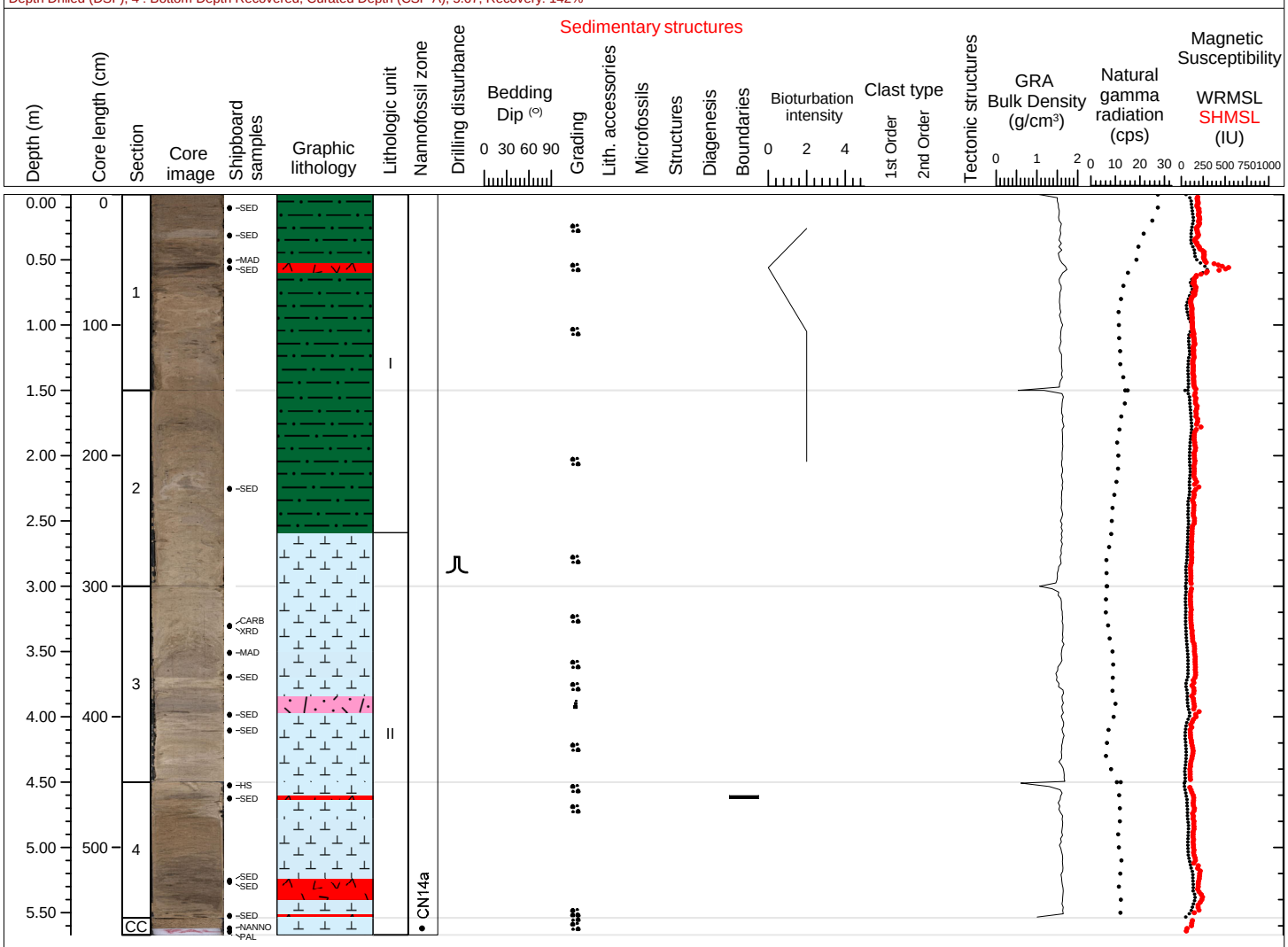
Hole 352 - U1442A Core 1R, Interval 0-4 m (CSF-A)

The upper part of the core is very strongly disturbed by drilling and is mostly soupy flow-in material. The sediment is mostly silty to sandy nannofossil mud and nannofossil ooze. Beginning in the mid part of Section 1, dark gray blotches are interpreted as the remains of admixed thin ash layers. Section 2 is also strongly disturbed by drilling. Beginning in the lower part of Section 3 there is a change to less disturbed sediment. This begins with off-white nannofossil ooze with fine silt, and this extends into the uppermost part of Section 4. Below this, there is an appearance of pale brown silty nannofossil ooze, which becomes slightly darker and more muddy downwards to the base of the core. Several grayish blotches, especially near the base of Section 4, are interpreted as additional ash layers that were dispersed by bioturbation or drilling.

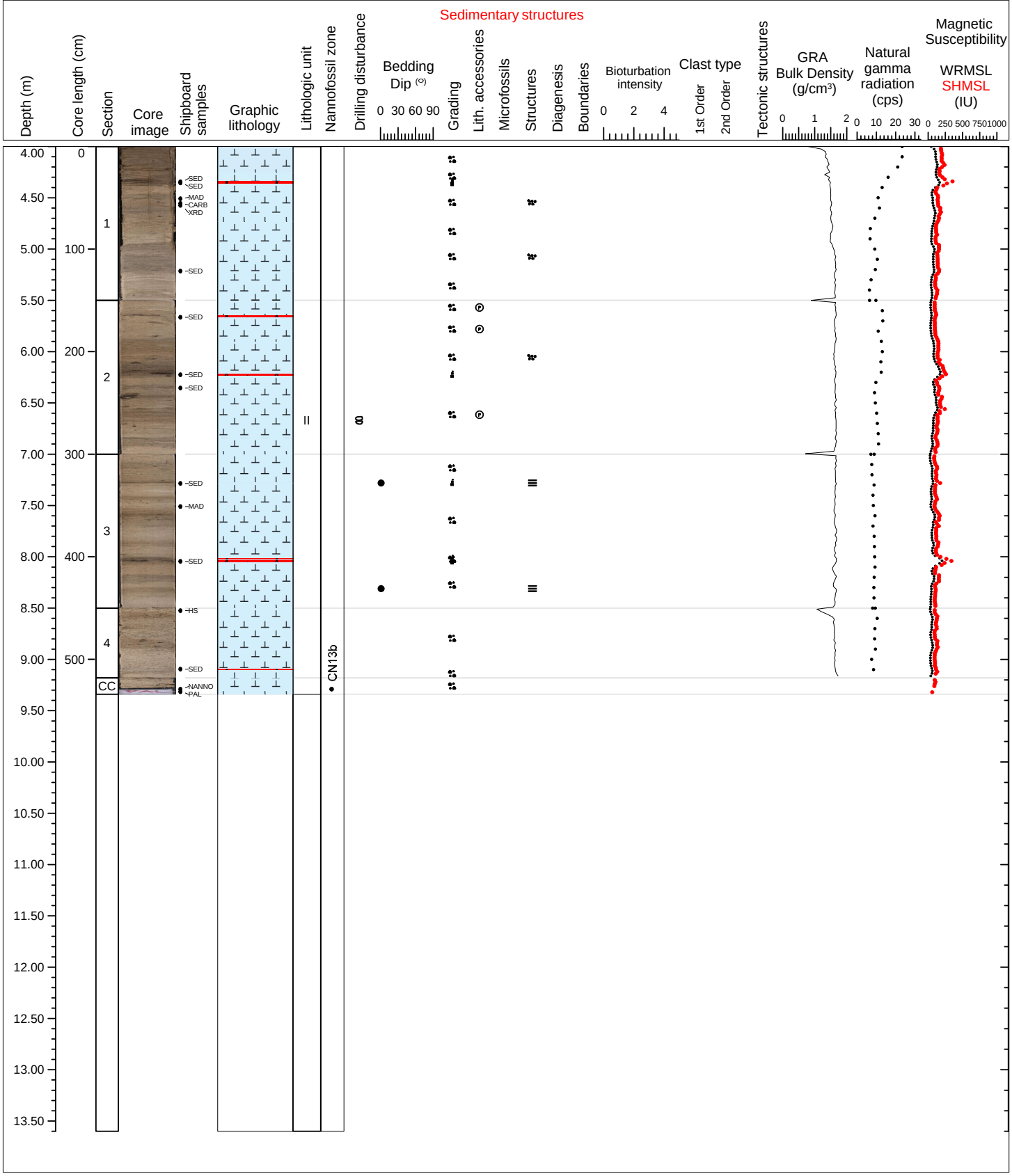
Depth Drilled (DSF), 4 : Bottom Depth Recovered, Curated Depth (CSF-A), 5.67, Recovery: 142%



Hole 352 - U1442A Core 2R, Interval 4-13.6 m (CSF-A)

The core begins with very disturbed soupy, brownish colored calcareous mud. The remainder of the core is color banded on a tens of centimeter scale. The paler (off-white) bands are nannofossil ooze with minor silt, whereas the slightly darker bands (pale brown) are also nannofossil rich but are rich in dispersed silt to fine sand of volcaniclastic origin. Six thin graded ash layers are present in Sections 1-3. These are up to 3 cm thick and show normal grading. The paler ash layers (pale brown) are dominantly felsic in composition, whereas the darker layers are more mafic. The cores have been affected by moderate to strong bioturbation which has mixed and dispersed some primary ash layers, as Section 2.

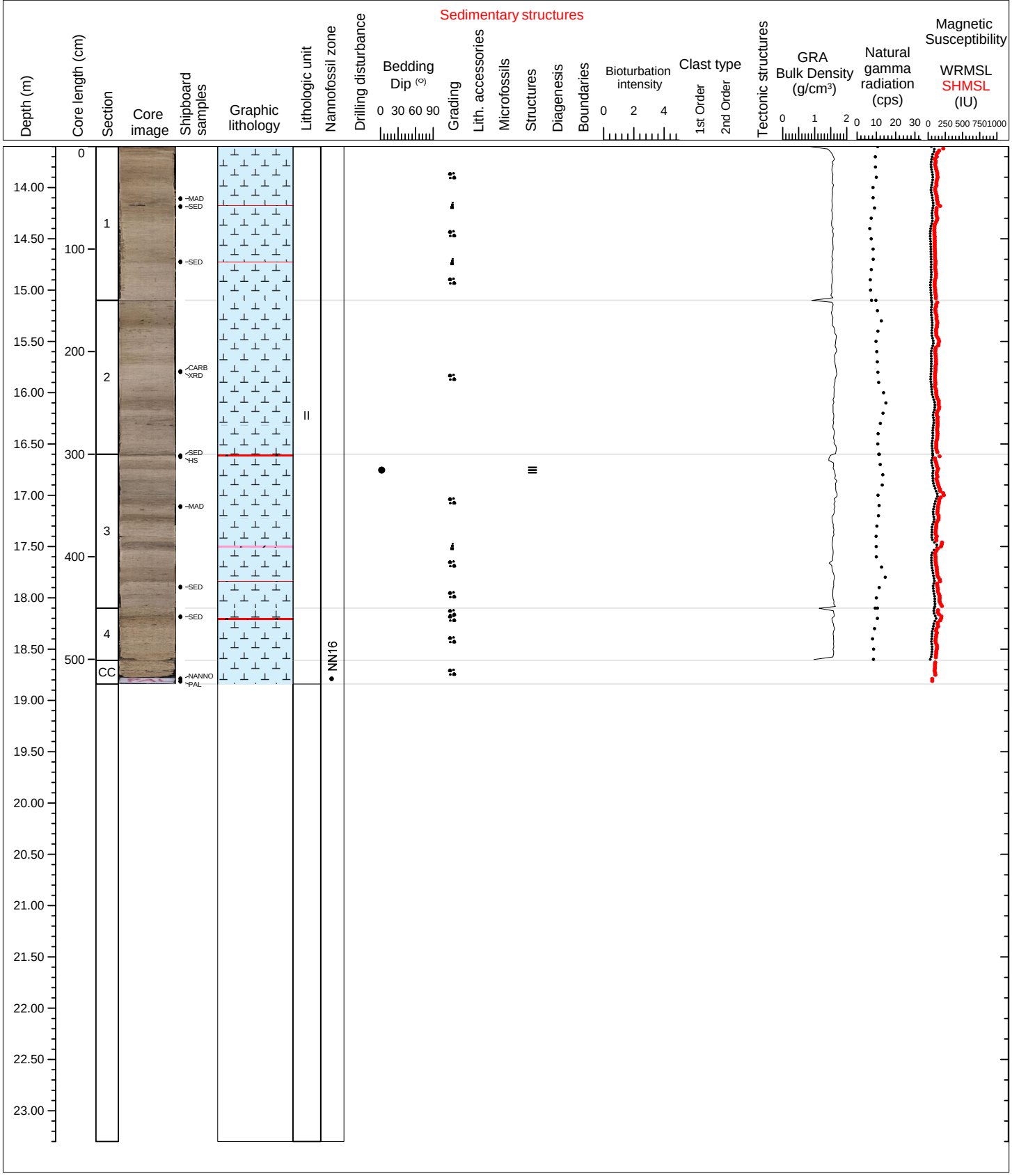
Depth Drilled (DSF), 13.6 : Bottom Depth Recovered, Curated Depth (CSF-A), 9.34, Recovery: 56%



Hole 352 - U1442A Core 3R, Interval 13.6-23.3 m (CSF-A)

The core is predominantly silty nannofossil ooze with slight color banding reflecting more and less muddy and silty layers. The whole core has been affected by at least moderate bioturbation. Several thin ash layers have been dispersed as a result of bioturbation.

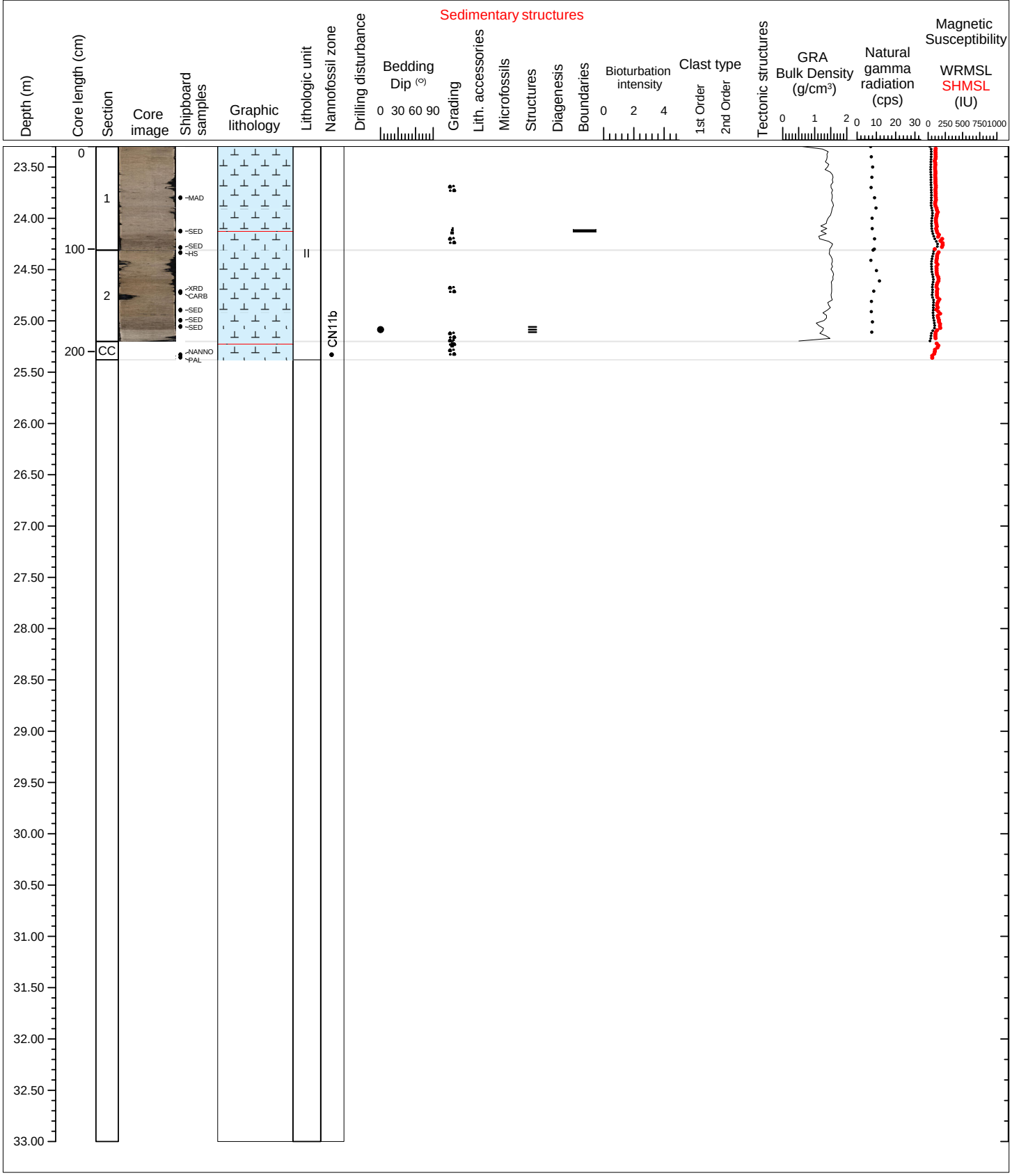
Depth Drilled (DSF), 23.3 : Bottom Depth Recovered, Curated Depth (CSF-A), 18.84, Recovery: 54%



Hole 352 - U1442A Core 4R, Interval 23.3-33 m (CSF-A)

This core continues the pattern in Core 3, being dominated by silty nannofossil ooze with a slight tendency for the color to darken until, in the lower part of Section 2, there is return to off-white nannofossil ooze. Several thin ash layers are partially dispersed owing to current reworking or bioturbation.

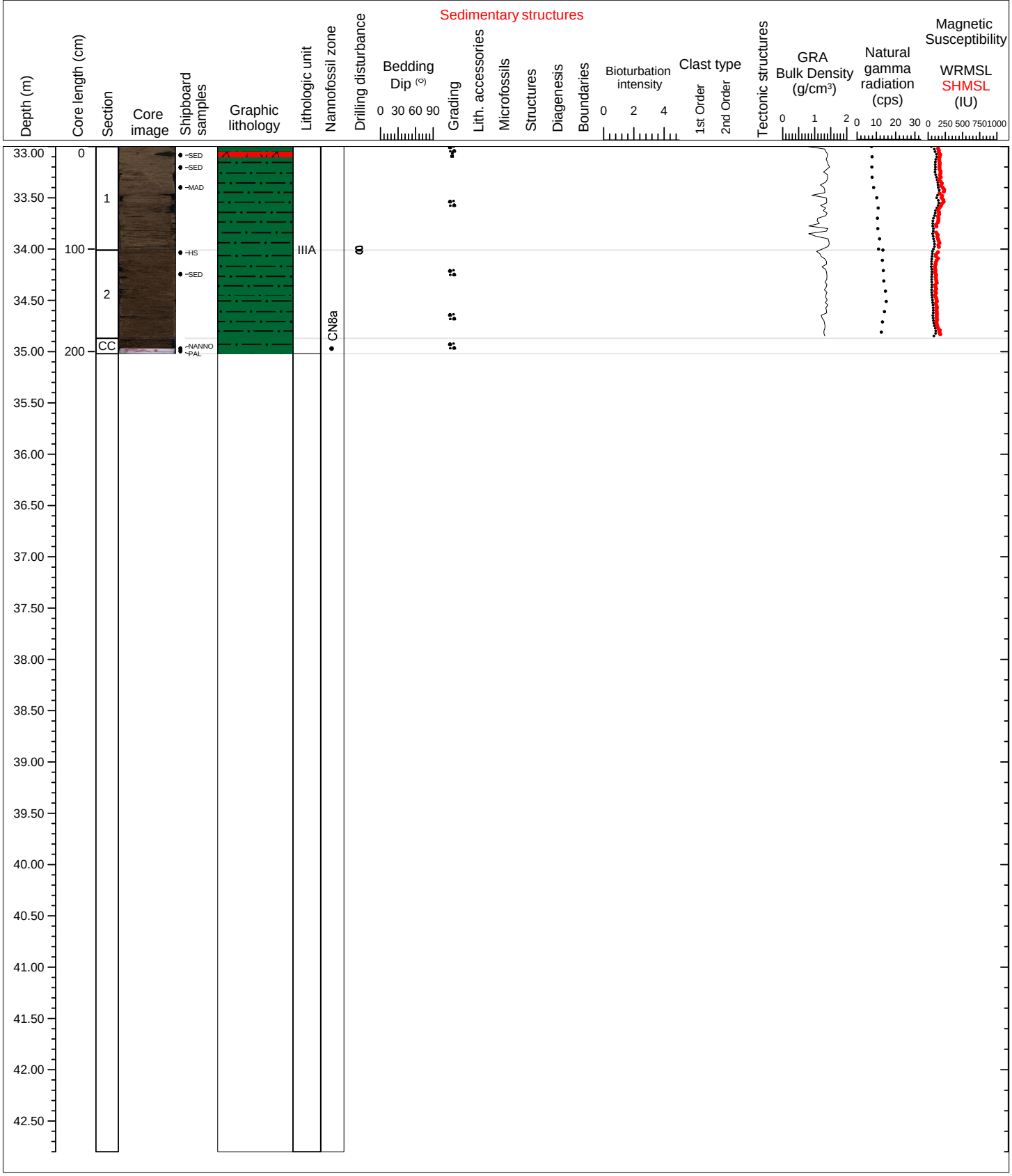
Depth Drilled (DSF), 33 : Bottom Depth Recovered, Curated Depth (CSF-A), 25.38, Recovery: 21%



Hole 352 - U1442A Core 5R, Interval 33-42.8 m (CSF-A)

In this core, the color continues to darken very subtly and the sediment becomes slightly more silty. A dark-gray graded ash is present near the top of Section 1, of which only a pod remains probably owing to bioturbation, which affects the core as a whole.

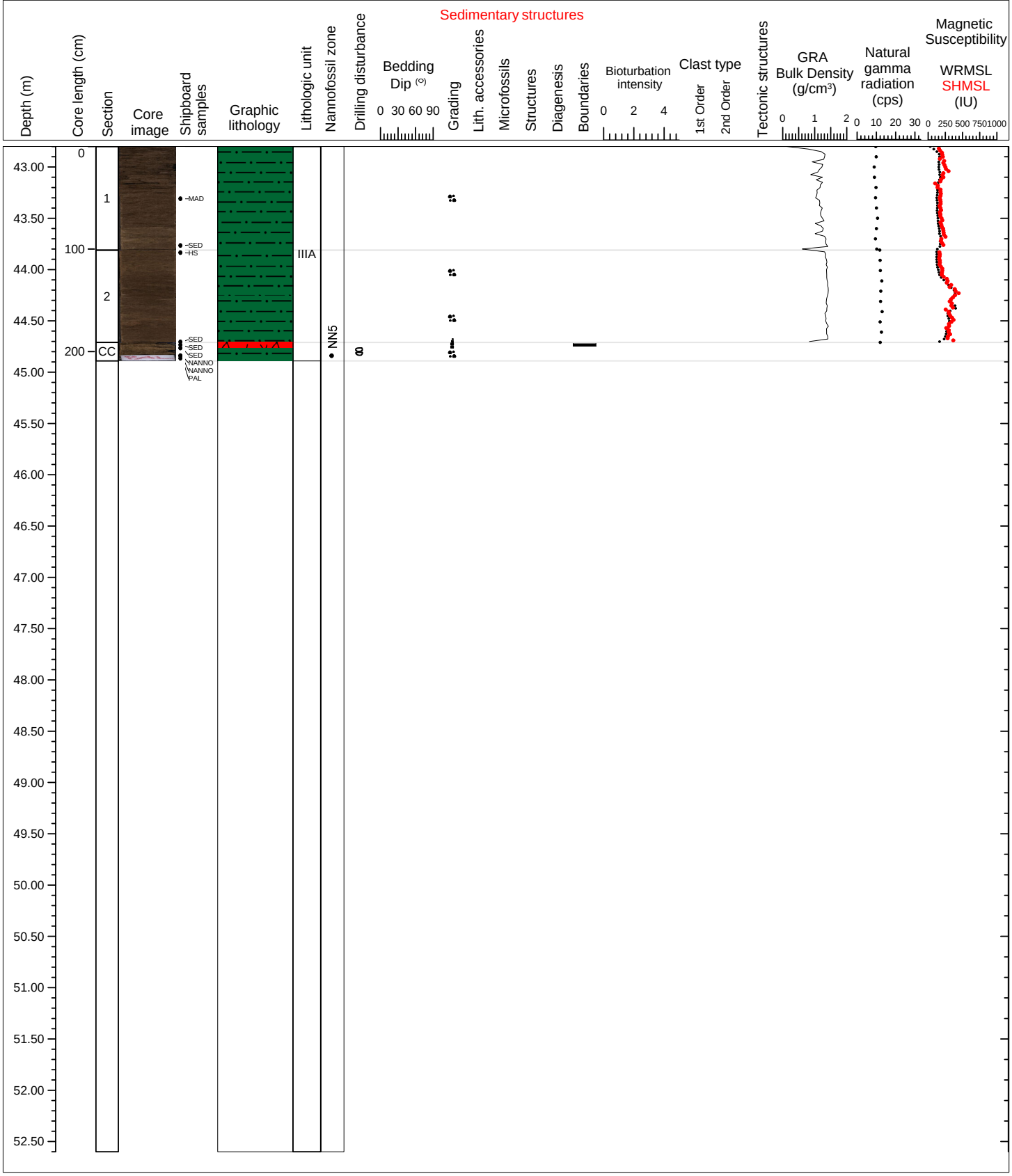
Depth Drilled (DSF), 42.8 : Bottom Depth Recovered, Curated Depth (CSF-A), 35.02, Recovery: 21%



Hole 352 - U1442A Core 6R, Interval 42.8-52.6 m (CSF-A)

The core continues the trend for the sediment to become very subtly darker downwards, with increasing clay and silt. The sediment is structureless. Testing with dilute HCl shows that the lower part of the core is relatively non-calcareous.

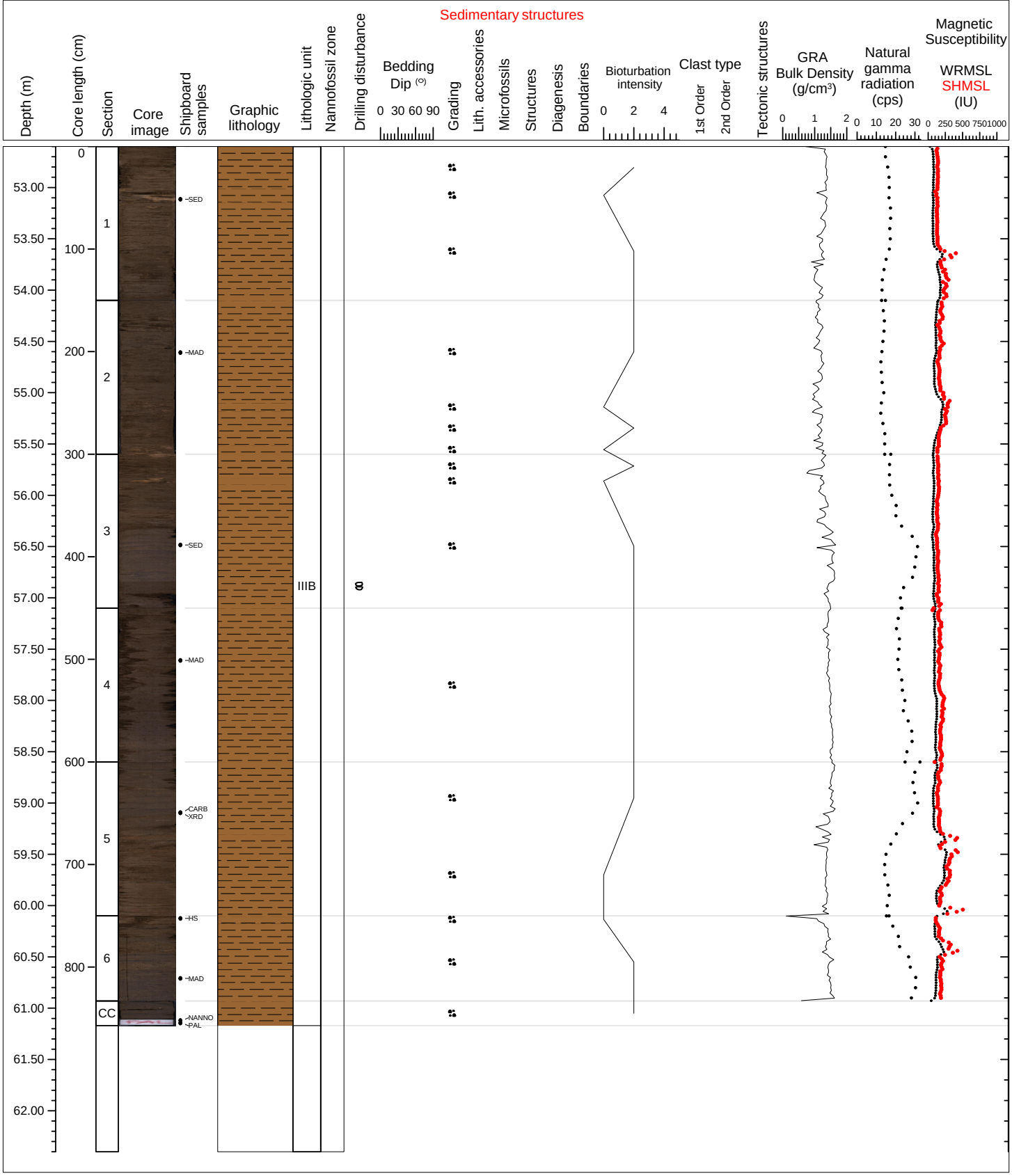
Depth Drilled (DSF), 52.6 : Bottom Depth Recovered, Curated Depth (CSF-A), 44.89, Recovery: 21%



Hole 352 - U1442A Core 7R, Interval 52.6-62.4 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. The manganese banding increases towards the base of the core (Sections 3, 5, and 6.) The diffuse nature of the color banding suggests it may be of diagenetic origin possibly related to the mobilization of manganese.

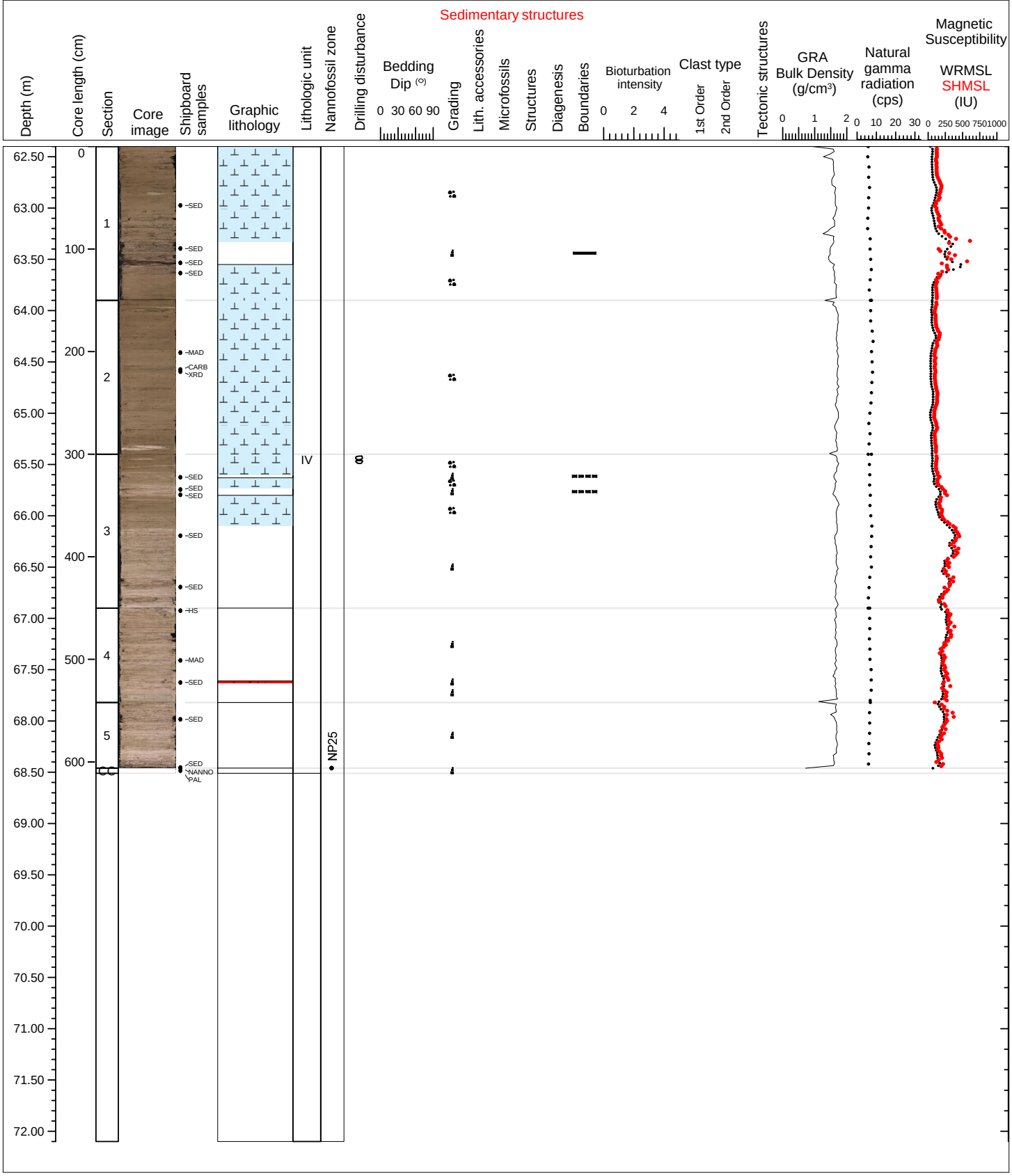
Depth Drilled (DSF), 62.4 : Bottom Depth Recovered, Curated Depth (CSF-A), 61.17, Recovery: 87%



Hole 352 - U1442A Core 8R, Interval 62.4-72.1 m (CSF-A)

The core is made of olive colored, structureless, nannofossil ooze. The texture is firm but not lithified. The color relates to the presence of disseminated silt and clay.

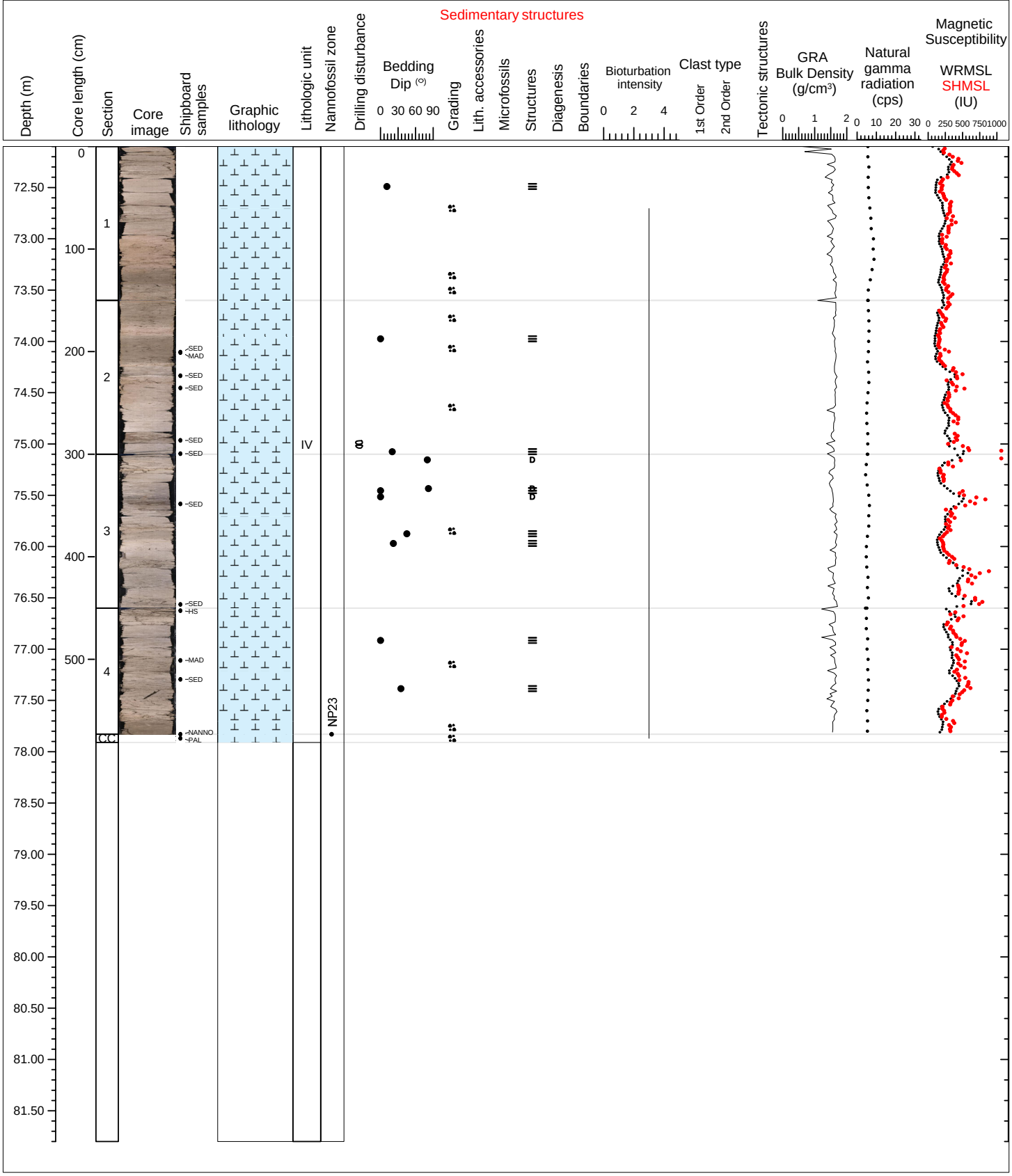
Depth Drilled (DSF), 72.1 : Bottom Depth Recovered, Curated Depth (CSF-A), 68.51, Recovery: 63%



Hole 352 - U1442A Core 9R, Interval 72.1-81.8 m (CSF-A)

The texture is initially firm but not lithified but becomes more lithified downwards. The core is dominated by pure, pale colored, nannofossil ooze with conspicuous bioturbation. Minor small (<0.5 cm), black diagenetic segregations appear in the lower part of Section 2. Sections 1 and 2 include several slightly darker layers that are slightly more silty and sandy but still nannofossil rich. Manganese segregations follow hairline fractures that are oriented at up to 35 degrees relative to the primary layering, which is picked out by horizontal burrows.

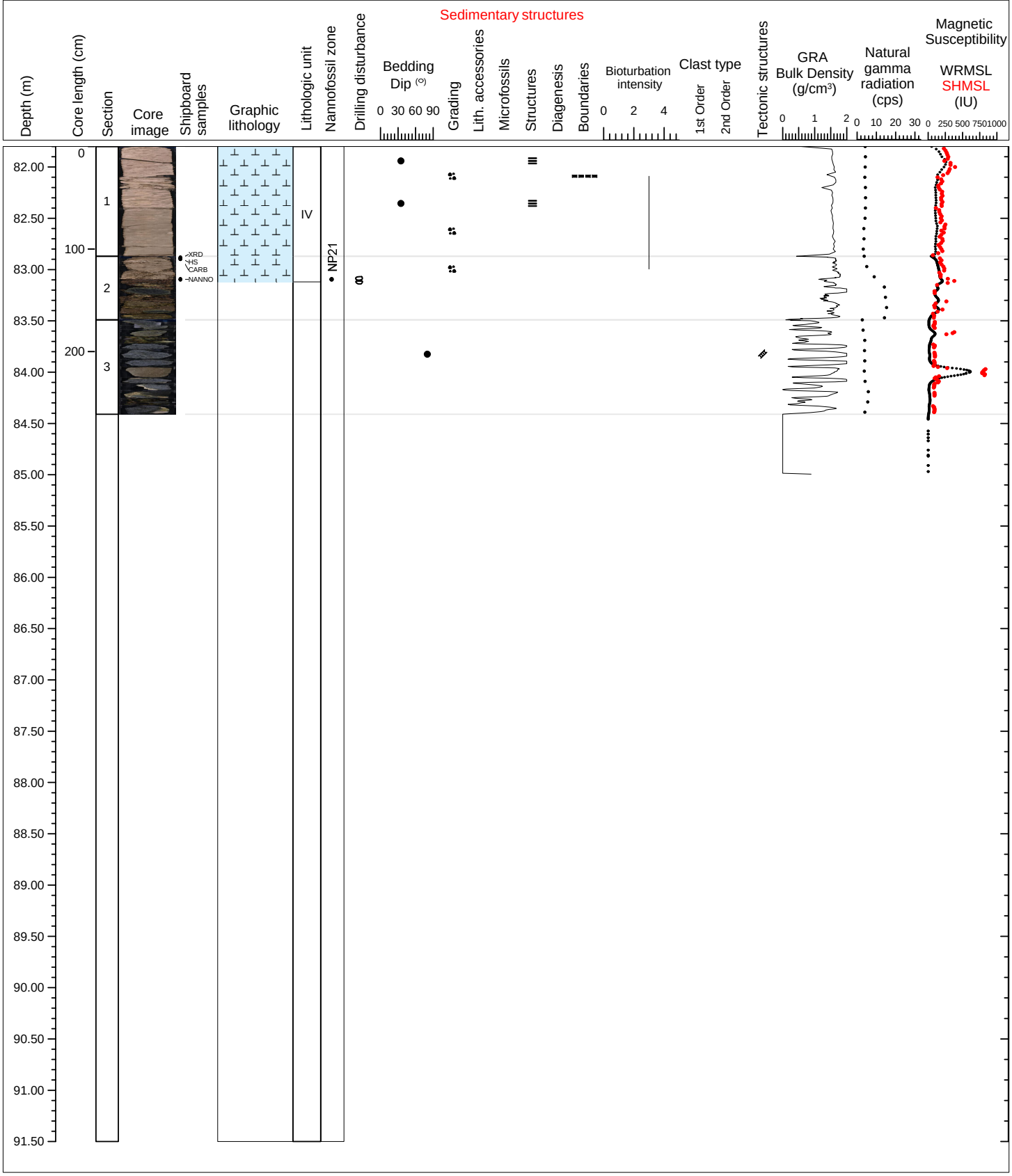
Depth Drilled (DSF), 81.8 : Bottom Depth Recovered, Curated Depth (CSF-A), 77.91, Recovery: 60%



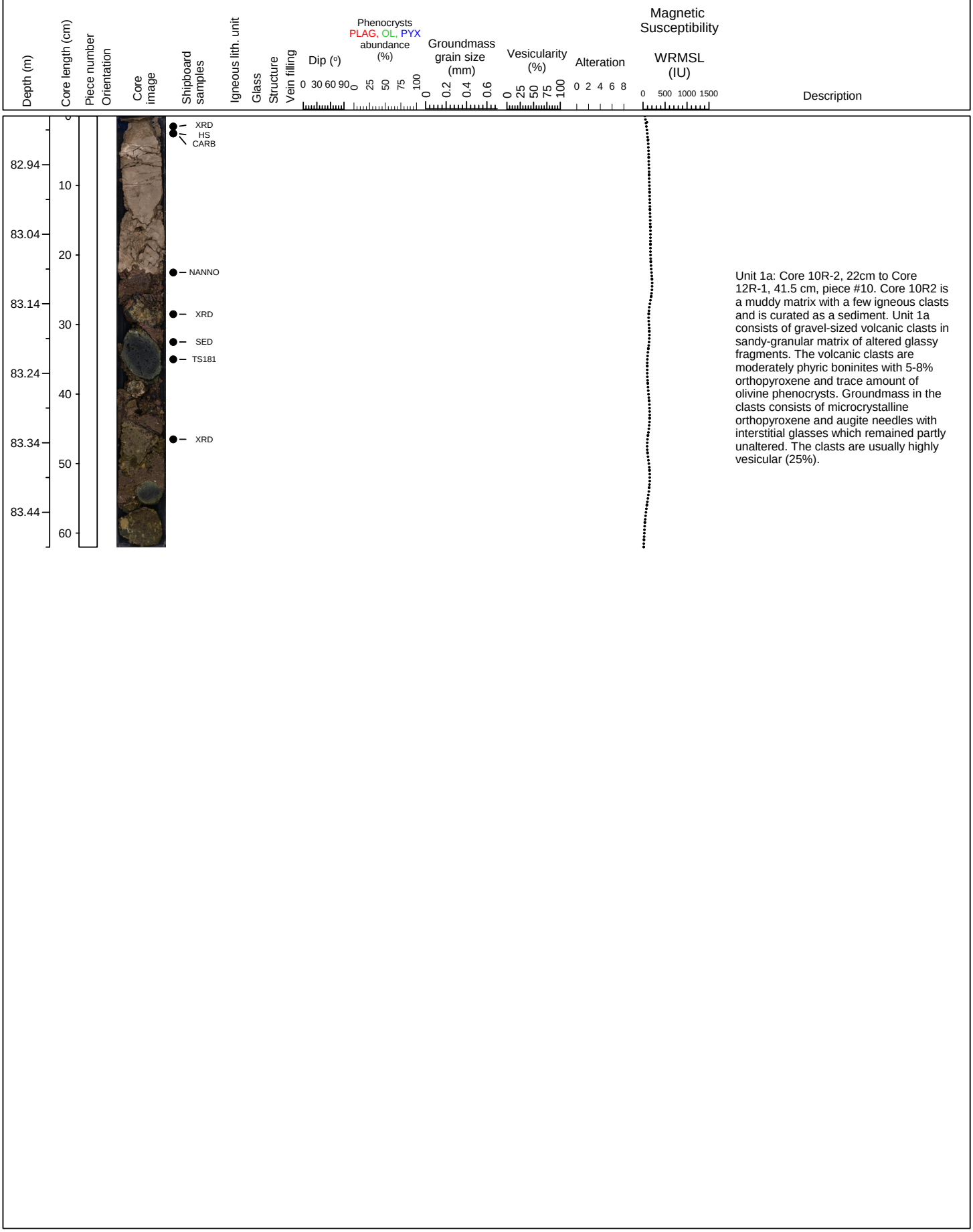
Hole 352 - U1442A Core 10R, Interval 81.8-91.5 m (CSF-A)

Section 1 to the contact with the igneous basement is a continuation of similar nannofossil rich, ooze, now lithified to nannofossil chalk. The lower part of Section 1 passes through mottled nannofossil chalk (transitional interval) into pale olive colored nannofossil chalk. The color probably relates to diagenetic manganese segregation. The bedding-parallel bioturbation (horizontal borrows) is inclined at up to 45 degrees. Changes in the angle of dip of the primary layering in Cores 9 & 10 (taken together) are possibly the result of pre-lithification gravity sliding or slumping. The top of the igneous basement in Core 10 includes five clasts of altered extrusive igneous rocks which are sub-rounded and coated with manganese oxide. The clasts are supported within a matrix of pinkish colored non-calcareous silty clay. The rest of Section 2 and Section 3 are described in the hard rock VCDs.

