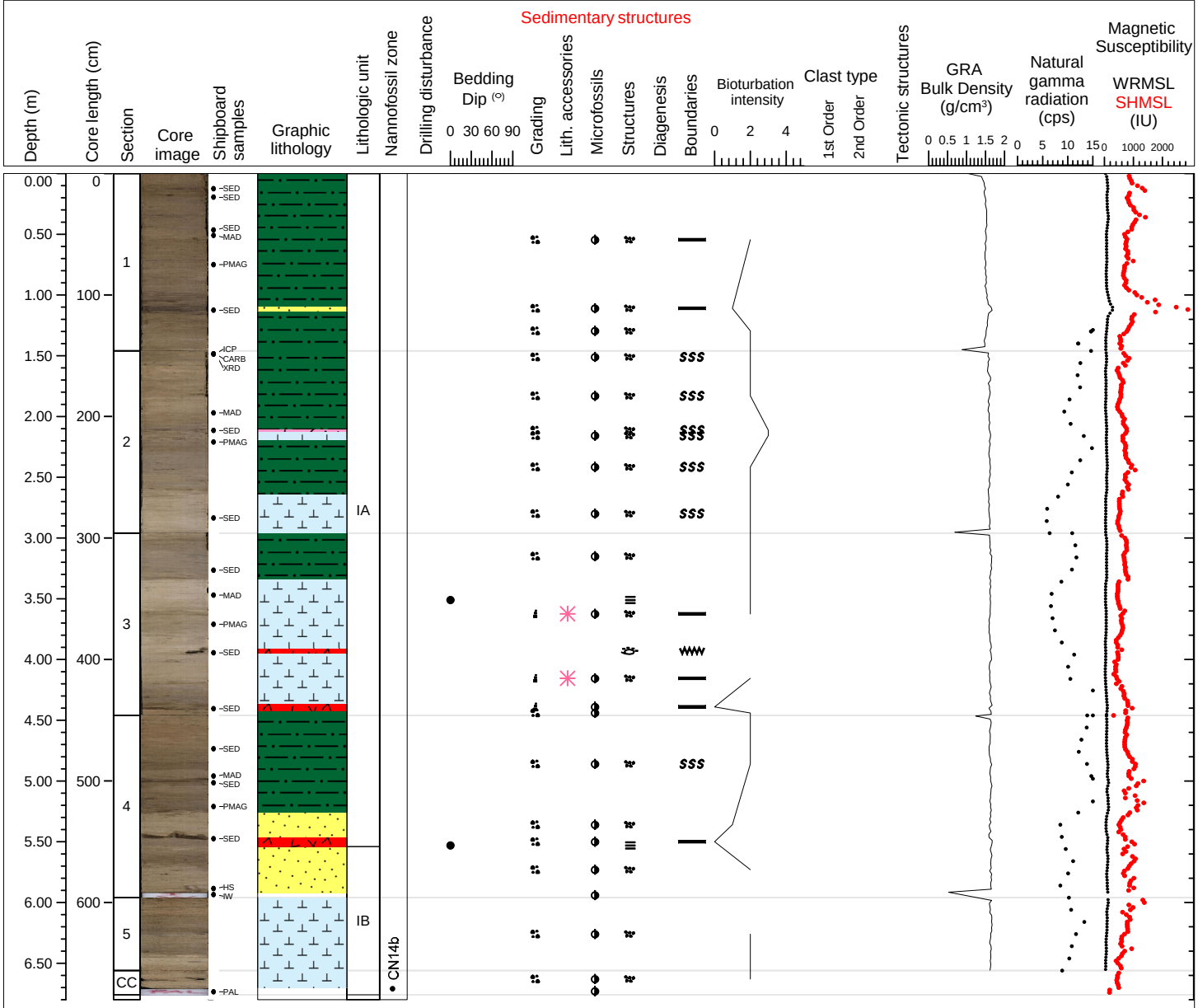
Hole 352 - U1439A Core 1H, Interval 0-6.8 m (CSF-A)

Silty mud with subordinate alternating beds of pale silty nannofossil ooze and occasional discrete ash layers, one of which is partly cemented and then fragmented by drilling.

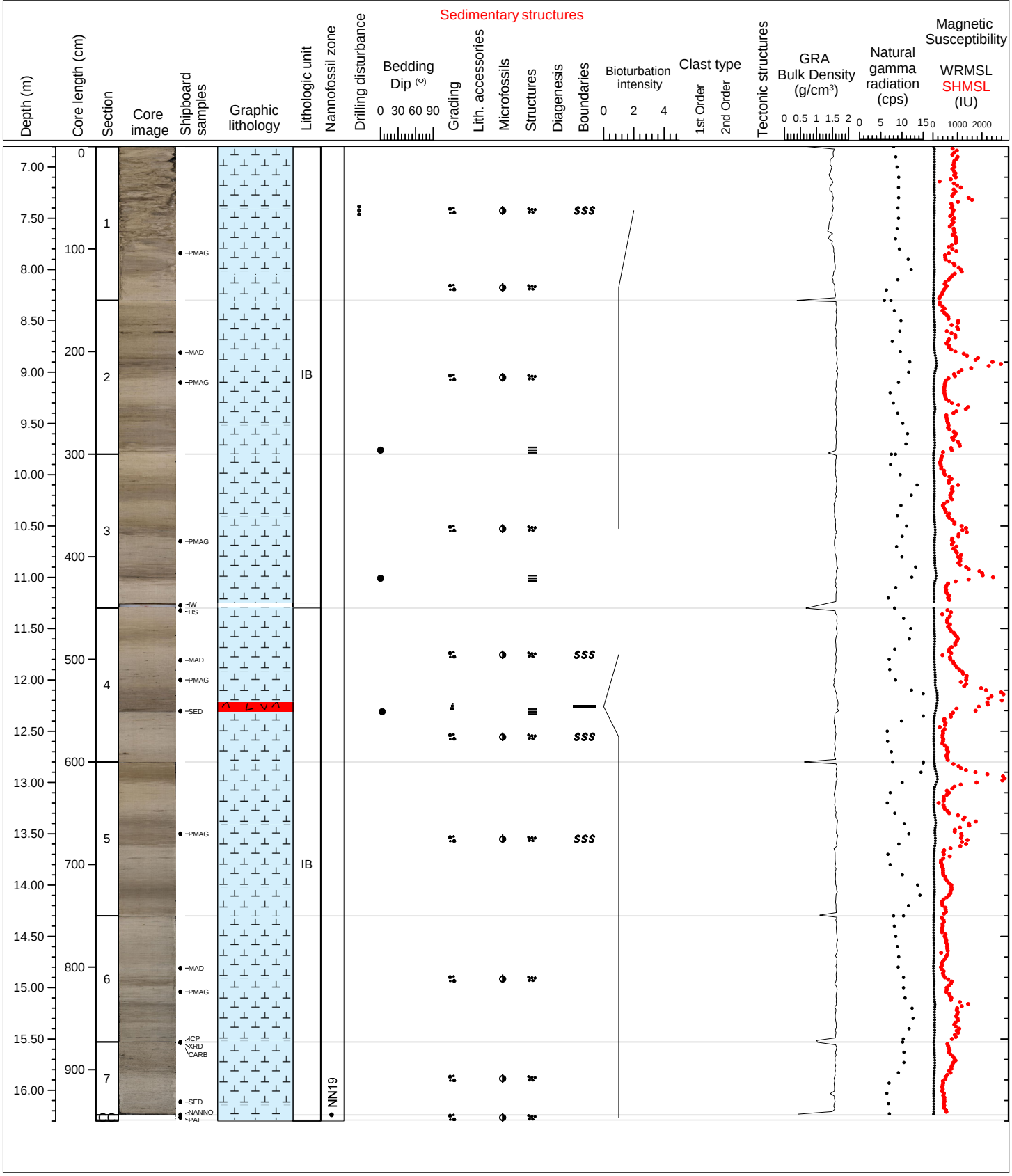
Depth Drilled (DSF), 6.8 : Bottom Depth Recovered, Curated Depth (CSF-A), 6.76, Recovery: 99%



Hole 352 - U1439A Core 2H, Interval 6.8-16.3 m (CSF-A)

Alternating muddy, sandy and clayey nannofossil ooze with a single tephta interbed in Section 4. Color change from beige to grayish starting in Section 6.

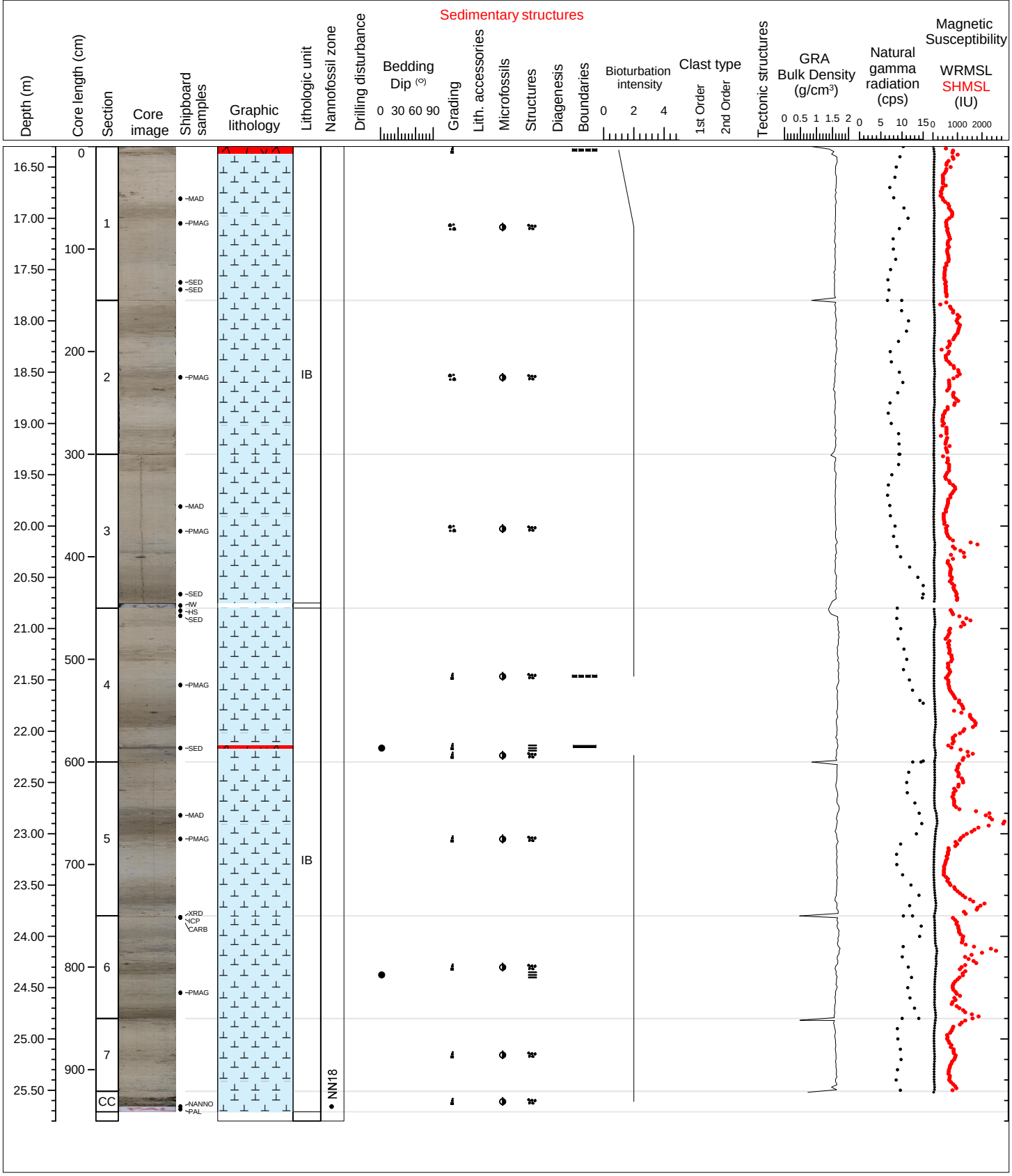
Depth Drilled (DSF), 16.3 : Bottom Depth Recovered, Curated Depth (CSF-A), 16.29, Recovery: 100%



Hole 352 - U1439A Core 3H, Interval 16.3-25.8 m (CSF-A)

Alternations of silty nannofossil ooze and calcareous mudstone; burrow mottled with gradational changes between sediment types; a single ash layer occurs in Section 4.

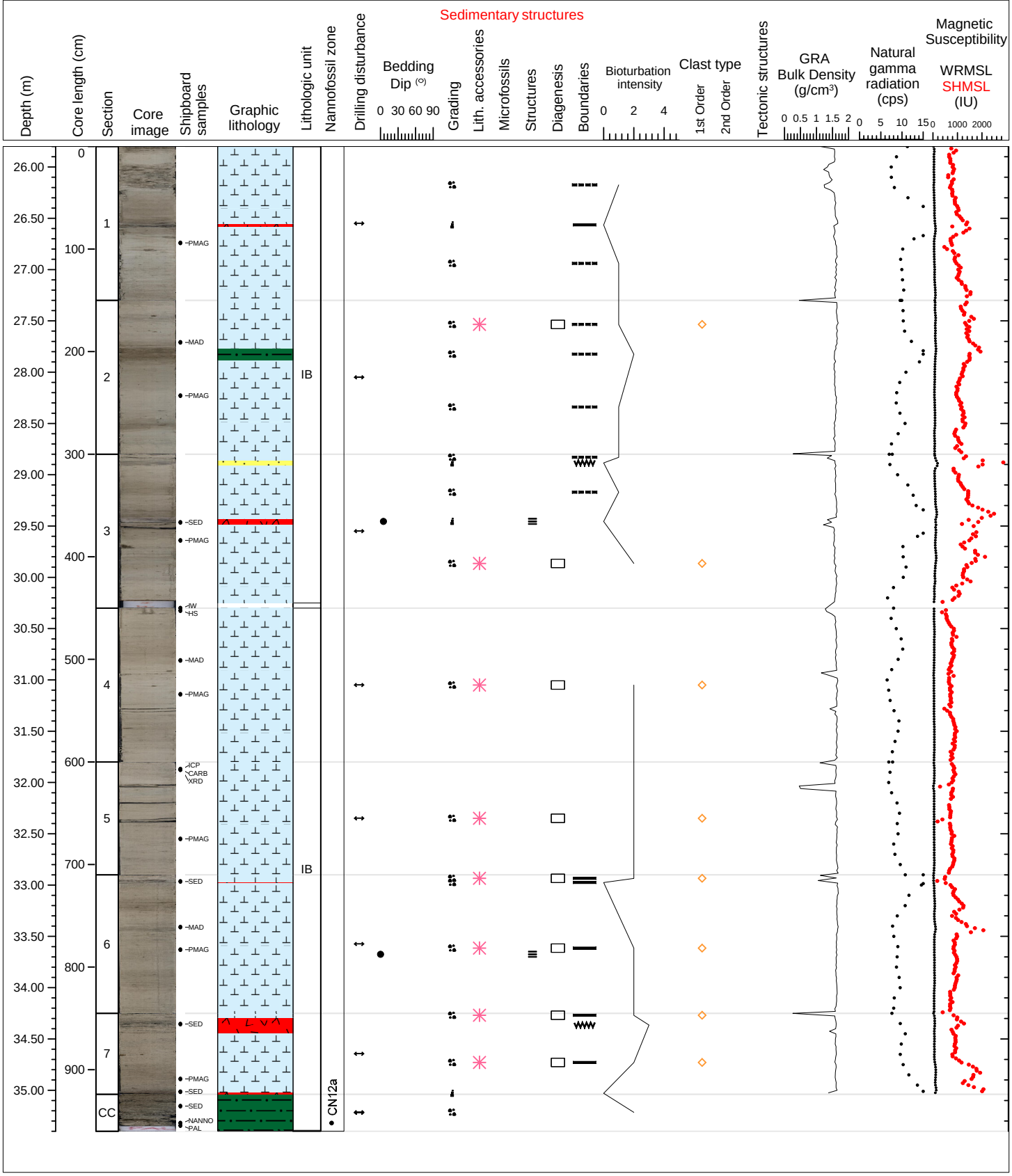
Depth Drilled (DSF), 25.8 : Bottom Depth Recovered, Curated Depth (CSF-A), 25.71, Recovery: 99%



Hole 352 - U1439A Core 4H, Interval 25.8-35.3 m (CSF-A)

Alternations of nannofossil ooze, with forams and nannofossil-bearing mud with silt. Thin graded ash layers in Sections 1,3,6 & 7. Burrow mottled throughout except for the ash layers. Muddy layers are darker and more greenish, whereas the nannofossil layers are off-white and the ash layers are pale grayish.

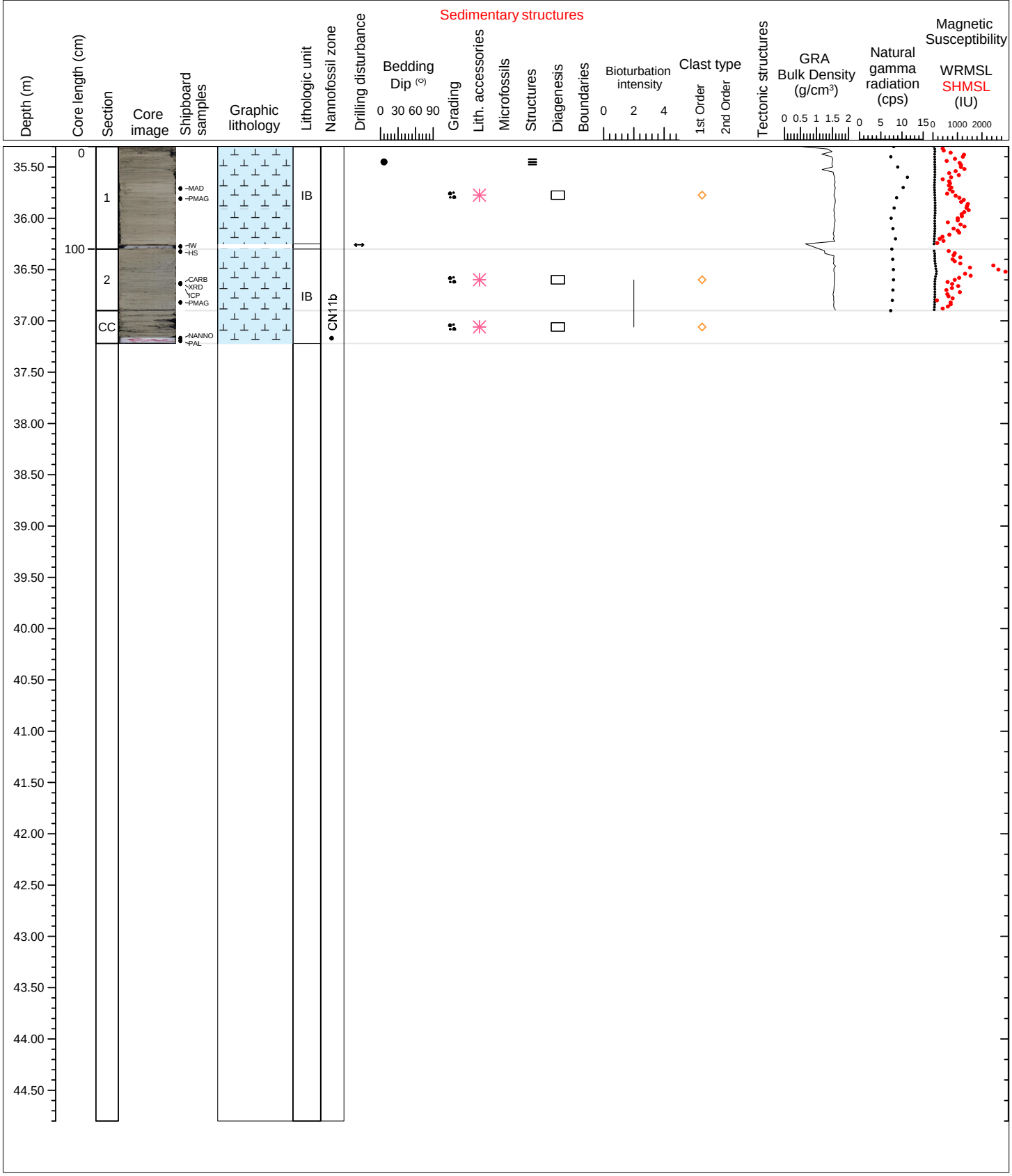
Depth Drilled (DSF), 35.3 : Bottom Depth Recovered, Curated Depth (CSF-A), 35.4, Recovery: 104%



Hole 352 - U1439A Core 5H, Interval 35.3-44.8 m (CSF-A)

Nannofossil ooze, with scattered forams. Burrow mottled throughout.

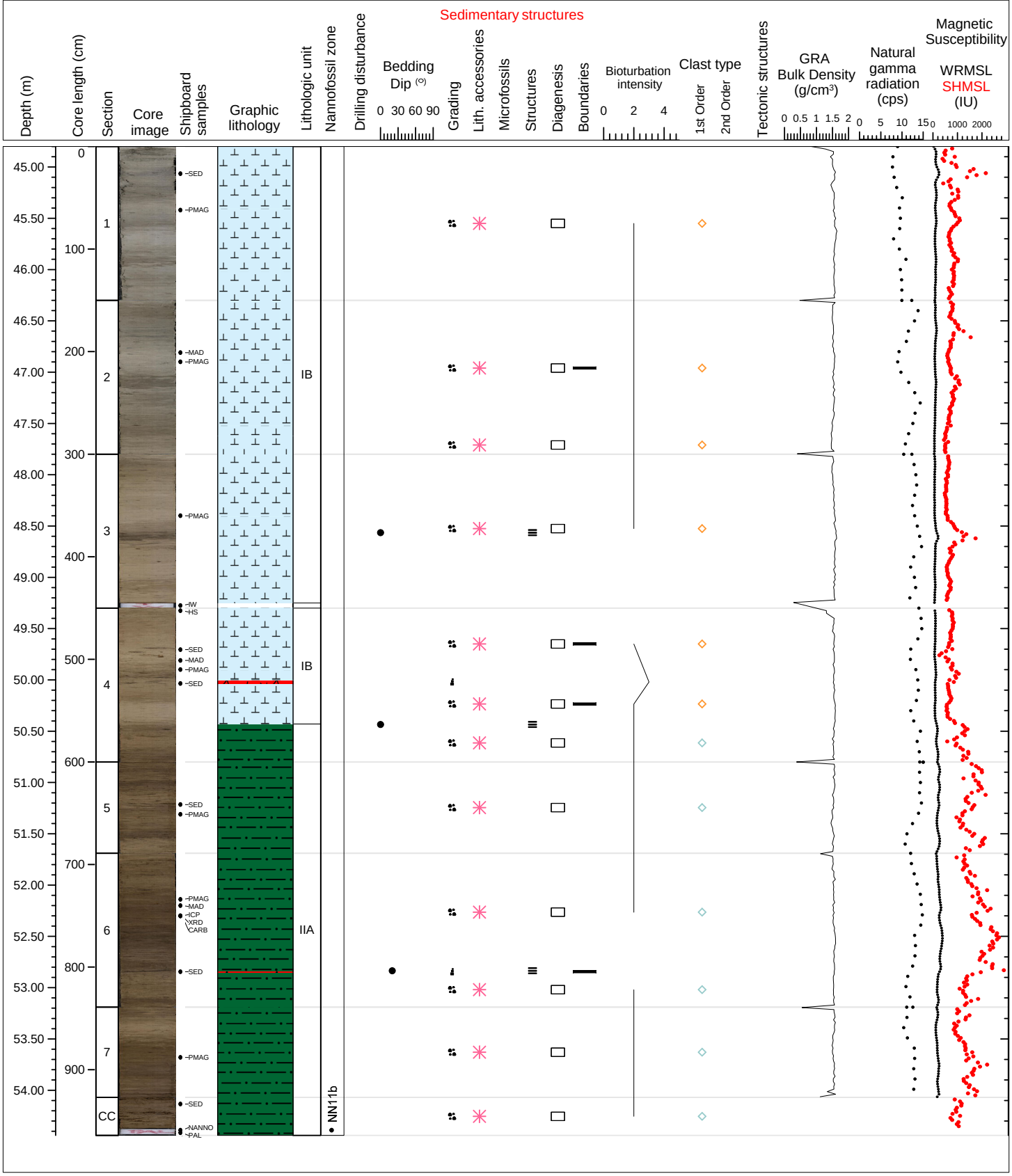
Depth Drilled (DSF), 44.8 : Bottom Depth Recovered, Curated Depth (CSF-A), 37.22, Recovery: 20%



Hole 352 - U1439A Core 6H, Interval 44.8-54.3 m (CSF-A)

Conspicuous change downcore from grayish silty nannofossil ooze, to pale pink, less silty nannofossil ooze and then to brownish more silty calcareous mud. Smear slides lower in the interval (Sections 4-CC) indicate a fine-grained mud matrix suggestive of a change to a more mafic volcanogenic provenance.

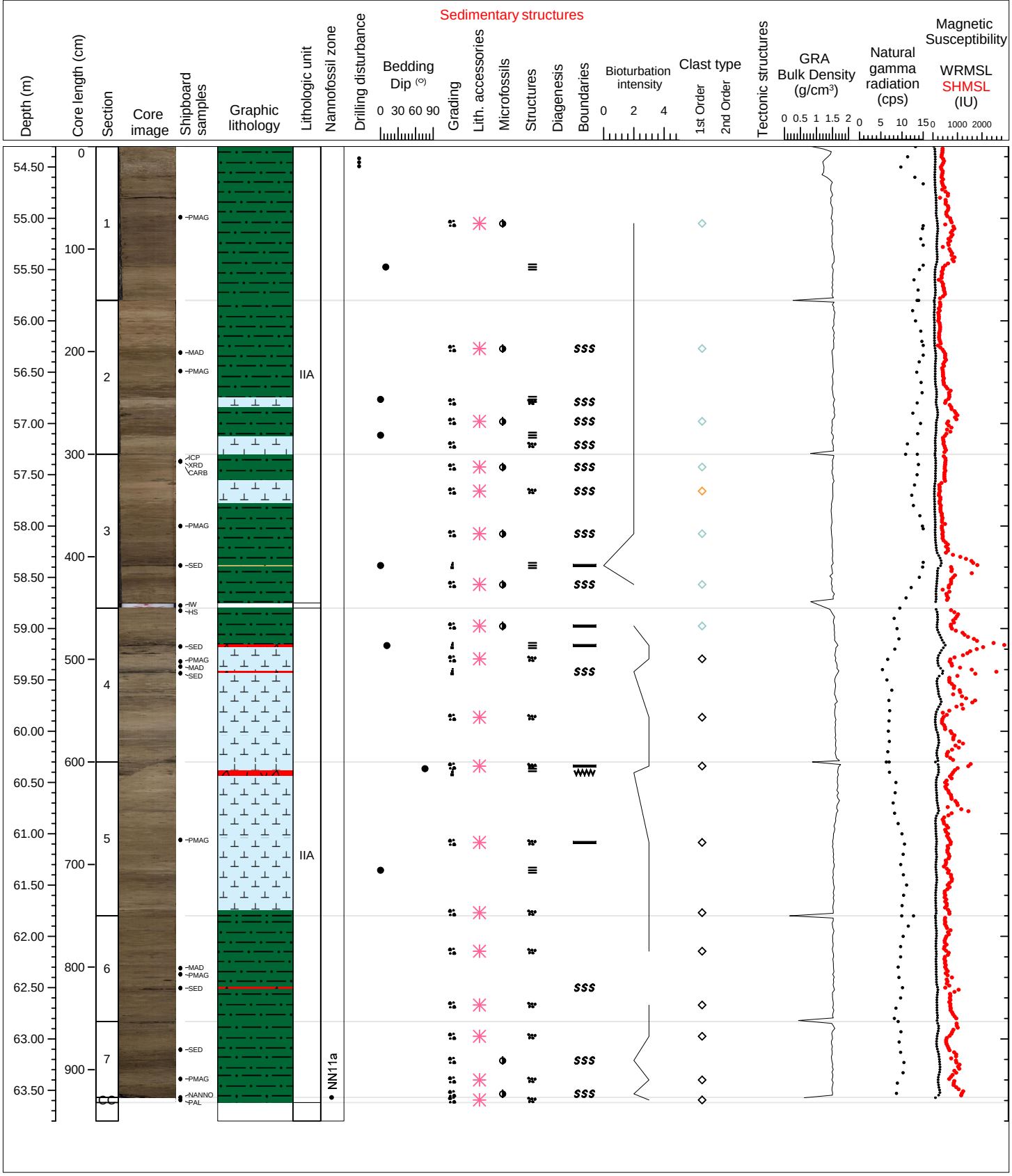
Depth Drilled (DSF), 54.3 : Bottom Depth Recovered, Curated Depth (CSF-A), 54.44, Recovery: 101%



Hole 352 - U1439A Core 7H, Interval 54.3-63.8 m (CSF-A)

Alternating beige nannofossil ooze, with brownish silty/sandy calcareous mud. Smear slides indicate a relatively mafic volcanogenic provenance. Thin ash layers (cm-size), predominantly mafic, are present in Sections 1 to 5 (loose) and 6 to 7 (cemented).

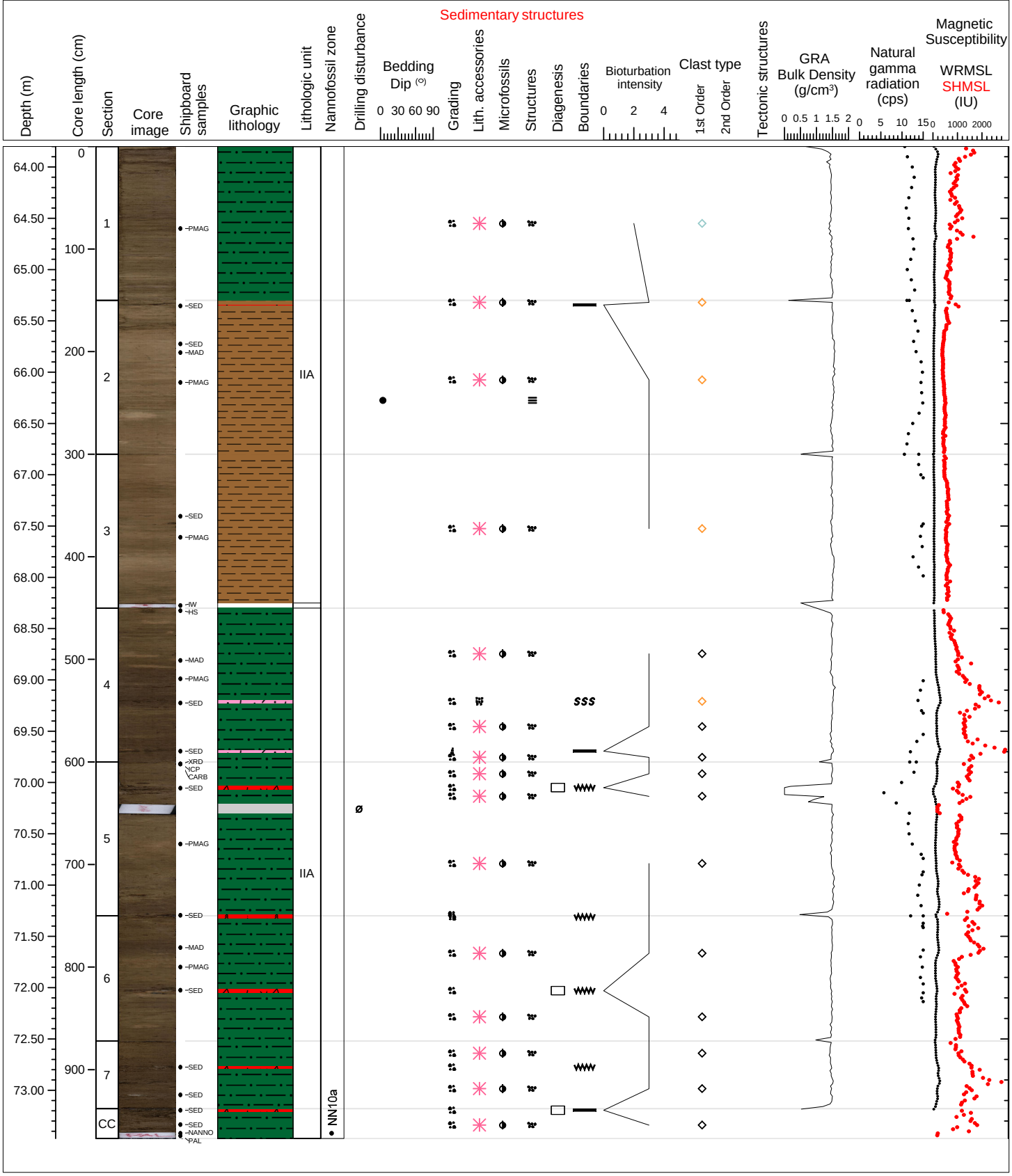
Depth Drilled (DSF), 63.8 : Bottom Depth Recovered, Curated Depth (CSF-A), 63.62, Recovery: 98%



Hole 352 - U1439A Core 8H, Interval 63.8-73.3 m (CSF-A)

Light brown clayey silt with nannofossils with brown silty/sandy calcareous mud. Thin ash layers (cm-size) that are predominantly mafic in Sections 1 to 4 (loose), and more felsic Sections 5 to CC (cemented) alternating.

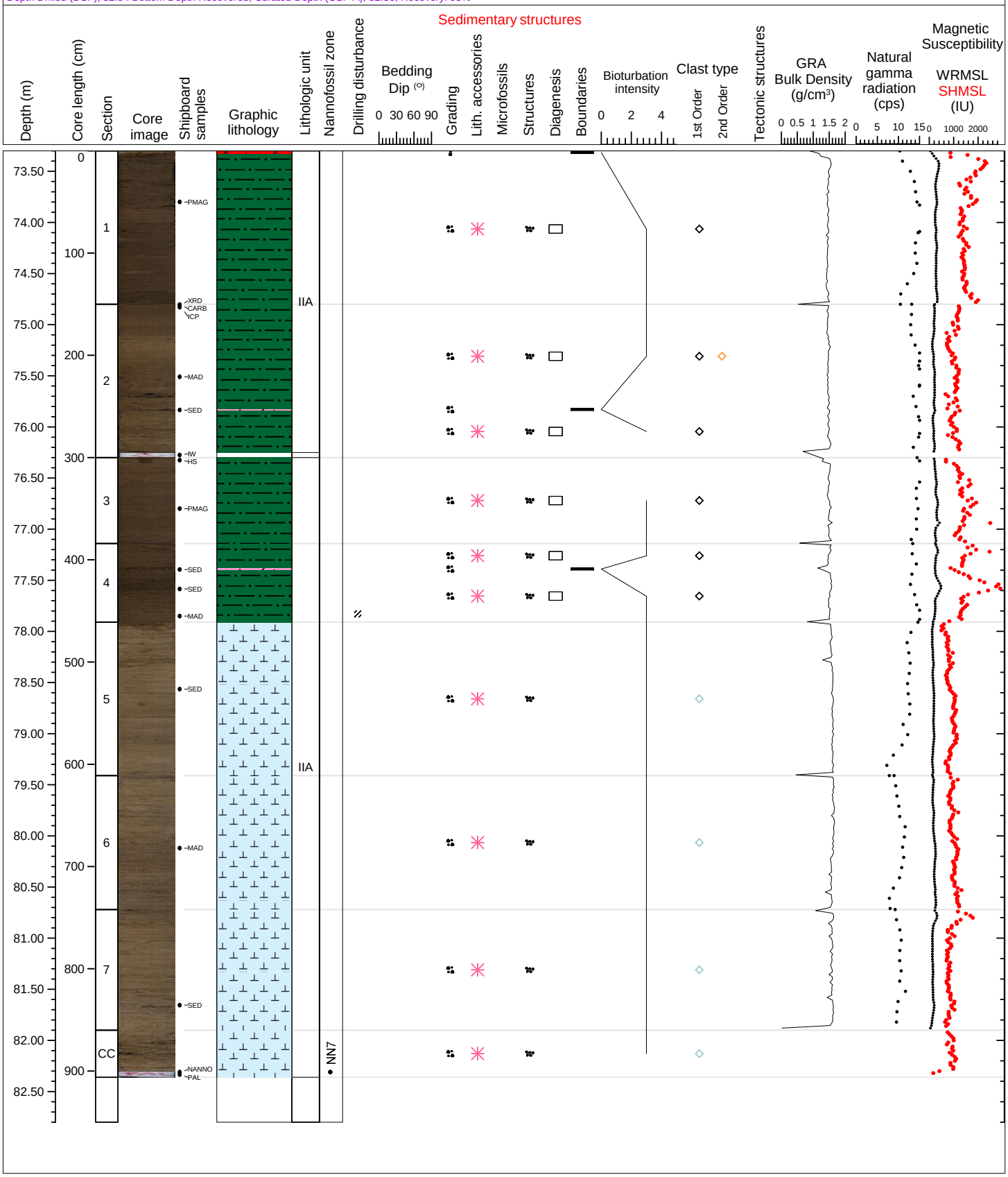
Depth Drilled (DSF), 73.3 : Bottom Depth Recovered, Curated Depth (CSF-A), 73.47, Recovery: 102%



Hole 352 - U1439A Core 9H, Interval 73.3-82.8 m (CSF-A)

The upper part (Sections 1 through 4) is dominated by brown silty/sandy calcareous mud with some volcaniclastic sandstone layers (Sections 1, 2 and 4). The lower part (Sections 5 through CC) is made up of pale brown, mottled, calcareous nannofossil ooze.

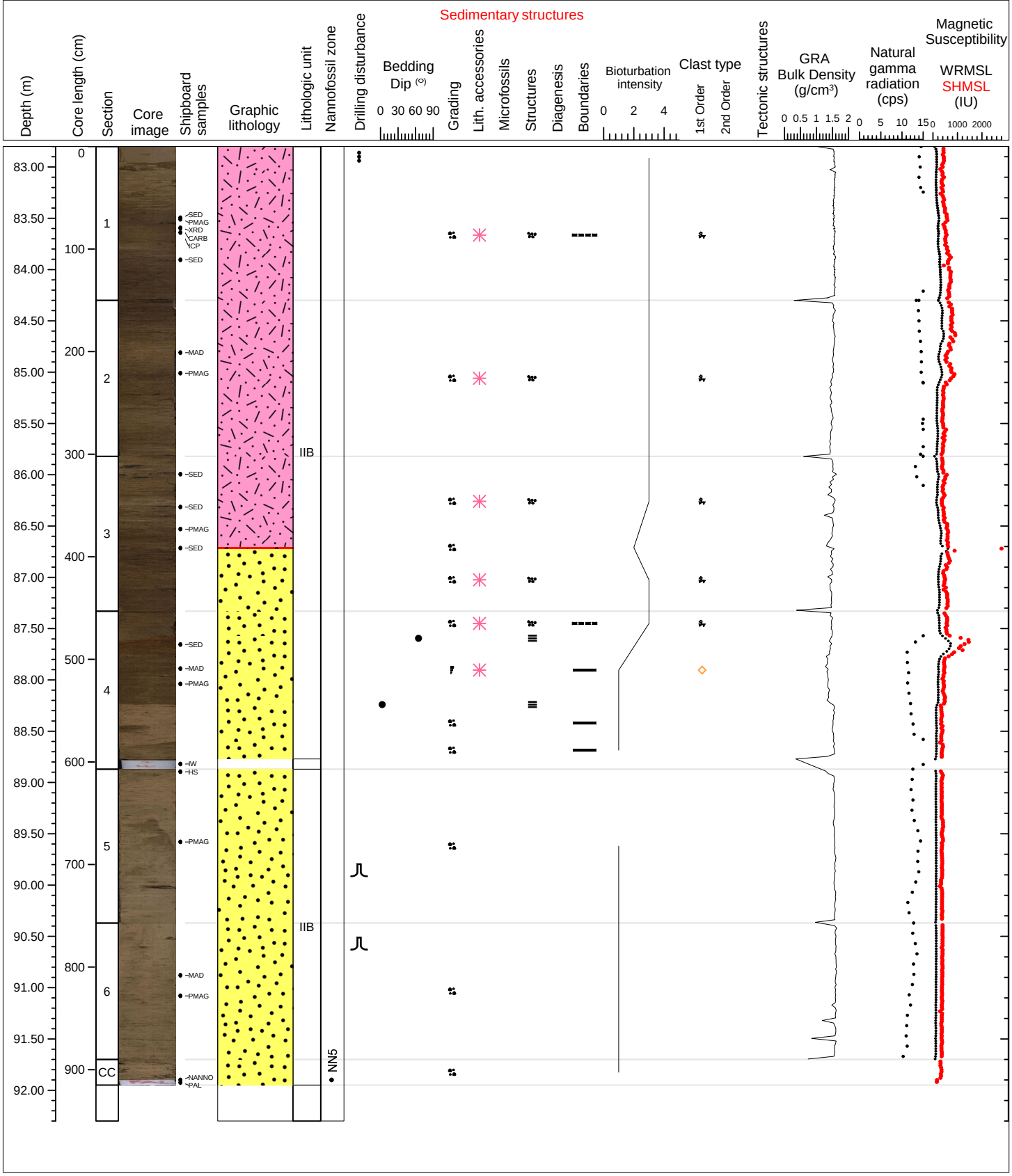
Depth Drilled (DSF), 82.8 : Bottom Depth Recovered, Curated Depth (CSF-A), 82.36, Recovery: 95%



Hole 352 - U1439A Core 10H, Interval 82.8-92.3 m (CSF-A)

Dominantly silty sand with nannofossil-rich intervals; occasional pods of vitric ash; flow-in disturbs the lower part of the core in Section 6.

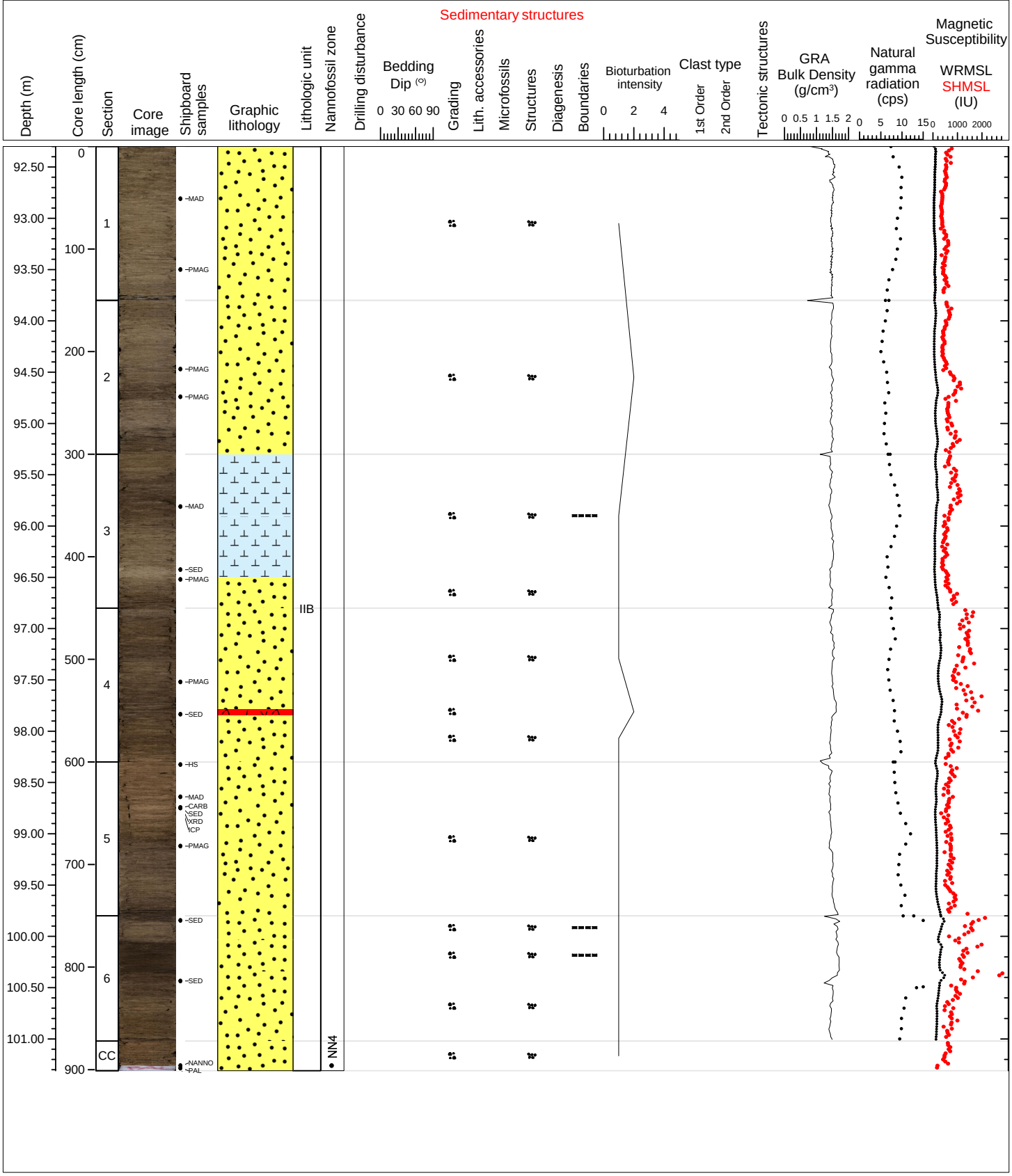
Depth Drilled (DSF), 92.3 : Bottom Depth Recovered, Curated Depth (CSF-A), 91.95, Recovery: 96%



Hole 352 - U1439A Core 11X, Interval 92.3-99 m (CSF-A)

Dominantly silty sand grading in and out to paler more nannofossil-rich intervals; grayish sand in Section 6 contrasts with the remainder of the core.

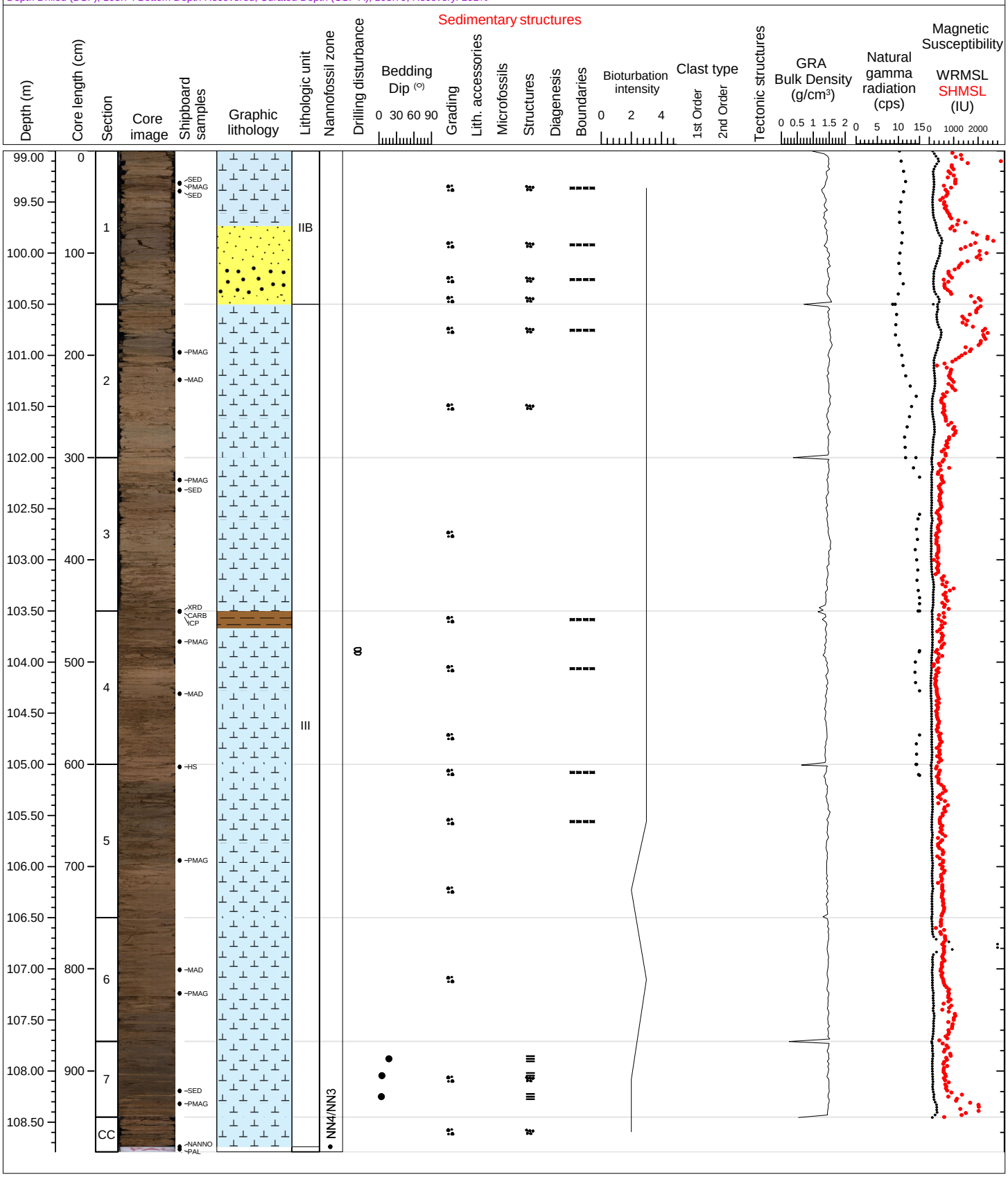
Depth Drilled (DSF), 99 : Bottom Depth Recovered, Curated Depth (CSF-A), 101.31, Recovery: 134%



Hole 352 - U1439A Core 12X, Interval 99-108.7 m (CSF-A)

Whole core has a background of consolidated silty nannofossil ooze with the addition of fine to medium and locally coarse sand, especially in Section 1. Color is pinkish to grayish producing color banding. The whole core is moderately to strongly bioturbated. Sandy layers are generally the most strongly bioturbated with occurrences of Chrondrites, Planolites and rarely Zoophycos.

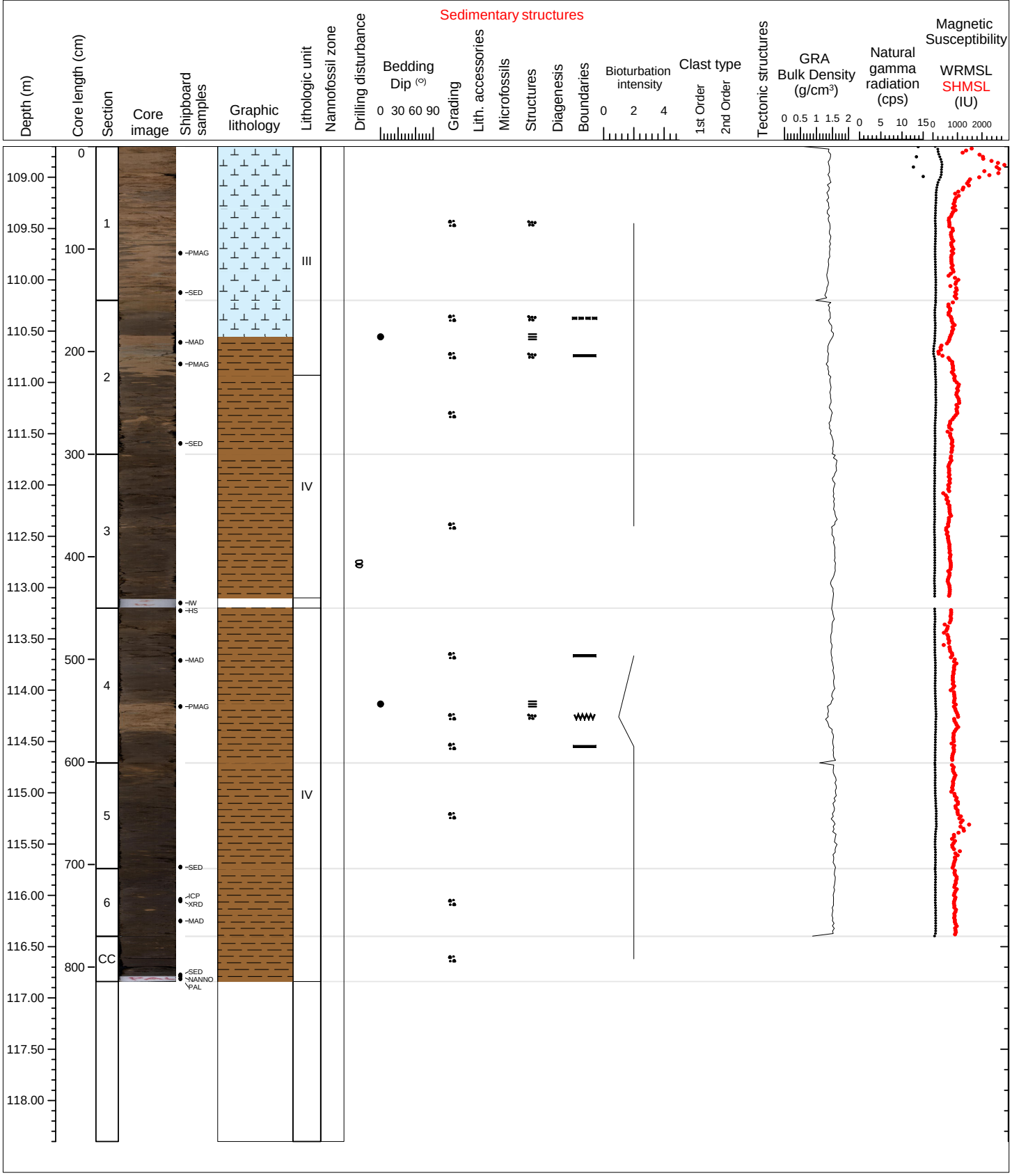
Depth Drilled (DSF), 108.7 : Bottom Depth Recovered, Curated Depth (CSF-A), 108.79, Recovery: 101%



Hole 352 - U1439A Core 13X, Interval 108.7-118.4 m (CSF-A)

The core is clay of variable color: pinkish, grayish, brownish to reddish brown, resulting in color banding. Section 2 includes segregations of dark oxide, possibly manganese oxide. Clays react only slightly or not at all with 10% HCl.

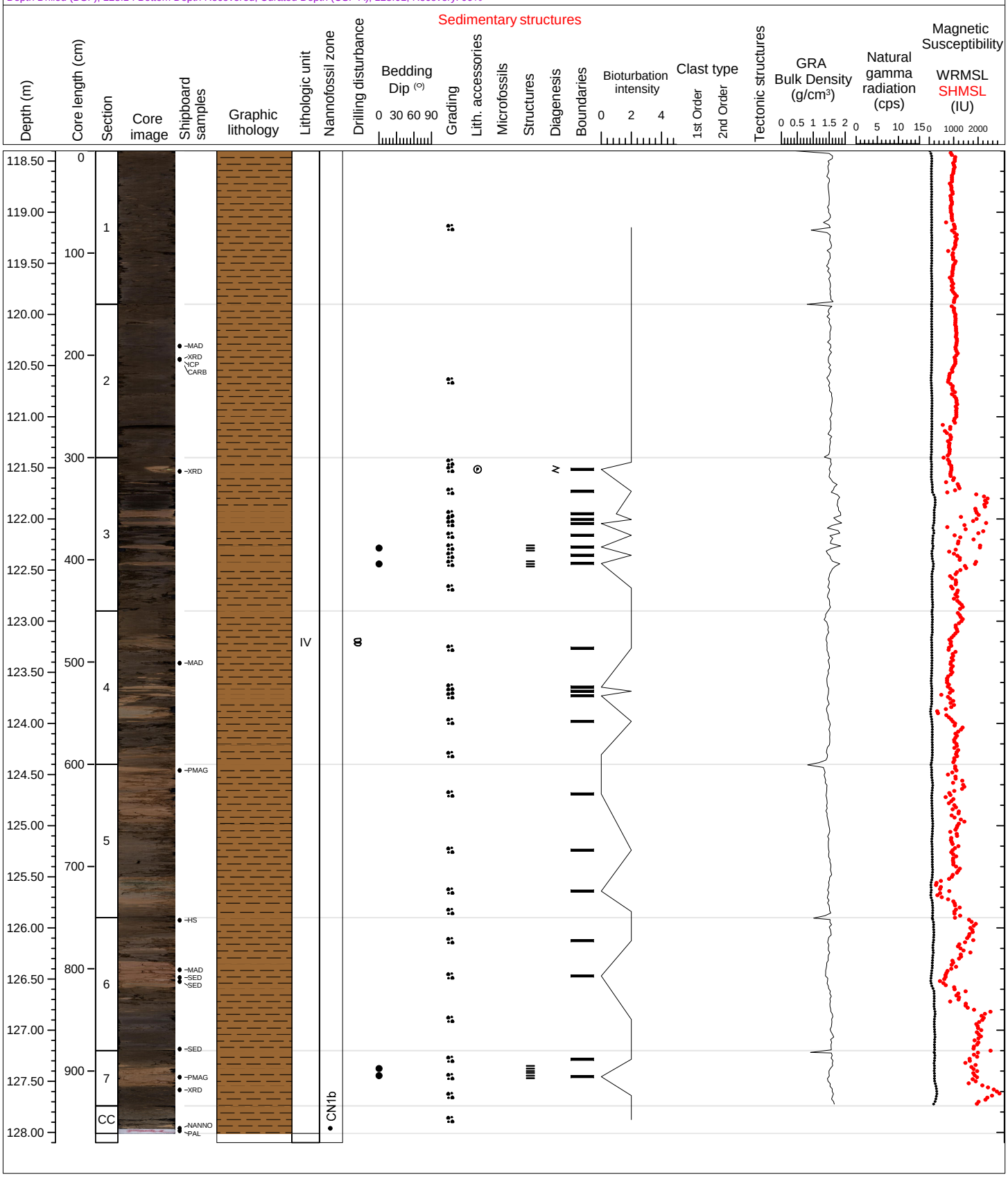
Depth Drilled (DSF), 118.4 : Bottom Depth Recovered, Curated Depth (CSF-A), 116.84, Recovery: 84%



Hole 352 - U1439A Core 14X, Interval 118.4-128.1 m (CSF-A)

Alternating layers of consolidated clay, varying from dark brownish to pinkish to pinkish red. In contrast to higher in the core there is little or no bioturbation. A single angular clast of diagenetically altered pumice is present in Section 3 (zeolite was observed in a smear slide). The diffuse nature of the color banding suggests that it may be of diagenetic origin possibly related to the mobilization of manganese.

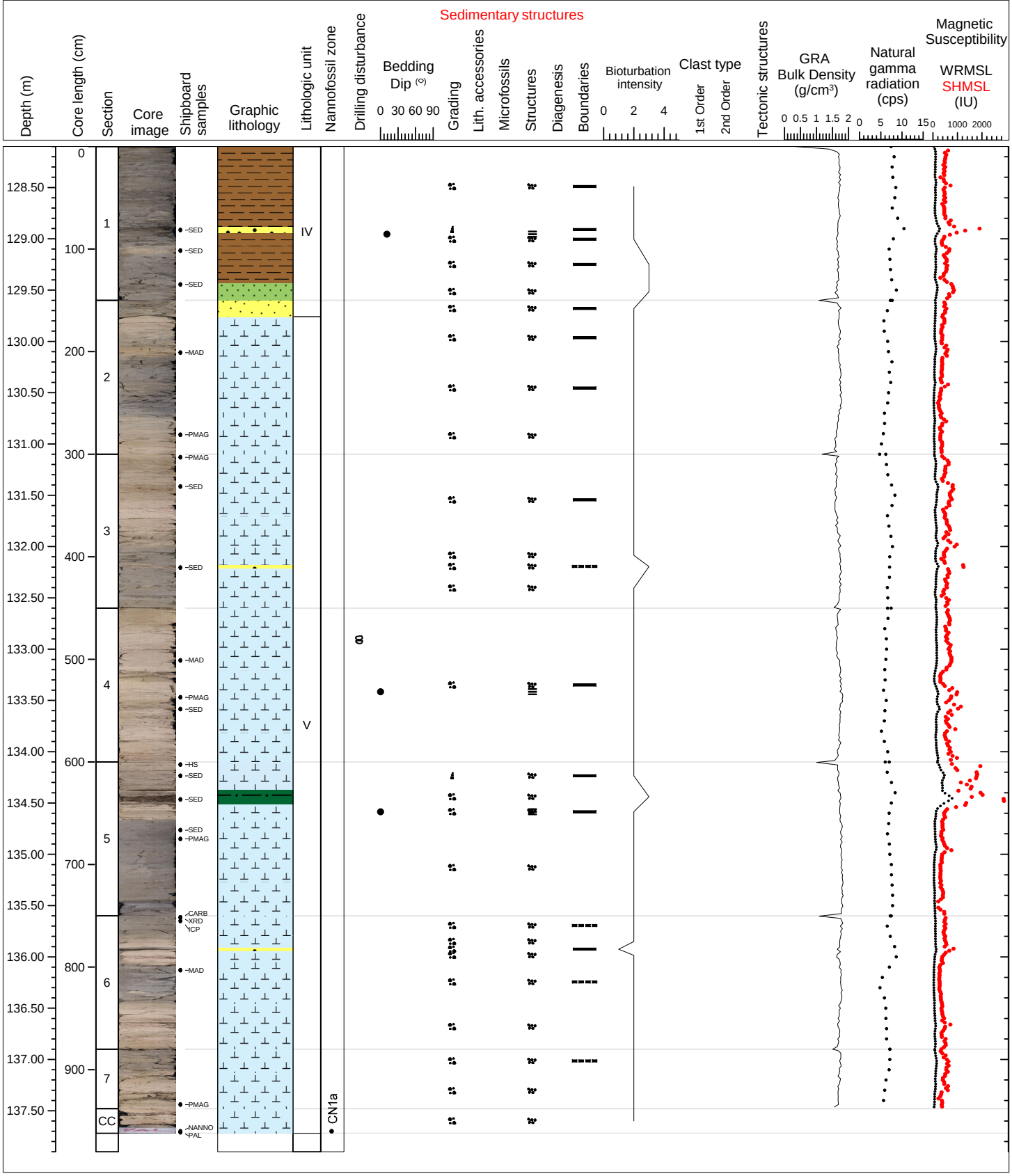
Depth Drilled (DSF), 128.1 : Bottom Depth Recovered, Curated Depth (CSF-A), 128.01, Recovery: 99%



Hole 352 - U1439A Core 15X, Interval 128.1-137.9 m (CSF-A)

Color banded consolidated nannofossil-rich ooze and clay with sandy layers; in Section 6 these reach granule grade. Sandy layers are bioturbated and in places mixed into the nannofossil ooze. There are grayish nannofossil ooze interbeds, which are generally finer grained than the pale nannofossil ooze and less bioturbated on average.

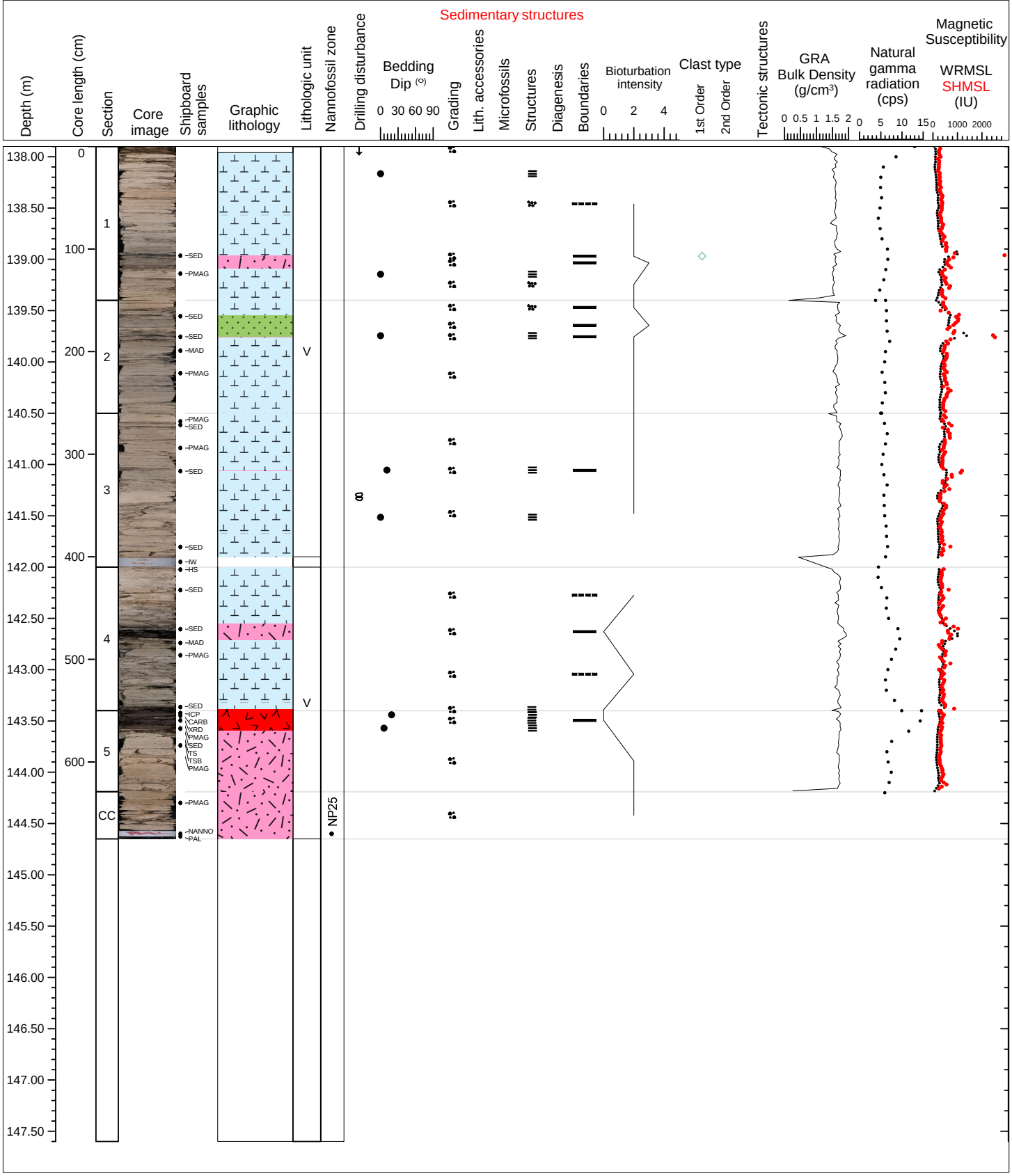
Depth Drilled (DSF), 137.9 : Bottom Depth Recovered, Curated Depth (CSF-A), 137.72, Recovery: 98%



Hole 352 - U1439A Core 16X, Interval 137.9-147.6 m (CSF-A)

Color banded, predominantly pinkish beige, lithified nannofossil-rich ooze and fine to medium, dark brown, cm-thick sandstone layers, rich in volcaniclastics. Sandy layers are partly bioturbated and in places mixed into nannofossil ooze. Ooze is strongly bioturbated. One thick tuff occurs between Sections 4 and 5.

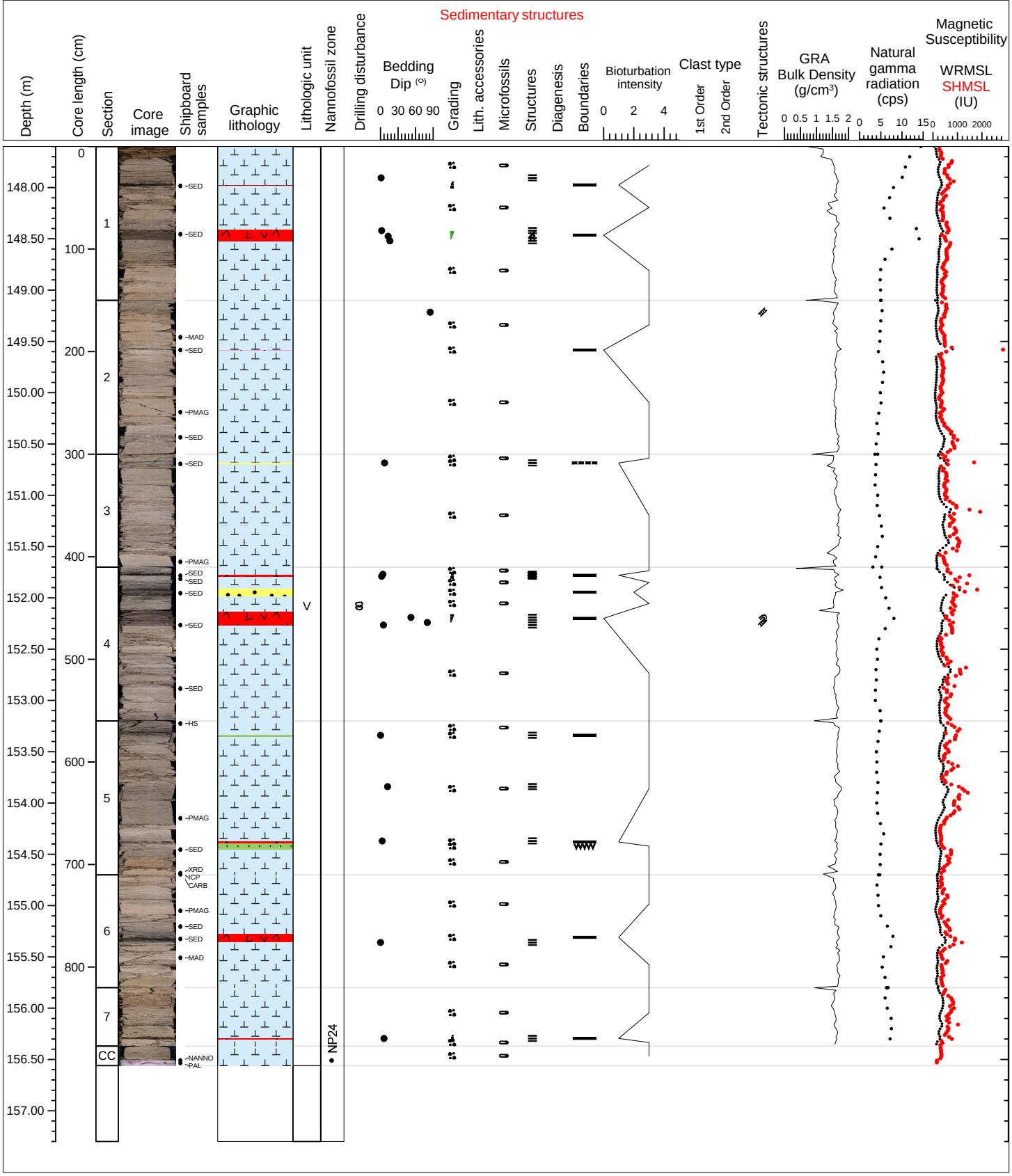
Depth Drilled (DSF), 147.6 : Bottom Depth Recovered, Curated Depth (CSF-A), 144.65, Recovery: 70%



Hole 352 - U1439A Core 17X, Interval 147.6-157.3 m (CSF-A)

Whole core has a background of cemented pinkish nannofossil ooze with variable admixtures of silt-to-sand-sized volcaniclastic material. Bioturbation ranges from moderate to intense. Superimposed are discrete thin to medium beds of volcaniclastic siltstone, sandstone and rare granule-grade conglomerate. Smear slides show that the volcaniclastic material is tuff. Individual tuffs range from normally graded and finely laminated, to reverse graded with pumiceous granular tops, to reverse graded tuff with distinctive convolute lamination.

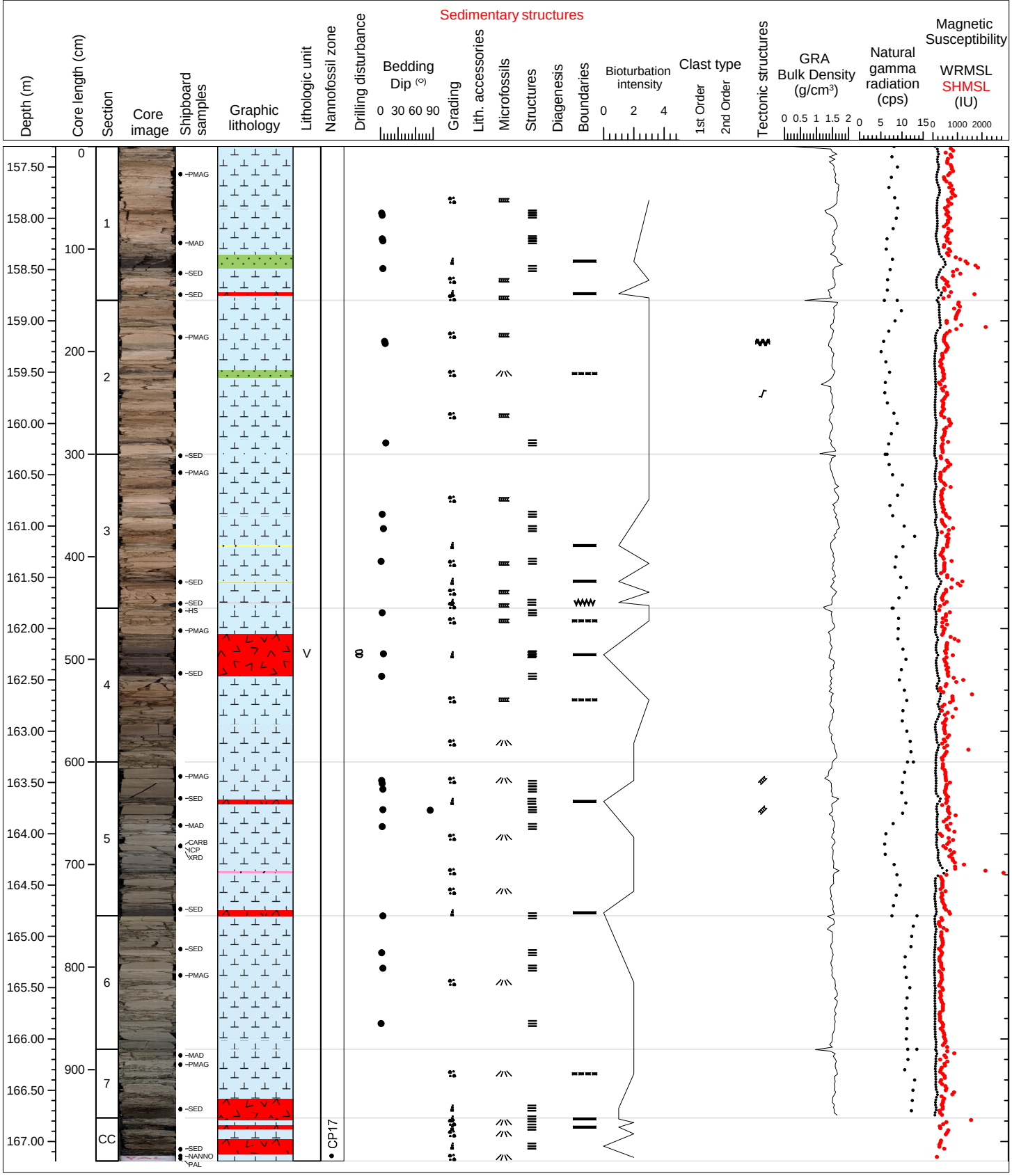
Depth Drilled (DSF), 157.3 : Bottom Depth Recovered, Curated Depth (CSF-A), 156.56, Recovery: 92%



Hole 352 - U1439A Core 18X, Interval 157.3-167.1 m (CSF-A)

The upper part of the core is pinkish nannofossil ooze, whereas the lower part is gray nannofossil ooze. The pink facies is generally more bioturbated than the gray facies. Both sediment types are variably admixed with silty and sandy volcaniclastic grains. Superimposed on the background are discrete interbeds of graded and laminated dark-colored volcaniclastic sand and silt. Individual layers are normally graded with sharp bases grading upwards, and becoming more bioturbated in the upper part. Several sands are multiply graded. One thin granule conglomerate is present in Section 4. Six of the graded interbeds are tuffs based on smear slide examination.

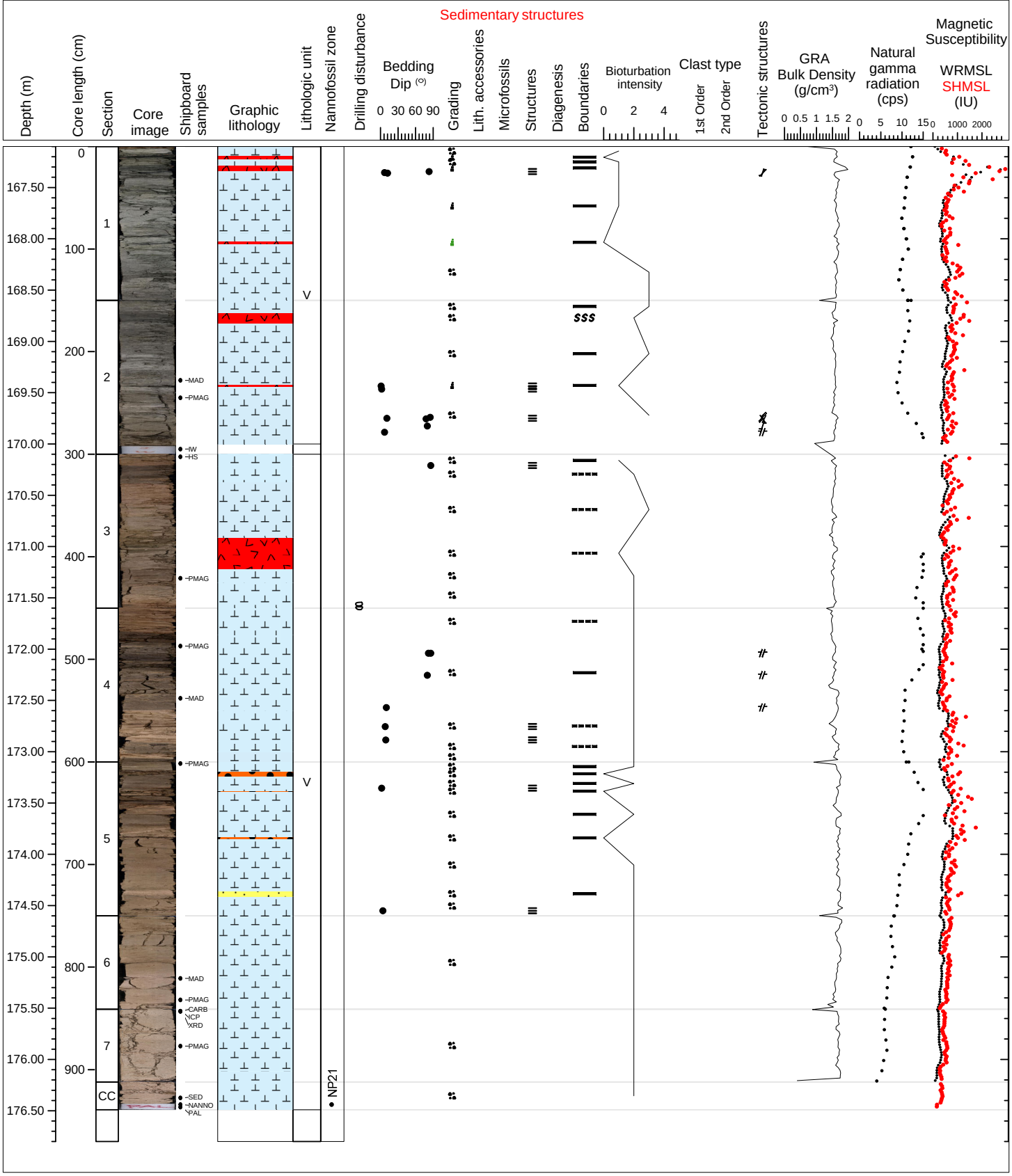
Depth Drilled (DSF), 167.1 : Bottom Depth Recovered, Curated Depth (CSF-A), 167.19, Recovery: 101%



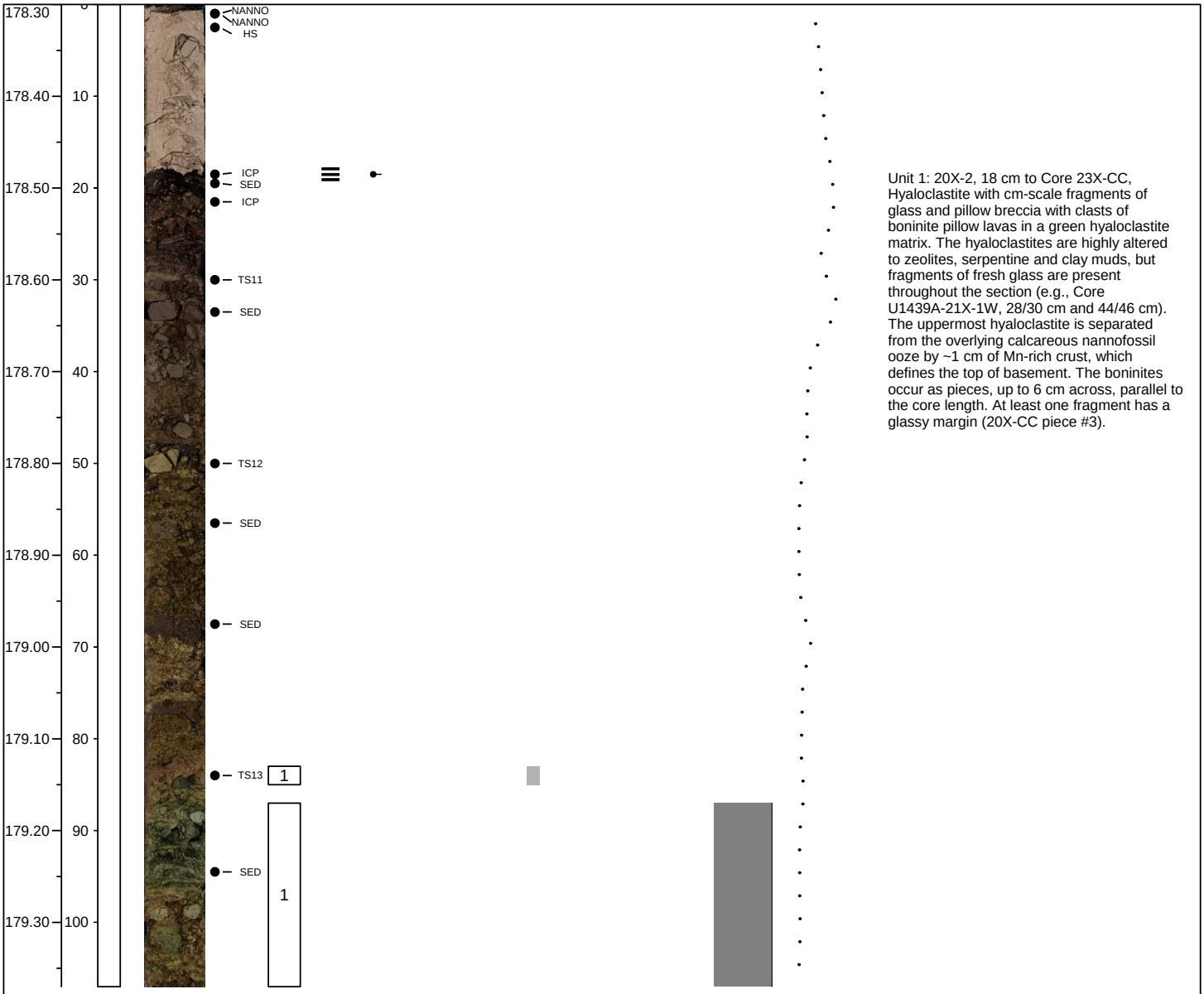
Hole 352 - U1439A Core 19X, Interval 167.1-176.8 m (CSF-A)

The core is basically an alternation of more or less tuffaceous nannofossil ooze, with occasional thin interbeds of tuff and granule-grade volcaniclastic conglomerate. The appearance of the core is, however, complicated by marked color variation between grayish, pinkish and brownish layers. The variation ranges from decimeter-scale banding to centimeter or millimeter-scale mottling. Much of this color variation is likely to be caused by diagenetic mobilization of iron and manganese.

