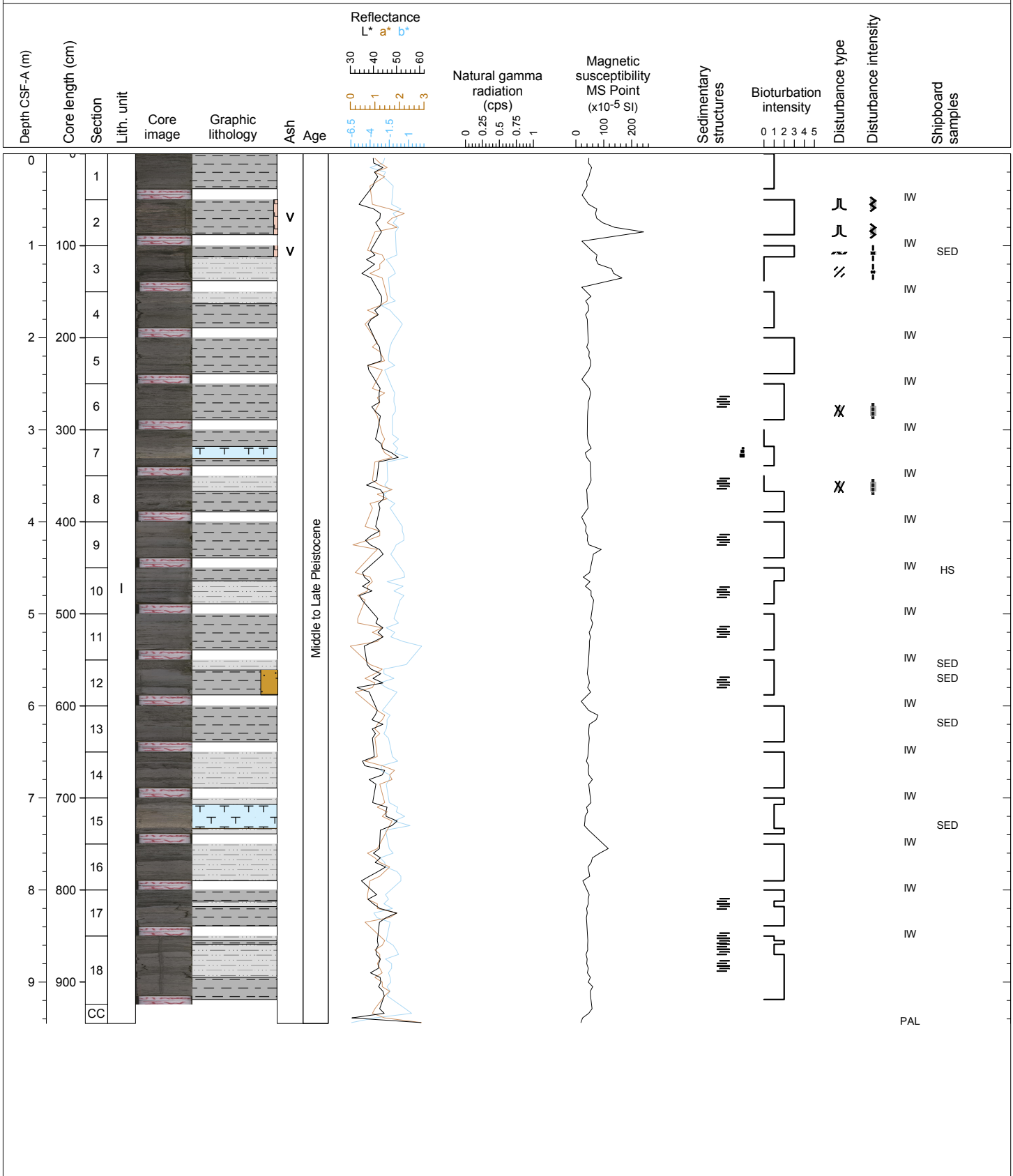


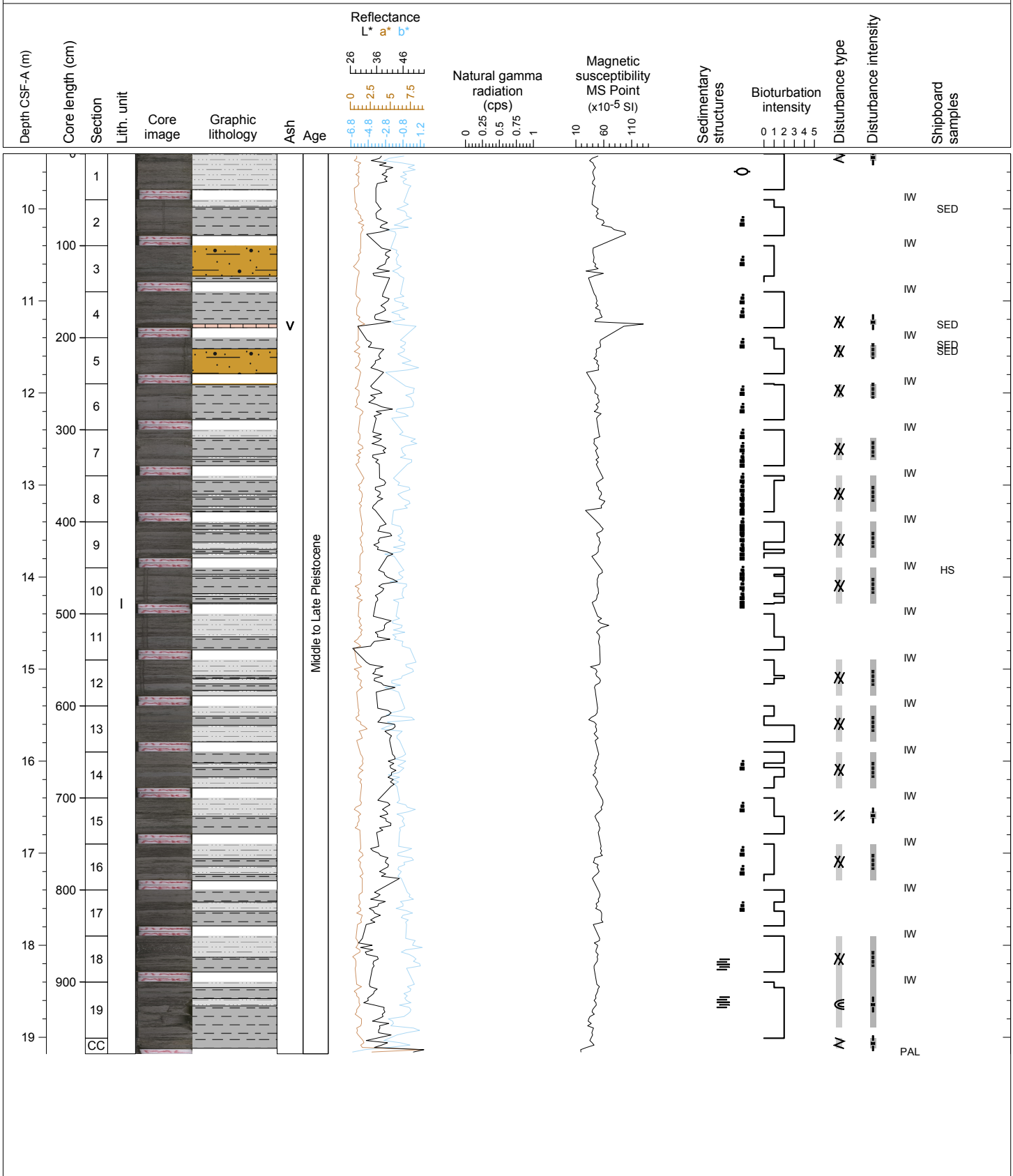
Hole 349-U1431A Core 1H, Interval 0.0-9.45 m (CSF-A)

Medium bedded SILTY CLAY turbidites interbedded with CLAY and CLAY WITH SILT deposits. Erosive bases occur occasionally with some fining upward intervals. Intervals of carbonate clastic sediment, dominated by FORAMINIFERAL OOOZE occur in Sections 7 and 15.



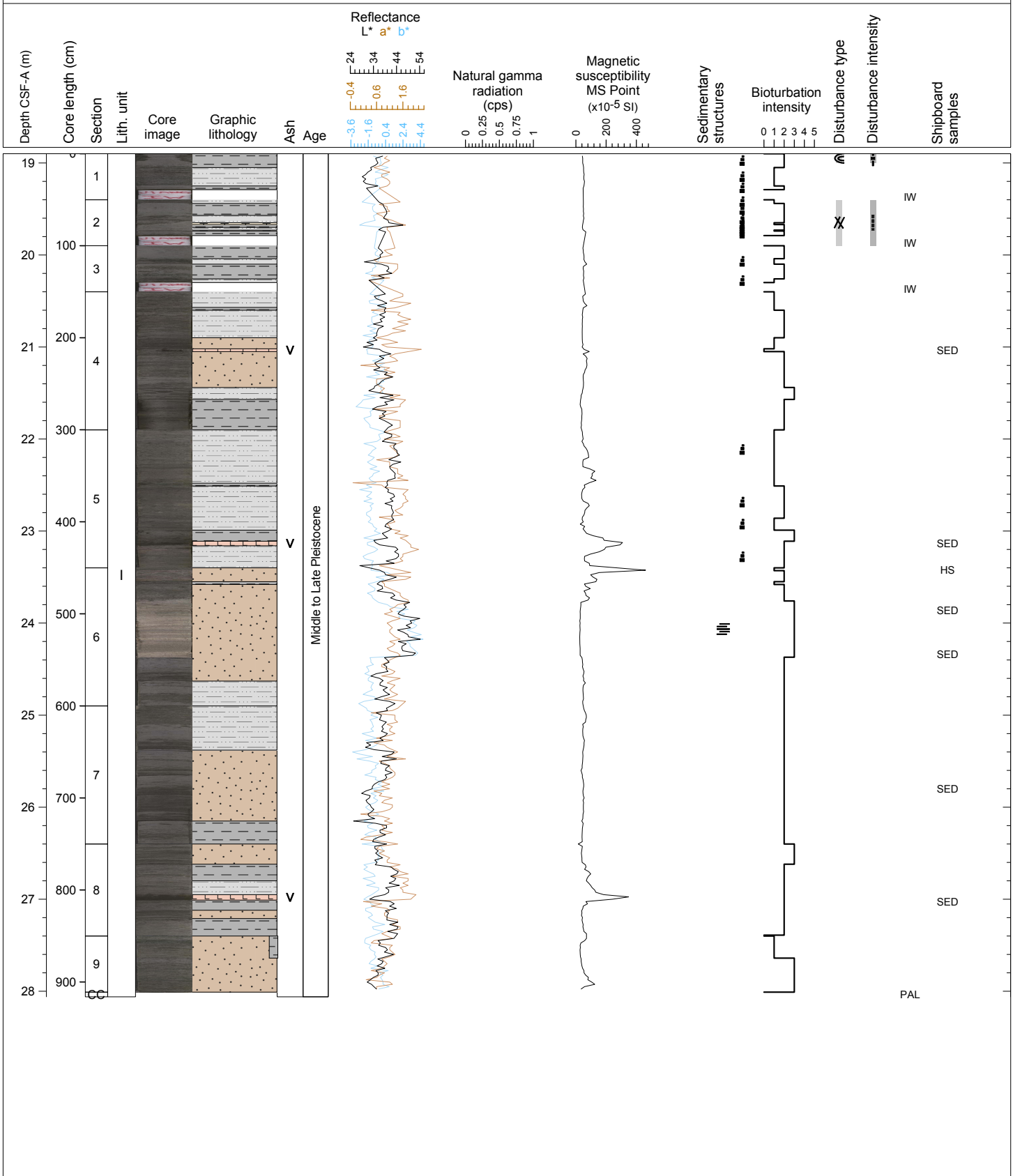
Hole 349-U1431A Core 2H, Interval 9.4-19.18 m (CSF-A)

SILTY CLAY turbidite deposits interbedded within a dominant CLAY WITH SILT background with a thin volcanic ASH layer observed in Section 4. Silt-rich layers are commonly fining upward above a sharp base. The core is generally gently bioturbated, especially visible in clay-rich layers.



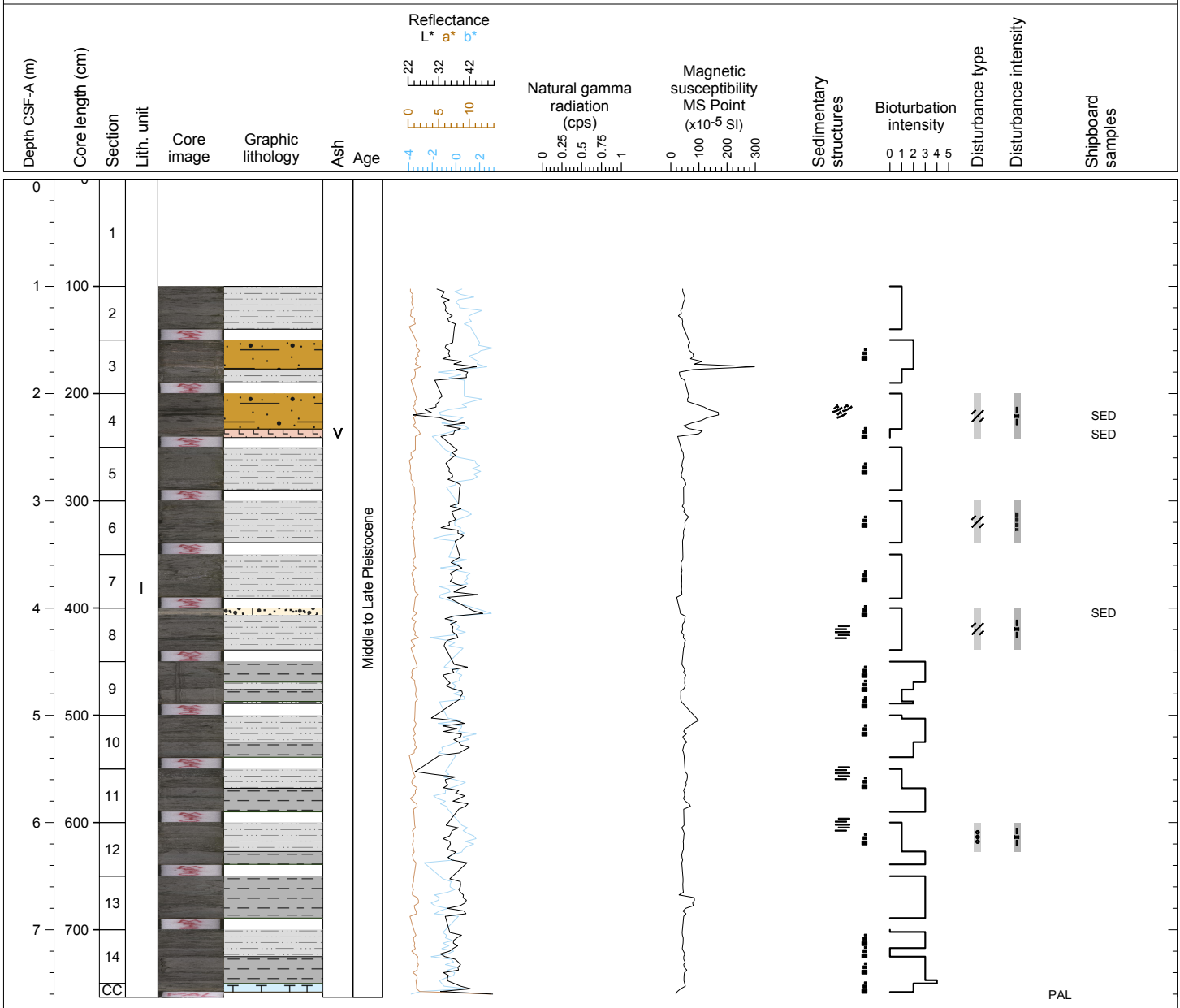
Hole 349-U1431A Core 3H, Interval 18.9-28.06 m (CSF-A)

SILTY CLAY turbidites are more dominant in this core compared to the overlying sequence. Grain size is still modest, rarely more than silt, but individual SILT beds are 10's of cm thick and with both parallel lamination and normal fining up structure. Three thin ASH layers are found within the core.



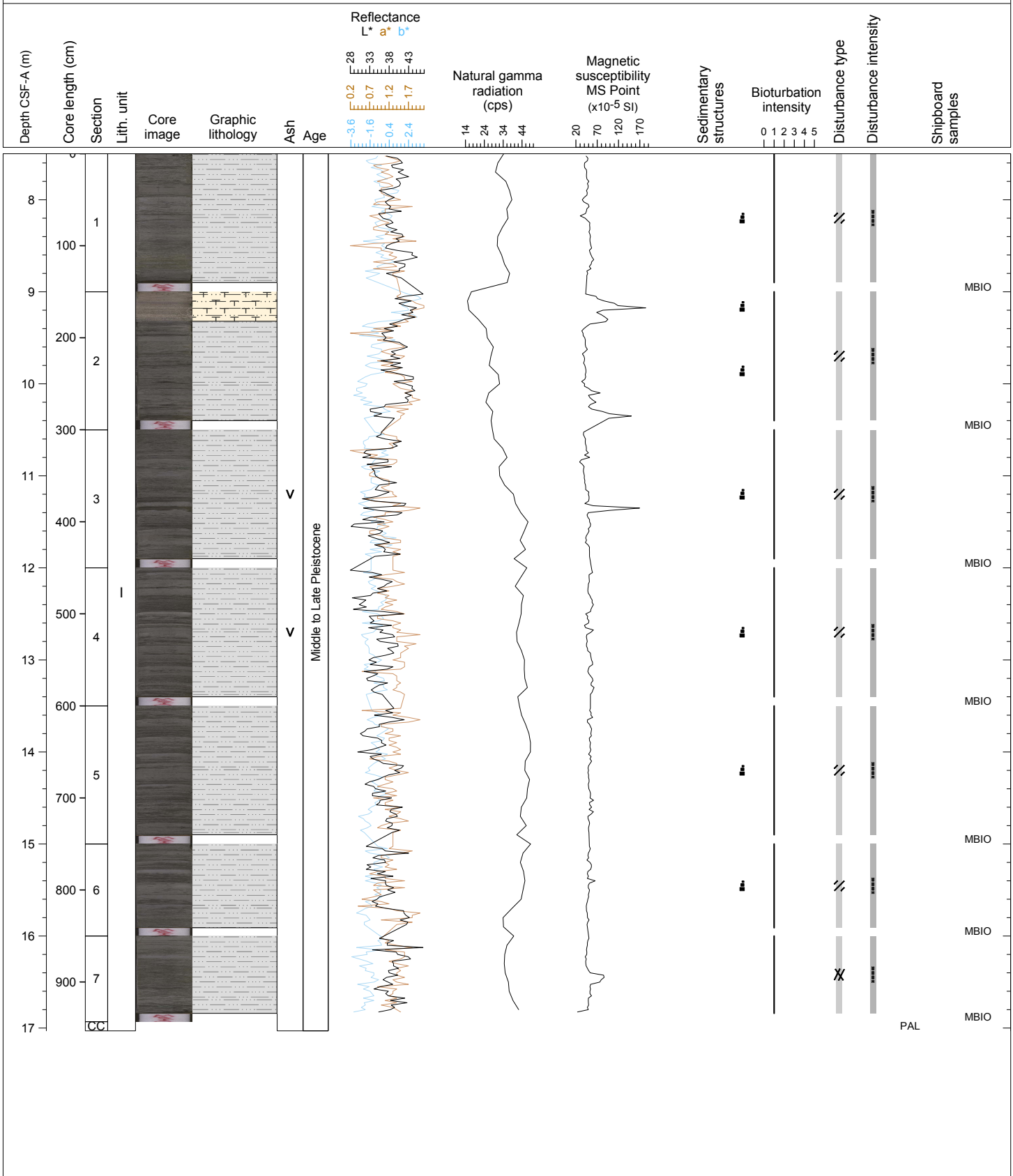
Hole 349-U1431B Core 1H, Interval 0.0-7.63 m (CSF-A)

SILTY CLAY turbidite deposits are found interbedded within a dominant CLAY WITH SILT background. SILT beds are more common toward the top of the core. Silt-rich layers are commonly fining upward above a sharp base. A thin volcanic ASH layer is observed in Section 4.



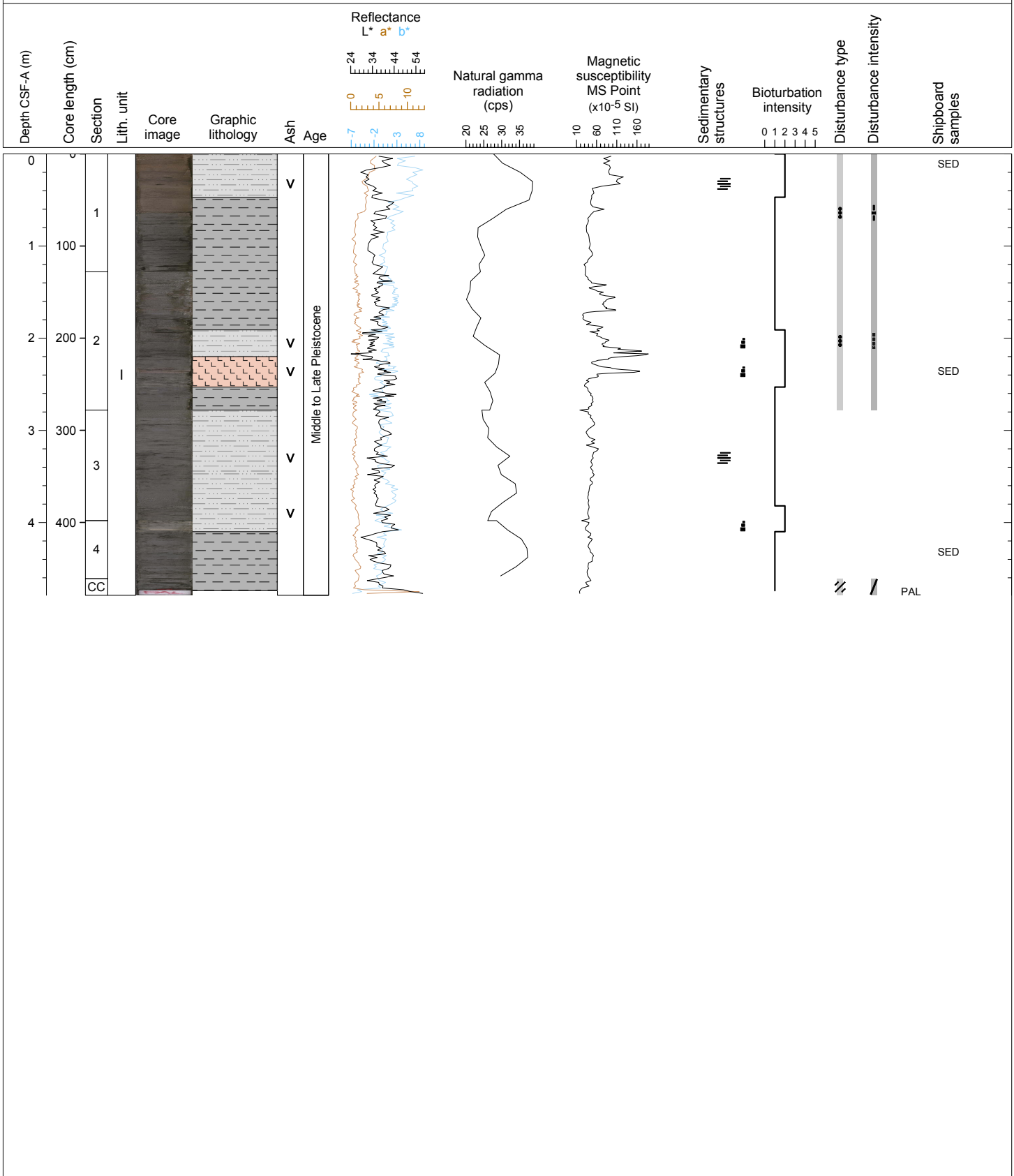
Hole 349-U1431B Core 2H, Interval 7.5-17.03 m (CSF-A)

Dark gray SILTY CLAY with volcanic ASH layers. The SILTY CLAY to CLAY packages are generally 15-30 cm thick and fining upward, indicating turbidity current origins. One layer of gray CLAYEY SILT to SILTY SAND WITH FORAMINIFERS (fining upward) occurs in the top part of Section 2, showing a nice turbidite layer. A few gray or dark brown volcanic ASH layers occur throughout the core. In general, the core is mainly composed of turbidite layers, either with FORAMINIFER-RICH SAND, CLAYEY SILT, or volcanic ASH at the bases.



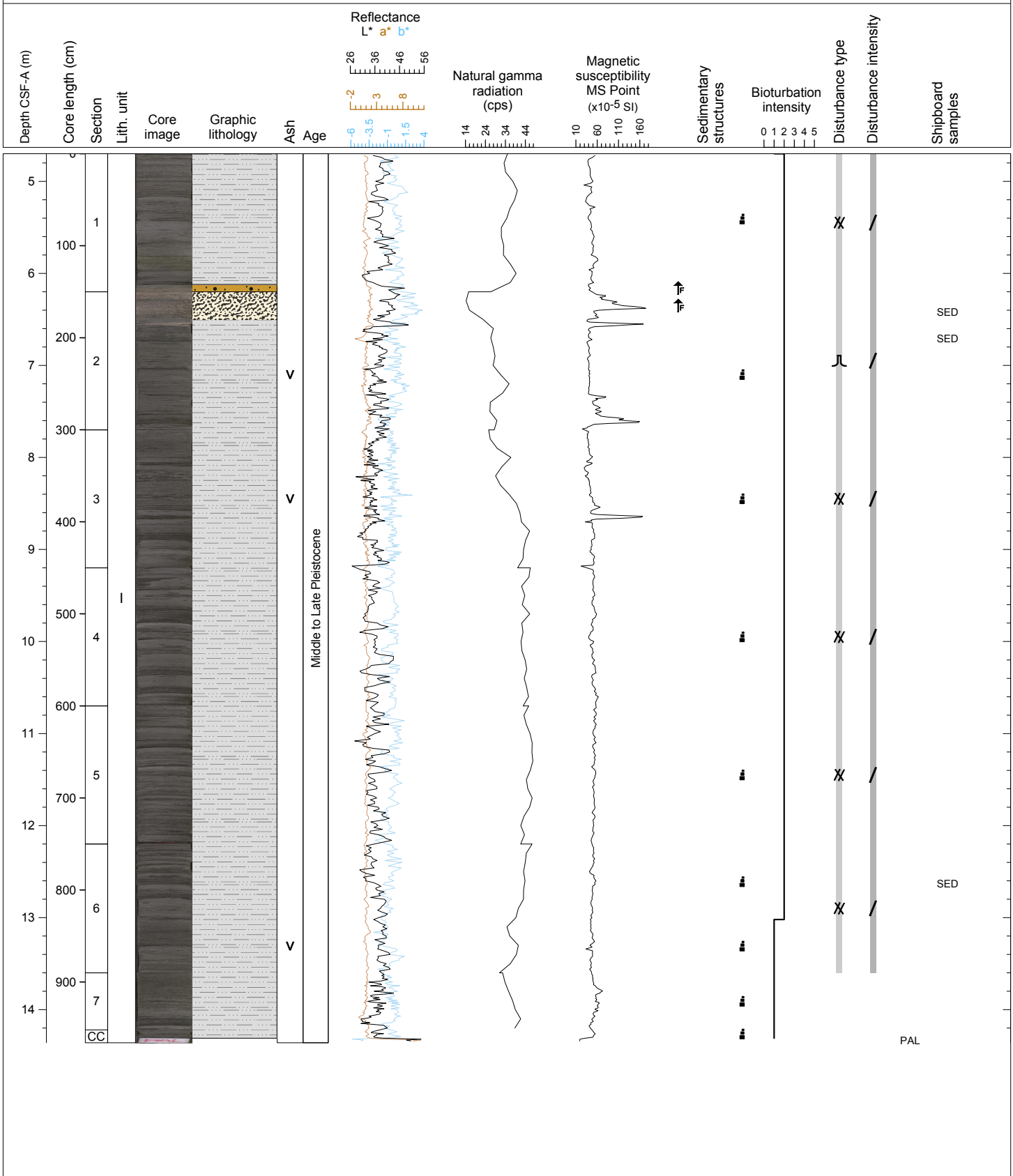
Hole 349-U1431C Core 1H, Interval 0.0-4.79 m (CSF-A)

Dark gray SILTY CLAY with volcanic ASH layers. The transition from SILTY CLAY (volcanic ash-rich) to CLAY is generally 15-30 cm thick and fining upward, indicating that it is a turbidite sequence. One layer of gray CLAYEY SILT with bioclasts and pure volcanic ASH was identified. A layer of reddish brown CLAYEY SILT with biogenic components (foraminifers, radiolarians) occurs at the core top. The core is mainly composed of turbidite layers.



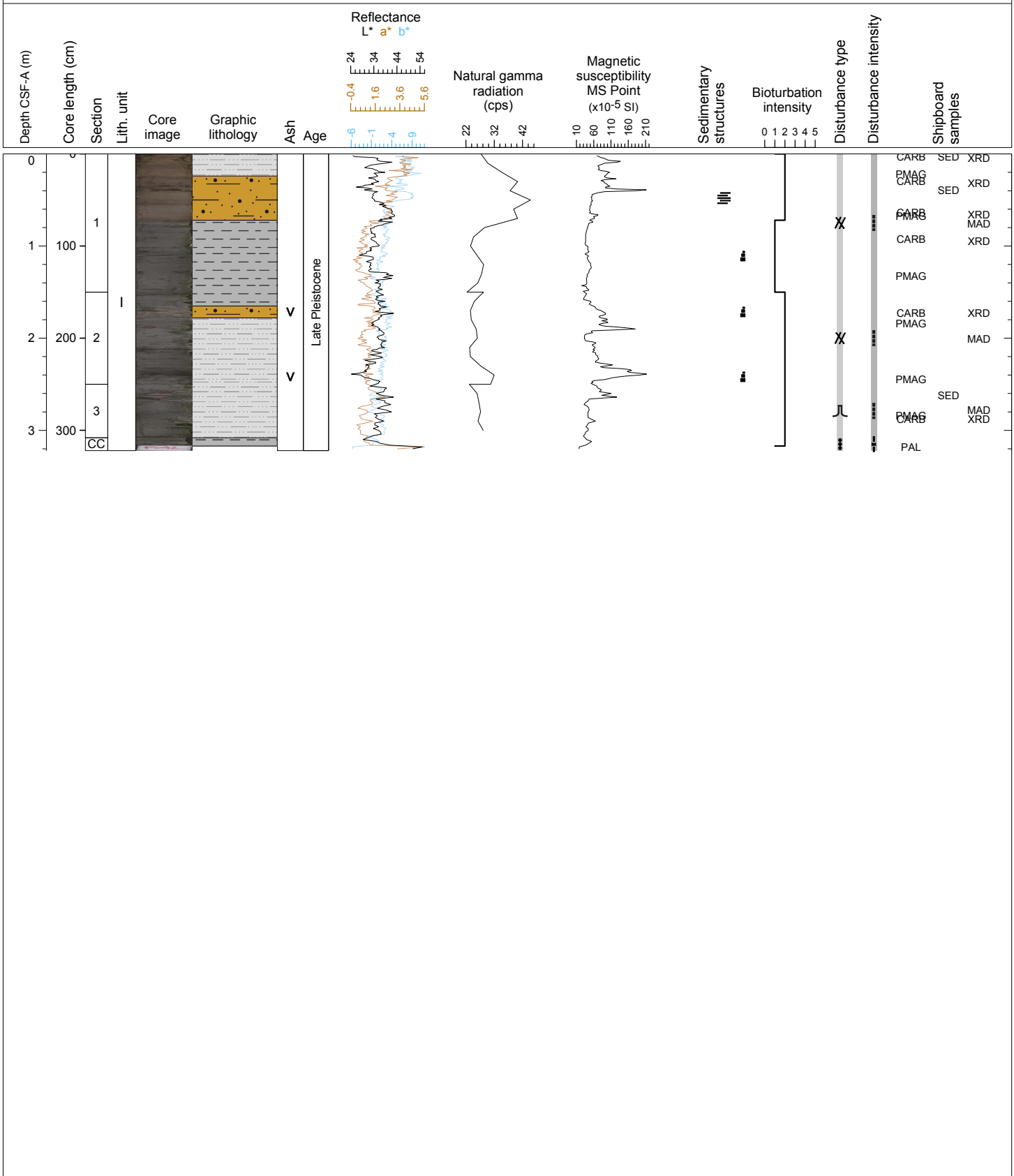
Hole 349-U1431C Core 2H, Interval 4.7-14.36 m (CSF-A)

SILTY CLAY, dark gray with volcanic ASH layers. The cycle from SILTY CLAY to CLAY is generally 15-30 cm thick and fining upward, indicating that it is a turbidite sequence. One layer of gray CLAYEY SILT to SILTY SAND WITH FORAMINIFERS (fining upward) occurs in the lower part of Section 1 and in the upper part of Section 2, indicating turbidite layers. A few gray or dark brown volcanic ASH layers occur in Sections 2 and 3. In general, the core is mainly composed of turbidite layers, either with FORAMINIFER OOZE (sand-sized grains), CLAYEY SILT, or volcanic ASH at the base.



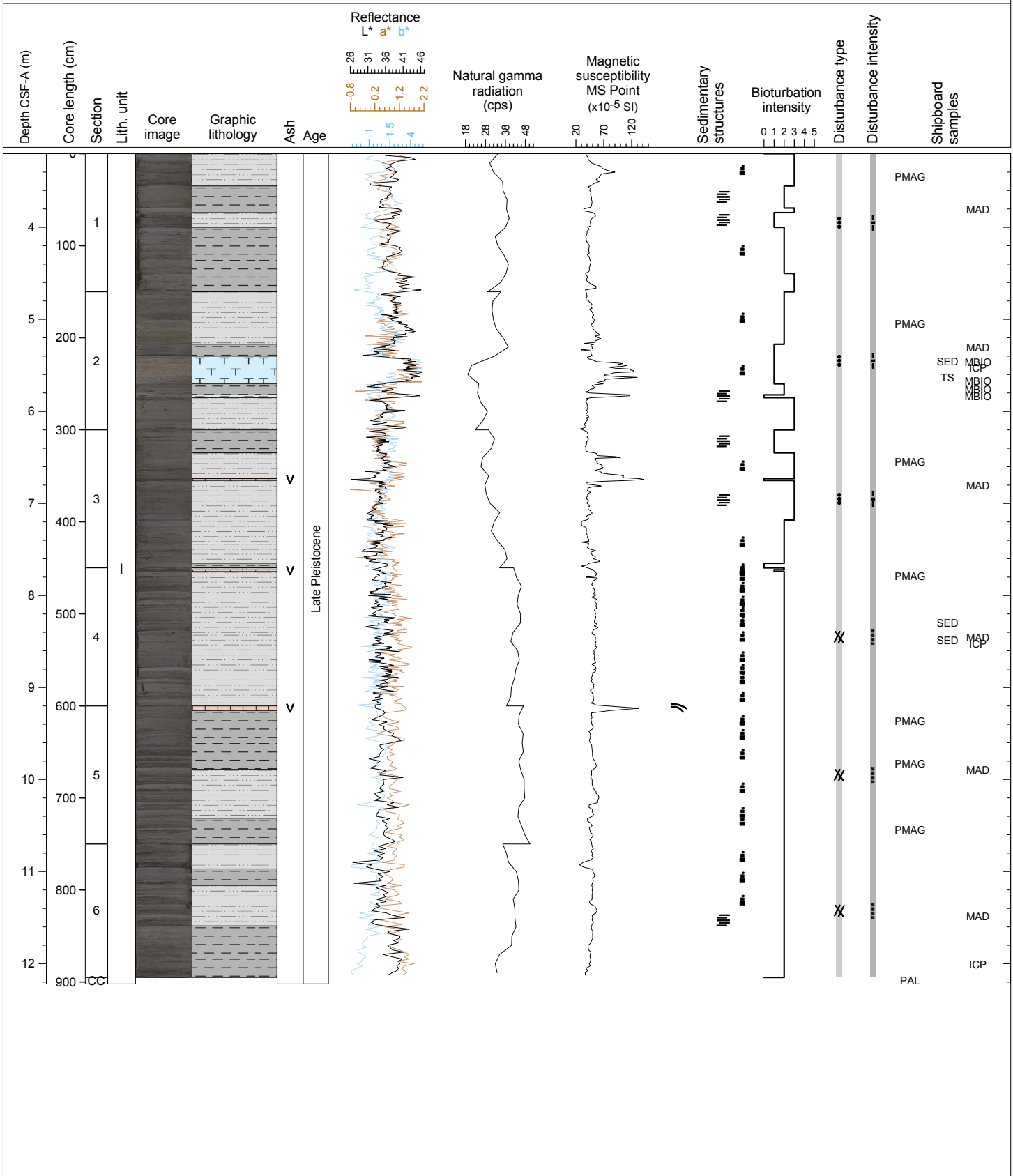
Hole 349-U1431D Core 1H, Interval 0.0-3.22 m (CSF-A)

SILTY CLAY, dark gray with volcanic ASH layers. At the top of core, there is a layer of reddish brown SILTY CLAY with biogenic components (foraminifers, radiolarians, etc.). This is underlain by cyclic layers of CLAYEY SILT that were probably deposited as turbidites. These are interbedded with layers of blackish volcanic ASH. In the lower part of the core, two volcanic GRAVELS (about 10 cm thick) occur within CLAY layers.



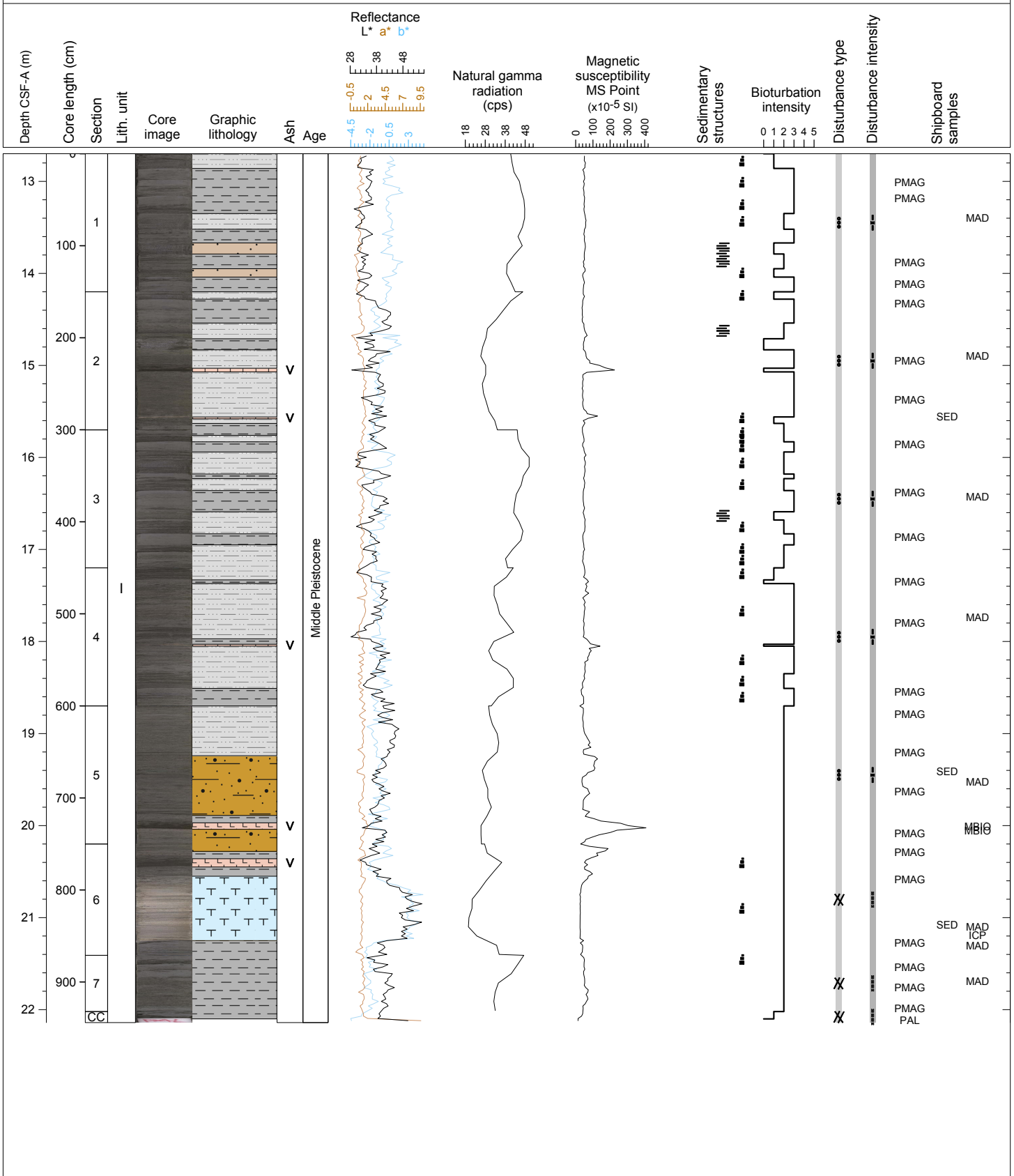
Hole 349-U1431D Core 2H, Interval 3.2-12.22 m (CSF-A)

Gray green SILTY CLAY turbidites are interbedded with slightly lighter colored CLAY WITH SILT hemipelagic deposits that show clear bioturbation and mottling by burrowing. Section 2 contains a calcareous turbidite, rich in foraminifers and with a clear erosive base and fining upward structure. This bed contains occasional volcanic clasts. Thin ASH beds are found in Sections 3, 4 and 5.



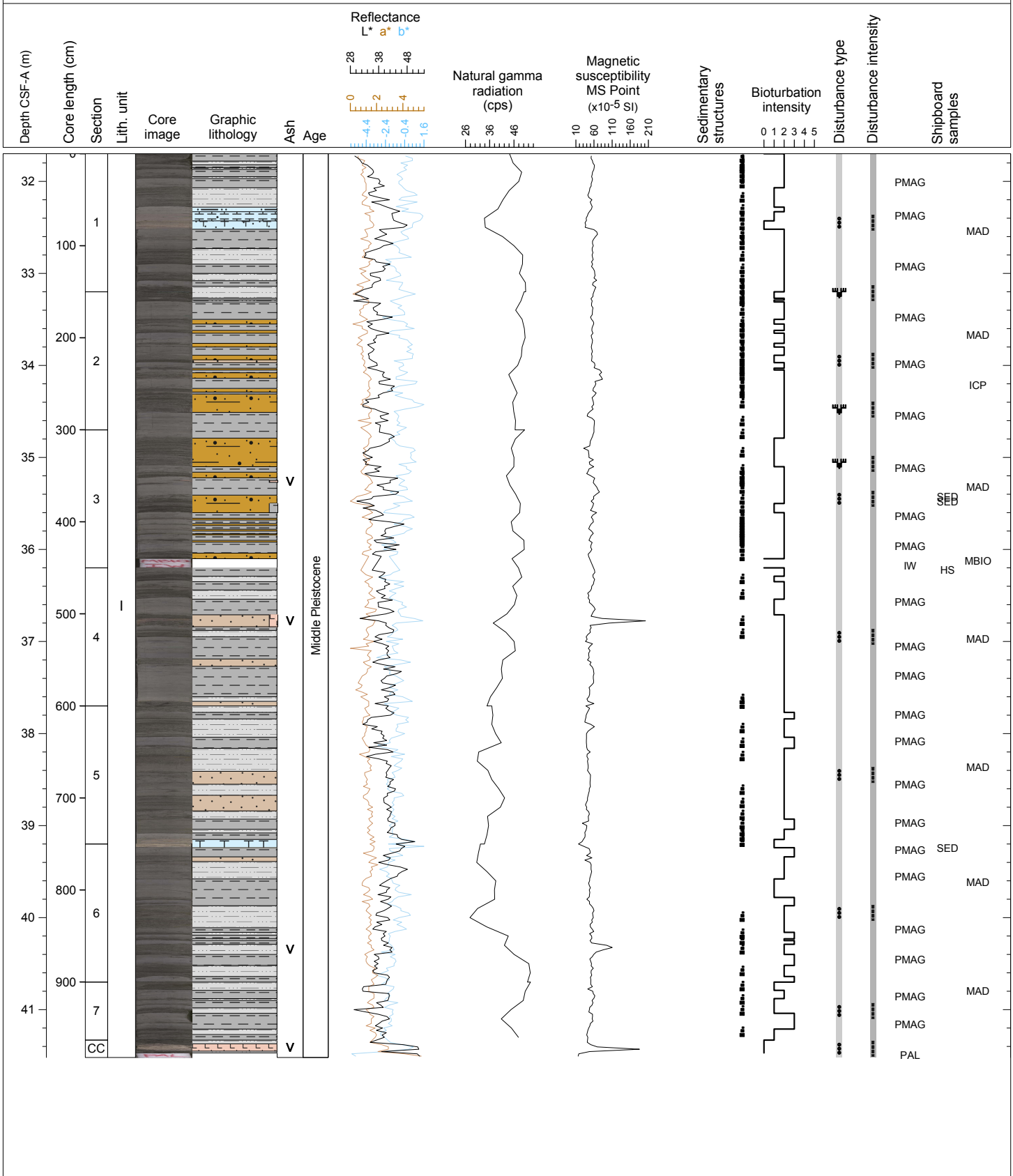
Hole 349-U1431D Core 3H, Interval 12.7-22.14 m (CSF-A)

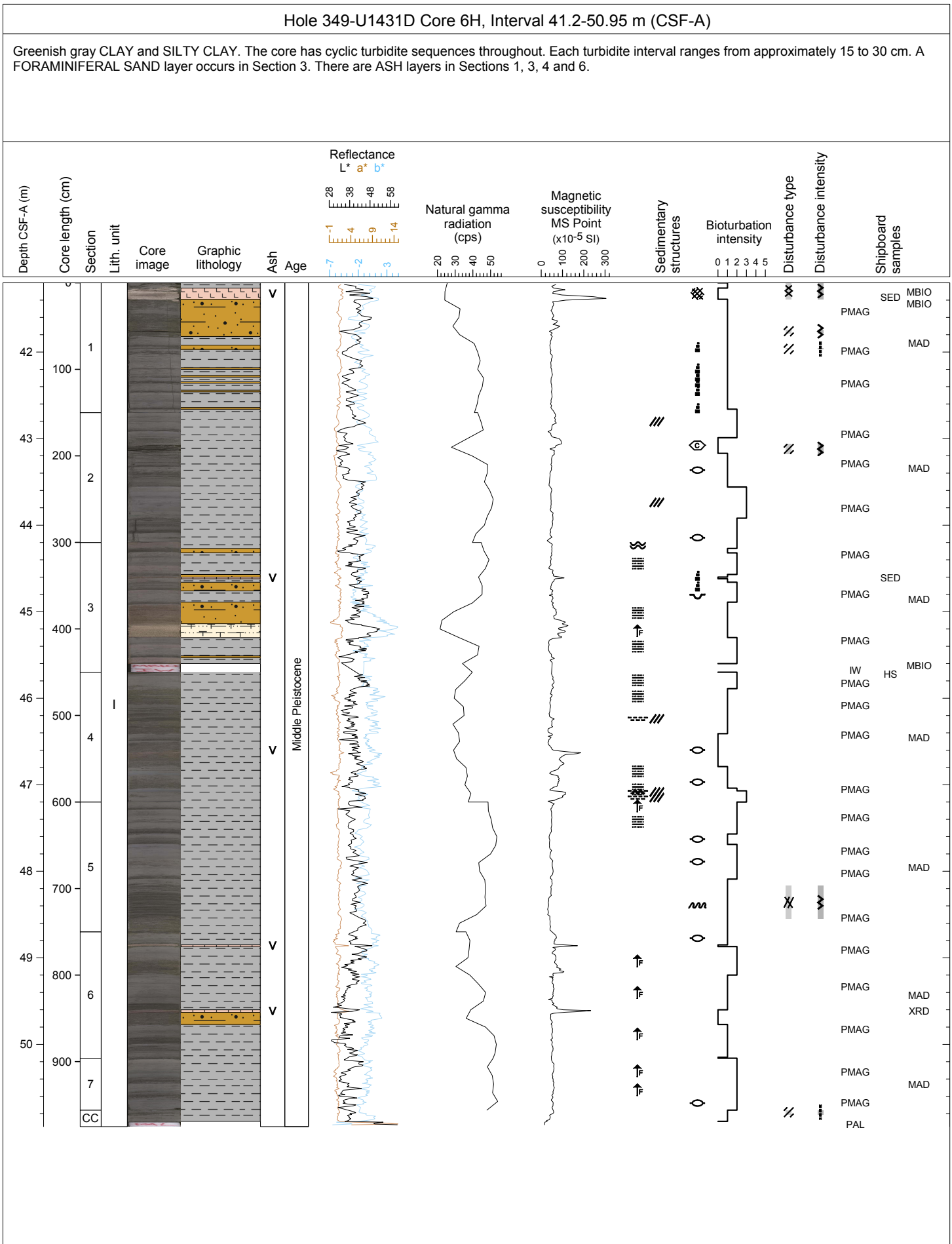
Dark greenish gray CLAY and CLAY WITH SILT dominate this core with frequent interbeds of SILTY CLAY especially toward the base of the core. These beds are fining upward and display the sharp erosive beds associated with turbidites. Section 6 is marked by a thick calcareous turbidite with abundant foraminifers and detrital carbonate grains. Parallel laminations and fining upward structure is observed. Mottling due to bioturbation is prominent in the muddy intervals.



Hole 349-U1431D Core 5H, Interval 31.7-41.52 m (CSF-A)

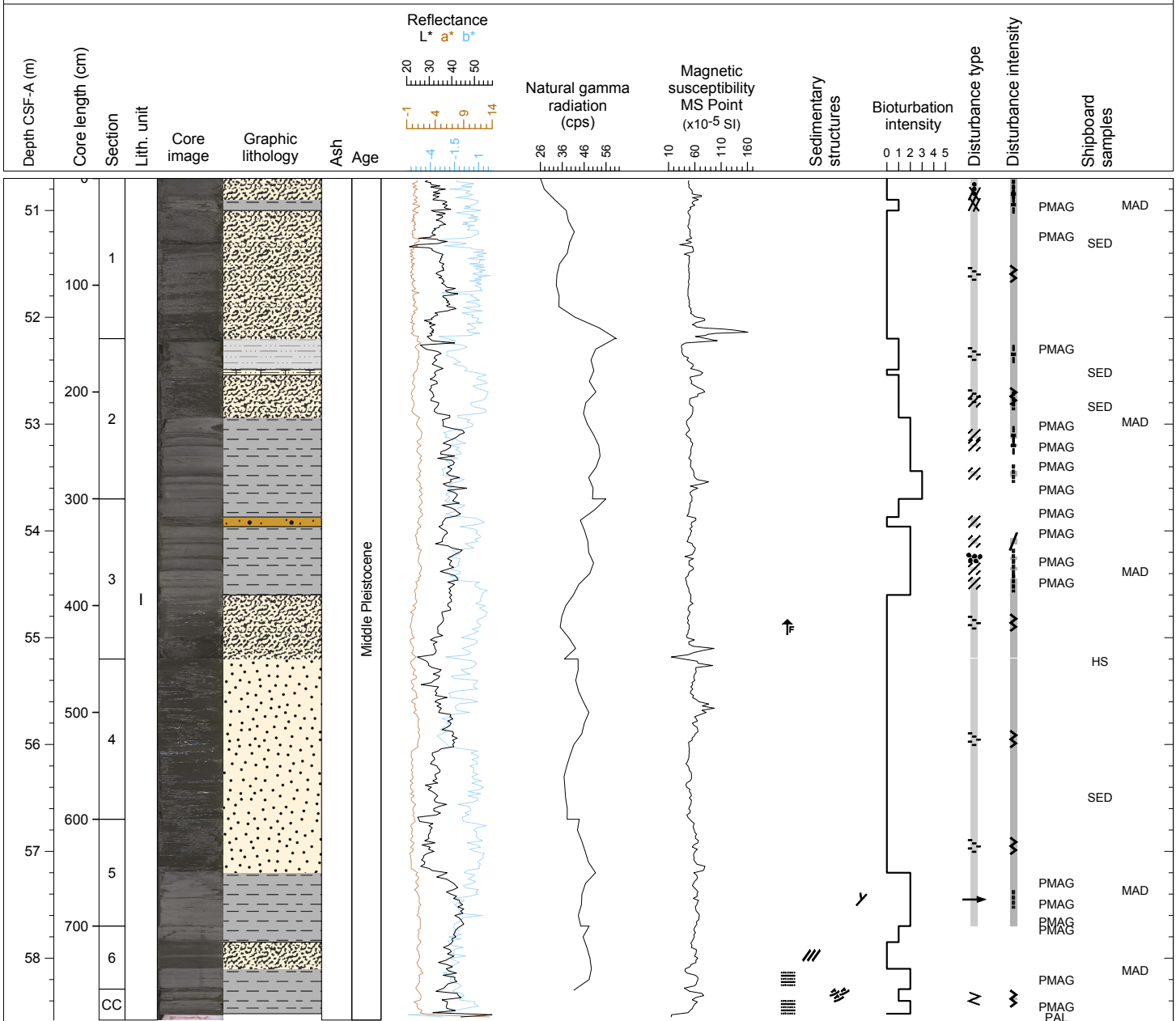
Greenish gray CLAY-RICH SILT turbidites, generally <50 cm thick. Sharp, erosive bases and clear grading are typical. Some beds are rich in glauconite. A 30 cm thick calcareous turbidite occurs in Section 1 and thinner, approximately 20 cm thick turbidites occur in Sections 5, 6 and CC. Small, light-colored ASH pods occur in Sections 3 and 4.





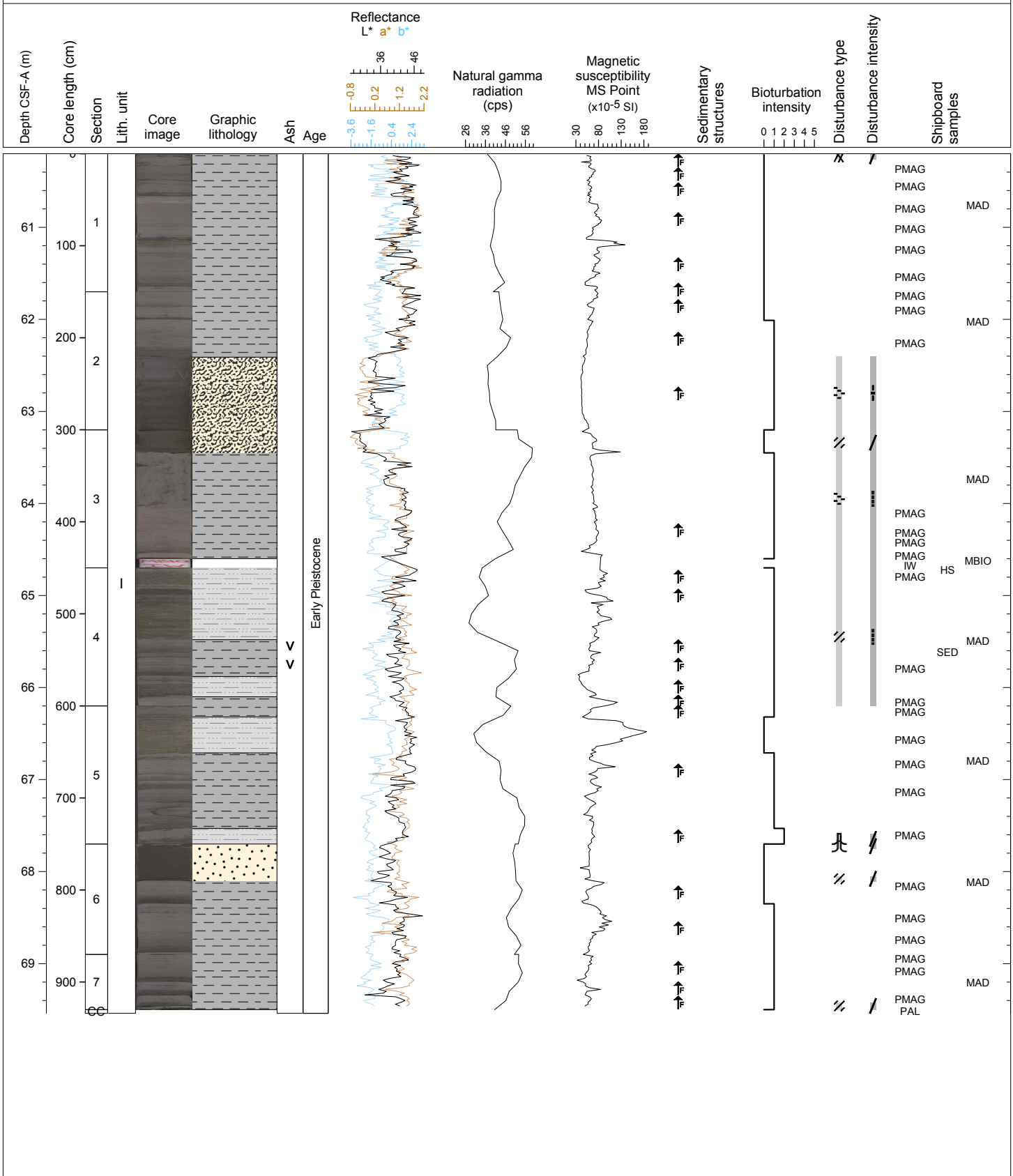
Hole 349-U1431D Core 7H, Interval 50.7-58.58 m (CSF-A)

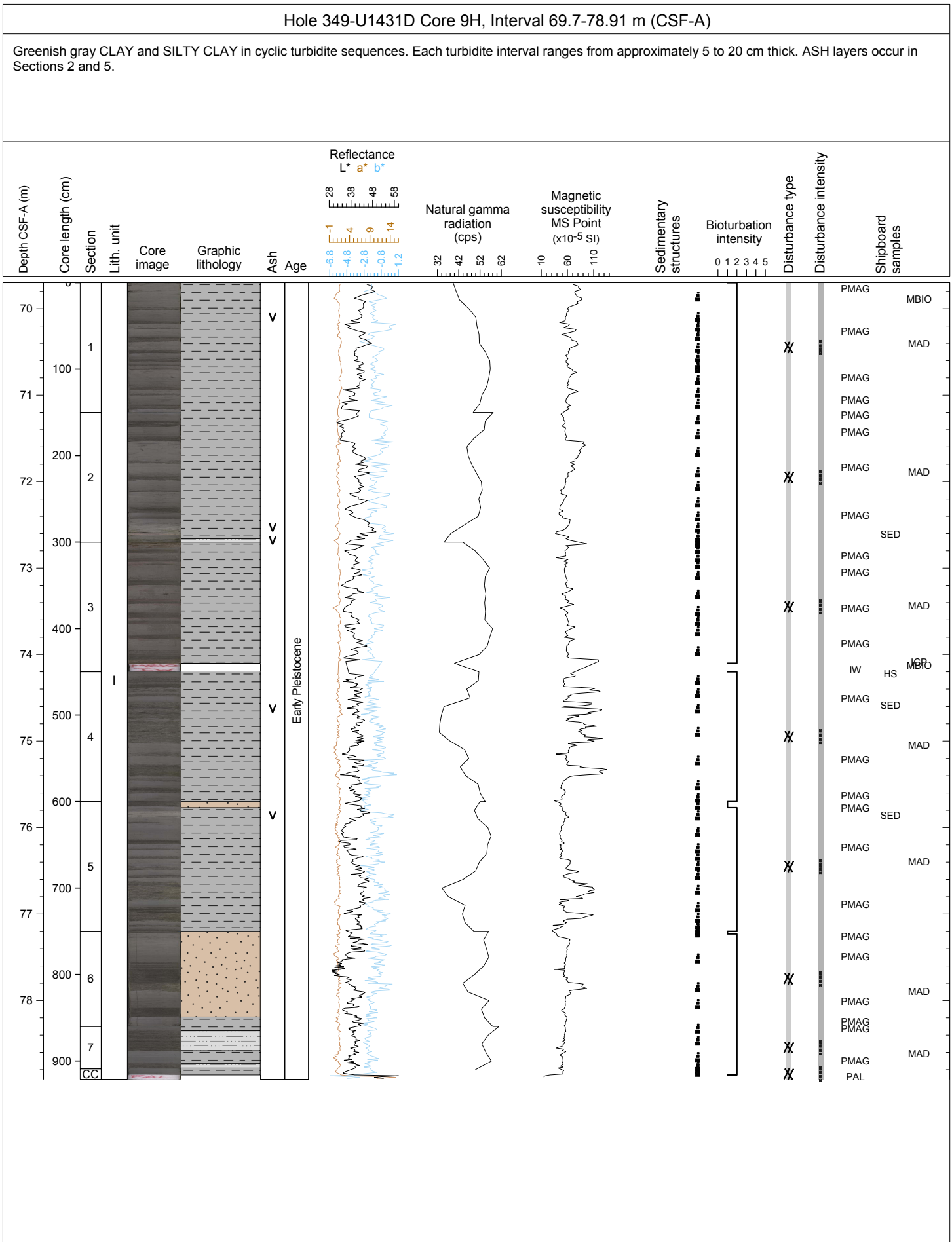
Dark greenish gray SAND fining upward to greenish gray CLAY and SILTY CLAY. An upward fining SAND layer occurs in Section 3 from 106-150 cm and is interpreted as a turbidite. Cyclic turbidite intervals composed of CLAY and SILTY CLAY occur frequently in the core. There is a homogenous FINE SAND interval at the top of Section 4 to the upper 50 cm of Section 5. A 6 cm interval of coarse sand, consisting mainly of quartz, feldspar, amphibole, volcanic glass, and foraminifer grains, occurs in Section 2. There is evidence of core disturbance in the SAND intervals.



Hole 349-U1431D Core 8H, Interval 60.2-69.54 m (CSF-A)

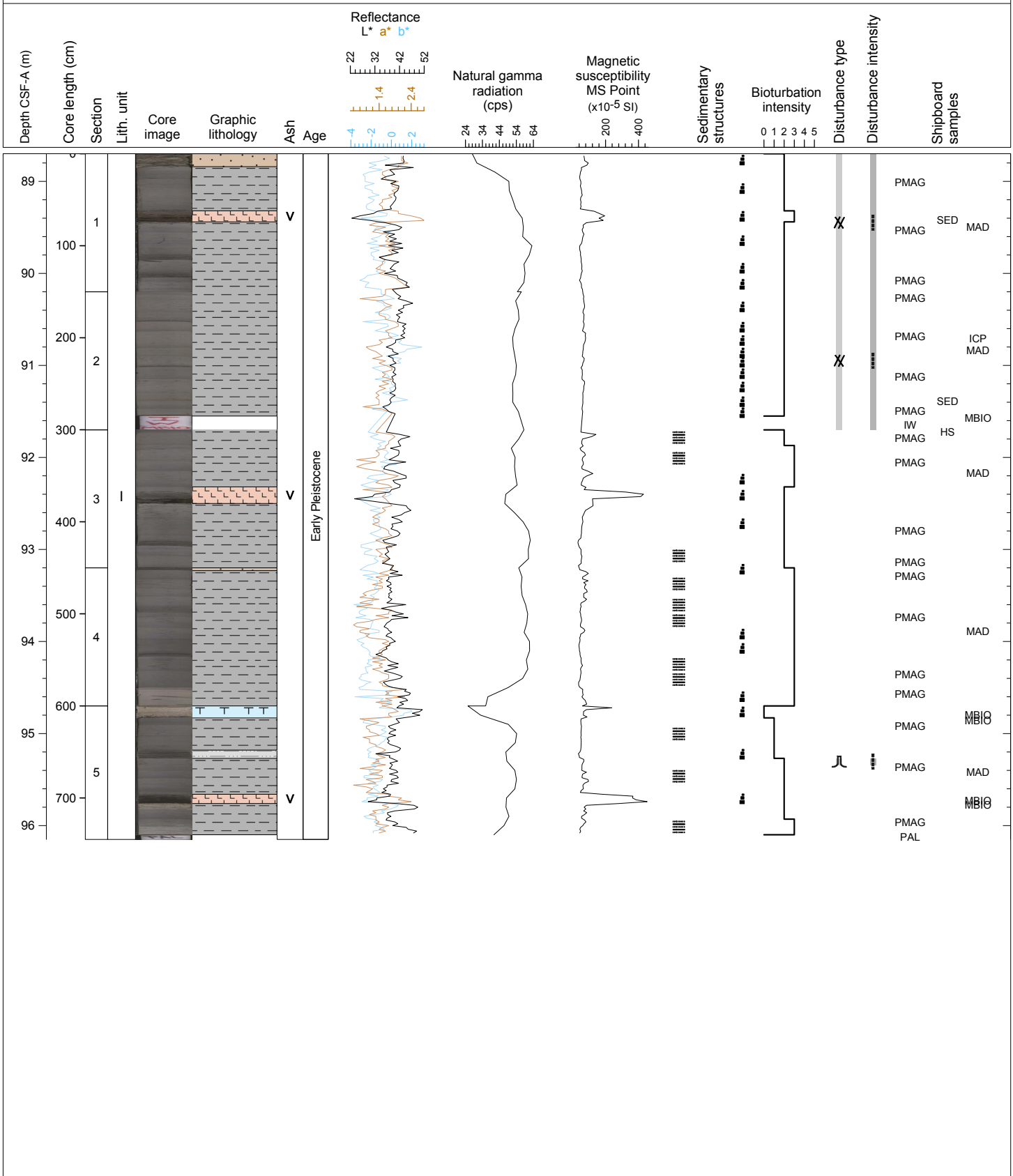
Turbidites grading from dark greenish gray CLAYEY SILT to CLAY are abundant. SAND layers are fining upward and have an erosive contact with the CLAY layer below. Two ASH-RICH SILT layers occur in SILT layers of the turbidite cycles in Section 4. A potential slide deposit with steep contact between CLAY and SILT layers occurs in the lower part of Section 5. In summary, the core is mainly composed of turbidite deposits.





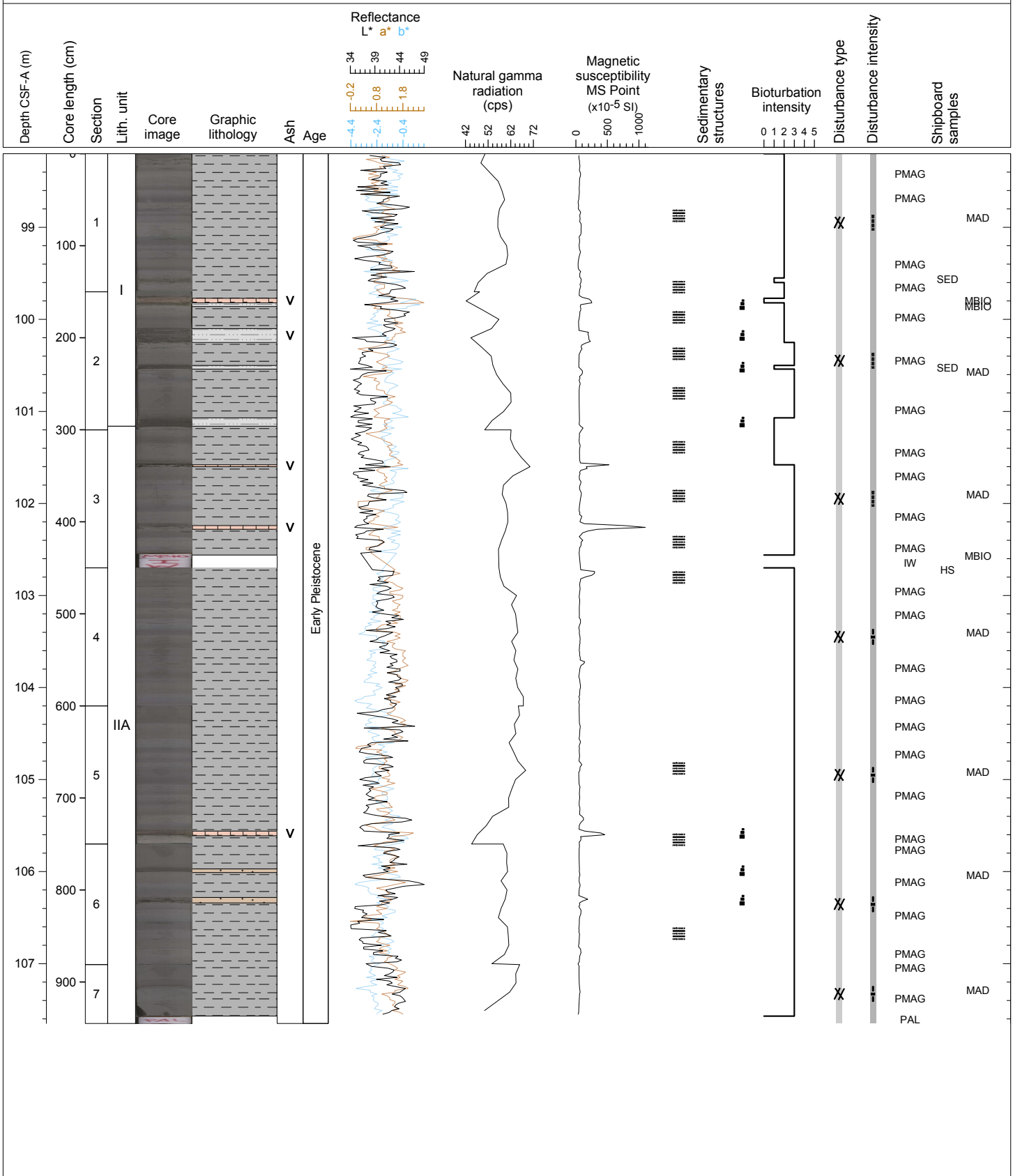
Hole 349-U1431D Core 11H, Interval 88.7-96.15 m (CSF-A)

Clay-rich, greenish gray SILTY CLAY with occasional SILT turbidites approximately 15 cm thick. One CLAY layer is 90 cm thick. Two brown-colored ASH layers occur in Sections 1, 3 and 5. A 13 cm thick FORAMINIFERAL OOZE turbidite occurs at the top of Section 5. Bioturbation is prominent in clay-rich intervals. Generally finer than overlying cores.



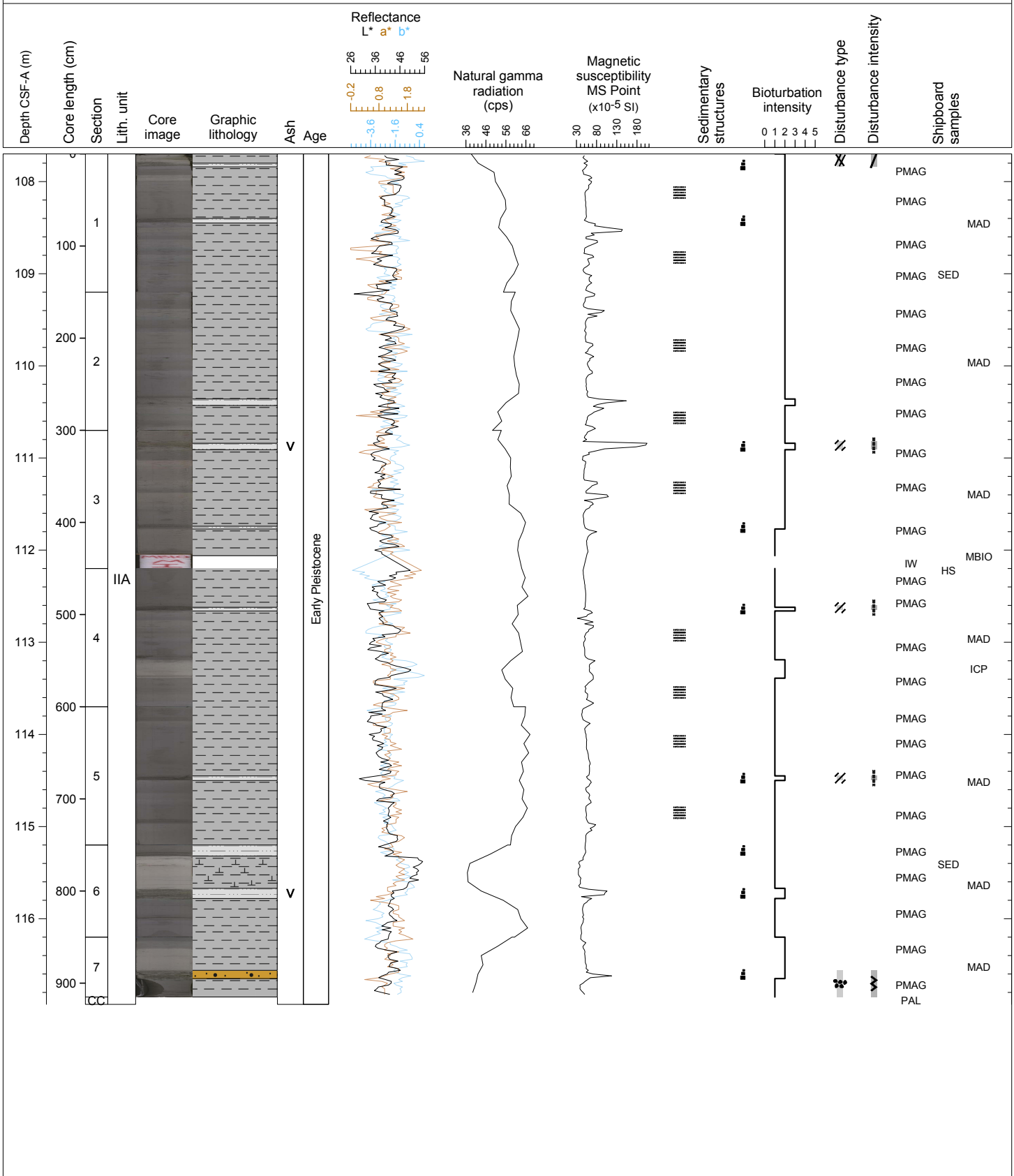
Hole 349-U1431D Core 12H, Interval 98.2-107.65 m (CSF-A)

Clay-rich, greenish gray CLAY WITH SILT with occasional SILTY CLAY turbidites up to 30 cm thick. One CLAY layer is 3.9 m thick and is color banded. Two brown-colored ASH layers occur in Section 3 and two light-colored ASH layers occur in Sections 2 and 5. Bioturbation is prominent in clay-rich intervals.



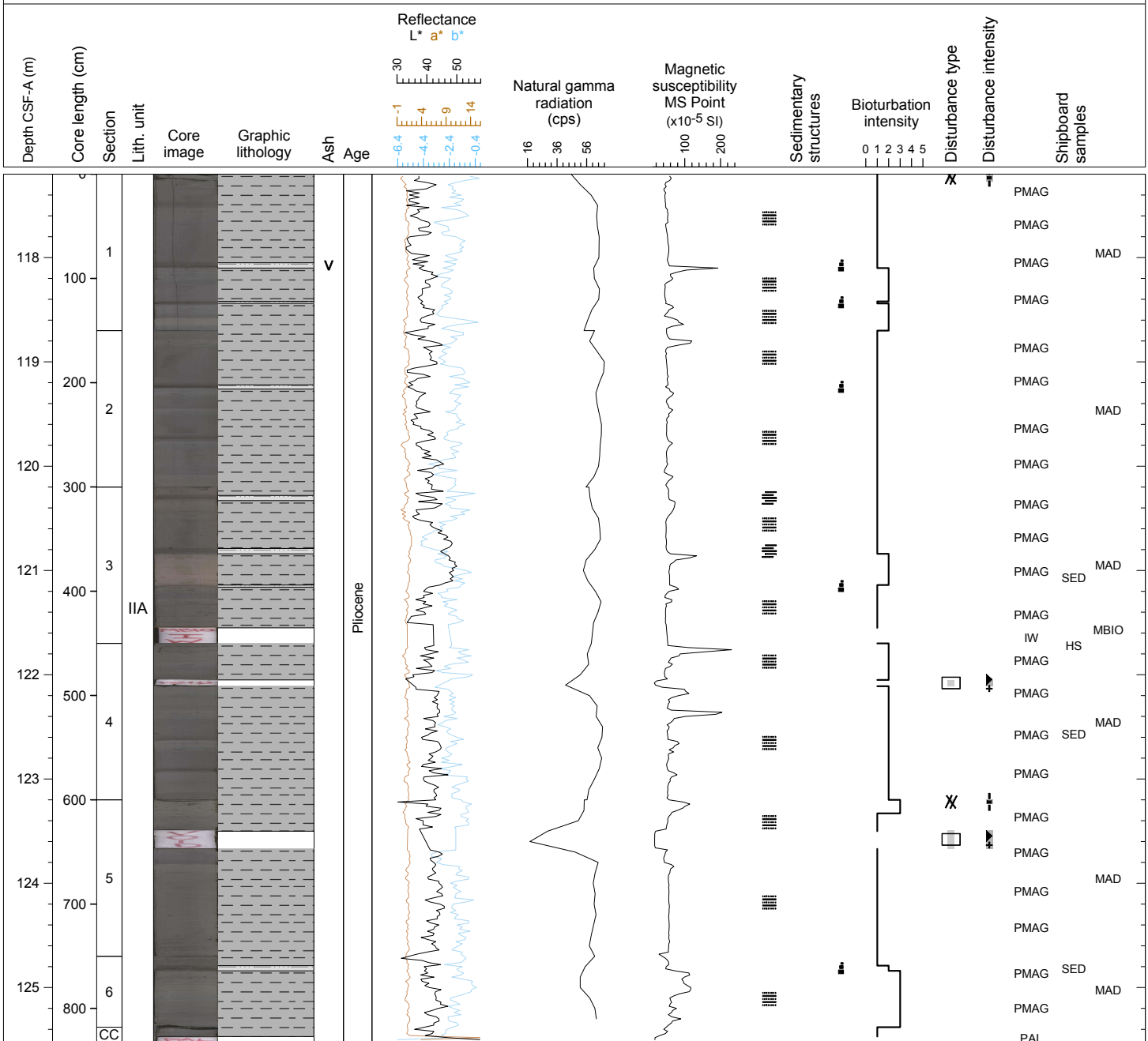
Hole 349-U1431D Core 13H, Interval 107.7-116.93 m (CSF-A)

Dark greenish gray CLAY with occasional SILTY CLAY turbidite layers ranging from 3 to 15 cm thick. One layer of greenish gray CLAY WITH NANNOFOSSILS in Section 4 and NANNOFOSSIL-RICH CLAY in Section 6 occur among the thick CLAY layers. Thin turbidite CLAYEY SILT layers fine upward. Bioturbation is generally moderate in SILTY CLAY and slight in CLAY intervals.



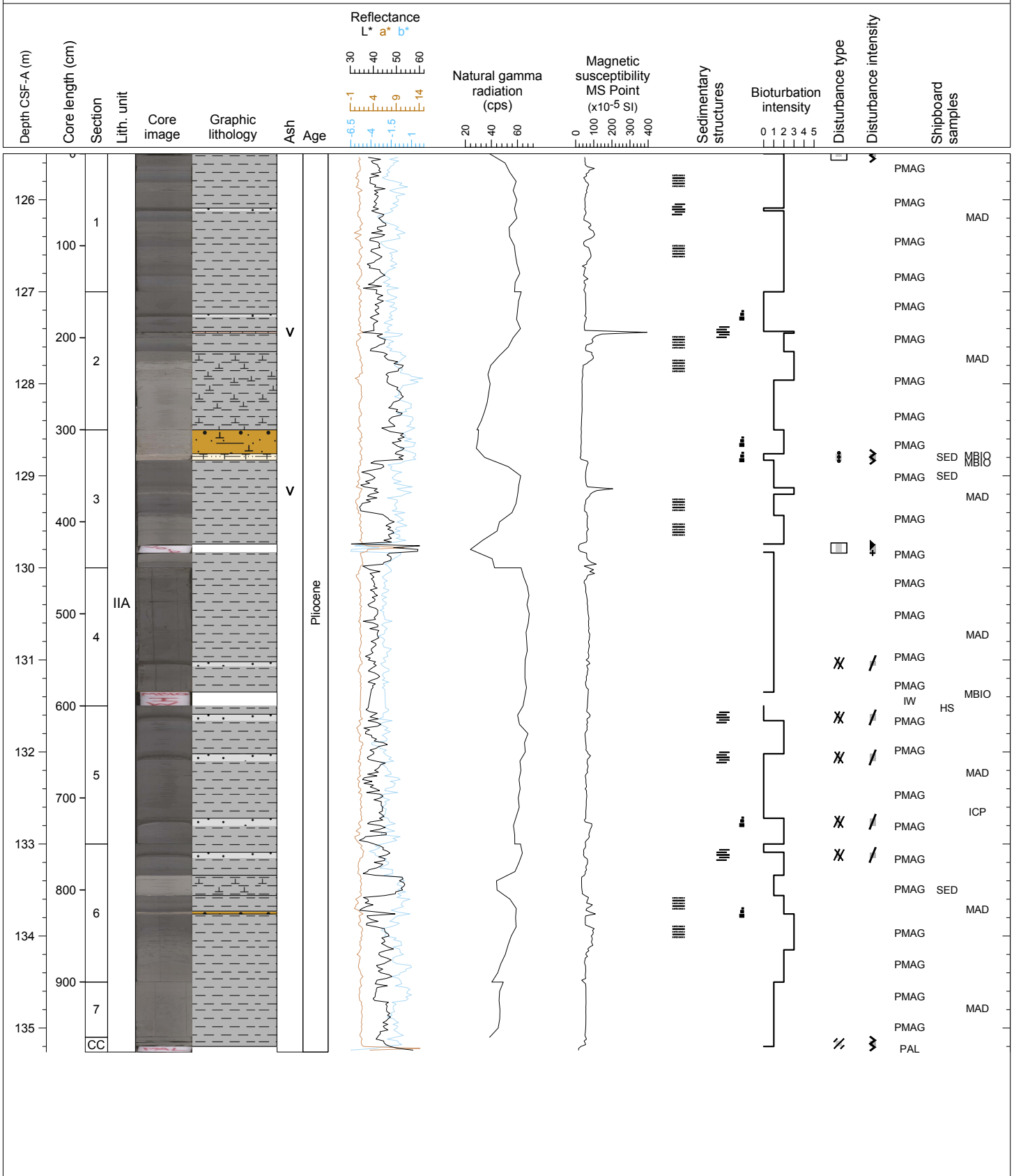
Hole 349-U1431D Core 14H, Interval 117.2-125.52 m (CSF-A)

Dark greenish gray CLAY with occasional SILTY CLAY laminated layers ranging from 5-10 cm thickness. Two layers of greenish gray CLAY WITH NANNOFOSSILS in Sections 1 and 3 occur interbedded with the thick CLAY layers. Thin turbidite SILT layers are rare and mainly in SILTY CLAY laminated layers. Bioturbation is generally slight-moderate in CLAY intervals.



