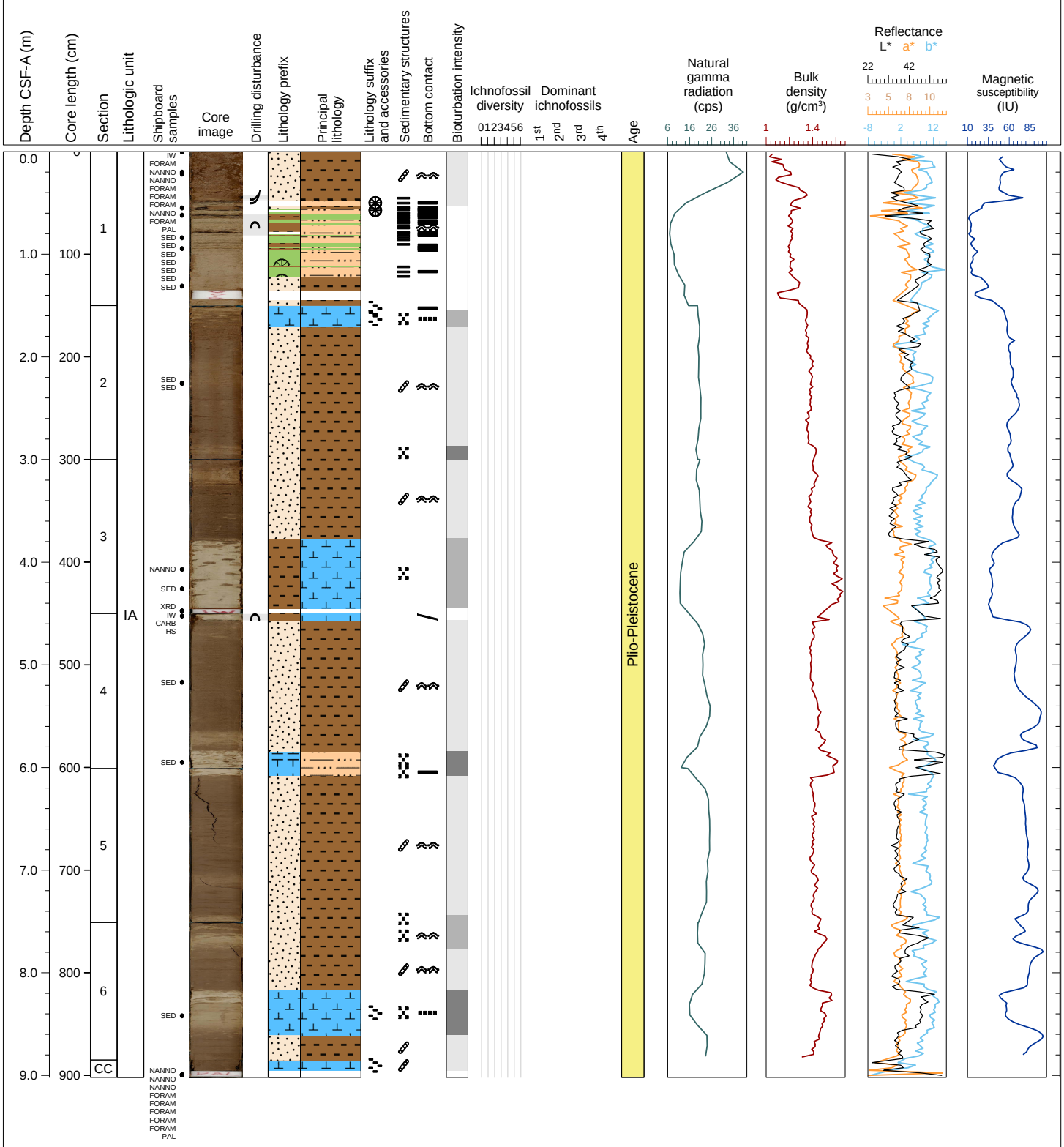
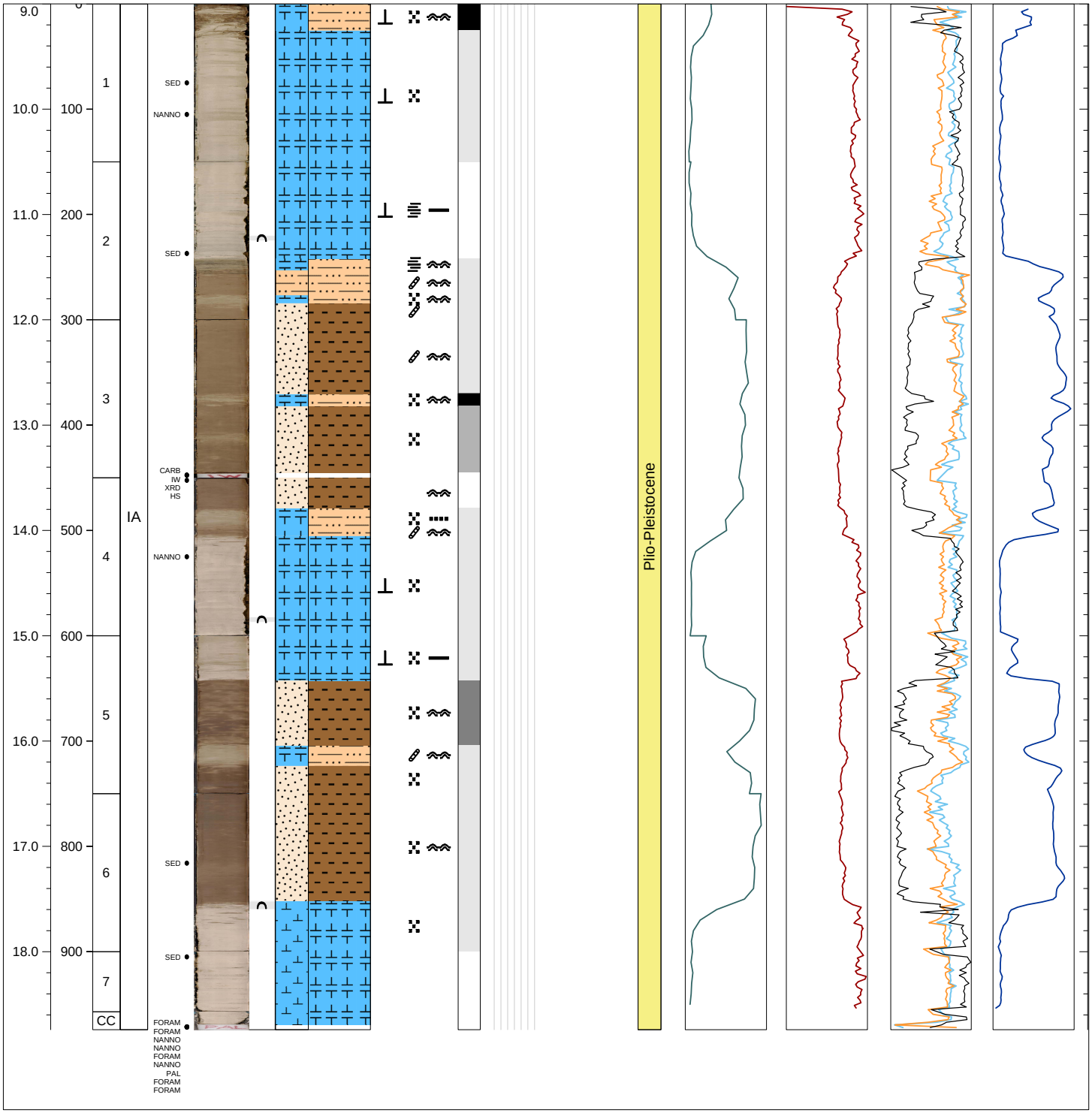
Hole 390C-U1556A Core 1H, Interval 0.0-9.02 m (CSF-A)

Core 1H contains mostly dark brownish (10YR 3/4) to brown (10YR 5/3) silty clay. In section 1A, a portion of alternating pink-pale yellow diatom-rich silty clay was observed from 47 to 122 cm. In this portion, also dark grey (5Y 3/1) organic-rich layers (47-53 cm; 56-56.5 cm; 78-80 cm) were observed, as well as a pale olive (5Y 6/4) diatom-rich biosiliceous layer. Brown (7.5YR 5/3) calcareous silty clay were observed in two portions (377 - 457 cm; 584-608 cm). There are portions with trace to abundant bioturbation along the whole core. There are slight signs of drilling disturbance: a fall in (42-47 cm) and up-arching (62-82 cm).



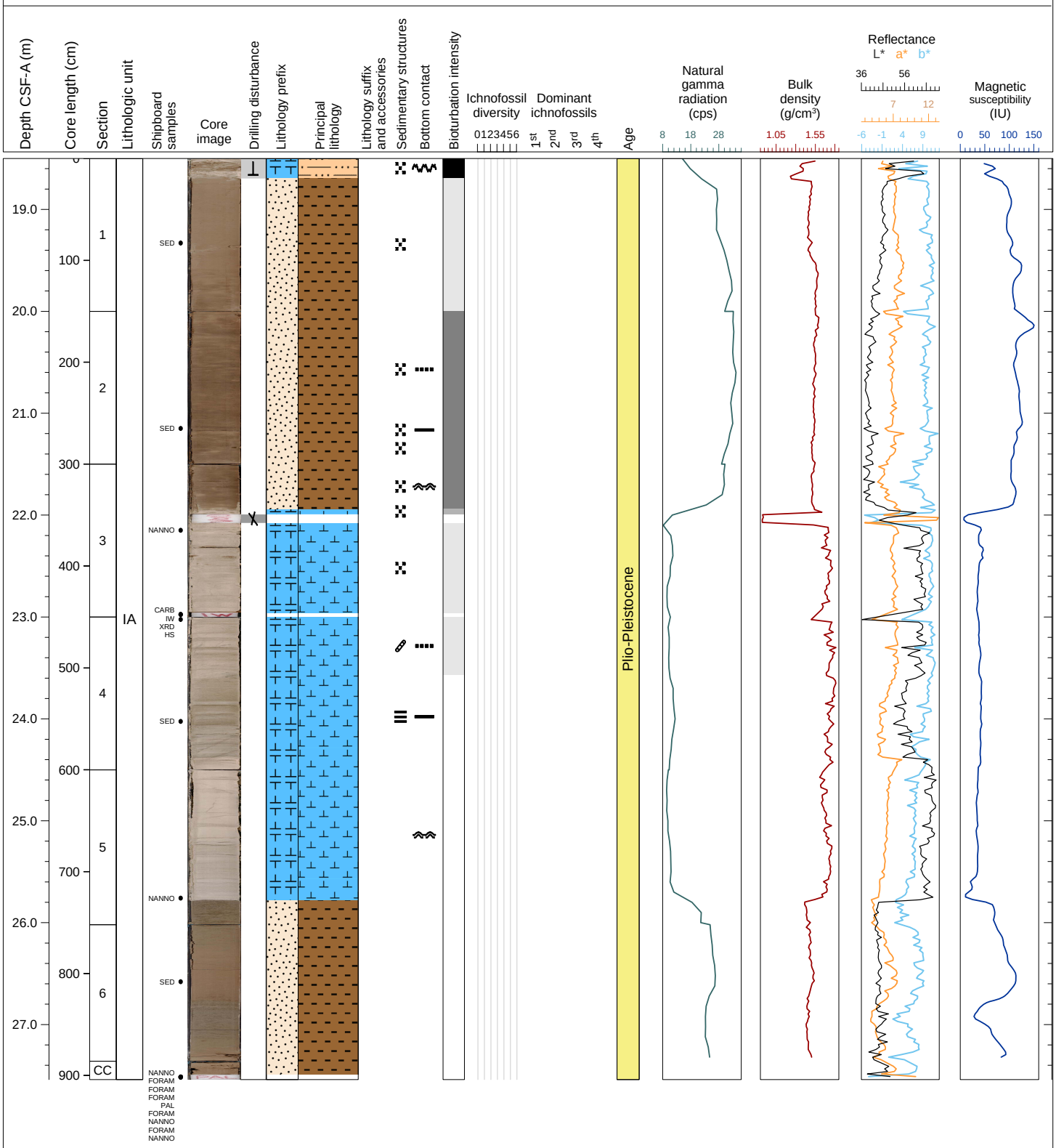
Hole 390C-U1556A Core 2H, Interval 9.0-18.74 m (CSF-A)

Core 2H contains varied lithologies including very pale brown to brown (10YR 6/3,7/4, to 5/3) calcareous silty clay and silty clay, and pinkish white (7.5YR 8/2) calcareous ooze, calcareous ooze with nannofossils, and nannofossil-rich calcareous ooze. There are some organic rich laminations in section 2A. There are portions of the Core with trace to abundant bioturbation, which is mostly in the form of mottling. Drilling disturbance includes some slight up-arching in sections 2A, 4A, and 6A.



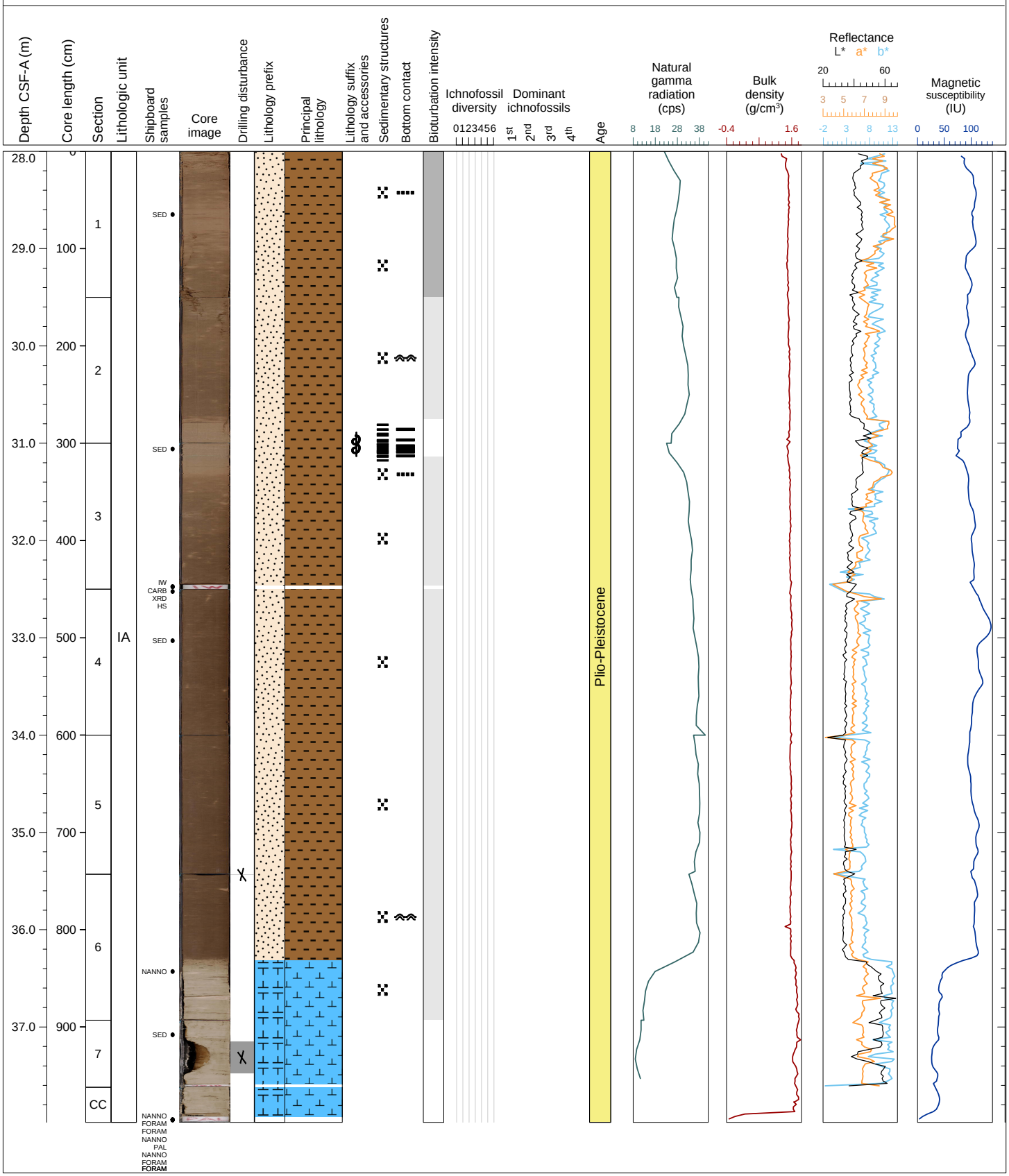
Hole 390C-U1556A Core 3H, Interval 18.5-27.54 m (CSF-A)

Core 3H contains mainly pinkish white (7.5YR 8/2) calcareous nannofossil ooze and light brown to brown (7.5YR 6/3 to 5/3) silty clay. There are some organic rich laminations in section 4A. There are portions of the Core with trace to abundant bioturbation, which is mostly in the form of mottling. Drilling disturbance has resulted in some fracturing in section 1A and a void in section 3A.



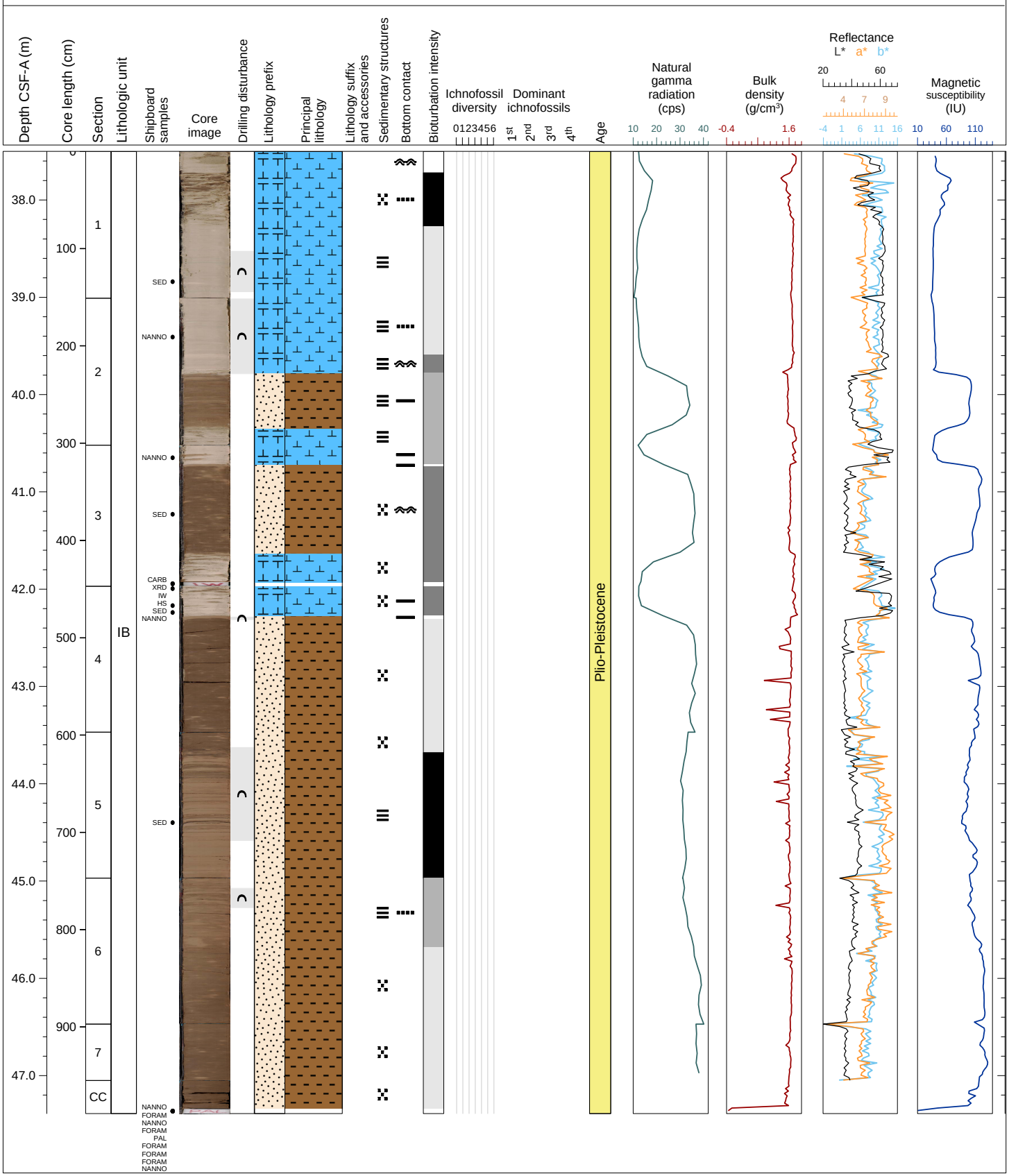
Hole 390C-U1556A Core 4H, Interval 28.0-37.98 m (CSF-A)

Core 4H contains mainly light brown to brown (7.5YR 6/3 to 5/3) silty clay and pinkish white (7.5YR 8/2 and 10YR 7/2) calcareous nannofossil ooze. There are some organic rich laminations in section 4A. There are small laminations of silty clay with biosilica in some of the sections. There are portions of the Core with trace to abundant bioturbation, which is mostly in the form of mottling. Drilling disturbance has resulted in a horizontal and vertical void.



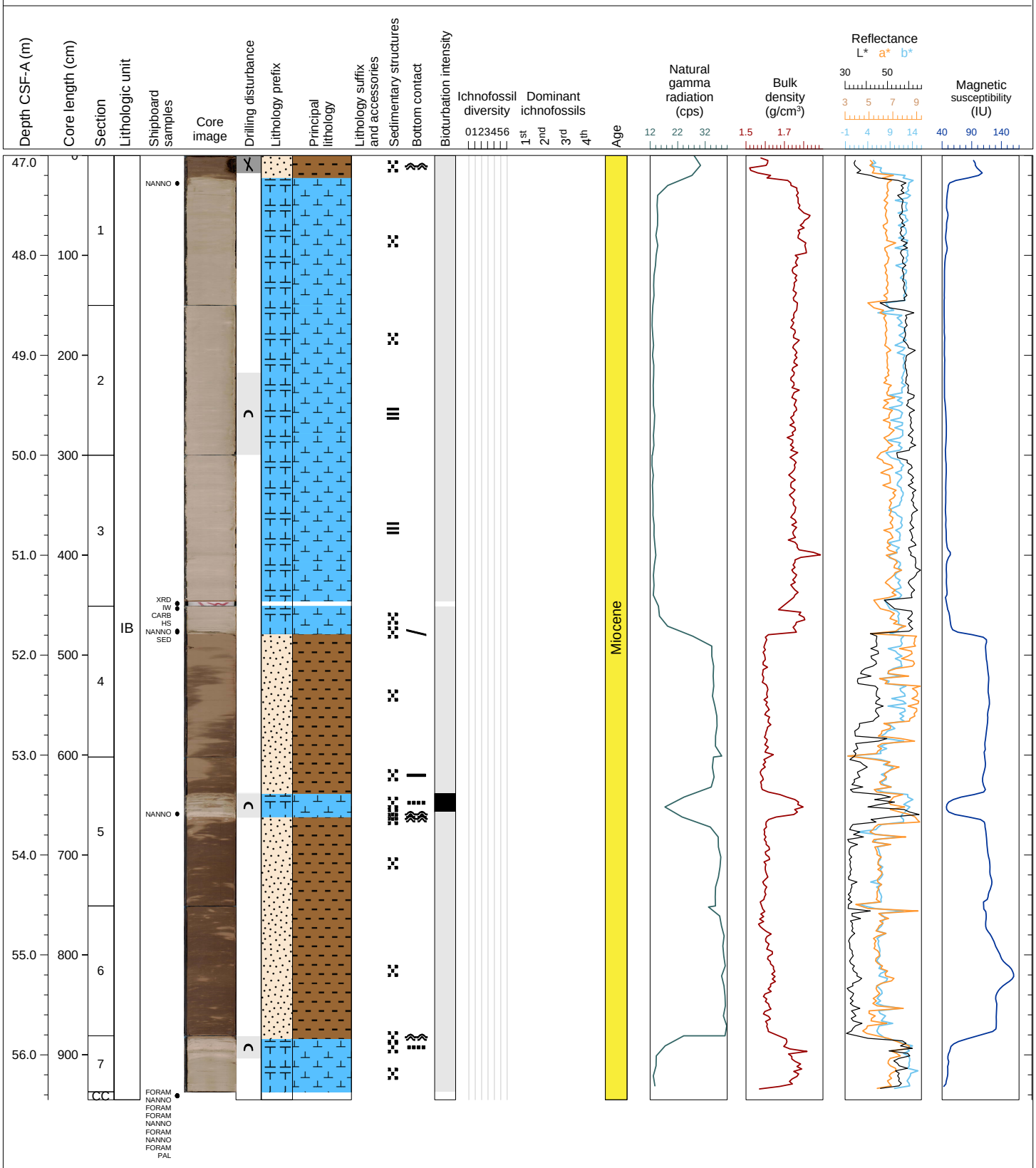
Hole 390C-U1556A Core 5H, Interval 37.5-47.39 m (CSF-A)

Core 5H contains mainly light brown to brown (7.5YR 6/3 to 5/3) silty clay and pinkish white (7.5YR 8/2) calcareous nannofossil-ooze. There are common organic rich laminations in section 5A. There is high bioturbation which is mostly in the form of mottling in sections 1A, 3A and 4A. Drilling disturbance has resulted in slight up-arching in sections 1A to 6A.



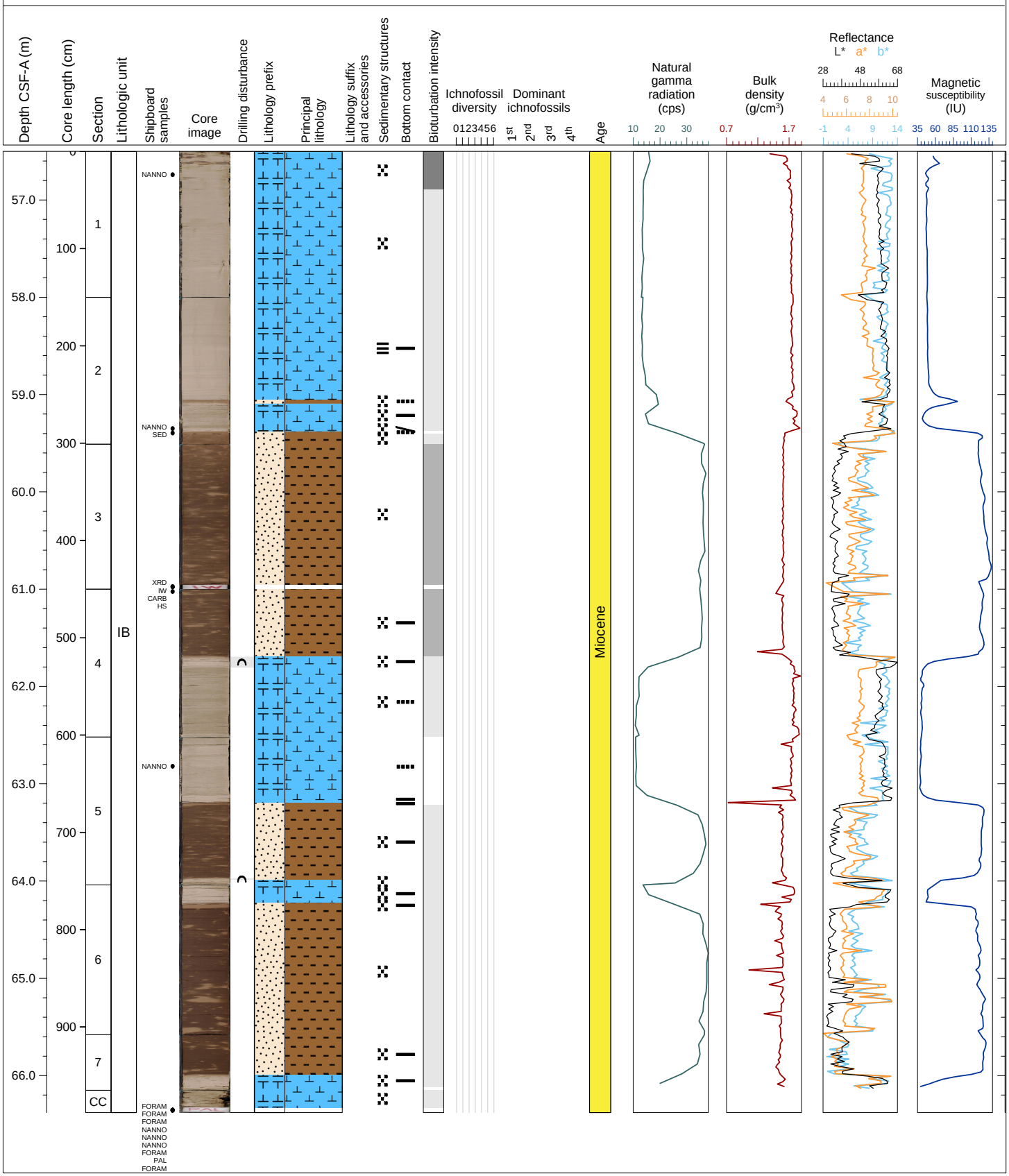
Hole 390C-U1556A Core 6H, Interval 47.0-56.45 m (CSF-A)

Core 6H contains mainly light gray (10YR 7/2) calcareous nannofossil ooze and brown (7.5YR 6/3 to 5/3) silty clay. There are sparse organic matter thin laminations in 2A and 3A. There are scattered organic rich dots in section 4A. Drilling disturbance has resulted in slight up-arching in sections 2A, 5A and 7A with a vertical void on the side in section 1A.



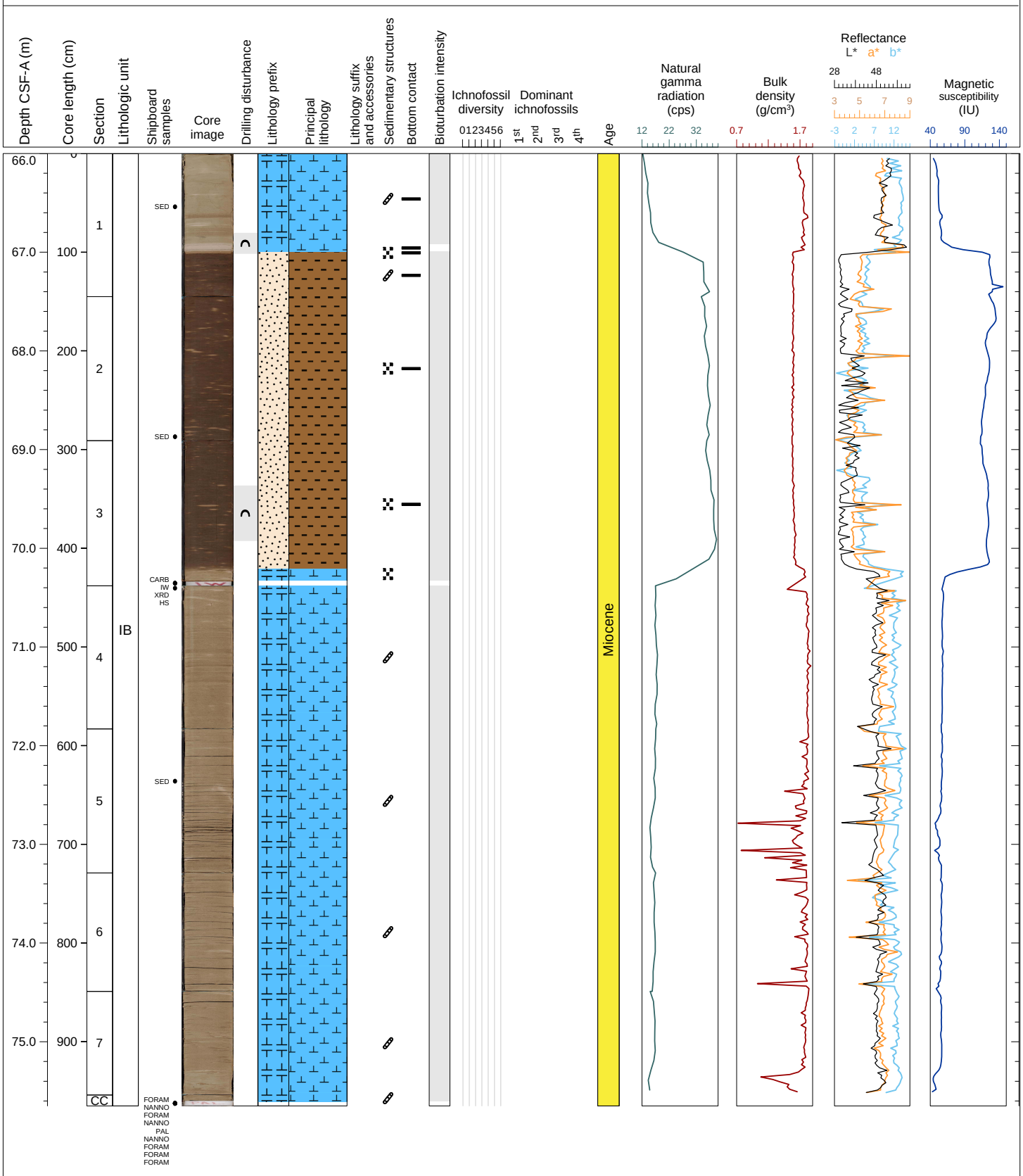
Hole 390C-U1556A Core 7H, Interval 56.5-66.38 m (CSF-A)

Core 7H contains mainly light gray (10YR 7/2) calcareous nannofossil ooze and brown (7.5YR 6/3 to 5/3) silty clay. There are sparse thin laminations of organic matter in 1A and 2A. There are scattered organic-rich dots in section 2A. There are portions of the Core with sparse bioturbation. Drilling disturbance has resulted in slight up-arching in sections 4A and 5A.



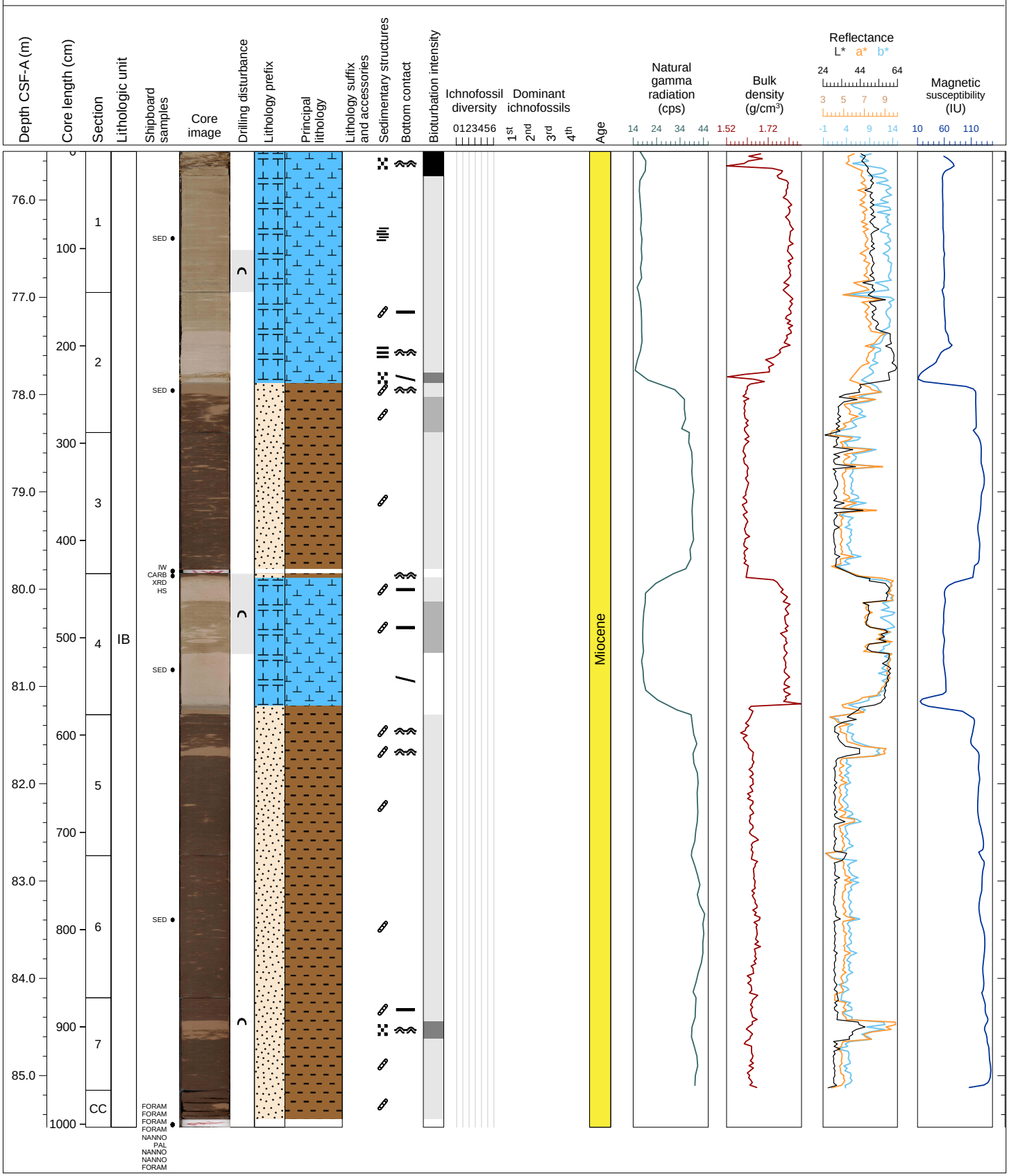
Hole 390C-U1556A Core 8H, Interval 66.0-75.65 m (CSF-A)

Core 8H contains mainly pale brown (or light gray) (10YR 6/3) calcareous nannofossil ooze and brown (7.5YR 5/3) silty clay. There are portions of the Core with sparse or mottling bioturbation. Drilling disturbance has resulted in slight up-arching in sections 1A and 4A.



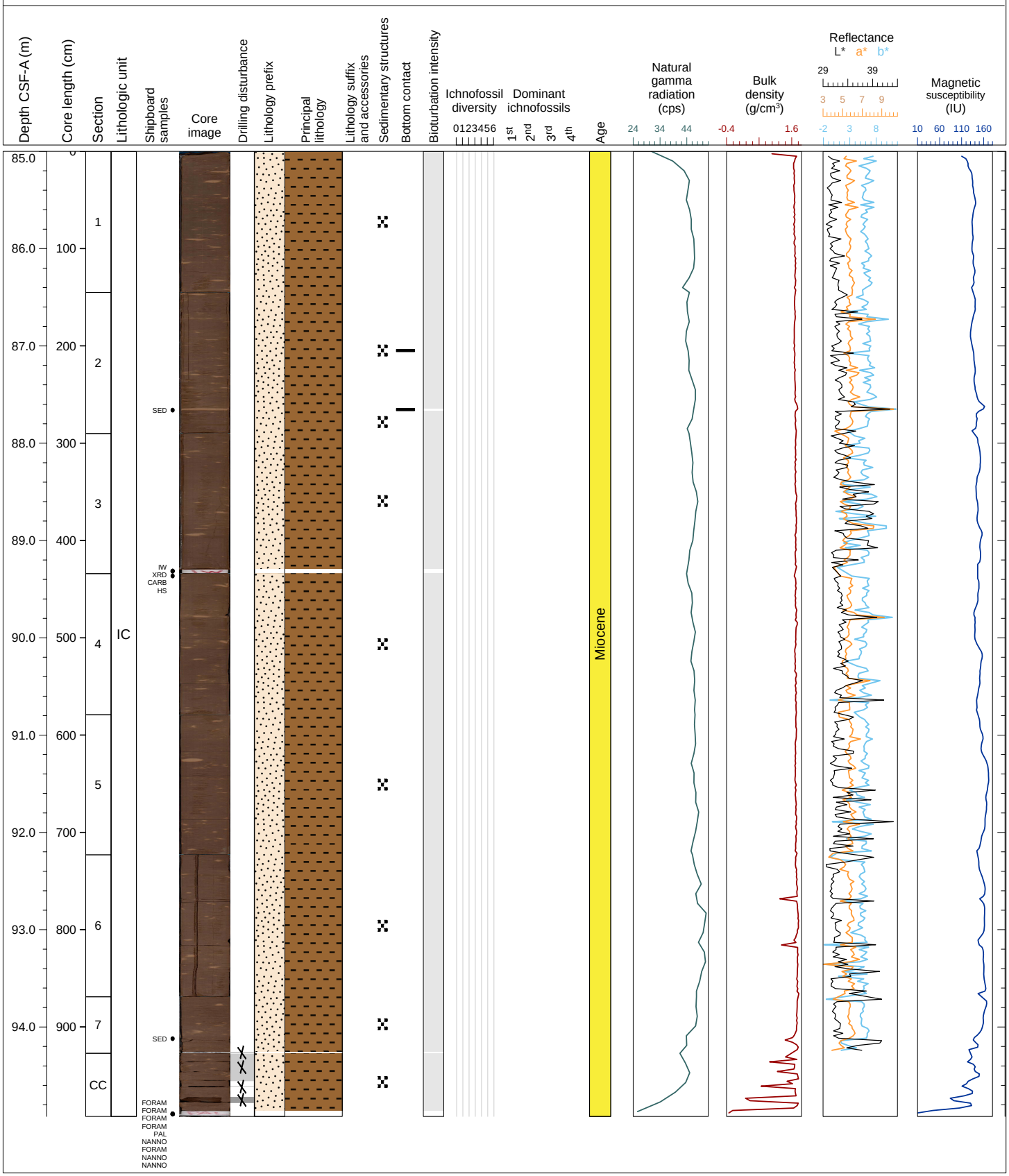
Hole 390C-U1556A Core 9H, Interval 75.5-85.53 m (CSF-A)

Core 9H contains mainly very pale brown or pinkish white (10YR 7/3 or 7.5YR 8/2) calcareous nannofossil ooze and light or brown (7.5YR 5/3) silty clay. There are portions of the Core with sparse or mottling bioturbation. Drilling disturbance has resulted in slight up-arching in sections 1A, 4A and 7A.



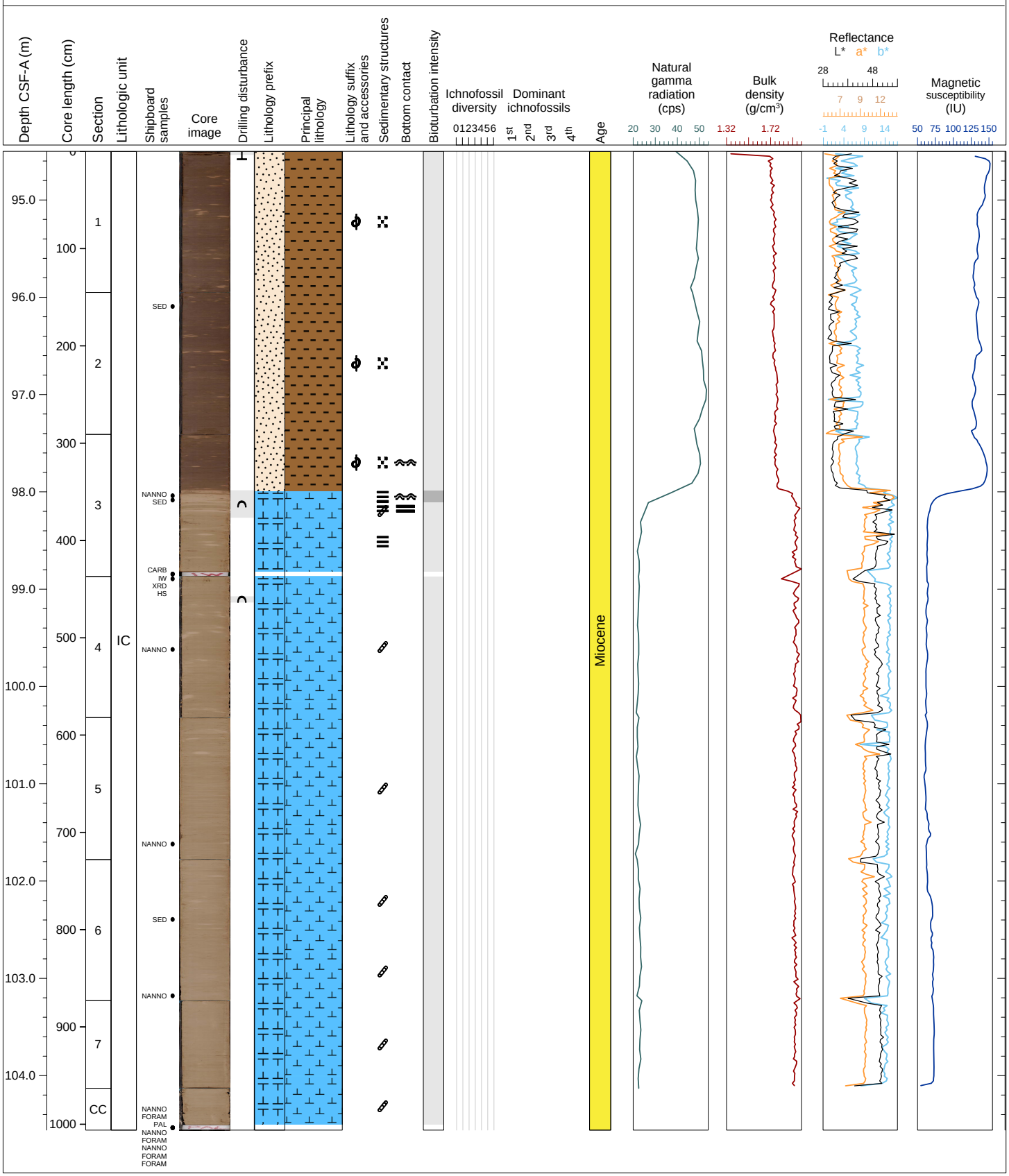
Hole 390C-U1556A Core 10H, Interval 85.0-94.92 m (CSF-A)

Core 10H is relatively homogenous and contains almost all brown (7.5YR 5/3) silty clay. One relatively thin bioturbation-type layer of silty clay (7.5 YR 6/4) with very minor bioclasts is in section 2A (2 cm thick). Sparse mottling bioturbation throughout (7.5YR 6/4, light brown). Drilling disturbance has resulted in disturbances in section CC.



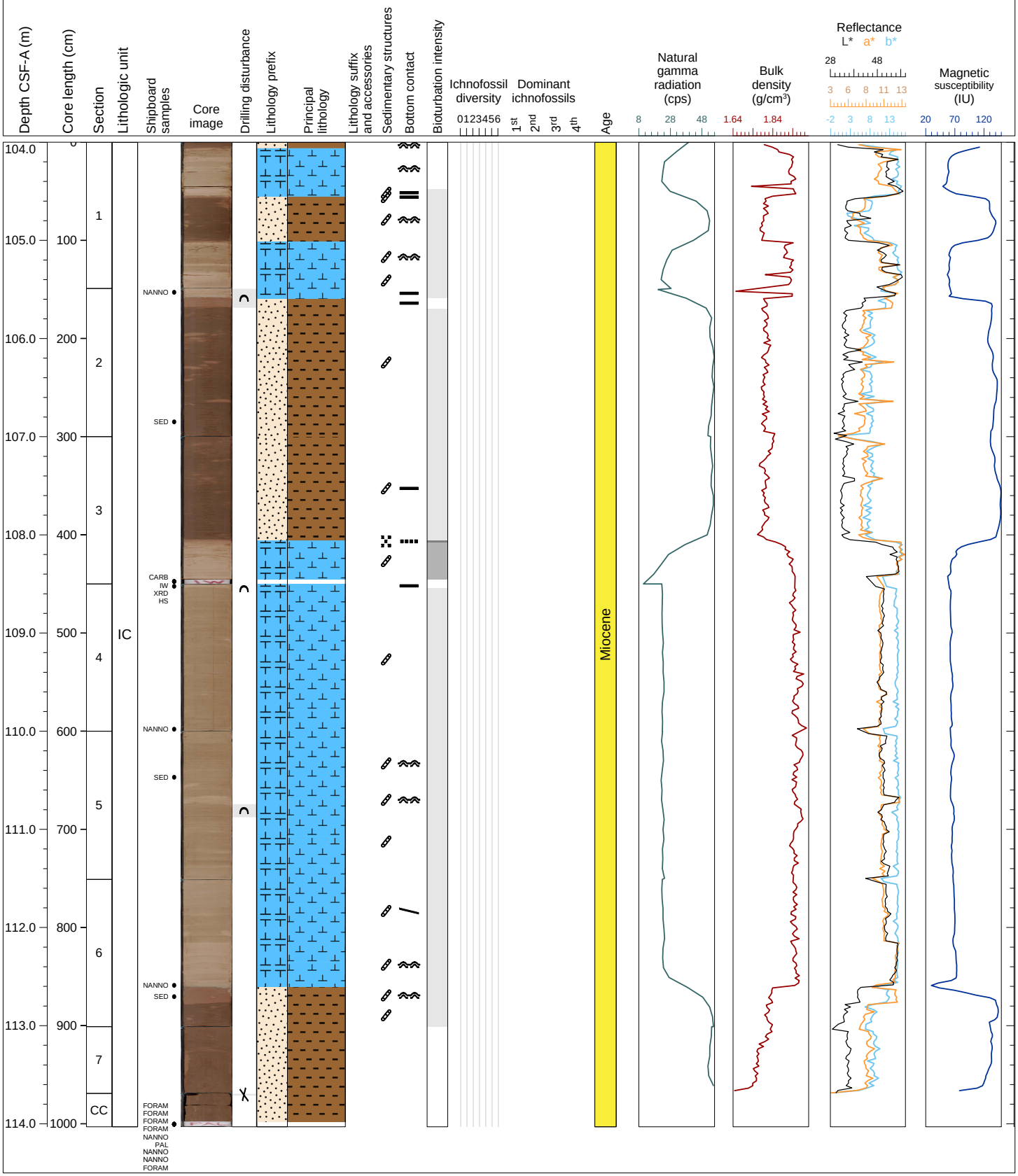
Hole 390C-U1556A Core 11H, Interval 94.5-104.56 m (CSF-A)

Core 11H contains brown (7.5YR 5/3) silty clay to section 3A and then the rest of the core is mainly pinkish gray (7.5YR 7/2) calcareous nannofossil ooze. Sparse trace or mottling bioturbation throughout. Drilling disturbance has resulted in minor up-arching in places, and one fractured place in the top 4 cm of section 1A.



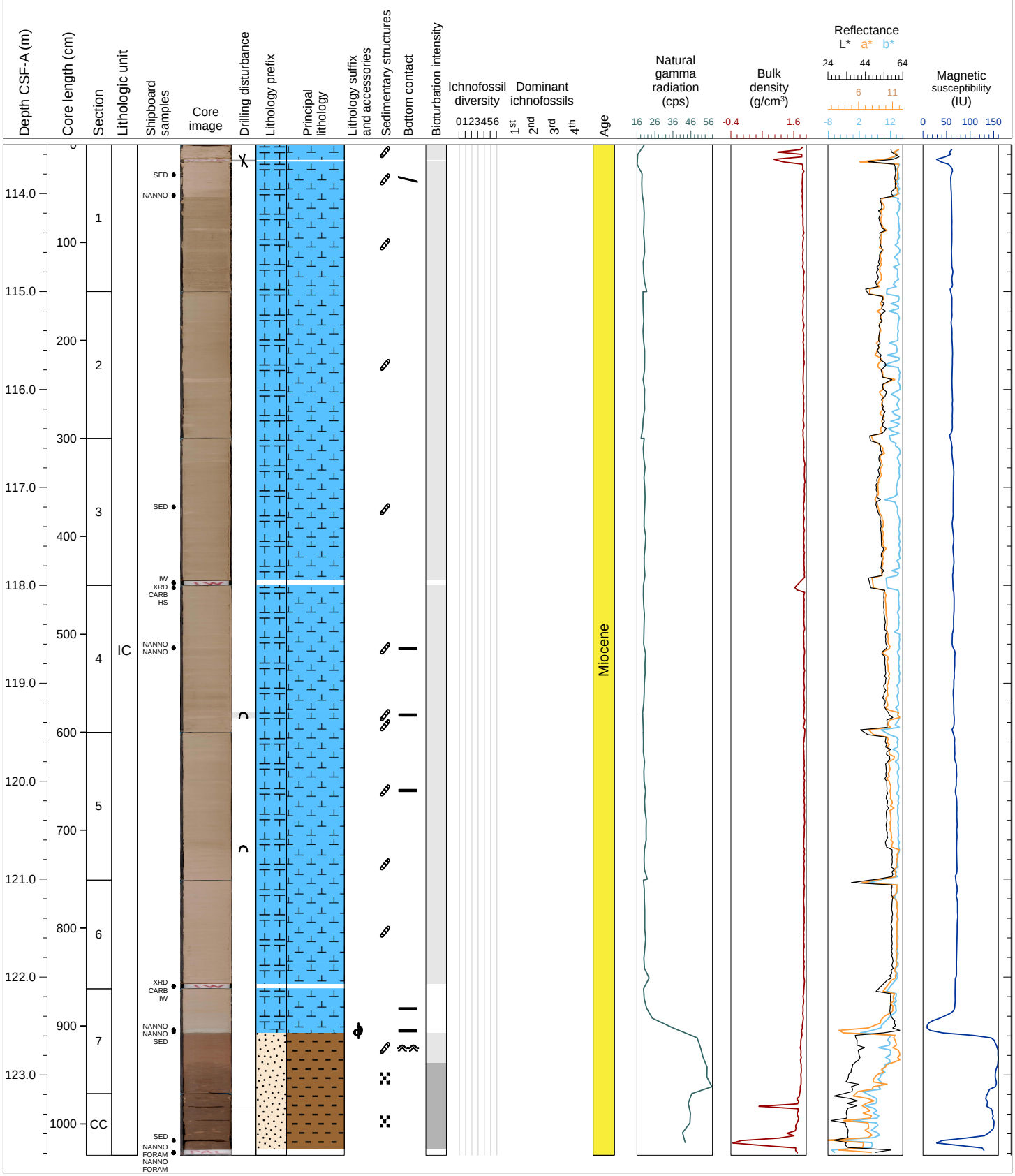
Hole 390C-U1556A Core 12H, Interval 104.0-114.03 m (CSF-A)

Core 12H contains mainly pink or pinkish gray (5YR 7/3 or 7.5YR 7/2 or 7/4) calcareous nannofossil-ooze and light or brown (7.5YR 5/3) or light reddish brown (5YR 6/4) silty clay. There are portions of the Core with sparse trace or mottling bioturbation. Drilling disturbance has resulted in slight up-arching in sections 2A,4A, 5A and a small void at the top of section CC.



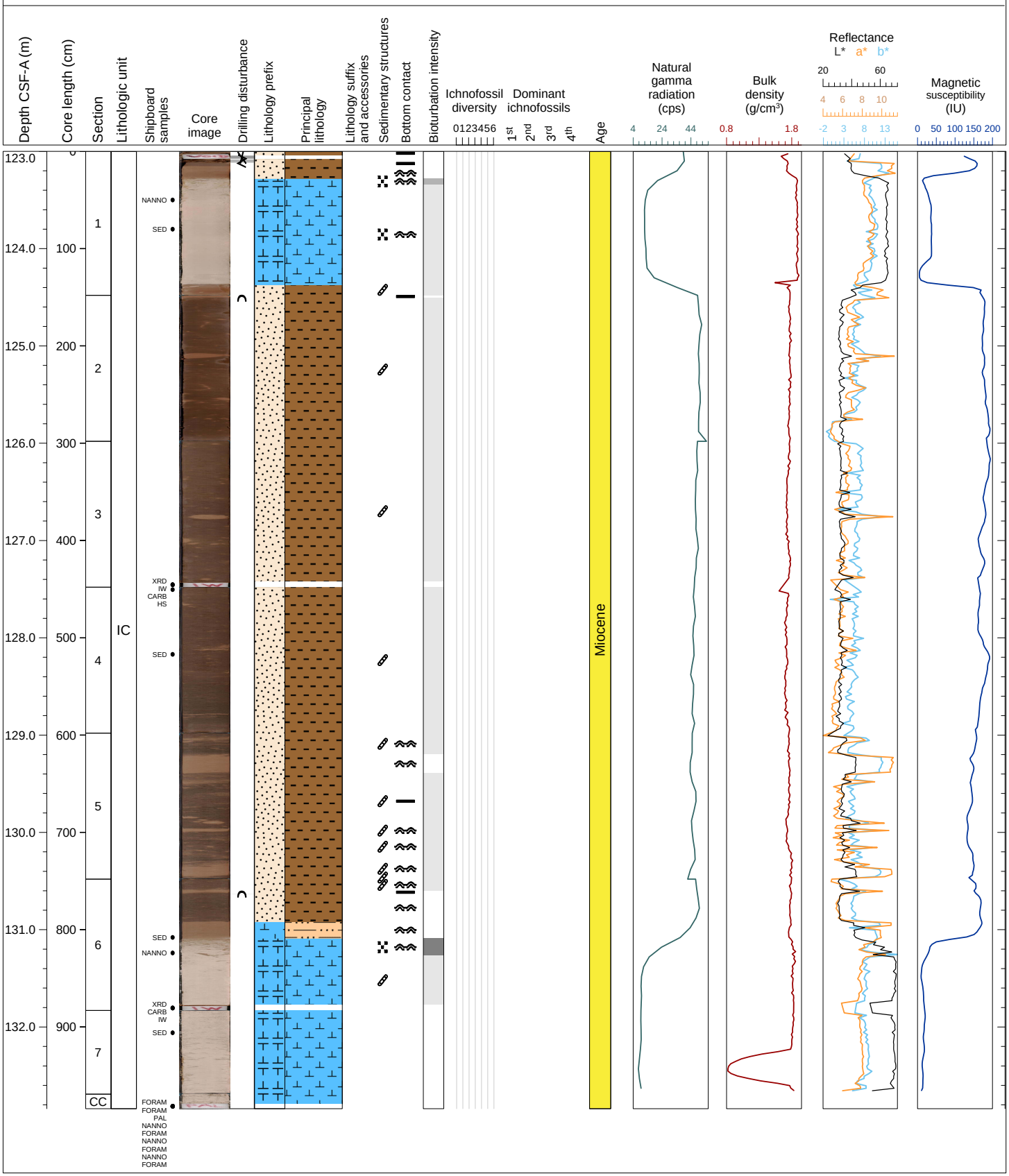
Hole 390C-U1556A Core 13H, Interval 113.5-123.82 m (CSF-A)

Core 13H contains mainly pink or pinkish gray (7.5YR 7/2 or 7/3) calcareous nannofossil ooze and brown (7.5YR 5/3) or light reddish brown (5YR 6/4) silty clay. There is a distinct layer of foraminiferal nannofossil ooze with bioclasts (7.5YR 8/2) in section 7A. There are portions of the Core with sparse trace or mottling bioturbation. Drilling disturbance has resulted in a void in section 1A, slight up-arching in places, and a crack with some some missing material in section CC.



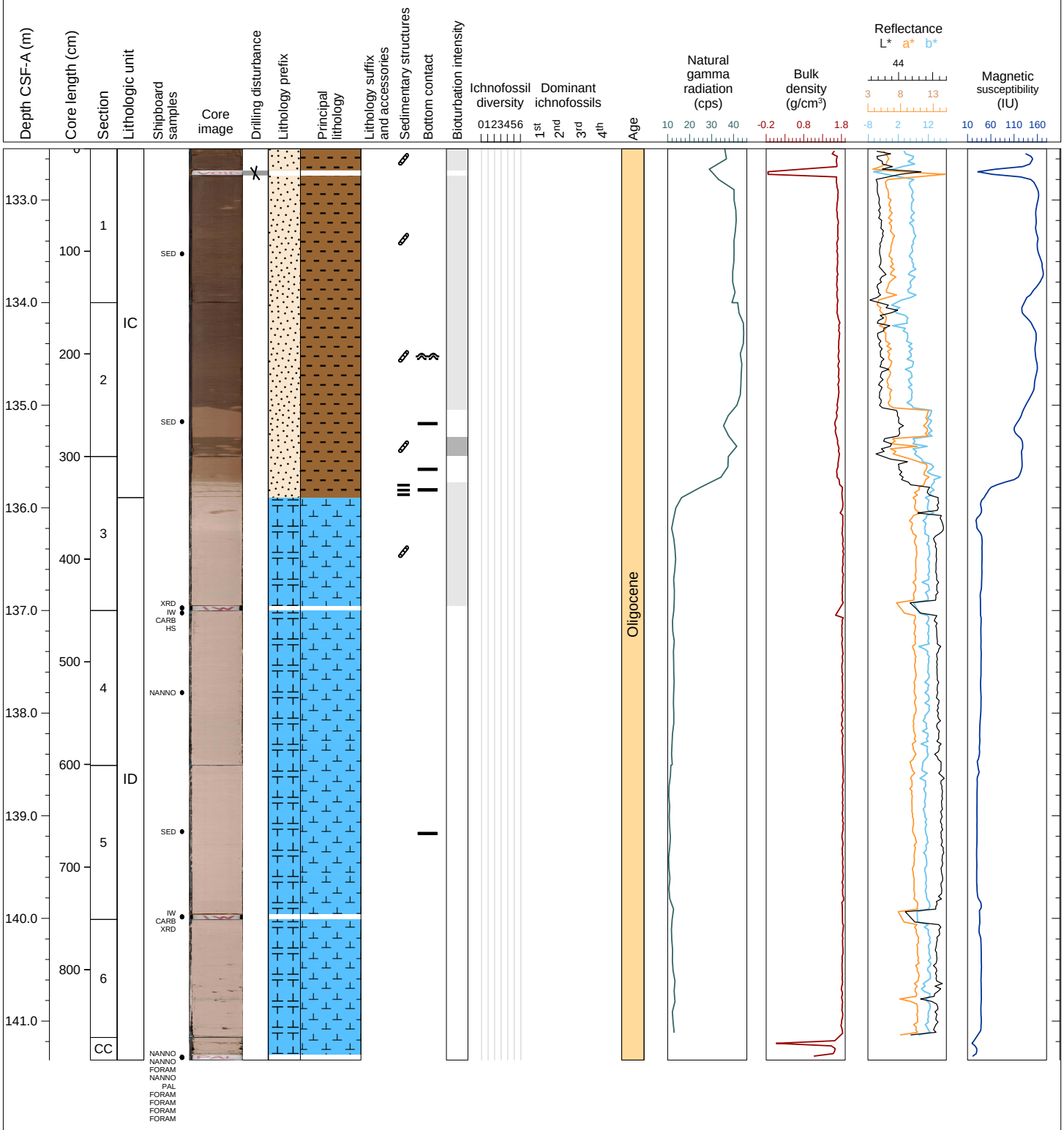
Hole 390C-U1556A Core 14H, Interval 123.0-132.84 m (CSF-A)

Core 14H contains mainly brown (7.5YR 5/3) or light reddish brown (5YR 6/4) silty clay and pink or pinkish white calcareous nannofossil ooze (7.5YR 8/2). The reddish brown silty clay contains nannofossil-rich discoasters. There are portions of the Core with sparse trace or mottling bioturbation. Drilling disturbance has resulted in a void in section 1A, slight up-arching in places.



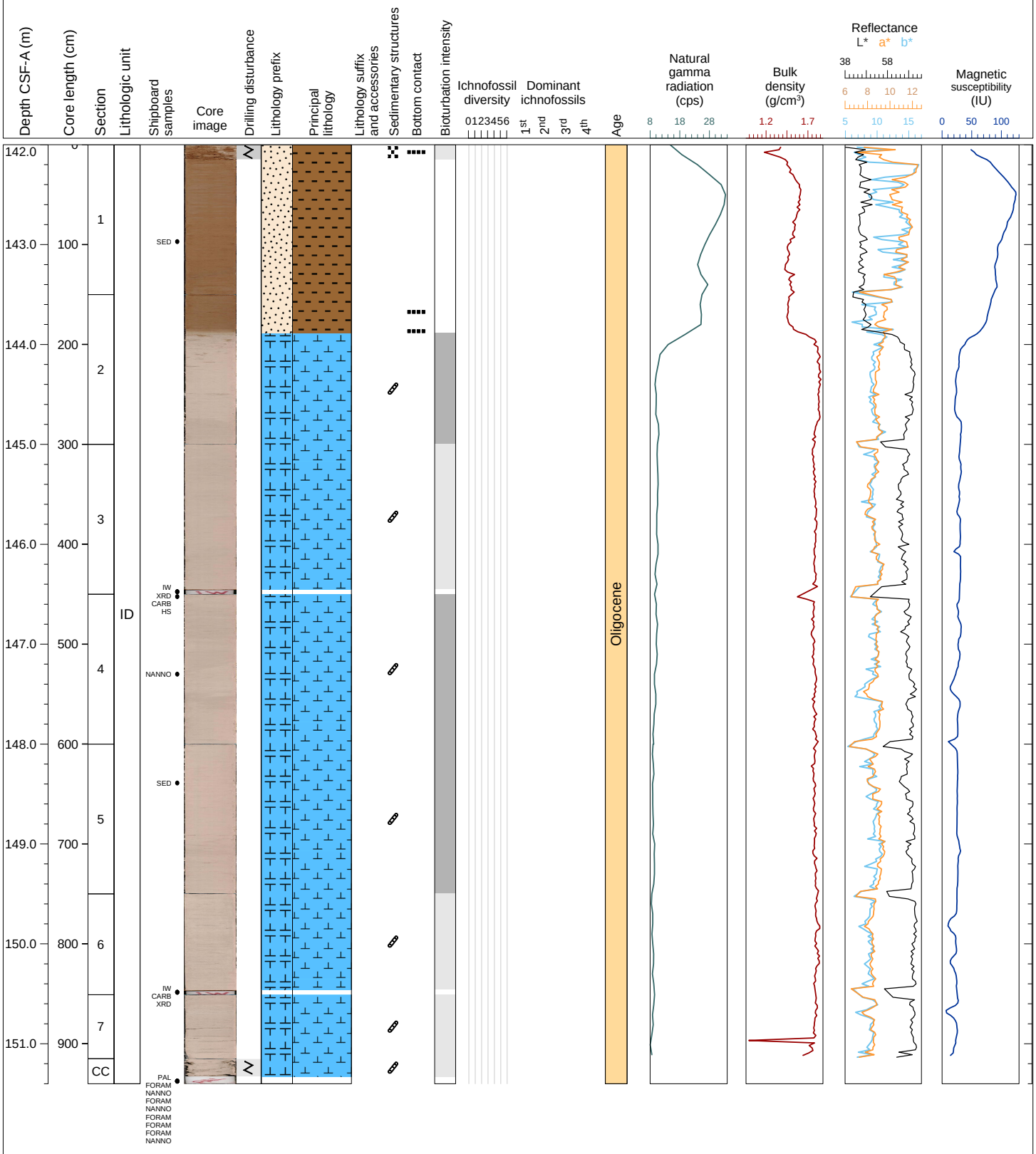
Hole 390C-U1556A Core 15H, Interval 132.5-141.38 m (CSF-A)

Core 15H contains mainly brown (7.5YR 5/3) or light reddish brown (5YR 6/4) silty clay and pink or pinkish (5YR 8/2 and 8/3) calcareous nannofossil ooze. Most of the Core does not have obvious bioturbation. Drilling disturbance has resulted in a void in section 1A.



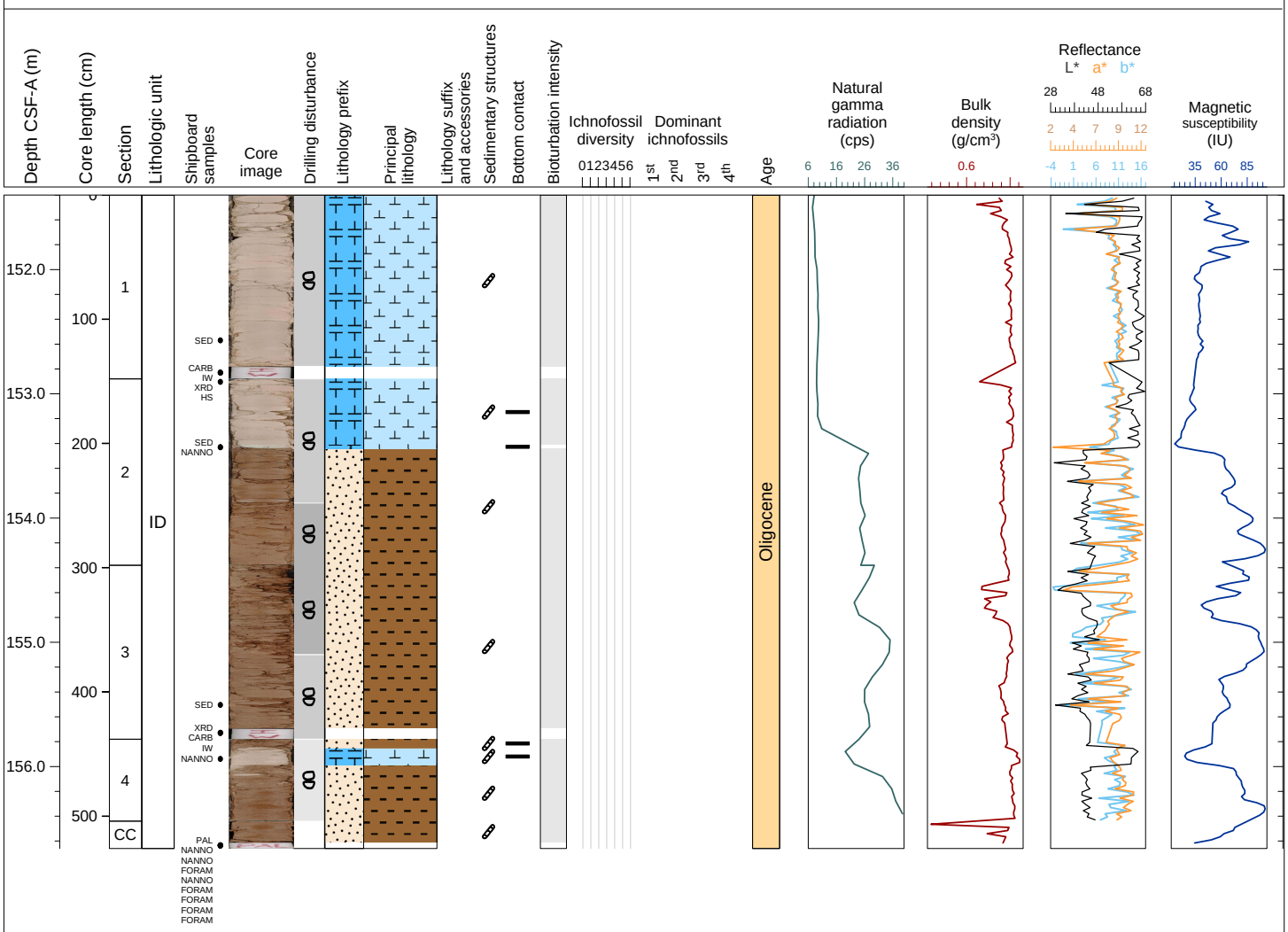
Hole 390C-U1556A Core 16H, Interval 142.0-151.4 m (CSF-A)

Core 16H is relatively homogenous and contains mainly pinkish white (7.5YR 8/2) calcareous nannofossil ooze and light reddish brown (5YR 6/4) silty clay in sections 1A and 2A. Most of the Core has sparse bioturbation although it is more difficult to see in homogenous pinkish white sections. Drilling disturbance has resulted in some fragmentation in sections 1A and CC.



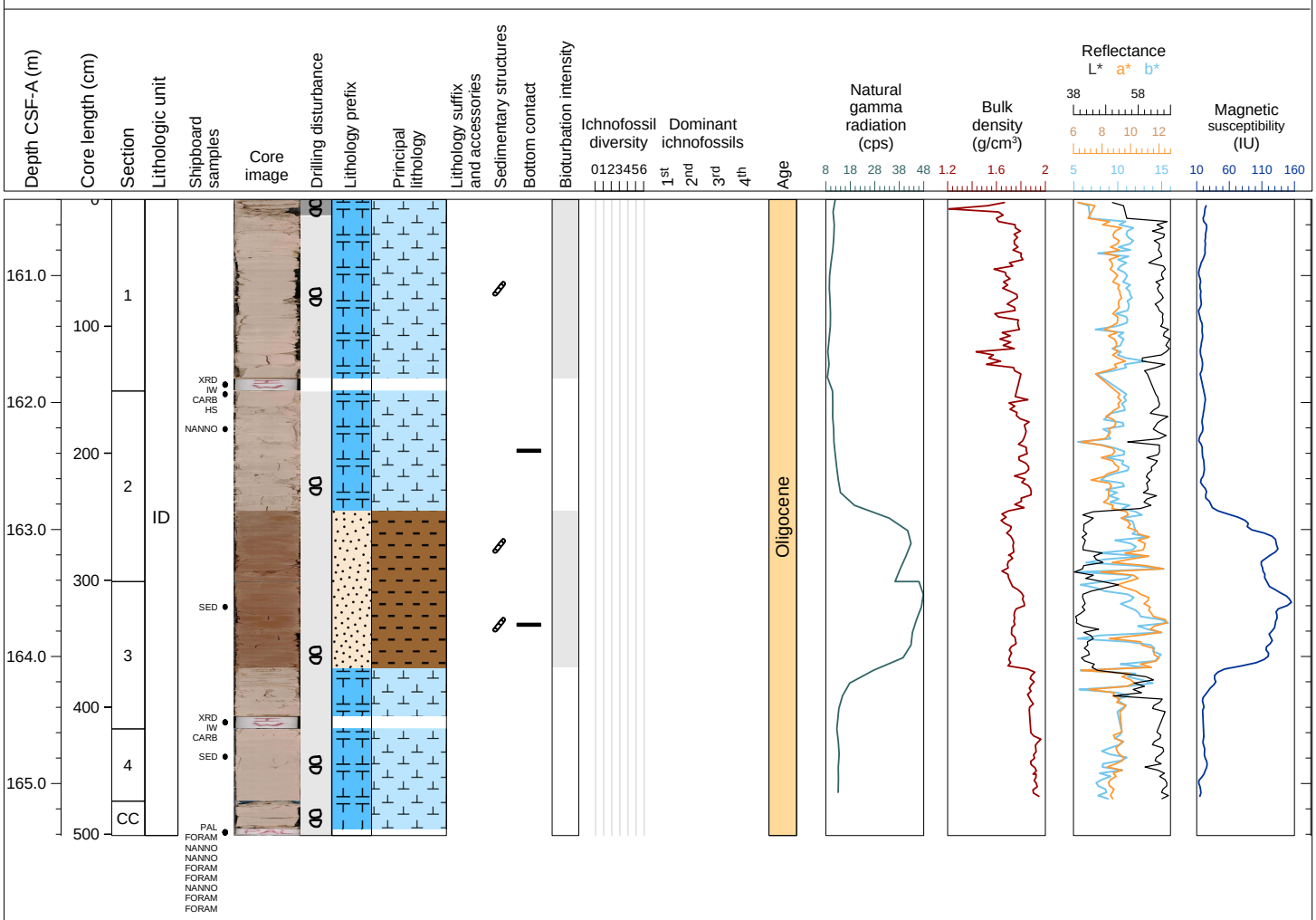
Hole 390C-U1556A Core 17X, Interval 151.4-156.66 m (CSF-A)

Core 17X contains mainly reddish brown (5YR 5/3) silty clay and pinkish white (7.5YR 8/2) calcareous nannofossil chalk. Silty clay in lower part of sections 2A,3A, 4A, and CC. Calcareous nannofossil chalk in 1A and upper part of section 2A. White (2.5Y 8/1) foraminiferal nannofossil chalk in section 2A. Most of the core has sparse bioturbation of trails tracks and burrows. Drilling disturbance caused severe biscuits in sections 2A and 3A, and slight to moderate biscuits in sections 1A and 4A.



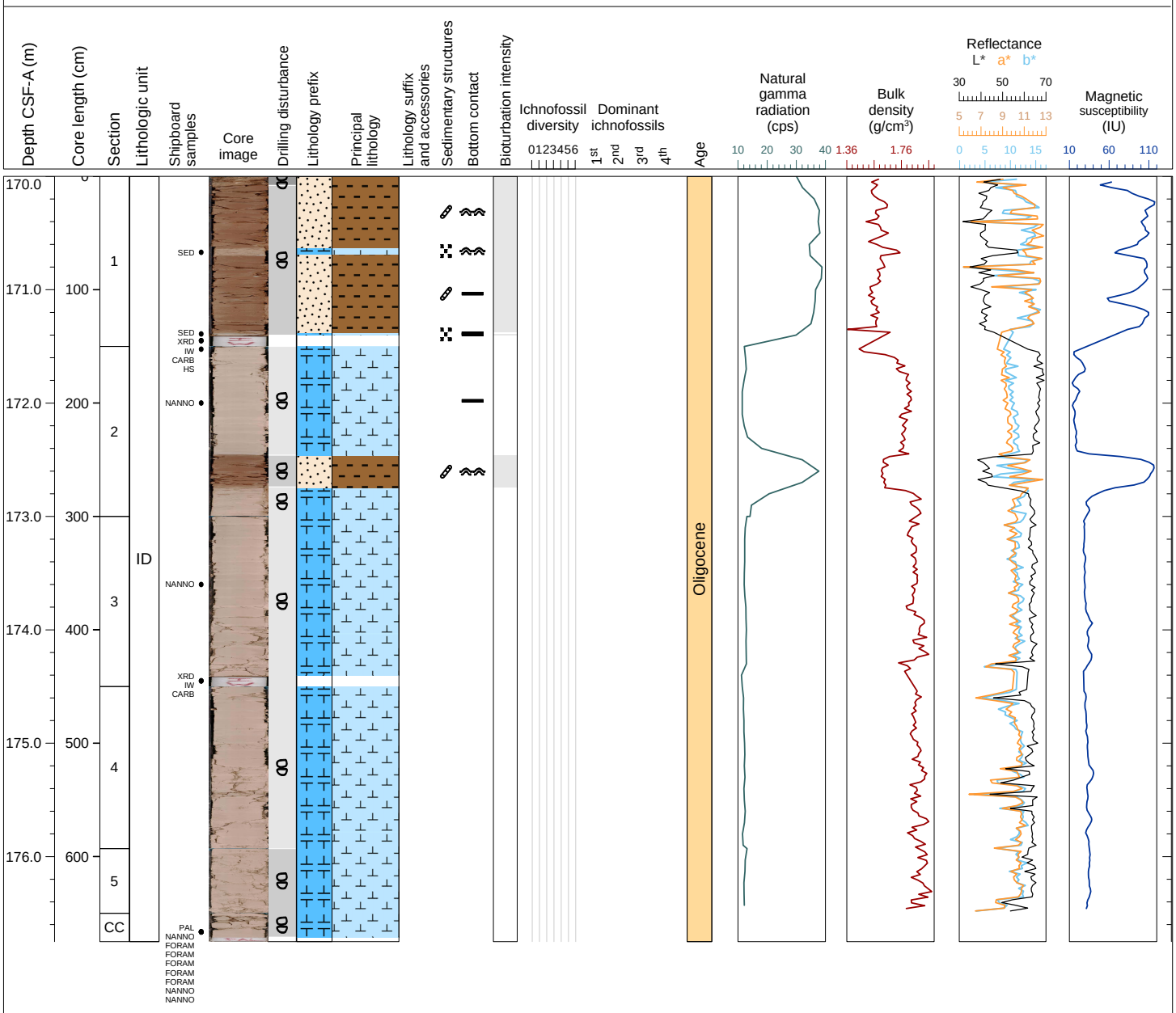
Hole 390C-U1556A Core 18X, Interval 160.4-165.41 m (CSF-A)

Core 18X contains mainly pinkish white (7.5YR 8/2) calcareous nannofossil chalk and reddish brown (5YR 5/3) silty clay. Calcareous nannofossil chalk in section 1A, upper part of section 2A, lower part of sections 3A, 4A, and CC. Silty clay in lower part of section 2A (94cm), upper part of section 3A (67cm). Most of the core have none to sparse bioturbation. Drilling disturbance caused biscuits and associated voids in section 1A (7-12cm), and slight biscuiting in sections 2A to CC.



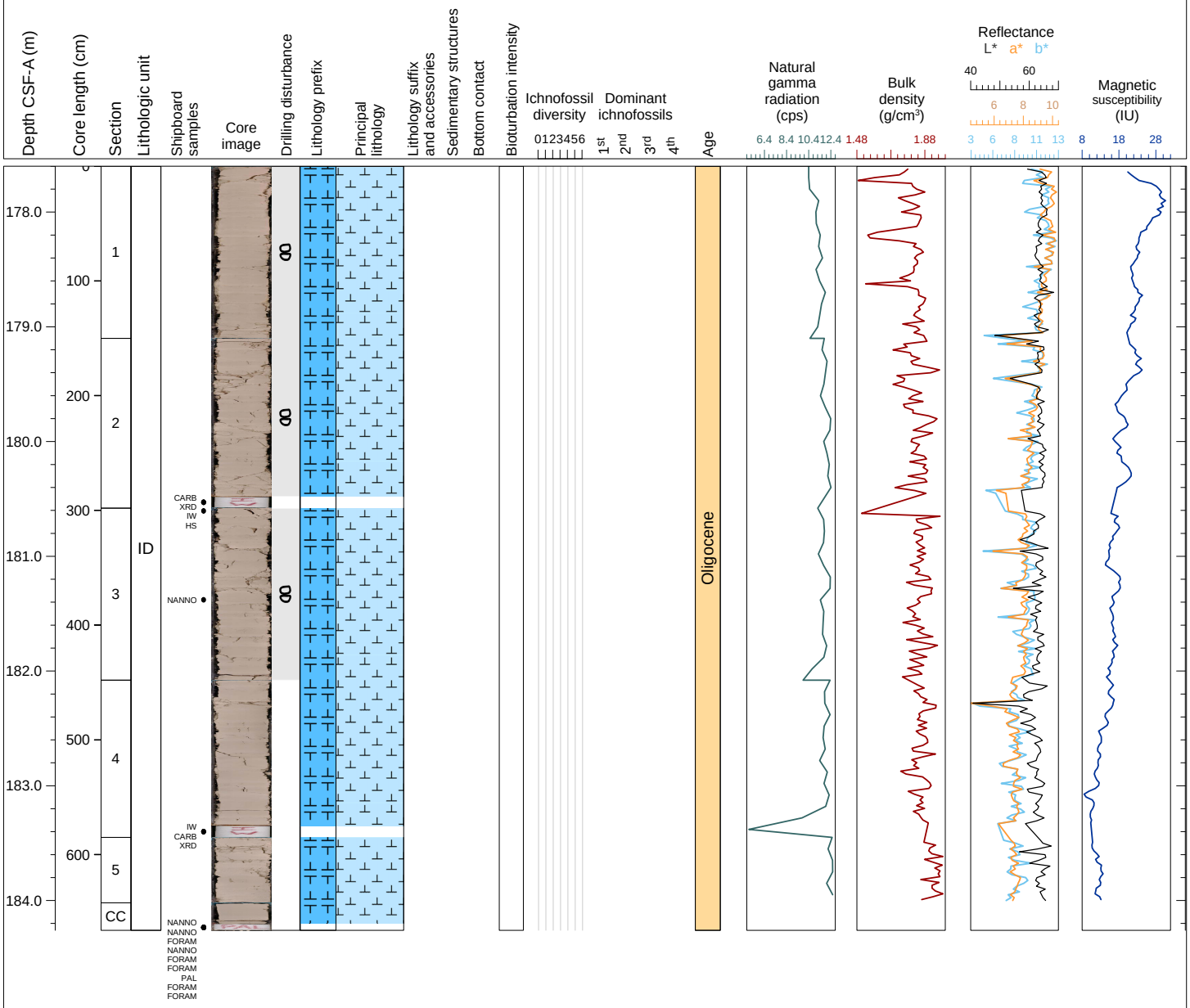
Hole 390C-U1556A Core 19X, Interval 170.0-176.75 m (CSF-A)

Core 19X contains mainly pinkish white (7.5YR 8/2) calcareous nannofossil chalk and reddish brown (5YR 5/3) silty clay. There is a distinct layer of foraminiferal nannofossil chalk (2.5Y 8/1) in bottom of section 1A. Most silty clay section has sparse bioturbation although it is more difficult to see in homogenous pinkish white sections. Drilling disturbance resulted in biscuits that destroyed the upper 8 cm of section 1A and they occur in upper part of section CC.



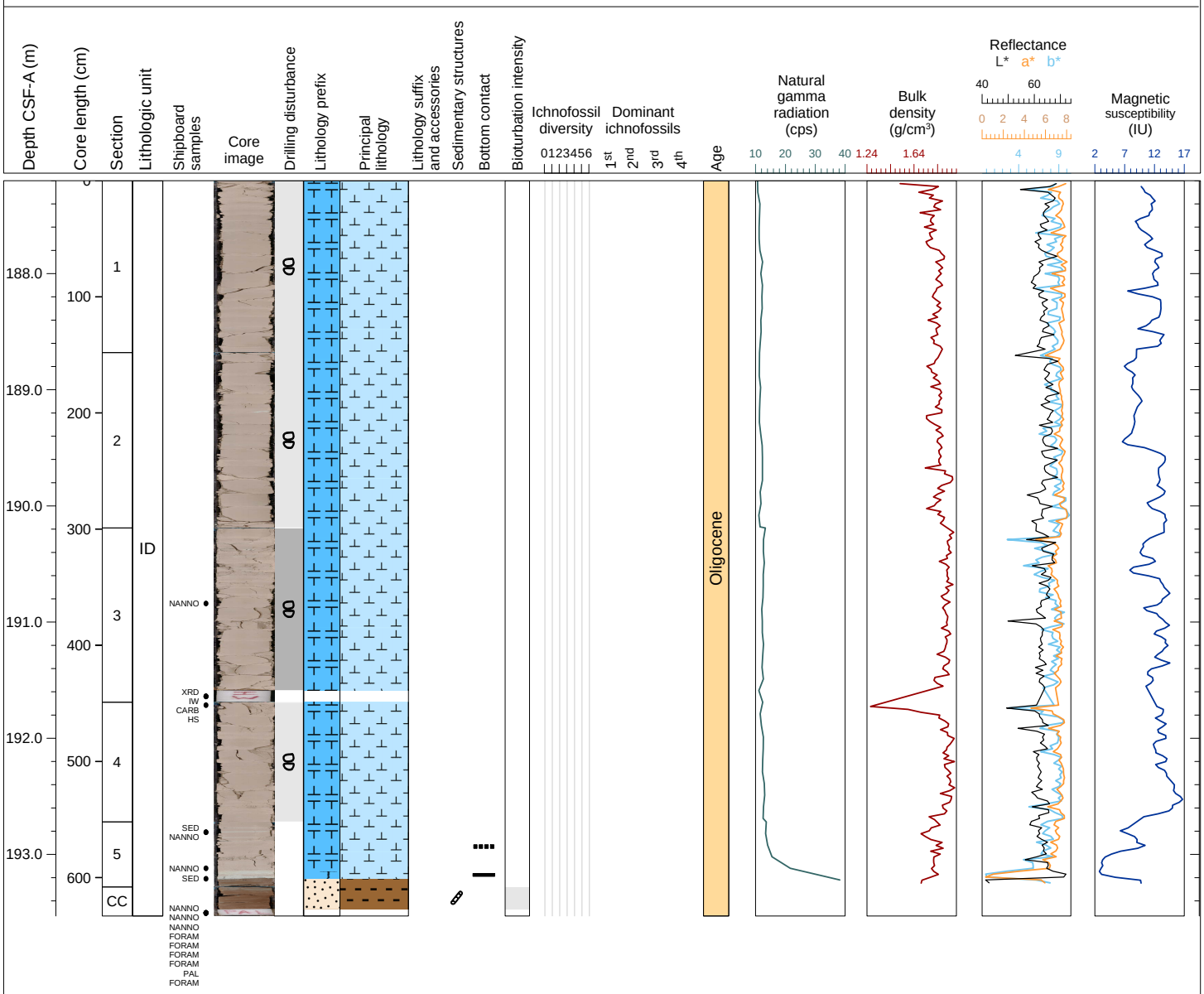
Hole 390C-U1556A Core 20X, Interval 177.6-184.26 m (CSF-A)

Core 20X contains only pinkish white (7.5YR 8/2) calcareous nannofossil chalk. It is difficult to see bioturbation in homogenous pinkish white sections. Drilling disturbance caused some biscuiting in sections 1A to CC.



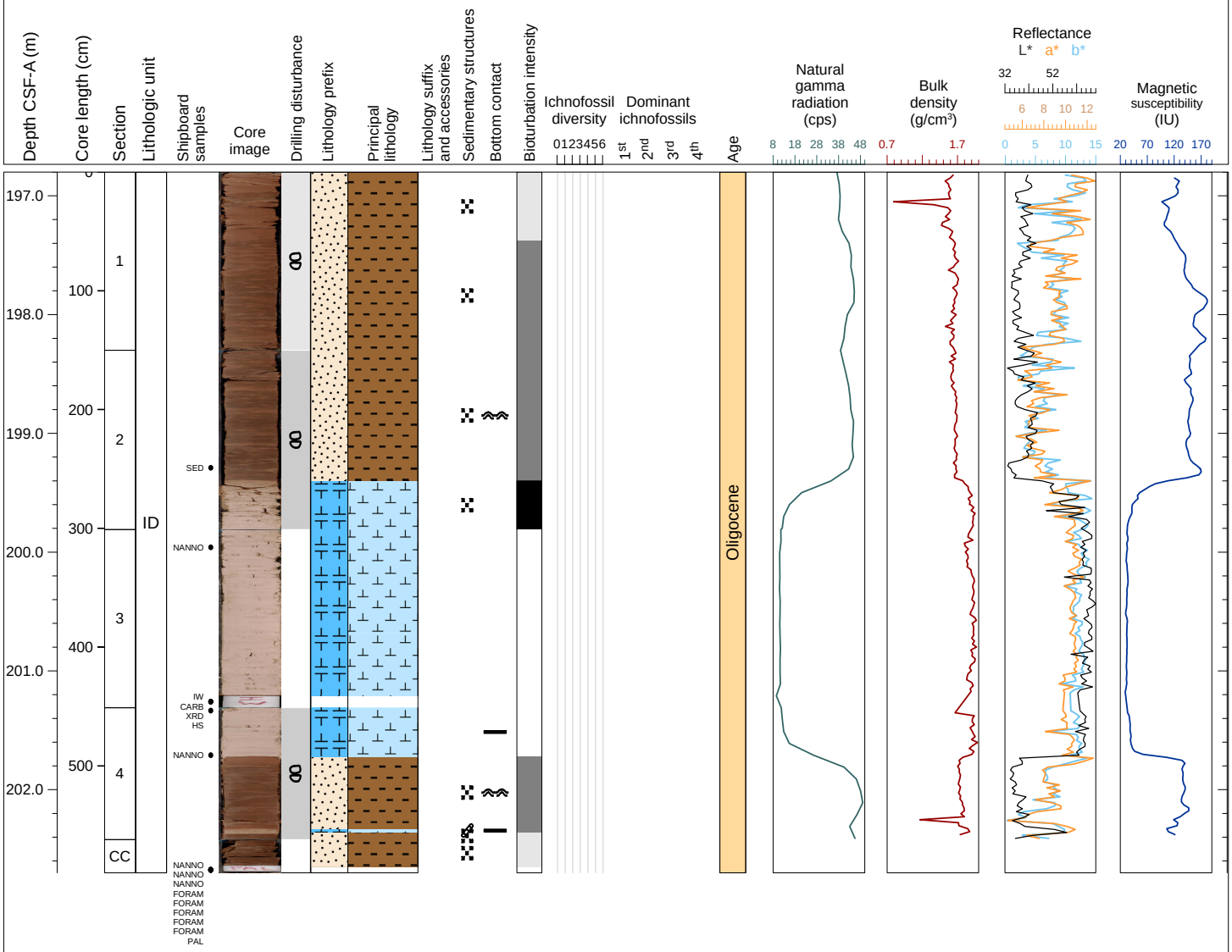
Hole 390C-U1556A Core 21X, Interval 187.2-193.53 m (CSF-A)

Core 21X contain mainly pinkish white (7.5YR 8/2) calcareous nannofossil chalk. There are white (2.5Y 8/1) laminations of foraminiferal nannofossil chalk medium in section 5A. There are medium and thin laminations of light grayish green (5GY 6/2) silty clay in section 5A. It is difficult to see bioturbation in homogenous pinkish white sections. Drilling disturbance has resulted in some biscuiting in sections 3A and 4A.



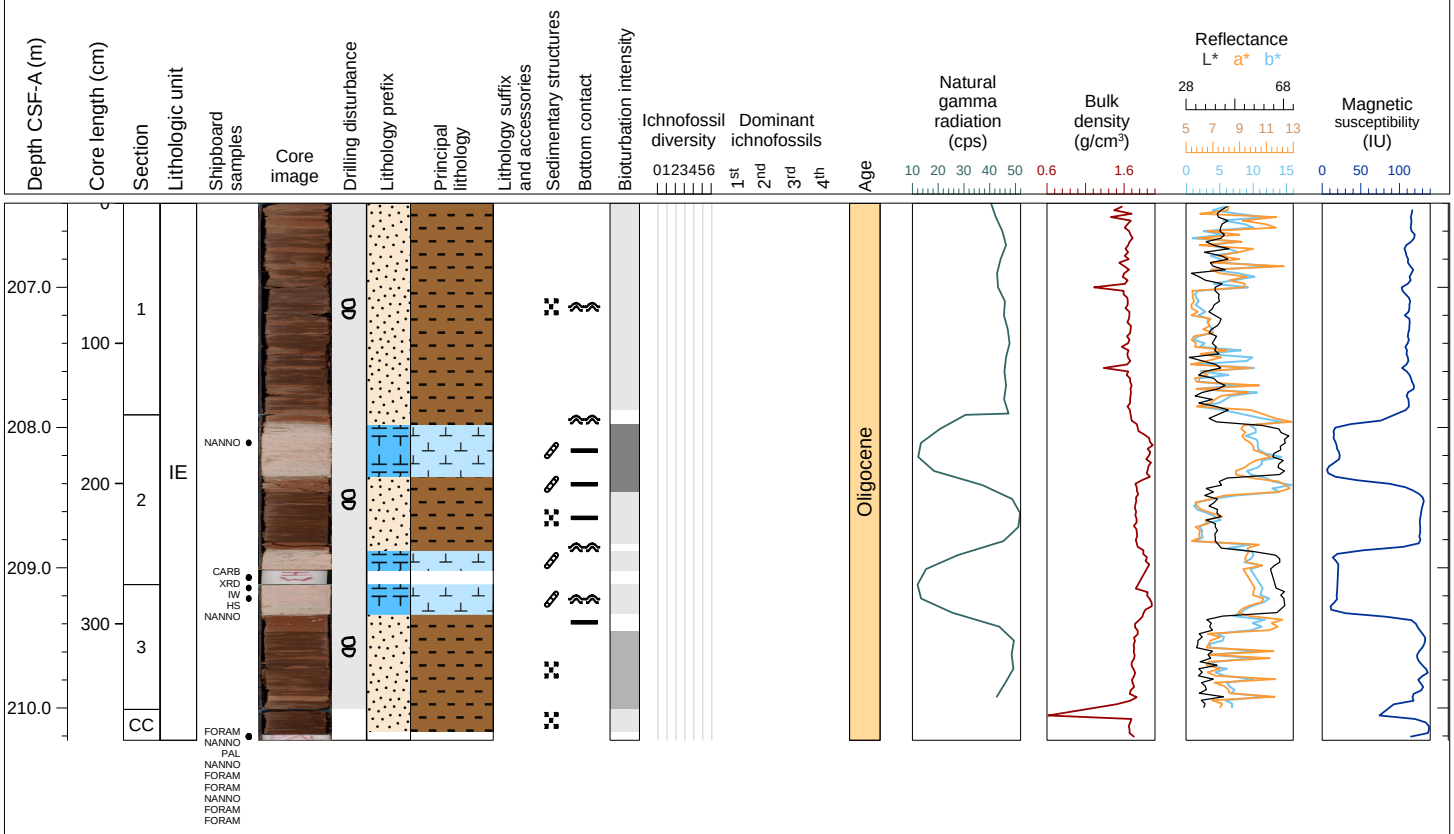
Hole 390C-U1556A Core 22X, Interval 196.8-202.7 m (CSF-A)

Core 22X contain mainly dark reddish gray to reddish brown (5YR 4/2 to 5YR 5/3) silty clay and pinkish white (7.5YR 8/2) calcareous nannofossil chalk. There are thin organic rich laminations in 1A 47cm. Moderate to high bioturbation in 1A, 2A, 4A, and CC. It is difficult to see bioturbation in homogenous pinkish white sections. Drilling disturbance has resulted in some biscuiting.



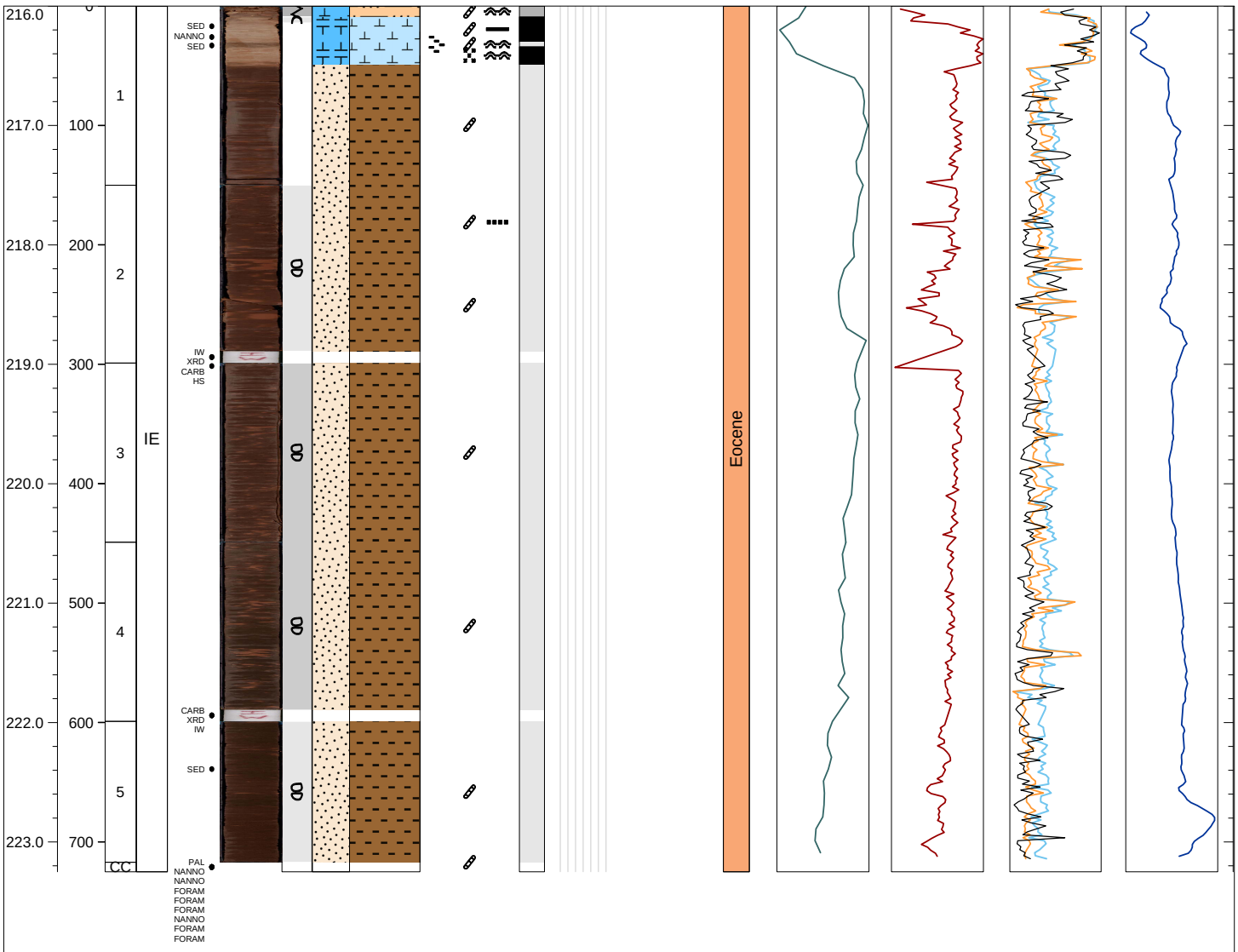
Hole 390C-U1556A Core 23X, Interval 206.4-210.23 m (CSF-A)

Core 23X contain mainly dark reddish gray to reddish brown (5YR 4/2 to 5YR 5/3) silty clay and pinkish white (7.5YR 8/2) calcareous nannofossil chalk. Sparse to moderate bioturbation in 1A to CC. Drilling disturbance has resulted in some biscuiting.



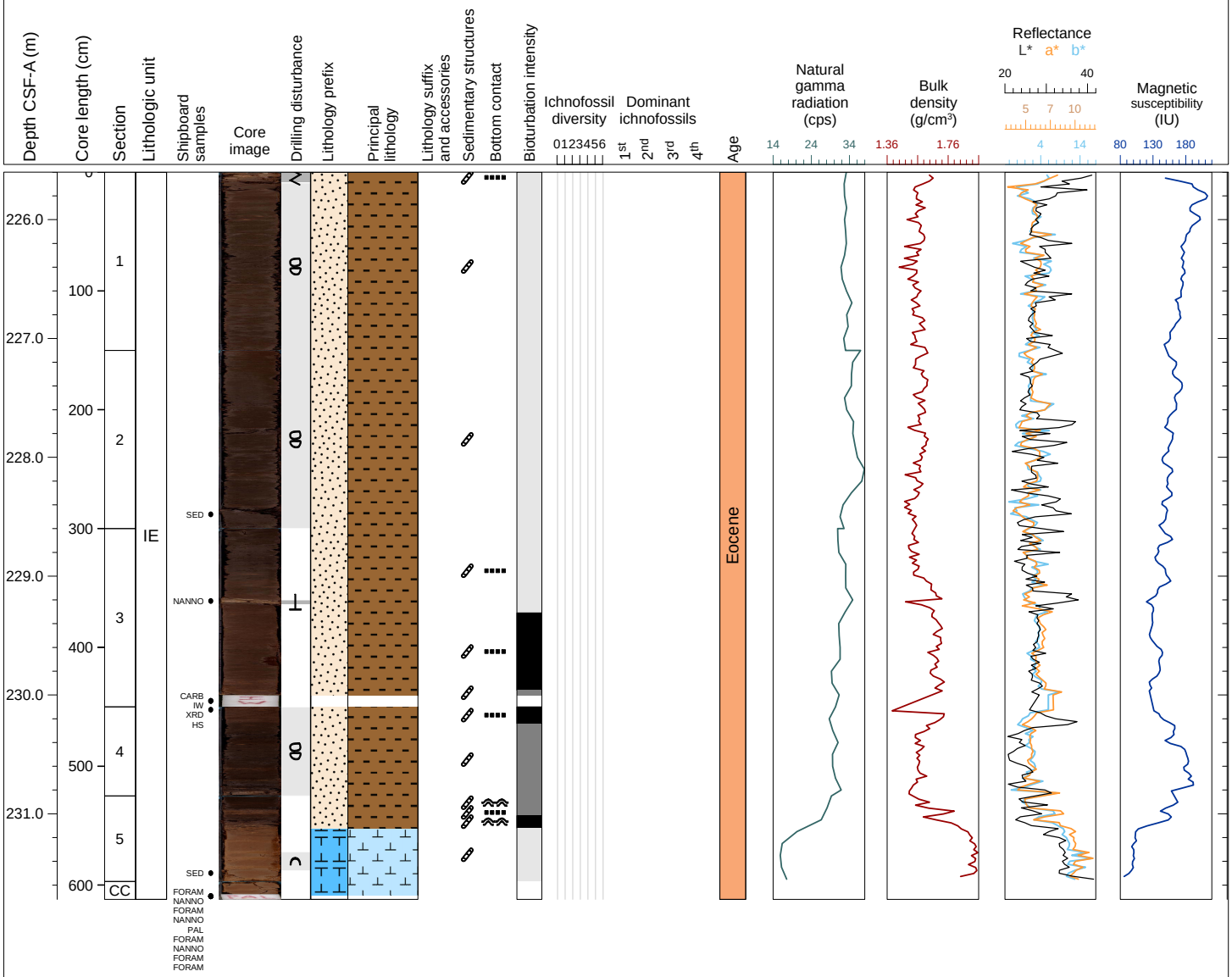
Hole 390C-U1556A Core 24X, Interval 216.0-223.25 m (CSF-A)

Core 24X contains mainly dark reddish gray to reddish brown (5YR 4/2 to 5YR 4/3) silty clay, and in 1A pink and pinkish white (5YR 6/2 and 7/4) calcareous nannofossil chalk. 5A is darker (5YR 3/3). Sparse bioturbation throughout except for moderate to high in 1A. Drilling disturbance has resulted in biscuits more or less throughout and some up-arching and fragmentation in 1A.



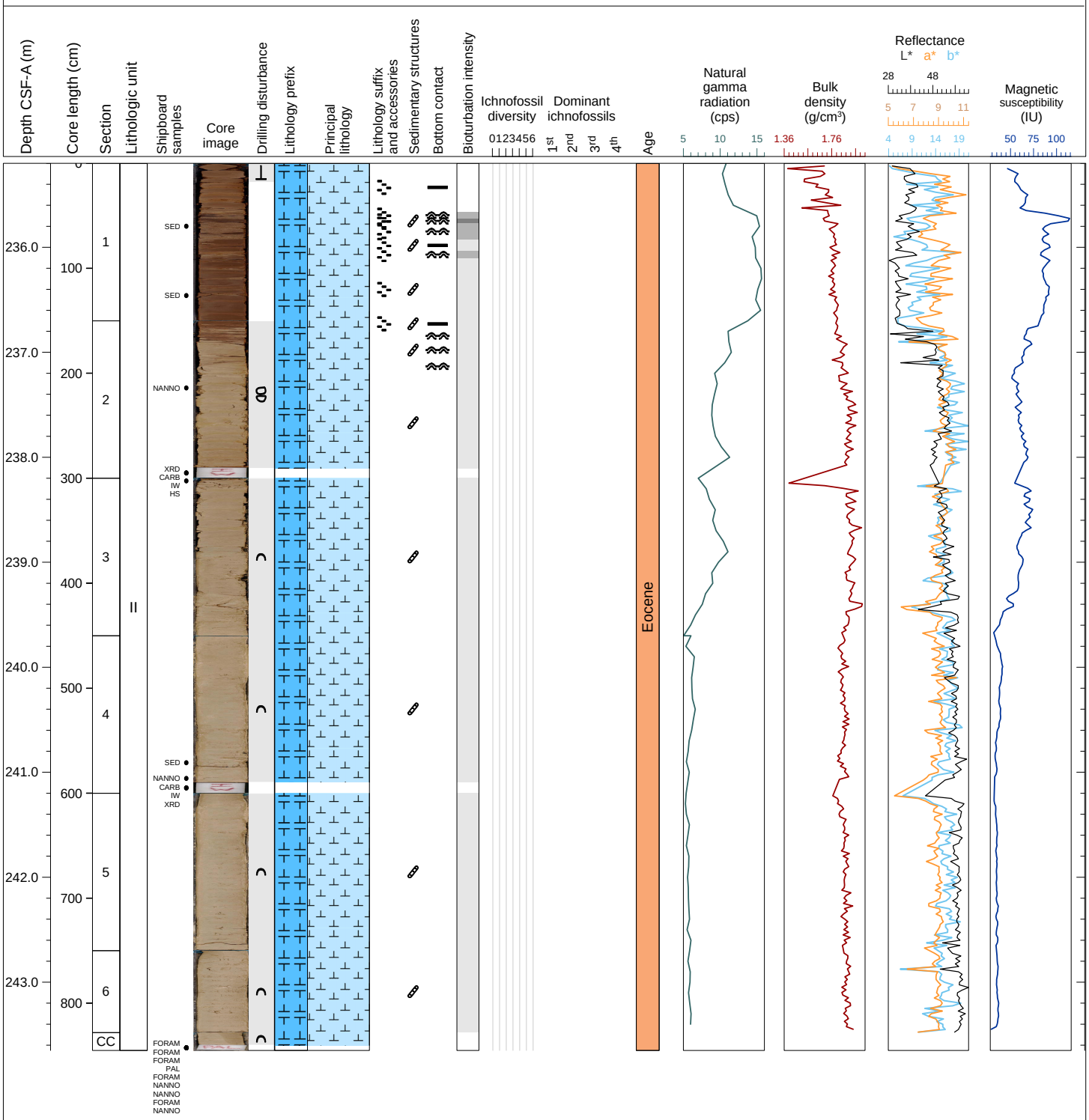
Hole 390C-U1556A Core 25X, Interval 225.6-231.72 m (CSF-A)

Core 25X contains almost all dark reddish brown or reddish brown (5YR 3/2 to 5YR 4/3) silty clay, except in 5A and CC there is a light brown (7.5YR 6/4) calcareous nannofossil chalk. Sparse to high bioturbation. Drilling disturbance has resulted in biscuits, a major fracture, some up-arching and fragmentation.



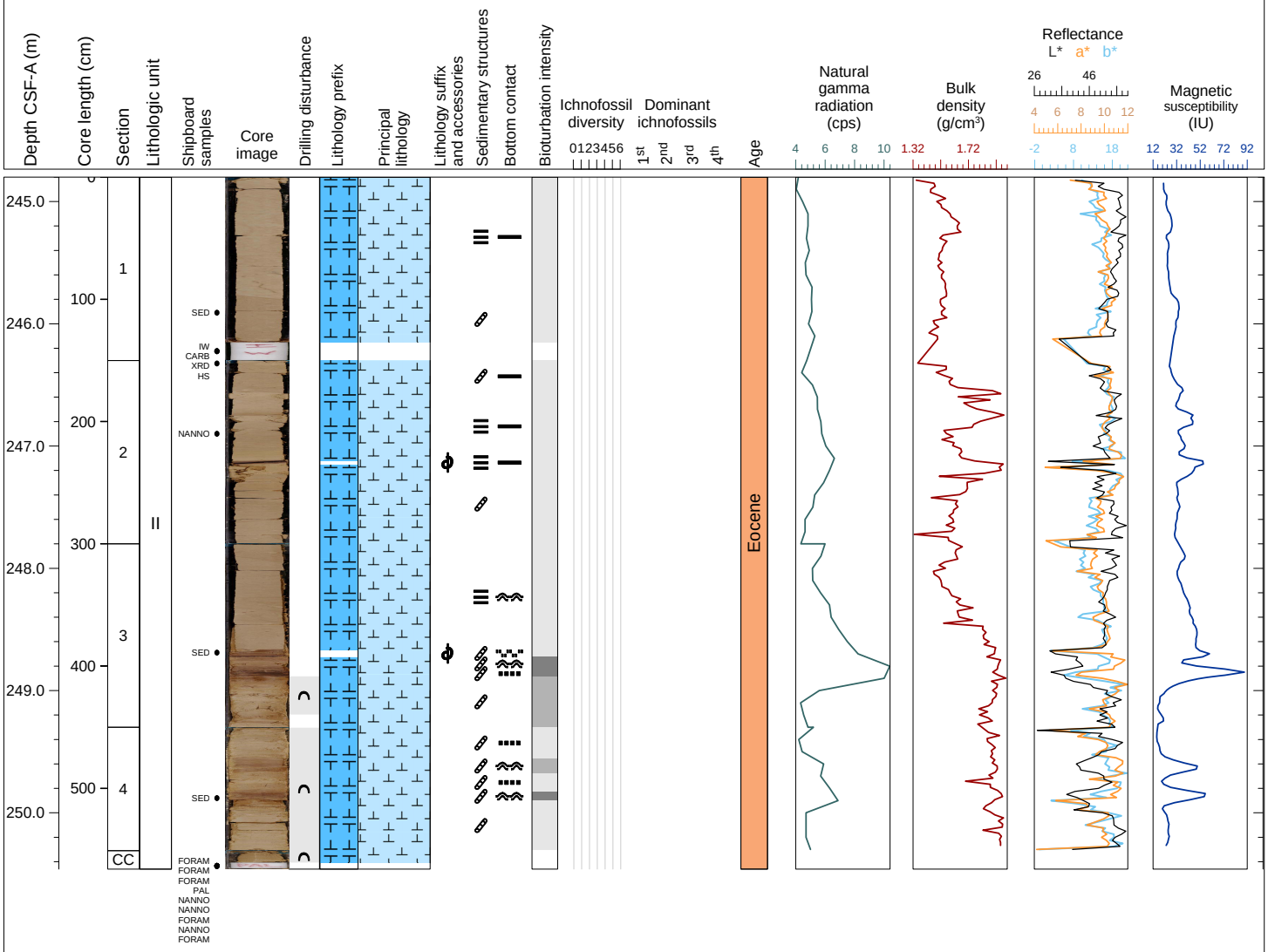
Hole 390C-U1556A Core 26X, Interval 235.2-243.65 m (CSF-A)

Core 26X contains almost all light brown or brown (7.5YR 6/3, 6/4, 4/4) and very pale brown (10YR 7/3) calcareous nannofossil chalk. In 2A, from 6 cm to 54 cm, sediments are convoluted. Bioturbation is sparse. Drilling disturbance has resulted in up-arching and biscuits.



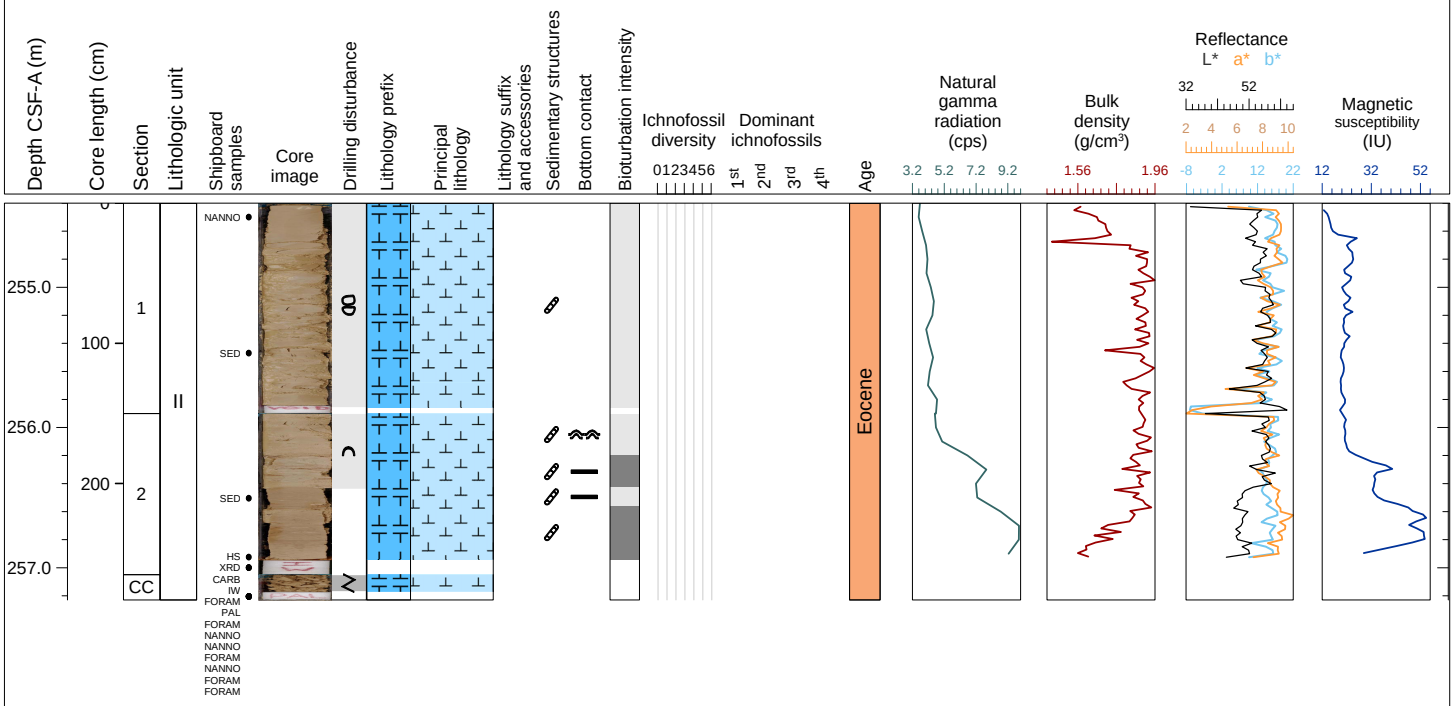
Hole 390C-U1556A Core 27X, Interval 244.8-250.46 m (CSF-A)

Core 27X contains mainly very pale brown, yellowish brown, and brown (10YR 7/4 and 7/3, 5/3, 6/4) calcareous nannofossil chalk. Two layers in 2A and 3A are prominent organic-rich nannofossil chalk with bioclasts. 1A,2A and much of 3A are moderately consolidated; sections have dried out and cracks and fragmentation occurs in places. Sparse bioturbation throughout. Drilling disturbance has resulted in up-arching in 3A, 4A and in the CC.



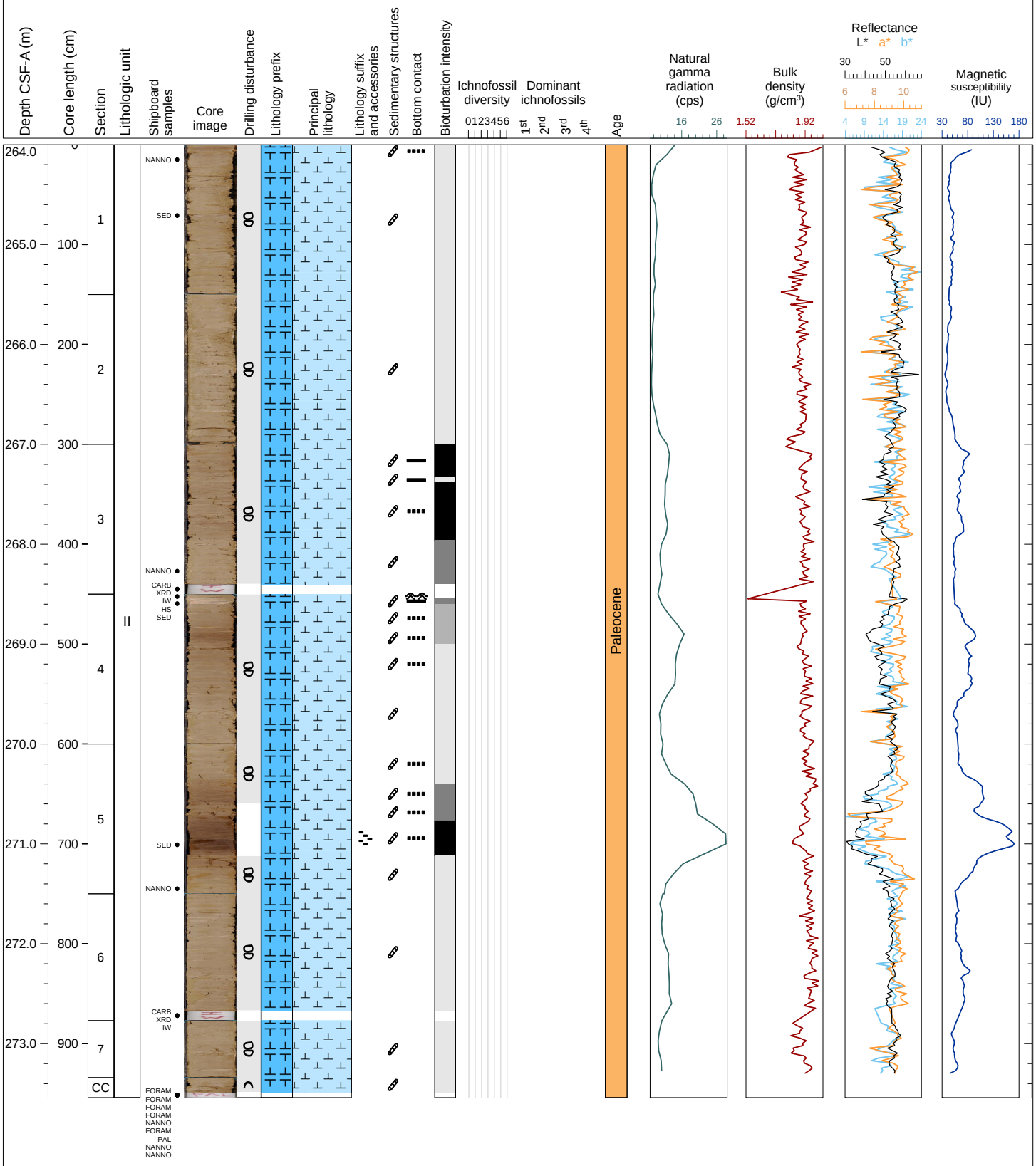
Hole 390C-U1556A Core 28X, Interval 254.4-257.23 m (CSF-A)

Core 28X contains very pale brown, yellowish brown, and light yellowish brown (10YR 7/4, 5/4, 6/4) calcareous nannofossil chalk. Sparse or moderate bioturbation throughout the core. Drilling disturbance has resulted in up-arching.CC is fragmented.



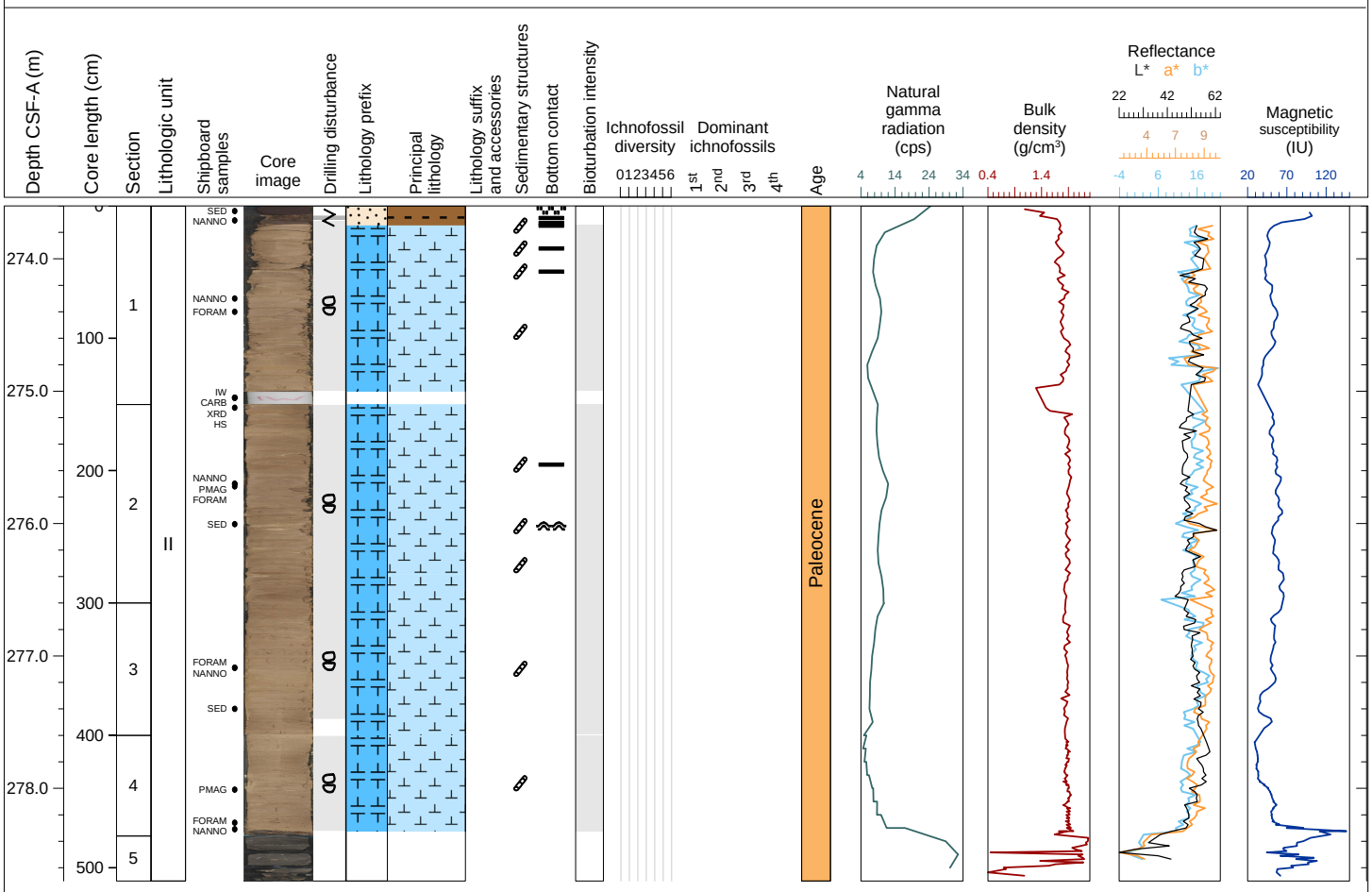
Hole 390C-U1556A Core 29X, Interval 264.0-273.54 m (CSF-A)

Core 29X contains mainly yellowish brown and light yellowish brown (10YR 6/4, 5/4) calcareous nannofossil chalk. One light red layer in 4A (2.5YR 7/8) is also calcareous nannofossil chalk. One brown layer in 5A is calcareous nannofossil chalk with clay. Mainly sparse or moderate bioturbation throughout the core. Drilling disturbance has resulted in biscuits and possibly some up-arching.

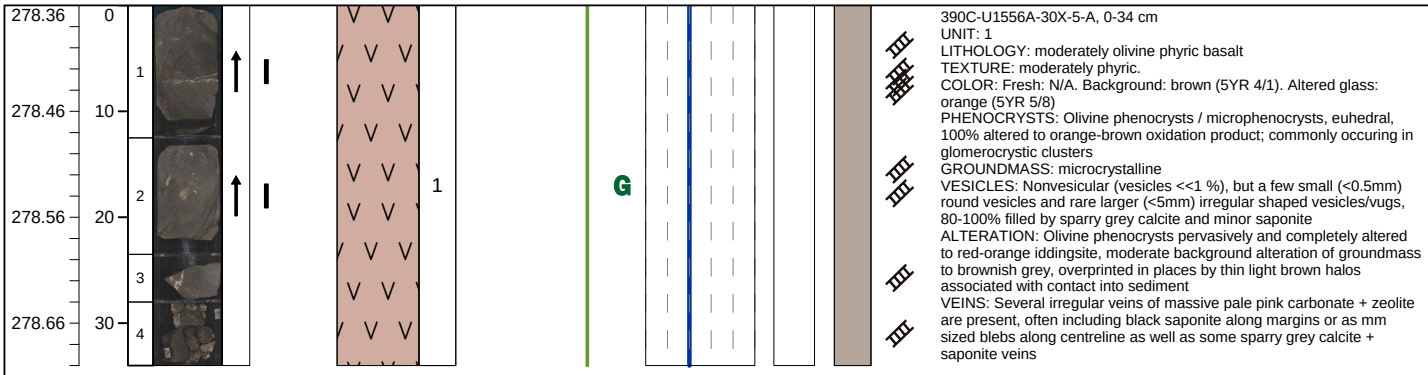


Hole 390C-U1556A Core 30X, Interval 273.6-278.7 m (CSF-A)

Core 30X contains mainly very pale brown to pale brown (10YR 7/3 and 6/3) calcareous nannofossil chalk. In 1A two layers are very dark brown (7.5YR 2.5/2) and brown (7.5YR 4/2) respectively, which are silty clay with nannofossils as an an accessory. Sparse bioturbation throughout the core. Drilling disturbance has resulted in mainly biscuits and one fragmented section near the top of 1A.



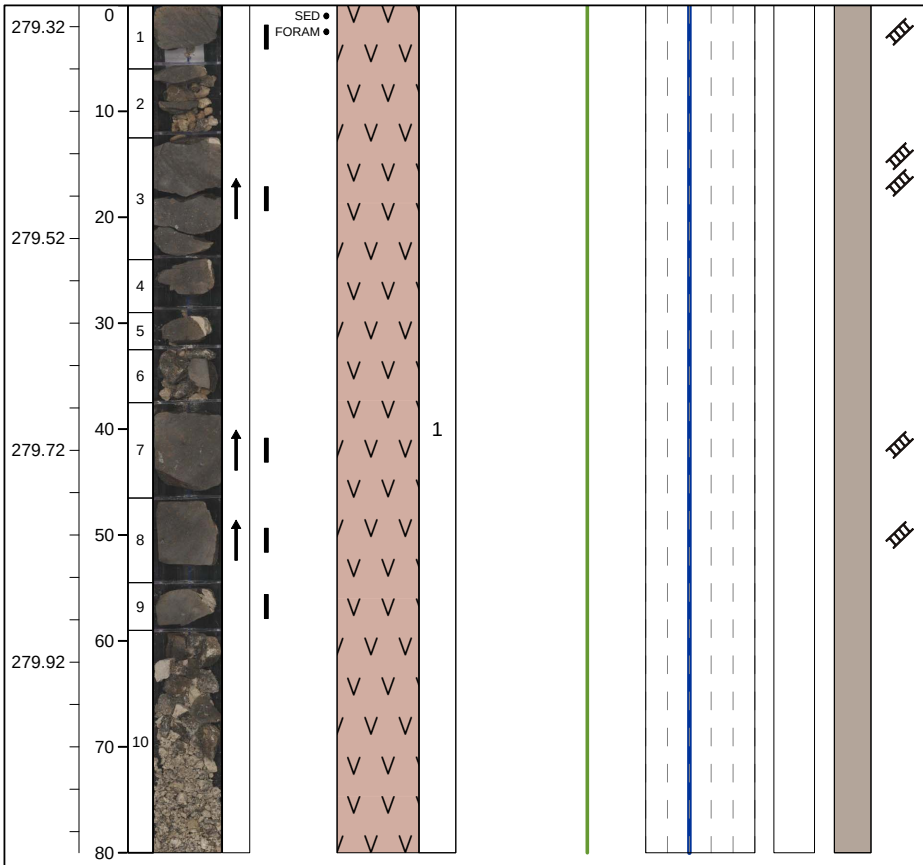
Hole 390C-U1556A-30X Section 5, Top of Section: 278.36 m (CSF-A)



Description

390C-U1556A-30X-5-A, 0-34 cm
UNIT: 1
LITHOLOGY: moderately olivine phyric basalt
TEXTURE: moderately phyric.
COLOR: Fresh: N/A. Background: brown (5YR 4/1). Altered glass: orange (5YR 5/8)
PHENOCRYSTS: Olivine phenocrysts / microphenocrysts, euhedral, 100% altered to orange-brown oxidation product; commonly occuring in glomerocrystic clusters
GROUNDMASS: microcrystalline
VESICLES: Nonvesicular (vesicles <<1 %), but a few small (<0.5mm) round vesicles and rare larger (<5mm) irregular shaped vesicles/vugs, 80-100% filled by sparry grey calcite and minor saponite
ALTERATION: Olivine phenocrysts pervasively and completely altered to red-orange iddingsite, moderate background alteration of groundmass to brownish grey, overprinted in places by thin light brown halos associated with contact into sediment
VEINS: Several irregular veins of massive pale pink carbonate + zeolite are present, often including black saponite along margins or as mm sized blebs along centreline as well as some sparry grey calcite + saponite veins

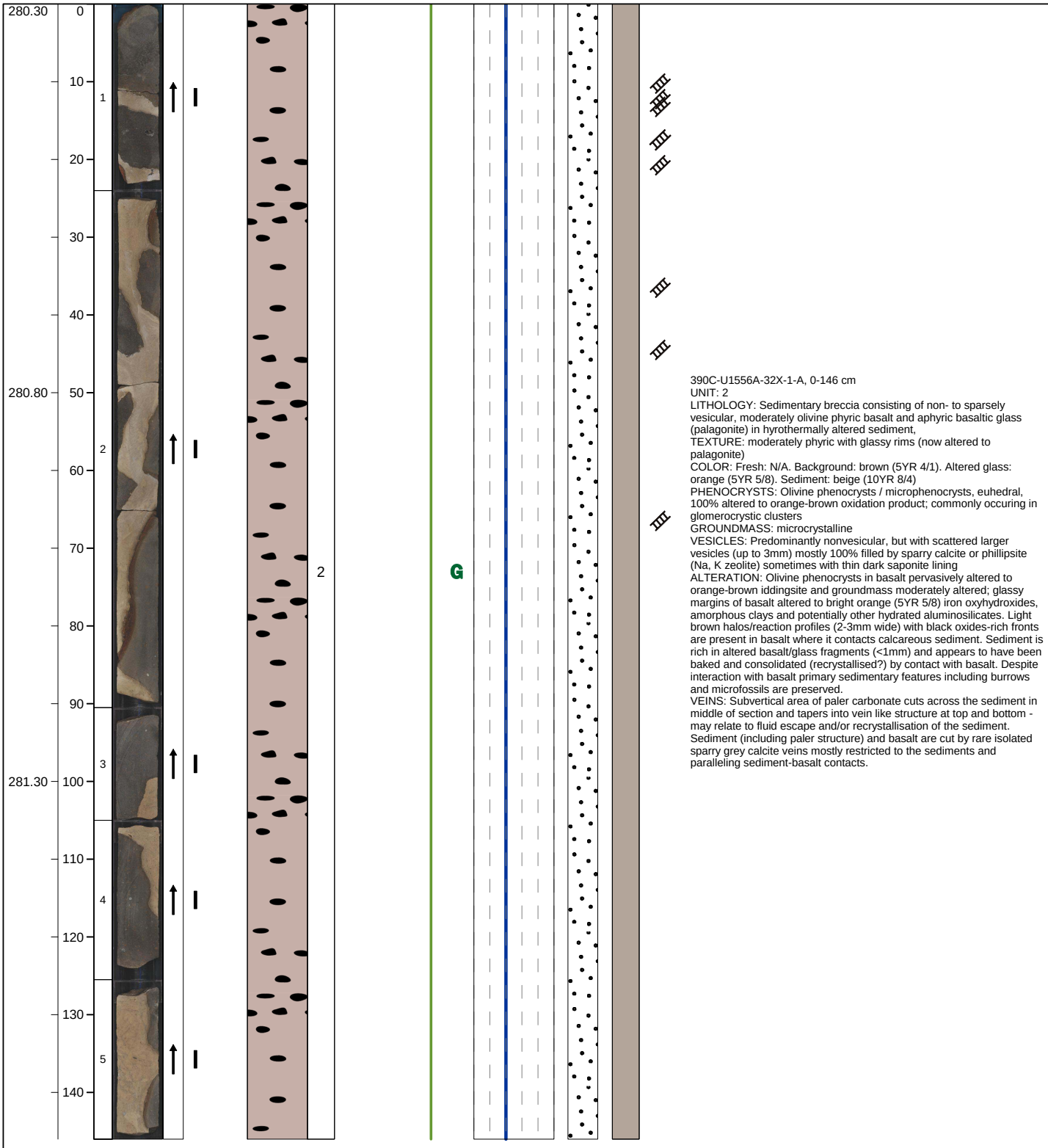
Hole 390C-U1556A-31X Section 1, Top of Section: 279.3 m (CSF-A)



Description

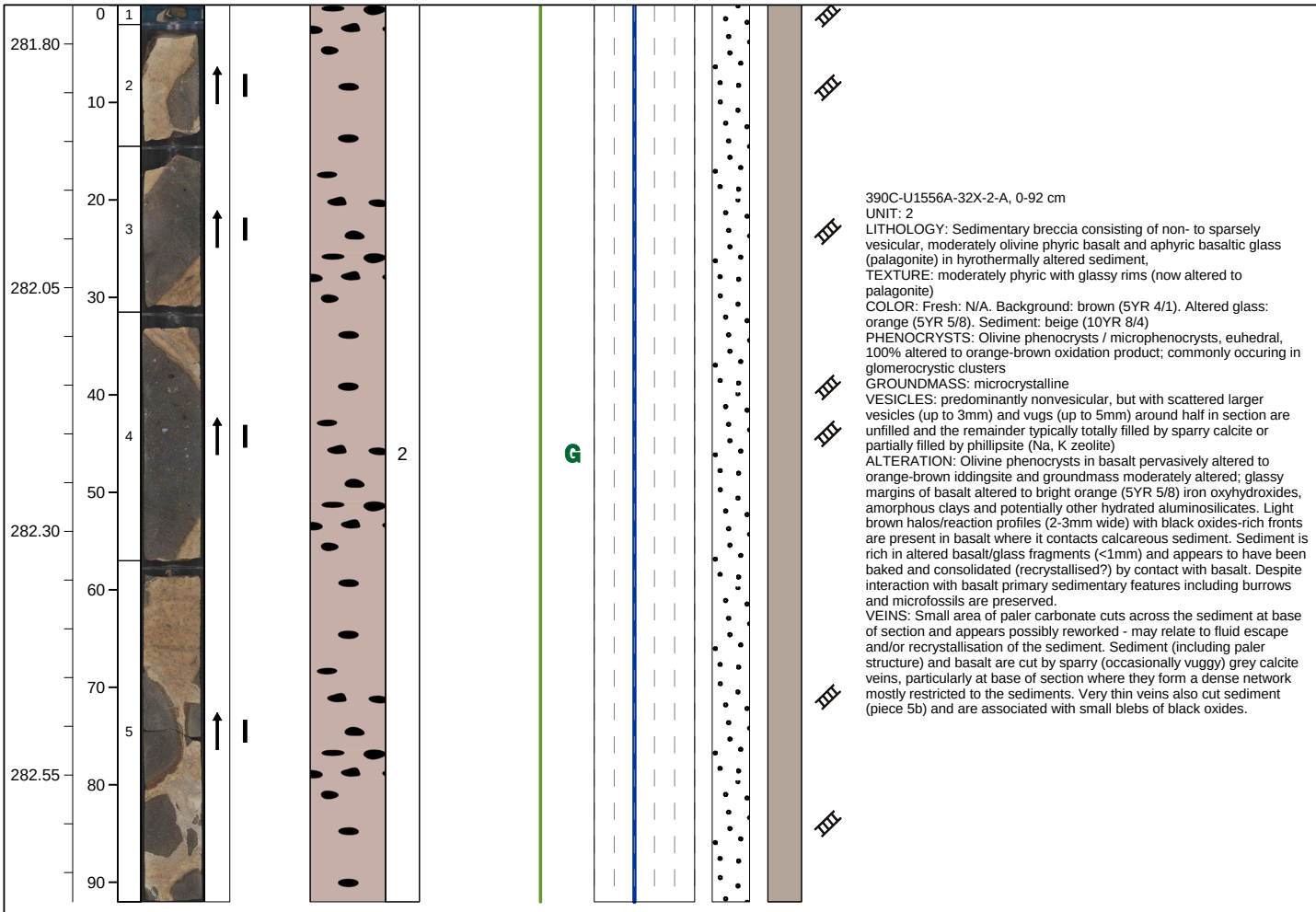
390C-U1556A-31X-1-A, 0-80 cm
UNIT: 1
LITHOLOGY: moderately olivine phyric basalt
TEXTURE: moderately phyric
COLOR: Fresh: N/A. Background: brown (5YR 4/1). Sediment: beige (10YR 8/4)
PHENOCRYSTS: Olivine phenocrysts / microphenocrysts, euhedral, 100% altered to orange-brown oxidation product; commonly occuring in glomerocrystic clusters
GROUNDMASS: microcrystalline
VESICLES: Nonvesicular (pieces 1,2,4,5,6,8,9) to sparsely vesicular (pieces 3,7) with rare larger (<5mm) irregular shaped vesicles/vugs, 80-100% filled by sparry grey calcite and minor saponite
ALTERATION: Olivine phenocrysts in basalt pervasively altered to orange-brown iddingsite and groundmass moderately altered; glassy margins of basalt altered to bright orange (5YR 5/8) iron oxyhydroxides, amorphous clays and potentially other hydrated aluminosilicates. Light brown halos/reaction profiles (2-3mm wide) with black oxides-rich fronts are present in basalt where it contacts calcareous sediment. Sediment is rich in altered basalt/glass fragments (<1mm) and appears to have been baked and consolidated (recrystallised?) by contact with basalt. Despite interaction with basalt, primary sedimentary features including burrows and microfossils are preserved.
VEINS: Few veins except on a couple of broken surfaces which reveal black saponite-lined light pink carbonate + zeolite

Hole 390C-U1556A-32X Section 1, Top of Section: 280.3 m (CSF-A)



390C-U1556A-32X-1-A, 0-146 cm
UNIT: 2
LITHOLOGY: Sedimentary breccia consisting of non- to sparsely vesicular, moderately olivine phyric basalt and aphyric basaltic glass (palagonite) in hyrothermally altered sediment,
TEXTURE: moderately phyric with glassy rims (now altered to palagonite)
COLOR: Fresh: N/A. Background: brown (5YR 4/1). Altered glass: orange (5YR 5/8). Sediment: beige (10YR 8/4)
PHENOCRYSTS: Olivine phenocrysts / microphenocrysts, euhedral, 100% altered to orange-brown oxidation product; commonly occuring in glomerocrystic clusters
GROUNDMASS: microcrystalline
VESICLES: Predominantly nonvesicular, but with scattered larger vesicles (up to 3mm) mostly 100% filled by sparry calcite or phillipsite (Na, K zeolite) sometimes with thin dark saponite lining
ALTERATION: Olivine phenocrysts in basalt pervasively altered to orange-brown iddingsite and groundmass moderately altered; glassy margins of basalt altered to bright orange (5YR 5/8) iron oxyhydroxides, amorphous clays and potentially other hydrated aluminosilicates. Light brown halos/reaction profiles (2-3mm wide) with black oxides-rich fronts are present in basalt where it contacts calcareous sediment. Sediment is rich in altered basalt/glass fragments (<1mm) and appears to have been baked and consolidated (recrystallised?) by contact with basalt. Despite interaction with basalt primary sedimentary features including burrows and microfossils are preserved.
VEINS: Subvertical area of paler carbonate cuts across the sediment in middle of section and tapers into vein like structure at top and bottom - may relate to fluid escape and/or recrystallisation of the sediment. Sediment (including paler structure) and basalt are cut by rare isolated sparry grey calcite veins mostly restricted to the sediments and paralleling sediment-basalt contacts.