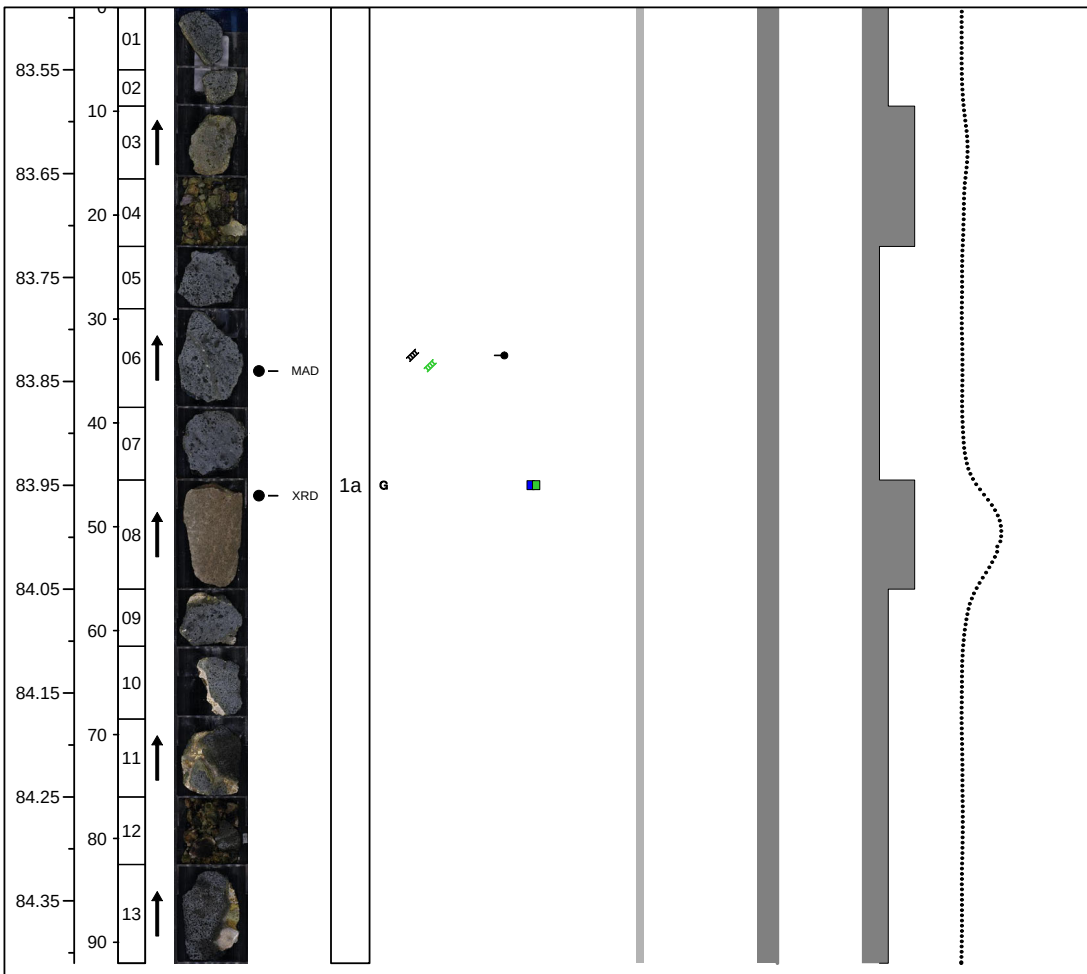
Depth Drilled (DSF), 91.5 : Bottom Depth Recovered, Curated Depth (CSF-A), 84.41, Recovery: 25%



Hole 352-U1442A-10R Section 2, Top of Section: 82.87 m (CSF-A)



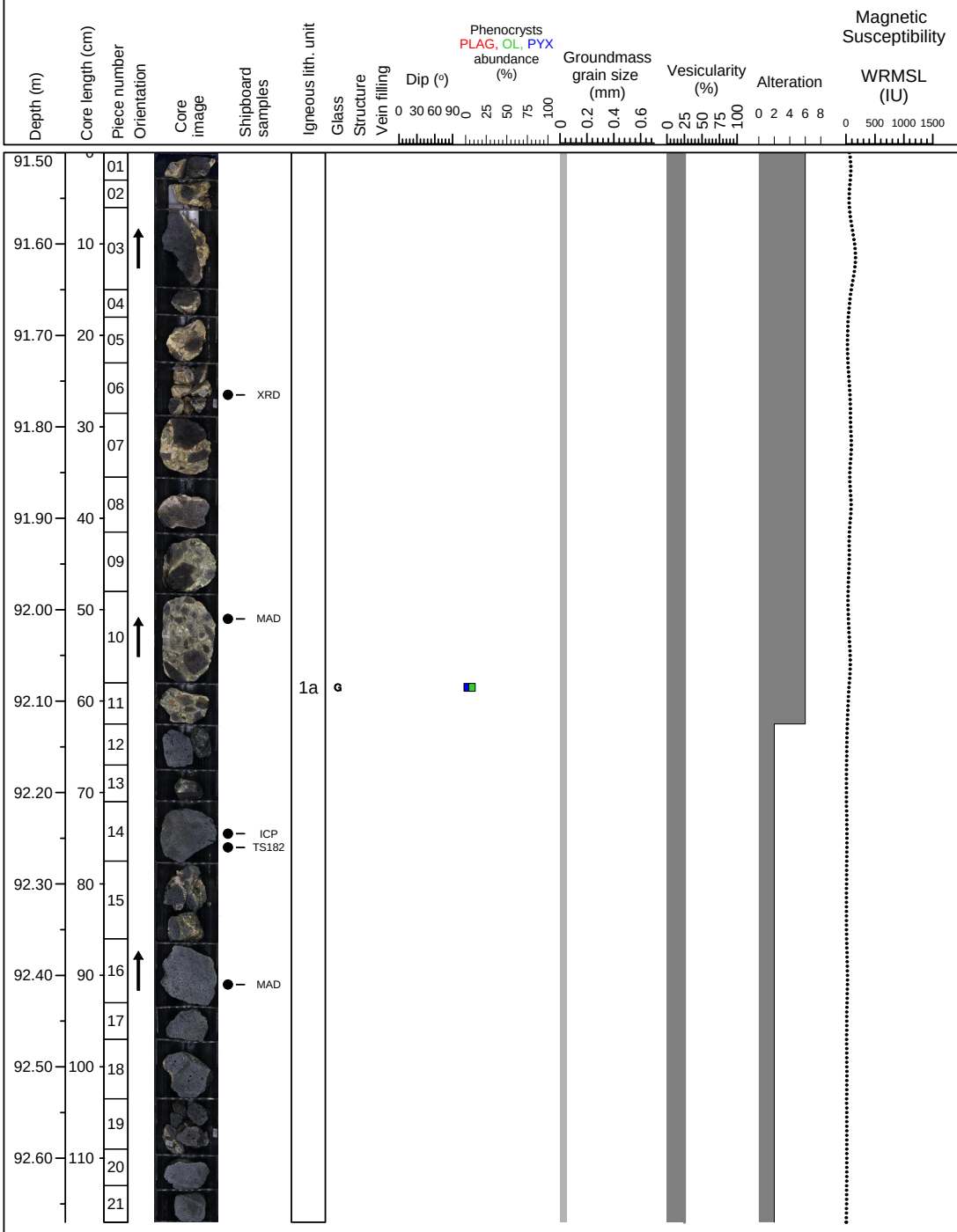
Hole 352-U1442A-10R Section 3, Top of Section: 83.49 m (CSF-A)



Description

Unit 1a: Core 10R-2, 22cm to Core 12R-1, 41.5 cm, piece #10. Core 10R2 is a muddy matrix with a few igneous clasts and is curated as a sediment. Unit 1a consists of gravel-sized volcanic clasts in sandy-granular matrix of altered glassy fragments. The volcanic clasts are moderately phyric boninites with 5-8% orthopyroxene and trace amount of olivine phenocrysts. Groundmass in the clasts consists of microcrystalline orthopyroxene and augite needles with interstitial glasses which remained partly unaltered. The clasts are usually highly vesicular (25%).

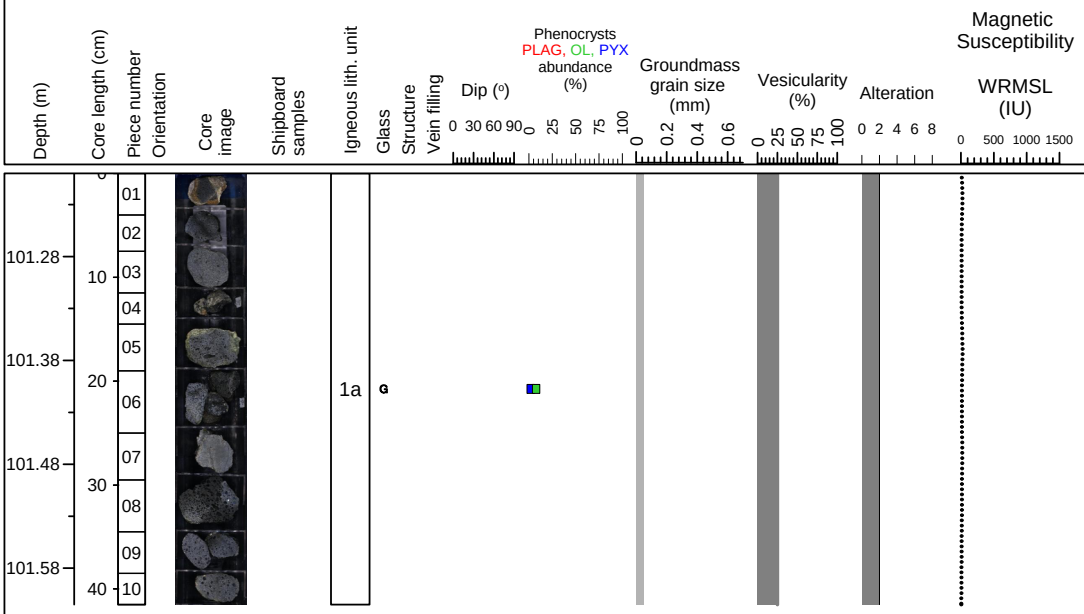
Hole 352-U1442A-11R Section 1, Top of Section: 91.5 m (CSF-A)



Description

Unit 1a: Core 10R-2, 22cm to Core 12R-1, 41.5 cm, piece #10. Core 10R2 is a muddy matrix with a few igneous clasts and is curated as a sediment. Unit 1a consists of gravel-sized volcanic clasts in sandy-granular matrix of altered glassy fragments. The volcanic clasts are moderately phyric boninites with 5-8% orthopyroxene and trace amount of olivine phenocrysts. Groundmass in the clasts consists of microcrystalline orthopyroxene and augite needles with interstitial glasses which remained partly unaltered. The clasts are usually highly vesicular (25%).

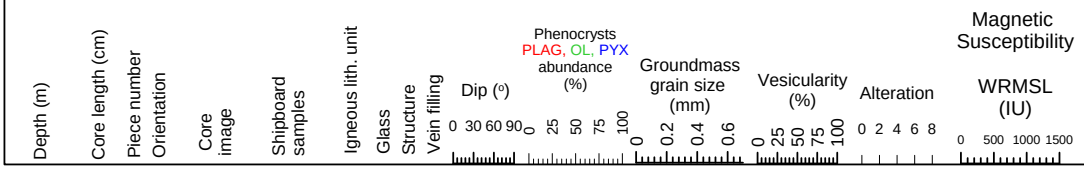
Hole 352-U1442A-12R Section 1, Top of Section: 101.2 m (CSF-A)



Description

Unit 1a: Core 10R-2, 22cm to Core 12R-1, 41.5 cm, piece #10. Core 10R2 is a muddy matrix with a few igneous clasts and is curated as a sediment. Unit 1a consists of gravel-sized volcanic clasts in sandy-granular matrix of altered glassy fragments. The volcanic clasts are moderately phyric boninites with 5-8% orthopyroxene and trace amount of olivine phenocrysts. Groundmass in the clasts consists of microcrystalline orthopyroxene and augite needles with interstitial glasses which remained partly unaltered. The clasts are usually highly vesicular (25%).

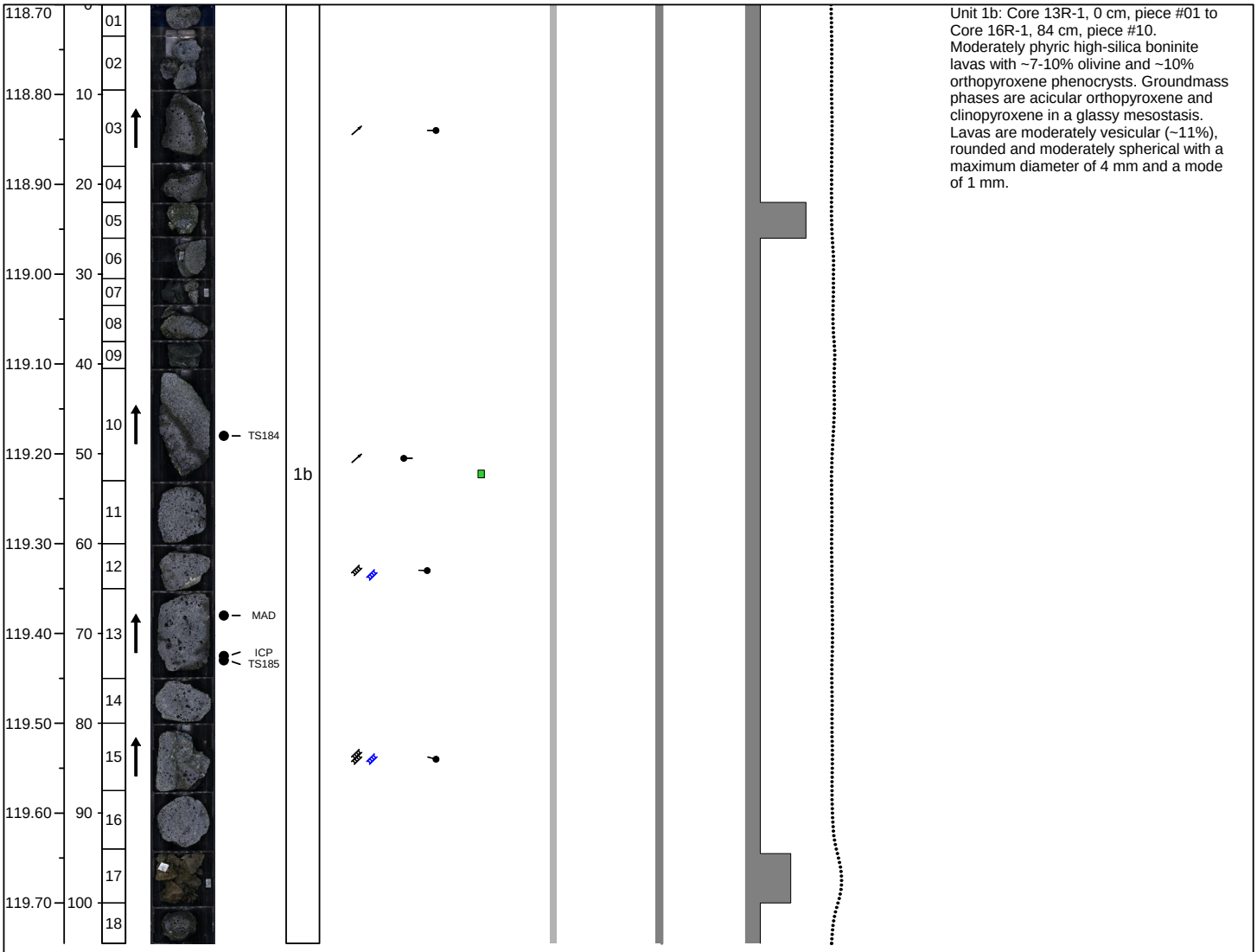
Hole 352-U1442A-13R Section 1, Top of Section: 110.9 m (CSF-A)



Unit 1b: Core 13R-1, 0 cm, piece #01 to Core 16R-1, 84 cm, piece #10. Moderately phyric high-silica boninite lavas with ~7-10% olivine and ~10% orthopyroxene phenocrysts. Groundmass phases are acicular orthopyroxene and clinopyroxene in a glassy mesostasis. Lavas are moderately vesicular (~11%), rounded and moderately spherical with a maximum diameter of 4 mm and a mode of 1 mm.

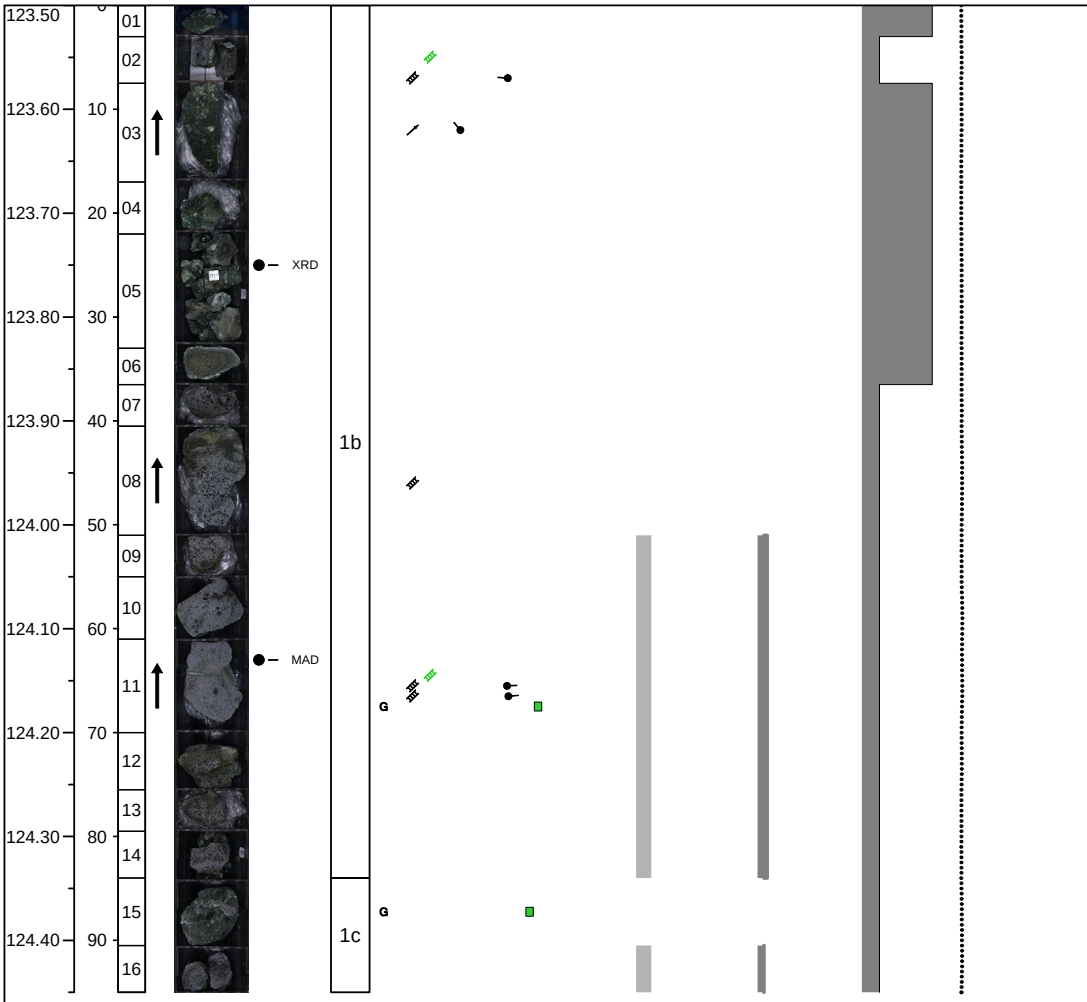
U1442A-14R NO RECOVERY

Hole 352-U1442A-15R Section 1, Top of Section: 118.7 m (CSF-A)



Unit 1b: Core 13R-1, 0 cm, piece #01 to Core 16R-1, 84 cm, piece #10. Moderately phyric high-silica boninite lavas with ~7-10% olivine and ~10% orthopyroxene phenocrysts. Groundmass phases are acicular orthopyroxene and clinopyroxene in a glassy mesostasis. Lavas are moderately vesicular (~11%), rounded and moderately spherical with a maximum diameter of 4 mm and a mode of 1 mm.

Hole 352-U1442A-16R Section 1, Top of Section: 123.5 m (CSF-A)

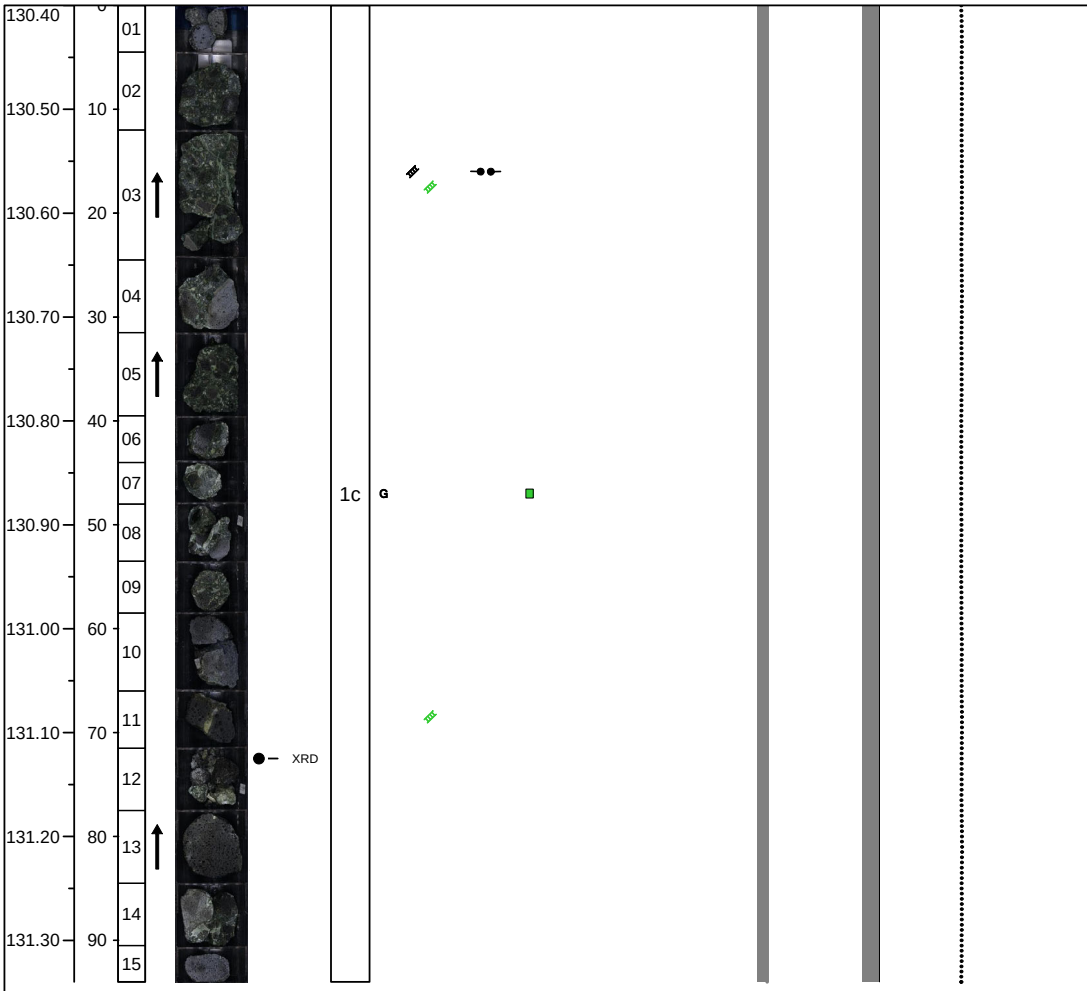


Description

Unit 1b: Core 13R-1, 0 cm, piece #01 to Core 16R-1, 84 cm, piece #10. Moderately phyric high-silica boninite lavas with ~7-10% olivine and ~10% orthopyroxene phenocrysts. Groundmass phases are acicular orthopyroxene and clinopyroxene in a glassy mesostasis. Lavas are moderately vesicular (~11%), rounded and moderately spherical with a maximum diameter of 4 mm and a mode of 1 mm.

Unit 1c: Core 16R-1, 84cm, piece #15 to Core 22R-1, 110.5 cm, piece #21. Hyaloclastite breccia containing boninite clasts and pumice within a green glassy matrix. The boninite clasts contain sparse orthopyroxene and olivine phenocrysts. The groundmass phases are acicular orthopyroxene in a glassy matrix. Clasts are moderately vesicular (~8-18%) and with a maximum diameter of 16 mm and a mode of 2 mm. The glassy green matrix is highly altered but still contains portions of unaltered glass.

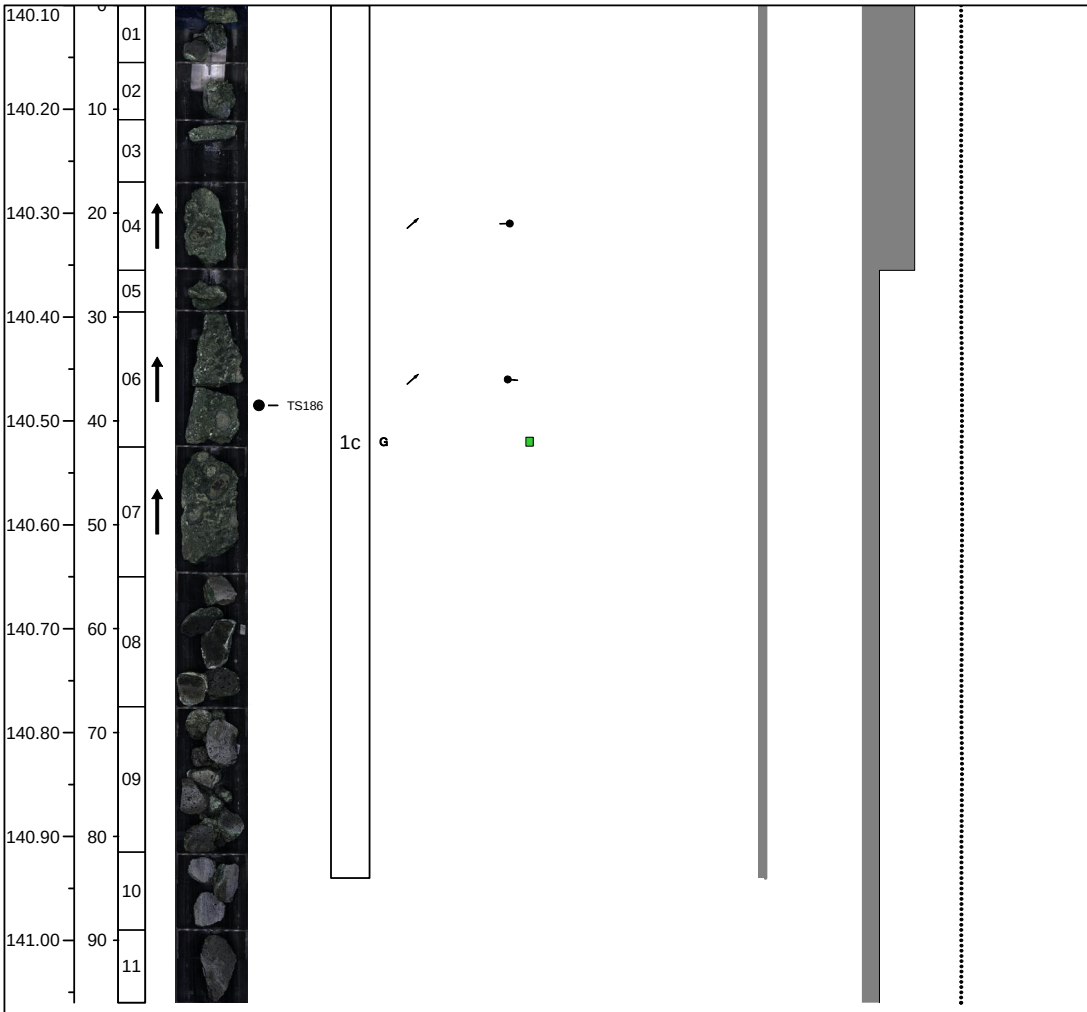
Hole 352-U1442A-17R Section 1, Top of Section: 130.4 m (CSF-A)



Description

Unit 1c: Core 16R-1, 84cm, piece #15 to Core 22R-1, 110.5 cm, piece #21. Hyaloclastite breccia containing boninite clasts and pumice within a green glassy matrix. The boninite clasts contain sparse orthopyroxene and olivine phenocrysts. The groundmass phases are acicular orthopyroxene in a glassy matrix. Clasts are moderately vesicular (~8-18%) and with a maximum diameter of 16 mm and a mode of 2 mm. The glassy green matrix is highly altered but still contains portions of unaltered glass.

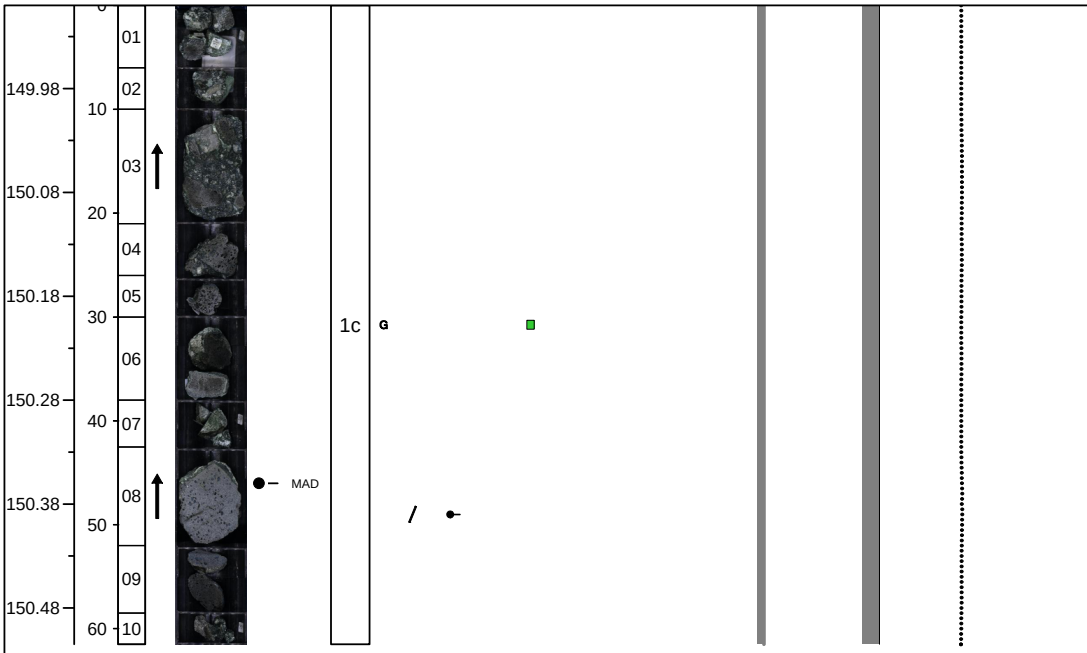
Hole 352-U1442A-18R Section 1, Top of Section: 140.1 m (CSF-A)



Description

Unit 1c: Core 16R-1, 84cm, piece #15 to Core 22R-1, 110.5 cm, piece #21. Hyaloclastite breccia containing boninite clasts and pumice within a green glassy matrix. The boninite clasts contain sparse orthopyroxene and olivine phenocrysts. The groundmass phases are acicular orthopyroxene in a glassy matrix. Clasts are moderately vesicular (~8-18%) and with a maximum diameter of 16 mm and a mode of 2 mm. The glassy green matrix is highly altered but still contains portions of unaltered glass.

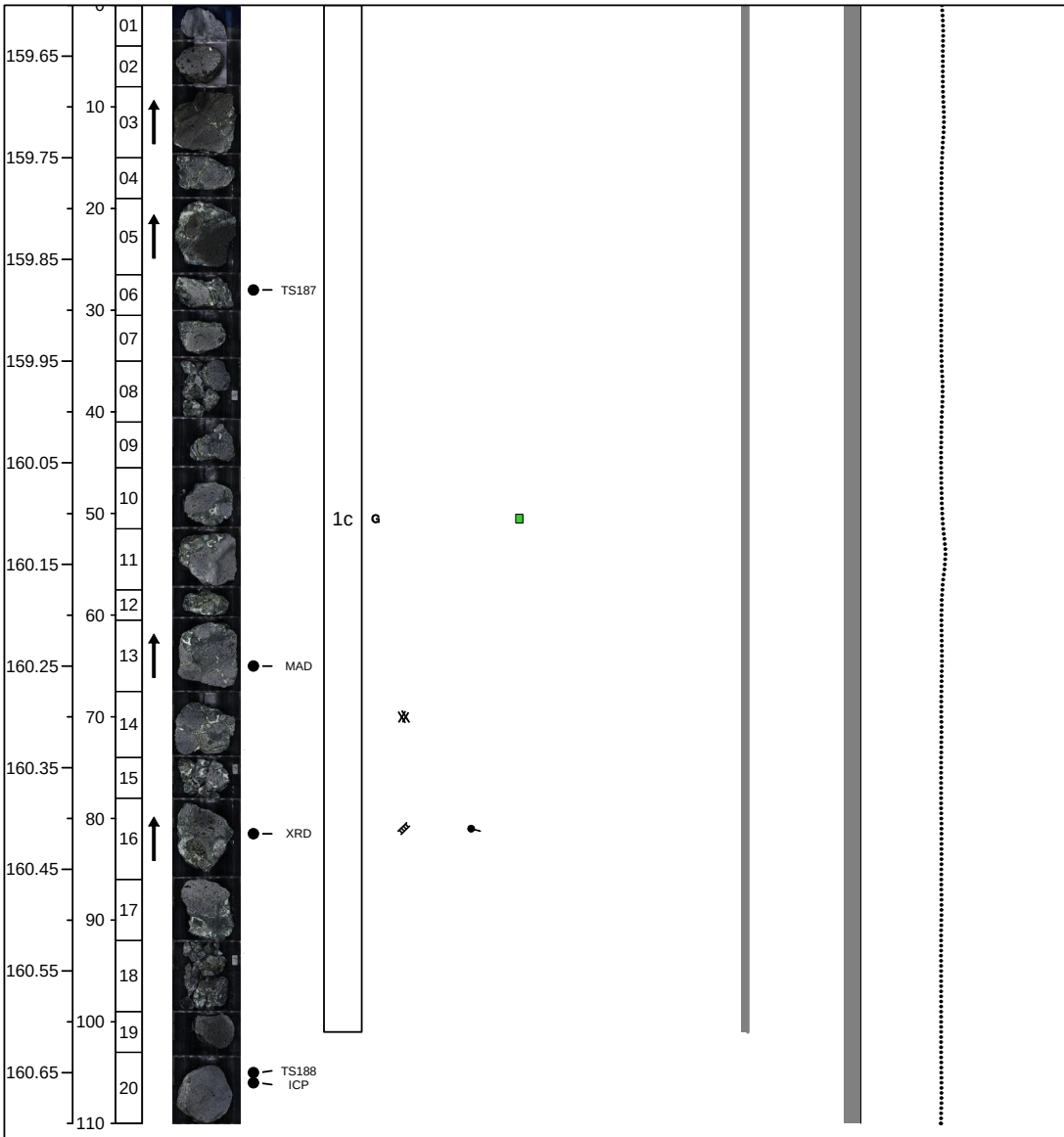
Hole 352-U1442A-19R Section 1, Top of Section: 149.9 m (CSF-A)



Description

Unit 1c: Core 16R-1, 84cm, piece #15 to Core 22R-1, 110.5 cm, piece #21. Hyaloclastite breccia containing boninite clasts and pumice within a green glassy matrix. The boninite clasts contain sparse orthopyroxene and olivine phenocrysts. The groundmass phases are acicular orthopyroxene in a glassy matrix. Clasts are moderately vesicular (~8-18%) and with a maximum diameter of 16 mm and a mode of 2 mm. The glassy green matrix is highly altered but still contains portions of unaltered glass.

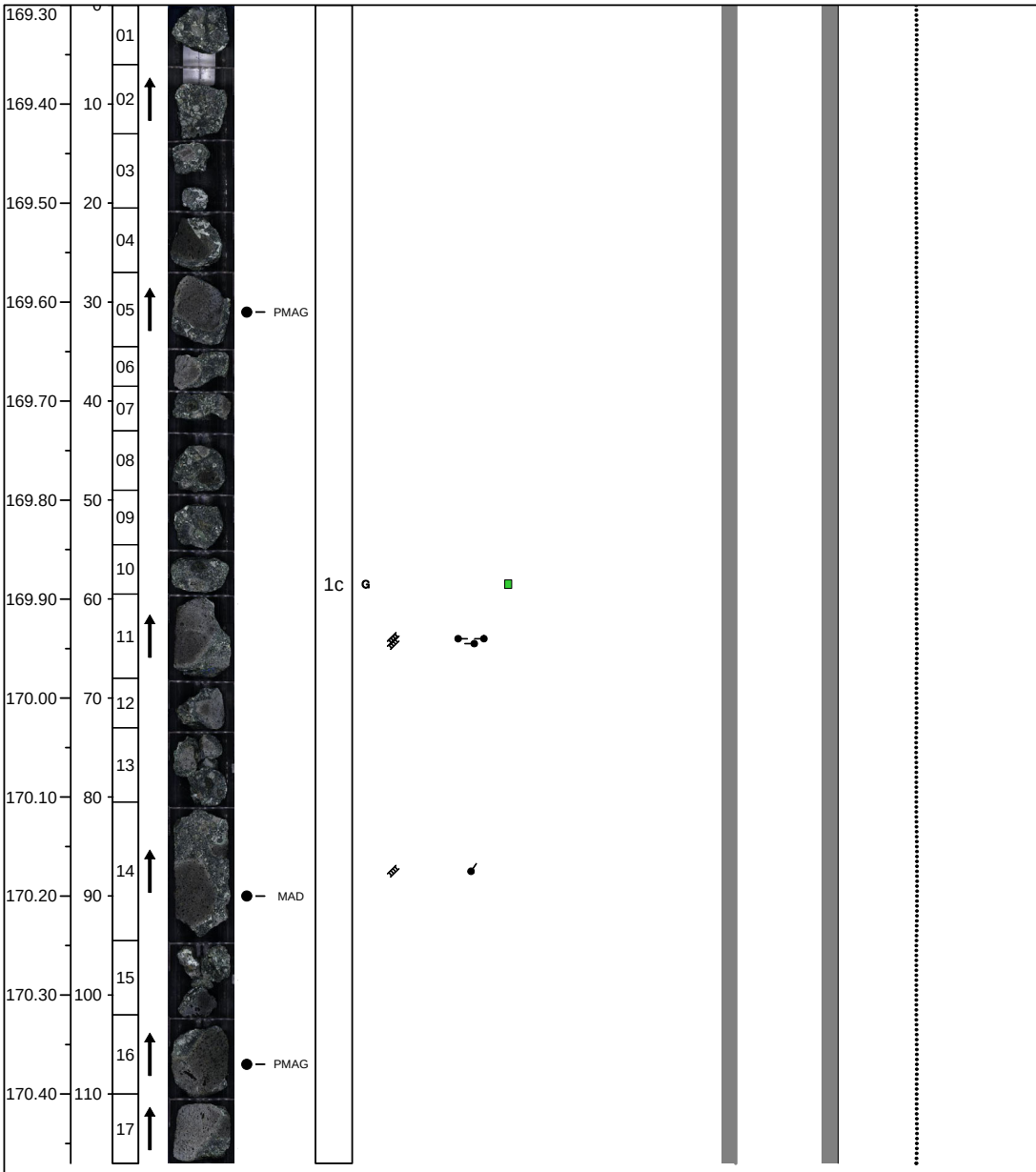
Hole 352-U1442A-20R Section 1, Top of Section: 159.6 m (CSF-A)



Description

Unit 1c: Core 16R-1, 84cm, piece #15 to Core 22R-1, 110.5 cm, piece #21. Hyaloclastite breccia containing boninite clasts and pumice within a green glassy matrix. The boninite clasts contain sparse orthopyroxene and olivine phenocrysts. The groundmass phases are acicular orthopyroxene in a glassy matrix. Clasts are moderately vesicular (~8-18%) and with a maximum diameter of 16 mm and a mode of 2 mm. The glassy green matrix is highly altered but still contains portions of unaltered glass.

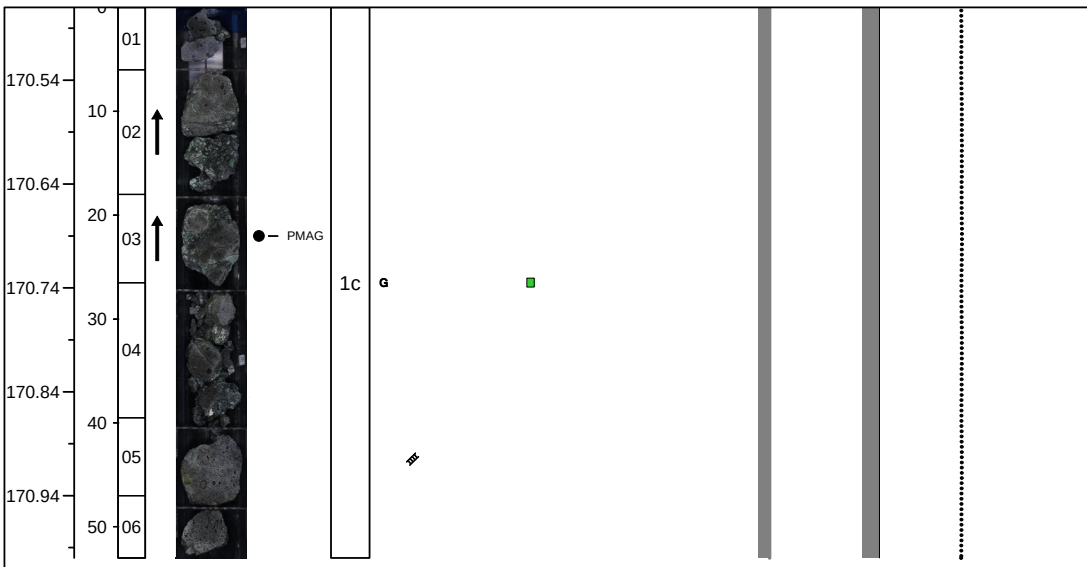
Hole 352-U1442A-21R Section 1, Top of Section: 169.3 m (CSF-A)



Description

Unit 1c: Core 16R-1, 84cm, piece #15 to Core 22R-1, 110.5 cm, piece #21. Hyaloclastite breccia containing boninite clasts and pumice within a green glassy matrix. The boninite clasts contain sparse orthopyroxene and olivine phenocrysts. The groundmass phases are acicular orthopyroxene in a glassy matrix. Clasts are moderately vesicular (~8-18%) and with a maximum diameter of 16 mm and a mode of 2 mm. The glassy green matrix is highly altered but still contains portions of unaltered glass.

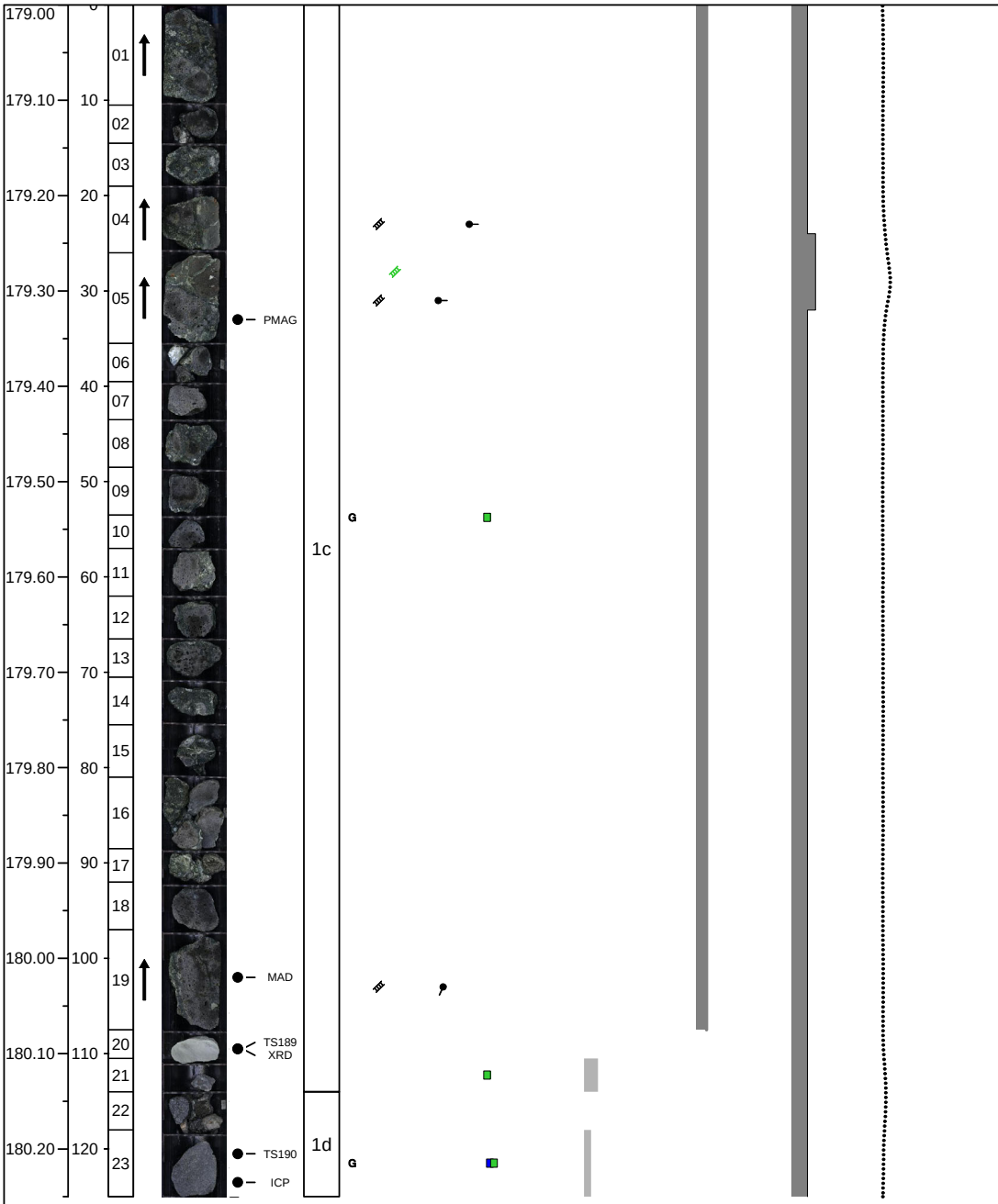
Hole 352-U1442A-21R Section 2, Top of Section: 170.47 m (CSF-A)



Description

Unit 1c: Core 16R-1, 84cm, piece #15 to Core 22R-1, 110.5 cm, piece #21. Hyaloclastite breccia containing boninite clasts and pumice within a green glassy matrix. The boninite clasts contain sparse orthopyroxene and olivine phenocrysts. The groundmass phases are acicular orthopyroxene in a glassy matrix. Clasts are moderately vesicular (~8-18%) and with a maximum diameter of 16 mm and a mode of 2 mm. The glassy green matrix is highly altered but still contains portions of unaltered glass.

