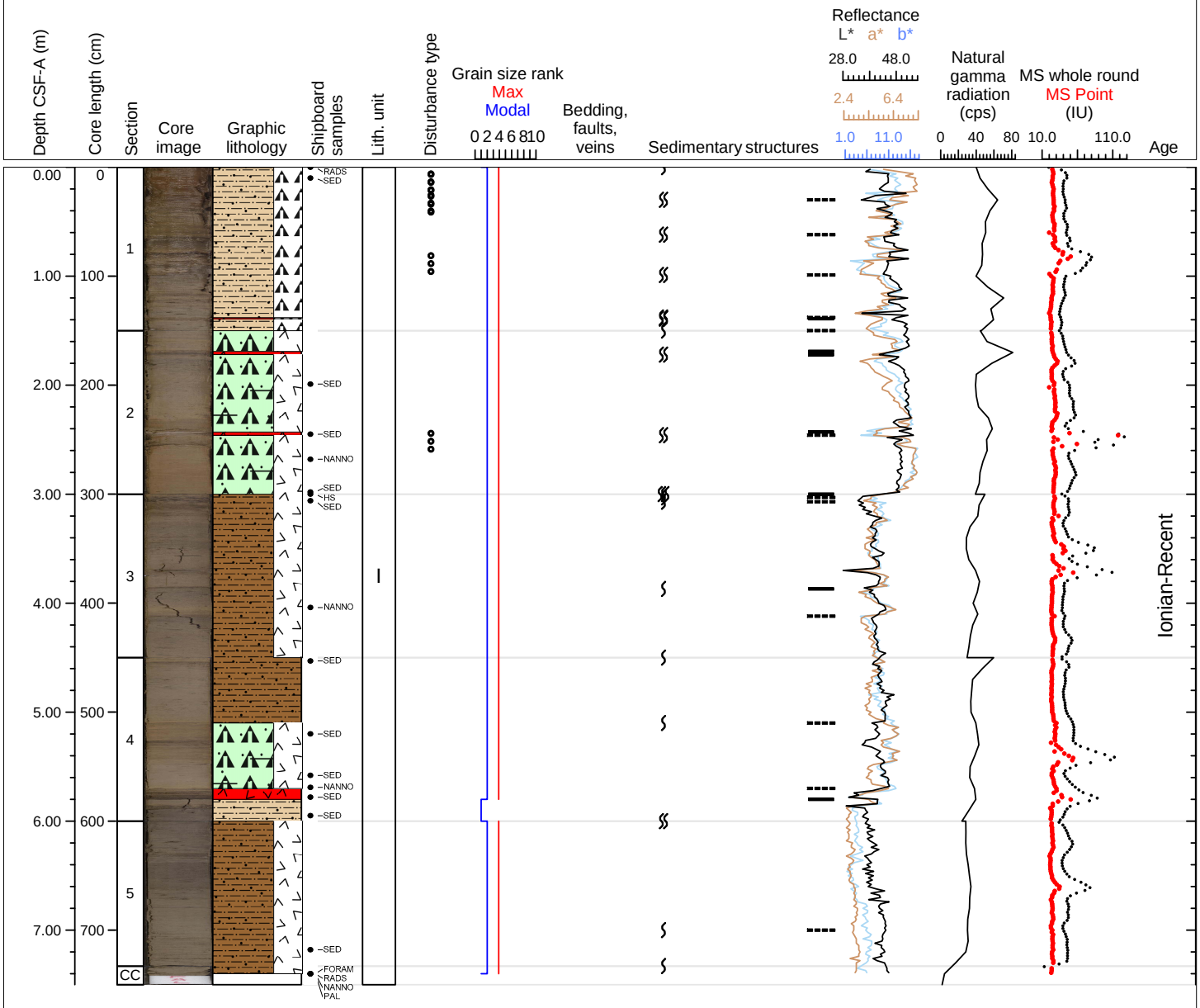
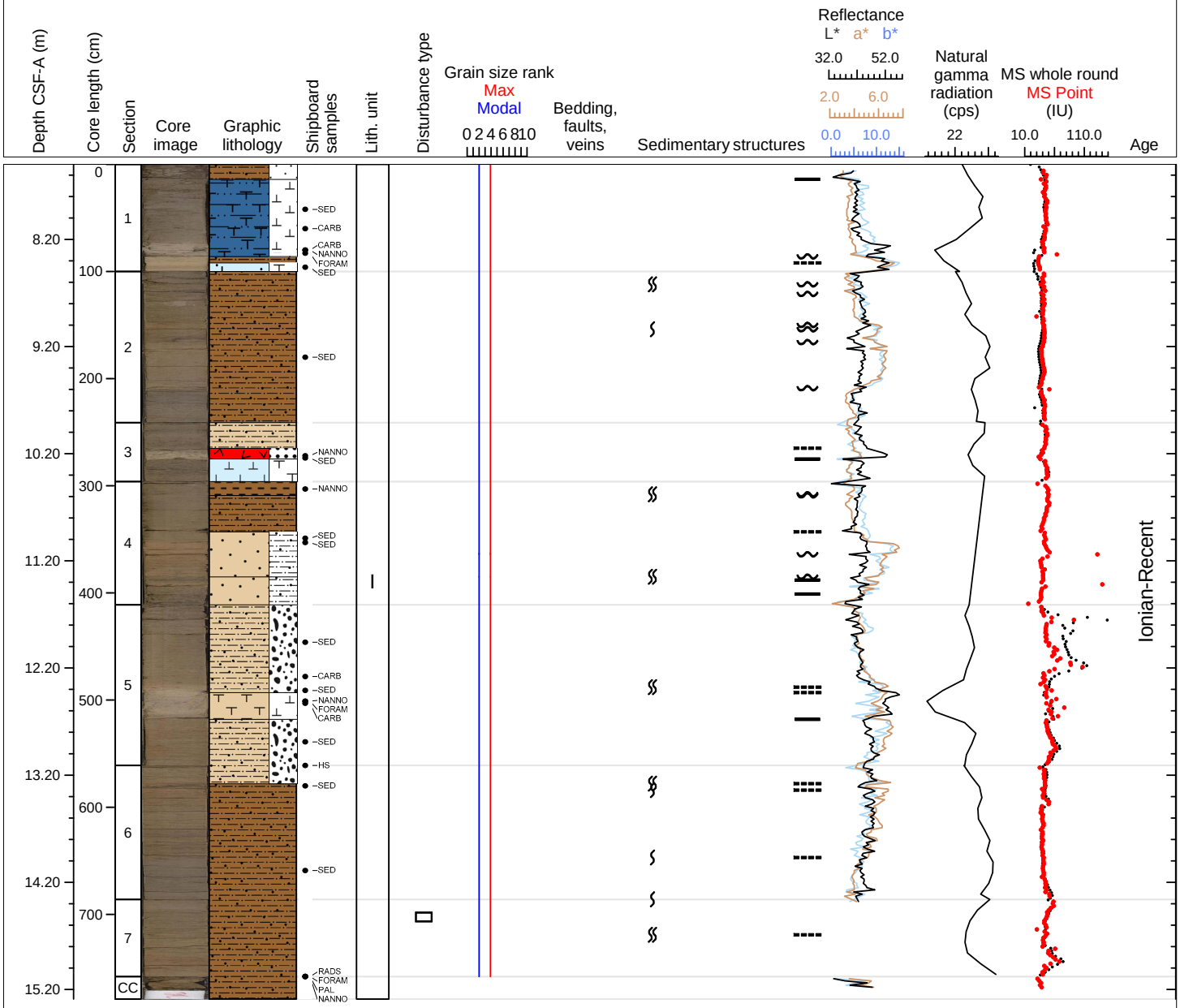
Hole 351-U1438A Core 1H, Interval 0.0-7.5 m (CSF-A)

MUD WITH ASH, RADIOLARIAN-RICH MUD WITH ASH, MUD, ASH, TUFFACEOUS MUD: Core 1H displays three main sediment types: a tuffaceous mud with radiolaria with varying color (grayish brown [5YR 3/2], yellowish brown [10YR 6/4], dark yellowish brown [10YR 4/2] and moderate yellowish brown [10YR 5/4]), radiolarian-rich mud with varying color (dark yellowish brown [10YR 4/2] and moderate yellowish brown [10YR 5/4]), and dark yellowish brown mud with ash (10YR 4/2). Bedding thickness varies at decimeter scale, and most contacts are planar and gradational. Several ash layers have been observed most prominently: Section 2, 94-96 cm, Section 4, 120-122 cm, 124-126 cm, 128-130 cm and 136-138 cm. Bioturbation is slight to moderate throughout the core. The top of the core is unconsolidated.



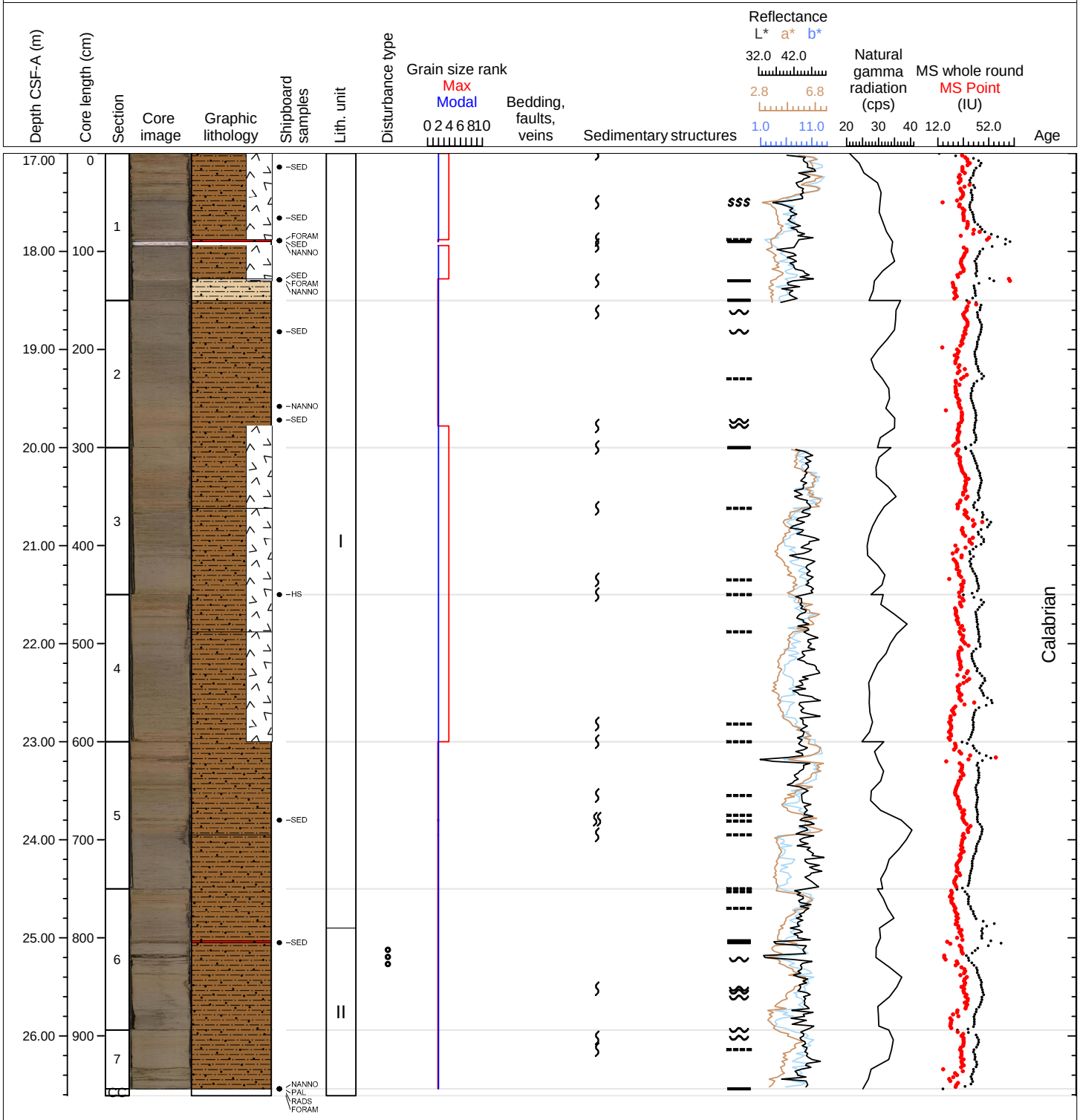
Hole 351-U1438A Core 2H, Interval 7.5-15.29 m (CSF-A)

NANNOFOSSIL AND FORAMINIFER MUD, TUFFACEOUS SILT WITH NANNOFOSSILS, MUD, FORAMINIFER OOZE: Core 2H contains mud with a number of alternating colors (on dm-scale). The colors vary from pale to medium and dark yellowish brown (10YR 6/2, 10YR 5/4, 10YR 4/2) through to olive gray (5Y 4/1). The core also contains an ash layer in Section 4, 67-68 cm and a number of lighter colored foraminifer ooze layers (10-20 cm thick) in Section 3, 34-55 cm and Section 5, 82-107 cm. The foraminifer ooze also contains abundant calcareous nannofossils. Bioturbation is slight to moderate throughout the core.



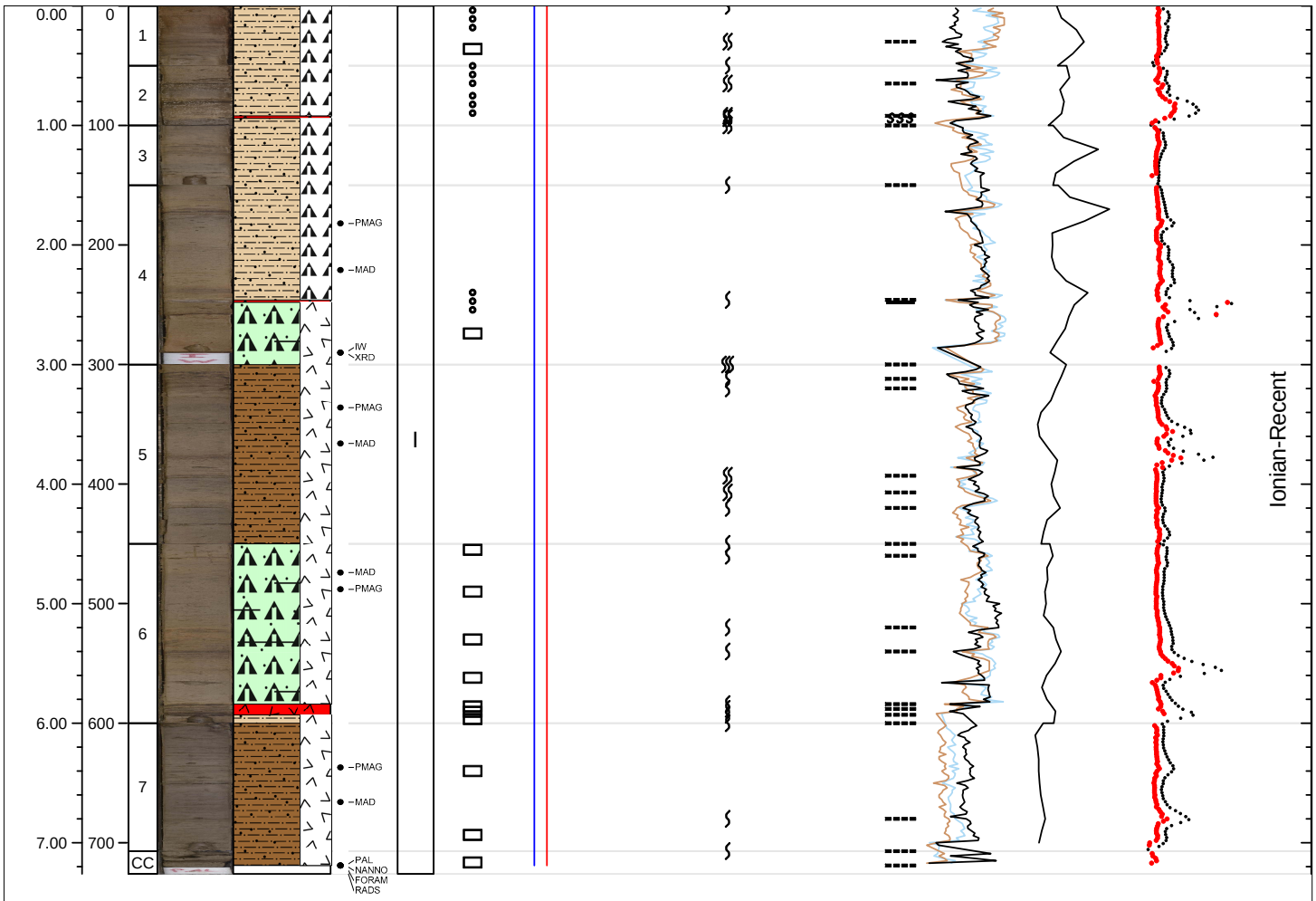
Hole 351-U1438A Core 3H, Interval 17.0-26.61 m (CSF-A)

MUD, ASH, TUFFACEOUS MUD: Core 3H contains alternating medium (10YR 5/4) and dark yellowish brown (10YR4/2) layers of mud and tuffaceous mud, 10 to 80 cm thick with occasional narrow dusky yellowish brown layers (10YR 2/2) and lighter colored ash layers in Section 1, 86-85 cm, 90-92 cm and 128-130 cm. Both bioturbation and core disturbance were either not observed or very slight throughout the core.



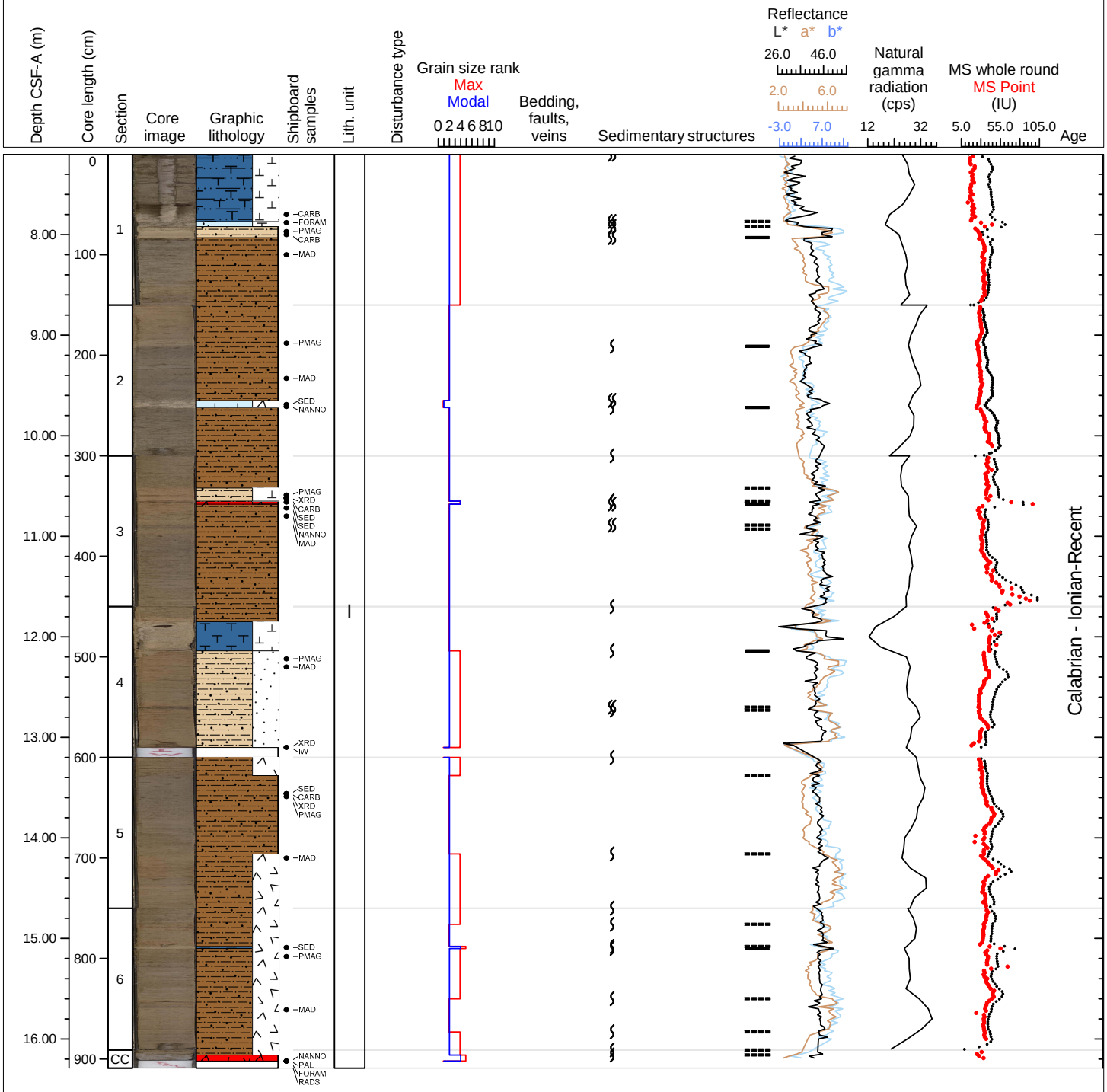
Hole 351-U1438B Core 1H, Interval 0.0-7.26 m (CSF-A)

MUD WITH ASH, RADIOLARIAN-RICH MUD WITH ASH, MUD, ASH, TUFFACEOUS MUD: Core 351-U1438B-1H consists of alternating layers of various shades of brown mud (yellowish brown [10YR 6/4], medium yellowish brown [10YR 5/4], dark yellowish brown [10YR 4/2], pale brown [5YR 5/2], brownish grey [5YR 4/1]). The first three Sections are composed of tuffaceous mud with radiolarians, succeeded by radiolarian-rich mud with ash and mud with ash. A distinct ash layer is present in Section 2, 42-44 cm. Bioturbation is slight to moderate and most parts of the core are affected by slight to moderate drilling disturbances.



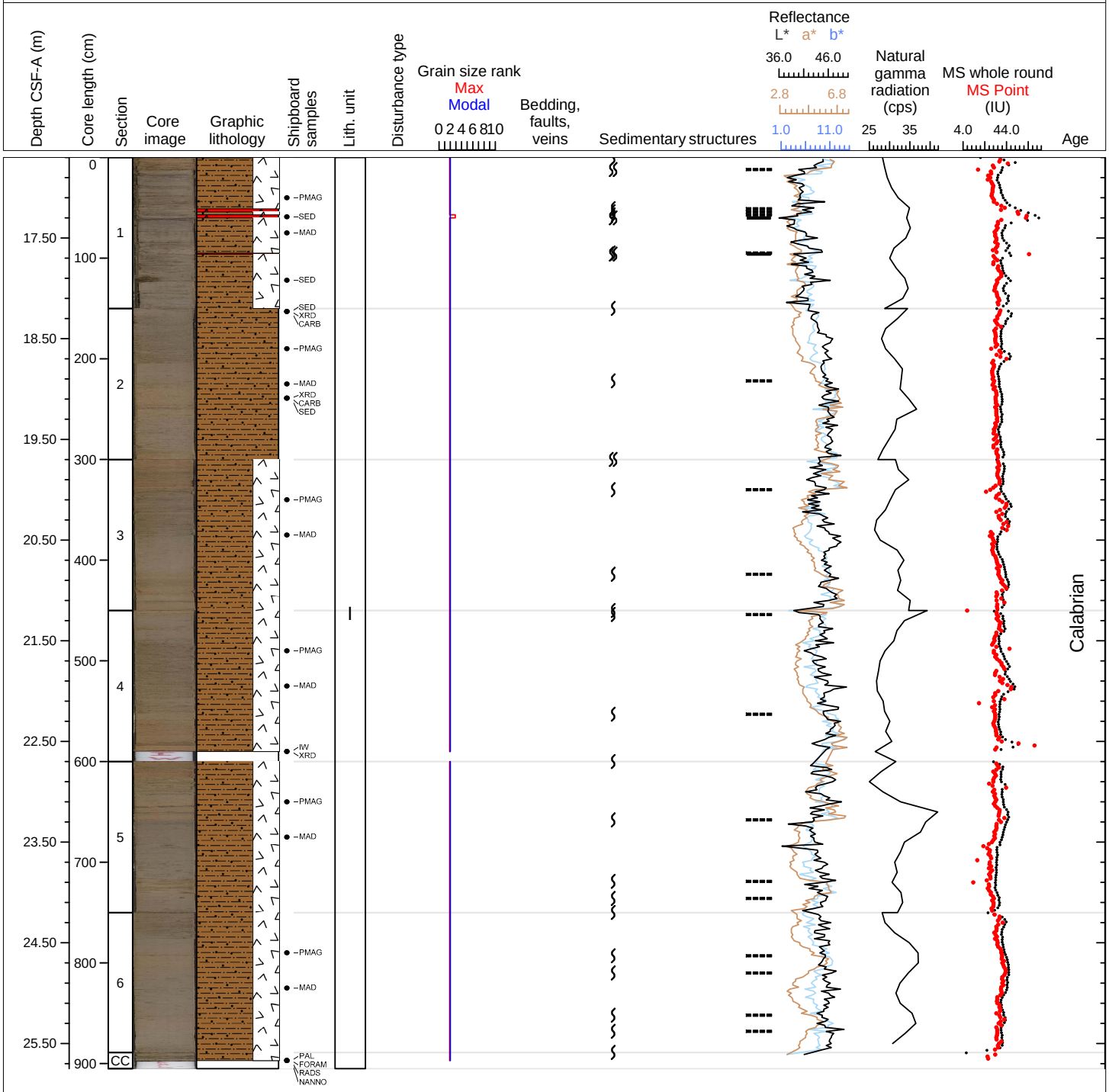
Hole 351-U1438B Core 2H, Interval 7.2-16.29 m (CSF-A)

MUD WITH ASH, FORAMINIFER OOZE, TUFFACEOUS MUD: Mud with two alternating colors dominates Core 2H: light olive gray (5Y 5/2) mud and moderate yellowish brown (10YR 5/4) mud with fine sand. The muds alternate at decimeter scales and contacts are all planar and gradational. Black mottled zones, 1-2 cm thick, occur throughout. Minor but robust sediment layers are pale yellowish brown (10YR 6/2) foraminifer ooze, located in Section 1, 67-72 cm, Section 2, 95-102 cm, Section 4, 15-44 cm, and Section 6, 38-40 cm. There is a felsic ash layer (vitric grains and crystals) in Section 3, 45-48 cm. Bioturbation is slight to moderate throughout the core.



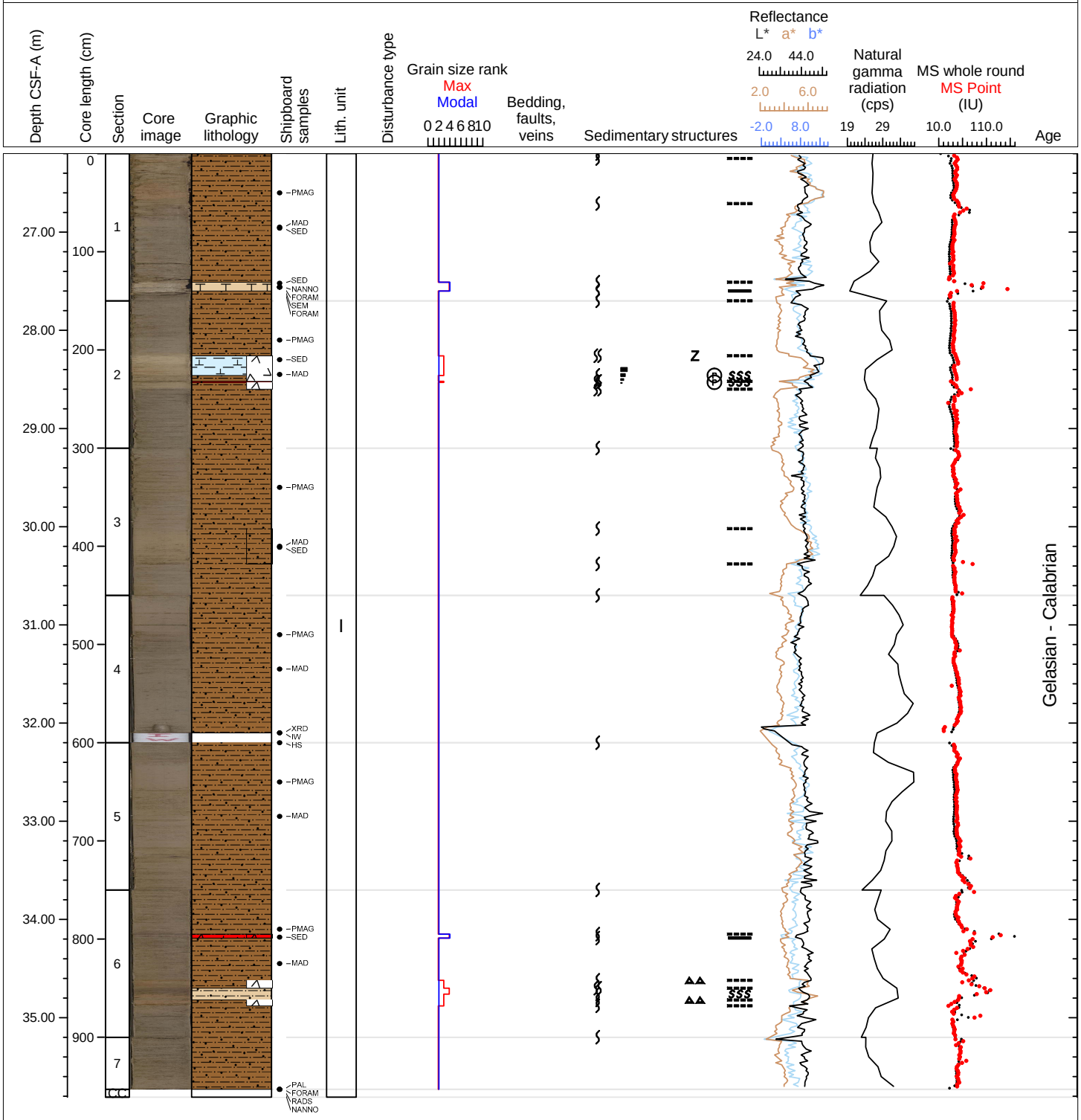
Hole 351-U1438B Core 3H, Interval 16.7-25.75 m (CSF-A)

MUD, ASH: Mud with two alternating colors dominate Core 3H: light olive gray (5Y 5/2) mud and moderate yellowish brown (10YR 5/4) mud with fine sand. The muds alternate at decimeter scales and contacts are all planar and gradational. Black mottled zones, 1-2 cm thick, occur throughout. Towards the bottom of the core the brown layers become thinner. Bioturbation is slight to moderate throughout the core.



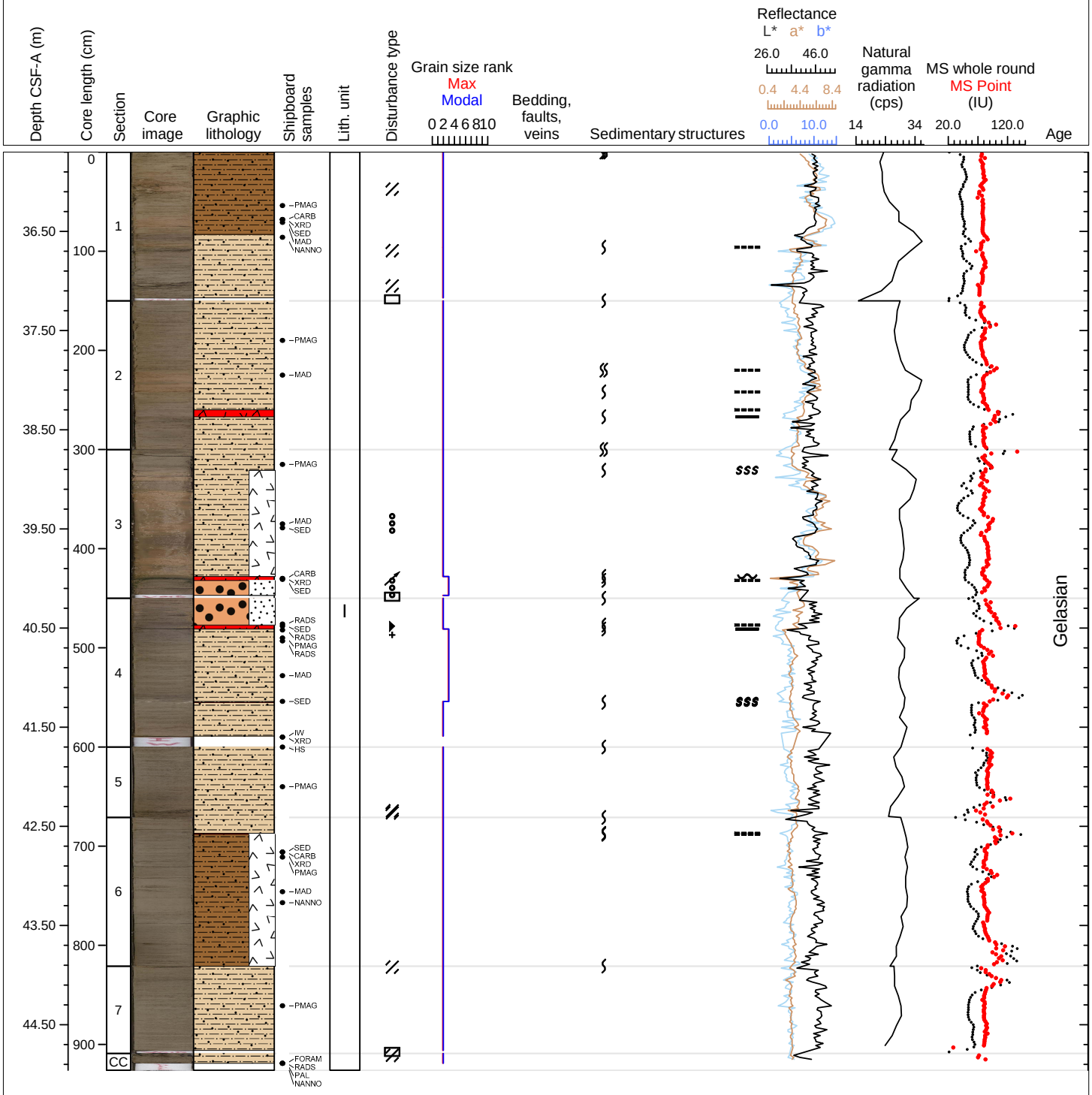
Hole 351-U1438B Core 4H, Interval 26.2-35.81 m (CSF-A)

MUD, TUFFACEOUS MUD, MUD WITH ASH, TUFFACEOUS FORAMINIFER OOZE, ASH, PUMICE PEBBLE: Mud with two alternating colors dominate Core 4H: Light olive gray (5Y 5/2) mud and moderate yellowish brown (10YR 5/4) mud with very fine and sometimes fine sand. Nannofossil clay with ash of pale to moderate yellowish brown color (10YR 6/2 to 10YR 5/4), moderately bioturbated. Tuffaceous foraminifer ooze in Section 1, 131-135 cm and a single pumice clast in Section 3, 121 cm. Ash is present in Section 1, 135-140, Section 2, 82-84 cm and Section 6, 45-49 cm. The latter is a felsic, crystal vitric ash of pale red color (10R 6/2). Concretions (probably chert) has been found in Section 6, 92 cm and Section 6, 118 cm. The core is undisturbed, most contacts (except for sharp lower contacts of ash layers) are gradational, and slight bioturbation occurs throughout the core.



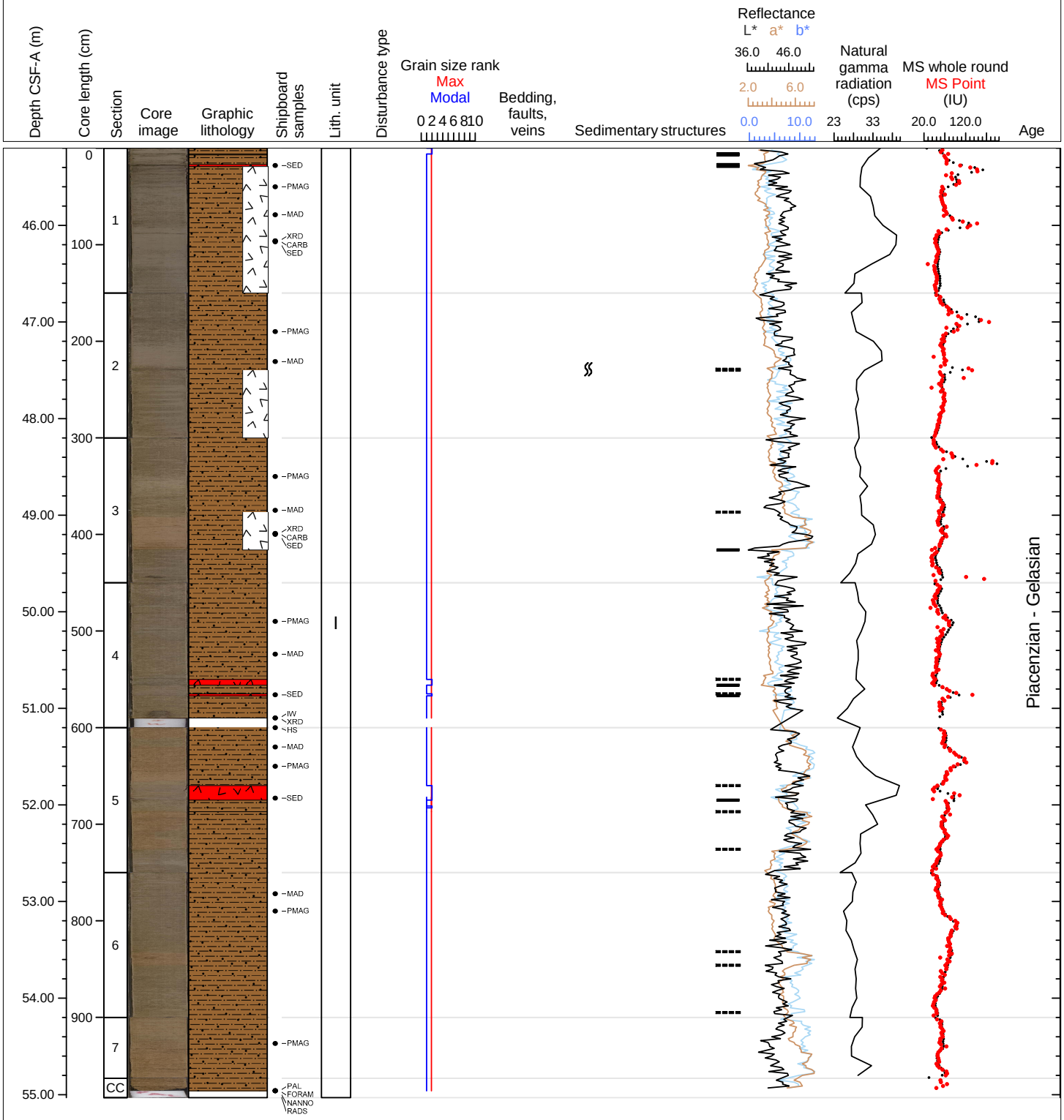
Hole 351-U1438B Core 5H, Interval 35.7-44.96 m (CSF-A)

TUFFACEOUS MUD, TUFFACEOUS SAND WITH SILT, MUD WITH ASH, ASH: Core 5H consists mainly of two tuffaceous mud types of different color alternating on dm-scale: one dark yellowish brown (10YR 4/2) and one moderate yellowish brown (10YR 5/4). The mud contains occasional thin (2-5 cm) dark mottled layers. Ash layers (general colors vary from pale yellowish brown [10YR 6/2] to very light gray [N8]) are common throughout Core 5H and are present in Section 2, 110-117 cm, Section 3, 79-82 cm (80% felsic glass, pale yellowish brown to red in color [10YR 6/2 to 10R 6/2]) and 128-132 cm (unusual deep green [10Y 4/2] layer with 70% volcanic material), Section 4, 27-31 cm and 104-106 cm and Section 6, 16-17 cm. Intercalated are some layers of tuffaceous sand with silt. Bioturbation is slight to moderate throughout the core. Drilling disturbance is limited to few short intervals.



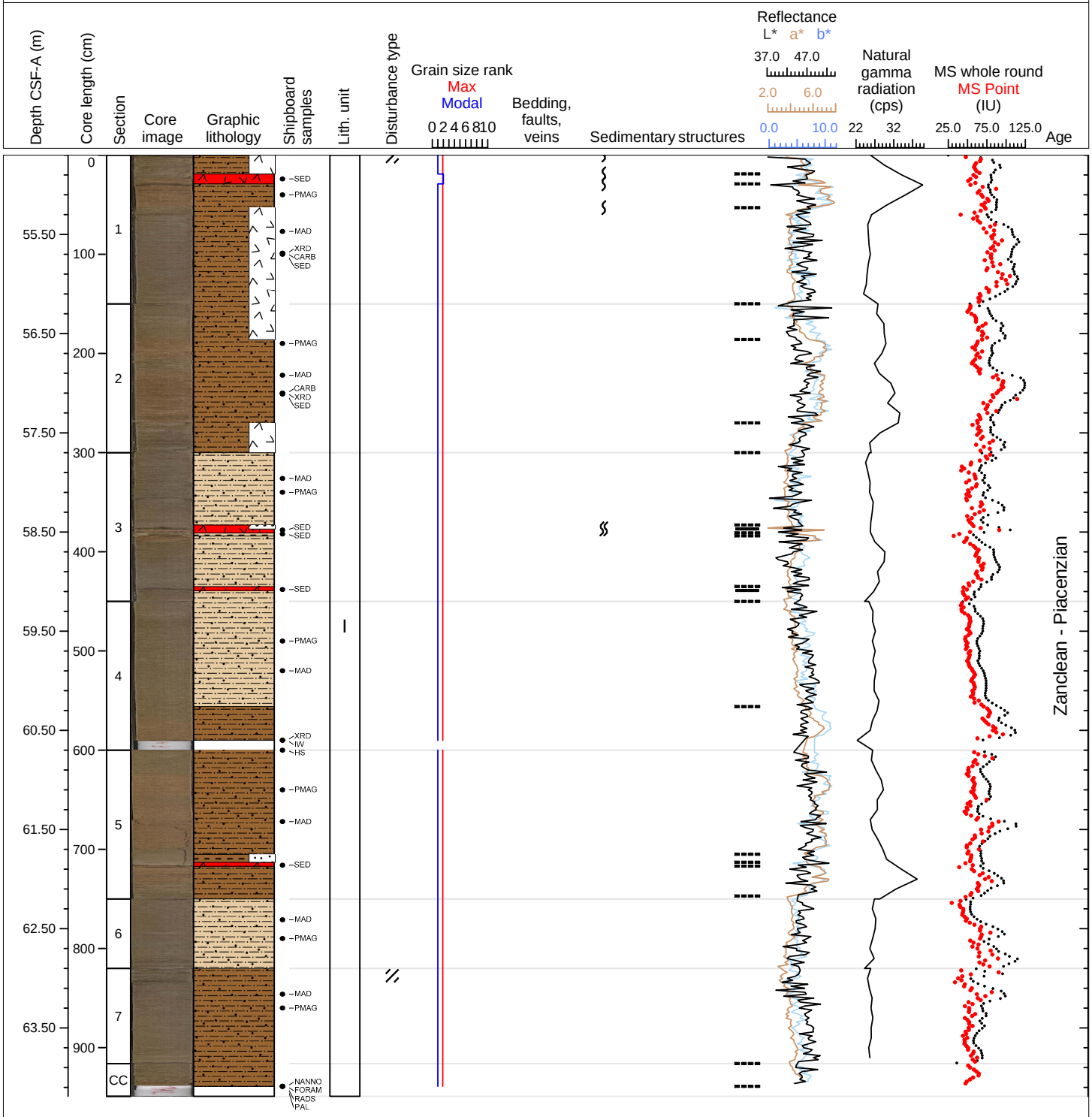
Hole 351-U1438B Core 6H, Interval 45.2-55.03 m (CSF-A)

MUD WITH ASH: Core 6H is dominated by light olive gray (5Y 5/2) and moderate yellowish brown (10YR 5/4) muds that are interlayered at the dm-scale with boundaries that are gradational, planar and horizontal. The muds are commonly 40-60% silt with similar amounts of clay. Some contain more than 10% vitric and crystal grains, and arc classified as mud with ash. The core contains ash layers that are relatively pure and well preserved. Two ash layers are present in Section 1, 17-19 cm and 78-80 cm. Further below, there are a felsic ash layer with pumice, which contains 85% vitric grains (Section 4, 100-106 cm), an ash layer with 65% vitric grains including some coarse sand (Section 4, 115-117 cm), and an ash layer with pumice containing 85% vitric grains (Section 5, 70-75 cm).



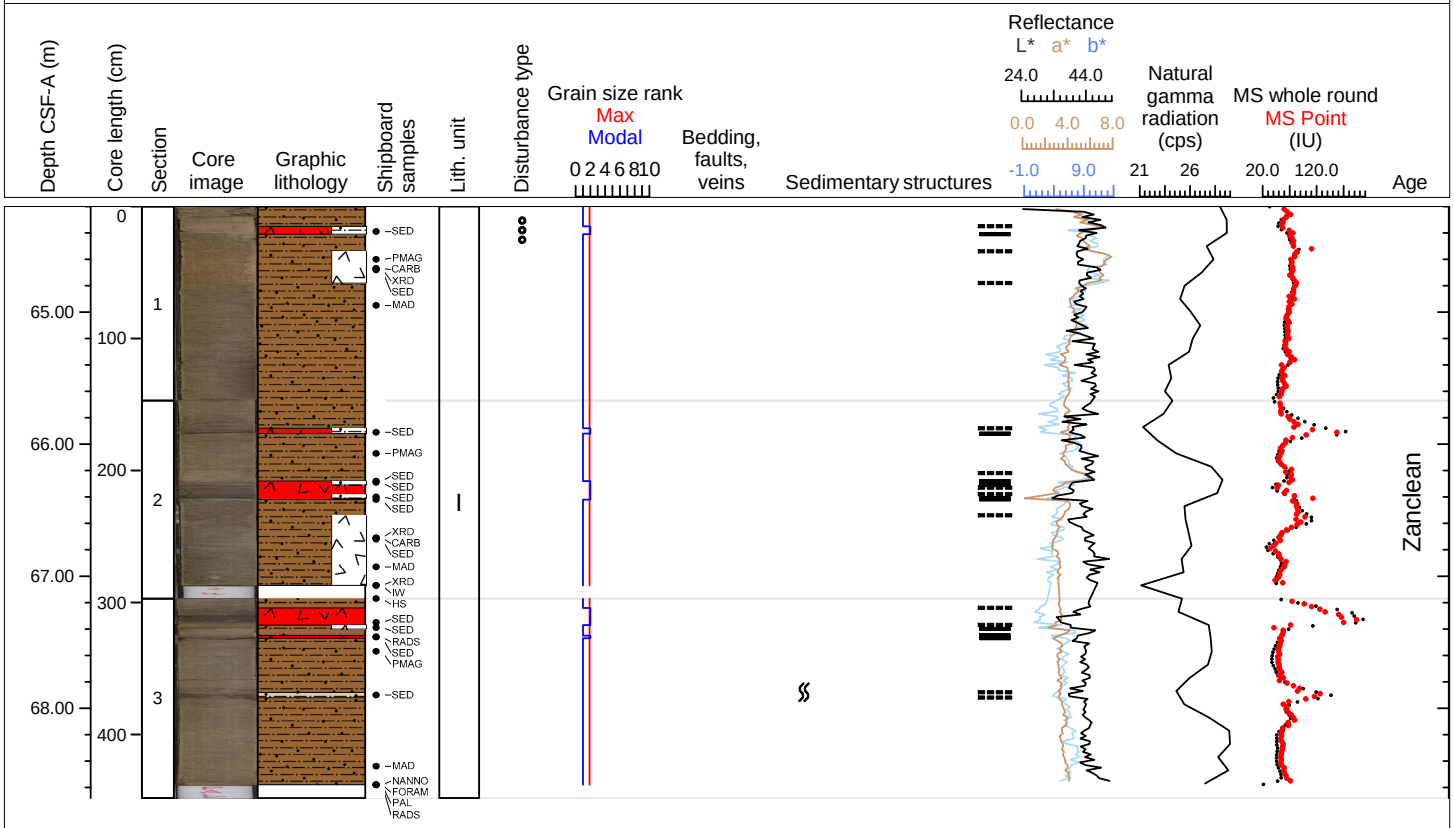
Hole 351-U1438B Core 7H, Interval 54.7-64.19 m (CSF-A)

MUD, MUD WITH ASH, TUFFACEOUS MUD, ASH: Core 7H is dominated by on dm- to m- scale alternating layers of moderate yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/2) mud, mud with ash and tuffaceous mud. Thin ash layers are present at Section 1, 24-30 cm, Section 3, 74-81 cm and 135-139 cm and Section 5, 115-116 cm. Drilling disturbance and bioturbation is slight to moderate and tend to occur around the ash layers.



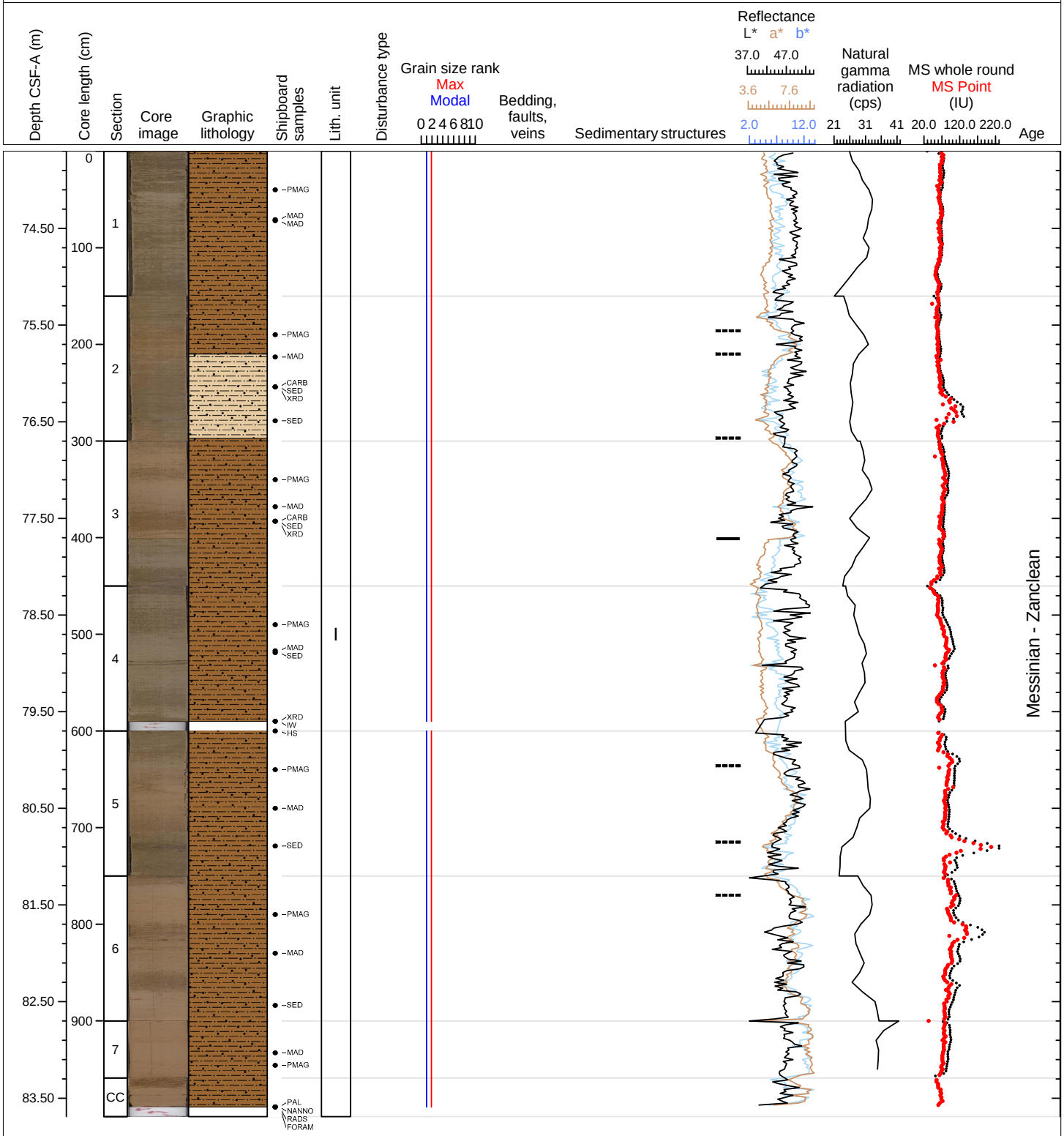
Hole 351-U1438B Core 8H, Interval 64.2-68.68 m (CSF-A)

MUD WITH ASH: This relatively short core (47% recovery) is dominated by light olive gray (5Y 5/2) and moderate yellowish brown (10YR 5/4) muds that are interlayered at the decimeter scale along boundaries that are gradational, planar, and horizontal. All of the muds appear to contain a significant ash component (ash with mud, tuffaceous mud). Core 8H contains 5 major ash layers (most of which are impure): in Section 1, 18-20 cm, Section 2, 21-25 cm and 61-75 cm (light brownish-gray [5YR 6/1] felsic ash containing 90% vitric grains), Section 3, 3-19 cm and 29-30 cm.



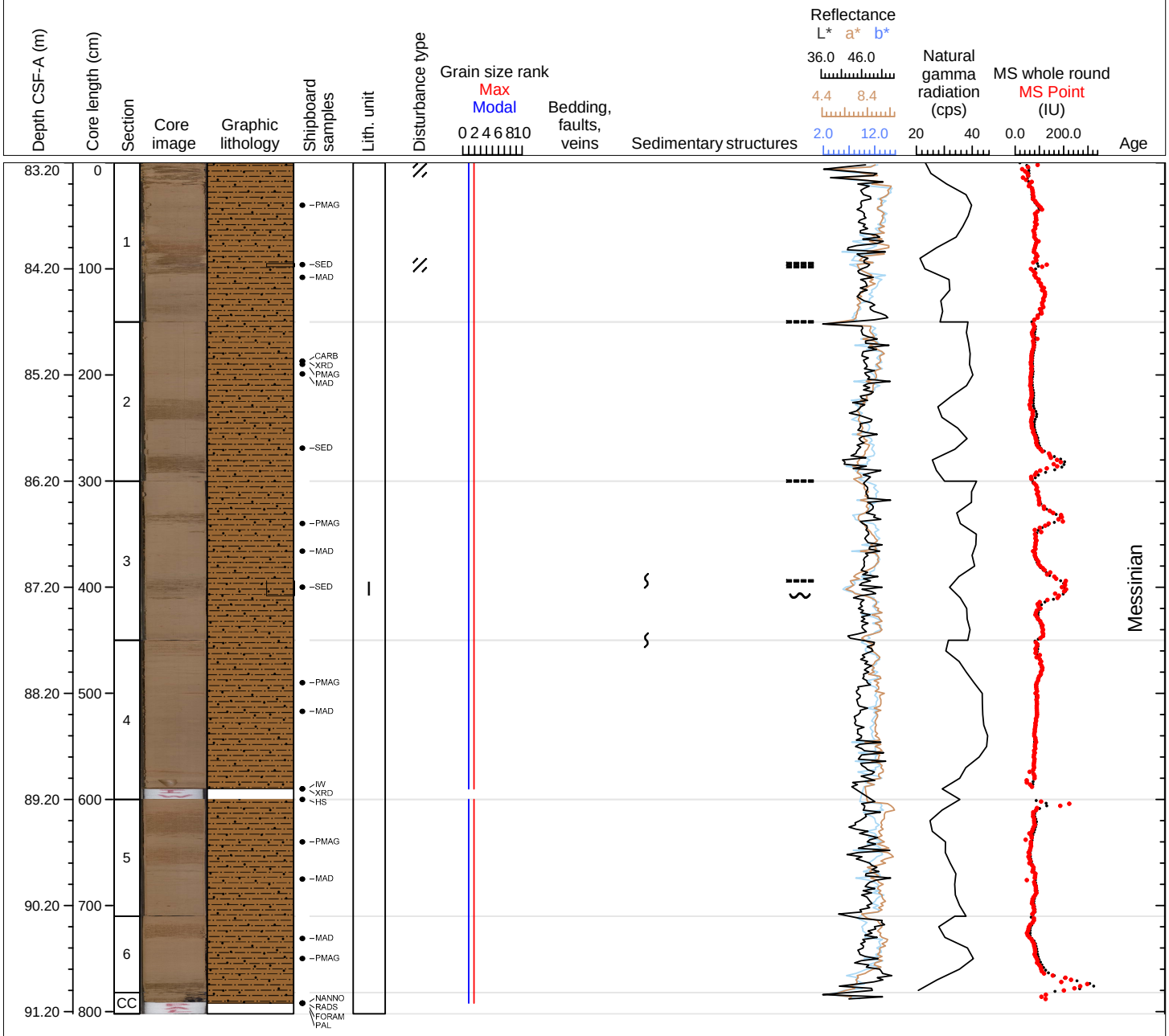
Hole 351-U1438B Core 9H, Interval 73.7-83.69 m (CSF-A)

MUD, TUFFACEOUS MUD: The core is dominated by thick (dm- to m-scle) of alternating layers of moderate yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/2) mud and tuffaceous mud but unlike earlier cores it contains no major ash layers. The contacts between the layers are gradational. Smear slides contained very little vitric material (<5%). A distinct ash layer is present in Section 2, 126-130 cm. Bioturbation and drilling disturbance was slight.



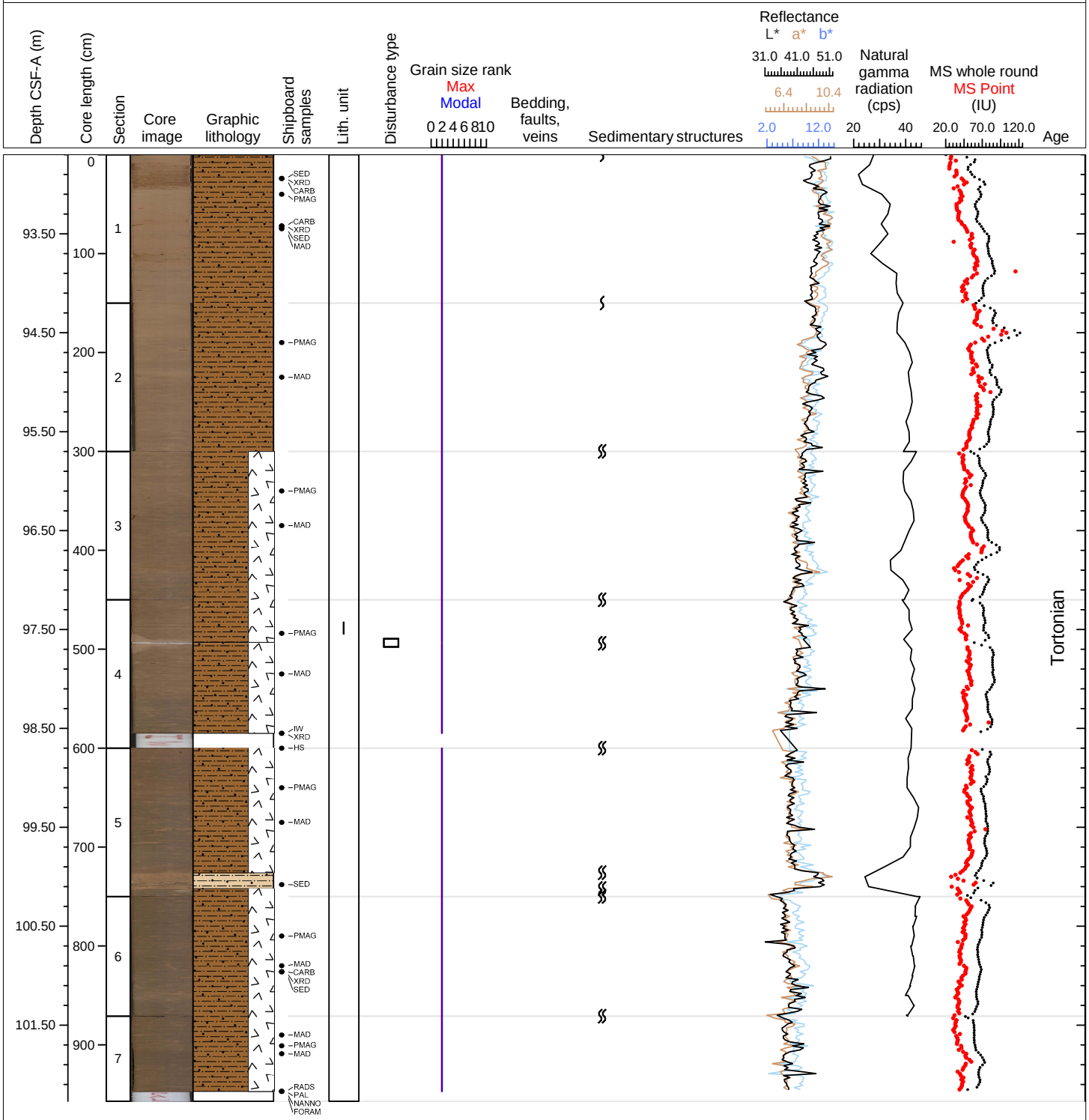
Hole 351-U1438B Core 10H, Interval 83.2-91.22 m (CSF-A)

MUD: The majority of Core 10H consists of moderate yellowish brown (10YR 5/4) mud with small (cm-scale) darker (light olive gray [5Y 5/2]) layers characterized by slightly higher content of silt to sand-sized quartz, feldspar and opaque minerals (up 35 %). A single distinct ash layer is present in Section 1, 94-104 cm but otherwise smear slides contained no vitric grains. Drilling disturbance and bioturbation is low throughout the core.



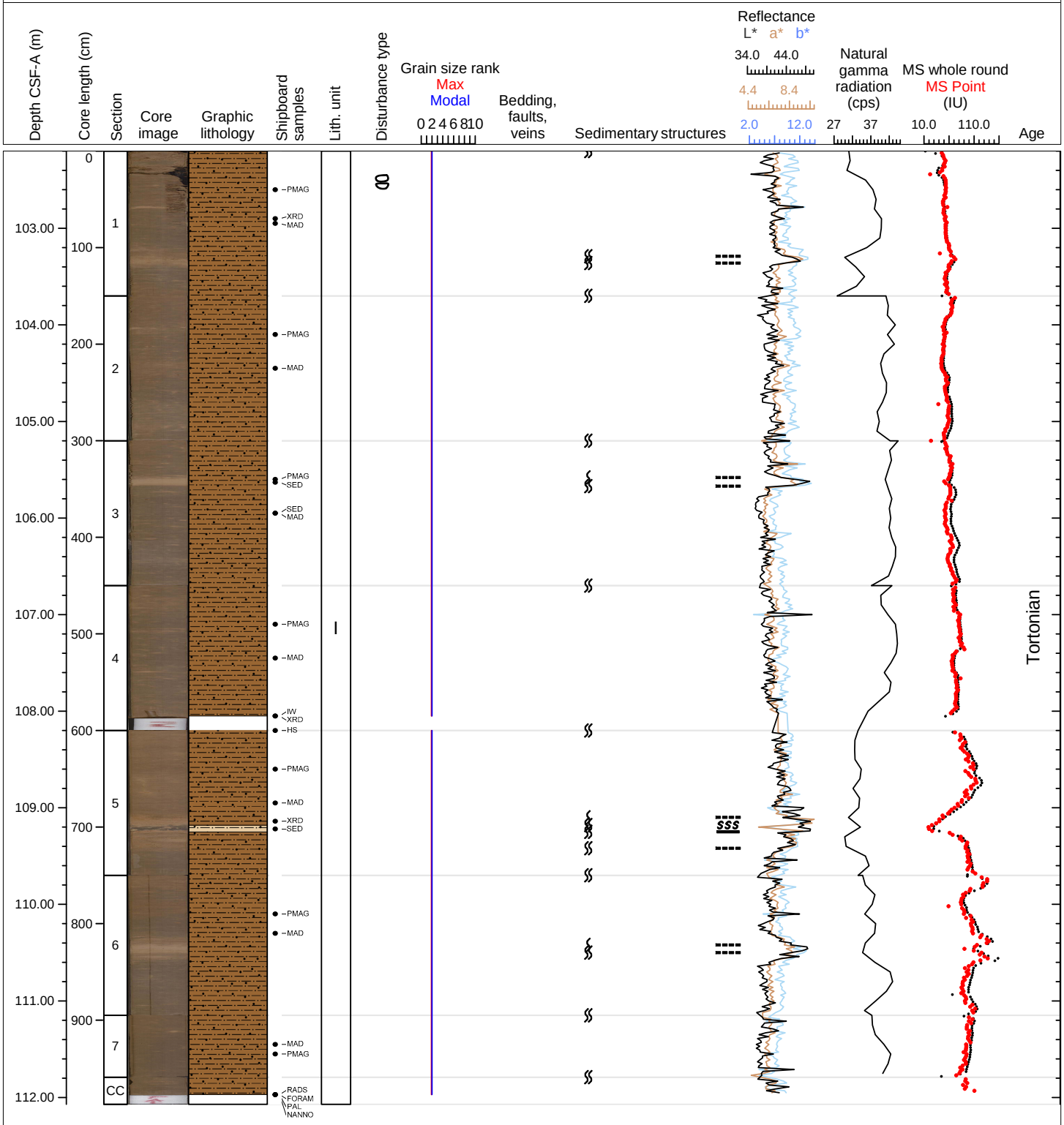
Hole 351-U1438B Core 11H, Interval 92.7-102.27 m (CSF-A)

MUD, TUFFACEOUS MUD, MUD WITH ASH: Core 11H is dominated by mud with subtle variations. The top of the core is light brown (5YR 6/4) mud containing mostly silt-sized particles, followed by slightly darker (10YR 5/4 and 10YR 4/2) mud with ash. The ash occurs as discrete cohesive blobs (<2 mm) with particles up to lapilli in size in Section 2, 26-32 cm and Section 5, 136-139 cm. Contacts between the muds are planar and gradational. Lighter colored muds are slightly bioturbated whereas darker muds are moderately bioturbated.



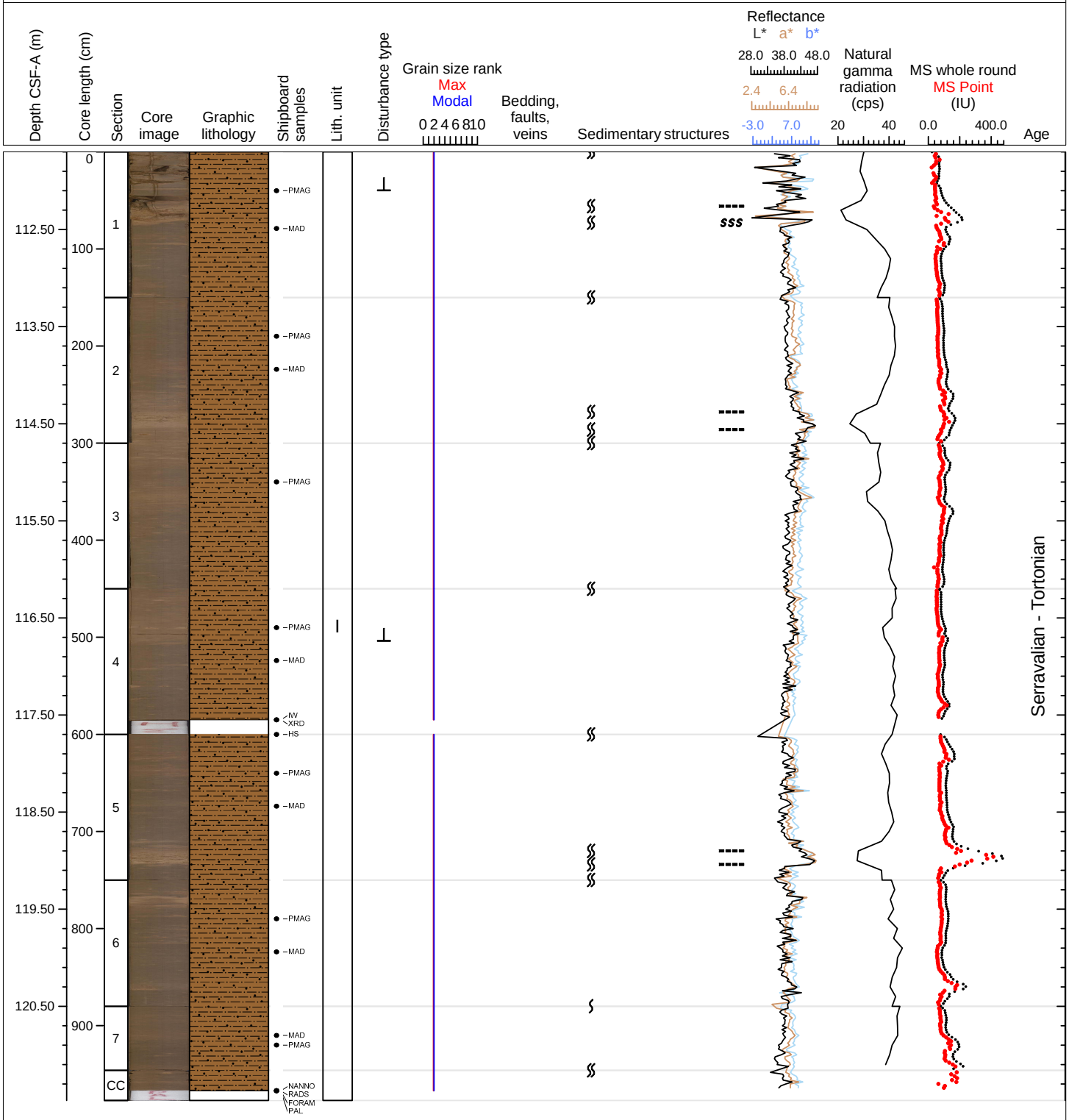
Hole 351-U1438B Core 12H, Interval 102.2-112.07 m (CSF-A)

MUD, TUFFACEOUS MUD: Core 12H is dominated by dark yellow brown (10YR 4/2) mud. The top of the core is light brown (5YR 6/4) mud containing mostly silt-sized particles, followed by slightly darker (10YR 5/4 and 10YR 4/2) mud with ash. Centimeter-scale layers of lighter (10YR 5/4) mud occur in Section 1, 106-116 cm, Section 3, 38-47 cm, Section 5, 90-98 cm and 105-122 cm, and Section 6, 72-80 cm with no apparent change in composition in comparison with the predominant mud. A brownish gray (5YR 4/1) tuffaceous mud occurs in Section 5, 98-105 cm, underlain by a discrete ash layer (Section 5, 100-104 cm). The upper 65 cm of Section 1 are affected by moderate drilling disturbance. Contacts between muds are mostly planar and gradational and bioturbation ranges from slight to moderate.