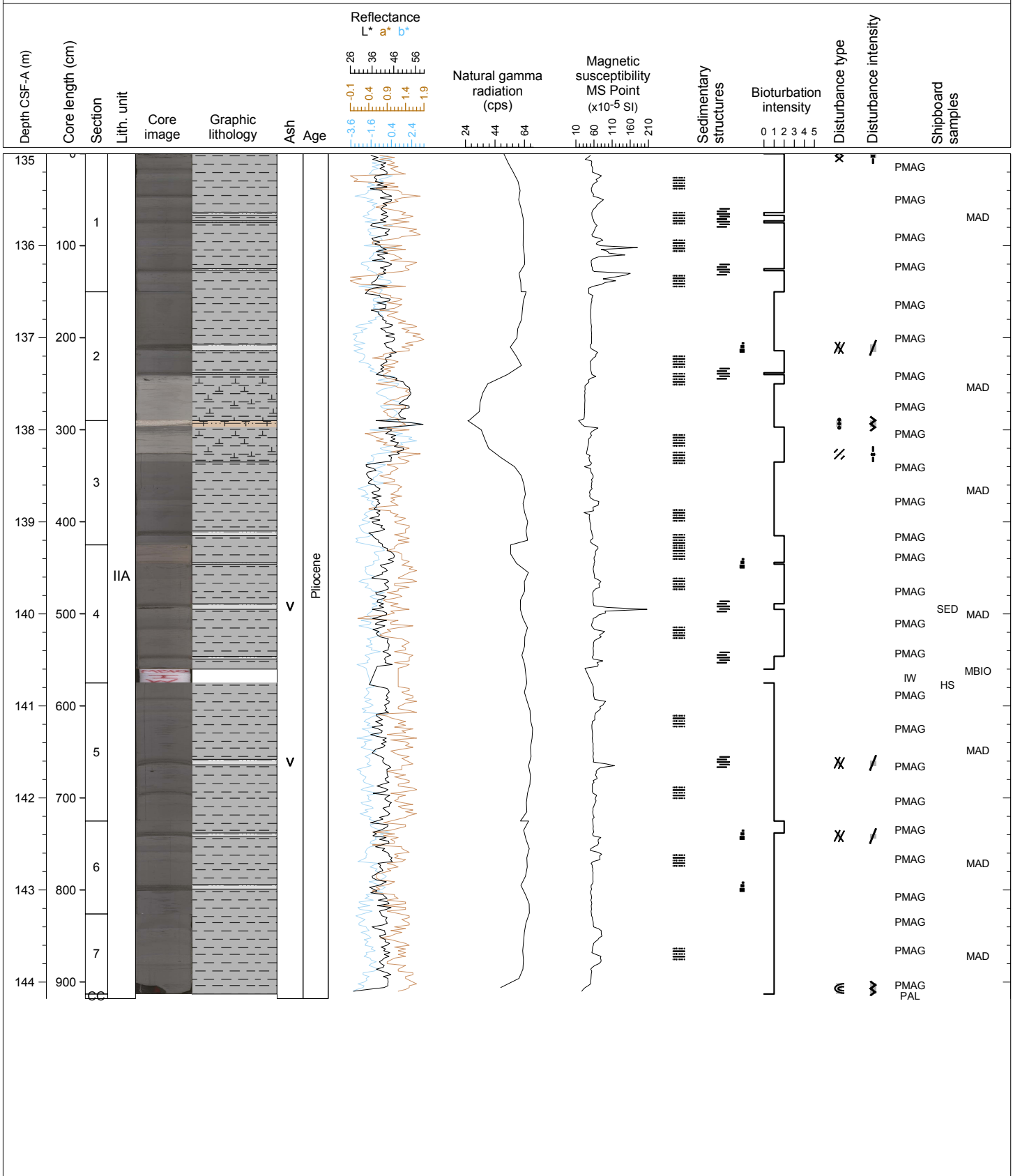
Hole 349-U1431D Core 15H, Interval 125.5-135.26 m (CSF-A)

Dark greenish gray CLAY interbedded with gray NANNOFOSSIL-RICH CLAY. A FORAMINIFER-RICH SAND turbidite layer occurs in Section 3. A very thin dark volcanic ASH layer occurs in Section 2. Thin SILTY CLAY laminations occur among the thick CLAY layers. Bioturbation is generally slight-moderate in CLAY intervals.



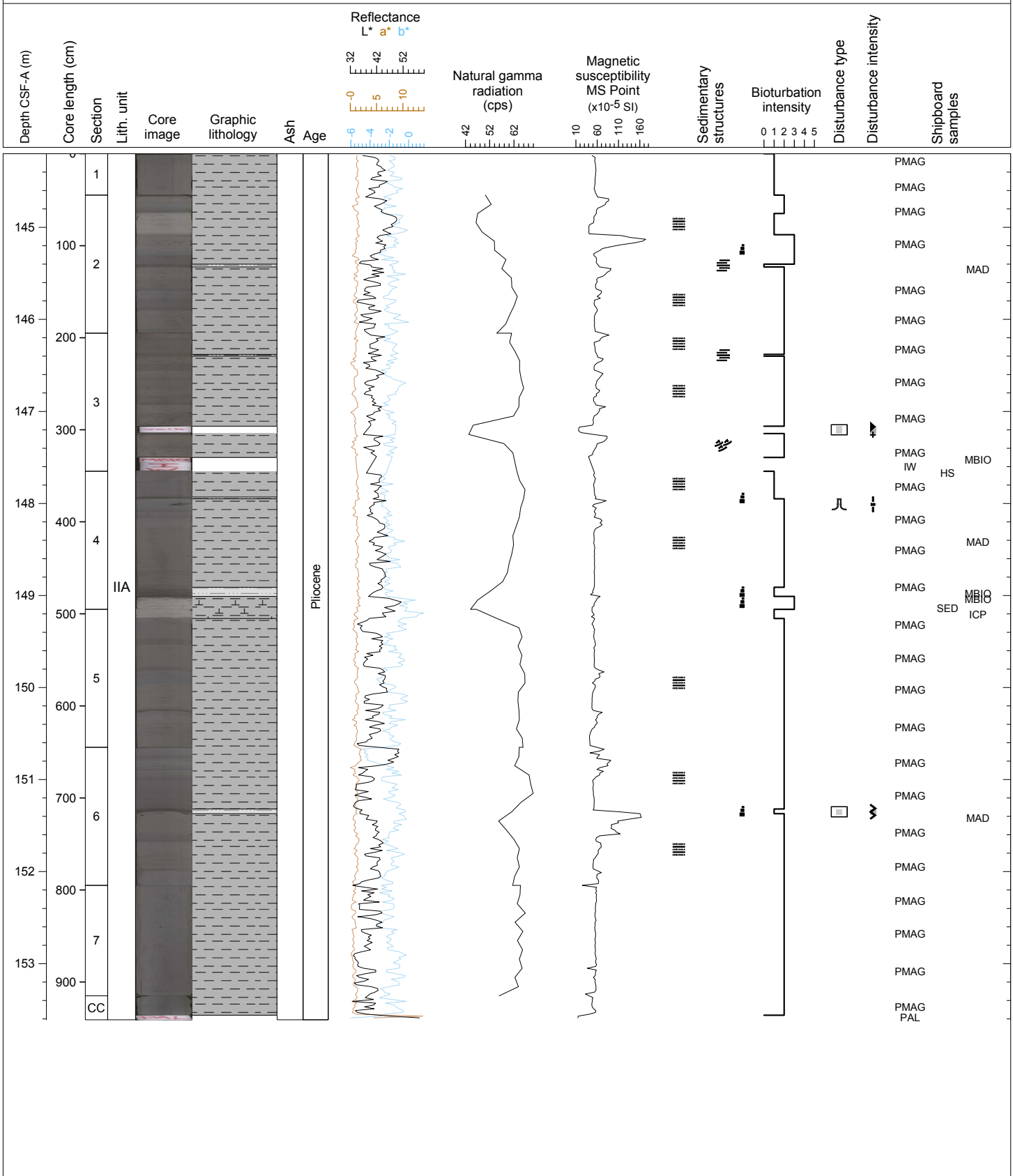
Hole 349-U1431D Core 16H, Interval 135.0-144.18 m (CSF-A)

Dark greenish gray CLAY with two thick layers of NANNOFOSSIL-RICH CLAY in Sections 2 and 3. A FORAMINIFER-RICH SAND turbidite layer occurs in the lower part of a NANNOFOSSIL-RICH CLAY layer. Thin SILTY CLAY laminations, usually 2-5 cm in thickness, occur in the thick CLAY layers. Bioturbation is generally slight-moderate in CLAY intervals.



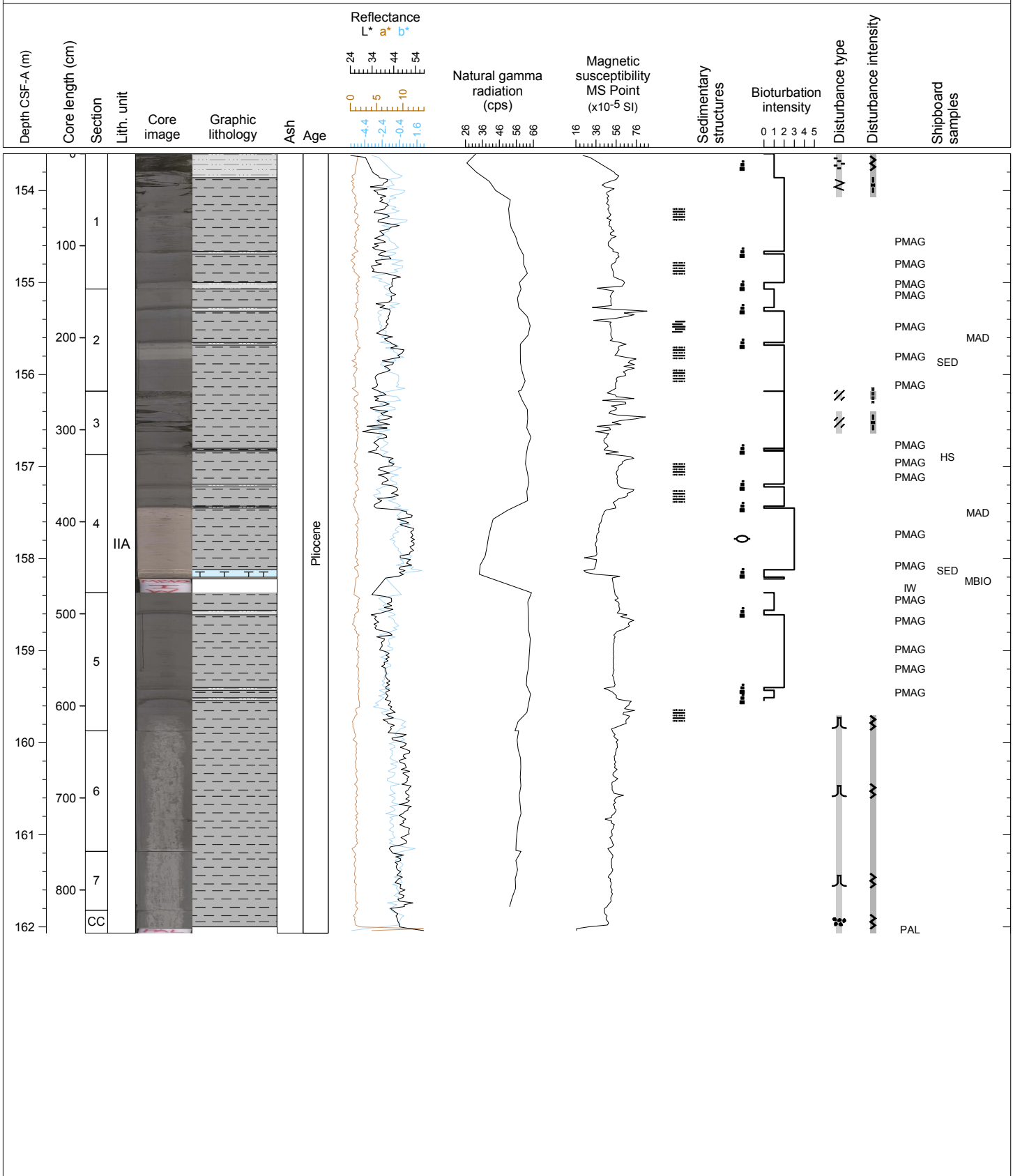
Hole 349-U1431D Core 17H, Interval 144.2-153.61 m (CSF-A)

Dark greenish gray CLAY is the dominant lithology in this core. Two moderately thick layers of NANNOFOSSIL-RICH CLAY with gradational contacts with the underlying CLAY occur in Sections 4, and 5. Thin SILTY CLAY laminations, usually 2-5 cm in thickness, occur interbedded with the thick CLAY layers. Bioturbation is generally slight-moderate in CLAY intervals.



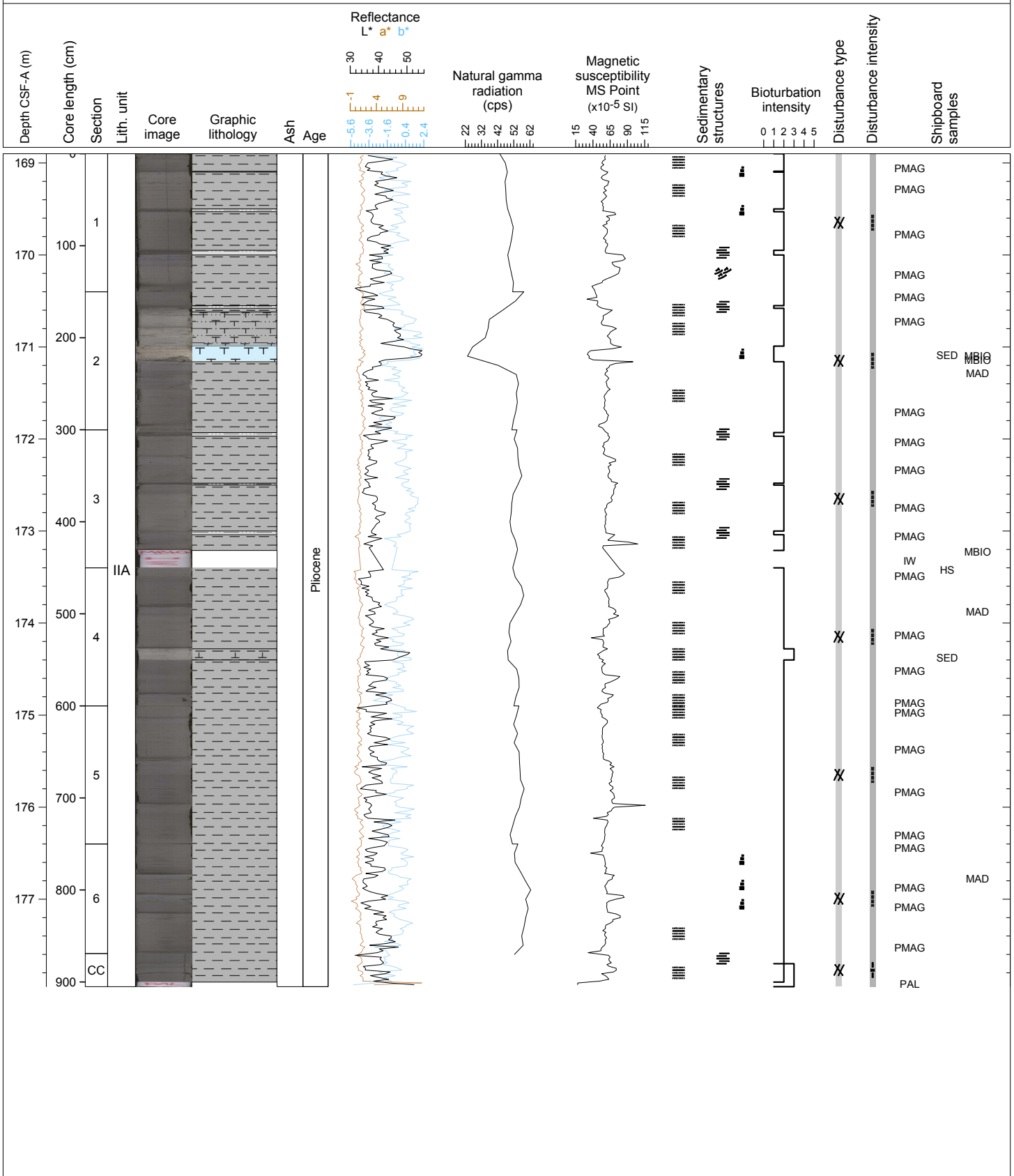
Hole 349-U1431D Core 18H, Interval 153.6-162.07 m (CSF-A)

Greenish gray CLAY with minor interbeds of light greenish gray SILTY CLAY turbidites comprising about 5% of the total core. One light greenish gray FORAMINIFERAL OOZE is overlain by a fining upward package of CLAY WITH FORAMINIFERS in Section 4. The core is bioturbated but much of the CLAY is homogenous, except at bed tops. Drilling disturbance is locally problematic, with large amounts of flow-in at the base.



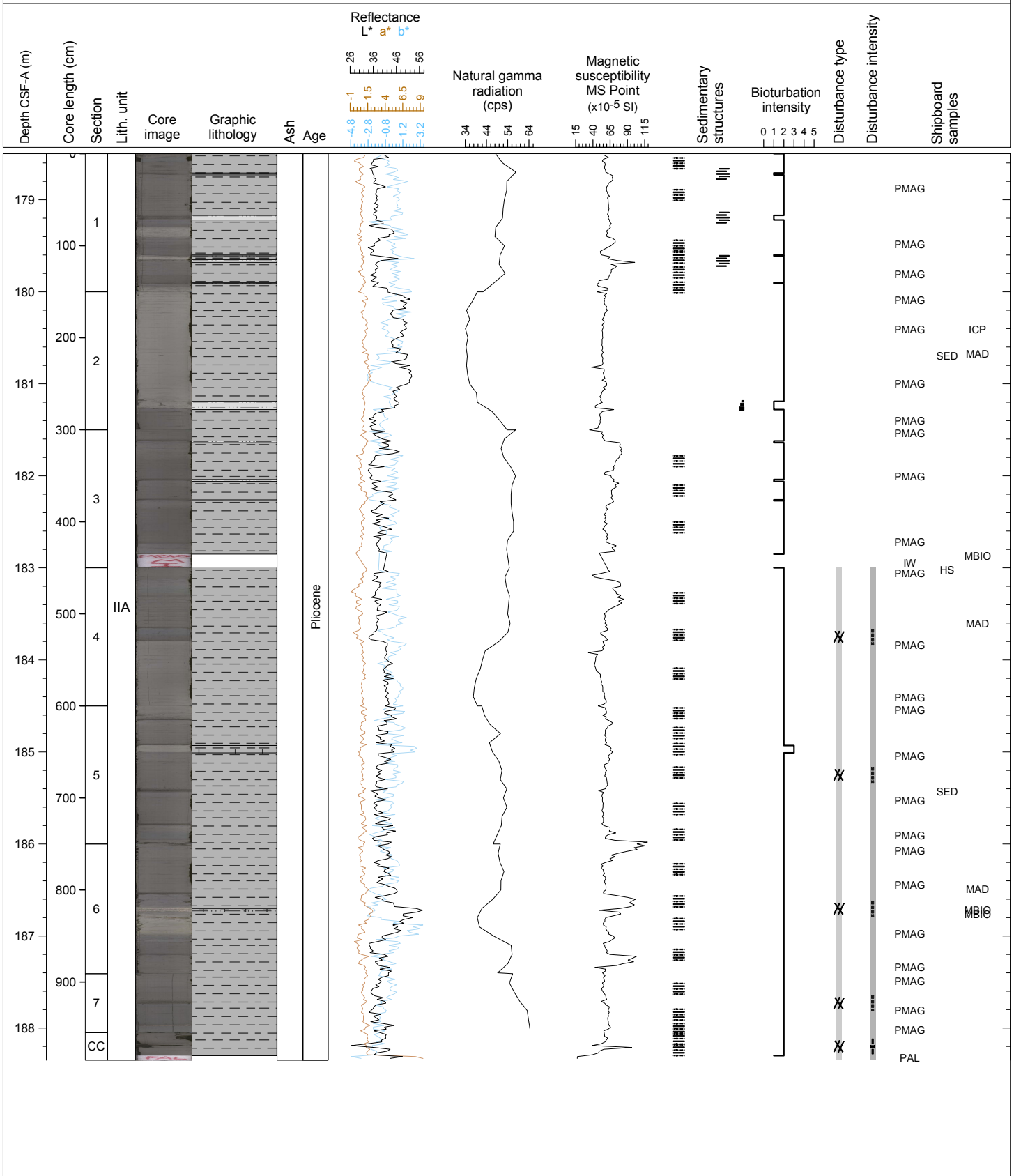
Hole 349-U1431D Core 20X, Interval 168.9-177.95 m (CSF-A)

Dark greenish gray CLAY with occasional SILT WITH CLAY laminated layers ranging from 2-3 cm thick. Two layers of light gray FORAMINIFER or NANNOFOSSIL-RICH CLAY within Sections 2 and 4 occur within the thick CLAY layers. Thin turbidite SILT layers are rare and mainly in SILT WITH CLAY laminations. Bioturbation is generally moderate in CLAY intervals.



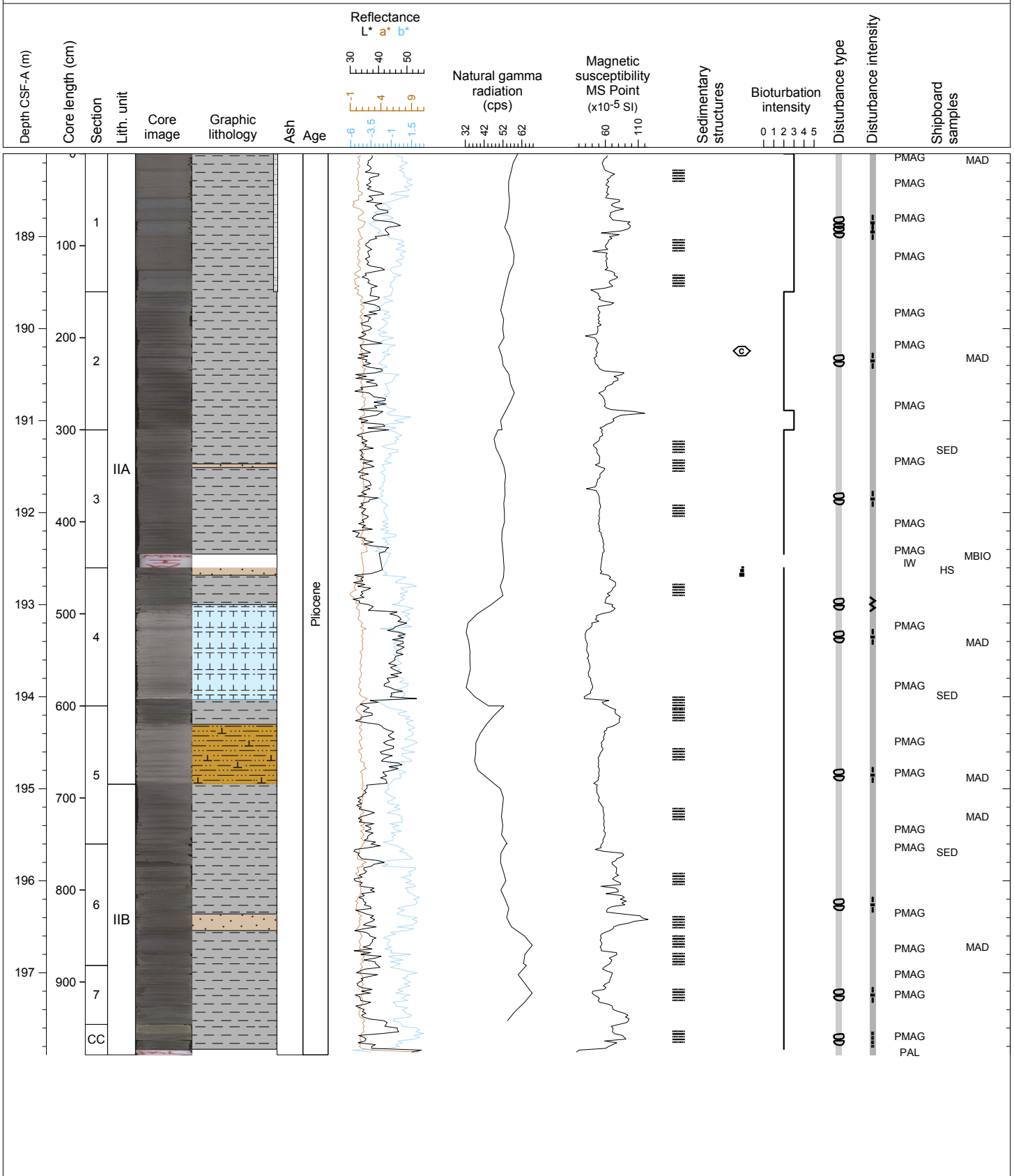
Hole 349-U1431D Core 21X, Interval 178.5-188.35 m (CSF-A)

Dark greenish gray CLAY with occasional SILT WITH CLAY laminated layers ranging from 1-3 cm thick. One layer of light gray NANNOFOSSIL-RICH CLAY in Section 2 and one of FORAMINIFERAL OOZE in Section 6. Thin turbidite SILT layers are rare and mainly in SILT WITH CLAY laminations. Bioturbation is generally moderate in CLAY intervals.



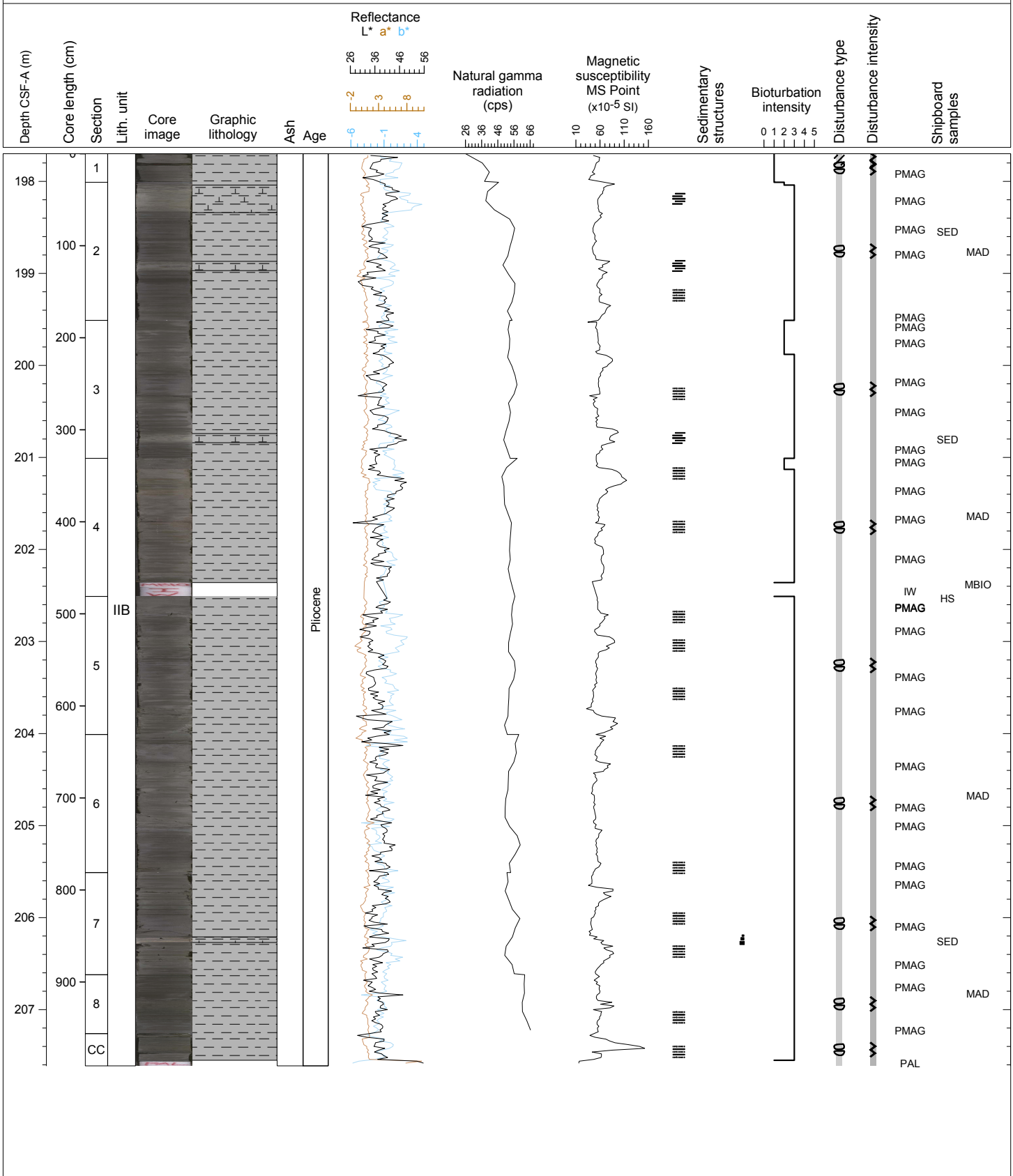
Hole 349-U1431D Core 22X, Interval 188.1-197.89 m (CSF-A)

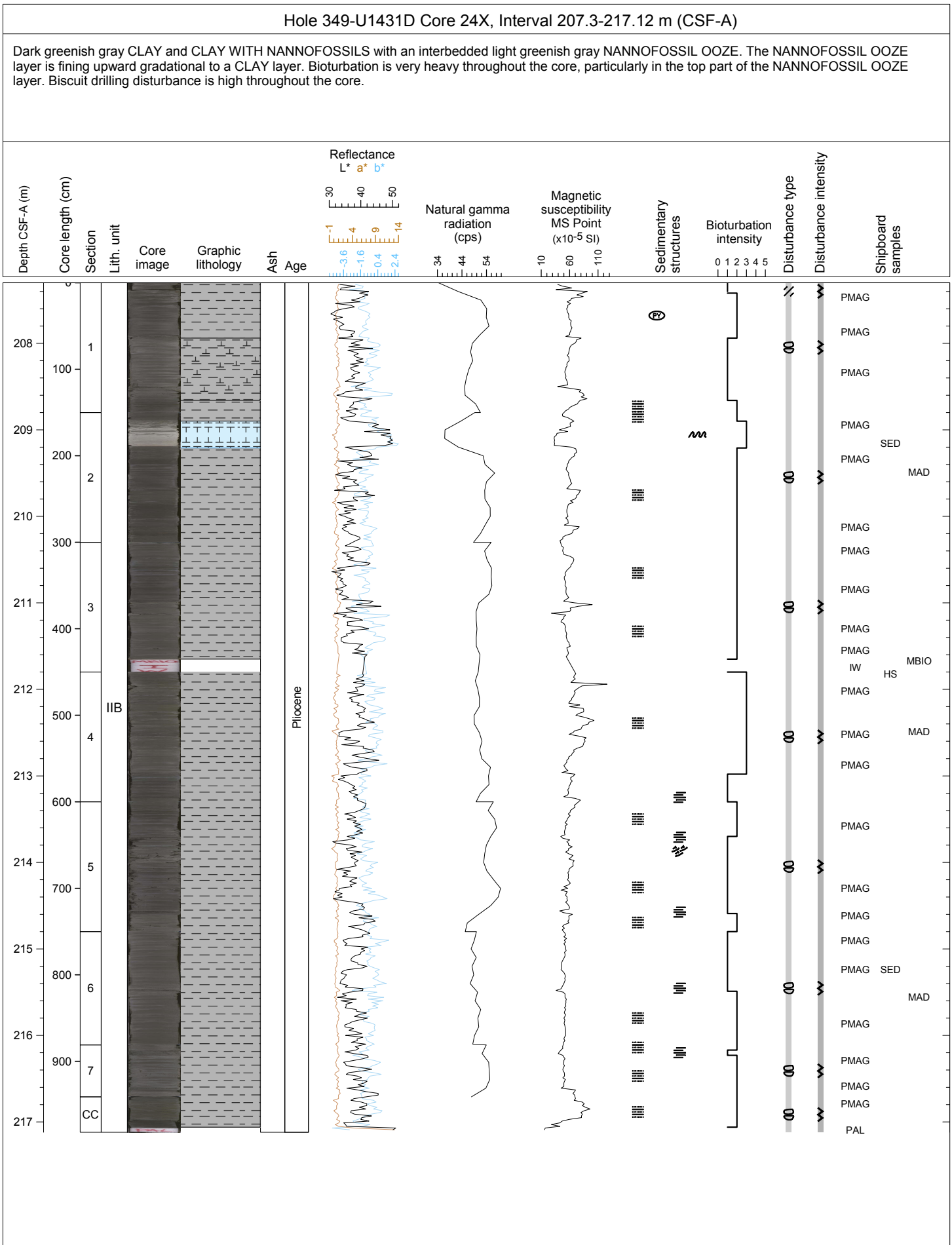
Greenish gray CLAY and CLAY WITH SILT. SILTY CLAY turbidites are 1-3 cm thick and form <5% of the total core. Core is well bioturbated and shows burrows highlighted where contrasting lithologies meet, especially at the top of Section 4 where there is a ~1 m thick CALCAREOUS OOZE showing an erosive base and clear grading. Another such unit occurs in Section 5 with parallel laminated base.



Hole 349-U1431D Core 23X, Interval 197.7-207.61 m (CSF-A)

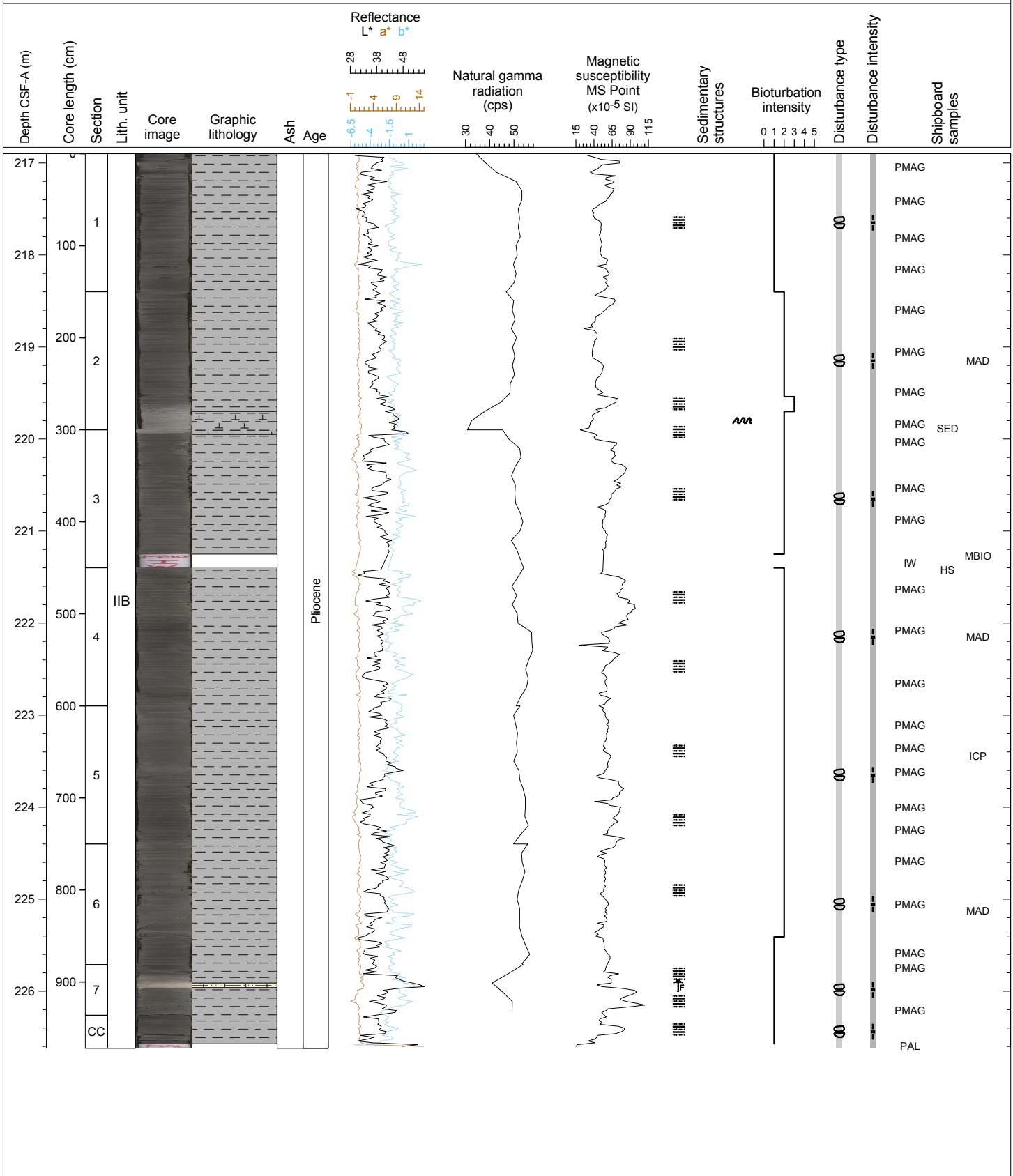
Dark greenish gray CLAY and CLAY WITH SILT with interbedded light greenish gray NANNOFOSSIL-RICH CLAY. The NANNOFOSSIL-RICH CLAY layers are fining upward gradational to CLAY layers. A thin (1 cm thick) fine sandy FORAMINIFERAL OOZE occurs at the bottom of a thin layer of NANNOFOSSIL-RICH CLAY in Section 7. Bioturbation is very heavy throughout the core, especially in the top parts of NANNOFOSSIL-RICH CLAY layers. Biscuit drilling disturbance is high throughout the core.





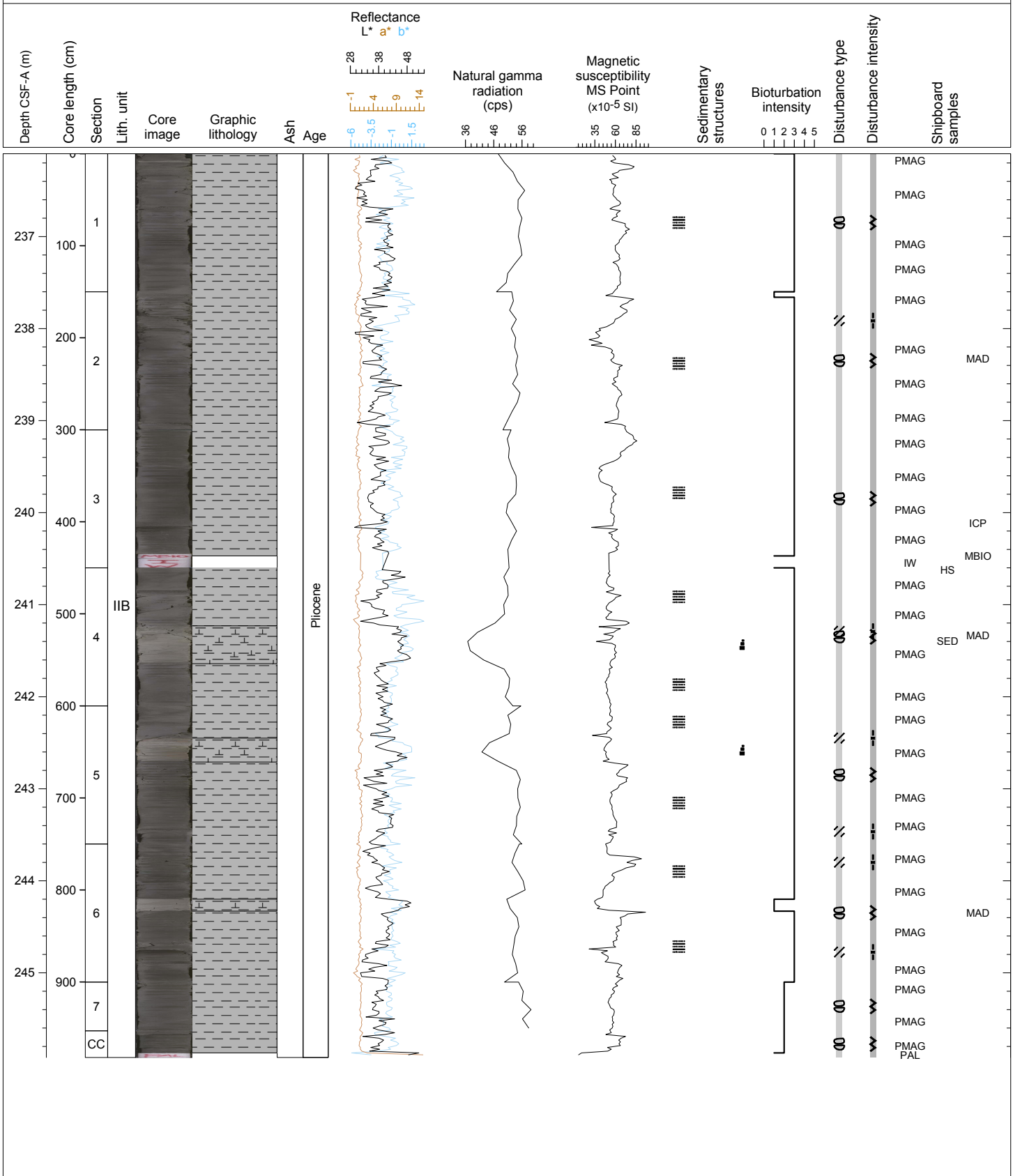
Hole 349-U1431D Core 25X, Interval 216.9-226.62 m (CSF-A)

CLAY, NANNOFOSSIL-RICH CLAY, and FORAMINIFERAL OOZE. This core has alternating slightly dark greenish gray and dark gray intervals. These changes might be caused by the degree of nannofossil content. A FORAMINIFERAL OOZE interval was observed in Section 6. A NANNOFOSSIL-RICH CLAY interval was observed in Section 2. Bioturbation is slight to heavy, and biscuit drilling disturbance is high throughout the core. Sand and gravel-sized pyrite concretions are present in Section 1.



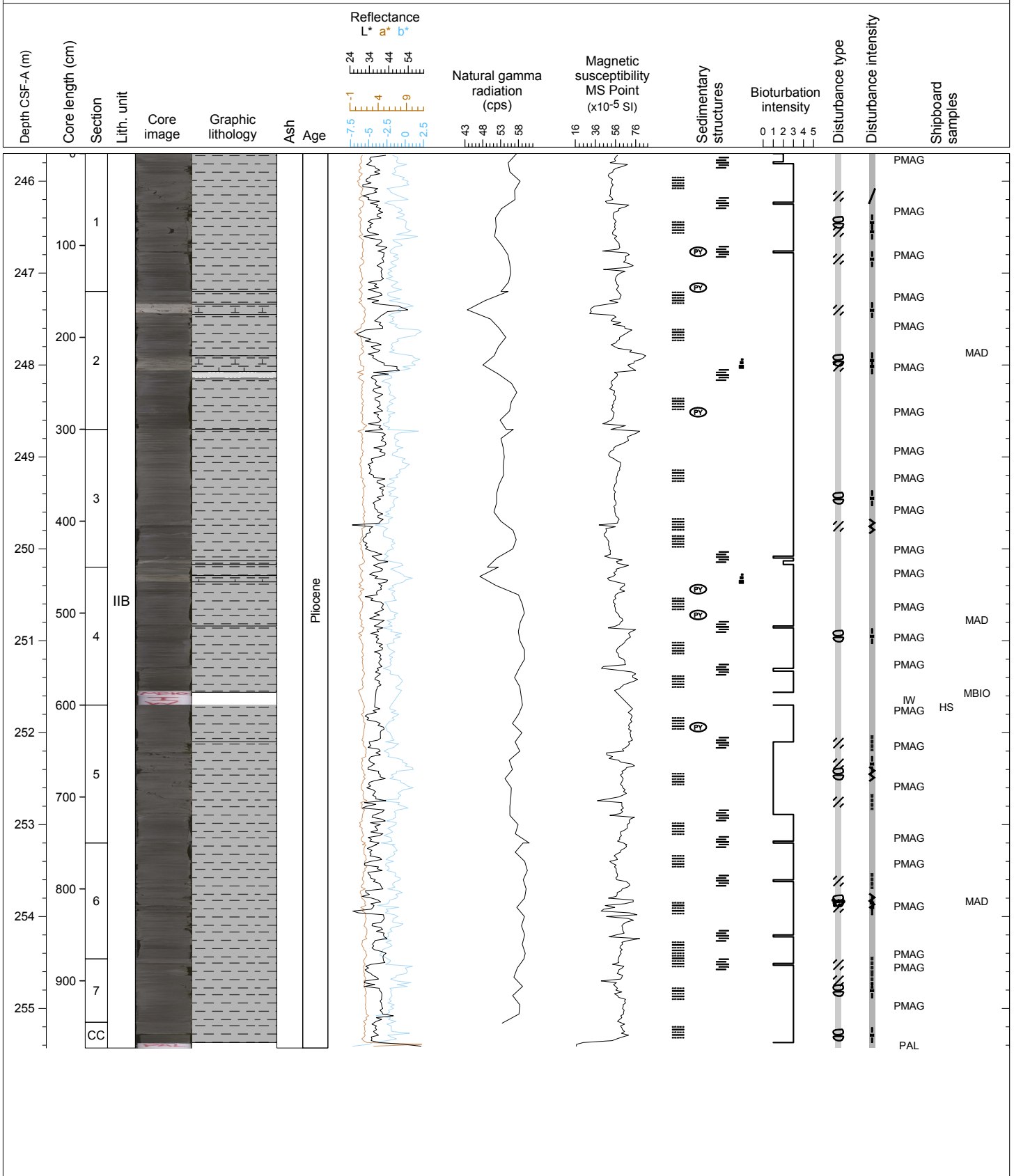
Hole 349-U1431D Core 27X, Interval 236.1-245.92 m (CSF-A)

Very thick bedded, dark greenish gray CLAY and CLAY WITH SILT with interbedded light greenish gray, medium bedded NANNOFOSSIL-RICH CLAY. Two NANNOFOSSIL-RICH CLAY layers are fining upward gradational to CLAY layers in Sections 4 and 5. However, one NANNOFOSSIL-RICH CLAY layer has abrupt planar contacts with underlying and overlying thick CLAY layers in Section 6. Bioturbation is heavy throughout the core, particularly in the top parts of NANNOFOSSIL-RICH CLAY layers. Biscuit drilling disturbance is high throughout the core.



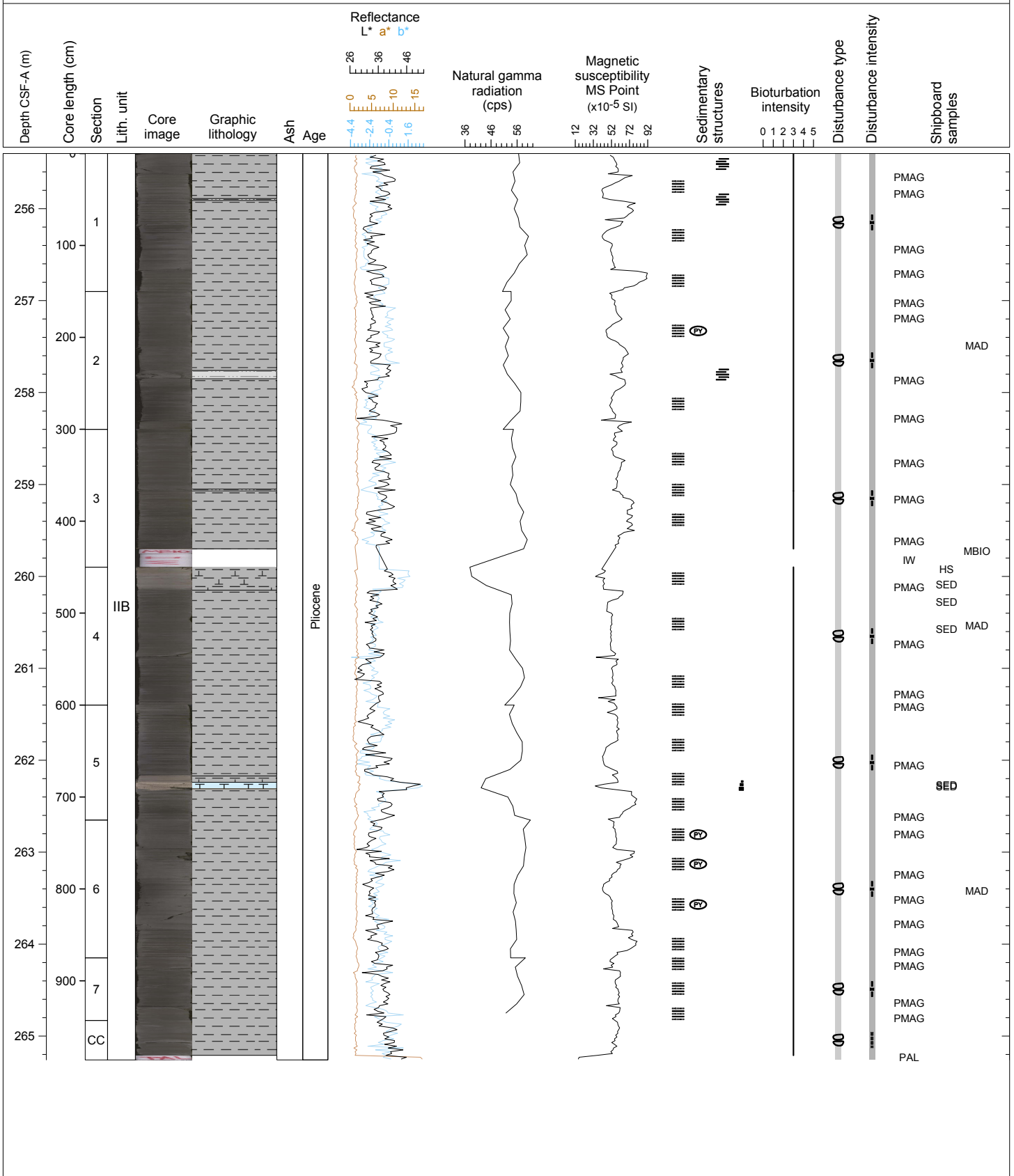
Hole 349-U1431D Core 28X, Interval 245.7-255.43 m (CSF-A)

Dark greenish gray, very thick bedded CLAY and CLAY WITH SILT with interbedded light greenish gray, medium bedded NANNOFOSSIL-RICH CLAY. NANNOFOSSIL-RICH CLAY layers are fining upward gradational to CLAY layers in Sections 2, 3 and 4. Bioturbation is heavy throughout the core, particularly in the top parts of NANNOFOSSIL-RICH CLAY layers. Biscuit drilling disturbance is high throughout the core.



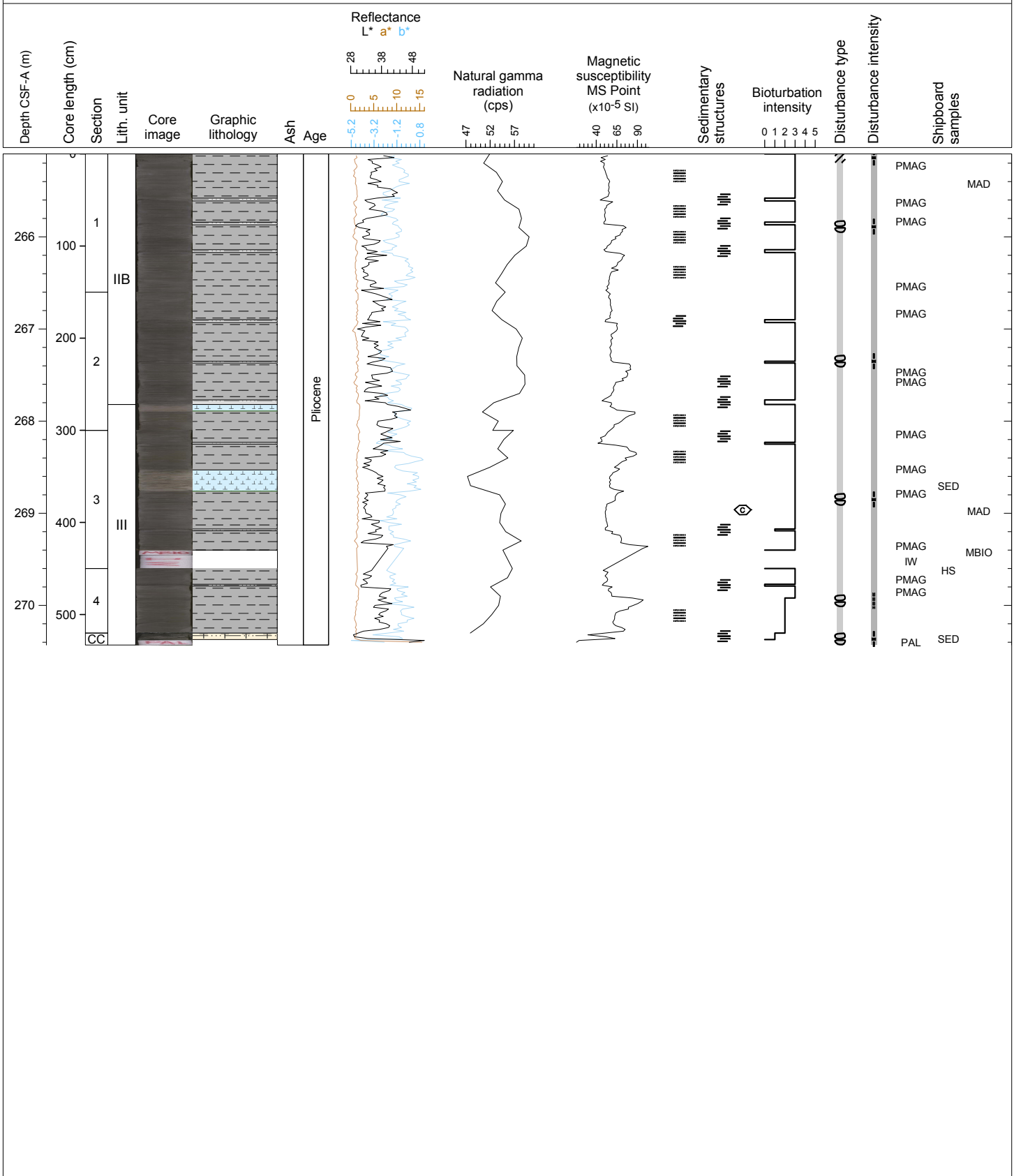
Hole 349-U1431D Core 29X, Interval 255.4-265.26 m (CSF-A)

Dark greenish gray CLAY with occasional SILT WITH CLAY laminated layers ranging from 1-3 cm thick. One layer of light gray FORAMINIFERAL-RICH CLAY in Section 5 occurs within the thick CLAY layers. Thin turbidite SILT layers are rare and mainly in SILT WITH CLAY laminations. Bioturbation is generally moderate in CLAY intervals.



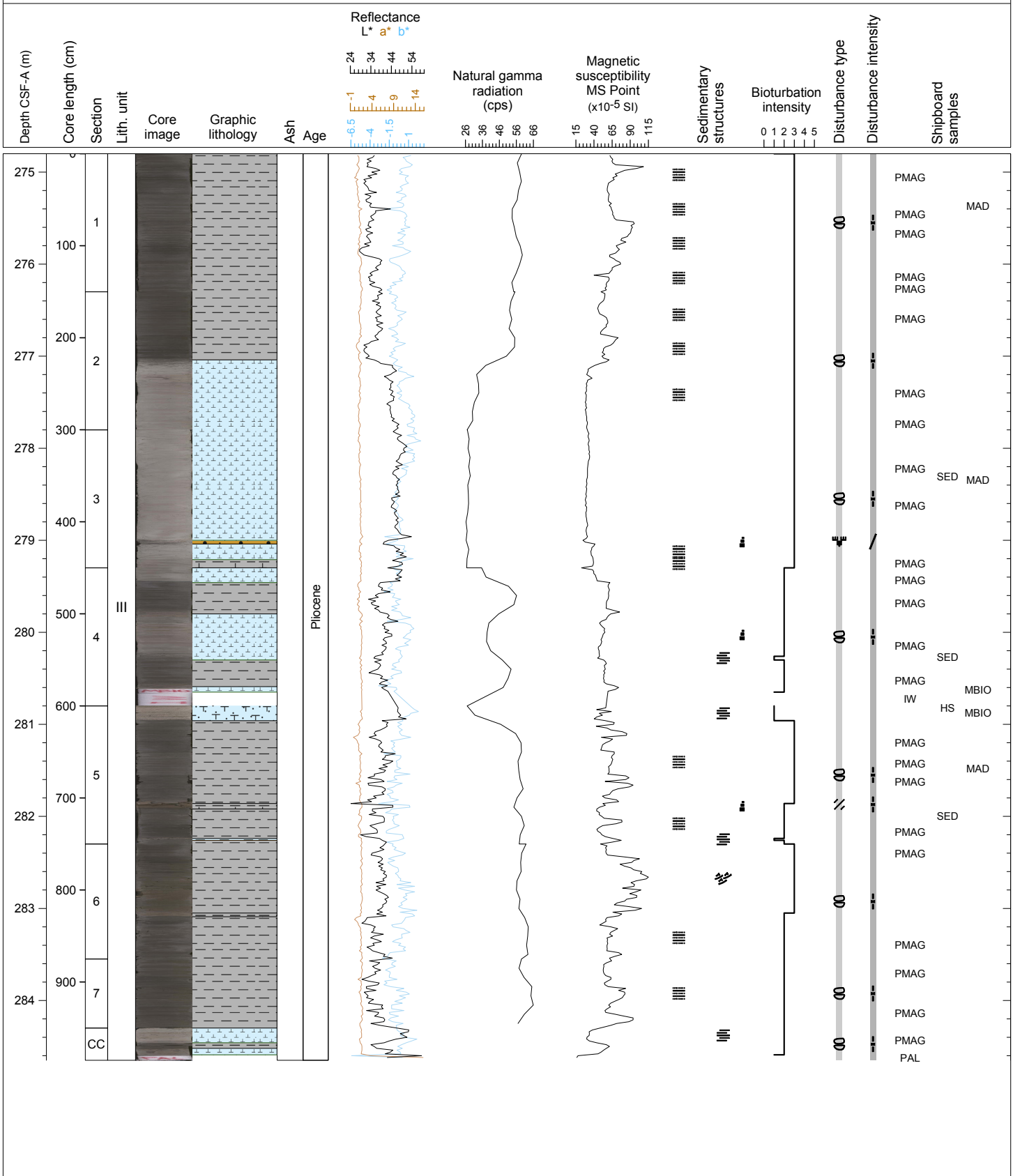
Hole 349-U1431D Core 30X, Interval 265.1-270.43 m (CSF-A)

Dark greenish gray CLAY with occasional, thin, laminated interbeds of SILTY CLAY representing ~5% of the core. These are erosive or flat based and generally sharp-topped deposits indicating higher energy conditions. They contrast with minor graded NANNOFOSSIL OOZE WITH FORAMINIFERS beds that are marked by prominent burrowing and graded tops in Sections 2 and 3. Core is disrupted by biscuiting because of coring disturbance.



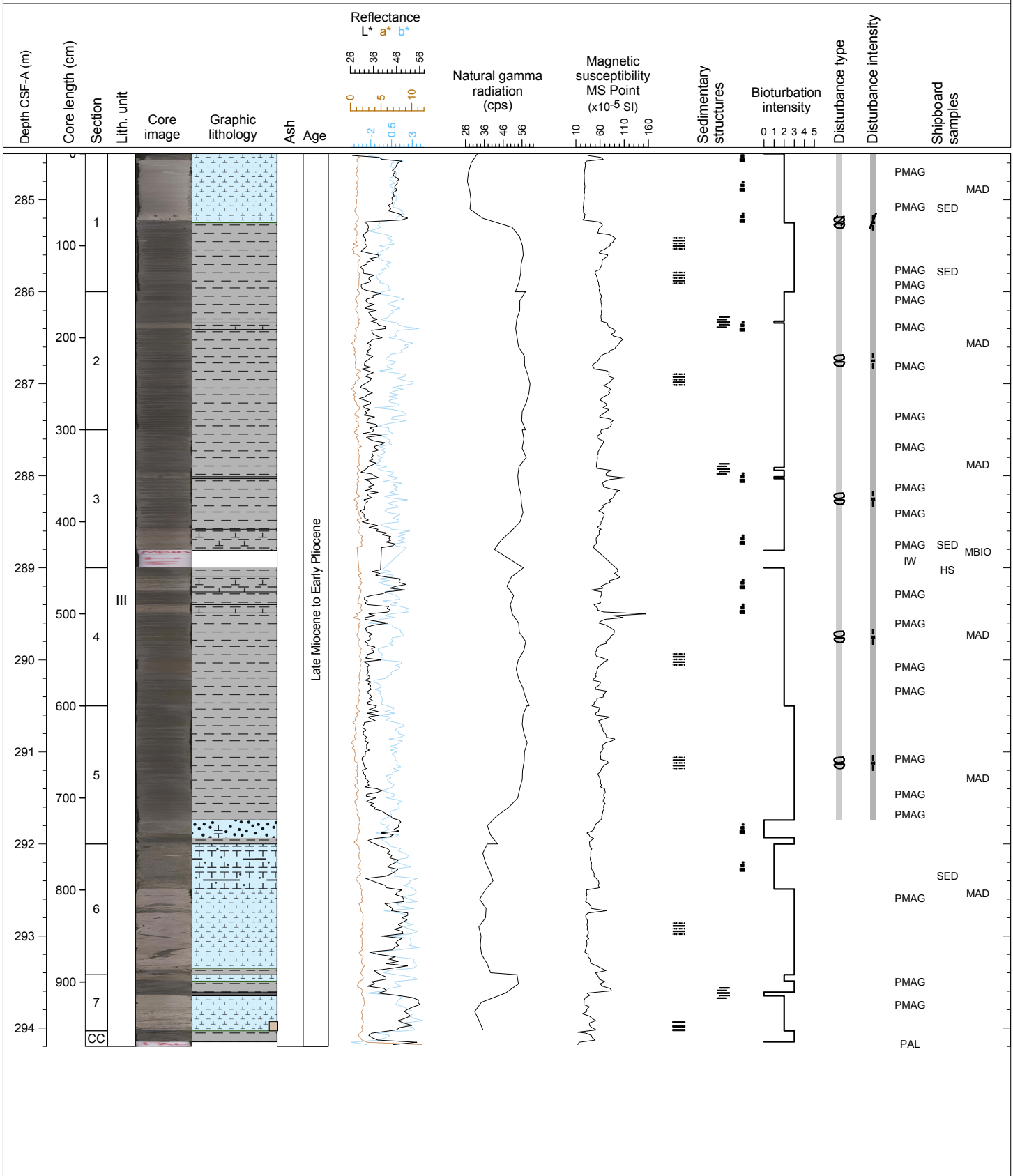
Hole 349-U1431D Core 31X, Interval 274.8-284.65 m (CSF-A)

Dark greenish gray CLAY with rare, thin, laminated interbeds of SILTY CLAY. There is a 2.5 m thick NANNOFOSSIL-RICH CLAY bed in Sections 2, 3 and 4. At the top of Section 5 is a laminated and graded FORAMINIFER-RICH SILT. Burrows are visible in the light-colored NANNOFOSSIL-RICH CLAY intervals. Core is disrupted by biscuiting because of coring disturbance.



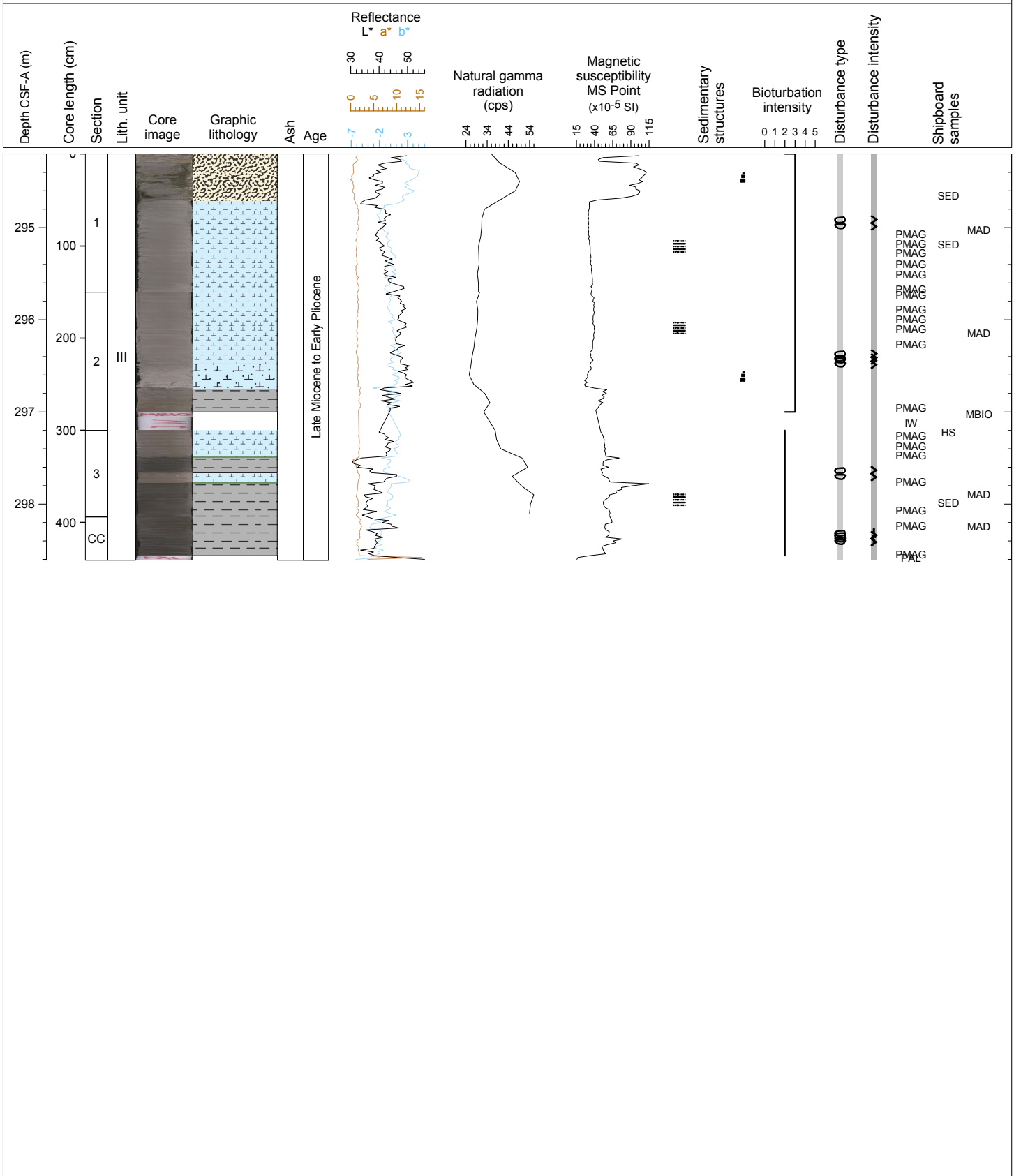
Hole 349-U1431D Core 32X, Interval 284.5-294.2 m (CSF-A)

Dark greenish gray CLAY interbedded with light greenish gray NANNOFOSSIL OOZE. Beds show sharp, erosive bases and fine upward into the dominant lithology. Major carbonate turbidite beds composed of CALCAREOUS SAND and CALCAREOUS SILT are seen in Sections 5 and 6. Carbonate units are marked by fine scale trace fossils. Fracturing and apparent sand injection structures in Section 6 are interpreted as being drilling related.



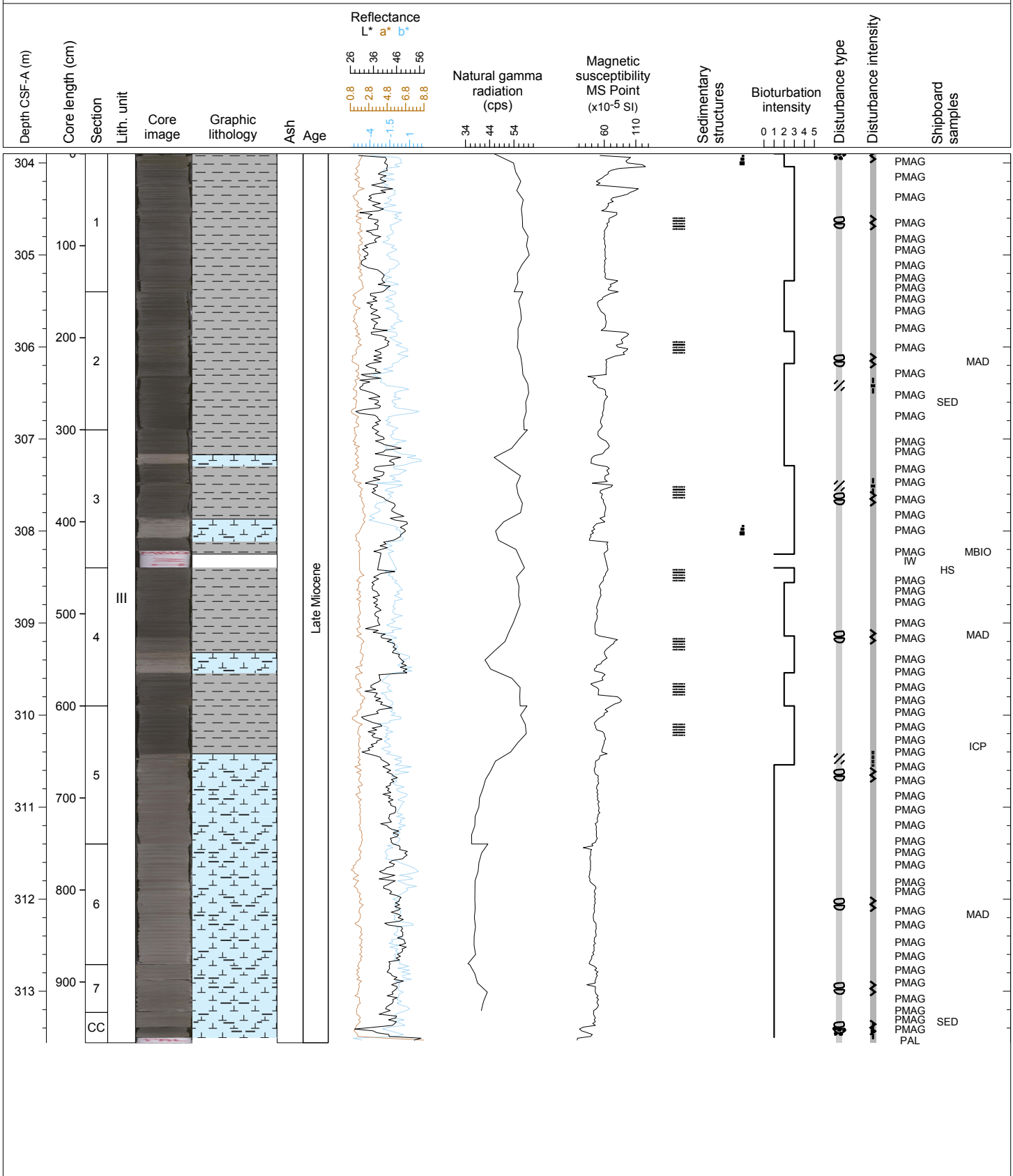
Hole 349-U1431D Core 33X, Interval 294.2-298.61 m (CSF-A)

The core is dominantly greenish gray NANNOFOSSIL OOZE with approximately 40 cm of olive gray SILTY SAND at the top of Section 1. There are intervals of dark greenish gray CLAY in Sections, 2, 3 and CC. The NANNOFOSSIL OOZE beds are graded. CLAY intervals are bioturbated with the intensity of bioturbation increasing toward the top of beds. The core has biscuit-style drilling disturbance throughout. The SILTY SAND in Section 1 is slightly soupy.



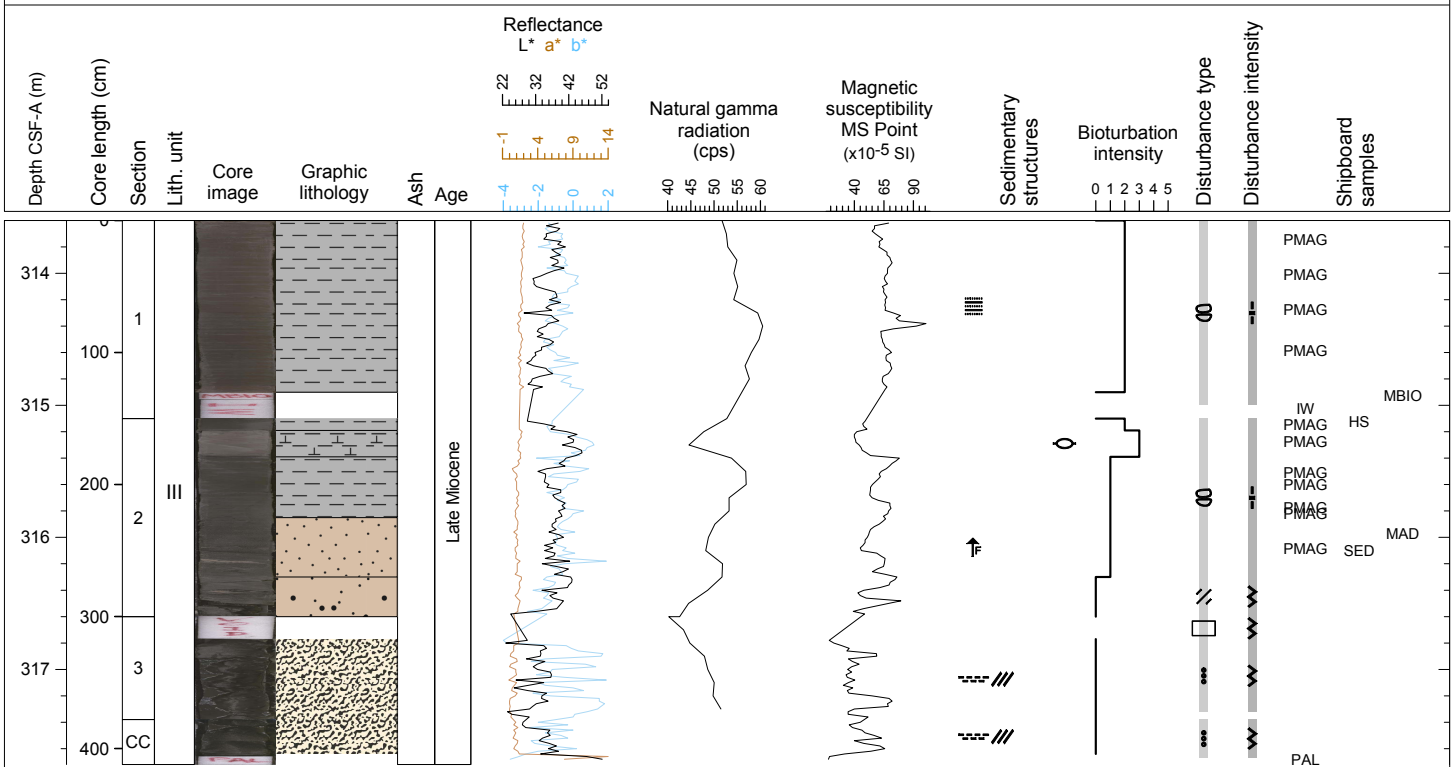
Hole 349-U1431D Core 34X, Interval 303.9-313.56 m (CSF-A)

Dominantly thick bedded, dark greenish gray CLAY in the upper part (Sections 1-5) and greenish gray NANNOFOSSIL OOZE in the lower part (Sections 5-CC). Three medium-bedded NANNOFOSSIL OOZE layers also occur in Sections 3 and 4. NANNOFOSSIL OOZE layers usually have erosive or planar contacts with underlying CLAY layers and fine upward with gradational contacts with the CLAY above. However, one NANNOFOSSIL OOZE layer has a planar (erosive) contact with the CLAY layer above in Section 3. CLAY intervals are bioturbated with the intensity of bioturbation increasing toward the top of beds. The core has biscuit-style drilling disturbance throughout.



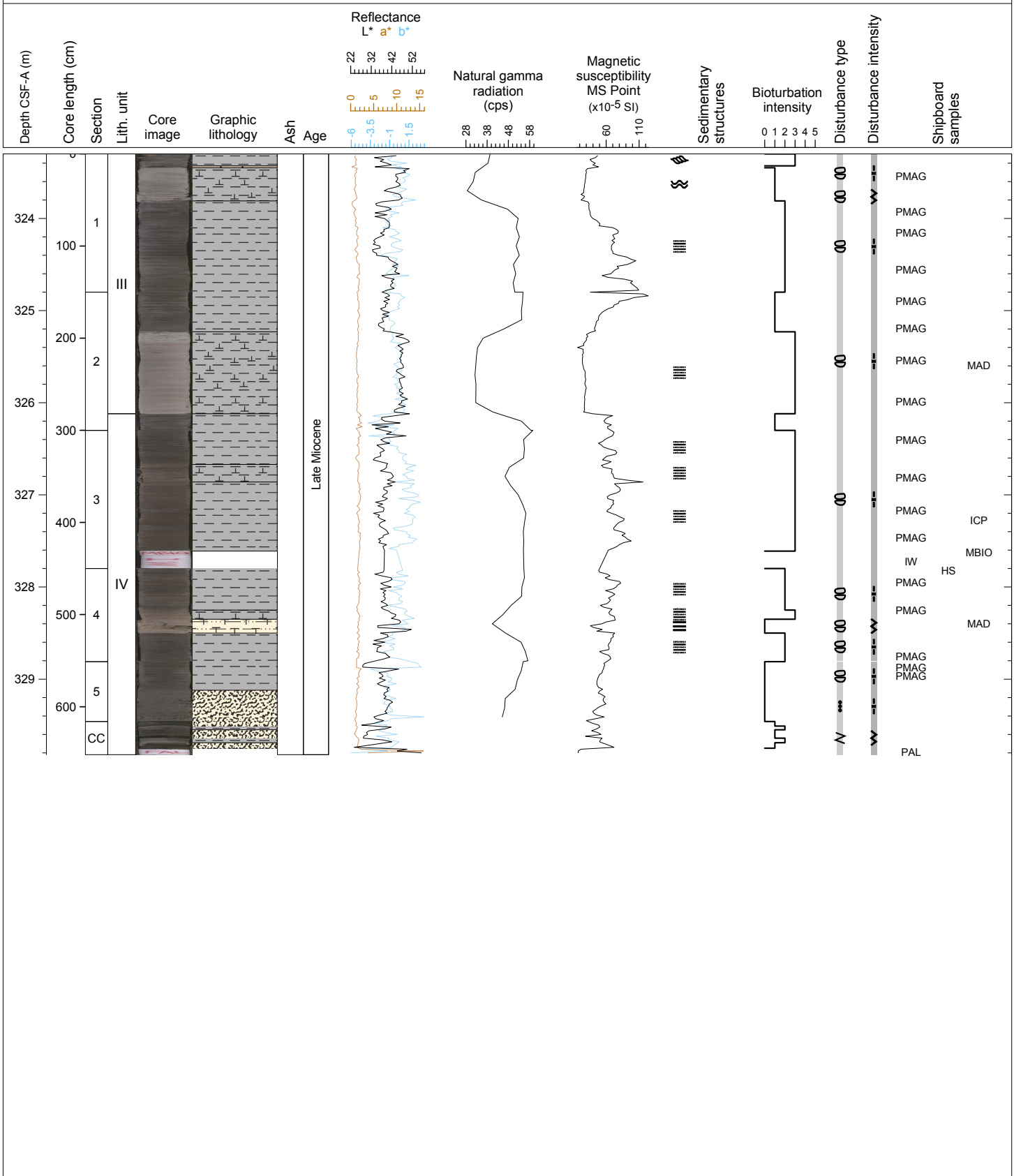
Hole 349-U1431D Core 35X, Interval 313.6-317.72 m (CSF-A)

Dark gray CLAY and greenish gray NANNOFOSSIL-RICH CLAY in Sections 1 and 2. Below approximately 110 cm in Section 2, the sediment is composed of dark greenish gray FINE SAND to COARSE SILT with a void interval in the top 9 cm of Section 3. The FINE SAND to COARSE SILT interval is soupy.



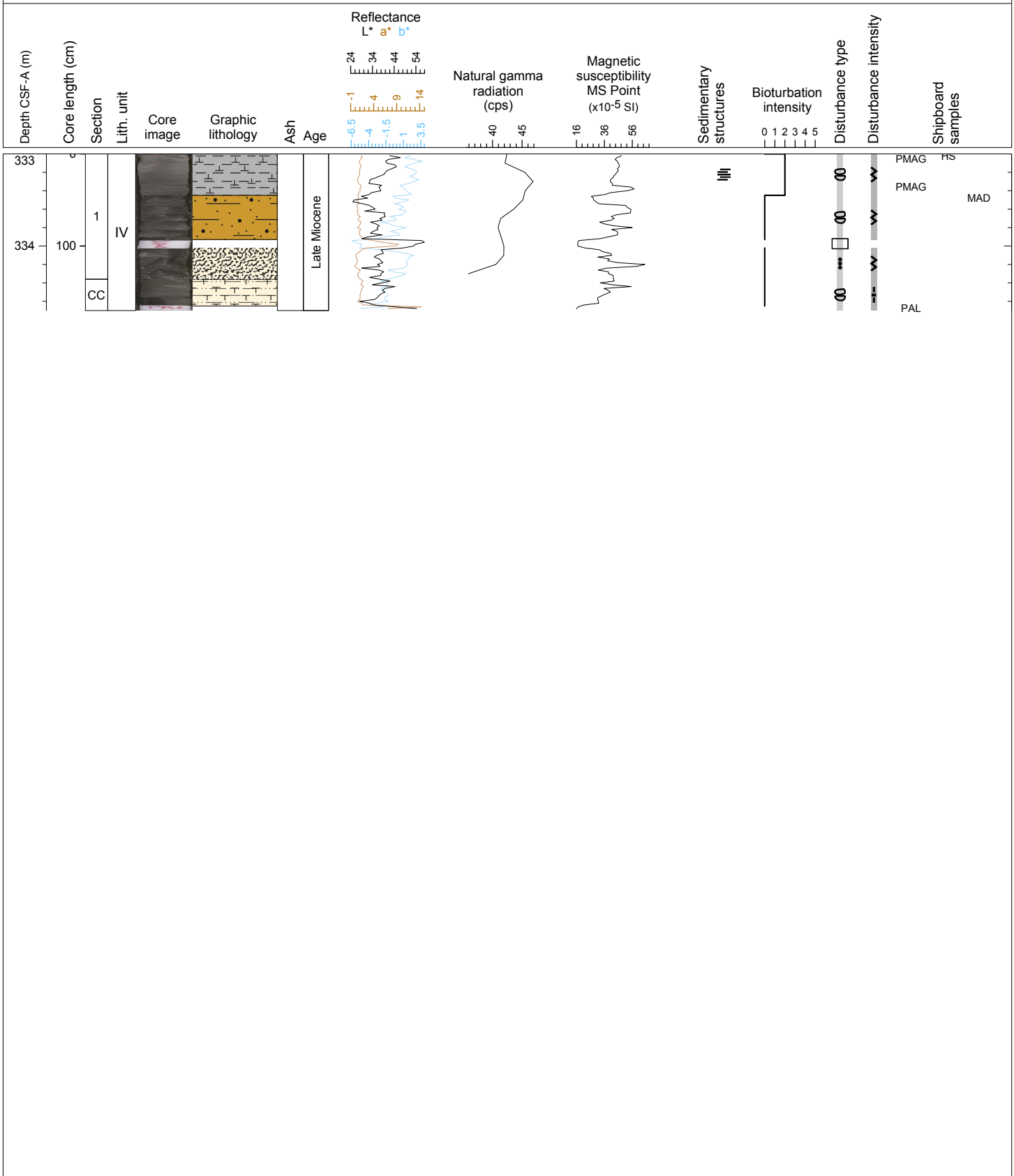
Hole 349-U1431D Core 36X, Interval 323.3-329.82 m (CSF-A)

Greenish gray NANNOFOSSIL-RICH CLAY, dark greenish gray CLAY, greenish gray FORAMINIFER-RICH SAND and dark greenish gray SILTY SAND. Section 1 has a 40 cm thick interval of NANNOFOSSIL-RICH CLAY with approximately 10 cm of laminated SILT at its base and a sharp basal contact indicating deposition from a turbidity current. A similar interval, 100 cm thick, occurs in Section 2. The NANNOFOSSIL-RICH CLAY beds are interbedded with CLAY. Section 4 has a 30 cm, fining upward interval of FORAMINIFER-RICH SAND that is laminated at its base and fines upward to bioturbated CLAY. Bioturbation is moderate except in laminated intervals where it is slight or absent. The core has moderate biscuit drilling disturbance for most of its length, with a soupy interval in Section 5.



