real. From 70 cm to the bottom >10 veinlets.

XRD: 26-28cm - serp 9%, talc 90%, hydroxides.

XRD: 81-83cm - serp 63%, chl 27%, carb 5%, hydroxides.

Thin section at 80-83 cm is a 100% serpentinized harzburgite cut by a thick serpentine vein with complex textures

Thin section at 34-35 cm is an amphibole-chlorite schist with some talc. Patches of flattened chlorite suggest it may be in part metagabbro (chlorite typically after plagioclase)

Thin section at 42-44.5cm is harzburgite, largely serpentinized, with orthopyroxene ofetn altered to talc. Horizontal talc veins cut a steep serpentine vein which appears to be on the edge of a highly altered (to chlorite and amphibole) gabbroic vein.

Some rubble intervals (most probably induced by drilling):

0-8cm - rubble (to 2cm)

8-31cm - one coherent piece

31-40cm - slightly bigger rubble (to 5cm)

40-48cm - one piece

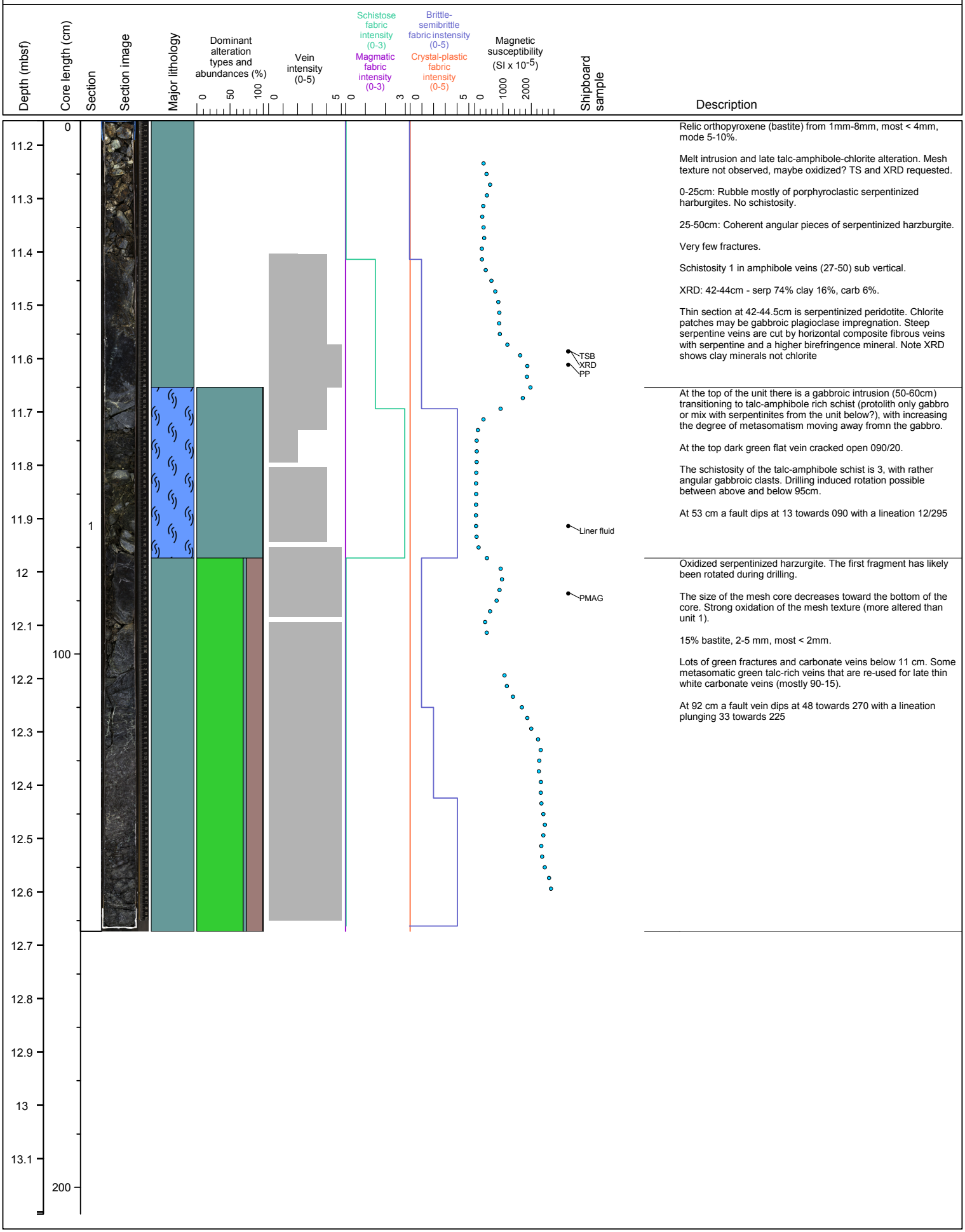
48-52cm - rubble (to 3cm)

52-END - several big pieces.

Clasts of oxidized porphyroclastic serpentinized harzurgites. Clasts size mostly < 0.5 mm. 3 bigger clasts (2-3 cm).

Opx 1-4 mm, most <2mm. Variably altered to talc-amph schist.

Site M0076 Hole B Core 8R Cored 11.154-12.874 mbsf



Relic orthopyroxene (bastite) from 1mm-8mm, most < 4mm, mode 5-10%.

Melt intrusion and late talc-amphibole-chlorite alteration. Mesh texture not observed, maybe oxidized? TS and XRD requested.

0-25cm: Rubble mostly of porphyroclastic serpentinized harburgites. No schistosity.

25-50cm: Coherent angular pieces of serpentinized harzburgite.

Very few fractures.

Schistosity 1 in amphibole veins (27-50) sub vertical.

XRD: 42-44cm - serp 74% clay 16%, carb 6%.

Thin section at 42-44.5cm is serpentinized peridotite. Chlorite patches may be gabbroic plagioclase impregnation. Steep serpentine veins are cut by horizontal composite fibrous veins with serpentine and a higher birefringence mineral. Note XRD shows clay minerals not chlorite

At the top of the unit there is a gabbroic intrusion (50-60cm) transitioning to talc-amphibole rich schist (protolith only gabbro or mix with serpentinites from the unit below?), with increasing the degree of metasomatism moving away fromn the gabbro.

At the top dark green flat vein cracked open 090/20.

The schistosity of the talc-amphibole schist is 3, with rather angular gabbroic clasts. Drilling induced rotation possible between above and below 95cm.

At 53 cm a fault dips at 13 towards 090 with a lineation 12/295

Oxidized serpentinized harzurgite. The first fragment has likely been rotated during drilling.

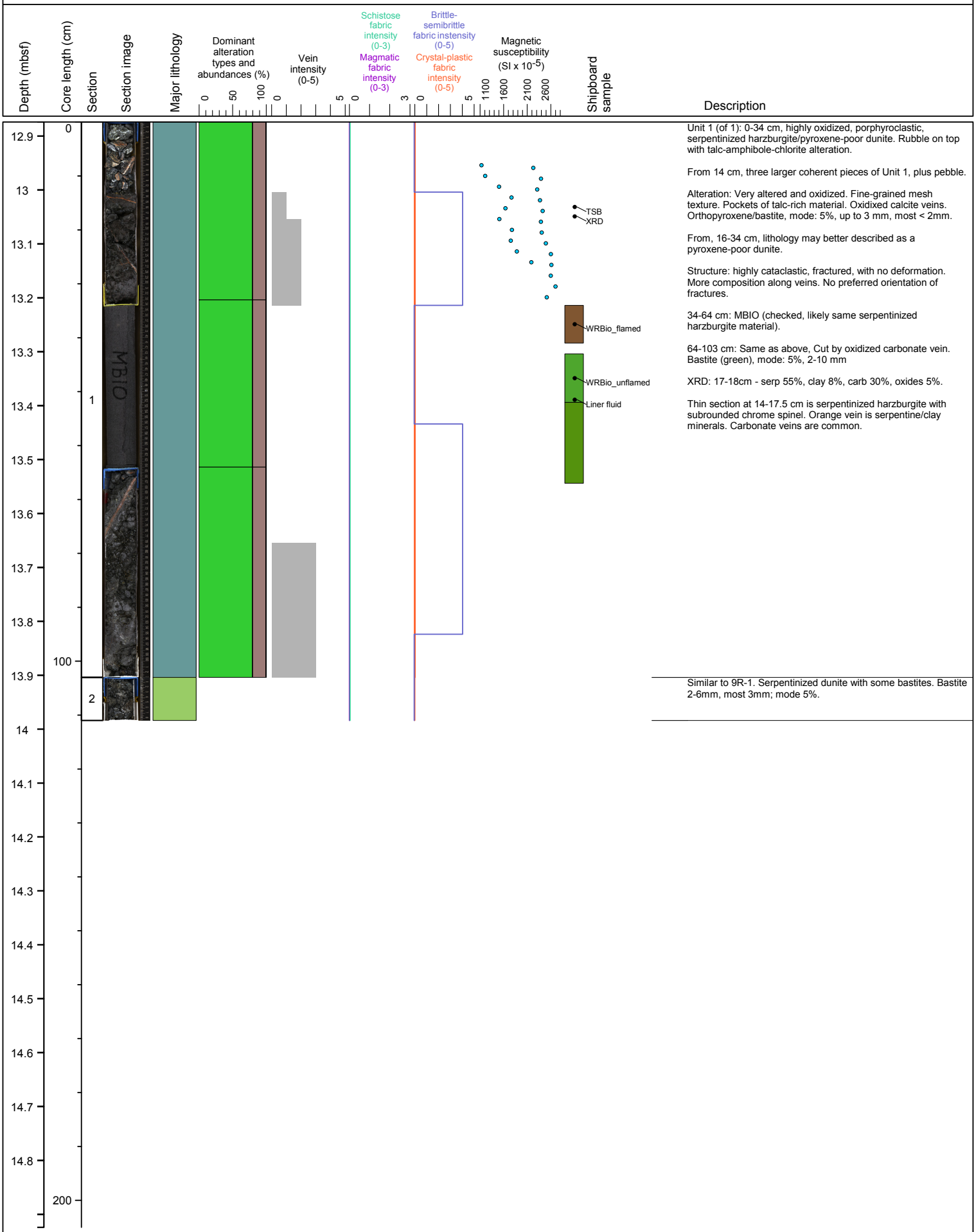
The size of the mesh core decreases toward the bottom of the core. Strong oxidation of the mesh texture (more altered than unit 1).

15% bastite, 2-5 mm, most < 2mm.

Lots of green fractures and carbonate veins below 11 cm. Some metasomatic green talc-rich veins that are re-used for late thin white carbonate veins (mostly 90-15).

At 92 cm a fault vein dips at 48 towards 270 with a lineation plunging 33 towards 225

Site M0076 Hole B Core 9R Cored 12.874-14.591 mbsf



Unit 1 (of 1): 0-34 cm, highly oxidized, porphyroclastic, serpentinized harzburgite/pyroxene-poor dunite. Rubble on top with talc-amphibole-chlorite alteration.

From 14 cm, three larger coherent pieces of Unit 1, plus pebble.

Alteration: Very altered and oxidized. Fine-grained mesh texture. Pockets of talc-rich material. Oxidixed calcite veins. Orthopyroxene/bastite, mode: 5%, up to 3 mm, most < 2mm.

From, 16-34 cm, lithology may better described as a pyroxene-poor dunite.

Structure: highly cataclastic, fractured, with no deformation. More composition along veins. No preferred orientation of fractures.

34-64 cm: MBIO (checked, likely same serpentinized harzburgite material).