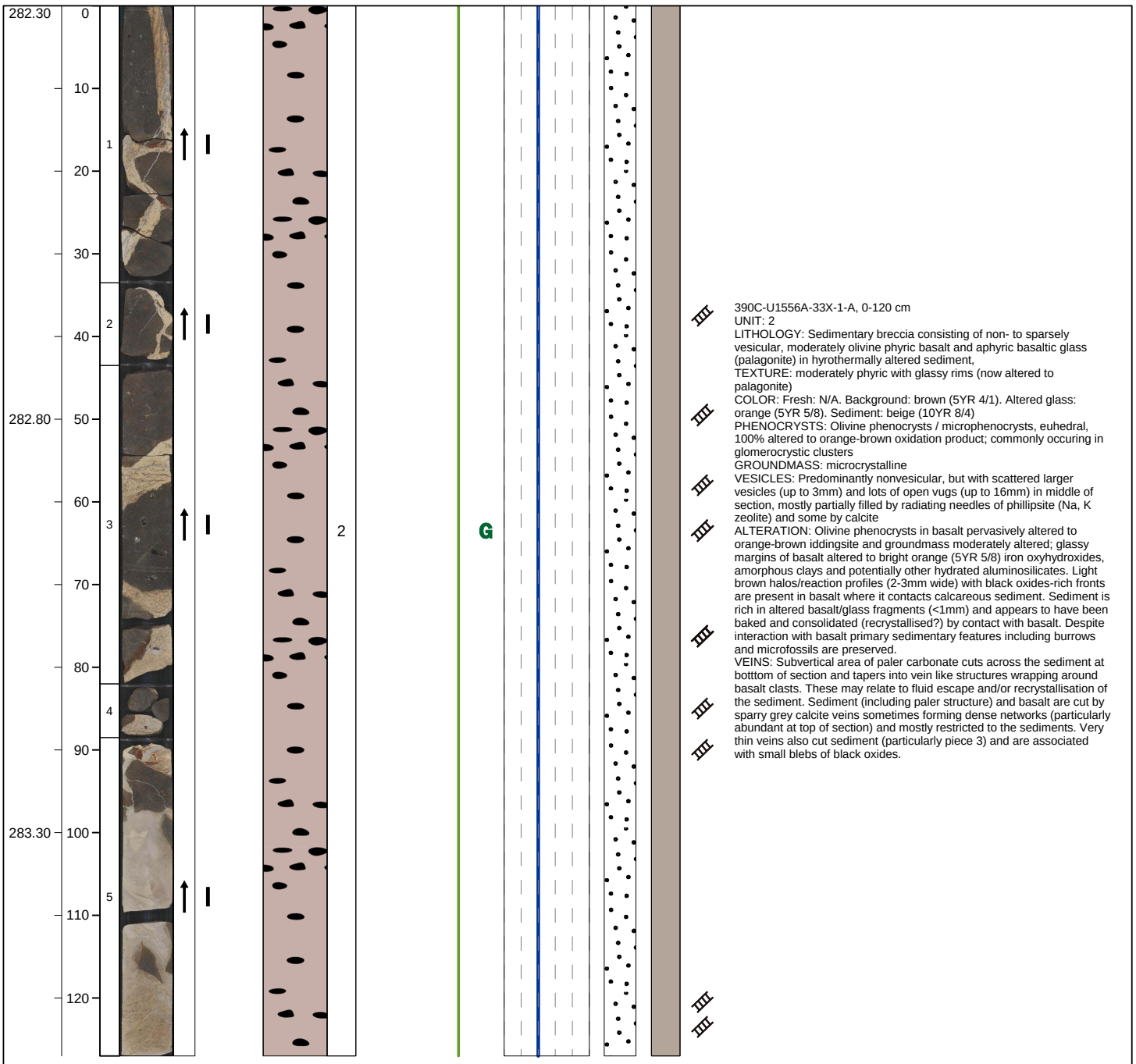
Hole 390C-U1556A-32X Section 2, Top of Section: 281.76 m (CSF-A)



Description

390C-U1556A-32X-2-A, 0-92 cm
UNIT: 2
LITHOLOGY: Sedimentary breccia consisting of non- to sparsely vesicular, moderately olivine phyric basalt and aphyric basaltic glass (palagonite) in hyrothermally altered sediment,
TEXTURE: moderately phyric with glassy rims (now altered to palagonite)
COLOR: Fresh: N/A. Background: brown (5YR 4/1). Altered glass: orange (5YR 5/8). Sediment: beige (10YR 8/4)
PHENOCRYSTS: Olivine phenocrysts / microphenocrysts, euhedral, 100% altered to orange-brown oxidation product; commonly occuring in glomerocrystic clusters
GROUNDMASS: microcrystalline
VESICLES: predominantly nonvesicular, but with scattered larger vesicles (up to 3mm) and vugs (up to 5mm) around half in section are unfilled and the remainder typically totally filled by sparry calcite or partially filled by phillipsite (Na, K zeolite)
ALTERATION: Olivine phenocrysts in basalt pervasively altered to orange-brown iddingsite and groundmass moderately altered; glassy margins of basalt altered to bright orange (5YR 5/8) iron oxyhydroxides, amorphous clays and potentially other hydrated aluminosilicates. Light brown halos/reaction profiles (2-3mm wide) with black oxides-rich fronts are present in basalt where it contacts calcareous sediment. Sediment is rich in altered basalt/glass fragments (<1mm) and appears to have been baked and consolidated (recrystallised?) by contact with basalt. Despite interaction with basalt primary sedimentary features including burrows and microfossils are preserved.
VEINS: Small area of paler carbonate cuts across the sediment at base of section and appears possibly reworked - may relate to fluid escape and/or recrystallisation of the sediment. Sediment (including paler structure) and basalt are cut by sparry (occasionally vuggy) grey calcite veins, particularly at base of section where they form a dense network mostly restricted to the sediments. Very thin veins also cut sediment (piece 5b) and are associated with small blebs of black oxides.

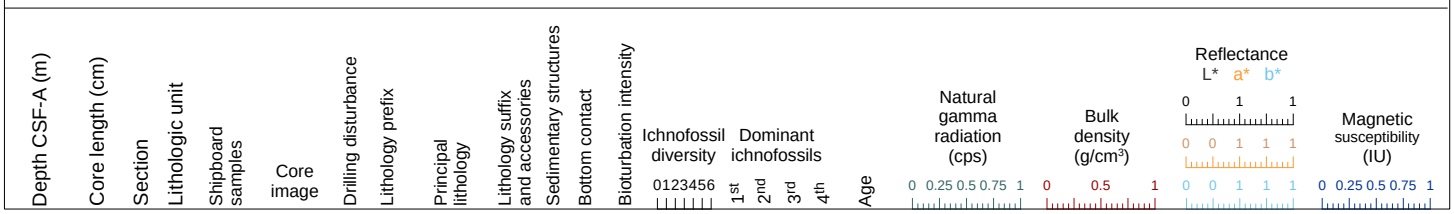
Hole 390C-U1556A-33X Section 1, Top of Section: 282.3 m (CSF-A)



390C-U1556A-33X-1-A, 0-120 cm
UNIT: 2
LITHOLOGY: Sedimentary breccia consisting of non- to sparsely vesicular, moderately olivine phyric basalt and aphyric basaltic glass (palagonite) in hyrothermally altered sediment,
TEXTURE: moderately phyric with glassy rims (now altered to palagonite)
COLOR: Fresh: N/A. Background: brown (5YR 4/1). Altered glass: orange (5YR 5/8). Sediment: beige (10YR 8/4)
PHENOCRYSTS: Olivine phenocrysts / microphenocrysts, euhedral, 100% altered to orange-brown oxidation product; commonly occuring in glomerocrystic clusters
GROUNDMASS: microcrystalline
VESICLES: Predominantly nonvesicular, but with scattered larger vesicles (up to 3mm) and lots of open vugs (up to 16mm) in middle of section, mostly partially filled by radiating needles of phillipsite (Na, K zeolite) and some by calcite
ALTERATION: Olivine phenocrysts in basalt pervasively altered to orange-brown iddingsite and groundmass moderately altered; glassy margins of basalt altered to bright orange (5YR 5/8) iron oxyhydroxides, amorphous clays and potentially other hydrated aluminosilicates. Light brown halos/reaction profiles (2-3mm wide) with black oxides-rich fronts are present in basalt where it contacts calcareous sediment. Sediment is rich in altered basalt/glass fragments (<1mm) and appears to have been baked and consolidated (recrystallised?) by contact with basalt. Despite interaction with basalt primary sedimentary features including burrows and microfossils are preserved.
VEINS: Subvertical area of paler carbonate cuts across the sediment at botttom of section and tapers into vein like structures wrapping around basalt clasts. These may relate to fluid escape and/or recrystallisation of the sediment. Sediment (including paler structure) and basalt are cut by sparry grey calcite veins sometimes forming dense networks (particularly abundant at top of section) and mostly restricted to the sediments. Very thin veins also cut sediment (particularly piece 3) and are associated with small blebs of black oxides.

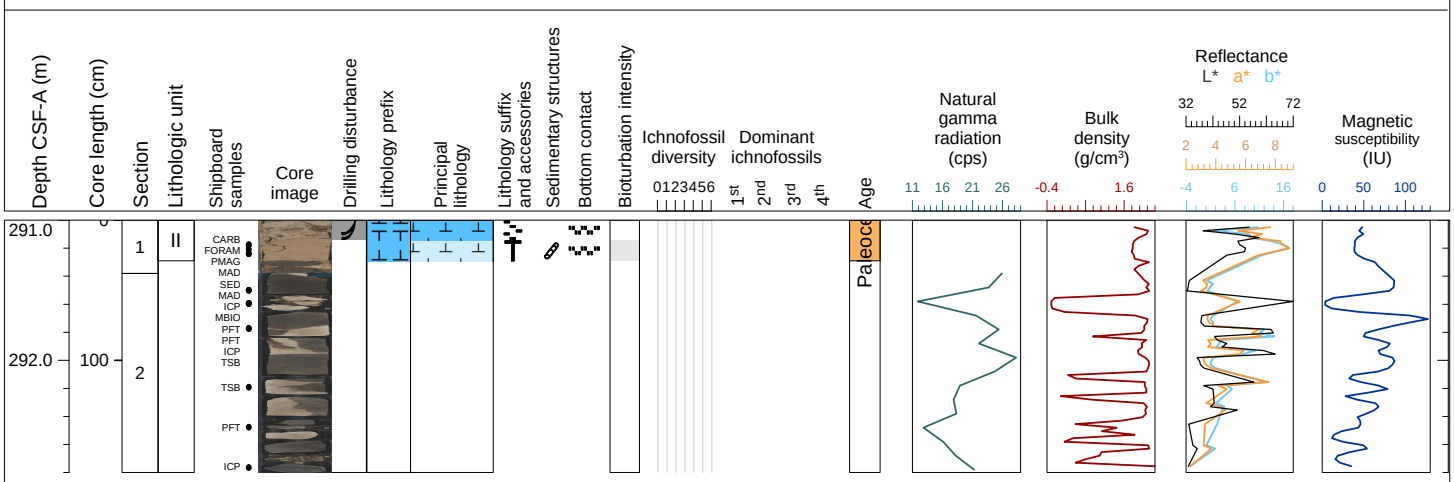
Hole 390-U1556B Core 11, Interval 0.0-291.0 m (CSF-A)

DRILLED INTERVAL 0-291.0 m

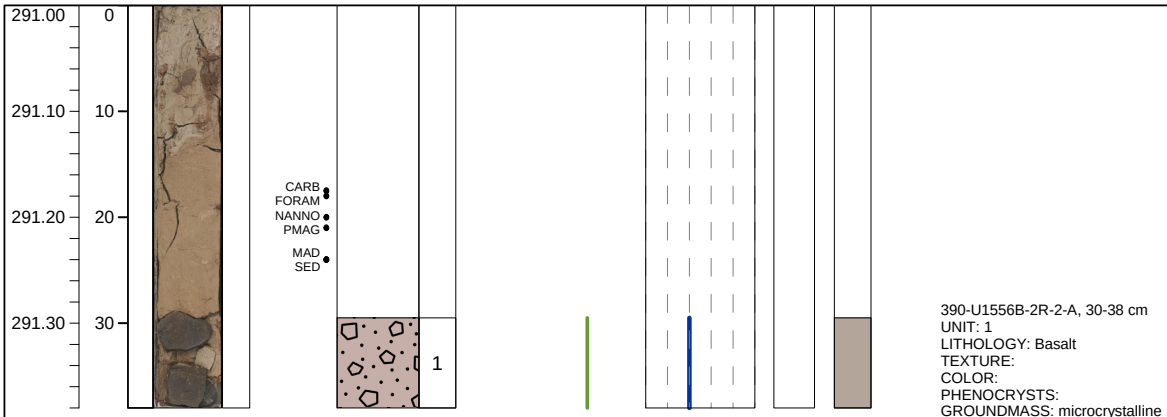


Hole 390-U1556B Core 2R, Interval 291.0-292.8 m (CSF-A)

Core 2R is composed by an pink (7.5YR 7/3) calcareous nannofossil ooze with clay on top (heavily disturbed by drilling, with silty clays fall in) and a very pale brown (10YR 7/4) calcareous nannofossil chalk with foraminifera (below). Sparse bioturbation occur in the calcareous nannofossil chalk. Basalt occurs as rubble clasts at the bottom of the sediment core.

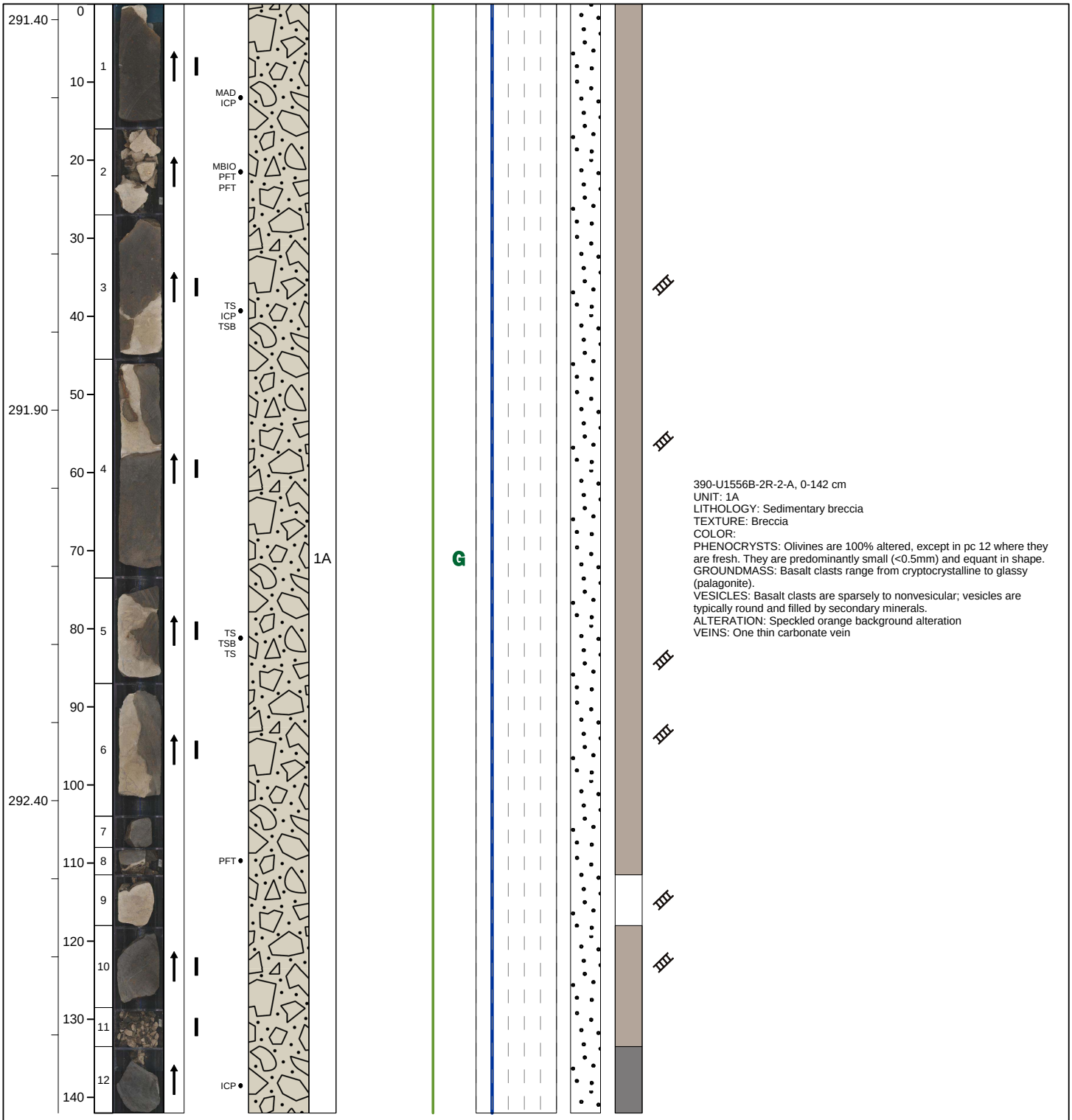


Hole 390-U1556B-2R Section 1, Top of Section: 291.0 m (CSF-A)

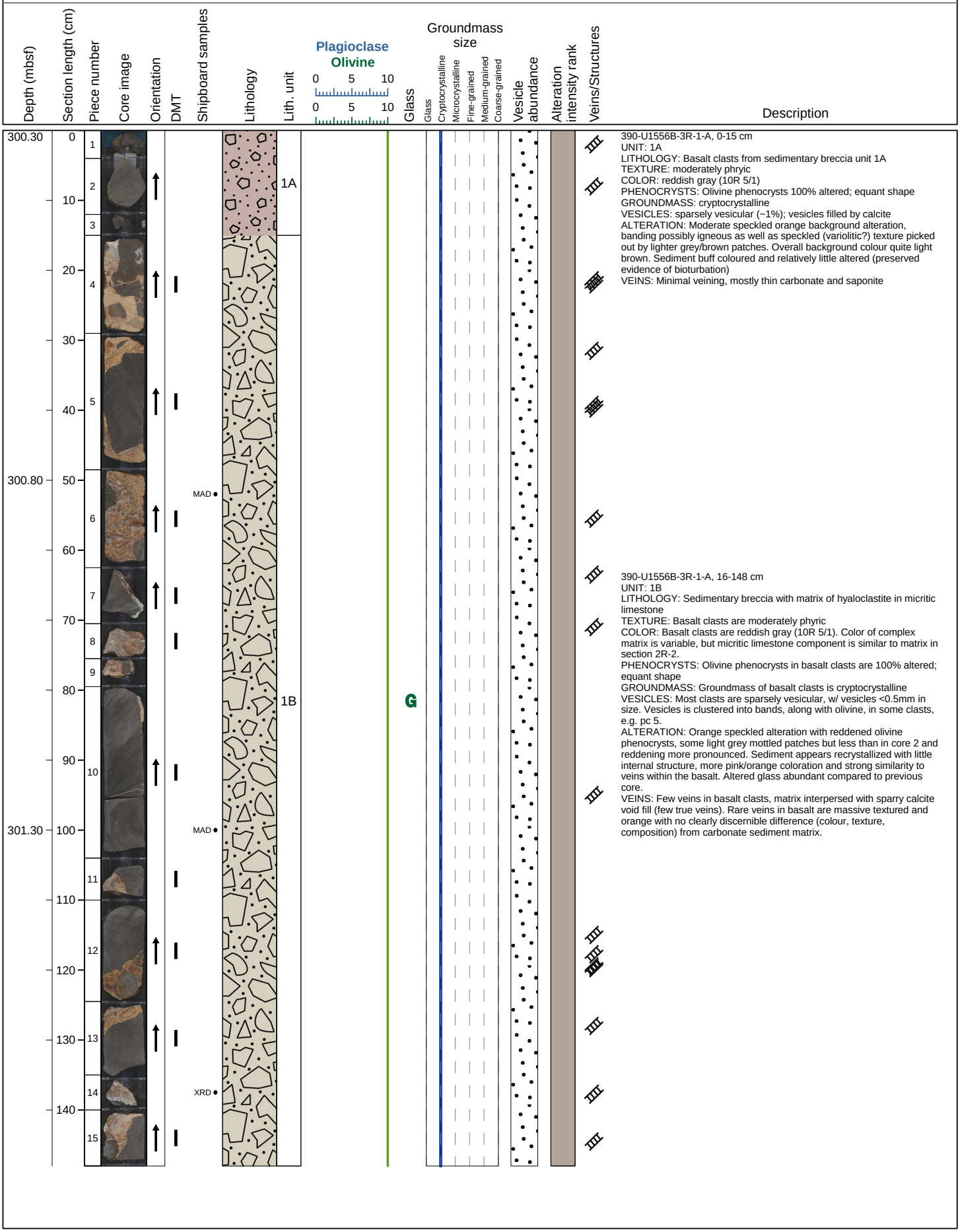


390-U1556B-2R-2-A, 30-38 cm
UNIT: 1
LITHOLOGY: Basalt
TEXTURE:
COLOR:
PHENOCRYSTS:
GROUNDMASS: microcrystalline
VESICLES:
ALTERATION:
VEINS:

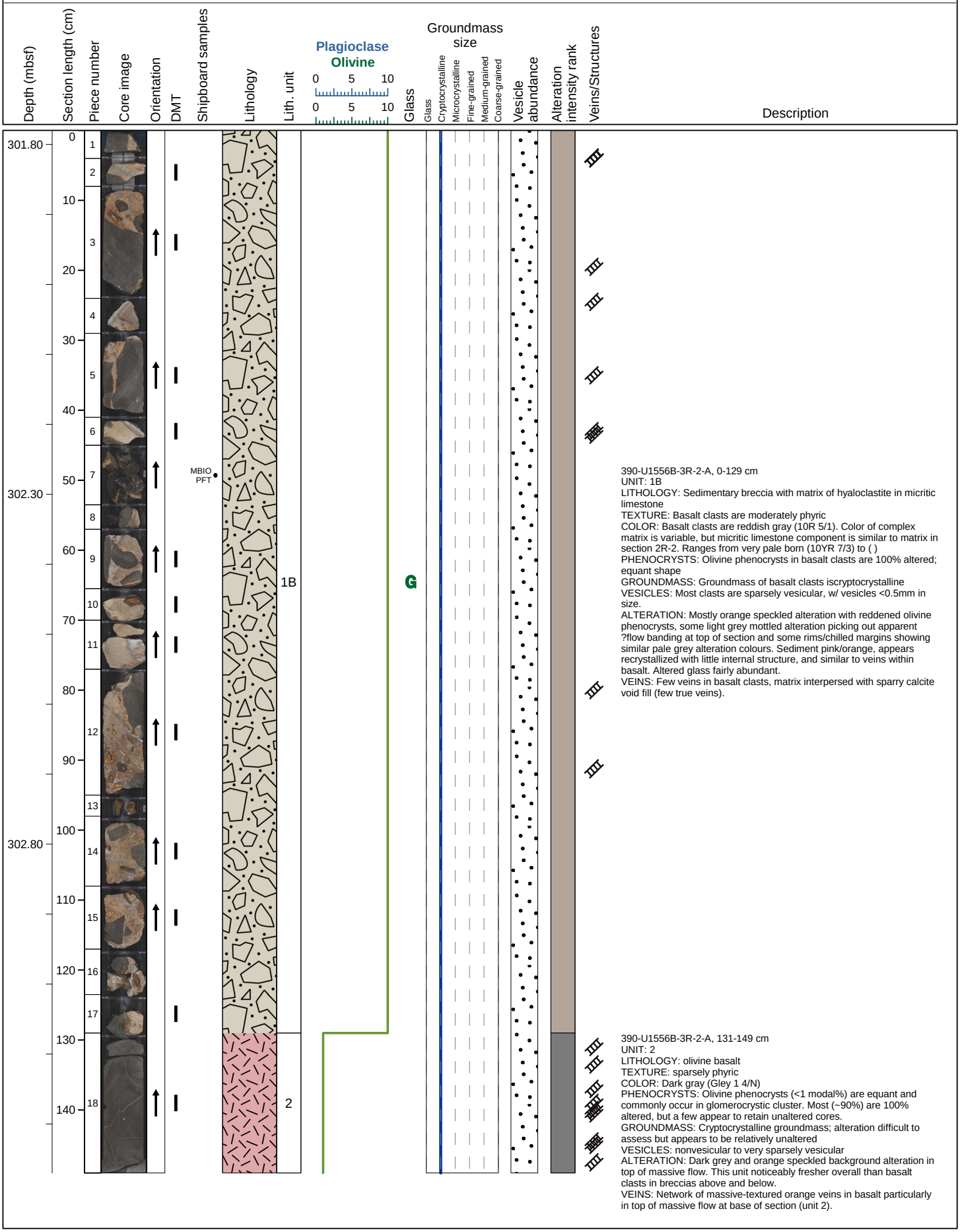
Hole 390-U1556B-2R Section 2, Top of Section: 291.38 m (CSF-A)



Hole 390-U1556B-3R Section 1, Top of Section: 300.3 m (CSF-A)



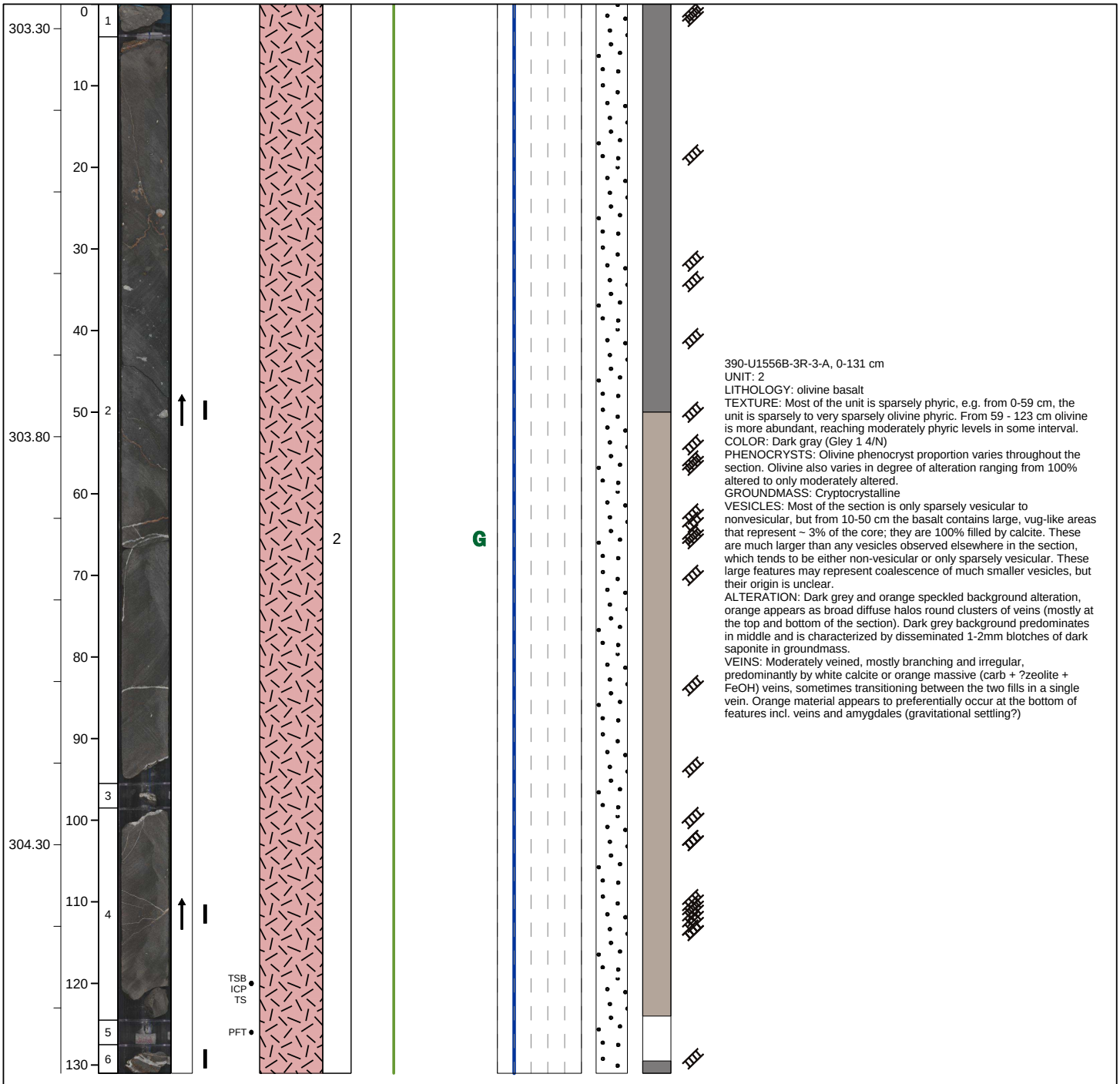
Hole 390-U1556B-3R Section 2, Top of Section: 301.78 m (CSF-A)



390-U1556B-3R-2-A, 0-129 cm
UNIT: 1B
LITHOLOGY: Sedimentary breccia with matrix of hyaloclastite in micritic limestone
TEXTURE: Basalt clasts are moderately phyric
COLOR: Basalt clasts are reddish gray (10R 5/1). Color of complex matrix is variable, but micritic limestone component is similar to matrix in section 2R-2. Ranges from very pale born (10YR 7/3) to ( )
PHENOCRYSTS: Olivine phenocrysts in basalt clasts are 100% altered; equant shape
GROUNDMASS: Groundmass of basalt clasts iscryptocrystalline
VESICLES: Most clasts are sparsely vesicular, w/ vesicles <0.5mm in size.
ALTERATION: Mostly orange speckled alteration with reddened olivine phenocrysts, some light grey mottled alteration picking out apparent ?flow banding at top of section and some rims/chilled margins showing similar pale grey alteration colours. Sediment pink/orange, appears recrystallized with little internal structure, and similar to veins within basalt. Altered glass fairly abundant.
VEINS: Few veins in basalt clasts, matrix interpersed with sparry calcite void fill (few true veins).

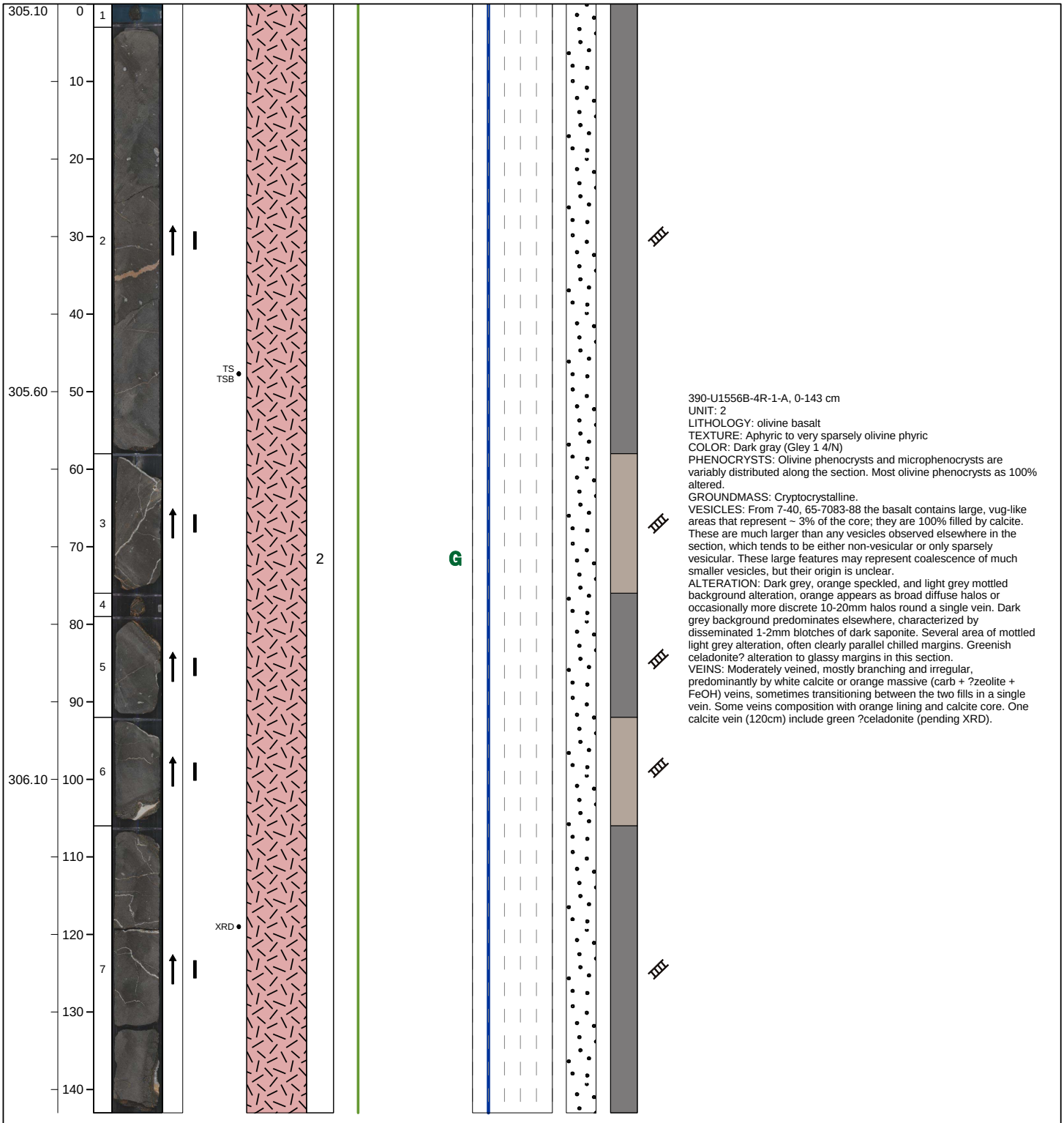
390-U1556B-3R-2-A, 131-149 cm
UNIT: 2
LITHOLOGY: olivine basalt
TEXTURE: sparsely phyric
COLOR: Dark gray (Gley 1 4/N)
PHENOCRYSTS: Olivine phenocrysts (<1 modal%) are equant and commonly occur in glomerocrystic cluster. Most (~90%) are 100% altered, but a few appear to retain unaltered cores.
GROUNDMASS: Cryptocrystalline groundmass; alteration difficult to assess but appears to be relatively unaltered
VESICLES: nonvesicular to very sparsely vesicular
ALTERATION: Dark grey and orange speckled background alteration in top of massive flow. This unit noticeably fresher overall than basalt clasts in breccias above and below.
VEINS: Network of massive-textured orange veins in basalt particularly in top of massive flow at base of section (unit 2).

Hole 390-U1556B-3R Section 3, Top of Section: 303.27 m (CSF-A)



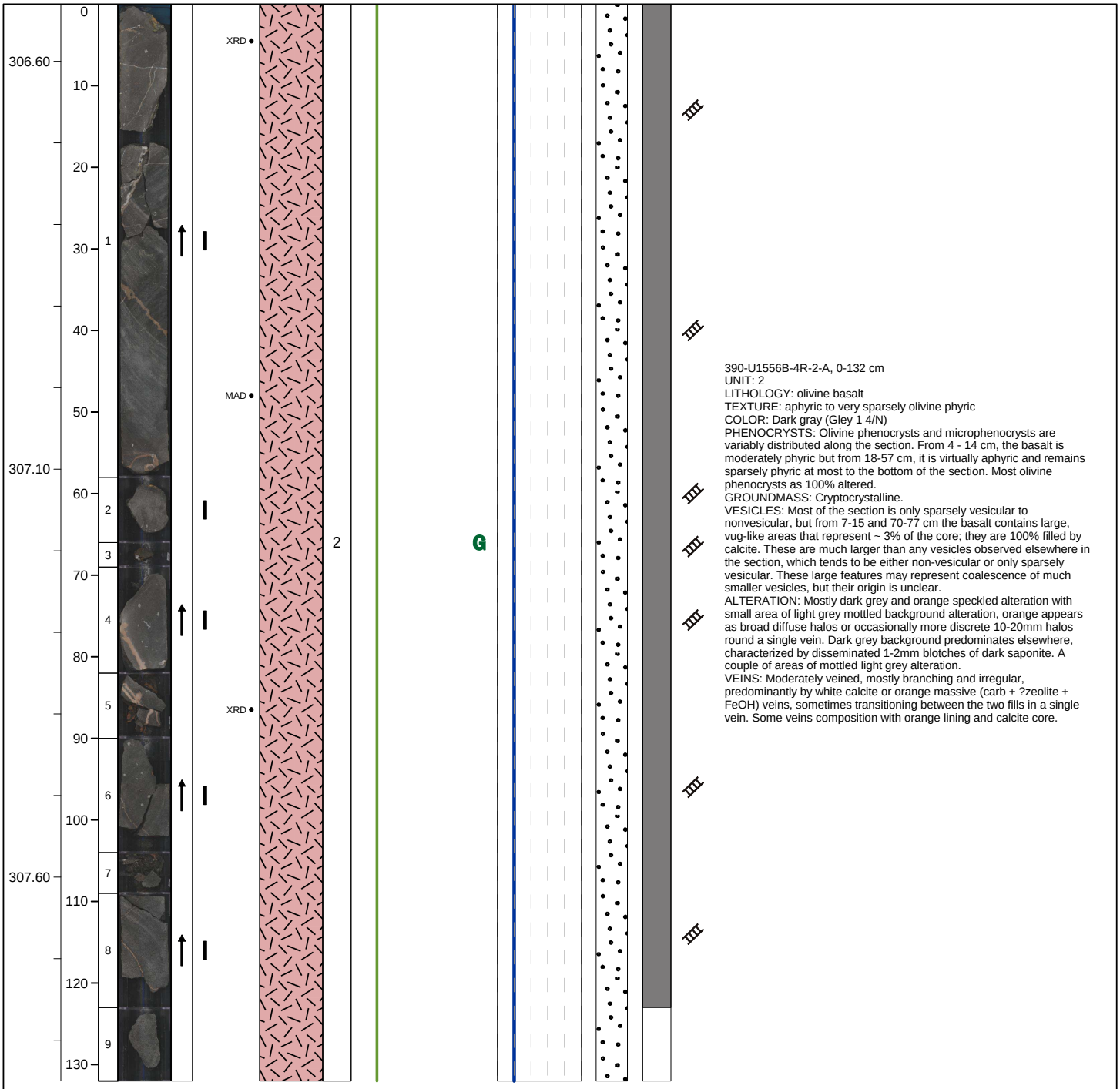
390-U1556B-3R-3-A, 0-131 cm
UNIT: 2
LITHOLOGY: olivine basalt
TEXTURE: Most of the unit is sparsely phyric, e.g. from 0-59 cm, the unit is sparsely to very sparsely olivine phyric. From 59 - 123 cm olivine is more abundant, reaching moderately phyric levels in some interval.
COLOR: Dark gray (Gley 1 4/N)
PHENOCRYSTS: Olivine phenocryst proportion varies throughout the section. Olivine also varies in degree of alteration ranging from 100% altered to only moderately altered.
GROUNDMASS: Cryptocrystalline
VESICLES: Most of the section is only sparsely vesicular to nonvesicular, but from 10-50 cm the basalt contains large, vug-like areas that represent ~ 3% of the core; they are 100% filled by calcite. These are much larger than any vesicles observed elsewhere in the section, which tends to be either non-vesicular or only sparsely vesicular. These large features may represent coalescence of much smaller vesicles, but their origin is unclear.
ALTERATION: Dark grey and orange speckled background alteration, orange appears as broad diffuse halos round clusters of veins (mostly at the top and bottom of the section). Dark grey background predominates in middle and is characterized by disseminated 1-2mm blotches of dark saponite in groundmass.
VEINS: Moderately veined, mostly branching and irregular, predominantly by white calcite or orange massive (carb + ?zeolite + FeOH) veins, sometimes transitioning between the two fills in a single vein. Orange material appears to preferentially occur at the bottom of features incl. veins and amygdales (gravitational settling?)

Hole 390-U1556B-4R Section 1, Top of Section: 305.1 m (CSF-A)



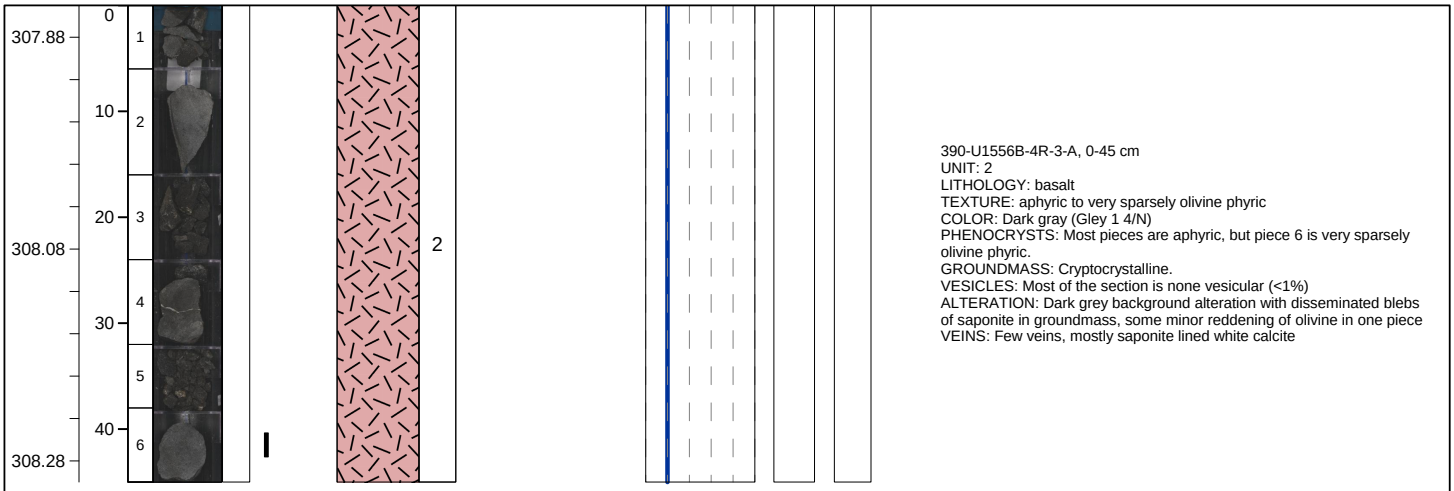
390-U1556B-4R-1-A, 0-143 cm
UNIT: 2
LITHOLOGY: olivine basalt
TEXTURE: Aphyric to very sparsely olivine phyric
COLOR: Dark gray (Gley 1 4/N)
PHENOCRYSTS: Olivine phenocrysts and microphenocrysts are variably distributed along the section. Most olivine phenocrysts as 100% altered.
GROUNDMASS: Cryptocrystalline.
VESICLES: From 7-40, 65-7083-88 the basalt contains large, vug-like areas that represent ~ 3% of the core; they are 100% filled by calcite. These are much larger than any vesicles observed elsewhere in the section, which tends to be either non-vesicular or only sparsely vesicular. These large features may represent coalescence of much smaller vesicles, but their origin is unclear.
ALTERATION: Dark grey, orange speckled, and light grey mottled background alteration, orange appears as broad diffuse halos or occasionally more discrete 10-20mm halos round a single vein. Dark grey background predominates elsewhere, characterized by disseminated 1-2mm blotches of dark saponite. Several area of mottled light grey alteration, often clearly parallel chilled margins. Greenish celadonite? alteration to glassy margins in this section.
VEINS: Moderately veined, mostly branching and irregular, predominantly by white calcite or orange massive (carb + ?zeolite + FeOH) veins, sometimes transitioning between the two fills in a single vein. Some veins composition with orange lining and calcite core. One calcite vein (120cm) include green ?celadonite (pending XRD).

Hole 390-U1556B-4R Section 2, Top of Section: 306.53 m (CSF-A)



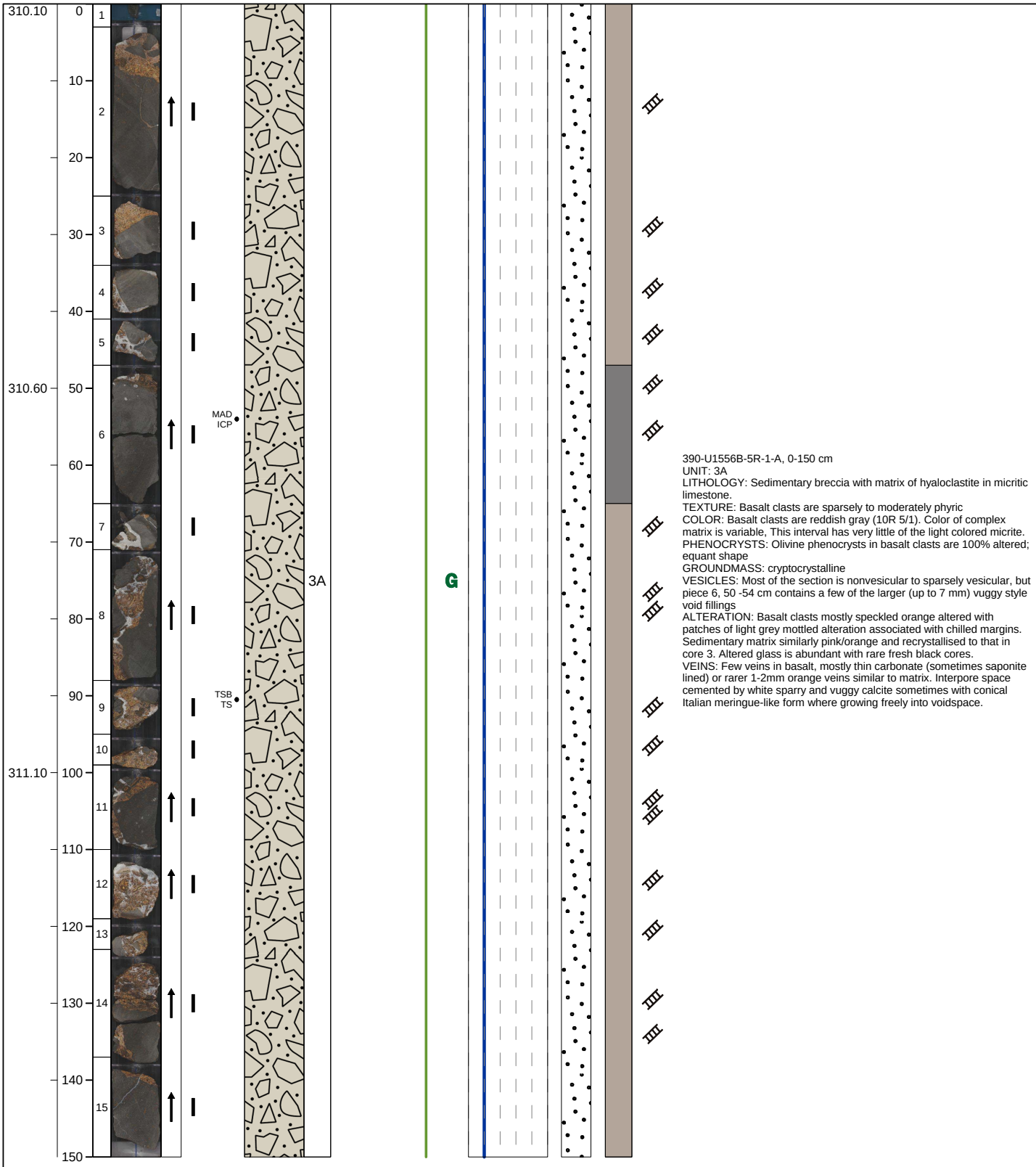
390-U1556B-4R-2-A, 0-132 cm
UNIT: 2
LITHOLOGY: olivine basalt
TEXTURE: aphyric to very sparsely olivine phyric
COLOR: Dark gray (Gley 1 4/N)
PHENOCRYSTS: Olivine phenocrysts and microphenocrysts are variably distributed along the section. From 4 - 14 cm, the basalt is moderately phyric but from 18-57 cm, it is virtually aphyric and remains sparsely phyric at most to the bottom of the section. Most olivine phenocrysts as 100% altered.
GROUNDMASS: Cryptocrystalline.
VESICLES: Most of the section is only sparsely vesicular to nonvesicular, but from 7-15 and 70-77 cm the basalt contains large, vug-like areas that represent ~ 3% of the core; they are 100% filled by calcite. These are much larger than any vesicles observed elsewhere in the section, which tends to be either non-vesicular or only sparsely vesicular. These large features may represent coalescence of much smaller vesicles, but their origin is unclear.
ALTERATION: Mostly dark grey and orange speckled alteration with small area of light grey mottled background alteration, orange appears as broad diffuse halos or occasionally more discrete 10-20mm halos round a single vein. Dark grey background predominates elsewhere, characterized by disseminated 1-2mm blotches of dark saponite. A couple of areas of mottled light grey alteration.
VEINS: Moderately veined, mostly branching and irregular, predominantly by white calcite or orange massive (carb + ?zeolite + FeOH) veins, sometimes transitioning between the two fills in a single vein. Some veins composition with orange lining and calcite core.

Hole 390-U1556B-4R Section 3, Top of Section: 307.85 m (CSF-A)



390-U1556B-4R-3-A, 0-45 cm
UNIT: 2
LITHOLOGY: basalt
TEXTURE: aphyric to very sparsely olivine phyric
COLOR: Dark gray (Gley 1 4/N)
PHENOCRYSTS: Most pieces are aphyric, but piece 6 is very sparsely olivine phyric.
GROUNDMASS: Cryptocrystalline.
VESICLES: Most of the section is none vesicular (<1%)
ALTERATION: Dark grey background alteration with disseminated blebs of saponite in groundmass, some minor reddening of olivine in one piece
VEINS: Few veins, mostly saponite lined white calcite

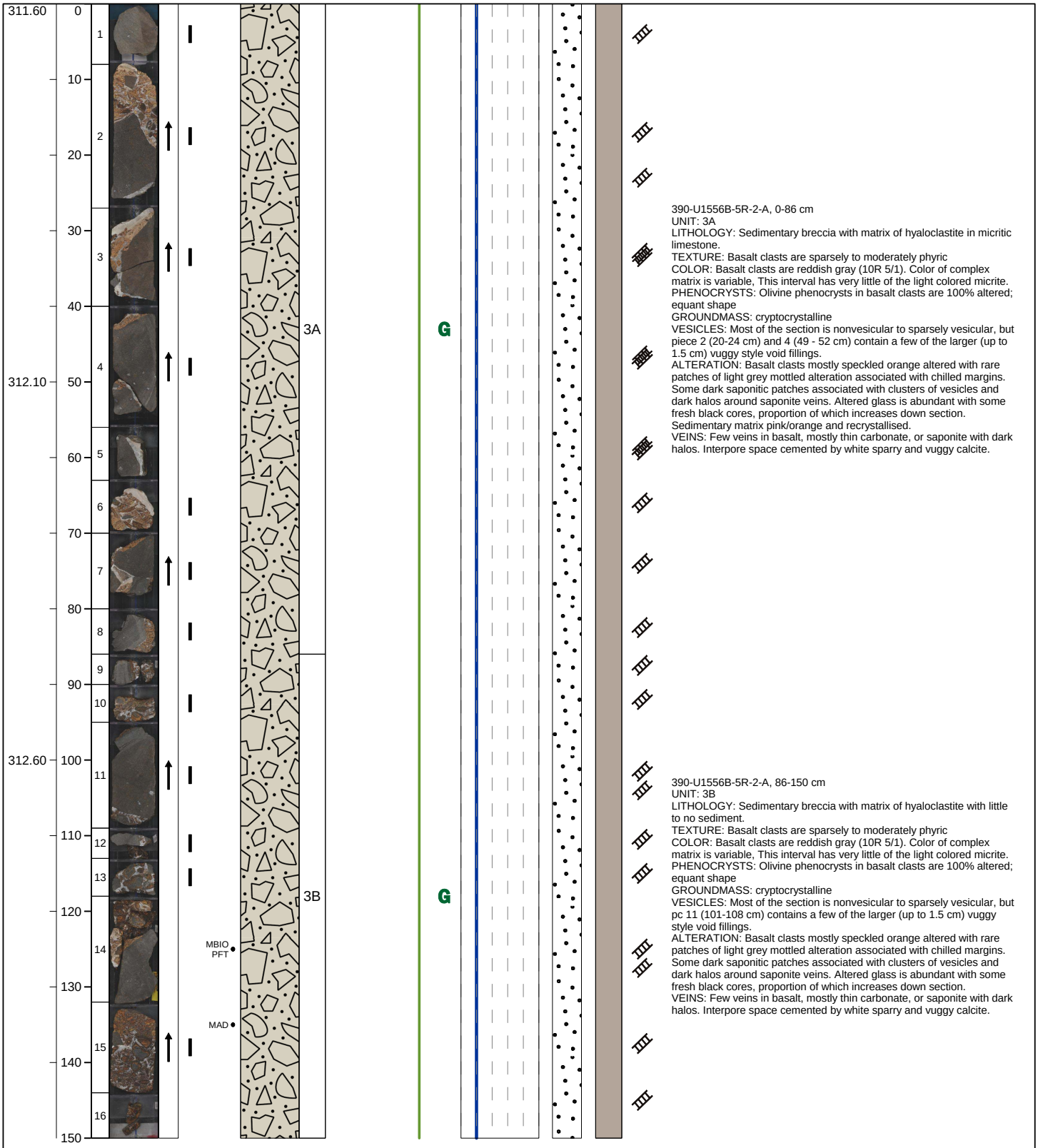
Hole 390-U1556B-5R Section 1, Top of Section: 310.1 m (CSF-A)



Description

390-U1556B-5R-1-A, 0-150 cm
UNIT: 3A
LITHOLOGY: Sedimentary breccia with matrix of hyaloclastite in micritic limestone.
TEXTURE: Basalt clasts are sparsely to moderately phyric
COLOR: Basalt clasts are reddish gray (10R 5/1). Color of complex matrix is variable, This interval has very little of the light colored micrite.
PHENOCRYSTS: Olivine phenocrysts in basalt clasts are 100% altered; equant shape
GROUNDMASS: cryptocrystalline
VESICLES: Most of the section is nonvesicular to sparsely vesicular, but piece 6, 50 -54 cm contains a few of the larger (up to 7 mm) vuggy style void fillings
ALTERATION: Basalt clasts mostly speckled orange altered with patches of light grey mottled alteration associated with chilled margins. Sedimentary matrix similarly pink/orange and recrystallised to that in core 3. Altered glass is abundant with rare fresh black cores.
VEINS: Few veins in basalt, mostly thin carbonate (sometimes saponite lined) or rarer 1-2mm orange veins similar to matrix. Interpore space cemented by white sparry and vuggy calcite sometimes with conical Italian meringue-like form where growing freely into voidspace.

Hole 390-U1556B-5R Section 2, Top of Section: 311.6 m (CSF-A)

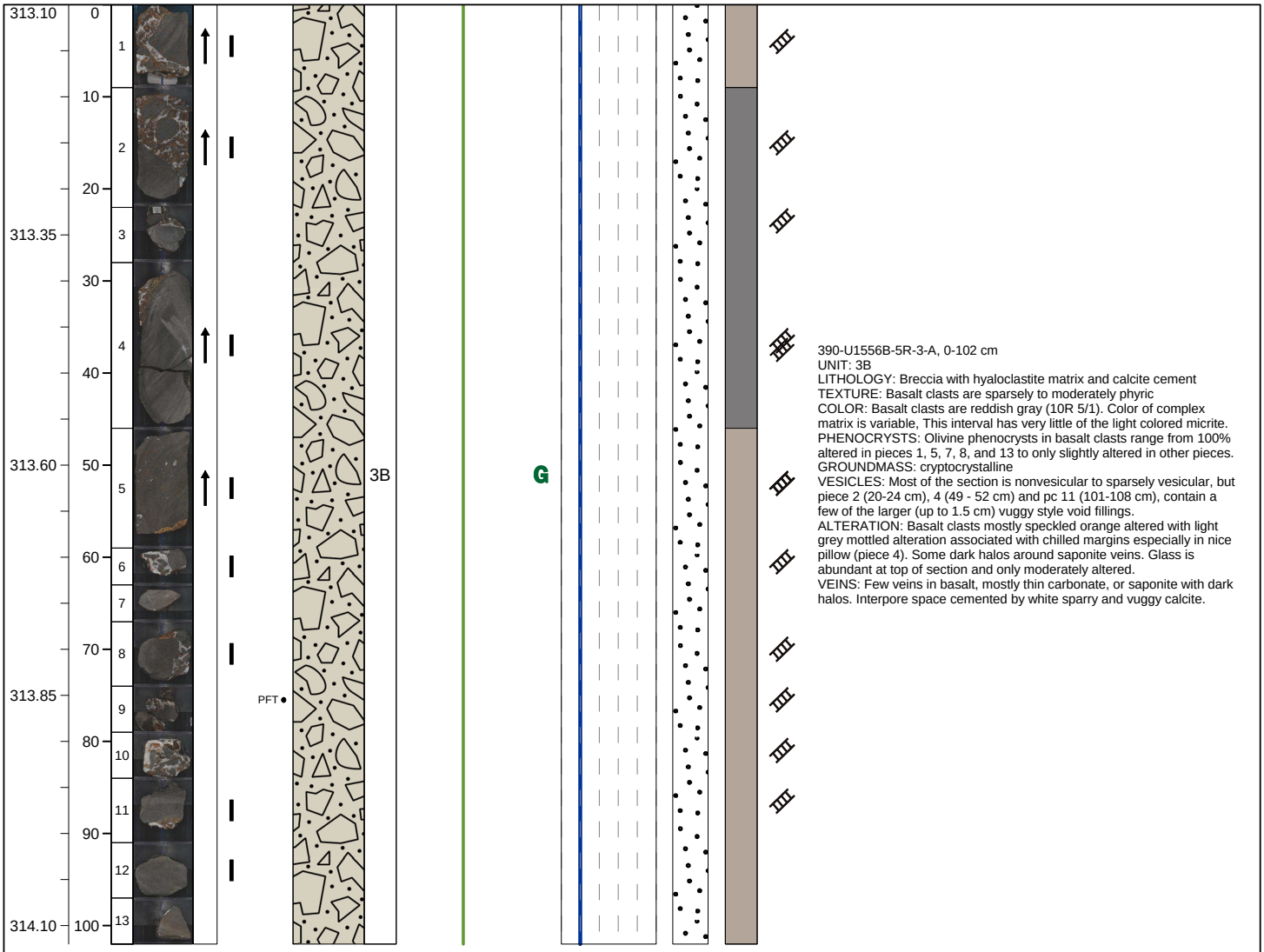


Description

390-U1556B-5R-2-A, 0-86 cm
UNIT: 3A
LITHOLOGY: Sedimentary breccia with matrix of hyaloclastite in micritic limestone.
TEXTURE: Basalt clasts are sparsely to moderately phyric
COLOR: Basalt clasts are reddish gray (10R 5/1). Color of complex matrix is variable, This interval has very little of the light colored micrite.
PHENOCRYSTS: Olivine phenocrysts in basalt clasts are 100% altered; equant shape
GROUNDMASS: cryptocrystalline
VESICLES: Most of the section is nonvesicular to sparsely vesicular, but piece 2 (20-24 cm) and 4 (49 - 52 cm) contain a few of the larger (up to 1.5 cm) vuggy style void fillings.
ALTERATION: Basalt clasts mostly speckled orange altered with rare patches of light grey mottled alteration associated with chilled margins. Some dark saponitic patches associated with clusters of vesicles and dark halos around saponite veins. Altered glass is abundant with some fresh black cores, proportion of which increases down section. Sedimentary matrix pink/orange and recrystallised.
VEINS: Few veins in basalt, mostly thin carbonate, or saponite with dark halos. Interpore space cemented by white sparry and vuggy calcite.

390-U1556B-5R-2-A, 86-150 cm
UNIT: 3B
LITHOLOGY: Sedimentary breccia with matrix of hyaloclastite with little to no sediment.
TEXTURE: Basalt clasts are sparsely to moderately phyric
COLOR: Basalt clasts are reddish gray (10R 5/1). Color of complex matrix is variable, This interval has very little of the light colored micrite.
PHENOCRYSTS: Olivine phenocrysts in basalt clasts are 100% altered; equant shape
GROUNDMASS: cryptocrystalline
VESICLES: Most of the section is nonvesicular to sparsely vesicular, but pc 11 (101-108 cm) contains a few of the larger (up to 1.5 cm) vuggy style void fillings.
ALTERATION: Basalt clasts mostly speckled orange altered with rare patches of light grey mottled alteration associated with chilled margins. Some dark saponitic patches associated with clusters of vesicles and dark halos around saponite veins. Altered glass is abundant with some fresh black cores, proportion of which increases down section.
VEINS: Few veins in basalt, mostly thin carbonate, or saponite with dark halos. Interpore space cemented by white sparry and vuggy calcite.

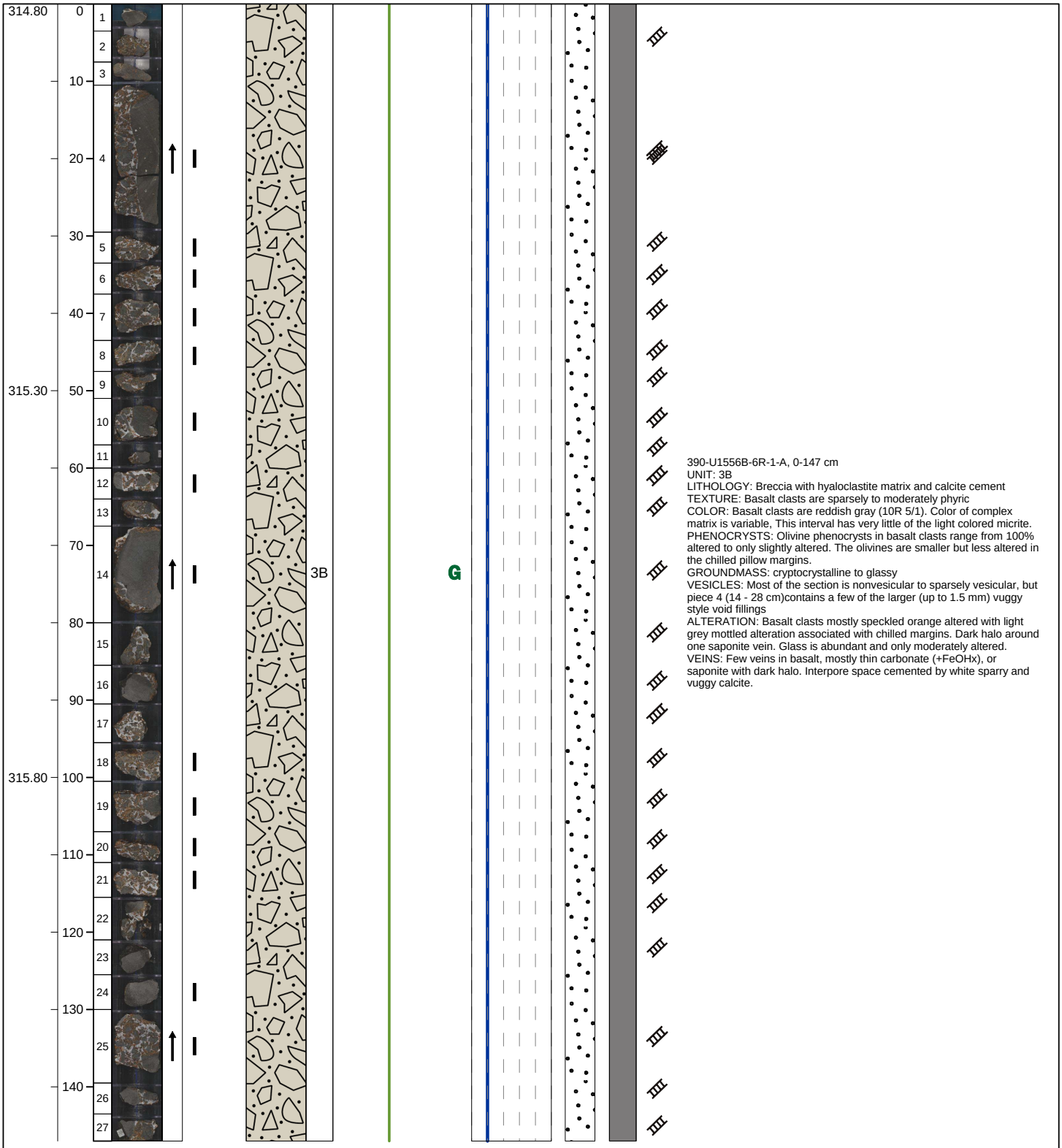
Hole 390-U1556B-5R Section 3, Top of Section: 313.1 m (CSF-A)



Description

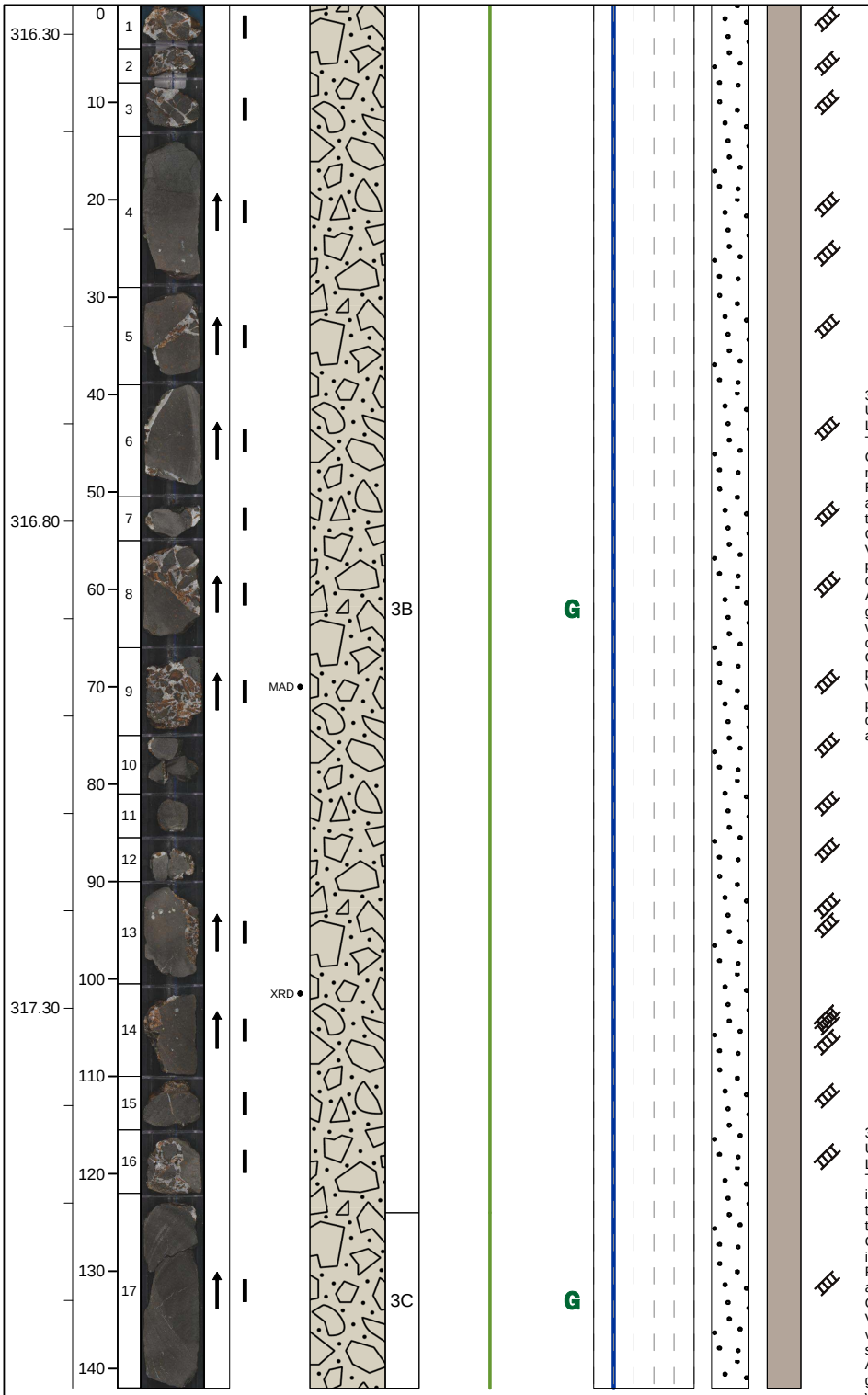
390-U1556B-5R-3-A, 0-102 cm
UNIT: 3B
LITHOLOGY: Breccia with hyaloclastite matrix and calcite cement
TEXTURE: Basalt clasts are sparsely to moderately phyric
COLOR: Basalt clasts are reddish gray (10R 5/1). Color of complex matrix is variable, This interval has very little of the light colored micrite.
PHENOCRYSTS: Olivine phenocrysts in basalt clasts range from 100% altered in pieces 1, 5, 7, 8, and 13 to only slightly altered in other pieces.
GROUNDMASS: cryptocrystalline
VESICLES: Most of the section is nonvesicular to sparsely vesicular, but piece 2 (20-24 cm), 4 (49 - 52 cm) and pc 11 (101-108 cm), contain a few of the larger (up to 1.5 cm) vuggy style void fillings.
ALTERATION: Basalt clasts mostly speckled orange altered with light grey mottled alteration associated with chilled margins especially in nice pillow (piece 4). Some dark halos around saponite veins. Glass is abundant at top of section and only moderately altered.
VEINS: Few veins in basalt, mostly thin carbonate, or saponite with dark halos. Interpore space cemented by white sparry and vuggy calcite.

Hole 390-U1556B-6R Section 1, Top of Section: 314.8 m (CSF-A)



390-U1556B-6R-1-A, 0-147 cm
UNIT: 3B
LITHOLOGY: Breccia with hyaloclastite matrix and calcite cement
TEXTURE: Basalt clasts are sparsely to moderately phyric
COLOR: Basalt clasts are reddish gray (10R 5/1). Color of complex matrix is variable, This interval has very little of the light colored micrite.
PHENOCRYSTS: Olivine phenocrysts in basalt clasts range from 100% altered to only slightly altered. The olivines are smaller but less altered in the chilled pillow margins.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Most of the section is nonvesicular to sparsely vesicular, but piece 4 (14 - 28 cm)contains a few of the larger (up to 1.5 mm) vuggy style void fillings
ALTERATION: Basalt clasts mostly speckled orange altered with light grey mottled alteration associated with chilled margins. Dark halo around one saponite vein. Glass is abundant and only moderately altered.
VEINS: Few veins in basalt, mostly thin carbonate (+FeOHx), or saponite with dark halo. Interpore space cemented by white sparry and vuggy calcite.

Hole 390-U1556B-6R Section 2, Top of Section: 316.27 m (CSF-A)

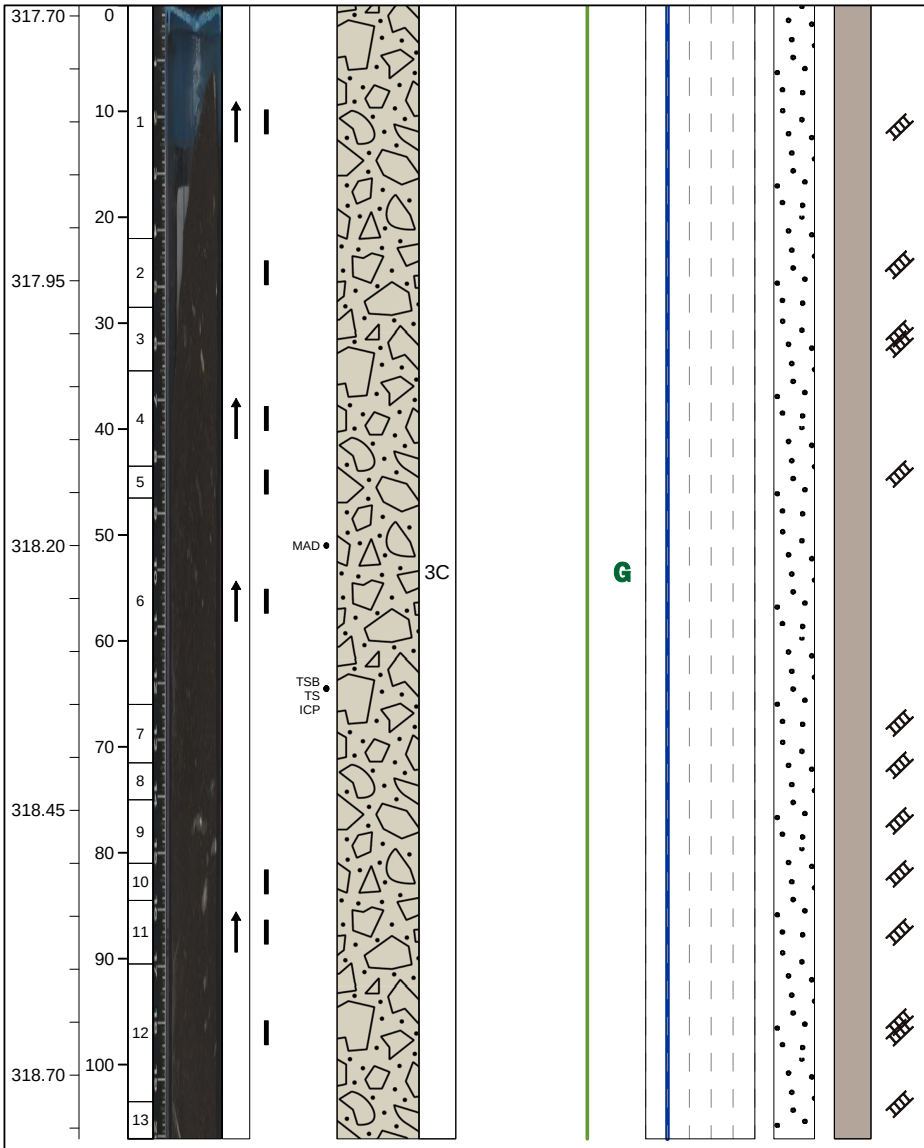


Description

390-U1556B-6R-2-A, 0-123 cm
UNIT: 3B
LITHOLOGY: Breccia with hyaloclastite matrix and calcite cement
TEXTURE: Basalt clasts are sparsely to moderately phyric
COLOR: Basalt clasts are reddish gray (10R 5/1). Color of complex matrix is variable, This interval has very little of the light colored micrite.
PHENOCRYSTS: Olivine phenocrysts in basalt clasts range from 100% altered to only slightly altered. The olivines are smaller but less altered in the chilled pillow margins.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Most of the section is nonvesicular to sparsely vesicular, but pieces 4 (20 - 28 cm). 13 (92-94 cm) and 14 (102-107 cm) contain a few of the larger (up to 8 mm) vesicles / vuggy style void fillings.
ALTERATION: Basalt clasts mostly speckled orange altered with light grey mottled alteration associated with chilled margins and possibly as vein halo in piece 13. Saponite appears as dark mould-like blooms overgrowing vug-lining carbonate on broken veins (pieces 4 and 14). Glass is less abundant and a slightly greater proportion altered than preceding section.
VEINS: Sparse veins in basalt with a greater proportion of saponite than previous section, mostly saponite or thin carbonate +FeOHx +/- saponite often composite. Few halos. Interpore space cemented by white sparry and vuggy calcite.

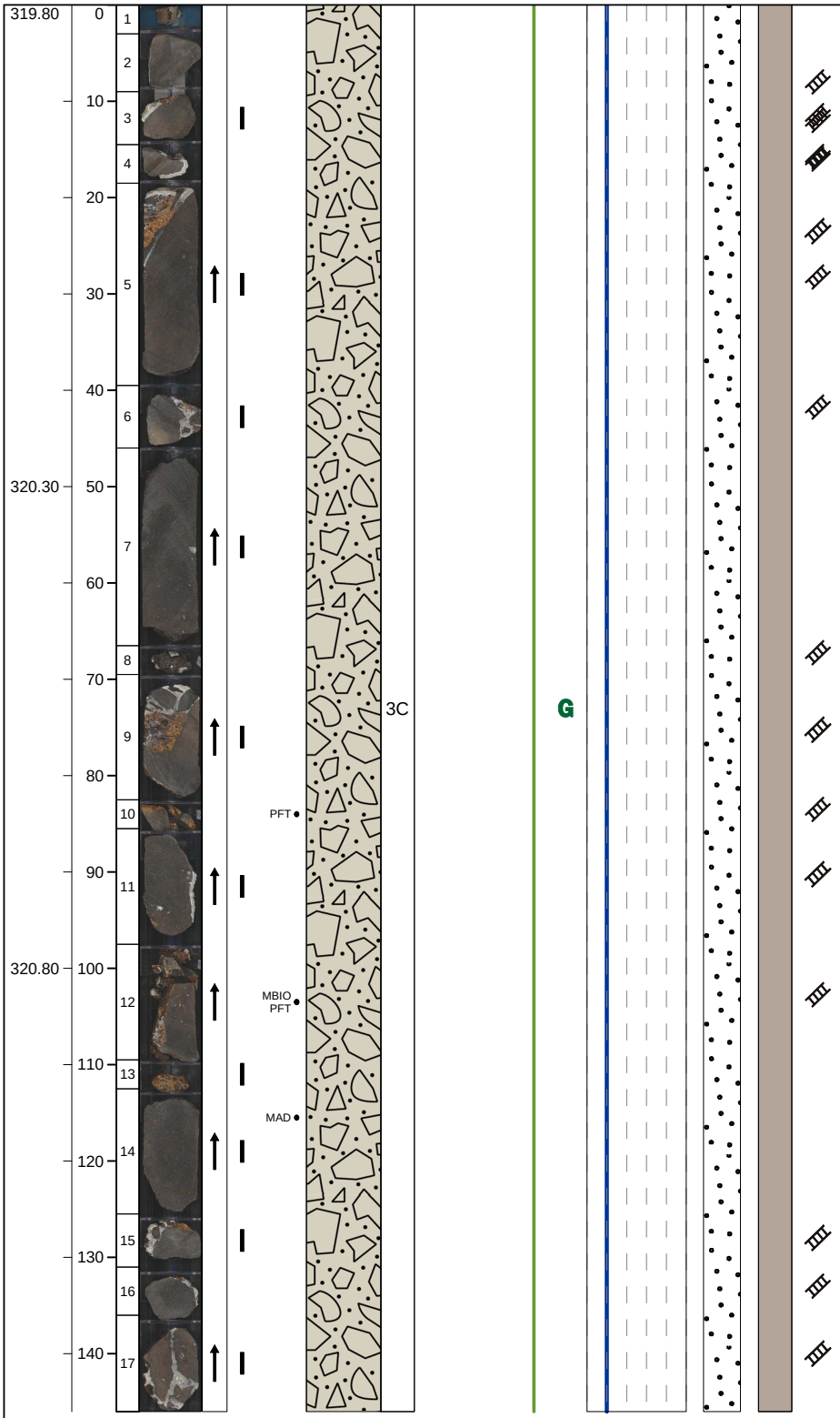
390-U1556B-6R-2-A, 124-142 cm
UNIT: 3C
LITHOLOGY: Breccia with hyaloclastite matrix and calcite cement
TEXTURE: This piece recovered a pillow chilled margin with grain size increasing down section away from the chilled margin at 123 cm. The texture is very sparsely phyric near the chilled margin becoming sparsely to moderately phyric as grain size increases.
COLOR: Basalt clasts are reddish gray (10R 5/1). Color of hyaloclastite is variable.
PHENOCRYSTS: Olivine phenocrysts in basalt clasts range from 100% altered to only slightly altered.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: The piece is sparsely vesicular, with small (<0.75 mm) round vesicles but also contains a few larger (up to 3 mm) vesicles / vuggy style void fillings.
ALTERATION: Basalt clasts mostly speckled orange altered with light grey mottled alteration associated with chilled margins and possibly as vein halo in piece 13. Saponite appears as dark mould-like blooms overgrowing vug-lining carbonate on broken veins (pieces 4 and 14). Glass is less abundant and a slightly greater proportion altered than preceding section.
VEINS: Sparse veins in basalt with a greater proportion of saponite than previous section, mostly saponite or thin carbonate +FeOHx +/- saponite often composite. Few halos. Interpore space cemented by white sparry and vuggy calcite.

Hole 390-U1556B-6R Section 3, Top of Section: 317.69 m (CSF-A)



390-U1556B-6R-3-A, 0-107 cm
UNIT: 3C
LITHOLOGY: Breccia with hyaloclastite matrix and calcite cement
TEXTURE: Basalt clasts are sparsely to moderately phyric
COLOR: Basalt clasts are reddish gray (10R 5/1). Color of complex matrix is variable, This interval has very little of the light colored micrite.
PHENOCRYSTS: Olivine phenocrysts in basalt clasts range from 100% altered to only slightly altered. The olivines are smaller but less altered in the chilled pillow margins.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Most of the section is nonvesicular to sparsely vesicular, but pieces 1 (0 - 21 cm), 4 (40-42 cm) and 12 (93-97 cm) contain the larger (up to 8 mm) vuggy style vesicles / void fillings. In piece one, these elongate vesicles are oriented radially and roughly perpendicular to the pillow chilled margin.
ALTERATION: Basalt clasts mostly speckled orange altered with some diffuse halo/areas f more pervasive orange alteration and saponitic patches/halos. Glass is abundant in several intervals and mostly fresh therein.
VEINS: Sparse veins in basalt mostly saponite or thin carbonate +FeOHx +/- saponite, often composite. Interpore space cemented by white sparry and vuggy calcite.

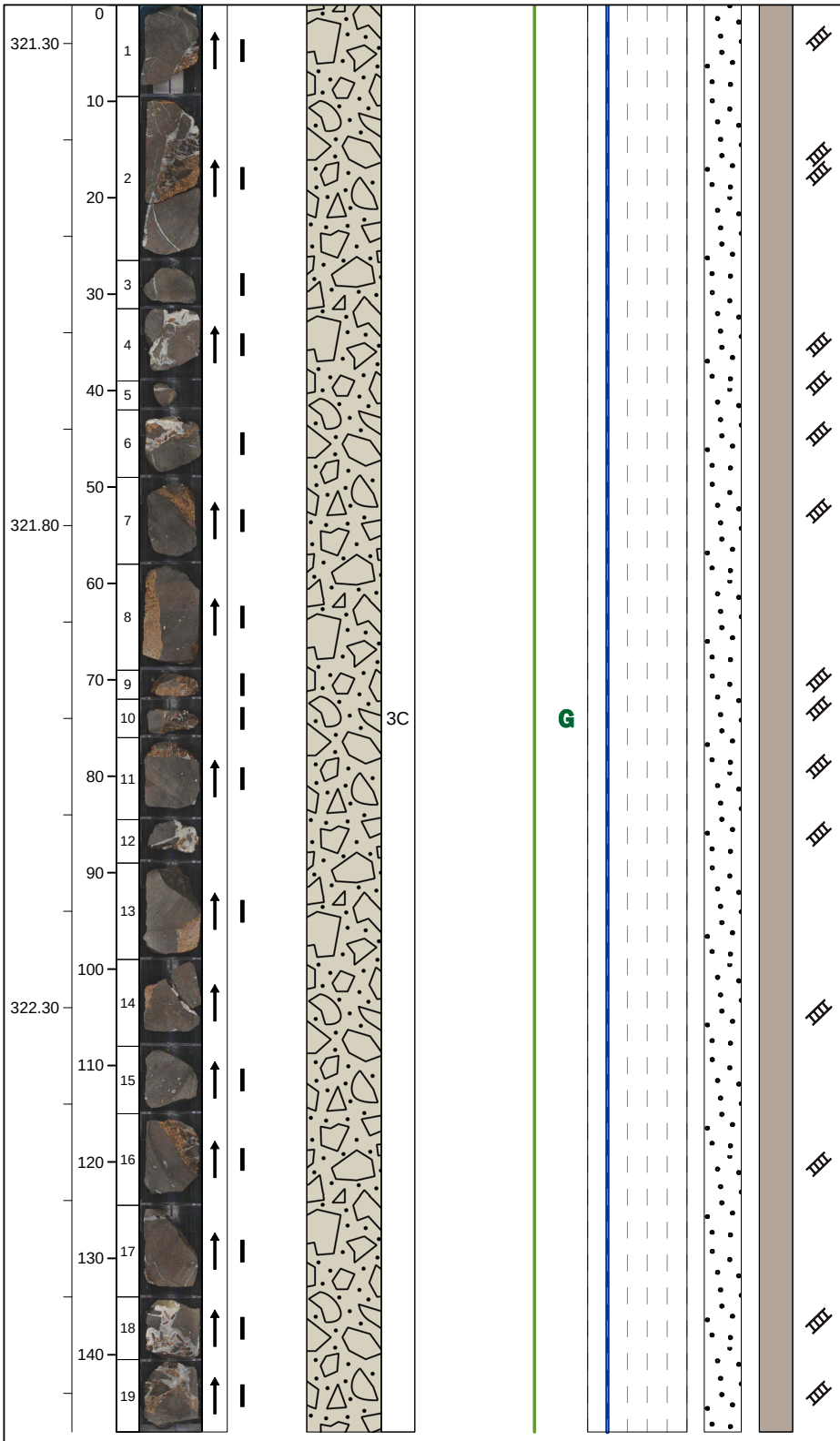
Hole 390-U1556B-7R Section 1, Top of Section: 319.8 m (CSF-A)



Description

390-U1556B-7R-1-A, 0-146 cm
UNIT: 3C
LITHOLOGY: Sedimentary breccia with matrix of hyaloclastite in micritic limestone .
TEXTURE: Basalt clasts are sparsely to moderately phyric
COLOR: Basalt clasts are reddish gray (10R 5/1). Color of complex matrix is variable, This interval has very little of the light colored micrite.
PHENOCRYSTS: Most olivine phenocrysts in basalt clasts are 100% altered . The olivines are smaller but less altered in the chilled pillow margins.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Most of the section is nonvesicular to sparsely vesicular, but pieces 7, 9, 11, 12 contain a few of the larger (up to 8 mm) vuggy style void fillings.
ALTERATION: Basalt clasts mostly speckled orange altered with some diffuse halo/areas of more pervasive orange alteration and saponitic patches/halos. Glass almost all altered.
VEINS: Sparse veins in basalt mostly saponite or carbonate + saponite sometimes with dark halos. Interpore space cemented by white sparry and vuggy calcite often lined and/or overgrown by saponite.

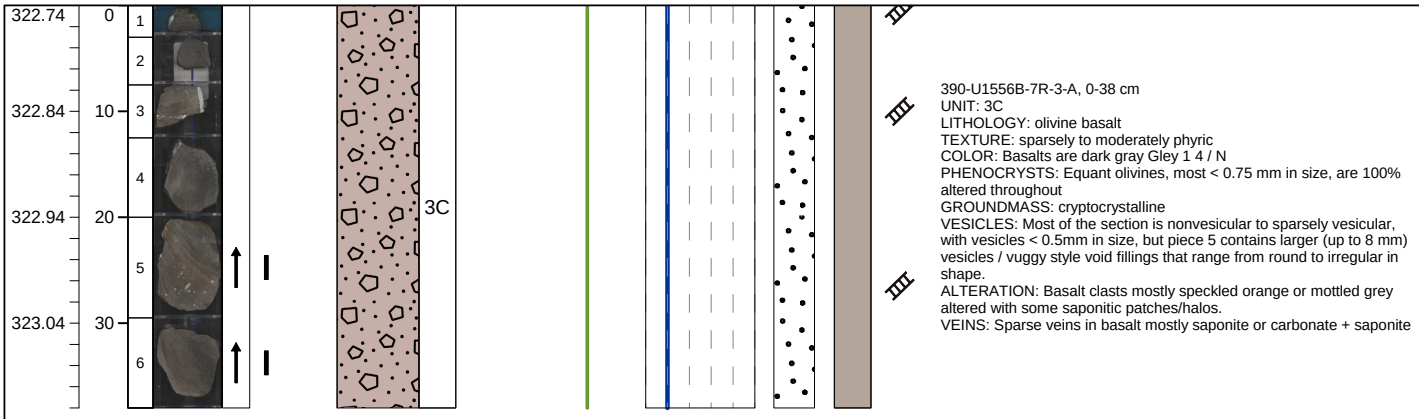
Hole 390-U1556B-7R Section 2, Top of Section: 321.26 m (CSF-A)



Description

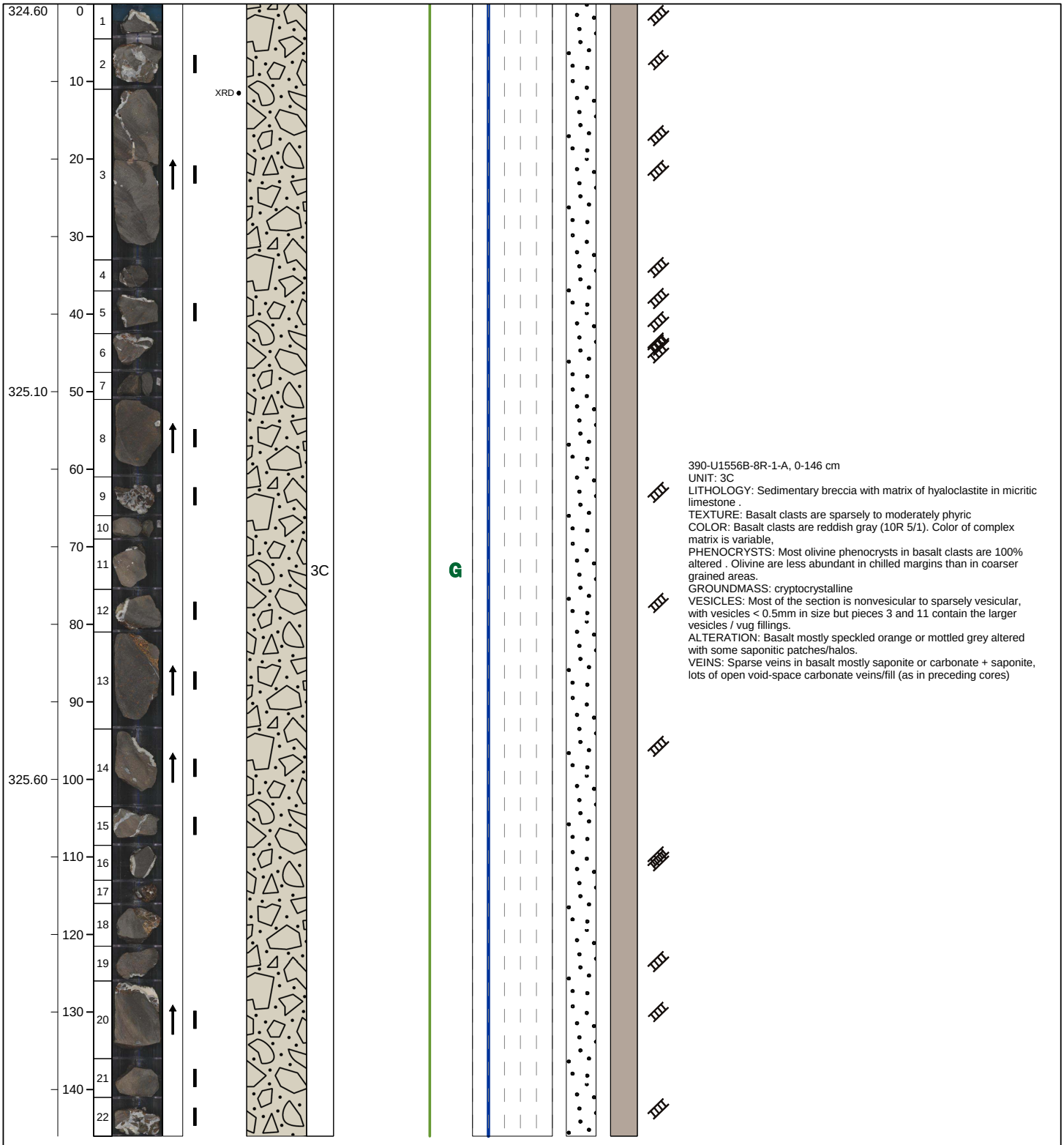
390-U1556B-7R-2-A, 0-148 cm
UNIT: 3C
LITHOLOGY: Sedimentary breccia with matrix of hyaloclastite in micritic limestone .
TEXTURE: Basalt clasts are sparsely to moderately phyric
COLOR: Basalt clasts are reddish gray (10R 5/1). Color of complex matrix is variable,
PHENOCRYSTS: Most olivine phenocrysts in basalt clasts are 100% altered . The olivines are smaller but less altered in the chilled pillow margins.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Most of the section is nonvesicular to sparsely vesicular, but pieces 7, 8, 9, 11, 12, 14, 15, 16, 17 contain a few of the larger (up to 8 mm) vuggy style void fillings.. Piece 7 has elongated vesicles that appear to be oriented perpendicular to the pillow chilled margin.
ALTERATION: Basalt clasts mostly speckled orange altered with some diffuse halo/areas of more pervasive orange alteration and saponitic patches/halos. Glass almost all altered.
VEINS: Sparse veins in basalt mostly saponite or carbonate + saponite sometimes with dark halos. Thin saponite veins crosscut by thicker carbonate +/- saponite veins in a few places. Interpore space cemented by white sparry and vuggy calcite often lined and/or overgrown by saponite.

Hole 390-U1556B-7R Section 3, Top of Section: 322.74 m (CSF-A)

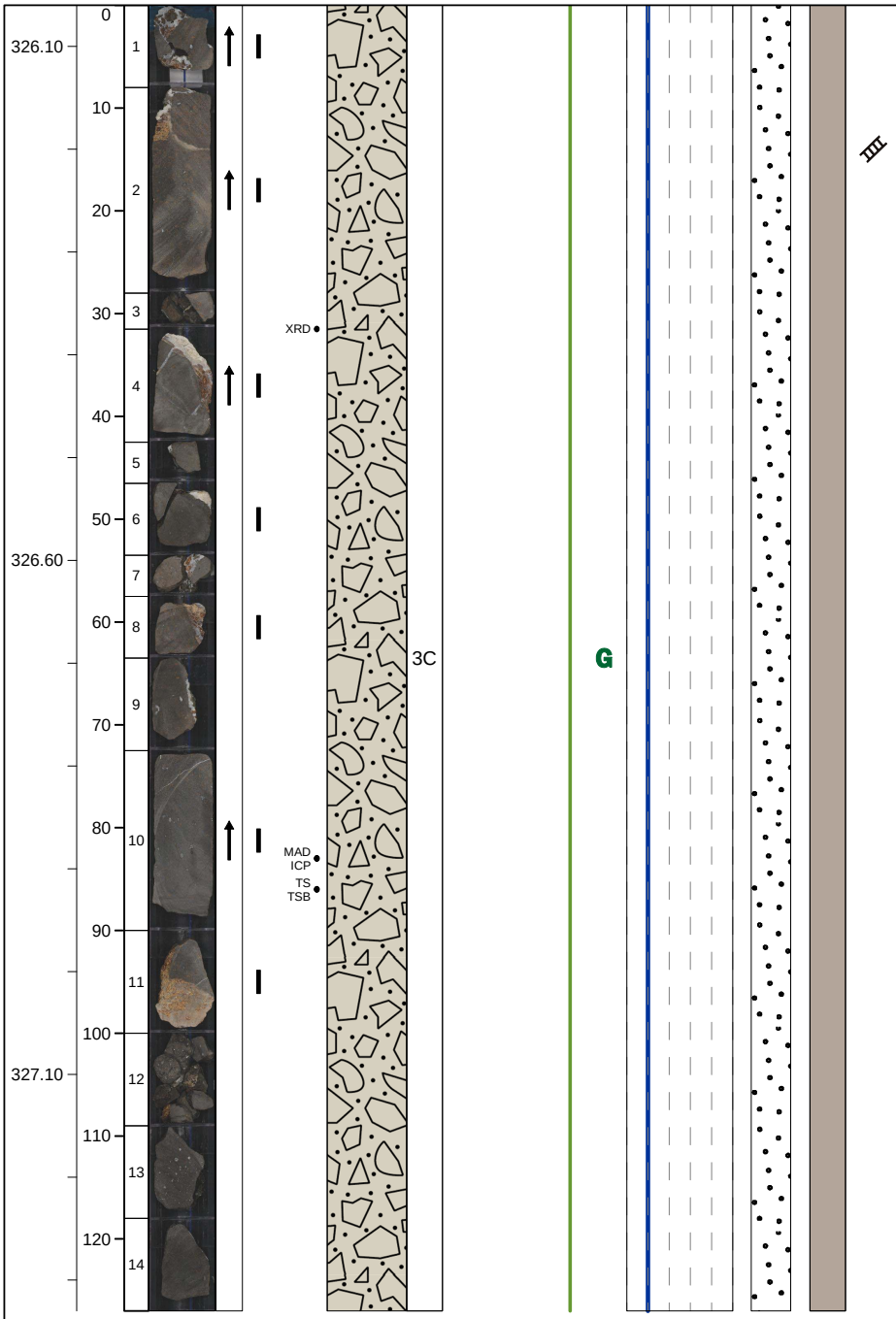


390-U1556B-7R-3-A, 0-38 cm
UNIT: 3C
LITHOLOGY: olivine basalt
TEXTURE: sparsely to moderately phyric
COLOR: Basalts are dark gray Gley 1 4 / N
PHENOCRYSTS: Equant olivines, most < 0.75 mm in size, are 100% altered throughout
GROUNDMASS: cryptocrystalline
VESICLES: Most of the section is nonvesicular to sparsely vesicular, with vesicles < 0.5mm in size, but piece 5 contains larger (up to 8 mm) vesicles / vuggy style void fillings that range from round to irregular in shape.
ALTERATION: Basalt clasts mostly speckled orange or mottled grey altered with some saponitic patches/halos.
VEINS: Sparse veins in basalt mostly saponite or carbonate + saponite

Hole 390-U1556B-8R Section 1, Top of Section: 324.6 m (CSF-A)

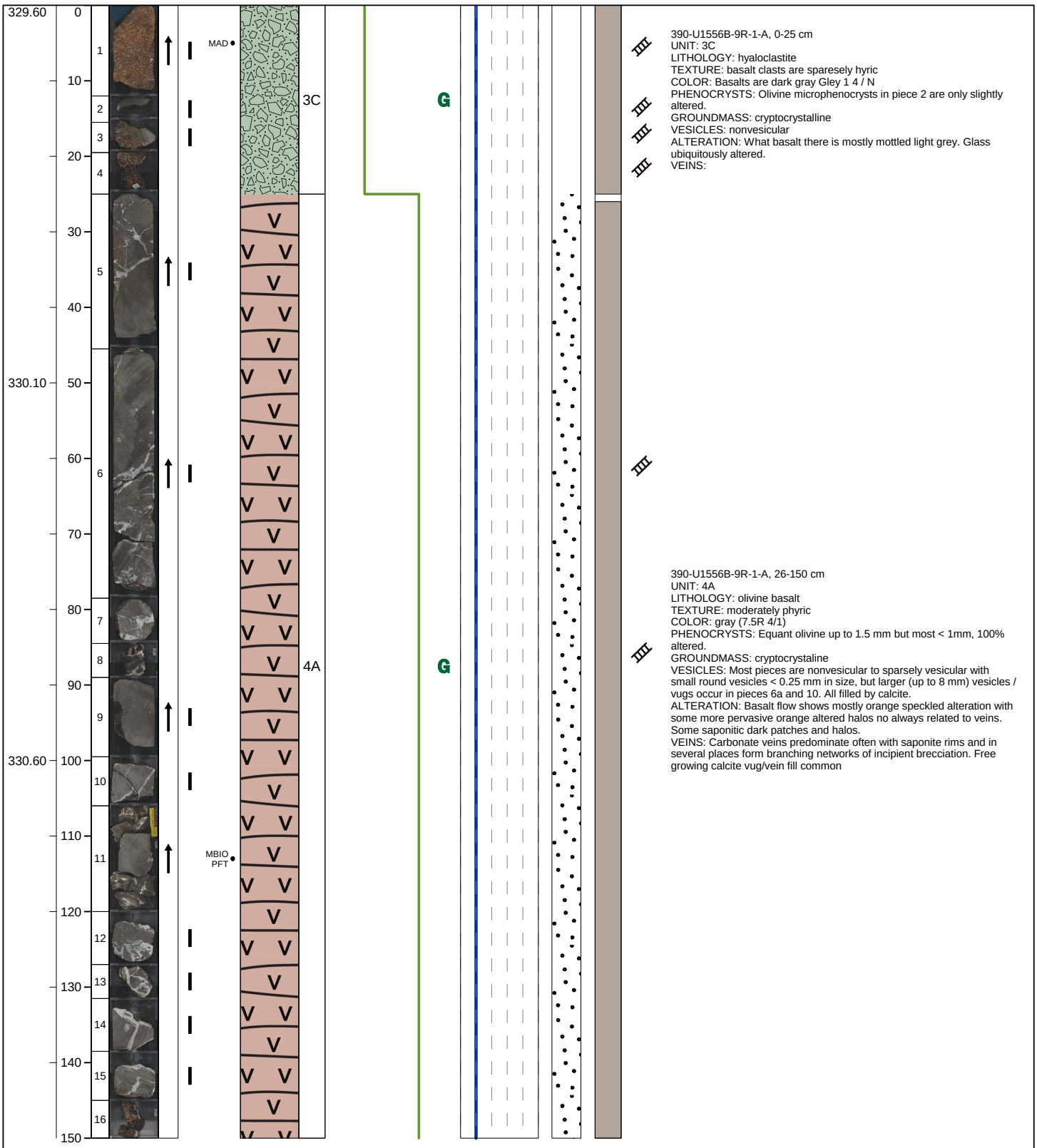


Hole 390-U1556B-8R Section 2, Top of Section: 326.06 m (CSF-A)

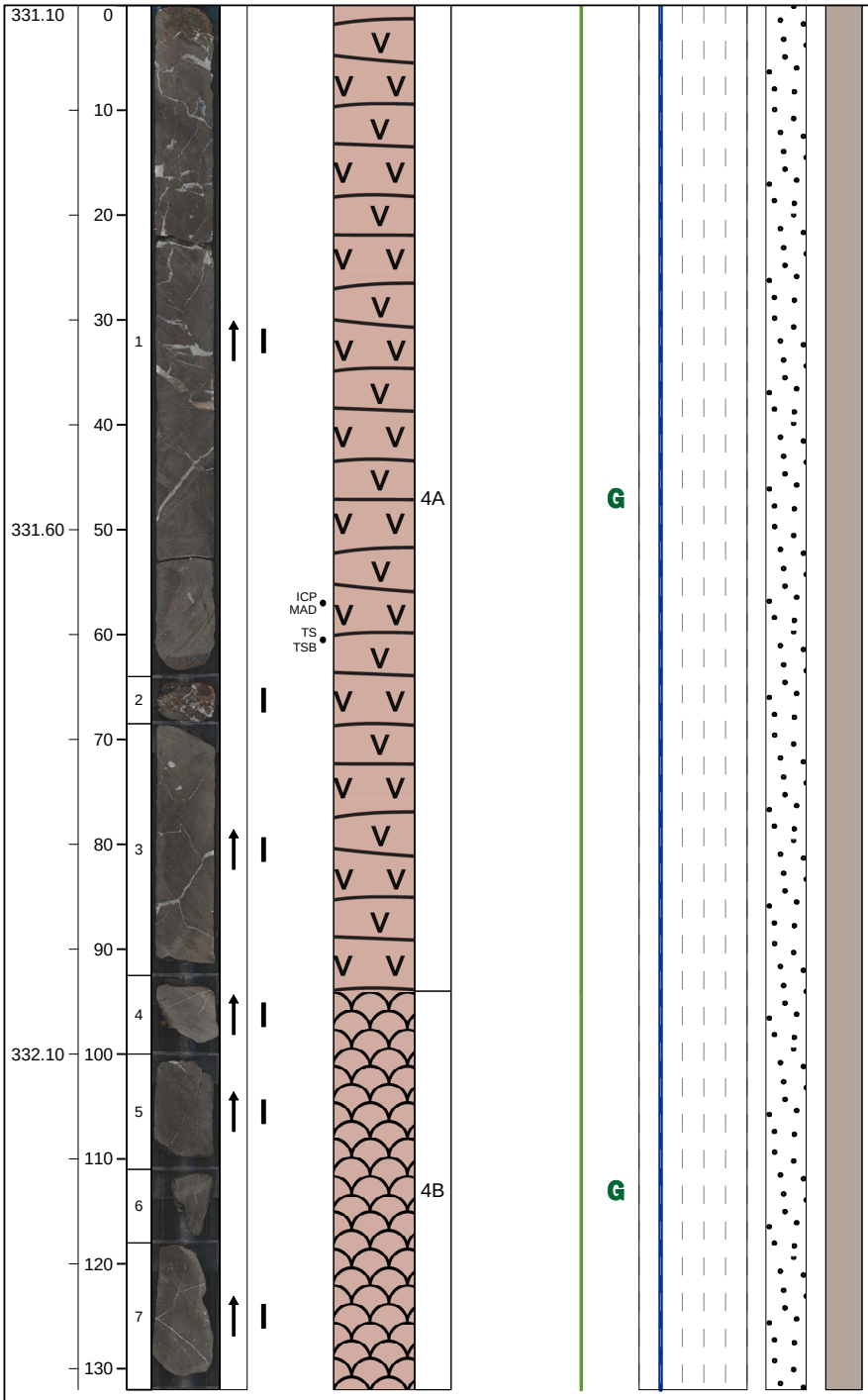


390-U1556B-8R-2-A, 0-127 cm
UNIT: 3C
LITHOLOGY: Sedimentary breccia with matrix of hyaloclastite in micritic limestone .
TEXTURE: Basalt clasts are sparsely phyric
COLOR: Basalt clasts are reddish gray (10R 5/1). Color of complex matrix is variable,
PHENOCRYSTS: Most olivine phenocrysts in basalt clasts are 100% altered . Olivine are less abundant in chilled margins than in coarser grained areas.
GROUNDMASS: cryptocrystalline
VESICLES: Most of the section is nonvesicular to sparsely vesicular, with vesicles < 0.5mm in size. Pieces 2, 9, 10, and 13 contain the larger (up to 4mm) vesicles / vuggy void fillings.
ALTERATION: Basalt mostly speckled orange or mottled light grey with some saponitic patches/halos.
VEINS: Sparse veins in basalt mostly saponite or carbonate + saponite, lots of open void-space carbonate veins with saponite variously lining and overgrowing "Italian meringue" calcite, two examples of cream coloured massive mineral overgrowing calcite (XRD analysis pending)

Hole 390-U1556B-9R Section 1, Top of Section: 329.6 m (CSF-A)



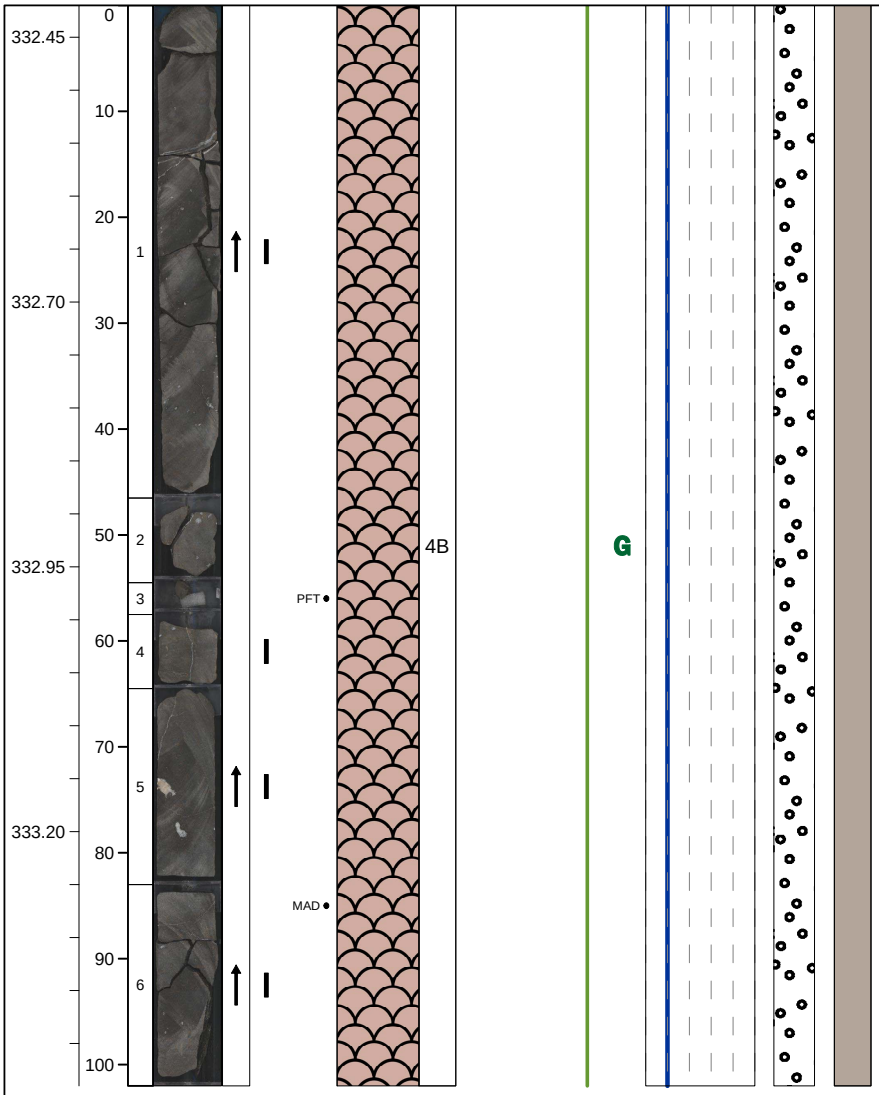
Hole 390-U1556B-9R Section 2, Top of Section: 331.1 m (CSF-A)



390-U1556B-9R-2-A, 0-92 cm
UNIT: 4A
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (7.5R 4/1)
PHENOCRYSTS: Equant olivine up to 1 mm but most < 1mm, 100% altered.
GROUNDMASS: cryptocrystalline
VESICLES: Most pieces are nonvesicular to sparsely vesicular with small round vesicles < 0.25 mm in size, but larger (up to 8 mm) vesicles / vugs, more irregular in shape,1 and 3. All filled by calcite.
ALTERATION: Basalt flow shows mostly orange speckled background, or mottled grey background, with some orange halos.
VEINS: Quite heavily veined by carbonate with some saponite rims and occasional dark halos

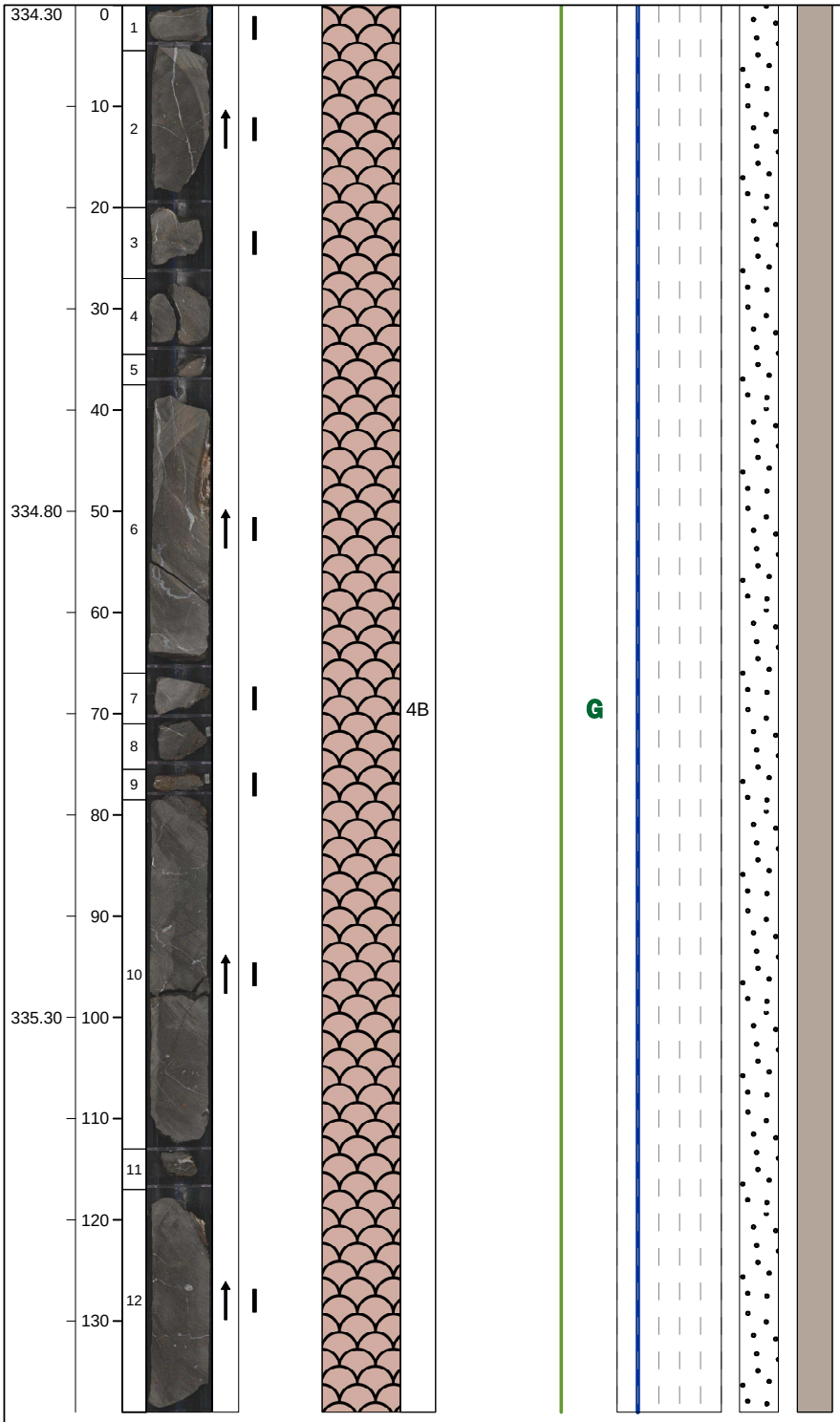
390-U1556B-9R-2-A, 93-132 cm
UNIT: 4B
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (7.5R 4/1)
PHENOCRYSTS: Equant olivine up to 1 mm but most < 1mm, 100% altered.
GROUNDMASS: cryptocrystalline
VESICLES: Most pieces are nonvesicular to sparsely vesicular with small round vesicles < 0.25 mm in size, but larger (up to 8 mm) vesicles / vugs, more irregular in shape, in piece 7. All filled by calcite.
ALTERATION: Mostly orange speckled background, or mottled grey background, with some orange halos.
VEINS: Sparse carbonate veins in pillow radial cooling cracks with saponite rims.

Hole 390-U1556B-9R Section 3, Top of Section: 332.42 m (CSF-A)



390-U1556B-9R-3-A, 0-102 cm
UNIT: 4B
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (7.5R 4/1)
PHENOCRYSTS: Equant olivine up to 1 mm but most < 1mm, 100% altered.
GROUNDMASS: cryptocrystalline
VESICLES: Most pieces are sparsely vesicular with small round vesicles < 0.25 mm in size, but larger (up to 8 mm) vesicles / vugs, more irregular in shape, occur in pieces 1, 4, and 5. All filled by calcite. If included in the modal proportion of vesicles, the total would be moderately vesicular. In piece 1 the abundance and size of vesicles increases with distance down section away from the chilled margin.
ALTERATION: Orange speckled background alteration, quite uniform.
VEINS: Sparse carbonate and saponite veins in pillow radial cooling cracks sometimes with saponite rims.

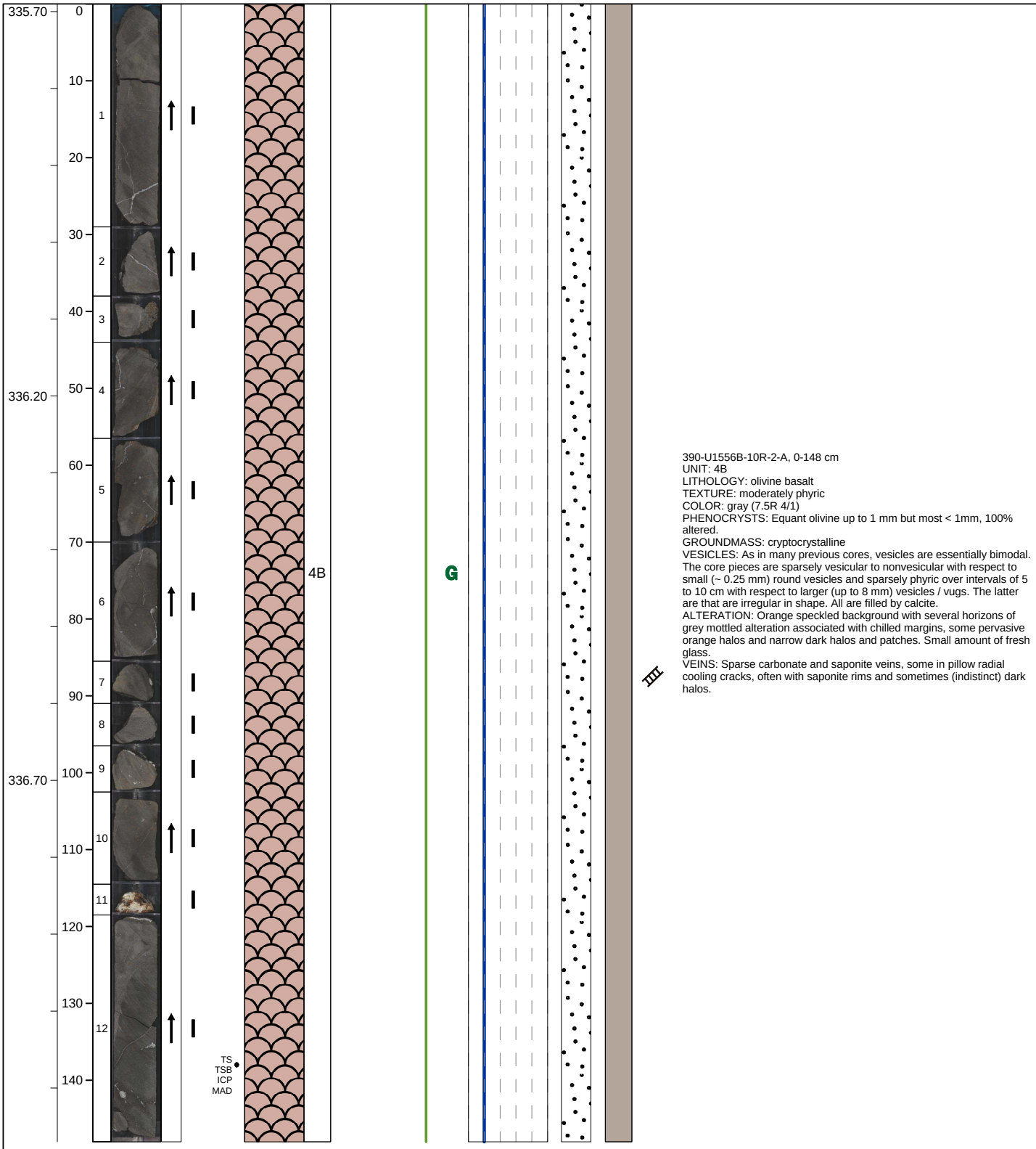
Hole 390-U1556B-10R Section 1, Top of Section: 334.3 m (CSF-A)



Description

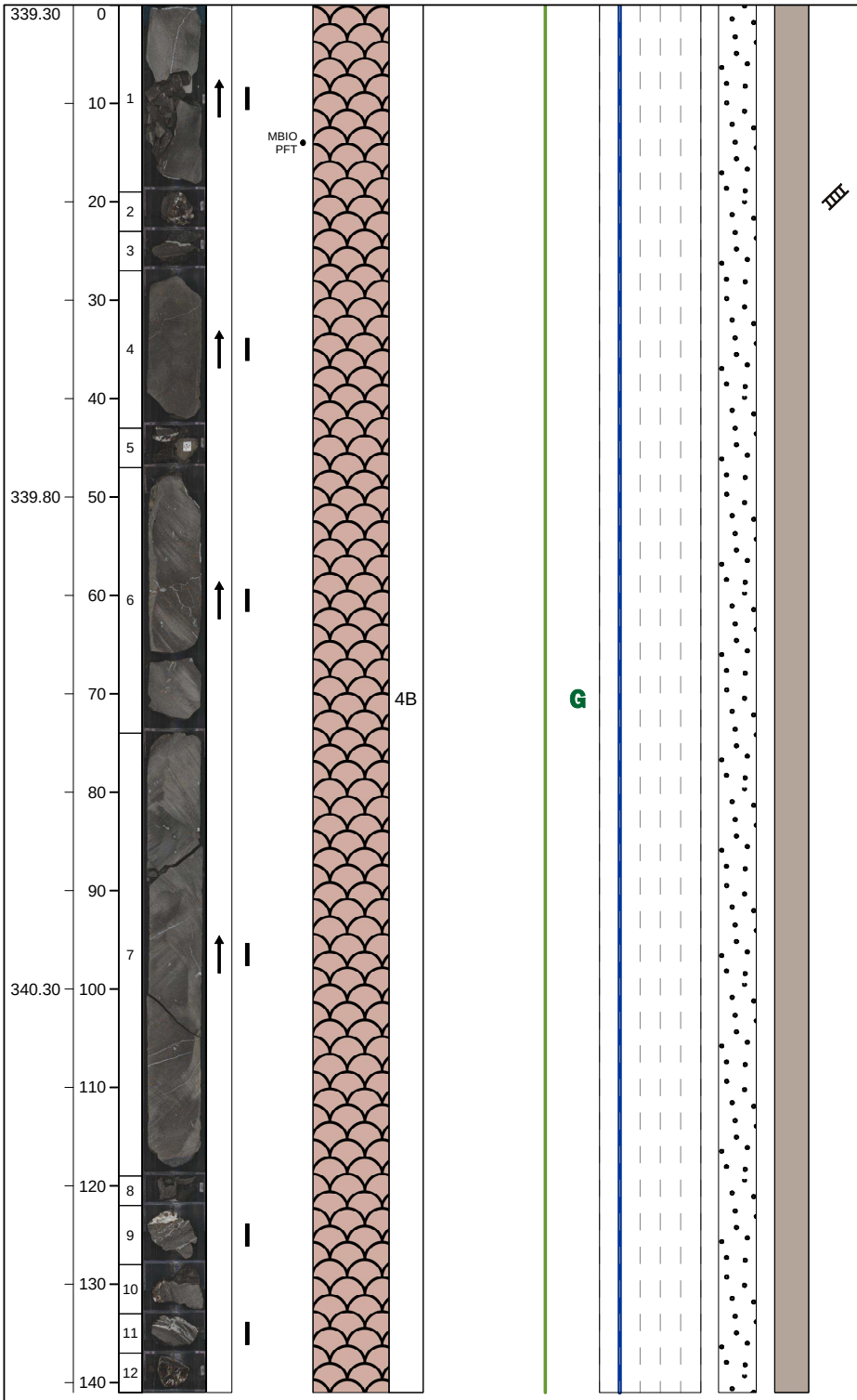
390-U1556B-10R-1-A, 0-139 cm
UNIT: 4B
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (7.5R 4/1)
PHENOCRYSTS: Equant olivine up to 1 mm but most < 1mm, 100% altered.
GROUNDMASS: cryptocrystalline
VESICLES: As in many previous cores, vesicles are essentially bimodal. the samples are sparsely vesicular with respect to small (~ 0.25 mm) round vesicles but up to moderately vesicular over intervals of 5 to 10 cm with larger (up to 0.8 mm) vesicles / vugs that are irregular in shape. All are filled by calcite.
ALTERATION: Orange speckled background with a few areas of grey mottled alteration associated with chilled margins, a prominent orange halo associated with chilled margin in piece 6 and narrow dark halos and patches. Small amount of fresh glass.
VEINS: Sparse carbonate and saponite veins in pillow radial cooling cracks sometimes with saponite rims.

Hole 390-U1556B-10R Section 2, Top of Section: 335.69 m (CSF-A)



390-U1556B-10R-2-A, 0-148 cm
UNIT: 4B
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (7.5R 4/1)
PHENOCRYSTS: Equant olivine up to 1 mm but most < 1mm, 100% altered.
GROUNDMASS: cryptocrystalline
VESICLES: As in many previous cores, vesicles are essentially bimodal. The core pieces are sparsely vesicular to nonvesicular with respect to small (~ 0.25 mm) round vesicles and sparsely phyric over intervals of 5 to 10 cm with respect to larger (up to 8 mm) vesicles / vugs. The latter are that are irregular in shape. All are filled by calcite.
ALTERATION: Orange speckled background with several horizons of grey mottled alteration associated with chilled margins, some pervasive orange halos and narrow dark halos and patches. Small amount of fresh glass.
VEINS: Sparse carbonate and saponite veins, some in pillow radial cooling cracks, often with saponite rims and sometimes (indistinct) dark halos.

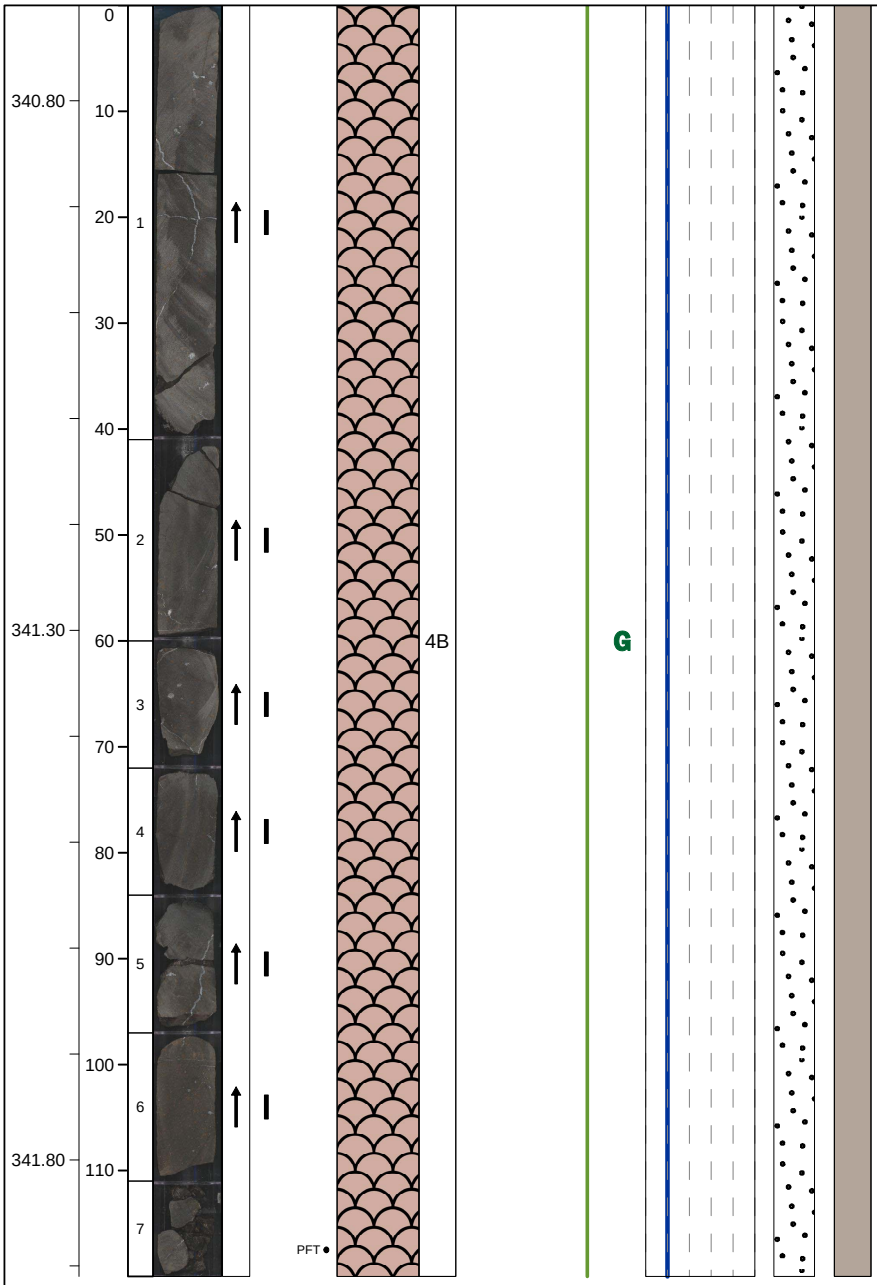
Hole 390-U1556B-11R Section 1, Top of Section: 339.3 m (CSF-A)



Description

390-U1556B-11R-1-A, 0-141 cm
UNIT: 4B
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (7.5R 4/1)
PHENOCRYSTS: Equant olivine up to 1 mm but most < 1mm, 100% altered. Chilled margins are typically only sparsely phyric to aphyric.
GROUNDMASS: cryptocrystalline
VESICLES: Vesicles are essentially bimodal and their distribution is heterogeneous. The core pieces are sparsely vesicular to nonvesicular with respect to small (~ 0.25 mm) round vesicles and sparsely phyric over intervals of 5 to 10 cm with respect to larger (up to 8 mm) vesicles / vugs. The latter are that are irregular in shape. All are filled by calcite.
ALTERATION: Orange speckled background with some grey mottled alteration associated with chilled margins and pervasive orange halos and narrow dark halos and patches.
VEINS: Sparse carbonate and saponite veins, often with saponite rims and sometimes (indistinct) dark halos.

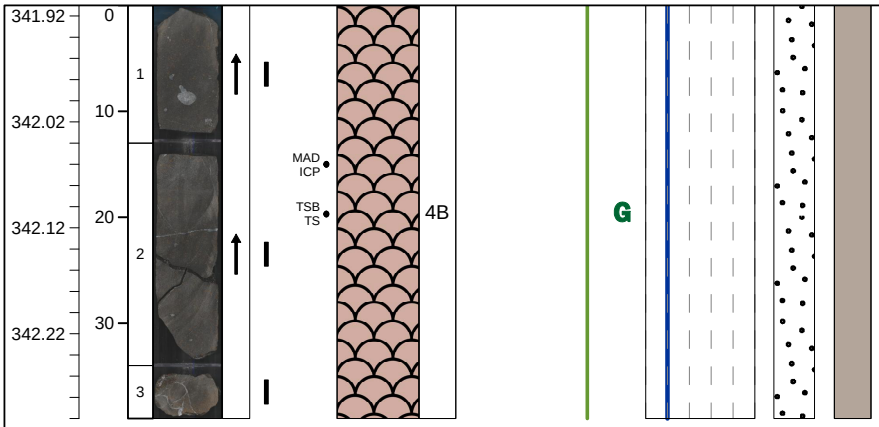
Hole 390-U1556B-11R Section 2, Top of Section: 340.71 m (CSF-A)



Description

390-U1556B-11R-2-A, 0-120 cm
UNIT: 4B
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: Less altered pieces are gray (7.5R 4/1), more altered pieces are dark reddish brown (5YR 2.5/2)
PHENOCRYSTS: Equant olivine up to 1 mm but most < 1mm, 100% altered. Chilled margins are typically only sparsely phyric to aphyric.
GROUNDMASS: cryptocrystalline
VESICLES: Most of the section is essentially nonvesicular, but pieces 1b, 1c, 2, 3, 5b and6 have a few larger (up to 5 mm) vesicles / vugs, irregular in shape that are filled by calcite.
ALTERATION: Orange speckled alteration predominates with some saponitic patches and halos and one prominent vertically oriented band of speckled grey alteration to internal intrusive chilled margin. One unusual ovoid dark halo without clear relation to veins.
VEINS: Sparse carbonate and saponite veins sometimes crosscutting in several generations, dark saponitic halos common.