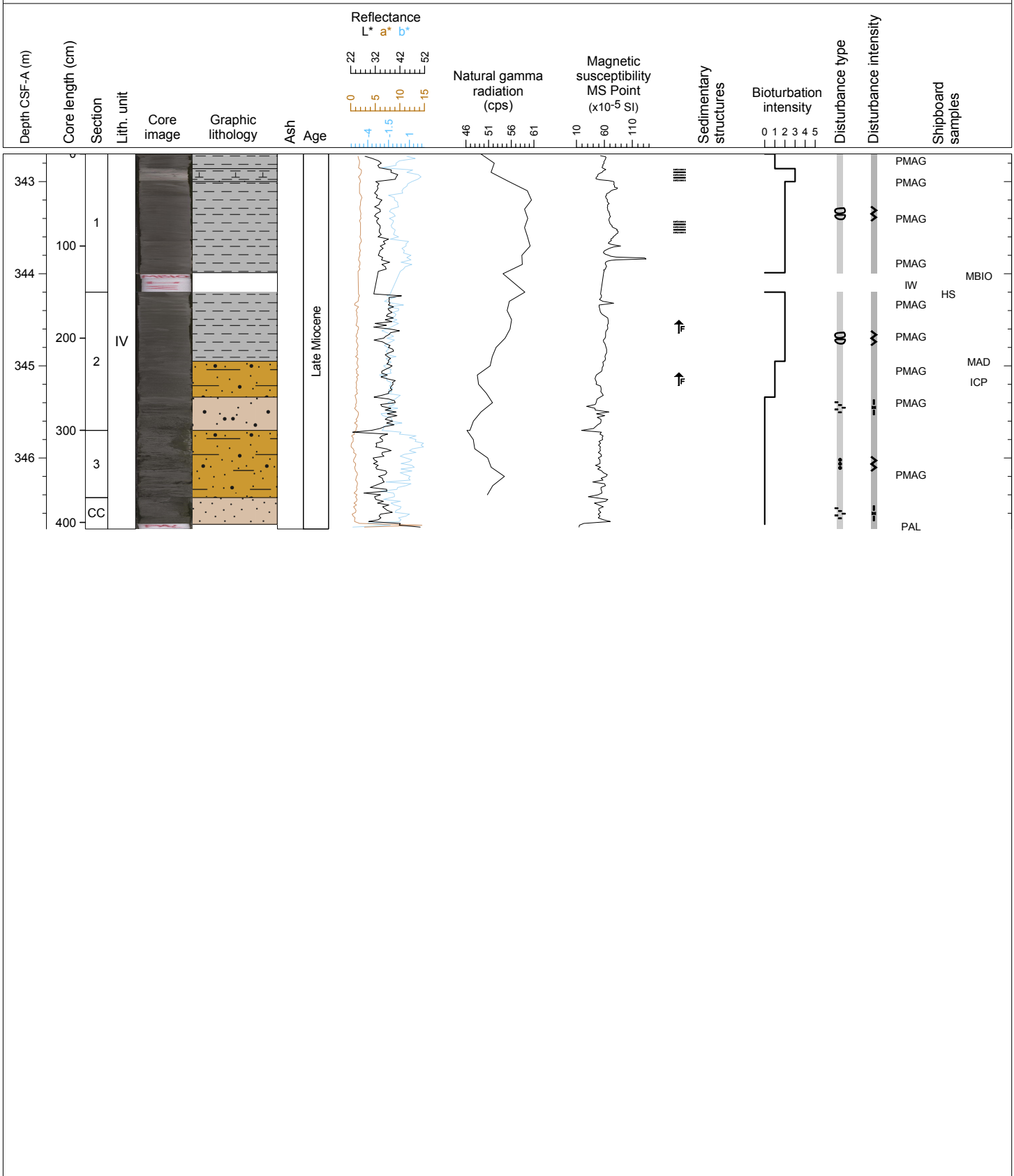
Hole 349-U1431D Core 37X, Interval 333.0-334.7 m (CSF-A)

Dark greenish gray NANNOFOSSIL-RICH CLAY, 45 cm thick and laminated at the base, overlying dark greenish gray CLAYEY SILT and dark greenish gray SILTY SAND. The basal 25 cm of the core is FORAMINIFER-RICH SAND. Bioturbation is moderate in the CLAY interval. There is biscuit drilling disturbance and a soupy interval in Section 1.



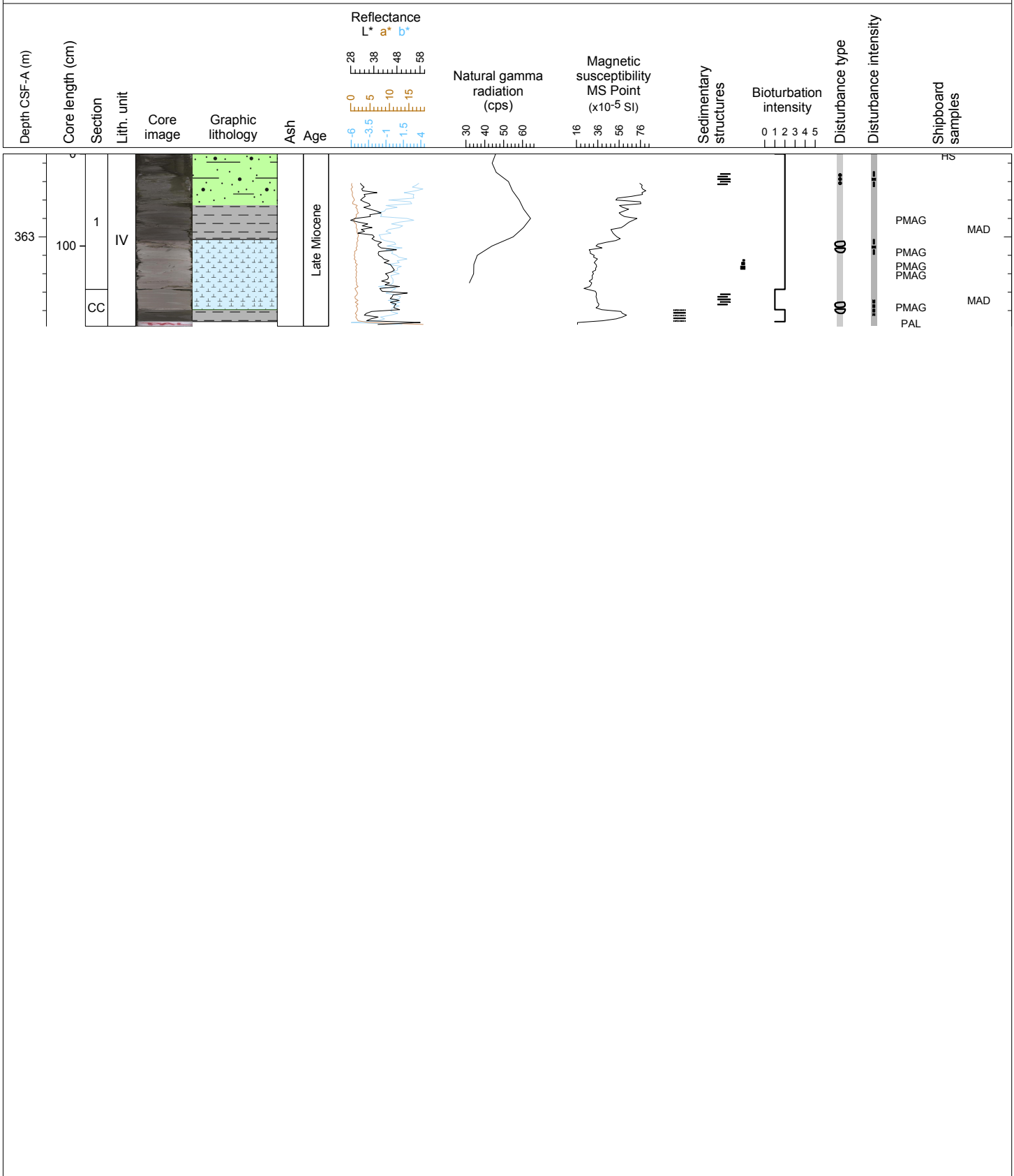
Hole 349-U1431D Core 38X, Interval 342.7-346.77 m (CSF-A)

Dark gray CLAY and SANDY SILT with upward fining CLAYEY SAND. A greenish gray NANNOFOSSIL-RICH CLAY interval occurs between 17 and 30 cm in Section 1. Below 122 cm in Section 2, the SANDY SILT has a slurry condition to the bottom of the core.



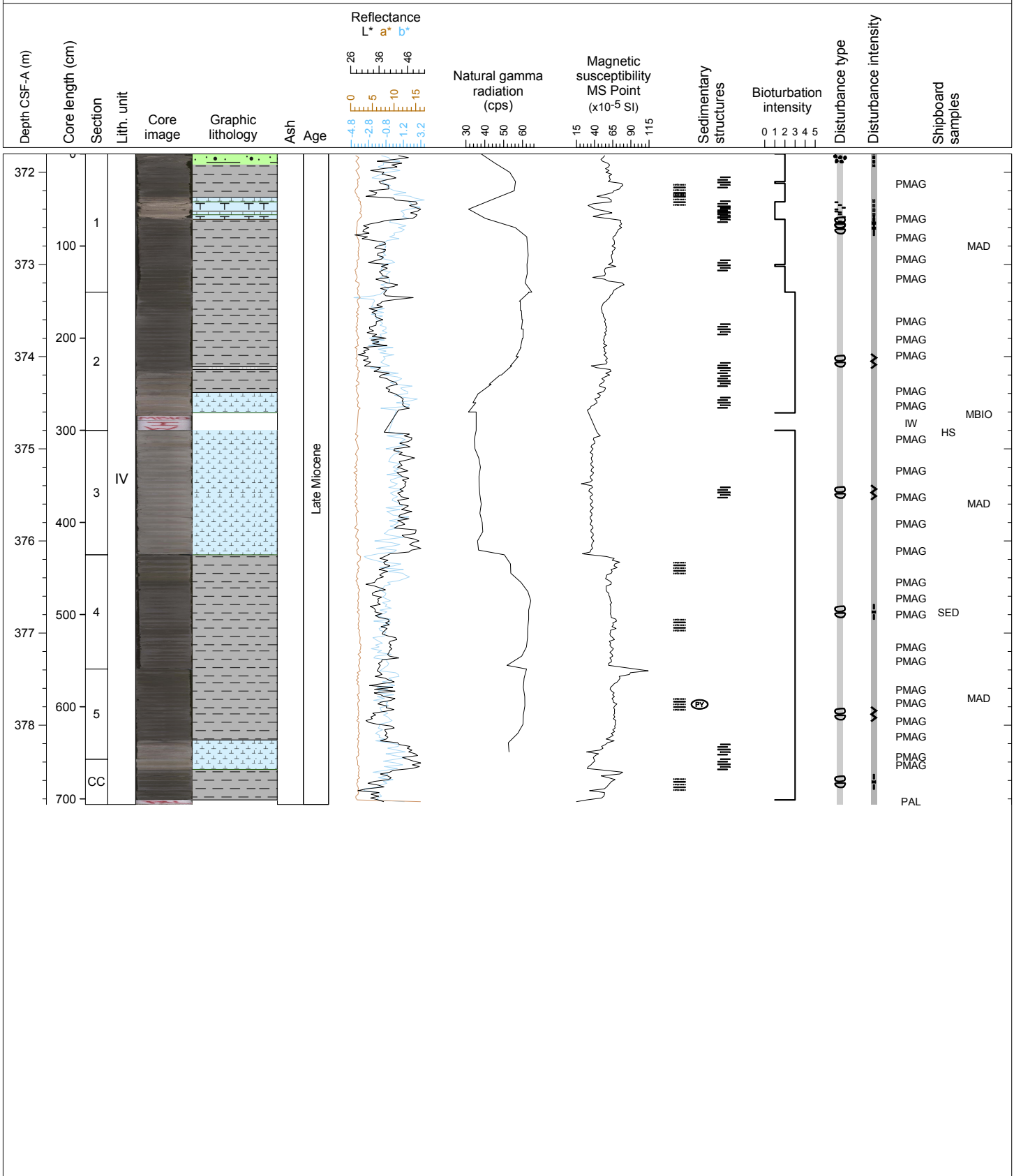
Hole 349-U1431D Core 40X, Interval 362.1-363.97 m (CSF-A)

The upper part of Section 1 is dark greenish gray CLAYEY SAND that is soupy due to drilling disturbance. This is underlain by thick bedded, dark greenish gray CLAY and greenish gray NANNOFOSSIL OOZE. The NANNOFOSSIL OOZE has an erosive base, is graded, and is more bioturbated toward the top. This bed was probably deposited as a turbidite. Below the soupy interval, the core is in biscuits due to drilling disturbance.



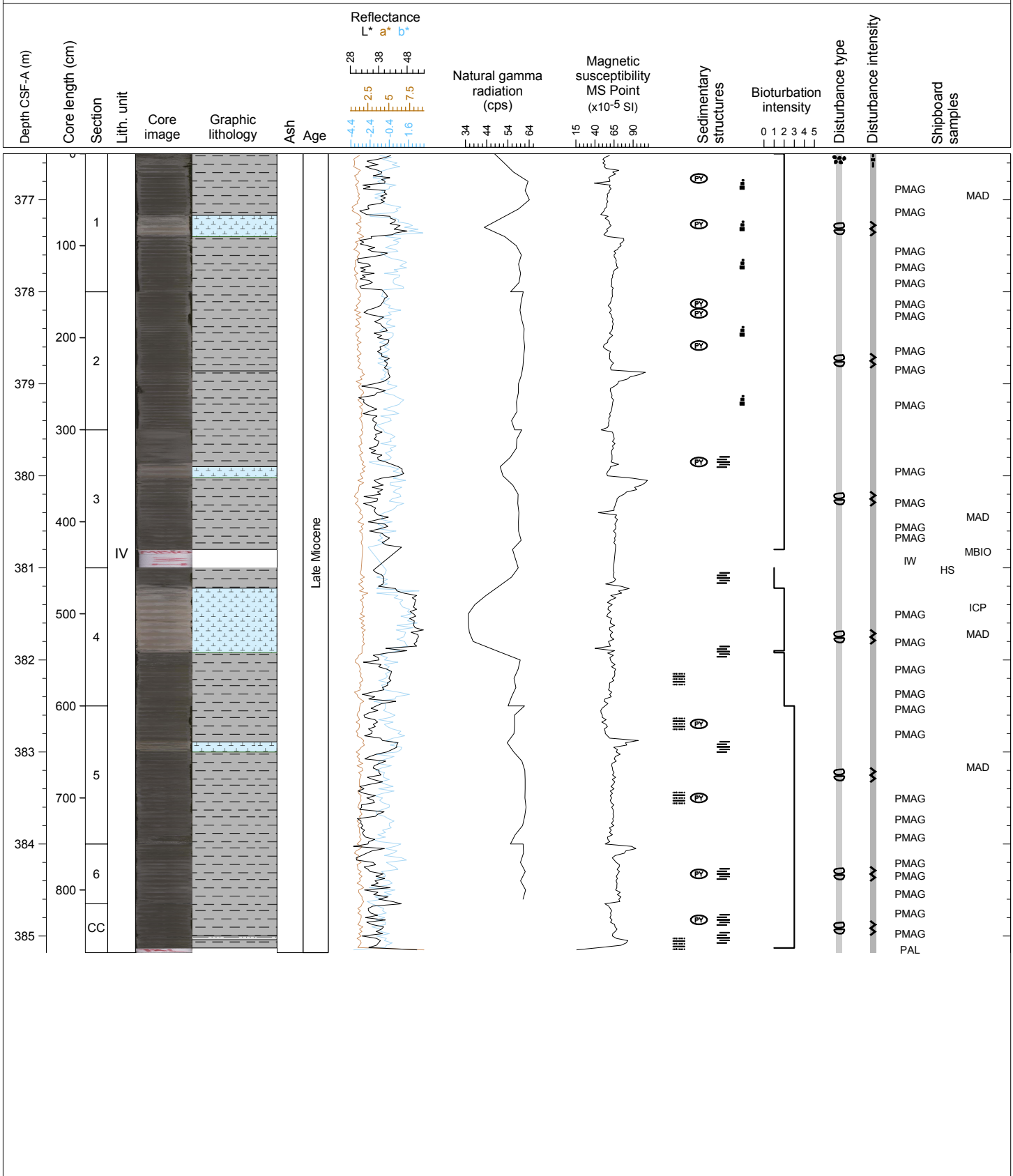
Hole 349-U1431D Core 41X, Interval 371.8-378.86 m (CSF-A)

Thick bedded, dark greenish gray CLAY and greenish gray NANNOFOSSIL OOZE. Two thick bedded NANNOFOSSIL OOZE layers occur in Sections 2, 3 and 5 with erosive bottom contacts. A FORAMINIFERAL OOZE with a thickness of 25 cm occurs in Section 1. CLAY intervals are heavily bioturbated. Biscuit drilling disturbance is heavy throughout the core.



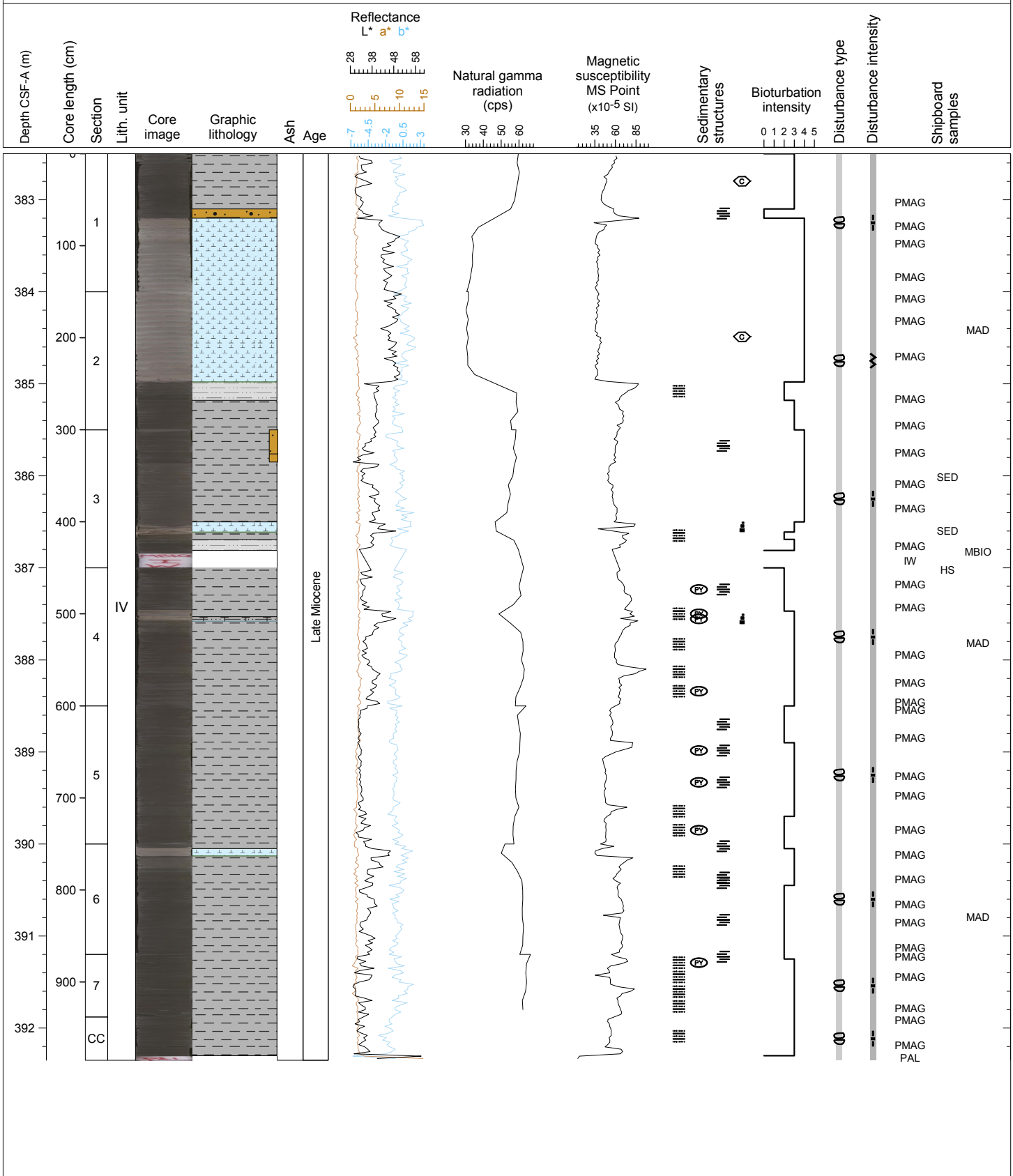
Hole 349-U1431D Core 42X, Interval 376.5-385.18 m (CSF-A)

Thick bedded dark greenish gray CLAY and greenish gray NANNOFOSSIL OOZE. Four NANNOFOSSIL OOZE layers are interbedded in Sections 1, 3, 4 and 5 with a thickness ranging from 15 to 70 cm. CLAY intervals are heavily bioturbated with color banding. Biscuit drilling disturbance is heavy throughout the core.



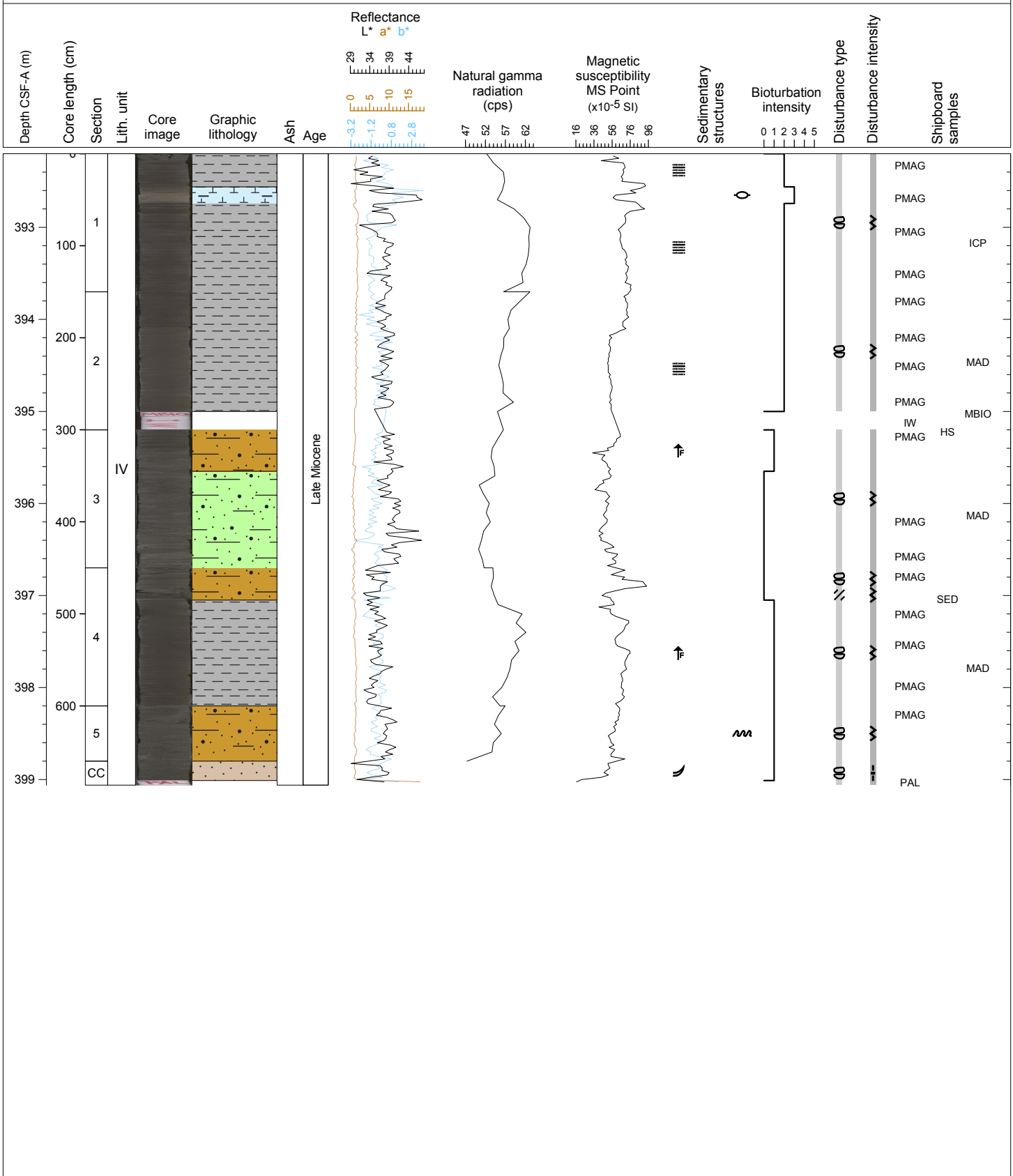
Hole 349-U1431D Core 43X, Interval 382.5-392.35 m (CSF-A)

Dark greenish gray and olive gray CLAY and CLAY WITH SILT. There is a 2 m thick interval of gray NANNOFOSSIL OOZE in Sections 1 and 2 and 10 cm thick intervals in Sections 3 and 6. A 5 cm thick bed of light gray FORAMINIFER-RICH CLAY occurs in Section 4. Bioturbation is moderate to heavy throughout the core. There is biscuit-style drilling disturbance throughout.



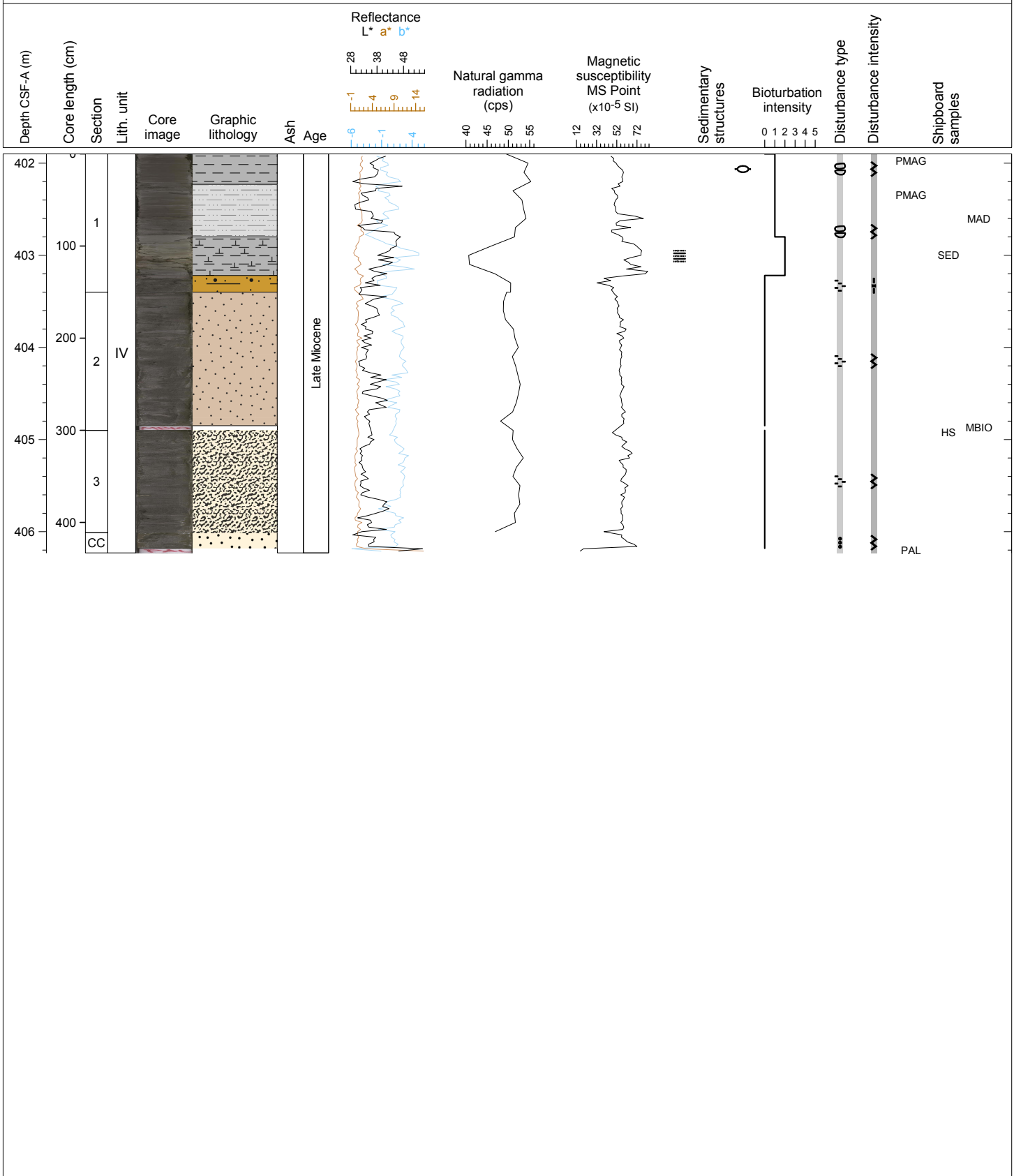
Hole 349-U1431D Core 44X, Interval 392.2-399.06 m (CSF-A)

Dark greenish gray CLAY from the top of the core to the bottom of Section 2 with moderate to high bioturbation. Section 3 is composed of mainly CLAYEY SILT and FINE SAND. A CLAY interval is intercalated between 36 and approximately 120 cm in Section 4. Bioturbation is generally heavy in CLAY intervals.



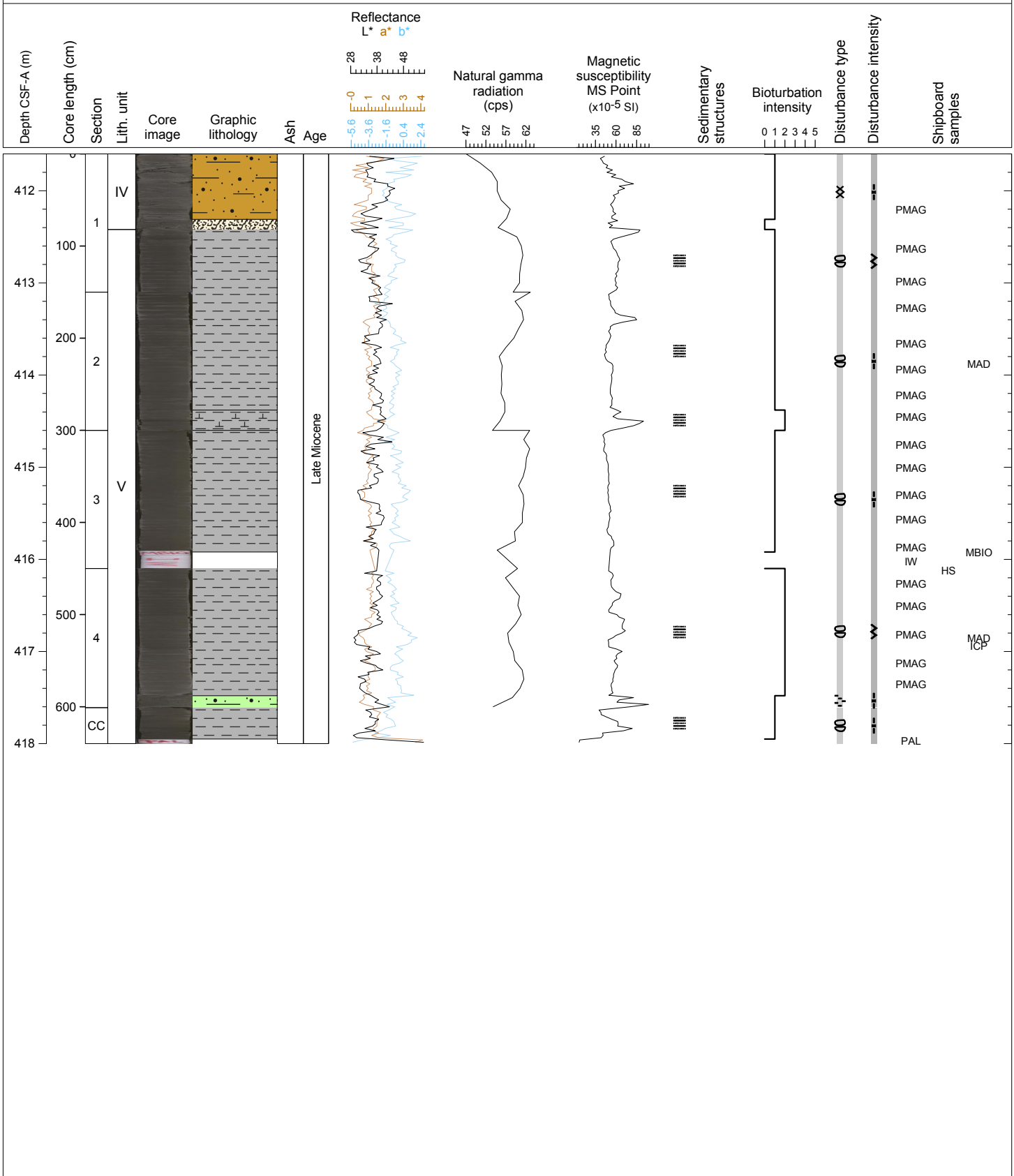
Hole 349-U1431D Core 45X, Interval 401.9-406.23 m (CSF-A)

In the upper part of Section 1, CLAY is the main component, and from 90 to 132 cm this is intercalated with light greenish gray NANNOFOSSIL-RICH CLAY. FINE SAND occurs below this layer.



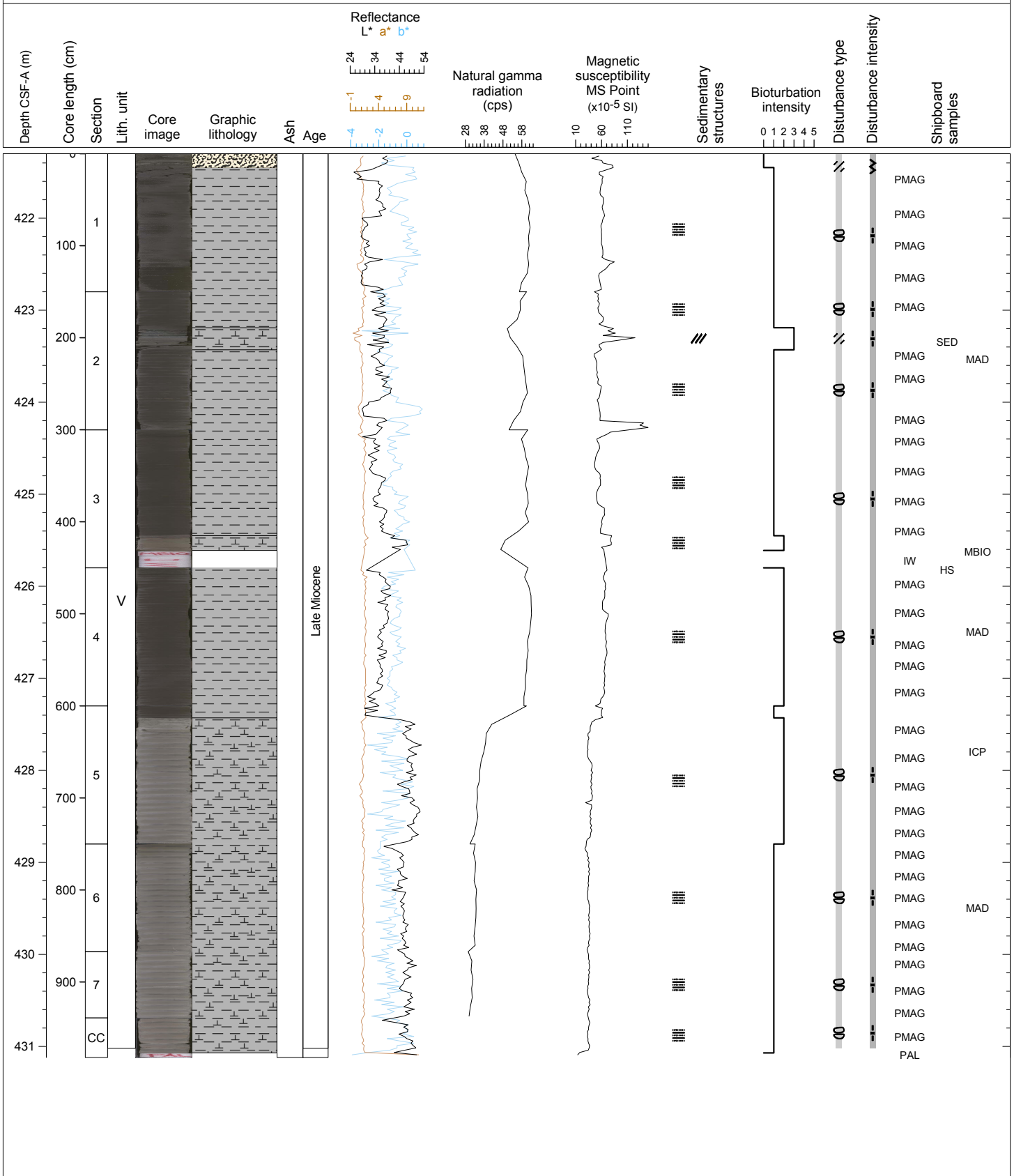
Hole 349-U1431D Core 46X, Interval 411.6-418.0 m (CSF-A)

Light greenish gray SILT and homogenous CLAY. FINE SAND layers are present between 72 and 82 cm in Section 1, and 138 and 150 cm in Section 4. Bioturbation is generally weak to moderate and drilling disturbance was observed throughout the core.



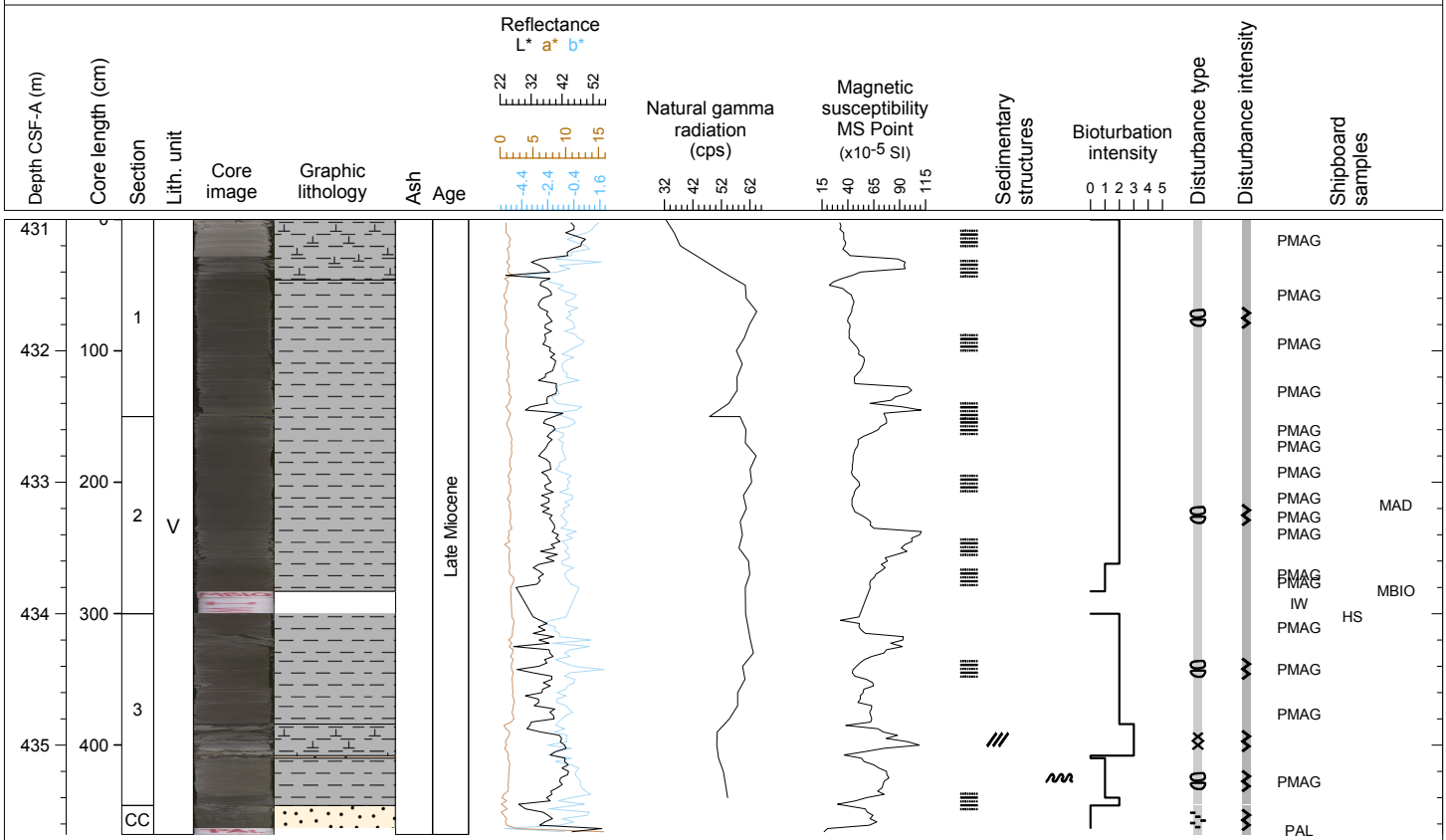
Hole 349-U1431D Core 47X, Interval 421.3-431.12 m (CSF-A)

Dark greenish gray CLAY and NANNOFOSSIL-RICH CLAY except in the top 15 cm of Section 1, which is dark greenish gray SILTY SAND. Moderate drilling disturbance and moderate to weak bioturbation was recognized throughout.

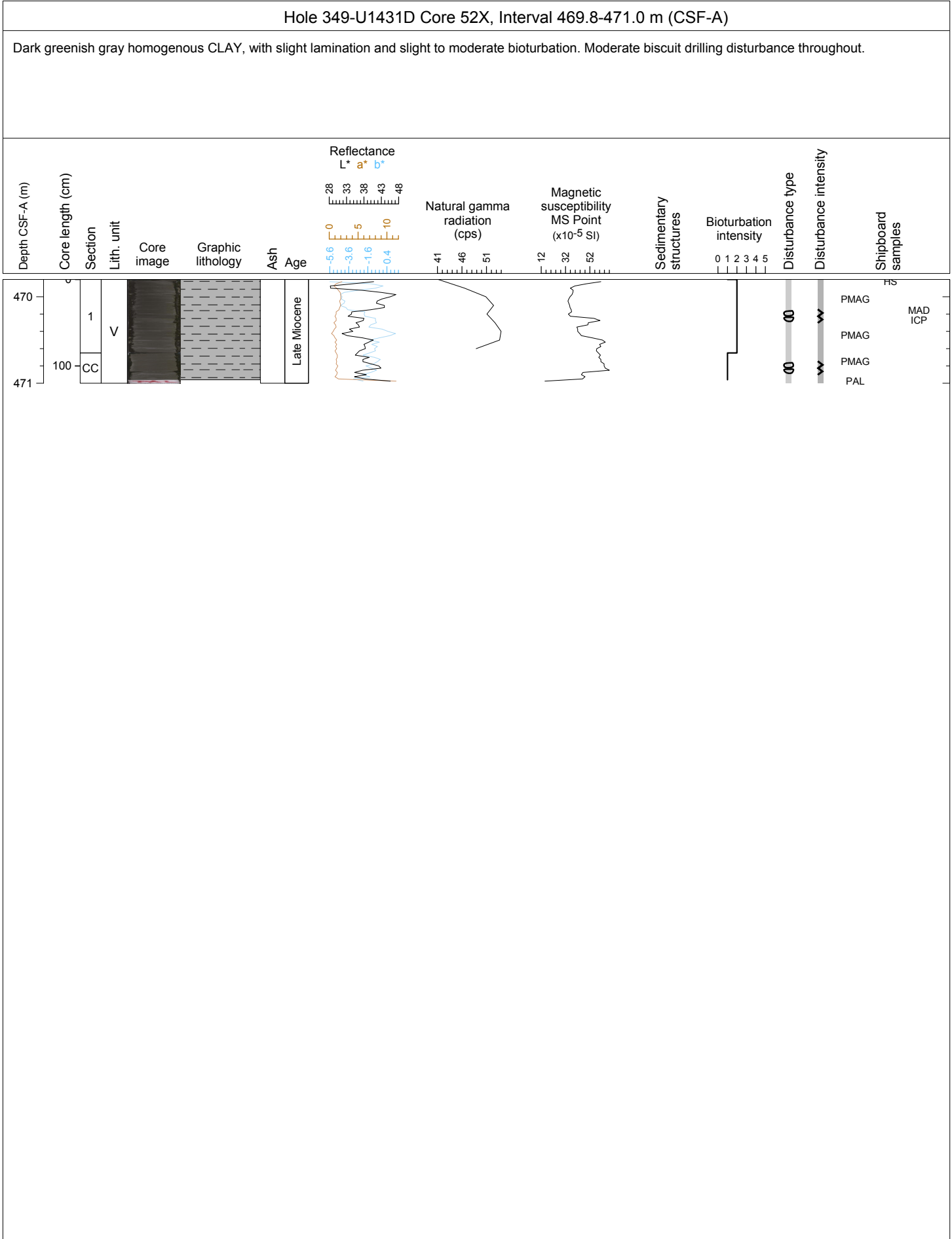


Hole 349-U1431D Core 48X, Interval 431.0-435.68 m (CSF-A)

Dark greenish gray CLAY and light greenish gray to greenish gray NANNOFOSSIL-RICH CLAY except for a FINE SAND layer in the core catcher. A thin (<3 cm), very dark greenish gray SILT layer occurs between 108 and 110 cm in Section 3. Overall, this core shows moderate drilling disturbance and moderate to weak bioturbation.

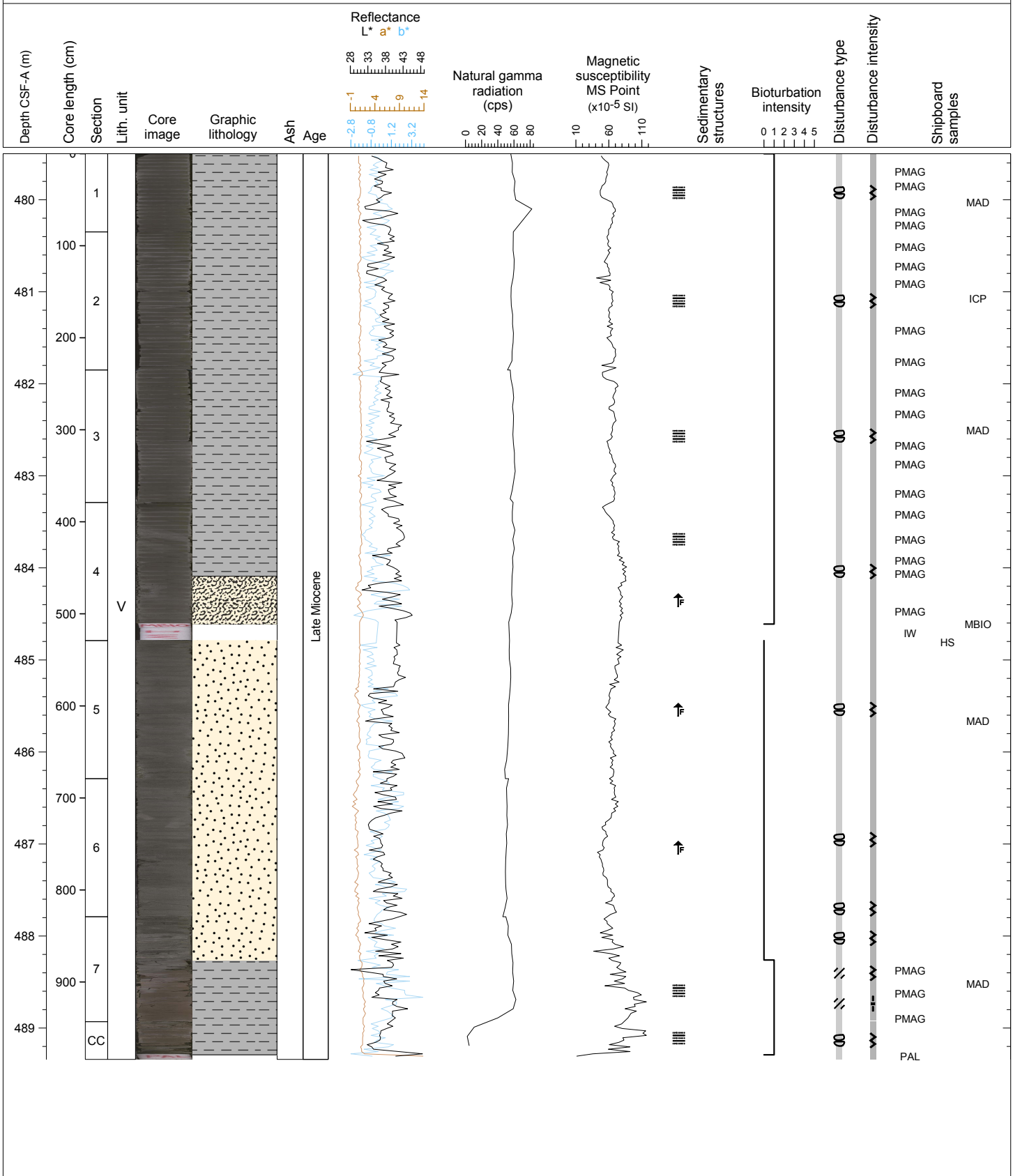


U1431D-49X through U1431D-51X NO RECOVERY



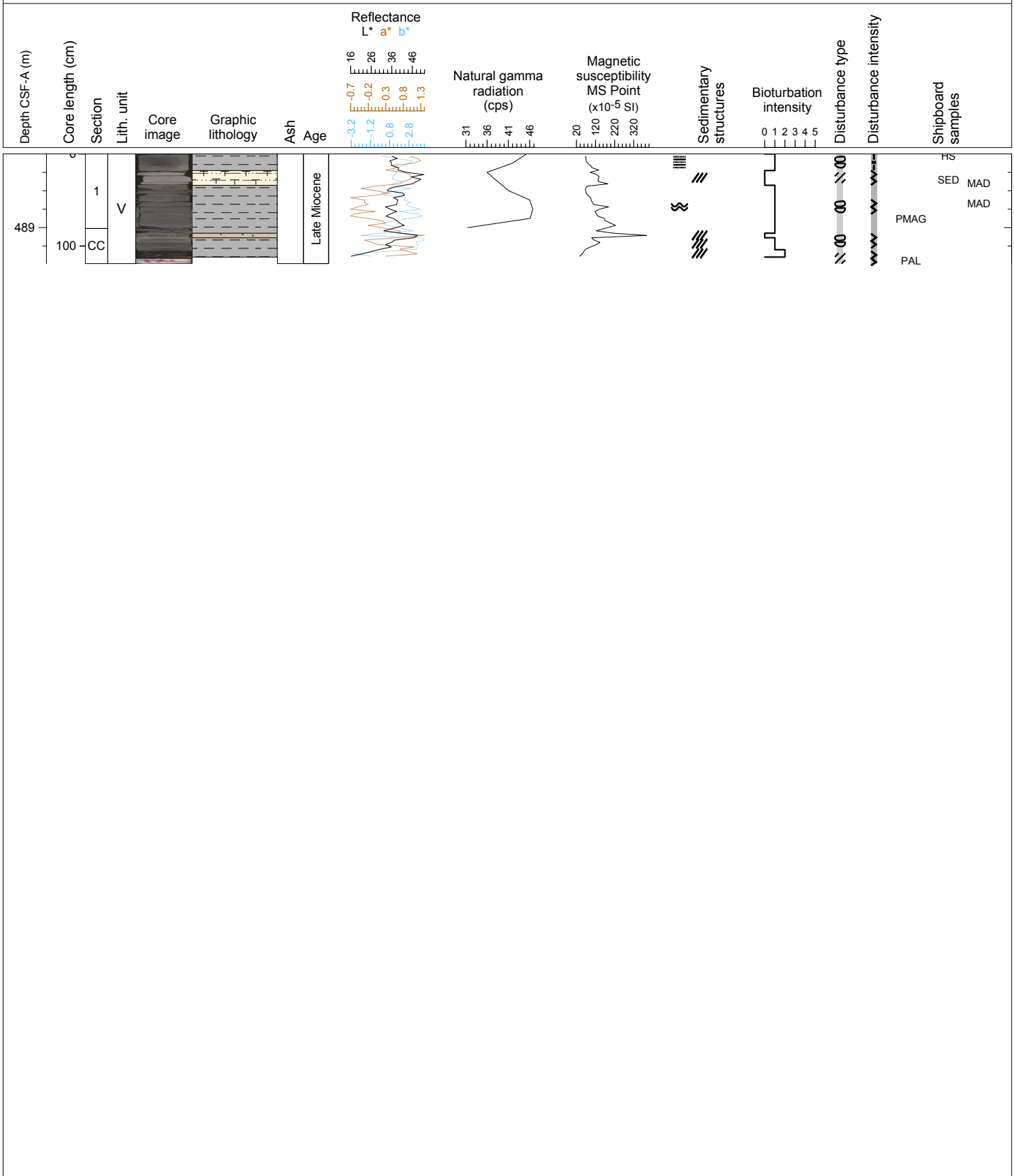
Hole 349-U1431D Core 53X, Interval 479.5-489.34 m (CSF-A)

Homogenous, very dark greenish gray CLAY and dark greenish gray SILTY SAND to MEDIUM SAND. The SAND interval occurs from 85 cm in Section 3 to 46 cm in Section 7 and is fining upward. Below this layer (46 cm in Section 7), olive gray CLAY is present. Moderate to high drilling disturbance throughout the core. Slight bioturbation in CLAY intervals.



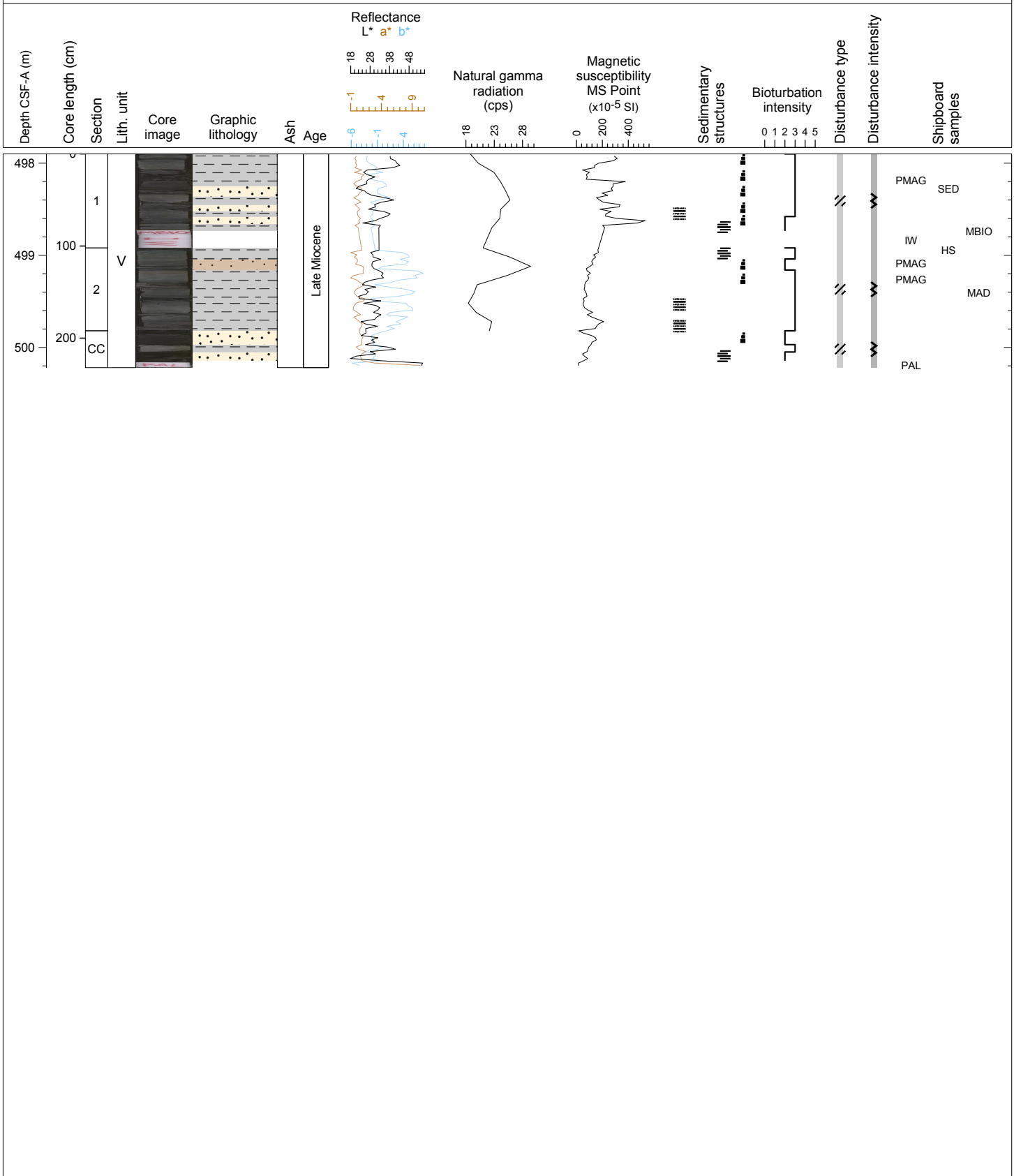
Hole 349-U1431D Core 54X, Interval 488.2-489.39 m (CSF-A)

Intercalated light greenish gray FORAMINIFER-RICH SAND and dark gray CLAY with color banding and cross-bedding. The CLAY intervals have moderate to weak bioturbation. The core is lithified and there is drilling disturbance throughout.



Hole 349-U1431D Core 55X, Interval 497.9-500.22 m (CSF-A)

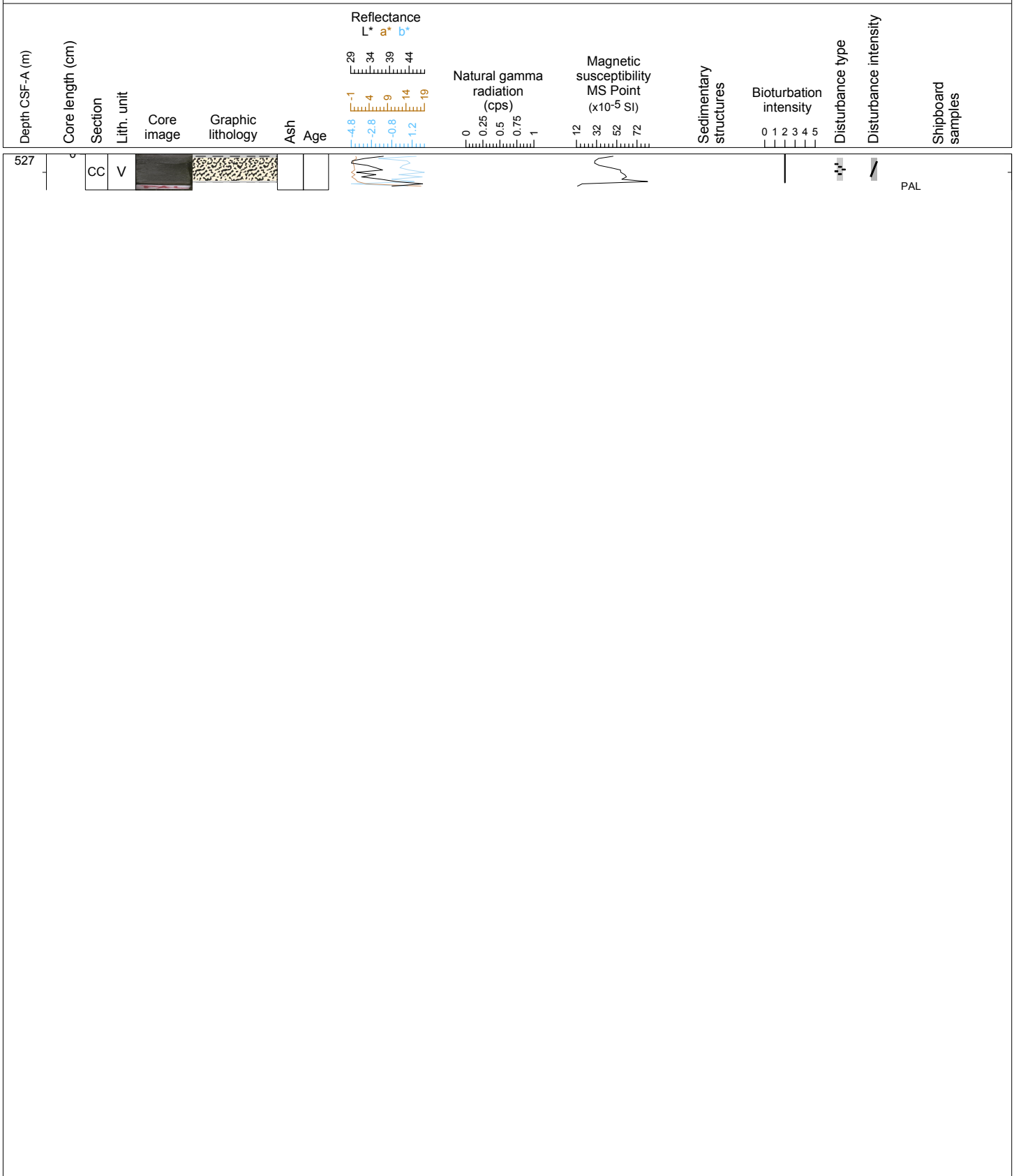
Greenish MUDSTONE with three 10 cm thick SANDSTONE layers in Sections 1 and CC. Bioturbation is generally heavy in MUDSTONE and the core is fractured throughout due to drilling disturbance.



U1431D-56X and U1431D-57X NO RECOVERY

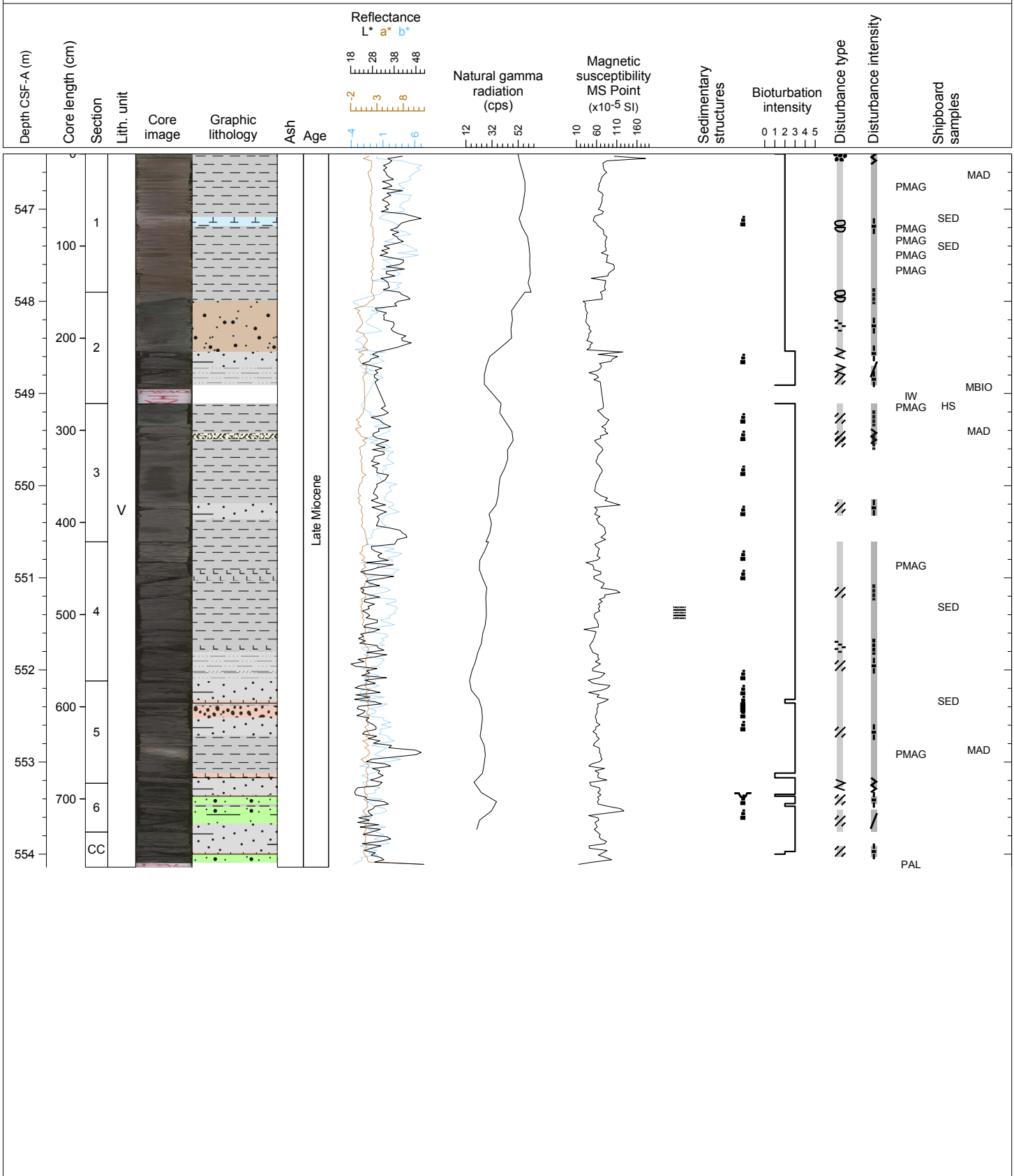
Hole 349-U1431D Core 58X, Interval 527.0-527.39 m (CSF-A)

Greenish gray SILTY SAND and two light gray, 5 cm thick CLAY WITH SILT intervals at the top and bottom of the core. Bioturbation is generally slight and soupy drilling disturbance is moderate throughout the core.



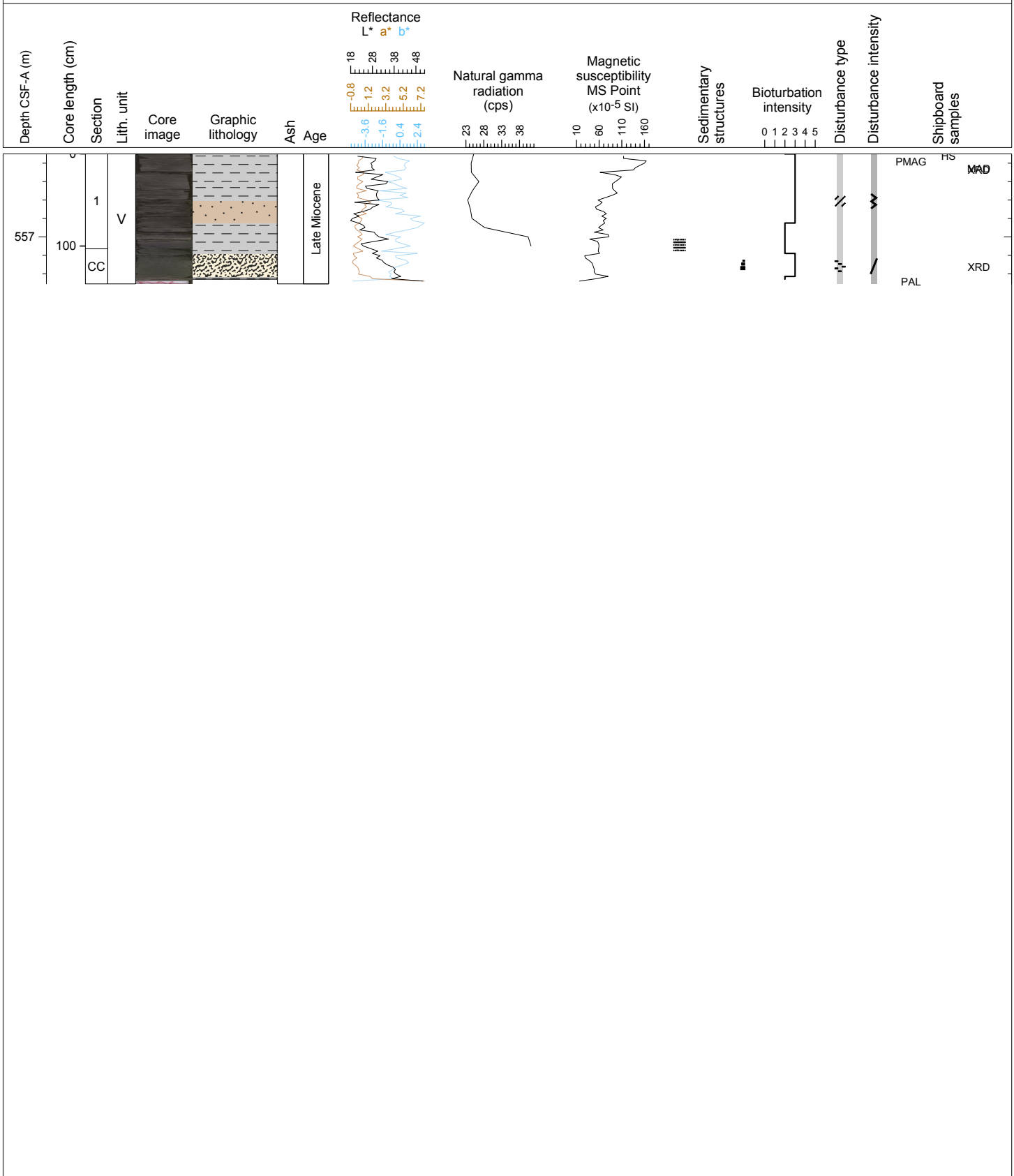
Hole 349-U1431D Core 60X, Interval 546.4-554.14 m (CSF-A)

Greenish gray CLAY interbedded with dark greenish gray SAND and intervals that grade from black volcanic ASH to CLAY WITH ASH. The CLAY interval in Section 1 has a fining upward top that grades to NANNOFOSSIL OOZE. Section 2 has a 40 cm thick SAND interval that is much less consolidated than the surrounding CLAY intervals. The graded ASH beds have strongly bioturbated tops and were deposited as turbidites. The CLAY in Section 1 has well developed biscuits. The graded ASH turbidites are fractured.



Hole 349-U1431D Core 61X, Interval 556.1-557.51 m (CSF-A)

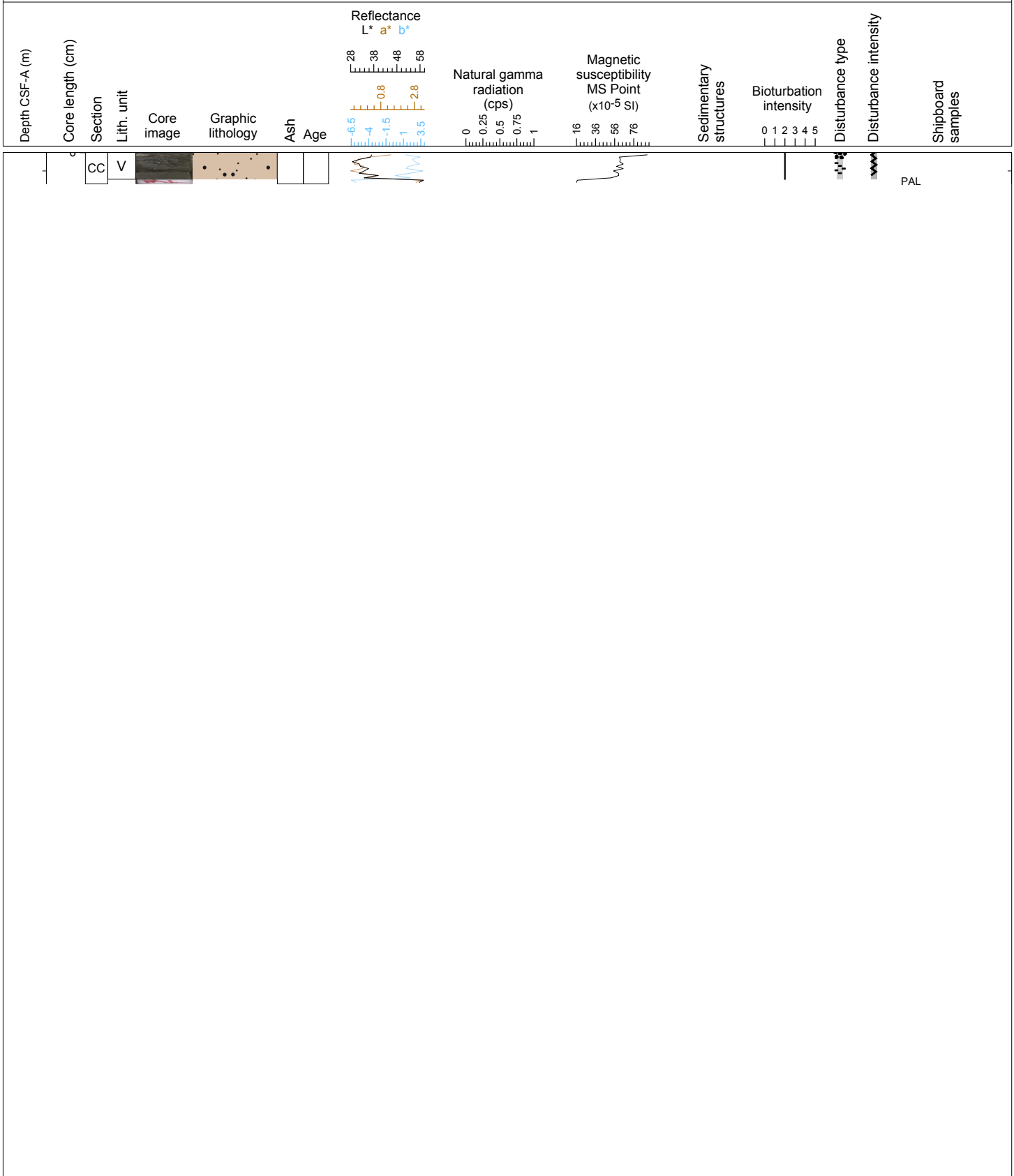
Greenish gray CLAYSTONE WITH ASH interbedded with dark greenish gray SILTY SAND. The CLAYSTONE WITH ASH occurs in Section 1. CC has a 30 cm thick SILTY SAND interval that is much less consolidated than the surrounding CLAYSTONE. Bioturbation is strong in the top of the CLAYSTONE. The CLAYSTONE is fractured and the SILTY SAND is soupy.



U1431D-62X and U1431D-63X TO PALEO

Hole 349-U1431D Core 64X, Interval 585.2-585.54 m (CSF-A)

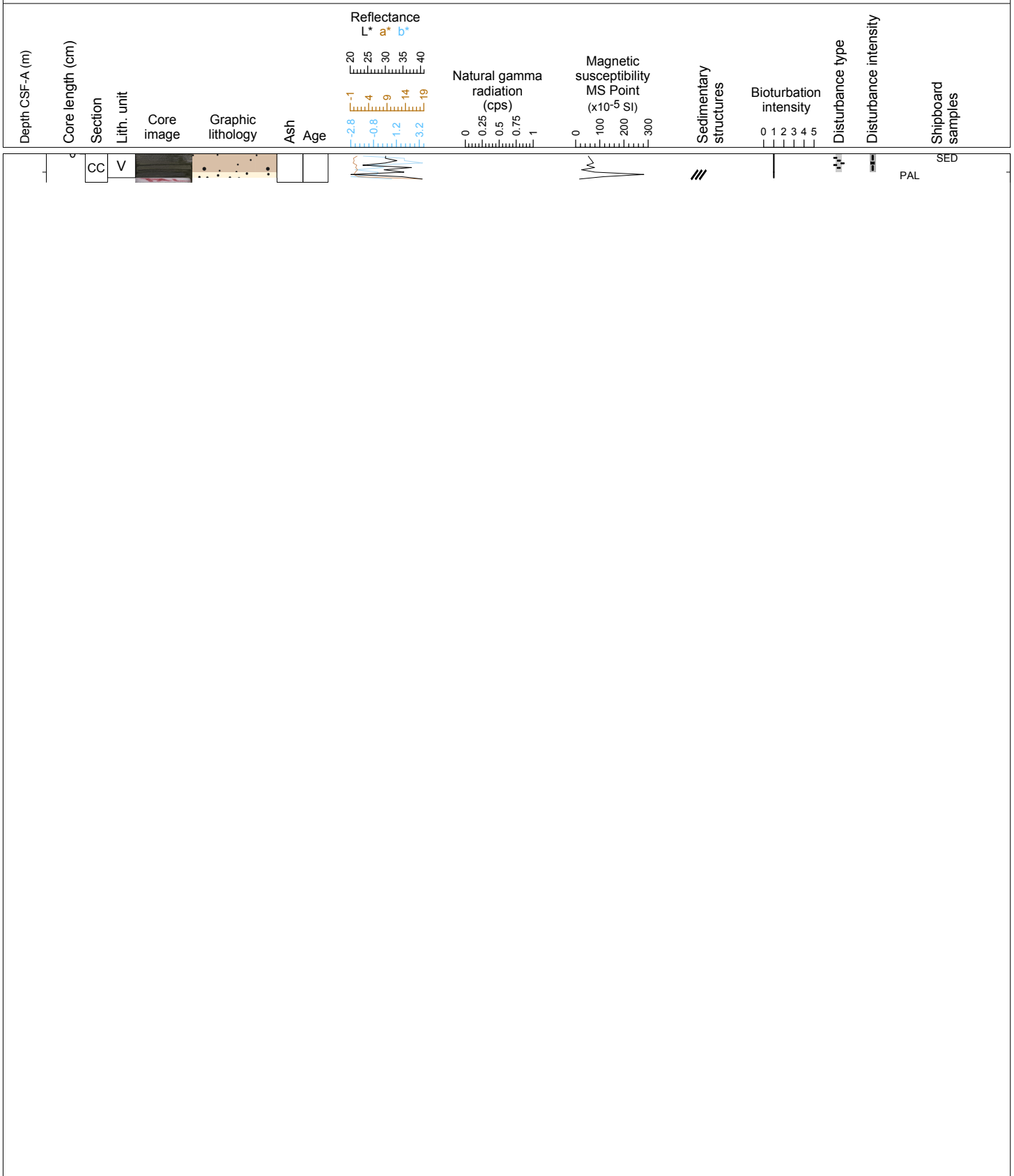
Dark greenish gray SANDY SILT WITH CLAY. This interval is a moderate slurry due to drilling disturbance. The top 5 cm of the core has fall-in debris.



U1431D-65X and U1431-67X NO RECOVERY

Hole 349-U1431D Core 66X, Interval 604.6-604.91 m (CSF-A)

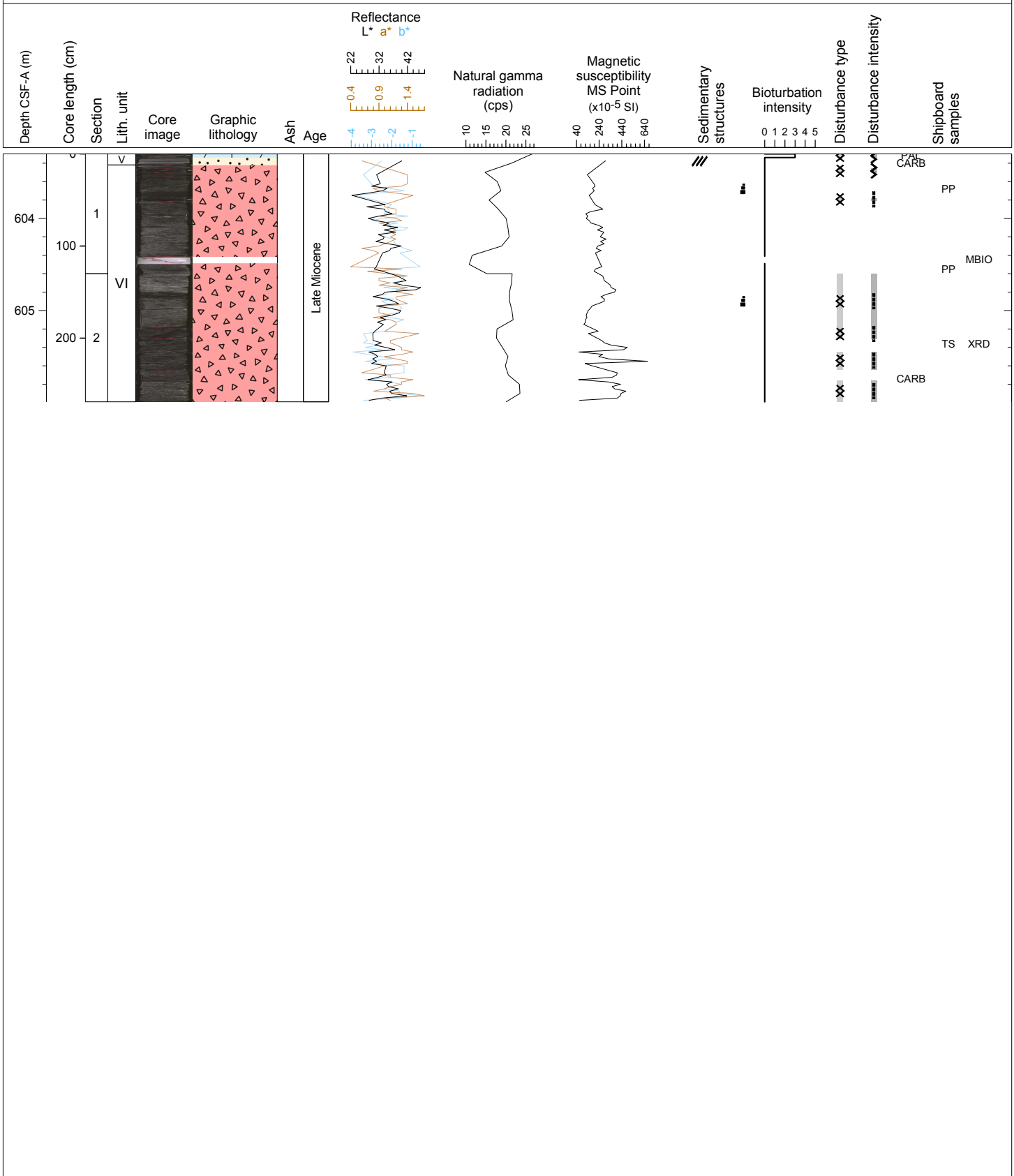
Dark greenish gray SANDY SILT WITH CLAY. This interval is a moderate slurry due to drilling disturbance. The layer at the base is lithified, dark greenish gray to black SILTY SANDSTONE. This interval has low angle cross lamination and slight bioturbation.



U1431E-11 and U1431E-31 DRILLED INTERVAL; U1431E-2R and U1431E-4R through U1431E-6R NO RECOVERY

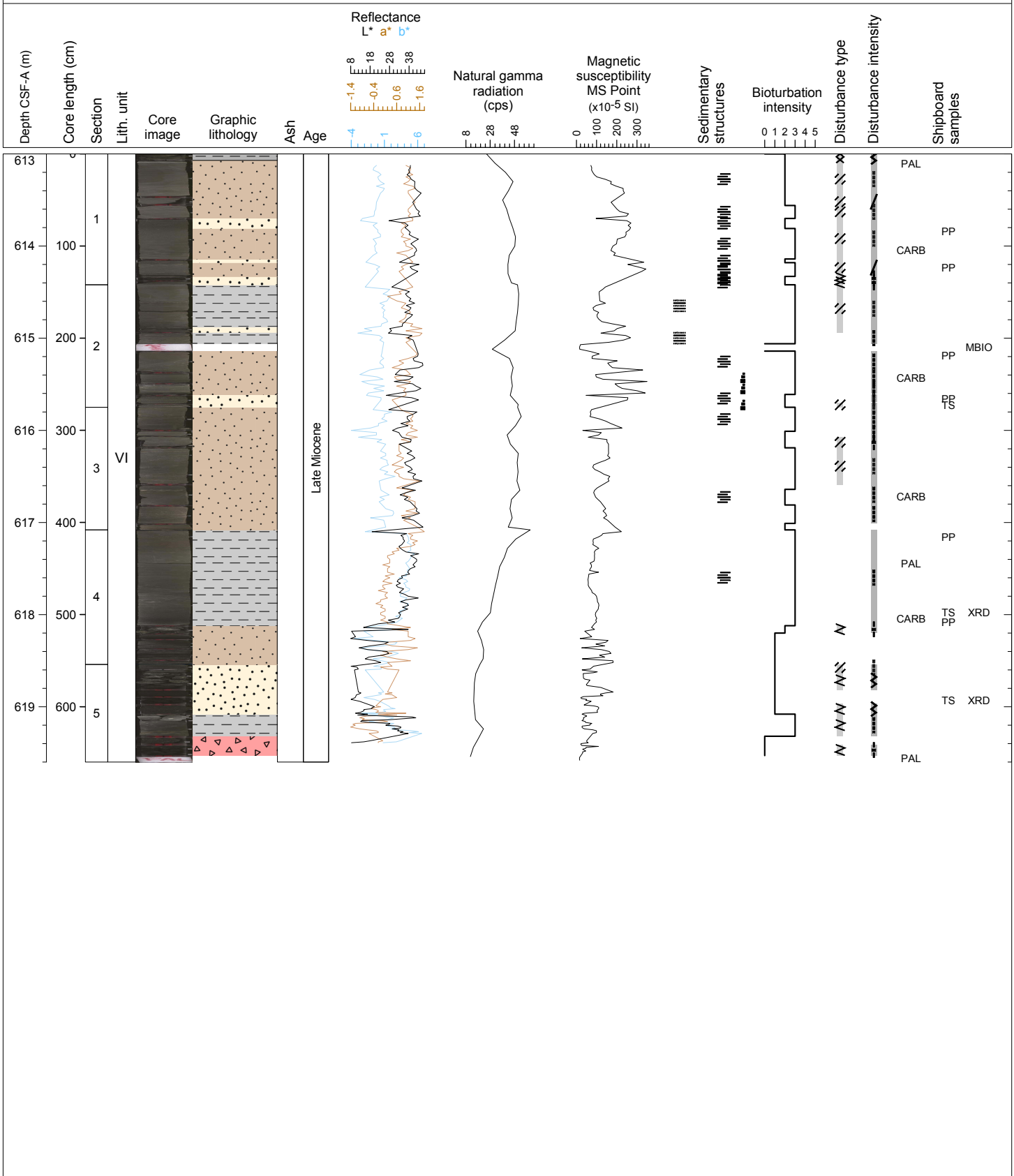
Hole 349-U1431E Core 7R, Interval 603.3-605.99 m (CSF-A)

Dark greenish gray, volcanoclastic BRECCIA with 11 cm of medium-grained dark greenish gray SANDSTONE at the top of the core showing parallel and cross lamination. BRECCIA is typically massive and ungraded, poorly sorted and with angular clasts up to 2 cm of volcanic rock with vesicles. Clasts are mainly highly vesicular aphyric basalt, with minor aphyric, non-vesicular to sparsely vesicular basalt and trachytic basalt, and rare fine-grained glassy basalt. The matrix contains some pyroxene and feldspar crystals. Colors vary between clasts reflecting different degrees of alteration.