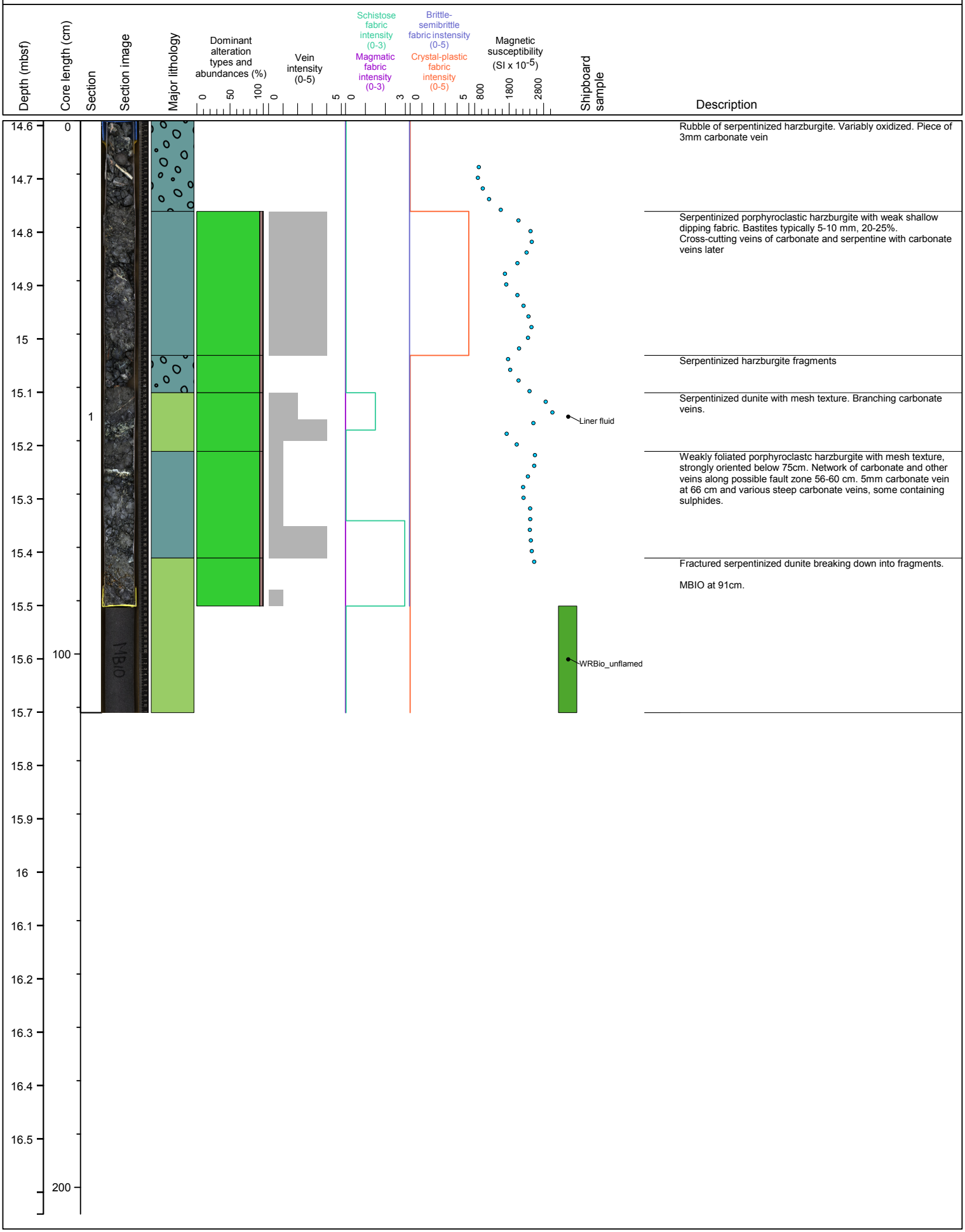
64-103 cm: Same as above, Cut by oxidized carbonate vein. Bastite (green), mode: 5%, 2-10 mm

XRD: 17-18cm - serp 55%, clay 8%, carb 30%, oxides 5%.

Thin section at 14-17.5 cm is serpentinized harzburgite with subrounded chrome spinel. Orange vein is serpentine/clay minerals. Carbonate veins are common.

Similar to 9R-1. Serpentinized dunite with some bastites. Bastite 2-6mm, most 3mm; mode 5%.

Site M0076 Hole B Core 10R Cored 14.591-16.311 mbsf



EXPEDITION	SITE	HOLE	CORE	SECTION	TOP	BOTTOM	UNIT TYPE	MAJOR COMPONENT	SUMMARY
357	68	A	1	1	34	35	Metamorphic/Fault rock	Serpentinized harzburgite	talc-amphibole-chlorite schist with schistose to apparently undeformed fabrics, protolith undetermined
357	68	B	1	1	79.5	83.5	Sediment	Breccia, clast supported	breccia with polymict clast assemblage (serpentinized ultramafics, amphibolite, talc-rich, palagonitic glass, metadolerite, ilmenite-rich) and a foraminifeous carbonate matrix
357	68	B	1	1	119	121	Sediment	Breccia, clast supported	totally altered gabbro, replaced by a talc-amphibole-chlorite assemblage, fibrous vein and amphibole-rich cataclastic zone
357	68	B	1	1	134	139	Metamorphic/Fault rock	Metagabbro	metagabbro (50% altered to amphibole and chlorite) with protomylonitic texture
357	68	B	2	1	31	36.5	Gabbroic rock	Gabbronorite	layered metagabbronorite (15% altered to amphibole and chlorite), very little strain
357	68	B	2	1	50	55	Metamorphic/Fault rock	Talc-amphibole-chlorite schist	talc-amphibole-chlorite schist, probably after impregnated and totally serpentinized harzburgite, sheared talc vein
357	68	B	2	1	78	85	Metamorphic/Fault rock	Serpentinized harzburgite	totally serpentinized harzburgite, highly overprinted by talc and amphibole, with a metagabbroic vein altered to talc, amphibole and chlorite
357	68	B	4	1	18	22	Metamorphic/Fault rock	Serpentinized harzburgite	partially serpentinized harzburgite (45% altered) with metagabbroic veinlets altered to talc, amphibole, chlorite
357	68	B	4	1	50	53	Metamorphic/Fault rock	Metagabbro	partially serpentinized dunite (45% altered) with metagabbroic vein altered to talc, amphibole, chlorite
357	68	B	8	1	15	20	Rubble	Mixed rubble	foliated cataclastic rock with clasts of schistose amphibolite and veins of talc, chlorite in some vein margins and in the matrix. Presence of a quartz vein and possible clinopyroxene relicts
357	69	A	5	1	14	19	Metamorphic/Fault rock	Serpentinized harzburgite	totally (95%) serpentinized harzburgite highly overprinted by talc metasomatism, relicts of orthopyroxenes, mesh texture and bastites, and presence of fibrous talc veins
357	69	A	5	1	38	42.5	Metamorphic/Fault rock	Metadolerite	totally altered doleritic breccia mostly altered to chlorite and amphibole, with presence of talc, epidote (veins + intergrowths with amphibole)
357	69	A	5	1	110	113	Metamorphic/Fault rock	Metadolerite	metadolerite (85% altered to amphibole and chlorite) with chlorite-rich domains (+ little amphibole) and epidote veins
357	69	A	6	1	37	41	Metamorphic/Fault rock	Metadolerite	chlorite schist (possible breccia with doleritic clasts protolith) with foliated amphibole and epidote veins
357	69	A	7	1	6	7	Metamorphic/Fault rock	Talc-amphibole schist	talc-amphibole-chlorite schist, the protolith could be partly doleritic and appears to be a deformed breccia. Presence of epidote and 5% porosity
357	69	A	8	1	117	119	Metamorphic/Fault rock	Talc-amphibole-chlorite schist	talc-amphibole-chlorite schist , protolith undetermined
357	69	A	10	1	80	87	Metamorphic/Fault rock	Serpentinized harzburgite	totally (99%) serpentinized harzburgite with mesh texture, amphibole and chlorite after pyroxene, chlorite after spinel
357	69	A	10	3	0	2.5	Metamorphic/Fault rock	Serpentinized dunite	totally serpentinized dunite with mesh texture, serpentine veins and one chlorite vein
357	70	A	2	1	73	77.3	Sediment	Basaltic breccia, carbonate matrix	sedimentary basalt (25% altered to orange amorphous rims and spherulitic brownish minerals) breccia with foraminiferous carbonate matrix
357	70	C	1	1	35.5	37.5	Sediment	Basaltic breccia, carbonate matrix	dolerite (8% altered to clays and hydroxides)
357	71	A	1	1	9	11.5	Metamorphic/Fault rock	Serpentinized dunite	totally serpentinized dunite with mesh texture, carbonate veins, and oxidation
357	71	A	1	2	88	92	Metamorphic/Fault rock	Serpentinized harzburgite	totally serpentinized harzburgite with mesh texture, bastites, serpentine veins
357	71	A	2	1	64	67	Metamorphic/Fault rock	Metagabbro	totally altered gabbro, replaced by a chlorite-amphibole assemblage
357	71	B	1	1	12	15	Rubble	Serpentinite rubble	totally serpentinized harzburgite with mesh texture, bastites, serpentine veins
357	71	C	1	1	13	15.5	Rubble	Serpentinite rubble	totally serpentinized harzburgite with mesh texture, bastites, serpentine veins, and possible replacement/recrystallization by chlorite (+amphibole?) or antigorite
357	71	C	1	1	44	46	Rubble	Serpentinite rubble	totally serpentinized harzburgite with mesh texture, bastites, serpentine veins
357	71	C	2	1	74	76	Metamorphic/Fault rock	Serpentinized porphyroclastic harzburgite	totally serpentinized harzburgite with mesh texture, bastites, and amphibole after pyroxene
357	71	C	6	1	55	57	Rubble	Dolerite rubble	metadolerite (80% altered to amphibole and chlorite), thin veins of amphibole and of talc
357	72	B	2	1	49	53	Gabbroic rock	Oxide gabbro	metagabbro (40% altered to amphibole and maybe albite)
357	72	B	5	2	3	5	Metamorphic/Fault rock	Talc-amphibole schist	chlorite schist (possible doleritic protolith), schistose fabric
357	72	B	6	1	63	65	Metamorphic/Fault rock	Serpentinized dunite	chlorite schist (blackwall alteration of a mafic intrusion) exhibiting concentric domains in which the grain size varies as well as the nature of the side minerals (possible oxides, serpentine, smectite-vermiculite, apatite, amphibole)
357	72	B	7	1	34	35.5	Metamorphic/Fault rock	Talc-amphibole-chlorite schist	talc-amphibole-chlorite schist with a schistose fabric
357	72	B	7	1	58	59.5	Metamorphic/Fault rock	Talc-amphibole-chlorite schist	chlorite schist (blackwall lateration of a breccia mafic clasts) with possible minor serpentine, oxides, smectite-vermiculite like minerals, amphibole, and plagioclase relicts
357	72	B	8	1	64	66	Metamorphic/Fault rock	Talc-amphibole schist	chlorite schist (possible basaltic or doleritic clasts protolith) with presence of oxides, quartz and tremolite
357	72	B	8	1	67	69	Metamorphic/Fault rock	Talc-amphibole schist	talc-amphibole-chlorite schist with relicts of former serpentinized textures (serpentine-magnetite assemblages) and a contact with a serpentinized peridotite domain overprinted by metasomatic veins
357	72	B	8	2	1.5	3.5	Metamorphic/Fault rock	Serpentinized porphyroclastic harzburgite	totally (95%) serpentinized harzburgite (olivine relicts, mesh texture, serpentine veins) in contact with a chlorite-rich zone locally with a schistose fabric, in intergrowth with tremolite, as veins. Presence of carbonate veins
357	72	B	8	2	73	76	Metamorphic/Fault rock	Serpentinized porphyroclastic harzburgite	amphibole (+ chlorite) schist after gabbroic material with clasts of totally serpentinized peridotite (dunite or harzburgite?)
357	75	A	1	1	25	27	Sediment	Polymict breccia	talc schist/fels, probably after totally serpentinized harzburgite
357	75	A	1	CC	0	5	Metamorphic/Fault rock	Talc-chlorite schist	talc-amphibole-chlorite schist, with secondary plagioclases, possible a talc-overprinted dolerite
357	75	B	2	1	16	19	Rubble	Talc-amphibole schist rubble	talc schist with possible chlorite, protolith undetermined (maybe dolerite), schistose fabric
357	75	B	2	1	64	66	Metamorphic/Fault rock	Metadolerite	metadolerite (85% altered to amphibole and chlorite) with chlorite-rich domains (+amphibole) and quartz vein
357	75	B	3	1	78	86	Metamorphic/Fault rock	Talc-amphibole-chlorite schist	amphibole-chlorite schist, sheared fabric of the amphibole-rich domains (doleritic protolith?)
357	75	B	3	1	97	100	Metamorphic/Fault rock	Talc-amphibole-chlorite schist	amphibole-chlorite schist, sheared fabric of the amphibole-rich domains (doleritic protolith?)
357	75	B	3	1	100	102	Metamorphic/Fault rock	Talc-amphibole-chlorite schist	amphibole-chlorite schist (doleritic protolith?)
357	76	A	1	1	24	27	Sediment	Basaltic breccia, carbonate matrix	vesicular metadolerite (25% altered to clays and hyroxides) clasts in a foraminiferous carbonate matrix
357	76	A	1	1	28	31	Sediment	Basaltic breccia, carbonate matrix	metadolerite (17% altered to clays and hydroxides)
357	76	B	3	1	51	54.5	Metamorphic/Fault rock	Serpentinized harzburgite	totally serpentinized harzburgite crosscut by chlorite veins and highly overprinted by talc along a talc-rich zone
357	76	B	4	1	92.5	95.5	Metamorphic/Fault rock	Serpentinized harzburgite	totally serpentinized harzburgite with mesh texture, bastites, and serpentine veins. Talc, amphibole and chlorite are present after pyroxenes and in veins. Local oxidation
357	76	B	4	2	19.2	22	Metamorphic/Fault rock	Serpentinized harzburgite	totally serpentinized harzburgite with mesh texture, bastites, and serpentine veins. Amphibole, chlorite (+ possible talc) after pyroxenes and in veins. Slight oxidation along veins
357	76	B	5	1	73	77	Metamorphic/Fault rock	Metagabbro	talc-amphibole-chlorite schist, with a schistose fabric recording shear deformation
357	76	B	6	1	21	24	Metamorphic/Fault rock	Serpentinized harzburgite	amphibole-chlorite schist with schistose fabric in contact with a highly serpentinized harzburgite partially metasomatised in talc
357	76	B	7	1	43.2	45.5	Metamorphic/Fault rock	Serpentinized porphyroclastic harzburgite	totally serpentinized harzburgite with mesh texture, bastites, serpentine veins associated with a mafic intrusion containing talc, amphibole and chlorite. Talc, amphibole and chlorite also replace pyroxenes in the harzburgitic areas
357	76	B	7	1	81	83	Metamorphic/Fault rock	Serpentinized porphyroclastic harzburgite	totally serpentinized porphyroclastic harzburgite with mesh texture, bastites, recrystallized serpentine, serpentine veins, magmatic impregnation altered to amphibole-chlorite assemblage
357	76	B	8	1	42	44.5	Metamorphic/Fault rock	Serpentinized porphyroclastic harzburgite	totally serpentinized porphyroclastic harzburgite with mesh texture, bastites, recrystallized serpentine, serpentine veins
357	76	B	9	1	14	17.5	Metamorphic/Fault rock	Serpentinized harzburgite	totally serpentinized dunite (to harzburgite) with mesh texture, rare bastites and serpentine veins, carbonate veins and oxidation