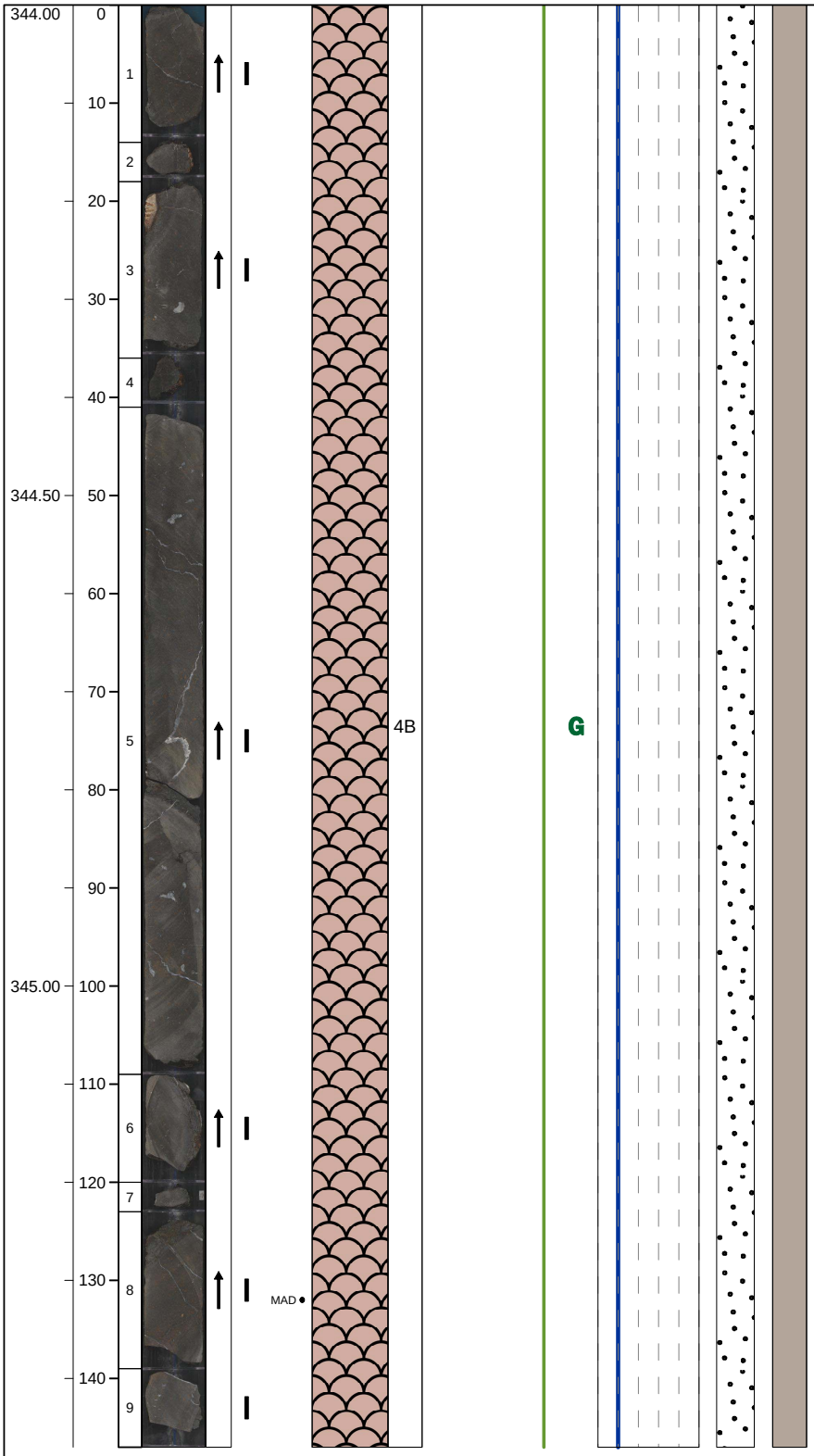
Hole 390-U1556B-11R Section 3, Top of Section: 341.91 m (CSF-A)



Description

390-U1556B-11R-3-A, 0-39 cm
UNIT: 4B
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: Less altered areas are gray (7YR 4/1), more altered pieces are dark reddish brown (5YR 2.5/2)
PHENOCRYSTS: Equant olivine up to 1 mm but most < 1mm, 100% altered. Chilled margins are typically only sparsely phyric to aphyric.
GROUNDMASS: cryptocrystalline
VESICLES: Most of the section is essentially nonvesicular, but pieces 1 and 2 have a few larger (up to 5 mm) vesicles / vugs, irregular in shape that are filled by calcite.
ALTERATION: Orange speckled alteration predominates with some saponitic halos and one mottled grey altered ?internal chilled margin.
VEINS: Sparse carbonate and saponite veins, one large carbonate filled vesicle/vug

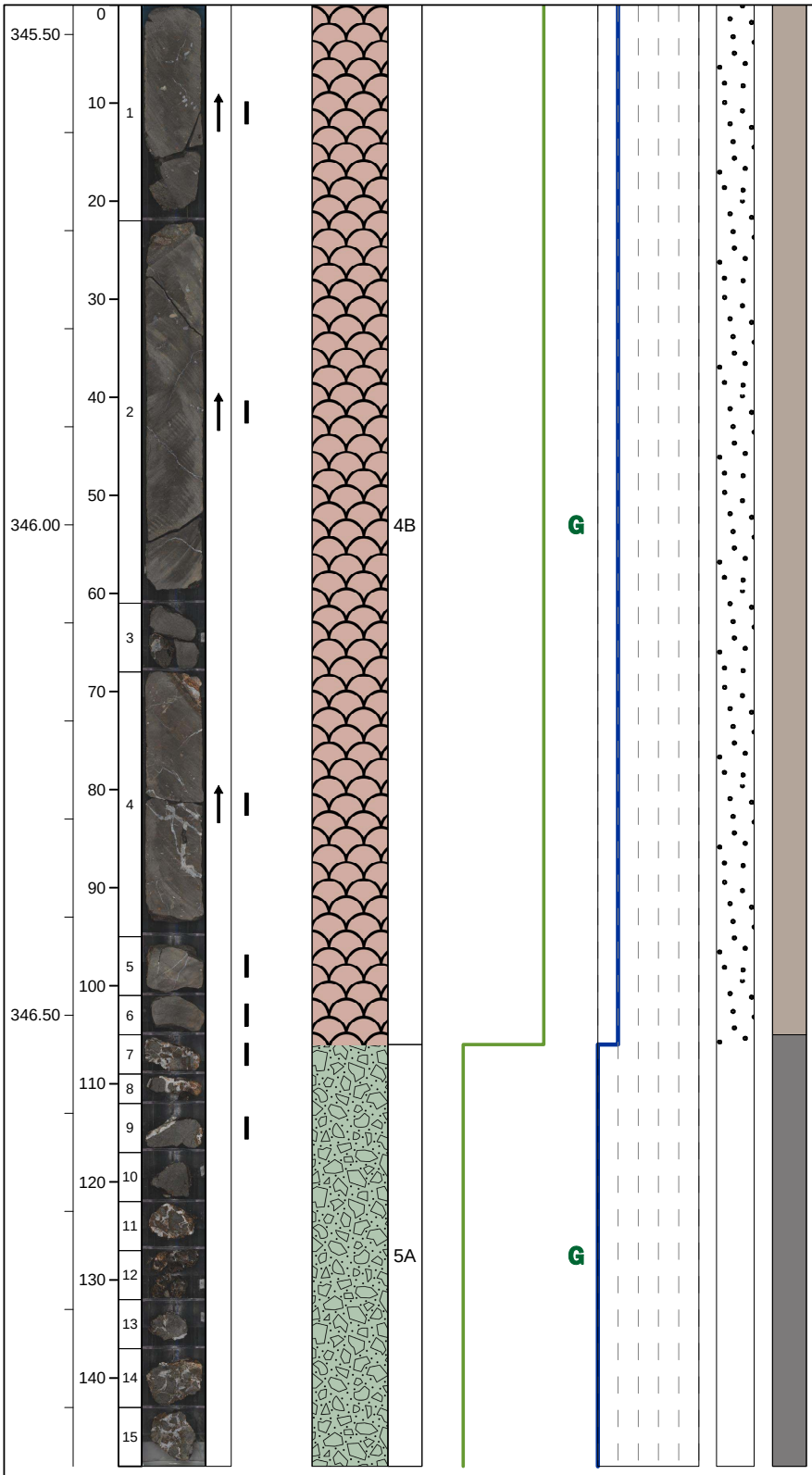
Hole 390-U1556B-12R Section 1, Top of Section: 344.0 m (CSF-A)



Description

390-U1556B-12R-1-A, 0-147 cm
UNIT: 4B
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: Less altered areas are gray (7YR 4/1), more altered pieces are dark reddish brown (5YR 2.5/2)
PHENOCRYSTS: Equant olivine up to 1 mm but most < 1mm, 100% altered. Chilled margins are typically only sparsely phyric to aphyric.
GROUNDMASS: cryptocrystalline
VESICLES: Most of the section is essentially nonvesicular, but pieces 1, 3, 5, 8, 9 have a few larger (up to 20 mm) vesicles / vugs, irregular in shape, that are filled by calcite.
ALTERATION: Orange speckled alteration predominates with some saponitic halos and one mottled grey altered ?internal chilled margin.
VEINS: Sparse carbonate and saponite veins, one large carbonate filled vesicle/vug

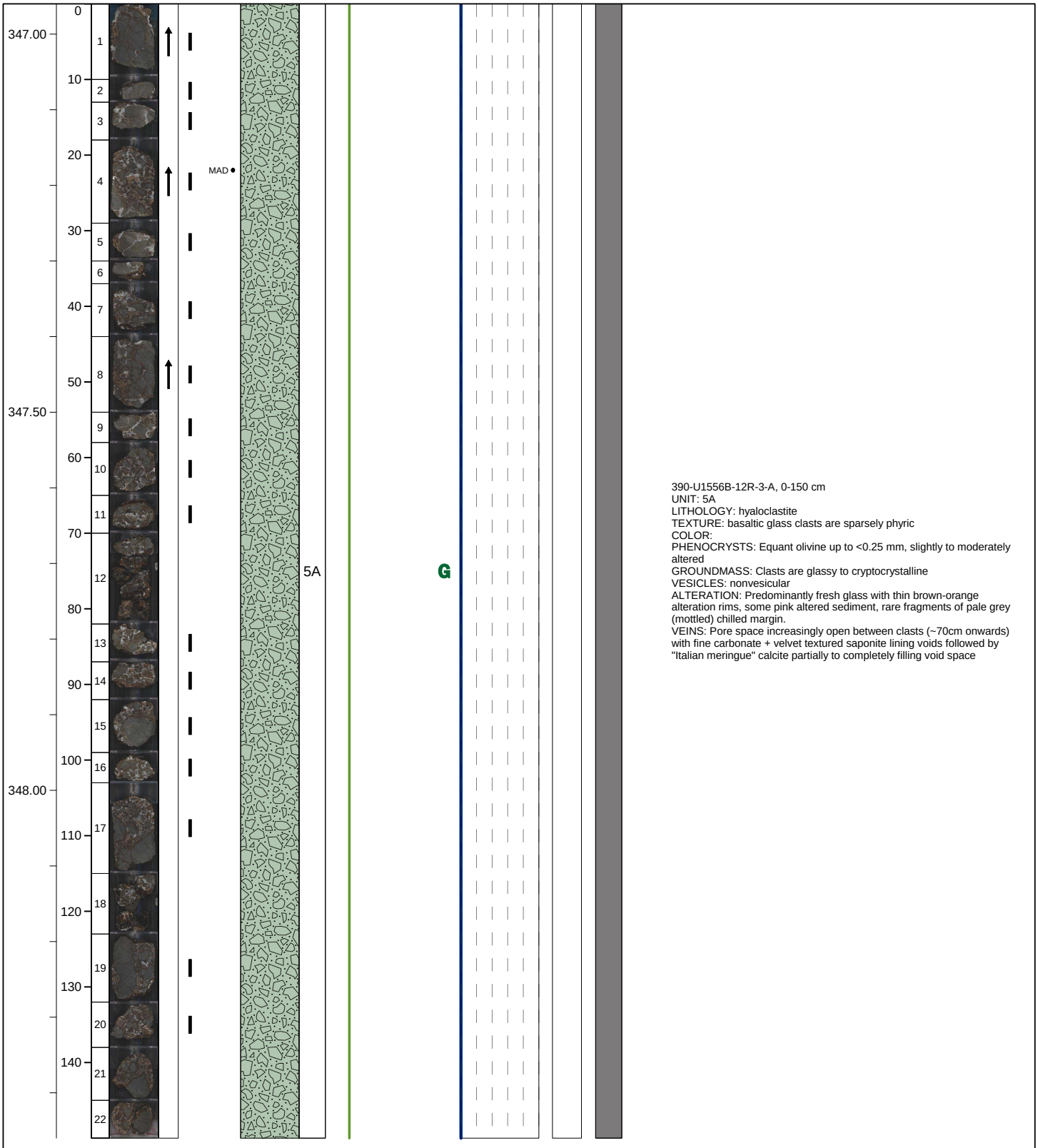
Hole 390-U1556B-12R Section 2, Top of Section: 345.47 m (CSF-A)



390-U1556B-12R-2-A, 0-106 cm
UNIT: 4B
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: dark gray (7.5R 4/1)
PHENOCRYSTS: Equant olivine up to 1 mm but most < 1mm, 100% altered. Chilled margins are typically only sparsely phyric to aphyric.
GROUNDMASS: cryptocrystalline
VESICLES: Most of the section is essentially nonvesicular, but pieces 1, 2, and 4 have a few larger (up to 15 mm) vesicles / vugs, irregular in shape, that are filled by calcite.
ALTERATION: Orange speckled alteration with several intervals of grey speckled alteration ass. with chilled margins and fresh glass. Large area (pieces 4 and 5) shows hybrid light grey mottled/orange halo type alteration (7.5YR 5/1) possibly associated with heavy veining. Saponite patches common in piece 2.
VEINS: Sparse carbonate and saponite veins, one area of heavy veining associated with broad orange halo (piece 5)

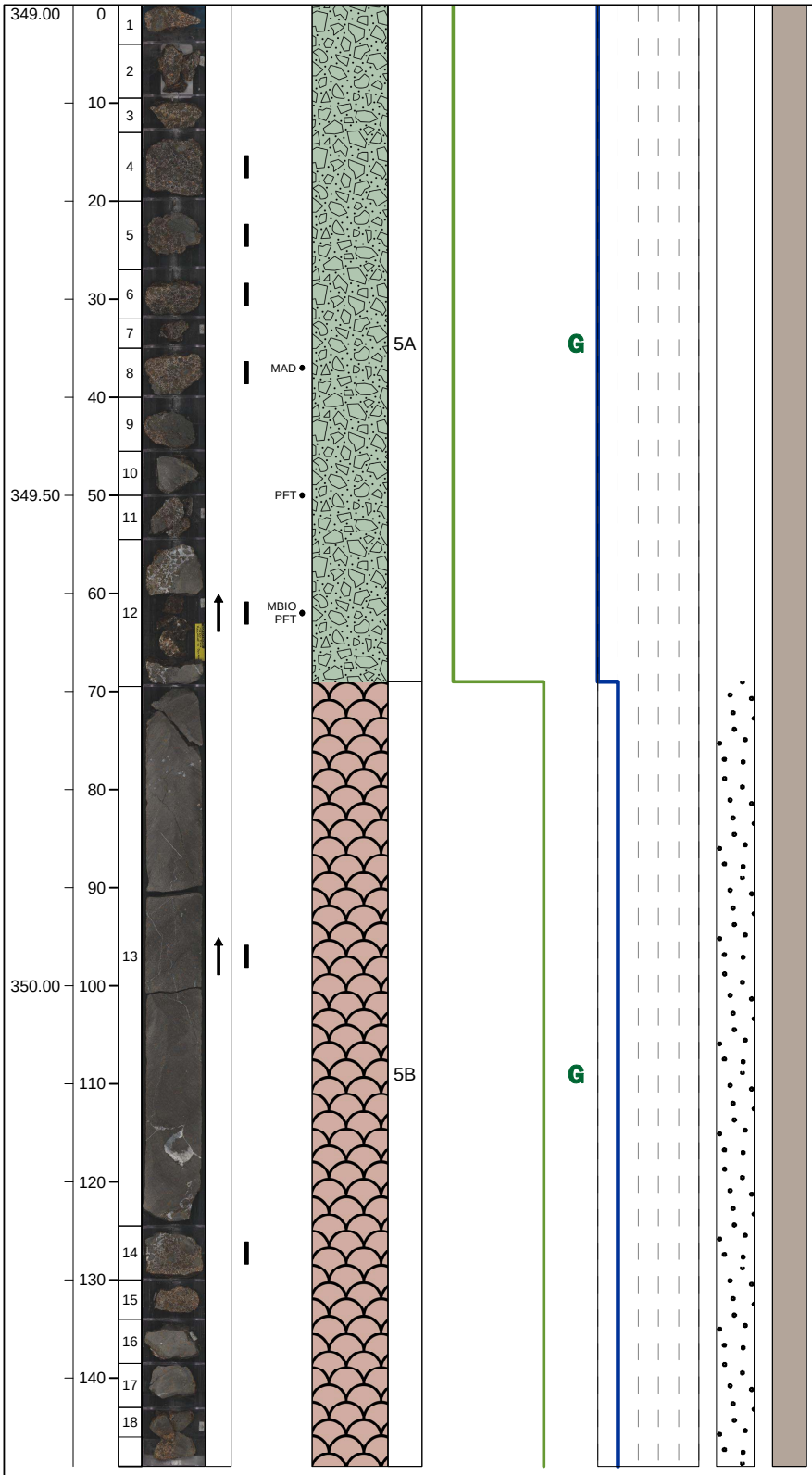
390-U1556B-12R-2-A, 107-149 cm
UNIT: 5A
LITHOLOGY: hyaloclastite
TEXTURE: basaltic clasts are sparsely phyric
COLOR:
PHENOCRYSTS: Equant olivine up to <0.4 mm only slightly altered.
GROUNDMASS: cryptocrystaline
VESICLES: nonvesicular
ALTERATION: Predominantly fresh glass with thin brown-orange alteration rims, some pink altered sediment, rare fragments of pale grey (mottled) chilled margin.
VEINS: Pore space partially to completely filled by calcite

Hole 390-U1556B-12R Section 3, Top of Section: 346.96 m (CSF-A)



390-U1556B-12R-3-A, 0-150 cm
UNIT: 5A
LITHOLOGY: hyaloclastite
TEXTURE: basaltic glass clasts are sparsely phyric
COLOR:
PHENOCRYSTS: Equant olivine up to <0.25 mm, slightly to moderately altered
GROUNDMASS: Clasts are glassy to cryptocrystalline
VESICLES: nonvesicular
ALTERATION: Predominantly fresh glass with thin brown-orange alteration rims, some pink altered sediment, rare fragments of pale grey (mottled) chilled margin.
VEINS: Pore space increasingly open between clasts (~70cm onwards) with fine carbonate + velvet textured saponite lining voids followed by "Italian meringue" calcite partially to completely filling void space

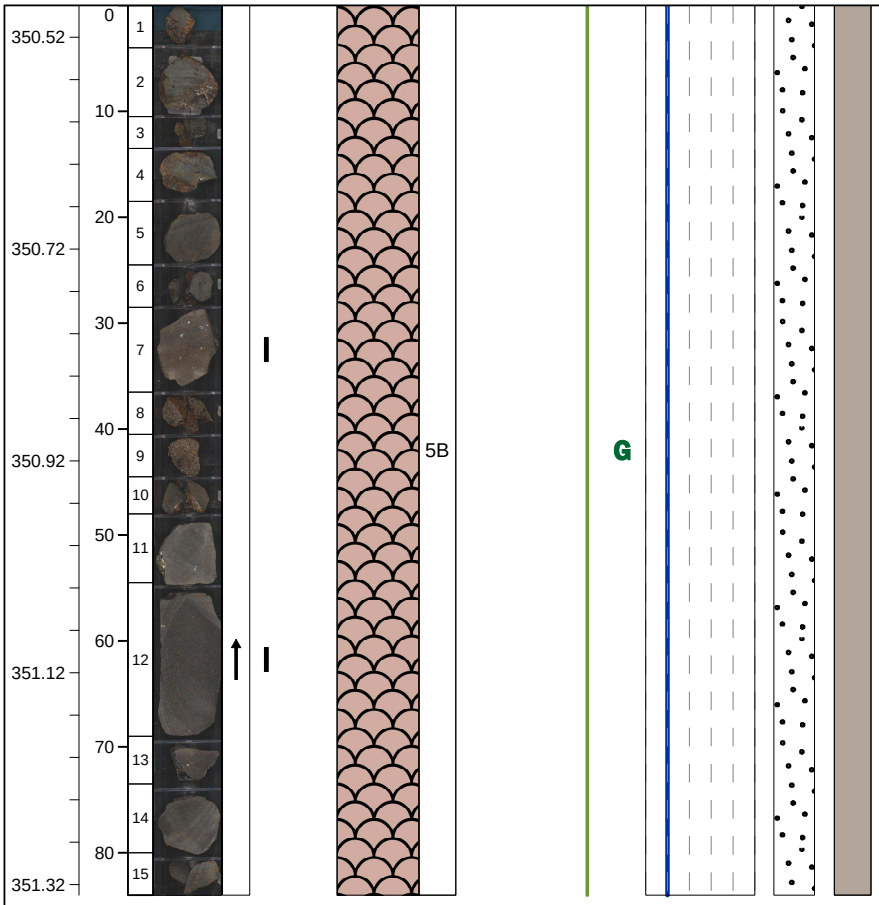
Hole 390-U1556B-13R Section 1, Top of Section: 349.0 m (CSF-A)



390-U1556B-13R-1-A, 0-69 cm
UNIT: 5A
LITHOLOGY: hyaloclastite
TEXTURE: basaltic glass clasts are sparsely phyric
COLOR:
PHENOCRYSTS: Equant olivine up to <0.25 mm, slightly to moderately altered
GROUNDMASS: Clasts are glassy to cryptocrystalline
VESICLES: nonvesicular
ALTERATION: Predominantly altered glass, some fresh cores. Small area of chilled margin - mottled grey altered.
VEINS: Pore space very open with only thin coating of calcite + velvety saponite with almost no sparry/vuggy fill. Veins rare to absent.

390-U1556B-13R-1-A, 70-149 cm
UNIT: 5B
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are moderately phyric
COLOR: dark gray (7.5R 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, Most are 100% altered, but some microphenocrysts in glass / chilled margins are only slightly altered. Chilled margins are typically only sparsely phyric to aphyric.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Most of the section is essentially nonvesicular, but pieces 13 has a few larger (up to 7 mm) vesicles / vugs, irregular in shape, that are filled by calcite. These larger, irregular - shaped vesicles tend to be concentrated in bands parallel to and about 6 cm from the chilled margins recovered at the top and bottom of the core piece, which is 53 cm long.
ALTERATION: Orange speckled alteration with intervals of grey speckled alteration ass. with chilled margins. Dark halos common. Glass mostly altered.
VEINS: Sparse carbonate and saponite veins in large pillow. Calcite cement mostly filling pore space in hyaloclastite intervals.

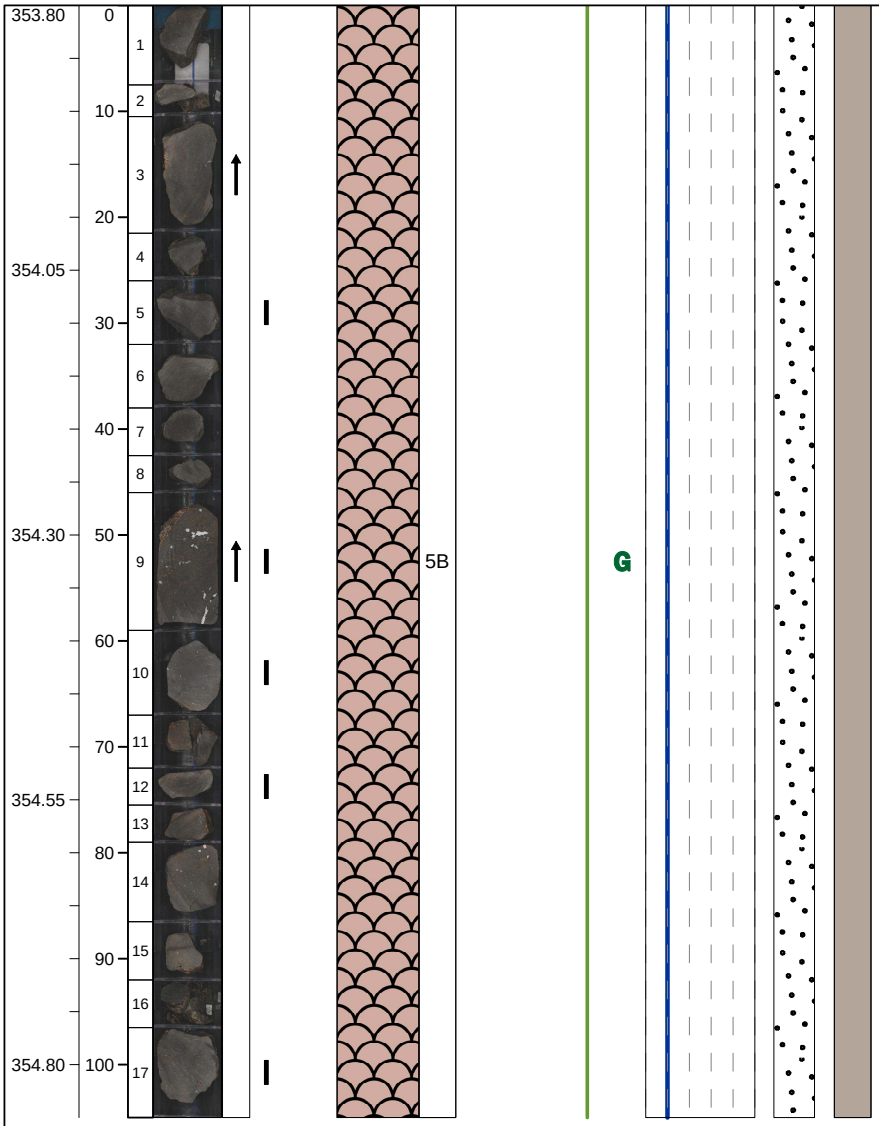
Hole 390-U1556B-13R Section 2, Top of Section: 350.49 m (CSF-A)



Description

390-U1556B-13R-2-A, 0-84 cm
UNIT: 5B
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are moderately phyric
COLOR: gray (Gley 1 5/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.5 mm but most < 0.25 mm, 100% altered. Chilled margins are aphyric
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Most of the section is essentially nonvesicular, but pieces 7 contains larger (up to 5 mm) vesicles / vugs, irregular in shape, that are filled by calcite.
ALTERATION: Orange speckled alteration with intervals of grey speckled alteration ass. with chilled margins. Dark halos common. Glass mostly altered. More altered sediment than preceding sections in hyaloclastic intervals.
VEINS: Sparse carbonate and saponite veins in large pillow. Calcite cement with a high proportion of saponite filling pore space in hyaloclastite intervals.

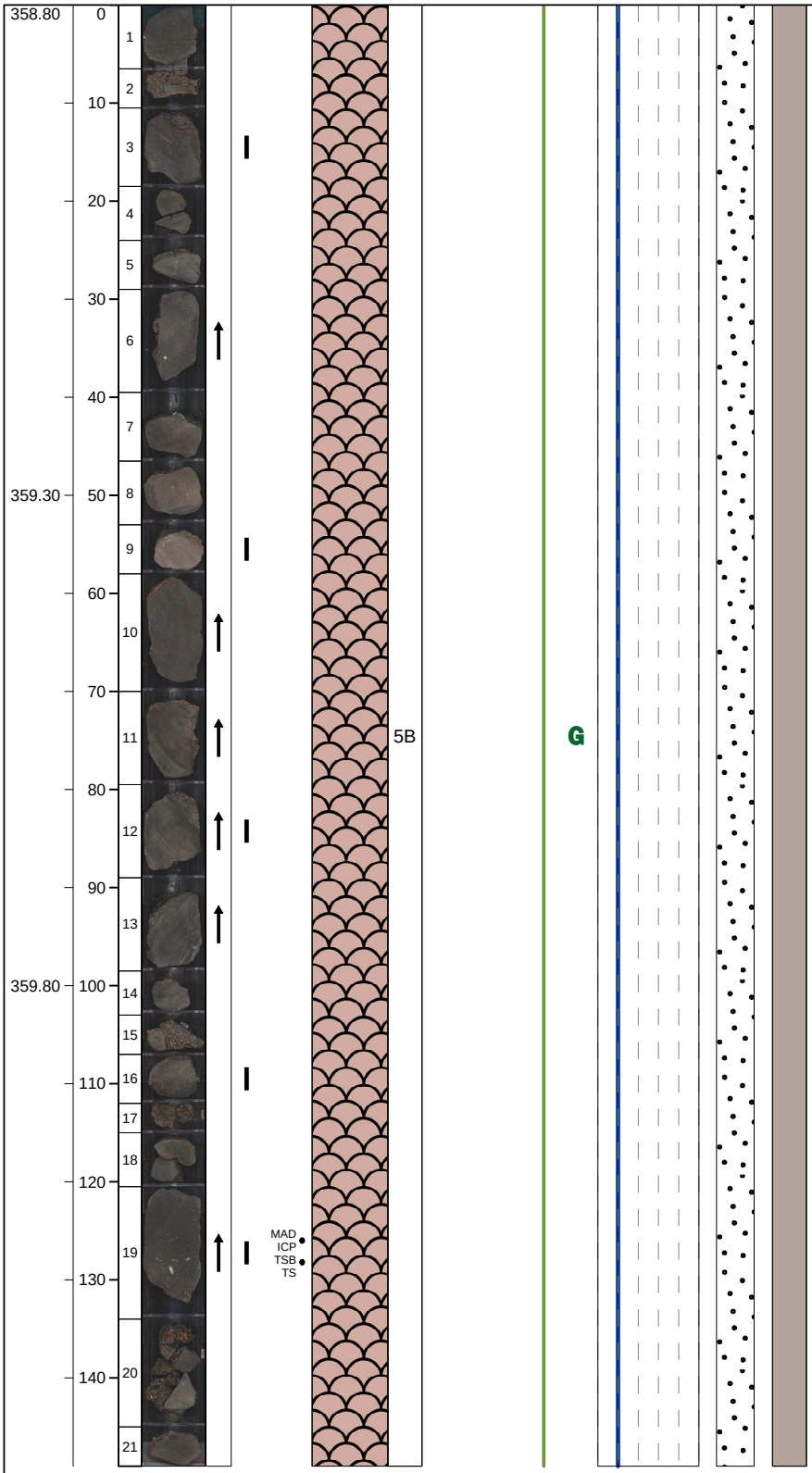
Hole 390-U1556B-14R Section 1, Top of Section: 353.8 m (CSF-A)



Description

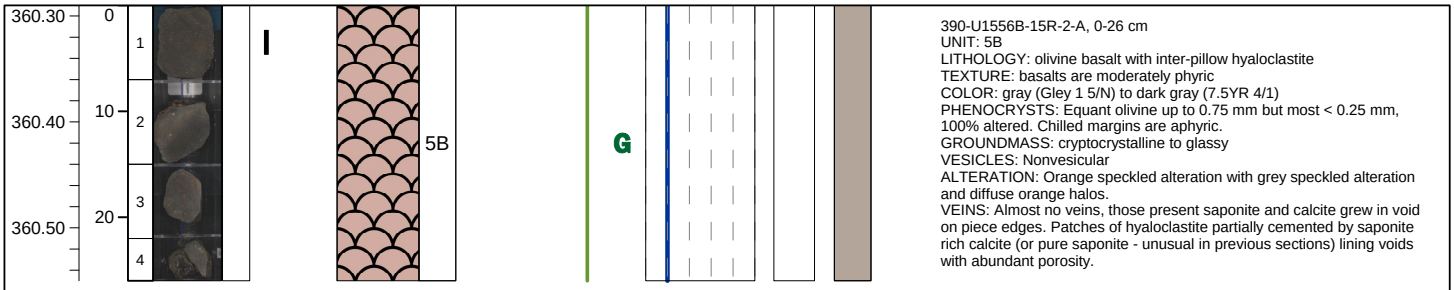
390-U1556B-14R-1-A, 0-105 cm
UNIT: 5B
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are moderately phyric
COLOR: gray (Gley 1 5/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 1 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Most of the section is essentially nonvesicular, but pieces 9 and 14 contain larger (up to 17 mm) vesicles / vugs, irregular in shape, that are filled by calcite; no obvious preferred orientation..
ALTERATION: Orange speckled alteration with intervals of grey speckled alteration ass. with chilled margins and picking out complex ?flow banding (piece 6). Some dark halos and rarer diffuse orange halos without obvious relation to veins.
VEINS: Very sparse carbonate and saponite veins, some bright white massive filled amygdales.

Hole 390-U1556B-15R Section 1, Top of Section: 358.8 m (CSF-A)



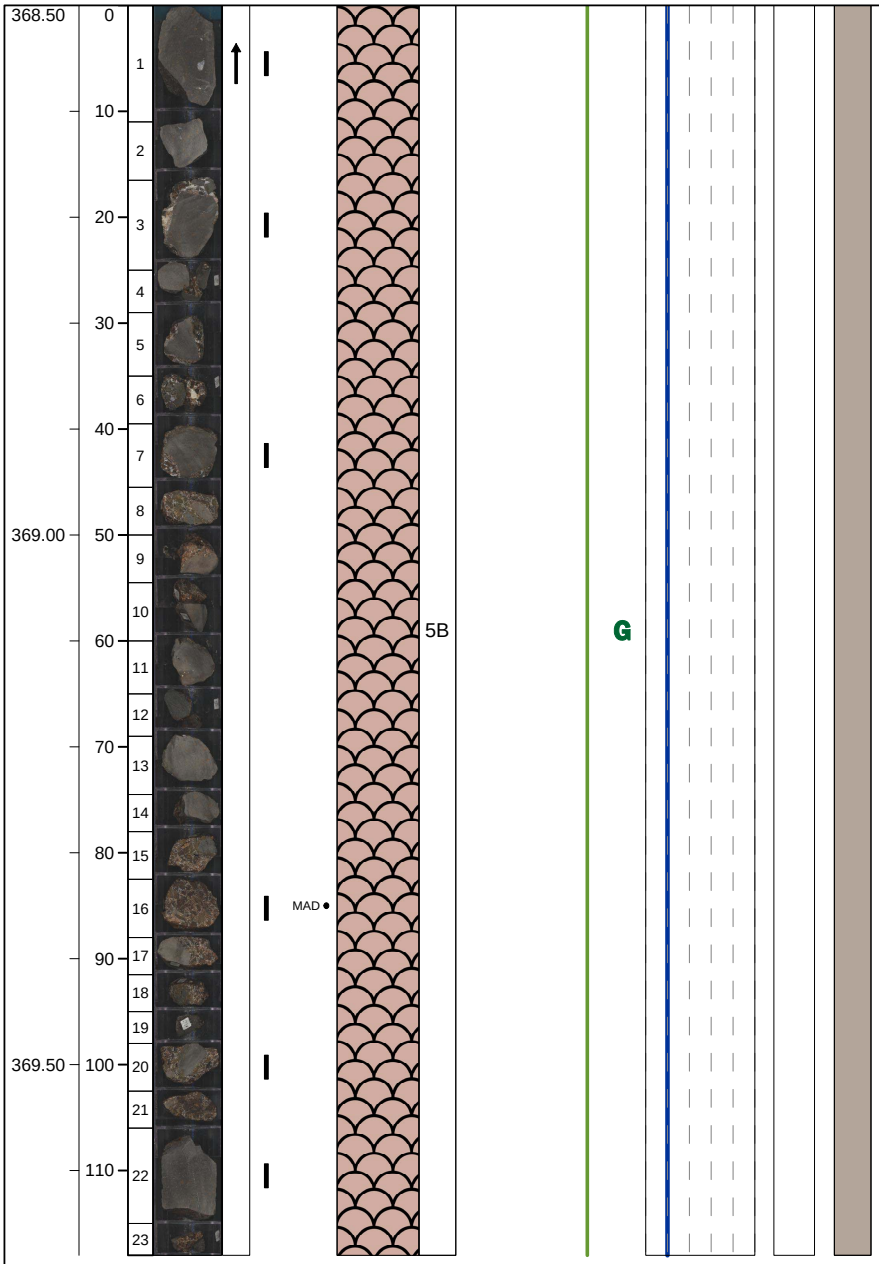
390-U1556B-15R-1-A, 0-149 cm
UNIT: 5B
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are moderately phyric
COLOR: gray (Gley 1 5/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 1 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Most of the section is essentially nonvesicular, but pieces 9 and 14 contain larger (up to 17 mm) vesicles / vugs, irregular in shape, that are filled by calcite; no obvious preferred orientation..
ALTERATION: Orange speckled alteration with several intervals of grey speckled alteration ass. with chilled margins (incl. nice arcuate pillow piece 10). Some diffuse orange halos (without obvious relation to veins), dark halos rare in section. Fragments of glass all altered.
VEINS: Almost no veins, those present saponite and calcite grew in void on piece edges.

Hole 390-U1556B-15R Section 2, Top of Section: 360.29 m (CSF-A)



390-U1556B-15R-2-A, 0-26 cm
UNIT: 5B
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are moderately phyric
COLOR: gray (Gley 1 5/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.25 mm, 100% altered. Chilled margins are aphyric.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Nonvesicular
ALTERATION: Orange speckled alteration with grey speckled alteration and diffuse orange halos.
VEINS: Almost no veins, those present saponite and calcite grew in void on piece edges. Patches of hyaloclastite partially cemented by saponite rich calcite (or pure saponite - unusual in previous sections) lining voids with abundant porosity.

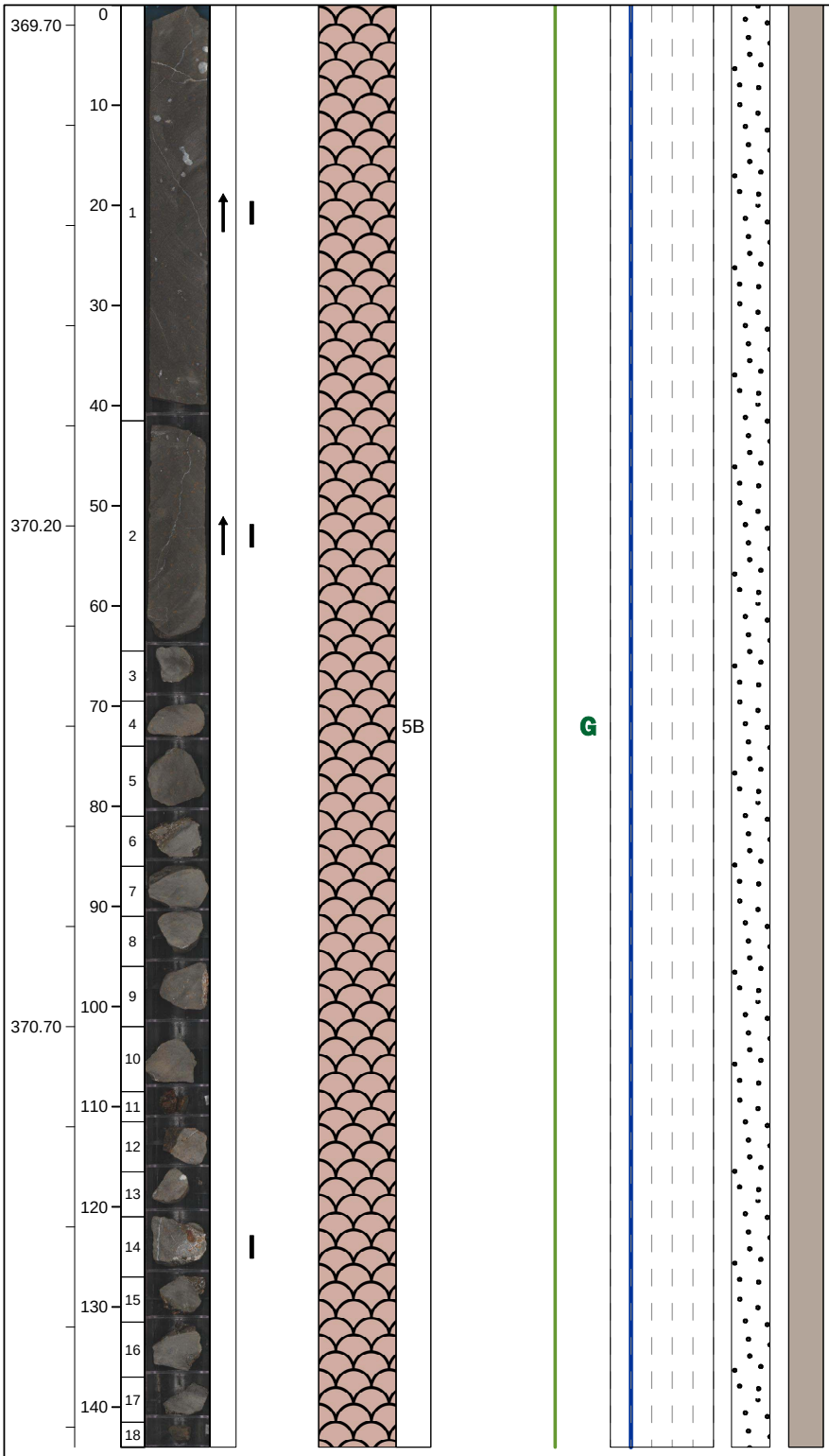
Hole 390-U1556B-16R Section 1, Top of Section: 368.5 m (CSF-A)



Description

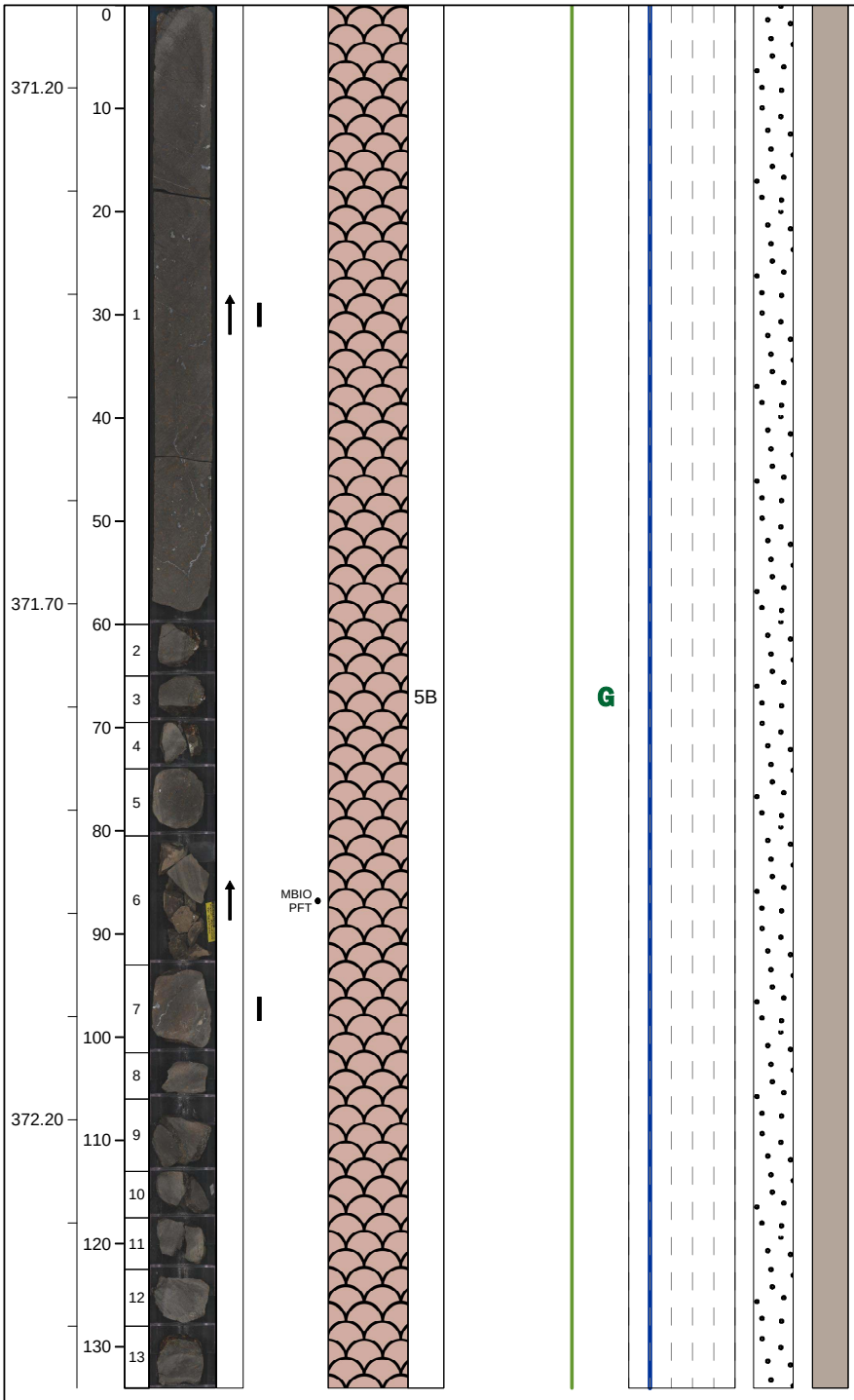
390-U1556B-16R-1-A, 0-118 cm
UNIT: 5B
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are moderately phyric
COLOR: gray (Gley 1 5/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Nonvesicular
ALTERATION: Orange speckled alteration and grey speckled alteration in basalt clasts, glass mostly altered.
VEINS: Very rare veins (saponite and calcite). Patches of hyaloclastite partially cemented by saponite rich calcite lining voids with abundant porosity.

Hole 390-U1556B-16R Section 2, Top of Section: 369.68 m (CSF-A)



390-U1556B-16R-2-A, 0-145 cm
UNIT: 5B
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are moderately phyric
COLOR: gray (Gley 1 5/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 1 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity could be described as bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, 100% filled by calcite. Pieces, 1, 2, 9, and 13 contain larger (up to 10 mm) vesicles / vugs, irregular in shape, that are filled by calcite; no obvious preferred orientation..
ALTERATION: Orange speckled alteration with orange and dark halos in larger basalt piece, mostly chilled margin grey speckled alteration in basalt clasts, glass mostly altered.
VEINS: Sparse carbonate and saponite veins in large basalt piece many with dark halos. Hyaloclastite cemented by calcite often with high proportion of open pore space and saponite overgrowing thin calcite void lining.

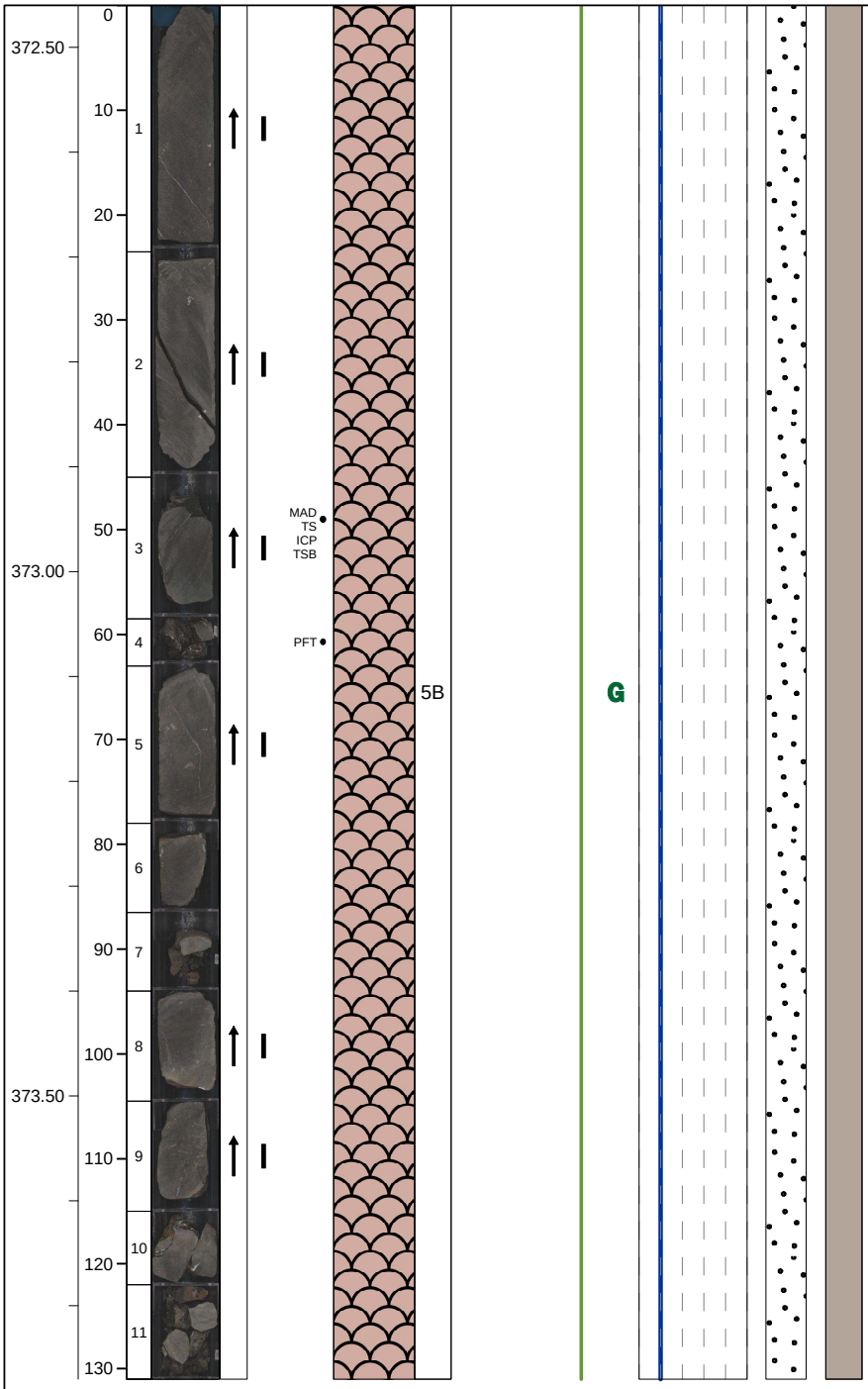
Hole 390-U1556B-16R Section 3, Top of Section: 371.12 m (CSF-A)



Description

390-U1556B-16R-3-A, 0-134 cm
UNIT: 5B
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 5/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.25 mm, 100% altered. Chilled margins are aphyric.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity could be described as bimodal. Most of the coarser-grained pieces have sparse (< 1%), tiny (0.25 - 0.5 mm), round vesicles, 100% filled by calcite. Pieces, 1 and 4 contain larger (up to 10 mm) vesicles / vugs, irregular in shape, that are filled by calcite. These may occur in a band about 4 cm wide occuring about 4 cm below the chilled margin, but difficult to tell from core recovery.
ALTERATION: Orange speckled alteration with moderately abundant orange and dark halos in large pillow (piece 1), mostly chilled margin grey speckled alteration in basalt clasts, glass mostly fresh.
VEINS: Carbonate and saponite veins moderately common in large basalt piece many with dark halos. In several examples thin saponite veins with dark halos appear to have been reused as pathways for calcite (or calcite-rich) veins which overprint orange halos on the original dark halo. Veins sparse to absent in grey mottled altered basalt clasts/rubble.

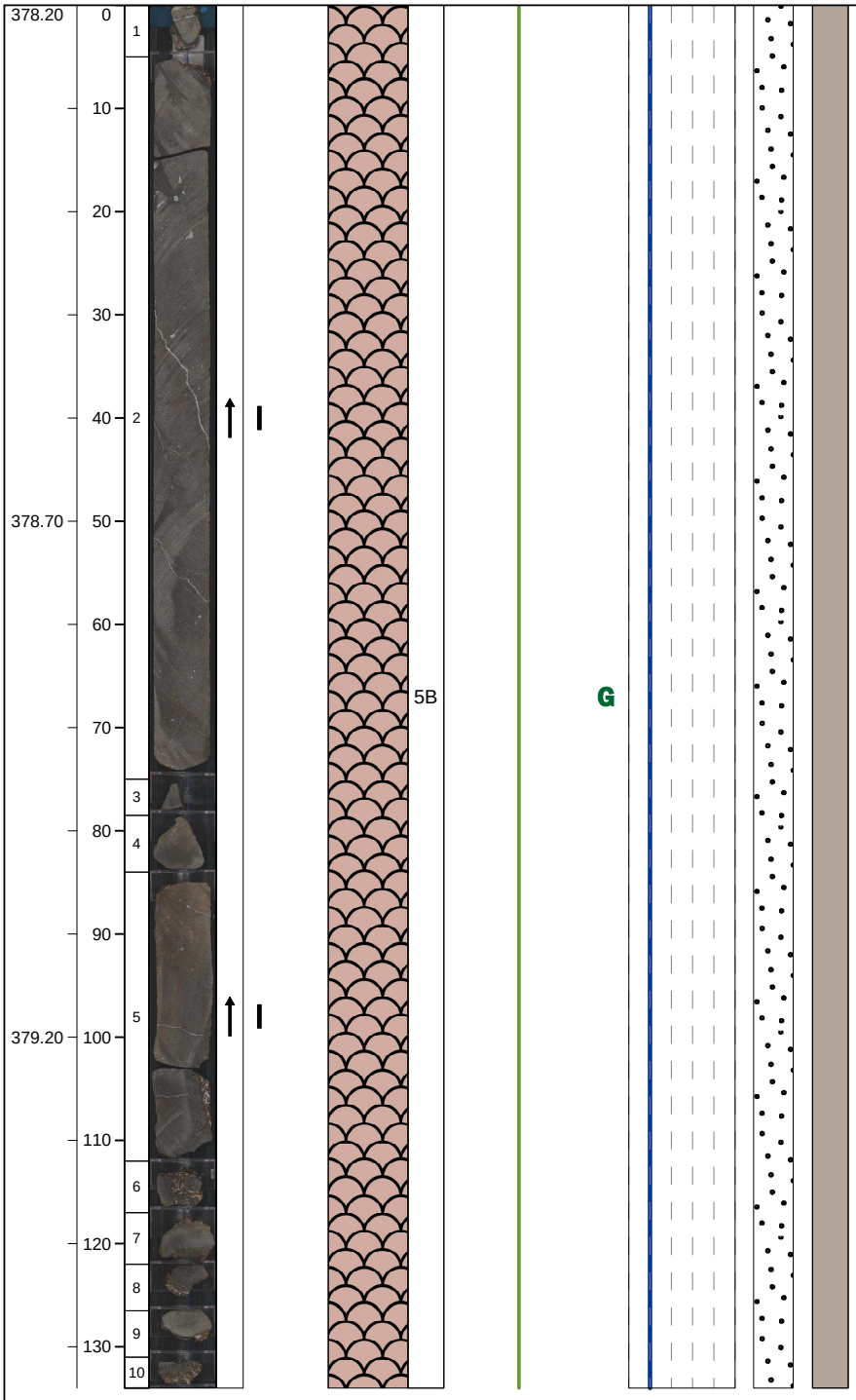
Hole 390-U1556B-16R Section 4, Top of Section: 372.46 m (CSF-A)



Description

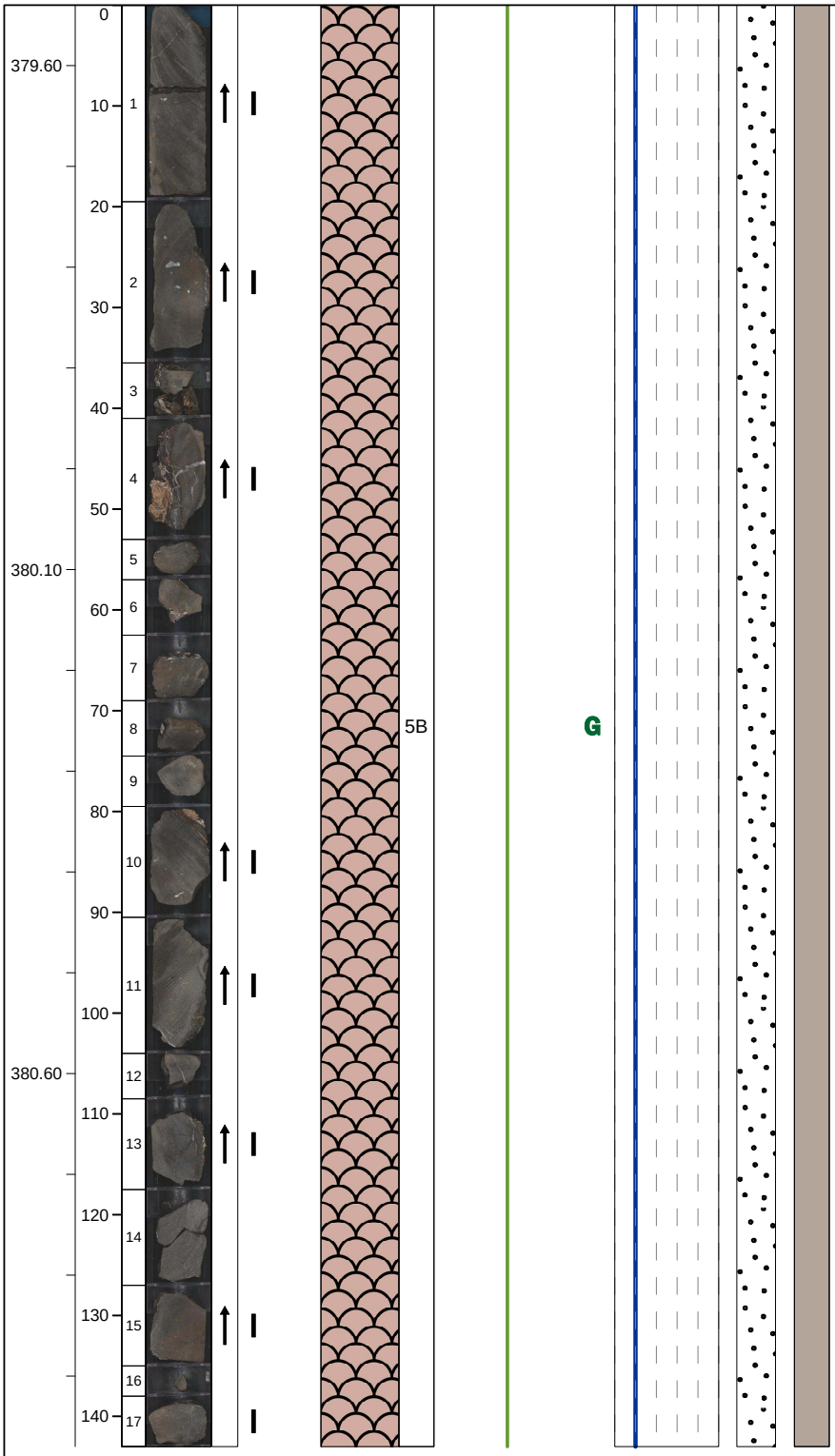
390-U1556B-16R-4-A, 0-131 cm
UNIT: 5B
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 5/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.25 mm, 100% altered. Chilled margins are aphyric.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity could be described as bimodal. Most of the coarser-grained pieces have sparse (< 1%), tiny (0.25 - 0.5 mm), round vesicles, 100% filled by calcite. Pieces 1, 3, 5, 6, 7, 8, and 9 contain larger (up to 13 mm) vesicles / vugs, irregular in shape, that are filled by calcite. No obvious preferred orientation.
ALTERATION: Orange speckled alteration with occasional dark halos and several areas of poorly developed diffuse orange halo, chilled margin grey speckled alteration common, some glass mostly fresh.
VEINS: Sparse carbonate and saponite veins, some with dark halos.

Hole 390-U1556B-17R Section 1, Top of Section: 378.2 m (CSF-A)



390-U1556B-17R-1-A, 0-134 cm
UNIT: 5B
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are sparsely phyric
COLOR: gray (Gley 1 5/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 1.2 mm but most < 0.5 mm, 100% altered. Chilled margins are very sparsely olivine phyric with small (<~0.2mm) olivines that appear to be fresh in pieces 2a, 5 and 7
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity could be described as bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, 100% filled by calcite. Pieces, 2b and 5 contain larger (up to 17 mm) vesicles / vugs, irregular in shape, that are filled by calcite. In piece 2b and piece 5 the large vesicles appear to be clustered in a band that is about 2 to 3 cm below the chilled margin.
ALTERATION: Orange speckled alteration with abundant pale grey mottled intervals associated with chilled margins. Overall alteration colour quite pale in this section (particularly piece 2), large area of orange halo (piece 5) and lots of diffuse dark halos throughout. Glass along chilled margins and in hyaloclastite at base of section moderately altered.
VEINS: Carbonate and saponite veins, mostly thin, often with dark halos. Mostly radial to chilled margin in piece 5. Hyaloclastite cemented by white calcite with smaller proportion of void space and saponite to previous sections.

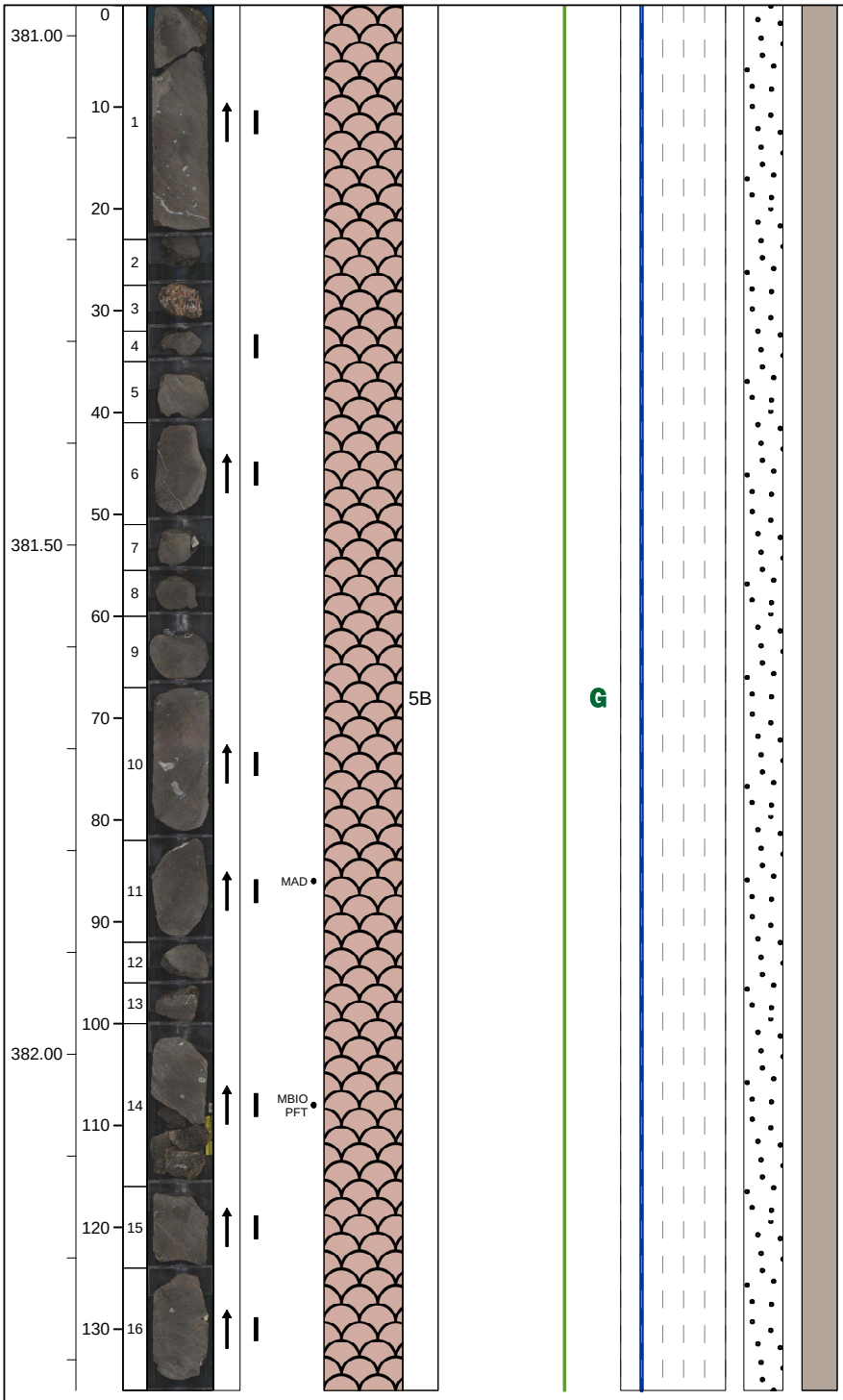
Hole 390-U1556B-17R Section 2, Top of Section: 379.54 m (CSF-A)



Description

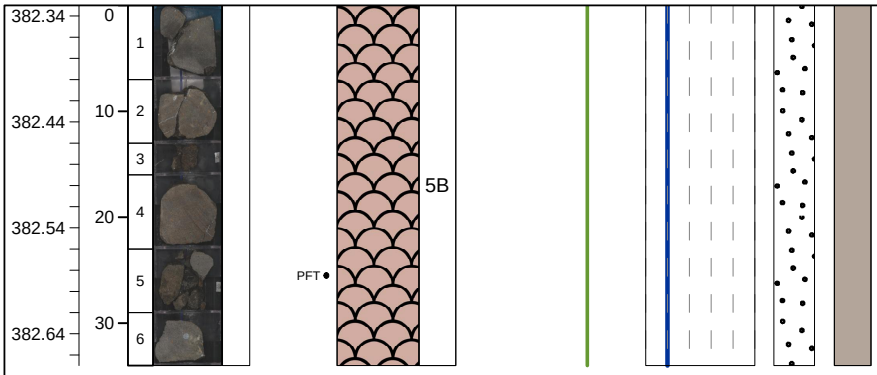
390-U1556B-17R-2-A, 0-143 cm
UNIT: 5B
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are sparsely phyric
COLOR: gray (Gley 1 5/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 1.5 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity could be described as bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, 100% filled by calcite. Pieces, 2 and 10 contain larger (up to 15 mm) vesicles / vugs, irregular in shape, that are filled by calcite.
ALTERATION: Orange speckled alteration with abundant pale grey mottled intervals with typical fish skin appearance associated with chilled margins (several pieces seem to parallel vertical pillow edge). Diffuse and irregular orange halos (without obvious veins) common. Glass quite pervasively altered.
VEINS: Veins somewhat rare, carbonate and saponite. One piece (4) shows abundant thick carbonate veins running radial or tangential to chilled margin and incipient hyaloclastite breccia.

Hole 390-U1556B-17R Section 3, Top of Section: 380.97 m (CSF-A)



390-U1556B-17R-3-A, 0-136 cm
UNIT: 5B
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are moderately phyric
COLOR: gray (Gley 1 5/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity could be described as bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, 100% filled by calcite. Pieces, 1, 10, 11, 14, 15, and 16 contain larger (up to 15 mm) vesicles / vugs, irregular in shape, that are filled by calcite. No obvious preferred orientation.
ALTERATION: Orange speckled background but much of section alternates between diffuse and often irregular orange and dark halos without clear relation to veins. Grey mottled alteration along chilled margins common.
VEINS: Sparse carbonate and saponite veins, some with dark halos.

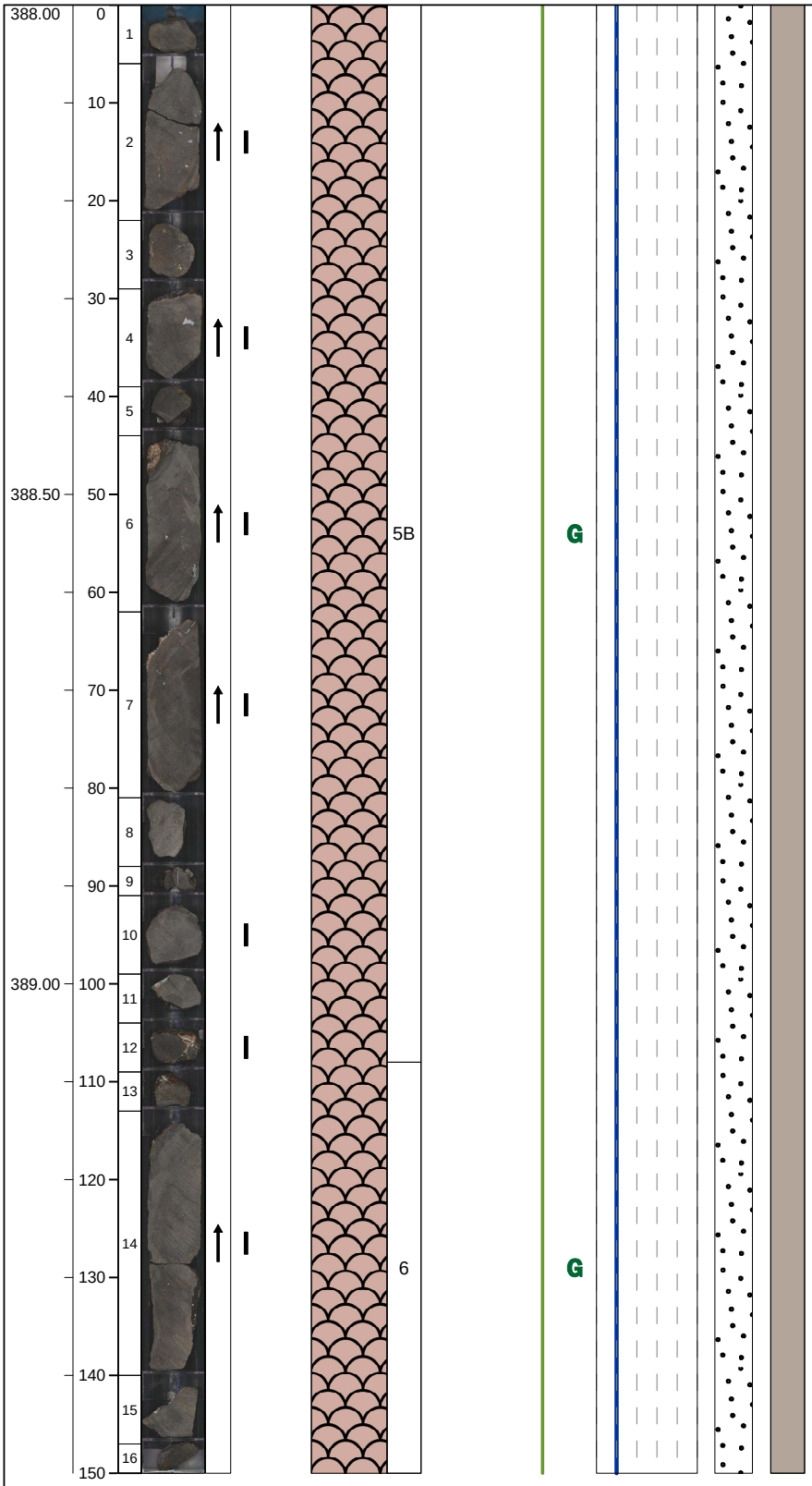
Hole 390-U1556B-17R Section 4, Top of Section: 382.33 m (CSF-A)



Description

390-U1556B-17R-4-A, 0-34 cm
UNIT: 5B
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 5/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 1 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity could be described as bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, 100% filled by calcite. Pieces 1, 2 and 6 contain sparse larger (up to 6 mm) vesicles / vugs, irregular in shape, that are filled by calcite. No obvious preferred orientation.
ALTERATION: Orange speckled background but much of section alternates between diffuse and often irregular orange and dark halos without clear relation to veins. Grey mottled alteration along chilled margins common.
VEINS: Veins rare, carbonate and saponite.

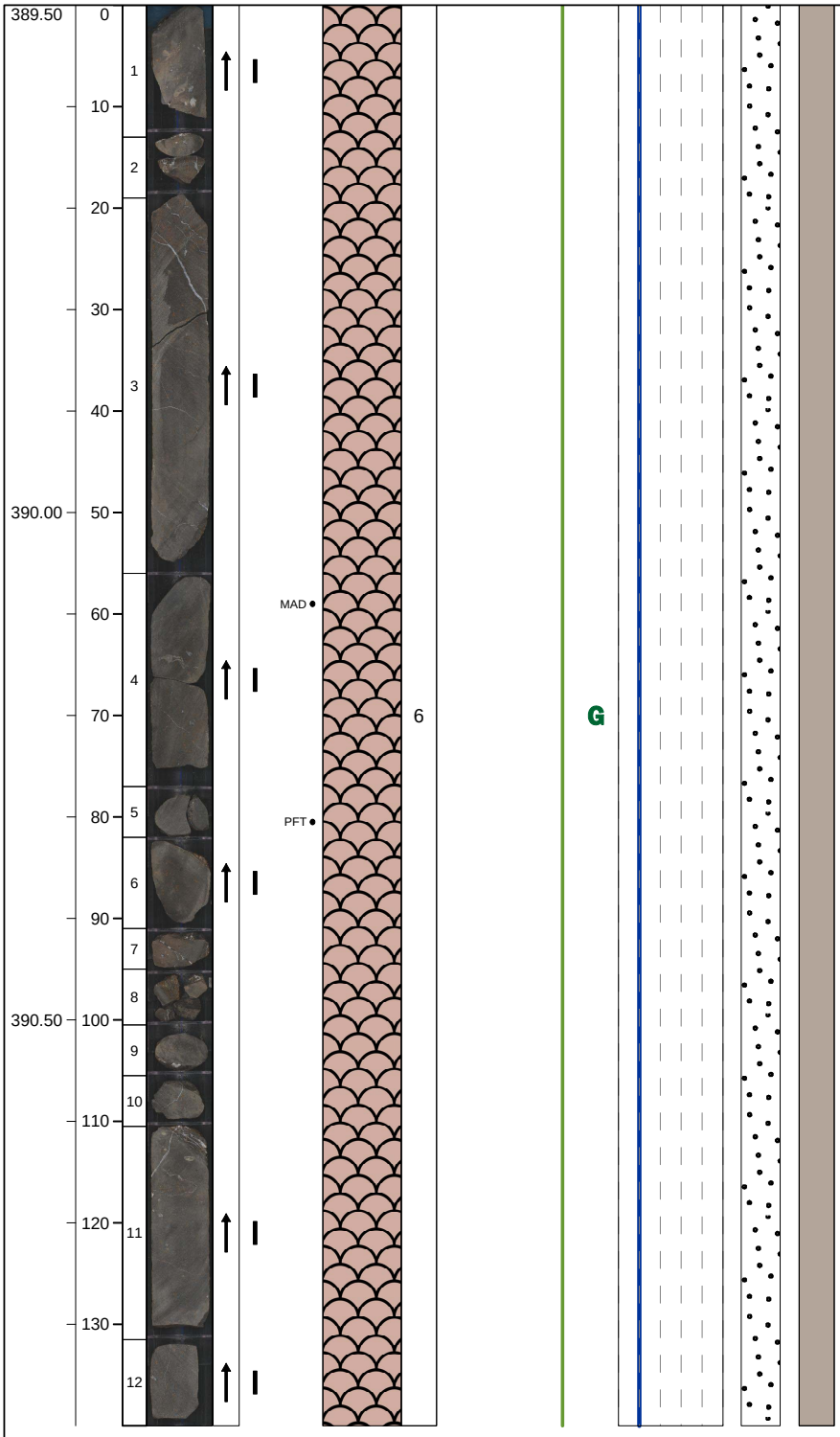
Hole 390-U1556B-18R Section 1, Top of Section: 388.0 m (CSF-A)



390-U1556B-18R-1-A, 0-108 cm
UNIT: 5B
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are moderately phyric
COLOR: gray (Gley 1 5/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 1 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity could be described as bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, 100% filled by calcite. Pieces 2, 3, 4, 6, and 7 contain larger (up to 12 mm on the core face) vesicles / vugs, irregular in shape, that are filled by calcite. No obvious preferred orientation.
ALTERATION: Orange speckled background with moderately abundant, diffuse and often irregular dark halos without clear relation to veins. Not many orange halos though overall background quite pale and orange. Grey mottled alteration along chilled margins.
VEINS: Veins rare, carbonate and saponite. Small patches of hyaloclastite cemented by saponite and calcite with some open pore space.

390-U1556B-18R-1-A, 109-150 cm
UNIT: 6
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 5/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 1 mm but most < 0.5 mm, 100% altered. Chilled margins appear to be very sparsely olivine phyric and these olivine microphenocrysts are unaltered or only slightly altered in pieces 13 and 16.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity could be described as bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, 100% filled by calcite. Piece 14 contains larger (up to 3 mm on the core face) vesicles / vugs, irregular in shape, that are filled by calcite. No obvious preferred orientation.
ALTERATION: Orange speckled background with orange and black halo in piece 14 and grey mottled alteration along chilled margins.
VEINS: Veins rare; carbonate and saponite.

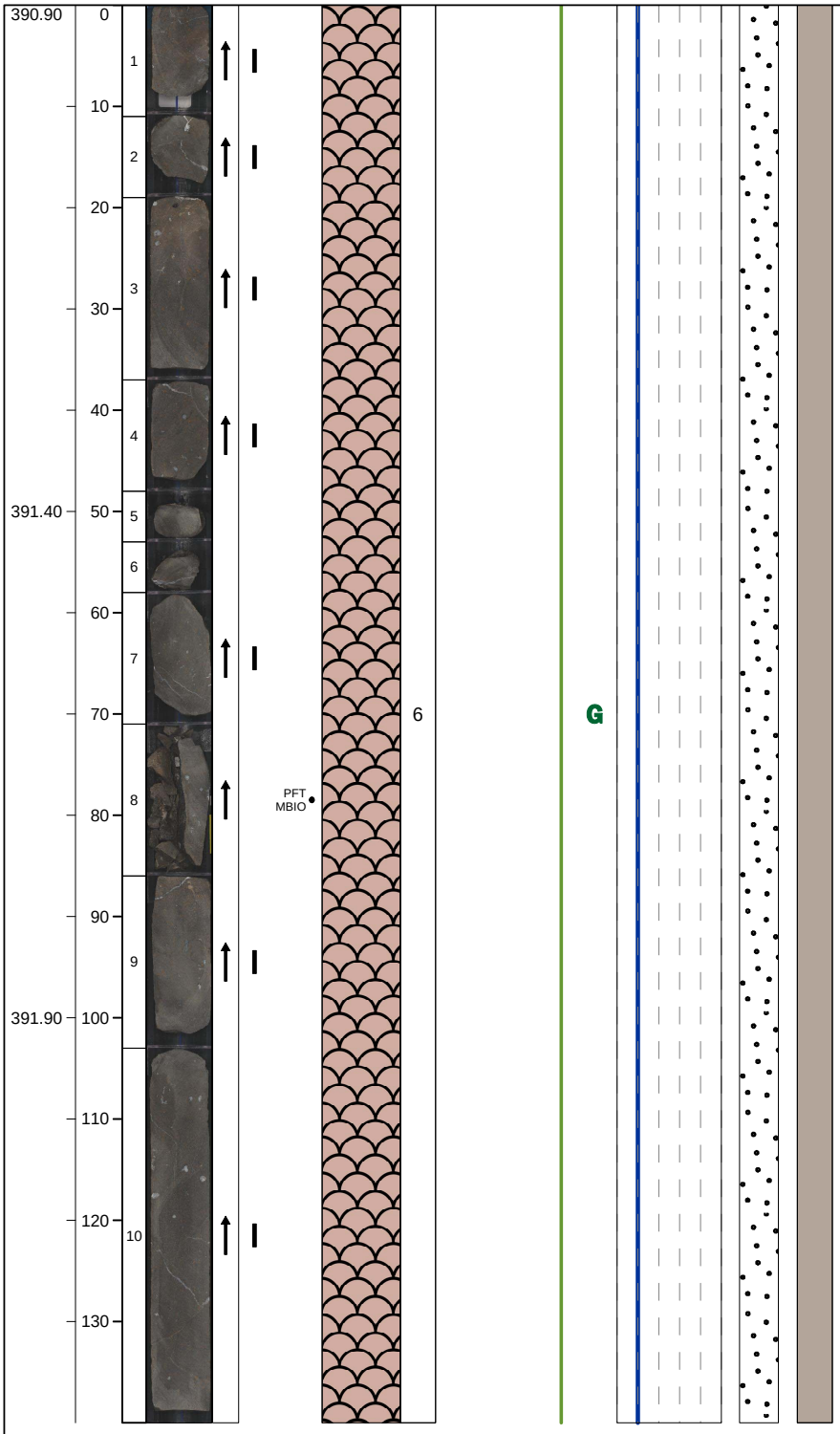
Hole 390-U1556B-18R Section 2, Top of Section: 389.5 m (CSF-A)



Description

390-U1556B-18R-2-A, 0-140 cm
UNIT: 6
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 5/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, 100% altered. Chilled margins appear to be very sparsely olivine phyric and these olivine microphenocrysts are unaltered or only slightly altered in pieces 3 and possible 5.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity could be described as bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, 100% filled by calcite. Piece 1 through 4, 11 and 12 contains larger (up to 10 mm on the core face) vesicles / vugs, irregular in shape, that are filled by calcite. No obvious preferred orientation.
ALTERATION: Orange speckled background with abundant diffuse orange and dark halos, the latter often around thin veins. Grey mottled alteration along chilled margins common.
VEINS: Sparse carbonate and saponite veins, often with dark halos. Thin saponite veins with light grey alteration as halo seen in chilled margin (piece 3). Orange mineral (or mixture) not seen in preceding cores occurs in a couple of veins and continues to appear occasionally in subsequent cores (tentatively identified as calcite + zeolite).

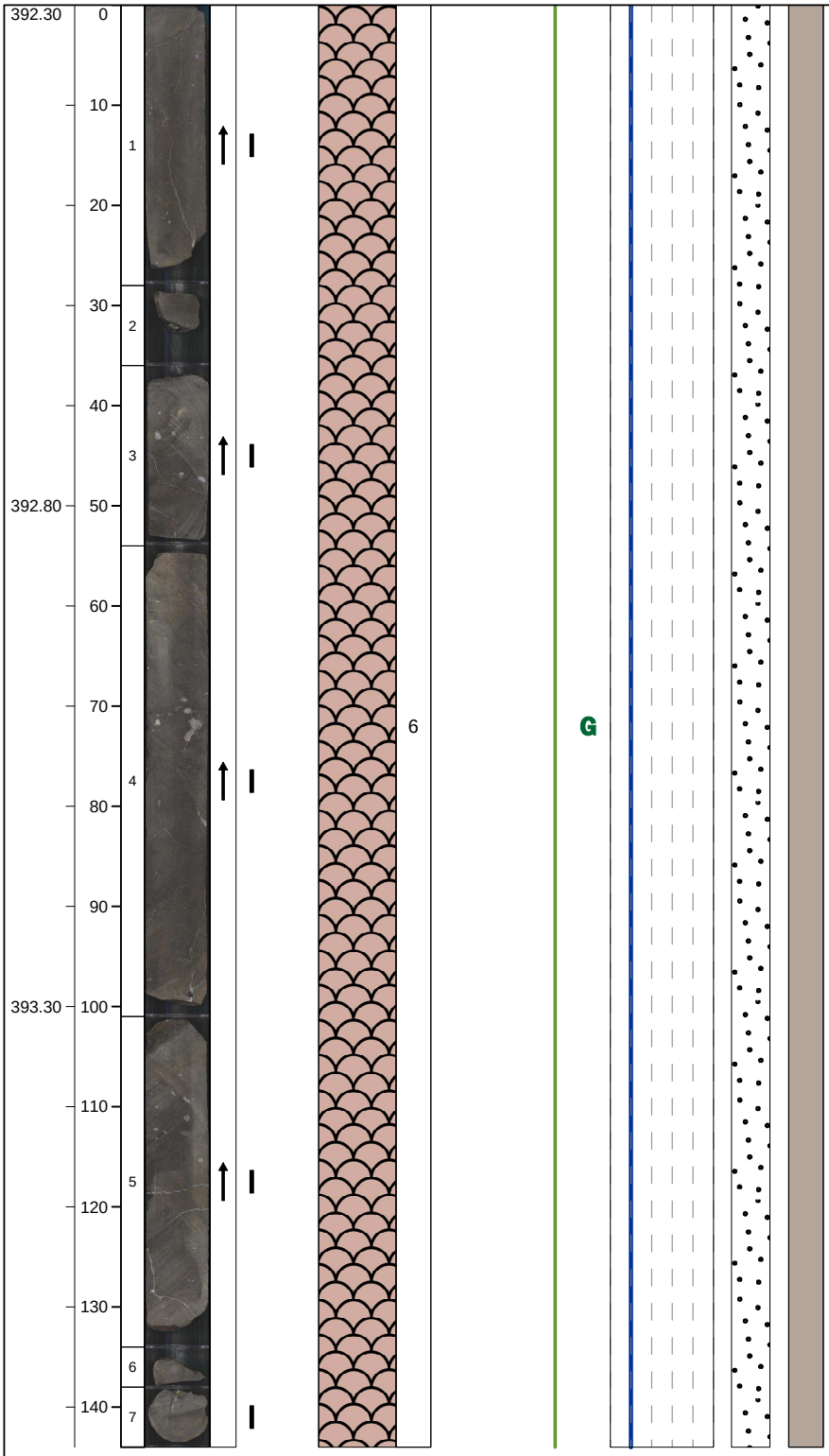
Hole 390-U1556B-18R Section 3, Top of Section: 390.9 m (CSF-A)



Description

390-U1556B-18R-3-A, 0-140 cm
UNIT: 6
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 5/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, 100% altered. Chilled margins appear to be very sparsely olivine phyric and these olivine microphenocrysts are unaltered or only slightly altered in pieces 3 and possible 5.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity could be described as bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, 100% filled by calcite. Pieces 1 through 4 and 7 through 10 contain larger (up to 8 mm on the core face) vesicles / vugs, irregular in shape, that are filled by calcite. No obvious preferred orientation.
ALTERATION: Orange halo with several complex halos with inner orange and outer dark zones (seen in previous cores but particularly abundant here). These often overprint large diffuse areas of diffuse orange halo. Some grey speckled alteration of variolitic chilled margins also present.
VEINS: Sparse carbonate and saponite veins, several with compound orange - dark halos.

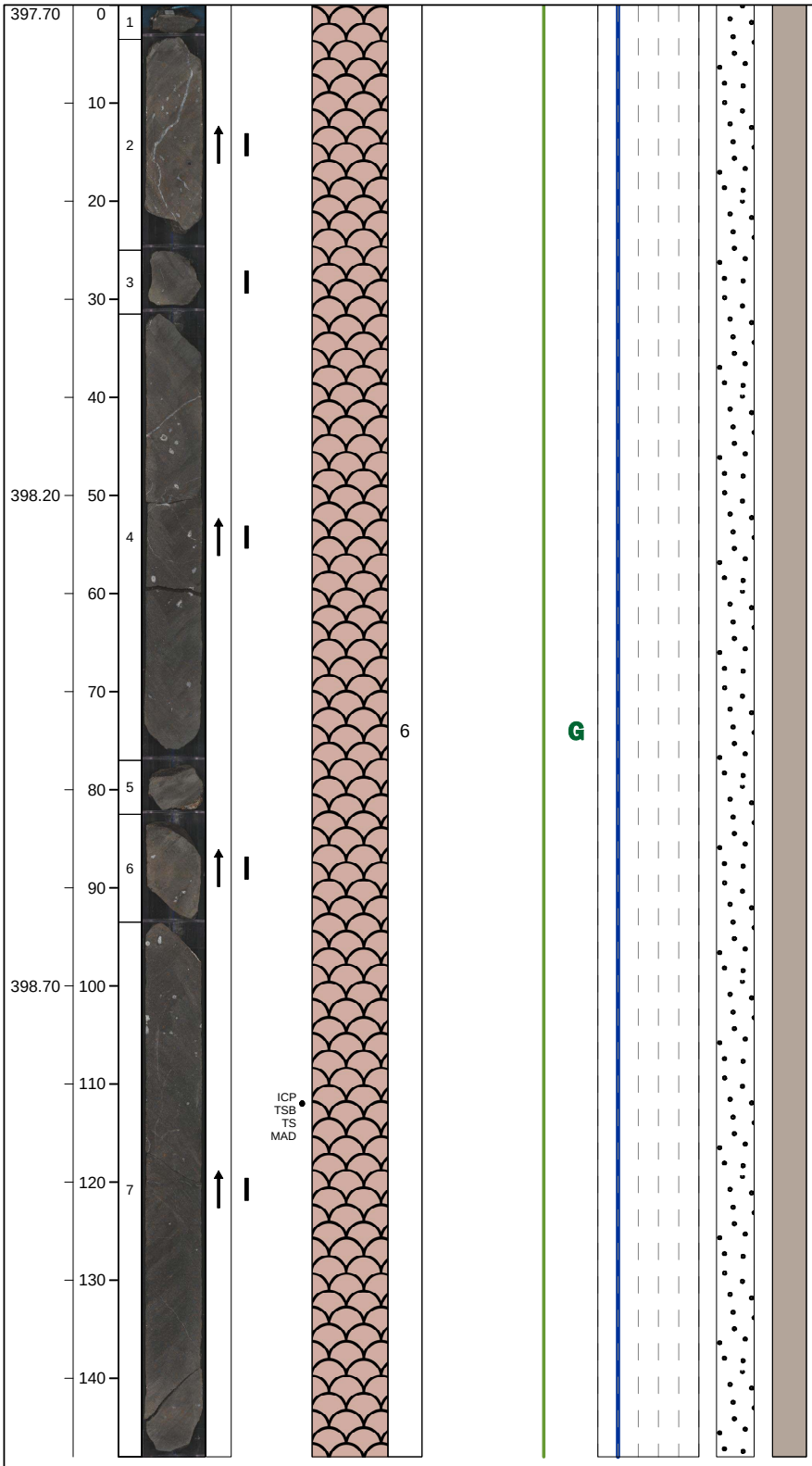
Hole 390-U1556B-18R Section 4, Top of Section: 392.3 m (CSF-A)



Description

390-U1556B-18R-4-A, 0-144 cm
UNIT: 6
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 5/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric in this interval.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity could be described as bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, 100% filled by calcite. Pieces 1 through 5 and 7 contain larger (up to 7 mm on the core face) vesicles / vugs, irregular in shape, that are filled by calcite. No obvious preferred orientation.
ALTERATION: Orange speckled background with some complex halos. Overall a bit darker with less pervasive background oxidation (i.e. diffuse orange halo) than preceding sections.
VEINS: Sparse carbonate and saponite veins, several with compound orange - dark halos.

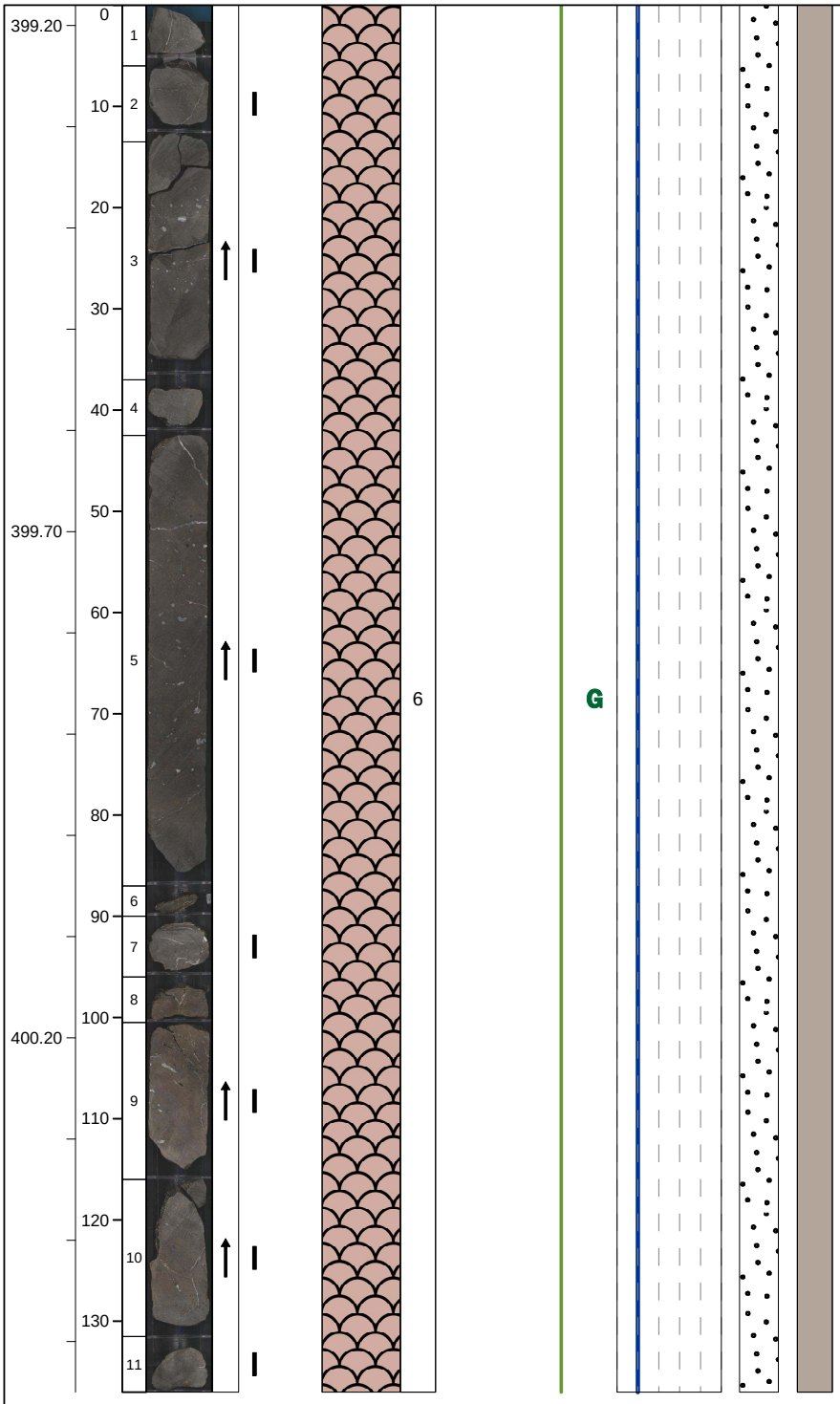
Hole 390-U1556B-19R Section 1, Top of Section: 397.7 m (CSF-A)



Description

390-U1556B-19R-1-A, 0-148 cm
UNIT: 6
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 4/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric in this interval with the possible exception of piece 6, but crystals too small for positive identification.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity could be described as bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles that are homogenously distributed throughout the piece, 100% filled by calcite. Pieces 2, 4, 6 and 7 contain larger (up to 12 mm on the core face) vesicles / vugs, irregular in shape, that are partially to totally filled by calcite. The large vesicles in piece 1 appear to be concentrated in a band ~ 3 cm wide with the directio nof elongation perpendicular to the chilled margin. No obvious preferred orientation is noted for other core pieces.
ALTERATION: Orange speckled background with large intervals of diffuse orange halo, generally near and paralleling chilled margins, and sometimes alternating with dark halos; dark saponitic patches round vesicles, chilled margin altered to typical grey mottled colour picking out variolitic textures.
VEINS: Sparse (but occasionally thick) carbonate and (thin) saponite veins, several with compound orange - dark halos. Moderatly abundant vesicles filled by white carbonate.

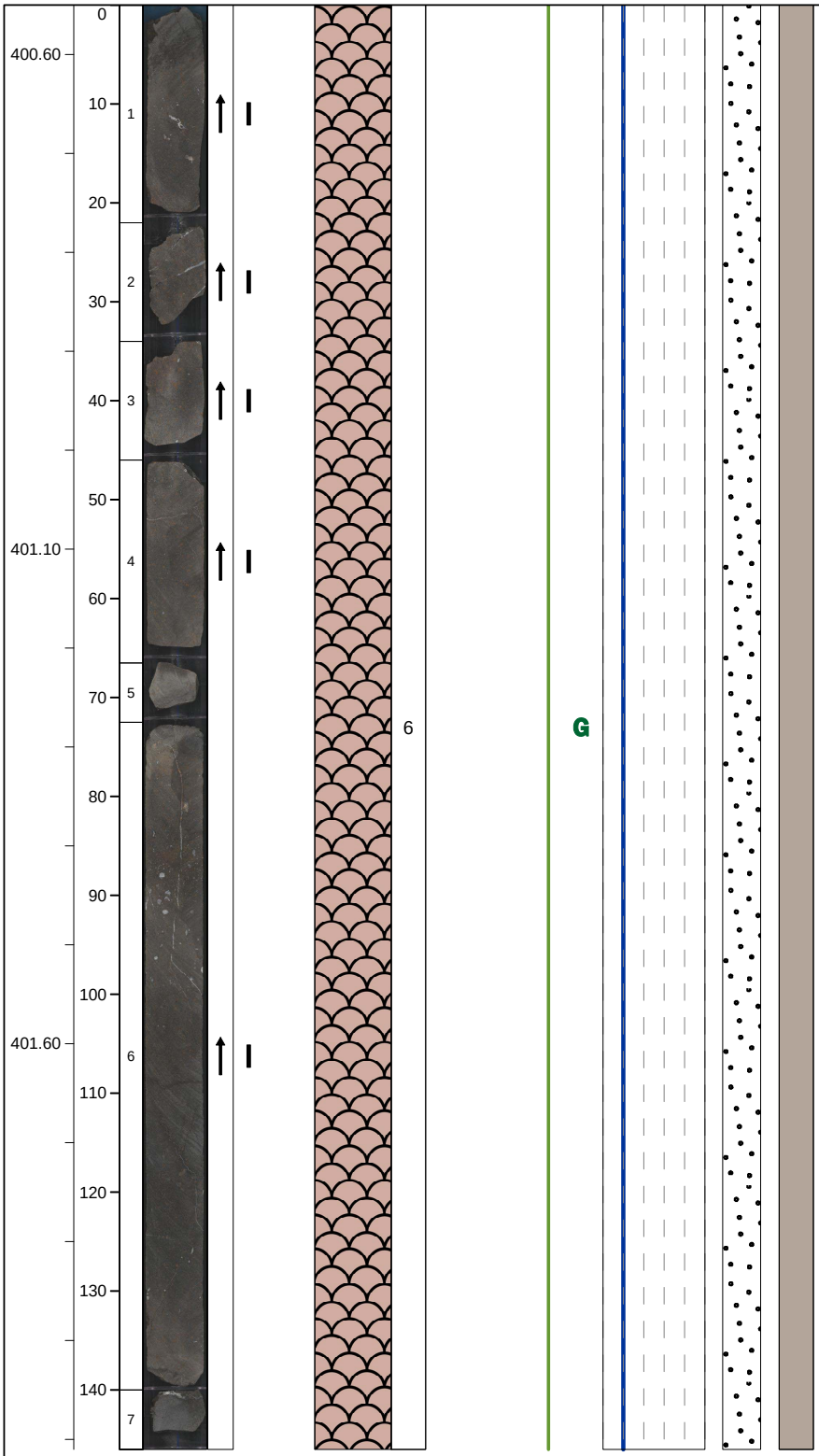
Hole 390-U1556B-19R Section 2, Top of Section: 399.18 m (CSF-A)



Description

390-U1556B-19R-2-A, 0-137 cm
UNIT: 6
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric in this interval. Typical occurrence of the olivines in glomerocrystic clusters.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity is bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece; 100% filled by calcite. Pieces 3, 5, 9, and 10 contain larger (up to 15 mm on the core face) vesicles / vugs, irregular in shape that are heterogeneously distributed in the core and are filled by calcite. The large vesicles in piece 1 appear to be concentrated in bands or clusters in pieces 3, 5 and 9, and in piece 5 the band (~ 4 - 5 mm wide is located about 2 - 3 mm below the chilled margin.
ALTERATION: Pervasive orange halo type alteration affects much of section imparting orange colouration throughout and partially overprinting other alteration styles, particularly light mottled grey chilled margins. Some veins have complex halos with dark saponitic outer zones but there are fewer areas of diffuse dark orange speckled background alteration in this section (phenocrysts remain pervasively reddened as in almost all sections).
VEINS: Carbonate and saponite veins, moderately abundant in some intervals (e.g. piece 9), several with compound orange - dark halos, in places also wrapping around vesicles which form interconnected radial oriented porosity together with veins at pillow margins (piece 9)

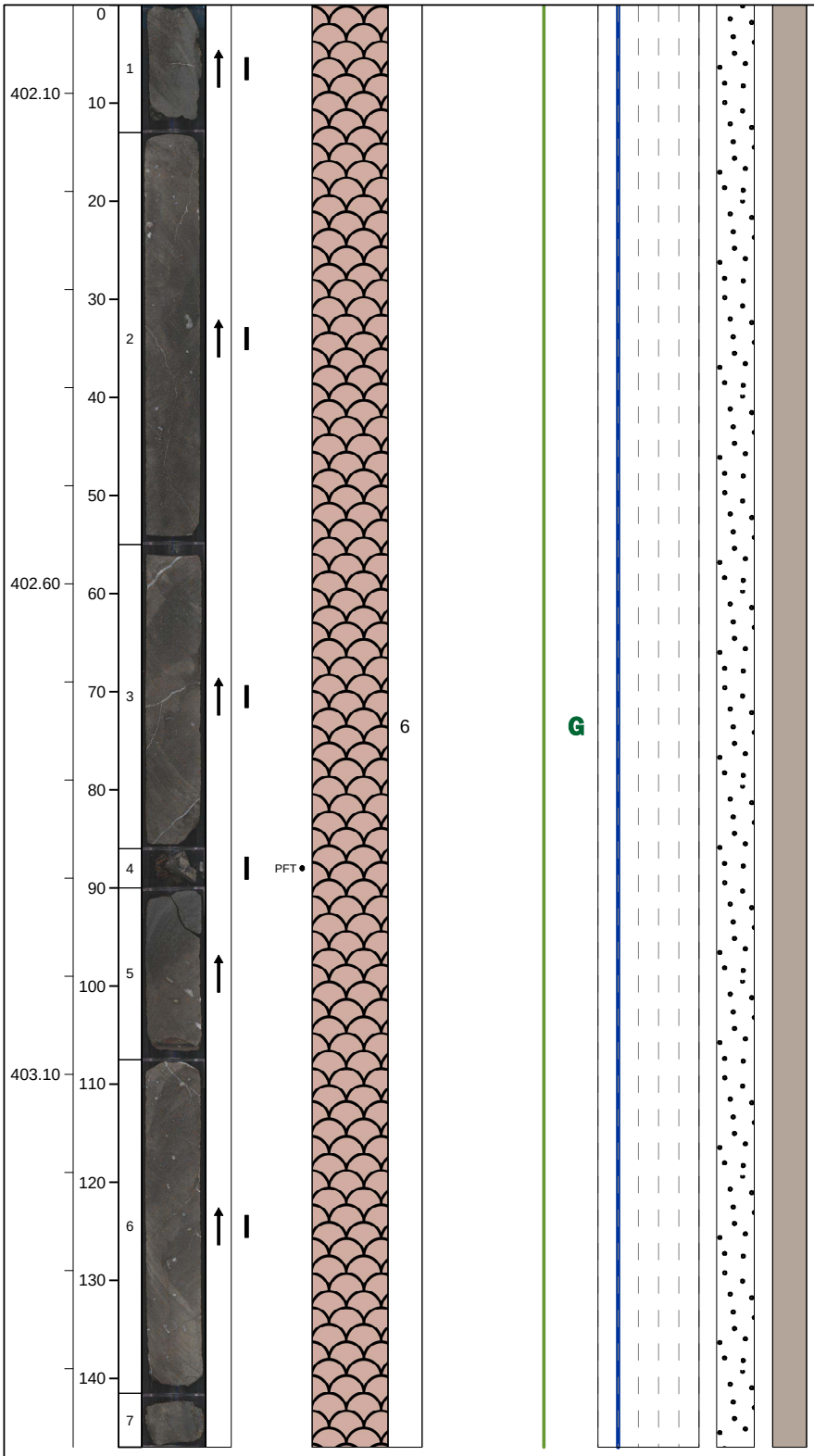
Hole 390-U1556B-19R Section 3, Top of Section: 400.55 m (CSF-A)



Description

390-U1556B-19R-3-A, 0-146 cm
UNIT: 6
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 4/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric in this interval, although piece 7 may retain a few small fresh olivines. Typical occurrence of the olivines in glomerocrystic clusters.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity is bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Pieces 1, 4, and 6 contain larger (up to 10 mm on the core face) vesicles / vugs, irregular in shape that are heterogeneously distributed in the core and partially to totally filled by calcite. No preferred orientation or position is observed
ALTERATION: Orange speckled background; large pillow (piece 6) shows alteration profile with diffuse orange halos at margins grading to dark grey in core,15cm interval (116-130cm) very dark background and one small patch without reddened phenocrysts. Overall background colour appears increasingly dark in this and preceding cores. Somewhat unclear in hand specimen whether this relates to fresher rock or pervasive saponitic alteration; presence of fresh(er) olivine in core suggests the former.
VEINS: Carbonate and saponite veins, several with compound orange - dark halos, often superimposed on more diffuse orange halos. Area of dark grey background without reddened phenocrysts shows dark halo around vein suggesting groundmass predominantly not particularly saponite-altered outside halo. One large vein with abundant red Fe oxyhydroxides is notable for diverging from some combination of only carbonate and saponite.

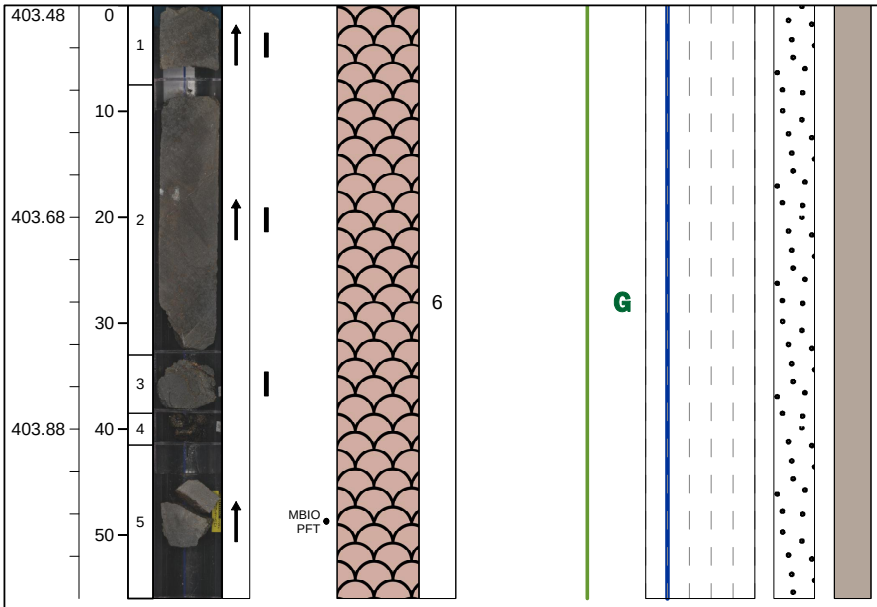
Hole 390-U1556B-19R Section 4, Top of Section: 402.01 m (CSF-A)



Description

390-U1556B-19R-4-A, 0-147 cm
UNIT: 6
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 4/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric to very sparsely phyric with possible fresh olivine in the chilled margins of pieces 1, 5b and 7. Typical occurrence of the olivines in glomerocrystic clusters.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity is bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Pieces 2, 3, 5, and 6 contain larger (up to 15 mm in the long dimension) vesicles / vugs. The largest vesicles are elongate, e.g. max length 15 mm, but only about 3 mm wide. These irregularly shaped vesicles are heterogeneously distributed in the core and partially to totally filled by calcite. No preferred orientation or position is observed in this section.
ALTERATION: Orange speckled background overprinted by numerous well-defined orange halos (20-30mm half width, some wider and more diffuse) around sub-vertical carbonate veins, usually with an additional orange cored - dark brown rimmed compound halo (~2-3mm half width). Darker orange speckled background between orange halos quite uniform.
VEINS: Carbonate and saponite veins, notable for having clearly defined broad orange halos, as well as superimposed thinner orange - dark brown compound halos

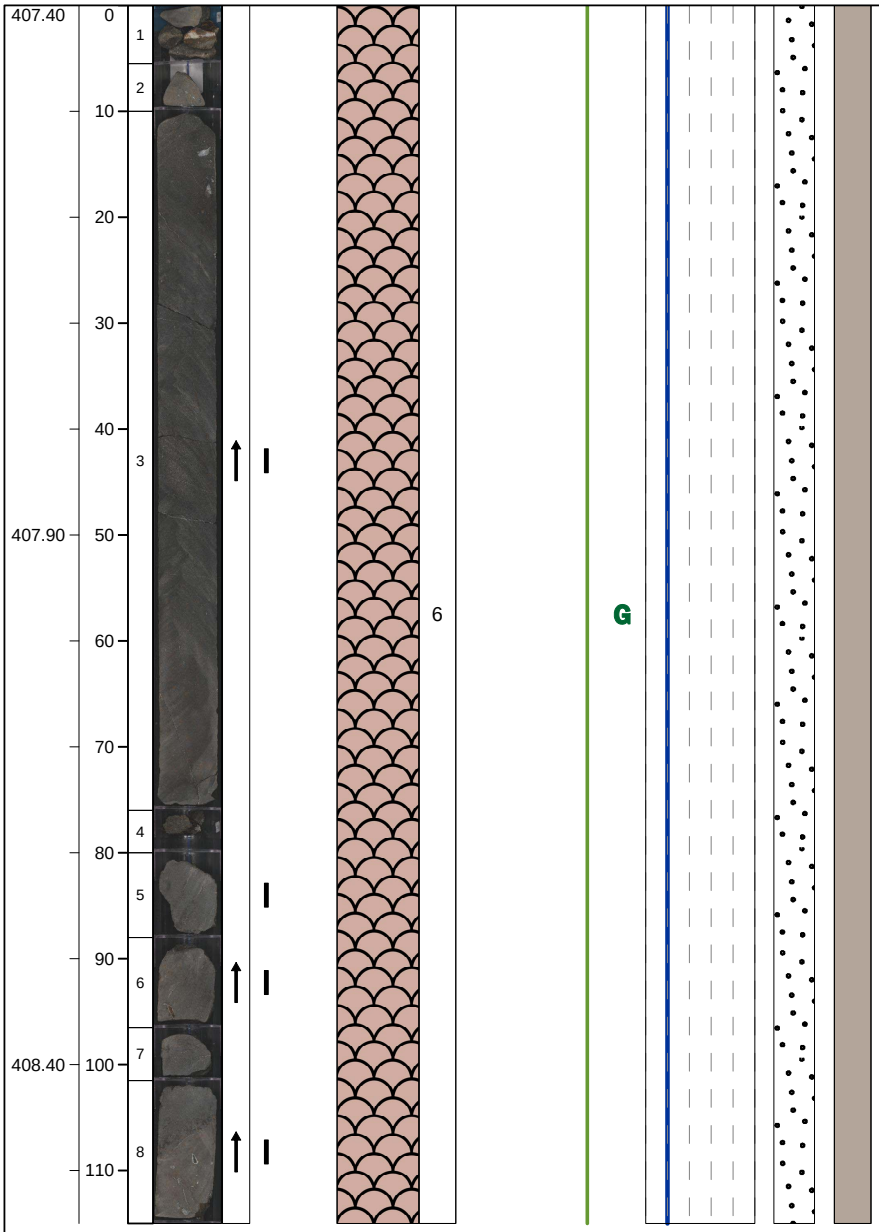
Hole 390-U1556B-19R Section 5, Top of Section: 403.48 m (CSF-A)



Description

390-U1556B-19R-5-A, 0-56 cm
UNIT: 6
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 4/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric to very sparsely phyric with possible fresh olivine in the chilled margins of piece 3. Typical occurrence of the olivines in glomerocrystic clusters.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity is bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Piece 2 contains larger (up to 12 mm) vesicles / vugs that are elongate. These irregularly shaped vesicles are heterogeneously distributed in the core and partially to totally filled by calcite. No preferred orientation or position is observed in this section.
ALTERATION: Orange speckled background with vein-related, dark brown rimmed orange halo; some grey mottled alteration on chilled rims - in this core, this alteration style appear darker, browner and generally muddier looking (approx. 2.5Y 4/1) in contrast to the un-tinted pale grey which typified shallower cores (typically closer to 2.5Y 5/1).
VEINS: Veins rare, carbonate and saponite, on with well-defined compound halo (piece 2).

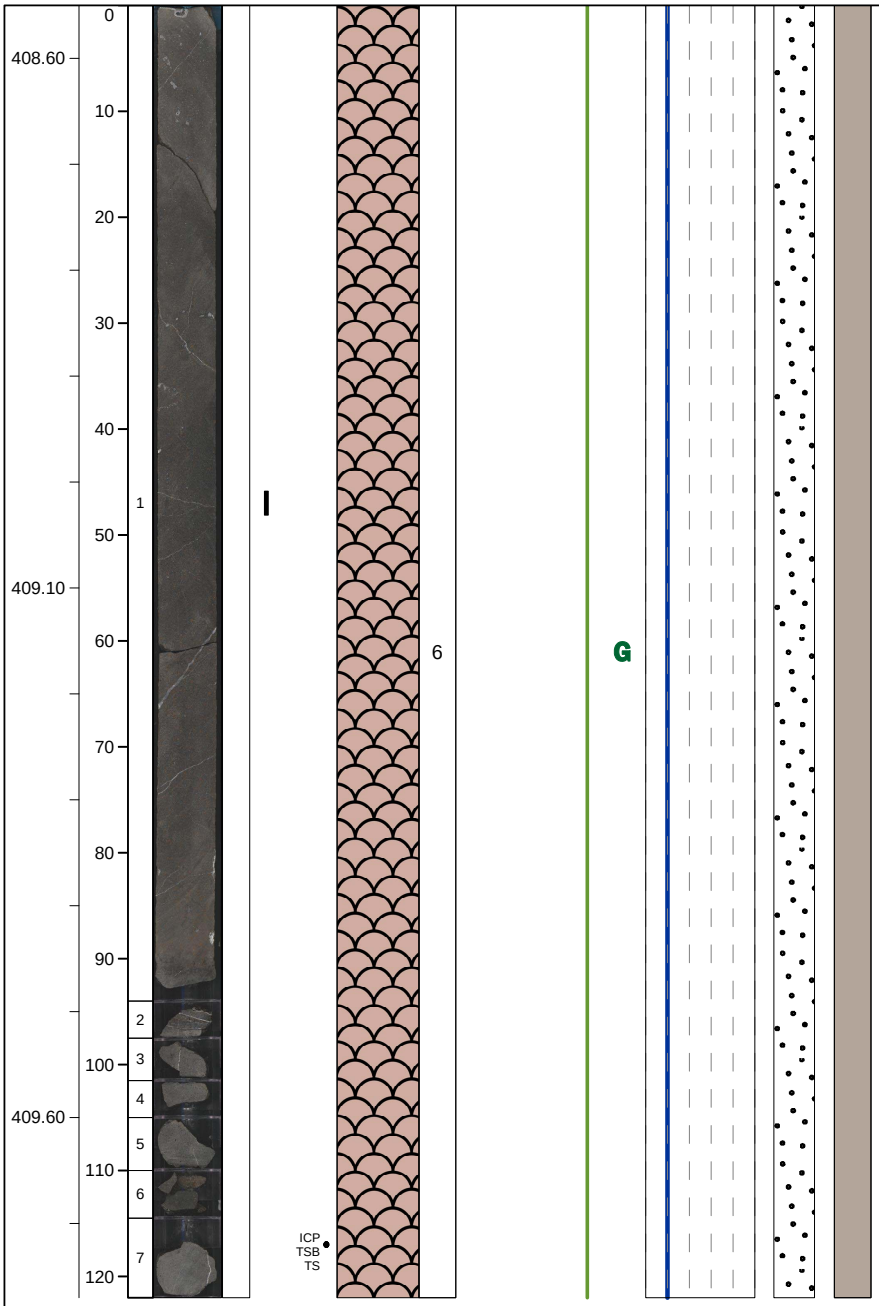
Hole 390-U1556B-20R Section 1, Top of Section: 407.4 m (CSF-A)



Description

390-U1556B-20R-1-A, 0-115 cm
UNIT: 6
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 4/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric to very sparsely phyric with possible fresh olivine in the chilled margins of pieces 5a, 6, 7, and 8. Typical occurrence of the olivines in glomerocrystic clusters.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity is bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Pieces 2 and 9 contain larger (up to 20 mm x 3 mm) vesicles / vugs that are elongate, possibly oriented perpendicular to the chilled margin in piece 9. These irregularly shaped vesicles are heterogeneously distributed in the core and partially to totally filled by calcite.
ALTERATION: Orange speckled background, very dark with few orange or dark halos; quite abundant intervals of light grey speckled alteration to variolitic quenched margins with slightly muddy appearance similar to preceding core.
VEINS: Very sparse carbonate and saponite veins, all very thin and most without halos (possible some dark halos invisible due to darkness of background in this section)

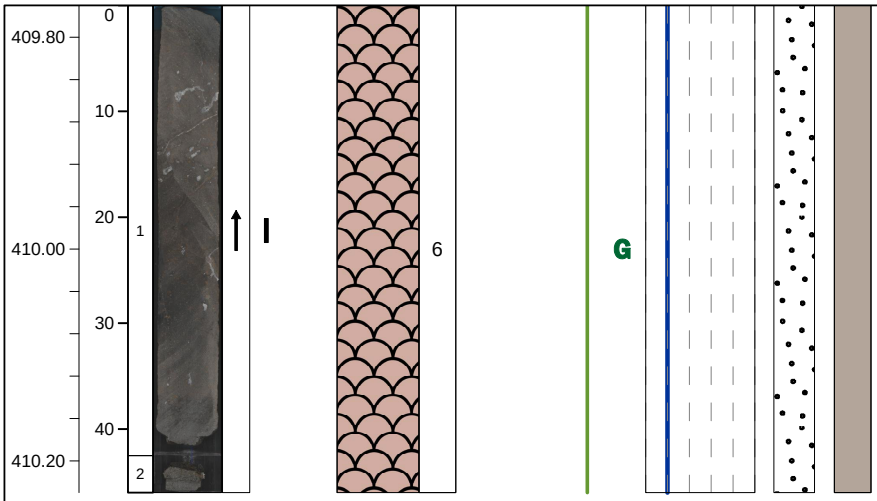
Hole 390-U1556B-20R Section 2, Top of Section: 408.55 m (CSF-A)



Description

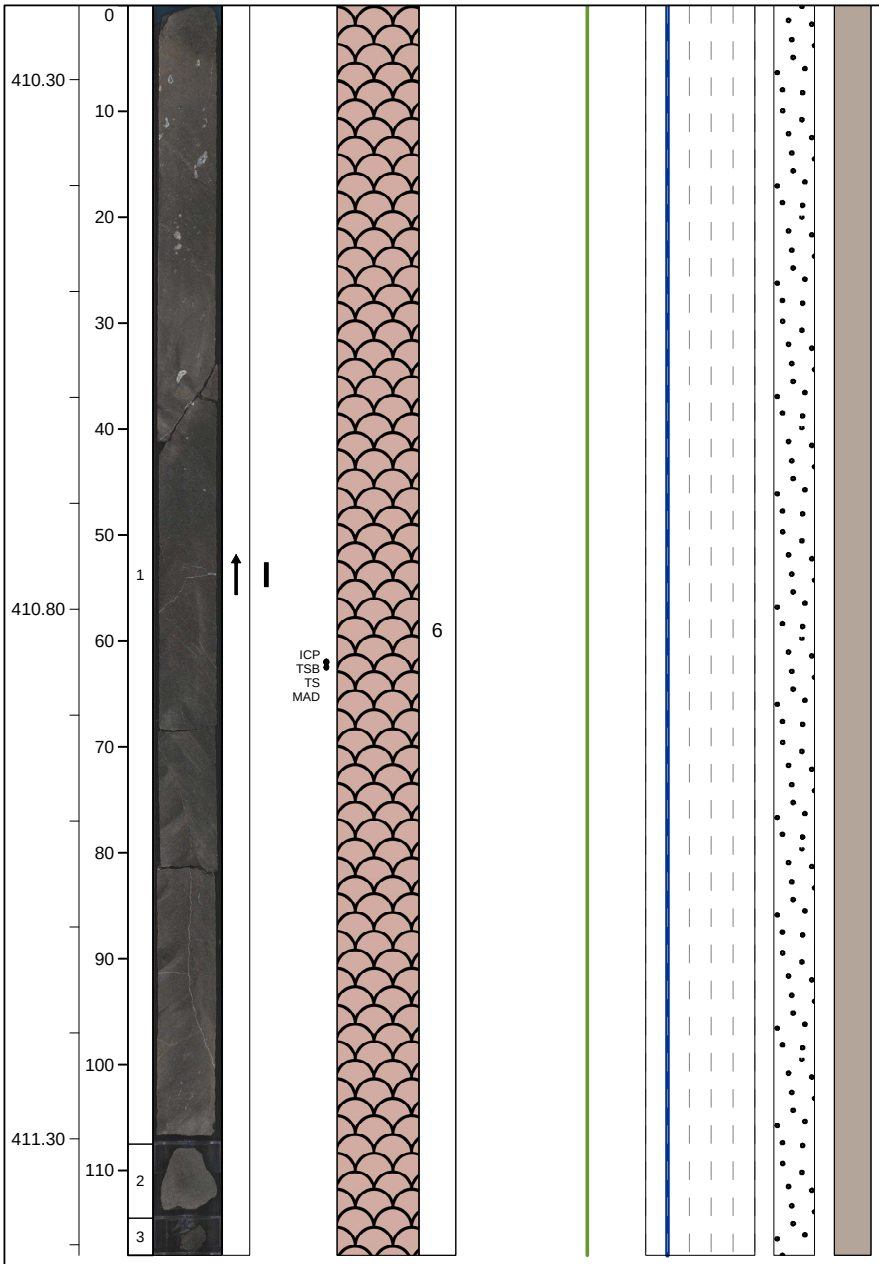
390-U1556B-20R-2-A, 0-122 cm
UNIT: 6
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 4/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric to very sparsely phyric with possible fresh olivine in the chilled margins of pieces 3 through 7. Typical occurrence of the olivines in glomerocrystic clusters.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity is bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Piece 1 contains larger (up to 30 mm x 3 mm) vesicles / vugs that are elongate, possibly oriented perpendicular to the chilled margin. These irregularly shaped vesicles are heterogeneously distributed in the core and partially to totally filled by calcite.
ALTERATION: Orange speckled background, very dark with several diffuse orange dark halos; slightly more olivine phyric than most cores, giving overall redder appearance to rock but overall alteration is broadly similar to preceding section.
VEINS: Moderately abundant carbonate and saponite veins sometimes with Fe oxyhydroxide lining, variable widths, few with well defined halos; rarer carbonate + orange pink ?zeolite (zeolite + calcite + clay?) veins or inclusions.

Hole 390-U1556B-20R Section 3, Top of Section: 409.77 m (CSF-A)



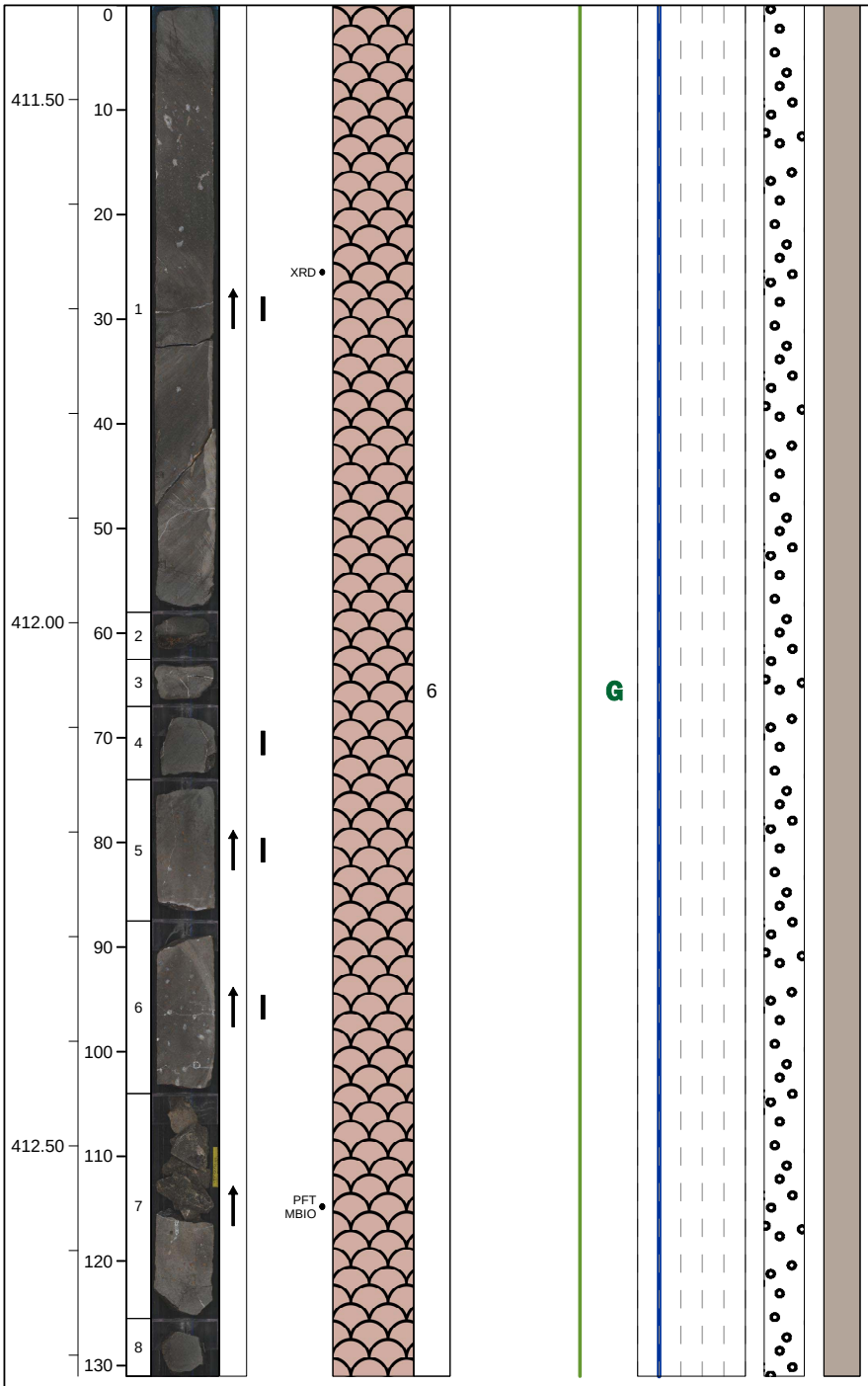
390-U1556B-20R-3-A, 0-46 cm
UNIT: 6
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 4/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric to very sparsely phyric with possible fresh olivine in the chilled margins of pieces 3 through 7. Typical occurrence of the olivines in glomerocrystic clusters.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity is bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Piece 1 contains larger (up to 16 mm x 2 mm) vesicles / vugs that are elongate. These irregularly shaped vesicles are heterogeneously distributed in the core and partially to totally filled by calcite.
ALTERATION: Orange speckled background, very dark with several compound halos round thin veins.
VEINS: Sparse carbonate-saponite veins with compound halos which often wrap around vesicles too; rarer carbonate + orange pink ?zeolite (zeolite + calcite + clay?) veins or inclusions.

Hole 390-U1556B-20R Section 4, Top of Section: 410.23 m (CSF-A)



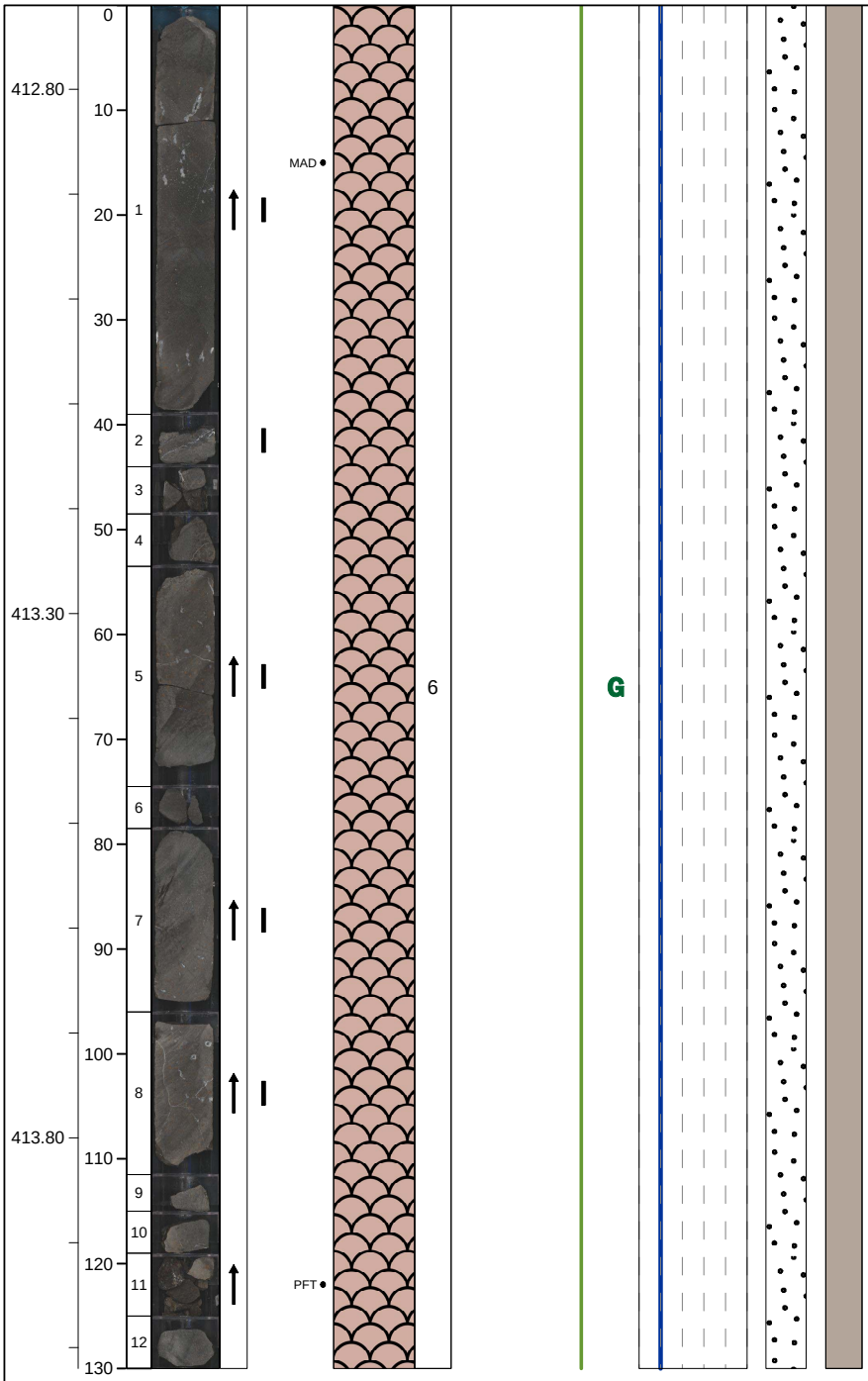
390-U1556B-20R-4-A, 0-118 cm
UNIT: 6
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 4/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, Olivines in the pillow interior are 75% altered for the interval as a whole, although in most intervals the olivine is 100% altered. Piece 1, between 29-40 cm and between 71-79 cm, has olivine that is only moderately altered. Fresh olivines also in the chilled margins in pieces 2 and 3.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity is bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Piece 1, one long continuous piece that is 106 cm long, contains larger (up to 16 mm x 2 mm) vesicles / vugs that are elongate to irregular in shape that are concentrated between 4 and 35 cm, i.e. toward the top of the core piece where there is a chilled margin. This piece also has an intermediate size vesicle that is round and ~ 0.6 mm in size, concentrated in the same interval as the larger vesicles. The intermediate size vesicles are filled by calcite; the larger vesicles are partially to totally filled by calcite.
ALTERATION: Orange speckled background, with diffuse orange halos at top and bottom of large pillow and along veins but otherwise grading to very dark and relatively fresh in the centre of piece 1.
VEINS: Sparse carbonate-saponite veins and rarer carbonate + orange pink ?zeolite (zeolite + calcite + clay?) veins or inclusions.

Hole 390-U1556B-20R Section 5, Top of Section: 411.41 m (CSF-A)



390-U1556B-20R-5-A, 0-131 cm
UNIT: 6
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 4/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, Coarser grained intervals are moderately phyric ranging to sparsely phyric in chilled margins. Olivines in the pillow interior are 100% altered Fresh olivines occur in the chilled margins in pieces 1, through 8, and these areas are sparsely phyric.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity is bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Piece 1, one long continuous piece that is 38 cm long, contains larger (up to 16 mm x 3 mm) vesicles / vugs that are elongate to irregular in shape that are concentrated between 8 and 19 cm, i.e. toward the top of the core piece where there is a chilled margin. There are also some elongate, thinner vesicle 'pipes' that are perpendicular to the lower chilled margin. One of these can be traced discontinuously over a distance of ~ 4cm. Piece 1 also has an intermediate size vesicle that is round and ~ 0.75 mm in size, concentrated in the same interval as the larger vesicles. Pieces 5, 7, and 8 also have large and small vesicles. The intermediate size vesicles are filled by calcite, like the very small ones; the larger vesicles are partially to totally filled by calcite.
ALTERATION: Orange speckled background, with diffuse orange halos at top and bottom of large pillows and along veins. Several compound halos along carbonate - saponite veins.
VEINS: Sparse carbonate and saponite veins. Abundant 1mm vesicles interspersed with rarer large vugs (incomplete coalescence?) in piece 1, all filled by carbonate and orange mineral (or mixture), likely zeolite-bearing, which first appeared in core 18.

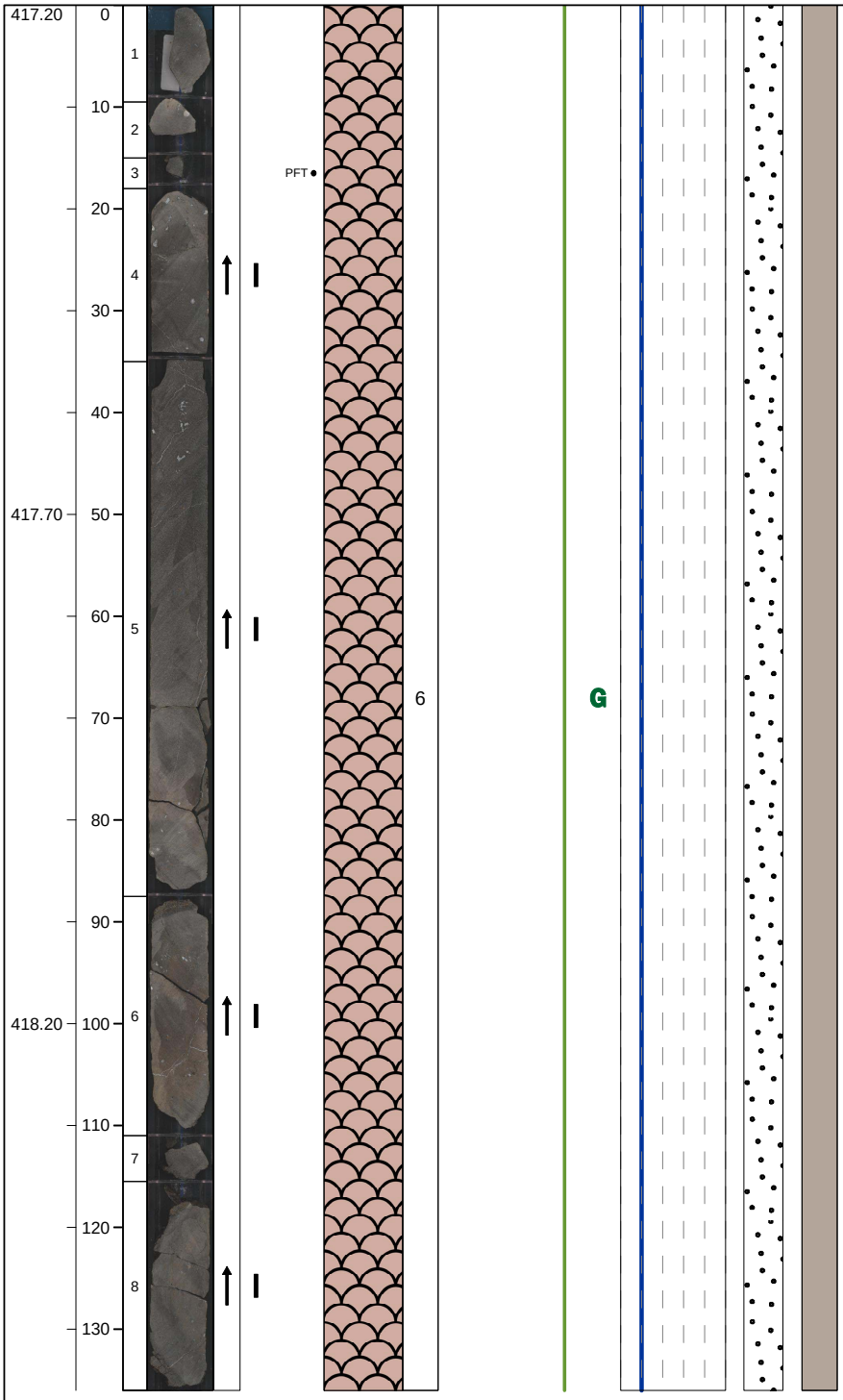
Hole 390-U1556B-20R Section 6, Top of Section: 412.72 m (CSF-A)



Description

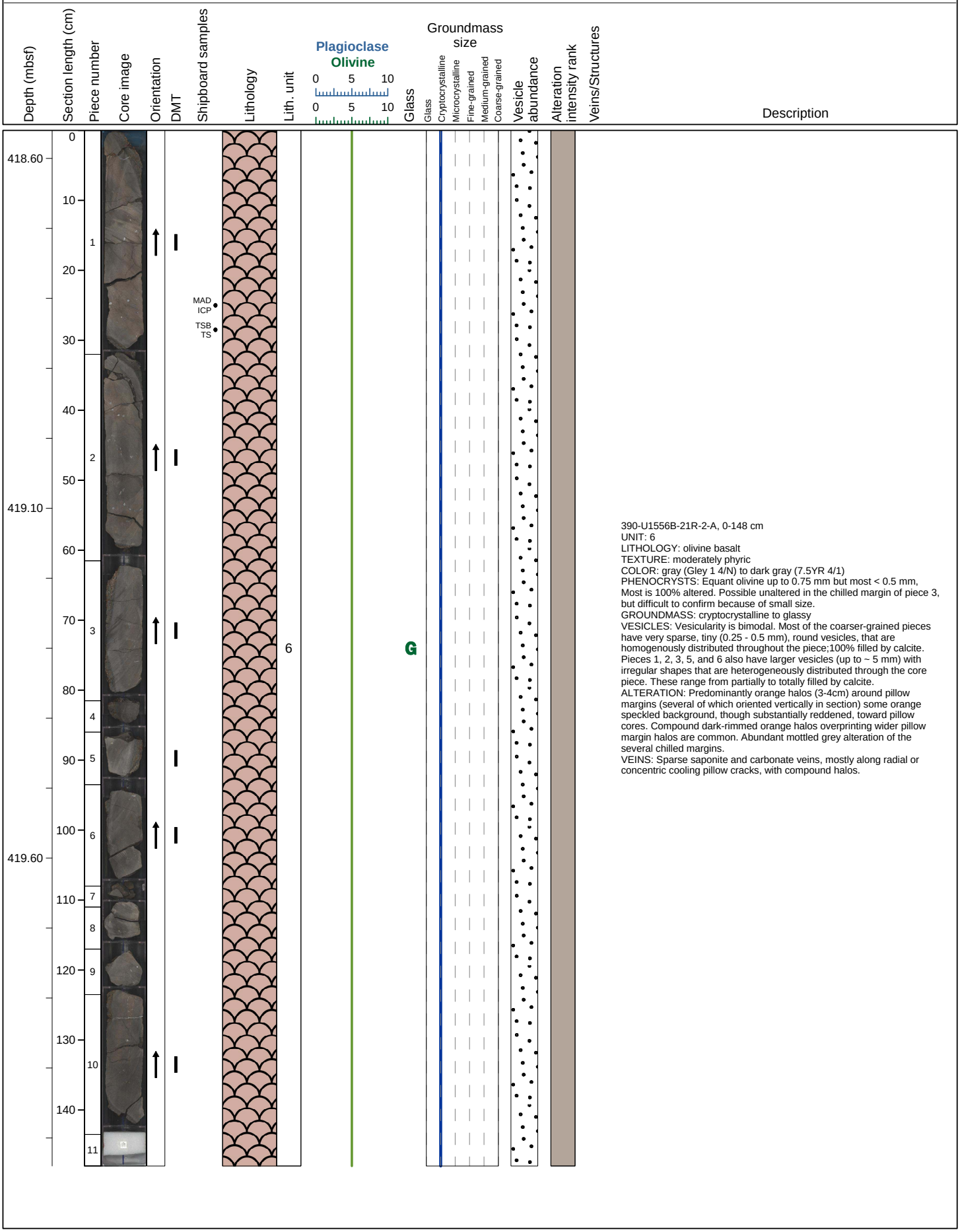
390-U1556B-20R-6-A, 0-130 cm
UNIT: 6
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 4/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, Coarser grained intervals are moderately phyric ranging to sparsely phyric in chilled margins. Olivines in the pillow interior are 100% altered Fresh olivines occur in the chilled margins in pieces 1, 4, 5, 6, and 7 and these areas are sparsely phyric.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity is bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Piece 1, one long continuous piece that is 38 cm long, contains larger (up to 16 mm x 3 mm) vesicles / vugs that are elongate to irregular in shape that are concentrated between 8 and 19 cm, i.e. toward the top of the core piece where there is a chilled margin. There are also some elongate, thinner vesicle 'pipes' that are perpendicular to the lower chilled margin. One of these can be traced discontinuously over a distance of ~ 4cm. Piece 1 also has an intermediate size vesicle that is round and ~ 0.75 mm in size, concentrated in the same interval as the larger vesicles. Pieces 5, 7, and 8 also have large and small vesicles. The intermediate size vesicles are filled by calcite, like the very small ones; the larger vesicles are partially to totally filled by calcite.
ALTERATION: Orange speckled background, with diffuse orange halos at top and bottom of large pillows and along veins. Mottled grey alteration often reddened in orange halos at edge of pieces. Several compound halos along carbonate - saponite veins.
VEINS: Few veins, carbonate and saponate, with compound orange - dark rimmed halos. Large elongate partially carbonate filled vesicles in piece 1.

Hole 390-U1556B-21R Section 1, Top of Section: 417.2 m (CSF-A)



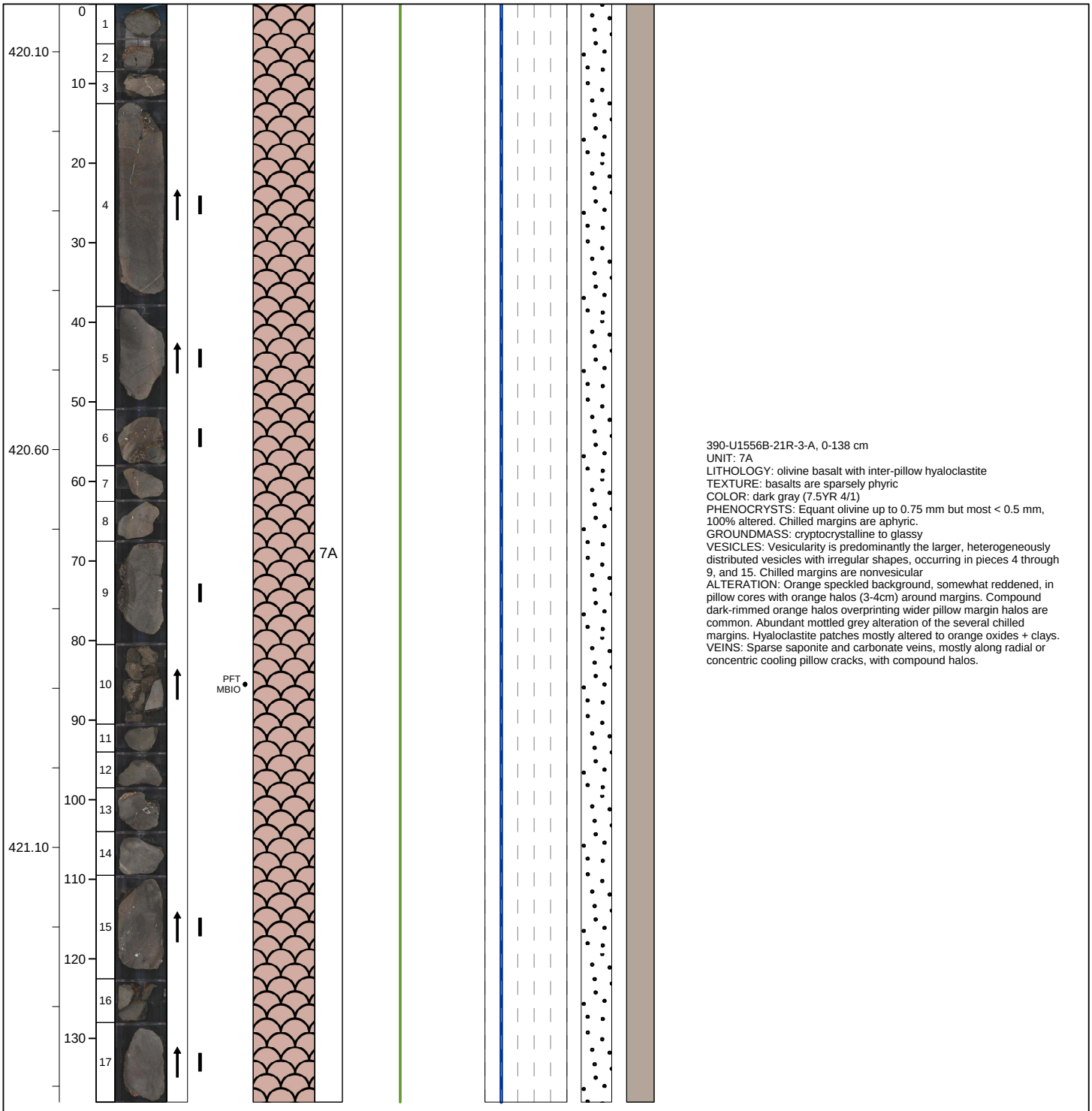
390-U1556B-21R-1-A, 0-136 cm
UNIT: 6
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 4/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, Overall alteration remains high for the section as a whole, but there are intervals in piece 5 along the left side of the archive core where the olivines are only partially altered (~ 50%). Fresh olivines may also be present in the chilled margins in pieces 6 through 8, but are too small to confirm.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity is bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Pieces 4, 5, 6, and 8 also have larger vesicles with irregular shapes that are heterogeneously distributed through the core piece. These range from partially to totally filled by calcite.
ALTERATION: Orange speckled background with large areas of well developed orange halos along veins (e.g. piece 4). Mottled grey alteration of variolitic chilled margins.
VEINS: Sparse saponite and carbonate veins with orange halos.