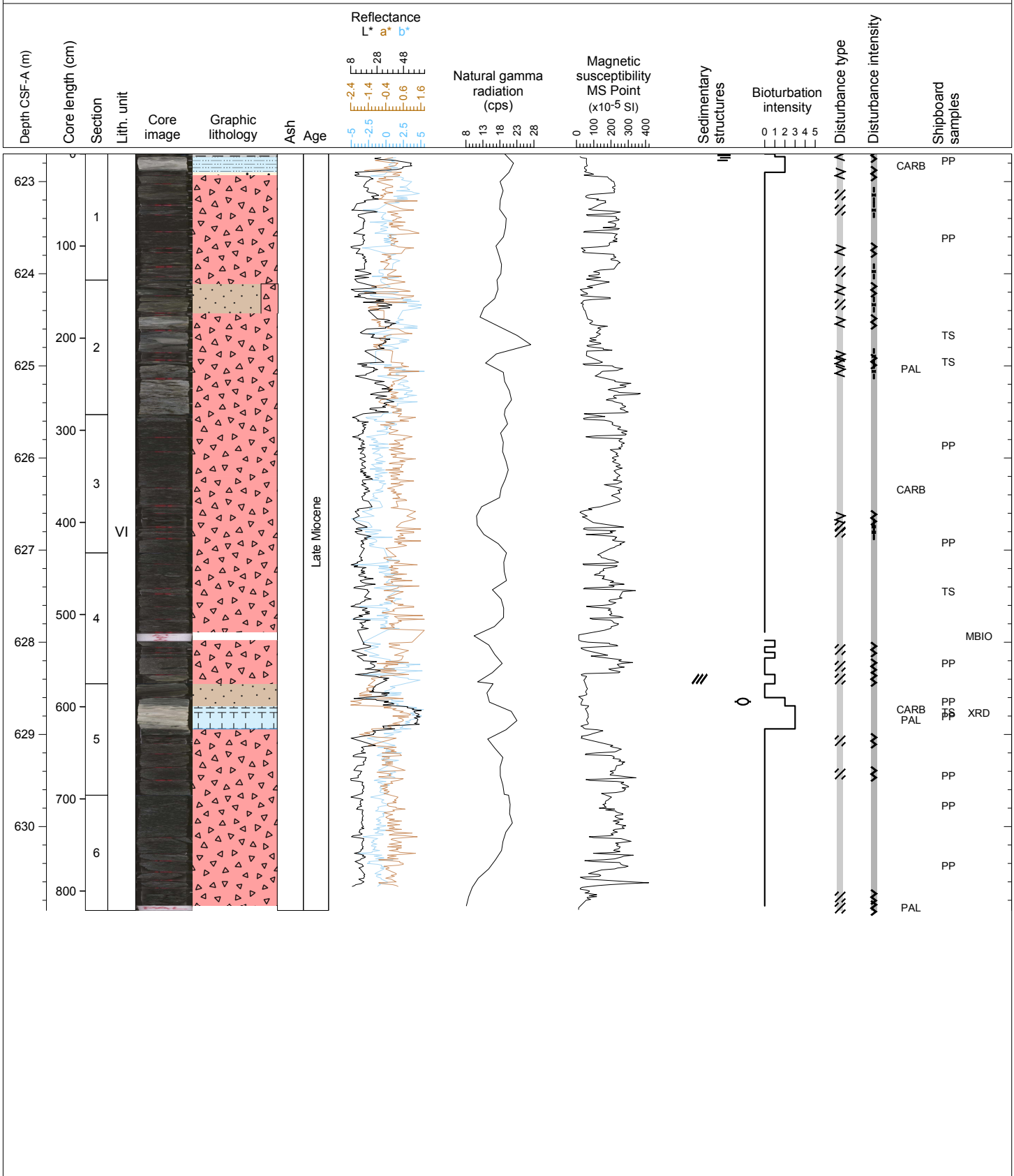
Hole 349-U1431E Core 8R, Interval 613.0-619.6 m (CSF-A)

Greenish gray SILTSTONE interbedded with light greenish gray SANDSTONE and BRECCIA. The SILTSTONE is fining upward with heavy bioturbation and is slightly fractured. Volcaniclastic BRECCIA is matrix-supported with four basaltic clast types up to 10 mm. Clasts are mainly aphyric non-vesicular basalt, with minor aphyric, highly vesicular basalt and sparsely vesicular trachytic basalt, and rare fine-grained glassy basalt. Some clay and clayey-silt clasts are also present.



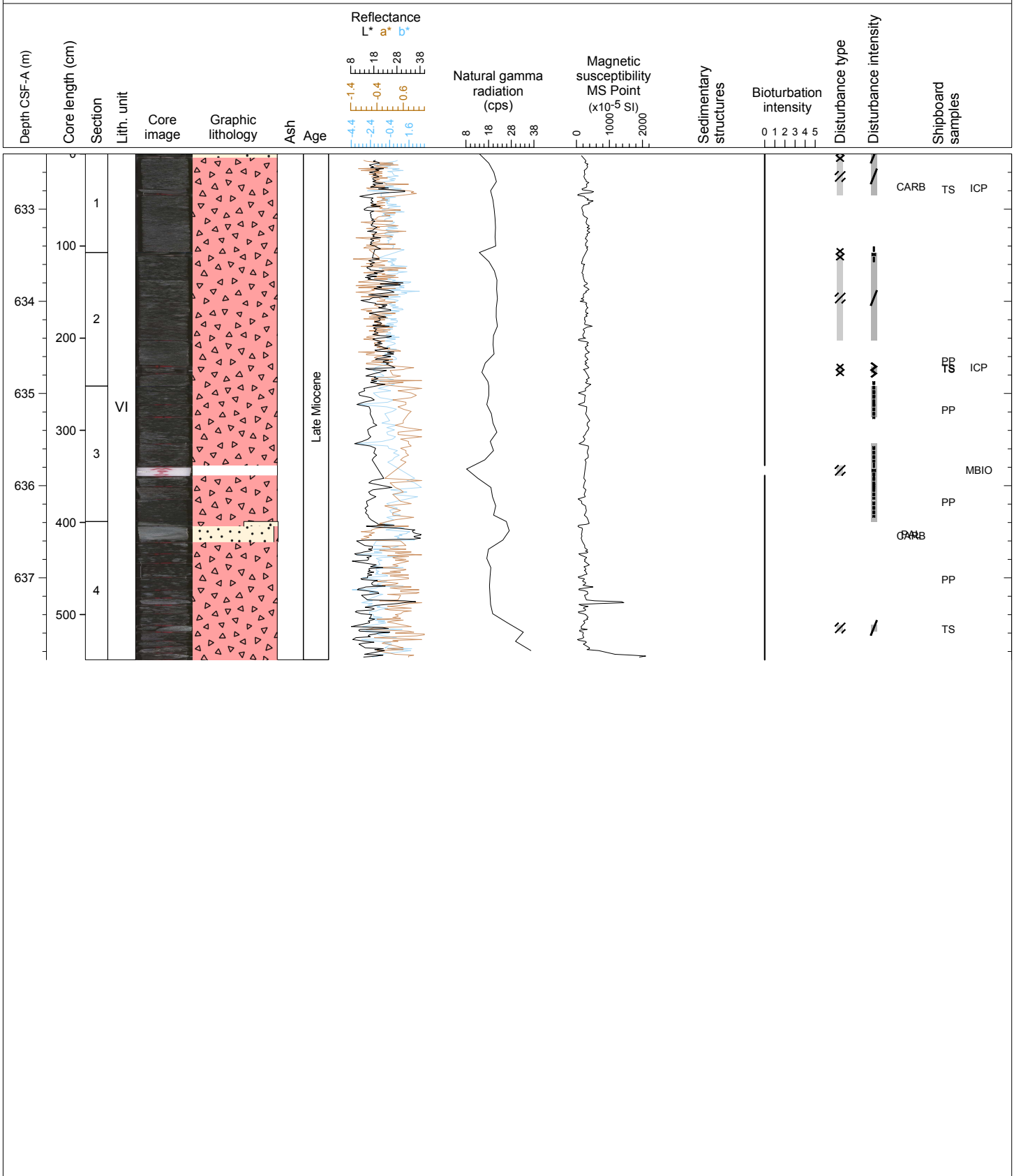
Hole 349-U1431E Core 9R, Interval 622.7-630.91 m (CSF-A)

Dark greenish gray, volcanoclastic BRECCIA, typically massive and ungraded, poorly sorted, and with angular clasts of basalt and subrounded claystone and siltstone. Colors vary between clasts reflecting different degrees of alteration. One ~50 cm interval of CHALK occurs in the massive BRECCIA layer in Section 5. Volcanic clasts in the BRECCIA include highly vesicular, aphyric basalt and light-colored pumice.



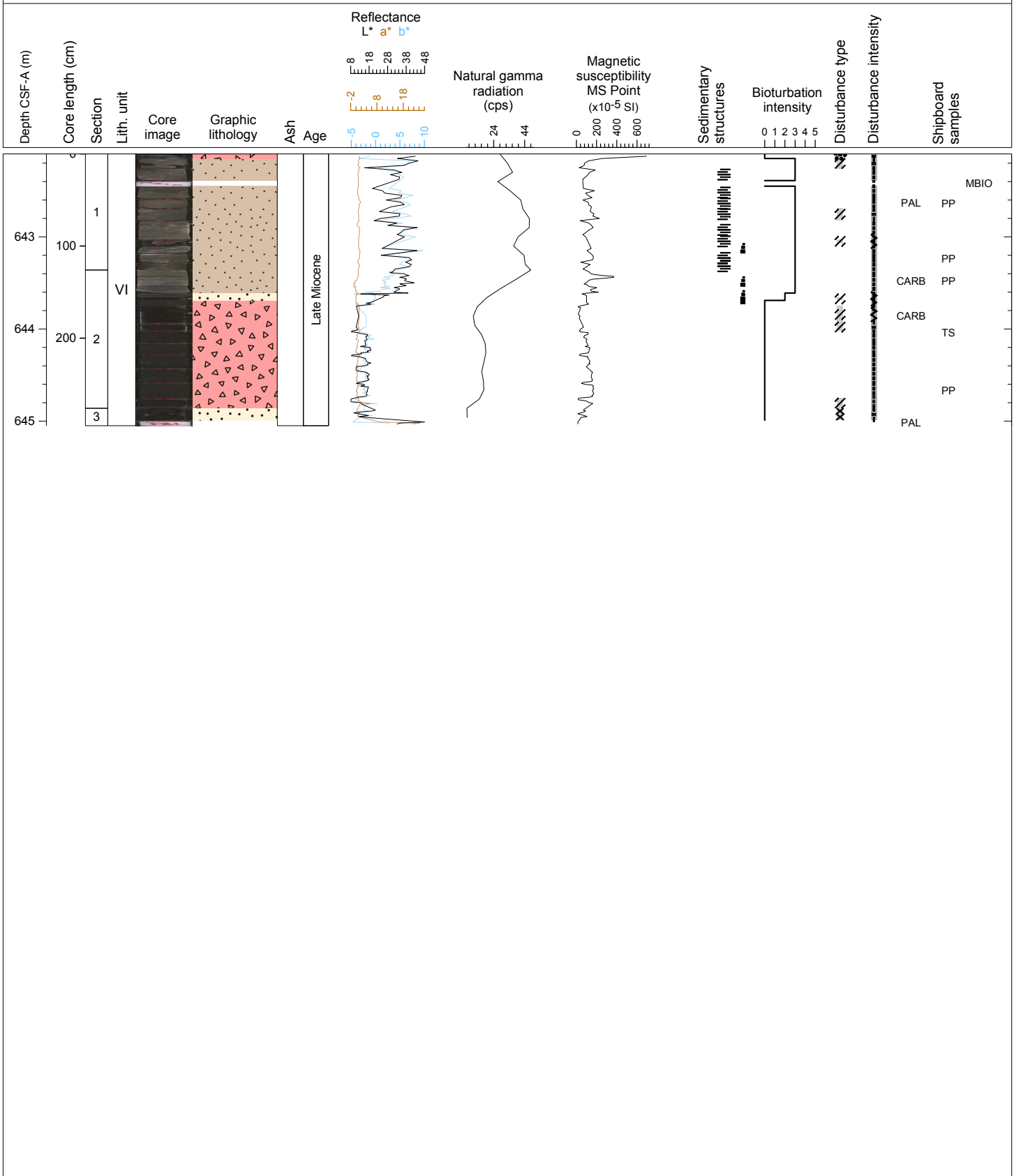
Hole 349-U1431E Core 10R, Interval 632.4-637.89 m (CSF-A)

Greenish black, volcanoclastic BRECCIA dominates the core with a 17 cm bed of volcanoclastic medium-grained SANDSTONE in Section 4. BRECCIA is massive, ungraded and poorly sorted. Clasts are generally subangular and comprised of basalt, as well as reworked mudstone and siltstone. SANDSTONE is dark greenish gray and is also massive and ungraded with a sharp base and top. BRECCIA clasts are mostly granule grade but are rarely pebble sized, up to 8 cm across. The largest pebbles are composed of vesicular basalt. The BRECCIA has five basaltic clast types, including non-vesicular to sparsely vesicular aphyric basalt, and minor non-vesicular basalt, highly vesicular aphyric basalt, and trachytic basalt.



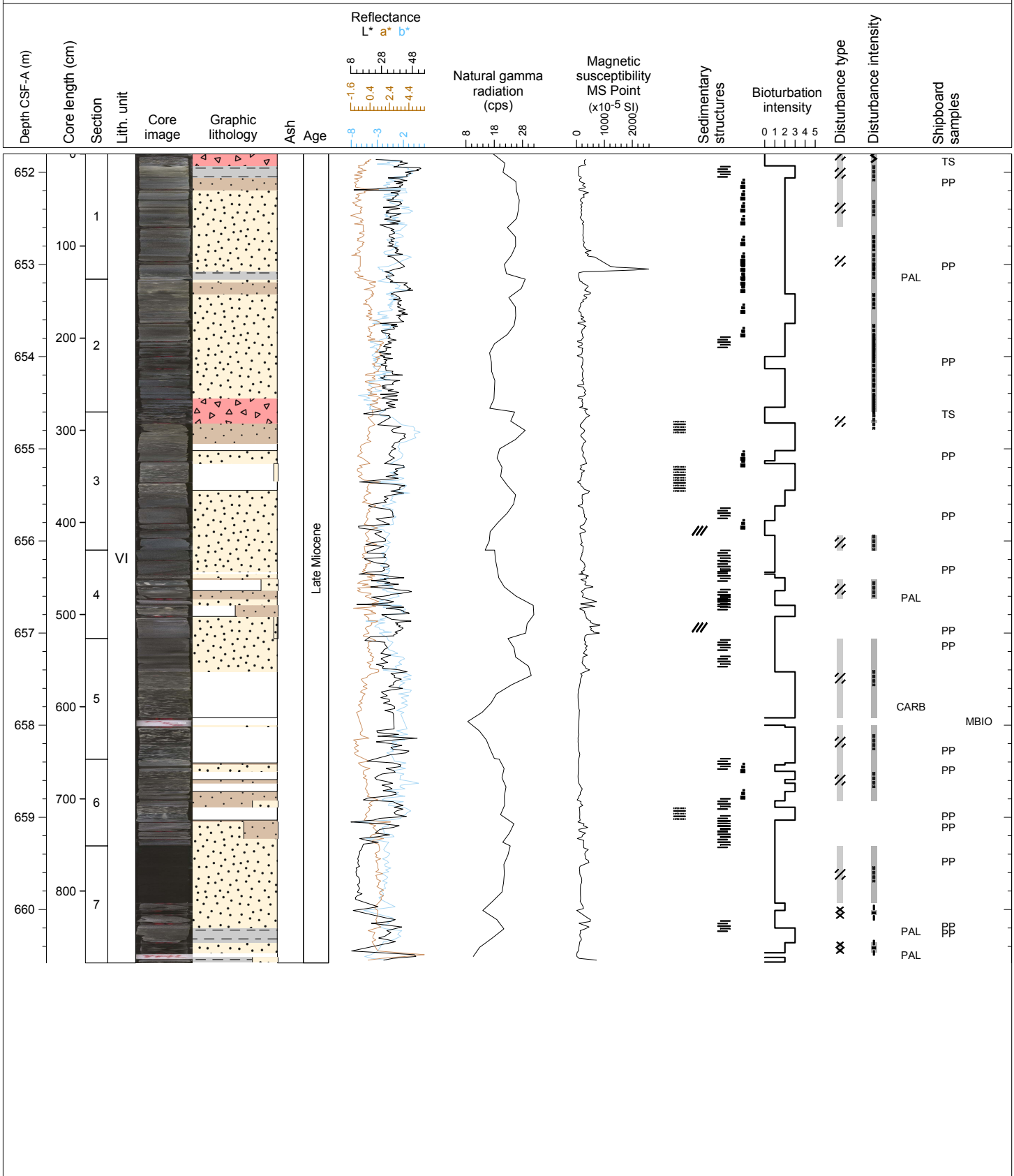
Hole 349-U1431E Core 11R, Interval 642.1-645.05 m (CSF-A)

Greenish gray SILTSTONE and dark greenish gray volcanoclastic BRECCIA. In the upper part of the core, several greenish gray SILTSTONE layers have graded bedding. In the lower part is a very thick greenish volcanoclastic BRECCIA, typically massive and ungraded, poorly sorted, and with subrounded clasts of mainly non-vesicular to sparsely vesicular aphyric basalt, minor non-vesicular basalt and lighter colored, well-rounded mudstone clasts. Color varies between clasts reflecting different degrees of alteration. The core is fractured by drilling disturbance in some places.



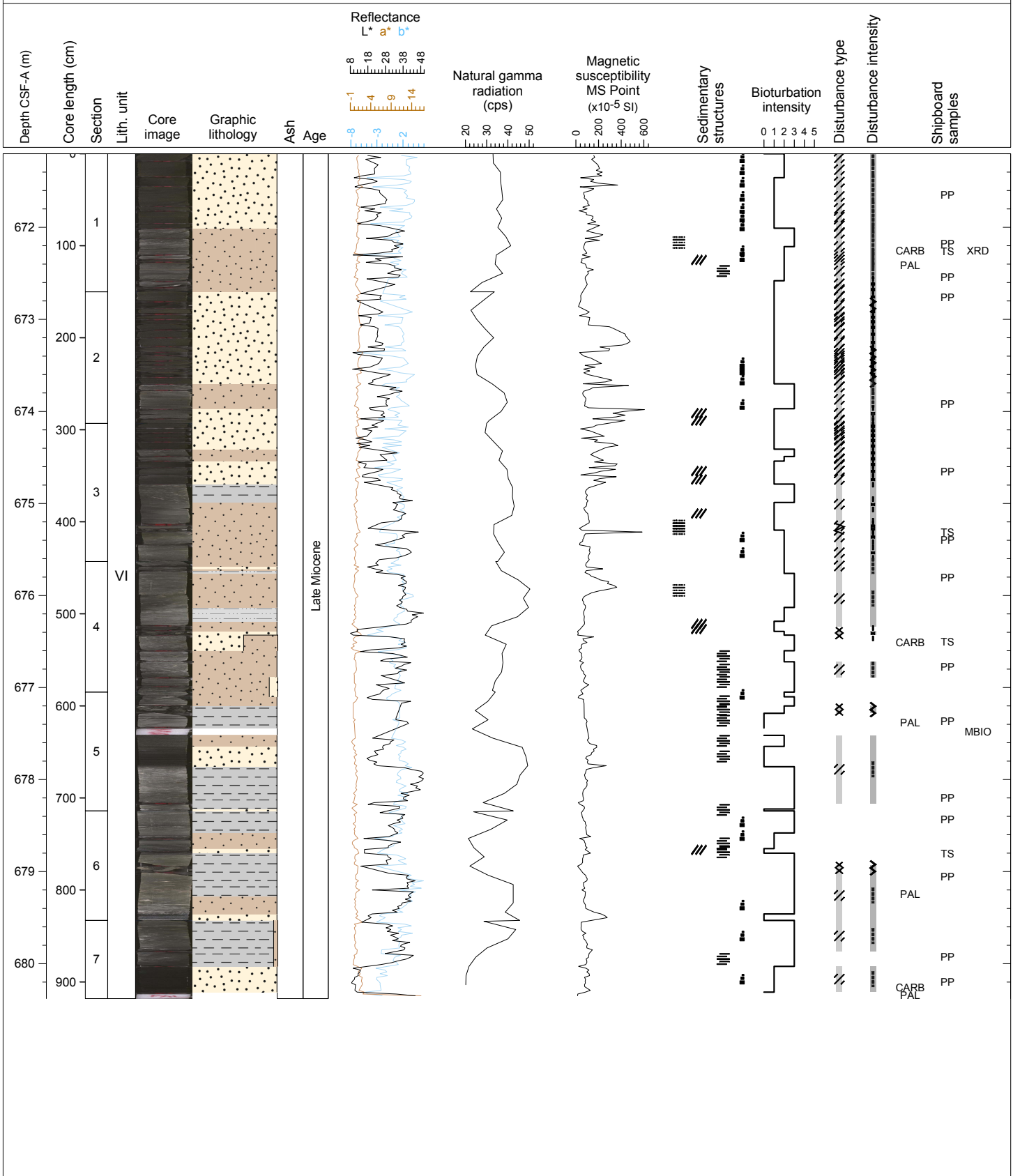
Hole 349-U1431E Core 12R, Interval 651.8-660.58 m (CSF-A)

Fine to medium-grained, greenish gray SANDSTONE that fines upward and has sharp bases, greenish gray CALCAREOUS CLAYSTONE that is heavily bioturbated, black SANDSTONE, and greenish gray volcaniclastic BRECCIA. The BRECCIA occurs at the top of the core for 10 cm in Sections 1 and 3 and contains three basaltic clast types that are up to 24 mm. Clasts are mainly non-vesicular to sparsely vesicular aphyric basalt, with minor non-vesicular and highly vesicular basalt. The greenish gray SANDSTONE is occasionally laminated or cross-laminated. The base of Section 6 and top 60 cm of Section 7 have a black medium-grained SANDSTONE bed.



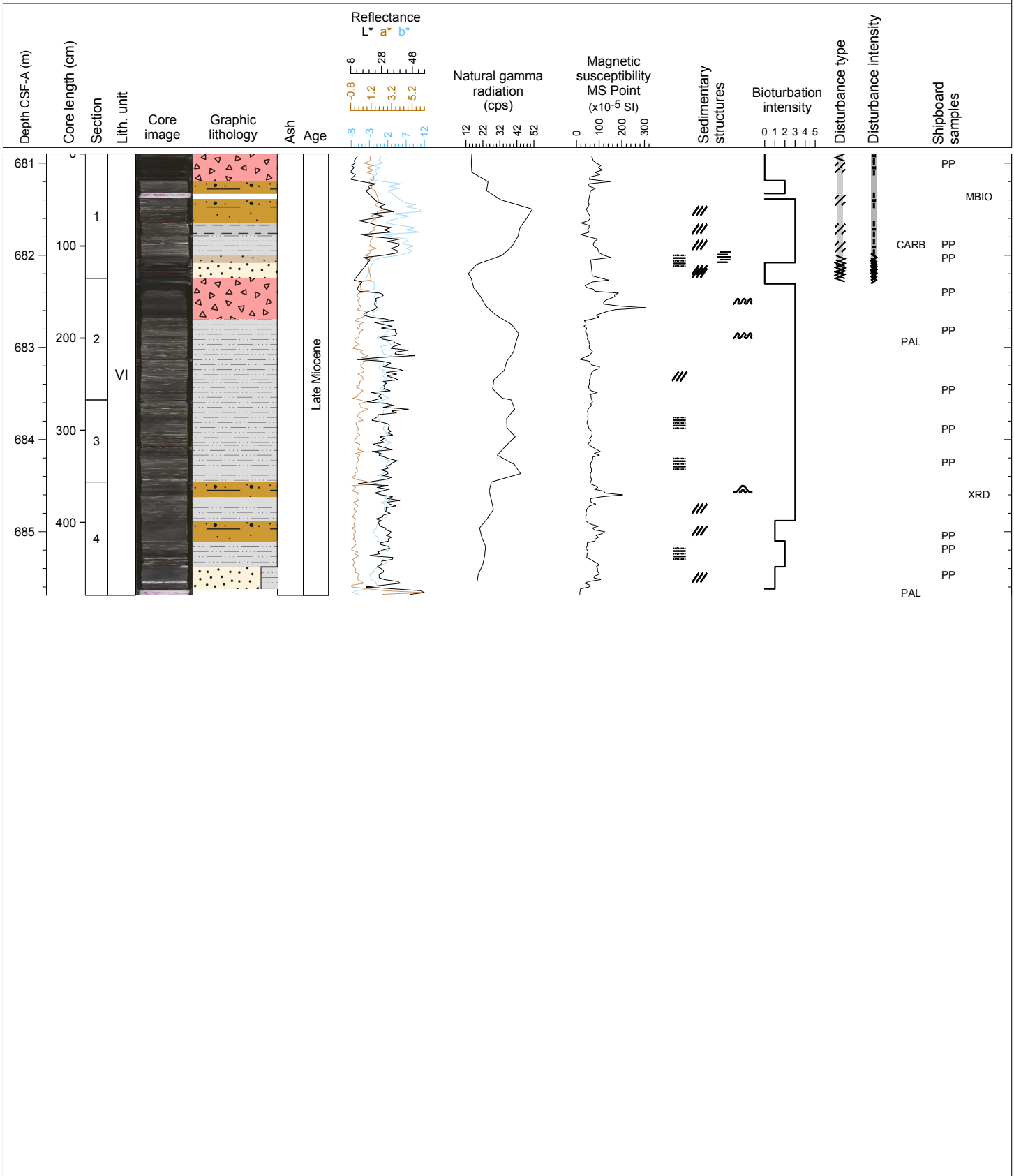
Hole 349-U1431E Core 14R, Interval 671.2-680.38 m (CSF-A)

Interbedded dark greenish gray and greenish gray CLAYSTONE, SILTY CLAYSTONE, SILTSTONE, and SANDSTONE. Some beds fine upward from SANDSTONE to SILTY CLAYSTONE and CLAYSTONE. The CLAYSTONE and SILTY CLAYSTONE are heavily bioturbated and the SILTSTONE and SANDSTONE are laminated or cross-laminated. Graded beds have erosive bases. There are beds of medium to coarse-grained, black heterolithic volcanoclastic SANDSTONE in Sections 1 and 7 that are slightly bedded toward the top and cross-bedded at the top of Section 7.



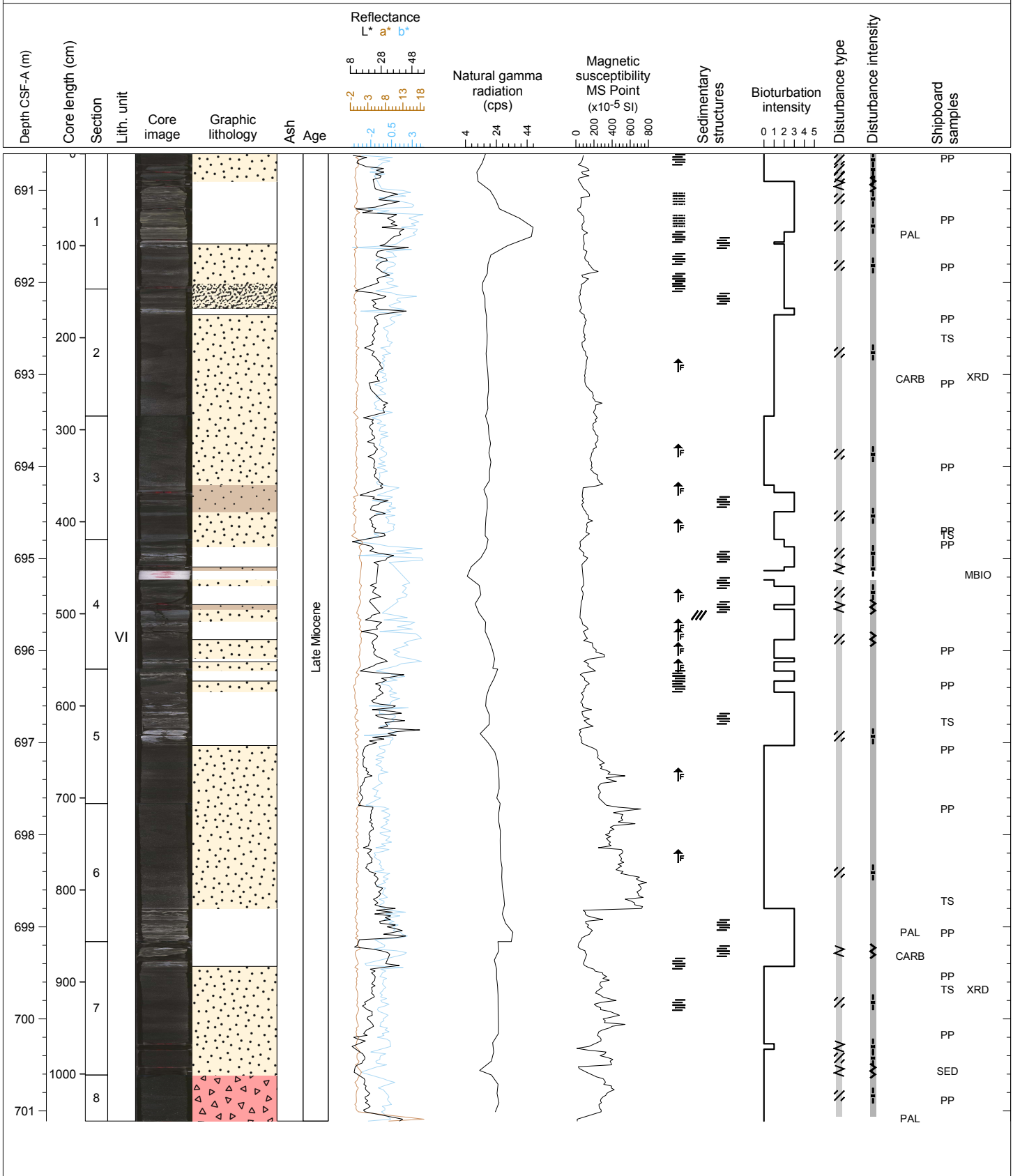
Hole 349-U1431E Core 15R, Interval 680.9-685.69 m (CSF-A)

Greenish gray SILTSTONE and CLAYSTONE are interbedded with dark gray and black gray, coarse to very coarse-grained, heterolithic, and slightly bedded volcanoclastic SANDSTONE and BRECCIA. All CLAYSTONE beds have heavy bioturbation and show bedding and/or lamination.



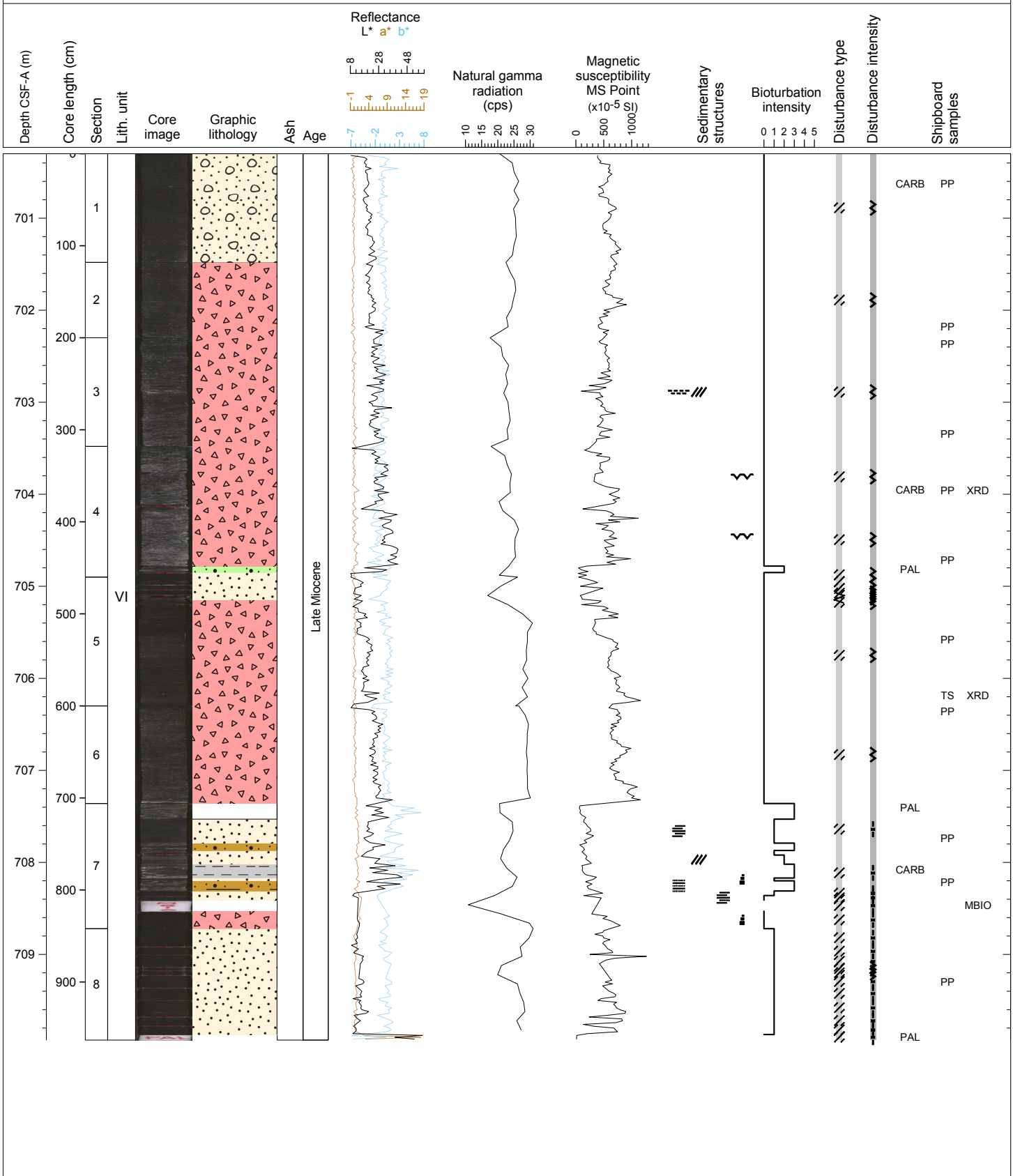
Hole 349-U1431E Core 16R, Interval 690.6-701.11 m (CSF-A)

Two units of dark gray to black, thick-bedded, coarse-grained volcanoclastic SANDSTONE are interbedded with dark gray calcareous CLAYEY SILTSTONE. SANDSTONE layers usually show parallel bedding and fine upward to the overlying SILTSTONE layers. Bioturbation is heavy in the calcareous CLAYEY SILTSTONE and occurs with white calcite diagenetic concretions. Two black ash-rich SANDSTONE layers occur in Section 7.



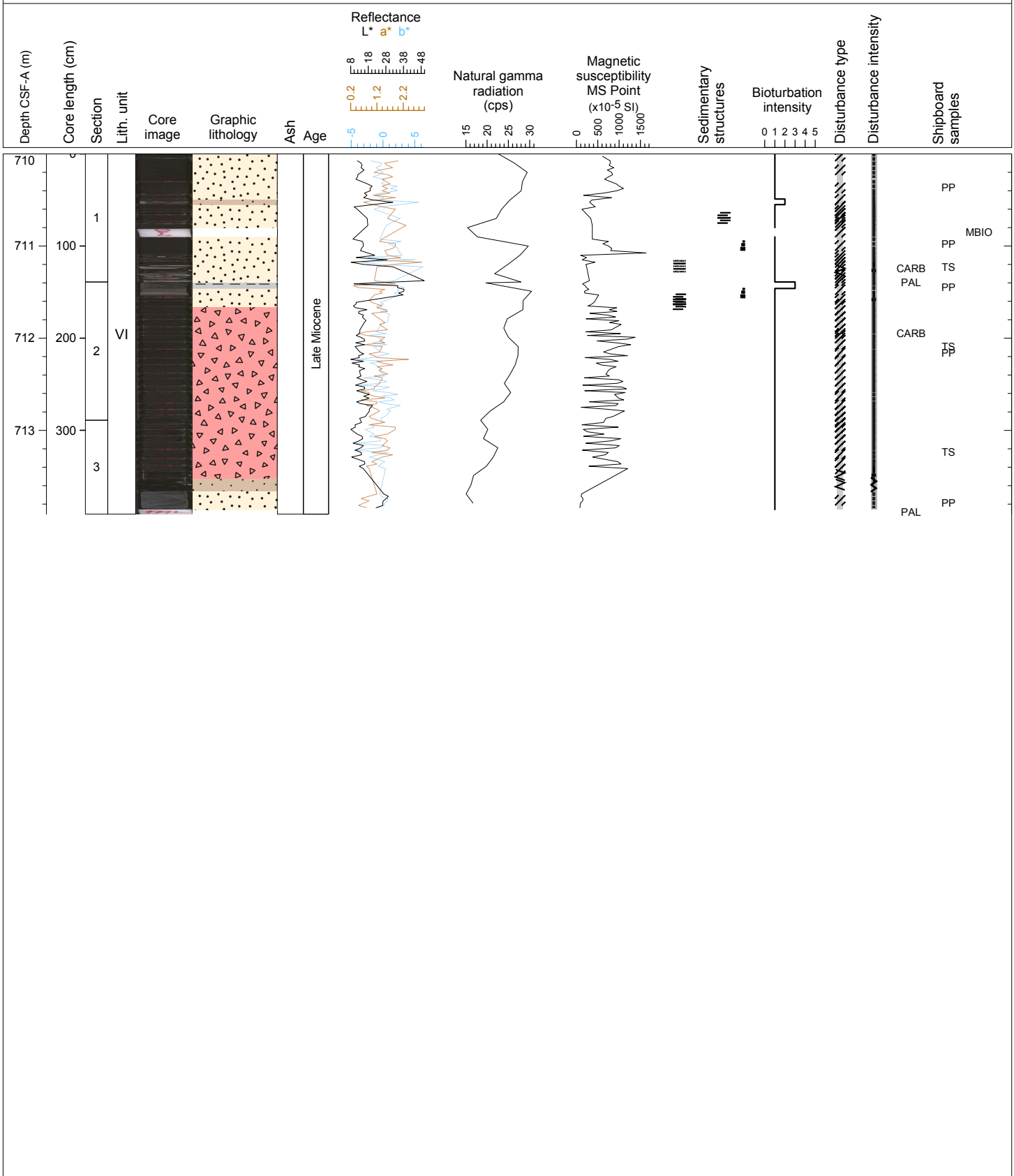
Hole 349-U1431E Core 17R, Interval 700.3-709.93 m (CSF-A)

Greenish black volcanoclastic BRECCIA, largely present as a massive, thick-bedded unit that grades upward to black massive and poorly sorted volcanoclastic SANDSTONE from 130 cm in Section 4 to the top of Section 1. The clasts become closely packed from the bottom of Section 2. Very dark gray volcanoclastic SANDSTONE that grades from poorly sorted, coarse sand at the base to finely laminated sand toward the top, occurs in Section 4. A series of greenish black SANDSTONE and CLAYSTONE cycles in Section 7 shows strong bioturbation with whitish-colored burrows. Volcanoclastic SANDSTONE comprises around 80% of the lower part of the core. Both volcanoclastic BRECCIA and SANDSTONE contain clasts of highly to non-vesicular aphyric to sparsely-aphyric basalt, trachytic basalt, glassy vesicular basalt with ~1 mm palagonite rims and some mudstone clasts.



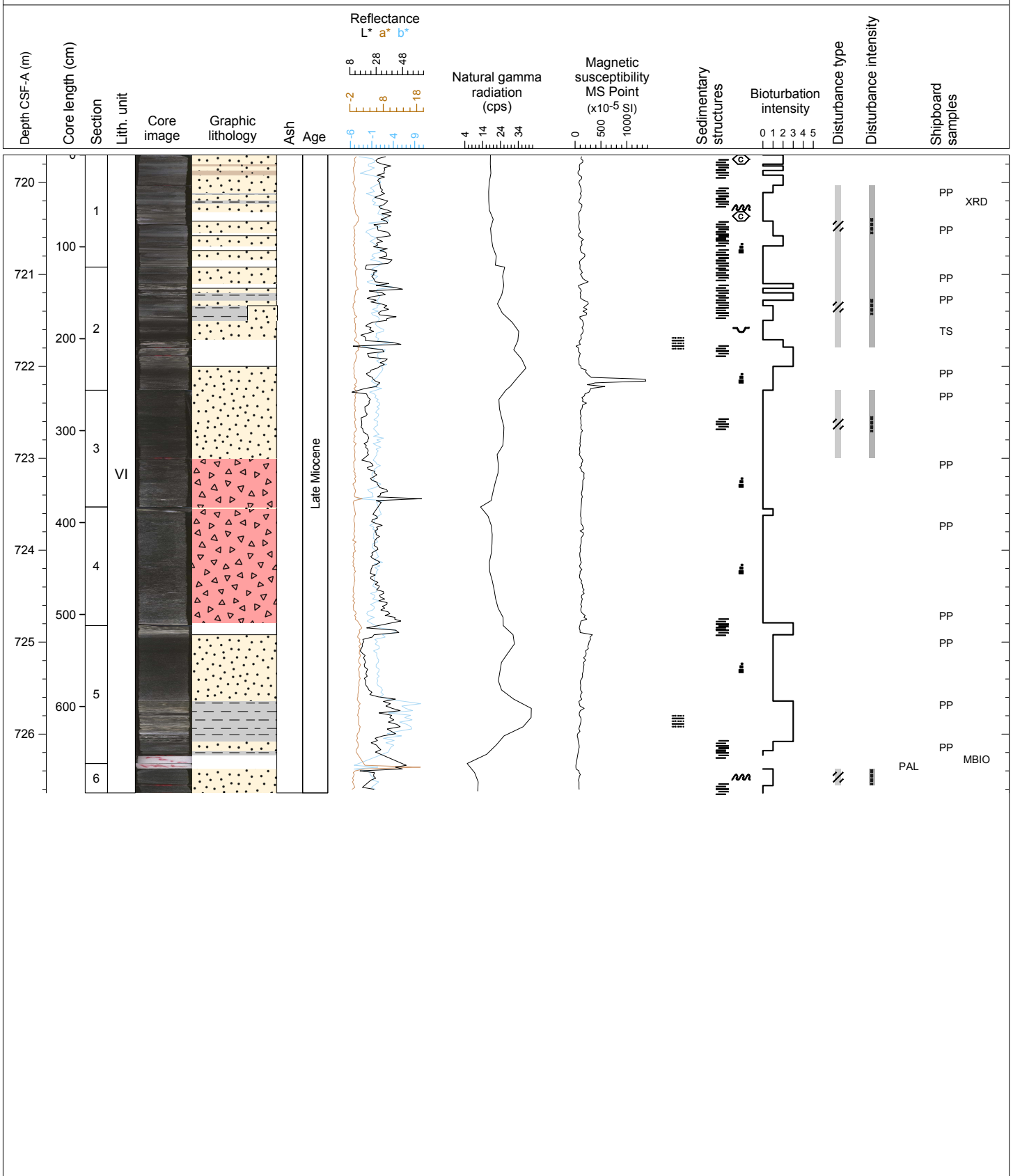
Hole 349-U1431E Core 18R, Interval 710.0-713.91 m (CSF-A)

Greenish black volcanoclastic BRECCIA and gray SILTSTONE beds with a thickness of ~10 cm in every section. The BRECCIA is largely present as massive, thick-bedded units with sparsely vesicular aphyric basalt, highly vesicular aphyric basalt, and non-vesicular glassy basalt clasts in decreasing order. The SILTSTONE is generally well sorted with cross-bedding and strong bioturbation with whitish-colored burrows. The upper part of Section 1 is a volcanoclastic SANDSTONE containing volcanic glass, basalt grains and plagioclase.



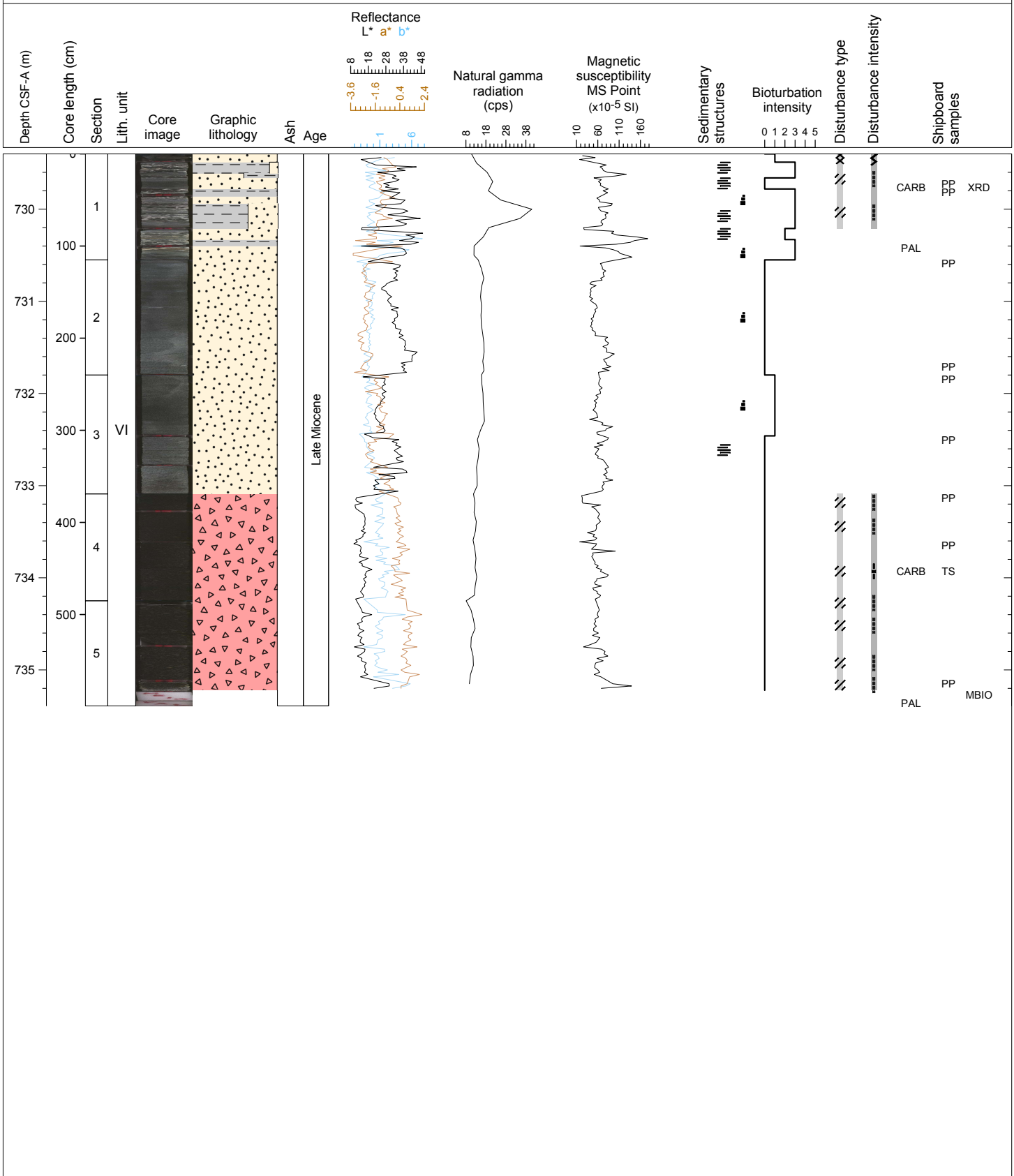
Hole 349-U1431E Core 19R, Interval 719.7-726.64 m (CSF-A)

Sequence of greenish gray SANDSTONE interbedded at the 10-20 cm scale with SILTSTONE and CLAYSTONE. Bases of coarse-grained beds are planar but often not erosive, showing parallel laminae indicative of high energy current activity. Finer-grained interbeds are a minor lithology and are often laminated and with planar tops and bases. A thick, graded bed of volcanoclastic BRECCIA and volcanoclastic SANDSTONE dominates Sections 3 and 4, with few structures visible. Volcanoclastic BRECCIA contains clasts of highly to non-vesicular basalt, mudstone, and possible pumice in decreasing order of abundance. More thinly bedded, graded, dark gray SANDSTONE is interbedded with bioturbated CLAYSTONE in Sections 5 and 6. A wood fragment was found in Section 1 at 67.5-70 cm.



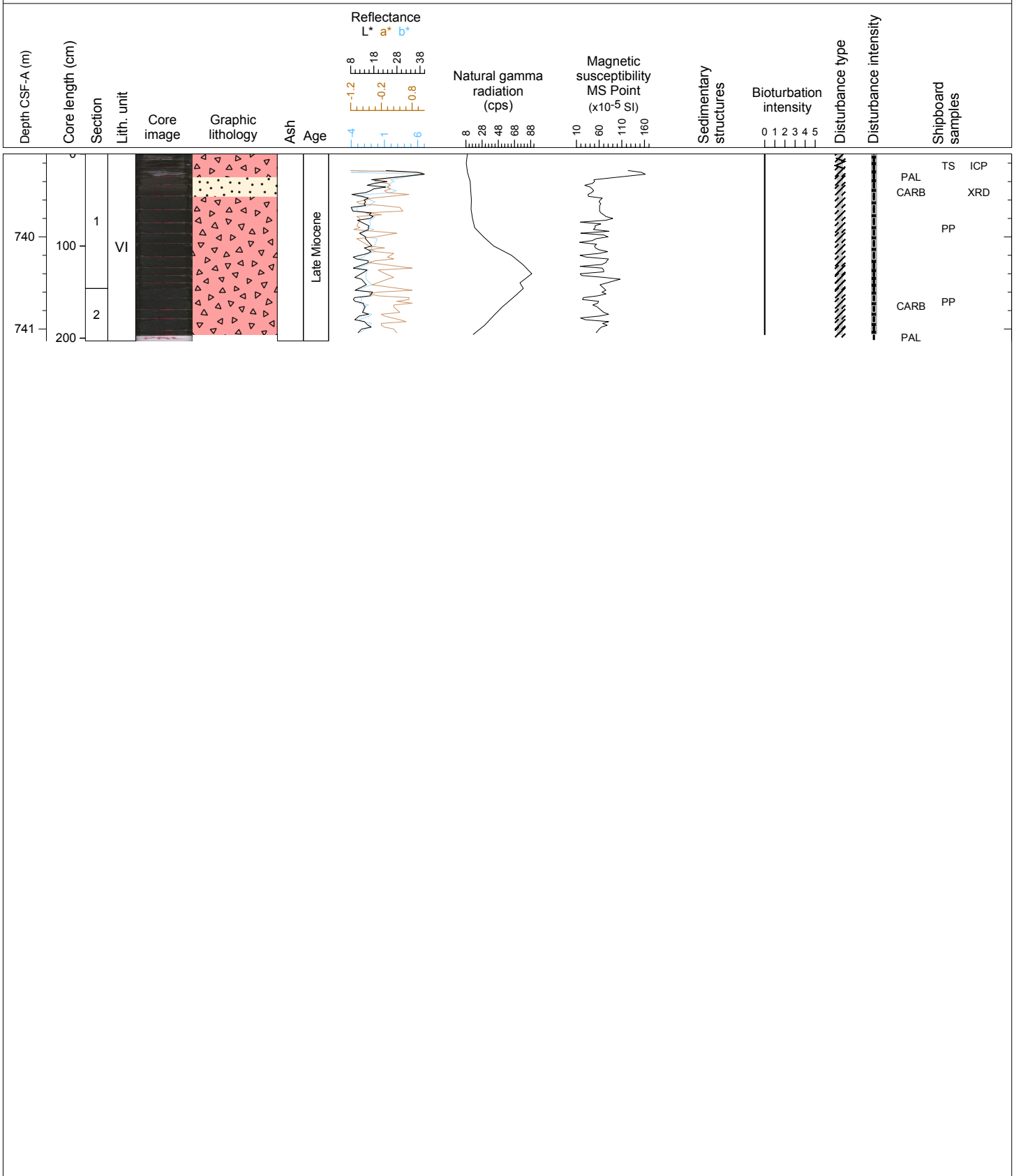
Hole 349-U1431E Core 20R, Interval 729.4-735.39 m (CSF-A)

Greenish gray volcanoclastic BRECCIA is present as a thick bed in Sections 4 and 5. The BRECCIA fines upward to volcanoclastic SANDSTONE and laminated light greenish gray CLAYSTONE. Clasts in the BRECCIA are up to pebble size in the bottom 2 m of the bed. The bed contains angular, poorly sorted clasts of mostly vesicular to highly vesicular aphyric basalt, lesser non-vesicular microcrystalline to glassy basalt, and minor mudstone. Section 1 shows cycles of greenish gray, laminated, fine-grained SANDSTONE with sharp, erosive bases fining upward rapidly into medium-bedded, dark gray CLAYSTONE beds with strong bioturbation.



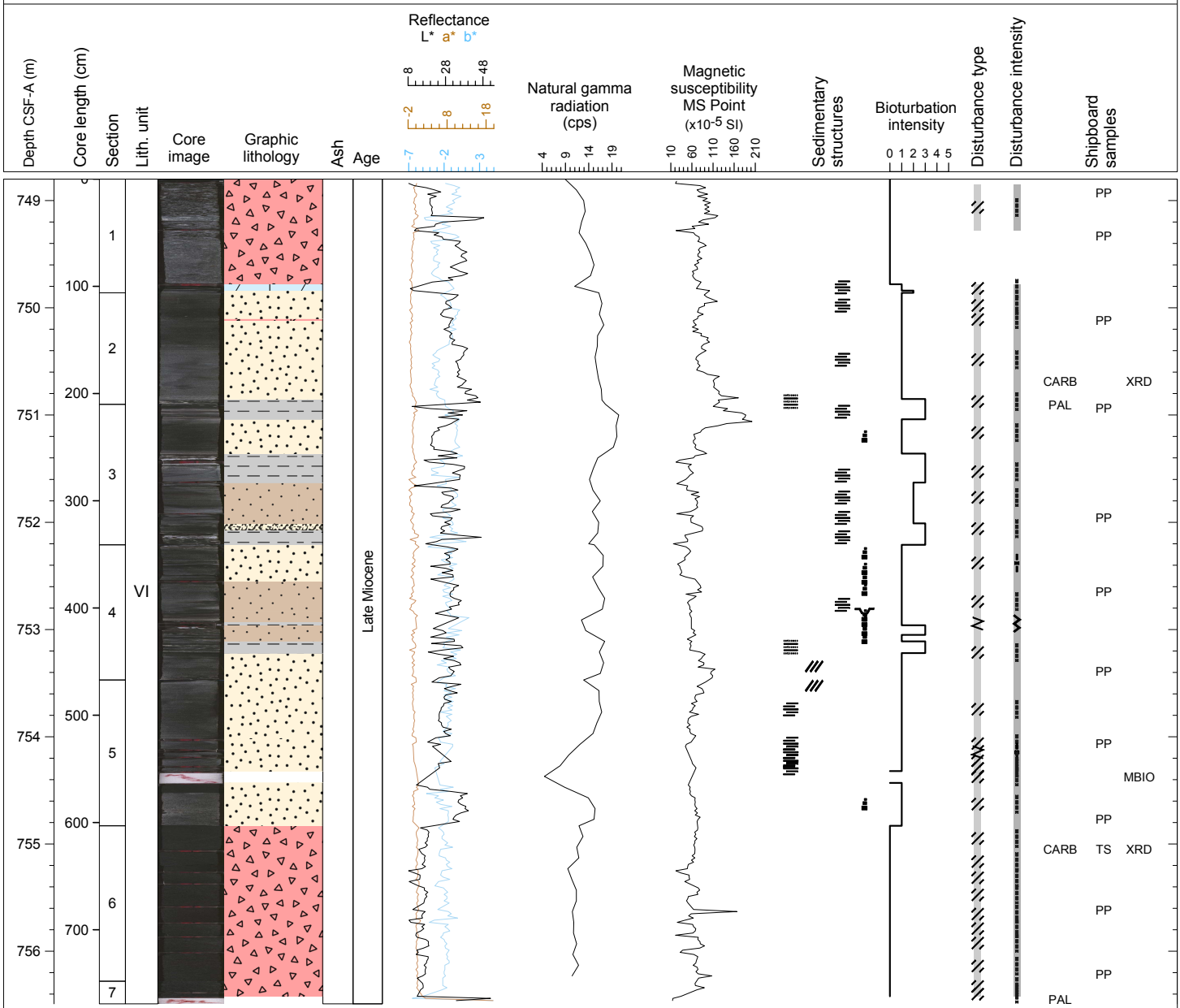
Hole 349-U1431E Core 21R, Interval 739.1-741.13 m (CSF-A)

Greenish black volcanoclastic BRECCIA with a thickness of 1.5 m at the end of the core. The clasts include moderate to highly altered non-vesicular microcrystalline to glassy basalt, sparsely vesicular aphyric basalt, and highly vesicular aphyric basalt in decreasing order. A greenish gray SANDSTONE with a thickness of 10 cm occurs near the top of Section 1. The bioturbation is generally slight throughout the core.



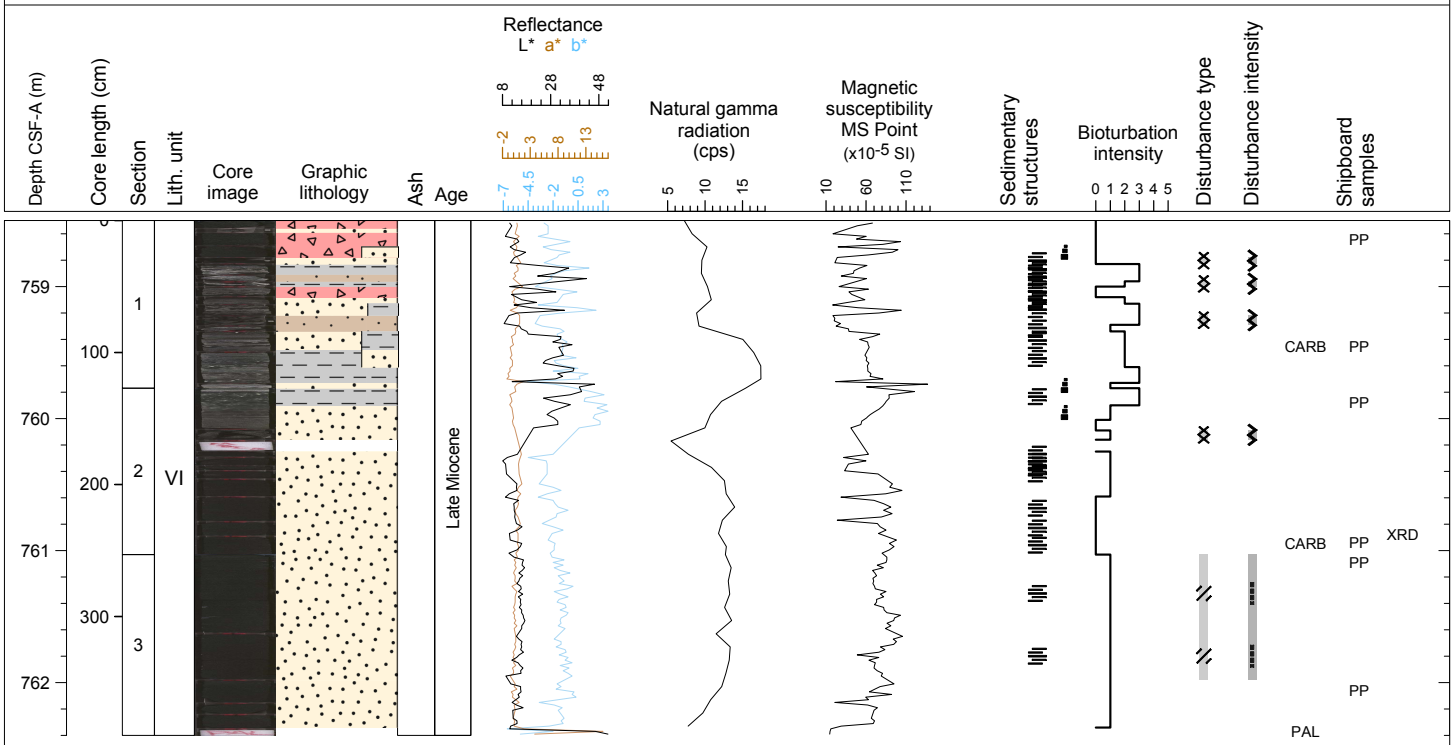
Hole 349-U1431E Core 22R, Interval 748.8-756.49 m (CSF-A)

Greenish gray volcanoclastic SANDSTONE occurs in thick, massive and laminated beds with sharp, erosive bases, overlying dark greenish gray and dark gray CLAYSTONE with pervasive bioturbation or well developed parallel lamination. Sandy bases locally show cross-bedding. CLAYSTONE comprises <10% of the total core. Sections 1,6 and 7 are marked by a pebbly dark gray volcanoclastic BRECCIA with a sharp, erosive base but no clear grading. Clasts are highly to sparsely vesicular aphyric and non-vesicular microcrystalline to glassy basalt. Two calcite veins up to 2 cm across are seen in Section 3 running horizontally across the core.



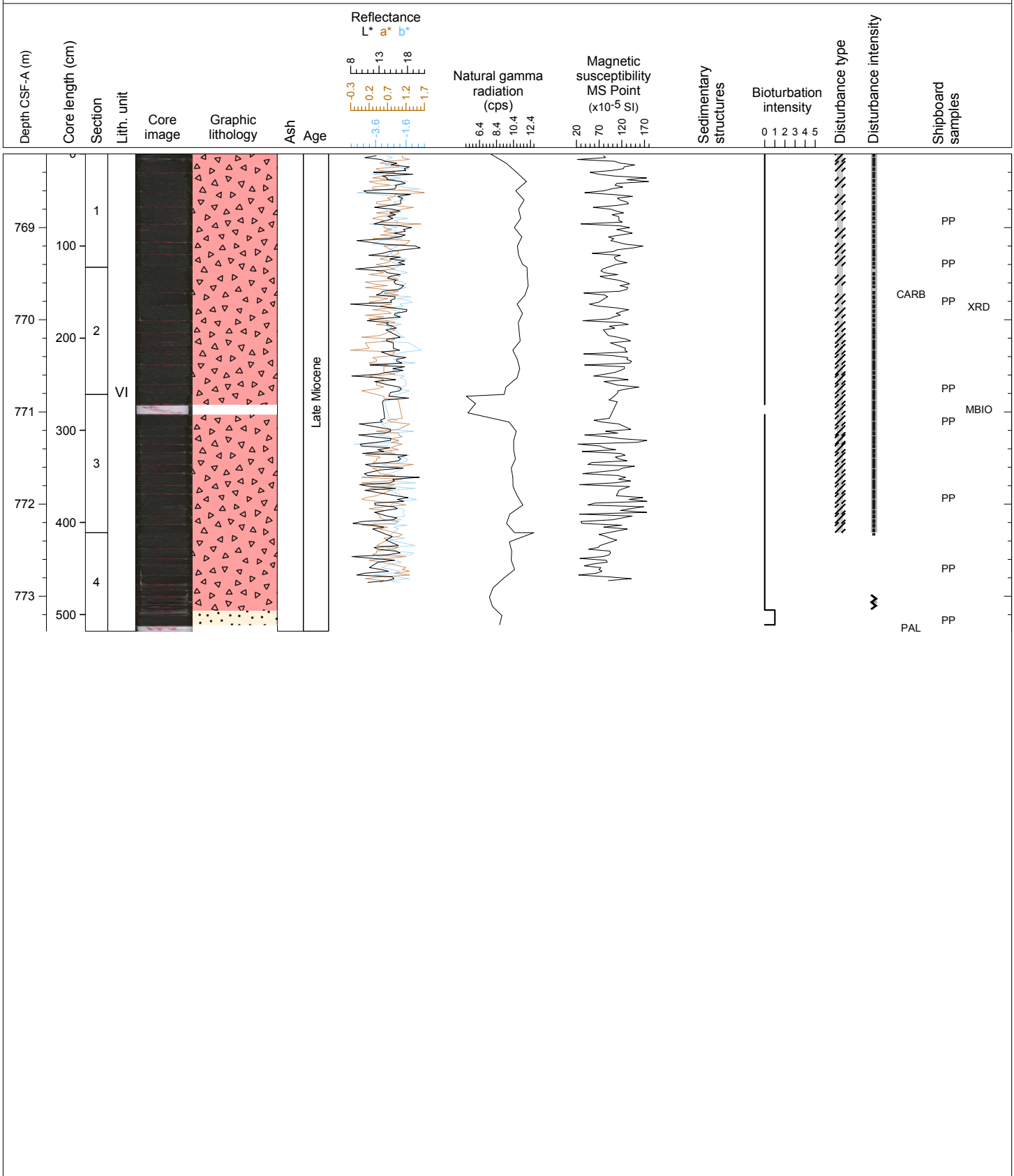
Hole 349-U1431E Core 23R, Interval 758.5-762.4 m (CSF-A)

Dark-colored, thick-bedded SANDSTONE with thick-bedded volcanoclastic BRECCIA and medium to thin-bedded SILTSTONE and CLAYSTONE in the upper part. SANDSTONE is usually massive and laminated. CLAYSTONE comprises <10% of total core. Volcanoclastic BRECCIA makes up the top 33 cm of the core and contains slightly to moderately altered, highly vesicular to sparsely aphyric basalt and non-vesicular glassy to microcrystalline basalt clasts. The BRECCIA has a sharp, erosive base, but no clear grading. The lower half of the core is a black volcanoclastic SANDSTONE with a similar composition to the BRECCIA.



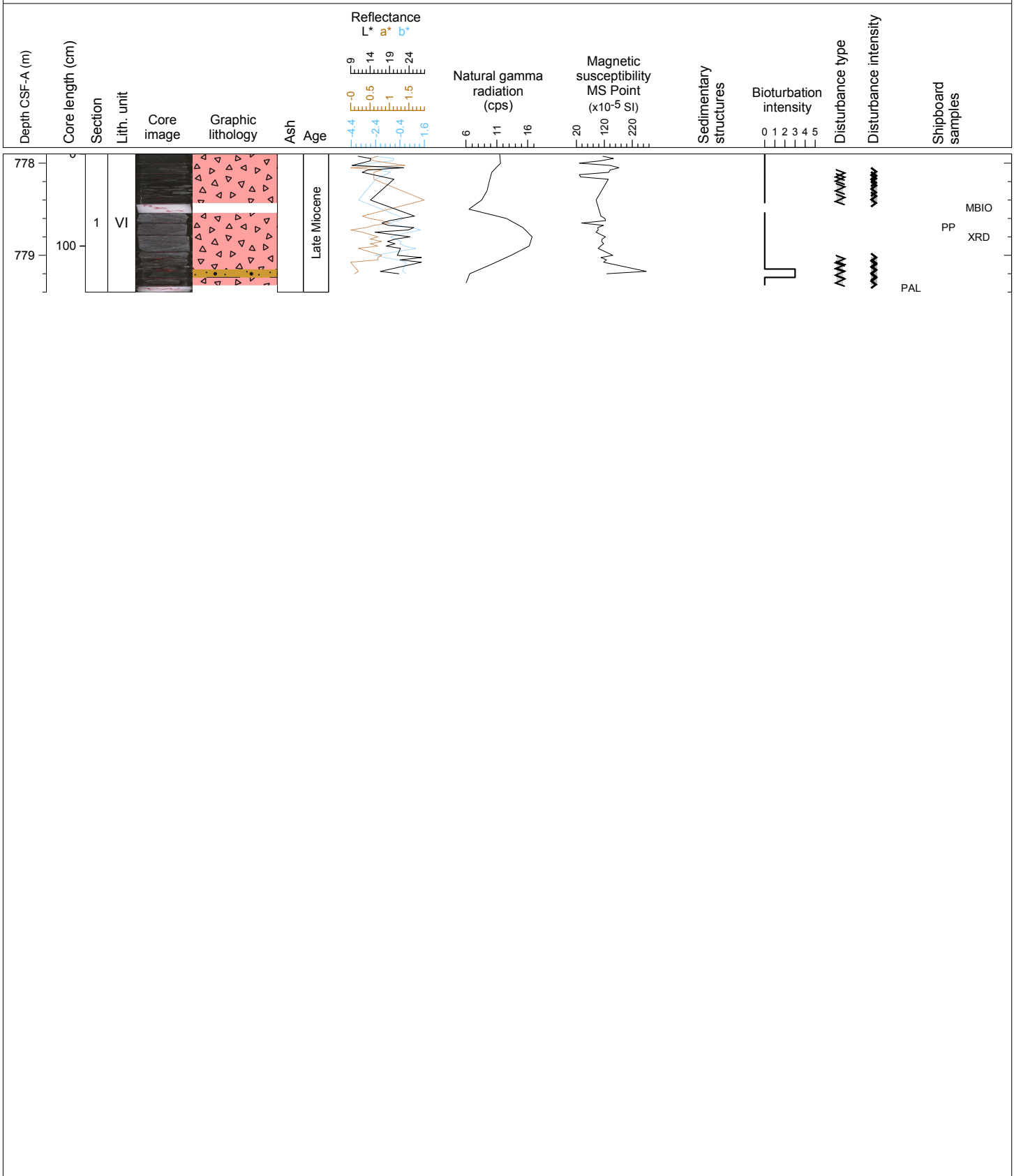
Hole 349-U1431E Core 24R, Interval 768.2-773.38 m (CSF-A)

Black volcanoclastic BRECCIA with little internal structure. The BRECCIA in Section 4 fines upward slightly. Clasts are angular and mainly composed of non-vesicular microcrystalline to sparsely and highly vesicular aphyric basalt with minor mudstone. The bed is homogeneous and massive with a sharp erosive base near the base of Section 4 where the BRECCIA overlies dark, blackish green fine to medium-grained SANDSTONE.



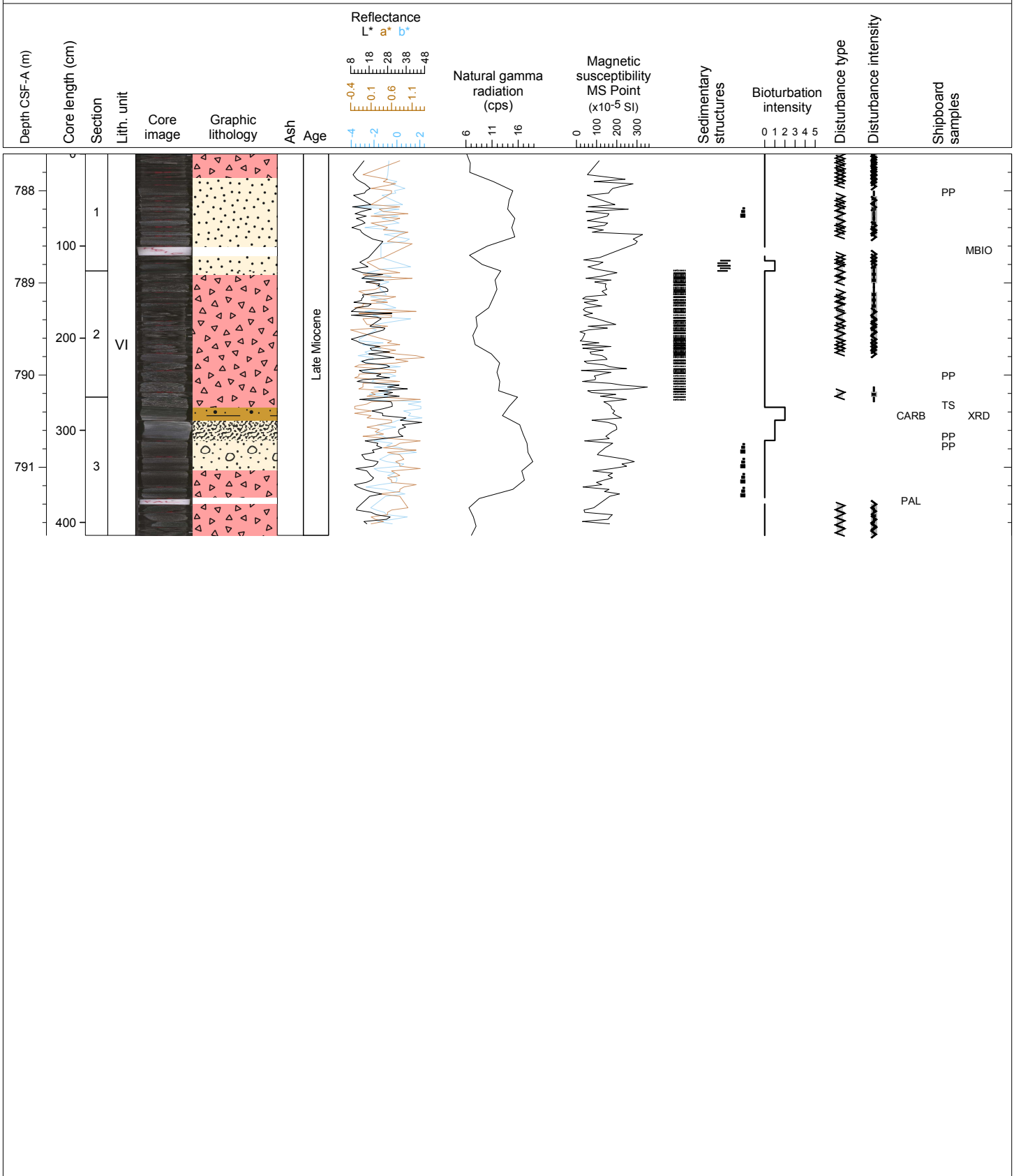
Hole 349-U1431E Core 25R, Interval 777.9-779.4 m (CSF-A)

Dark gray, thickly bedded, massive volcanoclastic BRECCIA, with greenish black, thin-bedded CLAYEY SILTSTONE. The BRECCIA comprises >90% of the core. The BRECCIA is made up of four separate beds differing from each other by abundance, size, and sorting of clasts. Clasts include moderately to highly altered, sparsely to highly vesicular aphyric basalt and non-vesicular microcrystalline basalt.



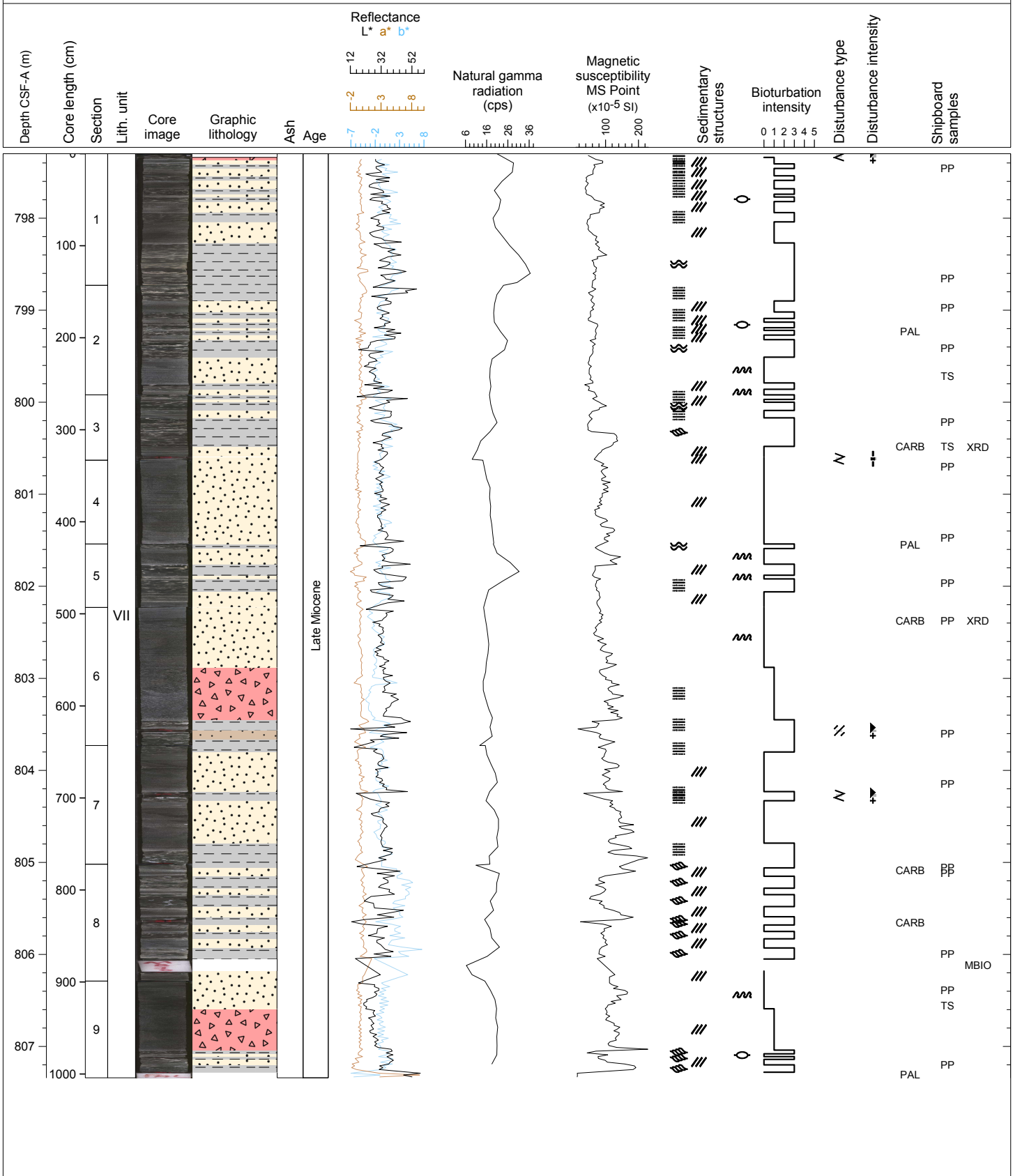
Hole 349-U1431E Core 26R, Interval 787.6-791.74 m (CSF-A)

Black and very dark gray volcanoclastic BRECCIA with little internal structure interbedded with volcanoclastic SANDSTONE. BRECCIA in Section 3 fines upward slightly. Clasts are subangular and composed of mostly aphyric non-vesicular basalt and less abundant vesicular basalt. Few clasts of sparsely plagioclase-phyric basalt and one large (10 cm) clast of vesicular aphyric basalt were identified. A fining upward sequence of greenish black, medium-bedded GRAVELLY SANDSTONE and SILTSTONE that display finely laminated to cross-laminated gradation toward the top occurs in Section 3.



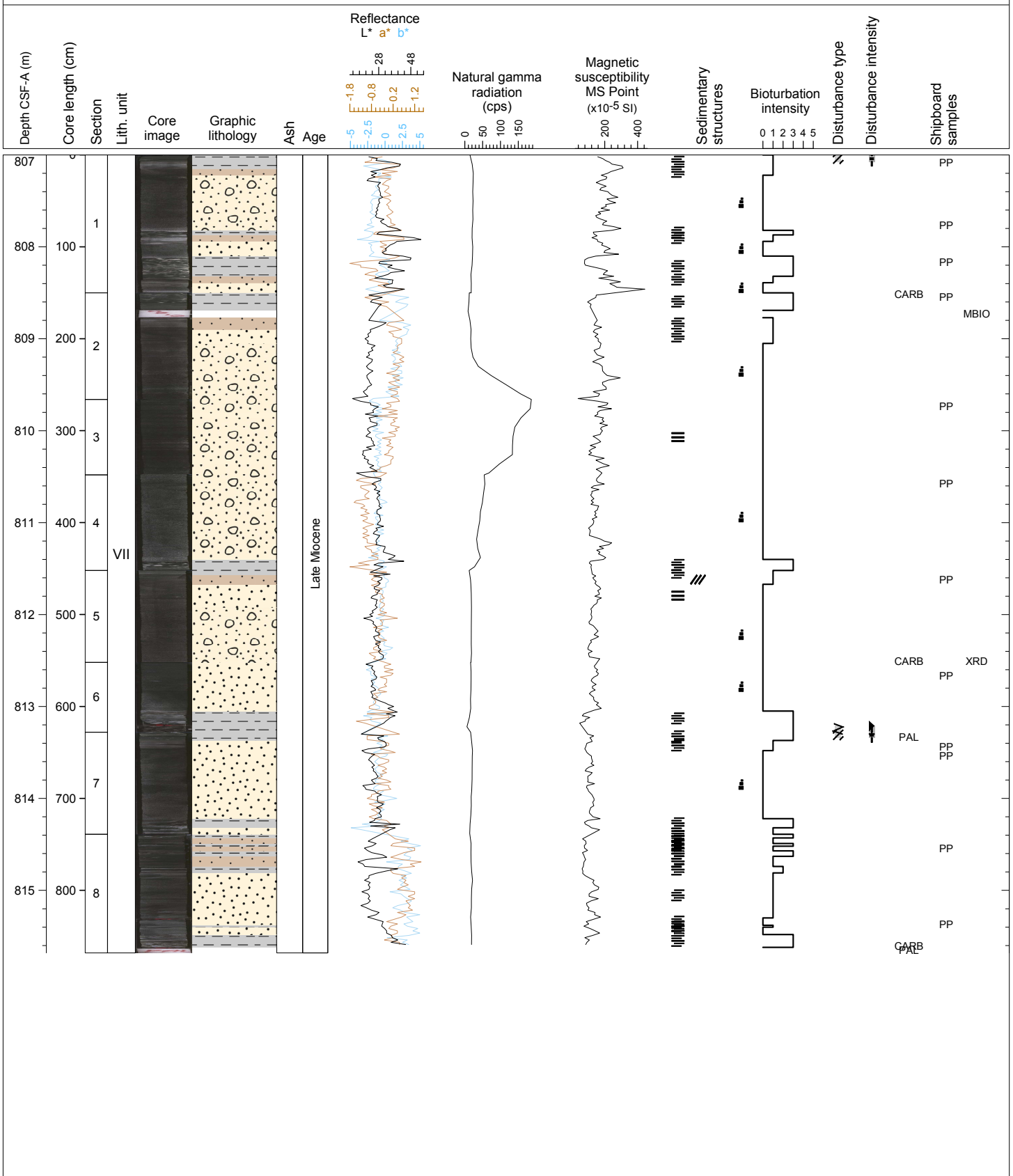
Hole 349-U1431E Core 27R, Interval 797.3-807.34 m (CSF-A)

Volcaniclastic BRECCIA (Section 6) intercalated between cycles of dark greenish gray SANDSTONE grading to CLAYSTONE in layers that vary from 7 cm to 1.35 m. Bioturbation is usually moderate to strong in CLAYSTONE. Parallel bedding and cross-bedding are common in SANDSTONE. SANDSTONE and volcaniclastic BRECCIA always fine upward, indicating their turbidite origins. Volcaniclastic BRECCIA is clast-supported and has a sharp base with underlying CLAYSTONE.