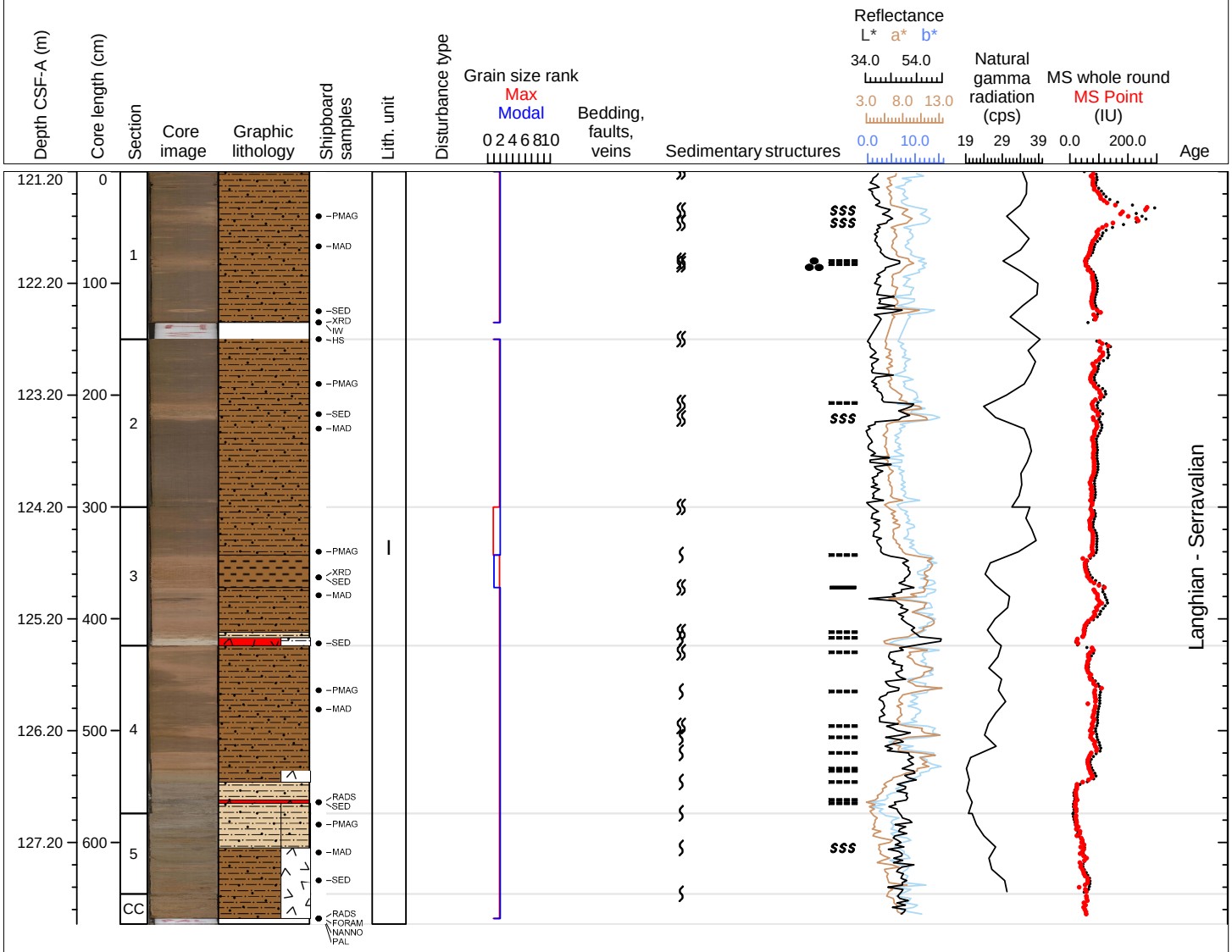
Hole 351-U1438B Core 13H, Interval 111.7-121.47 m (CSF-A)

MUD: Core 13H is predominantly dark yellow brown (10YR 4/2) mud. Discrete ash layers occur in Section 1, 60-70 cm and Section 5, 128-132 cm. Contacts between mud layers are planar and gradational. The upper 73 cm of Section 1 are moderately affected by drilling disturbance.



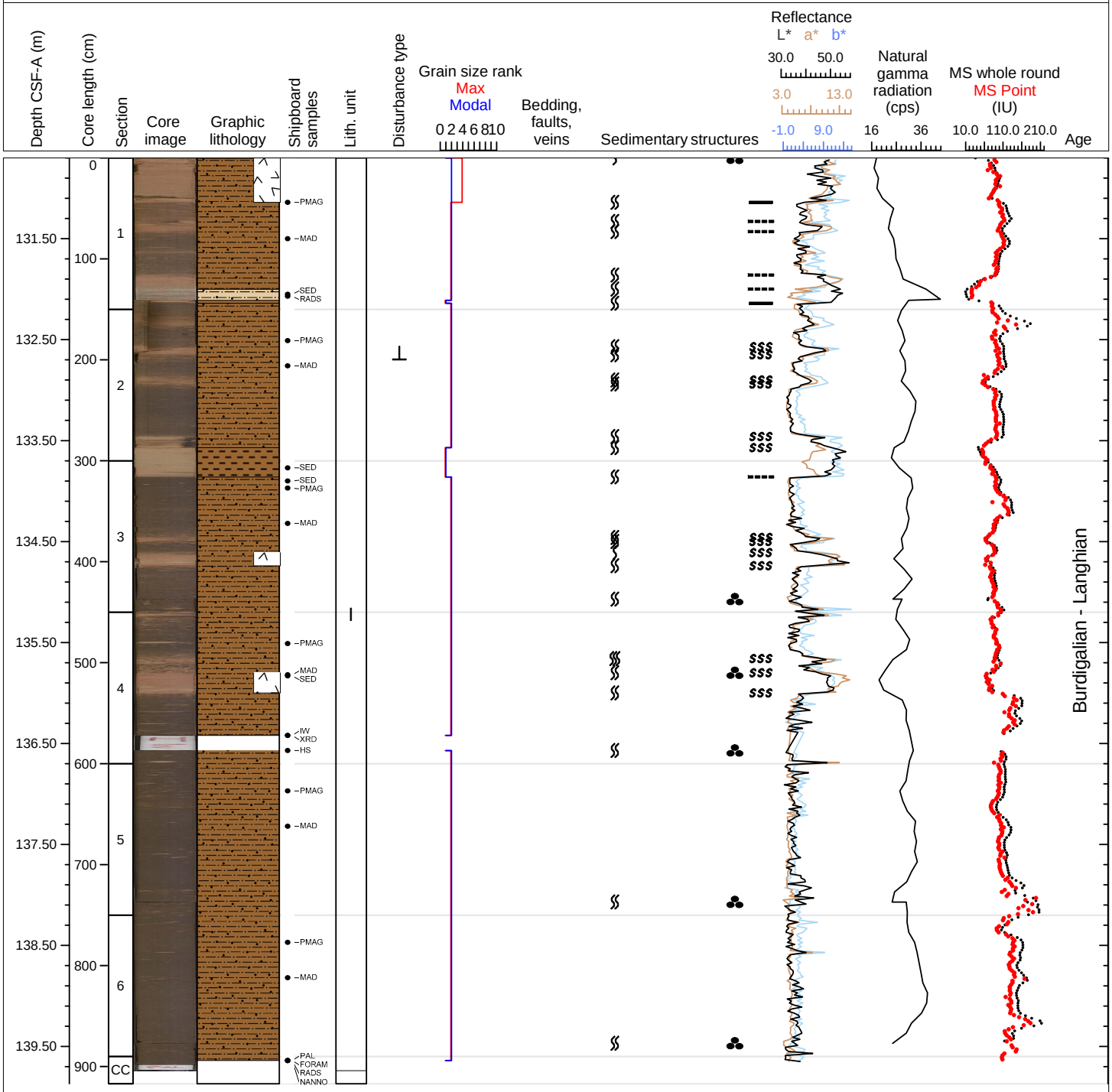
Hole 351-U1438B Core 14H, Interval 121.2-127.93 m (CSF-A)

MUD, TUFFACEOUS MUD, MUD WITH ASH, CLAY, ASH WITH MUD, ASH: Dark yellowish brown (10YR 4/2) to moderate yellowish brown (10YR 5/4) mud is the dominant sediment throughout Core 14H. Lesser amounts of dm-scale moderate yellowish brown (10YR 5/4) to pale yellowish brown (10YR 6/2) tuffaceous muds are present. Dark yellowish brown (10YR 4/2) clay is present in Section 4 at 72 cm. Ash layers (ash and ash with mud) occur in Section 1, 40-44 cm, Section 3, 120-123 cm, Section 4, 138-142 cm and Section 5, 8-13 cm. The color of these ash layers varies from light brownish gray (5YR 6/1) to grayish orange pink (5YR 7/2). Contacts are predominantly gradational or bioturbated and bioturbation varies between none and moderate.



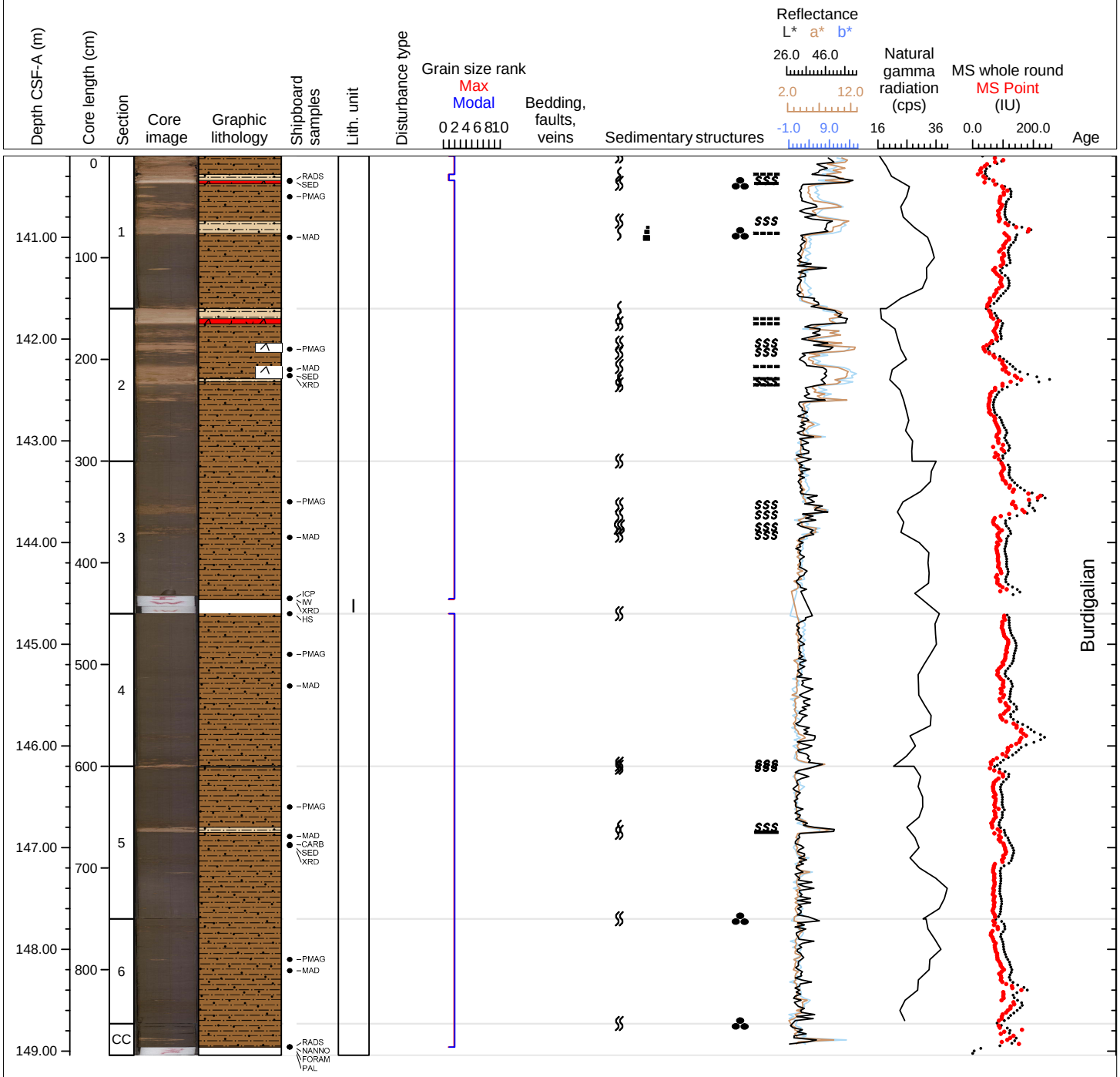
Hole 351-U1438B Core 15H, Interval 130.7-139.87 m (CSF-A)

MUD, MUD WITH ASH, CLAY, ASH: From Section 1 to 4, the mud is alternating in color from light brown (5YR 5/6) to dark yellowish brown (10YR 4/2) on dm-scale. From Section 5, the mud becomes darker due to increasing contents of Mn-hydroxides. In Sections 1 through 4, there are several dm-scale layers of light brown (5YR 5/6) mud with ash and two layers of clay (light brown [5YR 6/4] in Section 1 and dark yellowish orange [10YR 6/6] in Section 3). Ash layers are common in the upper part of core 15H: Section 1, 38-40 cm, 130-132 cm, 134-136 cm and 138-141 cm. Boundaries are generally gradational and bioturbation varies from slight to moderate.



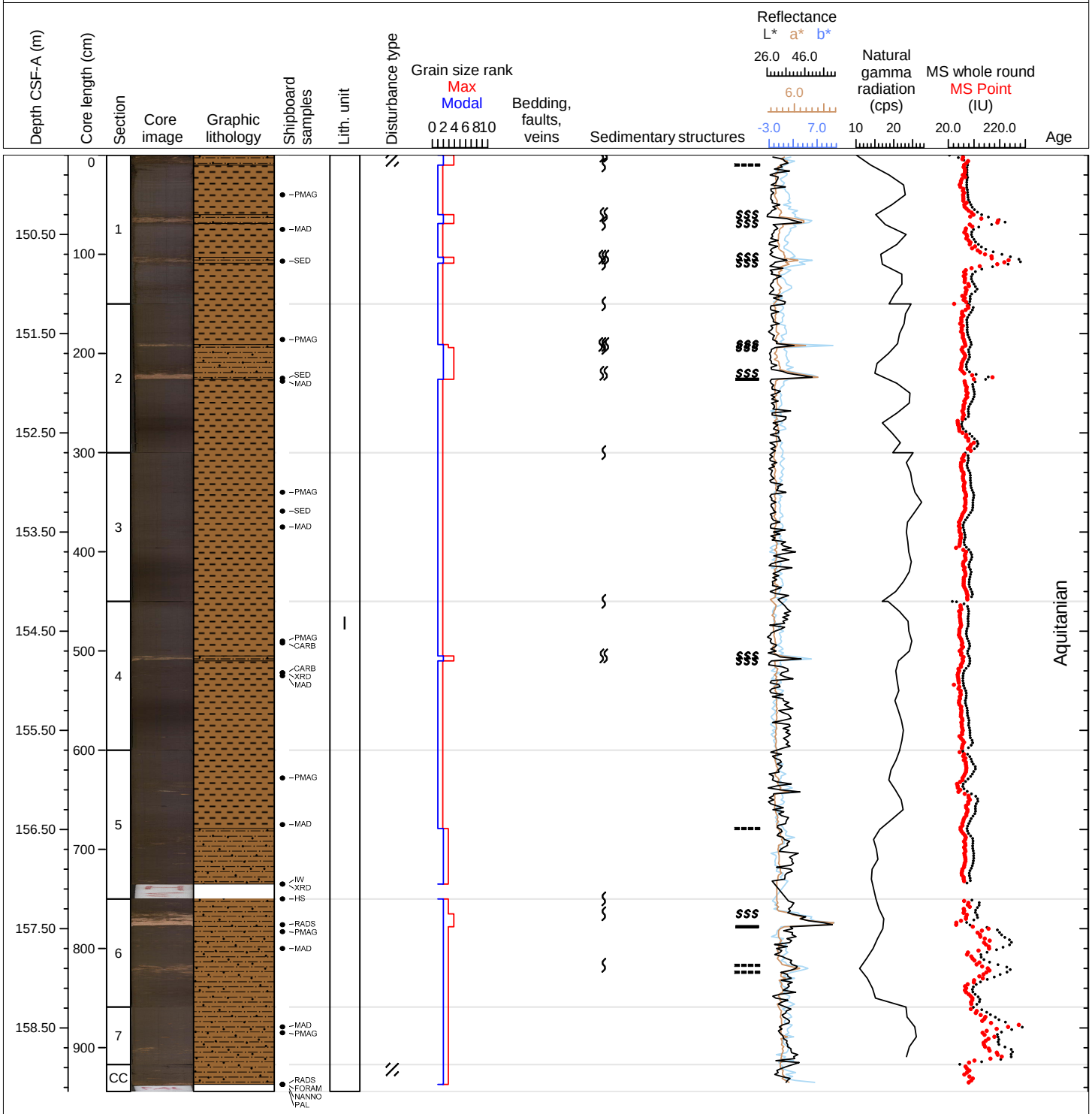
Hole 351-U1438B Core 16H, Interval 140.2-149.04 m (CSF-A)

MUD, TUFFACEOUS MUD, MUD WITH ASH, ASH: Dark mud is the dominant sediment type throughout Core 16H. In the first two Sections, the mud is of dark yellowish brown (10 YR 4/2) to moderate yellowish brown (10YR 5/4) color and lower in the core of dusky yellowish brown (10YR 2/2) color. Again, this is due to an increase in the amounts of disseminated Mn-hydroxides. The lighter colored intervals in the upper parts of Section 1 and 2 contain lighter colored mud, tuffaceous mud, mud with ash and grayish orange pink (5YR 7/2), felsic ash. Discrete ash layers are present in Section 1, 24-27 cm and 68-77 cm, Section 2, 9-16 cm, 35-41 cm and 68-72 cm and Section 5, 61-64 cm. Lower contacts of ash layers are sharp, other contacts are gradational or bioturbated and bioturbation is absent to moderate throughout this core.



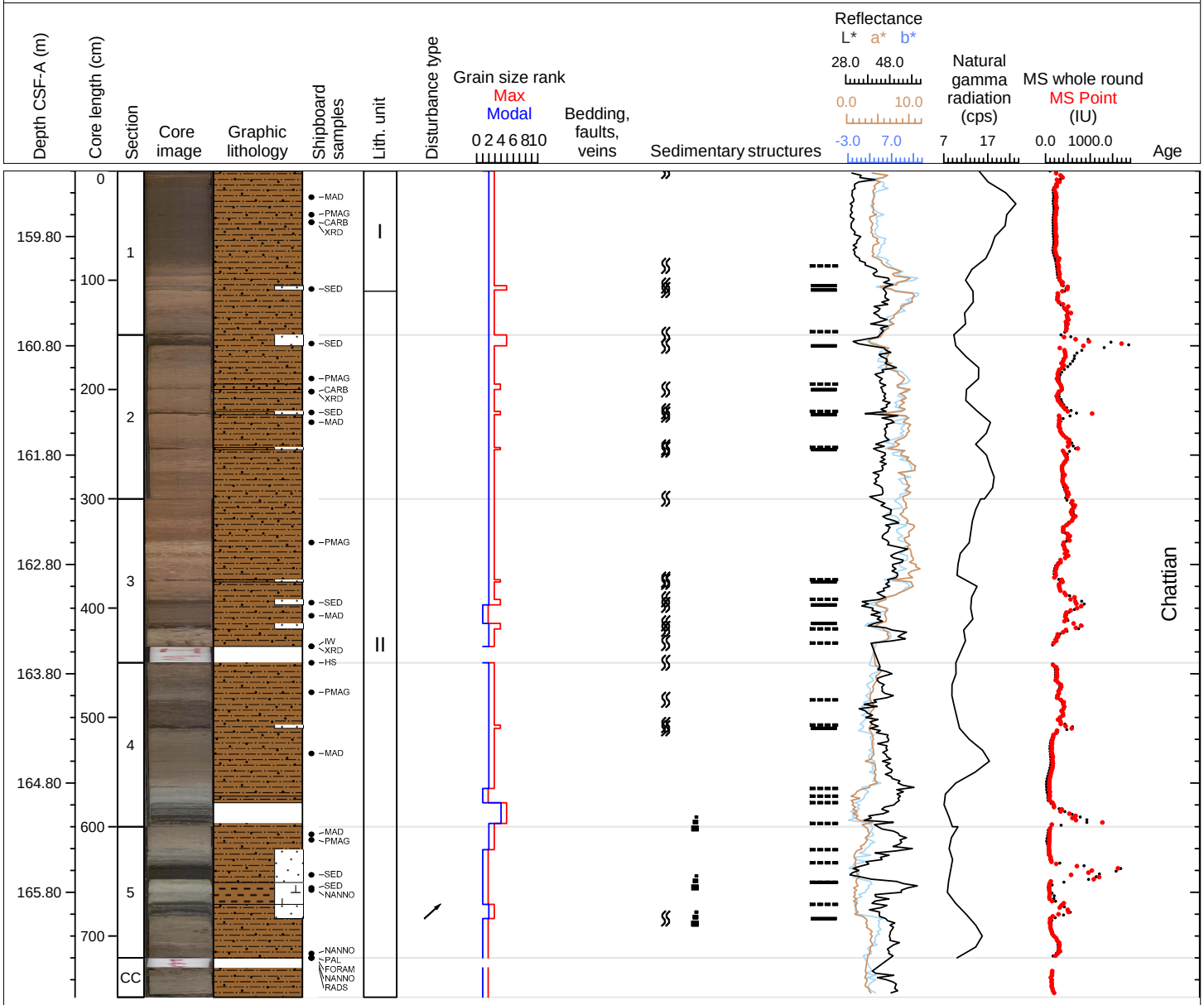
Hole 351-U1438B Core 17H, Interval 149.7-159.14 m (CSF-A)

MUD, CLAY, SILT: Core 17H consists of thick layers (0.6 to 2 m) of dusky yellowish brown (10YR 2/2) clay with thin intervals (2 to 10 cm) of lighter colored mud (5YR 3/2) and silt (light brown 10YR 6/4). Two ash layers are present in Section 2, 70-78 cm and Section 6, 20-28 cm. The smear slides show that the black color is related to high content of Fe- and Mn-hydroxides. Bioturbation and core disturbance are both very low but tend to occur in the coarser silts.



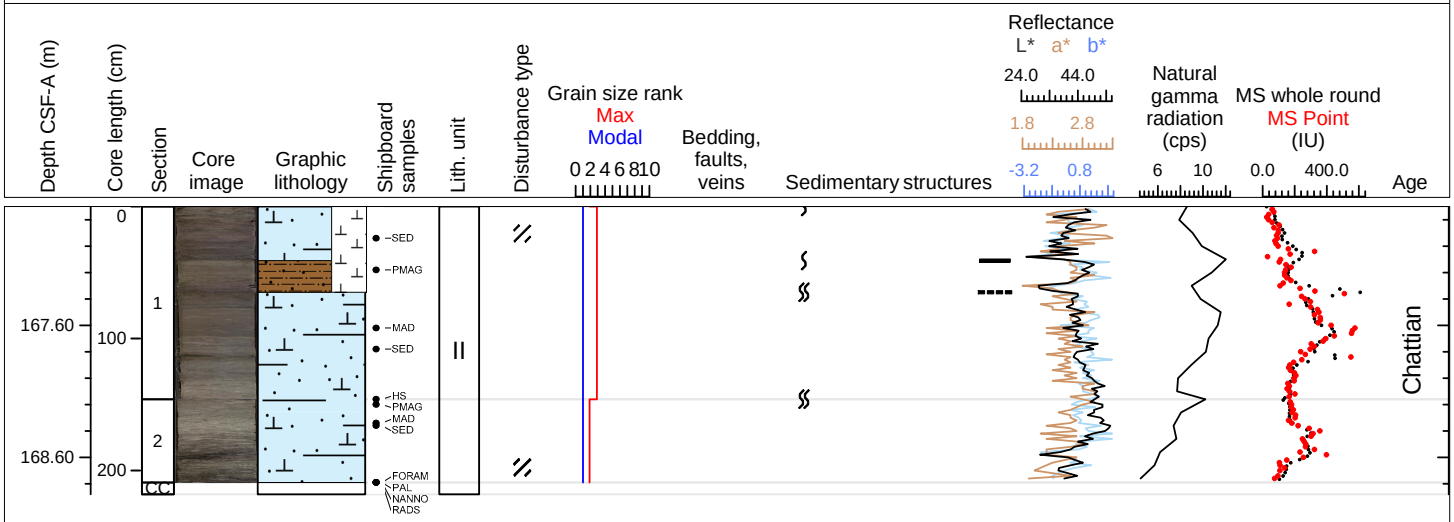
Hole 351-U1438B Core 18H, Interval 159.2-166.76 m (CSF-A)

MUD, SILT, CLAY, SAND, SANDY MUD: Core 18H marks the transition from the brown colored pelagic muds to the green colors of the volcaniclastic rocks from the deeper parts of Hole U1438B. The first 4.5 m are characterized by light brown muds (5YR 6/4) with thin (2 to 5 cm) dark yellowish brown silt layers (10YR 4/2). These are much more bioturbated than the preceding cores with burrows and mottling reworking the darker silts. The last 1/3 of the core (Section 4) is dominated by olive gray (5Y 4/1) muds (20-70 cm thick) with the dark gray (N4) sandy muds and silts. The coarser intervals tend to grade upwards from sharp bases. Drilling disturbance is generally slight with Section 5, 71-84 cm showing moderate up-arching.



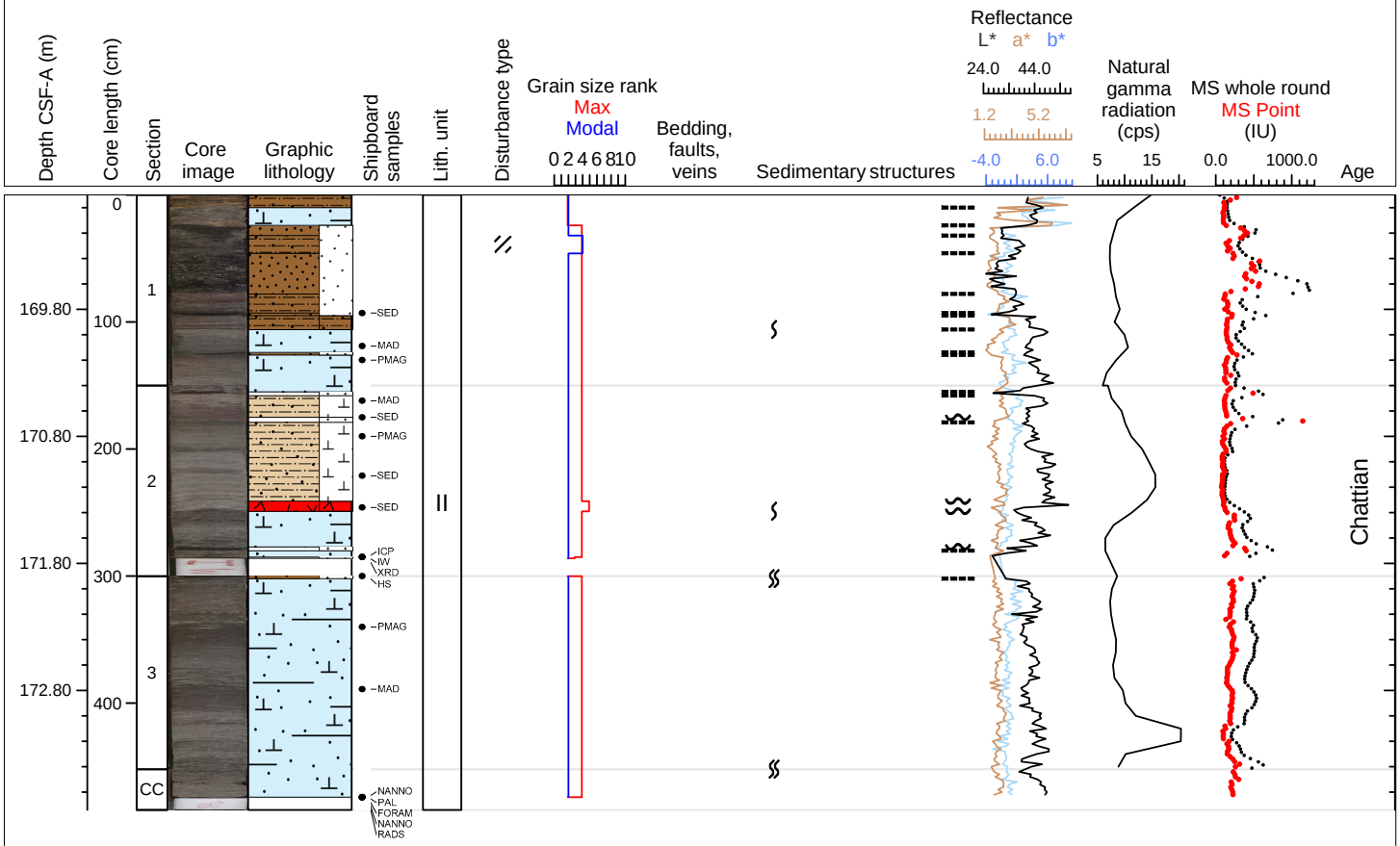
Hole 351-U1438B Core 19H, Interval 166.7-168.88 m (CSF-A)

NANNOFOSSIL MUD, MUD: Core 19H consists of two main lithologies. A pale red (10R 6/2) to olive gray (5Y 4/1) nannofossil-bearing or nannofossil mud (50% nannofossils) and a pale brown mud (5YR 5/2). Contacts are gradational. Bioturbation in the core is slight to moderate. Drilling disturbance is severe in the top and bottom of the core and slight in the middle.



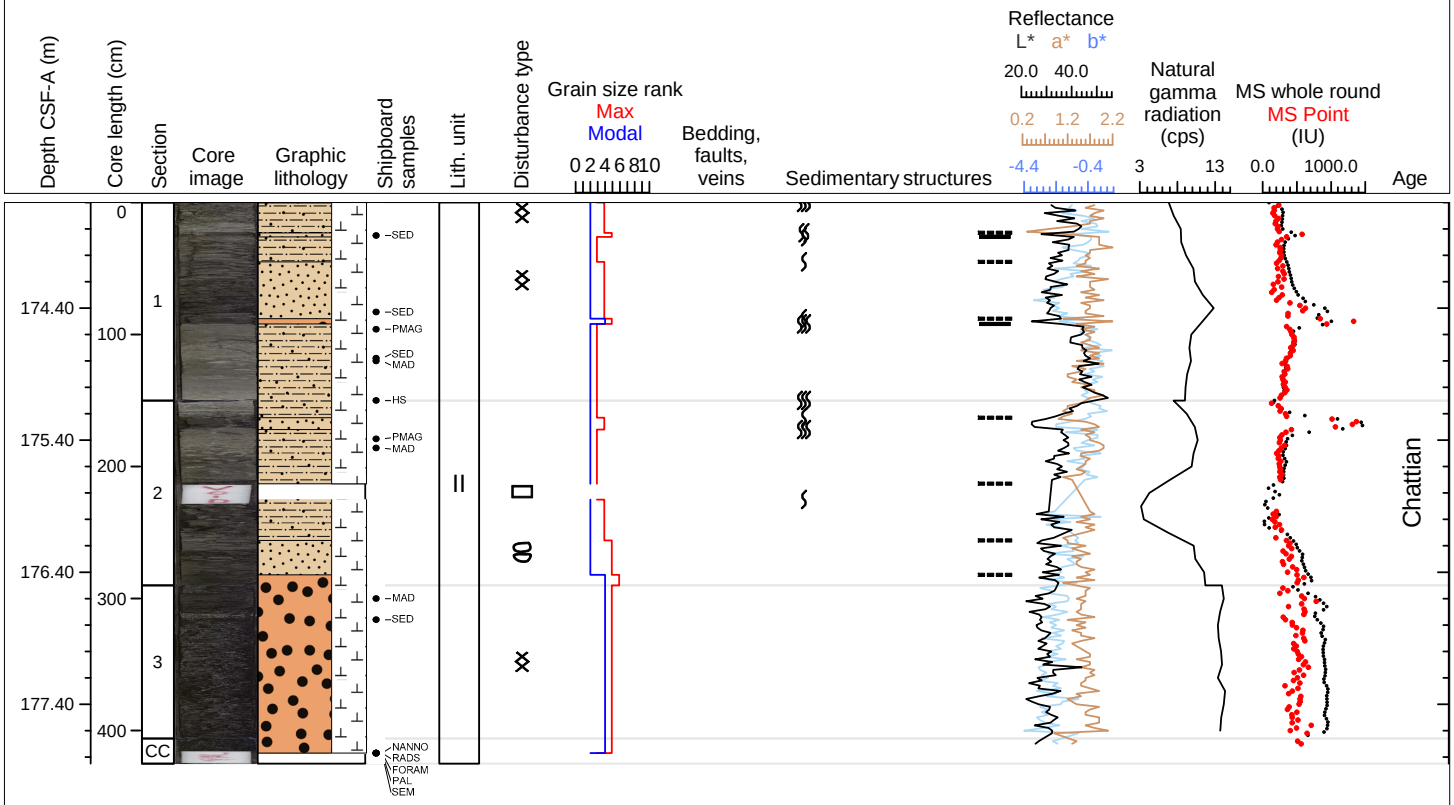
Hole 351-U1438B Core 20F, Interval 168.9-173.74 m (CSF-A)

NANNOFOSSIL MUD, NANNOFOSSIL TUFFACEOUS MUD, SANDY SILT: Grayish brown (5YR 4/1) nannofossil mud dominates Core 20F. 2 cm thick grayish black (N2) sandy silt and mud is intercalated into nannofossil mud at Section 1, 93 cm and 124 cm, Section 2, 5 cm, 25 cm and 127 cm and top of Section 3. The nannofossil mud is moderately bioturbated. Nannofossil tuffaceous mud occurs in Section 2 (8 cm to 62 cm thick). There is an 8 cm thick light olive gray (5Y 6/1) intermediate ash layer with crystals at Section 2, 96-97 cm, beneath a layer of nannofossil tuffaceous mud. Drilling disturbance is severe in Section 1, 0-78 cm containing soft mud, nannofossil mud, sandy silt and mud collapsed from bore hole.



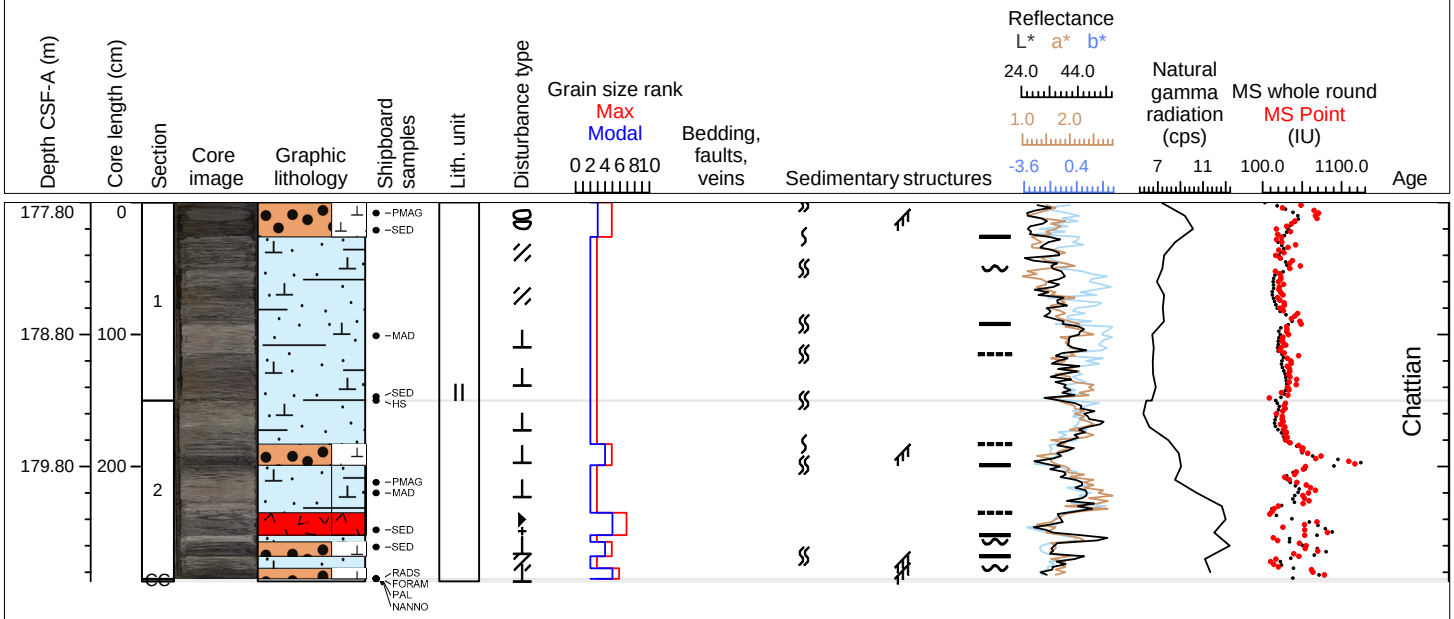
Hole 351-U1438B Core 21F, Interval 173.6-177.85 m (CSF-A)

TUFFACEOUS SANDSTONES, TUFFACEOUS SILTSTONES, TUFFACEOUS MUDSTONES WITH NANNOFOSSILS: Rocks in Core 21F are gray (N5) and dark gray (N4) tuffaceous sandstones and tuffaceous siltstones and greenish gray (5G 6/1) tuffaceous mudstones. These rocks represent a clear break from the muddy sediments that dominated Core B above this point, and they mark the onset of tuffaceous and nannofossil-bearing sedimentary rocks dominant immediately below this horizon. Normal graded sedimentary sequences at the decimeter scale are evident in this core. One such sequence extends from tuffaceous sandstone at the bottom of the core, to tuffaceous siltstone and tuffaceous mudstone that extend to the 90 cm depth in Section 2 of the core. These lithologies, especially the mudstones, often contain significant quantities of nannofossils. These rocks contain lower quantities of fresh vitric and crystal grains that are present in tuffaceous sedimentary rocks at greater depths in Hole U1438B.



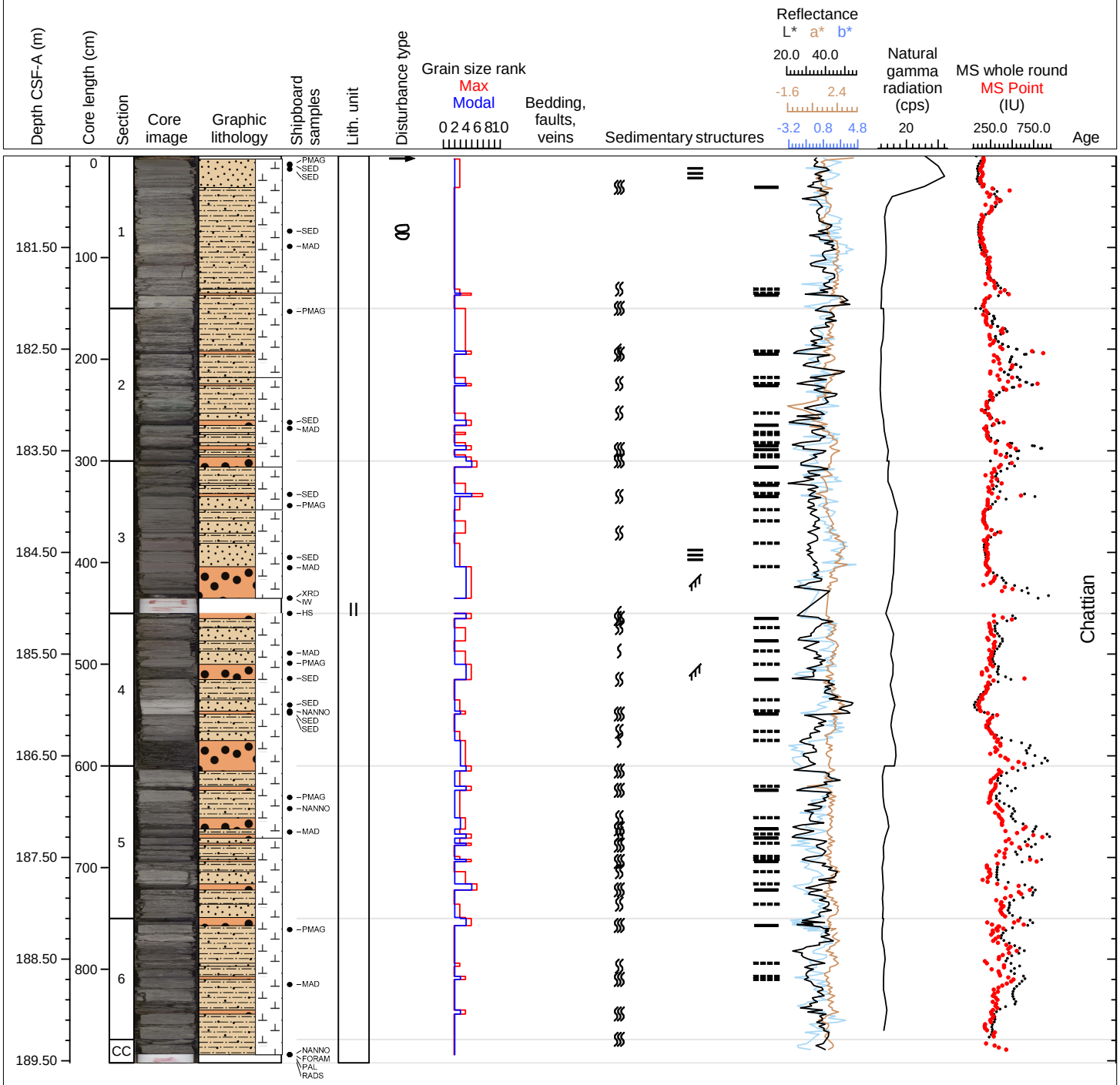
Hole 351-U1438B Core 22F, Interval 177.8-180.67 m (CSF-A)

NANNOFOSSIL TUFFACEOUS MUDSTONE, TUFFACEOUS SANDSTONE, ASH: Core 22F is dominated by two main lithologies. One is nannofossil tuffaceous mudstone, which is medium to light gray in color (N5-N7) and strongly bioturbated. Mudstone intervals are bounded by upward-fining sequences of dark gray (N2-N3) tuffaceous sandstone, also nannofossil-bearing, but not bioturbated. Lower contacts of sandstone beds are sharp and sometimes wavy, while upper contacts are gradational. Several intervals show parallel or cross-lamination. Sandstone grains include volcanic glass, feldspar, pyroxene, amphibole and magnetite. An unconsolidated, intermediate ash with crystals is present in Section 2, 107-113 cm. The core is slightly to severely affected by drilling, mainly fragmentation, fracturing and extension of the rock units.



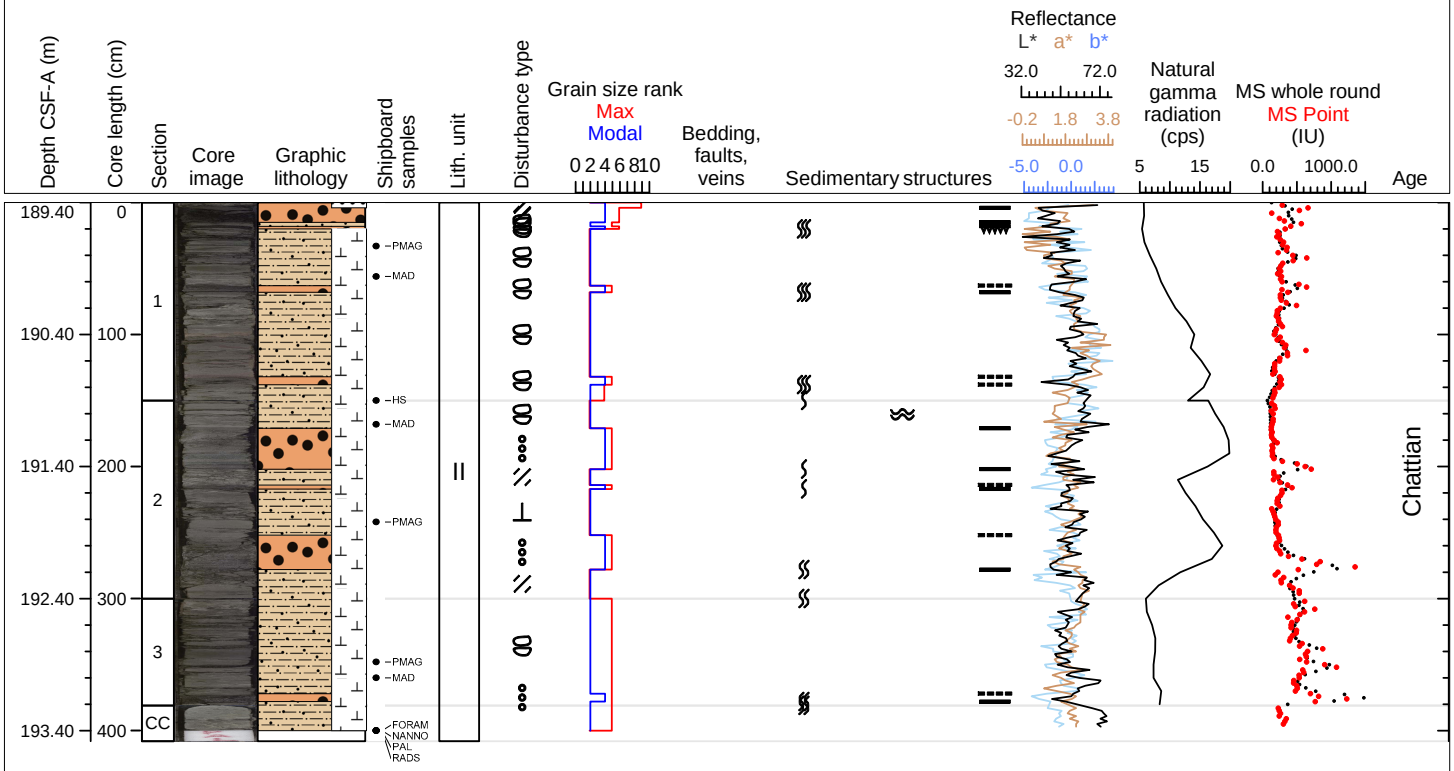
Hole 351-U1438B Core 23X, Interval 180.6-189.52 m (CSF-A)

TUFFACEOUS SANDSTONES, TUFFACEOUS SILTSTONES, TUFFACEOUS MUDSTONES WITH NANNOFOSSILS: Rocks in Core 23X are light brownish gray (5YR 6/1) tuffaceous sandstones, tuffaceous siltstones and tuffaceous mudstones. These lithologies, especially the mudstones, often contain significant quantities of nannofossils. Fining-upward sedimentary sequences at the decimeter scale are common. These are particularly evident in Section 4, which contains four such sequences that grade upward from tuffaceous sandstones to tuffaceous mudstones. Smear slide observations indicate that tuffaceous siltstones in this core contain high quantities of vitric and fresh crystal grains, especially in Section 1, 9-10 cm (65% vitric, 20% crystal), Section 1, 13-16 cm (70% vitric, 15% crystal), Section 2, 112-113 cm (70% vitric, 25% crystal), Section 3, 33-34 cm (45% vitric, 25% crystal), Section 3, 95-96 cm (65% vitric, 7% crystal) and Section 4, 97-98 cm (60% vitric, 25% crystal).



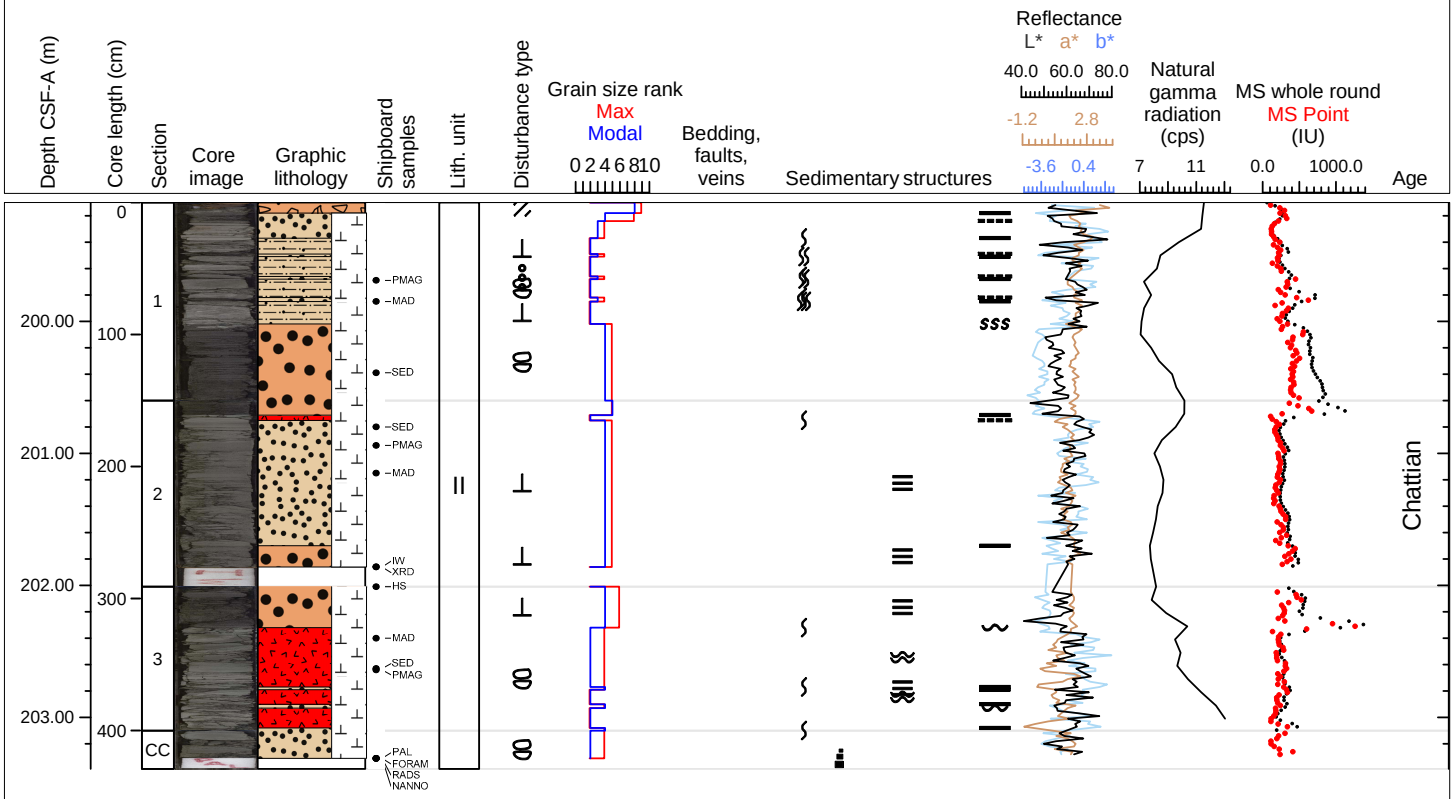
Hole 351-U1438B Core 24X, Interval 189.4-193.48 m (CSF-A)

TUFFACEOUS MUDSTONE WITH NANNOFOSSILS, TUFFACEOUS SANDSTONE WITH NANNOFOSSILS, TUFFACEOUS SANDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE WITH LAPILLI: Core 24X consists of dark gray (5Y 4/1) to dark greenish gray (5G 6/1) tuffaceous mud- and sandstones with nannofossils. The cm- to dm-thick sandstones are intercalated in the mudstones. Bioturbation is variable but moderate to strong in some sections. Drilling disturbances include slight soupy intervals and biscuiting but moderate to strong fragmenting.



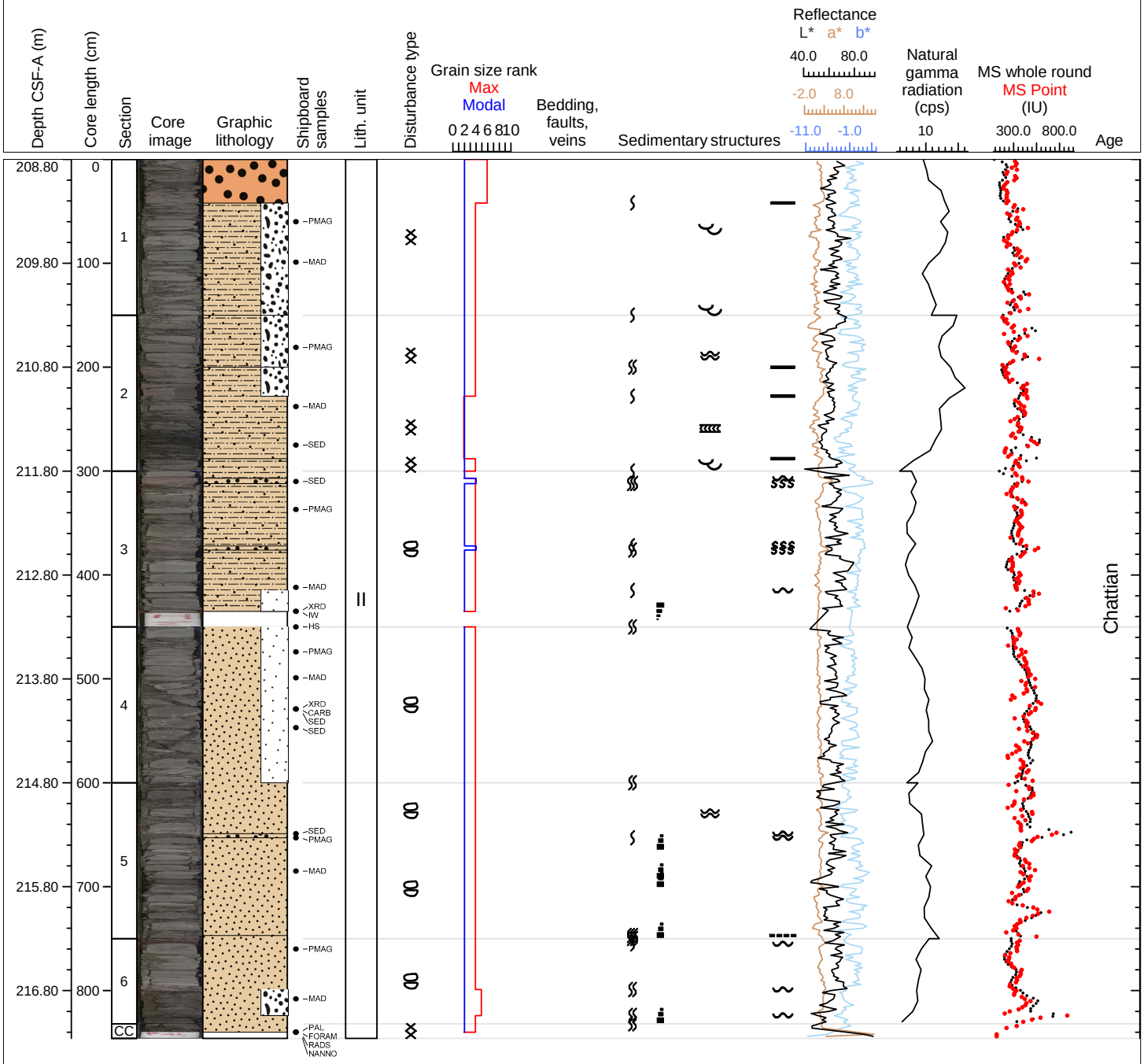
Hole 351-U1438B Core 25X, Interval 199.1-203.39 m (CSF-A)

TUFFACEOUS MUDSTONE WITH NANNOFOSSILS, TUFFACEOUS FINE SANDSTONE WITH NANNOFOSSILS, TUFF WITH NANNOFOSSILS, NANNOFOSSIL-BEARING TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE: The dominant lithology in Core 25X are cm- to dm-thick tuffaceous silt- and sandstones of various shades of grey (N2, N3, N4, N6, N7) alternating with dm-thick layers of medium light gray (N6) tuffaceous mudstone. Greenish gray (5G 6/1) tuffs with nannofossils are interbedded periodically in the core and are of cm-thickness. Contacts at the base of the tuffs are planar and sharp, and the beds coarsen upwards to the contact. Other contacts are generally sharp. Nannofossils are commom throughout the lithologies. Discrete ash layers are present in Section 2, 11-15 cm and 20-21 cm, Section 3, 62-63 cm, 70-76 cm and 92-107 cm. The core is severely fractured owing to biscuited drilling disturbances.



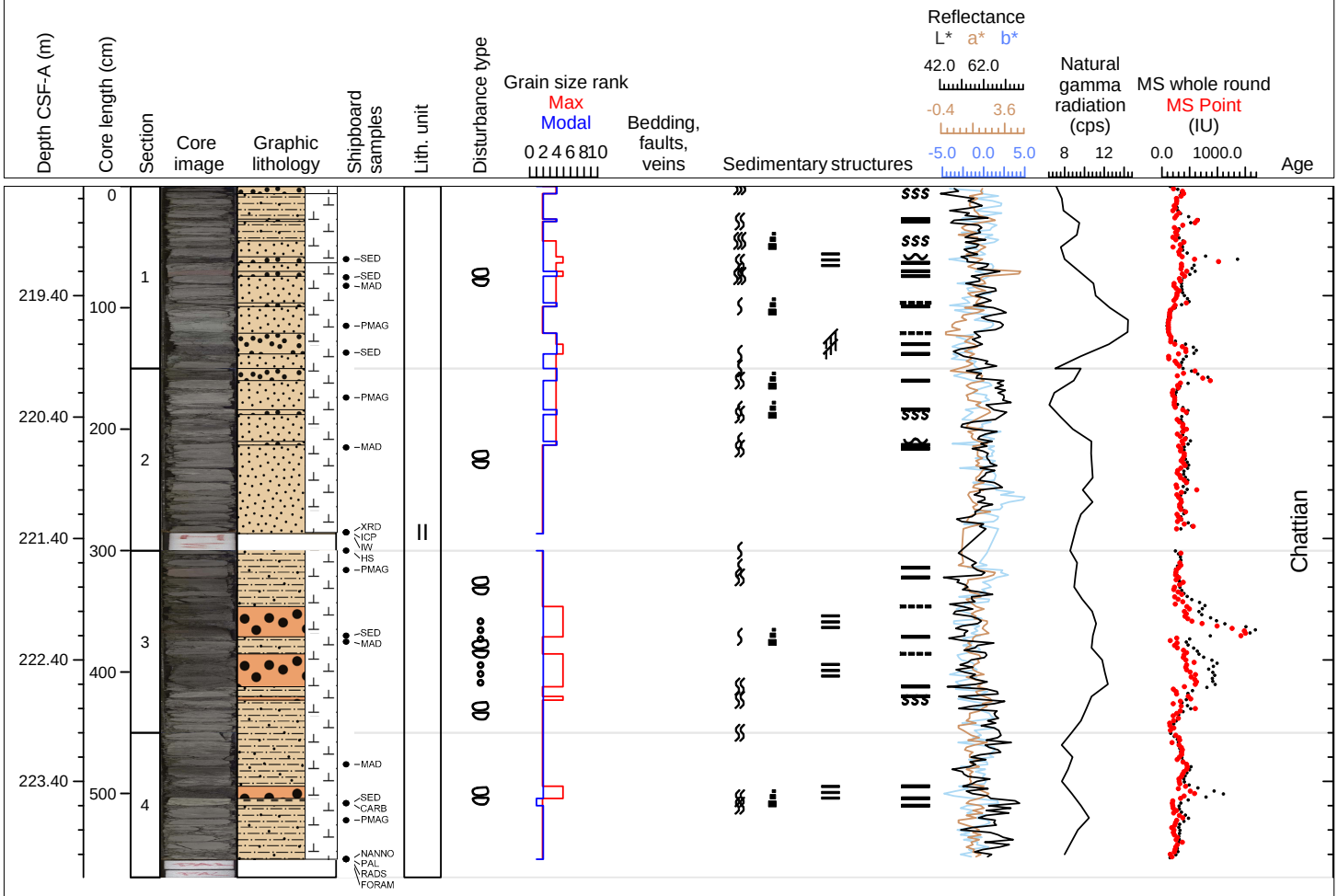
Hole 351-U1438B Core 26X, Interval 208.8-217.26 m (CSF-A)

TUFFACEOUS MUDSTONES, TUFFACEOUS SILTSTONES, TUFFACEOUS MUDSTONE WITH SAND, TUFFACEOUS SILTSTONE WITH SAND, TUFFACEOUS FINE SANDSTONE: The dominant lithologies throughout Core 26X are olive or brownish gray (5Y 4/1 and 5YR 4/1), sometimes medium gray (N5) tuffaceous mudstones and siltstones, sometimes with sand. The sandy parts occur at the base of dm-thick alternating layers with fining upward grading. The rocks are semi-consolidated and deformation structures occur throughout the core. Deformation is at the transition between brittle and ductile due to the low degree of lithification. Sections 2 and 3 are fractures, deformed, tilted or even overturned due to slumping. Possible ash layers are present in Section 2, 56-78 cm and 125-126 cm, Section 3, 6-14 cm and 70-76 cm, Section 4, 97-98 cm and Section 5, 49-51 cm. Bioturbation is slight and moderate at the top of each alternating bed. Recovery is high but drilling disturbance (especially biscuiting) is moderate to severe.



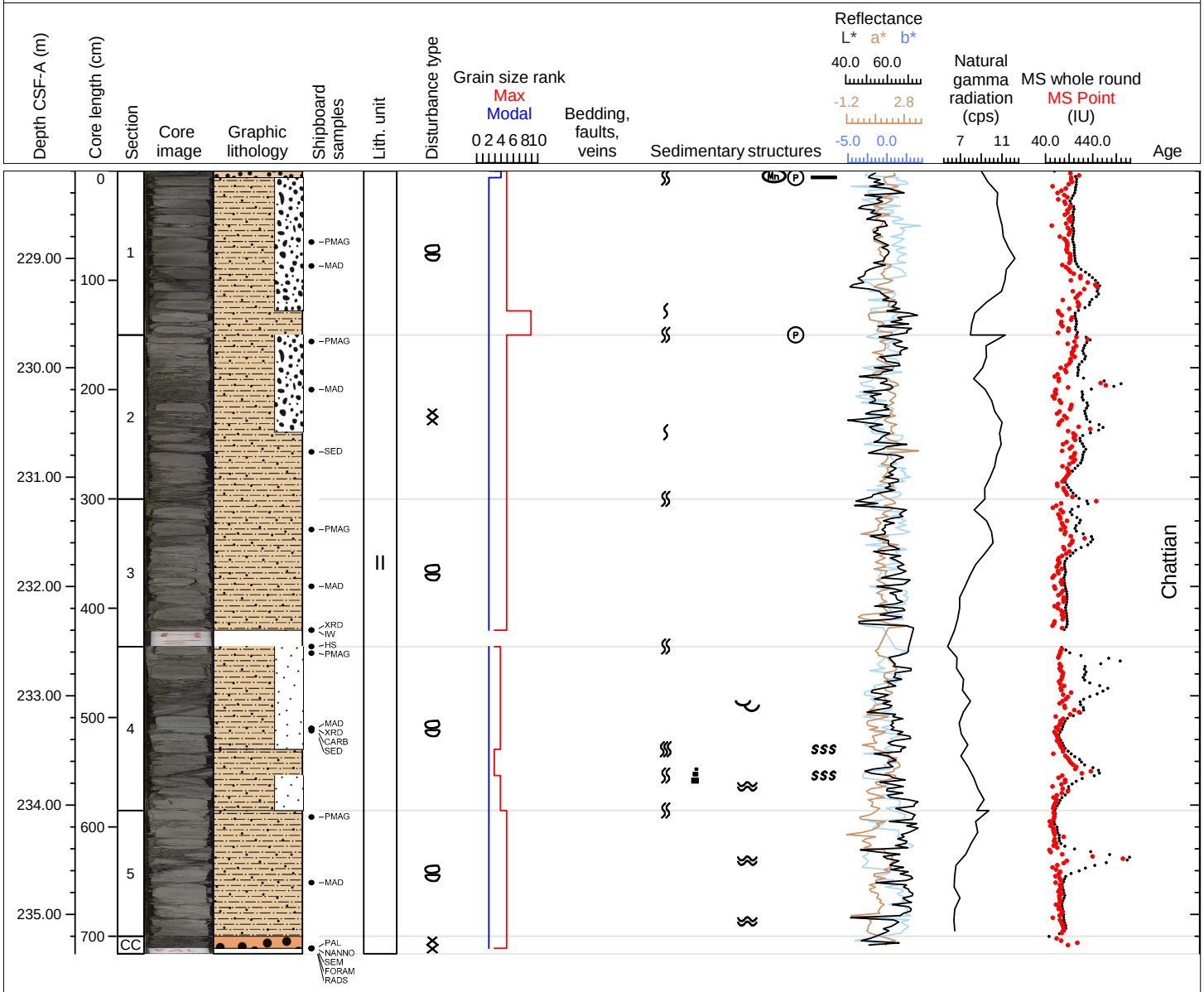
Hole 351-U1438B Core 27X, Interval 218.5-224.19 m (CSF-A)

TUFFACEOUS MUDSTONE WITH NANNOFOSSILS, SILTSTONE AND SANDSTONE: Core 27X generally consists of alternating sequences of dm-thick medium dark to medium light gray (N4, N5, N6) sandstones, dm-thick medium dark to medium gray (N4, N5) siltstones, and dm-thick light to medium olivine gray (5Y 4/1 and 6/1) to dark greenish gray (GY 4/1) tuffaceous mudstones with nannofossils. Contacts at the base of the sandstone layers are usually sharp and planar, whereas the contacts between the sandstone and siltstone beds, and the siltstone and the mudstone are gradational. The sandstone layers show planar bedding. Bioturbation tends to be moderate and strong in the siltstone and mudstone layers, whereas it is absent to slight in the sandstones. Numerous layers are potential ash layers: Section 1, 29-33 cm and 60-65 cm, Section 2, 8-11 cm, 99-101 cm and 125-135 cm and Section 3, 66-72 cm, 120-123 cm and 129-131 cm. Recovery is good, but the core exhibit moderate biscuiting drilling disturbances.