Hole 390-U1556B-21R Section 2, Top of Section: 418.56 m (CSF-A)



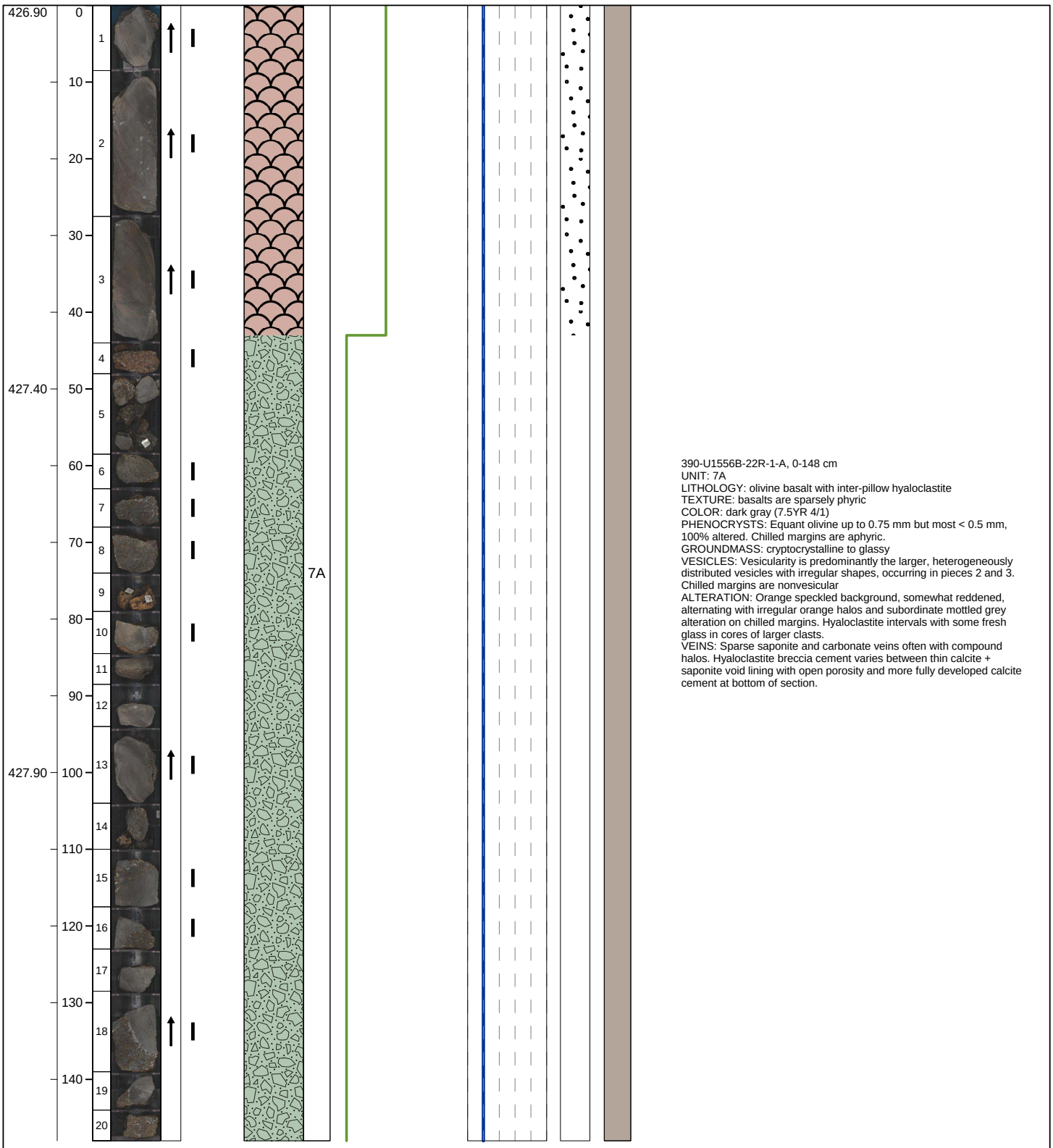
390-U1556B-21R-2-A, 0-148 cm
UNIT: 6
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 4/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, Most is 100% altered. Possible unaltered in the chilled margin of piece 3, but difficult to confirm because of small size.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity is bimodal. Most of the coarser-grained pieces have very sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Pieces 1, 2, 3, 5, and 6 also have larger vesicles (up to ~ 5 mm) with irregular shapes that are heterogeneously distributed through the core piece. These range from partially to totally filled by calcite.
ALTERATION: Predominantly orange halos (3-4cm) around pillow margins (several of which oriented vertically in section) some orange speckled background, though substantially reddened, toward pillow cores. Compound dark-rimmed orange halos overprinting wider pillow margin halos are common. Abundant mottled grey alteration of the several chilled margins.
VEINS: Sparse saponite and carbonate veins, mostly along radial or concentric cooling pillow cracks, with compound halos.

Hole 390-U1556B-21R Section 3, Top of Section: 420.04 m (CSF-A)



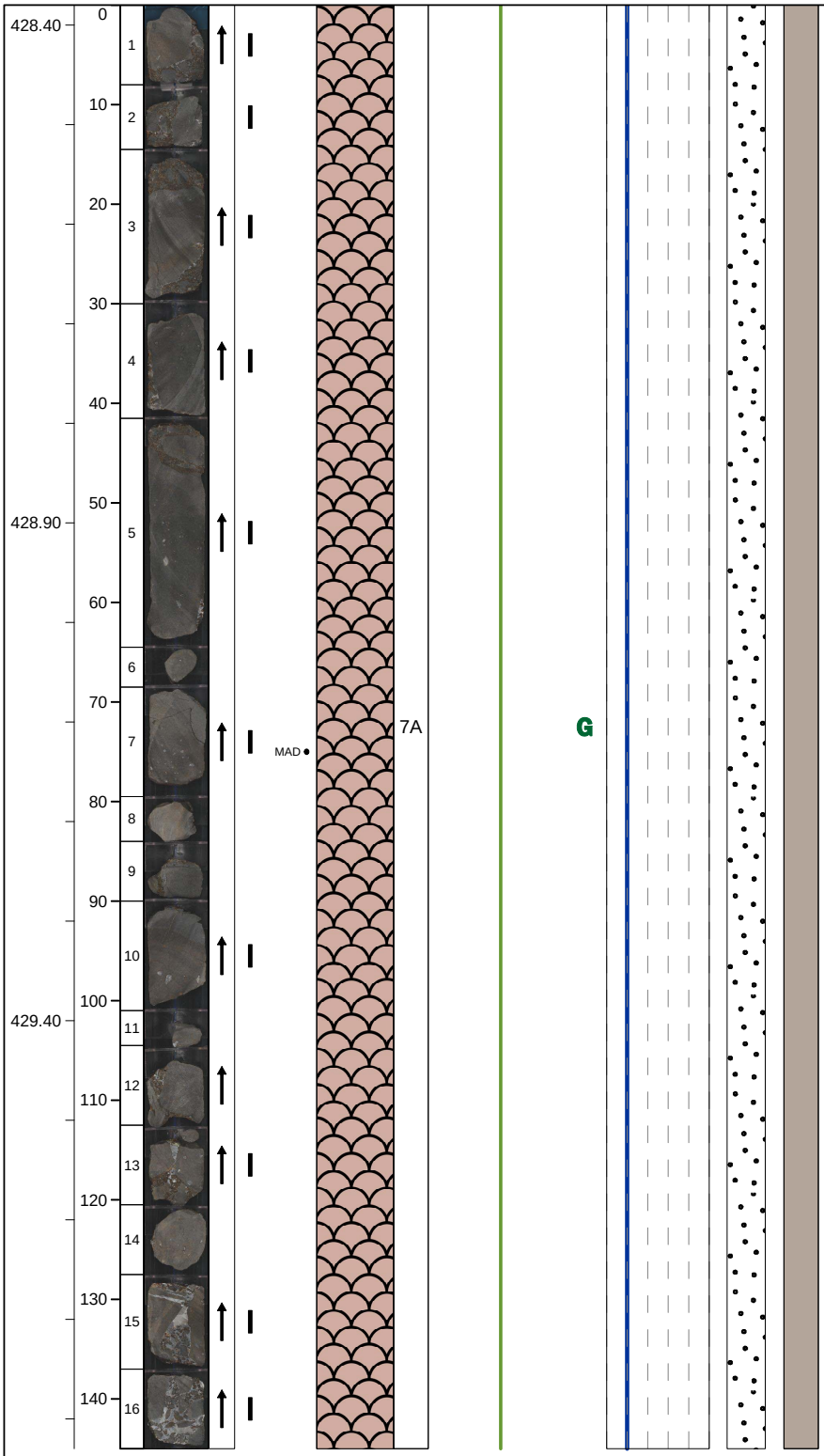
390-U1556B-21R-3-A, 0-138 cm
UNIT: 7A
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are sparsely phyric
COLOR: dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity is predominantly the larger, heterogeneously distributed vesicles with irregular shapes, occurring in pieces 4 through 9, and 15. Chilled margins are nonvesicular
ALTERATION: Orange speckled background, somewhat reddened, in pillow cores with orange halos (3-4cm) around margins. Compound dark-rimmed orange halos overprinting wider pillow margin halos are common. Abundant mottled grey alteration of the several chilled margins. Hyaloclastite patches mostly altered to orange oxides + clays.
VEINS: Sparse saponite and carbonate veins, mostly along radial or concentric cooling pillow cracks, with compound halos.

Hole 390-U1556B-22R Section 1, Top of Section: 426.9 m (CSF-A)



390-U1556B-22R-1-A, 0-148 cm
UNIT: 7A
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are sparsely phyric
COLOR: dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity is predominantly the larger, heterogeneously distributed vesicles with irregular shapes, occurring in pieces 2 and 3. Chilled margins are nonvesicular
ALTERATION: Orange speckled background, somewhat reddened, alternating with irregular orange halos and subordinate mottled grey alteration on chilled margins. Hyaloclastite intervals with some fresh glass in cores of larger clasts.
VEINS: Sparse saponite and carbonate veins often with compound halos. Hyaloclastite breccia cement varies between thin calcite + saponite void lining with open porosity and more fully developed calcite cement at bottom of section.

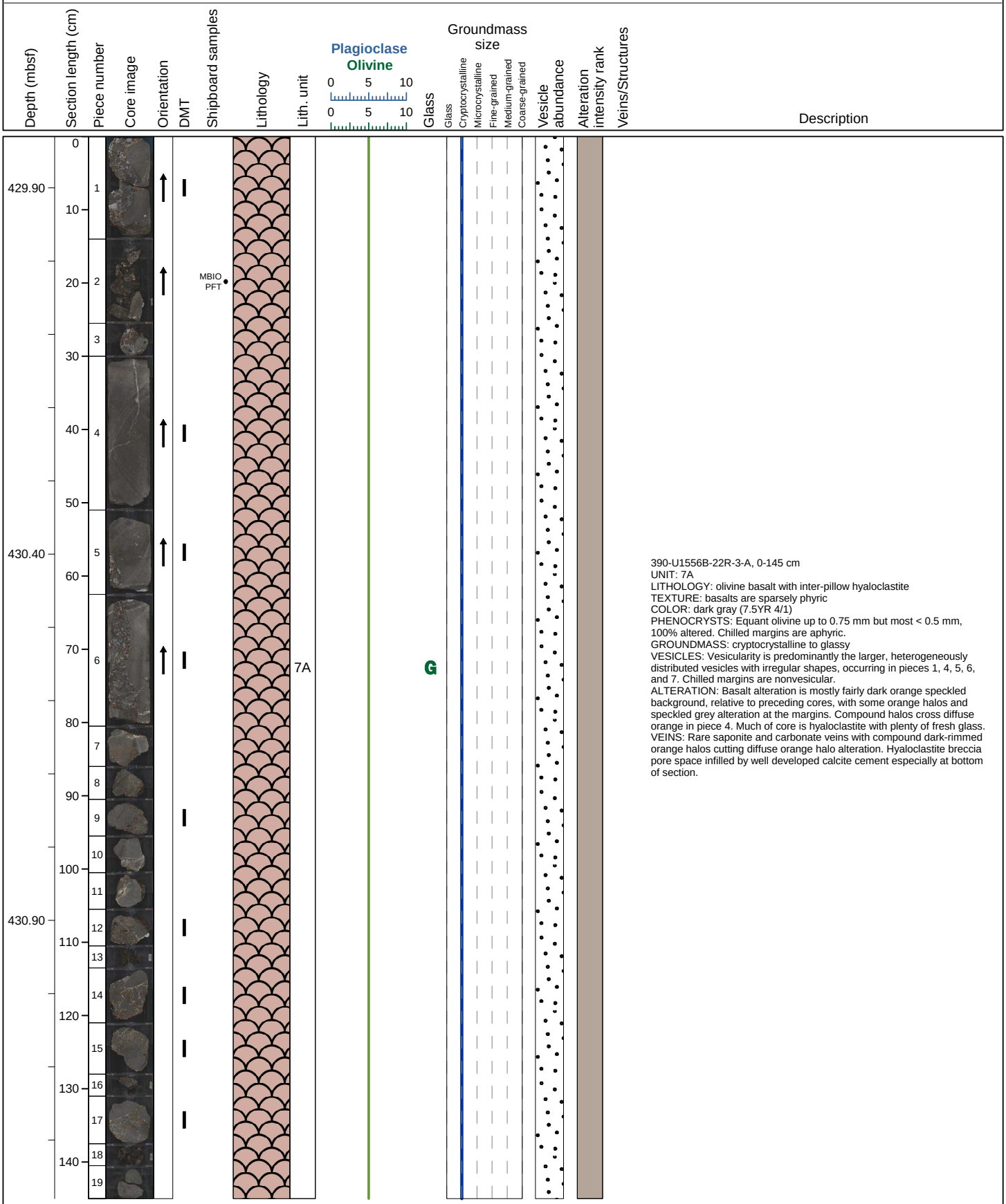
Hole 390-U1556B-22R Section 2, Top of Section: 428.38 m (CSF-A)



Description

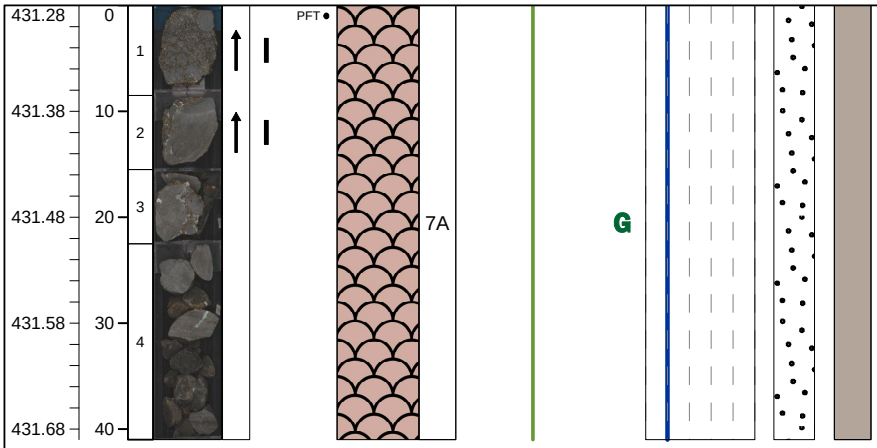
390-U1556B-22R-2-A, 0-145 cm
UNIT: 7A
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are sparsely phyric
COLOR: dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric, except for piece 10, which is very sparsely phyric and may have some olivine microphenocrysts that are only slightly altered.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity is predominantly the larger, heterogeneously distributed vesicles with irregular shapes, occurring in 3, 4, 5, 7, 8, 11, 13, 14, 15. Chilled margins are nonvesicular.
ALTERATION: Orange speckled background grading into irregular orange halos and mottled grey alteration on chilled margins. Hyaloclastite intervals with some fresh glass in cores of larger clasts.
VEINS: Rare saponite and carbonate veins. Hyaloclastite breccia pore space infilled by well developed calcite cement especially at bottom of section.

Hole 390-U1556B-22R Section 3, Top of Section: 429.83 m (CSF-A)



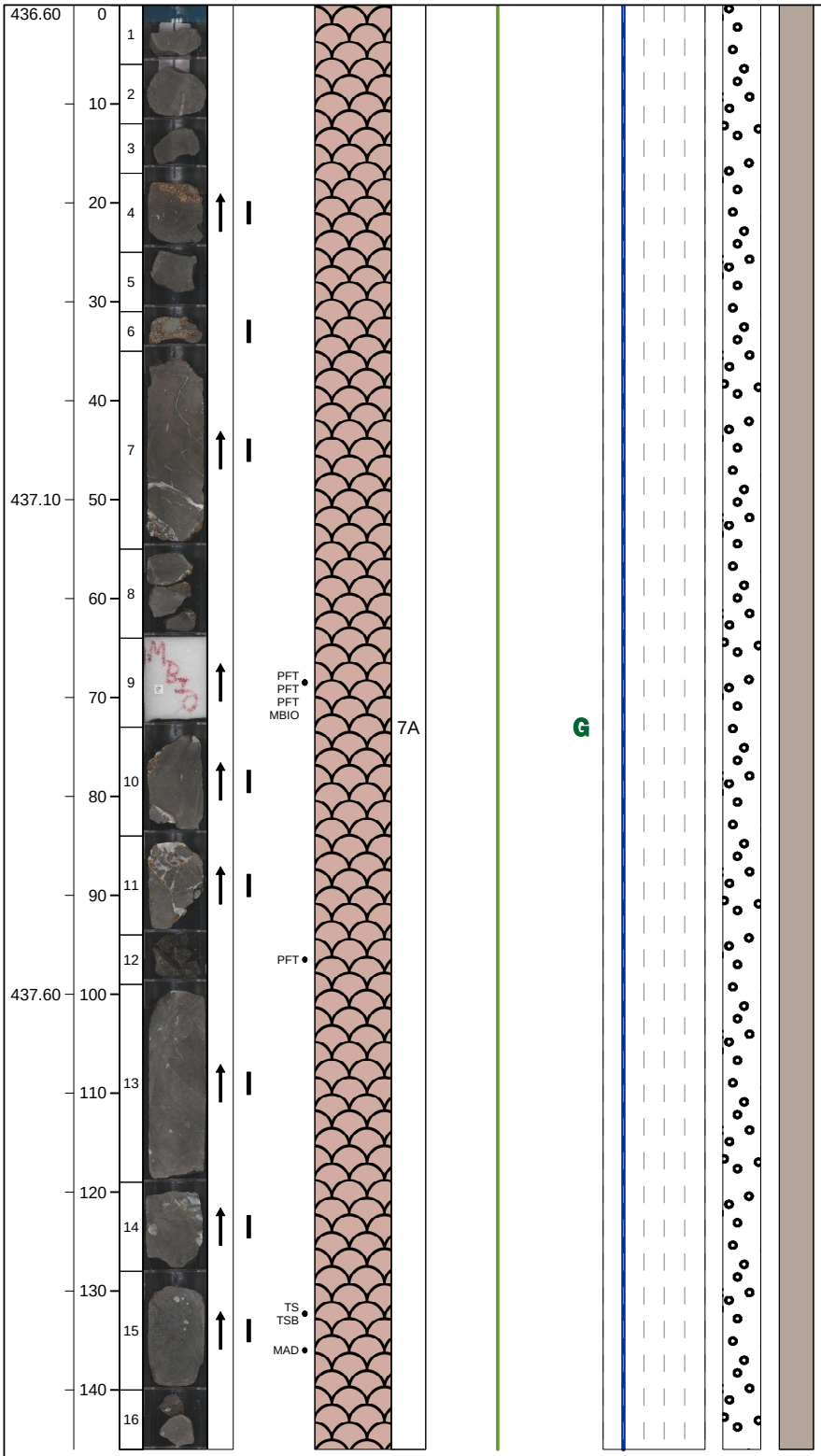
390-U1556B-22R-3-A, 0-145 cm
UNIT: 7A
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are sparsely phyric
COLOR: dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, 100% altered. Chilled margins are aphyric.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity is predominantly the larger, heterogeneously distributed vesicles with irregular shapes, occurring in pieces 1, 4, 5, 6, and 7. Chilled margins are nonvesicular.
ALTERATION: Basalt alteration is mostly fairly dark orange speckled background, relative to preceding cores, with some orange halos and speckled grey alteration at the margins. Compound halos cross diffuse orange in piece 4. Much of core is hyaloclastite with plenty of fresh glass.
VEINS: Rare saponite and carbonate veins with compound dark-rimmed orange halos cutting diffuse orange halo alteration. Hyaloclastite breccia pore space infilled by well developed calcite cement especially at bottom of section.

Hole 390-U1556B-22R Section 4, Top of Section: 431.28 m (CSF-A)



390-U1556B-22R-4-A, 0-41 cm
UNIT: 7A
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are sparsely phyric
COLOR: dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine < 0.5 mm, 100% altered.
GROUNDMASS: cryptocrystalline to glassy
VESICLES:
ALTERATION: Orange speckled background with orange halo and pale speckled grey. Hyaloclastite dominantly fresh glass.
VEINS: Veins almost absent. Hyaloclastite tightly packed with calcite cement forming a small proportion.

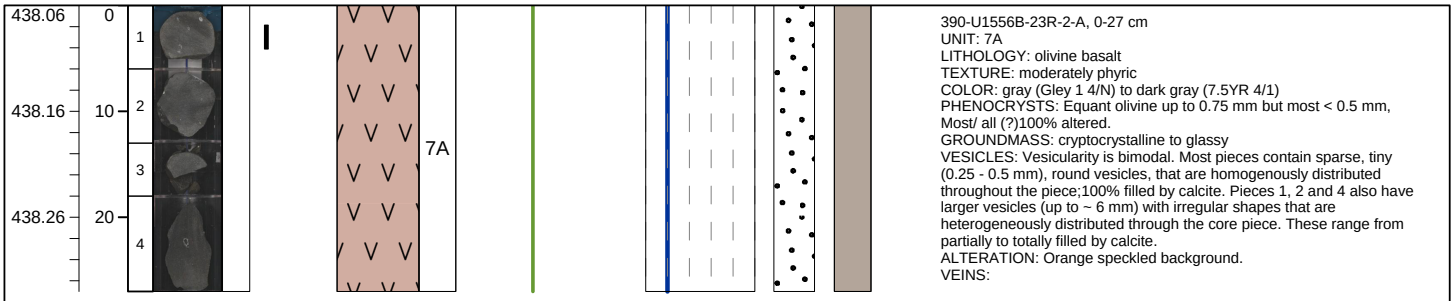
Hole 390-U1556B-23R Section 1, Top of Section: 436.6 m (CSF-A)



Description

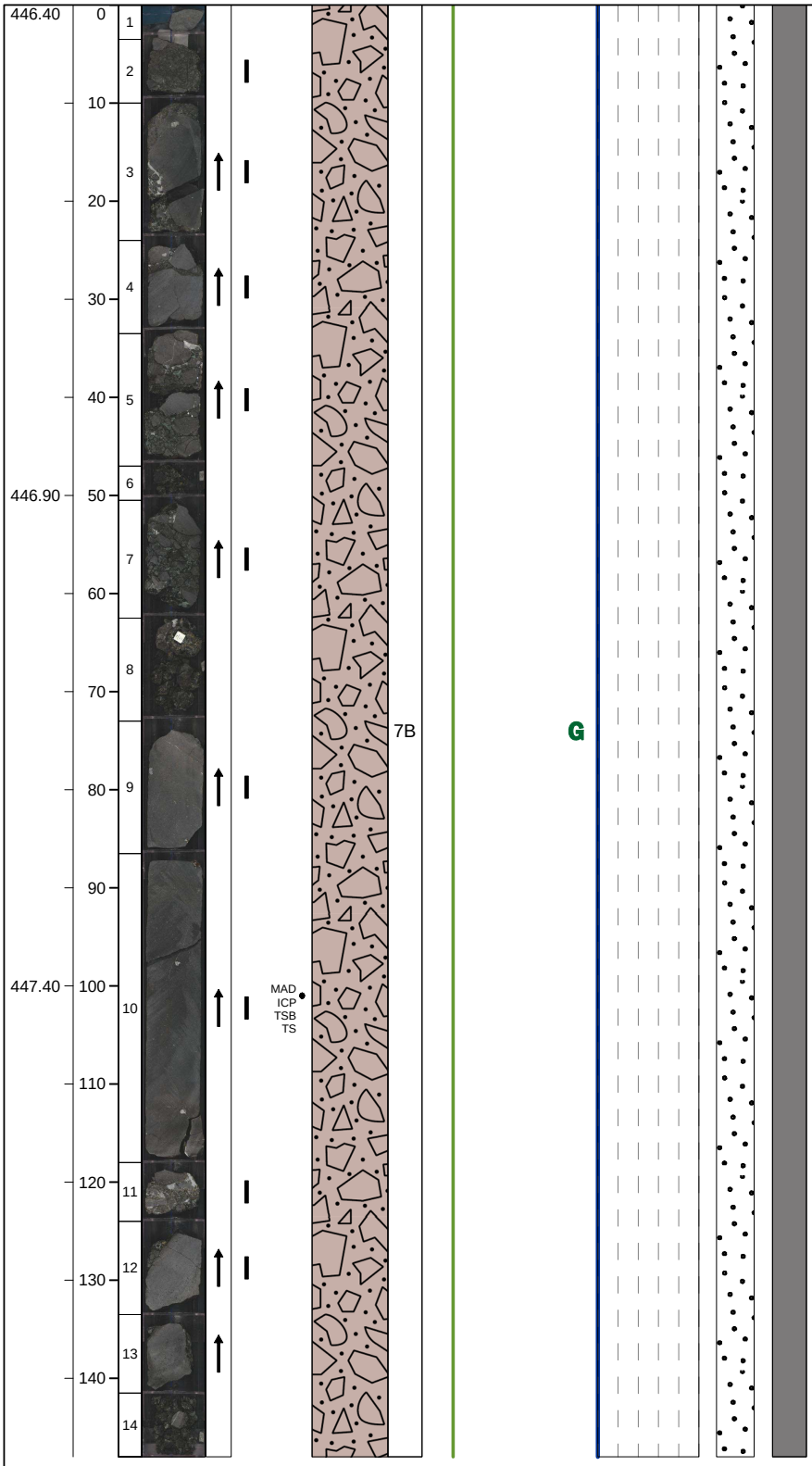
390-U1556B-23R-1-A, 0-146 cm
UNIT: 7A
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are sparsely phyric
COLOR: dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine < 0.5 mm, 100% altered in most pieces, but some fresh olivine in the rubble clasts in bin 8.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: sparsely vesicular. Vesicles irregular in shape and heterogeneously distributed. Most up to 5 mm in size, but can be large, e.g. up to 2 cm long and 1 cm in diameter. Filled 100% with calcite.
ALTERATION: Orange speckled background mostly quite dark with some poorly developed orange halos and pale speckled grey. Diffuse orange halos are superposed by compound halos round veins. Rare hyaloclastite intervals dominantly altered glass.
VEINS: Sparse carbonate and saponite veins expect for piece 7 which is cut by several carbonate veins which show compound halos and are potentially associated with a broader orange halo throughout the interval. Hyaloclastite cement ranges from voluminous (piece 11) to meagre with some open porosity (pieces 4 to 6)

Hole 390-U1556B-23R Section 2, Top of Section: 438.06 m (CSF-A)



390-U1556B-23R-2-A, 0-27 cm
UNIT: 7A
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: gray (Gley 1 4/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Equant olivine up to 0.75 mm but most < 0.5 mm, Most/ all (?)100% altered.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Vesicularity is bimodal. Most pieces contain sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Pieces 1, 2 and 4 also have larger vesicles (up to ~ 6 mm) with irregular shapes that are heterogeneously distributed through the core piece. These range from partially to totally filled by calcite.
ALTERATION: Orange speckled background.
VEINS:

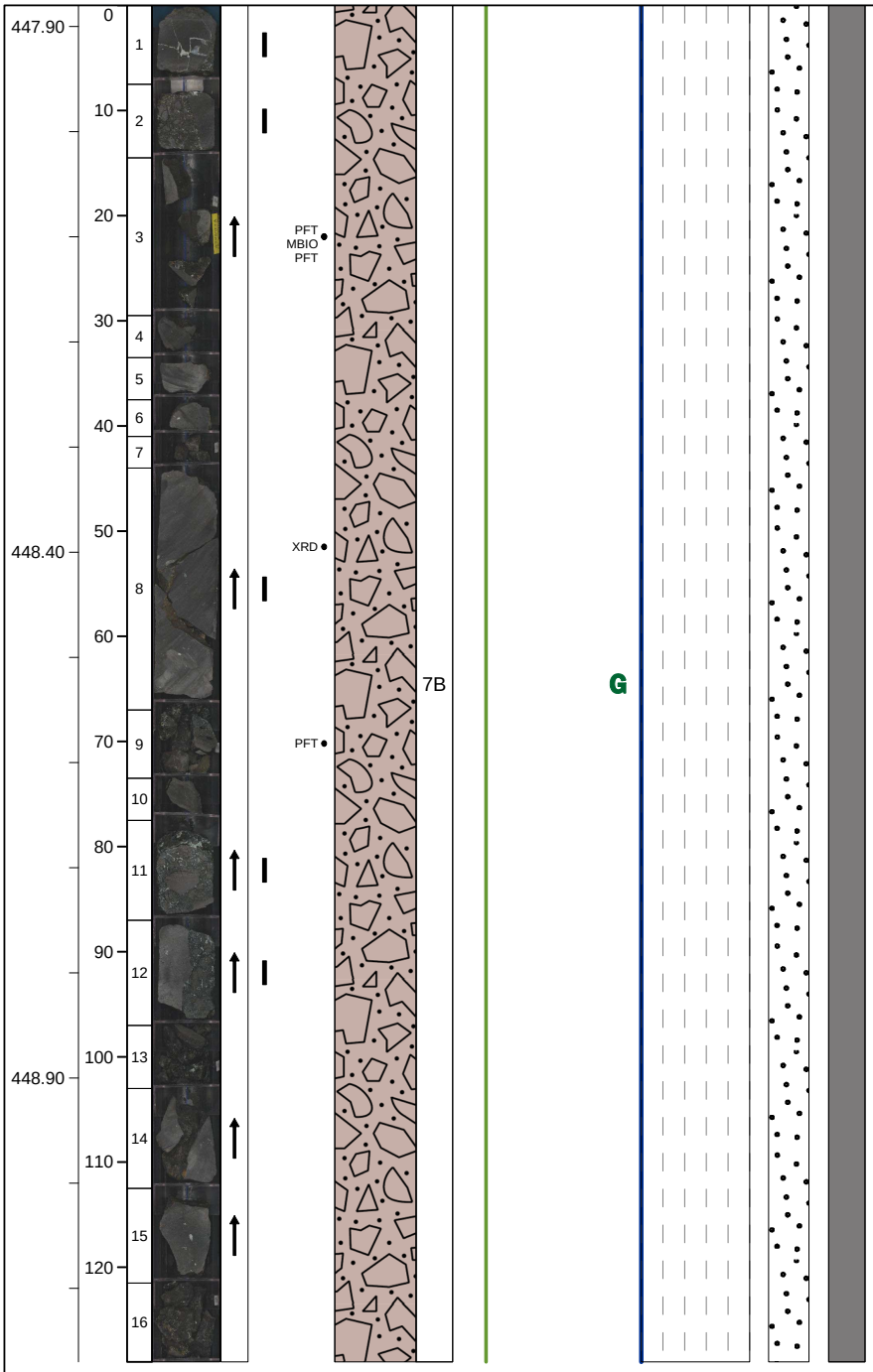
Hole 390-U1556B-24R Section 1, Top of Section: 446.4 m (CSF-A)



Description

390-U1556B-24R-1-A, 0-148 cm
UNIT: 7B
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are aphric to sparsely phyric
COLOR: very dark gray (Gley 1 3/N)
PHENOCRYSTS: Most of the section is aphyric to very sparsely phyric, with crystals < 0.5 mm in size. Where present, olivine appears to be fresh to slightly altered, but difficult to confirm because of grain size.
GROUNDMASS: glassy to cryptocrystalline
VESICLES: Glassy clasts are nonvesicular. Basalts with crypstocrystalline grain size (pieces 9 and 10) are sparsely vesicular. These vesicles are irregular in shape and heterogeneously distributed. Maximum of 14 mm in size. Filled 100% with calcite.
ALTERATION: Background basalt is dark grey without alteration of olivine (though less phyric than preceding cores). Speckled orange alteration is only seen as halos to carbonate veins and near grey mottled chilled margins. Approx. half of section is hyaloclastite of markedly different appearance to all previous cores characterised by pale green cement (GLEY 1 6/5G_1). Rims of glass clasts are altered to black saponite.
VEINS: Hyaloclastite cement is dominantly composed of fissile mixture of blue-green mineral (?celadonite, pending XRD) and white mineral (zeolite?), carbonate is occasionally present in cement but crystallized in discrete patches (recognizable by their higher crystallinity).

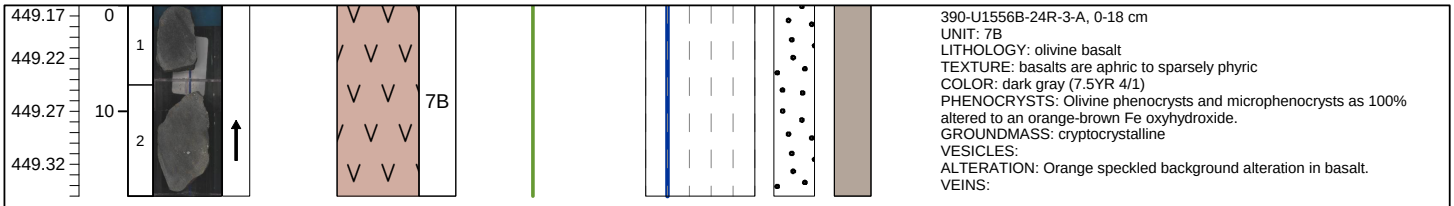
Hole 390-U1556B-24R Section 2, Top of Section: 447.88 m (CSF-A)



Description

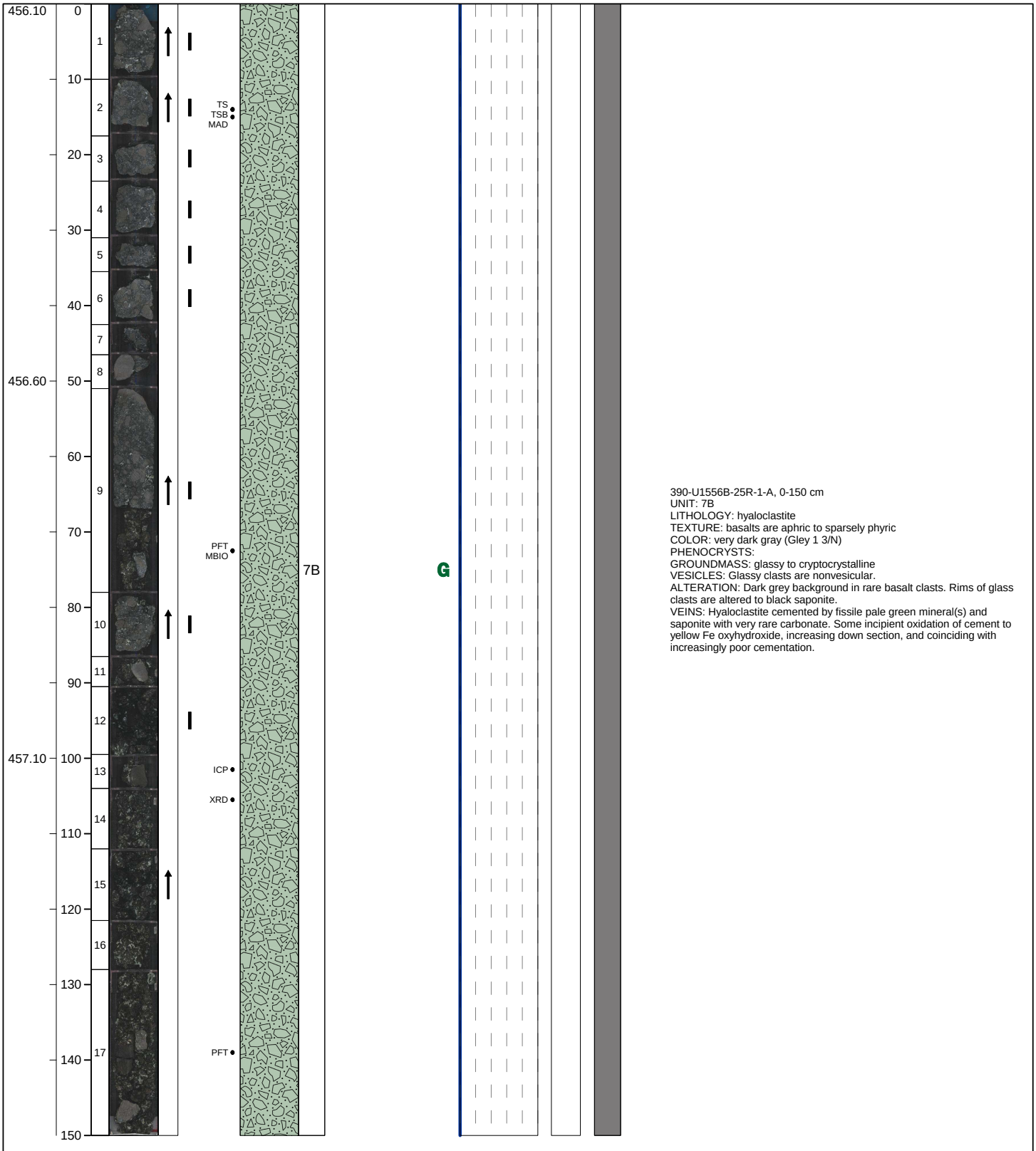
390-U1556B-24R-2-A, 0-129 cm
UNIT: 7B
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are aphric to sparsely phyric
COLOR: very dark gray (Gley 1 3/N)
PHENOCRYSTS: Most of the section is aphyric to very sparsely phyric, with crystals < 0.5 mm in size. Where present, olivine appears to be fresh to slightly altered, but difficult to confirm because of grain size. Olivine in the unoriented piece 15 and the rubble in bin 16 have olivine replaced by an orange-brown oxyhydroxide (but these could be clasts that have fallen in from further up the hole).
GROUNDMASS: glassy to cryptocrystalline
VESICLES: Glassy clasts are nonvesicular. Basalts with crypstocrystalline grain size (pieces 9 and 10) are sparsely vesicular. These vesicles are irregular in shape and heterogeneously distributed. Maximum of 6 mm in size. Filled 100% with calcite and the unknown minty green mineral..
ALTERATION: Dark grey background in basalt. Hyaloclastite cemented by fissile pale green mineral(s) and saponite with rare carbonate. Rims of glass clasts are altered to black saponite.
VEINS: Hyaloclastite cemented by fissle pale green mineral(s) and saponite with rare carbonate. Some incipient oxidation of green breccia cement to yellow Fe hydroxides. Veins mostly carbonate + saponite, sometimes with ?celadonite and often lined with yellowish Fe hydroxides. Some green ?celadonite + carbonate vesicle fills.

Hole 390-U1556B-24R Section 3, Top of Section: 449.17 m (CSF-A)



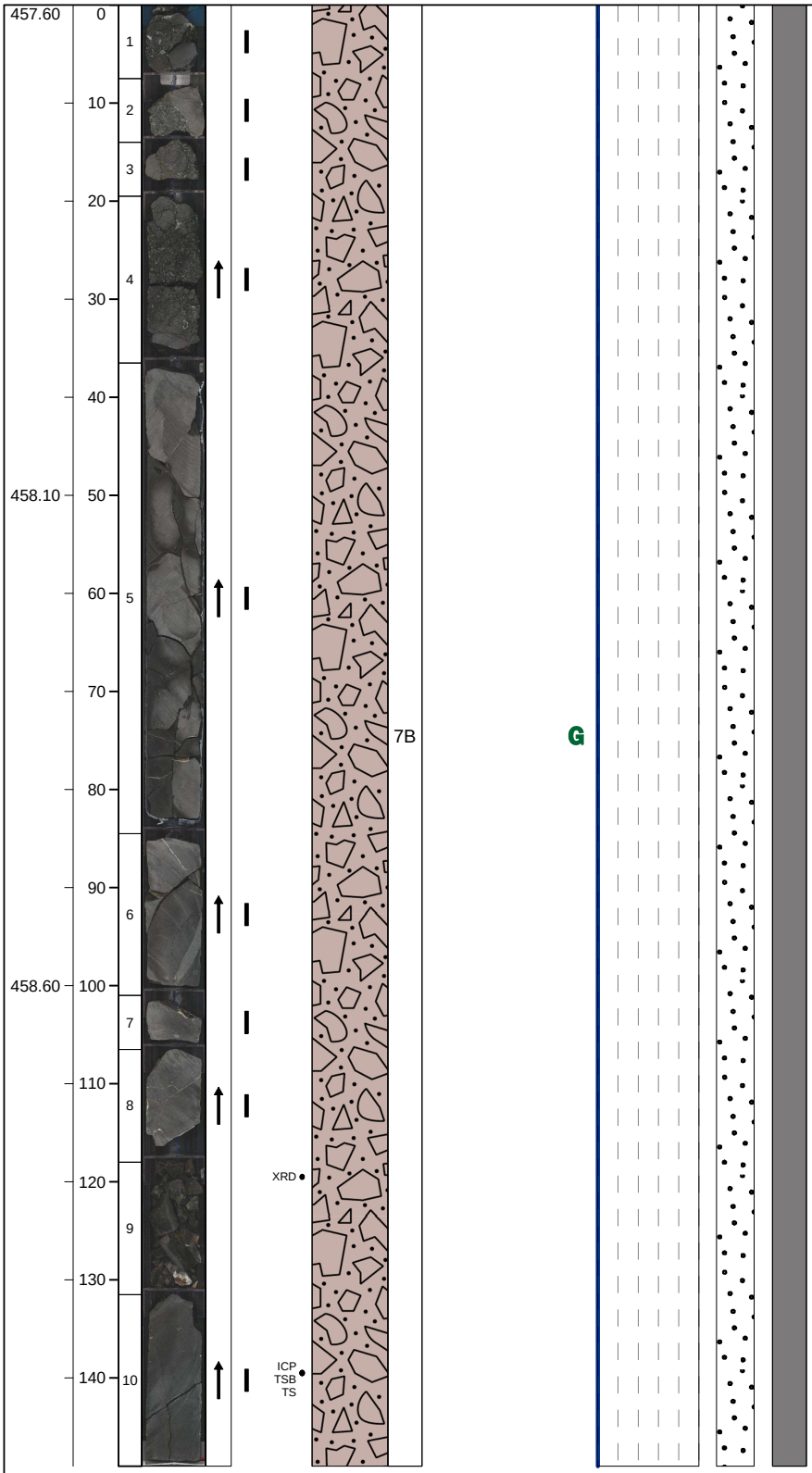
390-U1556B-24R-3-A, 0-18 cm
UNIT: 7B
LITHOLOGY: olivine basalt
TEXTURE: basalts are aphric to sparsely phyric
COLOR: dark gray (7.5YR 4/1)
PHENOCRYSTS: Olivine phenocrysts and microphenocrysts as 100% altered to an orange-brown Fe oxyhydroxide.
GROUNDMASS: cryptocrystalline
VESICLES:
ALTERATION: Orange speckled background alteration in basalt.
VEINS:

Hole 390-U1556B-25R Section 1, Top of Section: 456.1 m (CSF-A)



390-U1556B-25R-1-A, 0-150 cm
UNIT: 7B
LITHOLOGY: hyaloclastite
TEXTURE: basalts are aphric to sparsely phyric
COLOR: very dark gray (Gley 1 3/N)
PHENOCRYSTS:
GROUNDMASS: glassy to cryptocrystalline
VESICLES: Glassy clasts are nonvesicular.
ALTERATION: Dark grey background in rare basalt clasts. Rims of glass clasts are altered to black saponite.
VEINS: Hyaloclastite cemented by fissile pale green mineral(s) and saponite with very rare carbonate. Some incipient oxidation of cement to yellow Fe oxyhydroxide, increasing down section, and coinciding with increasingly poor cementation.

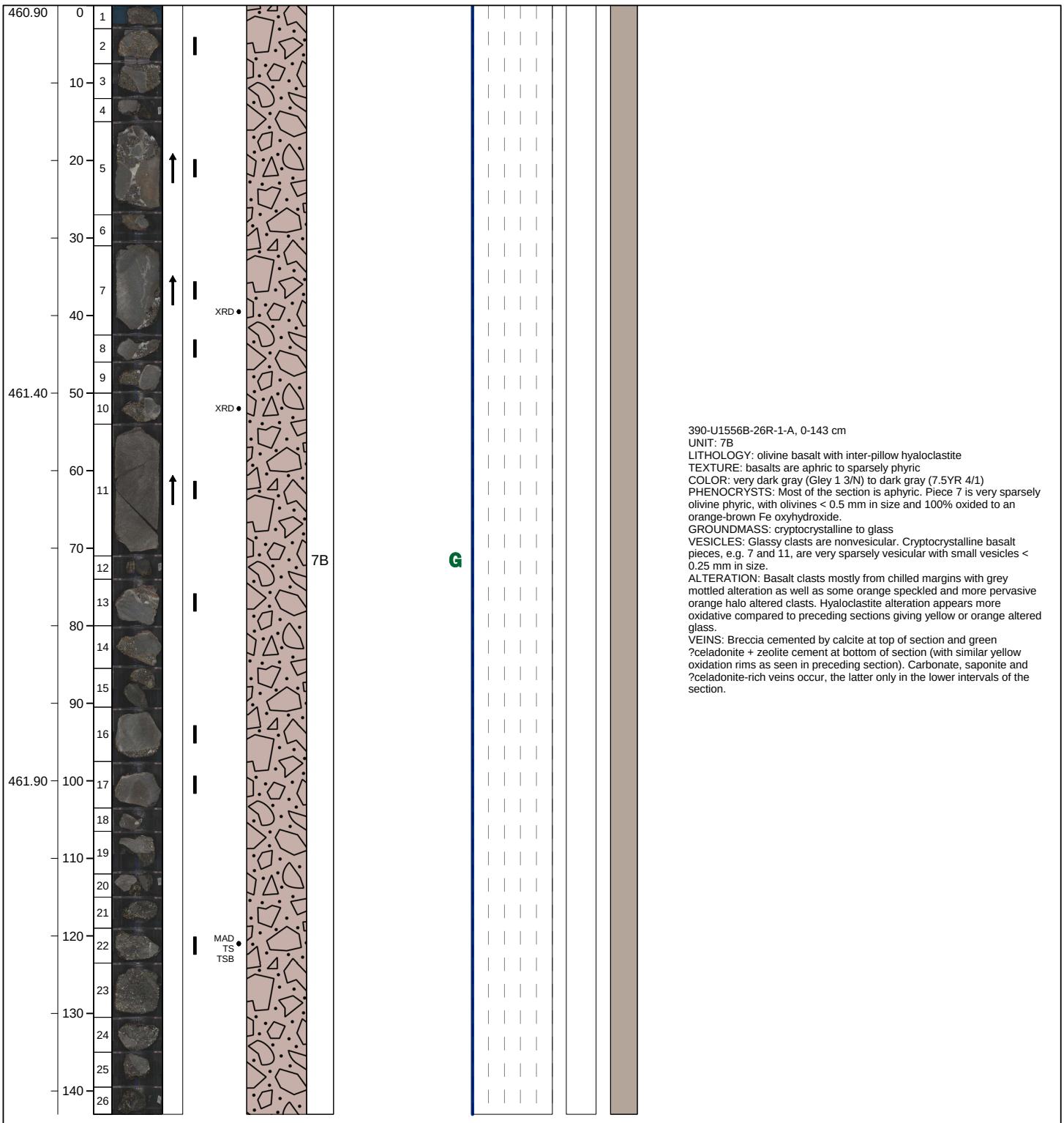
Hole 390-U1556B-25R Section 2, Top of Section: 457.6 m (CSF-A)



Description

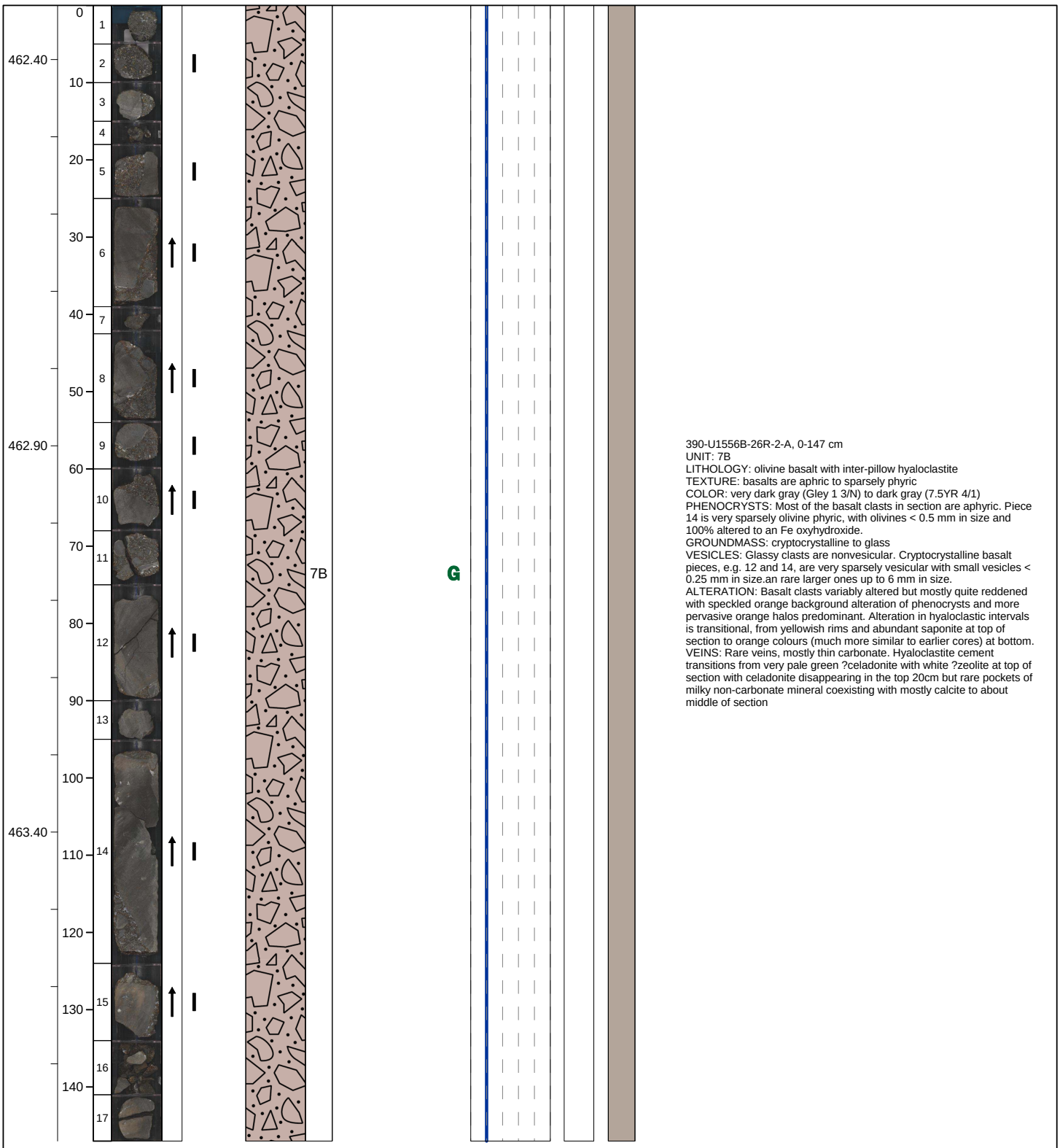
390-U1556B-25R-2-A, 0-149 cm
UNIT: 7B
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are aphric to sparsely phyric
COLOR: very dark gray (Gley 1 3/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Most of the section is aphyric. Piece 10 is sparsely phyric, with olivines < 0.5 mm in size, 100% altered to an orange-brown Fe oxyhydroxide.
GROUNDMASS: glassy to cryptocrystalline
VESICLES: Glassy clasts are nonvesicular. Piece 10 has very sparse vesicles, up to 10 mm in size, filled by calcite.
ALTERATION: Dark grey background in basalt with orange speckled alteration at margins of large pillow and as halo to vein (pieces 5 and 10).
VEINS: Hyaloclastite cement fissile green ?celadonite + ?zeolite + saponite and continues trend of increasing oxidisation (to yellow Fe oxyhydroxides) from previous section. Carbonate absent from breccia cement in this section. Abundant carbonate + saponite + ?celadonite + yellow Fe oxyhydroxide veins in shattered pillow (piece 5).

Hole 390-U1556B-26R Section 1, Top of Section: 460.9 m (CSF-A)



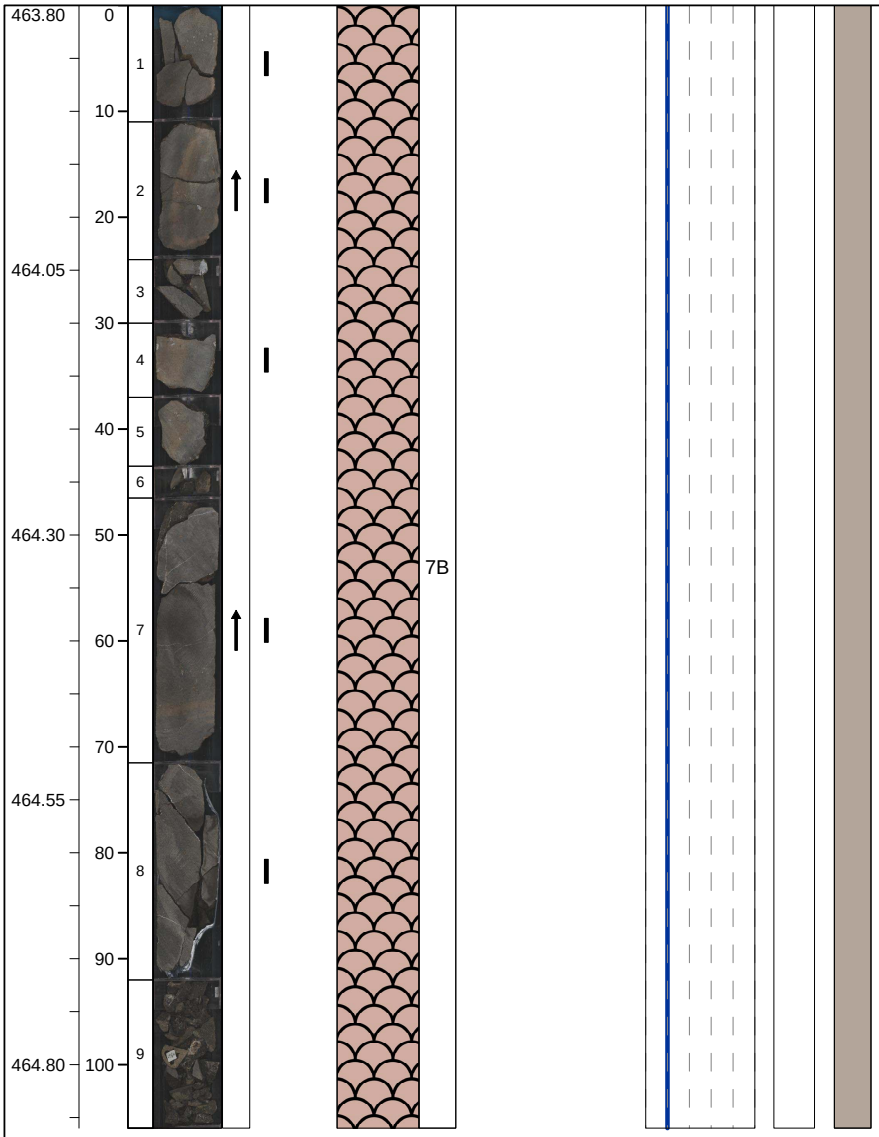
390-U1556B-26R-1-A, 0-143 cm
UNIT: 7B
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are aphric to sparsely phyric
COLOR: very dark gray (Gley 1 3/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Most of the section is aphyric. Piece 7 is very sparsely olivine phyric, with olivines < 0.5 mm in size and 100% oxided to an orange-brown Fe oxyhydroxide.
GROUNDMASS: cryptocrystalline to glass
VESICLES: Glassy clasts are nonvesicular. Cryptocrystalline basalt pieces, e.g. 7 and 11, are very sparsely vesicular with small vesicles < 0.25 mm in size.
ALTERATION: Basalt clasts mostly from chilled margins with grey mottled alteration as well as some orange speckled and more pervasive orange halo altered clasts. Hyaloclastite alteration appears more oxidative compared to preceding sections giving yellow or orange altered glass.
VEINS: Breccia cemented by calcite at top of section and green ?celadonite + zeolite cement at bottom of section (with similar yellow oxidation rims as seen in preceding section). Carbonate, saponite and ?celadonite-rich veins occur, the latter only in the lower intervals of the section.

Hole 390-U1556B-26R Section 2, Top of Section: 462.33 m (CSF-A)



390-U1556B-26R-2-A, 0-147 cm
UNIT: 7B
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are aphric to sparsely phyric
COLOR: very dark gray (Gley 1 3/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Most of the basalt clasts in section are aphyric. Piece 14 is very sparsely olivine phyric, with olivines < 0.5 mm in size and 100% altered to an Fe oxyhydroxide.
GROUNDMASS: cryptocrystalline to glass
VESICLES: Glassy clasts are nonvesicular. Cryptocrystalline basalt pieces, e.g. 12 and 14, are very sparsely vesicular with small vesicles < 0.25 mm in size.an rare larger ones up to 6 mm in size.
ALTERATION: Basalt clasts variably altered but mostly quite reddened with speckled orange background alteration of phenocrysts and more pervasive orange halos predominant. Alteration in hyaloclastic intervals is transitional, from yellowish rims and abundant saponite at top of section to orange colours (much more similar to earlier cores) at bottom.
VEINS: Rare veins, mostly thin carbonate. Hyaloclastite cement transitions from very pale green ?celadonite with white ?zeolite at top of section with celadonite disappearing in the top 20cm but rare pockets of milky non-carbonate mineral coexisting with mostly calcite to about middle of section

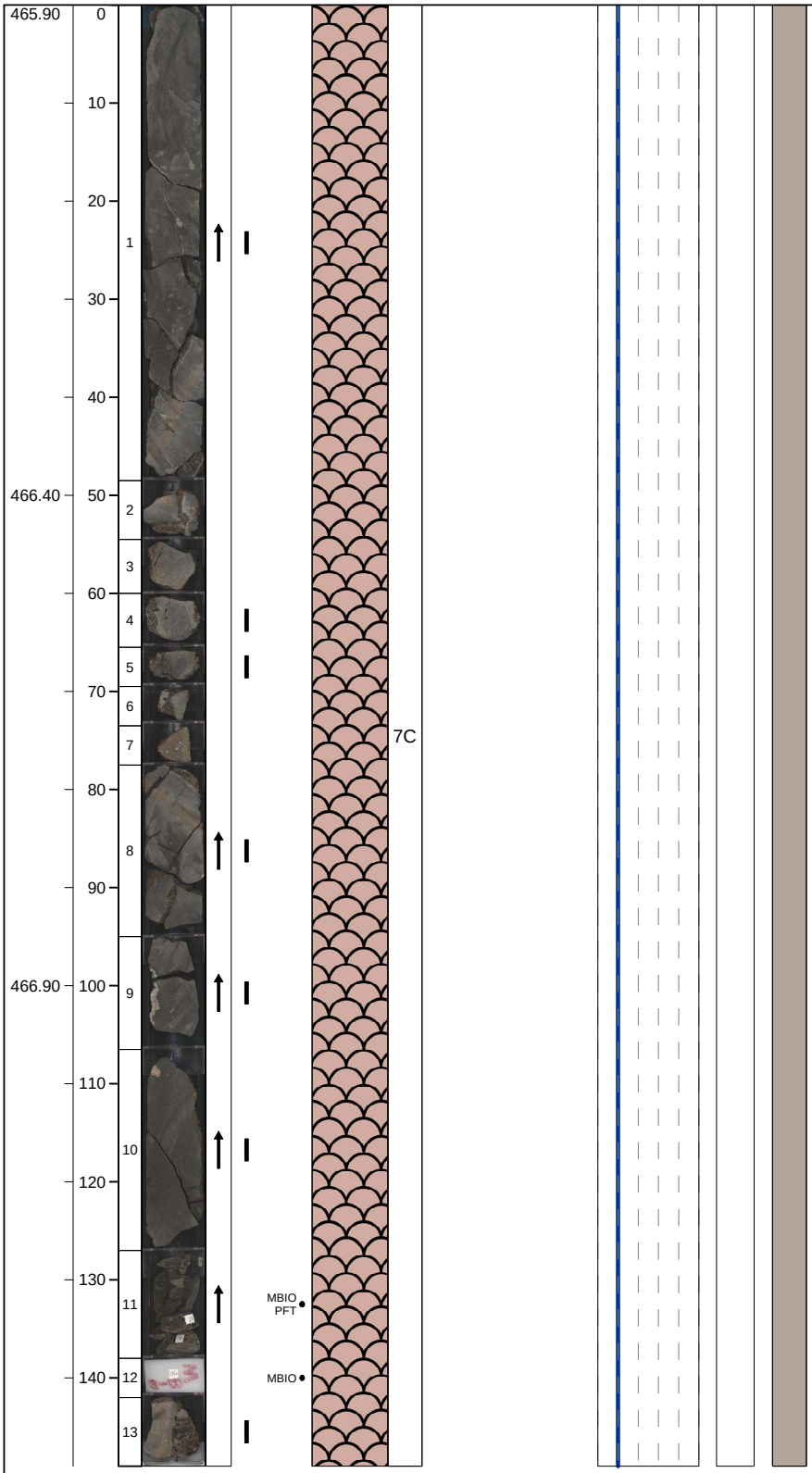
Hole 390-U1556B-26R Section 3, Top of Section: 463.8 m (CSF-A)



Description

390-U1556B-26R-3-A, 0-106 cm
UNIT: 7B
LITHOLOGY: olivine basalt
TEXTURE: aphyric to very sparsely phyric
COLOR: gray (Gley 1 4/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Most of the basalt clasts in section are aphyric. Two larger pieces in the section, pieces 7 and 8 are sparsely olivine phyric, with olivines 100% altered to an orange-brown Fe oxyhydroxide.
GROUNDMASS: cryptocrystalline to glass
VESICLES: nonvesicular
ALTERATION: Orange speckled background with broad bands of light mottled grey and orange halo along margins of small pillows. Orange halos somewhat more intense in colour relative to shallower examples. Rock notably shattered (poorer cementation of fractures by vein minerals?)
VEINS: Sparse veins, mostly carbonate with saponite +/- red Fe oxyhydroxides, without distinct halos.

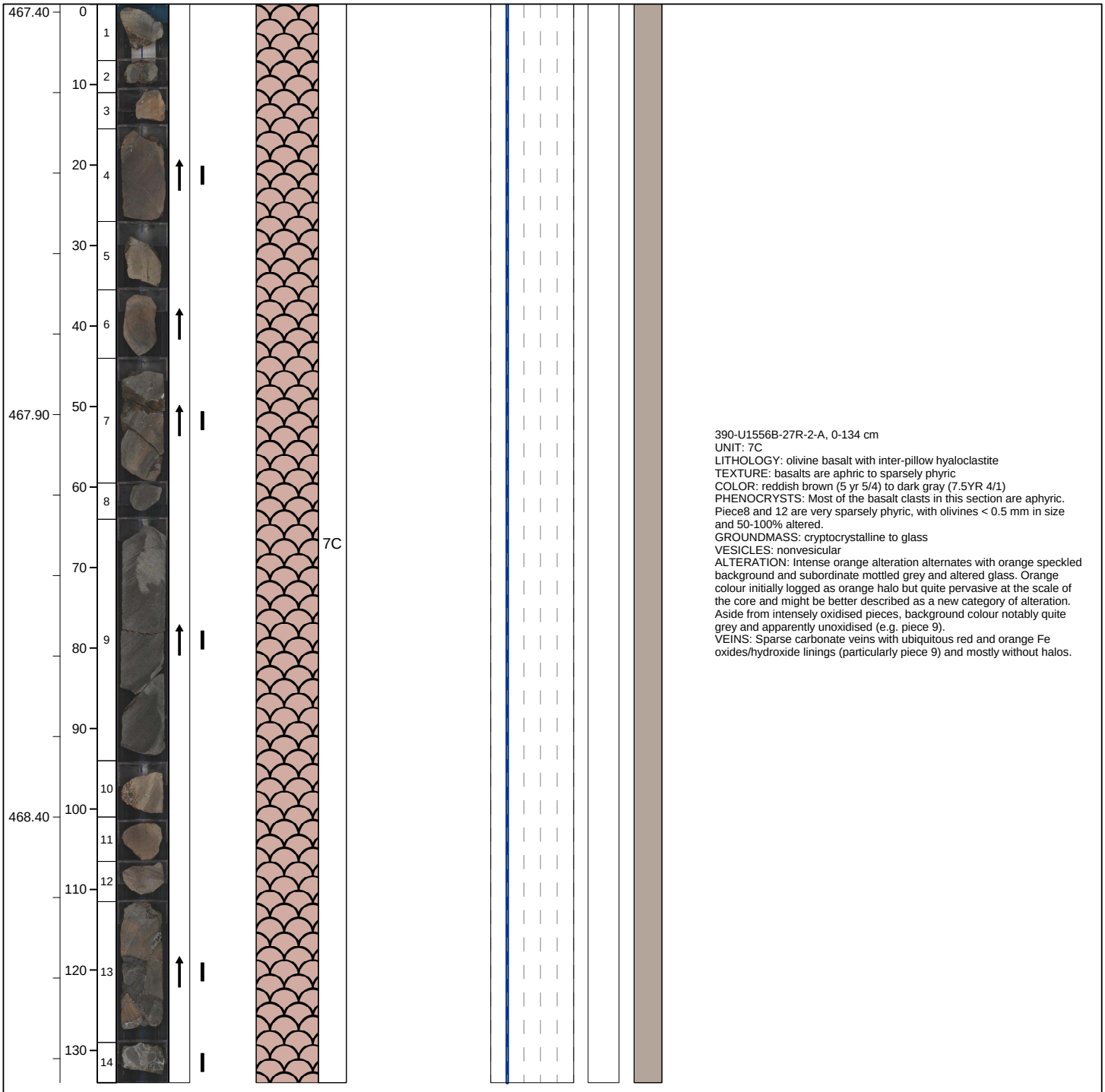
Hole 390-U1556B-27R Section 1, Top of Section: 465.9 m (CSF-A)



Description

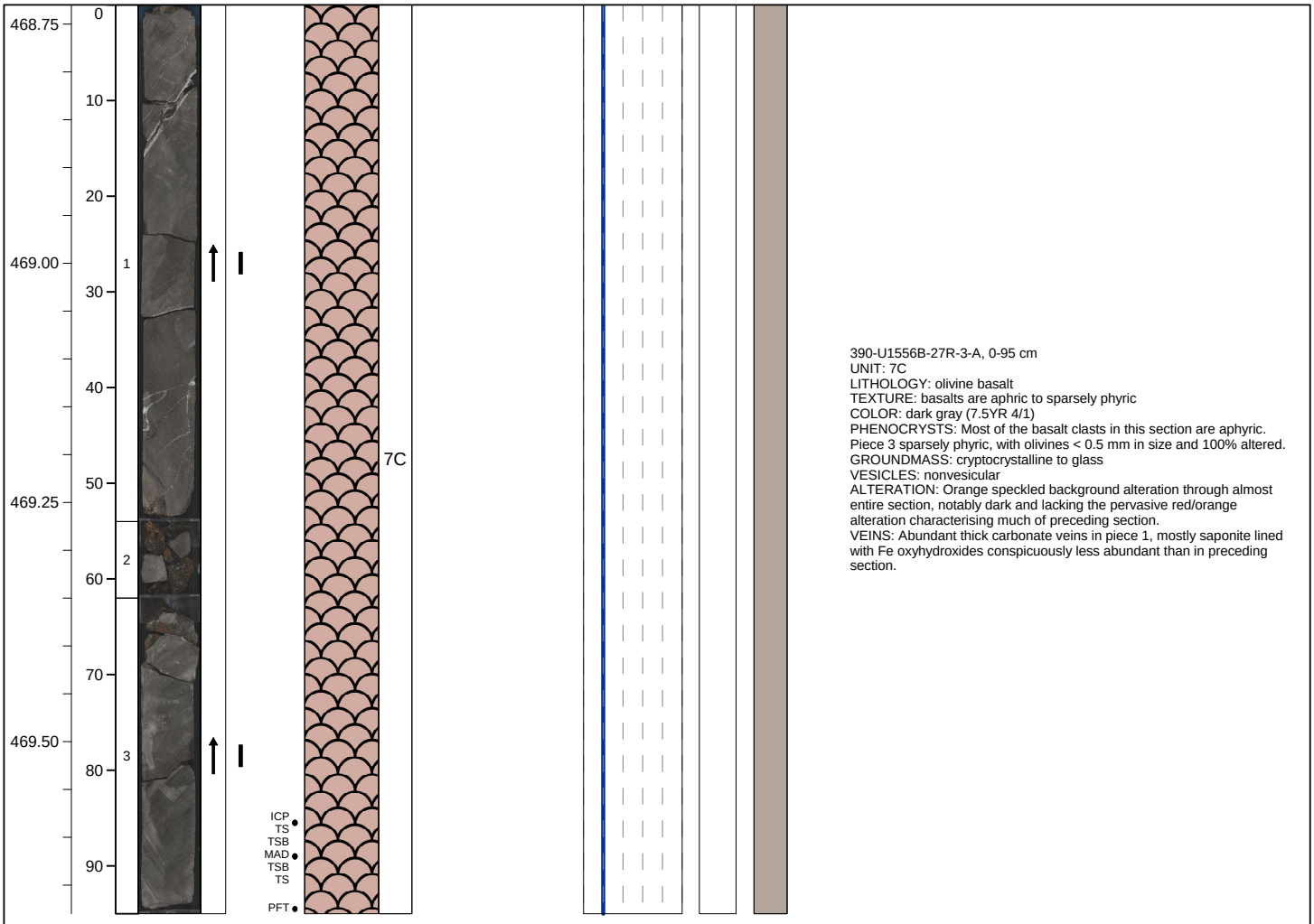
390-U1556B-27R-1-A, 0-149 cm
UNIT: 7C
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are aphric to sparsely phyric
COLOR: gray (Gley 1 4/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Most of the basalt clasts in section are aphyric. Piece 8, 9, and 19 are very sparsely olivine phyric, with olivines < 0.5 mm in size and 50-100% altered.
GROUNDMASS: cryptocrystalline to glass
VESICLES: Most basalt pieces in this section are nonvesicular. Only piece 7 is moderately vesicular, with ireggularly shaped vesicles up to 5 mm in size.
ALTERATION: Orange speckled background, generally quite light in colour, with a couple of grey mottled altered margins and associated orange halos. Small patches of adhered hyaloclastite altered deep brown/orange and partially filled by thin coating of calcite and saponite in pore space.
VEINS: Calcite veins with saponite or sometimes Fe oxyhydroxide lining. Moderately abundant carbonate veins in large pillow (piece 1). Large void/vug cemented by sparry crystalline calcite + red Fe oxyhydroxides (piece 9). Hyaloclastite cement is thin lining of white noncarbonate mineral (tentatively identified as zeolite) overgrown by velvety saponite. Bears strong resemblance to porous hyaloclastite intervals in earlier cores (e.g core 12R). Possible that presence of ?zeolite missed in these due to calcite overgrowth.

Hole 390-U1556B-27R Section 2, Top of Section: 467.39 m (CSF-A)



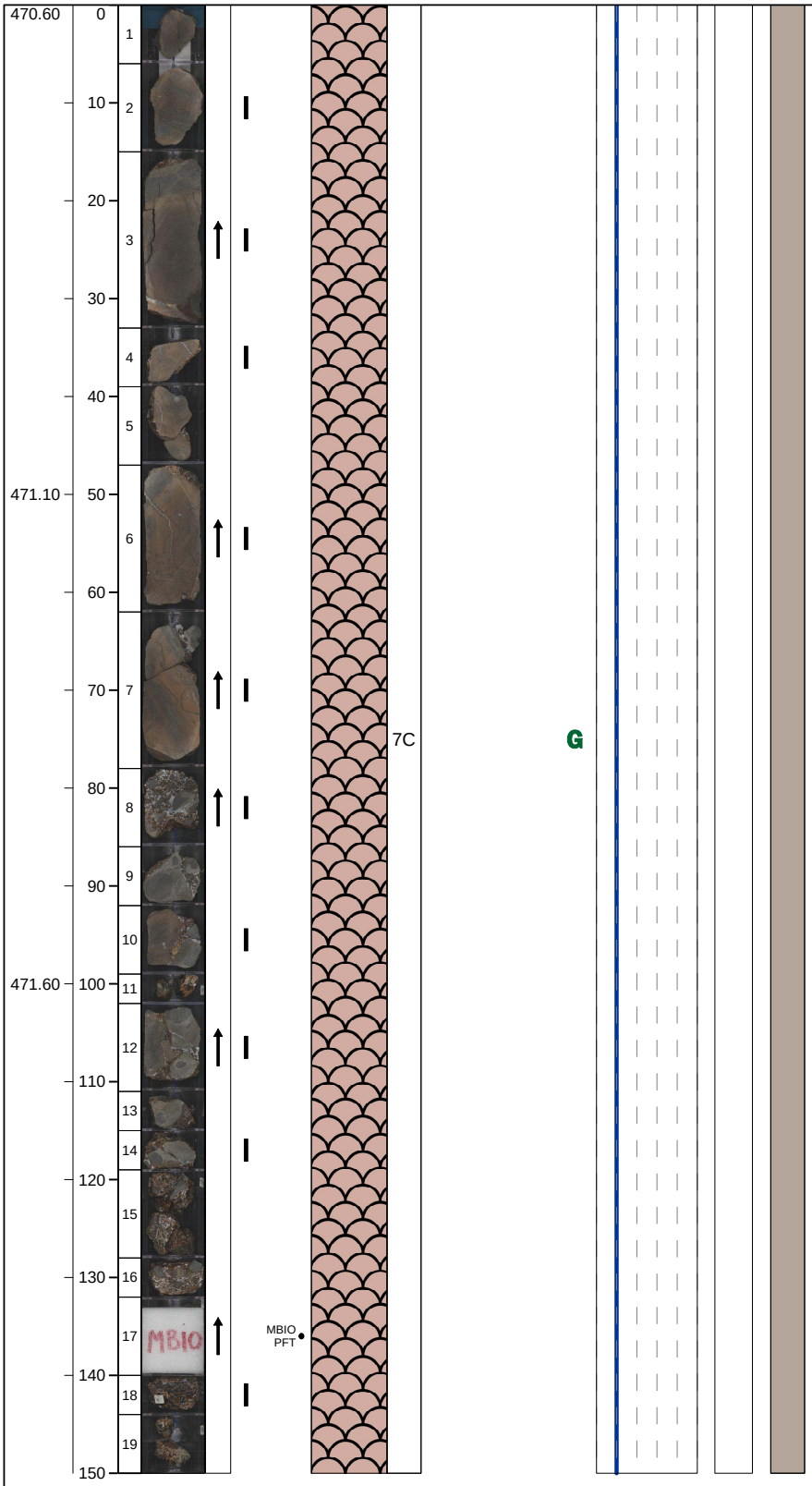
390-U1556B-27R-2-A, 0-134 cm
UNIT: 7C
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are aphric to sparsely phyric
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Most of the basalt clasts in this section are aphyric. Piece8 and 12 are very sparsely phyric, with olivines < 0.5 mm in size and 50-100% altered.
GROUNDMASS: cryptocrystalline to glass
VESICLES: nonvesicular
ALTERATION: Intense orange alteration alternates with orange speckled background and subordinate mottled grey and altered glass. Orange colour initially logged as orange halo but quite pervasive at the scale of the core and might be better described as a new category of alteration. Aside from intensely oxidised pieces, background colour notably quite grey and apparently unoxidised (e.g. piece 9).
VEINS: Sparse carbonate veins with ubiquitous red and orange Fe oxides/hydroxide linings (particularly piece 9) and mostly without halos.

Hole 390-U1556B-27R Section 3, Top of Section: 468.73 m (CSF-A)



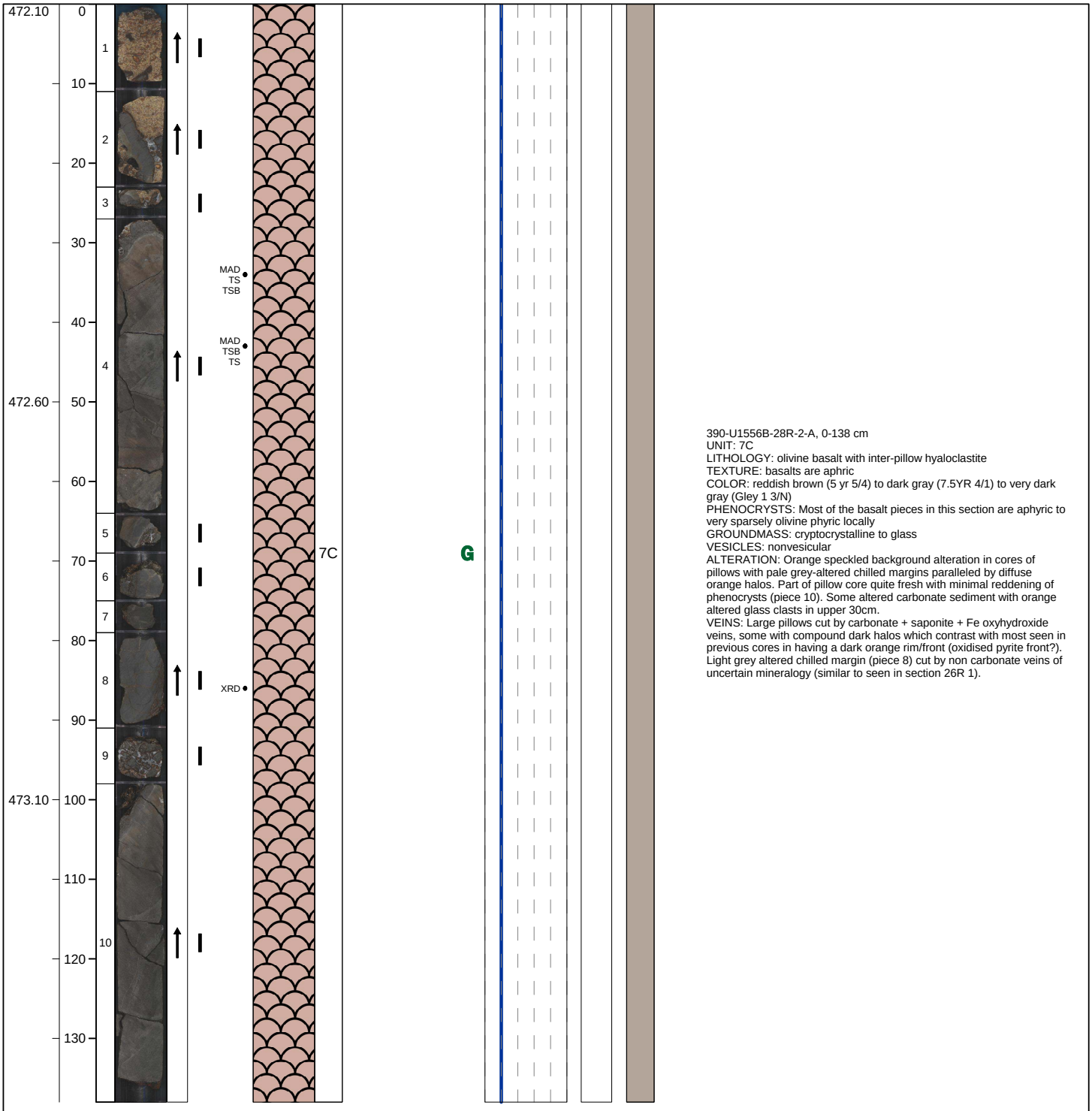
390-U1556B-27R-3-A, 0-95 cm
UNIT: 7C
LITHOLOGY: olivine basalt
TEXTURE: basalts are aphric to sparsely phyric
COLOR: dark gray (7.5YR 4/1)
PHENOCRYSTS: Most of the basalt clasts in this section are aphyric. Piece 3 sparsely phyric, with olivines < 0.5 mm in size and 100% altered.
GROUNDMASS: cryptocrystalline to glass
VESICLES: nonvesicular
ALTERATION: Orange speckled background alteration through almost entire section, notably dark and lacking the pervasive red/orange alteration characterising much of preceding section.
VEINS: Abundant thick carbonate veins in piece 1, mostly saponite lined with Fe oxyhydroxides conspicuously less abundant than in preceding section.

Hole 390-U1556B-28R Section 1, Top of Section: 470.6 m (CSF-A)



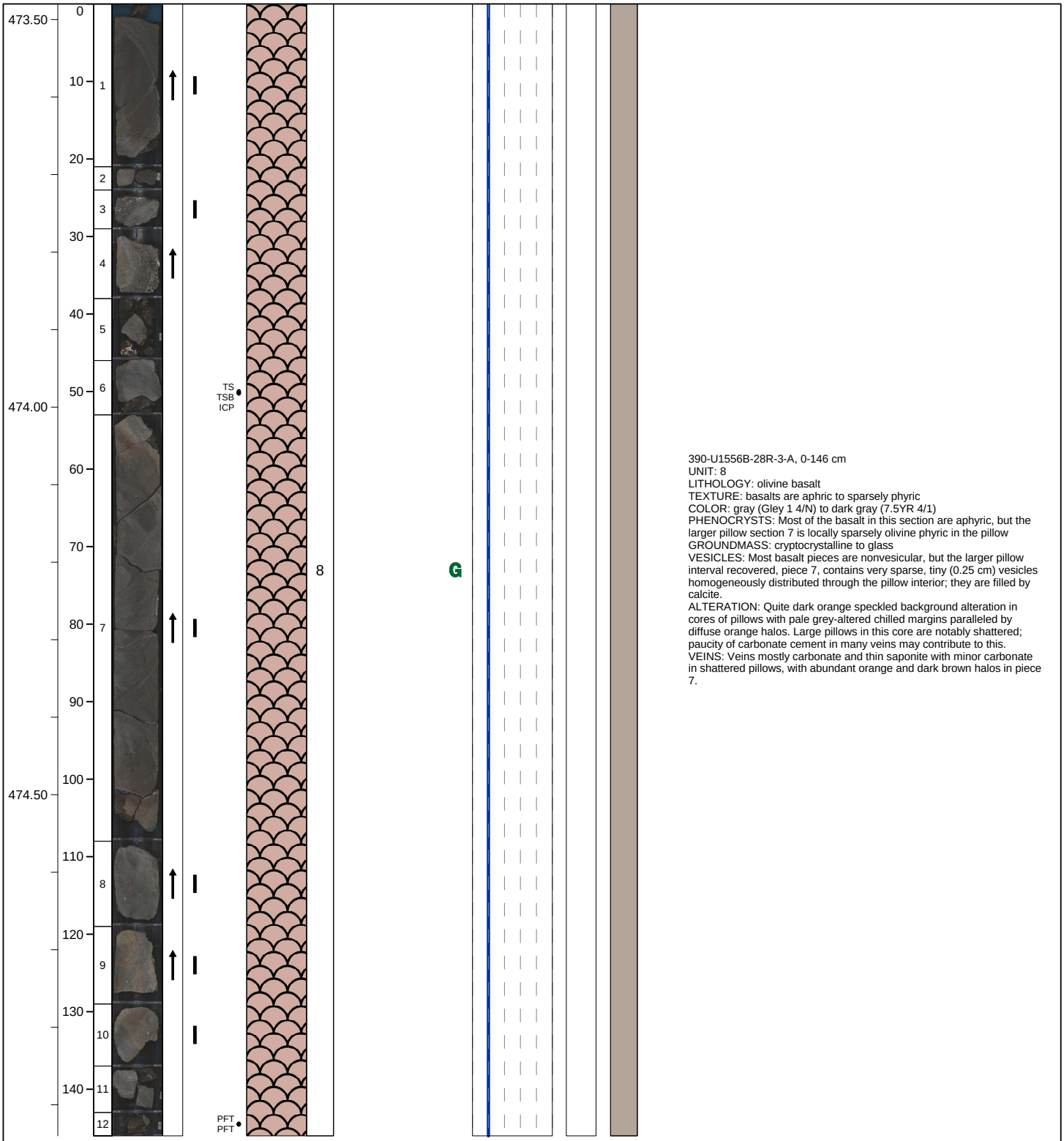
390-U1556B-28R-1-A, 0-150 cm
UNIT: 7C
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are aphric to sparsely phyric
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Most of the basalt pieces in this section are aphyric. Pieces 3 and 6 are sparsely olivine phyric in places, but overall aphyric Where phyric / microphyric, the olivines are < 0.5 mm in size and 100% altered.
GROUNDMASS: cryptocrystalline to glass
VESICLES: nonvesicular
ALTERATION: Intense orange halo alteration to almost all basalt with some mottled grey and subordinate altered glass.
VEINS: Sparse carbonate veins with saponite, many with thin dark brown halos overprinting pervasive orange halo alteration. Breccia cement varies between pervasive crystalline calcite and ?zeolite + saponite rims with open pore space, without any overall trend downsection.

Hole 390-U1556B-28R Section 2, Top of Section: 472.1 m (CSF-A)



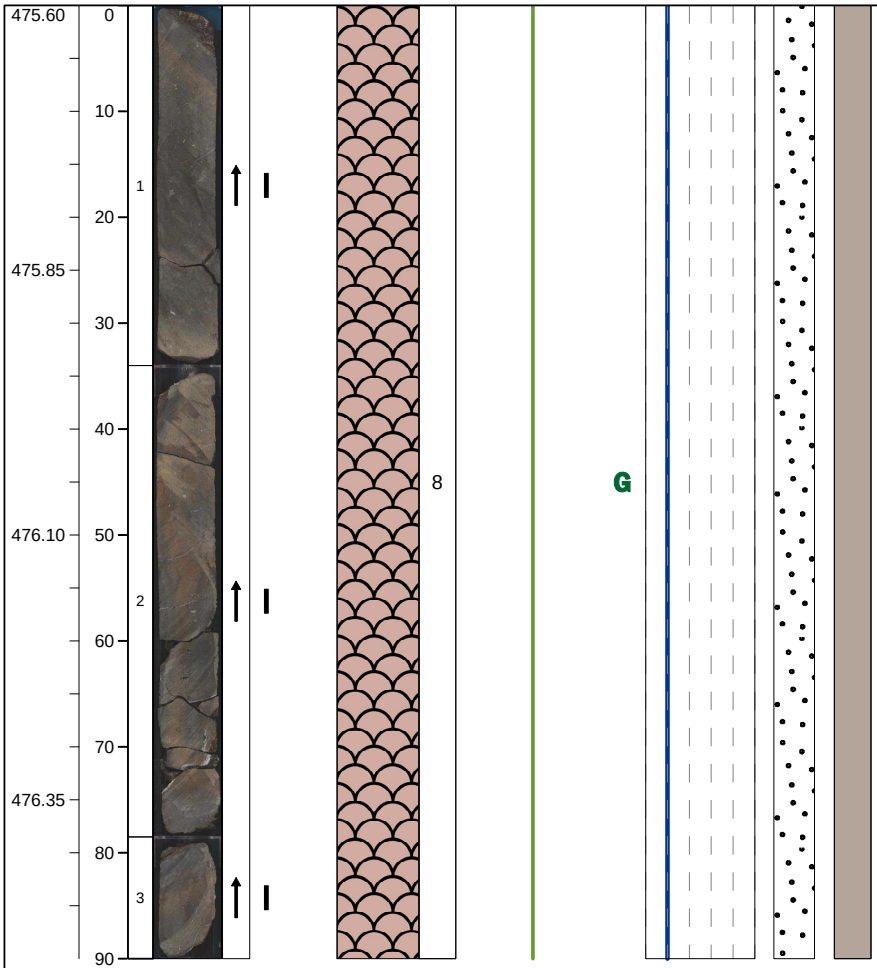
390-U1556B-28R-2-A, 0-138 cm
UNIT: 7C
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: basalts are aphric
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS: Most of the basalt pieces in this section are aphyric to very sparsely olivine phyric locally
GROUNDMASS: cryptocrystalline to glass
VESICLES: nonvesicular
ALTERATION: Orange speckled background alteration in cores of pillows with pale grey-altered chilled margins paralleled by diffuse orange halos. Part of pillow core quite fresh with minimal reddening of phenocrysts (piece 10). Some altered carbonate sediment with orange altered glass clasts in upper 30cm.
VEINS: Large pillows cut by carbonate + saponite + Fe oxyhydroxide veins, some with compound dark halos which contrast with most seen in previous cores in having a dark orange rim/front (oxidised pyrite front?). Light grey altered chilled margin (piece 8) cut by non carbonate veins of uncertain mineralogy (similar to seen in section 26R 1).

Hole 390-U1556B-28R Section 3, Top of Section: 473.48 m (CSF-A)



390-U1556B-28R-3-A, 0-146 cm
UNIT: 8
LITHOLOGY: olivine basalt
TEXTURE: basalts are aphric to sparsely phyric
COLOR: gray (Gley 1 4/N) to dark gray (7.5YR 4/1)
PHENOCRYSTS: Most of the basalt in this section are aphyric, but the larger pillow section 7 is locally sparsely olivine phyric in the pillow
GROUNDMASS: cryptocrystalline to glass
VESICLES: Most basalt pieces are nonvesicular, but the larger pillow interval recovered, piece 7, contains very sparse, tiny (0.25 cm) vesicles homogeneously distributed through the pillow interior; they are filled by calcite.
ALTERATION: Quite dark orange speckled background alteration in cores of pillows with pale grey-altered chilled margins paralleled by diffuse orange halos. Large pillows in this core are notably shattered; paucity of carbonate cement in many veins may contribute to this.
VEINS: Veins mostly carbonate and thin saponite with minor carbonate in shattered pillows, with abundant orange and dark brown halos in piece 7.

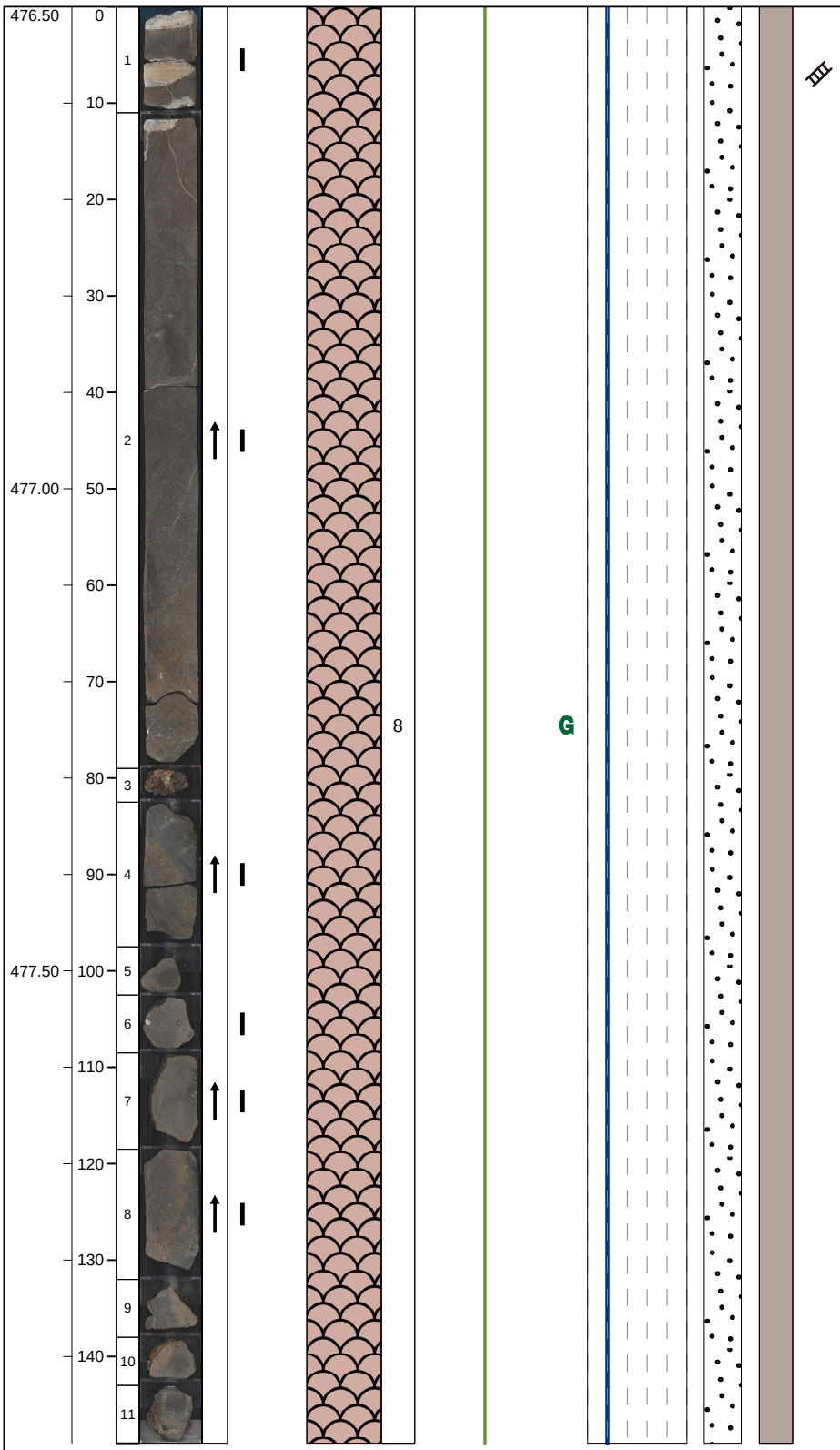
Hole 390-U1556B-29R Section 1, Top of Section: 475.6 m (CSF-A)



Description

390-U1556B-29R-1-A, 0-90 cm
UNIT: 8
LITHOLOGY: olivine basalt
TEXTURE: aphyric (in chilled margins) to sparsely phyric in pillow interiors
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/N)
PHENOCRYSTS: Olivine phenocrysts are 100% altered.
GROUNDMASS: cryptocrystalline
VESICLES: Vesicularity is bimodal. Chilled margins are nonvesicular, but interiors of pieces contain sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Pieces 1, 2, and 3 also have sparse larger vesicles (up to ~ 10 mm long x 2 mm wide); these have irregular shapes that are heterogeneously distributed through the core piece, but appear to be concentrated near the chilled margins. They are totally filled by calcite.
ALTERATION: Mostly mottled grey arcuate chilled margins and associated orange halos, the latter well developed and notably intense in this core. Some darker orange speckled background in the core of piece 1.
VEINS: Thin saponite and carbonate veins <2mm thick, mostly with thin dark halos superimposed on the orange halos.

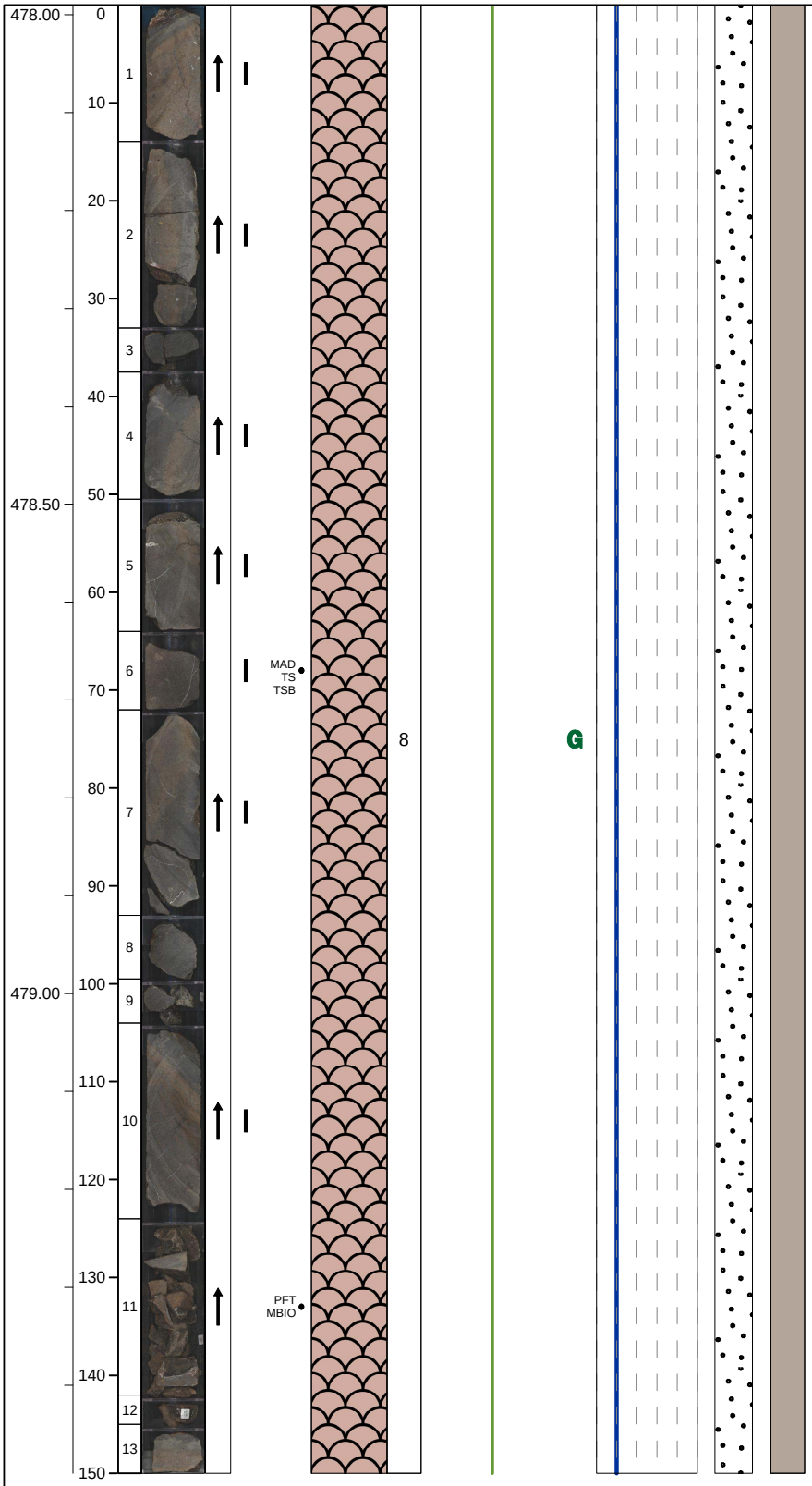
Hole 390-U1556B-29R Section 2, Top of Section: 476.5 m (CSF-A)



Description

390-U1556B-29R-2-A, 0-149 cm
UNIT: 8
LITHOLOGY: olivine basalt
TEXTURE: aphyric (in chilled margins) to sparsely phyric in pillow interiors
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/N)
PHENOCRYSTS: Olivine phenocrysts are 100% altered.
GROUNDMASS: cryptocrystalline
VESICLES: Vesicularity is bimodal. Chilled margins are nonvesicular, but interiors of pieces contain sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Pieces 2, 3, and 8 also have sparse larger vesicles (up to ~ 6 mm); these have irregular shapes that are heterogeneously distributed through the core piece, but appear to be concentrated near the chilled margins. They are totally filled by calcite.
ALTERATION: Orange speckled background in core of large pillow, with mottled grey alteration of chilled margins and abundant associated orange halos. Orange halos at pillow edges can be seen extending into larger pillow cores along thin saponite-carbonate veins (piece 1).
VEINS: Three very thick carbonate veins <3cm wide (pieces 1 and 2), likely including some zeolite based on cream/light orange colour, massive to fibrous texture, and similarity to previous examples confirmed by XRD. Elsewhere, thin saponite and carbonate veins, mostly with thin dark halos superimposed on the orange halos.

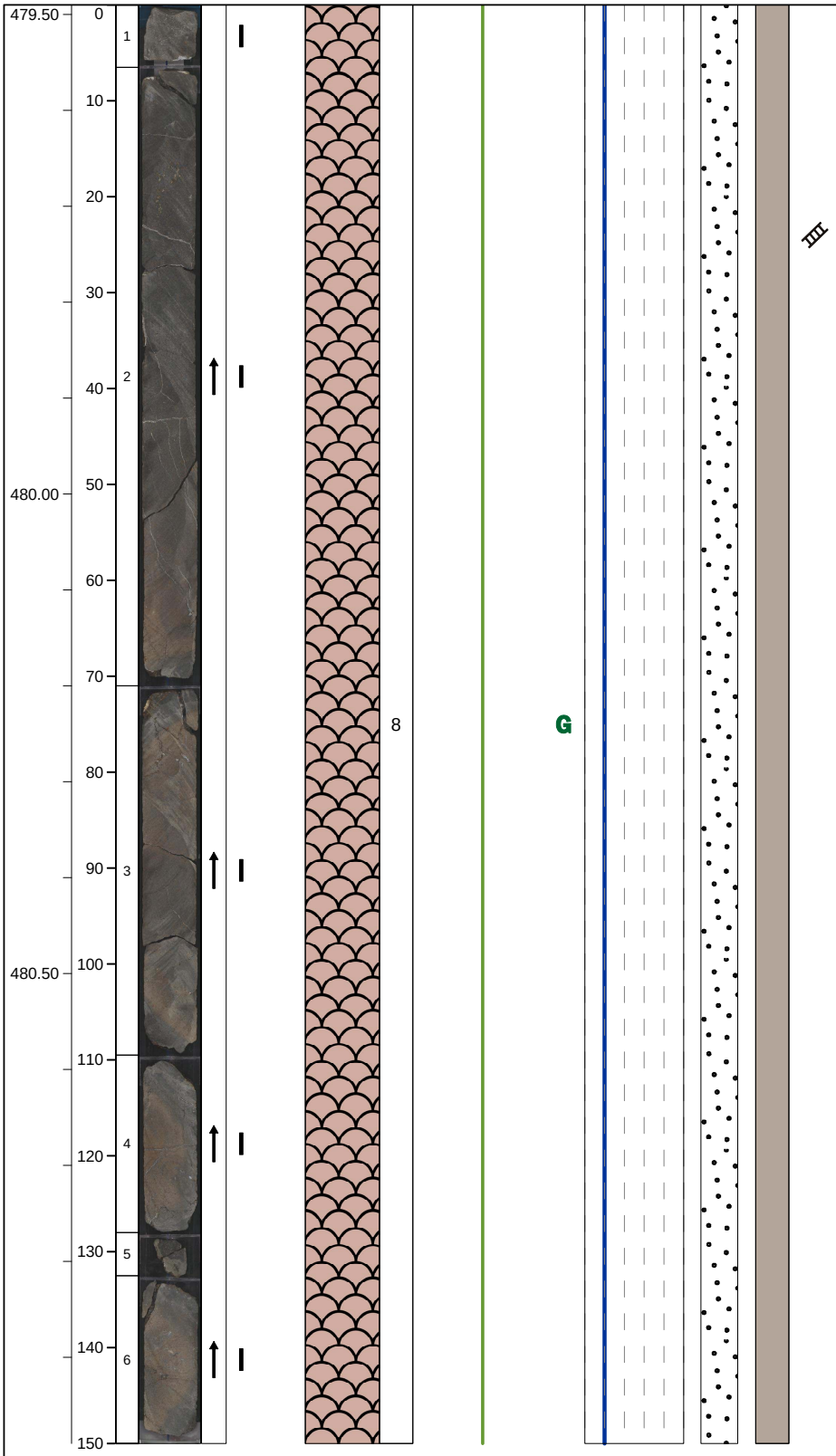
Hole 390-U1556B-29R Section 3, Top of Section: 477.99 m (CSF-A)



Description

390-U1556B-29R-3-A, 0-150 cm
UNIT: 8
LITHOLOGY: olivine basalt
TEXTURE: aphyric (in chilled margins) to moderately phyric in pillow interiors (piece 10 only)
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/N)
PHENOCRYSTS: Olivine phenocrysts are 100% altered.
GROUNDMASS: cryptocrystalline
VESICLES: Vesicularity is bimodal. Chilled margins are nonvesicular, but interiors of pieces contain sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Pieces 1, 2, and 5 also have sparse larger vesicles (up to ~ 13 mm); these have irregular shapes that are heterogeneously distributed through the core piece, but appear to be concentrated near the chilled margins. They are totally filled by calcite.
ALTERATION: Mottled grey alteration and abundant associated orange halos around margins of small pillows with some areas of less altered orange-speckled background preserved.
VEINS: Vein fills are variable proportions of saponite + carbonate with thin dark halos, formed in radial fractures of pillows.

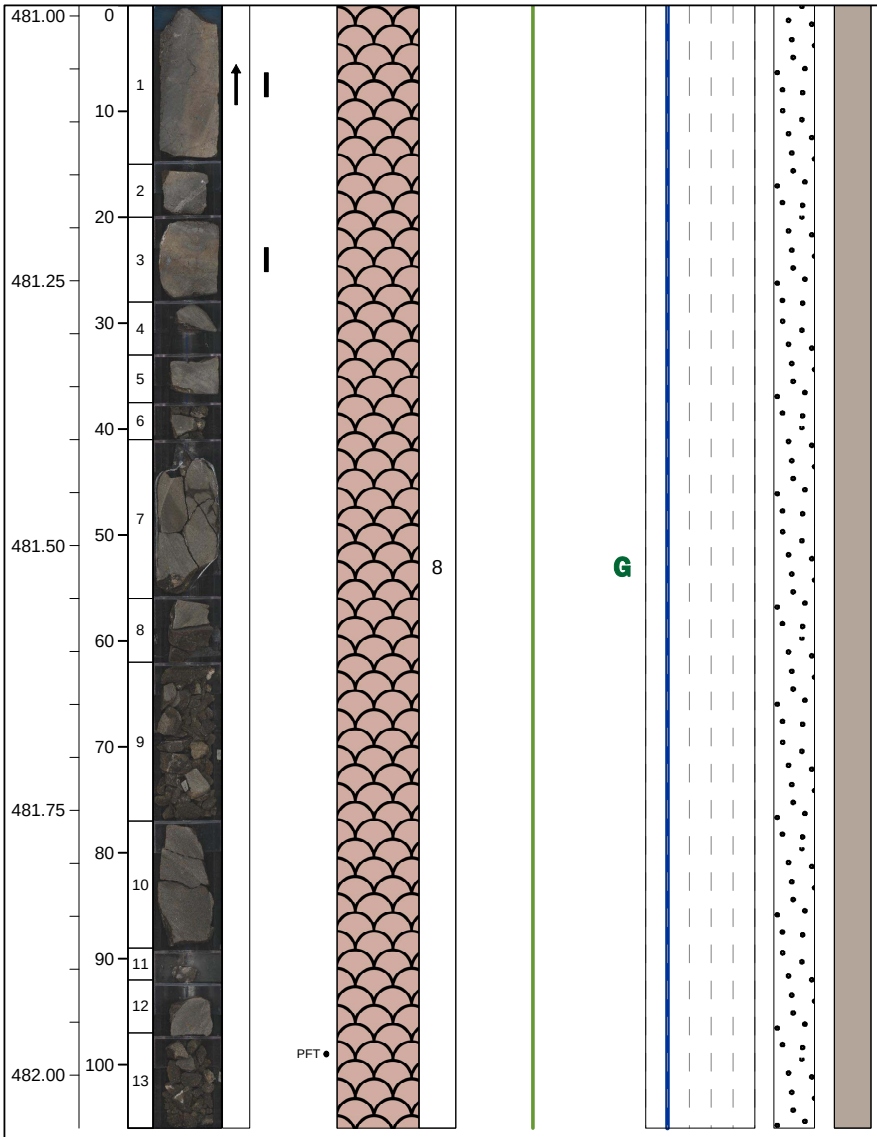
Hole 390-U1556B-29R Section 4, Top of Section: 479.49 m (CSF-A)



Description

390-U1556B-29R-4-A, 0-150 cm
UNIT: 8
LITHOLOGY: olivine basalt
TEXTURE: aphyric (in chilled margins) to sparsely phyric in pillow interiors (piece 10 only)
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/N)
PHENOCRYSTS: Olivine phenocrysts are 100% altered, with the possible exception of the chilled glassy margins of piece 4
GROUNDMASS: cryptocrystalline
VESICLES: Vesicularity is bimodal. Chilled margins are nonvesicular, but interiors of pieces contain sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Piece 2 is locally moderately vesicular and Pieces 3, and 4 are sparsely vesicular with the larger vesicles (up to ~ 5 mm) that have have irregular shapes; these are heterogeneously distributed through the core piece, but appear to be concentrated near the chilled margins. They are totally filled by calcite.
ALTERATION: Orange speckled background in core of large pillows, with mottled grey alteration of chilled margins and thick associated orange halos. Transition between orange halo and light grey mottled margin is characterised by alteration of spherulitic quench crystals (variolitic texture) to orange-brown and their increasing in abundance towards the interior of the pillow, coalescing to constitute most of the groundmass in the outer rim of the orange halo.
VEINS: Thin saponite and carbonate veins, many formed in pillow radial cooling cracks (lovely example pieces 4 and 6) almost all showing 1-2mm dark brown halos. Some carbonate veins quite thick <2mm and one with clear cross-fibrous texture (rarely observed to this point). Thicker carbonate veins quite consistent steeply dipping orientation contrasting with shallower dipping thinner saponite rich veins in this and preceding core.

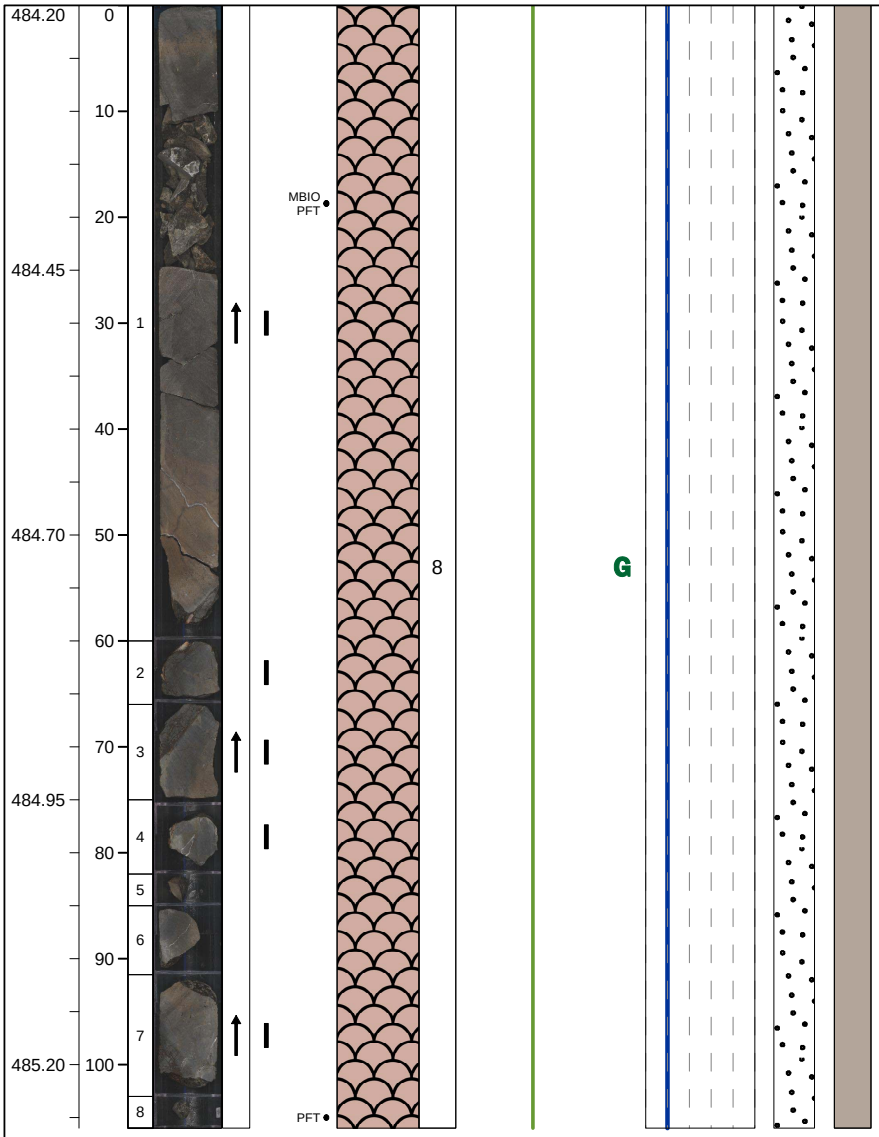
Hole 390-U1556B-29R Section 5, Top of Section: 480.99 m (CSF-A)



Description

390-U1556B-29R-5-A, 0-106 cm
UNIT: 8
LITHOLOGY: olivine basalt
TEXTURE: aphyric (in chilled margins) to sparsely phyric
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/N)
PHENOCRYSTS: Olivine phenocrysts are 100% altered, with the possible exception of the chilled glassy margins of piece 1, 2, and 3
GROUNDMASS: cryptocrystalline
VESICLES: Vesicularity is bimodal. Chilled margins are nonvesicular, but interiors of pieces contain sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Piece 1 also has sparse larger vesicles (up to ~ 3 mm); these have irregular shapes that are heterogeneously distributed through the core piece, but appear to be concentrated near the chilled margins. They are totally filled by calcite.
ALTERATION: Mostly orange speckled background, with mottled grey and orange halos along fragments of chilled margins.
VEINS: Veins quite thin and may contribute to section being quite fragmented.

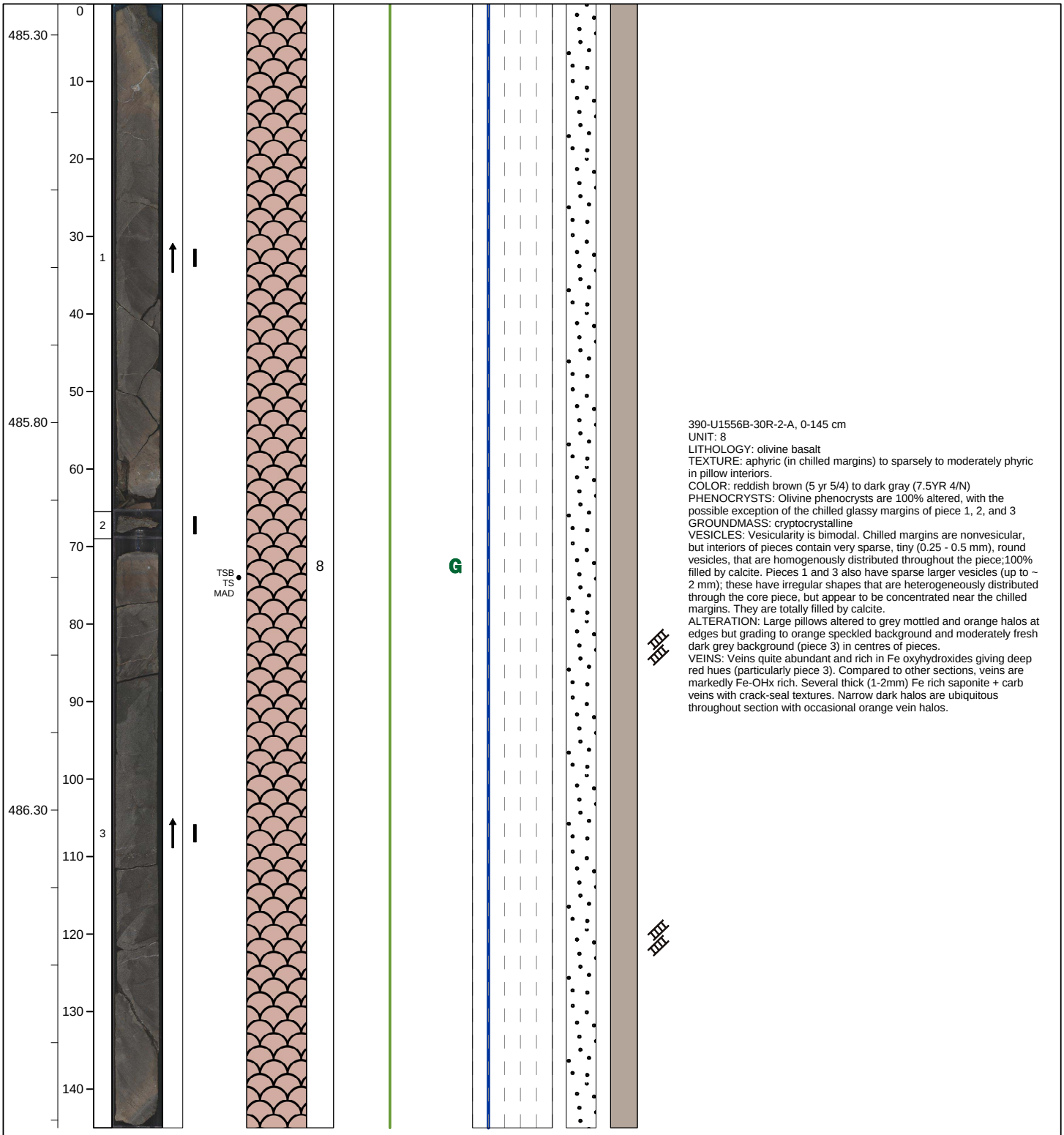
Hole 390-U1556B-30R Section 1, Top of Section: 484.2 m (CSF-A)



Description

390-U1556B-30R-1-A, 0-106 cm
UNIT: 8
LITHOLOGY: olivine basalt
TEXTURE: aphyric (in chilled margins) to sparsely to moderately phyric in pillow interiors.
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/N)
PHENOCRYSTS: Olivine phenocrysts are 100% altered, with the possible exception of the chilled glassy margins of piece 1 through 4, and 7
GROUNDMASS: cryptocrystalline
VESICLES: Vesicularity is bimodal. Chilled margins are nonvesicular, but interiors of pieces contain very sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Pieces 1, 3, 6 and 7 also have sparse larger vesicles (up to ~ 6 mm); these have irregular shapes that are heterogeneously distributed through the core piece, but appear to be concentrated near the chilled margins. They are totally filled by calcite.
ALTERATION: Approximately equal areas of orange speckled background, mottled grey and orange halos.
VEINS: Carbonate and saponite veins, some with dark halos.

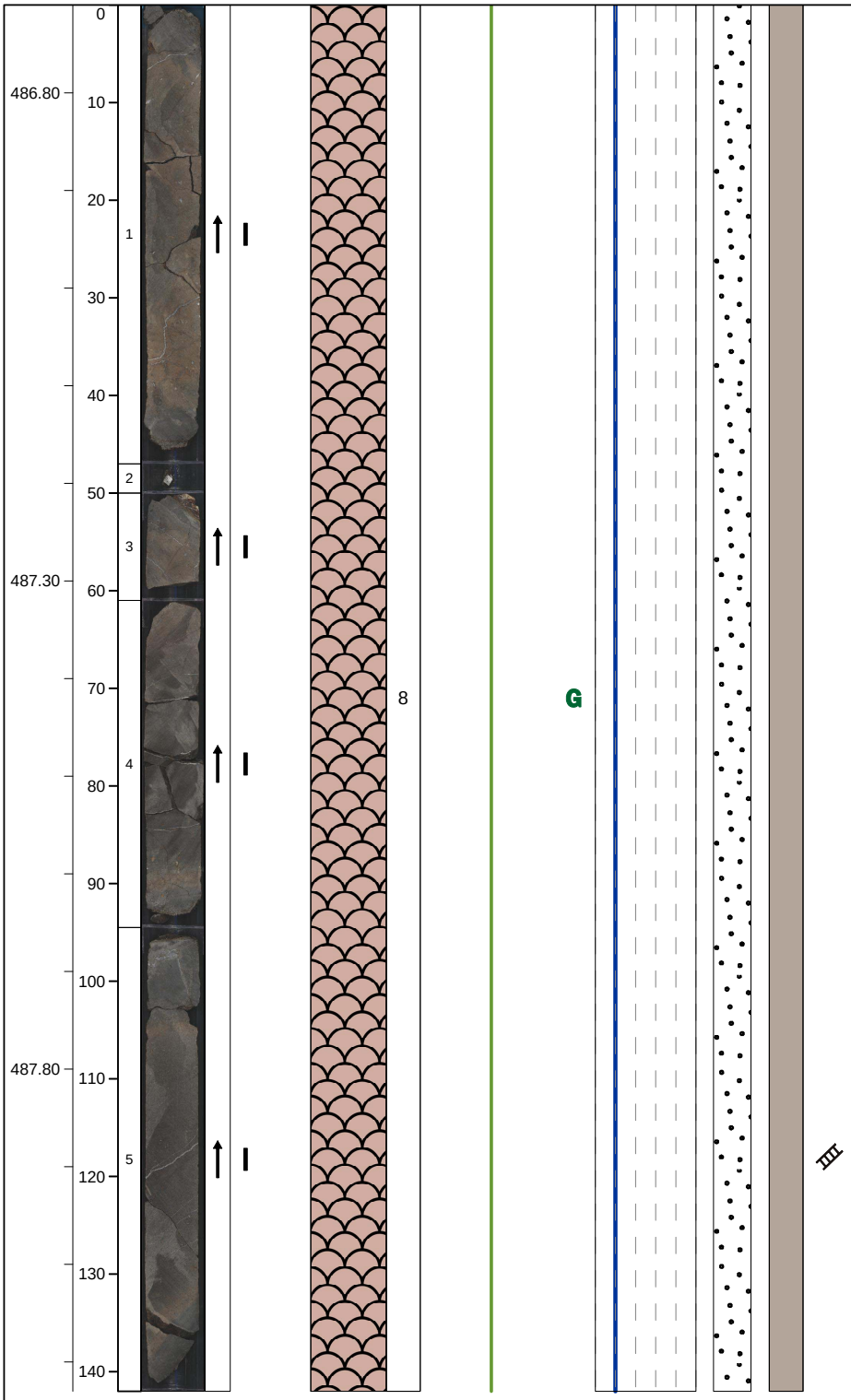
Hole 390-U1556B-30R Section 2, Top of Section: 485.26 m (CSF-A)



Description

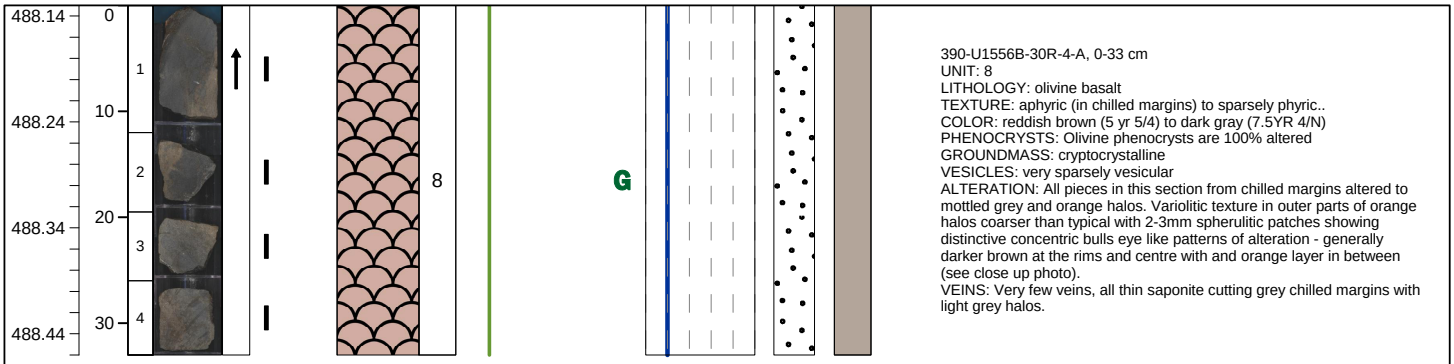
390-U1556B-30R-2-A, 0-145 cm
UNIT: 8
LITHOLOGY: olivine basalt
TEXTURE: aphyric (in chilled margins) to sparsely to moderately phyric in pillow interiors.
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/N)
PHENOCRYSTS: Olivine phenocrysts are 100% altered, with the possible exception of the chilled glassy margins of piece 1, 2, and 3
GROUNDMASS: cryptocrystalline
VESICLES: Vesicularity is bimodal. Chilled margins are nonvesicular, but interiors of pieces contain very sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Pieces 1 and 3 also have sparse larger vesicles (up to ~ 2 mm); these have irregular shapes that are heterogeneously distributed through the core piece, but appear to be concentrated near the chilled margins. They are totally filled by calcite.
ALTERATION: Large pillows altered to grey mottled and orange halos at edges but grading to orange speckled background and moderately fresh dark grey background (piece 3) in centres of pieces.
VEINS: Veins quite abundant and rich in Fe oxyhydroxides giving deep red hues (particularly piece 3). Compared to other sections, veins are markedly Fe-OHx rich. Several thick (1-2mm) Fe rich saponite + carb veins with crack-seal textures. Narrow dark halos are ubiquitous throughout section with occasional orange vein halos.

Hole 390-U1556B-30R Section 3, Top of Section: 486.71 m (CSF-A)



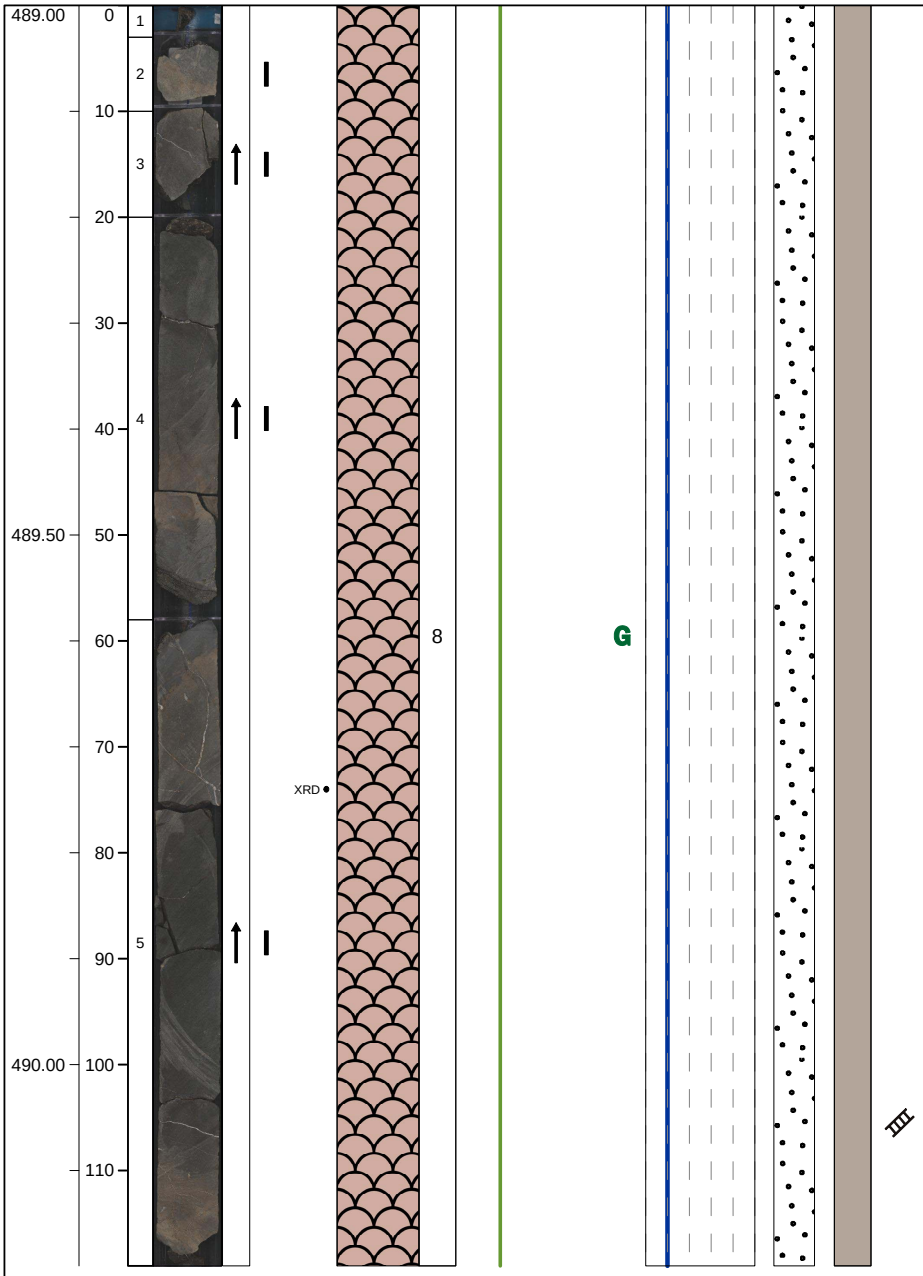
390-U1556B-30R-3-A, 0-142 cm
UNIT: 8
LITHOLOGY: olivine basalt
TEXTURE: aphyric (in chilled margins) to sparsely to moderately phyric in pillow interiors.
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/N)
PHENOCRYSTS: Olivine phenocrysts are 100% altered, with the possible exception of the chilled glassy margins of piece 1, 2, 4 and 5.
GROUNDMASS: cryptocrystalline
VESICLES: Vesicularity is bimodal. Chilled margins are nonvesicular, but interiors of pieces contain very sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Pieces 1, 3 and 5 also have sparse larger vesicles (up to ~ 10 mm long x 2 mm wide); these have irregular shapes that are heterogeneously distributed through the core piece, but appear to be concentrated near the chilled margins. They are totally filled by calcite.
ALTERATION: Mostly orange speckled background in cores of large pillows, with margins altered to grey mottled and orange halos.
VEINS: Carbonate and saponite veins are abundant, mostly moderately dipping. Fe oxides present but less abundant than preceding section. Abundant narrow dark halos around veins, often with blotchy or slightly dendritic growths of saponite.

Hole 390-U1556B-30R Section 4, Top of Section: 488.13 m (CSF-A)



390-U1556B-30R-4-A, 0-33 cm
UNIT: 8
LITHOLOGY: olivine basalt
TEXTURE: aphyric (in chilled margins) to sparsely phyric..
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/N)
PHENOCRYSTS: Olivine phenocrysts are 100% altered
GROUNDMASS: cryptocrystalline
VESICLES: very sparsely vesicular
ALTERATION: All pieces in this section from chilled margins altered to mottled grey and orange halos. Variolitic texture in outer parts of orange halos coarser than typical with 2-3mm spherulitic patches showing distinctive concentric bulls eye like patterns of alteration - generally darker brown at the rims and centre with and orange layer in between (see close up photo).
VEINS: Very few veins, all thin saponite cutting grey chilled margins with light grey halos.

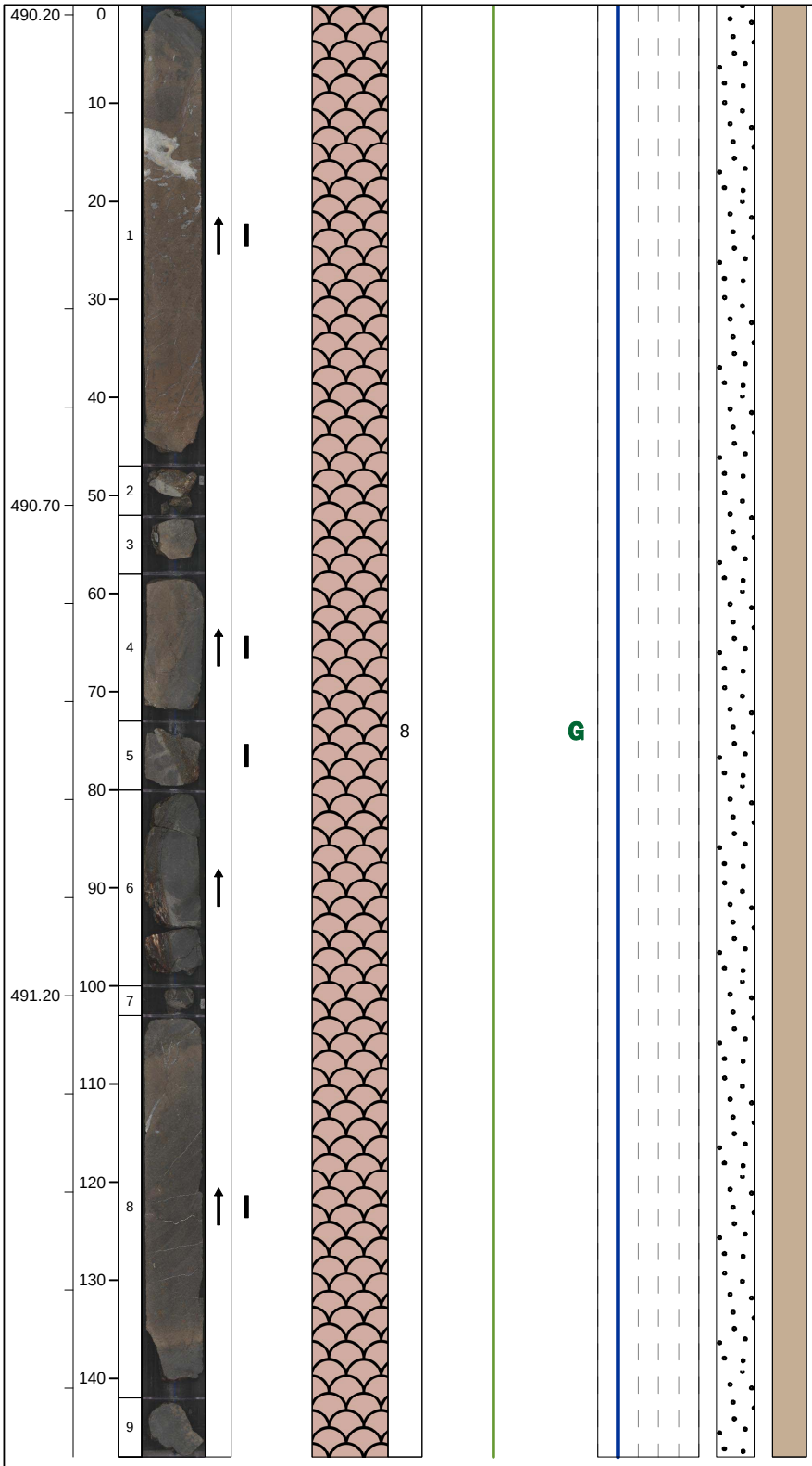
Hole 390-U1556B-31R Section 1, Top of Section: 489.0 m (CSF-A)



Description

390-U1556B-31R-1-A, 0-119 cm
UNIT: 8
LITHOLOGY: olivine basalt
TEXTURE: aphyric (in chilled margins) to sparsely phyric..
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/N)
PHENOCRYSTS: Olivine phenocrysts are 100% altered.
GROUNDMASS: cryptocrystalline
VESICLES: nonvesicular in most places, but rare larger vesicles up to 7mm occur randomly.
ALTERATION: Large pillows altered to grey mottled and (relatively dark) orange halos at edges but grading to orange speckled background and apparently quite fresh dark grey background (piece 4) in pillow cores. Margins show coarse orange halo-altered variolitic texture, similar to preceding section (30R 4).
VEINS: Reasonably sparse veins filled with carbonate and saponite, generally lined by orange-red Fe oxyhydroxides but lacking halos.

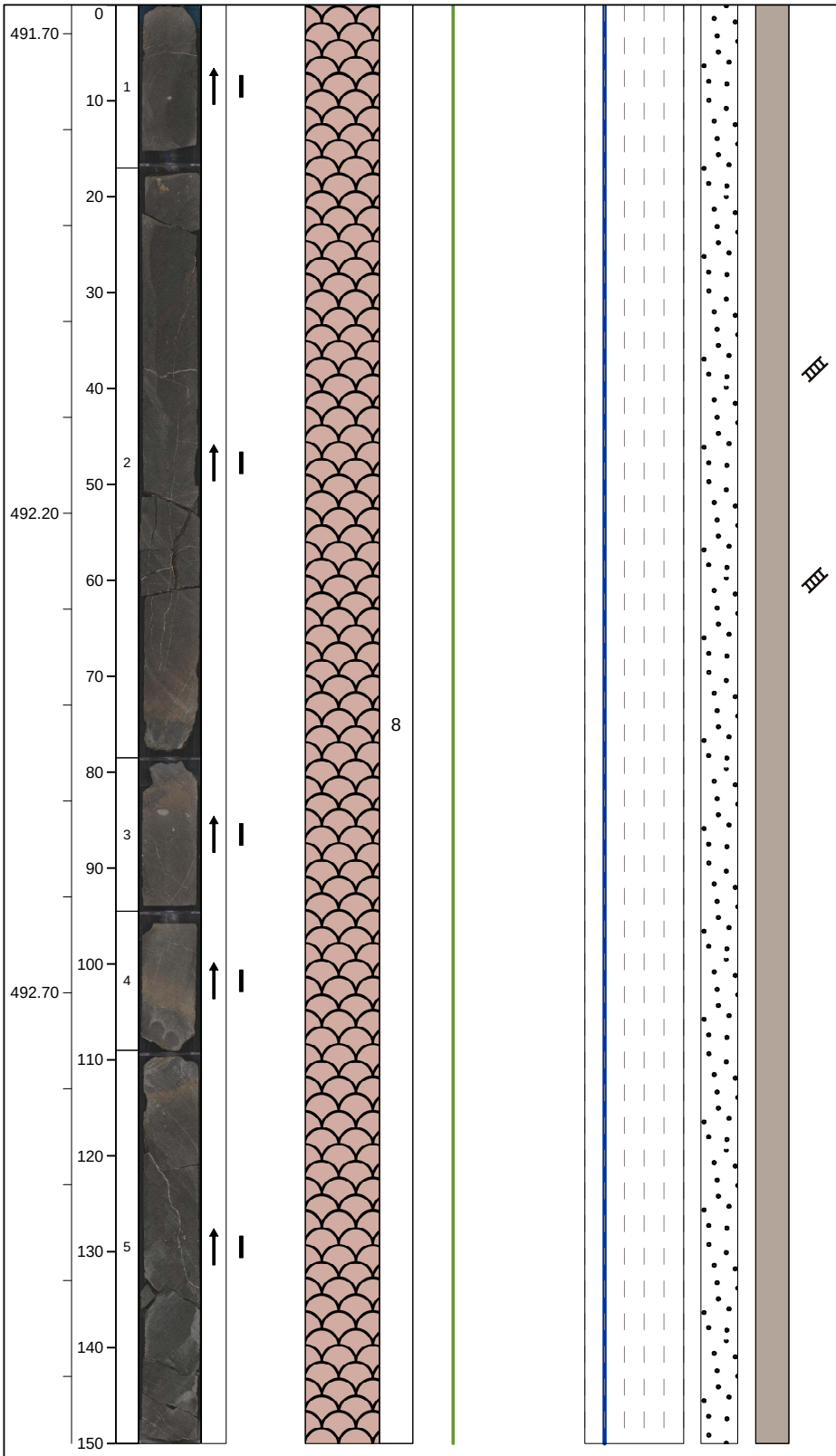
Hole 390-U1556B-31R Section 2, Top of Section: 490.19 m (CSF-A)



Description

390-U1556B-31R-2-A, 0-148 cm
UNIT: 8
LITHOLOGY: olivine basalt
TEXTURE: aphyric (in chilled margins) to moderately phyric in the interior of pillow lava piece 8...
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/N)
PHENOCRYSTS: Olivine phenocrysts are 100% altered.
GROUNDMASS: cryptocrystalline
VESICLES: Vesicularity is bimodal. Chilled margins are nonvesicular, but interiors of pieces contain sparse, tiny (0.25 - 0.5 mm), round vesicles, that are homogenously distributed throughout the piece;100% filled by calcite. Pieces 1 and 8also have sparse larger vesicles (up to 8 mm); these have irregular shapes that are heterogeneously distributed through the core piece, but appear to be concentrated near the chilled margins. They are partially to totally filled by calcite. Piece 1 also includes a large vug (7cm x 4 cm) filled by calcite. .
ALTERATION: Upper part of section pervasively altered to intense orange (logged as orange halo) likely related to large 3cm wide calcite-filled vug and associated network of veins cutting through centre of pillow. Some less pervasive orange speckled background alteration and grey mottled margins. Glass quite altered relative to what has been seen in neighboring cores.
VEINS: Thin carbonate veins are abundant and typically have thin dark halos superimposed on the orange alteration.