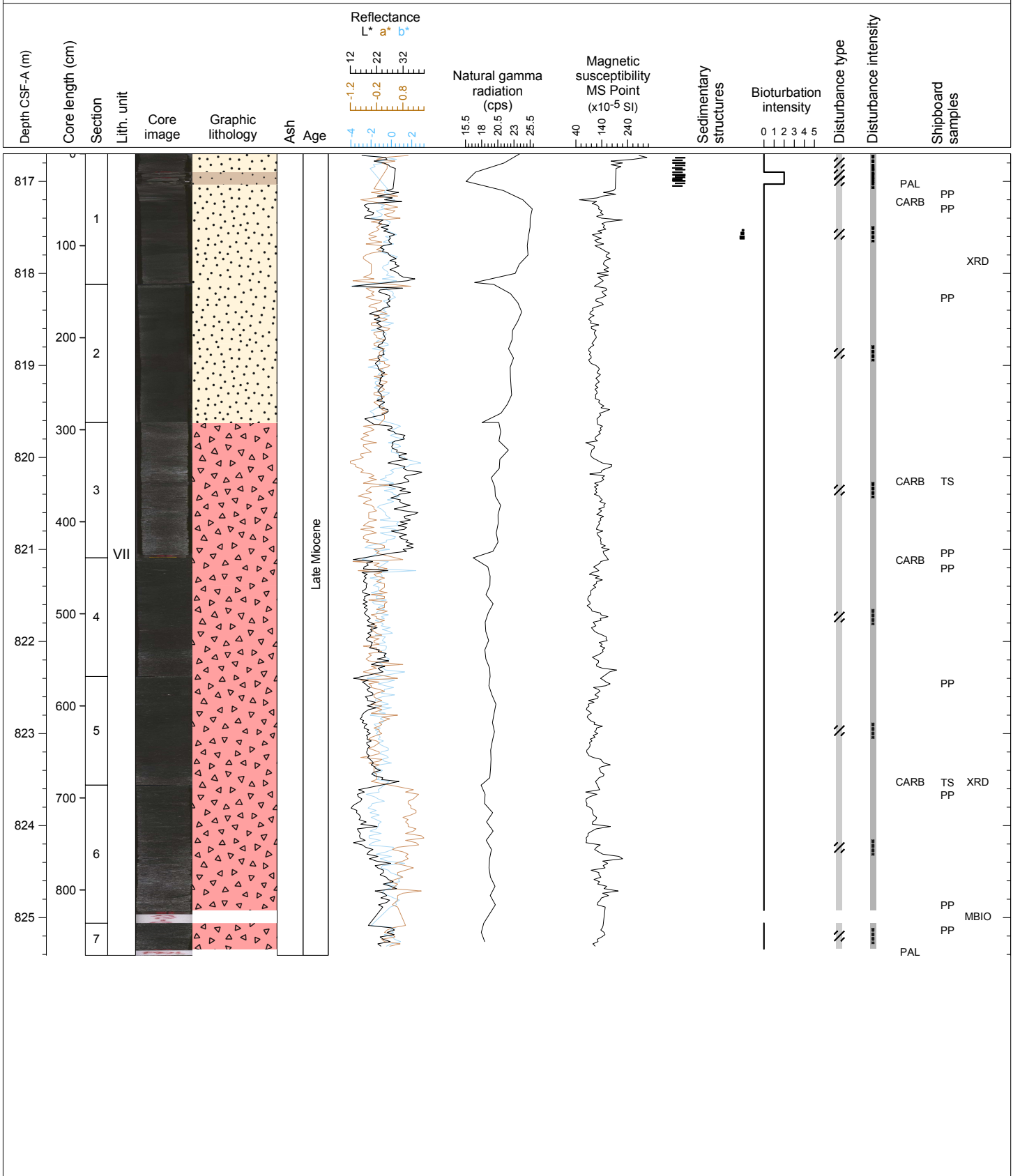
Hole 349-U1431E Core 28R, Interval 807.0-815.68 m (CSF-A)

Dominant very dark gray GRAVELLY SANDSTONE and SANDSTONE with interbedded SILTSTONE and CLAYSTONE. The sequence of graded and fining upward GRAVELLY SANDSTONE and SANDSTONE, SILTSTONE and CLAYSTONE usually has a sharp, erosive contact with the underlying CLAYSTONE. Such sequences are usually in meter scale through Sections 1 to 7 and in centimeter scale in the top of Section 8. Parallel bedding, graded bedding, and cross-bedding are common in SANDSTONE. Bioturbation is usually moderate to strong in CLAYSTONE.



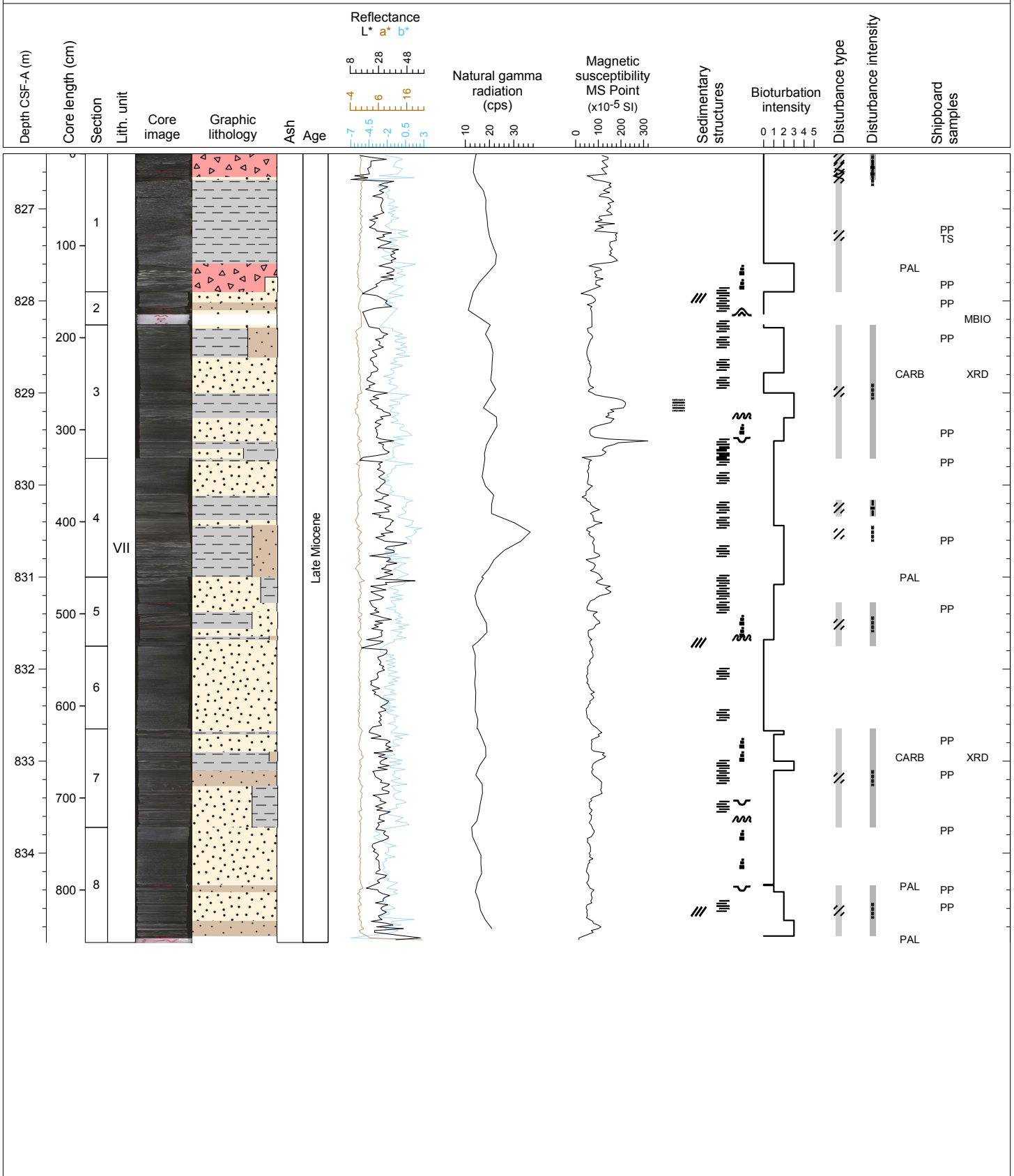
Hole 349-U1431E Core 29R, Interval 816.7-825.41 m (CSF-A)

Greenish black volcanoclastic BRECCIA with a thickness of 5.0 m occurs at the bottom of the core. The clasts include moderate to highly altered non-vesicular microcrystalline to glassy basalt, sparsely vesicular aphyric basalt, and highly vesicular aphyric basalt in decreasing order of abundance. A greenish gray SANDSTONE layer dominates Sections 1 and 2. Bioturbation is generally slight throughout the core.



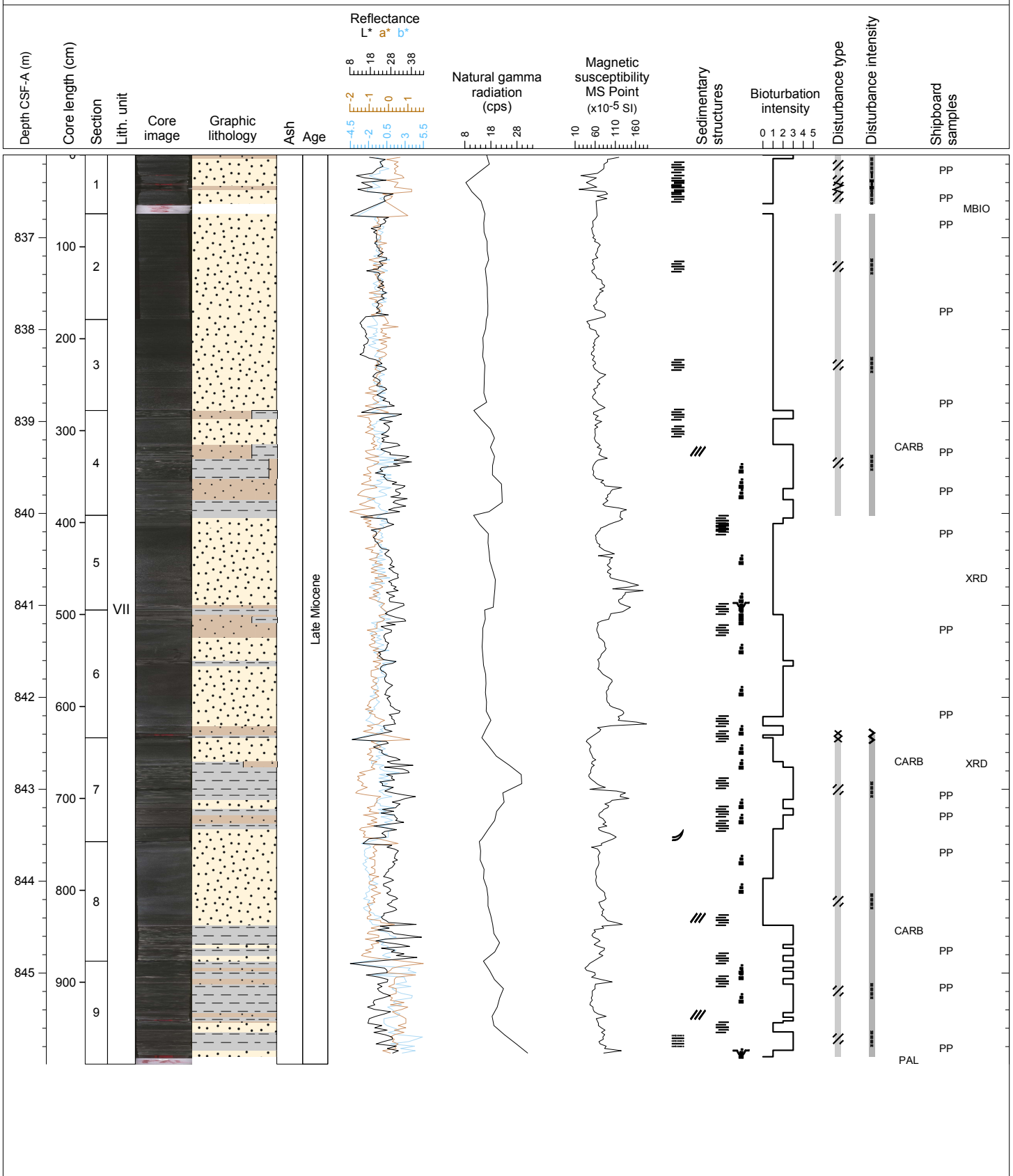
Hole 349-U1431E Core 30R, Interval 826.4-834.97 m (CSF-A)

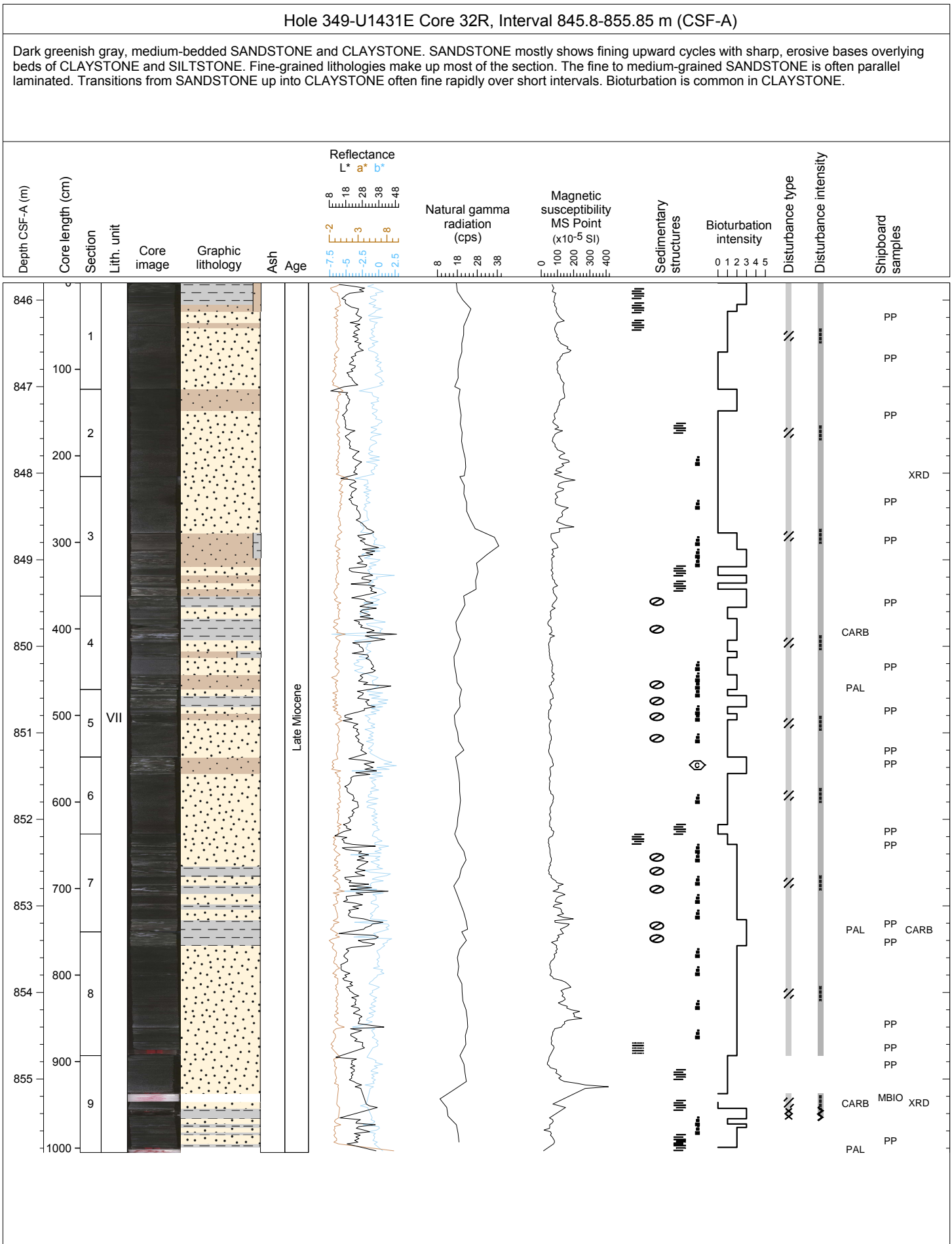
Dark greenish gray volcanoclastic BRECCIA, SANDSTONE, SILTSTONE and dark gray CLAYSTONE. The volcanoclastic BRECCIA only occurs in Section 1. It is massive and poorly sorted and has a sharp contact with the underlying CLAYSTONE. Clasts include non-vesicular microcrystalline to glassy basalt, sparsely vesicular aphyric basalt, highly vesicular aphyric basalt and pumice, in decreasing order and with different colors reflecting the degree of alteration. The remainder of the core consists of interbedded graded SANDSTONE and SILTSTONE beds with sharp bases and bioturbated CLAYSTONE. Some beds of CLAYSTONE are not bioturbated and are in thin interbeds with SILTSTONE. Some of the very thin bedded and laminated CLAYSTONE and SILTSTONE intervals have convolute lamination.



Hole 349-U1431E Core 31R, Interval 836.1-845.99 m (CSF-A)

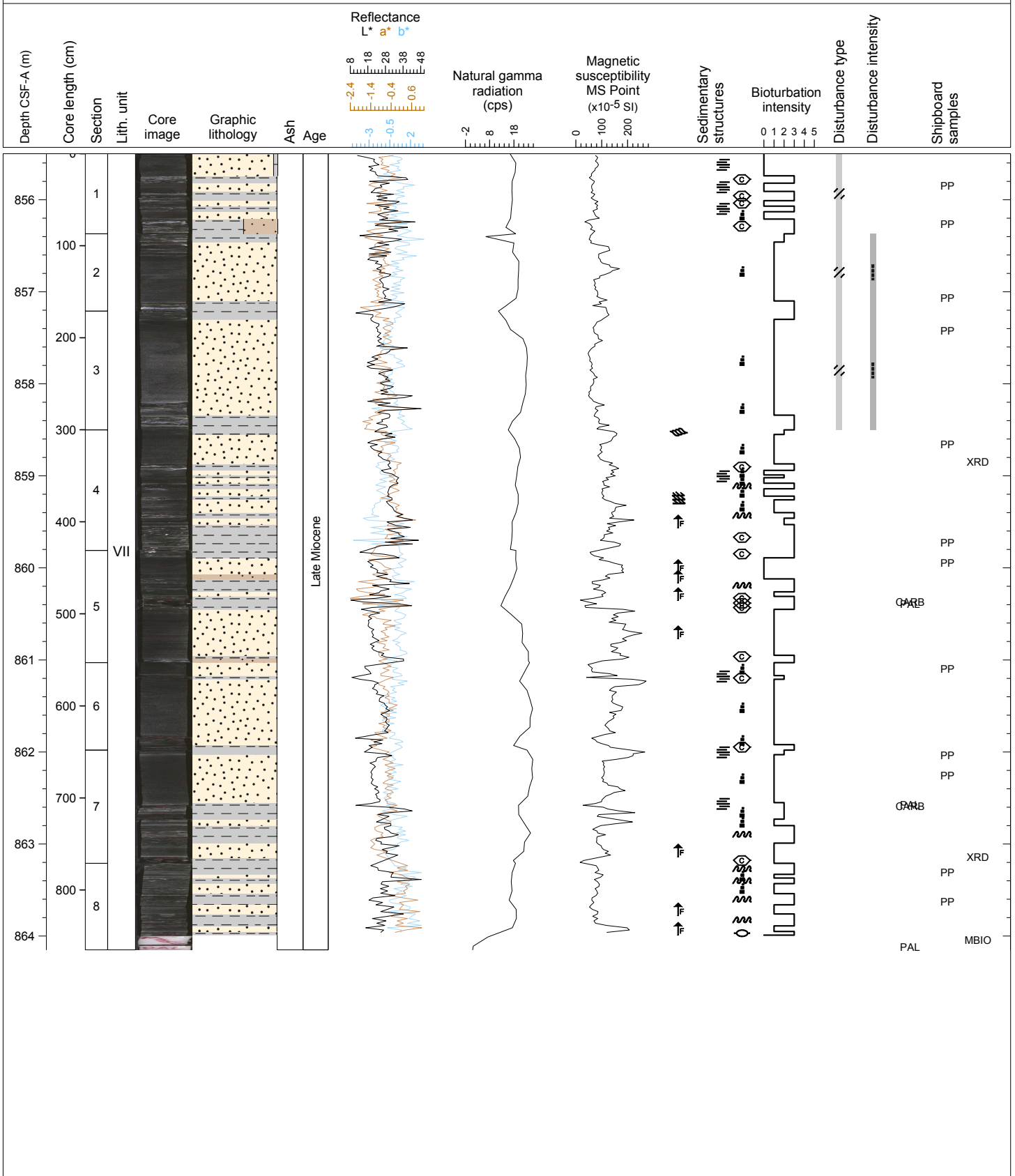
Very dark greenish gray SANDSTONE interbedded with bioturbated and laminated CLAYSTONE and SILTSTONE. Sequence comprises fining upward, graded cycles, ranging from 10 cm to ~1 m thick, above erosive bases. These cycles are interpreted as turbidites. CLAYSTONE shows the most bioturbation. Base of graded units can be up to coarse SANDSTONE grade and exhibit load casts, as well as high energy parallel lamination through the bottom half of the sandy cycle. Section 6 shows an escape trace fossil penetrating through the base of the sandy overlying sediment from the clay-rich material below.





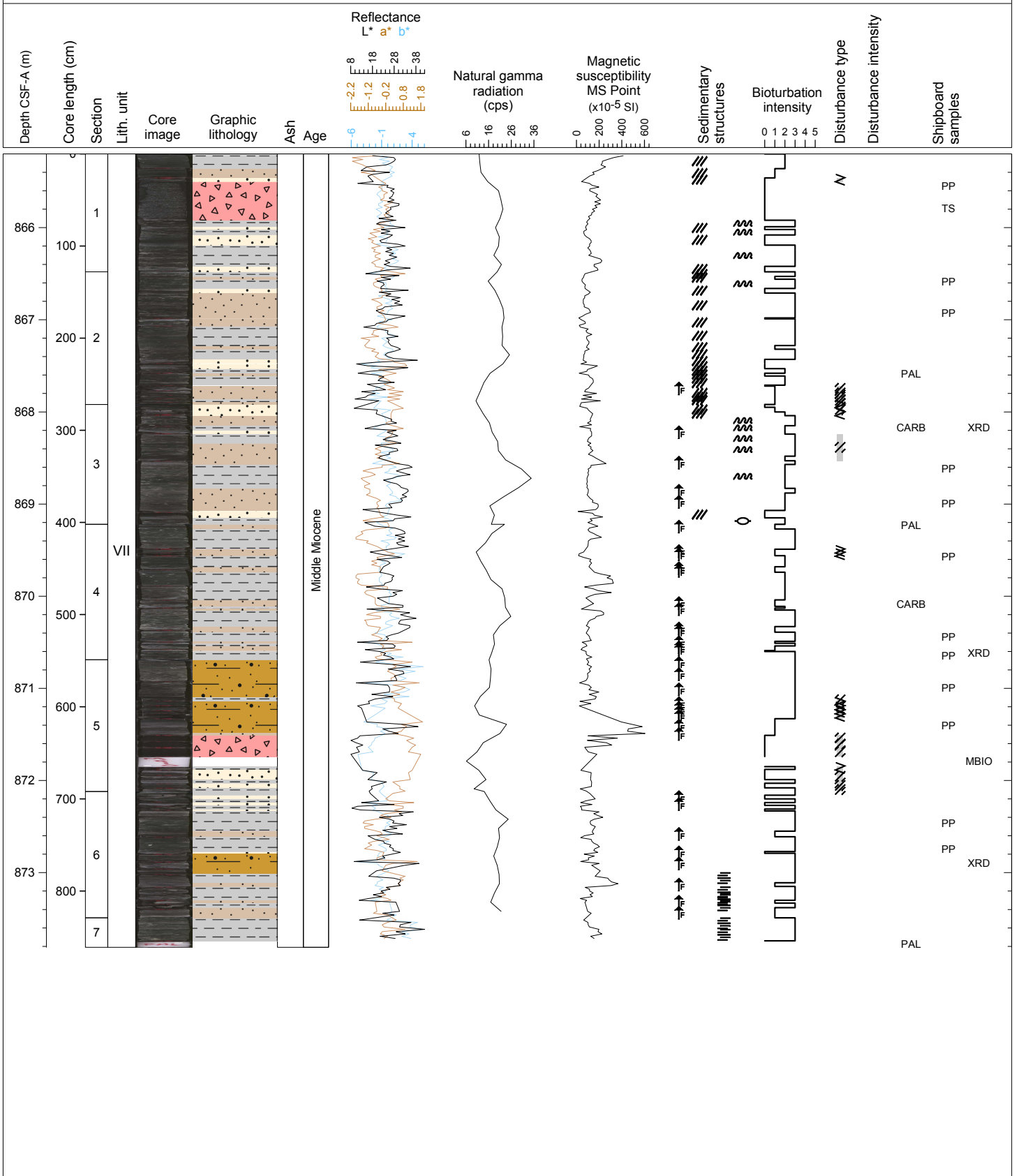
Hole 349-U1431E Core 33R, Interval 855.5-864.15 m (CSF-A)

Dark greenish gray SANDSTONE and CLAYSTONE. SANDSTONE shows fining upward cycles with sharp, erosive bases overlying beds of CLAYSTONE and SILTSTONE. Fine-grained lithologies comprise half of total section. The fine to medium-grained SANDSTONE is often parallel laminated. Transitions from SANDSTONE into CLAYSTONE are not always gradational and often fine rapidly over short intervals. Bioturbation is common in the CLAYSTONE.



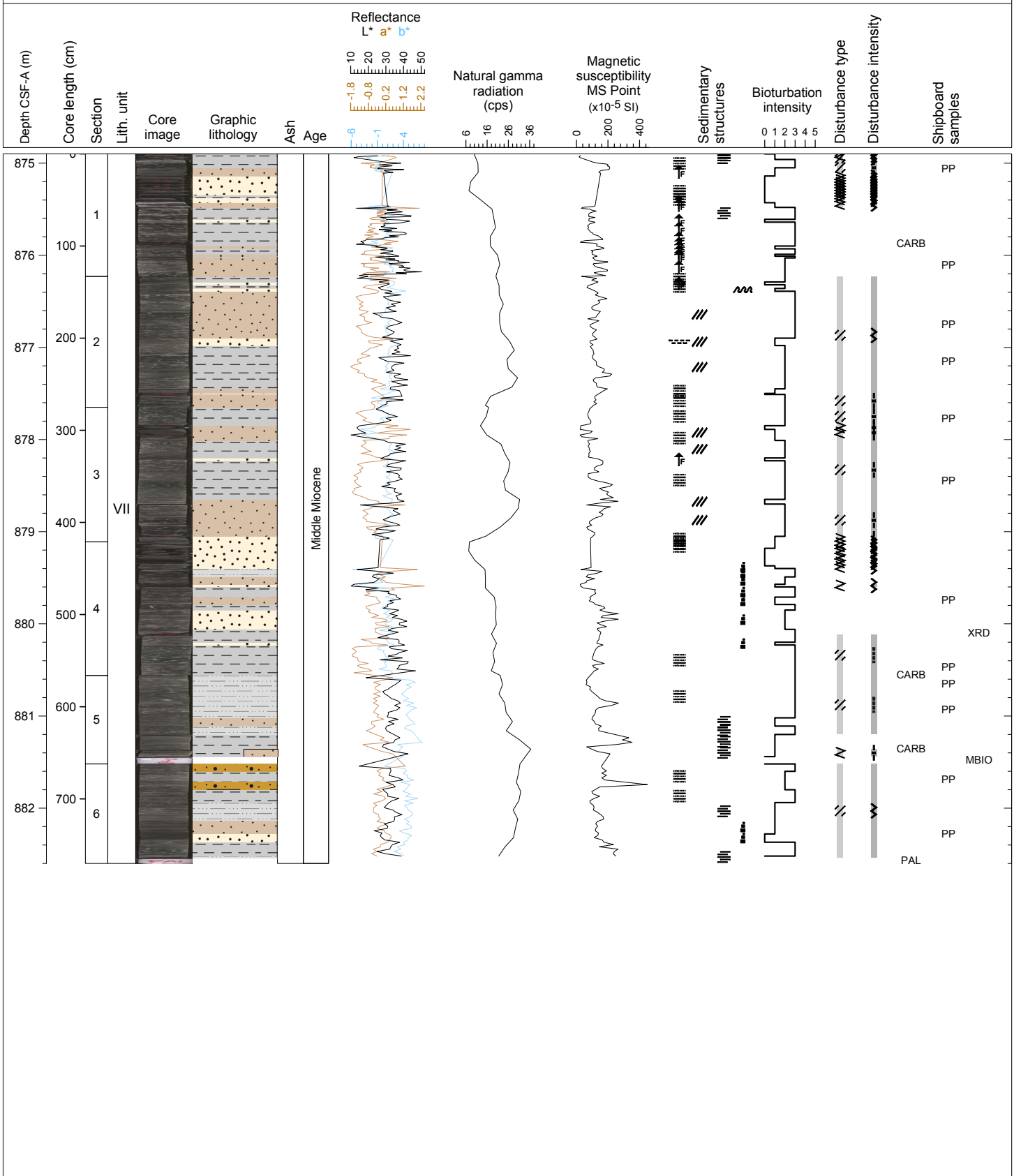
Hole 349-U1431E Core 34R, Interval 865.2-873.81 m (CSF-A)

Dark greenish gray CLAYSTONE with interbedded SANDSTONE and BRECCIA. Thin-bedded SANDSTONE or SILTSTONE is usually associated with medium-bedded CLAYSTONE, composing graded, upward fining cycles with sharp, erosive bases overlying beds of CLAYSTONE. The thickness of fining upward sequences varies from centimeter to tens of centimeter scales. Fine-grained lithologies comprise most of the total section. Fine to medium-grained SANDSTONE and SILTSTONE are often parallel laminated. Bioturbation is common in CLAYSTONE.



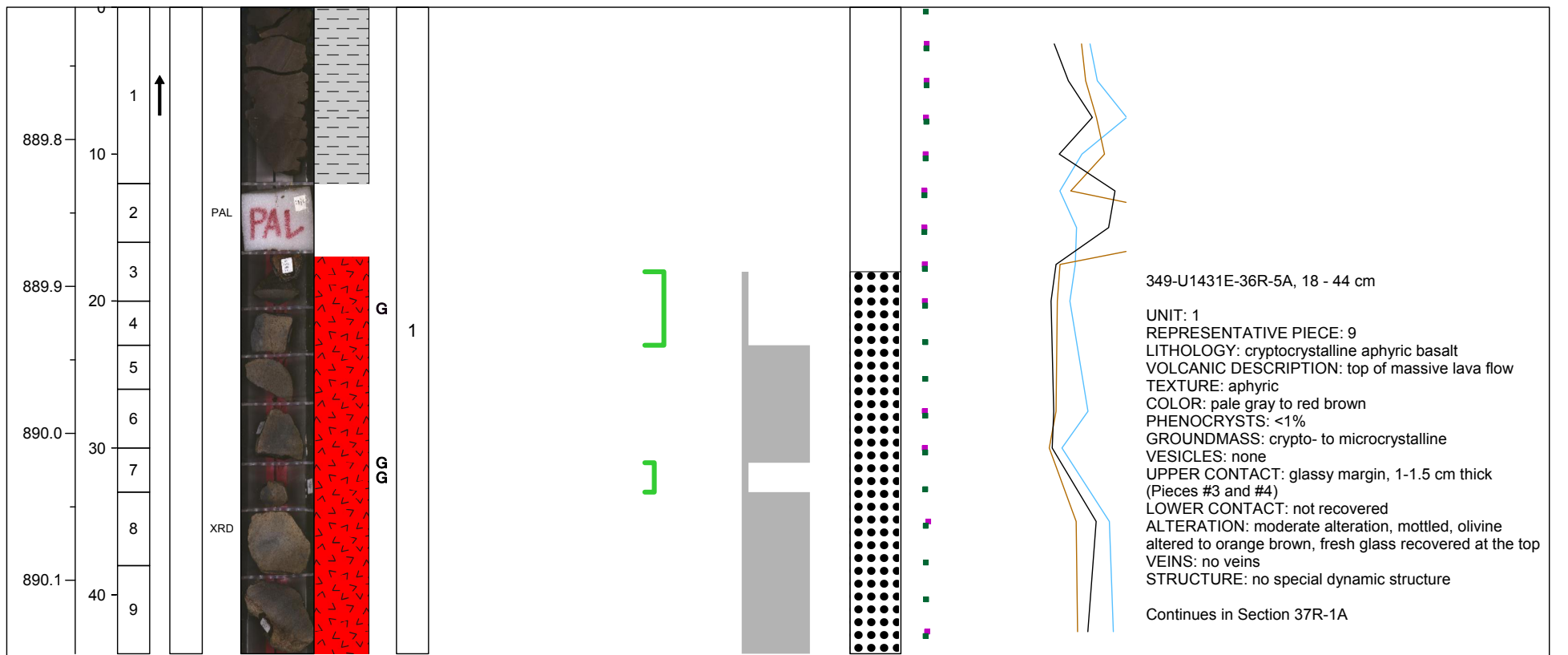
Hole 349-U1431E Core 35R, Interval 874.9-882.6 m (CSF-A)

Greenish gray, generally massive SILTY CLAYSTONE and CLAYSTONE. Bioturbation is heavy (Chondrites dominates). Contacts between silty and more clay-rich sediment beds are gradational. Dark greenish gray, graded SILTSTONE and fine to medium-grained SANDSTONE beds comprise <20% of the core. These beds are generally well graded, have erosive bases, some of which have load structures. Coarse-grained beds are usually <10 cm thick and not more than 20 cm.



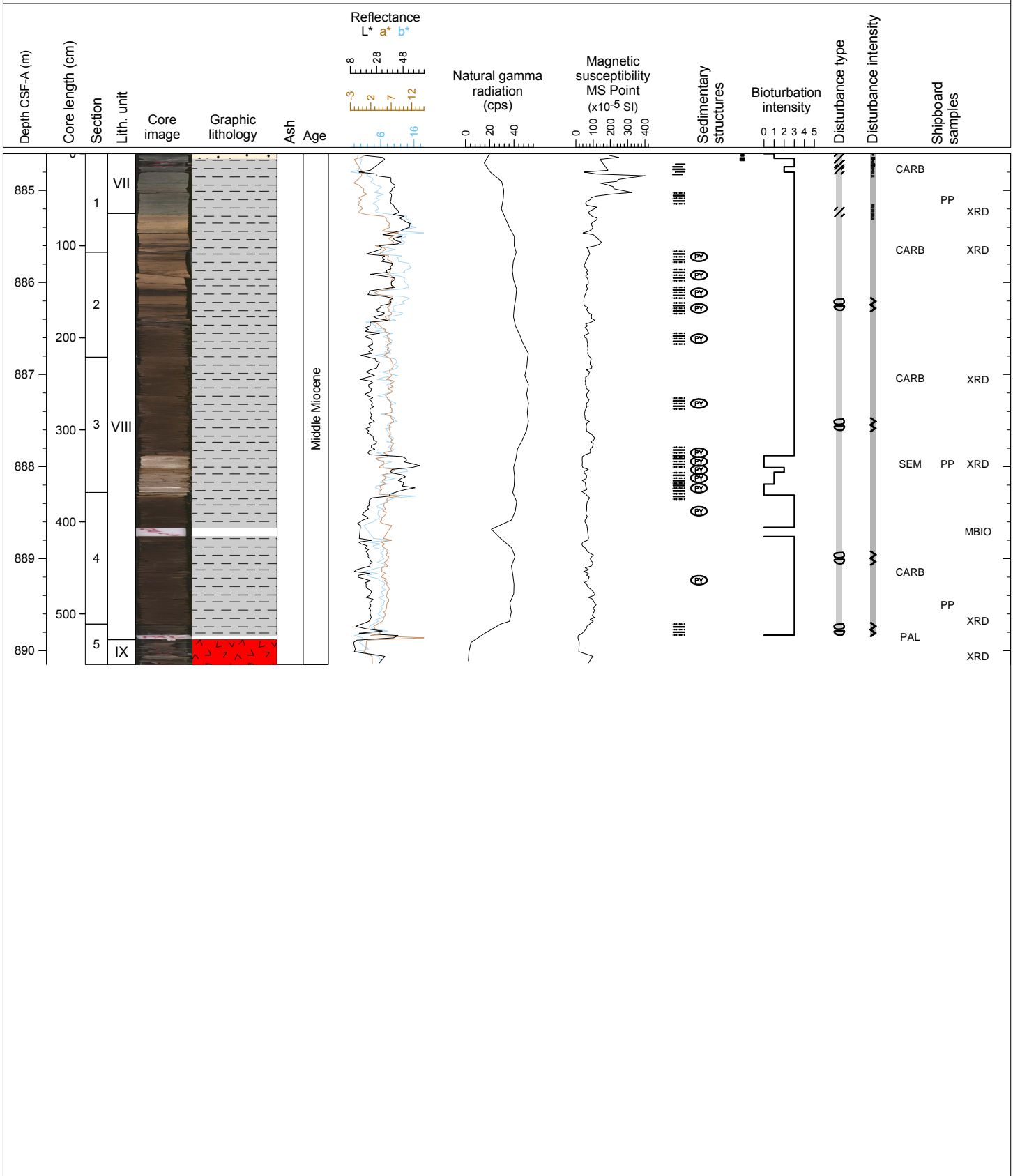
Hole 349-U1431E-36R Section 5, Top of Section: 889.71 m (CSF-A)

Depth CSF-A (m)	Core length (cm)	Piece number	Orientation	Shipboard samples	Scanned image	Graphic lithology	Glass	Igneous lith. unit	Structure	Veins	Dip (°)	Vesicularity (%)	Phenocrysts abundance (%)	Groundmass grain size (mm)	Alteration intensity	Magnetic susceptibility (x10 ⁻⁵ SI)	Reflectance L* a* b*	Description
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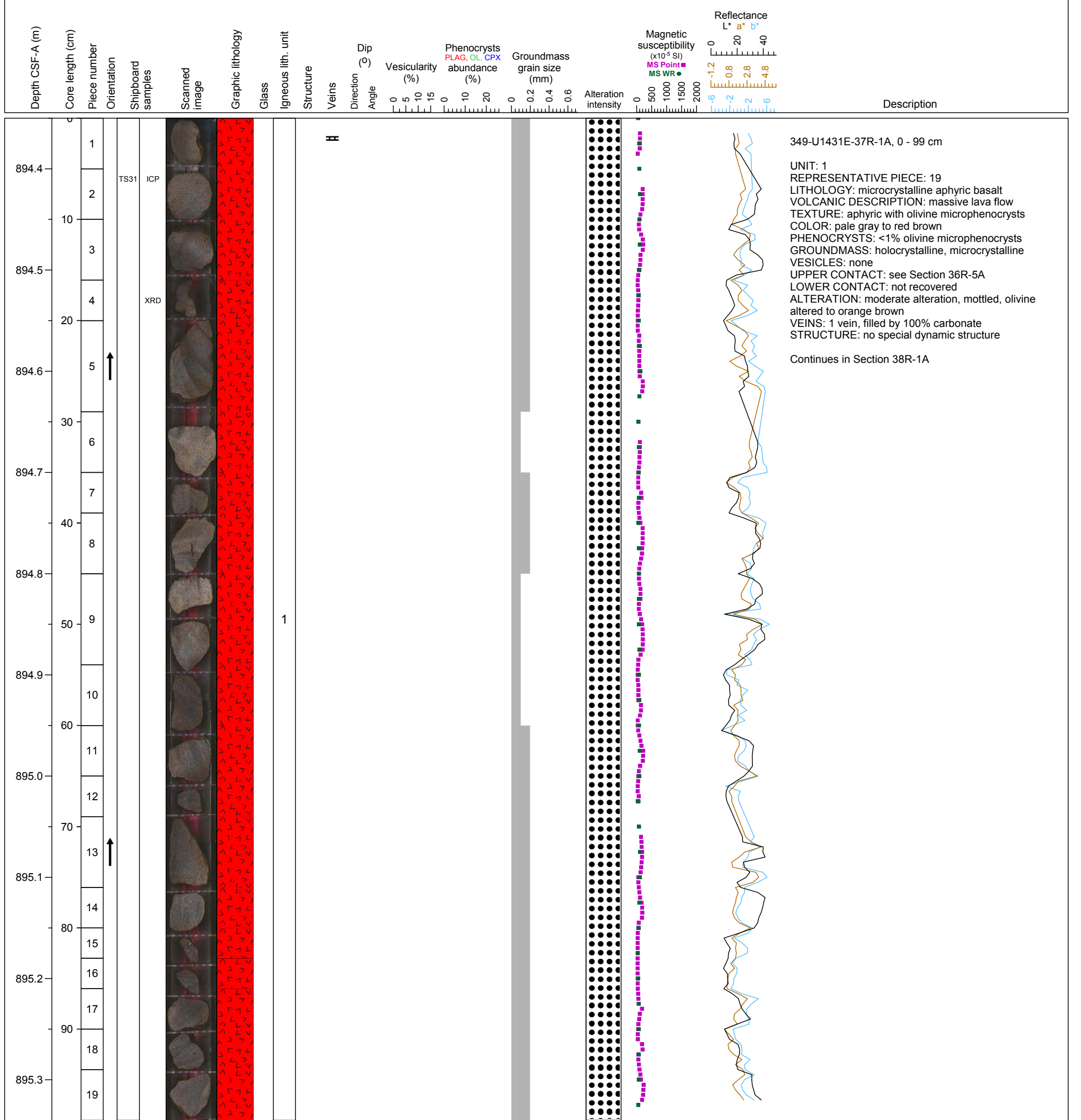


Hole 349-U1431E Core 36R, Interval 884.6-890.15 m (CSF-A)

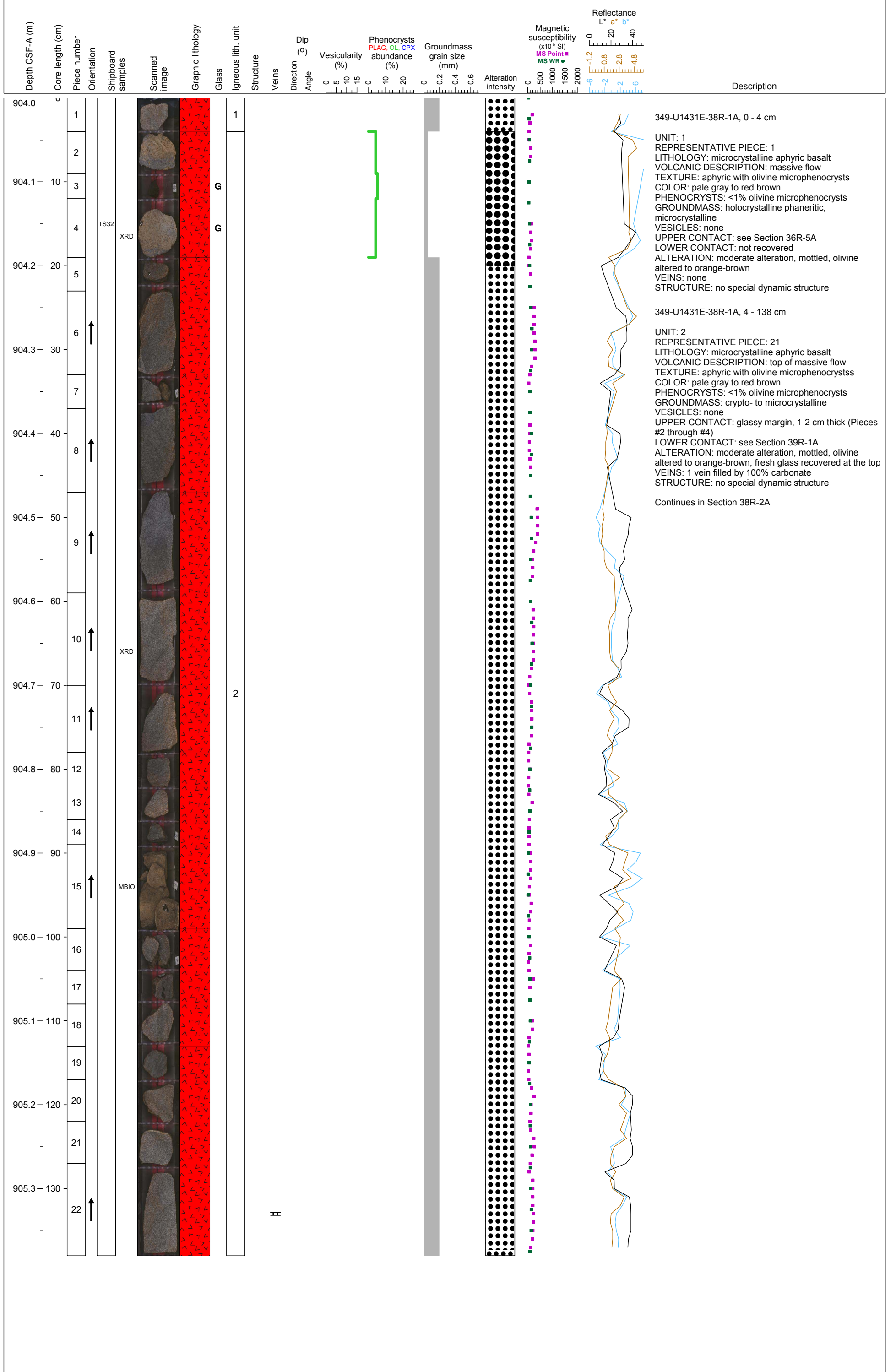
Various-colored CLAYSTONE intervals with a 30 cm thick BASALT at the bottom. The CLAYSTONE is dark olive brown, olive brown, dark grayish brown, light gray and dark greenish gray with pyrite minerals throughout the upper four sections. The bioturbation is generally moderate to heavy throughout the core.






Hole 349-U1431E-37R Section 1, Top of Section: 894.3 m (CSF-A)



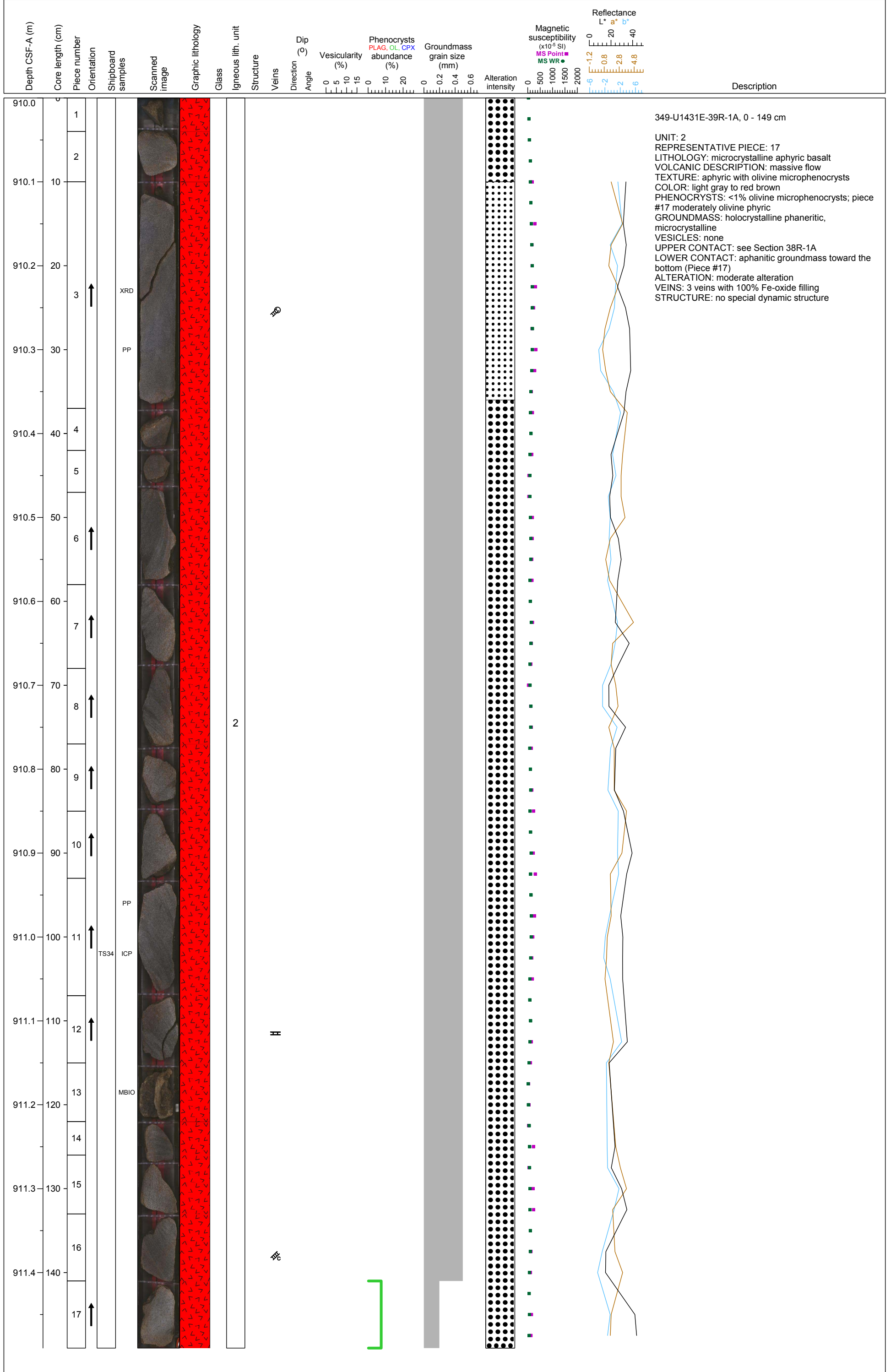
Hole 349-U1431E-38R Section 1, Top of Section: 904.0 m (CSF-A)



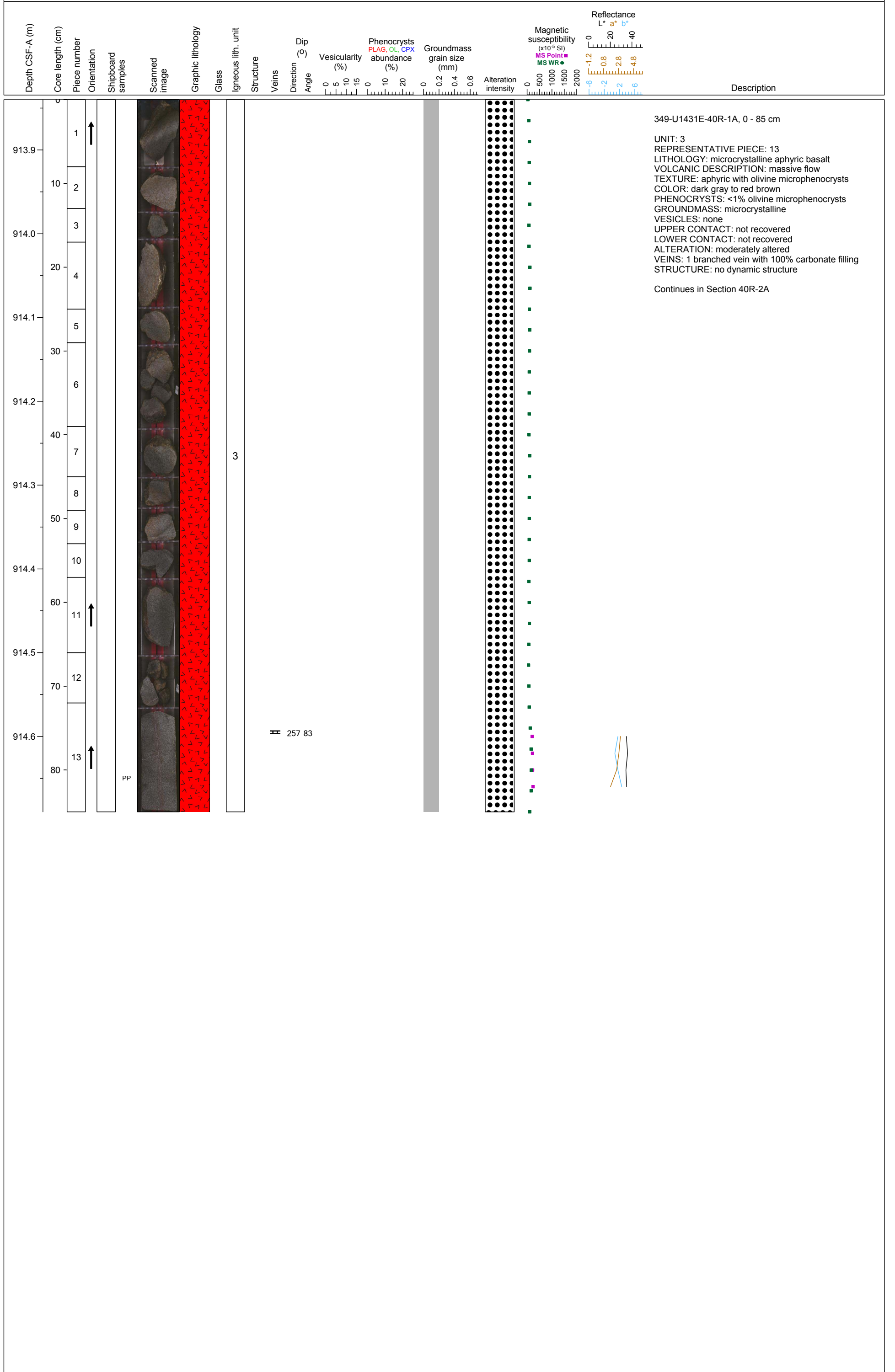
Hole 349-U1431E-38R Section 2, Top of Section: 905.38 m (CSF-A)

Depth CSF-A (m)	Core length (cm)	Piece number	Orientation	Shipboard samples	Scanned image	Graphic lithology	Glass	Igneous lith. unit	Structure	Veins	Dip (°)	Vesicularity (%)	Phenocrysts abundance (%)	Groundmass grain size (mm)	Alteration intensity	Magnetic susceptibility (x10 ⁻⁵ SI)	Reflectance L* a* b*	Description
905.5	10	1	↑					2										<p>349-U1431E-38R-2A, 0 - 22 cm</p> <p>UNIT: 2 REPRESENTATIVE PIECE: 1 LITHOLOGY: microcrystalline aphyric basalt VOLCANIC DESCRIPTION: massive flow TEXTURE: aphyric with olivine microphenocrysts COLOR: pale gray to brown PHENOCRYSTS: <1% olivine microphenocrysts GROUNDMASS: holocrystalline phaneritic, microcrystalline VESICLES: none UPPER CONTACT: see Section 38R-1A LOWER CONTACT: see Section 39R-1A ALTERATION: slightly altered VEINS: no veins STRUCTURE: no special dynamic structure</p> <p>Continues in Section 39R-1A</p>
905.6	20			TS33 ICP														

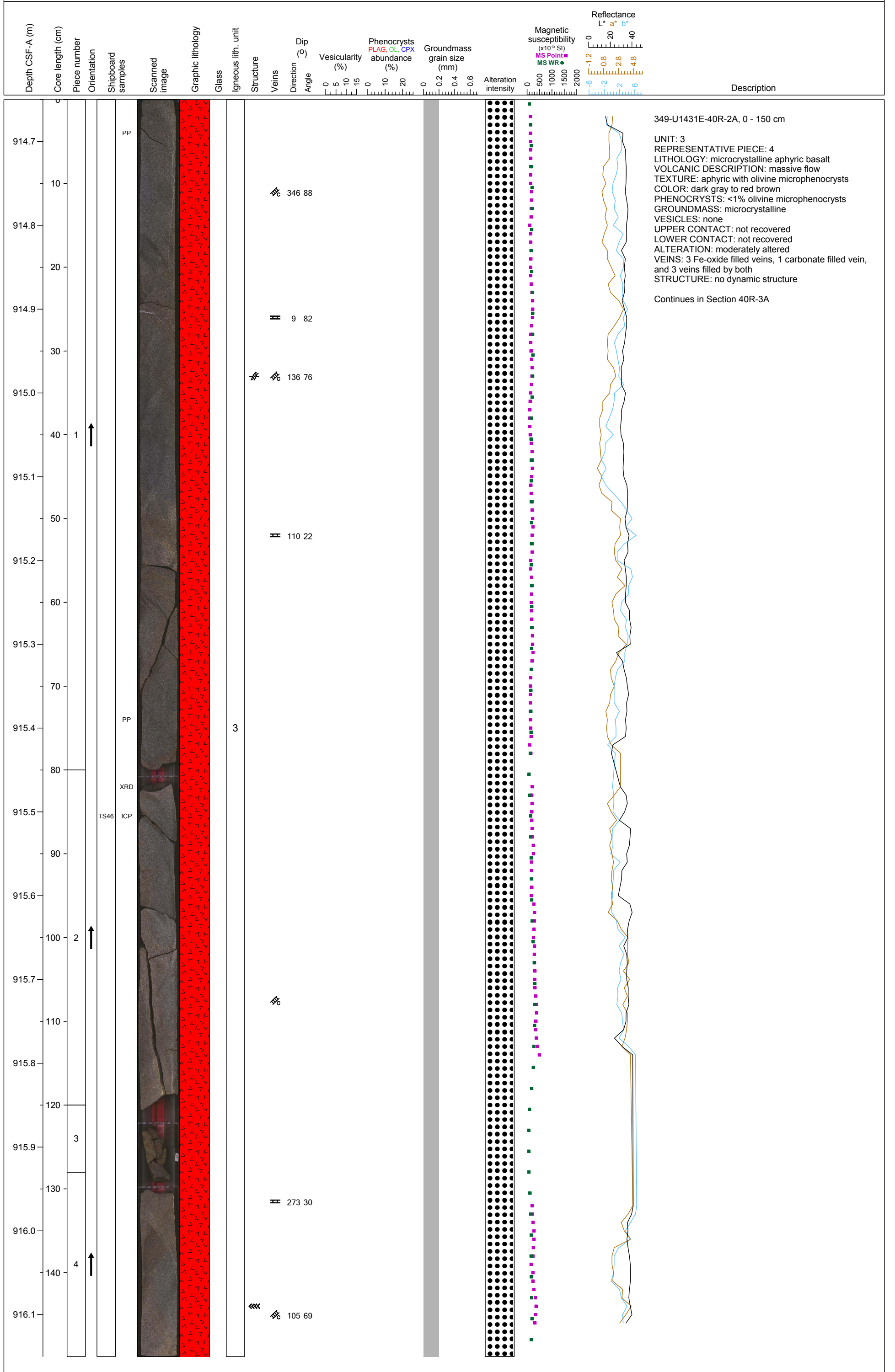
Hole 349-U1431E-39R Section 1, Top of Section: 910.0 m (CSF-A)



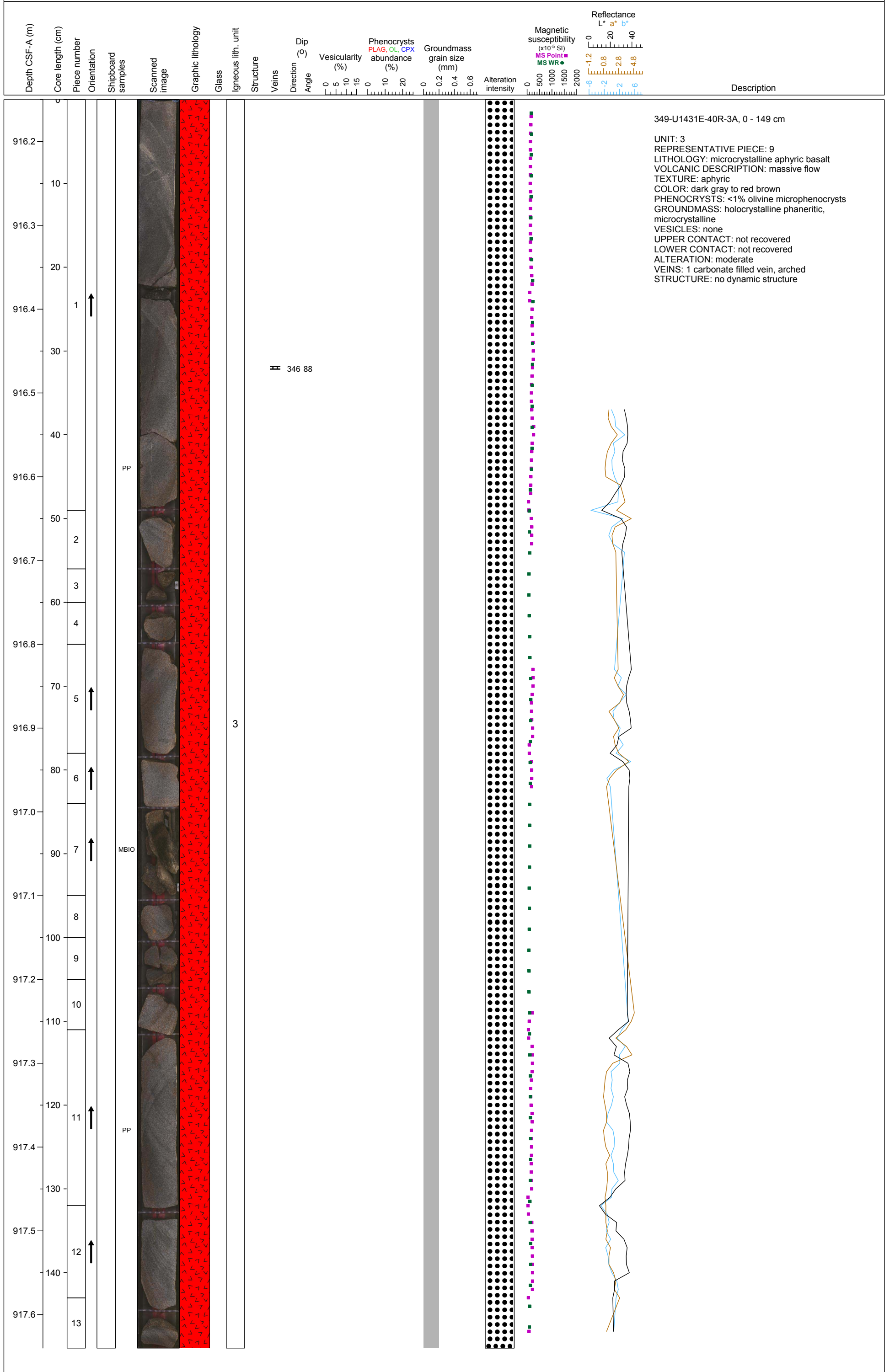
Hole 349-U1431E-40R Section 1, Top of Section: 913.8 m (CSF-A)



Hole 349-U1431E-40R Section 2, Top of Section: 914.65 m (CSF-A)

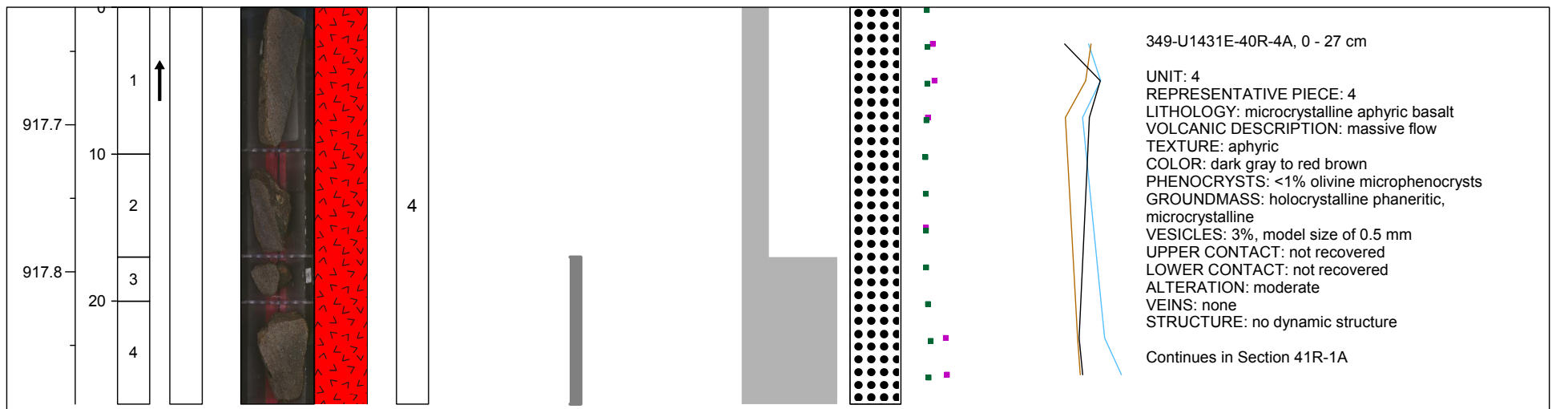


Hole 349-U1431E-40R Section 3, Top of Section: 916.15 m (CSF-A)

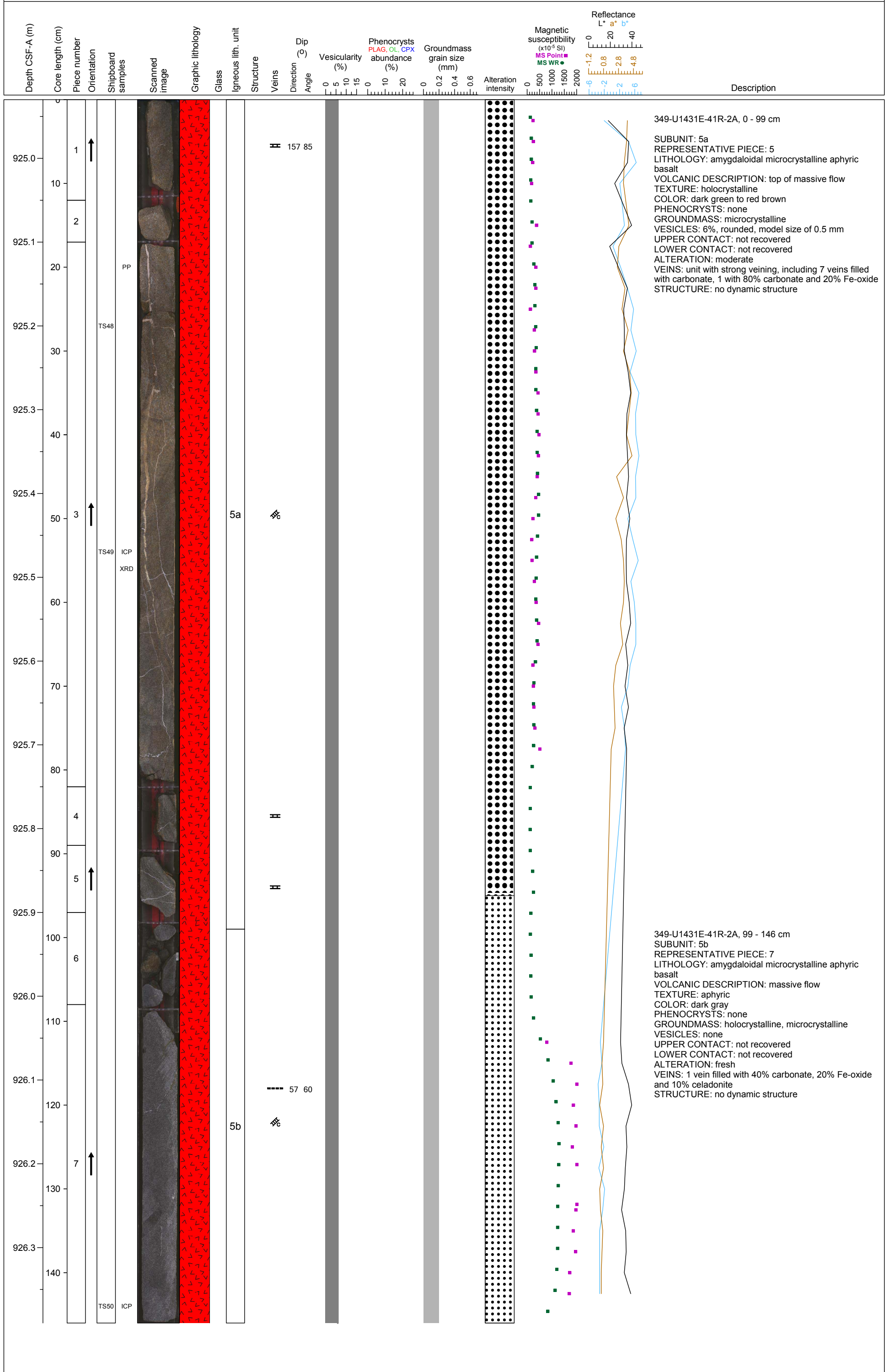


Hole 349-U1431E-40R Section 4, Top of Section: 917.64 m (CSF-A)

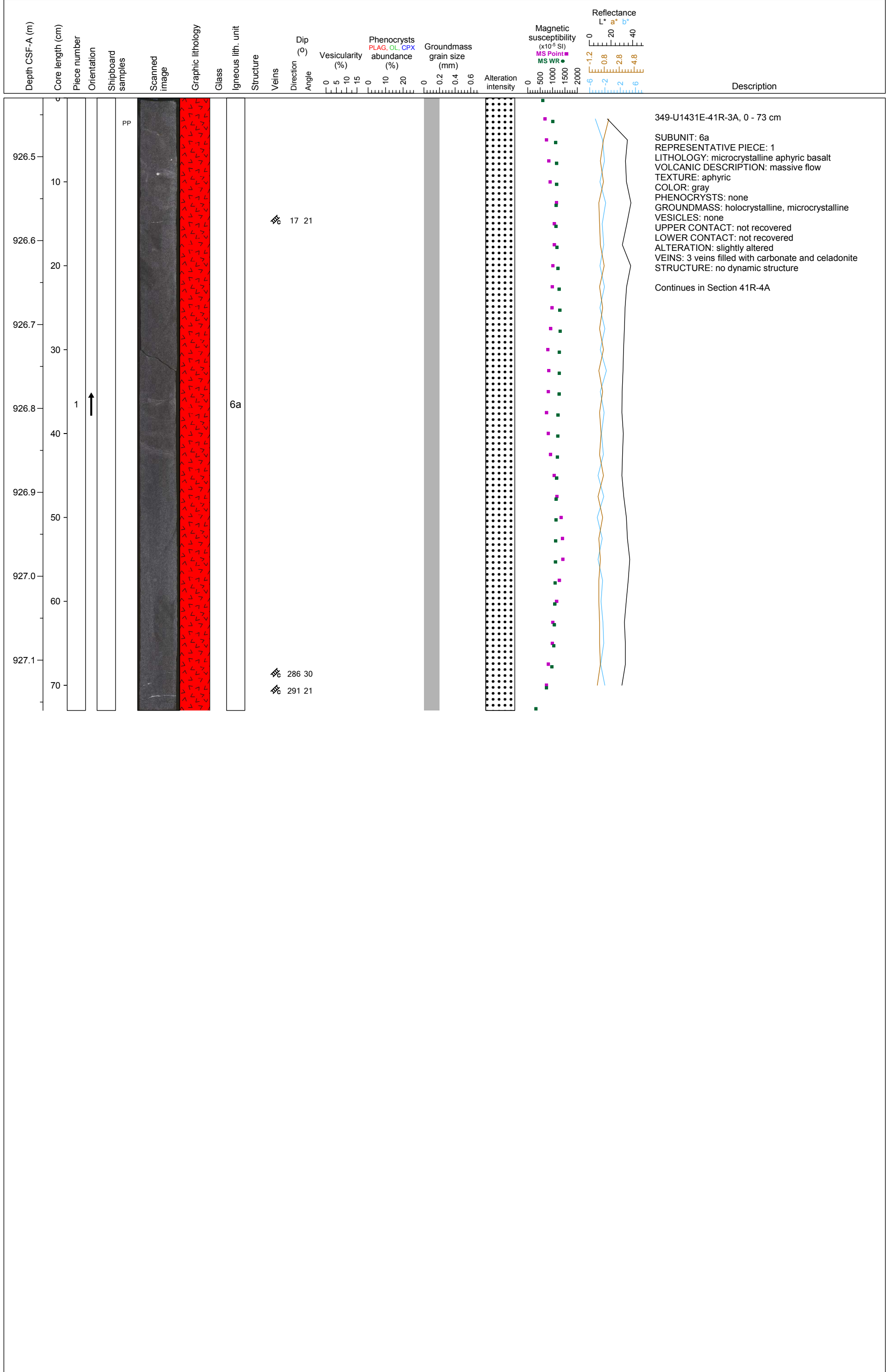
Depth CSF-A (m)	Core length (cm)	Piece number	Orientation	Shipboard samples	Scanned image	Graphic lithology	Glass	Igneous lith. unit	Structure	Veins	Dip (°)	Vesicularity (%)	Phenocrysts abundance (%)	Groundmass grain size (mm)	Alteration intensity	Magnetic susceptibility (x10 ⁻⁵ SI)	Reflectance L* a* b*	Description
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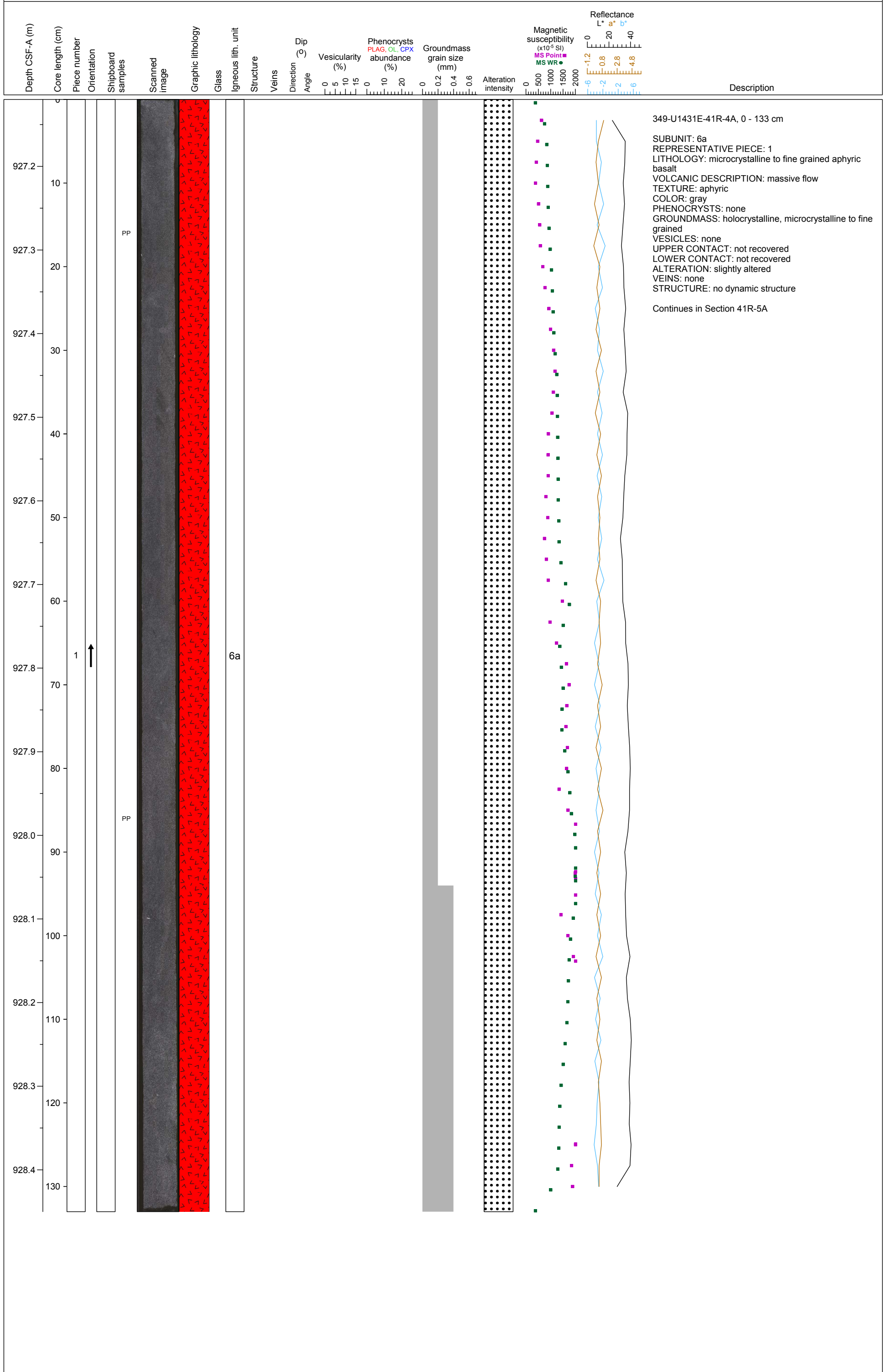
Hole 349-U1431E-41R Section 2, Top of Section: 924.93 m (CSF-A)



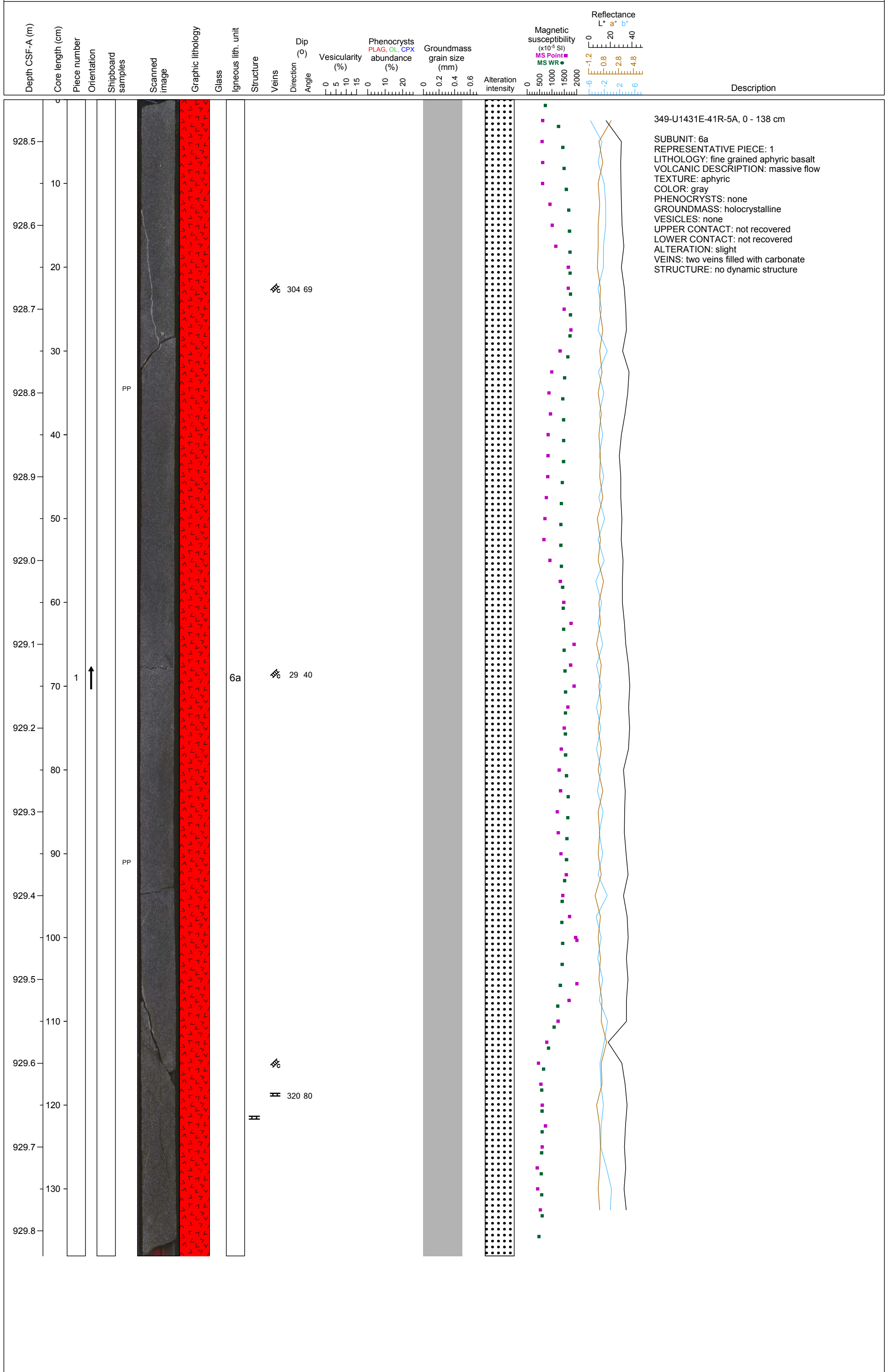
Hole 349-U1431E-41R Section 3, Top of Section: 926.39 m (CSF-A)



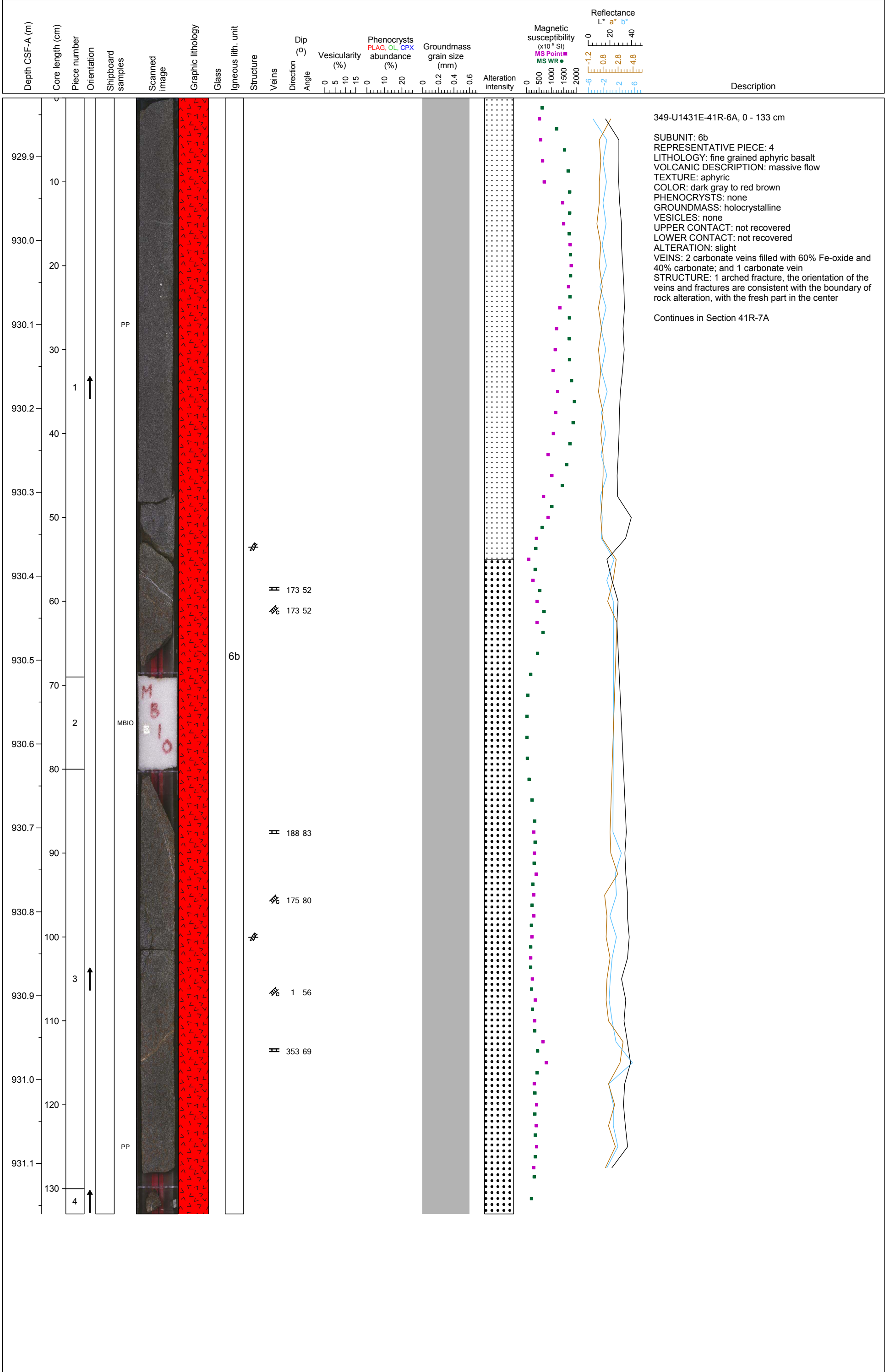
Hole 349-U1431E-41R Section 4, Top of Section: 927.12 m (CSF-A)



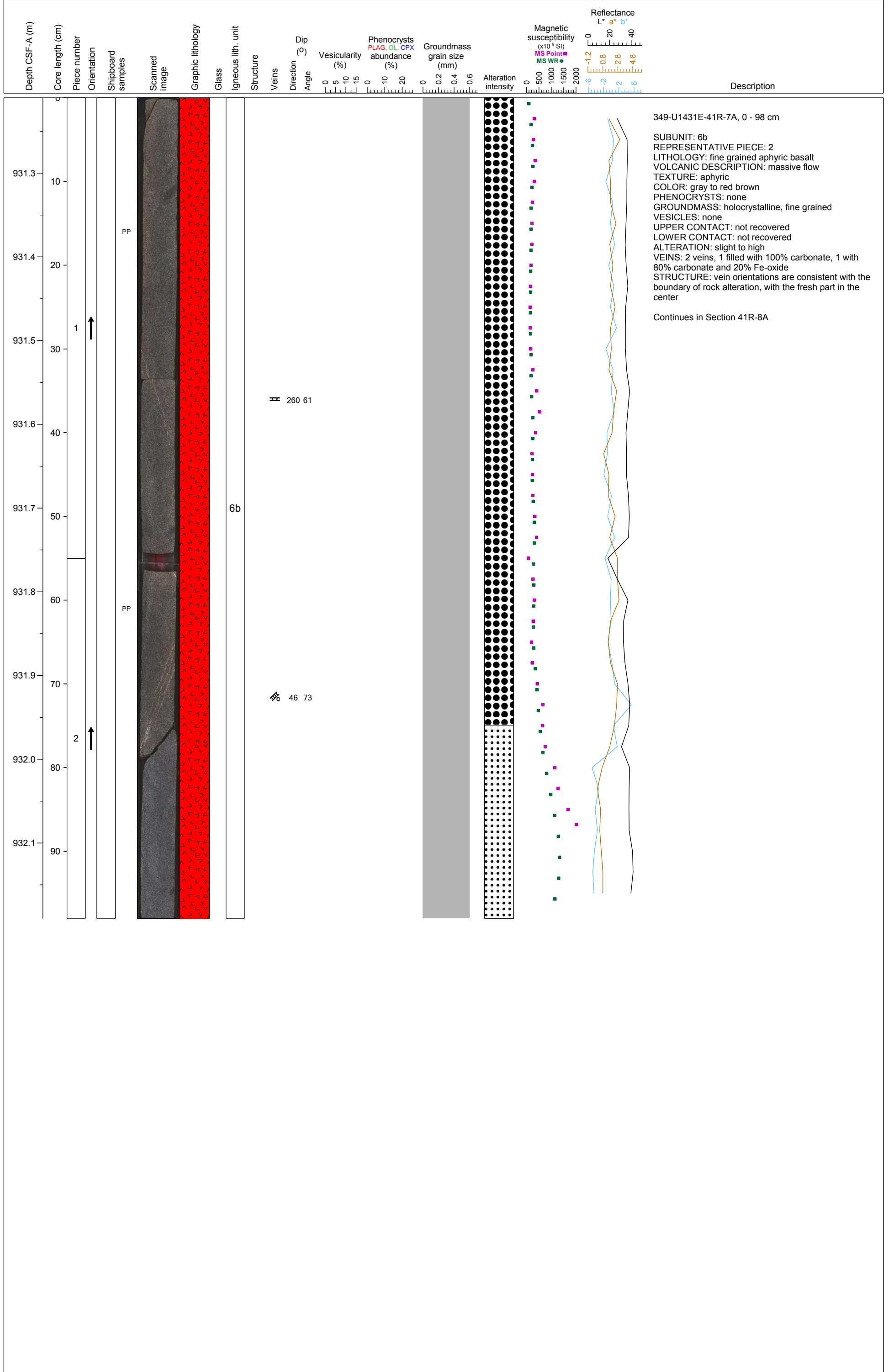
Hole 349-U1431E-41R Section 5, Top of Section: 928.45 m (CSF-A)