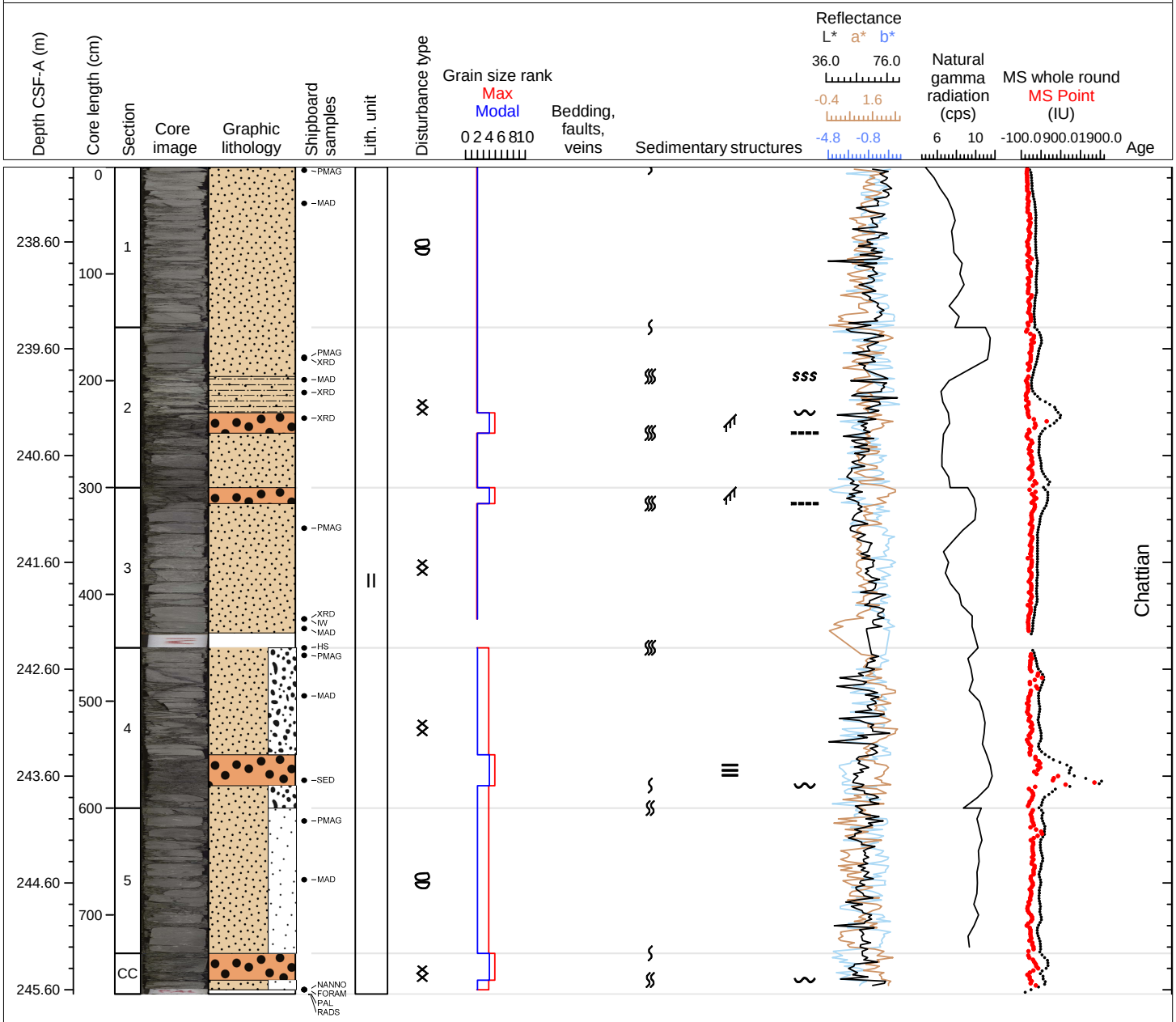
Hole 351-U1438B Core 28X, Interval 228.2-235.36 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS MUDSTONE WITH SAND, TUFFACEOUS SANDSTONE: The dark greenish gray tuffaceous mudstones in Core 28X are strongly brecciated. This is partly due to moderate drilling disturbance of the semi-consolidated lithology but also of primary origin. Fresh pumice occurs in Section 1 of this core and a Mn-nodule has been found at the very top of this Section. Bioturbation varies from slight to strong and 1-2 cm thick sand layers are present throughout the core. Those layers are inclined and show cross-bedding and convolute bedding. A fractured and deformed diffuse ash layer is present in Section 2, 95-108 cm. Drilling disturbance is slight (biscuiting) to moderate (brecciation).



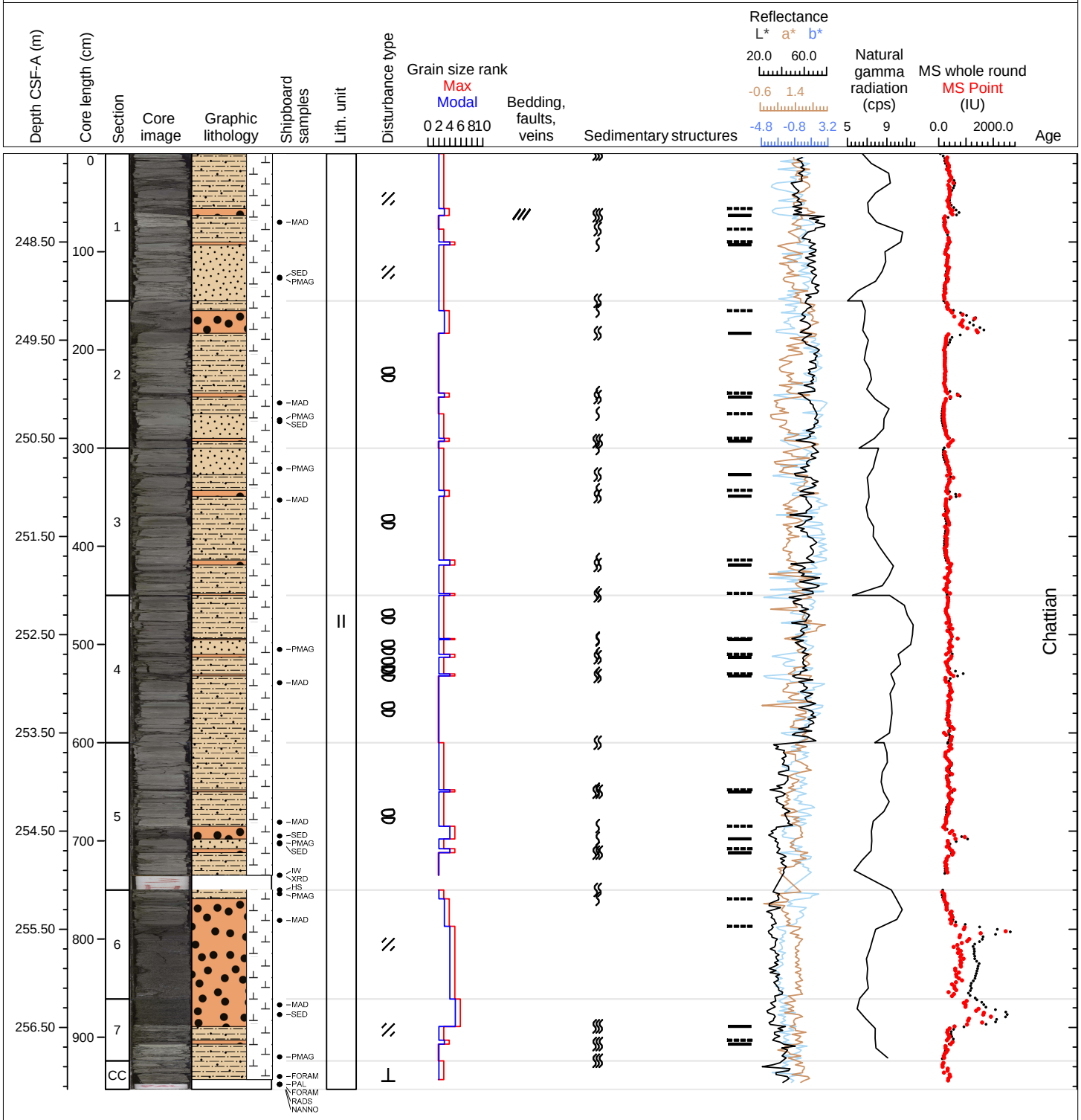
Hole 351-U1438B Core 29X, Interval 237.9-245.64 m (CSF-A)

TUFFACEOUS SILTSTONE WITH FINE SAND, TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE, TUFFACEOUS MUDSTONE: The tuffaceous mud- to sandstones in Core 29X are of dark greenish gray (5GY 4/1) to gray (N6) color. Section 1 is severely affected by drilling disturbances (biscuted). The more sandy intervals occur in the middle of Section 2, the upper part of Section 3, the lower part of Section 4 and the upper part of the Core Catcher. There is no bioturbation visible in those intervals but otherwise bioturbation is slight to strong. Contacts and bedding is irregular or wavy and often inclined.



Hole 351-U1438B Core 30X, Interval 247.6-257.13 m (CSF-A)

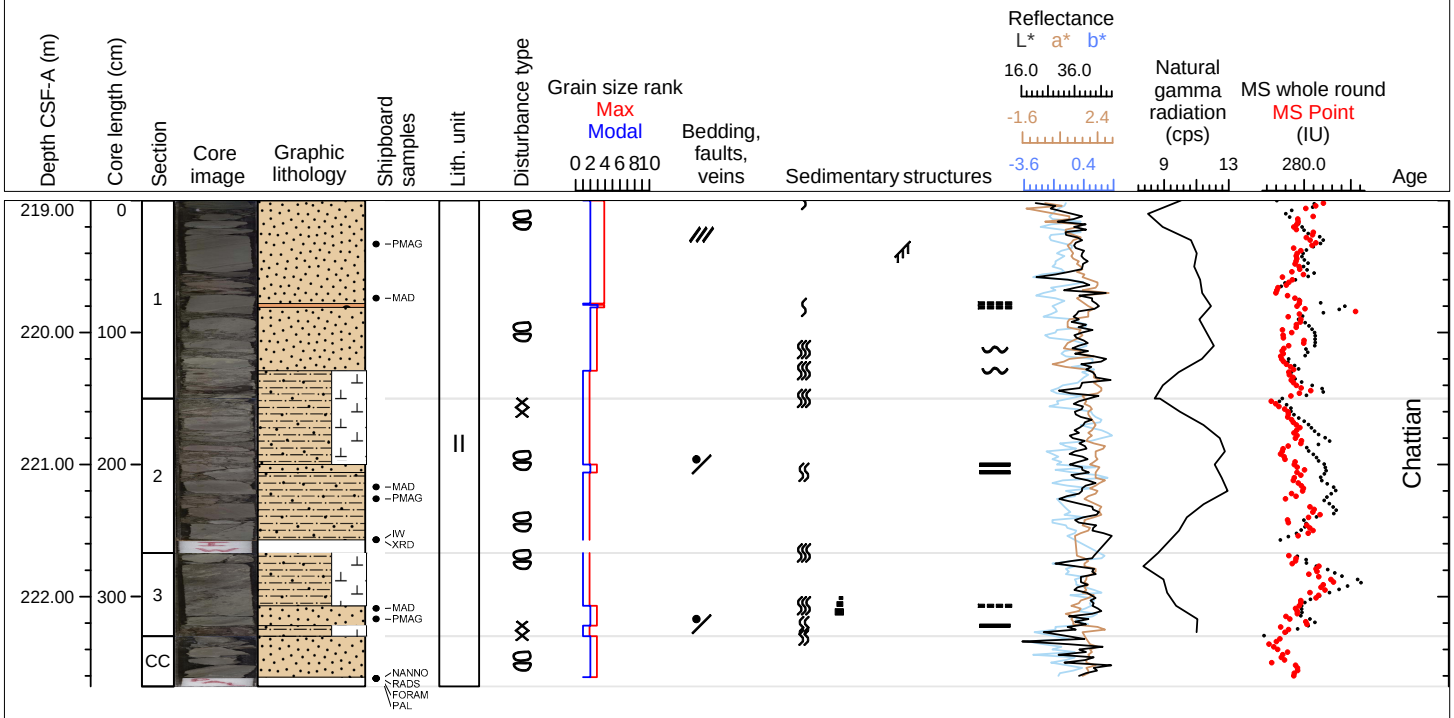
TUFFACEOUS MUDSTONE, SILTSTONE AND SANDSTONE: Core 30X consists of numerous sequences of tuffaceous dark gray sandstone (N3-N5), and medium gray tuffaceous siltstone and mudstone (both 5Y 6/1). Tuffaceous siltstone and mudstone may contain 50-60% nannofossils, and the mudstone is typically moderately to strongly bioturbated. Contacts between sandstone and underlying mudstone or siltstone are sharp, whereas other contacts are gradational. Sandstone often shows parallel or distorted laminations and in Section 6, gives way to very coarse unconsolidated tuffaceous sand, also with abundant nannofossils. Drilling disturbance is slight to moderate throughout the core, mostly biscuiting and fragmentation.



U1438D-1R NO RECOVERY

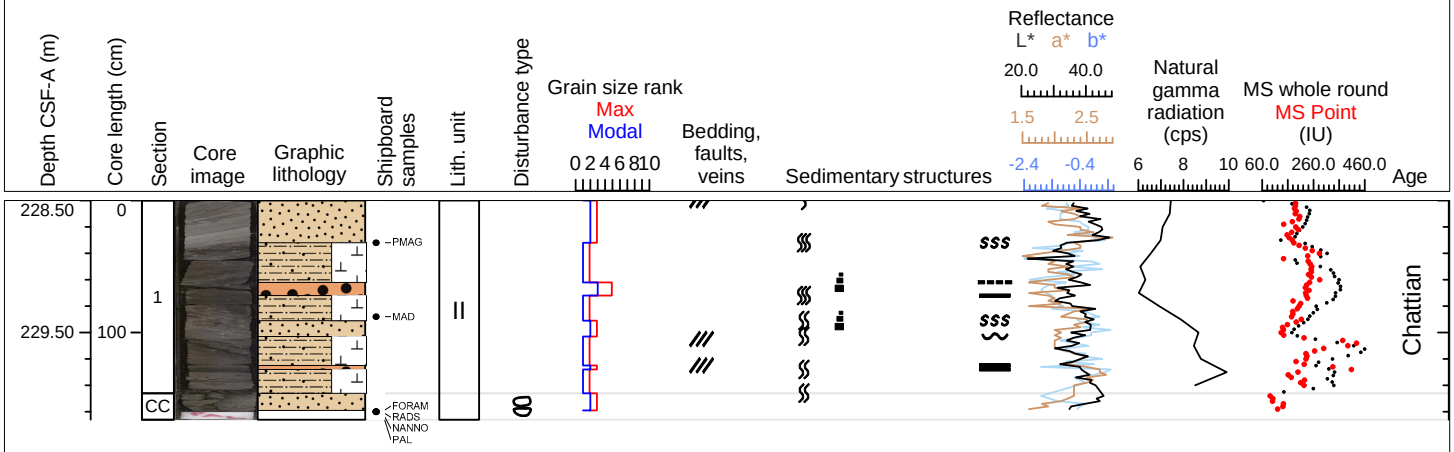
Hole 351-U1438D Core 2R, Interval 219.0-222.68 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS MUDSTONE WITH NANNOFOSSILS This core contains layers of olive gray (5Y 4/1) to greenish gray (5YR 6/1) tuffaceous mudstone, siltstone and sandstone. The mudstones are always strongly bioturbated and tend to contain nannofossils when examined in the smear slides. The sandstones and siltstones are much less bioturbated and tend to be normally graded. Repeated finning upward cycles of normally graded tuffaceous sediments are 1 to 50 cm thick. The cycles are disrupted by small fractures that dip moderately towards 90 degrees in the core reference frame. Bedding tend to be similar in orientations to the fractures.Drilling disturbace varies widely with some areas being totally disrupted but other sections are relatively undisturbed.



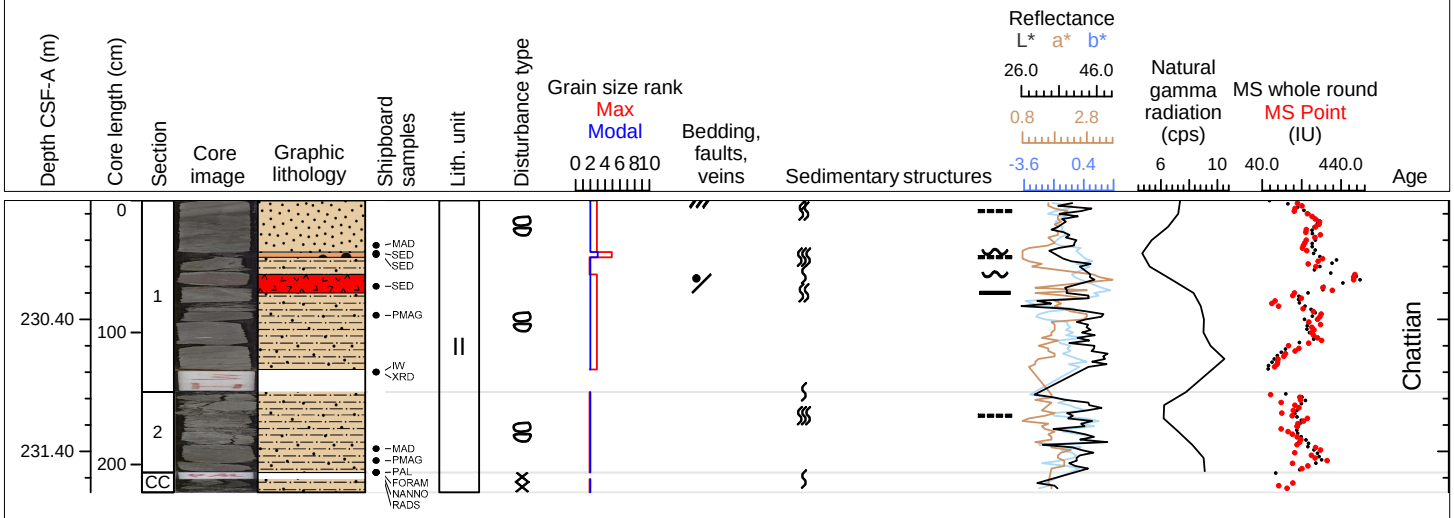
Hole 351-U1438D Core 3R, Interval 228.5-230.16 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS MUDSTONE WITH NANNOFOSSILS This core contains alternating layers of olive gray (5Y 4/1) to greenish gray (5YR 6/1) tuffaceous mudstone, siltstone and sandstone.Repeated finning upward cycles of normally graded tuffaceous sediments are 1 to 70 cm thick. The cycles are disrupted by both the bioturbation and drilling distubance. Bedding orientations vary widely from horizontal to steeply inclined in all dirrections. Bedding orientation changes seem to suggest that the core has been affected by both soft sediment deformation.



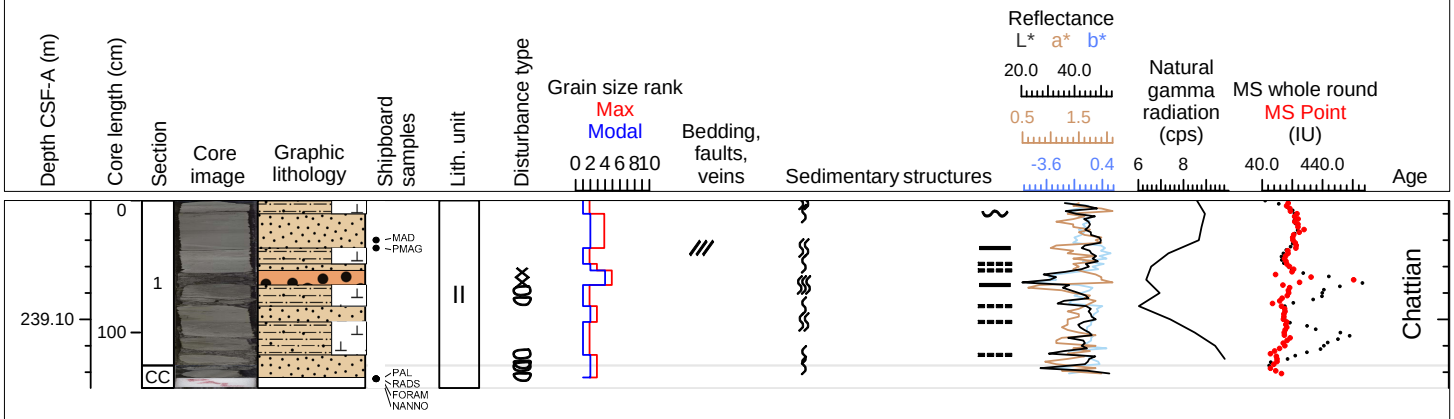
Hole 351-U1438D Core 4R, Interval 229.5-231.71 m (CSF-A)

TUFFACEOUS SILTSTONE, MUDSTONE AND TUFF: Core 4R consists of grayish green (5GY 6/1) moderately bioturbated tuffaceous mudstone and siltstone. In Section 1, 56 cm, there is a pod of reddish brown tuff (5YR 5/2). The core has several different structures: Bedding in siltstone at the top of the core is steeply inclined relative to the core boundary, and there is a fracture with reverse offset within the tuff layer. Drilling disturbance is slight to severe, including biscuiting and fragmentation.



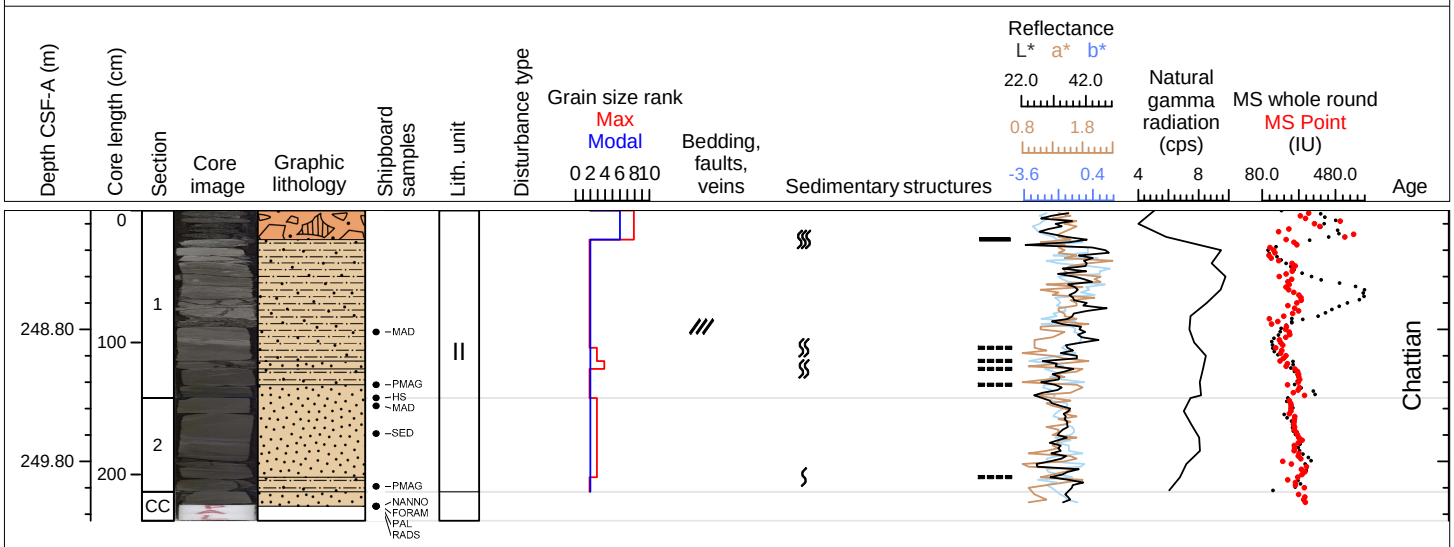
Hole 351-U1438D Core 5R, Interval 238.2-239.62 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS MUDSTONE WITH NANNOFOSSILS This core consists of a single section and a core catcher sample. It contains alternating layers of greenish gray (5YR 6/1) tuffaceous mudstone and siltstone with a small (10 cm) dark (N3) sandstone layer at in the middle. A total of 4 fining upward cycles of normally graded tuffaceous occur in the section each varying between 20-40 cm. Bedding orientations dip slightly 10 degrees towards 090 throughout the upper part of the core and are more horizontal in the lower part of the core. Bioturbation affects the mudstone part of the core. Drilling disturbance is severe in the coarser units.



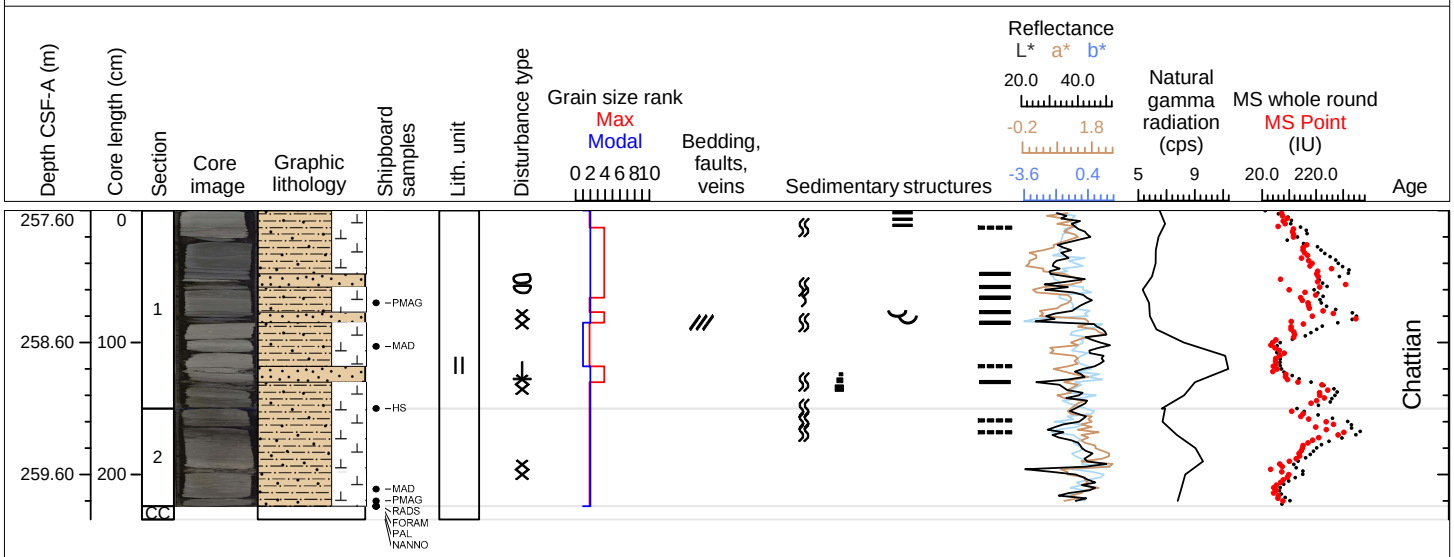
Hole 351-U1438D Core 6R, Interval 247.9-250.25 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SILTSTONE AND TUFFACEOUS BRECCIA-CONGLOMERATE: Core 6R continues lithologies found in overlying cores: tuffaceous mudstone and tuffaceous siltstone. Tuffaceous mudstone is medium gray (5Y 6/1) in color and bioturbated. Tuffaceous siltstones are darker gray (N4) and not bioturbated. The tuffaceous siltstones in this core show prominent soft sediment deformation through distortion of fine laminations in the rock. Bedding is strongly inclined relative to the core boundary, as seen in Section 1, 100 cm. Tuffaceous breccia-conglomerate appears for the first time at the top of Core 6R. Clasts are up to 3-4 mm in size and are lithic fragments, while small grains (<1 mm) include crystals of plagioclase, pyroxene and magnetite. Drilling disturbance is slight.



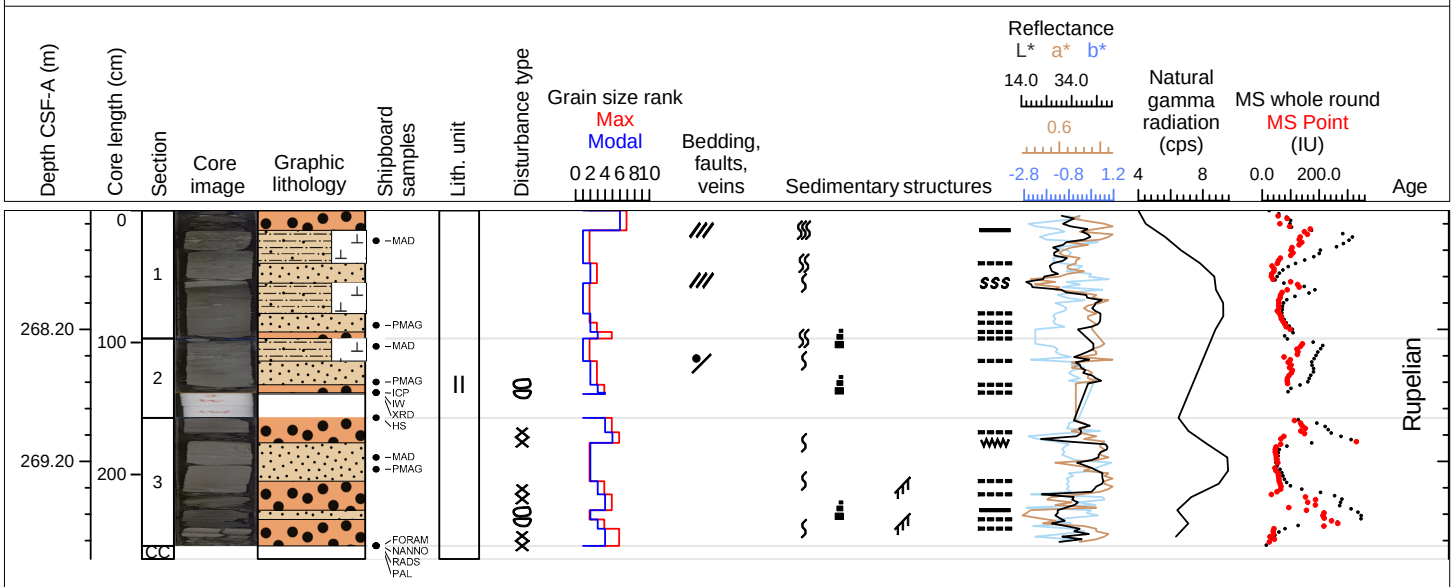
Hole 351-U1438D Core 7R, Interval 257.6-259.94 m (CSF-A)

TUFFACEOUS MUDSTONE WITH NANNOFOSSILS, TUFFACEOUS SILTSTONE: Core 7R is composed predominantly of several dm-thick alternating sequences of tuffaceous, medium dark to dark gray (N3, N4) fine- to medium-grained siltstones to tuffaceous mudstones with nannofossils of lighter colors (greenish gray, 5GY 6/1 and 5G 6/1). The siltstones, in some cases, are cross-bedded, normally-graded (fining-upward) and not bioturbated. The mudstones are sometimes graded at the bottom, more massive in the middle and moderately to strongly bioturbated at the top. Drilling disturbances are slight fracturing.



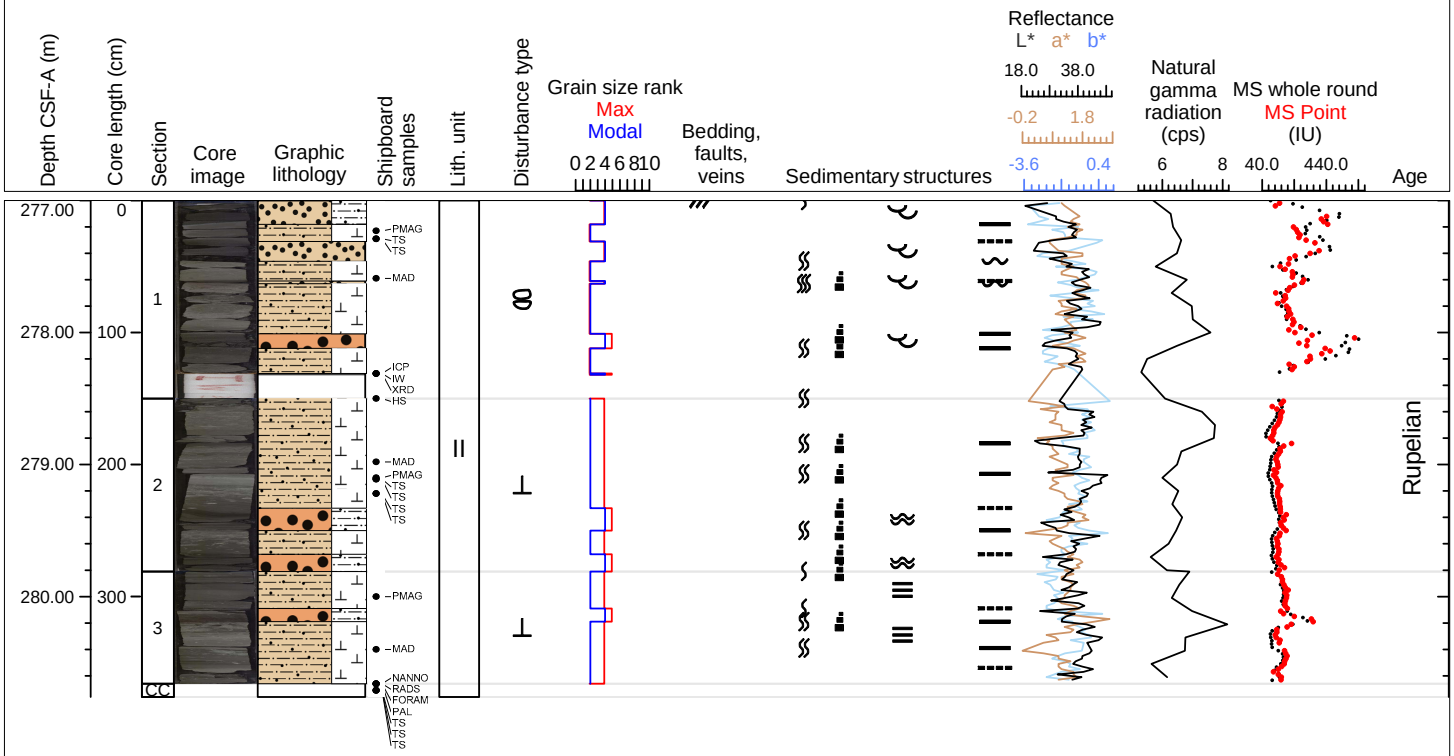
Hole 351-U1438D Core 8R, Interval 267.3-269.94 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS MUDSTONE WITH NANNOFOSSILS: Core 8R consists of greenish gray (5YR 6/1) and gray (N5, N6) tuffaceous mudstone and siltstone with small (10-15 cm) dark gray (N3) and medium light gray (N5) sandstone. 4-5 fining upward cycles of normally graded tuffaceous sedimentary rocks occur in Core 8R each varying in thickness between 20-40 cm. Bedding orientations are mostly shallow in dip. Bioturbation and soft deformation affects the mudstone layers. Drilling disturbance is strong in the coarser units.



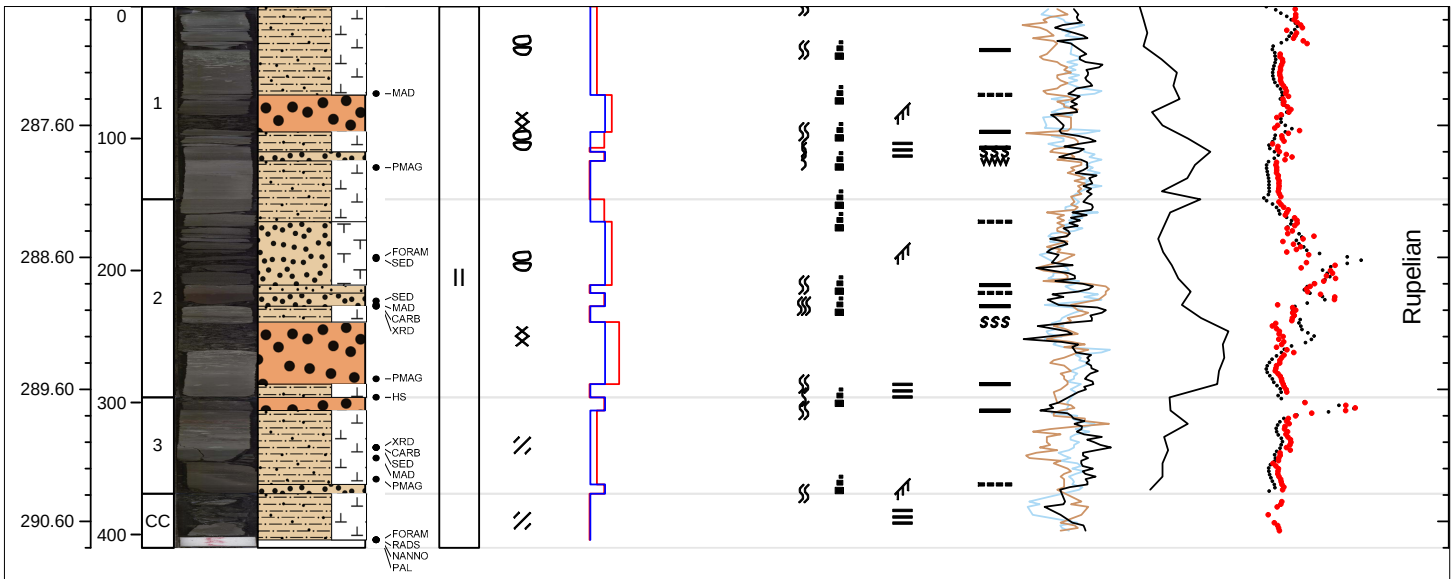
Hole 351-U1438D Core 9R, Interval 277.0-280.76 m (CSF-A)

TUFFACEOUS MUDSTONE WITH NANNOFOSSILS, TUFFACEOUS SANDSTONES WITH MUD: This core is composed of several dm-thick alternating sequences of tuffaceous, medium dark to dark gray (N3, N4) fine to medium grained sandstones to tuffaceous mudstones with nannofossils of lighter colors (Greenish gray, 5GY 6/1). The sandstones are cross-bedded, normally-graded (fining-upward) and not bioturbated. The mudstones are sometimes graded at the bottom, more massive in the middle and moderately to strongly bioturbated at the top.



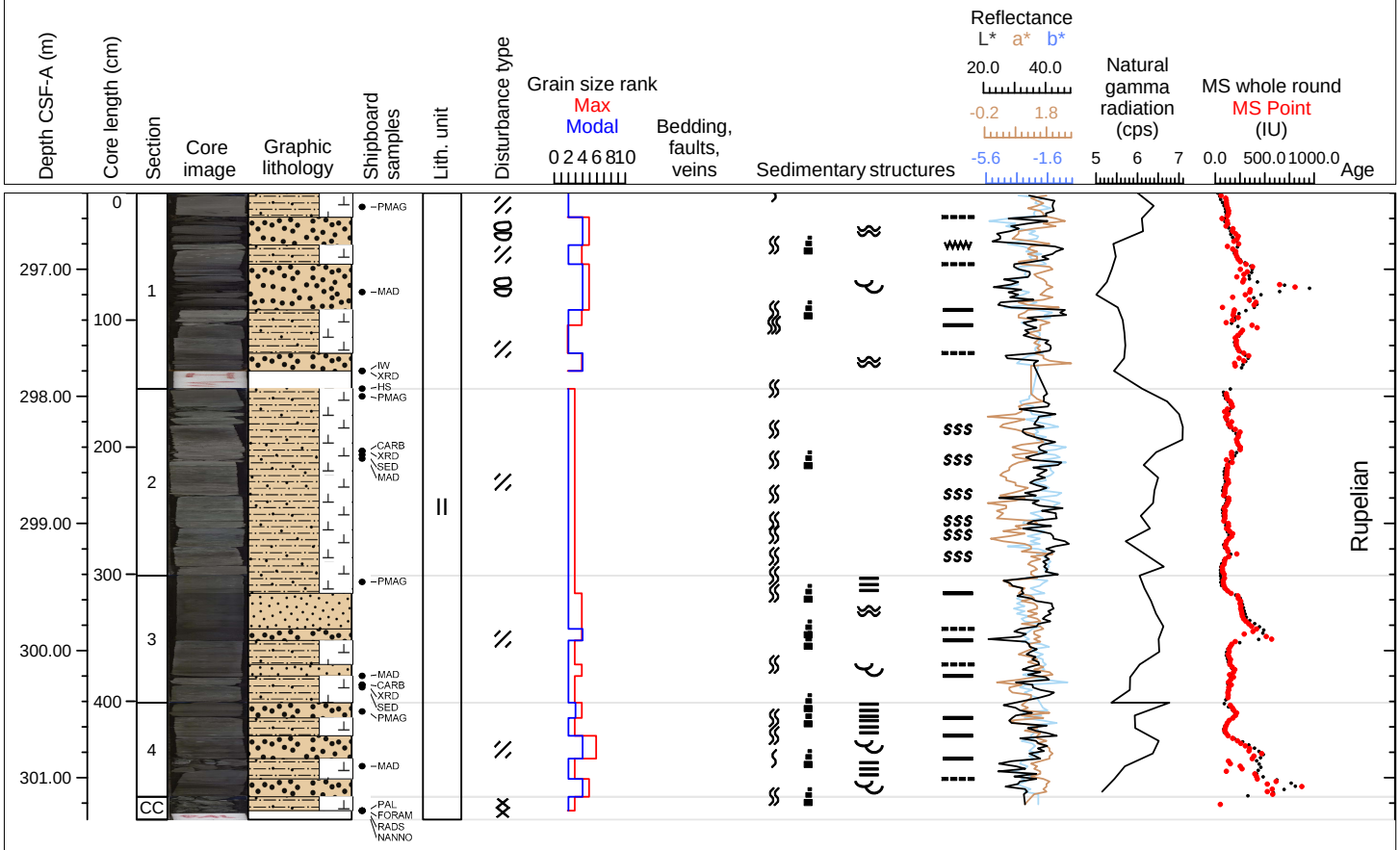
Hole 351-U1438D Core 10R, Interval 286.7-290.8 m (CSF-A)

TUFFACEOUS MUDSTONE WITH NANNOFOSSILS, TUFFACEOUS FINE SANDSTONE (WITH FORAMINIFERS), TUFFACEOUS SANDSTONE, TUFFACEOUS SILTSTONE: Core 10R is dominated by dark gray (5Y 4/1) tuffaceous mudstones with nannofossils and black (5Y 2.5/1) tuffaceous (fine) sandstones. The cm- to dm-thick layers of silt-, fine sand- and sandstones are intercalated in the mudstones and normally graded with cross bedding and planar laminations.



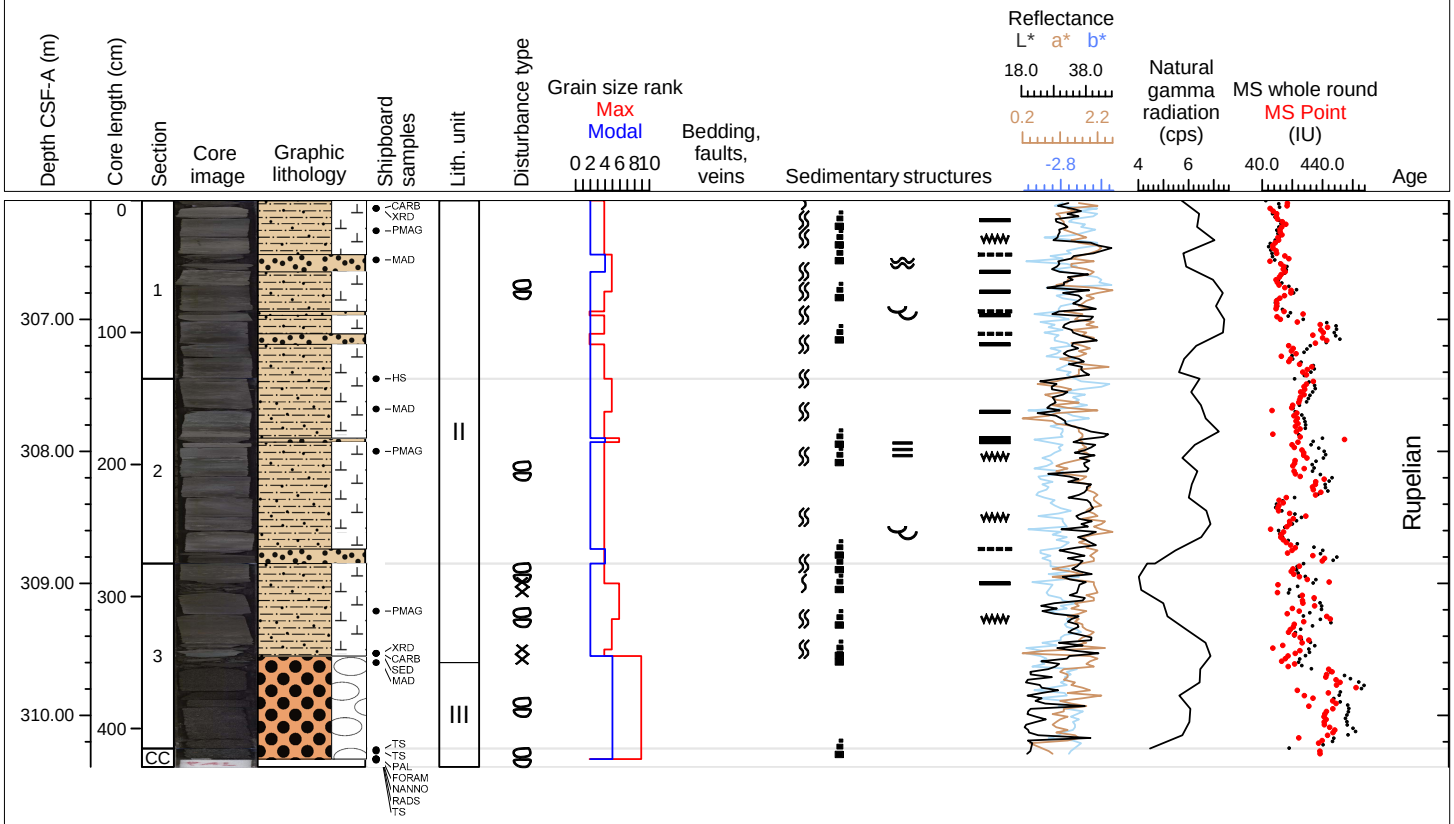
Hole 351-U1438D Core 11R, Interval 296.4-301.33 m (CSF-A)

TUFFACEOUS MUDSTONE WITH NANNOFOSSILS, TUFFACEOUS SANDSTONE, TUFFACEOUS FINE SANDSTONE: Core 11R consists of several dm-thick alternating sequences of tuffaceous, dark and medium dark gray (N3, N4) fine- to medium-grained sandstones with greenish to dark greenish gray and greenish black (5GY 4/1, 5GY 6/1, 5GY 2/1) tuffaceous mudstones with nannofossils. The alternating packages usually show a sandstone-to-mudstone sequence, with the sandstones showing normal grading and planar laminations and convolute bedding. The sandstones generally fine upwards. Contacts between the sandstone/siltstones and top of mudstones are sharp and planar. Bioturbation is moderate in the mudstones, and absent in the sandstones. Drilling disturbances range from slight biscuiting in the mudstone, to slight fragmentation and brecciation in the coarser sandstones.



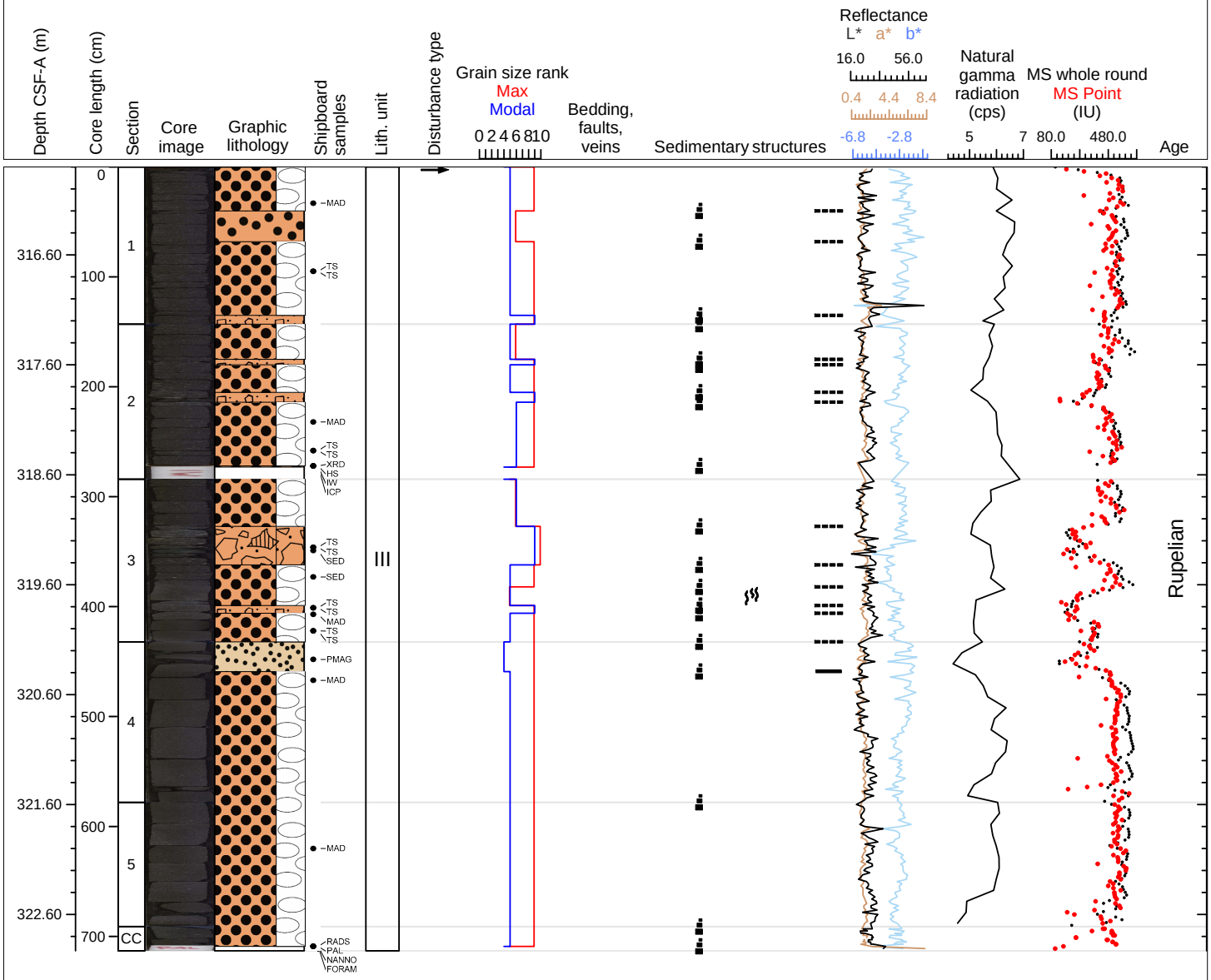
Hole 351-U1438D Core 12R, Interval 306.1-310.39 m (CSF-A)

TUFFACEOUS MUDSTONE WITH NANNOFOSSILS, TUFFACEOUS FINE SANDSTONE, TUFFACEOUS MEDIUM TO COARSE SANDSTONE WITH GRAVEL: Core 12R consists of several dm-thick alternating sequences of tuffaceous, medium bluish gray (5B 5/1) to brownish gray (5YR 4/1) mudstones with nannofossils, normal grading and moderate bioturbation. Those beds are interlayered by cm-thick layers of tuffaceous, greenish black (5G 2/1) fine to coarse sandstones. From the middle of Section 3 the rocks are coarser and poorly sorted. The rock has been described as a tuffaceous matrix-supported polymictic medium to coarse sandstone with pebbles and is of grayish black color (N2). This lithology is normally graded but not bioturbated. Drilling caused slight disturbance (biscuting).



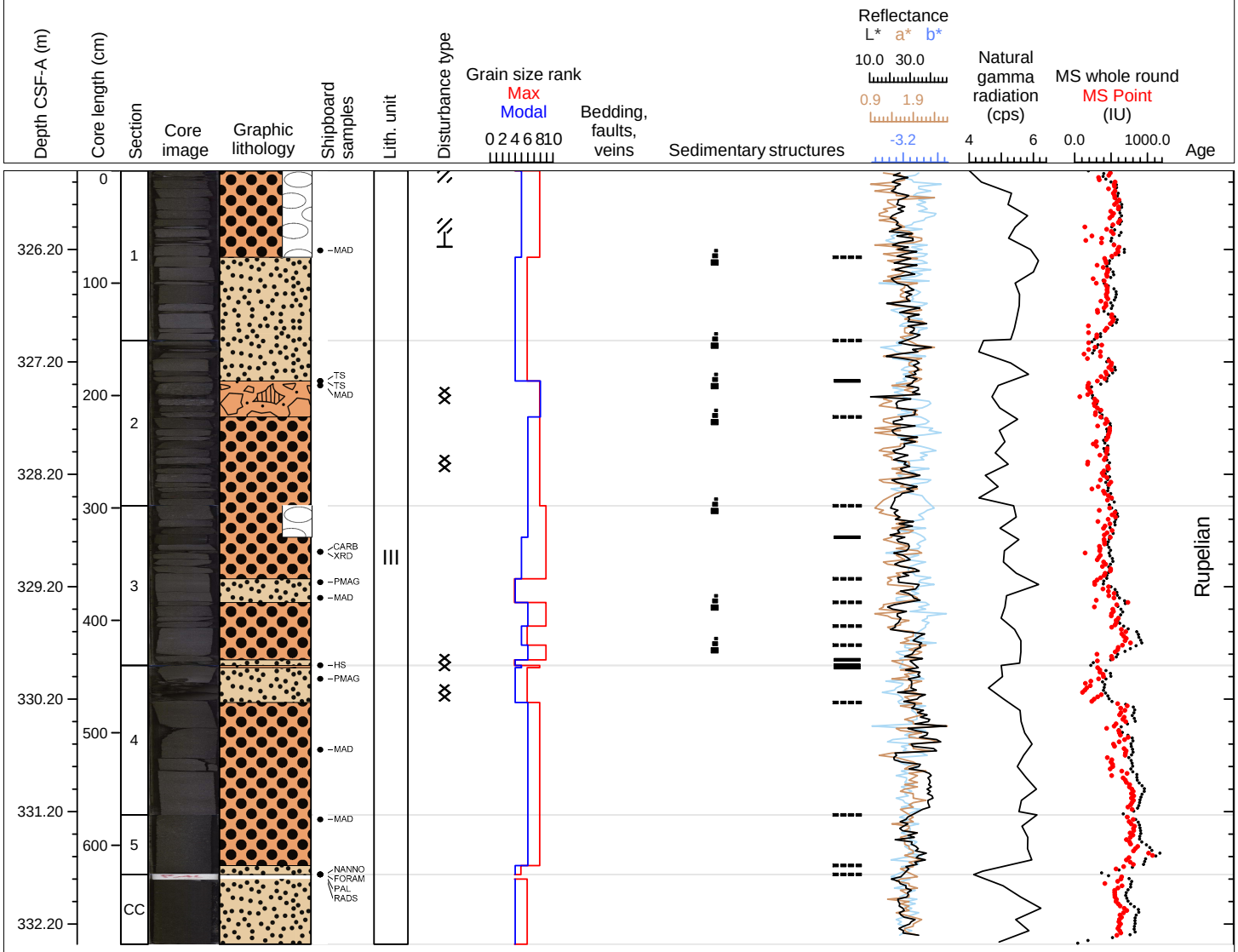
Hole 351-U1438D Core 13R, Interval 315.8-322.93 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE WITH GRAVEL, TUFFACEOUS BRECCIA-CONGLOMERATE: Core 13R consists of several thick (dm- to m-scale) normally graded sequences of dark gray (N2) tuffaceous medium to coarse sandstone with gravel and tuffaceous breccia-conglomerates. The majority of the clasts are gray in color but sparse red and white clasts occur throughout the core. In Section 3, 114 cm a large de-watering structure is present. Reverse grading has been found at the base of a large turbidite sequence. Drilling disturbance is limited to some fall-in. No bioturbation has been observed throughout Core 13R.



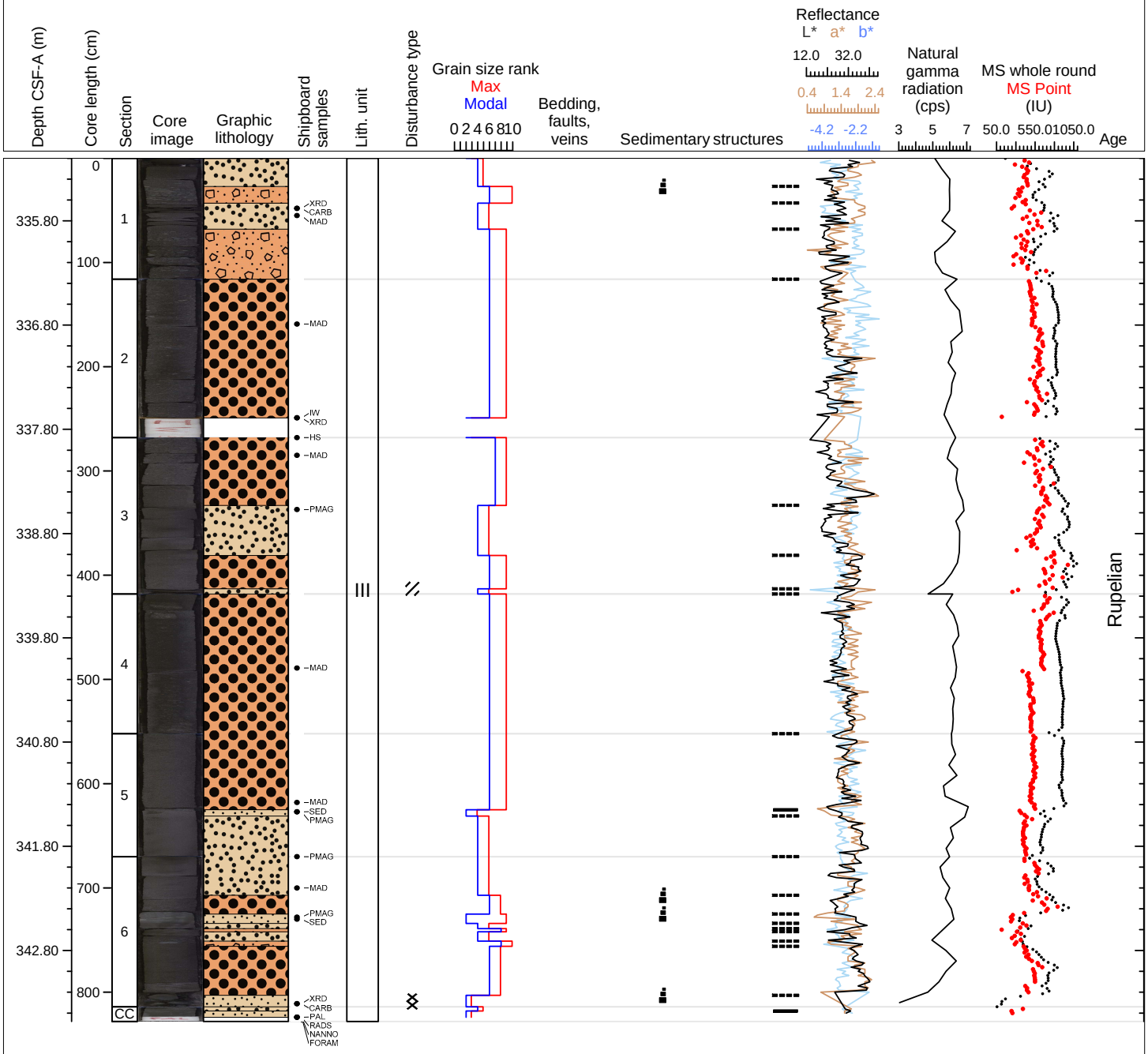
Hole 351-U1438D Core 14R, Interval 325.5-332.38 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE, TUFFACEOUS BRECCIA-CONGLOMERATE: Core 14R consists of medium dark gray (N4) to dark gray (N3) tuffaceous medium to course sandstones and tuffaceous breccia-conglomerates. These rocks are nearly identical in appearance to the previous core (13R) and contain diverse rock fragments of volcanic origin (polymict), mostly of lapilli size. Individual fragments include red oxidized scoria fragments, altered to zeolites white pumice fragments, dark gray to greenish-gray aphyric to porphyritic mafic rock fragments and dark gray and highly vesicular felsic pumice. The sandstones and breccia-conglomerates are moderately sorted, except in Section 3, 65-86 cm and 107-126 cm, where the sandstones are well-sorted and the contacts with the overlaying coarser pebble-containing sands appear to be gradational. No bioturbation was observed throughout the core. Three small intervals in Section 1 and one in the upper part of Section 4 experienced drilling disturbance.



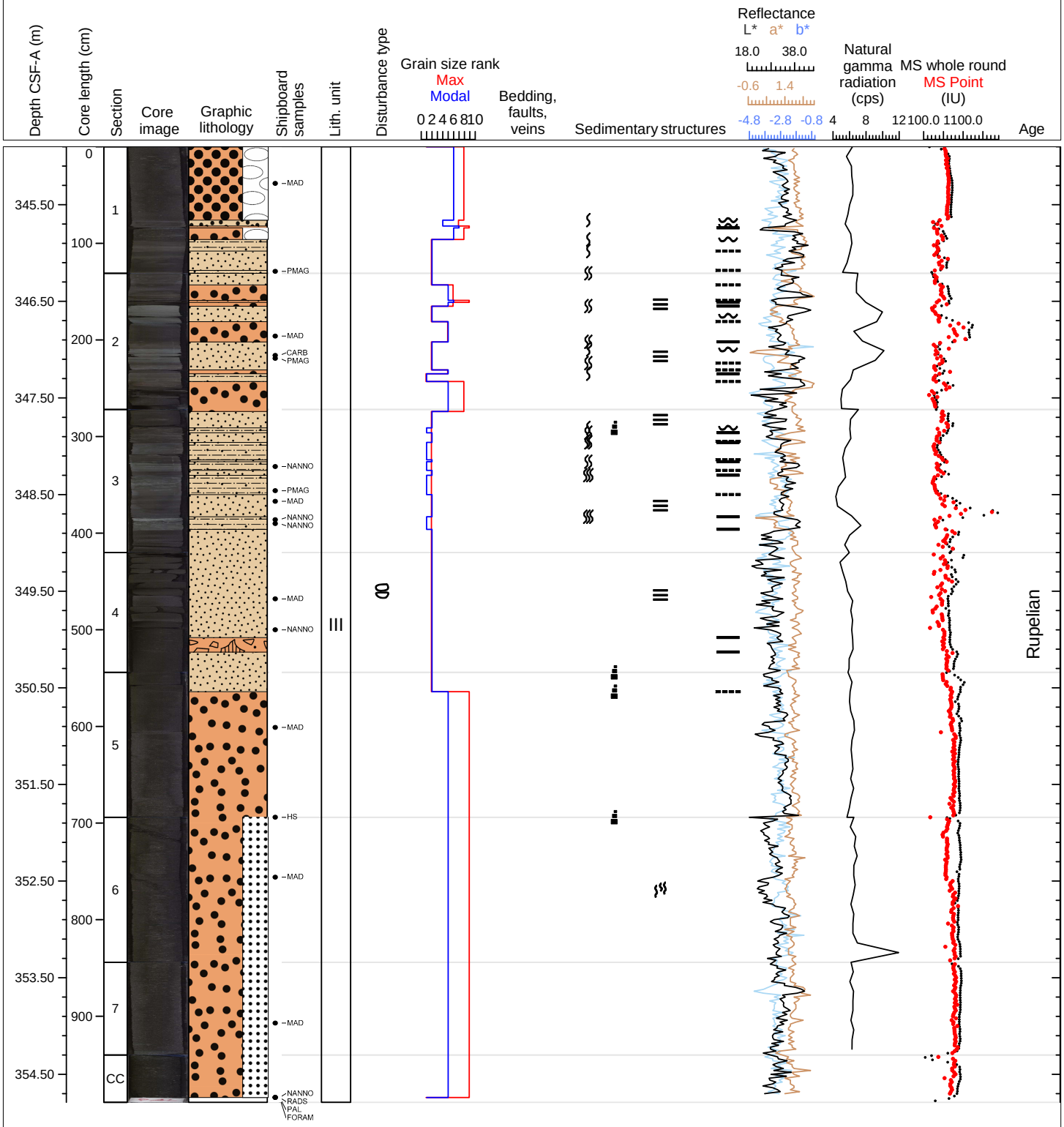
Hole 351-U1438D Core 15R, Interval 335.2-343.48 m (CSF-A)

TUFFACEOUS SANDSTONE, TUFFACEOUS CONGLOMERATE, TUFFACEOUS SILTSTONE: Core 15R is represented by dark gray (N3), dark greenish (5G 4/1) and greenish gray (5G 6/1) moderately to poorly sorted siltstones and sandstones with occasional pebble-rich varieties. The top and bottom of the core contain 5-10 cm intervals of dark greenish (N3) layers of tuffaceous conglomerates. The core is without bioturbation, with the exception of a tuffaceous siltstone in Section 5, 73-79 cm. No drilling disturbances except for Section 6, 134-144 cm.



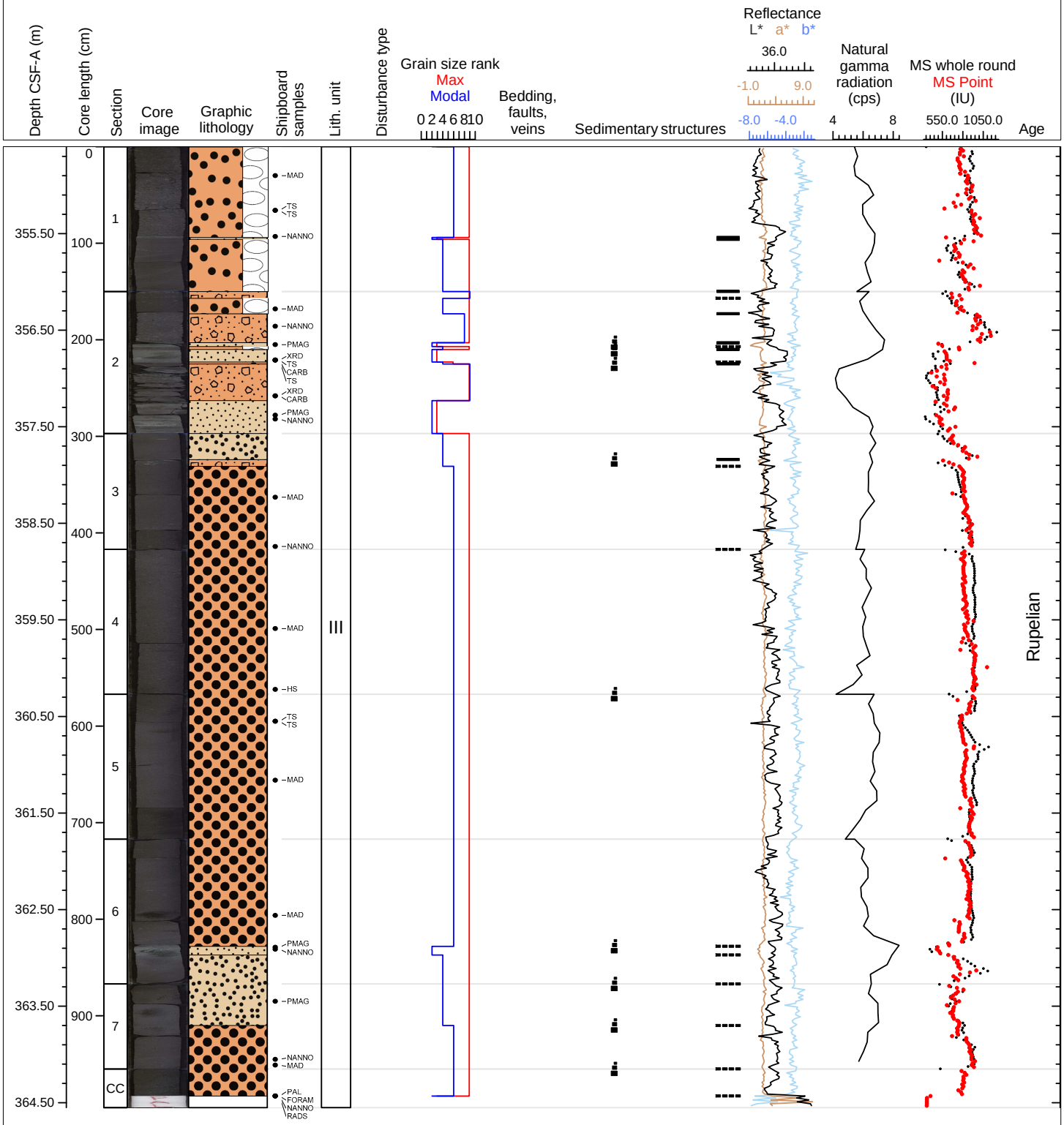
Hole 351-U1438D Core 16R, Interval 344.9-354.79 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS MEDIUM TO COARSE SANDSTONE, TUFFACEOUS CONGLOMERATE: The upper three Sections of Core 16R consist of several cm- to dm-thick alternating sequences of tuffaceous, olive-gray (5Y 4/1) to dark gray (N3) normally graded siltstones, interlaid by low to moderately bioturbated medium bluish gray (5B 5/1) to dark gray (N 3) tuffaceous mudstones. Two cm-thick tuffaceous monomictic conglomerates are found within these upper layers. Section 4 of Core 16R consist of well-sorted dark gray (N3) sandstone showing normal grading at the top of the sequence, with the presence of a 5-cm thick breccia-conglomerate. The lower two Sections consist of poorly sorted tuffaceous medium to coarse grained sandstone with pebbles where dewatering structures are present.