THIN SECTION Number	68A_1R1_34-35	**OBSERVER: AMcC**
ROCK NAME:	Talc-tremolite-chlorite schist	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			Composition	MORPHOLOGY	COMMENTS
			min.	max.	av.			
olivine	0	50						replaced by talc and tremolite; original proportion uncertain
pyroxene	0	25	4	8	6			replaced by actinolite and tremolite; original proportion uncertain. Clino pyroxene was present in gabbroic layers and probably orthopyroxene in ulramafic layers
plagioclase	0	25						
zircon					0.1		subhedral	one grain present of the edge of a chlorite area

SECONDARY MINERALOGY	PERCENT		SIZE (micron)				REPLACING / FILLING	COMMENTS
			min.	max.	av.			
actinolite	10		100	500			clinopyroxene	oriented pseudomorphic replacement in the centre of large clinopyroxene grains; size reflects acicular shape of amphibole. Also random dark needles within talc aggregates
tremolite	20		20	2000			clinopyroxene, olivine, plagioclase	Tremolite rims actinolite in pyroxene pseudomorphs and growa as euhedral porphyroblasts in the shear fabric. Fine grained aggregates of tremolite occur in pressure shadows and boudin necks of former pyroxenes
talc	60		10	200			olivine, earlier alteration minerals	Talc is a late phase, generally undeformed, and overprinting various earlier textures, including fibrouds chlorite veins.
chlorite	10		5	50			plagioclase, also in veins	fine aggregates forming elongate rims (probably former corona textures between plagioclase and olivine) and also equant masses, interpreted to be after gabbroic plagioclase
clay	<5							late veins?

TOTAL ALTERATION: 100%

STRUCTURE : The top and bottom of the slide show strong schistose fabrics and are largely gabbroic in original mineralogy, including one zircon. Pyroxenes (now amphibole) are boudinaged and rotated in the fabric, with dynamic recrystallisation of tremolite in grain mantles and pressure shadows. Tremolite is both bent and forms euhedral neoblasts. The central part of the slide shows complex textures but appears to have escaped significant strain and is largely overprinted by isotropic talc aggregates. Thin (0.1 to 0.2 mm) cross fibre veins of chlorite and talc are present

THIN SECTION Number	357_68B_1R1_79.5-83.5	**OBSERVER: AMcC**
ROCK NAME:	sedimentary breccia with fossiliferous calcite sand matrix	
GRAIN SIZE:		
TEXTURE:		

main clasts	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
serpentinite	35							
talc	15							sometimes single crystal talc
palagonitic glass	5							
amphibolite	15							schistose colourless amphibole in dynamically recrystallised texture
metadolerite	5							
?ilmenite rich clasts	20							
matrix	25							contains forams and other fossil fragments

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS

TOTAL ALTERATION:

STRUCTURE : carbonate matrix breccia with polymict clast assemblage indicating transport. Fossils quite recrystallised, probably during diaganesis and lithification. Clasts of palagonite indicates nearby volcanism. Clasts of fault schist, serpentinite and metadolerite come from the fault footwall. distictive clasts have an interlocking texture of opaque ?ilmenite, often mantling chrome spinel grains. In beteen these laths is chlorite, possible glassy material, and porosity.

THIN SECTION Number	68B_1R1_118.5-121	**OBSERVER: AMcC**
ROCK NAME:	metagabbro	
GRAIN SIZE:	coarse	
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
clinopyroxene	0	40					gabbroic texture	encloses chlorite pseudomorphs after plagioclase
plagioclase	0	40						chlorite-altered, overprinted by talc
olivine	0	20						enclosed by pyroxene, now talc
zircon	<1	<1						2 grains in tremolite/chlorite zone at edge of slide
oxides	<1	<1						

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
talc	50						olivine, chlorite	static except for vein
amphibole	30						pyroxene	replcaces pyroxene, occurs as fibrous mats and euhedral grains
chlorite	15							replces plagioclase, replaced by talc
clay	5							intergrown with talc in vein at end of slide? (in XRD)
?zeolite								in XRD but not observed

TOTAL ALTERATION: 100

STRUCTURE : Fibrous vein at the end of the slide has steep fibres on an internal fracture in the core. Adjacent to the vein is a 5 mm thick tremolite-rich cataclastic zone containing large clear tremolite grains and 2 zircons

THIN SECTION Number	68B_1R1_134-139	**OBSERVER: AMcC**
ROCK NAME:	Metagabbro	
GRAIN SIZE:	coarse 8-10 mm	
TEXTURE:	banded, protomylonitic	

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			Composition	MORPHOLOGY	COMMENTS
			min.	max.	av.			
clinopyroxene	20	50	5	10	7		anhedral/subhedral	forms curved band across slide - modal layering. Altered to green/brown hornblende and seconadry clinopyroxene
plagioclase	30	50	5	10	7	An-rich		partially recrystallised to secondary plagioclase aggregates
opaques	<1	<1						no obvious primary oxides remaining

SECONDARY MINERALOGY	PERCENT		SIZE (micron)				REPLACING / FILLING	COMMENTS
			min.	max.	av.			
amphibole	25		30	500	100		clinopyroxene	green/brown hornblende rims clinopyroxene and is intergrown with it in secondary aggregates in grain mantles
secondary clinoyroxene	5		30	150	80		clinopyroxene	dynamically recrystallised aggregates with amphibole
secondary plagioclase	18		40	200	100		plagioclase	rotated subgrains and neoblasts
chlorite	2							local patches
oxides	<1							small grain boundary aggregates

TOTAL ALTERATION: 50%

STRUCTURE: Extensive undulose extinction and deformation twins in plagioclase, with core/mantle structure and subgrain rotation evident. Similar textures around pyroxene but with alteration to amphibole and amphibole/clinopyroxene aggregates in grain mantles. Texture is protomylonitic with very little annealing despite high temperature syndeformational assemblage.

THIN SECTION Number	68B_2R1_31-36.5	**OBSERVER: AMcC**
ROCK NAME:	gabbronorite	
GRAIN SIZE:	coarse	
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
clinopyroxene	10	20	2	8	6		subhedral	often recrystallised to 200 - 400 micron neoblasts with some brown hornblende
orthopyroxene	<5	10	2	6	5		subhedral	altered to chlorite and amphibole.
plagioclase	70	70	2	8	5		recrystallised extensively	
								layer at end of slide has 50% plagioclase, 30% clinopyroxene, 20% orthopyroxene

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
chlorite	5						orthopyroxene	
amphibole	10						orthopyroxene,	
brown hornblende	<1							intergrown with secondary clinopyroxene

TOTAL ALTERATION: 15%

STRUCTURE : Modal layering present. Extensive undulose extinction and recystallisation in plagioclase to coarse neoblasts, also in clinopyroxene, but very little strain. Extensive cracking with fluid inclusion trains, but very little strain

THIN SECTION Number	68B_2R1_50-55	**OBSERVER: AMcC**
ROCK NAME:	talc altered peridotite, melt impregnated?	
GRAIN SIZE:	coarse	
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			Composition	MORPHOLOGY	COMMENTS
			min.	max.	av.			
olivine	0	70						altered to serpentine and talc
orthopyroxene	0	27	4	12	8		partly intersticial	alteered to tremolite and talc
plagioclase	0	2					intersticila, rimmed by chromite	alteered to chlorite and talc
chromite	1	1						

SECONDARY MINERALOGY	PERCENT		SIZE (micron)				REPLACING / FILLING	COMMENTS
			min.	max.	av.			
talc	60						olivine, orthopyroxene	undeformed aggregates
tremolite	15						orthopyroxene	rims and replacements of orthopyroxene (high abundance in XRF)
chlorite	5						plagioclase	small intersticila areas
serpentine	15						olivine, orthopyroxene	overprinted by talc
oxide/hydroxide	1							mainly in orthopyroxene: very little in overprinted mesh texture

TOTAL ALTERATION: 99%

STRUCTURE : 2mm talc vein at end of slide shows some shear. Otherwise undeformed since chromite precipitated.

THIN SECTION Number	68B_2R1_78-85	**OBSERVER: AMcC**
ROCK NAME:	Sepentinised harzburgite with metagabbro vein	
GRAIN SIZE:	coarse	
TEXTURE:	porphyroclastic, gabbroic	

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			Composition	MORPHOLOGY	COMMENTS
			min.	max.	av.			
olivine	0	89						replaced by mesh texture, serpentine overprinted by talc
orthopyroxene	0	10	4	8	6		porhyroclasts	bastites, overprinted by talc
chromite	1	1	0.5	2	1		intersticial	
METAGABBRO								
clinopyroxene	0	35						replaced by amphibole and talc
plagioclase	0	60						replaced by chlorite and talc
olivine?	0	5						talc patches may be after olivine?
zircon	<1	<1						in chlorite/tremolite zone

SECONDARY MINERALOGY	PERCENT		SIZE (micron)				REPLACING / FILLING	COMMENTS
			min.	max.	av.			
serpentine	20						olivine, orthopyroxene	mesh texture overprinted by talc, locally with magnetite also replaced
talc	70						overprints everything	
amphibole	5						around orthopyroxene	
magnetite	5						in mesh	
IN GABBRO								
amphibole	40						clinopyroxene	prportions very approximate
chlorite	40						plagioclase	
talc	20						everything	

TOTAL ALTERATION:

STRUCTURE : A cataclastic seam 3 mm thick cuts the gabbro, and there are some veins. Otherwise very little deformation

THIN SECTION Number	68B 4R1 18-22	**OBSERVER: AMcC**
ROCK NAME:	Harzburgite with gabbroic veinlets	
GRAIN SIZE:	coarse	
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
olivine	60	90	4	15	8			often fresh, abundant tiny fluid inclusions (% excludes gabbroic veinlets)
orthopyroxene	<5	10	4	6	5		porphyroclasts	often altered
chrome spinel	<1	1		2				
Gabbro veinlets								
clinopyroxene	0	50						very altered to tremolite/actinolite
plagioclase	0	50						altered to chlorite

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
serpentine	30						olivine, orthopyroxene	% includes veins.
magnetite	2						olivine	
tremolite	5						pyroxene in gabbroic veinlets	
chlorite	5						plagioclase in gabbroic veinlets	
talc	5						olivine	includes veins

TOTAL ALTERATION: 45%

STRUCTURE : Undulose extinction and some large subgrains in olivine. Strong serpentine vein fabric is at a high angle to little deformed gabbroic veinlets

THIN SECTION Number	68B4R1W50-53	**OBSERVER: Nori Akizawa**
ROCK NAME:	Serpentinized dunite	
GRAIN SIZE:	coarse	
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
Dunite								
olivine	40	94	0.1	6	2			often fresh, abundant tiny (<50µm) fluid and magnetite inclusions
spinel	<1	1	0.1	0.1	0.1			altered
Gabbroic vein								altered to chlorite-talc vein
plagioclase	0	3						
clinopyroxene	0	2						
zircon					0.05		Subhedral to euhedral	included in chlorite-talc vein

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
Dunite								
serpentine	60						olivine	
magnetite	2						olivine	
Vein								
tremolite-chlorite vein	30						olivine	
chlorite vein	20						olivine	
opx vein	10						olivine	replacing olivine, vein-like
serpentine vein	40						olvine	

TOTAL ALTERATION: 45%

STRUCTURE : Coarse olivine grain (~6mm) is cut by serpentinite vein (check thinsection scan). Some thin shear zones with fine grained recystallized olivine

PHOTOMICROGRAPH COMMENTS:
1. opx vein cutting olivine
2. tiny (~50µm) zircon in the talc-chlorite vein

THIN SECTION Number	357_68B_8R1_15-20	**OBSERVER: AMcC**
ROCK NAME:	cataclasite/fault schist	
GRAIN SIZE:		
TEXTURE:	cataclastic	

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
clinopyroxene	?20	80						seems to be some relict clinopyroxene, original proportions uncertain
plagioclase		20						

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
amphibole	70							colourless, tremolite
talc	15							brownish seams
chlorite	10							
quartz							in vein with chlorite	sector extinction typical of hydrothermal quartz

TOTAL ALTERATION: 90%

STRUCTURE : foliated cataclastic rock with clasts of schistose amphibolite and seams of talc. Some chlorite in vein margins and in matrix

THIN SECTION Number	357_69A_5R1_14-19	**OBSERVER: AMcC**
ROCK NAME:	serpentinised peridotite overprinted by talc	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	**PERCENT PRESENT**	**PERCENT ORIGINAL**	**SIZE (mm)**			**Composition**	**MORPHOLOGY**	**COMMENTS**
			min.	**max.**	**av.**			
olivine	0	80						ghosts of mesh texture still present
orthopyroxene	5	20						porhyroclastic texture

SECONDARY MINERALOGY	**PERCENT**		**SIZE (micron)**				**REPLACING / FILLING**	**COMMENTS**
			min.	**max.**	**av.**			
talc	75							isotropic talc overprints all previous phases. Fibrous talc veins cut everything
serpentine	10							mostly now in pyroxene pseudomorphs
magnetite	4							defines former mesh texture
sulphide	1 to 2							euhedral grains in talc in a zone at the edge of the slide

TOTAL ALTERATION: 95%

STRUCTURE : pyroxenes are bent reflecting porhyoclastic texture. Mesh texture is wekaly oriented. Late cross-fibre talc veins are shallow in the core reference frame and reflect sub-vertical extension

THIN SECTION Number	357_69A_5R1_38-42.5	**OBSERVER: AMcC**
ROCK NAME:	metadoleritic breccia	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
plagioclase	0	49						oroiginal mineral proportions hard to estimate and some of the materila was probably glass
clinopyroxene	0	49						
magnetite	2	2						

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
amphibole	30						pyroxene	% is uncertain in fine grained areas
chlorite	45						plagioclase, pyroxene	% is uncertain in fine grained areas
talc	10							mainly in one schitose clast, possibly an inclusion of fault rock in the original diabase
epidote	10							broken up vein material
magnetite	5							abundant in some clasts. Extent of secondary vs primary unclear

TOTAL ALTERATION: 98%

STRUCTURE : Breccia mainly of doleritic material with many different grain sizes indicating chilled margins. Some clast contain intrusive contacts and some appera to be enclosed in altered glass. Broken up epidote veins and epidote-amphibole intergrowths suggest fairly high temperature alteration. Some large pathes of chlorite contain euhedral amphiboles.