Hole 352-U1442A-22R Section 1, Top of Section: 179.0 m (CSF-A)

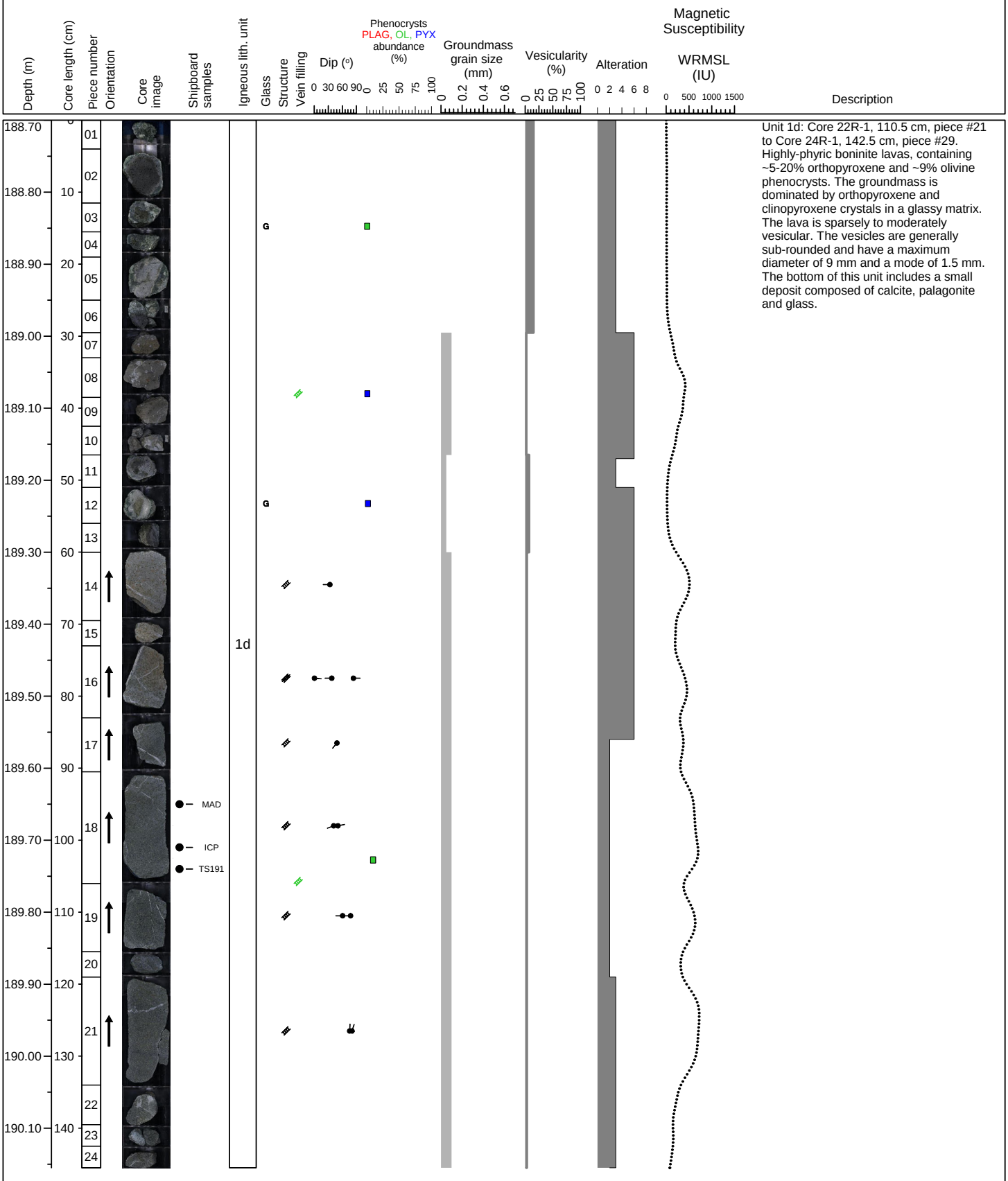


Description

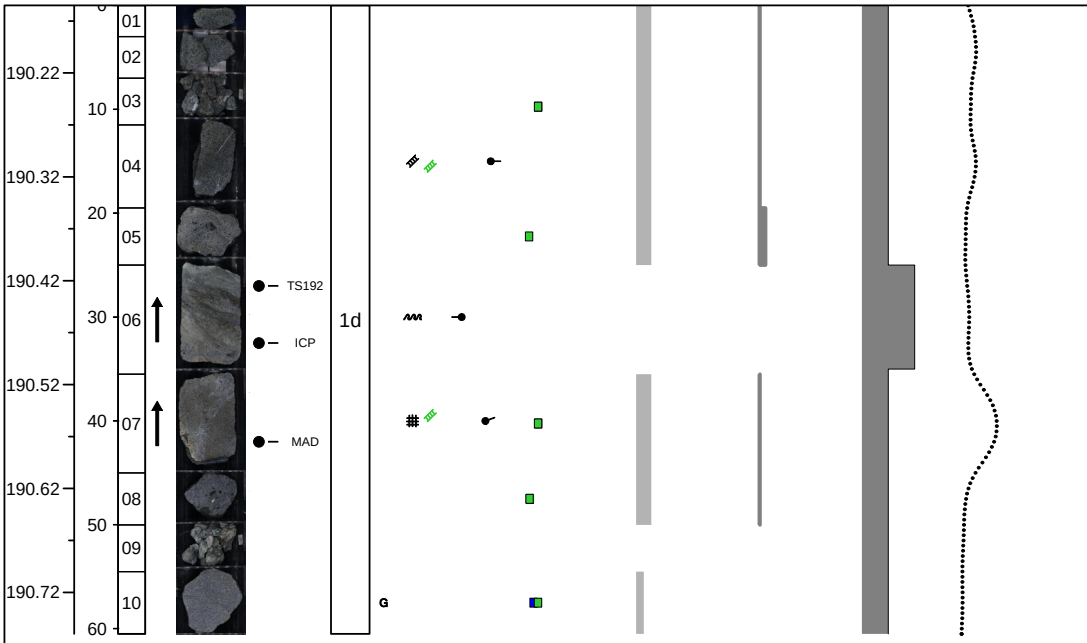
Unit 1c: Core 16R-1, 84cm, piece #15 to Core 22R-1, 110.5 cm, piece #21. Hyaloclastite breccia containing boninite clasts and pumice within a green glassy matrix. The boninite clasts contain sparse orthopyroxene and olivine phenocrysts. The groundmass phases are acicular orthopyroxene in a glassy matrix. Clasts are moderately vesicular (~8-18%) and with a maximum diameter of 16 mm and a mode of 2 mm. The glassy green matrix is highly altered but still contains portions of unaltered glass.

Unit 1d: Core 22R-1, 110.5 cm, piece #21 to Core 24R-1, 142.5 cm, piece #29. Highly-phyric boninite lavas, containing ~5-20% orthopyroxene and ~9% olivine phenocrysts. The groundmass is dominated by orthopyroxene and clinopyroxene crystals in a glassy matrix. The lava is sparsely to moderately vesicular. The vesicles are generally sub-rounded and have a maximum diameter of 9 mm and a mode of 1.5 mm. The bottom of this unit includes a small deposit composed of calcite, palagonite and glass.

Hole 352-U1442A-23R Section 1, Top of Section: 188.7 m (CSF-A)



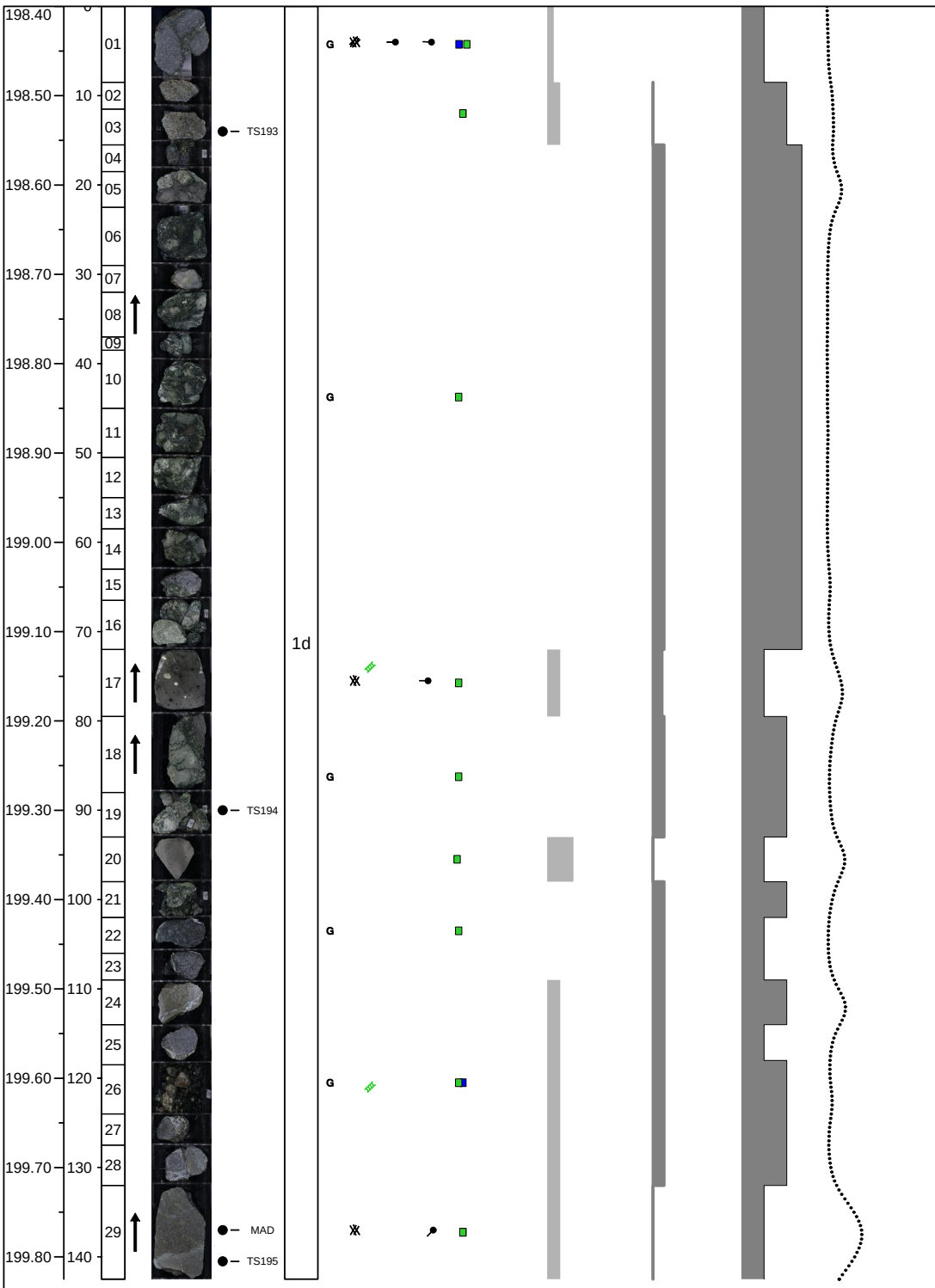
Hole 352-U1442A-23R Section 2, Top of Section: 190.155 m (CSF-A)



Description

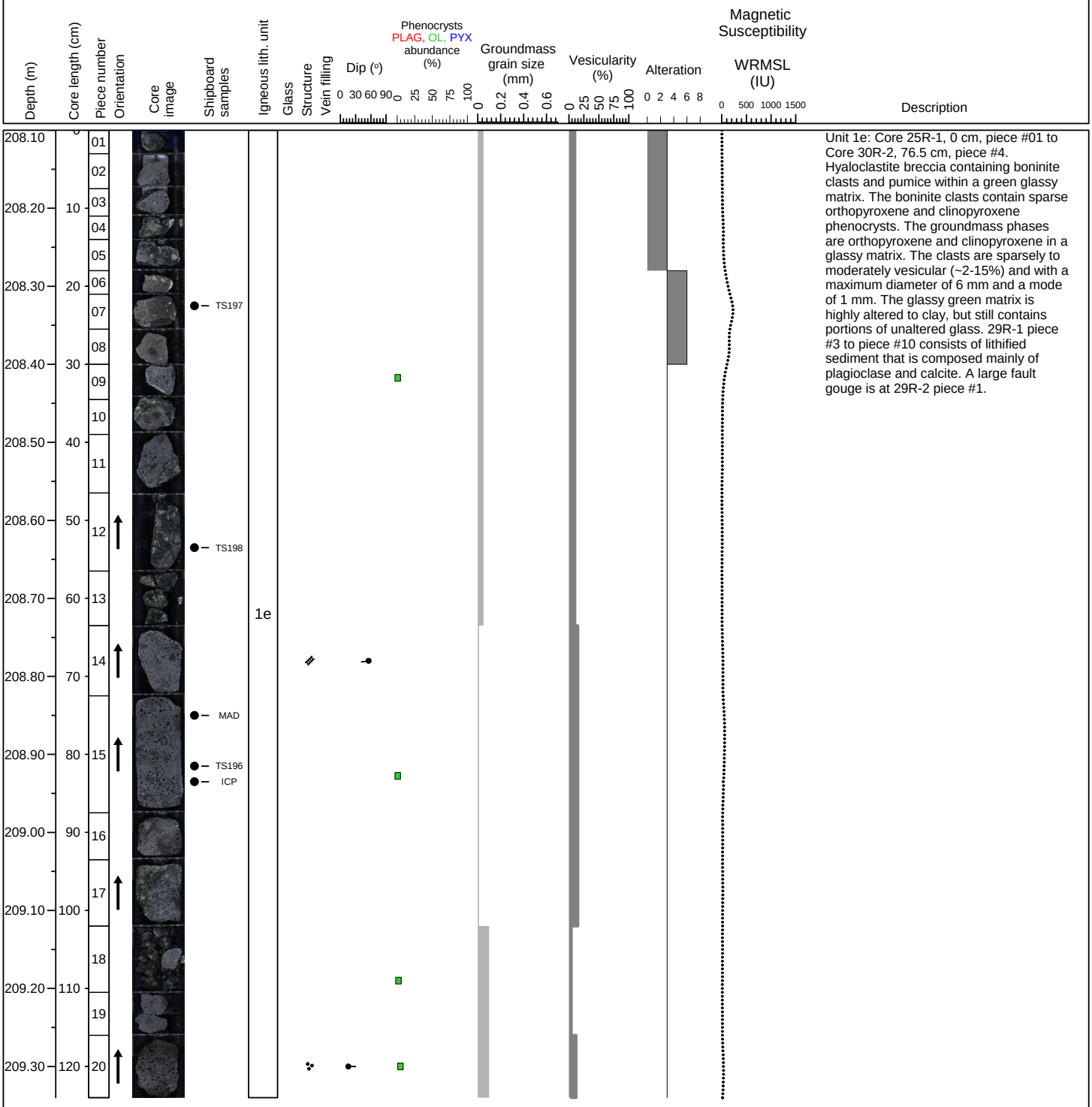
Unit 1d: Core 22R-1, 110.5 cm, piece #21 to Core 24R-1, 142.5 cm, piece #29. Highly-phyric boninite lavas, containing ~5-20% orthopyroxene and ~9% olivine phenocrysts. The groundmass is dominated by orthopyroxene and clinopyroxene crystals in a glassy matrix. The lava is sparsely to moderately vesicular. The vesicles are generally sub-rounded and have a maximum diameter of 9 mm and a mode of 1.5 mm. The bottom of this unit includes a small deposit composed of calcite, palagonite and glass.

Hole 352-U1442A-24R Section 1, Top of Section: 198.4 m (CSF-A)



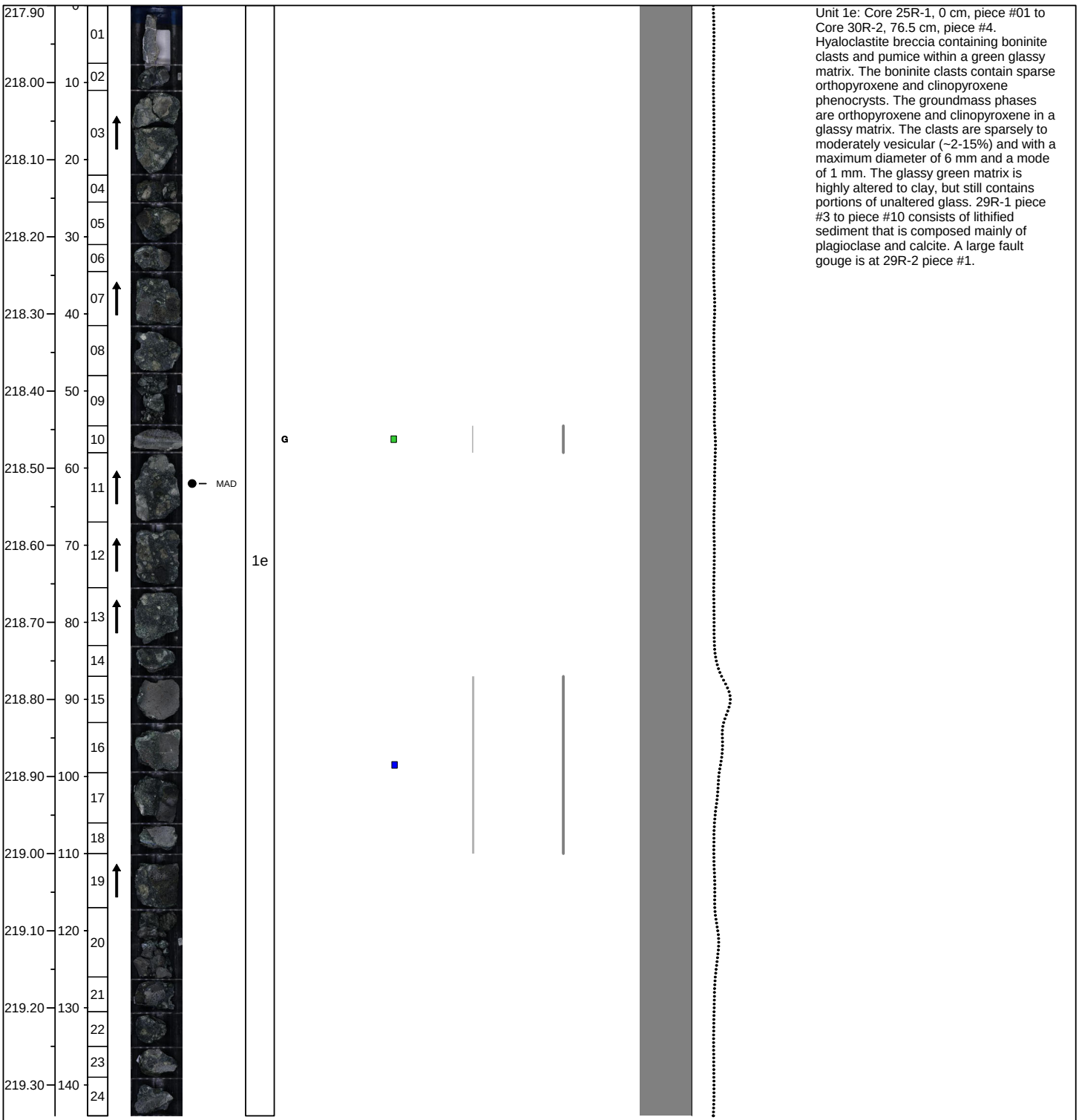
Unit 1d: Core 22R-1, 110.5 cm, piece #21 to Core 24R-1, 142.5 cm, piece #29. Highly-phyric boninite lavas, containing ~5-20% orthopyroxene and ~9% olivine phenocrysts. The groundmass is dominated by orthopyroxene and clinopyroxene crystals in a glassy matrix. The lava is sparsely to moderately vesicular. The vesicles are generally sub-rounded and have a maximum diameter of 9 mm and a mode of 1.5 mm. The bottom of this unit includes a small deposit composed of calcite, palagonite and glass.

Hole 352-U1442A-25R Section 1, Top of Section: 208.1 m (CSF-A)



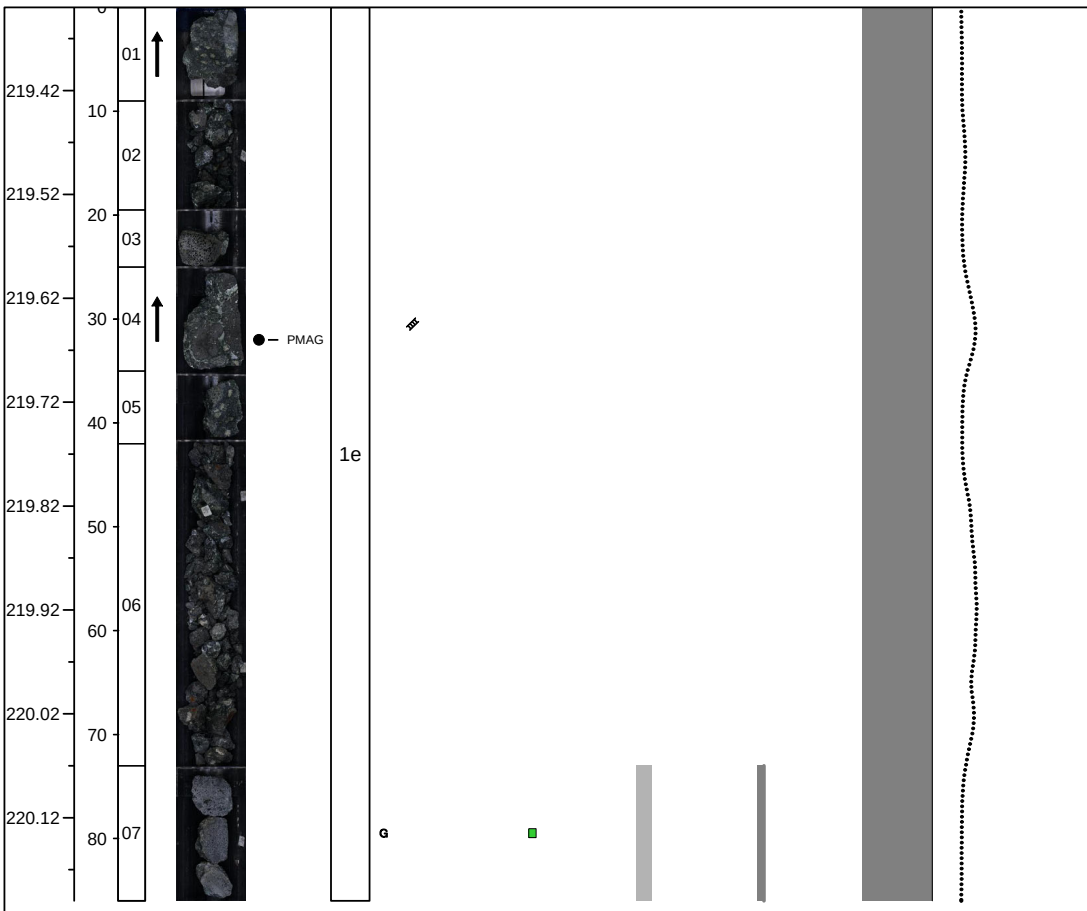
Unit 1e: Core 25R-1, 0 cm, piece #01 to Core 30R-2, 76.5 cm, piece #4. Hyaloclastite breccia containing boninite clasts and pumice within a green glassy matrix. The boninite clasts contain sparse orthopyroxene and clinopyroxene phenocrysts. The groundmass phases are orthopyroxene and clinopyroxene in a glassy matrix. The clasts are sparsely to moderately vesicular (~2-15%) and with a maximum diameter of 6 mm and a mode of 1 mm. The glassy green matrix is highly altered to clay, but still contains portions of unaltered glass. 29R-1 piece #3 to piece #10 consists of lithified sediment that is composed mainly of plagioclase and calcite. A large fault gouge is at 29R-2 piece #1.

Hole 352-U1442A-26R Section 1, Top of Section: 217.9 m (CSF-A)



Unit 1e: Core 25R-1, 0 cm, piece #01 to Core 30R-2, 76.5 cm, piece #4. Hyaloclastite breccia containing boninite clasts and pumice within a green glassy matrix. The boninite clasts contain sparse orthopyroxene and clinopyroxene phenocrysts. The groundmass phases are orthopyroxene and clinopyroxene in a glassy matrix. The clasts are sparsely to moderately vesicular (~2-15%) and with a maximum diameter of 6 mm and a mode of 1 mm. The glassy green matrix is highly altered to clay, but still contains portions of unaltered glass. 29R-1 piece #3 to piece #10 consists of lithified sediment that is composed mainly of plagioclase and calcite. A large fault gouge is at 29R-2 piece #1.

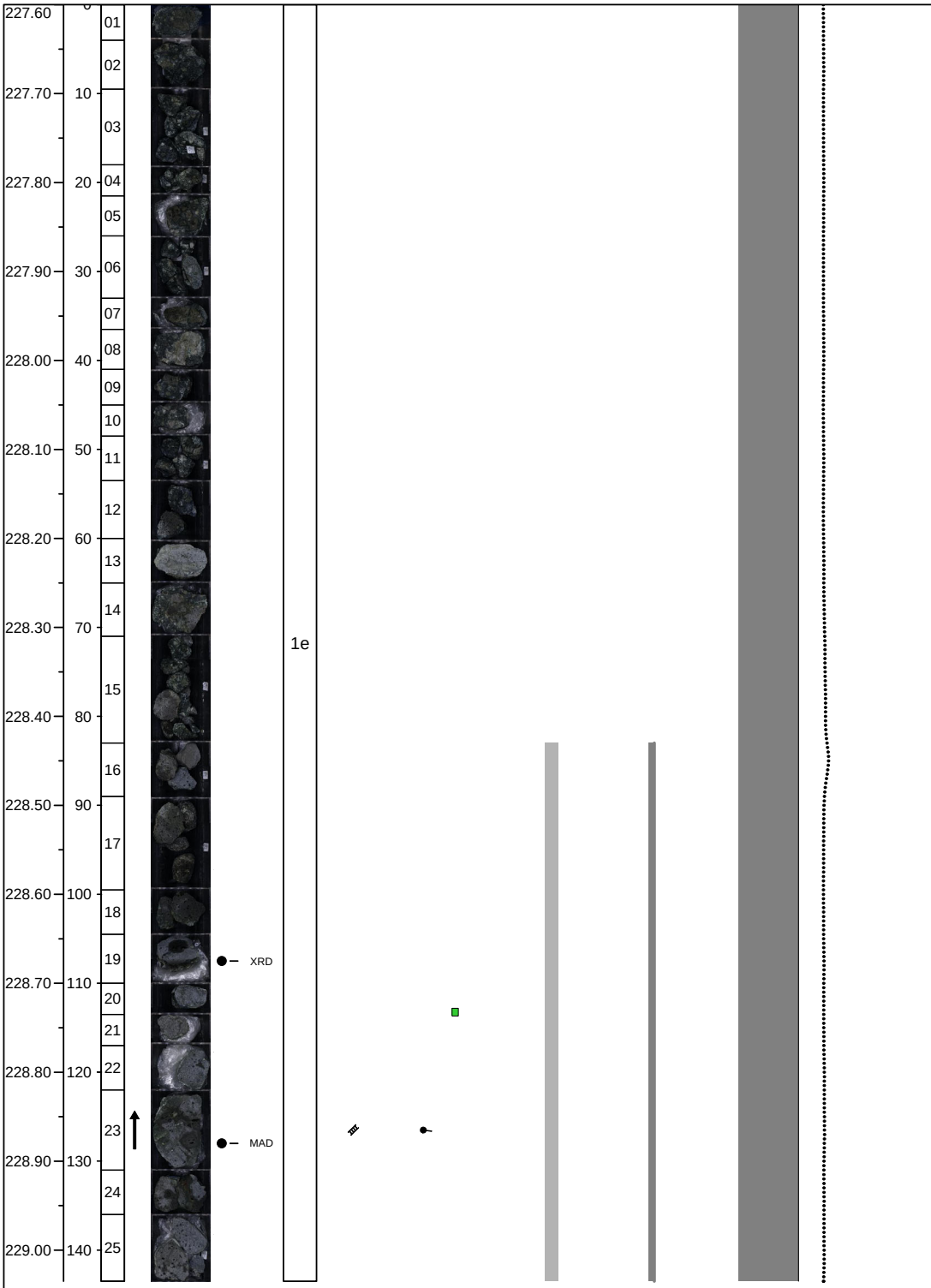
Hole 352-U1442A-26R Section 2, Top of Section: 219.34 m (CSF-A)



Description

Unit 1e: Core 25R-1, 0 cm, piece #01 to Core 30R-2, 76.5 cm, piece #4. Hyaloclastite breccia containing boninite clasts and pumice within a green glassy matrix. The boninite clasts contain sparse orthopyroxene and clinopyroxene phenocrysts. The groundmass phases are orthopyroxene and clinopyroxene in a glassy matrix. The clasts are sparsely to moderately vesicular (~2-15%) and with a maximum diameter of 6 mm and a mode of 1 mm. The glassy green matrix is highly altered to clay, but still contains portions of unaltered glass. 29R-1 piece #3 to piece #10 consists of lithified sediment that is composed mainly of plagioclase and calcite. A large fault gouge is at 29R-2 piece #1.

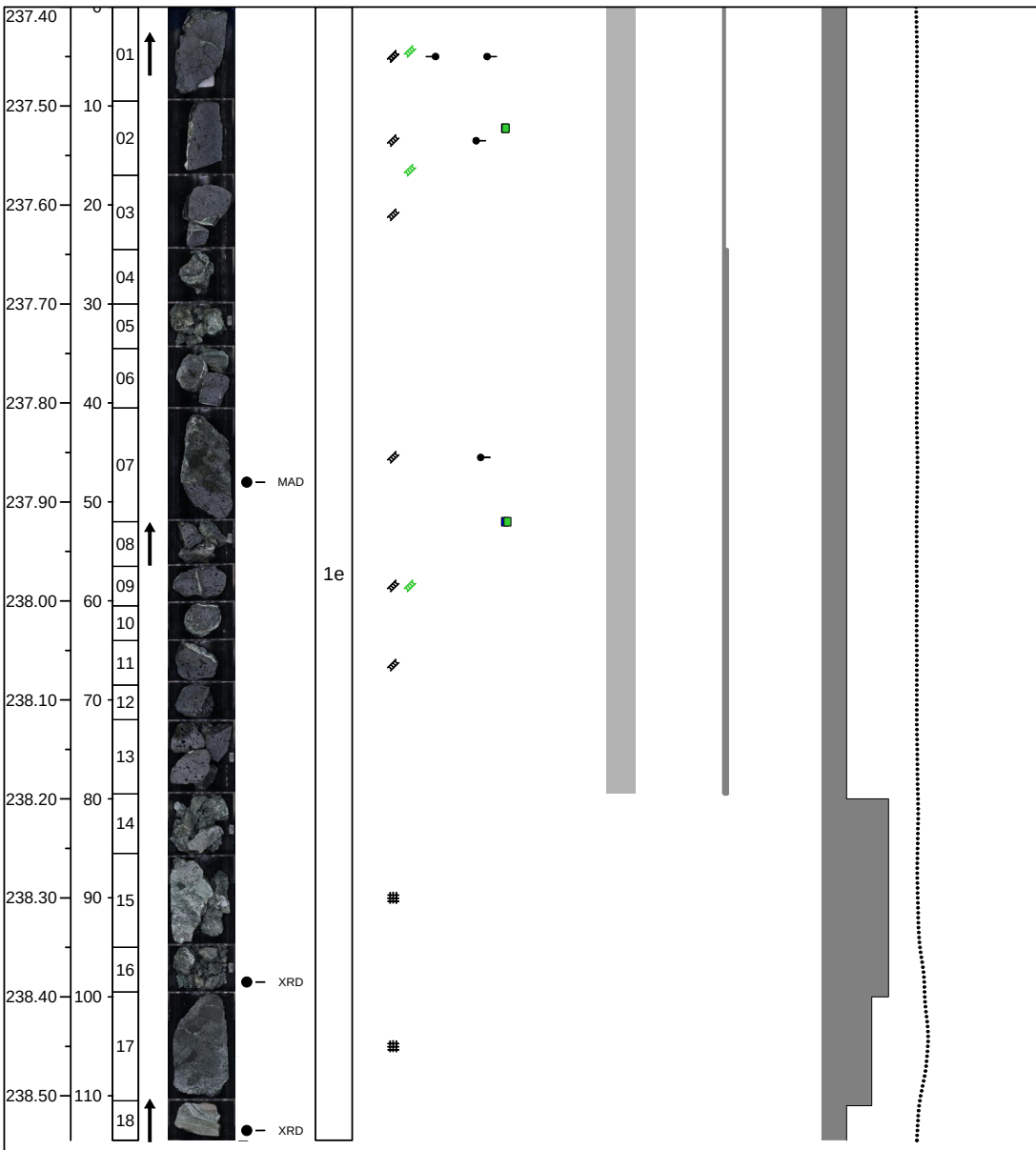
Hole 352-U1442A-27R Section 1, Top of Section: 227.6 m (CSF-A)



Description

Unit 1e: Core 25R-1, 0 cm, piece #01 to Core 30R-2, 76.5 cm, piece #4. Hyaloclastite breccia containing boninite clasts and pumice within a green glassy matrix. The boninite clasts contain sparse orthopyroxene and clinopyroxene phenocrysts. The groundmass phases are orthopyroxene and clinopyroxene in a glassy matrix. The clasts are sparsely to moderately vesicular (~2-15%) and with a maximum diameter of 6 mm and a mode of 1 mm. The glassy green matrix is highly altered to clay, but still contains portions of unaltered glass. 29R-1 piece #3 to piece #10 consists of lithified sediment that is composed mainly of plagioclase and calcite. A large fault gouge is at 29R-2 piece #1.

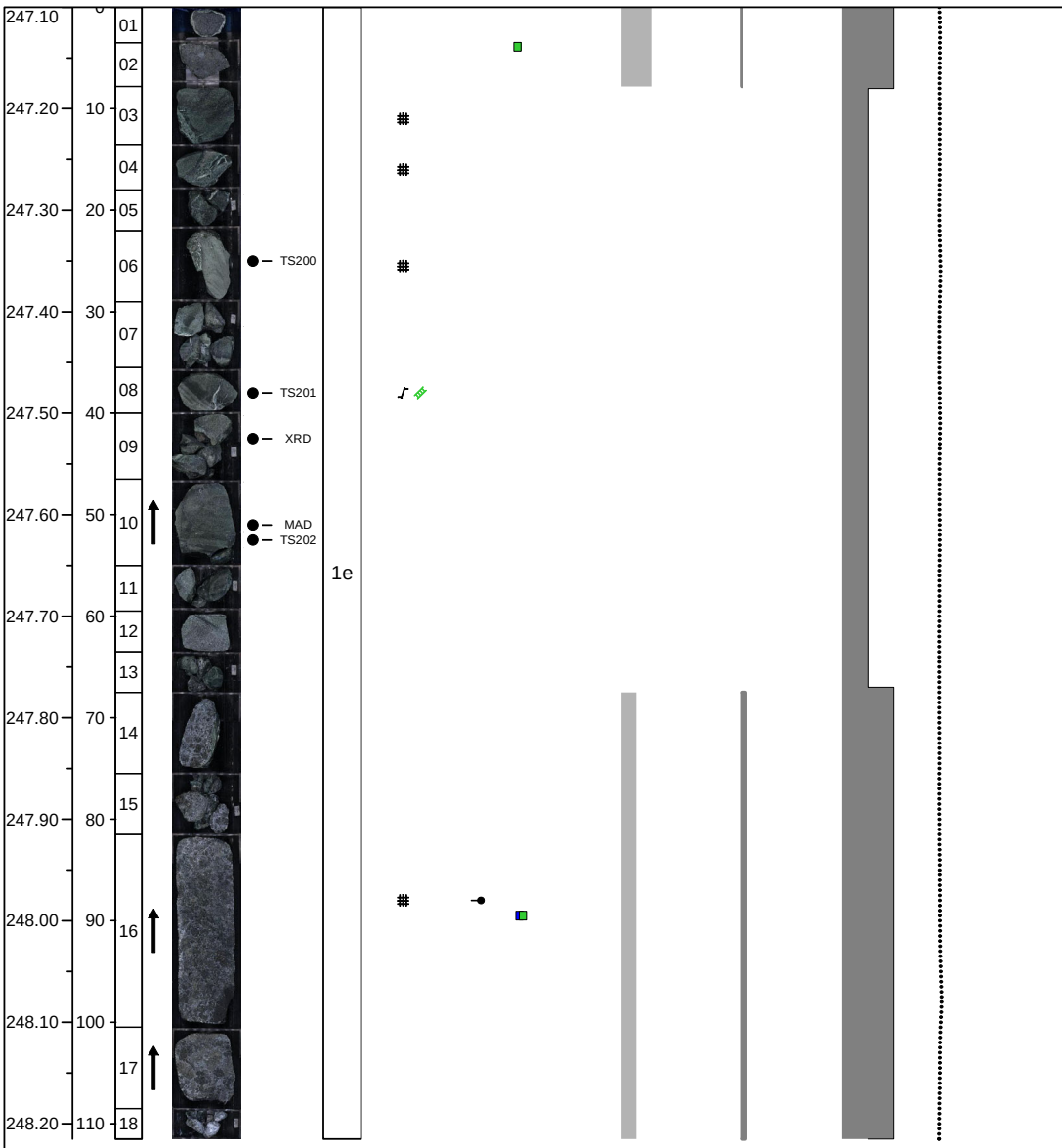
Hole 352-U1442A-28R Section 1, Top of Section: 237.4 m (CSF-A)



Description

Unit 1e: Core 25R-1, 0 cm, piece #01 to Core 30R-2, 76.5 cm, piece #4. Hyaloclastite breccia containing boninite clasts and pumice within a green glassy matrix. The boninite clasts contain sparse orthopyroxene and clinopyroxene phenocrysts. The groundmass phases are orthopyroxene and clinopyroxene in a glassy matrix. The clasts are sparsely to moderately vesicular (~2-15%) and with a maximum diameter of 6 mm and a mode of 1 mm. The glassy green matrix is highly altered to clay, but still contains portions of unaltered glass. 29R-1 piece #3 to piece #10 consists of lithified sediment that is composed mainly of plagioclase and calcite. A large fault gouge is at 29R-2 piece #1.

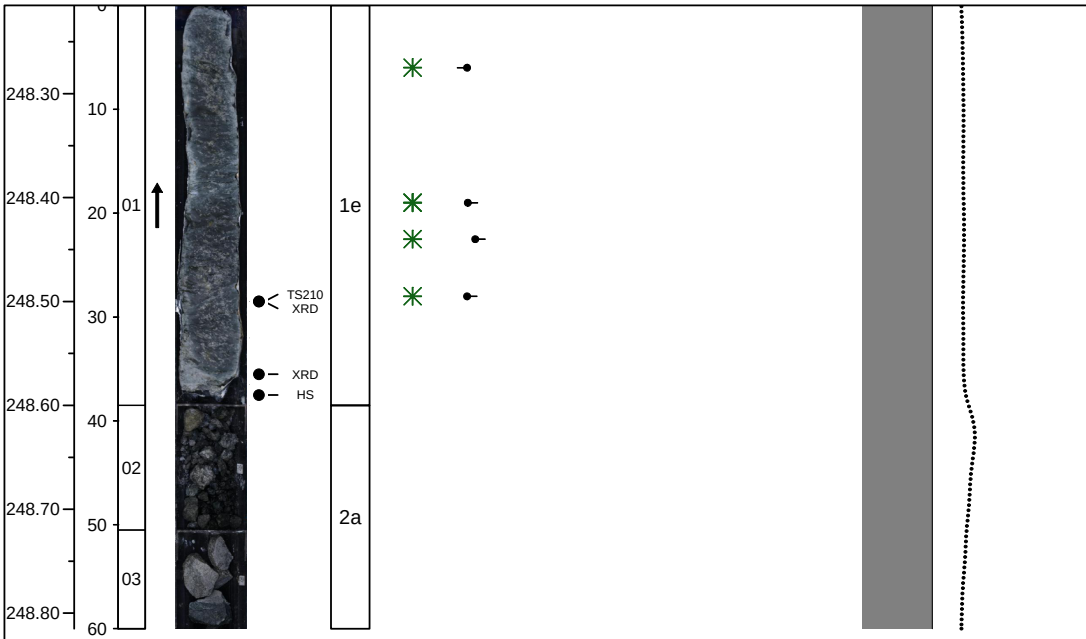
Hole 352-U1442A-29R Section 1, Top of Section: 247.1 m (CSF-A)



Description

Unit 1e: Core 25R-1, 0 cm, piece #01 to Core 30R-2, 76.5 cm, piece #4. Hyaloclastite breccia containing boninite clasts and pumice within a green glassy matrix. The boninite clasts contain sparse orthopyroxene and clinopyroxene phenocrysts. The groundmass phases are orthopyroxene and clinopyroxene in a glassy matrix. The clasts are sparsely to moderately vesicular (~2-15%) and with a maximum diameter of 6 mm and a mode of 1 mm. The glassy green matrix is highly altered to clay, but still contains portions of unaltered glass. 29R-1 piece #3 to piece #10 consists of lithified sediment that is composed mainly of plagioclase and calcite. A large fault gouge is at 29R-2 piece #1.

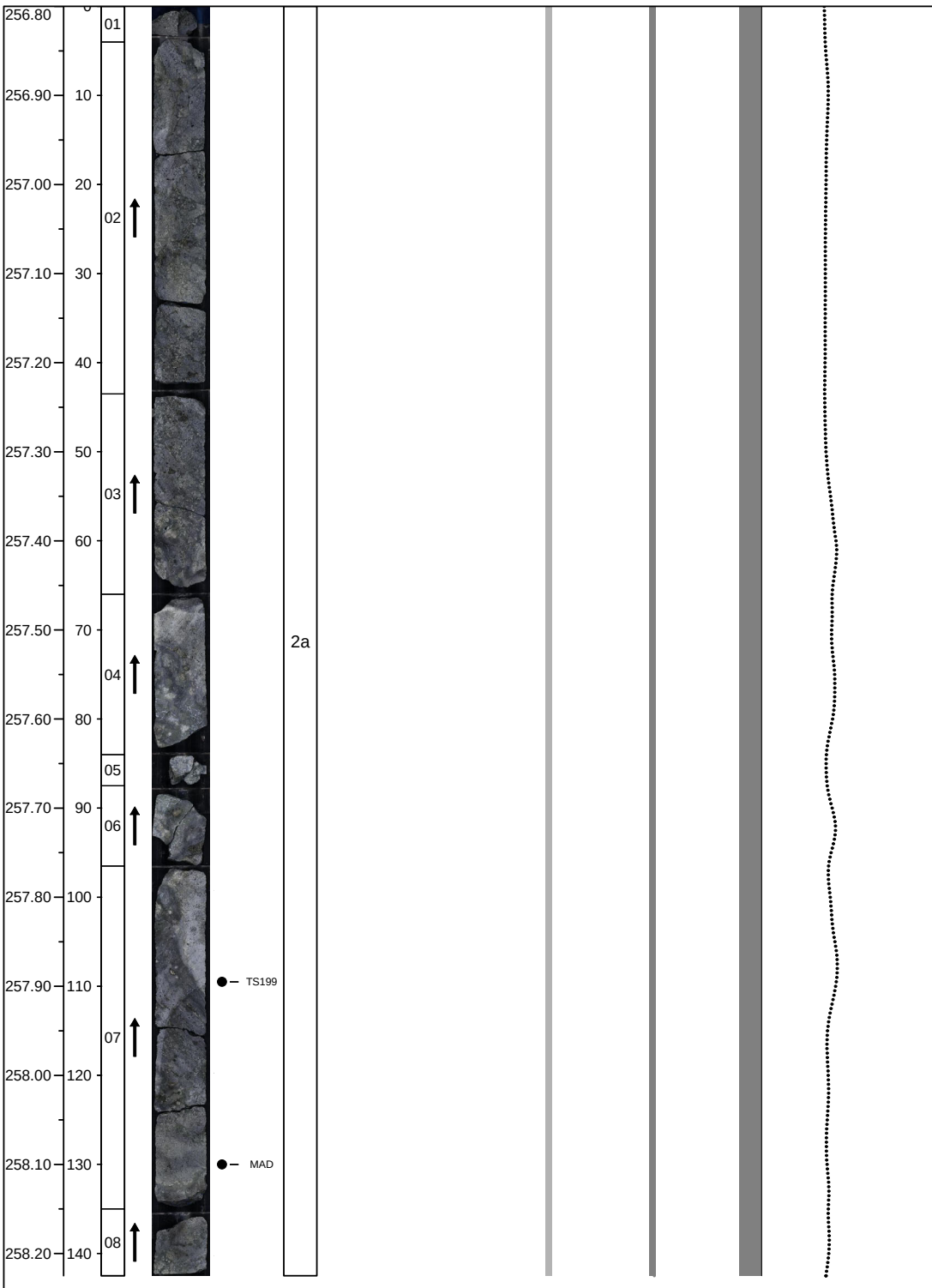
Hole 352-U1442A-29R Section 2, Top of Section: 248.215 m (CSF-A)



Unit 1e: Core 25R-1, 0 cm, piece #01 to Core 30R-2, 76.5 cm, piece #4. Hyaloclastite breccia containing boninite clasts and pumice within a green glassy matrix. The boninite clasts contain sparse orthopyroxene and clinopyroxene phenocrysts. The groundmass phases are orthopyroxene and clinopyroxene in a glassy matrix. The clasts are sparsely to moderately vesicular (~2-15%) and with a maximum diameter of 6 mm and a mode of 1 mm. The glassy green matrix is highly altered to clay, but still contains portions of unaltered glass. 29R-1 piece #3 to piece #10 consists of lithified sediment that is composed mainly of plagioclase and calcite. A large fault gouge is at 29R-2 piece #1.

Unit 2a: Core 29R-2, 38.5 cm, piece #02 to Core 35R-1, 39 cm, piece #09. Rounded to subangular clasts of moderate to highly vesicular boninite glass and lava with chilled rims, commonly intermingled with or intruded by lavas of evolved boninite. The boninite clasts contain sparse orthopyroxene and olivine phenocrysts, whereas the evolved boninites may contain augite ± plagioclase phenocrysts. Groundmass in the evolved boninites consists of microcrystalline clinopyroxene, plagioclase and, in some cases, orthopyroxene.