Depth Drilled (DSF), 176.8 : Bottom Depth Recovered, Curated Depth (CSF-A), 176.49, Recovery: 97%

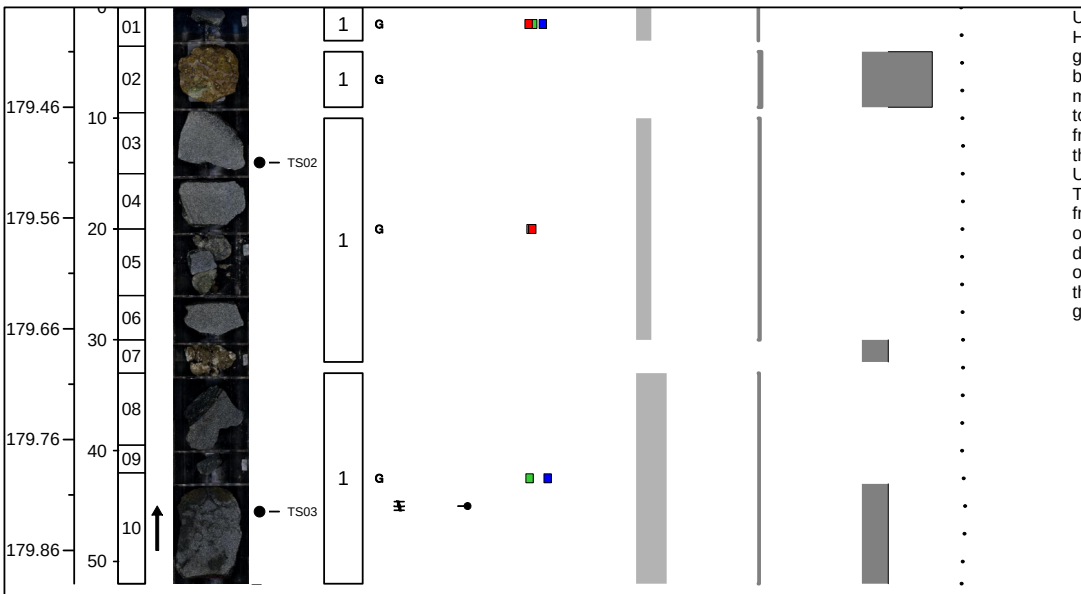


Hole 352-U1439A-20X Section 2, Top of Section: 178.3 m (CSF-A)



Unit 1: 20X-2, 18 cm to Core 23X-CC, Hyaloclastite with cm-scale fragments of glass and pillow breccia with clasts of boninite pillow lavas in a green hyaloclastite matrix. The hyaloclastites are highly altered to zeolites, serpentine and clay muds, but fragments of fresh glass are present throughout the section (e.g., Core U1439A-21X-1W, 28/30 cm and 44/46 cm). The uppermost hyaloclastite is separated from the overlying calcareous nannofossil ooze by ~1 cm of Mn-rich crust, which defines the top of basement. The boninites occur as pieces, up to 6 cm across, parallel to the core length. At least one fragment has a glassy margin (20X-CC piece #3).

Hole 352-U1439A-20X Section CC, Top of Section: 179.37 m (CSF-A)

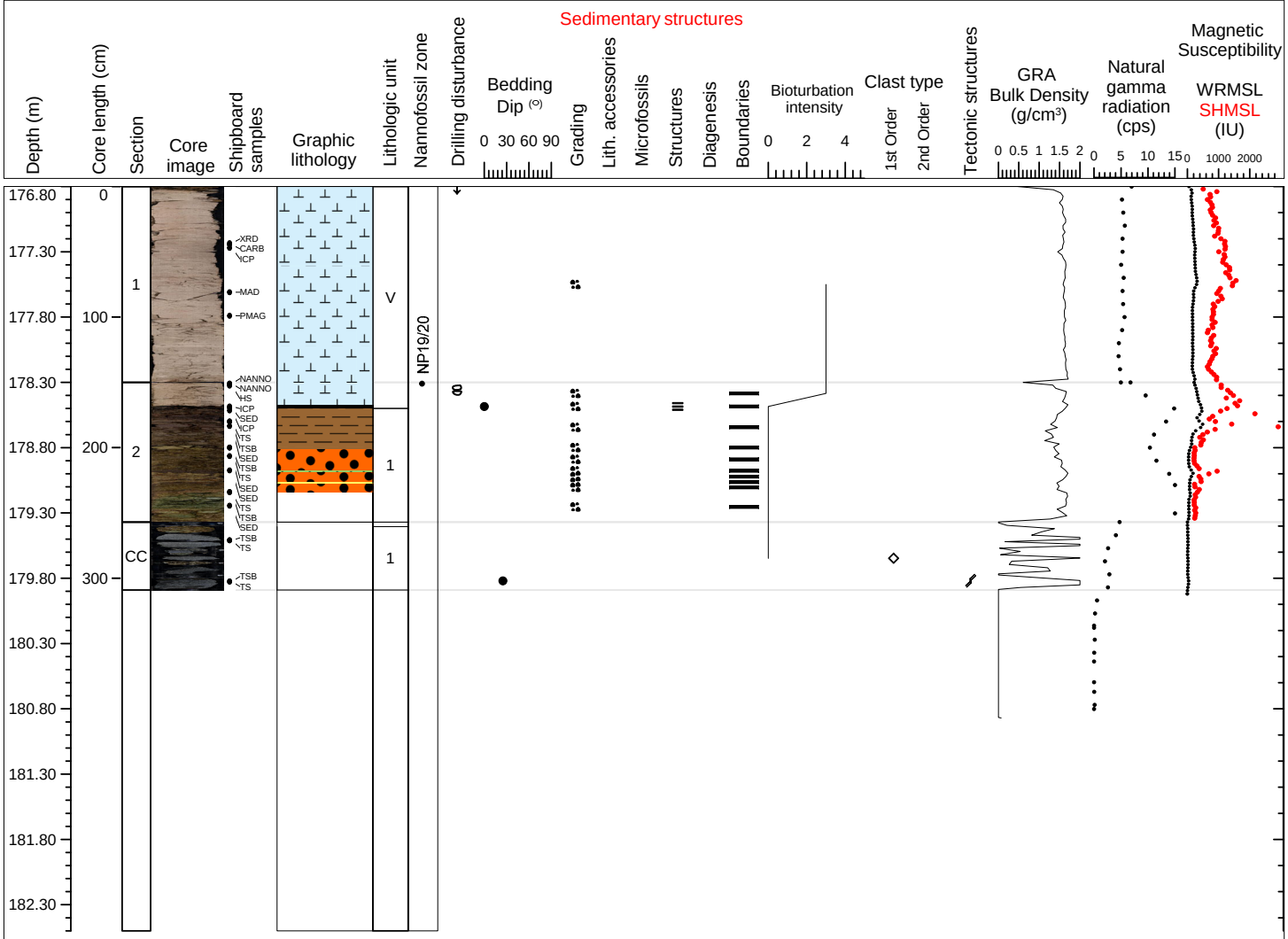


Unit 1: 20X-2, 18 cm to Core 23X-CC, Hyaloclastite with cm-scale fragments of glass and pillow breccia with clasts of boninite pillow lavas in a green hyaloclastite matrix. The hyaloclastites are highly altered to zeolites, serpentine and clay muds, but fragments of fresh glass are present throughout the section (e.g., Core U1439A-21X-1W, 28/30 cm and 44/46 cm). The uppermost hyaloclastite is separated from the overlying calcareous nannofossil ooze by ~1 cm of Mn-rich crust, which defines the top of basement. The boninites occur as pieces, up to 6 cm across, parallel to the core length. At least one fragment has a glassy margin (20X-CC piece #3).

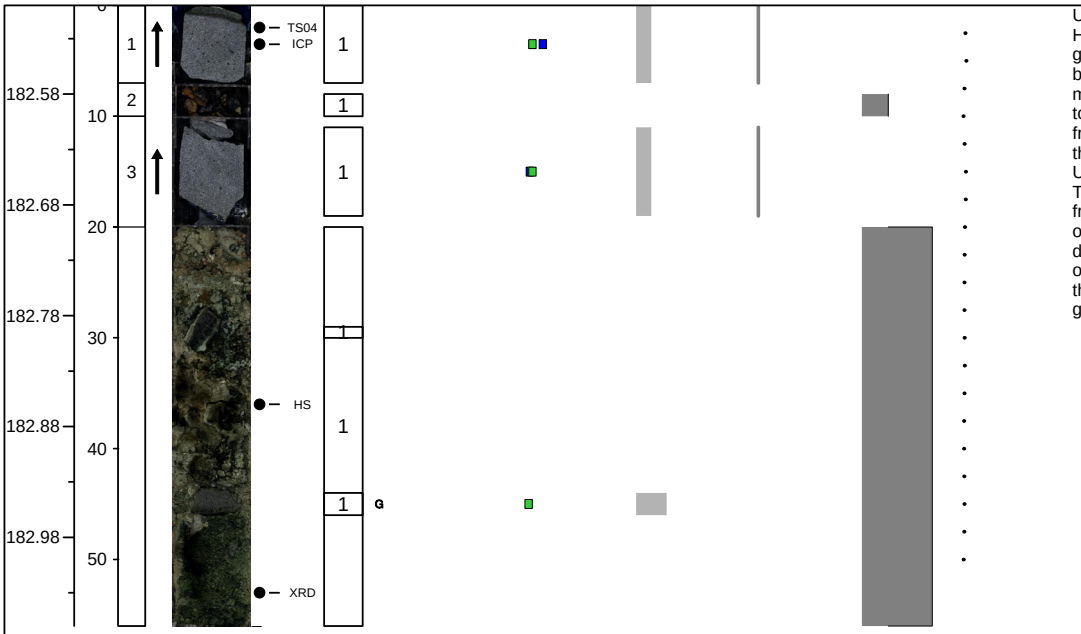
Hole 352 - U1439A Core 20X, Interval 176.8-182.5 m (CSF-A)

The core reflects the interface between the igneous basement and the sedimentary cover. The core ends with relatively pure pinkish consolidated (but not well lithified) bioturbated nannofossil ooze. Beneath is a thin layer of black clay-grade material, likely a manganese-oxide crust. Beneath come greenish or pinkish brown non-calcareous claystones. Below this are alternations of coarse sand to granule-grade, unconsolidated sand, made of highly altered volcanic material. The lowest part of the core is greenish breccia and sand made up of altered hyaloclastite with highly altered, vesicular basltic clasts. The rest of Section 2 and the CC are described in the hard rock VCDs.

Depth Drilled (DSF), 182.5 : Bottom Depth Recovered, Curated Depth (CSF-A), 179.89, Recovery: 51%

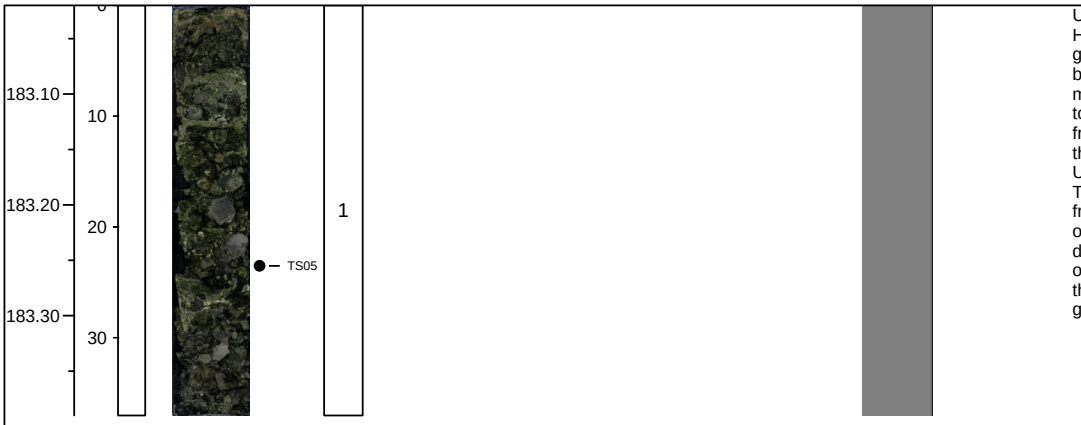


Hole 352-U1439A-21X Section 1, Top of Section: 182.5 m (CSF-A)



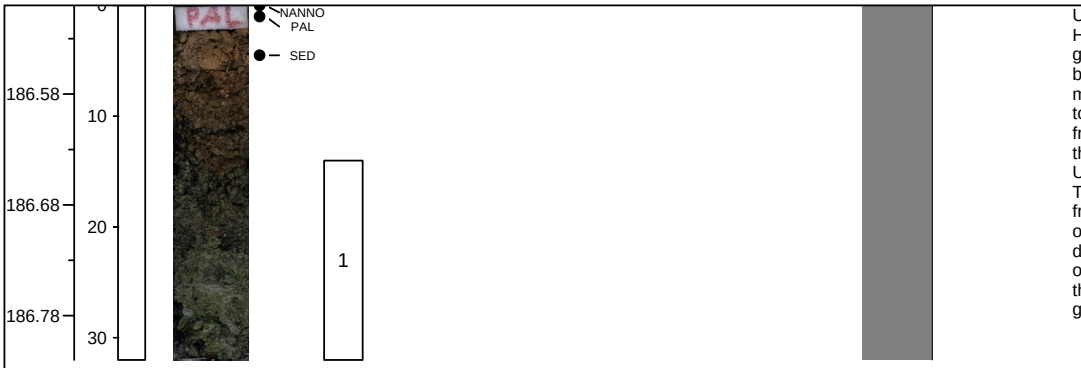
Unit 1: 20X-2, 18 cm to Core 23X-CC, Hyaloclastite with cm-scale fragments of glass and pillow breccia with clasts of boninite pillow lavas in a green hyaloclastite matrix. The hyaloclastites are highly altered to zeolites, serpentine and clay muds, but fragments of fresh glass are present throughout the section (e.g., Core U1439A-21X-1W, 28/30 cm and 44/46 cm). The uppermost hyaloclastite is separated from the overlying calcareous nannofossil ooze by ~1 cm of Mn-rich crust, which defines the top of basement. The boninites occur as pieces, up to 6 cm across, parallel to the core length. At least one fragment has a glassy margin (20X-CC piece #3).

Hole 352-U1439A-21X Section CC, Top of Section: 183.02 m (CSF-A)



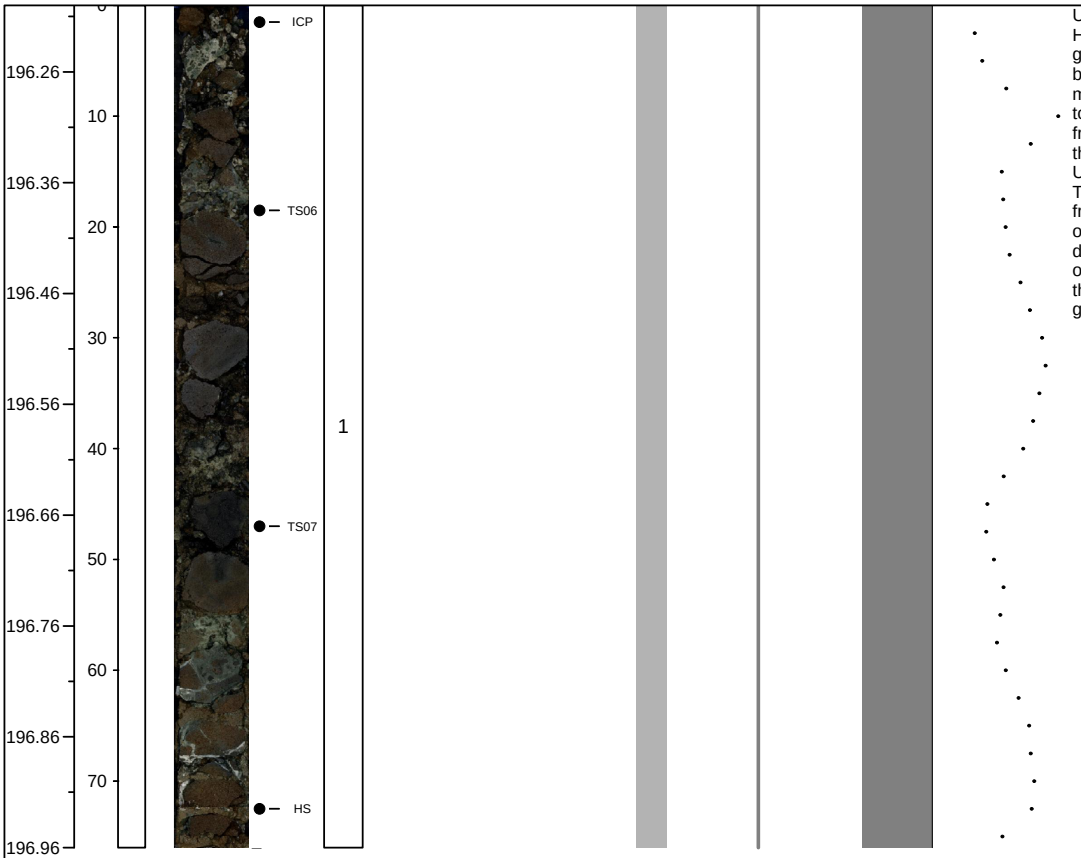
Unit 1: 20X-2, 18 cm to Core 23X-CC, Hyaloclastite with cm-scale fragments of glass and pillow breccia with clasts of boninite pillow lavas in a green hyaloclastite matrix. The hyaloclastites are highly altered to zeolites, serpentine and clay muds, but fragments of fresh glass are present throughout the section (e.g., Core U1439A-21X-1W, 28/30 cm and 44/46 cm). The uppermost hyaloclastite is separated from the overlying calcareous nannofossil ooze by ~1 cm of Mn-rich crust, which defines the top of basement. The boninites occur as pieces, up to 6 cm across, parallel to the core length. At least one fragment has a glassy margin (20X-CC piece #3).

Hole 352-U1439A-22X Section CC, Top of Section: 186.5 m (CSF-A)



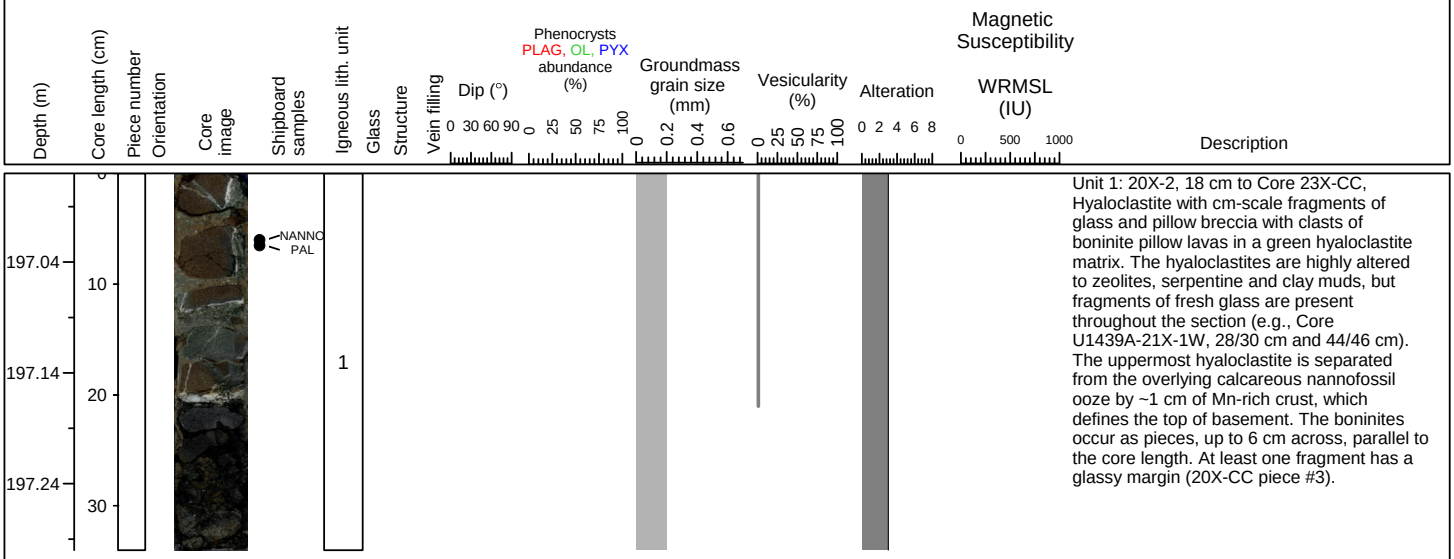
Unit 1: 20X-2, 18 cm to Core 23X-CC, Hyaloclastite with cm-scale fragments of glass and pillow breccia with clasts of boninite pillow lavas in a green hyaloclastite matrix. The hyaloclastites are highly altered to zeolites, serpentine and clay muds, but fragments of fresh glass are present throughout the section (e.g., Core U1439A-21X-1W, 28/30 cm and 44/46 cm). The uppermost hyaloclastite is separated from the overlying calcareous nannofossil ooze by ~1 cm of Mn-rich crust, which defines the top of basement. The boninites occur as pieces, up to 6 cm across, parallel to the core length. At least one fragment has a glassy margin (20X-CC piece #3).

Hole 352-U1439A-23X Section 1, Top of Section: 196.2 m (CSF-A)



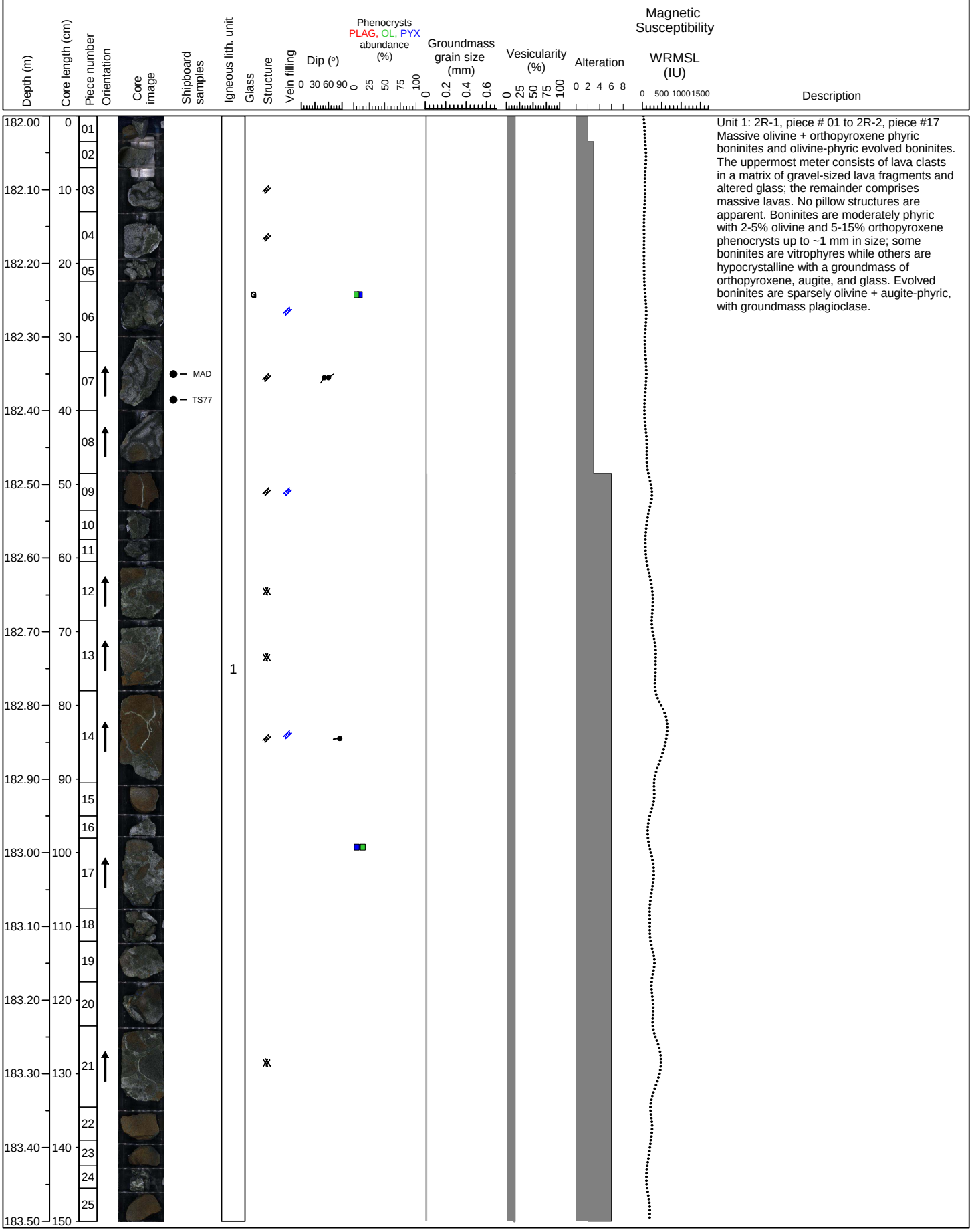
Unit 1: 20X-2, 18 cm to Core 23X-CC, Hyaloclastite with cm-scale fragments of glass and pillow breccia with clasts of boninite pillow lavas in a green hyaloclastite matrix. The hyaloclastites are highly altered to zeolites, serpentine and clay muds, but fragments of fresh glass are present throughout the section (e.g., Core U1439A-21X-1W, 28/30 cm and 44/46 cm). The uppermost hyaloclastite is separated from the overlying calcareous nannofossil ooze by ~1 cm of Mn-rich crust, which defines the top of basement. The boninites occur as pieces, up to 6 cm across, parallel to the core length. At least one fragment has a glassy margin (20X-CC piece #3).

Hole 352-U1439A-23X Section CC, Top of Section: 196.96 m (CSF-A)

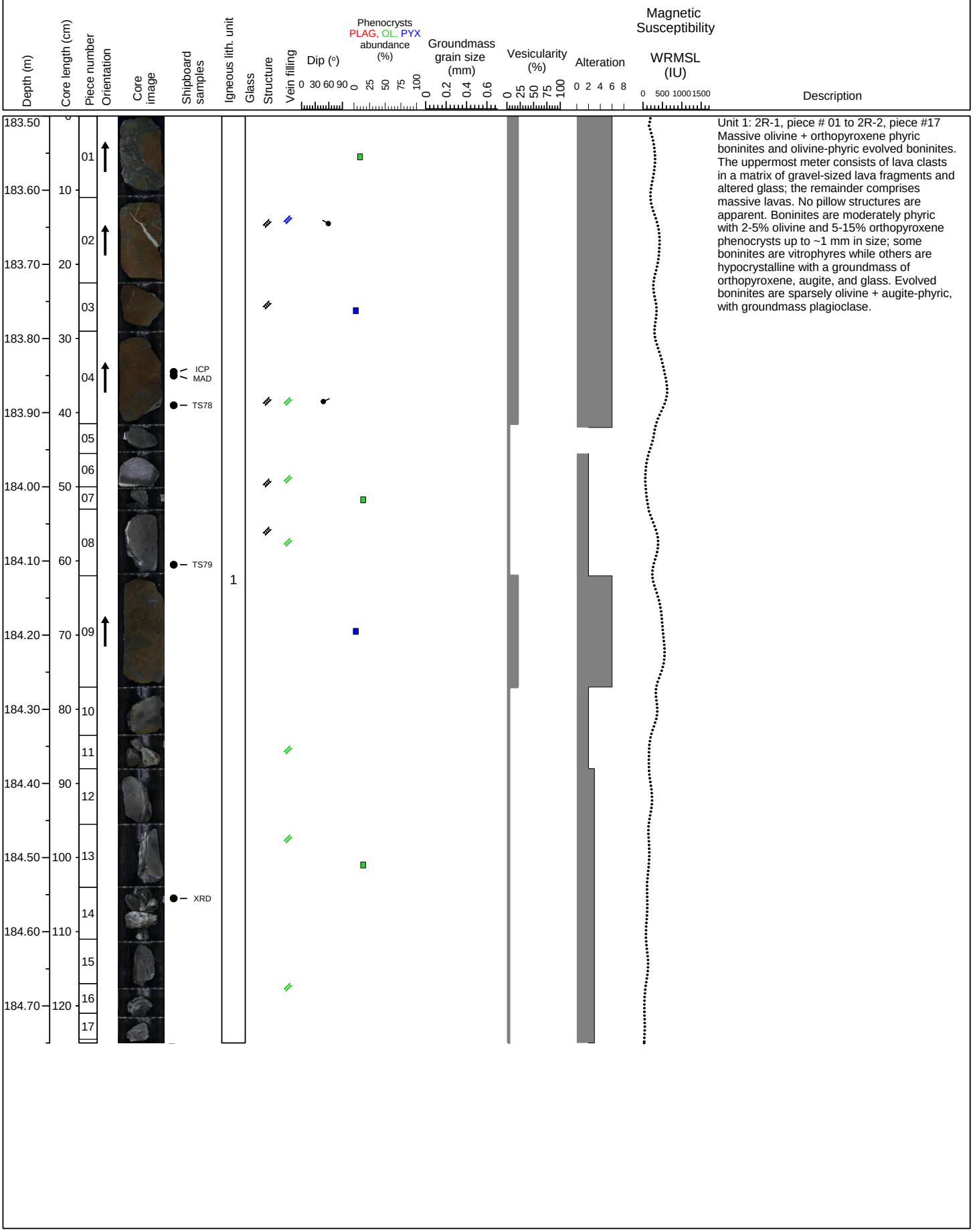


Unit 1: 20X-2, 18 cm to Core 23X-CC, Hyaloclastite with cm-scale fragments of glass and pillow breccia with clasts of boninite pillow lavas in a green hyaloclastite matrix. The hyaloclastites are highly altered to zeolites, serpentine and clay muds, but fragments of fresh glass are present throughout the section (e.g., Core U1439A-21X-1W, 28/30 cm and 44/46 cm). The uppermost hyaloclastite is separated from the overlying calcareous nannofossil ooze by ~1 cm of Mn-rich crust, which defines the top of basement. The boninites occur as pieces, up to 6 cm across, parallel to the core length. At least one fragment has a glassy margin (20X-CC piece #3).

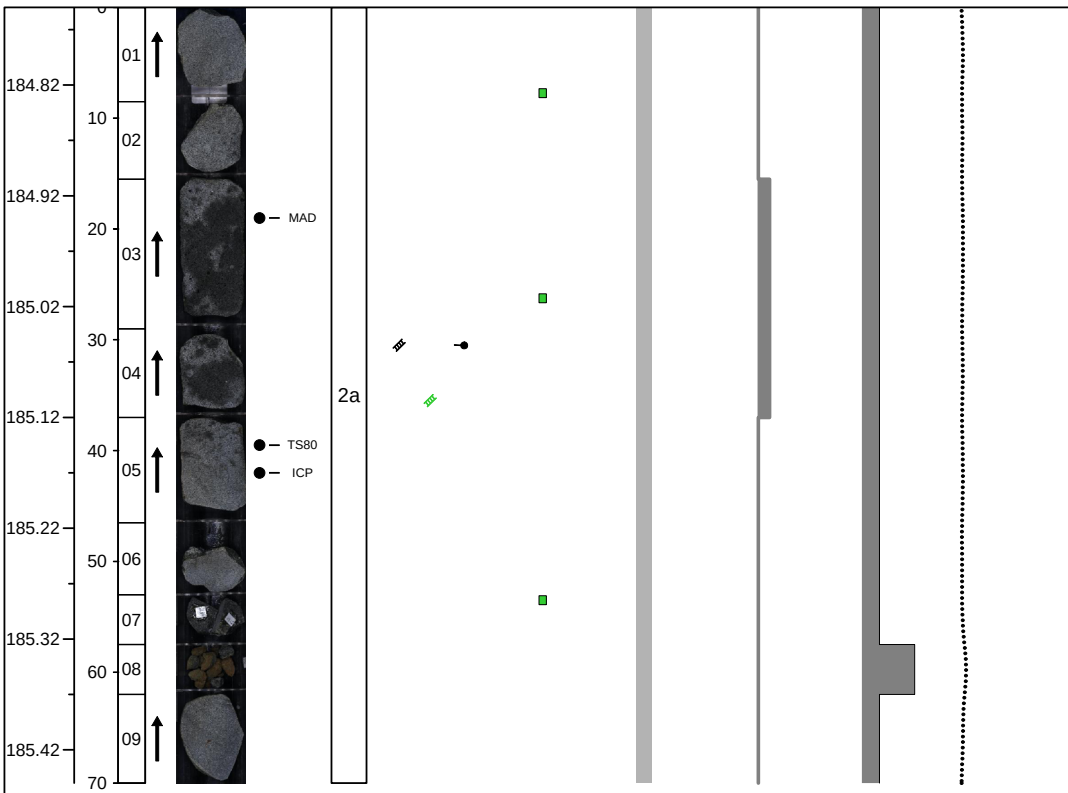
Hole 352-U1439C-2R Section 1, Top of Section: 182.0 m (CSF-A)



Hole 352-U1439C-2R Section 2, Top of Section: 183.5 m (CSF-A)



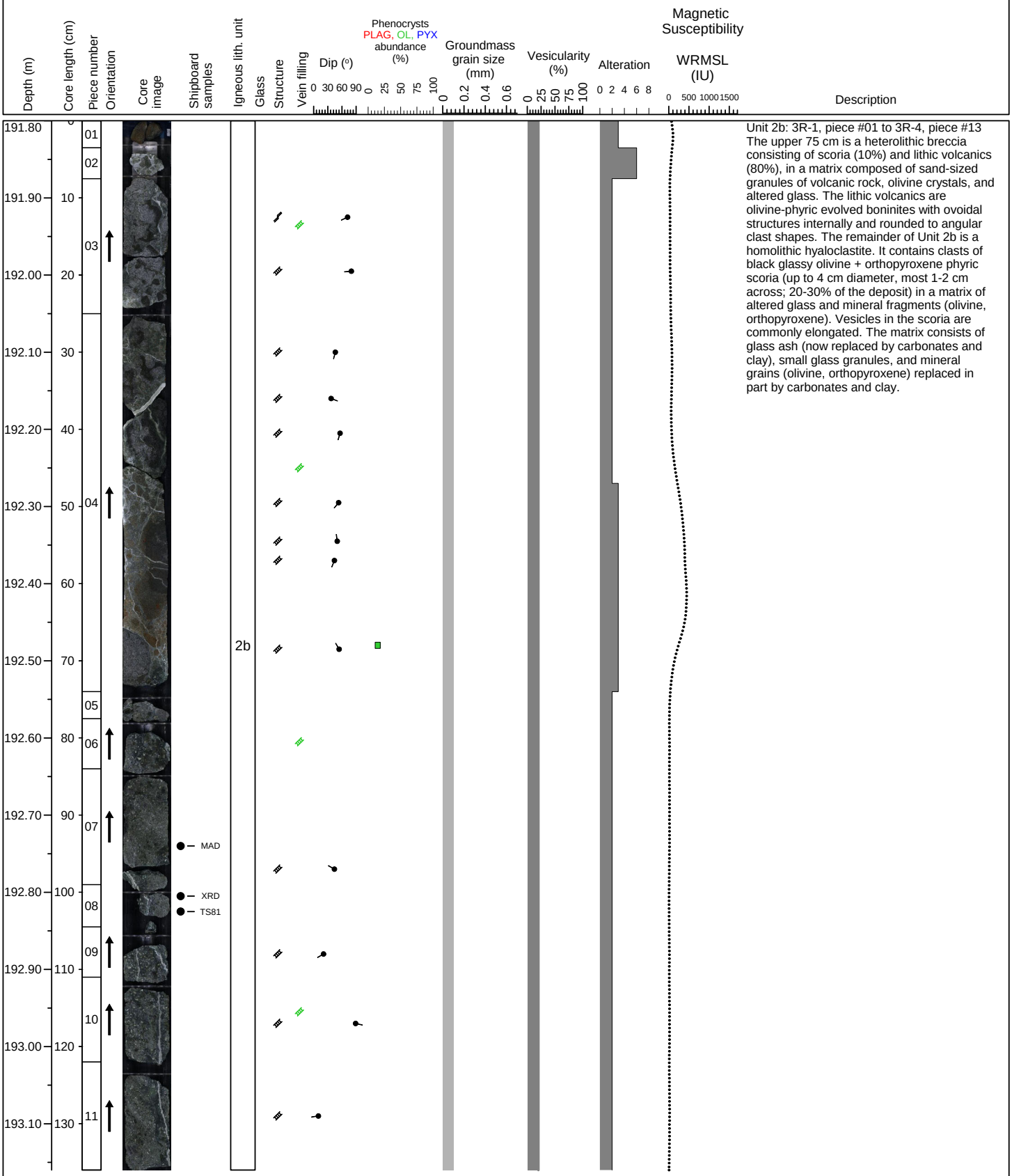
Hole 352-U1439C-2R Section 3, Top of Section: 184.75 m (CSF-A)



Description

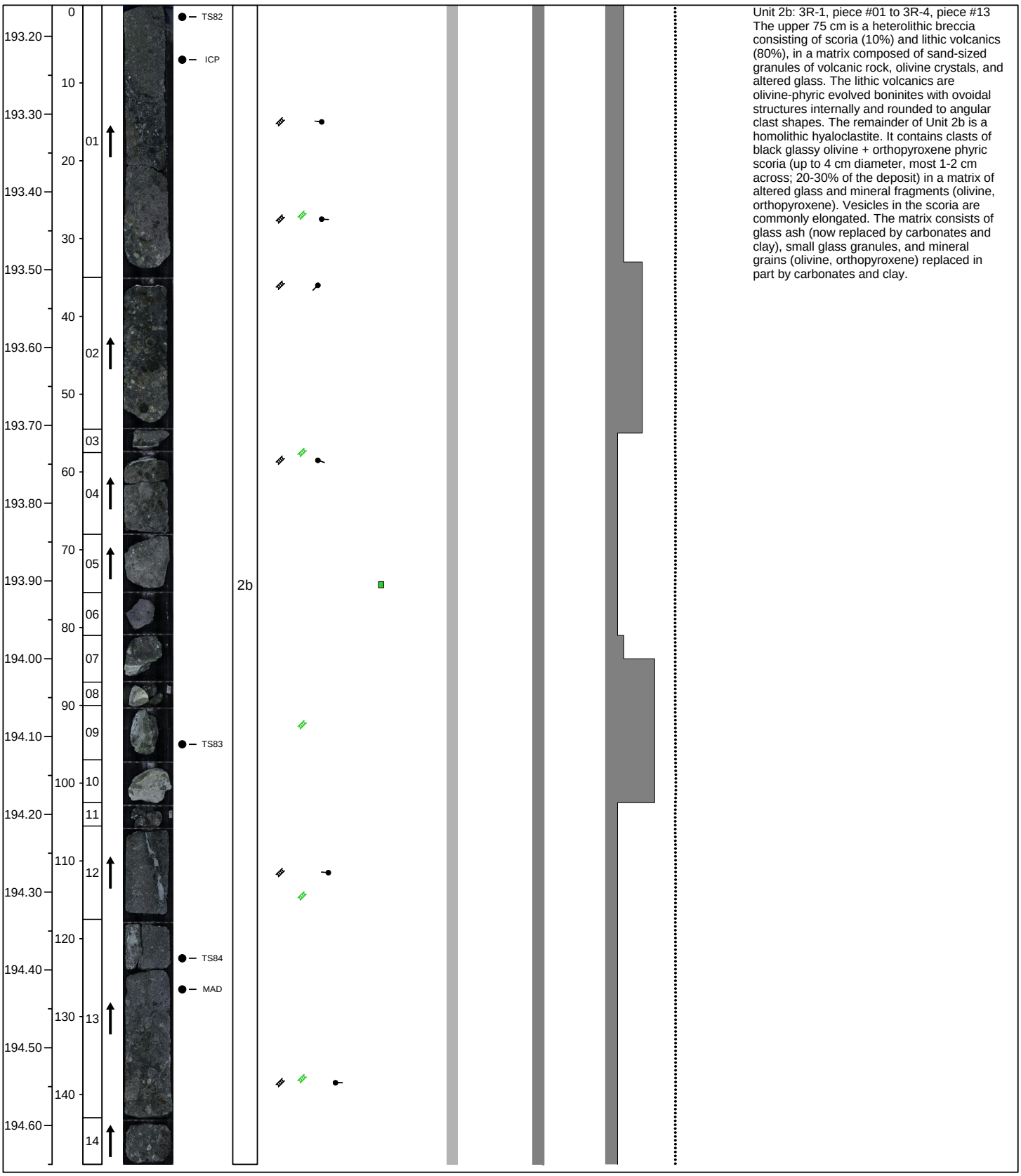
Unit 2a: 2R-3, piece #01 to #09 Massive olivine +/- orthopyroxene-phyric boninite. The groundmass consists of acicular orthopyroxene prisms and glass, which has a diktytaxitic texture, in which orthopyroxene needles form a framework that outlines interstitial vesicles. The lava has few vesicles, no glassy rims or pillow margins, and thus likely represents massive sheet flows.

Hole 352-U1439C-3R Section 1, Top of Section: 191.8 m (CSF-A)



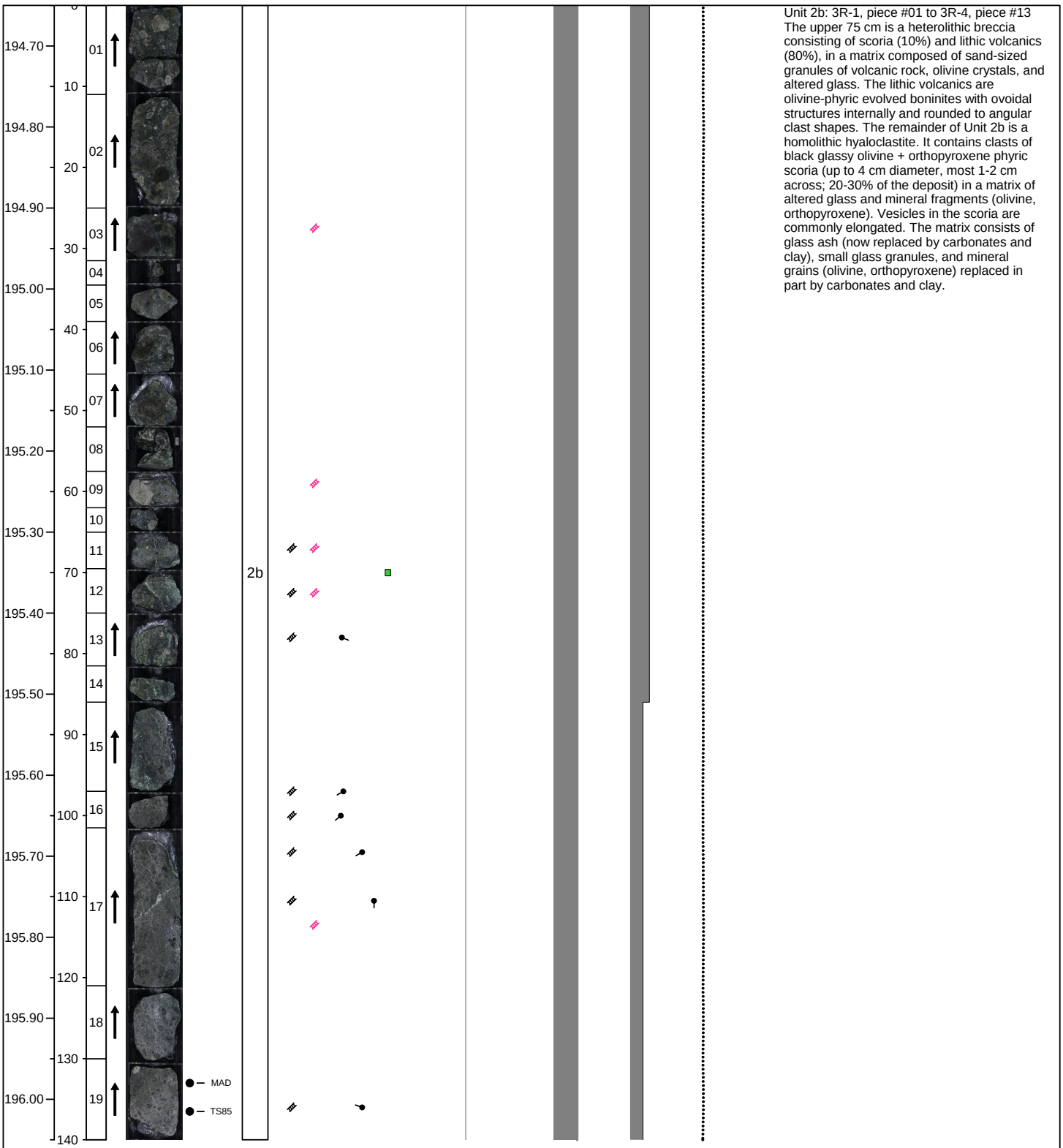
Unit 2b: 3R-1, piece #01 to 3R-4, piece #13
The upper 75 cm is a heterolithic breccia consisting of scoria (10%) and lithic volcanics (80%), in a matrix composed of sand-sized granules of volcanic rock, olivine crystals, and altered glass. The lithic volcanics are olivine-phyric evolved boninites with ovoidal structures internally and rounded to angular clast shapes. The remainder of Unit 2b is a homolithic hyaloclastite. It contains clasts of black glassy olivine + orthopyroxene phyric scoria (up to 4 cm diameter, most 1-2 cm across; 20-30% of the deposit) in a matrix of altered glass and mineral fragments (olivine, orthopyroxene). Vesicles in the scoria are commonly elongated. The matrix consists of glass ash (now replaced by carbonates and clay), small glass granules, and mineral grains (olivine, orthopyroxene) replaced in part by carbonates and clay.

Hole 352-U1439C-3R Section 2, Top of Section: 193.16 m (CSF-A)



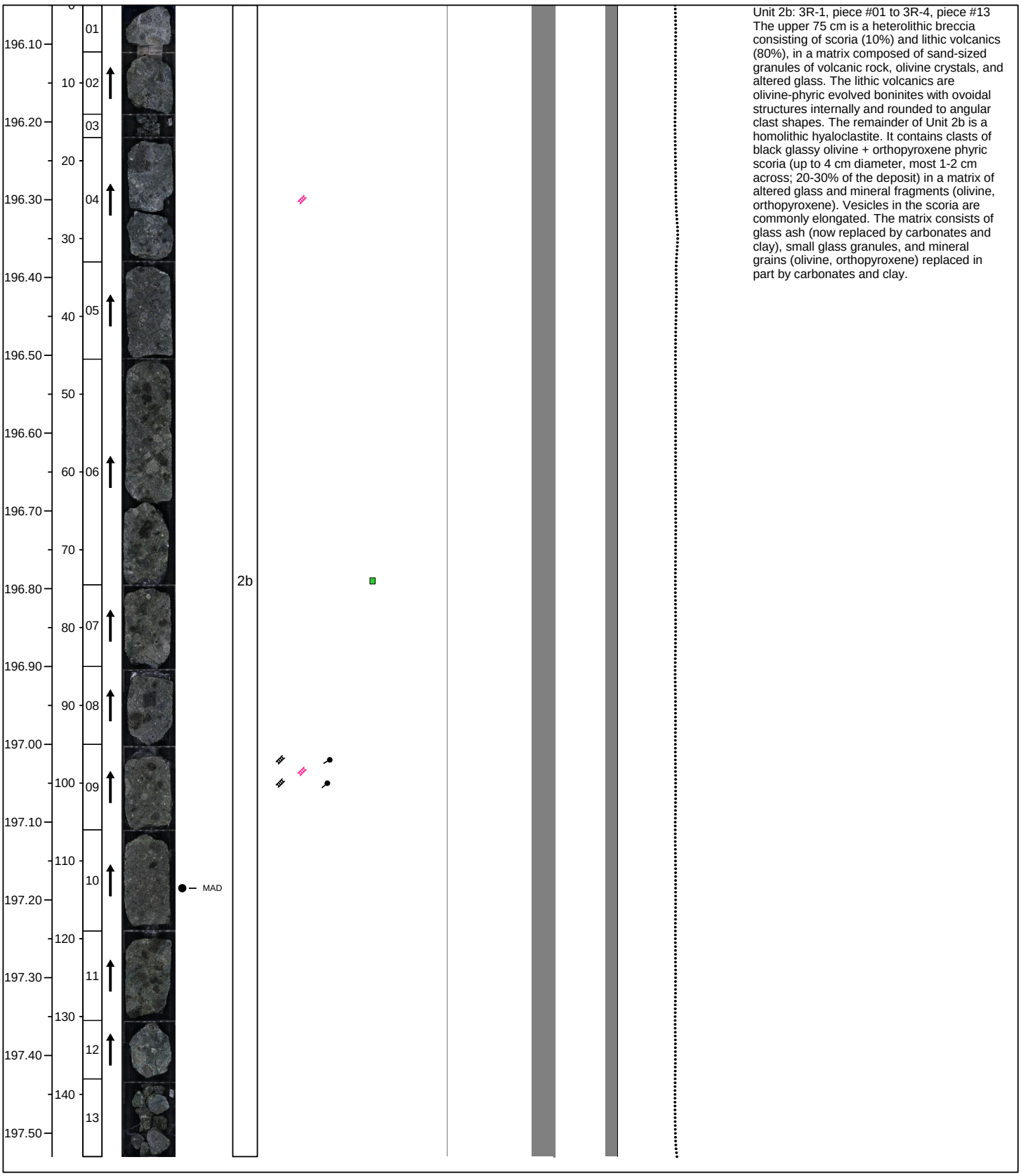
Unit 2b: 3R-1, piece #01 to 3R-4, piece #13
The upper 75 cm is a heterolithic breccia consisting of scoria (10%) and lithic volcanics (80%), in a matrix composed of sand-sized granules of volcanic rock, olivine crystals, and altered glass. The lithic volcanics are olivine-phyric evolved boninites with ovoidal structures internally and rounded to angular clast shapes. The remainder of Unit 2b is a homolithic hyaloclastite. It contains clasts of black glassy olivine + orthopyroxene phyric scoria (up to 4 cm diameter, most 1-2 cm across; 20-30% of the deposit) in a matrix of altered glass and mineral fragments (olivine, orthopyroxene). Vesicles in the scoria are commonly elongated. The matrix consists of glass ash (now replaced by carbonates and clay), small glass granules, and mineral grains (olivine, orthopyroxene) replaced in part by carbonates and clay.

Hole 352-U1439C-3R Section 3, Top of Section: 194.65 m (CSF-A)



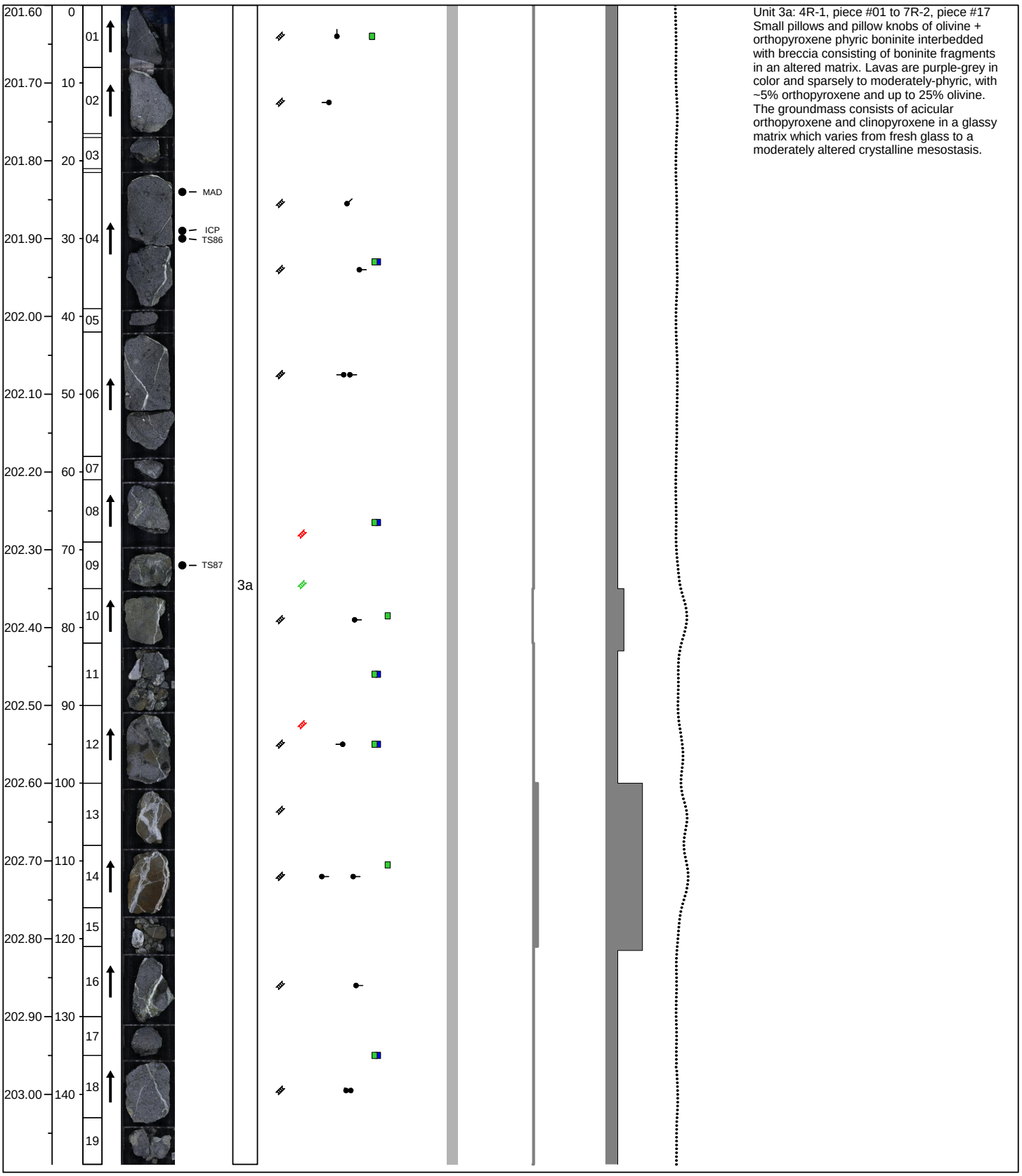
Unit 2b: 3R-1, piece #01 to 3R-4, piece #13
The upper 75 cm is a heterolithic breccia consisting of scoria (10%) and lithic volcanics (80%), in a matrix composed of sand-sized granules of volcanic rock, olivine crystals, and altered glass. The lithic volcanics are olivine-phyric evolved boninites with ovoidal structures internally and rounded to angular clast shapes. The remainder of Unit 2b is a homolithic hyaloclastite. It contains clasts of black glassy olivine + orthopyroxene phyric scoria (up to 4 cm diameter, most 1-2 cm across; 20-30% of the deposit) in a matrix of altered glass and mineral fragments (olivine, orthopyroxene). Vesicles in the scoria are commonly elongated. The matrix consists of glass ash (now replaced by carbonates and clay), small glass granules, and mineral grains (olivine, orthopyroxene) replaced in part by carbonates and clay.

Hole 352-U1439C-3R Section 4, Top of Section: 196.05 m (CSF-A)



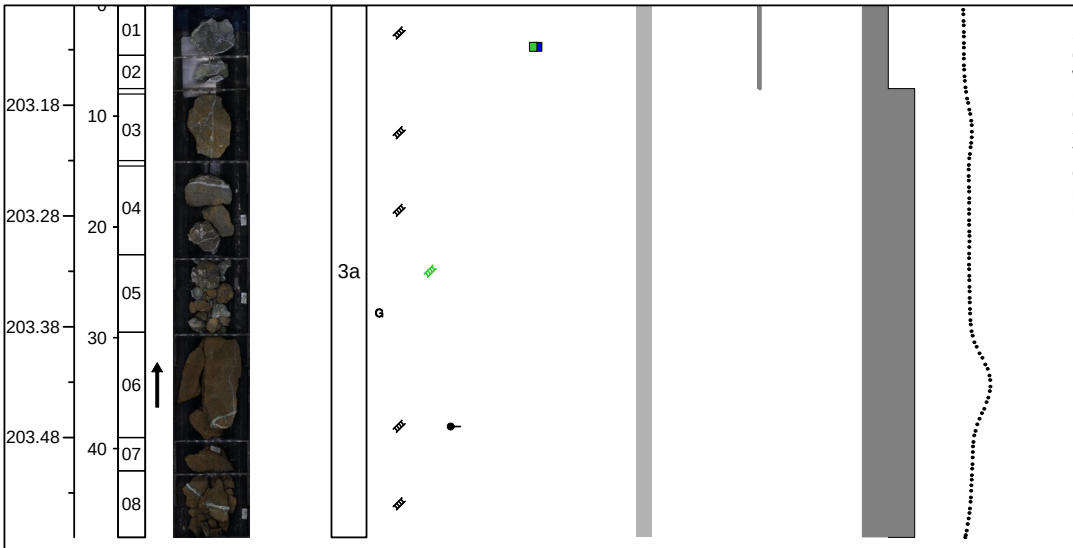
Unit 2b: 3R-1, piece #01 to 3R-4, piece #13
The upper 75 cm is a heterolithic breccia consisting of scoria (10%) and lithic volcanics (80%), in a matrix composed of sand-sized granules of volcanic rock, olivine crystals, and altered glass. The lithic volcanics are olivine-phyric evolved boninites with ovoidal structures internally and rounded to angular clast shapes. The remainder of Unit 2b is a homolithic hyaloclastite. It contains clasts of black glassy olivine + orthopyroxene phyric scoria (up to 4 cm diameter, most 1-2 cm across; 20-30% of the deposit) in a matrix of altered glass and mineral fragments (olivine, orthopyroxene). Vesicles in the scoria are commonly elongated. The matrix consists of glass ash (now replaced by carbonates and clay), small glass granules, and mineral grains (olivine, orthopyroxene) replaced in part by carbonates and clay.

Hole 352-U1439C-4R Section 1, Top of Section: 201.6 m (CSF-A)



Unit 3a: 4R-1, piece #01 to 7R-2, piece #17
Small pillows and pillow knobs of olivine + orthopyroxene phyric boninite interbedded with breccia consisting of boninite fragments in an altered matrix. Lavas are purple-grey in color and sparsely to moderately-phyric, with ~5% orthopyroxene and up to 25% olivine. The groundmass consists of acicular orthopyroxene and clinopyroxene in a glassy matrix which varies from fresh glass to a moderately altered crystalline mesostasis.

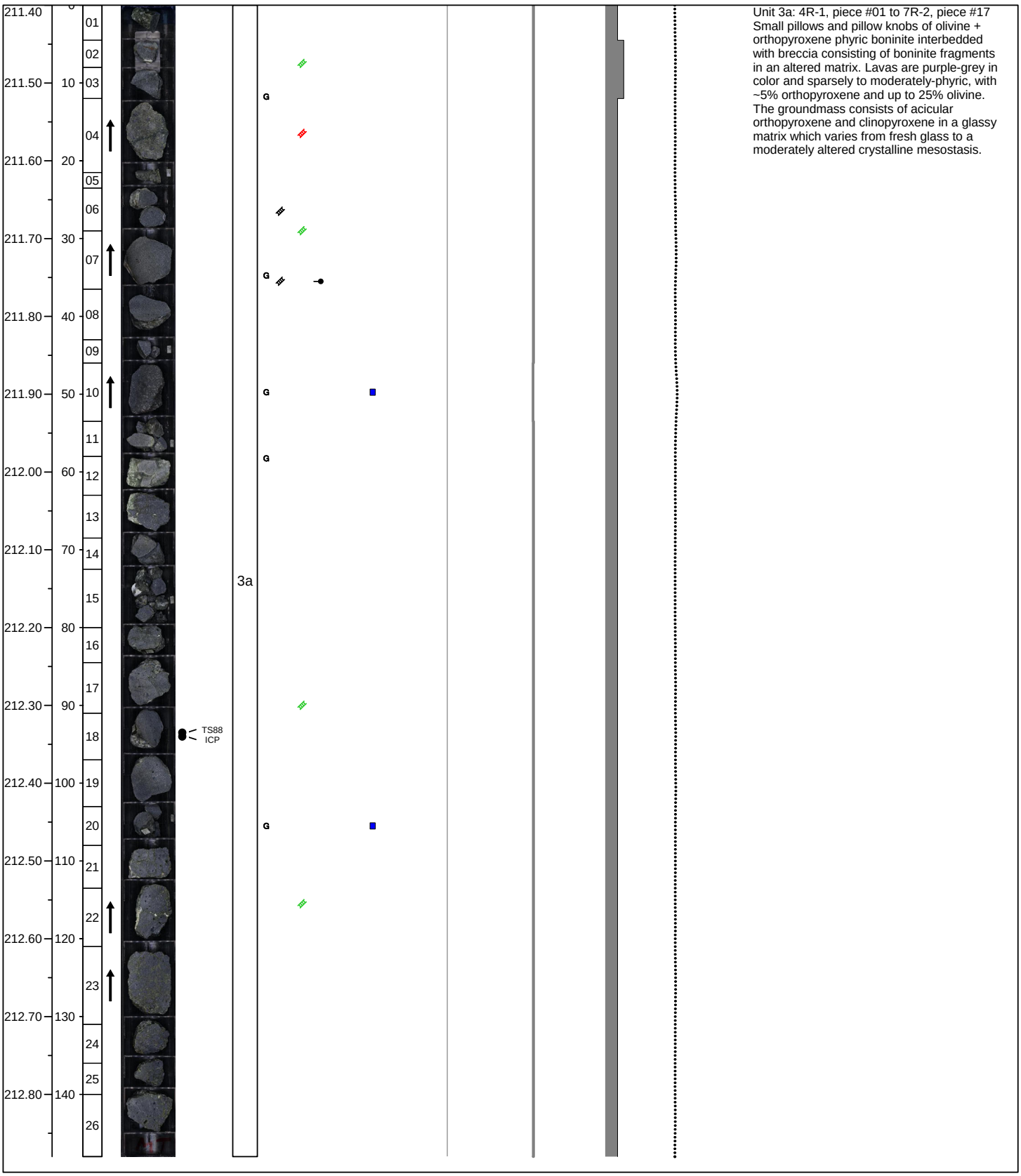
Hole 352-U1439C-4R Section 2, Top of Section: 203.09 m (CSF-A)



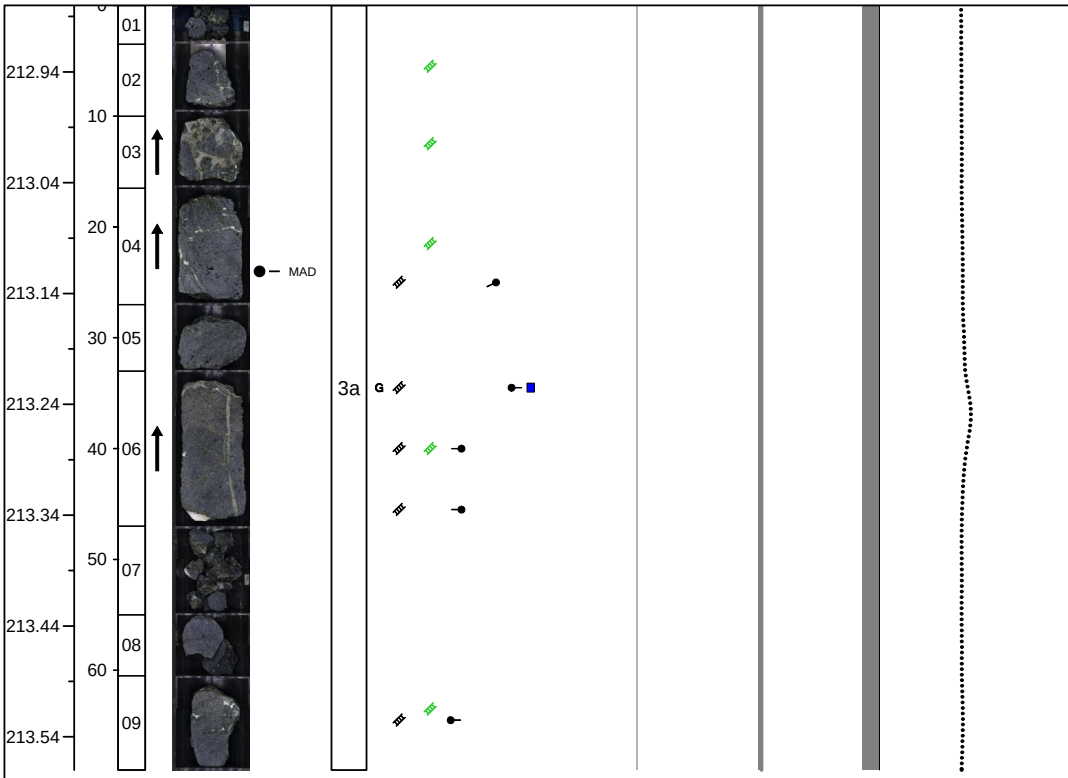
Description

Unit 3a: 4R-1, piece #01 to 7R-2, piece #17
Small pillows and pillow knobs of olivine + orthopyroxene phyric boninite interbedded with breccia consisting of boninite fragments in an altered matrix. Lavas are purple-grey in color and sparsely to moderately-phyric, with ~5% orthopyroxene and up to 25% olivine. The groundmass consists of acicular orthopyroxene and clinopyroxene in a glassy matrix which varies from fresh glass to a moderately altered crystalline mesostasis.

Hole 352-U1439C-5R Section 1, Top of Section: 211.4 m (CSF-A)



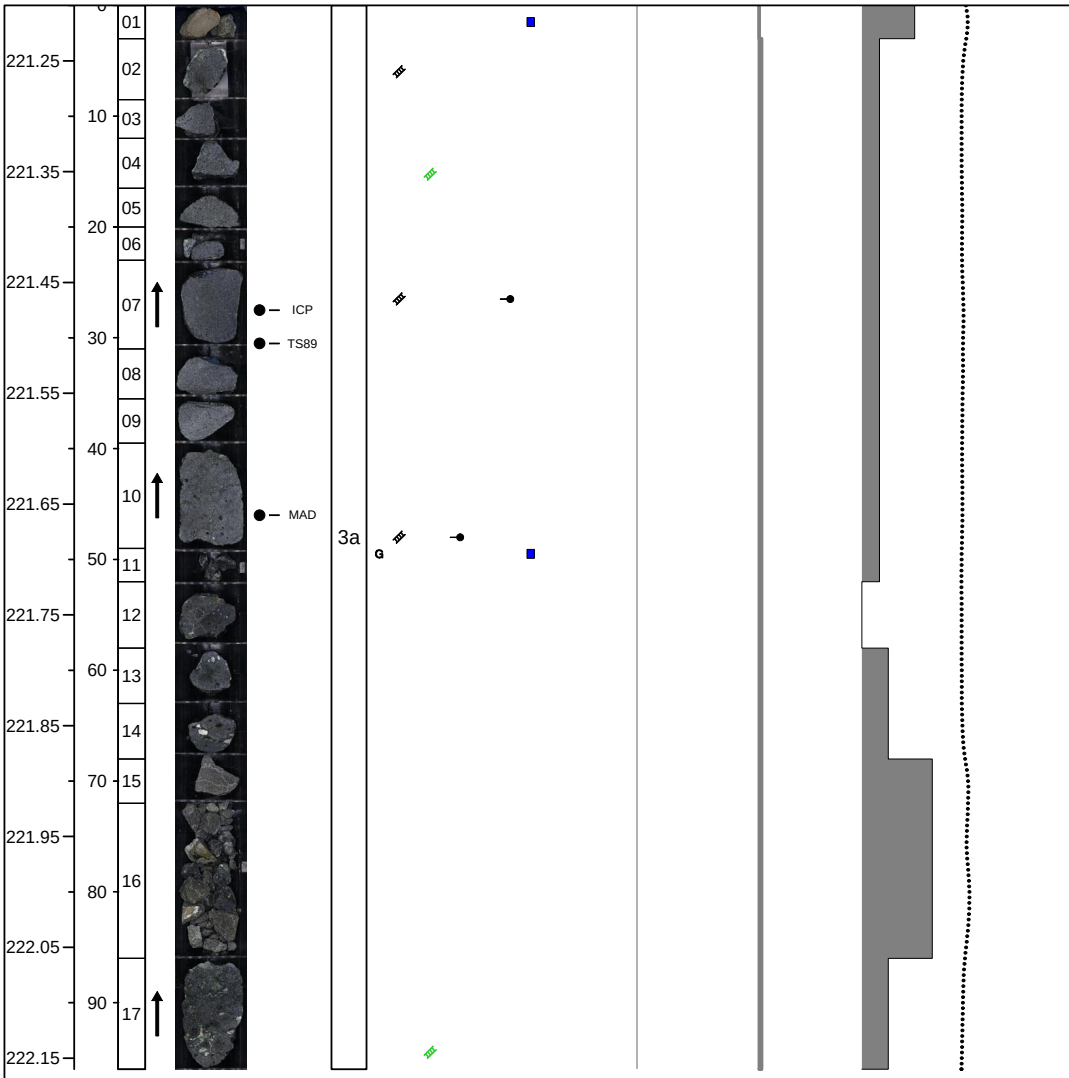
Hole 352-U1439C-5R Section 2, Top of Section: 212.88 m (CSF-A)



Description

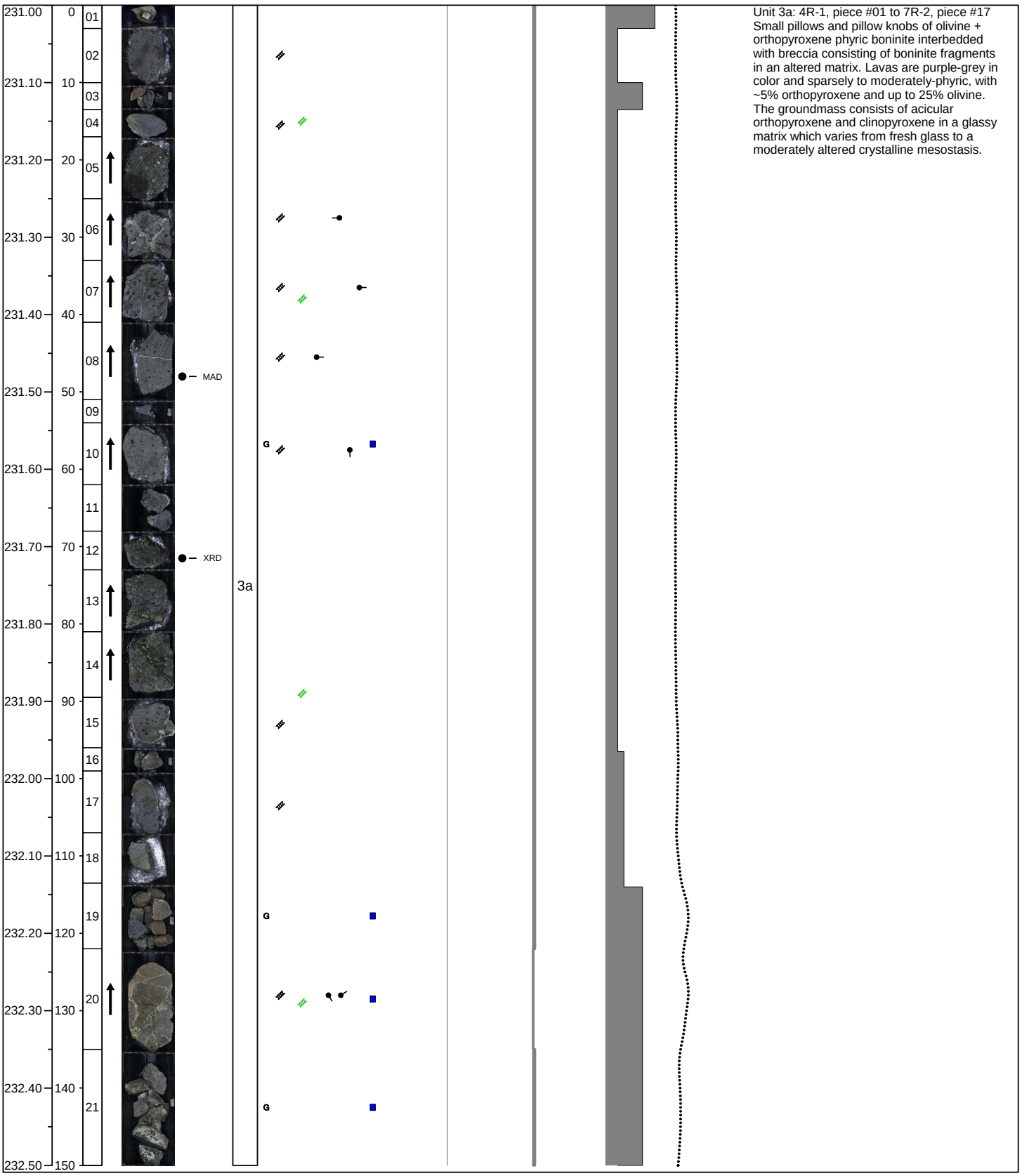
Unit 3a: 4R-1, piece #01 to 7R-2, piece #17
Small pillows and pillow knobs of olivine + orthopyroxene phyric boninite interbedded with breccia consisting of boninite fragments in an altered matrix. Lavas are purple-grey in color and sparsely to moderately-phyric, with ~5% orthopyroxene and up to 25% olivine. The groundmass consists of acicular orthopyroxene and clinopyroxene in a glassy matrix which varies from fresh glass to a moderately altered crystalline mesostasis.

Hole 352-U1439C-6R Section 1, Top of Section: 221.2 m (CSF-A)

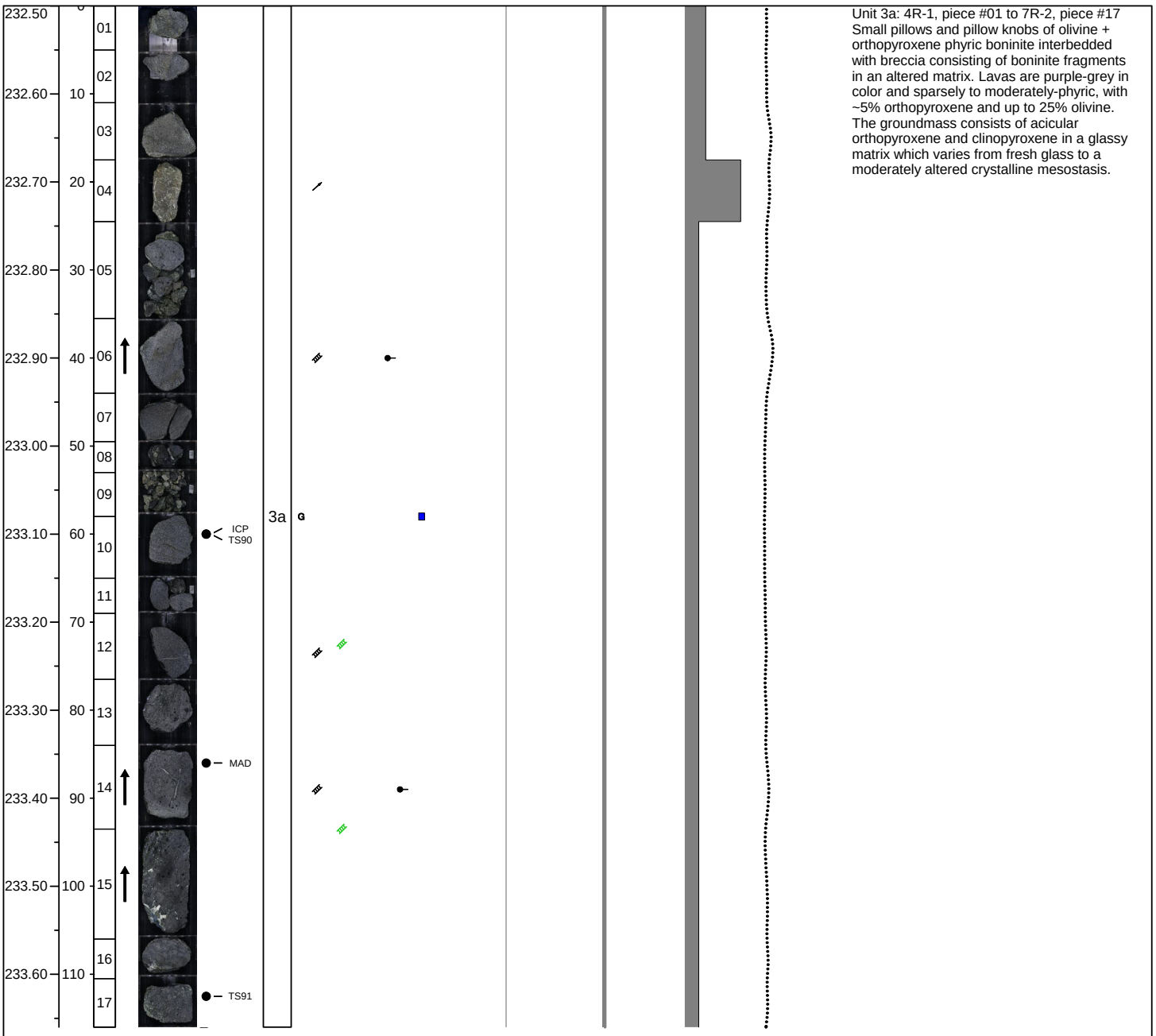


Unit 3a: 4R-1, piece #01 to 7R-2, piece #17
Small pillows and pillow knobs of olivine + orthopyroxene phyric boninite interbedded with breccia consisting of boninite fragments in an altered matrix. Lavas are purple-grey in color and sparsely to moderately-phyric, with ~5% orthopyroxene and up to 25% olivine. The groundmass consists of acicular orthopyroxene and clinopyroxene in a glassy matrix which varies from fresh glass to a moderately altered crystalline mesostasis.

Hole 352-U1439C-7R Section 1, Top of Section: 231.0 m (CSF-A)

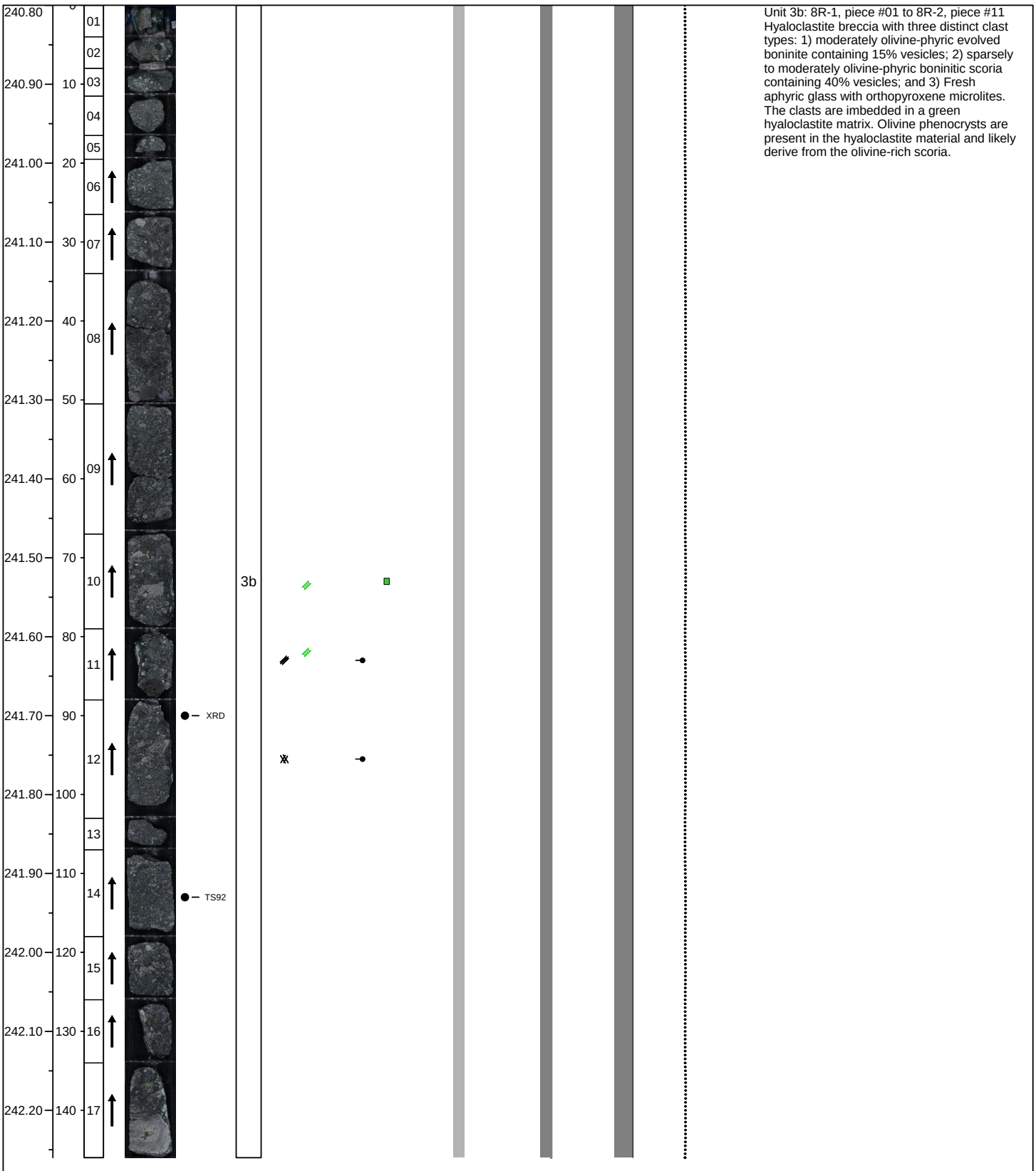


Hole 352-U1439C-7R Section 2, Top of Section: 232.5 m (CSF-A)

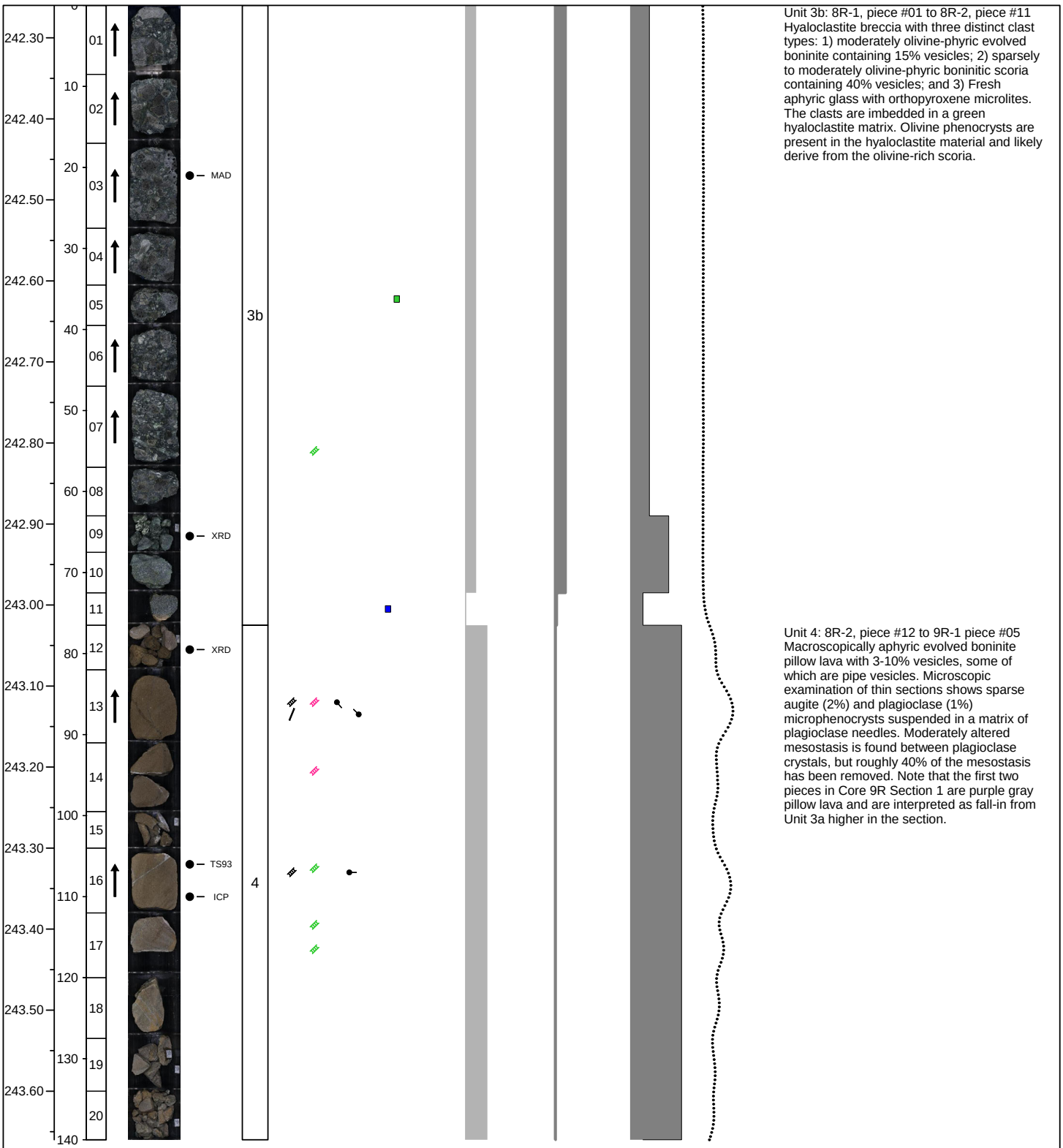


Unit 3a: 4R-1, piece #01 to 7R-2, piece #17
Small pillows and pillow knobs of olivine + orthopyroxene phyric boninite interbedded with breccia consisting of boninite fragments in an altered matrix. Lavas are purple-grey in color and sparsely to moderately-phyric, with ~5% orthopyroxene and up to 25% olivine. The groundmass consists of acicular orthopyroxene and clinopyroxene in a glassy matrix which varies from fresh glass to a moderately altered crystalline mesostasis.