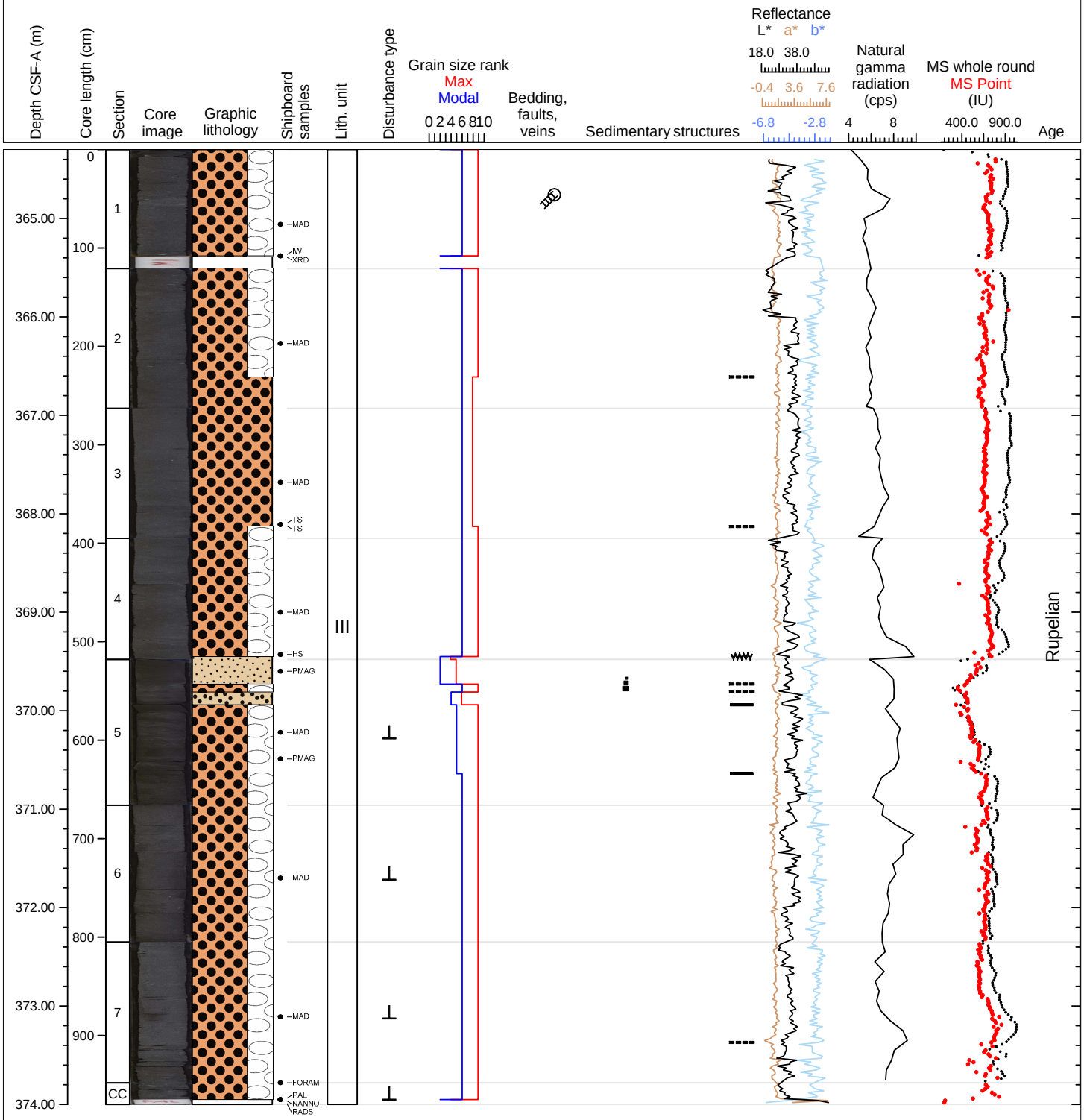
Hole 351-U1438D Core 17R, Interval 354.6-364.55 m (CSF-A)

TUFFACEOUS SANDSTONE, TUFFACEOUS CONGLOMERATE, TUFFACEOUS SILTSTONE: Core 17R contains thick (0.5 to 2 m) beds of dark gray (N3) sandstone interbedded with thin (3 to 30 cm) beds of monomict and polymict conglomerate and bioturbated siltstone. Polymict layers tend to contain mostly gray volcanic clasts with minor small red and white clasts. The monomict layers contain bluish gray rounded pumice clasts. Core 17R has not been affected by any significant drilling disturbance.



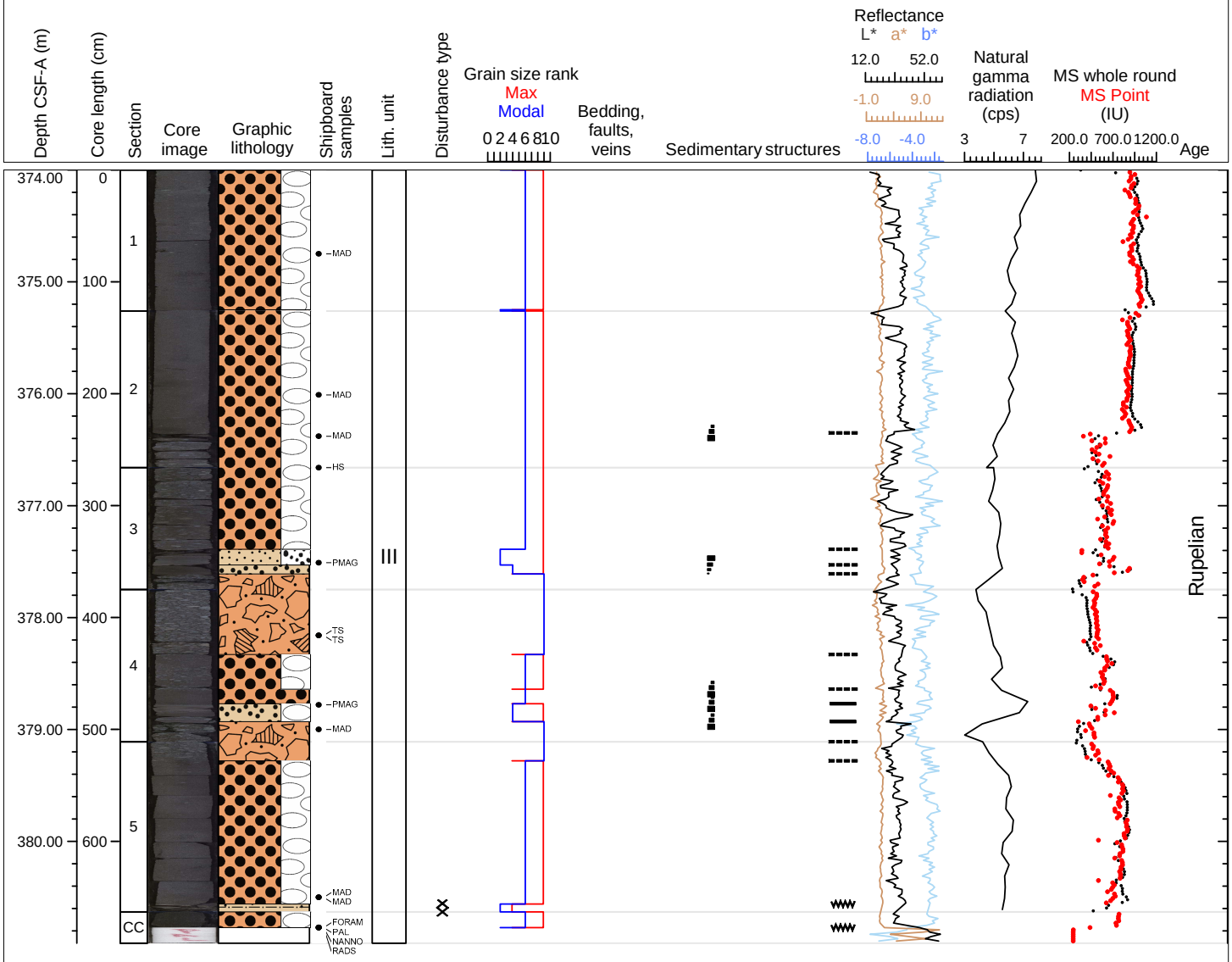
Hole 351-U1438D Core 18R, Interval 364.3-374.0 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE (WITH GRAVEL), TUFFACEOUS SILTSTONE, TUFFACEOUS FINE SANDSTONE: Core 18R is dominated by dark gray (N3) tuffaceous medium to coarse sandstone with gravel. The lowermost part of Section 3 and the upper half of Section 4 are composed of medium dark gray (N4) siltstone (silt to fine sand) with an interbed of dark gray (N3) tuffaceous medium to coarse sandstone with gravel. The dominant clasts are lithic, subrounded and volcanic felsic (e.g. pumice). In the lowermost part of Section 7, the size of the pebbles increases up to 45 mm and includes mafic volcanic rocks, probably basalt and andesite. No bioturbation is present in this core and the drilling disturbance is only very slight (some fracturing). One bluish halo has been observed in Section 1.



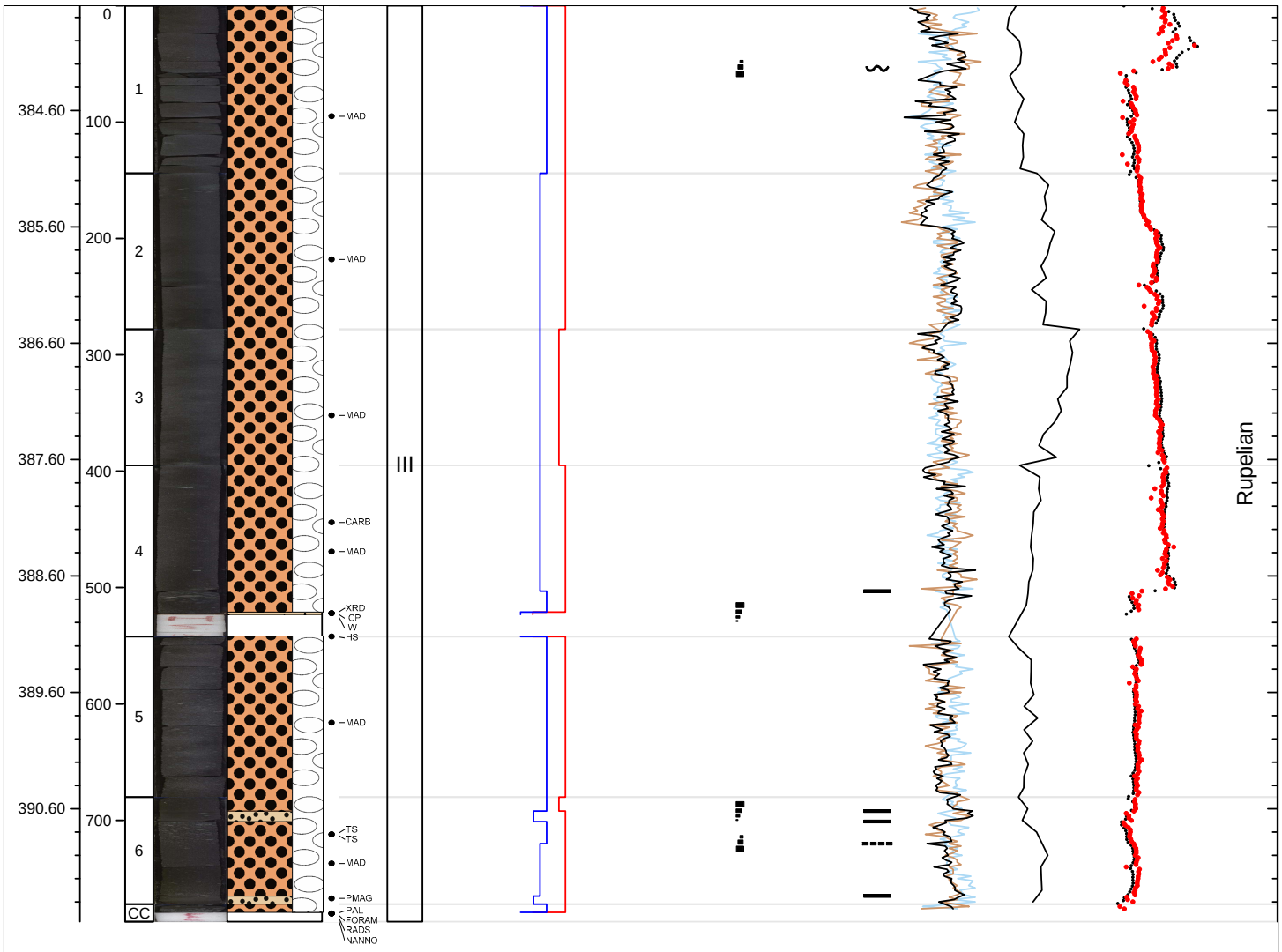
Hole 351-U1438D Core 19R, Interval 374.0-380.91 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE, TUFFACEOUS BRECCIA-CONGLOMERATE, TUFFACEOUS FINE SANDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS MUDSTONE: Core 19R is dominated by tuffaceous medium to coarse sandstone and tuffaceous matrix-supported polymict breccia-conglomerate. Minor lithologies are tuffaceous light gray (N7) mud-, medium dark gray (N4) silt- and brownish black (5YR 2/1) fine sandstone. Gradational contacts and normal grading are common in Core 19R. No bioturbation has been observed and only a single interval (Section 5, 145-152 cm) has been affected by drilling disturbance (brecciated, destroyed).



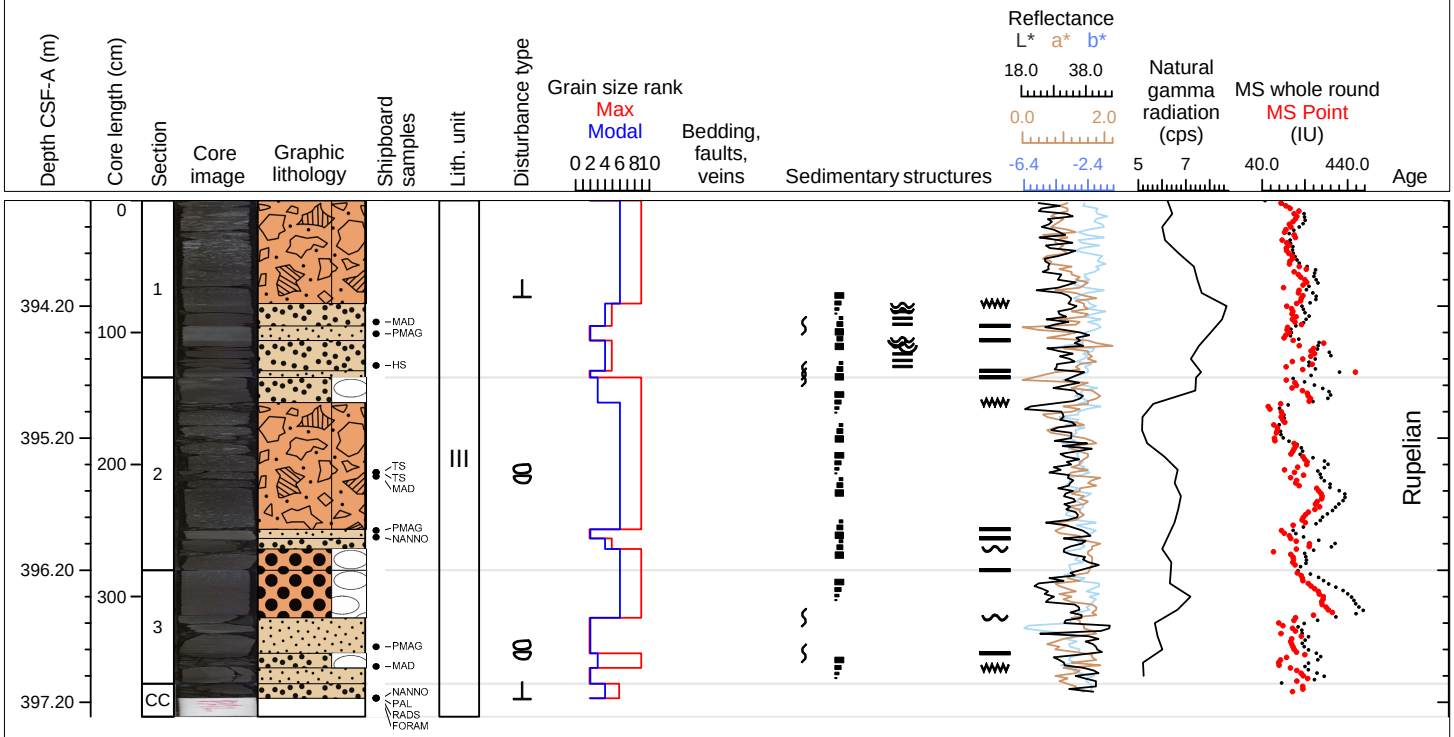
Hole 351-U1438D Core 20R, Interval 383.7-391.57 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE WITH GRAVEL, TUFFACEOUS FINE SANDSTONE WITH GRAVEL: Core 20R is composed almost exclusively of grayish black (N2) tuffaceous medium to coarse sandstone with gravel. The lower part of Section 1 is of bluish black (5B 2.5/1) color and two tuffaceous fine sandstone layers with gravel (light gray [N7]) are intercalated in Section 6, 12-21 cm and 85-92 cm. Most contacts are planar and sharp and the beds reversely graded. No bioturbation or drilling disturbances have been observed.



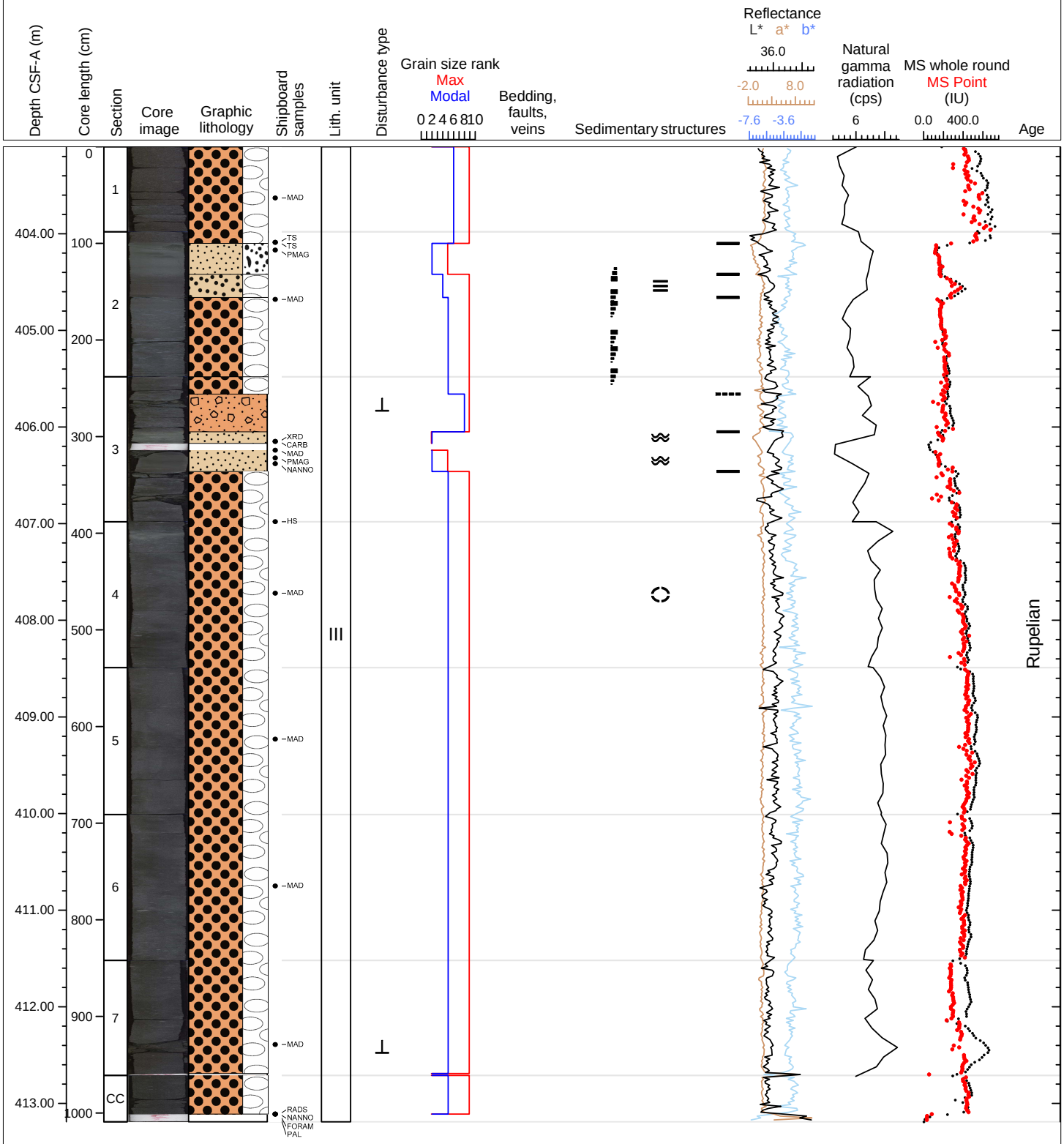
Hole 351-U1438D Core 21R, Interval 393.4-397.31 m (CSF-A)

TUFFACEOUS BRECCIA-CONGLOMERATE WITH SAND, TUFFACEOUS MEDIUM TO COARSE SANDSTONE (WITH GRAVEL), TUFFACEOUS FINE SANDSTONE (WITH GRAVEL), TUFFACEOUS SILTSTONE: Core 21R is dominated by dark gray (N3) tuffaceous, matrix-supported breccia-conglomerate with transitions to medium to coarse sandstone. Tuffaceous breccia-conglomerates and sandstones are often reversely graded but sometimes also normally graded. Intercalated are cm-thick beds of dark greenish gray (5GY 4/1) tuffaceous siltstones. Pebbles reach a maximum size of 50 mm in the Section 1 and are dominantly lithic, volcanic and felsic (pumice). Some bioturbation is present (limited to the siltstones) and the drilling disturbance is slight with minor intervals of moderate biscuting.



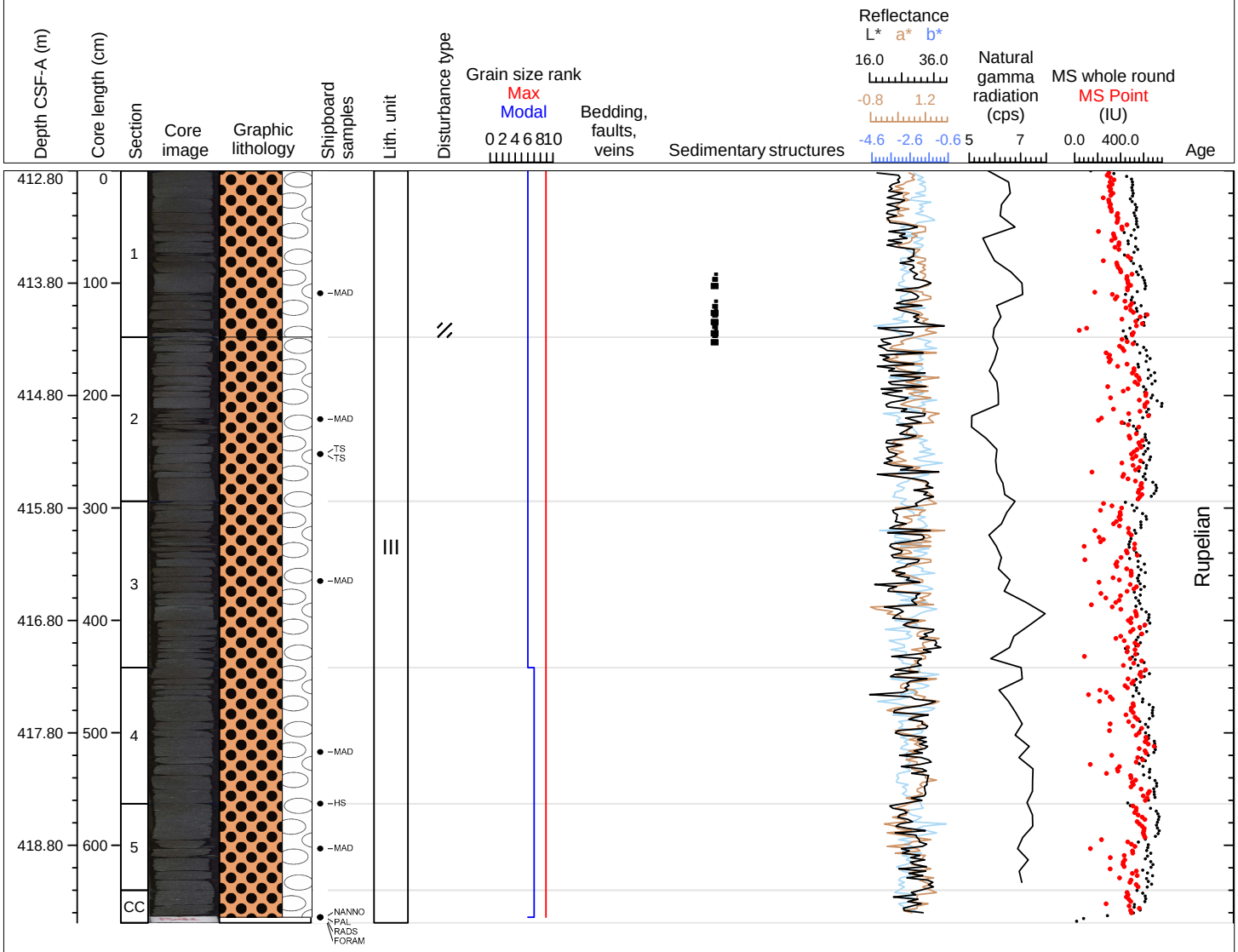
Hole 351-U1438D Core 22R, Interval 403.1-413.19 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE (WITH GRAVEL), TUFFACEOUS SILTSTONE (WITH GRAVEL/WITH SAND), TUFFACEOUS FINE SANDSTONE (WITH GRAVEL): Core 22R is dominated by medium bluish gray (5B 5/1) and medium dark gray (N4) tuffaceous medium to coarse sandstone with transitions to cm-thick beds of dark greenish gray (5G 4/1) tuffaceous siltstone (+/- sand) and medium dark gray (N4) tuffaceous fine sandstone with gravel. Layers of tuffaceous medium to coarse sandstone with gravel are often reversely graded in repeating sequences, but they are sometimes also normal graded. Pebbles reach a maximum size of 45 mm in Core 22R and are dominantly lithic, volcanic and felsic (pumice). A large (>80 mm), deformed intraclast occurs near the top of Section 4. No bioturbation is present, and the drilling disturbance is limited to severe fracturing for a short segment in Section 3 and moderate fracturing for a short segment in Section 7.



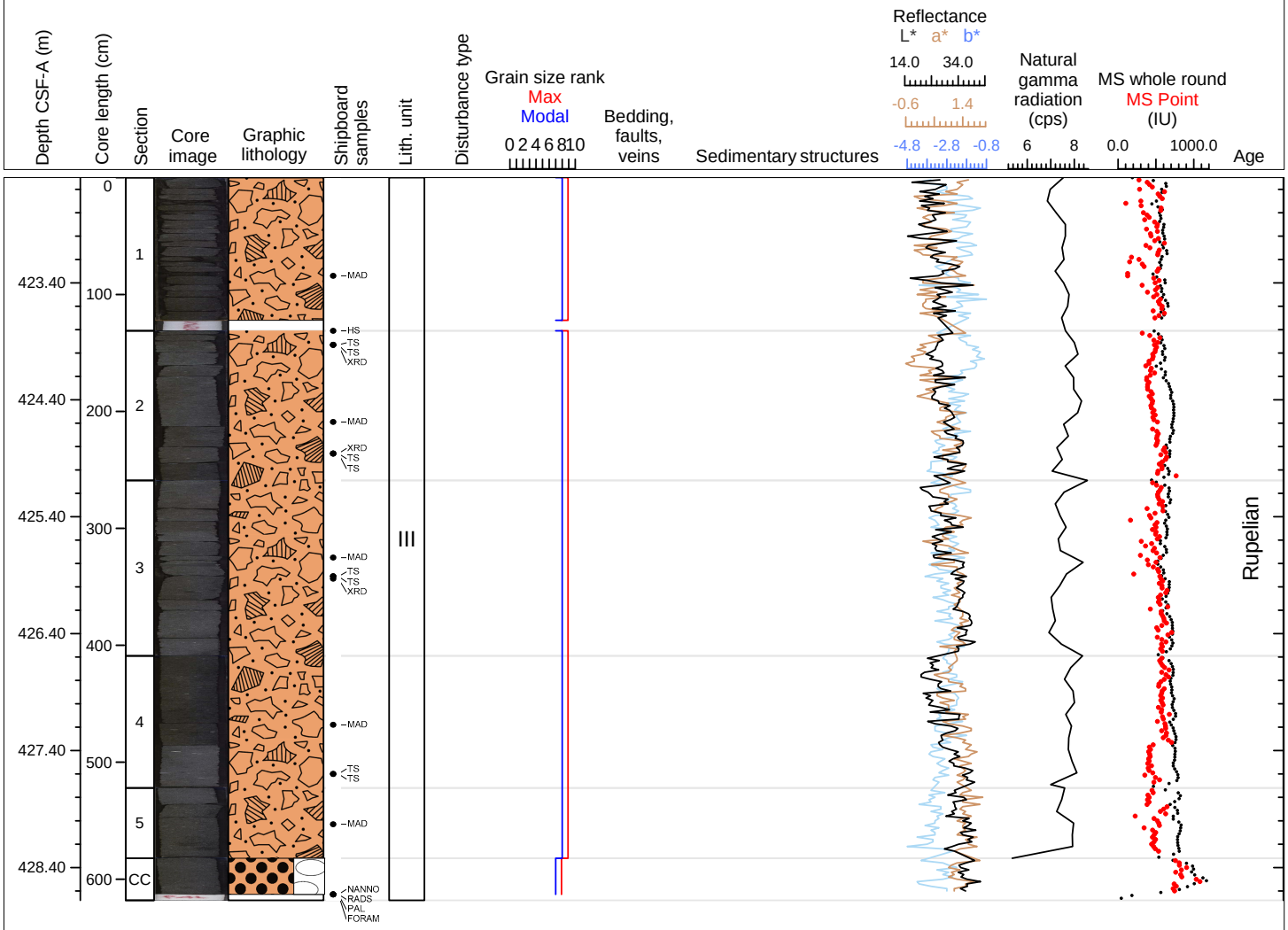
Hole 351-U1438D Core 23R, Interval 412.8-419.49 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE (WITH GRAVEL), TUFFACEOUS SILTSTONE WITH NANNOFOSSILS, TUFFACEOUS SANDSTONE: Core 23R is dominated by dark gray (N3) tuffaceous, medium to coarse sandstone with gravel. They are poorly sorted and have no sedimentary structures. Pebbles reach a maximum size of 20 mm and were identified as angular greenish black (5G 2/1) siltstone. The second major lithology are grayish green (5G 5/2) tuffaceous siltstones with nannofossils. Rare benthic foraminifer up to 5 mm can be seen in the core. No bioturbation is present and the drilling disturbance is slight to moderate and characterized by fracturing.



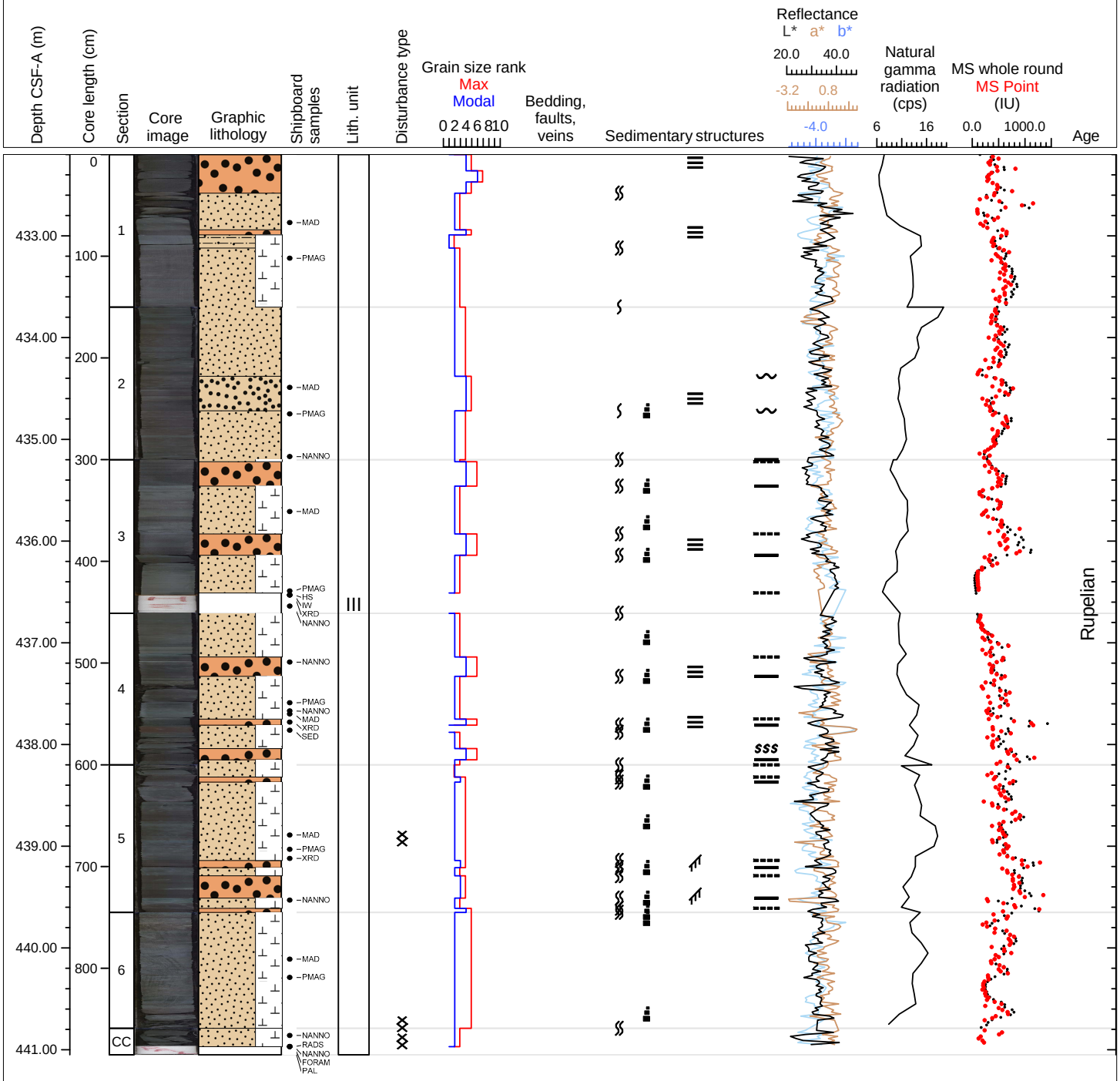
Hole 351-U1438D Core 24R, Interval 422.5-428.68 m (CSF-A)

TUFFACEOUS BRECCIA-CONGLOMERATE: Core 24R consists of tuffaceous, polymict breccia-conglomerate. The conglomerate is very poorly sorted but relatively homogeneous throughout the core both in terms of grain size and composition. Clasts vary from rounded to angular consisting of dark to light volcanic clasts, green fine grained siltstone, small fragments of limestone and red oxidized volcanics. No bioturbation or drilling disturbance is present.



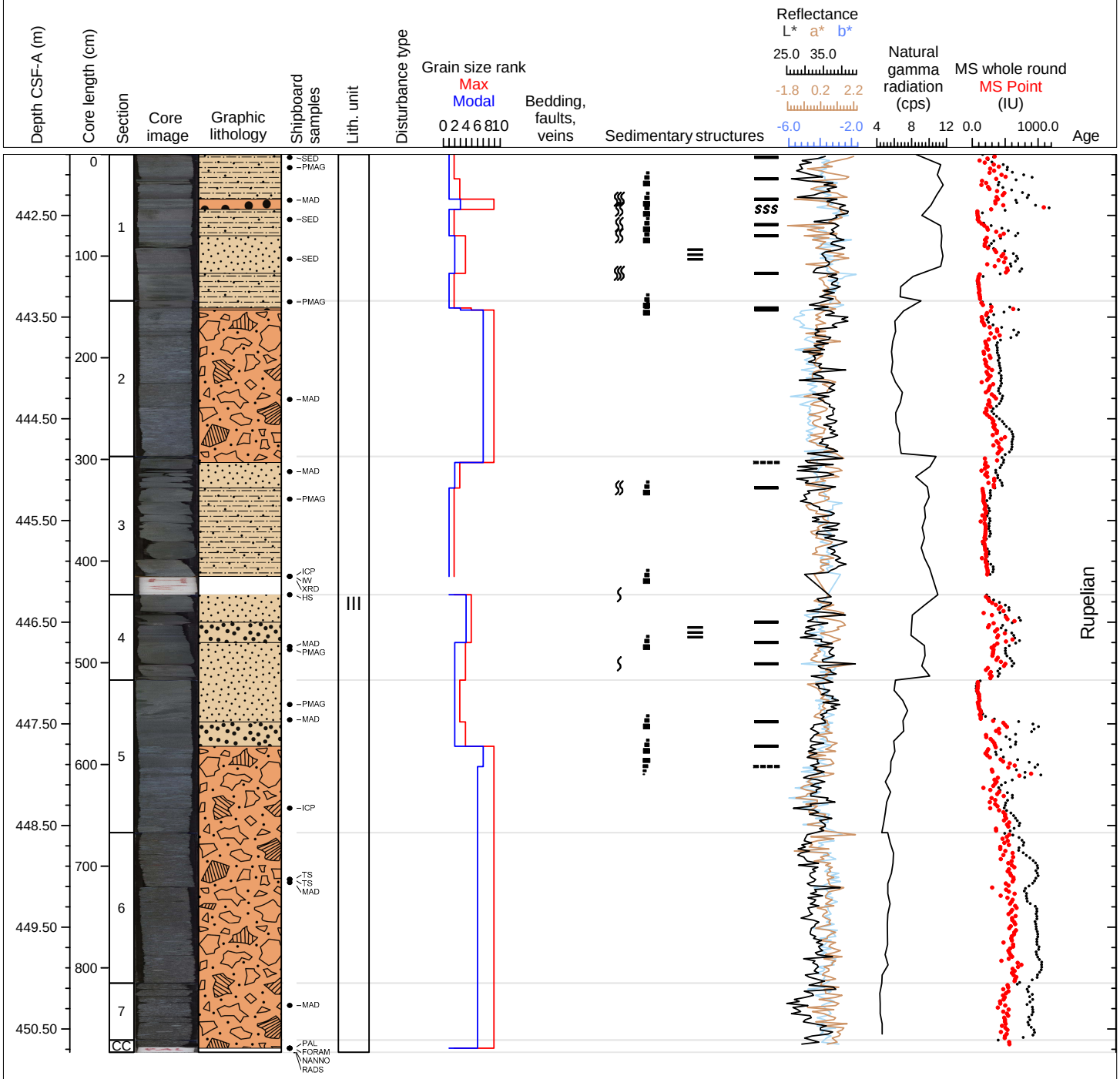
Hole 351-U1438D Core 25R, Interval 432.2-441.05 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE: Core 25R consists of alternating sequences of grayish green (5G 5/2) plane and cross laminated tuffaceous sand- and siltstones and moderately to strongly bioturbated mudstones. Each normally graded sequence is generally thin (cm- to dm-scale). Bioturbation is common and moderate. Drilling disturbance is minimal except in a small interval near the beginning of the core.



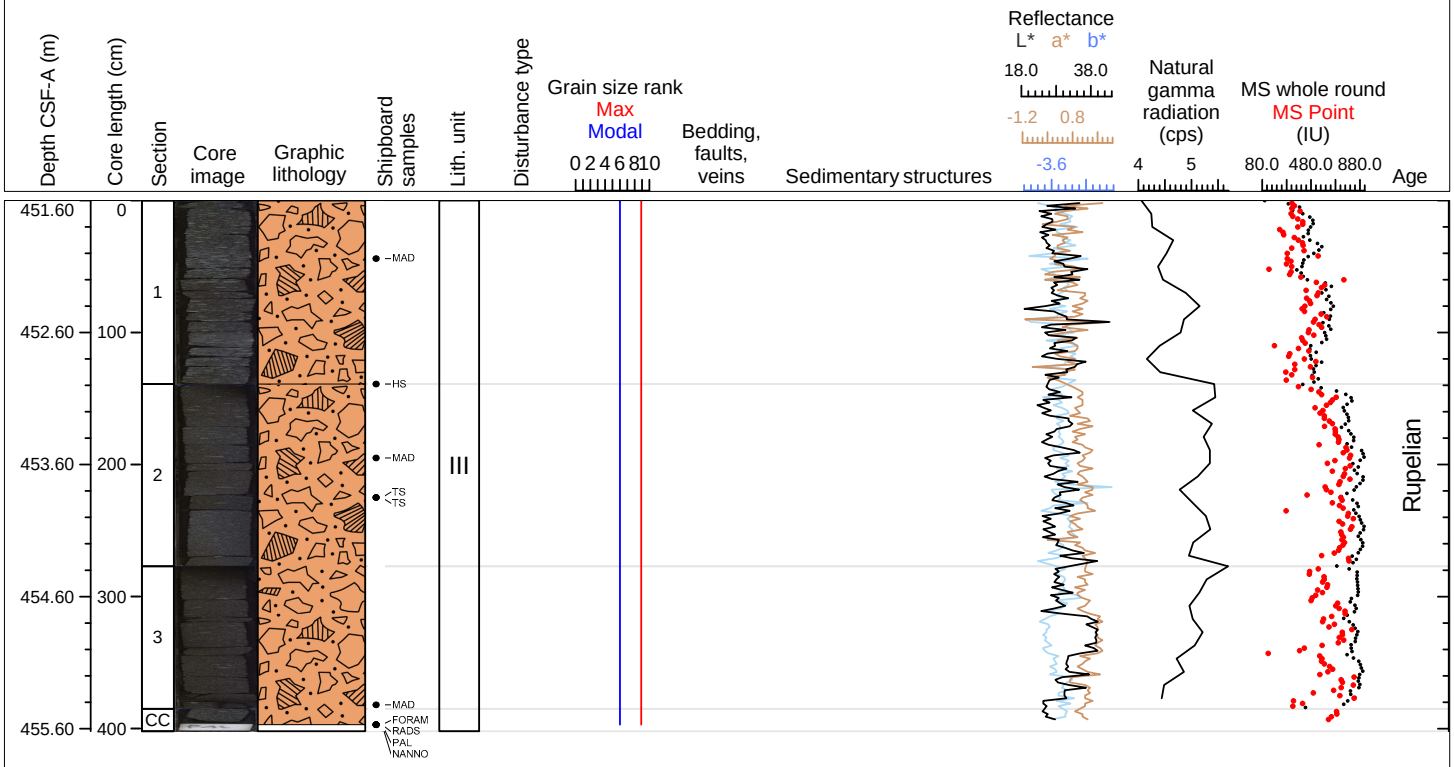
Hole 351-U1438D Core 26R, Interval 441.9-450.73 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE, TUFFACEOUS, TUFFACEOUS BRECCIA-CONGLOMERATE: Core 26R consists of alternating intervals of: 1) multiple upward fining sequences of grayish green (10G 4/2) laminated tuffaceous sand- and siltstones and moderately to strongly bioturbated tuffaceous mudstone, and 2) a bluish gray (5B 5/1) tuffaceous, monomict breccia-conglomerate. Conglomerate intervals are found from Section 2, 9 cm to Section 3, 6 cm and Section 5, 65 cm to the bottom of the core. Clasts in the tuffaceous breccia-conglomerate are mainly blue-gray pumice, some with mafic crystals. Tuffaceous sand- to mudstone sequences have sharp lower boundaries and range in size from 10 to 90 cm. Drilling disturbance is slight.



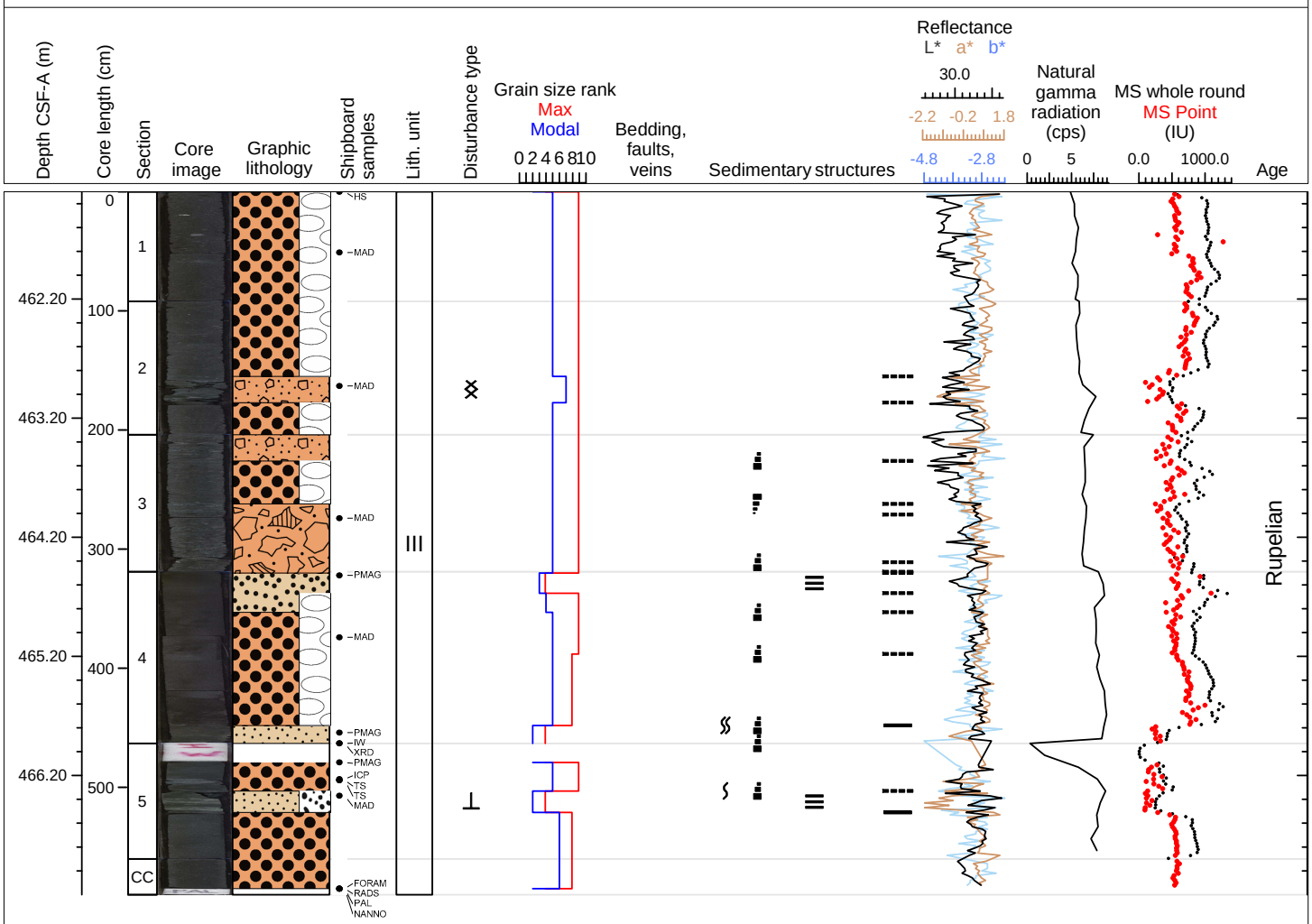
Hole 351-U1438D Core 27R, Interval 451.6-455.62 m (CSF-A)

TUFFACEOUS BRECCIA-CONGLOMERATE: Core 27R is built entirely of tuffaceous breccia-conglomerates. These are of grayish blue green (5BG 5/2) color in Section 1, 0-63 cm and from there dark gray (N3) for the rest of the core. The breccia-conglomerate contains abundant clasts with sizes up to 35 mm for the pumices and 25 mm for the silt/sandstone clasts. The clasts are mostly rounded pumice with gray-green color, angular reddish (altered) scoria clasts and/or dark green to gray-black sandstone/siltstone fragments- all surrounded by darker gray- black matrix of the same material plus individual crystals (up to 5 mm in size). The interval in Section 1, 6-62 cm is moderately well sorted, with the remaining of the core showing poor sorting. No bioturbation is visible. The only part that experienced moderate drilling disturbance is Section 3, 96-100 cm.



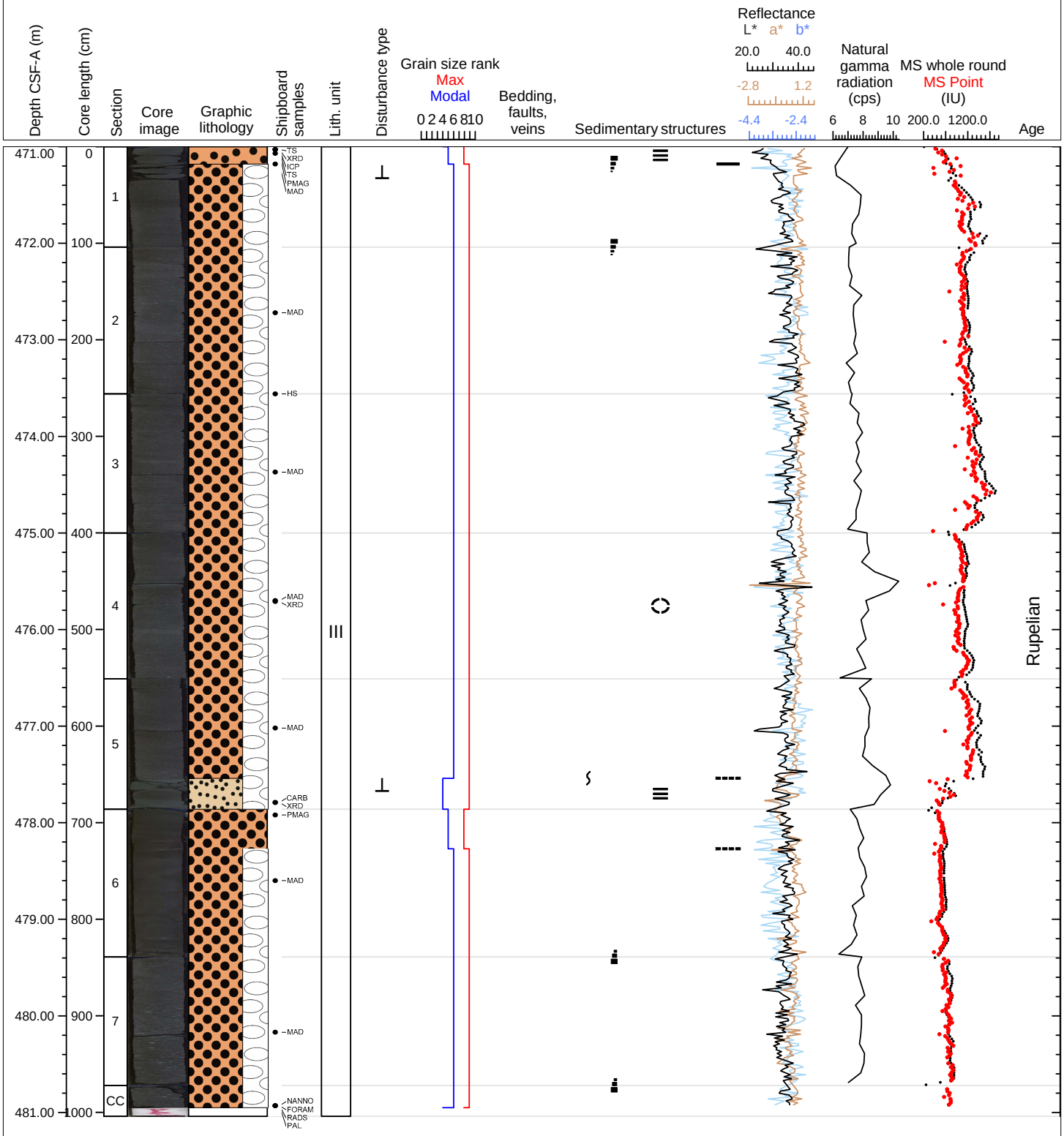
Hole 351-U1438D Core 28R, Interval 461.3-467.2 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE, TUFFACEOUS BRECCIA-CONGLOMERATE, TUFFACEOUS FINE SANDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS CONGLOMERATE: Core 28R is dominated by grayish black (N2) coarse grained lithologies such as tuffaceous clast-supported polymict conglomerates and breccia-conglomerates and tuffaceous medium to coarse sandstones with gravel. Tuffaceous fine sand- and siltstones are intercalated and dark greenish gray (5G 4/1). Slight to moderate bioturbation is limited to the siltstone layers in Section 4 and 5. Drilling disturbance is slight (fracturing in Section 5) to moderate (brecciation in Section 2).



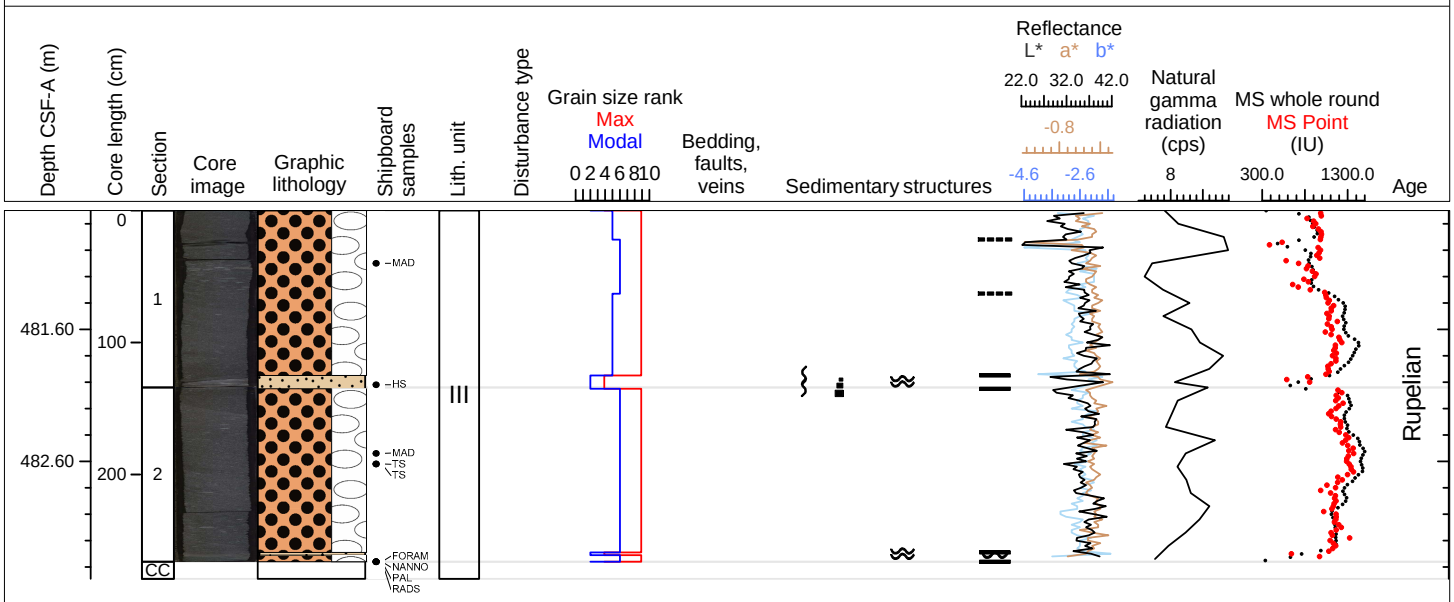
Hole 351-U1438D Core 29R, Interval 471.0-481.04 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE (WITH GRAVEL), TUFFACEOUS SANDSTONE, TUFFACEOUS FINE SANDSTONE (WITH GRAVEL): Core 29R, Sections 1-4 are dominated by medium dark gray (N4) tuffaceous medium to coarse sandstone with gravel, with minor transitions to dusky blue green (5BG 3/1) tuffaceous sandstone and grayish blue green (5BG 5/2) fine sandstone with gravel. They are generally poorly sorted, lack grading and have no sediment structures. Some are reversely graded. They contain pebbles up to 10 mm, and Section 4 contains a single mudstone intraclast (wider than the core diameter). These lithologies transition into dark greenish gray (5G 4/1) tuffaceous medium to coarse sandstones that contain pebbles up to 20 mm and are normally graded. No bioturbation is present and the drilling disturbance is slight and characterized by fracturing.



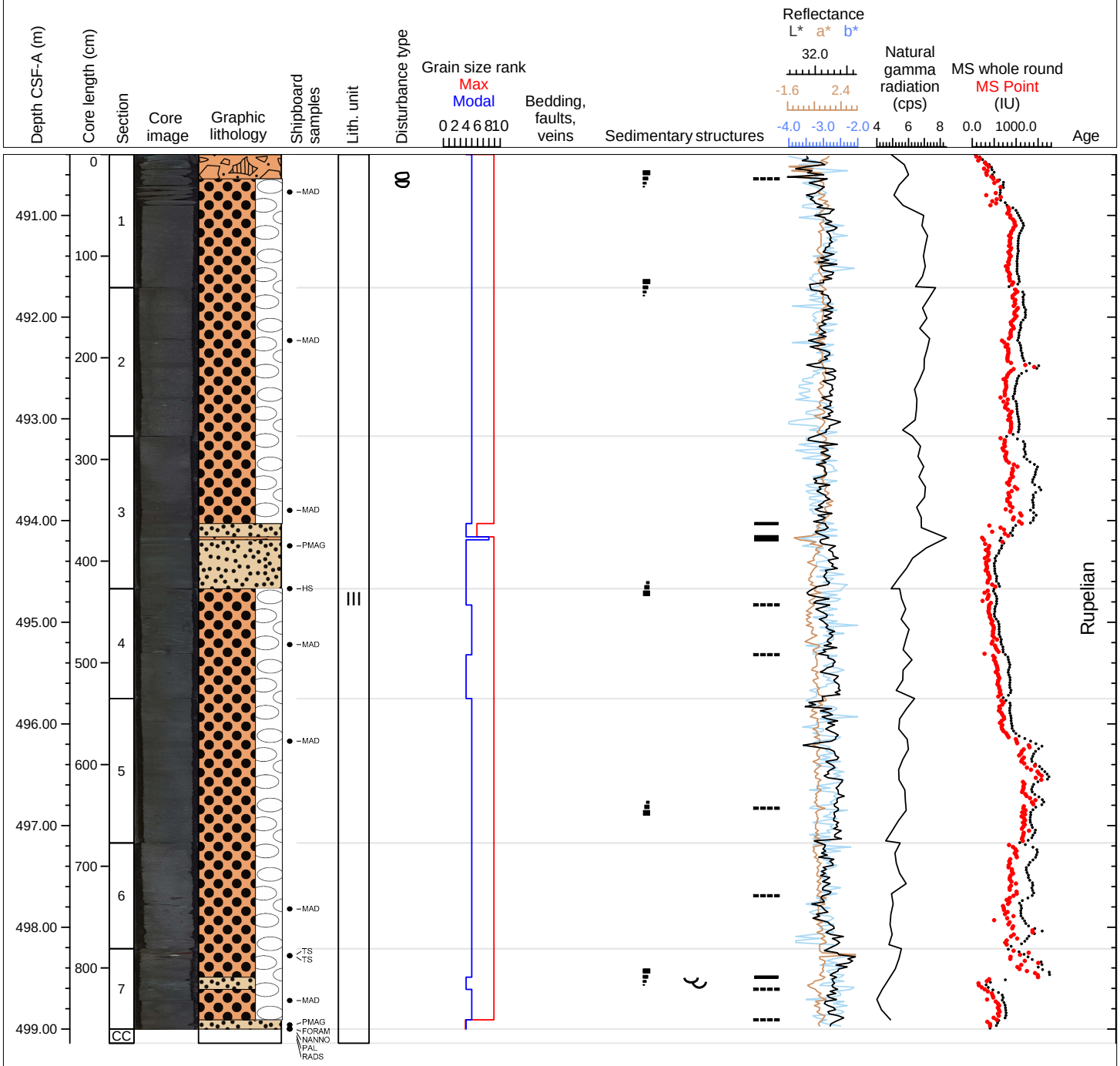
Hole 351-U1438D Core 30R, Interval 480.7-483.49 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE (WITH GRAVEL), TUFFACEOUS SILTSTONE: Core 30R is dominated by grayish black (N2) tuffaceous medium- to coarse-grained sandstone with gravel, interspersed with cm- to dm-thick layers of grayish black (N2) tuffaceous medium to coarse sandstone with gravel, and dark gray (N3) tuffaceous siltstone. They are poorly sorted, lack grading and have no sediment structures. They contain pebbles up to 20 mm, and Section 2 contains a dark pebble with framboidal sulfides. There is slight bioturbation in the siltstone, but otherwise Core 30R lack bioturbation. Drilling disturbances are absent.



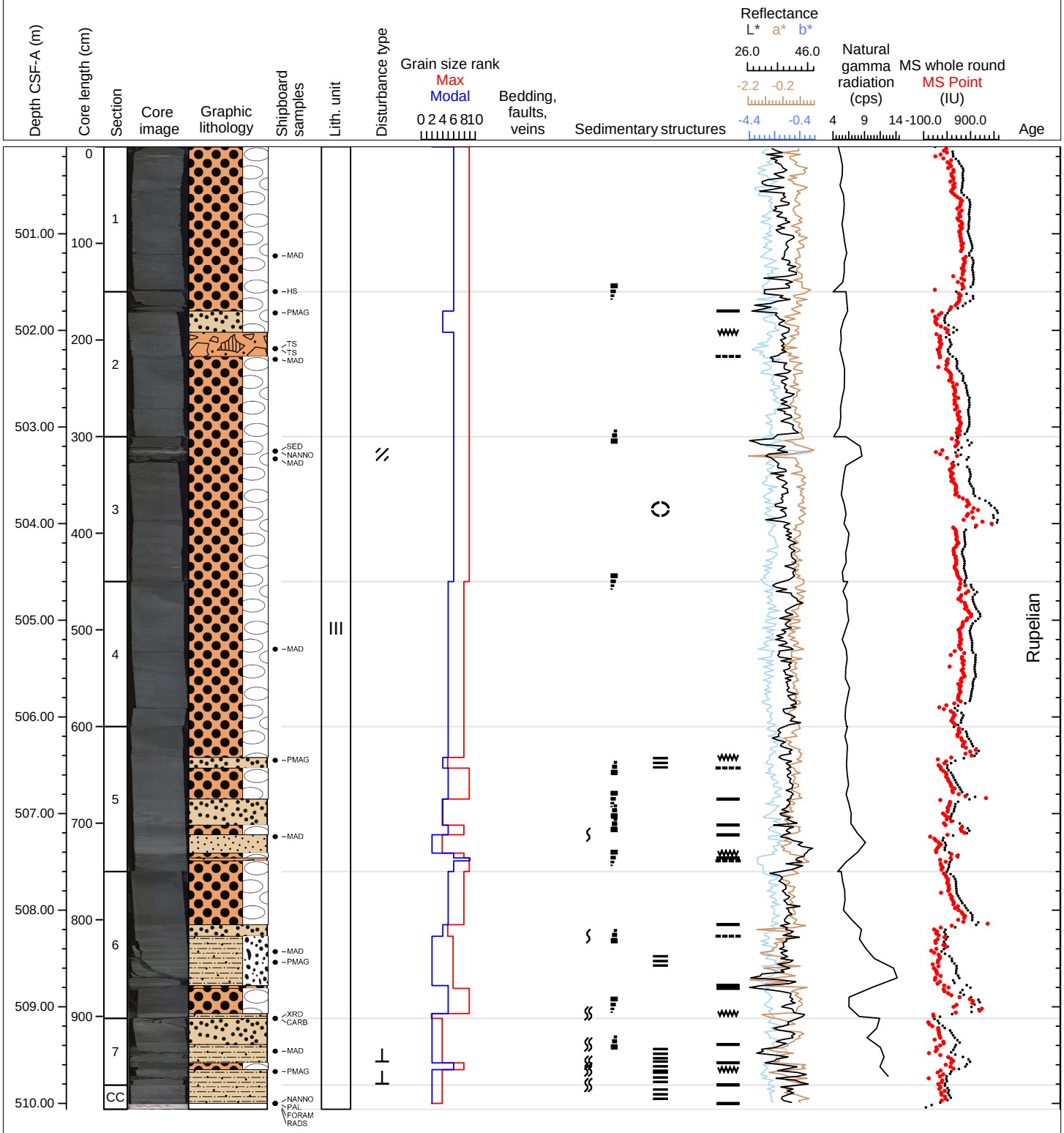
Hole 351-U1438D Core 31R, Interval 490.4-499.14 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE (WITH GRAVEL), TUFFACEOUS FINE SANDSTONE (WITH GRAVEL), TUFFACEOUS BRECCIA-CONGLOMERATE: dark gray (N3) to dark greenish gray (5GY 4/1) tuffaceous matrix-supported polymict medium to coarse sandstones with variable contents of pebble-sized volcanic components are dominant in 31R. These massive intervals are separated by a few up to several dm-thick layers of tuffaceous fine sandstone (sometimes containing pebbles) and dusky blue green (5BG 3/2) tuffaceous matrix-supported breccia-conglomerate. The fine sandstones are grading into medium- to coarse sandstones. No drilling disturbance or bioturbation is present.



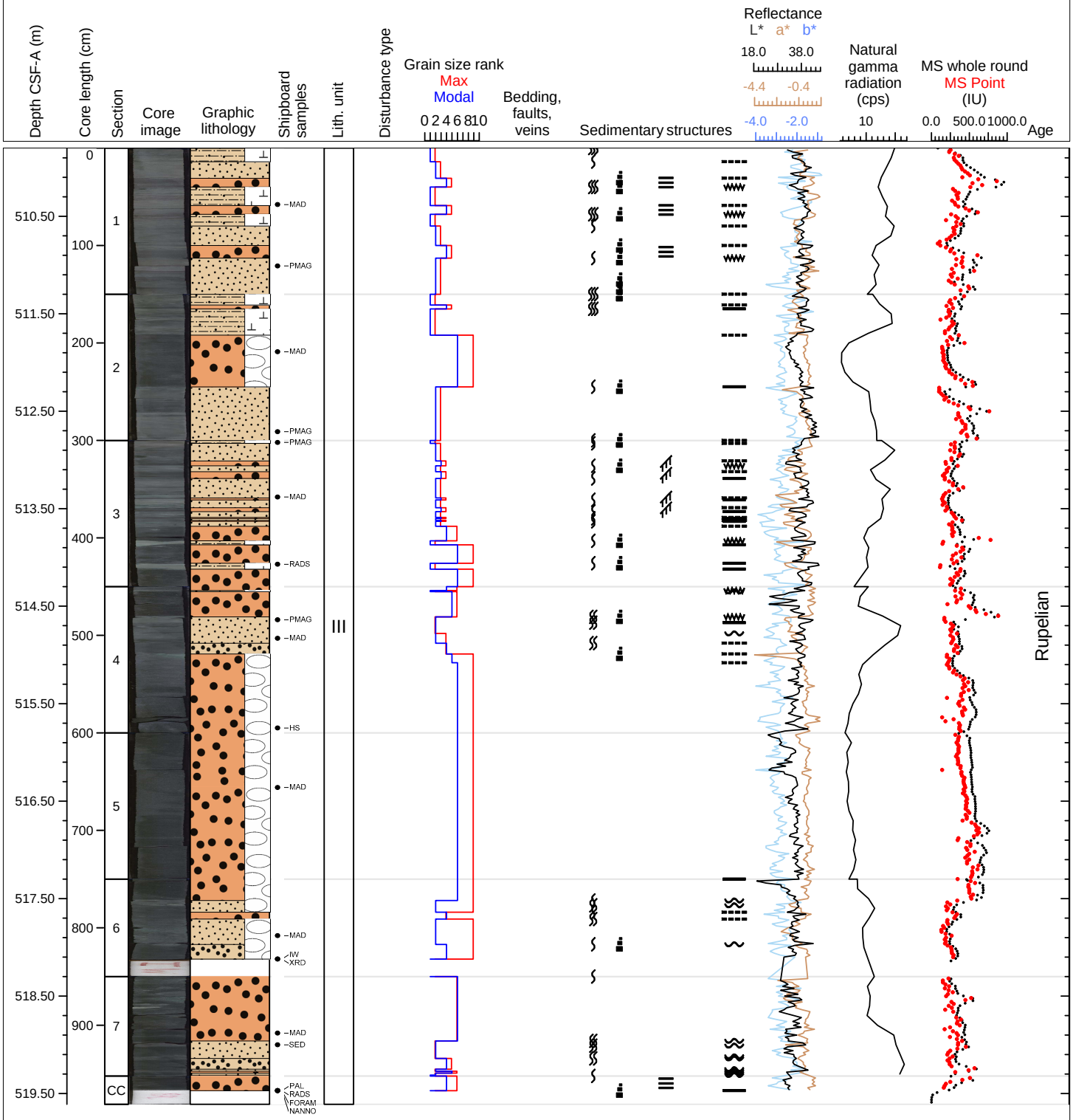
Hole 351-U1438D Core 32R, Interval 500.1-510.06 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE WITH GRAVEL, TUFFACEOUS FINE SANDSTONE, TUFFACEOUS MUDSTONE, TUFFACEOUS BRECCIA-CONGLOMERATE, TUFFACEOUS SILTSTONE: The lithologies in Core 32R are all of greenish gray colors (e.g. 5G 6/1, 5B 5/1, 5BG 5/1). Coarse grained lithologies (tuffaceous clast-supported polymict breccia-conglomerate and tuffaceous medium to coarse sandstones with gravel) are dominant but also tuffaceous fine sand-, silt- and mudstones are present. Grading is normal and reverse and some planar lamination can be found in Section 7. Some intervals of Core 32R are affected by moderate fragmenting and fracturing during drilling.