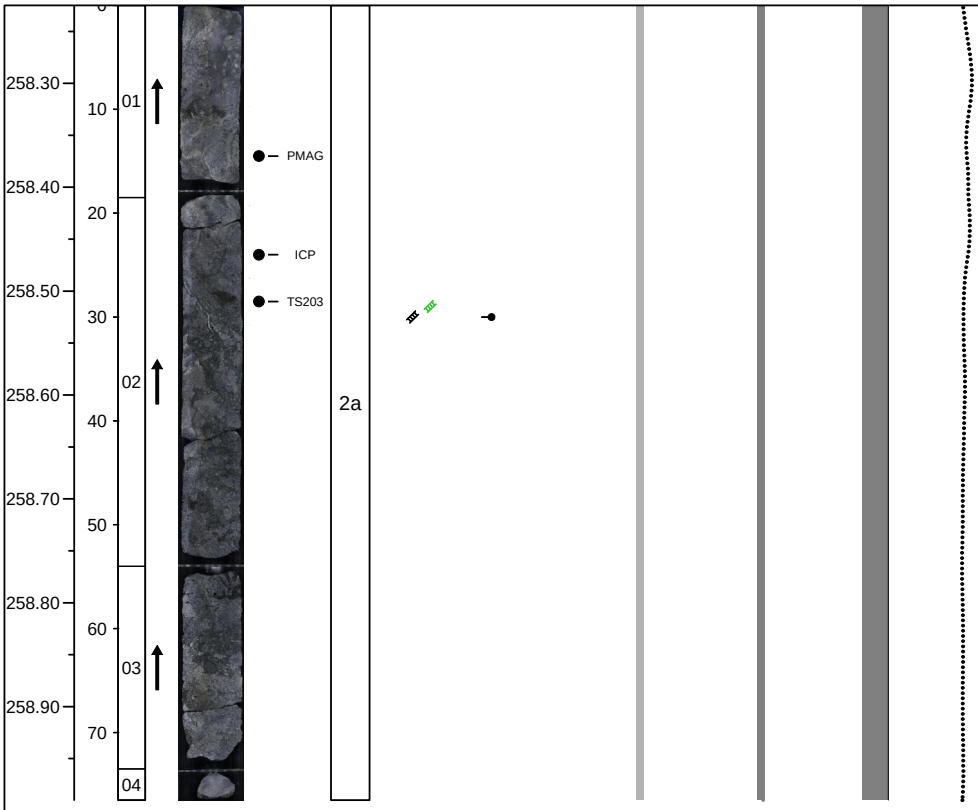
Hole 352-U1442A-30R Section 1, Top of Section: 256.8 m (CSF-A)



Description

Unit 2a: Core 25R-1, 0 cm, piece #01 to Core 30R-2, 76.5 cm, piece #4. Hyaloclastite breccia containing boninite clasts and pumice within a green glassy matrix. The boninite clasts contain sparse orthopyroxene and clinopyroxene phenocrysts. The groundmass phases are orthopyroxene and clinopyroxene in a glassy matrix. The clasts are sparsely to moderately vesicular (~2-15%) and with a maximum diameter of 6 mm and a mode of 1 mm. The glassy green matrix is highly altered to clay, but still contains portions of unaltered glass. 29R-1 piece #3 to piece #10 consists of lithified sediment that is composed mainly of plagioclase and calcite. A large fault gouge is at 29R-2 piece #1.

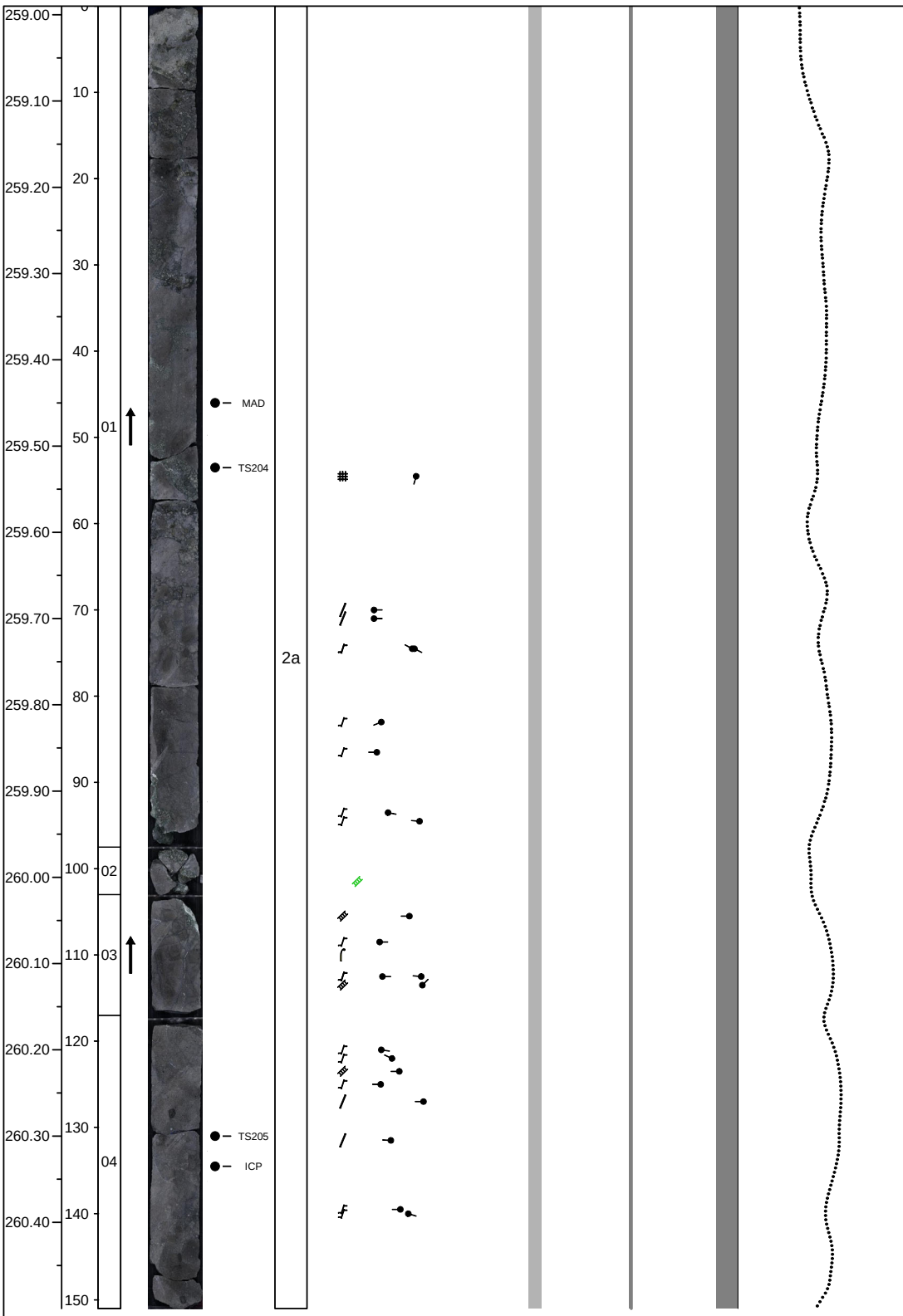
Hole 352-U1442A-30R Section 2, Top of Section: 258.225 m (CSF-A)



Description

Unit 2a: Core 25R-1, 0 cm, piece #01 to Core 30R-2, 76.5 cm, piece #4. Hyaloclastite breccia containing boninite clasts and pumice within a green glassy matrix. The boninite clasts contain sparse orthopyroxene and clinopyroxene phenocrysts. The groundmass phases are orthopyroxene and clinopyroxene in a glassy matrix. The clasts are sparsely to moderately vesicular (~2-15%) and with a maximum diameter of 6 mm and a mode of 1 mm. The glassy green matrix is highly altered to clay, but still contains portions of unaltered glass. 29R-1 piece #3 to piece #10 consists of lithified sediment that is composed mainly of plagioclase and calcite. A large fault gouge is at 29R-2 piece #1.

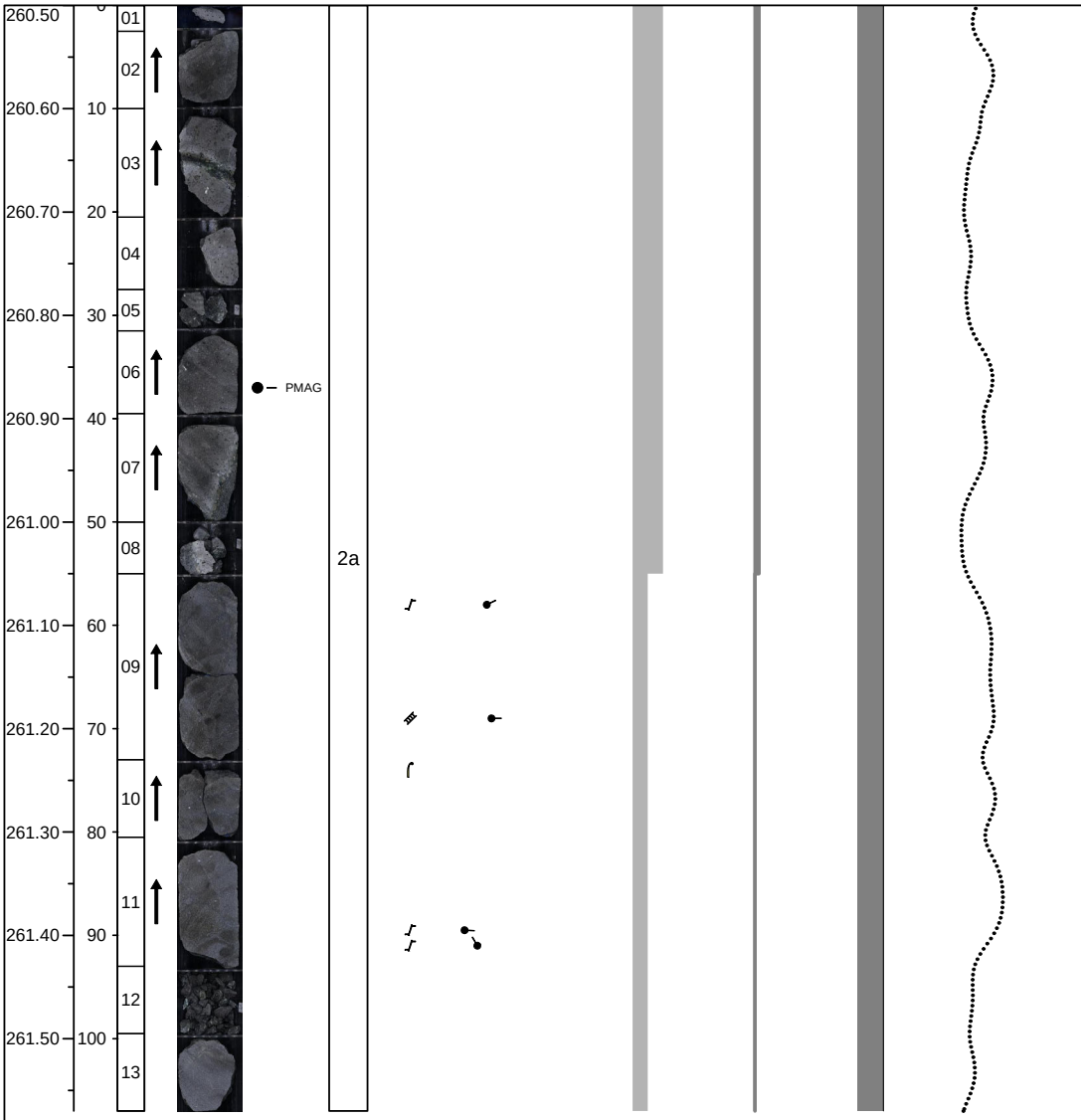
Hole 352-U1442A-30R Section 3, Top of Section: 258.99 m (CSF-A)



Description

Unit 2a: Core 30R-3, 0 cm, piece #01 to Core 35R-1, 39 cm, piece #09. Rounded to subangular clasts of moderate to highly vesicular boninite glass and lava with chilled rims, commonly intermingled with or intruded by lavas of evolved boninite. The boninite clasts contain sparse orthopyroxene and olivine phenocrysts, whereas the evolved boninites may contain augite +/- plagioclase phenocrysts. Groundmass in the evolved boninites consists of microcrystalline clinopyroxene, plagioclase and, in some cases, orthopyroxene.

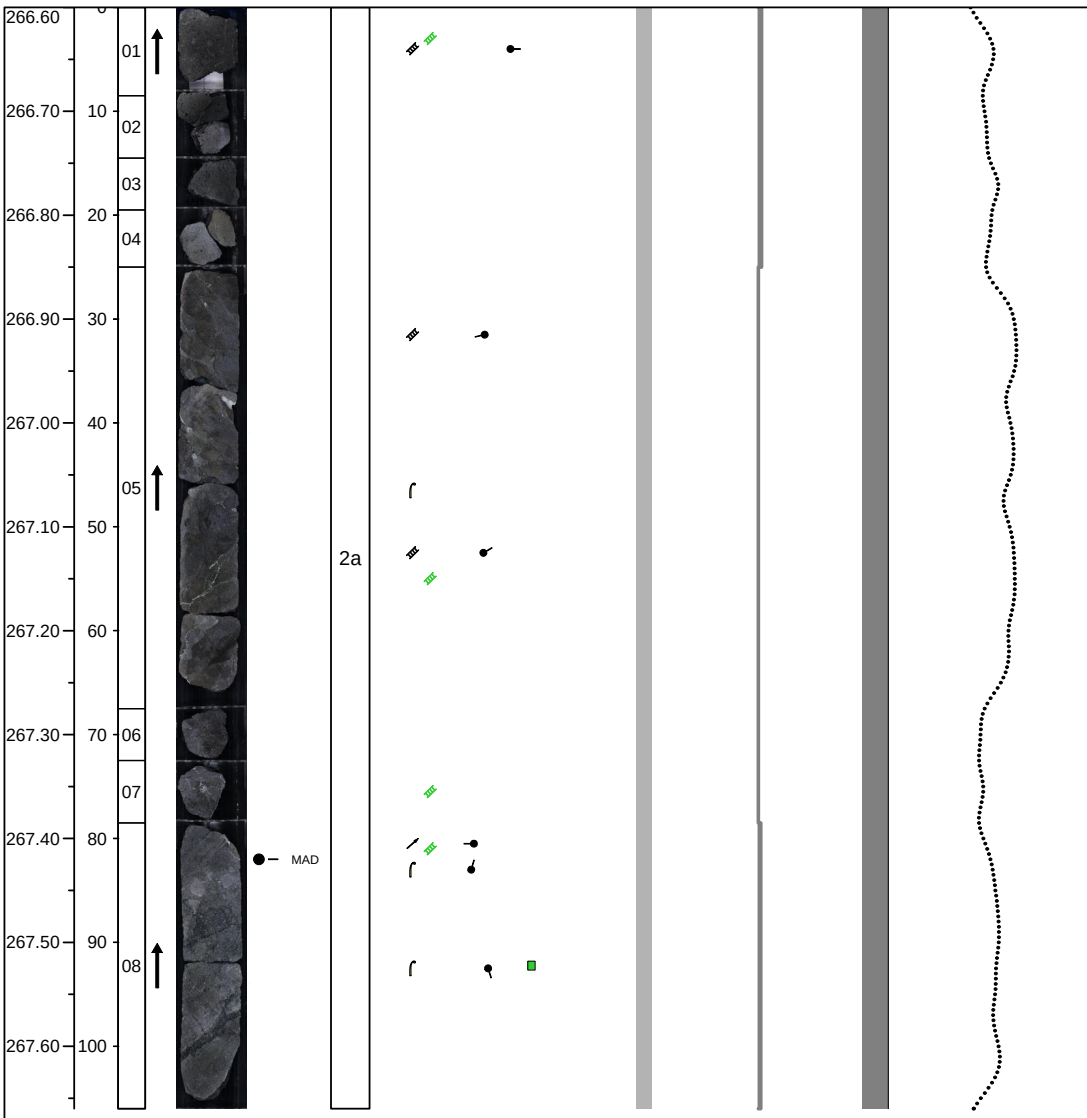
Hole 352-U1442A-30R Section 4, Top of Section: 260.5 m (CSF-A)



Description

Unit 2a: Core 30R-3, 0 cm, piece #01 to Core 35R-1, 39 cm, piece #09. Rounded to subangular clasts of moderate to highly vesicular boninite glass and lava with chilled rims, commonly intermingled with or intruded by lavas of evolved boninite. The boninite clasts contain sparse orthopyroxene and olivine phenocrysts, whereas the evolved boninites may contain augite +/- plagioclase phenocrysts. Groundmass in the evolved boninites consists of microcrystalline clinopyroxene, plagioclase and, in some cases, orthopyroxene.

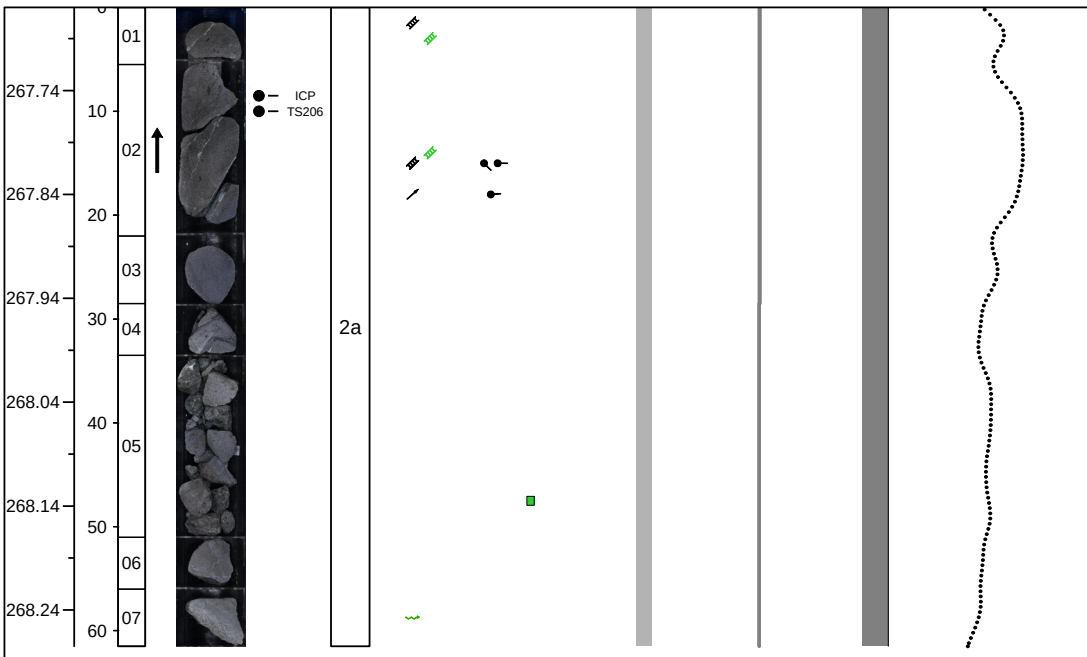
Hole 352-U1442A-31R Section 1, Top of Section: 266.6 m (CSF-A)



Description

Unit 2a: Core 30R-3, 0 cm, piece #01 to Core 35R-1, 39 cm, piece #09. Rounded to subangular clasts of moderate to highly vesicular boninite glass and lava with chilled rims, commonly intermingled with or intruded by lavas of evolved boninite. The boninite clasts contain sparse orthopyroxene and olivine phenocrysts, whereas the evolved boninites may contain augite +/- plagioclase phenocrysts. Groundmass in the evolved boninites consists of microcrystalline clinopyroxene, plagioclase and, in some cases, orthopyroxene.

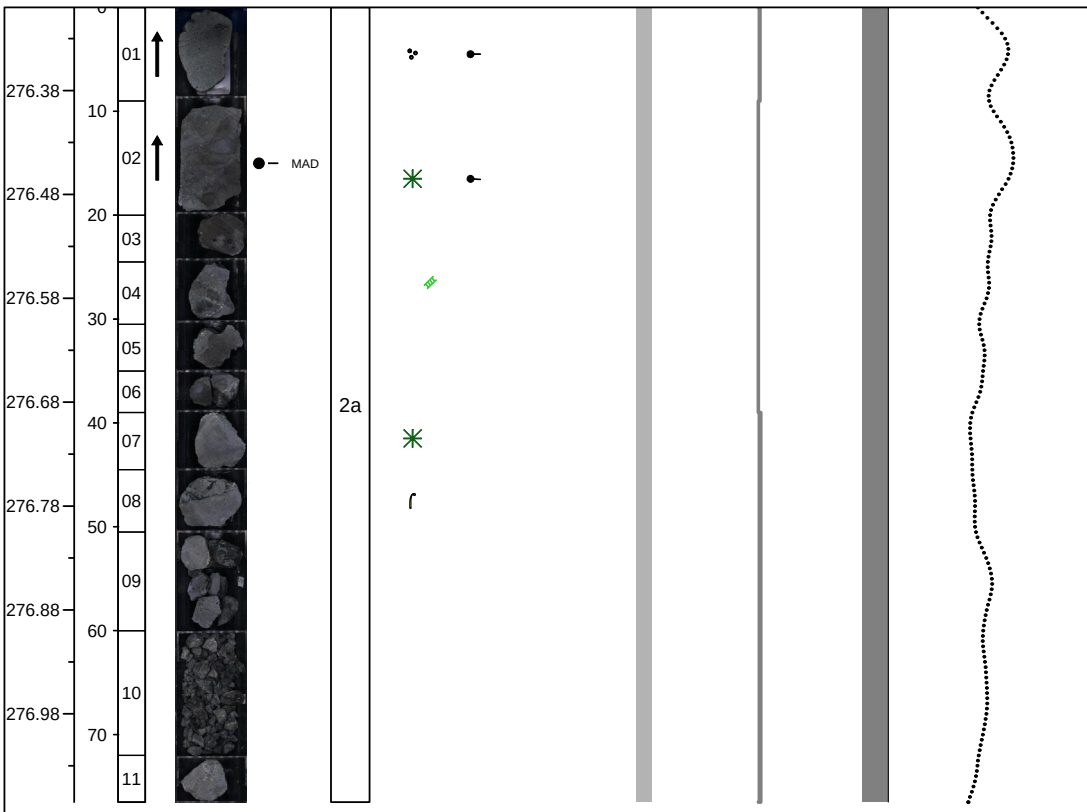
Hole 352-U1442A-31R Section 2, Top of Section: 267.66 m (CSF-A)



Description

Unit 2a: Core 30R-3, 0 cm, piece #01 to Core 35R-1, 39 cm, piece #09. Rounded to subangular clasts of moderate to highly vesicular boninite glass and lava with chilled rims, commonly intermingled with or intruded by lavas of evolved boninite. The boninite clasts contain sparse orthopyroxene and olivine phenocrysts, whereas the evolved boninites may contain augite +/- plagioclase phenocrysts. Groundmass in the evolved boninites consists of microcrystalline clinopyroxene, plagioclase and, in some cases, orthopyroxene.

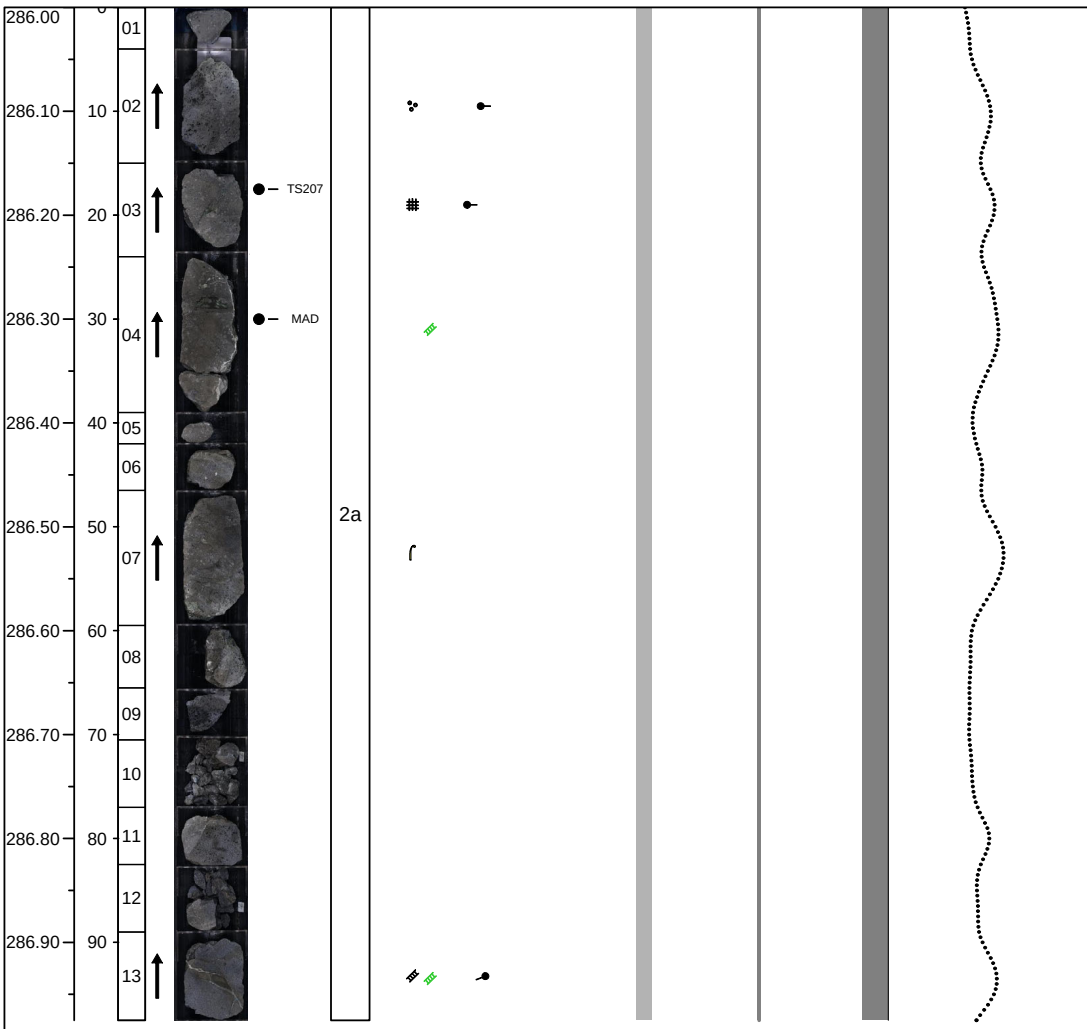
Hole 352-U1442A-32R Section 1, Top of Section: 276.3 m (CSF-A)



Description

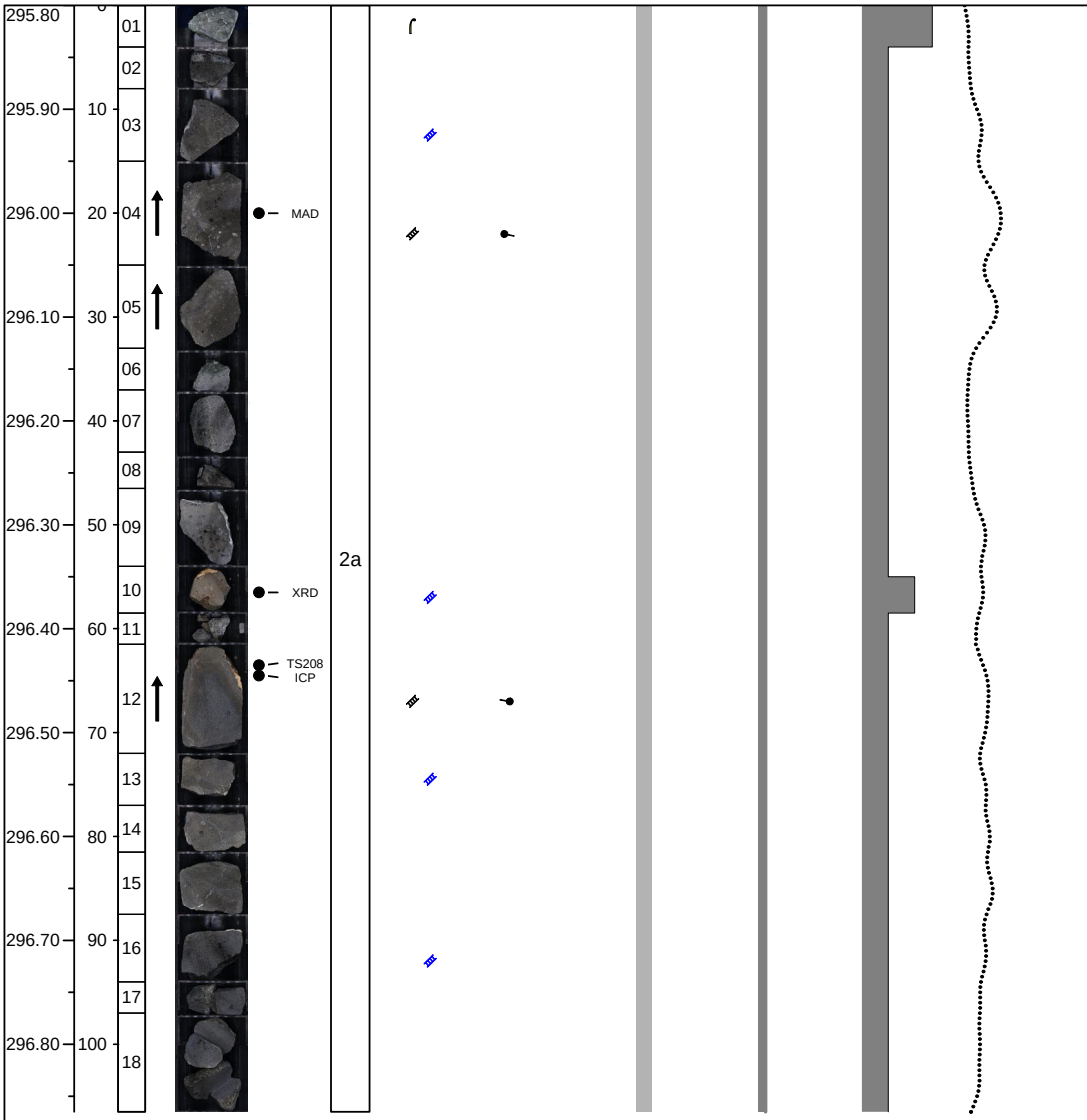
Unit 2a: Core 30R-3, 0 cm, piece #01 to Core 35R-1, 39 cm, piece #09. Rounded to subangular clasts of moderate to highly vesicular boninite glass and lava with chilled rims, commonly intermingled with or intruded by lavas of evolved boninite. The boninite clasts contain sparse orthopyroxene and olivine phenocrysts, whereas the evolved boninites may contain augite +/- plagioclase phenocrysts. Groundmass in the evolved boninites consists of microcrystalline clinopyroxene, plagioclase and, in some cases, orthopyroxene.

Hole 352-U1442A-33R Section 1, Top of Section: 286.0 m (CSF-A)



Unit 2a: Core 30R-3, 0 cm, piece #01 to Core 35R-1, 39 cm, piece #09. Rounded to subangular clasts of moderate to highly vesicular boninite glass and lava with chilled rims, commonly intermingled with or intruded by lavas of evolved boninite. The boninite clasts contain sparse orthopyroxene and olivine phenocrysts, whereas the evolved boninites may contain augite +/- plagioclase phenocrysts. Groundmass in the evolved boninites consists of microcrystalline clinopyroxene, plagioclase and, in some cases, orthopyroxene.

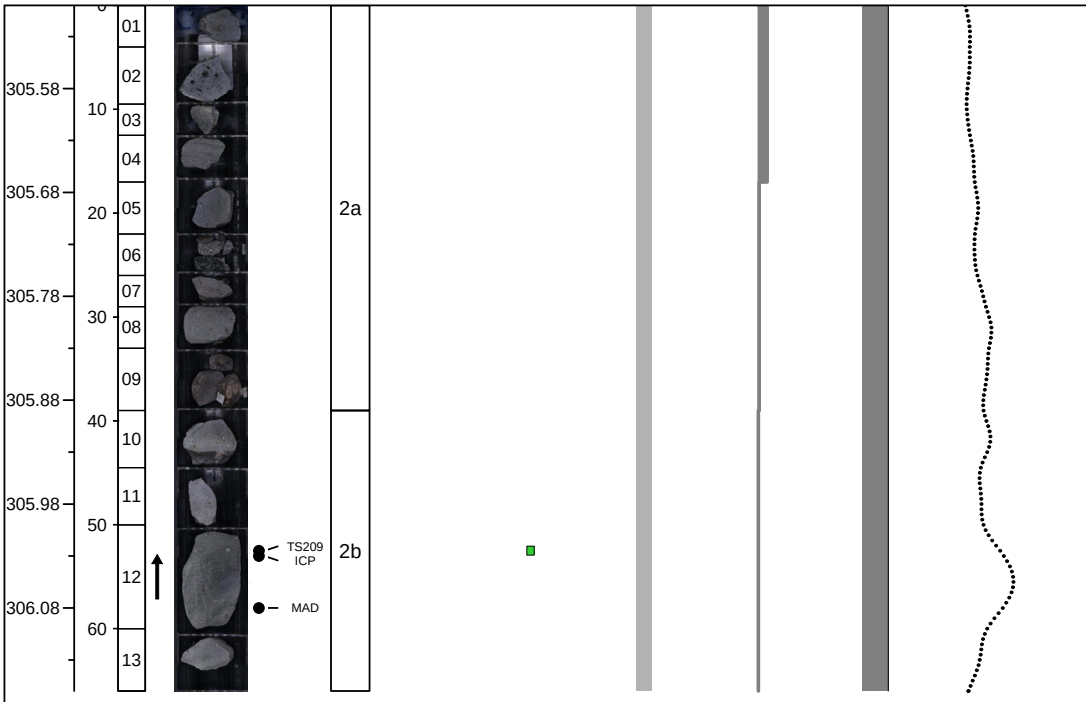
Hole 352-U1442A-34R Section 1, Top of Section: 295.8 m (CSF-A)



Description

Unit 2a: Core 30R-3, 0 cm, piece #01 to Core 35R-1, 39 cm, piece #09. Rounded to subangular clasts of moderate to highly vesicular boninite glass and lava with chilled rims, commonly intermingled with or intruded by lavas of evolved boninite. The boninite clasts contain sparse orthopyroxene and olivine phenocrysts, whereas the evolved boninites may contain augite +/- plagioclase phenocrysts. Groundmass in the evolved boninites consists of microcrystalline clinopyroxene, plagioclase and, in some cases, orthopyroxene.

Hole 352-U1442A-35R Section 1, Top of Section: 305.5 m (CSF-A)

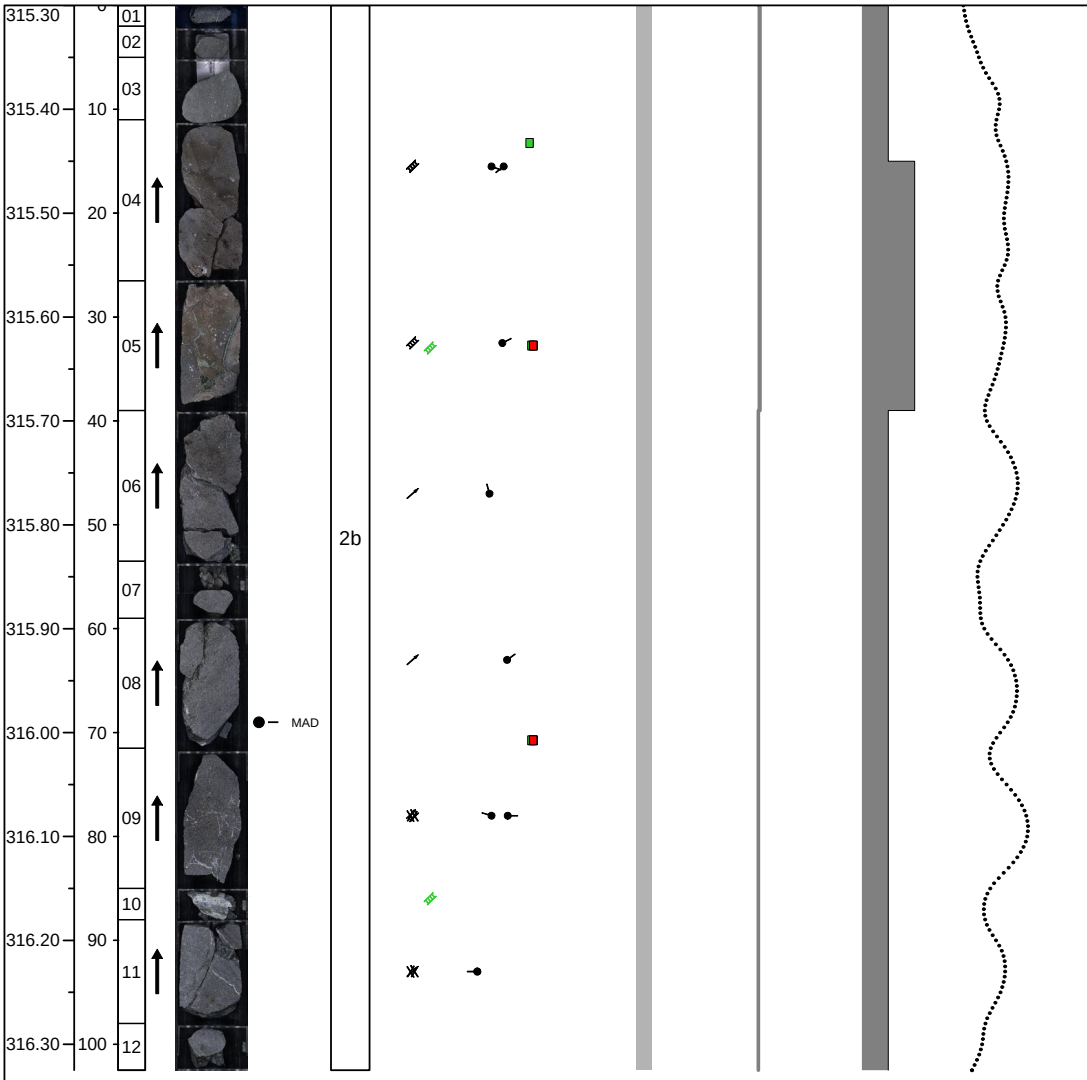


Description

Unit 2a: Core 30R-3, 0 cm, piece #01 to Core 35R-1, 39 cm, piece #09. Rounded to subangular clasts of moderate to highly vesicular boninite glass and lava with chilled rims, commonly intermingled with or intruded by lavas of evolved boninite. The boninite clasts contain sparse orthopyroxene and olivine phenocrysts, whereas the evolved boninites may contain augite +/- plagioclase phenocrysts. Groundmass in the evolved boninites consists of microcrystalline clinopyroxene, plagioclase and, in some cases, orthopyroxene.

Unit 2b: Core 35R-1, 39 cm, piece #10 to Core 44R-1, 21 cm, piece #07. Evolved boninite lavas containing sparse phenocrysts of olivine plagioclase and clinopyroxene crystals. While clinopyroxene is often the sole phenocryst phase, olivine and plagioclase phenocrysts are rarely present without clinopyroxene. Clinopyroxene abundance increases significantly (up to 15 modal %) in the middle of the unit (Cores 35R through 37R); in this rare instance, olivine and plagioclase are also present as phenocrysts in sparse to moderate amounts. The lava is sparsely to moderately vesicular (~1-10%), with a maximum diameter of 8 mm and a mode of 1 mm. Possible dikes, characterized by uniformly fine-grained to aphanitic textures, and a complete lack of vesicles or glass pillow rims, are found in several core sections within this unit (e.g., U1442A-37R-1, Pieces #10-14; U1442A-38R-1, Pieces #6-18; U1442A-41R-1, all; and U1442A-43R-1, Pieces #5-9).

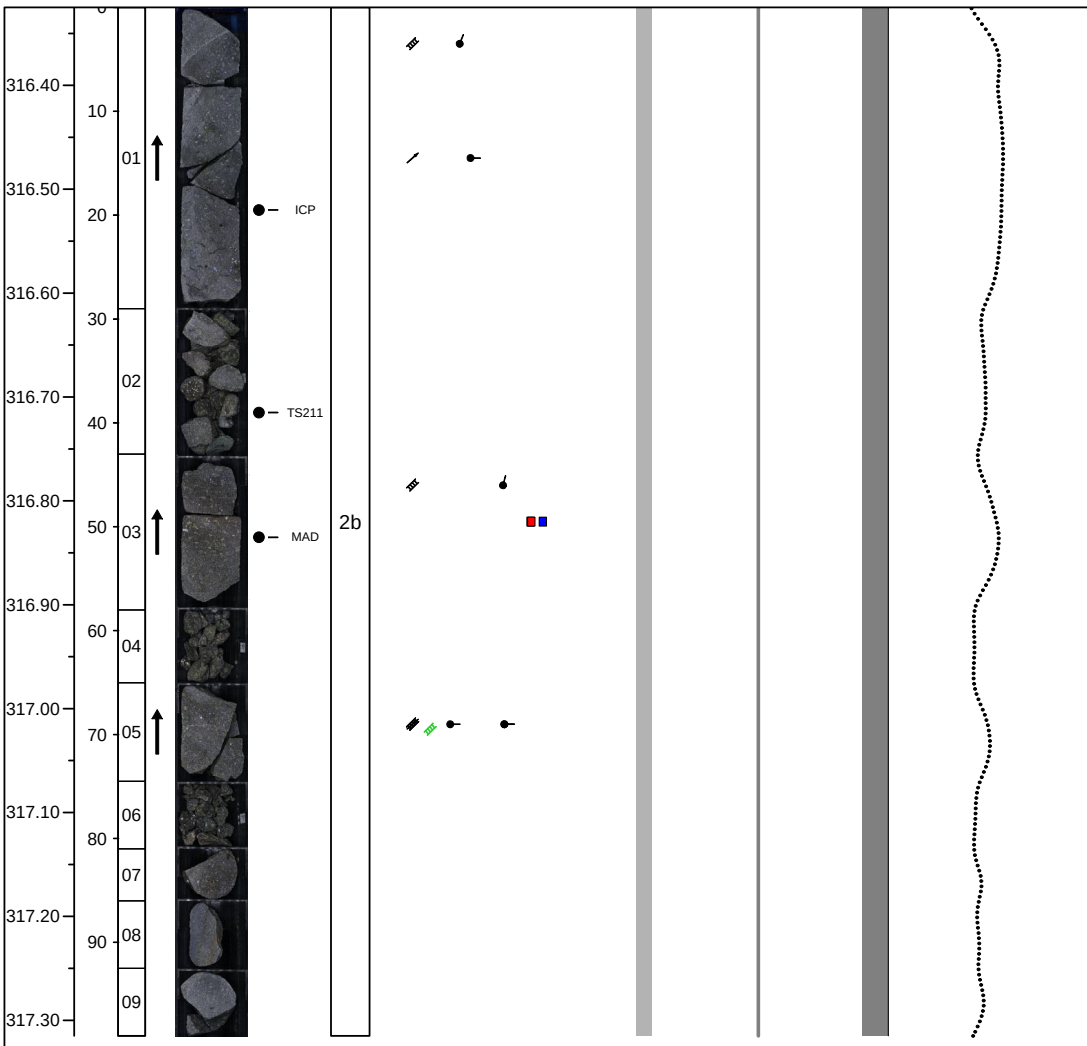
Hole 352-U1442A-36R Section 1, Top of Section: 315.3 m (CSF-A)



Description

Unit 2b: Core 35R-1, 39 cm, piece #10 to Core 44R-1, 21 cm, piece #07. Evolved boninite lavas containing sparse phenocrysts of olivine plagioclase and clinopyroxene crystals. While clinopyroxene is often the sole phenocryst phase, olivine and plagioclase phenocrysts are rarely present without clinopyroxene. Clinopyroxene abundance increases significantly (up to 15 modal %) in the middle of the unit (Cores 35R through 37R); in this rare instance, olivine and plagioclase are also present as phenocrysts in sparse to moderate amounts. The lava is sparsely to moderately vesicular (~1-10%), with a maximum diameter of 8 mm and a mode of 1 mm. Possible dikes, characterized by uniformly fine-grained to aphanitic textures, and a complete lack of vesicles or glass pillow rims, are found in several core sections within this unit (e.g., U1442A-37R-1, Pieces #10-14; U1442A-38R-1, Pieces #6-18; U1442A-41R-1, all; and U1442A-43R-1, Pieces #5-9).

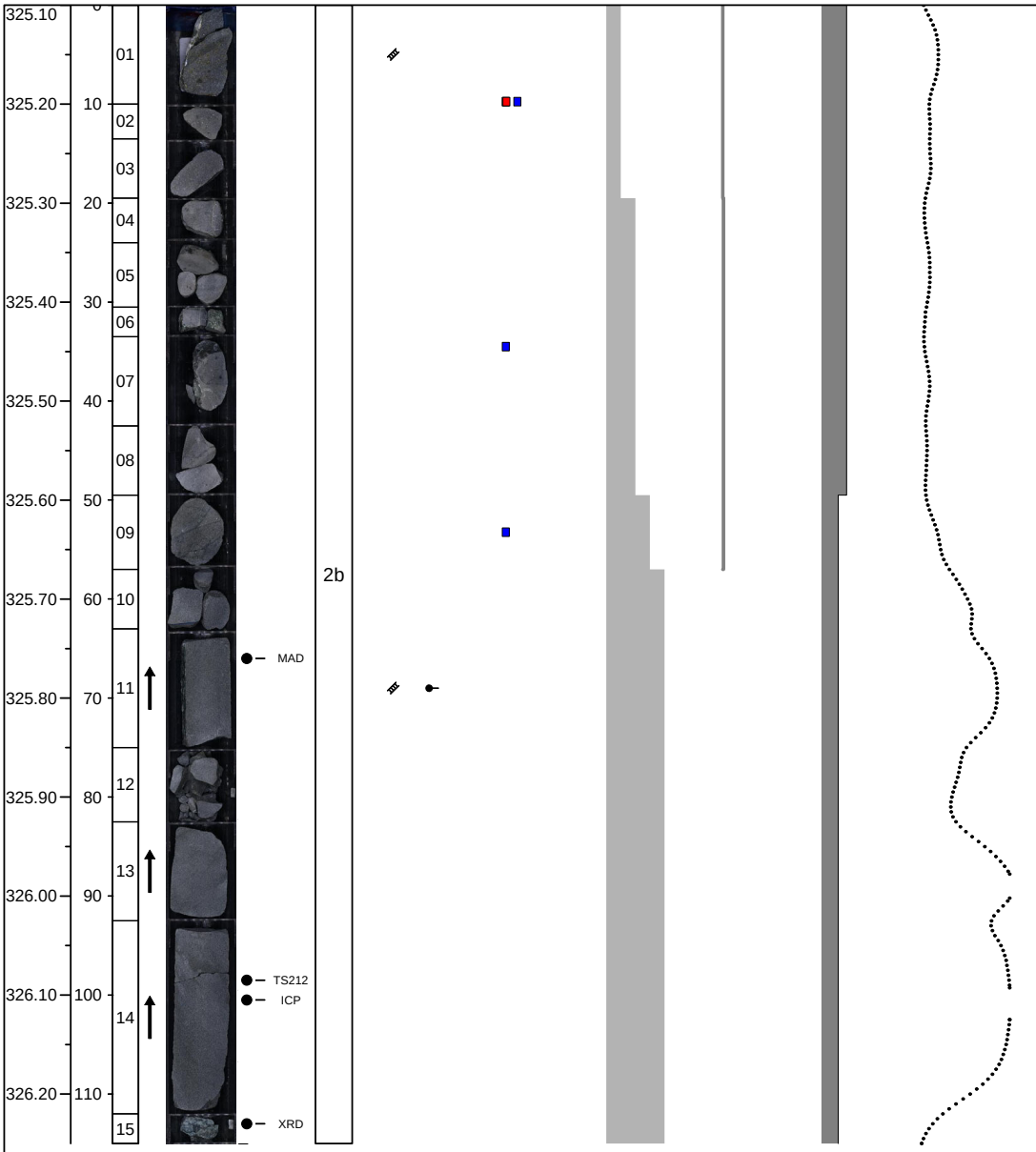
Hole 352-U1442A-36R Section 2, Top of Section: 316.325 m (CSF-A)



Description

Unit 2b: Core 35R-1, 39 cm, piece #10 to Core 44R-1, 21 cm, piece #07. Evolved boninite lavas containing sparse phenocrysts of olivine plagioclase and clinopyroxene crystals. While clinopyroxene is often the sole phenocryst phase, olivine and plagioclase phenocrysts are rarely present without clinopyroxene. Clinopyroxene abundance increases significantly (up to 15 modal %) in the middle of the unit (Cores 35R through 37R); in this rare instance, olivine and plagioclase are also present as phenocrysts in sparse to moderate amounts. The lava is sparsely to moderately vesicular (~1-10%), with a maximum diameter of 8 mm and a mode of 1 mm. Possible dikes, characterized by uniformly fine-grained to aphanitic textures, and a complete lack of vesicles or glass pillow rims, are found in several core sections within this unit (e.g., U1442A-37R-1, Pieces #10-14; U1442A-38R-1, Pieces #6-18; U1442A-41R-1, all; and U1442A-43R-1, Pieces #5-9).