THIN SECTION Number	(two thin sections were made for this interval. They are both described here). 357-69A-5R1-110-113cm **OBSERVER:Mathilde Cannat**
ROCK NAME:	metadolerite with chlorite-rich domains
GRAIN SIZE:	less than 0.5 mm
TEXTURE:	doleritic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			Composition	MORPHOLOGY	COMMENTS
			min.	max.	av.			
(metadolerite) plagioclase	15	50	0.1	0.5	0.3		Laths	partially altered to chlorite
(metadolerite) clinopyroxene	0	47			0.5		irregular	fully altered to amphibole
(metadolerite) oxides	0	3			0.1			fully altered to magnetite
(chlorite-rich domains) plagioclase	0	80						fully altered to chlorite
(chlorite-rich domains) clinopyroxene	0	18.5						fully altered to chlorite and amphibole
(chlorite-rich domains) oxides	0	1.5						fully altered to magnetite
(chlorite-rich domains) zircon	<<1%	<<1%	0.01	0.15	0.05		euhedral	there could also be sphene from the alteration of oxides...

SECONDARY MINERALOGY	PERCENT		SIZE (micron)				REPLACING / FILLING	COMMENTS
			min.	max.	av.			
(metadolerite) amphibole	55						clinopyroxene	
(metadolerite) chlorite	28.5						plagioclase	
(metadolerite) magnetite	1.5						oxides	
(chlorite-rich domains) amphibole	<10%						clinopyroxene	
(chlorite-rich domains) chlorite	90						plagioclase	
(chlorite-rich domains) sphene	traces ?						oxides	very small, not identified for sure
(chlorite-rich domains) magnetite	1.5						oxides	
(veins) epidote	8%	3%	50	400	150		filling cracks	

TOTAL ALTERATION: 85%

STRUCTURE : Both thin sections include domains that have an epidote texture and lots of amphibole after pyroxene, and domains that are mostly made of chlorite, with accessory oxides and traces of zircon. The contacts between the two types of domains are irregular... they may be magmatic (zones more or less rich in plagioclase). The chlorite-rich domains are clearly more deformed, with locally a well defined schistosity, but the contacts themselves are not transposed, and the doleritic domains, although not foliated, are also deformed. The epidote veins are tardi and post deformation. They have the shape of cracks and fractures, with no preferred orientation.

COMMENTS : (captions for microphotographs) : 357_69_A_05R_01_110-113cm_10x_tsb_photomicro_P1260076.TIF : Polarized light. Zircon in chlorite-rich domain. Also note irregular vein filled with epidote. / 357_69_A_05R_01_110-113cm_10x_tsb_photomicro_P1260077.TIF : Polarized light. General view of deloritic texture with plagioclase lath and amphibole pseudomorph after primary clinopyroxene. / 357_69_A_05R_01_110-113cm_10x_tsb_photomicro_P1260078.TIF : Polarized light. View of sheared chlorite in chlorite-rich domain, with epidote filled vein. 357_69_A_05R_01_110-113cm_2.5x_tsb_photomicro_P1280106.TIF chloritised plagioclase microlite in margin of doleritic area. 357_69_A_05R_01_110-113cm_10x_tsb_photomicro_P1280107.TIF; chlotitised microlite PPL 357_69_A_05R_01_110-113cm_10x_tsb_photomicro_P1280108.TIF; chloritised microlite surrounded by epidote XPL. 357_69_A_05R_01_110-113cm_10x_tsb_photomicro_P1280109.TIF chloritised microlite PPL better image

THIN SECTION Number	357_69A_6R1_37-41	**OBSERVER: AMcC**
ROCK NAME:	flattened fault breccia	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
plagioclase								large clots of chlorite are probably plagioclase pseudomorphs
clinopyroxene								
metadolerite dyke material	~50%							as clasts and probabl;y intrusve material into the breccia

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
chlorite	80						replaces dolerite, plagioclase and probably talc	
amphibole	10							
epidote	10							
serpentine?	<5							

TOTAL ALTERATION: 100%

STRUCTURE : Slightly to moderately foliated breccia with clasts of metadolerite, foliated tremolite, broken up epidote vein material, and gabbroic plagioclase, all heavily chloritised. Foliations are randomly oriented in clasts and there are clasts of finer breccia. Undeformed metadoleritic material on one side of the slide appears to be intruding the breccia. Epidote veins look like they were emplaced into the breccia, then broken up, rather than being pre-brecciation

THIN SECTION Number	357_69A_7R1_6-7	**OBSERVER: AMcC**
ROCK NAME:	flattened fault breccia	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			Composition	MORPHOLOGY	COMMENTS
			min.	max.	av.			
olivine?								protolith is uncertain and probably in part dolerite. Very poor polish hampers observations
pyroxene?								
plagioclase								

SECONDARY MINERALOGY	PERCENT		SIZE (micron)				REPLACING / FILLING	COMMENTS
			min.	max.	av.			
talc	~50							
amphibole	~20							
chlorite	~20							
epidote	5							forms large grains and cataclastic lenses. Epidote veins are typical of metadolerites
magnetite	2							
porosity	~5							

TOTAL ALTERATION: 100%

STRUCTURE : Very pooorly polished. Appears to be a deformed breccia. Crenulatioin cleavage is the dominant fabric. Muddy patches may be in part dolerite. Irregular patches of porosity are lined by needles of ?amphibole, and have pull-apart geometries. Porosity is associated with muddy material which may be intrusive glassy material (doleritic)

THIN SECTION Number	357_69A_8R1_117-119	**OBSERVER: AMcC**
ROCK NAME:	talc-amphibole-chlorite schist/breccia	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
olivine								assumed to be replaced by talc-tremolite rich zones
plagioclase								assumed to be replaced by patches of chlorite
clinopyroxene?								

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
talc	60							brownish clots and foliae
chlorite	20							clots and layers, colourless, sometimes vein-fill textures
amphibole	20							colourless, broken
magnetite	2							clots of small euhedral grains on the edge of chlorite areas, sometimes cored by ilmenite (?)

TOTAL ALTERATION: 100%

STRUCTURE : isoclinal folds seen in talc foliae. Doleritic (?) clasts up to 2 mm in size, rich in amphibole. The rock is largely a flattened breccia with clasts of a previous schist, but large chlorite patches suggets gabbroic plagioclase in the protolith

THIN SECTION Number	357_69A_10R1_80-87cm	**OBSERVER: Nori Akizawa**
ROCK NAME:	Serpentinized harzburgite	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			Composition	MORPHOLOGY	COMMENTS
			min.	max.	av.			
Olivine	0	74						
Orthopyroxene	0	20						
Clinopyroxene	0	5						
Spinel	1	1	0.1	2	0.5		Highly irregular in shape	The rim is generally altered, but the core is still primary in composition (yellowish red in color).

SECONDARY MINERALOGY	PERCENT		SIZE (micron)				REPLACING / FILLING	COMMENTS
			min.	max.	av.			
Serpentine	80							
Chlorite	3						Pyroxenes and spinel	
Chlorite (green in color)	2						Spinel	This type of chlorite is closely associated with spinel, which is always partly altered. Al and Fe were supplied during the alteration of spinel.
Amphibole (probably actinolite)	5						Pyroxenes (probably clinopyroxene)	Polychromatic.

TOTAL ALTERATION: 99%

STRUCTURE :

THIN SECTION Number	69A_10R3_0-2.5	**OBSERVER: SR**
ROCK NAME:	serpentinized dunite	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	**PERCENT PRESENT**	**PERCENT ORIGINAL**	**SIZE (mm)**			**Composition**	**MORPHOLOGY**	**COMMENTS**
			min.	**max.**	**av.**			
olivine	0	95	unknown					
spinel	0	5	< mm	3 mm	1 mm			

SECONDARY MINERALOGY	**PERCENT**		**SIZE (micron)**				**REPLACING / FILLING**	**COMMENTS**
			min.	**max.**	**av.**			
serpentine	94		< µm				olivine	mesh texture equant to ribbon, patches of interlocking texture, magnetite along fractures in the mesh
oxide (magnetite)			< µm					
oxide	5		< mm	3 mm	1 mm		spinel	
chlorite	< 1		< µm				vein	
serpentinte	< 1						fibrous veins	

TOTAL ALTERATION: 100 %

STRUCTURE : mesh texture + fibrous veins + one vein with chlorite

THIN SECTION Number	70A-2R1-73-77.3	**OBSERVER: M. Cannat**
ROCK NAME:	sedimentary basalt breccia with foraminiferous carbonate matrix	
GRAIN SIZE:	clasts are angular to rounded and <100microns to several cm in size.	
TEXTURE:	breccia	

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
glassy basalt	35	60	0.05	4000			angular glass shards to angular to subrounded larger clasts	several clasts contain microliths of plagioclase (~20 microns) and phenocrysts of plagioclase (lath, up to 1mm) and olivine (skelettal or euhedral, up to 1mm and 0.2 mm on average)
carbonate matrix	40	40						contains forams

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
orange amorphous alteration mineral	20						basalt glass	orange alteration forms rims around clasts, and is mostly post breccia formation
spherulitic brownish mineral	5						basalt glass and microliths	a few clasts are fully replaced by this spherulitic assemblage prior to inorporation into the breccia

TOTAL ALTERATION: 25%

STRUCTURE : no deformation

COMMENTS : microphotograph 357_70A_02R1_73_77.3_photomicro_ppl.tif shows forams and variably altered basalt clasts in carbonated matrix. Microphotograph 357_70A_02R1_73_77.3_photomicro_xpl.tif shows detail of plagioclase and olivine phenocrysts in glassy basalt with plagioclase microliths.

THIN SECTION Number	70C-1R1-35.5-37.5 cm	**OBSERVER: M. Cannat**
ROCK NAME:	dolerite	
GRAIN SIZE:	1 mm	
TEXTURE:	doleritic	

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
plagioclase	59	60	0.2	1.5	1		laths and anhedral	
calcium-poor pyroxene ?	8	10	0.5	0.5	0.3		subhedral	low birefringence pyroxene
olivine / and clinopyroxene ?	22	27	0.2	1.5	0.5		skelettal or subhedral	The higher birefringence ferromagnesian silicates are probably olivine but they could also be clinopyroxene (there seems to be cleavages suggesting clinopyroxene, and the relief does not seem that high... but there are also undulose extinction, and the skelettal shapes that suggest olivine)
oxides	3	3			0.05		interstitial to euhedral	

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
mixed clays and hydroxides	8						olivine, pyroxene, and in fractures in plagioclase	

TOTAL ALTERATION: 8

STRUCTURE : undeformed except for limited microfracturing and undulose extinction in olivine(or CPX???)

COMMENTS : photomicrograph 357_70C_01R1_35.5_37.5_photomicro_xpl.tif shows doleritic texture in crossed polarized light and 357_70C_01R1_35.5_37.5_photomicro_ppl.tif shows another part of TS in plane light, with the altered areas appearing as orange and reddish-grey.