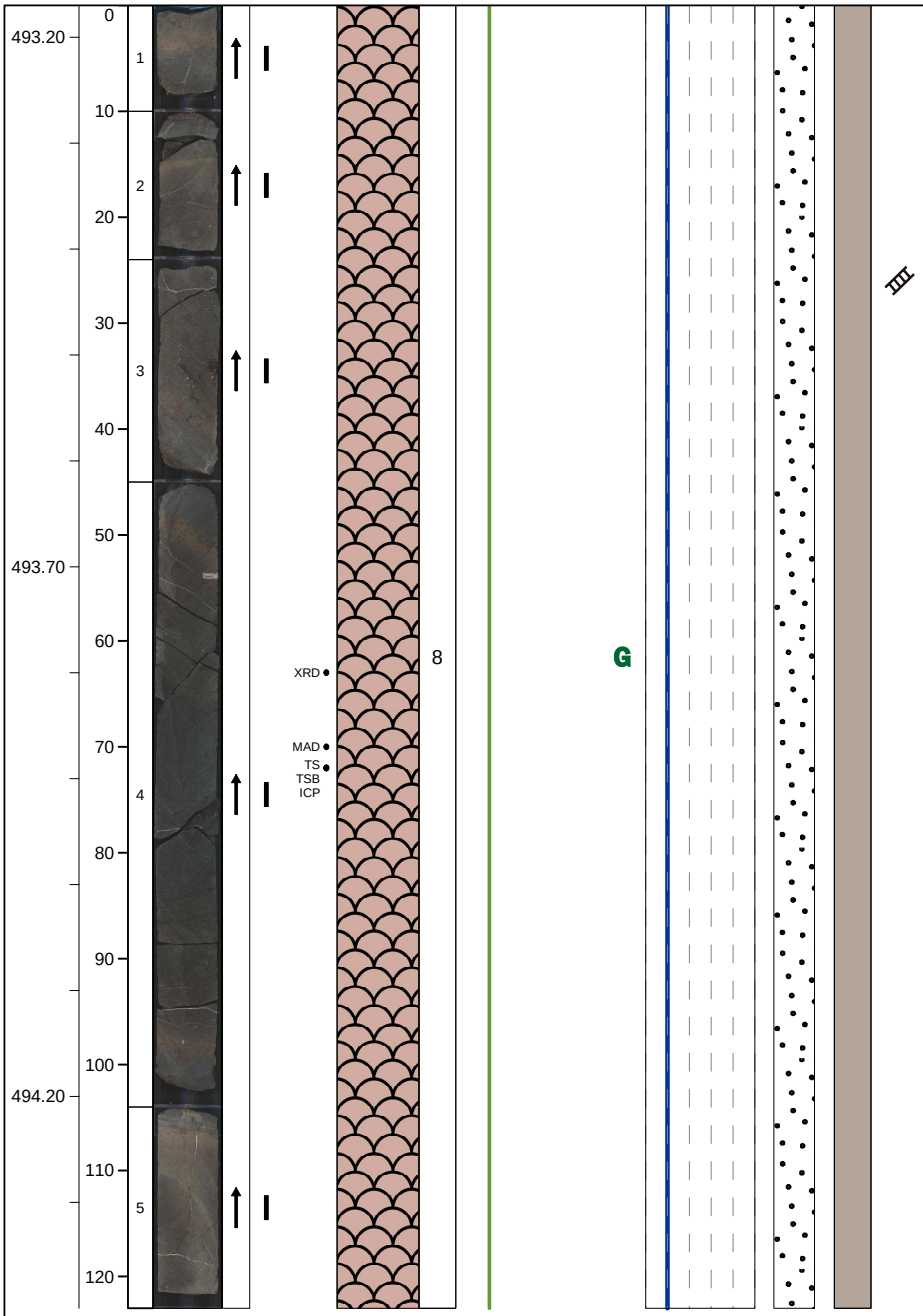
Hole 390-U1556B-31R Section 3, Top of Section: 491.67 m (CSF-A)



Description

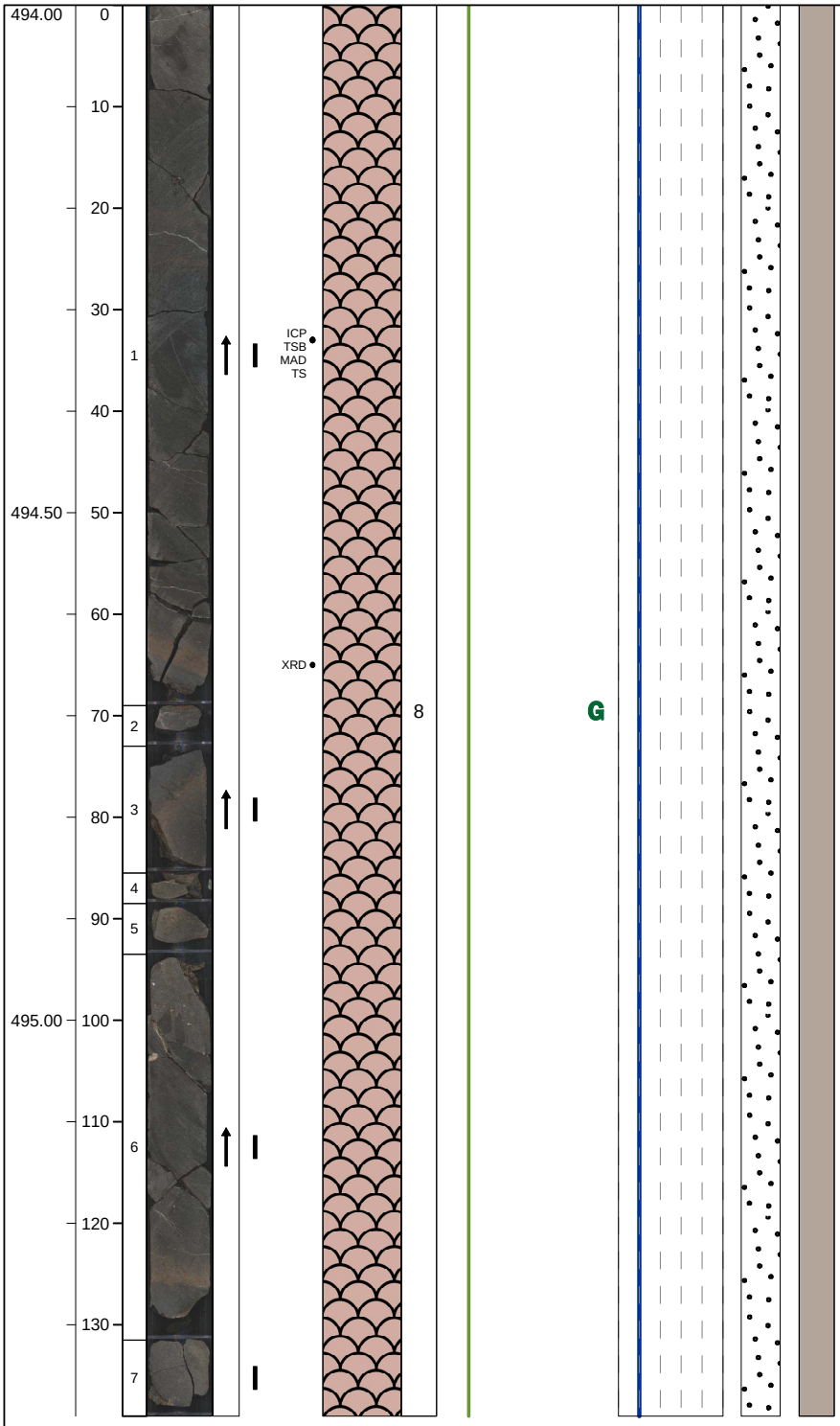
390-U1556B-31R-3-A, 0-150 cm
UNIT: 8
LITHOLOGY: olivine basalt
TEXTURE: Phenocryst abundance is heterogeneous throughout the section and within individual pieces. Piece 2, which is ~ 60 cm long, ranges from aphyric to very sparsely phyric between 18 to ~ 58 cm, and is sparsely to moderately phyric between 58 and 71 cm, before becoming aphyric again in the chilled margin.
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/N)
PHENOCRYSTS: Olivine phenocrysts are 100% altered.
GROUNDMASS: cryptocrystalline
VESICLES: Vesicularity is bimodal and heterogeneous. Chilled margins are nonvesicular,. Piece 1 is sparsely vesicular with round vesicles (~0.75 mm) filled with smectite (?). Pieces 1, 2, 3, and 5 also have sparse larger vesicles (up to 18 mm); these have irregular shapes that are heterogeneously distributed through the core piece, but appear to be concentrated near the chilled margins. They are partially to totally filled by calcite.
ALTERATION: Mostly orange speckled background with orange halos at edges of large pillows and along some veins. Variolitic texture of chilled margins continues to be coarse and show distinctive bulls-eye alteration pattern. Transition from (outer) moderately altered dark grey cryptocrystalline material to (inner) orange halo has narrowed compared to earlier cores with orange alteration overprinting parts of the dark grey.
VEINS: Small vesicles (most <1mm), filled with soft yellow Fe-OH, abundant in top and bottom of large pillow. One vein with well-developed rusty orange halo/front (piece 2). Many saponite + carbonate veins in this and adjacent cores are distinctive for having a much greater degree of mixing of the two minerals or saponite along the medial line (rather than only lining the walls of veins)

Hole 390-U1556B-31R Section 4, Top of Section: 493.17 m (CSF-A)



390-U1556B-31R-4-A, 0-123 cm
UNIT: 8
LITHOLOGY: olivine basalt
TEXTURE: dominantly aphyric ranging to sparsely phyric locally
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/N)
PHENOCRYSTS: The few olivine phenocrysts observed are 100% altered.
GROUNDMASS: cryptocrystalline
VESICLES: Vesicularity is bimodal and heterogeneous. Chilled margins are nonvesicular. Small (<0.75 mm) vesicles appear in most pieces; these are round and 100% filled. Larger vesicles are irregular in shape and more heterogeneous in their distribution. Maximum size observed was 13 mm x 4 mm. These are also partially to totally filled.
ALTERATION: Mostly orange speckled background and orange halos. Some quite fresh looking basalt, lacking the ubiquitous reddening of olivine phenocrysts in the centre of large piece (4). This is divided from more typical speckled orange background by sharp oxidation fronts (63-68cm and 83-84cm)
VEINS: Carbonate veins fill a set of very thin horizontal fractures in this interval; distinctive for being much shallower dipping and closely spaced then generally seen previously. In freshest rock veins are lined with a blue-green mineral (?celadonite, ?saponite) implying different alteration style compared to most of the core.

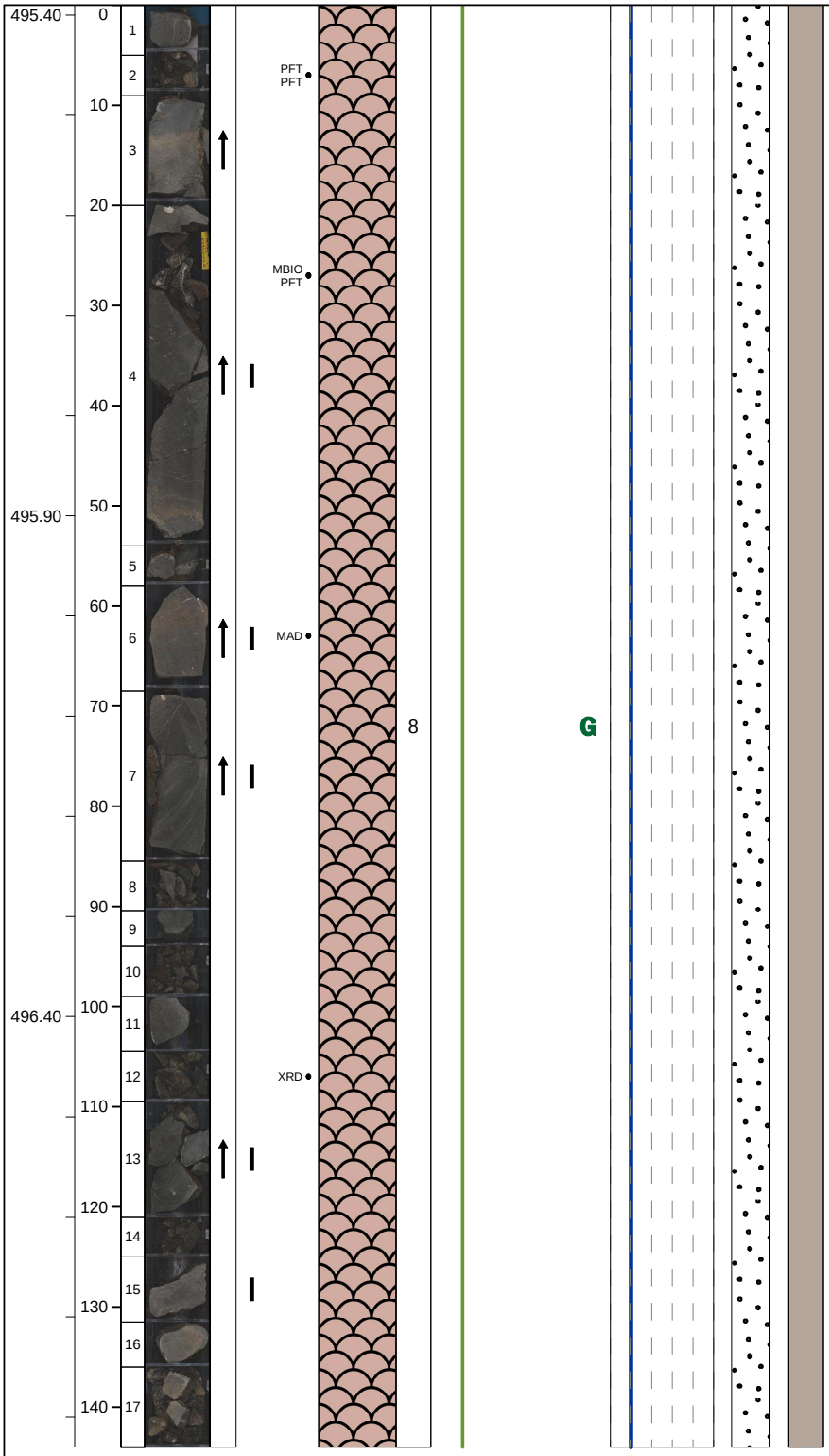
Hole 390-U1556B-32R Section 1, Top of Section: 494.0 m (CSF-A)



Description

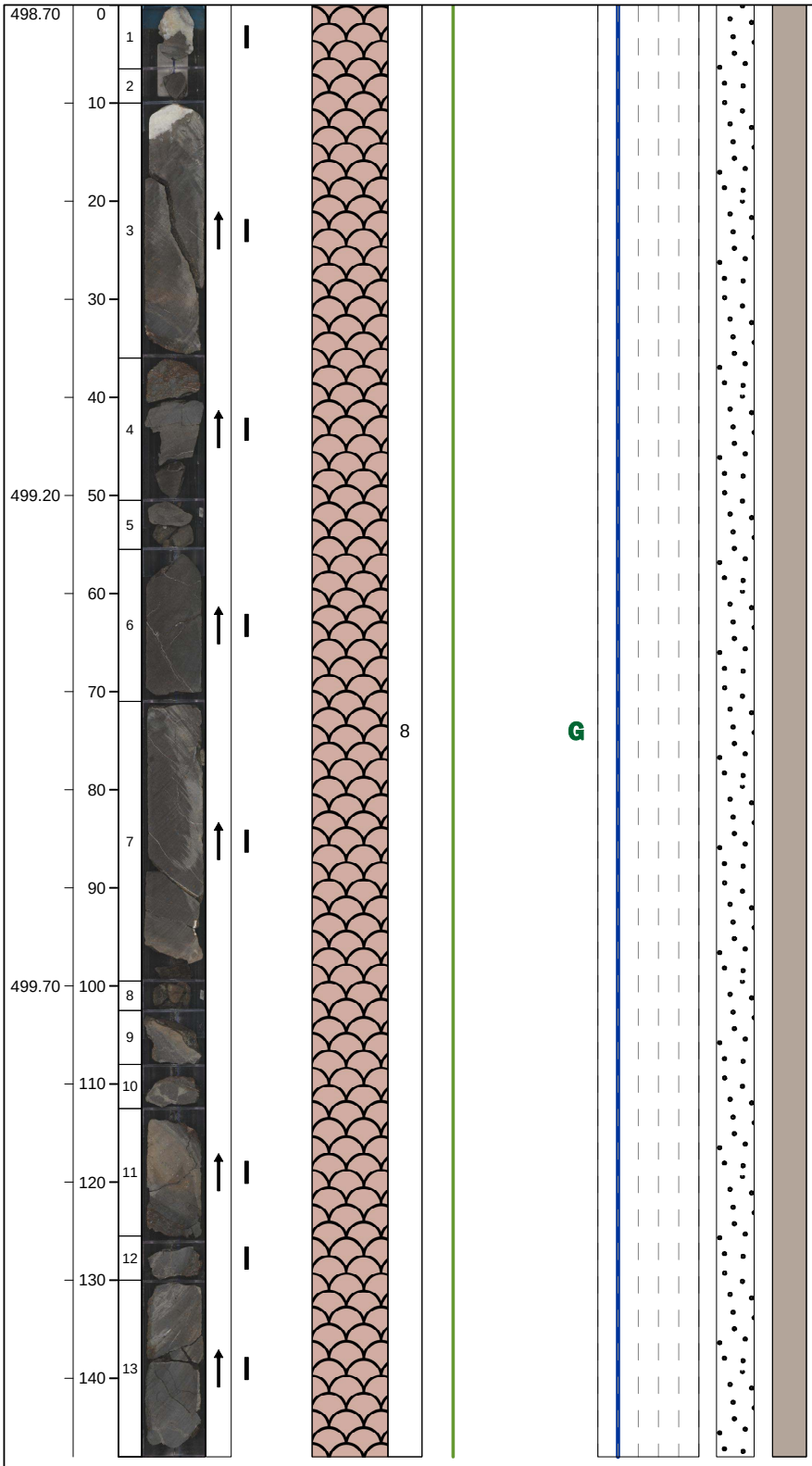
390-U1556B-32R-1-A, 0-139 cm
UNIT: 8
LITHOLOGY: olivine basalt
TEXTURE: dominantly aphyric ranging to sparsely phyric locally
COLOR: reddish brown (5 yr 5/3) to dark gray (7.5YR 4/N)
PHENOCRYSTS: The few olivine phenocrysts observed are 100% altered.
GROUNDMASS: cryptocrystalline
VESICLES: Vesicularity is bimodal and heterogeneous. Chilled margins are nonvesicular. Small (<0.75 mm) vesicles appear in most pieces; these are round and 100% filled. Larger vesicles are irregular in shape and more heterogeneous in their distribution. Maximum size observed was 11 mm. These are also partially to totally filled.
ALTERATION: Large pillows with only dark grey background alteration through much of their interiors. Relatively thin orange halos, and bands of grey mottled and orange speckled alteration at margins. Orange speckled alteration appears as halos in piece 1 with sharp rusty fronts.
VEINS: Carbonate and saponite veins relatively rich in red Fe oxyhydroxides. Thicker veins (~1+mm) tend to be compound with polycrystalline mixing of saponite and carbonate or saponite-rich medial lines.

Hole 390-U1556B-32R Section 2, Top of Section: 495.39 m (CSF-A)



390-U1556B-32R-2-A, 0-144 cm
UNIT: 8
LITHOLOGY: olivine basalt
TEXTURE: dominantly aphyric ranging to sparsely phyric locally
COLOR: dark gray (7.5YR 4/N) to reddish brown (5 yr 5/3)
PHENOCRYSTS: The few olivine phenocrysts observed are 100% altered.
GROUNDMASS: cryptocrystalline
VESICLES: Vesicularity is bimodal and heterogeneous. Chilled margins are nonvesicular. Small (<0.5 mm) vesicles appear in most pieces; these are round and 100% filled. Larger vesicles are irregular in shape and more heterogeneous in their distribution. Maximum size observed was 11 mm. These are also partially to totally filled.
ALTERATION: Mostly orange speckled background with some fresher dark grey cores. Relatively thin orange halos, and bands of grey mottled and orange speckled alteration at margins. Orange rusty halo front in piece 13.
VEINS: Carbonate and saponite veins relatively rich in red Fe oxyhydroxides as well as a greenish clay mineral (poss. a variety of saponite - pending XRD) which sometimes occurs in veins with flat rosettes of radiating acicular carbonate crystals.

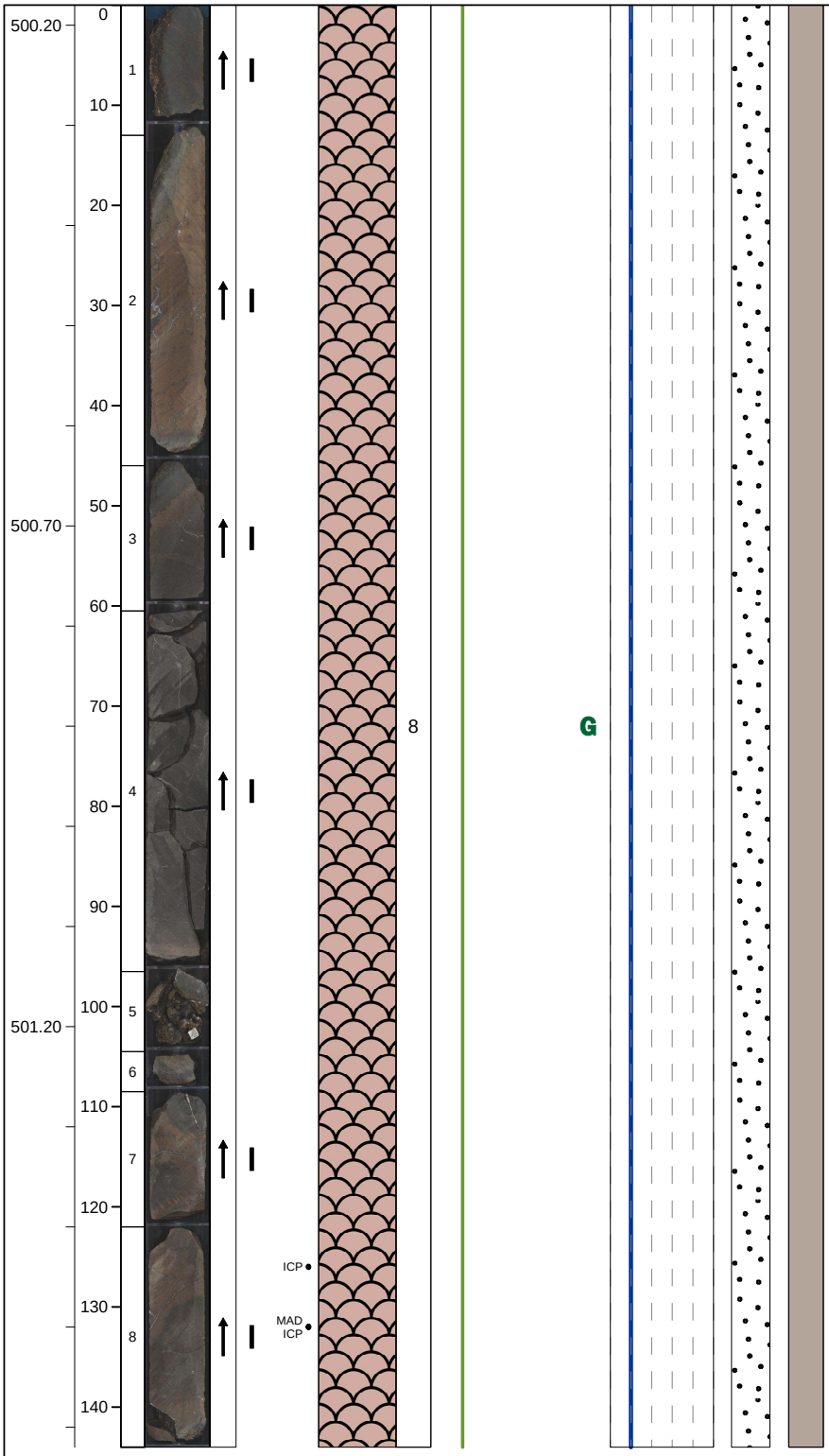
Hole 390-U1556B-33R Section 1, Top of Section: 498.7 m (CSF-A)



Description

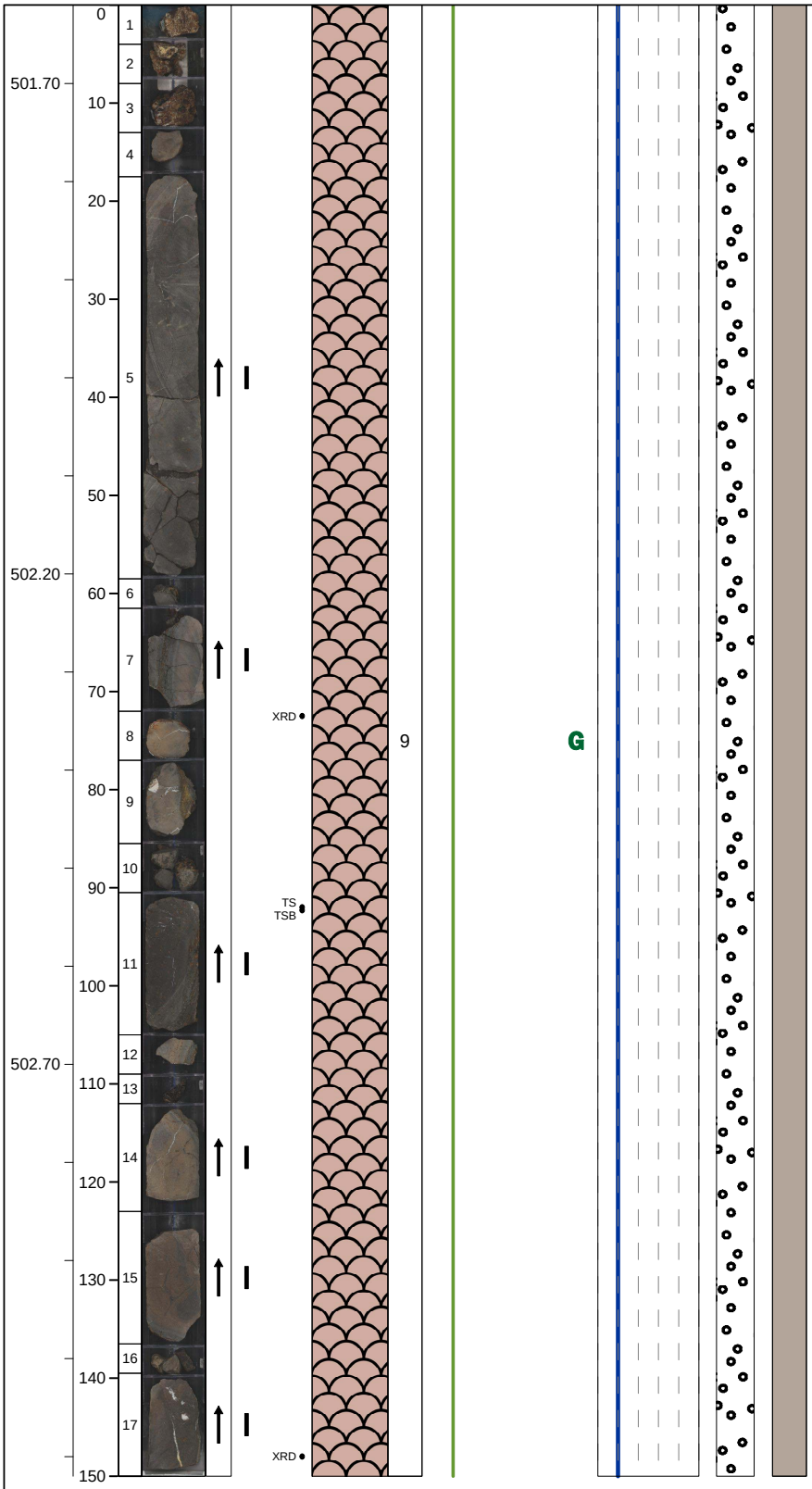
390-U1556B-33R-1-A, 0-147 cm
UNIT: 8
LITHOLOGY: olivine basalt
TEXTURE: dominantly aphyric ranging to sparsely phyric locally
COLOR: dark gray (7.5YR 4/N) to reddish brown (5 yr 5/3)
PHENOCRYSTS: The few olivine phenocrysts observed are 100% altered.
GROUNDMASS: cryptocrystalline
VESICLES: Vesicularity is bimodal and heterogeneous. Chilled margins are nonvesicular. Small (<0.5 mm) vesicles appear in most pieces; these are round and 100% filled.
ALTERATION: Mostly orange speckled background and grey mottled alteration of multiple chilled margins.
VEINS: Quite abundant carbonate + saponite many with faint orange halos in pillow interiors (pieces 5 and 6) but less Fe-OH rich than preceding core. Two very thick (20-30mm) accumulations of crystalline calcite at top of section - not clear if veins or void fill as similar width to section.

Hole 390-U1556B-33R Section 2, Top of Section: 500.18 m (CSF-A)



390-U1556B-33R-2-A, 0-144 cm
UNIT: 8
LITHOLOGY: olivine basalt
TEXTURE: dominantly aphyric ranging to sparsely phyric locally
COLOR: reddish dark gray (5 yr 4/2) to dark gray (7.5YR 4/N)
PHENOCRYSTS: The few olivine phenocrysts observed are 100% altered, except possibly for a few microphenocrysts in the chilled margins of pieces 1 and 3.
GROUNDMASS: cryptocrystalline
VESICLES: Vesicularity is bimodal and heterogeneous. In contrast to previous assessments, it may be that many of the chilled margins are sparsely vesicular, with very small (<0.3mm) vesicles. Difficult to distinguish them from varioles in some cases and as a function of the alteration in others. Small (<0.5 mm) vesicles appear in most pieces; these are round and 100% filled.
ALTERATION: Similar bimodal alteration to preceding section; either pervasive orange or speckled orange pseudomorphic alteration, though the later a bit redder overall. Shattered pillow margin (piece 10) cemented by veins with appear to cross-cut earlier light grey banding and may define a later fracturing + vein filling event.
VEINS: Lots of compound carbonate + saponite + Fe oxyhydroxide veins with bright rusty red linings (piece 5), many with convoluted dark-fronted halos. Several veins and vesicles in lower part of section cemented by milky white ?zeolite intergrowth with carbonate sometimes including bright orange or red blotches.

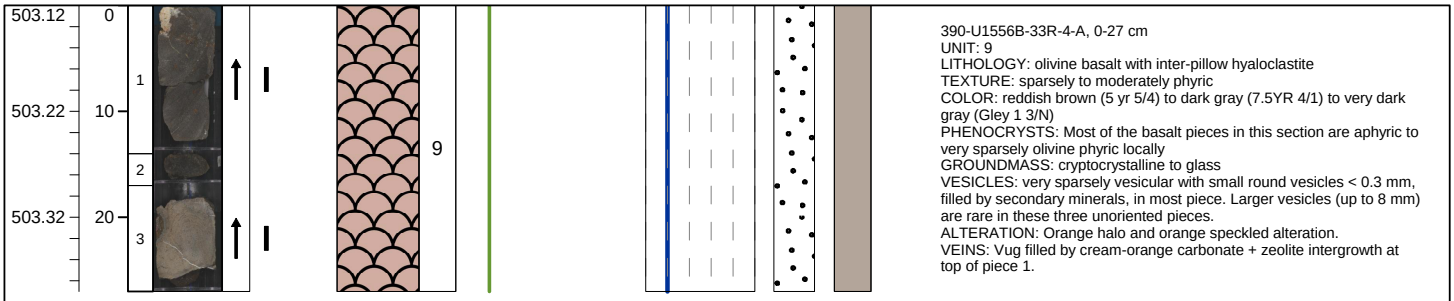
Hole 390-U1556B-33R Section 3, Top of Section: 501.62 m (CSF-A)



Description

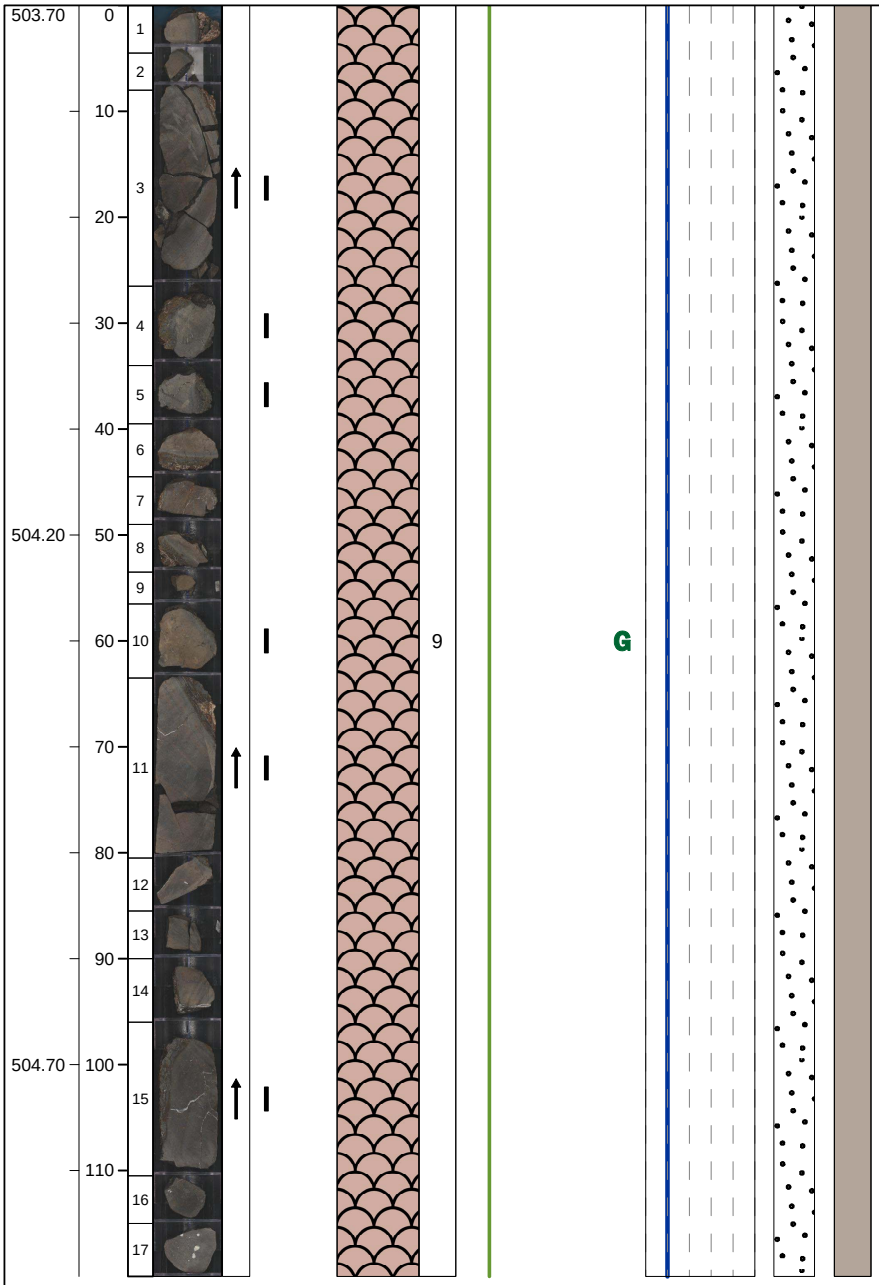
390-U1556B-33R-3-A, 0-150 cm
UNIT: 9
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: aphyric (in chilled margins to sparsely to moderately phyric in pillow interiors.
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS: Most of the basalt pieces in this section are aphyric to very sparsely olivine phyric locally
GROUNDMASS: cryptocrystalline to glass
VESICLES: sparsely vesicular with small round vesicles < 0.5 mm, filled by secondary minerals, in most piece. Larger vesicles are heterogeneously distributed and reach sizes up to 20 mm long x 2 mm wide.
ALTERATION: Orange halo and orange speckled alteration.
VEINS: Vug filled by cream-orange carbonate + zeolite intergrowth at top of piece 1.

Hole 390-U1556B-33R Section 4, Top of Section: 503.12 m (CSF-A)



390-U1556B-33R-4-A, 0-27 cm
UNIT: 9
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: sparsely to moderately phyric
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS: Most of the basalt pieces in this section are aphyric to very sparsely olivine phyric locally
GROUNDMASS: cryptocrystalline to glass
VESICLES: very sparsely vesicular with small round vesicles < 0.3 mm, filled by secondary minerals, in most piece. Larger vesicles (up to 8 mm) are rare in these three unoriented pieces.
ALTERATION: Orange halo and orange speckled alteration.
VEINS: Vug filled by cream-orange carbonate + zeolite intergrowth at top of piece 1.

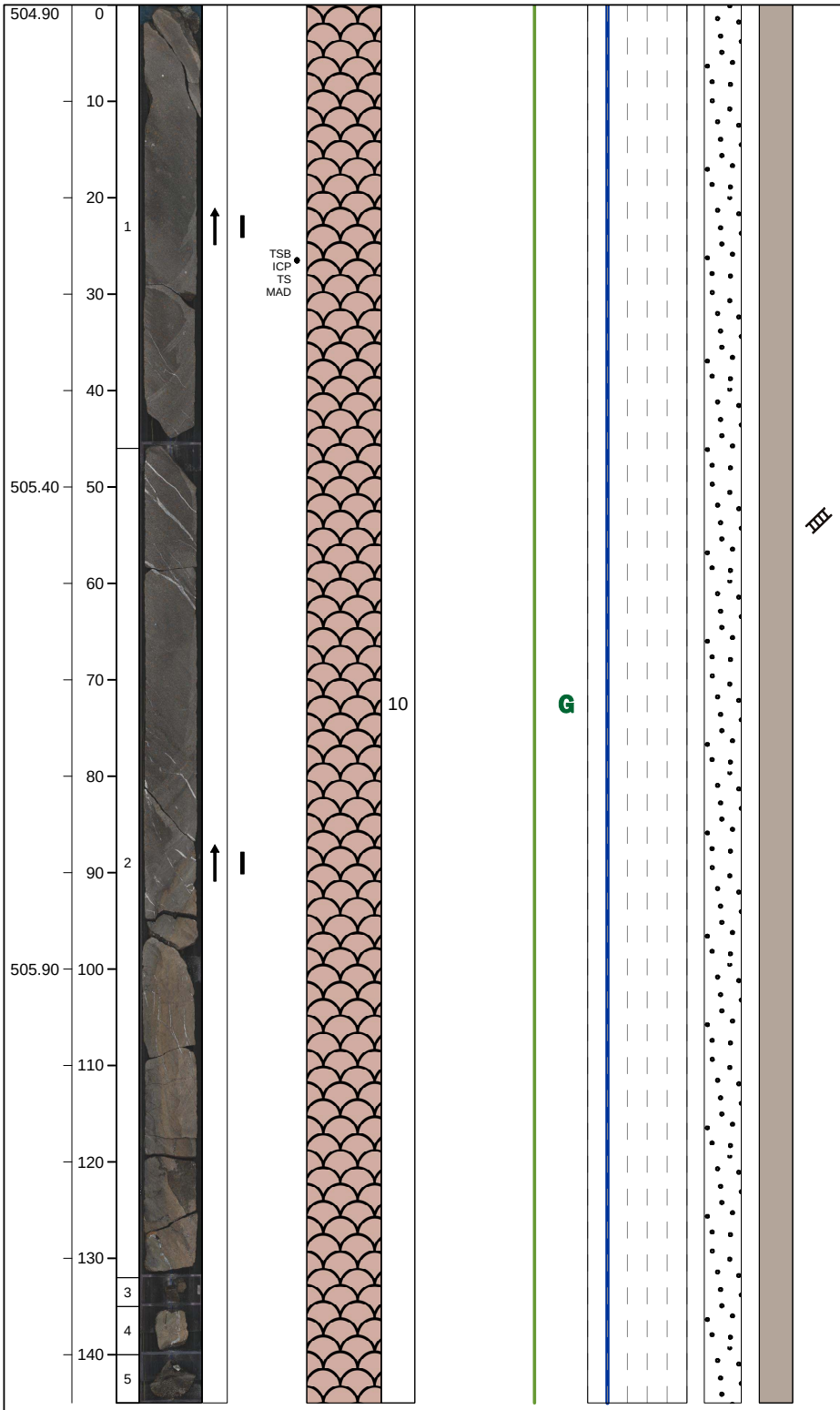
Hole 390-U1556B-34R Section 1, Top of Section: 503.7 m (CSF-A)



Description

390-U1556B-34R-1-A, 0-120 cm
UNIT: 9
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: aphric to sparsely phyric
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS: Olivines are 100% altered throughout with the possible exception of the chilled margins for pieces 4 and 5, where alteration may be only partial
GROUNDMASS: cryptocrystalline to glass
VESICLES: Predominantly nonvesicular. Some larger vesicles (up to 10 mm) in pieces 16 and 17
ALTERATION: Mostly grey mottled margins with muted orange halos and moderately abundant altered glass.
VEINS: Altered glass/hyaloclastite cemented by thin zeolite + saponite coatings. Veins rare. Some milky white + orange vesicle fill (2-3mm) at bottom of section (piece 17)

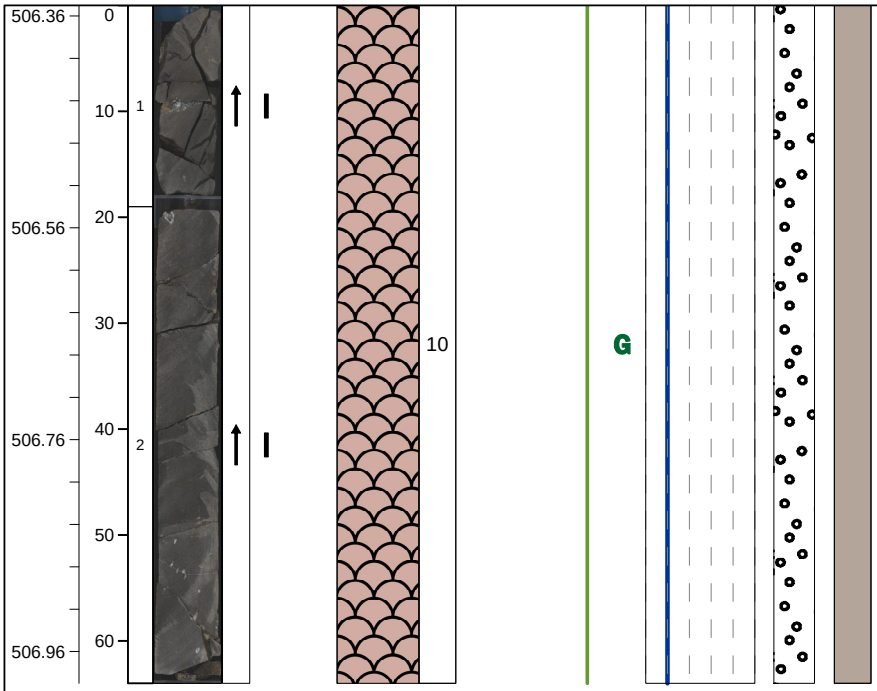
Hole 390-U1556B-34R Section 2, Top of Section: 504.9 m (CSF-A)



Description

390-U1556B-34R-2-A, 0-145 cm
UNIT: 10
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS: Olivines are 100% altered throughout
GROUNDMASS: cryptocrystalline to glass
VESICLES: Predominantly nonvesicular, with very small (<0.4 mm) round vesicles occuring in low abundance throughout.
ALTERATION: Orange speckled background predominates in thick flow forming most of section with a prominent orange halo and some mottled grey alteration around the chilled margin in the lower half. Thick unit has distinct highly speckled appearance possibly caused by pseudomorphic replacement of slightly coarser (relative to previous units) groundmass crystals.
VEINS: Veining is somewhat distinct to preceding cores; subparallel moderate to steeply dipping thick (1-3mm) bright white calcite veins, predominate throughout core 34R, sometimes lined by red Fe oxyhydroxides.

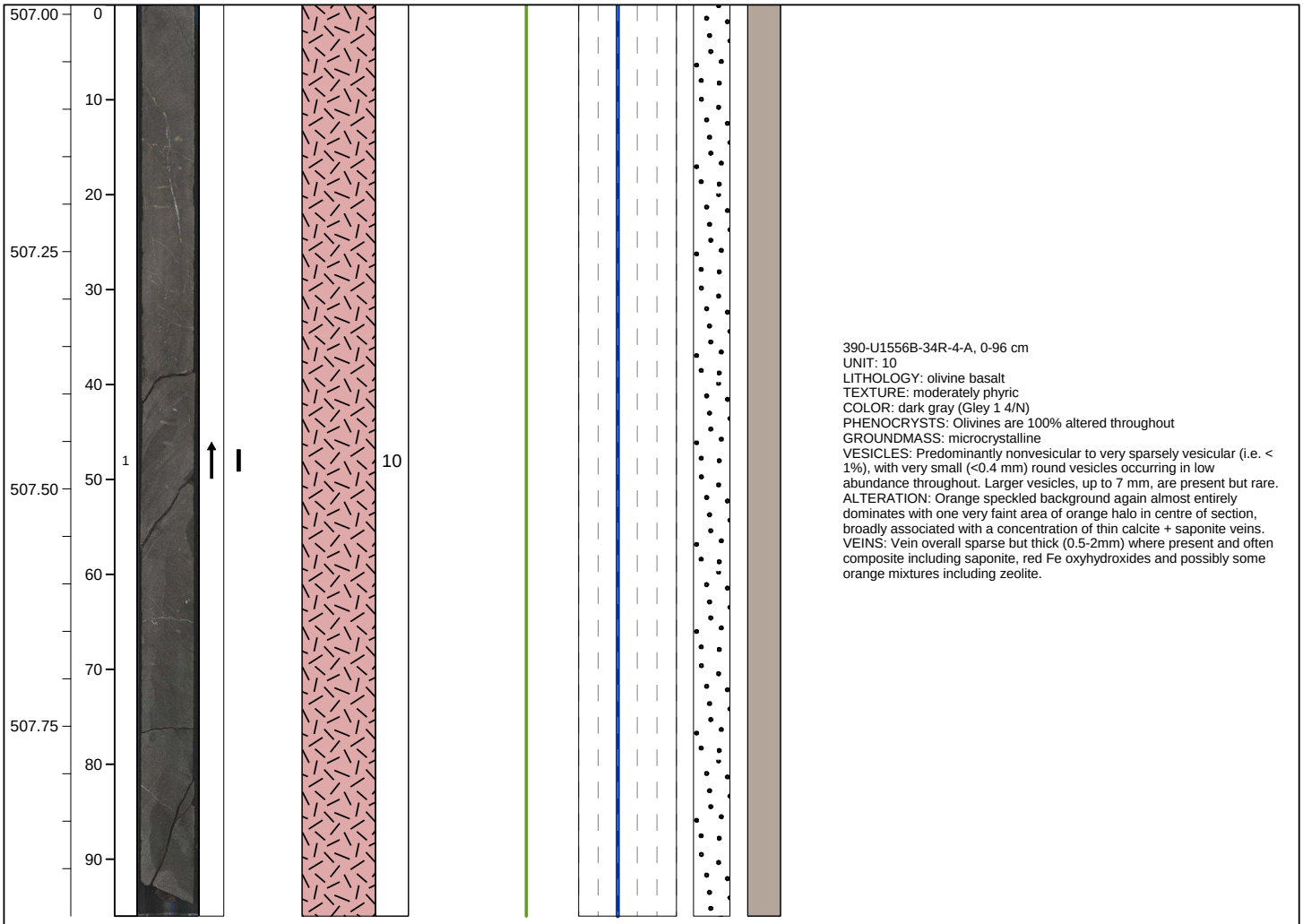
Hole 390-U1556B-34R Section 3, Top of Section: 506.35 m (CSF-A)



Description

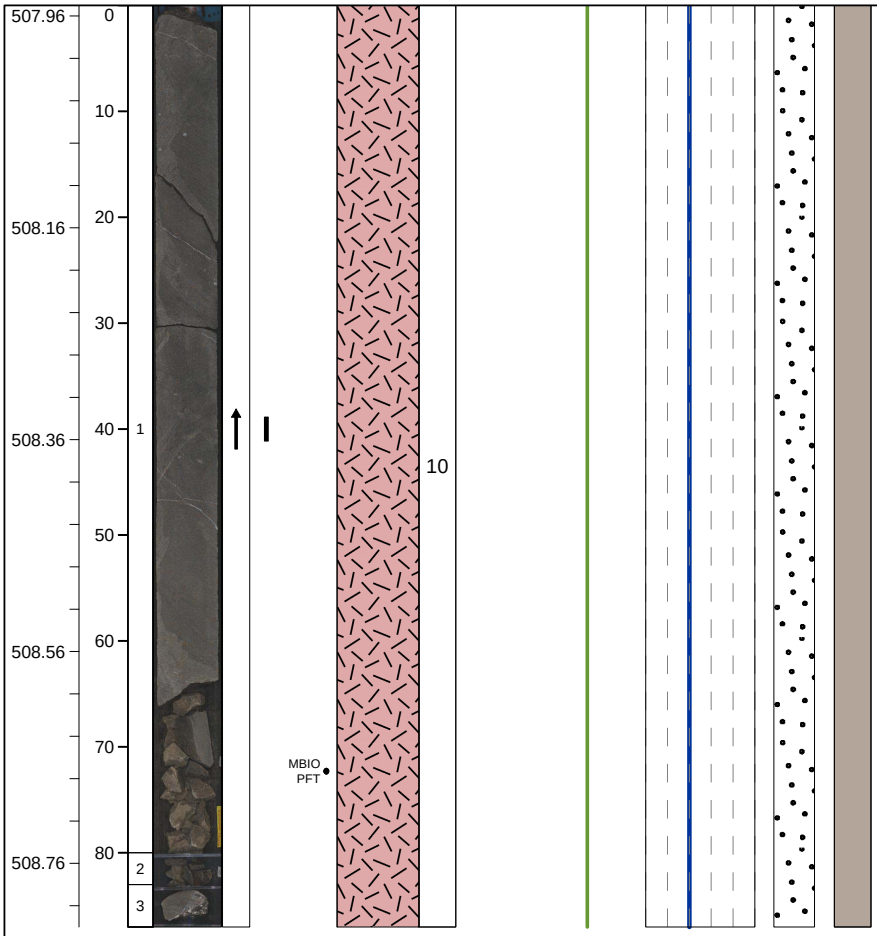
390-U1556B-34R-3-A, 0-64 cm
UNIT: 10
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: dark gray (Gley 1 4/N)
PHENOCRYSTS: Olivines are 100% altered throughout
GROUNDMASS: cryptocrystalline to glass
VESICLES: Predominantly nonvesicular to very sparsely vesicular (i.e. < 1%), with very small (<0.4 mm) round vesicles occuring in low abundance throughout. Larger vesicles, up to 5 mm, concentrated in the lower half of piece 2, where they exhibit a discontinuous radial pattern.
ALTERATION: Orange speckled background alteration throughout with similar appearance to previous section with slightly darker (fresher?) groundmass.
VEINS: Veins mostly shallow dipping and poorly cemented with only tihn linings of saponite and dustings of calcite and/or Fe oxyhydroxides. Some calcite filled vesicles.

Hole 390-U1556B-34R Section 4, Top of Section: 506.99 m (CSF-A)



390-U1556B-34R-4-A, 0-96 cm
UNIT: 10
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: dark gray (Gley 1 4/N)
PHENOCRYSTS: Olivines are 100% altered throughout
GROUNDMASS: microcrystalline
VESICLES: Predominantly nonvesicular to very sparsely vesicular (i.e. < 1%), with very small (<0.4 mm) round vesicles occurring in low abundance throughout. Larger vesicles, up to 7 mm, are present but rare.
ALTERATION: Orange speckled background again almost entirely dominates with one very faint area of orange halo in centre of section, broadly associated with a concentration of thin calcite + saponite veins.
VEINS: Vein overall sparse but thick (0.5-2mm) where present and often composite including saponite, red Fe oxyhydroxides and possibly some orange mixtures including zeolite.

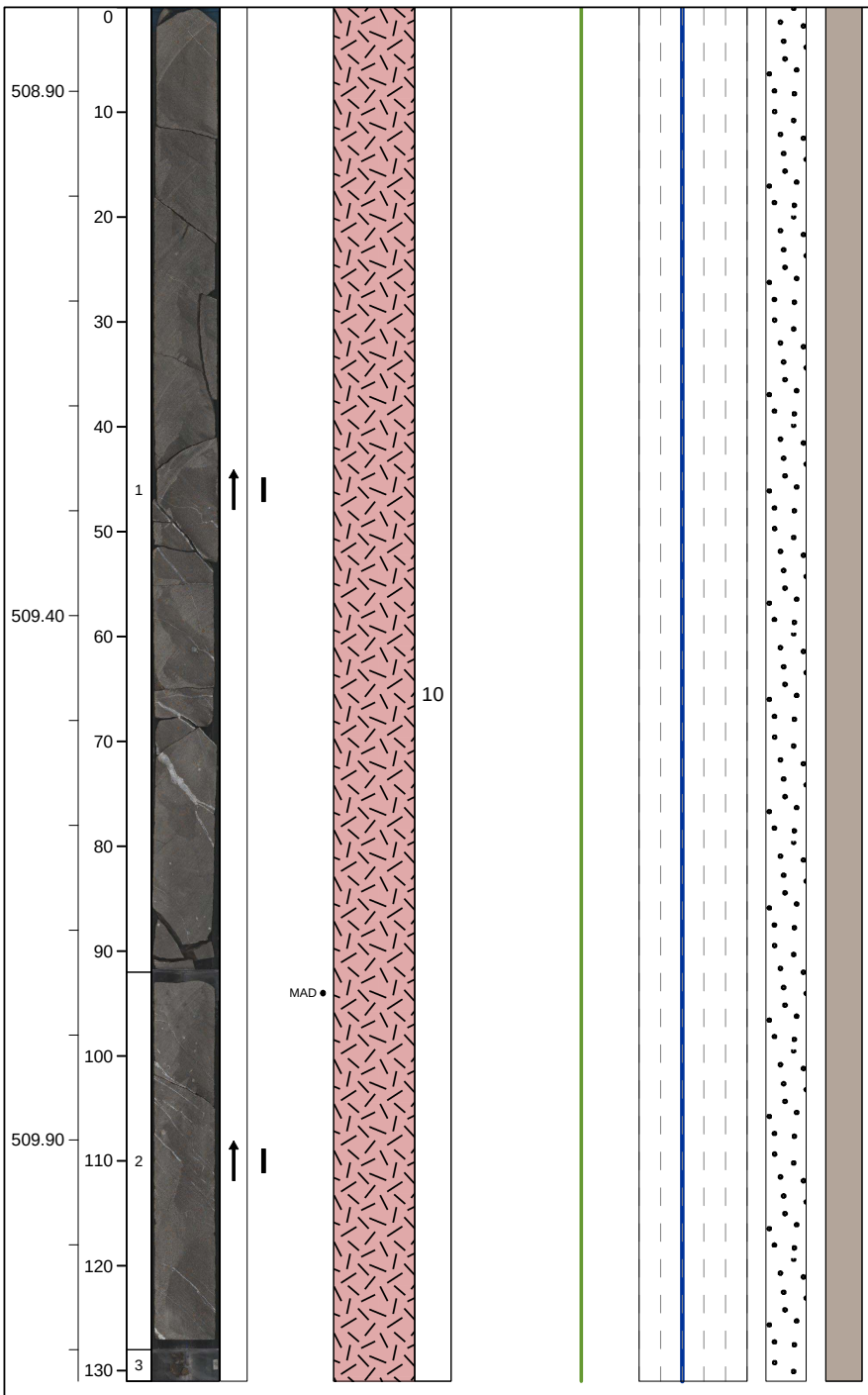
Hole 390-U1556B-34R Section 5, Top of Section: 507.95 m (CSF-A)



Description

390-U1556B-34R-5-A, 0-87 cm
UNIT: 10
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: dark gray (Gley 1 4/N)
PHENOCRYSTS: Olivines are 100% altered throughout
GROUNDMASS: microcrystalline
VESICLES: Predominantly nonvesicular to very sparsely vesicular (i.e. < 1%), with very small (<0.4 mm) round vesicles occurring in low abundance throughout. Larger vesicles, up to 3 mm, are present but rare.
ALTERATION: Orange speckled background throughout, with slight oxidation gradient to more orange colours towards bottom of section.
VEINS: Veins rare; either thin or composite 1mm saponite + carbonate.

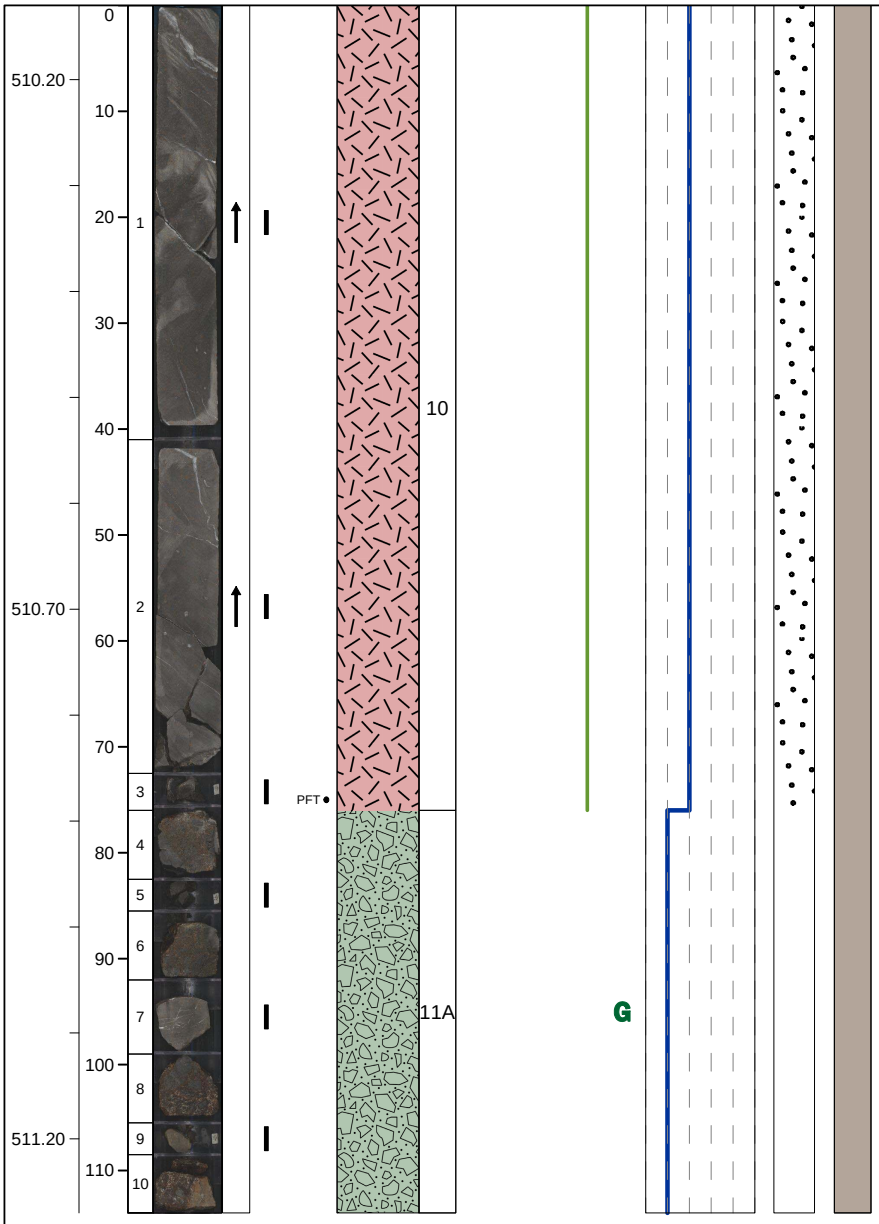
Hole 390-U1556B-34R Section 6, Top of Section: 508.82 m (CSF-A)



Description

390-U1556B-34R-6-A, 0-133 cm
UNIT: 10
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: dark gray (Gley 1 4/N)
PHENOCRYSTS: Olivines are 100% altered throughout
GROUNDMASS: microcrystalline
VESICLES: Predominantly nonvesicular to very sparsely vesicular (i.e. < 1%), with very small (<0.4 mm) round vesicles occurring in low abundance throughout. Larger vesicles, up to 3 mm, are present but rare.
ALTERATION: Orange speckled background throughout; slight variations in colour mainly due to variations in phenocrysts abundance down section.
VEINS: Moderately abundant veins, particularly in lower half which is dominated by thick, moderately dipping, white carbonate veins with cross-fibrous texture and distinct medial lines, often lined by saponite and/or red Fe-OH and possibly zeolites. Halos rare throughout this thick flow unit.

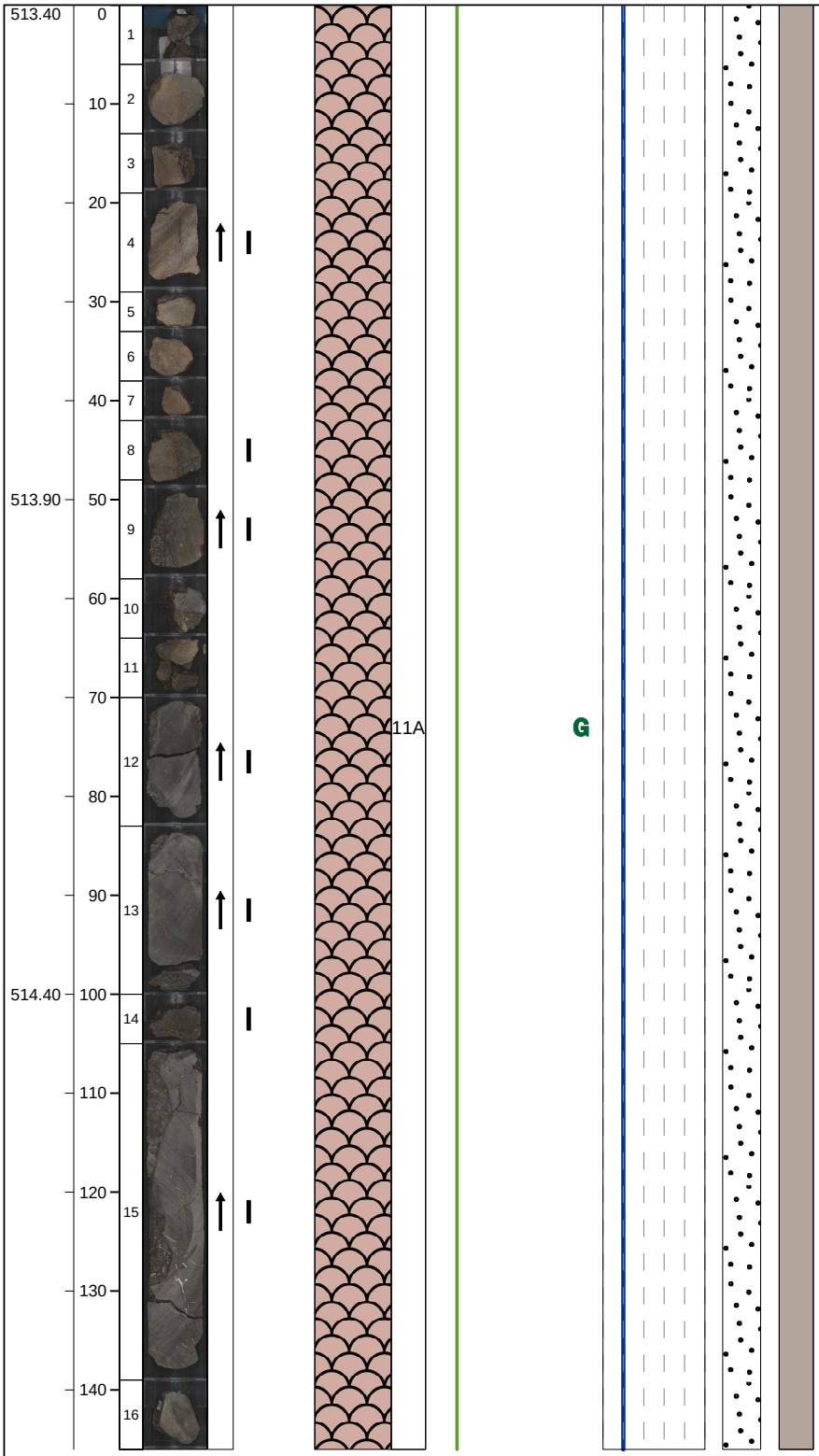
Hole 390-U1556B-34R Section 7, Top of Section: 510.13 m (CSF-A)



390-U1556B-34R-7-A, 0-86 cm
UNIT: 10
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: dark gray (Gley 1 4/N)
PHENOCRYSTS: Olivines are 100% altered throughout
GROUNDMASS: microcrystalline
VESICLES: Predominantly nonvesicular to very sparsely vesicular (i.e. < 1%), with very small (<0.4 mm) round vesicles occurring in low abundance throughout. Larger vesicles, up to 3 mm, are present but rare.
ALTERATION: Orange speckled background throughout.
VEINS: Thick (2-5mm), moderately dipping, white carbonate veins with cross-fibrous or polycrystalline texture, often lined by saponite and/or red Fe-OH. Halos rare throughout this thick flow unit.

390-U1556B-34R-7-A, 86-114 cm
UNIT: 11A
LITHOLOGY: hyaloclastite
TEXTURE: aphyric
COLOR:
PHENOCRYSTS:
GROUNDMASS: clasts in the hyaloclastite range from glass to sparsely olivine phryic. The latter are typically more altered than the former.
VESICLES:
ALTERATION: Mostly altered glass in hyaloclastite breccia forming top of unit 11. Some fragments and clasts of basalt showing orange speckled pseudomorphic alteration, quite light brown in colour.
VEINS: Breccia sparsely cemented by thin coating of saponite + zeolites and small patches of carbonate in places.

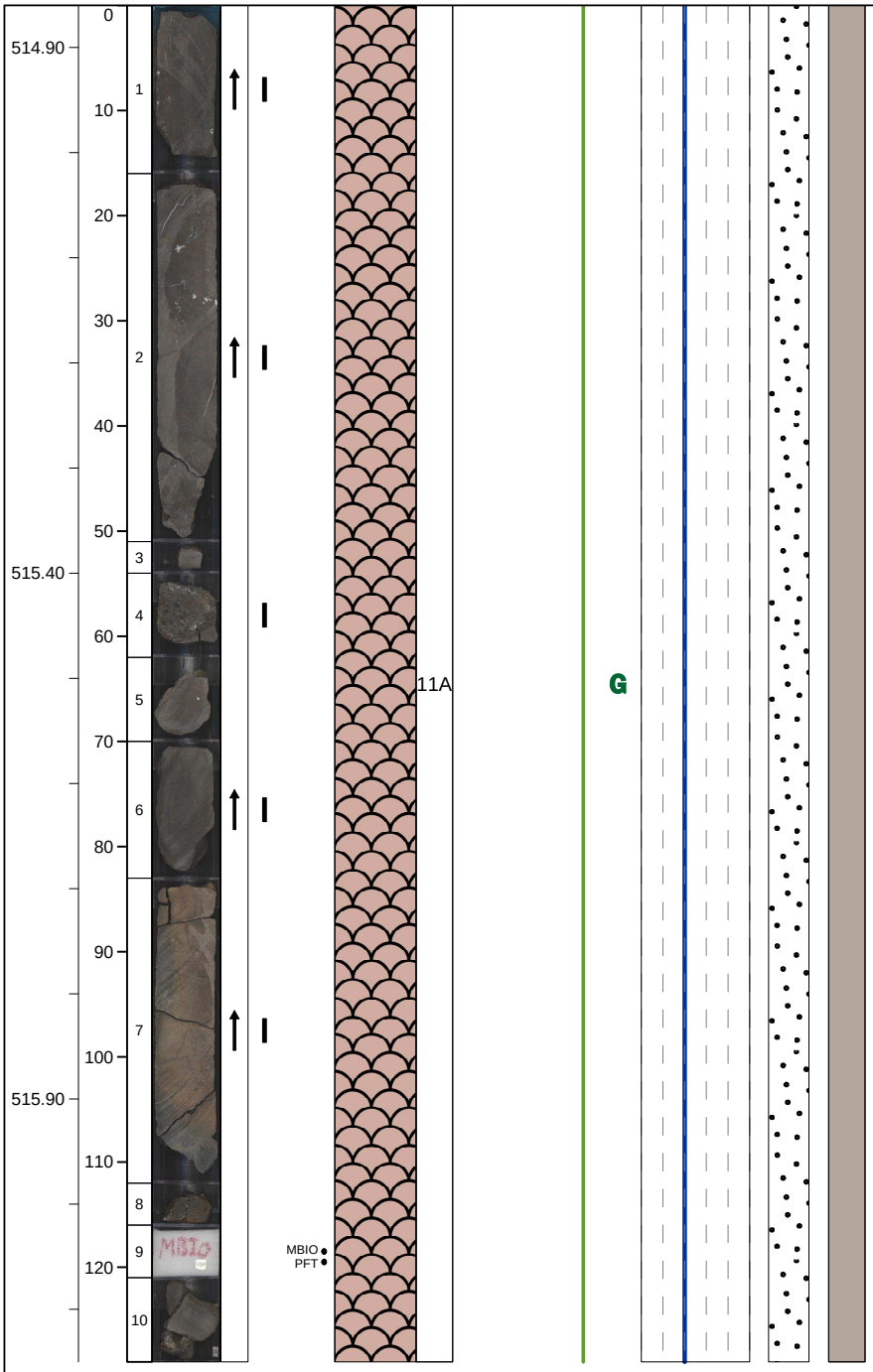
Hole 390-U1556B-35R Section 1, Top of Section: 513.4 m (CSF-A)



Description

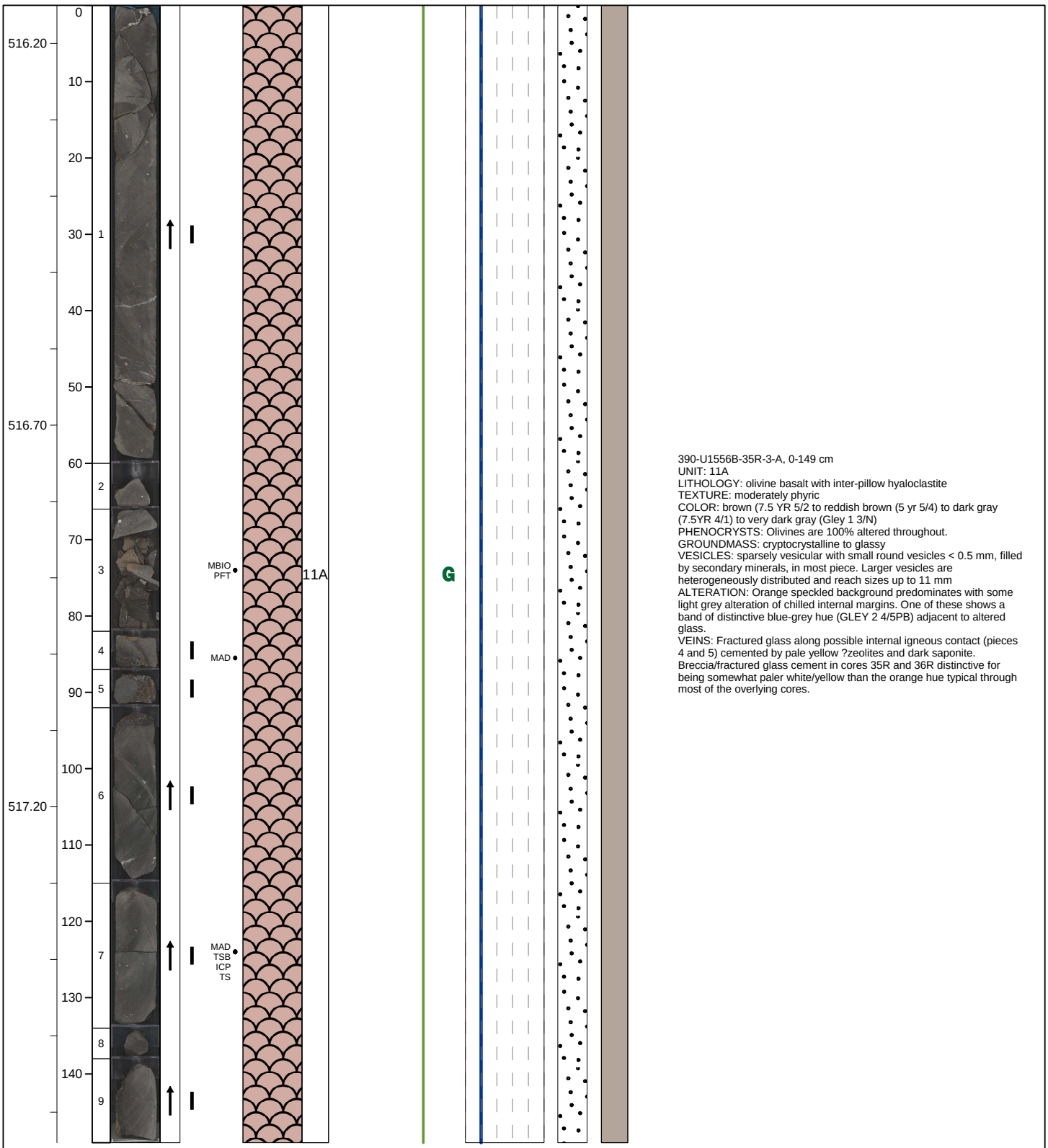
390-U1556B-35R-1-A, 0-146 cm
UNIT: 11A
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: aphric to sparsely phyric
COLOR: brown (7.5 YR 5/2 to reddish brown (5 yr 5/4) to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS: Olivines are 100% altered throughout with the possible exception of the chilled margins for pieces 4 and 5, where alteration may be only partial
GROUNDMASS: cryptocrystalline to glass
VESICLES: Predominantly nonvesicular to very sparsely vesicular (i.e. < 1%), with very small (<0.4 mm) round vesicles occurring in low abundance throughout. Larger vesicles, up to 3 mm, are present but rare.
ALTERATION: Mostly fragments with either pervasive orange (?halo) or light grey alteration of chilled margins. Chilled margins show diffuse concentric bands of lighter and darker grey alteration possibly picking out igneous flow banding.
VEINS: Hyaloclastite and fractured (approx. in situ) glass cemented by thin layers of zeolite overgrown by dark velvety saponite, retaining significant porosity. Sparse veins filled by carbonate, saponite and pale orange zeolite-bearing mixture.

Hole 390-U1556B-35R Section 2, Top of Section: 514.86 m (CSF-A)



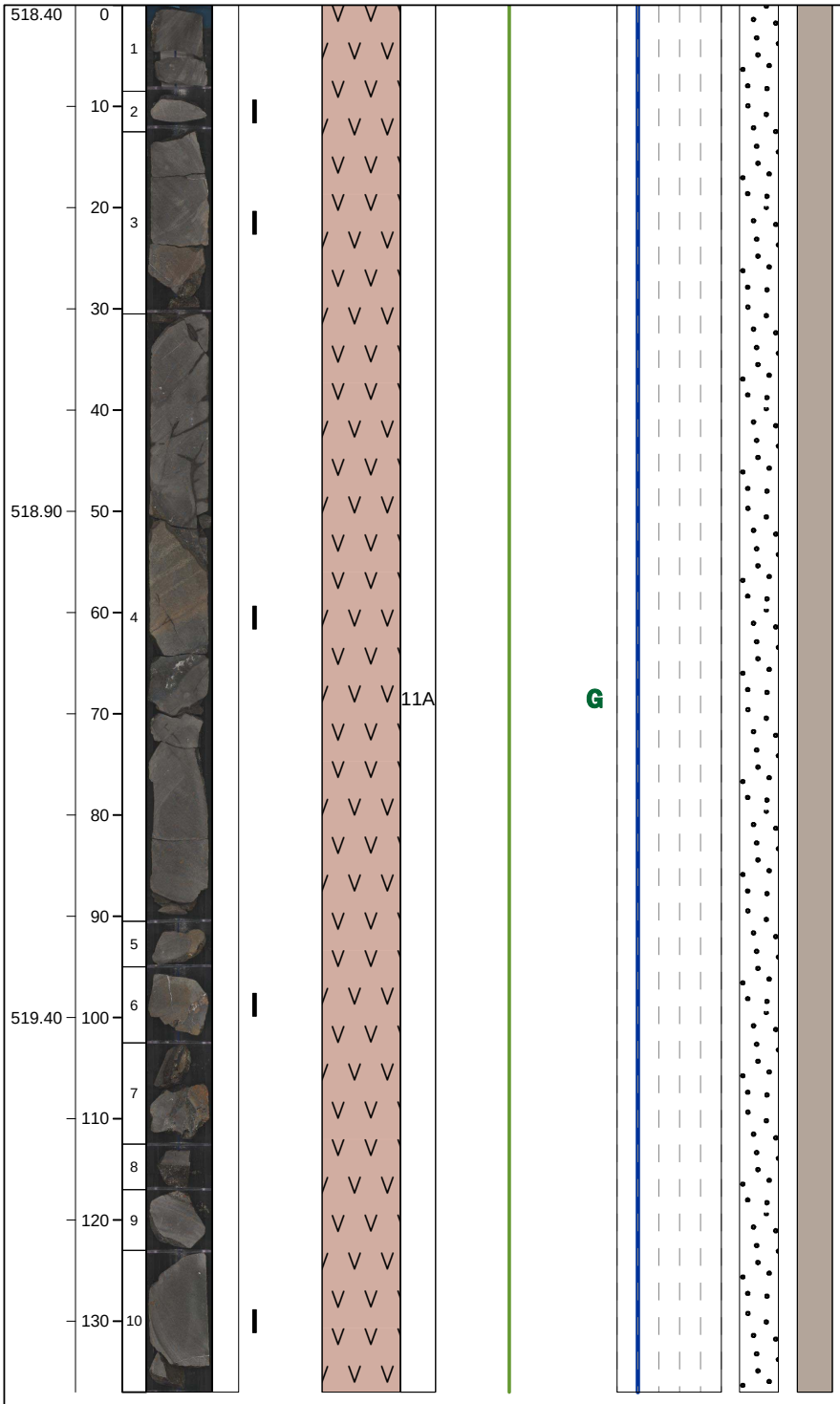
390-U1556B-35R-2-A, 0-129 cm
UNIT: 11A
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: aphric to sparsely phyric
COLOR: brown (7.5 YR 5/2 to reddish brown (5 yr 5/4) to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS: Olivines are 100% altered throughout with the possible exception of one of the chilled margin clasts in bin 10, where alteration may be only partial
GROUNDMASS: cryptocrystalline to glass
VESICLES: Predominantly nonvesicular to very sparsely vesicular (i.e. < 1%), with very small (<0.4 mm) round vesicles occurring in low abundance throughout. Larger vesicles, up to 12 mm, are present on pieces 1, 2, and 5. Vesicles are partially to totally filled by alteration minerals.
ALTERATION: Orange speckled background with grey mottled and orange halos associated with pillow margins.
VEINS: Veins are bright milky white carbonate in larger pillow and thinner and more saponite rich in orange altered parts. White non carbonate, likely zeolite, common as vein lining and hyaloclastite breccia cement throughout.

Hole 390-U1556B-35R Section 3, Top of Section: 516.15 m (CSF-A)



390-U1556B-35R-3-A, 0-149 cm
UNIT: 11A
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: moderately phyric
COLOR: brown (7.5 YR 5/2 to reddish brown (5 yr 5/4) to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS: Olivines are 100% altered throughout.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: sparsely vesicular with small round vesicles < 0.5 mm, filled by secondary minerals, in most piece. Larger vesicles are heterogeneously distributed and reach sizes up to 11 mm
ALTERATION: Orange speckled background predominates with some light grey alteration of chilled internal margins. One of these shows a band of distinctive blue-grey hue (GLEY 2 4/5PB) adjacent to altered glass.
VEINS: Fractured glass along possible internal igneous contact (pieces 4 and 5) cemented by pale yellow ?zeolites and dark saponite. Breccia/fractured glass cement in cores 35R and 36R distinctive for being somewhat paler white/yellow than the orange hue typical through most of the overlying cores.

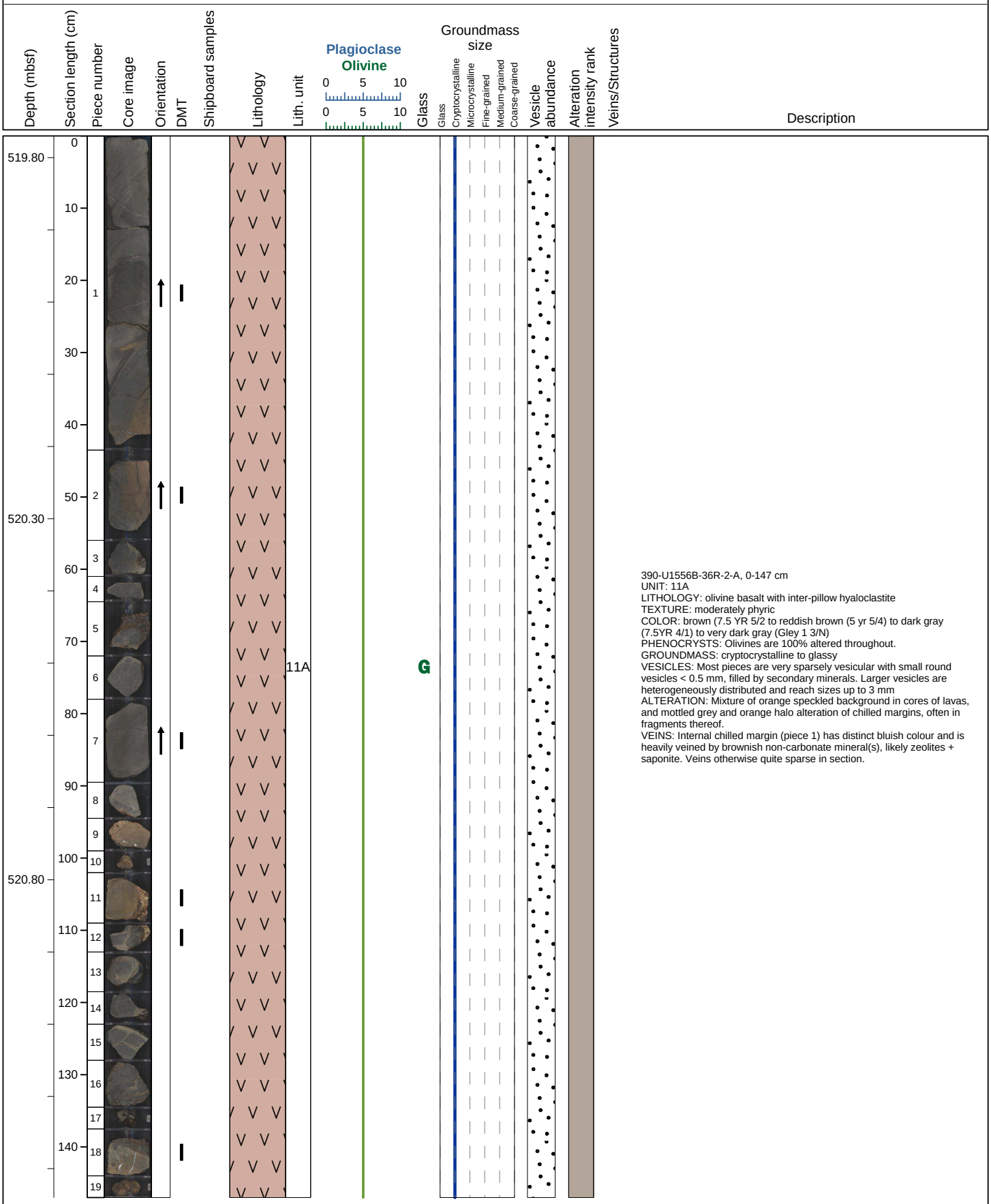
Hole 390-U1556B-36R Section 1, Top of Section: 518.4 m (CSF-A)



Description

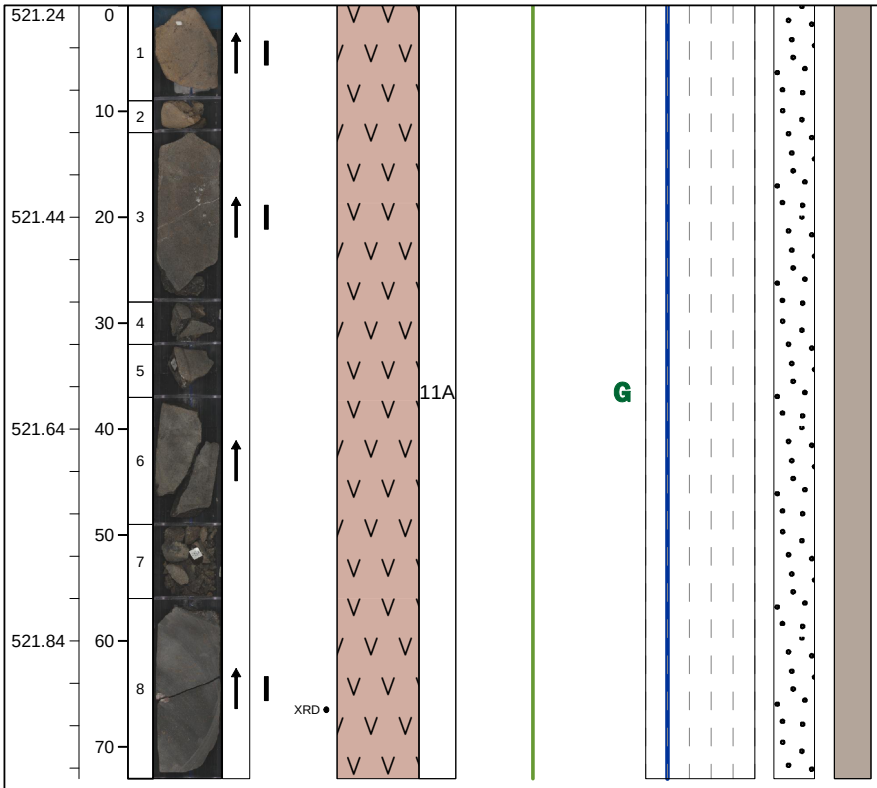
390-U1556B-36R-1-A, 0-137 cm
UNIT: 11A
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: moderately phyric
COLOR: brown (7.5 YR 5/2 to reddish brown (5 yr 5/4) to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS: Olivines are 100% altered throughout.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: sparsely vesicular with small round vesicles < 0.5 mm, filled by secondary minerals, in most piece. Larger vesicles are heterogeneously distributed and reach sizes up to 5 mm
ALTERATION: Orange speckled background predominates with some light grey alteration of chilled internal margins. One margin of same distinctive blue-grey hue (GLEY 2 4/5PB) seen in preceding section (pc. 2 64-70cm). Orange halo associated with upper margin sharply cut by igneous contact, indicating oxidation likely preceded juxtaposition of the two lavas.
VEINS: Veins moderately sparse, mostly thin carbonate and saponite, some with Fe oxyhydroxides or more rarely zeolites. Fractures generally quite poorly cemented in igneous unit (11) with just a dusting of saponite, carbonate and/or Fe oxyhydroxides in many. Partially brecciated internal contact (pc. 2) cemented by milky white carbonate.

Hole 390-U1556B-36R Section 2, Top of Section: 519.77 m (CSF-A)



390-U1556B-36R-2-A, 0-147 cm
UNIT: 11A
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: moderately phyric
COLOR: brown (7.5 YR 5/2 to reddish brown (5 yr 5/4) to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS: Olivines are 100% altered throughout.
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Most pieces are very sparsely vesicular with small round vesicles < 0.5 mm, filled by secondary minerals. Larger vesicles are heterogeneously distributed and reach sizes up to 3 mm
ALTERATION: Mixture of orange speckled background in cores of lavas, and mottled grey and orange halo alteration of chilled margins, often in fragments thereof.
VEINS: Internal chilled margin (piece 1) has distinct bluish colour and is heavily veined by brownish non-carbonate mineral(s), likely zeolites + saponite. Veins otherwise quite sparse in section.

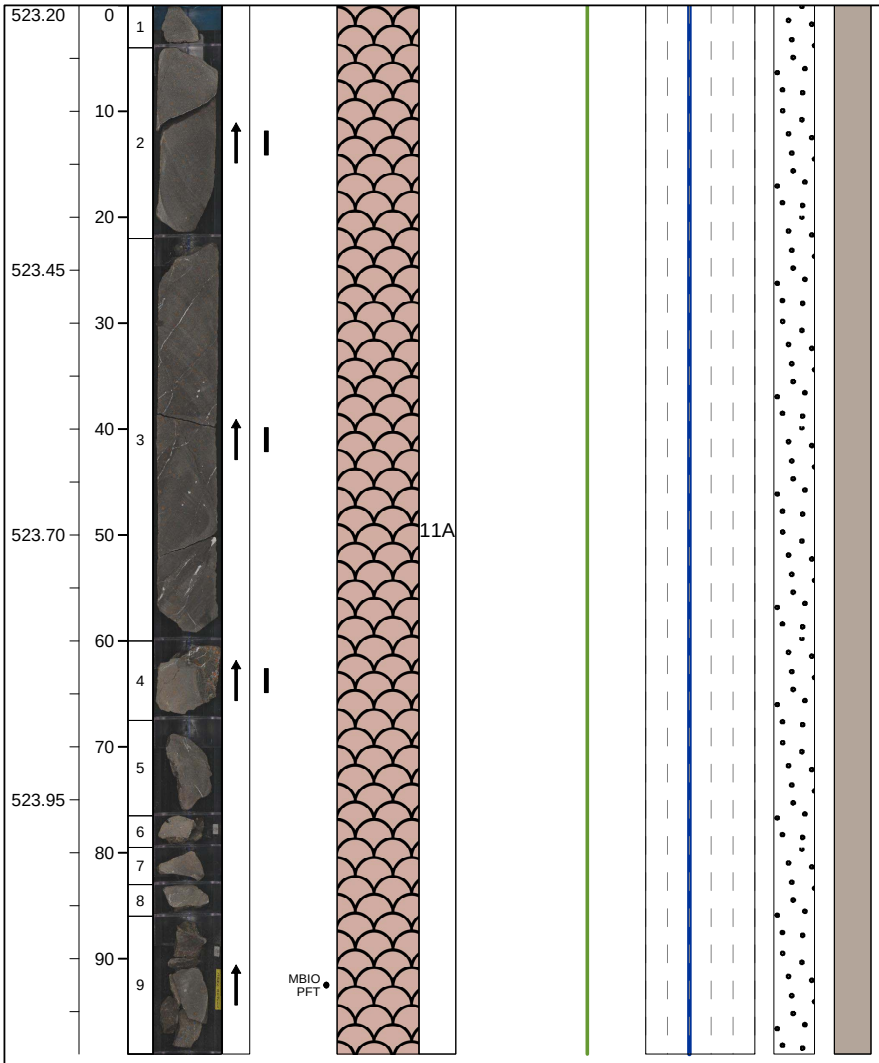
Hole 390-U1556B-36R Section 3, Top of Section: 521.24 m (CSF-A)



Description

390-U1556B-36R-3-A, 0-30 cm
UNIT: 11A
LITHOLOGY: olivine basalt
TEXTURE: aphryic to sparsely phyric
COLOR: reddish brown (5 yr 5/4) to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS: Olivines are 100% altered throughout
GROUNDMASS: microcrystalline
VESICLES: Predominantly nonvesicular to very sparsely vesicular (i.e. < 1%), with very small (<0.4 mm) round vesicles occurring in low abundance throughout. Larger vesicles, up to 7mm, are present but rare.
ALTERATION: Mostly of orange speckled background with some fragments of broad orange halos.
VEINS: Veins quite rare and poorly cemented with just a dusting of saponite, carbonate and/or Fe oxyhydroxides in many. Large vesicle (1cm; pc. 8) filled by carbonate stained or mixed with a bright pink (10R 7/3; pending XRD).

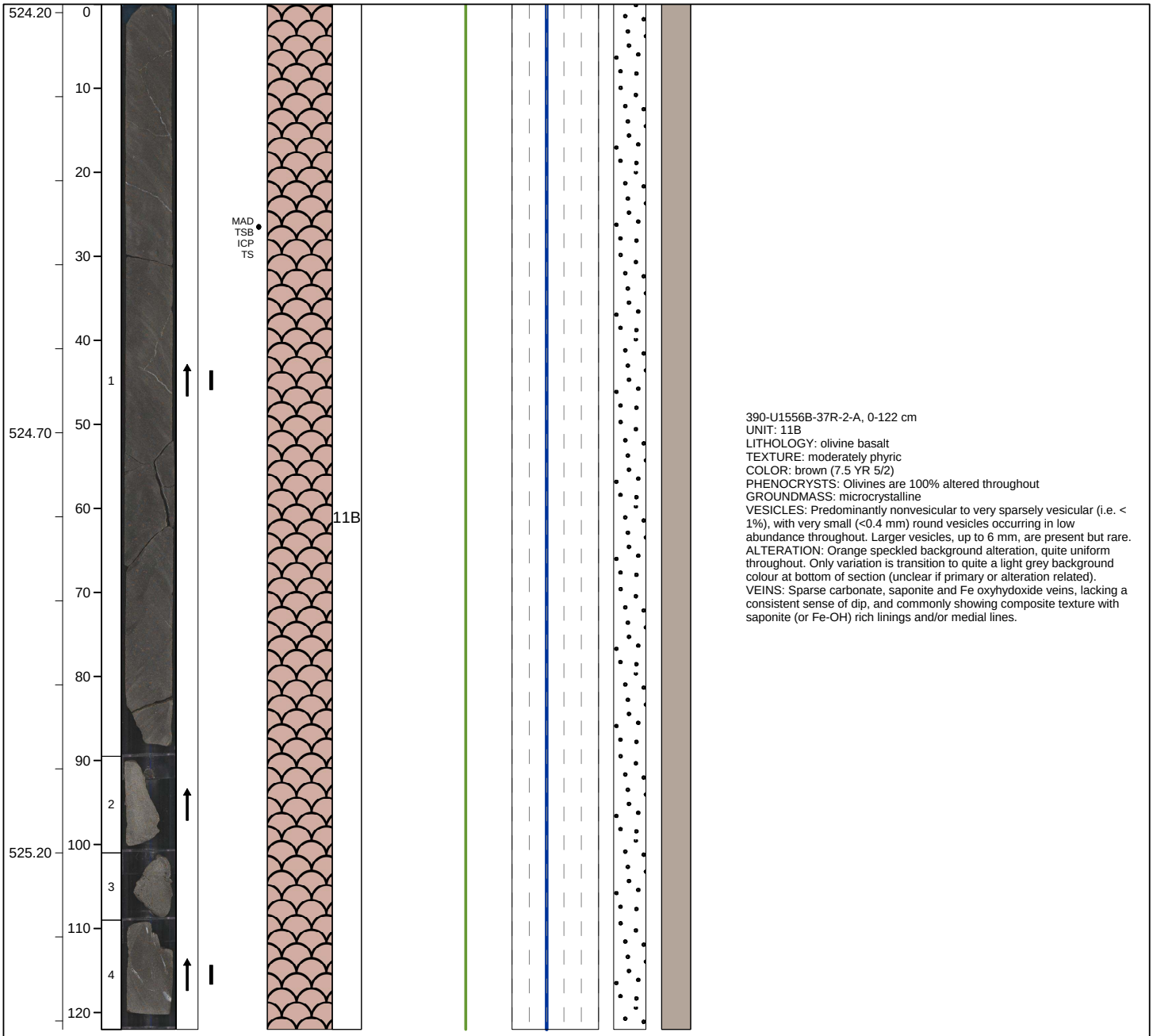
Hole 390-U1556B-37R Section 1, Top of Section: 523.2 m (CSF-A)



Description

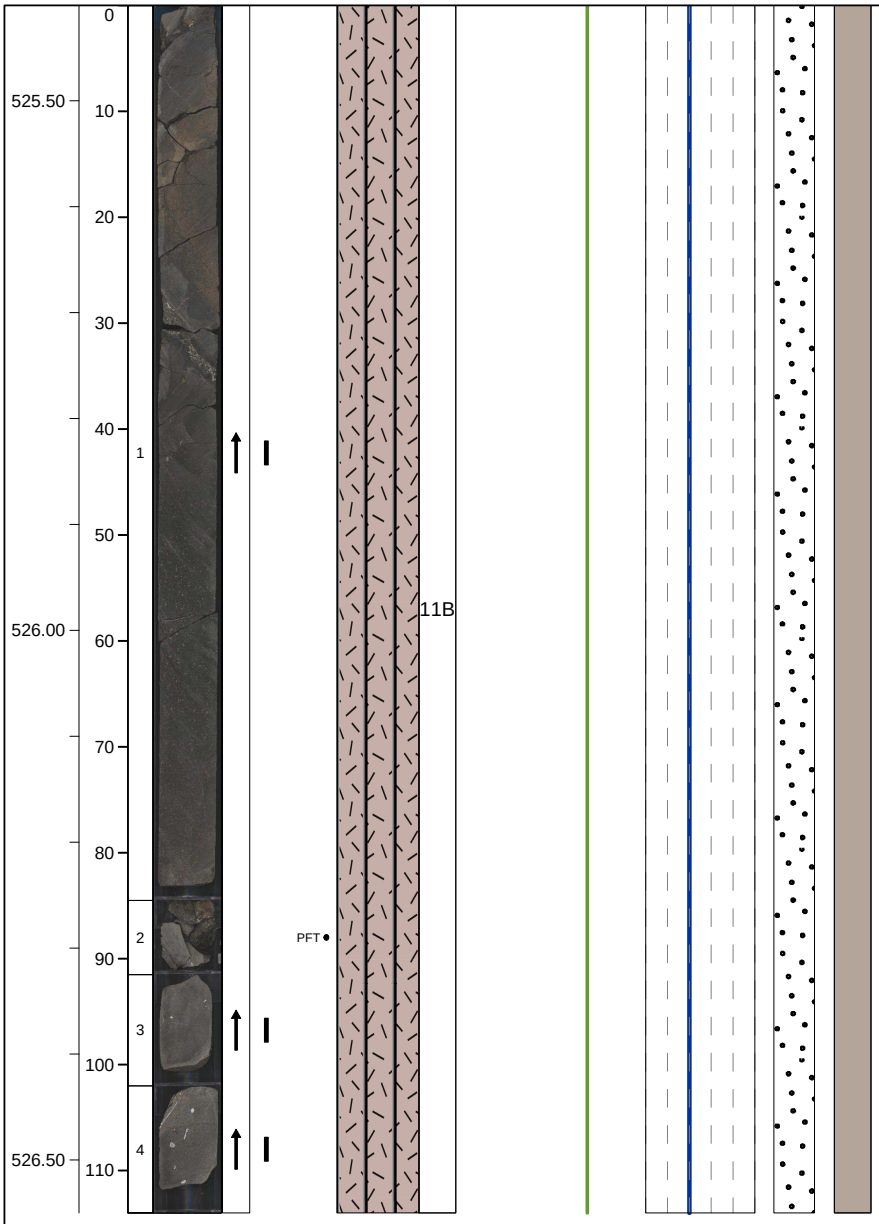
390-U1556B-37R-1-A, 0-99 cm
UNIT: 11A
LITHOLOGY: olivine basalt with inter-pillow hyaloclastite
TEXTURE: moderately phyric
COLOR: dark gray (7.5YR 4/1)
PHENOCRYSTS: Olivines are 100% altered throughout.
GROUNDMASS: microcrystalline to cryptocrystalline
VESICLES: Most pieces are very sparsely vesicular (<<1%) with small round vesicles < 0.75 mm, filled by calcite. Larger vesicles are rare, heterogeneously distributed and reach sizes up to 3 mm
ALTERATION: Almost uniformly orange speckled background alteration.
VEINS: Majority of veins are evenly spaced, moderately dipping and subparallel, milky white carbonate-filled, and lacking halos.

Hole 390-U1556B-37R Section 2, Top of Section: 524.19 m (CSF-A)



390-U1556B-37R-2-A, 0-122 cm
UNIT: 11B
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: brown (7.5 YR 5/2)
PHENOCRYSTS: Olivines are 100% altered throughout
GROUNDMASS: microcrystalline
VESICLES: Predominantly nonvesicular to very sparsely vesicular (i.e. < 1%), with very small (<0.4 mm) round vesicles occurring in low abundance throughout. Larger vesicles, up to 6 mm, are present but rare.
ALTERATION: Orange speckled background alteration, quite uniform throughout. Only variation is transition to quite a light grey background colour at bottom of section (unclear if primary or alteration related).
VEINS: Sparse carbonate, saponite and Fe oxyhydoxide veins, lacking a consistent sense of dip, and commonly showing composite texture with saponite (or Fe-OH) rich linings and/or medial lines.

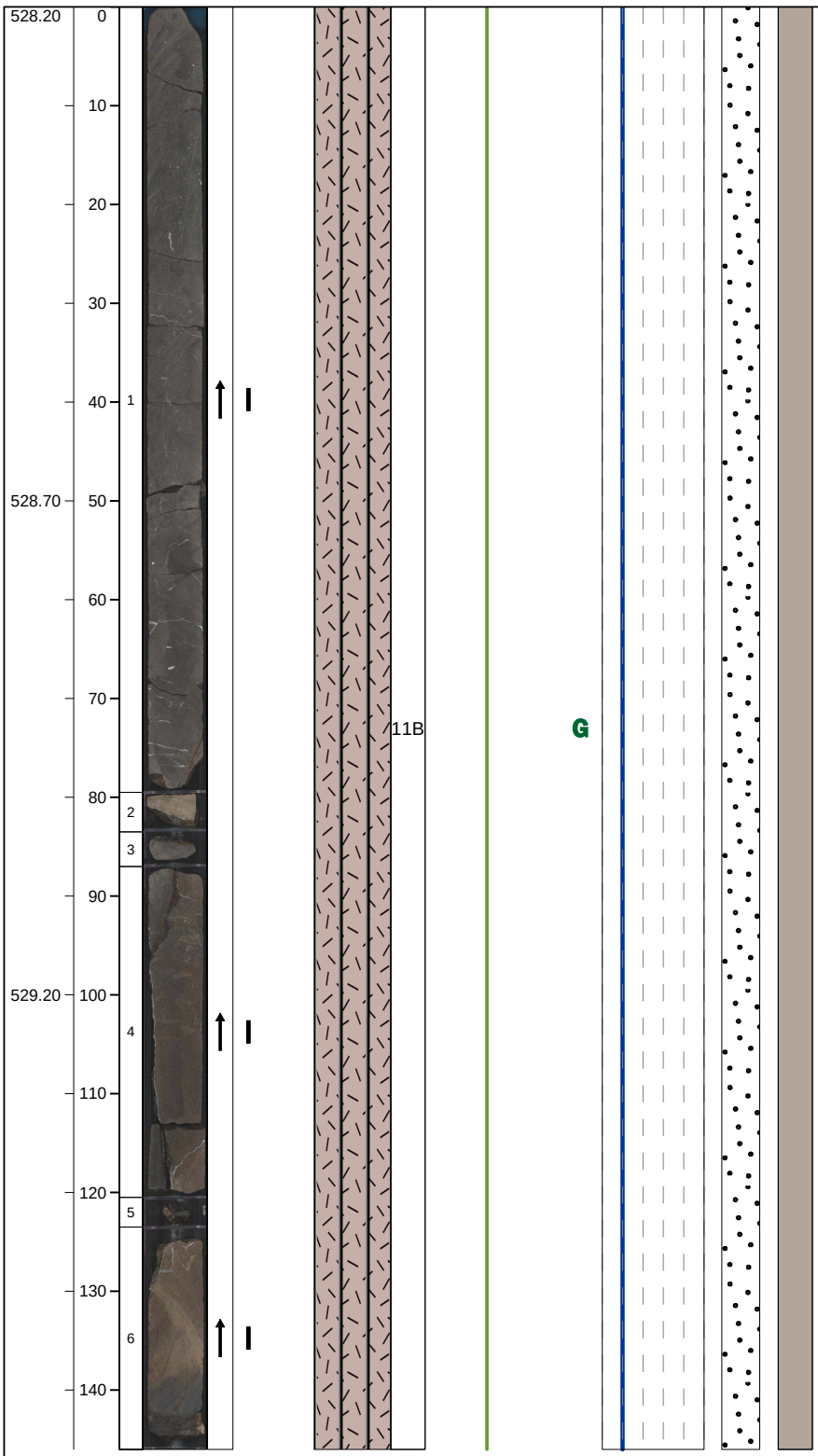
Hole 390-U1556B-37R Section 3, Top of Section: 525.41 m (CSF-A)



Description

390-U1556B-37R-3-A, 0-114 cm
UNIT: 11B
LITHOLOGY: There are two basalts in this section. Basalt 1 is aphyric to very sparsely phyric (piece 1, 0 - 3 cm). Basalt 2 is moderately olivine phyric and dominates piece 1 from 38 to 84 cm.
TEXTURE: moderately phyric
COLOR: Older pillow lava is brown (7.5YR 4/2), whereas the feeder dike is very dark grey (Gley 1 3/N)
PHENOCRYSTS: Olivine in the feeder dike is variably altered. In most places, it is 100% altered to orange / brown. Between 47 - 71 cm, it is only slightly altered. .
GROUNDMASS: cryptocrystalline to microcrystalline
VESICLES: The feeder dike (piece 1) is very sparsely vesicular (<1%), with small round vesicles < 0.5 mm, now totally filled by secondary minerals. Pieces 2, 3 and 4 also contain larger vesicles, irregular in shape from round to highly elongate, and up to 12 mm long. these are partially to totally filled by calcite.
ALTERATION: Predominantly orange speckled background in cores of lavas with mottled grey and orange halo alteration around margins. Pseudomorphic alteration of olivine phenocrysts varies from orange to yellow in thick basalt pillow (pc. 1). Intrusive margin (centre of pc. 1) shows similar blue-grey colour to examples in preceding sections.
VEINS: Intrusive margin (pc. 1) partially brecciated and cemented by cream coloured non-carbonate mineral(s), likely zeolites bearing. Veins otherwise quite sparse in section.

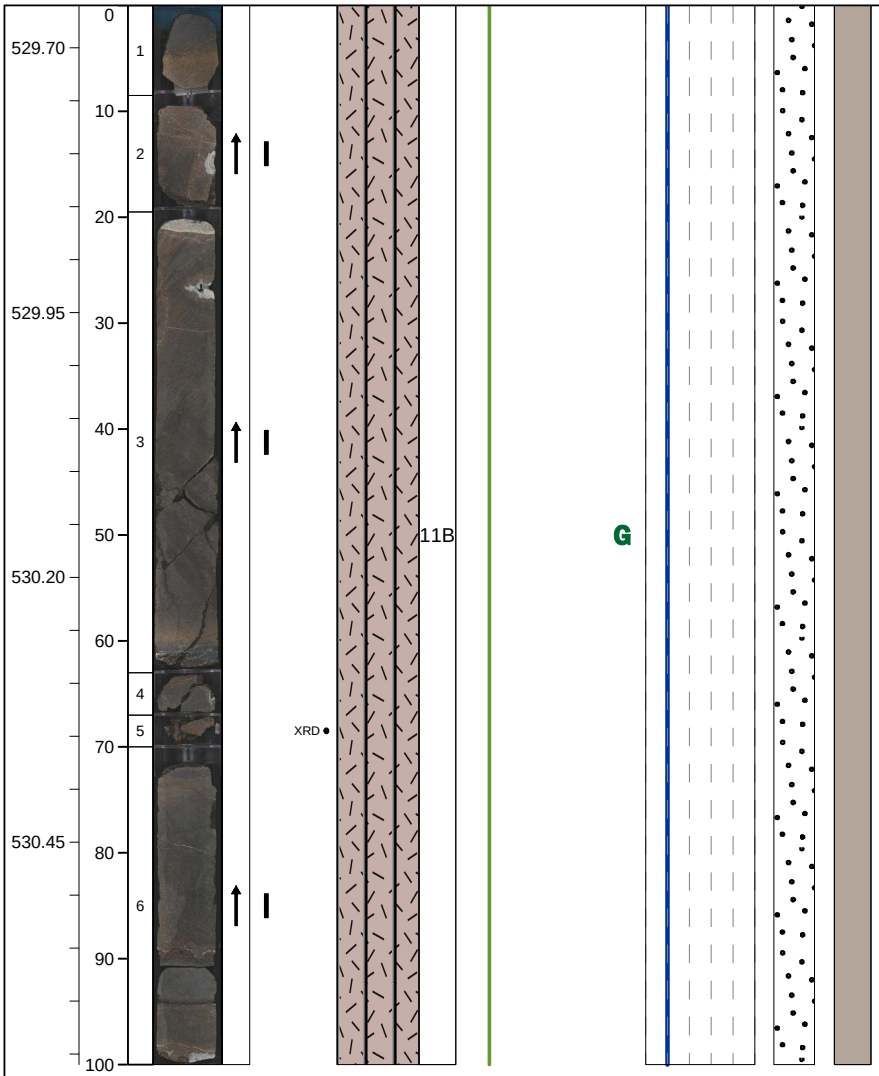
Hole 390-U1556B-38R Section 1, Top of Section: 528.2 m (CSF-A)



Description

390-U1556B-38R-1-A, 0-146 cm
UNIT: 11B
LITHOLOGY: There are two basalts in this section. Basalt 1 is aphyric to very sparsely phyric and dominates pieces 2, 4, and 6. Basalt 2 is moderately olivine phyric and dominates piece 1 and possibly piece 3.
TEXTURE: Basalt 1 is aphyric to very sparsely phyric (80-82, 88-119, 124-143 cm). Basalt 2 is moderately phyric (0-77 cm); piece 1 (75-78 cm) and piece 4 include contacts between the two lithologies.
COLOR: Basalt 1, interpreted as an older pillow lava, is brown (7.5YR 4/2), whereas the feeder dike, basalt 2, is very dark grey (Gley 1 3/N)
PHENOCRYSTS: Basalt 2, the feeder dike (piece 1), is moderately phyric (10%) between 8 -26 cm and very sparsely phyric from 27 -78 cm, where it approaches the contact with basalt 2. Olivine in the feeder dike (basalt 1) is variably altered. In most places, it is 100% altered to orange / brown. Between 8 - 26 cm, it is only slightly altered. Basalt 1 is aphyric, particularly in piece 6, to very sparsely olivine phyric in piece 4.
GROUNDMASS: microcrystalline to cryptocrystalline
VESICLES: The feeder dike, basalt 2, is sparsely vesicular with small round vesicles < 0.5 mm, now totally filled by secondary minerals. Larger vesicle, irregular in shape, are heterogeneously distributed along the core piece. They are irregular in shape, up to 20mm long and filled by calcite.
ALTERATION: Upper half orange speckled background appearing dark grey in aphyric patches; lower half entirely orange speckled alteration.
VEINS: Carbonate + saponite veins moderately abundant with Fe oxyhydroxides common in upper half and zeolites in the lower half.

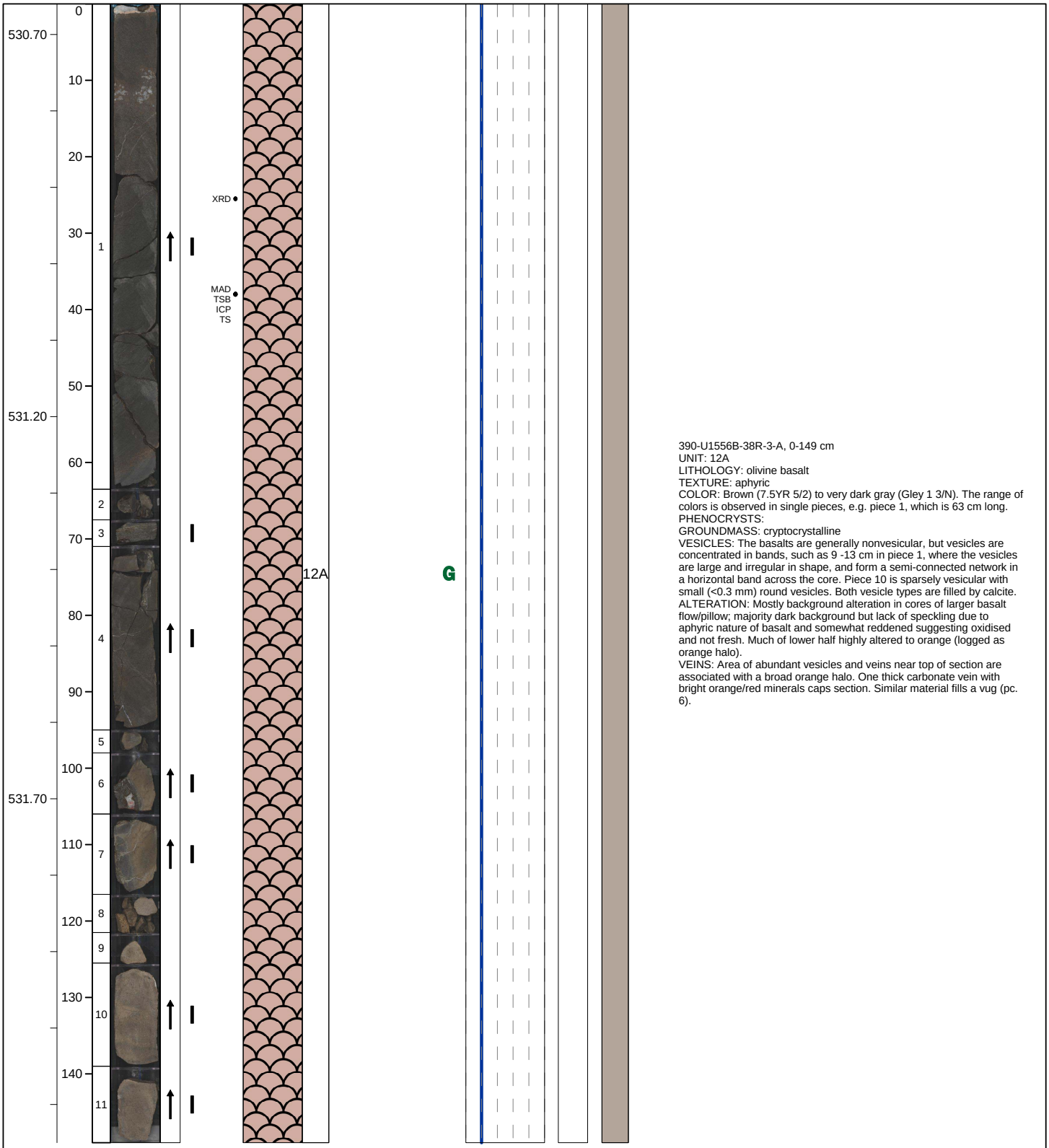
Hole 390-U1556B-38R Section 2, Top of Section: 529.66 m (CSF-A)



Description

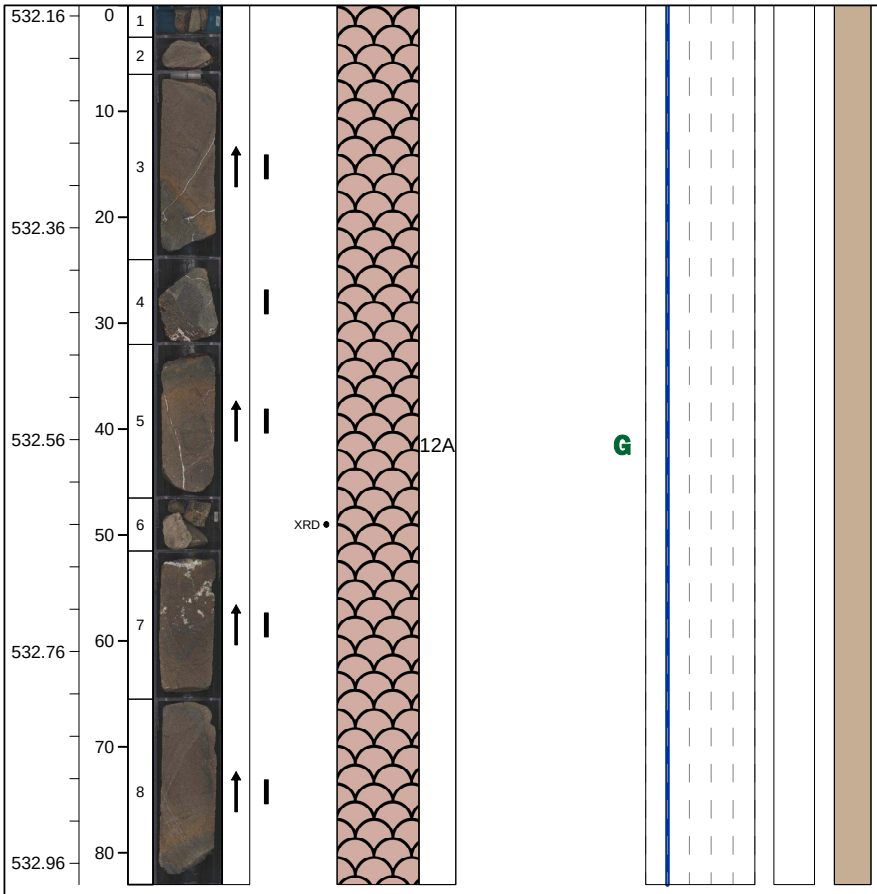
390-U1556B-38R-2-A, 0-100 cm
UNIT: 11B
LITHOLOGY: There are two basalts in this section. Basalt 1 is aphyric to very sparsely phyric and dominates the section, aside from a small intrusion of basalt 2 between 92 - 92 cm. Basalt 2 is very sparsely (<1%) olivine phyric.
TEXTURE: Basalt 1 (pieces 1 through 6) is aphyric to very sparsely phyric. Basalt 2 is very sparsely (<1 %) phyric.
COLOR: Basalt 1, interpreted as an older pillow lava, is brown (7.5YR 4/2), whereas the feeder dike / sill is very dark grey (Gley 1 3/N)
PHENOCRYSTS: Basalt 2, the feeder dike (piece 6), is very sparsely phyric (<1 %) between 90-94 cm, and the olivine microphenocrysts are only slightly altered. Basalt 2 is aphyric to sparsely phyric, and is 100% altered.
GROUNDMASS: cryptocrystalline
VESICLES: Basalt 1 is sparsely vesicular, with small (<0.75 mm) round vesicles, now 100% filled by calcite. Larger vesicles and vugs, reaching up to 4 cm in size, are partially filled by calcite.
ALTERATION: Orange halos along chilled margins predominate and what orange speckled background there is is also crossed by numerous less intense orange halos in the core of the larger pillow/flow (piece 3).
VEINS: One very thick (15 mm) carbonate vein with orange-yellow margins (likely zeolite bearing) and large vugs filled with sparry calcite. Thin carbonate + saponite + red Fe-OH veins with broad indistinct orange halos are common in upper half of section. Abundant small (<1mm) yellow Fe-OH filled vesicles in lowermost 30cm.

Hole 390-U1556B-38R Section 3, Top of Section: 530.66 m (CSF-A)



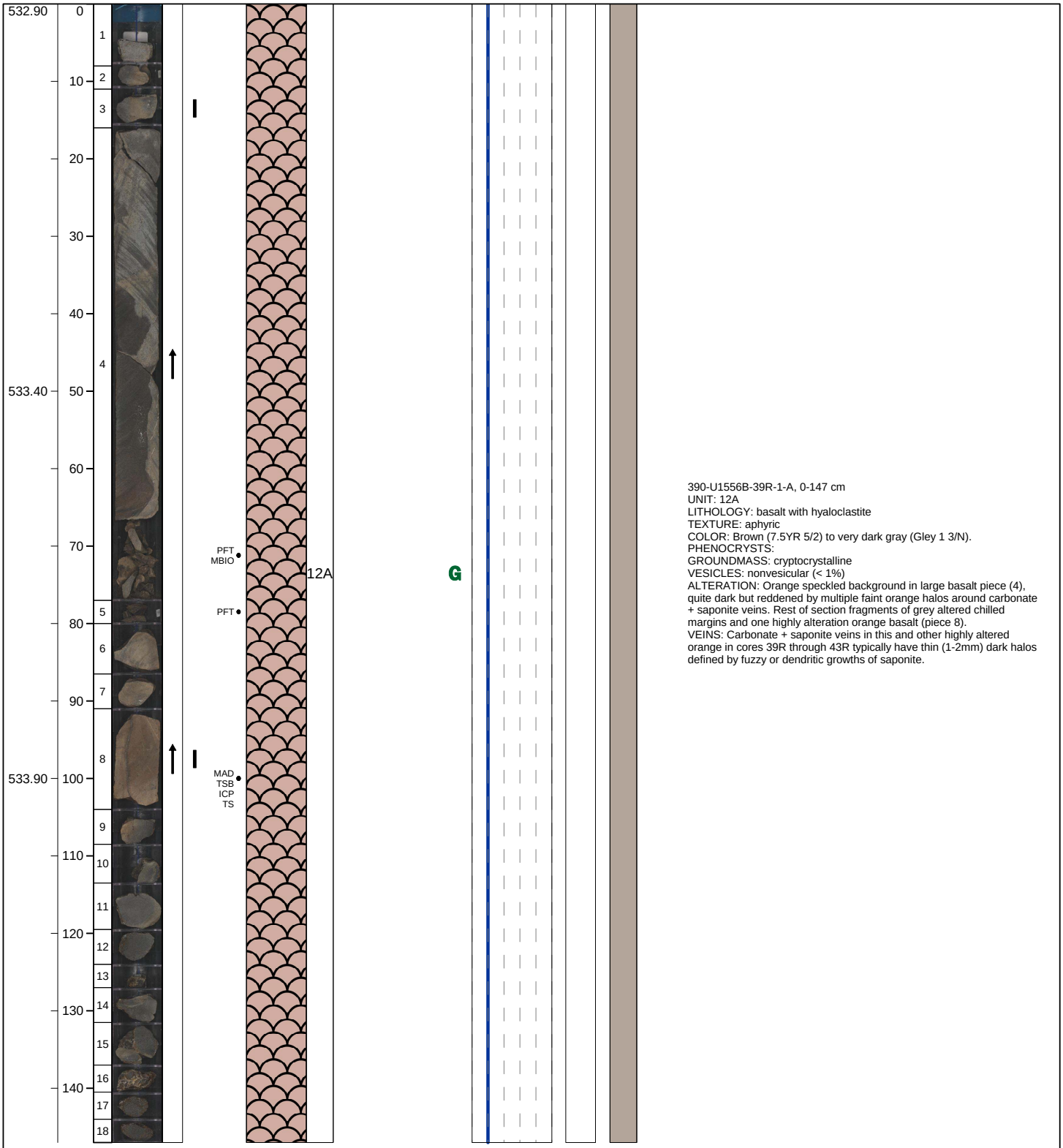
390-U1556B-38R-3-A, 0-149 cm
UNIT: 12A
LITHOLOGY: olivine basalt
TEXTURE: aphyric
COLOR: Brown (7.5YR 5/2) to very dark gray (Gley 1 3/N). The range of colors is observed in single pieces, e.g. piece 1, which is 63 cm long.
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: The basalts are generally nonvesicular, but vesicles are concentrated in bands, such as 9 -13 cm in piece 1, where the vesicles are large and irregular in shape, and form a semi-connected network in a horizontal band across the core. Piece 10 is sparsely vesicular with small (<0.3 mm) round vesicles. Both vesicle types are filled by calcite.
ALTERATION: Mostly background alteration in cores of larger basalt flow/pillow; majority dark background but lack of speckling due to aphyric nature of basalt and somewhat reddened suggesting oxidised and not fresh. Much of lower half highly altered to orange (logged as orange halo).
VEINS: Area of abundant vesicles and veins near top of section are associated with a broad orange halo. One thick carbonate vein with bright orange/red minerals caps section. Similar material fills a vug (pc. 6).

Hole 390-U1556B-38R Section 4, Top of Section: 532.15 m (CSF-A)

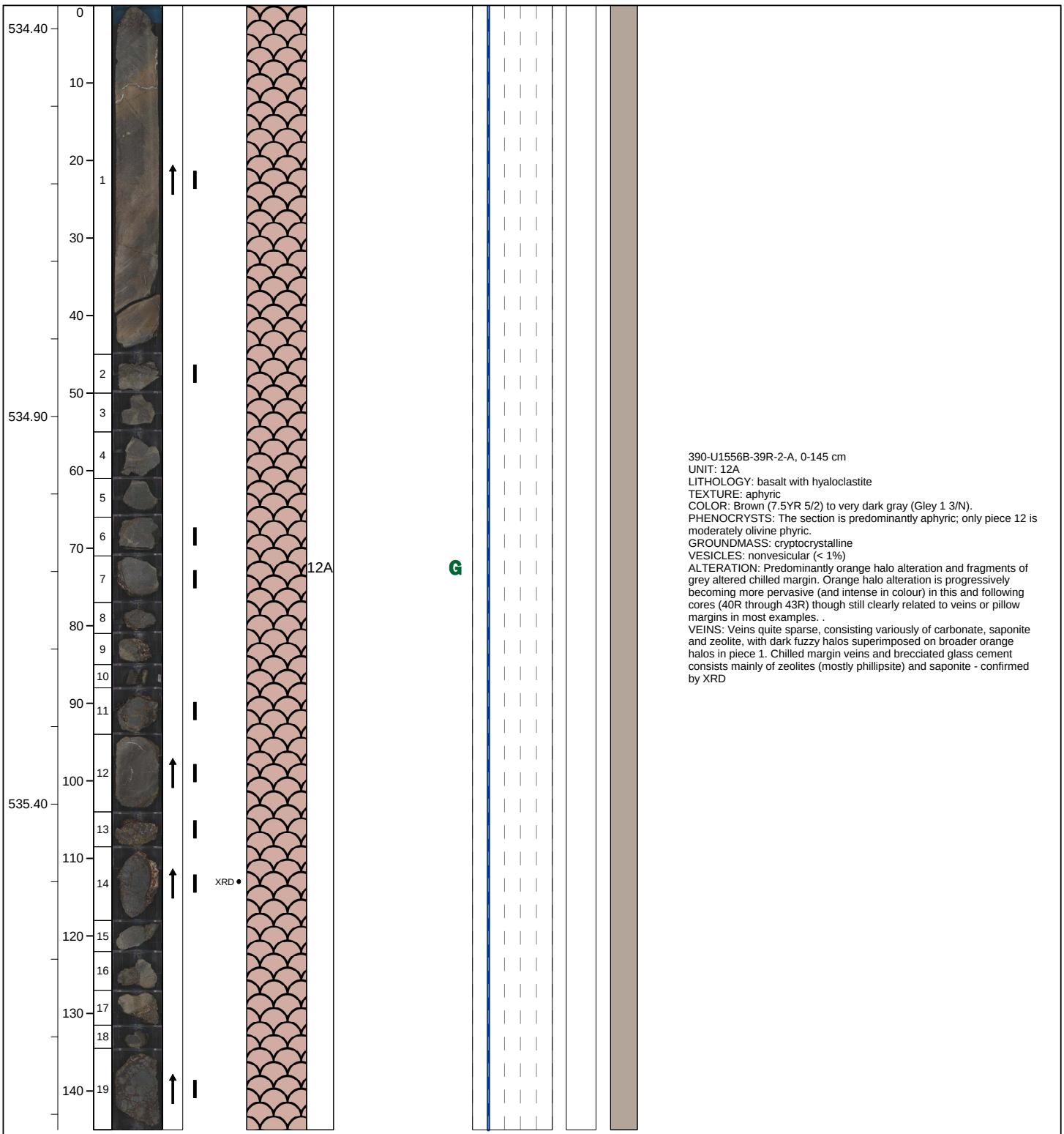


390-U1556B-38R-4-A, 0-83 cm
UNIT: 12A
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: Brown (7.5YR 5/2) to very dark gray (Gley 1 3/N).
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: Technically, nonvesicular for the section as a whole, but there are large vesicles concentrated in a band between 55 - 59 cm in piece 7. These vesicles are large and irregular in shape, and form a semi-connected network in a horizontal band across the core. Piece 5 is sparsely vesicular with small (<0.3 mm) round vesicles. Both vesicle types are filled by calcite.
ALTERATION: Highly altered throughout to intense orange colour except chilled margins which show light mottled grey alteration.
VEINS: Sparsely veined by carbonate + saponite. Some markedly bright milky white veins present as well as and an area of abundant vesicles/vugs all filled by unusual-looking cream to white massive carbonate with botryoidal habit.

Hole 390-U1556B-39R Section 1, Top of Section: 532.9 m (CSF-A)

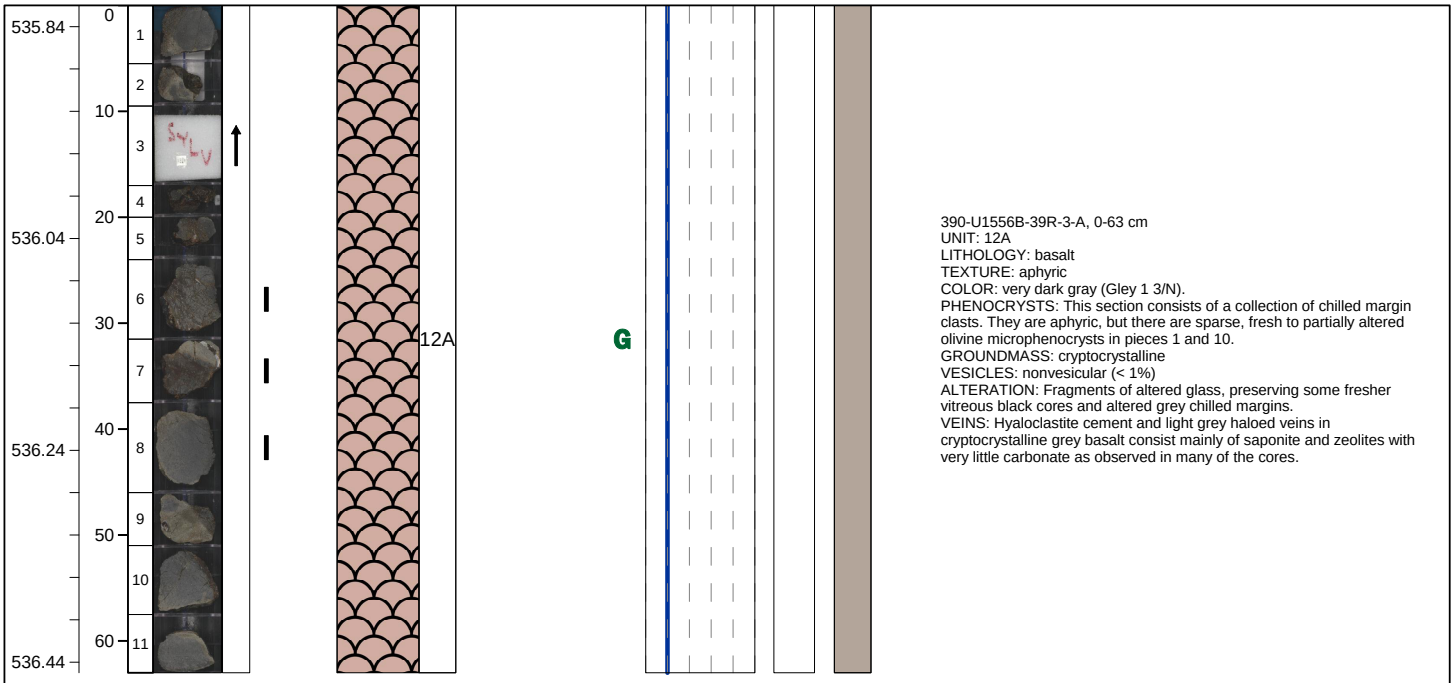


Hole 390-U1556B-39R Section 2, Top of Section: 534.37 m (CSF-A)



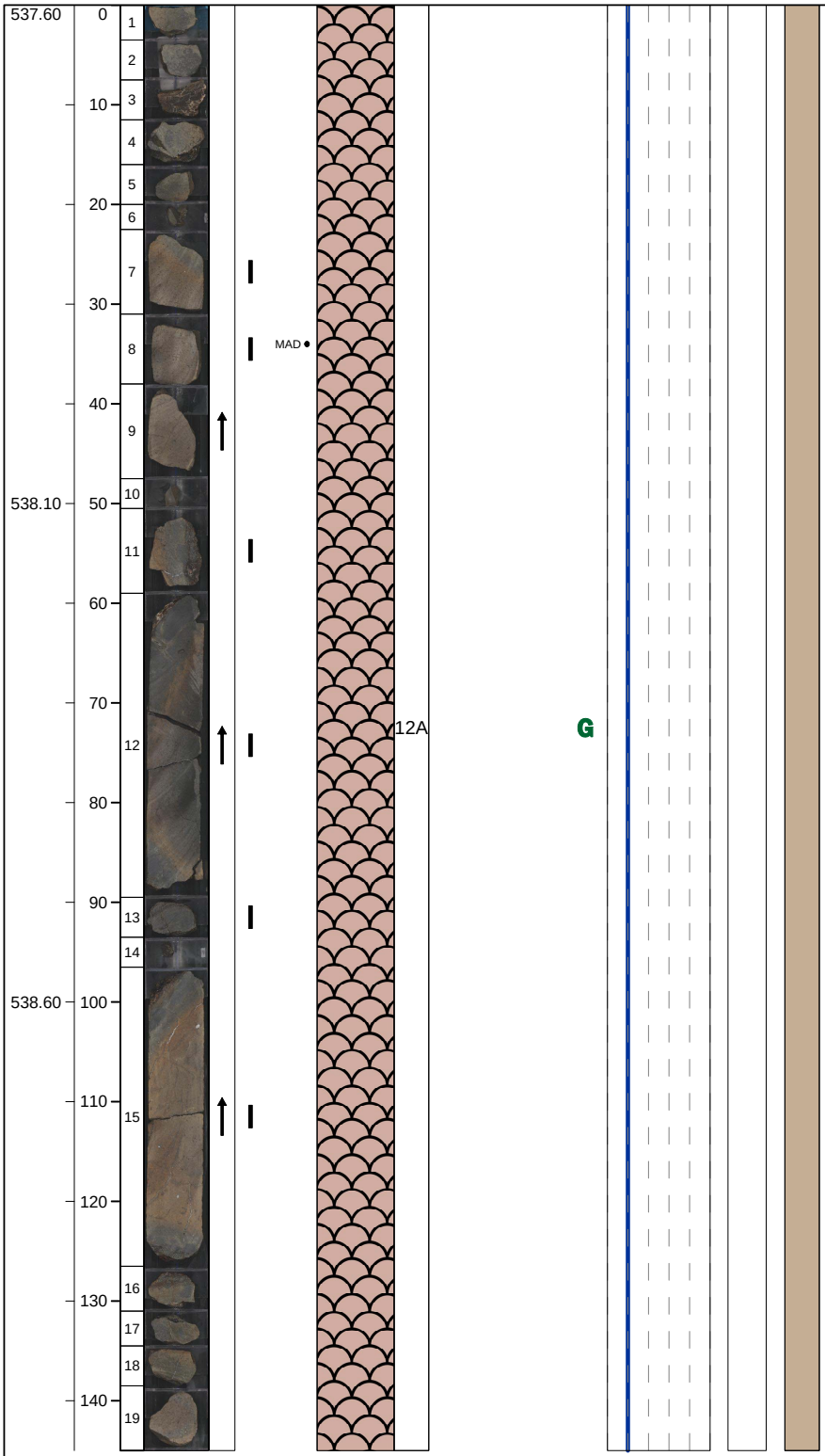
390-U1556B-39R-2-A, 0-145 cm
UNIT: 12A
LITHOLOGY: basalt with hyaloclastite
TEXTURE: aphyric
COLOR: Brown (7.5YR 5/2) to very dark gray (Gley 1 3/N).
PHENOCRYSTS: The section is predominantly aphyric; only piece 12 is moderately olivine phyric.
GROUNDMASS: cryptocrystalline
VESICLES: nonvesicular (< 1%)
ALTERATION: Predominantly orange halo alteration and fragments of grey altered chilled margin. Orange halo alteration is progressively becoming more pervasive (and intense in colour) in this and following cores (40R through 43R) though still clearly related to veins or pillow margins in most examples. .
VEINS: Veins quite sparse, consisting variously of carbonate, saponite and zeolite, with dark fuzzy halos superimposed on broader orange halos in piece 1. Chilled margin veins and brecciated glass cement consists mainly of zeolites (mostly phillipsite) and saponite - confirmed by XRD

Hole 390-U1556B-39R Section 3, Top of Section: 535.82 m (CSF-A)



390-U1556B-39R-3-A, 0-63 cm
UNIT: 12A
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: very dark gray (Gley 1 3/N).
PHENOCRYSTS: This section consists of a collection of chilled margin clasts. They are aphyric, but there are sparse, fresh to partially altered olivine microphenocrysts in pieces 1 and 10.
GROUNDMASS: cryptocrystalline
VESICLES: nonvesicular (< 1%)
ALTERATION: Fragments of altered glass, preserving some fresher vitreous black cores and altered grey chilled margins.
VEINS: Hyaloclastite cement and light grey haloed veins in cryptocrystalline grey basalt consist mainly of saponite and zeolites with very little carbonate as observed in many of the cores.

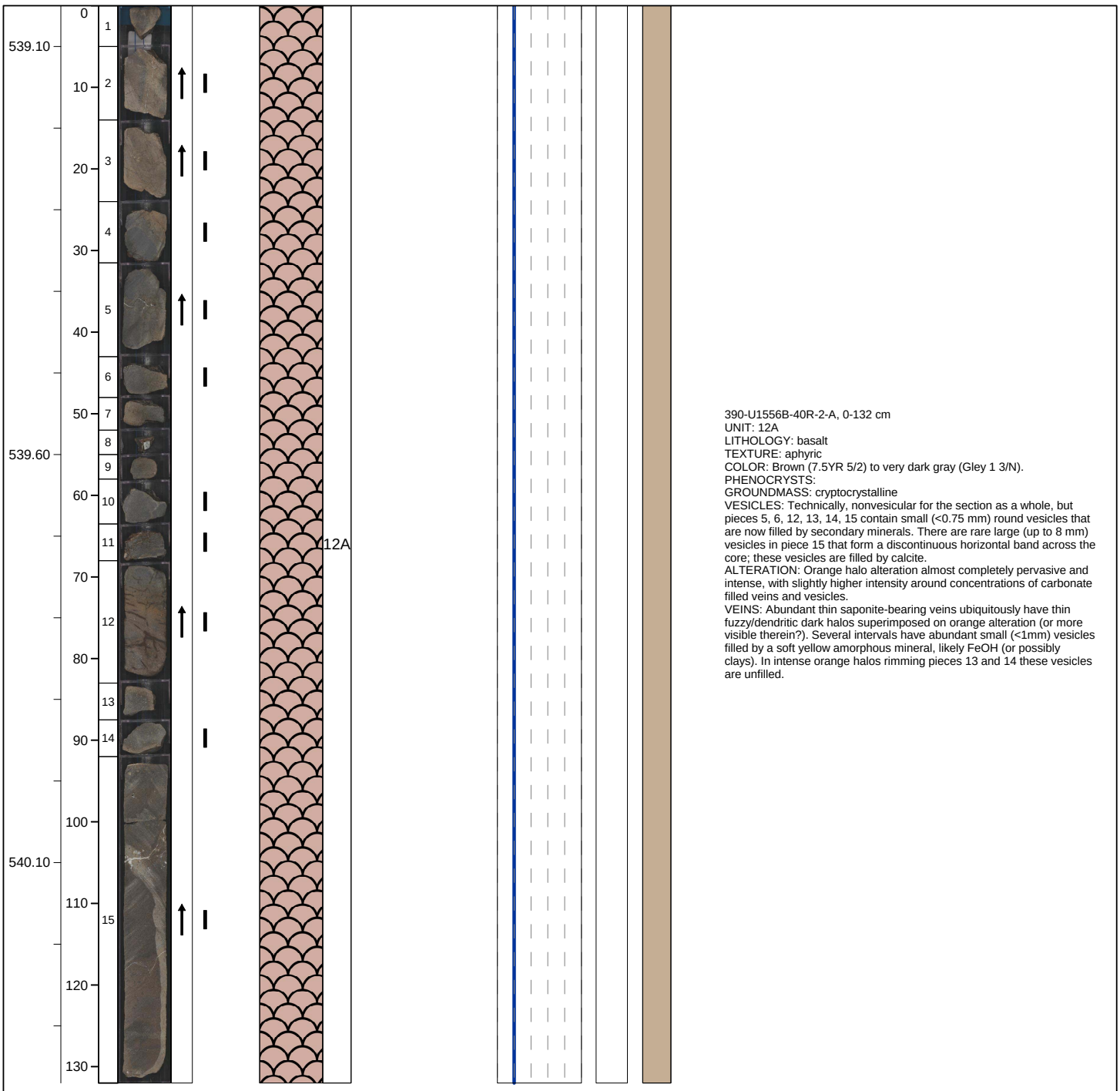
Hole 390-U1556B-40R Section 1, Top of Section: 537.6 m (CSF-A)



Description

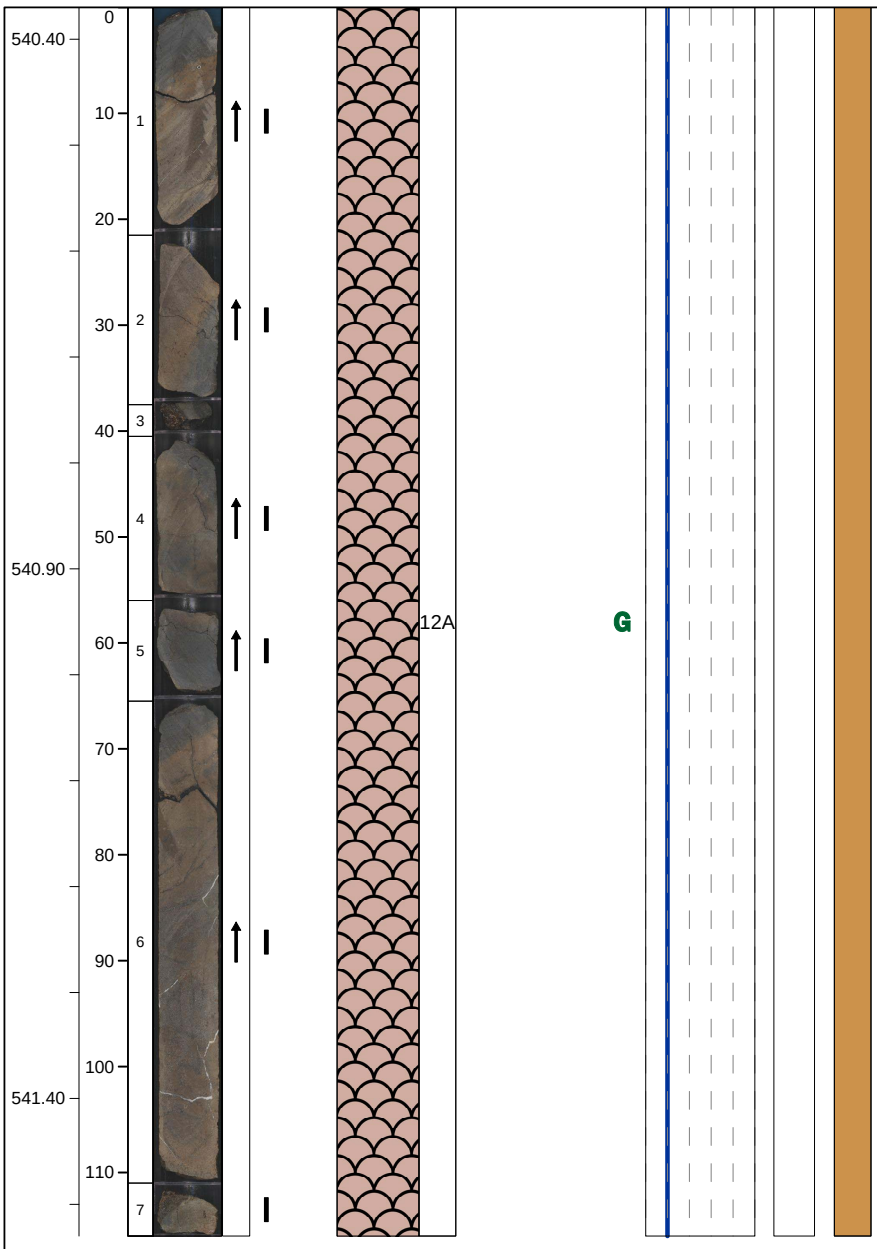
390-U1556B-40R-1-A, 0-145 cm
UNIT: 12A
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: Brown (7.5YR 5/2) to very dark gray (Gley 1 3/N).
PHENOCRYSTS: These basalts are aphyric, but there are sparse, fresh to partially altered olivine microphenocrysts in 13..
GROUNDMASS: cryptocrystalline
VESICLES: Technically, nonvesicular for the section as a whole, but there are rare large (up to 4 mm) vesicles in piece 15. Pieces 4, 7, 8, 15 and 19 contain small (<0.3 mm) round vesicles that are < 0.75 mm in size. Both vesicle types are filled..
ALTERATION: Orange halo alteration and fragmentary mottled-grey chilled margins. Two small pillows show variation in pervasiveness of orange halos apparently dependent on their degree of veining; some dark speckled background preserved in core of the less veined of the two. Transition from mottled grey altered variolitic texture of margin to orange halo is similarly condensed with bullseye pattern to spherules, as observed in previous cores.
VEINS: Carbonate + saponite veins fill radial cracks in pillow interiors and saponite + zeolite predominate in chilled margins.