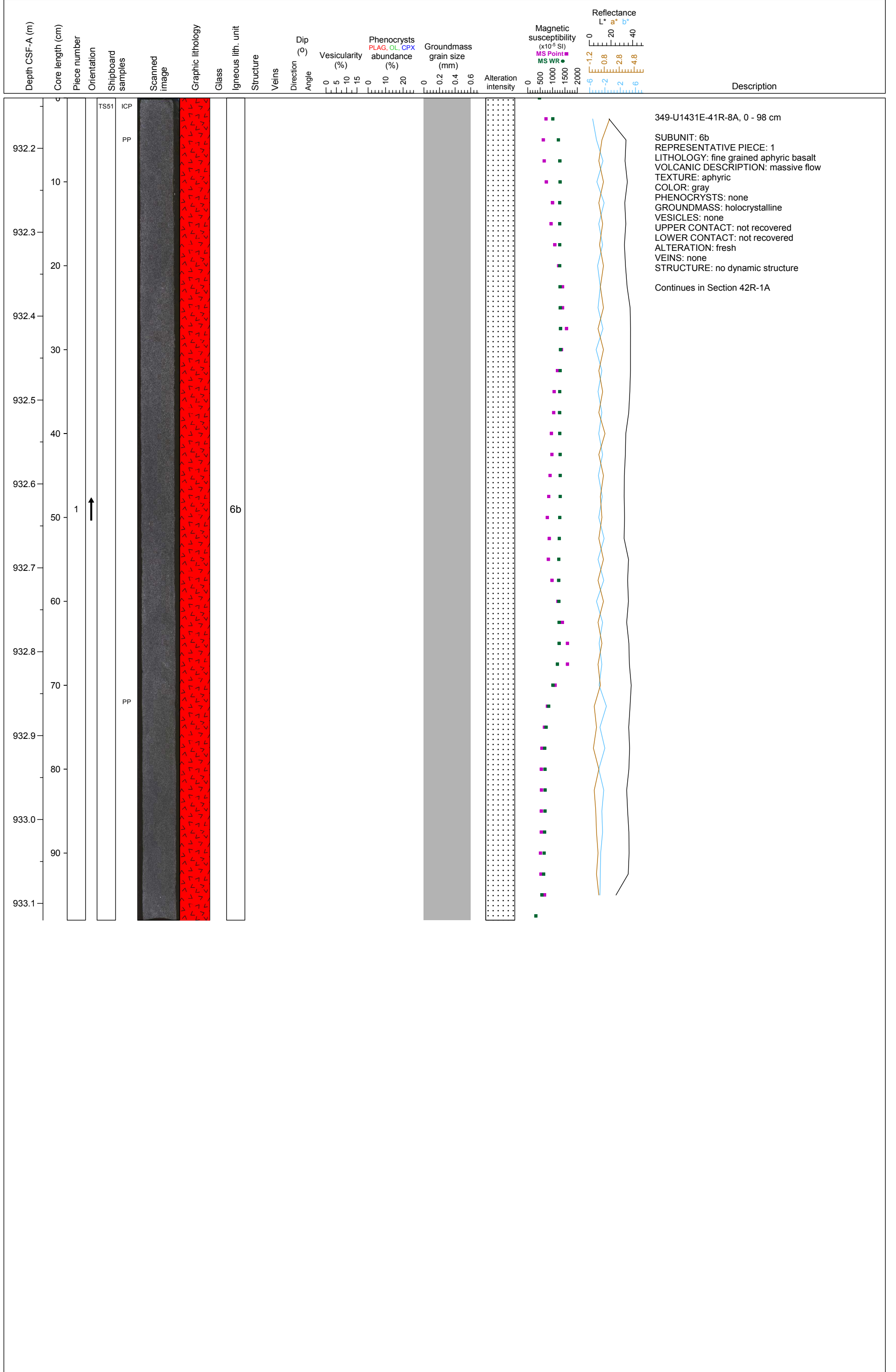
Hole 349-U1431E-41R Section 6, Top of Section: 929.83 m (CSF-A)



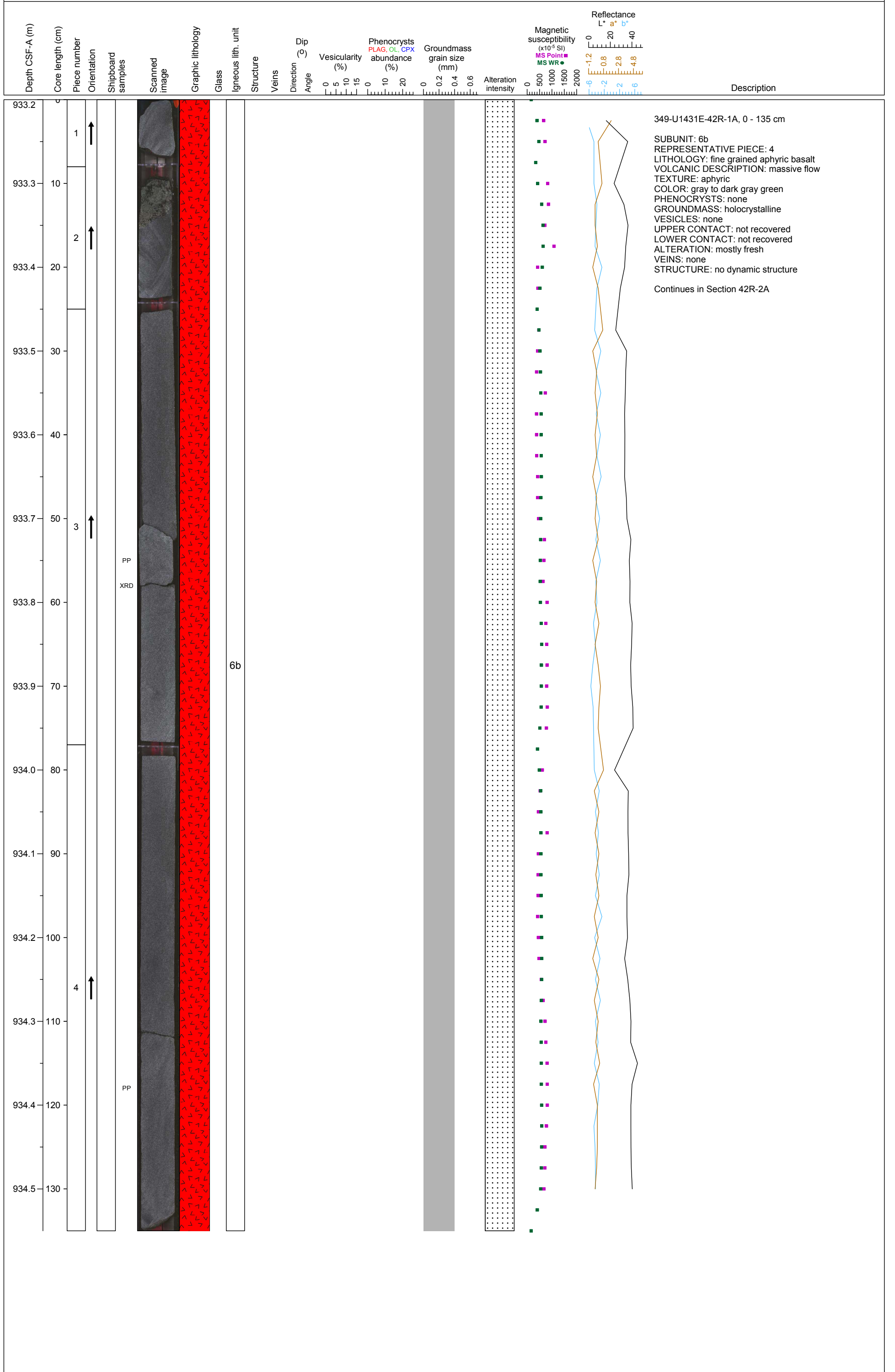
Hole 349-U1431E-41R Section 7, Top of Section: 931.16 m (CSF-A)

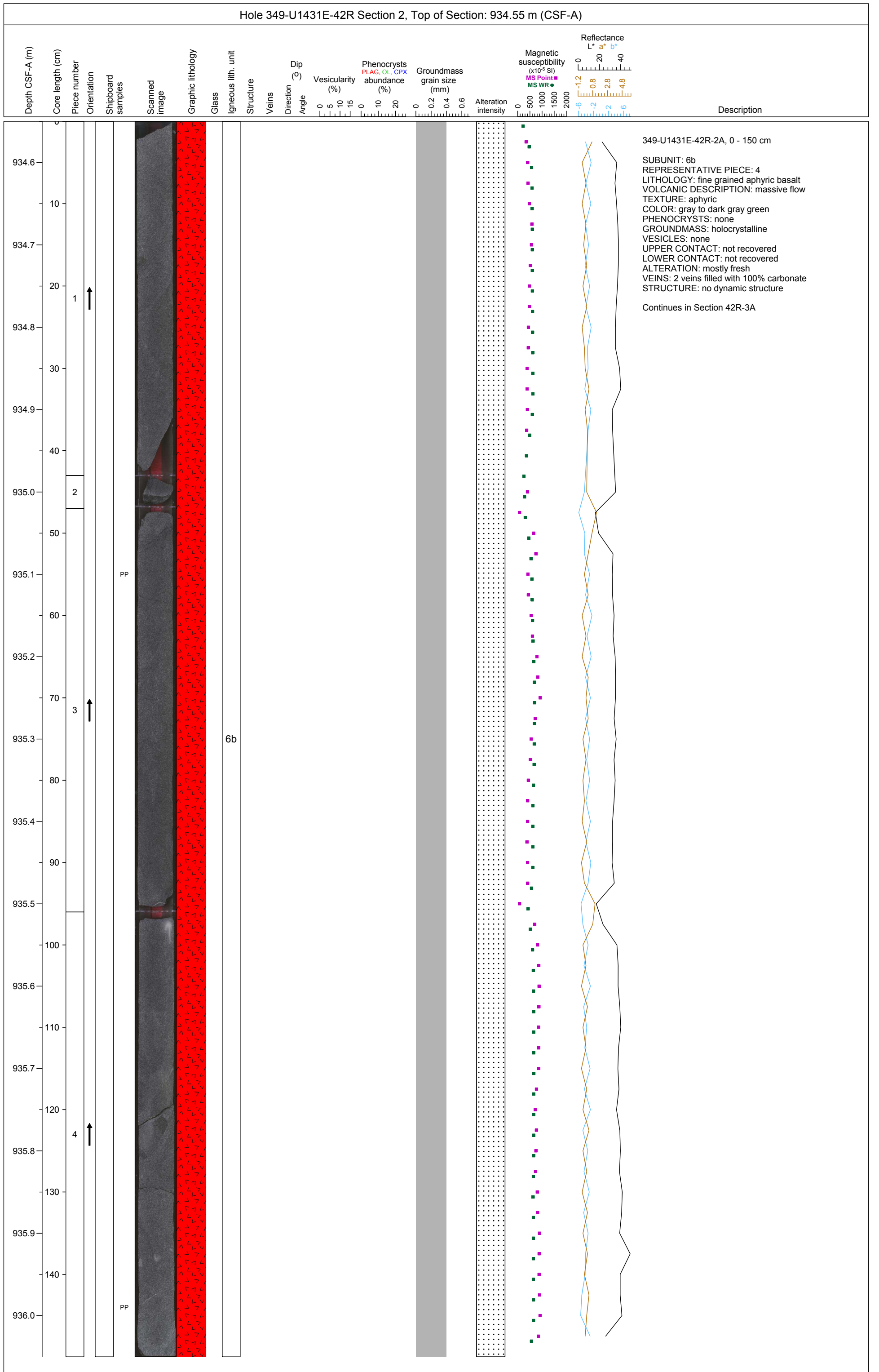


Hole 349-U1431E-41R Section 8, Top of Section: 932.14 m (CSF-A)

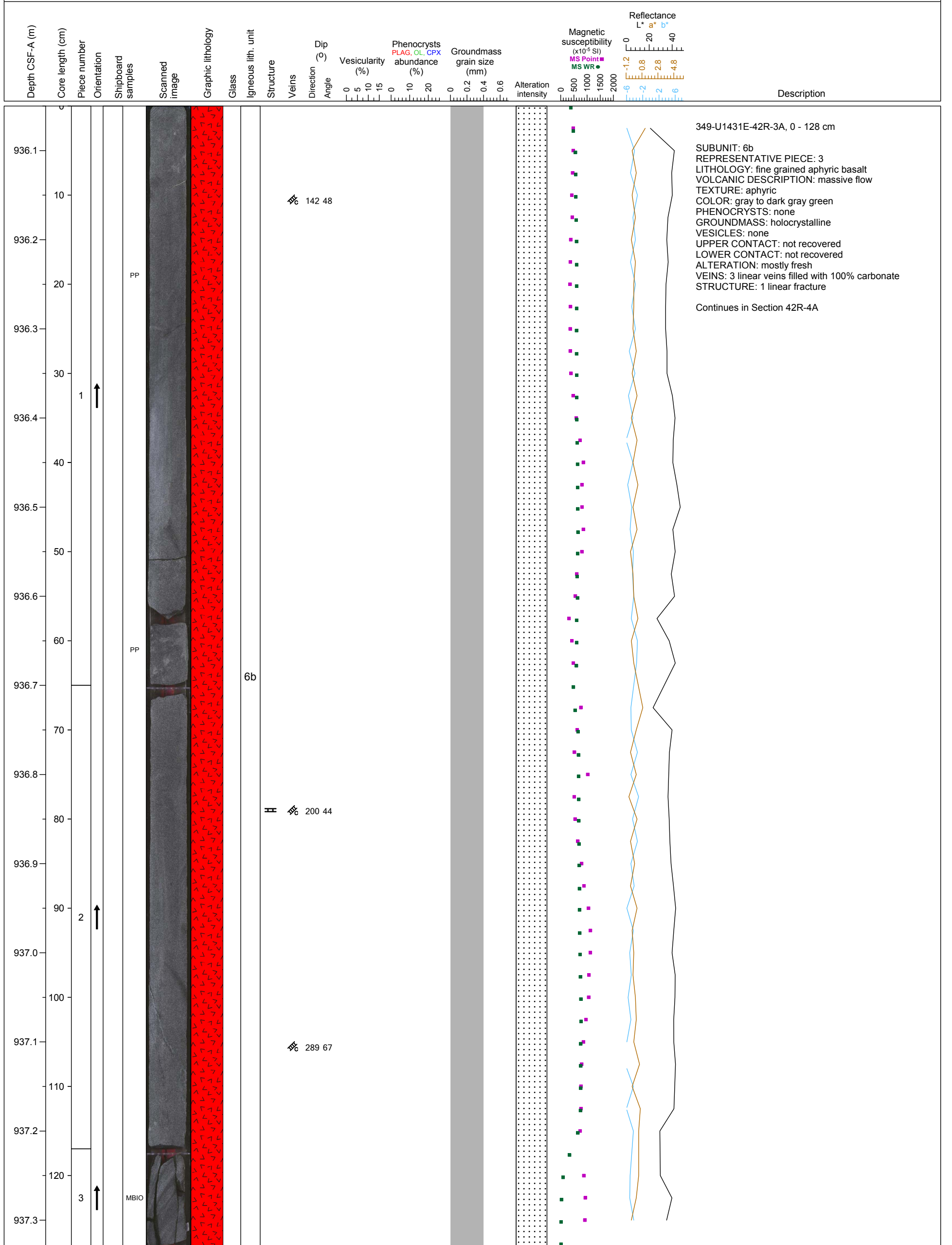


Hole 349-U1431E-42R Section 1, Top of Section: 933.2 m (CSF-A)

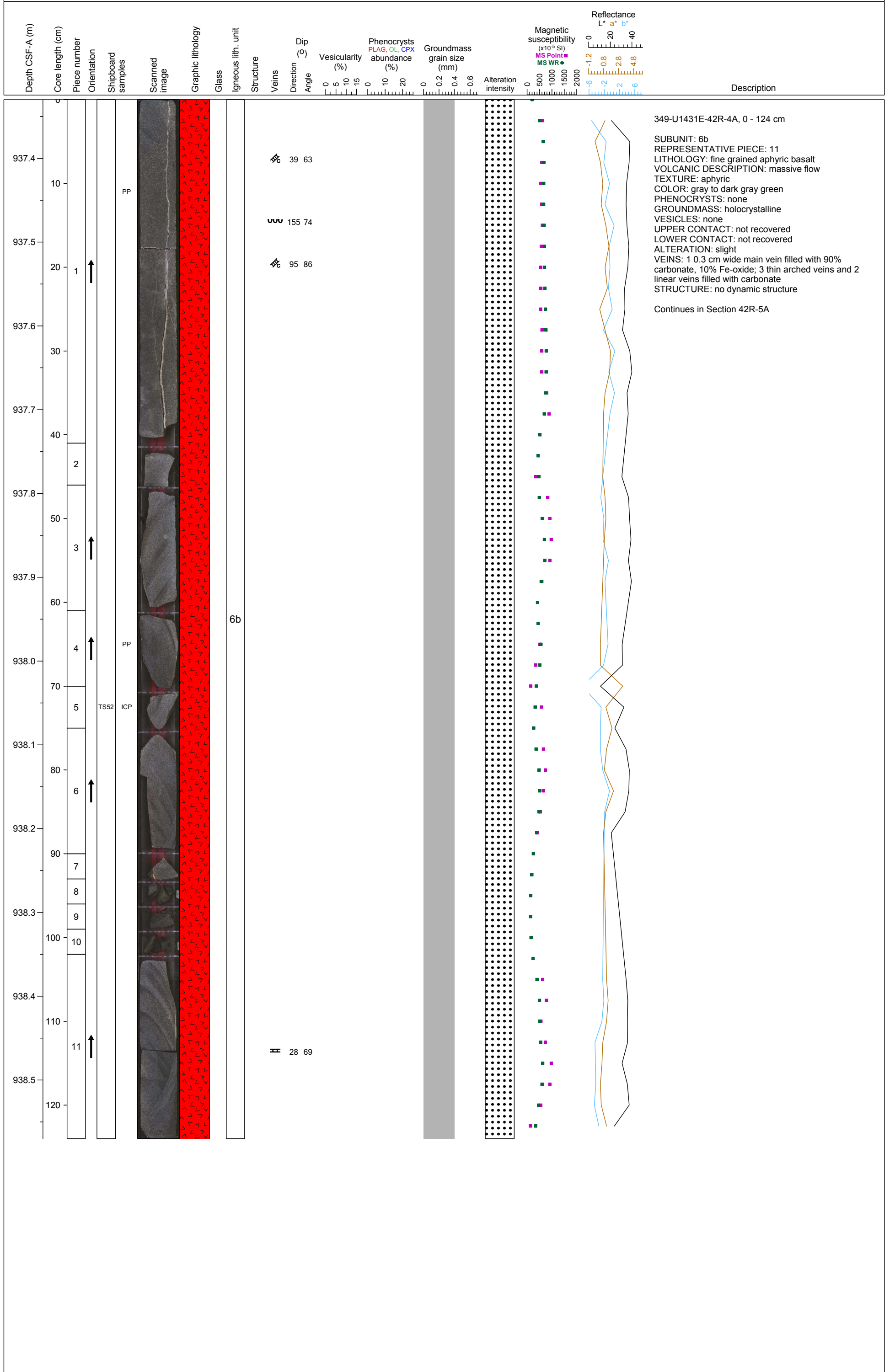




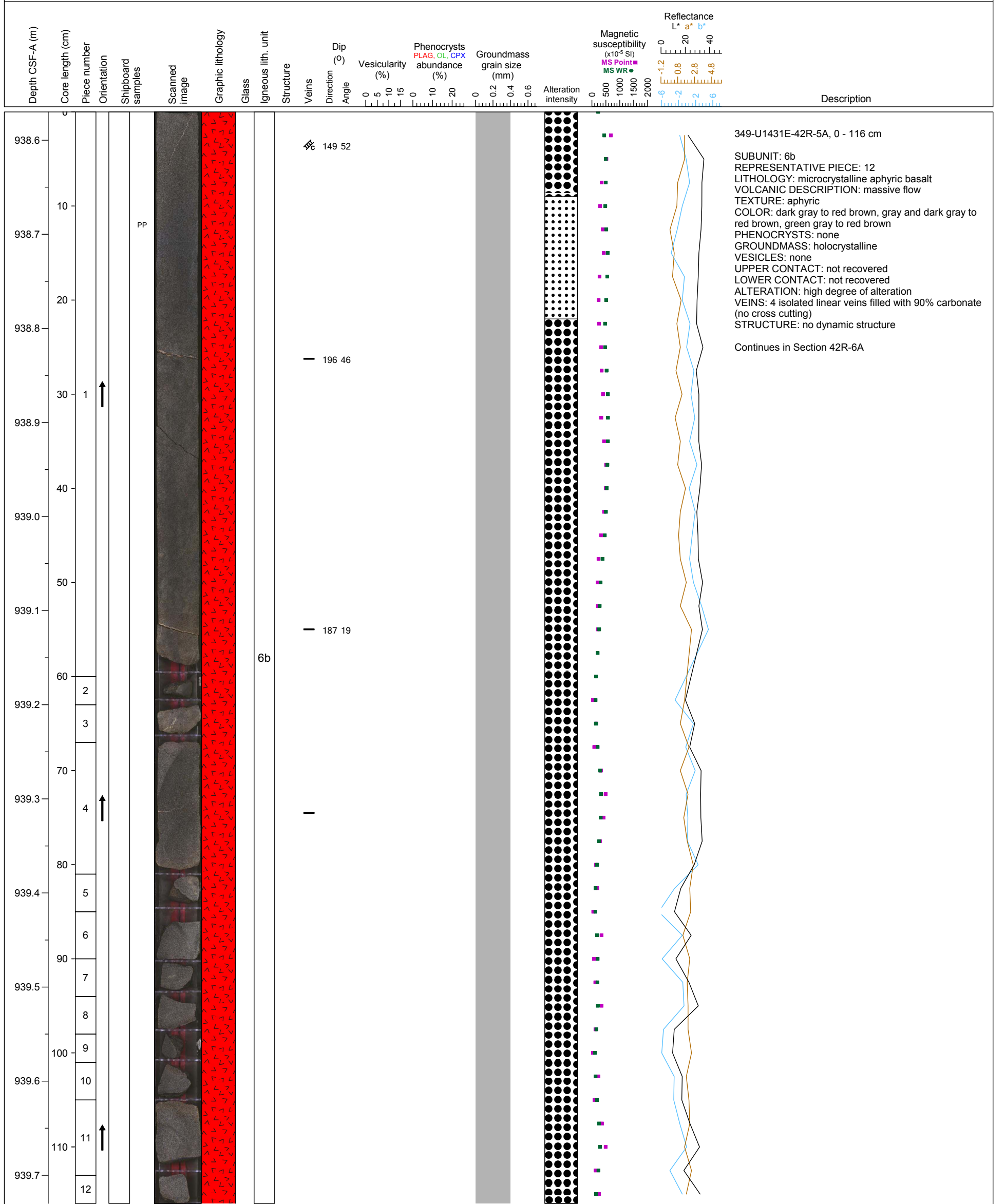
Hole 349-U1431E-42R Section 3, Top of Section: 936.05 m (CSF-A)



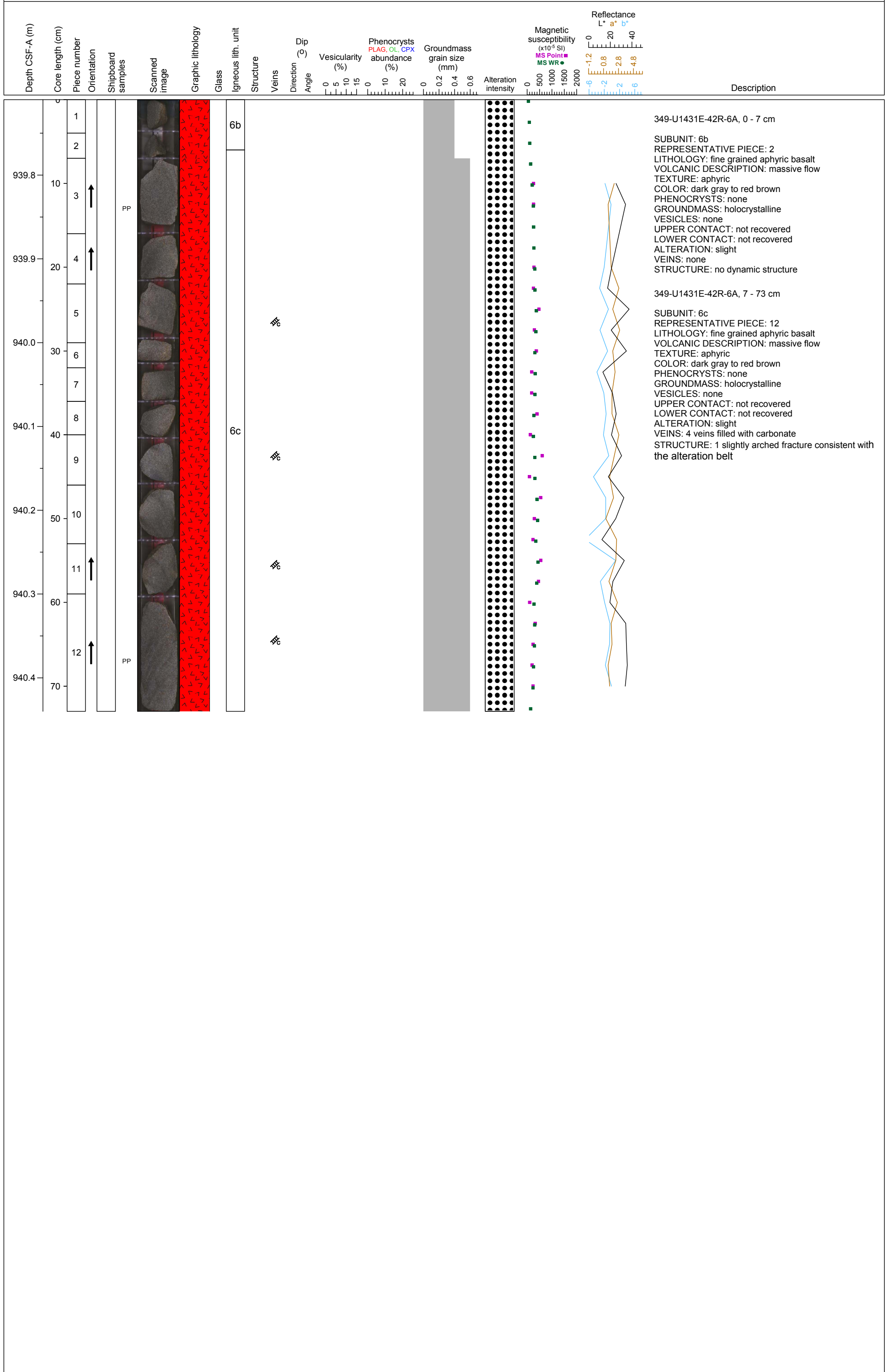
Hole 349-U1431E-42R Section 4, Top of Section: 937.33 m (CSF-A)



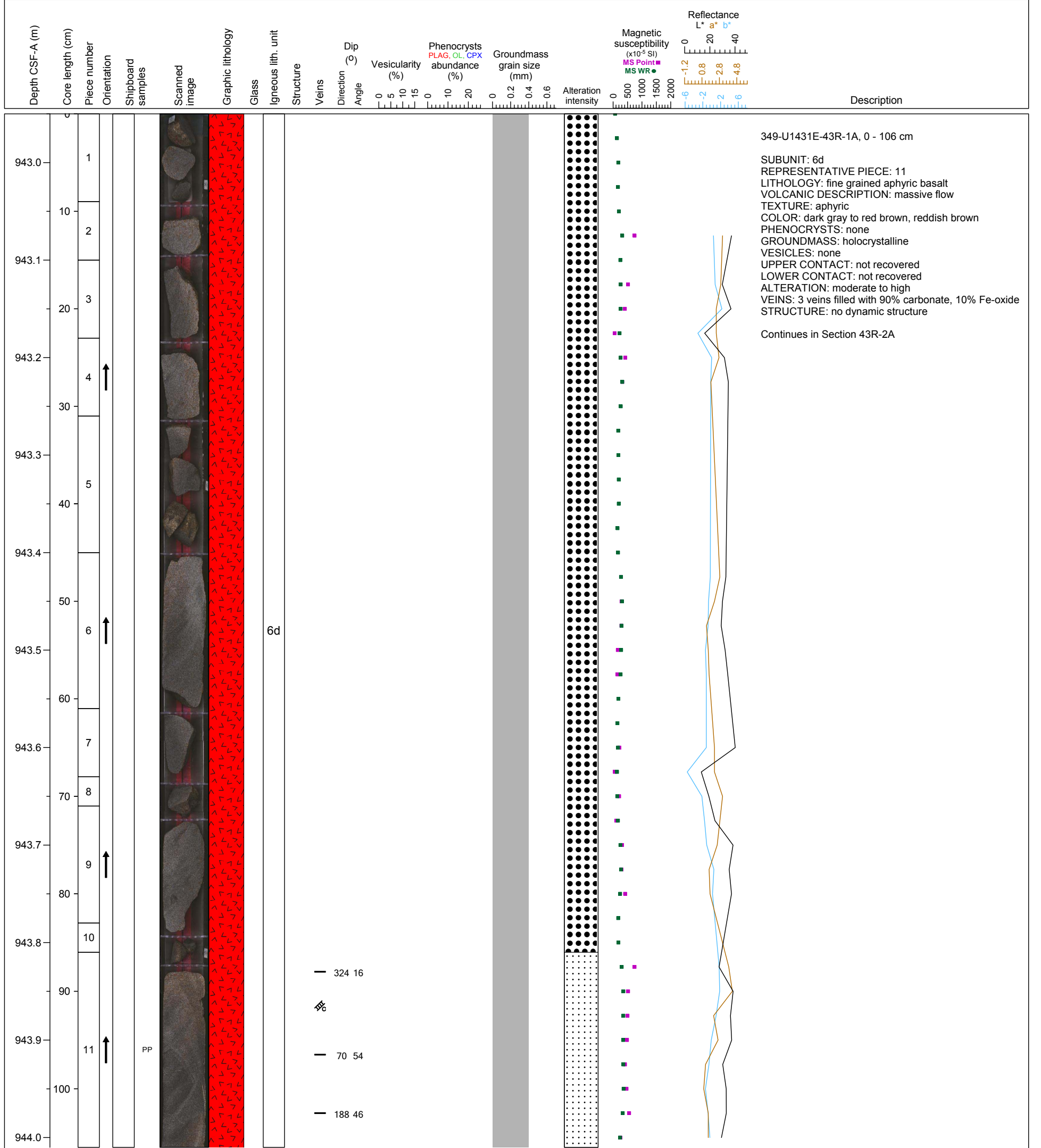
Hole 349-U1431E-42R Section 5, Top of Section: 938.57 m (CSF-A)



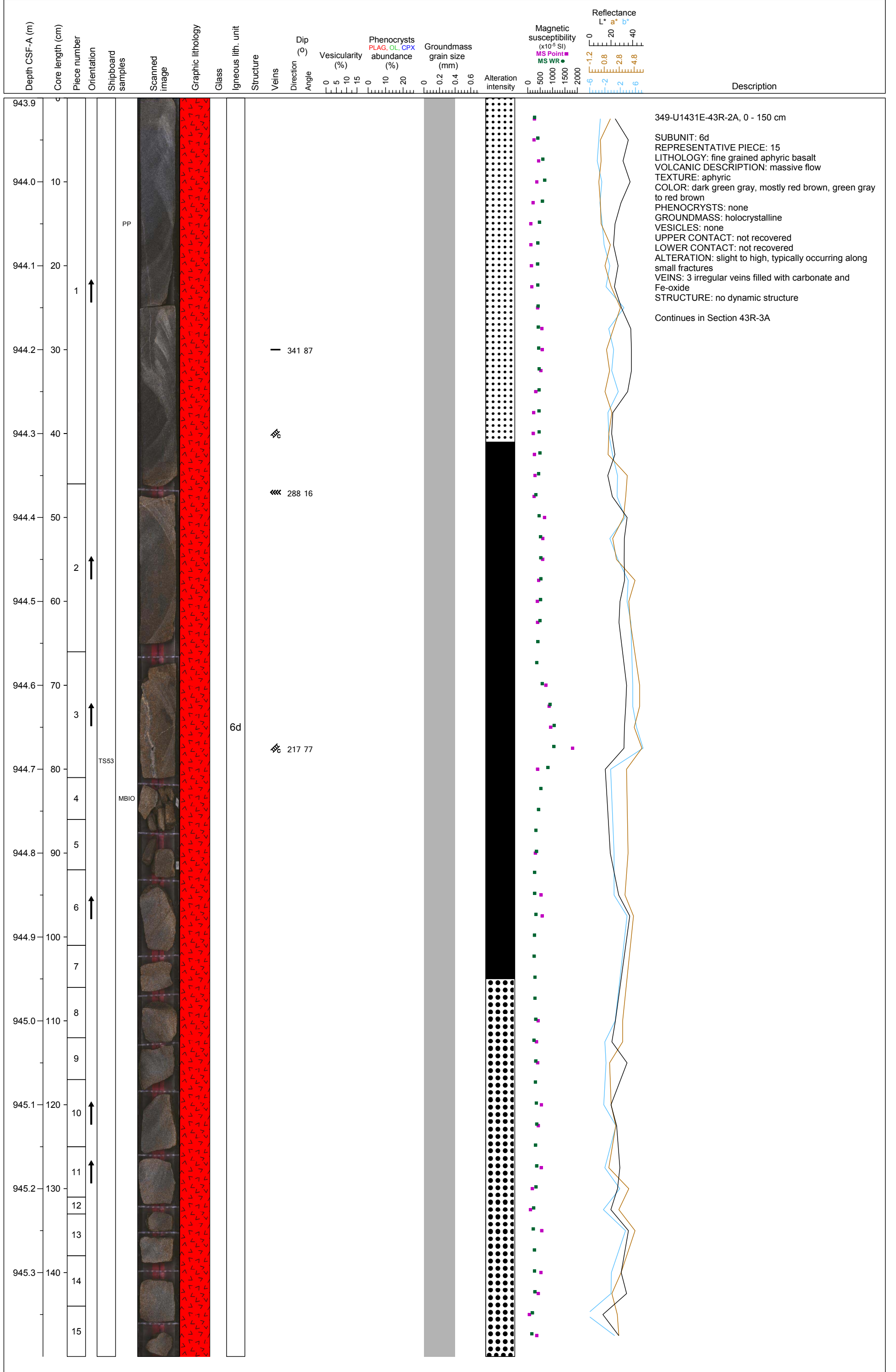
Hole 349-U1431E-42R Section 6, Top of Section: 939.73 m (CSF-A)



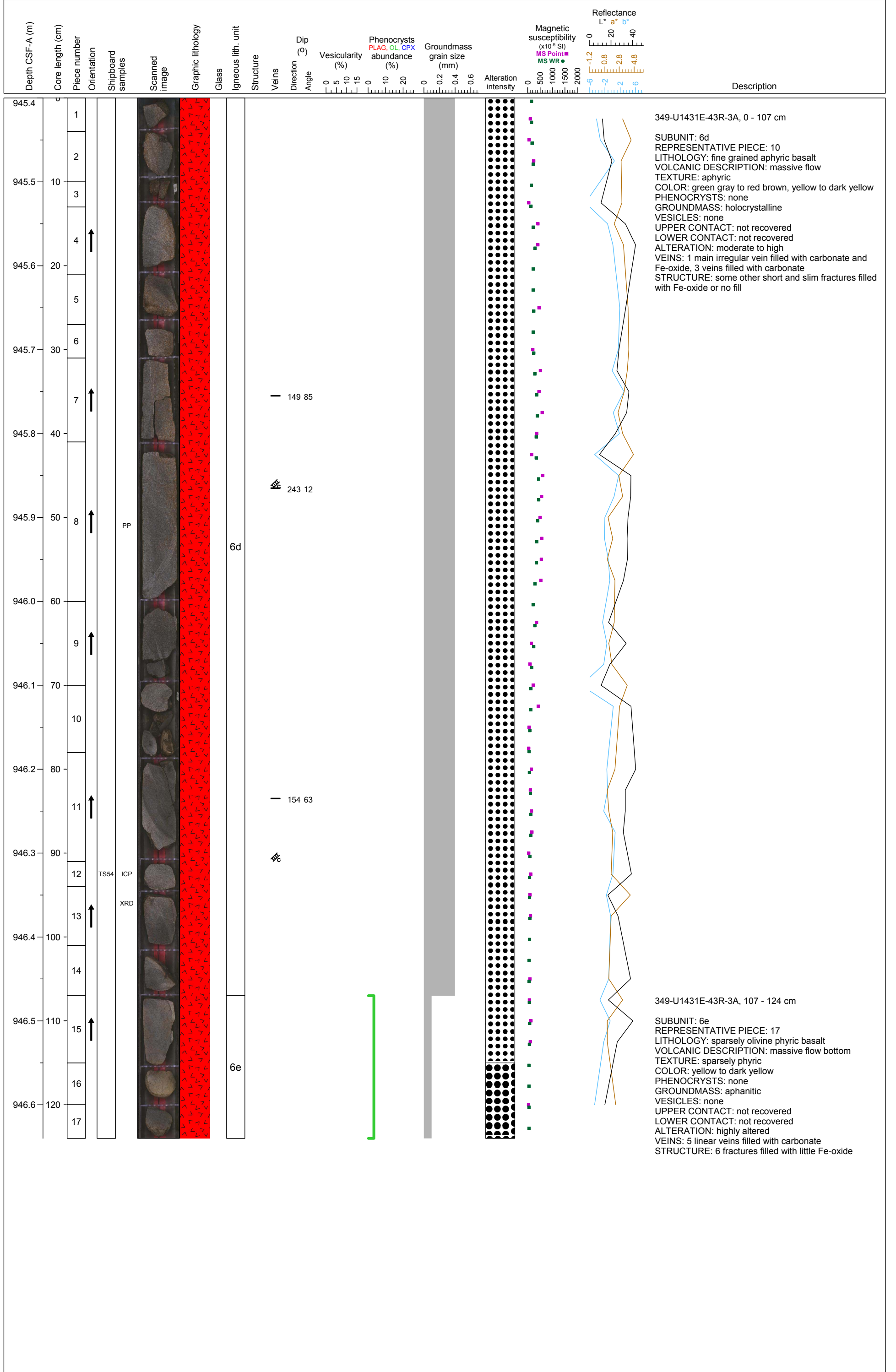
Hole 349-U1431E-43R Section 1, Top of Section: 942.9 m (CSF-A)



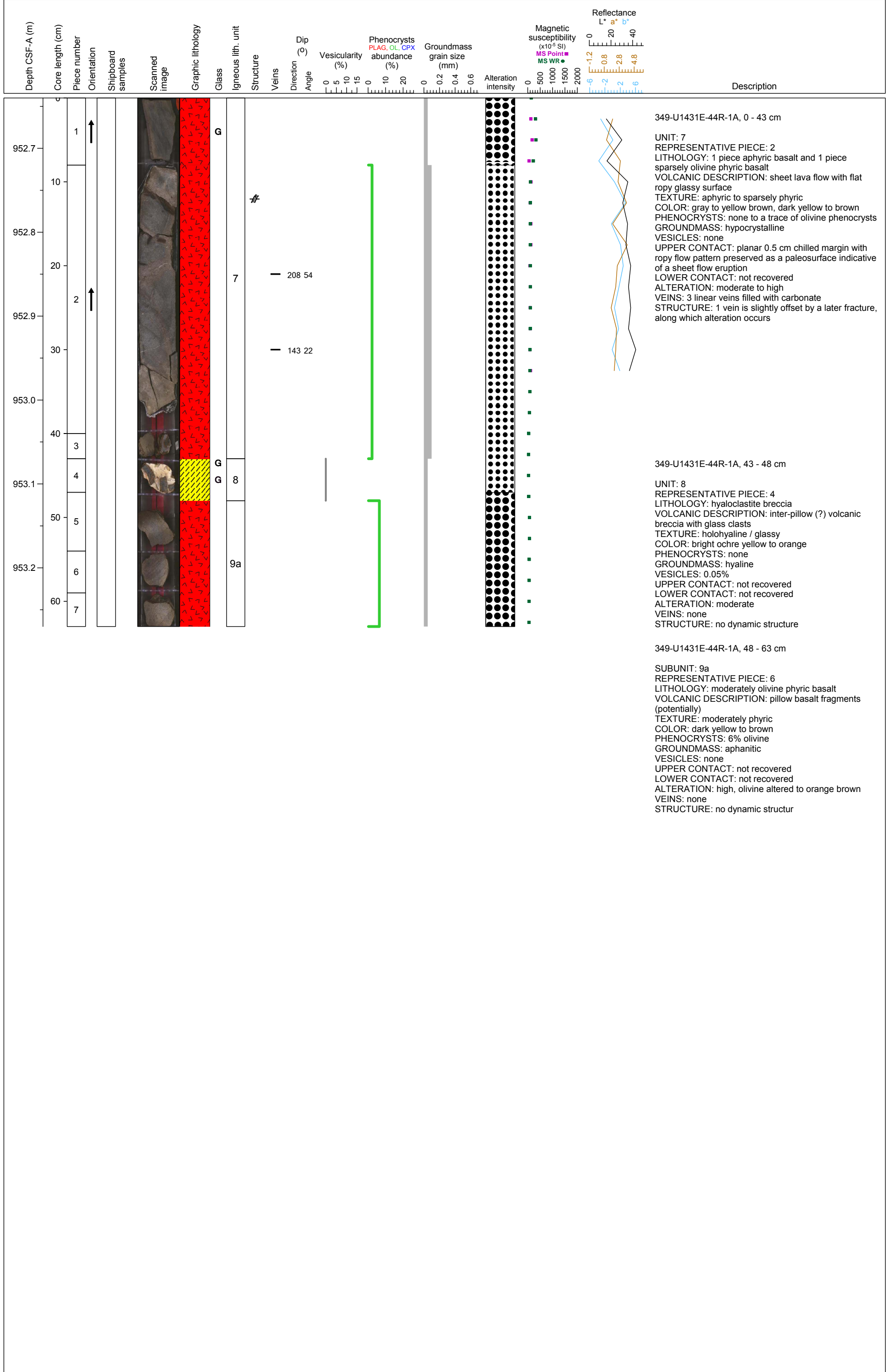
Hole 349-U1431E-43R Section 2, Top of Section: 943.9 m (CSF-A)



Hole 349-U1431E-43R Section 3, Top of Section: 945.4 m (CSF-A)

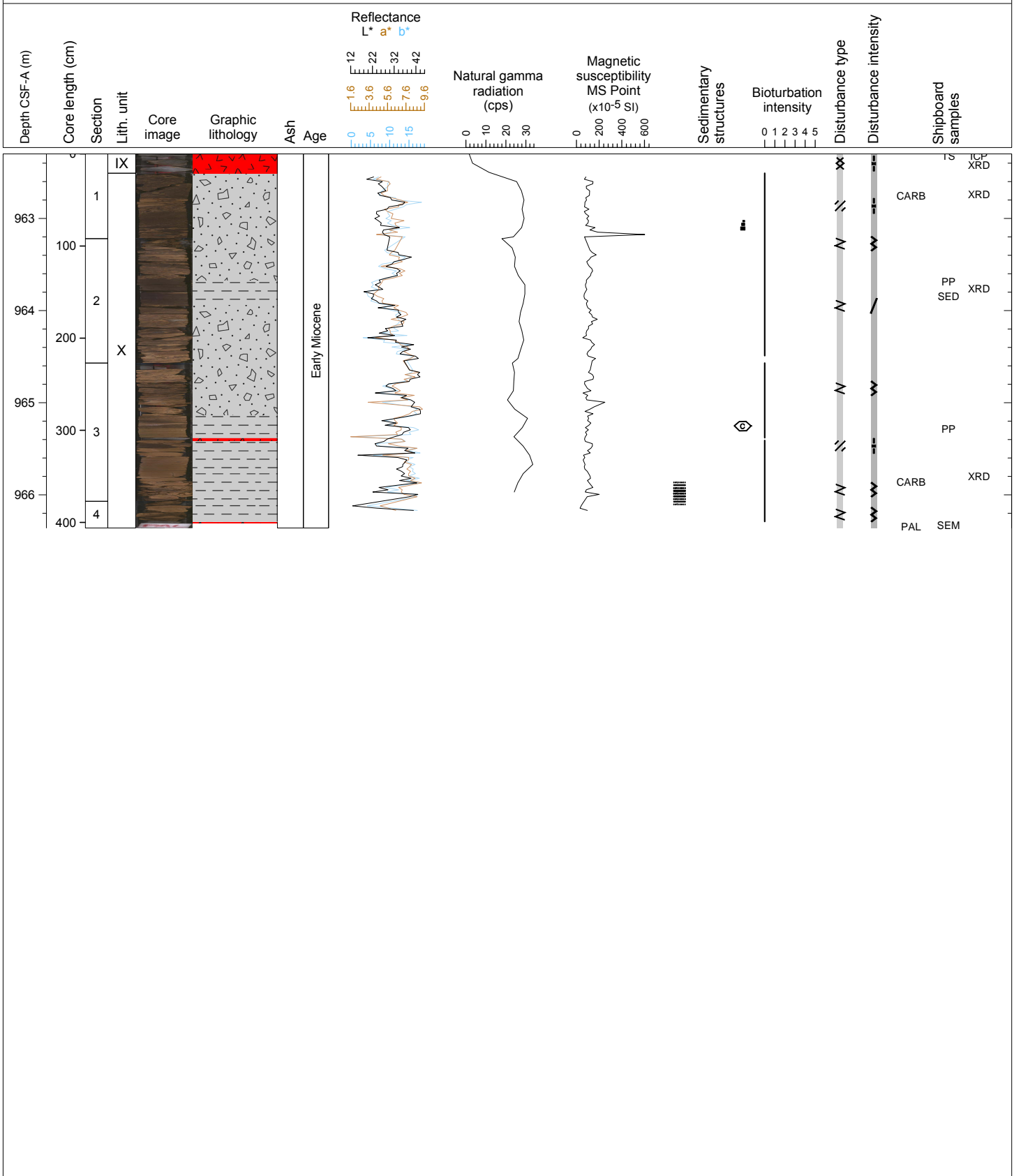


Hole 349-U1431E-44R Section 1, Top of Section: 952.6 m (CSF-A)

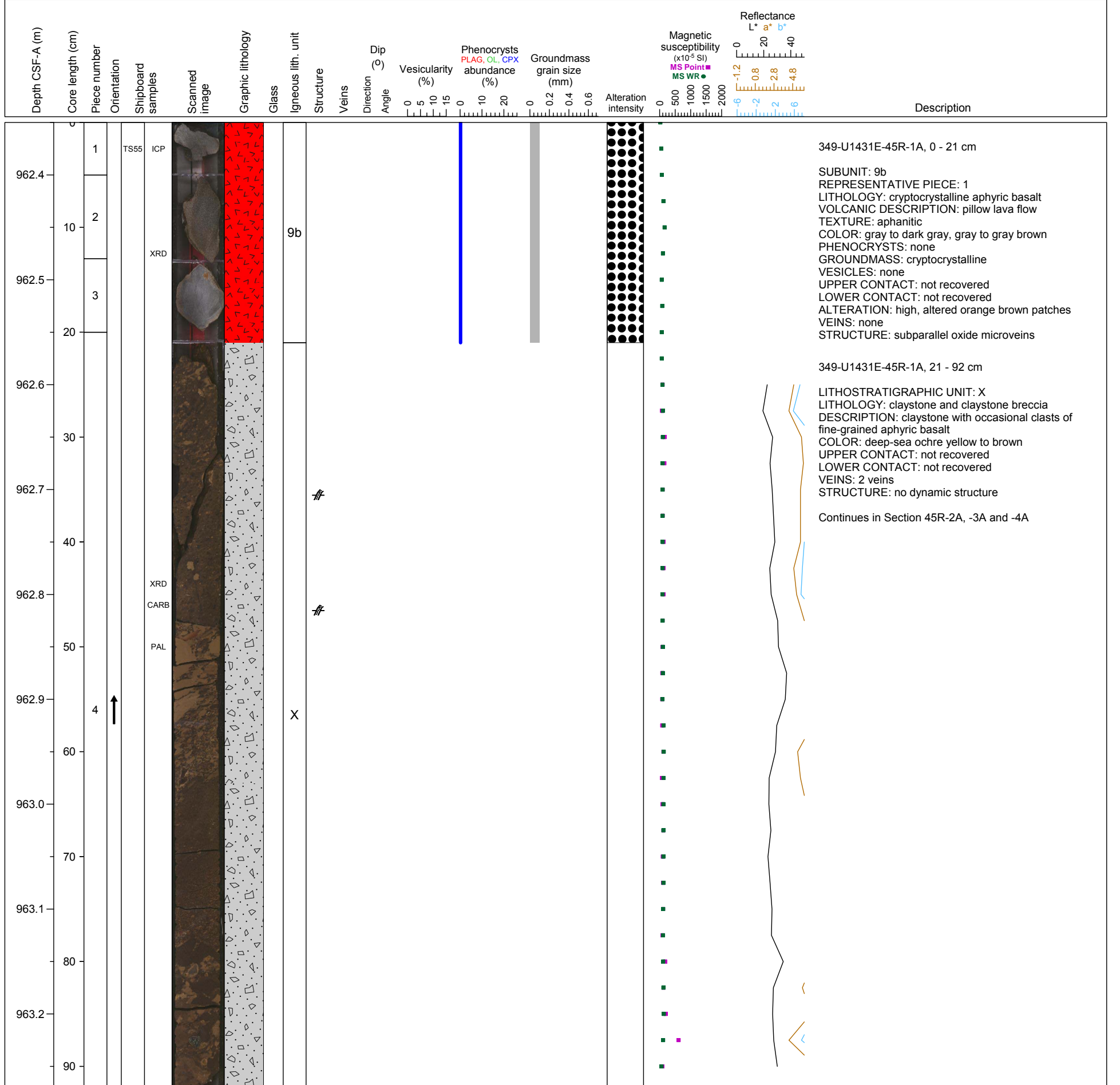


Hole 349-U1431E Core 45R, Interval 962.3-966.36 m (CSF-A)

Sediment between BASALT lava flows dominates this core. Yellowish brown CLAYSTONE BRECCIA containing variable amounts of fine dispersed ASH within its matrix, as well as angular dark gray clasts of BASALT up to 6 cm across floating in the fine-grained sediment. BASALT clasts are typically surrounded by a 2-3 mm thick halo of lighter CLAYSTONE with darker sediment in the rest of the core. There are also intervals, especially in Section 1, where the sediment is described as BRECCIA comprised of reworked clasts of CLAYSTONE. Compositionally the core is largely CLAYSTONE, but is more or less reworked locally.



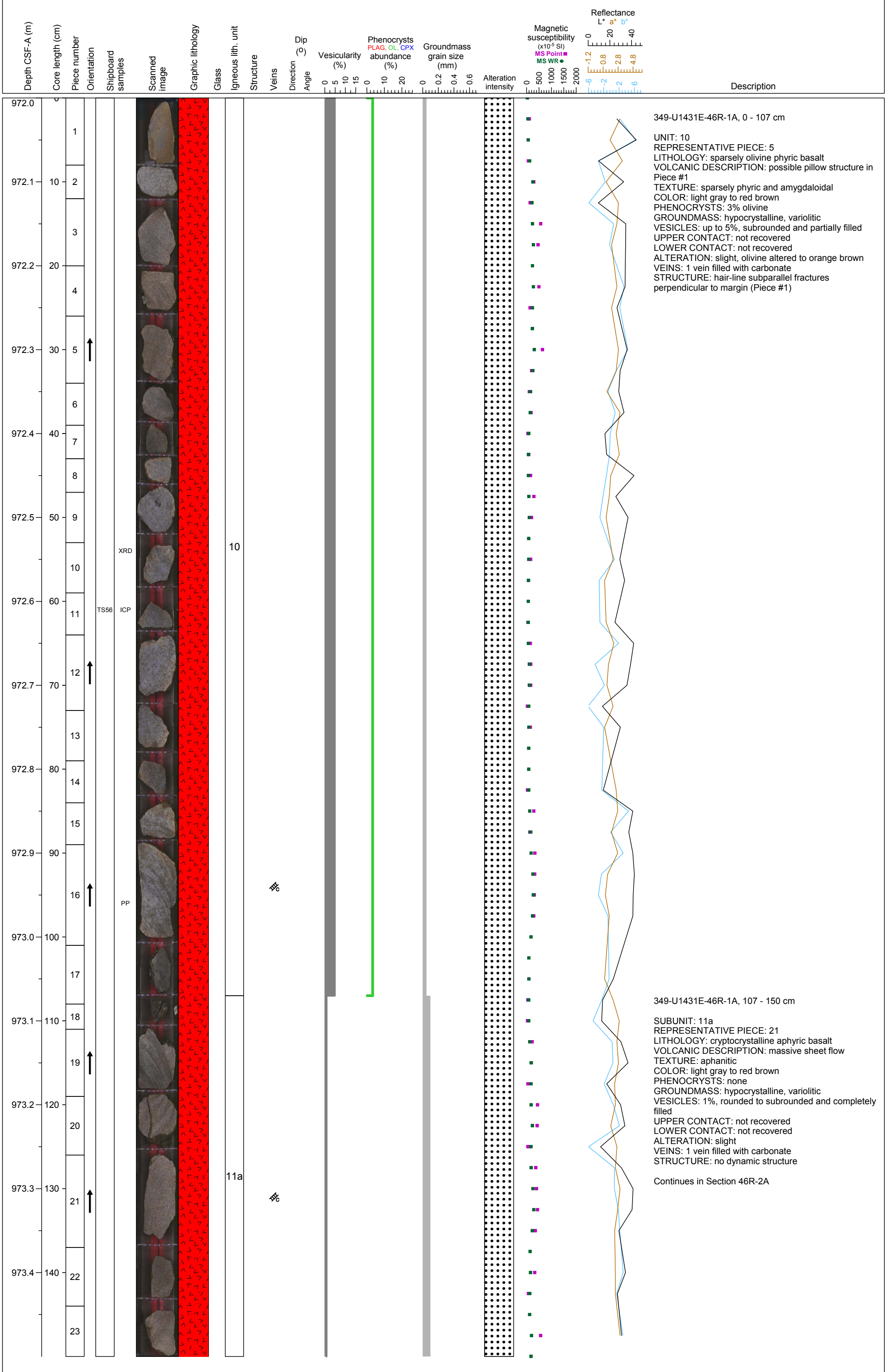
Hole 349-U1431E-45R Section 1, Top of Section: 962.3 m (CSF-A)



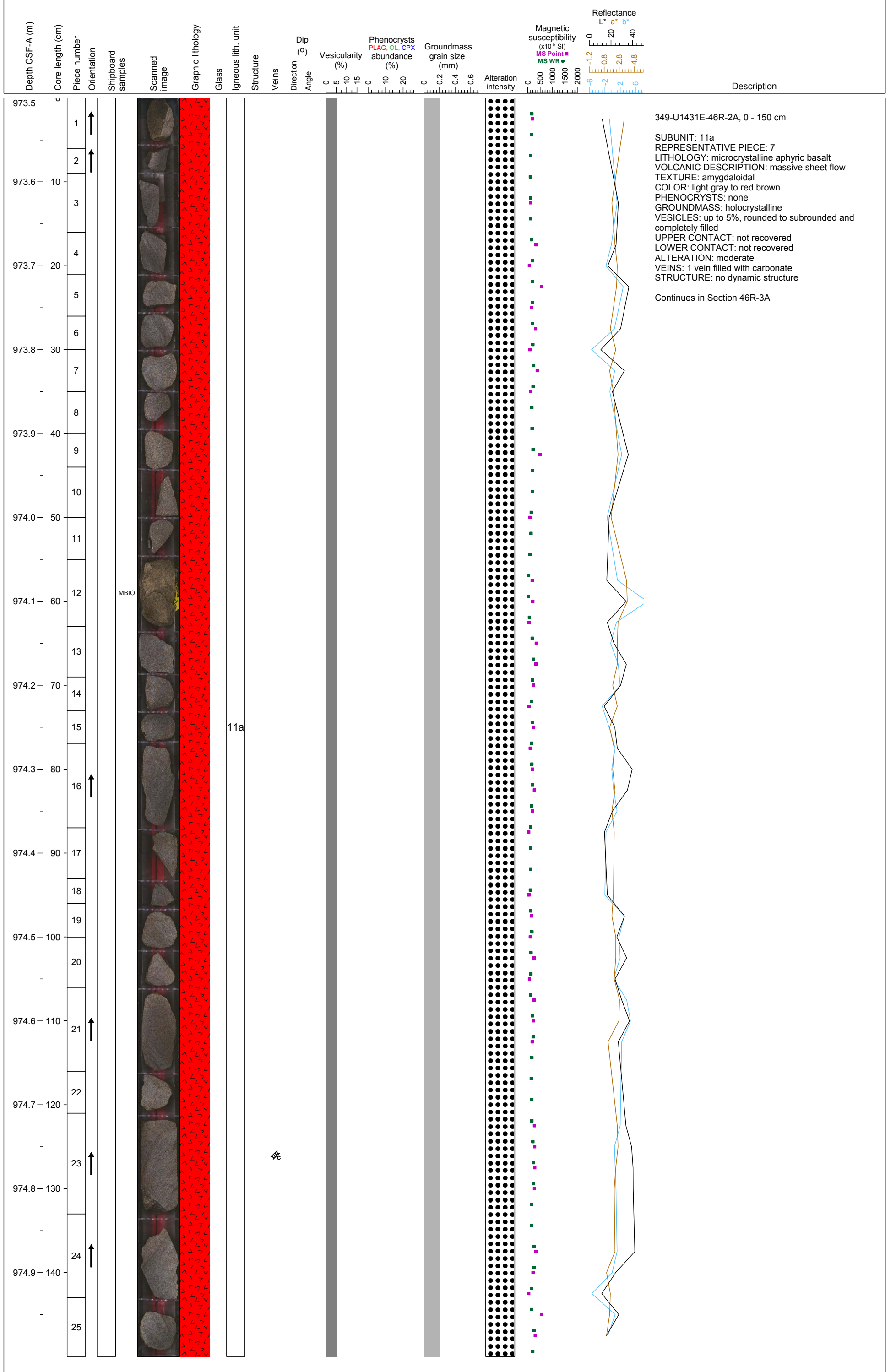
Hole 349-U1431E-45R Section 4, Top of Section: 966.07 m (CSF-A)

Depth CSF-A (m)	Core length (cm)	Piece number	Orientation	Shipboard samples	Scanned image	Graphic lithology	Glass	Igneous lith. unit	Structure	Veins	Dip (°)	Vesicularity (%)	Phenocrysts abundance (%)	Groundmass grain size (mm)	Alteration intensity	Magnetic susceptibility (x10 ⁻⁵ SI)	Reflectance (L*, a*, b*)	Description
966.2	10	1	↑	XRD				X										<p>349-U1431E-45R-4A, 0 - 22 cm</p> <p>LITHOSTRATIGRAPHIC UNIT: X LITHOLOGY: claystone and claystone breccia DESCRIPTION: claystone with occasional clasts of fine-grained aphyric basalt COLOR: deep-sea ochre yellow to brown UPPER CONTACT: not recovered LOWER CONTACT: not recovered VEINS: 2 veins STRUCTURE: no dynamic structure</p>
966.3	20			CARB				10										<p>349-U1431E-45R-4A, 22 - 29 cm</p> <p>UNIT: 10 REPRESENTATIVE PIECE: 1d LITHOLOGY: sparsely olivine phyrlic basalt VOLCANIC DESCRIPTION: sheet flow top TEXTURE: sparsely phyrlic COLOR: light gray to red brown PHENOCRYSTS: 2% olivine GROUNDMASS: hypocrySTALLINE VESICLES: 2%, subrounded UPPER CONTACT: not recovered LOWER CONTACT: not recovered ALTERATION: slight, olivine altered to orange brown VEINS: 1 vein filled with carbonate STRUCTURE: no dynamic structure</p> <p>Continues in Section 46R-1A</p>

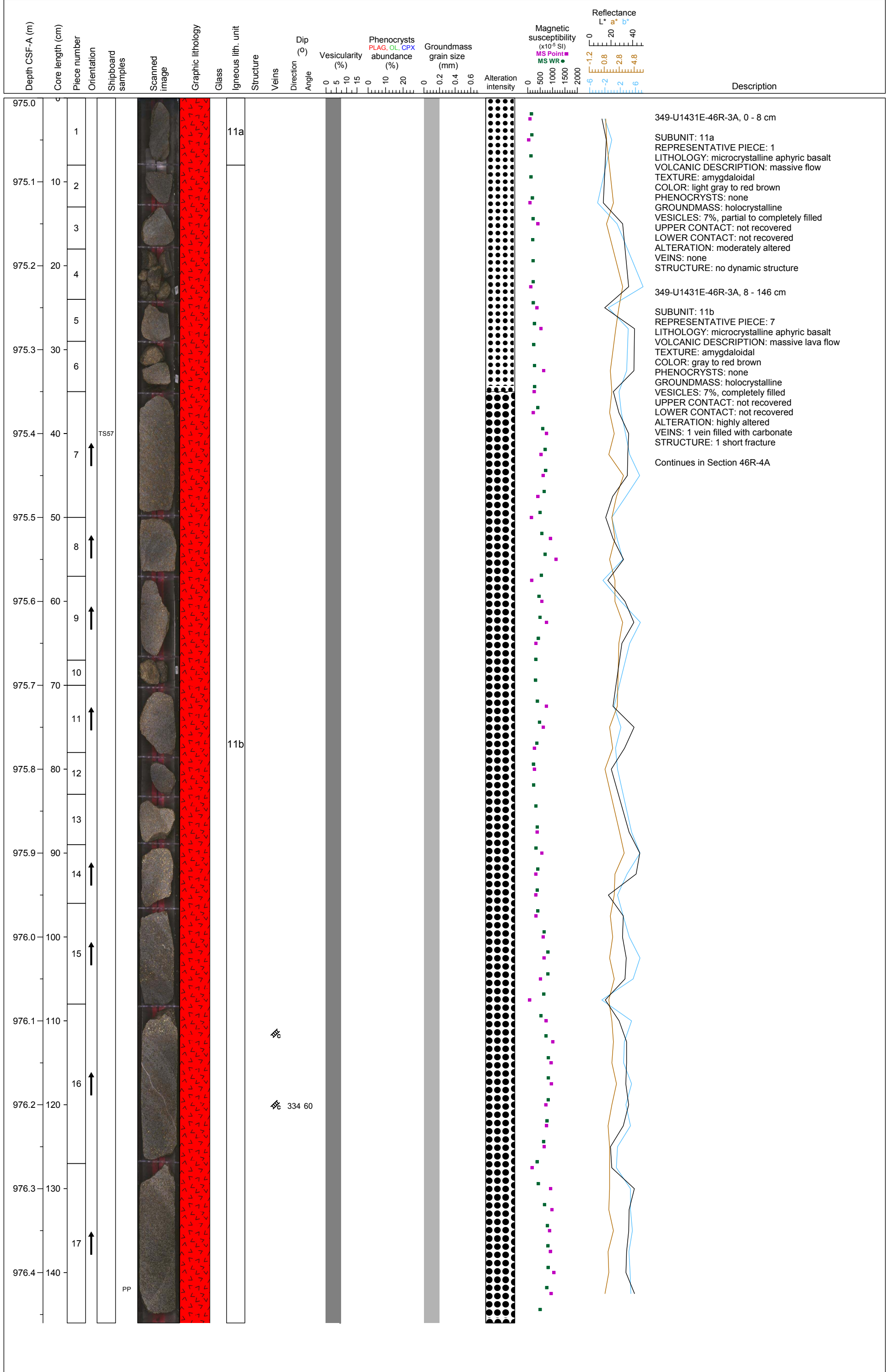
Hole 349-U1431E-46R Section 1, Top of Section: 972.0 m (CSF-A)



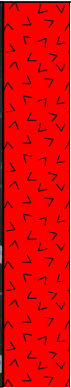

Hole 349-U1431E-46R Section 2, Top of Section: 973.5 m (CSF-A)



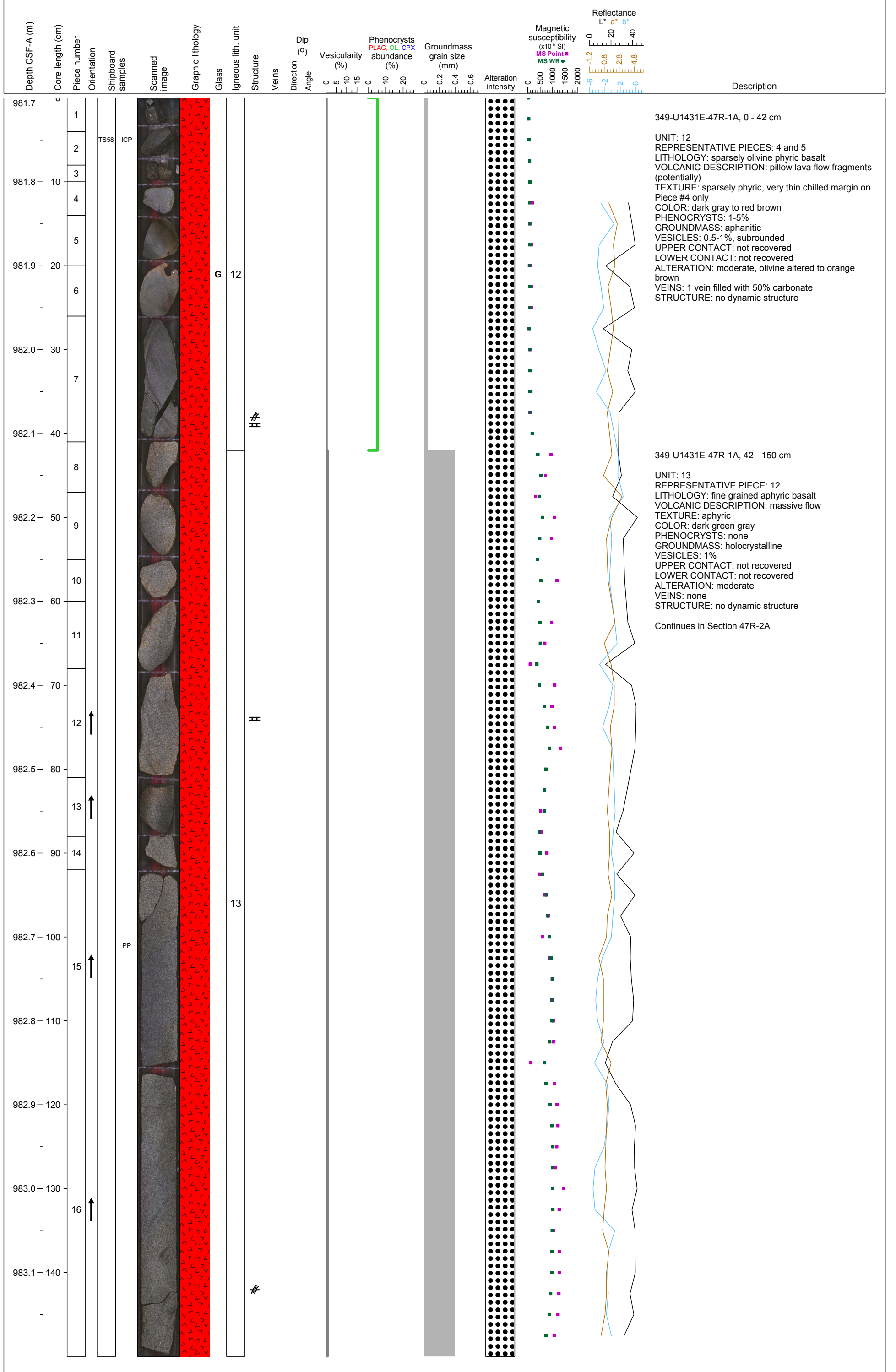
Hole 349-U1431E-46R Section 3, Top of Section: 975.0 m (CSF-A)



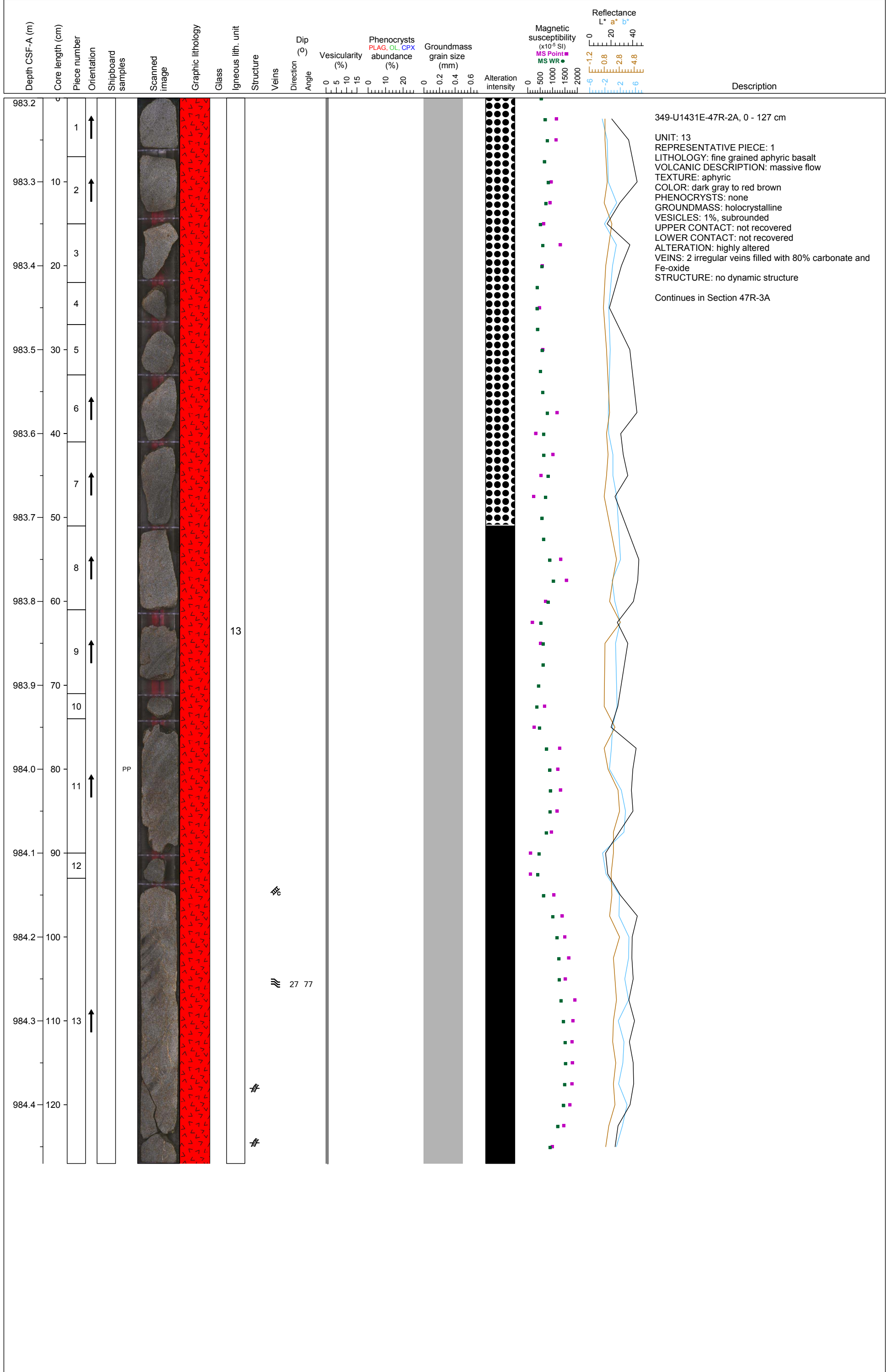
Hole 349-U1431E-46R Section 4, Top of Section: 976.46 m (CSF-A)

Depth CSF-A (m)	Core length (cm)	Piece number	Orientation	Shipboard samples	Scanned image	Graphic lithology	Glass	Igneous lith. unit	Structure	Veins	Dip (°)	Vesicularity (%)	Phenocrysts abundance (%)	Groundmass grain size (mm)	Alteration intensity	Magnetic susceptibility (x10 ⁻⁵ SI)	Reflectance L* a* b*	Description
976.6	10	1	↑					11b										349-U1431E-46R-4-A, 0 - 21 cm SUBUNIT: 11b REPRESENTATIVE PIECE: 1 LITHOLOGY: fine grained aphyric basalt VOLCANIC DESCRIPTION: massive flow TEXTURE: amygdaloidal COLOR: gray to green brown PHENOCRYSTS: none GROUNDMASS: holocrystalline VESICLES: UPPER CONTACT: not recovered LOWER CONTACT: not recovered ALTERATION: moderate VEINS: none STRUCTURE: no dynamic structure
976.7	20	3																

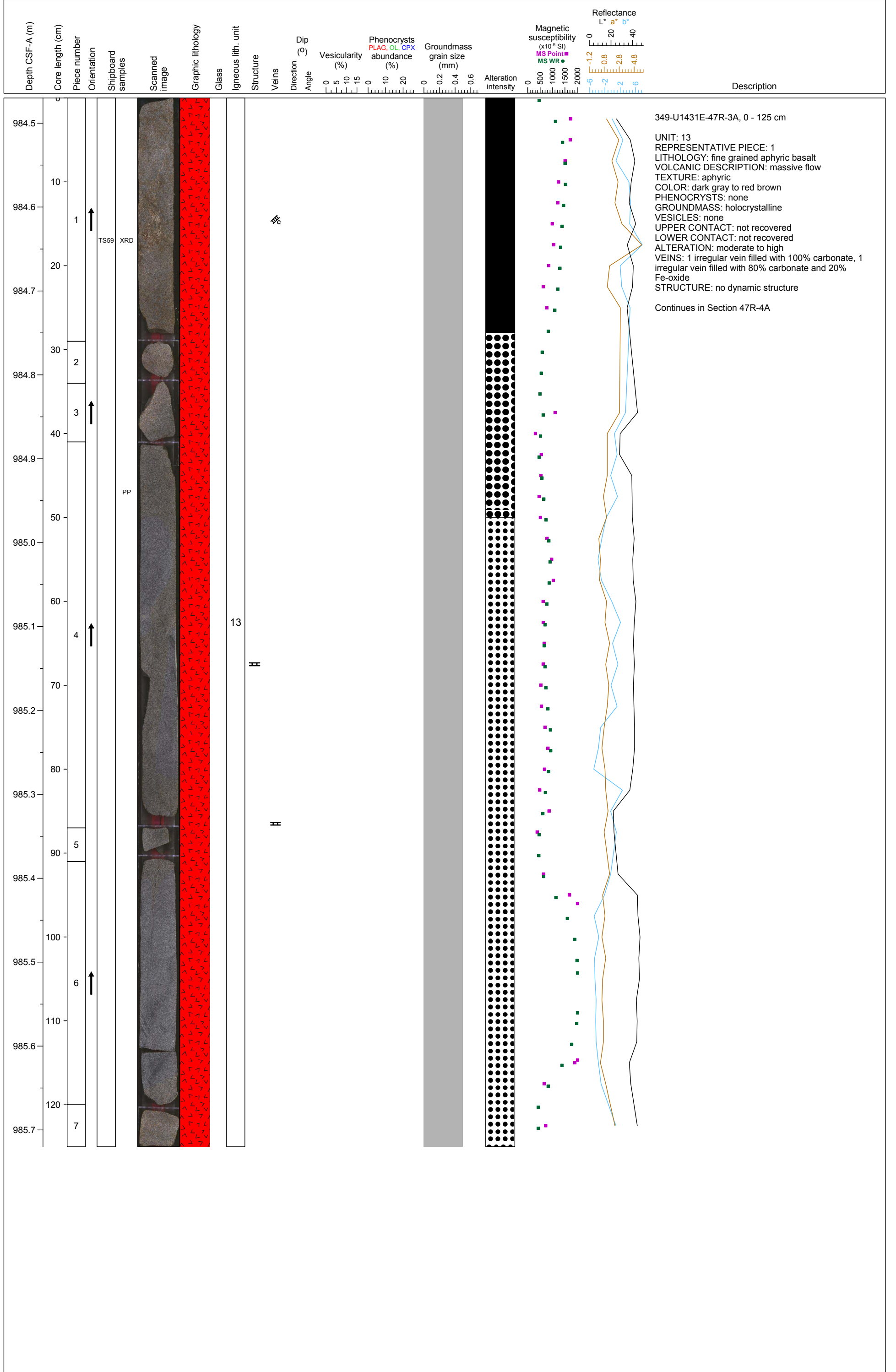
Hole 349-U1431E-47R Section 1, Top of Section: 981.7 m (CSF-A)



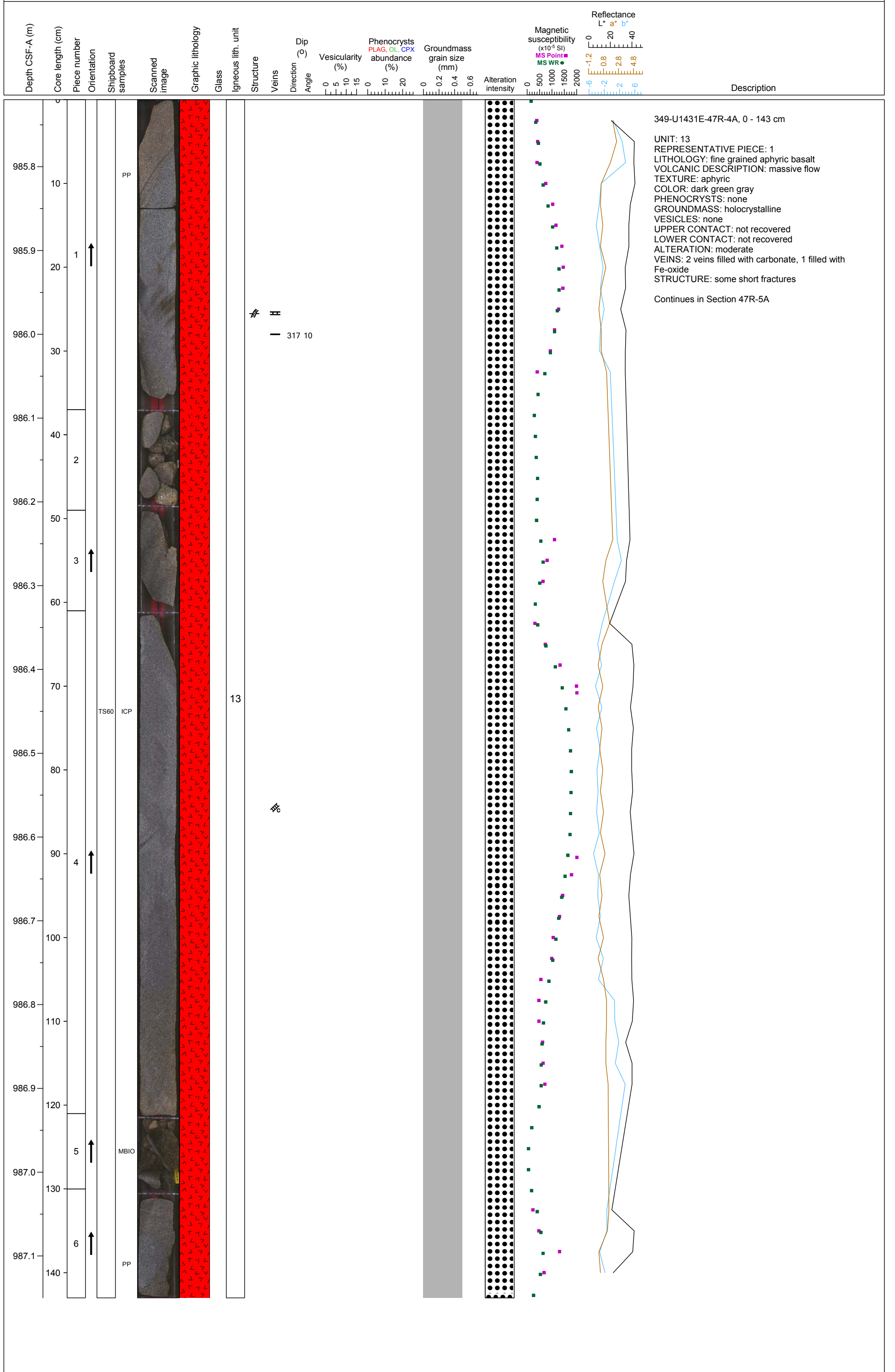
Hole 349-U1431E-47R Section 2, Top of Section: 983.2 m (CSF-A)



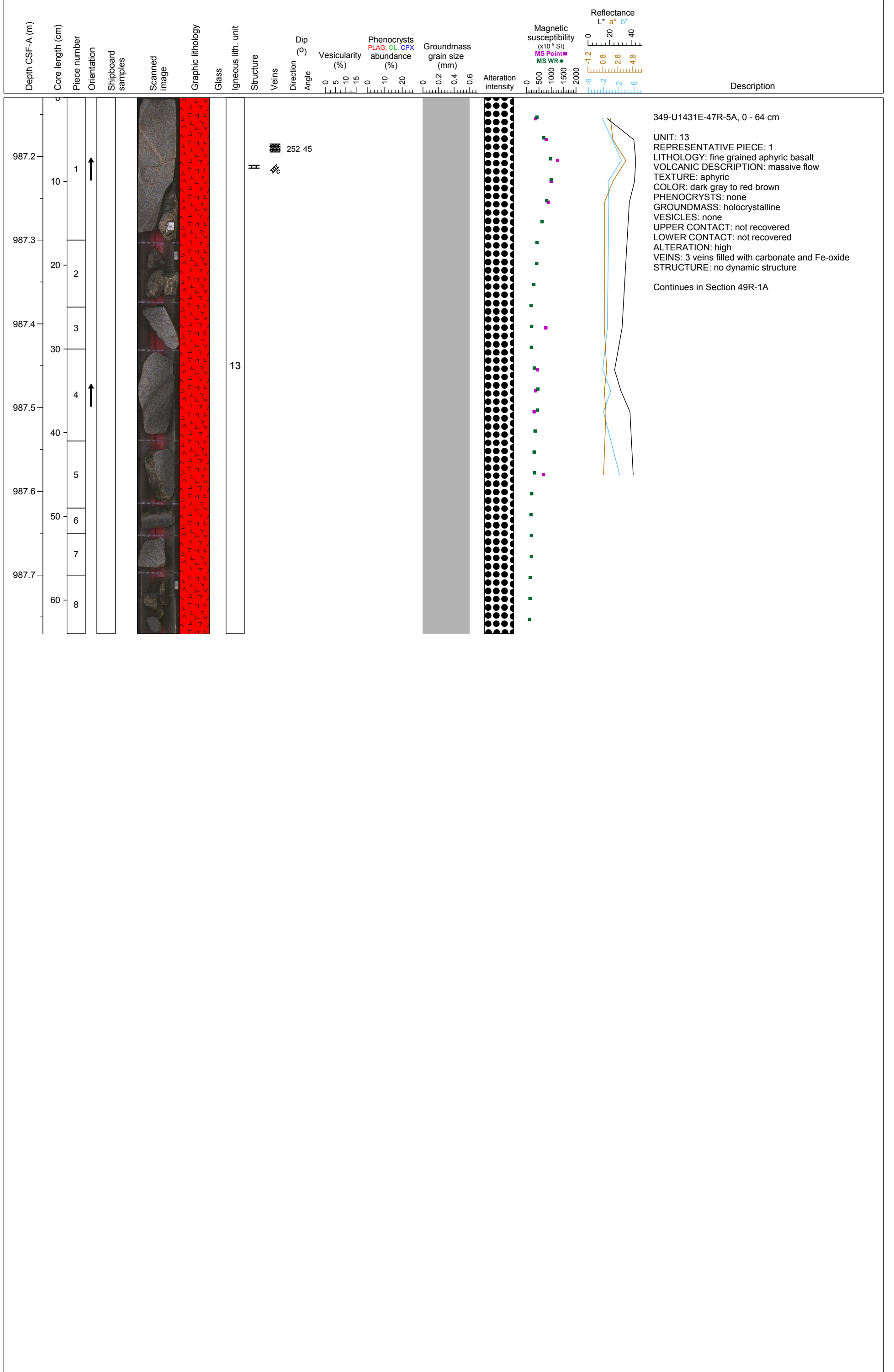
Hole 349-U1431E-47R Section 3, Top of Section: 984.47 m (CSF-A)