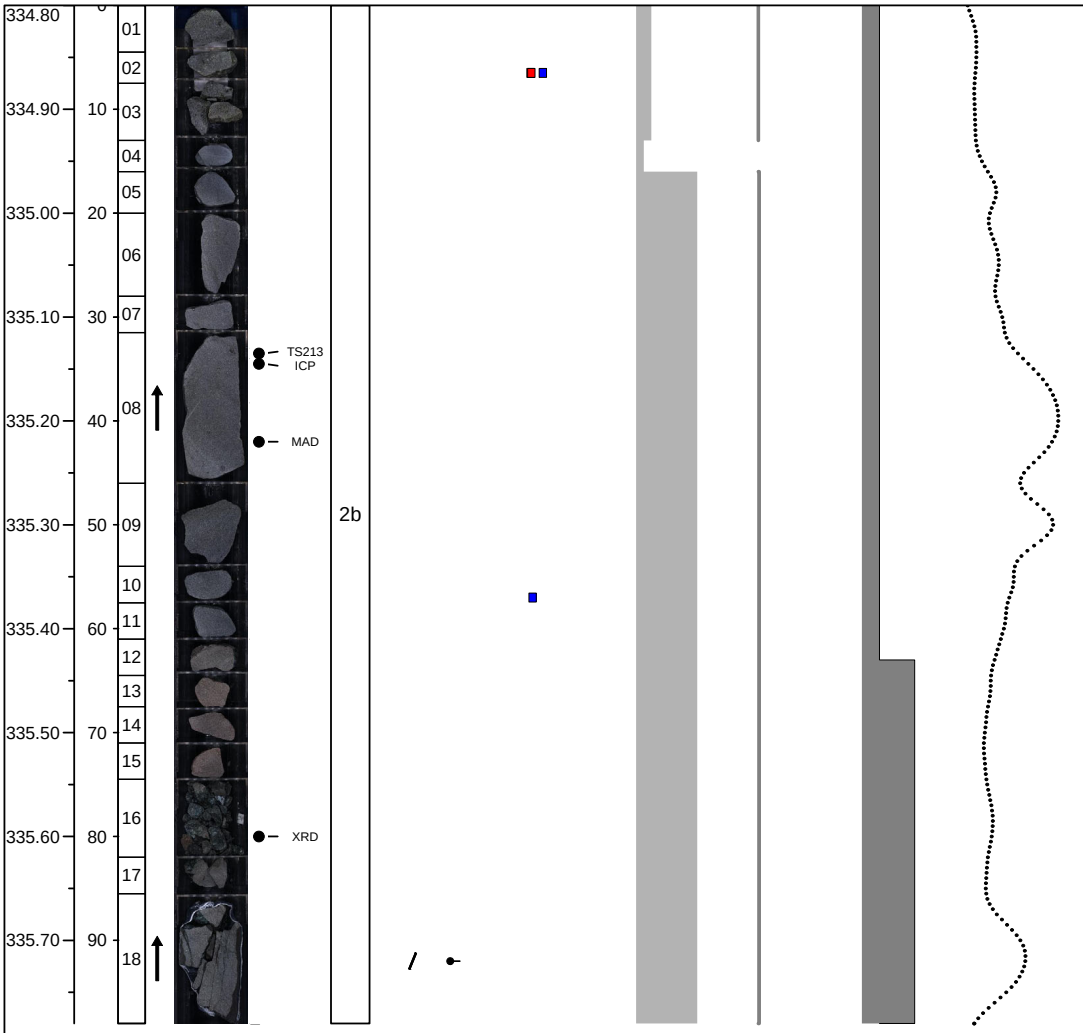
Hole 352-U1442A-37R Section 1, Top of Section: 325.1 m (CSF-A)



Description

Unit 2b: Core 35R-1, 39 cm, piece #10 to Core 44R-1, 21 cm, piece #07. Evolved boninite lavas containing sparse phenocrysts of olivine plagioclase and clinopyroxene crystals. While clinopyroxene is often the sole phenocryst phase, olivine and plagioclase phenocrysts are rarely present without clinopyroxene. Clinopyroxene abundance increases significantly (up to 15 modal %) in the middle of the unit (Cores 35R through 37R); in this rare instance, olivine and plagioclase are also present as phenocrysts in sparse to moderate amounts. The lava is sparsely to moderately vesicular (~1-10%), with a maximum diameter of 8 mm and a mode of 1 mm. Possible dikes, characterized by uniformly fine-grained to aphanitic textures, and a complete lack of vesicles or glass pillow rims, are found in several core sections within this unit (e.g., U1442A-37R-1, Pieces #10-14; U1442A-38R-1, Pieces #6-18; U1442A-41R-1, all; and U1442A-43R-1, Pieces #5-9).

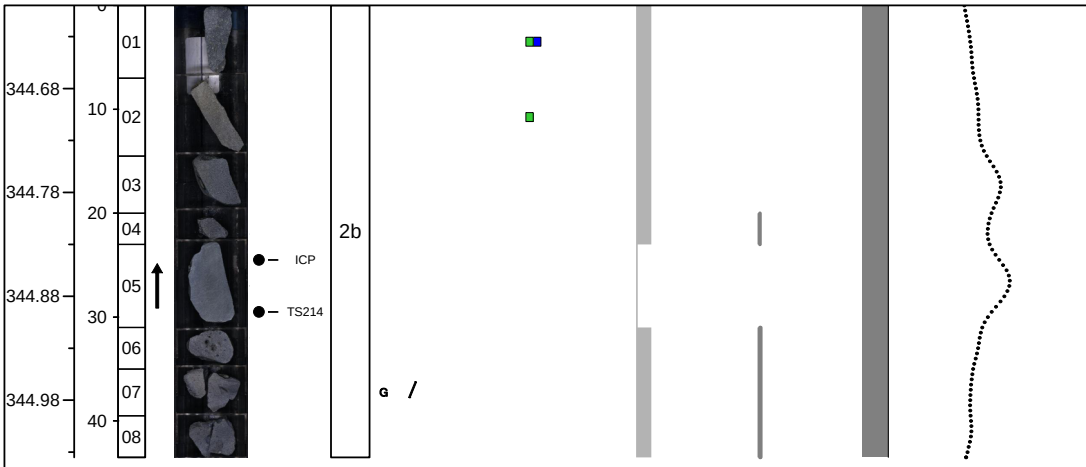
Hole 352-U1442A-38R Section 1, Top of Section: 334.8 m (CSF-A)



Description

Unit 2b: Core 35R-1, 39 cm, piece #10 to Core 44R-1, 21 cm, piece #07. Evolved boninite lavas containing sparse phenocrysts of olivine plagioclase and clinopyroxene crystals. While clinopyroxene is often the sole phenocryst phase, olivine and plagioclase phenocrysts are rarely present without clinopyroxene. Clinopyroxene abundance increases significantly (up to 15 modal %) in the middle of the unit (Cores 35R through 37R); in this rare instance, olivine and plagioclase are also present as phenocrysts in sparse to moderate amounts. The lava is sparsely to moderately vesicular (~1-10%), with a maximum diameter of 8 mm and a mode of 1 mm. Possible dikes, characterized by uniformly fine-grained to aphanitic textures, and a complete lack of vesicles or glass pillow rims, are found in several core sections within this unit (e.g., U1442A-37R-1, Pieces #10-14; U1442A-38R-1, Pieces #6-18; U1442A-41R-1, all; and U1442A-43R-1, Pieces #5-9).

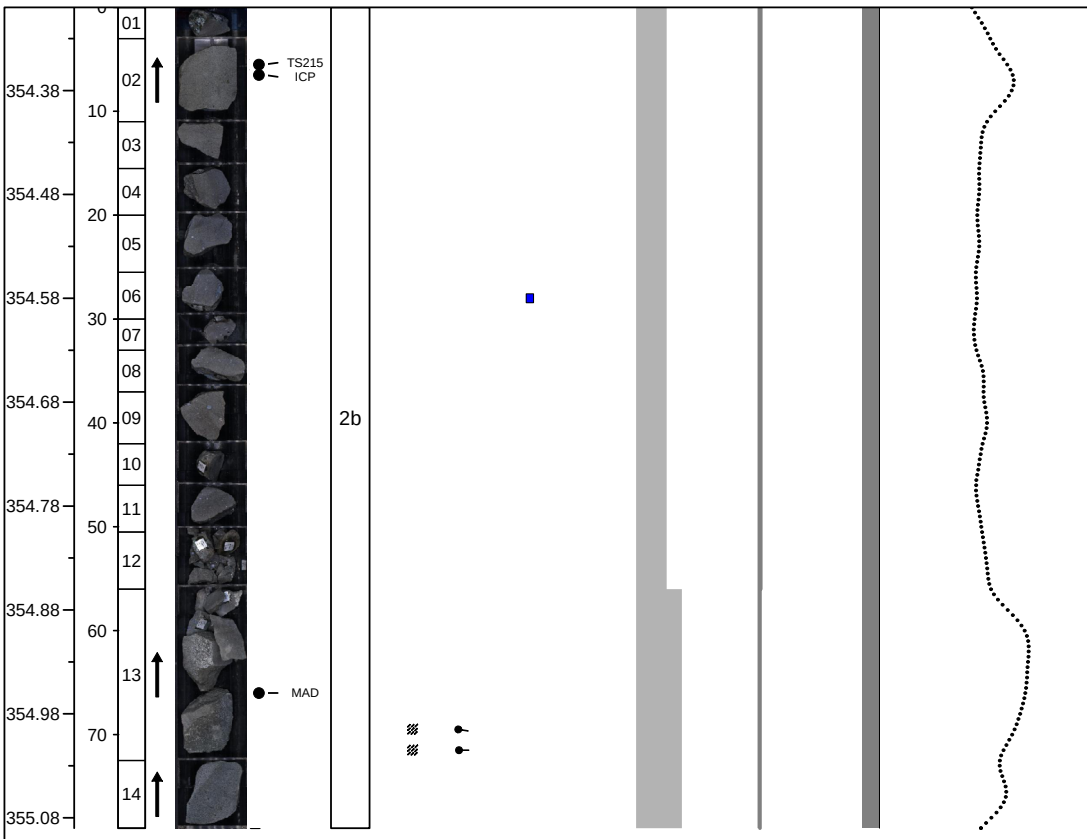
Hole 352-U1442A-39R Section 1, Top of Section: 344.6 m (CSF-A)



Description

Unit 2b: Core 35R-1, 39 cm, piece #10 to Core 44R-1, 21 cm, piece #07. Evolved boninite lavas containing sparse phenocrysts of olivine plagioclase and clinopyroxene crystals. While clinopyroxene is often the sole phenocryst phase, olivine and plagioclase phenocrysts are rarely present without clinopyroxene. Clinopyroxene abundance increases significantly (up to 15 modal %) in the middle of the unit (Cores 35R through 37R); in this rare instance, olivine and plagioclase are also present as phenocrysts in sparse to moderate amounts. The lava is sparsely to moderately vesicular (~1-10%), with a maximum diameter of 8 mm and a mode of 1 mm. Possible dikes, characterized by uniformly fine-grained to aphanitic textures, and a complete lack of vesicles or glass pillow rims, are found in several core sections within this unit (e.g., U1442A-37R-1, Pieces #10-14; U1442A-38R-1, Pieces #6-18; U1442A-41R-1, all; and U1442A-43R-1, Pieces #5-9).

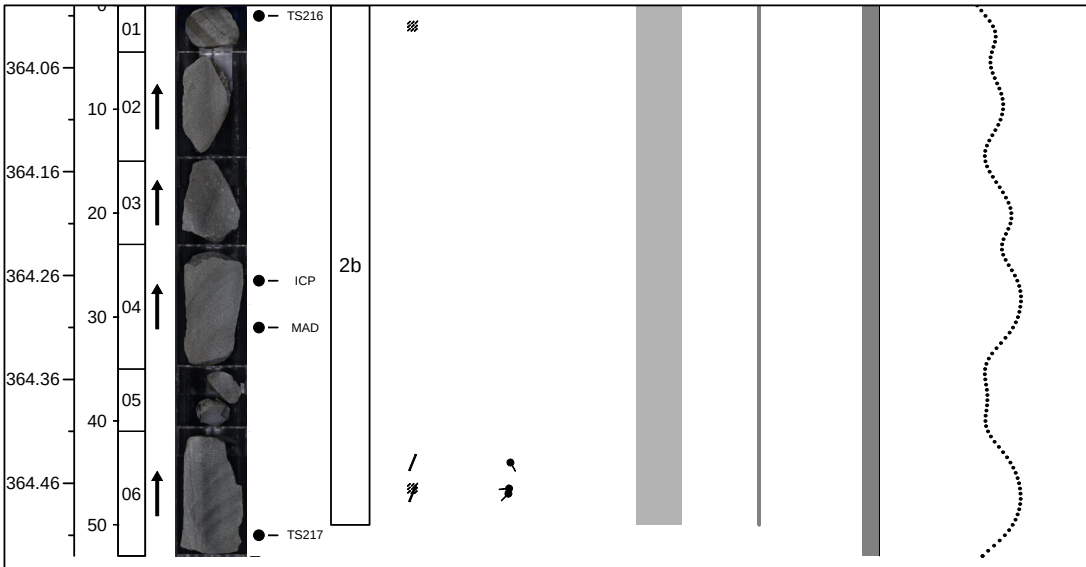
Hole 352-U1442A-40R Section 1, Top of Section: 354.3 m (CSF-A)



Description

Unit 2b: Core 35R-1, 39 cm, piece #10 to Core 44R-1, 21 cm, piece #07. Evolved boninite lavas containing sparse phenocrysts of olivine plagioclase and clinopyroxene crystals. While clinopyroxene is often the sole phenocryst phase, olivine and plagioclase phenocrysts are rarely present without clinopyroxene. Clinopyroxene abundance increases significantly (up to 15 modal %) in the middle of the unit (Cores 35R through 37R); in this rare instance, olivine and plagioclase are also present as phenocrysts in sparse to moderate amounts. The lava is sparsely to moderately vesicular (~1-10%), with a maximum diameter of 8 mm and a mode of 1 mm. Possible dikes, characterized by uniformly fine-grained to aphanitic textures, and a complete lack of vesicles or glass pillow rims, are found in several core sections within this unit (e.g., U1442A-37R-1, Pieces #10-14; U1442A-38R-1, Pieces #6-18; U1442A-41R-1, all; and U1442A-43R-1, Pieces #5-9).

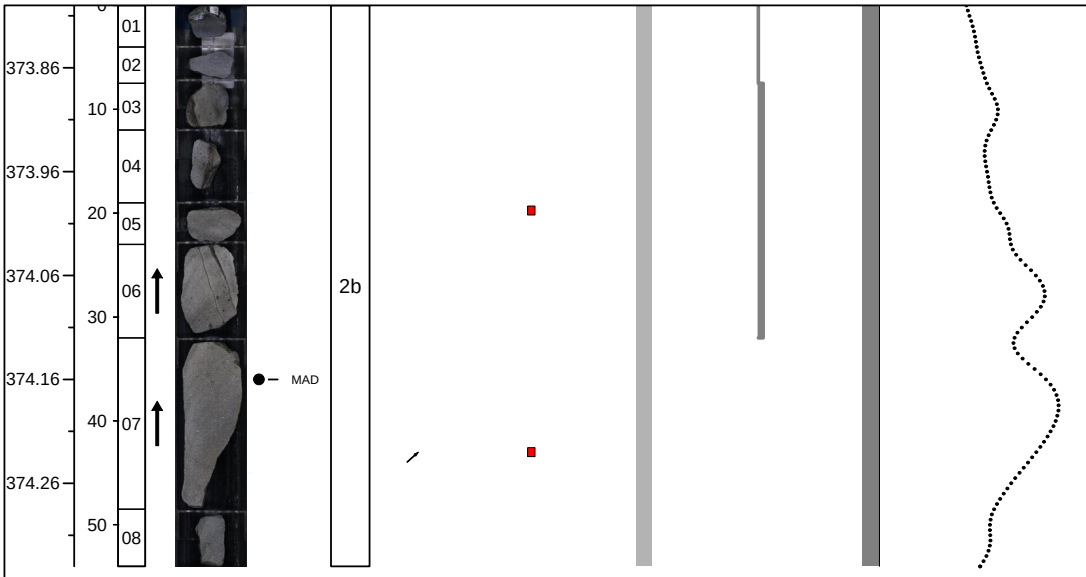
Hole 352-U1442A-41R Section 1, Top of Section: 364.0 m (CSF-A)



Description

Unit 2b: Core 35R-1, 39 cm, piece #10 to Core 44R-1, 21 cm, piece #07. Evolved boninite lavas containing sparse phenocrysts of olivine plagioclase and clinopyroxene crystals. While clinopyroxene is often the sole phenocryst phase, olivine and plagioclase phenocrysts are rarely present without clinopyroxene. Clinopyroxene abundance increases significantly (up to 15 modal %) in the middle of the unit (Cores 35R through 37R); in this rare instance, olivine and plagioclase are also present as phenocrysts in sparse to moderate amounts. The lava is sparsely to moderately vesicular (~1-10%), with a maximum diameter of 8 mm and a mode of 1 mm. Possible dikes, characterized by uniformly fine-grained to aphanitic textures, and a complete lack of vesicles or glass pillow rims, are found in several core sections within this unit (e.g., U1442A-37R-1, Pieces #10-14; U1442A-38R-1, Pieces #6-18; U1442A-41R-1, all; and U1442A-43R-1, Pieces #5-9).

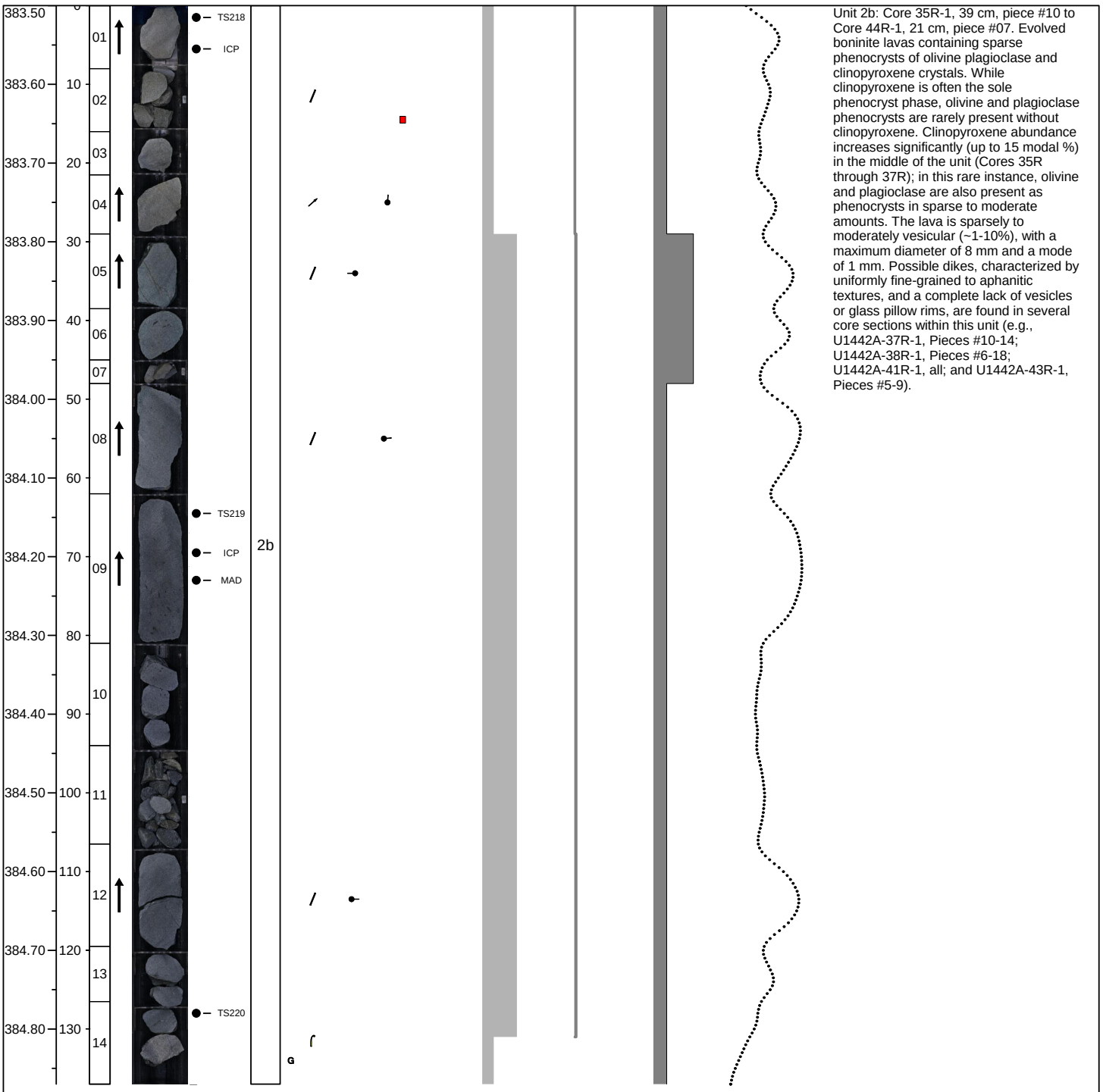
Hole 352-U1442A-42R Section 1, Top of Section: 373.8 m (CSF-A)



Description

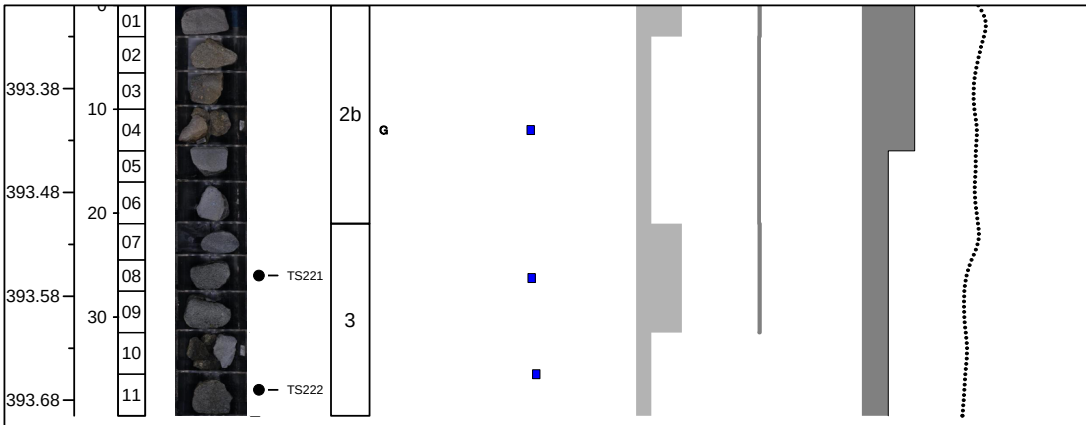
Unit 2b: Core 35R-1, 39 cm, piece #10 to Core 44R-1, 21 cm, piece #07. Evolved boninite lavas containing sparse phenocrysts of olivine plagioclase and clinopyroxene crystals. While clinopyroxene is often the sole phenocryst phase, olivine and plagioclase phenocrysts are rarely present without clinopyroxene. Clinopyroxene abundance increases significantly (up to 15 modal %) in the middle of the unit (Cores 35R through 37R); in this rare instance, olivine and plagioclase are also present as phenocrysts in sparse to moderate amounts. The lava is sparsely to moderately vesicular (~1-10%), with a maximum diameter of 8 mm and a mode of 1 mm. Possible dikes, characterized by uniformly fine-grained to aphanitic textures, and a complete lack of vesicles or glass pillow rims, are found in several core sections within this unit (e.g., U1442A-37R-1, Pieces #10-14; U1442A-38R-1, Pieces #6-18; U1442A-41R-1, all; and U1442A-43R-1, Pieces #5-9).

Hole 352-U1442A-43R Section 1, Top of Section: 383.5 m (CSF-A)



Unit 2b: Core 35R-1, 39 cm, piece #10 to Core 44R-1, 21 cm, piece #07. Evolved boninite lavas containing sparse phenocrysts of olivine plagioclase and clinopyroxene crystals. While clinopyroxene is often the sole phenocryst phase, olivine and plagioclase phenocrysts are rarely present without clinopyroxene. Clinopyroxene abundance increases significantly (up to 15 modal %) in the middle of the unit (Cores 35R through 37R); in this rare instance, olivine and plagioclase are also present as phenocrysts in sparse to moderate amounts. The lava is sparsely to moderately vesicular (~1-10%), with a maximum diameter of 8 mm and a mode of 1 mm. Possible dikes, characterized by uniformly fine-grained to aphanitic textures, and a complete lack of vesicles or glass pillow rims, are found in several core sections within this unit (e.g., U1442A-37R-1, Pieces #10-14; U1442A-38R-1, Pieces #6-18; U1442A-41R-1, all; and U1442A-43R-1, Pieces #5-9).

Hole 352-U1442A-44R Section 1, Top of Section: 393.3 m (CSF-A)

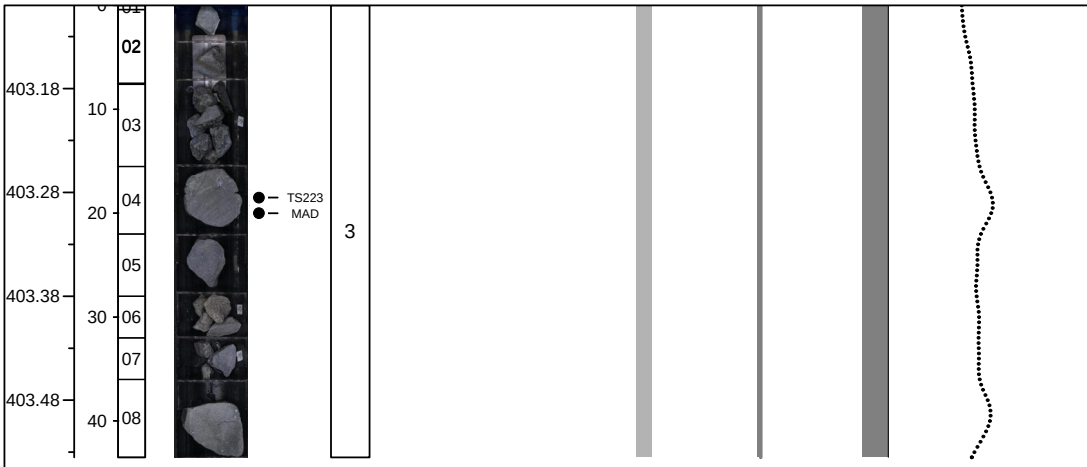


Description

Unit 2b: Core 35R-1, 39 cm, piece #10 to Core 44R-1, 21 cm, piece #07. Evolved boninite lavas containing sparse phenocrysts of olivine plagioclase and clinopyroxene crystals. While clinopyroxene is often the sole phenocryst phase, olivine and plagioclase phenocrysts are rarely present without clinopyroxene. Clinopyroxene abundance increases significantly (up to 15 modal %) in the middle of the unit (Cores 35R through 37R); in this rare instance, olivine and plagioclase are also present as phenocrysts in sparse to moderate amounts. The lava is sparsely to moderately vesicular (~1-10%), with a maximum diameter of 8 mm and a mode of 1 mm. Possible dikes, characterized by uniformly fine-grained to aphanitic textures, and a complete lack of vesicles or glass pillow rims, are found in several core sections within this unit (e.g., U1442A-37R-1, Pieces #10-14; U1442A-38R-1, Pieces #6-18; U1442A-41R-1, all; and U1442A-43R-1, Pieces #5-9).

Unit 3: Core 44R-1, 21 cm, piece #08 to Core 49R-3, 58.5 cm, piece #08. Boninite hyaloclastite and aphyric to sparsely-phyric evolved boninite lavas. Hyaloclastites contain highly vesicular and/or glassy low-silica boninite fragments in an altered glass matrix (now clays, zeolites, calcite). Rare phenocrysts of olivine and orthopyroxene appear in 49R-2. Interspersed with the hyaloclastite are flows of evolved, lighter-colored boninite, which typically appears to have intruded the hyaloclastites before lithification. The evolved boninite lavas are chilled against the glassy breccias with irregular lobate contacts. In some places, magma mingling occurred with diffused, cuspate contacts between dark and light-colored magmas (low-silica boninite and evolved boninite).

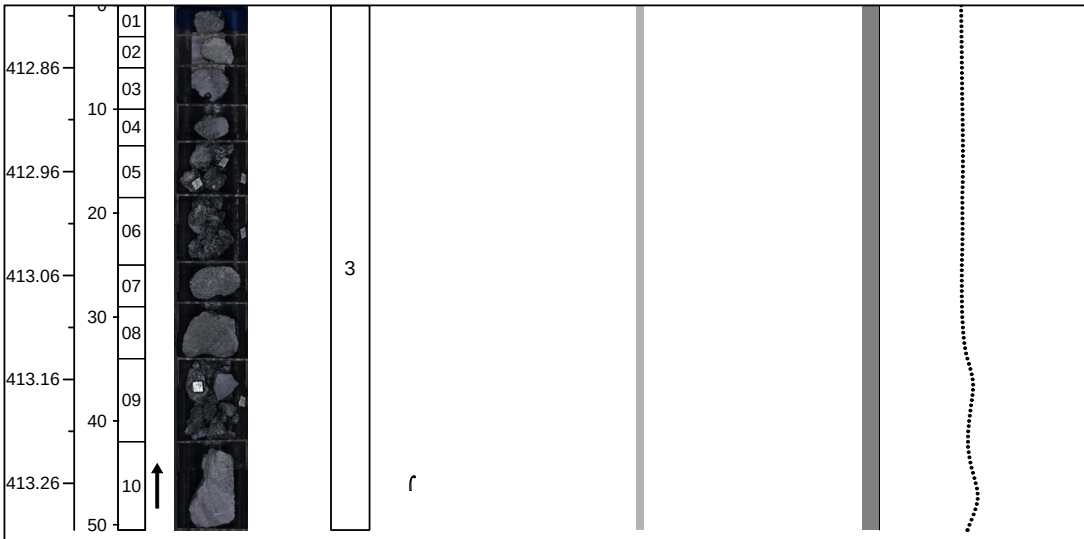
Hole 352-U1442A-45R Section 1, Top of Section: 403.1 m (CSF-A)



Description

Unit 3: Core 44R-1, 21 cm, piece #08 to Core 49R-3, 58.5 cm, piece #08. Boninite hyaloclastite and aphyric to sparsely-phyric evolved boninite lavas. Hyaloclastites contain highly vesicular and/or glassy low-silica boninite fragments in an altered glass matrix (now clays, zeolites, calcite). Rare phenocrysts of olivine and orthopyroxene appear in 49R-2. Interspersed with the hyaloclastite are flows of evolved, lighter-colored boninite, which typically appears to have intruded the hyaloclastites before lithification. The evolved boninite lavas are chilled against the glassy breccias with irregular lobate contacts. In some places, magma mingling occurred with diffused, cuspate contacts between dark and light-colored magmas (low-silica boninite and evolved boninite).

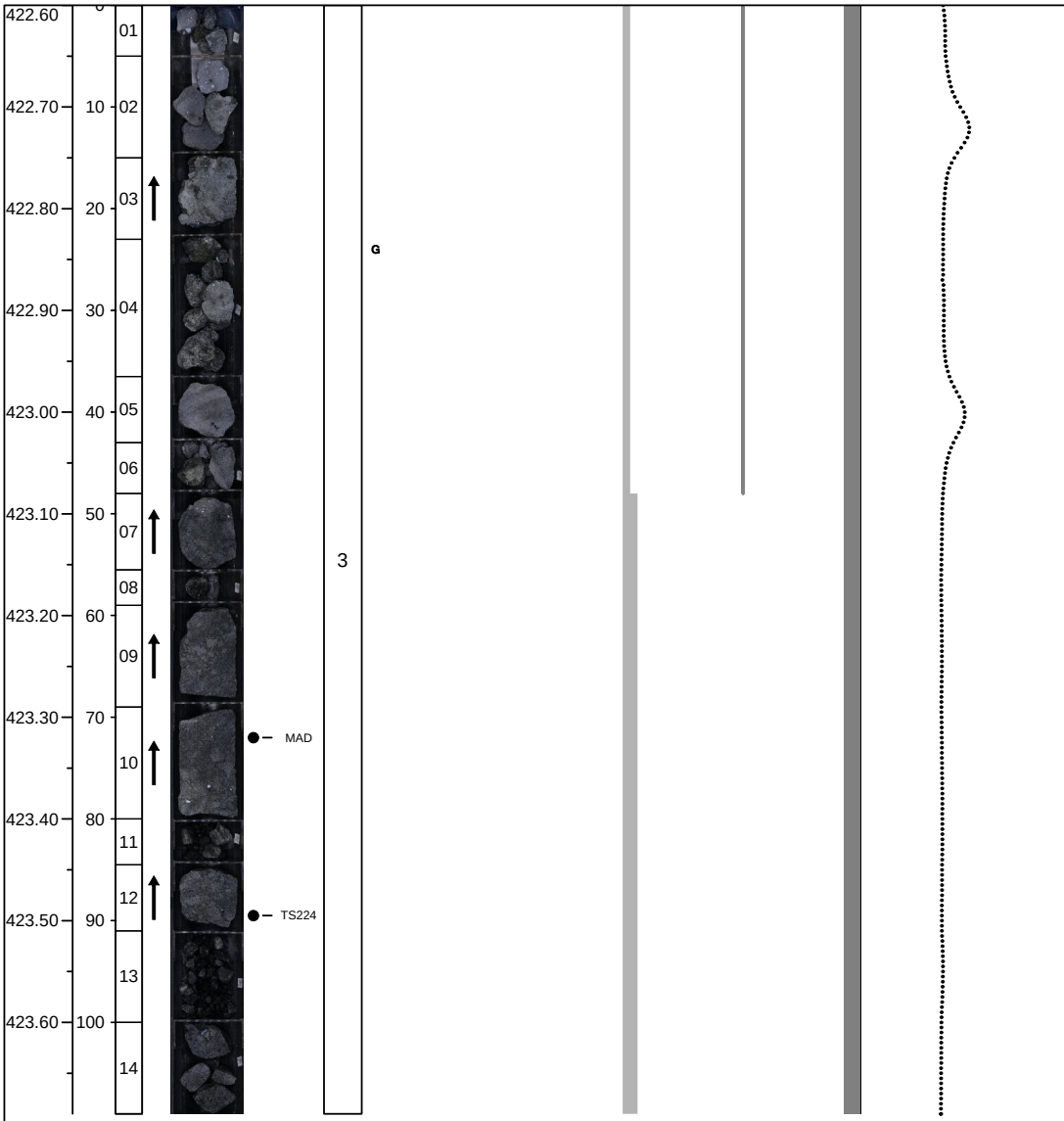
Hole 352-U1442A-46R Section 1, Top of Section: 412.8 m (CSF-A)



Description

Unit 3: Core 44R-1, 21 cm, piece #08 to Core 49R-3, 58.5 cm, piece #08. Boninite hyaloclastite and aphyric to sparsely-phyric evolved boninite lavas. Hyaloclastites contain highly vesicular and/or glassy low-silica boninite fragments in an altered glass matrix (now clays, zeolites, calcite). Rare phenocrysts of olivine and orthopyroxene appear in 49R-2. Interspersed with the hyaloclastite are flows of evolved, lighter-colored boninite, which typically appears to have intruded the hyaloclastites before lithification. The evolved boninite lavas are chilled against the glassy breccias with irregular lobate contacts. In some places, magma mingling occurred with diffused, cuspate contacts between dark and light-colored magmas (low-silica boninite and evolved boninite).

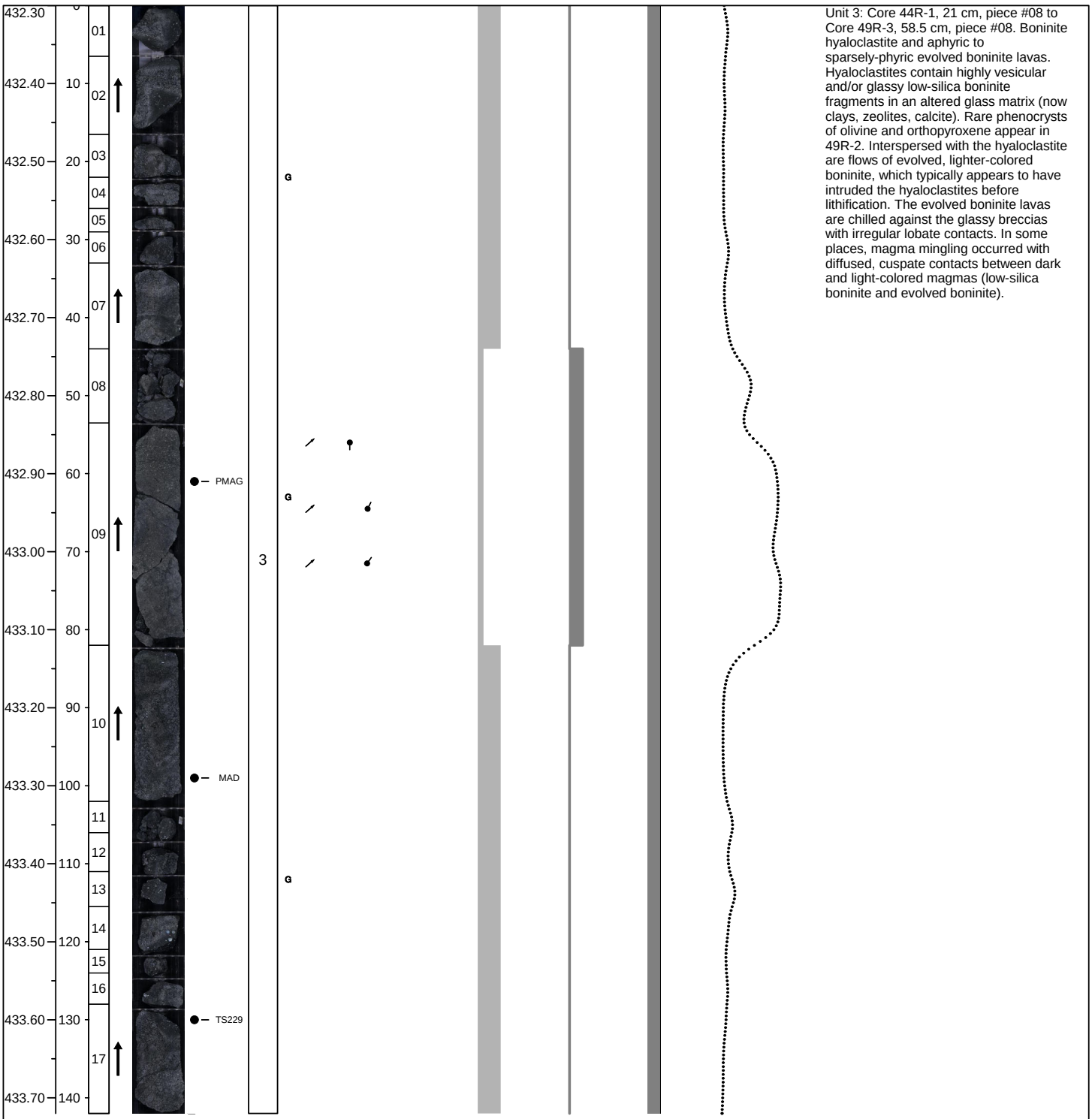
Hole 352-U1442A-47R Section 1, Top of Section: 422.6 m (CSF-A)



Description

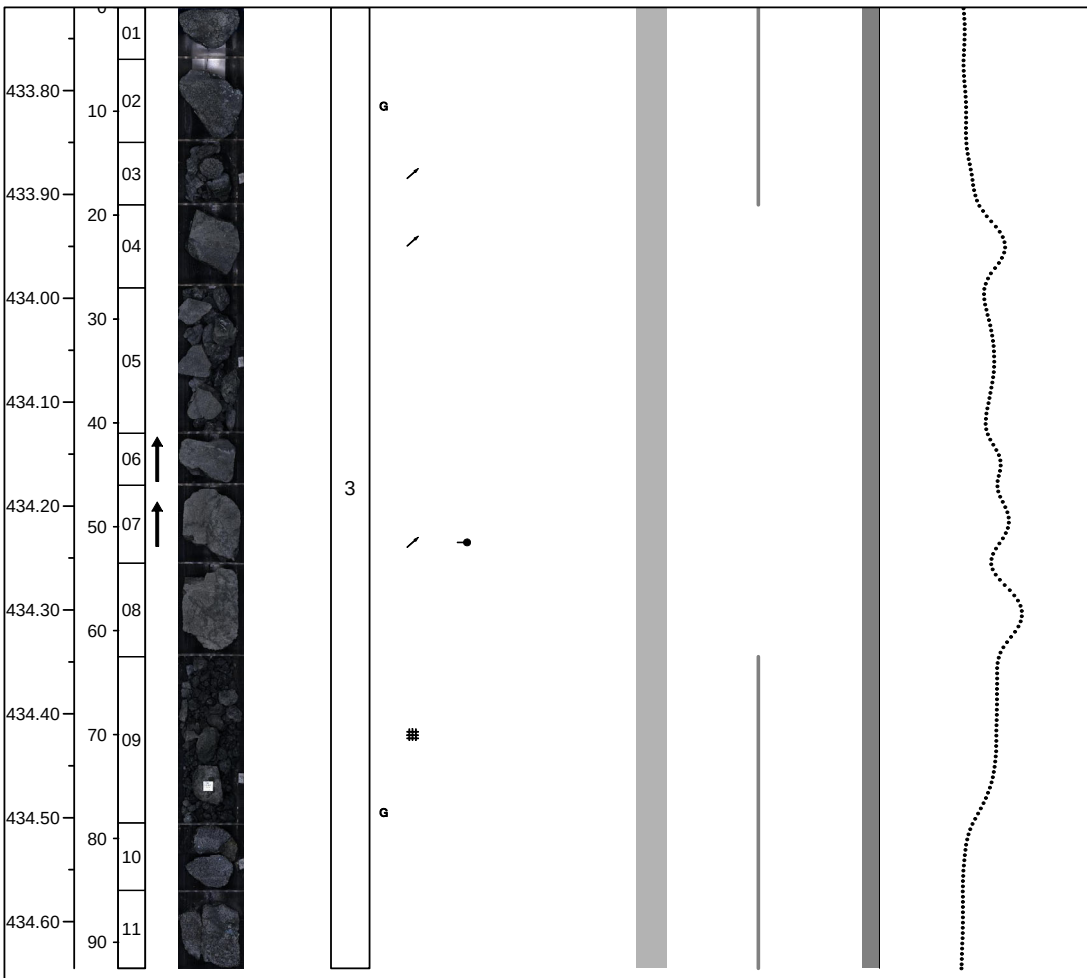
Unit 3: Core 44R-1, 21 cm, piece #08 to Core 49R-3, 58.5 cm, piece #08. Boninite hyaloclastite and aphyric to sparsely-phyric evolved boninite lavas. Hyaloclastites contain highly vesicular and/or glassy low-silica boninite fragments in an altered glass matrix (now clays, zeolites, calcite). Rare phenocrysts of olivine and orthopyroxene appear in 49R-2. Interspersed with the hyaloclastite are flows of evolved, lighter-colored boninite, which typically appears to have intruded the hyaloclastites before lithification. The evolved boninite lavas are chilled against the glassy breccias with irregular lobate contacts. In some places, magma mingling occurred with diffused, cuspate contacts between dark and light-colored magmas (low-silica boninite and evolved boninite).

Hole 352-U1442A-48R Section 1, Top of Section: 432.3 m (CSF-A)



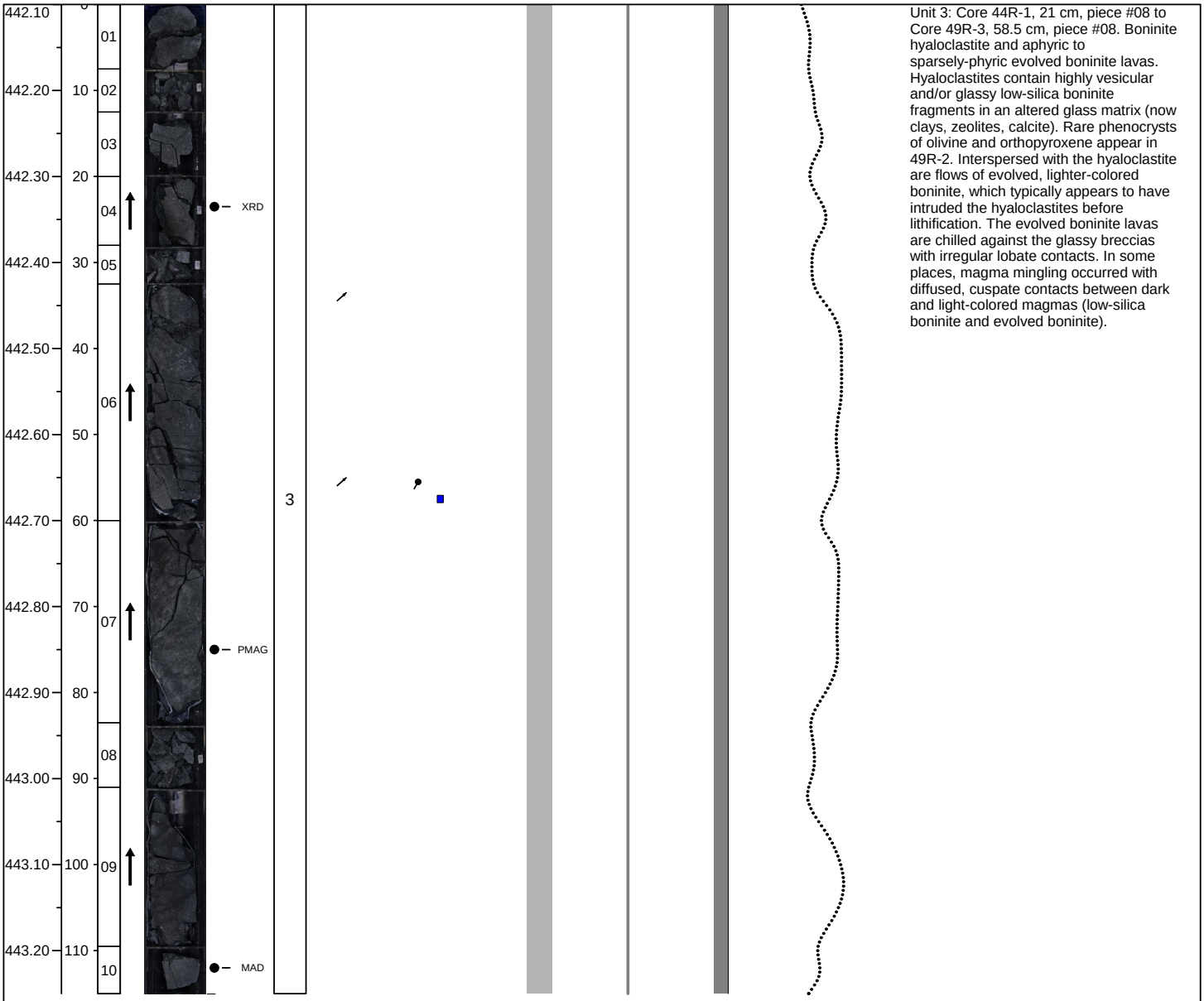
Unit 3: Core 44R-1, 21 cm, piece #08 to Core 49R-3, 58.5 cm, piece #08. Boninite hyaloclastite and aphyric to sparsely-phyric evolved boninite lavas. Hyaloclastites contain highly vesicular and/or glassy low-silica boninite fragments in an altered glass matrix (now clays, zeolites, calcite). Rare phenocrysts of olivine and orthopyroxene appear in 49R-2. Interspersed with the hyaloclastite are flows of evolved, lighter-colored boninite, which typically appears to have intruded the hyaloclastites before lithification. The evolved boninite lavas are chilled against the glassy breccias with irregular lobate contacts. In some places, magma mingling occurred with diffused, cuspate contacts between dark and light-colored magmas (low-silica boninite and evolved boninite).