Hole 352-U1439C-8R Section 1, Top of Section: 240.8 m (CSF-A)



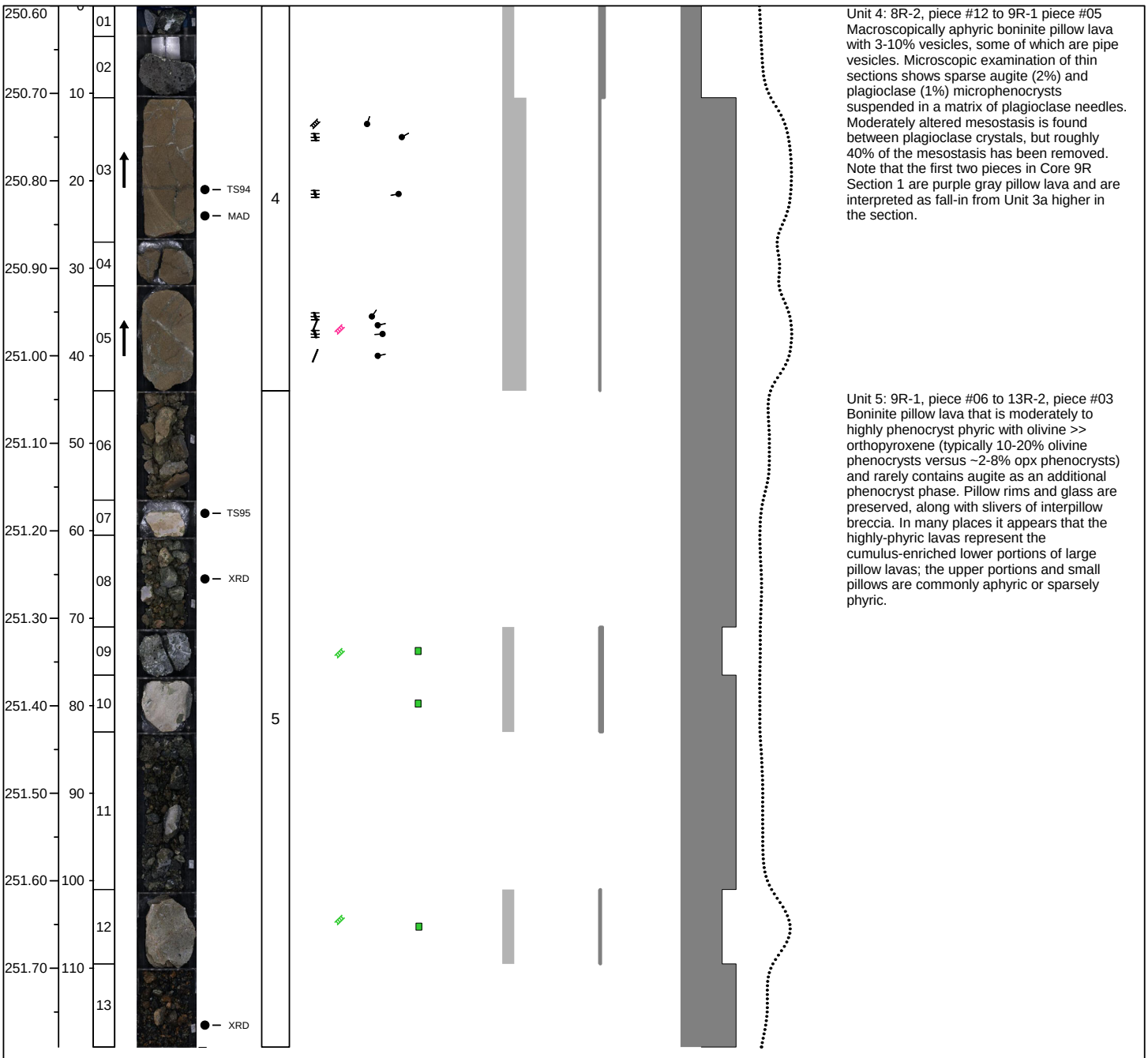
Hole 352-U1439C-8R Section 2, Top of Section: 242.26 m (CSF-A)



Unit 3b: 8R-1, piece #01 to 8R-2, piece #11 Hyaloclastite breccia with three distinct clast types: 1) moderately olivine-phyric evolved boninite containing 15% vesicles; 2) sparsely to moderately olivine-phyric boninitic scoria containing 40% vesicles; and 3) Fresh aphyric glass with orthopyroxene microlites. The clasts are imbedded in a green hyaloclastite matrix. Olivine phenocrysts are present in the hyaloclastite material and likely derive from the olivine-rich scoria.

Unit 4: 8R-2, piece #12 to 9R-1 piece #05 Macroscopically aphyric evolved boninite pillow lava with 3-10% vesicles, some of which are pipe vesicles. Microscopic examination of thin sections shows sparse augite (2%) and plagioclase (1%) microphenocrysts suspended in a matrix of plagioclase needles. Moderately altered mesostasis is found between plagioclase crystals, but roughly 40% of the mesostasis has been removed. Note that the first two pieces in Core 9R Section 1 are purple gray pillow lava and are interpreted as fall-in from Unit 3a higher in the section.

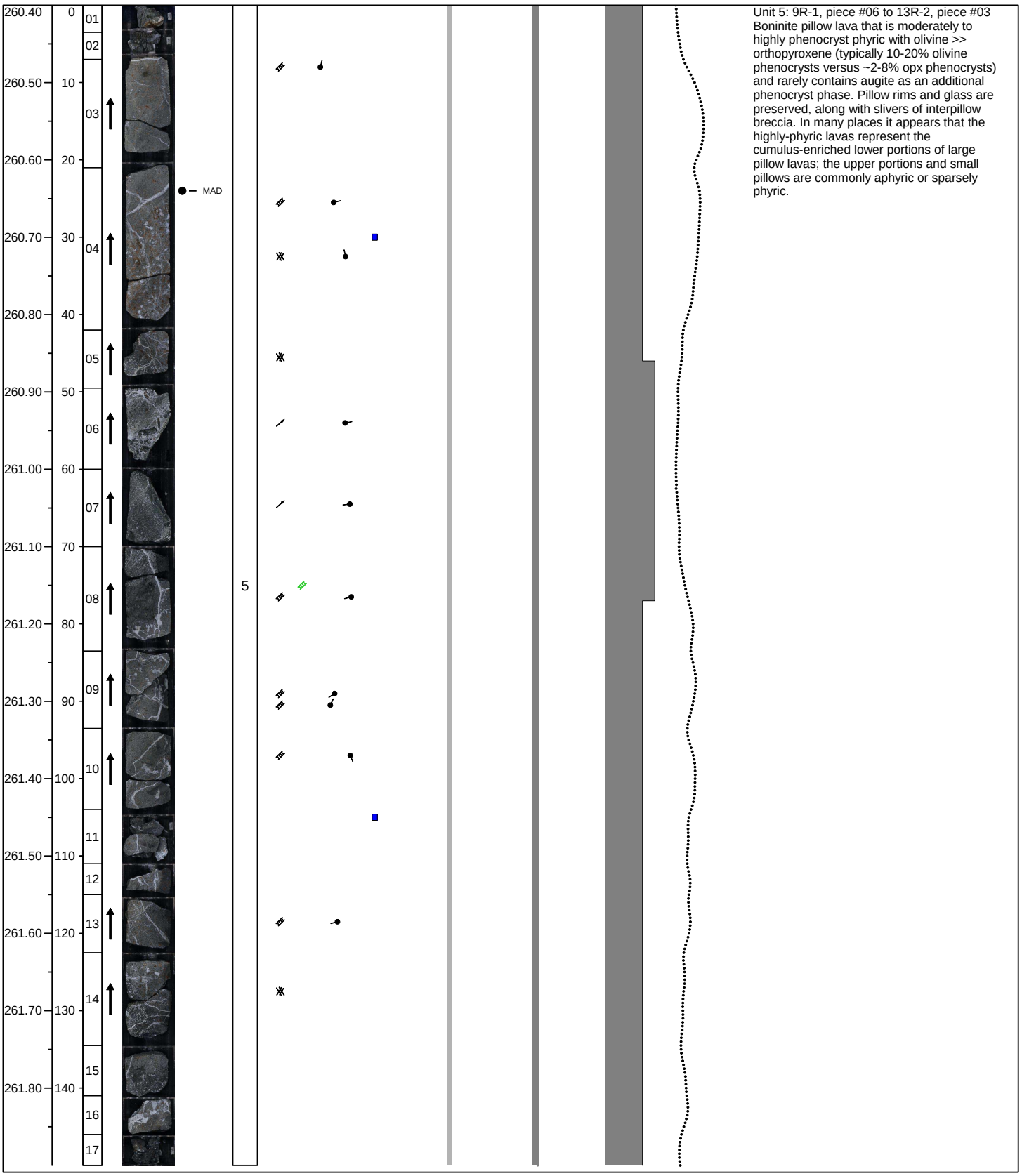
Hole 352-U1439C-9R Section 1, Top of Section: 250.6 m (CSF-A)



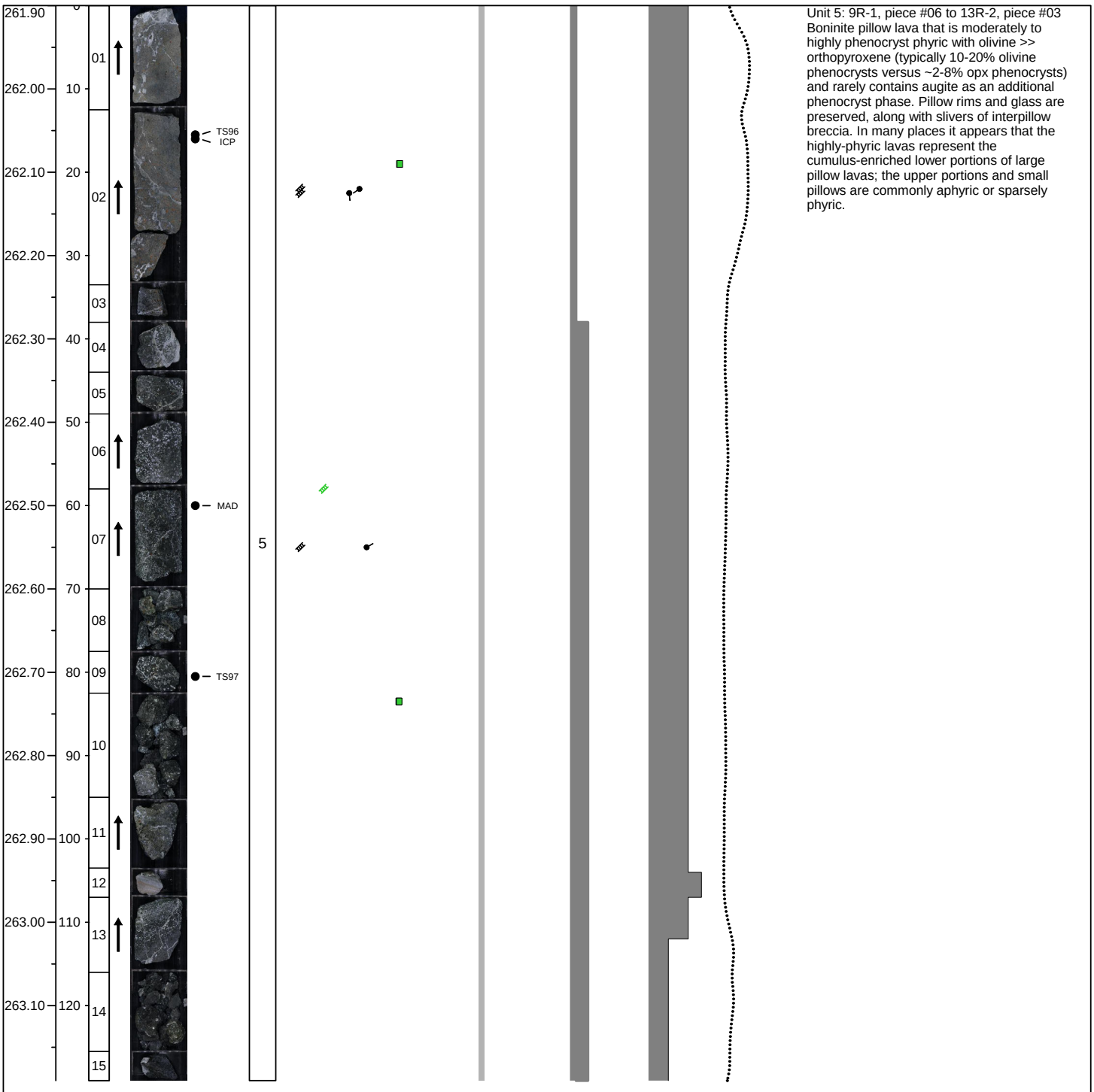
Unit 4: 8R-2, piece #12 to 9R-1 piece #05 Macroscopically aphyric boninite pillow lava with 3-10% vesicles, some of which are pipe vesicles. Microscopic examination of thin sections shows sparse augite (2%) and plagioclase (1%) microphenocrysts suspended in a matrix of plagioclase needles. Moderately altered mesostasis is found between plagioclase crystals, but roughly 40% of the mesostasis has been removed. Note that the first two pieces in Core 9R Section 1 are purple gray pillow lava and are interpreted as fall-in from Unit 3a higher in the section.

Unit 5: 9R-1, piece #06 to 13R-2, piece #03 Boninite pillow lava that is moderately to highly phenocryst phyric with olivine >> orthopyroxene (typically 10-20% olivine phenocrysts versus ~2-8% opx phenocrysts) and rarely contains augite as an additional phenocryst phase. Pillow rims and glass are preserved, along with slivers of interpillow breccia. In many places it appears that the highly-phyric lavas represent the cumulus-enriched lower portions of large pillow lavas; the upper portions and small pillows are commonly aphyric or sparsely phyric.

Hole 352-U1439C-10R Section 1, Top of Section: 260.4 m (CSF-A)

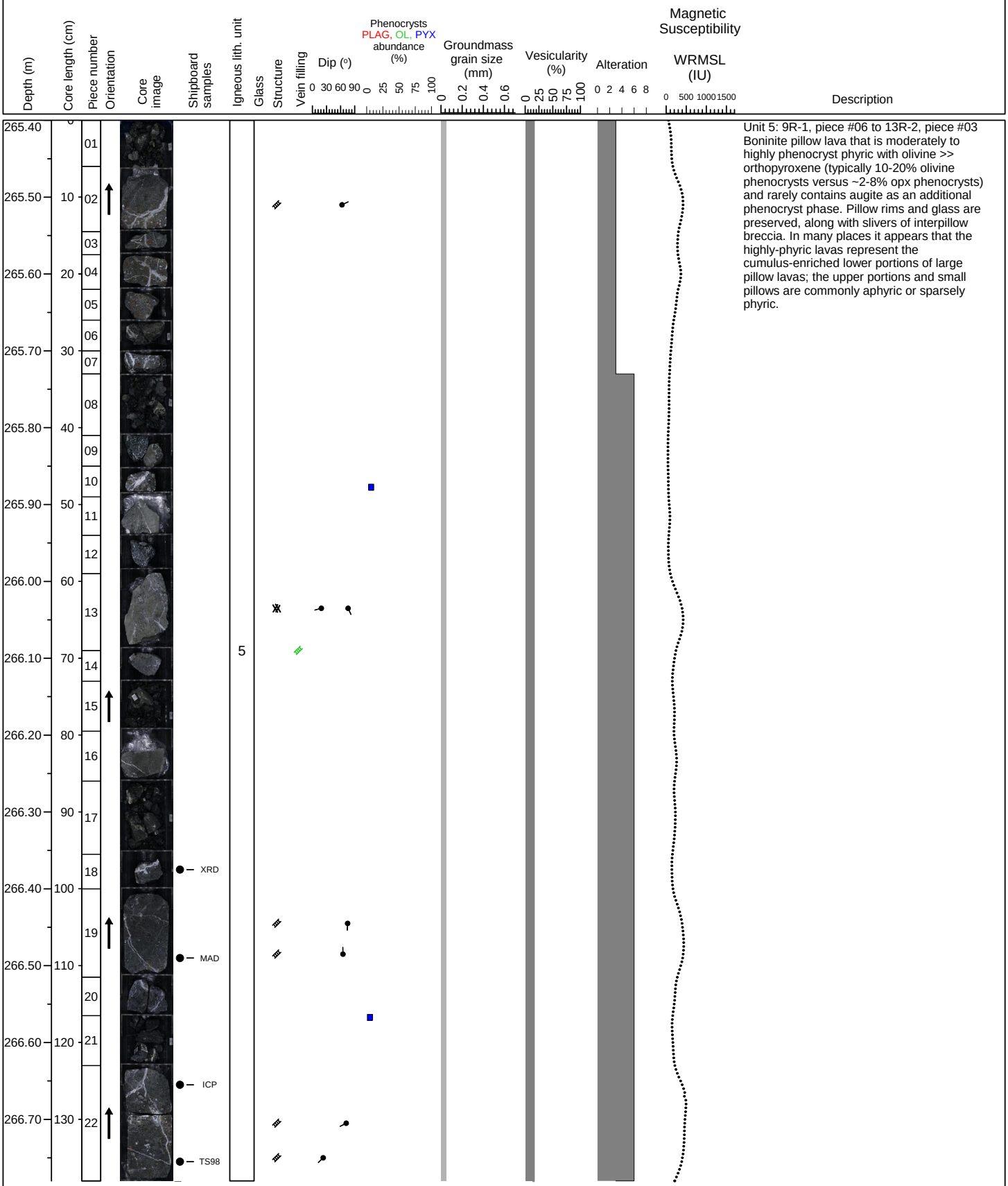


Hole 352-U1439C-10R Section 2, Top of Section: 261.9 m (CSF-A)

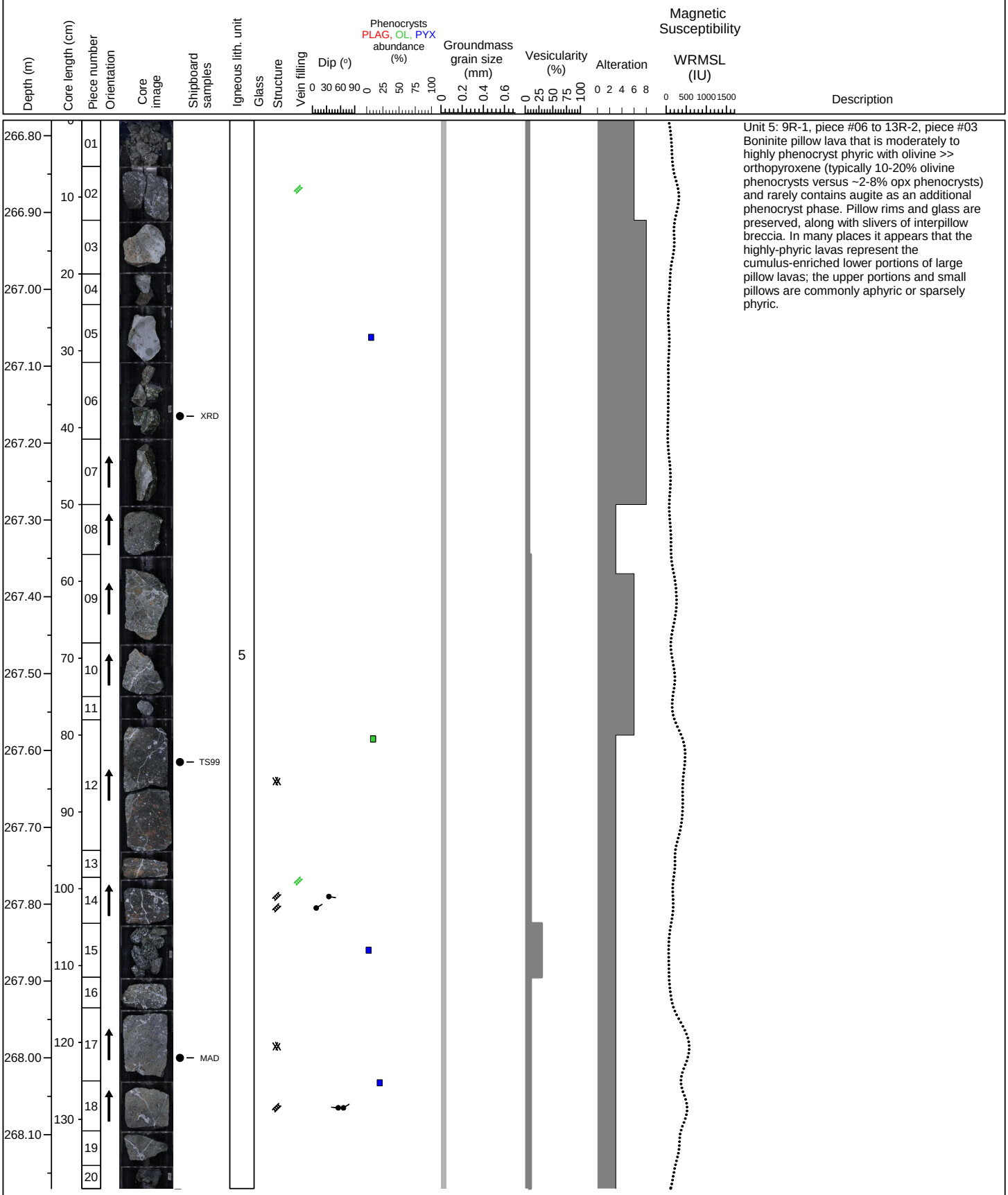


Unit 5: 9R-1, piece #06 to 13R-2, piece #03 Boninite pillow lava that is moderately to highly phenocryst phyric with olivine >> orthopyroxene (typically 10-20% olivine phenocrysts versus ~2-8% opx phenocrysts) and rarely contains augite as an additional phenocryst phase. Pillow rims and glass are preserved, along with slivers of interpillow breccia. In many places it appears that the highly-phyric lavas represent the cumulus-enriched lower portions of large pillow lavas; the upper portions and small pillows are commonly aphyric or sparsely phyric.

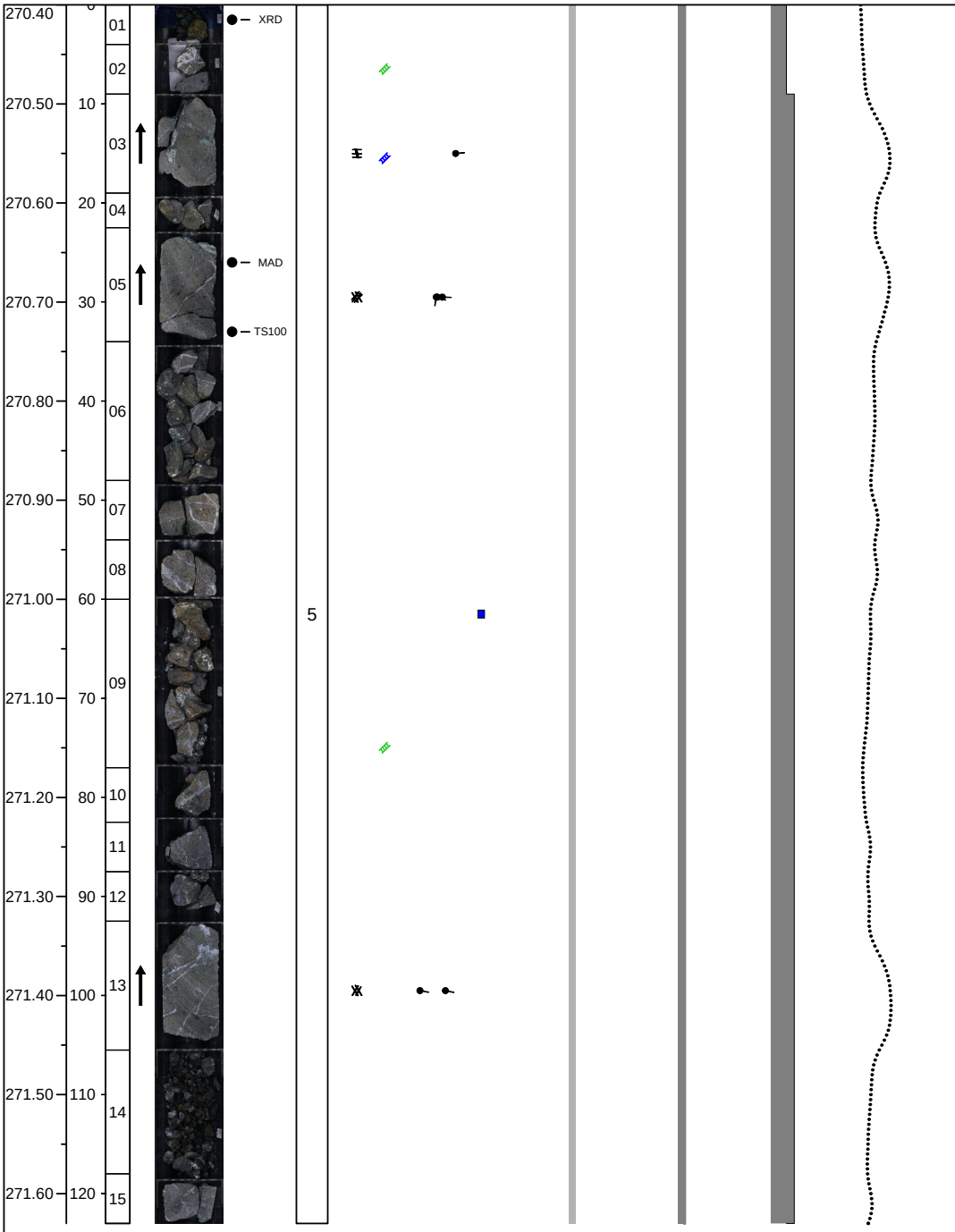
Hole 352-U1439C-11R Section 1, Top of Section: 265.4 m (CSF-A)



Hole 352-U1439C-11R Section 2, Top of Section: 266.78 m (CSF-A)

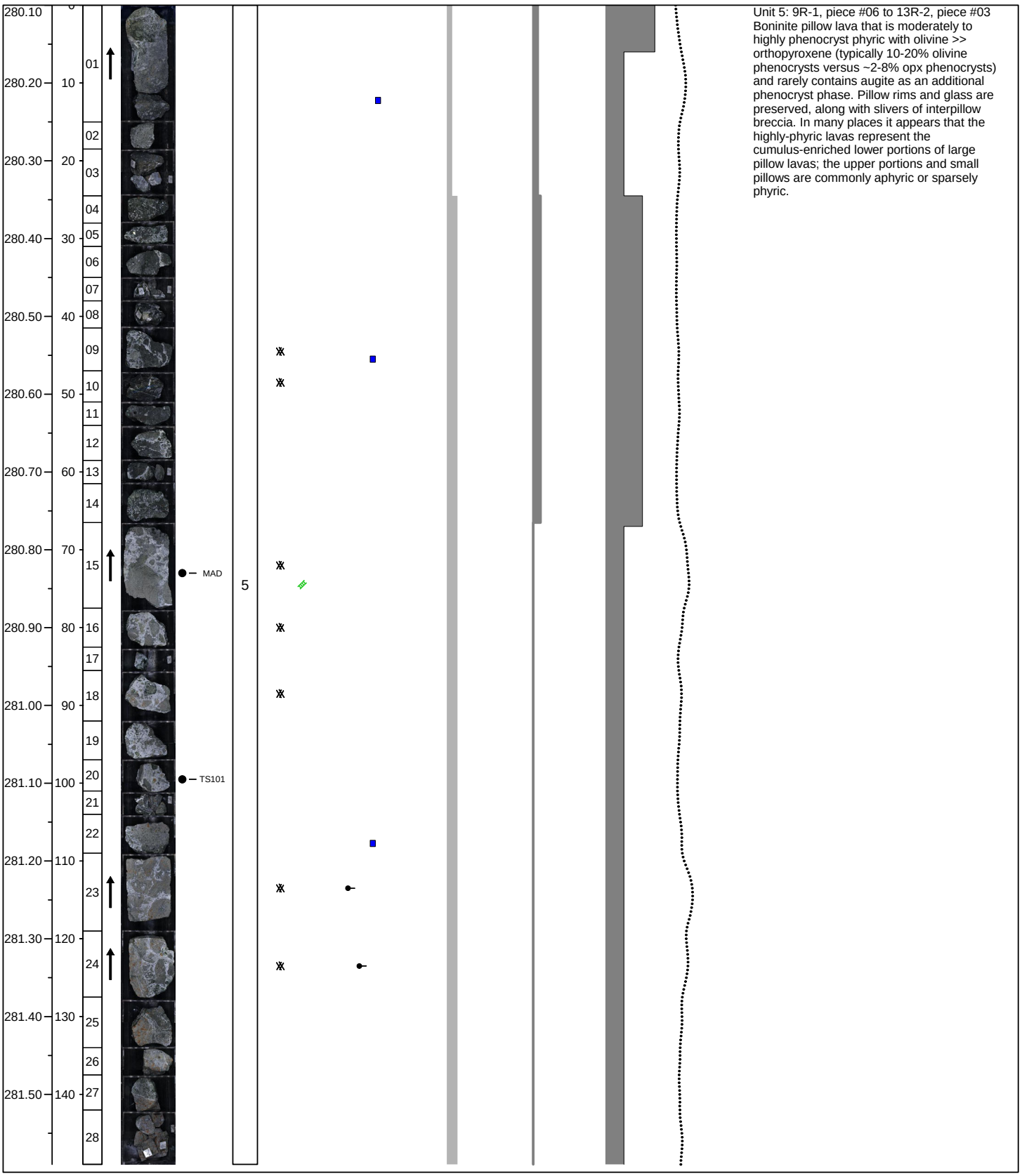


Hole 352-U1439C-12R Section 1, Top of Section: 270.4 m (CSF-A)

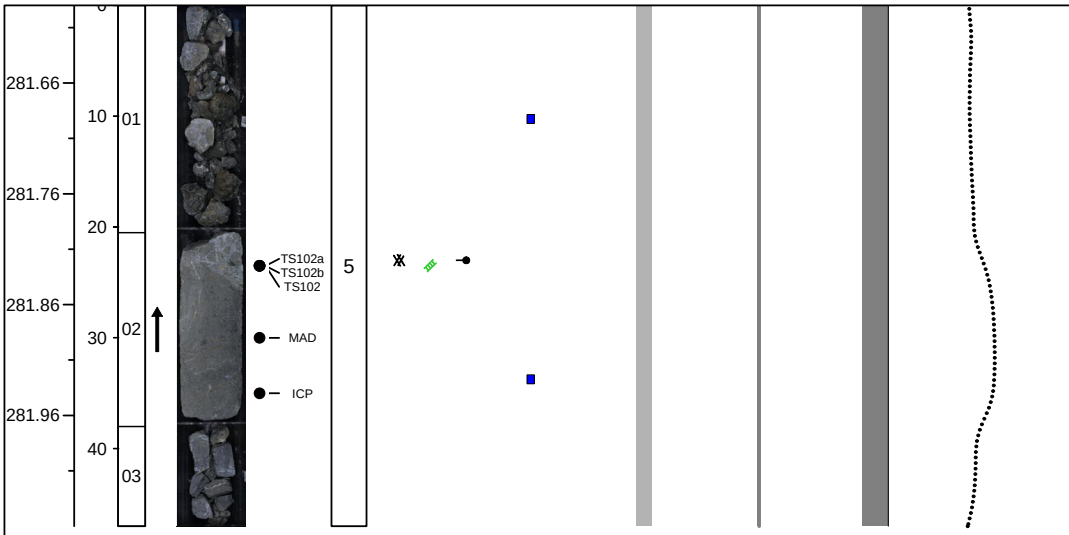


Unit 5: 9R-1, piece #06 to 13R-2, piece #03
Boninite pillow lava that is moderately to highly phenocryst phyric with olivine >> orthopyroxene (typically 10-20% olivine phenocrysts versus ~2-8% opx phenocrysts) and rarely contains augite as an additional phenocryst phase. Pillow rims and glass are preserved, along with slivers of interpillow breccia. In many places it appears that the highly-phyric lavas represent the cumulus-enriched lower portions of large pillow lavas; the upper portions and small pillows are commonly aphyric or sparsely phyric.

Hole 352-U1439C-13R Section 1, Top of Section: 280.1 m (CSF-A)



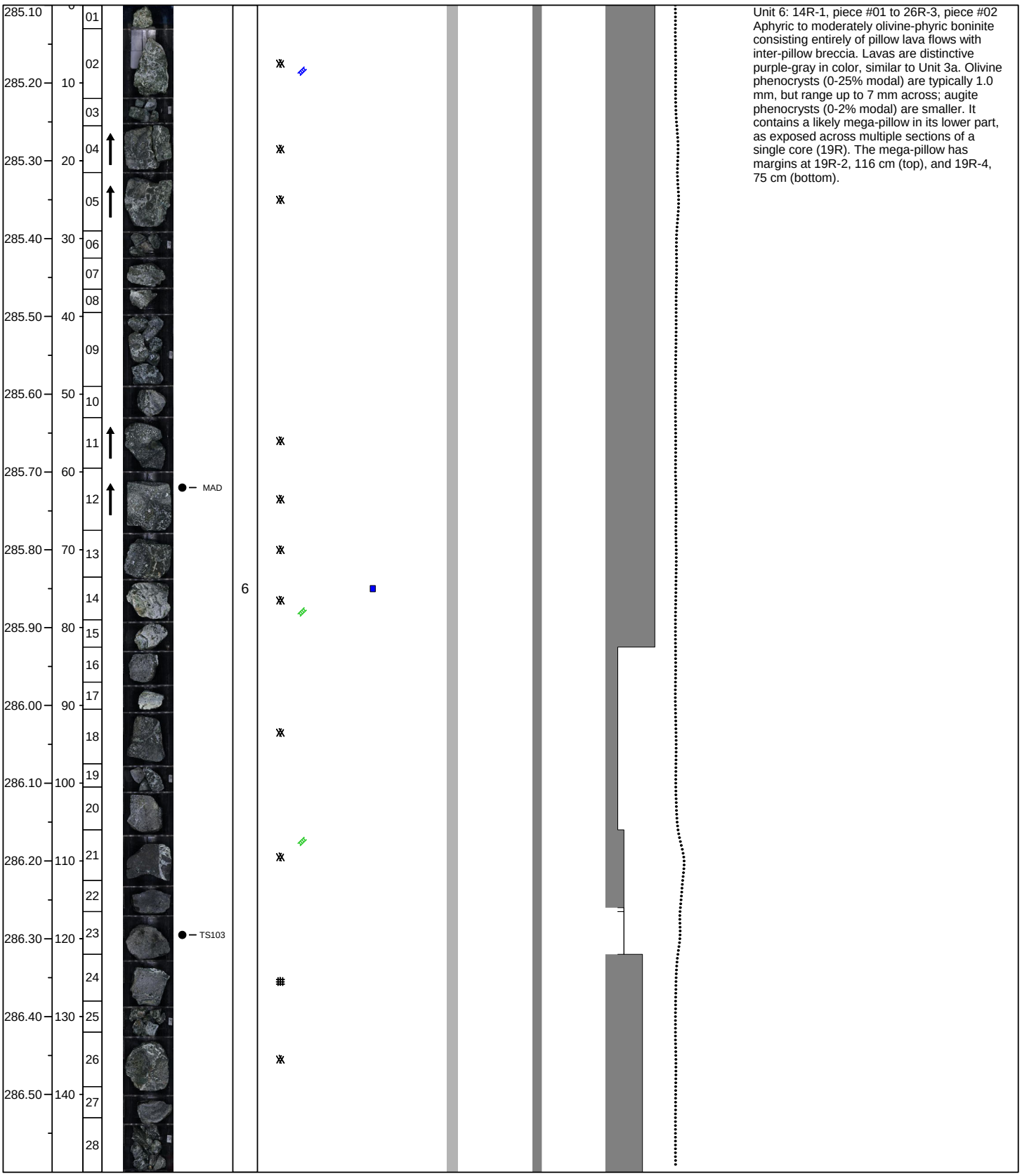
Hole 352-U1439C-13R Section 2, Top of Section: 281.59 m (CSF-A)



Description

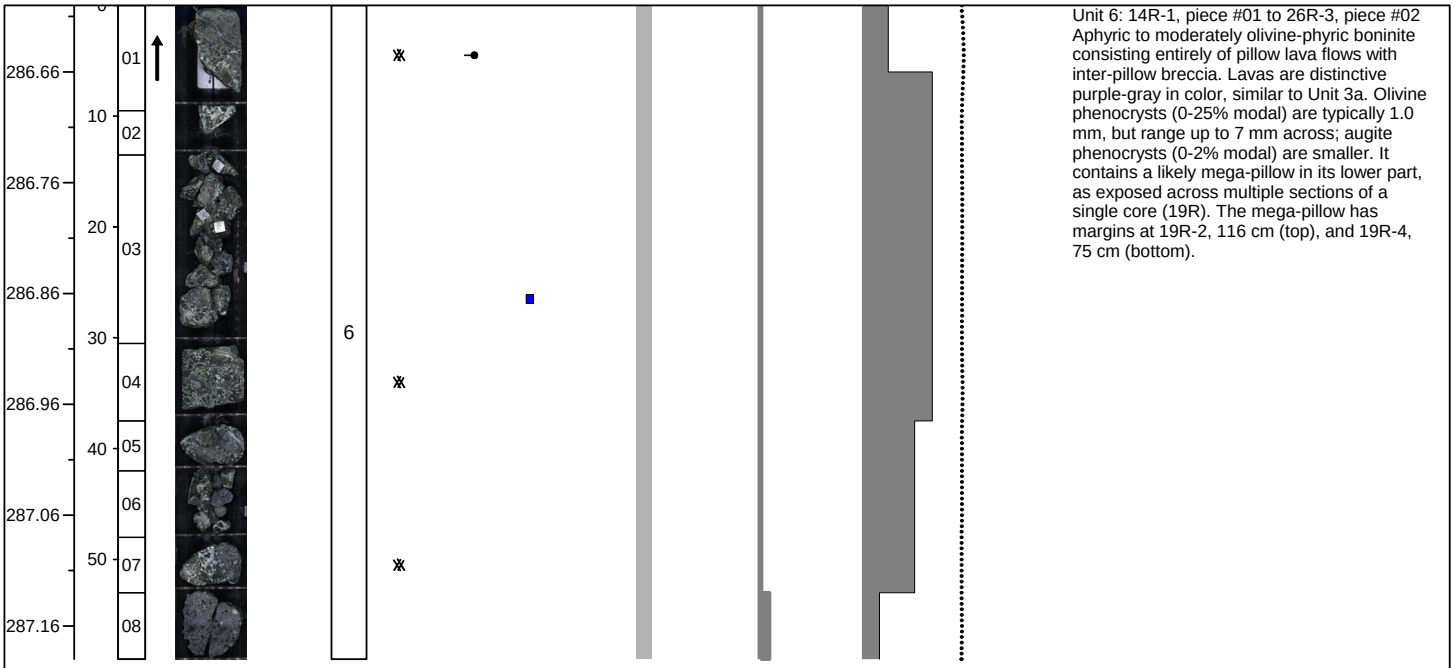
Unit 5: 9R-1, piece #06 to 13R-2, piece #03
Boninite pillow lava that is moderately to highly phenocryst phyric with olivine >> orthopyroxene (typically 10-20% olivine phenocrysts versus ~2-8% opx phenocrysts) and rarely contains augite as an additional phenocryst phase. Pillow rims and glass are preserved, along with slivers of interpillow breccia. In many places it appears that the highly-phyric lavas represent the cumulus-enriched lower portions of large pillow lavas; the upper portions and small pillows are commonly aphyric or sparsely phyric.

Hole 352-U1439C-14R Section 1, Top of Section: 285.1 m (CSF-A)



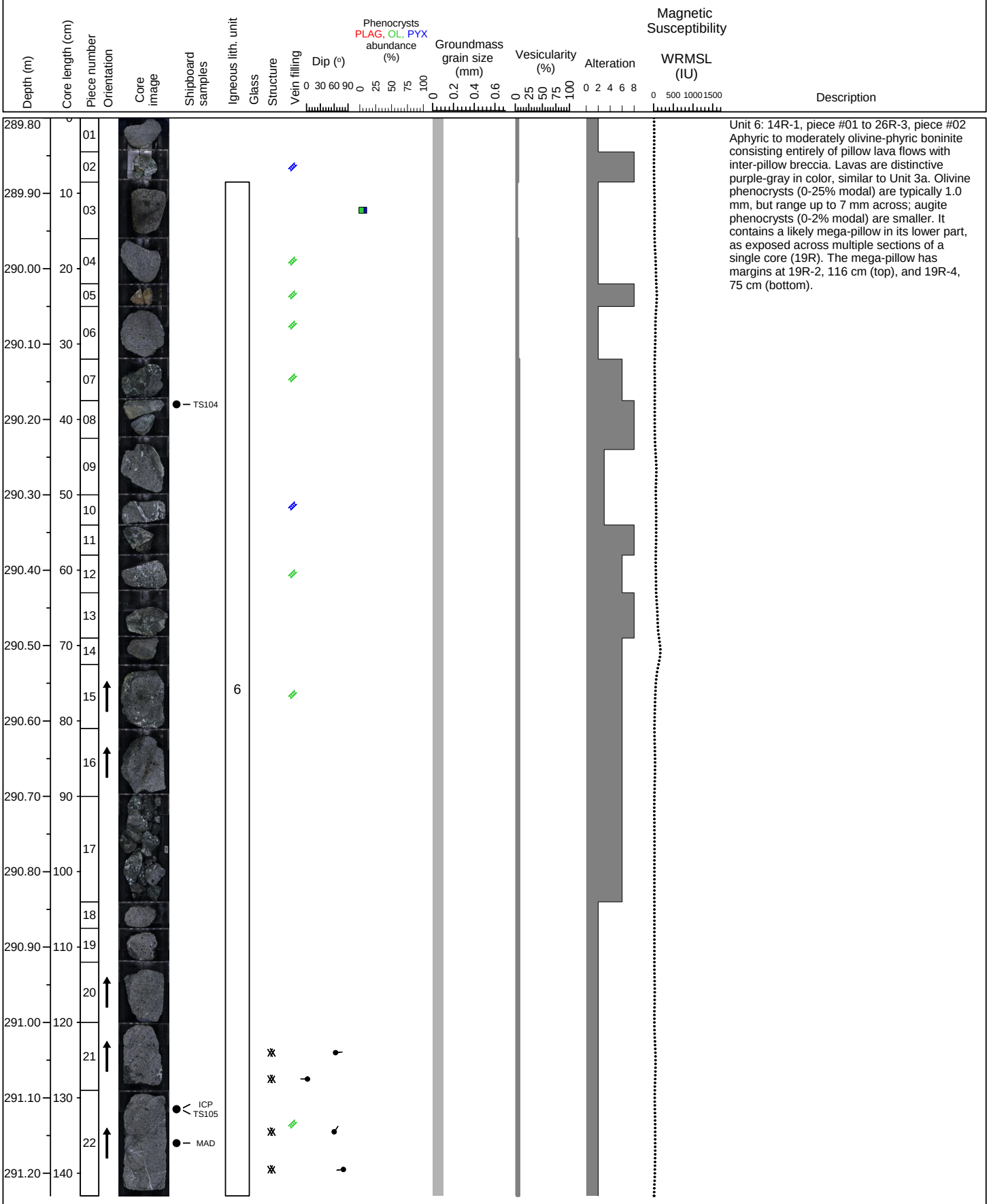
Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

Hole 352-U1439C-14R Section 2, Top of Section: 286.6 m (CSF-A)

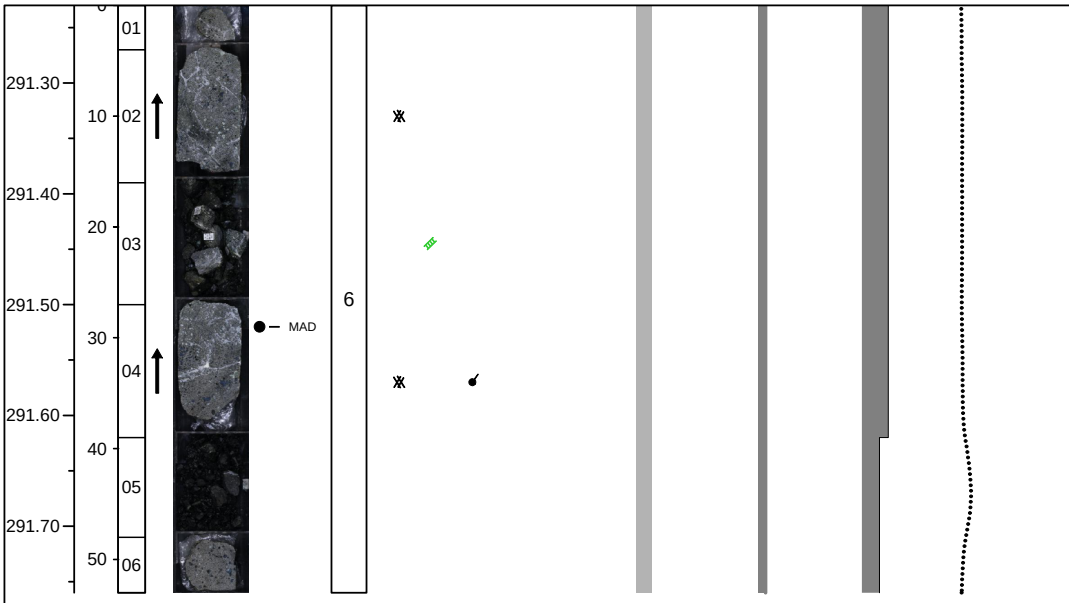


Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

Hole 352-U1439C-15R Section 1, Top of Section: 289.8 m (CSF-A)



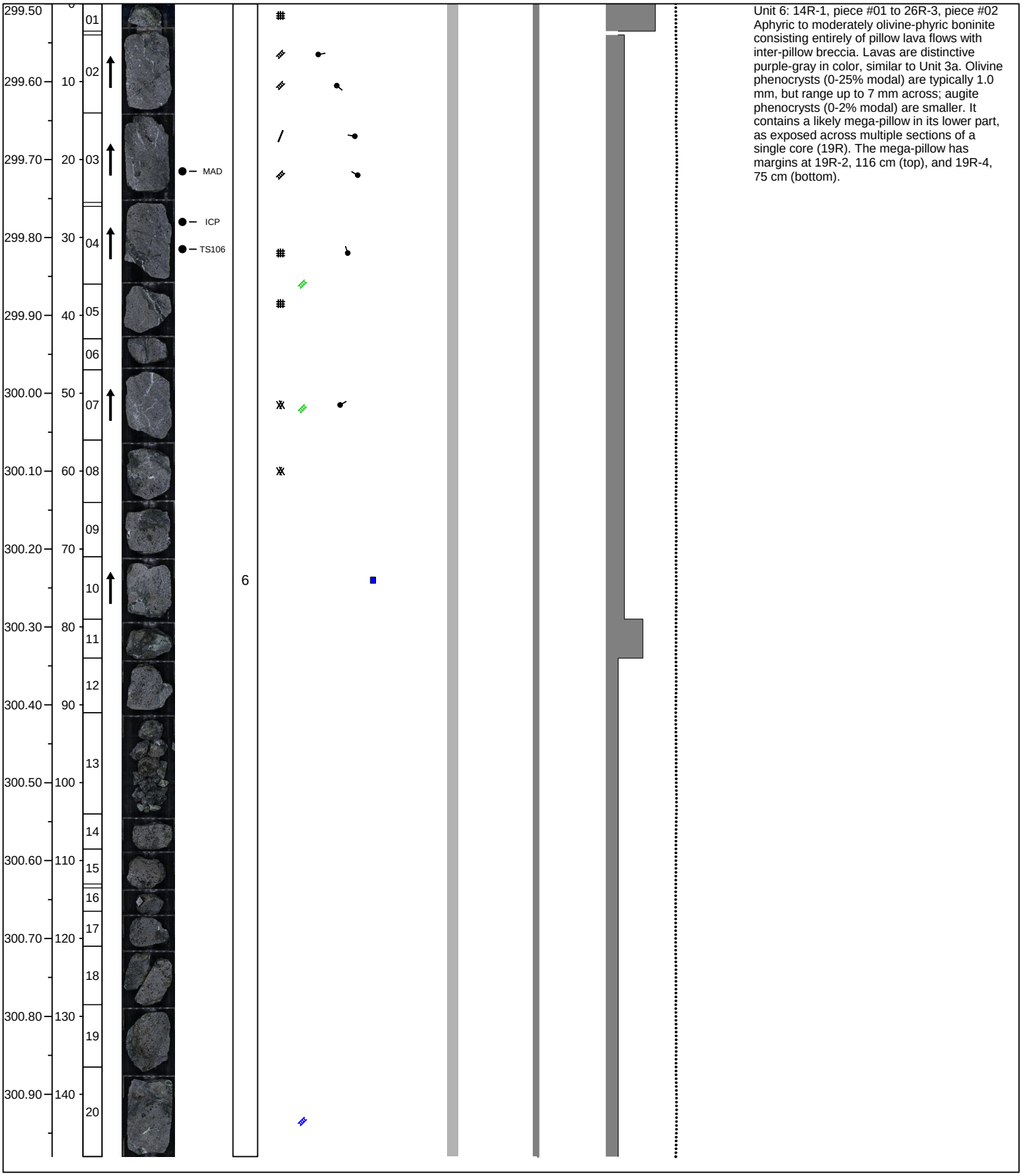
Hole 352-U1439C-15R Section 2, Top of Section: 291.23 m (CSF-A)



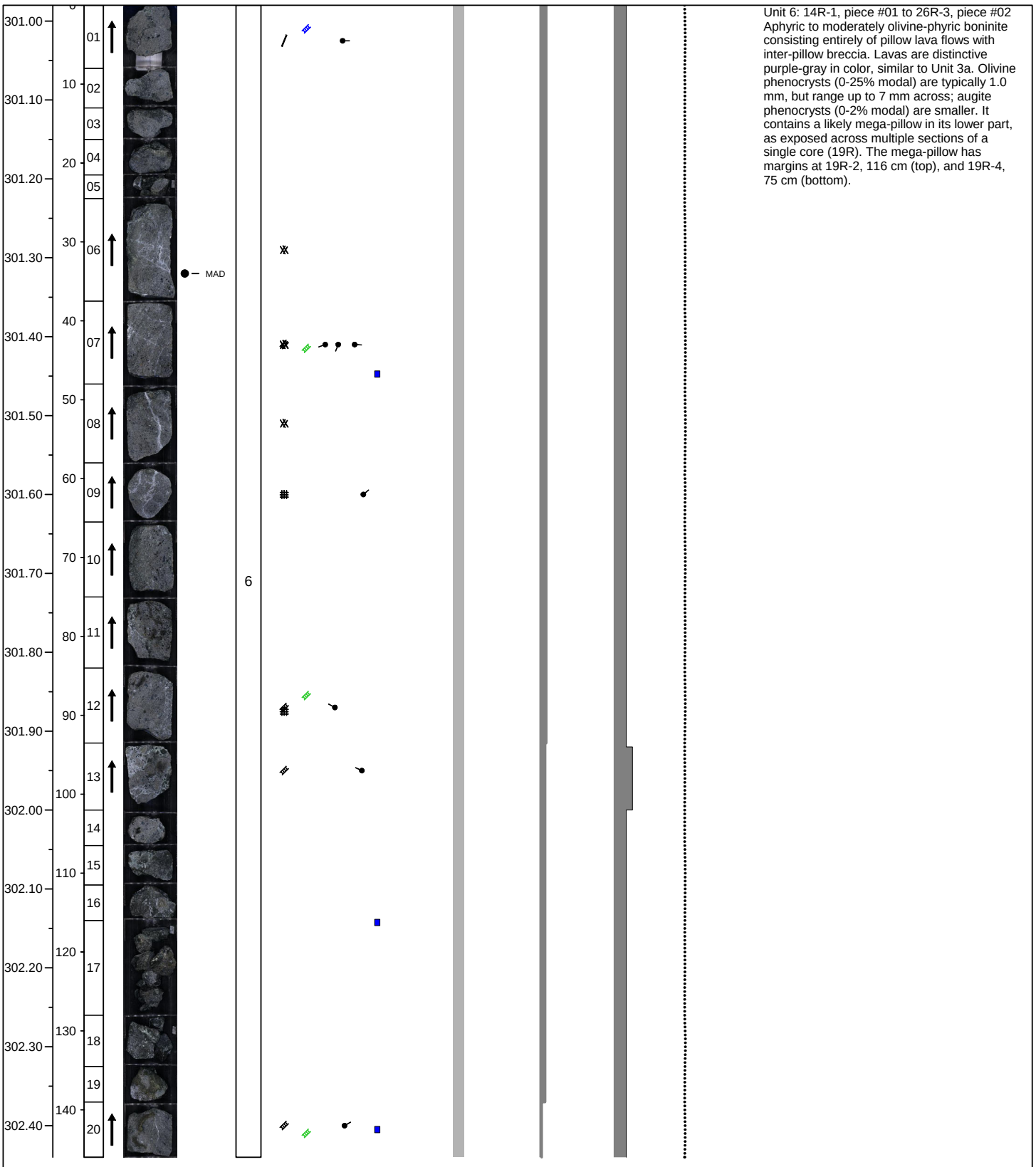
Description

Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

Hole 352-U1439C-16R Section 1, Top of Section: 299.5 m (CSF-A)

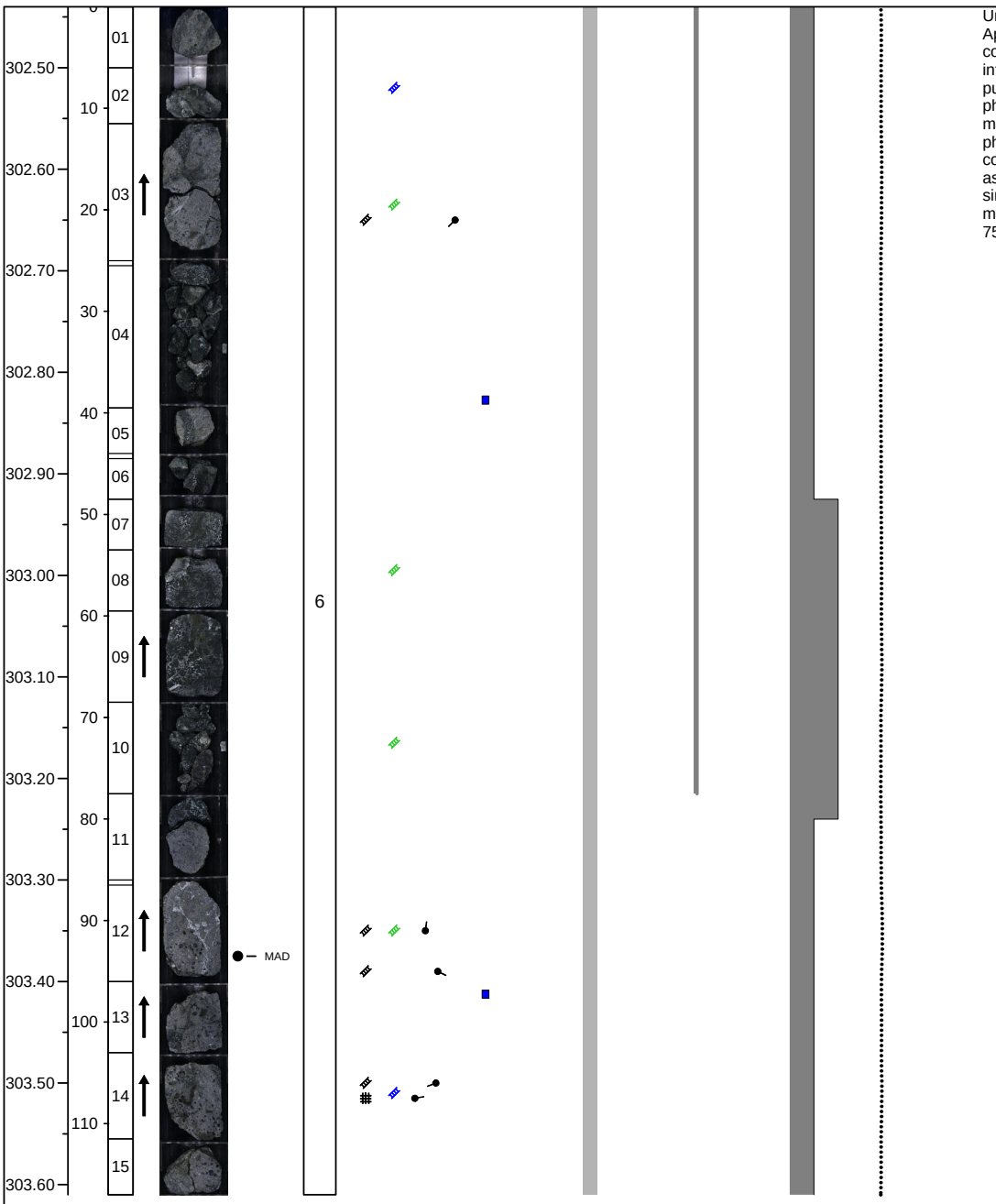


Hole 352-U1439C-16R Section 2, Top of Section: 300.98 m (CSF-A)



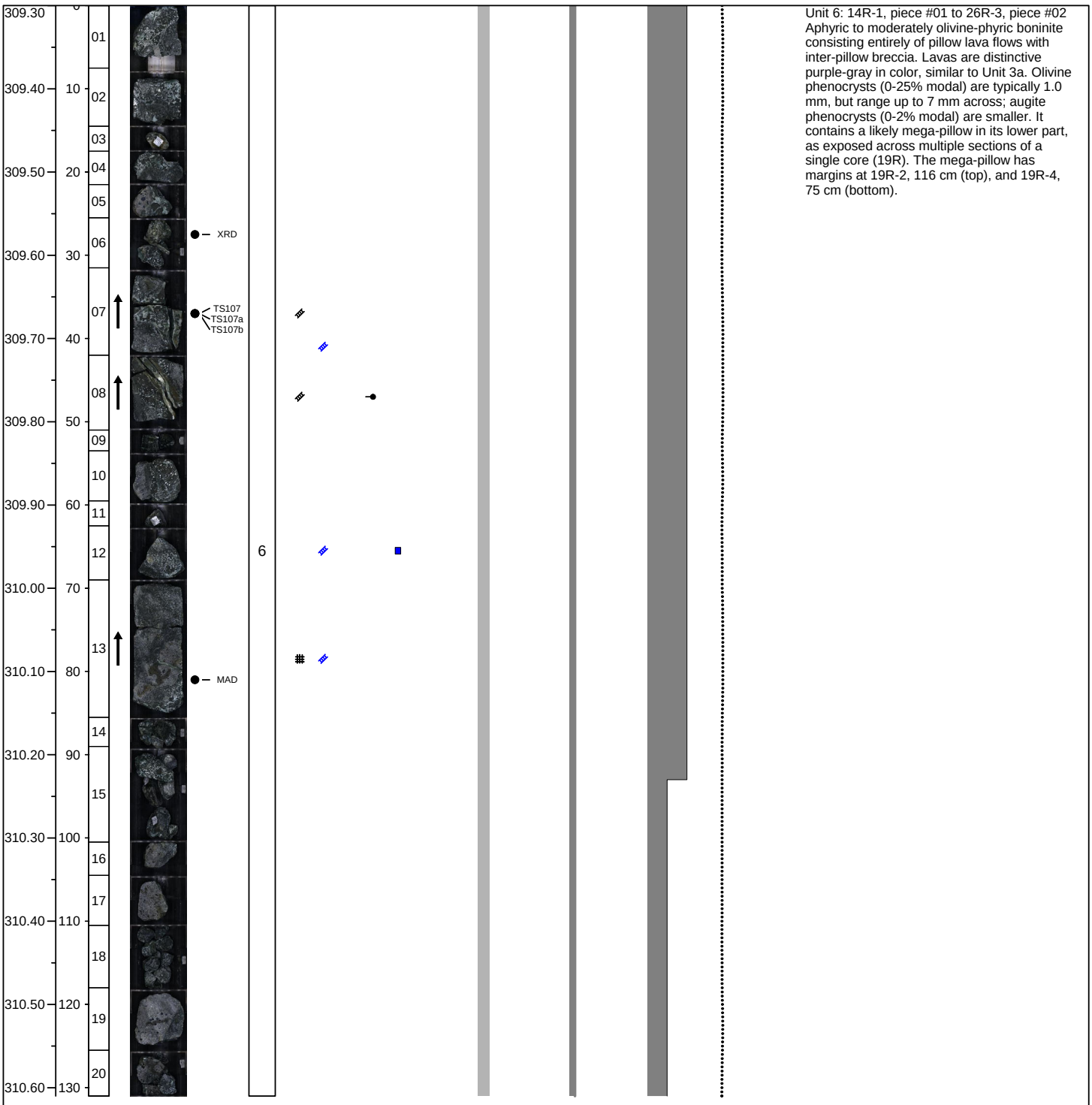
Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

Hole 352-U1439C-16R Section 3, Top of Section: 302.44 m (CSF-A)



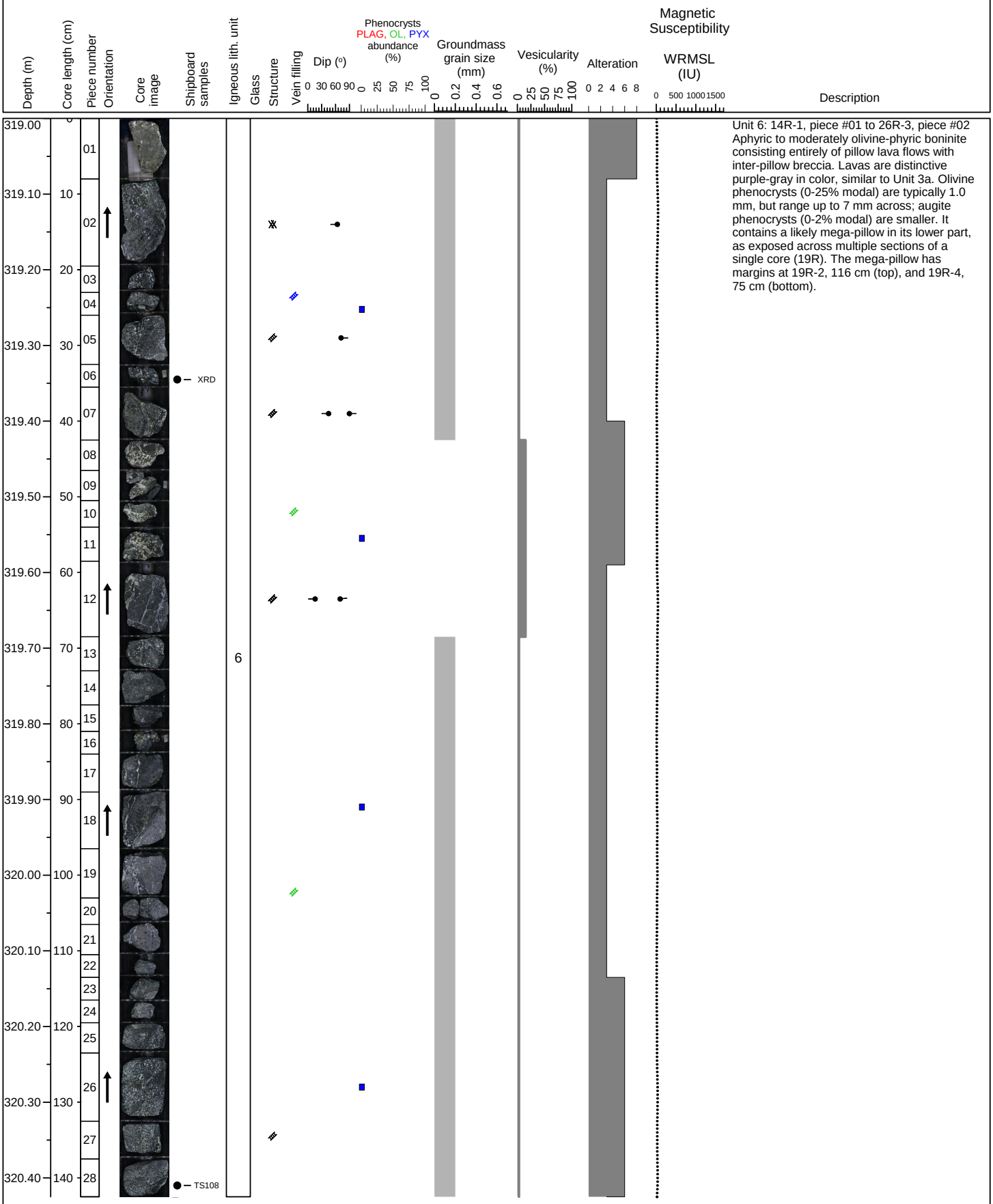
Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

Hole 352-U1439C-17R Section 1, Top of Section: 309.3 m (CSF-A)

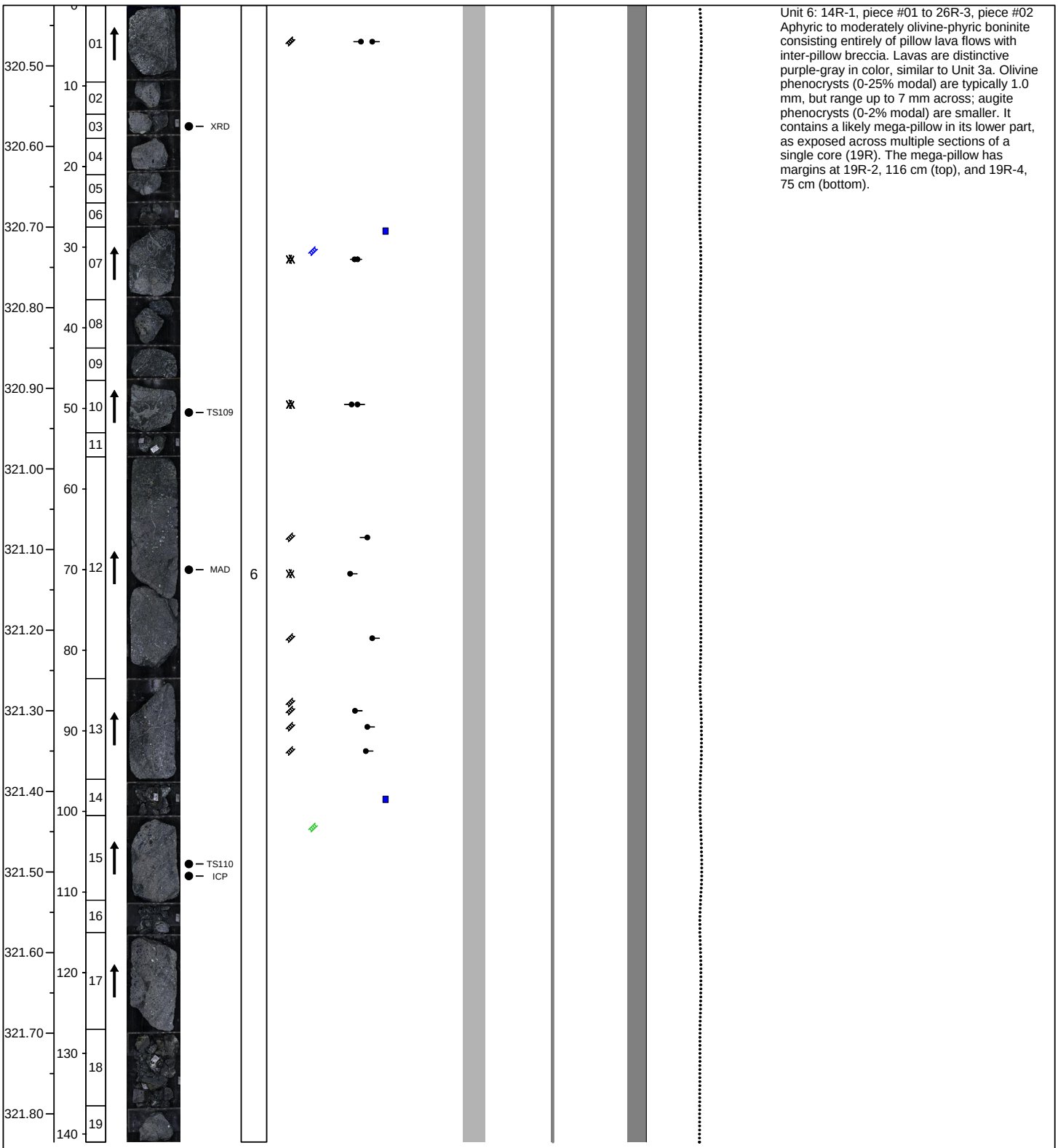


Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

Hole 352-U1439C-18R Section 1, Top of Section: 319.0 m (CSF-A)

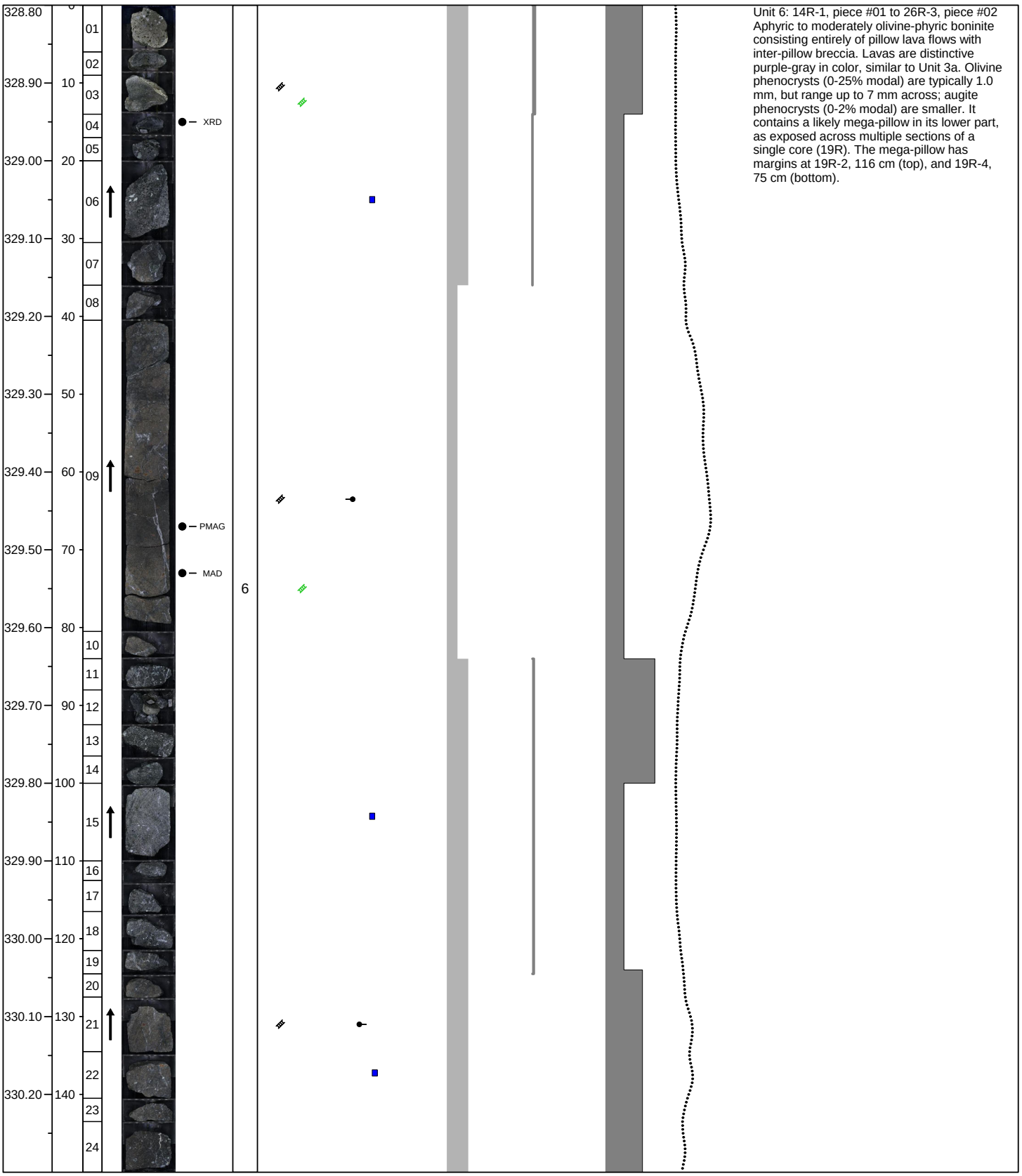


Hole 352-U1439C-18R Section 2, Top of Section: 320.425 m (CSF-A)

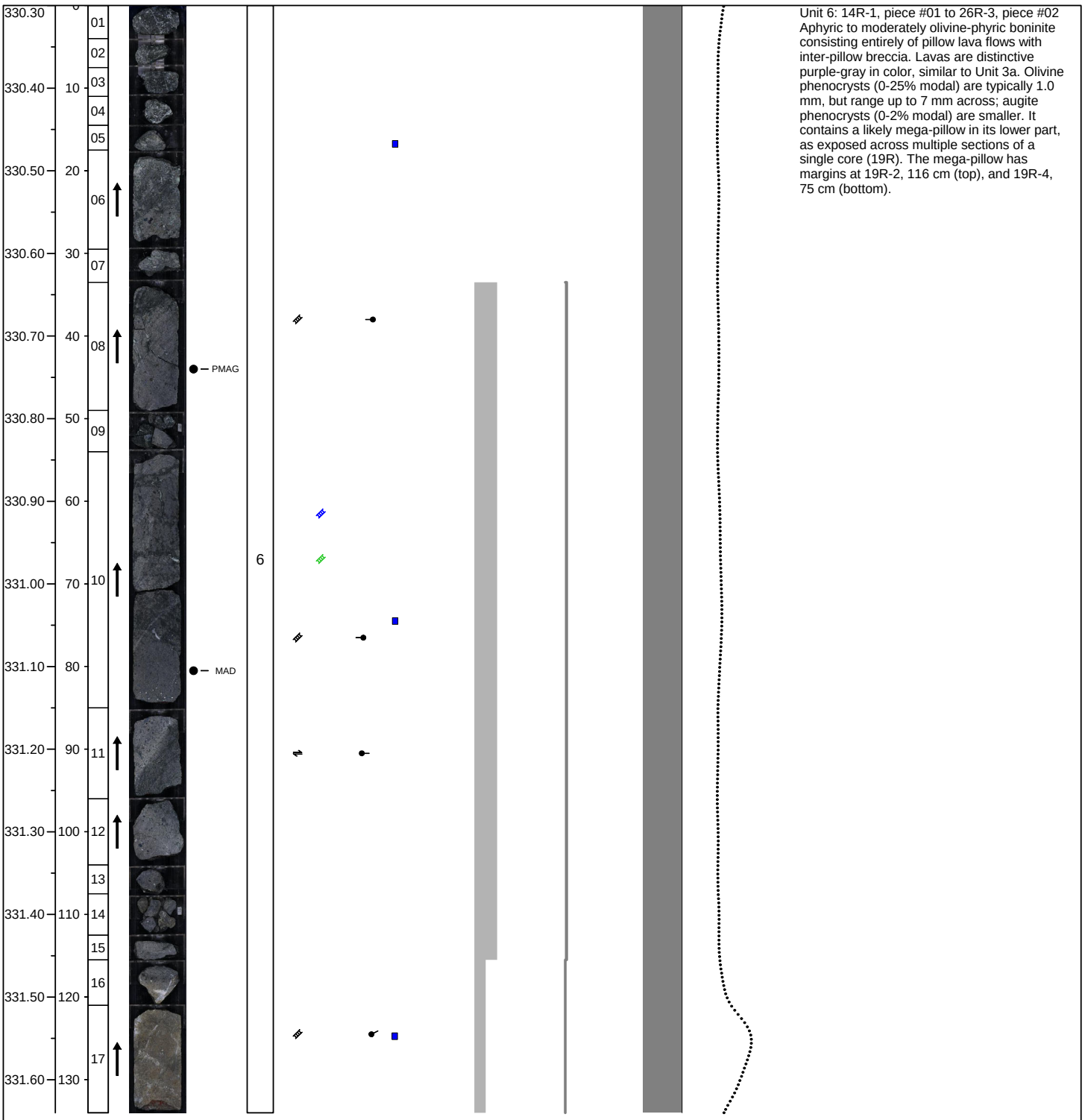


Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

Hole 352-U1439C-19R Section 1, Top of Section: 328.8 m (CSF-A)

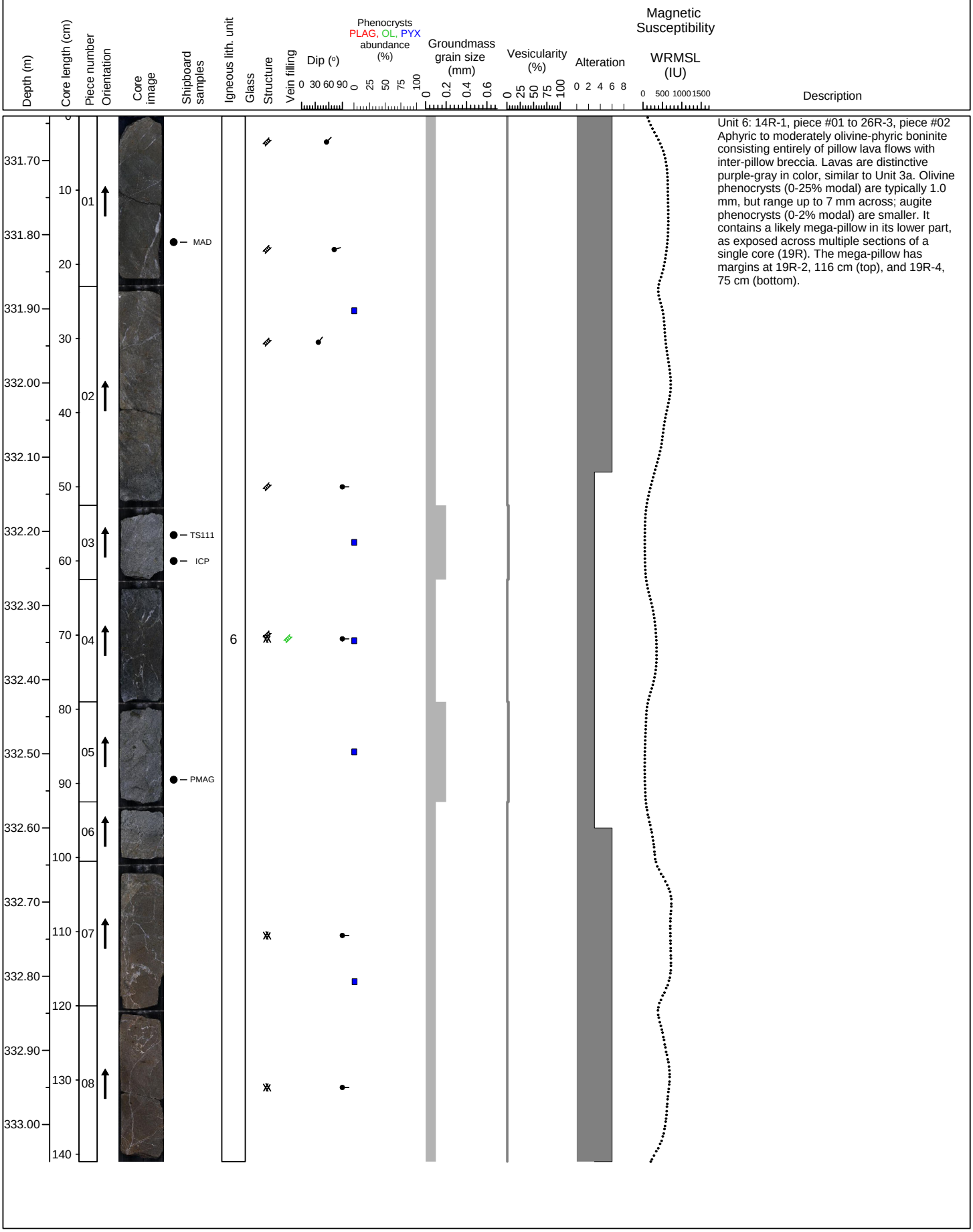


Hole 352-U1439C-19R Section 2, Top of Section: 330.3 m (CSF-A)