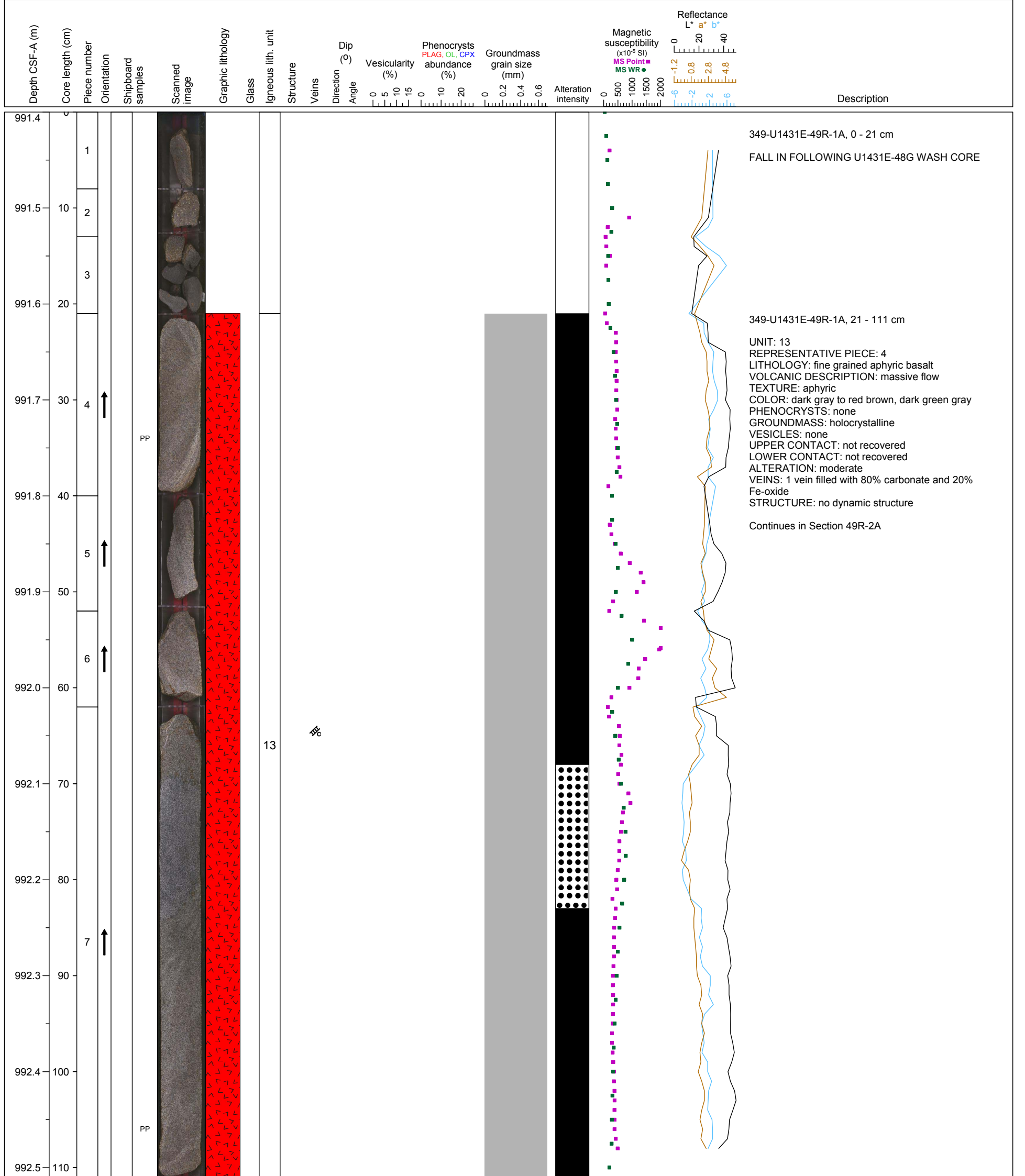
Hole 349-U1431E-47R Section 4, Top of Section: 985.72 m (CSF-A)



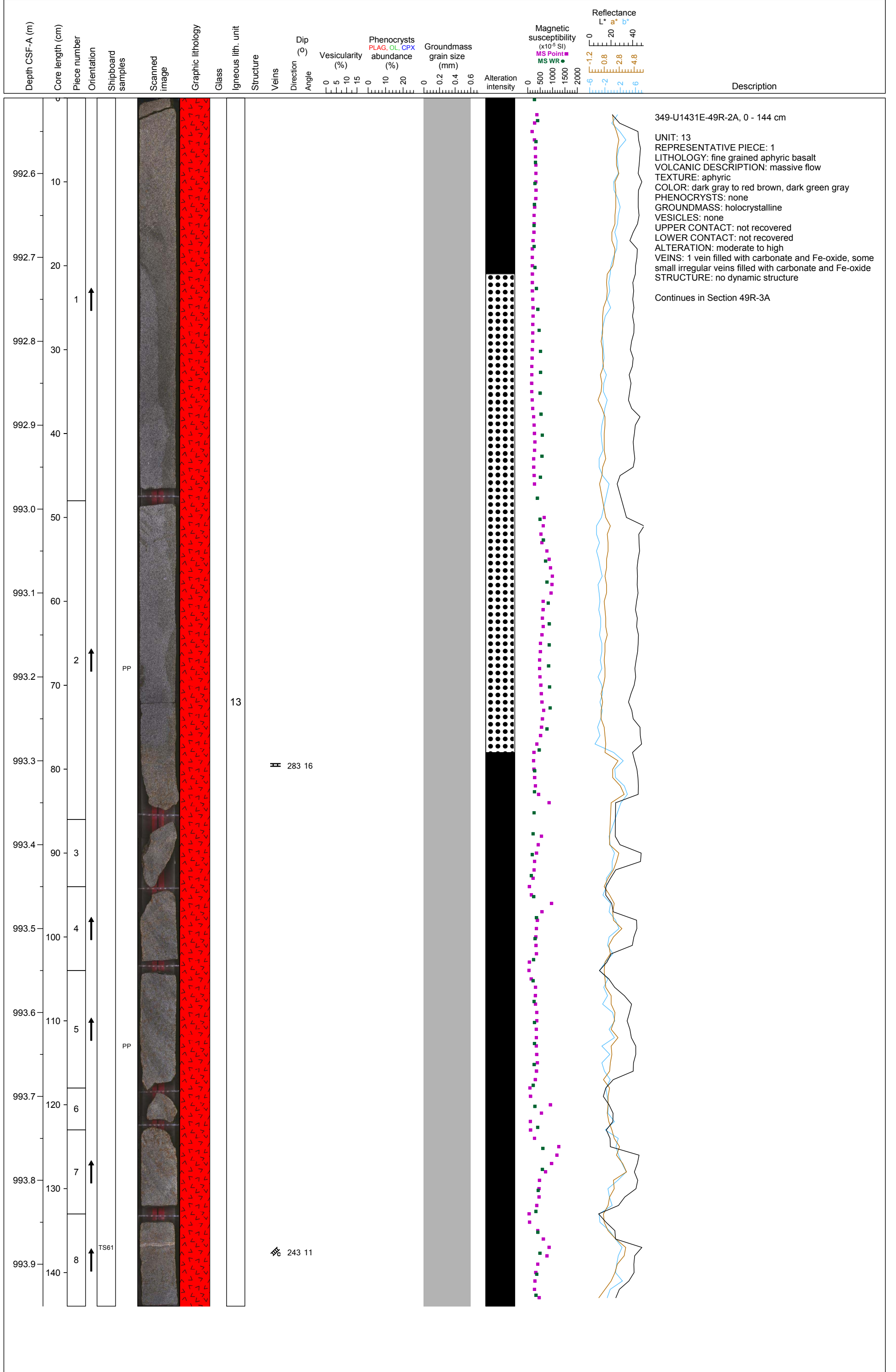
Hole 349-U1431E-47R Section 5, Top of Section: 987.15 m (CSF-A)



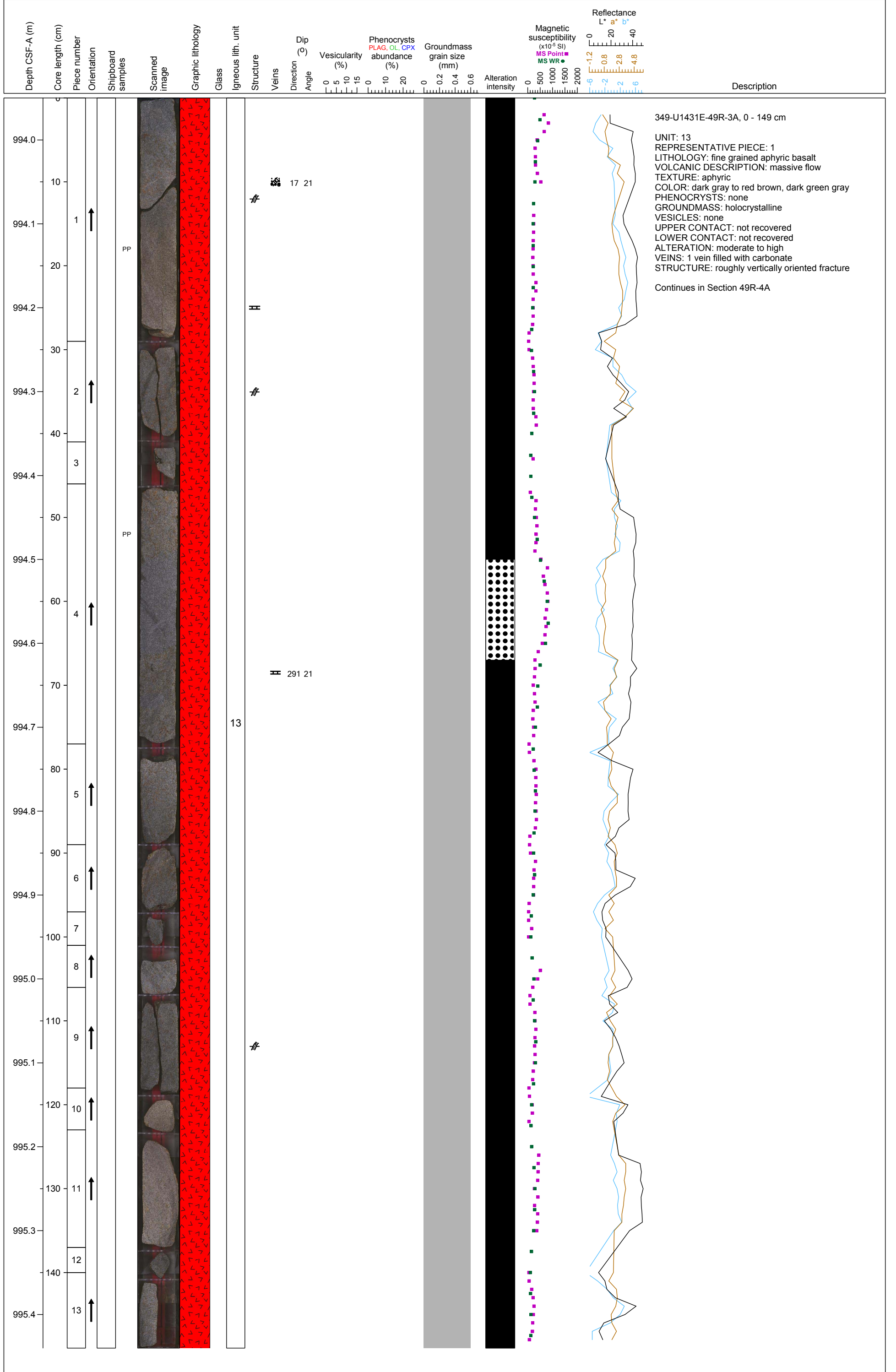
Hole 349-U1431E-49R Section 1, Top of Section: 991.4 m (CSF-A)



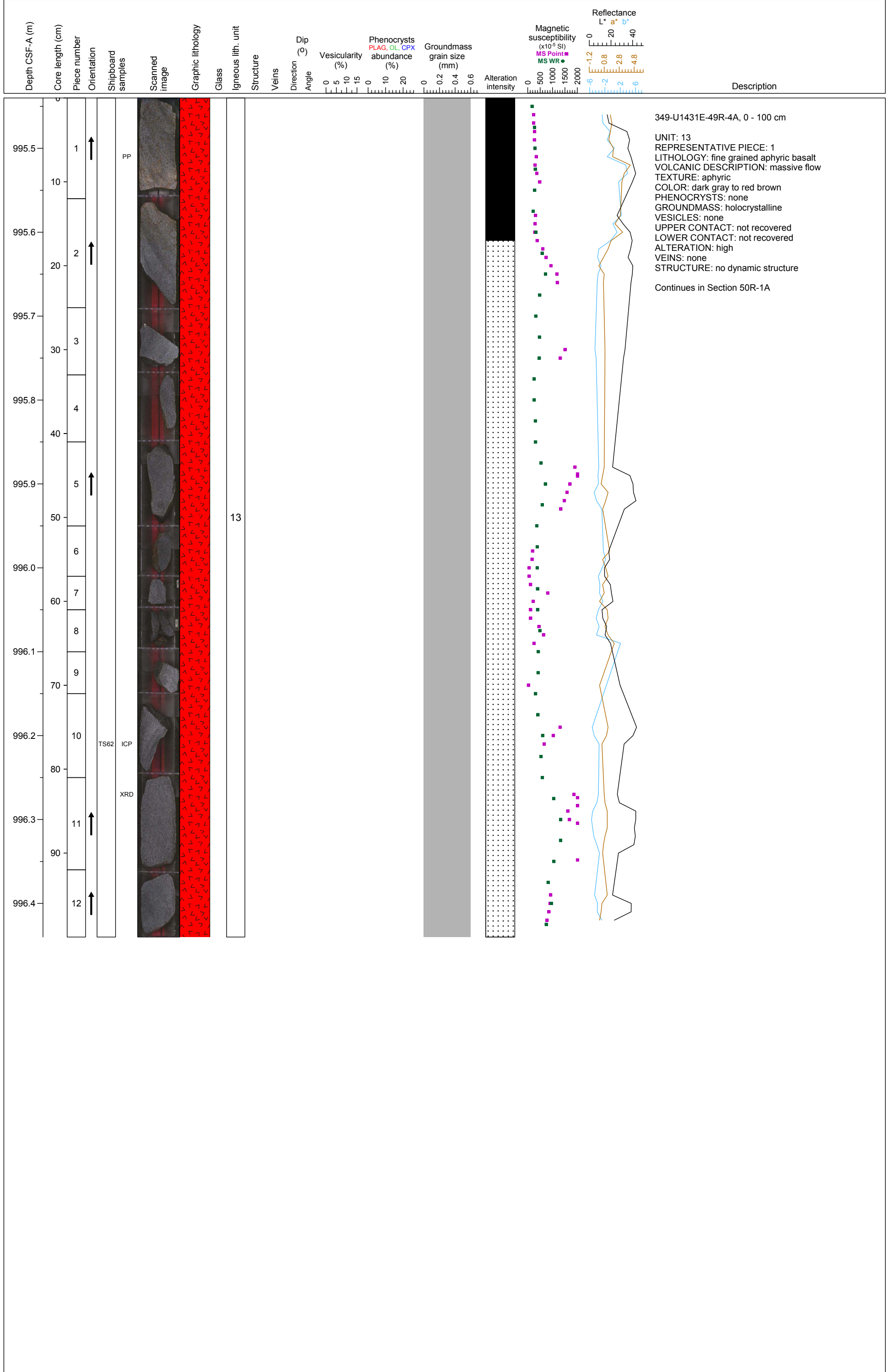
Hole 349-U1431E-49R Section 2, Top of Section: 992.51 m (CSF-A)



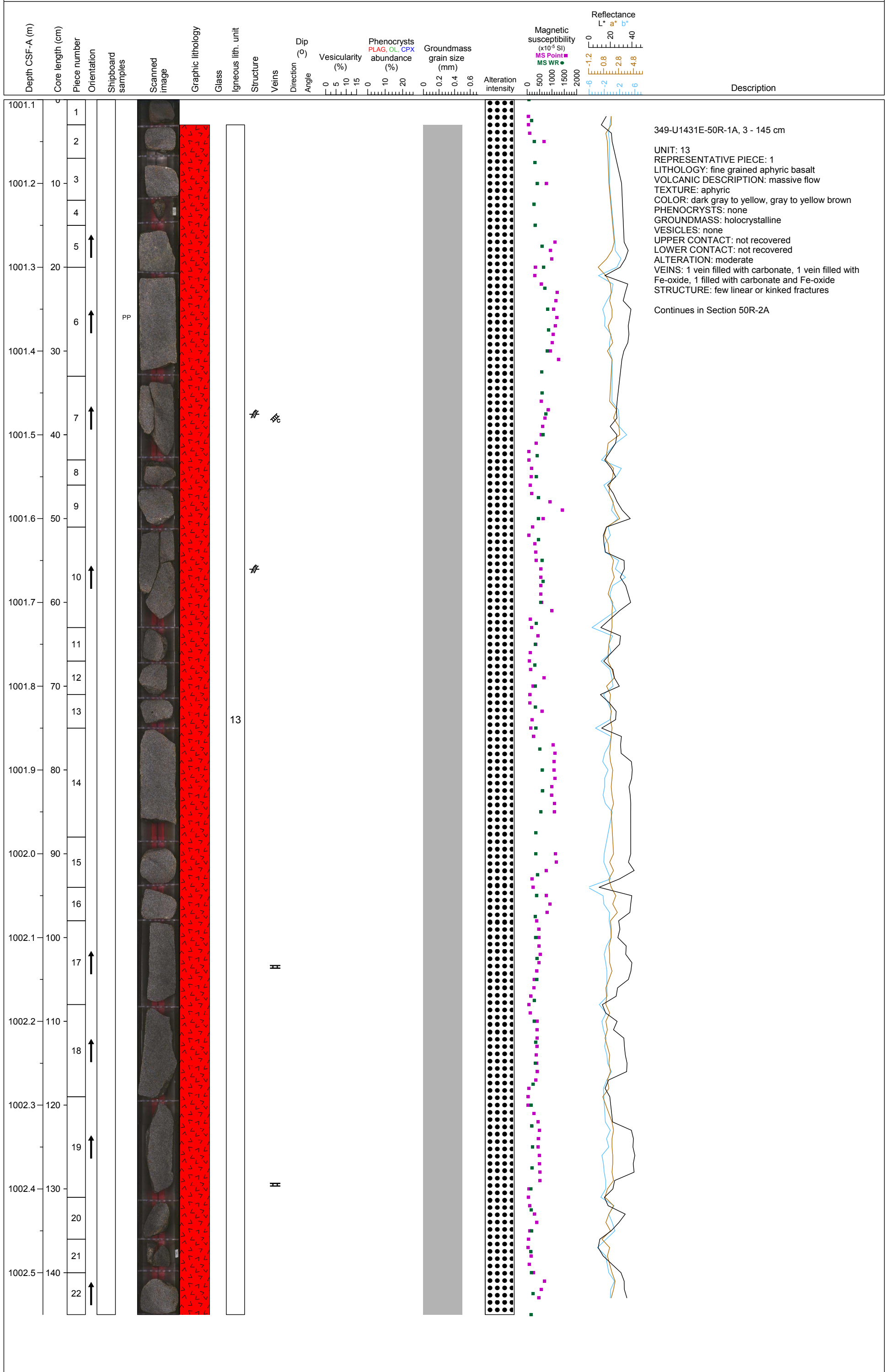
Hole 349-U1431E-49R Section 3, Top of Section: 993.95 m (CSF-A)



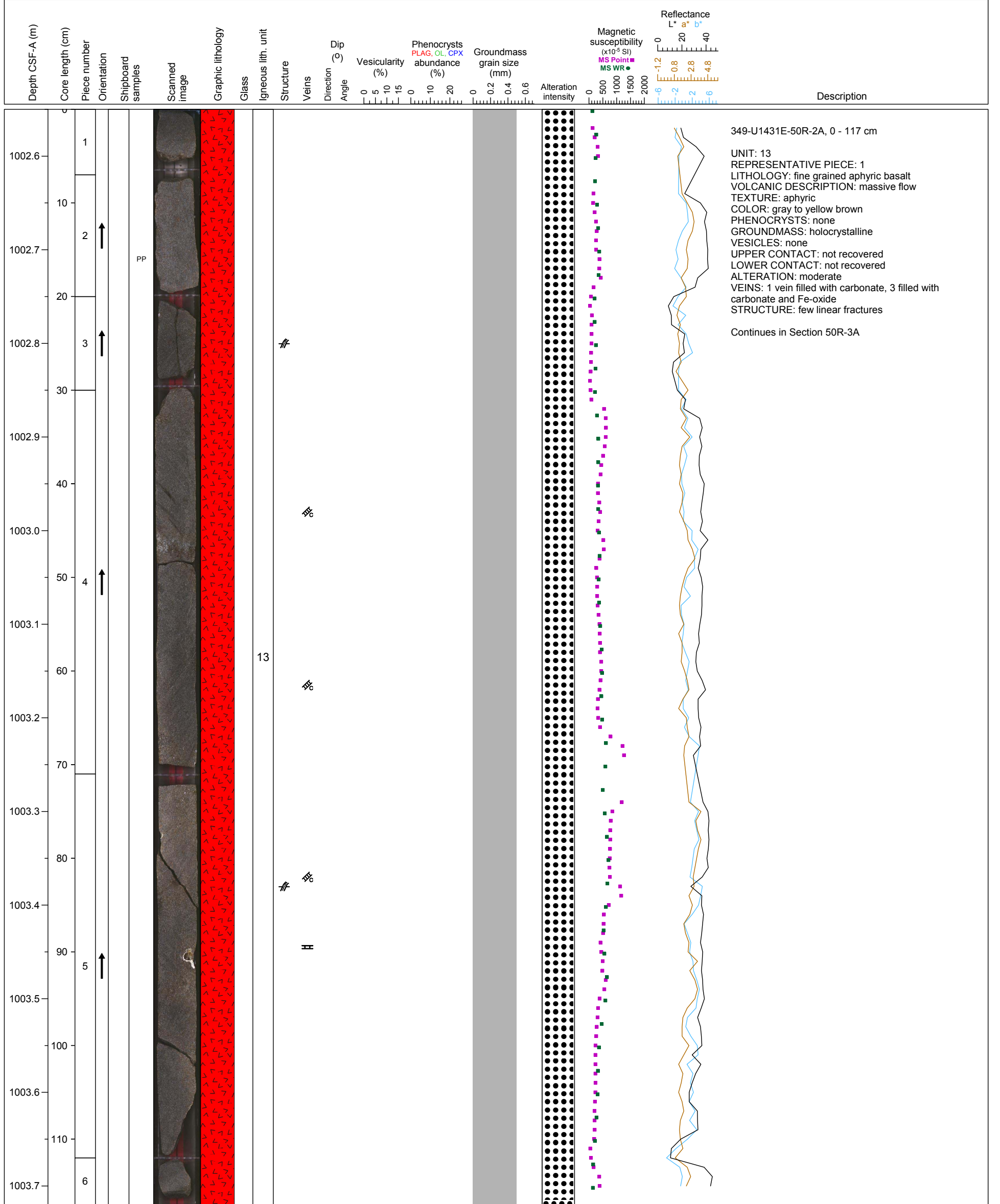
Hole 349-U1431E-49R Section 4, Top of Section: 995.44 m (CSF-A)



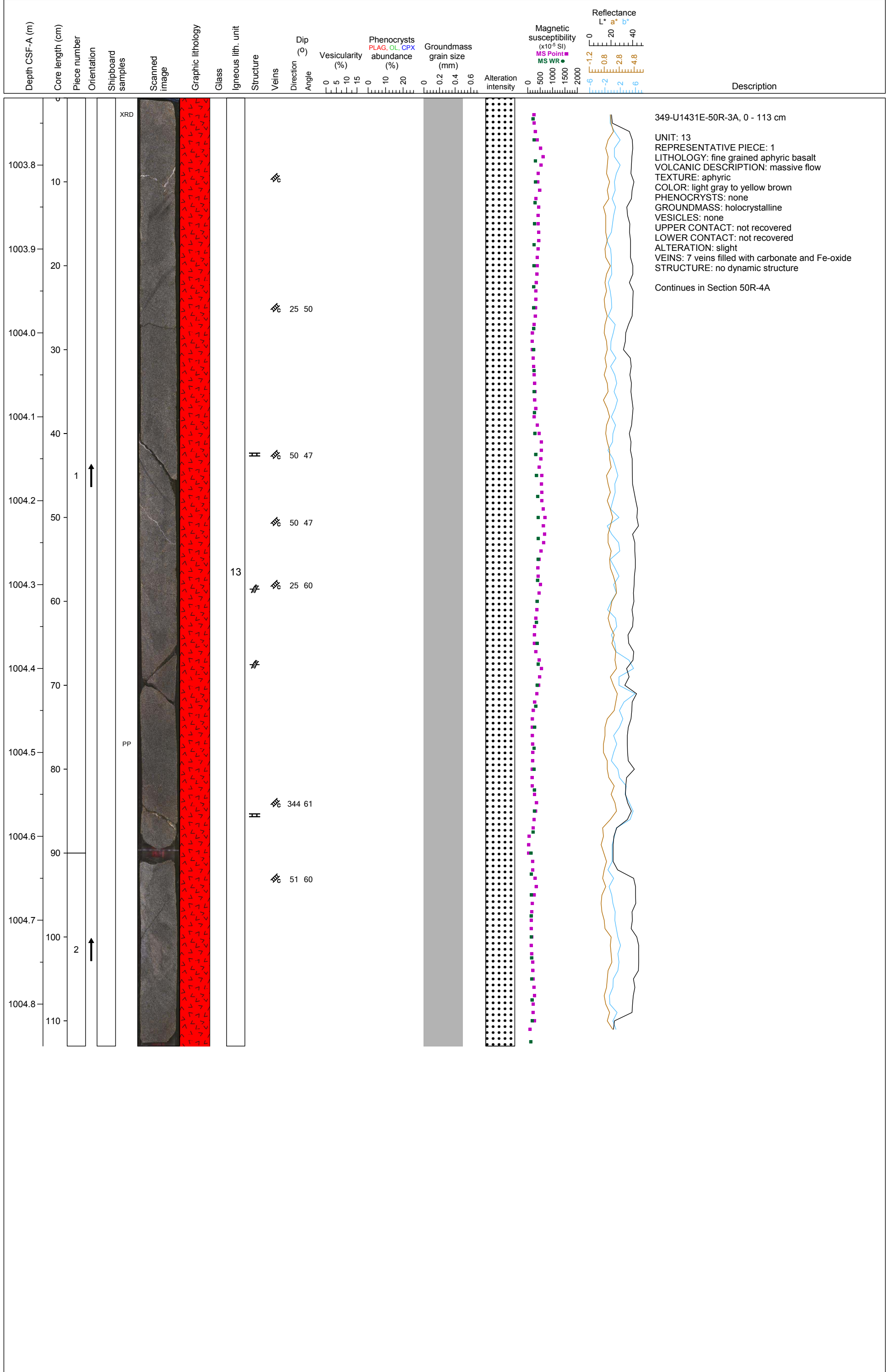
Hole 349-U1431E-50R Section 1, Top of Section: 1001.1 m (CSF-A)



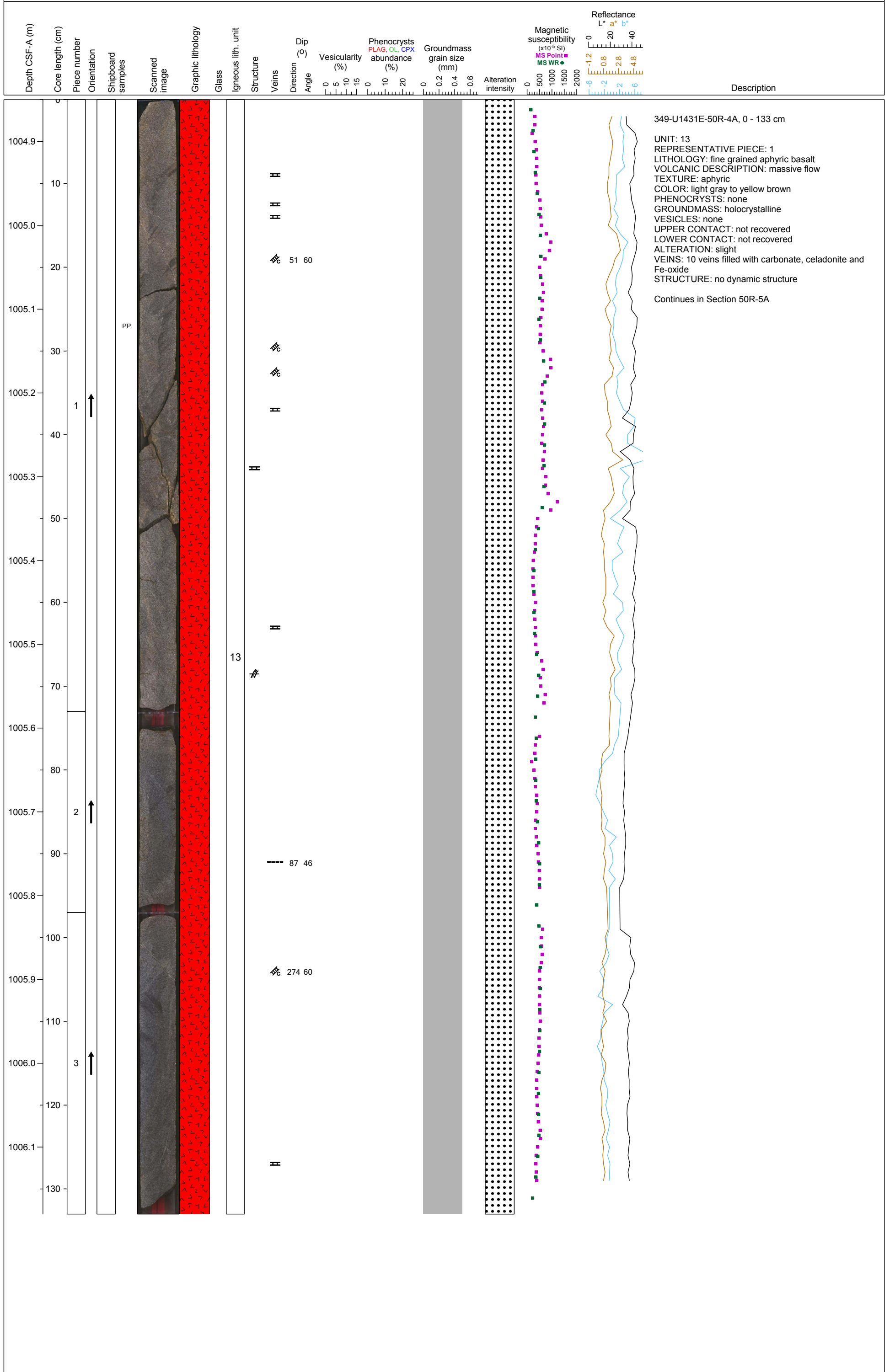
Hole 349-U1431E-50R Section 2, Top of Section: 1002.55 m (CSF-A)

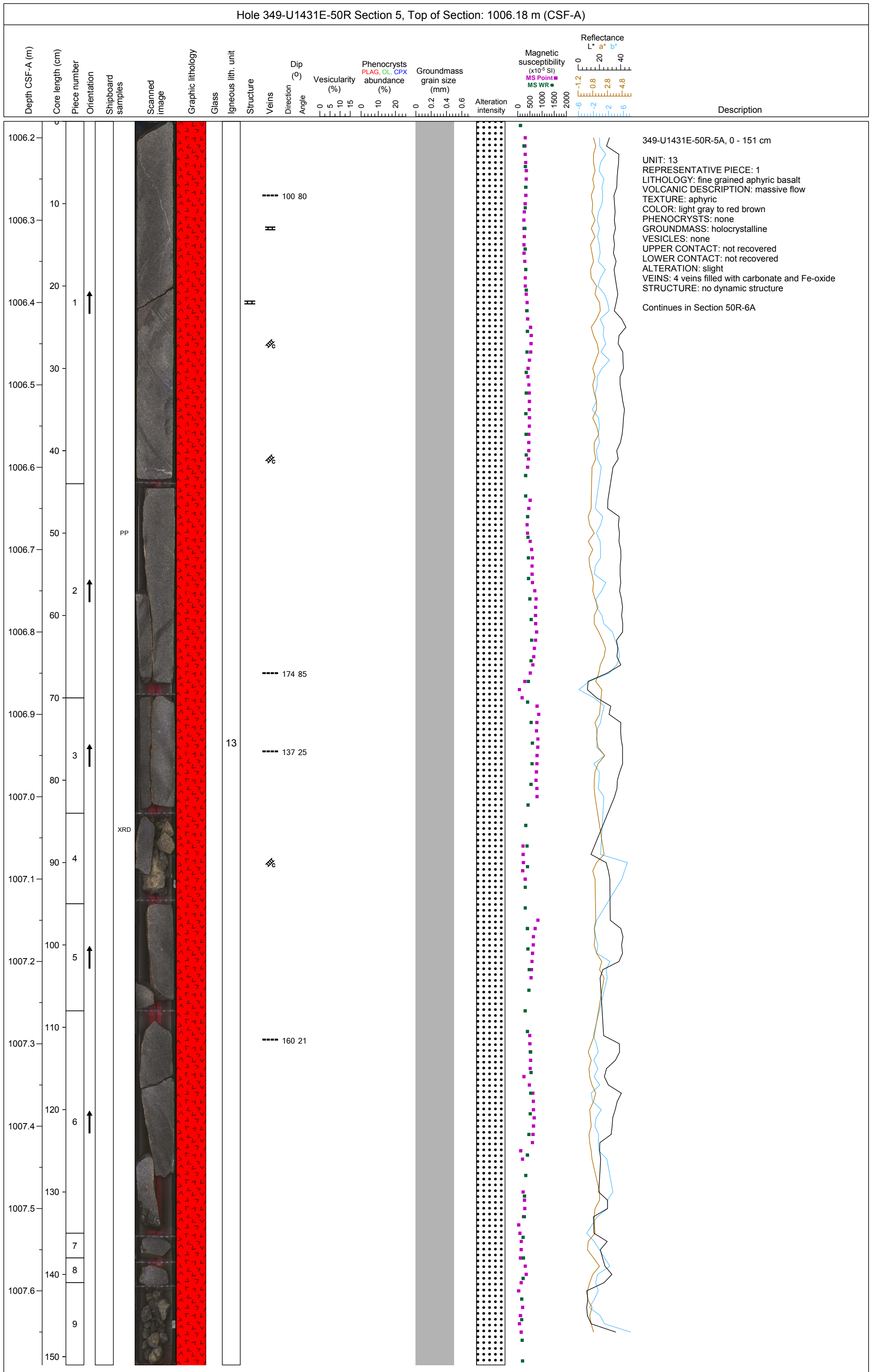


Hole 349-U1431E-50R Section 3, Top of Section: 1003.72 m (CSF-A)



Hole 349-U1431E-50R Section 4, Top of Section: 1004.85 m (CSF-A)





Hole 349-U1431E-50R Section 6, Top of Section: 1007.69 m (CSF-A)

Depth CSF-A (m)	Core length (cm)	Piece number	Orientation	Shipboard samples	Scanned image	Graphic lithology	Glass	Igneous lith. unit	Structure	Veins	Dip (°)	Vesicularity (%)	Phenocrysts abundance (%)	Groundmass grain size (mm)	Alteration intensity	Magnetic susceptibility (x10 ⁻⁵ SI)	Reflectance L* a* b*	Description
1007.8	10	1	↑	TS63 ICP				13										349-U1431E-50R-6A, 0 - 20 cm UNIT: 13 REPRESENTATIVE PIECE: 1 LITHOLOGY: fine grained aphyric basalt VOLCANIC DESCRIPTION: massive flow TEXTURE: aphyric COLOR: gray to gray green PHENOCRYSTS: none GROUNDMASS: holocrystalline VESICLES: none UPPER CONTACT: not recovered LOWER CONTACT: not recovered ALTERATION: slight VEINS: 1 vein filled with carbonate STRUCTURE: no dynamic structure
1007.9	2	2	↑	PP														End of Hole U1431E

THIN SECTION LABEL ID: **349-U1431D-2H-2W-93/94-TSB(93-94)-TS01**

Thin section no.: 1

Unit/Subunit:

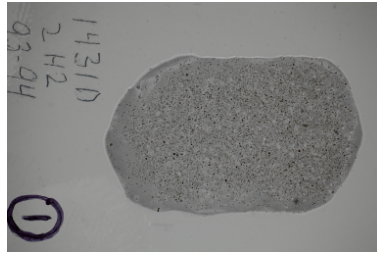
Piece no.:

Observer:

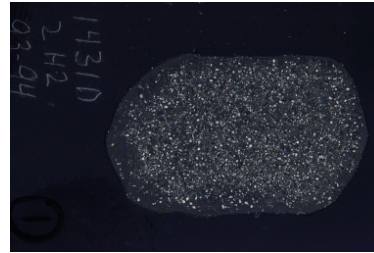
Dadd

Thin section summary:

Fine sand and silt-sized grains of foraminifers, plagioclase, basalt, glass shards, quartz, and lumps of clay, and rare clinopyroxene, biotite, ostracods and radiolarians.



Plane-polarized: 24571171

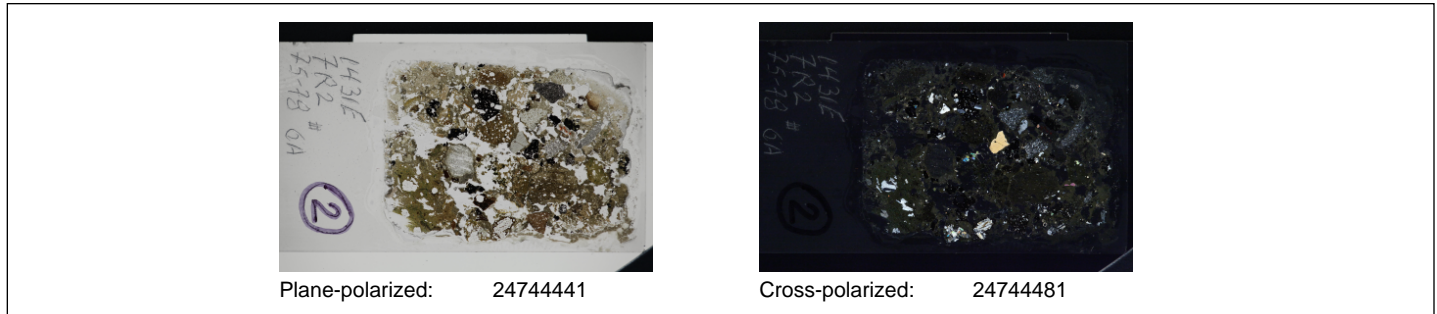


Cross-polarized: 24571151

THIN SECTION LABEL ID: 349-U1431E-7R-2-W 75/78-TSB(75-78)-TS02 Thin section no.: 2

Unit/Subunit: VI Piece no.: #3 Observer: Anthony Koppers

Thin section summary: Volcaniclastic breccia dominated by (glassy) volcanic clasts. This clast-supported breccia contains rounded lithic fragments of (laminated) mudstone as well as foraminifer fragments and the matrix has been partially cemented with carbonate. The matrix is relatively rich in plagioclase (up to a couple of percent) fragments (typically broken) that are unaltered in most cases and up to 2-3 mm in size. A trace of biotite flakes is found in the matrix. Two clast types dominate: (1) highly vesicular plagioclase-phyric basalt or scoria and (2) sparsely plagioclase-phyric trachytic basalt. A third less common clast in this thin section, but likely more abundant in the core, is a nonvesicular vitrophyric basalt with traces of plagioclase laths. All clasts are extremely altered, although some fresher glass areas are observed.



SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment matrix Domain rel. abundance (%): 100 Observer: CLIFT

Lithology: breccia

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	100	Tephra		Mineral grains	angular
Sand texture		Siliciclastics	100	Ash grains	angular
Silt texture		Detrital carbonate			
Clay texture		Biogenic carbonate			
		Biogenic silica			

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: clast type 1 Domain rel. abundance (%): 10 Observer: Anthony Koppers

Lithology: plagioclase-phyric basalt

Texture: porphyritic / porphyry Average grain size: cryptocrystalline Grain size distribution: bimodal

Domain comment: plagioclase-phyric scoriaceous clast type

Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Comments
Total (whole rock constituents):	40	0	40	0.02	0.7	0.2	elongate	

Phenocryst	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Special Features	Comments
Plagioclase	15	14	1	0.2		0.6	euhedral-subhedral	prismatic		clast type is likely source for all the large plagioclase fragments in the matrix of this volcanoclastic breccia
Total (whole rock constituents):	15	14	1							

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Glass	100	4	96						extremely altered by palagonitization
Total (groundmass constituents):	100	4	96						
Total (whole rock constituents):	45	2	43						

Sample domain name: clast type 2 Domain rel. abundance (%): 10 Observer: Anthony Koppers

Lithology: sparsely plagioclase-phyric basalt

Texture: trachytic Average grain size: fine grained Grain size distribution: bimodal

Domain comment: fine-grained trachytic basalt

Phenocryst	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Special Features	Comments
Plagioclase	2	1.9	0.1	0.05		0.1	euhedral-subhedral	prismatic short		
Total (whole rock constituents):	2	1.9	0.1							

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	2	1.6	0.4	0.02	0.1	0.05	subhedral	equant	not colored in single-polar light, so likely not clinopyroxene
Plagioclase	30	25	5	0.01	0.1	0.05	euhedral-subhedral	lath-shaped	
Fe-Ti Oxide	3	3	0	0.01	0.07	0.02	angular	equant	
Mesostasis	65	0	65						Seems that clinopyroxene is part of the mesostasis but hard to determine as it is barely crystalline
Total (groundmass constituents):	100	29.6	70.4						
Total (whole rock constituents):	98	29	69						

Sample domain name: clast type 3 Domain rel. abundance (%): 10 Observer: Anthony Koppers

Lithology: sparsely plagioclase-phyric basalt

Texture: porphyritic / porphyry Average grain size: cryptocrystalline Grain size distribution: bimodal

Domain comment: dark clasts macroscopically because 100% glass in matrix and only a few small plagioclase laths as microcrysts

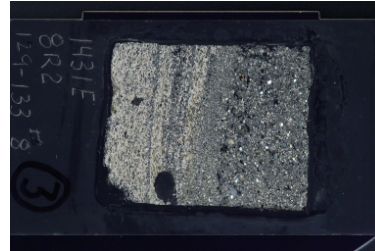
Phenocryst	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Special Features	Comments
Plagioclase	1	1	0	0.02		0.05	euohedral	prismatic elongated		
Total (whole rock constituents):	1	1	0							

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Glass	100	0	100						extremely altered but still has appearance of a glass in thin section
Total (groundmass constituents):	100	0	100						
Total (whole rock constituents):	99	0	99						

THIN SECTION LABEL ID: **349-U1431E-8R-2-W 129/133-TSB(129-133)-TS03** Thin section no.: 3
 Unit/Subunit: VI Piece no.: #8 Observer: Anthony Koppers
 Thin section summary: Bedded siltstone with foraminifers and 55% volcanoclastic components. This matrix-supported siltstone has carbonate supporting many small broken, subangular, equant pieces of plagioclase crystals, as well as highly altered pieces/shards of volcanic glass (not easily recognizable due to small size) and minor forams. The green color of this rock is likely due to the alteration of the volcanic glass.



Plane-polarized: 24744501



Cross-polarized: 24744521

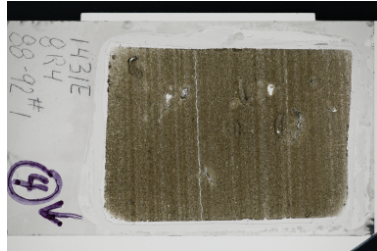
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment matrix Domain rel. abundance (%): 100 Observer: CLIFT

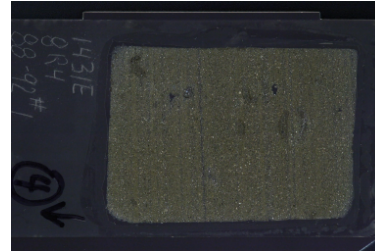
Lithology: siltstone with foraminifers

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture		Tephra	55	Mineral grains	subangular
Sand texture	10	Siliciclastics	20	Ash grains	
Silt texture	70	Detrital carbonate			
Clay texture	20	Biogenic carbonate	25		
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-8R-4-W 88/92-TSB(88-92)-TS04** Thin section no.: 4
 Unit/Subunit: VI Piece no.: #1 Observer: Anthony Koppers
 Thin section summary: Strongly laminated clayey siltstone with foraminifers and volcanoclastic components. This matrix-supported fine siltstone has carbonate supporting many small broken, subangular, equant pieces of plagioclase crystals, as well as highly altered pieces/shards of volcanic glass (not easily recognizable due to small size) and minor forams. The green color of this rock is likely due to the alteration of the volcanic glass.



Plane-polarized: 24744541



Cross-polarized: 24744561

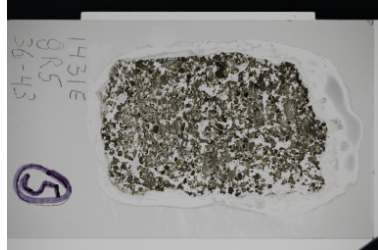
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment matrix Domain rel. abundance (%): 100 Observer: CLIFT

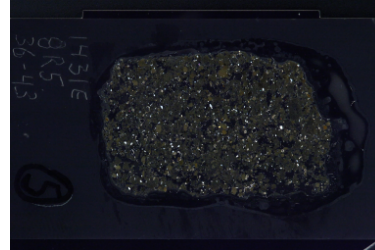
Lithology: clayey siltstone with foraminifers

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture		Tephra		Mineral grains	angular
Sand texture		Siliciclastics	85	Ash grains	
Silt texture	40	Detrital carbonate			
Clay texture	60	Biogenic carbonate	15		
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-8R-5-W 36/43-TSB(36-43)-TS05** Thin section no.: 5
 Unit/Subunit: VI Piece no.: #3, #4 Observer: Anthony Koppers
 Thin section summary: Volcaniclastic sandstone with foraminifers, other carbonate components, basaltic glass and plagioclase fragments. Matrix supported by carbonate. Fresh basaltic glass shards are observed up to 0.4 mm in size and are typically vesicle free. Plagioclase fragments are almost entirely fresh with sharp edges and also up to 0.4 mm in size. They appear to be broken pieces of larger (phenocrystic) crystals with 4% abundance in the sandstone. The majority of the volcanic clasts are scoriaceous, highly altered and show faint outlines of microlites.



Plane-polarized: 24744581



Cross-polarized: 24744601

SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment matrix Domain rel. abundance (%): 100 Observer: CLIFT

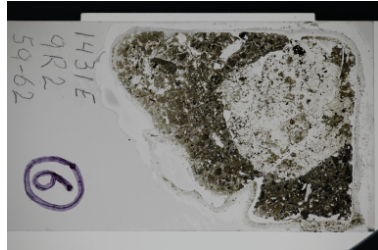
Lithology: sandstone

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture		Tephra		Mineral grains	angular
Sand texture	80	Siliciclastics	90	Ash grains	angular
Silt texture	20	Detrital carbonate			
Clay texture		Biogenic carbonate	10		
		Biogenic silica			

THIN SECTION LABEL ID: 349-U1431E-9R-2-W 59/62-TSB(59-62)-TS06 Thin section no.: 6

Unit/Subunit: VI Piece no.: #6 Observer: Anthony Koppers

Thin section summary: Volcaniclastic breccia with a single large clast of another similar breccia lithology. Traces of foraminifers, other carbonate components, basaltic glass and plagioclase fragments. Also traces of fresh olivine crystal fragments and some biotite flakes were found. Clast supported. Fresh basaltic glass shards are observed up to 1 mm in size and are typically vesicle free. Plagioclase fragments are almost entirely fresh with sharp edges and also up to 0.4 mm in size. They appear to be broken pieces of larger (phenocrystic) crystals with 2% abundance in the breccia. The majority of the volcanic clasts are scoriaceous, typically highly altered but a large group has partially preserved some of the volcanic glass making up the matrix of these basalts. Some show faint outlines of microlites.



Plane-polarized: 24744621



Cross-polarized: 24744641

SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment matrix Domain rel. abundance (%): 100 Observer: CLIFT

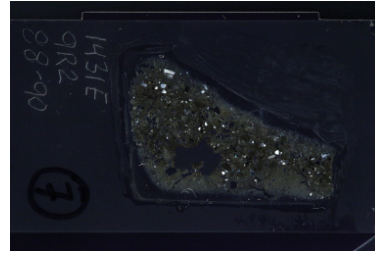
Lithology: breccia

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	60	Tephra	5	Mineral grains	subangular
Sand texture	15	Siliciclastics	95	Ash grains	angular
Silt texture	10	Detrital carbonate			
Clay texture	15	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-9R-2-W 88/90-TSB(88-90)-TS07** Thin section no.: 7
 Unit/Subunit: VI Piece no.: #8 Observer: CLIFT, Anthony Koppers
 Thin section summary: Coarse volcanic sandstone with angular fragments of vesicular mafic tephra, partially devitrified, together with large plagioclase grains, volcanic lithic clasts (plagioclase-phyric lavas) and lesser amounts of clinopyroxene, minor quartz and one planktonic foraminifer. Sediment is very poorly sorted. Matrix is clay-rich, possibly palagonite and authigenic. Some fresh volcanic glass shards are present as well as a trace of biotite flakes.



Plane-polarized: 24744661



Cross-polarized: 24744681

SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment matrix Domain rel. abundance (%): 100 Observer: CLIFT

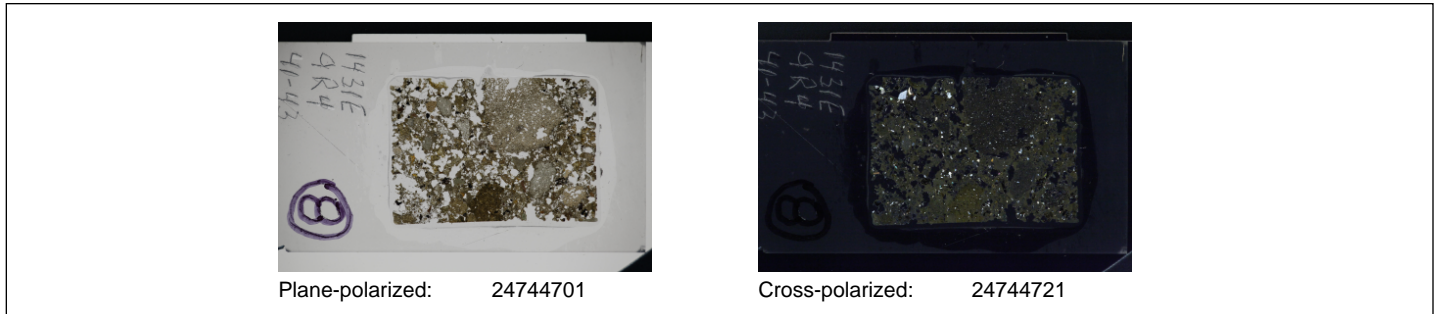
Lithology: sandstone

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture		Tephra	65	Mineral grains	subrounded
Sand texture	60	Siliciclastics	35	Ash grains	subangular
Silt texture	10	Detrital carbonate			
Clay texture	30	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: 349-U1431E-9R-4-W 41/43-TSB(41-43)-TS08 Thin section no.: 8

Unit/Subunit: VI Piece no.: #3 Observer: CLIFT, Anthony Koppers

Thin section summary: Coarse volcanic breccia with a coarse sandstone matrix of mostly angular to subangular clasts. Sorting is very poor with a clay-rich matrix. Sediment is clast supported. Mafic, vesicular glass fragments (scoria) are the most common followed by feldspar-phyric volcanic rocks, plagioclase fragments and clinopyroxene/olivine in descending order of abundance. Some reworked volcanic sandstone clasts observed. Sediment is very proximal.



SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 70 Observer: Tao

Lithology: breccia

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	85	Tephra	25	Mineral grains	subangular
Sand texture	10	Siliciclastics	75	Ash grains	subangular
Silt texture	5	Detrital carbonate			
Clay texture		Biogenic carbonate			
		Biogenic silica			

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: clast type 1 Domain rel. abundance (%): 15 Observer: Anthony Koppers

Lithology: sparsely plagioclase phyric basalt

Texture: vitrophyric Average grain size: cryptocrystalline Grain size distribution: bimodal

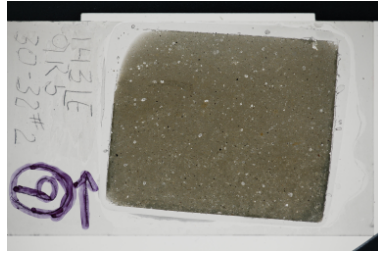
Domain comment: plagioclase-phyric scoriaceous clast type

Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Comments
Total (whole rock constituents):	50	0	50	0.02	0.6	0.06	rounded	some of the vesicles are banded and stretched

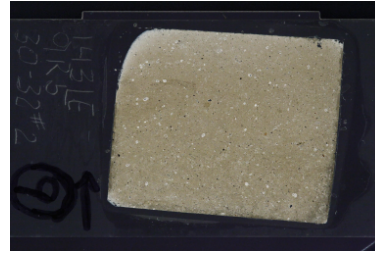
Phenocryst	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Special Features	Comments
Plagioclase	2	1.9	0.1	0.05		0.1	euhedral-subhedral	lath-shaped		
Total (whole rock constituents):	2	1.9	0.1							

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Glass	100	0	100						
Total (groundmass constituents):	100	0	100						
Total (whole rock constituents):	48	0	48						

THIN SECTION LABEL ID: **349-U1431E-9R-5-W 30/32-TSB(30-32)-TS09** Thin section no.: 9
 Unit/Subunit: VI Piece no.: #2 Observer: CLIFT, Anthony Koppers
 Thin section summary: Micritic limestone with common planktonic foraminifers floating in matrix of fine calcite and with scattered, very small clasts of dark brown mafic volcanic glass (shards) and minor opaques. The foraminifers are filled by calcite spar. Some are broken but many are whole. There are small amounts of amorphous calcite grains. Sediment is generally very homogenous.



Plane-polarized: 24744741



Cross-polarized: 24744761

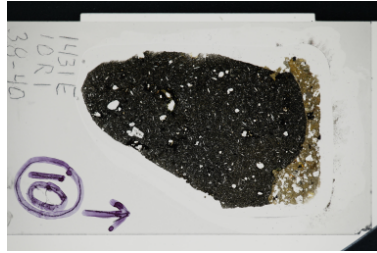
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment matrix Domain rel. abundance (%): 90 Observer: Tao

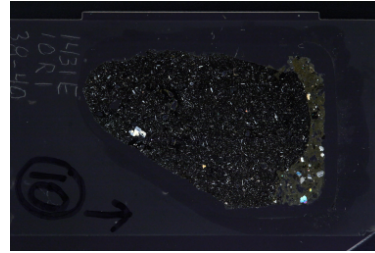
Lithology: claystone with silt

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture		Tephra	10	Mineral grains	subangular
Sand texture		Siliciclastics		Ash grains	subangular
Silt texture	15	Detrital carbonate	80		
Clay texture	85	Biogenic carbonate	10		
		Biogenic silica			

THIN SECTION LABEL ID: 349-U1431E-10R-1-W 38/40-TSB(38-40)-TS10 Thin section no.: 10
 Unit/Subunit: VI Piece no.: #2 Observer: MGTejada, Anthony Koppers
 Thin section summary: Large (4 cm) olivine-plagioclase-phyric basalt clast in volcanoclastic breccia, with small plagioclase microlites in devitrified glassy matrix, 4% vesicles, with the bigger vesicles only partially filled in. Volcanoclastic breccia matrix dominantly composed of fresh mafic glass shards, plagioclase and olivine crystal fragments, finer basaltic clasts, and fossils with fine palagonitized(?) glass or clay in between.



Plane-polarized: 24744781



Cross-polarized: 24744801

SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 90 Observer: Tao

Lithology: breccia with sand

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	90	Tephra	80	Mineral grains	subangular
Sand texture	5	Siliciclastics	20	Ash grains	subangular
Silt texture	5	Detrital carbonate			
Clay texture		Biogenic carbonate			
		Biogenic silica			

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: volcanoclastic clasts Domain rel. abundance (%): 90 Observer: MGTejada

Lithology: olivine-plagioclase-phyric basalt

Texture: vitrophyric Average grain size: cryptocrystalline Grain size distribution: bimodal

Domain comment: moderatey altered

Phenocryst	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Special Features	Comments
Olivine	1	0.9	0.1		0.2	0.4	euhedral-subhedral	prismatic elongated	euhedral pseudomorphs	some totally replaced by calcite or clay
Plagioclase	2	2	0	0.2	0.2	0.4	euhedral-subhedral	prismatic elongated	euhedral pseudomorphs	
Total (whole rock constituents):	3	2.9	0.1							

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	20	20	0	0.05	0.2	0.1	subhedral-anhedral	acicular	
Fe-Ti Oxide	17	17	0	0.01	0.1	0.05	subhedral-anhedral	interstitial	random distribution
Mesostasis	63	51	12						also contains patches of amoeboid secondary oxides
Total (groundmass constituents):	100	88	12						
Total (whole rock constituents):	97	85	12						

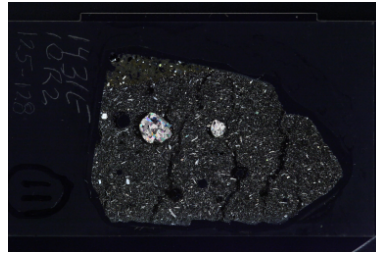
Sample domain name: volcaniclastic matrix Domain rel. abundance (%): 10 Observer: MGTejada

Domain comment: volcaniclastic breccia matrix; dominantly composed of mafic glass shards, plagioclase and olivine crystals, finer basaltic clasts, and fossils and fine brown clay or palagonitized glass

THIN SECTION LABEL ID: 349-U1431E-10R-2-W 125/128-TSB(125-128)-TS11 Thin section no.: 11
 Unit/Subunit: VI Piece no.: #4 Observer: MGTejada, Anthony Koppers
 Thin section summary: Large (5 cm) plagioclase-phyric basalt clast in volcanoclastic breccia. Matrix contains foraminifers, fresh volcanic glass fragments and shards, and pieces of plagioclase crystals.



Plane-polarized: 24744821



Cross-polarized: 24744841

SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 90 Observer: Tao

Lithology: breccia

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	100	Tephra	100	Mineral grains	angular
Sand texture		Siliciclastics		Ash grains	angular
Silt texture		Detrital carbonate			
Clay texture		Biogenic carbonate			
		Biogenic silica			

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: volcanoclastic matrix Domain rel. abundance (%): 5 Observer: Anthony Koppers

Domain comment: Volcanoclastic breccia matrix; dominantly composed of mafic glass shards, plagioclase and olivine crystals, finer basaltic clasts, and fossils and fine brown clay or palagonitized glass

Sample domain name: volcanoclastic clasts Domain rel. abundance (%): 95 Observer: MGTejada

Lithology: olivine-plagioclase-phyric basalt

Texture: vitrophyric Average grain size: cryptocrystalline Grain size distribution: bimodal

Domain comment: highly altered

Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Comments
Total (whole rock constituents):	5	5	0				rounded	

Phenocryst	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Special Features	Comments
Olivine	0.05	0.04	0.01	0.1	0.4	0.2	subhedral-anhedral	prismatic elongated		partially replaced
Plagioclase	6	6	0	0.2	0.4	0.4	euhedral-subhedral	prismatic elongated		
Total (whole rock constituents):	6.05	6.04	0.01							

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	20	20	0	0.03	0.2	0.05	subhedral-anhedral	acicular	
Fe-Ti Oxide	15	14.7	0.3	0.01	0.1	0.05	subhedral-anhedral	subequant	random distribution; some oxide staining
Mesostasis	65	51	14						also contains a few fragments of volcanic clasts
Total (groundmass constituents):	100	85.7	14.3						
Total (whole rock constituents):	88.95	75.96	12.99						

THIN SECTION LABEL ID: **349-U1431E-10R-4-W 116/118-TSB(116-118)-TS12** Thin section no.: 12
 Unit/Subunit: VI Piece no.: #11 Observer: Dadd
 Thin section summary: Breccia with angular to subrounded clasts of basalt. Clasts are up to 10 mm in size with an average of 3 mm. There are a number of different basalt types. Most are still glassy or show slight alteration after glass. The vesicularity of clasts varies from none to scoriaceous. Phenocrysts in the basalt clasts include olivine, clinopyroxene and plagioclase. A few trachytic basalt clasts are present. There are occasional single grain plagioclase crystals, some with glassy selvages. The matrix appears to be finer with more altered fragments of basalt and occasional foraminifer grains.



Plane-polarized: 24744861



Cross-polarized: 24744881

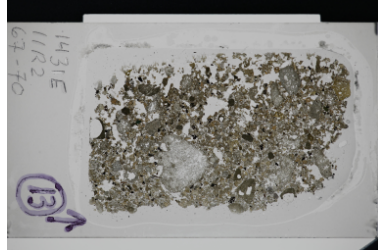
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 90 Observer: Tao

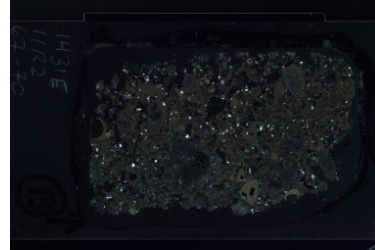
Lithology: breccia

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	85	Tephra	85	Mineral grains	angular
Sand texture	5	Siliciclastics	15	Ash grains	angular
Silt texture	5	Detrital carbonate			
Clay texture		Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-11R-2-W 67/70-TSB(67-70)-TS13** Thin section no.: 13
 Unit/Subunit: VI Piece no.: #7 Observer: Anthony Koppers
 Thin section summary: Breccia with subangular lithic clasts and a trace of basalt clasts. Clasts are up to 30 mm in size with an average of 8 mm. There are a number of different basalt types. Most are still glassy or show moderate to complete alteration after glass. The vesicularity of clasts varies from none to scoriaceous. Phenocrysts in the basalt clasts include olivine, clinopyroxene and plagioclase. Some of the clasts are welded pumice, with long stretched (filled) vesicles. There are occasional single grain plagioclase crystals, some with glassy selvages. The matrix appears to be finer with more altered fragments of basalt and occasional foraminifer grains.



Plane-polarized: 24764641



Cross-polarized: 24764661

SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 80 Observer: Dadd

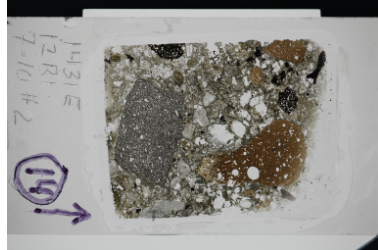
Lithology: breccia

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	90	Tephra	5	Mineral grains	subangular
Sand texture	5	Siliciclastics	98	Ash grains	subangular
Silt texture	5	Detrital carbonate			
Clay texture		Biogenic carbonate	2		
		Biogenic silica			

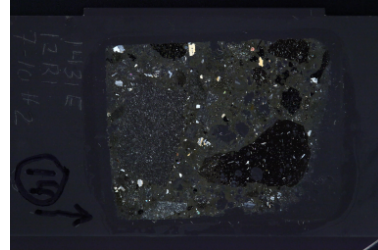
THIN SECTION LABEL ID: 349-U1431E-12R-1-W 7/10-TSB(7-10)-TS14 Thin section no.: 14

Unit/Subunit: VI Piece no.: #2 Observer: Anthony Koppers

Thin section summary: Breccia with angular to subrounded clasts of basalt. Clasts are up to 20 mm in size with an average of 2 mm. There are a number of different basalt types. Most are still glassy or show slight alteration after glass; fresh glass is present. The vesicularity of clasts varies from none to scoriaceous. Phenocrysts in the basalt clasts include olivine, clinopyroxene and plagioclase. There are occasional single grain plagioclase crystals, some with glassy selvages. The matrix appears to be finer with more altered fragments of basalt and occasional foraminifer grains.



Plane-polarized: 24764681



Cross-polarized: 24764701

SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 60 Observer: Dadd

Lithology: breccia

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	80	Tephra		Mineral grains	subangular
Sand texture	18	Siliciclastics	100	Ash grains	
Silt texture	2	Detrital carbonate			
Clay texture		Biogenic carbonate			
		Biogenic silica			

Sample domain name: sediment matrix Domain rel. abundance (%): 30 Observer: Dadd

Lithology: clayey silt

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture		Tephra		Mineral grains	
Sand texture		Siliciclastics	99	Ash grains	
Silt texture	20	Detrital carbonate			
Clay texture	80	Biogenic carbonate	1		
		Biogenic silica			

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: clast type 1 Domain rel. abundance (%): 10 Observer: Anthony Koppers

Lithology: sparsely olivine-plagioclase-phyric basalt

Texture: vitrophyric Average grain size: cryptocrystalline Grain size distribution: bimodal

Domain comment: moderately altered,, but different from clast type 3 by light colored appearance under microscope and in the core

Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Comments
Total (whole rock constituents):	5	3	2	0.02	1.6	0.1	rounded	

Phenocryst	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Special Features	Comments
Olivine	1	0.8	0.2	0.1	1	0.2	subhedral-anhedral	prismatic elongated		
Plagioclase	3	3	0	0.1	1	0.2	euhedral	prismatic elongated		
Total (whole rock constituents):	4	3.8	0.2							

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	2	2	0	0.01	0.05	0.02	subhedral	lath-shaped	
Fe-Ti Oxide	3	3	0	0.005	0.05	0.01	subhedral	subequant	random distribution; some oxide staining
Glass	95	70	25						beginning devitrification
Total (groundmass constituents):	100	75	25						
Total (whole rock constituents):	91	68	23						

Sample domain name: clast type 2 Domain rel. abundance (%): 3 Observer: Anthony Koppers

Lithology: aphyric basalt with biotite

Texture: trachytic Average grain size: fine grained Grain size distribution:

Domain comment: fine-grained trachytic basalt with traces of <0.1 mm long biotite flakes, possibly could be also hornblende (hard to tell due to alteration)

Phenocryst	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Special Features	Comments
Plagioclase	1	0.9	0.1	0.05		0.1	euhedral-subhedral	prismatic short		
Total (whole rock constituents):	1	0.9	0.1							

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	1	0.8	0.2	0.02	0.1	0.05	subhedral	equant	not colored in single-polar light, so likely not clinopyroxene
Plagioclase	30	25	5		0.1	0.05	euohedral-subhedral		
Fe-Ti Oxide	1	1	0	0.01	0.07	0.02	angular	equant	
Mesostasis	68	0	68						Seems that clinopyroxene is part of the mesostasis but hard to determine as it is barely crystalline
Total (groundmass constituents):	100	26.8	73.2						
Total (whole rock constituents):	99	27	72						

Sample domain name: clast type 3 Domain rel. abundance (%): 3 Observer: Anthony Koppers

Lithology: sparsely plagioclase-phyric
basalt

Texture: vitrophyric Average grain size: cryptocrystalline Grain size distribution: bimodal

Domain comment: moderately altered, but different from clast type 1 by very dark brown to black appearance under microscope and in the core

Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Comments
Total (whole rock constituents):	50	15	35	0.2	0.6	0.3	rounded	

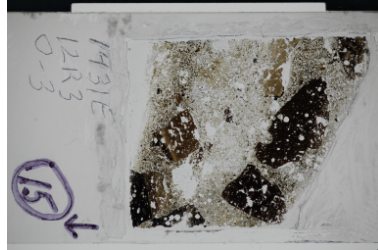
Phenocryst	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Special Features	Comments
Olivine	0	0	0.2					prismatic elongated		
Plagioclase	5	5	0	0.2		0.4	euohedral-subhedral	prismatic elongated		
Total (whole rock constituents):	5	5	0							

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Glass	100	0	100						
Total (groundmass constituents):	100	0	100						
Total (whole rock constituents):	45	0	45						

THIN SECTION LABEL ID: 349-U1431E-12R-3-W 0/3-TSB(0-3)-TS15 Thin section no.: 15

Unit/Subunit: VI Piece no.: #1 Observer: ZLIU, Anthony Koppers

Thin section summary: Breccia, with angular vitrophyric basalt clasts that contain plagioclase microlite laths. Clasts are up to 11 mm in size with an average of 3-4 mm. Some have relatively fresh volcanic glass, whereas others are partially altered to palagonite around the rims and others are completely altered to a dark brown opaque palagonite. Various types of basalt are observed, and phenocrysts in the basalt clasts and the volcanoclastic matrix are dominantly plagioclase, with minor olivine and clinopyroxene. Matrix also contains common foraminifers.



Plane-polarized: 24783281



Cross-polarized: 24783301

SEDIMENT/SEDIMENTARY ROCK

Sample domain name: Sediment clasts Domain rel. abundance (%): 100 Observer: ZLIU

Lithology: breccia

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	55	Tephra	95	Mineral grains	angular
Sand texture	25	Siliciclastics	4	Ash grains	angular
Silt texture	10	Detrital carbonate			
Clay texture	10	Biogenic carbonate	1		
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-13R-2-W 59/61-TSB(59-61)-TS20** Thin section no.: 20
 Unit/Subunit: VI Piece no.: #9 Observer: CLIFT, Anthony Koppers
 Thin section summary: Sandstone. Sands are mainly altered mafic vitroclasts (one of a dark variety that is likely highly altered and one with fresh glass) and fragments of feldspar, clinopyroxene, olivine and some traces of biotite. The majority of the glass shards are angular and vesicular or show indications that they are derived from scoria that erupted proximally.



Plane-polarized: 24764721



Cross-polarized: 24764741

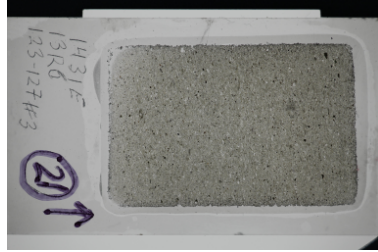
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 100 Observer: Tao

Lithology: sandstone

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture		Tephra	30	Mineral grains	subangular
Sand texture	70	Siliciclastics	70	Ash grains	subangular
Silt texture	20	Detrital carbonate			
Clay texture	10	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-13R-6-W 123/126-TSB(123-127)-TS21** Thin section no.: 21
 Unit/Subunit: VI Piece no.: #3 Observer: Dadd, Anthony Koppers
 Thin section summary: Faintly laminated silty sandstone with angular fragments of vesicular mafic tephra, plagioclase grain fragments (1-2%), volcanic vitroclasts, biotite flakes (up to 1% in certain fields of view) that are in good condition. It is poorly sorted. Matrix is dominated by clay possibly derived from the palagonitization of volcanic glass shards and many finely laminated fragments, possibly highly compacted pumice clasts seen higher in the succession as larger clasts as well.



Plane-polarized: 24764761



Cross-polarized: 24764781

SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment matrix Domain rel. abundance (%): 100 Observer: CLIFT

Lithology: silty sandstone

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture		Tephra	80	Mineral grains	subangular
Sand texture	60	Siliciclastics	20	Ash grains	angular
Silt texture	30	Detrital carbonate			
Clay texture	10	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-14R-1-W 105/108-TSB(105-108)-TS16** Thin section no.: 16
 Unit/Subunit: VI Piece no.: #9 Observer: Dadd, Anthony Koppers
 Thin section summary: Laminated silty claystone, generally well sorted and with Fe-staining in places due to early diagenesis. Minor amounts of quartz silt and clastic carbonate but much more volcanic glass fragments showing clouding due to breakdown and alteration. Darker volcanic grains are concentrated into layers. Some of the clasts are quite angular. Small amounts of bright reddish brown volcanic glass shards are visible, as are small broken pieces of plagioclase feldspar.



Plane-polarized: 24775921



Cross-polarized: 24775941

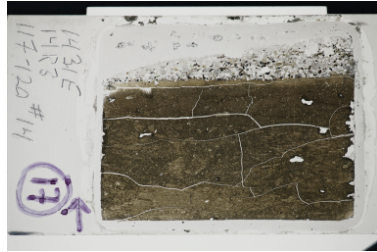
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 100 Observer: Tao

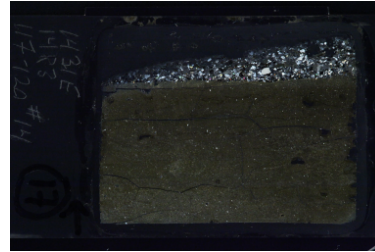
Lithology: silty claystone

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture		Tephra	5	Mineral grains	subangular
Sand texture		Siliciclastics	95	Ash grains	subangular
Silt texture	10	Detrital carbonate			
Clay texture	90	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-14R-3-W 117/120-TSB(117-120)-TS17** Thin section no.: 17
 Unit/Subunit: VI Piece no.: #14 Observer: Dadd, Anthony Koppers
 Thin section summary: Claystone in contact with coarse-grained sandstone. The claystone is clay rich with occasional silt-sized, angular crystals of (moderately to highly altered) plagioclase and rare rounded glassy plagioclase-phyric basalt clasts. The claystone has a mottled, patchy texture suggesting bioturbation. The contact with the sandstone is sharp and has load casts. Grains in the sandstone include crystals of plagioclase, clinopyroxene, opaque minerals and rare biotite. Clinopyroxene, opaques and biotite only occur in the bottom 5 mm and plagioclase is more concentrated in the bottom 10 mm. Clasts of basalt with varying textures and phenocryst content, mafic vitroclasts and glass shards.



Plane-polarized: 24775961



Cross-polarized: 24776041

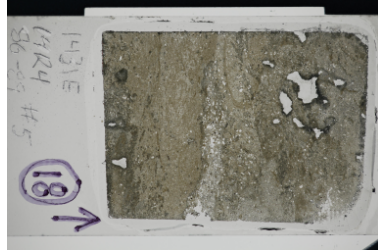
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 100 Observer: Tao

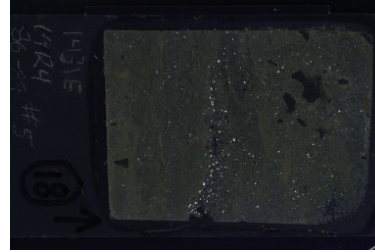
Lithology: claystone with sand

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture		Tephra	10	Mineral grains	subangular
Sand texture	15	Siliciclastics	85	Ash grains	subangular
Silt texture	5	Detrital carbonate			
Clay texture	80	Biogenic carbonate	5		
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-14R-4-W 86/89-TSB(86-89)-TS18** Thin section no.: 18
 Unit/Subunit: VI Piece no.: #5 Observer: Tao, Anthony Koppers
 Thin section summary: Laminated and bioturbated claystone with silt-sized grains throughout. The silt-sized grains include angular, single crystal fragments of plagioclase, biotite, opaque minerals and clinopyroxene, and angular to subrounded lithic grains of basalt and mafic glass. These minerals are in particular concentrated in the (single) coarsest laminae that also is lighter colored (due to higher concentration of feldspar). There are fine silt-sized black grains that may be pseudomorphs. These are concentrated in laminae and burrows.



Plane-polarized: 24776061



Cross-polarized: 24776081

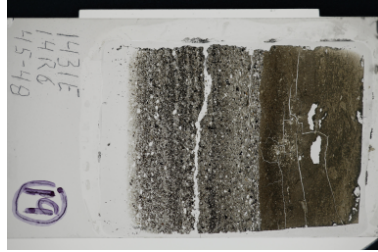
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 100 Observer: Tao

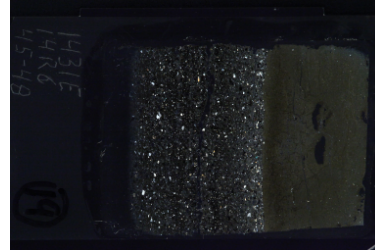
Lithology: claystone with silt

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture		Tephra	10	Mineral grains	subangular
Sand texture	2	Siliciclastics	85	Ash grains	angular
Silt texture	20	Detrital carbonate			
Clay texture	78	Biogenic carbonate	5		
		Biogenic silica			

THIN SECTION LABEL ID: 349-U1431E-14R-6-W 45/48-TSB(45-48)-TS19 Thin section no.: 19
 Unit/Subunit: VI Piece no.: #3 Observer: Tao, Anthony Koppers
 Thin section summary: Interbedded claystone and sandstone. The claystone has rare silt-sized grains of (altered) plagioclase. The sandstone is predominantly mafic vitroclasts and plagioclase with less abundant grains of clinopyroxene, basalt, and foraminifers. Lighter colored laminae have higher concentrations of feldspar and lesser concentrations of the mafic vitroclasts. The boundary between the claystone and sandstone is sharp with relatively larger and more abundant plagioclase and clinopyroxene crystal fragments on top of the boundary.



Plane-polarized: 24776101



Cross-polarized: 24776121

SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 40 Observer: Tao

Lithology: claystone

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture		Tephra	5	Mineral grains	subangular
Sand texture		Siliciclastics	95	Ash grains	angular
Silt texture	5	Detrital carbonate			
Clay texture	95	Biogenic carbonate			
		Biogenic silica			

Sample domain name: sediment clasts Domain rel. abundance (%): 60 Observer: Tao

Lithology: sandstone

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture		Tephra	5	Mineral grains	subangular
Sand texture	80	Siliciclastics	90	Ash grains	subangular
Silt texture	10	Detrital carbonate			
Clay texture	10	Biogenic carbonate	5		
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-16R-2-W 52/56-TSB(52-56)-TS22** Thin section no.: 22
 Unit/Subunit: VI Piece no.: #1 Observer: Tao, Anthony Koppers
 Thin section summary: Sandstone dominated by angular fragments of vesicular mafic vitroclasts, plagioclase fragments (up to 5-10% in certain fields of view), volcanic lithic clasts of a possibly welded pumice. Also minor fragments of clinopyroxene and olivine. It is poorly sorted. Possibly also quartz grains. Similar to TS23 but coarser grained.



Plane-polarized: 24764801



Cross-polarized: 24764821

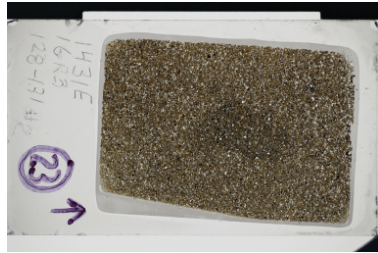
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment matrix Domain rel. abundance (%): 100 Observer: CLIFT

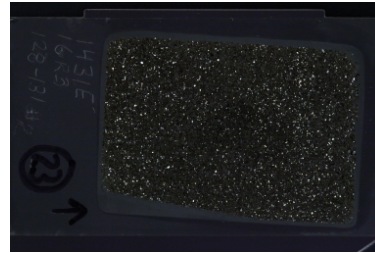
Lithology: sandstone

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture		Tephra	90	Mineral grains	angular
Sand texture	75	Siliciclastics	10	Ash grains	angular
Silt texture	20	Detrital carbonate			
Clay texture	5	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-16R-3-W 128/131-TSB(128-131)-TS23** Thin section no.: 23
 Unit/Subunit: VI Piece no.: #2 Observer: Tao, Anthony Koppers
 Thin section summary: Sandstone dominated by angular vesicular mafic vitroclasts, plagioclase grain fragments, and volcanic lithic clasts of a possible welded pumice nature. It is poorly sorted. Matrix is dominated by clay and possibly also quartz grains. Similar to TS22 but finer grained.



Plane-polarized: 24764841



Cross-polarized: 24764861

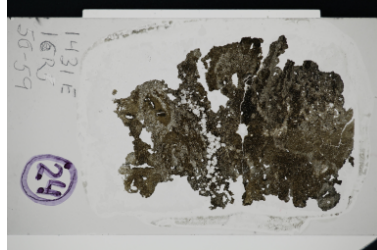
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment matrix Domain rel. abundance (%): 100 Observer: CLIFT

Lithology: sandstone with clay

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture		Tephra	90	Mineral grains	angular
Sand texture	65	Siliciclastics	10	Ash grains	angular
Silt texture	20	Detrital carbonate			
Clay texture	15	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-16R-5-W 56/59-TSB(56-59)-TS24** Thin section no.: 24
 Unit/Subunit: VI Piece no.: #1 Observer: Dadd, Anthony Koppers
 Thin section summary: Siltstone with grains of altered mafic volcanic glass, plagioclase, clinopyroxene and rare biotite crystals. Silt and clay-rich domains occur due to bioturbation. Mostly consists of densely packed but highly altered volcanic glass shards and clasts. A single horizon of secondary carbonate blobs occurs in the middle of the thin section and is oriented parallel to the bedding plane. Each blob contains sheaves of vertical crystal growth more or less perpendicular to the bedding, making it a likely product of early diagenesis.



Plane-polarized: 24764881



Cross-polarized: 24764901

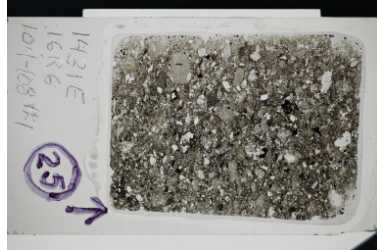
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment matrix Domain rel. abundance (%): 100 Observer: Dadd

Lithology: siltstone with clay

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture		Tephra	95	Mineral grains	angular
Sand texture		Siliciclastics	5	Ash grains	angular
Silt texture	80	Detrital carbonate			
Clay texture	20	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-16R-6-W 104/108-TSB(104-108)-TS25** Thin section no.: 25
 Unit/Subunit: VI Piece no.: #1 Observer: Tao, Anthony Koppers
 Thin section summary: Volcaniclastic sandstone with gravel. Poor sorting of gravel, sand, silt and clay. The main grains are highly vesicular, scoriaceous to even pumiceous clasts that are all highly altered with very few grains showing remnants of fresh glass. There are also (up to 10%) fragments and euhedral crystals of plagioclase, possibly a trace of quartz, opaques, up to 0.5% biotite flakes, olivine (one perfect euhedral cross section preserved) and some clinopyroxene fragments. Minor plagioclase-phyric trachytic basalt clasts with traces of biotite. Similar to TS27 but coarser-grained than TS26.



Plane-polarized: 24764921



Cross-polarized: 24764961

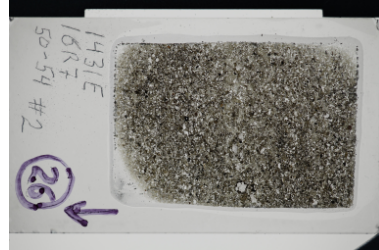
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 100 Observer: Tao

Lithology: sandstone with gravel

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	10	Tephra	5	Mineral grains	subangular
Sand texture	70	Siliciclastics	95	Ash grains	angular
Silt texture	10	Detrital carbonate			
Clay texture	10	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-16R-7-W 50/54-TSB(50-54)-TS26** Thin section no.: 26
 Unit/Subunit: VI Piece no.: #2 Observer: Tao, Anthony Koppers
 Thin section summary: Volcaniclastic sandstone with gravel. Poor sorting of gravel, sand, silt and clay. The main grains are highly vesicular, scoriaceous to even pumiceous clasts that are all highly altered with very few grains showing remnants of fresh glass. There are also (up to 10%) fragments and euhedral crystals of plagioclase, possibly a trace of quartz, opaques, up to 0.5% biotite flakes, olivine and some clinopyroxene fragments. Similar to TS25 and TS27 but finer-grained.