Hole 390-U1556B-40R Section 2, Top of Section: 539.05 m (CSF-A)



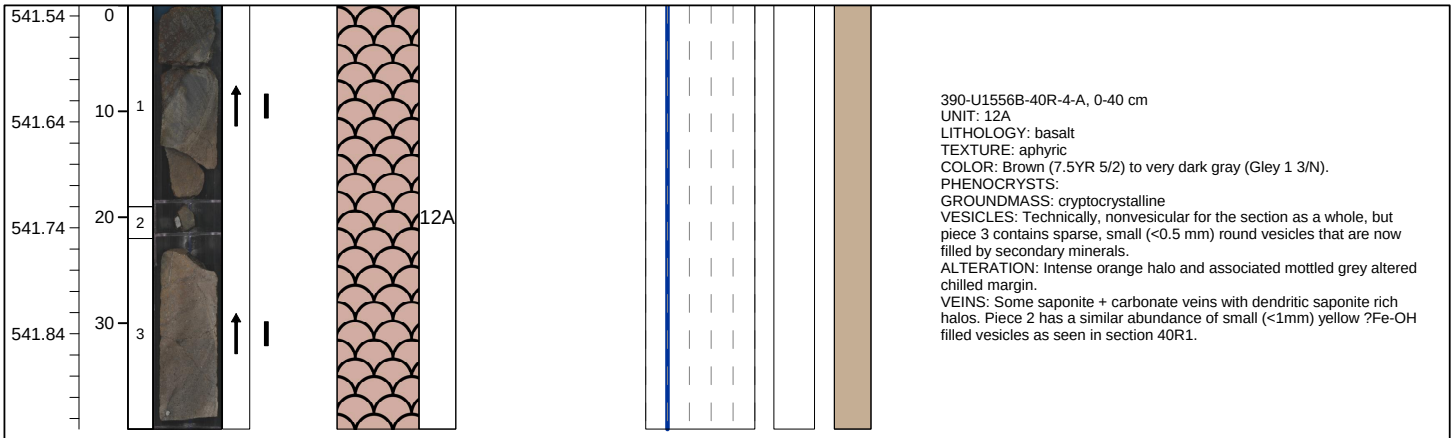
390-U1556B-40R-2-A, 0-132 cm
UNIT: 12A
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: Brown (7.5YR 5/2) to very dark gray (Gley 1 3/N).
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: Technically, nonvesicular for the section as a whole, but pieces 5, 6, 12, 13, 14, 15 contain small (<0.75 mm) round vesicles that are now filled by secondary minerals. There are rare large (up to 8 mm) vesicles in piece 15 that form a discontinuous horizontal band across the core; these vesicles are filled by calcite.
ALTERATION: Orange halo alteration almost completely pervasive and intense, with slightly higher intensity around concentrations of carbonate filled veins and vesicles.
VEINS: Abundant thin saponite-bearing veins ubiquitously have thin fuzzy/dendritic dark halos superimposed on orange alteration (or more visible therein?). Several intervals have abundant small (<1mm) vesicles filled by a soft yellow amorphous mineral, likely FeOH (or possibly clays). In intense orange halos rimming pieces 13 and 14 these vesicles are unfilled.

Hole 390-U1556B-40R Section 3, Top of Section: 540.37 m (CSF-A)



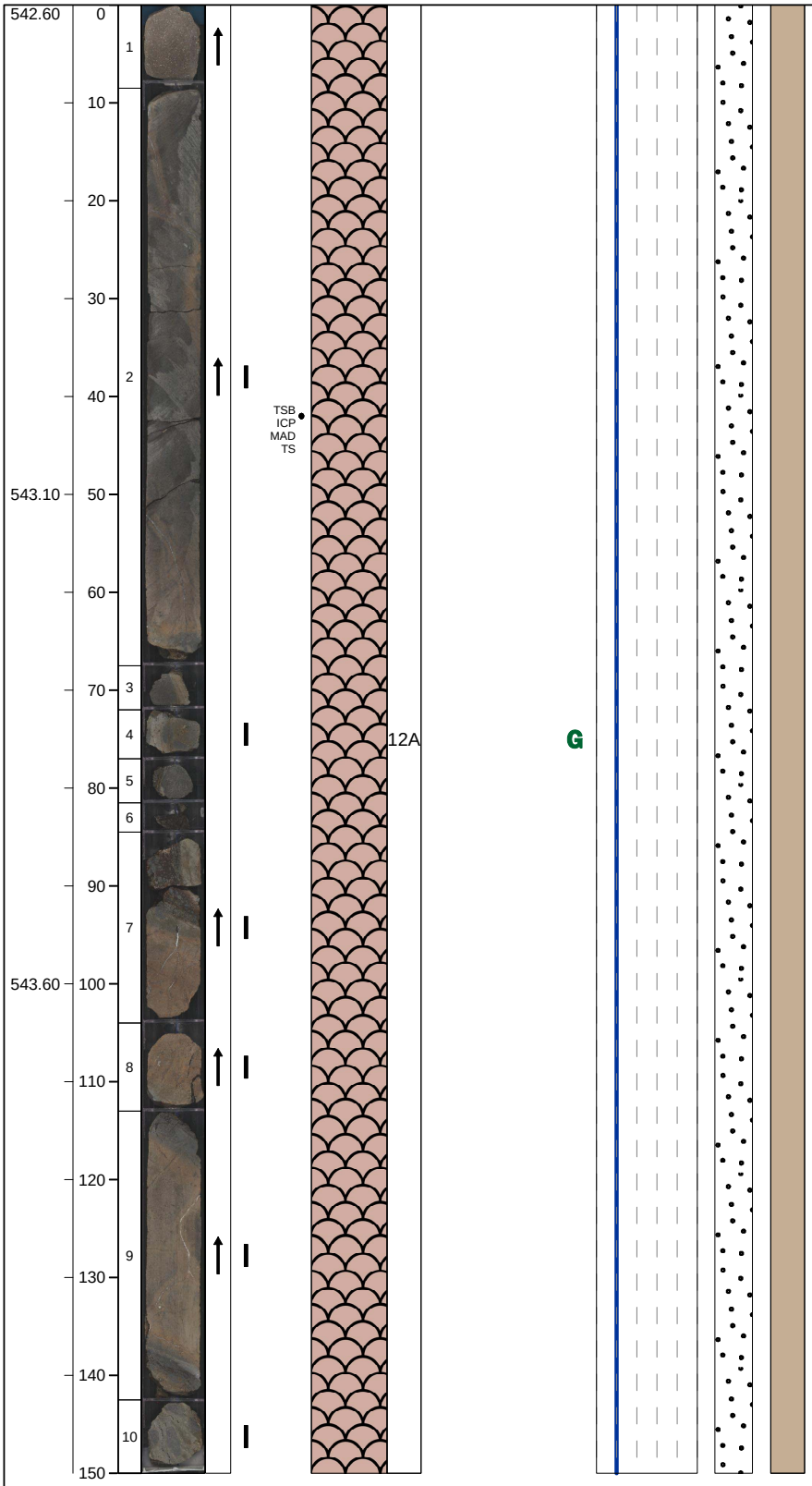
390-U1556B-40R-3-A, 0-116 cm
UNIT: 12A
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: Brown (7.5YR 5/2) to very dark gray (Gley 1 3/N).
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: Technically, nonvesicular for the section as a whole, but pieces 1, 3, 4, and 6 contain sparse, small (<0.75 mm) round vesicles that are now filled by secondary minerals.
ALTERATION: Orange halo alteration throughout with the exception of grey mottled margins. Intensity of alteration clearly relates to proximity of pillow margins or veins cutting the interiors.
VEINS: Moderately abundant thin saponite + carbonate with fuzzy/dendritic halos and less common thick (<2mm) milky white carbonate veins. Broad orange halos more related to the former.

Hole 390-U1556B-40R Section 4, Top of Section: 541.53 m (CSF-A)



390-U1556B-40R-4-A, 0-40 cm
UNIT: 12A
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: Brown (7.5YR 5/2) to very dark gray (Gley 1 3/N).
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: Technically, nonvesicular for the section as a whole, but piece 3 contains sparse, small (<0.5 mm) round vesicles that are now filled by secondary minerals.
ALTERATION: Intense orange halo and associated mottled grey altered chilled margin.
VEINS: Some saponite + carbonate veins with dendritic saponite rich halos. Piece 2 has a similar abundance of small (<1mm) yellow ?Fe-OH filled vesicles as seen in section 40R1.

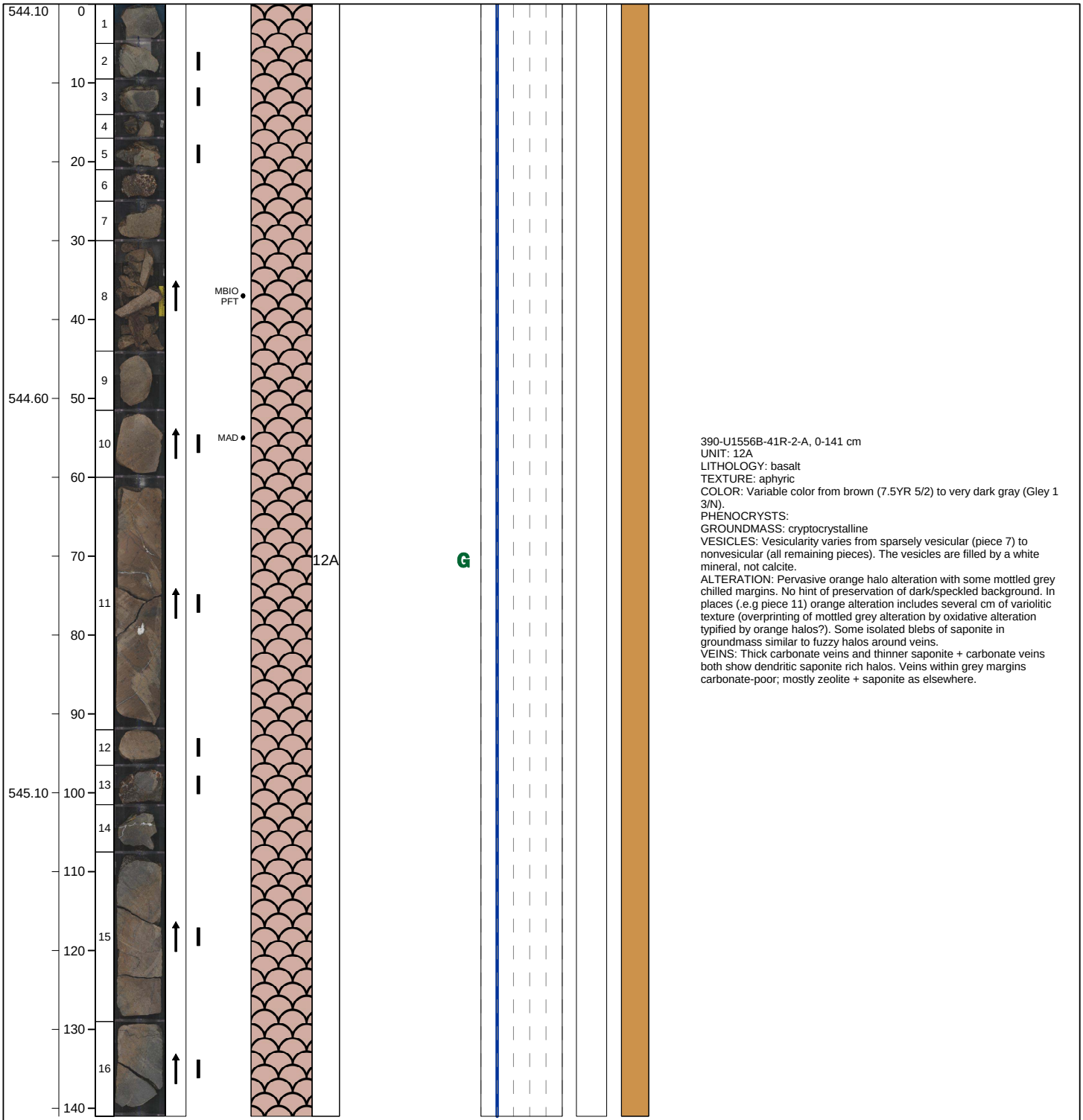
Hole 390-U1556B-41R Section 1, Top of Section: 542.6 m (CSF-A)



Description

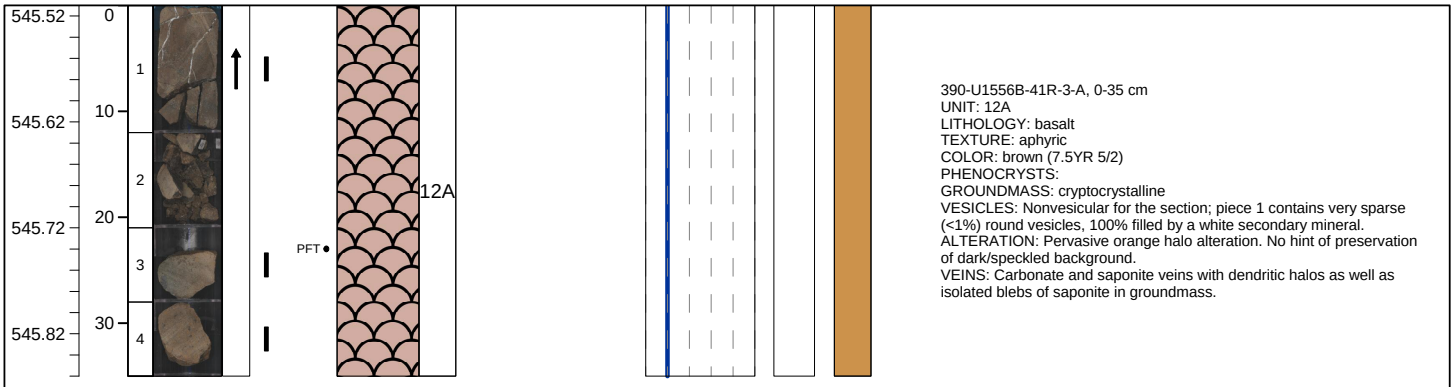
390-U1556B-41R-1-A, 0-150 cm
UNIT: 12A
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: Variable color from gray (5YR 5/1) to brown (7.5YR 5/2) to very dark gray (Gley 1 3/N).
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: Vesicularity varies from nonvesicular (pieces 3 through 10) to moderately vesicular (pieces 1 and 2). The vesicles in piece 1 are filled by calcite; those in piece 2 are filled by a dark brown mineral, probably a clay.
ALTERATION: Less pervasively altered than much of preceding core (40R) with moderately altered orange speckled basalt forming most of large pillow (pc. 2). Intense orange halos and associated mottled grey chilled margins predominate in smaller pillows in lower half of section.
VEINS: Carbonate + saponite +/- zeolite veins (in varying proportions) with well-defined orange halos are present throughout and commonly show thin dendritic saponite halos in addition to broad orange halos. Piece 1 hosts abundant small yellow ?Fe-OH filled vesicles.

Hole 390-U1556B-41R Section 2, Top of Section: 544.1 m (CSF-A)



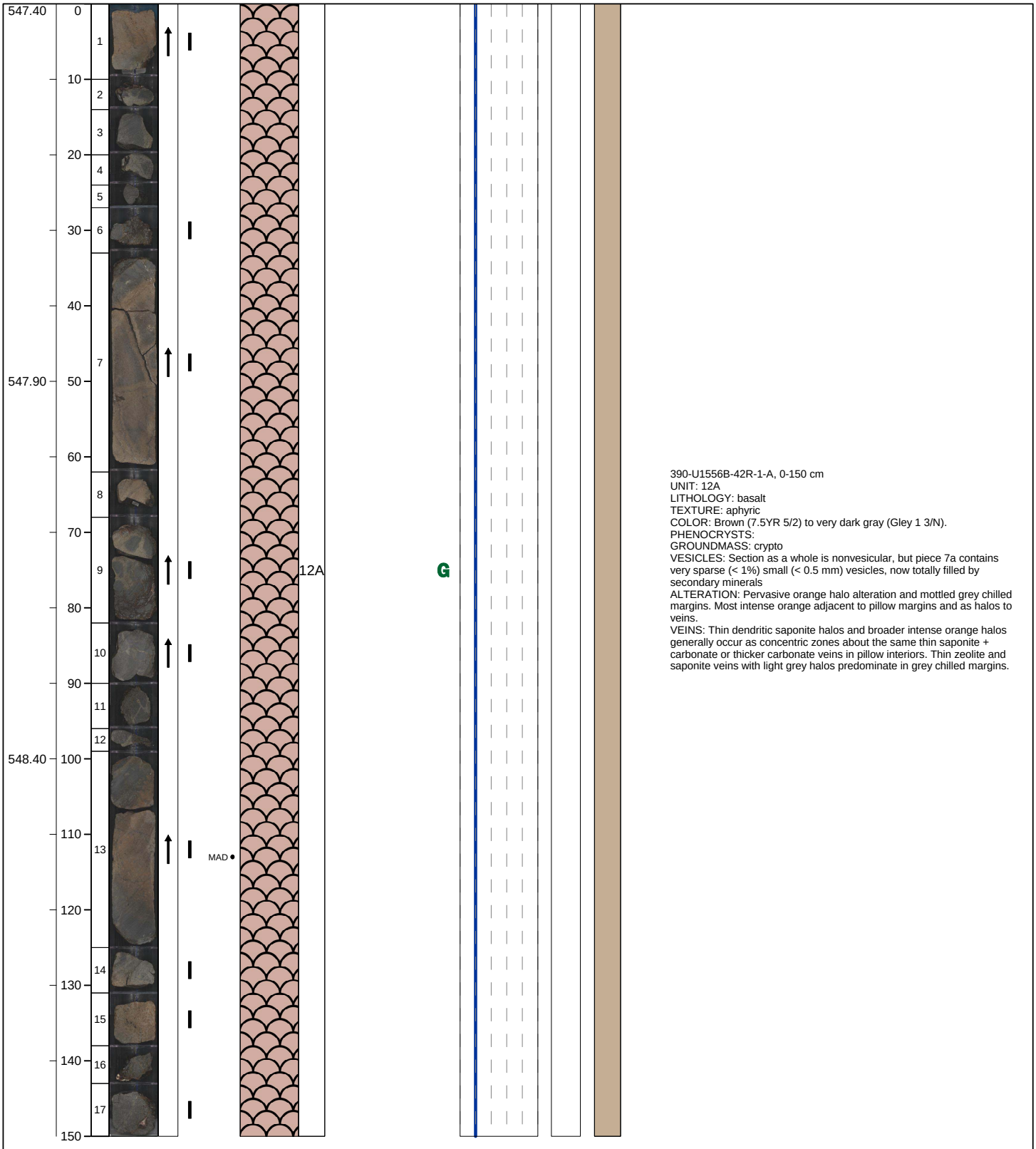
390-U1556B-41R-2-A, 0-141 cm
UNIT: 12A
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: Variable color from brown (7.5YR 5/2) to very dark gray (Gley 1 3/N).
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: Vesicularity varies from sparsely vesicular (piece 7) to nonvesicular (all remaining pieces). The vesicles are filled by a white mineral, not calcite.
ALTERATION: Pervasive orange halo alteration with some mottled grey chilled margins. No hint of preservation of dark/speckled background. In places (.e.g piece 11) orange alteration includes several cm of variolitic texture (overprinting of mottled grey alteration by oxidative alteration typified by orange halos?). Some isolated blebs of saponite in groundmass similar to fuzzy halos around veins.
VEINS: Thick carbonate veins and thinner saponite + carbonate veins both show dendritic saponite rich halos. Veins within grey margins carbonate-poor; mostly zeolite + saponite as elsewhere.

Hole 390-U1556B-41R Section 3, Top of Section: 545.51 m (CSF-A)



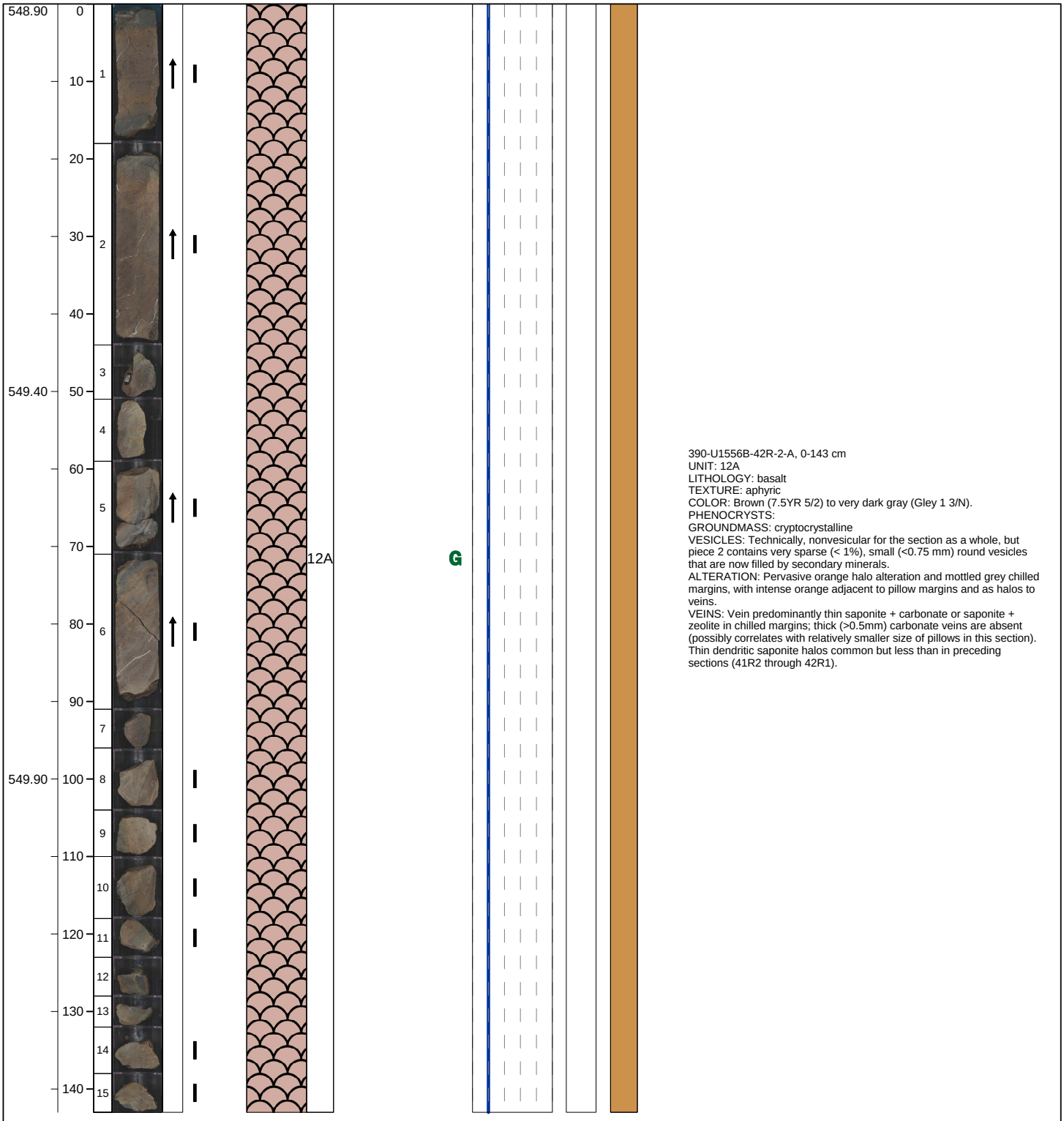
390-U1556B-41R-3-A, 0-35 cm
UNIT: 12A
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: brown (7.5YR 5/2)
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: Nonvesicular for the section; piece 1 contains very sparse (<1%) round vesicles, 100% filled by a white secondary mineral.
ALTERATION: Pervasive orange halo alteration. No hint of preservation of dark/speckled background.
VEINS: Carbonate and saponite veins with dendritic halos as well as isolated blebs of saponite in groundmass.

Hole 390-U1556B-42R Section 1, Top of Section: 547.4 m (CSF-A)



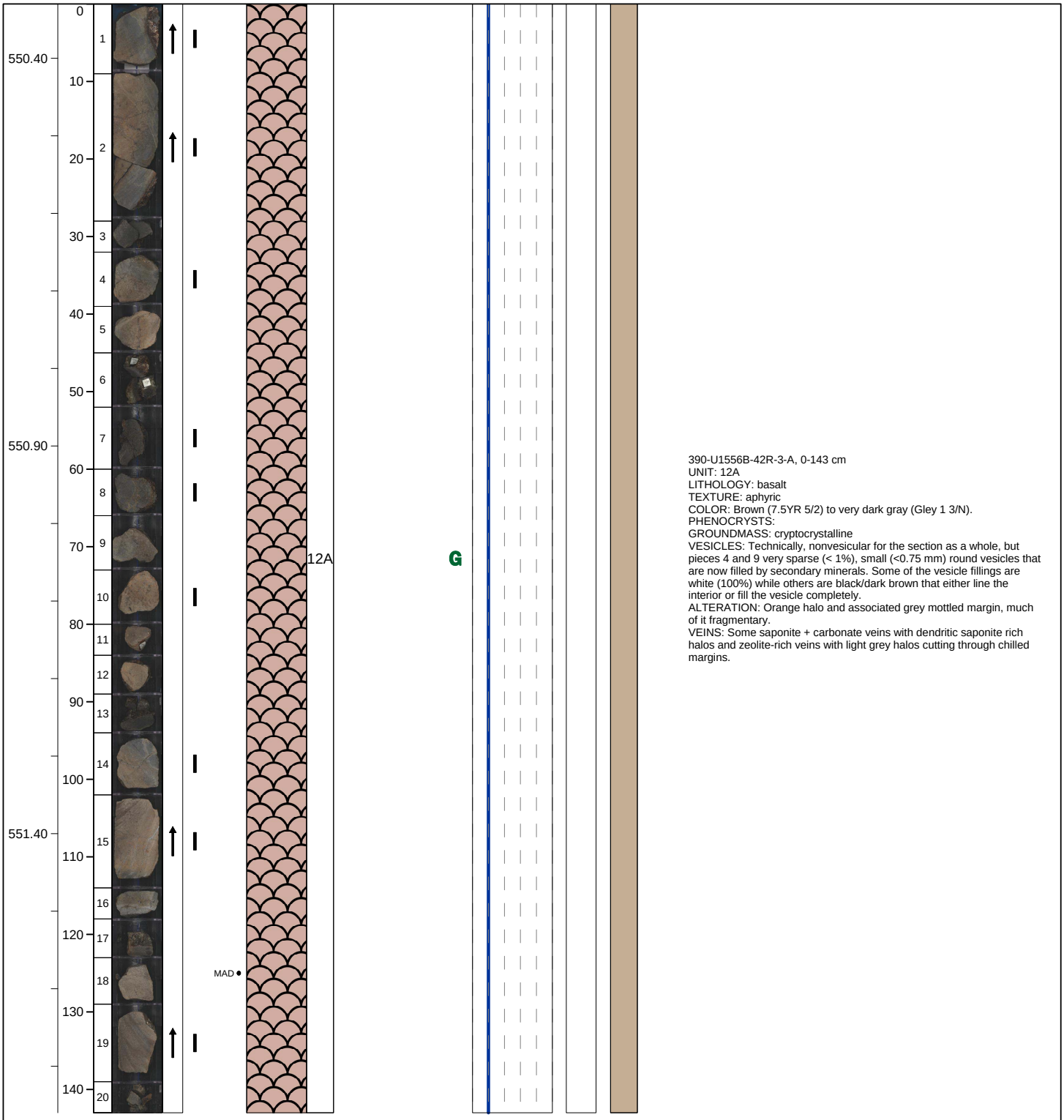
390-U1556B-42R-1-A, 0-150 cm
UNIT: 12A
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: Brown (7.5YR 5/2) to very dark gray (Gley 1 3/N).
PHENOCRYSTS:
GROUNDMASS: crypto
VESICLES: Section as a whole is nonvesicular, but piece 7a contains very sparse (< 1%) small (< 0.5 mm) vesicles, now totally filled by secondary minerals
ALTERATION: Pervasive orange halo alteration and mottled grey chilled margins. Most intense orange adjacent to pillow margins and as halos to veins.
VEINS: Thin dendritic saponite halos and broader intense orange halos generally occur as concentric zones about the same thin saponite + carbonate or thicker carbonate veins in pillow interiors. Thin zeolite and saponite veins with light grey halos predominate in grey chilled margins.

Hole 390-U1556B-42R Section 2, Top of Section: 548.9 m (CSF-A)



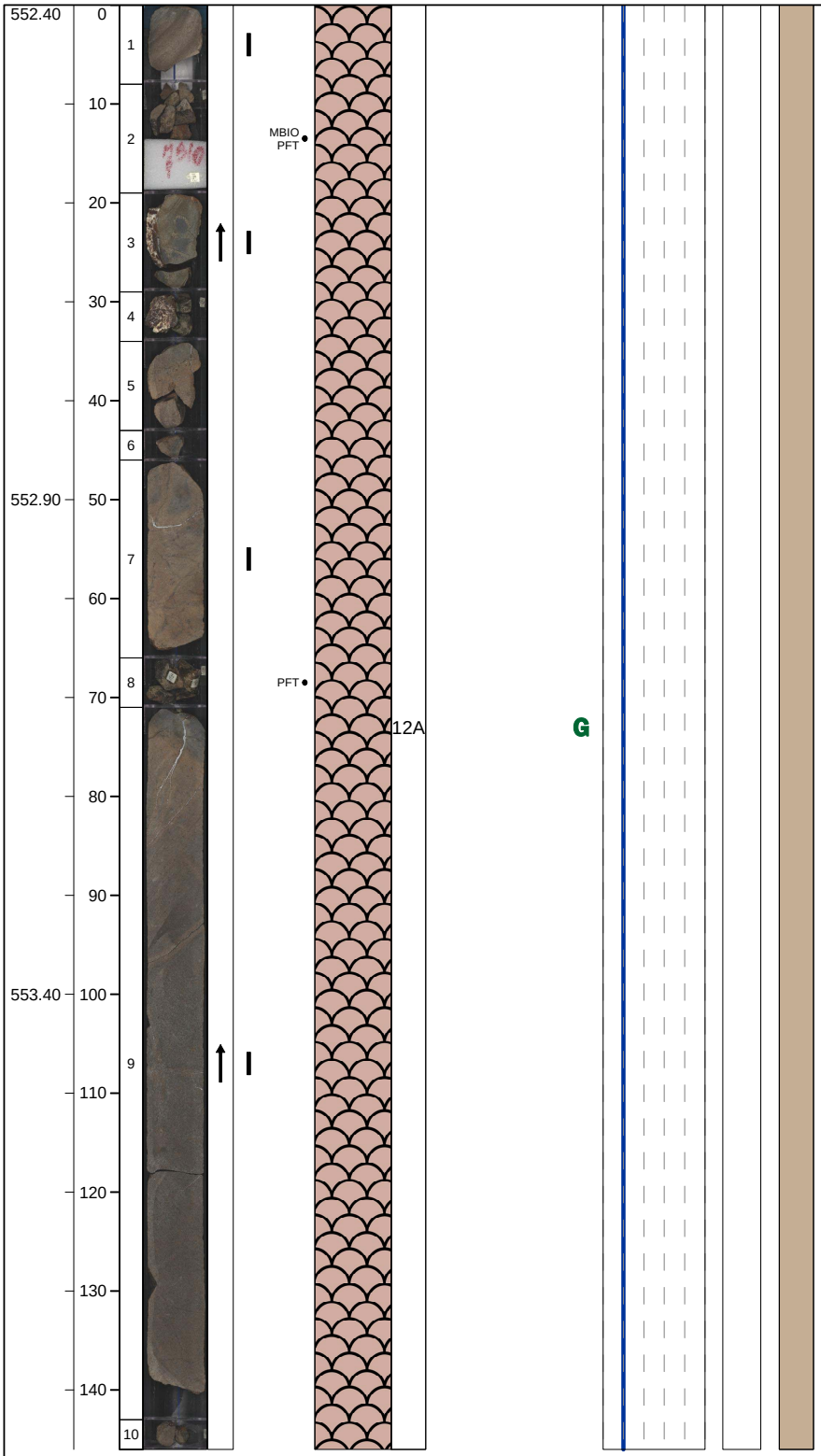
390-U1556B-42R-2-A, 0-143 cm
UNIT: 12A
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: Brown (7.5YR 5/2) to very dark gray (Gley 1 3/N).
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: Technically, nonvesicular for the section as a whole, but piece 2 contains very sparse (< 1%), small (<0.75 mm) round vesicles that are now filled by secondary minerals.
ALTERATION: Pervasive orange halo alteration and mottled grey chilled margins, with intense orange adjacent to pillow margins and as halos to veins.
VEINS: Vein predominantly thin saponite + carbonate or saponite + zeolite in chilled margins; thick (>0.5mm) carbonate veins are absent (possibly correlates with relatively smaller size of pillows in this section). Thin dendritic saponite halos common but less than in preceding sections (41R2 through 42R1).

Hole 390-U1556B-42R Section 3, Top of Section: 550.33 m (CSF-A)



390-U1556B-42R-3-A, 0-143 cm
UNIT: 12A
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: Brown (7.5YR 5/2) to very dark gray (Gley 1 3/N).
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: Technically, nonvesicular for the section as a whole, but pieces 4 and 9 very sparse (< 1%), small (<0.75 mm) round vesicles that are now filled by secondary minerals. Some of the vesicle fillings are white (100%) while others are black/dark brown that either line the interior or fill the vesicle completely.
ALTERATION: Orange halo and associated grey mottled margin, much of it fragmentary.
VEINS: Some saponite + carbonate veins with dendritic saponite rich halos and zeolite-rich veins with light grey halos cutting through chilled margins.

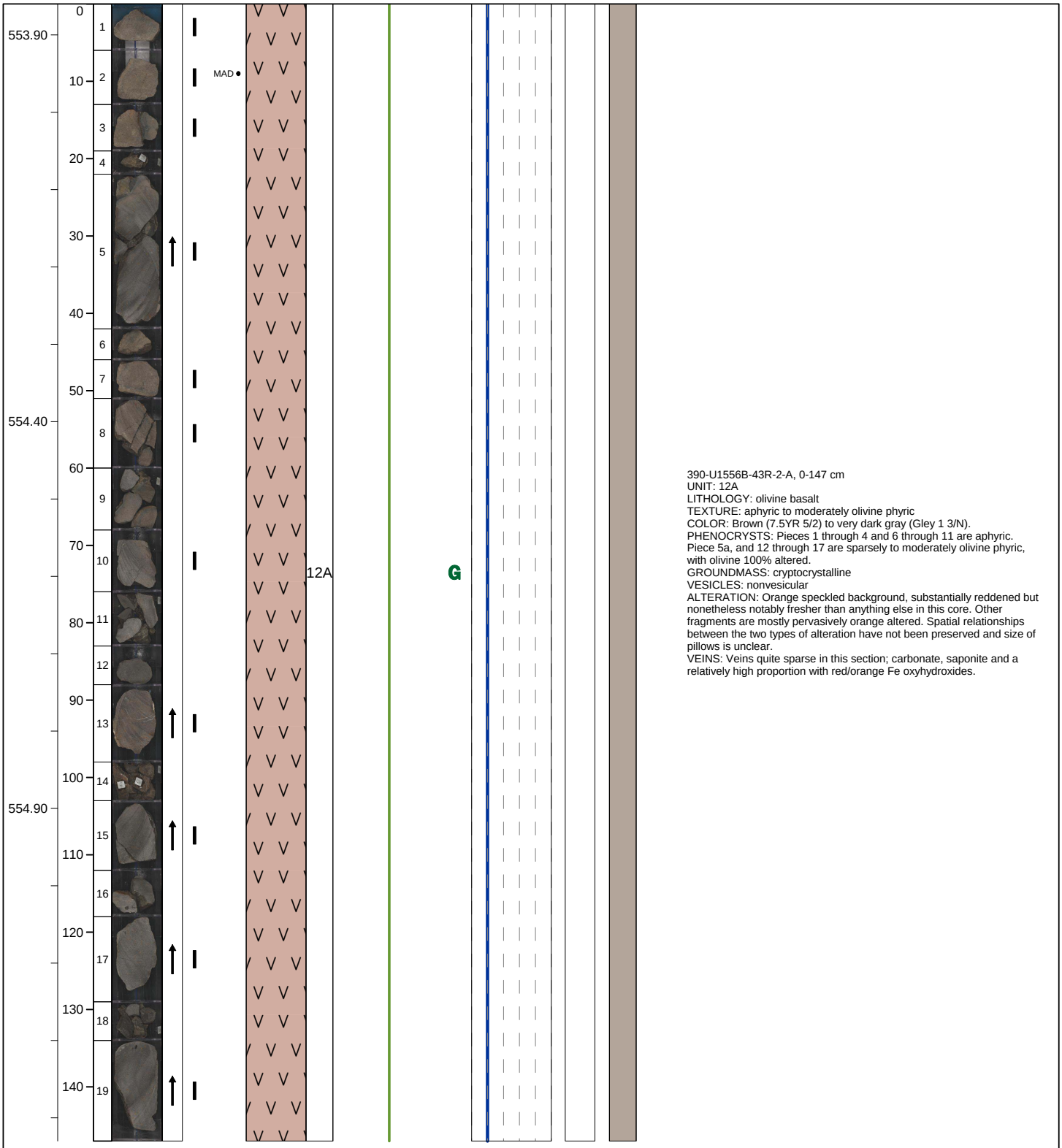
Hole 390-U1556B-43R Section 1, Top of Section: 552.4 m (CSF-A)



Description

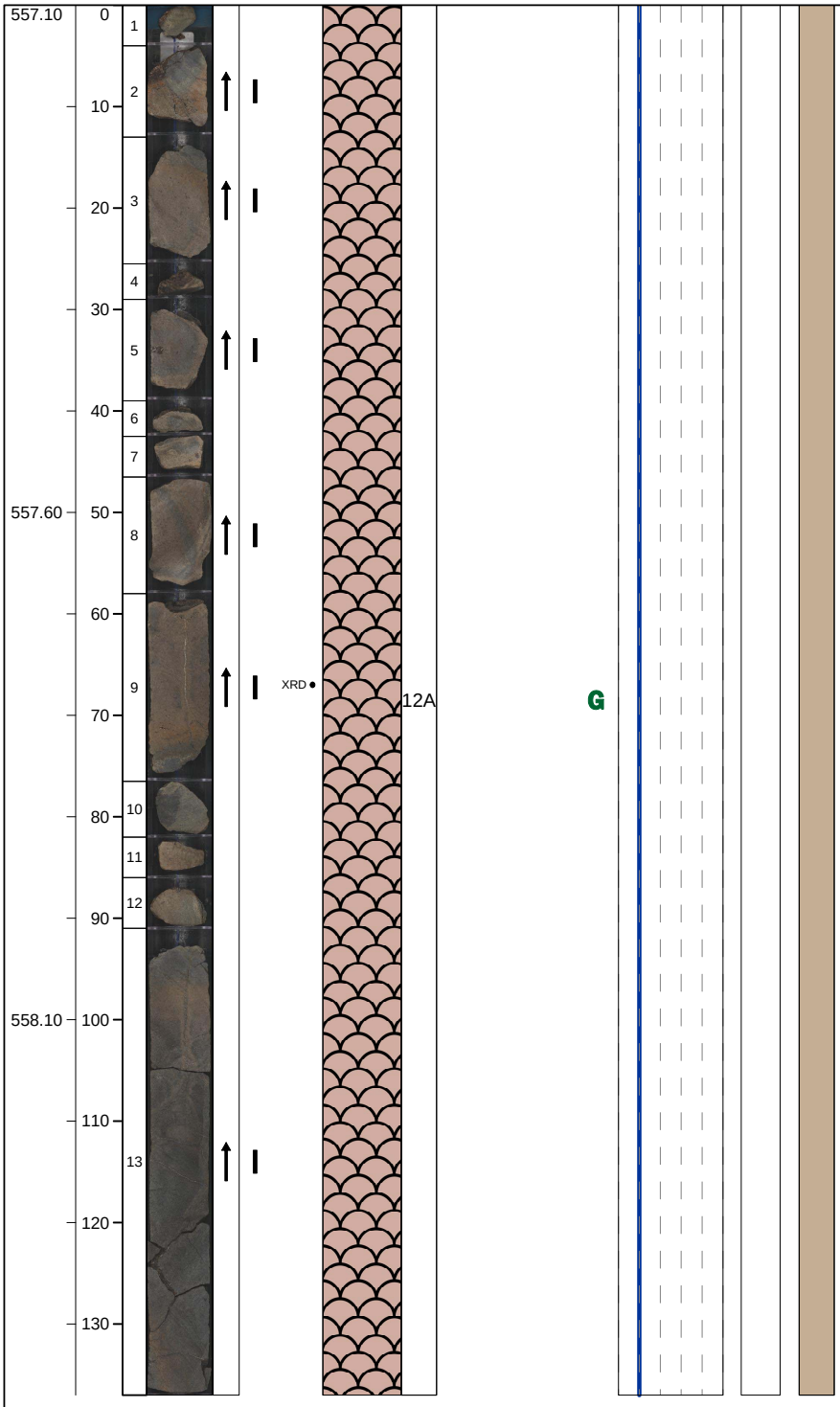
390-U1556B-43R-1-A, 0-146 cm
UNIT: 12A
LITHOLOGY: baslt
TEXTURE: aphyric to very sparsely olivine phyric
COLOR: Brown (7.5YR 5/2) to very dark gray (Gley 1 3/N).
PHENOCRYSTS: The section as a whole is aphyric, but the interior of piece 10, which is a medium-size pillow (at least ~68 cm) is sparsely olivine phyric. All olivine 100% altered.
GROUNDMASS: cryptocrystalline
VESICLES: Technically, nonvesicular for the section as a whole, but pieces 5, 6, and 8 have very sparse (< 1%), small (<0.75 mm) round vesicles that are now filled by secondary minerals.
ALTERATION: Mostly pervasive orange halos. Large (60cm+ thick) pillow forming lower half of section is significantly altered throughout and, compared to the relative freshness of similar sized pieces a few cores up-section, shows how much more pervasive alteration is in this unit and particularly in cores 41R through 42R (and beyond?).
VEINS: Thin saponite + carbonate and thicker carbonate dominated veins cut pillows with thin dendritic dark halos sometimes coexisting with broader orange halos (e.g. pieces 7, 10).

Hole 390-U1556B-43R Section 2, Top of Section: 553.86 m (CSF-A)



390-U1556B-43R-2-A, 0-147 cm
UNIT: 12A
LITHOLOGY: olivine basalt
TEXTURE: aphyric to moderately olivine phyric
COLOR: Brown (7.5YR 5/2) to very dark gray (Gley 1 3/N).
PHENOCRYSTS: Pieces 1 through 4 and 6 through 11 are aphyric. Piece 5a, and 12 through 17 are sparsely to moderately olivine phyric, with olivine 100% altered.
GROUNDMASS: cryptocrystalline
VESICLES: nonvesicular
ALTERATION: Orange speckled background, substantially reddened but nonetheless notably fresher than anything else in this core. Other fragments are mostly pervasively orange altered. Spatial relationships between the two types of alteration have not been preserved and size of pillows is unclear.
VEINS: Veins quite sparse in this section; carbonate, saponite and a relatively high proportion with red/orange Fe oxyhydroxides.

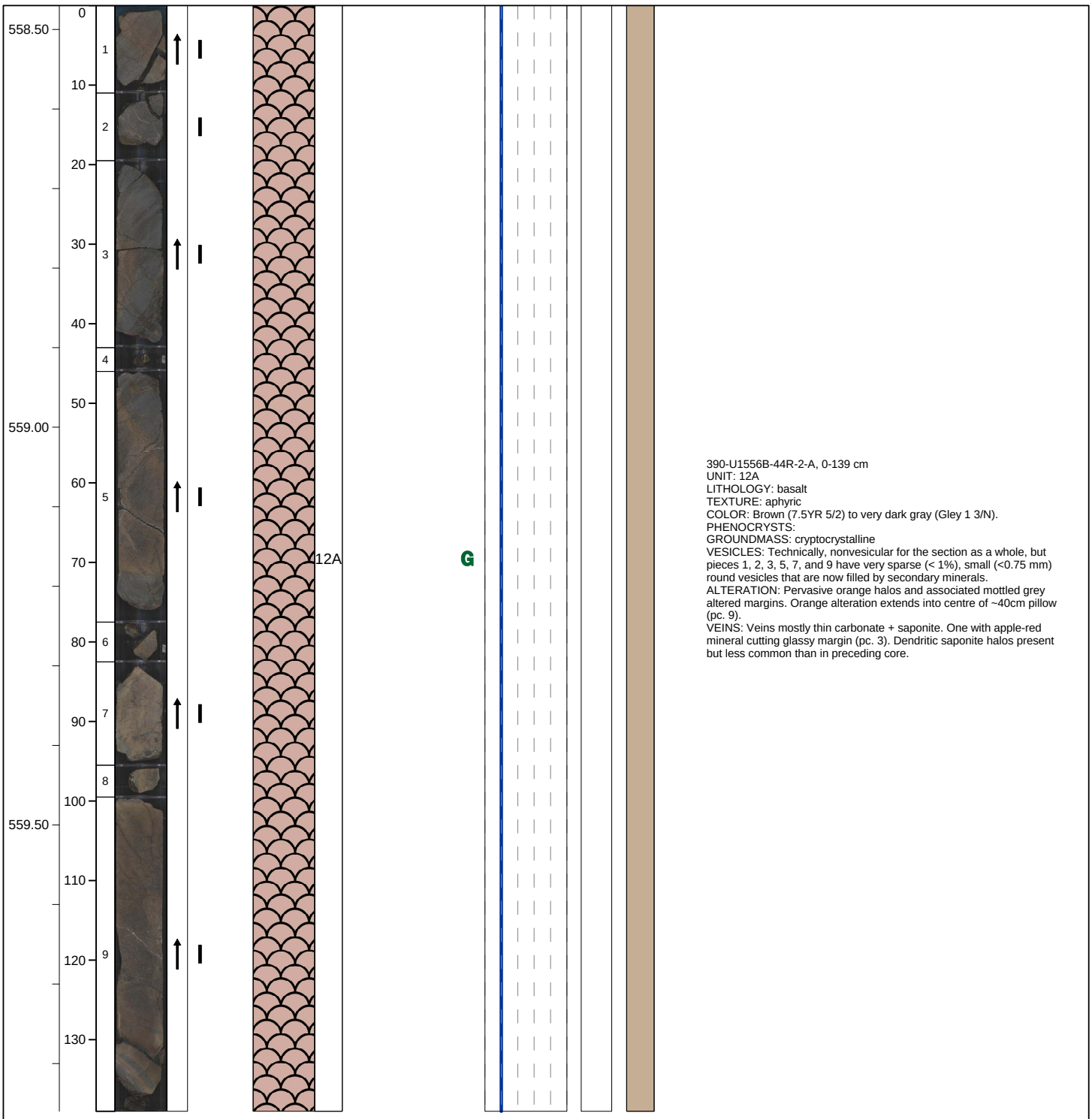
Hole 390-U1556B-44R Section 1, Top of Section: 557.1 m (CSF-A)



Description

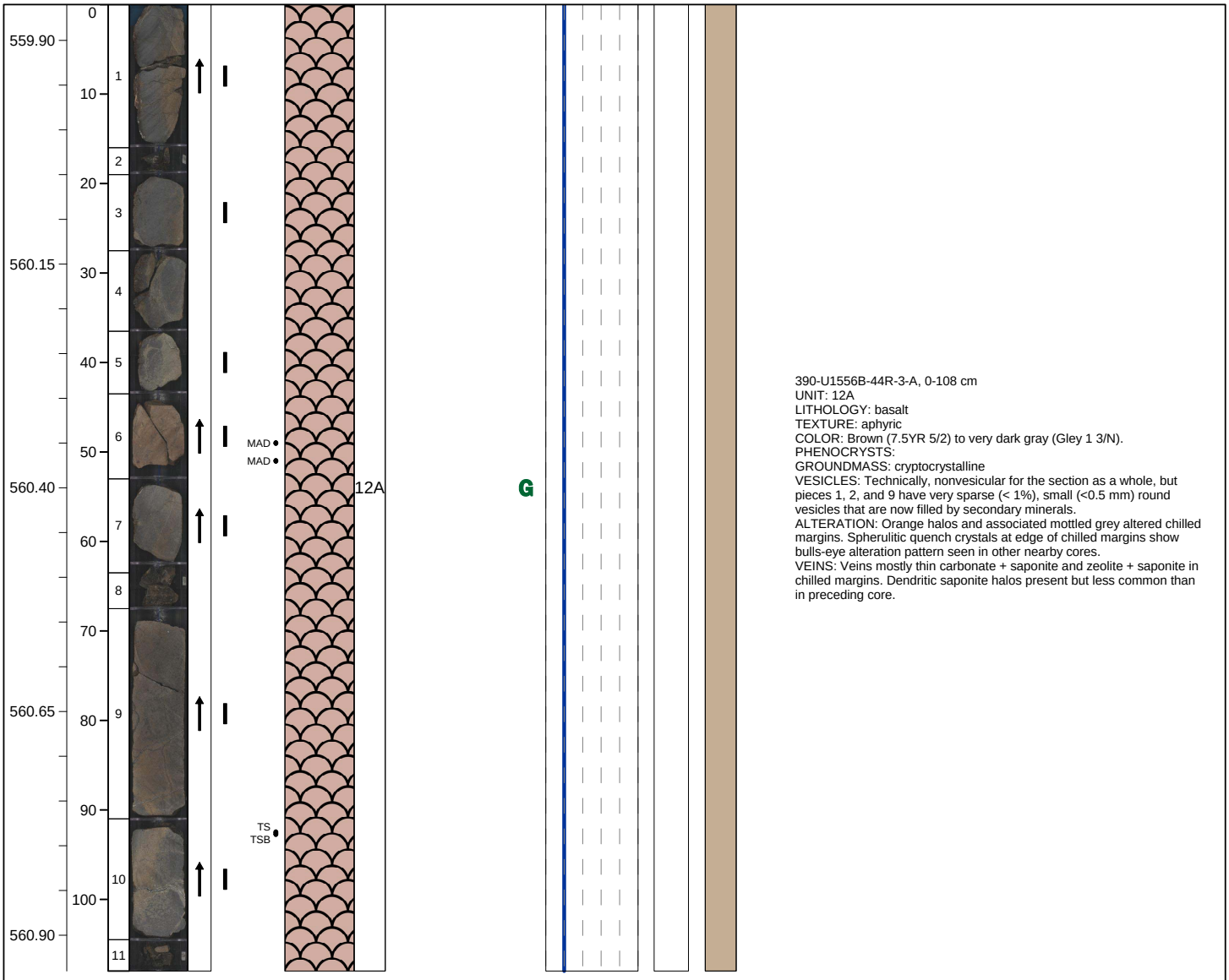
390-U1556B-44R-1-A, 0-137 cm
UNIT: 12A
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: Brown (7.5YR 5/2) to very dark gray (Gley 1 3/N).
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: Technically, nonvesicular for the section as a whole, but pieces 3, 5, 7, 9, and 11 have very sparse (< 1%), small (<0.75 mm) round vesicles that are now filled by secondary minerals. Piece 3 also has one large oval-shaped vesicle 7 mm wide
ALTERATION: Orange speckled background in larger pillows and mostly intense orange halos elsewhere. Orange halos on the outside of two pieces (5, 8) show an atypical darker concentric fringe ~1cm thick separating more intensely orange outer and inner zones.
VEINS: Most veins are thin and saponite rich with fuzzy dendritic dark halos. Several zeolite + saponite veins are only partially filled and have a similar appearance to the voids in porous hyaloclastites seen in some cores.

Hole 390-U1556B-44R Section 2, Top of Section: 558.47 m (CSF-A)



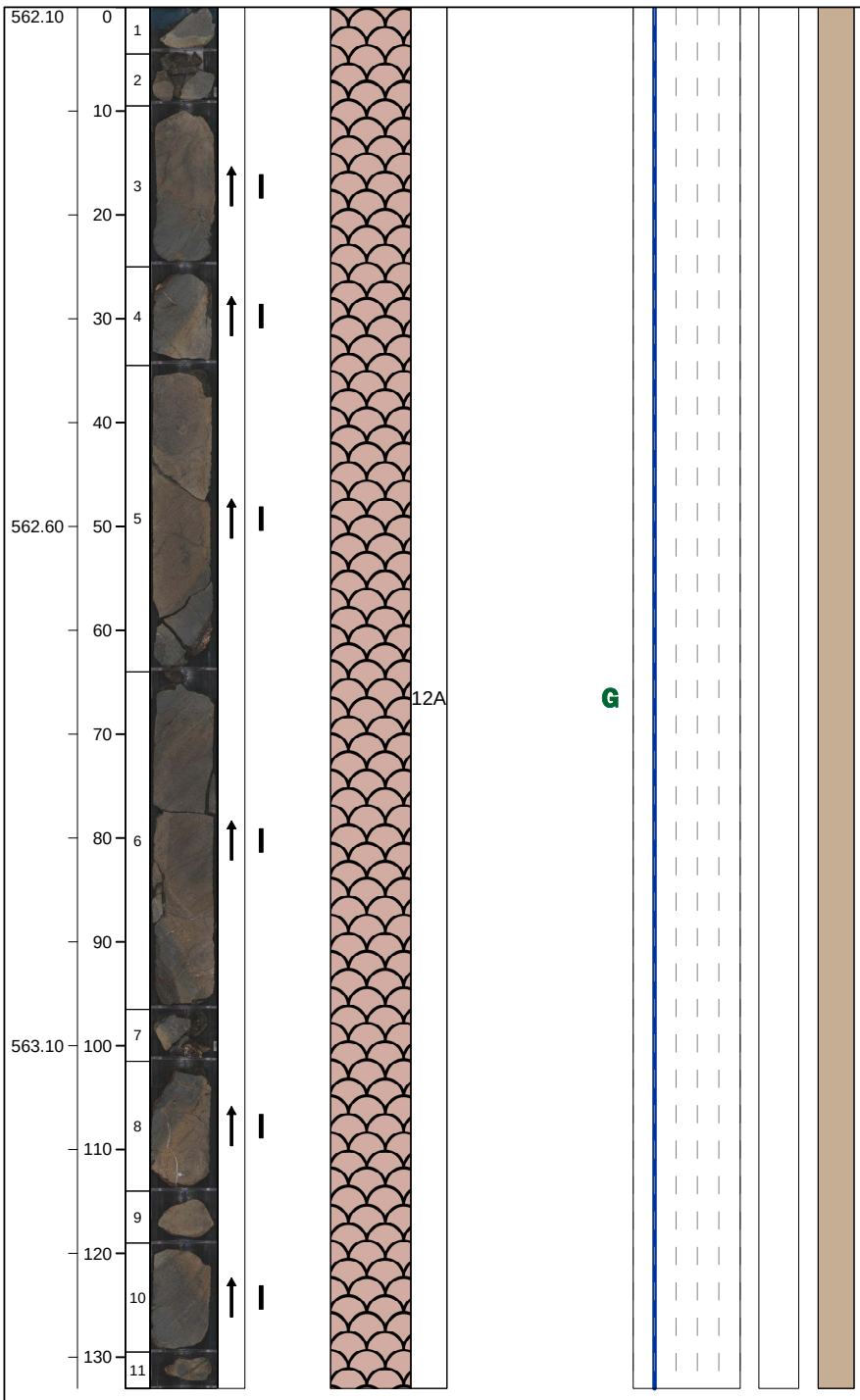
390-U1556B-44R-2-A, 0-139 cm
UNIT: 12A
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: Brown (7.5YR 5/2) to very dark gray (Gley 1 3/N).
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: Technically, nonvesicular for the section as a whole, but pieces 1, 2, 3, 5, 7, and 9 have very sparse (< 1%), small (<0.75 mm) round vesicles that are now filled by secondary minerals.
ALTERATION: Pervasive orange halos and associated mottled grey altered margins. Orange alteration extends into centre of ~40cm pillow (pc. 9).
VEINS: Veins mostly thin carbonate + saponite. One with apple-red mineral cutting glassy margin (pc. 3). Dendritic saponite halos present but less common than in preceding core.

Hole 390-U1556B-44R Section 3, Top of Section: 559.86 m (CSF-A)



390-U1556B-44R-3-A, 0-108 cm
UNIT: 12A
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: Brown (7.5YR 5/2) to very dark gray (Gley 1 3/N).
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: Technically, nonvesicular for the section as a whole, but pieces 1, 2, and 9 have very sparse (< 1%), small (<0.5 mm) round vesicles that are now filled by secondary minerals.
ALTERATION: Orange halos and associated mottled grey altered chilled margins. Spherulitic quench crystals at edge of chilled margins show bulls-eye alteration pattern seen in other nearby cores.
VEINS: Veins mostly thin carbonate + saponite and zeolite + saponite in chilled margins. Dendritic saponite halos present but less common than in preceding core.

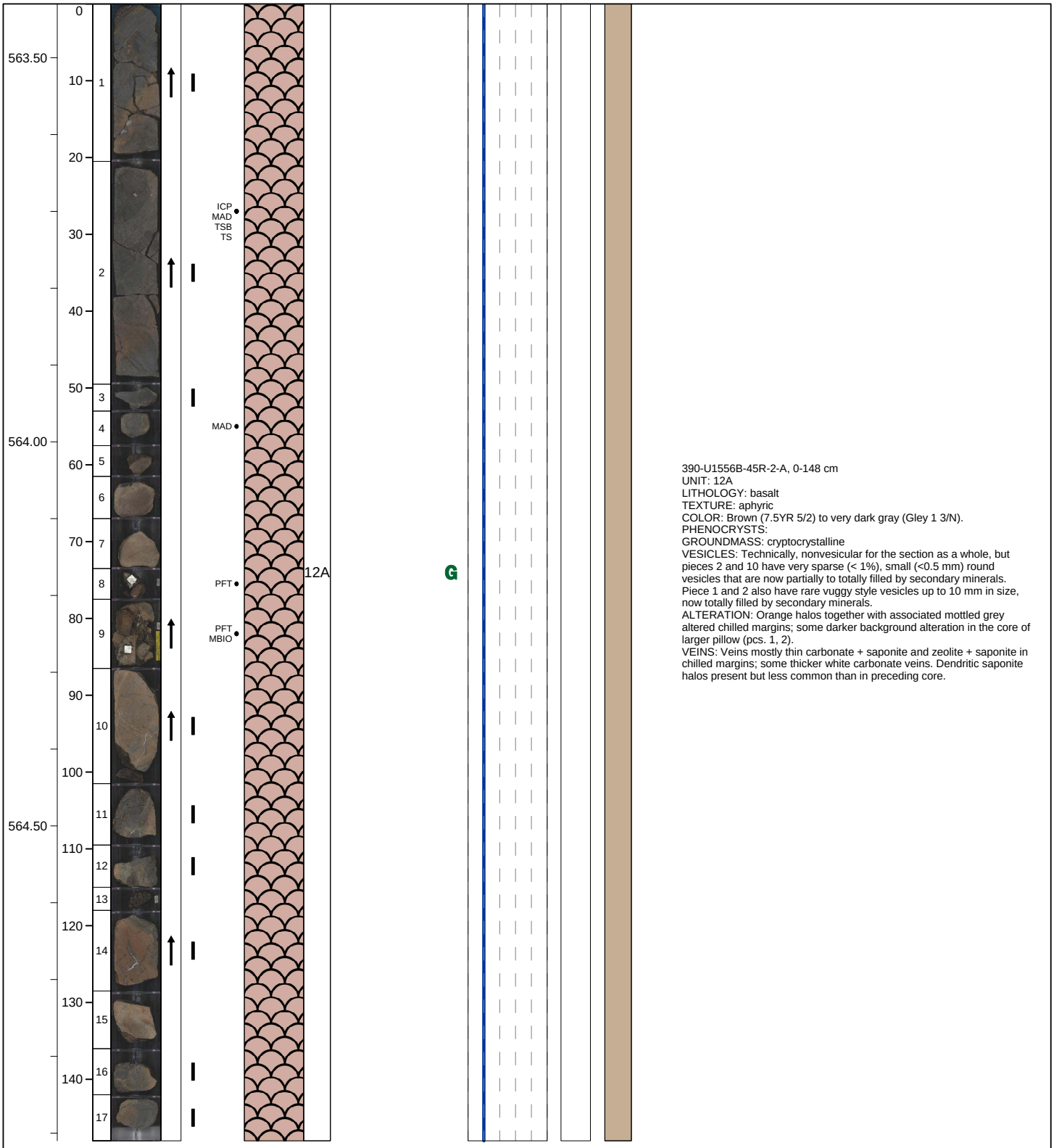
Hole 390-U1556B-45R Section 1, Top of Section: 562.1 m (CSF-A)



Description

390-U1556B-45R-1-A, 0-133 cm
UNIT: 12A
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: Brown (7.5YR 5/2) to very dark gray (Gley 1 3/N).
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: Technically, nonvesicular for the section as a whole, but pieces 3, 4, 5, 6, 8 and 9 have very sparse (< 1%), small (<0.5 mm) round vesicles that are now filled by secondary minerals.
ALTERATION: Orange halos extending to centres of small pillows together with associated mottled grey altered chilled margins.
VEINS: Veins mostly thin carbonate + saponite and zeolite + saponite cutting in margins. Dendritic saponite halos present but less common than in preceding core.

Hole 390-U1556B-45R Section 2, Top of Section: 563.43 m (CSF-A)

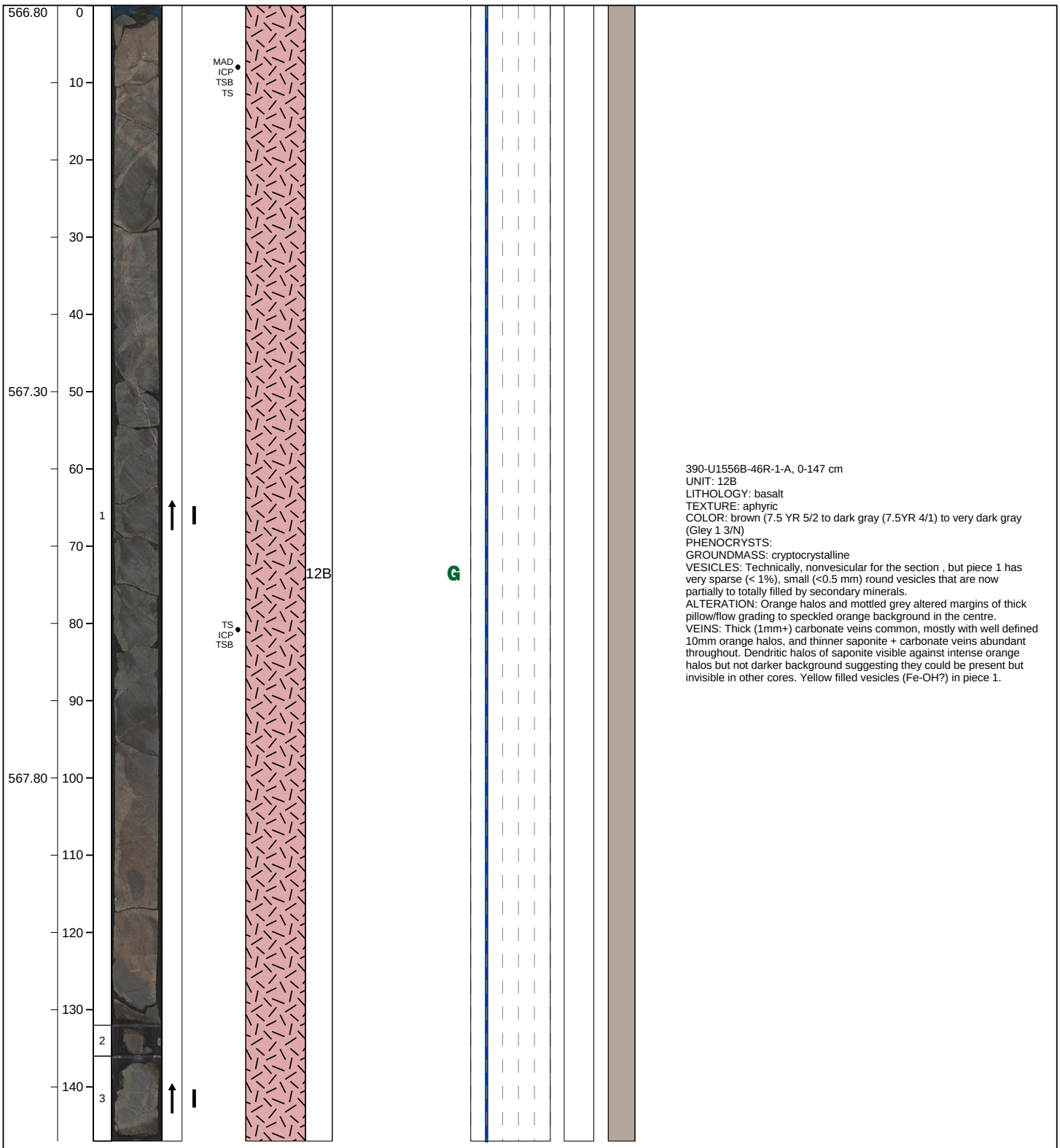


390-U1556B-45R-2-A, 0-148 cm
UNIT: 12A
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: Brown (7.5YR 5/2) to very dark gray (Gley 1 3/N).
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: Technically, nonvesicular for the section as a whole, but pieces 2 and 10 have very sparse (< 1%), small (<0.5 mm) round vesicles that are now partially to totally filled by secondary minerals. Piece 1 and 2 also have rare vuggy style vesicles up to 10 mm in size, now totally filled by secondary minerals.
ALTERATION: Orange halos together with associated mottled grey altered chilled margins; some darker background alteration in the core of larger pillow (pcs. 1, 2).
VEINS: Veins mostly thin carbonate + saponite and zeolite + saponite in chilled margins; some thicker white carbonate veins. Dendritic saponite halos present but less common than in preceding core.

Hole 390-U1556B-45R Section 3, Top of Section: 564.91 m (CSF-A)

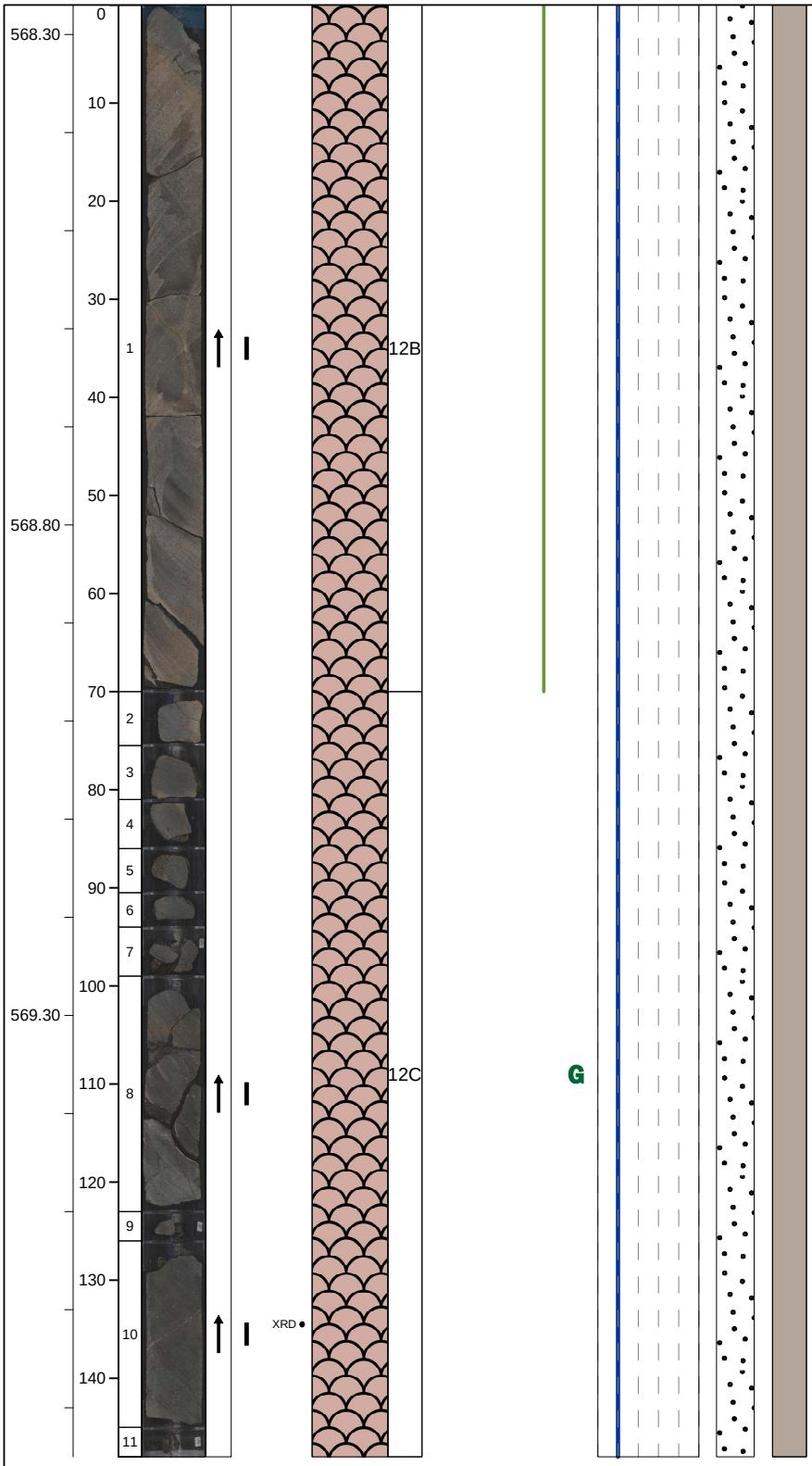
Depth (mbsf)	Section length (cm)	Piece number	Core image	Orientation	DMT	Shipboard samples	Lithology	Lith. unit	Plagioclase / Olivine 0 5 10	Glass	Groundmass size: Glass / Cryptocrystalline / Microcrystalline / Fine-grained / Medium-grained / Coarse-grained	Vesicle abundance	Alteration intensity rank	Veins/Structures	Description
564.91 564.93 564.95	0	1						12A		G					390-U1556B-45R-3-A, 0-5 cm UNIT: 12A LITHOLOGY: basalt TEXTURE: aphyric COLOR: very dark gray (Gley 1 3/N). PHENOCRYSTS: GROUNDMASS: cryptocrystalline VESICLES: ALTERATION: Fragment of grey altered margin VEINS:

Hole 390-U1556B-46R Section 1, Top of Section: 566.8 m (CSF-A)



390-U1556B-46R-1-A, 0-147 cm
UNIT: 12B
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: brown (7.5 YR 5/2 to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: Technically, nonvesicular for the section , but piece 1 has very sparse (< 1%), small (<0.5 mm) round vesicles that are now partially to totally filled by secondary minerals.
ALTERATION: Orange halos and mottled grey altered margins of thick pillow/flow grading to speckled orange background in the centre.
VEINS: Thick (1mm+) carbonate veins common, mostly with well defined 10mm orange halos, and thinner saponite + carbonate veins abundant throughout. Dendritic halos of saponite visible against intense orange halos but not darker background suggesting they could be present but invisible in other cores. Yellow filled vesicles (Fe-OH?) in piece 1.

Hole 390-U1556B-46R Section 2, Top of Section: 568.27 m (CSF-A)

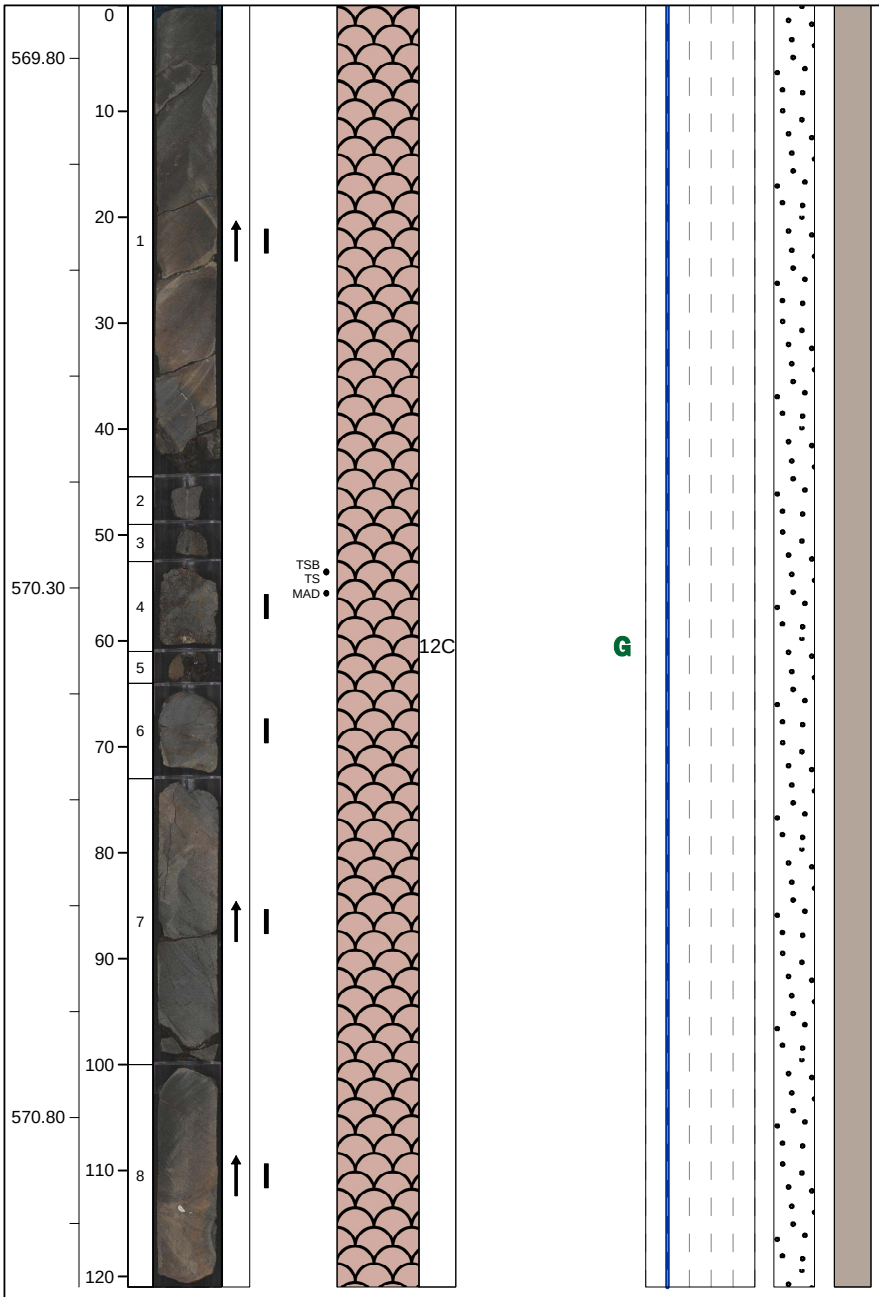


Description

390-U1556B-46R-2-A, 0-70 cm
UNIT: 12B
LITHOLOGY: olivine basalt
TEXTURE: moderately phyric
COLOR: brown (7.5 YR 5/2 to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS: Olivine phenocryst / microphenocrysts are difficult to distinguish because they are 100% altered to a very dark grey secondary mineral.
GROUNDMASS: cryptocrystalline to microcrystalline
VESICLES: Sparsely vesicular (<~1%), with small (<0.5 mm) round vesicles that are now partially to totally filled by a dark gray to black secondary minerals
ALTERATION: Large pillow mostly altered to orange halo along margins and veins with only small areas of orange speckled background alteration in between.
VEINS: Veined by carbonate + saponite (mostly ~0.5mm). Yellow ?Fe-OH filled vesicles concentrated in a concentric layer paralleling the rim of large pillow (pc. 1)

390-U1556B-46R-2-A, 70-148 cm
UNIT: 12C
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Sparsely vesicular (<~1%), with small (<0.5 mm) round vesicles that are now partially to totally filled by a dark gray to black secondary minerals
ALTERATION: Fragments of mottled grey altered chilled margin and larger pillow mostly orange speckled background with some orange halo.
VEINS: Veins mostly carbonate + saponite (with faint orange halos). One possibly zeolite bearing compound vein in piece 10.

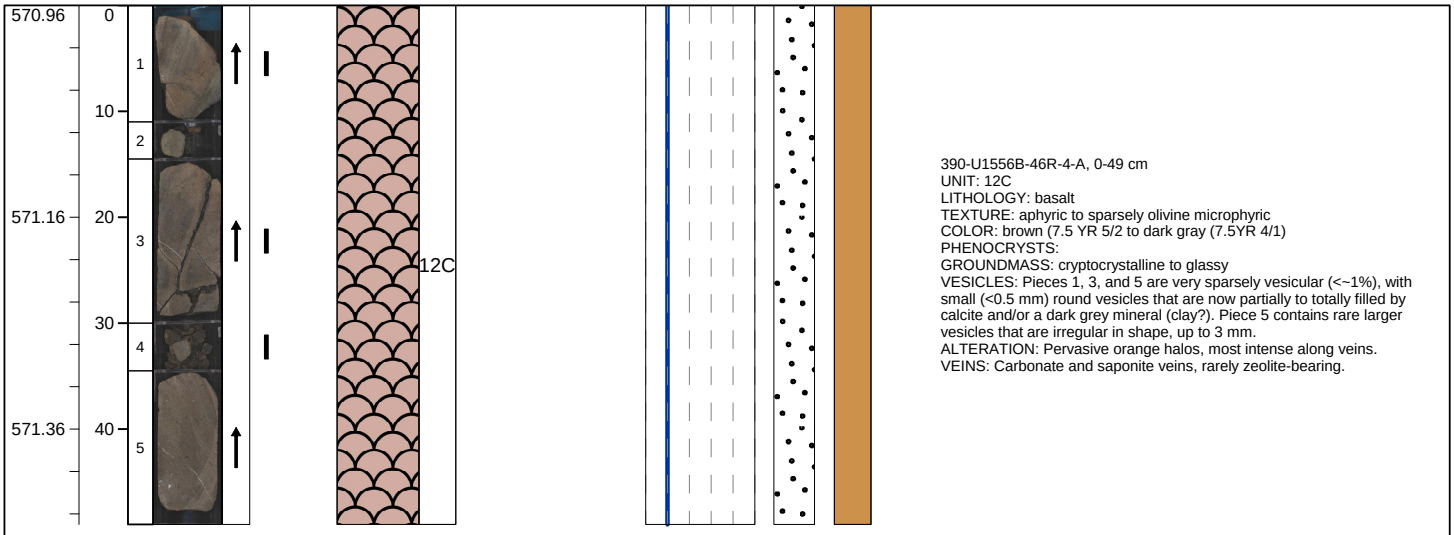
Hole 390-U1556B-46R Section 3, Top of Section: 569.75 m (CSF-A)



Description

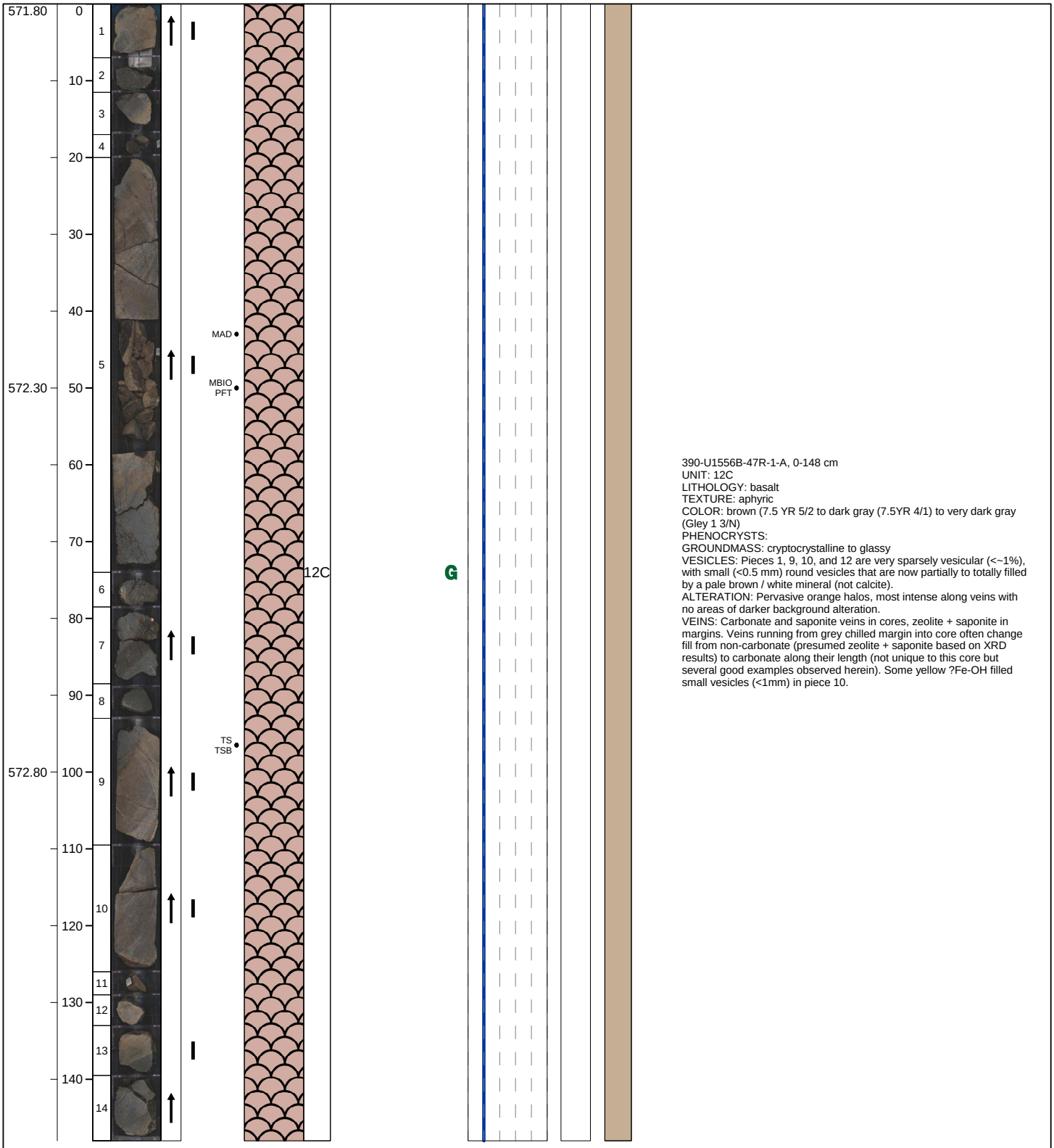
390-U1556B-46R-3-A, 0-121 cm
UNIT: 12C
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: brown (7.5 YR 5/2 to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Sparsely vesicular (<~1%), with small (<0.5 mm) round vesicles that are now partially to totally filled by a dark gray to black secondary minerals in the coarser grained areas. In chilled margins, vesicles are often only partially filled, or even empty.
ALTERATION: Gradational from grey mottled and orange halos at pillow margins to orange speckled background in cores (often sparsely speckled in nearly aphyric basalt).
VEINS: Veins mostly carbonate + saponite with faint orange halos in cores and saponite + zeolite in chilled margins.

Hole 390-U1556B-46R Section 4, Top of Section: 570.96 m (CSF-A)



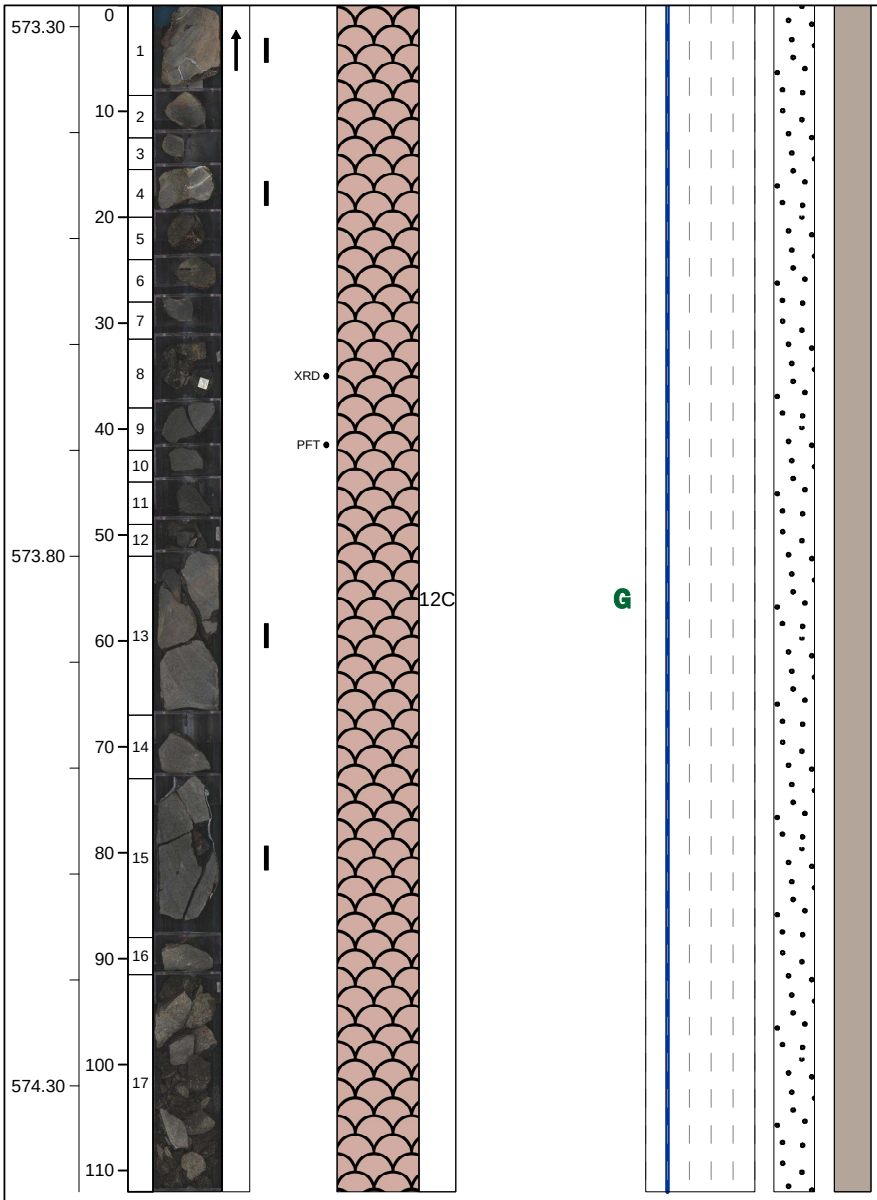
390-U1556B-46R-4-A, 0-49 cm
UNIT: 12C
LITHOLOGY: basalt
TEXTURE: aphyric to sparsely olivine microphyric
COLOR: brown (7.5 YR 5/2 to dark gray (7.5YR 4/1)
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Pieces 1, 3, and 5 are very sparsely vesicular (<~1%), with small (<0.5 mm) round vesicles that are now partially to totally filled by calcite and/or a dark grey mineral (clay?). Piece 5 contains rare larger vesicles that are irregular in shape, up to 3 mm.
ALTERATION: Pervasive orange halos, most intense along veins.
VEINS: Carbonate and saponite veins, rarely zeolite-bearing.

Hole 390-U1556B-47R Section 1, Top of Section: 571.8 m (CSF-A)



390-U1556B-47R-1-A, 0-148 cm
UNIT: 12C
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: brown (7.5 YR 5/2 to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Pieces 1, 9, 10, and 12 are very sparsely vesicular (<~1%), with small (<0.5 mm) round vesicles that are now partially to totally filled by a pale brown / white mineral (not calcite).
ALTERATION: Pervasive orange halos, most intense along veins with no areas of darker background alteration.
VEINS: Carbonate and saponite veins in cores, zeolite + saponite in margins. Veins running from grey chilled margin into core often change fill from non-carbonate (presumed zeolite + saponite based on XRD results) to carbonate along their length (not unique to this core but several good examples observed herein). Some yellow ?Fe-OH filled small vesicles (<1mm) in piece 10.

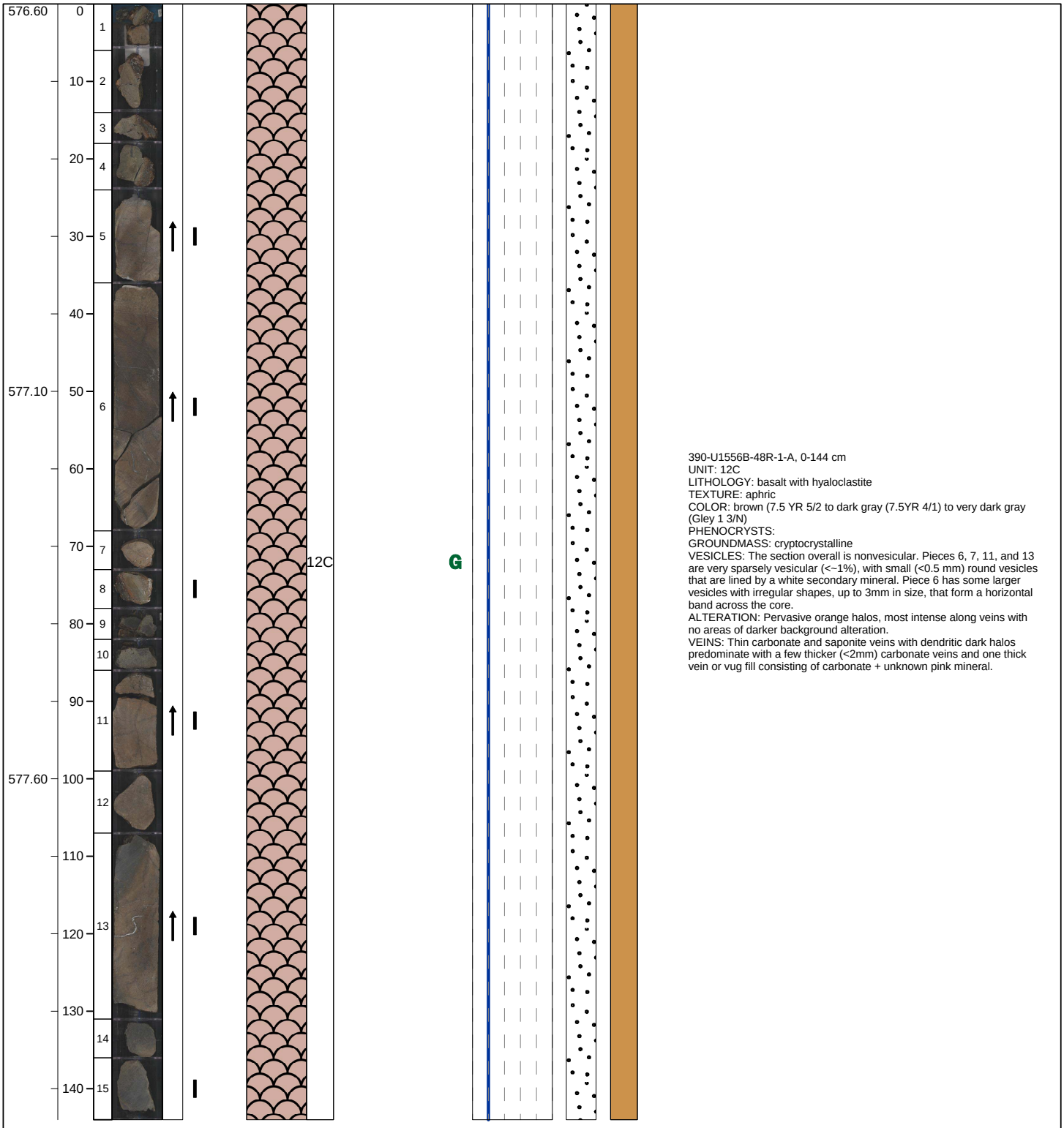
Hole 390-U1556B-47R Section 2, Top of Section: 573.28 m (CSF-A)



Description

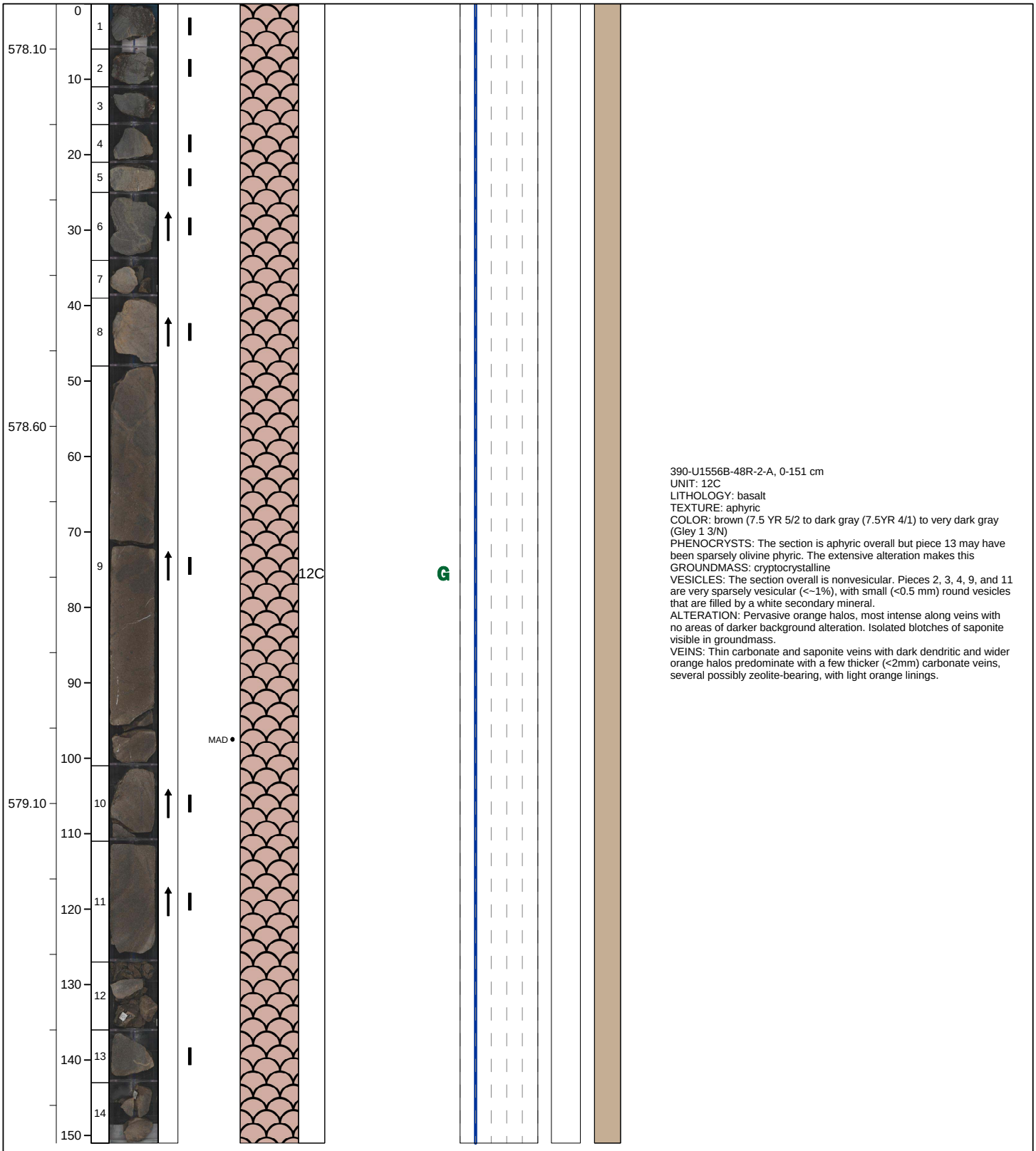
390-U1556B-47R-2-A, 0-112 cm
UNIT: 12C
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline to glassy
VESICLES: Piece 15 is sparsely vesicular (~1%), with small (<0.5 mm) round vesicles that are lined by a dark grey secondary mineral. Most of the chilled margin clasts are nonvesicular, but some are very sparsely vesicular (<1%), and these are often unfilled.
ALTERATION: Orange halos (and associated grey altered margins) and dark, orange-speckled background, mostly fragments and and rubble. Orange halos on one preseved margin (pc. 13) are thin (~2cm) relative to other adjacent cores, typically extending 10s cm from chilled margins in 46R through 48R.
VEINS: Some thick 2+mm carbonate veins which appear to have filled open voids (similar to open saponite + zeolite lined fractures recorded elsewhere in this and adjacent cores). Otherwise, few veins preserved in section.

Hole 390-U1556B-48R Section 1, Top of Section: 576.6 m (CSF-A)



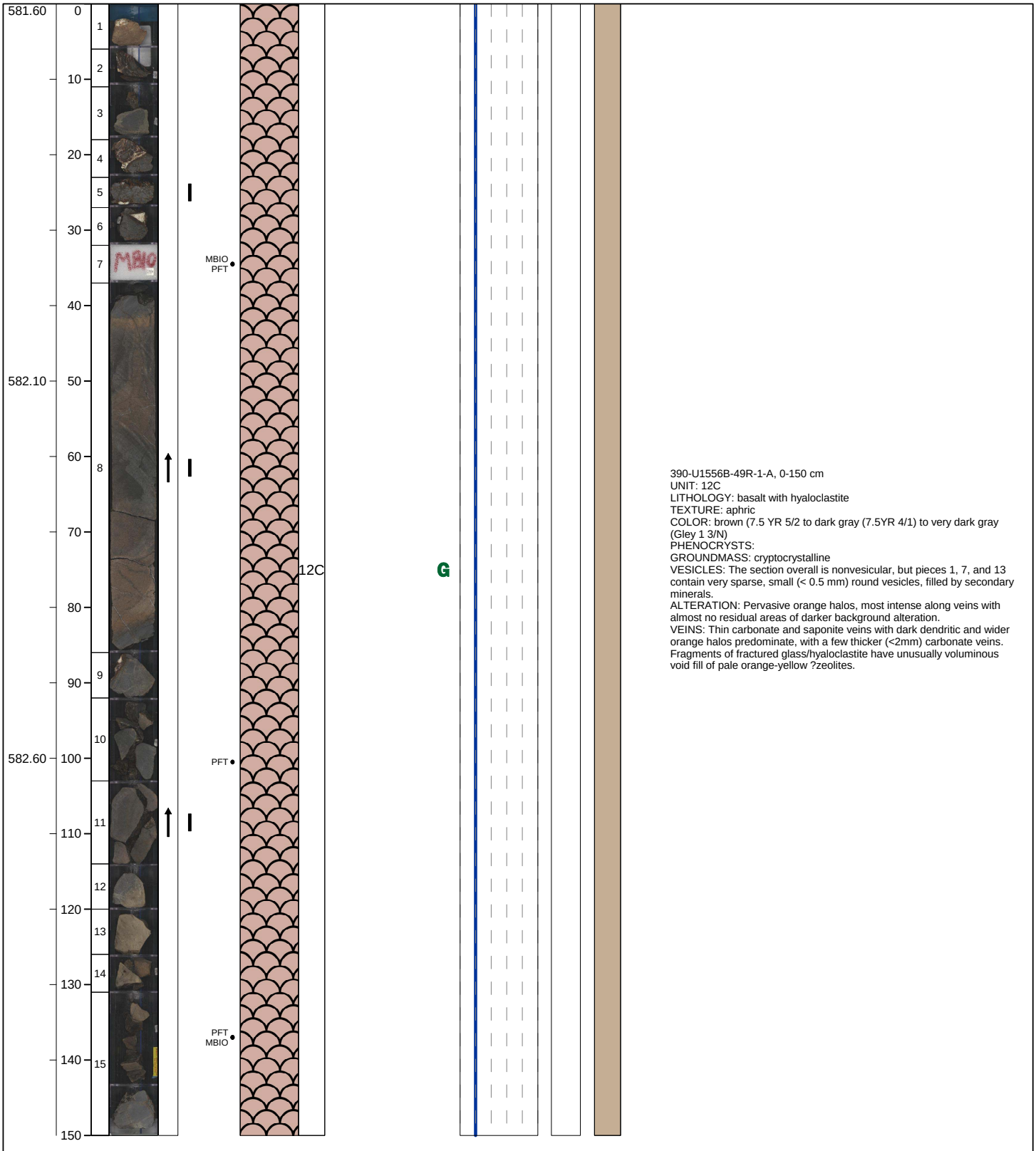
390-U1556B-48R-1-A, 0-144 cm
UNIT: 12C
LITHOLOGY: basalt with hyaloclastite
TEXTURE: aphric
COLOR: brown (7.5 YR 5/2 to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: The section overall is nonvesicular. Pieces 6, 7, 11, and 13 are very sparsely vesicular (<~1%), with small (<0.5 mm) round vesicles that are lined by a white secondary mineral. Piece 6 has some larger vesicles with irregular shapes, up to 3mm in size, that form a horizontal band across the core.
ALTERATION: Pervasive orange halos, most intense along veins with no areas of darker background alteration.
VEINS: Thin carbonate and saponite veins with dendritic dark halos predominate with a few thicker (<2mm) carbonate veins and one thick vein or vug fill consisting of carbonate + unknown pink mineral.

Hole 390-U1556B-48R Section 2, Top of Section: 578.04 m (CSF-A)



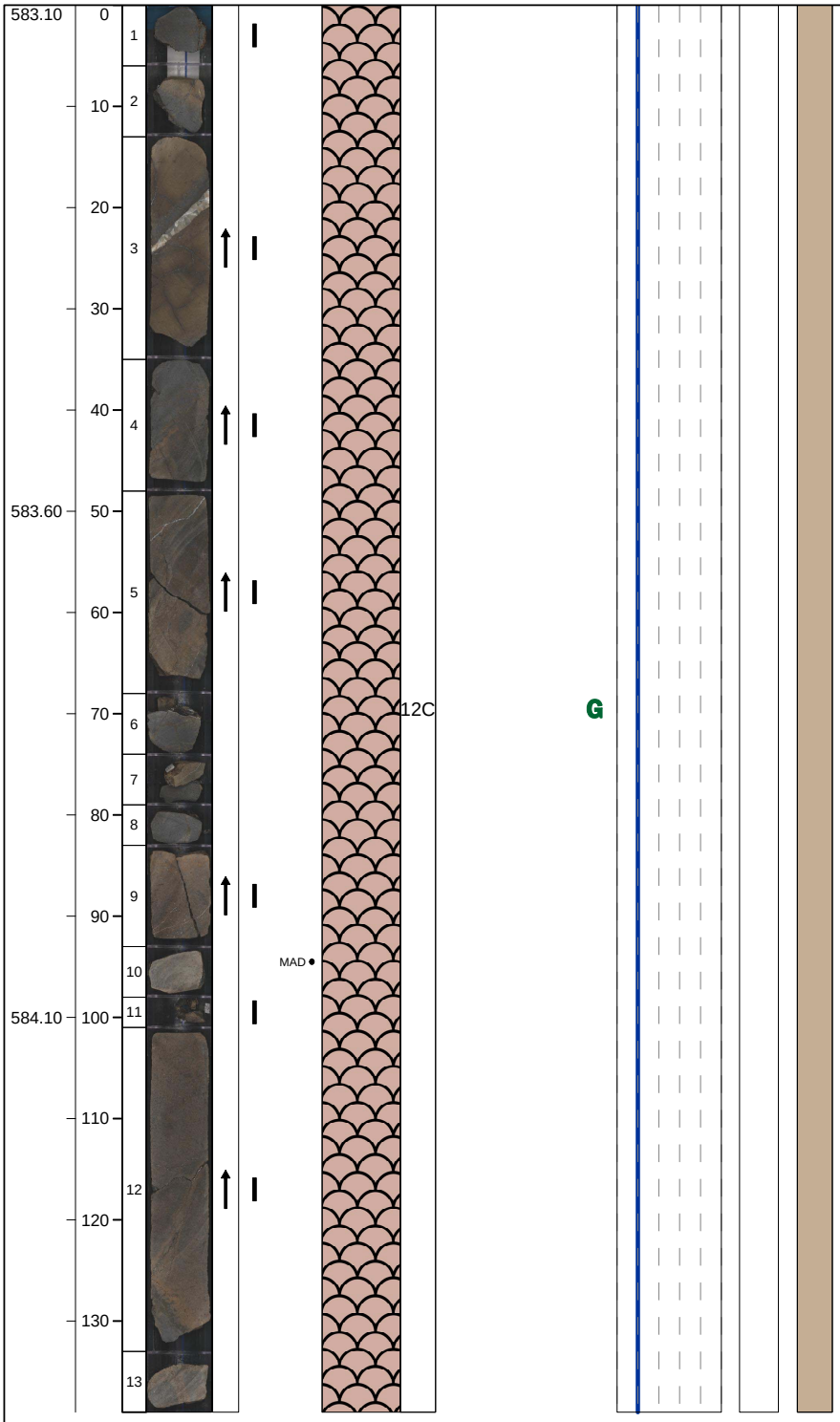
390-U1556B-48R-2-A, 0-151 cm
UNIT: 12C
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: brown (7.5 YR 5/2 to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS: The section is aphyric overall but piece 13 may have been sparsely olivine phyric. The extensive alteration makes this
GROUNDMASS: cryptocrystalline
VESICLES: The section overall is nonvesicular. Pieces 2, 3, 4, 9, and 11 are very sparsely vesicular (<~1%), with small (<0.5 mm) round vesicles that are filled by a white secondary mineral.
ALTERATION: Pervasive orange halos, most intense along veins with no areas of darker background alteration. Isolated blotches of saponite visible in groundmass.
VEINS: Thin carbonate and saponite veins with dark dendritic and wider orange halos predominate with a few thicker (<2mm) carbonate veins, several possibly zeolite-bearing, with light orange linings.

Hole 390-U1556B-49R Section 1, Top of Section: 581.6 m (CSF-A)



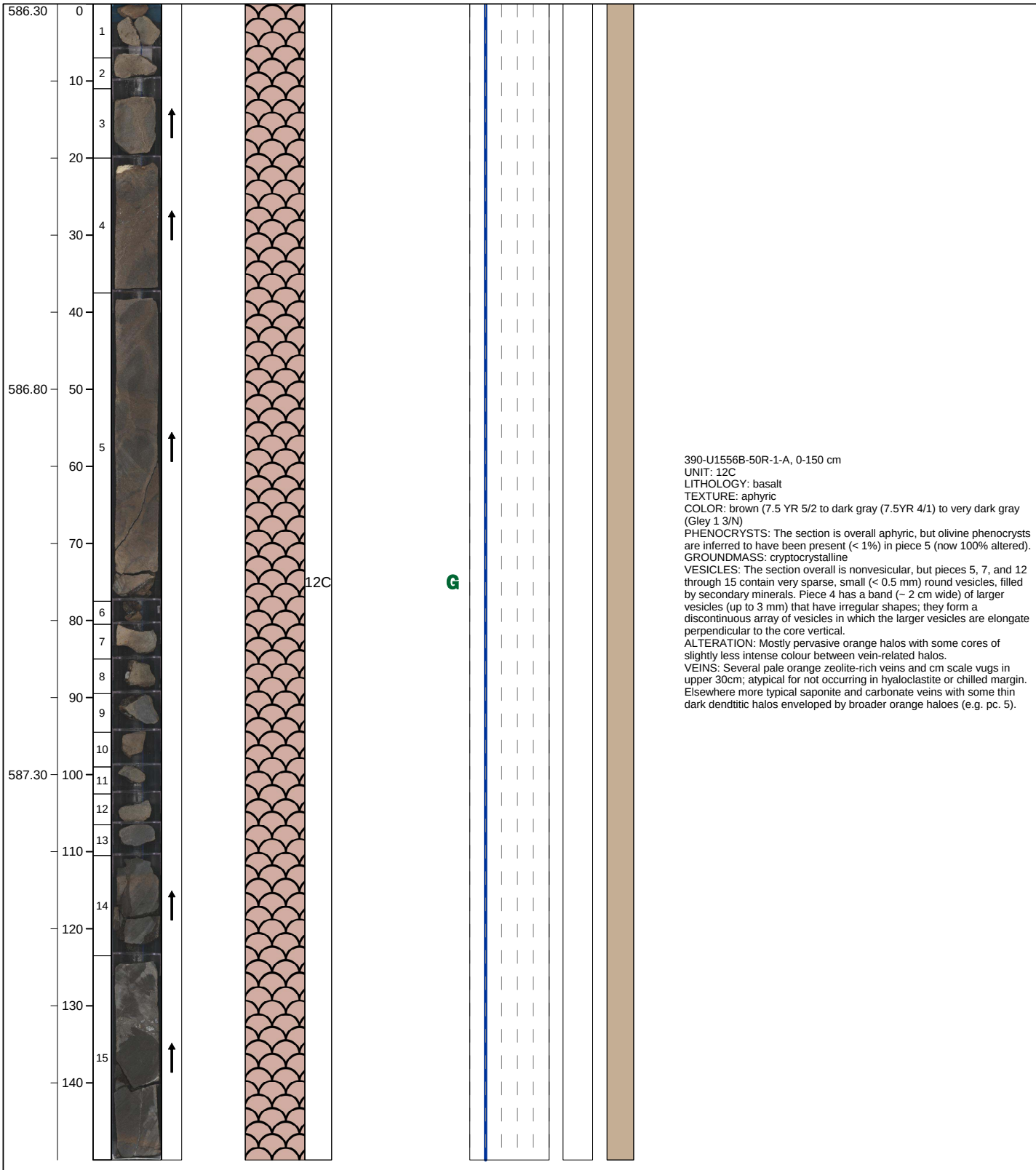
390-U1556B-49R-1-A, 0-150 cm
UNIT: 12C
LITHOLOGY: basalt with hyaloclastite
TEXTURE: aphric
COLOR: brown (7.5 YR 5/2 to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: The section overall is nonvesicular, but pieces 1, 7, and 13 contain very sparse, small (< 0.5 mm) round vesicles, filled by secondary minerals.
ALTERATION: Pervasive orange halos, most intense along veins with almost no residual areas of darker background alteration.
VEINS: Thin carbonate and saponite veins with dark dendritic and wider orange halos predominate, with a few thicker (<2mm) carbonate veins. Fragments of fractured glass/hyaloclastite have unusually voluminous void fill of pale orange-yellow ?zeolites.

Hole 390-U1556B-49R Section 2, Top of Section: 583.1 m (CSF-A)



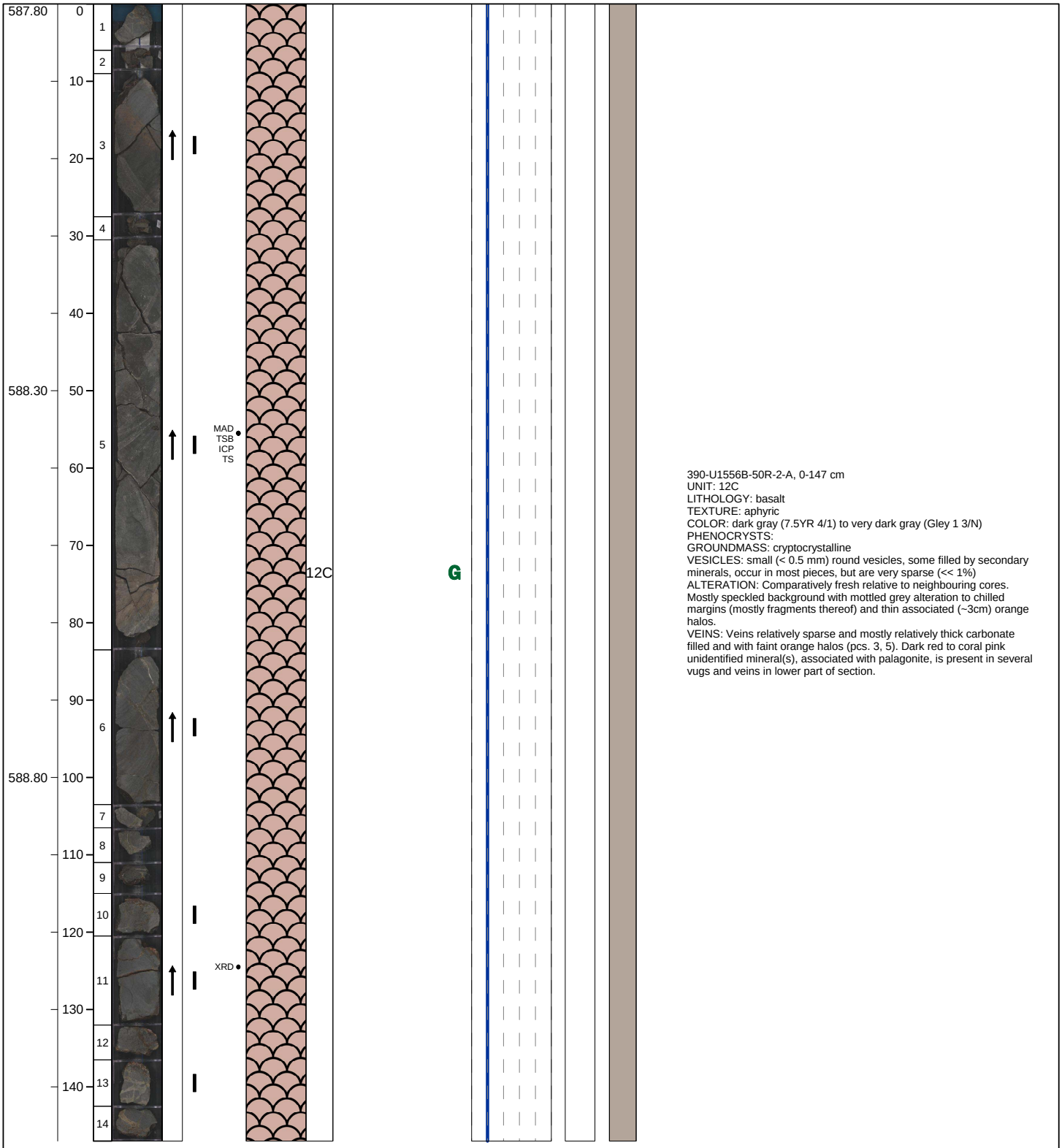
390-U1556B-49R-2-A, 0-139 cm
UNIT: 12C
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: brown (7.5 YR 5/2 to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS: The section is overall aphyric, but olivine phenocrysts are inferred to have been present (< 1%) in pieces 4 and 5a.
GROUNDMASS: cryptocrystalline
VESICLES: The section overall is nonvesicular, but pieces 3 through 5 and 9 through 13 contain very sparse, small (< 0.5 mm) round vesicles, filled by secondary minerals.
ALTERATION: Pervasive orange halos and associated grey mottled altered chilled margins.
VEINS: Thin carbonate and saponite veins with dark dendritic halos though less developed than in overlying sections. One very odd tubular (!) carbonate-filled vug associated with an apparently linear/prolate chilled margin - origins unclear. Alteration also atypical yellow-brown colour (10YR 4/3) in this piece (3). One piece (5) intensely veined by abundant thin saponite + carbonate veins associated with a broad orange halo.

Hole 390-U1556B-50R Section 1, Top of Section: 586.3 m (CSF-A)



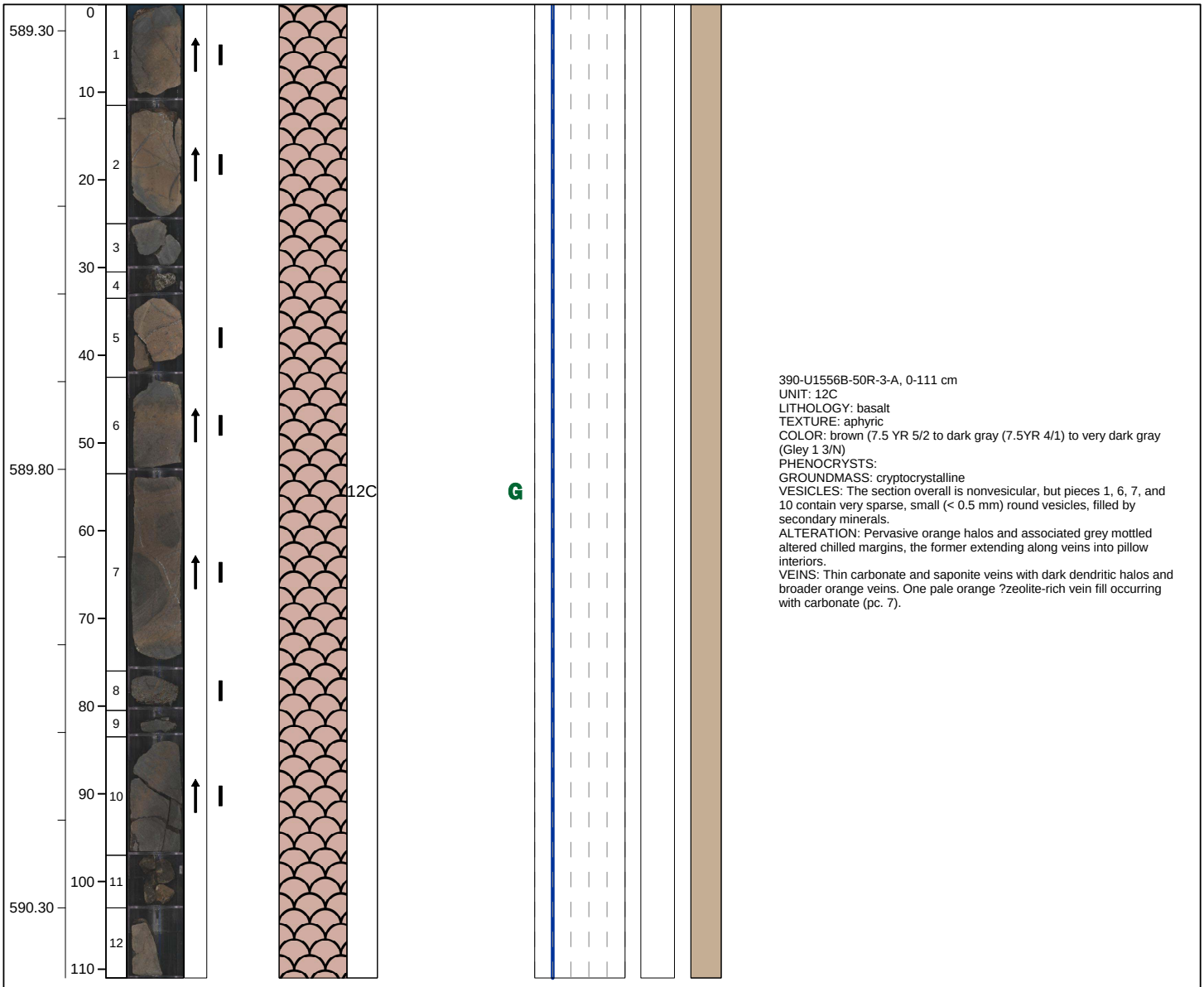
390-U1556B-50R-1-A, 0-150 cm
UNIT: 12C
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: brown (7.5 YR 5/2 to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS: The section is overall aphyric, but olivine phenocrysts are inferred to have been present (< 1%) in piece 5 (now 100% altered).
GROUNDMASS: cryptocrystalline
VESICLES: The section overall is nonvesicular, but pieces 5, 7, and 12 through 15 contain very sparse, small (< 0.5 mm) round vesicles, filled by secondary minerals. Piece 4 has a band (~ 2 cm wide) of larger vesicles (up to 3 mm) that have irregular shapes; they form a discontinuous array of vesicles in which the larger vesicles are elongate perpendicular to the core vertical.
ALTERATION: Mostly pervasive orange halos with some cores of slightly less intense colour between vein-related halos.
VEINS: Several pale orange zeolite-rich veins and cm scale vugs in upper 30cm; atypical for not occurring in hyaloclastite or chilled margin. Elsewhere more typical saponite and carbonate veins with some thin dark dendtitic halos enveloped by broader orange haloes (e.g. pc. 5).

Hole 390-U1556B-50R Section 2, Top of Section: 587.8 m (CSF-A)



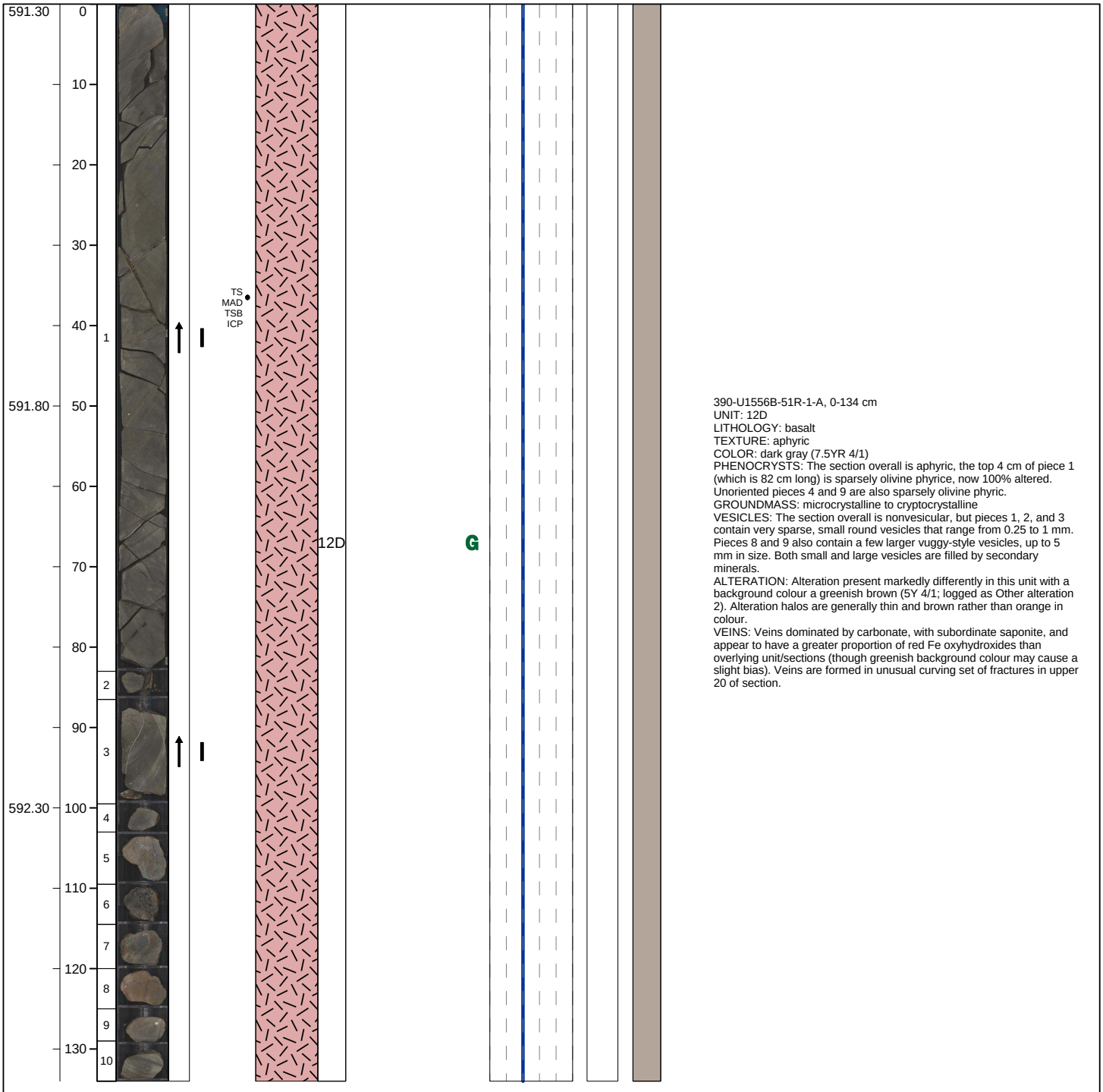
390-U1556B-50R-2-A, 0-147 cm
UNIT: 12C
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: small (< 0.5 mm) round vesicles, some filled by secondary minerals, occur in most pieces, but are very sparse (<< 1%)
ALTERATION: Comparatively fresh relative to neighbouring cores. Mostly speckled background with mottled grey alteration to chilled margins (mostly fragments thereof) and thin associated (~3cm) orange halos.
VEINS: Veins relatively sparse and mostly relatively thick carbonate filled and with faint orange halos (pcs. 3, 5). Dark red to coral pink unidentified mineral(s), associated with palagonite, is present in several vugs and veins in lower part of section.

Hole 390-U1556B-50R Section 3, Top of Section: 589.27 m (CSF-A)



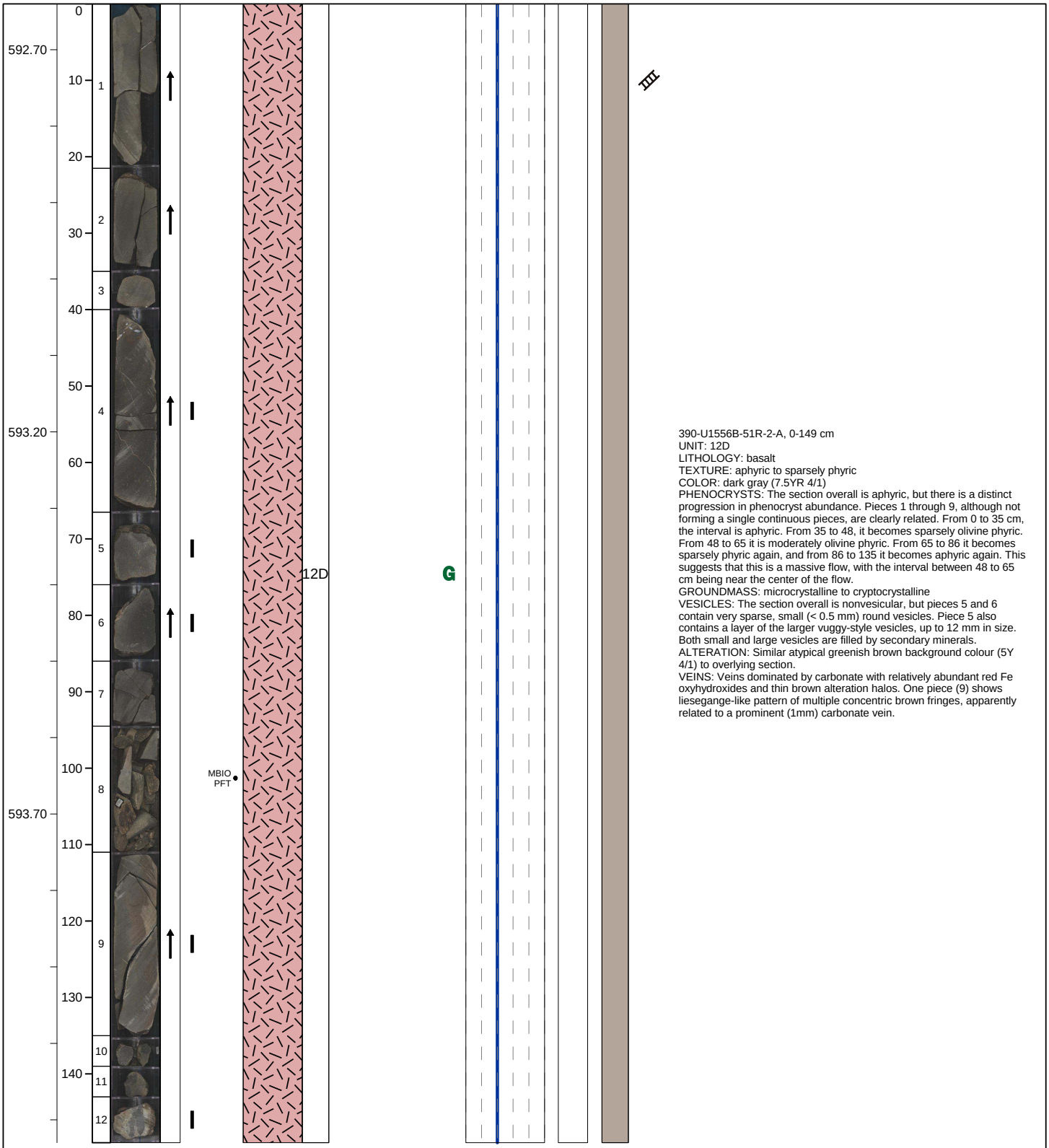
390-U1556B-50R-3-A, 0-111 cm
UNIT: 12C
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: brown (7.5 YR 5/2 to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: The section overall is nonvesicular, but pieces 1, 6, 7, and 10 contain very sparse, small (< 0.5 mm) round vesicles, filled by secondary minerals.
ALTERATION: Pervasive orange halos and associated grey mottled altered chilled margins, the former extending along veins into pillow interiors.
VEINS: Thin carbonate and saponite veins with dark dendritic halos and broader orange veins. One pale orange ?zeolite-rich vein fill occurring with carbonate (pc. 7).

Hole 390-U1556B-51R Section 1, Top of Section: 591.3 m (CSF-A)



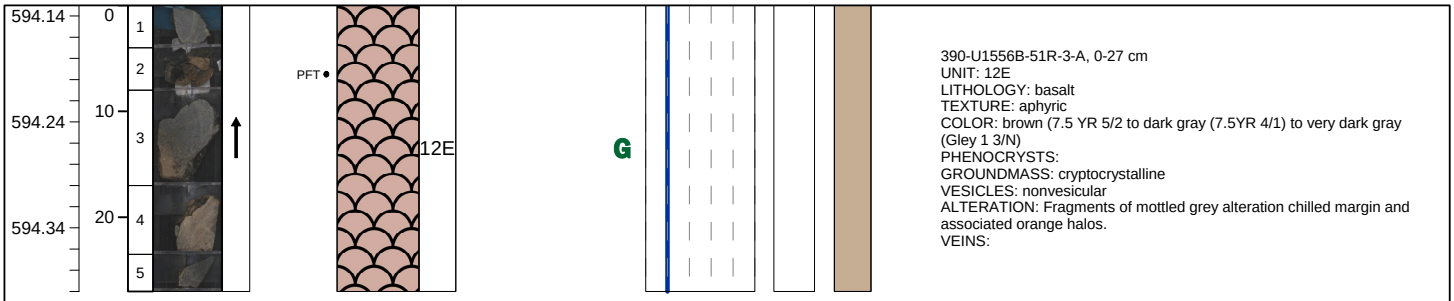
390-U1556B-51R-1-A, 0-134 cm
UNIT: 12D
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: dark gray (7.5YR 4/1)
PHENOCRYSTS: The section overall is aphyric, the top 4 cm of piece 1 (which is 82 cm long) is sparsely olivine phyrice, now 100% altered. Unoriented pieces 4 and 9 are also sparsely olivine phyric.
GROUNDMASS: microcrystalline to cryptocrystalline
VESICLES: The section overall is nonvesicular, but pieces 1, 2, and 3 contain very sparse, small round vesicles that range from 0.25 to 1 mm. Pieces 8 and 9 also contain a few larger vuggy-style vesicles, up to 5 mm in size. Both small and large vesicles are filled by secondary minerals.
ALTERATION: Alteration present markedly differently in this unit with a background colour a greenish brown (5Y 4/1; logged as Other alteration 2). Alteration halos are generally thin and brown rather than orange in colour.
VEINS: Veins dominated by carbonate, with subordinate saponite, and appear to have a greater proportion of red Fe oxyhydroxides than overlying unit/sections (though greenish background colour may cause a slight bias). Veins are formed in unusual curving set of fractures in upper 20 of section.

Hole 390-U1556B-51R Section 2, Top of Section: 592.64 m (CSF-A)



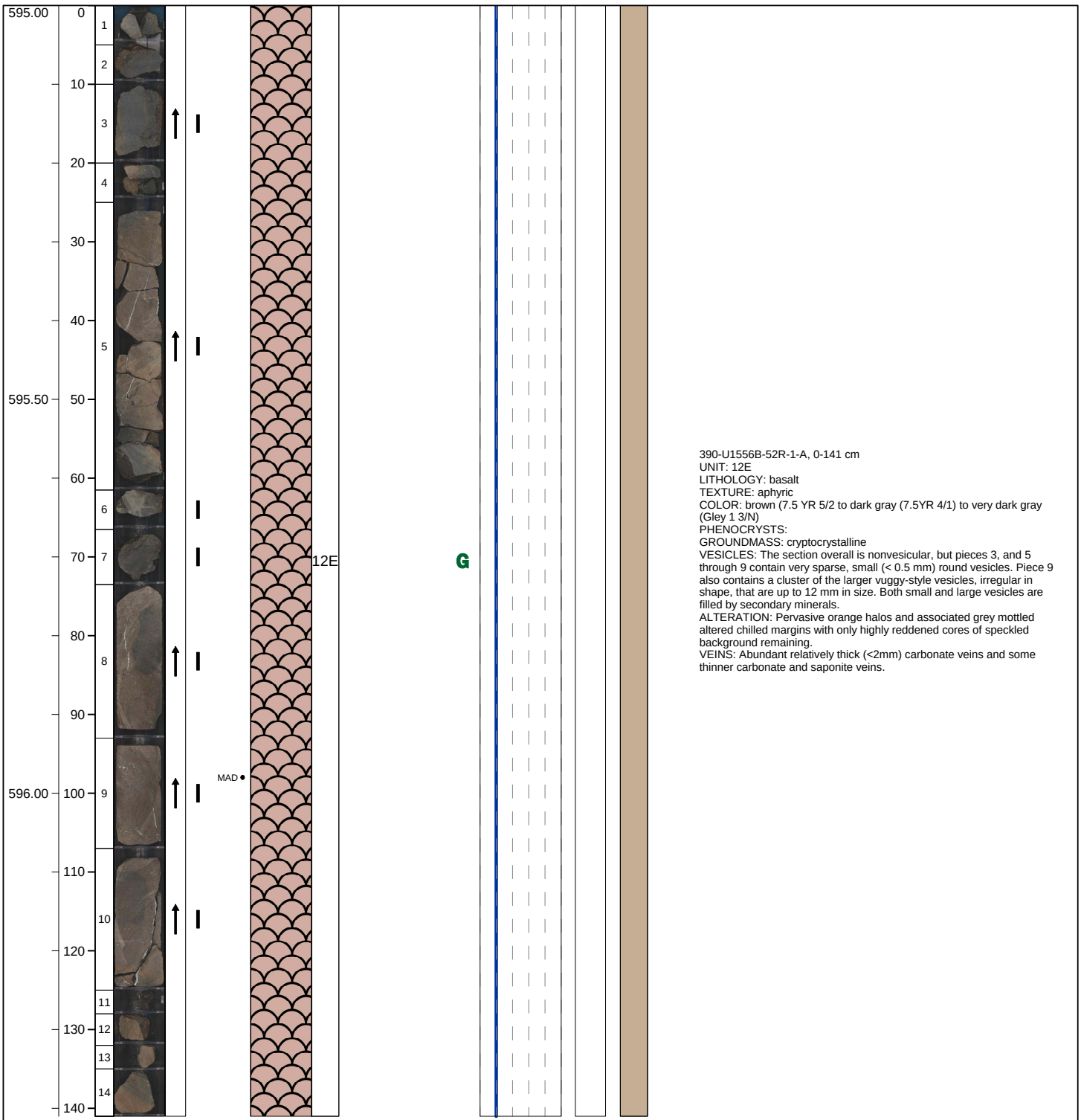
390-U1556B-51R-2-A, 0-149 cm
UNIT: 12D
LITHOLOGY: basalt
TEXTURE: aphyric to sparsely phyric
COLOR: dark gray (7.5YR 4/1)
PHENOCRYSTS: The section overall is aphyric, but there is a distinct progression in phenocryst abundance. Pieces 1 through 9, although not forming a single continuous pieces, are clearly related. From 0 to 35 cm, the interval is aphyric. From 35 to 48, it becomes sparsely olivine phyric. From 48 to 65 it is moderately olivine phyric. From 65 to 86 it becomes sparsely phyric again, and from 86 to 135 it becomes aphyric again. This suggests that this is a massive flow, with the interval between 48 to 65 cm being near the center of the flow.
GROUNDMASS: microcrystalline to cryptocrystalline
VESICLES: The section overall is nonvesicular, but pieces 5 and 6 contain very sparse, small (< 0.5 mm) round vesicles. Piece 5 also contains a layer of the larger vuggy-style vesicles, up to 12 mm in size. Both small and large vesicles are filled by secondary minerals.
ALTERATION: Similar atypical greenish brown background colour (5Y 4/1) to overlying section.
VEINS: Veins dominated by carbonate with relatively abundant red Fe oxyhydroxides and thin brown alteration halos. One piece (9) shows liesegange-like pattern of multiple concentric brown fringes, apparently related to a prominent (1mm) carbonate vein.