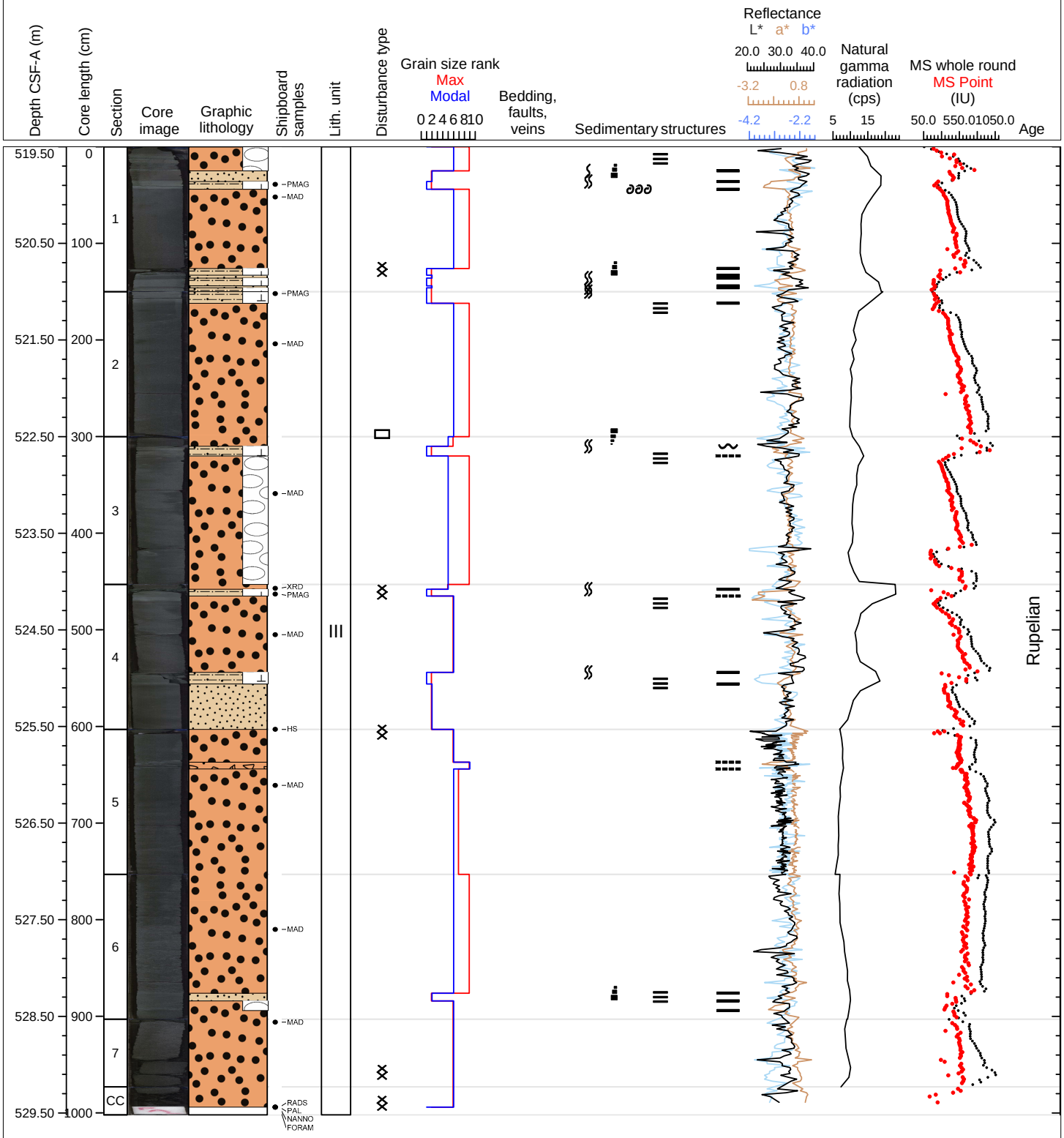
Hole 351-U1438D Core 33R, Interval 509.8-519.61 m (CSF-A)

TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE: Core 33R consists of finely interbedded intervals of greenish black (5GY 2/1) to greenish gray (5G 6/1) tuffaceous silt-, sand- and mudstones. Sections 1-3 are dominated by silt- and mudstones. The mudstones contain nannofossils and are moderately to strongly bioturbated. Siltstone intervals show parallel lamination and are normally graded. In Sections 4-7, the lithology shifts to siltstones and moderately sorted sandstones which contain occasional pebble-sized clasts of pumice and lithic fragments. Drilling disturbance is slight.



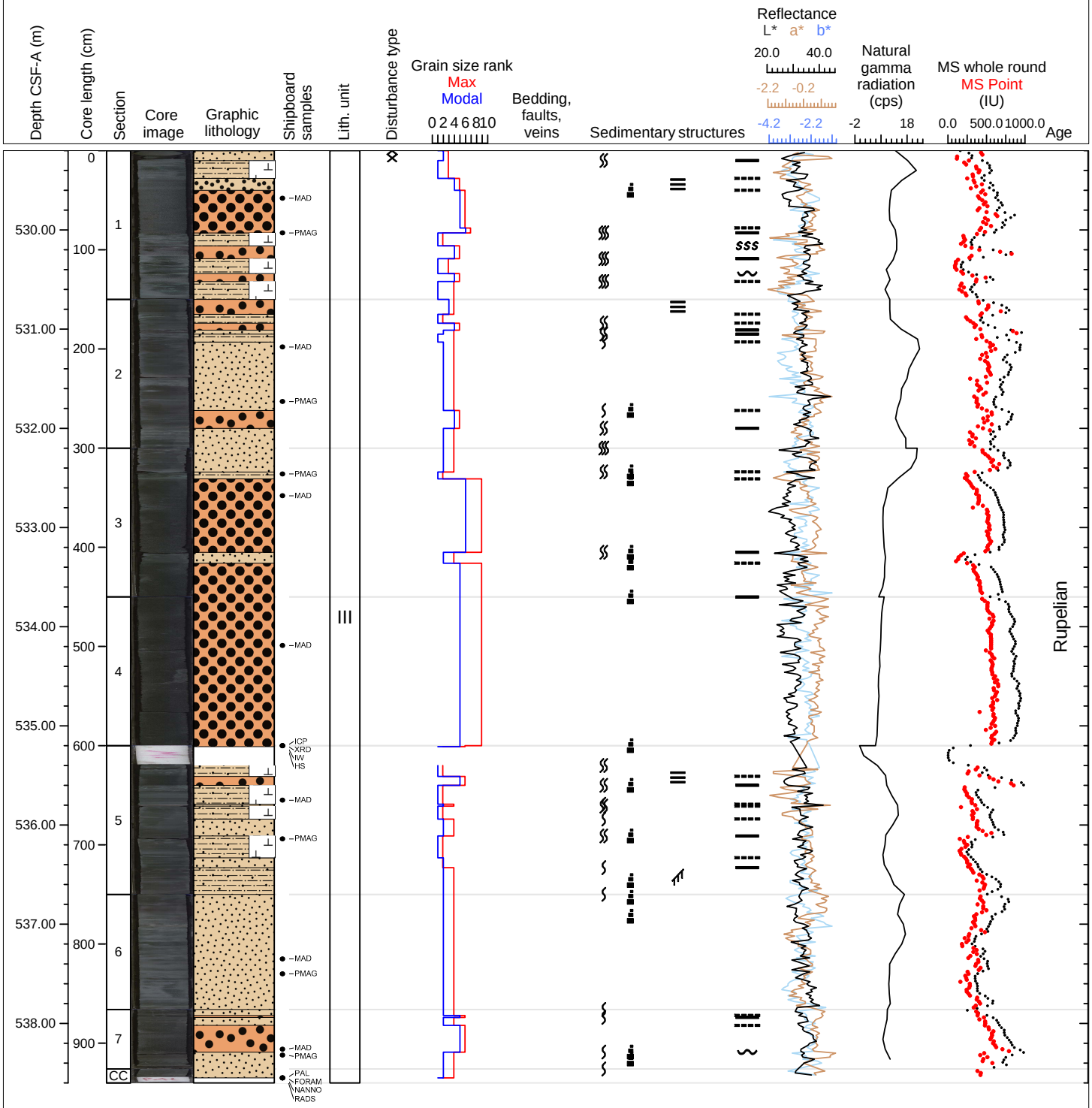
Hole 351-U1438D Core 34R, Interval 519.5-529.52 m (CSF-A)

TUFFACEOUS SANDSTONES, TUFFACEOUS SILTSTONES, TUFFACEOUS MUDSTONES WITH NANNOFOSSILS: Core 34R contains mostly normally graded greenish black (5G 2/1) tuffaceous sandstones and dark gray (N3) siltstones interbedded with grayish green (10G 4/2) tuffaceous muds with nannofossils. The tuffaceous muds are in sharp contact to the sandstones and siltstones. The sandstone layers contain pebble-rich intervals with clasts up to 13 mm. The clasts are mostly pumice, red scoria lithic clasts or sand-/siltstone. Sand- and siltstones are not bioturbated, whereas the majority of the tuffaceous muds are moderately bioturbated. Drilling disturbance is slight to absent.



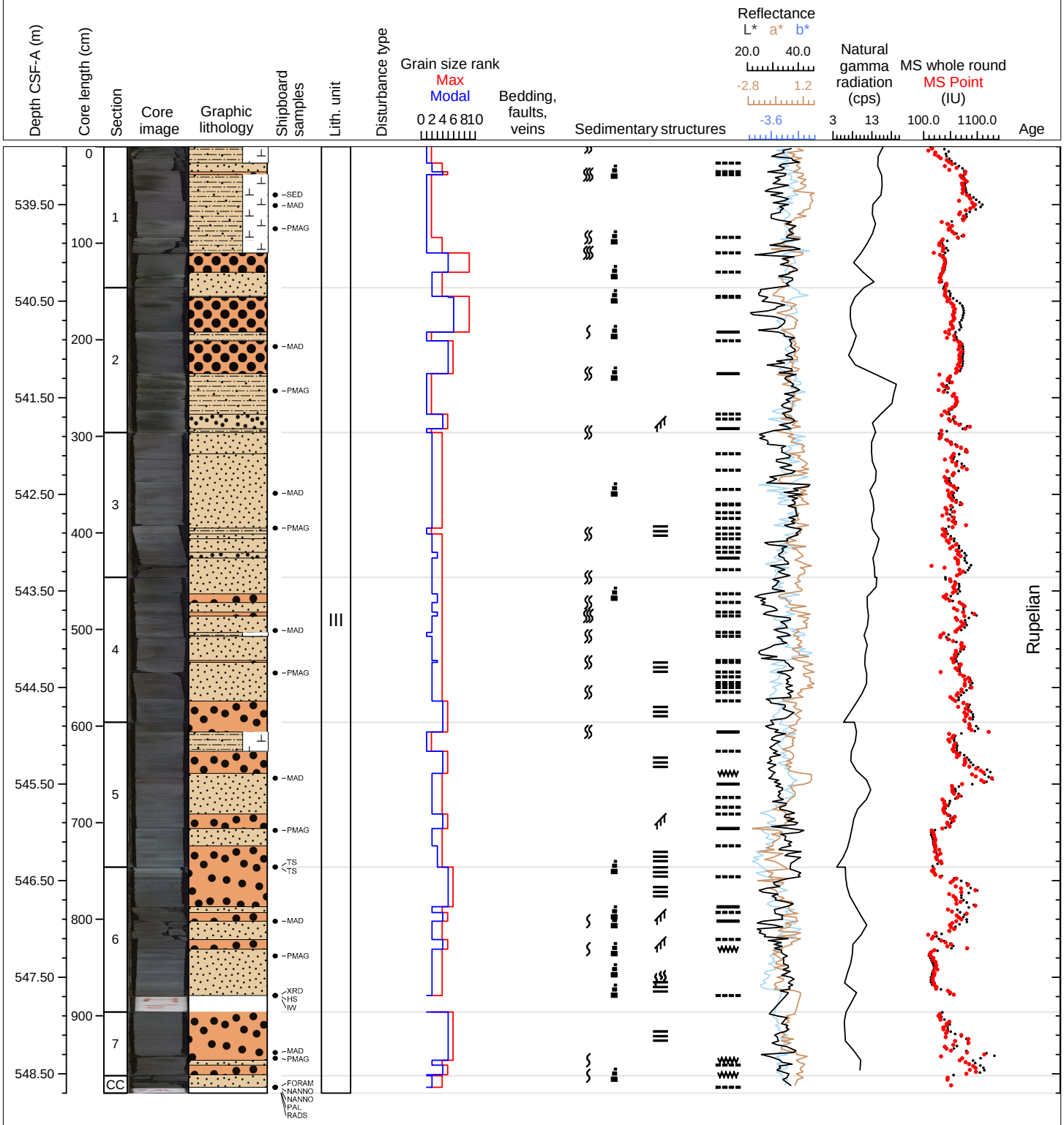
Hole 351-U1438D Core 35R, Interval 529.2-538.6 m (CSF-A)

TUFFACEOUS SANDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS MUDSTONE WITH NANNOFOSSILS, TUFF: Core 35R is dominated by dark gray (N3) to dark greenish gray (5GY 4/1) tuffaceous siltstone and mudstone. The fine lithologies are strongly bioturbated. The coarser lithologies are normally graded. Fluid escape structures and clastic dykes are present in the middle of the core. Small (1 cm) layers of slightly more gray color (GY 6/1) in the middle of the core are indurated ash layers (tuffs). No drilling disturbance is present.



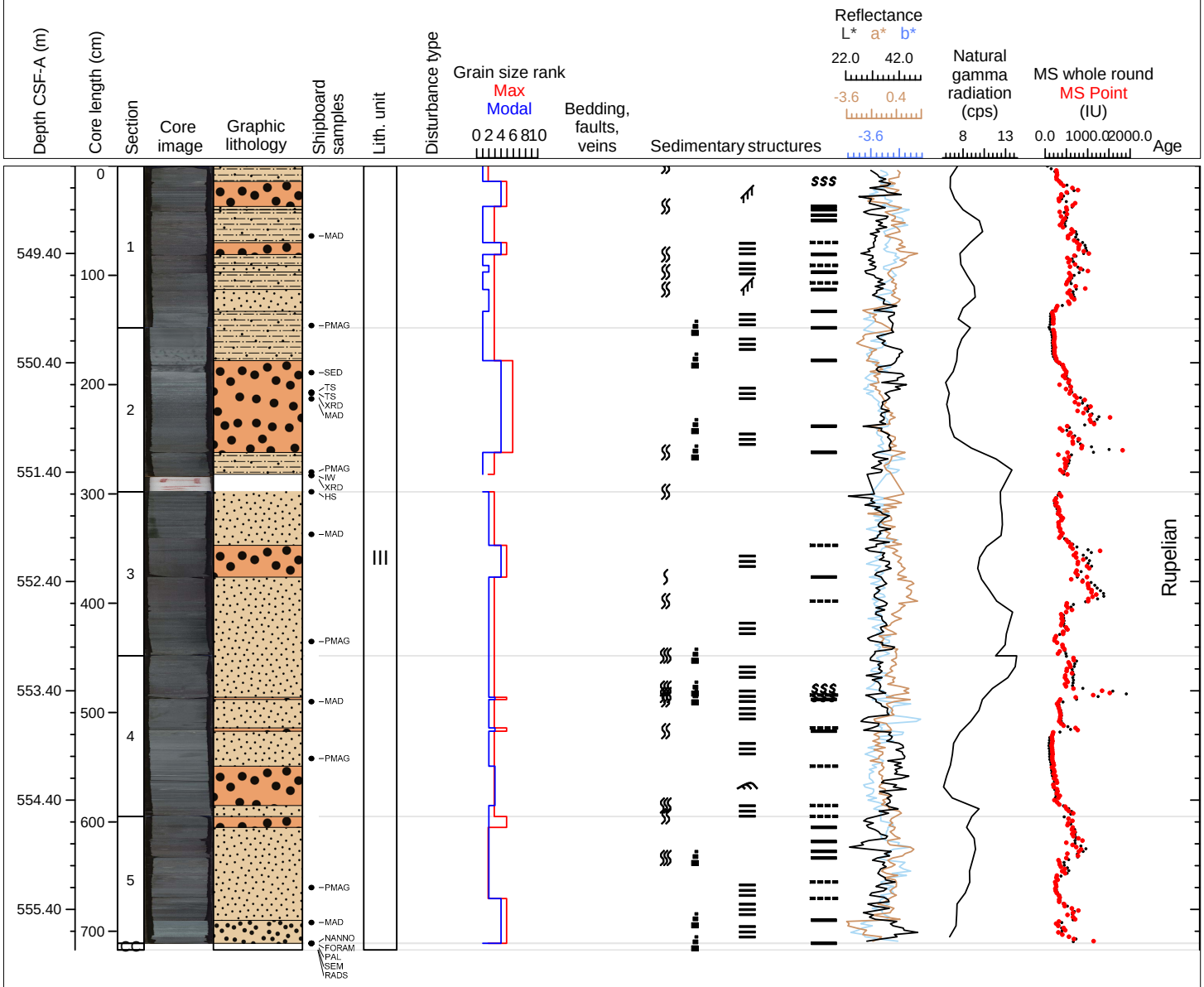
Hole 351-U1438D Core 36R, Interval 538.9-548.7 m (CSF-A)

TUFFACEOUS SANDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS MUDSTONE: Core 36R is dominated by dark gray (N3) to dark greenish gray (5GY 4/1) tuffaceous siltstones and mudstones. The fine lithologies are strongly bioturbated. The coarser lithologies are normally graded. Some of the sandstones have cross bedded intervals. Core 36R has a fine, glass-rich homogeneous mudstone interval at the top (50 cm thick). Very minor drilling disturbance is present.



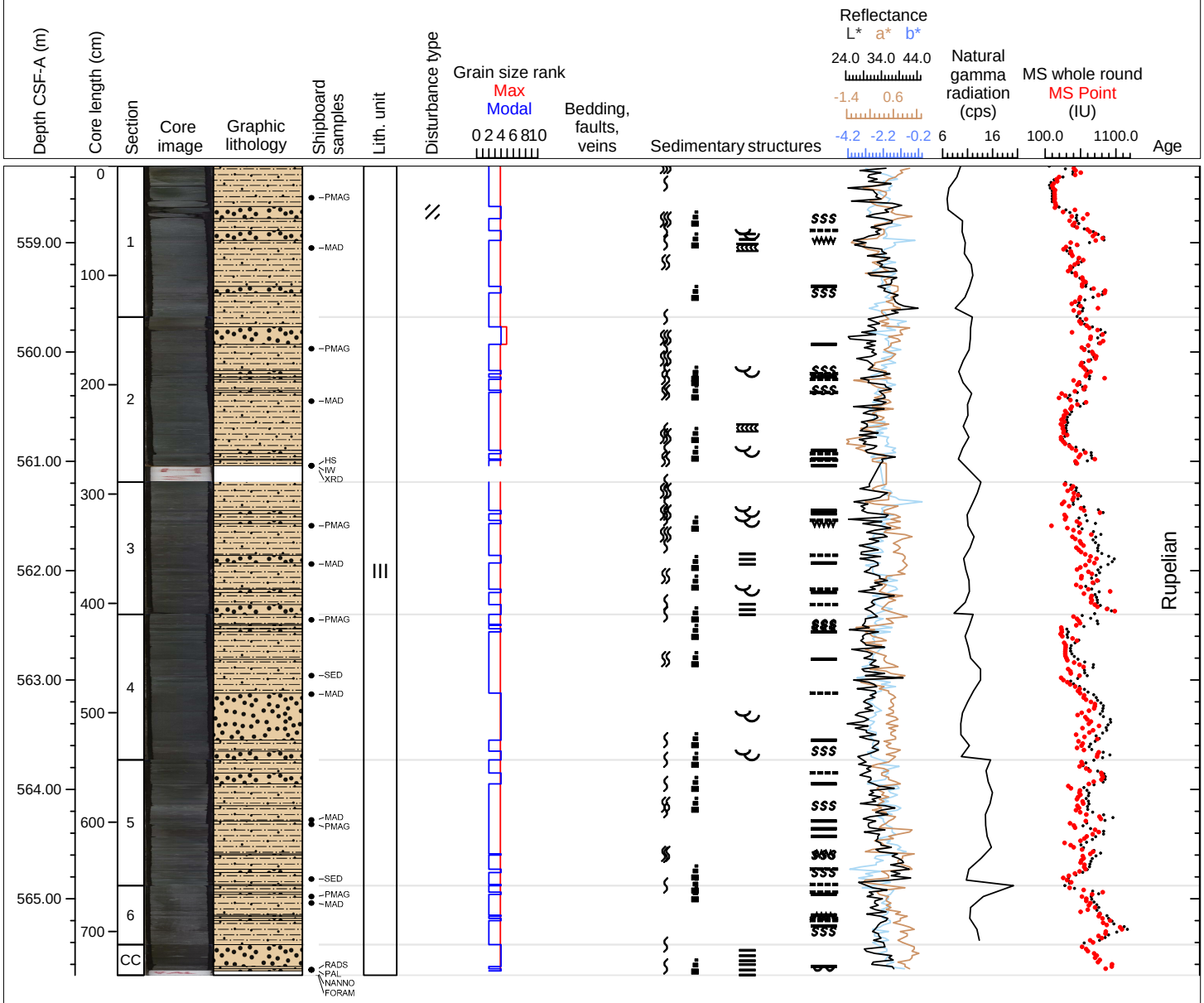
Hole 351-U1438D Core 37R, Interval 548.6-555.77 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE: Core 37R contains numerous small (10-60 cm) intervals of dark green gray (N3) to greenish gray (5G 6/1) tuffaceous mudstones through sandstones. Many intervals are normally graded with sharp lower contacts and strongly bioturbated mudstone tops. The core contains numerous sedimentary structures, such as parallel and cross lamination and ripple marks in coarser layers and fluid escape structures (Section 2, 20-40 cm). Drilling disturbance is minor except for the base of Section 3.



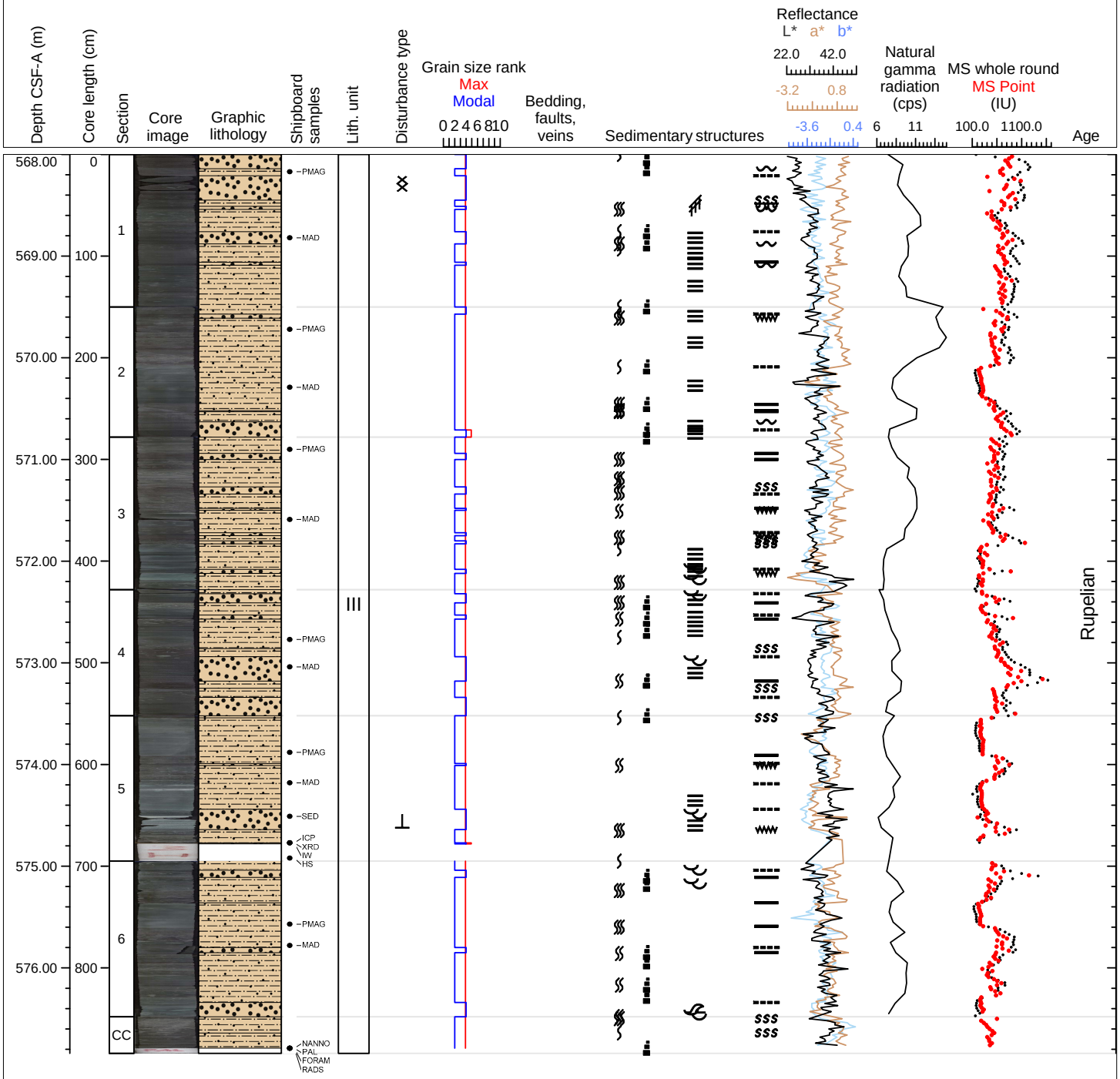
Hole 351-U1438D Core 38R, Interval 558.3-565.7 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SANDSTONE: Core 38R is dominated by dark greenish gray (5G 4/1) tuffaceous mudstones with intercalated beds of greenish black (5G 2/1) tuffaceous fine sandstone layers. The mudstones show slight to moderate bioturbation, including Zoophycus trace fossils. The fine sandstones show cross bedding and planar laminations and are not bioturbated. Normal grading and fining upward cycles are common with sharp or scoured contacts at the bottom of each cycle and bioturbated/gradational contacts within. Drilling disturbance is limited to severe fragmenting in Section 1, 37-47 cm.



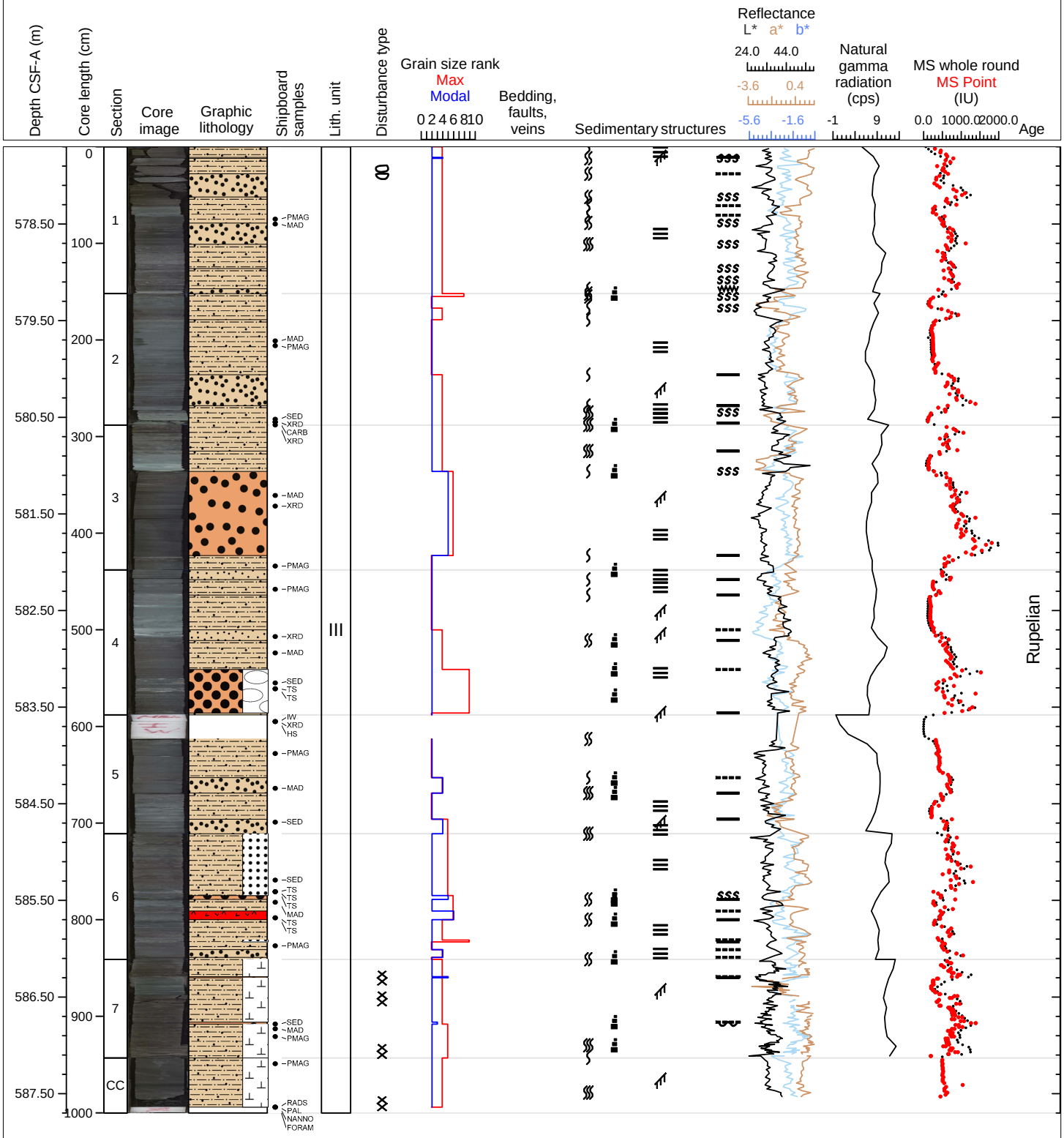
Hole 351-U1438D Core 39R, Interval 568.0-576.84 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS FINE SANDSTONE: Core 39R is essentially a progression of Core 38R. Dark greenish gray (5G 4/1) tuffaceous mudstones are dominant and dark gray (N3) tuffaceous fine sandstones are intercalated. Biotubation is most prominent in the upper portions of each mudstone layer. Sedimentary structures like, planar lamination, cross bedding and fining upward cycles are common. Contacts are planar and sharp/scoured at the base of each cycle and gradational/bioturbated within. Drilling disturbance is minor and limited to two short intervals in Sections 1 and 5.



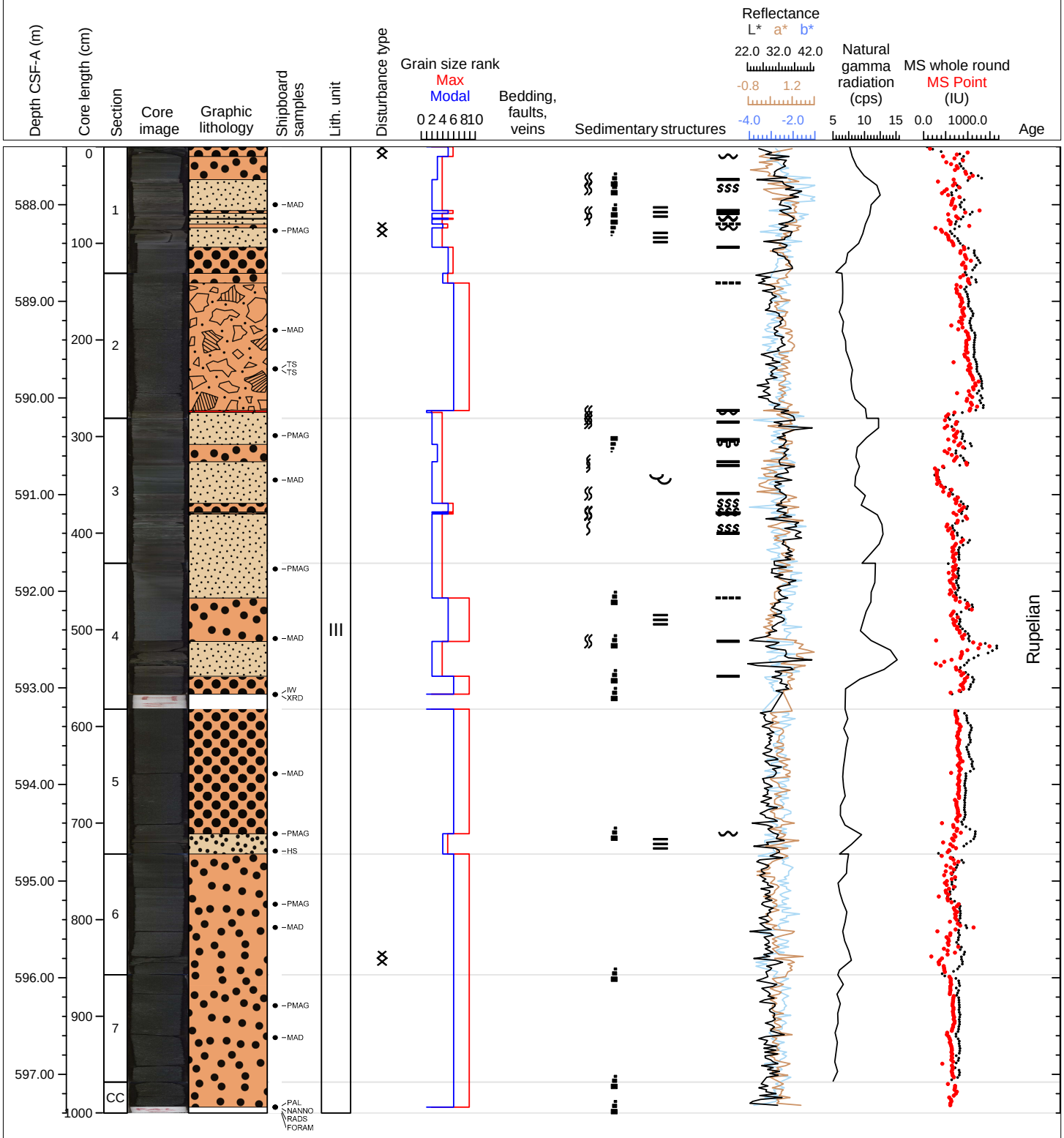
Hole 351-U1438D Core 40R, Interval 577.7-587.7 m (CSF-A)

TUFFACEOUS SANDSTONE, TUFFACEOUS MUDSTONE WITH NANNOFOSSILS: Core 40R contains frequently planar- and cross-laminated dark greenish gray (5G 4/1) tuffaceous sandstones intercalated with grayish blue green (5GB 5/2) tuffaceous mudstones with nannofossils. Medium to coarse sandstones with gravel in Section 4, 103-148 cm contain pebble size carbonate (white) and volcanic (pink) clasts. The tuffaceous mudstones and the fine sandstones are moderately bioturbated. There is slight drilling disturbance on top and bottom of the core.



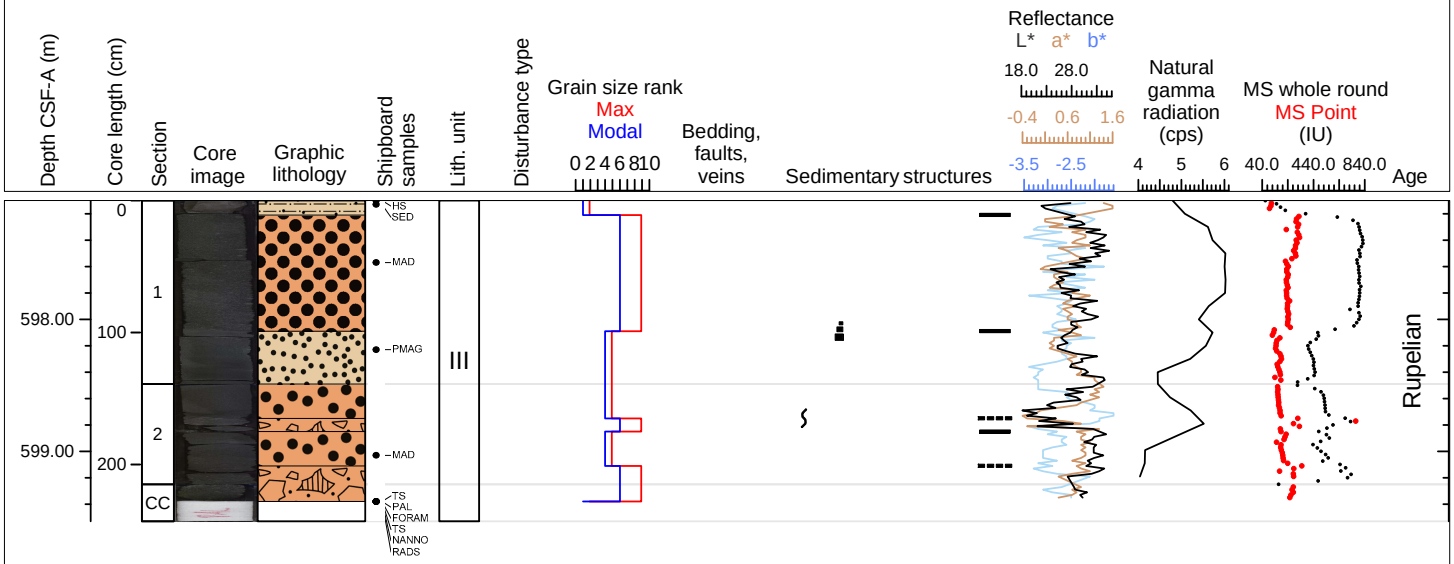
Hole 351-U1438D Core 41R, Interval 587.4-597.4 m (CSF-A)

This core contains a complex alternation of brownish gray (5YR 4/1) to dark greenish gray (5G 4/1) tuffaceous siltstones, greenish black (5G 2/1) to dusky green (5G 3/2) tuffaceous sandstones, and a horizon (almost the entire section 2) of dusky green (5G 3/2) volcanic breccia-conglomerate. Most of the sand and silt beds are normally graded (fining upwards) and/or laminated. The sorting of the sand and breccia- conglomerate layers is moderate to poor. Maximum sand particle sizes are pebbles and maximum clasts in the volcanic breccia conglomerates are up to 3 cm. Volcanic clasts include red (oxidized) scoria, lava flow (dark grey black) fragments and green- grey pumices. Moderate bioturbation of the siltstones is present throughout the core. The contacts between the siltstones and the sandstones can be either sharp and gradational, but are often bioturbated.



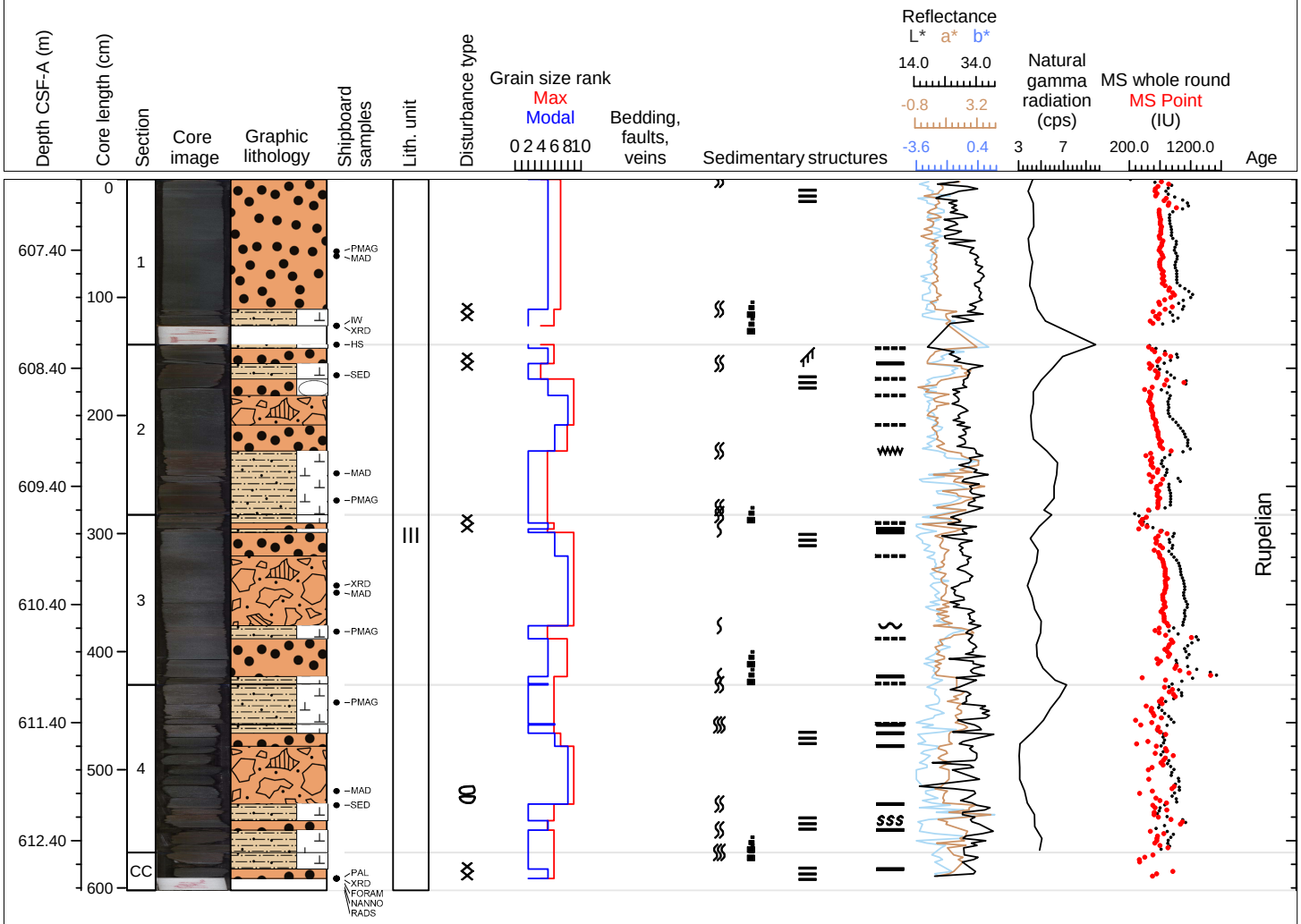
Hole 351-U1438D Core 42R, Interval 597.1-599.53 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SANDSTONE, TUFFACEOUS BRECCIA-CONGLOMERATE: Core 42R contains only 2 Sections that reflect alternation between brownish gray (5YR 4/1) tuffaceous mudstones, greenish black (5GY 2/1) volcanic breccia- conglomerates and grayish black (N2) tuffaceous sandstones. When not disturbed by drilling, the contacts between these rock types are irregular, gradational and inclined. No bioturbation was observed. The tuffaceous breccia-conglomerates contain lithic clasts of pumice, lavas, oxidized (red) scoria. The maximum size of clasts in the volcanic breccia-conglomerate is 47 mm but the majority of the clasts are 2-8 mm. Drilling disturbance includes moderate fracturing.



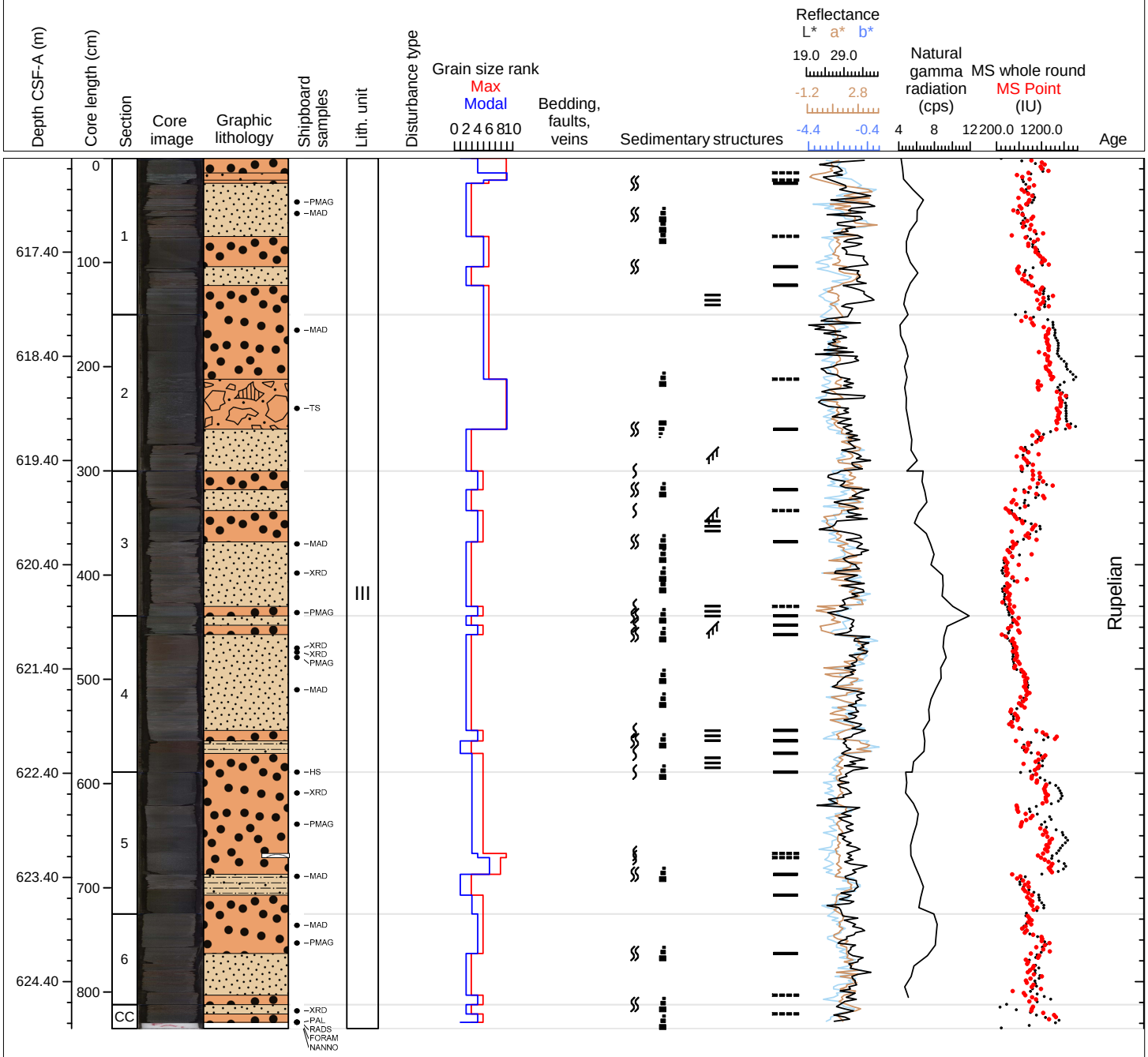
Hole 351-U1438D Core 43R, Interval 606.8-612.82 m (CSF-A)

TUFFACEOUS MUD, TUFFACEOUS SANDSTONES AND VOLCANIC BRECCIA-CONGLOMERATES This core consists of 4 sections (recovery was 62%) and extends 606.8 to 616.5 mbsf. Dark reddish brown (5YR 2.5/2) tuffaceous mudstones are interbedded with dark grayish green (5G 2/1) volcanic breccia-conglomerates and tuffaceous sandstones. The tuffaceous mudstones are moderately bioturbated. The volcanic breccia- conglomerates contain clasts of pumice, lavas, oxidized (red) scoria and are grading upward to tuffaceous sandstones with planer lamination. Section 4 consists of >10 pieces disturbed by drilling.



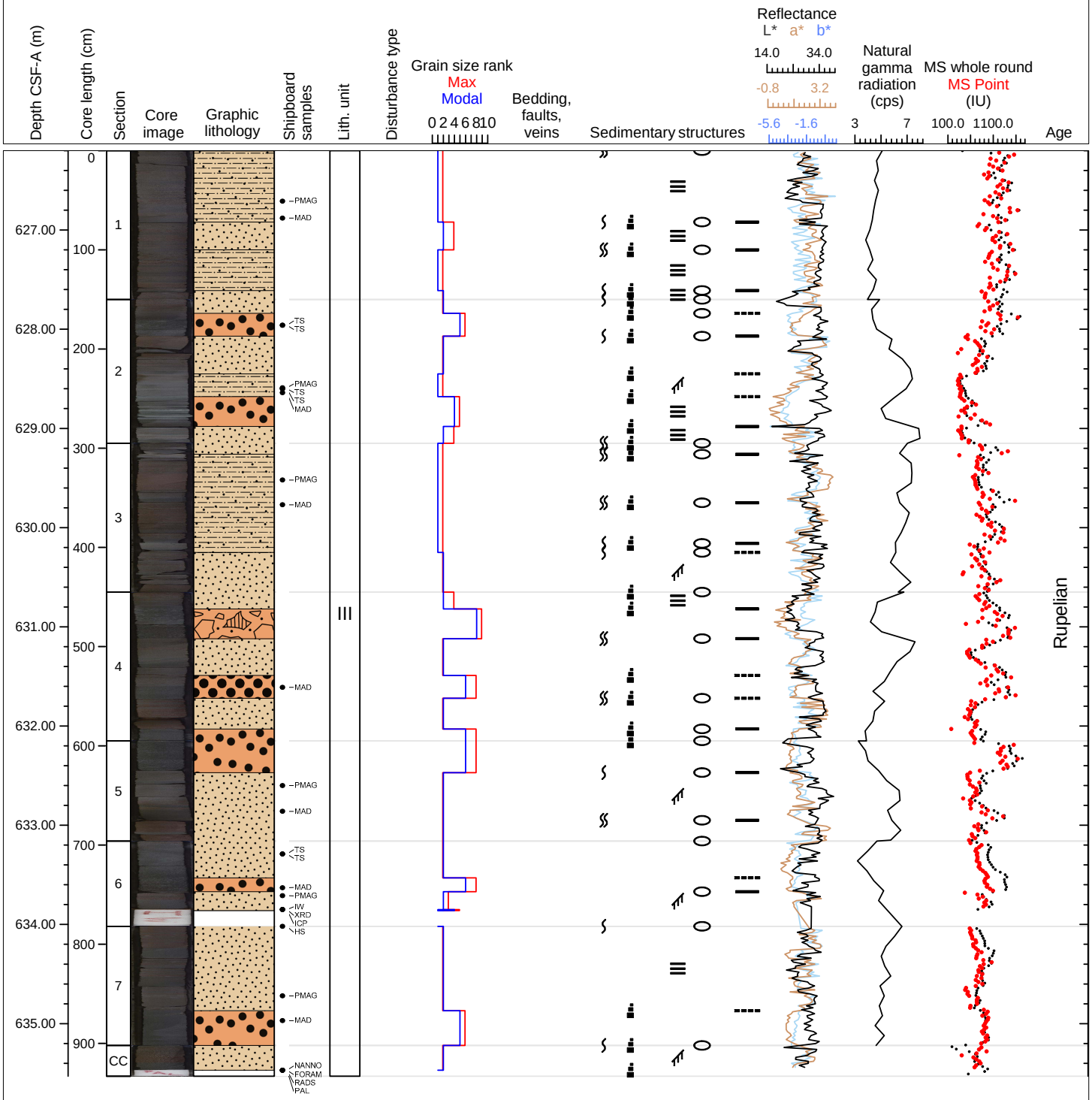
Hole 351-U1438D Core 44R, Interval 616.5-624.85 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SANDSTONE, TUFFACEOUS BRECCIA-CONGLOMERATE: Core 44R consists of grayish brown (5YR 3/2) tuffaceous mudstones interbedded with dark grayish green (5G 2/1) tuffaceous sandstones. Two intervals of tuffaceous clast-supported polymict breccia-conglomerate occur in Section 1 and 2. These breccia-conglomerates have a variety of clasts ranging in color, size and textures. The tuffaceous mudstones are much redder in color and contain small (up to 1 mm) black magnetic spheres/concretions. Bioturbation is restricted to the fine grained layers. No significant drilling disturbance has been observed.



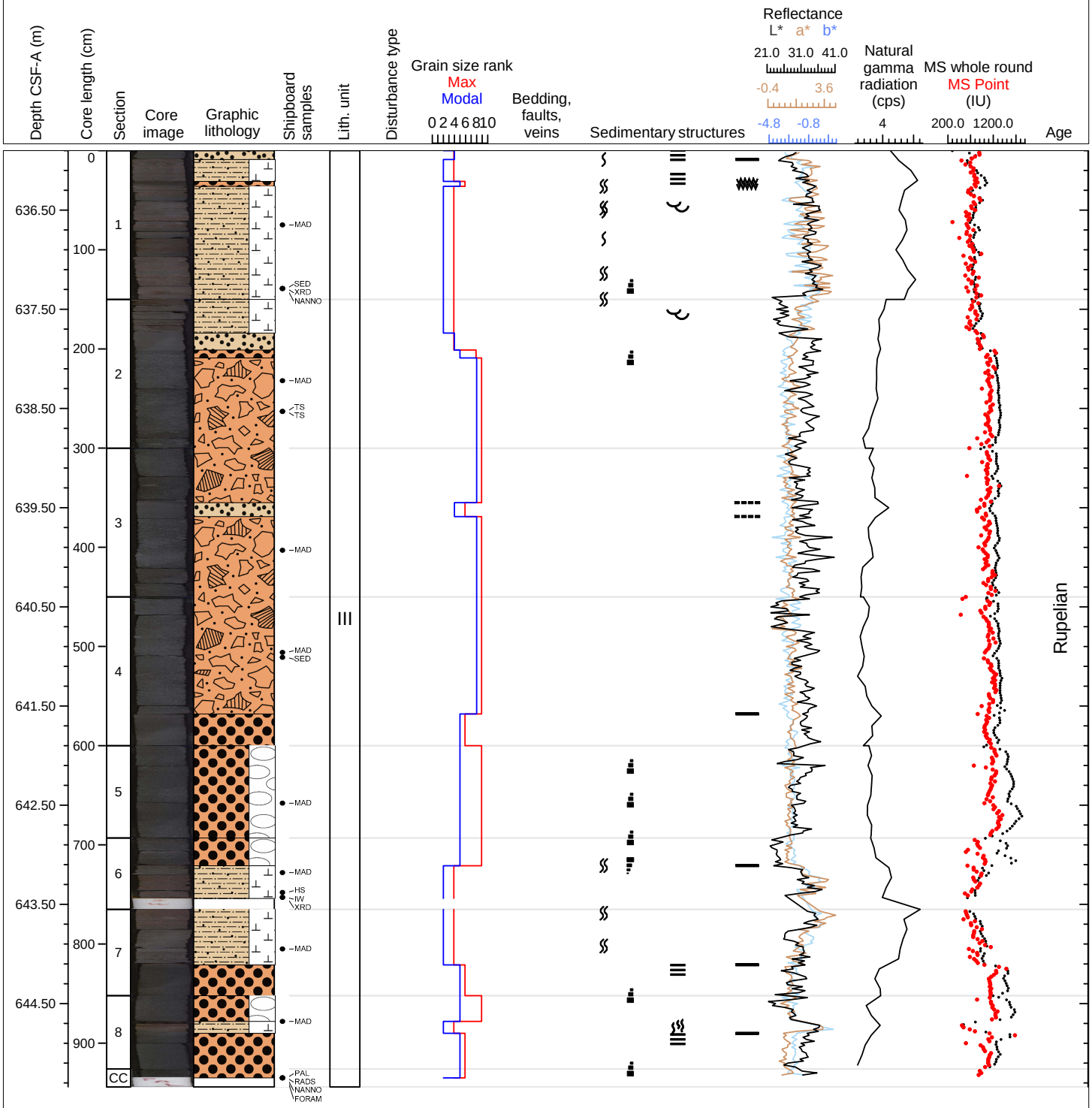
Hole 351-U1438D Core 45R, Interval 626.2-635.53 m (CSF-A)

TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE, TUFFACEOUS BRECCIA CONGLOMERATE: Core 45R consists of intercalated layers of tuffaceous mudstone/siltstone, sandstone, with one small layer of tuffaceous breccia-conglomerate in Section 4. The mudstone/siltstone intervals are banded (1-10 cm) with alternating brown gray (5YR 3/2) and dark gray (N3) colors. Brown layers are typically finer grained and more bioturbated while dark gray layers show cross and planar lamination. The sandstones are normally graded and the breccia-conglomerate is reversely graded. With the exception of a finely laminated sand- to mudstone interval in the lower part of Section 2, the entire core is characterized by dispersed small (1 mm) black concretions which contain magnetite and a white mineral. No significant drilling disturbance has been observed.



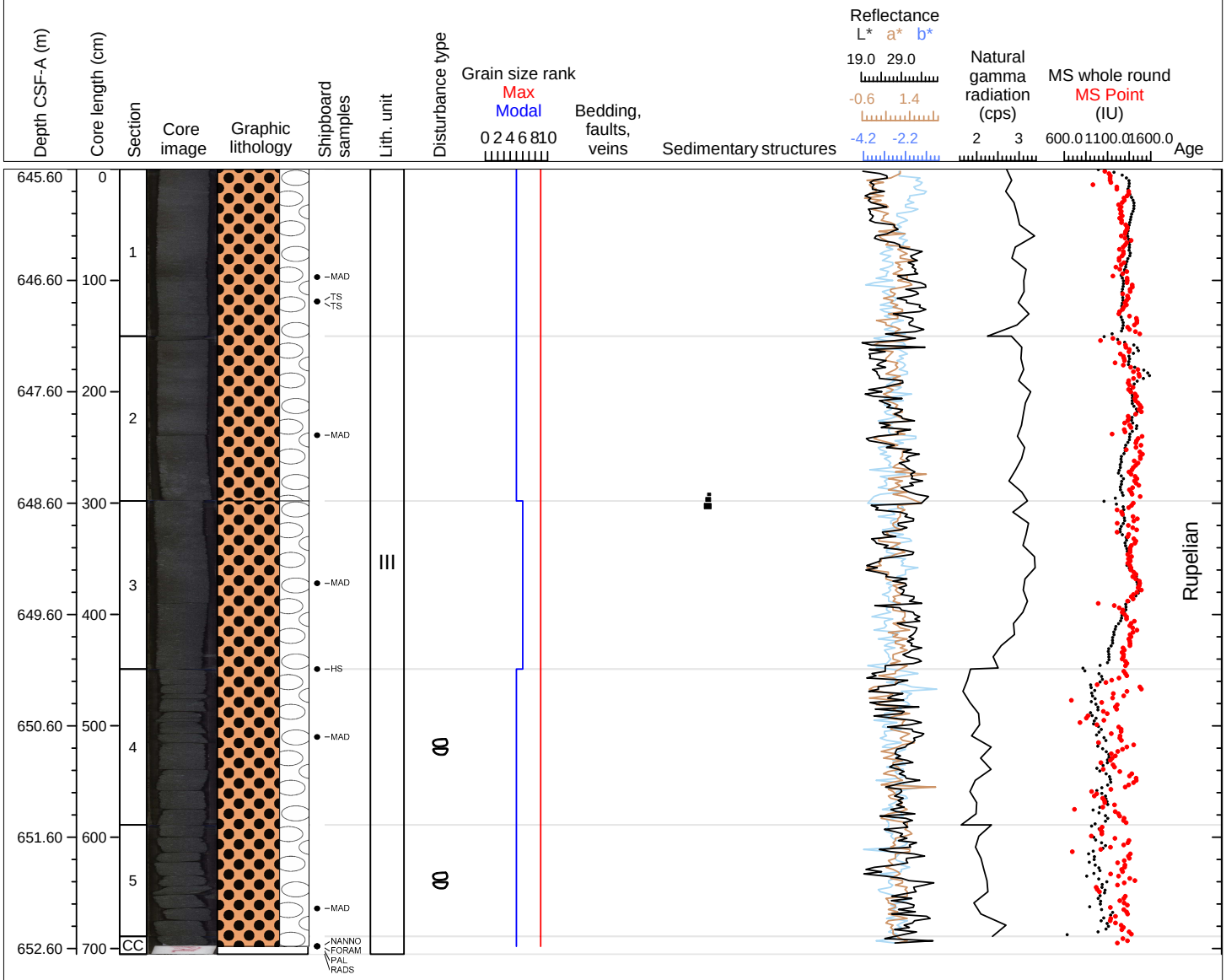
Hole 351-U1438D Core 46R, Interval 635.9-645.34 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE (WITH GRAVEL), TUFFACEOUS BRECCIA-CONGLOMERATE, TUFFACEOUS MUDSTONE WITH NANNOFOSSILS: Core 46R is composed of dusky yellowish brown (10YR 2/2) tuffaceous mudstone with nannofossils at the top, massive dark gray (N3) tuffaceous clast-supported polymictic breccia-conglomerate in the middle and dark gray (N3) tuffaceous medium to coarse sandstone (with gravel). The mudstones show slight to moderate bioturbation and are intercalated by mm- to cm-thick layers of more greenish tuffaceous fine sandstones. Micronodules are present in the mudstones as well. The tuffaceous medium to coarse sandstones are generally poorly sorted and graded. No significant drilling disturbance has been observed.



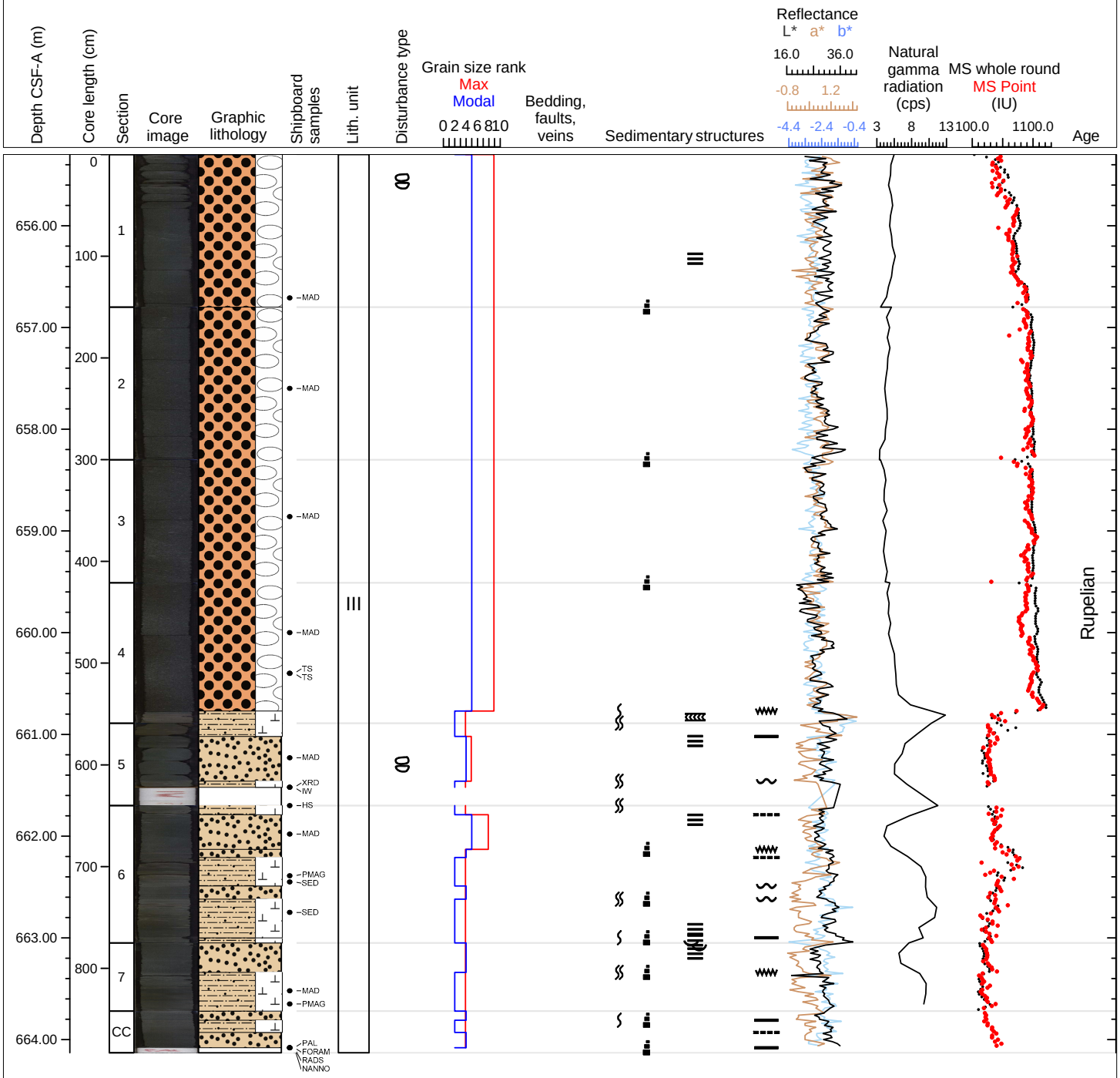
Hole 351-U1438D Core 47R, Interval 645.6-652.65 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE (WITH GRAVEL): Core 47R is composed completely of massive dark gray (N3) tuffaceous medium to coarse sandstone (with gravel). The tuffaceous medium to coarse sandstones are generally poorly sorted with no grading, although one ~120 cm long portion of Section 2 is normally graded. Sections 4 and 5 have moderate bisquiting drilling disturbances.