Plane-polarized: 24764941



Cross-polarized: 24764981

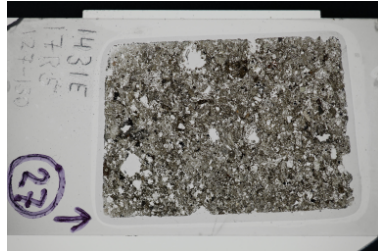
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 100 Observer: Tao

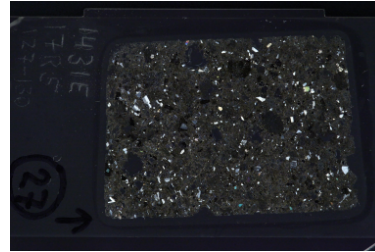
Lithology: sandstone with gravel

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	5	Tephra	2	Mineral grains	subangular
Sand texture	70	Siliciclastics	98	Ash grains	subangular
Silt texture	15	Detrital carbonate			
Clay texture	10	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-17R-5-W 127/130-TSB(127-130)-TS27** Thin section no.: 27
 Unit/Subunit: VI Piece no.: #6 Observer: ZLIU, Anthony Koppers
 Thin section summary: Volcaniclastic breccia with subangular to subrounded clasts of basalt. Clasts are generally 2 mm in size with abundant coarse sand. Plagioclase grains are abundant, and altered olivine and clinopyroxene are also observed. The matrix appears to be smaller and more altered fragments of basalt. It has poorly sorting of gravel, sand, silt and clay. The main clasts are highly vesicular, scoriaceous clasts that are highly altered with little fresh glass. There are also abundant fragments and euhedral crystals of plagioclase up to 10%, possibly a trace of quartz, opaques, up to 0.5% biotite flakes, olivine and clinopyroxene fragments. There are minor amounts of trachytic basalt clasts. Similar to TS27 but coarser-grained than TS26.



Plane-polarized: 24765001



Cross-polarized: 24765021

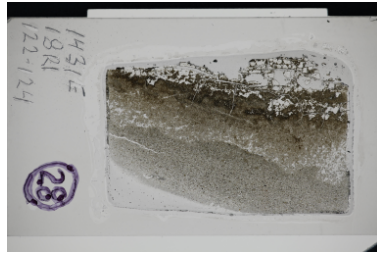
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: Sediment clasts Domain rel. abundance (%): 100 Observer: ZLIU

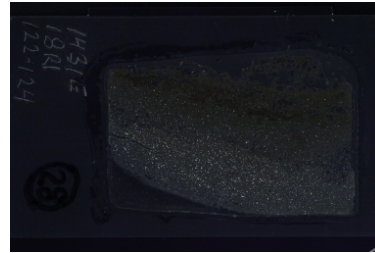
Lithology: breccia

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	45	Tephra	95	Mineral grains	angular
Sand texture	25	Siliciclastics	5	Ash grains	subangular
Silt texture	20	Detrital carbonate			
Clay texture	10	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-18R-1-W 122/124-TSB(122-124)-TS28** Thin section no.: 28
 Unit/Subunit: VI Piece no.: #16 Observer: ZLIU, Anthony Koppers
 Thin section summary: Silty claystone. Silts are mainly altered mafic volcanic glass and plagioclase, traces of biotite crystals and some fresh angular glass fragments. Silty lamination can be viewed from overview of the thin section, with plagioclase fragments disappearing (or not observable under microscope) in the finest siltstone laminae.



Plane-polarized: 24776141



Cross-polarized: 24776161

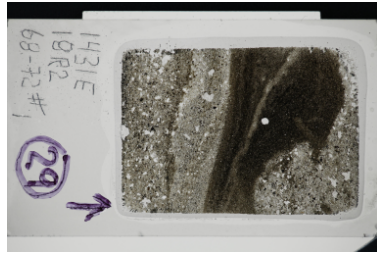
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 100 Observer: ZLIU

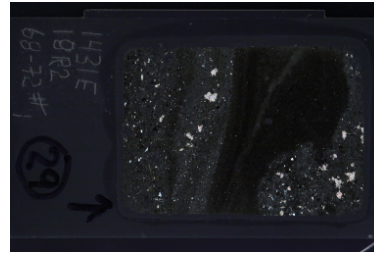
Lithology: silty claystone

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture		Tephra	20	Mineral grains	subangular
Sand texture		Siliciclastics	80	Ash grains	subangular
Silt texture	20	Detrital carbonate			
Clay texture	80	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-18R-2-W 68/72-TSB(68-72)-TS29** Thin section no.: 29
 Unit/Subunit: VI Piece no.: #10 Observer: ZLIU, Anthony Koppers
 Thin section summary: Clayey fine sandstone. Silt and fine sand are mainly composed of altered mafic volcanic glass and plagioclase, opaque minerals and trace biotite crystals. Clay lamination and erosive boundary can be viewed from overview of the thin section. The coarser breccia is similar to TS25.



Plane-polarized: 24765041



Cross-polarized: 24765061

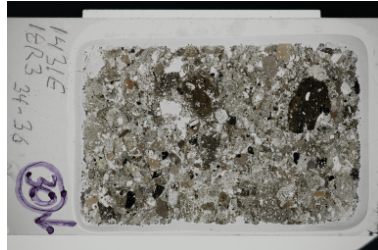
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 100 Observer: ZLIU

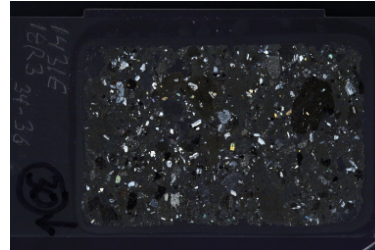
Lithology: clayey [Leg339] sandstone and siltstone

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture		Tephra	40	Mineral grains	angular
Sand texture	50	Siliciclastics	60	Ash grains	angular
Silt texture	20	Detrital carbonate			
Clay texture	30	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-18R-3-W 34/36-TSB(34-36)-TS30** Thin section no.: 30
 Unit/Subunit: VI Piece no.: #6 Observer: ZLIU, DADD, Anthony Koppers
 Thin section summary: Breccia with subangular to subrounded clasts of basalt. Clasts are up to 8 mm in size with an average of 2 mm. Various types of basalt are observed. Most are still fairly glassy or show slight alteration after glass (fresh glass fragments are common). The vesicularity of clasts varies from none to scoriaceous. Phenocrysts in the basalt clasts include olivine, clinopyroxene, plagioclase and biotite. Some clasts have a pilotaxitic texture. There are occasional single grain plagioclase crystals and traces of biotite. Plagioclase and olivine appear in glomerocrystic textures. Some highly vesicular or pumiceous clasts show post-depositional deformation of the clasts around large phenocrysts, creating a wave-banded appearance. These are subrounded but very fresh. The matrix appears to be finer with more altered fragments of basalt.



Plane-polarized: 24765081



Cross-polarized: 24765111

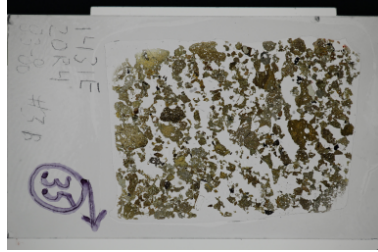
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 100 Observer: ZLIU

Lithology: breccia

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	50	Tephra	95	Mineral grains	angular
Sand texture	30	Siliciclastics	5	Ash grains	angular
Silt texture	10	Detrital carbonate			
Clay texture	10	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-20R-4-W 83/86-TSB(83-86)-TS35** Thin section no.: 35
 Unit/Subunit: VI Piece no.: #3 Observer: Anthony Koppers
 Thin section summary: Volcaniclastic breccia, with angular clasts of typically vitrophyric basalt. Clasts are commonly 2-3 mm in size and many still contain very fresh volcanic glass. When fresh, plagioclase microlites can be observed, and also large euhedral plagioclase phenocrysts in some clasts. Phenocrysts in the basalt clasts include olivine, clinopyroxene and plagioclase. This seems to be a loose breccia as the spaces in between most clasts are thin section resin.



Plane-polarized: 24826781



Cross-polarized: 24826831

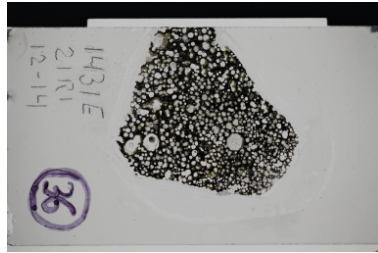
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 100 Observer: Tao

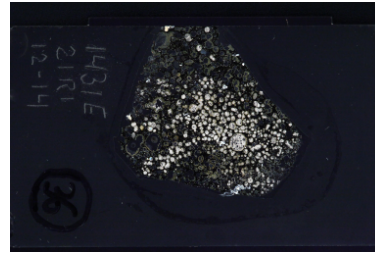
Lithology: breccia

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	50	Tephra	10	Mineral grains	angular
Sand texture	20	Siliciclastics	85	Ash grains	subangular
Silt texture	20	Detrital carbonate			
Clay texture	10	Biogenic carbonate	5		
		Biogenic silica			

THIN SECTION LABEL ID: 349-U1431E-21R-1-W 12/14-TSB(12-14)-TS36 Thin section no.: 36
 Unit/Subunit: VI Piece no.: #2 Observer: ZLIU, Anthony Koppers
 Thin section summary: Clast of highly vesicular to scoriaceous vitrophyric basalt. The vesicles are usually filled with calcite crystals. Plagioclase microphenocrysts in the basalt clast are abundant. Glassy matrix is altered, with no fresh glass remaining.



Plane-polarized: 24776221



Cross-polarized: 24776241

SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 100 Observer: ZLIU

Lithology: breccia

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	100	Tephra	100	Mineral grains	
Sand texture		Siliciclastics		Ash grains	angular
Silt texture		Detrital carbonate			
Clay texture		Biogenic carbonate			
		Biogenic silica			

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: Lithology Domain rel. abundance (%): 100 Observer: Anthony Koppers

Lithology: sparsely plagioclase-phyric basalt

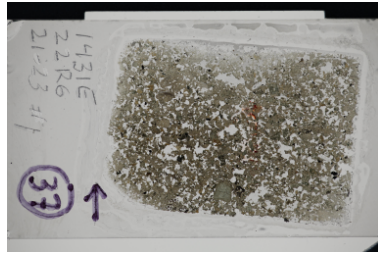
Texture: vitrophyric Average grain size: microcrystalline Grain size distribution: bimodal

Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Comments
Total (whole rock constituents):	50	30	20	0.1	2.2	0.5	rounded	

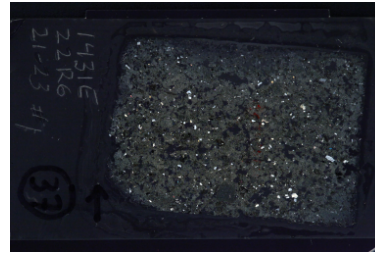
Phenocryst	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Special Features	Comments
Plagioclase	3	3	0	0.05		0.2	euhedral-subhedral	prismatic short		
Total (whole rock constituents):	3	3	0							

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	5	5	0	0.05	0.2	0.1	euhedral-subhedral	lath-shaped	
Mesostasis	95	0	95						completely devitrified glass
Total (groundmass constituents):	100	5	95						
Total (whole rock constituents):	47	47	0						

THIN SECTION LABEL ID: **349-U1431E-22R-6-W 21/23-TSB(21-23)-TS37** Thin section no.: 37
 Unit/Subunit: VI Piece no.: #1 Observer: ZLIU, Anthony Koppers
 Thin section summary: Volcaniclastic breccia, with angular clasts of typically vitrophyric basalt. Clasts are commonly 2-3 mm in size. Phenocrysts in the basalt clasts include olivine, clinopyroxene, biotite and plagioclase. The matrix appears to be finer with more altered fragments of basalt. Similar to TS38 but slightly finer-grained.



Plane-polarized: 24776261



Cross-polarized: 24776281

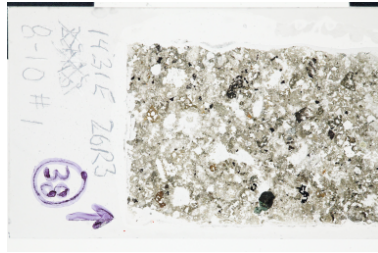
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: Sediment clasts Domain rel. abundance (%): 100 Observer: ZLIU

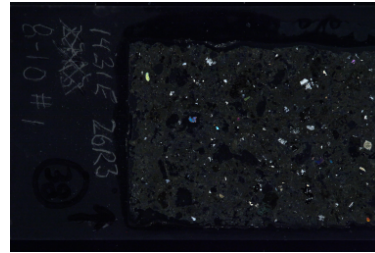
Lithology: breccia

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	60	Tephra	100	Mineral grains	
Sand texture	30	Siliciclastics		Ash grains	angular
Silt texture	5	Detrital carbonate			
Clay texture	5	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-26R-3-W 8/10-TSB(8-10)-TS38** Thin section no.: 38
 Unit/Subunit: VI Piece no.: #1 Observer: Anthony Koppers
 Thin section summary: Volcaniclastic breccia, with angular clasts of typically vitrophyric basalt. Clasts are commonly 4-5 mm in size. Phenocrysts in the basalt clasts include olivine, clinopyroxene, biotite and plagioclase. The matrix appears to be finer with more altered fragments of basalt. Similar to TS37 but slightly coarser-grained.



Plane-polarized: 24783321



Cross-polarized: 24783381

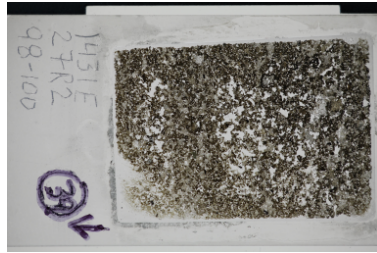
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment matrix Domain rel. abundance (%): 100 Observer: CLIFT

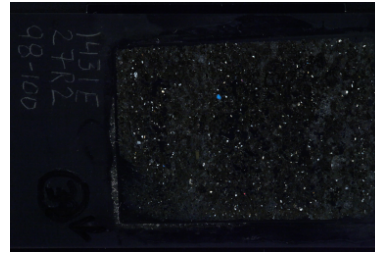
Lithology: breccia with sand

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	40	Tephra	90	Mineral grains	angular
Sand texture	30	Siliciclastics	10	Ash grains	angular
Silt texture	10	Detrital carbonate			
Clay texture	20	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-27R-2-W 98/100-TSB(98-100)-TS39** Thin section no.: 39
 Unit/Subunit: VII Piece no.: #1 Observer: Anthony Koppers
 Thin section summary: Volcaniclastic breccia, with angular clasts of typically vitrophyric basalt. Clasts are commonly 1-2 mm in size. Phenocrysts in the basalt clasts include olivine, clinopyroxene and plagioclase. The matrix appears to be finer with more altered fragments of glassy basalt fragments.



Plane-polarized: 24783401



Cross-polarized: 24783421

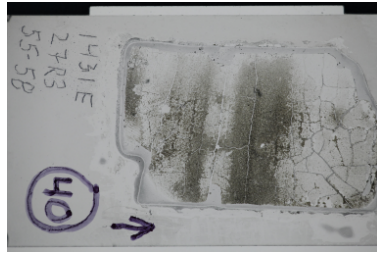
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment matrix Domain rel. abundance (%): 100 Observer: CLIFT

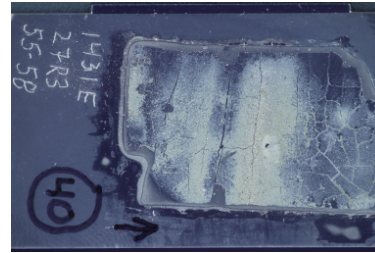
Lithology: breccia with sand

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	60	Tephra	90	Mineral grains	angular
Sand texture	25	Siliciclastics	10	Ash grains	angular
Silt texture	5	Detrital carbonate			
Clay texture	10	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-27R-3-W 55/58-TSB(55-58)-TS40** Thin section no.: 40
 Unit/Subunit: VII Piece no.: #1 Observer: ZLIU, Anthony Koppers
 Thin section summary: Claystone with laminations. A small amount of silt (mainly as volcanic glassy clasts and feldspar) exists. This is possibly volcaniclastic in character and includes many fine grained highly altered volcanic glass shards/fragments.



Plane-polarized: 24784771



Cross-polarized: 24784791

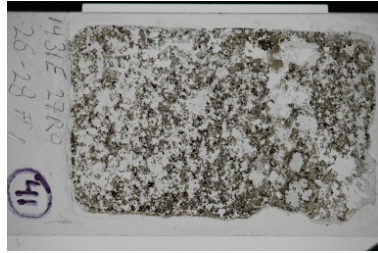
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 100 Observer: ZLIU

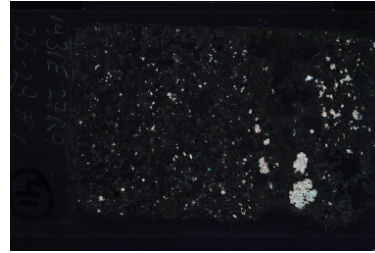
Lithology: claystone

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture		Tephra	5	Mineral grains	subangular
Sand texture		Siliciclastics	95	Ash grains	subangular
Silt texture	10	Detrital carbonate			
Clay texture	90	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-27R-9-W 26/28-TSB(26-28)-TS41** Thin section no.: 41
 Unit/Subunit: VII Piece no.: #1 Observer: ZLIU, Anthony Koppers
 Thin section summary: Breccia, with subangular to subrounded clasts of basalt. Clasts are generally 2 mm in size with abundant coarse sand. Various types of basalt are observed with a dominance of glass. Phenocrysts in the basalt clasts include altered olivine, clinopyroxene and plagioclase. The matrix appears to be finer with more altered fragments of basalt and abundant unaltered plagioclase fragments.



Plane-polarized: 24826641



Cross-polarized: 24826661

SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 100 Observer: ZLIU

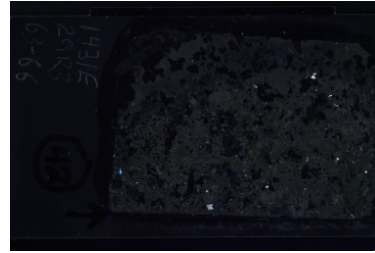
Lithology: breccia

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	50	Tephra	95	Mineral grains	subangular
Sand texture	25	Siliciclastics	5	Ash grains	subangular
Silt texture	15	Detrital carbonate			
Clay texture	10	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-29R-3-W 63/66-TSB(63-66)-TS42** Thin section no.: 42
 Unit/Subunit: VII Piece no.: #1 Observer: ZLIU, Anthony Koppers
 Thin section summary: Volcaniclastic breccia, with mostly angular clasts of glassy basalt. Clasts are generally 2-3 mm in size with abundant coarse sand. A minor component of phenocrysts in the basalt clasts includes (altered and fresh) olivine, clinopyroxene and plagioclase. The matrix appears to be finer-grained altered fragments of the same basalt types. Similar to TS43, TS44 and TS45.



Plane-polarized: 24784811



Cross-polarized: 24784831

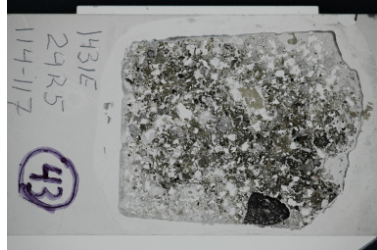
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 100 Observer: ZLIU

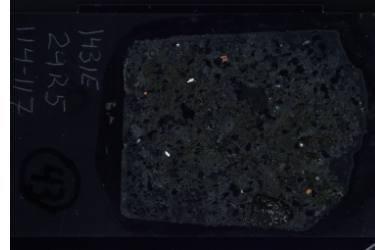
Lithology: breccia

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	60	Tephra	95	Mineral grains	angular
Sand texture	30	Siliciclastics	5	Ash grains	angular
Silt texture	5	Detrital carbonate			
Clay texture	5	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-29R-5-W 114/117-TSB(114-117)-TS43** Thin section no.: 43
 Unit/Subunit: VII Piece no.: #1 Observer: ZLIU, Anthony Koppers
 Thin section summary: Volcaniclastic breccia, with angular clasts of typically glassy basalt. Clasts are generally 2-4 mm in size with abundant coarse sand. A minor component of phenocrysts in the basalt clasts includes mainly plagioclase with a little (altered and fresh) olivine and clinopyroxene. The matrix appears to be finer-grained altered fragments of the same basalt types. Larger basalt clast types include scoriaceous, plagioclase-phyric and some trachytic aphyric basalt. Similar to TS42, TS44 and TS45.



Plane-polarized: 24784851



Cross-polarized: 24784871

SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 100 Observer: ZLIU

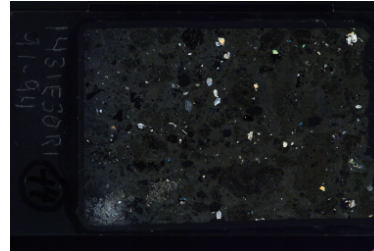
Lithology: breccia

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	60	Tephra	95	Mineral grains	angular
Sand texture	30	Siliciclastics	5	Ash grains	angular
Silt texture	5	Detrital carbonate			
Clay texture	5	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-30R-1-W 91/94-TSB(91-94)-TS44** Thin section no.: 44
 Unit/Subunit: VII Piece no.: #5 Observer: ZLIU, Anthony Koppers
 Thin section summary: Breccia, with angular clasts of basalt. Clasts are generally 2-4 mm with a few up to 5-6 mm in size. Phenocrysts in the basalt clasts mainly include olivine, clinopyroxene, and plagioclase. These phenocrysts are also up to 5 mm and some are very fresh. The matrix appears to be finer-grained altered fragments of the same basalt. Similar to TS42, TS43 and TS45.



Plane-polarized: 24784891



Cross-polarized: 24784911

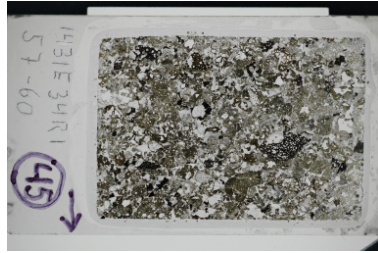
SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 100 Observer: ZLIU

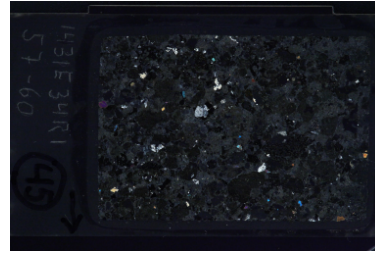
Lithology: breccia

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	55	Tephra	95	Mineral grains	angular
Sand texture	35	Siliciclastics	5	Ash grains	angular
Silt texture	5	Detrital carbonate			
Clay texture	5	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-34R-1-W 58/60-TSB(58-60)-TS45** Thin section no.: 45
 Unit/Subunit: VII Piece no.: #4 Observer: ZLIU, Anthony Koppers
 Thin section summary: Breccia, with angular clasts of basalt. Clasts are generally 3-4 mm with a few up to 5-6 mm in size. Phenocrysts in the basalt clasts mainly include plagioclase with a few olivine and clinopyroxene. The matrix appears to be altered fragments of basalt. Matrix contains a high proportion of secondary carbonate growing radially in the void spaces. Similar to TS42, TS43 and TS44.



Plane-polarized: 24784931



Cross-polarized: 24784951

SEDIMENT/SEDIMENTARY ROCK

Sample domain name: sediment clasts Domain rel. abundance (%): 100 Observer: ZLIU

Lithology: breccia

TEXTURE	Percent:	CONSTITUENT	Percent:	GRAIN ROUNDNESS	
Gravel texture	60	Tephra	95	Mineral grains	angular
Sand texture	30	Siliciclastics	5	Ash grains	angular
Silt texture	5	Detrital carbonate			
Clay texture	5	Biogenic carbonate			
		Biogenic silica			

THIN SECTION LABEL ID: **349-U1431E-37R-1-W 5/7-TSB(5-7)-TS31**

Thin section no.: 31

Unit/Subunit: IX

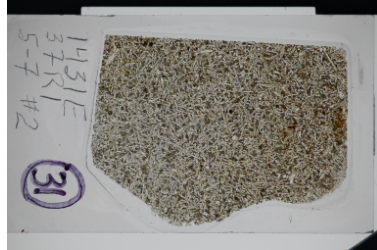
Piece no.: #2

Observer: MGTejada

MGTejada

Thin section summary:

Moderately altered fine-grained basalt showing thin laths of plagioclase forming triangular patterns filled with either olivine or clinopyroxene (intergranular texture). Olivine forms 0.04-0.8 mm euhedral to subhedral equant grains included in or surrounded by plagioclase laths, with some grains partially replaced by iddingsite. Plagioclase shows continuous zoning with a few grains having olivine inclusions. They are mostly prismatic and highly elongated, sometimes showing skeletal texture. A few big grains of plagioclase show veinlets filled with saponite cutting along cleavage traces.



Plane-polarized: 24746761



Cross-polarized: 24746781

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: lithology

Domain rel. abundance (%): 100

Observer: MGTejada

Lithology: aphyric basalt

Texture: intergranular

Average grain size: fine grained

Grain size distribution: seriate

Domain comment: moderately altered; thin laths form triangular patterns filled with either olivine of clinopyroxene

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	25	22.5	2.5	0.04	0.8	0.2	euhedral-subhedral	equant	included or surrounded by plagioclase, partially altered to iddingsite
Plagioclase	50	48.5	1.5	0.1	2.1	0.6	euhedral-subhedral	prismatic elongated	continuous zoning, a few grains have olivine inclusions; sometimes show skeletal texture; a few big grains show veinlets
Clinopyroxene	15	15	0	0.05	1	0.1	anhedral	prismatic short	interstitial between plagioclase laths
Fe-Ti Oxide	10	10	0	0.05	0.1	0.05	anhedral	equant	
Total (groundmass constituents):	100	96	4						
Total (whole rock constituents):	100	96	4						

IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)

Observer: MGT

Alteration intensity: slightly altered

Total alteration (%): 3

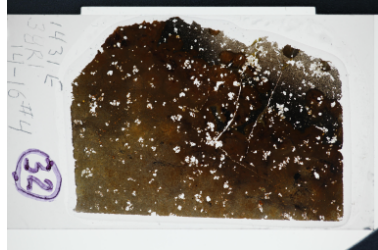
Alteration comments: Veinlets in feldspar

Alteration mineral:	Percent:
Carbonate	0.1
Saponite	10

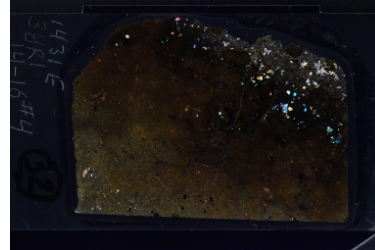
THIN SECTION LABEL ID: **349-U1431E-38R-1-W 14/16-TSB(14-16)-TS32** Thin section no.: 32

Unit/Subunit: IX Piece no.: #4 Observer: MGTejada

Thin section summary: Olivine-phyric basalt that is highly altered but glassy black margin is fresh with euhedral olivine. The slightly altered olivine phenocrysts only occur in the gray margin where they occur as 0.04-0.8 mm euhedral equant grains; otherwise, they are completely replaced by iddingsite. The groundmass contains plagioclase occurring as thin, needle-like, sometimes fibrous microlites 0.05-0.2 mm in length and aggregates of Fe-Ti oxides throughout.



Plane-polarized: 24746721



Cross-polarized: 24746741

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: lithology Domain rel. abundance (%): 100 Observer: MGTejada

Lithology: olivine-phyric basalt

Texture: intersertal Average grain size: microcrystalline Grain size distribution: bimodal

Domain comment: highly altered; but glassy black rim is fresh with euhedral olivines

Phenocryst	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Special Features	Comments
Olivine	5	4	1	0.04	0.8	0.3	euhedral			slightly altered phenocrysts only occur in the gray rim; otherwise, completely replaced by iddingsite
Total (whole rock constituents):	5	4	1							

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	65	75	0	0.05	0.2	0.2	subhedral	acicular	thin, needle-like, sometimes fibrous
Fe-Ti Oxide	13	13	0	0.05	0.1	0.05	anhedral	aggregates	
Mesostasis	12	1.2	10.8						relatively fresh at the rim of the glassy margin
Glass	10	10	0						fresh at the rim
Total (groundmass constituents):	100	89.2	10.8						
Total (whole rock constituents):	95	85	10						

IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)

Observer: MGT

Alteration intensity: highly altered Total alteration (%): 90

Alteration comments: Complete replacement of olivine except in glassy margin

Alteration mineral:	Percent:
Carbonate	0.1
Palagonite	60
Saponite	2

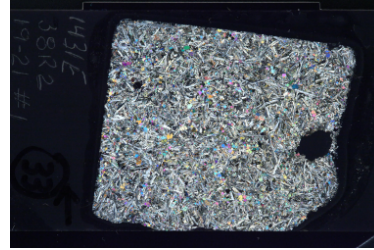
THIN SECTION LABEL ID: **349-U1431E-38R-2-W 19/21-TSB(19-21)-TS33** Thin section no.: 33

Unit/Subunit: IX Piece no.: #1 Observer: MGTejada

Thin section summary: Relatively fresh medium-grained diabasic basalt with subophitic texture showing plagioclase and clinopyroxene intergrowths and 0.5-1.1 mm olivine microphenocrysts. The olivine has euhedral to subhedral outlines, with some grains showing reaction rims, and they also contain glass inclusions. Plagioclase is quite fresh and occurs as long elongated laths up to 1.4 mm long and still show relict skeletal texture. Clinopyroxene occurs as anhedral amoeboid grains up to 0.5 mm in size filling in the interstices and holes in plagioclase and cracks in olivine.



Plane-polarized: 24746681



Cross-polarized: 24746701

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: lithology Domain rel. abundance (%): 100 Observer: MGTejada

Lithology: aphyric basalt

Texture: diabasic Average grain size: medium grained Grain size distribution: seriate

Domain comment: moderately altered

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	20	18	2	0.05	1.1	0.4	euhedral-subhedral	equant	inclusions present; thin reaction rim present in some grains
Plagioclase	50	49.5	0.5	0.2	1.4	1	subhedral-anhedral	prismatic elongated	quite fresh; some holes are still preserved in some grains
Clinopyroxene	20	20	0	0.05	0.5	0.2	anhedral	amoeboid-irregular	interstitial and filling holes in plagioclases and cracks in olivines
Fe-Ti Oxide	10	10	0	0.05	0.1	0.08	subhedral-anhedral	equant	form clusters
Total (groundmass constituents):	100	97.5	2.5						
Total (whole rock constituents):	100	97.5	2.5						

IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)

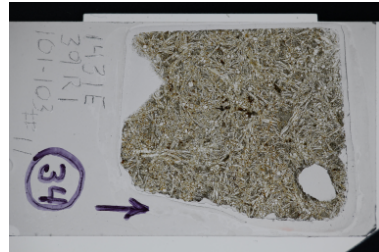
Observer: MGT

Alteration intensity: fresh Total alteration (%): 1

Alteration comments: Reaction rims in olivine

Alteration mineral:	Percent:
Saponite	2
Vesicle filling:	Percent:
Total vesicle fill	0

THIN SECTION LABEL ID: 349-U1431E-39R-1-W 101/103-TSB(101-103)-TS34 Thin section no.: 34
 Unit/Subunit: IX Piece no.: #11 Observer: MGTejada
 Thin section summary: Slightly altered medium-grained diabasic basalt with 0.04-1 mm size olivine microphenocrysts with glass inclusions and some grains showing embayment and reaction rims. Elongated laths of plagioclase up to 1.4 mm long are subhedral to anhedral with some alteration veinlets cutting through. Clinopyroxene grains form irregular to amoeboidal filling in the interstices between plagioclase laths and are associated with Fe-Ti oxides that form clusters.



Plane-polarized: 24746641



Cross-polarized: 24746661

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: lithology Domain rel. abundance (%): 100 Observer: MGTejada

Lithology: aphyric basalt

Texture: diabasic Average grain size: medium grained Grain size distribution: seriate

Domain comment: slightly altered

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	20	18	2	0.04	1	0.4	euhedral-subhedral	equant	inclusions present; some grains showing embayment and reaction rim
Plagioclase	50	48.5	1.5	0.2	3	1	subhedral-anhedral	prismatic elongated	partial veining in some big grains
Clinopyroxene	20	20	0	0.05	0.8	0.3	anhedral	amoeboid-irregular	interstitial and intergranular filling.
Fe-Ti Oxide	10	10	0	0.05	0.1	0.08	subhedral-anhedral	equant	form cluster
Total (groundmass constituents):	100	96.5	3.5						
Total (whole rock constituents):	100	96.5	3.5						

IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)

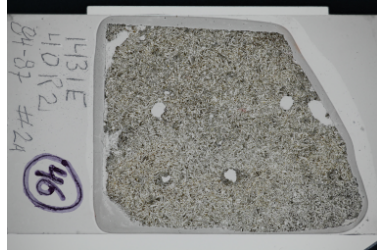
Observer: MGT

Alteration intensity: slightly altered Total alteration (%): 3

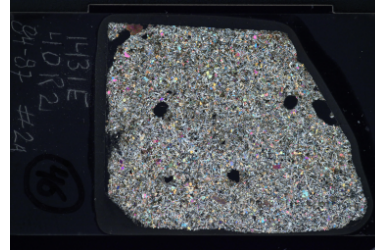
Alteration comments: Reaction rims in olivine

Alteration mineral:	Percent:
Saponite	25

THIN SECTION LABEL ID: 349-U1431E-40R-2-W 84/87-TSB(84-87)-TS46 Thin section no.: 46
 Unit/Subunit: IX Piece no.: #2 Observer: MGTejada
 Thin section summary: Slightly altered fine-grained aphyric microcrystalline basalt with intersertal to intergranular texture. Equant subhedral to anhedral olivine grains are clear and sometimes contain glass inclusions and are up to 1.2 mm in size. Up to 1.1 mm long plagioclase laths form triangular spaces filled with either glass or clinopyroxene. Clinopyroxene is mostly anhedral and fills the interstices between plagioclase laths and is associated with subequant isolated grains or aggregates of Fe-Ti oxides. About 1% cryptocrystalline brown mesostasis still remains in the interstitial spaces between plagioclase laths.



Plane-polarized: 24791891



Cross-polarized: 24791911

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: lithology Domain rel. abundance (%): 100 Observer: MGTejada
 Lithology: aphyric basalt
 Texture: intergranular Average grain size: fine grained Grain size distribution: seriate
 Domain comment: slightly altered; microcrystalline, intersertal with about 2% mesostasis to intergranular

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	25	23.5	1.5	0.05	1.2	0.2	subhedral-anhedral	equant	clear; inclusions in larger grains
Plagioclase	50	50	0	0.2	1.1	0.4	subhedral-anhedral	prismatic elongated	intersertal to intergranular arrangement enclosing either glass or clinopyroxene
Clinopyroxene	15	15	0	0.2	1	0.4	anhedral	amoeboid-irregular	interstitial and intergranular filling.
Fe-Ti Oxide	8	8	0	0.01	0.3	0.1	subhedral-anhedral	subequant	aggregates or isolated
Mesostasis	2	1	1						interstitial, brown; crypto crystalline
Total (groundmass constituents):	100	97.5	2.5						
Total (whole rock constituents):	100	97.5	2.5						

IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)

Observer: MGT
 Alteration intensity: slightly altered Total alteration (%): 5
 Alteration comments: Olivine replacement creating a few vugs

Alteration mineral:	Percent:
Saponite	5

THIN SECTION LABEL ID: 349-U1431E-41R-1-W 37/40-TSB(37-40)-TS47 Thin section no.: 47

Unit/Subunit: IX Piece no.: #8 Observer: MGTejada

Thin section summary: Highly altered medium-grained vesicular to amygdaloidal aphyric basalt with rusty staining all over and composed dominantly of plagioclase with marked variolitic texture (radial aggregates) especially around vesicles and absence or only traces of olivine. Vesicles are mostly filled with celadonite and carbonate + Fe-hydroxide. Clinopyroxene is minor, up to 5%, forming sheaf-like intergrowth with, or occurs as amoeboid interstitial filling between plagioclase laths. Fe-oxide is mostly rust-colored and form the inner lining of vesicles.



Plane-polarized: 24791951



Cross-polarized: 24791971

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: lithology Domain rel. abundance (%): 100 Observer: MGTejada

Lithology: amygdaloidal aphyric basalt

Texture: variolitic Average grain size: medium grained Grain size distribution: seriate

Domain comment: moderately altered with rusty staining all over; vesicular to amygdaloidal; plagioclase with marked variolitic texture (radial aggregates), especially around vesicles

Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Comments
Total (whole rock constituents):	15	3.7	11.3				rounded	

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	75	75	0	0.2	2.1	0.8	subhedral-anhedral	radial aggregates	variolitic texture especially around vesicles
Clinopyroxene	10	10	0	0.2	1	0.5	anhedral	amoeboid-irregular	interstitial or sheaf-like appearance between plagioclase laths
Fe-Ti Oxide	15	2	13	0.01	0.1	0.05	anhedral	aggregates	mostly rust-colored; inner lining of vesicles
Total (groundmass constituents):	100	87	13						
Total (whole rock constituents):	85	74	11						

IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)

Observer: MGT

Alteration intensity: moderately altered Total alteration (%): 15

Alteration comments: Rusty staining and vein lining; vesicle filling

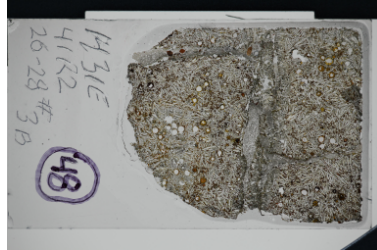
Alteration mineral:	Percent:
Carbonate	12
Saponite	15

Vesicle filling:	Percent:
Carbonate	45
Fe-oxide	7.5
Saponite	22.5
Total vesicle fill	75

THIN SECTION LABEL ID: **349-U1431E-41R-2-W 26/28-TSB(26-28)-TS48** Thin section no.: 48

Unit/Subunit: IX Piece no.: #3 Observer: MGTejada

Thin section summary: Moderately altered vesicular to amygdaloidal medium-grained aphyric basalt with rusty oxide stains and vesicle lining cut by several veins making up 20% of the section. It has dominantly variolitic texture and is composed mostly of plagioclase in radial arrangement (variolitic texture) and minor clinopyroxene occurring as interstitial or sheaf-like intergrowth between plagioclase laths. Fe-Ti oxides are black, grading to rust-colored when they form the inner lining of vesicles and also occur as aggregates or microcrystalline patches.



Plane-polarized: 24791991



Cross-polarized: 24792011

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: lithology Domain rel. abundance (%): 80 Observer: MGTejada

Lithology: amygdaloidal aphyric basalt

Texture: variolitic Average grain size: medium grained Grain size distribution: seriate

Domain comment: highly altered, with several veins making up 20% of the section; brown colored with rusty oxide stains and vesicle lining

Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Comments
Total (whole rock constituents):	15	7.5	7.5	0.3	1.2	0.6	rounded	

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	75	73.7	1.3	0.2	3.2	0.8	subhedral-anhedral	radial aggregates	variolitic to intergranular; some grains with hollow center
Clinopyroxene	15	15	0	0.2	1	0.5	anhedral	amoeboid-irregular	interstitial or sheaf-like appearance between plagioclase laths
Fe-Ti Oxide	10	4	6	0.01	0.1	0.05	anhedral	aggregates	black grading to rust-colored; inner lining of vesicles and form patches
Total (groundmass constituents):	100	93.0	7.3						
Total (whole rock constituents):	85	79	6						

Sample domain name: vein type 1 Domain rel. abundance (%): 20 Observer: MGTejada

Lithology: vein cutting amygdaloidal basalt

Texture: Average grain size: Grain size distribution:

Domain comment: calcite and oxyhydroxide

IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)

Observer: MGT

Alteration intensity: moderately altered Total alteration (%): 25

Alteration comments: Rusty staining, vesicle filling by alteration minerals

Vesicle filling:	Percent:
Carbonate	5
Fe-oxide	5
Saponite	40
Total vesicle fill	50

IGNEOUS ROCK - VEINS AND HALOS

Sample domain name: **vein type 1**

Observer: G Zhang

Vein type: vein fill

Ave. vein thickness (cm): 0.3

Vein boundary: uncertain boundary or contact

Vein connectivity: branched

Vein shear sense:

Vein generation: primary

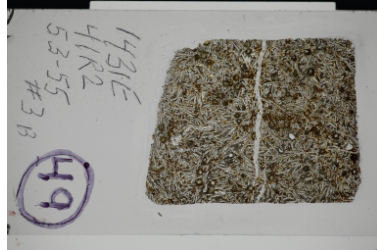
Vein filling mineral:	Percent:
Carbonate	50
Saponite	50

Halo (%):

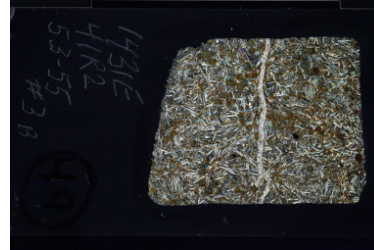
Halo thickness (cm): 0

Halo color:

THIN SECTION LABEL ID: 349-U1431E-41R-2-W 53/55-TSB(53-55)-TS49 Thin section no.: 49
 Unit/Subunit: IX Piece no.: #3 Observer: MGTejada
 Thin section summary: Highly altered sparsely vesicular amygdaloidal medium-grained basalt with rusty oxide stains and vesicle lining cut by a vein that makes up 6% of the section. It is composed mostly of plagioclase and clinopyroxene that show variolitic to intergranular arrangement. Some plagioclase grains display hollow cores, possibly the trace of an earlier skeletal texture. Fe-Ti oxides are black, grading to rust-colored when they form the inner lining of vesicles and also occur as aggregates or microcrystalline patches. Plagioclase microlites are present in the mesostasis.



Plane-polarized: 24796811



Cross-polarized: 24796831

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: lithology Domain rel. abundance (%): 94 Observer: MGTejada

Lithology: amygdaloidal aphyric basalt

Texture: variolitic Average grain size: medium grained Grain size distribution: seriate

Domain comment: a vein make up 6% of the section; highly altered, with rusty oxide stains and vesicle lining

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Total (groundmass constituents):	100	85	15						

Sample domain name: vein type 1 Domain rel. abundance (%): 6 Observer: MGTejada

Lithology: vein cutting amygdaloidal basalt

Texture: Average grain size: Grain size distribution:

Domain comment: calcite and oxyhydroxide

Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Comments
Total (whole rock constituents):	15	1.5	13.5	0.4	0.8	0.6	rounded	

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	1	1	0		0.4	0.4	subhedral-anhedral	equant	only 2 small anhedral grains observed in the section
Plagioclase	60	58	2	0.1	3.4	1	subhedral-anhedral	radial aggregates	variolitic to intergranular; some grains with hollow center
Clinopyroxene	21	21	0	0.2	2.4	0.8	anhedral	amoeboid-irregular	variolitic like plagioclase
Fe-Ti Oxide	13	5	8	0.01	0.1	0.05	anhedral	aggregates	black grading to rust-colored; inner lining of vesicles and form patches
Mesostasis	5	0	5						with microlites
Total (whole rock constituents):	85	72	13						

IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)

Observer: MGT

Alteration intensity: moderately altered Total alteration (%): 10

Alteration comments: Rusty staining and vesicle lining; vesicle filling by alteration minerals

Vesicle filling:	Percent:
Fe-oxide	5
Saponite	16
Total vesicle fill	90

IGNEOUS ROCK - VEINS AND HALOS

Sample domain name: **vein type 1**

Observer: G Zhang

Vein type: vein fill

Ave. vein thickness (cm): 0.15

Vein boundary: uncertain boundary or contact

Vein connectivity: isolated

Vein shear sense:

Vein generation: primary

Vein filling mineral:	Percent:
Carbonate	90
Saponite	10

Halo (%):

Halo thickness (cm):

0

Halo color:

THIN SECTION LABEL ID: **349-U1431E-41R-2-W 143/145-TSB(143-145)-TS50** Thin section no.: 50

Unit/Subunit: IX Piece no.: #7 Observer: MGTejada

Thin section summary: Slightly altered amygdaloidal medium- to coarser-grained aphyric basalt with texture ranging from sheaf-like arrangement of plagioclase laths to intergranular with clinopyroxene filling inside. Fewer filled vesicles are surrounded by plagioclase laths in a radial intergrowth arrangement with clinopyroxene. Fe-Ti oxides occur as isolated subequant grains or as aggregates of anhedral grains.



Plane-polarized: 24792031



Cross-polarized: 24792051

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: lithology Domain rel. abundance (%): 100 Observer: MGTejada

Lithology: amygdaloidal aphyric basalt

Texture: variolitic Average grain size: medium grained Grain size distribution: seriate

Domain comment: slightly altered version of TS #s 48-49; coarser-grained also with sheaf-like arrangement of plagioclase laths; intergranular with clinopyroxene grains inside.

Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Comments
Total (whole rock constituents):	10	2	8				rounded	

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	70	68.6	1.4	0.2	3.4	1	subhedral-anhedral	radial aggregate _s	variolitic to intergranular; some grains with hollow center
Clinopyroxene	20	20	0	0.05	1.4	0.5	anhedral	amoeboid-irregular	radial intergrowth with plagioclase; interstitial
Fe-Ti Oxide	10	10	0	0.01	0.1	0.1	subhedral-anhedral	subequant	aggregates or isolated
Total (groundmass constituents):	100	98.6	1.4						
Total (whole rock constituents):	90	89	1						

IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)

Observer: MGT

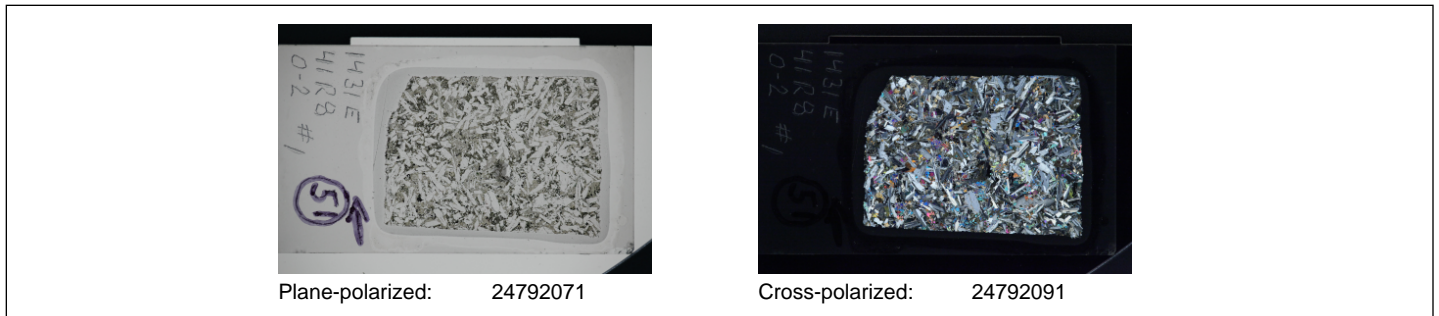
Alteration intensity: slightly altered Total alteration (%): 5

Alteration comments: Vein filling with secondary minerals; small veinlets in big plagioclase laths

Alteration mineral:	Percent:
Carbonate	0.2
Saponite	35

Vesicle filling:	Percent:
Carbonate	16
Saponite	64
Total vesicle fill	80

THIN SECTION LABEL ID:	349-U1431E-41R-8-W 0/2-TSB(0-2)-TS51			Thin section no.:	51
Unit/Subunit:	IX	Piece no.:	#1	Observer:	MGTejada
Thin section summary:	Slightly altered coarse-grained holocrystalline equigranular aphyric basalt composed dominantly of plagioclase and lesser clinopyroxene. The plagioclase is more stubby and less elongated compared to other samples and forms subophitic intergrowth with clinopyroxene. The Fe-Ti oxides occur as subhedral to anhedral equant grains that cluster with clinopyroxene.				



IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: lithology Domain rel. abundance (%): 100 Observer: MGTejada

Lithology: aphyric basalt

Texture: holocrystalline Average grain size: coarse grained Grain size distribution: equigranular

Domain comment: slightly altered, plagioclases are more stubby laths now

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	70	68.6	1.4	0.2	3.4	1	subhedral-anhedral	lath-shaped	more stubby laths compared to TS#s 48-50; now tabular to equigranular
Clinopyroxene	20	20	0	0.2	2.7	0.6	anhedral	amoeboid-irregular	interstitial
Fe-Ti Oxide	10	10	0	0.01	0.4	0.1	subhedral-anhedral	isometric	clusters with clinopyroxene
Total (groundmass constituents):	100	98.6	1.4						
Total (whole rock constituents):	100	98.6	1.4						

IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)

Observer: MGT

Alteration intensity: fresh Total alteration (%): 1

Alteration comments: Veinlets in plagioclase

Alteration mineral:	Percent:
Celadonite	5
Saponite	15

THIN SECTION LABEL ID: **349-U1431E-42R-4-W 70/75-TSB(70-75)-TS52**

Thin section no.: 52

Unit/Subunit: IX

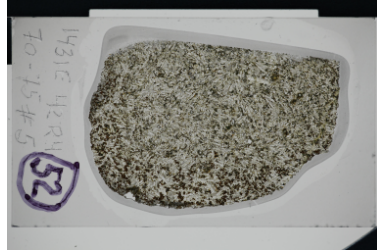
Piece no.: #5

Observer: MGTejada

MGTejada

Thin section summary:

Moderately altered medium-grained aphyric basalt with variolitic texture and alteration margin. Color is brown due to oxide staining and alteration. Olivine occurs as microcrysts with anhedral to subhedral equant grains of 0.03-0.5 size and are partially altered to iddingsite. Plagioclase forms highly elongated prisms up to 3.5 mm long in a fan-shaped arrangement. It is partially altered by veinlets (saponite) cutting through the grains. Clinopyroxene occurs as anhedral stubby prisms up to 1 mm long and interstitial or intergrown with plagioclase. Clinopyroxene is partially replaced by green celadonite.



Plane-polarized: 24792111



Cross-polarized: 24792131

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: lithology

Domain rel. abundance (%): 100

Observer: MGTejada

Lithology: aphyric basalt

Texture: variolitic

Average grain size: fine grained

Grain size distribution: seriate

Domain comment: medium-grained aphyric basalt with altered margin

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	15	10	5	0.03	0.5	0.4	subhedral-anhedral	equant	partially replaced by iddingsite and Fe-oxide
Plagioclase	50	48	2	0.2	3.5	1.2	subhedral-anhedral	prismatic elongated	forms fan-shaped arrangement of laths; cut by veinlets
Clinopyroxene	10	7	3	0.2	1		anhedral	prismatic short	interstitial or intergrown with plagioclase; partially replaced by green clay
Fe-Ti Oxide	15	8	7	0.01	0.4	0.1	subhedral-anhedral	aggregates	occurs as alteration of olivine and are oxidized and rust-colored within the altered margins
Mesostasis	10	0	10						mostly replaced by clay and oxyhydroxide
Total (groundmass constituents):	100	73	27						
Total (whole rock constituents):	100	73	27						

IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)

Observer: G Zhang

Alteration intensity: moderately altered

Total alteration (%): 35

Alteration mineral:	Percent:
Carbonate	0.1
Celadonite	6
Saponite	25

THIN SECTION LABEL ID: 349-U1431E-43R-2-W 78/80-TSB(78-80)-TS53 Thin section no.: 53
 Unit/Subunit: IX Piece no.: #3 Observer: MGTejada
 Thin section summary: A brown, highly altered medium-grained aphyric basalt cut by a 5-mm wide calcite and magnetite vein. The olivine still preserves euhedral to subhedral outlines but is completely pseudomorphed by secondary oxide mineral lining the original grains. Plagioclase and clinopyroxene are closely intergrown and are also cut by oxide and calcite veinlets.



Plane-polarized: 24792151



Cross-polarized: 24792171

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: lithology Domain rel. abundance (%): 100 Observer: G Zhang

Lithology: aphyric basalt

Texture: Average grain size: medium grained Grain size distribution:

Domain comment: brown-colored, highly altered medium-grained aphyric basalt cut by a 5-mm wide calcite and magnetite vein.

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	15	1	14	0.15	0.8	0.5	subhedral-anhedral	equant	mostly pseudomorphs of original grains outlined by secondary oxide
Plagioclase	40	30	10	0.1	3	1.8	subhedral	tabular	cut by oxide veinlets
Clinopyroxene	30	25	5	0.4	3.2	1	subhedral-anhedral	prismatic short	interstitial or intergrown with plagioclase; partially replaced by brown clay
Fe-Ti Oxide	15	5	10	0.06	0.4	0.2	subhedral		occurs in vein and as alteration of olivine and are oxidized and rust-colored throughout the section
Total (groundmass constituents):	100	61	39						
Total (whole rock constituents):	100	61	39						

IGNEOUS ROCK - VEINS AND HALOS

Sample domain name: vein type 1 Observer: G Zhang

Vein type: vein fill Ave. vein thickness (cm): 0.4

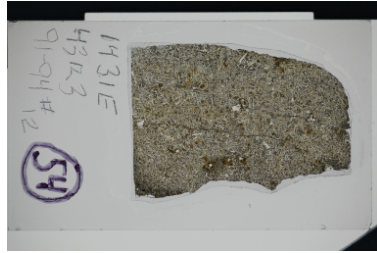
Vein boundary: uncertain boundary or contact Vein connectivity: isolated

Vein shear sense: Vein generation: primary

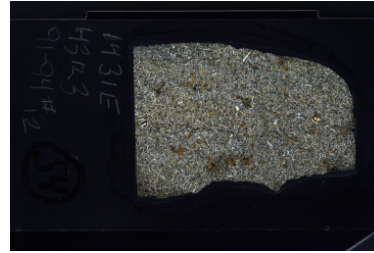
Vein filling mineral:	Percent:
Saponite	100

Halo (%): Halo thickness (cm): 0 Halo color:

THIN SECTION LABEL ID: 349-U1431E-43R-3-W 91/94-TSB(91-94)-TS54 Thin section no.: 54
 Unit/Subunit: IX Piece no.: #12 Observer: MGTejada
 Thin section summary: Highly altered sparsely olivine-plagioclase-phyric basalt with intergranular texture containing a few vesicles that are partially filled with secondary minerals. A few microphenocrysts of olivine and plagioclase are present in the groundmass dominantly composed of variolitic plagioclase. The mesostasis is mostly composed of microcrystalline clinopyroxene and oxides.



Plane-polarized: 24792191



Cross-polarized: 24792211

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: lithology Domain rel. abundance (%): 100 Observer: G Zhang

Lithology: sparsely olivine-plagioclase
phyric basalt

Texture: Average grain size: fine grained Grain size distribution:

Domain comment: moderately altered microcrystalline basalt with alteration marked by brown patches and rusty stains at the corners.
Contains minor microphenocrysts of olivine and plagioclase

Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Comments
Total (whole rock constituents):	5	3	2	0.2	0.4		rounded	

Phenocryst	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Special Features	Comments
Olivine	5	2	3	0.2	1.2	0.3	subhedral-anhedral	tabular		replaced along cracks and rims
Plagioclase	3	3	0	0.6	1.2	1	subhedral-anhedral	tabular		cut by saponite(?) veinlets
Total (whole rock constituents):	8	5	3							

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	45	35	10	0.05	1.5	0.8	subhedral	prismatic elongated	forms triangular arrangement of laths
Fe-Ti Oxide	12	12	0	0.01	0.08	0.04	subhedral		
Mesostasis	43	30	13						mostly composed of clinopyroxene microlites and oxides
Total (groundmass constituents):	100	77	23						
Total (whole rock constituents):	87	67	20						

IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)

Observer: G Zhang

Alteration intensity: highly altered

Total alteration (%): 65

Alteration comments: Fe-oxide vein

Alteration mineral:	Percent:
Carbonate	2

Vesicle filling:	Percent:
Carbonate	8
Saponite	24
Smectite	8
Total vesicle fill	40

THIN SECTION LABEL ID: **349-U1431E-45R-1-W 0/5-TSB(0-5)-TS55**

Thin section no.: 55

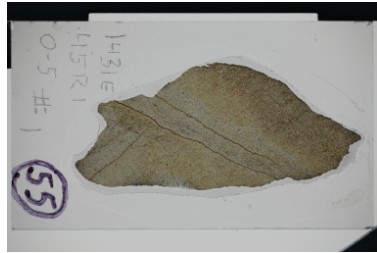
Unit/Subunit: IX

Piece no.: #1

Observer: MGTejada

Thin section summary:

Highly altered cryptocrystalline aphyric basalt with subparallel arrangement of plagioclase laths and felty appearance of interstitial clinopyroxene. Oxide veinlets cut through it and brown clay replaces the interstitial clinopyroxene microlites resulting in brown coloration.



Plane-polarized: 24792231



Cross-polarized: 24792251

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: lithology

Domain rel. abundance (%): 100

Observer: G Zhang

Lithology: aphyric basalt

Texture: aligned

Average grain size: cryptocrystalline

Grain size distribution: unimodal

Domain comment: highly altered cryptocrystalline with subparallel arrangement of plagioclase laths and felty appearance of interstitial clinopyroxene

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	50	45	5	0.01	0.1	0.05	subhedral	acicular	forms subparallel alignment
Fe-Ti Oxide	10	5	5	0.01	0.05	0.02	subhedral	subequant	occurs as black isolated equant grains and as secondary veinlets
Mesostasis	40	30	10						mostly composed of clinopyroxene microlites
Total (groundmass constituents):	100	80	20						
Total (whole rock constituents):	100	80	20						

IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)

Observer: G Zhang

Alteration intensity: moderately altered

Total alteration (%): 35

Alteration mineral:	Percent:
Saponite	15

THIN SECTION LABEL ID: **349-U1431E-46R-1-W 60/62-TSB(60-62)-TS56**

Thin section no.: 56

Unit/Subunit: XI

Piece no.: #11

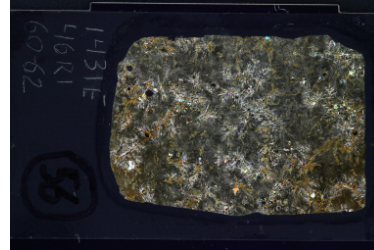
Observer: MGTejada

Thin section summary:

Moderately altered sparsely olivine-plagioclase-phyric basalt with acicular plagioclase forming radiating clusters surrounding olivine grains. The groundmass consists dominantly of acicular plagioclase microlites forming a sheaf-like or branching arrangement (dendritic texture). Most plagioclase phenocrysts display skeletal texture with holes at the center and swallow-tail structure. Few grains of clinopyroxene are found associated with the plagioclase-olivine clusters.



Plane-polarized: 24796491



Cross-polarized: 24796511

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: lithology

Domain rel. abundance (%): 100

Observer: G Zhang

Lithology: sparsely olivine-plagioclase-phyric basalt

Texture: intersertal

Average grain size: cryptocrystalline

Grain size distribution: bimodal

Domain comment: moderately altered; with acicular plagioclases forming radiating clusters surrounding olivine grains

Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Comments
Total (whole rock constituents):	5	1	4	0.15	1		rounded	

Phenocryst	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Special Features	Comments
Olivine	3	2	1	0.05	0.8	0.4	euhedral-subhedral	acicular		slightly altered with alteration rim and along cracks
Plagioclase	10	10	0	0.4	0.8	0.6	subhedral-anhedral	acicular		
Total (whole rock constituents):	13	12	1							

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	80	75	5	0.01	0.6	0.03	anhedral	variolitic	acicular to fibrous forming sheaf-like or branching arrangement
Clinopyroxene	1	1	0	0.05	0.4	0.2	anhedral	intergranular	occurs with olivine and plagioclase; only a few grains were observed
Fe-Ti Oxide	5	5	0	0.01	0.02	0.01	subhedral		
Mesostasis	14	0	14						
Total (groundmass constituents):	100	81	19						
Total (whole rock constituents):	82	66	16						

IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)

Observer: G Zhang

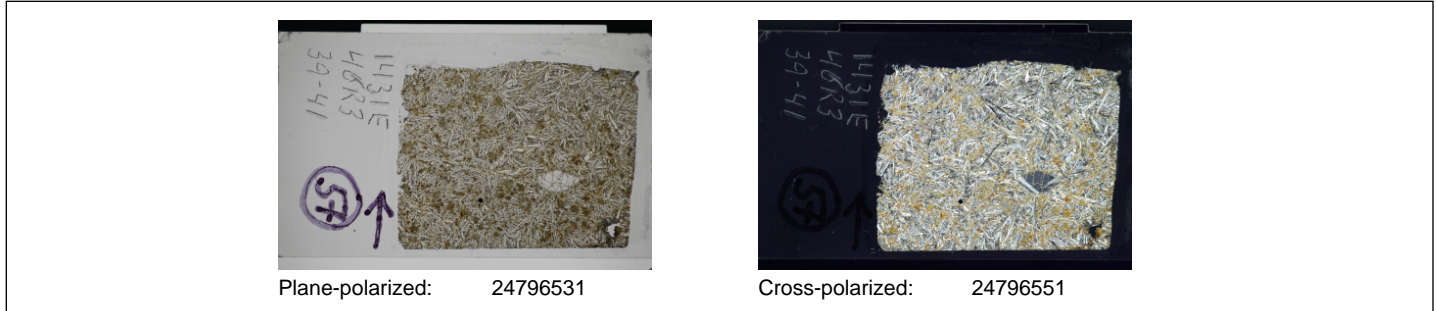
Alteration intensity: slightly altered

Total alteration (%): 3

Alteration mineral:	Percent:
Carbonate	0.5
Saponite	35

Vesicle filling:	Percent:
Carbonate	27
Saponite	53
Total vesicle fill	80

THIN SECTION LABEL ID:	349-U1431E-46R-3-W 39/41-TSB(39-41)-TS57			Thin section no.:	57
Unit/Subunit:	XI	Piece no.:	#7	Observer:	MGTejada
Thin section summary:	Highly altered medium-grained amygdaloidal basalt with one large plagioclase and relict olivine phenocrysts, brown with oxide stains and veinlets cutting throughout. Long elongated laths of plagioclase form radial aggregates (variolitic) in the groundmass and some with preserved skeletal textures (holes at the center). They are replaced and cut by saponite and calcite veins. Granular to tabular clinopyroxene fills the interstices and gaps between plagioclase laths and are mostly replaced by brown clay, brown oxyhydroxide and calcite. Vesicles have brown oxyhydroxide forming the lining and then filled by white and brown clay (saponite?), calcite and secondary oxides.				



IGNEOUS ROCK - PRIMARY MINERALOGY									
Sample domain name:	lithology		Domain rel. abundance (%):	100		Observer:	G Zhang		
Lithology:	amygdaloidal aphyric basalt								
Texture:	variolitic		Average grain size:	medium grained		Grain size distribution:	seriate		
Domain comment:	highly altered medium-grained amygdaloidal basalt with one large plagioclase and relict olivine phenocrysts.								
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Comments	
Total (whole rock constituents):	10	0	10	0.4	1.4	0.6	rounded		
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	45	32	13	0.4	3.9	1.2	subhedral-anhedral	prismatic elongated	form radial aggregates (variolitic) and some with preserved skeletal textures (holes at the center); replaced and cut by saponite and calcite veins.
Clinopyroxene	30	24	6	0.05	1	0.2	subhedral-anhedral	interstitial	granular to tabular filling the interstices or bridging gaps between plagioclase laths; overgrowths on big plagioclase phenocryst.
Fe-Ti Oxide	25	5	20	0.01	0.2	0.03	subhedral-anhedral	subequant	black grains occur with cpx in interstices; secondary oxides occur with brown clay as vesicle fillings and in veinlets cutting through the section.
Total (groundmass constituents):	100	61	39						
Total (whole rock constituents):	90	55	35						

IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)

Observer: G Zhang

Alteration intensity: highly altered

Total alteration (%): 55

Alteration mineral:	Percent:
Saponite	40

Vesicle filling:	Percent:
Carbonate	6
Saponite	94
Total vesicle fill	100

THIN SECTION LABEL ID: **349-U1431E-47R-1-W 4/6-TSB(4-6)-TS58**

Thin section no.: 58

Unit/Subunit: XI

Piece no.: #2

Observer: G ZHANG, M Tejada

Thin section summary:

Moderately altered olivine-plagioclase-phyric fine-grained basalt with brown alteration halo. Plagioclase occurs as microphenocrysts and groundmass mineral forming triangular patterns with interstices filled with microcrystalline clinopyroxene and oxides. Plagioclase microphenocrysts display swallow-tail and skeletal textures whereas those in the groundmass occur as thin laths with variolitic texture. The altered margin represents 30% of the section and is marked by orange-brown boundary. Secondary minerals include smectite and Fe-oxyhydroxide occurring in the altered margins. Olivine microphenocrysts have alteration halo and are partially replaced by iddingsite along cracks and margins.



Plane-polarized: 24796571



Cross-polarized: 24796591

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: lithology

Domain rel. abundance (%): 100

Observer: G Zhang

Lithology: sparsely olivine-plagioclase-phyric basalt

Texture: intergranular

Average grain size: fine grained

Grain size distribution: bimodal

Domain comment: moderately altered plagioclase-olivine-microphyric basalt with brown alteration halo

Phenocryst	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Special Features	Comments
Olivine	2	1.5	0.5	0.2	0.6	0.2	euhedral-subhedral	tabular		slightly altered with alteration rim and along cracks
Plagioclase	1	1	0	0.1	0.6	0.6	subhedral-anhedral	tabular		swallow-tail texture
Total (whole rock constituents):	3	2.5	0.5							

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	40	36	4	0.05	0.3	0.1	subhedral-anhedral	intersertal	skeletal with holes in the middle; mostly variolitic
Clinopyroxene	50	45	5	0.05	0.5	0.1	anhedral	intergranular	shows fibrous habit; integrown with plagioclase
Fe-Ti Oxide	10	8	2	0.01	0.1	0.05	subhedral-anhedral	aggregates	black to brown in the altered margin; occurs with brown clay in the altered margin
Total (groundmass constituents):	100	89	11						
Total (whole rock constituents):	97	86	11						

IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)

Observer: G Zhang

Alteration intensity: slightly altered

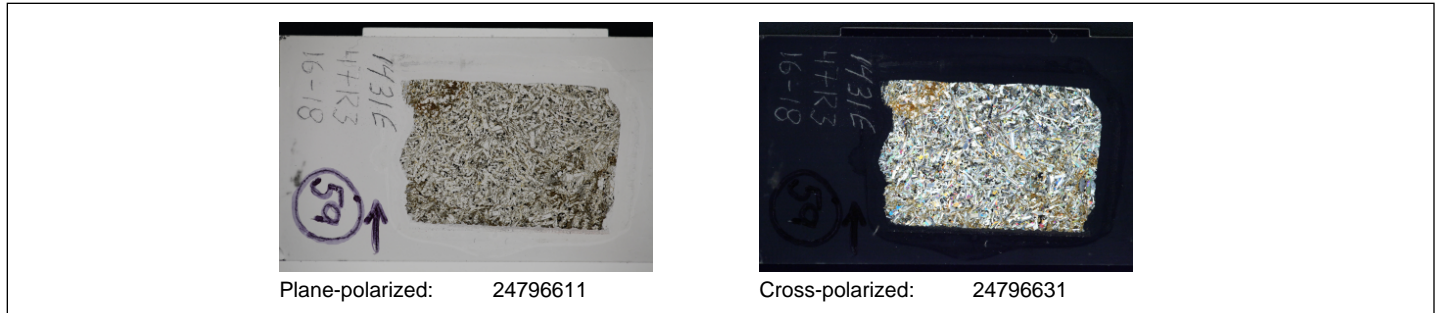
Total alteration (%): 9

Alteration mineral:	Percent:
Saponite	30

THIN SECTION LABEL ID: 349-U1431E-47R-3-W 16/18-TSB(16-18)-TS59 Thin section no.: 59

Unit/Subunit: XI Piece no.: Observer: G ZHANG, M Tejada

Thin section summary: Moderately altered microcrystalline coarse-grained aphyric basalt with alteration marked by brown patches and rusty stains at the corners. Only 3 grains of olivine were observed with anomalous elongated shape, highly cracked and enclosed in clinopyroxene grains, and are replaced by iddingsite and oxides. Consists mostly of up to 4 mm long highly elongated prismatic grains of plagioclase with concave inward outlines, dusty and cut by brown clay along cleavage and twinning axes. Clinopyroxene is pinkish brown to greenish and occurs as interstitial filling or intergrown with plagioclase and contain stretched olivine inclusions. They are replaced by brown and green clay and oxide.



IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: lithology Domain rel. abundance (%): 100 Observer: G Zhang

Lithology: aphyric basalt

Texture: variolitic Average grain size: coarse grained Grain size distribution: seriate

Domain comment: moderately altered microcrystalline basalt with alteration marked by brown patches and rusty stains at the corners

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	0.2	0.1	0.1	0.9	1.1	1	anhedral	subequant	only 3 grains observed with anomalous elongated shape, highly cracked and enclosed in cpx grains; replaced by iddingsite and oxides
Plagioclase	54.8	50	4.8	0.2	4	1.4	anhedral	prismatic elongated	up to 4 mm long highly elongated prismatic grains with concave inward outlines; dusty and cut by brown clays along cleavage and twinning axes
Clinopyroxene	30	25	5	0.2	2.6	0.8	anhedral	interstitial	pinkish brown to greenish; interstitial to intergrown with plagioclases and contain stretched olivine inclusions; replaced by brown and green clay and oxide
Fe-Ti Oxide	15	8	7	0.05	0.6	0.2	euohedral-subhedral	interstitial	occurs with clinopyroxene in interstices and as secondary minerals with brown clay and calcite
Total (groundmass constituents):	100	83.1	16.9						
Total (whole rock constituents):	100	83.1	16.9						

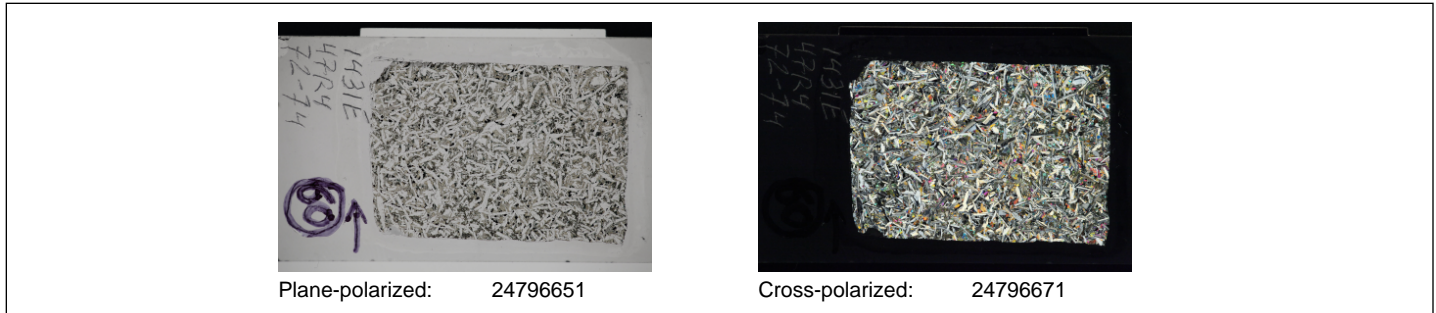
IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)

Observer: G Zhang

Alteration intensity: slightly altered Total alteration (%): 3

Alteration mineral:	Percent:
Saponite	10

THIN SECTION LABEL ID: 349-U1431E-47R-4-W 72/74-TSB(72-74)-TS60 **Thin section no.:** 60
Unit/Subunit: XI **Piece no.:** #1 **Observer:** G ZHANG, M Tejada
Thin section summary: Moderately altered medium- to coarse-grained aphyric basalt with olivine, plagioclase, and clinopyroxene. Olivine is replaced by iddingsite along cracks and margins and often shows pseudomorphs or ghosts with only parts of the original grain showing. Plagioclase shows irregular concave inward edges, myrmekitic intergrowth with clinopyroxene that sometimes are leaf-like in appearance with the twinning plane in plagioclase as the midline. Some grains display continuous zoning and some are cut by greenish and brown clay. Olivine also occurs as inclusions in a few grains of plagioclase. Fe-Ti oxides occur as six-sided, triangular, and tabular grains with subhedral ones preserving skeletal textures.



IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: lithology **Domain rel. abundance (%):** 100 **Observer:** G Zhang

Lithology: aphyric basalt

Texture: intergranular **Average grain size:** medium grained **Grain size distribution:** seriate

Domain comment: slightly altered, with subophitic to myrmekitic intergrowth between plagioclase and clinopyroxene

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	5	3	2	0.3	1	0.4	anhedral	amoeboid	replaced by iddingsite along cracks and margins; often shows pseudomorphs or ghost with only parts of the original grain showing
Plagioclase	50	47	3	0.2	3.1	1.2	anhedral	lath-shaped	irregular concave inward edges; myrmekitic intergrowth with plagioclase sometimes with leaf-like appearance with the twinning plane in plagioclase as the midline; some grains display continuous zoning and some are cut by greenish and brown clay; olivine included in plagioclase in a few grains
Clinopyroxene	30	28	2	0.2	1.1	0.6	anhedral	interstitial	myrmekitic intergrowth with plagioclase; replaced by green mineral (celadonite?)
Fe-Ti Oxide	15	10	5	0.1	0.8	0.4	euhedral-subhedral	tabular	black, with six-sided, triangular or tabular shaped euhedral grains; mostly interstitial with skeletal texture preserved
Total (groundmass constituents):	100	88	12						
Total (whole rock constituents):	100	88	12						

IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)

Observer: G Zhang

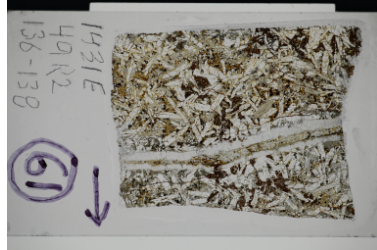
Alteration intensity: fresh **Total alteration (%):** 1

Alteration mineral:	Percent:
Saponite	15

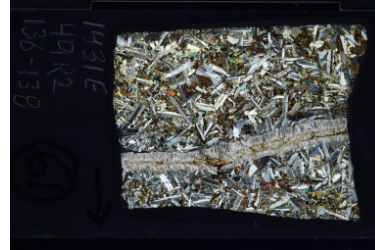
THIN SECTION LABEL ID: **349-U1431E-49R-2-W 136/138-TSB(136-138)-TS61** Thin section no.: 61

Unit/Subunit: XI Piece no.: #4 Observer: G ZHANG, M Tejada

Thin section summary: Highly altered coarse-grained aphyric basalt with variolitic texture composed of plagioclase and clinopyroxene and cut by a 3-mm wide vein and several veinlets of calcite. Plagioclase grains have irregular concave inward outlines and often have clinopyroxene intergrowths along the sides. Myrmekitic intergrowth between plagioclase and clinopyroxene sometimes looks like a fern leaf. Opaque minerals consist of primary and secondary types; the primary grains are black with six-sided or tabular shapes in euhedral grains, the secondary ones are massive dark brown patches that occur as amorphous aggregates with brown clay.



Plane-polarized: 24796691



Cross-polarized: 24796711

IGNEOUS ROCK - PRIMARY MINERALOGY

Sample domain name: lithology Domain rel. abundance (%): 100 Observer: G Zhang

Lithology: aphyric basalt

Texture: variolitic Average grain size: coarse grained Grain size distribution: seriate

Domain comment: highly altered coarse grained aphyric basalt with variolitic texture composed of plagioclase and clinopyroxene and cut by a vein and several veinlets of calcite

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	60	45	15	0.4	3.6	2	subhedral-anhedral	lath-shaped	variolitic to intergranular; some grains with hollow center
Clinopyroxene	20	14	6	0.1	2	0.5	subhedral-anhedral	interstitial	myrmekitic intergrowth with plagioclase; replaced by brown clay
Fe-Ti Oxide	12	5	7	0.1	0.6	0.4	euhedral-subhedral	tabular	black with six-sided or tabular shapes in euhedral grains;
Mesostasis	8	0	8						massive dark brown patches 0.5-1.4 mm wide that occur as amorphous oxide aggregates with brown clay
Total (groundmass constituents):	100	64	36						
Total (whole rock constituents):	100	64	36						

IGNEOUS ROCK - VEINS AND HALOS

Sample domain name: **vein type 1** Observer: G Zhang

Vein type: vein fill Ave. vein thickness (cm): 0.4

Vein boundary: uncertain boundary or contact Vein connectivity: nonbranched or single

Vein shear sense: Vein generation: primary

Vein filling mineral:	Percent:
Carbonate	70
Saponite	30

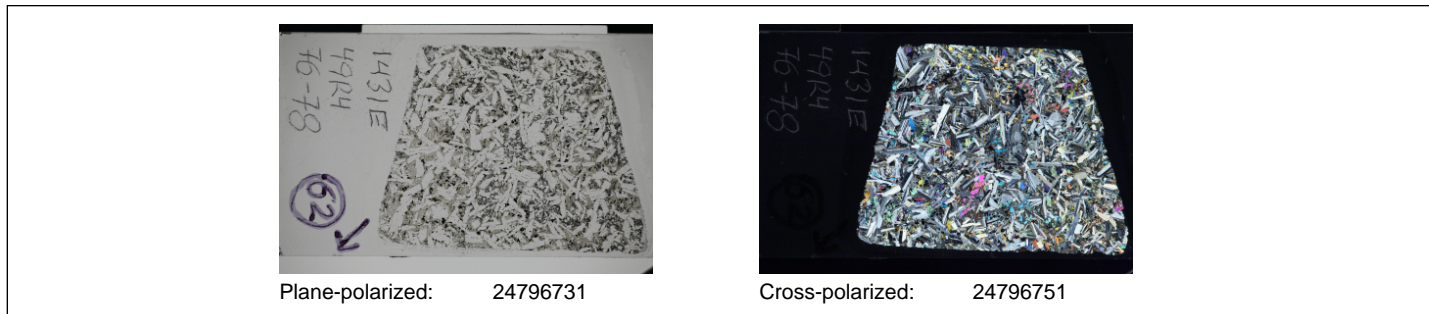
Halo (%): 100

Halo thickness (cm): 0.45

Halo color: dark gray

Halo mineral:	Percent:
Oxide (other)	50
Saponite	50

THIN SECTION LABEL ID:	349-U1431E-49R-4-W 76/78-TSB(76-78)-TS62			Thin section no.:	62
Unit/Subunit:	XI	Piece no.:	#12	Observer:	G ZHANG, M Tejada
Thin section summary:	Slightly altered coarse-grained hypidiomorphic aphyric basalt with myrmekitic intergrowth of plagioclase and clinopyroxene. Olivine forms large grains up to 1.8 mm that are broken up into smaller pieces along cracks. Plagioclase grades from anhedral to subhedral with some tabular grains and others forming highly elongate laths up to 3.2 mm long. Triangular patterns and interpenetrating elongated plagioclase laths with interstitial clinopyroxene grains are still observed whereas tabular grains show alternating normal and reverse zoning. Clinopyroxene grains display interstitial to subophitic texture with plagioclase and intergrowth with plagioclase is common. They are partially replaced by celadonite. Opaque minerals are euhedral to subhedral showing both triangular and tabular laths and some show skeletal textures.				

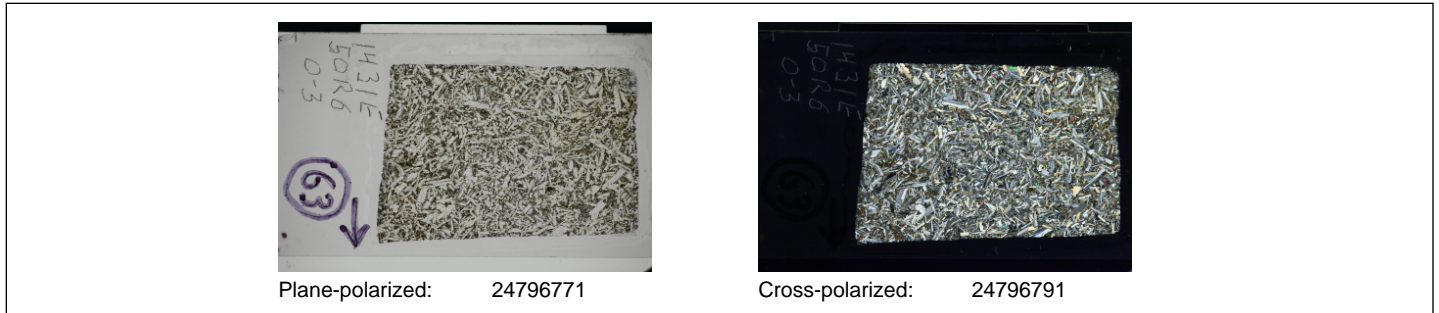


IGNEOUS ROCK - PRIMARY MINERALOGY									
Sample domain name:	lithology		Domain rel. abundance (%):	100		Observer:	G Zhang		
Lithology:	aphyric basalt								
Texture:	hypidiomorphic	Average grain size:	coarse grained	Grain size distribution:	equigranular				
Domain comment:	slightly altered with plagioclase and clinopyroxene forming myrmekitic intergrowths or subophitic textures								
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	5	4	1	0.2	1.8	0.4	anhedral	subequant	large grains broken up into smaller grains; a few are euhedral
Plagioclase	50	45	5	0.5	3.2	1.4	subhedral-anhedral	prismatic elongated	some tabular forms are also present; alternating normal and reverse zoning in several grains; elongated laths are interpenetrating or form triangular patterns filled by microcrystalline clinopyroxene inside; cut by calcite and white clay veinlets;
Clinopyroxene	35	34	1	0.4	3	0.6	subhedral-anhedral	amoeboid -irregular	subophitic to myrmekitic intergrowth with plagioclase; altered by celadonite
Fe-Ti Oxide	5	5	0	0.01	0.4	0.2	euhedral-subhedral	interstitial	form euhedral triangular sections to laths, with some skeletal subhedral grains
Mesostasis	5	2	3						microcrystalline clinopyroxene replaced by green celadonite
Total (groundmass constituents):	100	90	10						
Total (whole rock constituents):	100	90	10						

IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)			
Observer:	G Zhang		
Alteration intensity:	fresh	Total alteration (%):	0.2

Alteration mineral:	Percent:
Carbonate	0.1
Saponite	10

THIN SECTION LABEL ID:	349-U1431E-50R-6-W 0/3-TSB(0-3)-TS63			Thin section no.:	63
Unit/Subunit:	XI	Piece no.:	#3	Observer:	MGTejada
Thin section summary:	Slightly altered medium-grained aphyric basalt with hypidiomorphic texture. Some olivine grains are amoeboidal and partially replaced with oxide halos and along cracks. Plagioclase is tabular to highly elongated prismatic up to 3.2 mm long with several grains showing alternating normal and reverse zoning. They are partially altered by calcite and clay veinlets and display concave inward outlines. Clinopyroxene occurs as acicular to granular masses inside plagioclase laths or intergrown with plagioclase. It also forms overgrowth on plagioclase, with crystals growing perpendicularly or obliquely to the long axis. It is partially replaced by green clay and oxyhydroxides				



IGNEOUS ROCK - PRIMARY MINERALOGY									
Sample domain name:	lithology	Domain rel. abundance (%):	100	Observer:	MGTejada				
Lithology:	aphyric basalt								
Texture:	hypidiomorphic	Average grain size:	medium grained	Grain size distribution:	seriate				
Domain comment:	slightly altered; with plagioclases showing alternating normal and reverse zoning								
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	5	3	2	0.1	0.8	0.2	anhedral	equant	some grains are amoeboidal; partially replaced with oxide haloes and along cracks
Plagioclase	45	40	5	0.2	3.2	1.5	subhedral-anhedral	prismatic elongated	also tabular forms and display concave inward outlines; cut by calcite and clay veinlets; with alternating normal and reverse zoning in several grains.
Clinopyroxene	40	38	2	0.1	1.1	0.5	anhedral	acicular	occurs as acicular to granular masses inside plagioclase laths or intergrown with plagioclase; also form overgrowth on plagioclase, with crystals growing perpendicularly or obliquely to the long axis. It is partially replaced by green clay and oxyhydroxides
Fe-Ti Oxide	8	8	0	0.05	0.4	0.1	euhedral-subhedral	aggregates	occurs as euhedral to subhedral isolated crystals or as massive aggregates in altered olivine and mesostasis
Mesostasis	2	1	1						with plagioclase microlites, brown clay and oxides
Total (groundmass constituents):	100	90	10						
Total (whole rock constituents):	100	90	10						

IGNEOUS ROCK - SECONDARY MINERALOGY (ALTERATION)

Observer: G Zhang

Alteration intensity: slightly altered

Total alteration (%): 8

Alteration mineral:	Percent:
Celadonite	20
Saponite	30