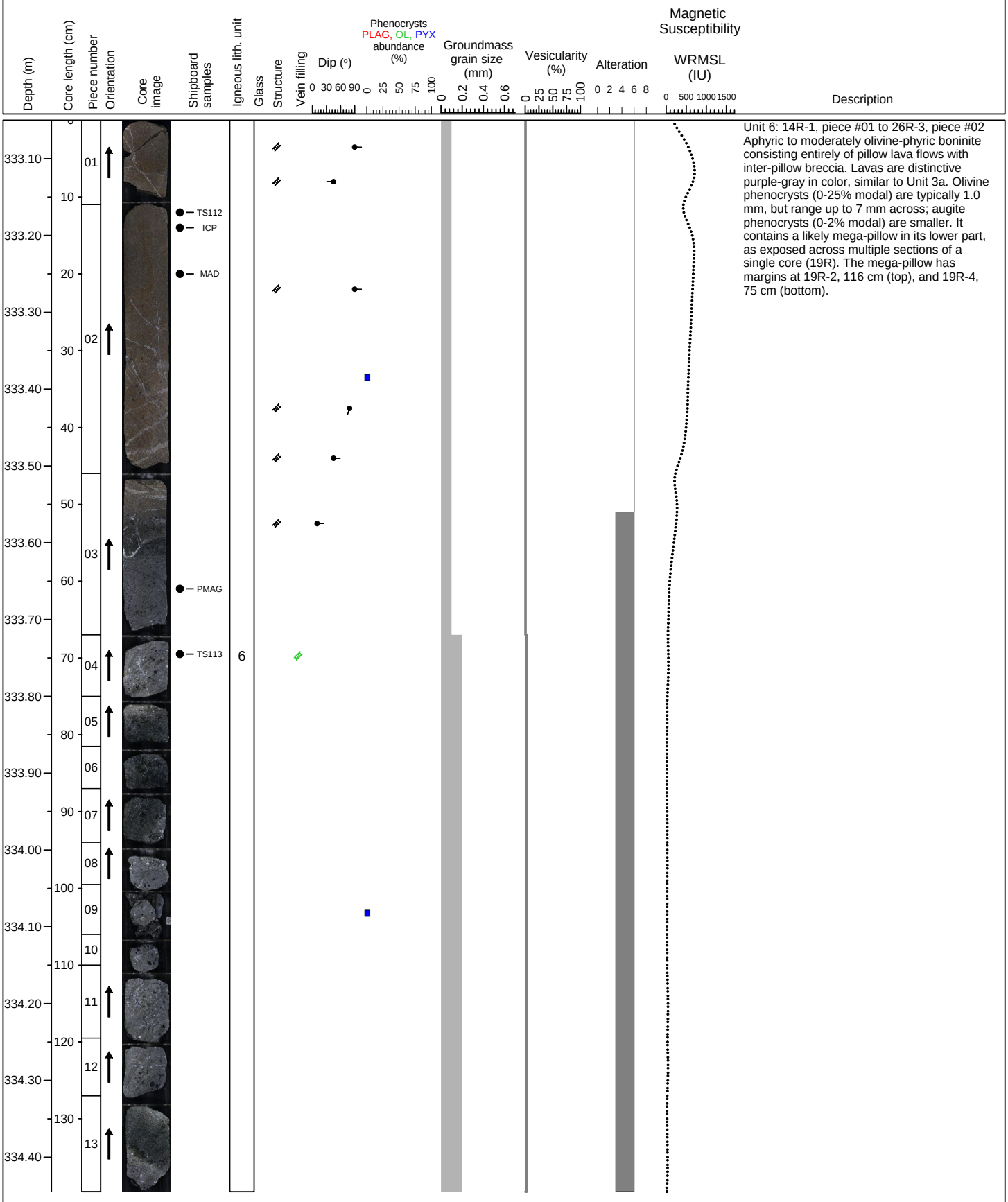


Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

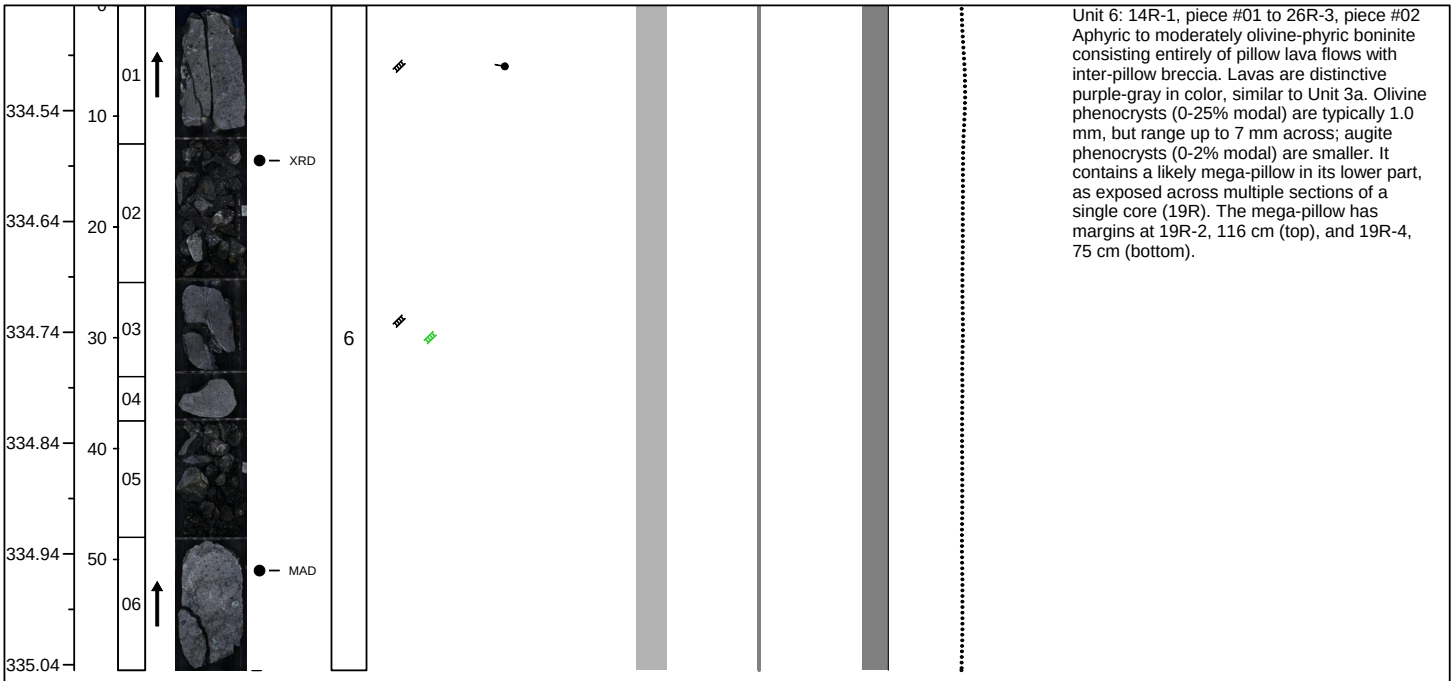
Hole 352-U1439C-19R Section 3, Top of Section: 331.64 m (CSF-A)



Hole 352-U1439C-19R Section 4, Top of Section: 333.05 m (CSF-A)

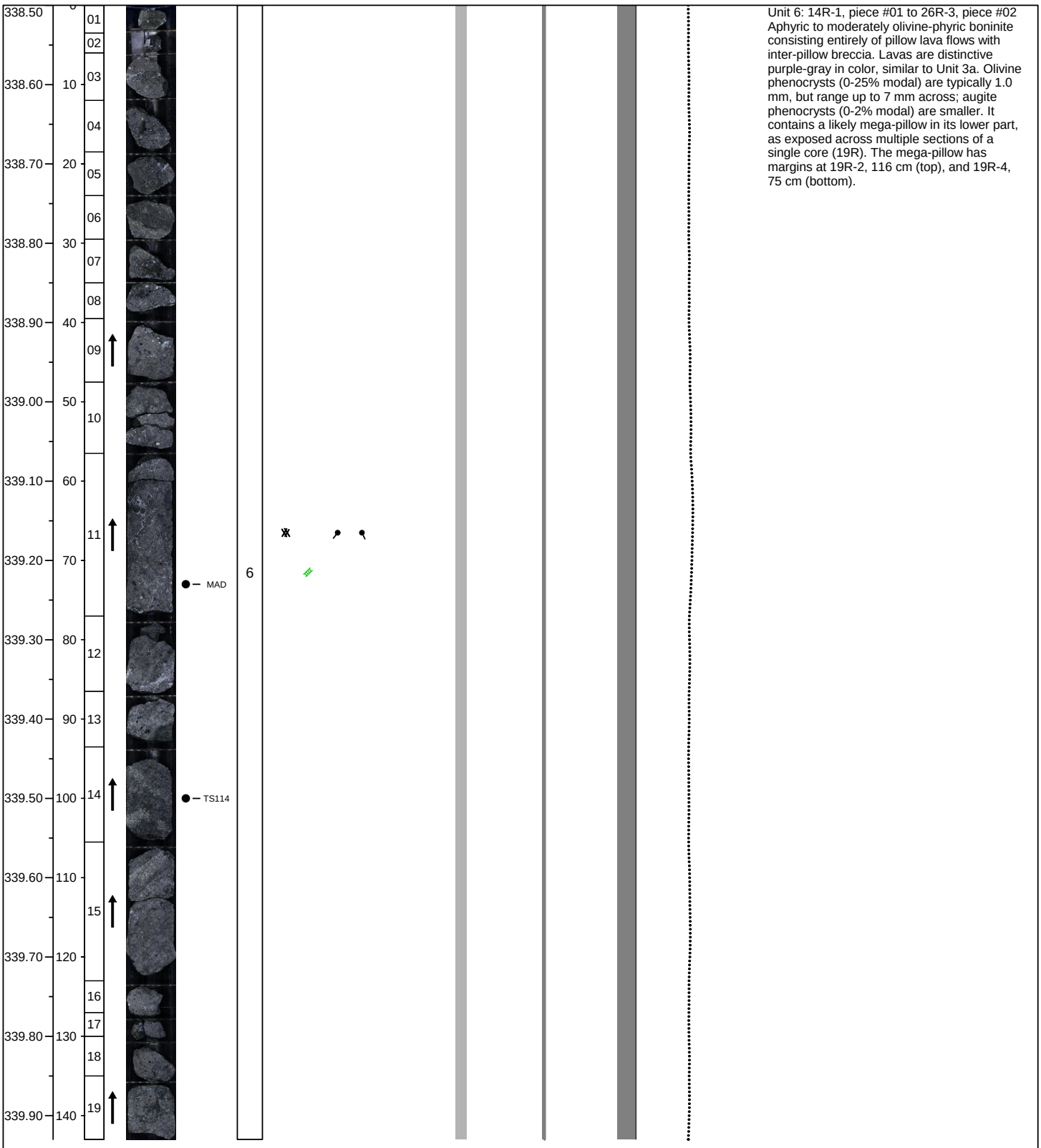


Hole 352-U1439C-19R Section 5, Top of Section: 334.445 m (CSF-A)



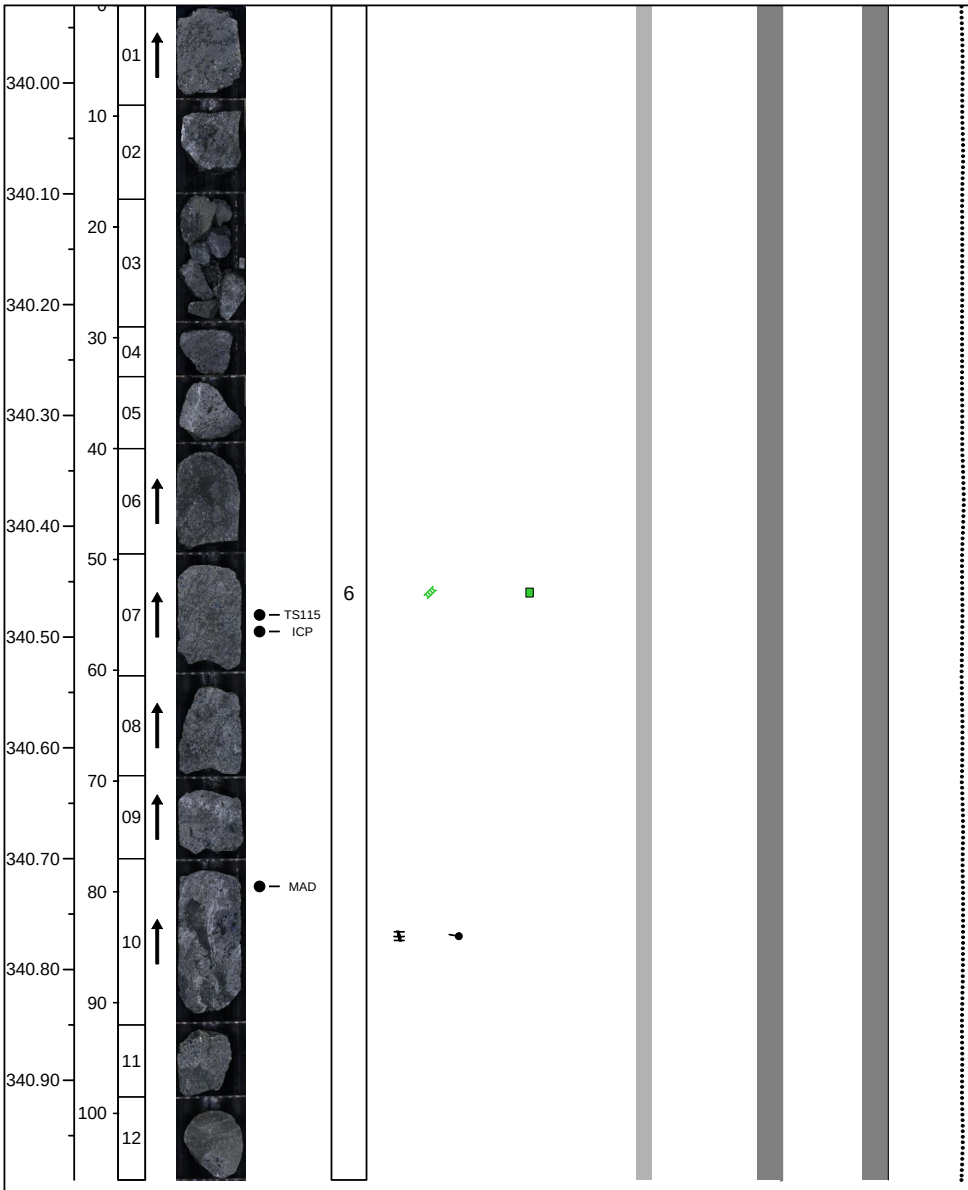
Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

Hole 352-U1439C-20R Section 1, Top of Section: 338.5 m (CSF-A)



Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

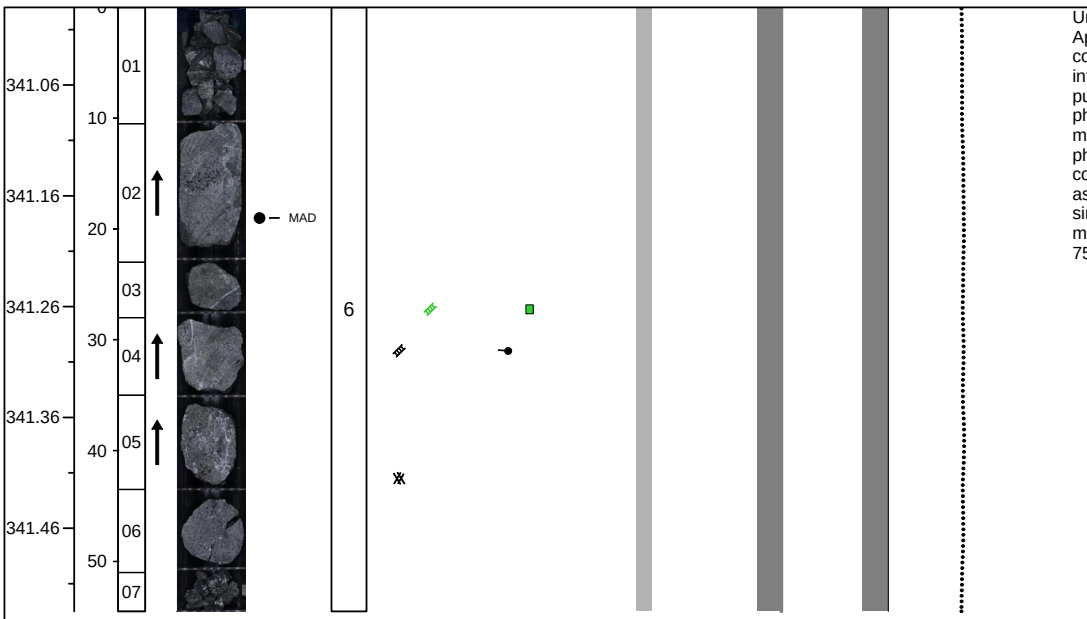
Hole 352-U1439C-20R Section 2, Top of Section: 339.93 m (CSF-A)



Description

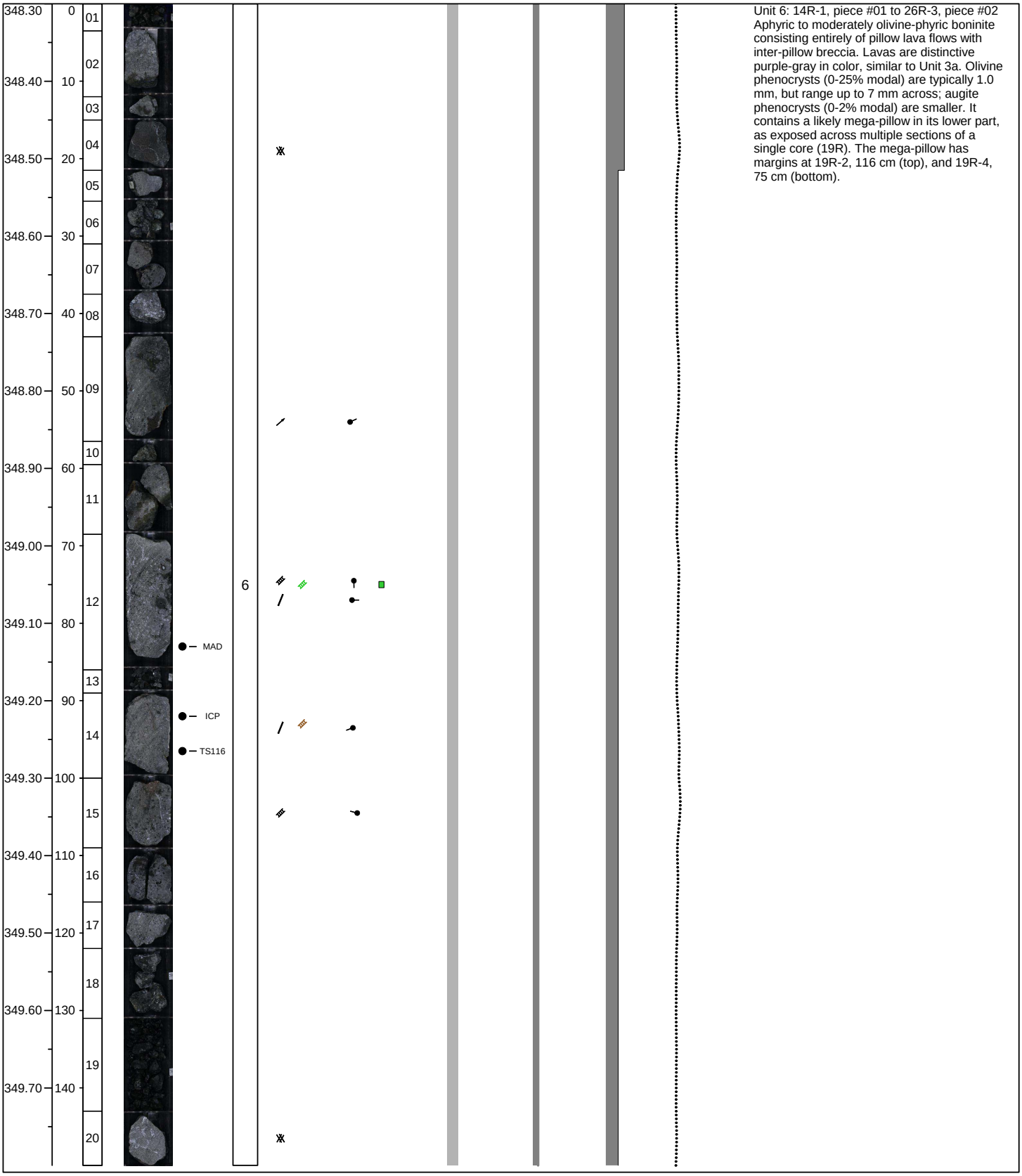
Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

Hole 352-U1439C-20R Section 3, Top of Section: 340.99 m (CSF-A)



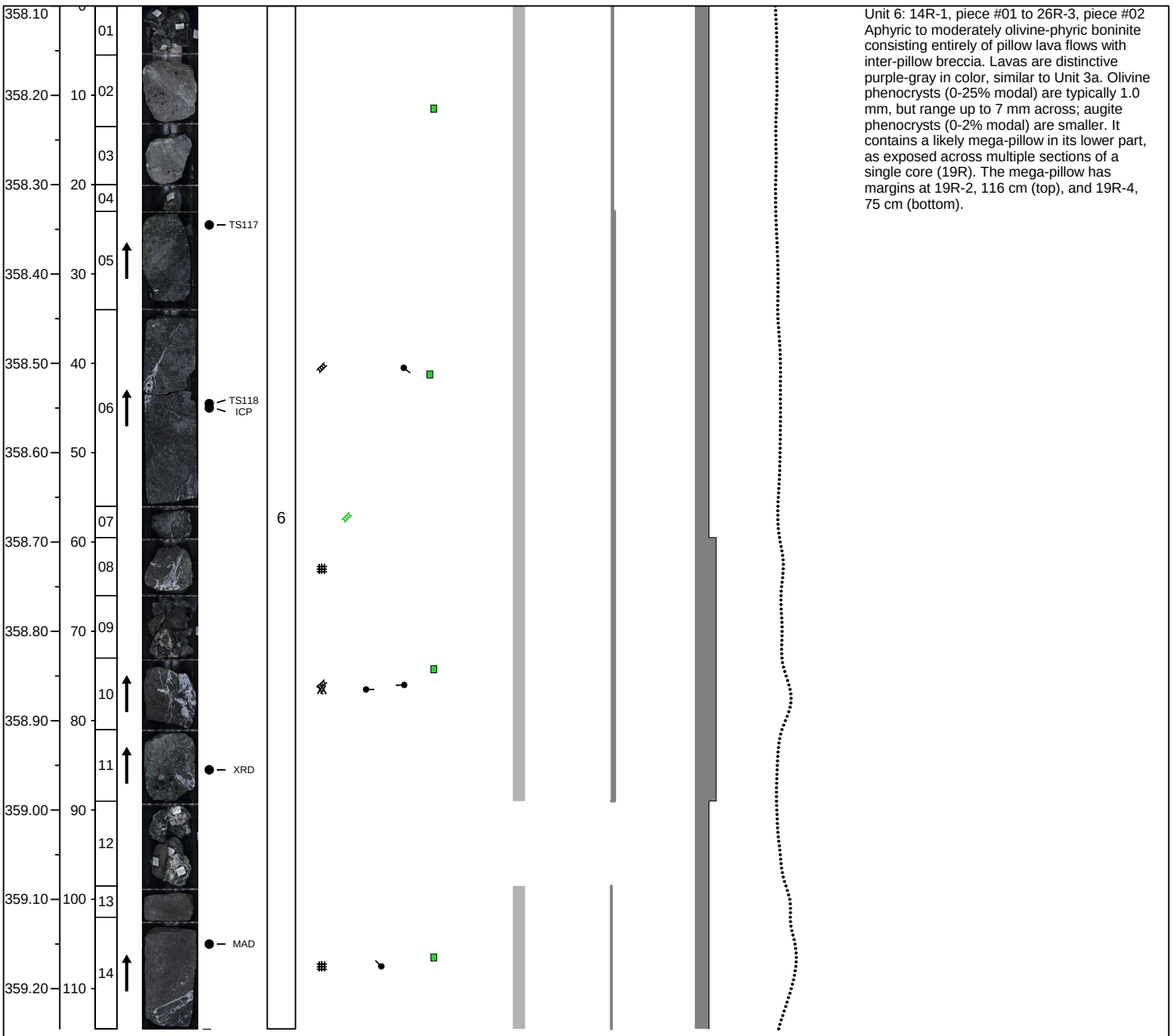
Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

Hole 352-U1439C-22R Section 1, Top of Section: 348.3 m (CSF-A)



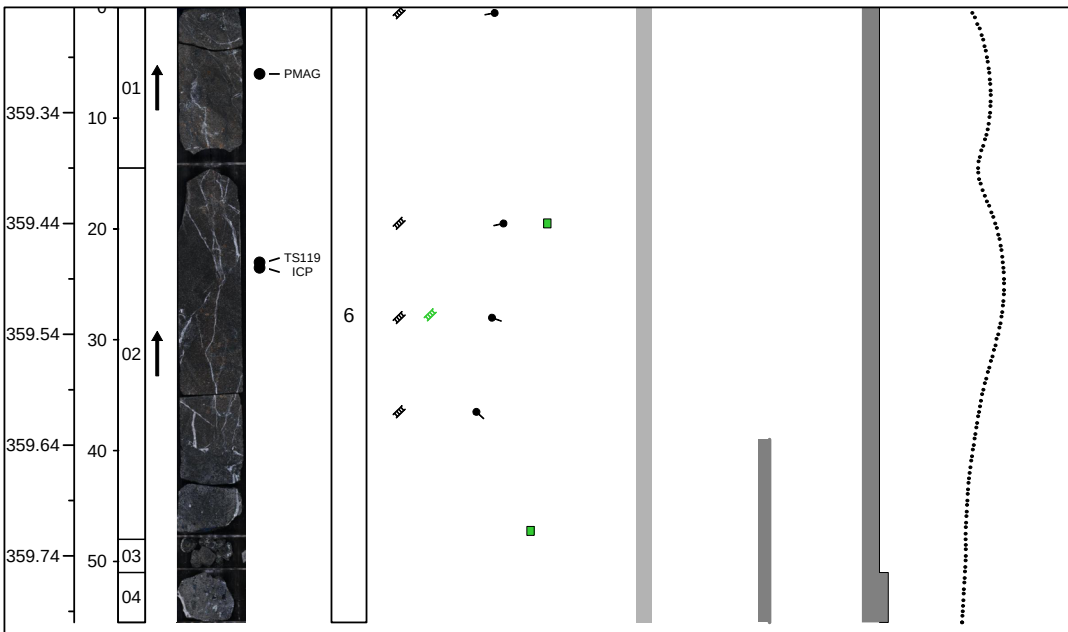
Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

Hole 352-U1439C-23R Section 1, Top of Section: 358.1 m (CSF-A)



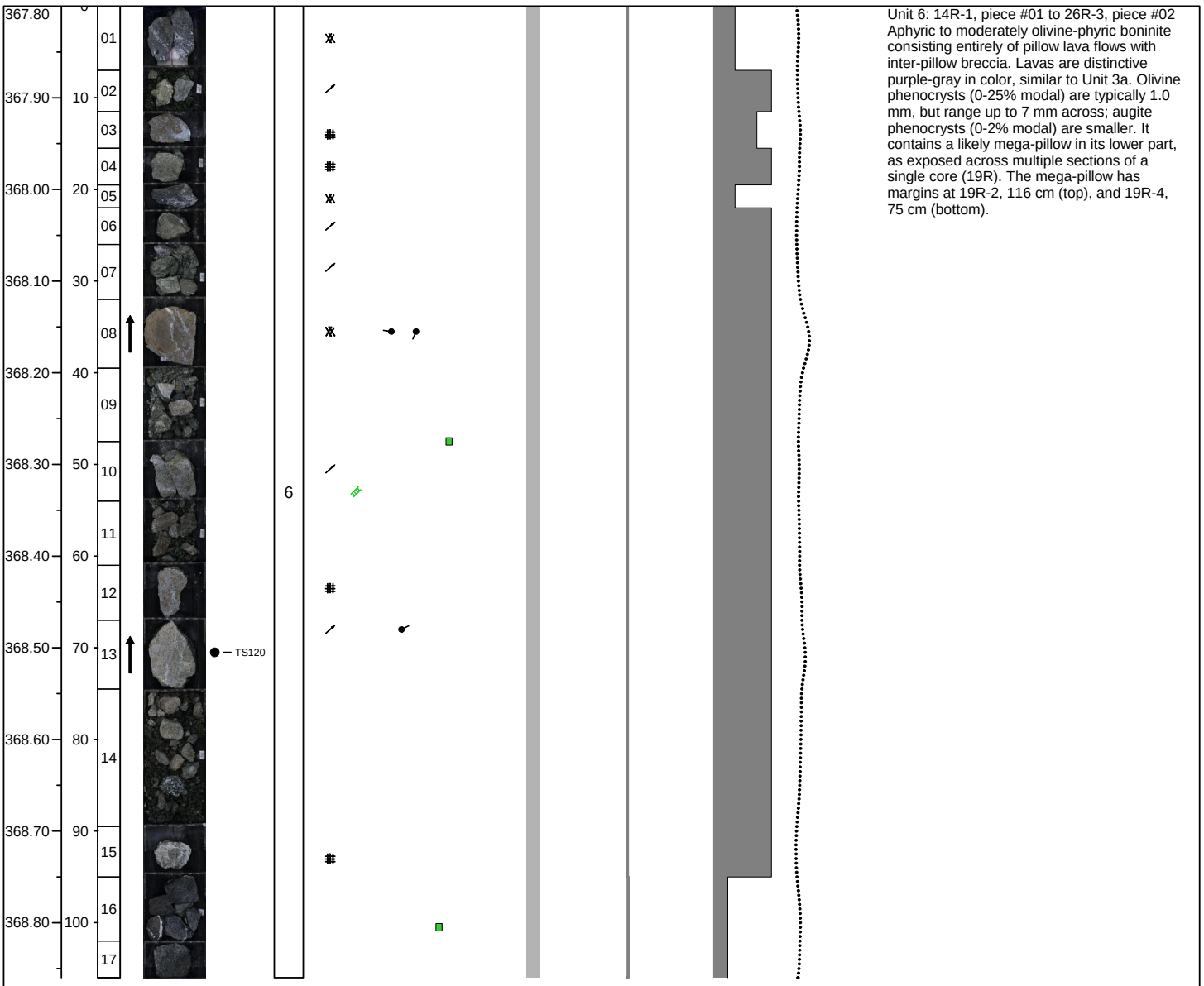
Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

Hole 352-U1439C-23R Section 2, Top of Section: 359.245 m (CSF-A)



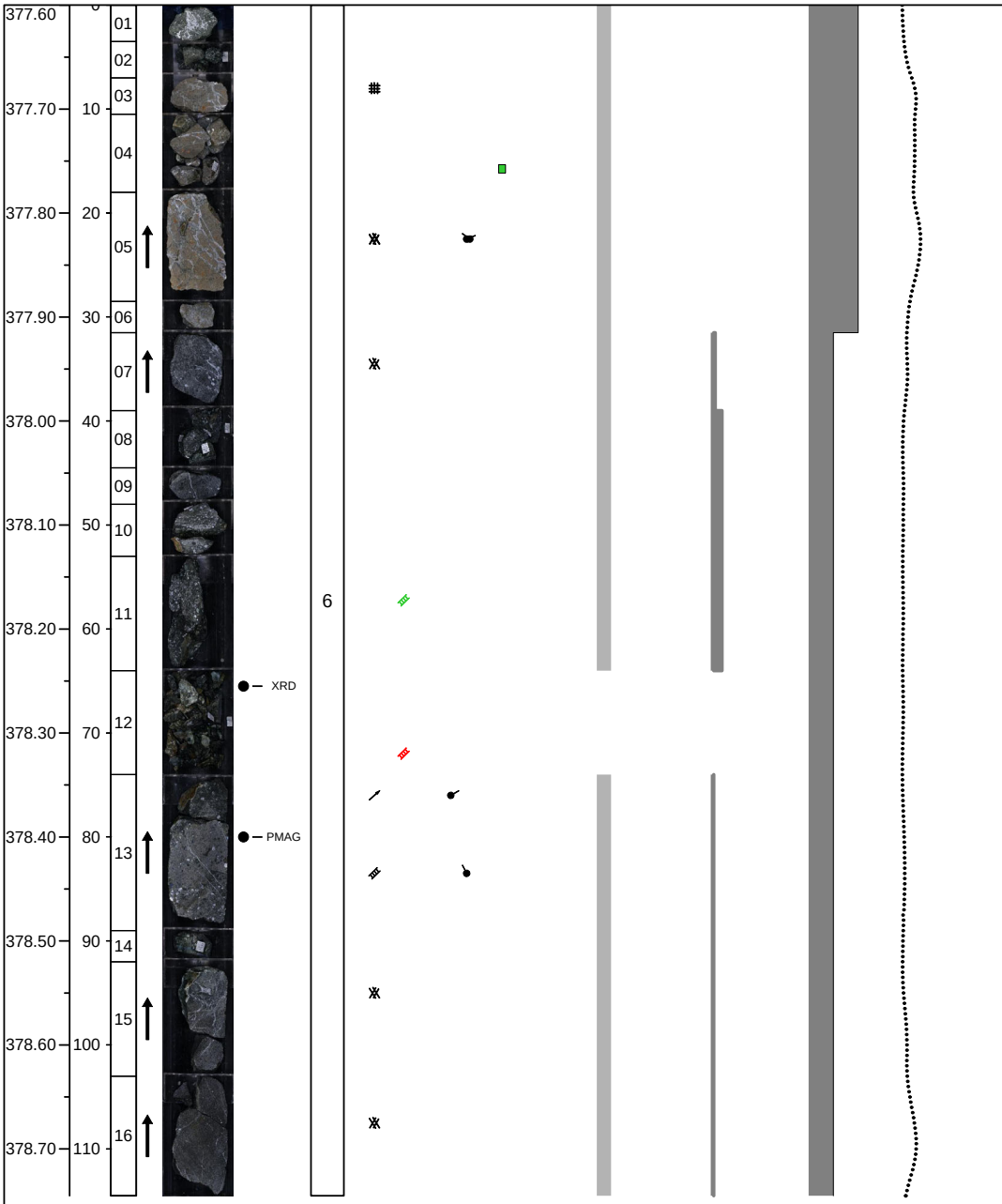
Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

Hole 352-U1439C-24R Section 1, Top of Section: 367.8 m (CSF-A)



Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

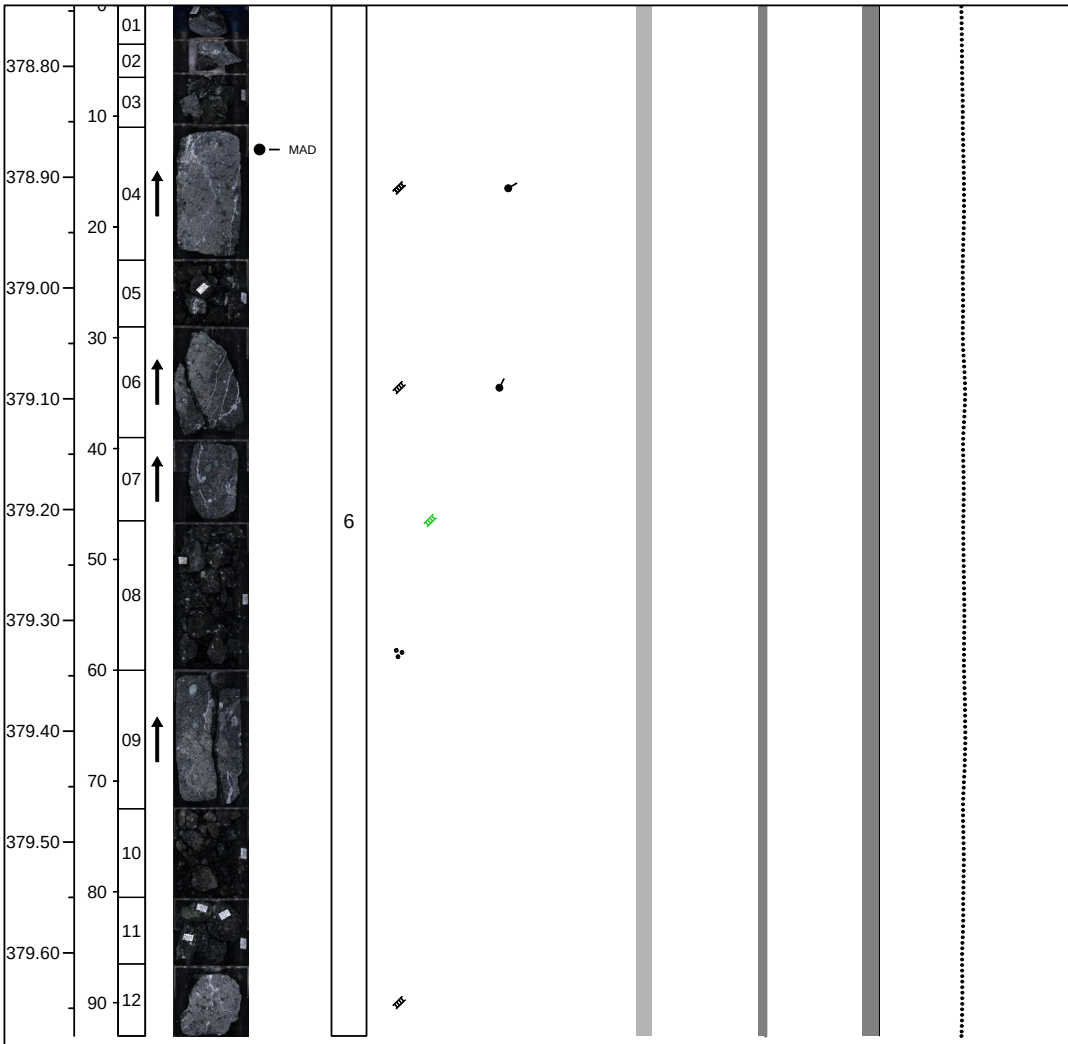
Hole 352-U1439C-25R Section 1, Top of Section: 377.6 m (CSF-A)



Description

Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

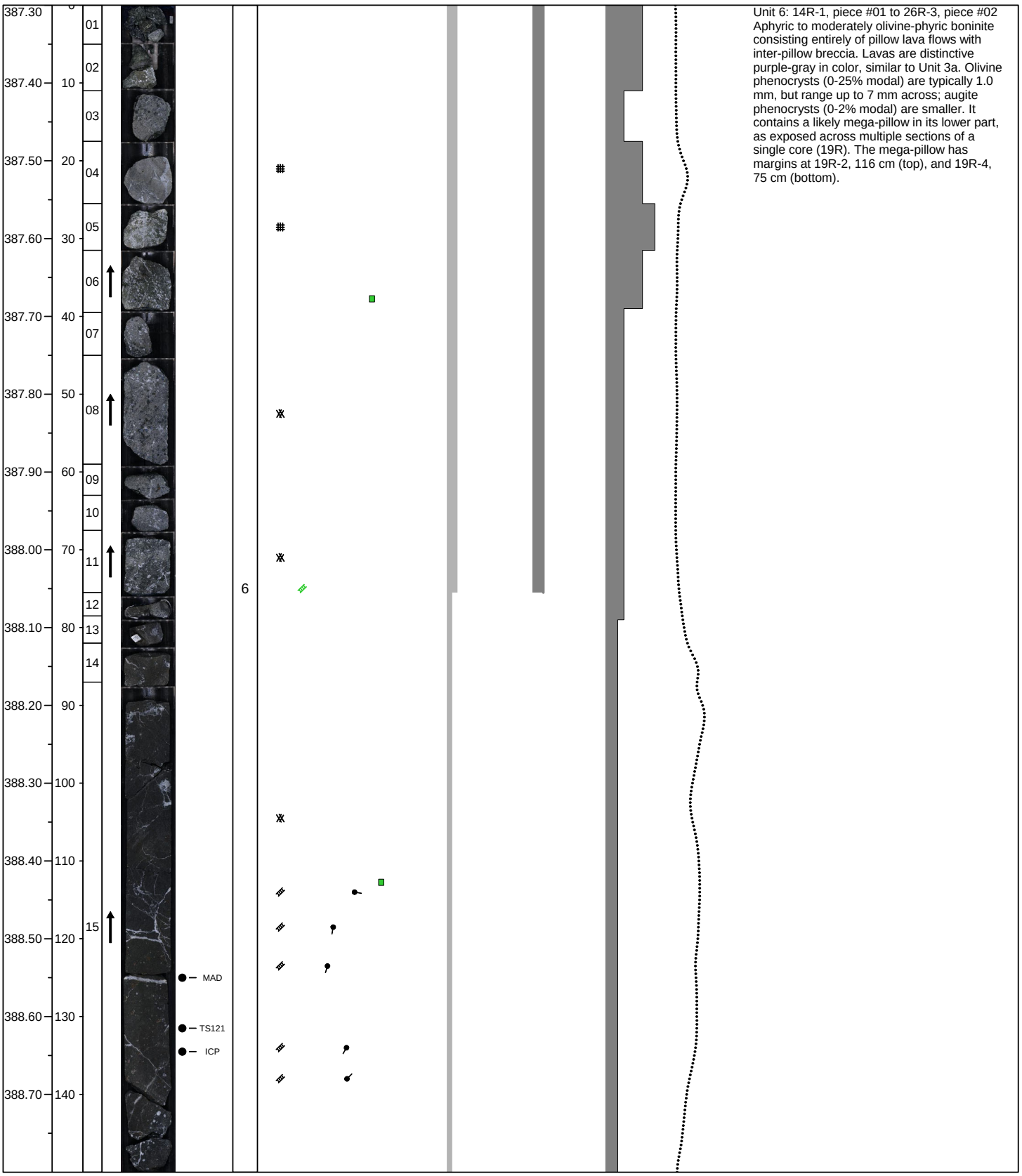
Hole 352-U1439C-25R Section 2, Top of Section: 378.745 m (CSF-A)



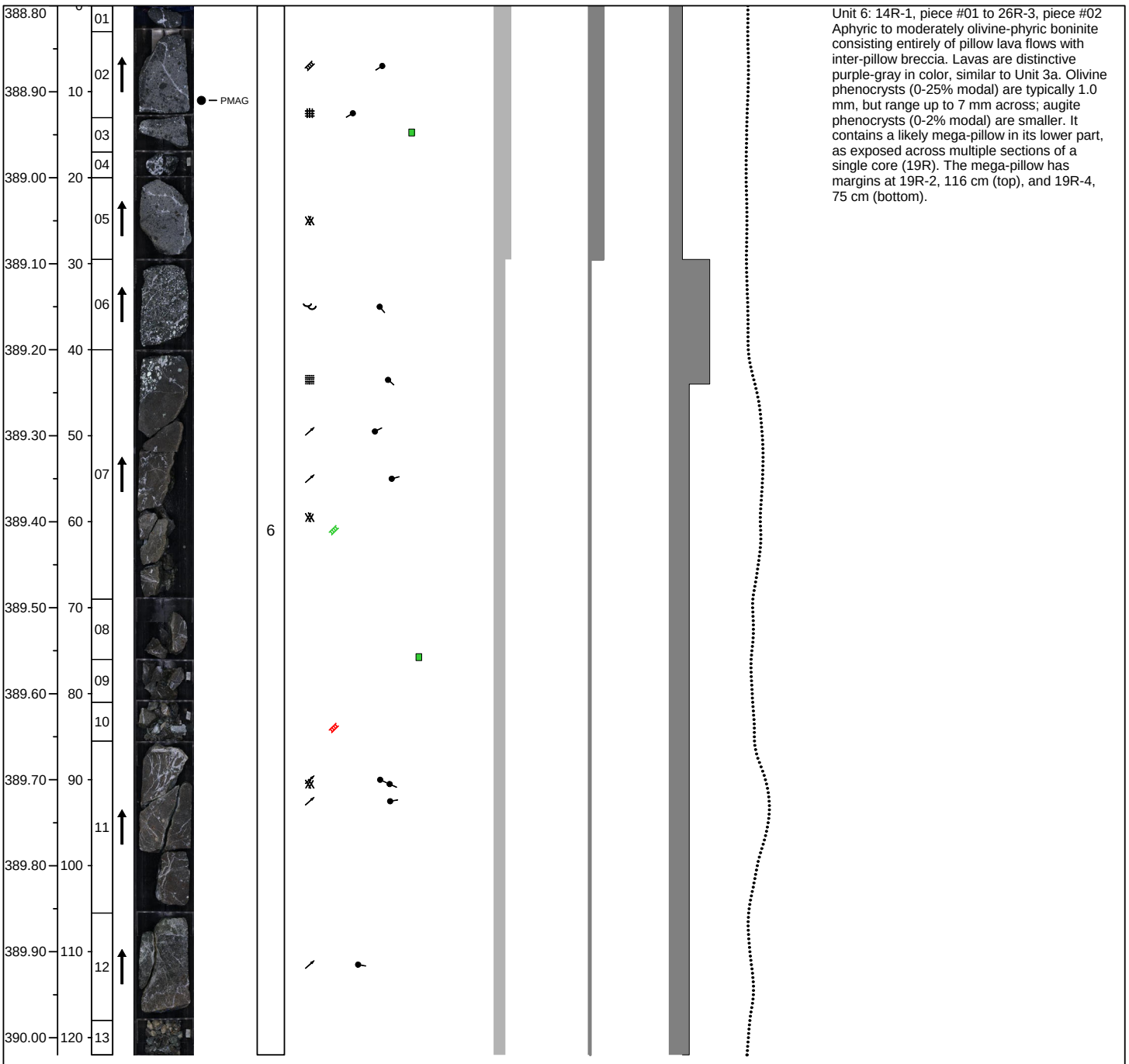
Description

Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

Hole 352-U1439C-26R Section 1, Top of Section: 387.3 m (CSF-A)

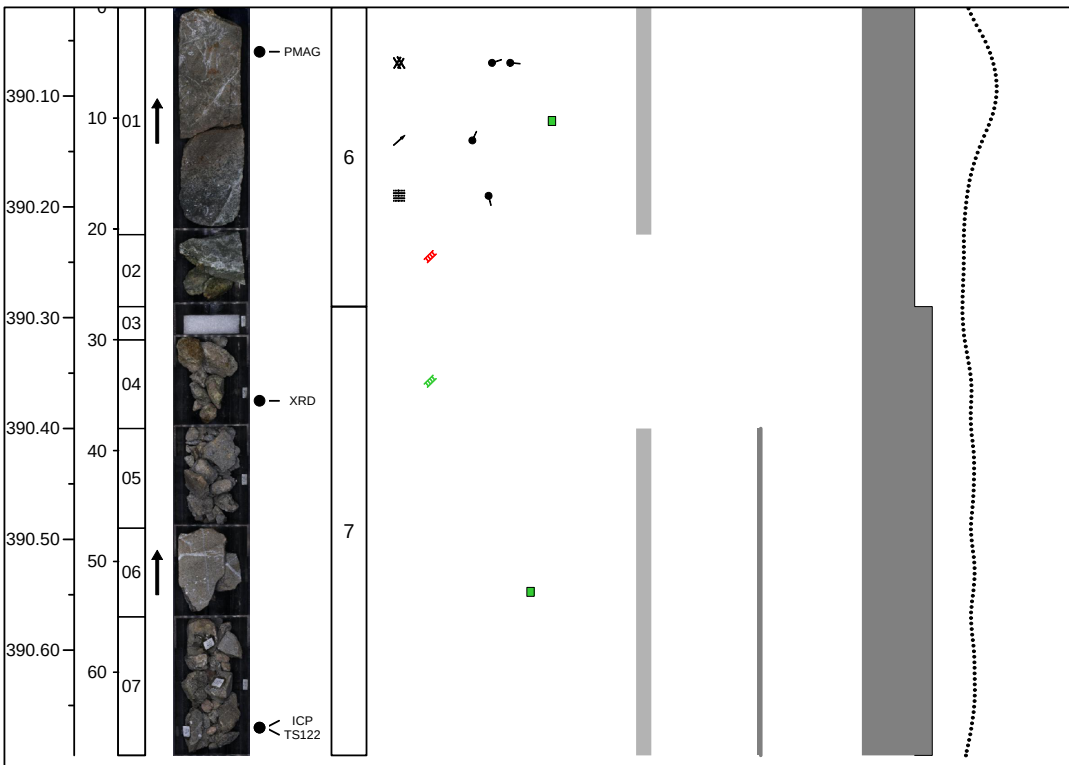


Hole 352-U1439C-26R Section 2, Top of Section: 388.8 m (CSF-A)



Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

Hole 352-U1439C-26R Section 3, Top of Section: 390.02 m (CSF-A)

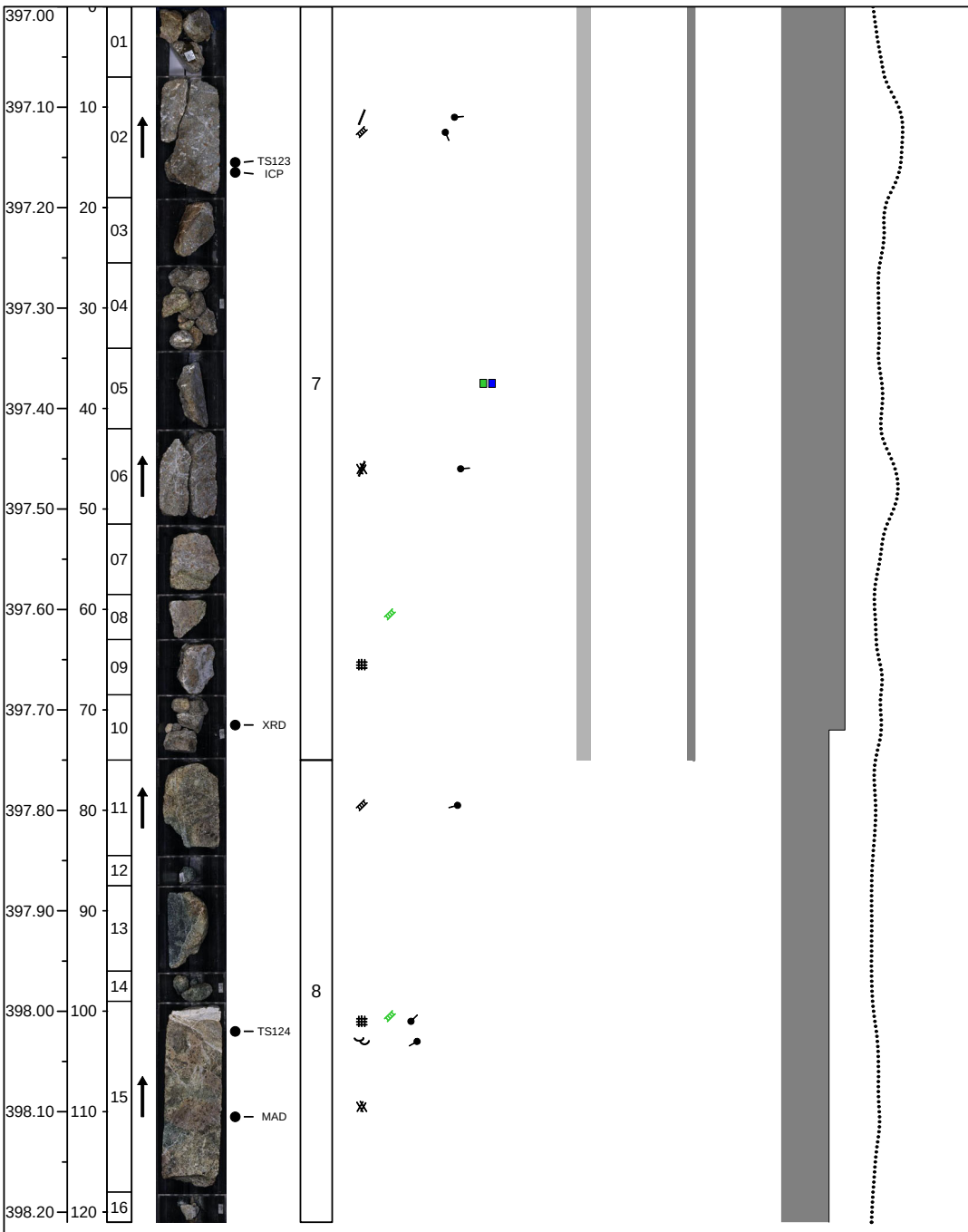


Description

Unit 6: 14R-1, piece #01 to 26R-3, piece #02
Aphyric to moderately olivine-phyric evolved boninite consisting entirely of pillow lava flows with inter-pillow breccia. Lavas are distinctive purple-gray in color, similar to Unit 3a. Olivine phenocrysts (0-25% modal) are typically 1.0 mm, but range up to 7 mm across; augite phenocrysts (0-2% modal) are smaller. It contains a likely mega-pillow in its lower part, as exposed across multiple sections of a single core (19R). The mega-pillow has margins at 19R-2, 116 cm (top), and 19R-4, 75 cm (bottom).

Unit 7: 26R-3, piece #03 to 27R-1, piece #10
An allochthonous (fault-bounded) sliver of massive boninites. Two varieties present: (a) augite + plagioclase-phyric evolved boninite with groundmass plagioclase, and (b) augite +/- olivine-phyric evolved boninite with groundmass plagioclase, replaced by zeolites. The lower boninite has large euhedral to subhedral augite phenocrysts that commonly form glomerocrysts, and are associated with alteration products that may pseudomorph olivine and plagioclase. The boninites are bounded on their upper and lower contacts by cataclasites.

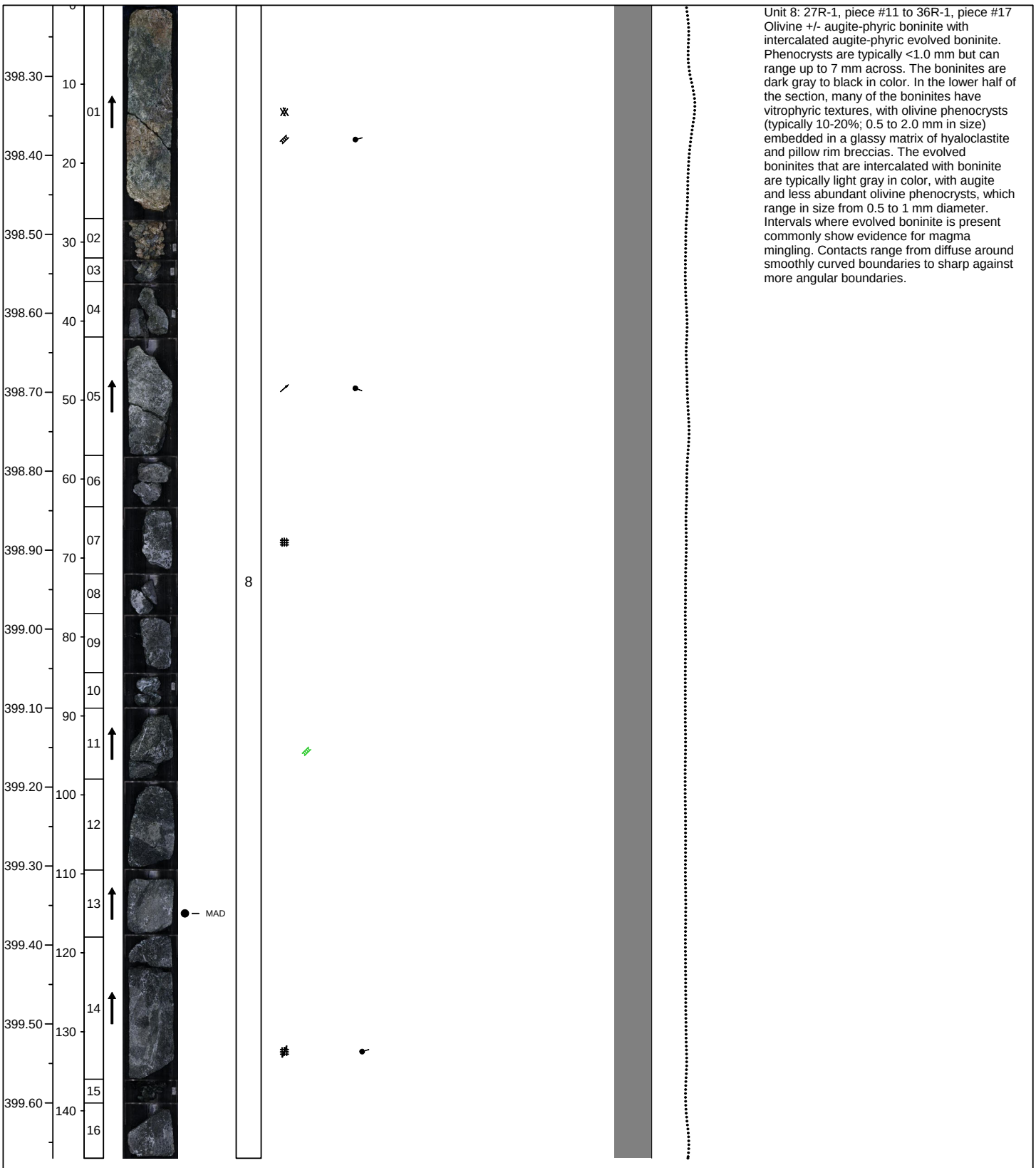
Hole 352-U1439C-27R Section 1, Top of Section: 397.0 m (CSF-A)



Unit 7: 26R-3, piece #03 to 27R-1, piece #10
An allochthonous (fault-bounded) sliver of massive boninites. Two varieties present: (a) augite + plagioclase-phyric evolved boninite with groundmass plagioclase, and (b) augite +/- olivine-phyric evolved boninite with groundmass plagioclase, replaced by zeolites. The lower boninite has large euhedral to subhedral augite phenocrysts that commonly form glomerocrysts, and are associated with alteration products that may pseudomorph olivine and plagioclase. The boninites are bounded on their upper and lower contacts by cataclasites.

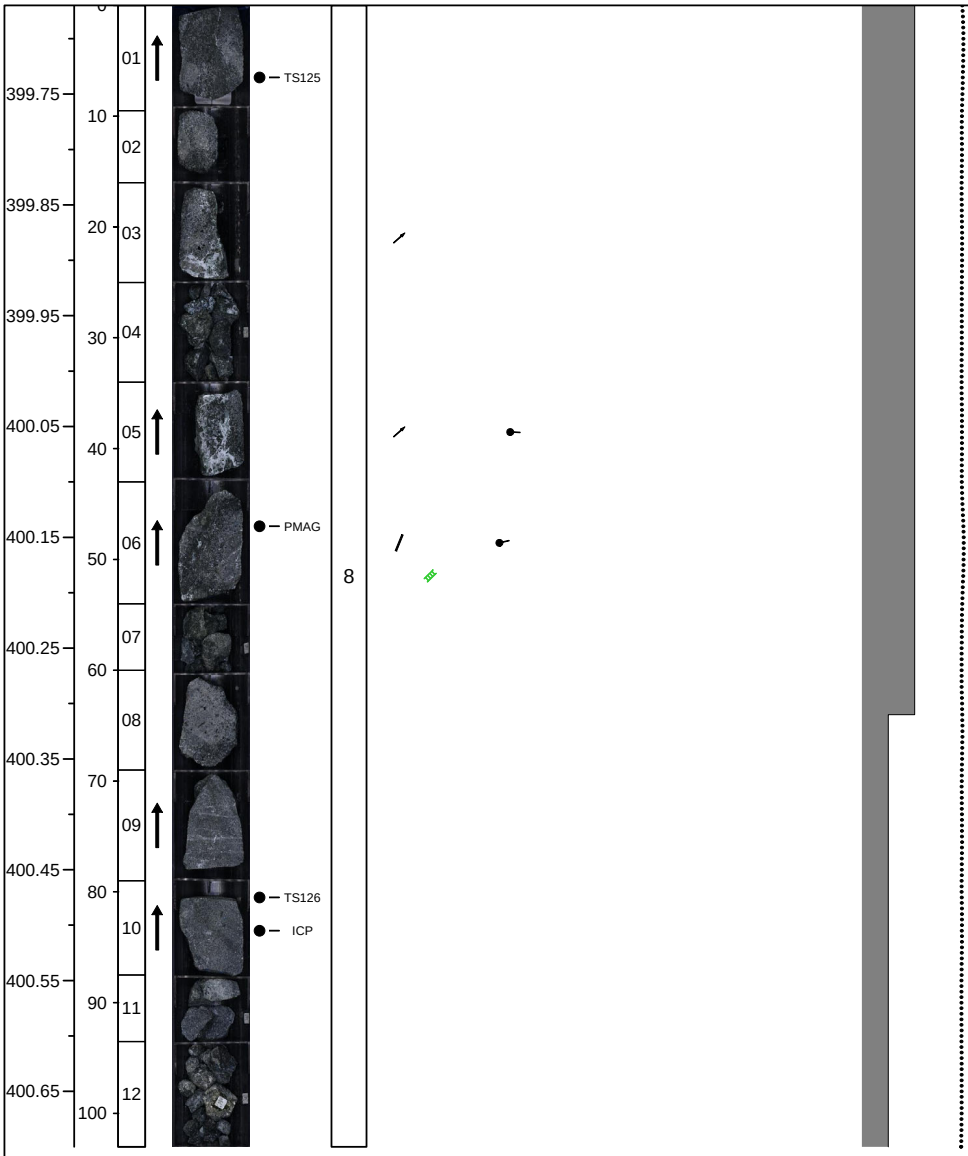
Unit 8: 27R-1, piece #11 to 36R-1, piece #17
Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

Hole 352-U1439C-27R Section 2, Top of Section: 398.21 m (CSF-A)



Unit 8: 27R-1, piece #11 to 36R-1, piece #17
Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

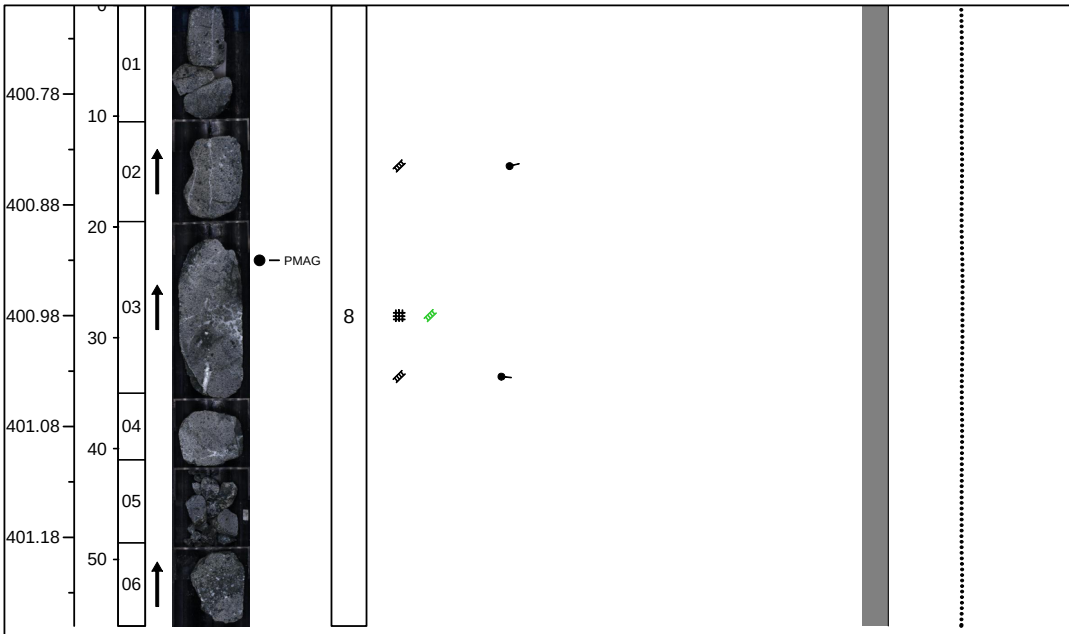
Hole 352-U1439C-27R Section 3, Top of Section: 399.67 m (CSF-A)



Description

Unit 8: 27R-1, piece #11 to 36R-1, piece #17
Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

Hole 352-U1439C-27R Section 4, Top of Section: 400.7 m (CSF-A)

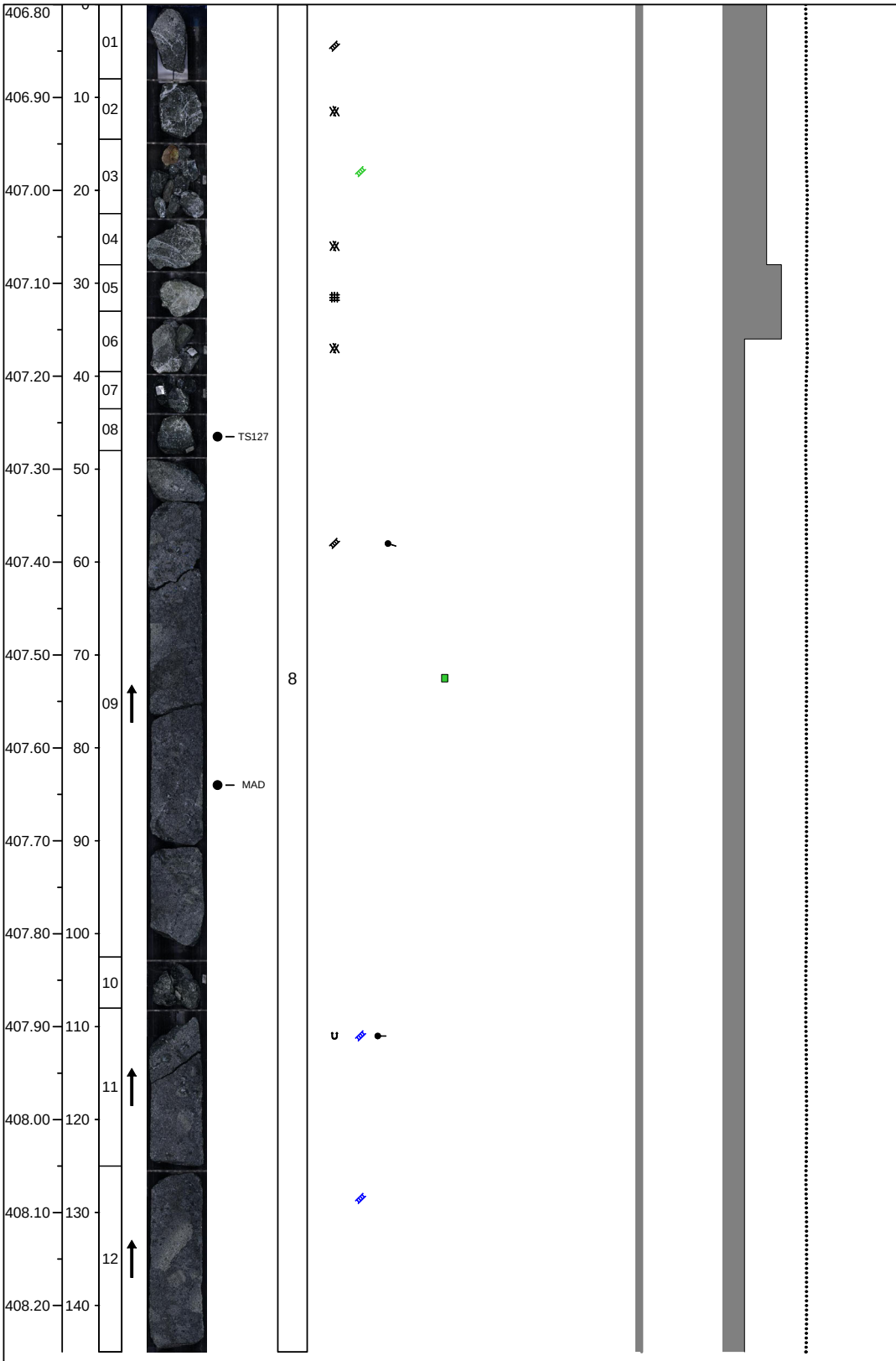


Description

Unit 8: 27R-1, piece #11 to 36R-1, piece #17

Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

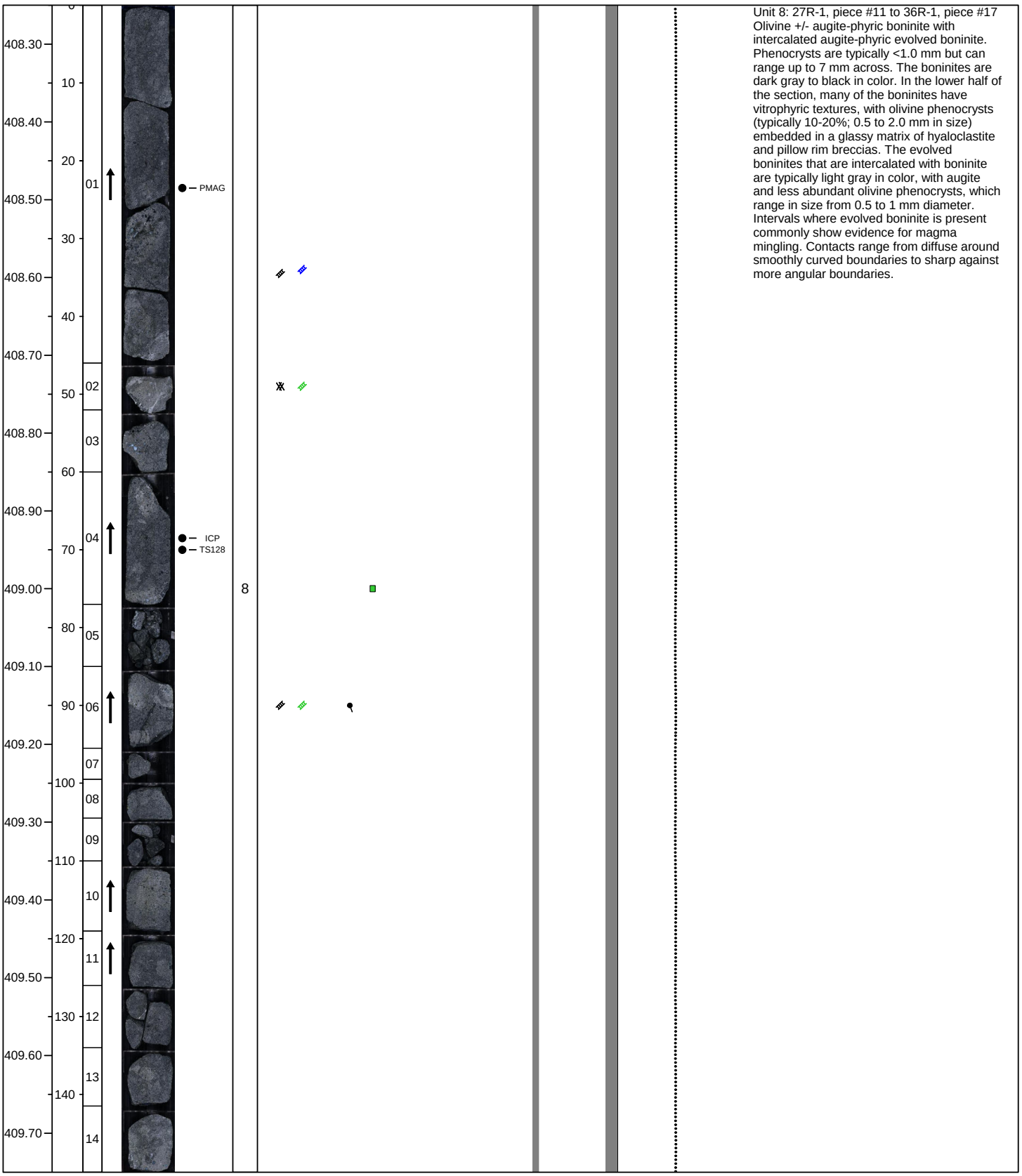
Hole 352-U1439C-28R Section 1, Top of Section: 406.8 m (CSF-A)



Description

Unit 8: 27R-1, piece #11 to 36R-1, piece #17
Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

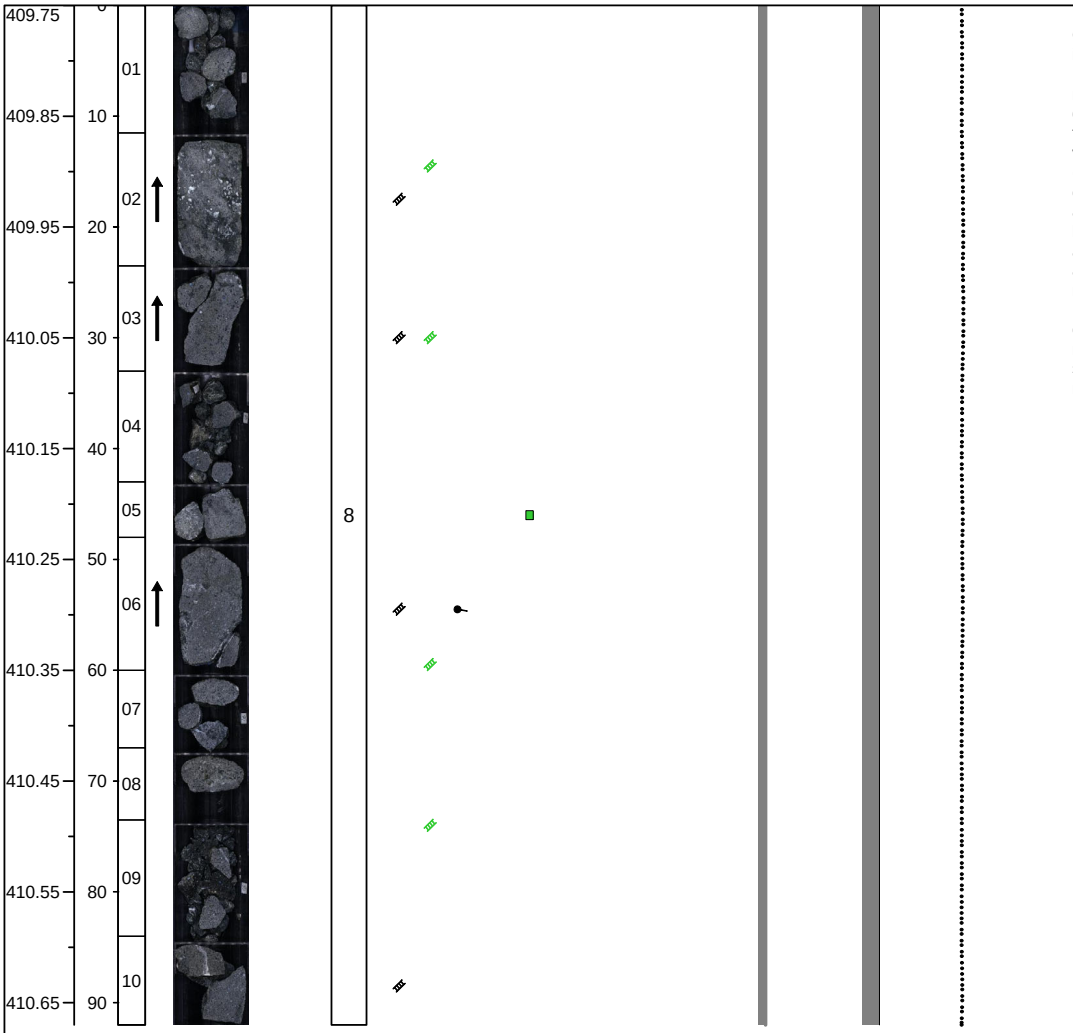
Hole 352-U1439C-28R Section 2, Top of Section: 408.25 m (CSF-A)



Description

Unit 8: 27R-1, piece #11 to 36R-1, piece #17 Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

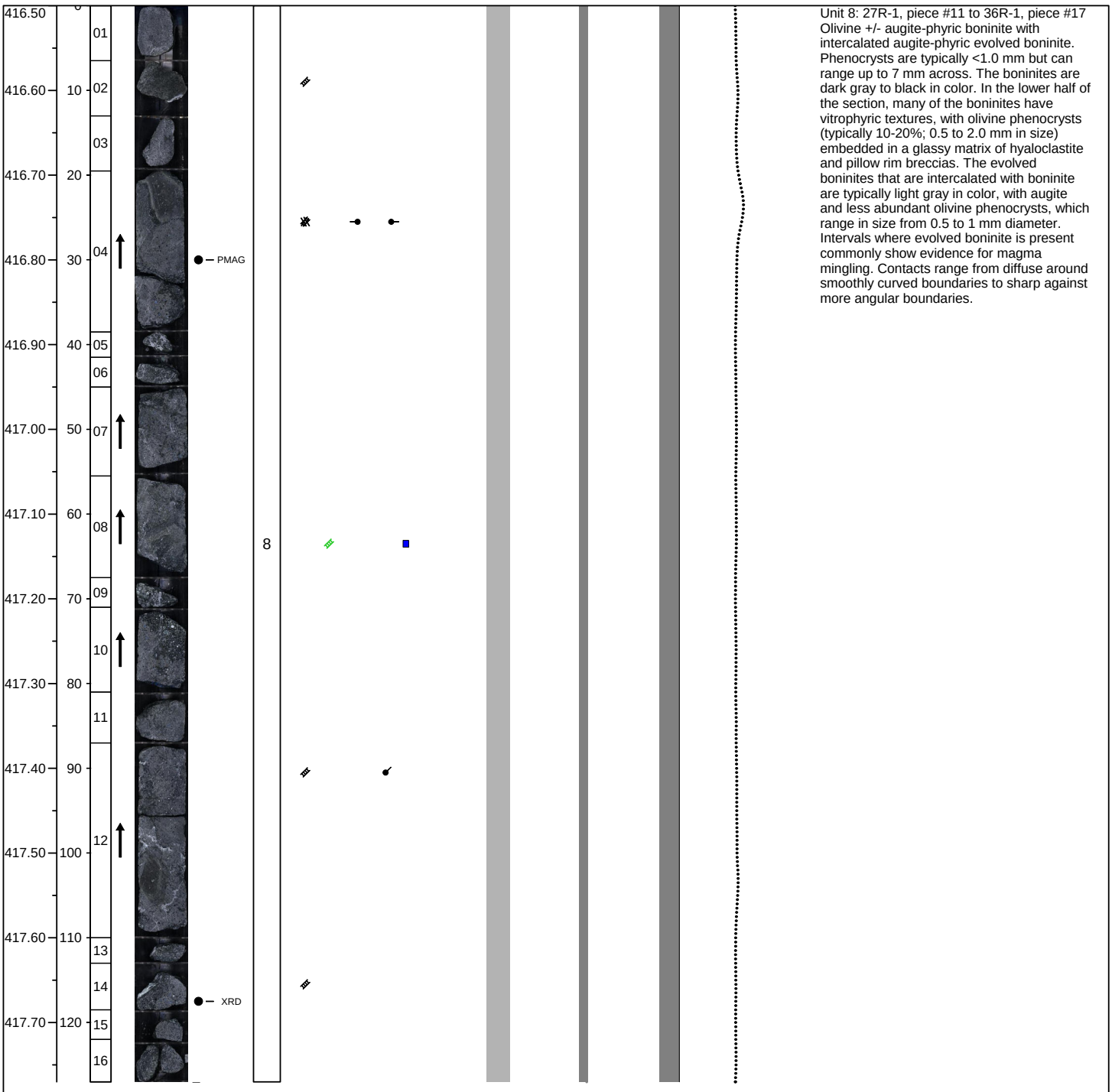
Hole 352-U1439C-28R Section 3, Top of Section: 409.75 m (CSF-A)



Description

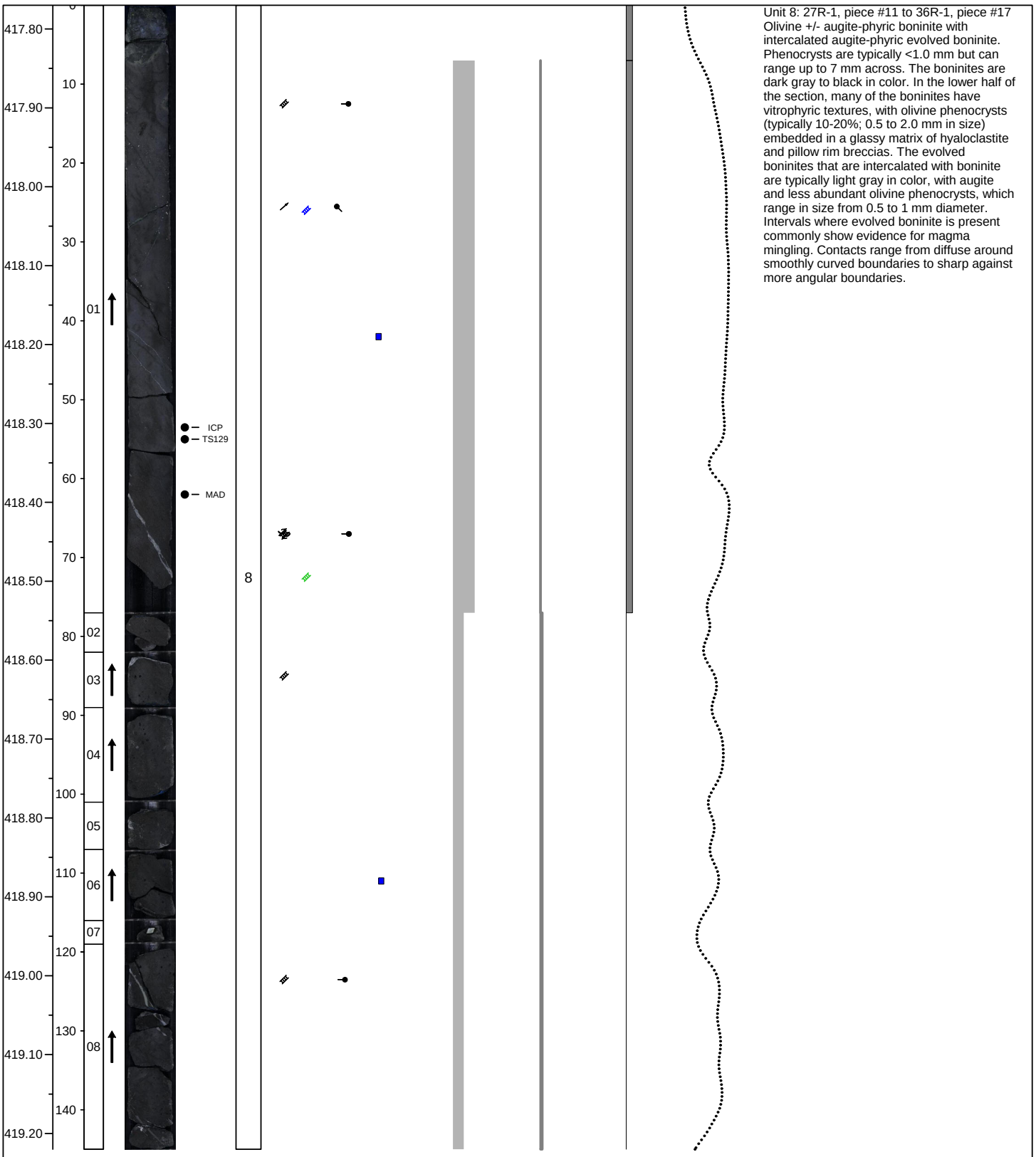
Unit 8: 27R-1, piece #11 to 36R-1, piece #17
Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

Hole 352-U1439C-29R Section 1, Top of Section: 416.5 m (CSF-A)



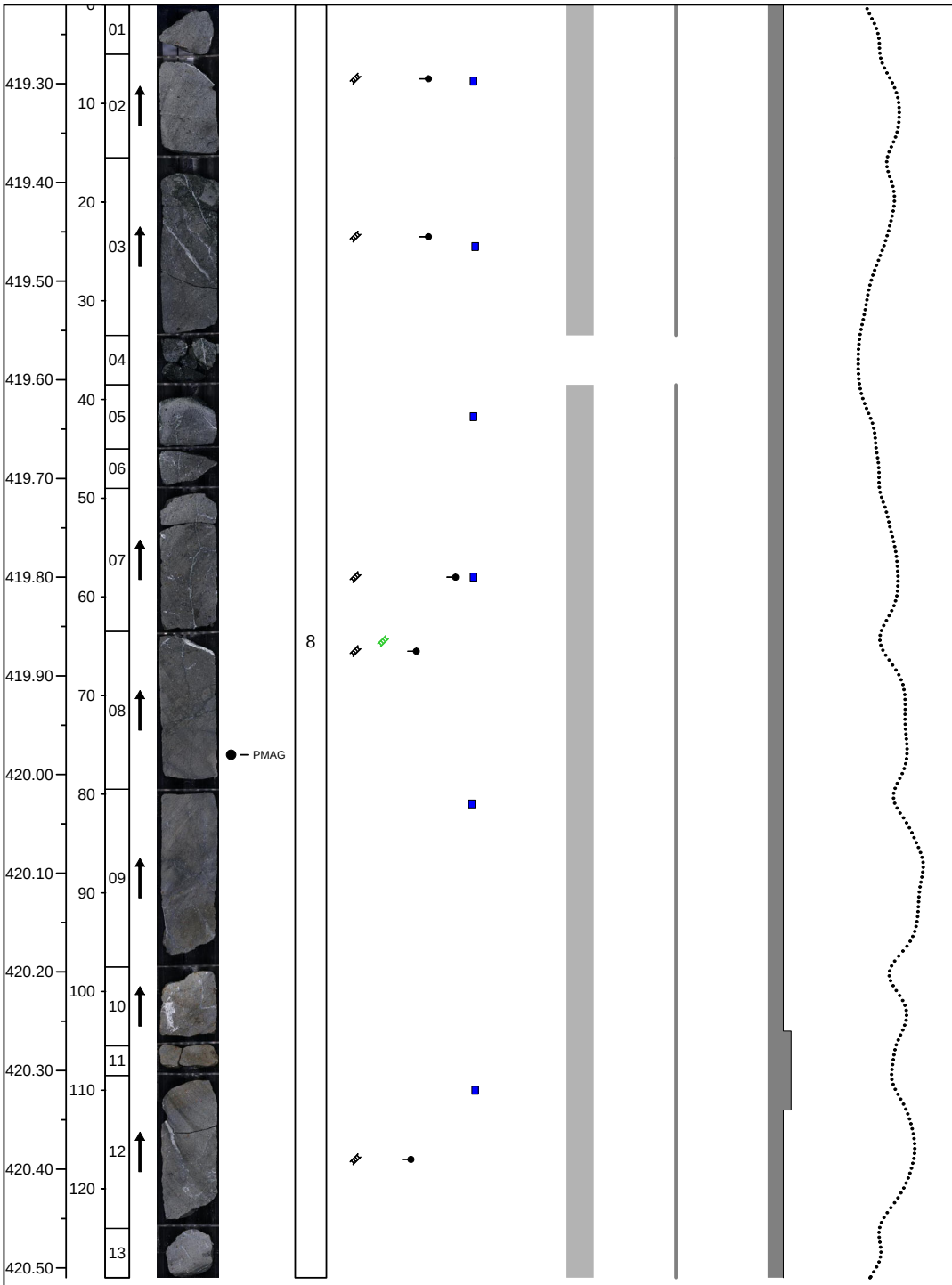
Unit 8: 27R-1, piece #11 to 36R-1, piece #17 Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