Hole 352-U1442A-48R Section 2, Top of Section: 433.72 m (CSF-A)



Unit 3: Core 44R-1, 21 cm, piece #08 to Core 49R-3, 58.5 cm, piece #08. Boninite hyaloclastite and aphyric to sparsely-phyric evolved boninite lavas. Hyaloclastites contain highly vesicular and/or glassy low-silica boninite fragments in an altered glass matrix (now clays, zeolites, calcite). Rare phenocrysts of olivine and orthopyroxene appear in 49R-2. Interspersed with the hyaloclastite are flows of evolved, lighter-colored boninite, which typically appears to have intruded the hyaloclastites before lithification. The evolved boninite lavas are chilled against the glassy breccias with irregular lobate contacts. In some places, magma mingling occurred with diffused, cuspate contacts between dark and light-colored magmas (low-silica boninite and evolved boninite).

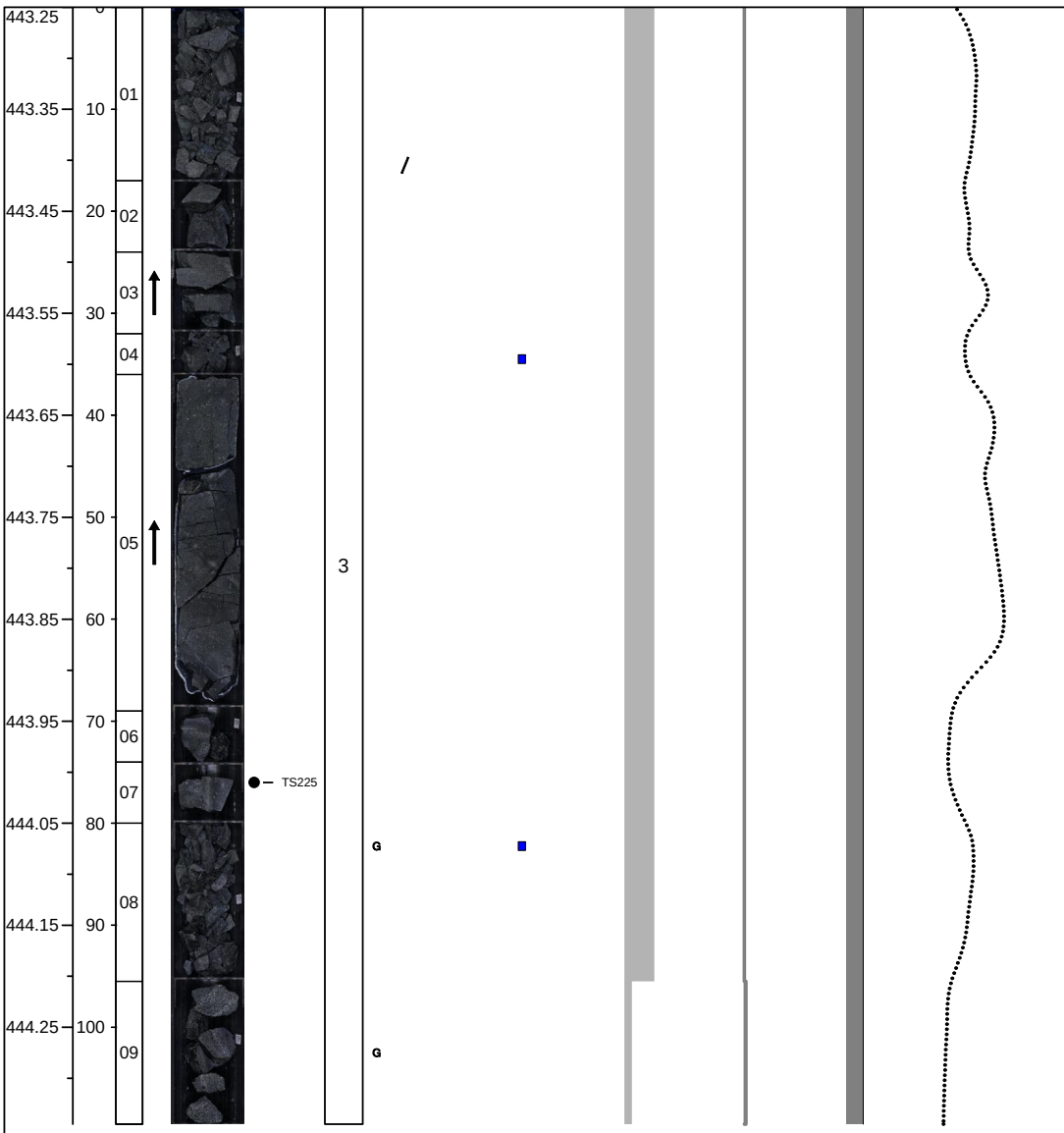
Hole 352-U1442A-49R Section 1, Top of Section: 442.1 m (CSF-A)



Description

Unit 3: Core 44R-1, 21 cm, piece #08 to Core 49R-3, 58.5 cm, piece #08. Boninite hyaloclastite and aphyric to sparsely-phyric evolved boninite lavas. Hyaloclastites contain highly vesicular and/or glassy low-silica boninite fragments in an altered glass matrix (now clays, zeolites, calcite). Rare phenocrysts of olivine and orthopyroxene appear in 49R-2. Interspersed with the hyaloclastite are flows of evolved, lighter-colored boninite, which typically appears to have intruded the hyaloclastites before lithification. The evolved boninite lavas are chilled against the glassy breccias with irregular lobate contacts. In some places, magma mingling occurred with diffused, cuspate contacts between dark and light-colored magmas (low-silica boninite and evolved boninite).

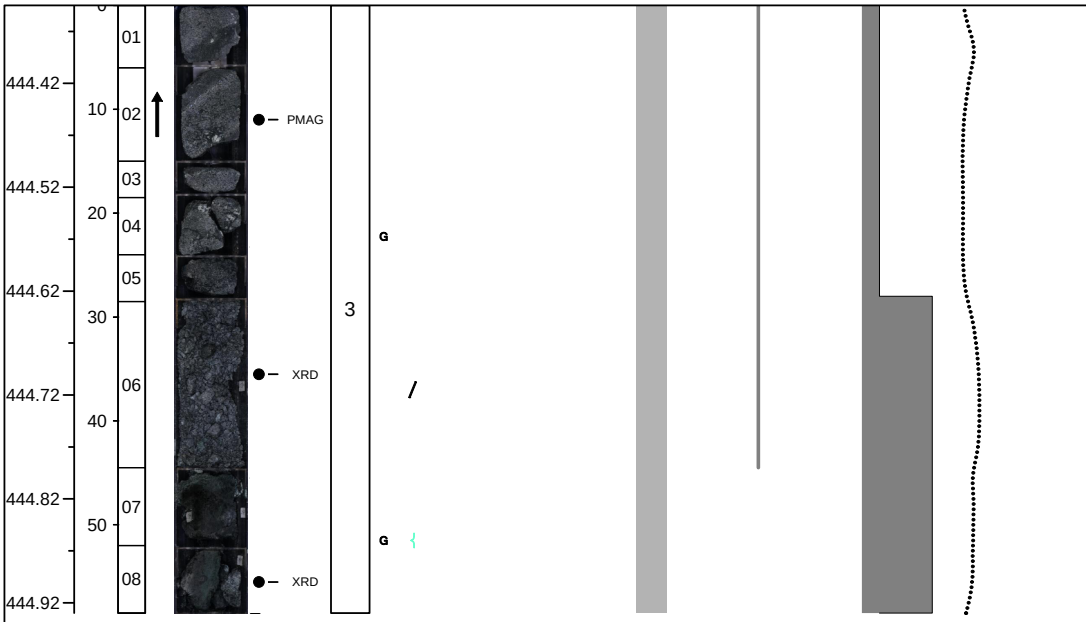
Hole 352-U1442A-49R Section 2, Top of Section: 443.25 m (CSF-A)



Description

Unit 3: Core 44R-1, 21 cm, piece #08 to Core 49R-3, 58.5 cm, piece #08. Boninite hyaloclastite and aphyric to sparsely-phyric evolved boninite lavas. Hyaloclastites contain highly vesicular and/or glassy low-silica boninite fragments in an altered glass matrix (now clays, zeolites, calcite). Rare phenocrysts of olivine and orthopyroxene appear in 49R-2. Interspersed with the hyaloclastite are flows of evolved, lighter-colored boninite, which typically appears to have intruded the hyaloclastites before lithification. The evolved boninite lavas are chilled against the glassy breccias with irregular lobate contacts. In some places, magma mingling occurred with diffused, cuspate contacts between dark and light-colored magmas (low-silica boninite and evolved boninite).

Hole 352-U1442A-49R Section 3, Top of Section: 444.345 m (CSF-A)

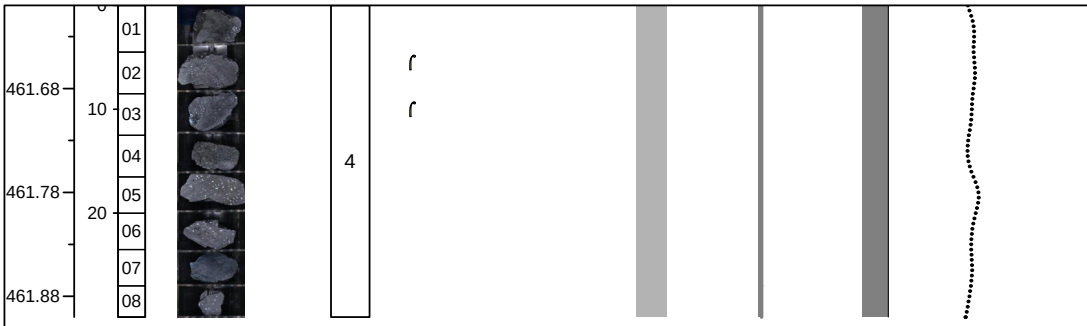


Description

Unit 3: Core 44R-1, 21 cm, piece #08 to Core 49R-3, 58.5 cm, piece #08. Boninite hyaloclastite and aphyric to sparsely-phyric evolved boninite lavas. Hyaloclastites contain highly vesicular and/or glassy low-silica boninite fragments in an altered glass matrix (now clays, zeolites, calcite). Rare phenocrysts of olivine and orthopyroxene appear in 49R-2. Interspersed with the hyaloclastite are flows of evolved, lighter-colored boninite, which typically appears to have intruded the hyaloclastites before lithification. The evolved boninite lavas are chilled against the glassy breccias with irregular lobate contacts. In some places, magma mingling occurred with diffused, cuspate contacts between dark and light-colored magmas (low-silica boninite and evolved boninite).

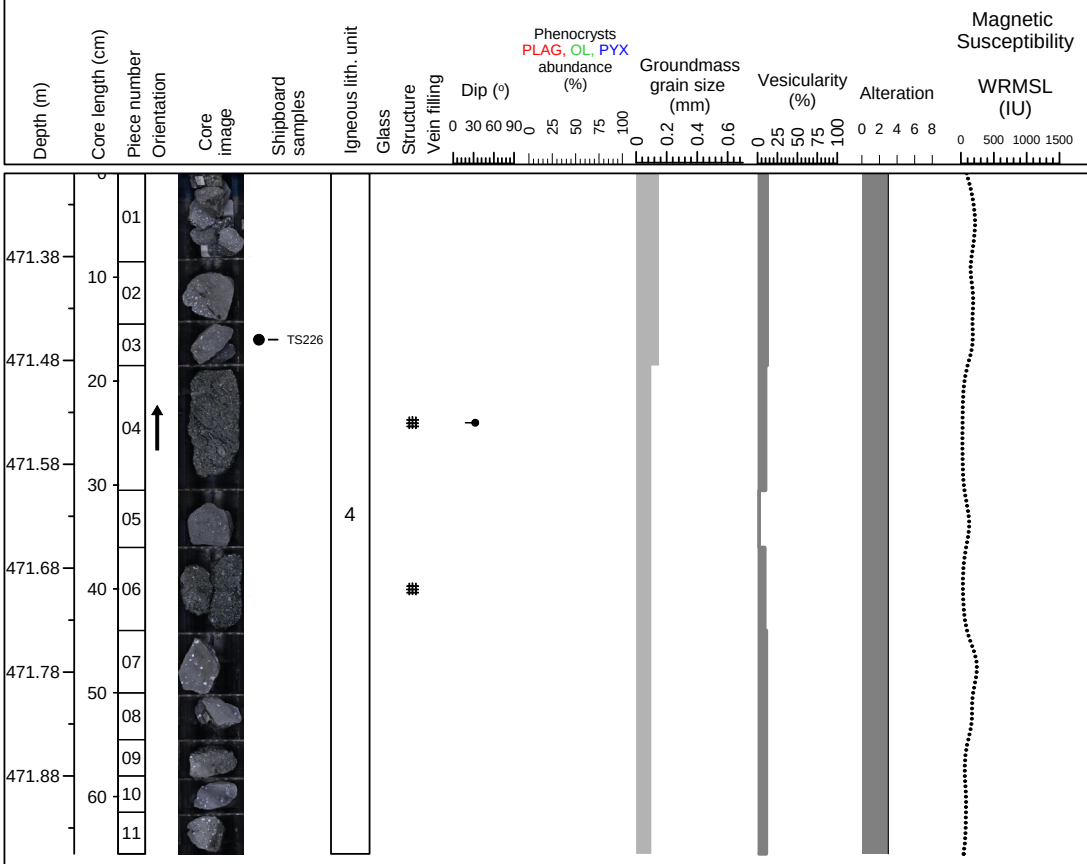
U1442A-50R NO RECOVERY

Hole 352-U1442A-51R Section 1, Top of Section: 461.6 m (CSF-A)



Unit 4: Core 51R-1, 0 cm, piece #01 to Core 57R-2, 150 cm, piece #10. Low-silica boninites and aphyric or sparsely-phyric evolved boninites. Cores 51R through 53R include lighter-colored evolved boninite flows that intrude hyaloclastites, similar to Unit 3. The hyaloclastite contains fresh glass with sparse orthopyroxene needles. Below 53R, massive, dark gray aphyric lavas are highly brecciated by a series of shear zones that impart a poorly defined rock cleavage on much of the section. Plagioclase phenocrysts reappear in the deepest portion of this unit (U1442A-57R). Note that there was no recovery of material in Core 50R.

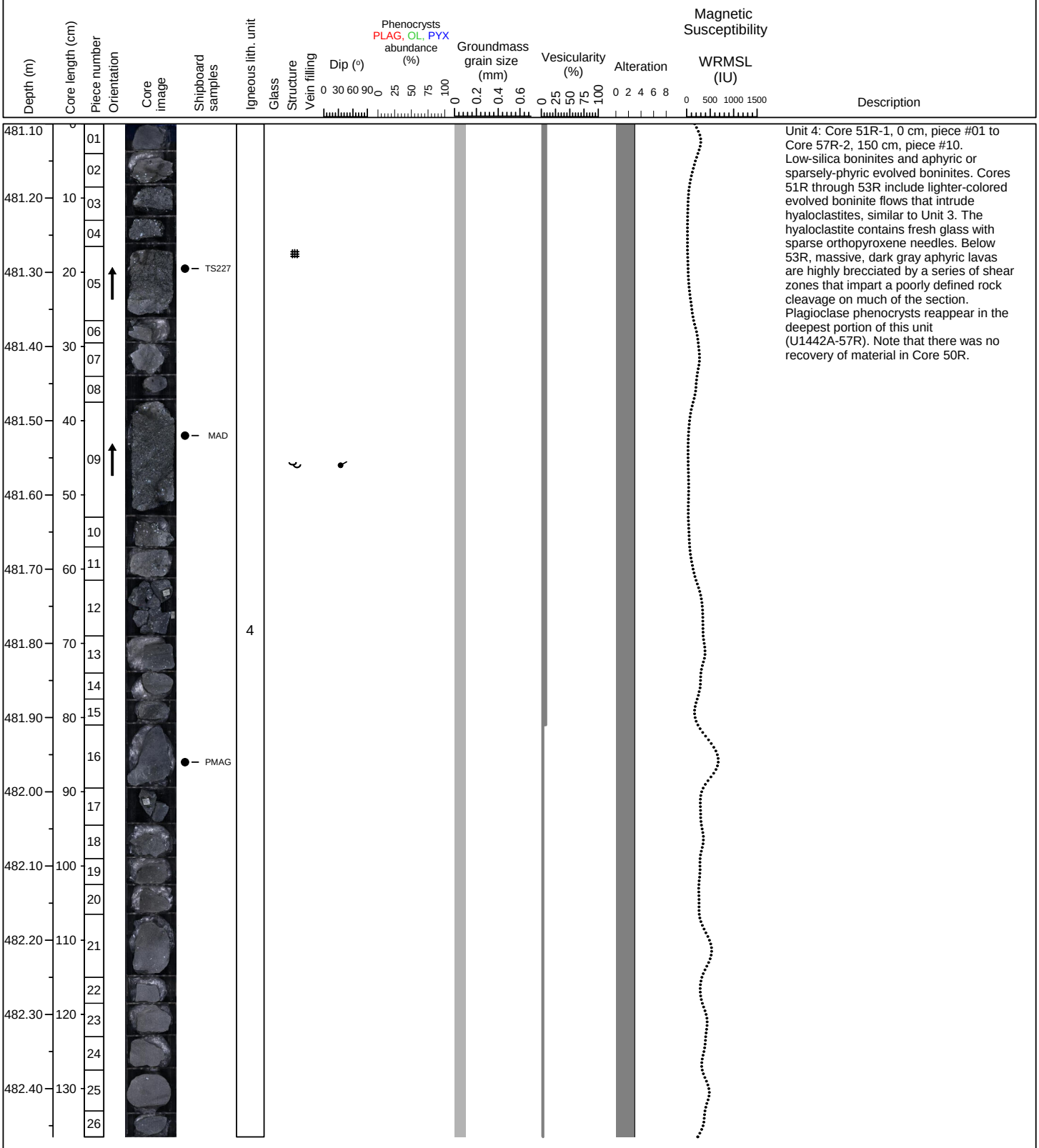
Hole 352-U1442A-52R Section 1, Top of Section: 471.3 m (CSF-A)



Description

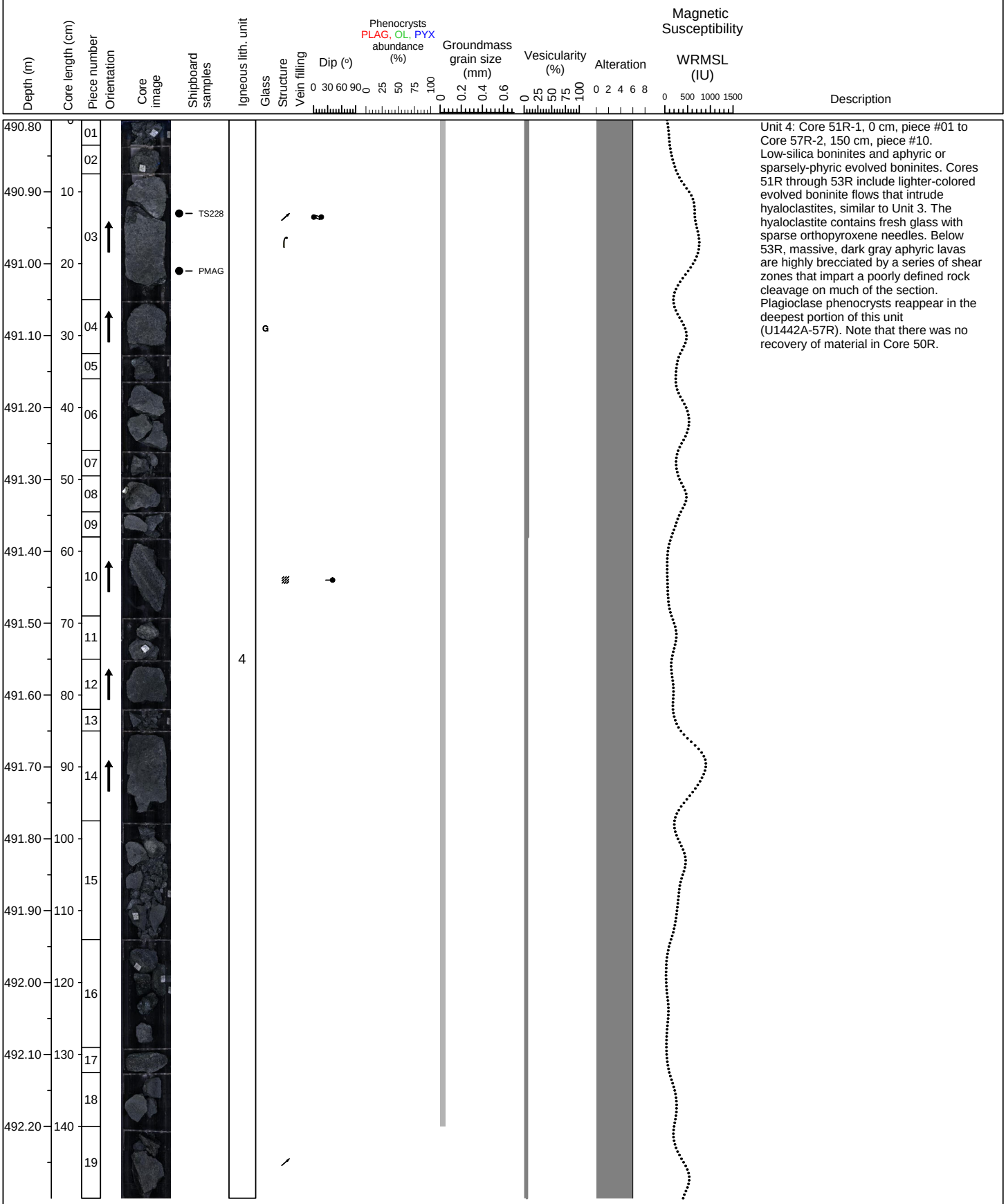
Unit 4: Core 51R-1, 0 cm, piece #01 to Core 57R-2, 150 cm, piece #10. Low-silica boninites and aphyric or sparsely-phyric evolved boninites. Cores 51R through 53R include lighter-colored evolved boninite flows that intrude hyaloclastites, similar to Unit 3. The hyaloclastite contains fresh glass with sparse orthopyroxene needles. Below 53R, massive, dark gray aphyric lavas are highly brecciated by a series of shear zones that impart a poorly defined rock cleavage on much of the section. Plagioclase phenocrysts reappear in the deepest portion of this unit (U1442A-57R). Note that there was no recovery of material in Core 50R.

Hole 352-U1442A-53R Section 1, Top of Section: 481.1 m (CSF-A)

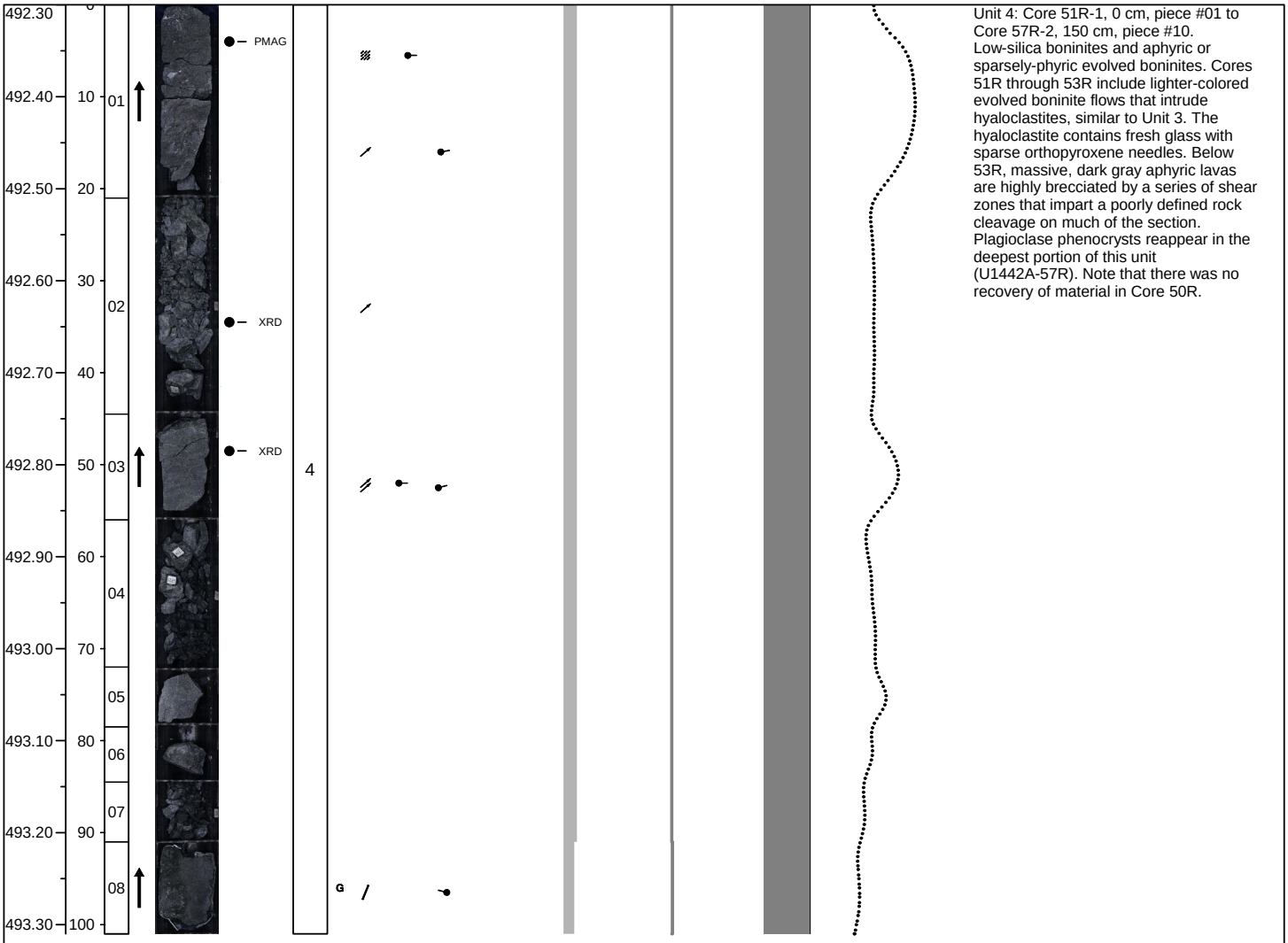


Unit 4: Core 51R-1, 0 cm, piece #01 to Core 57R-2, 150 cm, piece #10. Low-silica boninites and aphyric or sparsely-phyric evolved boninites. Cores 51R through 53R include lighter-colored evolved boninite flows that intrude hyaloclastites, similar to Unit 3. The hyaloclastite contains fresh glass with sparse orthopyroxene needles. Below 53R, massive, dark gray aphyric lavas are highly brecciated by a series of shear zones that impart a poorly defined rock cleavage on much of the section. Plagioclase phenocrysts reappear in the deepest portion of this unit (U1442A-57R). Note that there was no recovery of material in Core 50R.

Hole 352-U1442A-54R Section 1, Top of Section: 490.8 m (CSF-A)

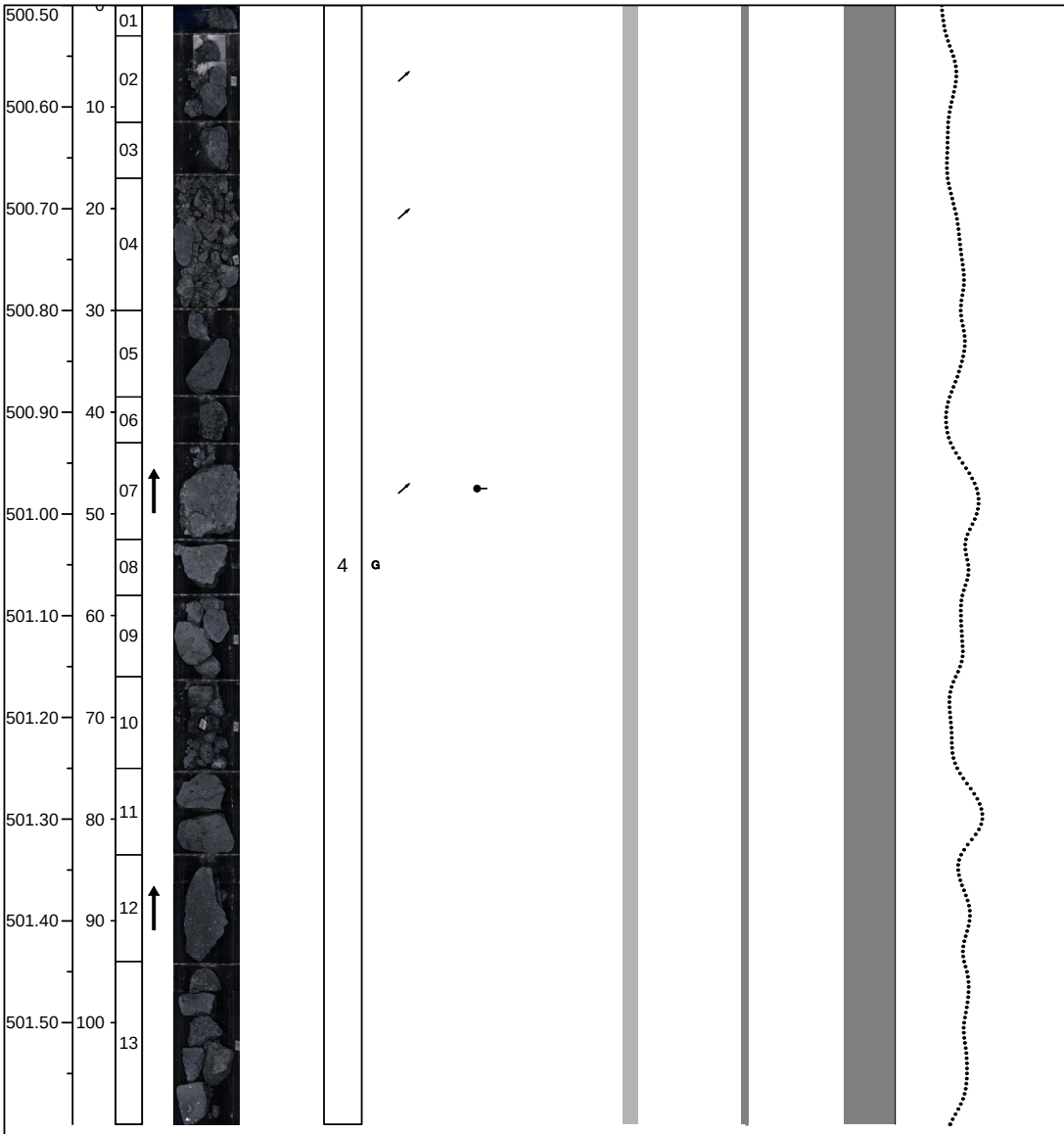


Hole 352-U1442A-54R Section 2, Top of Section: 492.3 m (CSF-A)



Unit 4: Core 51R-1, 0 cm, piece #01 to Core 57R-2, 150 cm, piece #10. Low-silica boninites and aphyric or sparsely-phyric evolved boninites. Cores 51R through 53R include lighter-colored evolved boninite flows that intrude hyaloclastites, similar to Unit 3. The hyaloclastite contains fresh glass with sparse orthopyroxene needles. Below 53R, massive, dark gray aphyric lavas are highly brecciated by a series of shear zones that impart a poorly defined rock cleavage on much of the section. Plagioclase phenocrysts reappear in the deepest portion of this unit (U1442A-57R). Note that there was no recovery of material in Core 50R.

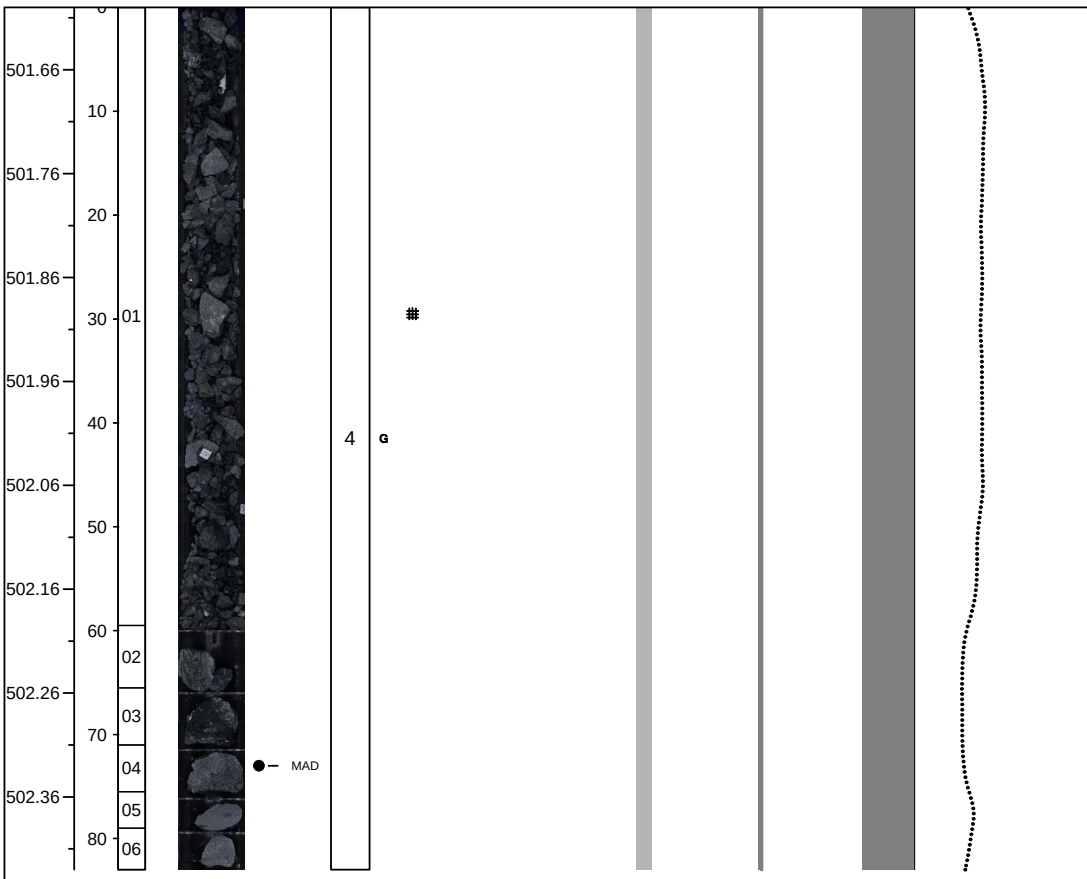
Hole 352-U1442A-55R Section 1, Top of Section: 500.5 m (CSF-A)



Description

Unit 4: Core 51R-1, 0 cm, piece #01 to Core 57R-2, 150 cm, piece #10. Low-silica boninites and aphyric or sparsely-phyric evolved boninites. Cores 51R through 53R include lighter-colored evolved boninite flows that intrude hyaloclastites, similar to Unit 3. The hyaloclastite contains fresh glass with sparse orthopyroxene needles. Below 53R, massive, dark gray aphyric lavas are highly brecciated by a series of shear zones that impart a poorly defined rock cleavage on much of the section. Plagioclase phenocrysts reappear in the deepest portion of this unit (U1442A-57R). Note that there was no recovery of material in Core 50R.

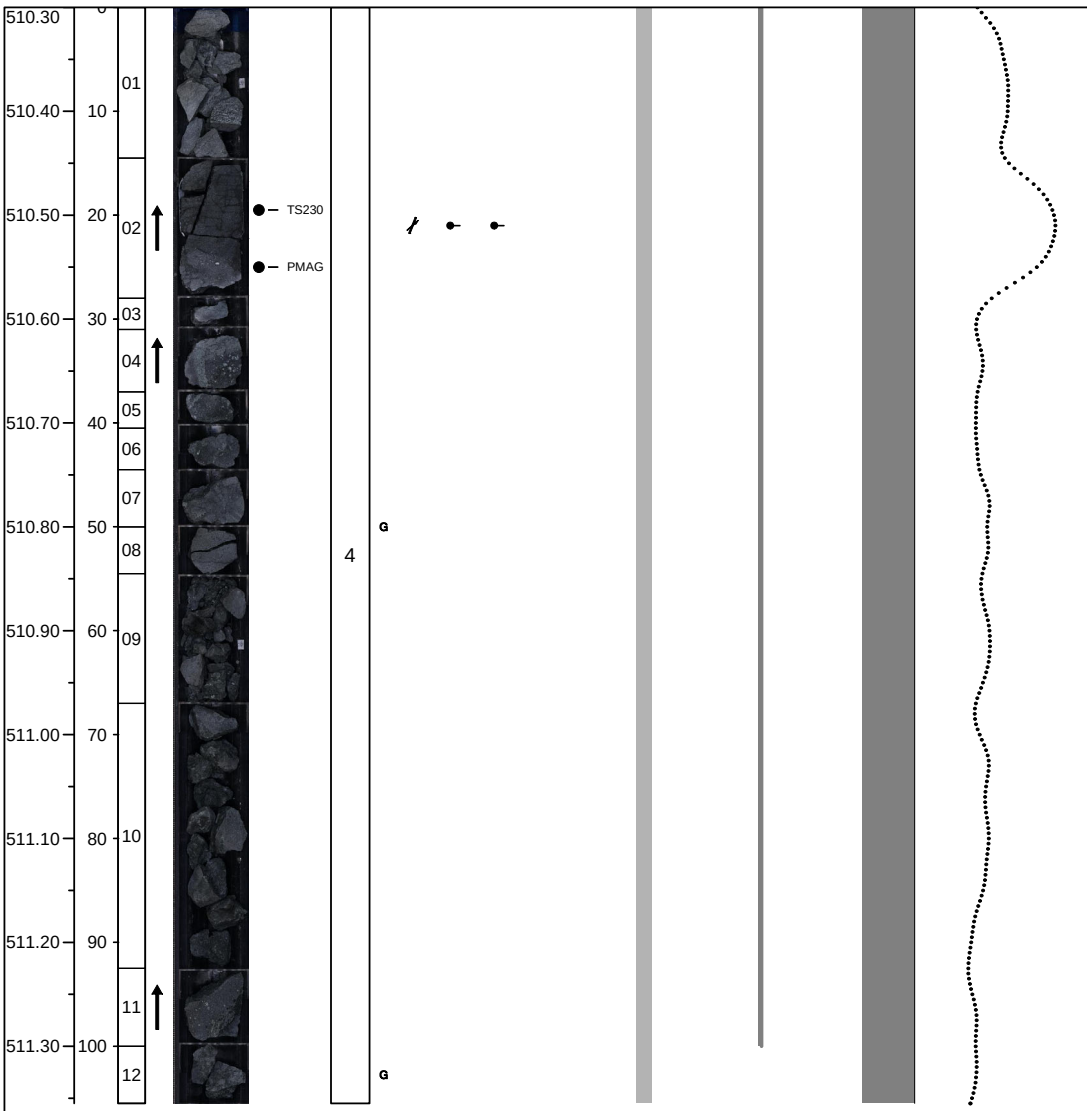
Hole 352-U1442A-55R Section 2, Top of Section: 501.6 m (CSF-A)



Description

Unit 4: Core 51R-1, 0 cm, piece #01 to Core 57R-2, 150 cm, piece #10. Low-silica boninites and aphyric or sparsely-phyric evolved boninites. Cores 51R through 53R include lighter-colored evolved boninite flows that intrude hyaloclastites, similar to Unit 3. The hyaloclastite contains fresh glass with sparse orthopyroxene needles. Below 53R, massive, dark gray aphyric lavas are highly brecciated by a series of shear zones that impart a poorly defined rock cleavage on much of the section. Plagioclase phenocrysts reappear in the deepest portion of this unit (U1442A-57R). Note that there was no recovery of material in Core 50R.

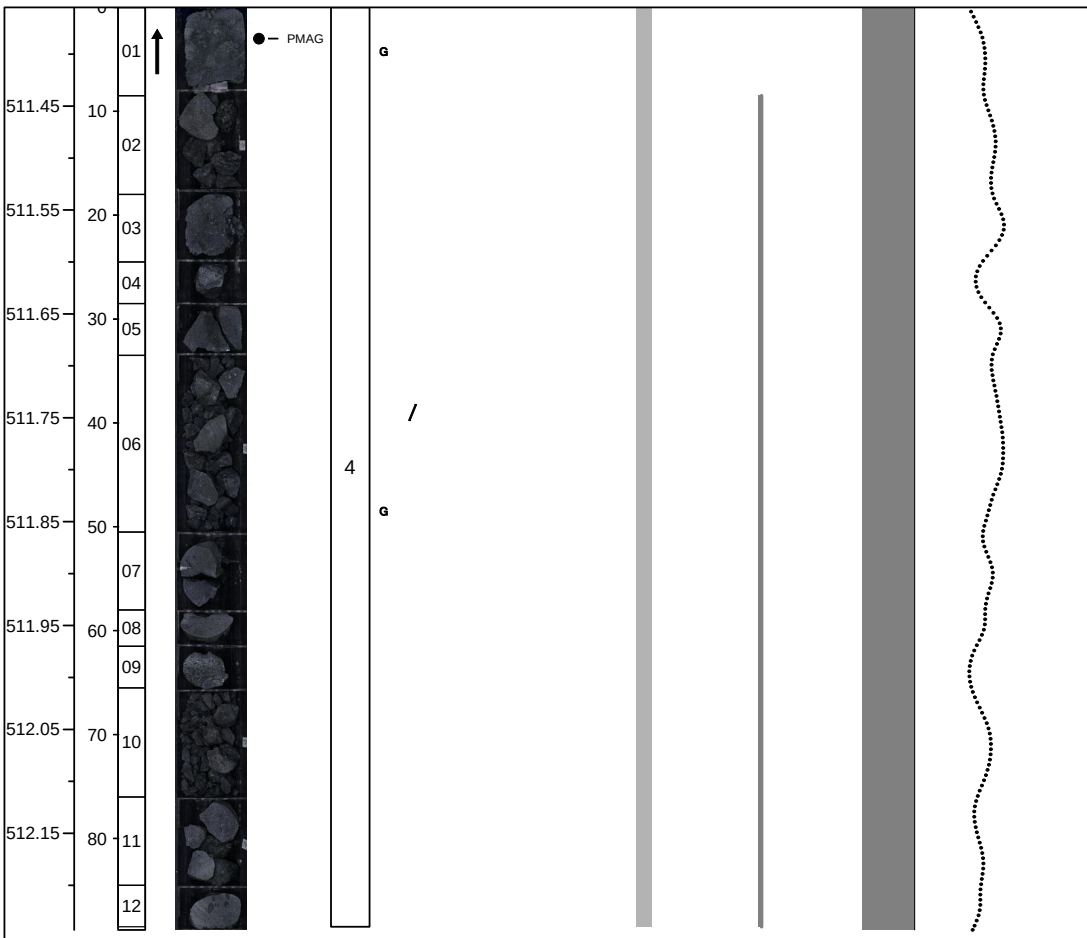
Hole 352-U1442A-56R Section 1, Top of Section: 510.3 m (CSF-A)



Description

Unit 4: Core 51R-1, 0 cm, piece #01 to Core 57R-2, 150 cm, piece #10. Low-silica boninites and aphyric or sparsely-phyric evolved boninites. Cores 51R through 53R include lighter-colored evolved boninite flows that intrude hyaloclastites, similar to Unit 3. The hyaloclastite contains fresh glass with sparse orthopyroxene needles. Below 53R, massive, dark gray aphyric lavas are highly brecciated by a series of shear zones that impart a poorly defined rock cleavage on much of the section. Plagioclase phenocrysts reappear in the deepest portion of this unit (U1442A-57R). Note that there was no recovery of material in Core 50R.