Hole 390-U1556B-51R Section 3, Top of Section: 594.13 m (CSF-A)



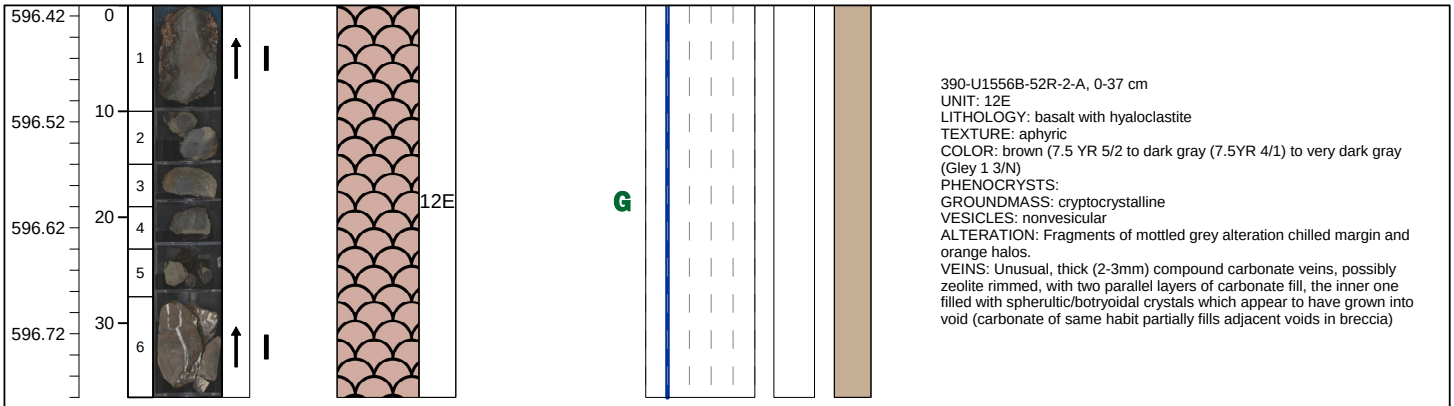
390-U1556B-51R-3-A, 0-27 cm
UNIT: 12E
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: brown (7.5 YR 5/2 to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: nonvesicular
ALTERATION: Fragments of mottled grey alteration chilled margin and associated orange halos.
VEINS:

Hole 390-U1556B-52R Section 1, Top of Section: 595.0 m (CSF-A)



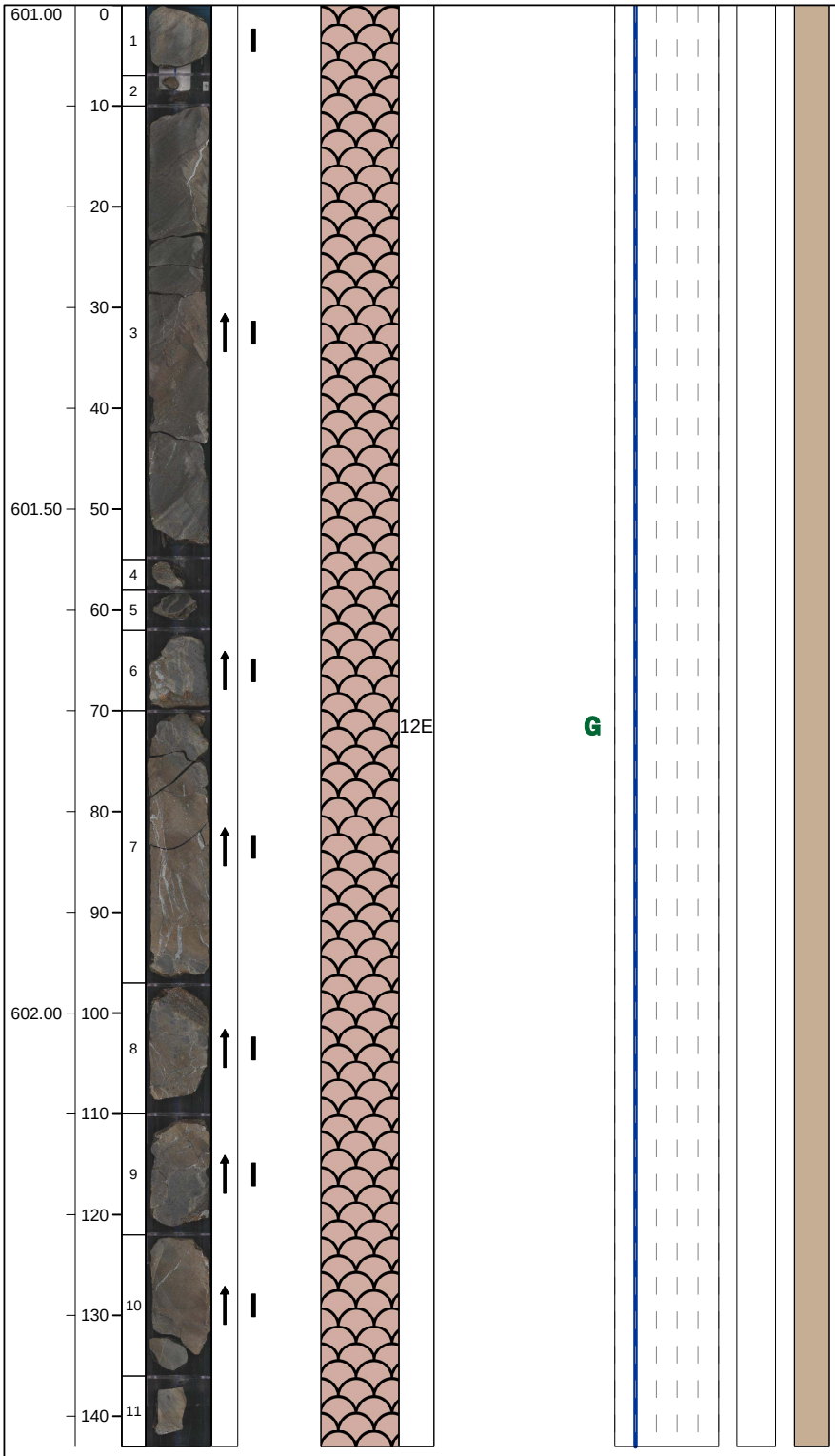
390-U1556B-52R-1-A, 0-141 cm
UNIT: 12E
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: brown (7.5 YR 5/2 to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: The section overall is nonvesicular, but pieces 3, and 5 through 9 contain very sparse, small (< 0.5 mm) round vesicles. Piece 9 also contains a cluster of the larger vuggy-style vesicles, irregular in shape, that are up to 12 mm in size. Both small and large vesicles are filled by secondary minerals.
ALTERATION: Pervasive orange halos and associated grey mottled altered chilled margins with only highly reddened cores of speckled background remaining.
VEINS: Abundant relatively thick (<2mm) carbonate veins and some thinner carbonate and saponite veins.

Hole 390-U1556B-52R Section 2, Top of Section: 596.41 m (CSF-A)



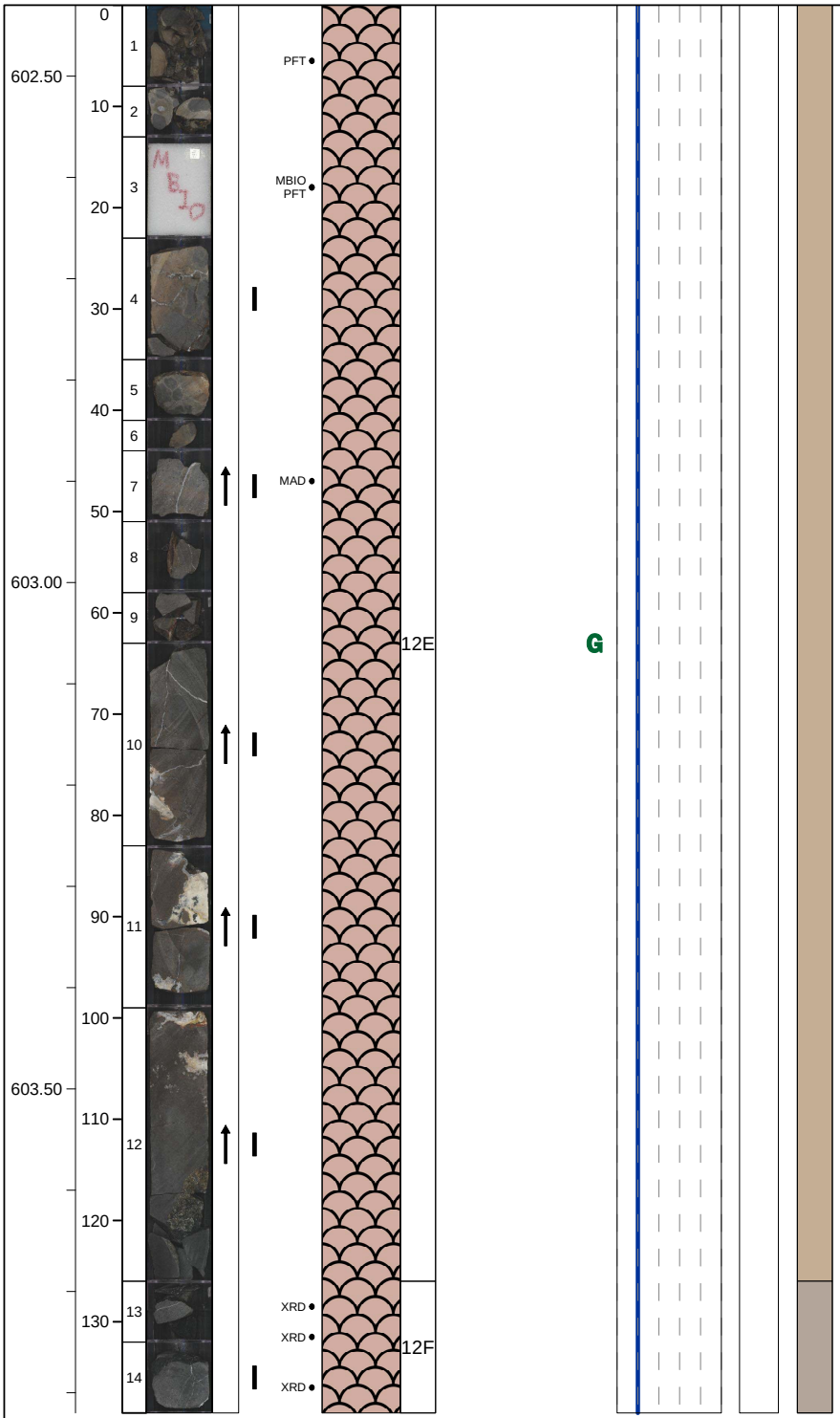
390-U1556B-52R-2-A, 0-37 cm
UNIT: 12E
LITHOLOGY: basalt with hyaloclastite
TEXTURE: aphyric
COLOR: brown (7.5 YR 5/2 to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: nonvesicular
ALTERATION: Fragments of mottled grey alteration chilled margin and orange halos.
VEINS: Unusual, thick (2-3mm) compound carbonate veins, possibly zeolite rimmed, with two parallel layers of carbonate fill, the inner one filled with spherultic/botryoidal crystals which appear to have grown into void (carbonate of same habit partially fills adjacent voids in breccia)

Hole 390-U1556B-53R Section 1, Top of Section: 601.0 m (CSF-A)



390-U1556B-53R-1-A, 0-143 cm
UNIT: 12E
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: brown (7.5 YR 5/2 to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: The section overall is nonvesicular, but pieces 1, 3, and 5 through 10 contain very sparse, small (< 0.5 mm) round vesicles. In most pieces these vesicles are filled by secondary minerals, but in some of the chilled margins they are either unfilled or thinly lined by a dark secondary mineral.
ALTERATION: Pillows with typical zones of grey mottled and orange halo alteration at margins with some dark orange speckled background in the core of one (sparsely speckled as largely aphyric). Orange halo colours slightly muted and buff/brown compared to overlying cores.
VEINS: Abundant thick (2-3mm) grey crystalline carbonate veins in cores of more pervasively altered pillows. Halos seem to occur more commonly around thin saponite-rich veins than thicker carbonate ones.

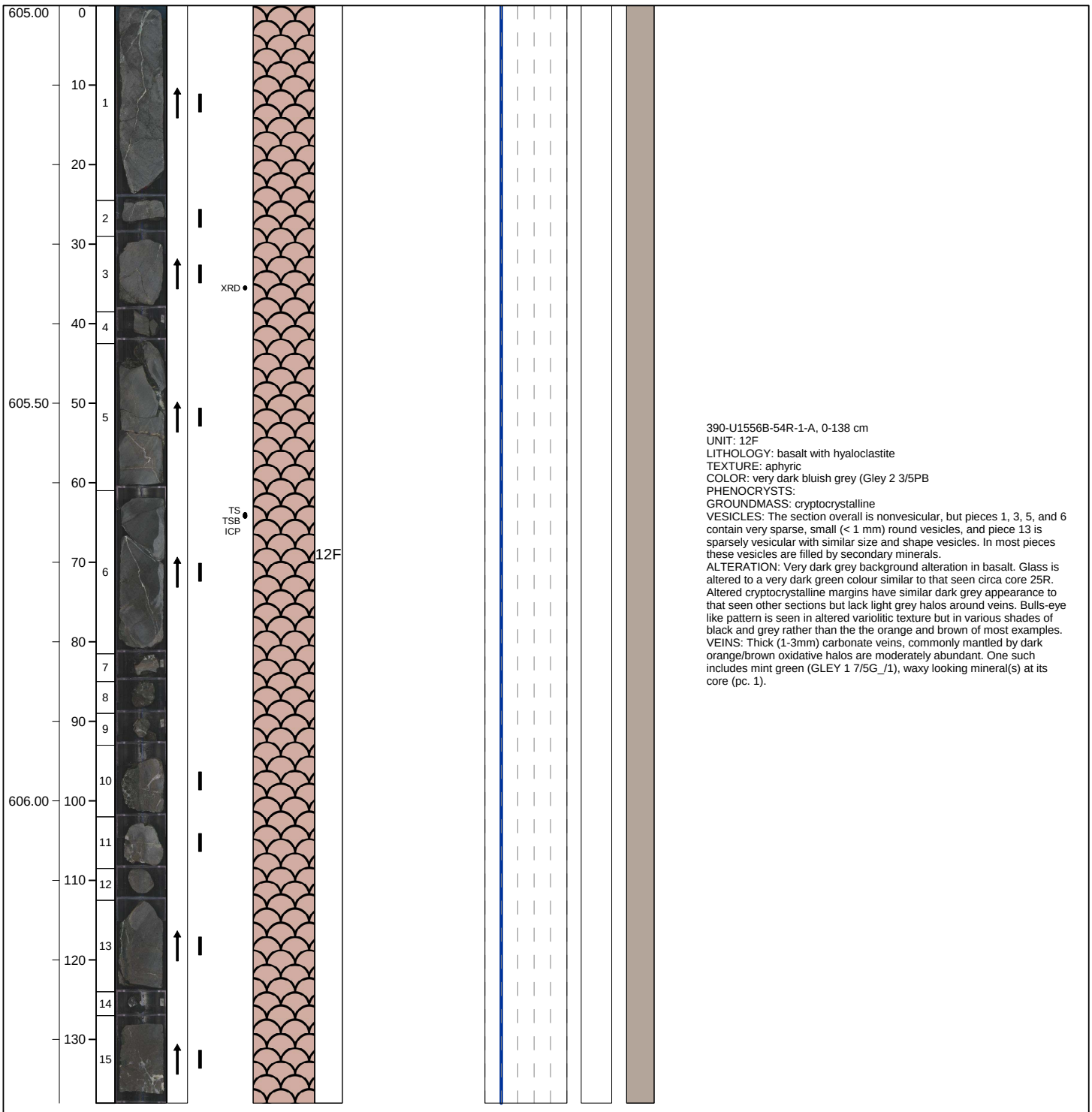
Hole 390-U1556B-53R Section 2, Top of Section: 602.43 m (CSF-A)



390-U1556B-53R-2-A, 0-126 cm
UNIT: 12E
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: brown (7.5 YR 5/2 to dark gray (7.5YR 4/1) to very dark gray (Gley 1 3/N)
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: The section overall is nonvesicular, but pieces 4, 5, 7, 10, 12, and 14 contain very sparse, small (< 1.5 mm) round vesicles. In most pieces these vesicles are filled by secondary minerals, but in some of the chilled margins they are either unfilled or thinly lined by a dark secondary mineral.
ALTERATION: Pillows with grey mottled and orange halo alteration at margins and relatively large proportions of dark orange speckled background in cores. Lower 20cm part of core see gradational transition to dark background and appearance of dark green mineral(s) in veins (marking transition to unit 13F).
VEINS: Several large (2-5cm) vugs filled by cream coloured carbonate with areas of black saponite. Carbonate likely mixed with zeolites and possibly other clays giving red and orange streaks.

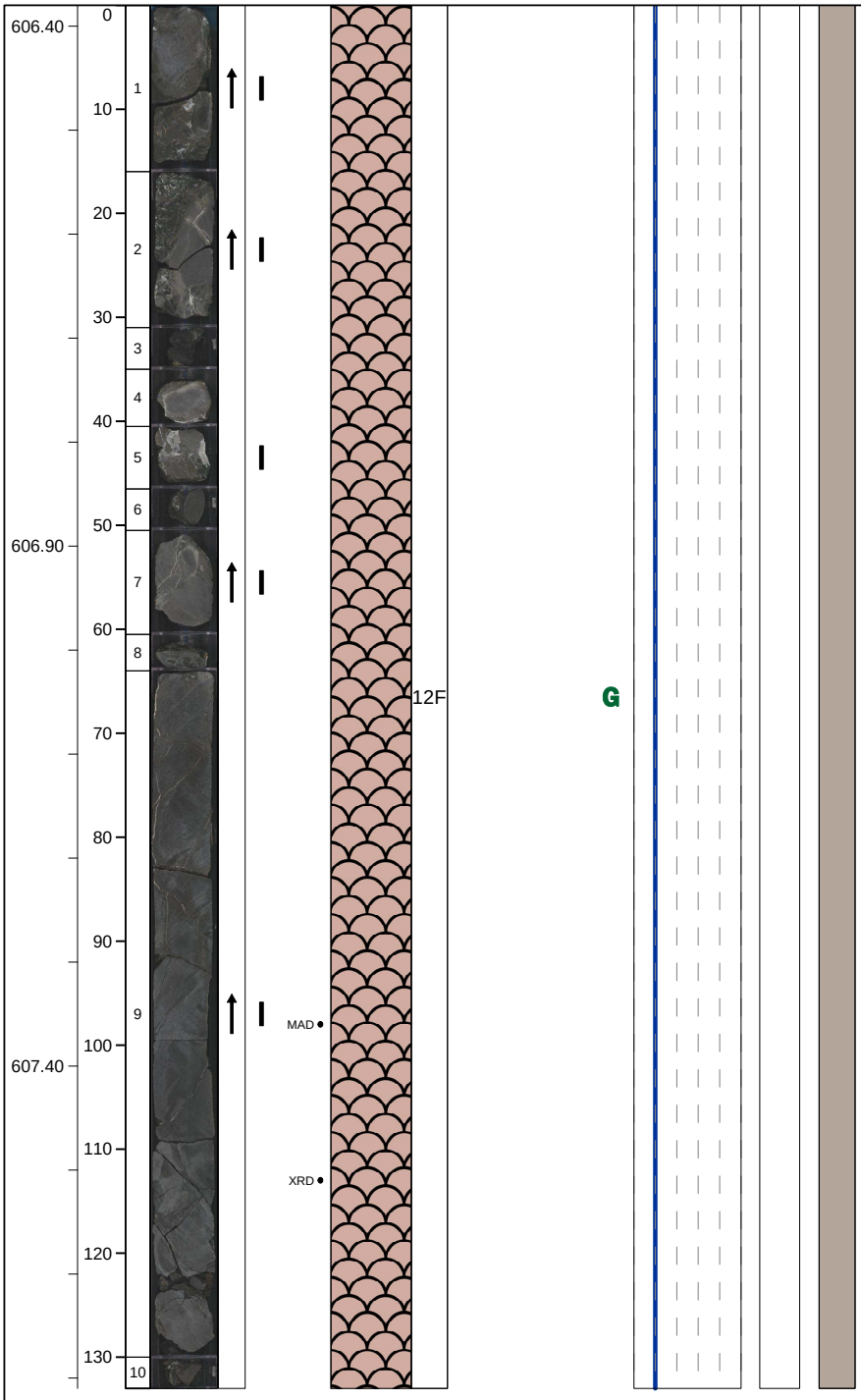
390-U1556B-53R-2-A, 126-139 cm
UNIT: 12F
LITHOLOGY: basalt
TEXTURE: aphyric
COLOR: very dark bluish grey (Gley 2 3/5PB
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: nonvesicular
ALTERATION: Several fragments of very dark grey basalt with distinct greenish hue on broken fractures and mint-green coloured massive mineral(s) overgrowing carbonate (pc. 14).
VEINS:

Hole 390-U1556B-54R Section 1, Top of Section: 605.0 m (CSF-A)



390-U1556B-54R-1-A, 0-138 cm
UNIT: 12F
LITHOLOGY: basalt with hyaloclastite
TEXTURE: aphyric
COLOR: very dark bluish grey (Gley 2 3/5PB
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: The section overall is nonvesicular, but pieces 1, 3, 5, and 6 contain very sparse, small (< 1 mm) round vesicles, and piece 13 is sparsely vesicular with similar size and shape vesicles. In most pieces these vesicles are filled by secondary minerals.
ALTERATION: Very dark grey background alteration in basalt. Glass is altered to a very dark green colour similar to that seen circa core 25R. Altered cryptocrystalline margins have similar dark grey appearance to that seen other sections but lack light grey halos around veins. Bulls-eye like pattern is seen in altered variolitic texture but in various shades of black and grey rather than the the orange and brown of most examples.
VEINS: Thick (1-3mm) carbonate veins, commonly mantled by dark orange/brown oxidative halos are moderately abundant. One such includes mint green (GLEY 1 7/5G_/1), waxy looking mineral(s) at its core (pc. 1).

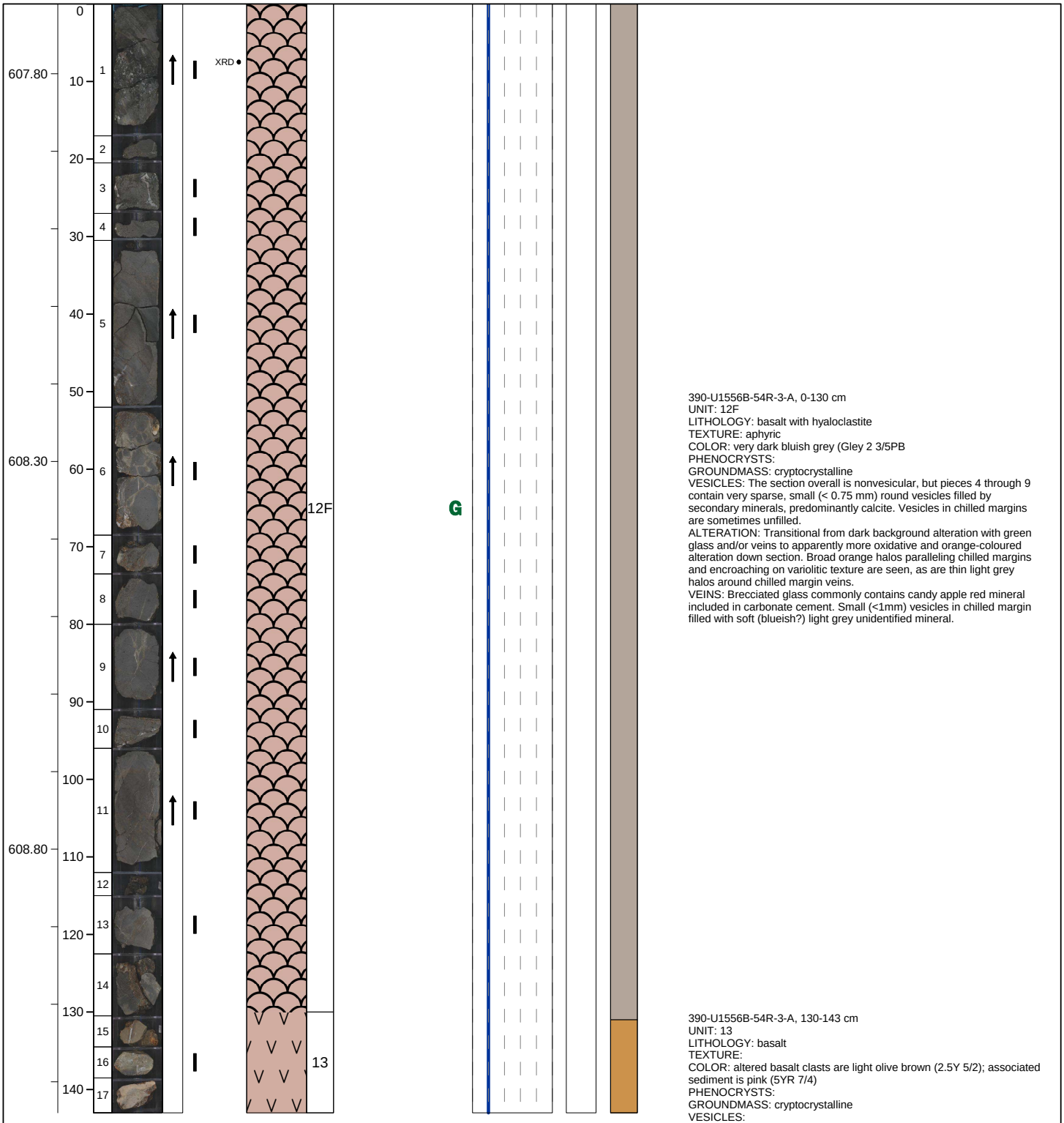
Hole 390-U1556B-54R Section 2, Top of Section: 606.38 m (CSF-A)



Description

390-U1556B-54R-2-A, 0-133 cm
UNIT: 12F
LITHOLOGY: basalt with hyaloclastite
TEXTURE: aphyric
COLOR: very dark bluish grey (Gley 2 3/5PB
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: The section overall is nonvesicular, but all pieces contain very sparse, small (< 1 mm) round vesicles, and piece 9 has a band about 6 cm wide that is sparsely vesicular with similar size and shape vesicles. In most pieces these vesicles are filled by secondary minerals.
ALTERATION: Very dark grey background alteration in basalt. Glass is altered to a very dark green colour and where fragmented, is coated with dark brown ?Fe oxyhydroxides and cemented by white/colourless carbonate.
VEINS: Moderately abundant carbonate veins cut large basalt piece (9), mostly mantled by dark orange/brown oxidative halos. Dark green mineral occurs with saponite in thin veins, sometimes oxidised to yellowish Fe oxyhydroxides; recorded as celadonite pending confirmation.

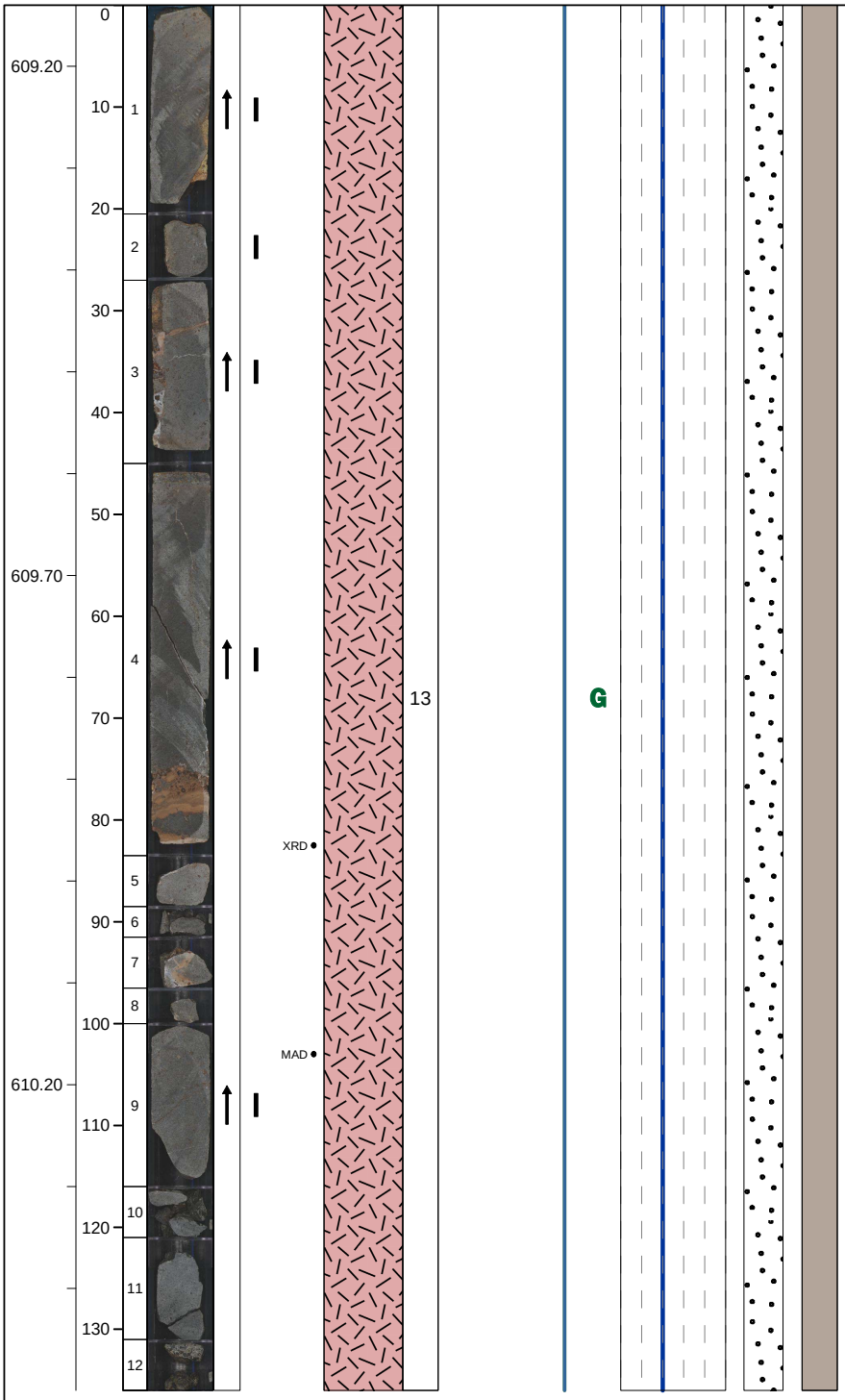
Hole 390-U1556B-54R Section 3, Top of Section: 607.71 m (CSF-A)



390-U1556B-54R-3-A, 0-130 cm
UNIT: 12F
LITHOLOGY: basalt with hyaloclastite
TEXTURE: aphyric
COLOR: very dark bluish grey (Gley 2 3/5PB
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES: The section overall is nonvesicular, but pieces 4 through 9 contain very sparse, small (< 0.75 mm) round vesicles filled by secondary minerals, predominantly calcite. Vesicles in chilled margins are sometimes unfilled.
ALTERATION: Transitional from dark background alteration with green glass and/or veins to apparently more oxidative and orange-coloured alteration down section. Broad orange halos paralleling chilled margins and encroaching on variolitic texture are seen, as are thin light grey halos around chilled margin veins.
VEINS: Brecciated glass commonly contains candy apple red mineral included in carbonate cement. Small (<1mm) vesicles in chilled margin filled with soft (blueish?) light grey unidentified mineral.

390-U1556B-54R-3-A, 130-143 cm
UNIT: 13
LITHOLOGY: basalt
TEXTURE:
COLOR: altered basalt clasts are light olive brown (2.5Y 5/2); associated sediment is pink (5YR 7/4)
PHENOCRYSTS:
GROUNDMASS: cryptocrystalline
VESICLES:
ALTERATION: Several fragments of highly altered plagioclase-phyric basalt and ?glass with light brown alteration colour markedly different to any seen in the overlying cores. Without more context difficult to ascertain if this represents halo or background alteration (logged as Other alteration 2).
VEINS:

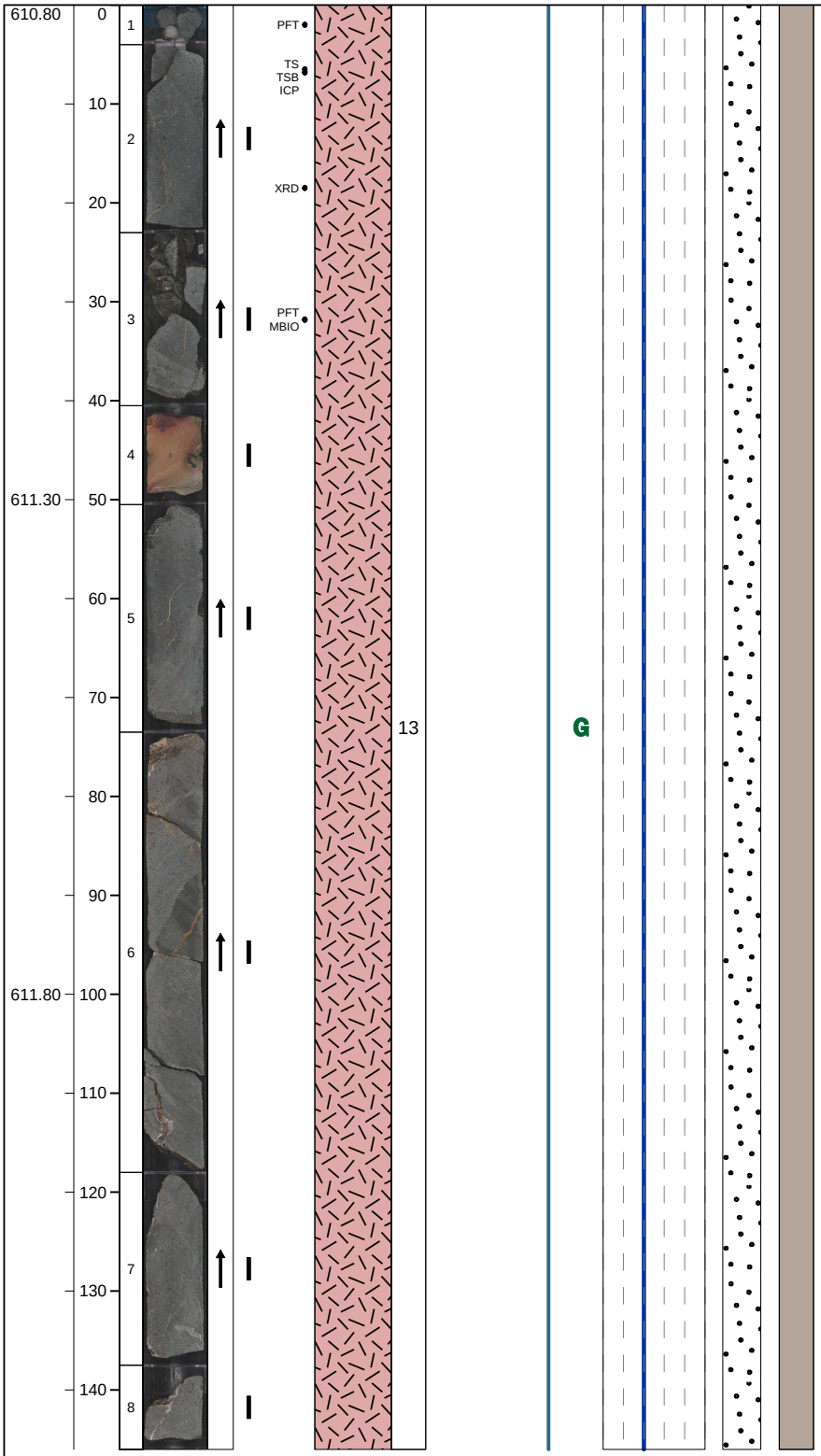
Hole 390-U1556B-54R Section 4, Top of Section: 609.14 m (CSF-A)



Description

390-U1556B-54R-4-A, 0-136 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt with hyaloclastite
TEXTURE: highly phyric
COLOR: gray (Gley 1 5/N)
PHENOCRYSTS:
GROUNDMASS: microscrystalline
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by calcite and/or clay minerals.
ALTERATION: Light gray orange speckled background predominates. Background colour is significantly paler than the darker greys or browns encountered in overlying cores but overall alteration style appears similar, with pseudomorphic replacement of phenocrysts by red-brown (or less commonly yellow) mineral/s (likely iddingsite and/or Fe-OH) and difference in colour most likely reflects the greater modal proportion of feldspar. Halos are less distinct and appear pale brown against this background but show similar patterns to the darker rocks, with broad gradients at chilled margins and narrower more discrete halos along veins. Sediment is deep orange-brown (5YR 6/4) and appears highly recrystallised. Two fragments at the base of the section show dark green to black alteration of phenocrysts/glass.
VEINS:

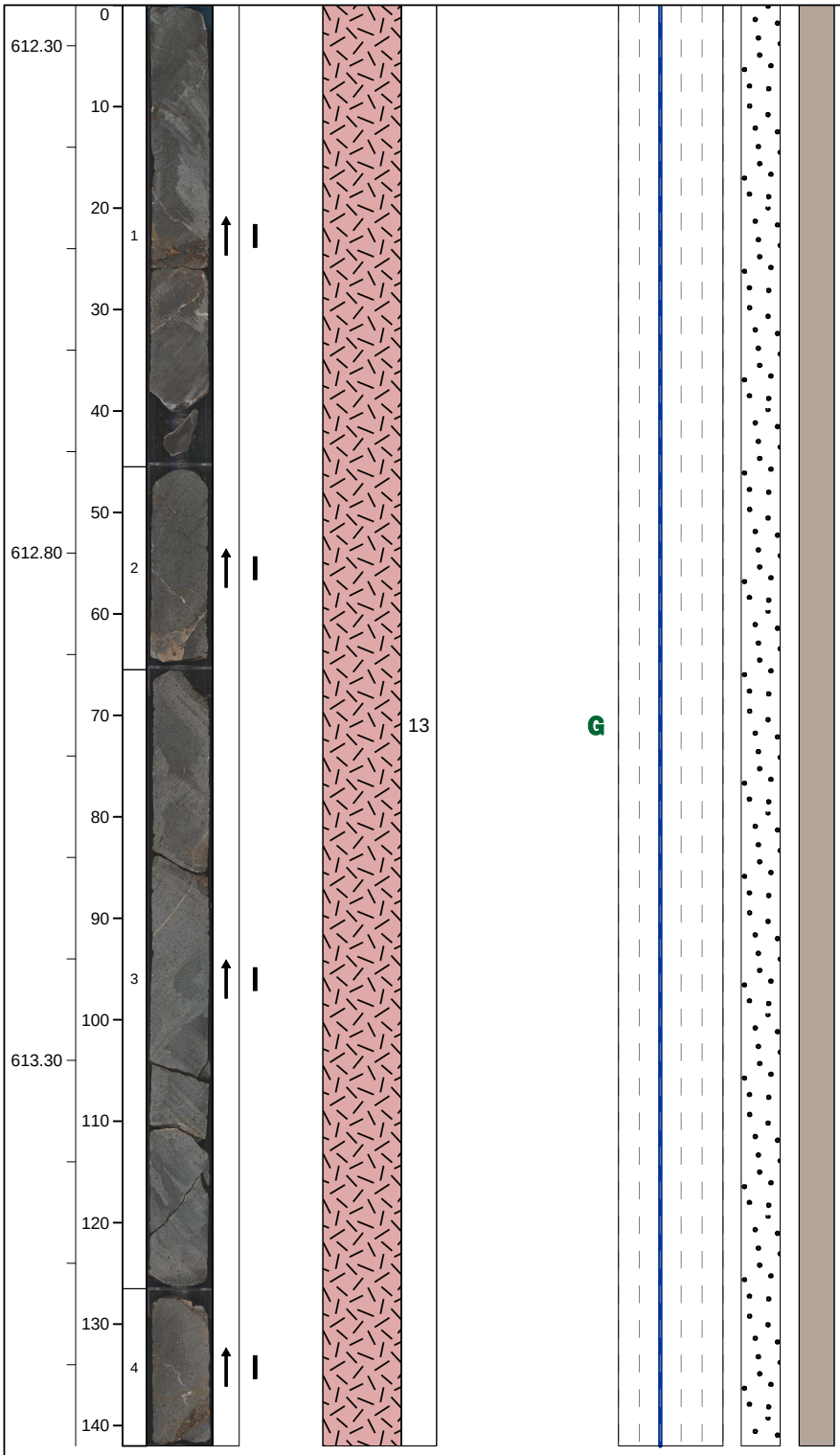
Hole 390-U1556B-55R Section 1, Top of Section: 610.8 m (CSF-A)



Description

390-U1556B-55R-1-A, 0-146 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt with hyaloclastite
TEXTURE: highly phyric
COLOR: gray (Gley 1 5/N)
PHENOCRYSTS: The section is highly plagioclase olivine phyric. The plagioclase crystals range up to 8 mm in size. Some of the larger plagioclase crystals appear to be xenocrystic, as they are partially resorbed in their cores. Olivine (up to 1.5 mm) is 100% altered to Fe oxyhydroxides and/or clay minerals, with alteration varying throughout the section. Rare Cr diopside may be present in pieces 2 and 3; identification uncertain but based on emerald green color.
GROUNDMASS: microscrystalline
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by calcite and/or clay minerals.
ALTERATION: Light grey background with pseudomorphic alteration of phenocrysts to red (and yellow in places). Expression of alteration in this lithology is expressed somewhat differently but has been logged using the same principal categories as previous units so as to be broadly comparable. Pseudomorphic alteration with reddening of phenocrysts logged as orange speckled background; brown to yellow halos at magmatic margins and around veins was logged as orange halos; a few areas of darker greenish background with black pseudomorphic replacement were logged as dark grey background. Carbonate sediment appears highly altered with irregular blooms of bright red colouration and clasts of dark green altered glass.
VEINS: Orange, buff and yellow veins (carbonate bearing but not 100% carbonate based on vigor of reaction with 10% HCl) with massive, amorphous texture and of very similar appearance to the sediment cross cut the basalt. Some of these are proximal to sediment-basalt interfaces and visibly contain small sedimentary clasts of glass but some are very thin (<0.2mm) and isolated from the nearest sediment by many cm suggesting they must be deposited by fluid. These are the predominant veins in the section with only rare carbonate + red Fe oxyhydoxide veins.

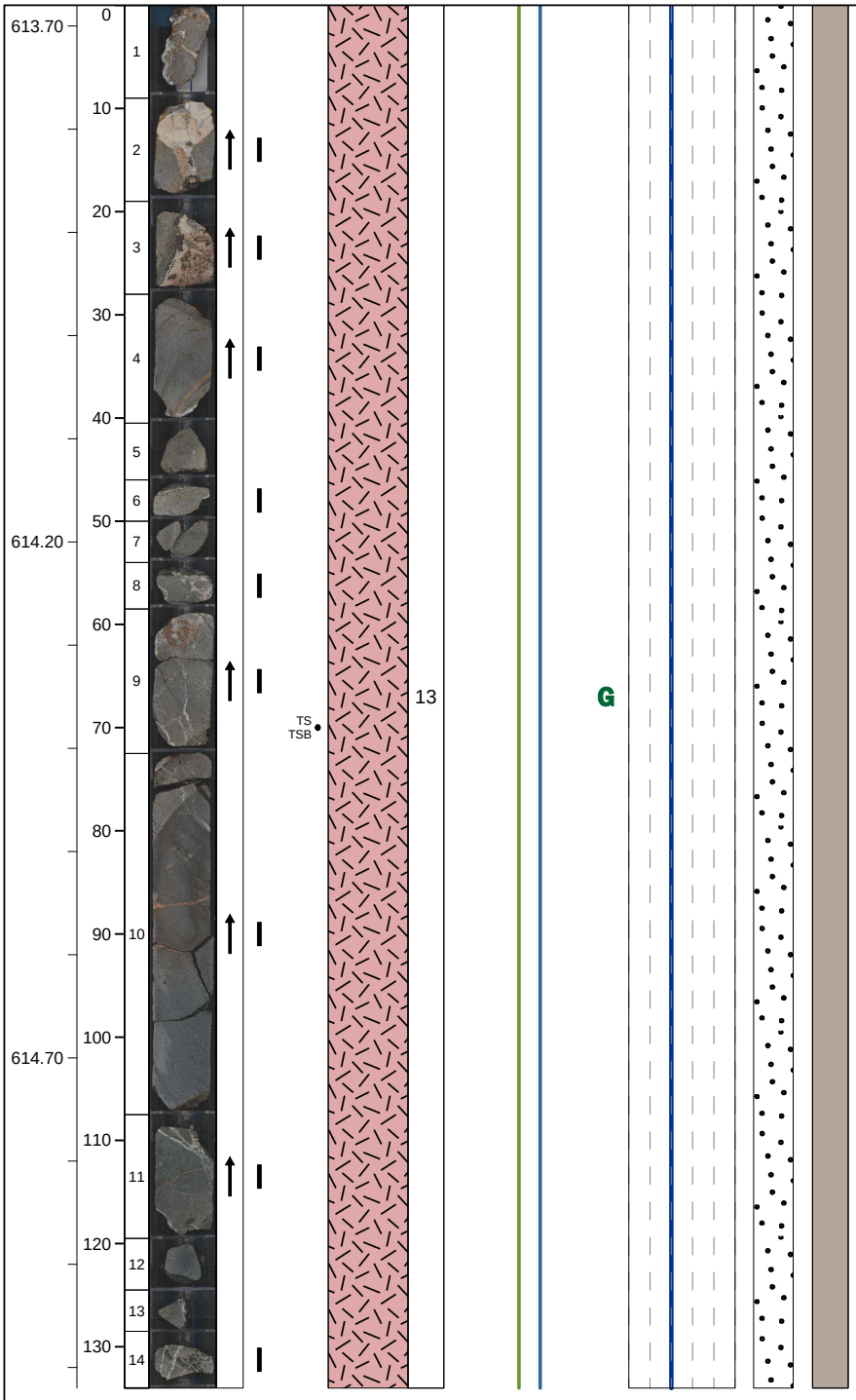
Hole 390-U1556B-55R Section 2, Top of Section: 612.26 m (CSF-A)



Description

390-U1556B-55R-2-A, 0-142 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt with hyaloclastite
TEXTURE: highly phyric
COLOR: gray (Gley 1 5/N)
PHENOCRYSTS: The section is highly plagioclase olivine phyric. The plagioclase crystals range up to 6 mm in size. Olivine (up to 2 mm) is 100% altered to Fe oxyhydroxides and/or clay minerals, with alteration varying throughout the section. Note the maximum size recorded may be an over-estimate because alteration makes it difficult to distinguish individual crystals from glomerocrystic cluster.
GROUNDMASS: microscrystalline
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by calcite and/or clay minerals.
ALTERATION: Light grey background with pseudomorphic alteration of olivine to orange and yellow iddingsite and broad pale brown to reddish halos at ?internal chilled margins and thinner (2-5mm) yellow halos associated with some veins.
VEINS: Massive yellow veins of similar appearance to sediment predominate. Some of these have medial cores of vuggy void fill carbonate. Carbonate veins crosscut the yellow veins in several places (82, 87, 136cm). Yellow halos appear to be associated only with yellow massive veins.

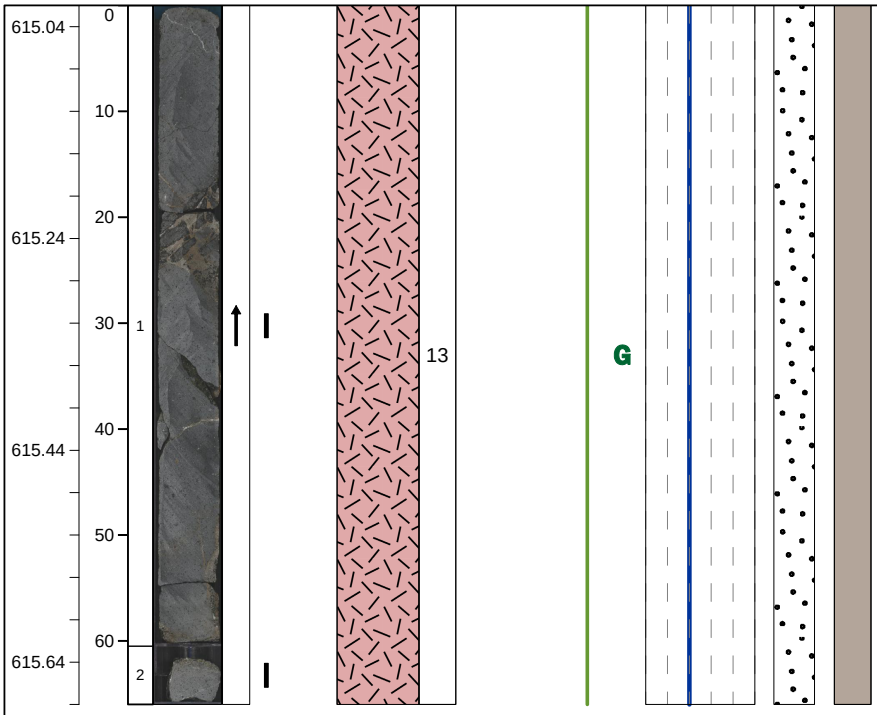
Hole 390-U1556B-55R Section 3, Top of Section: 613.68 m (CSF-A)



Description

390-U1556B-55R-3-A, 0-134 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt with hyaloclastite
TEXTURE: highly phyric
COLOR: gray (Gley 1 5/N)
PHENOCRYSTS: The section is highly plagioclase olivine phyric. The plagioclase crystals are tabular to equant and range up to 5 mm in size and are unaltered. Olivine (up to 1 mm) is equant and 100% altered to Fe oxyhydroxides and/or clay minerals.
GROUNDMASS: microscrystalline, but slightly finer grained groundmass relative to sections 55R-2 and 55R-1.
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by calcite and/or clay minerals.
ALTERATION: Light grey background with orange-yellow pseudomorphic alteration and darker, greenish alteration in lower part (90-135cm), logged as dark grey background. Carbonate sediment has massive, recrystallised appearance as seen in section 55R1 and hosts irregular blebs of secondary saponite. Broad pale brown to reddish halos at chilled margins; veins related halos rare in section.
VEINS: Massive yellow veins and carbonate veins, the latter more abundant than preceding sections. Carbonate veins crosscut the yellow veins in several places (112cm on back, 126, 130cm). Voids between sediment and basalt (pcs. 2, 3) partially filled by sparry dog-tooth carbonate.

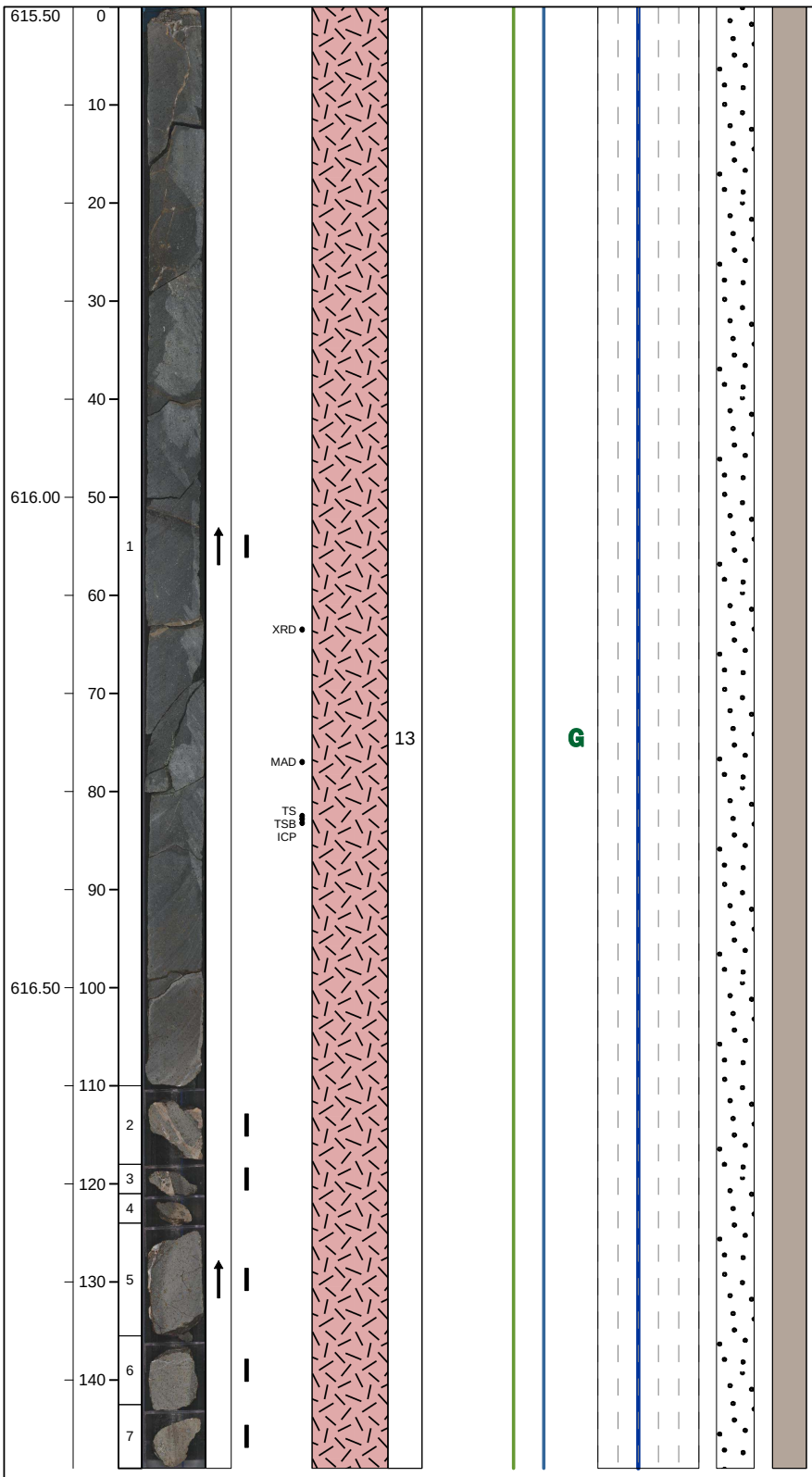
Hole 390-U1556B-55R Section 4, Top of Section: 615.02 m (CSF-A)



Description

390-U1556B-55R-4-A, 0-66 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt with hyaloclastite
TEXTURE: highly phyric
COLOR: gray (Gley 1 5/N)
PHENOCRYSTS: The section is highly plagioclase olivine phyric. The plagioclase crystals are tabular to equant and range up to 5 mm in size and are unaltered. Olivine (up to 1 mm) is equant and 100% altered to Fe oxyhydroxides and/or clay minerals.
GROUNDMASS: microscrystalline, but slightly finer grained groundmass relative to sections 55R-2 and 55R-1.
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by calcite and/or clay minerals.
ALTERATION: Mostly darker grey and greenish pseudomorphic alteration with phenonocrysts altered to dark grey or black except in localised yellow halos (<5mm half width) around veins and at margins of basalt. Glass clasts in hyaloclastic interval alteration to greenish black with a 1mm very dark brown rim and carbonate sediment a green-tinged khaki brown.
VEINS: Veins predominantly massive yellow filled with yellow halos and overall somewhat sparse. Thinner carbonate veins present and lined by dark green mineral associated with saponite and apparently partially oxidised to a dull olive green-brown (e.g. 30-36cm).

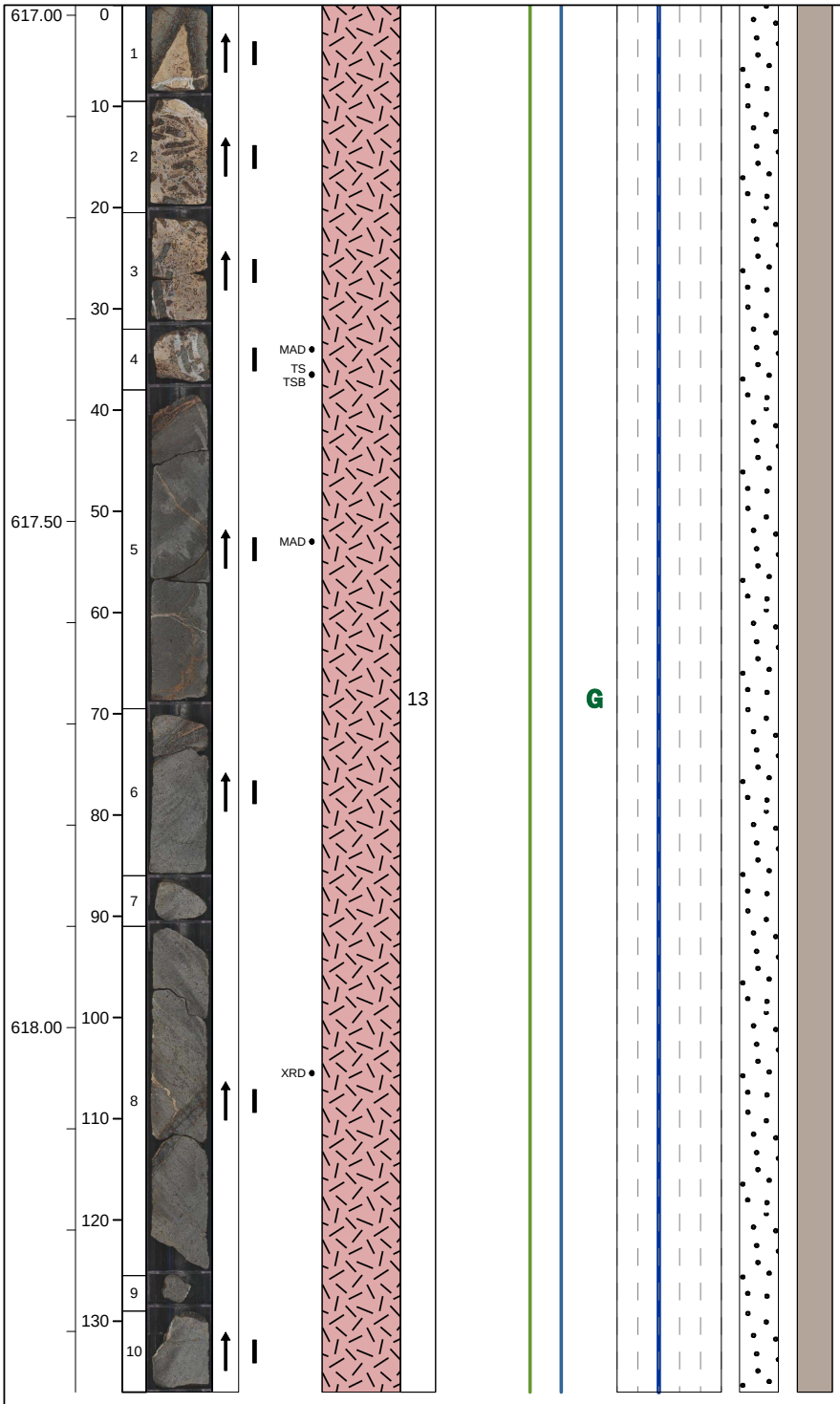
Hole 390-U1556B-56R Section 1, Top of Section: 615.5 m (CSF-A)



Description

390-U1556B-56R-1-A, 0-149 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt with breccia
TEXTURE: highly phyric
COLOR: gray (Gley 1 5/N)
PHENOCRYSTS: The section is highly plagioclase olivine phyric. The plagioclase crystals are tabular to equant and range up to 3 mm in size and are unaltered. Olivine (up to 1 mm) is equant and 100% altered to Fe oxyhydroxides and/or clay minerals.
GROUNDMASS: microscrystalline, but slightly finer grained groundmass relative to sections 55R-2 and 55R-1.
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by calcite and/or clay minerals.
ALTERATION: Predominantly dark grey with greenish pseudomorphic alteration of phenonocrysts to dark grey, black and green but with larger areas of reddened halo at end of large continuous ?flow (pc. 1) and some yellow halos (<5mm half width) around veins.
VEINS: Veins predominantly massive yellow-filled with yellow halos. Also present are thin poorly cemented dark ?saponite lined veins with a dusty, pale green mineral (appears different to dark green mineral seen in preceding core though could be finer grained equivalent). This mineral fill appears progressively oxidised to yellow ?Fe-oxyhydroxides down-section, mirroring the broad reddened halo seen in the macroscopic alteration colour of the groundmass (86-110cm)

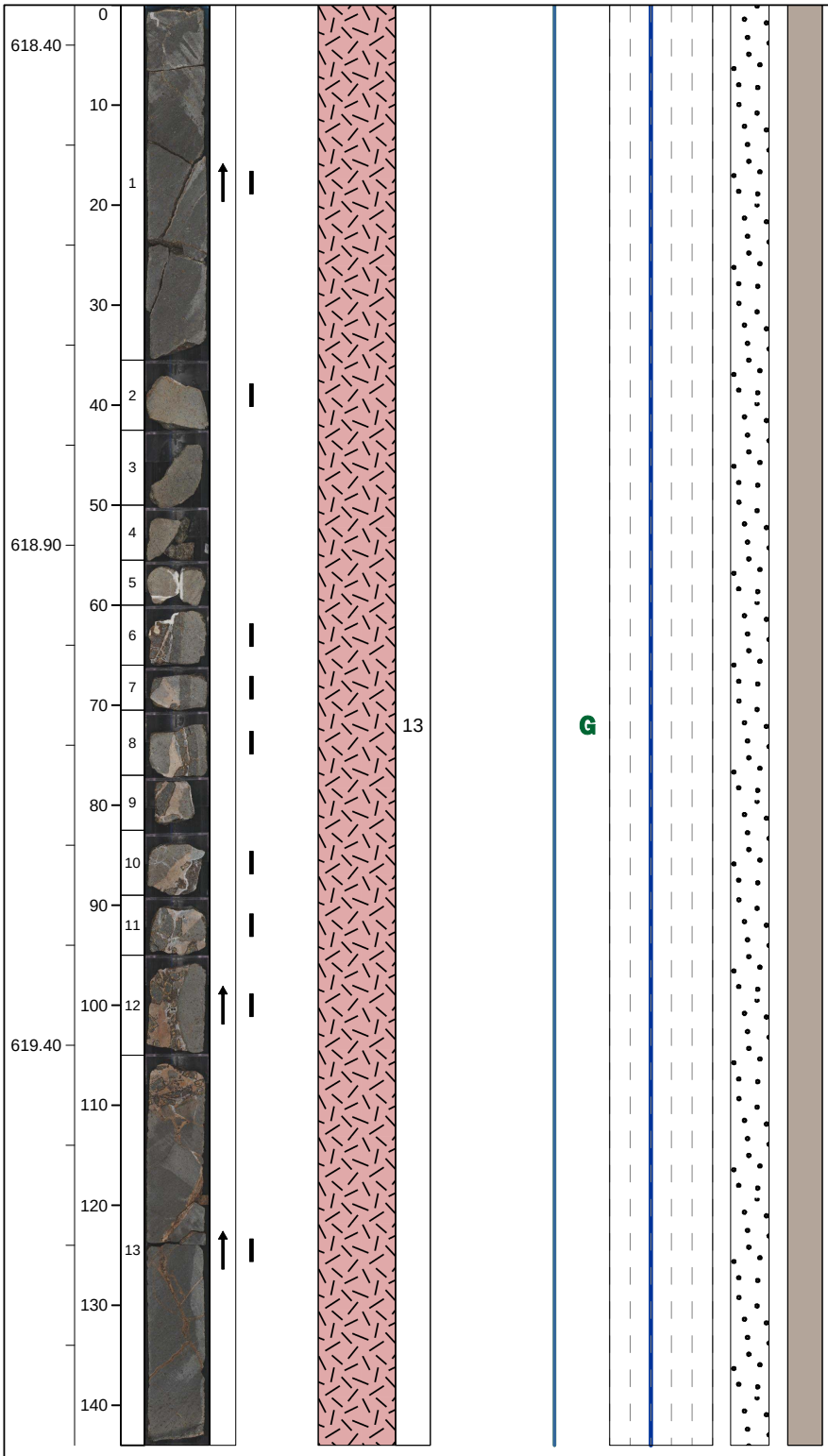
Hole 390-U1556B-56R Section 2, Top of Section: 616.99 m (CSF-A)



Description

390-U1556B-56R-2-A, 0-137 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt with hyaloclastite
TEXTURE: highly phyric
COLOR: gray (Gley 1 5/N)
PHENOCRYSTS: The section is highly plagioclase olivine phyric. The plagioclase crystals are tabular to equant and range up to 5 mm in size and are unaltered. Olivine (up to 1 mm) is equant and 100% altered to Fe oxyhydroxides and/or clay minerals.
GROUNDMASS: microscrystalline, but slightly finer grained groundmass relative to sections 55R-2 and 55R-1.
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by calcite and/or clay minerals.
ALTERATION: Light gray orange-speckled background alteration with broad orange-brown halos. Overall much more oxidised than sections 55R4 and 56R1. Glass altered to deep brown to bright orange. Sediment typical pale orange colour.
VEINS: Massive yellow filled veins predominate, most with yellow halos. Green mineral(s) absent from veins.

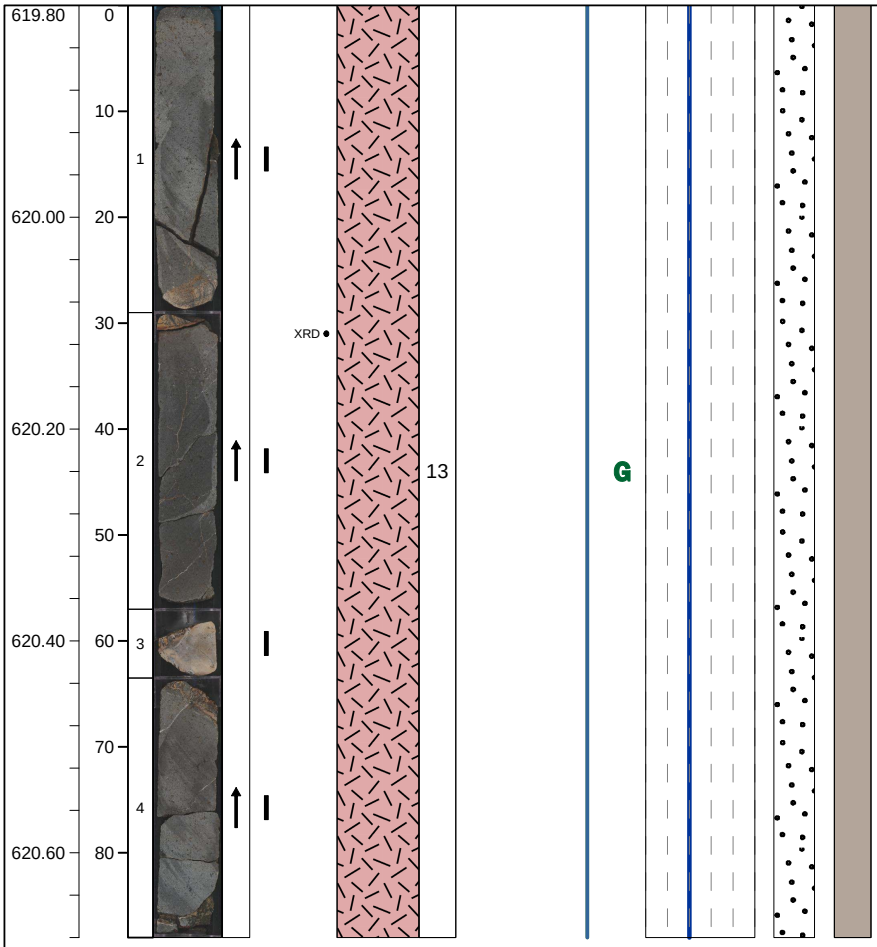
Hole 390-U1556B-56R Section 3, Top of Section: 618.36 m (CSF-A)



Description

390-U1556B-56R-3-A, 0-144 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt with hyaloclastite
TEXTURE: highly phyric
COLOR: gray (Gley 1 5/N)
PHENOCRYSTS: The section is highly plagioclase olivine phyric. The plagioclase crystals are tabular to equant and range up to 5 mm in size and are unaltered. Olivine (up to 1 mm) is equant and 100% altered to Fe oxyhydroxides and/or clay minerals.
GROUNDMASS: microscrystalline, but slightly finer grained groundmass relative to sections 55R-2 and 55R-1.
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by clay minerals?
ALTERATION: Light gray orange-speckled background alteration (phenocrysts altered to red and yellow) with broad orange/yellow-brown halos similar to preceding section (56R2). Glass altered to deep brown to bright orange. Sediment typical pale orange colour.
VEINS: Massive yellow filled veins predominate, most with yellow halos. Thick example (pc. 13) has abundant granule sized clasts of altered glass indicating sedimentary origin. Green mineral(s) absent from veins. Abundant sparry crystalline carbonate filling voids in sediment and between basalt clasts.

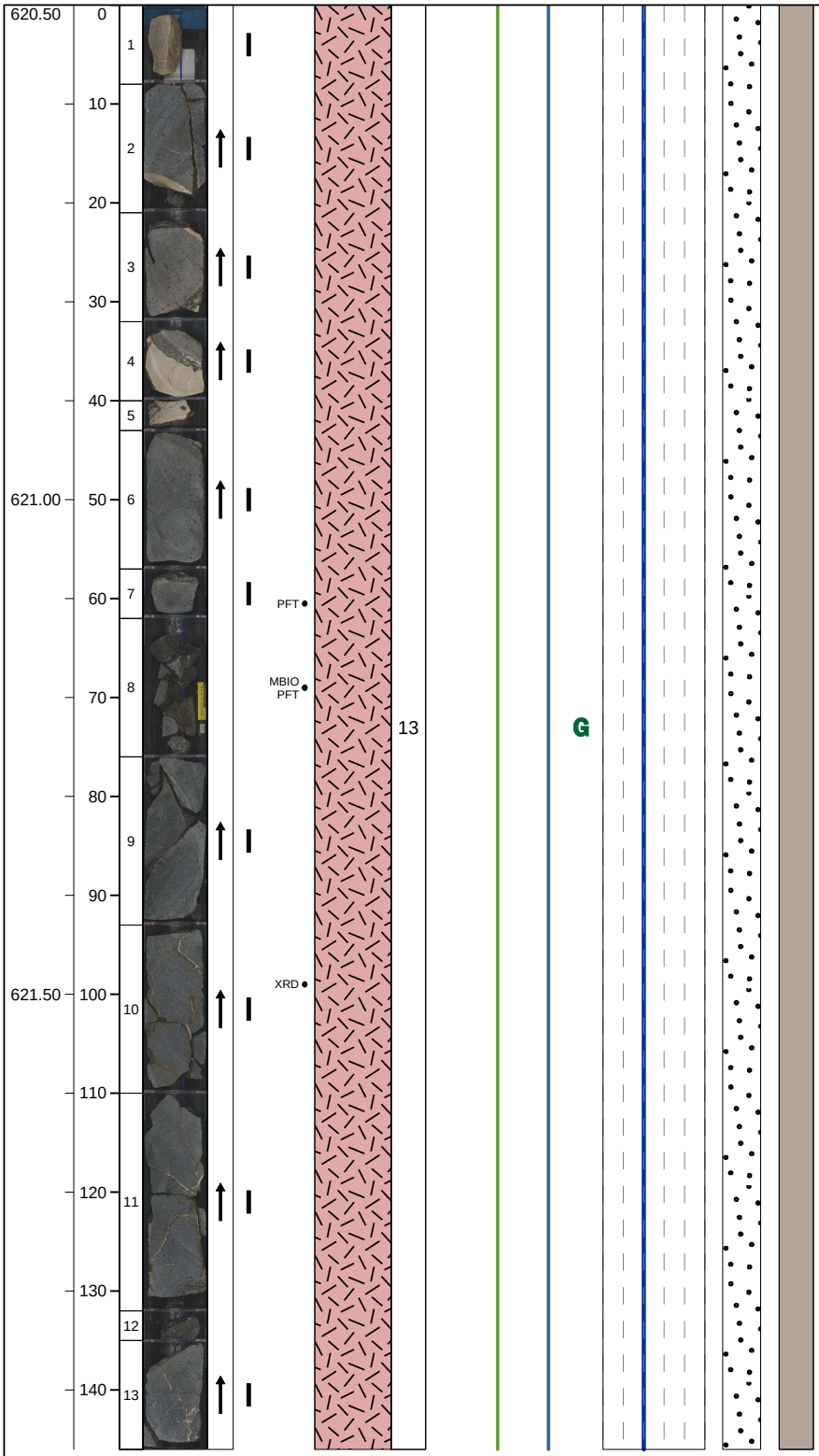
Hole 390-U1556B-56R Section 4, Top of Section: 619.8 m (CSF-A)



Description

390-U1556B-56R-4-A, 0-88 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt with hyaloclastite
TEXTURE: highly phyric
COLOR: gray (Gley 1 5/N)
PHENOCRYSTS: The section is highly plagioclase olivine phyric. The plagioclase crystals are tabular to equant and range up to 4 mm in size and are unaltered. Olivine (up to 0.75 mm) is equant and 100% altered to Fe oxyhydroxides and/or clay minerals.
GROUNDMASS: microscrystalline, but slightly finer grained groundmass relative to sections 55R-2 and 55R-1.
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by clay minerals and/or zeolites?
ALTERATION: Light gray orange-speckled background alteration (phenocrysts altered to red and yellow) with broad orange/yellow-brown halos similar to preceding sections (56R2-3). One interval of sediment (28-31cm) shows unusual concentric defined by dense growths of black, slightly dendritic ?saponite blebs, elongate perpendicular to the concentric layers of their accumulation - origin unclear!
VEINS: Sparse, thin massive yellow-filled veins predominate, most with yellow halos.

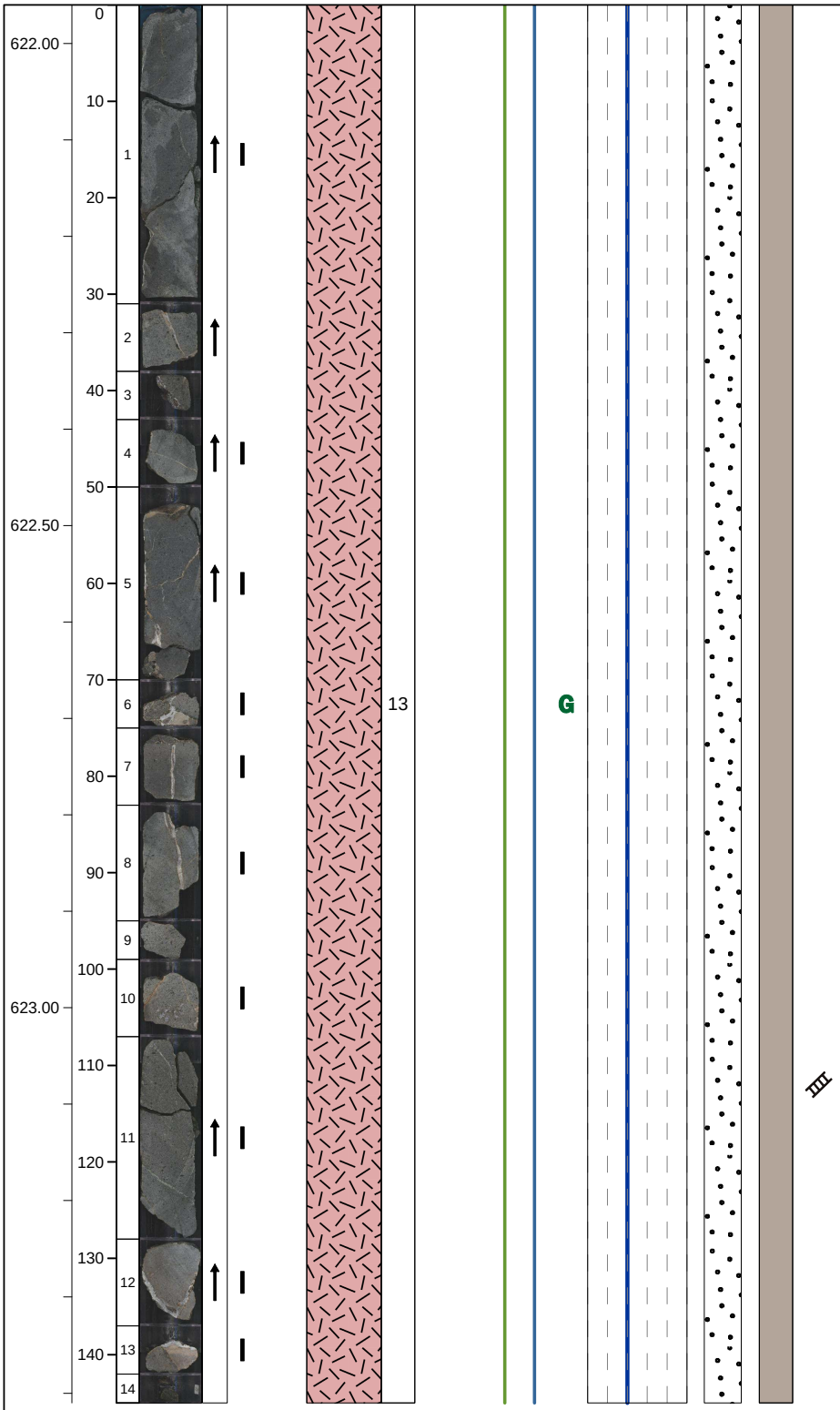
Hole 390-U1556B-57R Section 1, Top of Section: 620.5 m (CSF-A)



Description

390-U1556B-57R-1-A, 0-146 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt with sediment
TEXTURE: highly phyric
COLOR: gray (Gley 1 5/N)
PHENOCRYSTS: The section is highly plagioclase olivine phyric. The plagioclase crystals are tabular to equant and range up to 4 mm in size and are unaltered. Olivine (up to 1.5 mm) is equant and 100% altered to a dark green mineral (chlorite? talc?) + clay minerals.
GROUNDMASS: microscrystalline, but slightly finer grained groundmass relative to sections 55R-2 and 55R-1.
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by dark green / black mineral, calcite and/or clay minerals.
ALTERATION: Grey greenish background alteration with greenish pseudomorphic alteration of phenocrysts to dark grey, black and very dark green, and yellow halos (<5mm half width) around veins. Glass altered to very dark green. Some recrystallised sediment of similar buff colour to the veins. One piece of basalt completely altered with sandy brown colour (similar to top of unit in 54R3).
VEINS: Veins predominantly massive dull buff/yellow-filled (carbonate bearing), with sharp-edged yellow halos (especially pc. 10). These often have colourless white carbonate (~1mm) veins along one side, sometimes crossing cutting the buff veins (e.g. 98cm). This core approximately marks the abundant occurrence of dusty green ?clay mineral(s) along poorly cemented veins. These also often exploit one margin of existing veins (e.g. 93-98cm) and also never occur on both sides, indicating they are likely a late phase.

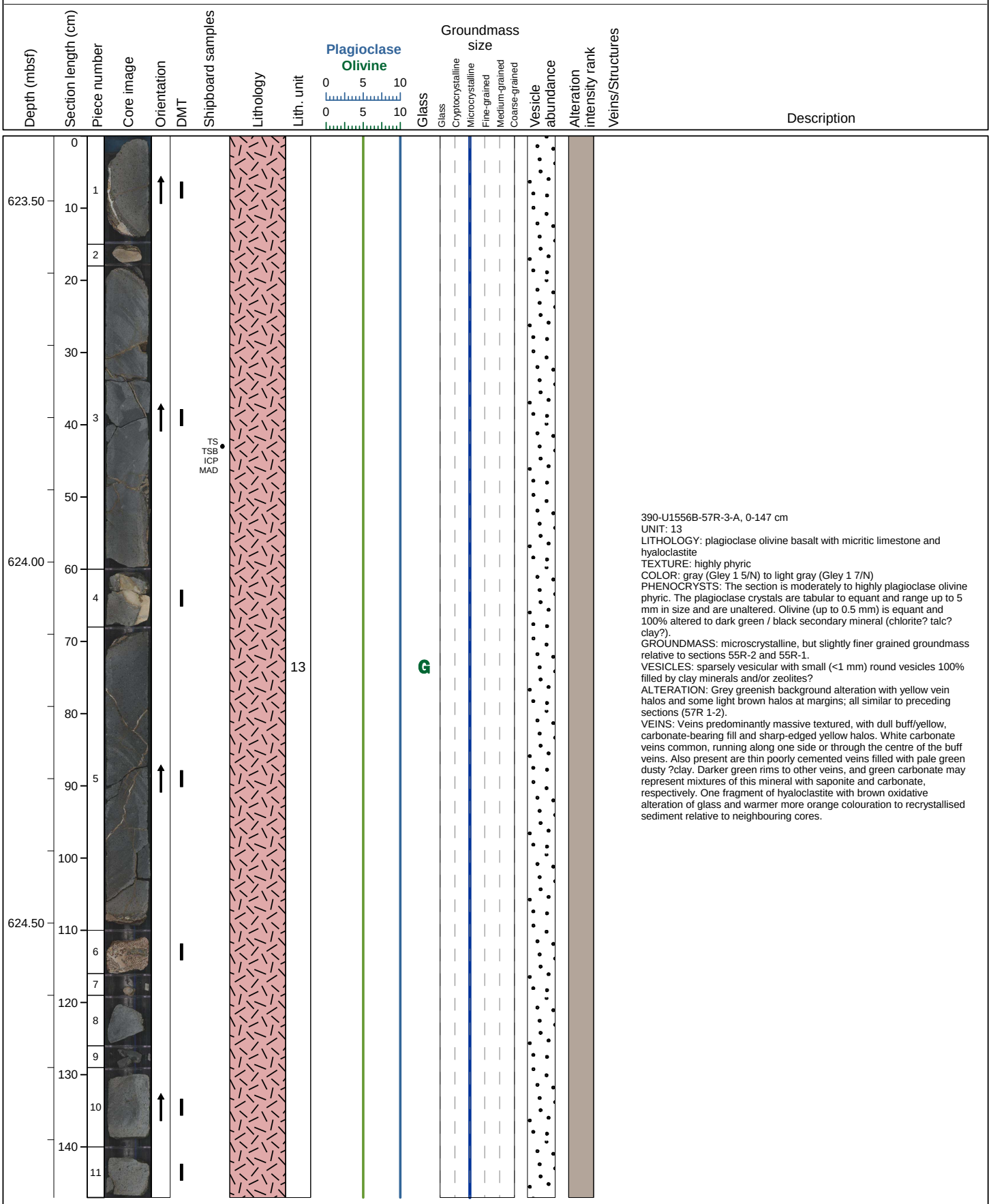
Hole 390-U1556B-57R Section 2, Top of Section: 621.96 m (CSF-A)



Description

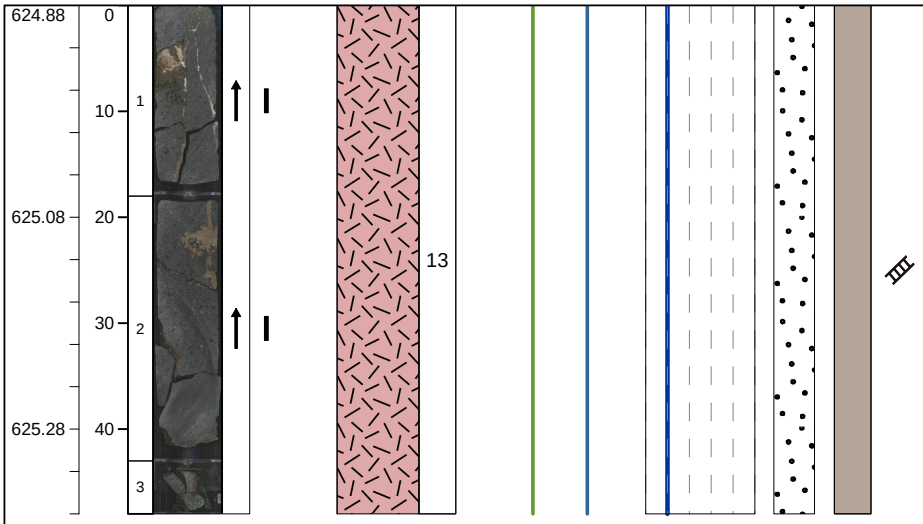
390-U1556B-57R-2-A, 0-145 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt with micritic limestone
TEXTURE: highly phyric
COLOR: light gray (Gley 1 7/N)
PHENOCRYSTS: The section is moderately to highly plagioclase olivine phyric. The plagioclase crystals are tabular to equant and range up to 6 mm in size and are unaltered. Olivine (up to 0.5 mm) is equant and 100% altered to Fe oxyhydroxides and/or clay minerals.
GROUNDMASS: microscrystalline, but slightly finer grained groundmass relative to sections 55R-2 and 55R-1.
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by clay minerals and/or zeolites?
ALTERATION: Grey greenish background alteration with green/black pseudomorphic alteration and yellow halos around veins. Halos of lighter brownish grey associated with chilled/glassy margins have a slight greenish layer logged as green halo. Unclear if this is part of same (apparently oxidative) alteration giving slight reddened broad halo (logged together with the yellow vein halos as orange halo) or an overprint.
VEINS: Veins predominantly massive textured, with dull buff/yellow carbonate bearing fill and sharp-edged yellow halos.

Hole 390-U1556B-57R Section 3, Top of Section: 623.41 m (CSF-A)



390-U1556B-57R-3-A, 0-147 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt with micritic limestone and hyaloclastite
TEXTURE: highly phyric
COLOR: gray (Gley 1 5/N) to light gray (Gley 1 7/N)
PHENOCRYSTS: The section is moderately to highly plagioclase olivine phyric. The plagioclase crystals are tabular to equant and range up to 5 mm in size and are unaltered. Olivine (up to 0.5 mm) is equant and 100% altered to dark green / black secondary mineral (chlorite? talc? clay?).
GROUNDMASS: microscrystalline, but slightly finer grained groundmass relative to sections 55R-2 and 55R-1.
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by clay minerals and/or zeolites?
ALTERATION: Grey greenish background alteration with yellow vein halos and some light brown halos at margins; all similar to preceding sections (57R 1-2).
VEINS: Veins predominantly massive textured, with dull buff/yellow, carbonate-bearing fill and sharp-edged yellow halos. White carbonate veins common, running along one side or through the centre of the buff veins. Also present are thin poorly cemented veins filled with pale green dusty ?clay. Darker green rims to other veins, and green carbonate may represent mixtures of this mineral with saponite and carbonate, respectively. One fragment of hyaloclastite with brown oxidative alteration of glass and warmer more orange colouration to recrystallised sediment relative to neighbouring cores.

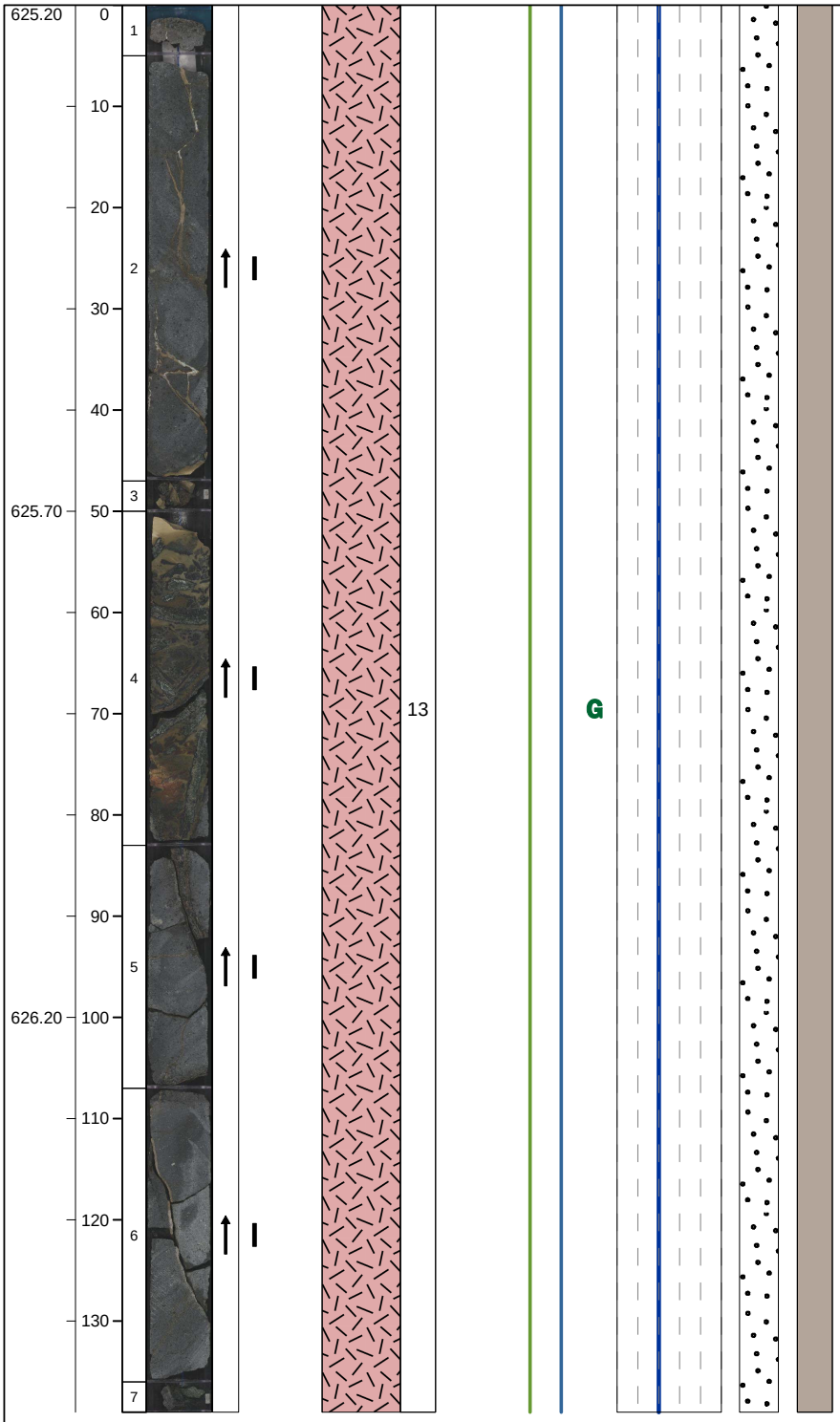
Hole 390-U1556B-57R Section 4, Top of Section: 624.88 m (CSF-A)



Description

390-U1556B-57R-4-A, 0-48 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt
TEXTURE: highly phyric
COLOR: dark bluish gray (Gley 1 4/10B)
PHENOCRYSTS: The section is highly plagioclase olivine phyric. The plagioclase crystals are tabular to equant and range up to 1 mm in size and are unaltered. Olivine (up to 0.75 mm) is equant and 100% altered to dark green / black secondary mineral (chlorite? talc? clay?).
GROUNDMASS: cryptocrystalline
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by clay minerals and/or zeolites?
ALTERATION: Grey greenish background alteration with yellow vein halos and some light brown halos at margins; all similar to preceding sections (57R 1-3).
VEINS: Veins predominantly massive textured, with dull buff/yellow, carbonate-bearing fill and yellow halos. Many of these are bounded on one side or crosscut by white carbonate and/or thin dusty green clay filled veins (or sometimes darker waxy green saponite + ?clay).

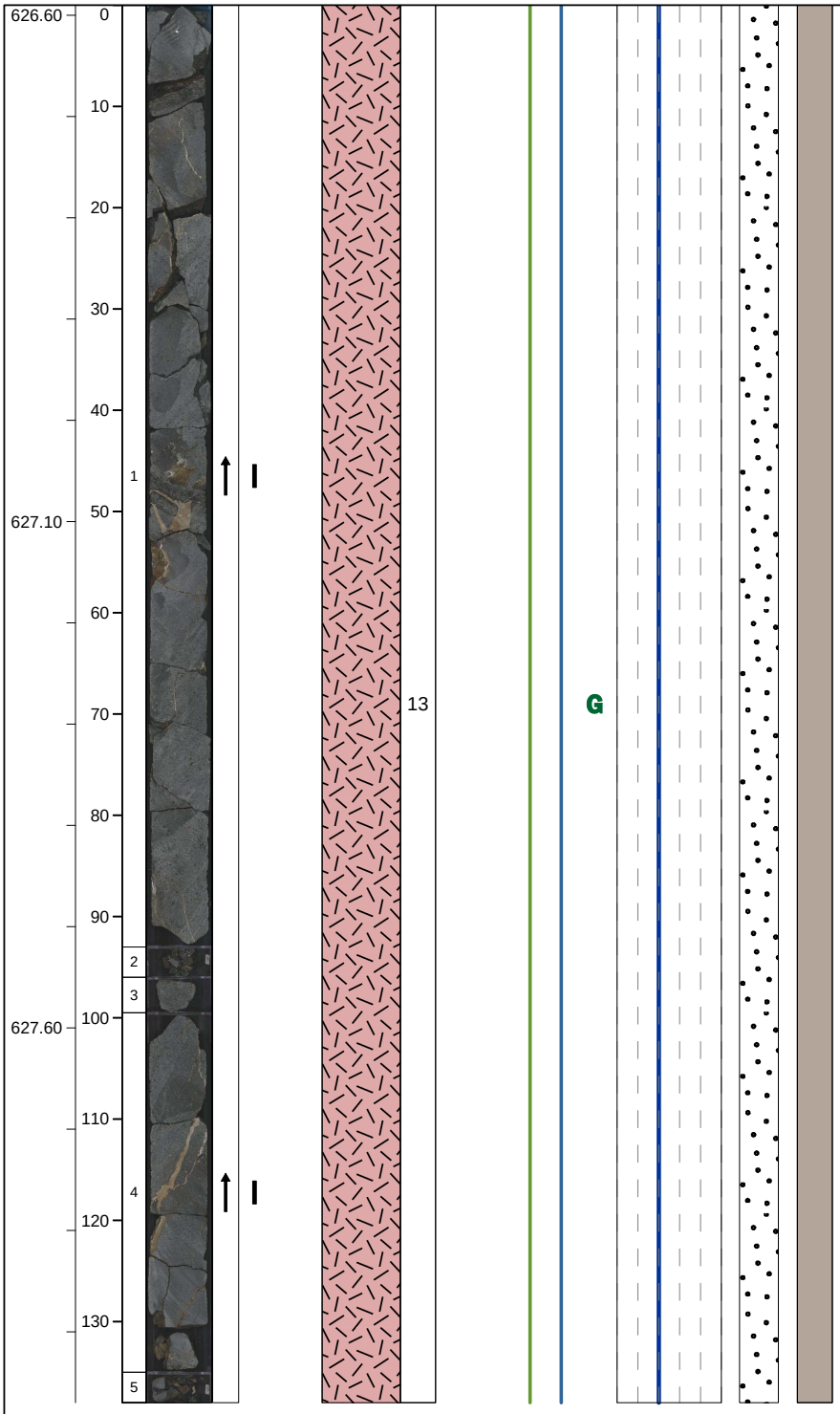
Hole 390-U1556B-58R Section 1, Top of Section: 625.2 m (CSF-A)



Description

390-U1556B-58R-1-A, 0-139 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt with hyaloclastite
TEXTURE: highly phyric
COLOR: gray (Gley 1 5/N)
PHENOCRYSTS: The section is highly plagioclase olivine phyric. The plagioclase crystals are tabular to equant and range up to 4 mm in size and are unaltered. Olivine (up to 1 mm) is equant and 100% altered to a dark green / black secondary mineral (chlorite? talc? clay?).
GROUNDMASS: microscrystalline, but slightly finer grained groundmass relative to sections 55R-2 and 55R-1.
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by clay minerals and/or zeolites?
ALTERATION: Grey greenish background alteration with yellow vein halos and some light brown halos at margins; all similar to preceding sections (57R 1-4). Glass in thick interval of hyaloclastite (pc. 4) is altered to very dark green as is much of the recrystallised sediment matrix though patches of sediment are a deep red-brown and some glass clasts have thin dark brown rims.
VEINS: Veins predominantly massive textured, with dull buff/yellow, carbonate bearing fill and yellow halos. Many of these are bounded on one side or crosscut by white carbonate and/or thin dusty green clay filled veins (or sometimes darker waxy green saponite + ?clay). Irregular pale green carbonate veins in the the centre of thick (3-5mm) buff veins are ubiquitous in the upper 50cm of the section.

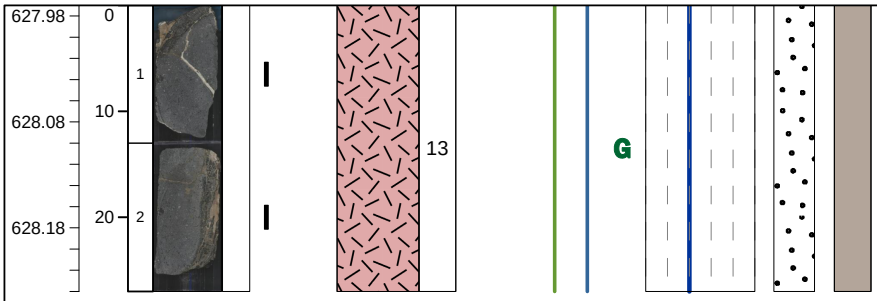
Hole 390-U1556B-58R Section 2, Top of Section: 626.59 m (CSF-A)



Description

390-U1556B-58R-2-A, 0-138 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt with hyaloclastite
TEXTURE: highly phyric
COLOR: gray (Gley 1 5/N)
PHENOCRYSTS: The section is moderately to highly plagioclase olivine phyric. The plagioclase crystals are tabular to equant and range up to 7 mm in size and are unaltered. Olivine (up to 1 mm) is equant and 100% altered to a dark green / black secondary mineral (chlorite? talc? clay?).
GROUNDMASS: microscrystalline, but slightly finer grained groundmass relative to sections 55R-2 and 55R-1.
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by clay minerals and/or zeolites?
ALTERATION: Grey greenish background alteration with yellow vein halos and some light brown halos at margins; all similar to preceding sections (57R1 through 58R1).
VEINS: Veins predominantly massive textured, with dull buff/yellow, carbonate bearing fill and yellow halos. Many of these are bounded on one side or crosscut by white carbonate and/or thin dusty green clay filled veins (or sometimes darker waxy green saponite + ?clay), the latter particularly ubiquitous from this section and through core 59R. This pale green clay appears to also occur in <1mm vesicles throughout this and subsequent sections where it can be seen to swell when the surface is wetted.

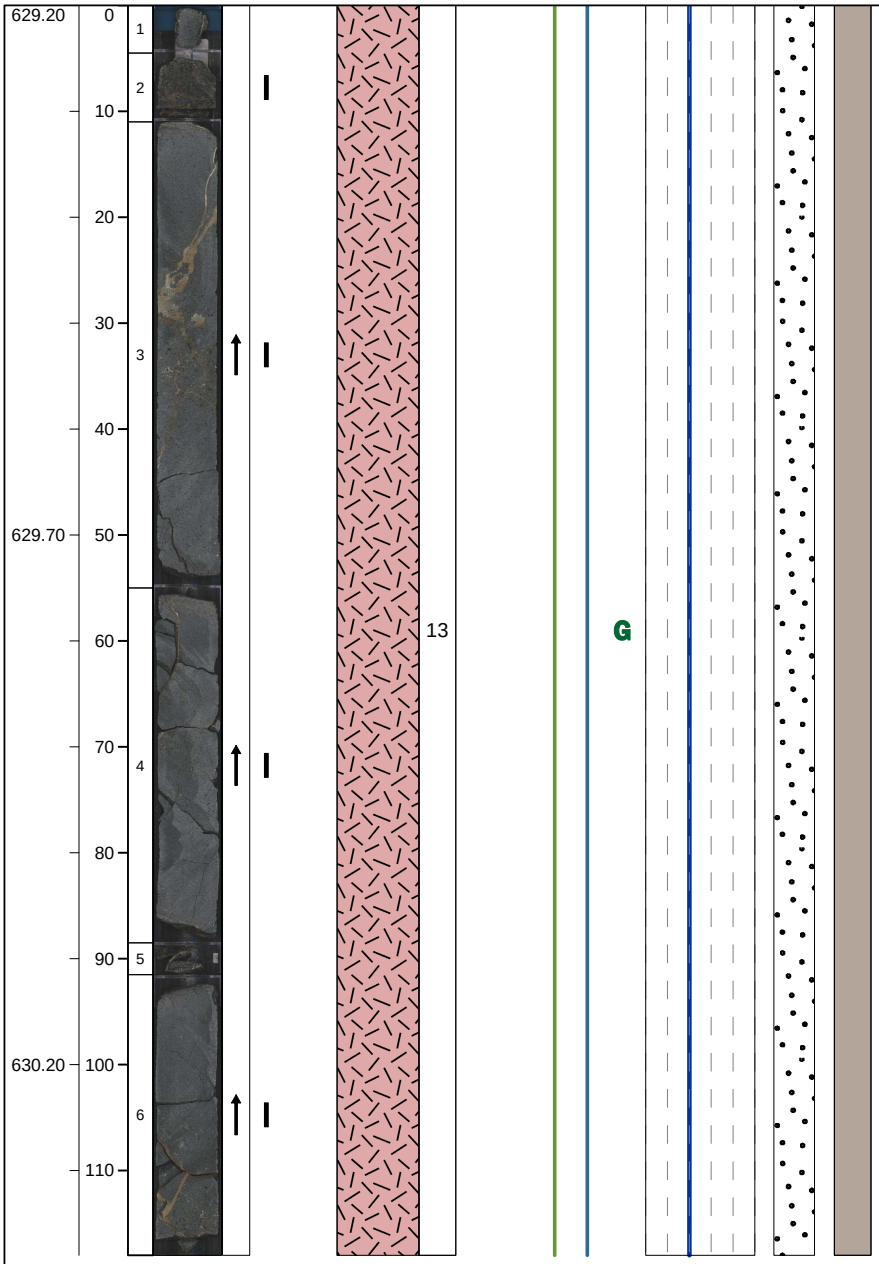
Hole 390-U1556B-58R Section 3, Top of Section: 627.97 m (CSF-A)



Description

390-U1556B-58R-3-A, 0-27 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt with hyaloclastite
TEXTURE: highly phyric
COLOR: gray (Gley 1 5/N)
PHENOCRYSTS: The section is moderately to highly plagioclase olivine phyric. The plagioclase crystals are tabular to equant and range up to 4 mm in size and are unaltered. Olivine (up to 1 mm) is equant and 100% altered to a dark green / black secondary mineral (chlorite? talc? clay?).
GROUNDMASS: microscrystalline, but slightly finer grained groundmass relative to sections 55R-2 and 55R-1.
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by clay minerals and/or zeolites?
ALTERATION: Grey greenish background alteration with yellow vein halos and some light brown halos at margins; all similar to preceding sections.
VEINS: Veins predominantly massive textured buff/yellow, some with thin green clay linings and/or white carbonate veins exploiting one side.

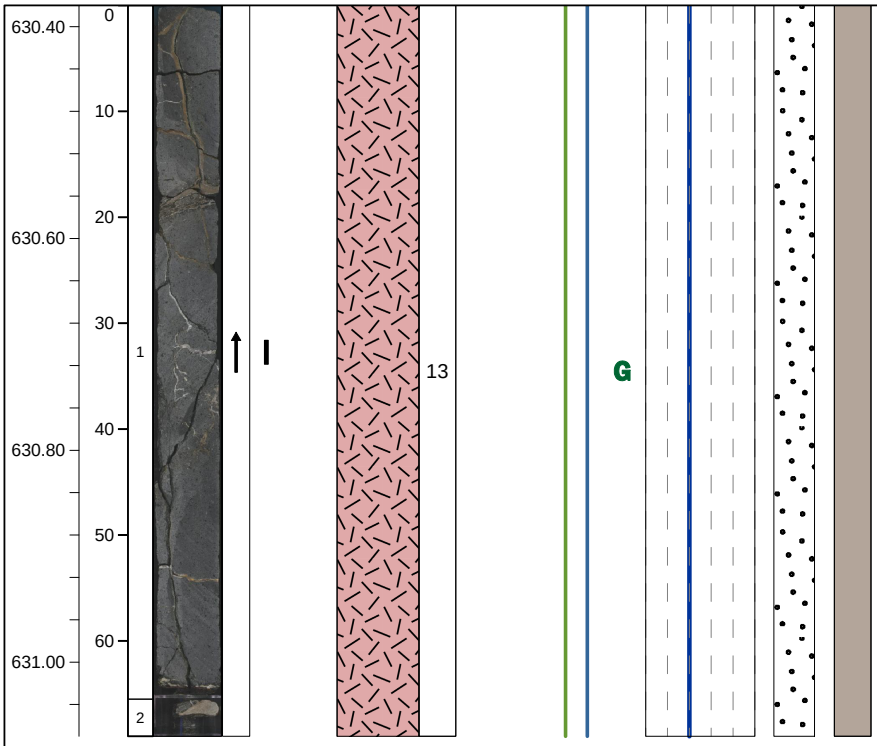
Hole 390-U1556B-59R Section 1, Top of Section: 629.2 m (CSF-A)



Description

390-U1556B-59R-1-A, 0-118 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt with hyaloclastite
TEXTURE: highly phyric
COLOR: gray (Gley 1 5/N)
PHENOCRYSTS: The section is moderately to highly plagioclase olivine phyric. The plagioclase crystals are tabular to equant and range up to 4 mm in size and are unaltered. Olivine (up to 1 mm) is equant and 100% altered to a dark green / black secondary mineral (chlorite? talc? clay?).
GROUNDMASS: microscrystalline, but slightly finer grained groundmass relative to sections 55R-2 and 55R-1.
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by clay minerals and/or zeolites?
ALTERATION: Grey greenish background alteration with yellow vein halos and some light brown halos at margins.
VEINS: Veins include massive buff fill, carbonate and thin poorly cemented veins with saponite (+/- carbonate) and a dusty pale green clay mineral (observed in cores 57R through 59R). This latter also appears in small (0.1-1mm) vesicles throughout sections in this core and swells when wet.

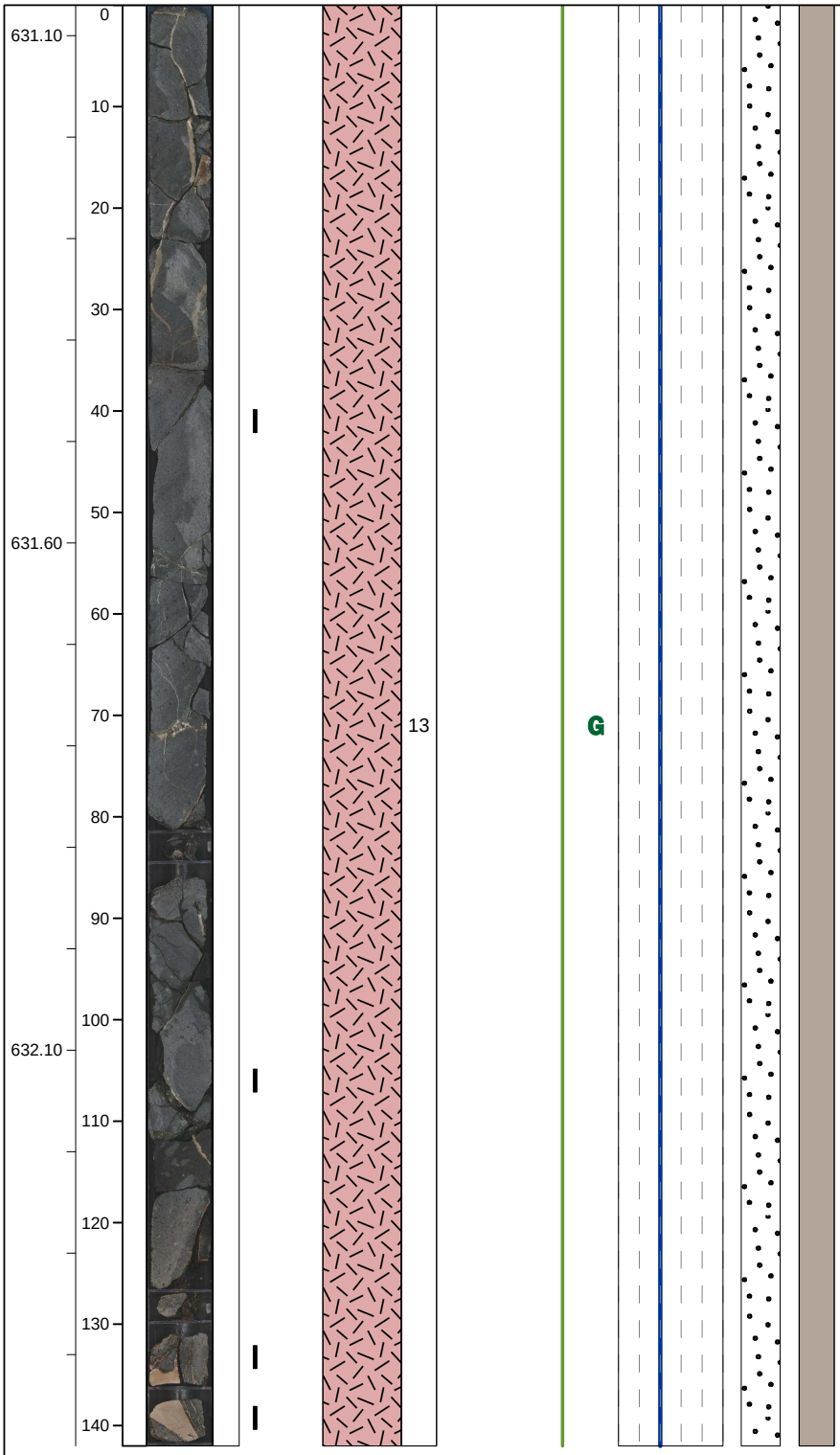
Hole 390-U1556B-59R Section 2, Top of Section: 630.38 m (CSF-A)



Description

390-U1556B-59R-2-A, 0-69 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt with hyaloclastite
TEXTURE: highly phyric
COLOR: gray (Gley 1 5/N)
PHENOCRYSTS: The section is moderately to highly plagioclase olivine phyric. The plagioclase crystals are tabular to equant and range up to 4 mm in size and are unaltered. Olivine (up to 2 mm) is equant and 100% altered to a dark green / black secondary mineral (chlorite? talc? clay?).
GROUNDMASS: microscrystalline, but slightly finer grained groundmass relative to sections 55R-2 and 55R-1.
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by clay minerals and/or zeolites?
ALTERATION: Grey greenish background alteration with yellow vein halos and some light brown halos at margins.
VEINS: Veins include massive buff fill, carbonate and thin poorly cemented veins with saponite (+/- carbonate) and a dusty pale green swelling clay. Crosscutting relationships (e.g. 0-18, 30-40cm) indicate buff massive veins formed first, then crystalline carbonate veins, then thin veins with green clay. Each subsequent vein generation often exploits the margins (or centres) of earlier veins giving the impression of a single composite vein. Dusty green clay almost always causes the core to split along veins it lines so and these splits typically form only on one side of another type of vein (and commonly cut across to change sides; e.g. 12cm) indicating that the clay does not form as an early lining on both sides of a fracture.

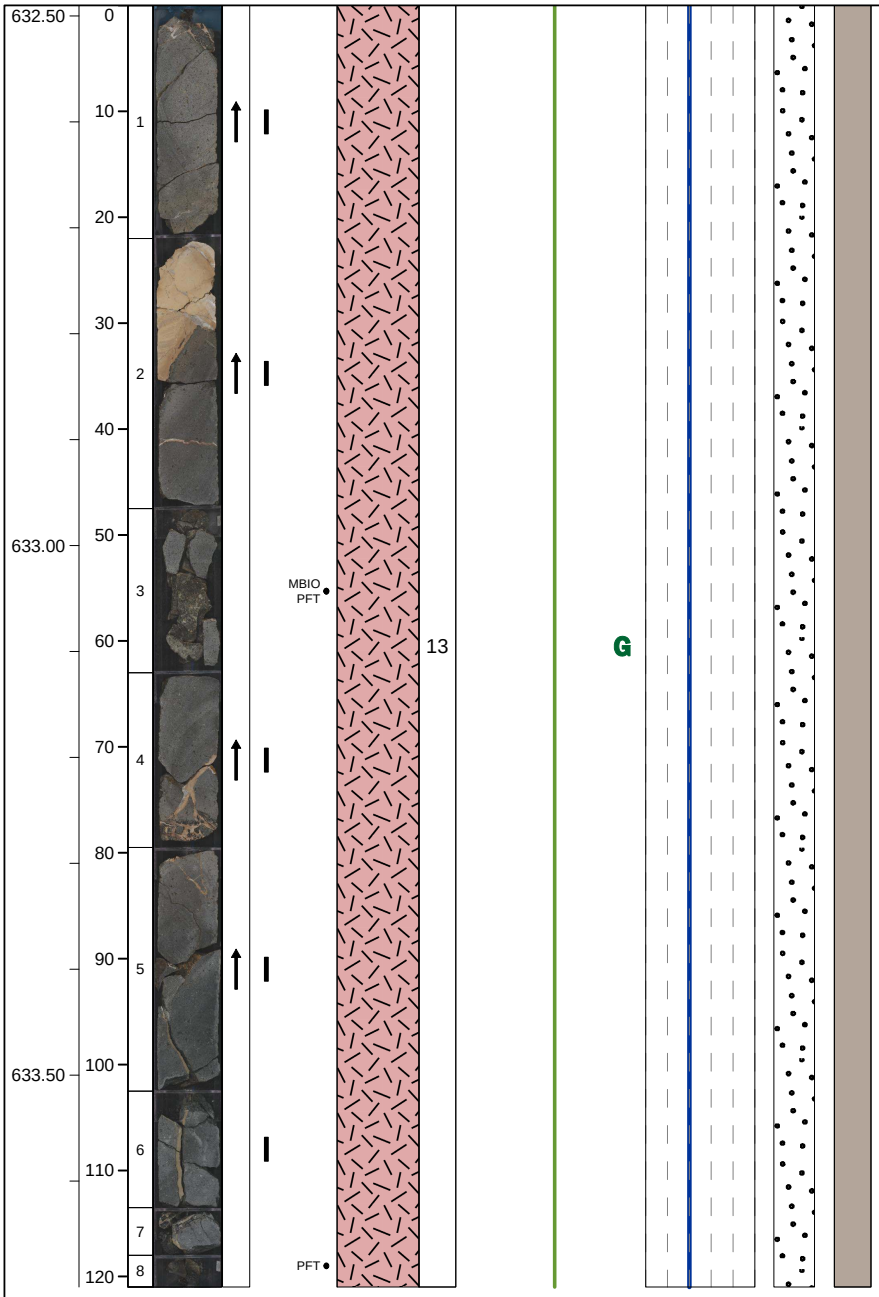
Hole 390-U1556B-59R Section 3, Top of Section: 631.07 m (CSF-A)



Description

390-U1556B-59R-3-A, 0-142 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt with hyaloclastite
TEXTURE: highly phyric
COLOR: gray (Gley 1 5/N)
PHENOCRYSTS: The section is moderately to highly plagioclase olivine phyric. The plagioclase crystals are tabular to equant and range up to 6 mm in size and are unaltered. Olivine (up to 1 mm) is equant and 100% altered to a dark green / black secondary mineral (chlorite? talc? clay?).
GROUNDMASS: microscrystalline, but slightly finer grained groundmass relative to sections 55R-2 and 55R-1.
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by clay minerals and/or zeolites?
ALTERATION: Grey greenish background alteration with yellow vein halos and some light brown halos at margins.
VEINS: Veins include massive buff fill, carbonate and thin poorly cemented veins with saponite (+/- carbonate) and a dusty pale green swelling clay. Calcite veins commonly form down the middle of earlier buff veins (e.g. 0-10cm) and have been record separately where possible.

Hole 390-U1556B-59R Section 4, Top of Section: 632.49 m (CSF-A)

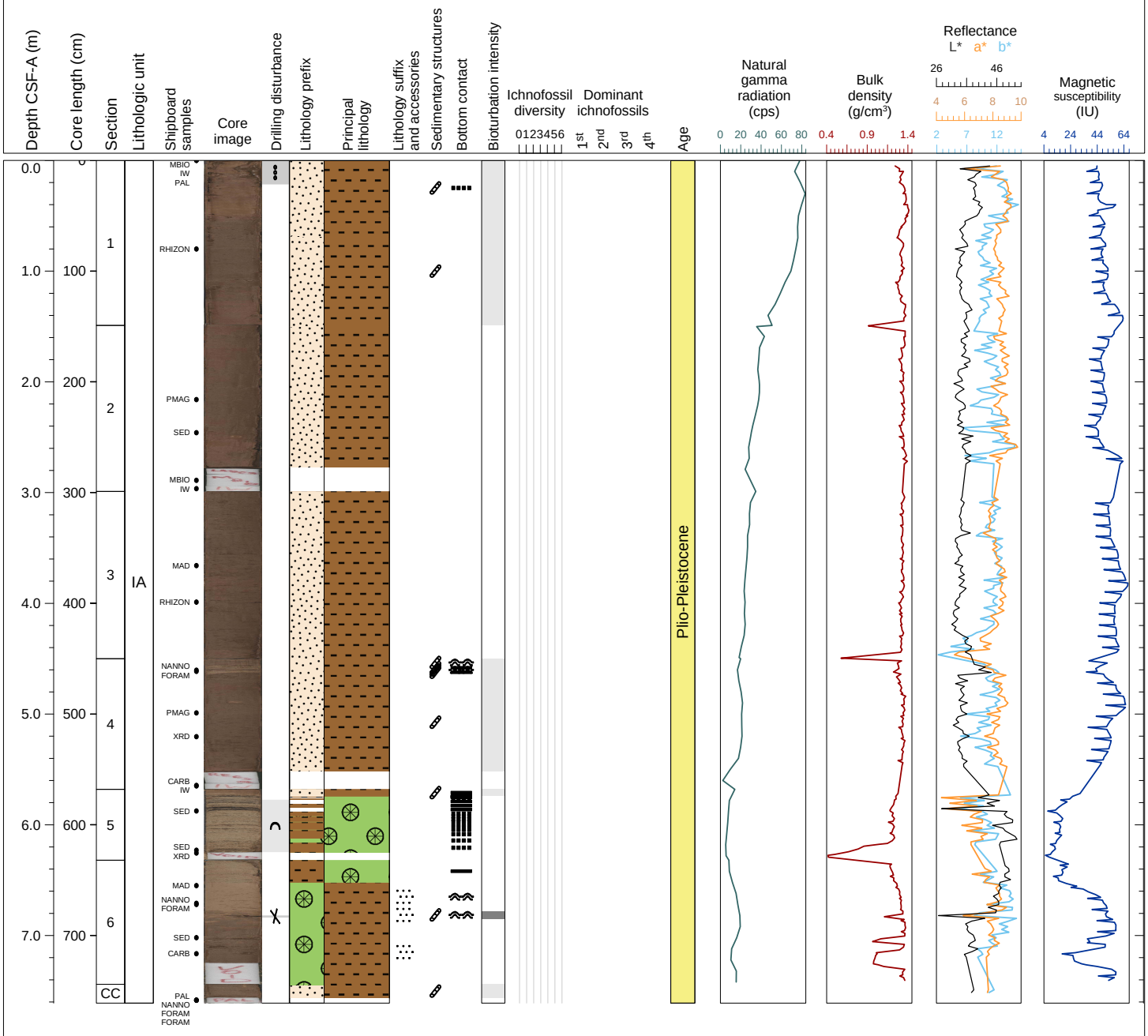


Description

390-U1556B-59R-4-A, 0-121 cm
UNIT: 13
LITHOLOGY: plagioclase olivine basalt with micritic limestone
TEXTURE: highly phyric
COLOR: gray (Gley 1 5/N)
PHENOCRYSTS: The section is highly plagioclase olivine phyric. The plagioclase crystals are tabular to equant and range up to 4 mm in size and are unaltered. Olivine (up to 1 mm) is equant and 100% altered to a dark green / black secondary mineral (chlorite? talc? clay?).
GROUNDMASS: microscrystalline, but slightly finer grained groundmass relative to sections 55R-2 and 55R-1.
VESICLES: sparsely vesicular with small (<1 mm) round vesicles 100% filled by clay minerals and/or zeolites?
ALTERATION: Light gray orange-speckled background alteration with some broad orange-brown halos along margin edges. Overall much more oxidised than srest of core 59R.
VEINS: Thin veins with rusty saponite +/- carbonate fill are common throughout core. These appear to have formed via oxidation of the dusty green swelling clay seen in overlying sections; the lowermost 30cm of the core preserves a sharp oxidation front between rusty orange and green within a single vein (92-93cm) which is mirrored by a sharp transition from speckled orange to green-grey alteration of the background rock over the same interval.

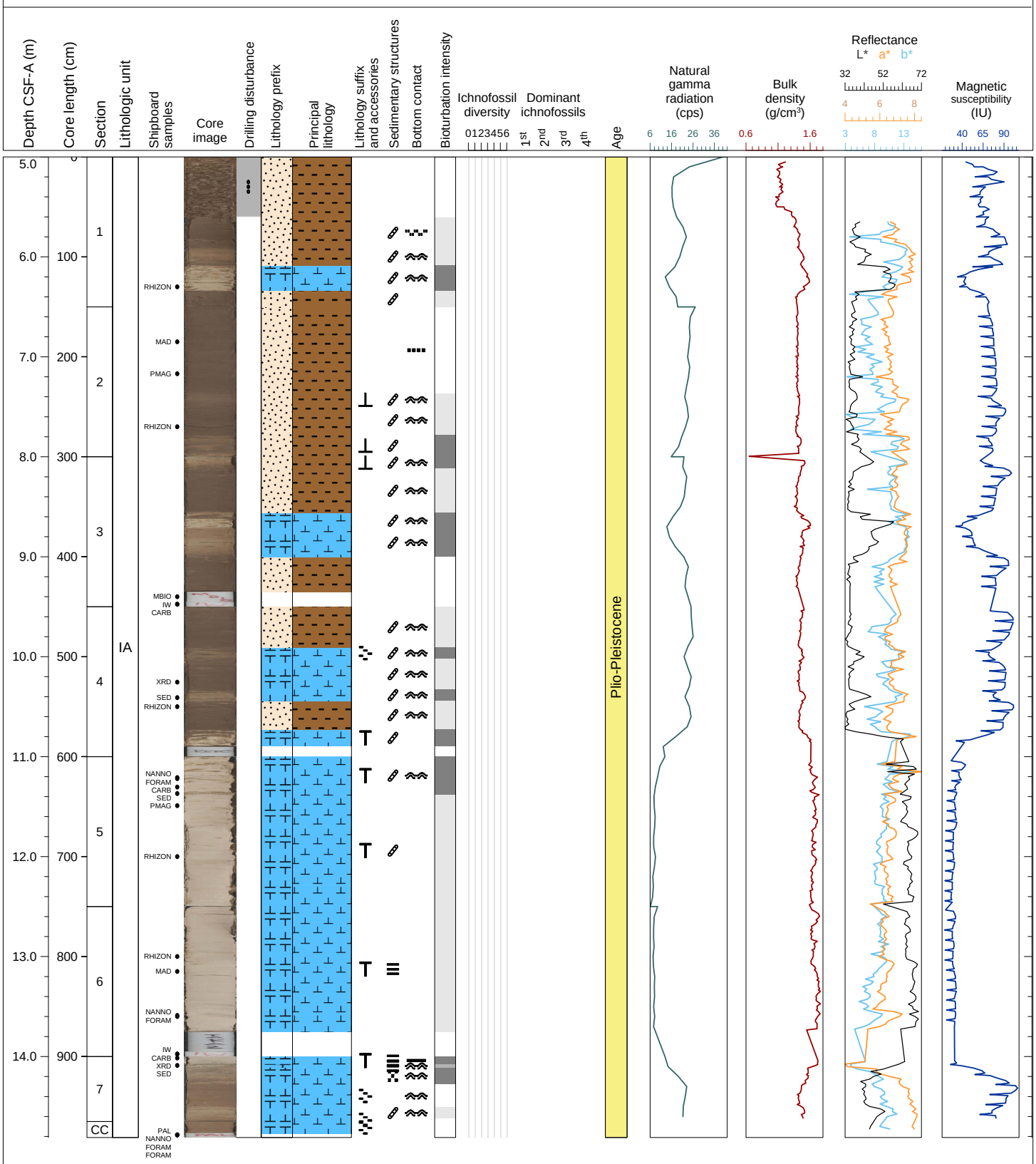
Hole 390-U1556C Core 1H, Interval 0.0-7.61 m (CSF-A)

Core 1H contains mainly (1A to top of 4A) brown and dark brown (7.5YR 5/4,3/4, 4/3) silty clay. Section 5A contains alternating greenish black and greenish gray (GLEY 1 2.5/10Y, 5/6GY) organic-rich diatom ooze, light greenish gray (GLEY 1 8/5GY) diatom ooze, and pinkish gray (7.5YR 7/2) calcareous diatom ooze. Section 6A contains light brown and brown (7.5YR 6/4, 5/3,4/3) diatom-rich clay with silt. For much of the Core bioturbation is none, but it ranges from sparse to moderate, although in places it can be also difficult to observe. Drilling disturbances include moderate soupy in 1A, slight up-arching in 2A, and a small moderate void in 6A.



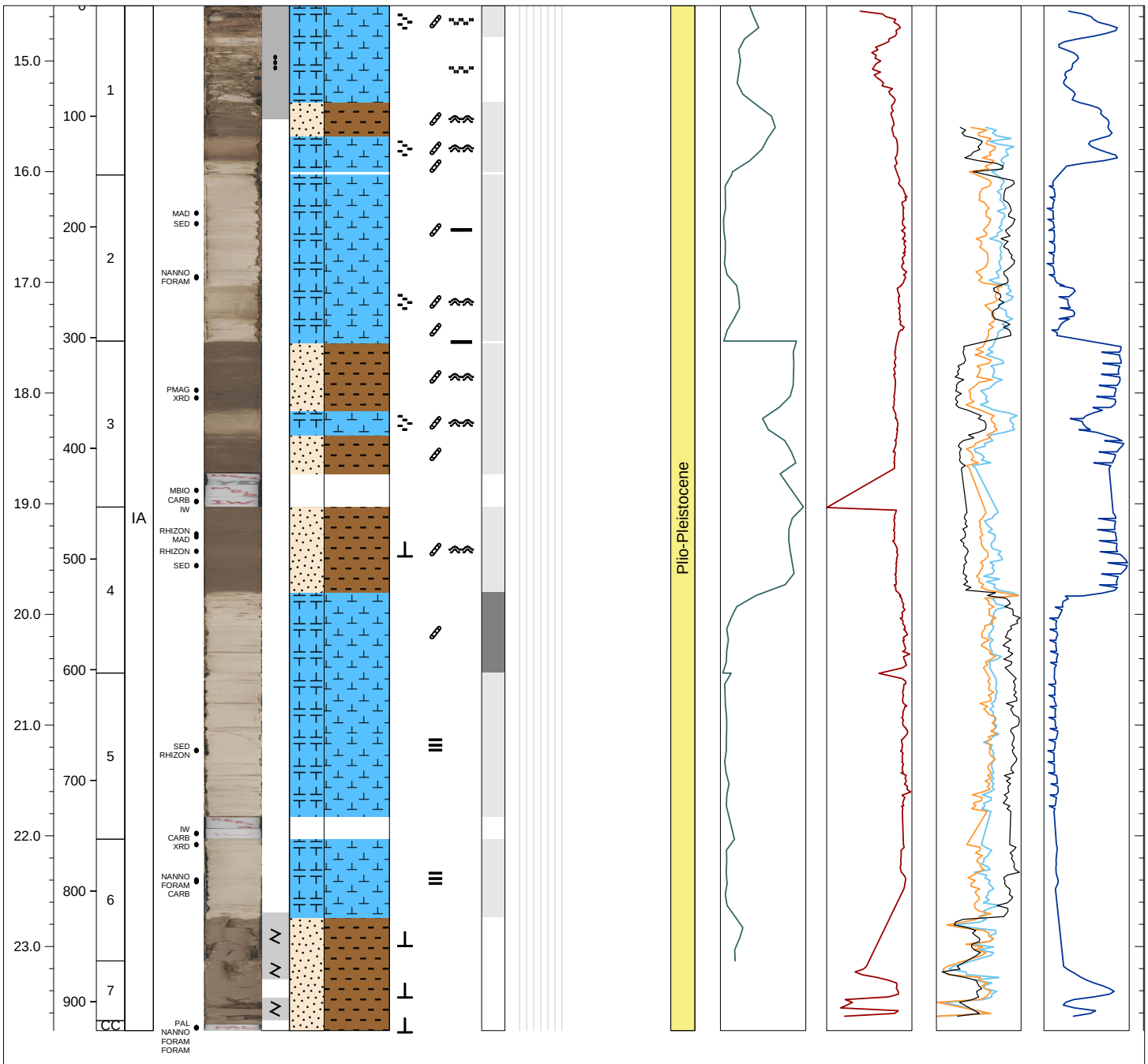
Hole 390-U1556C Core 2H, Interval 5.0-14.81 m (CSF-A)

Core 2H contains mainly brown (7.5YR 4/3) silty clay and pinkish white (7.5YR 8/2) calcareous nannofossil ooze. In section 6H, there are dark gray organic-rich thin laminations (78-117 cm). In section 6A, from 8 to 11 cm, there are brown (7.5YR 5/2) laminations of foraminiferal nannofossil ooze. Bioturbation is sparse to low. Drilling disturbance is slight to severe specifically for a soupy layer in 1H from 0-60cm.



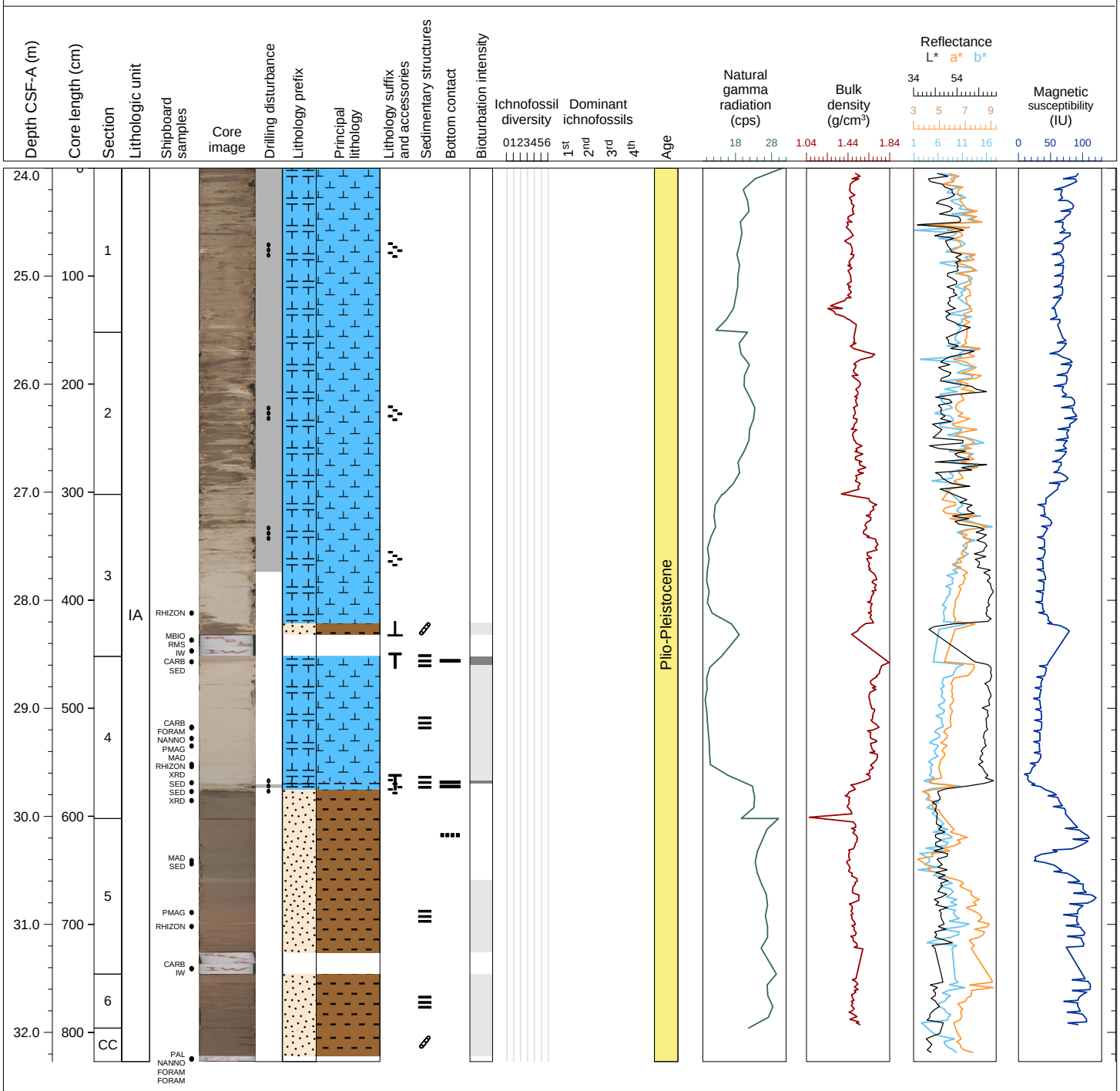
Hole 390-U1556C Core 3H, Interval 14.5-23.76 m (CSF-A)

Core 3H contains mostly pinkish white (7.5YR 8/2) calcareous nannofossil ooze and brown (7.5YR 4/3) silty clay. There are some organic-rich laminations in Sections 5A and 6A. There are portions of 3H that contain sparse to moderate bioturbation, which is mostly in the form of burrows. Drilling disturbance includes severe soupy in 1A and moderate fragmentation in 6A and 7A.



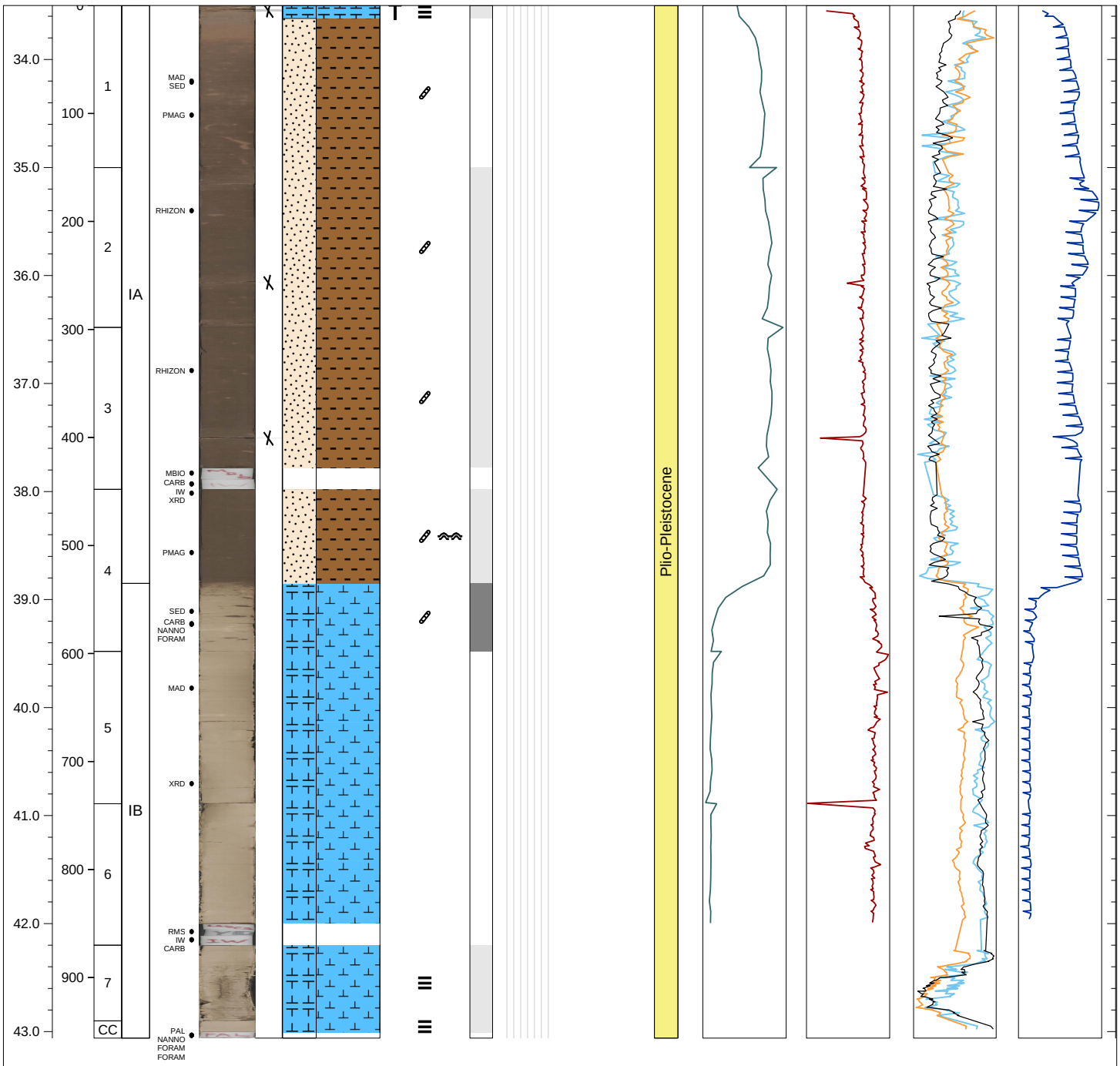
Hole 390-U1556C Core 4H, Interval 24.0-32.27 m (CSF-A)

Core 4H contains mainly brown (7.5YR 5/3) silty clay and pinkish white (7.5YR 8/2) calcareous nannofossil ooze. There are some light greenish gray (GLEY 1 8/5GY) diatom-rich thin laminations in 4A (2-8cm; 116-118cm; 124cm). Bioturbation is none to moderate, which is mostly in the form of burrows. Drilling disturbance is severe soupy in 1A, 2A and 3A.



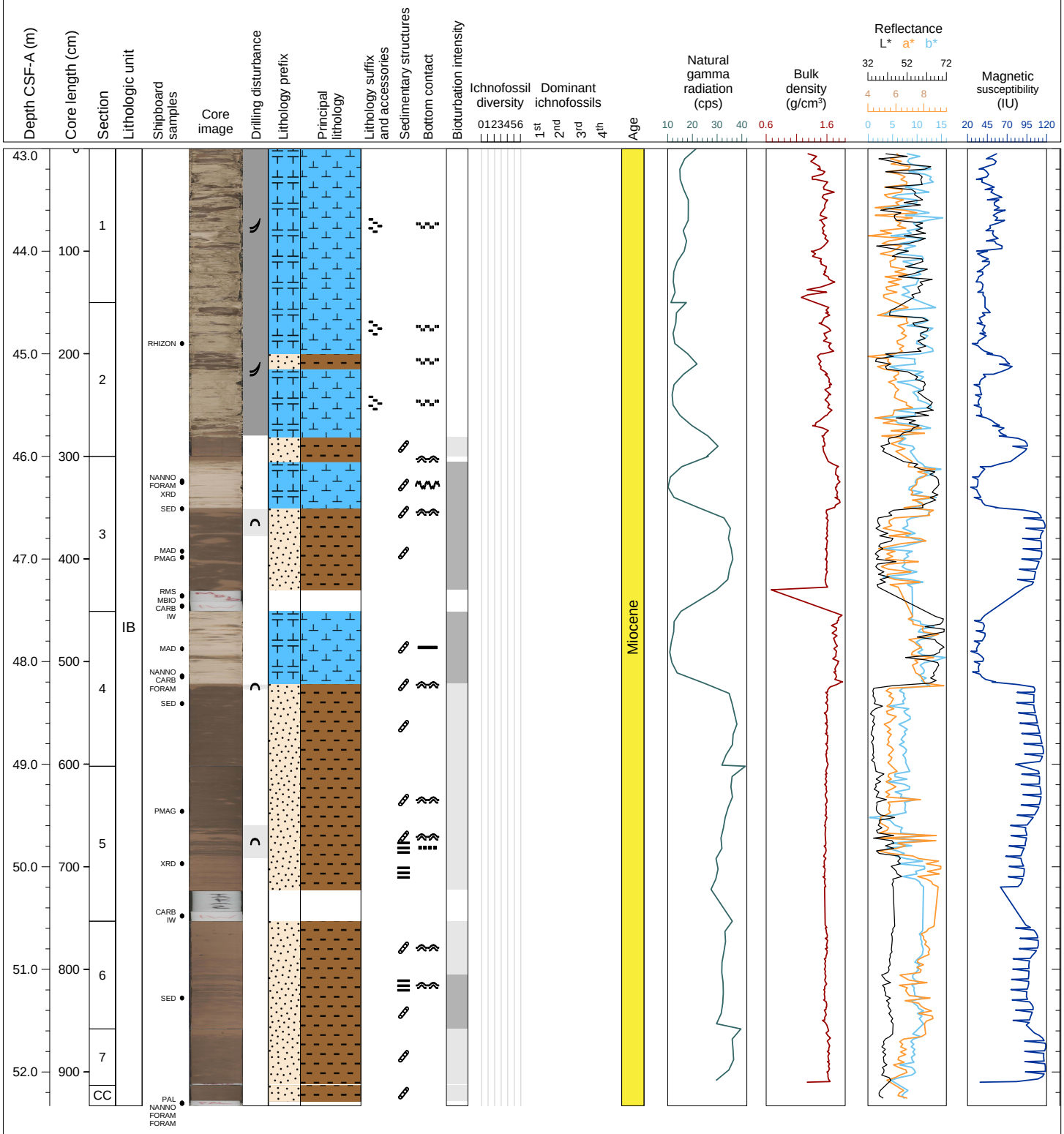
Hole 390-U1556C Core 5H, Interval 33.5-43.06 m (CSF-A)

Core 5H contains mainly brown (7.5YR 4/2) silty clay and pinkish white (7.5YR 8/2) calcareous nannofossil ooze. There are pale green diatom-rich laminations in 1A (2-12cm). There are some organic rich laminations in 7A. There are portions of the Core with none to moderate bioturbation, which is mostly in the form of burrows. Drilling disturbance has resulted in severe soupy in 7A, and slight voids in 1A, 2A, and 3A.