THIN SECTION Number	71A_1R1_9-11.5	**OBSERVER: SR**
ROCK NAME:	serpentinized dunite	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	**PERCENT PRESENT**	**PERCENT ORIGINAL**	**SIZE (mm)**			**Composition**	**MORPHOLOGY**	**COMMENTS**
			min.	**max.**	**av.**			
olivine	0	95	unknown					
spinel		5	< mm	3 mm	1 mm			

SECONDARY MINERALOGY	**PERCENT**		**SIZE (micron)**				**REPLACING / FILLING**	**COMMENTS**
			min.	**max.**	**av.**			
serpentine	94						olivine	mesh texture equant to hourglass, locally oxidized along fractures in the mesh
oxide (magnetite)								
oxide	5						spinel	
carbonate	1						veins	
serpentine	< 1						fibrous veins	

TOTAL ALTERATION: 100%

STRUCTURE : mesh texture + carbonate veins and oxidation

THIN SECTION Number	71A_1R2_88-92	**OBSERVER: SR**
ROCK NAME:	serpentinized harzburgite	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	**PERCENT PRESENT**	**PERCENT ORIGINAL**	**SIZE (mm)**			**Composition**	**MORPHOLOGY**	**COMMENTS**
			min.	**max.**	**av.**			
olivine	0	60	unknown					
orthopyroxene	0	40	< mm	5 m				
spinel		< 1	< mm	1 mm	< mm			

SECONDARY MINERALOGY	**PERCENT**		**SIZE (micron)**				**REPLACING / FILLING**	**COMMENTS**
			min.	**max.**	**av.**			
serpentine	99						olivine / orthopyroxene	mesh + bastites
oxide (magnetite)								along fractures in the mesh
oxide	< 1						spinel	
serpentinte	1						fibrous veins	

TOTAL ALTERATION: 100%

STRUCTURE : mesh texture + fibrous veins; comment: In one corner of the thin section, white areas around bastites. Microscopic observations in ppl show rusty brown colors with mesh texture aspect.

THIN SECTION Number	71A_2R1_64-67	**OBSERVER: AMcC**
ROCK NAME:	Chloritised gabbro	
GRAIN SIZE:	coarse	
TEXTURE:	gabbroic, ophitic	

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
clinopyroxene	0	40	2	10	6		ophitic (some plagioclase inclusions)	
plagioclase	0	60	2	10	6			
								357_71_A_02R_01_064-067cm_10x_tsb_photomicro_P1270100.TIF

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
chlorite	70						plagioclase, clinopyroxene	Fe-chlorite replaces clinopyroxene, Mg-chlorite replaces plagioclase. Centre of plagioclase replacements often contains relict porosity rimmed by vermicular or radiating chlorite
amphibole	10						clinopyroxene	replacenment parallel to cleavage is probably a mixture of amphibole and chlorite
secondary plagioclase	15						plagioclase	very turbid, replaced in turn by chlorite
zoisite	<5						plagioclase	dust in feldspar and eudral grains in the core of chlorite growths

TOTAL ALTERATION: 100%

STRUCTURE : *I*n the centre of the slide is a zone with extensive kinks of the cleavage in former clinopyroxenes, probably a minor catacastic zone. There is evidence for dissolution porosity/permeability in former plagioclase.

Photomicrographs: 357_71_A_02R_01_064-067cm_10x_tsb_photomicro_P1270100.TIF Chlorite replacing plagioclase and growing into porosity;

THIN SECTION Number	71B_1R1_12-15	**OBSERVER: SR**
ROCK NAME:	serpentinized harzburgite	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	**PERCENT PRESENT**	**PERCENT ORIGINAL**	**SIZE (mm)**			**Composition**	**MORPHOLOGY**	**COMMENTS**
			min.	**max.**	**av.**			
olivine	0	70	unknown					
orthopyroxene	0	30	< mm	5 mm				
spinel		<< 1	< mm					

SECONDARY MINERALOGY	**PERCENT**		**SIZE (micron)**				**REPLACING / FILLING**	**COMMENTS**
			min.	**max.**	**av.**			
serpentine	99						olivine / orthopyroxene	mesh equant to ribbon + bastites
oxide (magnetite)								along fractures in the mesh
oxide	<< 1						spinel	
serpentine	1						fibrous veins	

TOTAL ALTERATION: 100%

STRUCTURE : mesh texture + fibrous veins

THIN SECTION Number	71C_1R1_13-15.5	**OBSERVER: SR**
ROCK NAME:	serpentinized harzburgite	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
olivine	0	80	unknown					
orthopyroxene	0	20		3 mm				
spinel		<< 1	< mm					

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
serpentine	70						olivine / orthopyroxene	hourglass to interlocking + bastites
oxide (magnetite)								concentrated in bastites
serpentine	10						banded veins	
chlorite (+ amphibole?)	20						serpentine	or antigorite?
oxide	<< 1						spinel	

TOTAL ALTERATION: 100%

STRUCTURE : mesh texture + banded serpentine veins + recrystallization/ replacement by chlorite (+ amphibole?) or antigorite (?)

THIN SECTION Number	71C_1R1_44-46	**OBSERVER: SR**
ROCK NAME:	serpentinized harzburgite	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
olivine	0	60	unknown					
orthopyroxene	0	40	< mm	5 mm				
spinel	0	< 1	< mm					

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
serpentine	90						olivine / orthopyroxene	mesh ribbon to hourglass
oxide (magnetite)								along fractures in the mesh
oxide	< 1						spinel	
serpentine	10						fibrous veins	

TOTAL ALTERATION: 100

STRUCTURE : mesh + fibrous veins

THIN SECTION Number	71C_2R1_64-67	**OBSERVER: AMcC**
ROCK NAME:	Serpentinised harzburgite	
GRAIN SIZE:	coarse	
TEXTURE:	porphyroclastic; oriented serpentine mesh	

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
olivine	0	65						100% serpentinised
orthopyroxene	0	35	0.4	10	6		bastite pseudomorphs	replaced by serpentine and minor amphibole
chrome spinel	<1	<1	0.1	0.2	0.15		irregular, intersticial	

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
serpentine	85						olivine, pyroxene	oriented mesh texture and bastite pseudomorphs, and in a late fibrous vein
magnetite	5 to 10		1	200	50		olivine	in mesh veins
amphibole	5		30	100	60		orthopyroxene	early replacement of some orthopyroxene
Fe-Ni oxide	<1		0.5	5			olivine	dispersed needles in serpentine (interpretation uncertain)
brucite?	<1							possibly in center of vein?

TOTAL ALTERATION: 100%

STRUCTURE : Some recrystallisation of the orthopyroxenes to 400 micron neoblasts, aligned in the porphyroclastic fabric. Mesh texture is strongly oriented and cut by a fibrous serpentine vein

Photomicrographs: 357_71_C_02R_01_074-076cm_2.5x_tsb_photomicro_P1270101.TIF; PPL image of chrome spinel grain in the matrgin of a bastite pseudomorph after orthopyroxene. Oriented serpentine mesh texture is visible. 357_71_C_02R_01_074-076cm_10x_tsb_photomicro_P1270102.TIF. Enlarged view of chrome spinel, PPL

THIN SECTION Number	357-71C-6R1-55-57cm	**OBSERVER: Mathilde Cannat**
ROCK NAME:	metadolerite	
GRAIN SIZE:		
TEXTURE:	doleritic	

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (microns) min.	SIZE (microns) max.	SIZE (microns) av.	Composition	MORPHOLOGY	COMMENTS
plagioclase	20	50?	20	1000	100		laths and rare euhedral phenocrysts	plagioclase phenocrysts have corroded faces and locally a darker outer rim, about 5 microns-thick
clinopyroxene	0	49?						
oxides	0.5	1			10			

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
amphibole	60						clinopyroxene and clinopyroxene+plagioclase	
chlorite	39						plagioclase	
magnetite	0.5						oxides	
(veins) amphibole	<<1%							vein fill
(veins) talc	<<0.1%							vein fill

TOTAL ALTERATION: 80%

STRUCTURE : no crystal plastic deformation, but a hint of a magmatic foliation or alignment of plagioclase laths (intensity 1). A few thin veins (<200 microns-wide) are filled by fibrous amphibole and, very locally, with minor talc. One of these veins is slightly sheared (schistosity intensity 1).

COMMENTS : (captions for thin section photographs) / 357_71_C_06R_01_055-057cm_10x_tsb_photomicro_P1260088.TIF : Natural light, overview of doleritic texture / 357_71_C_06R_01_055-057cm_10x_tsb_photomicro_P1260089.TIF : polarized light, view of plagioclase phenocryst with thin grey outer rim in altered doleritic groundmass. / 357_71_C_06R_01_055-057cm_10x_tsb_photomicro_P1260090.TIF : natural light, view of fibrous amphibole vein with minor talc, in altered doleritic groundmass. / 357_71_C_06R_01_055-057cm_10x_tsb_photomicro_P1260091.TIF : same as 090, polarized light.

THIN SECTION Number	72B-2R1-49-53 cm	**OBSERVER: M. Cannat**
ROCK NAME:	metaferrogabbro	
GRAIN SIZE:	1-5 mm	
TEXTURE:	interlocking	

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
plagioclase	50	65	0.2	5	1.5		lath	although there is a lot of plagioclase left, a good part of it is probably modified (partially albitized)
clinopyroxene	5	30	0.2	2	1		anhedral	
oxides	5	5	0.1	2	0.8		euhedral to interstitial	

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
green to greenish brown amphibole	40				0.5		clinopyroxene and cracks in plagioclase	although there is a lot of plagioclase left, it is probably modified (partially albitized) next to the microfractures

TOTAL ALTERATION: 40%

STRUCTURE : a lot of microfractures but no substantial deformation

COMMENTS : Microphotograph 357_72B_02R1_49_53_photomicro_xpl.tif shows typical texture of this sample with large grains, amphibole-lined microfractures in plagioclase, and extensive replacement of clinopyroxene by amphibole.

THIN SECTION Number	72B_5R2_3-5	**OBSERVER: SR**
ROCK NAME:	chlorite schist	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
unknown	0							

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
chlorite	95		< µm				unknown	fine-grained texture, homogeneous at the thin section scale
chlorite	5						vein	

TOTAL ALTERATION: 100

STRUCTURE : fine-grained chlorite texture with preferential orientation crosscut by a (possible) shear zone containing bigger chlorite crystals; protolith: dolerite?

THIN SECTION Number	72B_6R1_63-65	**OBSERVER: C.Boschi**
ROCK NAME:	Chlorite blackwall / (LT) altered mafic intrusion	
GRAIN SIZE:	variable	
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
olivine	0	?						
orthopyroxene	0	?						
others	0	?						

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
chlorite	70							
smectite-vermiculite	10							
serpentine	10							
apatite	1							
amphibole	5							
oxide	4							

TOTAL ALTERATION: 100%

STRUCTURE : Very fine-grained chaotic intergrowth of chlorite + minor serpentine and/or smectite-vermiculite like minerals ± apatite ± amphibole ± oxides (± chalcedony??). Need microprobe to identify in details the minerals composition. We could distinguish three concentric layers: (1) the external one (medium-size) mainly made by chlorite ± oxides; (2) the middle layer made by a very fine-grained intergrowth of chlorite and serpentine (or chalcedony/other minerals??) + oxides; (3) the internal area, very fine-grained, is made by clasts completely replaced by bluish-grey mineral (serpentine? or chalcedony/other minerals??) in a whitish-light brown matrix made by phyllosilicates (most probably chlorite) ± apatite ± amphibole ± oxides.

COMMENTS : 357_72_B_6R_01_063-065cm_xxx_tsb_photomicro_ppl_1.jpg and 357_72_B_6R_01_063-065cm_xxx_tsb_photomicro_xpl_1.jpg: Apatite crystal in the chlorite-rich matrix. Around the apatite, high birefringent amphibole needles are observable
357_72_B_6R_01_063-065cm_xxx_tsb_photomicro_ppl_2.jpg and 357_72_B_6R_01_063-065cm_xxx_tsb_photomicro_xpl_2.jpg: Detail of the texture of the internal area (layers 3) of the rock: clasts completely replaced by bluish minerals surrounded by chlorite-rich matrix.

THIN SECTION Number	72B_7R1, 34-35.5 cm	**OBSERVER: Stéphane Rouméjon**
ROCK NAME:	talc-amphibole-chlorite schist	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	**PERCENT PRESENT**	**PERCENT ORIGINAL**	**SIZE (mm)**			**Composition**	**MORPHOLOGY**	**COMMENTS**
			min.	**max.**	**av.**			
undetermined								
spinels (?)	0	1	µm	< mm				indicating that at least a part of this sample was originally ultramafic?

SECONDARY MINERALOGY	**PERCENT**		**SIZE (micron)**				**REPLACING / FILLING**	**COMMENTS**
			min.	**max.**	**av.**			
amphibole (tremolite)	50				µm		?	schistose fabrics with a preferential orientation at the thin section scale
chlorite	39				µm		? + spinels	as elongated lenses in the amphibole matrix
talc	10				µm			in a corner of the thin section, overprinting chlorite in angular domains delineated by planes filled with amphibole
oxides	1				< mm		spinels	included in chlorite lenses. They form alignments along probable chlorite shear planes

TOTAL ALTERATION: 100%

STRUCTURE : preferential orientation of the amphiboles surrouding chlorite lenses and talc-dominated (after chlorite) domains

THIN SECTION Number	72B_7R1_58-59	**OBSERVER: C.Boschi**
ROCK NAME:	Chlorite blackwall / altered clast-supported mafic breccia	
GRAIN SIZE:	fine-medium	
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			Composition	MORPHOLOGY	COMMENTS
			min.	max.	av.			
others	0	?						