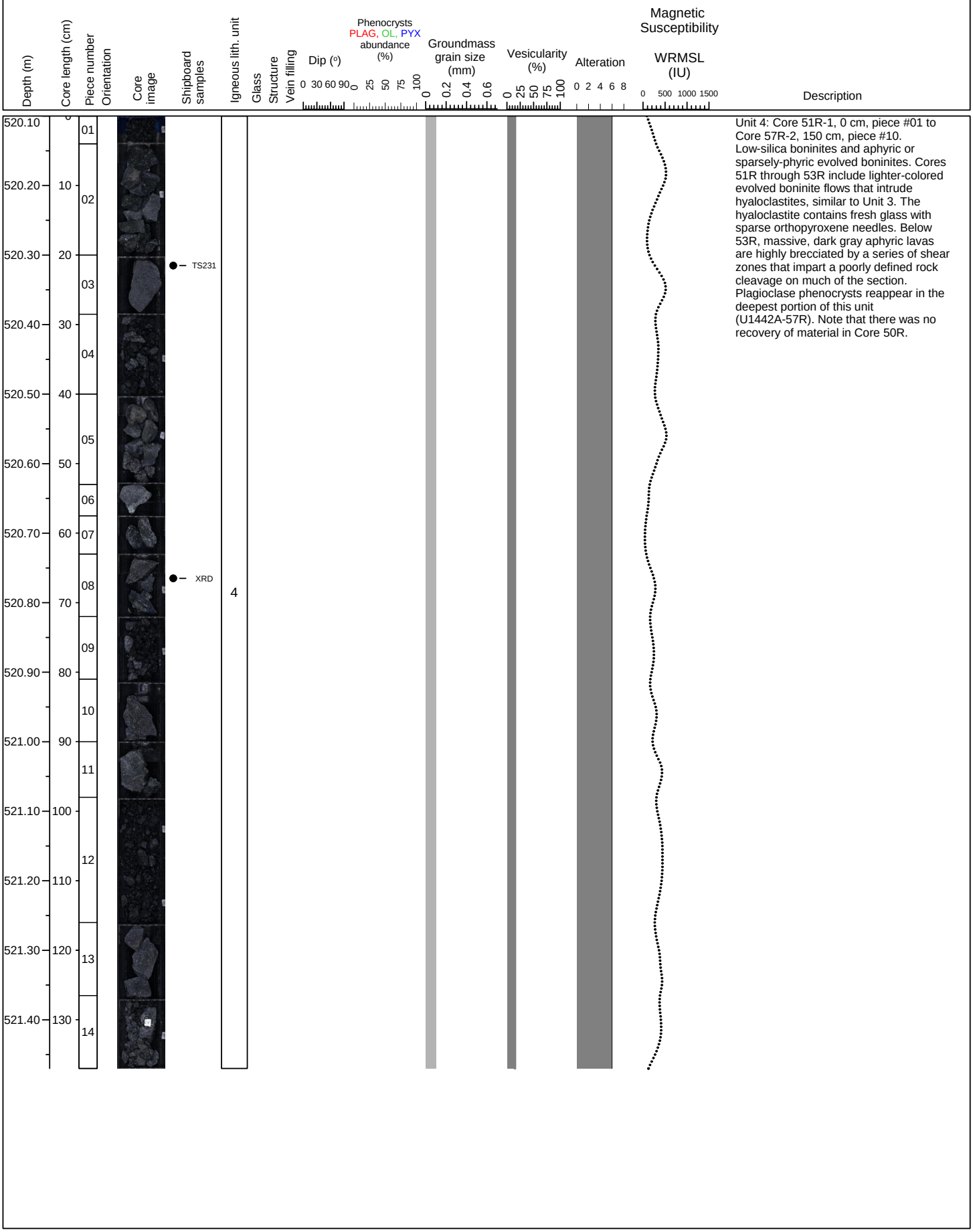
Hole 352-U1442A-56R Section 2, Top of Section: 511.355 m (CSF-A)



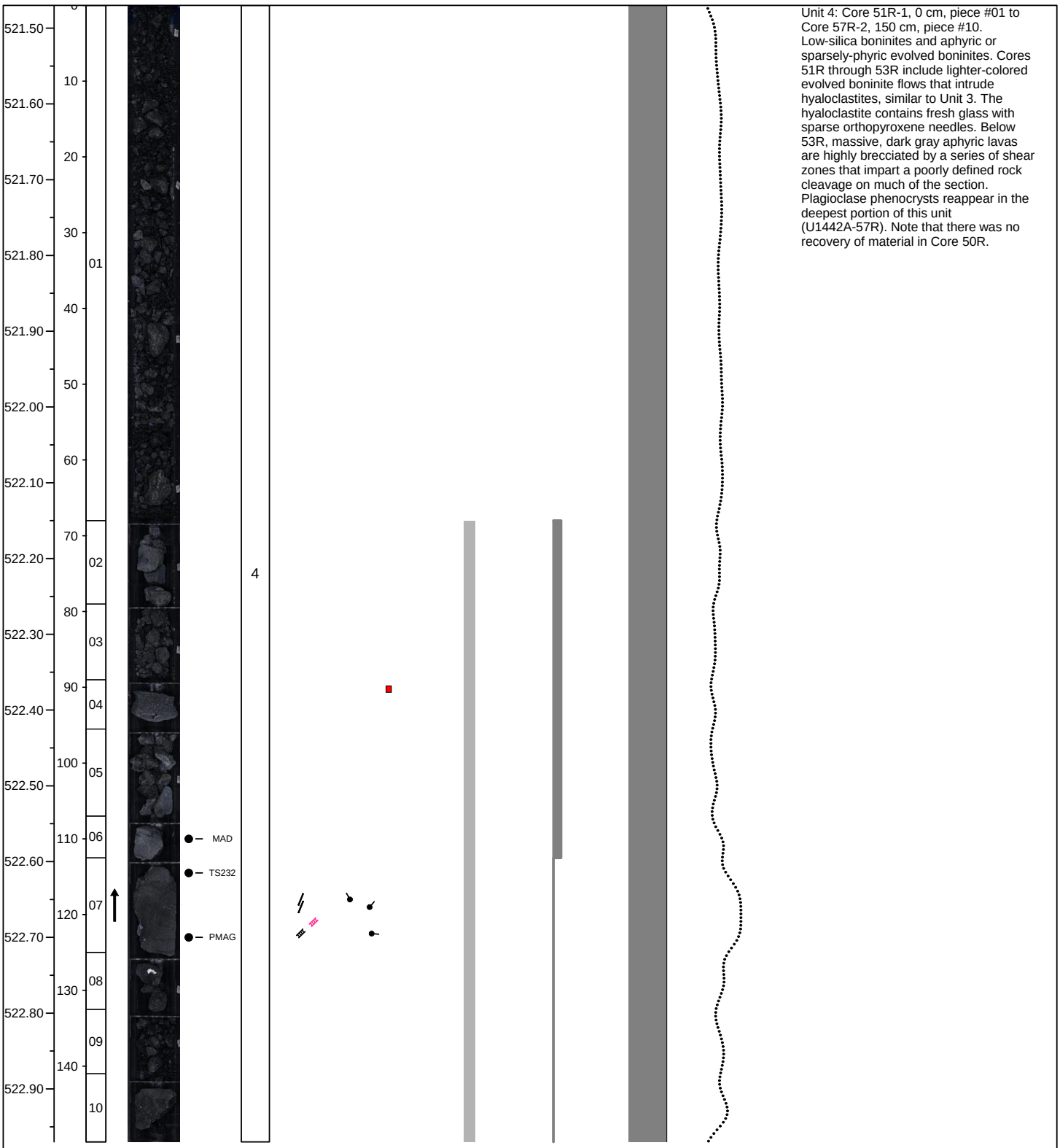
Description

Unit 4: Core 51R-1, 0 cm, piece #01 to Core 57R-2, 150 cm, piece #10. Low-silica boninites and aphyric or sparsely-phyric evolved boninites. Cores 51R through 53R include lighter-colored evolved boninite flows that intrude hyaloclastites, similar to Unit 3. The hyaloclastite contains fresh glass with sparse orthopyroxene needles. Below 53R, massive, dark gray aphyric lavas are highly brecciated by a series of shear zones that impart a poorly defined rock cleavage on much of the section. Plagioclase phenocrysts reappear in the deepest portion of this unit (U1442A-57R). Note that there was no recovery of material in Core 50R.

Hole 352-U1442A-57R Section 1, Top of Section: 520.1 m (CSF-A)



Hole 352-U1442A-57R Section 2, Top of Section: 521.47 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	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-U1442A-1R-1-A	10.00	11.0	0.1	0.11	5	15	80			Tr		Tr					Tr							Tr		Tr	Tr										R	R			Tr						A	D		C	R	R	Tr		
352-U1442A-1R-1-A	31.00	32.00	0.31	0	15	15	70			Tr		Tr					Tr								Tr	Tr	Tr									C	R		R					A	D		C	R	Tr	Tr		
352-U1442A-1R-1-A	56.00	57.00	0.56	1	20	30	50			R		C					R									R	Tr		A	C	R	R	C	A	R	Tr	C	A		R	Tr				C	A		R	Tr	Tr	Tr			
352-U1442A-1R-2-A	75.00	76.00	2.25	2	15	15	70			Tr		R					Tr								Tr		Tr	C									R	R		R	R				C	D		C	Tr	Tr				
352-U1442A-1R-3-A	69.00	70.0	3.69	4	20	35	45			R		C					R								R		R	R									R	Tr		C	C				R	D		R	Tr	Tr	Tr			
352-U1442A-1R-3-A	98.00	99.00	3.98	4	15	20	65			Tr		R					Tr								R		Tr	R									R	R		R	Tr				C	D		R	Tr	Tr				
352-U1442A-1R-3-A	110.00	111.0	4.1	4	5	15	80			Tr		Tr					Tr								Tr		Tr	Tr									C	Tr		Tr	Tr				R	D		R	Tr	Tr				
352-U1442A-1R-4-A	12.00	13.00	4.62	5	20	25	55			Tr		Tr					Tr									Tr	Tr		Tr	A	A	C	C	A	Tr		A	R		R	Tr				C	A		R	Tr	Tr				
352-U1442A-1R-4-A	75.00	76.0	5.25	5	25	15	60			Tr		R					Tr									Tr	Tr										C	C		C	Tr				C	D		R	Tr	Tr	Tr			
352-U1442A-1R-4-A	76.00	77.00	5.26	5.27	25	15	60			Tr		R					Tr									Tr			R	A	C	C	C	A	Tr	Tr	A	R		R	Tr				C	C		R	Tr	Tr				
352-U1442A-1R-4-A	102.00	103.00	5.52	6	25	50	75			Tr		R					Tr									Tr	Tr		C	A	A	C	C	C	Tr	Tr	C	A		R	Tr				C	A		R	R	R				
352-U1442A-2R-1-A	34.0	35.00	4.34	4.35	20	40	40			Tr		R					Tr							Tr		R	Tr		C	A	A	A	C	C	Tr	Tr	C	A		A	R				C	A		R	Tr	Tr				
352-U1442A-2R-1-A	35.00	36.00	4.35	4	25	35	40			Tr		C					Tr							Tr			R		A	C	C	C	C	C	C	R	A	R		C	R				R	A		R	Tr	Tr				
352-U1442A-2R-1-A	121.00	122.00	5.21	5.22	5	15	80			Tr		Tr					Tr							Tr		Tr										R	R		R	R				R	D		C	R	Tr				
352-U1442A-2R-2-A	16.00	17.00	5.66	6	40	40	20			Tr		R					Tr									Tr	Tr		R	D	A	D	C	C	R	Tr	D			R	Tr				R	A		R	Tr	Tr				
352-U1442A-2R-2-A	72.00	73.00	6.22	6	30	30	40			Tr		R					Tr										Tr		A	C	C	R	R	C	C	C	C	A		R	Tr				C	A		R		Tr				
352-U1442A-2R-2-A	85.00	86.0	6.35	6	35	20	45			Tr		R					Tr								Tr		Tr	Tr									R	Tr		R	R				A	A		Tr	Tr	Tr				
352-U1442A-2R-3-A	28.00	29.00	7.28	7.29	5	15	80			Tr		Tr					Tr									Tr	Tr										R	R		R	R				R	D		C	R	Tr				
352-U1442A-2R-3-A	104.00	105.00	8.04	8	20	35	45			Tr		R					Tr										Tr		C	A	R	A	C	A	Tr	Tr	C	A		R	Tr				C	A		R	Tr	Tr				
352-U1442A-2R-4-A	59.00	60.00	9.09	9	10	25	65			Tr		Tr					Tr									Tr	Tr		A	C	C	C	Tr	R	A	C	A	C		R	R				C	A		R	Tr	Tr				
352-U1442A-3R-1-A	58.00	59.00	14.18	14	15	40	45			Tr		R					Tr								Tr		Tr	Tr		C	A	C	A	C	C	Tr	Tr	C	A		R	R				R	A		R	Tr	Tr				
352-U1442A-3R-1-A	112.00	113.00	14.72	15	15	35	50			Tr		R					Tr										Tr	R		C	A	A	A	R	R	R	R	A	R		R	R				R	A		R	Tr	Tr				
352-U1442A-3R-3-A	1.0	2.00	16.61	17	15	40	45			Tr		R					Tr										Tr	Tr		C	A	C	A	Tr	C	Tr	C	D	R		R	R				R	A		R	Tr	Tr				
352-U1442A-3R-3-A	129.00	130.00	17.89	18	15	35	50			Tr		R					Tr										Tr	Tr										A	R		R	Tr				R	A		R	Tr	Tr				
352-U1442A-3R-4-A	8.00	9.00	18.18	18	55	20	25			Tr		R					Tr										Tr	Tr		R	D	R	D	R	R	Tr	Tr	A	R		C	R				R	A		R	Tr	Tr				
352-U1442A-4R-1-A	82.0	83.00	24.12	24	15	25	60			Tr		R					Tr										Tr	Tr		A	C	C	R	C	C	A	A	R	A			R				R	A		R	Tr	Tr				
352-U1442A-4R-1-A	98.00	99.00	24.28	24.29	15	50	35			Tr		R					Tr										Tr	R										C	R		R					R	C		R	Tr	Tr				C
352-U1442A-4R-2-A	58.00	59.00	24.89	24.9	5	30	65			Tr		Tr					Tr							Tr			Tr	Tr										R	Tr		R	Tr				R	A		C	R	R				
352-U1442A-4R-2-A	68.00	69.00	24.99	25	15	50	35			Tr		R					Tr							Tr			Tr	R										C	R		C	C				R	C		C	R	Tr				C
352-U1442A-4R-2-A	74.00	75.00	25.05	25.06	5	25	70			Tr		Tr					Tr										Tr	R										C	C		R	R				Tr	C		C		Tr				C
352-U1442A-5R-1-A	8.00	9.00	33.08	33.09	55	30	15			Tr		C					Tr										Tr	Tr		C	A	C	C	C	C	R	Tr	C	A		A	R					C		R		Tr				C
352-U1442A-5R-1-A	20.00	21.00	33.2	33	10	60	30			Tr		Tr					Tr							Tr				Tr	R										C	R		C	R					C		C	R	R				C
352-U1442A-5R-2-A	23.00	24.00	34.24	34	15	55	30			Tr		R					Tr										R	C										R	R		C	R				R	C		C	R	Tr				C
352-U1442A-6R-1-A	96.00	97.0	43.76	44	10	50	40			Tr		R					Tr										Tr	R										Tr	R		R	R				R	C		C	Tr	R				
352-U1442A-6R-2-A	89.00	90.00	44.7	45	50	20	30			Tr		Tr					R								R				C	A	C	C	R	C	C	R	A	C		C	R						Tr		R		R				
352-U1442A-6R-CC-A	2.00	3.00	44.73	45	40	50	10			Tr		R					Tr										Tr	R		C	A	C	A	R	C	C	R	D	R		R	R				R	C		R		Tr				
352-U1442A-6R-CC-A	5.00	6.00	44.76	44.77	35	15	50			Tr		A					R										Tr	Tr		C	D	R	A	R	R	Tr	Tr	A	R		C	R					C		R		Tr				
352-U1442A-7R-1-A	51.00	52.0	53.11	53	5	15	80			Tr		R					Tr										Tr										R	Tr		R	Tr							R		Tr			D
352-U1442A-7R-3-A	88.0	89.00	56.48	56	0	15	85			Tr		Tr					Tr										Tr										R	Tr		R										R			D
352-U1442A-8R-1-A	57.00	58.00	62.97	63	5	15	80			Tr		R	Tr				Tr										Tr										R	Tr		R	Tr				Tr	D								
352-U1442A-8R-1-A	99.00	100.00	63.39	63		15	85			Tr		R				Tr	Tr										Tr	Tr										R	Tr		Tr					Tr	D		C	Tr	Tr				
352-U1442A-8R-1-A	113.00	114.0	63.53	64	5	15	80			Tr		R	R				Tr							C			Tr	C										R	R		C	R					A				Tr				
352-U1442A-8R-1-A	123.0	124.00	63.63	64	25	35	40			Tr		C					Tr							R			Tr	R										R	C		C	R					A				Tr				C
352-U1442A-8R-3-A	22.00	23.0	65.62	65.63	5	20	75			Tr		Tr					Tr							C			Tr	C										R	Tr		R	R				R	D				Tr				C
352-U1442A-8R-3-A	34.00	35.00	65.74	66	5	25	70			Tr		R					Tr							R			Tr	C										R	R		R	C				R	D				Tr				C
352-U1442A-8R-3-A	36.00	37.00	65.76	66	5	15	80			Tr		Tr												R				C										Tr	Tr		Tr						D				Tr				
352-U1442A-8R-3-A	79.00	80.0	66.19	66	5	15	80			Tr		Tr				Tr	Tr							R			Tr	C										Tr	Tr		Tr	R				R	D				Tr				C
352-U1442A-8R-3-A	129.00	130.0	66.69	67	10	20	70			Tr		R					Tr							Tr			Tr	C										R	Tr		R	R					D								C
352-U1442A-8R-4-A	72.00	73.00	67.62	68	10	15	75			Tr		Tr					Tr							C			Tr	C										A	R		C	C					A				Tr				C
352-U1442A-8R-5-A	16.00	17.00	67.98	68		15	85			Tr		Tr					Tr							R			Tr	C										R	Tr		R	C					C				Tr				C
352-U1442A-8R-5-A	63.00	64.0	68.45	68	15	20	65			Tr		C					Tr							R			R	C										R	Tr		Tr	Tr					D					Tr			C
352-U1442A-9R-2-A	50.0	51.00	74.1	74	5	15	80			Tr		R					Tr							R														Tr							Tr	D				Tr				C
352-U1442A-9R-2-A	73.00	74.00	74.33	74	35	40	35			Tr		C				R	R							Tr			R											C	Tr		Tr	Tr					C								
352-U1442A-9R-2-A	85.00	86.00	74.45	74	15	25	60			Tr		C				R	R							R			R	Tr										Tr	Tr		R	R					C								
352-U1442A-9R-2-A	136.00	137.00	74.96	74.97	5	20	75			Tr		R				Tr	Tr							C			R	C										R	Tr		Tr	Tr					D								C
352-U1442A-9R-2-A	149.00	150.00	75.09	75	25	35	40			Tr		C	Tr			R	Tr										Tr	R										R	Tr		Tr	Tr					C								C
352-U1442A-9R-3-A	48.00	49.00	75.58	76	5	15	80			Tr		R				Tr	Tr										Tr											C	Tr		Tr	Tr					D								C
352-U1442A-9R-3-A	146.00	147.00	76.56	77	10	20	70			Tr		R				R	R							Tr	R		Tr	R										Tr			Tr	Tr				R	C								C
352-U1442A-9R-4-A	69.00	70.00	77.29	77.3	15	20	65			Tr		R	Tr			R	R										R	R										Tr	Tr		Tr	R				Tr	Tr								C

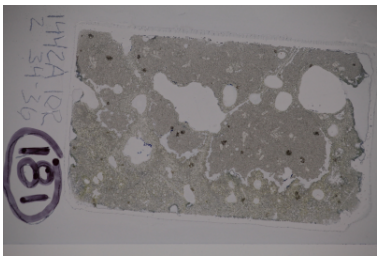
Sample	Top [cm]	Bottom [cm]	Top Depth [m]	Bottom Depth [m]	Sand texture [%]	Silt texture [%]	Clay texture [%]	Ash [%]	Siliciclastic [%]	Quartz abundance (name)	K-Feldspar abundance (name)	Plagioclase abundance (name)	Biotite abundance (name)	Muscovite abundance (name)	Chlorite abundance (name)	Amphibole 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-U1442A-10R-2-A	32.00	33.00	83.19	83.2	20	40	40					R					R						R	R													A			C	R													
352-U1442A-22R-1-W 109/110-TSB-TS_189	0.00	1.00	180.09	180.1	20	70	10			Tr		R			R		R						Tr	C			D											C															
352-U1442A-29R-1-W 36/40-TSB-TS_201	0.00	4.00	247.46	247.5	40	60						C					R	Tr						A			A									C	C															
352-U1442A-29R-1-W 51/54-TSB-TS_202	0.00	3.00	247.61	248	40	90	10					C					R	R						C			A									C	R		R													
352-U1442A-30R-3-W 52/55-TSB-TS_204	0.00	3.00	259.51	259.54	60	30	10					C					C	Tr					R				C									C	C		D	Tr													

THIN SECTION LABEL ID: **352-U1442A-10R-2-W 34/36-TSB-TS_181** Thin section no.: 181

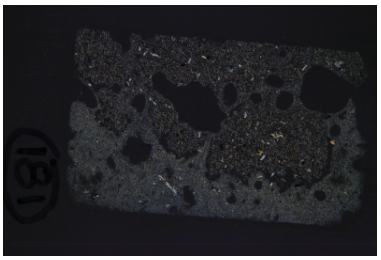
Unit/Subunit: 1a Piece no.: Observer: tc

Thin section summary: vitrophyric boninte with fresh clear glass

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately orthopyroxene phyric boninite clast

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Orthopyroxene	8	1.2	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	25	0.3	acicular	
Orthopyroxene	5	0.3	acicular	
Mesostasis	62			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
6	0	rounded	1	

MICROSTRUCTURES

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

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 25

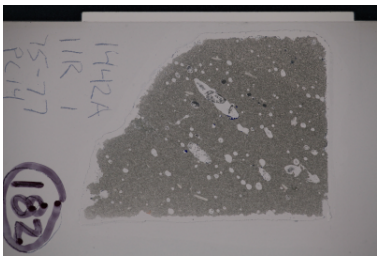
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		25	12			63
Altered [%]		15	15			40
Amph., green		5	8			
Chlorite		8	5			
Zeolite						35

THIN SECTION LABEL ID: **352-U1442A-11R-1-W 75/77-TSB-TS_182** Thin section no.: 182

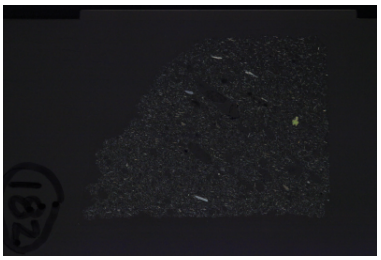
Unit/Subunit: 1a Piece no.: #14 Observer: tc

Thin section summary: trachytic boninite with aligned opx and cpx crystals

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely olivine-orthopyroxene phyric boninite lava

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	0.5	1.6	prismatic	embayed edges of euhedral crystal
Orthopyroxene	3.5	0.8	prismatic	some have small overgrowths of cpx

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	15	0.3	acicular	nucleating on opx
Orthopyroxene	10	0.3	acicular	
Mesostasis	61			mesh structure

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
3		elongate	1.5	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	moderate		weakly foliated/lineated	shape preferred orientation of acicular palg and cps, shape preferred orientation of elongated vesicles; single phenocrysts of plag with shape preferred orientation

SECONDARY (ALTERATION) MINERALOGY

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

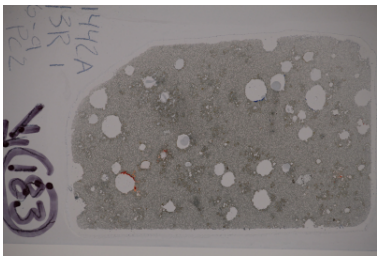
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	1	15	15			69
Altered [%]	0	0	0			30

THIN SECTION LABEL ID: **352-U1442A-13R-1-W 6/9-TSB-TS_183** Thin section no.: 183

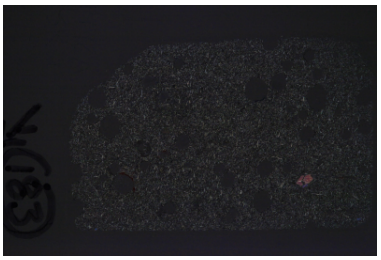
Unit/Subunit: 1b Piece no.: #02 Observer: ks

Thin section summary: olivine bearing vitrophyric boninite with fresh glass

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely olivine bearing boninite clast

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	0.5	1	prismatic	spinel inclusions

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	20	0.5	acicular	nucleating on opx rim
Orthopyroxene	40	0.5	acicular	
Mesostasis	40			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
15	0	rounded	1.2	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	weak		weakly foliated/lineated	slight shape preferred orientation of plagioclase and pyroxene

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 2

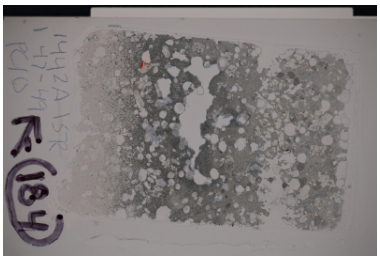
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	1	49	10			40
Altered [%]	0	0	0			5

THIN SECTION LABEL ID: **352-U1442A-15R-1-W 47/49-TSB-TS_184** Thin section no.: 184

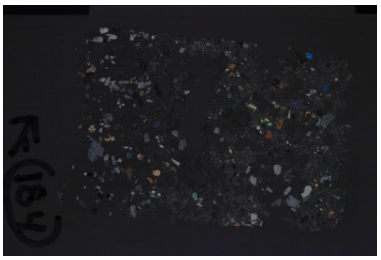
Unit/Subunit: 1b Piece no.: #10 Observer: ks

Thin section summary: highly olivine-orthopyroxene phyric boninite lava with unaltered glassy rim

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine-orthopyroxene phyric boninite lava

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	7	0.8	equant	
Orthopyroxene	10	0.8	blocky	some glomerocrystic

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	30	0.2	acicular	size decreases to glassy rim
Orthopyroxene	20	0.2	acicular	size decreases to glassy rim
Mesostasis	50			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
15	0	rounded	0.8	

MICROSTRUCTURES

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

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 15

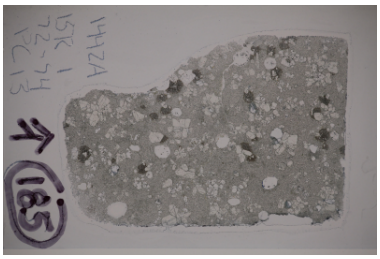
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	7	50	10			33
Altered [%]	10	5	10			40
Iddingsite	10					
Amph., green		5				
Clay minerals			10			

THIN SECTION LABEL ID: **352-U1442A-15R-1-W 72/74-TSB-TS_185** Thin section no.: 185

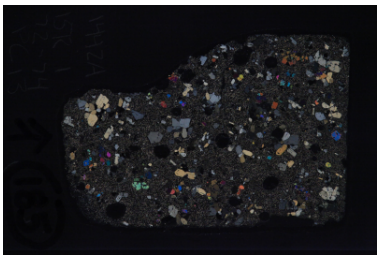
Unit/Subunit: 1b Piece no.: #13 Observer: deh

Thin section summary: Moderately olivine-orthopyroxene phyric boninite lava with a glassy and clinopyroxene rich groundmass.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine-orthopyroxene phyric boninite lava

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	10	0.6	equant	Inclusions of spinel
Orthopyroxene	10	1	blocky	clinopyroxe is crystallizing along the rim and cracks on some grains. Inclusions of spinel.

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	20	0.4	acicular	
Orthopyroxene	5	0.4	acicular	
Mesostasis	55			

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	porphyric, isotropic; microdomains of Cpx laths and acicular cpx arounf phenocrysts --> flow fabric, channelized flow

SECONDARY (ALTERATION) MINERALOGY

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

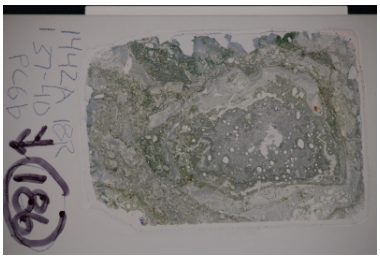
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	9	40	20		1	30
Altered [%]	5	2	2		0	10
Iddingsite	5					
Chlorite		2	2			

THIN SECTION LABEL ID: **352-U1442A-18R-1-W 37/40-TSB-TS_186** Thin section no.: 186

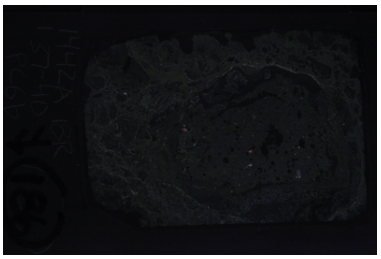
Unit/Subunit: 1c Piece no.: #06 Observer: deh

Thin section summary: boninite hyaloclastite with glassy groundmass. Clasts are pyroxene-rich and contain minor olivine phenocrysts.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic inclusion mafic** Domain no.: 1 Domain rel. abundance [%]: 70

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

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	0.5	0.5	equant	
Orthopyroxene	0.5	0.5	blocky	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Orthopyroxene	60	0.3	acicular	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
10	30	rounded	0.8	

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

LITHOLOGY: **heterolithic boninite hyaloclastite**

Texture 1:	granular	Texture 2:	glassy matrix
Avg. grain size:	fine grained	Grain size distrib.:	seriate

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	breccia, hyaloclastic, angular fragments

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: volcanic clast, mafic Domain no.: 1 Domain rel. abundance [%]: 70

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

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	1		60			39
Altered [%]	70		10			50
Serpentine	70					
Chlorite			10			
Other						20
Zeolite						30

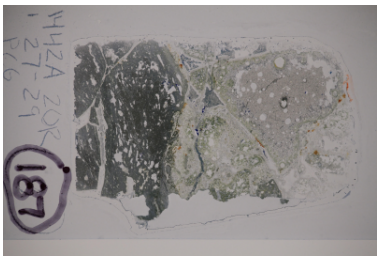
Alteration domain name: matrix Domain no.: 2 Domain rel. abundance [%]: 30

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

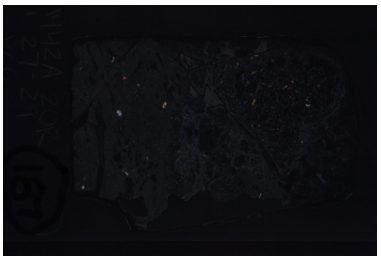
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]						100
Altered [%]						100
Clay minerals						10
Zeolite						80

THIN SECTION LABEL ID: **352-U1442A-20R-1-W 27/29-TSB-TS_187** Thin section no.: 187
Unit/Subunit: 1c Piece no.: #06 Observer: jws
Thin section summary: boninite hyaloclastite

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **scoria** Domain no.: 1 Domain rel. abundance [%]: 40

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

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	0.5	0.3	prismatic	up to 0.8 mm
Orthopyroxene	0.5	0.2		

Groundmass phases	% present	Average size (mm)	Habit	Comments
Orthopyroxene	15	0.1	acicular	Aligned strongly

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

Sample domain name: **volcanic inclusion mafic** Domain no.: 2 Domain rel. abundance [%]: 30

LITHOLOGY: **sparsely olivine bearing boninite clast**

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	1	0.3	prismatic	up to 0.5

Groundmass phases	% present	Average size (mm)	Habit	Comments
Orthopyroxene	30	0.2	acicular	random orientation except at edge of clast: oriented perpendicular to edge.

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
20	0	subrounded	0.5	

Sample domain name: **matrix** Domain no.: 3 Domain rel. abundance [%]: 30

LITHOLOGY: **heterolithic boninite hyaloclastite**

Texture 1:	granular	Texture 2:	glassy matrix
Avg. grain size:	fine grained	Grain size distrib.:	seriate

Groundmass phases	% present	Average size (mm)	Habit	Comments
Mesostasis	100			Matrix consists of boninite pumice lapilli 0.1-0.2 mm, originally glass, now replaced, with fine matric of glass ash - all now 100% altered. replaced by calcite, zeolites, etc.

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	weak		weakly foliated/lineated	shape preferred orientation of acicular cps and plag, altered, hyaloclastic, veins and vesicles with zeolite

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: volcanic clast, mafic Domain no.: 1 Domain rel. abundance [%]: 70

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

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	1		24			75
Altered [%]	50		5			50
Iddingsite	50					
Amph., green			5			
Clay minerals						5
Other						15
Zeolite						30

Alteration domain name: matrix Domain no.: 2 Domain rel. abundance [%]: 30

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

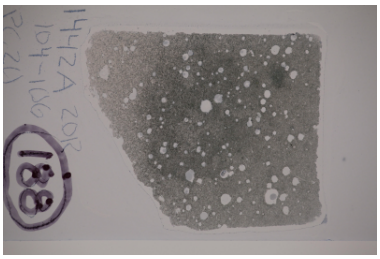
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]						100
Altered [%]						100
Clay minerals						20
Carbonate						20
Other						30
Zeolite						30

THIN SECTION LABEL ID: **352-U1442A-20R-1-W 104/106-TSB-TS_188** Thin section no.: 188

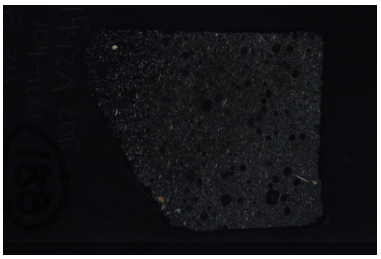
Unit/Subunit: 1c Piece no.: #20 Observer: jp

Thin section summary: boninite with very sparse microphenocrysts of opx + olivine. Opx+fresh glass in groundmass

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely olivine-orthopyroxene bearing boninite lava

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	0.5	0.3	equant	
Orthopyroxene	0.5	0.3	blocky	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Orthopyroxene	55	0.3	acicular	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
15	0	rounded	0.8	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
				domainal SPO

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	small domains of shape preferred orientation; altered

SECONDARY (ALTERATION) MINERALOGY

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

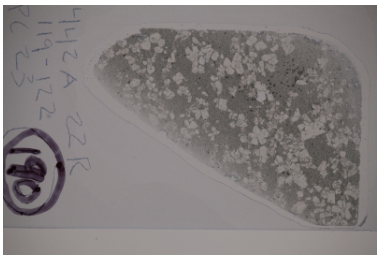
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	1		55			44
Altered [%]	50		5			20
Serpentine	50					
Amph., green			5			
Zeolite						10

THIN SECTION LABEL ID: **352-U1442A-22R-1-W 119/122-TSB-TS_190** Thin section no.: 190

Unit/Subunit: 1d Piece no.: #23 Observer: tc

Thin section summary: highly orthopyroxene and olivine phyric boninte, with a mesostasis of acicular clinopyroxene and lesser orthopyroxene and clear glass

Plane-polarized:



Cross-polarized:

PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: highly olivine-orthopyroxene phyric boninite lava

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	5	1	equant	can be emabyed
Orthopyroxene	20	1.5	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	7	0.3	acicular	
Orthopyroxene	8	0.3	acicular	
Mesostasis	50			

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	some of the Opx is broken before eruption

SECONDARY (ALTERATION) MINERALOGY

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

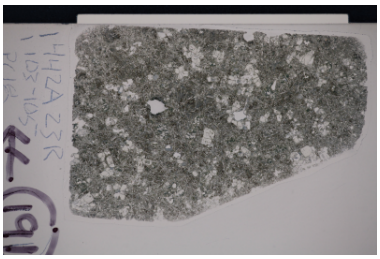
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	5	10	30			55
Altered [%]	2	0	5			5
Serpentine	2					
Amph., green			5			

THIN SECTION LABEL ID: **352-U1442A-23R-1-W 103/105-TSB-TS_191** Thin section no.: 191

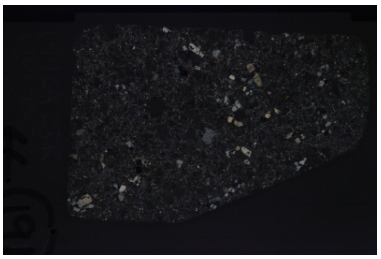
Unit/Subunit: 1d Piece no.: #18 Observer: deh

Thin section summary: moderately olivine-orthopyroxene phyric boninite lava. Large orthopyroxene and olivine phenocrysts.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine-orthopyroxene phyric boninite lava

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	5	1	equant	completely pseudomorphed
Orthopyroxene	10	0.8	prismatic	
Spinel	0.1	0.2		Within altered olivine

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	5	0.3	acicular	
Orthopyroxene	15	0.3	acicular	
Mesostasis	65			
Spinel		0.2		

MICROSTRUCTURES

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

SECONDARY (ALTERATION) MINERALOGY

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

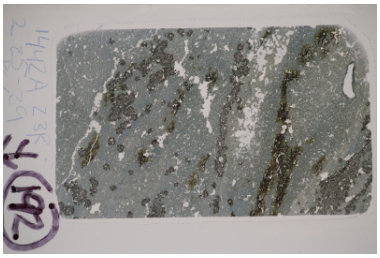
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	5	5	40			50
Altered [%]	30	5	20			70
Iddingsite	20					
Carbonate	10					10
Amph., green		5				
Chlorite			5			
Clay minerals			10			
Other			5			
Zeolite						10

THIN SECTION LABEL ID: **352-U1442A-23R-2-W 25/29-TSB-TS_192** Thin section no.: 192

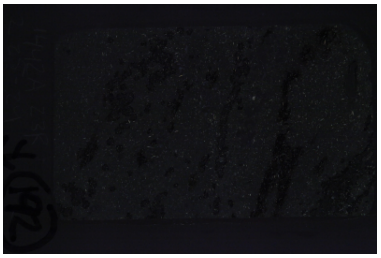
Unit/Subunit: 1d Piece no.: #06 Observer: deh

Thin section summary: Sparsely olivine-orthopyroxene phyric boninite. The olivine has been completely altered but there remains orthopyroxene phenocrysts and crystals of clinopyroxene and orthopyroxene in the groundmass. Vesicles are filled with zeolite.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely olivine-orthopyroxene phyric boninite lava

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	5	0.5	equant	completely pseudomorphed
Orthopyroxene	2	0.25		

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	5	0.1	acicular	
Orthopyroxene	20	0.2	acicular	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
2	100	elongate	1	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	strong		undeformed	flow banding in a magmatically layered volcanic rock

SECONDARY (ALTERATION) MINERALOGY

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

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	5		20			75
Altered [%]	100		50			100
Iddingsite	100					
Chlorite			5			
Clay minerals			45			50
Zeolite						50

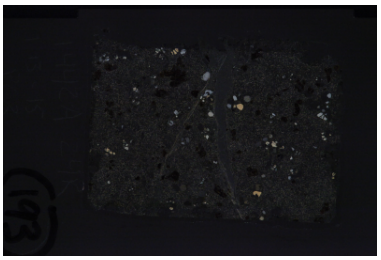
THIN SECTION LABEL ID: **352-U1442A-24R-1-W 13/15-TSB-TS_193** Thin section no.: 193

Unit/Subunit: 1d Piece no.: #03 Observer: tc

Thin section summary: fresh orthopyroxene phenocrysts in an altered mesostasis of clinopyroxene and glass

Plane-polarized:

Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine-orthopyroxene phyric boninite lava

Texture 1:	microlitic	Texture 2:	hypohyaline
Avg. grain size:	microcrystalline	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	3	1	equant	completely pseudomorphed
Orthopyroxene	5	1	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	5	0.3	acicular	
Orthopyroxene	15	0.3	acicular	

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	fractured phenocrysts

SECONDARY (ALTERATION) MINERALOGY

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

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

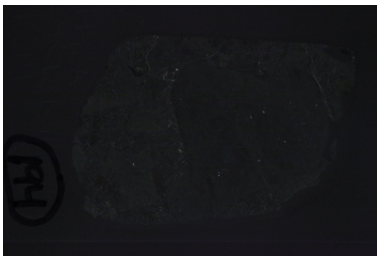
THIN SECTION LABEL ID: **352-U1442A-24R-1-W 89/91-TSB-TS_194** Thin section no.: 194

Unit/Subunit: 1d Piece no.: #19 Observer: ks

Thin section summary: heavily altered boninitic breccia with glassy fragments in matrix

Plane-polarized:

Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

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

LITHOLOGY: **aphyric boninite clast**

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

Groundmass phases	% present	Average size (mm)	Habit	Comments
Mesostasis	100			heavily altered, hard to difine orignial texture and mineralogy

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

LITHOLOGY: **aphyric boninite hyaloclastite**

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

Groundmass phases	% present	Average size (mm)	Habit	Comments
Mesostasis	100			heavily altered, hard to define orignial texture and mineralogy

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	some clasts have a strong SPO

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: volcanic clast, mafic Domain no.: 1 Domain rel. abundance [%]: 70

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

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

Alteration domain name: matrix Domain no.: 2 Domain rel. abundance [%]: 30

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

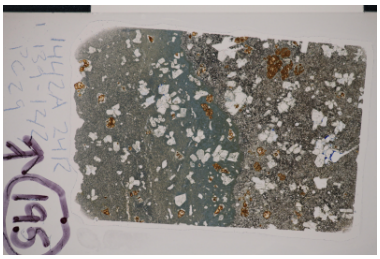
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]						100
Altered [%]						100
Clay minerals						50
Zeolite						50

THIN SECTION LABEL ID: **352-U1442A-24R-1-W 139/142-TSB-TS_195** Thin section no.: 195

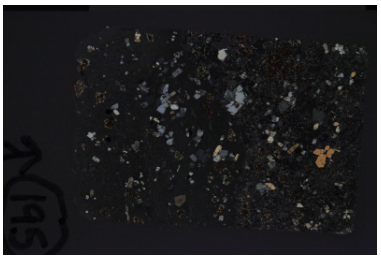
Unit/Subunit: 1d Piece no.: #29 Observer: jws

Thin section summary: magma-magma intrusive contact; both Opx-Ol phyric, with opx groundmass. Chilled margin and cuspate contact.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **mafic lava** Domain no.: 1 Domain rel. abundance [%]: 45

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

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	5	2	prismatic	altered to carbonates etc entirely
Orthopyroxene	18	1.5	prismatic	Some have Cpx overgrowths

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	25	0.5	acicular	
Orthopyroxene	10	0.3	acicular	Cpx rims

Sample domain name: **mafic lava** Domain no.: 2 Domain rel. abundance [%]: 55

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

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	3	0.4	prismatic	altered to carbonate, etc
Orthopyroxene	12	0.8	prismatic	No Cpx rims

Groundmass phases	% present	Average size (mm)	Habit	Comments
Mesostasis	85			Quench texture of Opx, glass; no cpx evident.

MICROSTRUCTURES

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

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: Boninite Domain no.: 1 Domain rel. abundance [%]: 55

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

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	3		12			
Altered [%]	100		25			
Iddingsite	40					
Carbonate	60					
Chlorite			10			
Clay minerals			10			
Other			5			

Alteration domain name: Altered Boninite Domain no.: 2 Domain rel. abundance [%]: 45

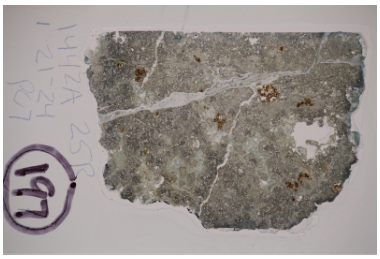
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	5	25	28			42
Altered [%]	100	10	20			100
Iddingsite	30					
Carbonate	70					10
Chlorite		10	10			
Clay minerals			5			30
Other			5			
Zeolite						60

THIN SECTION LABEL ID: **352-U1442A-25R-1-W 21/24-TSB-TS_197** Thin section no.: 197

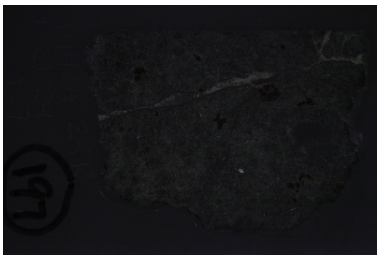
Unit/Subunit: 1e Piece no.: #07 Observer: wn

Thin section summary: Sparsely olivine-phyric boninite. A single orthopyroxene phenocryst is visible. Ateration is pervasive and has completley replaced olivine.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely olivine phyric boninite lava

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	1.5	3.3	prismatic	completely pseudomorphed
Orthopyroxene	0.5	0.5	blocky	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	5	0.1	bladed	
Orthopyroxene	20	0.1	bladed	
Mesostasis	72			Too altered to determine if this was once glass

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
3	10	angular	0.5	

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	altered; clay-zeolite veins, partly very fine-grained calcite

SECONDARY (ALTERATION) MINERALOGY

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

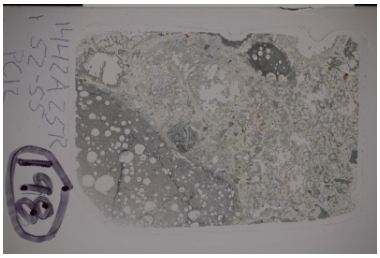
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	5	5	20			70
Altered [%]	100	20	20			90
Iddingsite	70					
Other	30					
Clay minerals		20	20			35
Zeolite						55

THIN SECTION LABEL ID: **352-U1442A-25R-1-W 52/55-TSB-TS_198** Thin section no.: 198

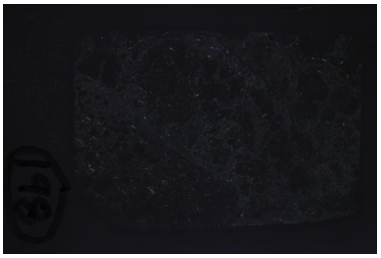
Unit/Subunit: 1e Piece no.: #12 Observer: jws

Thin section summary: hyaloclastite with re-melted clasts: clast has chilled margin with matrix. Most opx needles in contact area align parallel to the contact, but some bigger ones (mcirophenocryst protrude into matrix).