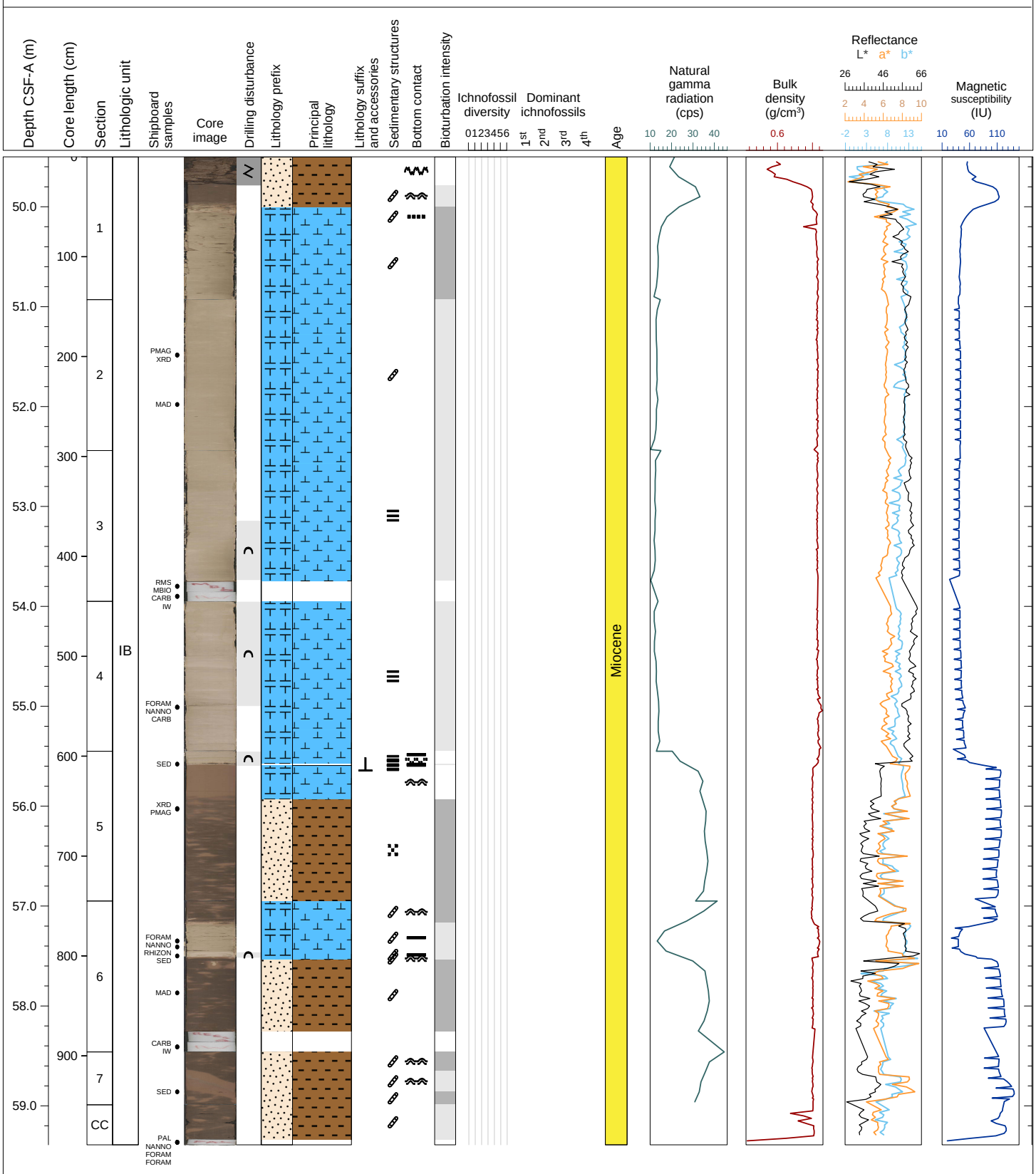
Hole 390-U1556C Core 6H, Interval 43.0-52.33 m (CSF-A)

Core 6H contains mainly brown (7.5YR 4/2, 5/3, 6/4, 6/3) silty clay and 10YR 8/2 (very pale brown) calcareous nannofossil ooze. The contact around 50.5 cm, or 50-50.5 cm, has white 1-2 mm spots containing foraminifera. 5A and 6A have thin to thick laminations. Drilling disturbance includes fall-in throughout 1H and 2H and slight up-arching in 3H,4H, and 5H.



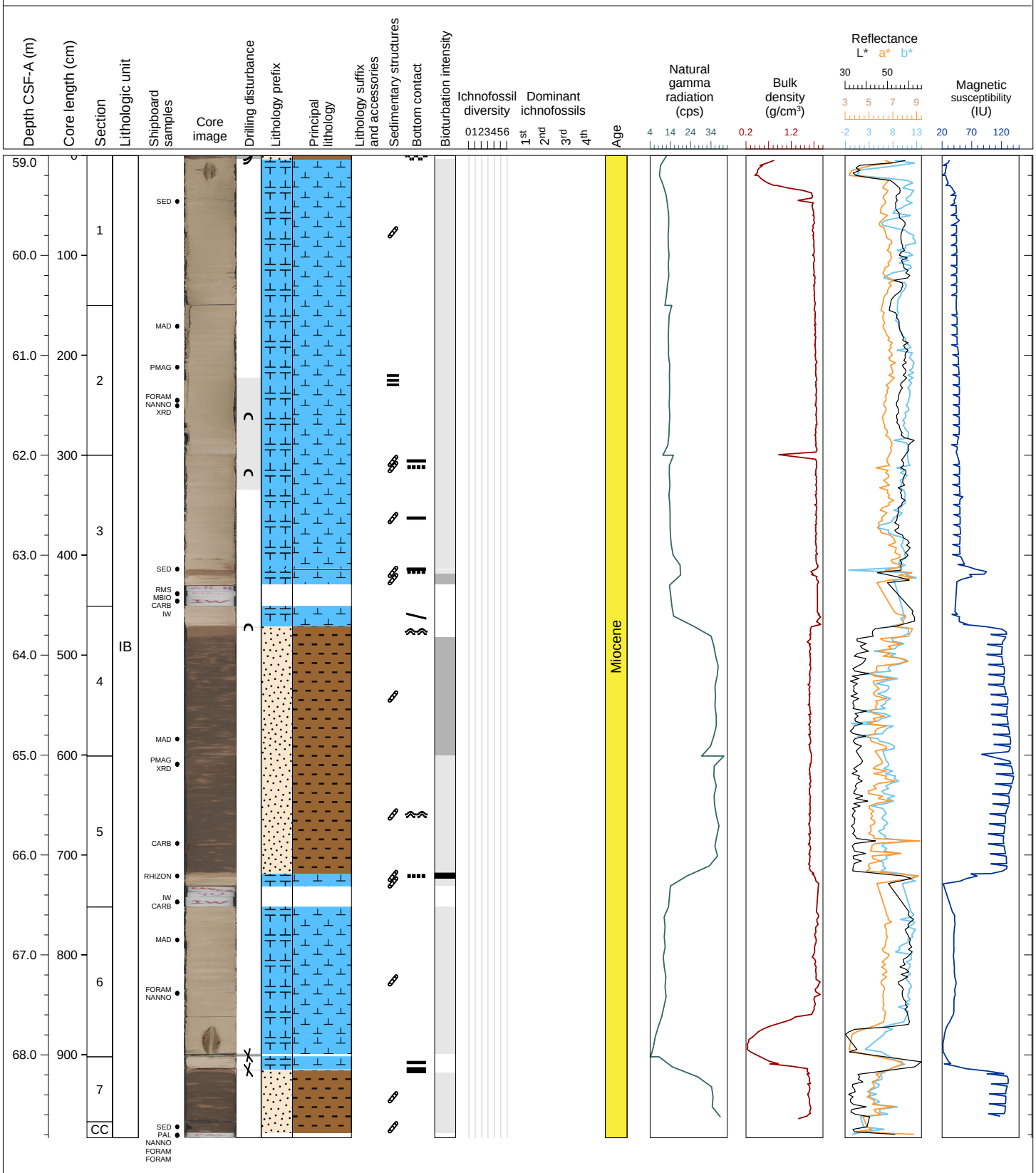
Hole 390-U1556C Core 7H, Interval 49.5-59.39 m (CSF-A)

Core 7H contains mainly pinkish gray and pinkish white (7.5YR 7/2, 8/2) calcareous nannofossil ooze and brown or light brown (7.5YR 4/2, 4/3, 6/4) silty clay. In 6A, the layer from 12.5 to 14.3 cm contains sediment composed of dark gray (7.5YR 4/1) organic-rich foraminiferal ooze with nannofossils, pinkish white (5YR 8/2) nannofossil-rich foraminiferal ooze, and pinkish gray (7.5YR 7/2) organic-rich foraminiferal ooze with nannofossils. 3A and 4A have thin laminations throughout. Drilling disturbance includes fall-in in 1A and 2H and slight up-arching in 3A,4A, 5A, and 6A.



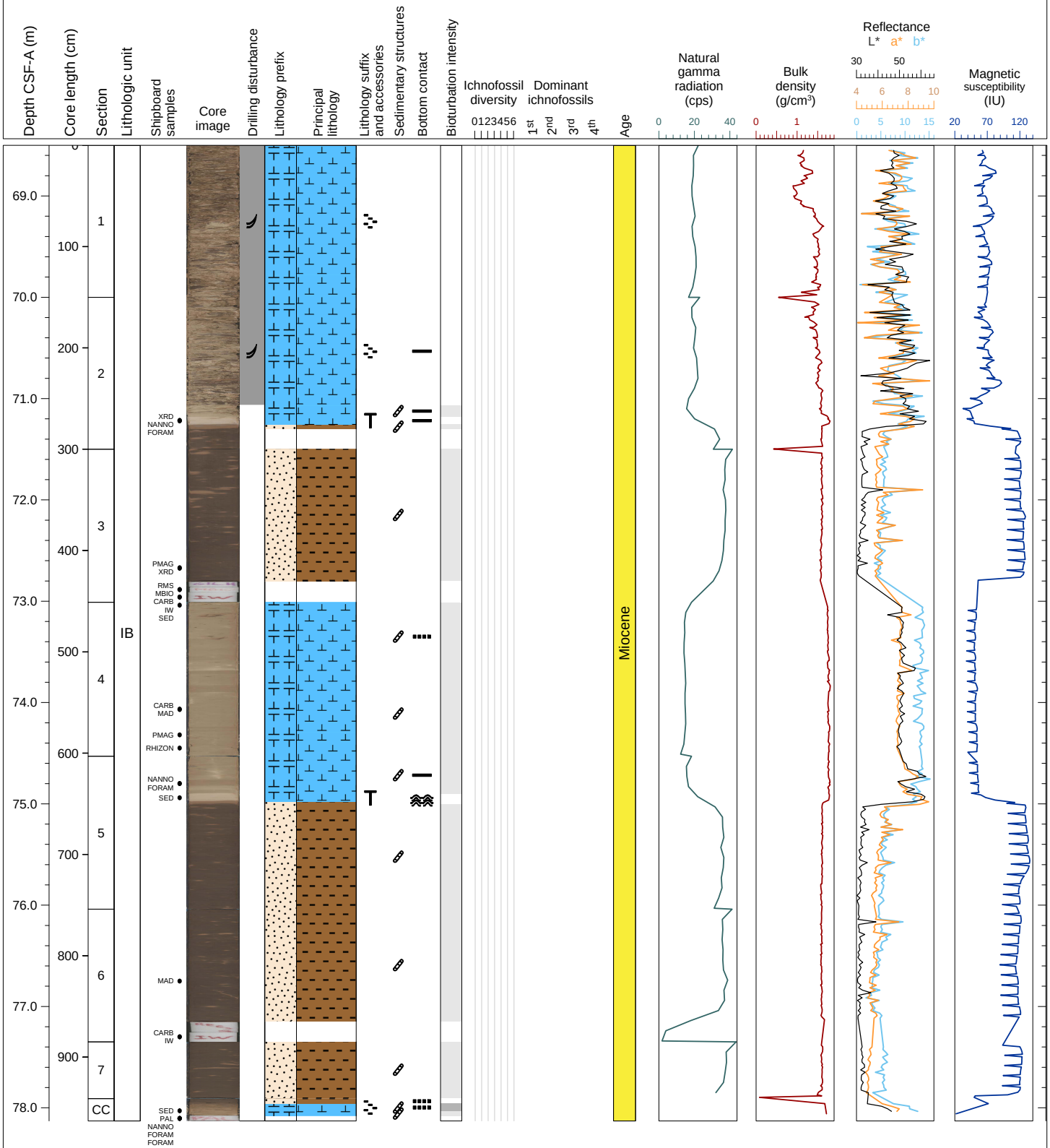
Hole 390-U1556C Core 8H, Interval 59.0-68.83 m (CSF-A)

Core 8H contains mainly pinkish gray and pinkish white (7.5YR 7/2, 8/2) calcareous nannofossil ooze and brown or light brown (7.5YR 4/2, 5/4, 4/3, 6/4) silty clay. In 3A, notably from ~113.5-114.5 cm, there is a white layer (7.5YR 8/1) of nannofossil-rich foraminiferal ooze. Bioturbation is generally sparse. Drilling disturbance includes slight up-arching,and voids in 6X and 7X.



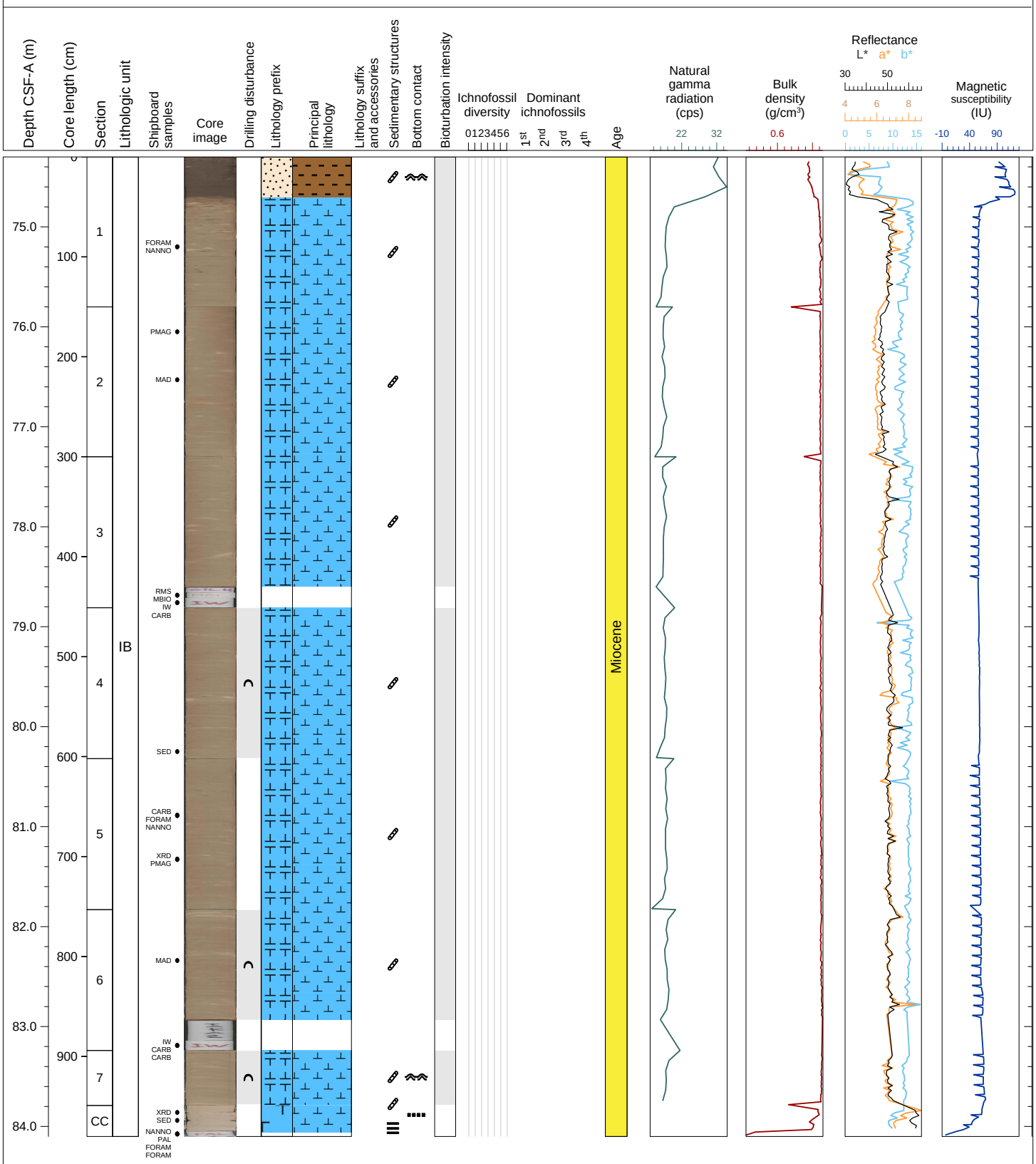
Hole 390-U1556C Core 9H, Interval 68.5-78.13 m (CSF-A)

Core 9H contains mainly brown or light brown (7.5YR 4/2) silty clay and pinkish gray and pinkish white (7.5YR 7/2, 6/2, 8/2) calcareous nannofossil ooze. In 2A and 5A, respectively, there is one ~7-8 cm thick pinkish white layer (7.5YR 8/2) of calcareous nannofossil ooze with foraminifera. Bioturbation is generally sparse. Drilling disturbance includes fall-in through 1A and most of 2A and slight up-arching in 5A.



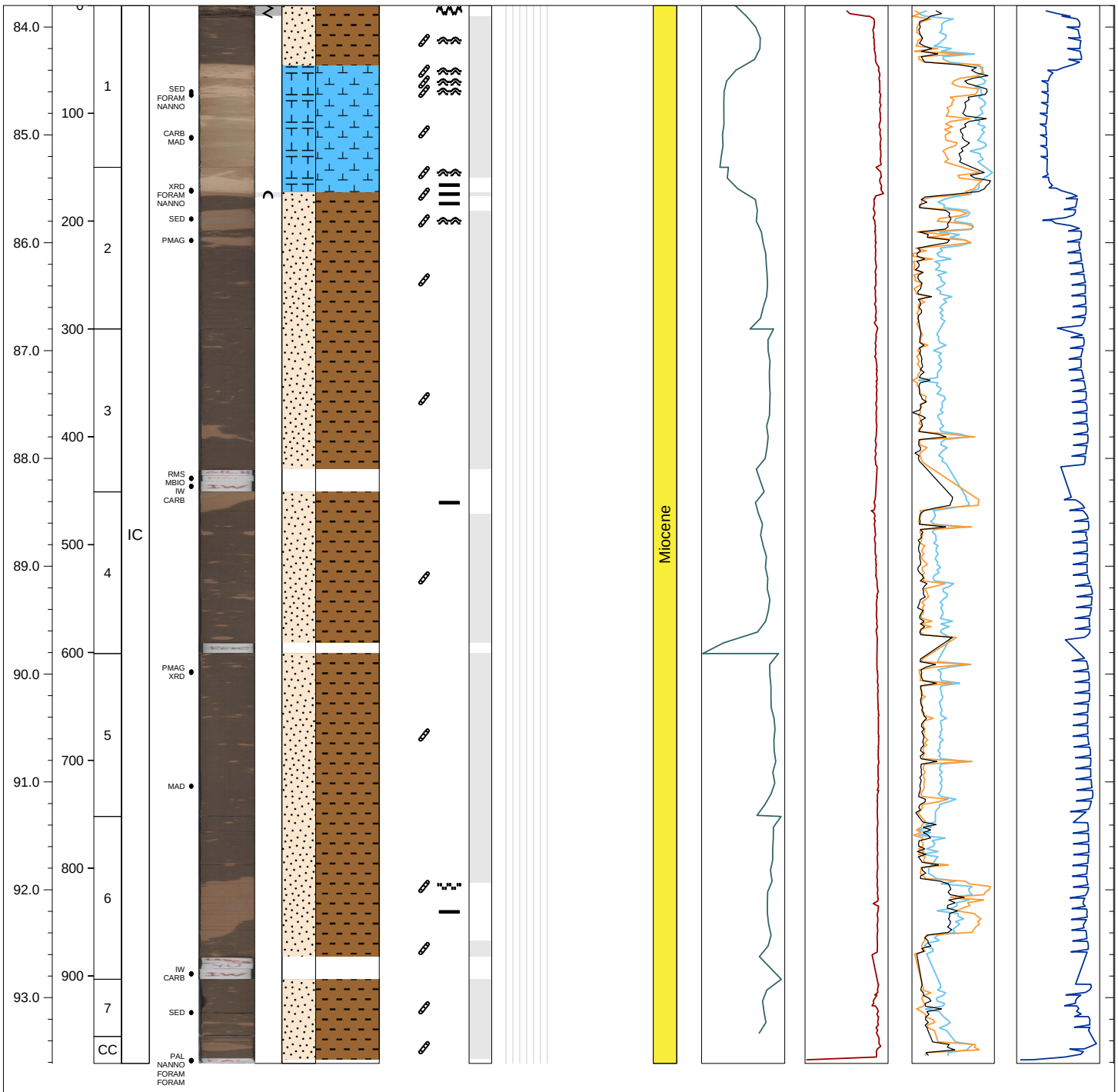
Hole 390-U1556C Core 10H, Interval 74.3-84.1 m (CSF-A)

Core 10H contains mainly pinkish gray and pinkish white (7.5YR 7/2, 8/2, 6/3) calcareous nannofossil ooze. The CC contains pinkish white (7.5YR 8/2) foraminiferal nannofossil ooze. Section 1A contains brown (7.5YR 4/2) silty clay above 40.5 cm. Bioturbation is generally sparse. Drilling disturbance includes slight up-arching in 4A, 5A, and 6A.



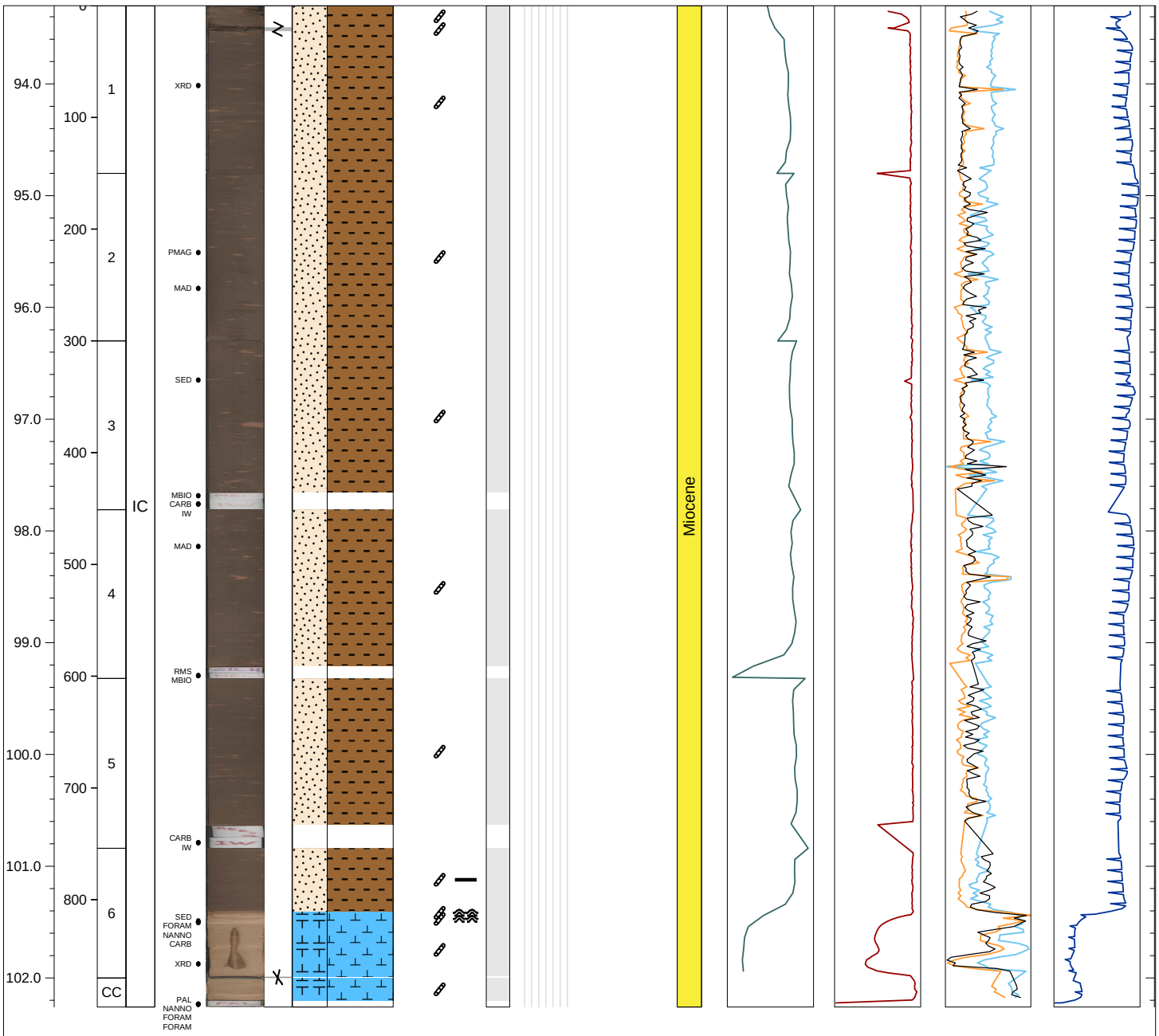
Hole 390-U1556C Core 11H, Interval 83.8-93.61 m (CSF-A)

Core 11H contains mainly brown silty clay (7.5YR 4/2, 5/3). In addition, 1A and 2A contain pinkish gray and pinkish white (7.5YR 8/2, 7/2) calcareous nannofossil ooze. In 2A, from 47 to 51 cm there is a light gray haze on surface; this is also silty clay (based on smear slide). Bioturbation is generally sparse. Apparent drilling disturbance includes fragmentation in top 10 cm of 1A and slight up-arching in 2A.



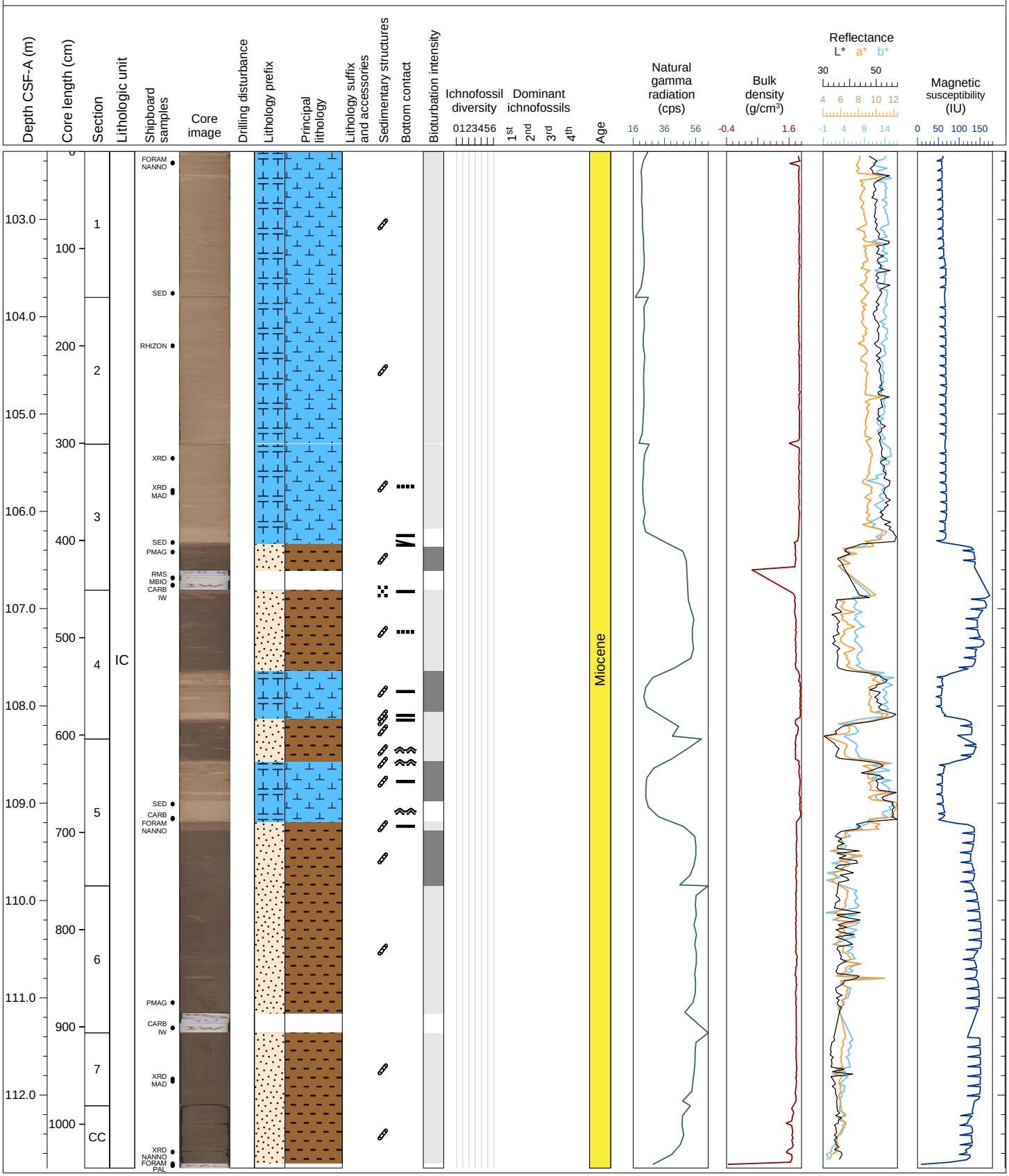
Hole 390-U1556C Core 12H, Interval 93.3-102.26 m (CSF-A)

Core 12H contains mainly brown silty clay (7.5YR 4/2). Sections 6A and CC contain also pink, light reddish brown and light brown (5YR 7/3, 6/4, 7.5YR 6/4) calcareous nannofossil ooze. Bioturbation is generally sparse. Apparent drilling disturbance includes severe fragmentation in 1A and a void (destroyed) in 6A.



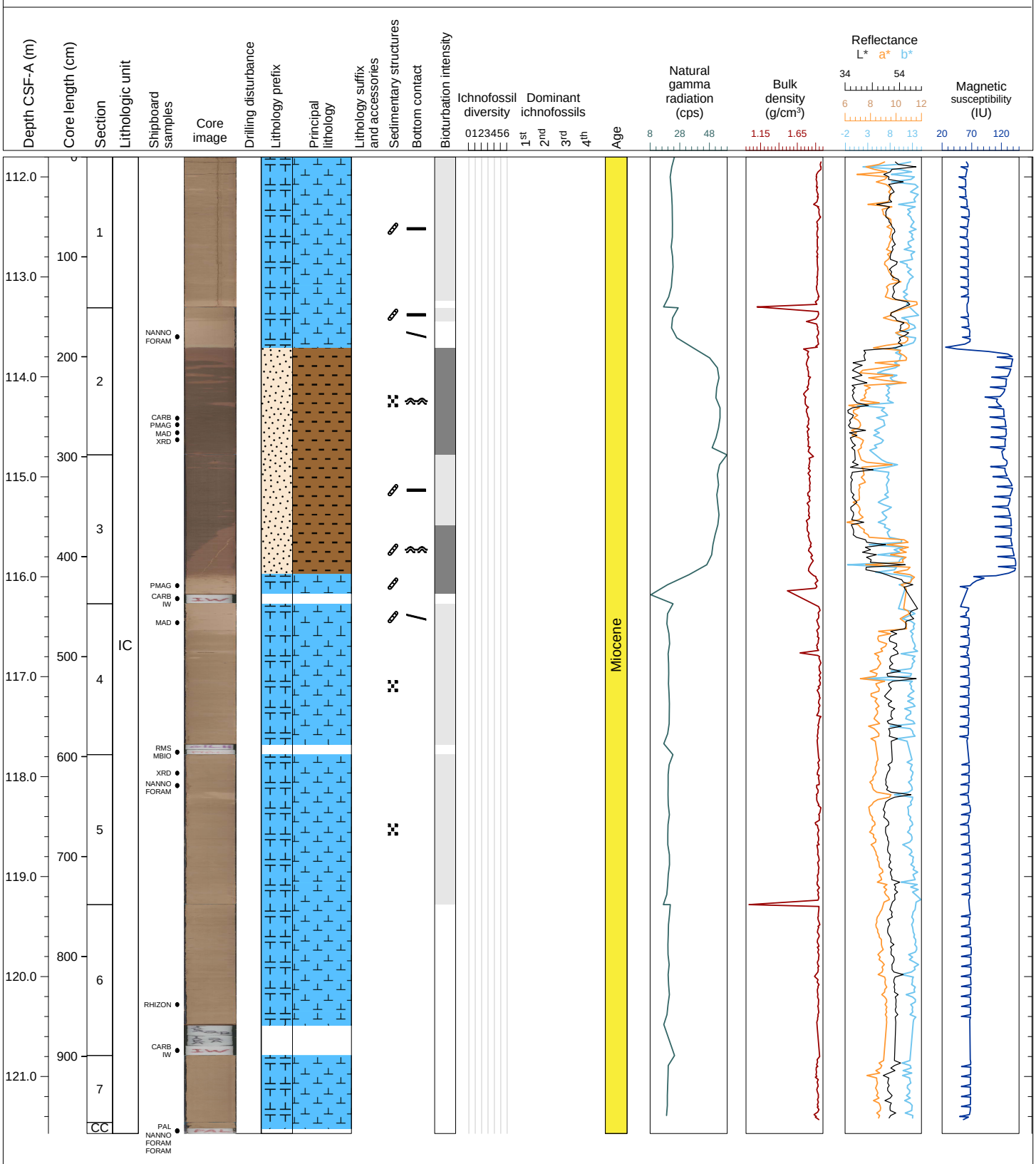
Hole 390-U1556C Core 13H, Interval 102.3-112.75 m (CSF-A)

Core 13H contains brown (7.5YR 4/2, 5/3) silty clay and light brown (7.5YR 6/4) calcareous nannofossil ooze. There is a thin bed of pinkish white foraminiferal nannofossil ooze in 3A (101-102cm). Bioturbation includes portions with sparse to moderate burrows. Drilling disturbance has resulted in slight up-arching in 5A.



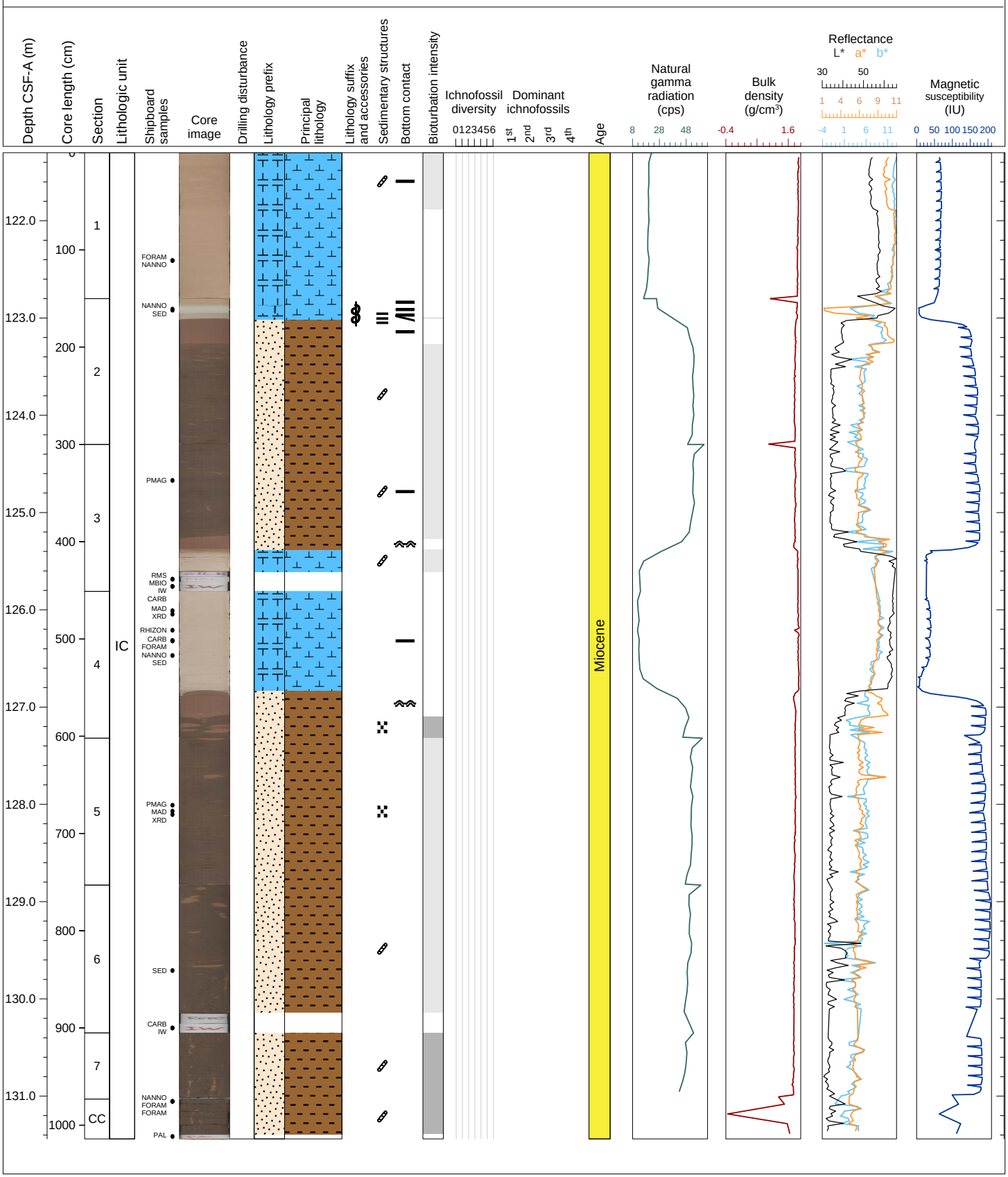
Hole 390-U1556C Core 14H, Interval 111.8-121.57 m (CSF-A)

Core 14H contains mainly pink (7.5YR 7/3) calcareous nannofossil ooze and reddish brown (5YR 5/3) silty clay. There is a highly inclined bottom contact in 3A (71 to 106cm). There are portions of the Core with none to moderate trace or mottling bioturbation. No drilling disturbance was observed.



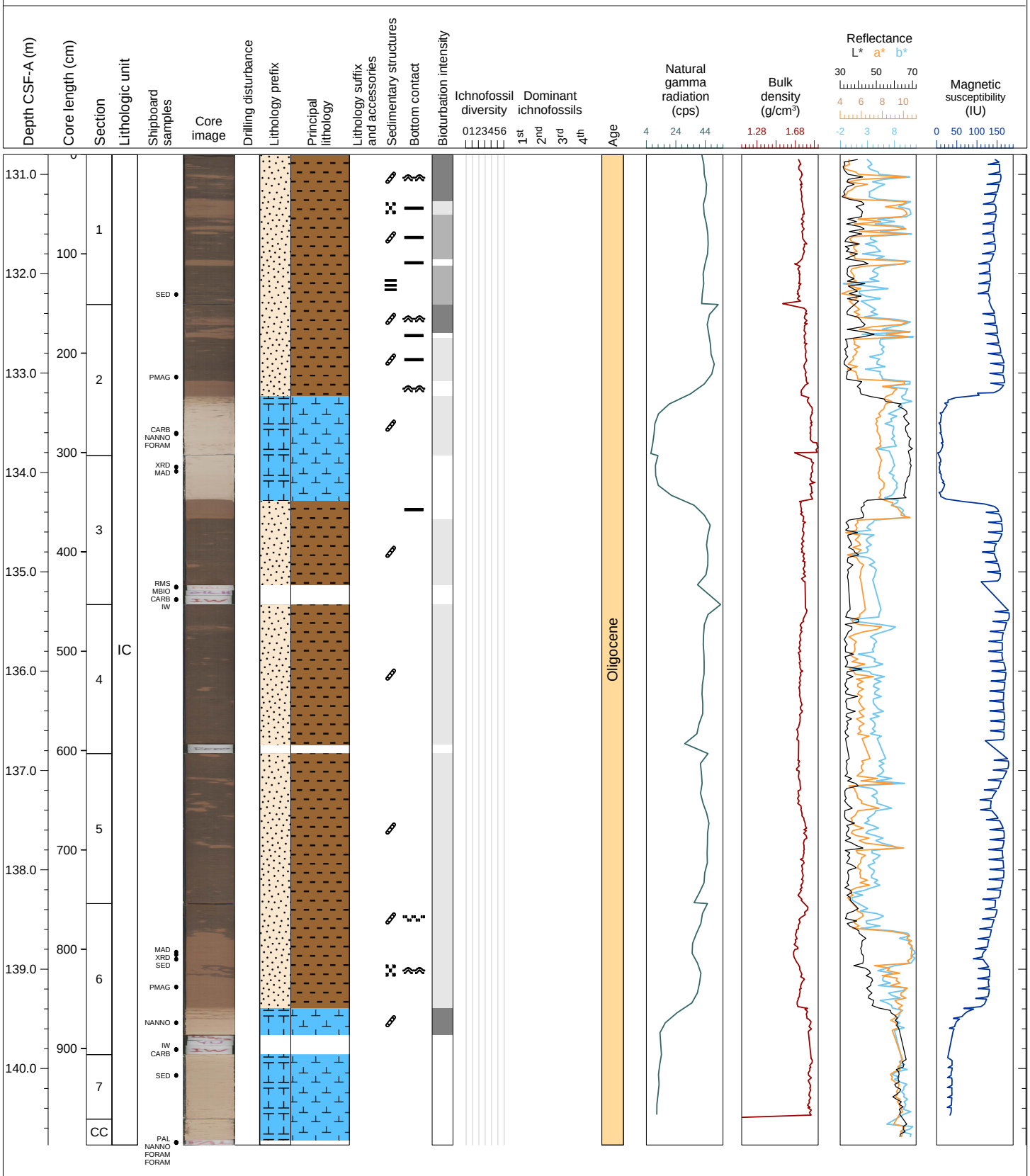
Hole 390-U1556C Core 15H, Interval 121.3-131.44 m (CSF-A)

Core 15H contains mainly brown (7.5YR 5/4) or reddish brown (5YR 5/3) silty clay and pink (5YR 7/3) to pinkish white (5YR 8/2) calcareous nannofossil ooze. There are layers of light greenish gray (GLEY 1 8/10GY) foraminiferal nannofossil ooze with bioclasts in 2A (8-15cm; 19-21cm). There are portions of the Core with none to low trace and burrow bioturbation. Drilling disturbance was not observed.



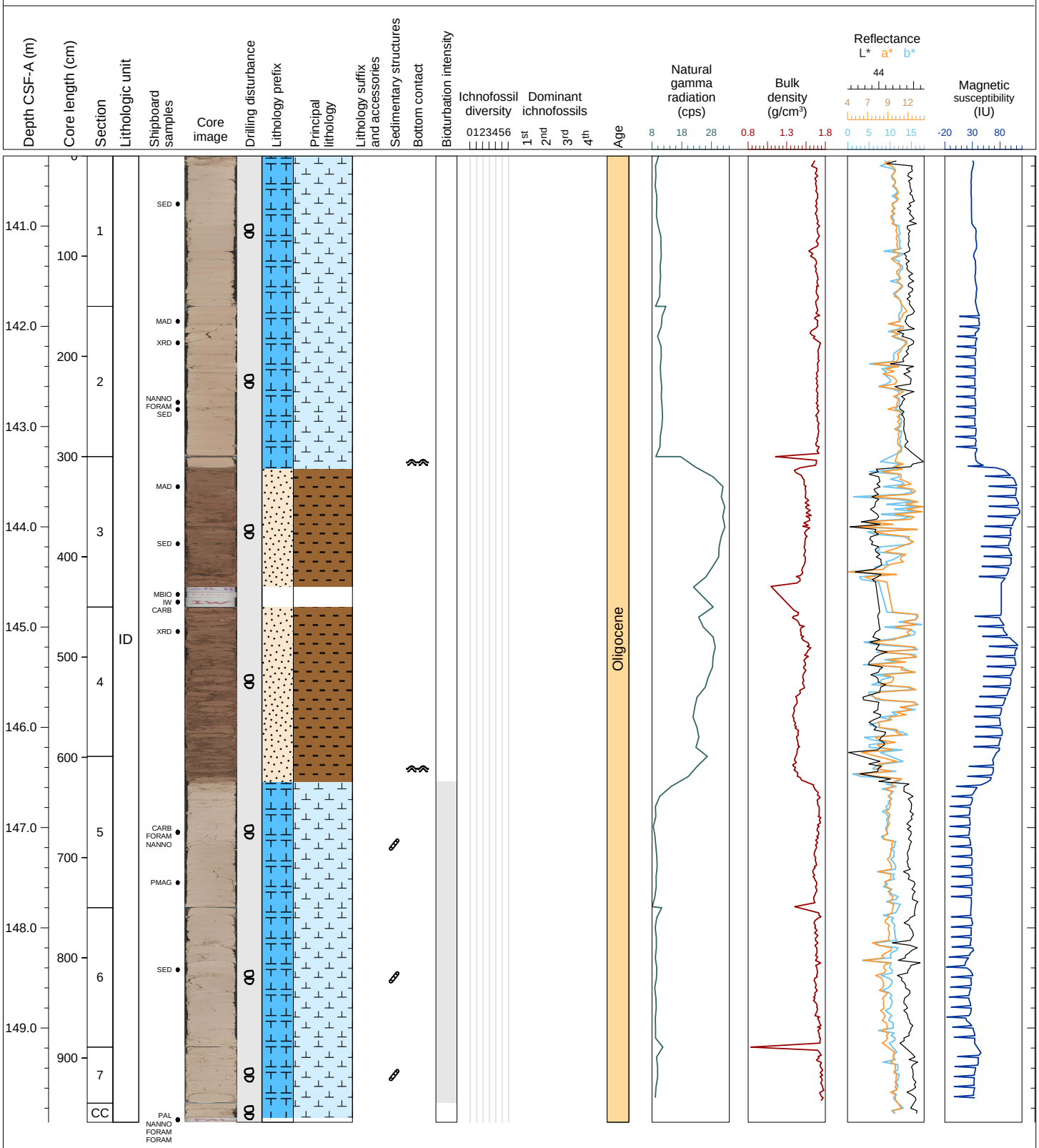
Hole 390-U1556C Core 16H, Interval 130.8-140.77 m (CSF-A)

Core 16H contains mainly brown (7.5YR 5/4) or reddish brown (5YR 5/3) silty clay and pinkish white (5YR 8/2) calcareous nannofossil ooze. Most of the brown (5YR 5/3) silty clay does not exhibit obvious bioturbation. There are portions of 16H with sparse to moderate trace or burrow bioturbation, specifically in the reddish brown (5YR 5/3) silty clay and the pinkish white (5YR 8/2) calcareous nannofossil ooze. Drilling disturbance was not observed.



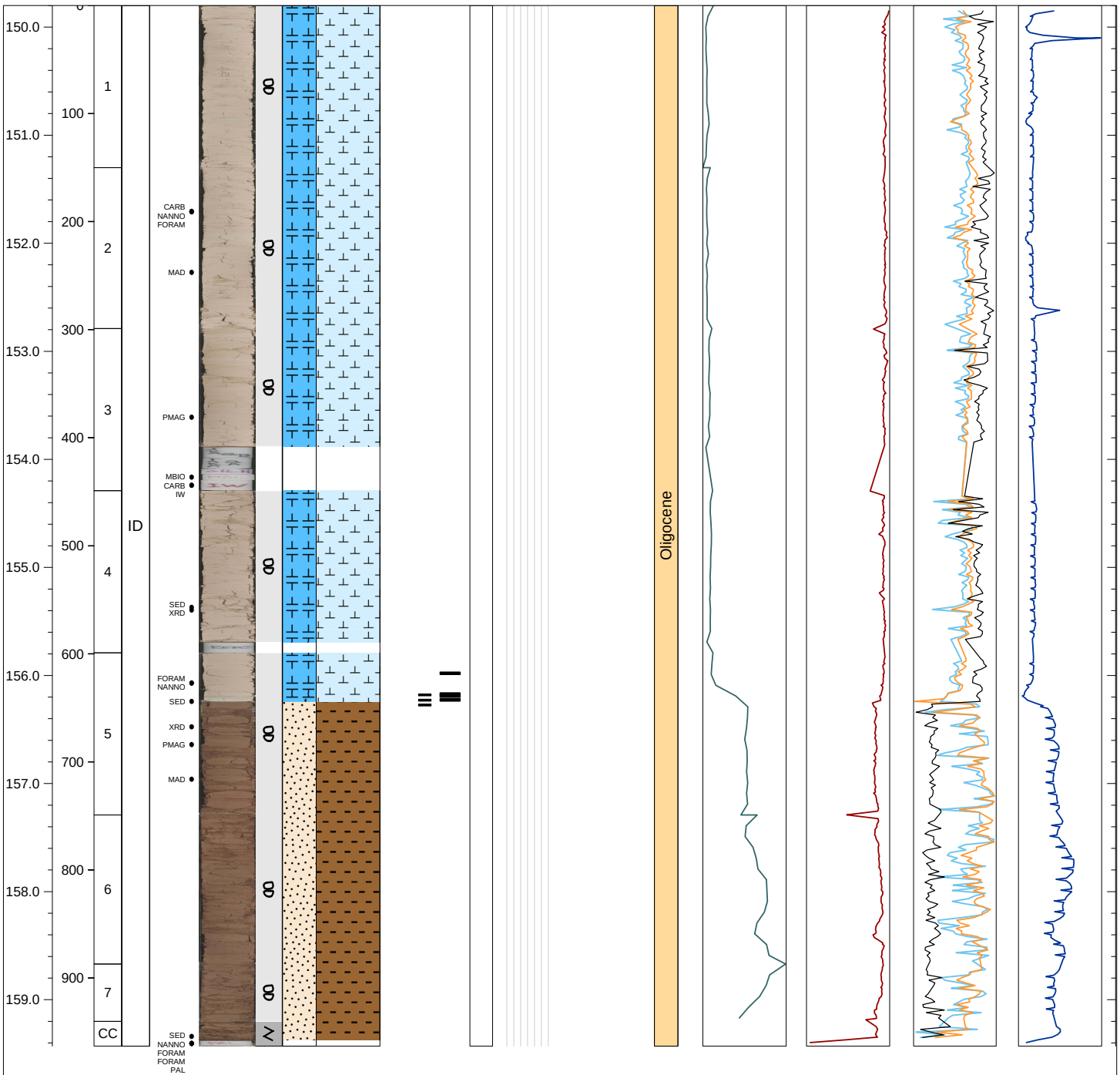
Hole 390-U1556C Core 17X, Interval 140.3-149.94 m (CSF-A)

Core 17X contains mainly pinkish white or pink (7.5 YR 8/2, 8/3) calcareous nannofossil chalk and brown (7.5YR 5/4, 5/3) or reddish brown (5YR 5/3) silty clay. The Core contains moderately consolidated chalk instead of ooze as appears in prior Cores. Dark organic-rich drilling fluid is scattered over at least Sections 1A to 3A. The drilling fluid appears as dots or dustiness, splotches, or flow features in the oozes between some biscuits. In the silty clay, drilling fluid appears as splotches or smears as a dusting on the surface. Bioturbation is either none or sparse. Drilling disturbance throughout the Core includes slight biscuits.



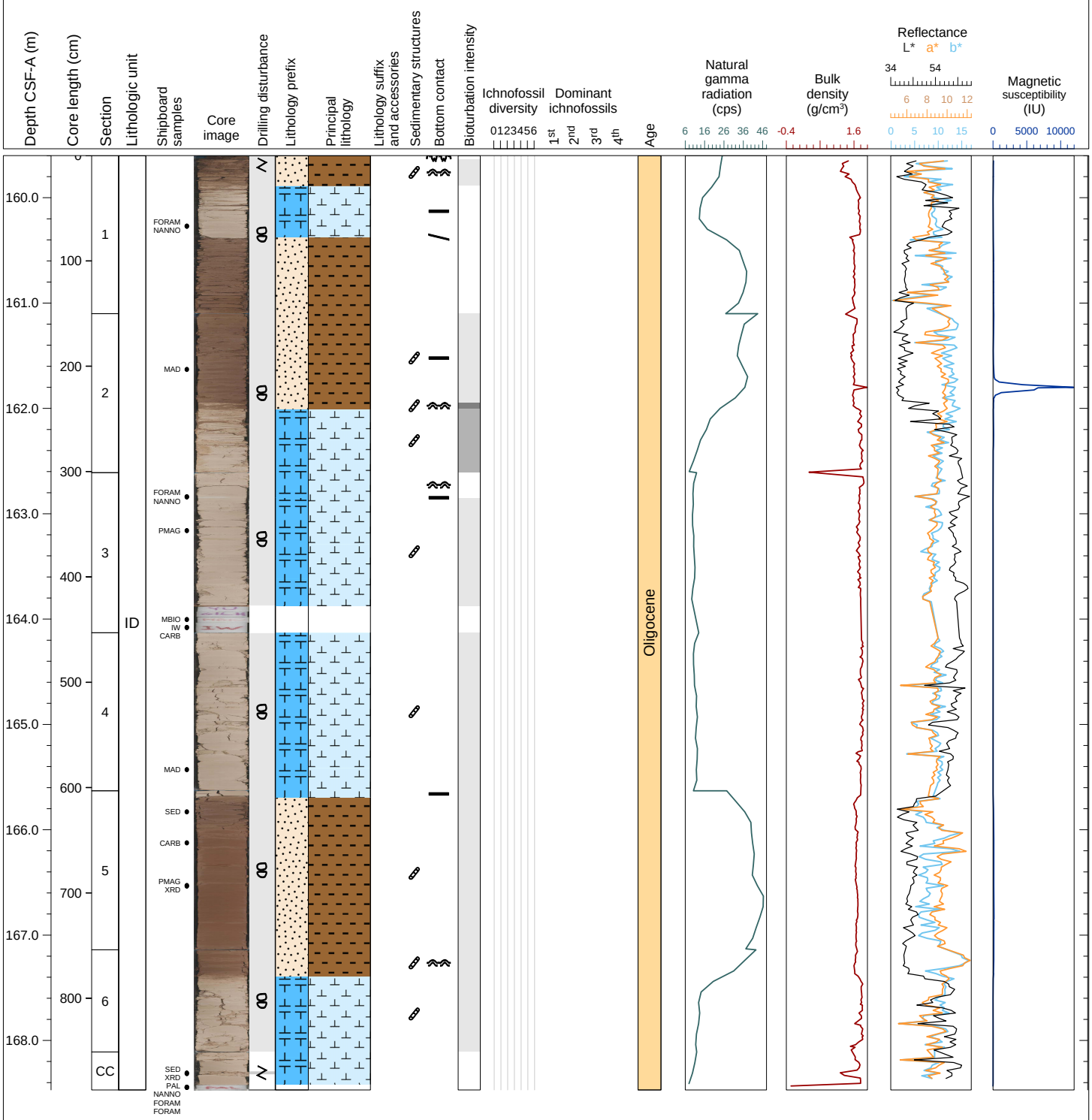
Hole 390-U1556C Core 18X, Interval 149.8-159.43 m (CSF-A)

Core 18X contains mainly pinkish white (7.5 YR 8/2) calcareous nannofossil chalk and reddish brown (5YR 5/4) or reddish brown (5YR 5/3) silty clay. Notably, from about 38 to 45.3 cm, light greenish gray (GLEY 1 8/10GY) foraminiferal nannofossil chalk occurs as either laminations or throughout. Bioturbation is lacking. Drilling disturbance includes slight biscuits throughout the Core, except in the CC where fragmentation is severe.



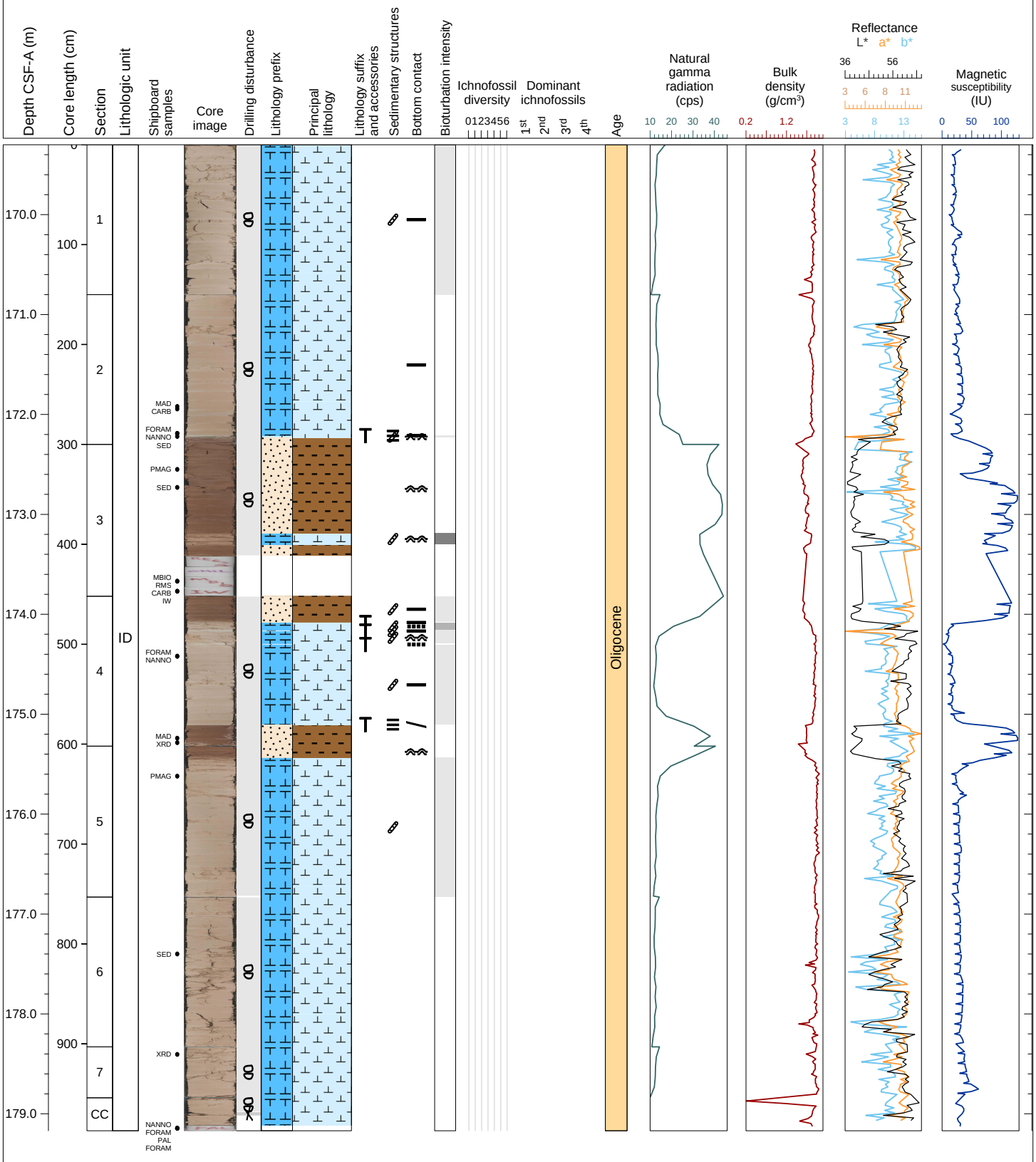
Hole 390-U1556C Core 19X, Interval 159.6-168.47 m (CSF-A)

Core 19X contains alternating pinkish white (7.5 YR 8/2) calcareous nannofossil chalk and brown (7.5YR 5/3) silty clay. Notably, there are areas of light greenish gray (GLEY 1 8/5GY) sediment <1 cm thick in 1A and 3A, but of smaller sizes in other Sections, which may include foraminifera. Bioturbation is typically none or sparse. Drilling disturbance throughout the Core includes slight biscuits, and also fragmentation in 1A and C.



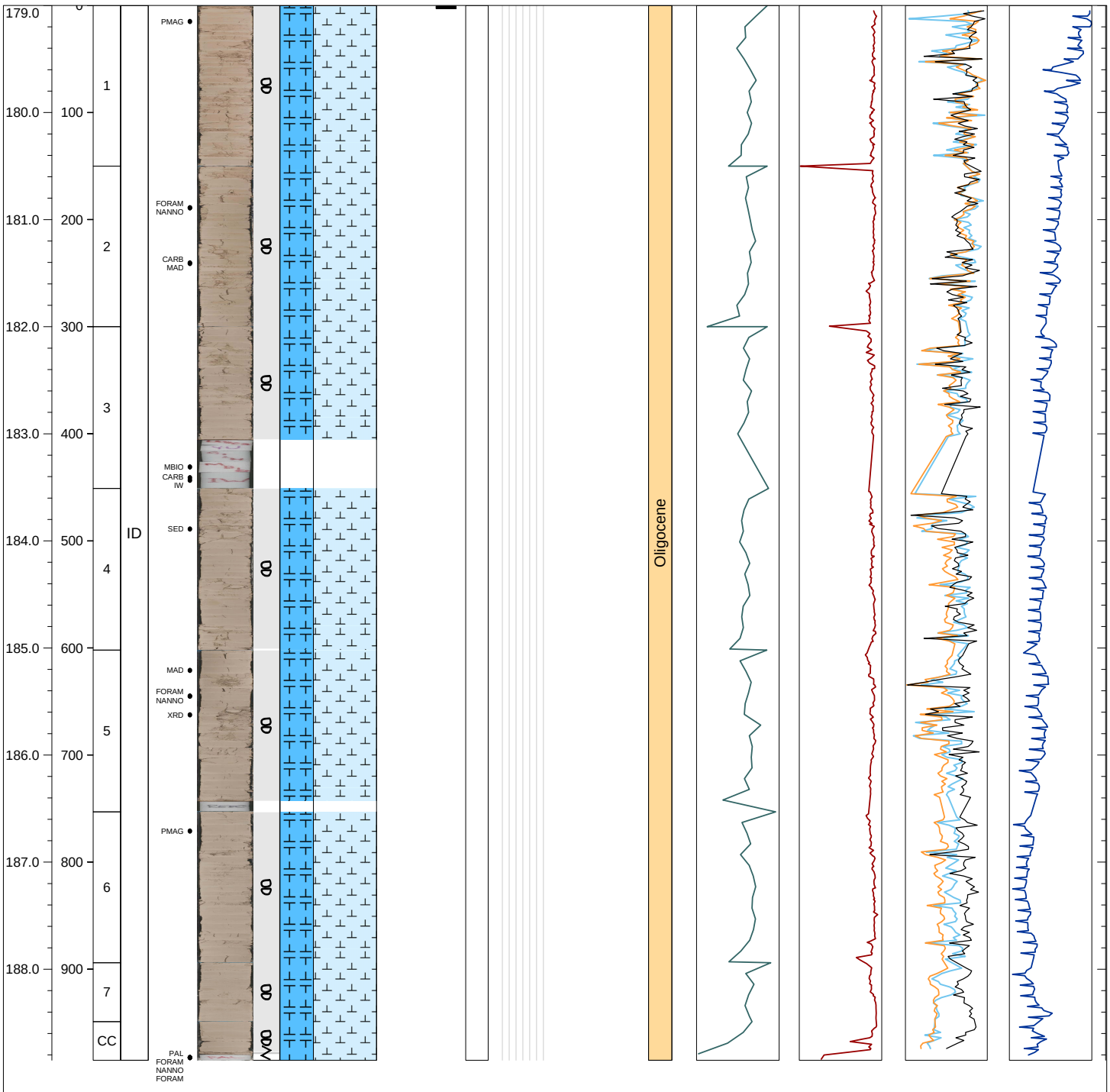
Hole 390-U1556C Core 20X, Interval 169.3-179.17 m (CSF-A)

Core 20X contains mainly pinkish white (7.5 YR 8/2, 5YR 8/2) calcareous nannofossil chalk, and brown (7.5YR 5/4) silty clay. In addition, in 2A and 4A there are layers of light greenish gray (GLEY 1 8/5GY), grayish green (GLEY 1 5/5G), and greenish gray (GLEY 1 6/5GY) nannofossil chalk with foraminifera. Bioturbation is typically none or sparse. Drilling disturbance includes slight biscuits and surface fracturing throughout the Core.



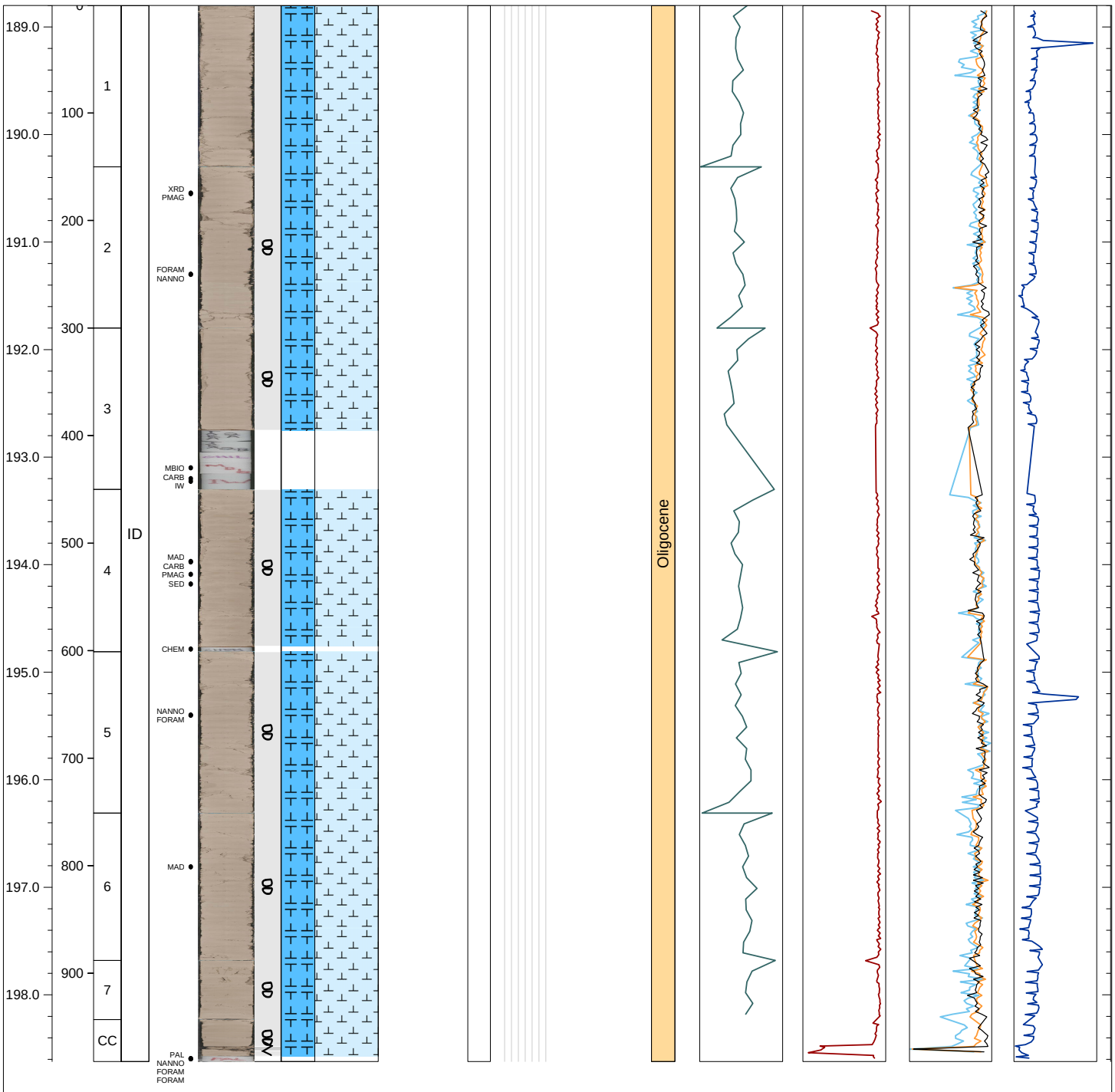
Hole 390-U1556C Core 21X, Interval 179.0-188.85 m (CSF-A)

Core 21X contains all pinkish white (7.5 YR 8/2) calcareous nannofossil chalk. In 6A until ~71 cm, there are a few scattered light greenish gray sediments as thin (<0.3 mm) lines <1 cm long. Bioturbation is described as none, but may be difficult to see given lack of contrast in the sediment. Also, it is difficult to distinguish what may be bioturbation from biscuit effects from drilling, which is throughout the Core. Drilling disturbance includes slight biscuits and surface fracturing throughout Core.



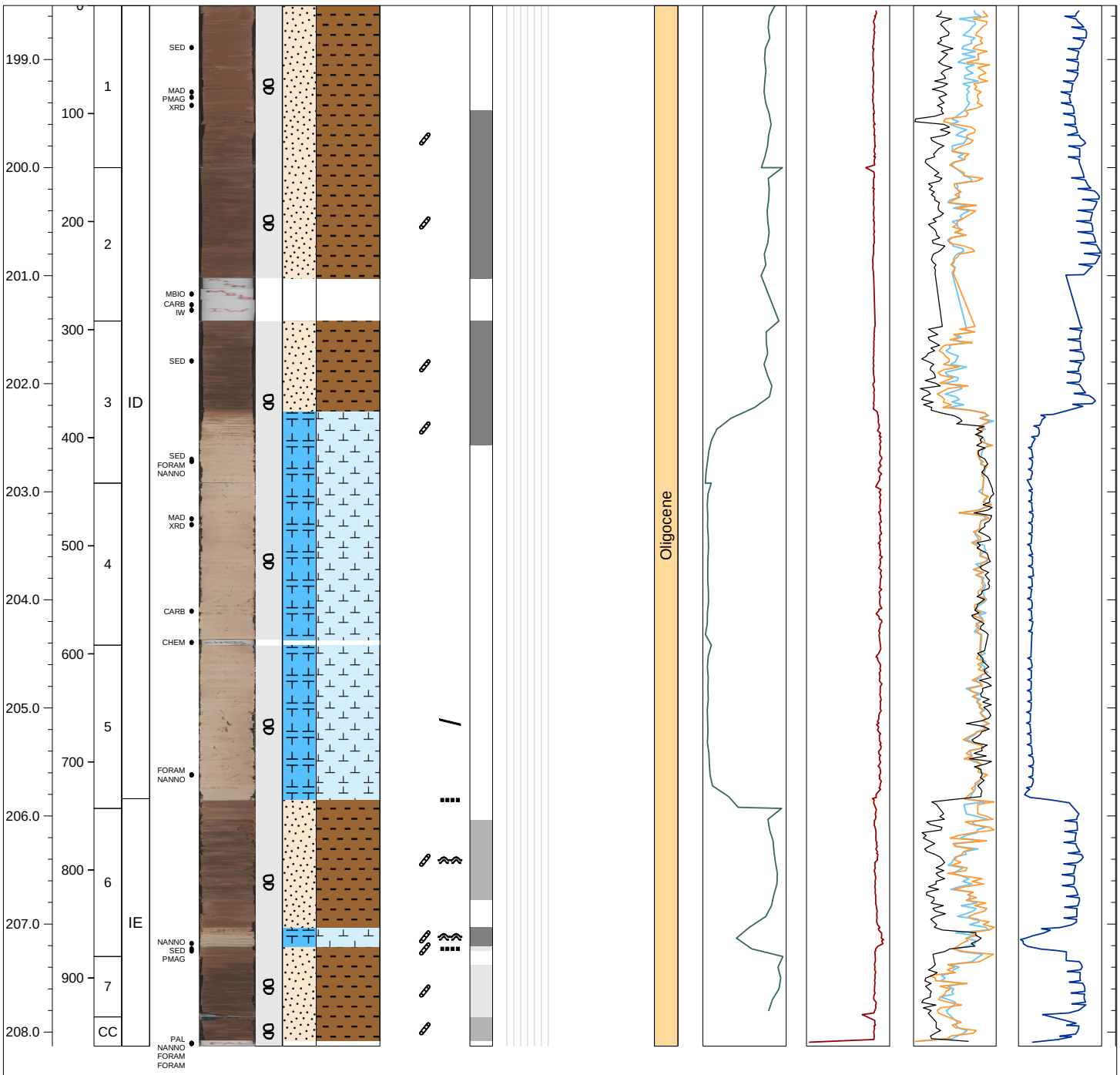
Hole 390-U1556C Core 22X, Interval 188.8-198.62 m (CSF-A)

Core 22X contains all pinkish white (7.5 YR 8/2) calcareous nannofossil chalk. In 2A,6A, and in the CC there are a few scattered light greenish gray (GLEY 1 8/5GY) thin lines or spots less than a few cm in length. Bioturbation is noted as none, but may be difficult to see given lack of contrast in the sediment. Also, it is difficult to distinguish what may be bioturbation from biscuit effects from drilling. Drilling disturbance includes slight biscuits throughout Core.



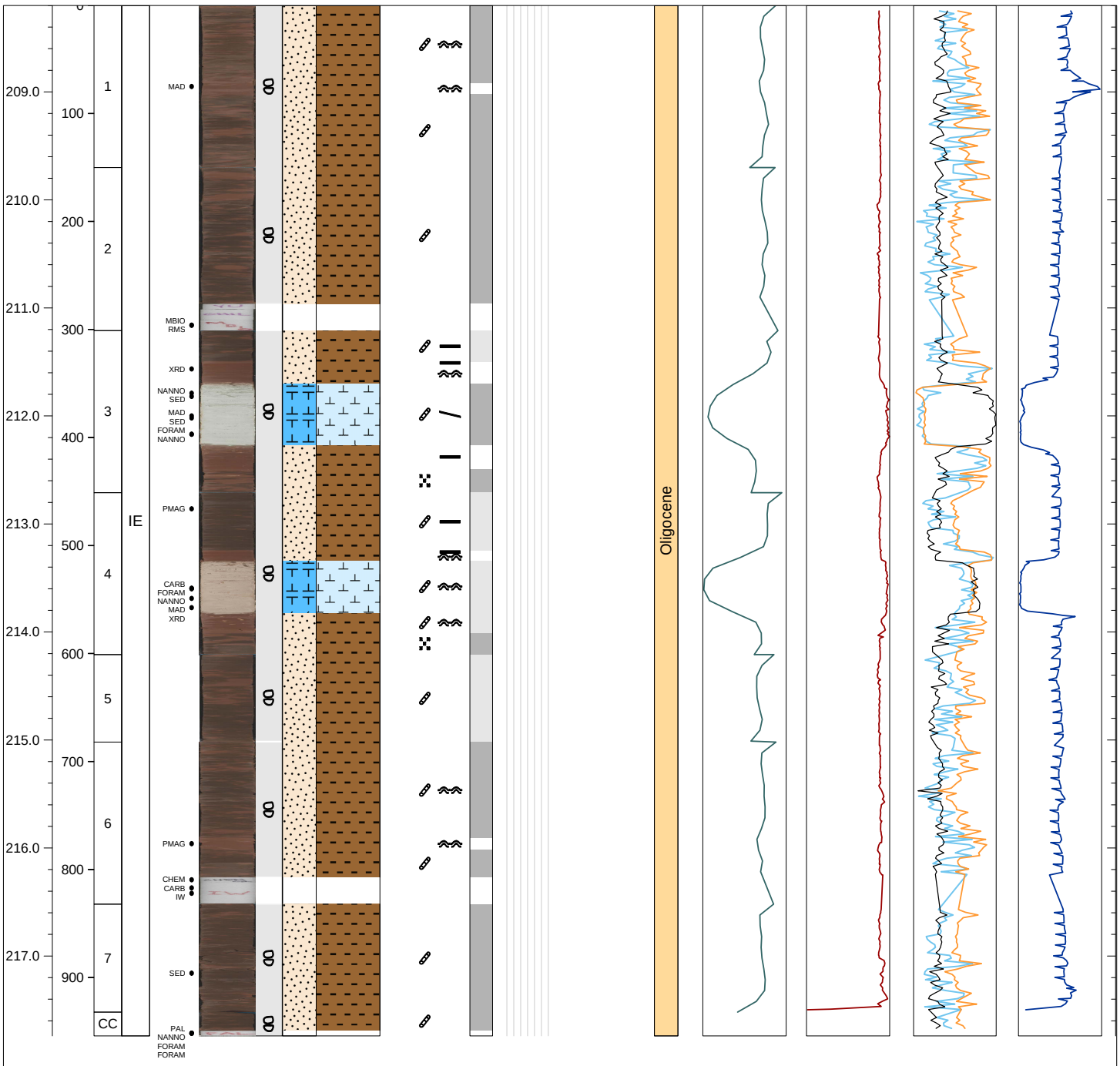
Hole 390-U1556C Core 23X, Interval 198.5-208.13 m (CSF-A)

Core 23X contains mainly reddish brown (5YR 4/4) to dark reddish gray (5YR 4/2) silty clay and pinkish white (7.5YR 8/2) calcareous nannofossil chalk. There are organic-rich blackish thin laminations in 3A. Moderate bioturbation includes trace or burrows in the dark reddish gray (5YR 4/2) silty clay, but none observed in reddish brown (5YR 4/4) and pinkish white (7.5YR 8/2) calcareous nannofossil chalk in 4A, 5A. Drilling disturbance includes slight biscuits throughout Core.



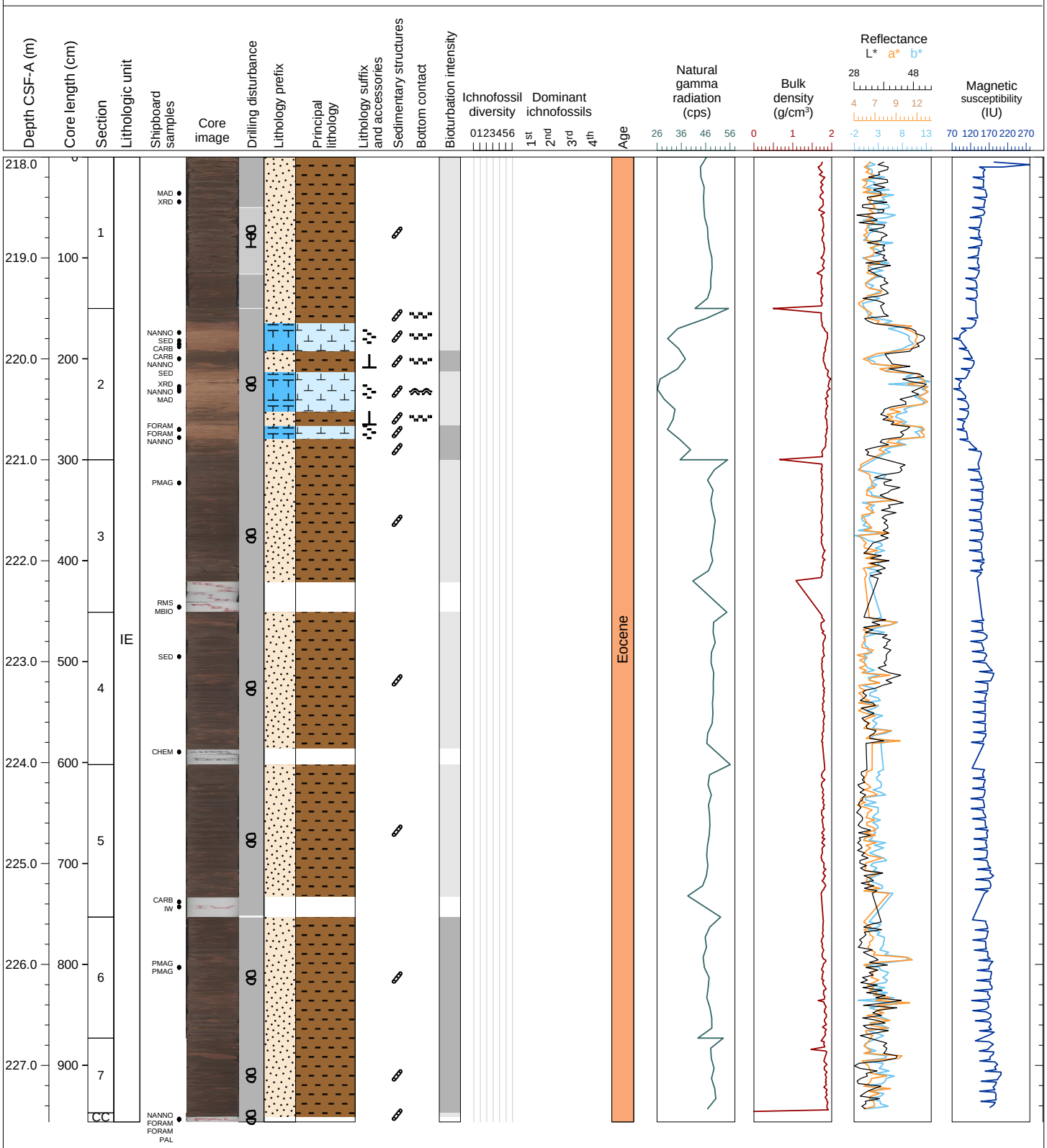
Hole 390-U1556C Core 24X, Interval 208.2-217.74 m (CSF-A)

Core 24X contains mainly dark reddish gray (5YR 4/2) to reddish brown (5YR 4/3) silty clay. In 4A there is pinkish white (7.5YR 8/2) calcareous nannofossil chalk and in 3A light greenish gray (GLEY 2 8/5BG) calcareous nannofossil chalk. Black scattered spherical spots in 5A, 6A, 7A and CC are assumed to contain organic matter. Bioturbation includes none to low bioturbation as trace or burrows and mottling. Drilling disturbance includes slight biscuits throughout the Core.



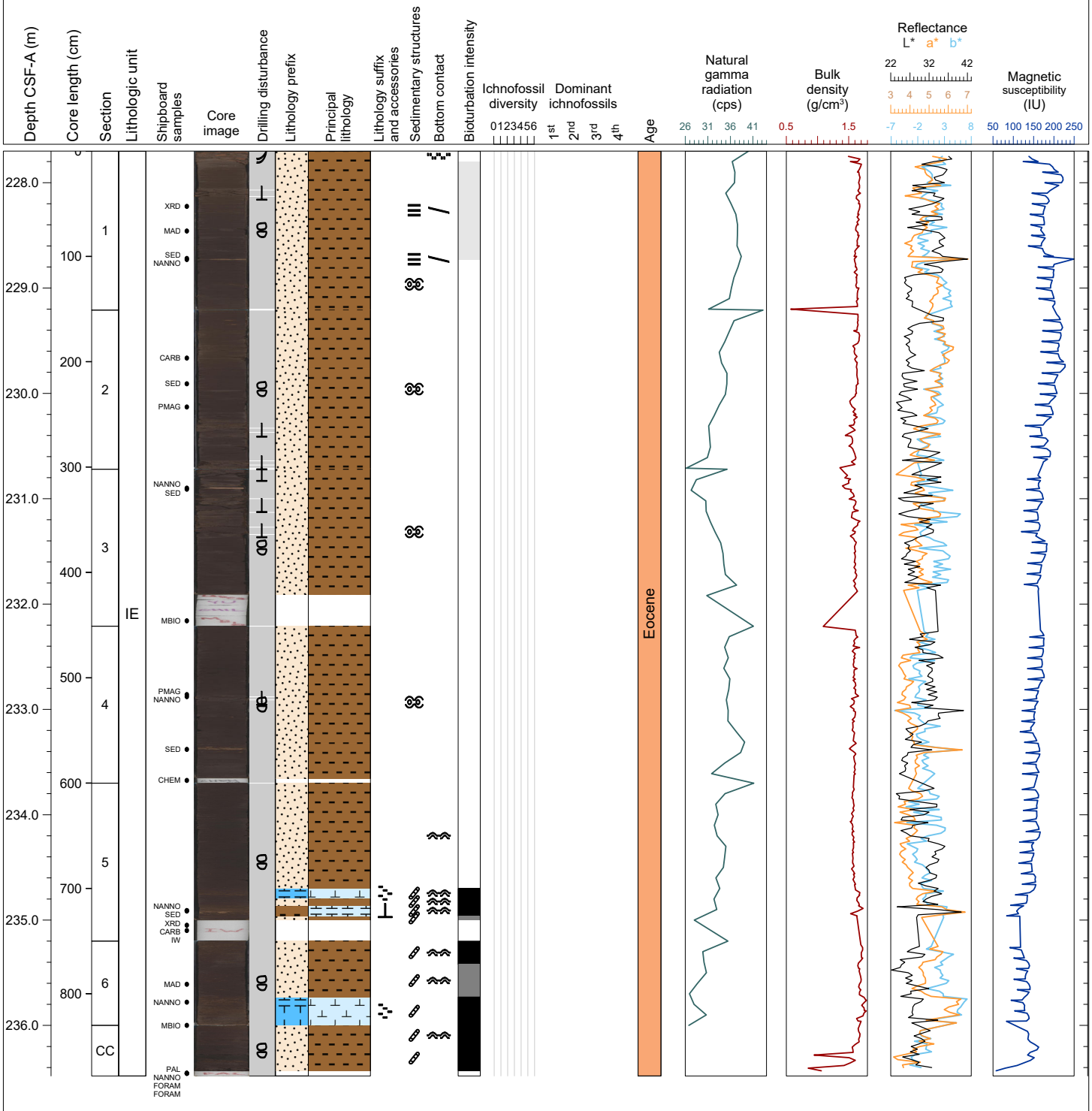
Hole 390-U1556C Core 25X, Interval 218.0-227.56 m (CSF-A)

Core 25X contains mainly dark reddish gray (5YR 4/2) silty clay and light reddish brown (5YR 6/4) calcareous nannofossil chalk. Scattered black spots (assumed organic matter) are only observed in the dark reddish gray (5YR 4/2) silty clay and not in the brighter reddish brown (5YR 4/4) silty clay. Bioturbation is noted as none to low, but may be difficult to see due to severe drilling disturbance. Drilling disturbance includes severe biscuits throughout Core.



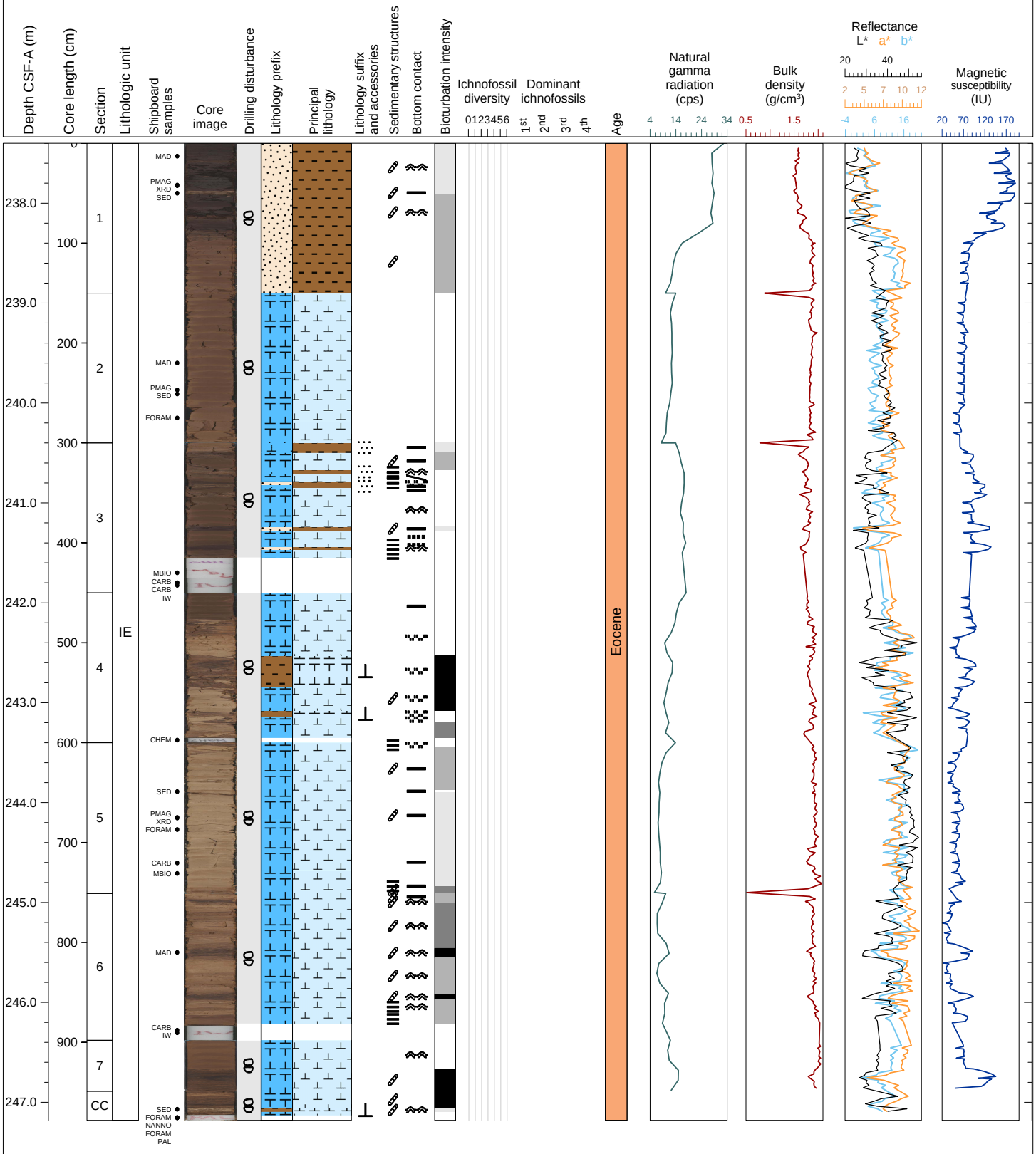
Hole 390-U1556C Core 26X, Interval 227.7-236.48 m (CSF-A)

Core 26X contains mainly dark brown (7.5YR 3/2) silty clay. There are lens and pods in 1A, 3A, and 4A that include light reddish brown (5YR 6/4) silty clay with silicate minerals of biotite. Bioturbation is none to low in dark brown (7.5YR 3/2) silty clay, and high in 6A and CC. Drilling disturbance includes moderate biscuits throughout the Core and moderate fractures in 1A, 2A, 3A, and 4A.



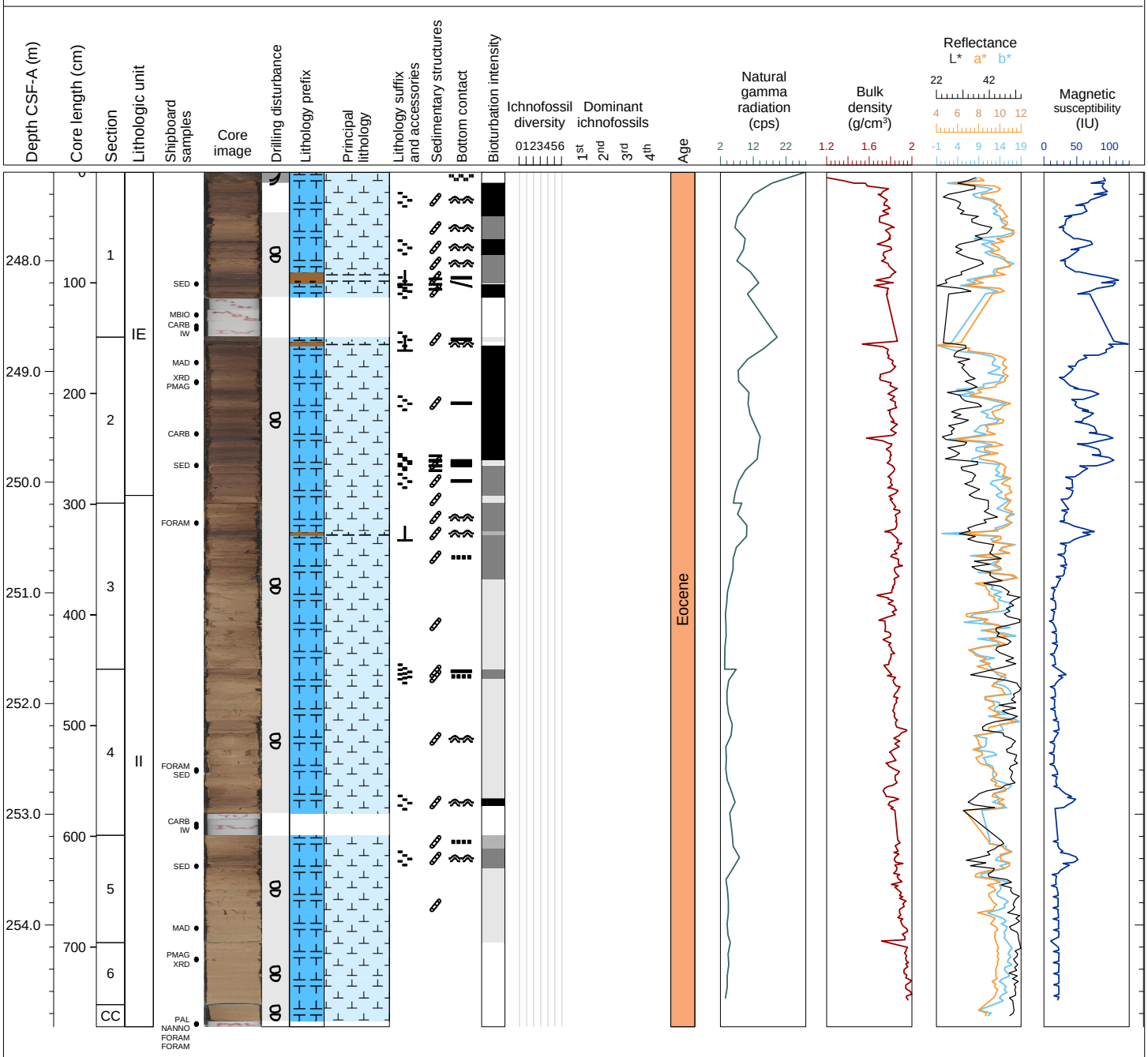
Hole 390-U1556C Core 27X, Interval 237.4-247.18 m (CSF-A)

Core 27 is varied and contains (i) light yellowish brown, light brown, brown, and dark brown (10YR 6/4, 5/4, 4/4, 3/3, 3/2) nannofossil-rich calcareous chalk (ii) brown and very dark brown (7.5YR 5/2, 2.5/2, 4/4, 3/4, 3/2) silty clay, and (iii) layers of brown (7.5YR 4/4, 5/4, 5/3) nannofossil-rich clay with silt and clayey calcareous chalk with nannofossils. There are ranges of color within some of the individual sections. In 3A, dots <3 mm could be microaggregates of clay or calcareous material? In 3A from 50 to 55 cm there are the small clast-like features <3-4 mm in size. In 5A, there is syn-deformation including convolutions, thin laminations, folds (most common 138-143.5 cm), beds and cross cutting; then, all sediments and structures affected by biscuit disturbance. There appears to be clasts of sediment in the convolutions. Bioturbation is often none or sparse but it ranges from none to intense. Drilling disturbance includes slight biscuits throughout the Core.



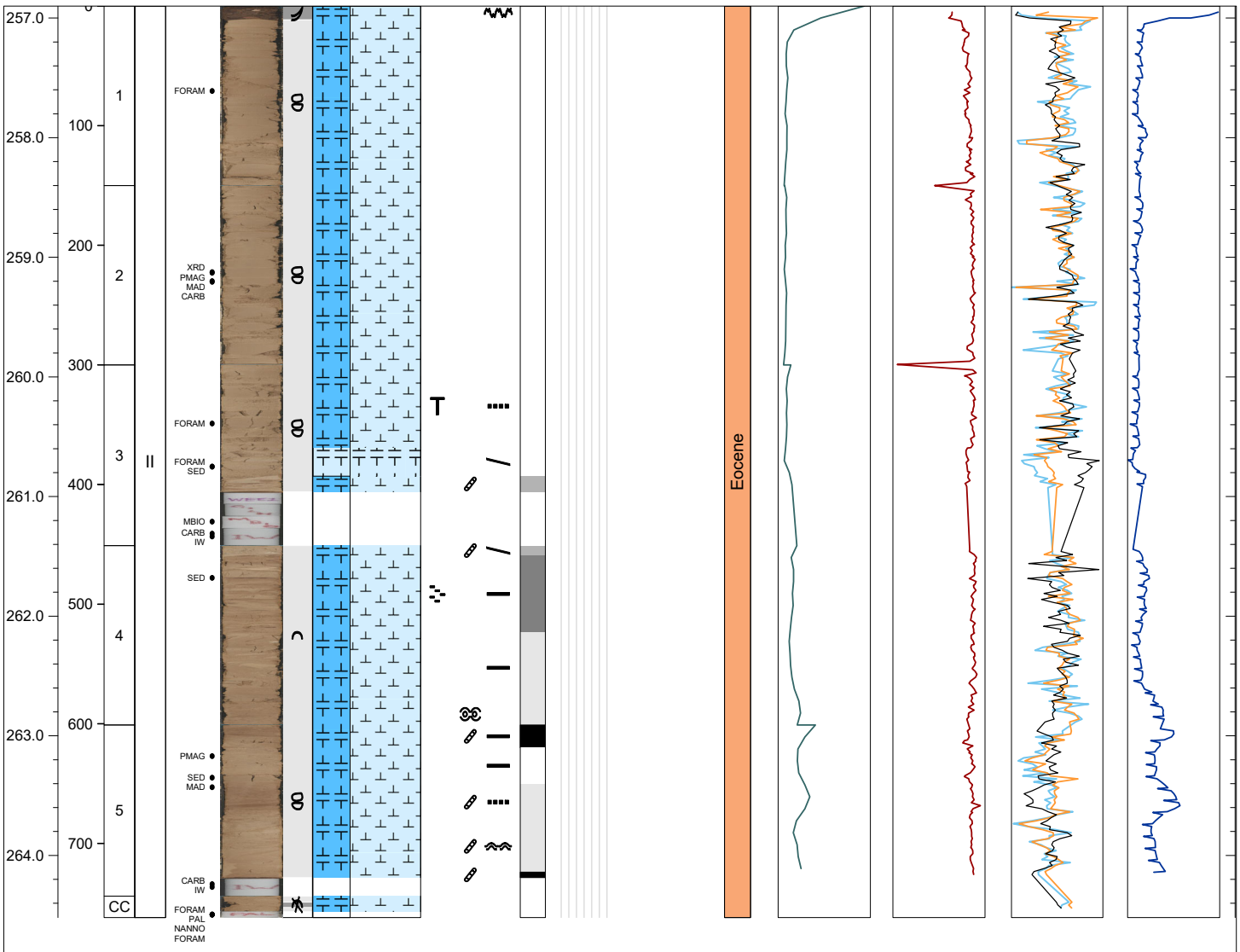
Hole 390-U1556C Core 28X, Interval 247.2-254.92 m (CSF-A)

Core 28X contains mainly (i) light brown to dark brown (7.5YR 3/2 4/3, 3/2, 5/4) nannofossil-rich calcareous chalk. Darker sections are higher in clay content and they range from nannofossil-rich calcareous chalk to clayey calcareous chalk with nannofossils, and (ii) a lesser amount of light brown and pink (7.5YR 6/4, 7/3) nannofossil-rich calcareous chalk. Bioturbation is generally moderate but often high, and ranges from none to high. Drilling disturbance includes slight biscuits throughout the Core and fall-in 1A. Biscuit outlines have returned to ooze and Section 3A, 129 to 150 cm has been ooze-ified.



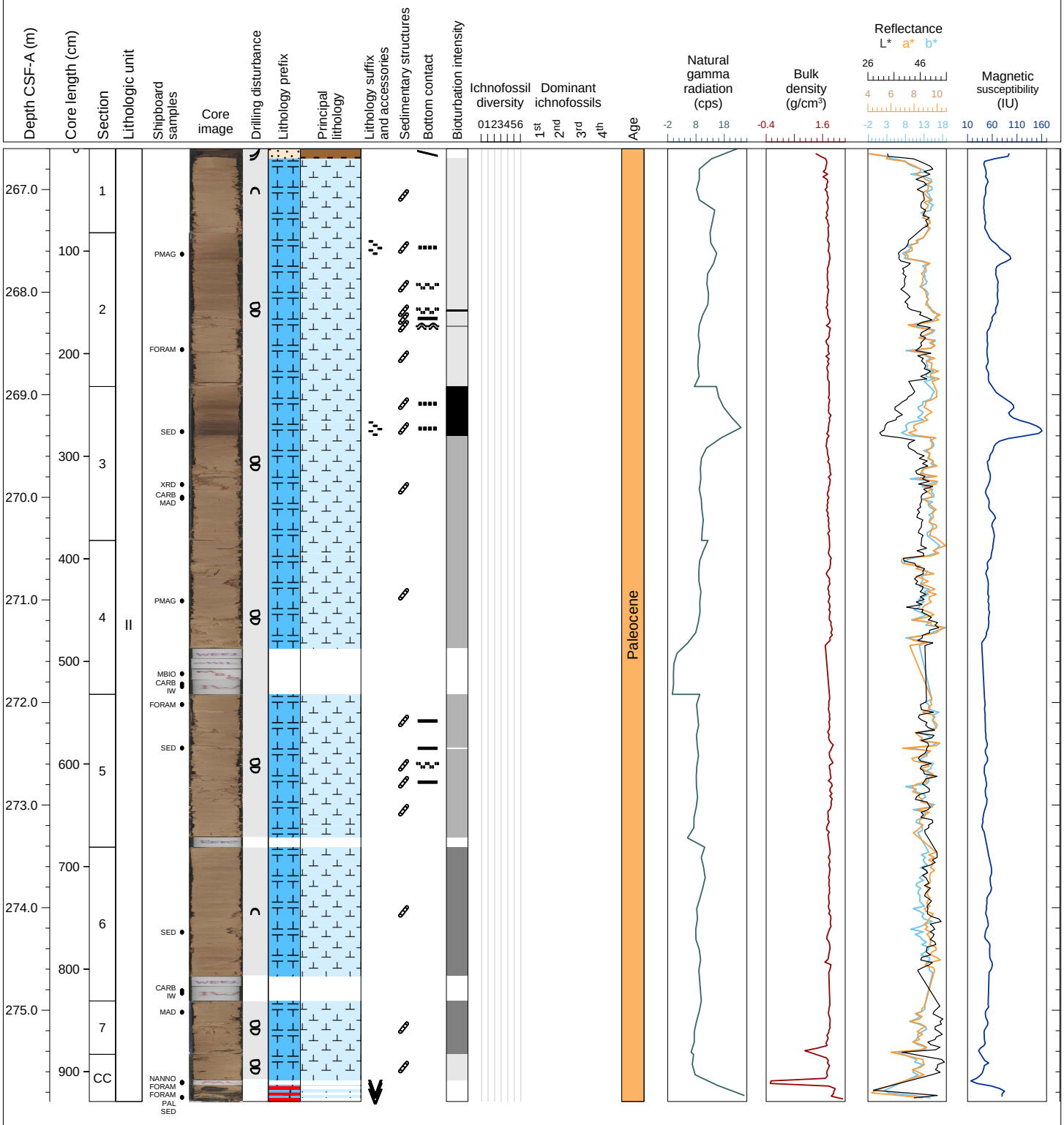
Hole 390-U1556C Core 29X, Interval 256.9-264.52 m (CSF-A)

Core 29X contains mainly light brown to brown (7.5YR 6/4, 4/2) nannofossil-rich calcareous chalk or calcareous nannofossil chalk, very pale brown (10YR 7/3) nannofossil-rich calcareous chalk, and in 3A very pale brown (10YR 7/3) nannofossil-rich calcareous chalk with foraminifera and foraminifera-nannofossil calcareous chalk. Section 4A contains deformational structures that contain horizontal thin laminations, swirly features, and folding. Bioturbation is generally none (or difficult to observe) but ranges from low to high. Drilling disturbance includes slight biscuits throughout the Core (or up-arching?) and fall-in 1A.

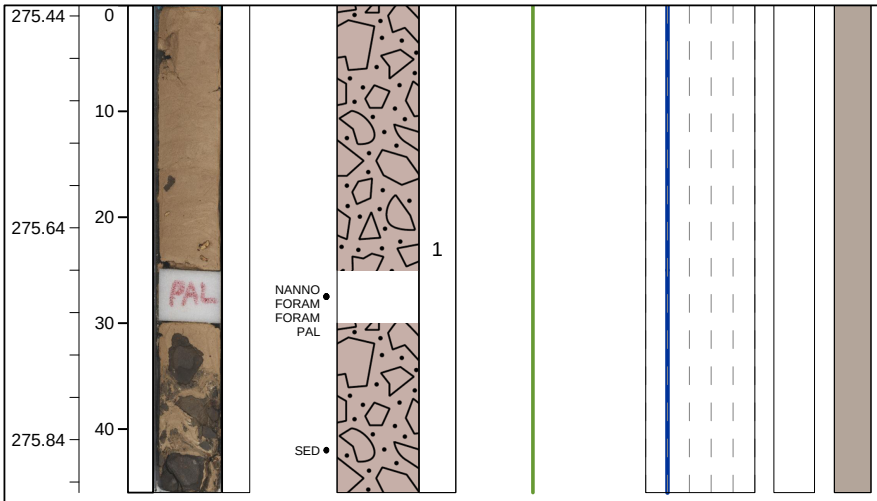


Hole 390-U1556C Core 30X, Interval 266.6-275.89 m (CSF-A)

Core 30X contains mainly light brown (7.5YR 6/4, 6/3) nannofossil-rich calcareous chalk. In 3A, there are layers of dark brown (7.5YR 3/3) nannofossil-rich calcareous chalk with clay and foraminifera as an accessory (that is, minor amount). Sections 2A and 5A contain pink (7.5YR 8/3) nannofossil-rich calcareous chalk and foraminifera as an accessory; other sections also may contain thin <1 cm long similar sediments, as noted in comments. Bioturbation ranges from none to high. Drilling disturbance includes slight biscuits and/or up-arching throughout the Core and fall-in 1A. At 31 cm, UNIT III begins with volcanics. From 34 to 37 cm and 40 to 42 cm gray (7.5YR 6/1) there is foraminiferal nannofossil chalk with volcanic glass. Otherwise, in Unit III, the sediment around the volcanics is light brown (7.5YR 6/3) nannofossil-rich calcareous chalk.



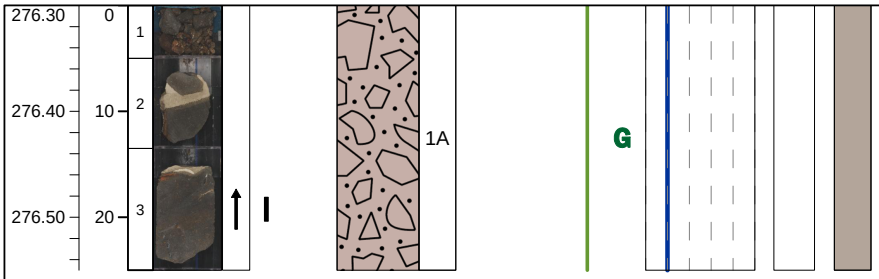
Hole 390-U1556C-30X Section CC, Top of Section: 275.43 m (CSF-A)



Description

390-U1556C-30X-CC-A, 0-46 cm
UNIT: 1
LITHOLOGY: breccia
TEXTURE: breccia
COLOR: Basalt clasts are reddish gray (10R 5/1). Color of the sediment, which is the majority of the CC material is light brown clay-rich calcareous sediment 7.5YR 6/4.
PHENOCRYSTS: Olivines are 100% altered. They are predominantly small (<0.75mm) and equant in shape.
GROUNDMASS: basalt clasts are cryptocrystalline
VESICLES:
ALTERATION: Small fragments of basalt, mostly orange speckled background, and totally altered glass.
VEINS:

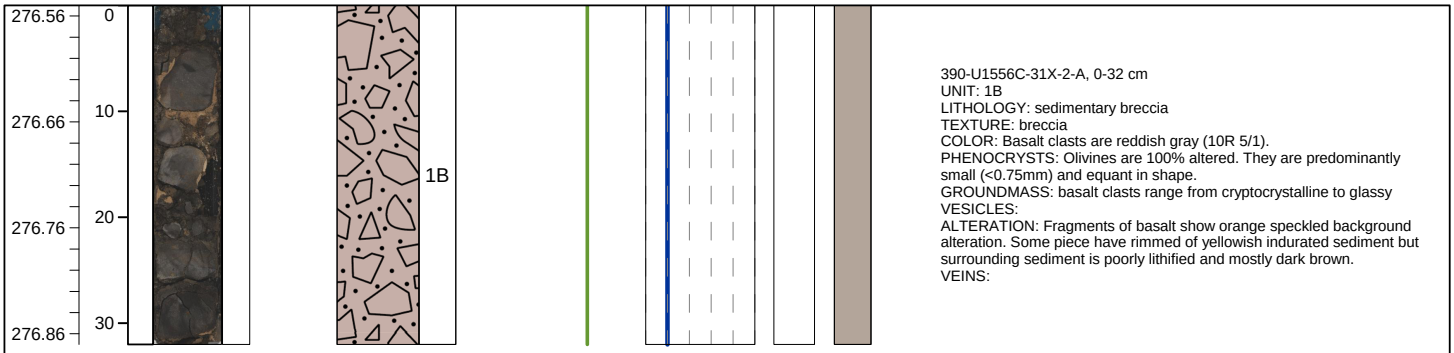
Hole 390-U1556C-31X Section 1, Top of Section: 276.3 m (CSF-A)



Description

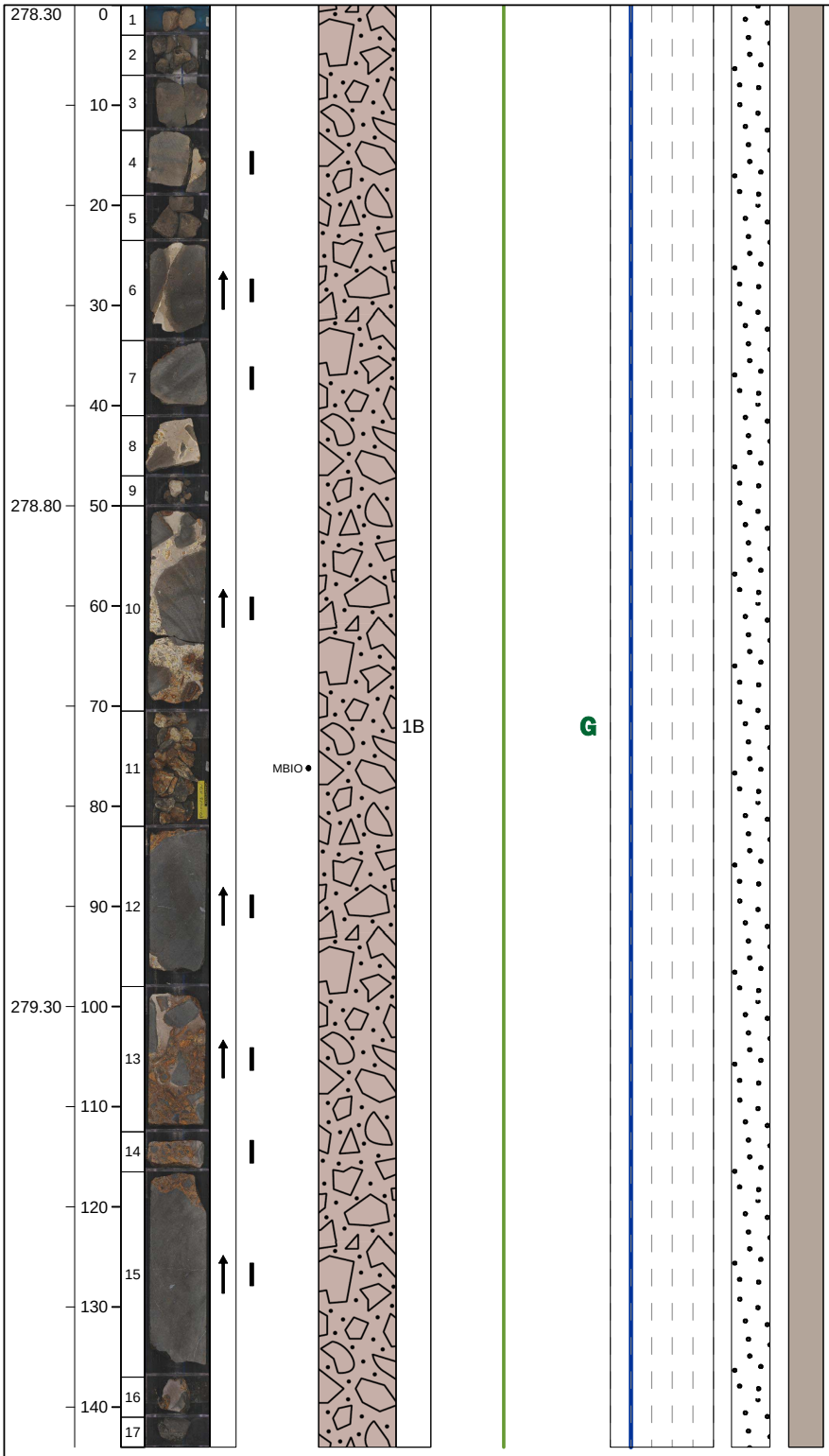
390-U1556C-31X-1-A, 0-25 cm
UNIT: 1A
LITHOLOGY: sedimentary breccia
TEXTURE: breccia
COLOR: Basalt clasts are reddish gray (10R 5/1). Color of complex matrix is variable. Ranges from very pale born (10YR 7/3) to ( )
PHENOCRYSTS: Olivines are 100% altered. They are predominantly small (<0.75mm) and equant in shape.
GROUNDMASS: basalt clasts range from cryptocrystalline to glassy
VESICLES: Vesicularity is bimodal. The basalts are very sparsely vesicular (<<1 %) with small round vesicles (~ 0.4mm in size) that are filled by calcite. Piece 3 also has a few larger, irregularly shaped vesicles up to 5 mm in size, also filled by calcite.
ALTERATION: Orange speckled background altered basalt in indurated sediment. Light brown halos along contacts. Some brown glass and grey mottled chilled margin. Sediment well lithified (either by baking or hydrothermal flow?).
VEINS:

Hole 390-U1556C-31X Section 2, Top of Section: 276.55 m (CSF-A)



390-U1556C-31X-2-A, 0-32 cm
UNIT: 1B
LITHOLOGY: sedimentary breccia
TEXTURE: breccia
COLOR: Basalt clasts are reddish gray (10R 5/1).
PHENOCRYSTS: Olivines are 100% altered. They are predominantly small (<0.75mm) and equant in shape.
GROUNDMASS: basalt clasts range from cryptocrystalline to glassy
VESICLES:
ALTERATION: Fragments of basalt show orange speckled background alteration. Some piece have rimmed of yellowish indurated sediment but surrounding sediment is poorly lithified and mostly dark brown.
VEINS:

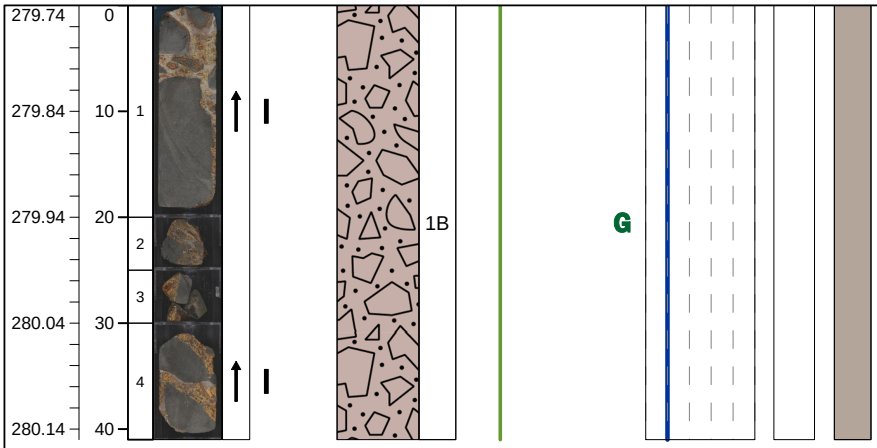
Hole 390-U1556C-32X Section 1, Top of Section: 278.3 m (CSF-A)



Description

390-U1556C-32X-1-A, 0-144 cm
UNIT: 1B
LITHOLOGY: sedimentary breccia
TEXTURE: breccia
COLOR: Basalt clasts are reddish gray (10R 5/1). Three different colors of matrix: very pale brown 10YR 7/3, white 10YR 8/5 and white 10YR 9/1.
PHENOCRYSTS: Most of the basalt clasts in this section are moderately altered olivine phyric basalts in which the olivines are 100% altered. The larger basalt pieces 7, 12, 15, and some of the smaller basalt clasts in breccia pieces 10 and 13 appear to contain small olivine microphenocrysts that are only slightly altered. They are predominantly small (<0.75mm) and equant in shape.
GROUNDMASS: basalt clasts range from cryptocrystalline to glassy
VESICLES: Vesicularity is bimodal. The basalts are very sparsely vesicular (<<1 %) with small round vesicles (<~ 0.3 mm in size) that are filled by calcite. Pieces 6, 10, 13 and 15 also have a few larger, irregularly shaped vesicles up to 10 mm in size, also filled by calcite.
ALTERATION: Basalt altered to orange speckled background and mottled grey along chilled margins. Some light brown halos along contacts with sediment. Sediment well lithified (either by baking or hydrothermal flow?). Glass almost completely altered, only rare cores of fresh(ish) black glass. Very sparse veins. No obvious difference in alteration to basalt in pale carbonate sediment vs. darker clay-rich sediment.
VEINS:

Hole 390-U1556C-32X Section 2, Top of Section: 279.74 m (CSF-A)

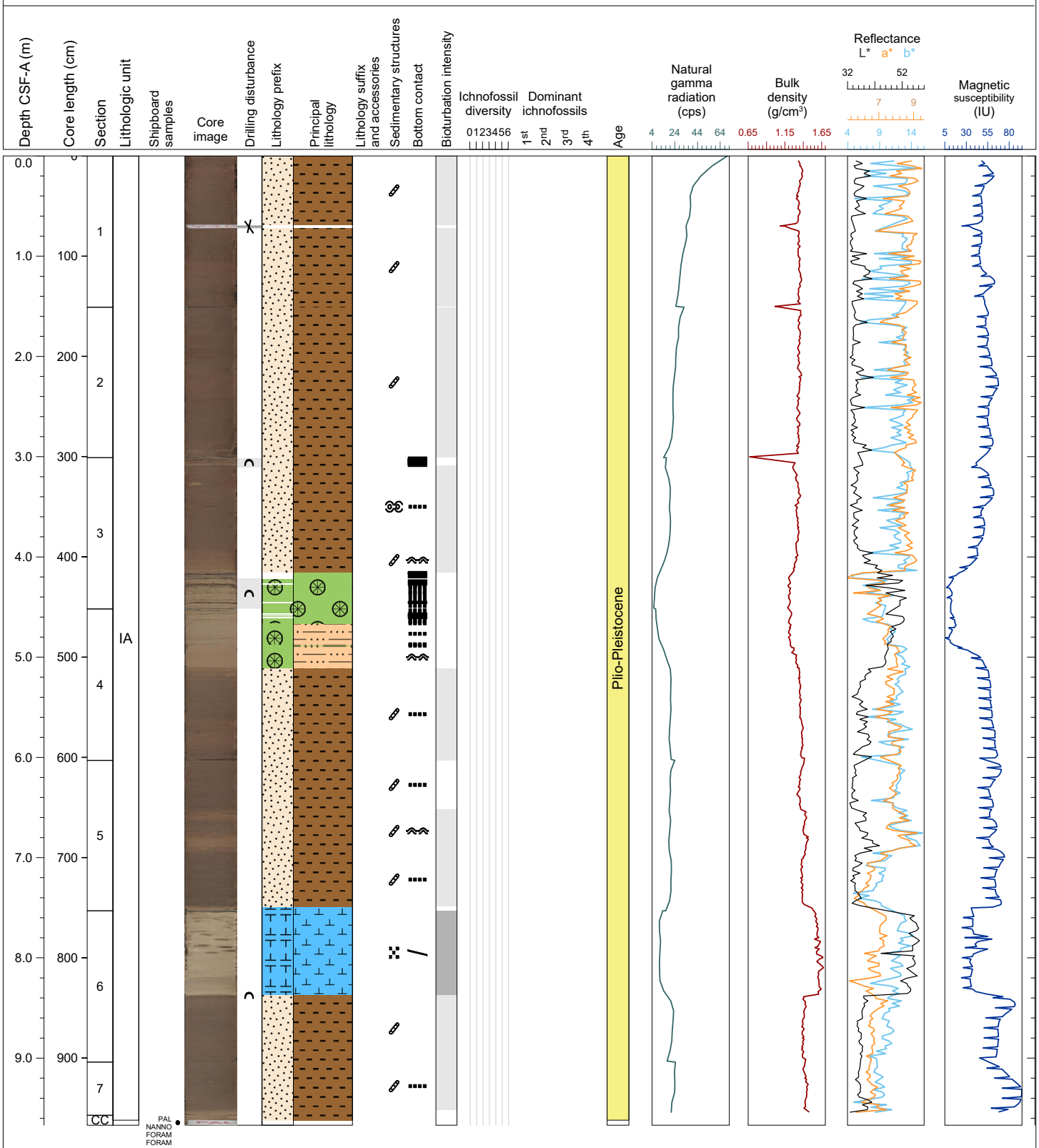


Description

390-U1556C-32X-2-A, 0-41 cm
UNIT: 1B
LITHOLOGY: sedimentary breccia
TEXTURE: breccia
COLOR: Basalt clasts are reddish gray (10R 5/1). Three different colors of matrix: very pale brown 10YR 7/3, white 10YR 8/5 and white 10YR 9/1.
PHENOCRYSTS: Several of the larger basalt pieces throughout this section appear to contain small olivine microphenocrysts that are only slightly altered. They are predominantly small (<0.5mm) and equant in shape.
GROUNDMASS: basalt clasts range from cryptocrystalline to glassy
VESICLES: Most pieces are nonvesicular. Piece 1 includes a larger clast that is very sparsely vesicular with small (< 1mm) round vesicles filled by calcite
ALTERATION: Basalt mostly altered to orange speckled background with some small remnants of altered chilled margins. Glass clasts mostly altered with some black cores of fresher material. Sediment well lithified (either by baking or hydrothermal flow?).
VEINS:

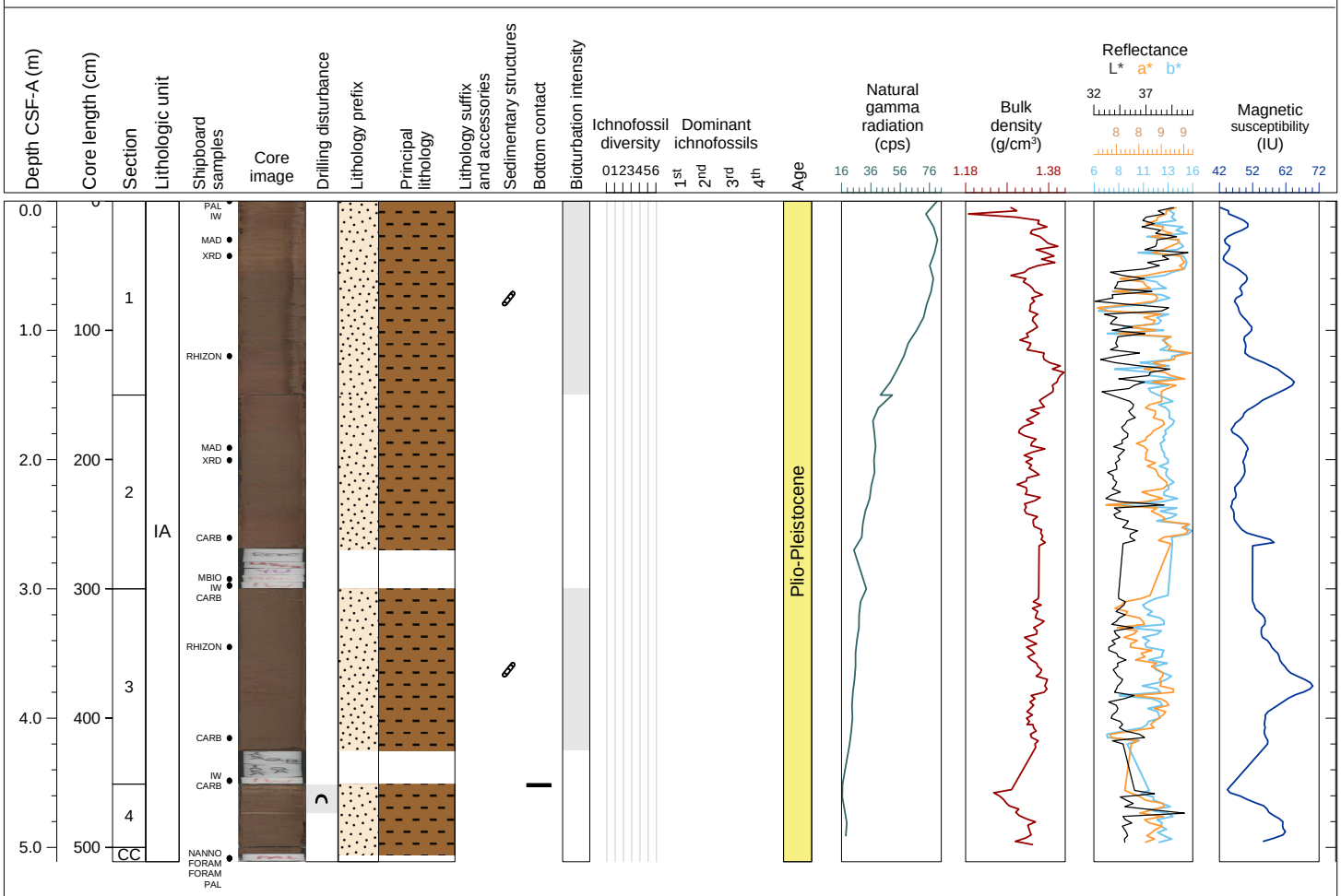
Hole 390-U1556D Core 1H, Interval 0.0-9.67 m (CSF-A)

Core 1H contains mostly brown (7.5YR 4/3) silty clay. In 3A, a portion of alternating greenish black (GLEY 1 2.5/10Y) diatom ooze, pinkish gray (7.5YR 7/2) organic-rich diatom ooze, and greenish black (GLEY 1 2.5/10Y) organic-rich diatom ooze was observed 114-15(4A) cm. There are portions with none to low bioturbation along the whole core. There are void in 1A, and up-arching in 3A and 6A.



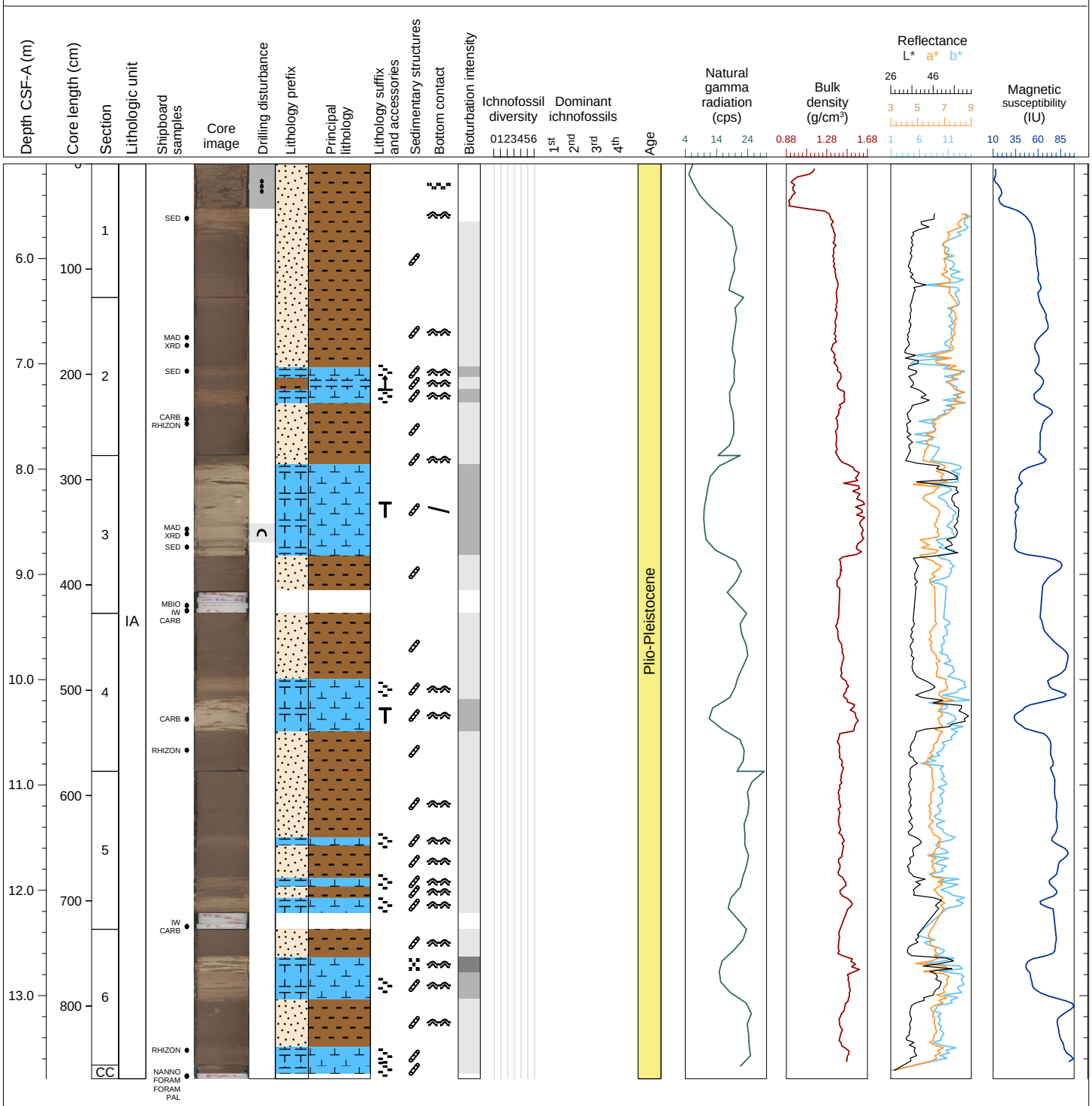
Hole 390-U1556E Core 1H, Interval 0.0-5.11 m (CSF-A)

Core 1H contains mainly (1A to CC) brown (7.5YR 4/3) silty clay. Section 4A(0-7.5cm) contains alternating dark brown (7.5YR 3/4) silty clay, pinkish gray (7.5YR 7/2) silty clay, and dark brown (7.5YR 3/4) silty clay. For much of the Core bioturbation is none. Drilling disturbances include slight up-arching in 4A.



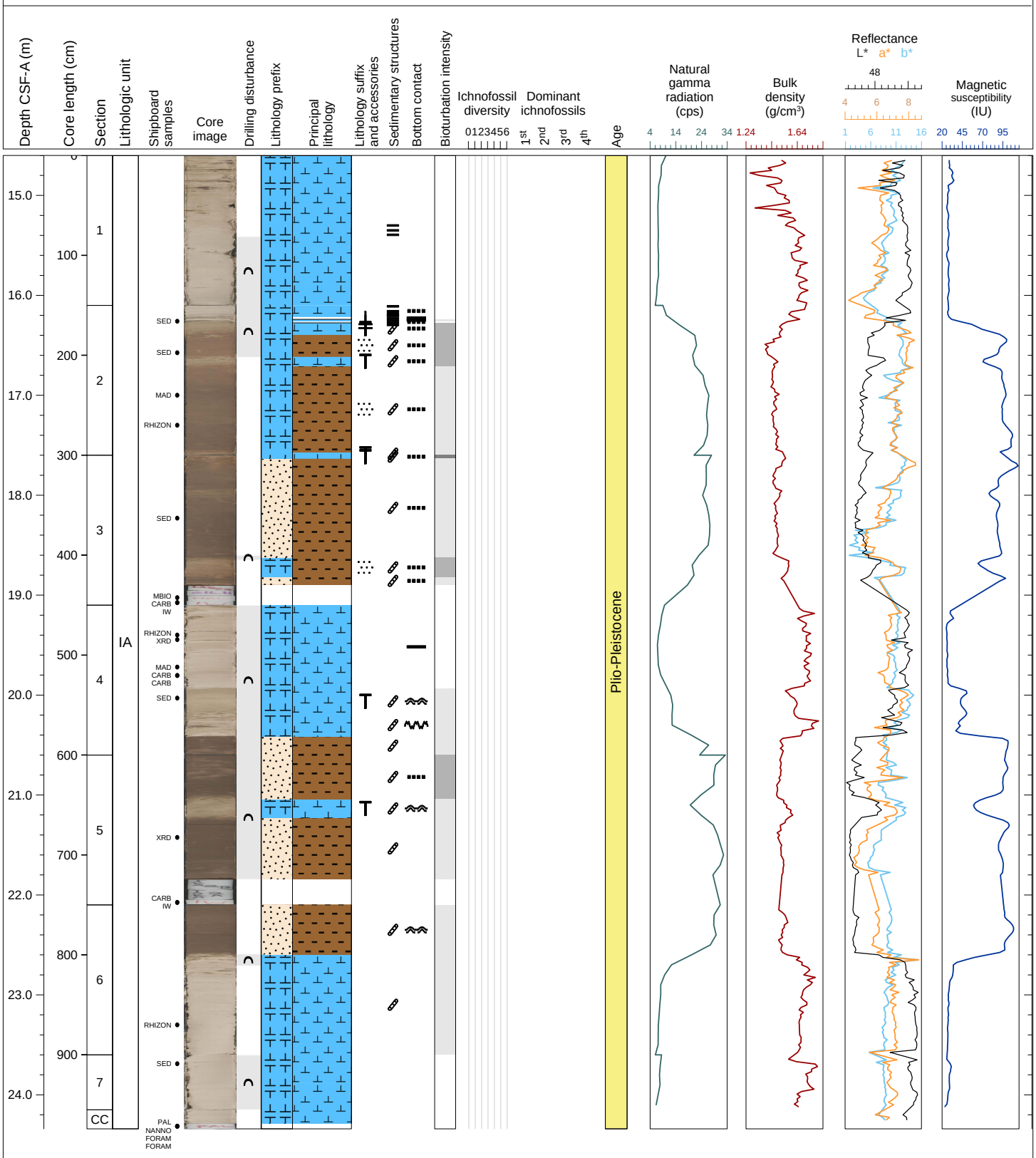
Hole 390-U1556E Core 2H, Interval 5.1-13.79 m (CSF-A)

Core 2H contains mainly brown (7.5YR 4/3) silty clay and pinkish white (7.5YR 8/2) calcareous nannofossil ooze with foraminifera in 3A, 4A and 6A. Organic rich thin lamination and mottling are mainly observed in 3A. Drilling disturbance includes slight signs of up-arching in 3A, and severe soupy in 1A.



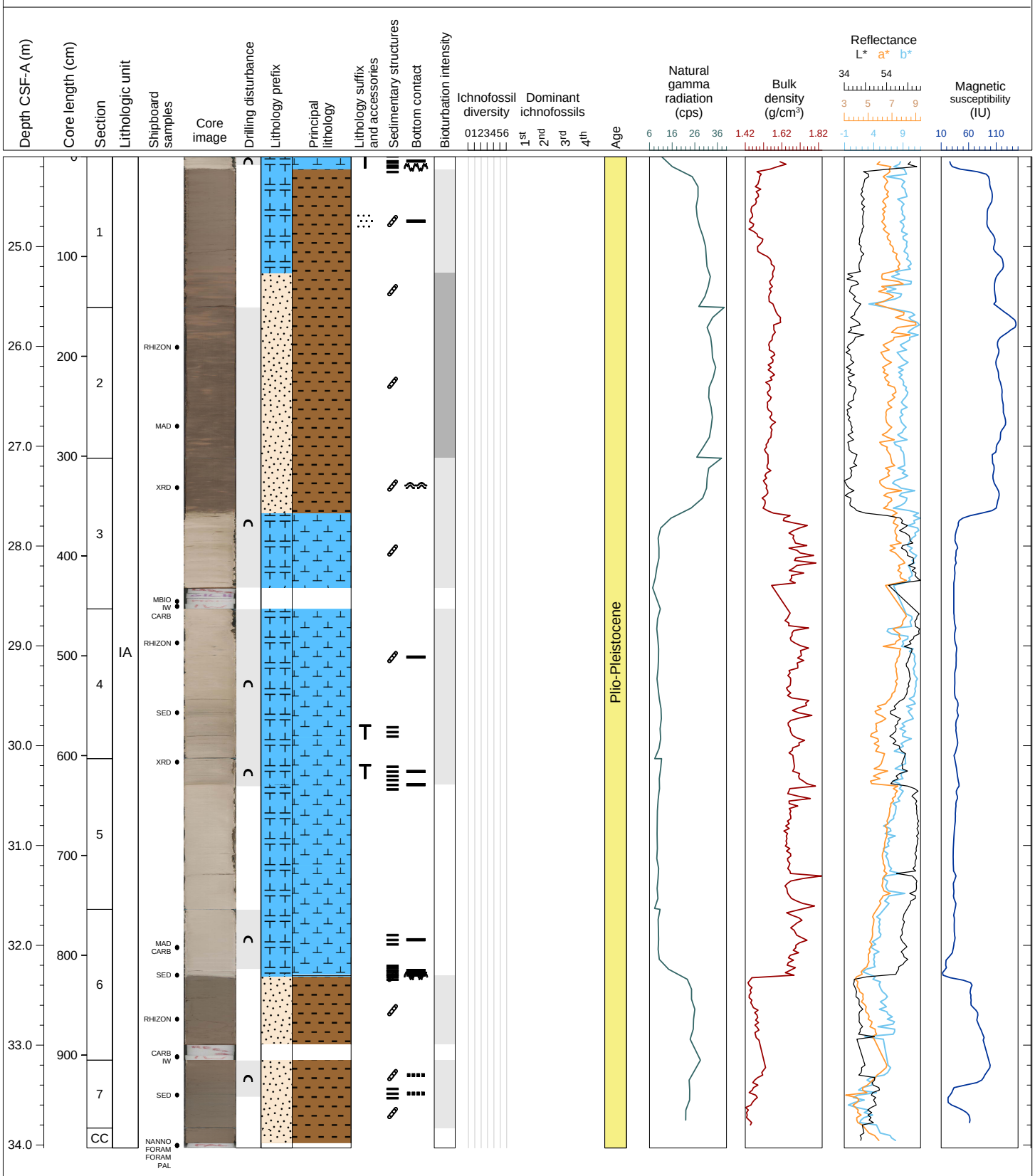
Hole 390-U1556E Core 3H, Interval 14.6-24.34 m (CSF-A)

Core 3H is varied and contains brown (7.5YR 4/3, 5/3, 4/2) silty clay, pinkish white (7.5YR 8/2) calcareous nannofossil ooze, light brown (7.5YR 6/3) calcareous clay with silt, light brown (7.5YR 6/3) calcareous nannofossil ooze with foraminifera, and in 2A notable layers of GLEY 1 5/10Y (greenish gray) calcareous foraminiferal ooze with nannofossils. Darker greenish gray (GLEY 1) faint thin to thick laminations or dustings of calcareous nannofossil ooze are assumed to be foraminifera rich given the smear slide in 2A. Bioturbation is generally either none or sparse or low. Drilling disturbance includes slight up-arching throughout the core.



Hole 390-U1556E Core 4H, Interval 24.1-34.03 m (CSF-A)

Core 4H is varied and contains brown (7.5YR 5/2, 4/2) silty clay, silty clay grayish brown (10YR 5/2) silty clay (in 5A to CC), and pinkish white (7.5YR 8/2) calcareous nannofossil ooze. In 4A and 5A, thin to thick laminations cause the sections are associated with pinkish gray (7.5YR 7/2) calcareous nannofossil ooze with foraminifera and foraminiferal nannofossil ooze (7.5YR 5/2 brown) and in 6A there is GLEY 1 8/5GY (light greenish gray) nannofossil-rich foraminiferal ooze . Bioturbation is generally none or sparse. Drilling disturbance includes slight up-arching throughout the core.



Hole 390-U1556E Core 5H, Interval 33.6-43.43 m (CSF-A)

Core 5H contains mainly almost all brown or light brown (7.5YR 6/3, 5/3,4/3, 4/2) silty clay. In 4A, from 3.5 to 19.5 cm, there are prominent laminations, which are diatom-rich silty clay. The color of the laminations is mainly 7.5YR 8/2, with some perhaps between 8/1 and 8/2. These laminations are within 7.5YR 6/3 (light brown) silty clay. Bioturbation is generally sparse or none but in places also low or moderate. Drilling disturbance includes fall in 1A and slight up-arching in 4A.