SECONDARY MINERALOGY	PERCENT		SIZE (micron)				REPLACING / FILLING	COMMENTS
			min.	max.	av.			
chlorite	60							
smectite-vermiculite	?							
plagioclase	?							
amphibole	?							
oxides	10							

TOTAL ALTERATION: 100%

STRUCTURE : The rocks is made by a brecciated central portion surrounded by a very fine-grained intergrowth of chlorite + minor serpentine and/or smectite-vermiculite like minerals + oxides (chlorite blackwall). At the left of the TS an other clast/aggregate of clasts is completely wrapped up by the chlorite-rich assemblage.
The central portion is made by clasts with variable grain-sizes. The largest, up to 6 mm in diameter show low berefringence (grey to pale yellow), some with undulatory extinction. Some of these clasts show a remaining polysynthetic twinning, typical of pl. The matrix is made by the same clasts (but smaller) together with a very fine-grained LT phyllosilicate (chlorite, smectite). Need microprobe to identify the minerals composition.

THIN SECTION Number	357-72B-8R1-64-66cm:	**OBSERVER: Javier Escartin**
ROCK NAME:	Chloritized metabasalt/metadolerite (?)	
GRAIN SIZE:	variable	
TEXTURE:	Fully chloritized clasts of metadolerite and chlorite veins, with late disseminated oxides and minor quartz	

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.	Composition	MORPHOLOGY	COMMENTS

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
(chloritized metadolerite) Chlorite	>98%		<100	1000	200			texture: mostly "secondary" with disseminated oxides. Either along veins with large crystals (fan-shaped aggragates) or as finer crystals in clasts. Locally brown-green chlorite.
(chloritized metadolerite) Oxides	<2%		<5	100	10			Disseminated both along veins and clasts, locally showing alignments.
(chloritized metadolerite) Quartz	<1%		<10	30	10			Small quartz crystals with euhedral shapes and possible fluid inclusions
(chloritized metadolerite) Tremolite	<1%		<100	200	100			Few occurrences of tremolite intergrowing with chlorite along veins

TOTAL ALTERATION:

STRUCTURE : Fully chloritized clasts of metadolerite cross-cut by chlorite veins. Vein and clasts boundaries are unclear and seem recrystallized. Veins show large chlorite crystals up to ~1 mm in length, in fan-shaped clusters and showing no preferred orientation. In clasts the grains are much smaller (< 200 microm.), often acicular, and with no preferred orientation. Disseminated oxides both throughout veins and clasts, of variable size, and with euhedral shapes (late precipitation/recrystallization). Some of the oxides cluster forming elongated trails, primairly within former metadolerite (?) clasts. Locally, and often associated with oxides, small euhedral quartz crystals. Tremolite intergrotwh with chlorite is observed locally along veins. No relict primary minerals can be observed

COMMENTS : (captions for microphotographs) 357_72_B_08R_01_064-066cm_2x_01pol.jpg: Polarized light. View of contact between chlorite vein with acicular, fan-shaped chlorite (crystals up to ~1 mm in length) and border of chloritized clast, with finer-grained chlorite (<0.4 microm), and oxides. Up-core is up-image. 357_72_B_08R_01_064-066cm_40x_02pol.jpg: Euhedral quartz grain and oxides in chlorite vein (fan-shaped texture). Quartz contains inclusions. Up-core is up-image

THIN SECTION Number	72B_8R1_67-69	**OBSERVER: C.Boschi**
ROCK NAME:	Talc-amphibole schist	
GRAIN SIZE:	fine-medium	
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			Composition	MORPHOLOGY	COMMENTS
			min.	max.	av.			
serpentine	5	?						
magnetite	0	?						
spinels	<1	?						

SECONDARY MINERALOGY	PERCENT		SIZE (micron)				REPLACING / FILLING	COMMENTS
			min.	max.	av.			
talc	40							
amphibole	30							
chlorite	20							
oxide	5							

TOTAL ALTERATION: 100%

STRUCTURE : TS too thick. Talc-amphibole-chlorite (talc-dominated) mineral assemblage overprinting the previous texture.
The (oxidized) matrix of the rocks is mainly made by talc, intergrowth with minor bluish chlorite and thin amphibole needles (< 1 mm). In few places, we could distinguish small enclaves (< 2 mm) of the previous serpentinite assemblage (serpentine ± magnetite).
Medium-size high-birefringent amphibole (up to few mm) crystals/clasts are wrapped up in the talc matrix: something they show cataclastic deformation, sometime they follow the main layering (made by talc).
At one corner of the thin section, there is a contact with a partially serpentinized peridotite (with relics of olivines). Numerous metasomatic veins have intruded this part. Need more observation at the boundary talc-schist/ serpentinite: there is an altered concentration of pyroxenes: what it represents? Is it a mafic vein?

THIN SECTION Number	357-72B-8R2-1.5-3.5cm	**OBSERVER: Javier Escartin**
ROCK NAME:	Chloritized metabasalt/metadolerite (?)	
GRAIN SIZE:	variable	
TEXTURE:	Serpentinized peridotite, fractured and veined, in contact with chlorite-rich vein.	

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (micron)			Composition	MORPHOLOGY	COMMENTS
			min.	max.	av.			
(serpentinized peridotite) olivine	<5%	?						
(serpentinized peridotite) Spinel	<1%	?						

SECONDARY MINERALOGY	PERCENT		SIZE (micron)				REPLACING / FILLING	COMMENTS
			min.	max.	av.			
(serpentinized peridotite) Chlorite	60%		<100	1000	200			texture: mostly "secondary" with disseminated oxides. In large laths, clasts, veins…
(serpentinized peridotite) serpentine	25%		<5	100	20			In mesh and veins
(serpentinized peridotite) tremolite	<5%		10	30	10			Intergrowth with chlorite, minor.
(serpentinized peridotite) oxides	<5%		<5	50	20			Oxides in mesh of serpentinized peridotite

TOTAL ALTERATION:

STRUCTURE : Mesh-textured serpentinized peridotite with relict olivine in contact with chlorite-rich vein/alteration zone. The serpenitized peridotite is brittlely deformed, with clasts (a few mm in size) that are cross-cut by several generations of veins (early serpentine veins, later predominantly chlorite, and last set of carbonate veins). The chlorite-rich zones shows a complex texture rich in oxides along mesh boundaries, with both zones of large crystals (up to 1 mm in length), locally undulated, and zones of intense brittle deformation with chloritized clasts, reworked chlorite clasts with schistose texture, and other fine-grained material. Some zones show tremolite intergrowth with chlorite (minor). Late carbonate filled veins cross cut both the chlorite-rich shear zone and the veined, serpentinized peridotite clasts. Spinel is abundant along the chlorite-rich zone. Sme small (<5 mm) lasts with tremolite and oxides in the chlorite-rich zone (euhedral, Carbonate veins are irregular and brnching. Zones with larger chlorite laths show locally kinking and folding.

COMMENTS : (captions for microphotographs) 357_72_B_08R_02_001.5-003.5cm_2x_01pol.jpg: Polarized light. View of contact between serpentinized peridotite and tremolite-rich vein/alteration zone. The serpentinized peridotite, cataclasized, shows mesh-texture with relict cores of olivine heterogeneously distributed and abundant oxides+magnetite, and veining. It is in contact with a tremolite-rich zone showing a complex microstructure with clasts (chlorite, foliated tremolite, etc) of variable size. Late carbonate veins cross-cut both the serpenintinized peridotite and the tremolite/chlorite vein/alteration zone. Up-core is up-image. 357_72_B_08R_02_001.5-003.5cm_2x_02pol.jpg: Chlorite-rich shear/alteration zone. Chlorite is locally well crystallized, and associate with spinels, locally intergrowths of tremolite. Up-core is up-image. 357_72_B_08R_02_001.5-003.5cm_2x_03pol.jpg: Late carbonate veins cross-cutting the chlorite-rich vein and adjacent serpentinized peridotite clasts (left). Up-core is up-image.

THIN SECTION Number	357-72B-8R2-73-76cm : there are two thin sections made in this interval; both are described here. Modal proportions are estimated as an average between the two sections.	**OBSERVER: Mathilde Cannat**
ROCK NAME:	amphibole schist after gabbroic melt with clasts of serpentinized peridotite	
GRAIN SIZE:	variable	
TEXTURE:	schistose, with multiple veins and clasts	

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (micron)			Composition	MORPHOLOGY	COMMENTS
			min.	max.	av.			
(serpentinized peridotite) olivine	1	70-80	10	2000	?		porphyroclasts and neoblasts	there are a few olivine relicts, some in large grains, others very finely recrystallized
(serpentinized peridotite) spinel	0.2	1		500	200			spinel are found in the serpentine clasts but also in the amphibolite schists
(serpentinized peridotite) pyroxene	0	19-29						there are large secondary amphibole that are probably pseudomorphs after pyroxenes from the original peridotite
(amphibole schist) amphibole or clinopyroxene?	0	99 ?						based on the secondary mineralogy, made of amphibole with very little to no chlorite, the magmatic protolith must have been made mostly of iron-magnesian minerals, with little to no plagioclase

SECONDARY MINERALOGY	PERCENT		SIZE (micron)				REPLACING / FILLING	COMMENTS
			min.	max.	av.			
(serpentinized peridotite) serpentine	73						olivine	texture: mostly "secondary" with lots of disseminated magnetite
(serpentinized peridotite) amphibole	20						pyroxene	
(serpentinized peridotite) magnetite	2.8						spinel and olivine	
(serpentinized peridotite) talc	5						serpentine	
(serpentinized peridotite) carbonate	traces						olivine	
(amphibole schist) chlorite	9						plagioclase?	
(amphibole schist) amphibole	90						amphibole, clinopyroxene? minor plagioclase?	
(veins) carbonate	<1%							latest veins, irregular, fill cracks
(veins) serpentine	<1%							irregular fill cracks

TOTAL ALTERATION:

STRUCTURE : Very heterogeneous semi-brittle deformation localized in the amphibole-rich zones. At least two generations can be distinguished just by looking at the thin section scan (natural light): 1- earlier zones of sheared amphibolite appear in grey. They contains small (typically 50-200 microns) prismatic colorless amphiboles that are elongated in the foliation and surrounded by a finer grained matrix (<10 microns) that is presently made of acicular and fibrous amphiboles, not always deformed. It is possible that these small amphiboles replace formed neoblasts, in which cas this was a CP deformation; 2- crosscutting irregular shear zones filled with fibrous amphibole. these appear brown in the scan. The fibrous aphibole is locally folded. Then there are later cracks filled with serpentine, then carbonates. No prefered orientation.

COMMENTS : (captions for microphotographs) 357_72_B_08R_02_073-076cm_10x_tsb_photomicro_P1260079.TIF: Polarized light. View of contact between serpentinite clast and sheared amphibolite (the earlier type, with sub-hedral to prismatic colorless amphiboles in finer grained matrix). / 357_72_B_08R_02_073-076cm_10x_tsb_photomicro_P1260080.TIF: Polarized light. Serpentinite clasts in sheared fibrous amphibole (the later type of shear zones). Note small discontinuous vein filled with talc in serpentinite. /357_72_B_08R_02_073-076cm_10x_tsb_photomicro_P1260081.TIF. Polarized light. Another view of a contact between a serpentinite clast that is locally altered into talc, and sheared amphibolite. Here, the earlier foliation defined by prismatic amphibole is reworked as an elongated clast in the foliation defined by fibrous amphibole, that is locally folded. / 357_72_B_08R_02_073-076cm_10x_tsb_photomicro_P1260082.TIF. Polarized light. Another view of a serpentinite clast (with a little talc) in sheared mostly fibrous amphibolite. / 357_72_B_08R_02_073-076cm_10x_tsb_photomicro_P1260083.TIF. Polarized light. Contact between serpentinite clast and sheared amphibolite (here also some chlorite). There are a few relicts of olivine in the form of neoblasts. Talc develops next to these neoblasts, as well as pseudomorphs that appear to be made of carbonate? / 357_72_B_08R_02_073-076cm_10x_tsb_photomicro_P1260084.TIF and P1260085.TIF. Polarized and natural light detailed view of olivine neoblasts, talc and possible carbonate pseudomorphs. / 357_72_B_08R_02_073-076cm_10x_tsb_photomicro_P1260086.TIF and P1260087.TIF Polarized and natural light detailed view of olivine porphyroclast and neoblasts in another serpentinite clast. This is a strange texture... not typical of dynamic recrystallization of olivine.... Also note the pale brown inclusions in olivine...

THIN SECTION Number	75A_1R1_25-27	**OBSERVER: SR**
ROCK NAME:	talc schist/fels after ultramafic rock	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	**PERCENT PRESENT**	**PERCENT ORIGINAL**	**SIZE (mm)**			**Composition**	**MORPHOLOGY**	**COMMENTS**
			min.	**max.**	**av.**			
olivine (?)	0	90	unknown					
pyroxene	0	10	< mm	< 1 cm				
spinel	10	< 1	< mm					protolith was probably a harzburgite

SECONDARY MINERALOGY	**PERCENT**		**SIZE (micron)**				**REPLACING / FILLING**	**COMMENTS**
			min.	**max.**	**av.**			
talc	100						serpentine mesh texture + bastites	looks like mesh cells from the mesh texture (after olivine) are still recognizable in some zones
oxides	< 1						spinel	small relics
oxides (magnetite)								concentrated in ghosts of pyroxenes

TOTAL ALTERATION: 100%

STRUCTURE : probably mesh texture + bastites overprinted by static talc metasomatism

THIN SECTION Number	357_75A_1RCC_0-5	**OBSERVER: AMcC**
ROCK NAME:	talc-overprinted dolerite	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
plagioclase		40					phenocrysts and needles	mainly replaced by talc, some chlorite
pyroxene		40						replaced by amphibole
glass		20						

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
talc	30						dyke margins, plagioclase phenocrysts	proportion of talc to amphibole is uncertain
chlorite	20							with amphibole in coarser areas of dolerite
amphibole	40							
seconadry plagioclase	10							inferred to be replacing plagioclase needles

TOTAL ALTERATION: 100

STRUCTURE : chlorite is mainly in veins and pull-aparts, with some larger clots perhaps after gabbroic plagioclase. Chilled dyke margins have talc/chlorite pseudomorphs after plagioclase phenocrysts. Coarser areas show relicts of plagioclase needles although they are likely to be largely secondary plagioclase

THIN SECTION Number	75B_2R1_16-19	**OBSERVER: SR**
ROCK NAME:	talc-amphibole schist	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
unknown	0							

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
talc	100		< µm				unknown	fine-grained
chlorite ?								possibly locally
oxides	< 1							randomly distributed

TOTAL ALTERATION:

STRUCTURE : texture locally with a preferential orientation (deformation?), locally homogeneous (static replacement?)