Hole 352-U1439C-29R Section 2, Top of Section: 417.77 m (CSF-A)



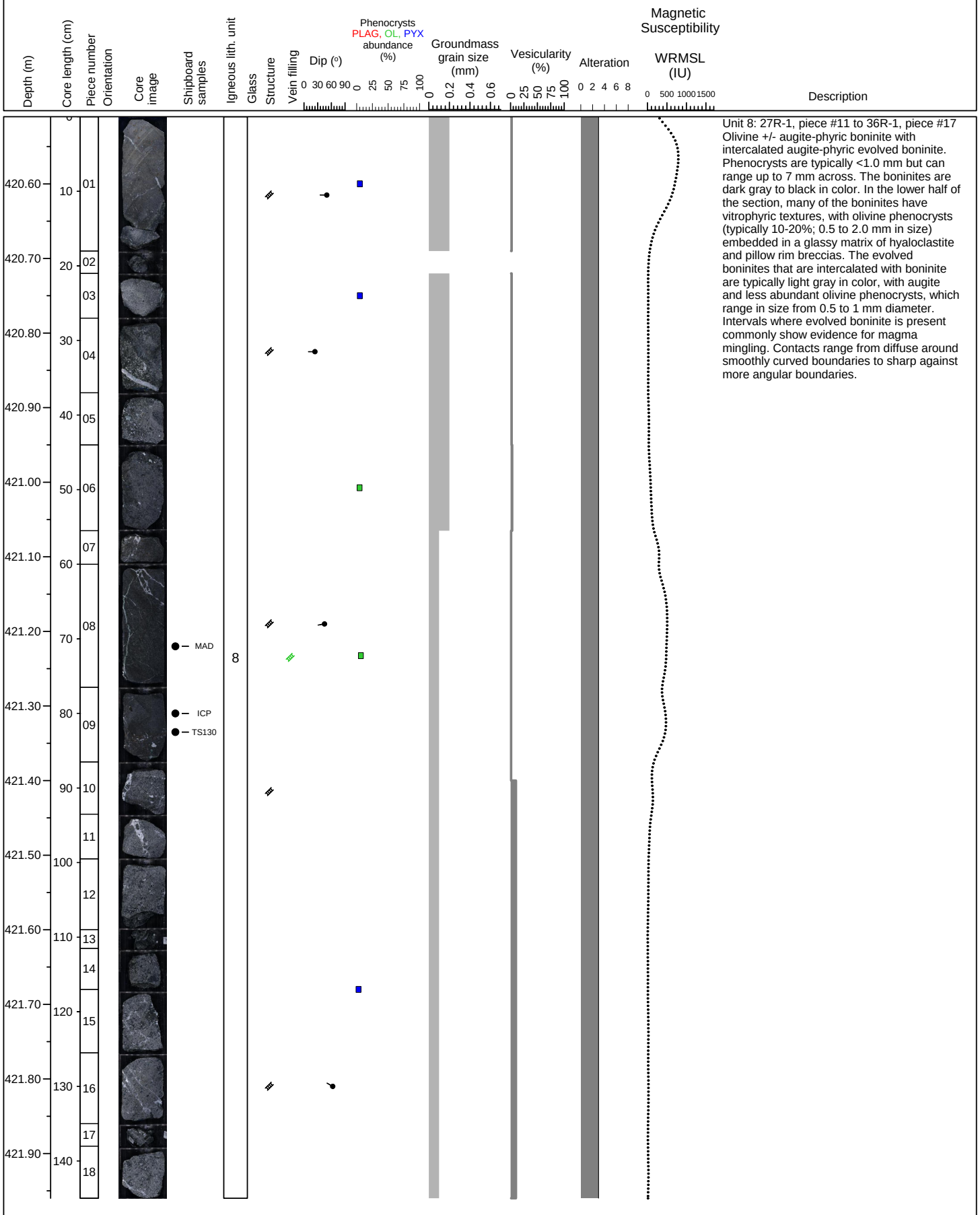
Unit 8: 27R-1, piece #11 to 36R-1, piece #17
Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

Hole 352-U1439C-29R Section 3, Top of Section: 419.22 m (CSF-A)

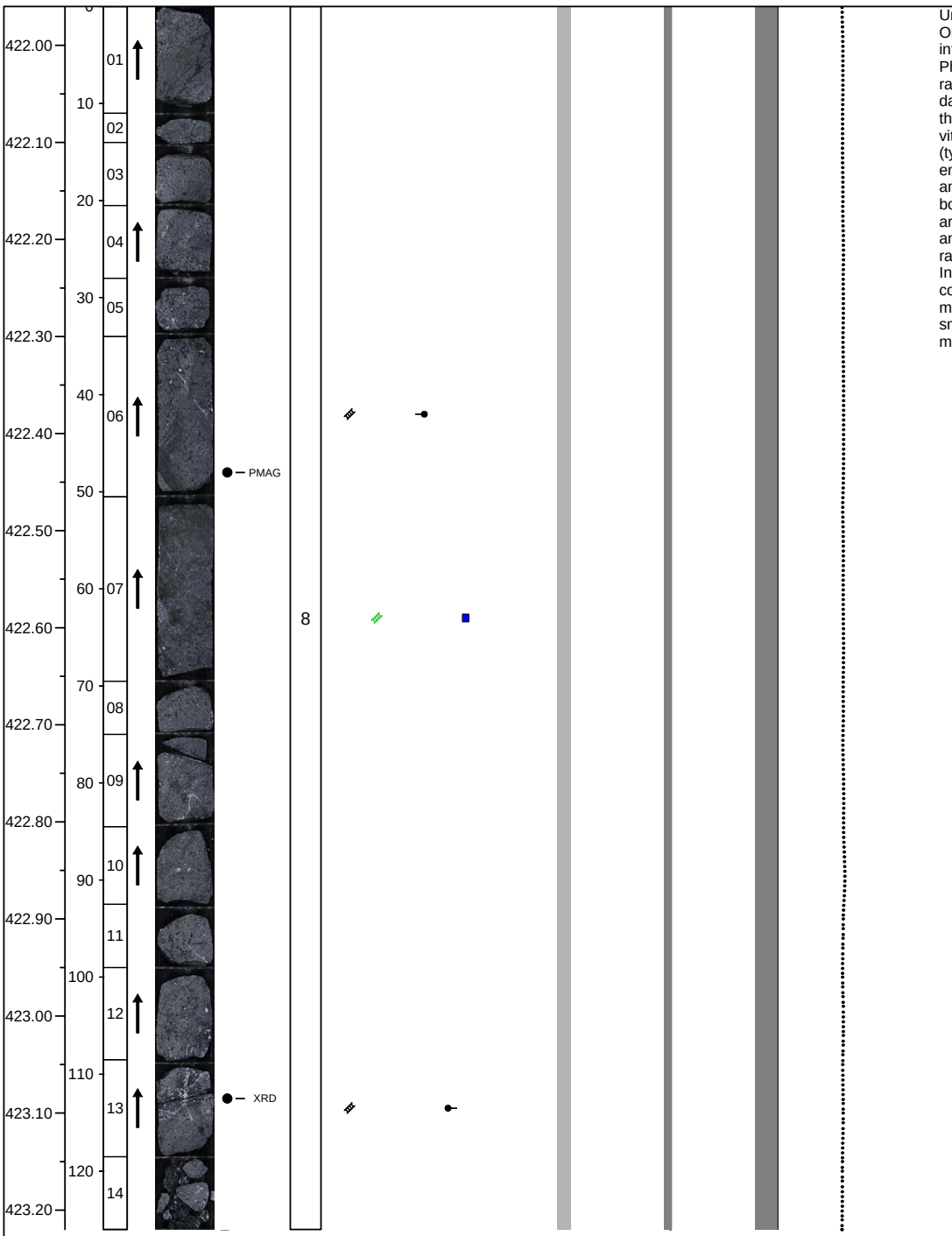


Unit 8: 27R-1, piece #11 to 36R-1, piece #17 Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

Hole 352-U1439C-29R Section 4, Top of Section: 420.51 m (CSF-A)



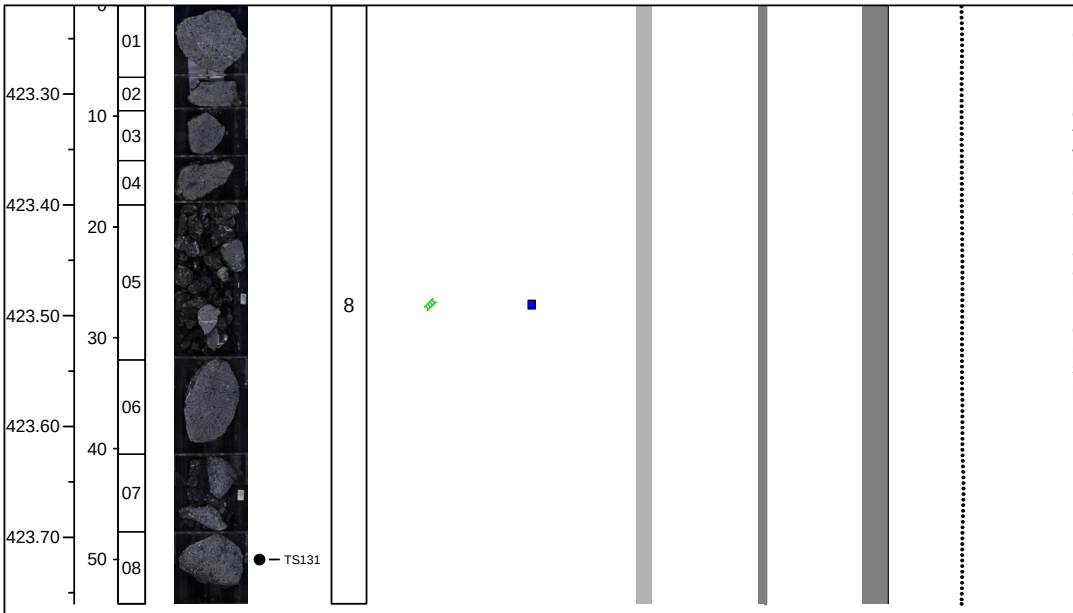
Hole 352-U1439C-29R Section 5, Top of Section: 421.96 m (CSF-A)



Description

Unit 8: 27R-1, piece #11 to 36R-1, piece #17 Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

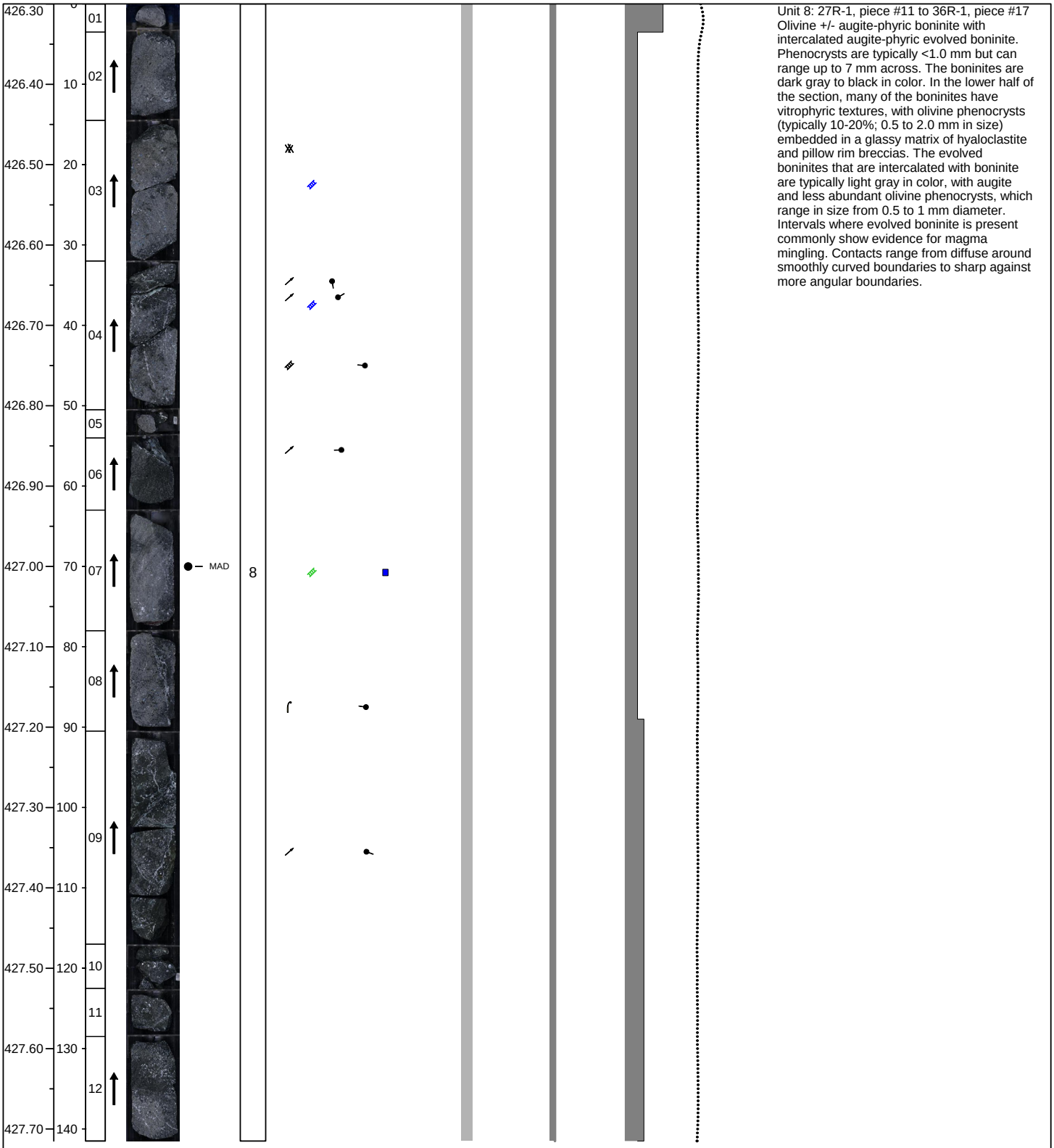
Hole 352-U1439C-29R Section 6, Top of Section: 423.22 m (CSF-A)



Description

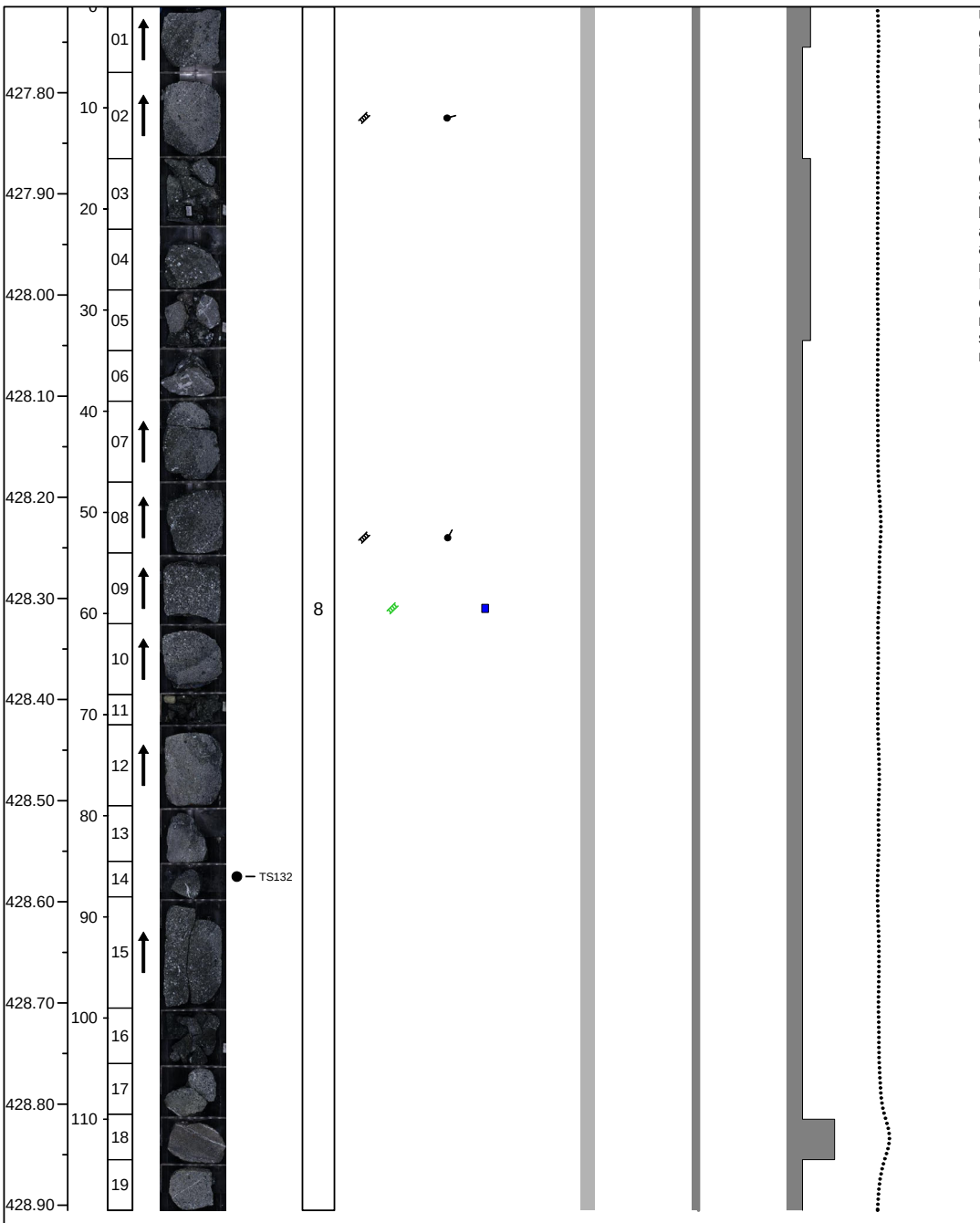
Unit 8: 27R-1, piece #11 to 36R-1, piece #17
Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

Hole 352-U1439C-30R Section 1, Top of Section: 426.3 m (CSF-A)



Unit 8: 27R-1, piece #11 to 36R-1, piece #17
Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

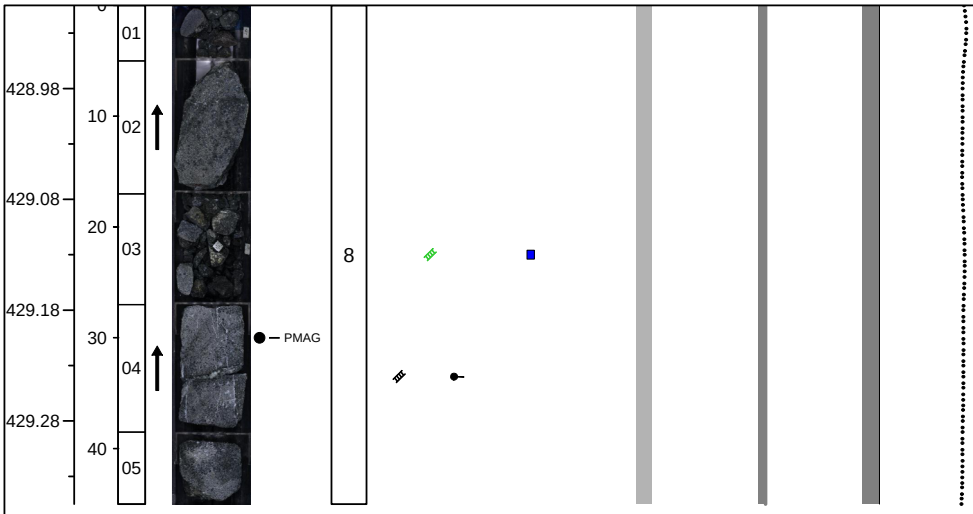
Hole 352-U1439C-30R Section 2, Top of Section: 427.715 m (CSF-A)



Description

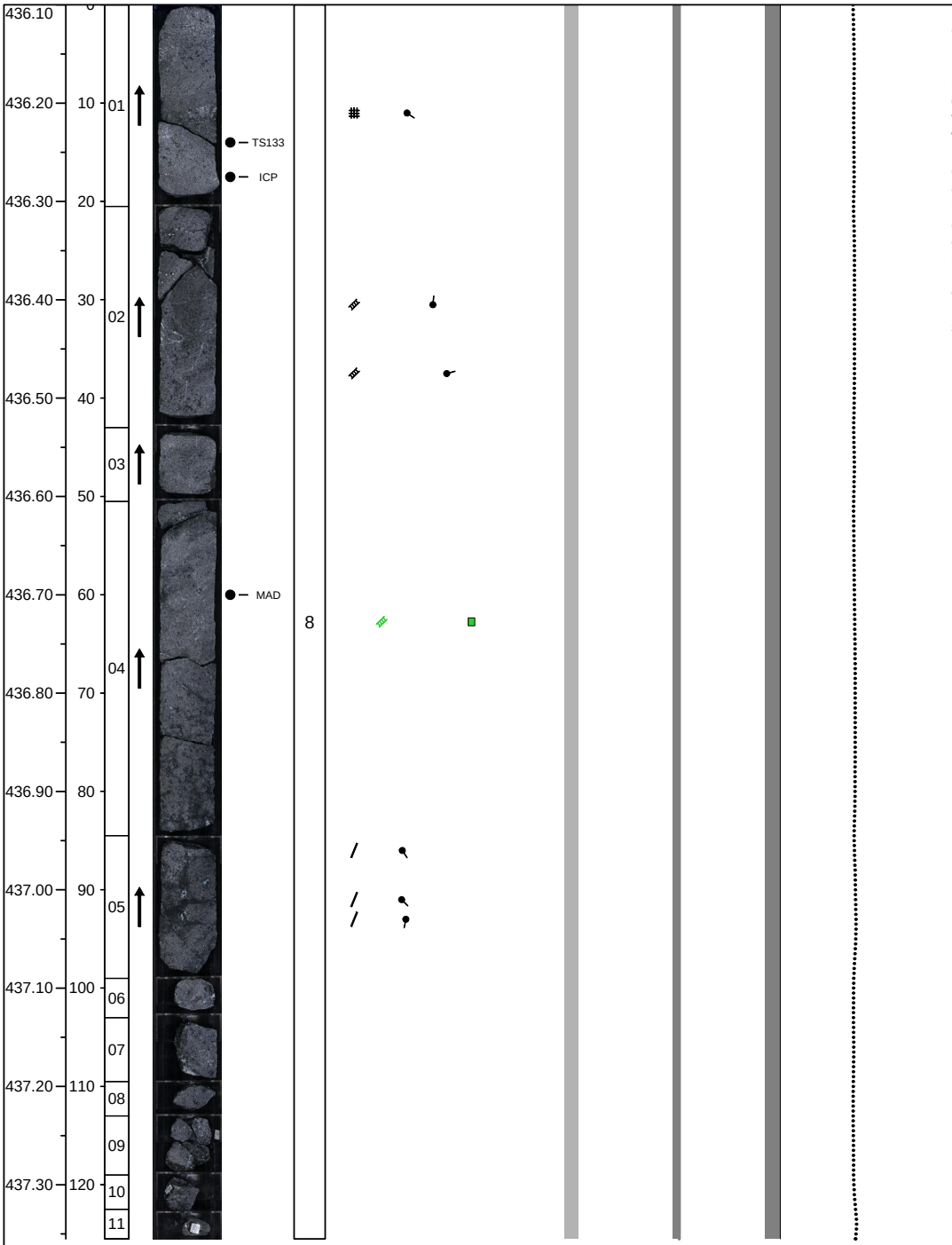
Unit 8: 27R-1, piece #11 to 36R-1, piece #17
Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

Hole 352-U1439C-30R Section 3, Top of Section: 428.905 m (CSF-A)



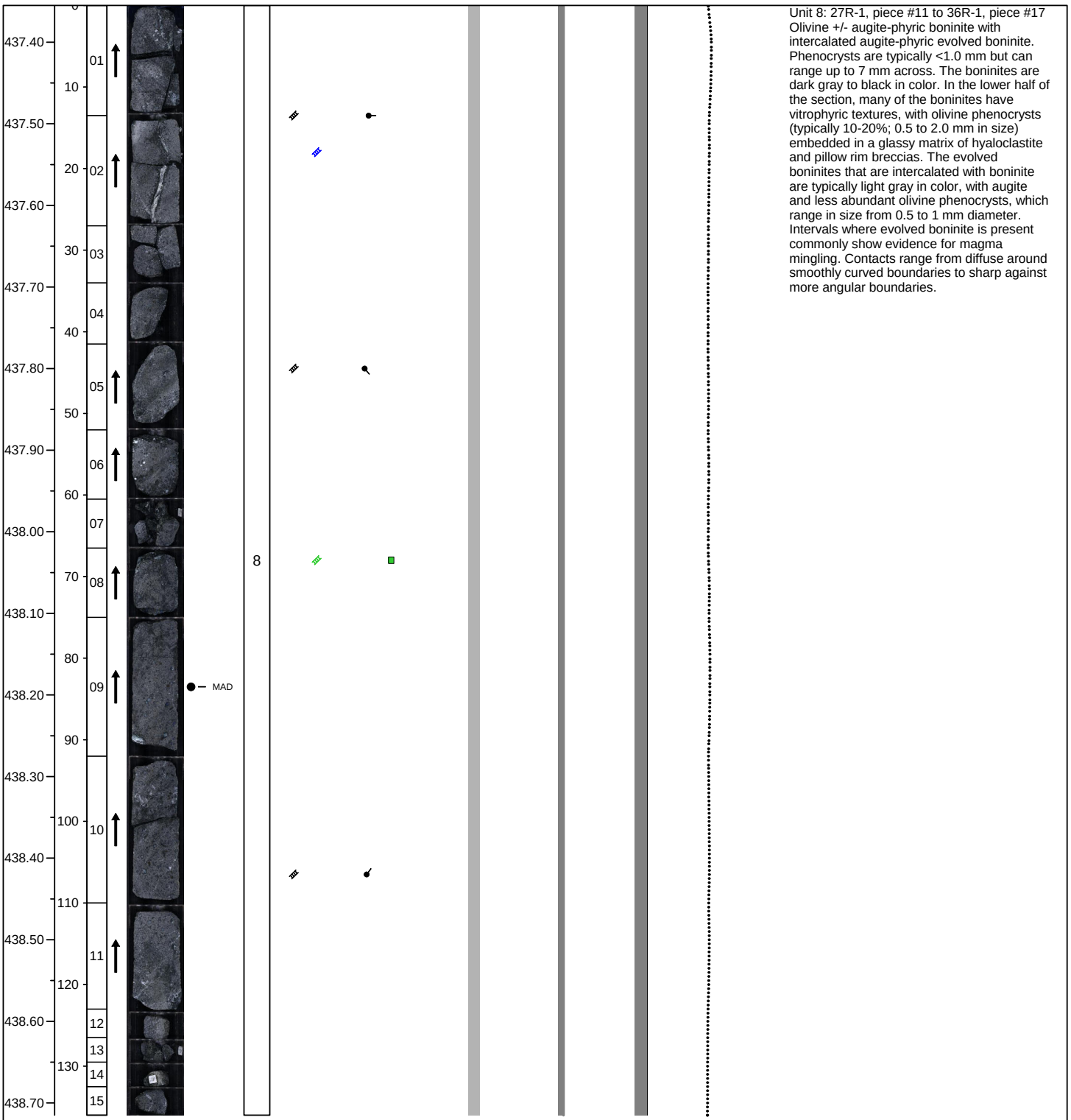
Unit 8: 27R-1, piece #11 to 36R-1, piece #17 Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

Hole 352-U1439C-31R Section 1, Top of Section: 436.1 m (CSF-A)



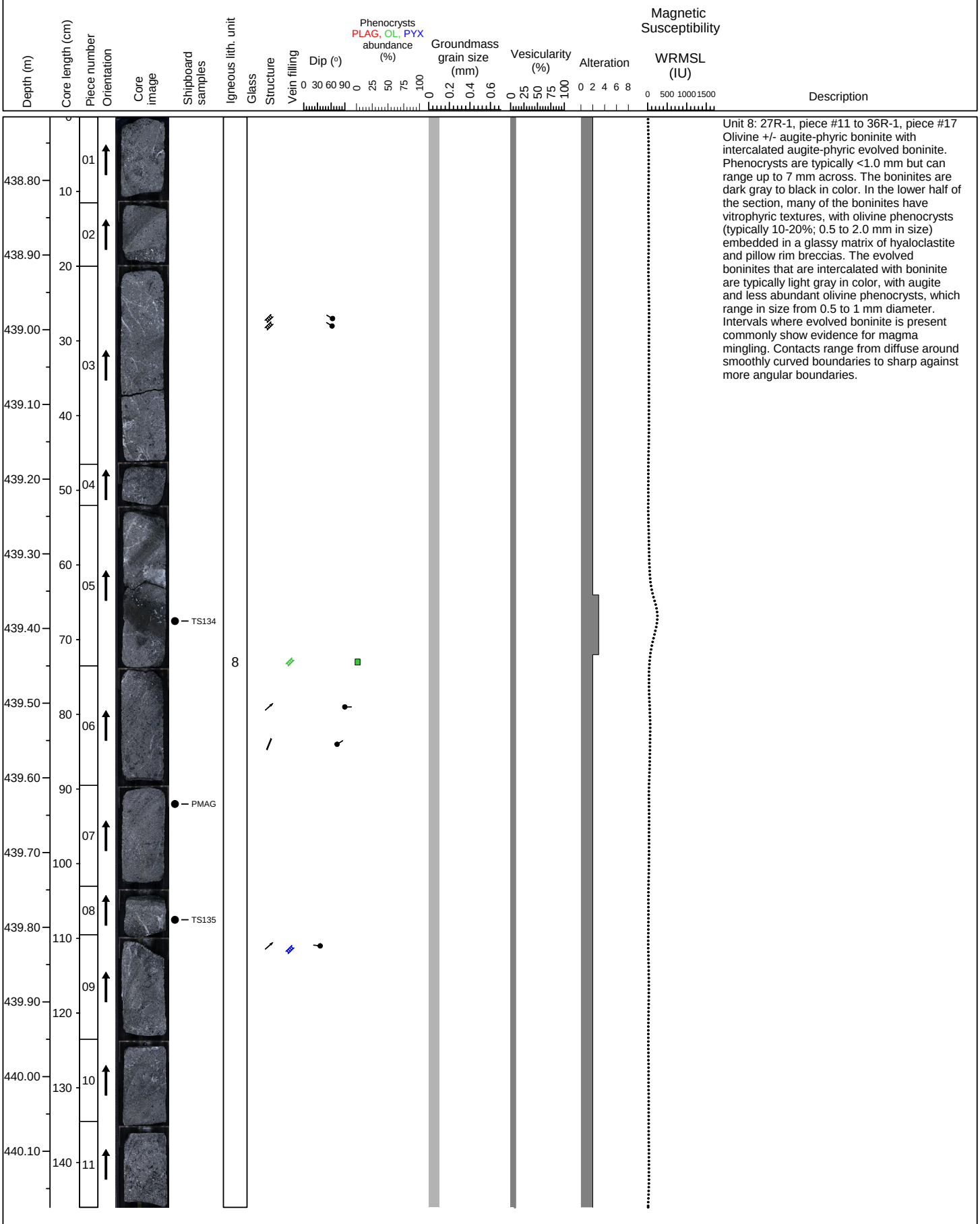
Unit 8: 27R-1, piece #11 to 36R-1, piece #17 Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

Hole 352-U1439C-31R Section 2, Top of Section: 437.355 m (CSF-A)

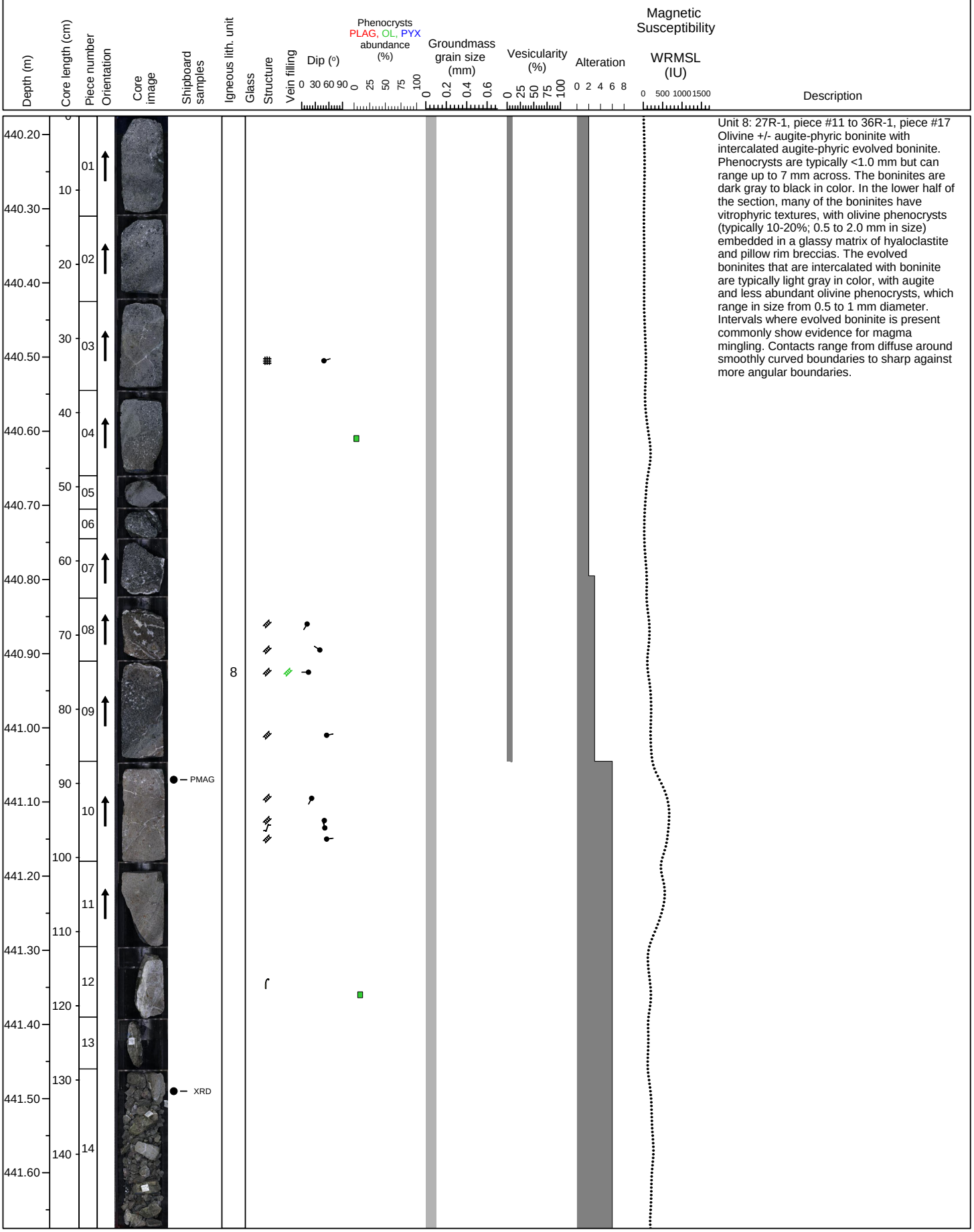


Unit 8: 27R-1, piece #11 to 36R-1, piece #17 Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

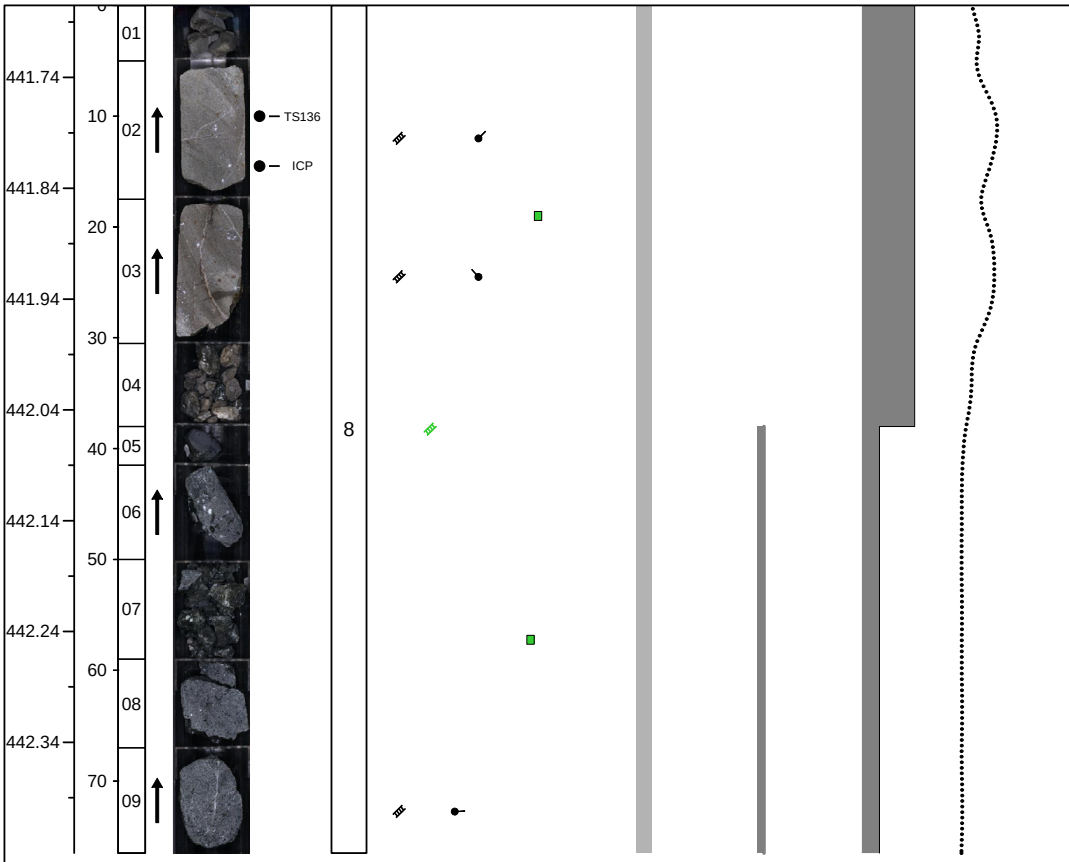
Hole 352-U1439C-31R Section 3, Top of Section: 438.715 m (CSF-A)



Hole 352-U1439C-31R Section 4, Top of Section: 440.175 m (CSF-A)



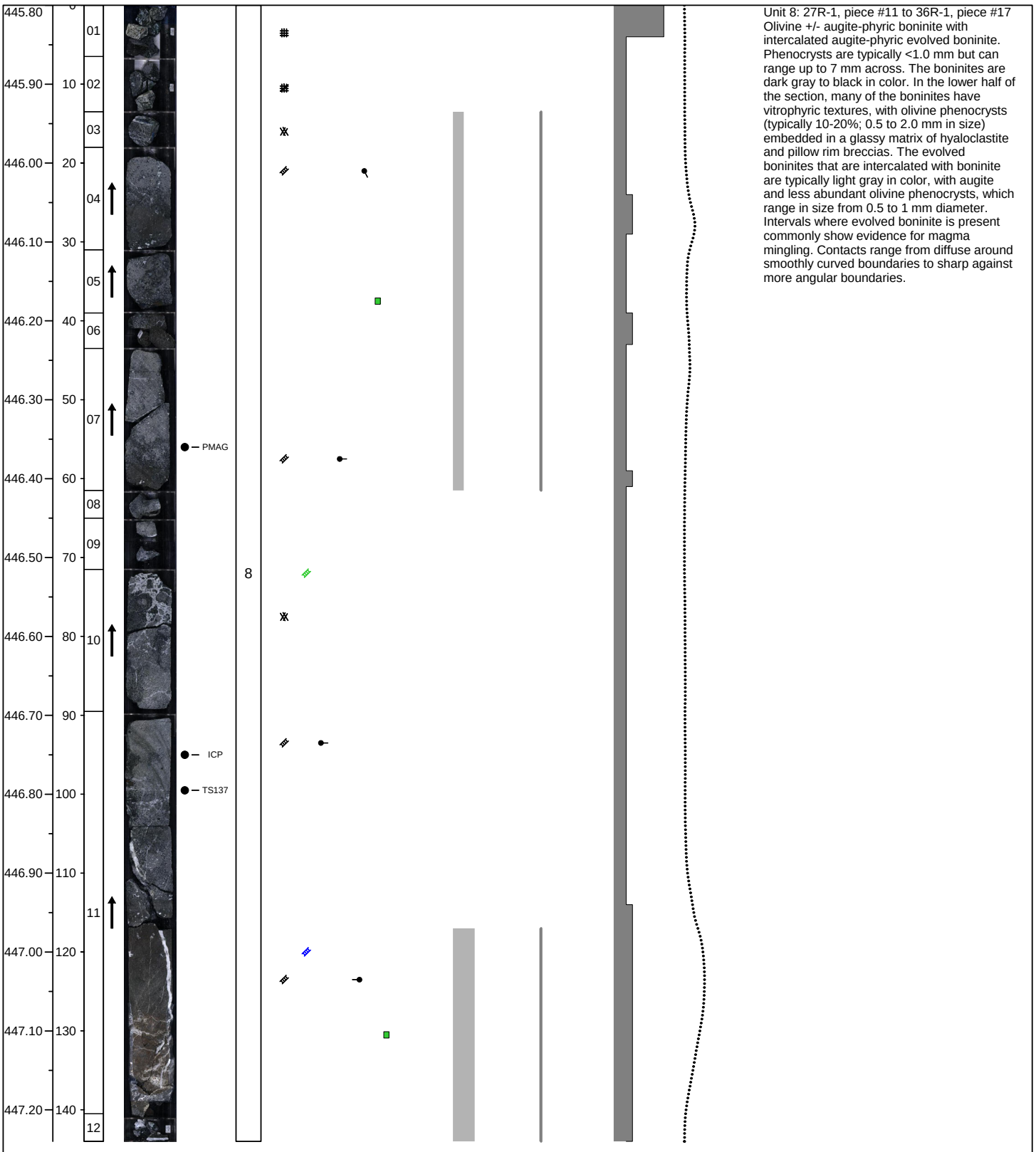
Hole 352-U1439C-31R Section 5, Top of Section: 441.675 m (CSF-A)



Description

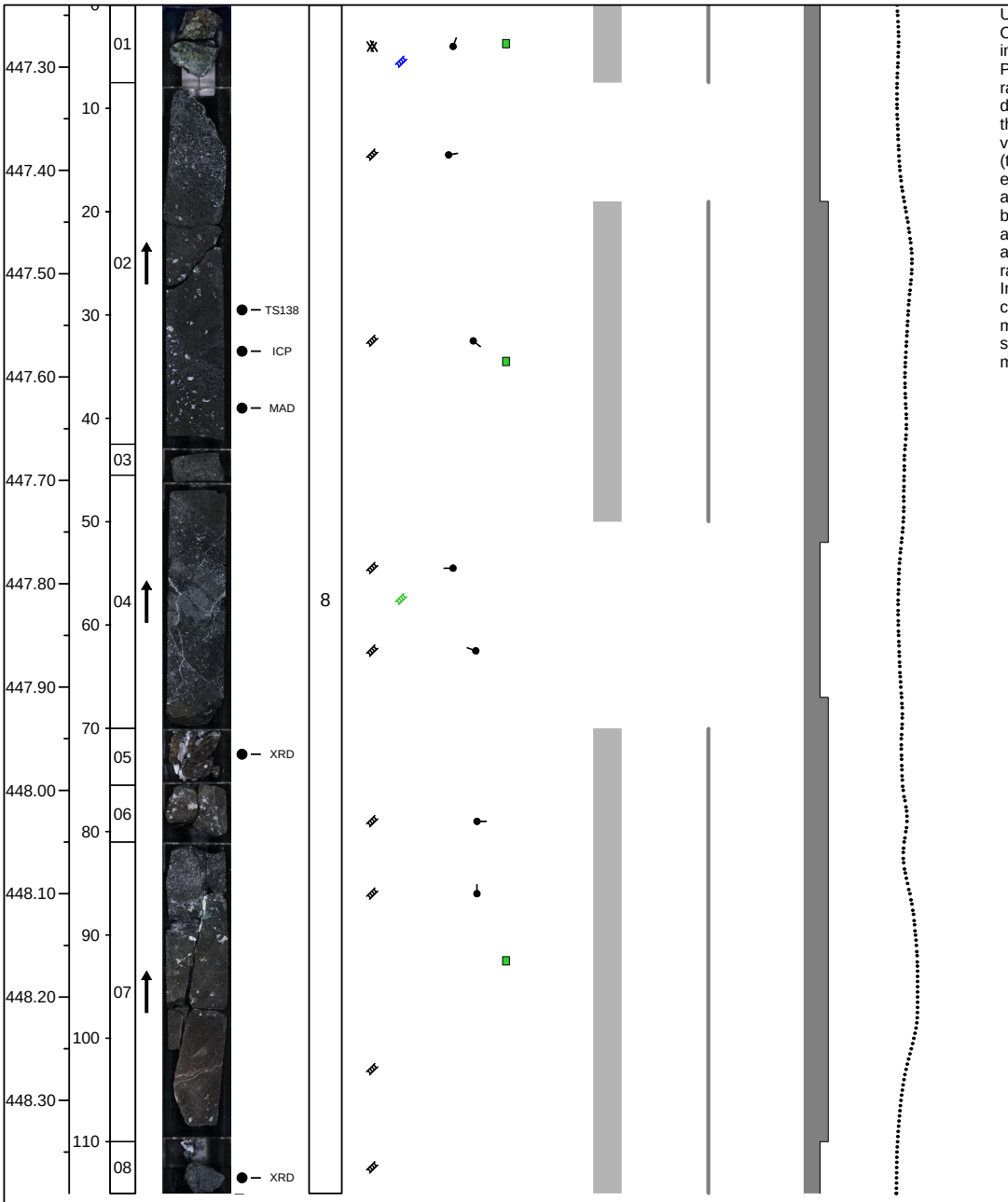
Unit 8: 27R-1, piece #11 to 36R-1, piece #17
Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

Hole 352-U1439C-32R Section 1, Top of Section: 445.8 m (CSF-A)



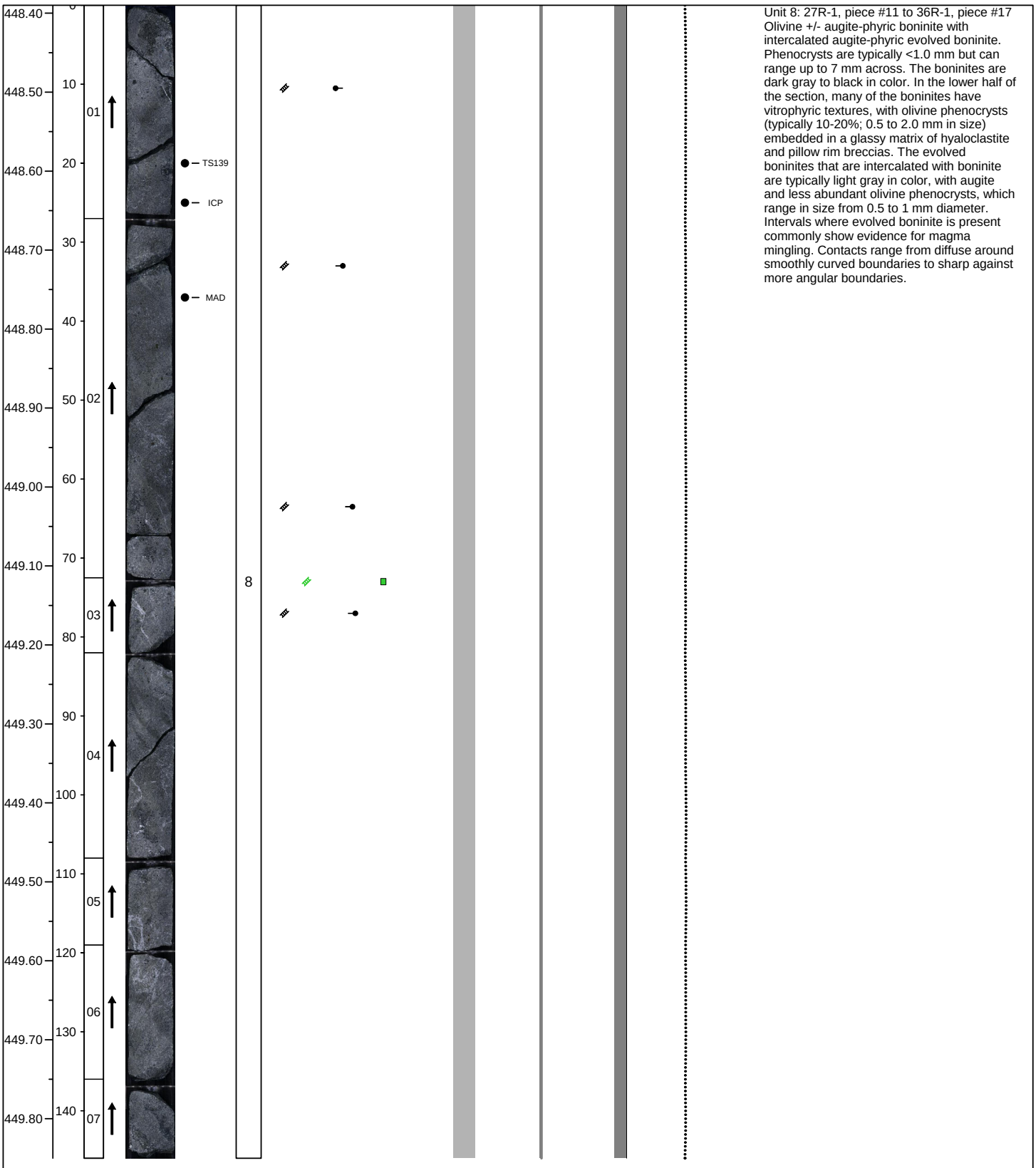
Unit 8: 27R-1, piece #11 to 36R-1, piece #17 Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

Hole 352-U1439C-32R Section 2, Top of Section: 447.24 m (CSF-A)



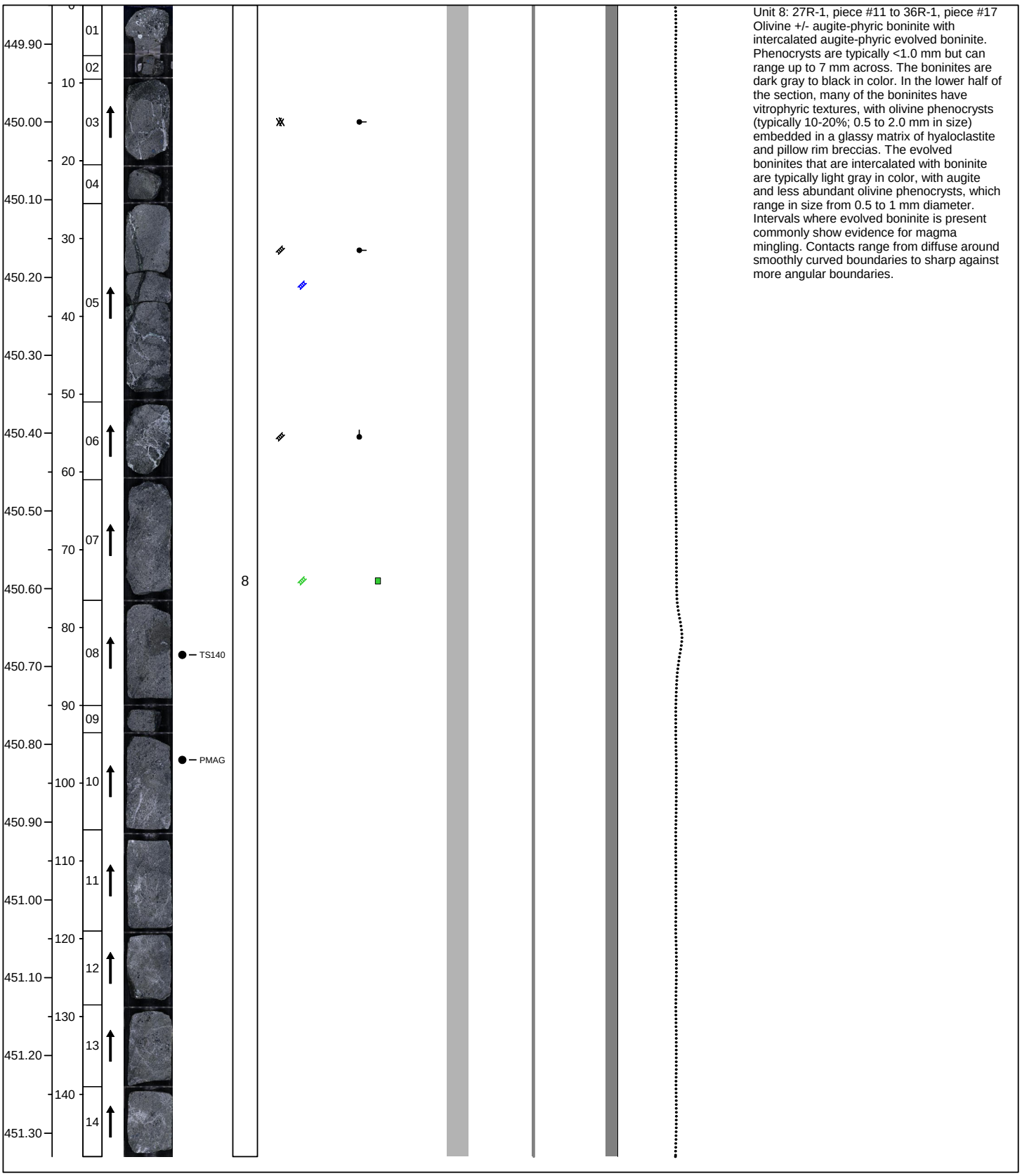
Unit 8: 27R-1, piece #11 to 36R-1, piece #17 Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

Hole 352-U1439C-32R Section 3, Top of Section: 448.39 m (CSF-A)



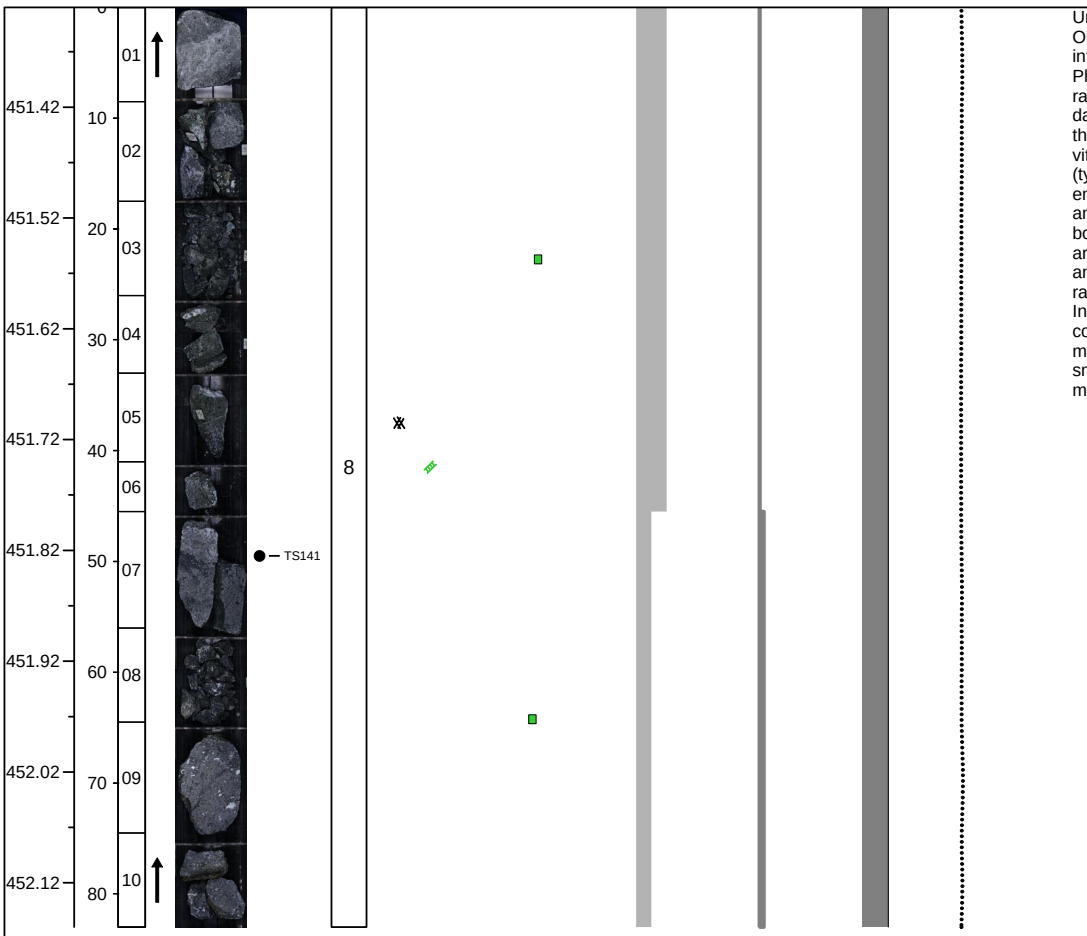
Unit 8: 27R-1, piece #11 to 36R-1, piece #17 Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

Hole 352-U1439C-32R Section 4, Top of Section: 449.85 m (CSF-A)



Unit 8: 27R-1, piece #11 to 36R-1, piece #17
Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

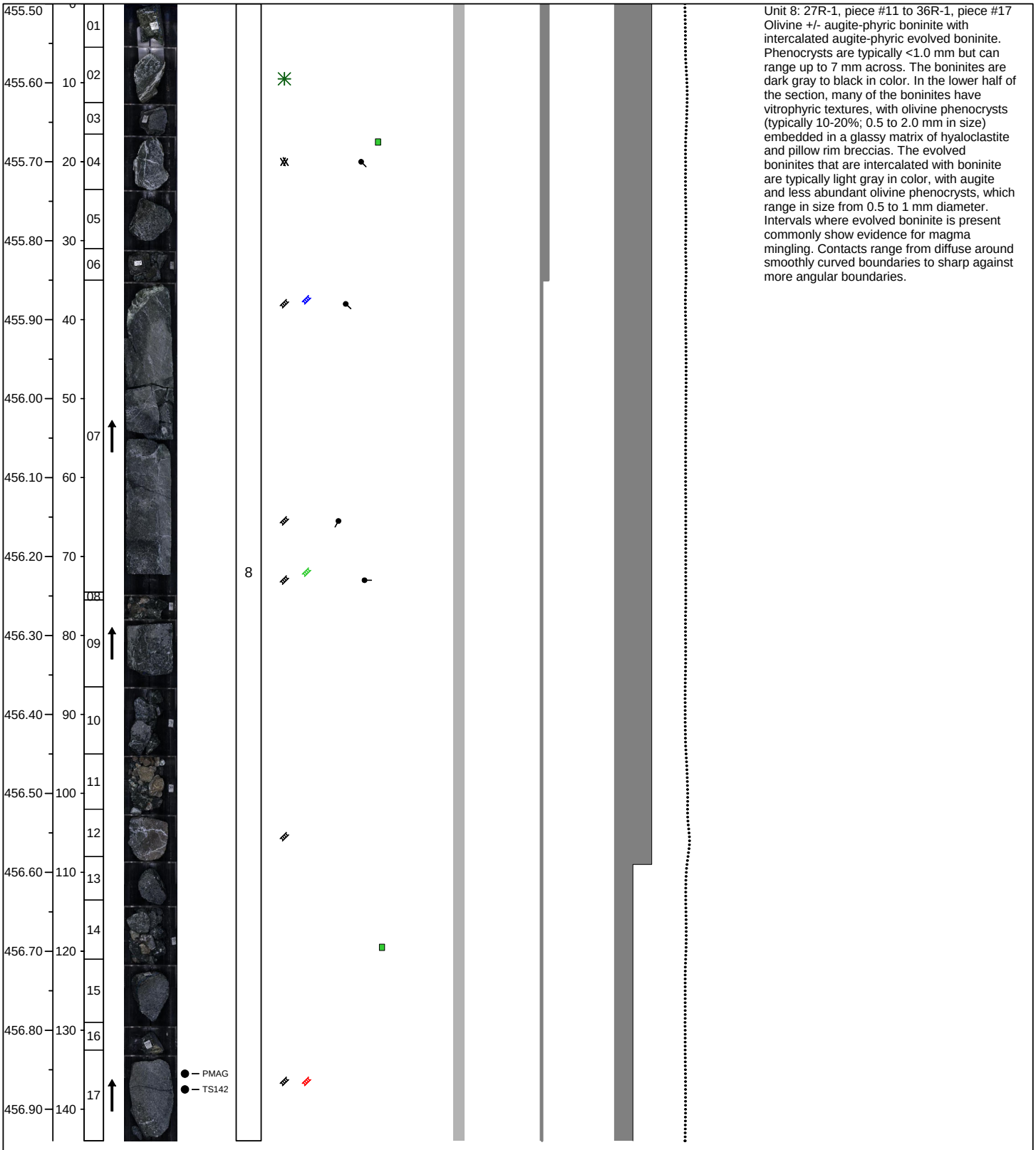
Hole 352-U1439C-32R Section 5, Top of Section: 451.33 m (CSF-A)



Description

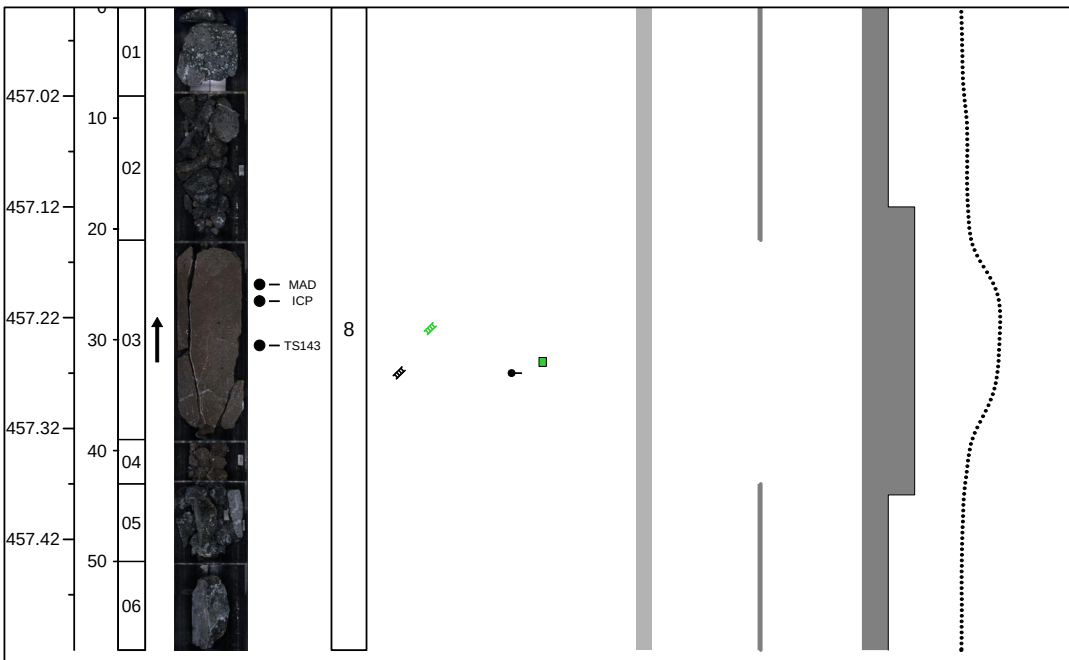
Unit 8: 27R-1, piece #11 to 36R-1, piece #17
Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

Hole 352-U1439C-33R Section 1, Top of Section: 455.5 m (CSF-A)



Unit 8: 27R-1, piece #11 to 36R-1, piece #17
Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

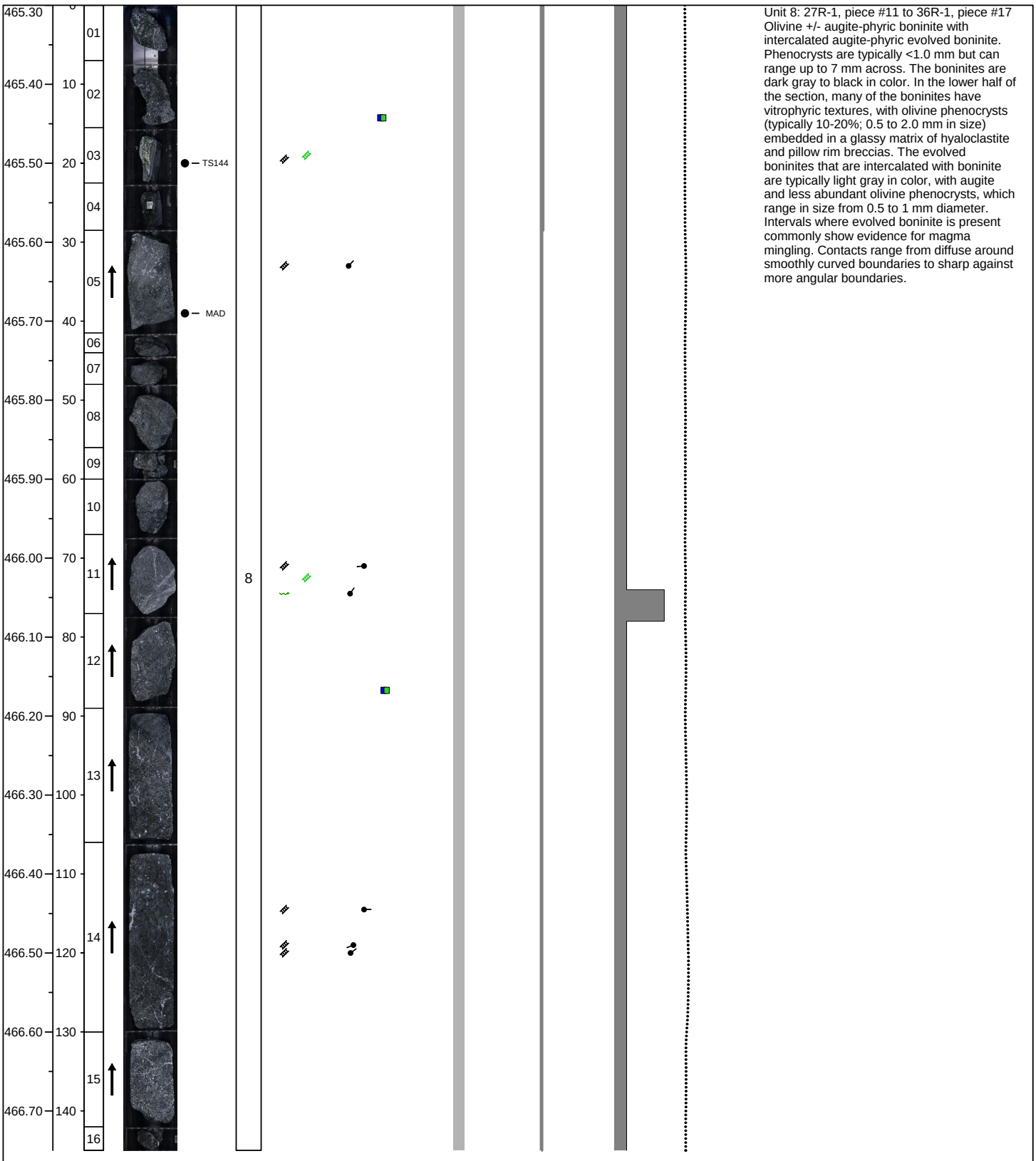
Hole 352-U1439C-33R Section 2, Top of Section: 456.94 m (CSF-A)



Unit 8: 27R-1, piece #11 to 36R-1, piece #17

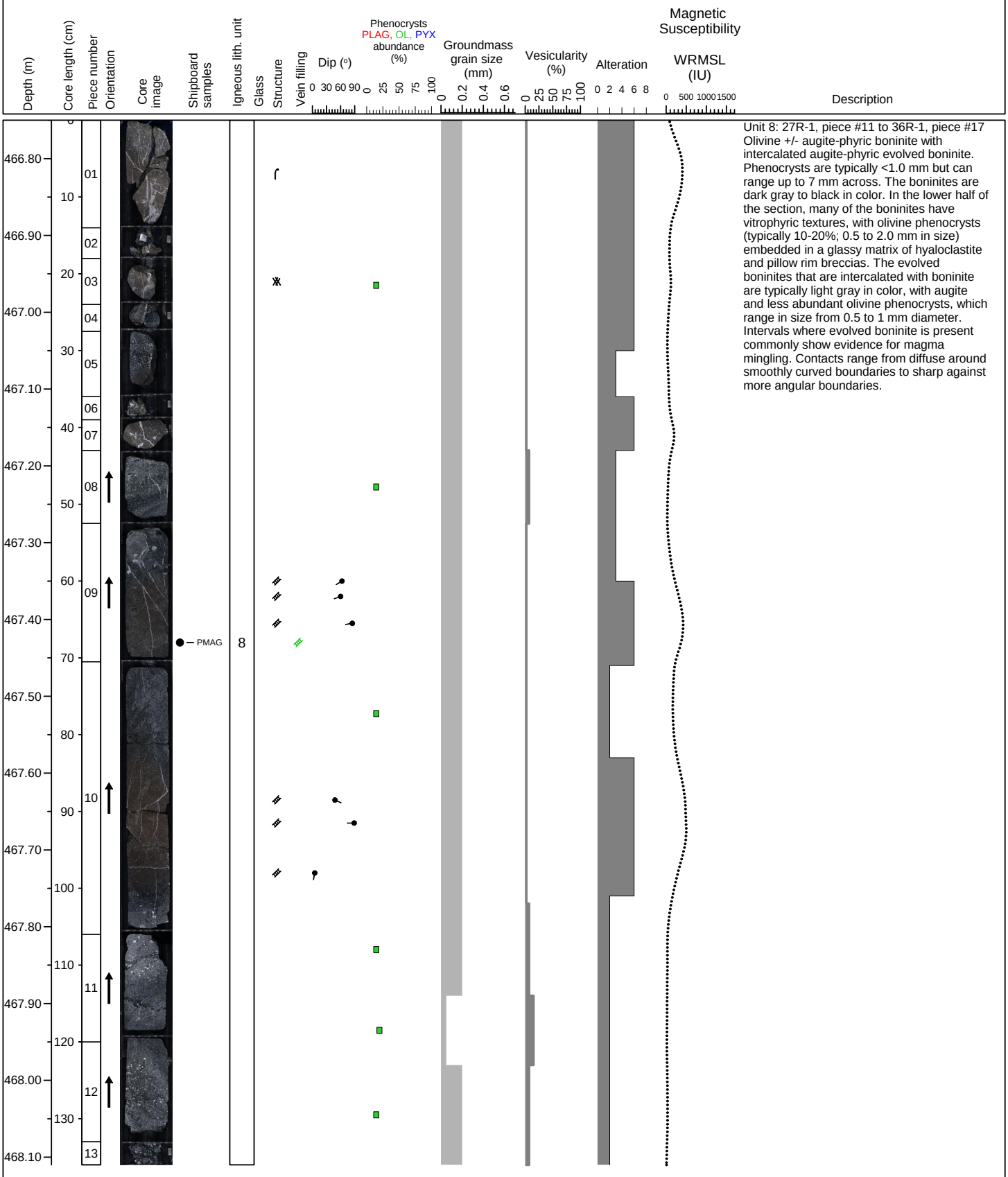
Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

Hole 352-U1439C-35R Section 1, Top of Section: 465.3 m (CSF-A)

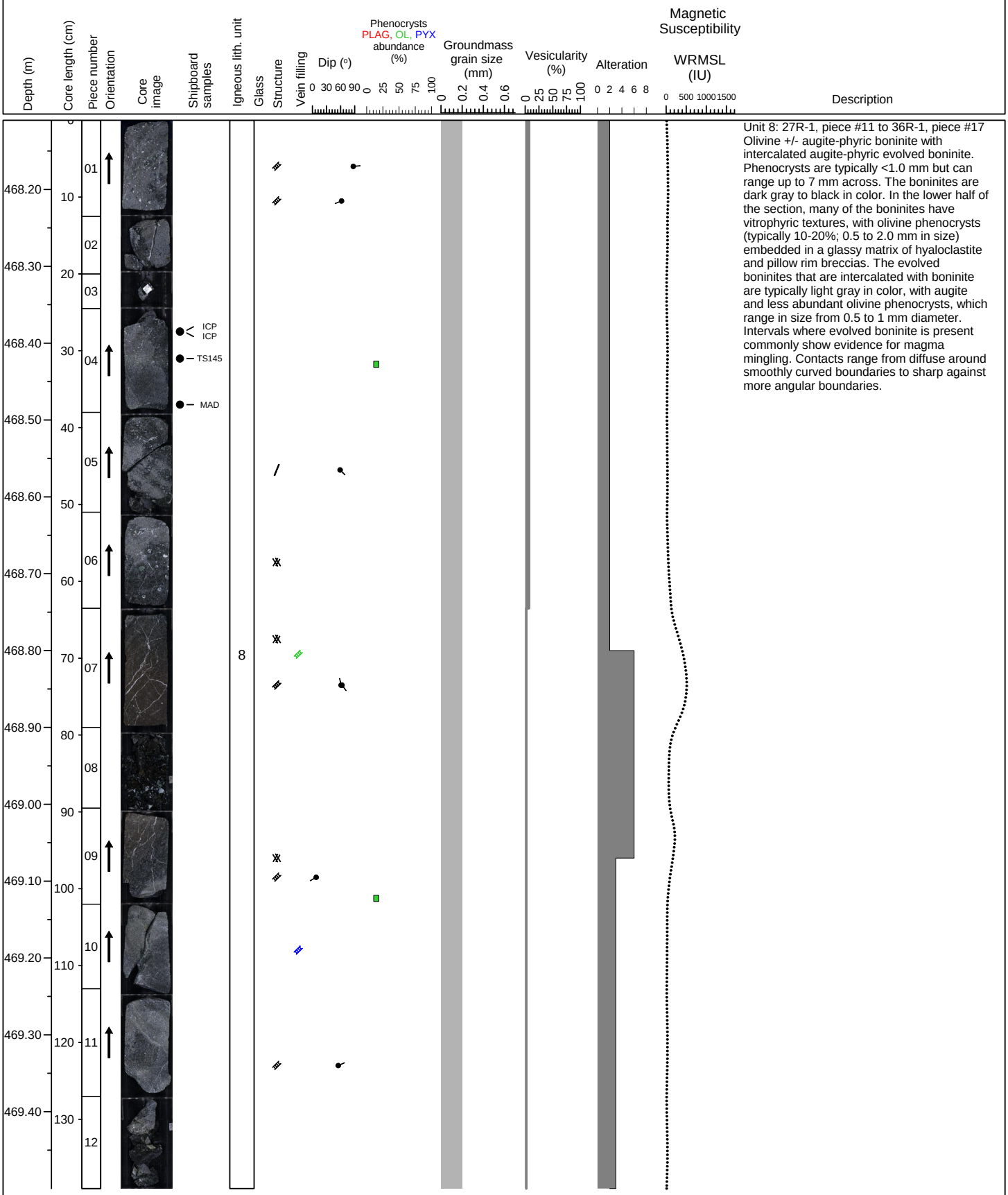


Unit 8: 27R-1, piece #11 to 36R-1, piece #17
Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

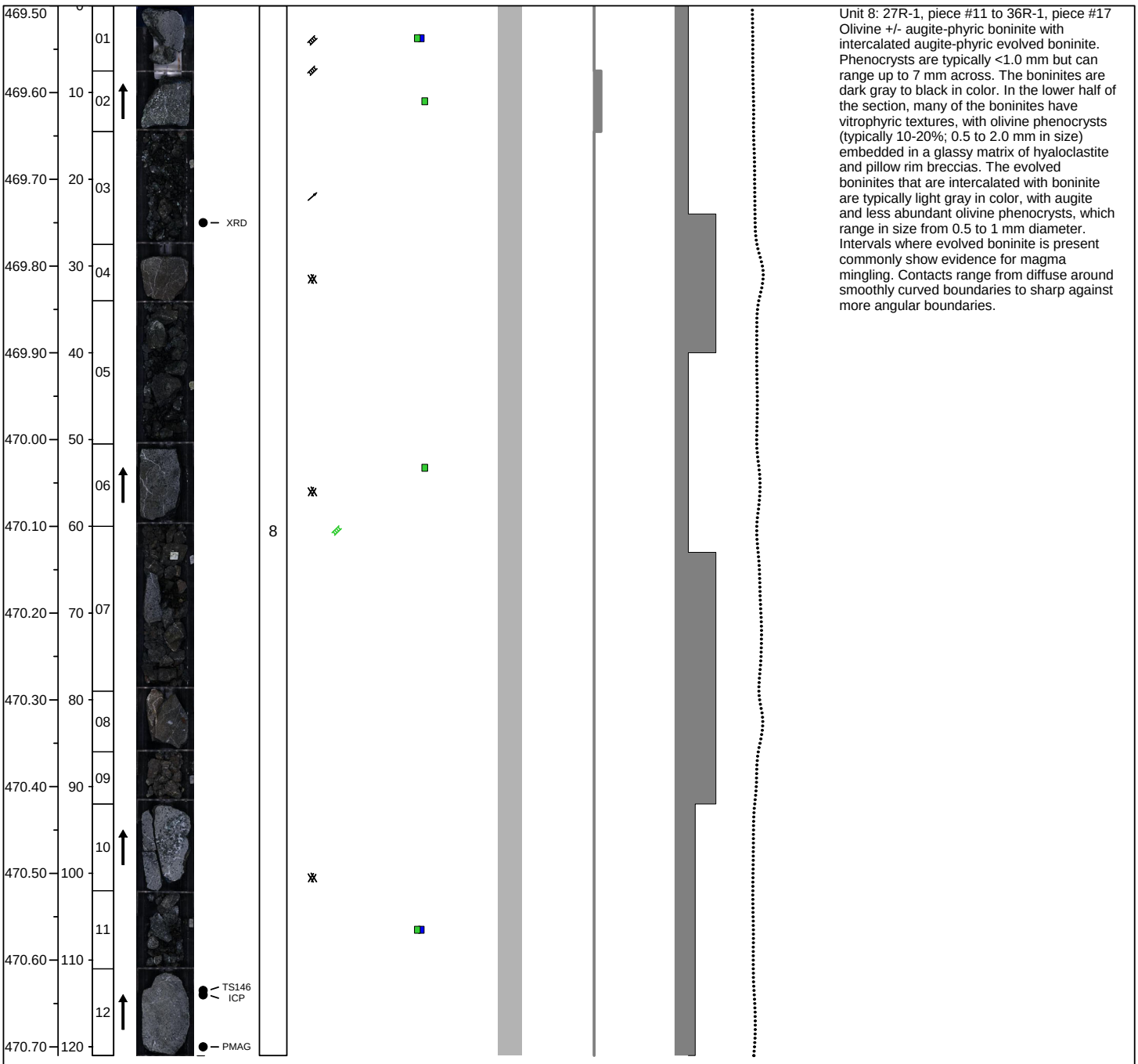
Hole 352-U1439C-35R Section 2, Top of Section: 466.75 m (CSF-A)



Hole 352-U1439C-35R Section 3, Top of Section: 468.11 m (CSF-A)

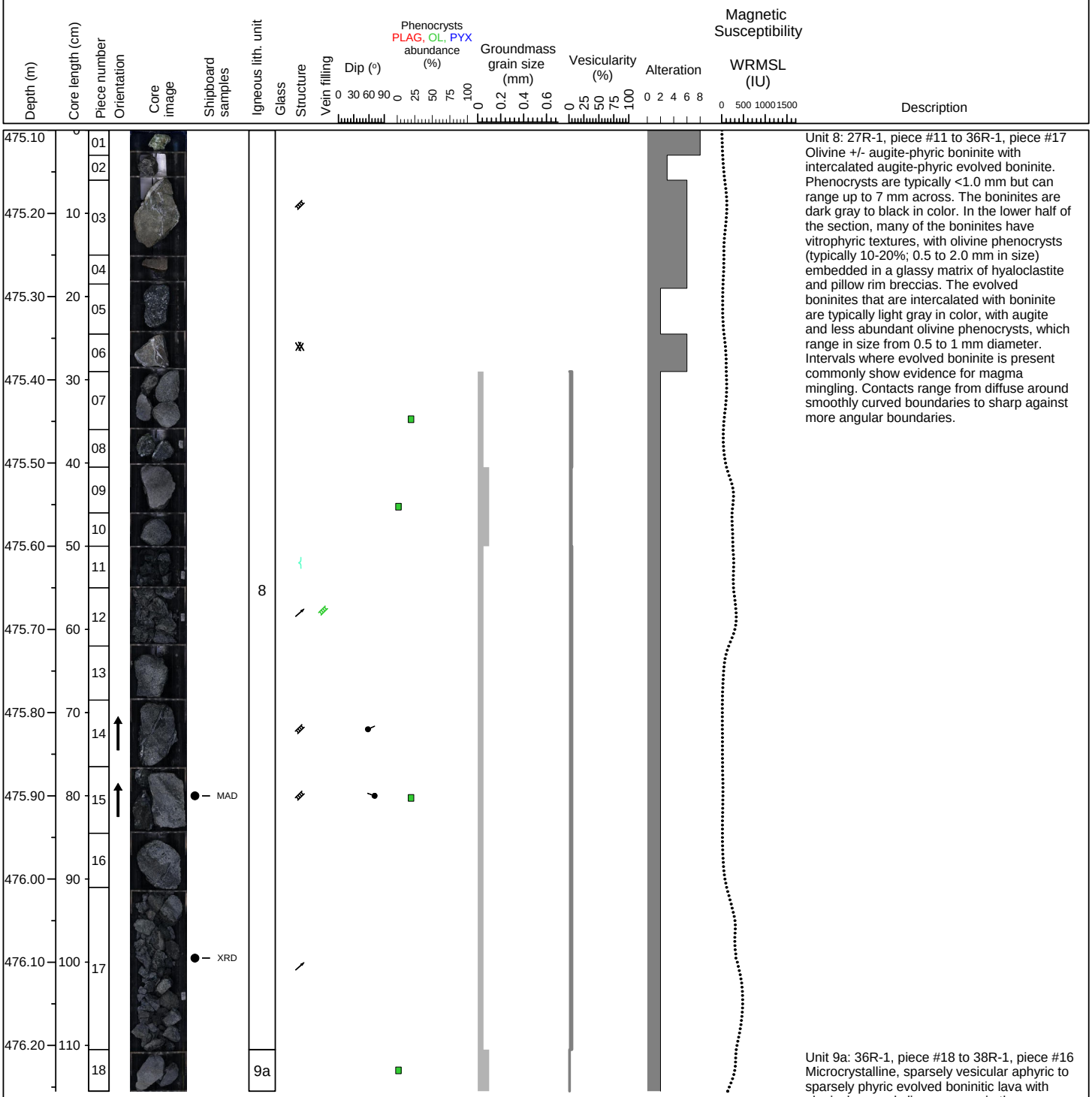


Hole 352-U1439C-35R Section 4, Top of Section: 469.5 m (CSF-A)



Unit 8: 27R-1, piece #11 to 36R-1, piece #17 Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

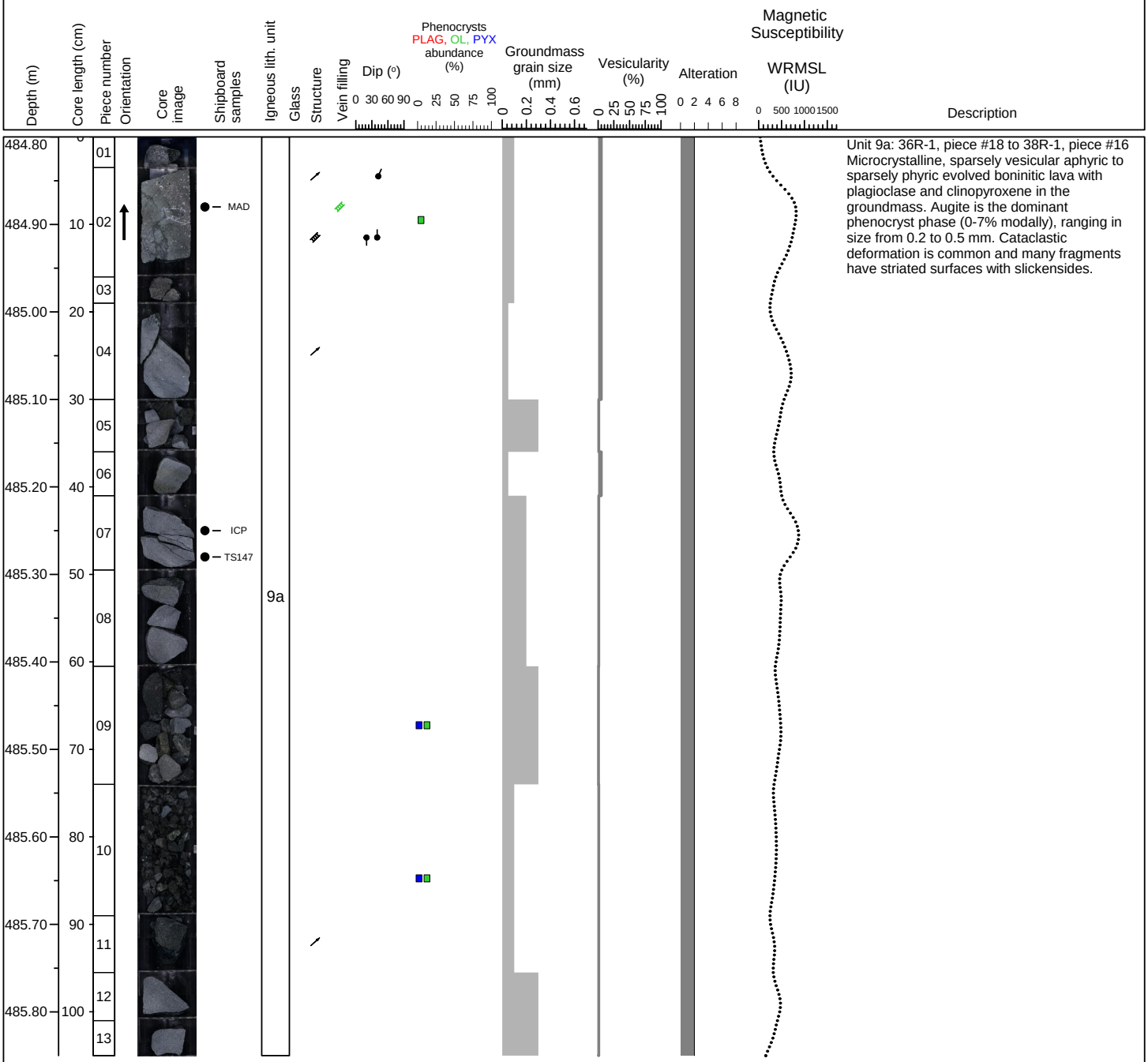
Hole 352-U1439C-36R Section 1, Top of Section: 475.1 m (CSF-A)



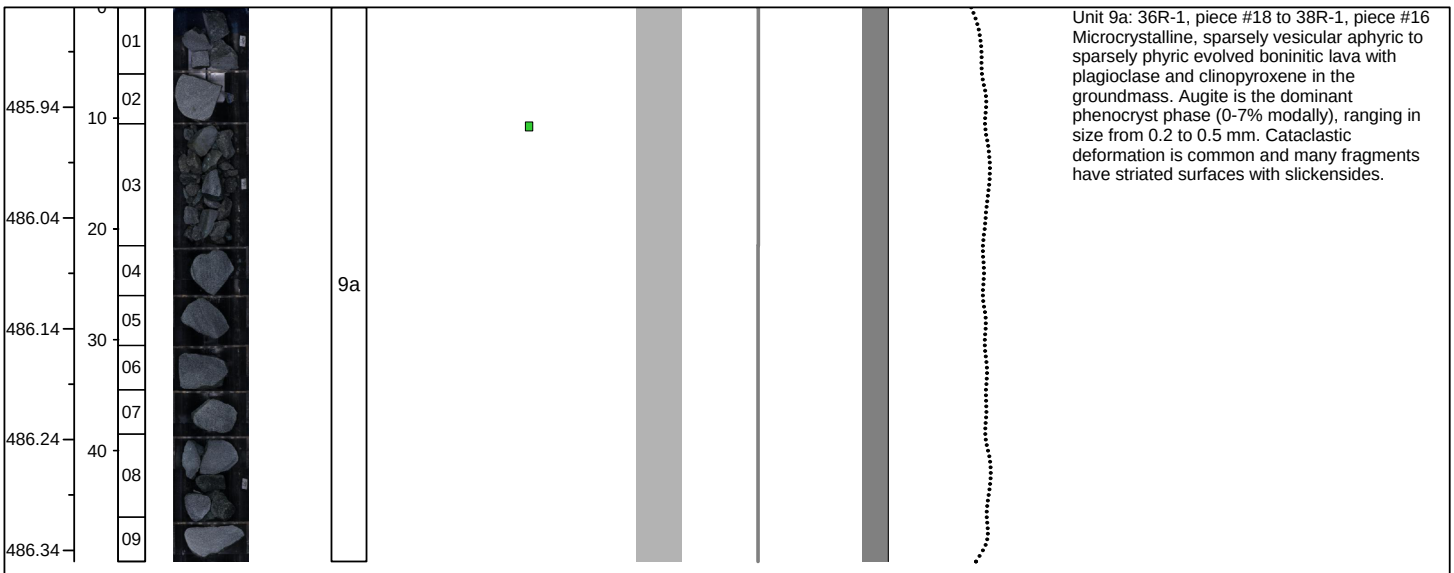
Unit 8: 27R-1, piece #11 to 36R-1, piece #17 Olivine +/- augite-phyric boninite with intercalated augite-phyric evolved boninite. Phenocrysts are typically <1.0 mm but can range up to 7 mm across. The boninites are dark gray to black in color. In the lower half of the section, many of the boninites have vitrophyric textures, with olivine phenocrysts (typically 10-20%; 0.5 to 2.0 mm in size) embedded in a glassy matrix of hyaloclastite and pillow rim breccias. The evolved boninites that are intercalated with boninite are typically light gray in color, with augite and less abundant olivine phenocrysts, which range in size from 0.5 to 1 mm diameter. Intervals where evolved boninite is present commonly show evidence for magma mingling. Contacts range from diffuse around smoothly curved boundaries to sharp against more angular boundaries.