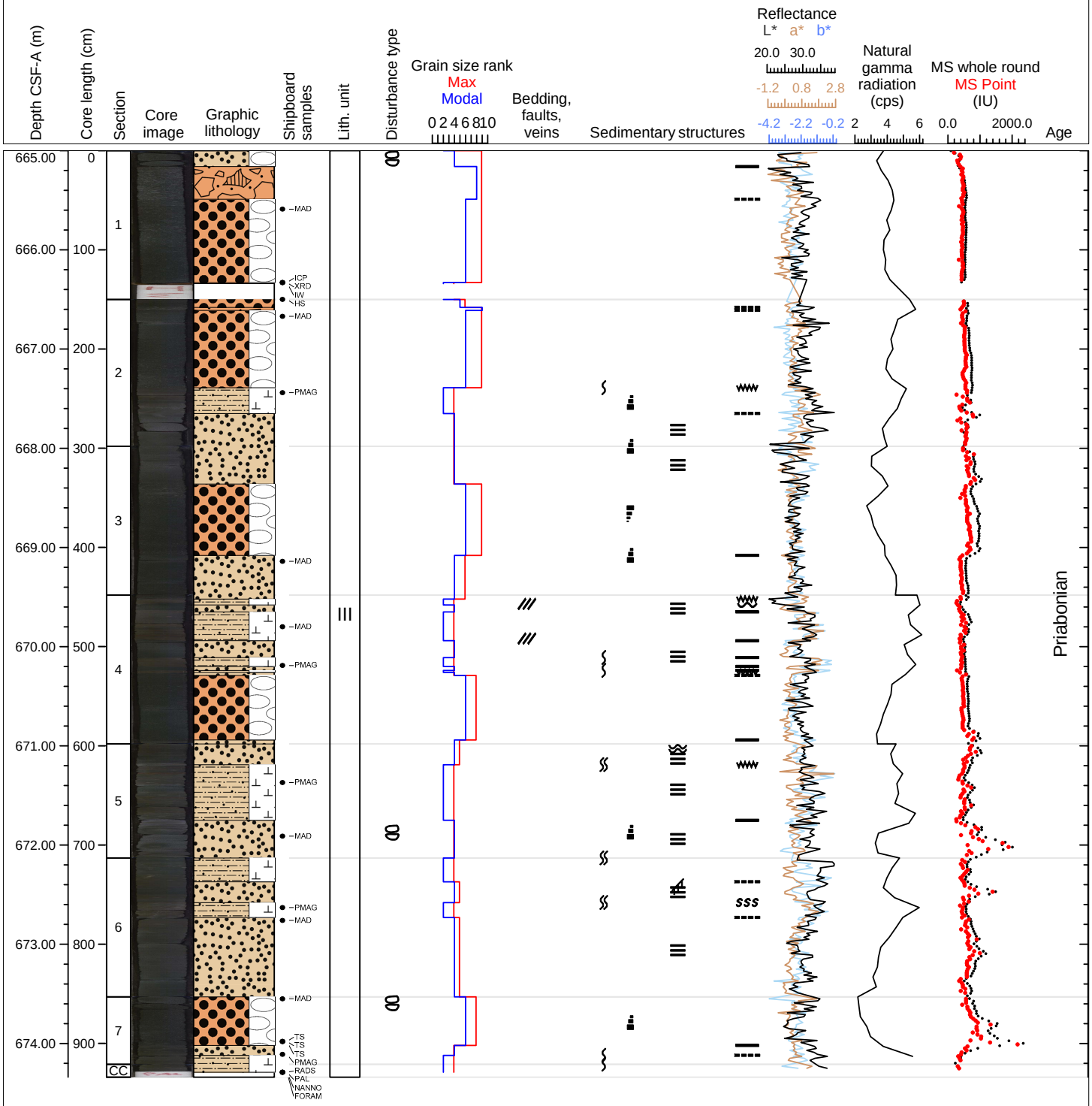
Hole 351-U1438D Core 48R, Interval 655.3-664.13 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE (WITH GRAVEL), TUFFACEOUS FINE SANDSTONE, TUFFACEOUS MUDSTONE WITH NANNOFOSSILS: Core 48R is still dominated by dusky blue green (5BG 3/2) tuffaceous medium to coarse sandstone that shows a large fining upwards sequence from Section 1, 109 cm to the bottom of Section 3. From Section 4, the alternating cm- to dm-thick sequences of tuffaceous fine sandstone and tuffaceous mudstone with nannofossils re-appear. Those are of dark gray (5Y 4/1) and dark greenish gray (5G 4/1) colors with some cross-bedding and planar laminations. Bioturbation is slight to moderate in the mudstone layers. Drilling disturbance include slight to moderate biscuiting.



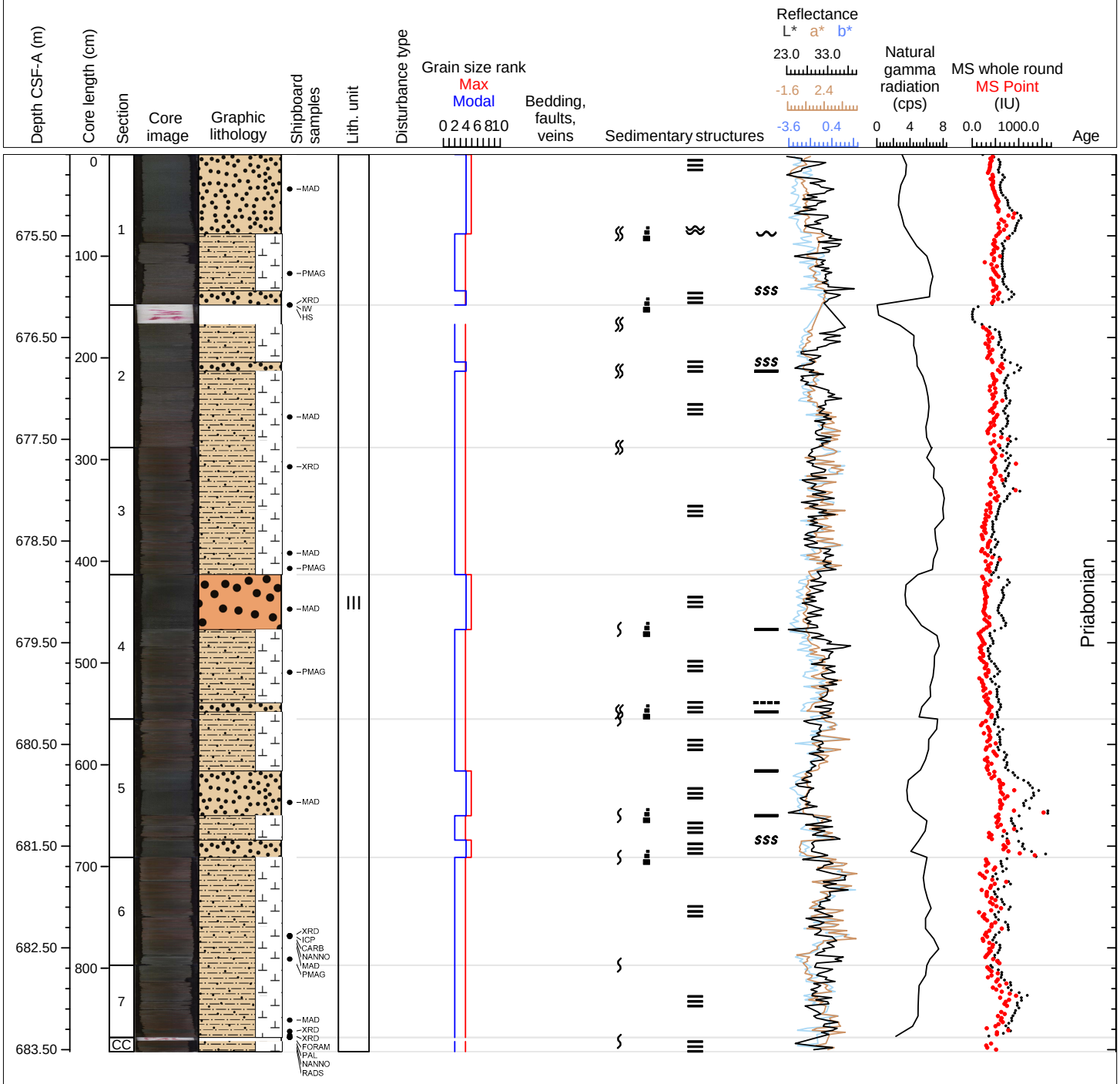
Hole 351-U1438D Core 49R, Interval 665.0-674.34 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE (WITH GRAVEL), TUFFACEOUS FINE SANDSTONE, TUFFACEOUS MUDSTONE WITH NANNOFOSSILS: Core 49R is characterized by alternating dusky blue green (5BG 3/2) tuffaceous medium to coarse sandstone and greenish black (5G 2/1) tuffaceous fine sandstone/dark reddish brown (5YR 3/2) to dark greenish gray (5GY 4/1) tuffaceous mudstone combinations. The siltstone and mudstone layers show planar laminations. Bioturbation is slight to moderate in the mudstone layers. Drilling disturbance include slight to moderate biscuiting.



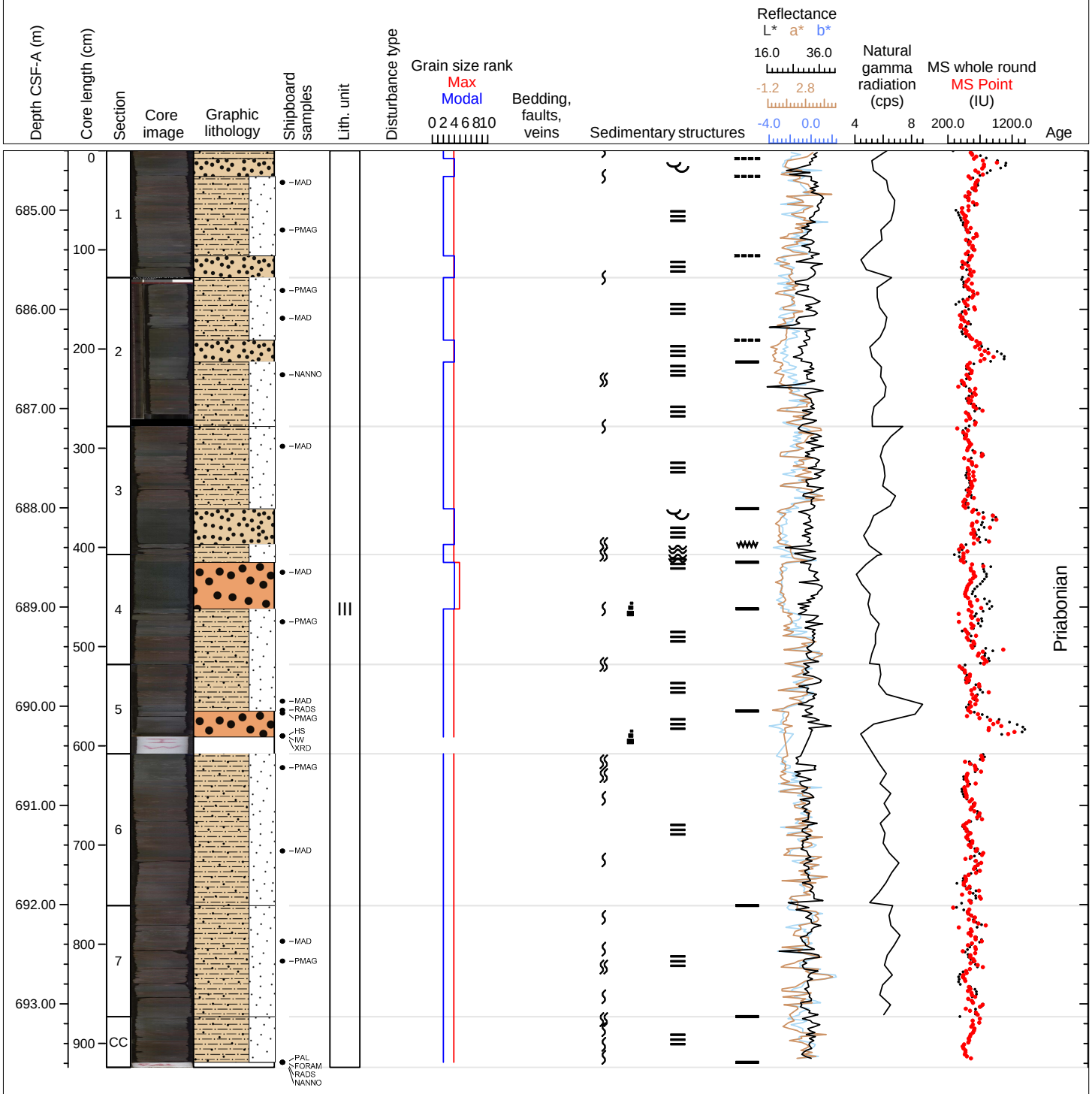
Hole 351-U1438D Core 50R, Interval 674.7-683.52 m (CSF-A)

TUFFACEOUS MUDSTONE WITH NANNOFOSSILS, TUFFACEOUS FINE SANDSTONE, TUFFACEOUS SANDSTONE: Core 50R consists of alternating layers of tuffaceous mudstone with nannofossils and tuffaceous fine sandstone. At the top of Section 4, a thick bed of dark greenish gray (5G 4/1) tuffaceous sandstone is present. The alternating layers of mud- and fine sandstone also show alternating colors of dark reddish brown (10R 3/4) and greenish black (5G 2/1). Normal grading and planar laminations are common. Bioturbation is slight to moderate in the mudstones. No significant drilling disturbance has been observed.



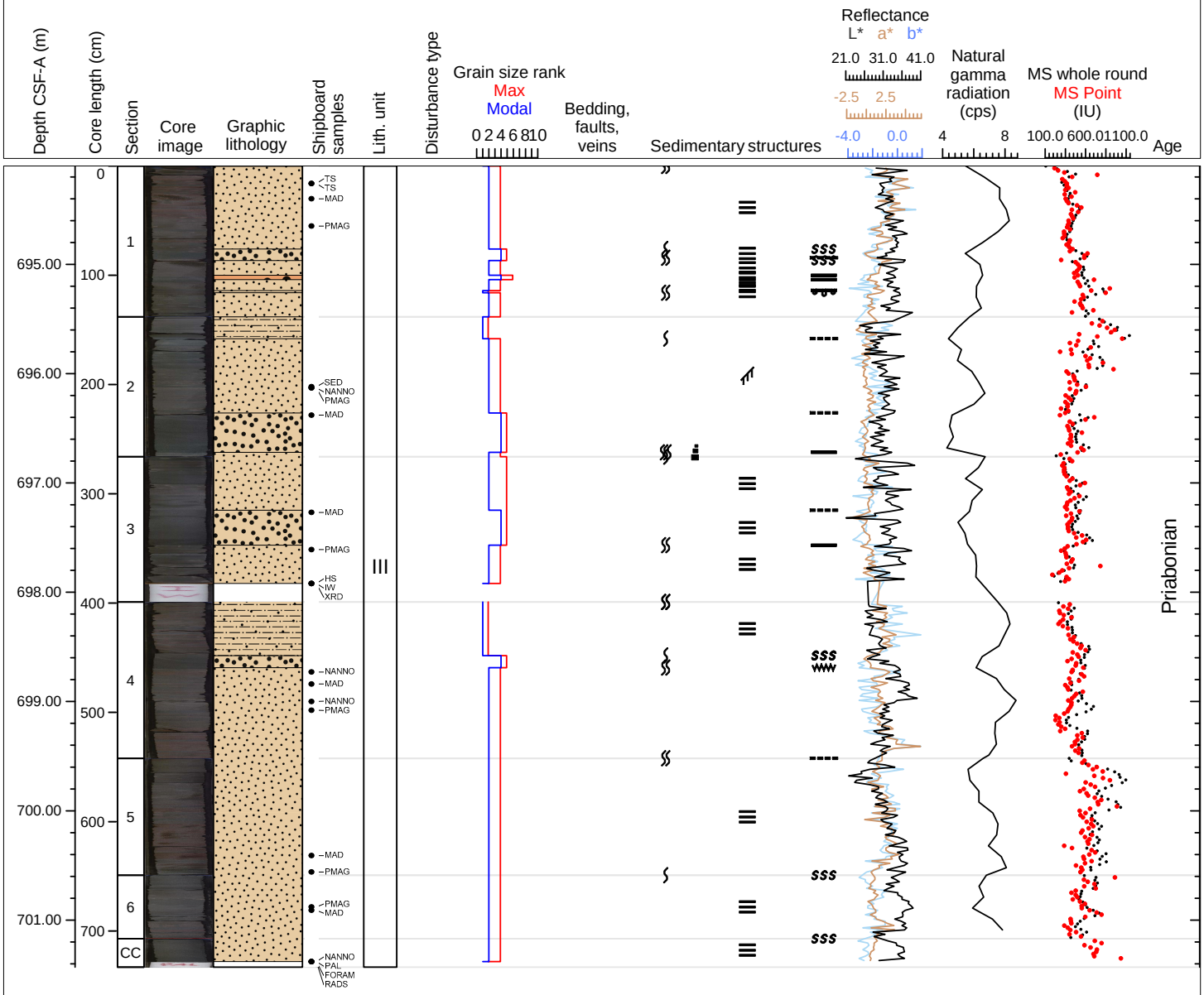
Hole 351-U1438D Core 51R, Interval 684.4-693.64 m (CSF-A)

TUFFACEOUS MUDSTONE WITH SAND, TUFFACEOUS FINE SANDSTONE, TUFFACEOUS SANDSTONE: Core 51R is very similar to Core 50R. Alternating beds of tuffaceous mudstones with sand and tuffaceous fine sandstones dominate throughout and even the colors are the same: dark reddish brown (10R 3/4) and greenish black (5G 2/1). Another tuffaceous sandstone bed is present in Section 4. Most contacts are sharp or gradational and planar, wavy and cross lamination is common. Bioturbation is slight to moderate in the mudstones. No significant drilling disturbance has been observed.



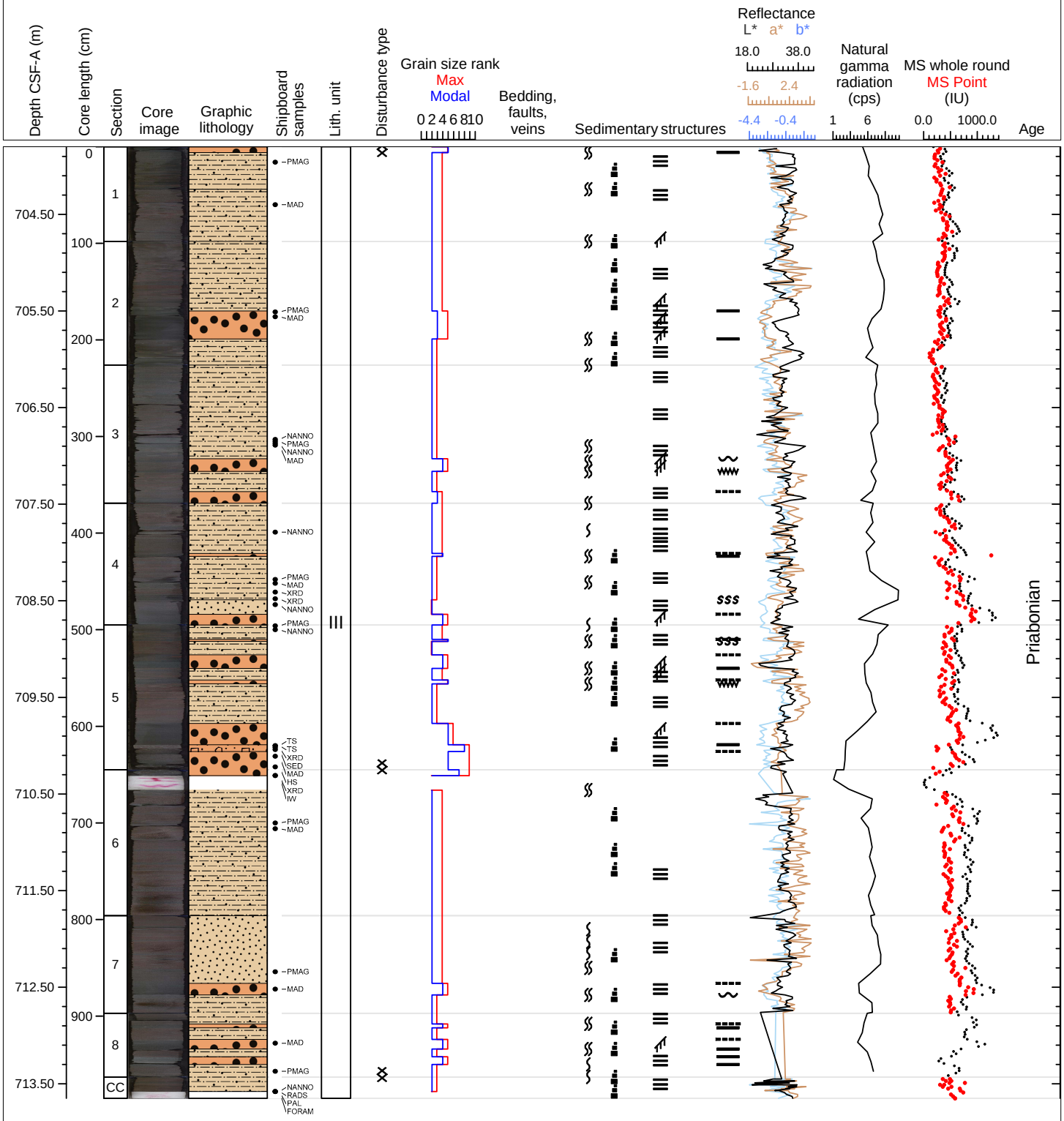
Hole 351-U1438D Core 52R, Interval 694.1-701.43 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE: Core 52R consists of intercalated 15 to 100 cm intervals of moderate brown (5YR 3/4) siltstone and dark greenish gray (5G 4/1) siltstone, and dark greenish gray mudstone, siltstone and greenish black (5G 2/1) fine to medium sandstone. The finely intercalated (3 mm to 10 cm) brown and green siltstones are bioturbated, while dark greenish siltstone and sandstone intervals show fine planar and cross lamination and are normally graded. Tiny spherical black concretions (<<1 mm) occur at a few levels in the core. No significant drilling disturbance has been observed.



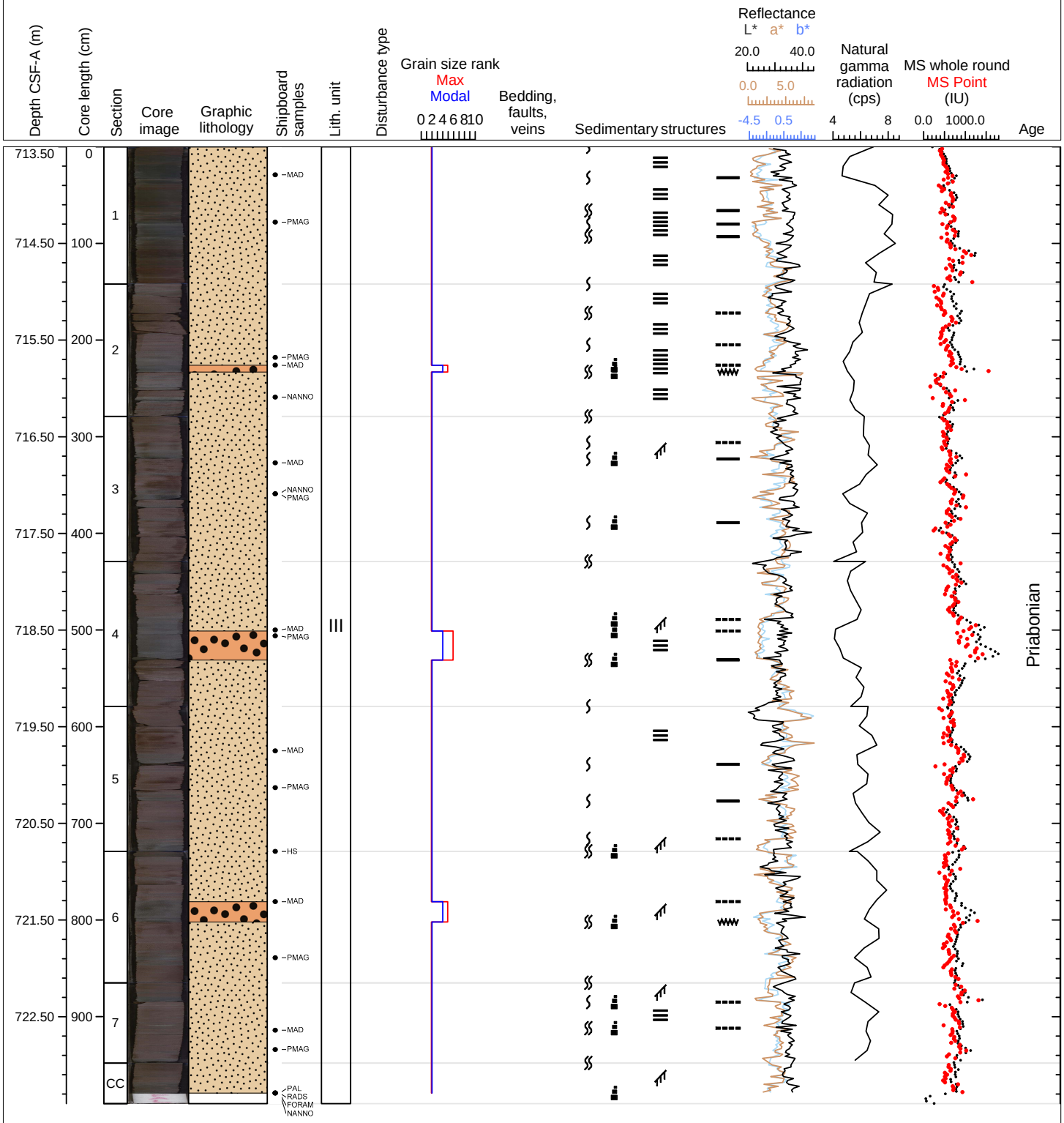
Hole 351-U1438D Core 53R, Interval 703.8-713.65 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SANDSTONE, CONGLOMERATE: Core 53R consists of intercalated 2 to 100 cm intervals of dark reddish brown (5YR 3/2) mudstone and very dark grayish green (5G 3/2) fine to medium sandstone. Both mudstone and sandstone have planar and cross laminations, and normal grading. The laminations are disturbed by compaction and moderate to strong bioturbation. Conglomerate at Section 5 and beneath the sandstone contain pebble-sized (up to 12 mm) anhydrite crystals. No significant drilling disturbance has been observed.



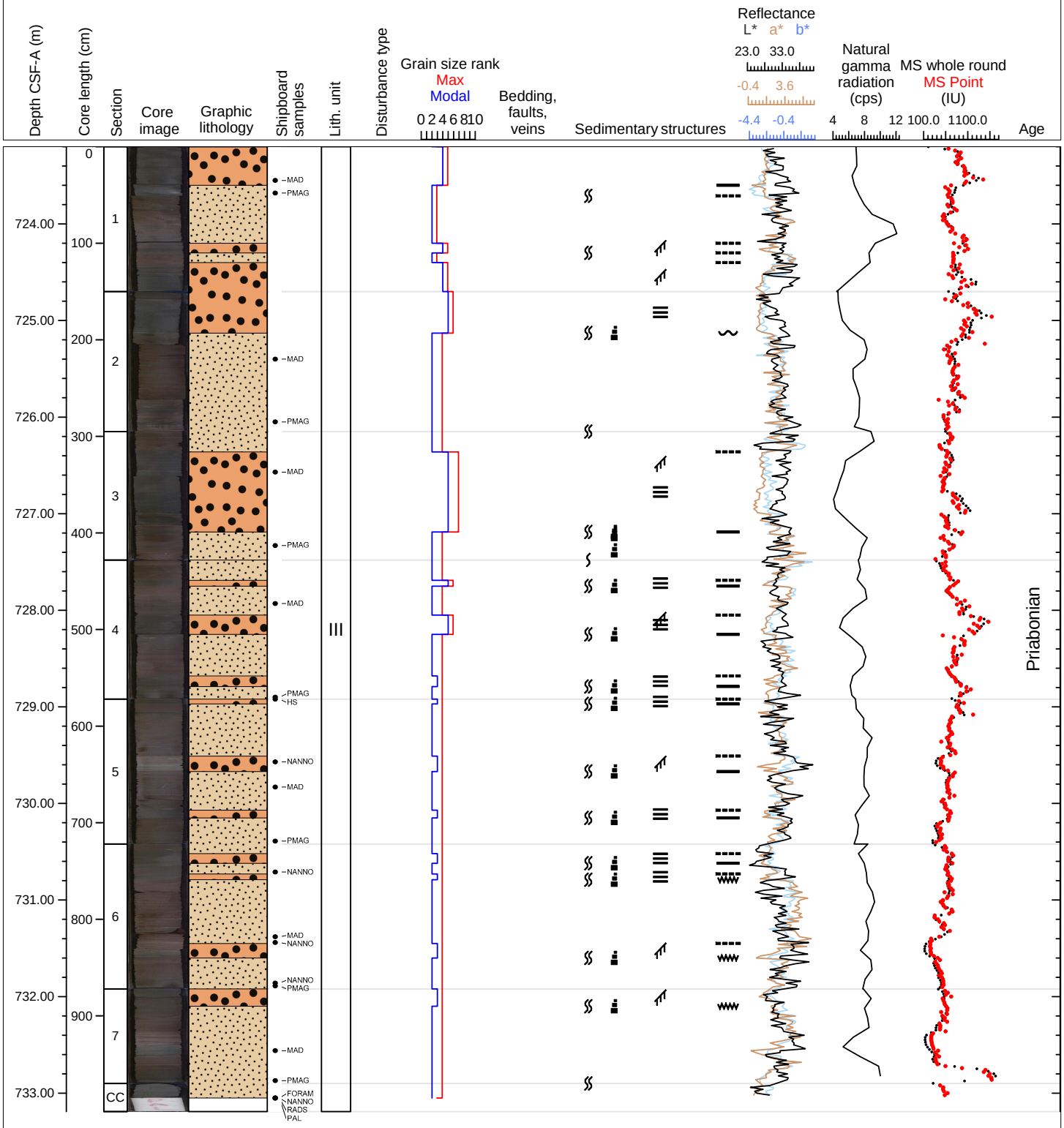
Hole 351-U1438D Core 54R, Interval 713.5-723.4 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE: 54R consists of intervals of dark reddish brown (5YR 3/4) and dark gray (N3) siltstone, separated by three 3-30 cm intervals of dark gray (N3) fine to medium sandstone. The finely intercalated (3 mm to 10 cm) brown and green siltstones are typically bioturbated, while dark gray sandstone intervals show fine planar and cross lamination and are normally graded. Tiny spherical black concretions (<<1 mm) occur at a few levels in the core. No significant drilling disturbance has been observed.



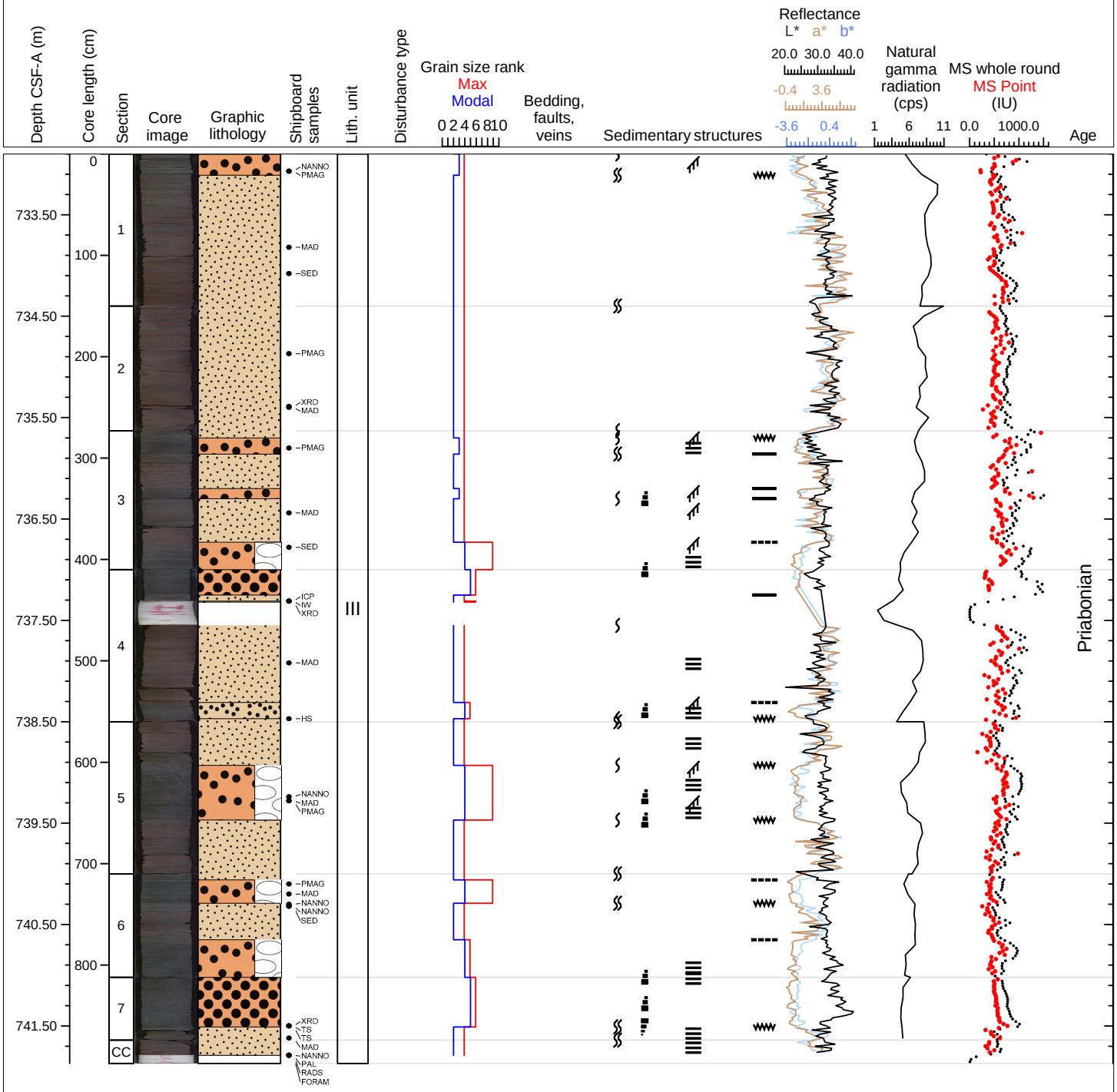
Hole 351-U1438D Core 55R, Interval 723.2-733.19 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE: Core 55R consists of intervals of dark reddish brown (5G 3/2) and dark gray (5Y 2/1) siltstones with small intervals or fine sandstone. The finely brown and green siltstones are typically bioturbated, while dark gray sandstone intervals show fine planar and cross lamination. No significant drilling disturbance has been observed.



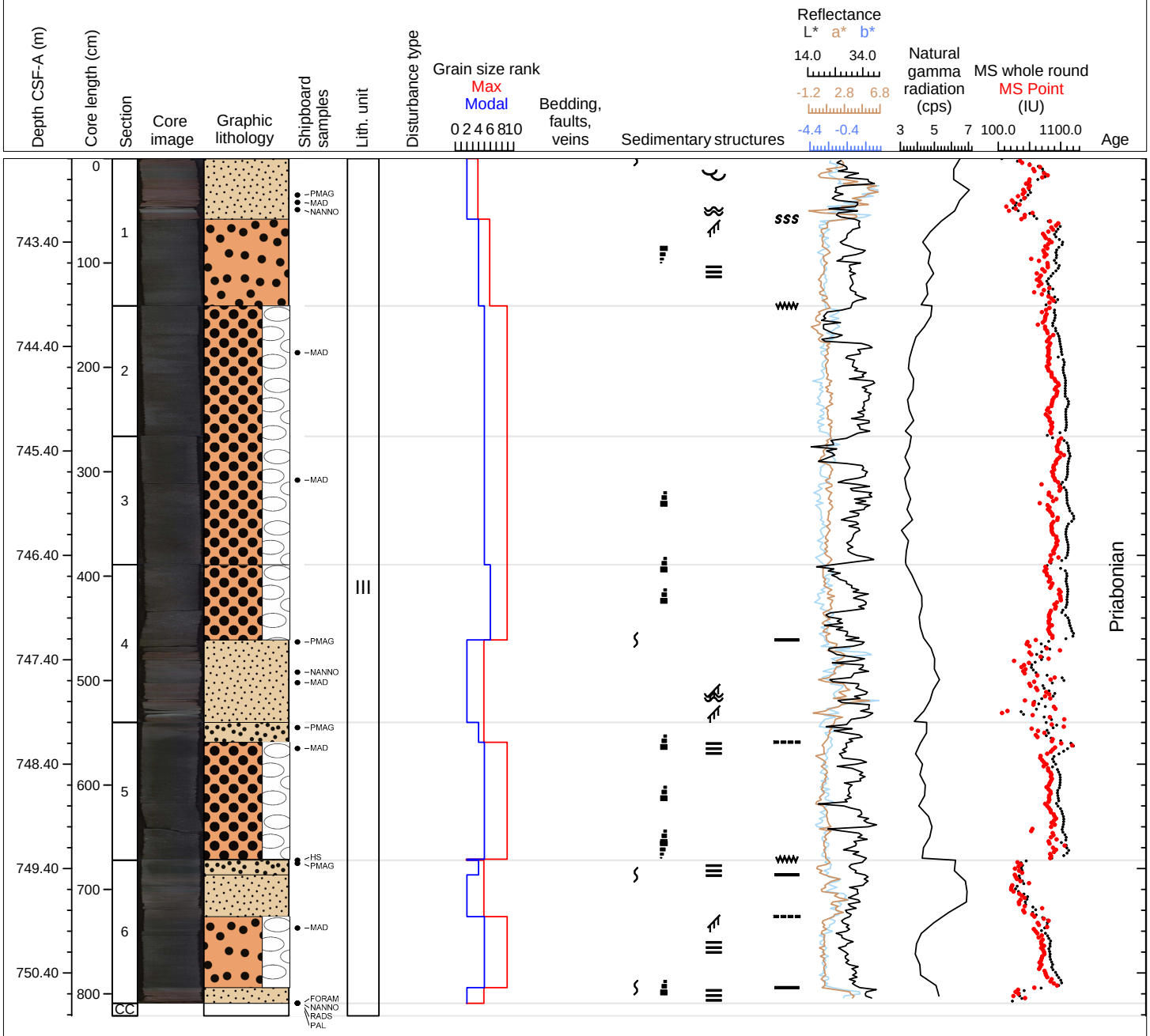
Hole 351-U1438D Core 56R, Interval 732.9-741.87 m (CSF-A)

TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE (WITH GRAVEL), TUFFACEOUS MEDIUM TO COARSE SANDSTONE, TUFFACEOUS FINE SANDSTONE: Core 56R is composed of alternating dark reddish brown (5YR 3/2) tuffaceous siltstone and greenish layers of silt- and fine sandstone that are intercalated with greenish black (5G 2/1) tuffaceous sandstone, sandstone with gravel, medium to coarse sandstone and fine sandstone. The sandstone layers are lesser in volume in the core, and they usually have some form of planar lamination, cross bedding and normal grading. Contacts at the base of the sandstones/siltstones are generally sharp and scour the underlying siltstone. Bioturbation is slight to moderate in the mudstone layers. No significant drilling disturbance has been observed.



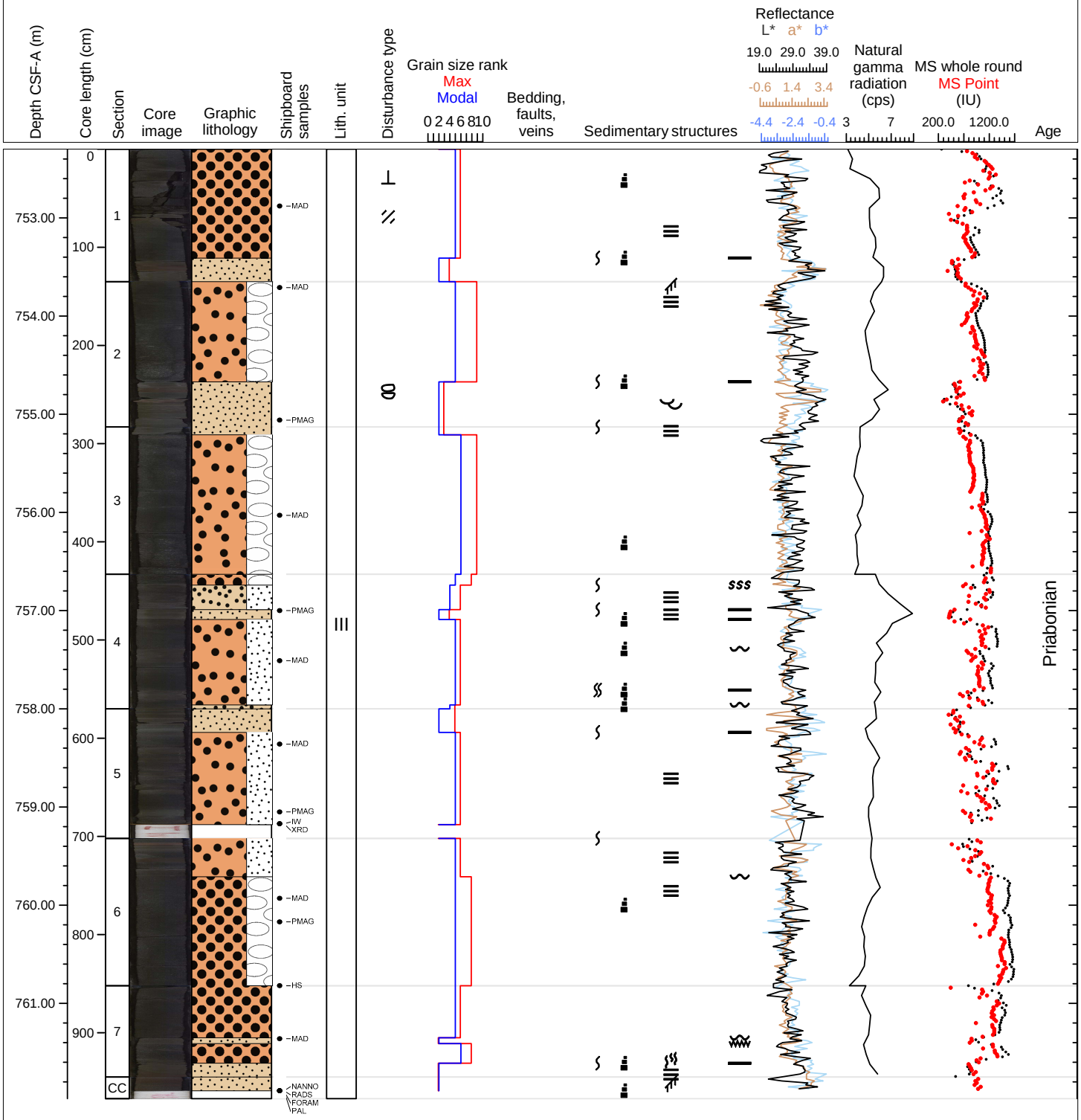
Hole 351-U1438D Core 57R, Interval 742.6-750.81 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE WITH GRAVEL, TUFFACEOUS SILTSTONE, TUFFACEOUS FINE SANDSTONE: Core 57R is dominated by greenish black (5G 2/1) tuffaceous, medium to coarse sandstones with gravel (up to 10 mm). The intervals between those medium to coarse sandstones are capped by tuffaceous fine sandstones of the same color. Between those sandy intervals, tuffaceous siltstones are present. These siltstones have alternating color bands between dark reddish brown (5YR 3/2) and greenish colors. Cross and planar lamination can be found in the fine sand intervals and bioturbation is limited to the silt intervals. Zeolite is present as a mineral phase and the reddish color is derived from hematite staining (oxidizing intervals). The more reducing greenish intervals may have preserved fresh glass as evident from smear slides. No significant drilling disturbance has been observed.



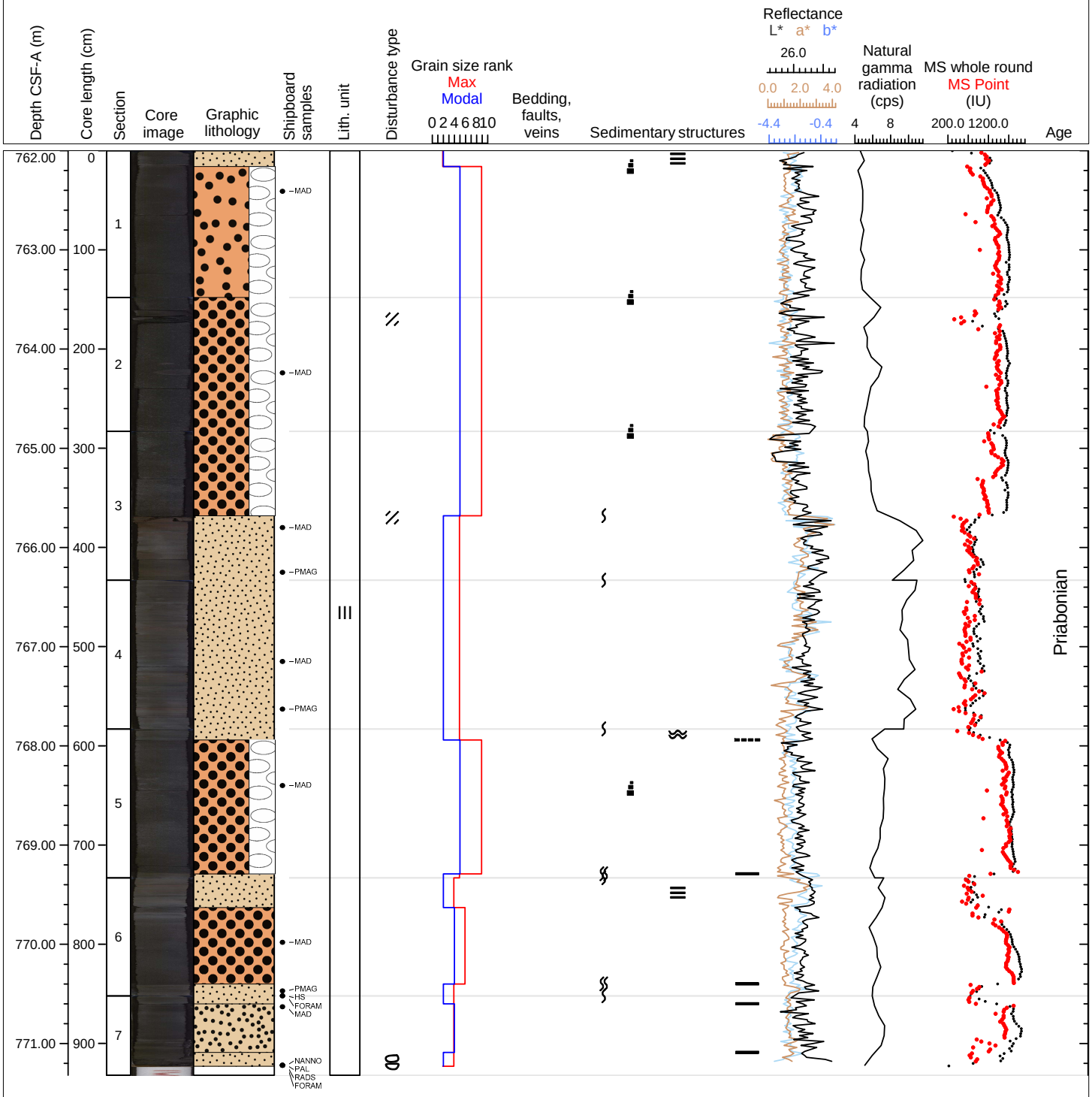
Hole 351-U1438D Core 58R, Interval 752.3-761.97 m (CSF-A)

TUFFACEOUS SANDSTONE WITH SILT, TUFFACEOUS SILTSTONE, TUFFACEOUS MEDIUM TO COARSE SANDSTONE WITH GRAVEL: In contrast to overlying cores, this core is dominated by sandstone, siltstone is less abundant. The colors range from greenish black (5G 2/1) for the sandstone to dark reddish brown (5YR 3/2) and very dark brown (10YR 2/2) for the siltstones. Grading and planar lamination are common, bioturbation is slight to absent. A fresh mafic glassy clast is present in Section 3, 76 cm. Drilling disturbance is slight to moderate but limited to short intervals.



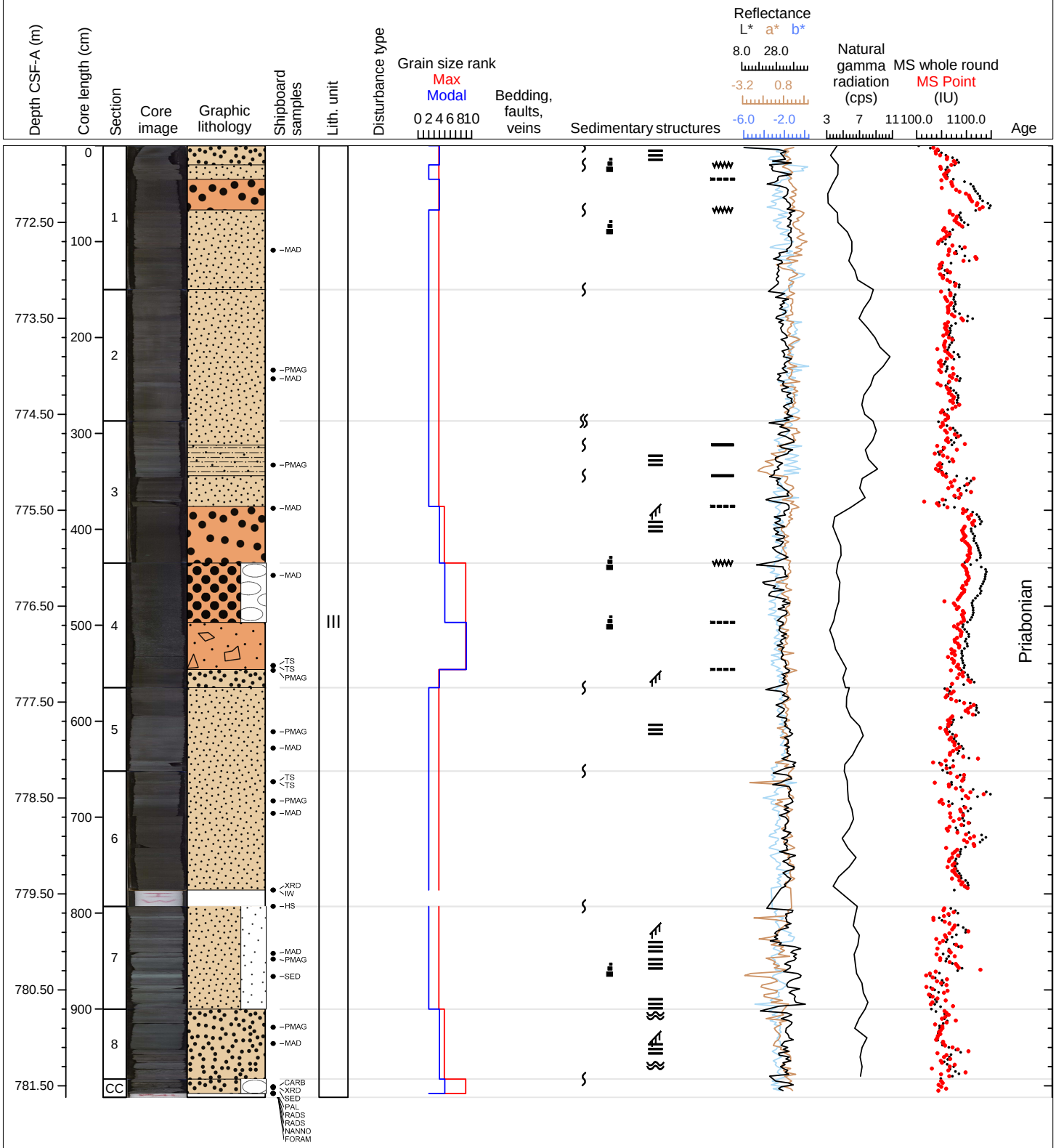
Hole 351-U1438D Core 59R, Interval 762.0-771.32 m (CSF-A)

TUFFACEOUS SANDSTONE WITH GRAVEL, TUFFACEOUS SILTSTONE, TUFFACEOUS MEDIUM TO COARSE SANDSTONE (WITH GRAVEL), TUFFACEOUS FINE SANDSTONE: Core 59R is primarily sandstone with lesser amounts of siltstone. The colors range from greenish black (5G 2/1) and black (5Y 2/1) for the various sandstones to very dark brown (10YR 2/2), black (N2) and greenish black (5G 2/1) for the siltstones. In the siltstone, micronodules are present in the top of Section 1, and in the sandstones, pebbles are as large as 10 mm. Most contacts are sharp and planar, although a few are irregular or gradational. Bioturbation is slight to moderate chiefly in the siltstones. Drilling disturbances occur in Sections 2, 3 and 7.



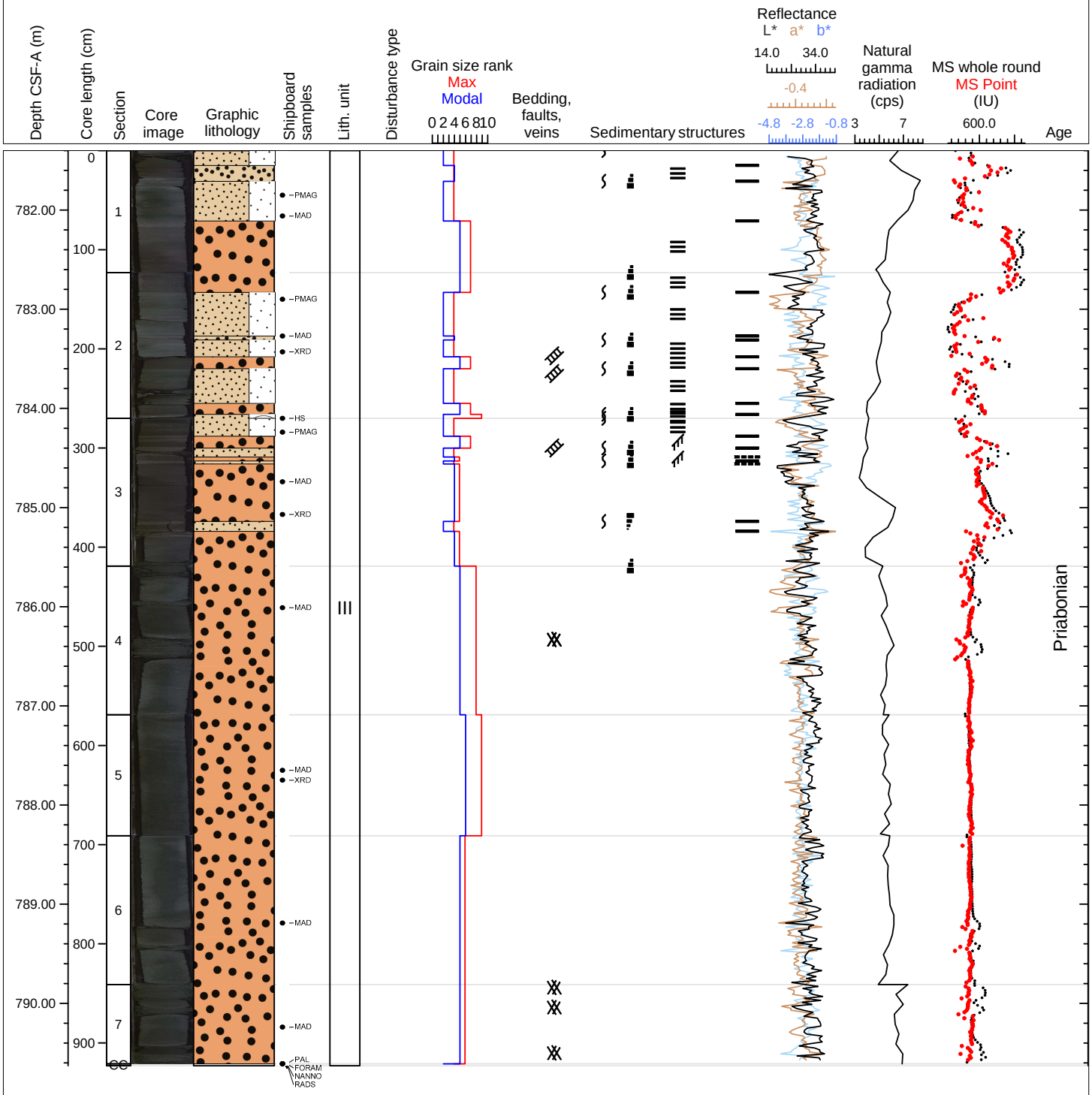
Hole 351-U1438D Core 60R, Interval 771.7-781.62 m (CSF-A)

TUFFACEOUS SILTSTONE, TUFFACEOUS MEDIUM TO COARSE SANDSTONE (WITH GRAVEL), TUFFACEOUS FINE SANDSTONE (WITH GRAVEL), TUFFACEOUS BRECCIA, TUFFACEOUS MUDSTONE: Core 60R consists primarily various siltstones and mudstones with lesser amounts of dm-thick intervals of sandstones. The colors range from greenish black (5G 2/1), black (5Y 2/1), very dark gray (N3) and dark greenish gray (5GY 5/2) for the various sandstones and breccia to dark greenish gray (5GY 5/2 and 5G 4/1), and grayish blue green (5BG 5/2) for the siltstones and grayish green (10G 4/2) for the mudstones. In the siltstone, micronodules are present in Section 6 and 7, and in the sandstones, pebbles are as large as 10 mm. The cm-thick intervals of grayish blue green siltstones stand out in the siltstones. Most contacts are sharp and planar, although a few are irregular or gradational. Bioturbation is slight to moderate in the siltstones. No significant drilling disturbance has been observed.



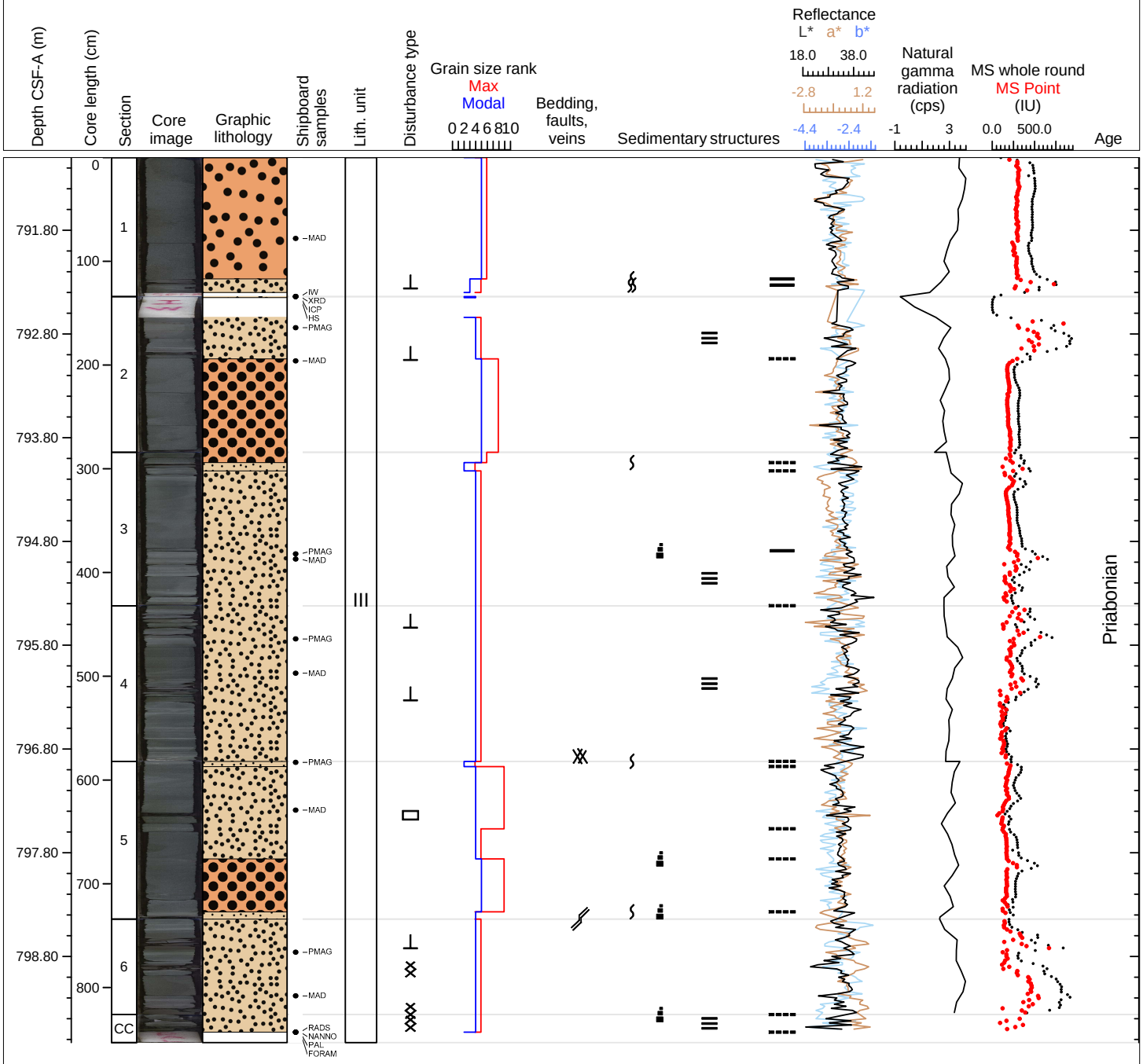
Hole 351-U1438D Core 61R, Interval 781.4-790.63 m (CSF-A)

TUFFACEOUS SILTSTONE, TUFFACEOUS MEDIUM TO COARSE SANDSTONE, TUFFACEOUS FINE SANDSTONE: Core 61R contains mostly large beds of homogeneous sandstones with lesser amounts of thinly bedded siltstones with minor thin (2-10 cm) normally-graded fine sandstone bases. The colors range from greenish black (5G 2/1), to dark greenish gray (5GY 5/2). Bioturbation is slight in the siltstones. In Section 1, 53 cm, a small (0.5 cm) anhydrite-replaced clast contains a small amount of native copper. The core also contains 2 vein types: horizontal, bedding-parallel anhydrite and steeply-dipping chlorite veins that cut through softer parts of the massive sandstone beds. These occur in two conjugate orientations. No significant drilling disturbance has been observed.



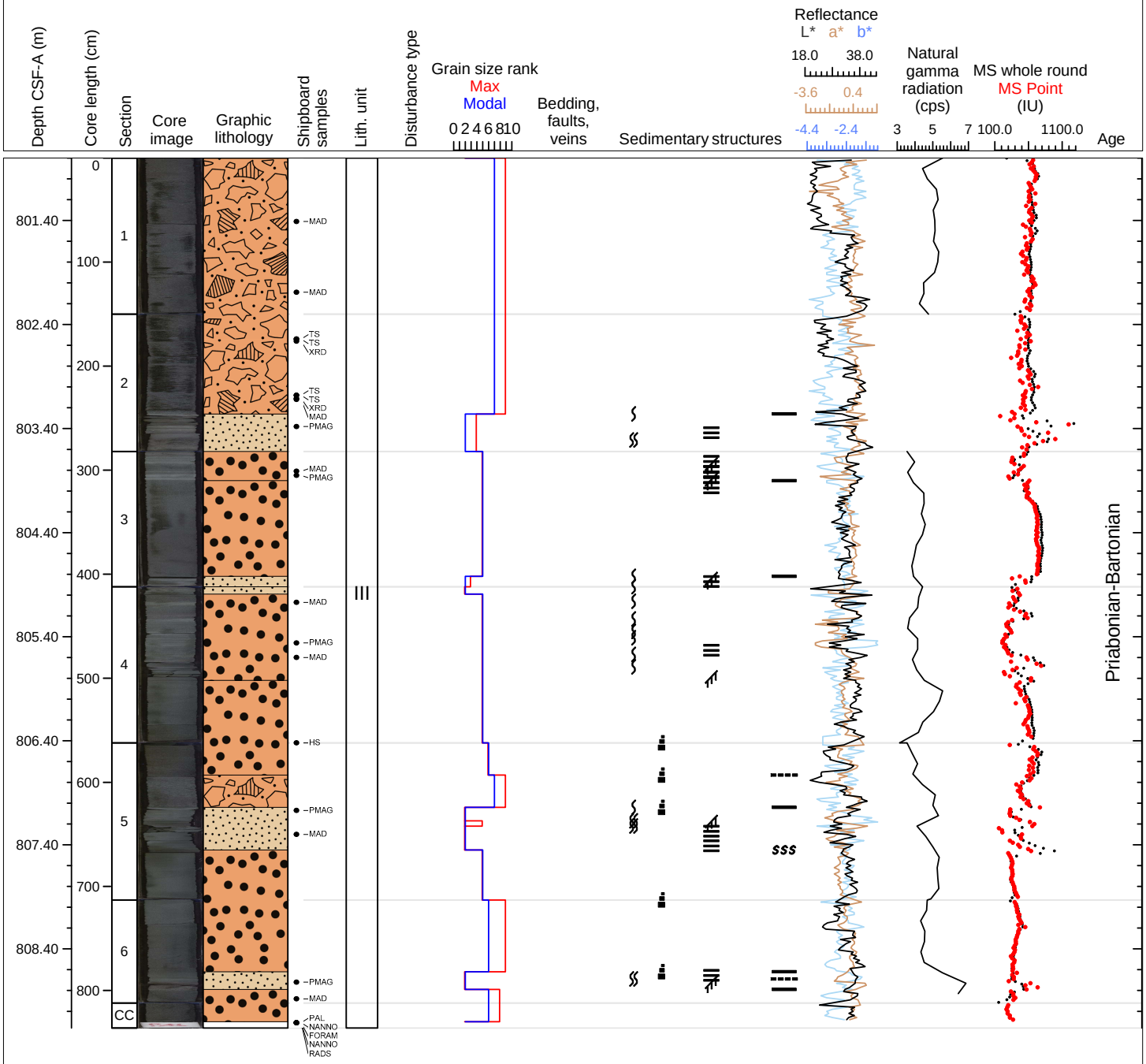
Hole 351-U1438D Core 62R, Interval 791.1-799.63 m (CSF-A)

TUFFACEOUS SILTSTONE, TUFFACEOUS MEDIUM TO COARSE SANDSTONE, TUFFACEOUS FINE SANDSTONE: Core 62R contains thick beds (0.5 to 1 m) of tuffaceous sandstones interbedded with thinly bedded tuffaceous siltstone with minor thin (2-10 cm) normally-graded fine sandstone bases. The colors range from dusky green (5BG 3/2), to grayinsh green (5G 5/2). Bioturbation is slight, mostly in the siltstones. Small (0.1-0.5 cm) discontinuous veins of occur towards the end of Section 4. Drilling disturbance includes slight fracturing and moderate brecciating.



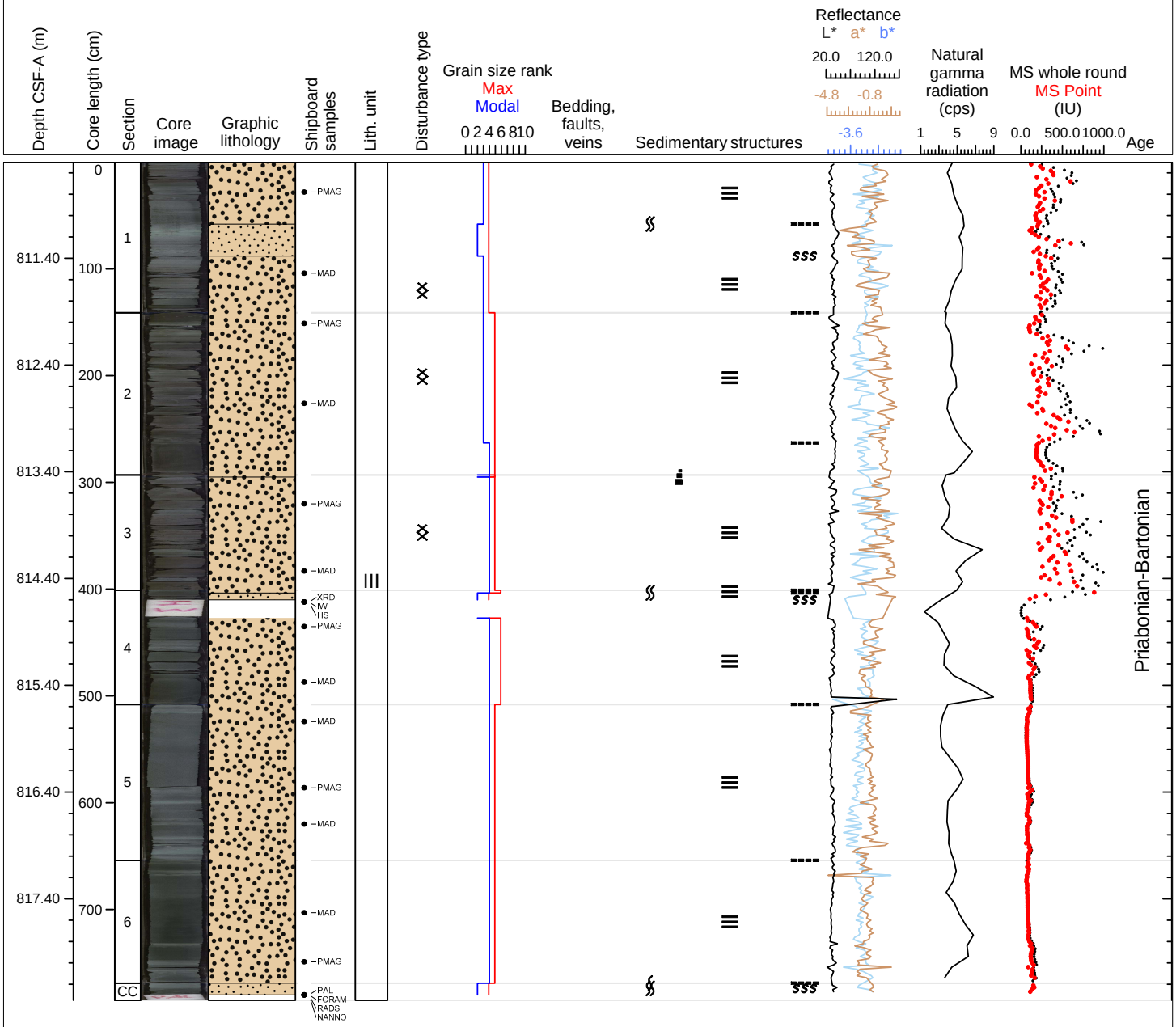
Hole 351-U1438D Core 63R, Interval 800.8-809.16 m (CSF-A)

TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE, TUFFACEOUS BRECCIA-CONGLOMERATE: Core 63R consist of alternating grayish green (5G 5/2) to medium dark gray (N4) tuffaceous siltstones, grayish green (10G 4/2) tuffaceous sandstones and grayish green (10G 4/2) to dusky green (5G 3/2) tuffaceous breccia-conglomerates. The sandstones are predominantly normally graded, laminated and/or cross bedded. The siltstones experienced slight to moderate bioturbation. Siltstones and sandstones are moderately to poorly sorted and the breccia conglomerates are poorly sorted. The contacts between the tuffaceous siltstones and tuffaceous sandstones are sharp and contacts between the tuffaceous breccia-conglomerates and the tuffaceous sandstones are gradational. Maximum clast sizes in the volcanic breccia-conglomerates is 18 mm, average is around 1.5 mm. Bioturbation is slight to moderate and no significant drilling disturbance has been observed.