COMMENTS: Protolith unknown. Rock name is talc-amphibole schist according to the visual core description; this thinsection is a talc schist.

THIN SECTION Number	357-75B-2R1-64-66 cm	**OBSERVER: Mathilde Cannat**
ROCK NAME:	metadolerite	
GRAIN SIZE:	200 microns	
TEXTURE:	doleritic	

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (microns) min.	max.	av.	Composition	MORPHOLOGY	COMMENTS
plagioclase	20	50		1000	150-200		laths and a few phenocrysts, subhedral and corroded	this relict plag is likely chemically modified during alteration (albtized)
clinopyroxene	0	47			200		irregular, enclosing laths of plagioclase	
oxides	0.5	3			<50			
(chlorite-rich zone) plagioclase	5	?			100		laths	the doleritic domain does not seem to contain zircon.. this chlorite rich zone could thus be magmatic in origin, more plag-
(chlorite-rich zone) clinopyroxene	0	?						
(chlorite-rich zone) oxides	0.5	2			<50			
(chlorite-rich zone) zircon	<1	<1			<10		euhedral	

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	max.	av.		REPLACING / FILLING	COMMENTS
amphibole	55				100		clinopyroxene and plagioclase	
chlorite	30				100		plagioclase	
magnetite	2.5				<50		oxides	
(chlorite-rich zone) amphibole	28.5						clinopyroxene and plagioclase	
(chlorite-rich zone) chlorite	66						plagioclase	
(chlorite-rich zone) quartz	4				50		?	this quartz appears corroded (almost vermicular) like the vein quartz.. was it part of the magmatic assemblage? This is bizarre and has to be looked at further..
(chlorite-rich zone) magnetite	1.5						oxides	
(veins) quartz	<1						syn to post kinematic?	veins open in fractures cutting through chlorite-rich domain, **contain euhedral zircon**
(vein) smectite or chlorite??	<1						post kinematic vein	pale grey spherulitic, medium relief... smectite? chlorite?

TOTAL ALTERATION: 85%

STRUCTURE : Cataclastic deformation with sheared chlorite in the fractures, no clear preferred orientation, no pervasive foliation. Quartz veins appear to cut across sheared chlorite but this needs to be ascertained. They are also deformed. Vein with spherulitic mineral (smectite?) are later and apparently undeformed.

COMMENTS : (captions for microphotographs). 357_75_B_02R_01_064-066cm_10x_tsb_photomicro_P1260092.TIF. Natural light. View of doleritic texture with plagioclase laths, larger plagioclase, amphibole and oxides. 357_75_B_02R_01_064-066cm_10x_tsb_photomicro_P1260093.TIF: Natural light, amphibole-chlorite microshear zone in dolerite./357_75_B_02R_01_064-066cm_10x_tsb_photomicro_P1260094.TIF: Polarized light, amphibole-chlorite microshear zone in dolerit. /357_75_B_02R_01_064-066cm_10x_tsb_photomicro_P1260095.TIF. Polarized light. Numerous sheared microfractures ligned with chlorite in plagioclase phenocrysts. / 357_75_B_02R_01_064-066cm_10x_tsb_photomicro_P1260096.TIF. Polarized light. Quartz veins in chlorite-rich zone. / 357_75_B_02R_01_064-066cm_10x_tsb_photomicro_P1260097.TIF. Natural light. View of quartz vein with enclosed zircon and corroded quartz at contact with host chlorite-rich material. / 357_75_B_02R_01_064-066cm_10x_tsb_photomicro_P1260098.TIF/ same as previous, larger magnification. / 357_75_B_02R_01_064-066cm_10x_tsb_photomicro_P1260099.TIF. Polarized light. Deformed quartz vein (folded) cutting through sheared chlorite. Note isolated quartz grains in chlorite-rich host rock. / 357_75_B_02R_01_064-066cm_10x_tsb_photomicro_P1270104.TIF. Natural light. Small zircon in chlorite-rich domain. / 357_75_B_02R_01_064-066cm_10x_tsb_photomicro_P1270103.TIF. Polarized light. Vein of smectite?? in dolerite.

THIN SECTION Number	75B_3R1_78-86	**OBSERVER: SR**
ROCK NAME:	talc-amphibole-chlorite schist	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
unknown								

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
amphibole	90		µm				unknown	matrix, preferential orientation
chlorite	10		µm				unknown	elongated domains
oxides	< 1							association with clorite domains

TOTAL ALTERATION: 100%

STRUCTURE : Elongated domains with chlorite and oxides in a preferentially oriented tremolite matrix. Similar to 75B_3R1_97-100. Protolith unknown. Rock name is talc-amphibole-chlorite schist according to visual core description; no talc has been observed in this thinsection.

Exp. 357 Thin Section Descriptions

THIN SECTION Number	75B_3R1_97-100	**OBSERVER: SR**
ROCK NAME:	talc-amphibole-chlorite schist	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
unknown								

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
amphibole	90		µm				unknown	tremolite, fine-grained to fibrous
chlorite	10		µm				unknown	in lens-shaped domains
oxides	< 1						unknown	rare, associated with chlorite

TOTAL ALTERATION: 100

STRUCTURE : Preferential orientation of the amphibole + lens-shaped domains of chlorite/ oxides. Similar to 75B_3R1_78-85. Protolith unknown. Rock name is talc-amphibole-chlorite schist according to the visual core description; no talc has been observed in this thinsection.

Photos: P2040252 / x2.5 / ppl and P2040253 / x2.5 / xpl: lens-shaped domains with chlorite and oxides in a matrix of preferentially oriented tremolite

THIN SECTION Number	75B_3R1_100-102	**OBSERVER: SR**
ROCK NAME:	talc-amphibole-schlorite schist	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
unknown								

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
amphibole	90		µm				unknown	randomly oriented, association with chlorite
chlorite	10		µm				unknown	with amphibole in the matrix, as bigger and more equant crystals in veins (?)
oxides	< 1							

TOTAL ALTERATION:

STRUCTURE : matrix of amphibole-chlorite + veins (?) of chlorite; possibly metadolerite dyke (or two) that appears to be intruded across the fabric of a schistose fault rock

Comments: Talc-amphibole-chlorite schist according to visual core description; no talc observed in this thinsection. Similar to 75B_3R1_78-85 and 75B_3R1_97-100, but not deformed (no preferential orientation)

THIN SECTION Number	76A-1R1-24-27 cm	**OBSERVER: M. Cannat**
ROCK NAME:	vesicular microdolerite : clast in sedimentary breccia with foraminiferous carbonated matrix	
GRAIN SIZE:	0.3 mm	
TEXTURE:	doleritic with large vesicles : 0.5 to 2mm in diameter	

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
plagioclase	40	50	0.05	0.5	0.3		laths	
olivine	5	10	0.1	0.3	0.2		anhedral to subhedral	
clinopyroxene? or olivine?	20	30	0.1	0.5	0.3		anhedral to subhedral	some grains show cleavage but several also have an undulose extinction that suggests olivine.. yet the relief is less than other grains that look like typical olivine..???
calcium-poor pyroxene	3	5	0.1	0.3	0.2		euhedral	
oxide	3	3	0.01	0.1	0.04		interstitial to euhedral	
								vesicles are lined with orange material (alteration of former glass)

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
mixed clays and hydroxides	25						olivine, pyroxene, plagioclase and glassy matrix	vesicles are lined with orange material (alteration of former glass)

TOTAL ALTERATION: 25%

STRUCTURE : no deformation, just limited undulose extinction of the olivine/clinopyroxene grains (??)

COMMENTS : Microphotograph 357_76A_01R1_24_27_photomicro_xpl.tif shows texture with vesicles that are lined with orange material that looks like altered glass. Microphotograph 357_76A_01R1_24_27_photomicro_xpl_detail.tif shows detail of doleritic assemblage with clear olivine (partially altered into oxidized material), and probable clinopyroxene (lesser relief and hint of cleavage)

THIN SECTION Number	76A-1R1-28-31 cm	**OBSERVER: M. Cannat**
ROCK NAME:	dolerite	
GRAIN SIZE:	1mm	
TEXTURE:	doleritic	

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
plagioclase	45	50	0.2	2	1		lath	
calcium-poor pyroxene ?	3	6	0.2	0.5	0.3		euhedral	
clinopyroxene and-or olivine ?							skelettal or anhedral	these grains are a bit low relief for olivine, some look like they have cleavage, but their skeletal ahape and undulose extinction suggests olivine
olivine	3	6	0.05	0.5	0.3		euhedral	
oxides	2	2			0.05		interstitial to euhedral	

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
mixed clays and hydroxides	17						olivine, pyroxene, and in fractures in plagioclase	

TOTAL ALTERATION:

STRUCTURE : No significant deformation but undulose extinction in the olivine/clinopyroxene?? and several plagioclase laths have mechanical twins.

COMMENTS : Microphotograph 357_76A_01R1_28_31_photomicro_xpl.tif show typical texture.

THIN SECTION Number	357-76B-3R1-51-54.5cm: **OBSERVER: Javier Escartin**
ROCK NAME:	Serpentinized peridotite with talc alteration and vein
GRAIN SIZE:	variable
TEXTURE:	Altered/oxidized serpentinized peridotite, cut by fine veins (chlorite?) and later talc alteration and in contact with talc vein

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.	Composition	MORPHOLOGY	COMMENTS

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS

TOTAL ALTERATION:

STRUCTURE : Former serpentinized peridotite extremely altered-oxidized, almost opaque or reddish in parallel light (rhodingitized?) with no remains of serpentine nor olivine. Cross-cut by early network of very thin, subparallel veins (chlorite).It shows alteration to talc along talc-rich vein boundary. The talc-rich vein/shear zone shows both talc clasts (>100 microm and <1 mm) with very fine-grained talc crystals (microcrystalline) and foliation around them (some talc crystals can reach ~1 mm). The talc-rich zone transitions to a chlorite-rich zone, also showing clasts and local foliations. Chlorite intergrows with talc. Opaque minerals (oxides? talc?) are abundant and vary in size from <10 microm. to ~250 microm.

COMMENTS : (captions for microphotographs) 357_76_B_03R_01_051-054.5cm_2x_01pol.jpg: Polarized light. Former serpentinized peridotite (oxidized/rhodingitized), cross cut by early set of fine veins (chlorite?) and later alteration to talc and veining with talc. Up-core is up-image. 357_76_B_03R_01_051-054.5cm_10x_02pol.jpg: Talc shar zone with microcrystalline clasts, foliated zones around clasts with larger talc laths (up to 1 mm), and transitioning to a chlorite-rich zone. Opaques (oxides, altered spinel?) are abundant, and locally aligned due to deformation.

THIN SECTION Number	76B_4R1_92-95	**OBSERVER: C. Boschi**
ROCK NAME:	Serpentinized harzburgite	
GRAIN SIZE:	coarse	
TEXTURE:	porphyroclastic	

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			Composition	MORPHOLOGY	COMMENTS
			min.	max.	av.			
olivine	0	75						100% serpentinized. Yellow mesh cores.
orthopyroxene	0	25	3	10	6		bastite pseudomorphs	replaced by serpentine, amphibole, chl, tc
chrome spinel	<1	<1	0.5	3	2		irregular, holly-leaf	surrounded by chlorite, Sligth alteration to Fe-chromite.
clinopyroxenes	<1	<1	3	6	4			

SECONDARY MINERALOGY	PERCENT		SIZE (micron)				REPLACING / FILLING	COMMENTS
			min.	max.	av.			
serpentine	70						olivine , pyroxene, veins	mesh texture and bastite pseudomorphs, and in a late fibrous vein
magnetite	15		20	200	50		olivine	in mesh rims and late veins
chlorite	7		30	200	60		orthopyroxene, veins, around spinels	
talc	4						orthopyroxene, veins	
amphibole	4		30	100	60		orthopyroxene, veins	

TOTAL ALTERATION: 100%

STRUCTURE : HT alteration of few pyroxenes (undulatory extinction). Opx are mostly altered to serpentine + late mixture of amphibole ± chlorite ± talc. Magnetite concentrated along the mesh rims (less in mesh cores). Yellow mesh cores (oxidartion or mix of serpentine + ? brucite/iddingsite?). Three sub-horizontal veins made by chlorite/smectite like minerals (low birifrangence, fibrous; ± amphibole) crosscutted by late generation of serp veins (thinner, irregular, sub-vertical to the chlorite/smectite-rich veins); some of these veins appear very high in birifrangence= maybe TS too high?).
Moderate oxidation in some portions of the thin section.