Unit 9a: 36R-1, piece #18 to 38R-1, piece #16 Microcrystalline, sparsely vesicular aphyric to sparsely phyric evolved boninitic lava with plagioclase and clinopyroxene in the groundmass. Augite is the dominant phenocryst phase (0-7% modally), ranging in size from 0.2 to 0.5 mm. Cataclastic deformation is common and many fragments have striated surfaces with slickensides.

Hole 352-U1439C-37R Section 1, Top of Section: 484.8 m (CSF-A)

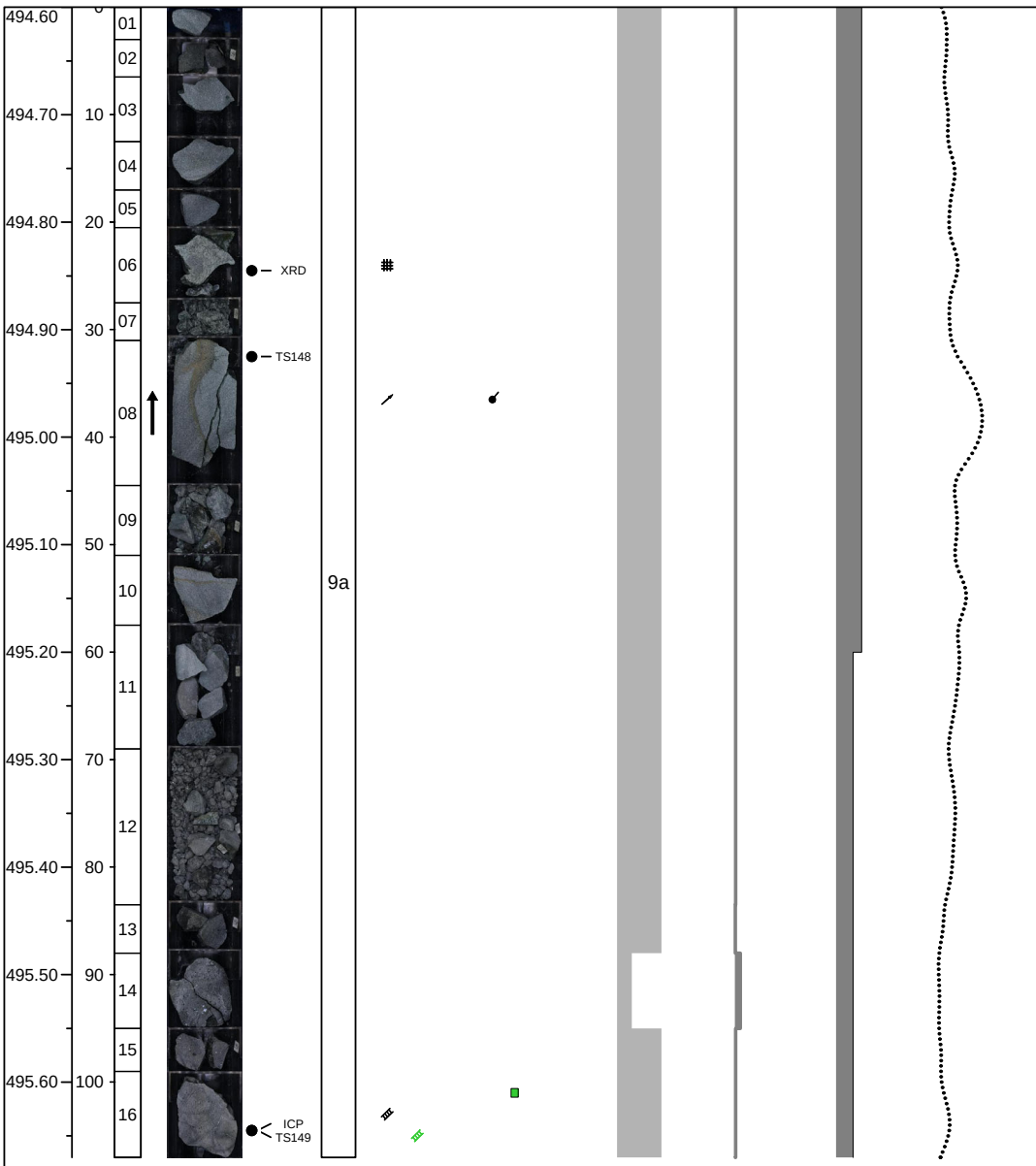


Hole 352-U1439C-37R Section 2, Top of Section: 485.85 m (CSF-A)



Unit 9a: 36R-1, piece #18 to 38R-1, piece #16
Microcrystalline, sparsely vesicular aphyric to sparsely phyric evolved boninitic lava with plagioclase and clinopyroxene in the groundmass. Augite is the dominant phenocryst phase (0-7% modally), ranging in size from 0.2 to 0.5 mm. Cataclastic deformation is common and many fragments have striated surfaces with slickensides.

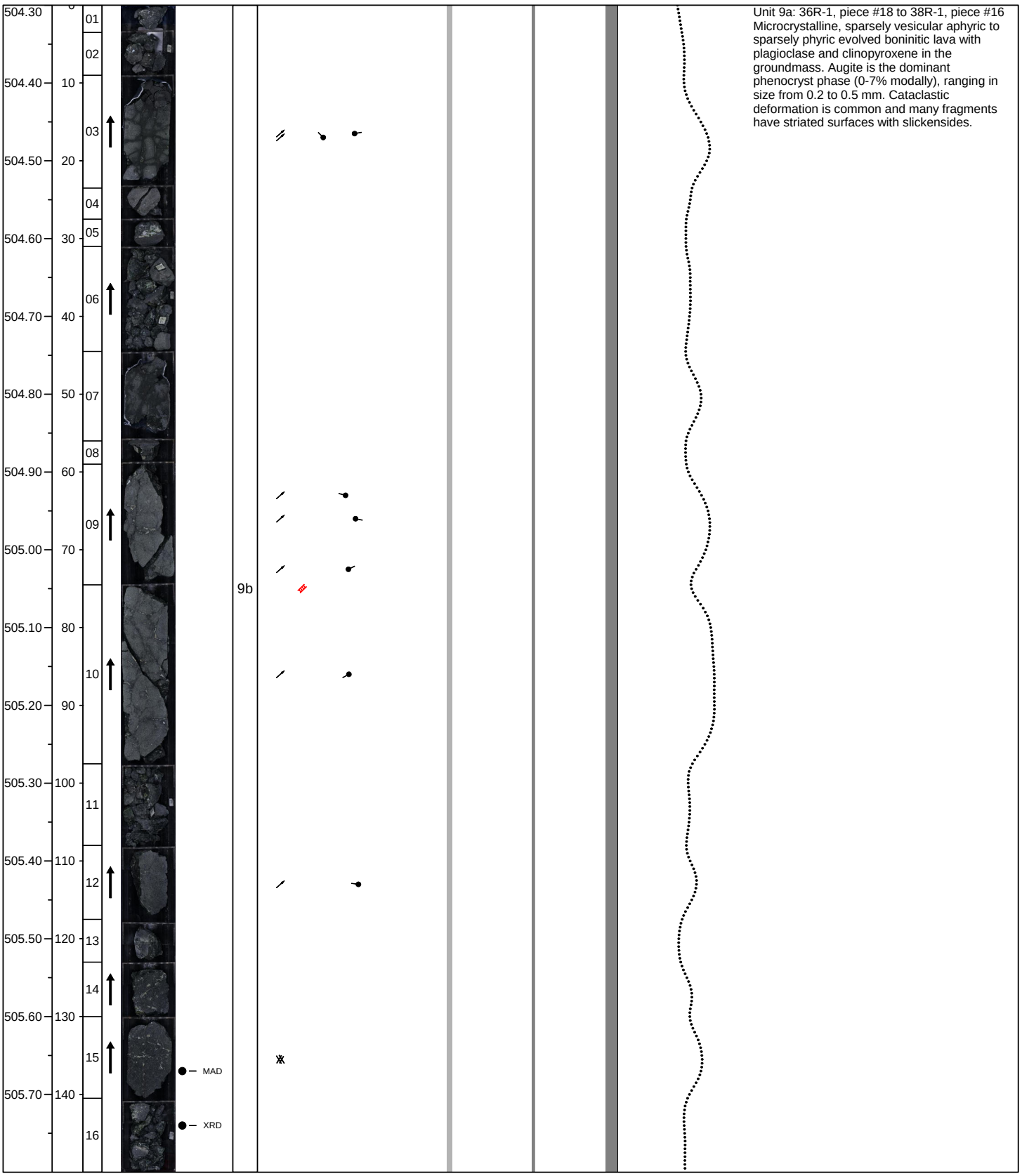
Hole 352-U1439C-38R Section 1, Top of Section: 494.6 m (CSF-A)



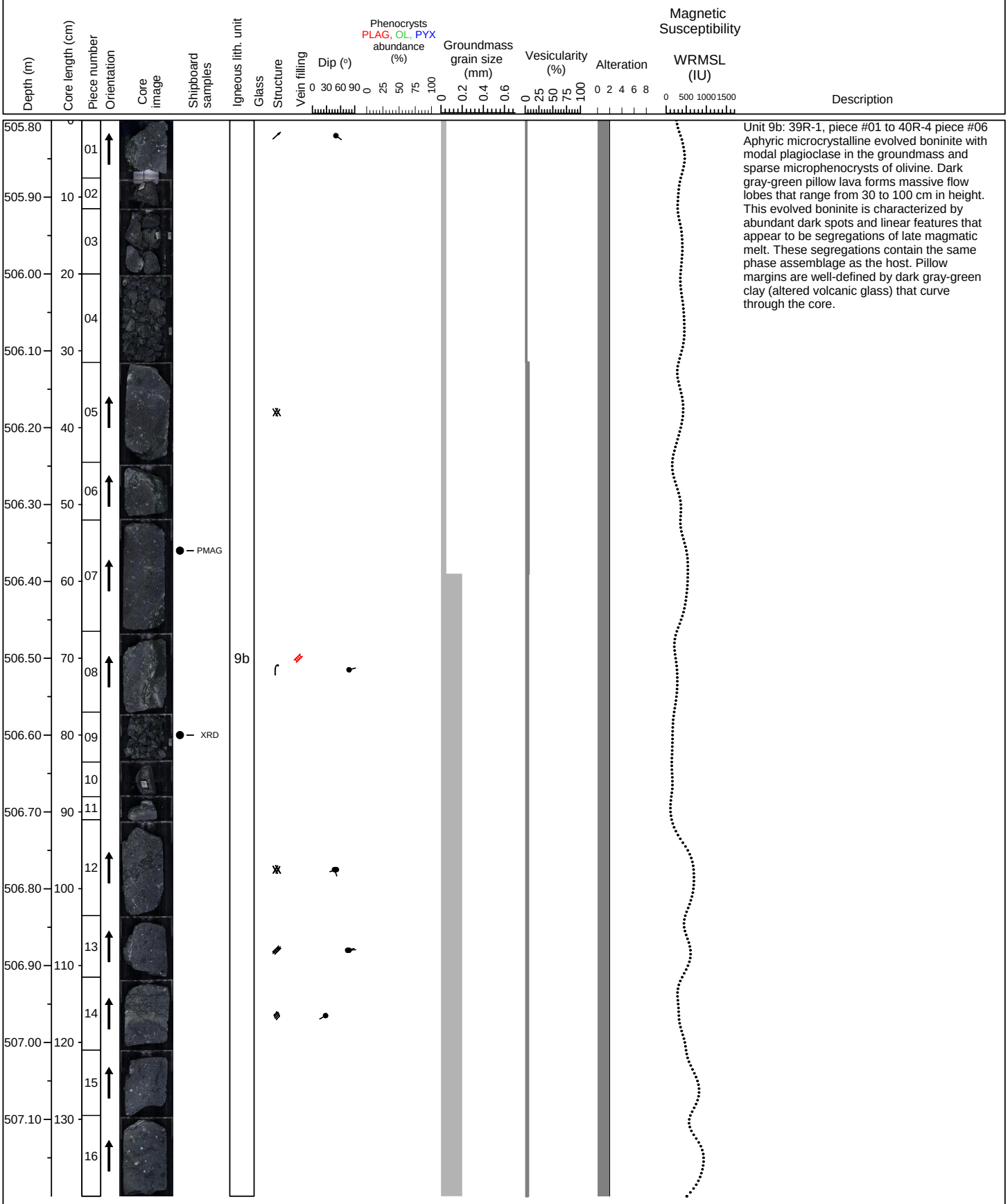
Description

Unit 9a: 36R-1, piece #18 to 38R-1, piece #16
Microcrystalline, sparsely vesicular aphyric to sparsely phyric evolved boninitic lava with plagioclase and clinopyroxene in the groundmass. Augite is the dominant phenocryst phase (0-7% modally), ranging in size from 0.2 to 0.5 mm. Cataclastic deformation is common and many fragments have striated surfaces with slickensides.

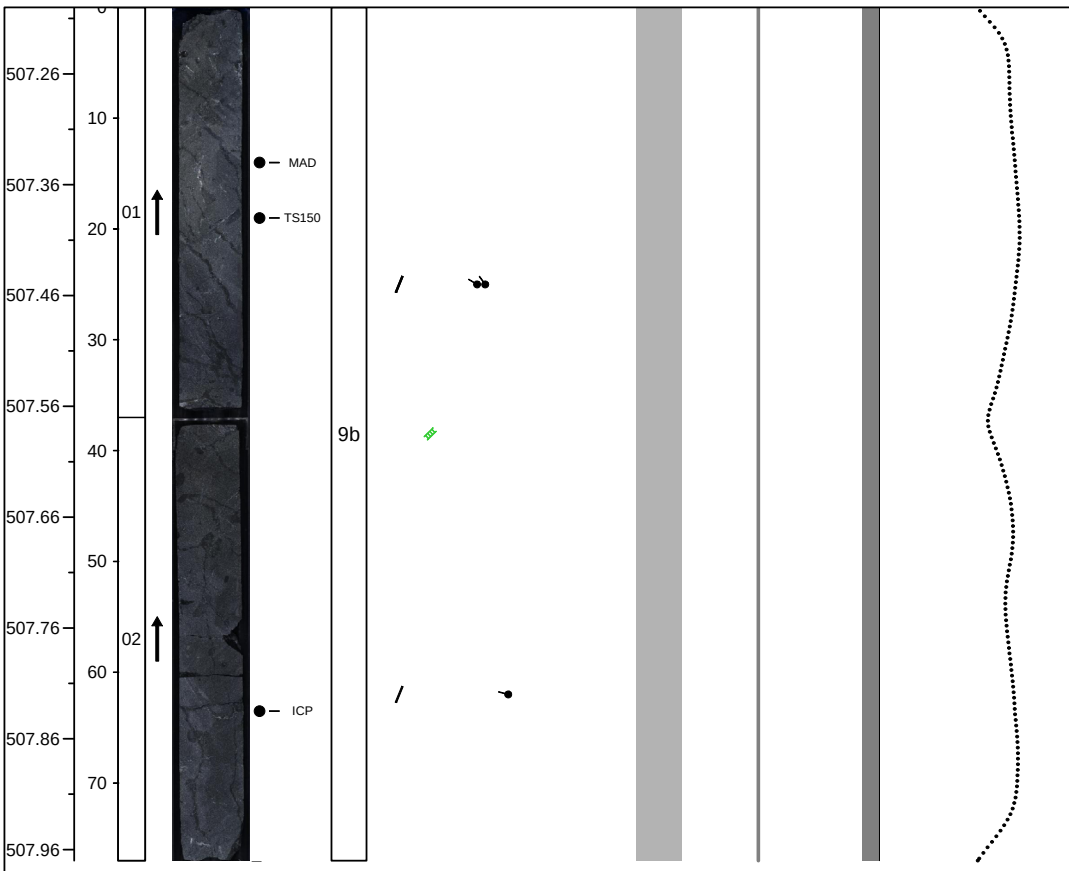
Hole 352-U1439C-39R Section 1, Top of Section: 504.3 m (CSF-A)



Hole 352-U1439C-39R Section 2, Top of Section: 505.8 m (CSF-A)



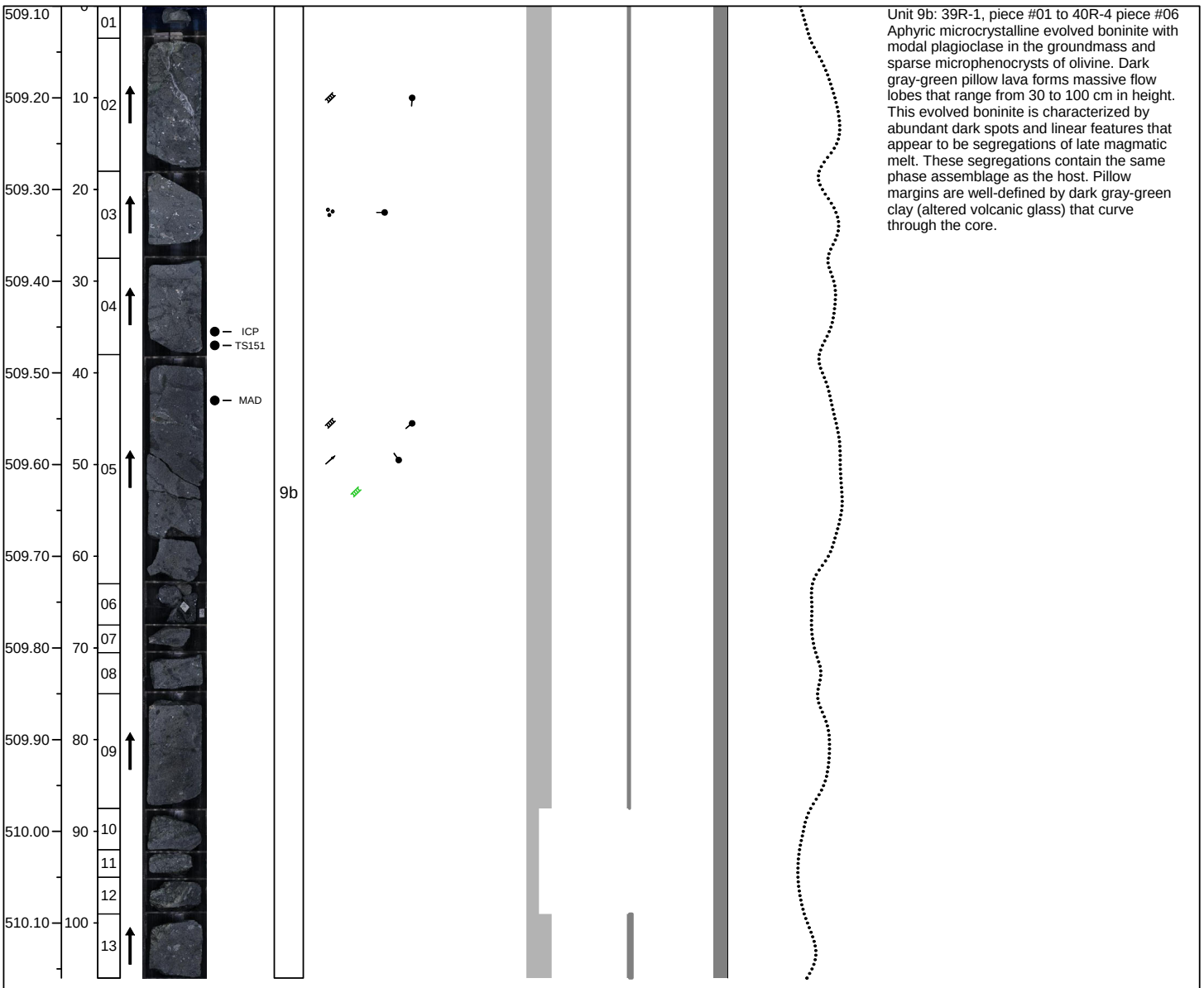
Hole 352-U1439C-39R Section 3, Top of Section: 507.2 m (CSF-A)



Description

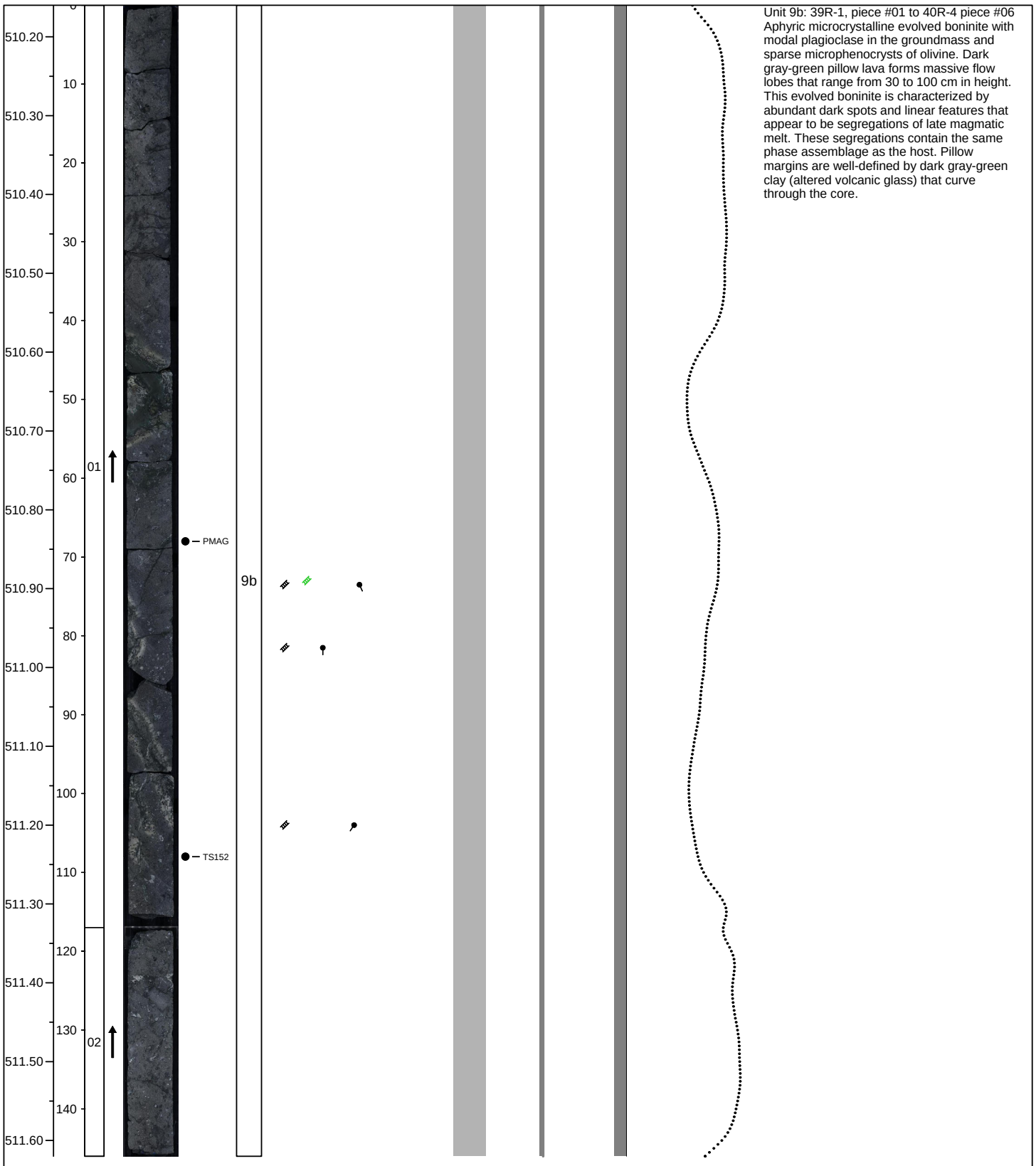
Unit 9b: 39R-1, piece #01 to 40R-4 piece #06 Aphyric microcrystalline evolved boninite with modal plagioclase in the groundmass and sparse microphenocrysts of olivine. Dark gray-green pillow lava forms massive flow lobes that range from 30 to 100 cm in height. This evolved boninite is characterized by abundant dark spots and linear features that appear to be segregations of late magmatic melt. These segregations contain the same phase assemblage as the host. Pillow margins are well-defined by dark gray-green clay (altered volcanic glass) that curve through the core.

Hole 352-U1439C-40R Section 1, Top of Section: 509.1 m (CSF-A)

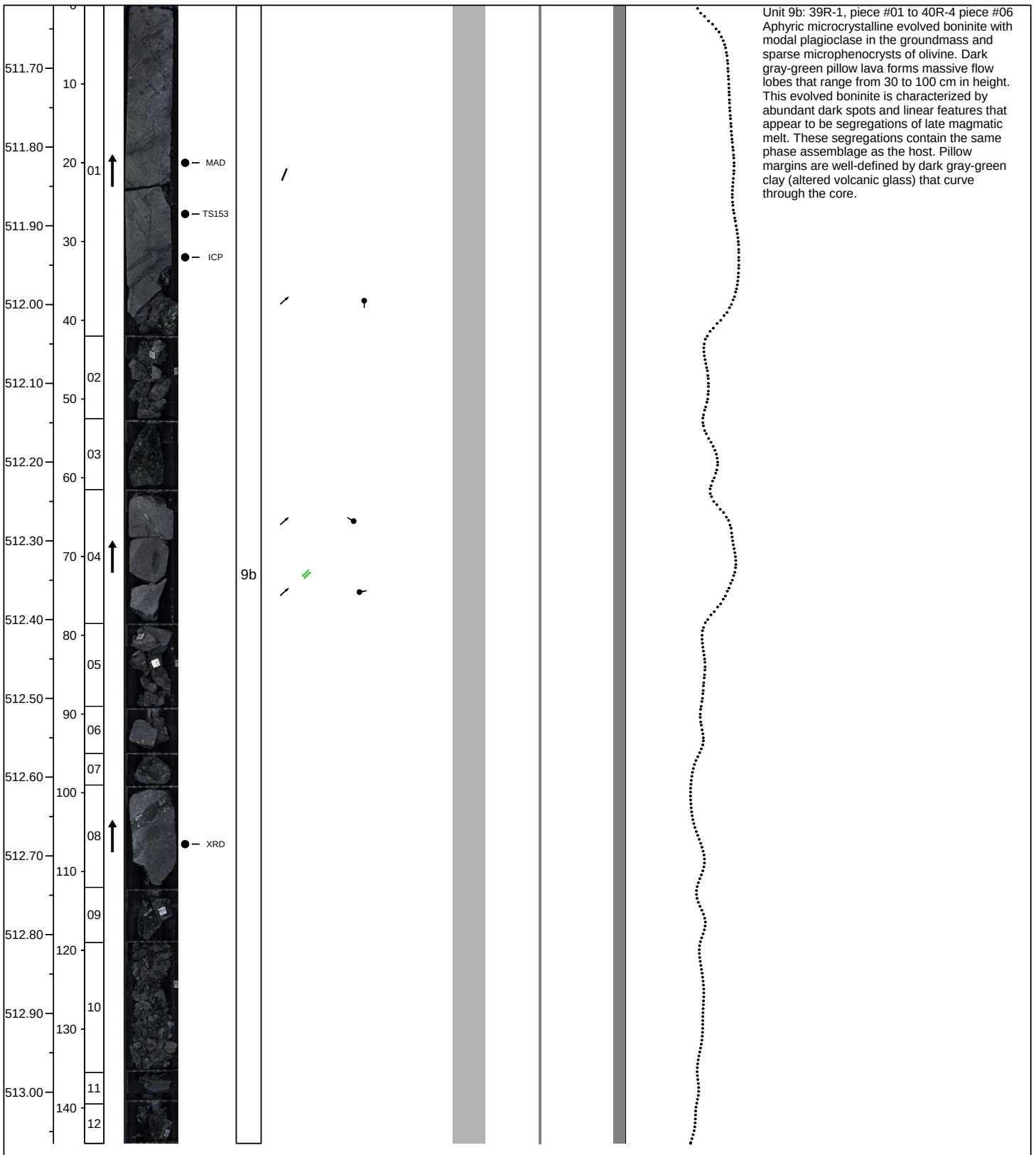


Unit 9b: 39R-1, piece #01 to 40R-4 piece #06 Aphyric microcrystalline evolved boninite with modal plagioclase in the groundmass and sparse microphenocrysts of olivine. Dark gray-green pillow lava forms massive flow lobes that range from 30 to 100 cm in height. This evolved boninite is characterized by abundant dark spots and linear features that appear to be segregations of late magmatic melt. These segregations contain the same phase assemblage as the host. Pillow margins are well-defined by dark gray-green clay (altered volcanic glass) that curve through the core.

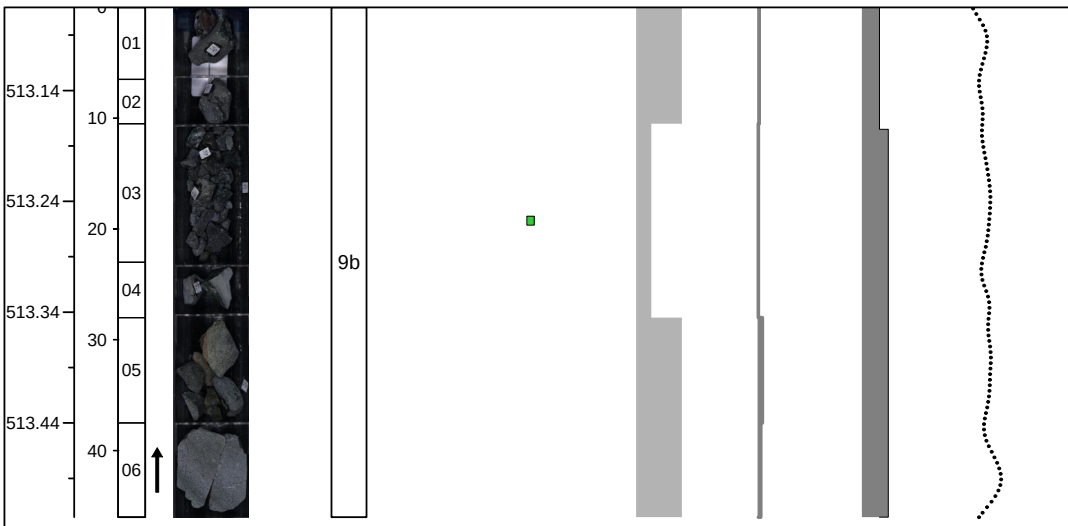
Hole 352-U1439C-40R Section 2, Top of Section: 510.16 m (CSF-A)



Hole 352-U1439C-40R Section 3, Top of Section: 511.62 m (CSF-A)

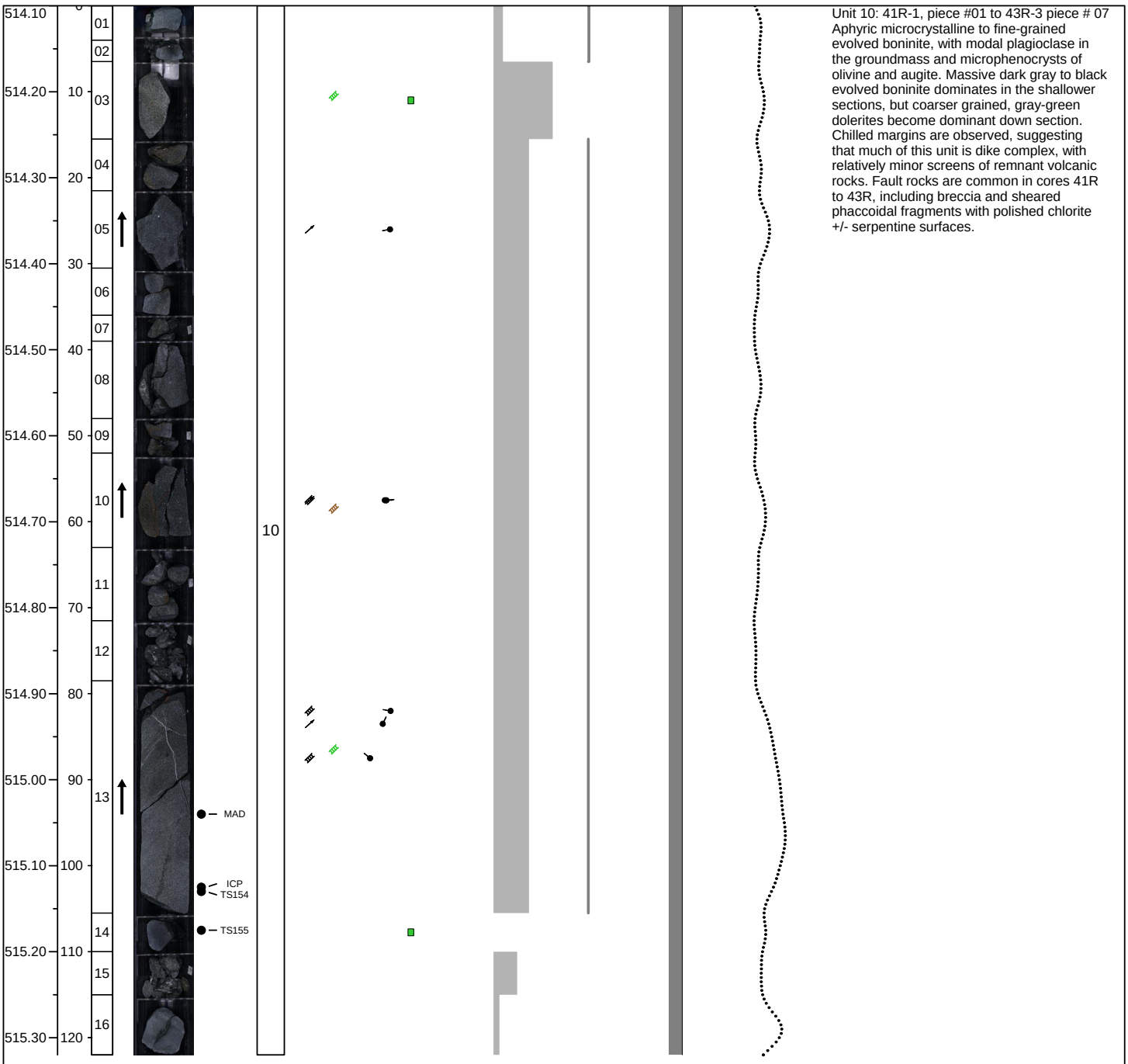


Hole 352-U1439C-40R Section 4, Top of Section: 513.065 m (CSF-A)



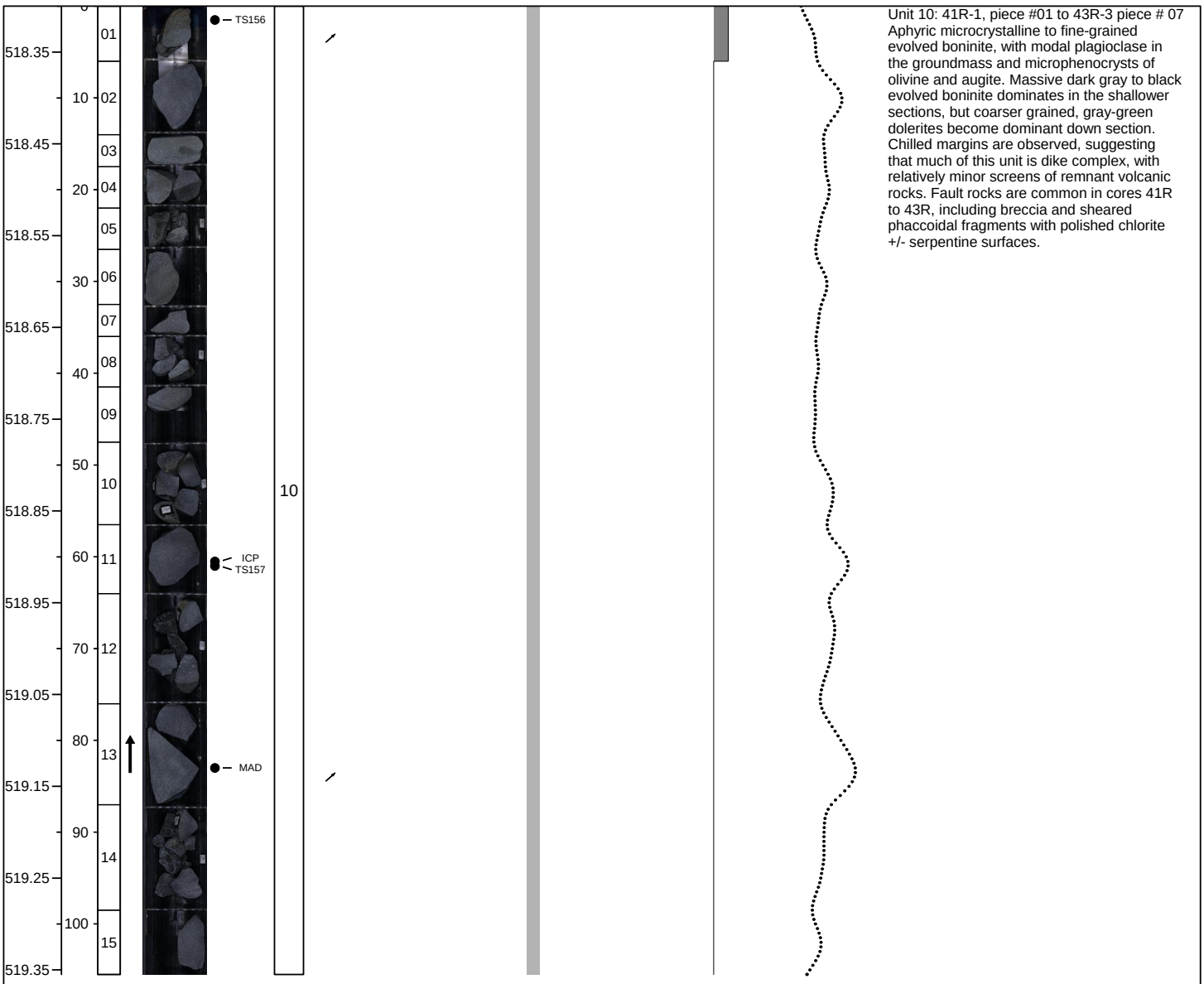
Unit 9b: 39R-1, piece #01 to 40R-4 piece #06
Aphyric microcrystalline evolved boninite with modal plagioclase in the groundmass and sparse microphenocrysts of olivine. Dark gray-green pillow lava forms massive flow lobes that range from 30 to 100 cm in height. This evolved boninite is characterized by abundant dark spots and linear features that appear to be segregations of late magmatic melt. These segregations contain the same phase assemblage as the host. Pillow margins are well-defined by dark gray-green clay (altered volcanic glass) that curve through the core.

Hole 352-U1439C-41R Section 1, Top of Section: 514.1 m (CSF-A)



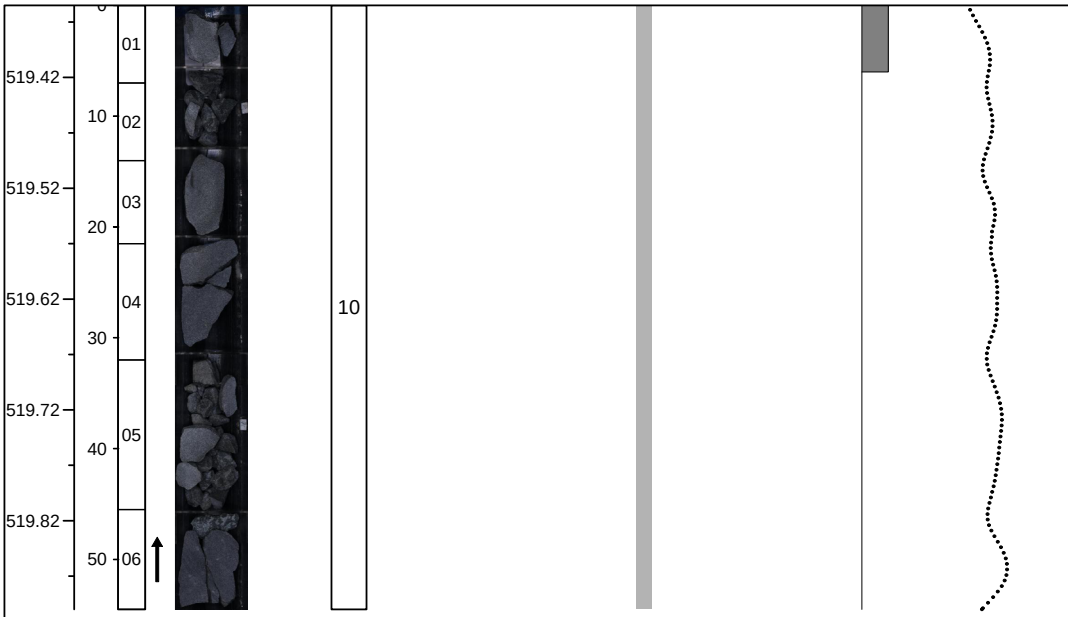
Unit 10: 41R-1, piece #01 to 43R-3 piece # 07 Aphyric microcrystalline to fine-grained evolved boninite, with modal plagioclase in the groundmass and microphenocrysts of olivine and augite. Massive dark gray to black evolved boninite dominates in the shallower sections, but coarser grained, gray-green dolerites become dominant down section. Chilled margins are observed, suggesting that much of this unit is dike complex, with relatively minor screens of remnant volcanic rocks. Fault rocks are common in cores 41R to 43R, including breccia and sheared phaccoidal fragments with polished chlorite +/- serpentine surfaces.

Hole 352-U1439C-42R Section 1, Top of Section: 518.3 m (CSF-A)



Unit 10: 41R-1, piece #01 to 43R-3 piece # 07 Aphyric microcrystalline to fine-grained evolved boninite, with modal plagioclase in the groundmass and microphenocrysts of olivine and augite. Massive dark gray to black evolved boninite dominates in the shallower sections, but coarser grained, gray-green dolerites become dominant down section. Chilled margins are observed, suggesting that much of this unit is dike complex, with relatively minor screens of remnant volcanic rocks. Fault rocks are common in cores 41R to 43R, including breccia and sheared phaccoidal fragments with polished chlorite +/- serpentine surfaces.

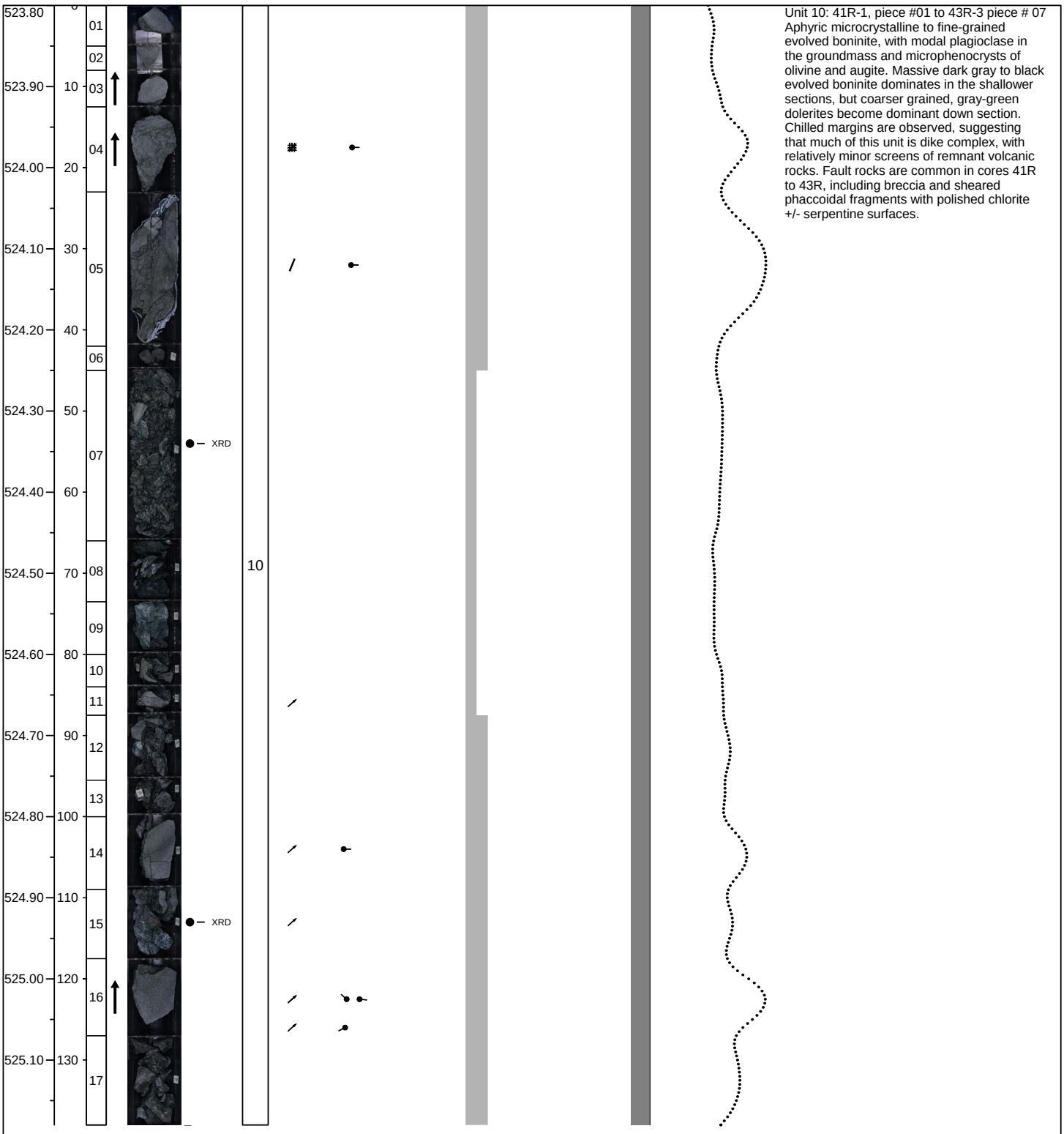
Hole 352-U1439C-42R Section 2, Top of Section: 519.355 m (CSF-A)



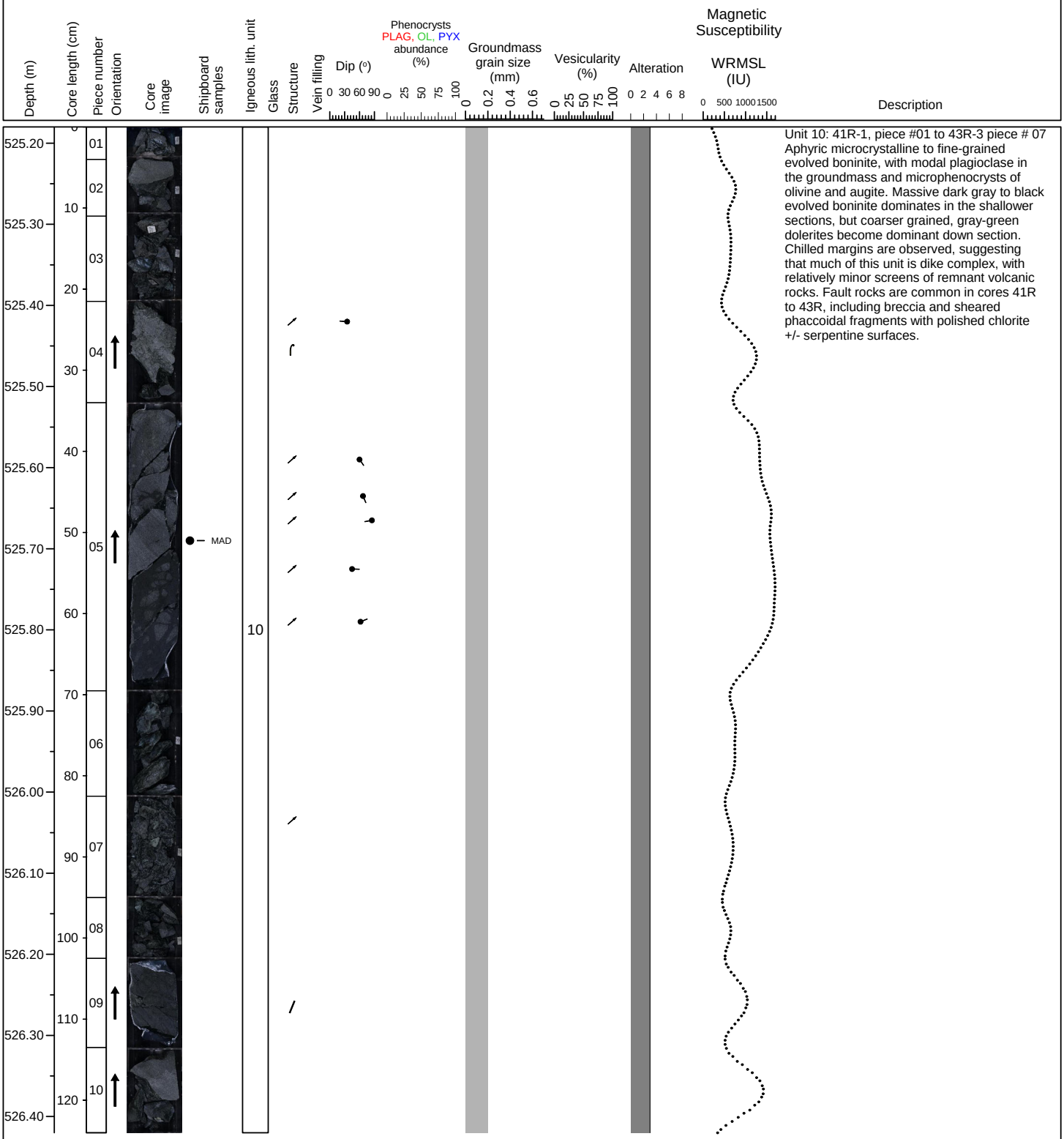
Description

Unit 10: 41R-1, piece #01 to 43R-3 piece # 07 Aphyric microcrystalline to fine-grained evolved boninite, with modal plagioclase in the groundmass and microphenocrysts of olivine and augite. Massive dark gray to black evolved boninite dominates in the shallower sections, but coarser grained, gray-green dolerites become dominant down section. Chilled margins are observed, suggesting that much of this unit is dike complex, with relatively minor screens of remnant volcanic rocks. Fault rocks are common in cores 41R to 43R, including breccia and sheared phaccoidal fragments with polished chlorite +/- serpentine surfaces.

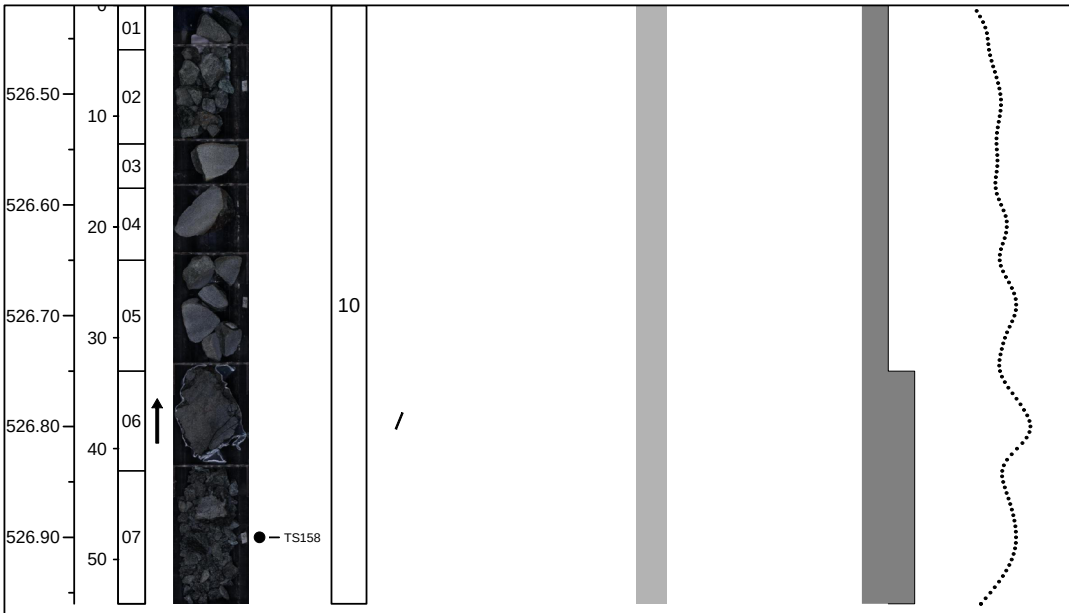
Hole 352-U1439C-43R Section 1, Top of Section: 523.8 m (CSF-A)



Hole 352-U1439C-43R Section 2, Top of Section: 525.18 m (CSF-A)



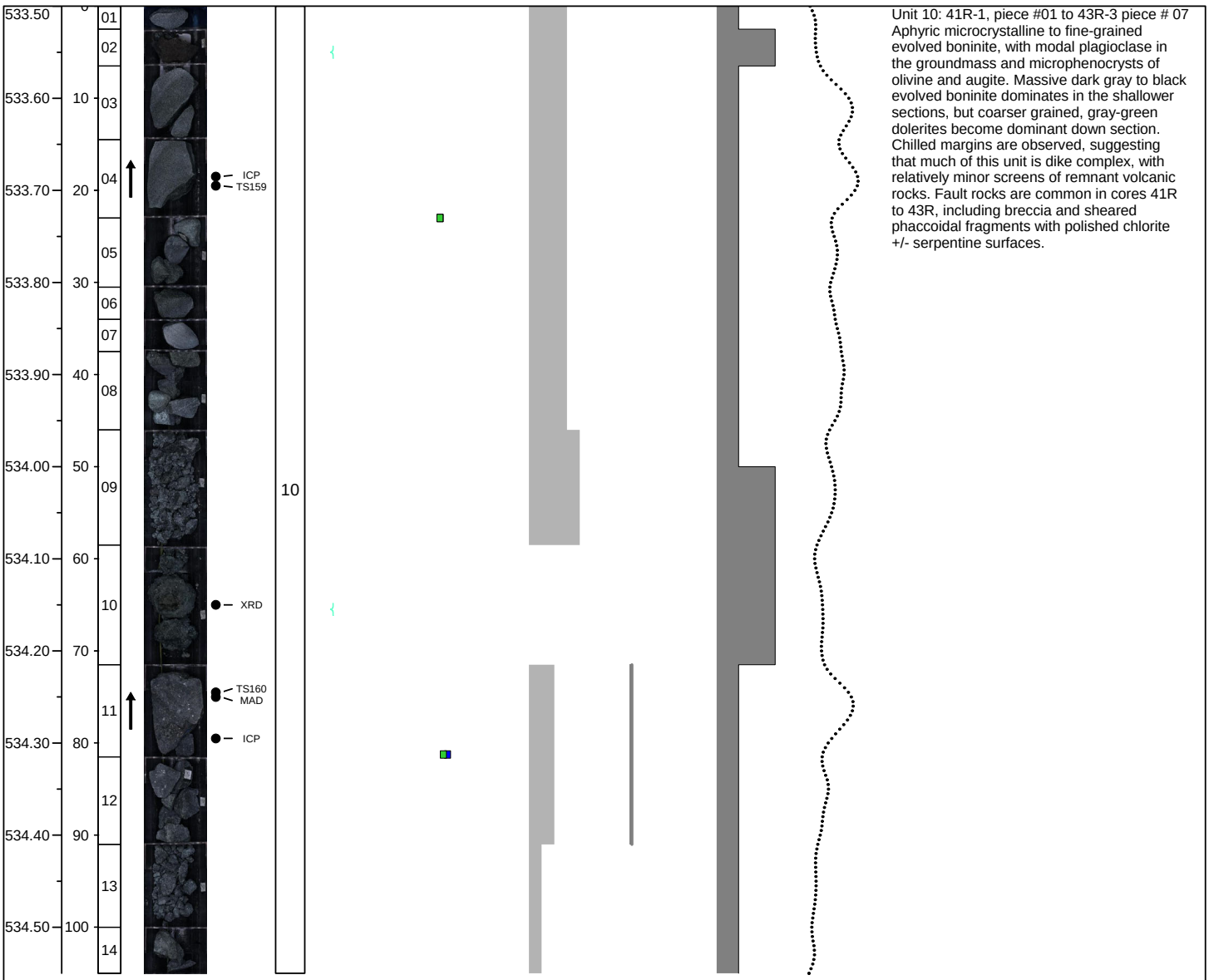
Hole 352-U1439C-43R Section 3, Top of Section: 526.42 m (CSF-A)



Description

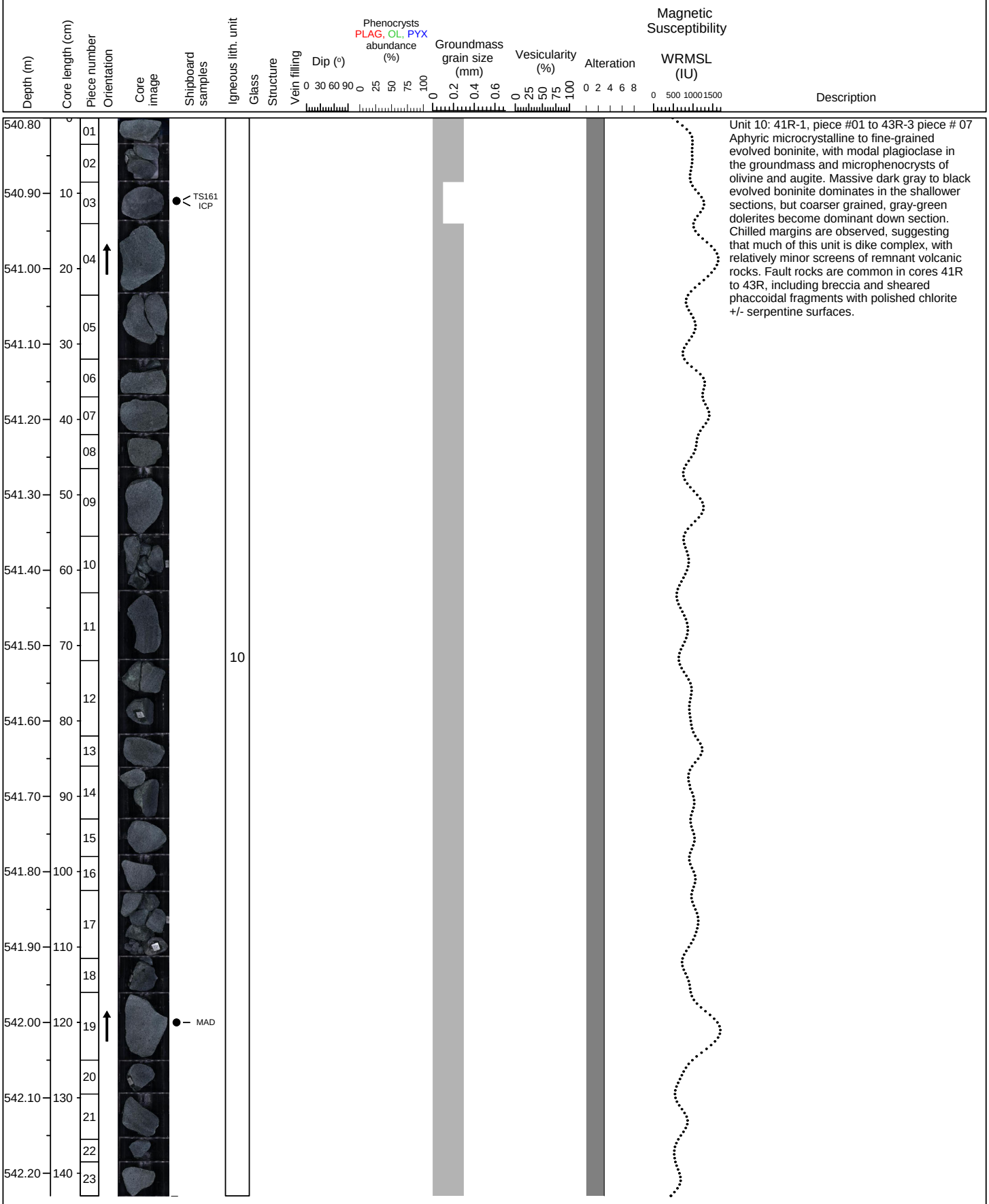
Unit 10: 41R-1, piece #01 to 43R-3 piece # 07
Aphyric microcrystalline to fine-grained evolved boninite, with modal plagioclase in the groundmass and microphenocrysts of olivine and augite. Massive dark gray to black evolved boninite dominates in the shallower sections, but coarser grained, gray-green dolerites become dominant down section. Chilled margins are observed, suggesting that much of this unit is dike complex, with relatively minor screens of remnant volcanic rocks. Fault rocks are common in cores 41R to 43R, including breccia and sheared phaccoidal fragments with polished chlorite +/- serpentine surfaces.

Hole 352-U1439C-44R Section 1, Top of Section: 533.5 m (CSF-A)



Unit 10: 41R-1, piece #01 to 43R-3 piece # 07 Aphyric microcrystalline to fine-grained evolved boninite, with modal plagioclase in the groundmass and microphenocrysts of olivine and augite. Massive dark gray to black evolved boninite dominates in the shallower sections, but coarser grained, gray-green dolerites become dominant down section. Chilled margins are observed, suggesting that much of this unit is dike complex, with relatively minor screens of remnant volcanic rocks. Fault rocks are common in cores 41R to 43R, including breccia and sheared phaccoidal fragments with polished chlorite +/- serpentine surfaces.

Hole 352-U1439C-45R Section 1, Top of Section: 540.8 m (CSF-A)



Sample	Top [cm]	Bottom [cm]	Top Depth [m]	Bottom Depth [m]	Sand texture [%]	Silt texture [%]	Clay texture [%]	Ash [%]	Siliciclastic [%]	Quartz abundance (name)	K-Feldspar abundance (name)	Plagioclase abundance (name)	Biotite abundance (name)	Muscovite abundance (name)	Chlorite abundance (name)	Amphibole abundance (name)	Pyroxene abundance (name)	Olivine abundance (name)	Apatite abundance (name)	Zircon abundance (name)	Barite abundance (name)	Glauconite abundance (name)	Zeolite abundance (name)	Palagonite abundance (name)	Pyrite, authigenic abundance (name)	Fe oxide abundance (name)	Calcite, authigenic abundance (name)	Dolomite, authigenic abundance (name)	Pyroclasts, pumiceous abundance (name)	Pyroclasts, blocky abundance (name)	Pyroclasts, cuspate abundance (name)	Vesicles, non-vesicular abundance (name)	Vesicles, round abundance (name)	Vesicles, elliptical abundance (name)	Vesicles, elongate abundance (name)	Vesicles, tabular abundance (name)	Glass (pyroclasts), transparent abundance (name)	Glass (pyroclasts), brown or colored abundance (name)	Glass (pyroclasts) comment	Volcanic lithic abundance (name)	Sedimentary lithic abundance (name)	Metamorphic lithic abundance (name)	Chert abundance (name)	Mineral grain comment	Foraminifera abundance (name)	Calcareous nannofossils abundance (name)	Pteropod fragments abundance (name)	Radiolarians abundance (name)	Diatoms abundance (name)	Siliceous sponge spicule fragments abundance (name)	Organic matter abundance (name)	Plant residuals abundance (name)	Clay, authigenic (matrix) abundance (name)	Smear slide general comment
352-U1439A-1H-1-A	12.00	13.0	0.12	0.13	5	60	35			R		R					Tr									R													R	Tr			R				R	A			R	R	Tr			
352-U1439A-1H-1-A	46.00	47.00	0.46	0	5	40	55			R		Tr	Tr				Tr		Tr							Tr													R	Tr			Tr				R	A		R		Tr	Tr			
352-U1439A-1H-1-A	112.00	113.00	1.12	1	5	15	80			R		C	R				Tr									Tr													R	Tr		R	R				Tr	A		R	Tr	R				
352-U1439A-1H-2-A	65.00	66.00	2.11	2	5	30	65			R		R					Tr									Tr	Tr												A	Tr							R	A		R	Tr	Tr				
352-U1439A-1H-2-A	137.00	138.0	2.83	3	10	15	75			Tr		Tr															Tr												R								C	D		R	R	R	R			
352-U1439A-1H-3-A	30.00	31.00	3.26	3	5	10	85			Tr		Tr																										R	Tr			Tr				R	D		R	Tr	Tr				
352-U1439A-1H-3-A	98.00	99.0	3.94	4	15	80	5			Tr		R					R							Tr						A	A	C	C	C	A	C	R	D	Tr							Tr	C		Tr		Tr				
352-U1439A-1H-3-A	144.00	145.00	4.4	4	15	80	5			Tr	Tr	R					Tr													A	D	C	R	Tr	C	C	R	D	Tr		Tr	Tr				Tr	Tr								
352-U1439A-1H-4-A	27.00	28.0	4.73	5	10	15	75			Tr		Tr	Tr																									R								C	A		R	Tr	Tr		Tr		
352-U1439A-1H-4-A	55.00	56.00	5.01	5.02	5	35	60			R		R															R												C	Tr		R	R				R	A		R	Tr	R				
352-U1439A-1H-4-A	101.00	102.00	5.47	5	10	80	10			Tr		R					R							Tr		Tr				R	A	D	D	C	C	R	Tr	D	Tr								C									Minor cpx+opx
352-U1439A-2H-4-A	100.0	101.00	12.3	12.31	15	80	5			Tr		R					R		Tr											C	D	R	D	R	R	R		D	Tr							R	C								
352-U1439A-2H-7-A	58.00	59.00	16.11	16	5	20	75				Tr	Tr																										R			Tr					R	D								
352-U1439A-3H-1-A	132.00	133.00	17.62	17.63		10	90			Tr		Tr																Tr										Tr								C	D		R	R	R				Rare silicoflagelates
352-U1439A-3H-3-A	7.00	8.00	19.37	19	35	55	10			R		R					R							Tr						A	R	A	A	R	R	C	A	D	Tr		Tr	Tr				Tr	C		Tr	Tr					Cpx+opx
352-U1439A-3H-3-A	136.00	137.00	20.66	21		20	80			Tr		Tr																										Tr								R	D		Tr	Tr					
352-U1439A-3H-4-A	136.00	137.0	22.16	22	40	55	5			R		R					Tr		Tr				Tr				Tr				C	D	C	D	R	R	R	C	D	Tr			Tr				Tr	C								
352-U1439A-4H-3-A	66.00	67.00	29.46	29.47	5	80	15			R		R	Tr				R													C	D	C	D		R	R	C	D								C									Cpx+opx
352-U1439A-4H-6-A	6.00	7.00	32.96	33	10	70	20			R		Tr					Tr													C	A	C	A	R	C	A	C	D				R				R	C								Cpx
352-U1439A-4H-7-A	10.00	11.00	34.35	34	0	10	90			Tr		R					Tr										Tr			A	A	A	C	A	A	C	A	A	A								R	C								
352-U1439A-4H-7-A	76.00	77.00	35.01	35	1	14	85			R		Tr					Tr																					R		Tr	Tr								D		R							
352-U1439A-4H-CC-A	11.00	12.00	35.15	35	5	30	70			R		R					Tr																					C									D		Tr	Tr							
352-U1439A-5H-1-A	26.0	27.00	35.56	36		10	90			R		R					R																					R				R				Tr	D		Tr	Tr							
352-U1439A-6H-4-A	40.00	41.00	49.7	50	5	15	80			R		Tr					R									Tr				R	A	C	A	R	C	C	C	A	Tr		Tr					R	A			Tr						
352-U1439A-6H-4-A	73.00	74.00	50.03	50	10	70	20			Tr		Tr																		C	A	C	A	R	R	C	C	D				R				R	C		R	R	Tr				
352-U1439A-6H-5-A	41.0	42.00	51.21	51		15	85			R		R					R	Tr							Tr													C				Tr				R	C		Tr	Tr	Tr				
352-U1439A-6H-6-A	115.00	116.00	52.84	52.85		15	85			Tr		R					Tr									Tr													C	Tr								D		R	R	R				
352-U1439A-6H-CC-A	6.00	7.00	54.13	54.14		20	80			Tr		Tr					Tr									Tr													A	Tr			Tr					D		R	R	R				
352-U1439A-7H-3-A	108.00	109.00	58.38	58	5	15	80			Tr		R					Tr													A									C			Tr	Tr					C									
352-U1439A-7H-4-A	37.00	38.00	59.17	59.18	5	15	80			R		Tr					Tr													C	A	C	C	A	A	A		C	A																	R	
352-U1439A-7H-4-A	63.00	64.00	59.43	59.44	1	9	90			Tr		Tr					Tr								Tr			Tr		C									C				R	R										
352-U1439A-7H-6-A	70.00	71.00	62.5	63	5	70	25			Tr							Tr									C				A		A		A	A			D	Tr			C					C							
352-U1439A-7H-7-A	27.00	28.00	63.1	63	1	9	90			Tr		Tr																										R				Tr	Tr								D	
352-U1439A-8H-2-A	5.00	6.0	65.35	65	10	60	30			Tr		R				R	R									Tr				A	A	C	A	C		C	A	D									C							
352-U1439A-8H-2-A	42.00	43.00	65.72	66		5	95			Tr																				R								R								R	A		R	R				A	
352-U1439A-8H-3-A	60.00	61.00	67.4	67	5	40	55			Tr		R				Tr	Tr													C	C	A	A	A	C		C	D										C		Tr					
352-U1439A-8H-4-A	92.00	93.00	69.22	69.23	55	40	5			R		R					Tr																					C	C			C							R		R	R				
352-U1439A-8H-4-A	139.00	140.0	69.69	70	5	70	25			R		R					Tr	Tr																			C				C							C		R	R				
352-U1439A-8H-5-A	25.0	26.00	70.1	70		80	20			Tr		Tr																		R	A	A	A	A	C	R	R	D									Tr									
352-U1439A-8H-5-A	149.00	150.00	71.3	71	40	50	10			R		R					Tr													C	C	A	A	C	A	C	C	D				R					C									
352-U1439A-8H-6-A	72.00	73.00	72.02	72	10	75	15			Tr		C					R													A	C	A	R	A	A	R	R	D									C									
352-U1439A-8H-7-A	25.00	26.0	72.77	73	10	80	10			Tr		Tr					Tr													A	R	A	C	R	C	A	A	D									R									
352-U1439A-8H-7-A	52.0	53.00	73.04	73		80	20			Tr		Tr																		C	A	A	A	A	A	R	R	D									R									
352-U1439A-8H-CC-A	1.00	2.0	73.19	73.2	40	50	10			Tr		Tr					Tr													A	R	A	C	R	C	A	A	D				R					R									
352-U1439A-8H-CC-A	15.00	16.00	73.33	73		20	80			R		R					Tr																					C	Tr		R	R	R				A		R	R	R				
352-U1439A-9H-2-A	103.00	104.00	75.83	76	5	70	25			Tr		Tr					Tr								Tr		Tr													A				R					C		R	R	R			C	
352-U1439A-9H-4-A	25.00	26.0	77.39	77	10	80	10			R		R					R													C								C				A					C		Tr							
352-U1439A-9H-4-A	44.00	45.0	77.58	78		15	85			Tr		R					R													C	TR			C		Tr											Tr	Tr								
352-U1439A-9H-5-A	55.00	56.00	78.46	78		5	95			Tr		Tr					Tr										Tr													C									D		Tr	Tr							
352-U1439A-9H-7-A	93.00	94.00	81.65	82		5	95			Tr		Tr					Tr																					R									D		R	R							
352-U1439A-10H-1-A	69.00	70.0	83.49	84		15	85			R		R					Tr																					A	C		R	C					A		R		R				A	
352-U1439A-10H-1-A	110.0	111.00	83.9	84	10	85	5			R		Tr					R													C	A	C	A	C	C	A	C	D									R									
352-U1439A-10H-3-A	17.00	18.00	85.99	86	5	15	80			R		R					Tr									Tr													A									A									
352-U1439A-10H-3-A	49.00	50.00	86.31	86	5	55	40			R		R					R	Tr								Tr													A			Tr	R				R	A				Tr					
352-U1439A-10H-3-A	89.00	90.00	86.7	86.72	10	80	10			R		R					C									Tr													C	A	C	A	C	C	C	C	D						R				
352-U1439A-10H-4-A	32.00	33.00	87.65	88	0	45	55			Tr		R					R		Tr																					C				C	C								A		R		R				
352-U1439A-11X-3-A	112.00	113.00	96.42	96	5	20	75			Tr		Tr					Tr										Tr													Tr									Tr	D		Tr		Tr				
352-U1439A-11X-4-A	103.00	104.00	97.83	98	5	80	15			Tr		R	Tr				Tr		Tr								R				C	A	R	A	R	R	C	C	D	Tr		Tr						Tr	C								
352-U1439A-11X-5-A	44.00	45.00	98.74	98.75	0	10	90			Tr		Tr															Tr													Tr									R	D		R		R				

Sample	Top [cm]	Bottom [cm]	Top Depth [m]	Bottom Depth [m]	Sand texture [%]	Silt texture [%]	Clay texture [%]	Ash [%]	Siliciclastic [%]	Quartz abundance (name)	K-Feldspar abundance (name)	Plagioclase abundance (name)	Biotite abundance (name)	Muscovite abundance (name)	Chlorite abundance (name)	Amphibole abundance (name)	Pyroxene abundance (name)	Olivine abundance (name)	Apatite abundance (name)	Zircon abundance (name)	Barite abundance (name)	Glauconite abundance (name)	Zeolite abundance (name)	Palagonite abundance (name)	Pyrite, authigenic abundance (name)	Fe oxide abundance (name)	Calcite, authigenic abundance (name)	Dolomite, authigenic abundance (name)	Pyroclasts, pumiceous abundance (name)	Pyroclasts, blocky abundance (name)	Pyroclasts, cuspate abundance (name)	Vesicles, non-vesicular abundance (name)	Vesicles, round abundance (name)	Vesicles, elliptical abundance (name)	Vesicles, elongate abundance (name)	Vesicles, tabular abundance (name)	Glass (pyroclasts), transparent abundance (name)	Glass (pyroclasts), brown or colored abundance (name)	Glass (pyroclasts) comment	Volcanic lithic abundance (name)	Sedimentary lithic abundance (name)	Metamorphic lithic abundance (name)	Chert abundance (name)	Mineral grain comment	Foraminifera abundance (name)	Calcareous nannofossils abundance (name)	Pteropod fragments abundance (name)	Radiolarians abundance (name)	Diatoms abundance (name)	Siliceous sponge spicule fragments abundance (name)	Organic matter abundance (name)	Plant residuals abundance (name)	Clay, authigenic (matrix) abundance (name)	Smear slide general comment
352-U1439A-11X-6-A	4.00	5.00	99.84	99.85		20	80			Tr		Tr					Tr									Tr											C						A		Tr		Tr			
352-U1439A-11X-6-A	63.00	64.00	100.43	100.44		20	80			Tr		Tr				Tr	Tr	Tr								R											R				R		D		Tr		Tr				
352-U1439A-12X-1-A	31.00	32.00	99.31	99.32	1	19	80			Tr		Tr				Tr	Tr						Tr			Tr										R				R		C		Tr		Tr			
352-U1439A-12X-1-A	39.00	40.00	99.39	99		10	90			Tr		Tr					Tr						Tr			Tr										C				R		D				Tr			
352-U1439A-12X-3-A	31.00	31.00	102.31	102.31		10	90			Tr		Tr				Tr	Tr									Tr										Tr						D				Tr			
352-U1439A-12X-7-A	48.00	49.00	108.19	108.2		10	90			Tr		R					Tr						Tr			Tr										R			Tr	TR		C							D
352-U1439A-13X-1-A	142.00	143.00	110.12	110	1	4	95					R					R						C													C			C			D							Clast
352-U1439A-13X-2-A	139.00	140.00	111.6	111.6		5	95			Tr		Tr																														C						D	Manganese oxide lense
352-U1439A-13X-5-A	101.00	102.00	115.72	115.73		5	95			Tr		Tr					Tr						Tr													Tr			Tr	R		R							
352-U1439A-13X-CC-A	37.00	38.00	116.77	116.78			100			Tr		Tr				Tr	Tr						Tr													Tr				R		R							D
352-U1439A-14X-6-A	58.0	59.00	126.48	126		10	90			Tr		Tr				Tr	Tr		Tr					R																A		C				R			Altered Tephra Lense
352-U1439A-14X-6-A	62.00	63.00	126.52	127		5	95			Tr		R				Tr	Tr		Tr				C																									D	Including Fish Teeth
352-U1439A-14X-6-A	128.00	129.00	127.18	127.19		25	75			R		R				Tr	Tr						Tr			C											R			Tr	R							D	
352-U1439A-15X-1-A	81.00	82.00	128.91	129	5	10	85			Tr		R	Tr			R	R	Tr					C			Tr											R			Tr	R		D							
352-U1439A-15X-1-A	101.00	102.00	129.11	129.12	5	5	90			Tr		Tr	Tr				Tr																			Tr						D							
352-U1439A-15X-1-A	134.00	135.00	129.44	129		5	95			Tr		R				Tr	R																			Tr						D							
352-U1439A-15X-3-A	31.00	32.00	131.41	131	10	4	95			Tr		Tr				Tr	Tr									Tr											Tr				Tr		D							
352-U1439A-15X-3-A	110.00	111.0	132.2	132	5	15	80			C		R	R			Tr	Tr																			Tr					C	D							
352-U1439A-15X-4-A	98.00	99.00	133.58	133.59	20	10	70			Tr		R				R	R	Tr					Tr													Tr				R		C	A						A	Clinopthinalite
352-U1439A-15X-5-A	13.00	14.00	134.23	134	2	3	95			Tr		R				R	R									Tr																d							
352-U1439A-15X-5-A	36.00	37.00	134.46	134.47	5	10	85			R	R	R	Tr			Tr	Tr									Tr											Tr				Tr		D							
352-U1439A-15X-5-A	66.00	67.00	134.76	134.77	5	15	80					Tr	Tr			Tr	Tr									Tr											Tr						D			Tr				
352-U1439A-16X-1-A	106.00	107.00	138.96	139	50	30	20			R	Tr	C				C	C		Tr				D													Tr				R		C							Fibrous and platy zeolithe, philipsite
352-U1439A-16X-2-A	15.00	16.00	139.55	139.56	60	30	10					C	Tr			Tr	C																			R				Tr		C				Tr			
352-U1439A-16X-2-A	35.00	36.00	139.75	139.76	90	8	2			TR	Tr	C				C	C	Tr								Tr											R			Tr										
352-U1439A-16X-3-A	11.00	12.00	140.61	140.62	5	20	75			Tr	Tr	R				Tr	Tr	Tr								Tr											Tr					Tr	D			Tr	Tr				
352-U1439A-16X-3-A	55.00	57.00	141.05	141.07	10	40	50			R		R				Tr	R						C													R			Tr	Tr		R	A		R	Tr				
352-U1439A-16X-3-A	130.00	131.00	141.8	141.81	5	25	70			R		R	Tr			Tr	R						R			Tr											C				Tr		D		Tr		R			
352-U1439A-16X-4-A	22.00	23.00	142.22	142.23	0	5	95			Tr		Tr	Tr			Tr										Tr											Tr				Tr		D		Tr		Tr			
352-U1439A-16X-4-A	60.00	61.00	142.6	142.61	50	40	10			Tr		R				R	R		Tr							Tr											R			C	Tr		C				Tr	Tr		
352-U1439A-16X-4-A	136.00	137.00	143.36	143.37	15	70	15			C		C				Tr	R						R			R			A	R	R		C	R	C	A	A	R		Tr	R			Tr				
352-U1439A-16X-5-A	9.00	10.00	143.49	144	20	70	10				R	R				Tr	Tr						C			Tr			A	C	C	A	R	R	R	C	D	R		Tr	Tr			C		Tr				
352-U1439A-16X-5-W	17.00	18.00	143.57	143.58	10	70	20			R		R					Tr									Tr			C	C	A	A	R	R	R	C	D	R		Tr						C				This is a thin section of a lithified tuffaceous sandstone
352-U1439A-17X-1-A	38.00	39.00	147.98	147.99	20	30	50			R		R				Tr	Tr						R			Tr											A	C		R	R					A						
352-U1439A-17X-1-A	85.00	86.00	148.45	148.46	20	35	45			Tr		R				Tr	Tr									Tr			C	A	A	A	Tr	Tr	C	R	D				R						C						
352-U1439A-17X-2-A	48.00	49.00	149.58	149.59	25	10	65			R		R				R	R									R											C							A						
352-U1439A-17X-2-A	133.00	134.00	150.43	150.44	5	1	94					Tr				Tr	Tr																			R						D							
352-U1439A-17X-3-A	9.00	10.00	150.69	150.7	80	15	5			R		A				C	C									C											C			R	R			R							
352-U1439A-17X-4-A	8.00	9.00	151.78	151.79	20	75	5			Tr		R					Tr	Tr					C						C	A	C	A	C	C			A	C					C							
352-U1439A-17X-4-A	11.00	12.00	151.81	151.82	1	4	95			Tr		Tr				Tr	Tr																			R						D							
352-U1439A-17X-4-A	25.00	26.00	151.95	151.96	40	50	10			C		C				Tr	C	Tr								R											C			R	R			C							
352-U1439A-17X-4-A	56.00	57.0	152.26	152.27	20	65	15			R	Tr	R				Tr	Tr									Tr			C	A	C	A	R	R	C	C	D									C						
352-U1439A-17X-5-A	118.00	119.00	154.38	154.39	20	70	10			R		R				Tr	Tr						R			Tr			A	C	C		C	R	C	A	D									C						
352-U1439A-17X-5-A	125.00	126.00	154.45	154.46	5	15	80					Tr				Tr	Tr																			R						D				Tr			
352-U1439A-17X-6-A	50.00	51.00	155.2	155.21	10	50	40			R		R				Tr	Tr						C			R	R										C			R	R			C							A
352-U1439A-17X-6-A	62.00	63.00	155.32	155.33	20	70	10			Tr	Tr	R				Tr	R									Tr			C	A	A	A	A	A	C	C	D									C						
352-U1439A-18X-1-A	118	119.00	158.5	158.49	10	40	50			C		C				R	R	Tr					C			R											C			C	R			R	C						
352-U1439A-18X-1-A	144.00	145.00	158.7	158.75	20	35	45			R		R				Tr	R						C			Tr			C	A	A	A	R	R	C	C	D									C						
352-U1439A-18X-3-A	1.00	2.00	160.31	160.32		10	90			Tr		Tr					Tr																									D			Tr	Tr			
352-U1439A-18X-3-A	124.00	125.0	161.54	161.55	10	60	30			C		C					R						C			R											C			R	C			A			R	R			
352-U1439A-18X-3-A	145.0	146.00	161.75	161.76	5	15	80			R		R				Tr	TR						R													C			Tr	Tr			D		R		R			
352-U1439A-18X-4-A	63.00	64.00	162.4	162.44	15	75	10			R		R				Tr	Tr												A	C	C	C	C	C	A	A	D	R		Tr	R		Tr			C						
352-U1439A-18X-5-A	35.00	36.00	163.65	163.66	10	20	70			C		C				Tr	Tr						R						R	D	C	D	C	C	R	R	D									A				R			
352-U1439A-18X-5-A	143.0	144.00	164.73	164.74	5	80	15			Tr		Tr					Tr						C						D	C	C	C	R	C	A	A	D									A						
352-U1439A-18X-6-A	32.00	33.0	165.12	165.13		5	95			Tr		Tr					Tr																			R						D							
352-U1439A-18X-7-A	58.00	59.00	166.68	166.69	20	70	10			Tr		R					R						R			C			C	A	A	D	C	C	C	R	D	R										
352-U1439A-18X-CC-A	30.00	31.0	167.07	167.08	70	20	10			R		R				Tr	R									C			R	A	A	D	R	R	R	Tr	D	C			R						R			
352-U1439A-19X-CC-A	15.00	16.00	176.37	176.38	5	5	90			R		R																									R							C	D						Manganese layer
352-U1439A-20X-2-A	4.0	5.00	178.34	178.35		20	80					Tr											C															R		R										D	Phillipsite

Sample	Top [cm]	Bottom [cm]	Top Depth [m]	Bottom Depth [m]	Sand texture [%]	Silt texture [%]	Clay texture [%]	Ash [%]	Siliciclastic [%]	Quartz abundance (name)	K-Feldspar abundance (name)	Plagioclase abundance (name)	Biotite abundance (name)	Muscovite abundance (name)	Chlorite abundance (name)	Amphibole abundance (name)	Pyroxene abundance (name)	Olivine abundance (name)	Apatite abundance (name)	Zircon abundance (name)	Barite abundance (name)	Glauconite abundance (name)	Zeolite abundance (name)	Palagonite abundance (name)	Pyrite, authigenic abundance (name)	Fe oxide abundance (name)	Calcite, authigenic abundance (name)	Dolomite, authigenic abundance (name)	Pyroclasts, pumiceous abundance (name)	Pyroclasts, blocky abundance (name)	Pyroclasts, cuspate abundance (name)	Vesicles, non-vesicular abundance (name)	Vesicles, round abundance (name)	Vesicles, elliptical abundance (name)	Vesicles, elongate abundance (name)	Vesicles, tabular abundance (name)	Glass (pyroclasts), transparent abundance (name)	Glass (pyroclasts), brown or colored abundance (name)	Glass (pyroclasts) comment	Volcanic lithic abundance (name)	Sedimentary lithic abundance (name)	Metamorphic lithic abundance (name)	Chert abundance (name)	Mineral grain comment	Foraminifers abundance (name)	Calcareous nannofossils abundance (name)	Pteropod fragments abundance (name)	Radiolarians abundance (name)	Diatoms abundance (name)	Siliceous sponge spicule fragments abundance (name)	Organic matter abundance (name)	Plant residuals abundance (name)	Clay, authigenic (matrix) abundance (name)	Smear slide general comment
352-U1439A-20X-2-A	19.00	20.00	178.49	178.5		5	95			Tr		Tr					Tr									D																											
352-U1439A-20X-2-A	33.0	34.00	178.63	178.64	30	50	20			Tr		Tr														C																C	C			R								
352-U1439A-20X-2-A	56.00	57.00	178.86	178.87	80	15	5			Tr		Tr																	Tr	D	C	D	C	R	R		D					C				R								
352-U1439A-20X-2-A	67.00	68.00	178.97	178.98	20	40	40																C	C												Tr			R														Manganese oxide layer
352-U1439A-20X-2-A	94.00	95.00	179.24	179.25	60	30	10					Tr					Tr									R			Tr	D	D	D	C	R	R		Tr	D																

THIN SECTION LABEL ID: **352-U1439A-20X-2-W 83/85-TSB-TS_13** Thin section no.: 13

Unit/Subunit: Piece no.: Observer: deh

Thin section summary: Completely altered olivine-orthopyroxene phyric low-Ca boninite with a moderate abundance of vesicles.