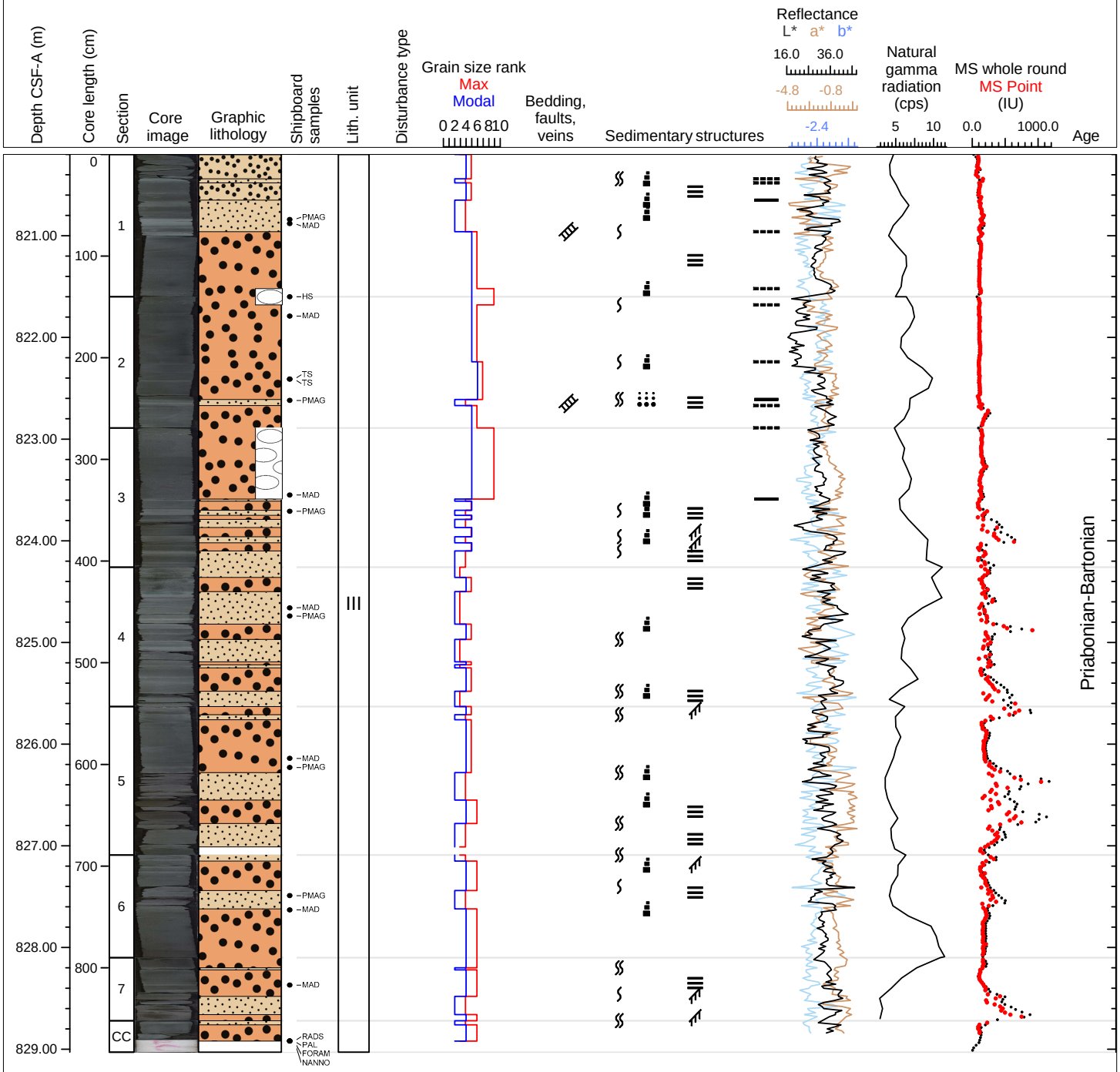
Hole 351-U1438D Core 64R, Interval 810.5-818.35 m (CSF-A)

TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE: Core 64R consist of alternating grayish green (5G 5/2) to dark greenish gray (5G 4/1) tuffaceous siltstones and dark greenish gray (5G 4/1) tuffaceous sandstones. The tuffaceous siltstones are moderately bioturbated, whereas the tuffaceous sandstones may be only slightly bioturbated. The boundaries between the tuffaceous siltstones and tuffaceous sandstones is either bioturbated or sharp. The tuffaceous sandstones are well sorted and usually display normal grading. Often the tuffaceous sandstones are with fine lamination. Core 64R is affected by slight biscuiting.



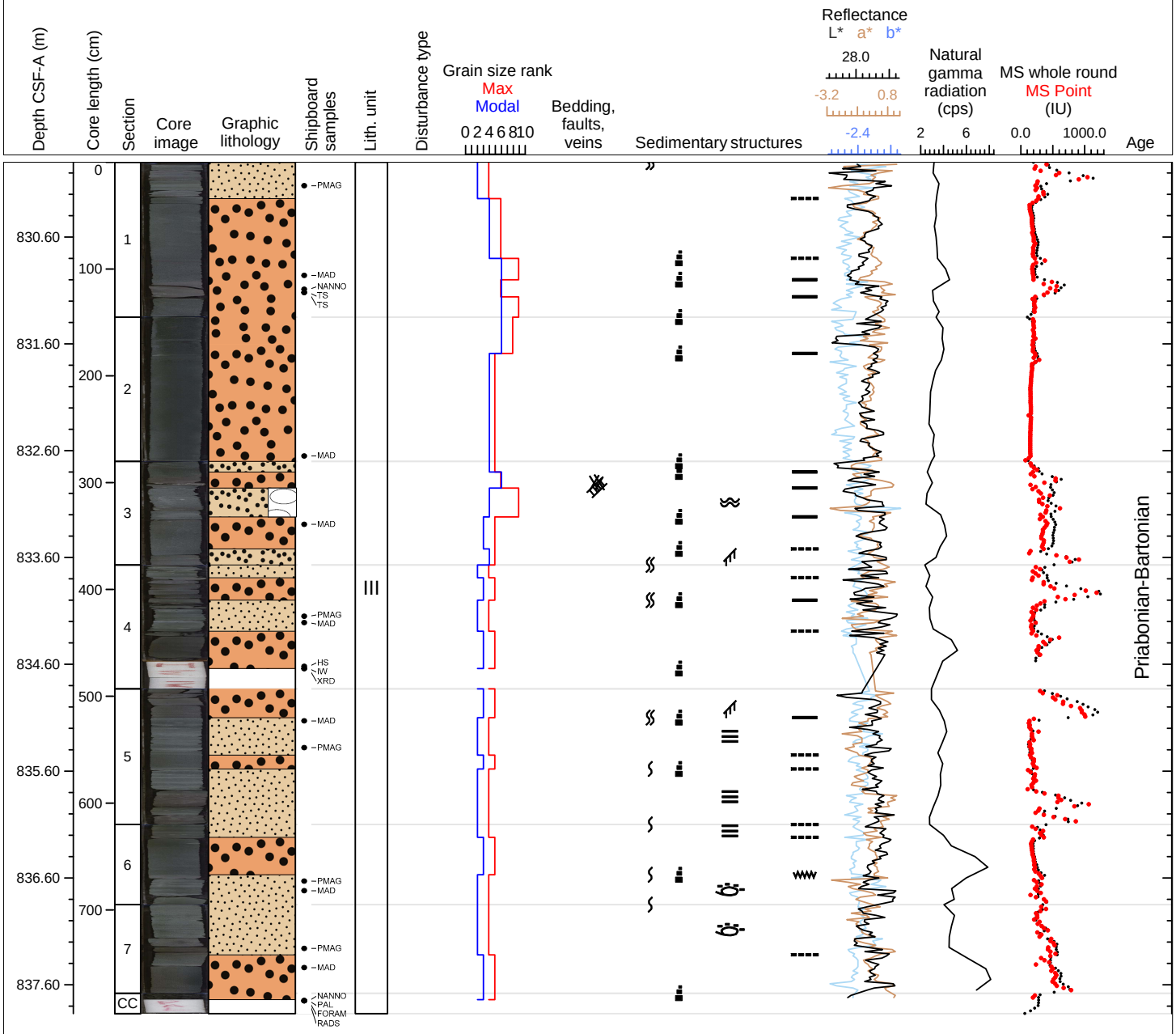
Hole 351-U1438D Core 65R, Interval 820.2-829.03 m (CSF-A)

TUFFACEOUS SILTSTONE AND TUFFACEOUS SANDSTONE, TUFFACEOUS SANDSTONE WITH GRAVEL: Core 65R consist of alternating dusky green (5G 3/2) to dark grayish green (10YG 5/2) tuffaceous siltstones. The tuffaceous siltstones are moderately bioturbated, whereas the tuffaceous sandstones either slightly or not bioturbated. The tuffaceous sandstones are well sorted and usually display normal grading. Small bedding-parallel anhydrite veins occur in the core. Also anhydrite crystals occur and are replacing pumice and infilling burrows. No significant drilling disturbance has been observed.



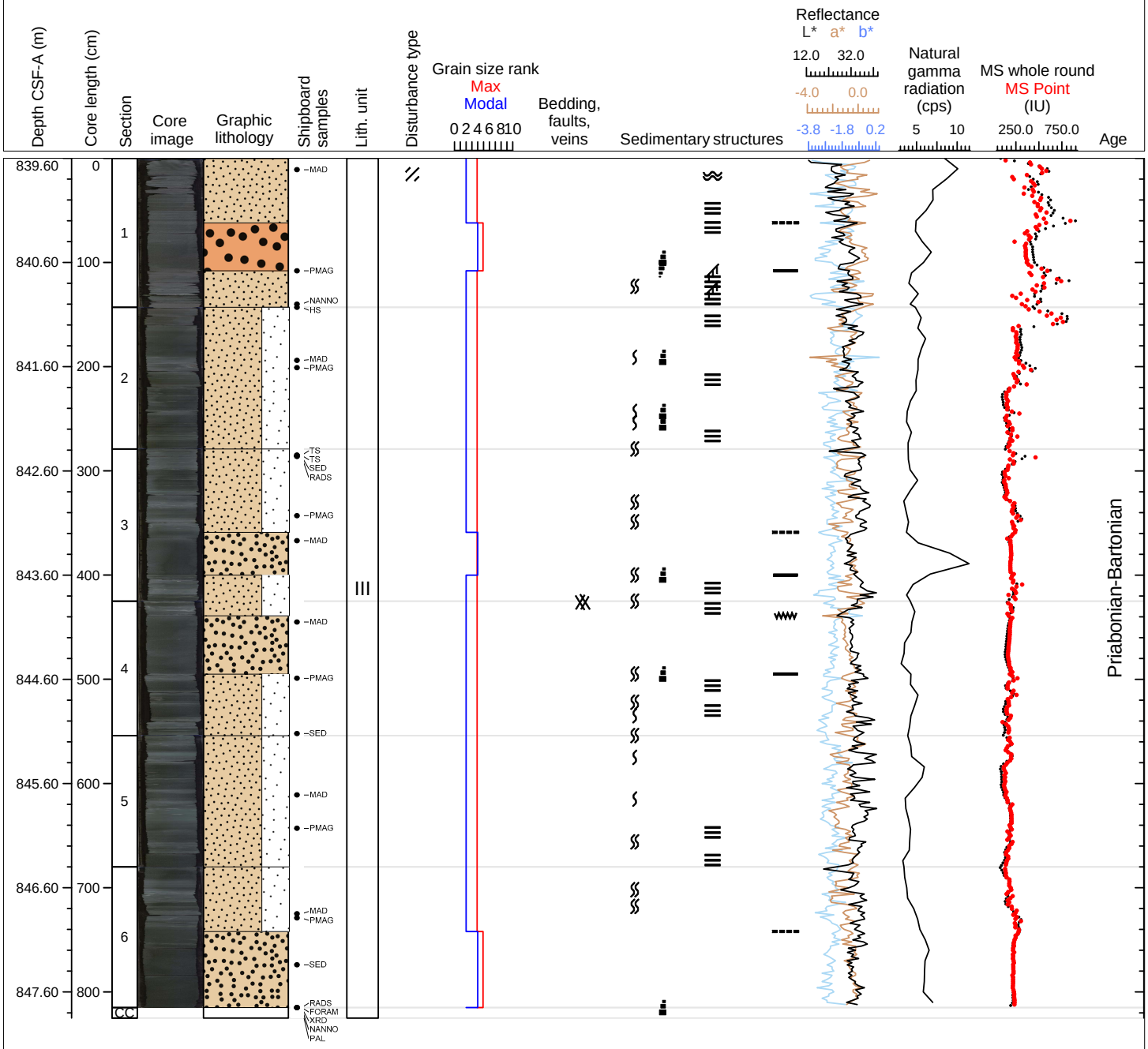
Hole 351-U1438D Core 66R, Interval 829.9-837.87 m (CSF-A)

TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE: Core 66R consist of alternating grayish green (5G 5/2) to dusky green (5G3/2) tuffaceous siltstones and two large cobbles of dark gray (N 4) chalk. The clasts have irregular outlines and are associated with convolute bedding in the underlying lithologies suggesting slumping. One of the clasts also contains a quartz-phyric volcanic rock. Bioturbation is slight to moderate in the siltstones. No significant drilling disturbance has been observed.



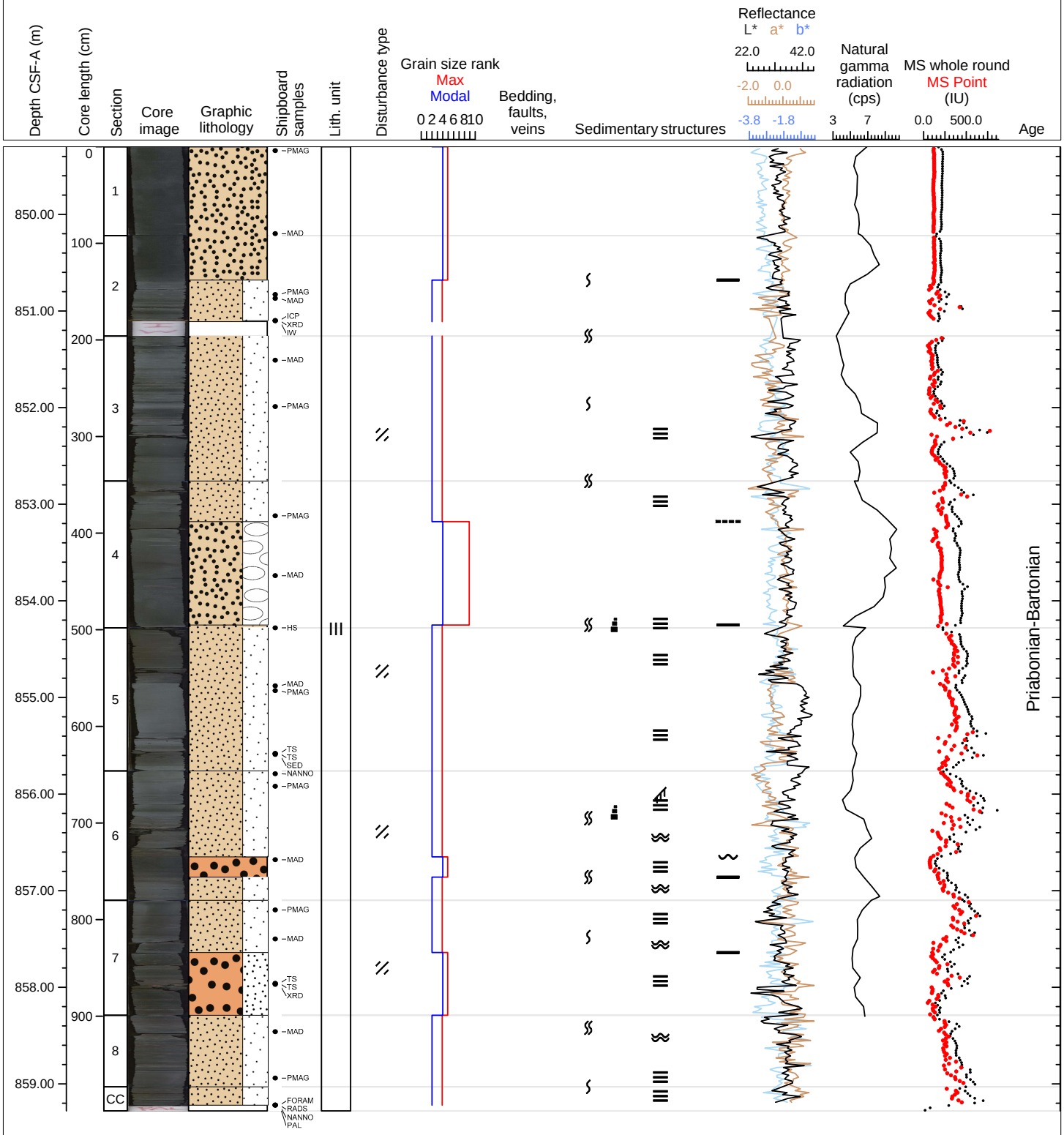
Hole 351-U1438D Core 67R, Interval 839.6-847.85 m (CSF-A)

TUFFACEOUS SILTSTONE WITH FINE SAND, TUFFACEOUS FINE SANDSTONE: Core 67R has subequal amounts of very dark grayish green (5G 3/2) siltstones with fine sand and dm-thick intervals of very dark grayish green (5G 3/2) sandstones. There are portions of the siltstone that contain anastomosing planar laminations particularly in Sections 1 and 2. Most of the fine sandstones are normally graded. Contacts vary between sharp and planar, irregular, gradational, or scoured. Bioturbation is slight to moderate chiefly in the siltstones. There is slight drilling disturbance in Section 1.



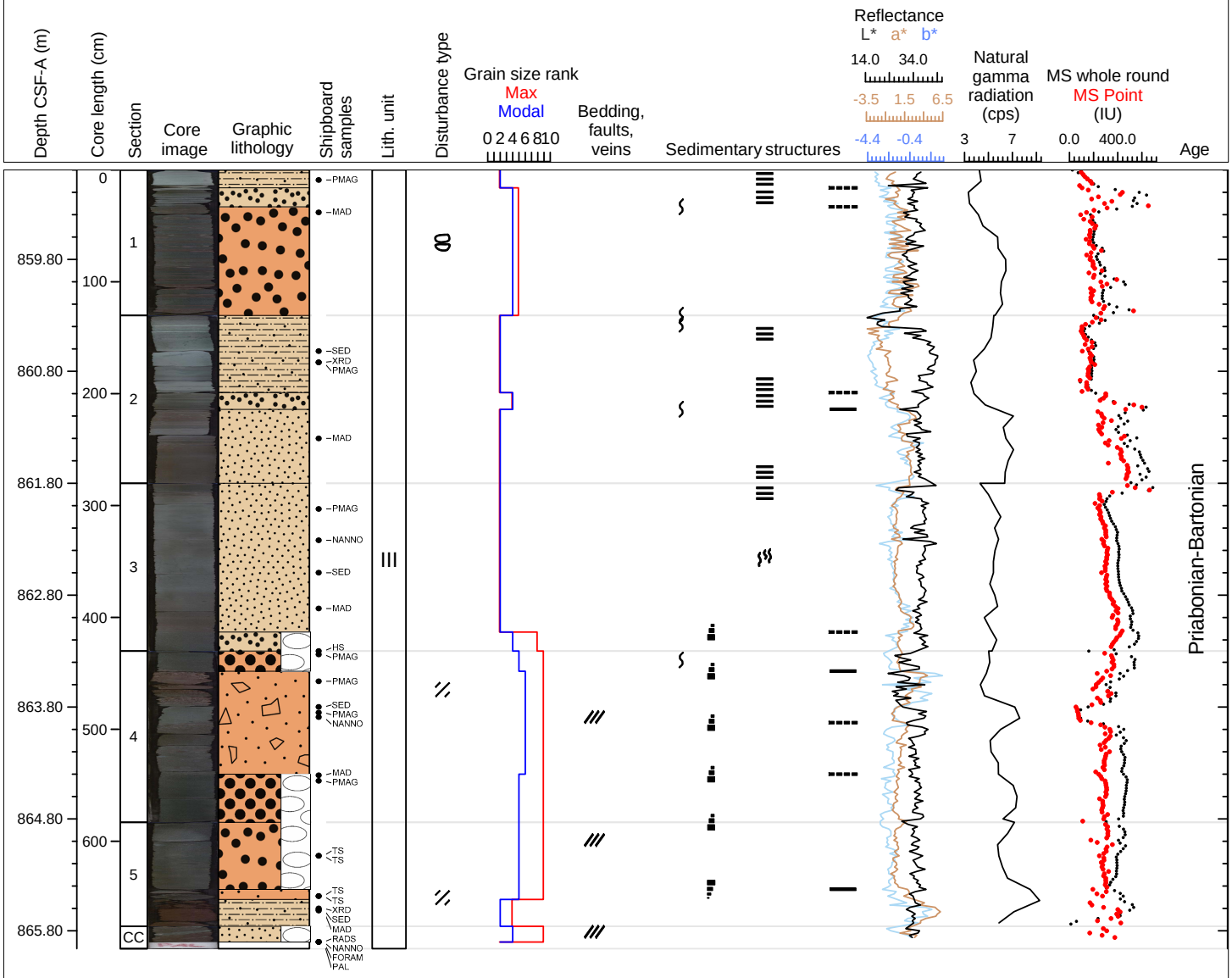
Hole 351-U1438D Core 68R, Interval 849.3-859.28 m (CSF-A)

TUFFACEOUS SILTSTONE WITH FINE SAND, TUFFACEOUS FINE SANDSTONE (WITH GRAVEL), TUFFACEOUS FINE SANDSTONE WITH SILT: Core 68R has subequal amounts of dm- thick intervals of sandstones with siltstone and siltstones with fine sand. The colors range from very dark grayish green (5G 3/2), grayish green (5G 5/2) and dark gray (5Y 4/1) for the siltstone and sandstone. There are portions of the siltstone and sandstone that contain intertwinning planar laminations particularly in Sections 5 to 7. Some of the siltstones and fine sandstones are normally graded. Contacts vary between sharp and planar, and irregular and wavy. Bioturbation is slight to moderate chiefly in the siltstones. There is slight drilling disturbance in Section 3, 5, 6 and 7.



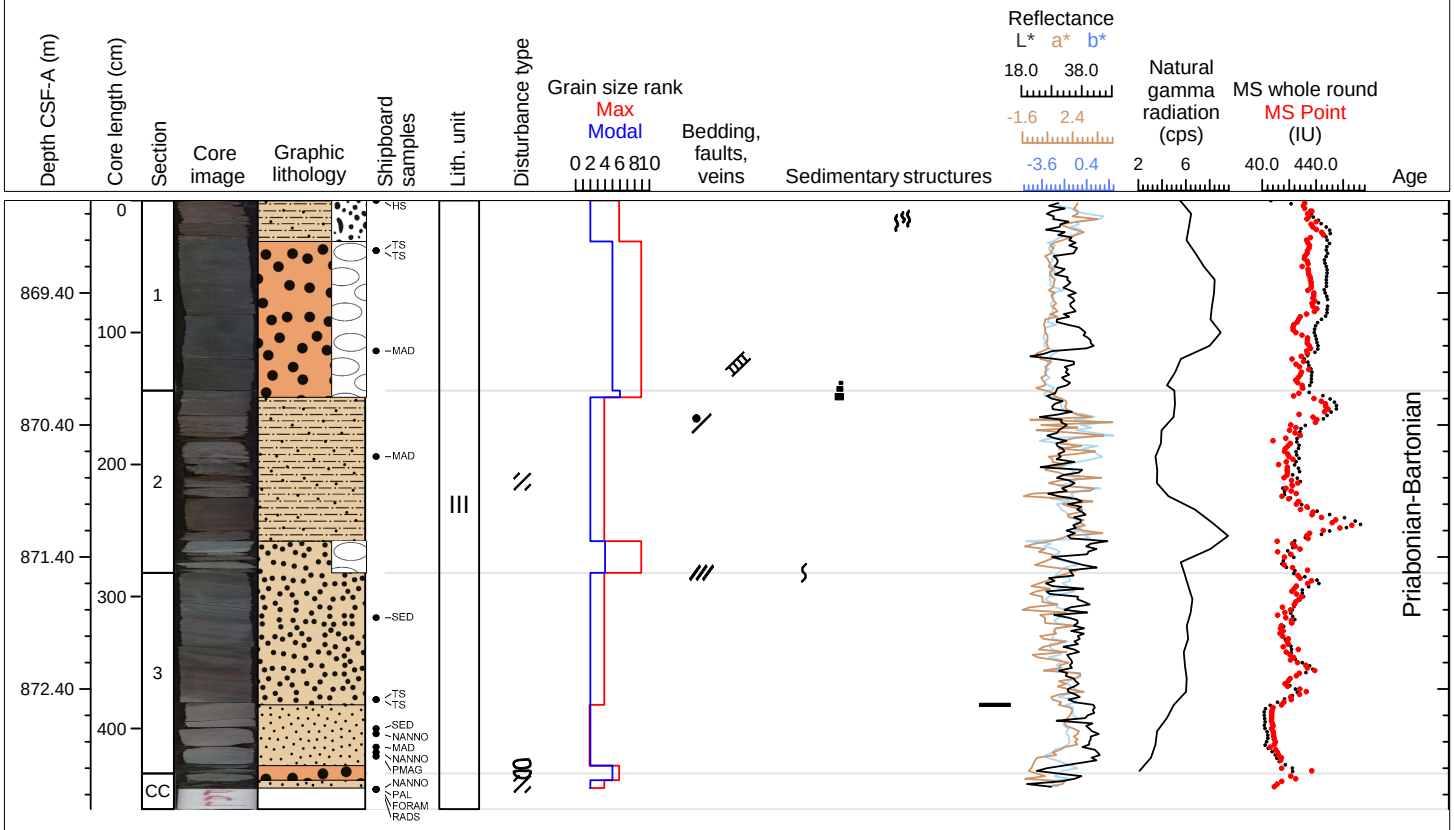
Hole 351-U1438D Core 69R, Interval 859.0-865.96 m (CSF-A)

TUFFACEOUS SANDSTONE (WITH GRAVEL), TUFFACEOUS SILTSTONE, TUFFACEOUS BRECCIA: The top of Core 69R recovered rocks similar to the overlying cores composed of alternating mud-, silt and fine sandstones banded in grayish green (10G 4/2) and brownish gray (5YR 4/1) colors. Particularly the fine grained intervals contain significant amounts of secondary formed zeolites and are lighter in color (5BG 3/2). Towards the middle of the core, rocks become coarser grained (medium to coarse sandstones). Section 4 sampled a tuffaceous clast- and matrix-supported breccia (with reverse grading) with nannofossil-bearing clasts up to 14 cm. The rocks in the core catcher show inclined, irregular bedding. Bioturbation is slight, drilling disturbance include slight biscuting and fragmenting with one interval in Section 5 being destroyed.



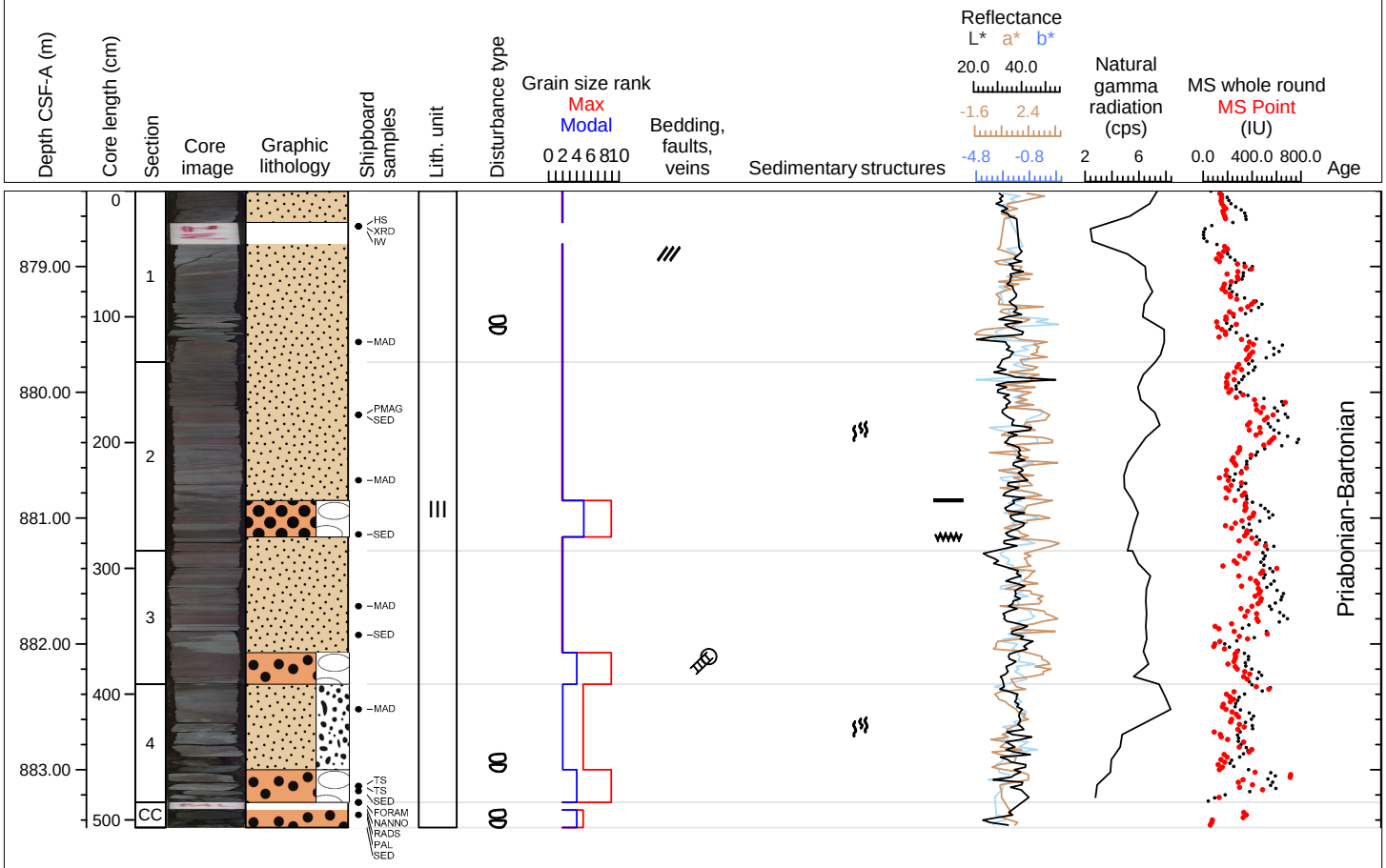
Hole 351-U1438D Core 70R, Interval 868.7-873.31 m (CSF-A)

TUFFACEOUS SANDSTONE (WITH GRAVEL), TUFFACEOUS SILTSTONE (WITH GRAVEL), TUFFACEOUS FINE SANDSTONE (WITH GRAVEL), TUFFACEOUS MUDSTONE (WITH SAND): Core 70R show significant deformation. The lithologies are still volcaniclastic rocks of various grain sizes (mud to pebbles). Dominant rock colors are dark greenish gray (5G 4/1) to 10G 4/2 (grayish green) with intercalated red to brownish bands. A tuffaceous siltstone layer at the bottom of Section 3 is of pale red purple color. Deformation structures range from microfaults to fault breccia in Section 2 and many bedding planes are inclined and wavy.



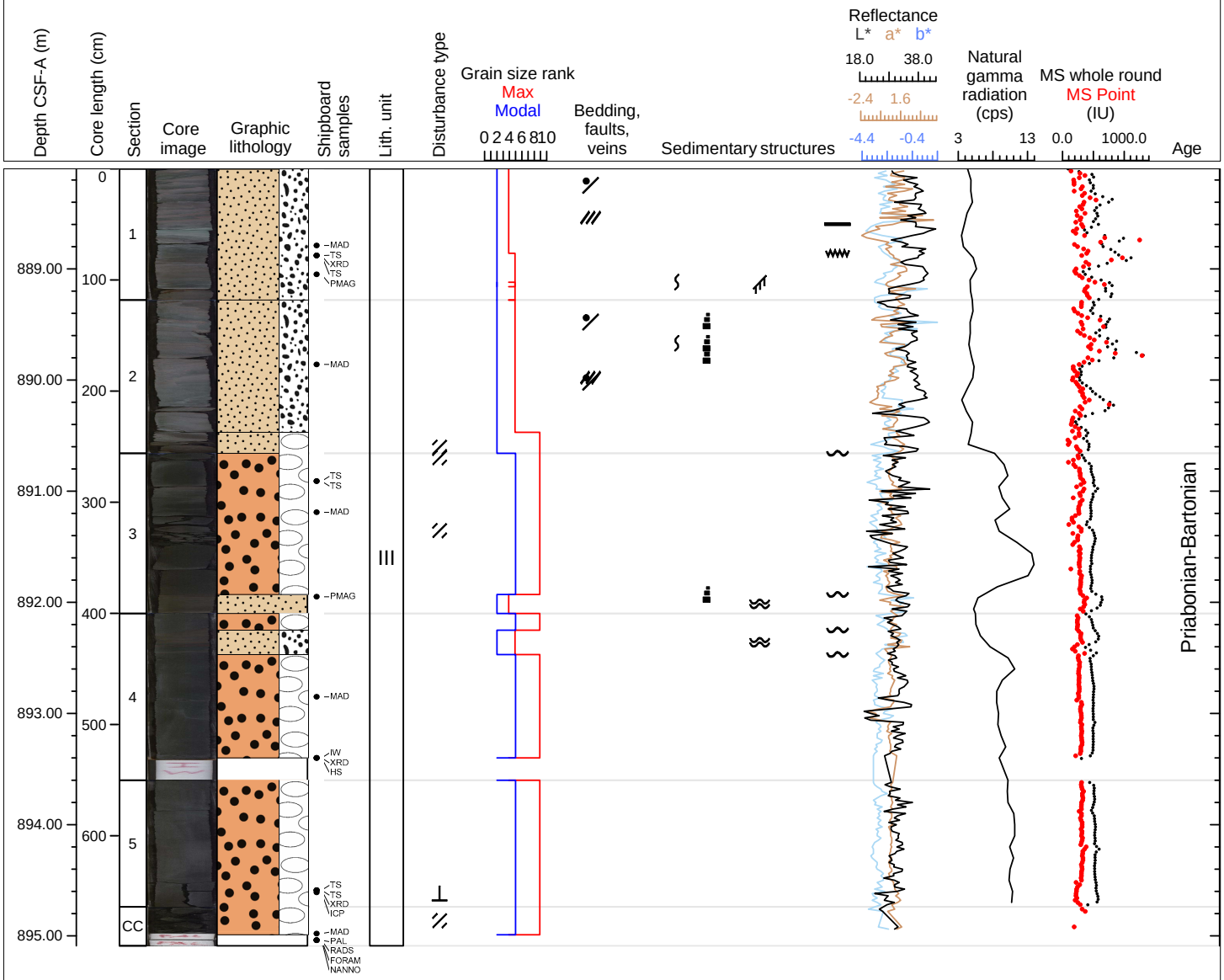
Hole 351-U1438D Core 71R, Interval 878.4-883.46 m (CSF-A)

TUFFACEOUS SILTSTONE (WITH SAND), TUFFACEOUS SANDSTONE (WITH GRAVEL), TUFFACEOUS MEDIUM TO COARSE SANDSTONE (WITH GRAVEL): The primary lithology of Core71R is dark greenish gray (5G 4/1), dark reddish brown (5YR 3/2), grayish blue green (5BG 5/2) and greenish gray (5G 6/1) tuffaceous siltstone (with sand). The minor component is dark greenish gray (5G 4/1), gray (5YR 5/1), grayish red (10R 4/2) and grayish blue green (5BG 5/2) sandstones, some with pebbles. This core show significant deformation features which include microfaults and inclined and wavy bedding planes. Dewatering features are common in this core, particularly in the siltstones. Bioturbation is not seen. Drilling disturbance is highly localized but moderate to severe.



Hole 351-U1438D Core 72R, Interval 888.1-895.09 m (CSF-A)

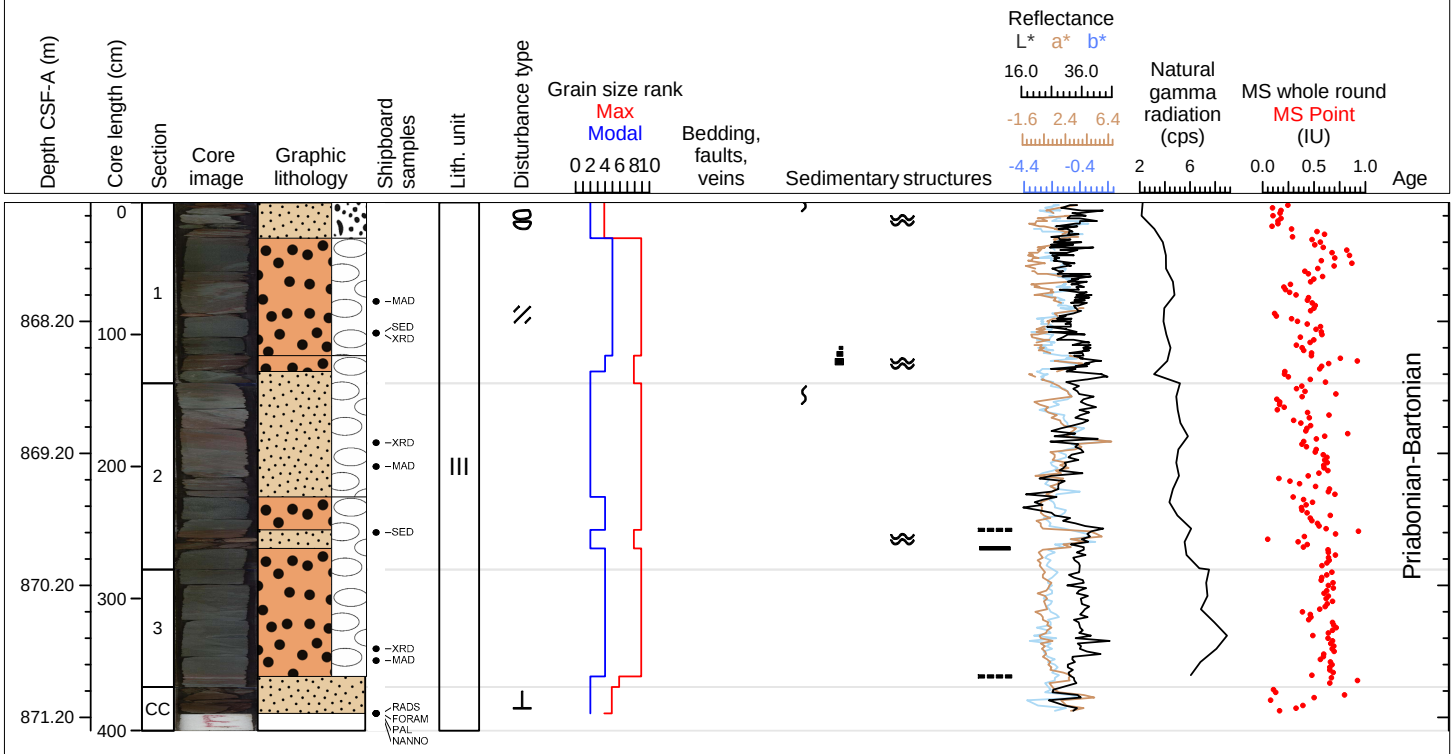
TUFFACEOUS SANDSTONE (WITH GRAVEL), TUFFACEOUS SILTSONE (WITH SAND): The upper two Sections of Core 72R are composed of tuffaceous siltstones with sand of alternating grayish red (10R 4/2) and dusky blue green (5BG 7/2) colors. Microfaults are present in these two Sections, most of which have a normal sense of shear. The lower Sections of the core consist of dusky blue green (5BG 3/2) tuffaceous sandstones with gravel. Section 3 is normally graded, the following Sections are massive. No bioturbation has been observed and drilling disturbance is slight.



U1438E-1R, 2R, 3R NO RECOVERY

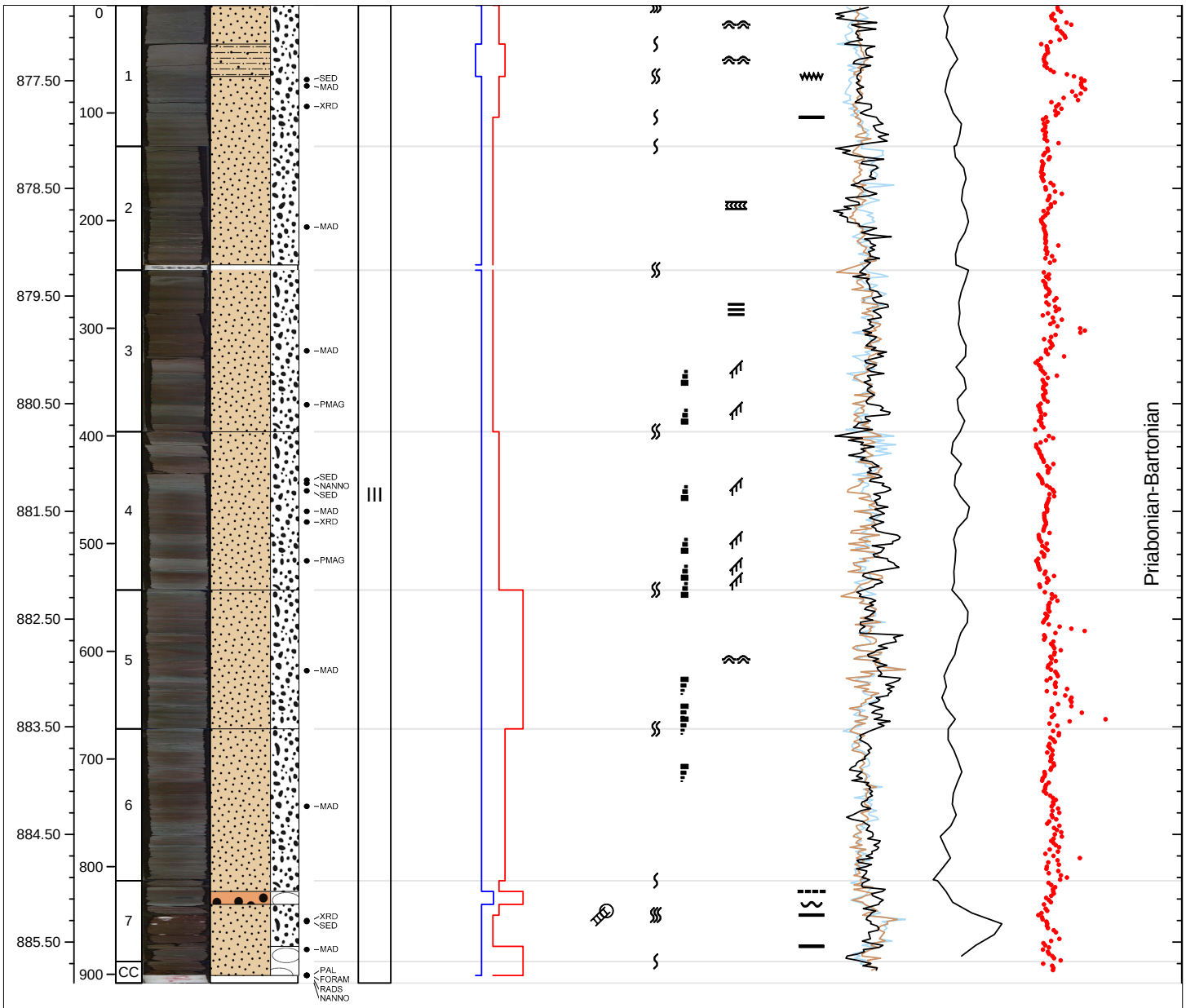
Hole 351-U1438E Core 4R, Interval 867.3-871.3 m (CSF-A)

TUFFACEOUS SANDSTONE (WITH GRAVEL), TUFFACEOUS SILTSTONE (WITH SAND), TUFFACEOUS SILTSTONE (WITH GRAVEL): Core 4R is best described as subequal amounts of alternating grayish green (10G 4/2), grayish blue green (5BG 5/2) and dark reddish brown (5YR 3/2) tuffaceous siltstones and siltstones with sand with dark greenish gray (5G 4/1) tuffaceous sandstone with gravel, some with pebbles up to 60 mm. The grayish green and reddish brown siltstones are intercalated, and these sections often are microfaulted, folded, and contain inclined beds. Bioturbation is slight in the siltstones, and drilling disturbance is severe in small sections.



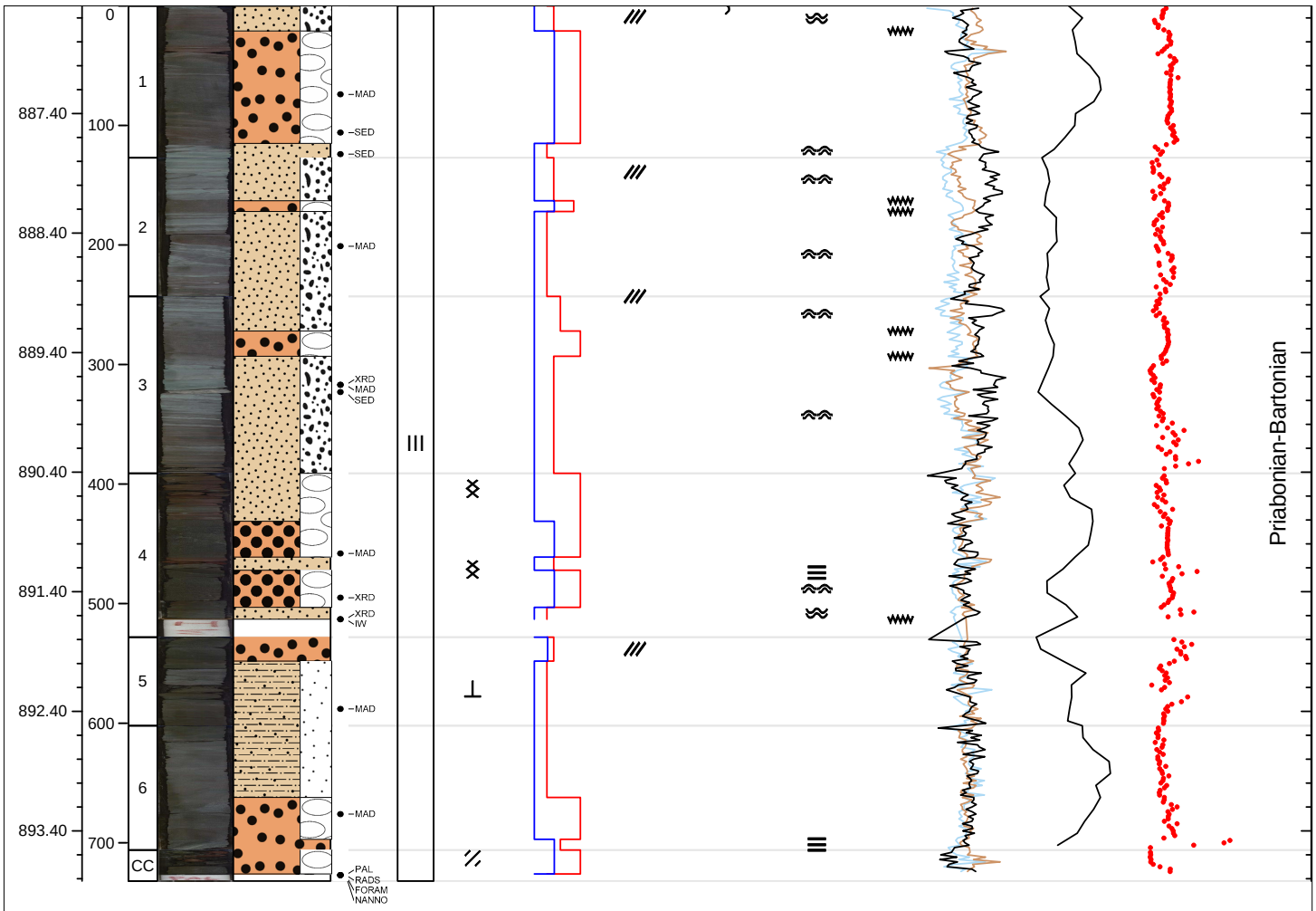
Hole 351-U1438E Core 5R, Interval 876.8-885.88 m (CSF-A)

TUFFACEOUS SANDSTONE (WITH GRAVEL), TUFFACEOUS SILTSTONE (WITH SAND), TUFFACEOUS SILTSTONE (WITH GRAVEL); TUFFACEOUS MUDSTONE (WITH SAND): Core 5R is dominated by alternating very dark gray (N 3), dark gray (5YR 4/1), dark greenish gray (5G 4/1) and dusky red (10R 3/4) or weak red (10R 4/2) tuffaceous siltstones with sand, with gravel, and tuffaceous mudstone with sand. There is a very small amount of dark gray (5YR 4/1) tuffaceous sandstone with gravel, in the form of thin injected sand layers, with pebbles up to 30 mm. The grayish green and reddish siltstones are intercalated, and these sections often are microfaulted, and contain inclined beds. One larger overturned bed may be present. Bioturbation is slight to strong in the siltstones.



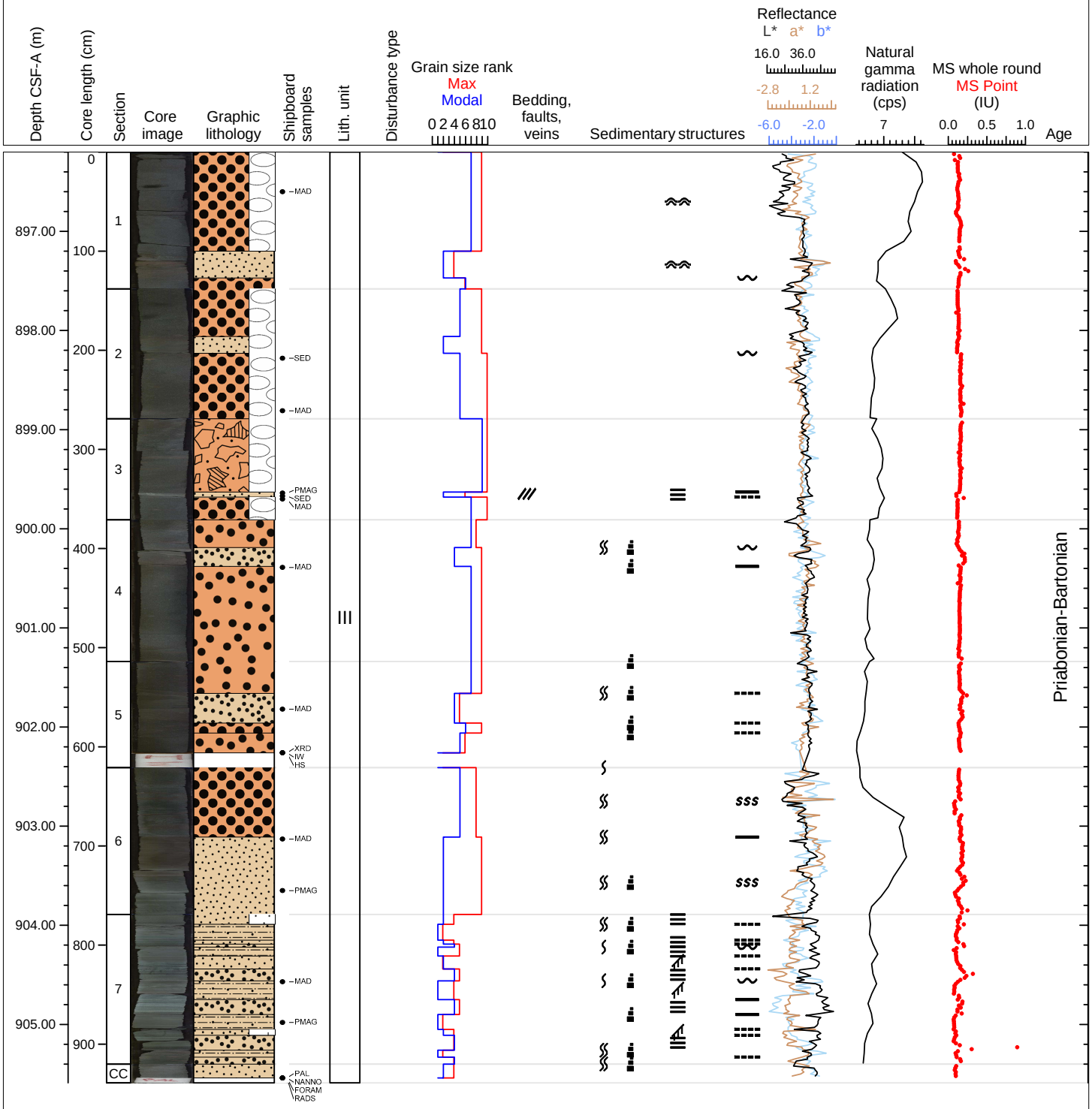
Hole 351-U1438E Core 6R, Interval 886.5-893.82 m (CSF-A)

TUFFACEOUS SANDSTONE (WITH GRAVEL), TUFFACEOUS SILTSTONE (WITH SAND), TUFFACEOUS MEDIUM TO COARSE SANDSTONE WITH GRAVEL, TUFFACEOUS MUDSTONE WITH FINE SAND: Core 6R consists of repeating sequences of weak red (10R 4/2) and dusky red (10R 3/4) tuffaceous siltstones (with sand) and greenish gray (5G 6/1) to dark greenish gray (5GY 4/1) tuffaceous (medium to coarse) sandstones (with gravel). Normal microfaults are common in the fine grained lithologies (mud- and siltstones) and some of the sandlayers show evidence for clastic diking and injection into the fine grained lithologies. Contacts are irregular and mostly scoured. Sorting is moderate or poor and planar and wavy laminations are present. Bioturbation is almost absent. Drilling caused moderate to destructive disturbance (brecciated and fragmented) in few narrow intervals.



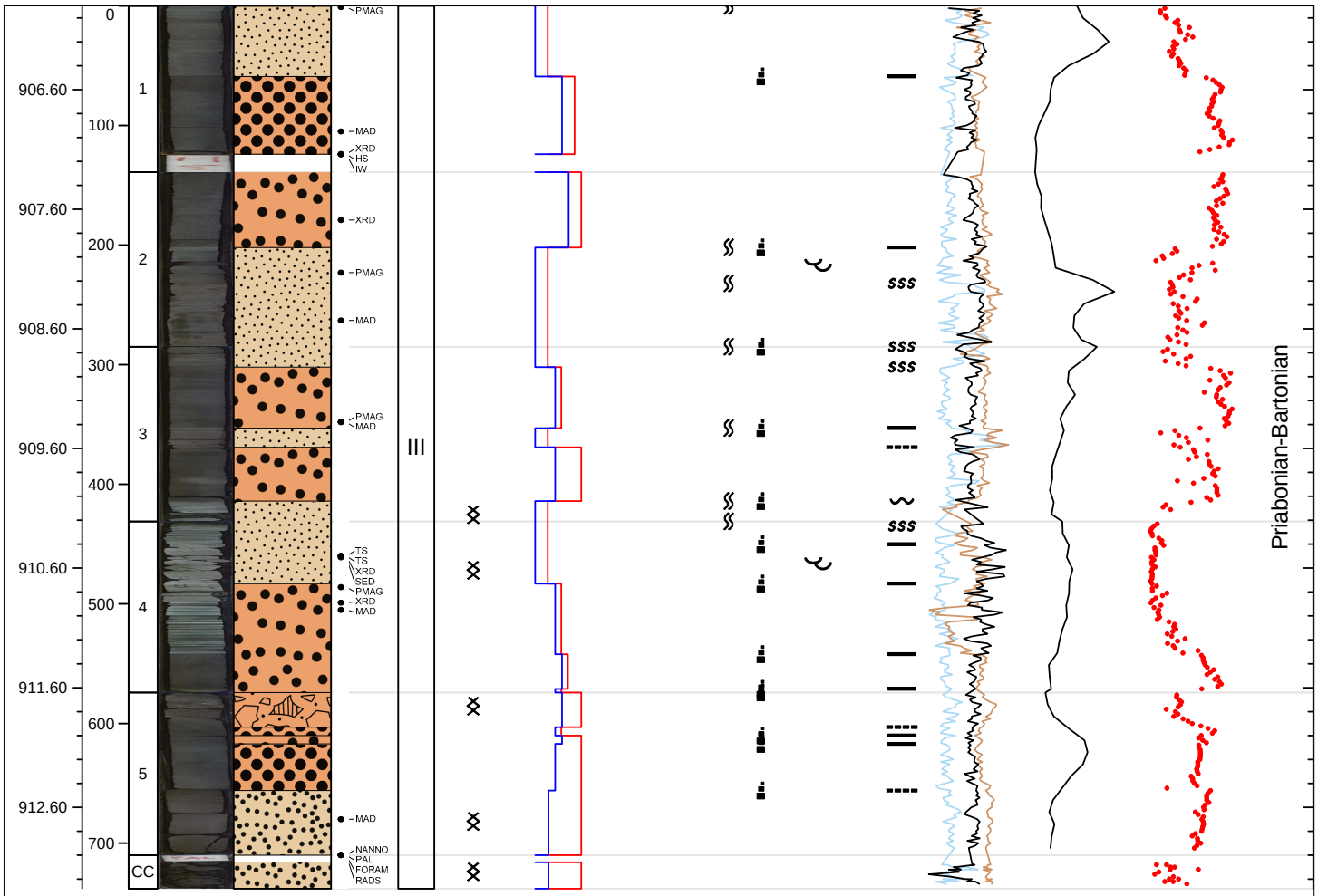
Hole 351-U1438E Core 7R, Interval 896.2-905.59 m (CSF-A)

TUFFACEOUS SANDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS BRECCIA-CONGLOMERATE: Core 7R is dominated by beds of greenish black (5G 2/1) and dark greenish grey (5G 4/1) fine to coarse tuffaceous sandstone, with minor tuffaceous siltstone and tuffaceous breccia-conglomerate. Many of the beds are normally graded and have both planar and cross laminations. Both inclined beds and clastic dykes occur at the top of the core. Bioturbation is moderate in some fine grained intervals. No drilling disturbance has been observed.



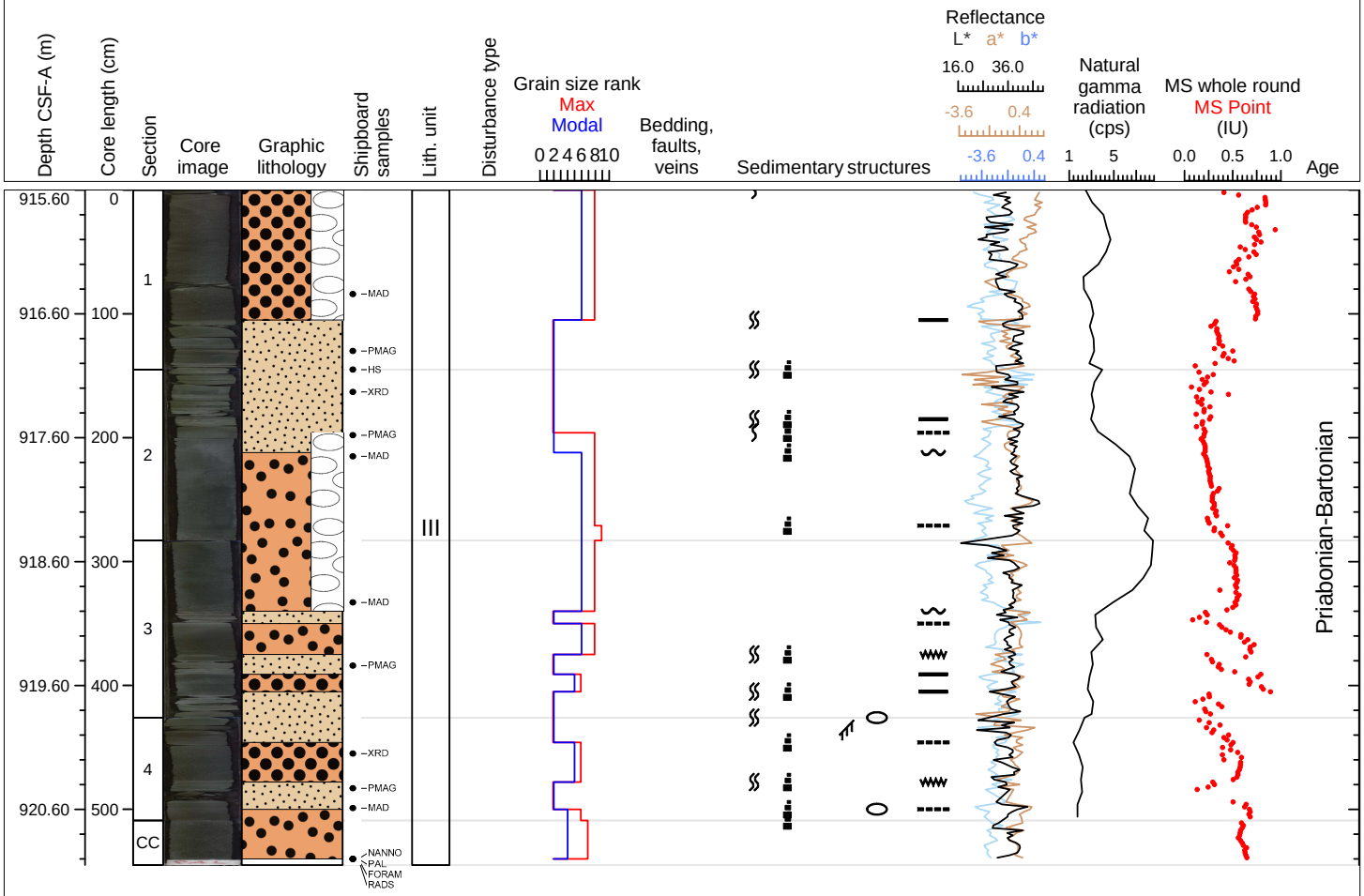
Hole 351-U1438E Core 8R, Interval 905.9-913.28 m (CSF-A)

TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE, BRECCIA-CONGLOMERATE: Core 8R contains alternation of: 1) moderately bioturbated dark greenish grey (5G 4/1), grayish brown (5YR 3/2) to olive grey (5Y 4/1) siltstones with 2) medium to coarse grained greenish black (5G 2/1), grayish green (5G 5/2) and dark green (N3) sandstones and weak red (10R 4/2) poorly sorted volcanic breccia-conglomerates, The tuffaceous sandstone-siltstone boundary is usually sharp and wavy. The tuffaceous sandstones are normally graded and often exhibit fine lamination and cross bedding. In section 4 the tuffaceous siltstones are with fine lamination and cross bedding structures, especially in the interval between 50 and 110 cm where we see alternation of very light gray (N8) and greyish green (5G 5/2) beds. Bioturbation is moderate in siltstones and some intervals have been affected by slight to severe drilling disturbances.



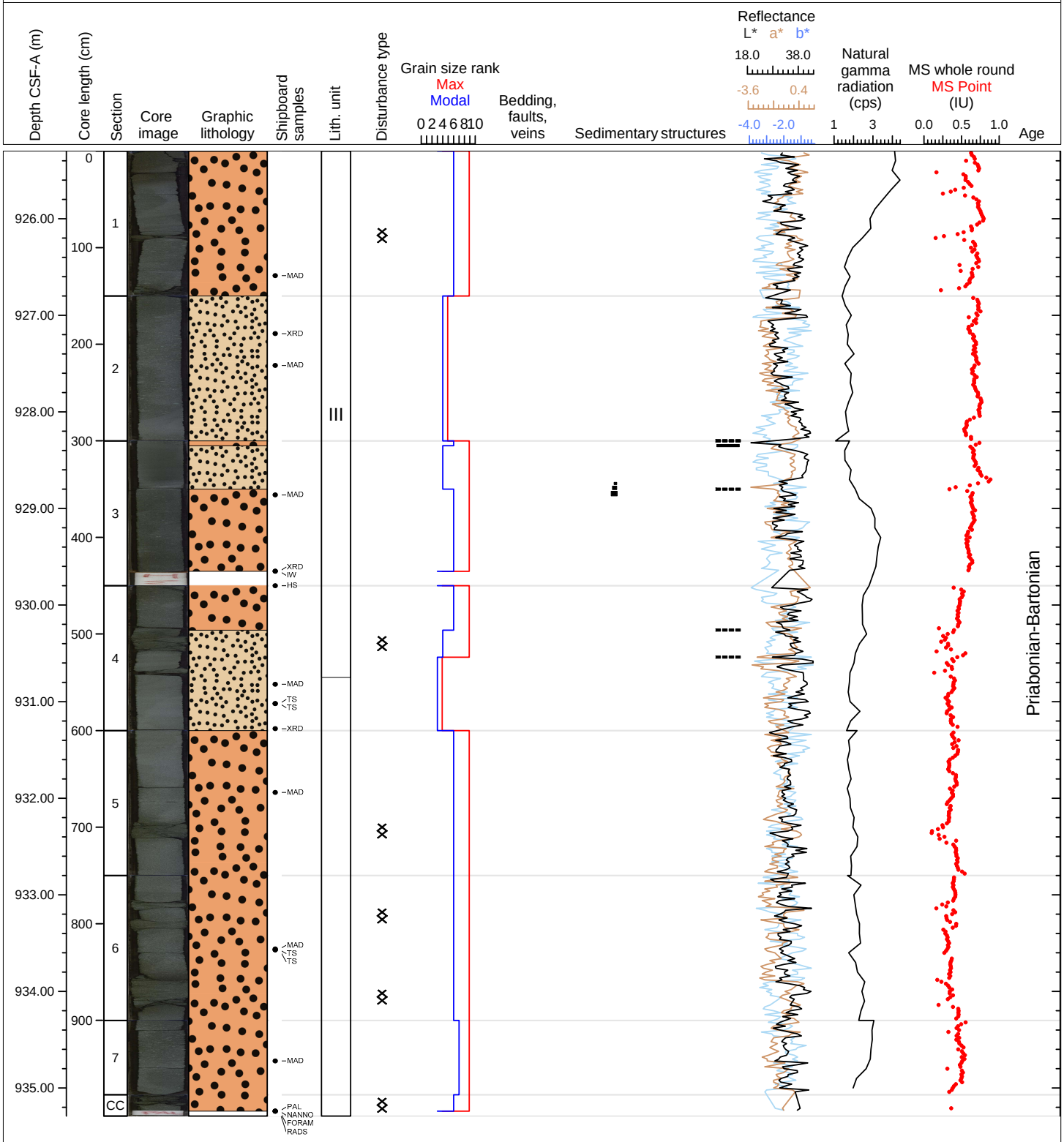
Hole 351-U1438E Core 9R, Interval 915.6-921.05 m (CSF-A)

TUFFACEOUS SANDSTONE AND SILTSTONE: Core 9R consists of intercalated intervals of greenish black (5G 2/1) tuffaceous coarse sandstone and greenish grey tuffaceous siltstone (5G 4/1). Sandstone is the dominant lithology and it forms thick (300-100 cm) poorly sorted and ungraded layers. Intervals in Section 2, 51-67 cm and 126-137 cm and Section 3, 67-92 cm contain a few pebble sized clasts of mudstone and volcanic rock. Siltstone intervals are 10-20 cm thick and have gradational lower contacts with underlying sandstones. They grade upward into moderately bioturbated fine siltstone. In Section 4, sandstone is marked by numerous 1 mm grey spherical concretions. Drilling disturbance is slight.