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **volcanic inclusion mafic** Domain no.: 1 Domain rel. abundance [%]: 25

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

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	1	0.6	prismatic	Separate xtls and rims on Opx
Orthopyroxene	2	0.6	prismatic	Som ehav eCpx rims, feathery terminations

Groundmass phases	% present	Average size (mm)	Habit	Comments
Orthopyroxene	40	0.1	acicular	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
40	0	spherical	0.8	

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

LITHOLOGY: **boninite hyaloclastite**

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

SECONDARY (ALTERATION) MINERALOGY

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

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

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		2	40			58
Altered [%]		10	10			50
Clay minerals		10	10			10
Zeolite						40

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

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

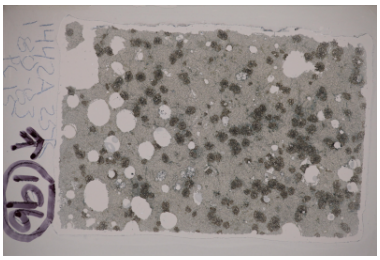
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]			10			90
Altered [%]			80			100
Clay minerals			80			20
Zeolite						80

THIN SECTION LABEL ID: **352-U1442A-25R-1-W 80/83-TSB-TS_196** Thin section no.: 196

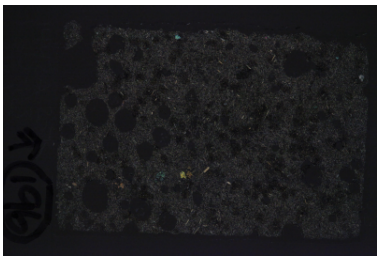
Unit/Subunit: 1e Piece no.: #15 Observer: jp

Thin section summary: ol+opx phyric boninite with glass +opx+cpx matrix.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely olivine-orthopyroxene phyric boninite lava

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	1.5	0.8	equant	
Orthopyroxene	0.5	0.8	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	10	0.3	acicular	
Orthopyroxene	40	0.3	acicular	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
15	0	rounded	2	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	strong		undeformed	strong Cpx SPO despite lack of elongation in vesicles

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 8

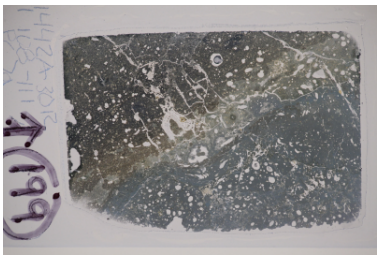
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	2	10	40			48
Altered [%]	10	0	5			10
Iddingsite	10					
Clay minerals			5			5
Zeolite						5

THIN SECTION LABEL ID: **352-U1442A-30R-1-W 108/111-TSB-TS_199** Thin section no.: 199

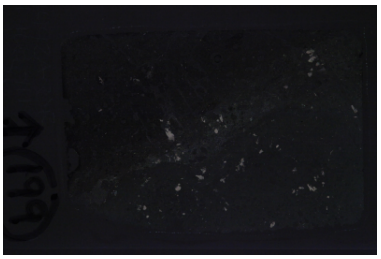
Unit/Subunit: 1e Piece no.: #07 Observer: wn

Thin section summary: Example of magma mingling (?) with two mafic lavas containing ol and opx as well as just opx, respectively.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **mafic lava** Domain no.: 1 Domain rel. abundance [%]: 40

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

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	1	0.4	blocky	100% altered
Orthopyroxene	1	0.5	bladed	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	10	0.3	acicular	
Mesostasis	28			highly altered

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
7	20	subrounded	0.6	

Sample domain name: **mafic lava** Domain no.: 2 Domain rel. abundance [%]: 60

LITHOLOGY: **sparsely orthopyroxene bearing boninite lava**

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Orthopyroxene	1	0	acicular	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	19	0.2	acicular	
Orthopyroxene	40	0.2	acicular	
Mesostasis	40			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
3	80	subrounded	1	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	weak		undeformed	zeolite veins, microdomains of slight SPO

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: Altered Boninite Domain no.: 1 Domain rel. abundance [%]: 40

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

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	1	10	1			88
Altered [%]	100	50	100			100
Iddingsite	100					
Chlorite		8				
Clay minerals		40	50			10
Other			50			
Carbonate						10
Zeolite						60

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

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

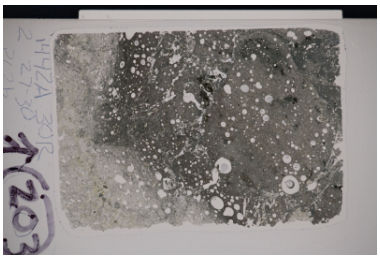
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		20	40			60
Altered [%]		50	60			100
Chlorite		8				
Clay minerals		40	80			15
Other			20			
Carbonate						15
Zeolite						70

THIN SECTION LABEL ID: **352-U1442A-30R-2-W 27/30-TSB-TS_203** Thin section no.: 203

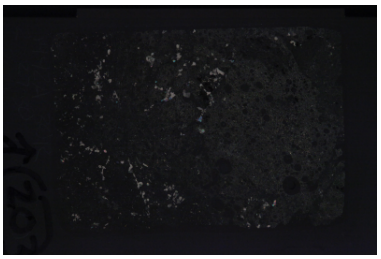
Unit/Subunit: 1e Piece no.: #02 Observer: deh

Thin section summary: Boninite clast with fresh glassy rim and a microcrystalline cpx rich center with sparse phenocrysts of cpx, opx and altered olivine.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

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

LITHOLOGY: **sparsely olivine-orthopyroxene-clinopyroxene boninite lava**

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	0.5	0.1	blocky	
Clinopyroxene	0.5	0.2	prismatic	
Orthopyroxene	0.5	0.15	blocky	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	50	0.1	acicular	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
15	50	spherical	0.5	

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

LITHOLOGY: **sparsely augite-orthopyroxene bearing boninite hyaloclastite**

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	0.25	0.2	blocky	
Orthopyroxene	0.25	0.3	bladed	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	60	0.05	acicular	
Mesostasis	39.5			

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: volcanic clast, mafic Domain no.: 1 Domain rel. abundance [%]: 70

Total alteration in rock, bulk estimate (%): 15

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	1	50	1			48
Altered [%]	50	2	5			20
Iddingsite	30					
Carbonate	70					10
Chlorite		2				
Clay minerals			5			

Alteration domain name: matrix Domain no.: 2 Domain rel. abundance [%]: 30

Total alteration in rock, bulk estimate (%): 15

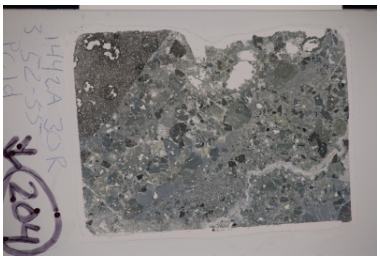
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]						100
Altered [%]						30
Carbonate						20

THIN SECTION LABEL ID: **352-U1442A-30R-3-W 52/55-TSB-TS_204** Thin section no.: 204

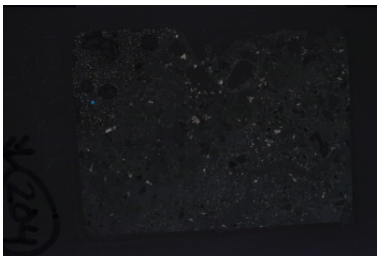
Unit/Subunit: 2a Piece no.: #01 Observer: ks

Thin section summary: sparsely cpx phyric boninitic pillow lava with volconiclastic sediment infilling fractures

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

Sample domain name: **mafic lava** Domain no.: 1 Domain rel. abundance [%]: 10

LITHOLOGY: **sparsely augite phyric boninite pillow lava**

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	1	0.6	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	20	0.2	acicular	
Clinopyroxene	30	0.1	equant	
Mesostasis	49			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
15	20	subrounded	2	segregation vesicle, some calcite filling

Sample domain name: **glass** Domain no.: 2 Domain rel. abundance [%]: 90

LITHOLOGY: **boninite hyaloclastite**

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
5	10	subrounded	0.2	size and shape vary according to the clast

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: volcanic clast, mafic Domain no.: 1 Domain rel. abundance [%]: 15

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

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		30		20		50
Altered [%]		15		20		40
Chlorite		5				
Clay minerals		10				10
Zeolite				20		20
Carbonate						10

Alteration domain name: Matrix Domain no.: 2 Domain rel. abundance [%]: 95

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

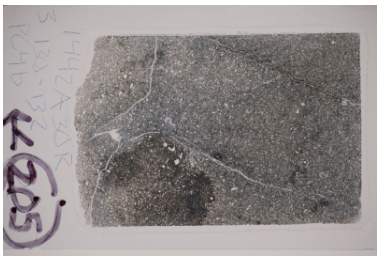
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]						100
Altered [%]						100
Clay minerals						20
Carbonate						30
Zeolite						30

THIN SECTION LABEL ID: **352-U1442A-30R-3-W 130/132-TSB-TS_205** Thin section no.: 205

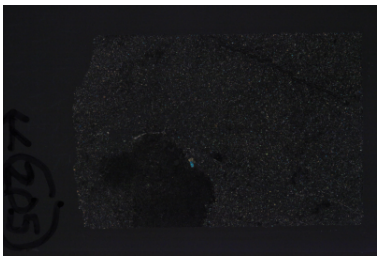
Unit/Subunit: 2a Piece no.: #04 Observer: tc

Thin section summary: sparsely orthopyroxene phyric boninite containing intersertal groundmass of cpx and pl

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely augite-orthopyroxene phyric boninite lava

Texture 1:	intersertal	Texture 2:	intergranular
Avg. grain size:	fine grained	Grain size distrib.:	seriate

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	1	0.5	prismatic	sector zoning
Orthopyroxene	1	1	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	30	0.4	tabular	
Clinopyroxene	15	0.4	prismatic	
Mesostasis	53			altered to clay. Alteration highly localised into specific domains.

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
1	0	irregular	0.4	

MICROSTRUCTURES

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

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 55

Groundmass original [%]: 48 Groundmass altered [%]: 100 Groundmass alt. intensity:

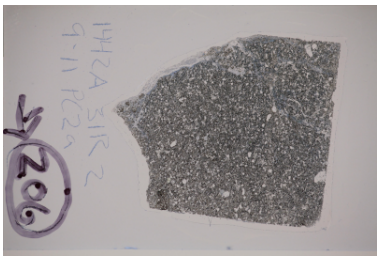
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		16	1	30		
Altered [%]		20	10	15		
Chlorite		5	5	5		
Clay minerals		15	5			
Zeolite				10		

THIN SECTION LABEL ID: **352-U1442A-31R-2-W 9/11-TSB-TS_206** Thin section no.: 206

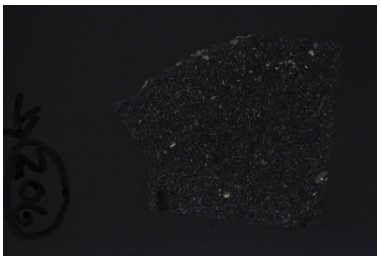
Unit/Subunit: 2a Piece no.: #02 Observer: jp

Thin section summary: weakly trachytic sparsley plag phyric boninite

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely plagioclase bearing boninite lava

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Plagioclase	1	1	tabular	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	55	0.1	acicular	weak trachytic texture
Clinopyroxene	8	0.1	blocky	
Mesostasis	36			glass altered to clay

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
3	0	irregular	0.08	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	gradational boundary or contact		Vein with cataclastic deformation of the basalt and sporadic crystallisation of carbonates

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	moderate		undeformed	moderate magmatic foliation marked by acicular crystals

SECONDARY (ALTERATION) MINERALOGY

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

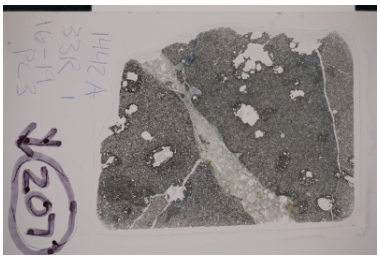
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		8		55		37
Altered [%]		5		30		100
Clay minerals		5				30
Zeolite				30		60
Carbonate						5

THIN SECTION LABEL ID: **352-U1442A-33R-1-W 16/19-TSB-TS_207** Thin section no.: 207

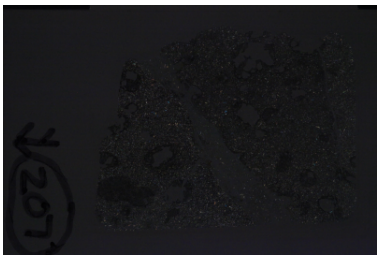
Unit/Subunit: 2a Piece no.: #03 Observer: tc

Thin section summary: microporphyritic boninite containing both phenocrysts and groundmass augite and orthopyroxene

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately augite-orthopyroxene phyric boninite lava

Texture 1:	microporphyritic	Texture 2:	intersertal
Avg. grain size:	fine grained	Grain size distrib.:	seriate

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	4	0.6	prismatic	zoning
Orthopyroxene	1	0.5	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	25	0.4	tabular	
Clinopyroxene	10	0.3	blocky	
Orthopyroxene	5	0.3	blocky	
Mesostasis	55			altered to clay. Large brecciated vein through the centre of the sample

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
15	0	irregular	1	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.4	sharp boundary or contact		Cataclastic vein with zeolite groundmass and volcanic clasts

MICROSTRUCTURES

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

SECONDARY (ALTERATION) MINERALOGY

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

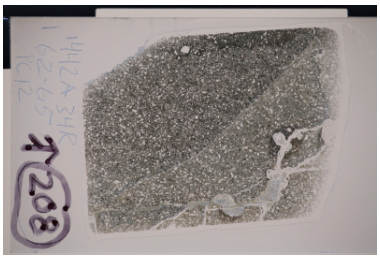
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		14	6	25		55
Altered [%]		10	5	30		100
Clay minerals		8	5			
Zeolite				30		20

THIN SECTION LABEL ID: **352-U1442A-34R-1-W 62/65-TSB-TS_208** Thin section no.: 208

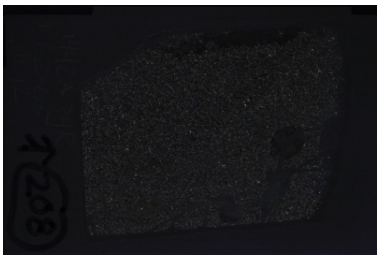
Unit/Subunit: 2a Piece no.: #12 Observer: tc

Thin section summary: aphyric intersertal to intergranular boninite, highly altered. Orthopyroxene occurs within the groundmass.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: aphyric boninite lava

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

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	30	0.2	tabular	
Clinopyroxene	10	0.3	prismatic	
Orthopyroxene	1	0.2	prismatic	
Mesostasis	59			highly altered to clay, abundant veins of zeolite

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
20	0	irregular	0.4	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.1	sharp boundary or contact		Cataclastic vein with zeolite replaced by clays

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	contact btw 2 magmas, no chilled margin

SECONDARY (ALTERATION) MINERALOGY

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

Groundmass original [%]: 59 Groundmass altered [%]: 100 Groundmass alt. intensity:

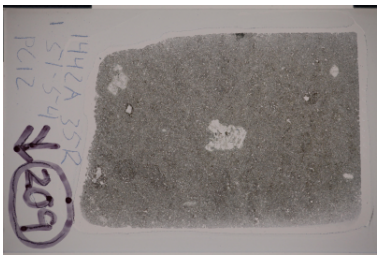
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		10	1	30		
Altered [%]		30	100	20		
Clay minerals		27	100			
Zeolite				20		

THIN SECTION LABEL ID: **352-U1442A-35R-1-W 51/54-TSB-TS_209** Thin section no.: 209

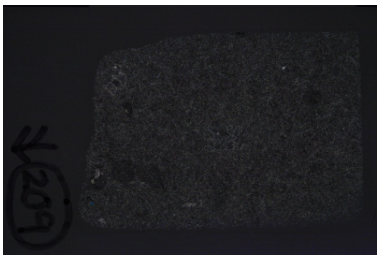
Unit/Subunit: 2b Piece no.: #12 Observer: ks

Thin section summary: sparsely olivine phyric boninite with cpx and plagioclase in groundmass, olivine is completely replaced

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely olivine-orthopyroxene-clinopyroxene boninite lava

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	1	1	prismatic	some glomerocristic, completely altered
Clinopyroxene	0.5	0.5	blocky	2 grains in TS
Orthopyroxene	0.5	0.3	equant	few grains in TS

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	40	0.2	acicular	some skeletal shape
Clinopyroxene	25	0.1	acicular	
Fe Ti oxide	3	0.03	prismatic	
Mesostasis	32			

MICROSTRUCTURES

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

SECONDARY (ALTERATION) MINERALOGY

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

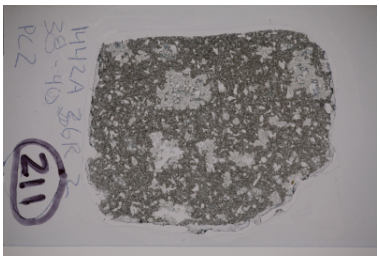
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	1	25	1	40	3	30
Altered [%]	5	10	5	10	0	50
Iddingsite	5					
Chlorite		5	5			
Clay minerals		5				
Zeolite				10		
Carbonate						10

THIN SECTION LABEL ID: **352-U1442A-36R-2-W 38/40-TSB-TS_211** Thin section no.: 211

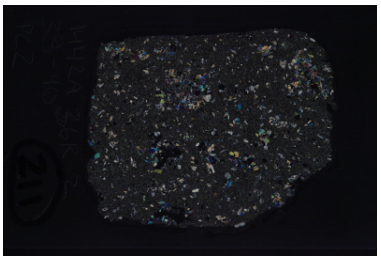
Unit/Subunit: 2b Piece no.: #02 Observer: tc

Thin section summary: fresh euhedral, twinned augite and plagioclase phenocrysts within an intersertal matrix

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately olivine-plagioclase-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	0.8	poikilitic	some glomerocrystic; completely altered
Plagioclase	5	0.8	tabular	
Clinopyroxene	15	0.9	prismatic	many contain simple twins

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	40	0.2	tabular	
Clinopyroxene	10	0.2	blocky	
Mesostasis	30			altered to clay

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

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	bimodal grain size, possible xenoliths of coarser grained material in fine grained basalt

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 15

Groundmass original [%]: 25 Groundmass altered [%]: 60 Groundmass alt. intensity:

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	3	25	2	45		
Altered [%]	5	5	10	5		
Iddingsite	5					
Amph., green		5				
Talc			10			
Zeolite				2		
Plagioclase, secondary				3		

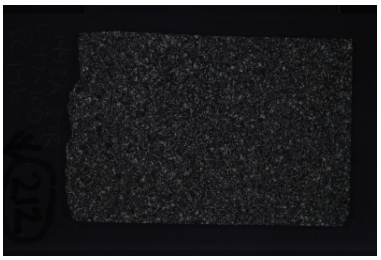
THIN SECTION LABEL ID: **352-U1442A-37R-1-W 97/100-TSB-TS_212** Thin section no.: 212

Unit/Subunit: 2b Piece no.: #14 Observer: jp

Thin section summary: highly altered aphyric boninite

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	30	0.1	tabular	
Clinopyroxene	20	0.1	blocky	
Fe Ti oxide	1	0.03	skeletal	
Mesostasis	49			replaced to brown clays and some undulatory low birefringence material that may be zeolite

MICROSTRUCTURES

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

SECONDARY (ALTERATION) MINERALOGY

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

Groundmass original [%]: 49 Groundmass altered [%]: 100 Groundmass alt. intensity:

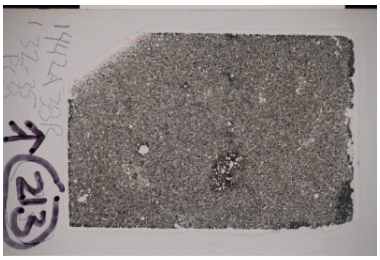
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		20		30	1	
Altered [%]		15		25	0	
Clay minerals		15				
Zeolite				25		

THIN SECTION LABEL ID: **352-U1442A-38R-1-W 32/35-TSB-TS_213** Thin section no.: 213

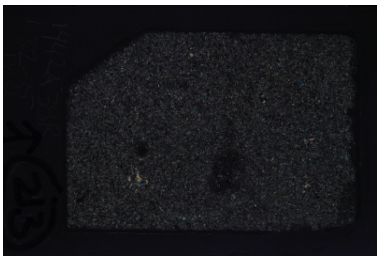
Unit/Subunit: 2b Piece no.: #08 Observer: tc

Thin section summary: highly altered boninite, containing rare glomerocrysts of augite

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely augite phyric boninite lava

Texture 1:	glomerocrystic	Texture 2:	intergranular
Avg. grain size:	fine grained	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	3	0.6	prismatic	forms glomerocrysts

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	40	0.4	tabular	
Clinopyroxene	25	0.3	blocky	altered to zeolite and/or clay
Fe Ti oxide	2	0.2	equant	
Mesostasis	30			all altered to clay or zeolite

MICROSTRUCTURES

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

SECONDARY (ALTERATION) MINERALOGY

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

Groundmass original [%]: 30 Groundmass altered [%]: 100 Groundmass alt. intensity:

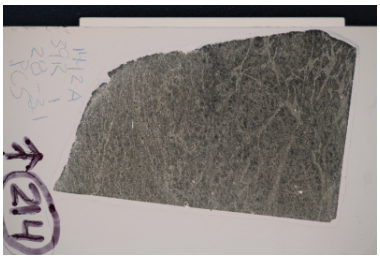
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		28		40	2	
Altered [%]		15		20	5	
Chlorite		5				
Clay minerals		10				
Zeolite				20		

THIN SECTION LABEL ID: **352-U1442A-39R-1-W 28/31-TSB-TS_214** Thin section no.: 214

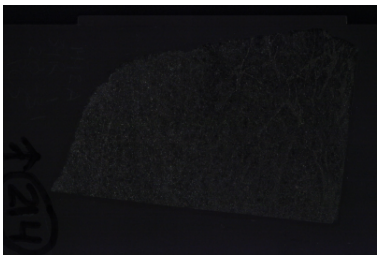
Unit/Subunit: 2b Piece no.: #05 Observer: deh

Thin section summary: Sparsely augite phryic boninite. Augite phenocrysts have been completely altered as well as nearly all groundmass plagioclase, clinopyroxene and mesostasis.

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	1	1.5		

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	25	0.4	tabular	
Clinopyroxene	40	0.3	blocky	
Fe Ti oxide	2	0.2	equant	
Mesostasis	30			all altered to clay or zeolite

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	strong		undeformed	strong SPO, strongly altered

SECONDARY (ALTERATION) MINERALOGY

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

Groundmass original [%]: 33 Groundmass altered [%]: 100 Groundmass alt. intensity:

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		40		25	2	
Altered [%]		100		70	0	
Amph., green		30				
Clay minerals		70				
Zeolite				40		
Plagioclase, secondary				30		

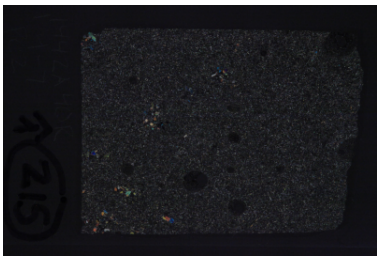
THIN SECTION LABEL ID: **352-U1442A-40R-1-W 4/7-TSB-TS_215** Thin section no.: 215

Unit/Subunit: 2b Piece no.: #02 Observer: tc

Thin section summary: augite glomerocrysts in a intergranular matrix

Plane-polarized:

Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely olivine-augite phyric boninite lava

Texture 1:	glomerocrystic	Texture 2:	intergranular
Avg. grain size:	fine grained	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	1	0.5		mostly altered, some remain fresh
Clinopyroxene	4	0.5	prismatic	forms glomerocrysts

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	45	0.4	tabular	
Clinopyroxene	20	0.3	blocky	
Fe Ti oxide	1	0.2	equant	
Mesostasis	30			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
5		rounded	0.2	some may be appear diktytaxitic

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	clusters of larger grains

SECONDARY (ALTERATION) MINERALOGY

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

Groundmass original [%]: 34 Groundmass altered [%]: 100 Groundmass alt. intensity:

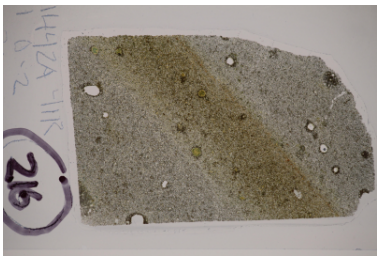
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	1	24		40	1	
Altered [%]	100	15		30	0	
Iddingsite	100					
Chlorite		10				
Clay minerals		5				
Zeolite				30		

THIN SECTION LABEL ID: **352-U1442A-41R-1-W 0/2-TSB-TS_216** Thin section no.: 216

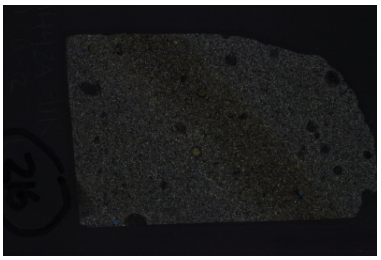
Unit/Subunit: 2b Piece no.: #01 Observer: tc

Thin section summary: highly altered augite phyric boninite

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely augite phyric boninite lava

Texture 1:	intergranular	Texture 2:	intersertal
Avg. grain size:	fine grained	Grain size distrib.:	inequigranular

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	3	0.6	prismatic	all altered

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	45	0.4	tabular	
Clinopyroxene	20	0.4	blocky	
Fe Ti oxide	2	0.3	equant	
Mesostasis	30			all altered to clay

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

MICROSTRUCTURES

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

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: Boninite Domain no.: 1 Domain rel. abundance [%]: 75

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

Groundmass original [%]: 30 Groundmass altered [%]: 100 Groundmass alt. intensity:

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		23		45	2	
Altered [%]		30		5	1	
Amph., pale		20				
Clay minerals		10				
Zeolite				5		

Alteration domain name: Altered boninite Domain no.: 2 Domain rel. abundance [%]: 25

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

Groundmass original [%]: 30 Groundmass altered [%]: 100 Groundmass alt. intensity:

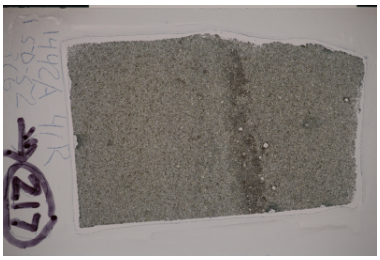
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		23		45	2	
Altered [%]		30		10	1	
Amph., pale		10				
Clay minerals		20				
Zeolite				10		

THIN SECTION LABEL ID: **352-U1442A-41R-1-W 50/52-TSB-TS_217** Thin section no.: 217

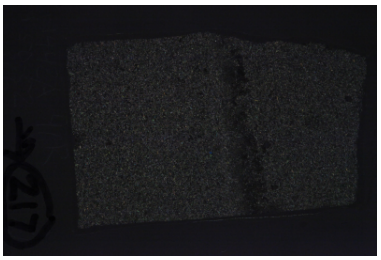
Unit/Subunit: 2b Piece no.: #06 Observer: jp

Thin section summary: highly altered aphyric boninite

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: aphyric boninite lava

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

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	45	0.1	tabular	
Clinopyroxene	30	0.1	prismatic	
Fe Ti oxide	2	0.08	equant	don't show up as brightly in reflected light
Mesostasis	23			replaced to clays

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
2	10	spherical	0.5	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	weak		undeformed	Fe oxide mark a magmatic layering

SECONDARY (ALTERATION) MINERALOGY

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

Groundmass original [%]: 25 Groundmass altered [%]: 100 Groundmass alt. intensity:

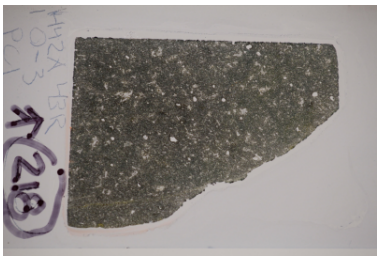
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		30		43	2	
Altered [%]		50		30	5	
Amph., pale		20				
Clay minerals		28				
Zeolite				30		

THIN SECTION LABEL ID: **352-U1442A-43R-1-W 0/3-TSB-TS_218** Thin section no.: 218

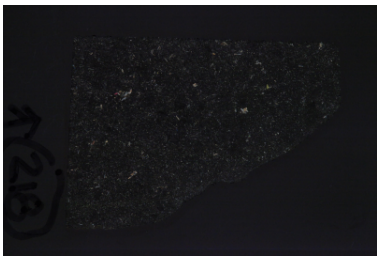
Unit/Subunit: 2b Piece no.: #01 Observer: tc

Thin section summary: plagioclase and augite phenocrysts in an altered fine-grained matrix

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: moderately plagioclase-augite phyric boninite lava

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Plagioclase	4	0.8	tabular	
Clinopyroxene	1	0.6	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	35	0.3	tabular	
Clinopyroxene	10	0.3	blocky	
Fe Ti oxide	5	0.1	equant	
Mesostasis	45			

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

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	moderate		undeformed	clusters of coarser grained material

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 35

Groundmass original [%]: 45 Groundmass altered [%]: 50 Groundmass alt. intensity:

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		10		40	5	
Altered [%]		20		20	0	
Clay minerals		19				
Sulfide		1				
Zeolite				20		

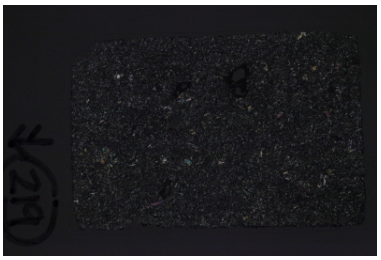
THIN SECTION LABEL ID: **352-U1442A-43R-1-W 63/66-TSB-TS_219** Thin section no.: 219

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

Thin section summary: moderately altered sparsely plagioclase-clinopyroxene phyric boninite

Plane-polarized:

Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely plagioclase-augite phyric boninite lava

Texture 1:	intergranular	Texture 2:	trachytic
Avg. grain size:	microcrystalline	Grain size distrib.:	bimodal

Phenocrysts	% present	Average size [mm]	Habit	Comments
Plagioclase	1	0.8	tabular	
Clinopyroxene	1	0.8	prismatic	some large elongate phenocrysts and one agglomerate of smaller crystals

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	55	0.3	tabular	
Clinopyroxene	25	0.2	blocky	
Fe Ti oxide	1	0.02	equant	no preferred distribution
Mesostasis	19			indistinct clays

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
3		irregular	1	some rounded and some very irregular

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	moderate		undeformed	irregular SPO

SECONDARY (ALTERATION) MINERALOGY

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

Groundmass original [%]: 19 Groundmass altered [%]: 50 Groundmass alt. intensity:

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		25		55	1	
Altered [%]		10		15	0	
Chlorite		5				
Clay minerals		5		5		
Zeolite				10		

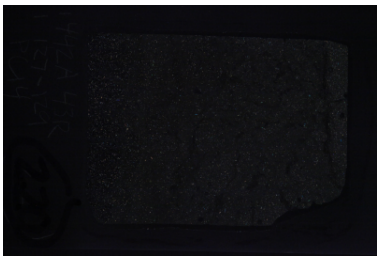
THIN SECTION LABEL ID: **352-U1442A-43R-1-W 127/129-TSB-TS_220** Thin section no.: 220

Unit/Subunit: 2b Piece no.: #14 Observer: tc

Thin section summary: fractured hypohaline boninite

Plane-polarized:

Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: aphyric boninite lava

Texture 1:	hypohyaline	Texture 2:	trachytic
Avg. grain size:	microcrystalline	Grain size distrib.:	equigranular

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	30	0.2	tabular	aligned
Clinopyroxene	10	0.2	prismatic	
Mesostasis	40			fractured clasts, surrounded by infilled clay or zeolite

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

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	moderate		undeformed	variable SPO with gradational increase

SECONDARY (ALTERATION) MINERALOGY

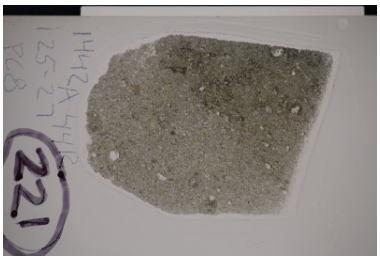
Total alteration in rock, bulk estimate (%): 30

Groundmass original [%]: 40 Groundmass altered [%]: 50 Groundmass alt. intensity:

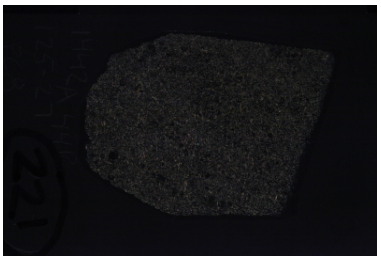
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		10		30		20
Altered [%]		5		5		15
Chlorite		5				
Zeolite				5		
Clay minerals						8

THIN SECTION LABEL ID: **352-U1442A-44R-1-W 25/27-TSB-TS_221** Thin section no.: 221
Unit/Subunit: 3 Piece no.: #08 Observer: ks
Thin section summary: olivine-phyric boninite with interstitial fresh glass and acicular cpx in groundmass

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely olivine phyric boninite lava

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	3	0.3	prismatic	mostly altered

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	45	0.2	acicular	
Orthopyroxene	5	0.2	prismatic	
Mesostasis	50			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
2	50	subrounded	0.5	

MICROSTRUCTURES

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

SECONDARY (ALTERATION) MINERALOGY

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

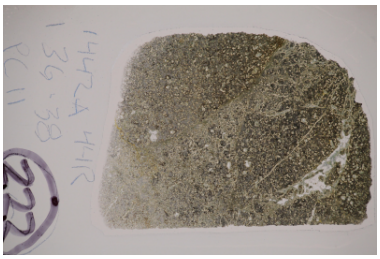
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		45	5			50
Altered [%]		5	50			50
Chlorite		5	20			
Clay minerals			30			
Zeolite						20

THIN SECTION LABEL ID: **352-U1442A-44R-1-W 36/38-TSB-TS_222** Thin section no.: 222

Unit/Subunit: 3 Piece no.: #11 Observer: tc ks

Thin section summary: sparsely olivine phyric boninite with groundmass olivine, cpx and opx; olivine completely is replaced

Plane-polarized:



Cross-polarized:

PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely olivine phyric boninite lava

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	3	0.5	prismatic	completely altered

Groundmass phases	% present	Average size (mm)	Habit	Comments
Olivine	30	0.2	prismatic	
Clinopyroxene	40	0.2	acicular	
Orthopyroxene	5	0.2	prismatic	
Mesostasis	25			

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

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.05	sharp boundary or contact		Cataclastic fibrous vein containing clasts of the host

MICROSTRUCTURES

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

SECONDARY (ALTERATION) MINERALOGY

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

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	30	40	5			25
Altered [%]	100	10	50			70
Talc	30					
Chlorite	70	10	50			
Zeolite						10

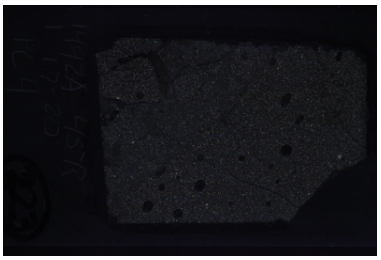
THIN SECTION LABEL ID: **352-U1442A-45R-1-W 17/20-TSB-TS_223** Thin section no.: 223

Unit/Subunit: 3 Piece no.: #04 Observer: tc

Thin section summary: plagioclase and augite bearing boninite

Plane-polarized:

Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: aphyric boninite lava

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

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	50	0.3	tabular	
Clinopyroxene	25	0.4	prismatic	
Mesostasis	25			

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

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
composite vein	0.05	sharp boundary or contact		Cataclastic vein containing grain-sized clasts of the host

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		undeformed	with irregular fracture network; fractures with alteration seams, fragments same as wall rock, no shape preferred orientation of acicular plag and px

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: volcanic clast, mafic Domain no.: 1 Domain rel. abundance [%]: 80

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

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		25	10	50		10
Altered [%]		10	100	10		50
Chlorite		10	70	10		
Talc			30			
Clay minerals				10		40

Alteration domain name: Cataclastic matrix Domain no.: 2 Domain rel. abundance [%]: 20

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

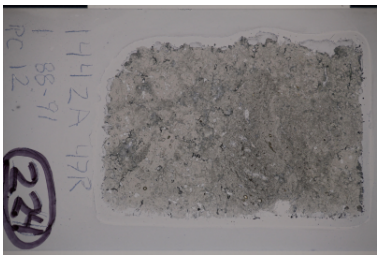
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		25	10	50		10
Altered [%]		5	100	10		100
Chlorite		5		10		
Talc			100			
Clay minerals				10		50
Other						30
Zeolite						8

THIN SECTION LABEL ID: **352-U1442A-47R-1-W 88/91-TSB-TS_224** Thin section no.: 224

Unit/Subunit: 3 Piece no.: #12 Observer: ks

Thin section summary: aphyric glassy boninite hyaloclastite, having various degree of devitrification amoung clasts

Plane-polarized:



Cross-polarized:

PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: aphyric boninite hyaloclastite

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

Groundmass phases	% present	Average size (mm)	Habit	Comments
Olivine	1	0.2	skeletal	
Plagioclase	3	0.2	tabular	
Clinopyroxene	10	0.2	poikilitic	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
15	30	rounded	1	size and mode vary amoung clasts

MICROSTRUCTURES

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

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 25

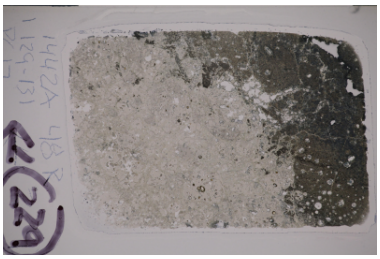
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	1	10		3		86
Altered [%]	100	2		0		30
Talc	30					
Chlorite	70					
Clay minerals		2				
Zeolite						25

THIN SECTION LABEL ID: **352-U1442A-48R-1-W 129/131-TSB-TS_229** Thin section no.: 229

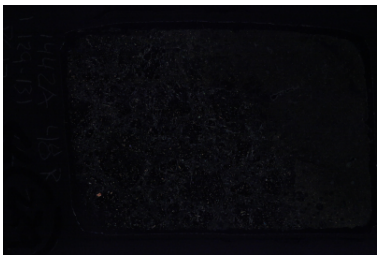
Unit/Subunit: 3 Piece no.: #17 Observer: tc

Thin section summary: Thin section contains two domains: (1) boninite hyaloclastite with glassy fragments - 70%, and (2) highly altered aphyric boninite lava with sparse vesicles - 30%.

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

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

LITHOLOGY: **sparsely augite phyric boninite hyaloclastite**

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	2	0.2	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Mesostasis				cm sized glassy fragments enclosed by an altered devitrified matrix

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

LITHOLOGY: **aphyric boninite lava**

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

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	5	0.3	acicular	
Mesostasis	97			

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
3	90	rounded	0.5	

MICROSTRUCTURES

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

SECONDARY (ALTERATION) MINERALOGY

Alteration domain name: Basalt Domain no.: 1 Domain rel. abundance [%]: 80

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

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		5				95
Altered [%]		5				50
Clay minerals		5				10
Zeolite						80

Alteration domain name: altered zone Domain no.: 2 Domain rel. abundance [%]: 20

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

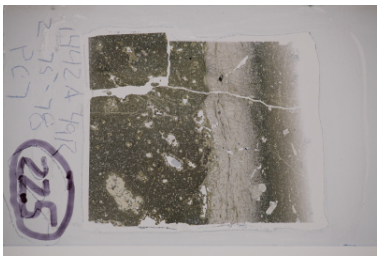
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		5				95
Altered [%]		50				100
Clay minerals		50				20
Zeolite						10

THIN SECTION LABEL ID: **352-U1442A-49R-2-W 75/78-TSB-TS_225** Thin section no.: 225

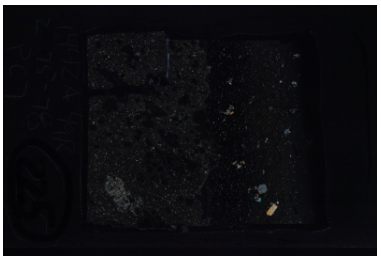
Unit/Subunit: 4 Piece no.: #07 Observer: tc

Thin section summary: vitrophyric boninte with fresh orthopyroxene phenocrysts

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

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

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

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Olivine	1.5	1.5	prismatic	completely altered
Plagioclase	1.5	0.5		
Orthopyroxene	0.5	0.6	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	15	0.2	prismatic	
Orthopyroxene	10	0.2	prismatic	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
8	50	rounded	1	

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

LITHOLOGY: **sparsely augite-orthopyroxene bearing boninite lava**

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	2	0.6	prismatic	glomerocrystsic
Orthopyroxene	2	1.2	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	7	0.1	acicular	
Orthopyroxene	3	0.1	acicular	

Vesicles [%]	% Filled	Vesicle shape	Avg. size [mm]	Vesicle comments
1	0	elongate	0.3	

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	weak		undeformed	widely isotropic, microdomains with shape preferred orientation of acicular plag and pyroxene

SECONDARY (ALTERATION) MINERALOGY

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

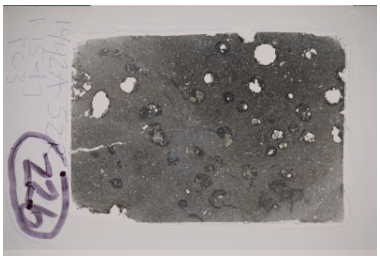
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]	0.5	15	10	1.5		73
Altered [%]	100	5	50	0		50
Talc	50		40			
Chlorite	50		60			
Amph., green		5				
Zeolite						10

THIN SECTION LABEL ID: **352-U1442A-52R-1-W 15/17-TSB-TS_226** Thin section no.: 226

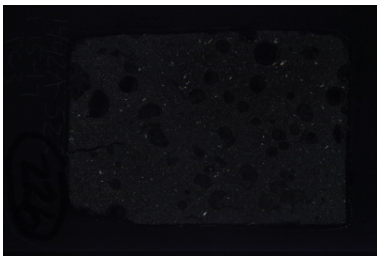
Unit/Subunit: 4 Piece no.: #03 Observer: tc

Thin section summary: intersertal boninite with groundmass cpx

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: aphyric boninite lava

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

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	20	0.3	tabular	
Clinopyroxene	35	0.4	acicular	
Orthopyroxene	5	0.3	prismatic	
Mesostasis	60			

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

MICROSTRUCTURES

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

SECONDARY (ALTERATION) MINERALOGY

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

Groundmass original [%]: 60 Groundmass altered [%]: 70 Groundmass alt. intensity:

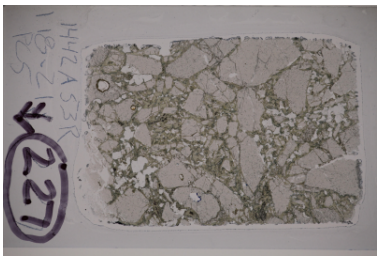
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		35	5	20		
Altered [%]		10	20	5		
Chlorite		10	20	5		

THIN SECTION LABEL ID: **352-U1442A-53R-1-W 18/21-TSB-TS_227** Thin section no.: 227

Unit/Subunit: 4 Piece no.: #05 Observer: tc

Thin section summary: boninte hyaloclastite with fresh glass

Plane-polarized:



Cross-polarized:

PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely augite-orthopyroxene phyric boninite hyaloclastite

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	3	0.3	prismatic	
Orthopyroxene	1	0.3	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Clinopyroxene	10	0.2	acicular	

VEINS

Vein	Thickness [cm]	Boundary	Generation	Vein comment
banded vein	0.01	sharp boundary or contact		Cracks in glass

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	isotropic		weakly foliated/lineated	magmatic breccia, internal fabric of fragments with alignment of acicular plag and pyroxene, overall fabric isotropic due to brecciation

SECONDARY (ALTERATION) MINERALOGY

Total alteration in rock, bulk estimate (%): 25

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		13	1			86
Altered [%]		5	0			30
Amph., green		5				
Clay minerals						25

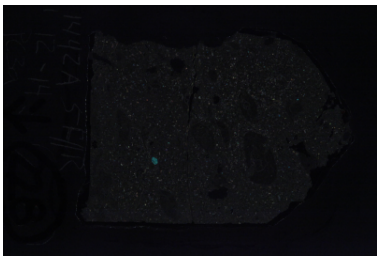
THIN SECTION LABEL ID: **352-U1442A-54R-1-W 12/14-TSB-TS_228** Thin section no.: 228

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

Thin section summary: augite bearing altered boninite

Plane-polarized:

Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely augite bearing boninite lava

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

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	30	0.2	tabular	
Clinopyroxene	15	0.3	prismatic	
Orthopyroxene	2	0.2	prismatic	
Mesostasis	53			all altered

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

MICROSTRUCTURES

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

SECONDARY (ALTERATION) MINERALOGY

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

Groundmass original [%]: 53 Groundmass altered [%]: 70 Groundmass alt. intensity:

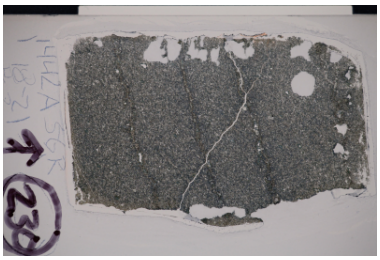
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		15	2	30		
Altered [%]		20	50	30		
Clay minerals		20				
Talc			20			
Chlorite			30			
Zeolite				30		

THIN SECTION LABEL ID: **352-U1442A-56R-1-W 18/21-TSB-TS_230** Thin section no.: 230

Unit/Subunit: 4 Piece no.: #02 Observer: tc

Thin section summary: trachytic boninite with distinct aligned veins

Plane-polarized:



Cross-polarized:

PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: aphyric boninite lava

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

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	50	0.3	tabular	trachytic
Clinopyroxene	25	0.4	prismatic	
Mesostasis	25			all altered to clay

MICROSTRUCTURES

Microstructure	Mag. fabric intensity	CPF type	CPF intensity	Structure comments
	weak		weakly foliated/lineated	slight shape preferred orientation of acicular plagioclase

SECONDARY (ALTERATION) MINERALOGY

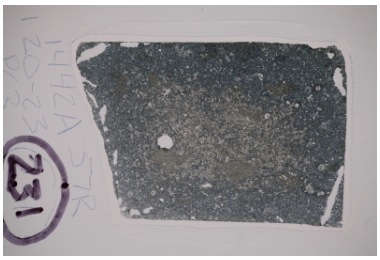
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		25		50		25
Altered [%]		30		20		100
Chlorite		30		20		
Clay minerals						20
Zeolite						10

THIN SECTION LABEL ID: **352-U1442A-57R-1-W 20/23-TSB-TS_231** Thin section no.: 231

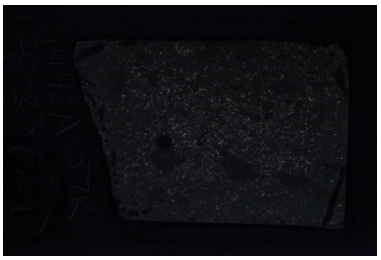
Unit/Subunit: 4 Piece no.: #03 Observer: tc

Thin section summary: aphyric boninite containing intersertal plagioclase-rich groundmass

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: aphyric boninite lava

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

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	50	0.3	tabular	
Clinopyroxene	10	0.3	prismatic	
Mesostasis	40			

MICROSTRUCTURES

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

SECONDARY (ALTERATION) MINERALOGY

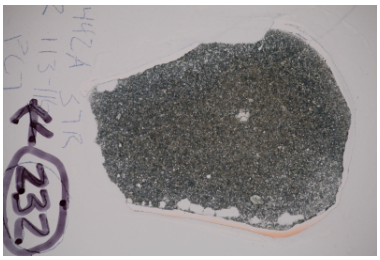
Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		10		50		40
Altered [%]		40		30		100
Amph., pale		40				
Chlorite				30		
Clay minerals						40
Zeolite						20

THIN SECTION LABEL ID: **352-U1442A-57R-2-W 113/116-TSB-TS_232** Thin section no.: 232

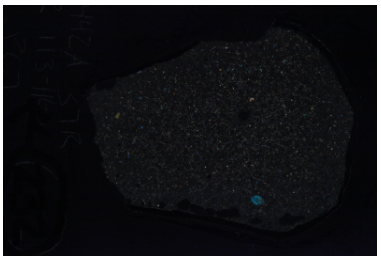
Unit/Subunit: 4 Piece no.: #07 Observer: tc

Thin section summary: augite-bearing boninite with intergranular plagioclase-rich matrix

Plane-polarized:



Cross-polarized:



PRIMARY (IGNEOUS) MINERALOGY

LITHOLOGY: sparsely augite bearing boninite lava

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

Phenocrysts	% present	Average size [mm]	Habit	Comments
Clinopyroxene	1	0.6	prismatic	

Groundmass phases	% present	Average size (mm)	Habit	Comments
Plagioclase	45	0.3	tabular	
Clinopyroxene	20	0.3	blocky	
Mesostasis	34			all altered to clay

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

MICROSTRUCTURES

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

SECONDARY (ALTERATION) MINERALOGY

Phenocryst -->	Olivine	Clinopyroxene	Orthopyoxene	Plagioclase	Oxide	Glass
Original [%]		20		45		35
Altered [%]		20		30		100
Amph., pale		20				
Chlorite				30		
Clay minerals						40
Zeolite						10