Plane-polarized:

Cross-polarized:

PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine-orthopyroxene phyric high-Ca boninite pillow lava

Texture 1:	hyalophitic	Texture 2:	glassy matrix
Avg. grain size:	cryptocrystalline	Grain size distrib.:	

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	1	1		altered to iddingsite
Orthopyroxene	9	0.4	prismatic	Completely altered. Amphibole is present in the fractures of many orthopyroxene minerals.

Groundmass phases	% present	Average size (mm)	Habit	Comments
Mesostasis	100			Completely altered, possibly to serpentinite

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
10	50	subrounded	0.5	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	

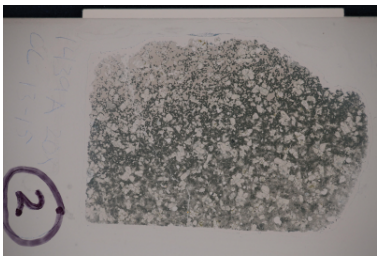
SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 100

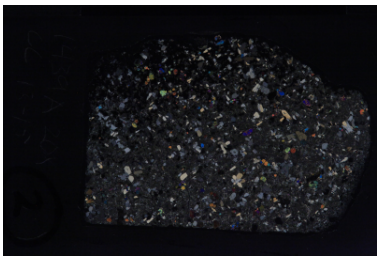
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	1		9			90
Altered [%]	100		95			100
Serpentine	20		35			
Iddingsite	80					
Amph., pale			40			
Chlorite			20			
Clay minerals						70
Other						25

THIN SECTION LABEL ID: **352-U1439A-20X-CC-W 13/15-TSB-TS_02** Thin section no.: 2
Unit/Subunit: Piece no.: #03 Observer: jws, jp, tc
Thin section summary: olivine-orthopyroxene phyric low Ca boninite with fresh glass and opx groundmass

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine-orthopyroxene phyric low-Ca boninite pillow lava

Texture 1:	glassy matrix	Texture 2:	variolitic
Avg. grain size:	vitrophyre-glassy	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	5	1	equant	
Orthopyroxene	15	2	blocky	Opx colorless to pale tan; no exsolution.

Groundmass phases	% present	Average size (mm)	Habit	Comments
Orthopyroxene	40	0.3	acicular radiating	size = length
Mesostasis				GM= pale to clear glass with ~40% acicular Opx in radiating sheaves.

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	

SECONDARY (ALTERATION) MINERALOGY

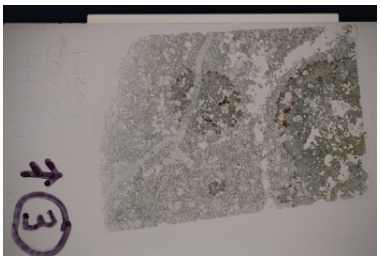
Total alteration in rock, bulk estimate (%): 10

Groundmass original [%]: 74 Groundmass altered [%]: 10 Groundmass alt. intensity: slight

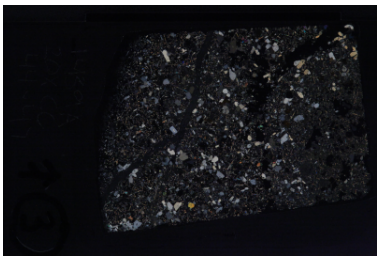
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	5		15			40
Altered [%]	1		2			20
Serpentine	1					
Amph., green			2			
Clay minerals						10

THIN SECTION LABEL ID: **352-U1439A-20X-CC-W 44/47-TSB-TS_03** Thin section no.: 3
Unit/Subunit: Piece no.: #10 Observer: jws, jp, tc
Thin section summary: olivine-orthopyroxene-clinopyroxene high Ca boninite with fresh glass in groundmass

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **mafic lava** Domain no.: 1 Domain rel. abundance [%]: 85

LITHOLOGY: **moderately orthopyroxene phyric high-Ca boninite pillow lava**

Texture 1:	intersertal	Texture 2:	glassy matrix
Avg. grain size:	fine grained	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	1	0.5	blocky	sparse
Orthopyroxene	25	2	blocky	Blocky Opx phenoxtls up to 3 mm; often intergrown

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	25	0.3	prismatic	often forms on Opx cores
Orthopyroxene	4	0.3	prismatic	
Mesostasis				Pale glass with acicular prisms of Opx, overgrown by Cpx. Some GM pxs have swallowtail habit

Sample domain name: **volcanic inclusion mafic** Domain no.: 2 Domain rel. abundance [%]: 15

LITHOLOGY: **moderately olivine-orthopyroxene phyric high-Ca boninite pillow lava**

Texture 1:	hyalophitic	Texture 2:	glassy matrix
Avg. grain size:	fine grained	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	2	1	embayed	altered to iddingsite
Orthopyroxene	15	2		blocky, often intergrown.

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	20	0.25	prismatic	
Orthopyroxene	15	0.25	prismatic	
Mesostasis				Altered glass with microxtls of hollow to skeletal, prismatic/acicular Cpx, sometimes cored with Opx.

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: mafic lava Domain no.: 1 Domain rel. abundance [%]: 85

Total alteration in rock, bulk estimate (%): 20

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	1	25	29			45
Altered [%]	10	15	15			30
Iddingsite	10					
Amph., green		15	15			
Clay minerals						5
Zeolite						9

Alteration domain name: volcanic inclusion mafic Domain no.: 2 Domain rel. abundance [%]: 15

Total alteration in rock, bulk estimate (%): 80

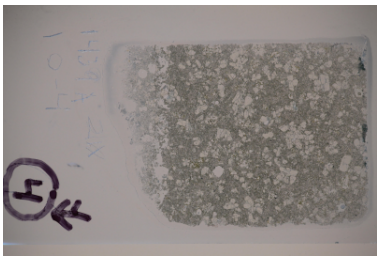
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	2	20	30			47
Altered [%]	70	30	30			100
Iddingsite	70					
Amph., green		5	5			
Amph., pale		15	10			
Chlorite		10	10			
Clay minerals			5			30
Zeolite						70

THIN SECTION LABEL ID: **352-U1439A-21X-1-W 0/4-TSB-TS_04** Thin section no.: 4

Unit/Subunit: Piece no.: #1 Observer: jws, jp, tc

Thin section summary: olivine-orthopyroxene high Ca boninite with fresh glass and opx in groundmass

Plane-polarized:



Cross-polarized:

PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine-orthopyroxene phyric low-Ca boninite pillow lava

Texture 1:	vitrophyre	Texture 2:	glassy matrix
Avg. grain size:	fine grained	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	5	2	amoeboid	
Orthopyroxene	15	3	blocky	blocky

Groundmass phases	% present	Average size (mm)	Habit	Comments
Orthopyroxene	20	0.5	acicular	
Mesostasis				~15-20 Acicular dendritic Opx in GM

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 5

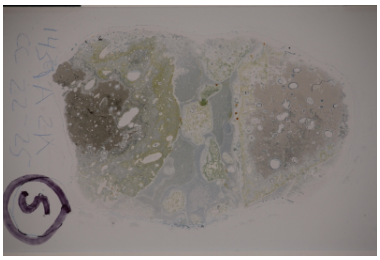
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	5		35			60
Altered [%]	1		2			2
Iddingsite	1					
Amph., pale			2			
Clay minerals						1

THIN SECTION LABEL ID: **352-U1439A-21X-CC-W 22/25-TSB-TS_05** Thin section no.: 5

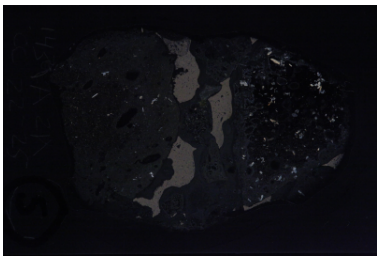
Unit/Subunit: Piece no.: Observer: jws, jp, tc

Thin section summary: hyaloclastite orthopyroxene phyric low Ca boninite

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately orthopyroxene phyric low-Ca boninite hyaloclastite

Texture 1:	vitrophyre	Texture 2:	glassy matrix
Avg. grain size:		Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Orthopyroxene	15	2	blocky	Opx phenoxts may include clinoenstatite

Groundmass phases	% present	Average size (mm)	Habit	Comments
Mesostasis				Mostly glass with tiny Opx needles

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	strong	undeformed	undeformed	

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: matrix Domain no.: 1 Domain rel. abundance [%]: 30

Total alteration in rock, bulk estimate (%): 5

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		5	1	15		79
Altered [%]		5	5	5		100
Amph., green		4				
Chlorite		1		1		
Amph., pale			5			
Zeolite				4		
Clay minerals						90

Alteration domain name: volcanic clast, mafic Domain no.: 2 Domain rel. abundance [%]: 70

Total alteration in rock, bulk estimate (%): 80

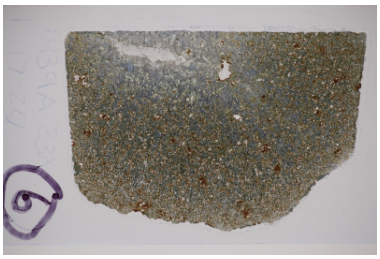
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]			15			40
Altered [%]			5			10
Amph., green			1			
Serpentine			4			

THIN SECTION LABEL ID: **352-U1439A-23X-1-W 17/20-TSB-TS_06** Thin section no.: 6

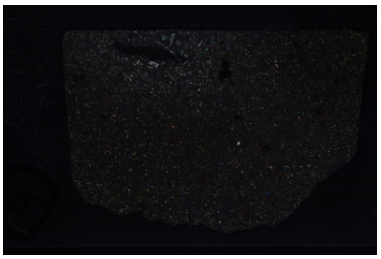
Unit/Subunit: Piece no.: Observer: jws, jp, tc

Thin section summary: clinopyroxene-orthopyroxene high Ca vitrophyric boninite with all glassy groundmass altered

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: Domain no.: 1 Domain rel. abundance [%]:

LITHOLOGY: sparsely augite-orthopyroxene phyric high-Ca boninite lava

Texture 1:	intersertal	Texture 2:	glassy matrix
Avg. grain size:	fine grained	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	0			
Clinopyroxene	12	1		cpx nucleating off of opx.
Orthopyroxene	8	2	blocky	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Mesostasis				altered green-brown glass.

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
5		subrounded	1	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 50

Groundmass original [%]: 80 Groundmass altered [%]: 80 Groundmass alt. intensity: high

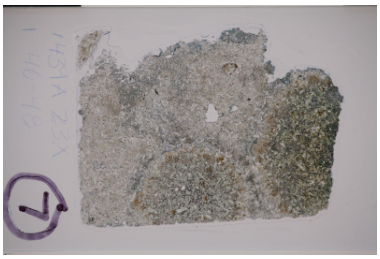
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		12	8			
Altered [%]		30	30			
Amph., brown		2				
Clay minerals		28	28			

THIN SECTION LABEL ID: **352-U1439A-23X-1-W 46/48-TSB-TS_07** Thin section no.: 7

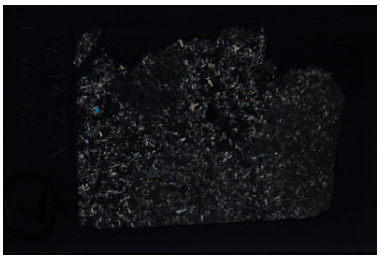
Unit/Subunit: Piece no.: Observer: jws, jp, tc

Thin section summary: olivine-orthopyroxene-clinopyroxene high Ca boninite with possible magma mingling between two distinct domains

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **mafic lava** Domain no.: 1 Domain rel. abundance [%]: 60

LITHOLOGY: **moderately augite-orthopyroxene phyric high-Ca boninite lava**

Texture 1:	intersertal	Texture 2:	glassy matrix
Avg. grain size:	fine grained	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	1	2	embayed	
Clinopyroxene	10	1	prismatic	cpx nucleating off of opx phenocrysts
Orthopyroxene	14	1	prismatic	interpentrating grains

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	25	0.3	prismatic	
Orthopyroxene	4	0.25	prismatic	
Mesostasis				minimal acicular cpx in groundmass.

Sample domain name: **mafic lava** Domain no.: 2 Domain rel. abundance [%]: 40

LITHOLOGY: **moderately augite-orthopyroxene phyric high-Ca boninite lava**

Texture 1:	intersertal	Texture 2:	glassy matrix
Avg. grain size:	fine grained	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	10	1	skeletal	cpx nucleating off opx
Orthopyroxene	15	1.5	prismatic	cluster at edge of domain.

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	20	0.4	skeletal	
Orthopyroxene	15	0.5	acicular	
Mesostasis				dendritic, branching opx (parallel extinction). Opx concentrated towards margins. Center is mostly altered glass

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: Mafic domain 1 Domain no.: 1 Domain rel. abundance [%]: 60

Total alteration in rock, bulk estimate (%): 70

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		35	18			46
Altered [%]		20	20			95
Chlorite		1				
Clay minerals		17	18			40
Zeolite						55

Alteration domain name: Mafic domain 2 Domain no.: 2 Domain rel. abundance [%]: 40

Total alteration in rock, bulk estimate (%): 40

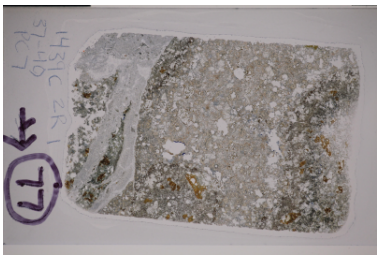
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		30	30			40
Altered [%]		10	10			50
Chlorite		1				
Clay minerals		8	8			14
Amph., pale			2			
Zeolite						35

THIN SECTION LABEL ID: **352-U1439C-2R-1-W 37/40-TSB-TS_77** Thin section no.: 77

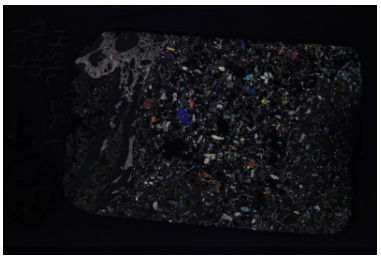
Unit/Subunit: 1 Piece no.: #07 Observer: tc

Thin section summary: Orthopyroxene and olivine phenocrysts within a clear glassy matrix. Carbonate vein with a clay-rich alteration halo.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine-orthopyroxene phyric boninite glass

Texture 1:	microporphyritic	Texture 2:	
Avg. grain size:	cryptocrystalline	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	5	0.6	equant	
Orthopyroxene	10	0.3	prismatic	interpentrating crystals

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
7	0	subrounded	0.7	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.7	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 5

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	4	1	10			85
Altered [%]	5	10	5			0
Sulfide	5					
Amph., green		8	4			
Clay minerals		2	1			

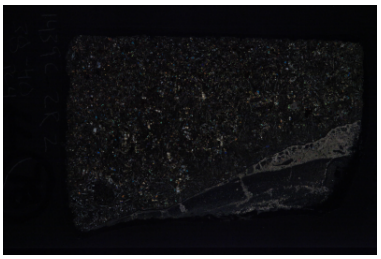
THIN SECTION LABEL ID: **352-U1439C-2R-2-W 38/40-TSB-TS_78** Thin section no.: 78

Unit/Subunit: 1 Piece no.: #04 Observer: tc

Thin section summary: Orthopyroxene phenocrysts with an accicular quench textured mesostasis, comprising skeletal plagioclase

Plane-polarized:

Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely augite-orthopyroxene phyric boninite lava

Texture 1:	microporphyritic	Texture 2:	dendritic or skeletal
Avg. grain size:	microcrystalline	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	2	0.6	equant	
Clinopyroxene	2	0.3	prismatic	
Orthopyroxene	1	0.3	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Olivine	10	0.2	equant	
Plagioclase	45	0.3		forms hollow boxes and chains
Clinopyroxene	20	0.2	prismatic	rimming opx
Orthopyroxene	5	0.3	prismatic	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	weak			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 30

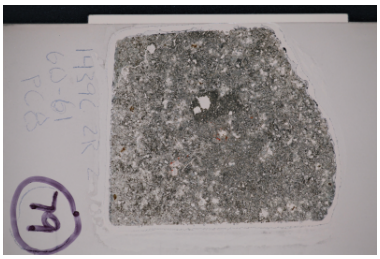
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	7	20	53			20
Altered [%]	100	2	10			90
Iddingsite	100					
Clay minerals	90		8			90
Amph., green		2				

THIN SECTION LABEL ID: **352-U1439C-2R-2-W 60/61-TSB-TS_79** Thin section no.: 79

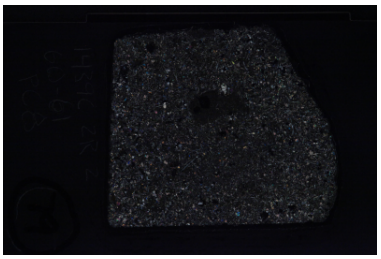
Unit/Subunit: 1 Piece no.: #08 Observer: wn

Thin section summary: prismatic orthopyroxene phenocrysts with small clinopyroxene and accicular orthopyroxene in an altered mesostasis

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately orthopyroxene phyric boninite lava

Texture 1:	microporphyritic	Texture 2:	skeletal or dendritic
Avg. grain size:	fine grained	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Orthopyroxene	5	1.5	prismatic	some phenocrysts have survived alteration while others are completely altered with subophitic olivine

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	10	0.3	prismatic	
Orthopyroxene	50	0.6	acicular	
Mesostasis	33			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
7	50	subangular	1	many vesicles are filled with calcite

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 40

Groundmass original [%]: 40 Groundmass altered [%]: 100 Groundmass alt. intensity: complete

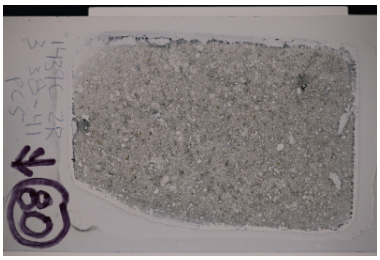
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		10	50			
Altered [%]		2	30			
Amph., green		2				
Clay minerals			25			

THIN SECTION LABEL ID: **352-U1439C-2R-3-W 38/41-TSB-TS_80** Thin section no.: 80

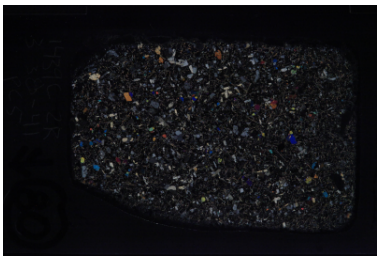
Unit/Subunit: 2a Piece no.: #05 Observer: ks

Thin section summary: highly olivine-orthopyroxene boninite with fresh glass preserved in groundmass

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine-orthopyroxene phyric boninite lava

Texture 1:	glassy matrix	Texture 2:	skeletal or dendritic
Avg. grain size:	fine grained	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	5	0.6	equant	most olivines are rounded (probably dessolved in olivine-unsaturated magma)
Orthopyroxene	15	1	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Orthopyroxene	40	1.2	acicular	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
2	50	rounded	0.2	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 3

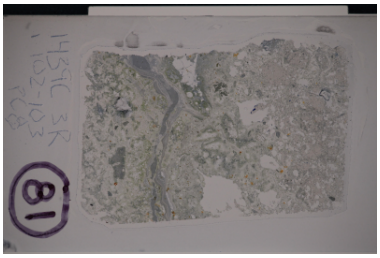
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	5		55			40
Altered [%]	5		2			5
Iddingsite	5					
Clay minerals	5					5
Amph., green			2			

THIN SECTION LABEL ID: **352-U1439C-3R-1-W 102/103-TSB-TS_81** Thin section no.: 81

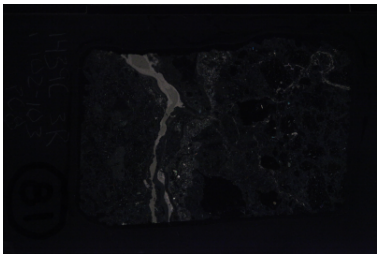
Unit/Subunit: 2b Piece no.: #08 Observer: sk

Thin section summary: two species of glass (tachylitic and glassy) interbedded in remolded fine grain ash matrix, remorphic flow structures around the glass. The glass show quenching rims, but are not flattened.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **matrix** Domain no.: 1 Domain rel. abundance [%]: 70

LITHOLOGY: **devitirified glass with zeolite**

Texture 1:	fluidal	Texture 2:	vitrophyric
Avg. grain size:	cryptocrystalline	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	1			
Orthopyroxene	1			

Groundmass phases	% present	Average size (mm)	Habit	Comments
Mesostasis				re-melted fine-ash matrix.

Sample domain name: **scoria** Domain no.: 2 Domain rel. abundance [%]: 30

LITHOLOGY: **heterolithic boninite clast**

Texture 1:	microlitic	Texture 2:	scoriaceous
Avg. grain size:	medium grained	Grain size distrib.:	equigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	0.5	0.2	blocky	
Orthopyroxene	1	0.1	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Mesostasis				two species of glass (tachylitic and glassy) interbedded in remolded fine grain ash matrix, remorphic flow strucutres around the glass. The glass show quenching rims, but are not flattened.

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
10		rounded	0.5	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.2	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: volcanic clast, mafic Domain no.: 1 Domain rel. abundance [%]: 30

Total alteration in rock, bulk estimate (%): 65

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	0.5		1	5		93.5
Altered [%]	10		5	5		5
Iddingsite	10					
Clay minerals			5			5
Zeolite				5		

Alteration domain name: Matrix Domain no.: 2 Domain rel. abundance [%]: 70

Total alteration in rock, bulk estimate (%): 65

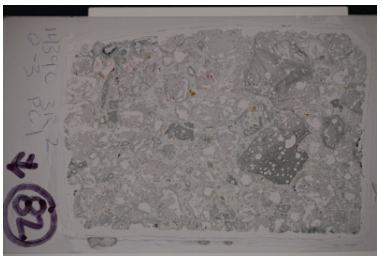
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	1		1	1		97
Altered [%]	50		5	5		100
Iddingsite	50					
Clay minerals			5			10
Zeolite				5		10
Carbonate						20

THIN SECTION LABEL ID: **352-U1439C-3R-2-W 0/3-TSB-TS_82** Thin section no.: 82

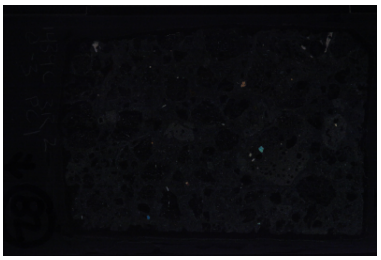
Unit/Subunit: 2b Piece no.: #01 Observer: sk

Thin section summary: two species of glass (higher proportions of tachylitic and glassy) interbedded in partially remolded fine grain ash matrix, remorphic flow structures around the glass. The glass show quenching rims, but are not flattened. Glass are rounded, because of melt film around angular edges.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **glass** Domain no.: 2 Domain rel. abundance [%]: 70

LITHOLOGY: **homolithic boninite hyaloclastite**

Texture 1:	glassy matrix	Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Groundmass phases	% present	Average size (mm)	Habit	Comments
Mesostasis				Altered glass

Sample domain name: **scoria** Domain no.: 1 Domain rel. abundance [%]: 30

LITHOLOGY: **homolithic boninite clast**

Texture 1:	glassy matrix	Texture 2:	scoriaceous
Avg. grain size:	medium grained	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	1	0.4	blocky	
Orthopyroxene	1	1	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Orthopyroxene	7	0.2	acicular	Small needles in glass, abundance varies
Mesostasis				two species of glass (higher proportions of tachylitic and glassy) interbedded in partially remolded fine grain ash matrix, remorphic flow structures around the glass. The glass show quenching rims, but are not flattened. Glass are rounded, because of melt film around angular edges.

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
10		rounded	0.5	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: volcanic clast, mafic Domain no.: 1 Domain rel. abundance [%]: 40

Total alteration in rock, bulk estimate (%): 65

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	0.5		1	5		93.5
Altered [%]	40		10	5		10
Iddingsite	40					
Amph., green			10			
Zeolite				5		

Alteration domain name: Matrix Domain no.: 2 Domain rel. abundance [%]: 60

Total alteration in rock, bulk estimate (%): 65

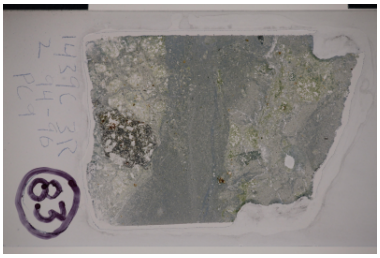
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	0.5		1	1.5		97
Altered [%]	40		10	5		100
Iddingsite	40					
Amph., green			10			
Zeolite				5		50
Clay minerals						30
Carbonate						10

THIN SECTION LABEL ID: **352-U1439C-3R-2-W 94/96-TSB-TS_83** Thin section no.: 83

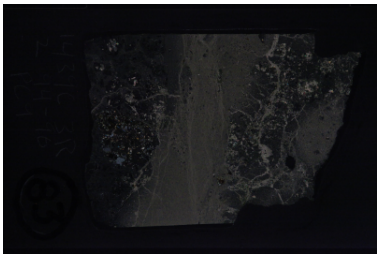
Unit/Subunit: 2b Piece no.: #09 Observer: sk

Thin section summary: heterolitic mixture of different volcanic fragments from scoria to lava, which are porphyritic. Agglomerates of the two previous sections, mostly glass re-melted with glass material reworked. More clastic.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **vein** Domain no.: 2 Domain rel. abundance [%]: 75

LITHOLOGY: **calcite vein**

Sample domain name: **scoria** Domain no.: 1 Domain rel. abundance [%]: 25

LITHOLOGY: **heterolithic low-Ca boninite clast**

Texture 1:		Texture 2:	scoriaceous
Avg. grain size:	medium grained	Grain size distrib.:	equigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Orthopyroxene	40	4	poikilitic	Abundant from 0.5 to 5 mm in size in volcanic glass clast next to vein

Groundmass phases	% present	Average size (mm)	Habit	Comments
Mesostasis				heterolitic mixture of different volcanic fragments from scoria to lava, which are porphyritic. Agglomerates of the two previous sections, mostly glass re-melted with glass material reworked. More clastic.

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			volcanic breccia

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: volcanic clast, mafic Domain no.: 1 Domain rel. abundance [%]: 25

Total alteration in rock, bulk estimate (%): 90

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	0.5		3			96.5
Altered [%]	30		50			80
Iddingsite	30					
Amph., green			20			
Clay minerals			30			20
Carbonate						50

Alteration domain name: Matrix Domain no.: 2 Domain rel. abundance [%]: 35

Total alteration in rock, bulk estimate (%): 90

Groundmass original [%]: Groundmass altered [%]: Groundmass alt. intensity: complete

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	0.5		0.5			99
Altered [%]	40		100			100
Iddingsite	40					
Amph., green			10			
Clay minerals			85			20
Carbonate						50
Zeolite						30

Alteration domain name: Cataclasite Domain no.: 3 Domain rel. abundance [%]: 40

Total alteration in rock, bulk estimate (%): 90

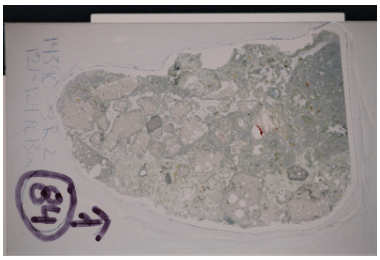
Groundmass original [%]: 100 Groundmass altered [%]: 100 Groundmass alt. intensity:

THIN SECTION LABEL ID: **352-U1439C-3R-2-W 121/124-TSB-TS_84** Thin section no.: 84

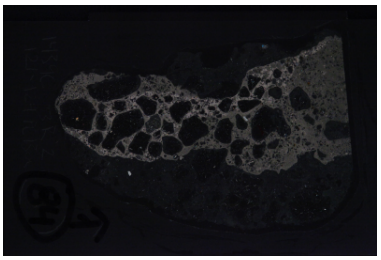
Unit/Subunit: 2b Piece no.: #13 Observer: sk

Thin section summary: Heterolitic clastic mixture of different volcanic fragments from 70% scoria to porphyritic lava. Agglomerates of the 81 and 82 sections, mostly sub-rounded to rounded glass re-melted and reworked. Fine-grained matrix completely made up of carbonate in addition to blocky matrix. The scoriceous clast are aphyric.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **scoria** Domain no.: 1 Domain rel. abundance [%]: 25

LITHOLOGY: **sparsely olivine-orthopyroxene phyric boninite clast**

Texture 1:	glassy matrix	Texture 2:	vitrophyric
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	8	0.4	blocky	
Orthopyroxene	2	0.3	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Orthopyroxene	10	0.1	acicular	Commony flow aligned

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
20		rounded	0.3	

Sample domain name: **scoria** Domain no.: 2 Domain rel. abundance [%]: 5

LITHOLOGY: **sparsely olivine-orthopyroxene bearing boninite clast**

Texture 1:	glassy matrix	Texture 2:	vitrophyric
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	2	0.3	blocky	
Orthopyroxene	2	0.4		

Groundmass phases	% present	Average size (mm)	Habit	Comments
Orthopyroxene	45	0.1	acicular	Masses of felted opx needles

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
0				

Sample domain name: glass Domain no.: 3 Domain rel. abundance [%]: 70

LITHOLOGY: sparsely olivine-orthopyroxene bearing boninite hyaloclastite

Texture 1:	glassy matrix	Texture 2:	
Avg. grain size:	cryptocrystalline	Grain size distrib.:	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Olivine	7	0.2	blocky	Commonly replaced, pseudomorphs
Orthopyroxene	3	0.1	prismatic	Commonly replaced, psuedomorphs

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
0				

LITHOLOGY: heterolithic low-Ca boninite clast

Texture 1:	glassy matrix	Texture 2:	scoriaceous
Avg. grain size:	microcrystalline	Grain size distrib.:	equigranular

Groundmass phases	% present	Average size (mm)	Habit	Comments
Mesostasis				Heterolitic clastic mixture of different volcanic fragments from 70% scoria to porphyritic lava. Agglomerates of the 81 and 82 sections, mostly sub-rounded to rounded glass re-melted and reworked. Fine-grained matrix completely made up of carbonate in addition to blocky matrix. The scoriceous clast are aphyric.

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	2	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: volcanic clast, mafic Domain no.: 1 Domain rel. abundance [%]: 10

Total alteration in rock, bulk estimate (%): 75

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	0.5		2			97.5
Altered [%]	1		5			20
Iddingsite	1					
Clay minerals			5			5
Carbonate						10
Other						5

Alteration domain name: Carbonate matrix Domain no.: 2 Domain rel. abundance [%]: 100

Total alteration in rock, bulk estimate (%): 75

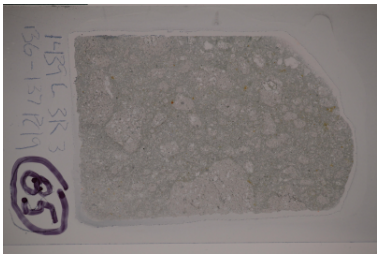
Groundmass original [%]: 100 Groundmass altered [%]: 100 Groundmass alt. intensity: complete

THIN SECTION LABEL ID: **352-U1439C-3R-3-W 136/137-TSB-TS_85** Thin section no.: 85

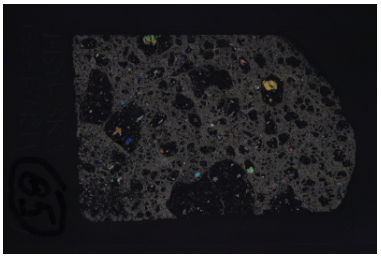
Unit/Subunit: 2b Piece no.: #19 Observer: sk

Thin section summary: Scoriaceous glass. Fragements of the glass in the matrix (block and ash flows). Carbonate inbetween the glass fragments. Glass are highly angular. Highly vesicular and more phyric.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **matrix** Domain no.: 2 Domain rel. abundance [%]: 70

LITHOLOGY: **moderately olivine-orthopyroxene phyric boninite hyaloclastite**

Texture 1:	glassy matrix	Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	5	0.2	blocky	Clasts in crushed glass matrix
Orthopyroxene	3	0.2	poikilitic	Clasts in crushed glass matrix

Groundmass phases	% present	Average size (mm)	Habit	Comments
Mesostasis	92			Crushed glass

Sample domain name: **scoria** Domain no.: 1 Domain rel. abundance [%]: 30

LITHOLOGY: **moderately olivine-orthopyroxene phyric low-Ca boninite clast**

Texture 1:	glassy matrix	Texture 2:	scoriaceous
Avg. grain size:	medium grained	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	9	0.6	blocky	
Orthopyroxene	3	0.4	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Orthopyroxene	8		acicular	
Mesostasis				Scoriaceous glass. Fragements of the glass in the matrix (block and ash flows). Carbonate inbetween the glass fragments. Glass are highly angular. Highly vesicular and more phyric.

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
15		rounded	0.5	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			calcite vein

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: volcanic clast, mafic Domain no.: 1 Domain rel. abundance [%]: 35

Total alteration in rock, bulk estimate (%): 65

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	5	7	5			83
Altered [%]	0	0	0			5
Clay minerals						3

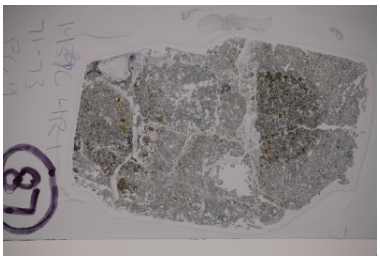
Alteration domain name: matrix Domain no.: 2 Domain rel. abundance [%]: 65

Total alteration in rock, bulk estimate (%): 65

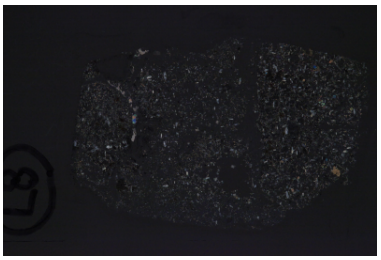
Groundmass original [%]: 100 Groundmass altered [%]: 100 Groundmass alt. intensity: complete

THIN SECTION LABEL ID: **352-U1439C-4R-1-W 71/73-TSB-TS_87** Thin section no.: 87
Unit/Subunit: 3a Piece no.: #09 Observer: jws
Thin section summary: olivine bearing ovoids surrounded by orthopyroxene boninite

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **oviodal** Domain no.: 1 Domain rel. abundance [%]: 25

LITHOLOGY: **moderately olivine-orthopyroxene phyric boninite lava**

Texture 1:	granular	Texture 2:	vitrophyric
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	4	1	prismatic	
Orthopyroxene	3	0.8	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Orthopyroxene	40	0.2	prismatic	
Mesostasis	53			

Sample domain name: **mafic lava** Domain no.: 2 Domain rel. abundance [%]: 75

LITHOLOGY: **moderately orthopyroxene phyric boninite lava**

Texture 1:	vitrophyric	Texture 2:	granular
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Orthopyroxene	5	1	prismatic	cpx overgrowths

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	20	0.1	blocky	
Orthopyroxene	30	0.1	blocky	
Mesostasis	45			

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.2	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: oviodal Domain no.: 1 Domain rel. abundance [%]: 25

Total alteration in rock, bulk estimate (%): 40

Groundmass original [%]: 55 Groundmass altered [%]: 50 Groundmass alt. intensity: moderate

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]			45			
Altered [%]			20			
Amph., green			5			
Chlorite			5			
Clay minerals			10			

Alteration domain name: mafic lava Domain no.: 2 Domain rel. abundance [%]: 75

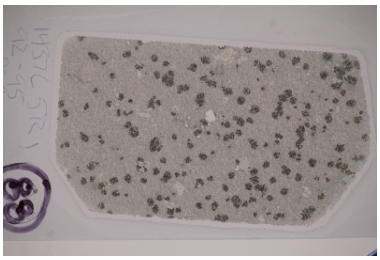
Total alteration in rock, bulk estimate (%): 40

Groundmass original [%]: 45 Groundmass altered [%]: 60 Groundmass alt. intensity: moderate

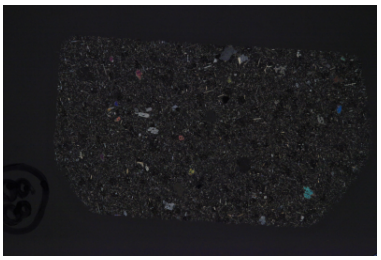
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		20	35			
Altered [%]		30	30			
Amph., green		5	5			
Chlorite		10	10			
Clay minerals		15	15			

THIN SECTION LABEL ID: **352-U1439C-5R-1-W 92/95-TSB-TS_88** Thin section no.: 88
Unit/Subunit: 3a Piece no.: #18 Observer: tc
Thin section summary: large orthopyroxene and olivine phenocrysts overgrown by augite

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine-orthopyroxene phyric boninite lava

Texture 1:	vitrophyric	Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	2	0.5	blocky	coronae of opx
Orthopyroxene	4	1	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	20	0.2	blocky	
Orthopyroxene	20	0.2	blocky	
Mesostasis	54			clear

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	weak			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 7

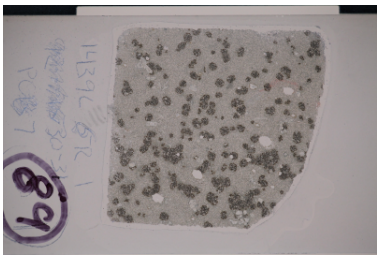
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		20	25			55
Altered [%]		5	5			10
Amph., green		5	5			
Clay minerals						5
Zeolite						5

THIN SECTION LABEL ID: **352-U1439C-6R-1-W 30/31-TSB-TS_89** Thin section no.: 89

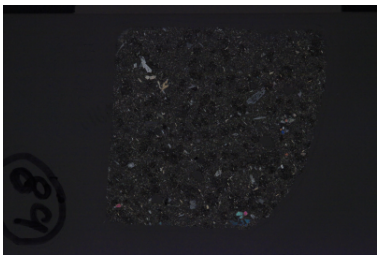
Unit/Subunit: 3a Piece no.: #07 Observer: ks

Thin section summary: sparsly olivine-orthopyroxene boninite with fresh glassy ground mass (homogeneous distributed spherulites)

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely olivine-orthopyroxene phyric boninite lava

Texture 1:	hypocrystalline	Texture 2:	
Avg. grain size:	fine grained	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	1	0.4	poikilitic	some are include in opx phenocryst
Orthopyroxene	3	0.8	prismatic	cpx overgrowths at rim and cleavage

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	5	0.1	acicular	overgrowth mostly on rims of opx
Orthopyroxene	35	0.4		
Mesostasis	56			spherulite

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	moderate			slight SPO

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 7

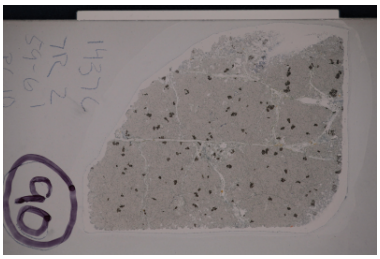
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		5	40			55
Altered [%]		5	5			10
Amph., green		3	3			
Clay minerals		2	2			5
Zeolite						5

THIN SECTION LABEL ID: **352-U1439C-7R-2-W 59/61-TSB-TS_90** Thin section no.: 90

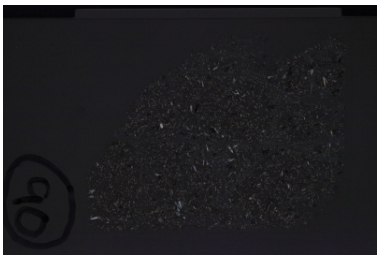
Unit/Subunit: 3a Piece no.: #10 Observer: wn

Thin section summary: Orthopyroxene-phyric microporphyritc boninite with acicular orthopyroxene and clinopyroxene in glassy matrix.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely orthopyroxene phyric boninite lava

Texture 1:	hypohyaline	Texture 2:	microporphyritic
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Orthopyroxene	3	1.2	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	7	0.3	acicular	microlites
Orthopyroxene	7	0.3	acicular	microlites

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
1	0	subangular	0.6	regions of alteration are associated with vesicles

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	moderate			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 5

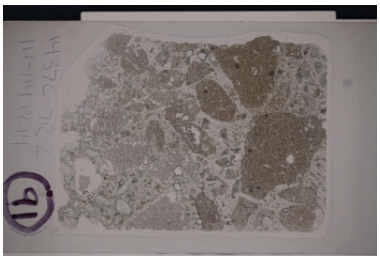
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		10	10			80
Altered [%]		2	2			5
Amph., green		2	2			
Clay minerals						2
Zeolite						3

THIN SECTION LABEL ID: **352-U1439C-7R-2-W 111/114-TSB-TS_91** Thin section no.: 91

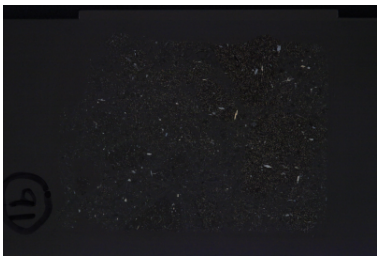
Unit/Subunit: 3a Piece no.: #17 Observer: Marie

Thin section summary: Volcaniclastic sediments with glassy volcanic clasts and cataclatic matrix

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic inclusion mafic** Domain no.: 1 Domain rel. abundance [%]: 35

LITHOLOGY: **moderately orthopyroxene phyric boninite clast**

Texture 1:	vitrophyric	Texture 2:	
Avg. grain size:		Grain size distrib.:	

Phenocrysts	% present	Average size [mm]	Habit	Comments
Orthopyroxene	7	0.5	blocky	some bowties, prismatic also.

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	45		acicular	needles swimming in glass

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
5		subrounded	0.5	

Sample domain name: **glass** Domain no.: 2 Domain rel. abundance [%]: 65

LITHOLOGY: **matrix glass**

Texture 1:	vitrophyric	Texture 2:	
Avg. grain size:		Grain size distrib.:	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Mesostasis				matrix is impregnated epoxy (that is likely in place of glass/clays) with very small bits from volcanic clasts. Even single opx crystals are fragmented and incorporated into the matrix.

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	strong			

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: volcanic clast, mafic Domain no.: 1 Domain rel. abundance [%]: 35

Total alteration in rock, bulk estimate (%): 60

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		45	7			48
Altered [%]		5	5			50
Amph., green		5	5			
Clay minerals						20
Zeolite						20

Alteration domain name: matrix Domain no.: 2 Domain rel. abundance [%]: 65

Total alteration in rock, bulk estimate (%): 60

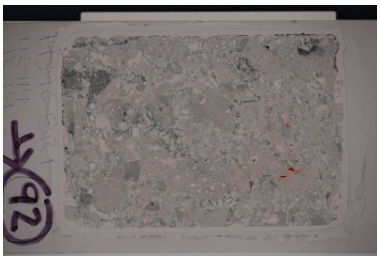
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]						100
Altered [%]						80
Zeolite						10

THIN SECTION LABEL ID: **352-U1439C-8R-1-W 112/114-TSB-TS_92** Thin section no.: 92

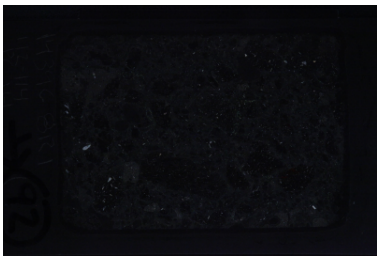
Unit/Subunit: 3b Piece no.: #14 Observer: wn

Thin section summary: Volcaniclastic material with aphyric boninitic glass fragments in a glassy matrix.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **mafic lava** Domain no.: 1 Domain rel. abundance [%]: 30

LITHOLOGY: **aphyric boninite glass**

Texture 1:	vesicular	Texture 2:	microlitic
Avg. grain size:	cryptocrystalline	Grain size distrib.:	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Orthopyroxene	1	0.2	skeletal	microlites

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
25	0	subrounded	1	

Sample domain name: **matrix** Domain no.: 2 Domain rel. abundance [%]: 70

LITHOLOGY: **hyaloclastite**

Groundmass phases	% present	Average size (mm)	Habit	Comments
Mesostasis	100			mesostasis is a combination of glassy fragments and altered groundmass

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			palagonitized basalt

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: volcanic clast, mafic Domain no.: 1 Domain rel. abundance [%]: 30

Total alteration in rock, bulk estimate (%): 65

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]			1			99
Altered [%]			2			10
Amph., green			2			
Clay minerals						10

Alteration domain name: matrix Domain no.: 2 Domain rel. abundance [%]: 70

Total alteration in rock, bulk estimate (%): 65

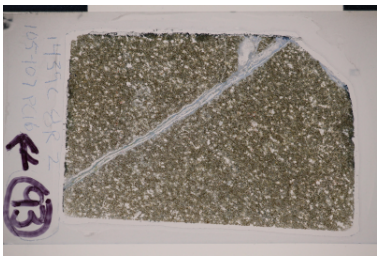
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]						100
Altered [%]						90
Clay minerals						20
Zeolite						40

THIN SECTION LABEL ID: **352-U1439C-8R-2-W 105/107-TSB-TS_93** Thin section no.: 93

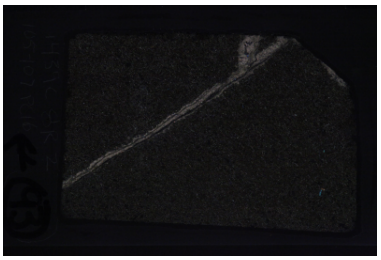
Unit/Subunit: 4 Piece no.: #16 Observer: jws, tc

Thin section summary: intersertal plagioclase bearing matrix with phenocrysts of augite

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely augite phyric andesite lava

Texture 1:	intersertal	Texture 2:	microporphyritic
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Plagioclase	1	0.4	tabular	albite rims
Clinopyroxene	2	0.6	prismatic	twinned

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	37	0.2	tabular	
Mesostasis	54			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
3		rounded	0.4	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.2	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	moderate			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 60

Groundmass original [%]: 58 Groundmass altered [%]: 100 Groundmass alt. intensity: complete

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		2		40		
Altered [%]		10		10		
Chlorite		10				
Zeolite				10		

THIN SECTION LABEL ID: **352-U1439C-9R-1-W 20/22-TSB-TS_94** Thin section no.: 94

Unit/Subunit: 4 Piece no.: #03 Observer: tc

Thin section summary: augite phenocrysts in a intersertal plagioclase-rich matrix

Plane-polarized:

Cross-polarized:

PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely augite phyric andesite lava

Texture 1:	intersertal	Texture 2:	microporphyritic
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Plagioclase	1	0.4	tabular	albite rims
Clinopyroxene	2	0.6	prismatic	twinned

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	37	0.2	tabular	
Mesostasis	54			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
3		rounded	0.4	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.2	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 60

Groundmass original [%]: 58 Groundmass altered [%]: 100 Groundmass alt. intensity: complete

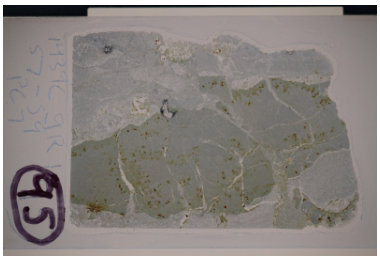
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		2		40		
Altered [%]		10		10		
Chlorite		10				
Zeolite				10		

THIN SECTION LABEL ID: **352-U1439C-9R-1-W 57/59-TSB-TS_95** Thin section no.: 95

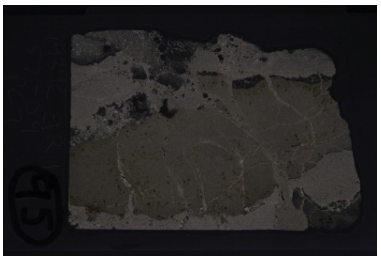
Unit/Subunit: 4 Piece no.: #07 Observer: Marie

Thin section summary: Carbonate cement containg some volcanic clasts highly altered into carbonates

Plane-polarized:



Cross-polarized:



MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
				calcite-dominated vein fill

SECONDARY (ALTERATION) MINERALOGY

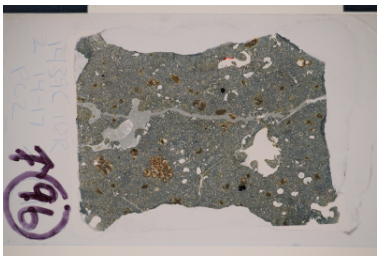
Total alteration in rock, bulk estimate (%): 99

Groundmass original [%]: 95 Groundmass altered [%]: 100 Groundmass alt. intensity: complete

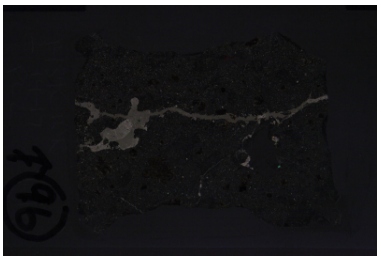
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	2		3			
Altered [%]	50		70			
Iddingsite	50					
Clay minerals			70			

THIN SECTION LABEL ID: **352-U1439C-10R-2-W 14/17-TSB-TS_96** Thin section no.: 96
Unit/Subunit: 5 Piece no.: #02 Observer: ks
Thin section summary: sparsly olivine-orthopyroxene phyric boninite (highly altered)

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely olivine-orthopyroxene-clinopyroxene boninite lava

Texture 1:	pseudomorphic	Texture 2:	
Avg. grain size:	cryptocrystalline	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	2	0.6	prismatic	replaced by clay
Orthopyroxene	2	1	prismatic	replaced by clay
Spinel	0.5	0.2	prismatic	many of the are included in olivine and opx phenocrysts

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	15	0.1	blocky	
Orthopyroxene	10	0.2	tabular	
Mesostasis	70.5			
Spinel		0.2	prismatic	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
5		irregular	1	pipe vesicles?

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			calcite vein

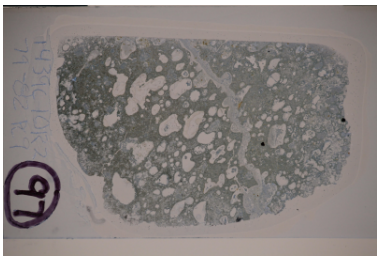
SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 80

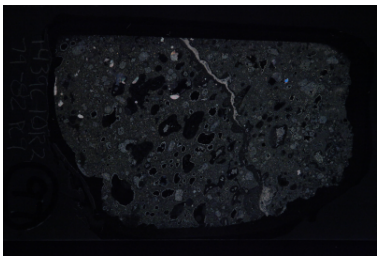
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	4	15	10		0.5	70.5
Altered [%]	20	5	90		0	100
Serpentine	5					
Clay minerals	15	5	20			
Chlorite			70			
Zeolite						10

THIN SECTION LABEL ID: **352-U1439C-10R-2-W 79/82-TSB-TS_97** Thin section no.: 97
Unit/Subunit: 5 Piece no.: #09 Observer: ks
Thin section summary: highly altered vesicular boninite (cryptocrystalline)

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine-orthopyroxene phyric boninite lava

Texture 1:	pseudomorphic	Texture 2:	
Avg. grain size:	cryptocrystalline	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	3	0.6	prismatic	completedly replaced
Orthopyroxene	3	1.2	prismatic	completely replaced by clay
Spinel	0.5	0.5	prismatic	Chromian spinel

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	19.5	0.1	blocky	
Orthopyroxene	15	0.1	tabular	
Mesostasis	59			
Spinel		0.5	prismatic	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
30	10	rounded	0.6	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	moderate			

SECONDARY (ALTERATION) MINERALOGY

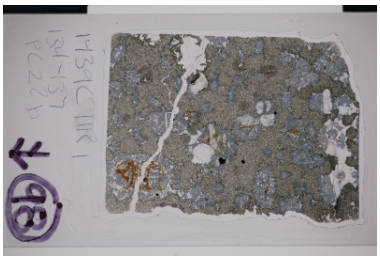
Total alteration in rock, bulk estimate (%): 70

Groundmass original [%]: 59.5 Groundmass altered [%]: 100 Groundmass alt. intensity: complete

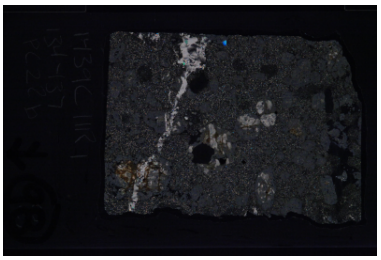
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	3	20	17		0.5	
Altered [%]	90	60	80		0	
Iddingsite	90					
Chlorite		20	50			
Clay minerals		40	30			

THIN SECTION LABEL ID: **352-U1439C-11R-1-W 134/137-TSB-TS_98** Thin section no.: 98
Unit/Subunit: 5 Piece no.: #22 Observer: tc, jp
Thin section summary: large olivine phenocrysts completely replaced by zeolite

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine phyric boninite lava

Texture 1:	pseudomorphic	Texture 2:	phaneroporphyritic
Avg. grain size:	microcrystalline	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	14	7	prismatic	completely replaced by zeolite and/or calcite and have remanant Cr spinel inclusions
Clinopyroxene	2	5	prismatic	some replaced with zeolite and/or calcite. some pristine phenocrysts of cpx remain.
Orthopyroxene	8	5	prismatic	completely replaced with zeolite and/or calcite
Spinel	1	1	prismatic	many associated with relict olivine

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	20	0.1	blocky	
Orthopyroxene	10	0.2	tabular	replaced by zeolite
Mesostasis	45			calcite and zeolite possible infiltration from veins
Spinel		1	prismatic	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
dynamic recrystallizatio n	isotropic	subgrain boundaries		calcite vein with coarse-grained (Mg-) calcite, abundant twinning, pervasive undulatory extinction, subgrains with various size and shape

SECONDARY (ALTERATION) MINERALOGY

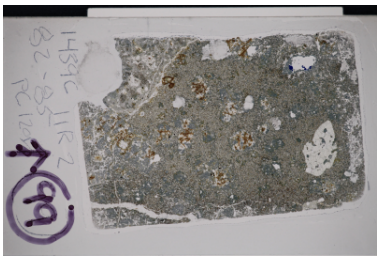
Total alteration in rock, bulk estimate (%): 60

Groundmass original [%]: 40 Groundmass altered [%]: 100 Groundmass alt. intensity: complete

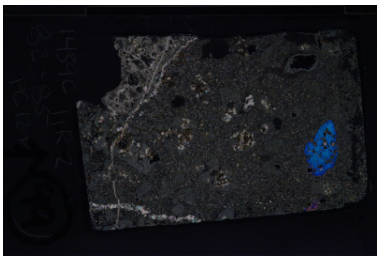
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	10	25	24		1	
Altered [%]	5	15	70		0	
Iddingsite	5					
Amph., green		5				
Chlorite		15				
Clay minerals			30			
Other			40			

THIN SECTION LABEL ID: **352-U1439C-11R-2-W 82/85-TSB-TS_99** Thin section no.: 99
Unit/Subunit: 5 Piece no.: #12 Observer: tc, jp
Thin section summary: olivine and orthopyroxene phenocrysts replaced by zeolite, augite fresh

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine-augite phyric boninite lava

Texture 1:	pseudomorphic	Texture 2:	phaneroporphyritic
Avg. grain size:	microcrystalline	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	20	2	prismatic	completely altered to zeolite, and have associated Cr spinel inclusions
Clinopyroxene	3	5	prismatic	one huge 8mm long cpx phenocryst along with some other smaller ones
Orthopyroxene	3	4	prismatic	completely replaced by zeolite and/or calciate
Spinel	4	1	prismatic	many associated with old olivine

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	15	0.1	blocky	
Orthopyroxene	15	0.2	tabular	replaced by zeolite/calcite
Mesostasis	44			calcite and zeolite
Spinel		1	prismatic	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
2	10	irregular	0.8	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undulose extinction		calcite vein with (Mg-) calcite, variable grain size; abundant twinning, pervasive undulose extinction; vesicles with radial calcite fibres

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 70

Groundmass original [%]: 40 Groundmass altered [%]: 100 Groundmass alt. intensity: complete

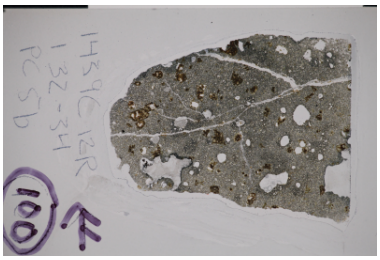
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	20	18	18		4	
Altered [%]	25	20	90		0	
Iddingsite	15					
Carbonate	10					
Chlorite		5				
Clay minerals		15	40			
Other			50			

THIN SECTION LABEL ID: **352-U1439C-12R-1-W 32/34-TSB-TS_100** Thin section no.: 100

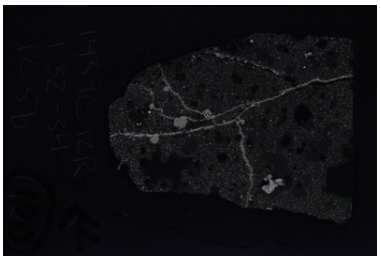
Unit/Subunit: 5 Piece no.: #05 Observer: jws, tc, jp

Thin section summary: olivine, orthopyroxene and augite phenocrysts in highly altered boninte

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine-orthopyroxene-clinopyroxene boninite lava

Texture 1:	pseudomorphic	Texture 2:	phaneroporphyritic
Avg. grain size:	microcrystalline	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	3	2	prismatic	completely replaced by clays
Clinopyroxene	1	0.3	prismatic	augite is least altered of the phenocryst assmeblage. Mostly occurs as glomerocrysts with opx
Orthopyroxene	3	2	prismatic	completely replaced by clays

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	25	0.1	blocky	
Orthopyroxene	10	0.2	tabular	totally replaced
Mesostasis	58			altered to clays

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
5		irregular	1	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undulose extinction		calcite vein with (Mg-) calcite, variable grain size; abundant twinning, pervasive undulose extinction

SECONDARY (ALTERATION) MINERALOGY

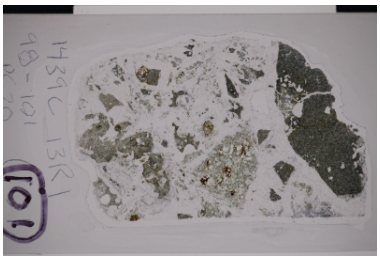
Total alteration in rock, bulk estimate (%): 70

Groundmass original [%]: 58 Groundmass altered [%]: 100 Groundmass alt. intensity: complete

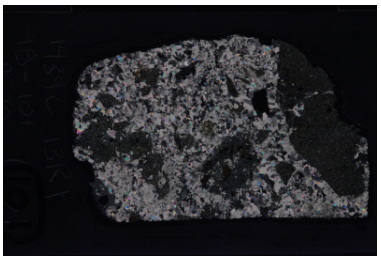
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	3	26	13			
Altered [%]	100	10	50			
Iddingsite	100					
Chlorite		10	10			
Clay minerals			30			
Other			10			

THIN SECTION LABEL ID: **352-U1439C-13R-1-W 98/101-TSB-TS_101** Thin section no.: 101
Unit/Subunit: 5 Piece no.: #20 Observer: Marie
Thin section summary: Cataclasite with volcanic clasts and carbonate matrix

Plane-polarized:



Cross-polarized:



MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undulose extinction		calcite, coarse grained; abundant twinning (type I), pervasive undulose extinction

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: volcanic clast, mafic Domain no.: 1 Domain rel. abundance [%]: 45

Total alteration in rock, bulk estimate (%): 95

Groundmass original [%]: 55 Groundmass altered [%]: 100 Groundmass alt. intensity: complete

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	2	40	3			
Altered [%]	100	50	90			
Iddingsite	70					
Carbonate	30					
Chlorite		25				
Clay minerals		70	60			
Other			30			

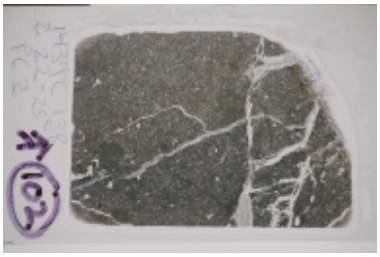
Alteration domain name: matrix Domain no.: 2 Domain rel. abundance [%]: 60

Total alteration in rock, bulk estimate (%): 95

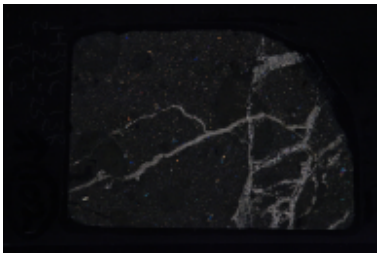
Groundmass original [%]: 100 Groundmass altered [%]: Groundmass alt. intensity:

THIN SECTION LABEL ID: **352-U1439C-13R-2-W 22/25-TSB-TS_102** Thin section no.: 102
Unit/Subunit: 5 Piece no.: #02 Observer: jws, tc, jp
Thin section summary: olivine phyric altered boninite

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine-augite phyric boninite lava

Texture 1:	pseudomorphic	Texture 2:	phaneroporphyritic
Avg. grain size:	microcrystalline	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	0.5	3	prismatic	completely replaced by zeolite or clay
Clinopyroxene	5	0.3	prismatic	
Orthopyroxene	0.5	0.5		

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	19	0.1	blocky	
Orthopyroxene	10	0.1	tabular	totally replaced by clays
Mesostasis	65			altered to clays and zeolite

MICROSTRUCTURES

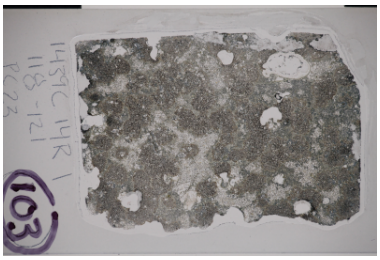
Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undulose extinction		calcite vein with (Mg-) calcite, variable grain size; abundant twinning, pervasive undulose extinction; two vein types: 1) coarse grained, with twinning, 2) fine grained, crosscuts 1)

THIN SECTION LABEL ID: **352-U1439C-14R-1-W 118/121-TSB-TS_103** Thin section no.: 103

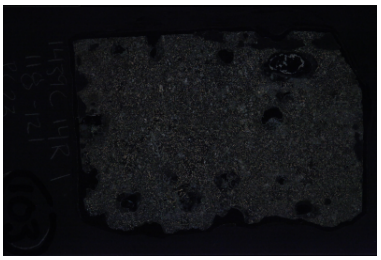
Unit/Subunit: 6 Piece no.: #23 Observer: jws, jp, tc

Thin section summary: ovoids of radiating vesciles in altered groundmass

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **glass** Domain no.: 1 Domain rel. abundance [%]: 15

LITHOLOGY: **sparsely olivine phyric boninite lava**

Texture 1:	vitrophyric	Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	5	0.5		completely replaced by zeolite or clay

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	30	0.2	acicular	

Sample domain name: **ovoid** Domain no.: 2 Domain rel. abundance [%]: 85

LITHOLOGY: **boninite lava**

Texture 1:	vesicular	Texture 2:	radiating structure
Avg. grain size:	microcrystalline	Grain size distrib.:	equigranular

Groundmass phases	% present	Average size (mm)	Habit	Comments
Mesostasis	100			altered to clays

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
25	100	irregular	0.15	radiating filled with carbonate, zeolite and clay

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	gradational boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	no shape preferred orientation of crystals and vesicles

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 70

Groundmass original [%]: 65 Groundmass altered [%]: 100 Groundmass alt. intensity: complete

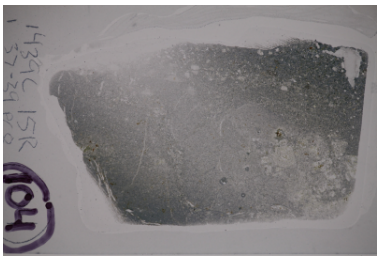
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	5	30				
Altered [%]	100	20				
Iddingsite	100					
Amph., green		5				
Clay minerals		15				

THIN SECTION LABEL ID: **352-U1439C-15R-1-W 37/39-TSB-TS_104** Thin section no.: 104

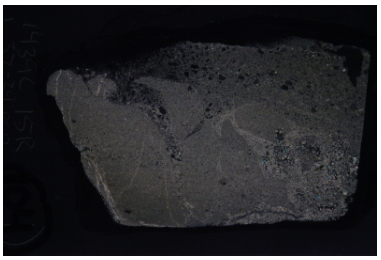
Unit/Subunit: 6 Piece no.: #07, #08 Observer: Marie

Thin section summary: Carbonate ciment containing some completely altered volcanic clasts

Plane-polarized:



Cross-polarized:



MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	weak	undeformed	undeformed	mainly isotropic; distinct domain with elongate shape of vesicles and shape preferred orientation; calcite veins with (Mg-) calcite, variable grain size; abundant twinning.

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 100

Groundmass original [%]: 85 Groundmass altered [%]: 100 Groundmass alt. intensity: complete

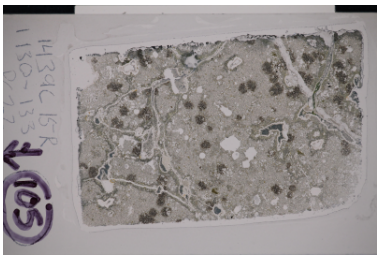
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		5	10			
Altered [%]		95	100			
Clay minerals		65	40			
Other		30	60			

THIN SECTION LABEL ID: **352-U1439C-15R-1-W 130/133-TSB-TS_105** Thin section no.: 105

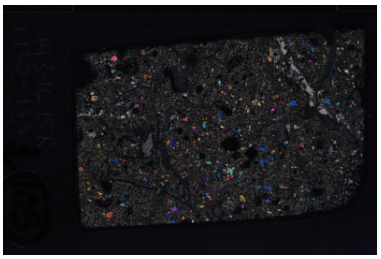
Unit/Subunit: 6 Piece no.: #22 Observer: dh

Thin section summary: highly olivine phyric boninite containing a augite-bearing, glassy-rich matrix. Alteration to zeolites

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine phyric boninite lava

Texture 1:		Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	17	0.6	blocky	
Spinel	1	0.2	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	25	0.3	acicular	
Spinel		0.2	prismatic	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
3	40	angular	1	radiating filling with zeolite

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	mainly isotropic, no shape preferred orientation; calcite vein with (Mg-) calcite, variable grain size; abundant twinning, undulose extinction.

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 5

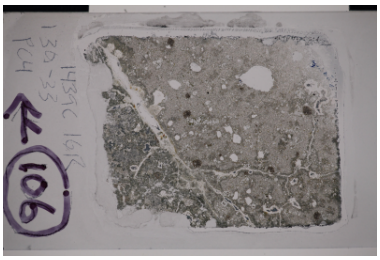
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	19	25			1	50
Altered [%]	5	10			0	5
Iddingsite	5					
Clay minerals		10				3

THIN SECTION LABEL ID: **352-U1439C-16R-1-W 30/33-TSB-TS_106** Thin section no.: 106

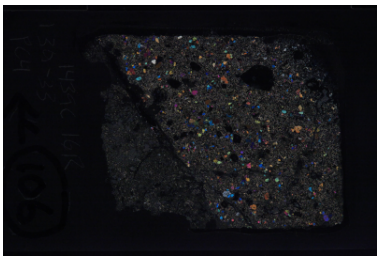
Unit/Subunit: 6 Piece no.: #04 Observer: dh

Thin section summary: eqaunt fresh olivine phenocrysts with radiating vesicles

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine phyric boninite lava

Texture 1:		Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	16	0.6	blocky	
Spinel	0.5	0.1	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	30	0.3	acicular	
Spinel		0.1	prismatic	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
2	30	angular	1	radiating filling with zeolite

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	isotropic, no shape preferred orientation; zeolite veins

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 5

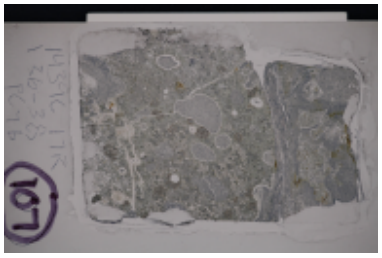
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	16	30			0.5	53.5
Altered [%]	5	5			0	5
Iddingsite	5					
Amph., green		5				
Clay minerals						2

THIN SECTION LABEL ID: **352-U1439C-17R-1-W 36/38-TSB-TS_107** Thin section no.: 107

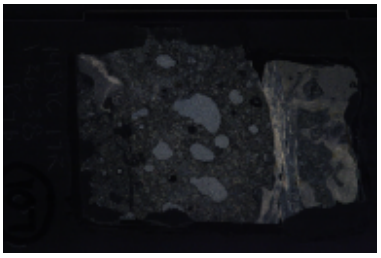
Unit/Subunit: 6 Piece no.: #07 Observer: ks

Thin section summary: vesicular olivine phyric boninite lava (highly altered)

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine phyric boninite lava

Texture 1:	vesicular	Texture 2:	vitrophyric
Avg. grain size:	microcrystalline	Grain size distrib.:	equigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	10	0.4	prismatic	aggregated; completely replaced by clay and zeolite

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	20	0.2	blocky	
Orthopyroxene	5	0.2	tabular	some rimmed by cpx
Mesostasis	65			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
20	100	rounded	1	zeolite and calcite filling

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
banded vein	0.3	sharp boundary or contact	2nd generation	

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact	1st generation	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
shear band		strongly foliated/lineated	strongly foliated/lineated	shear zone along "vein", with strong foliation, probably clay minerals, with intercalation of silicic material; calcite in cement and veins fine grained

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 45

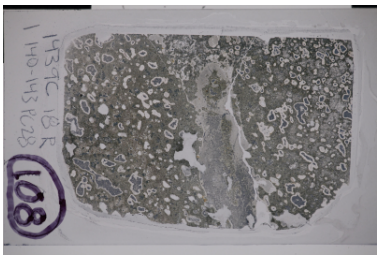
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Amphibole	Plagioclase	Feldspar	Biotite	Oxide	Glass
Original [%]	10	25	5						60
Altered [%]	100	15	20						50
Iddingsite	100								
Clay minerals		15	20						20

THIN SECTION LABEL ID: **352-U1439C-18R-1-W 140/143-TSB-TS_108** Thin section no.: 108

Unit/Subunit: 6 Piece no.: #28 Observer: jp, tc

Thin section summary: aphyric intersertal boninite that is completely altered and highly vesicular. Likely a pillow rim.

Plane-polarized:



Cross-polarized:

PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine phyric boninite lava

Texture 1:	vesicular	Texture 2:	intersertal
Avg. grain size:	microcrystalline	Grain size distrib.:	equigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	5	0.8	prismatic	completely altered
Spinel	0.5	0.2	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	49.5	0.1	acicular	
Mesostasis	45			glass and pyroxene completely replaced by zeolite
Spinel		0.2	prismatic	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
40	80	irregular	1	filled with zeolite and clacite, big crack in middle of section filed with zeolite

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
uniform vein	0.3	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	vesicles partly elongated, but no shape preferred orientation, veins with zeolite

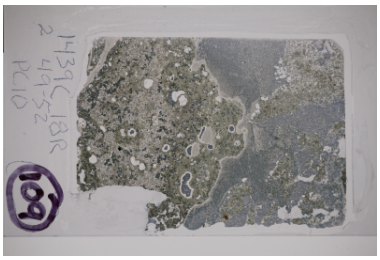
SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 10

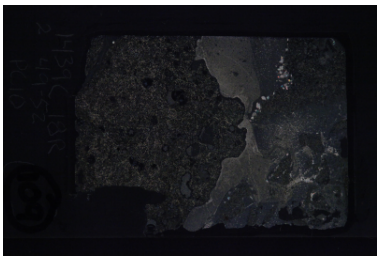
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	4.5	50			0.5	45
Altered [%]	100	20			0	10
Iddingsite	100					
Amph., green		5				
Chlorite		15				
Clay minerals						5

THIN SECTION LABEL ID: **352-U1439C-18R-2-W 49/52-TSB-TS_109** Thin section no.: 109
Unit/Subunit: 6 Piece no.: #10 Observer: ks
Thin section summary: highly olivine phyric altered boninite

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine phyric boninite lava

Texture 1:	vitrophyric	Texture 2:	vesicular
Avg. grain size:	microcrystalline	Grain size distrib.:	equigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	9.5	0.4	prismatic	completely altered to clay/zeolite
Spinel	0.5	0.3	prismatic	dissolution texture?