THIN SECTION Number	76B_4R2_19-22	**OBSERVER: C. Boschi**
ROCK NAME:	Serpentinized harzburgite	
GRAIN SIZE:	coarse	
TEXTURE:	porphyroclastic	

PRIMARY MINERALOGY	**PERCENT PRESENT**	**PERCENT ORIGINAL**	**SIZE (mm)**			**Composition**	**MORPHOLOGY**	**COMMENTS**
			min.	**max.**	**av.**			
olivine	0	71						100% serpentinized
orthopyroxene	0	25	0.4	10	6		bastite pseudomorphs	replaced by serpentine (±amphibole ±talc). Some cpx exsolutions (maybe altered in amphibole).
clinopyroxenes	2	2	0.4	10	6			
chrome spinel	2	2	0.5	5	3		irregular, holly-leaf	close to altered pyroxenes. Partially altered to Fe-chromite.

SECONDARY MINERALOGY	**PERCENT**		**SIZE (micron)**				**REPLACING / FILLING**	**COMMENTS**
			min.	**max.**	**av.**			
serpentine	70						olivine , pyroxene, veins	mesh texture and bastite pseudomorphs, and in late veins
magnetite	15		1	100	10		olivine, veins	in mesh rims
amphibole	5		30	100	60		orthopyroxene, veins	
chlorite	4		100	2000	500		orthopyroxene, veins	
talc	?						orthopyroxene	

TOTAL ALTERATION: 100%

STRUCTURE : HT alteration of some pyroxenes (undulatory extinction) overprinted by serpentinization (serpentine ± amphibole ± talc). Magnetite concentrated along the mesh rims (less in mesh cores).
Banded (NS) composite vein (up to 7 mm-wide) of serpentine ± chlorite ± amphibole at the external long-side of the TS. Late serpentine veins crosscutting all the texture.
Slight oxidation along the veins. Some patchs of late chlorite.

THIN SECTION Number	357_76B_5R1_73-77cm: **OBSERVER: Javier Escartin**
ROCK NAME:	Shear zone
GRAIN SIZE:	variable
TEXTURE:	Shear zone recording both cataclastic and ductile deformation (schistosity) with clasts that are chlorite- and amphibole-rich. Late chlorite crystallization and talc veining.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.	Composition	MORPHOLOGY	COMMENTS
(shear zone)								

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
(shear zone) talc	45%		<5	100	10			Talc in veins and in major shear zone (mainly microcrystalline)
(shear zone) Chlorite	20%		<5	800	50			In clasts (fine acicular crystals) and recrystallized as larger laths fanning.
(shear zone) amphibole	25%		<50	1000	100			Highly variable crystal grain size
(shear zone) serpentinite	<5%							After spinel (larger ones)?

TOTAL ALTERATION:

STRUCTURE : Shear zone with complex history of alteration and deformation. Shear zone with microcrystalline talc and elongated zones with primarily chlorite and some tremolite cores, with cataclastic deformation within. Abundance of chlorite clasts varies across the shear zone. Large clast of amphibole (tremolite) with variable crystal grain size (up to 1 mm). Zones with statically grown chlorite with laths up to ~800 microm in length. Late veining with microcrytalline infill (primarily talc plus chlorite), with several phases of veining. Some of the smaller veins may contain serpentinite (chrysotile according to XRD?).

COMMENTS :XRD: chrys (13), liz (6), tlc (15), amph (60), chl (6). (captions for microphotographs) 357_76_B_05R_01_073-077.5cm_2x_01pol.jpg: Polarized light. Microcrystalline talc with embedded elongates zones of tremolite and/or chlorite. Up core is up in image. 357_76_B_05R_01_073-077.5cm_2x_01pol.jpg: Polarized light. Cataclastically deformed amphibole-rich clast with interstitial chlorite and late veins (talc + chlorite?).

THIN SECTION Number	76B_6R1, 21-24 cm	**OBSERVER: Stéphane Rouméjon**
ROCK NAME:	talc-amphibole-chlorite schist	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	**PERCENT PRESENT**	**PERCENT ORIGINAL**	**SIZE (mm)**			**Composition**	**MORPHOLOGY**	**COMMENTS**
			min.	**max.**	**av.**			
olivine	< 5	?			??			possible relicts?
pyroxene	0	?		3 mm	< mm			altered to talc, or to amphibole and chlorite
spinel	<1	1			< mm			

SECONDARY MINERALOGY	**PERCENT**		**SIZE (micron)**				**REPLACING / FILLING**	**COMMENTS**
			min.	**max.**	**av.**			
amphibole (tremolite)	40				µm		? + pyroxene	schistose fabrics in cm-wide domains, surrounding a zone of mixed amphibole and chlorite + replaces pyroxenes in the
chlorite	20				µm		? + pyroxene	in association with amphibole and replacing pyroxenes in the ultramafic domain
talc	29				µm		serpentine? + pyroxene	replaces the previous mineralogical assemblage (serpentine + amphibole and chlorite) in a cm-wide zone between the amphibole-chlorite domain and the ultramafic domain
serpentine	10				µm		olivine	serpentine mesh interlocking textures, possible olivine relicts in mesh cores (?)
oxides (magnetite)					µm			along fractures in the mesh texture
oxides (magnetite)	1				< mm		spinels	

TOTAL ALTERATION: > 95%

STRUCTURE : at least a zone of serpentinized harzburgite, partially metasomatised to talc, in contact with a amphibole-chlorite schist

THIN SECTION Number	76B_7R1_43-45	**OBSERVER: C. Boschi**
ROCK NAME:	Serpentinized harzburgite (opx-poor) and talc-amphibole schist	
GRAIN SIZE:	coarse/fine	
TEXTURE:	porphyroclastic (serpentinite)	

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	Composition	MORPHOLOGY	COMMENTS
ultramafic area								
olivine	0	80						100% serpentinized
orthopyroxene	0	17	0.4	10	6		bastite pseudomorphs	replaced by amphibole ± chl ± tc ± serp
clinopyroxenes	0	3	0.4	10	5			replaced by amphibole ± chl
chrome spinel	<1	<1	0.1	0.2	0.15			

SECONDARY MINERALOGY	PERCENT		SIZE (micron) min.	SIZE (micron) max.	SIZE (micron) av.		REPLACING / FILLING	COMMENTS
ultramafic area								
serpentine	65						olivine , pyroxene	mesh texture and bastite pseudomorphs, and in a late veins
magnetite	15		1	200	50		olivine , veins	in mesh rims and veins
amphibole	8		30	100	60		orthopyroxene	
talc	5						orthopyroxene	
chlorite	7		30	100	60		orthopyroxene	
mafic area								
amphibole	35						in veins and replacing previuos mafic assemblage	
talc	35						veins	
chlorite	20						in veins and replacing previuos mafic assemblage	
oxides	10		1	200	50		veins	

TOTAL ALTERATION: 100%

STRUCTURE : Melt intruded opx-poor harzburgites. Peridotite portions (two lateral sides) is completely serpentinized; the opx are altered to amph±chl+ minor talc and serp. The central portion of the TS shows a complicate multiple events of veining and alteration (with amphibole ± chlorite ± talc ± oxides) of a previuos melt intrusion (opx-rich? pyroxenite layer?). A late veining crosscutting perpendiculary the area; these veins are fine-grained, rich in talc, amphibole and chlorite (in variable proportion), some times oxidized; some portions of the veins show cataclasis (? rotated fragments of minerals inside the vein itself ?). Need to be defined in more detail with microprobe.

THIN SECTION Number	76B 7R1 81-83 cm	**OBSERVER: Stéphane Rouméjon**
ROCK NAME:	Porphyroclastic serpentinite	
GRAIN SIZE:		
TEXTURE:	mesh texture + serpentine recrystallization + serpentine veins	

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			Composition	MORPHOLOGY	COMMENTS
			min.	max.	av.			
olivine	0	80	?	?	?			impossible to determine
orthopyroxene	0	10	0.1	< 5mm				
clinopyroxene	0	4	0.1	< 5mm				
spinel	0	1	0.1	0.1				

SECONDARY MINERALOGY	PERCENT		SIZE (micron)				REPLACING / FILLING	COMMENTS
			min.	max.	av.			
serpentine	50				< micron		olivine	mesh texture
serpentine	5				< micron		orthopyroxene	bastite
serpentine	10				< micron		serpentine mesh texture	homogeneous recrystallization texture (2 successive zones, present a cm-wide corridors crosscutting the thin section
serpentine	20				< micron		serpentine veins infill	banded, fibrous, granular veins with interlocking to interpenetrative texture (possible antigorite recrystallization)
tremolite (+actinolite) and chlorite	14						pyroxenes	pyroxenes from the harzburgite and from magmatic intrusion
chlorite and oxides	1				< micron		spinel	

TOTAL ALTERATION: 100%

STRUCTURE : magmatic intrusion in the harzburgite (pyroxenes altered into amphibole chlorite),
banded vein (5 mm-wide, serpentine) crosscutting the corridor of recrystallized mesh texture in the middle, and the altered intrusions,
lens-shaped, fibrous veins (serpentine), crosscutting the banded vein orthogonally,
isotropic to granular veins crosscutting the banded and fibrous veins,
thin (< 1 mm) and continuous veins of carbonates and oxides crosscutting the whole sequence

COMMENTS: (captions for photomicrographs)
P1290111: 76B_7R1_81-83cm, 2.5x, sequence of veining including banded vein and interlocking to intepenetrative textures (possible recrystallization to antigorite) + fibrous to isotropic serpentine vein
P1290112: 76B_7R1_81-83cm, 2.5x, same as P1290111 but under cross-polarized light
P1290113: 76B_7R1_81-83cm, 2.5x, mesh texture and mesh texture being recrystallized, both crosscut by a serpentine fibrous vein
P1290114: 76B_7R1_81-83cm, 2.5x, mesh texture and mesh texture being recrystallized, in contact with altered magmatic intrusion (cpx to chlorite and amphibole), all crosscut by serpentine fibrous vein
P1290114: 76B_7R1_81-83cm, 2.5x, same as P1290114 but under cross-polarized light

THIN SECTION Number	76B-8R-1, 42-44.5 cm	**OBSERVER: Stéphane Rouméjon**
ROCK NAME:	serpentinized harzburgite	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			Composition	MORPHOLOGY	COMMENTS
			min.	max.	av.			
olivine	0	80	?	?	?			
pyroxene	0	20	< mm	5 mm				
spinel	0	<1	< mm					

SECONDARY MINERALOGY	PERCENT		SIZE (micron)				REPLACING / FILLING	COMMENTS
			min.	max.	av.			
serpentine	70		µm				olivine, pyroxene	equant to ribbon mesh textures + bastites
oxides (magnetite)			µm					along fractures of the mesh, along fractures and grain boundaries of pyroxenes
serpentine	20		µm				mesh texture	nearly isotropic to interlocking texture on both sides of the central vein = recrystallization of mesh texture
serpentine	2		µm				fibrous veins	
serpentine	3		µm				banded veins	
serpentine	5		µm				recrystallization of central banded vein	interlocking to interpenetrative texture, possibly antigorite
oxides	<1							

TOTAL ALTERATION: 100

STRUCTURE :
- mesh texture
- domain (vein?) with pyroxene altered to amphibole and chlorite
- band of recrystallized mesh texture (parallel to the thin section width)
- fibrous veins in the mesh (parallel to the thin section width)
- large central vein - probably a former banded vein - recrystallized into an interlocking to interpenetrative texture (antigorite?). It crosscuts the recrystallized mesh texture
- lens-shaped fibrous to banded serpentine veins, orthogonal to the central vein, crosscut it

Photomicrographs:
P2040254, x2.5, cross-polarized light and P2040255, x2.5, plain-polarized light. Mesh texture (right side) being recrystallized (left side), crosscut by banded veins, in contact with an altered pyroxene.
P2040256, x2.5, cross-polarized ligth and P2040257, x2.5, plain-polarized ligth. Left to right: chlorite zone/recrystallized serpentine with interlocking texture/recrystallized banded vein with interlocking texture (antigorite?). Upper side: banded vein

THIN SECTION Number	76B_9R1_14-17.5	**OBSERVER: SR**
ROCK NAME:	serpentinized dunite (to harzburgite?)	
GRAIN SIZE:		
TEXTURE:		

PRIMARY MINERALOGY	**PERCENT PRESENT**	**PERCENT ORIGINAL**	**SIZE (mm)**			**Composition**	**MORPHOLOGY**	**COMMENTS**
			min.	**max.**	**av.**			
olivine	95		unknown					
orthopyroxene	< 5		< mm	3 mm				
spinel	< 1		< mm	2 mm				

SECONDARY MINERALOGY	**PERCENT**		**SIZE (micron)**				**REPLACING / FILLING**	**COMMENTS**
			min.	**max.**	**av.**			
serpentine	90						olivine / orthopyroxene	equant to ribbon mesh + bastites
oxide (magnetite)								along fractures in the mesh
oxide	< 1							
serpentine	< 1						fibrous veins	
carbonate	10						network of veins	oxidation halos

TOTAL ALTERATION: 100%

STRUCTURE : mesh texture + rare fibrous veins + carbonate veins and oxidation