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	60	0.3	acicular	
Mesostasis	30			
Spinel		0.3	prismatic	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
10	100	moderately spherical	1.5	some elongated

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
		twinning		calcite, coarse grained; abundant twinning (type I), pervasive undulose extinction

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	vesicles partly elongated, but no shape preferred orientation

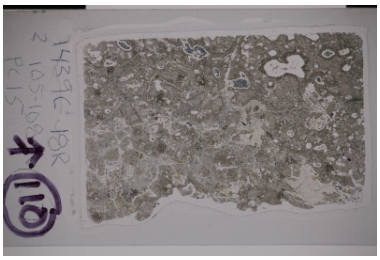
SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 60

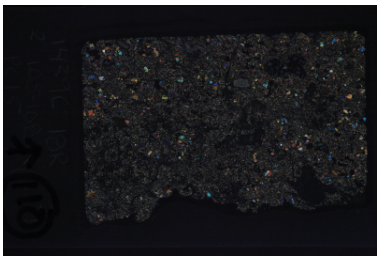
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	9.5	50			0.5	40
Altered [%]	100	20			0	90
Iddingsite	100					
Clay minerals		20				30
Zeolite						50

THIN SECTION LABEL ID: **352-U1439C-18R-2-W 105/108-TSB-TS_110** Thin section no.: 110
Unit/Subunit: 6 Piece no.: #15 Observer: jp, tc
Thin section summary: olivine-orthopyroxene phyric in fresh glassy matrix with acicular augite

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine phyric boninite lava

Texture 1:	phaneroporphyritic	Texture 2:	intersertal
Avg. grain size:	microcrystalline	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	19.5	0.4	prismatic	some are embayed
Spinel	0.5	0.2	prismatic	occurs adjacent to, or as inclusions in, olivine

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	15	0.3	acicular	
Spinel		0.2	prismatic	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
3	50	irregular	1	one big vesicle

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 5

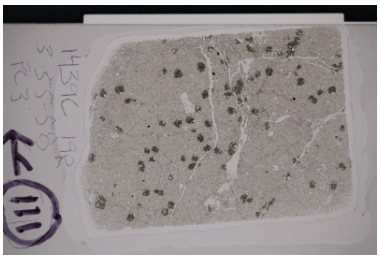
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	19.5	15			0.5	40
Altered [%]	10	5			0	10
Serpentine	10					
Amph., green		5				

THIN SECTION LABEL ID: **352-U1439C-19R-3-W 55/58-TSB-TS_111** Thin section no.: 111

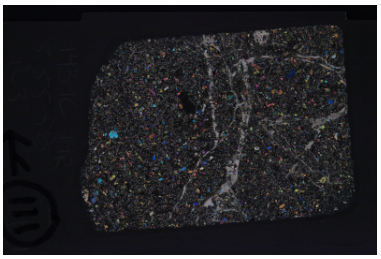
Unit/Subunit: 6 Piece no.: #03 Observer: jp, tc

Thin section summary: large olivine orthopyroxene phenocryst, in fresh cpx and glass matrix. Pervasively veined by clacite with black alteration globules.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine-orthopyroxene phyric boninite lava

Texture 1:	phaneroporphyritic	Texture 2:	vitrophyric
Avg. grain size:	microcrystalline	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	26	0.3	prismatic	
Orthopyroxene	2	0.2	prismatic	
Spinel	1	0.3	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	20	0.15	acicular	
Spinel		0.3	prismatic	
Mesostasis				blotches of alteration and calcite veins

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
1	10	irregular	1	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
		twinning		calcite, coarse grained; abundant twinning (type I), pervasive undulose extinction, transition to subgrain formation

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 3

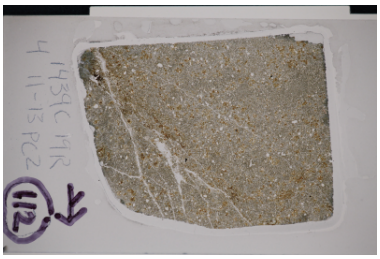
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	25	20	2		1	52
Altered [%]	2	1	2		0	5
Iddingsite	2					
Amph., green		1				
Clay minerals			2			2

THIN SECTION LABEL ID: **352-U1439C-19R-4-W 11/13-TSB-TS_112** Thin section no.: 112

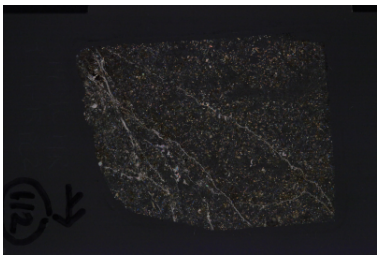
Unit/Subunit: 6 Piece no.: #02 Observer: jp, tc, ks

Thin section summary: moderately olivine phyric boninite with clinopyroxene nucleating on orthopyroxene in the groundmass. Highly altered with quench textures

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine phyric boninite lava

Texture 1:	intersertal	Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	7	0.4	prismatic	completely altered to clay
Spinel	0.5	0.3	prismatic	larger than all groundmass phases

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	35	0.2	skeletal	
Orthopyroxene	20	0.2	skeletal	sometime skeletal and cpx nucleated on opx
Spinel	2	0.3	prismatic	present in groundmass
Mesostasis	29.5			mesostasis looks felty like a quench texture
Plagioclase		0.2	skeletal	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
		twinning		thin veins with calcite, abundant twinning (type I), pervasive undulose extinction, partly subgrains (radially arranged)

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	

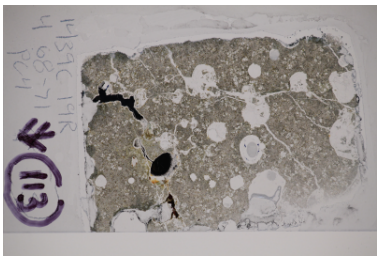
SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 65

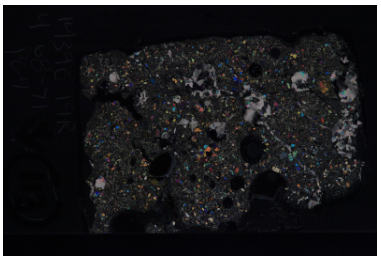
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	6.5	40	20		0.5	33
Altered [%]	100	5	10		0	100
Iddingsite	100					
Clay minerals		5	10			20
Carbonate						20
Zeolite						60

THIN SECTION LABEL ID: **352-U1439C-19R-4-W 68/71-TSB-TS_113** Thin section no.: 113
Unit/Subunit: 6 Piece no.: #04 Observer: wn
Thin section summary: Highly olivine phyric lava with acicular clinopyroxene needles in the groundmass.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine phyric boninite lava

Texture 1:	glassy matrix	Texture 2:	glomerocrystic
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	20	0.9	prismatic	very fresh
Spinel	1	0.2	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	50	0.2	acicular	
Mesostasis	30			may have once been glass but is now a brown material.
Spinel		0.2	prismatic	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
5	60	subrounded	2	calcite and zeolite line and fill some vesicles but is completely absent from others.

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
		twinning		veins with calcite, abundant twinning (type I), pervasive undulose extinction, partly subgrains (radially arranged)

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	

SECONDARY (ALTERATION) MINERALOGY

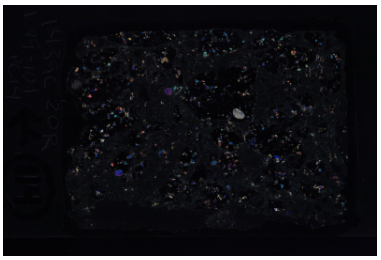
Total alteration in rock, bulk estimate (%): 20

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	20	50			1	29
Altered [%]	5	5			0	50
Iddingsite	5					
Clay minerals		5				3
Carbonate						4
Zeolite						40

THIN SECTION LABEL ID: **352-U1439C-20R-1-W 99/101-TSB-TS_114** Thin section no.: 114
Unit/Subunit: 6 Piece no.: #14 Observer: wn
Thin section summary: moderately olivine phyric boninite with fresh glassy matrix

Plane-polarized:

Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: Domain no.: 1 Domain rel. abundance [%]:

LITHOLOGY: moderately olivine phyric boninite lava

Texture 1:	vitrophyric	Texture 2:	vesicular
Avg. grain size:	cryptocrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	14.5	0.7	prismatic	very fresh
Spinel	0.5	1	prismatic	large crystal independent of olivine (with melt inclusion)

Groundmass phases	% present	Average size (mm)	Habit	Comments
Spinel		1	prismatic	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
2	10	subrounded	0.3	some are filled with calcite; some do not have filling

Sample domain name: Domain no.: 2 Domain rel. abundance [%]:

LITHOLOGY: sparsely olivine phyric boninite hyaloclastite

Texture 1:	vitrophyric	Texture 2:	
Avg. grain size:	cryptocrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	5	0.4	prismatic	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: volcanic clast, mafic Domain no.: 1 Domain rel. abundance [%]: 50

Total alteration in rock, bulk estimate (%): 50

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	15				0.5	85
Altered [%]	5				0	5
Iddingsite	5					
Clay minerals						5

Alteration domain name: matrix Domain no.: 2 Domain rel. abundance [%]: 50

Total alteration in rock, bulk estimate (%): 50

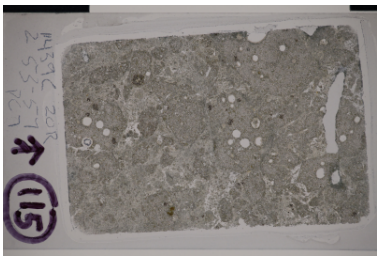
Groundmass original [%]: 100 Groundmass altered [%]: Groundmass alt. intensity:

THIN SECTION LABEL ID: **352-U1439C-20R-2-W 53/57-TSB-TS_115** Thin section no.: 115

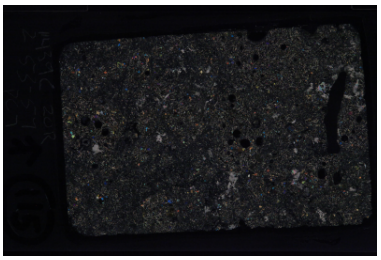
Unit/Subunit: 6 Piece no.: #07 Observer: ks

Thin section summary: moderately olivine phyric boninite with acicular cpx (patchy alteration)

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine phyric boninite lava

Texture 1:	intersertal	Texture 2:	vitrophyric
Avg. grain size:	microcrystalline	Grain size distrib.:	equigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	7	0.3	prismatic	patially altered, some skeletal

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	50	0.2	acicular	
Mesostasis	3			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
10	10	rounded	1	rimmed by zeolite

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
		twinning		small veins with calcite, abundant twinning (type I), undulose extinction,

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: volcanic clast, mafic Domain no.: 1 Domain rel. abundance [%]: 60

Total alteration in rock, bulk estimate (%): 35

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	7	50				43
Altered [%]	5	5				5
Iddingsite	5					
Amph., green		2				
Clay minerals		3				1
Zeolite						4

Alteration domain name: matrix Domain no.: 2 Domain rel. abundance [%]: 40

Total alteration in rock, bulk estimate (%): 35

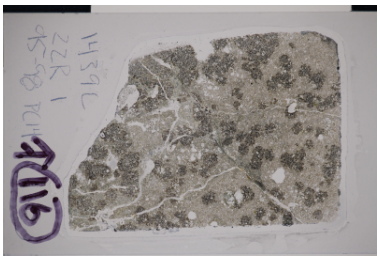
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	2	20				78
Altered [%]	10	50				100
Iddingsite	10					
Amph., green		10				
Chlorite		20				
Clay minerals		20				10
Carbonate						20
Zeolite						70

THIN SECTION LABEL ID: **352-U1439C-22R-1-W 95/98-TSB-TS_116** Thin section no.: 116

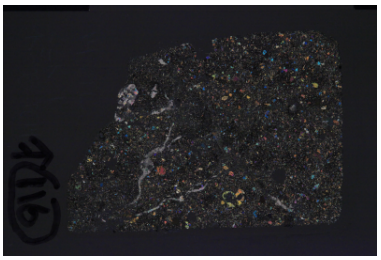
Unit/Subunit: 6 Piece no.: #14 Observer: tc

Thin section summary: fresh olivine phenocrysts in a clear vitrophyric matrix

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine phyric boninite lava

Texture 1:	vitrophyric	Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	8	0.5	prismatic	
Orthopyroxene	1	0.4	prismatic	
Spinel	1	0.2	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	25	0.2	prismatic	
Mesostasis	65			
Spinel		0.2	prismatic	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
4		rounded	1	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
dynamic recrystallization		twinning		calcite in veins and vesicles coarse grained in center, fine grained along margins; abundant twinning (type I), pervasive undulose extinction, some grains with subgrains; veins and vesicles also contain zeolite (margins)

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 25

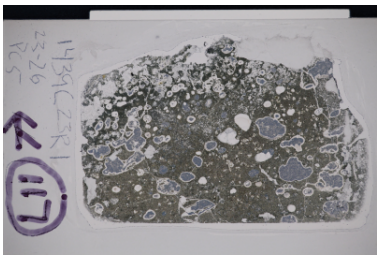
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	8	25	1		1	65
Altered [%]	15	10	50		0	30
Iddingsite	15					
Amph., green		5				
Clay minerals		5	40			10
Other			10			
Carbonate						5
Zeolite						15

THIN SECTION LABEL ID: **352-U1439C-23R-1-W 23/26-TSB-TS_117** Thin section no.: 117

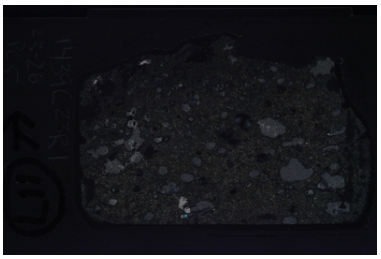
Unit/Subunit: 6 Piece no.: #05 Observer: tc

Thin section summary: olivine-phyric boninite with quenched branching mesostasis. Olivine is completely replaced.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine phyric boninite lava

Texture 1:	intersertal	Texture 2:	microporphyritic
Avg. grain size:	microcrystalline	Grain size distrib.:	equigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	7	0.8	prismatic	completely pseudomorphed

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	45	0.3	acicular	branching
Mesostasis	55			felty quench texture

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
15	100	subrounded	1	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	vesicles partly elongated with shape preferred orientation

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 70

Groundmass original [%]: 50 Groundmass altered [%]: 100 Groundmass alt. intensity: complete

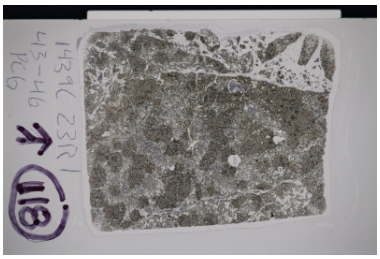
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	7	43				
Altered [%]	100	60				
Iddingsite	10					
Clay minerals	80	10				
Carbonate	10					
Amph., pale		50				

THIN SECTION LABEL ID: **352-U1439C-23R-1-W 43/46-TSB-TS_118** Thin section no.: 118

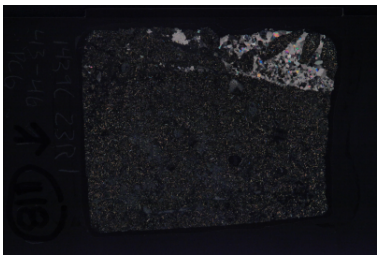
Unit/Subunit: 6 Piece no.: #06 Observer: jp, ks

Thin section summary: highly olivine phyric, altered lava. cpx and glass in groundmass, blotches of clay alteration visible in ppl

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine phyric boninite lava

Texture 1:	vitrophyric	Texture 2:	glassy matrix
Avg. grain size:	cryptocrystalline	Grain size distrib.:	

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	14.5	0.5	prismatic	some are skeletal, completely pseudomorphed
Spinel	0.5	0.2	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	30	0.1	acicular	alters to mottled brown
Mesostasis	55			glassy matrix is completely altered. There are also brown clay clots visible in ppl. And a big vein of calcite.
Spinel		0.2	prismatic	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
1		rounded	0.75	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
dynamic recrystallizatio n		twinning		calcite in veins coarse grained ; abundant twinning (type I), pervasive undulose extinction, some grains with subgrains (partially radially arranged)

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 80

Groundmass original [%]: 60 Groundmass altered [%]: 100 Groundmass alt. intensity: complete

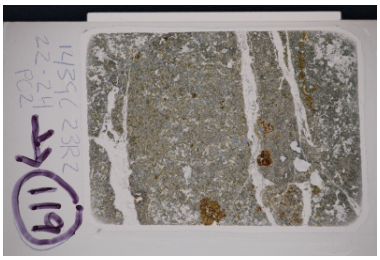
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	14.5	25			0.5	
Altered [%]	100	30			0	
Iddingsite	70					
Clay minerals	15	20				
Carbonate	15					
Amph., pale		10				

THIN SECTION LABEL ID: **352-U1439C-23R-2-W 22/24-TSB-TS_119** Thin section no.: 119

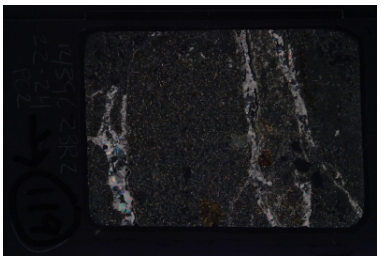
Unit/Subunit: 6 Piece no.: #02 Observer: tc

Thin section summary: altered olivine and orthopyroxene phenocrysts in altered groundmass

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely olivine-orthopyroxene phyric boninite lava

Texture 1:	microporphyritic	Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	1	1	prismatic	completely pseudomorphed
Orthopyroxene	2	0.8	prismatic	altered

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	35	0.4	blocky	skeletal
Mesostasis	62			altered

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
8	10	subangular	1	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
dynamic recrystallizatio n		twinning		calcite in veins coarse grained ; abundant twinning (type I), pervasive undulose extinction, some grains with subgrains (partially radially arranged)

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	undeformed	undeformed	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 70

Groundmass original [%]: 62 Groundmass altered [%]: 60 Groundmass alt. intensity: moderate

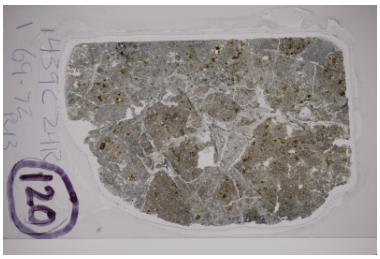
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	1	35	2			
Altered [%]	100	40	100			
Iddingsite	100					
Amph., pale		10				
Clay minerals		30	80			
Other			20			

THIN SECTION LABEL ID: **352-U1439C-24R-1-W 69/72-TSB-TS_120** Thin section no.: 120

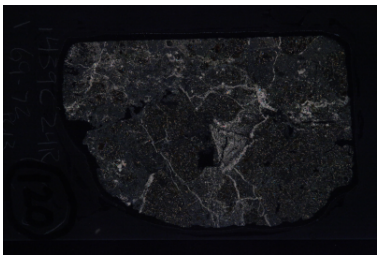
Unit/Subunit: 6 Piece no.: #13 Observer: jp

Thin section summary: Internally fragmented lava with relect olivine phenocrysts and pervasive carbonate-filled veins

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely olivine phyric boninite breccia

Texture 1:	vitrophyric	Texture 2:	
Avg. grain size:	cryptocrystalline	Grain size distrib.:	

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	2	0.8	prismatic	completely psuedomorphed
Orthopyroxene	1	0.8	prismatic	completely pseudomorphed

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	17	0.1	blocky	much of cpx altered.
Mesostasis	80			completely altered glass. Carbonate veins are pervasive. Entire section is fragmented and infilled with secondary minerals

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
				difficult to distinguish vesicles from elongated fractures, of which there are many.

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
microbrecciation		twinning		calcite in veins coarse grained ; abundant twinning (type I), pervasive undulose extinction

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: volcanic clast, mafic Domain no.: 1 Domain rel. abundance [%]: 70

Total alteration in rock, bulk estimate (%): 65

Groundmass original [%]: 60 Groundmass altered [%]: 80 Groundmass alt. intensity: high

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	2	38	1			
Altered [%]	100	30	100			
Iddingsite	100					
Amph., pale		10				
Clay minerals		15	80			
Other		5	20			

Alteration domain name: matrix Domain no.: 2 Domain rel. abundance [%]: 30

Total alteration in rock, bulk estimate (%): 65

Groundmass original [%]: 90 Groundmass altered [%]: 100 Groundmass alt. intensity: complete

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		10				
Altered [%]		30				
Amph., pale		10				
Other		20				

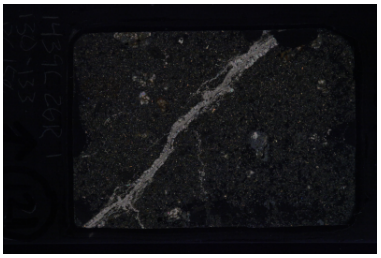
THIN SECTION LABEL ID: **352-U1439C-26R-1-W 130/133-TSB-TS_121** Thin section no.: 121

Unit/Subunit: 6 Piece no.: #15 Observer: jp

Thin section summary: Sparsely olivine phyric with glass and cpx in groundmass. Completely altered groundmass and phenocrysts. Difficult to indentify original phenocrysts since all carbonate + clay

Plane-polarized:

Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine phyric boninite lava

Texture 1:	vitrophyric	Texture 2:	
Avg. grain size:	cryptocrystalline	Grain size distrib.:	

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	5	5	equant	completely replaced by carbonate and clay material. Only visible iwith naked eye and in ppl. May not even be olivine

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	15	0.1	blocky	muc of groundmass in general is alterd to clays/. Ther may be relict phenocrysts, but they are extremely difficult to distinguish
Spinel	1			altered to a red brown with a black rim in ppl
Mesostasis	79			completely replaced to clays

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
5	75	irregular	2	filled with calcite and or zeolite. Also a large vein running thorugh sample, filled with calcite

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
		twinning		calcite in veins coarse grained in center, fine-grained along margins; slight twinning (type I), undulose extinction

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 55

Groundmass original [%]: 74 Groundmass altered [%]: 60 Groundmass alt. intensity: moderate

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	5	15			1	
Altered [%]	100	30			0	
Iddingsite	40					
Carbonate	60					
Amph., pale		5				
Clay minerals		25				

THIN SECTION LABEL ID: **352-U1439C-26R-3-W 64/66-TSB-TS_122** Thin section no.: 122

Unit/Subunit: 7 Piece no.: #07 Observer: ks

Thin section summary: highly olivine augite phyric basalt with plagioclase in matrix, olivine-completely altered

Plane-polarized:

Cross-polarized:

PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine-augite phyric andesite lava

Texture 1:	intersertal	Texture 2:	intergranular
Avg. grain size:	microcrystalline	Grain size distrib.:	equigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	7	0.3	prismatic	completely altered, some huge (~5mm across) olivine psuedomorph
Clinopyroxene	10	0.4	blocky	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	20	0.2	acicular	
Mesostasis	63			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
7	100	subrounded	1.2	filled with mostly calcite, some zeolite

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.02	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
dynamic recrystallizatio n		twinning		calcite in vesicles coarse grained ; abundant twinning (type I), pervasive undulose extinction, some grains with subgrains (partly radially arranged)

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 60

Groundmass original [%]: 63 Groundmass altered [%]: 80 Groundmass alt. intensity: high

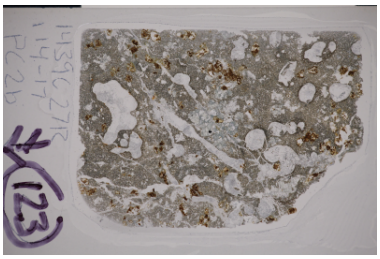
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	7	10		20		
Altered [%]	100	5		20		
Iddingsite	25					
Carbonate	10					
Other	65					
Clay minerals		4		5		
Zeolite				15		

THIN SECTION LABEL ID: **352-U1439C-27R-1-W 14/17-TSB-TS_123** Thin section no.: 123

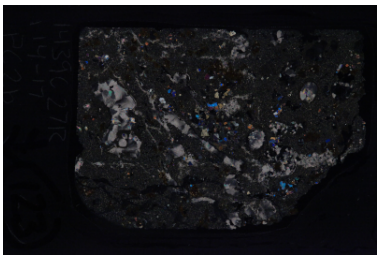
Unit/Subunit: 7 Piece no.: #02 Observer: ks

Thin section summary: moderately olivine augite phyric basalt with plagioclase and cpx in matrix, olivine-completely altered

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine-augite phyric andesite lava

Texture 1:	intersertal	Texture 2:	glomerocrystic
Avg. grain size:	cryptocrystalline	Grain size distrib.:	seriate

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	3	0.8	prismatic	altered to zeolite and calcite
Clinopyroxene	5	0.6	blocky	some large (~2mm) grains

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	15	0.1	acicular	identified by shape
Clinopyroxene	20	0.1		
Mesostasis	57			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
10	100	subrounded	2	seggregation vesicles

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.02	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
dynamic recrystallizatio n		twinning		calcite in vesicles coarse grained ; abundant twinning (type I), pervasive undulose extinction, some grains with subgrains (partly radially arranged)

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 60

Groundmass original [%]: 57 Groundmass altered [%]: 70 Groundmass alt. intensity: moderate

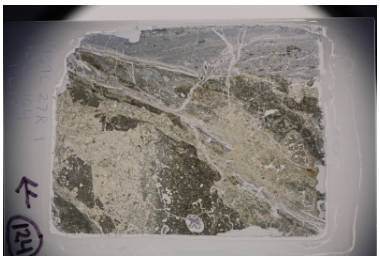
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	3	25		15		
Altered [%]	100	5		80		
Iddingsite	10					
Other	90					
Amph., green		5				
Chlorite				40		
Zeolite				40		

THIN SECTION LABEL ID: **352-U1439C-27R-1-W 100/104-TSB-TS_124** Thin section no.: 124

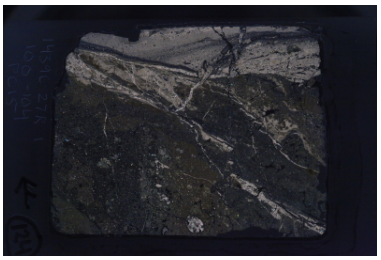
Unit/Subunit: 8 Piece no.: #15 Observer: tc

Thin section summary: cataclasite with local grain size variation and sheared veins

Plane-polarized:



Cross-polarized:



VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.2	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
shear band		strongly foliated/lineated		intersecting shear zones, layered; layering due to alternating fine-grained and coarse grained bands of calcite; fine grained layers probably ultracataclastic; reverse shear zone, later transected by normal shear; also cut by steep distinct reverse shears (brittle), latest shears are extensional

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 92

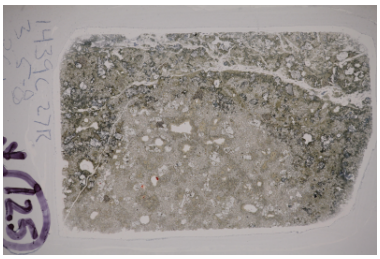
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	10	15				80
Altered [%]	50	100				90
Iddingsite	25					
Carbonate	25					30
Serpentine		100				
Clay minerals						10
Zeolite						50

THIN SECTION LABEL ID: **352-U1439C-27R-3-W 5/8-TSB-TS_125** Thin section no.: 125

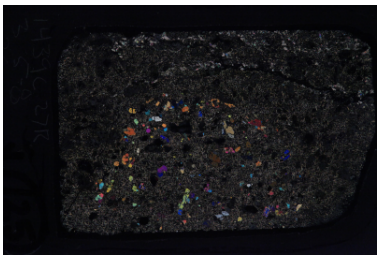
Unit/Subunit: 8 Piece no.: #01 Observer: wn

Thin section summary: Moderately olivine phyric boninite with acicular clinopyroxene needles in a glassy, variably altered groundmass

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine phyric boninite pillow lava

Texture 1:	porphyritic	Texture 2:	glassy matrix
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	15	1.5	prismatic	many crystals show embayment - could be resorbtion or skeletal growth - difficult to tell. Near the edges of the t.s., the olivine is completely altered.

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	35	0.6	acicular	uneven alteration: cpx in the center of the t.s. is fresher than that near the perimeter.
Mesostasis				Uneven alteration

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
7	70	subangular	0.9	commonly filled with calcite

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.05	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	weakly foliated/ineated	undeformed	mainly isotropic; distict domains with shape preferred orientation of acicular plagioclase and pyroxene crystals

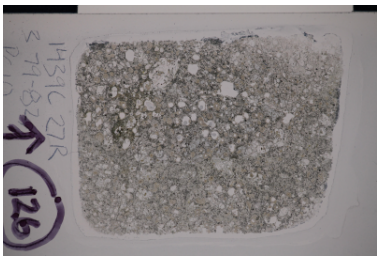
SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 15

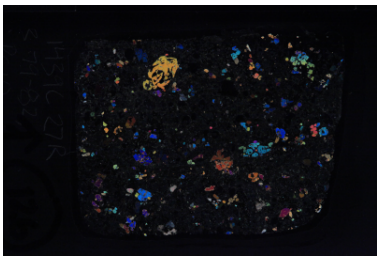
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	15	35				50
Altered [%]	10	5				20
Iddingsite	8					
Carbonate	2					
Amph., green		5				
Clay minerals						5

THIN SECTION LABEL ID: **352-U1439C-27R-3-W 79/82-TSB-TS_126** Thin section no.: 126
Unit/Subunit: 8 Piece no.: #10 Observer: wn
Thin section summary: Moderately olivine phyric boninite in glassy matrix.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine phyric boninite pillow lava

Texture 1:	porphyritic	Texture 2:	glassy matrix
Avg. grain size:	cryptocrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	15	2	prismatic	large phenocrysts show skeltal growth textures

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	5	0.2	acicular	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
15	70	rounded	0.8	lightly lined with clay

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	mainly glass with phenocrysts of olivine and px, no shape preferred orientation

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 10

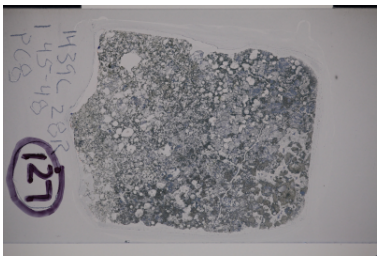
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	15	5				70
Altered [%]	5	5				10
Iddingsite	5					
Amph., green		5				
Zeolite						10

THIN SECTION LABEL ID: **352-U1439C-28R-1-W 45/48-TSB-TS_127** Thin section no.: 127

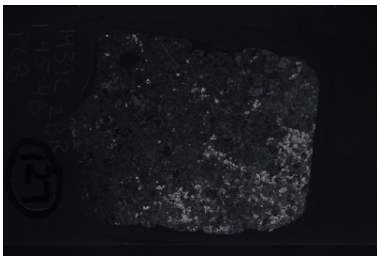
Unit/Subunit: 8 Piece no.: #08 Observer: tc

Thin section summary: highly altered olivine phyric boninite with many calcite veins

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely olivine phyric boninite lava

Texture 1:	vitrophyric	Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	2	1	equant	altered

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	20	0.2	acicular	
Mesostasis	88			all altered to clay and calcite

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
15	100	irregular	1	all filled with calcite

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
dynamic recrystallization				coarse grained calcite in vesicles; thin twins, weak undulose extinction

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic	twinning	undeformed	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 100

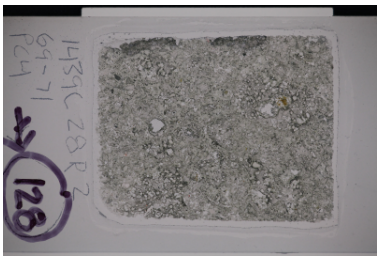
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	15	5				70
Altered [%]	100	100				100
Carbonate	50					30
Other	50					
Chlorite		50				
Clay minerals		50				30
Zeolite						40

THIN SECTION LABEL ID: **352-U1439C-28R-2-W 69/71-TSB-TS_128** Thin section no.: 128

Unit/Subunit: 8 Piece no.: #04 Observer: jws

Thin section summary: highly olivine phyric boninite glass, partially brecciated and altered

Plane-polarized:



Cross-polarized:

PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine phyric boninite glass

Texture 1:	vitrophyric	Texture 2:	vesicular
Avg. grain size:		Grain size distrib.:	

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	30	1.1	embayed	Single phenocrysts and glomerocrysts. Parlty euhedral, partly resorbed, even in one xtl.

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
30	5	elongate	1	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
dynamic recrystallizatio n		twinning		coarse grained calcite in vesicles; thin twins, weak undulose extinction

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	

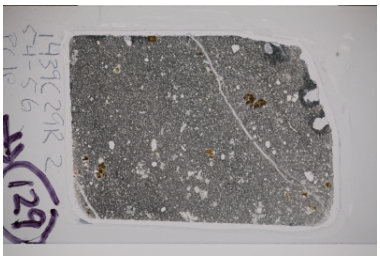
SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 50

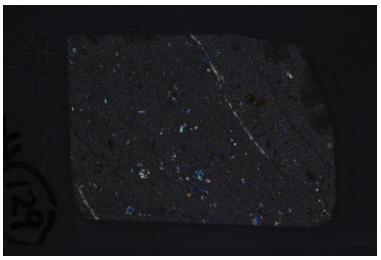
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	30					70
Altered [%]	20					60
Iddingsite	10					
Carbonate	5					20
Other	5					
Zeolite						40

THIN SECTION LABEL ID: **352-U1439C-29R-2-W 54/56-TSB-TS_129** Thin section no.: 129
Unit/Subunit: 8 Piece no.: #01 Observer: tc
Thin section summary: olivine and augite phyric vitrophyre

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine-augite phyric boninite lava

Texture 1:	glomerocrystic	Texture 2:	intersertal
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	3	1	blocky	Gloms of olivine or Ol-Augite common, Olivine totally altered to clay, calcite, possibly serpentine, Fe-oxides. Perfect pseudomorphs of most.
Clinopyroxene	7	0.4	blocky	Typically as glomercrysts of augite; may glom with olivine.

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	40	0.08	blocky	commonly altered to zeolite. Much is in quench tecture with augite.
Clinopyroxene	35	0.1	indeterminate	Many small drystals, but much in in quench tecture with plagioclase.

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.05	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
		twinning		zoned calcite veins; fibrous calcite along vein margins, fine grained along central vein suture, undulose extinction

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 25

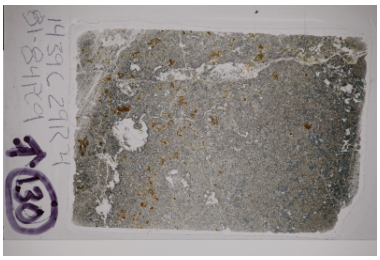
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	3	40		40		17
Altered [%]	10	30		5		70
Iddingsite	10					
Amph., pale		30				
Zeolite				5		

THIN SECTION LABEL ID: **352-U1439C-29R-4-W 81/84-TSB-TS_130** Thin section no.: 130

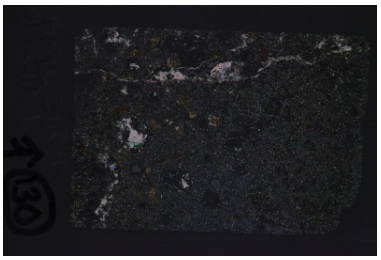
Unit/Subunit: 8 Piece no.: #09 Observer: tc

Thin section summary: olivine phenocryst altered witihn a cpx and opx groundmass that may contain pl

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine phyric boninite lava

Texture 1:	microporphyritic	Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	15	1.2	equant	all altered to zeolite

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	10	0.3	tabular	potentially
Clinopyroxene	20	0.4	prismatic	
Orthopyroxene	20	0.4	prismatic	
Mesostasis	35			all altered

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
10		rounded	0.6	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.01	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	

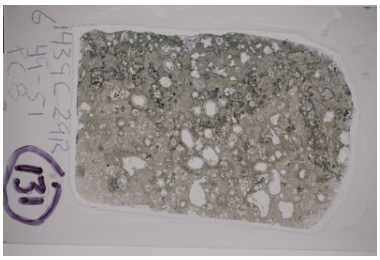
SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 45

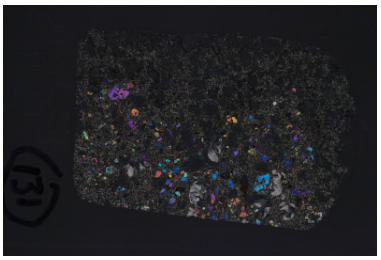
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	15	30	20			25
Altered [%]	100	5	10			100
Iddingsite	90					
Carbonate	10					20
Clay minerals		5	10			40
Zeolite						40

THIN SECTION LABEL ID: **352-U1439C-29R-6-W 49/51-TSB-TS_131** Thin section no.: 131
Unit/Subunit: 8 Piece no.: #08 Observer: tc
Thin section summary: large olivine and orthopyroxene phenocrysts within a vitrophyric matrix with augite

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine-orthopyroxene phyric boninite lava

Texture 1:	microporphyritic	Texture 2:	vitrophyric
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	15	1.5	equant	some completely altered
Orthopyroxene	5	1.2	prismatic	partly altered

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	30	0.5	acicular	
Mesostasis	50			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
15	100	rounded	1	filled with zeolite

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		weakly foliated/lineated	elongated vesicles with slight shape preferred orientation

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 10

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	15	30	5			50
Altered [%]	5	5	70			10
Iddingsite	3					
Carbonate	2					
Amph., green		5				
Clay minerals			70			5

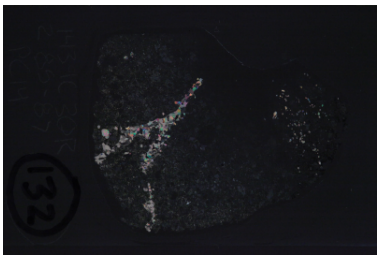
THIN SECTION LABEL ID: **352-U1439C-30R-2-W 85/87-TSB-TS_132** Thin section no.: 132

Unit/Subunit: 8 Piece no.: #14 Observer: wn

Thin section summary: moderately olivine phyric vesicular boninite. The crystals and groundmass are completely altered.

Plane-polarized:

Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine phyric boninite lava

Texture 1:	porphyritic	Texture 2:	glassy matrix
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	10	0.6	prismatic	completely altered

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	40	0.2	acicular	completely altered
Mesostasis	50			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
10	50	subangular	0.6	lined with zeolite

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
dynamic recrystallizatio n		twinning		coarse grained calcite ; thin twins, undulose extinction, subgrain boundaries

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	

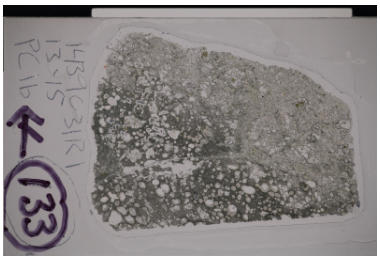
SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 65

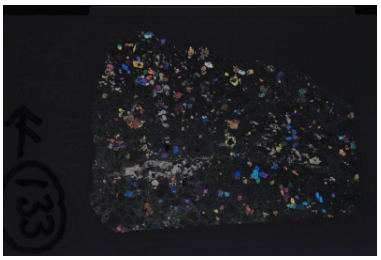
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	10	40				50
Altered [%]	100	100				30
Clay minerals	90	50				
Carbonate	10					
Chlorite		50				
Zeolite						20

THIN SECTION LABEL ID: **352-U1439C-31R-1-W 13/15-TSB-TS_133** Thin section no.: 133
Unit/Subunit: 8 Piece no.: #01 Observer: jp
Thin section summary: highly olivine phyric highly vesicular pillow rim

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine phyric boninite lava

Texture 1:	phaneroporphyritic	Texture 2:	vitrophyric
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	20	0.5	embayed	fresh olivine throughout section. Some embayed

Groundmass phases	% present	Average size (mm)	Habit	Comments
Mesostasis	80			biogneic bateria imaged in sparse fresh glass

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
40	100	elongate	0.5	pillow rim. Many vesicles, filled with zeolite and/or calcite. Some elongate, some spherical

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
dynamic recrystallization		twinning		coarse grained calcite in veins; thin twins, undulose extinction, subgrain boundaries

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 60

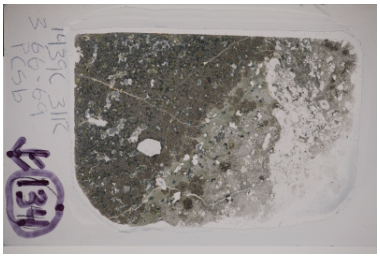
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	15		5			80
Altered [%]	15		100			70
Chlorite	10					
Carbonate	5					20
Other			100			
Zeolite						30

THIN SECTION LABEL ID: **352-U1439C-31R-3-W 66/69-TSB-TS_134** Thin section no.: 134

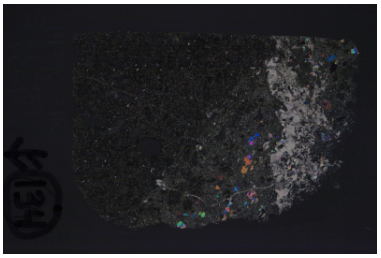
Unit/Subunit: 8 Piece no.: #05 Observer: deh

Thin section summary: moderately olivine phyric boninite lava with glassy and clinopyroxene groundmass. Glass and clinopyroxene is heavily altered towards the top of the thin section while being well preserved at the bottom.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine phyric boninite lava

Texture 1:	phaneroporphyritic	Texture 2:	vitrophyric
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	10	0.5	embayed	Some spinel inclusions.

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	30	0.2	acicular	
Orthopyroxene	2	0.2	tabular	clinopyroxene is growing around the rims of pyroxene crystals
Spinel	1			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
5	50	moderately spherical	0.3	lined with zeolite and filled with calcite

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.3	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
dynamic recrystallizatio n		twinning		coarse grained calcite in veins; zoned growth of calcite; relatively thick twins (type I and II), undulose extinction, bent twins, subgrain boundaries

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: Boninite Domain no.: 1 Domain rel. abundance [%]: 40

Total alteration in rock, bulk estimate (%): 40

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	10	30	2			58
Altered [%]	100	50	100			100
Clay minerals	90	50	100			30
Carbonate	10					
Zeolite						70

Alteration domain name: Glassy zone Domain no.: 2 Domain rel. abundance [%]: 60

Total alteration in rock, bulk estimate (%): 40

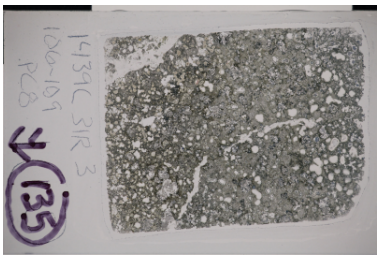
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	10	30	2			58
Altered [%]	50	2	50			10
Iddingsite	45					
Carbonate	5					2
Amph., green		2				
Clay minerals			50			
Zeolite						5

THIN SECTION LABEL ID: **352-U1439C-31R-3-W 106/109-TSB-TS_135** Thin section no.: 135

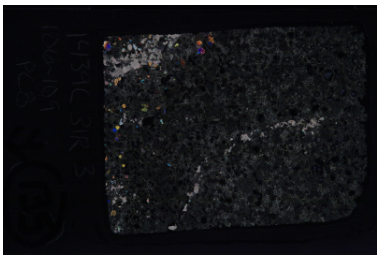
Unit/Subunit: 8 Piece no.: #08 Observer: wn

Thin section summary: highly olivine phyric, highly vesicular boninite. Most (but not all) of the olivine are alteration pseudomorphs

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine phyric boninite lava

Texture 1:	porphyritic	Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	12	2	prismatic	fresh olivine is present in one corner of the t.s.; otherwise only olivine pseudomorphs remain

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	70	0.2	acicular	partially altered but can still see some appropriate interference colors
Mesostasis	18			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
20	75	moderately spherical	0.8	lined with zeolite

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.05	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
dynamic recrystallizatio n		twinning		coarse grained calcite in veins and vesicles; zoned growth of calcite; relatively thick twins (type I and II), undulose extinction, bent twins, subgrain boundaries; calcite seems to replace veins in cavities

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 10

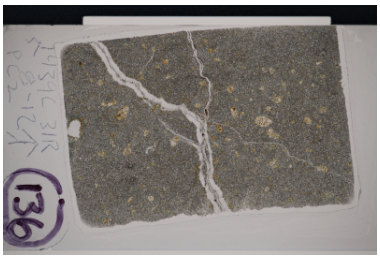
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	12	70				18
Altered [%]	30	2				15
Iddingsite	30					
Amph., green		2				
Clay minerals						15

THIN SECTION LABEL ID: **352-U1439C-31R-5-W 8/12-TSB-TS_136** Thin section no.: 136

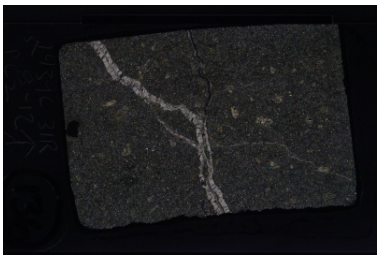
Unit/Subunit: 8 Piece no.: #02 Observer: deh

Thin section summary: moderately olivine phyric boninite lava with heavily altered groundmass containing blocky clinopyroxene crystals.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine phyric boninite lava

Texture 1:	phaneroporphyritic	Texture 2:	vitrophyric
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	10	0.7	embayed	Some spinel inclusions.

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	50	0.2	blocky	
Spinel	1			
Mesostasis	39			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
0.5	0	moderately spherical	2	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 65

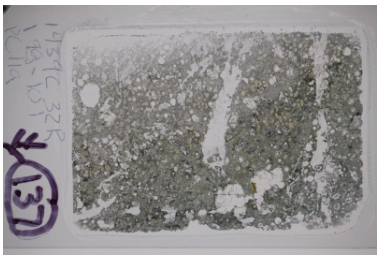
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	10	50				39
Altered [%]	100	30			1	100
Iddingsite	60					
Carbonate	40					
Clay minerals		30				50
Zeolite						50

THIN SECTION LABEL ID: **352-U1439C-32R-1-W 98/101-TSB-TS_137** Thin section no.: 137

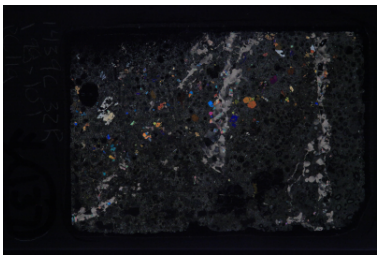
Unit/Subunit: 8 Piece no.: #11 Observer: jp

Thin section summary: moderately olivine-opx phyric boninite pillow rim with glass altered to variable degrees in groundmass

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine-orthopyroxene phyric boninite lava

Texture 1:	intersertal	Texture 2:	felty
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	5	0.4	equant	fresh with some embayments
Orthopyroxene	1	0.5	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	65	0.05	acicular	needles of cpx in a relatively fresh glass matrix
Spinel	1			
Fe Ti oxide	1	0.05	equant	red-brown in ppl
Mesostasis	27			some glass fragments that look to be altered to clays. Two large (2mm wide) calcite veins running through sample.

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
35	95	moderately spherical	0.5	filled with clay and/or calcite

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			calcite veins with subgrain boundaries and twins

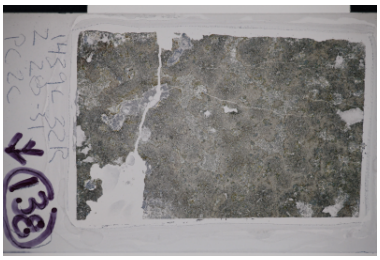
SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 20

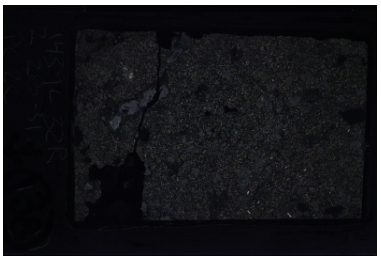
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	5	65	1			28
Altered [%]	20	2	100		1	30
Iddingsite	10					
Carbonate	10					
Amph., green		2				
Clay minerals			100			
Zeolite						10

THIN SECTION LABEL ID: **352-U1439C-32R-2-W 28/31-TSB-TS_138** Thin section no.: 138
Unit/Subunit: 8 Piece no.: #02 Observer: tc
Thin section summary: pseudomorphs of olivine and orthopyroxene otherwise completely altered

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely olivine-orthopyroxene phyric boninite lava

Texture 1:	vitrophyric	Texture 2:	pseudomorphic
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	2	1	equant	all altered
Orthopyroxene	2	1	prismatic	all altered

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	30	0.2	prismatic	some skeletal
Orthopyroxene	10	0.2	prismatic	
Mesostasis	56			all altered

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
3	30	rounded	1	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			calcite veins with subgrain boundaries and twins

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 55

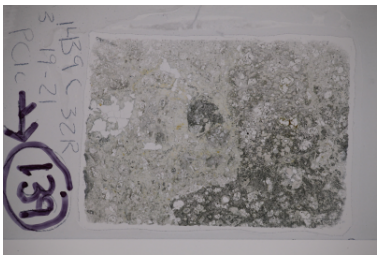
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	2	30	12			56
Altered [%]	100	30	5			80
Clay minerals	100	30	5			40
Zeolite						40

THIN SECTION LABEL ID: **352-U1439C-32R-3-W 19/21-TSB-TS_139** Thin section no.: 139

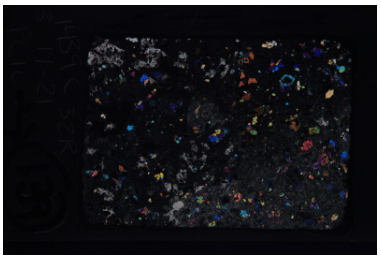
Unit/Subunit: 8 Piece no.: #01 Observer: tc

Thin section summary: euhedral fresh olivine and opx phenocrysts in glassy matrix, with abundant acicular augite.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine-orthopyroxene phyric boninite glass

Texture 1:	vitrophyric	Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	10	1.2	embayed	some skeletal to embayed
Orthopyroxene	5	1	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	10	0.2	acicular	
Mesostasis	75			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
25		rounded	1	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			cluster of isotropic minerals

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 30

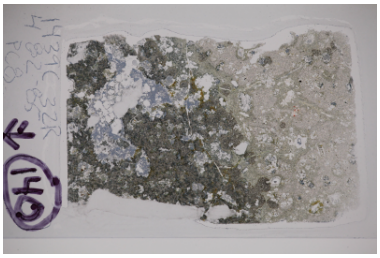
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	10	10	5			75
Altered [%]	30	20	5			35
Chlorite	30					
Amph., green		20				
Amph., pale			5			
Clay minerals						10
Carbonate						5
Zeolite						20

THIN SECTION LABEL ID: **352-U1439C-32R-4-W 82/85-TSB-TS_140** Thin section no.: 140

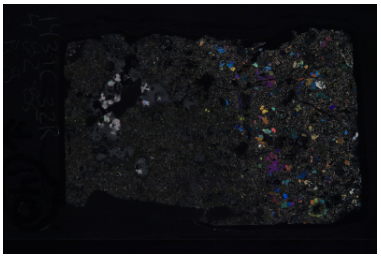
Unit/Subunit: 8 Piece no.: #08 Observer: jws

Thin section summary: euhedral fresh olivine phenocrysts in glassy matrix, with abundant acicular opx prisms overgrown by augite, and acicular augites (smaller). Olivines may be embayed; many are kink-banded (xenocrysts?).

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **mafic lava** Domain no.: 1 Domain rel. abundance [%]:

LITHOLOGY: **highly olivine phyric boninite lava**

Texture 1:	phaneroporphyritic	Texture 2:	vitrophyric
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	30	1	embayed	Single olivines up to 2.5 mm across; many glomerocrysts, some glom like clusters have same extinction angle. Many olivines embayed. Some have kink-bands, may be xenocrysts.

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	25	0.2	acicular	Many have opx cores
Orthopyroxene	5	0.3	blocky	Slightly larger than cpx; typically mantled with cpx.
Mesostasis	40			GM is glass+augite+opx

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
10	25	rounded	1.1	Filled with clays, zeolites, and or calcite

Sample domain name: **altered mafic lava** Domain no.: 2 Domain rel. abundance [%]:

LITHOLOGY: **highly olivine phyric boninite lava**

Texture 1:	phaneroporphyritic	Texture 2:	pseudomorphic
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	35	1	blocky	Olivine all totally altered, replaced by clays, calcite, Fe-oxides.

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	30	0.2	acicular	
Orthopyroxene	5	0.3	blocky	slightly larger than cpx, typically overgrown by cpx.
Mesostasis	30			GM is augite+opx; rest altered.

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
10	100	subrounded	1	Filled with clays, zeolites, and or calcite

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
banded vein	0.05	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			subgrain boundaries in calcite

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: mafic lava Domain no.: 1 Domain rel. abundance [%]: 50

Total alteration in rock, bulk estimate (%): 47

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	30	25	5			40
Altered [%]	20	5	30			5
Clay minerals	15		30			3
Carbonate	5					
Amph., green		5				
Zeolite						2

Alteration domain name: altered mafic lava Domain no.: 2 Domain rel. abundance [%]: 50

Total alteration in rock, bulk estimate (%): 47

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	35	30	5			30
Altered [%]	100	20	100			100
Clay minerals	70	20	100			30
Carbonate	30					15
Zeolite						55

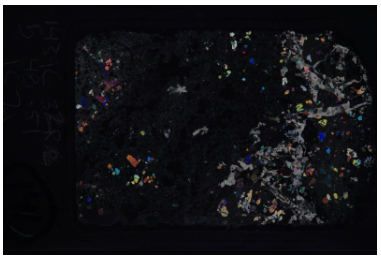
THIN SECTION LABEL ID: **352-U1439C-32R-5-W 48/51-TSB-TS_141** Thin section no.: 141

Unit/Subunit: 8 Piece no.: #07 Observer: jp

Thin section summary: fragmented hyaloclastite boninite (pillow rim) Zeolite and calcite secondary minerals are abundant

Plane-polarized:

Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine phyric boninite hyaloclastite

Texture 1:	vitrophyric	Texture 2:	
Avg. grain size:	cryptocrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	5	0.4	equant	fresh olivine. Concentrated in different parts of thin section
Orthopyroxene	1	0.5	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	25	0.05	acicular	concetrated in one part of thin section
Fe Ti oxide	1	0.03	equant	
Mesostasis	68			some fresh glass fragments with the biotubes.

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
15	100	irregular	0.8	filled with calcite and/or zeolite. Unequal distribution throughout section

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			oblique growth of calcite grins in veins

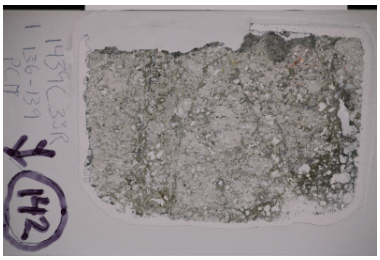
SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 45

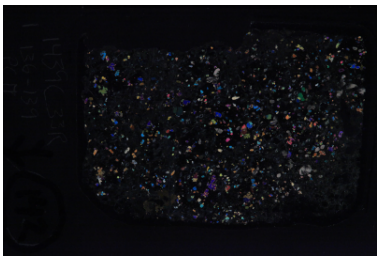
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	5	25	1			68
Altered [%]	50	10	50		1	70
Chlorite	40		50			
Carbonate	10					10
Amph., green		10				
Clay minerals						20
Zeolite						40

THIN SECTION LABEL ID: **352-U1439C-33R-1-W 136/139-TSB-TS_142** Thin section no.: 142
Unit/Subunit: 8 Piece no.: #17 Observer: jws
Thin section summary: Scoria: vesicle-rich glass vitrophyre with abundant subhedral olivine phenocrysts.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine phyric boninite glass

Texture 1:	vitrophyric	Texture 2:	glomeroporphyritic
Avg. grain size:		Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	30	0.8	embayed	Commonly embayed, no kink bands

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
30	70	subrounded	1.1	Filled with brown-green clay

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
banded vein	0.05	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			some zeolite cavities are cut by fractures

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 8

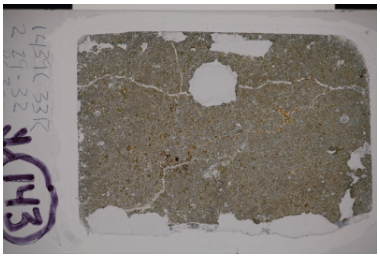
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	30					70
Altered [%]	5					15
Chlorite	5					
Clay minerals						5
Carbonate						5
Zeolite						10

THIN SECTION LABEL ID: **352-U1439C-33R-2-W 29/32-TSB-TS_143** Thin section no.: 143

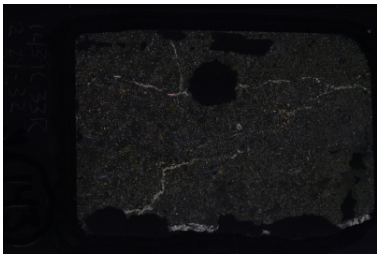
Unit/Subunit: 8 Piece no.: #03 Observer: deh

Thin section summary: Moderately olivine phyric boninite lava with heavily altered olivine phenocrysts, groundmass clinopyroxene and mesostasis. Microphenocrysts of clinopyroxene and orthopyroxene are moderately altered.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine phyric boninite lava

Texture 1:		Texture 2:	
Avg. grain size:	cryptocrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	6	0.7	embayed	Heavily altered
Clinopyroxene	2	0.3	prismatic	
Orthopyroxene	1	0.2	blocky	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	20	0.05	acicular	
Mesostasis	71			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
2		irregular	4	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.05	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			oblique growth of calcite grins in veins

SECONDARY (ALTERATION) MINERALOGY

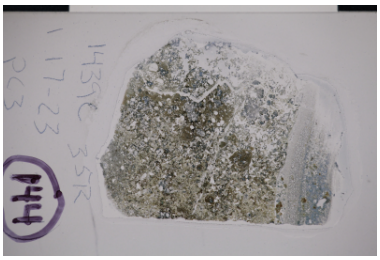
Total alteration in rock, bulk estimate (%): 80

Groundmass original [%]: 70 Groundmass altered [%]: 100 Groundmass alt. intensity:

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	7	22	1			
Altered [%]	100	10	100			
Iddingsite	90					
Carbonate	10					
Clay minerals		10	90			

THIN SECTION LABEL ID: **352-U1439C-35R-1-W 17/23-TSB-TS_144** Thin section no.: 144
Unit/Subunit: 8 Piece no.: #03, #04 Observer: ks
Thin section summary: highly olivine phyric boninite, glassy groundmass; glass and olivine completely altered

Plane-polarized:



Cross-polarized:

PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine phyric boninite hyaloclastite

Texture 1:	vitrophyric	Texture 2:	glomeroporphyritic
Avg. grain size:		Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	7	0.8	prismatic	heavily altered (99%), Cr-spinel inclusions

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	5	0.05	skeletal	occur in a small angular clast
Mesostasis	88			completely

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
15	70	subrounded	1	filld with calcite

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			fine grained calcite vein

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 70

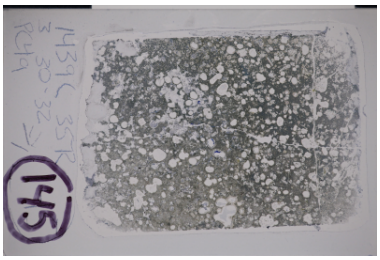
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	7	5				88
Altered [%]	100	100				70
Chlorite	40	100				
Iddingsite	50					
Carbonate	10					15
Clay minerals						15
Zeolite						40

THIN SECTION LABEL ID: **352-U1439C-35R-3-W 30/32-TSB-TS_145** Thin section no.: 145

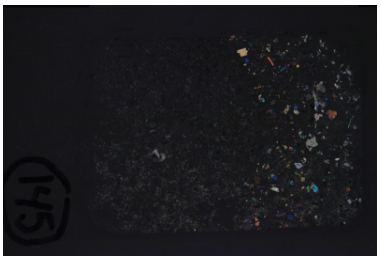
Unit/Subunit: 8 Piece no.: #04 Observer: tc

Thin section summary: olivine and orthopyroxene euhedral phenocrysts within vitrophyric altered groundmass

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine-orthopyroxene phyric boninite lava

Texture 1:	vitrophyric	Texture 2:	microporphyritic
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	8	1.2	embayed	
Orthopyroxene	2	0.8	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	25	0.3	acicular	
Mesostasis	65			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
20	20	subrounded	1	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
banded vein	0.05	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			type I twin in calcite filling vesicles + subgrain boundaries

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 65

Groundmass original [%]: 40 Groundmass altered [%]: 100 Groundmass alt. intensity:

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	8	25	2			30
Altered [%]	10	20	10			70
Chlorite	10	20	10			
Carbonate						10
Zeolite						30

THIN SECTION LABEL ID: **352-U1439C-35R-4-W 112/115-TSB-TS_146** Thin section no.: 146

Unit/Subunit: 8 Piece no.: #12 Observer: tc

Thin section summary: highly olivine and clinoyroxene phyric, both fresh and euhedral in dendritic vitrophyric, cpx-rich matrix

Plane-polarized:

Cross-polarized:

PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine-augite phyric boninite lava

Texture 1:	vitrophyric	Texture 2:	microporphyritic
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	10	0.8	embayed	
Clinopyroxene	5	0.5	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	35	0.3	skeletal	dendritic in places
Mesostasis	50			some fresh glass

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
1		irregular	1	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.05	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			magma mingling, type I twins in calcite

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 15

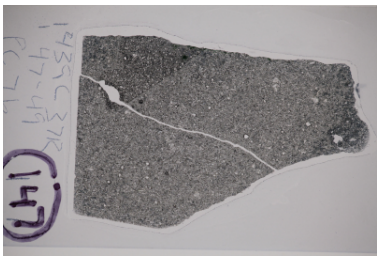
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	10	40				50
Altered [%]	5	5				30
Chlorite	5					
Amph., green		5				
Clay minerals						5
Carbonate						10
Zeolite						15

THIN SECTION LABEL ID: **352-U1439C-37R-1-W 47/49-TSB-TS_147** Thin section no.: 147

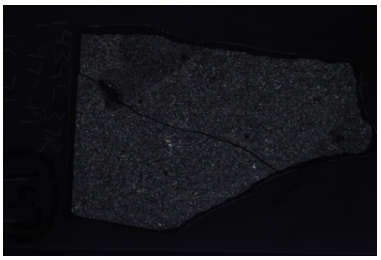
Unit/Subunit: 9a Piece no.: #07 Observer: tc

Thin section summary: rare augite phenocrysts in a weakly trachytic plagioclase-rich matrix

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely augite phyric boninite lava

Texture 1:	intersertal	Texture 2:	trachytic
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	1	0.3	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	50	0.2	tabular	flow banding
Clinopyroxene	20	0.1	blocky	
Mesostasis	29			

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	moderate			magma mingling, sith SPO along contact

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 15

Groundmass original [%]: 30 Groundmass altered [%]: 20 Groundmass alt. intensity:

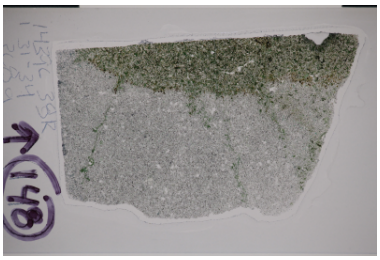
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		20		50		
Altered [%]		15		15		
Amph., green		10				
Chlorite		5		10		
Zeolite				5		

THIN SECTION LABEL ID: **352-U1439C-38R-1-W 31/34-TSB-TS_148** Thin section no.: 148

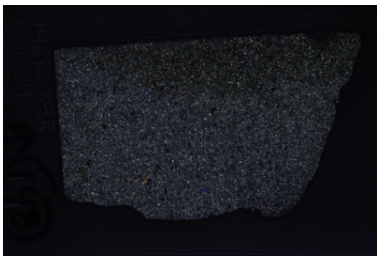
Unit/Subunit: 9a Piece no.: #08 Observer: tc

Thin section summary: fine-grained boninite with euhedral augite phenocryst

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely augite phyric boninite lava

Texture 1:	intergranular	Texture 2:	granular
Avg. grain size:	fine grained	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	3	0.5	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	45	0.4	tabular	
Clinopyroxene	25	0.4	blocky	
Fe Ti oxide	2	0.2	equant	
Mesostasis	25			

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: Fresh volcanics Domain no.: 1 Domain rel. abundance [%]: 75

Total alteration in rock, bulk estimate (%): 25

Groundmass original [%]: 25 Groundmass altered [%]: 50 Groundmass alt. intensity:

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		28		45	2	
Altered [%]		10		5	30	
Amph., green		10				
Chlorite				5		

Alteration domain name: Altered zone Domain no.: 2 Domain rel. abundance [%]: 25

Total alteration in rock, bulk estimate (%): 25

Groundmass original [%]: 25 Groundmass altered [%]: 100 Groundmass alt. intensity:

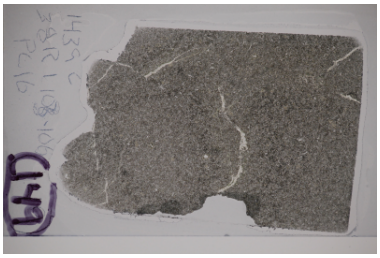
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		28		45	2	
Altered [%]		30		10	30	
Amph., green		18				
Chlorite		12		5		
Zeolite				5		

THIN SECTION LABEL ID: **352-U1439C-38R-1-W 103/106-TSB-TS_149** Thin section no.: 149

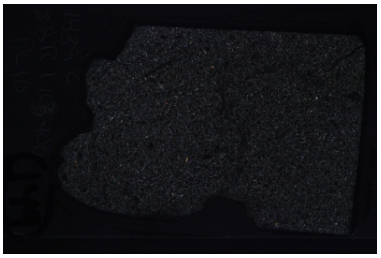
Unit/Subunit: 9a Piece no.: #16 Observer: deh

Thin section summary: Moderately olivine-plagioclase-augite phyric boninite. Abudant olivine phenocrysts that have been heavily altered. Some olivines contain spinel inclusions. Mesostasis is completely altered but plagioclase and augite crystals are in good shape.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine-plagioclase-augite phyric boninite lava

Texture 1:		Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	5	0.5	embayed	Heavily altered
Plagioclase	1	0.5	bladed	
Clinopyroxene	1	0.3	tabular	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	40	0.15	bladed	
Clinopyroxene	10	0.1	blocky	
Spinel	0.5			
Mesostasis	42.5			

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
banded vein	0.02	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 30

Groundmass original [%]: 44.5 Groundmass altered [%]: 50 Groundmass alt. intensity:

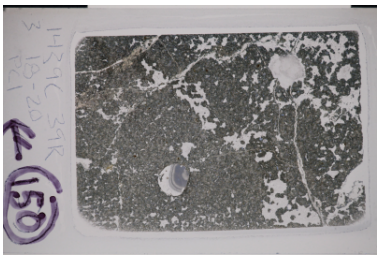
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	5	10		40	0.5	
Altered [%]	100	5		5	0	
Iddingsite	100					
Amph., green		5				
Zeolite				5		

THIN SECTION LABEL ID: **352-U1439C-39R-3-W 18/20-TSB-TS_150** Thin section no.: 150

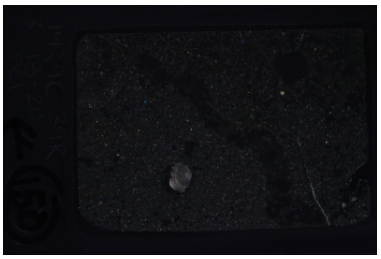
Unit/Subunit: 9b Piece no.: #01 Observer: deh

Thin section summary: Sparsely augite-phyric boninite. Groundmass crystals and mesostasis have been heavily altered.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely augite phyric boninite lava

Texture 1:		Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	4	0.2	blocky	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	50	0.1	bladed	
Clinopyroxene	30	0.1	blocky	
Mesostasis	16			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
3	50	rounded	2	filled with zeolite and calcite

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
banded vein	0.02	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			vertical zeolite-calcite contact in vesicle

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 35

Groundmass original [%]: 16 Groundmass altered [%]: 100 Groundmass alt. intensity:

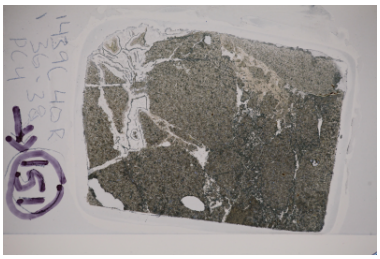
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		34		50		
Altered [%]		15		30		
Chlorite		5		5		
Clay minerals		10		15		
Zeolite				10		

THIN SECTION LABEL ID: **352-U1439C-40R-1-W 36/38-TSB-TS_151** Thin section no.: 151

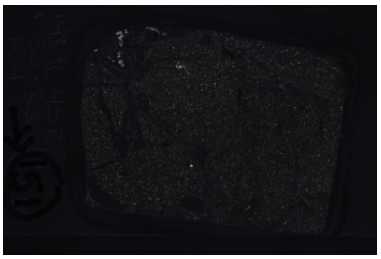
Unit/Subunit: 9b Piece no.: #04 Observer: deh

Thin section summary: Moderately augite-phyric boninite. Groundmass mesostasis and crystals have been heavily altered. Clinopyroxene phenocrysts are slightly altered.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately augite phyric boninite lava

Texture 1:		Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	6	0.3	blocky	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	50	0.1	bladed	
Clinopyroxene	30	0.1	blocky	
Mesostasis	14			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
4	70	angular	1	filled with zeolizte an calcite

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
banded vein	0.2	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			subvertical zeolite and calcite veins

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 35

Groundmass original [%]: 14 Groundmass altered [%]: 100 Groundmass alt. intensity:

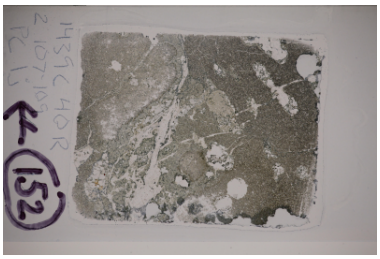
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		36		50		
Altered [%]		20		30		
Amph., green		5				
Chlorite		15		30		

THIN SECTION LABEL ID: **352-U1439C-40R-2-W 107/109-TSB-TS_152** Thin section no.: 152

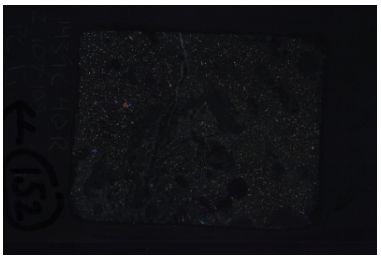
Unit/Subunit: 9b Piece no.: #01 Observer: wn

Thin section summary: Sparsely clinopyroxene-bearing boninite with plagioclase and skeletal cpx in the groundmass. Considerably altered

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely augite bearing boninite lava

Texture 1:	glassy matrix	Texture 2:	glomerocrystic
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	2	0.7	bladed	usually found in clusters

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	40	0.5	bladed	completely altered
Clinopyroxene	15	0.2	skeletal	
Mesostasis	53			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
5	95	subangular	1.5	varies from spherical to elongate

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
banded vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			vertical zeolite vein

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 60

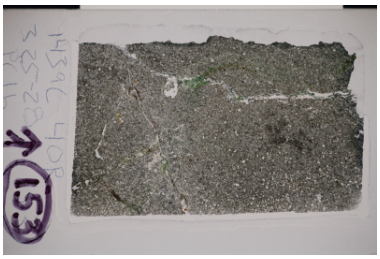
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		17		40		43
Altered [%]		5		30		100
Chlorite		5		30		
Clay minerals						30
Zeolite						40

THIN SECTION LABEL ID: **352-U1439C-40R-3-W 25/28-TSB-TS_153** Thin section no.: 153

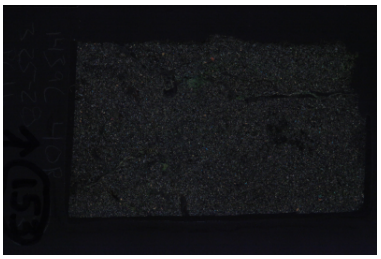
Unit/Subunit: 9b Piece no.: #01 Observer: wn

Thin section summary: Sparsely clinopyroxene-bearing boninite with abundant plagioclase and clinopyroxene groundmass phases.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely augite bearing boninite lava

Texture 1:	microporphyritic	Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	1	0.6	blocky	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	50	0.3	bladed	
Clinopyroxene	10	0.2	blocky	
Mesostasis	39			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
20	85	angular	0.4	irregular and elongate

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
banded vein	0.1	sharp boundary or contact		

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	weak			slight SPO, shear fracture filled with zeolite, then chlorite

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 15

Groundmass original [%]: 40 Groundmass altered [%]: 30 Groundmass alt. intensity:

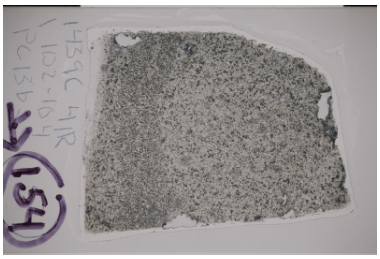
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		10		50		
Altered [%]		10		5		
Amph., green		5				
Chlorite		5		5		

THIN SECTION LABEL ID: **352-U1439C-41R-1-W 102/104-TSB-TS_154** Thin section no.: 154

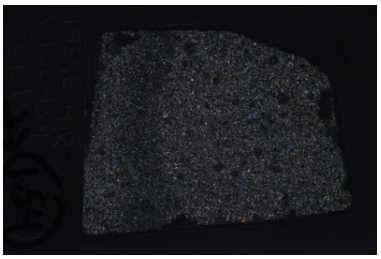
Unit/Subunit: 10 Piece no.: #13 Observer: wn

Thin section summary: Clinopyroxene-phyric boninite with a few pseudomorphed olivine grains and a plagioclase-rich groundmass

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine-augite phyric boninite lava

Texture 1:	porphyritic	Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	1	1	blocky	completley altered
Clinopyroxene	5	0.6	tabular	subtle rimming is visible on some of the phenocrysts

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	50	0.4	bladed	no visible prefered orientatoin
Spinel	3			
Mesostasis	41			

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 50

Groundmass original [%]: 41 Groundmass altered [%]: 90 Groundmass alt. intensity:

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	1	5		50	3	
Altered [%]	100	3		30	0	
Iddingsite	100					
Amph., green		3				
Quartz				10		
Plagioclase, secondary				20		

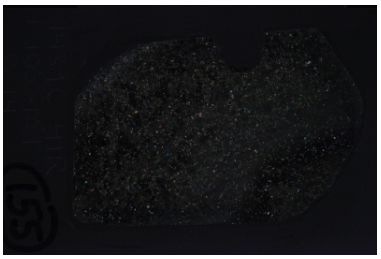
THIN SECTION LABEL ID: **352-U1439C-41R-1-W 106/109-TSB-TS_155** Thin section no.: 155

Unit/Subunit: 10 Piece no.: #14 Observer: wn

Thin section summary: microcrystalline to fine-grained augite microporphyritc boninite. Roughly 1% of olivine may be present but completely replaced

Plane-polarized:

Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine-augite phyric boninite lava

Texture 1:	skeletal or dendritic	Texture 2:	microporphyritic
Avg. grain size:	microcrystalline	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	1	0.5	blocky	completely altered
Clinopyroxene	5.5	0.5	skeletal	
Spinel	0.5	0.2	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Mesostasis	80			completely altered
Spinel		0.2	prismatic	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 95

Groundmass original [%]: 80 Groundmass altered [%]: 100 Groundmass alt. intensity:

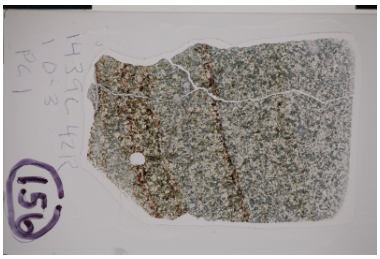
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	1	5.5			0.5	13
Altered [%]	100	30			0	100
Iddingsite	20					
Carbonate	80					
Amph., green		5				
Chlorite		25				
Clay minerals						80

THIN SECTION LABEL ID: **352-U1439C-42R-1-W 0/3-TSB-TS_156** Thin section no.: 156

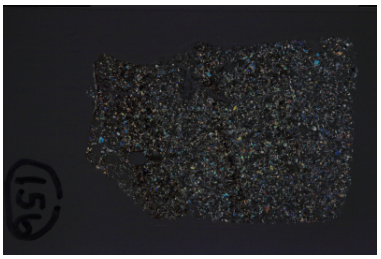
Unit/Subunit: 10 Piece no.: #01 Observer: jp

Thin section summary: Aphyric boninitic lava with plagioclase and cpx in the groundmass. Some oxidative weathering lineation

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: aphyric boninite lava

Texture 1:	intergranular	Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	equigranular

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	60	0.3	tabular	no preferred orientation.
Clinopyroxene	28	0.3	blocky	
Fe Ti oxide	2	0.05	equant	
Mesostasis	10			lineated oxidative alteration - onion skin weathering.

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
				one 2mm round vesicle

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
				calcite vein with oblique growth, slight cataclasis

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 15

Groundmass original [%]: 10 Groundmass altered [%]: 100 Groundmass alt. intensity:

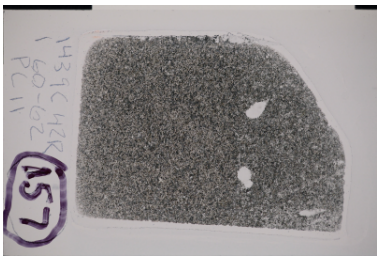
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		28		60	2	
Altered [%]		5		5	0	
Amph., green		5				
Chlorite				5		

THIN SECTION LABEL ID: **352-U1439C-42R-1-W 60/62-TSB-TS_157** Thin section no.: 157

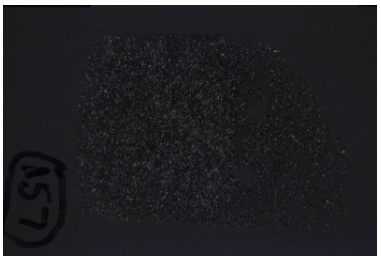
Unit/Subunit: 10 Piece no.: #11 Observer: tc

Thin section summary: weakly trachytic boninite with rare augite microphenocrysts. Highly altered to chlorite.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely augite bearing boninite lava

Texture 1:	granular	Texture 2:	intergranular
Avg. grain size:	fine grained	Grain size distrib.:	equigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	1	0.5	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	50	0.3	tabular	trachytic
Clinopyroxene	20	0.3	blocky	
Fe Ti oxide	3	0.2	equant	
Mesostasis	27			all altered to chlorite

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	weak			small domains of local SPO

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 25

Groundmass original [%]: 27 Groundmass altered [%]: 70 Groundmass alt. intensity:

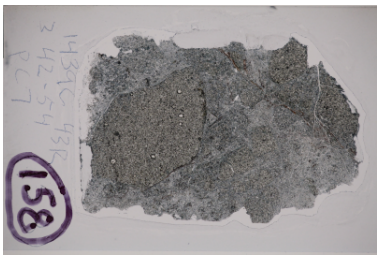
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		20		50	3	
Altered [%]		30		5	0	
Amph., green		5				
Chlorite		25		5		

THIN SECTION LABEL ID: **352-U1439C-43R-3-W 42/54-TSB-TS_158** Thin section no.: 158

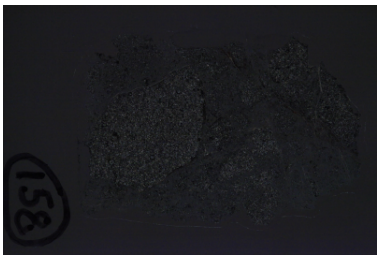
Unit/Subunit: 10 Piece no.: #07 Observer: tc

Thin section summary: breccia with clasts of aphyric intergranular boninite surrounded by finer-grained matrix formed during cataclasis

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: aphyric boninite breccia

Texture 1:	granular	Texture 2:	intergranular
Avg. grain size:	fine grained	Grain size distrib.:	equigranular

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	50	0.4	tabular	
Clinopyroxene	15	0.4	blocky	
Fe Ti oxide	2	0.2	equant	
Mesostasis	33			brecciated clasts have groundmass and cpx altered. Clasts are surrounded by finer-grained matrix formed by cataclasis.

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			cataclastically deformed basalt; large clasts fractured bound, with a thin, sporadic crush zone in places; fractures dominated by zeolite and clay; significant comminution in places

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: volcanic clast, mafic Domain no.: 1 Domain rel. abundance [%]: 45

Total alteration in rock, bulk estimate (%): 75

Groundmass original [%]: 33 Groundmass altered [%]: 100 Groundmass alt. intensity:

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		15		50	2	
Altered [%]		70		10	0	
Chlorite		30		10		
Clay minerals		40				

Alteration domain name: matrix Domain no.: 2 Domain rel. abundance [%]: 55

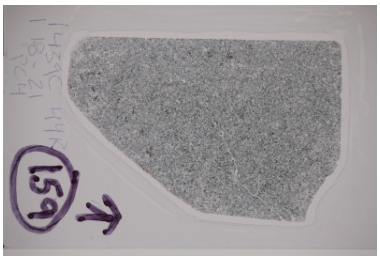
Total alteration in rock, bulk estimate (%):	75				
Groundmass original [%]:	100	Groundmass altered [%]:	100	Groundmass alt. intensity:	

THIN SECTION LABEL ID: **352-U1439C-44R-1-W 18/21-TSB-TS_159** Thin section no.: 159

Unit/Subunit: 10 Piece no.: #04 Observer: jp

Thin section summary: Heavily altered aphyric boninite with only moderate surviving groundmass plagioclase.

Plane-polarized:



Cross-polarized:

PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: aphyric boninite lava

Texture 1:	intergranular	Texture 2:	
Avg. grain size:	microcrystalline	Grain size distrib.:	equigranular

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	57	0.2	tabular	very altered
Clinopyroxene	30	0.2		almost none surviving
Fe Ti oxide	3	0.02	equant	
Mesostasis				very altered sample.

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 55

Groundmass original [%]: 10 Groundmass altered [%]: 100 Groundmass alt. intensity:

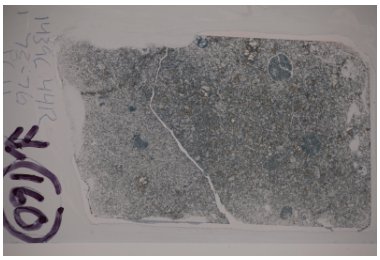
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		30		57	3	
Altered [%]		100		30		
Chlorite		10				
Clay minerals		90				
Zeolite				10		
Plagioclase, secondary				20		

THIN SECTION LABEL ID: **352-U1439C-44R-1-W 73/76-TSB-TS_160** Thin section no.: 160

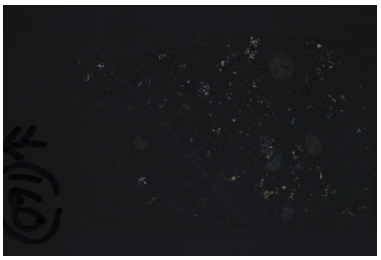
Unit/Subunit: 10 Piece no.: #11 Observer: ks

Thin section summary: olivine-augite phyric boninite; heavily altered

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine-augite phyric boninite lava

Texture 1:	intergranular	Texture 2:	glomerocrystic
Avg. grain size:	microcrystalline	Grain size distrib.:	equigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	2	0.5	prismatic	completely altered; replaced by quartz?
Clinopyroxene	5	0.5	blocky	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	30	0.1	acicular	altered
Clinopyroxene	20	0.2		heavily altered
Mesostasis	50			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
5	100	rounded	2	filled with zeolite (&chlorite?)

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
				quartz with irregular, angular and curved grain boundaries; undulose extinction; mainly isometric grain shapes; prismatic subgrains; subsequent fracturing

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic			

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 85

Groundmass original [%]: 43 Groundmass altered [%]: 100 Groundmass alt. intensity:

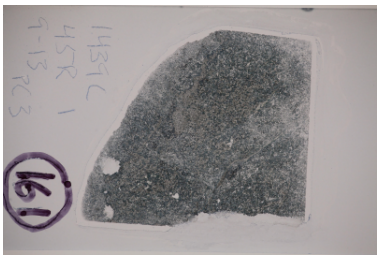
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	2	25		30		
Altered [%]		55		100		
Amph., green		5				
Chlorite		30		10		
Clay minerals		20				
Quartz				30		
Zeolite				60		

THIN SECTION LABEL ID: **352-U1439C-45R-1-W 9/13-TSB-TS_161** Thin section no.: 161

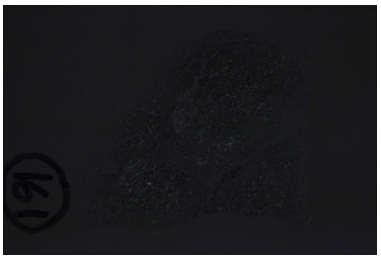
Unit/Subunit: 10 Piece no.: #03 Observer: wn

Thin section summary: Fine-grained, sparsely cpx-bearing boninite with plagioclase dominated groundmass. Highly altered.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely augite bearing boninite lava

Texture 1:	intergranular	Texture 2:	
Avg. grain size:	fine grained	Grain size distrib.:	equigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	1	0.4	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	50	0.4	bladed	highly altered
Mesostasis	49			completley altered

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	weak			small domain of plagioclase laths preferred orientation, hybrid tension/shear zeolite fracture <0.2 mm width

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 80

Groundmass original [%]: 49 Groundmass altered [%]: 100 Groundmass alt. intensity:

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		1		50		
Altered [%]		5		65		
Amph., green		5				
Chlorite				15		
Quartz				10		
Zeolite				30		
Plagioclase, secondary				10		