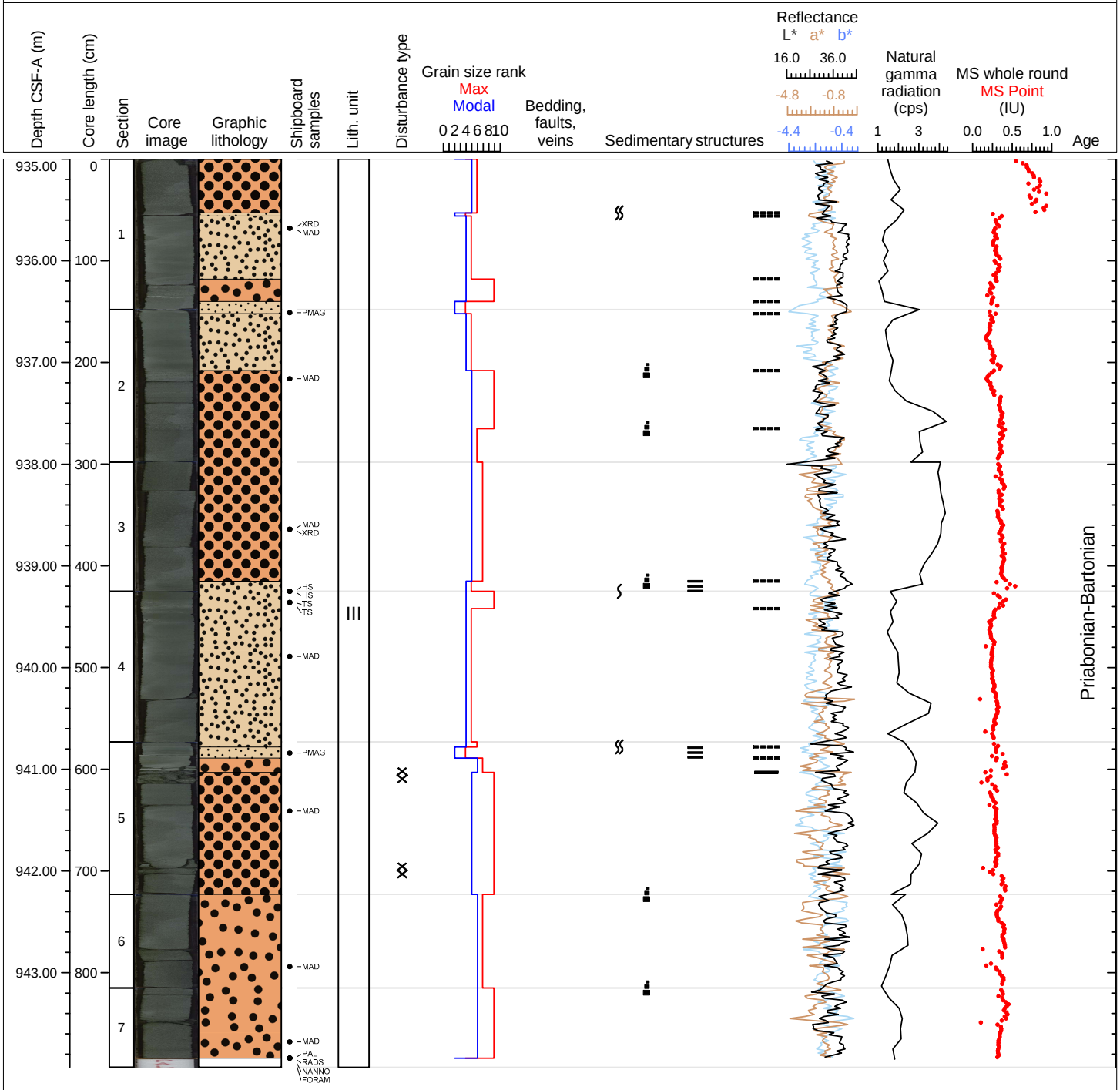
Hole 351-U1438E Core 10R, Interval 925.3-935.29 m (CSF-A)

TUFFACEOUS SANDSTONES: Core 10R consist entirely of moderately to poorly sorted coarse grained tuffaceous sandstones. Colors vary from dark greenish gray (5G 4/1) to grayish green (5G 5/2). The tuffaceous sandstones are not bioturbated and exhibit normal grading. The boundaries between the sandstone types are gradational and either inclined or sub-horizontal. Often they contain pebbles up to 1.9 cm in size. Sections 4, 5, and 6 show intervals with moderate to severe drilling disturbances (brecciation).



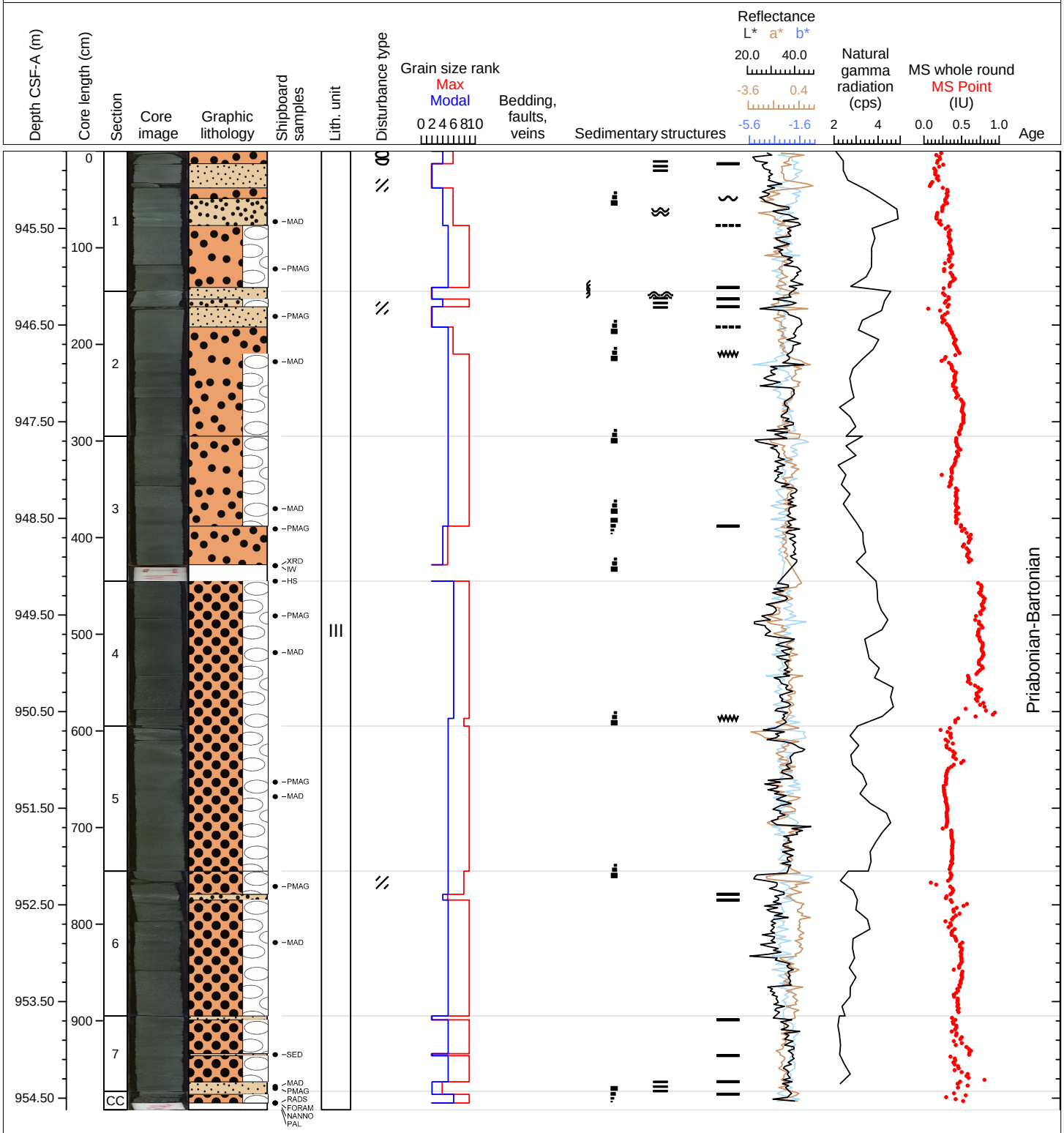
Hole 351-U1438E Core 11R, Interval 935.0-943.93 m (CSF-A)

TUFFACEOUS (MEDIUM TO COARSE) SANDSTONE, TUFFACEOUS FINE SANDSTONE, TUFFACEOUS SILTSTONE: Core 11R is dominated by decimeter-scale beds of fine-to-coarse tuffaceous sandstone, with minor siltstone and rare mudstone. Beds in this interval are 50-70 cm thick and show diffuse normal and reverse grading of sand-size particles. Planar laminations are rare and restricted to the finer grain sizes. The color of the rock is dominated by shades of grayish green (10G 4/2 and 5G 5/2). Bioturbation occurs in silt- and fine sandstones. Minor drilling disturbance (brecciation) was observed in two intervals in Section 5.



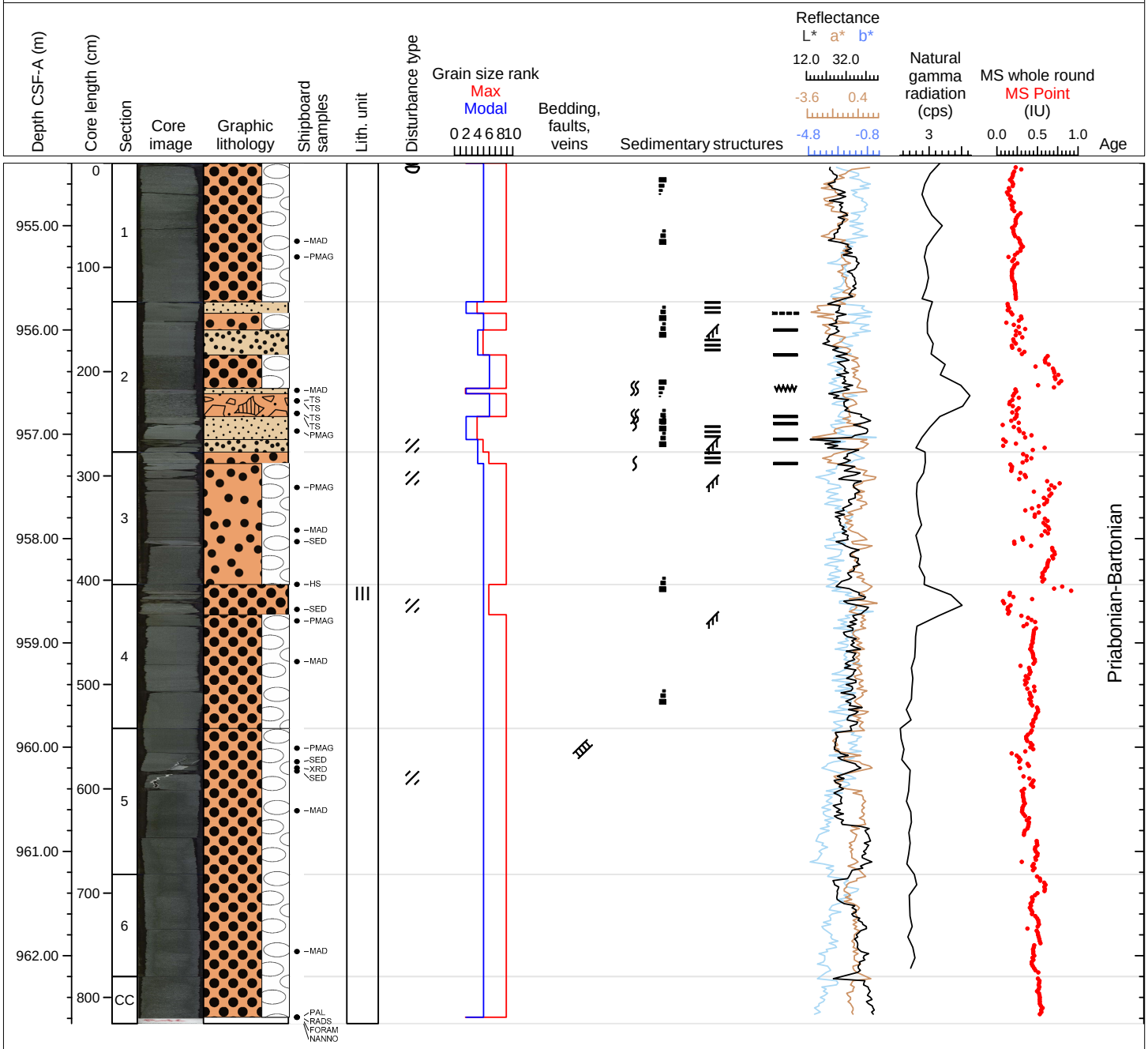
Hole 351-U1438E Core 12R, Interval 944.7-954.62 m (CSF-A)

TUFFACEOUS SANDSTONE (WITH GRAVEL), TUFFACEOUS MEDIUM TO COARSE SANDSTONE (WITH GRAVEL), TUFFACEOUS SILTSTONE, TUFFACEOUS SILTSTONE (WITH GRAVEL); TUFFACEOUS FINE SANDSTONE (WITH GRAVEL): Core 12R is dominated by grayish green (5G 5/2; 10G 4/2) tuffaceous sandstones (with gravel) with pebbles up to 20 mm, and tuffaceous siltstones (with gravel). Many of the coarse sandstones show either normal or reverse grading over dm-lengthscales. Contacts between the sandstones and siltstones are generally sharp and planar, although graded and scoured contacts occur. Bioturbation is absent in the core. Short intervals are affected by moderate to severe fragmenting.



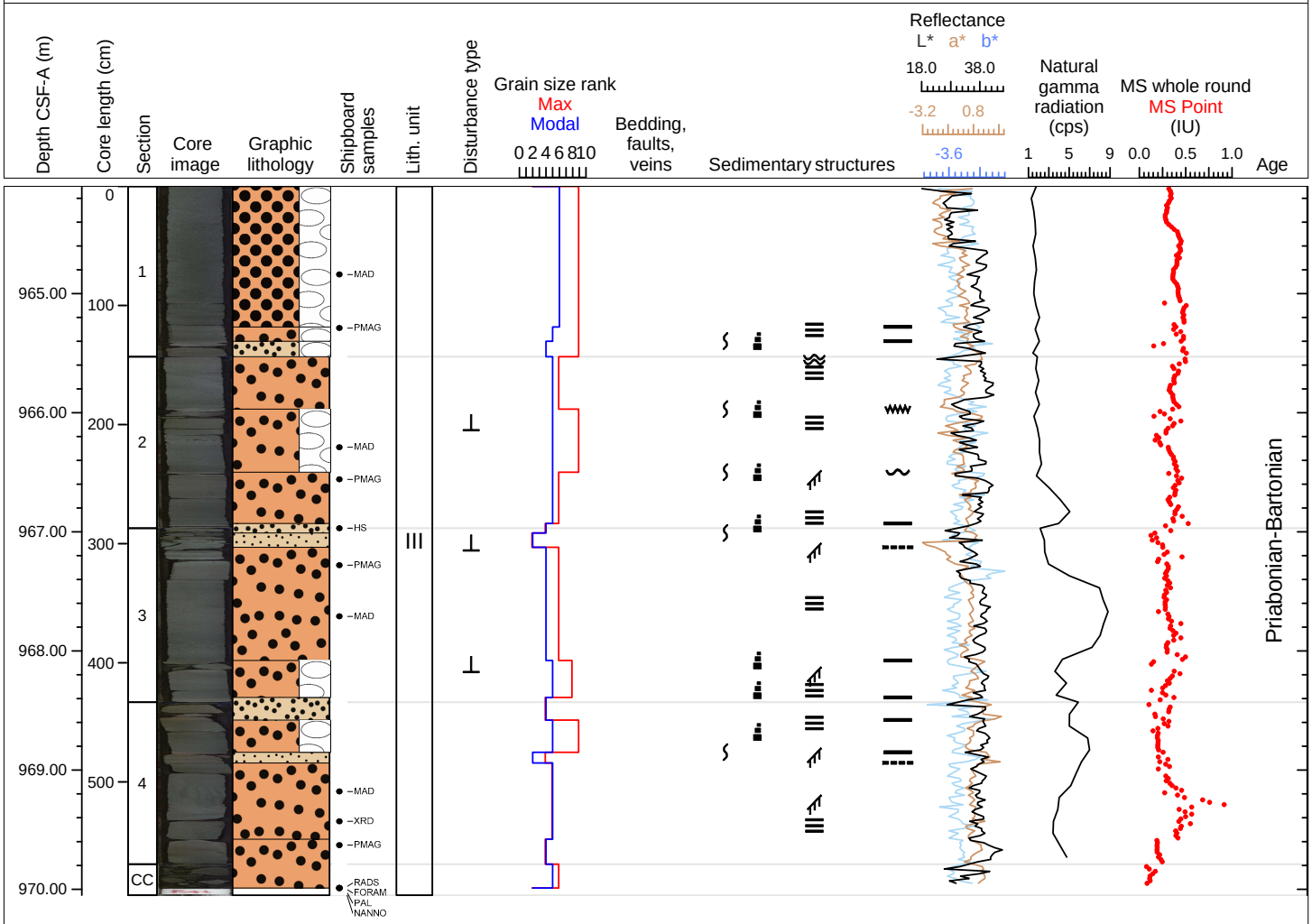
Hole 351-U1438E Core 13R, Interval 954.4-962.65 m (CSF-A)

TUFFACEOUS SANDSTONE (WITH GRAVEL), TUFFACEOUS MEDIUM TO COARSE SANDSTONE (WITH GRAVEL), TUFFACEOUS BRECCIA-CONGLOMERATE, TUFFACEOUS SILTSTONE, TUFFACEOUS FINE SANDSTONE: Core 13R is predominantly composed of grayish green (5G 5/2; 10G 4/2), dark greenish gray (5G 4/1) and pale green (10G 4/1) tuffaceous sandstones (with gravel) with pebbles up to 23 mm, and tuffaceous siltstones (with gravel). Many of the coarse sandstones show normal grading over dm-scales. Some intervals show planar and cross lamination. Contacts between the sandstones and siltstones are generally sharp and planar, although graded and scoured contacts occur. A white vein (quartz/gypsum?) occurs in Section 5. Bioturbation is slight to moderate in the silt- and sandstones. Short intervals are affected by slight to moderate fragmenting.



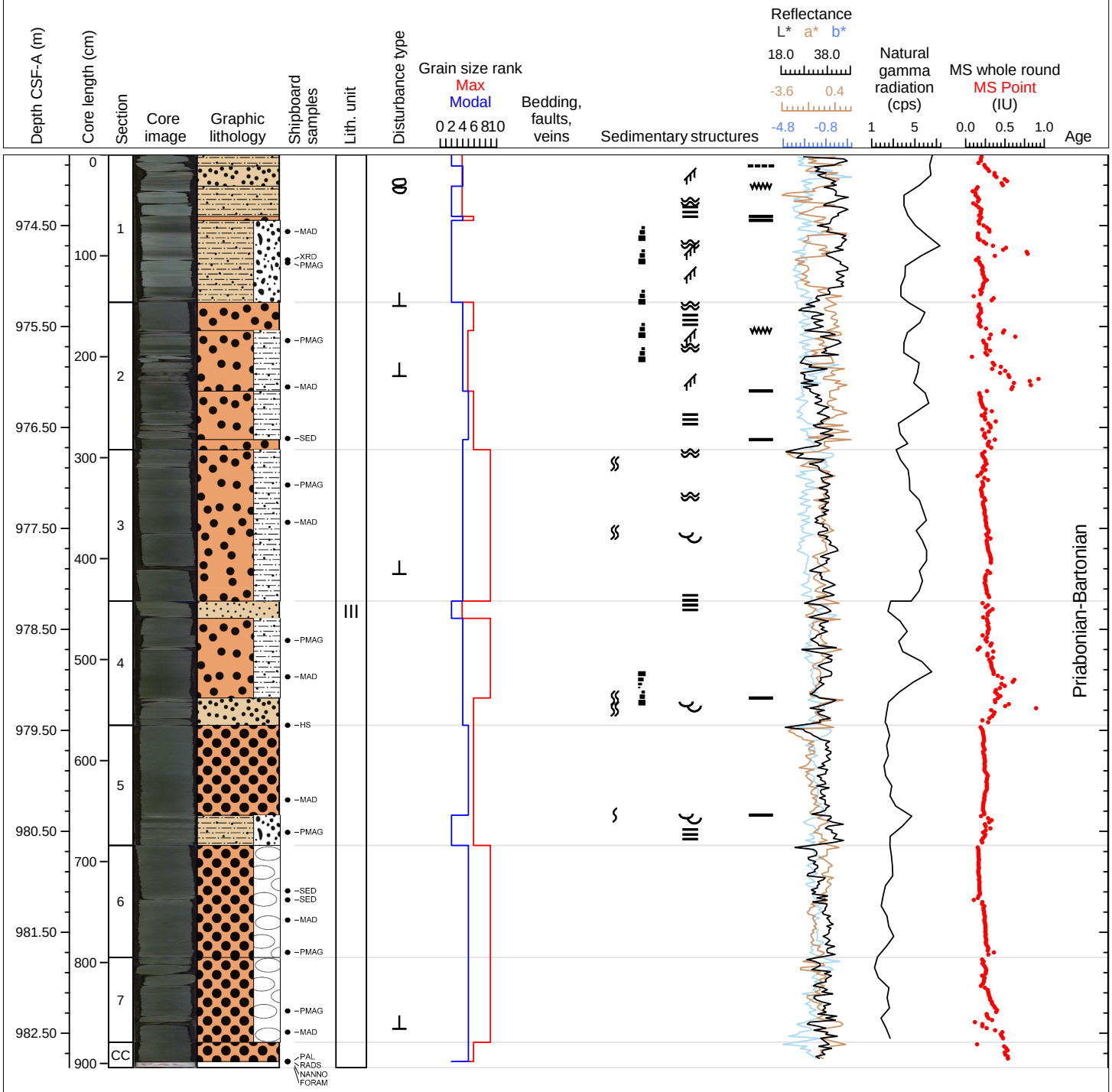
Hole 351-U1438E Core 14R, Interval 964.1-970.05 m (CSF-A)

TUFFACEOUS SANDSTONE (WITH GRAVEL), TUFFACEOUS FINE SANDSTONE, TUFFACEOUS SILTSTONE: Core 14R is predominantly grayish green (10G 4/2, 5G 5/2) and dark greenish gray (5G 4/1, 5GY4/1) tuffaceous sandstones (with gravel) with pebbles up to 15 mm, and tuffaceous siltstones. Many of the sandstones show normal grading over dm-scales. Some intervals show planar and cross lamination. Contacts between the sandstones and siltstones are generally sharp and planar, although graded contacts occur. Bioturbation is slight in the silt- and sandstones. Some intervals have been slightly to severely fractured during drilling.



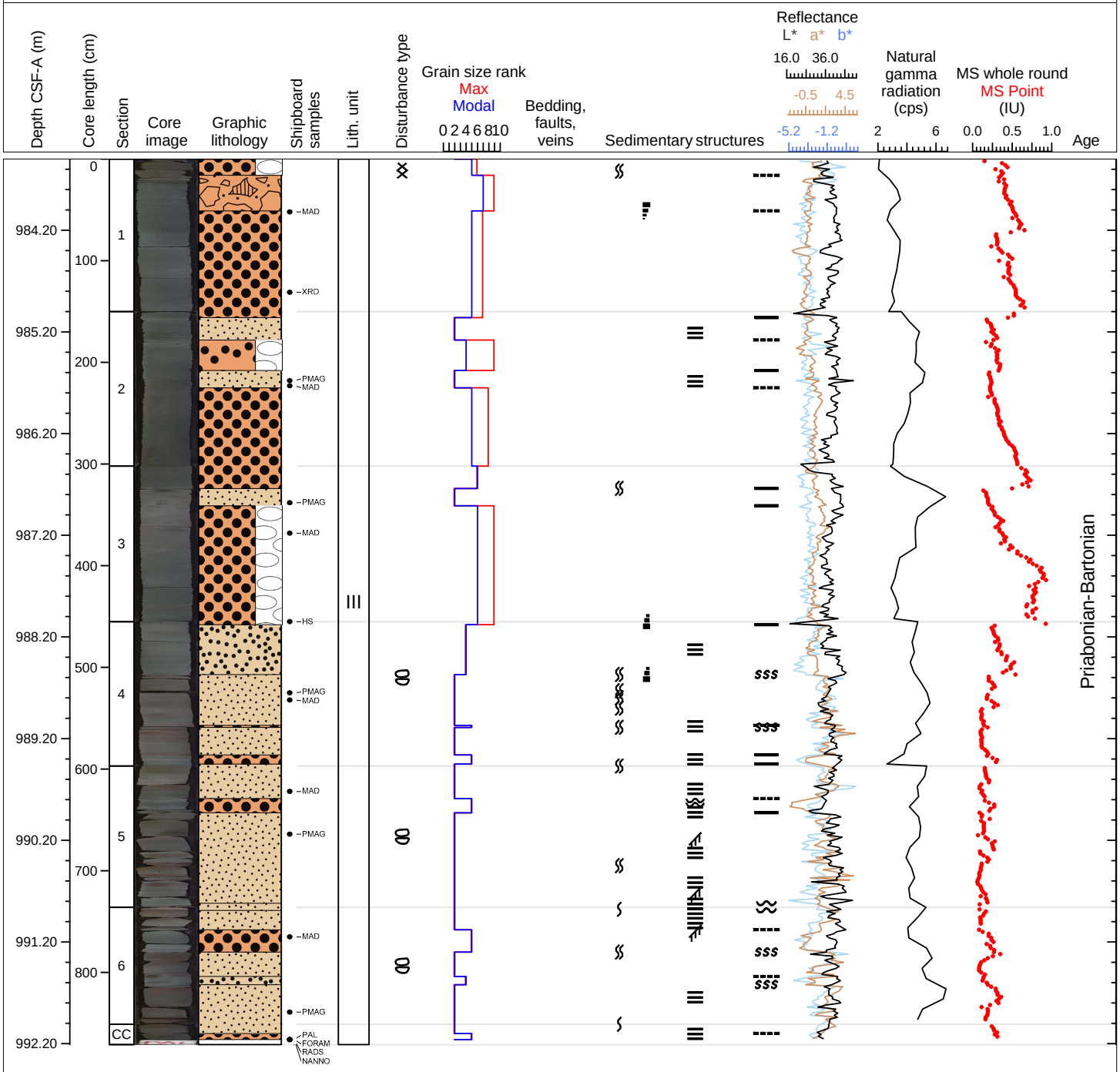
Hole 351-U1438E Core 15R, Interval 973.8-982.84 m (CSF-A)

TUFFACEOUS SANDSTONE (WITH MUD/WITH GRAVEL), TUFFACEOUS MEDIUM TO COARSE SANDSTONE, TUFFACEOUS FINE SANDSTONE, TUFFACEOUS MUDSTONE (WITH SAND), TUFFACEOUS SILTSTONE: Core 15R is dominated by tuffaceous sandstones of various grainsizes and shades of green (5G 5/2, 10G 4/2, 5G 4/1). Mud- and siltstones are intercalated and some beds show slight to moderate bioturbation. Grading is rare and clasts are smaller compared to overlying cores (< 8 mm). Bedding structures are diverse and mottled laminations are the dominant sedimentary structure, even if this might be due to secondary overprint. Drilling disturbance is restricted to short intervals in the core.



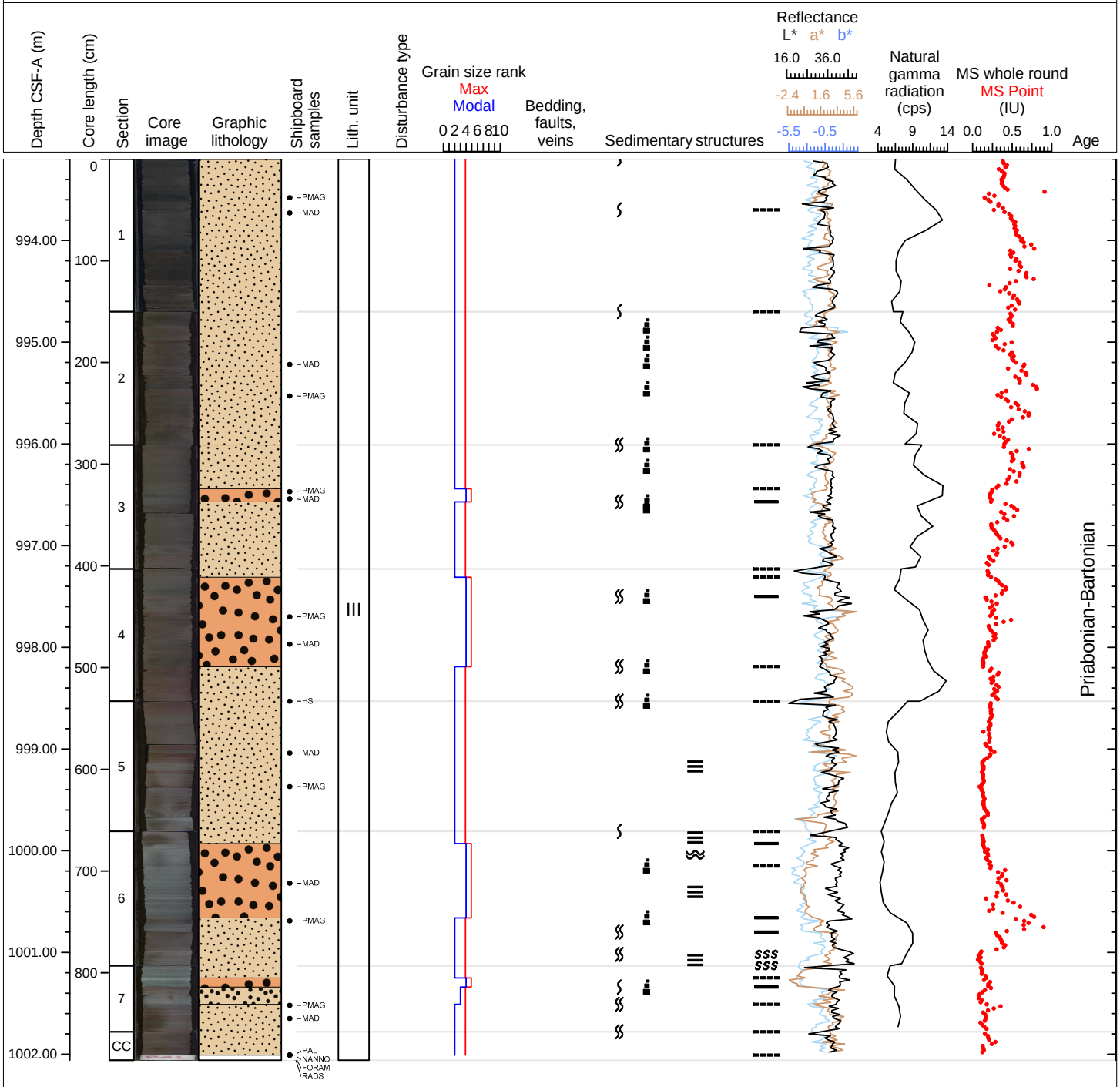
Hole 351-U1438E Core 16R, Interval 983.5-992.21 m (CSF-A)

TUFFACEOUS FINE, MEDIUM AND COARSE SANDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS BRECCIA-CONGLOMERATE: Grayish green (5G 5/2 and 10G 4/2) tuffaceous medium to coarse sandstones are dominant at Section 1 to 3 of Core 16R. Fine and medium sandstones are alternating with pale brown (5YR 5/2) tuffaceous siltstone from Section 4 to CC. Bottom contacts of sandstones are sharp. The sandstones have planar and cross lamination. Siltstones also have planar lamination and are slight to moderately bioturbated. Breccia-conglomerate at Section 1, 16-51 cm have reverse grading and the max clast size is 13 mm. Drilling disturbance is none to slight in Sections 5 and 6.



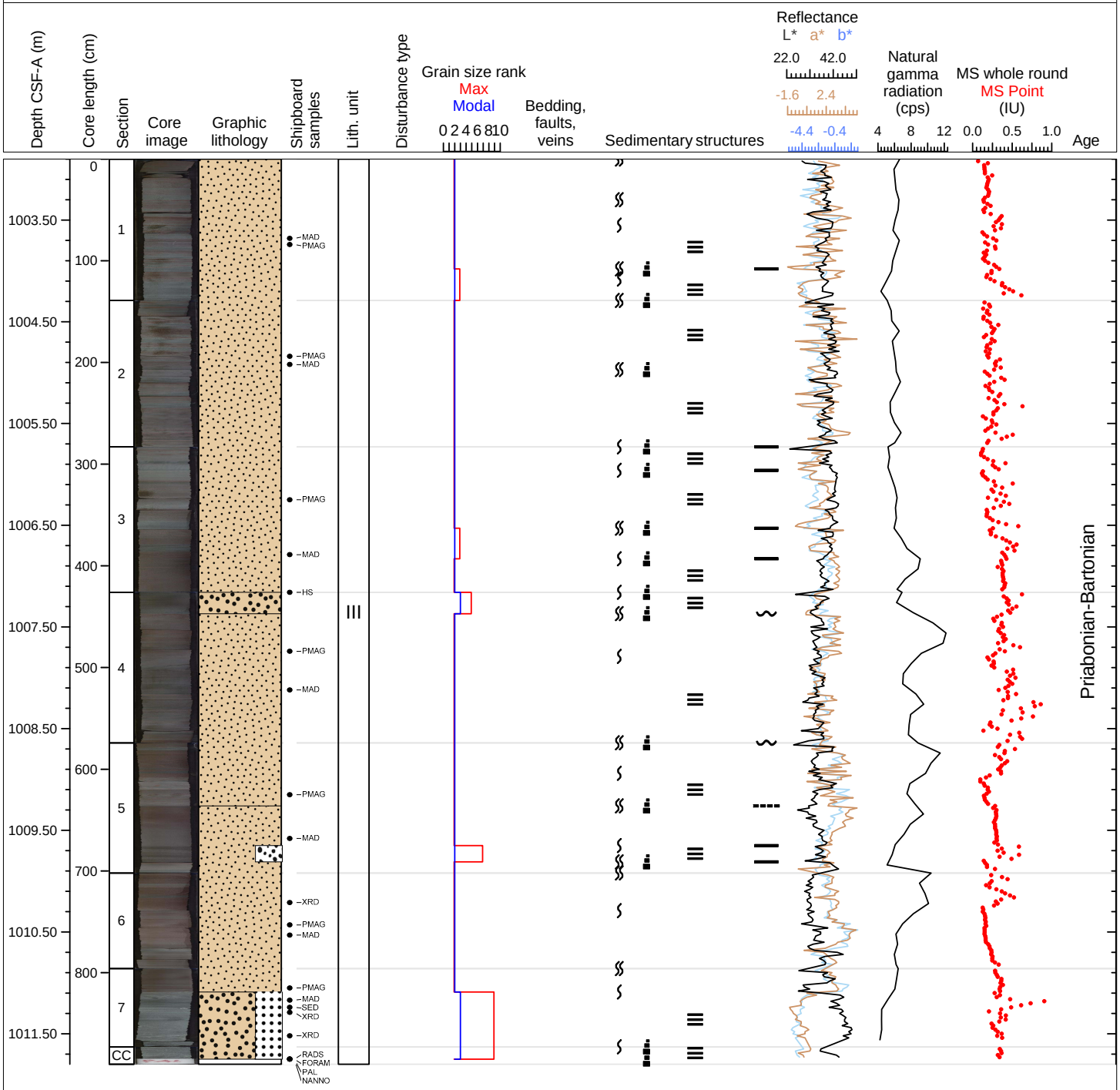
Hole 351-U1438E Core 17R, Interval 993.2-1002.06 m (CSF-A)

TUFFACEOUS SANDSTONE, TUFFACEOUS SILTSTONE: Core 17R is dominated by dark reddish brown (5YR 5/2) and bluish grey (5B 5/1) tuffaceous siltstone interbedded with thin dark greenish grey (5G 4/1) and dark olive grey (5Y 3/2) fine-grained tuffaceous sandstone. Some intervals contain convoluted bedding, planar laminations and/or normally graded intervals. The siltstone is slightly to moderately bioturbated. Drilling disturbance is either not present or very slight.



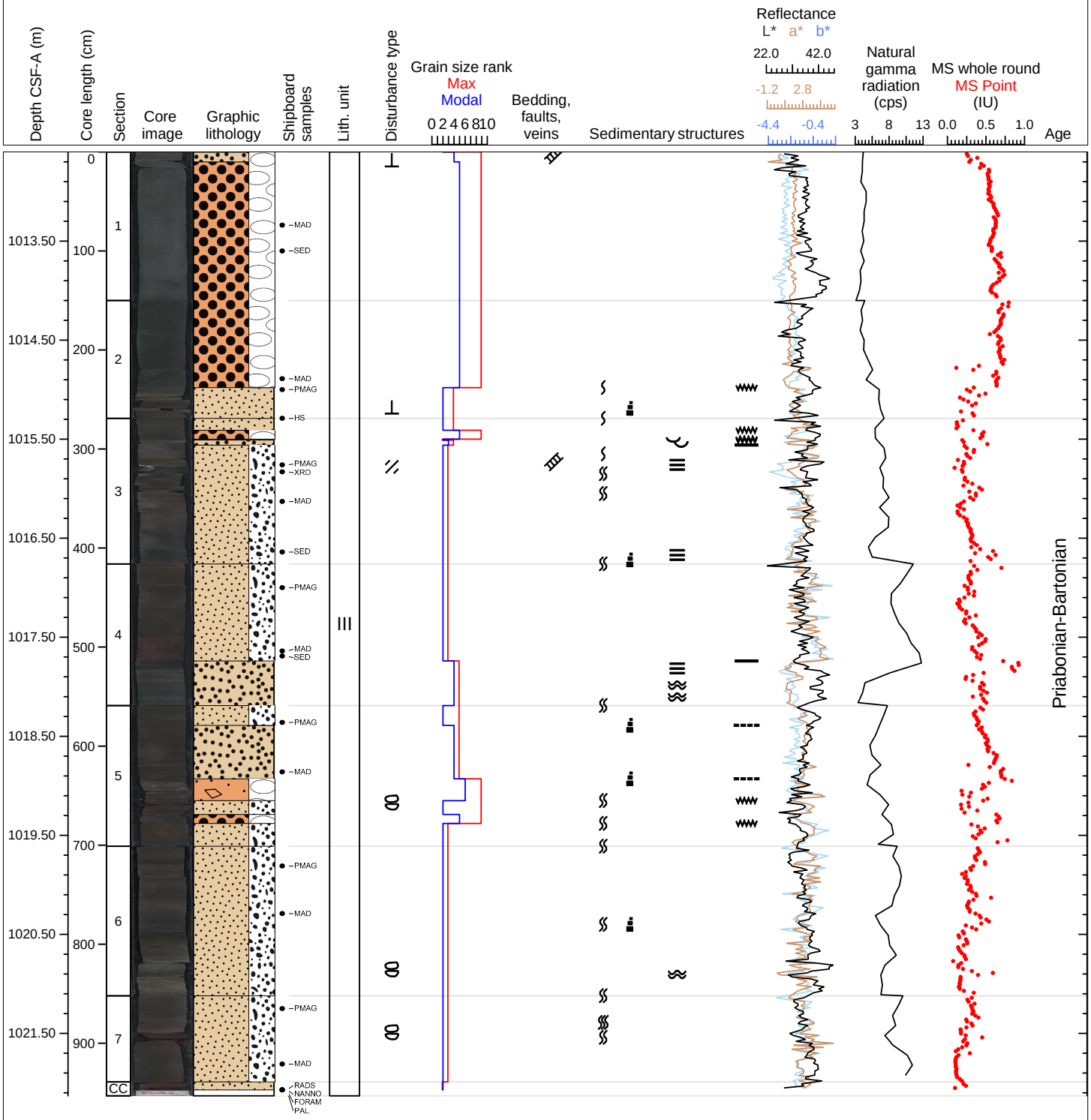
Hole 351-U1438E Core 18R, Interval 1002.9-1011.8 m (CSF-A)

TUFFACEOUS SILTSTONE, TUFFACEOUS FINE SANDSTONE: Core 18R consists of multiple small (4-15 cm) intervals of intercalated dusky blue green (5BG 3/2) and greyish red (10R 4/1) siltstone. Intervals are graded upward, with planar lamination in the lower parts and bioturbation in the upper parts. Contacts are sharp and planar or wavy. In Core 5, there is a 16 cm interval of laminated siltstone with white flattened sand-sized grains, and the final interval in Core 7 and CC is a tuffaceous fine sandstone with lapilli. Drilling disturbance is minimal.



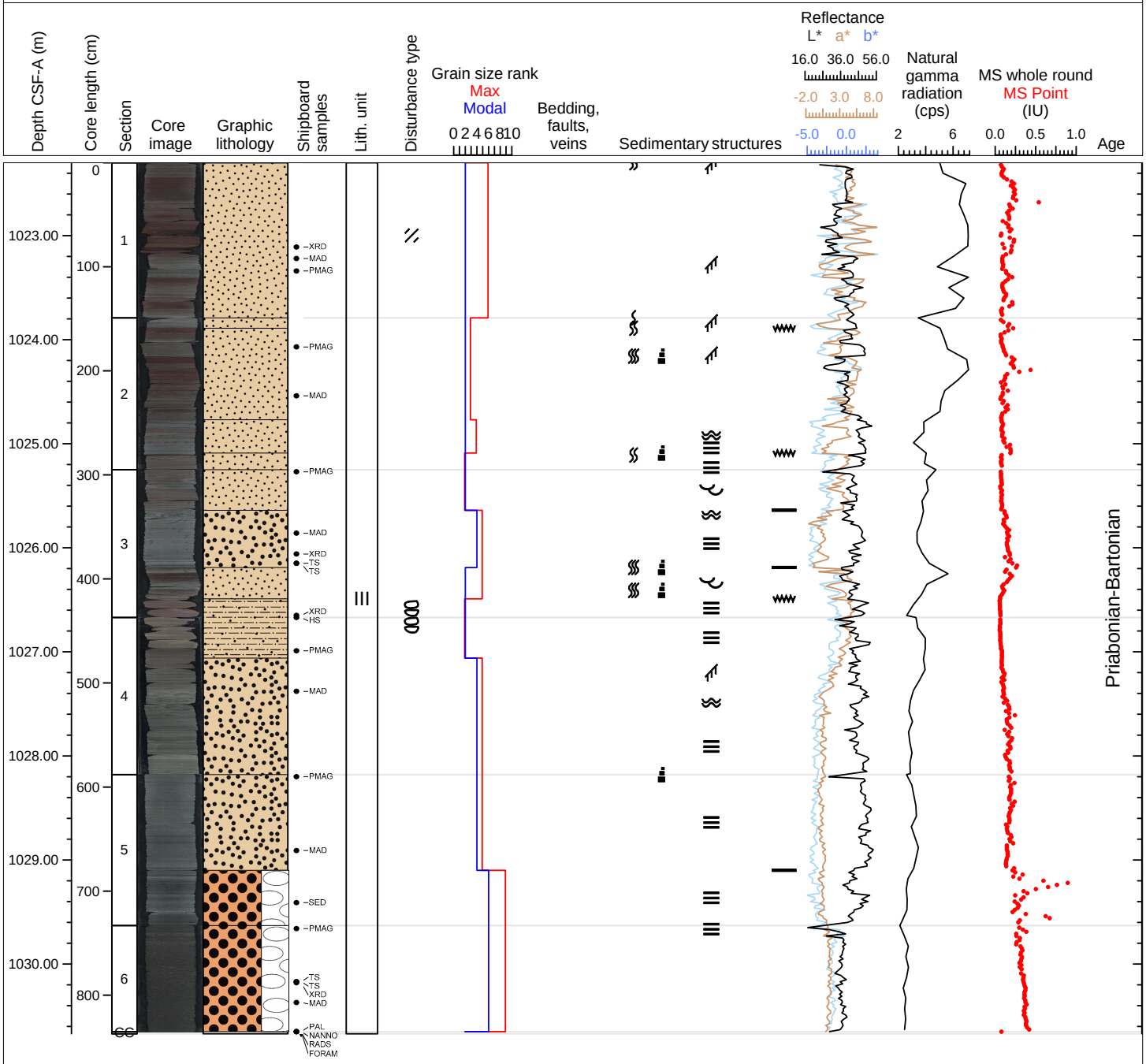
Hole 351-U1438E Core 19R, Interval 1012.6-1022.13 m (CSF-A)

TUFFACEOUS SILTSTONE (WITH SAND), TUFFACEOUS FINE SANDSTONE (WITH GRAVEL), TUFFACEOUS MEDIUM TO COARSE SANDSTONE (WITH GRAVEL), TUFFACEOUS MATRIX-SUPPORTED POLYMICT BRECCIA: Sections 1 and 2 of Core 19R are predominantly dark gray (N4) and bluish gray (5B 5/1) tuffaceous sandstone (with gravel) with pebbles up to 12 mm, which intercalated by dm-scales weak red (10R 4/2) tuffaceous siltstone. Sections 3 to cc are dominated by dark reddish brown (5YR 3/2), weak red (10R 4/2) and dusky red (10R 3/4) tuffaceous siltstone intercalated by dm-scales bluish gray (5B 5/1), gray (N5), dark greenish gray (5G 4/1) and dark reddish brown (5YR 3/2) tuffaceous fine sandstone. In Section 5, dark gray (5YR 4/1) tuffaceous matrix-supported polymict breccia with mud clast and black (5YR 2.5/1) sandstone are intercalated. Some siltstones show slight to strong bioturbation. Some sandstones show normal grading and planar and cross bedding. Drilling disturbance is restricted to short intervals in the core.



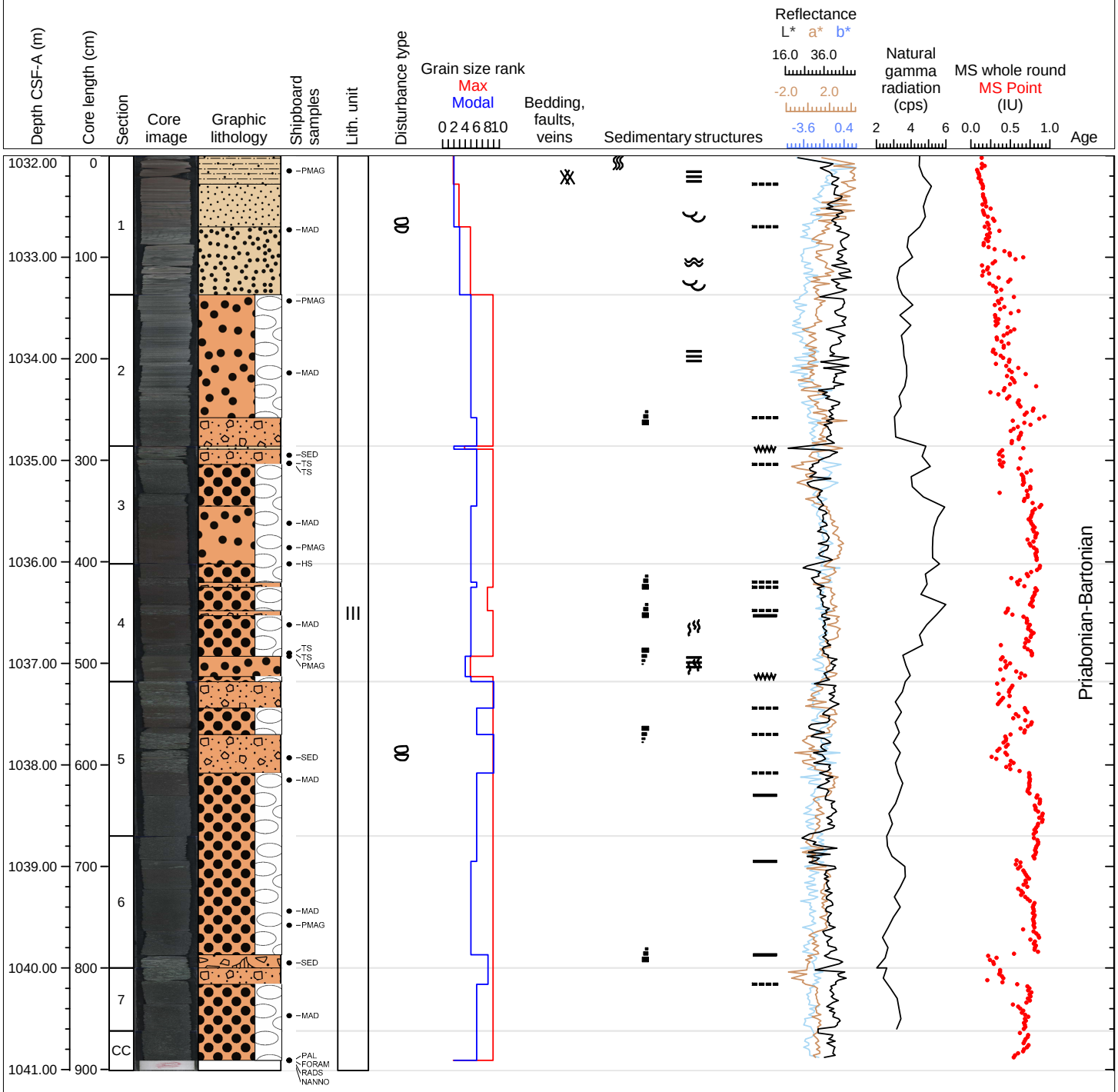
Hole 351-U1438E Core 20R, Interval 1022.3-1030.67 m (CSF-A)

TUFFACEOUS SILTSTONE, TUFFACEOUS FINE SANDSTONE, TUFFACEOUS MEDIUM TO COARSE SANDSTONE WITH GRAVEL, TUFFACOUS MUDSTONE: Core 20R is composed of alternating beds of pale red (10R 6/2) and dusky red (10R 3/4) tuffaceous mud- and siltstones and greenish gray (5G 6/1) to greenish black (5G 2/1) tuffaceous fine or medium to coarse sandstones (with gravel). Sorting is well to moderate and normal-grading is common. Cross- and planar laminations are very common throughout the core and bioturbation is slight to strong in the mud- and siltstones. Drilling caused moderate biscuiting in Sections 1 and 3.



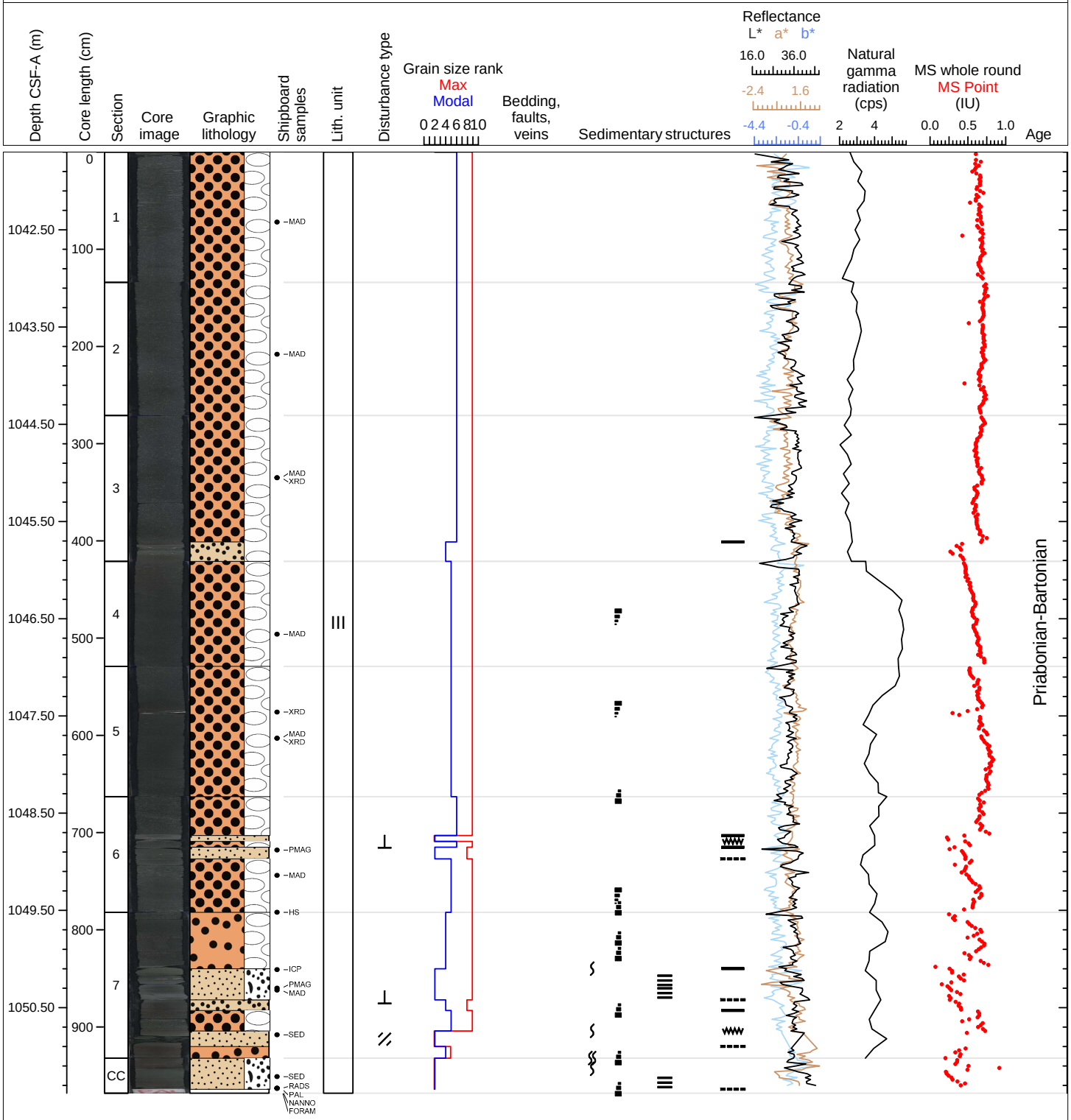
Hole 351-U1438E Core 21R, Interval 1032.0-1041.01 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE WITH GRAVEL, TUFFACEOUS SANDSTONE WITH GRAVEL, TUFFACEOUS MATRIX-SUPPORTED POLYMICT CONGLOMERATE, TUFFACEOUS FINE SANDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS MUDSTONE: Core 21R is dominated by alternating beds of tuffaceous sandstone (most is medium to coarse) with gravel and tuffaceous matrix-supported polymict conglomerates. The top two Sections of the core include a normal-graded sequence from weak red (10R 4/2) mud- and siltstone to strongly cross-bedded, gray (5YR 6/1) fine sandstone and laminated, gray sandstone (N3) and very dark gray (N3) conglomerate at the base of Section 2. The middle Sections are dominated by very dusky red (10R 2.5/2) colors, whereas green is dominant towards the bottom (grayish green [5G 5/2], greenish black [5G 2/1]). No bioturbation except for the uppermost part of the mudstone layer in Section 1. Drilling disturbance is absent or restricted to short intervals.



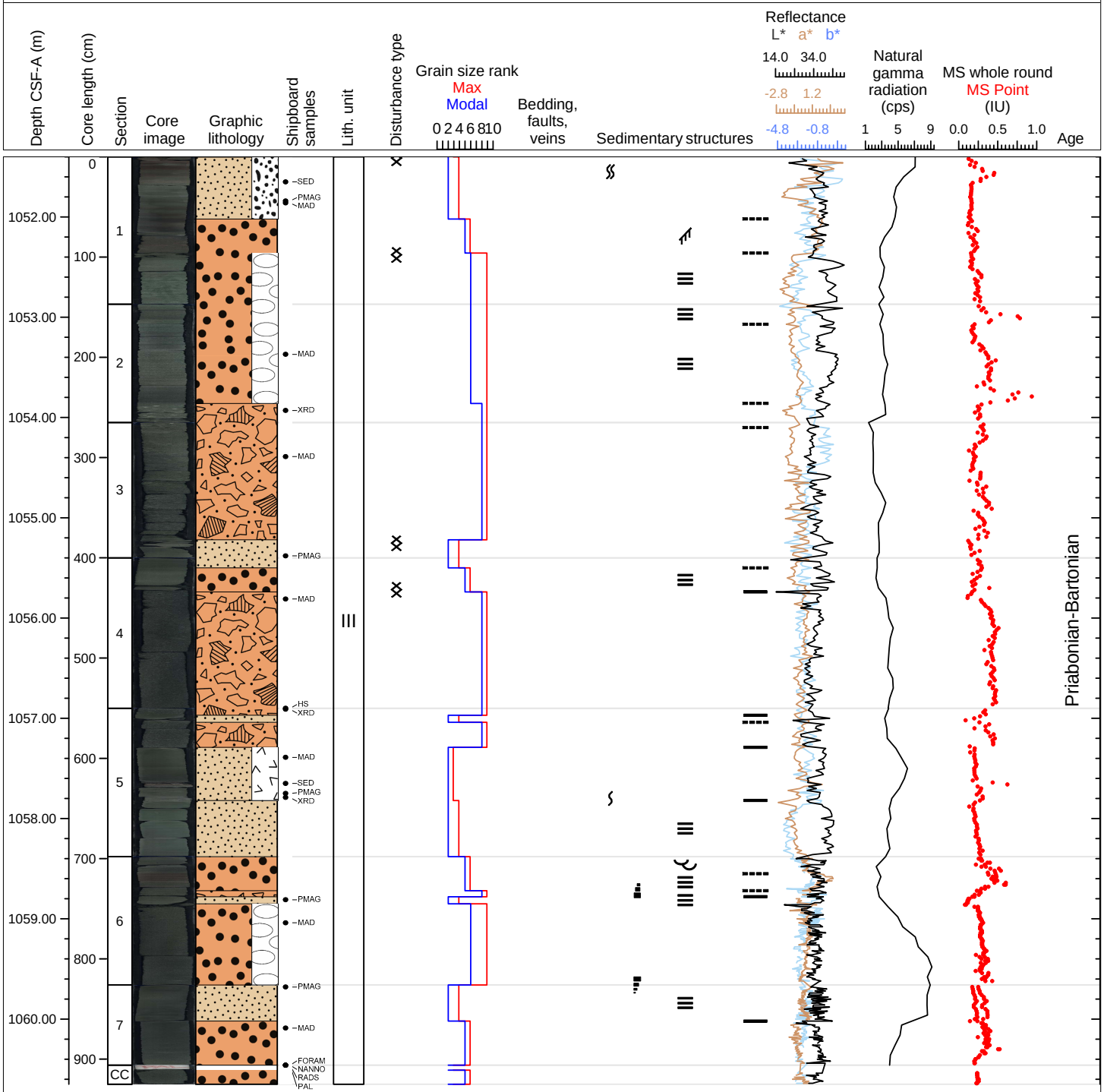
Hole 351-U1438E Core 22R, Interval 1041.7-1051.38 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE WITH GRAVEL, TUFFACEOUS SANDSTONE WITH GRAVEL, TUFFACEOUS SILTSTONE, TUFFACEOUS FINE SANDSTONE: Core 22R is dominated by dark greenish gray (5G 4/1), black (5YR 2.5/1) and dark reddish brown (5YR 3/2) tuffaceous sandstone with gravel up to 36 mm. In Section 6 to CC, dark greenish gray (5G 4/1) and dark reddish brown (5YR 3/2) tuffaceous siltstones are intercalated. Some sandstones show normal grading. Some siltstones show planar lamination and slight to moderate bioturbation. Drilling disturbance is restricted to short intervals.



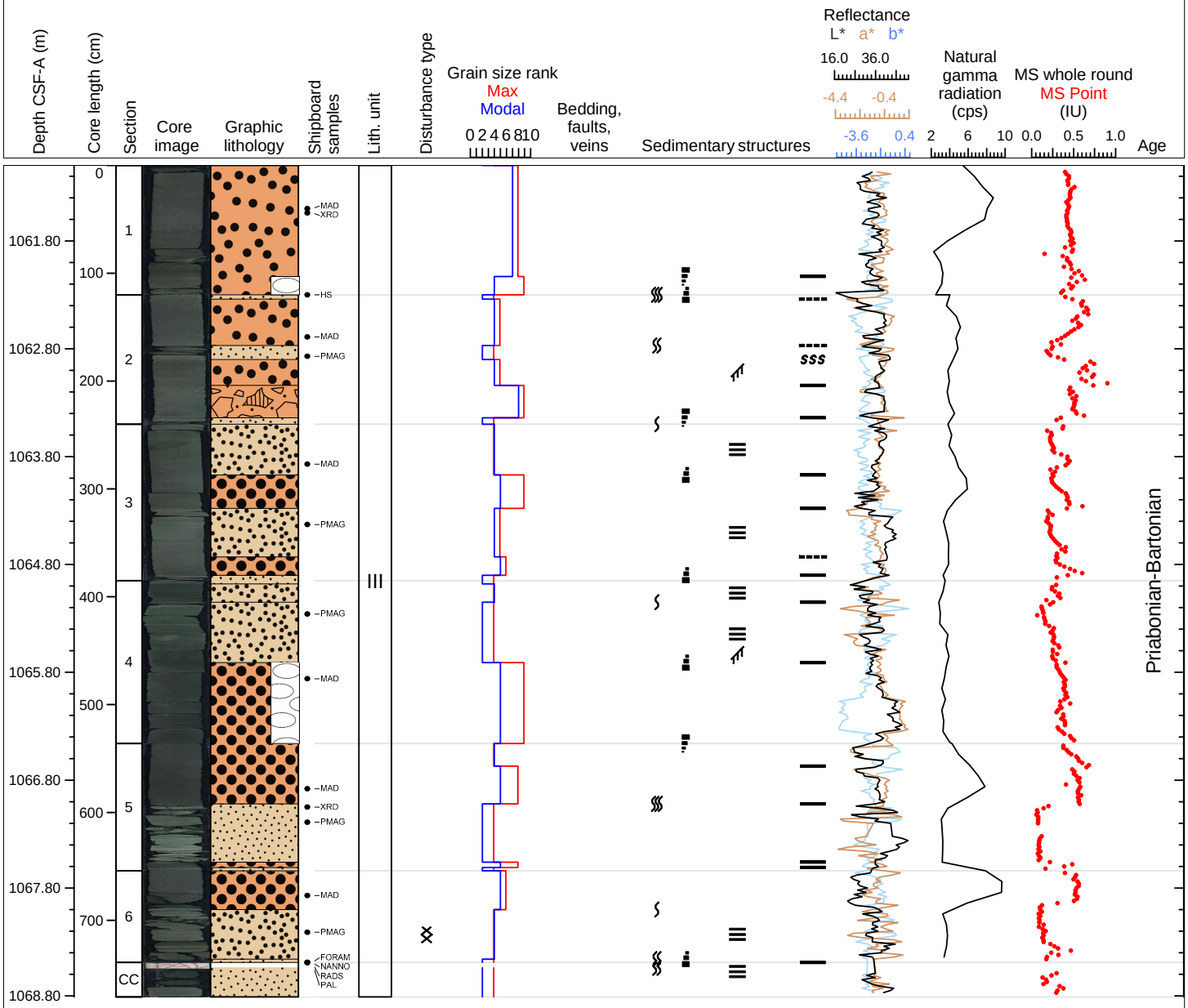
Hole 351-U1438E Core 23R, Interval 1051.4-1060.65 m (CSF-A)

TUFFACEOUS SANDSTONE (WITH GRAVEL), TUFFACEOUS SILTSTONE, TUFFACEOUS BRECCIA-CONGLOMERATE: Core 23R is dominated by horizontal beds (5-100 cm) of mostly dark greenish gray (5G 4/1) and greyish green (5G 5/2, 10G 4/2) and greyish (5Y 2/1) tuffaceous fine-to-coarse sandstone with planar laminations. Minor tuffaceous siltstone and tuffaceous breccia-conglomerate occur, too. Clasts of pumice and volcanic rocks are up to 13 mm in size. Only very minor bioturbation in some siltstones. Some moderate drilling disturbance is present in this Core.



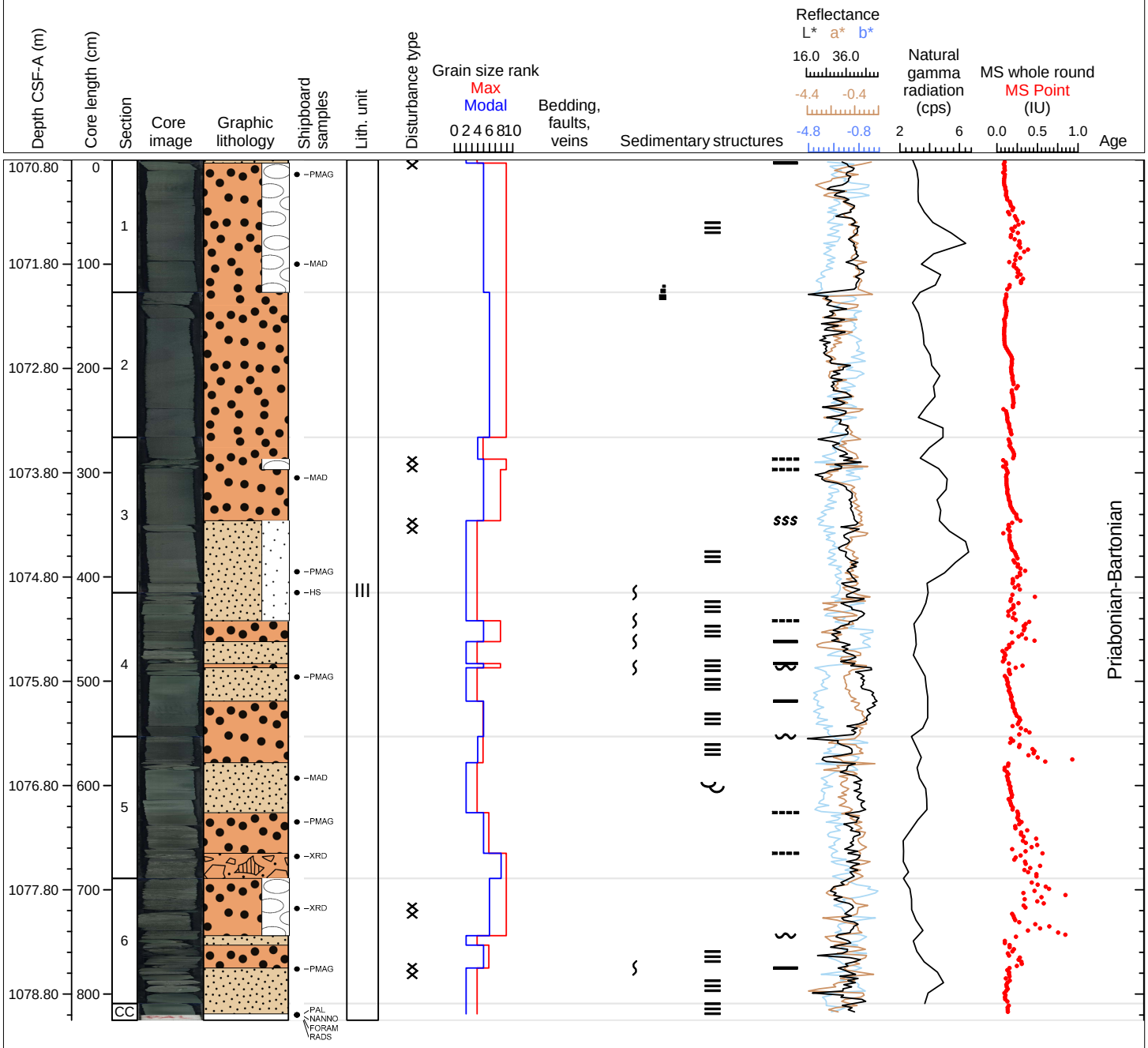
Hole 351-U1438E Core 24R, Interval 1061.1-1068.81 m (CSF-A)

TUFFACEOUS SANDSTONE (WITH GRAVEL), TUFFACEOUS SILTSTONE, TUFFACEOUS BRECCIA-CONGLOMERATE: Core 24R is dominated by horizontal beds (5-100 cm) of mostly dark greenish gray (5G 4/1) and greyish green (5G 5/2, 10G 4/2) and greyish (5Y 2/1) tuffaceous fine-to-coarse sandstone with planar laminations. The sandstones are interbedded with tuffaceous siltstone and tuffaceous breccia-conglomerate. Both normal and reverse graded intervals occur throughout the Core. The core contains very little drilling disturbance and very little bioturbation is present in the Core.



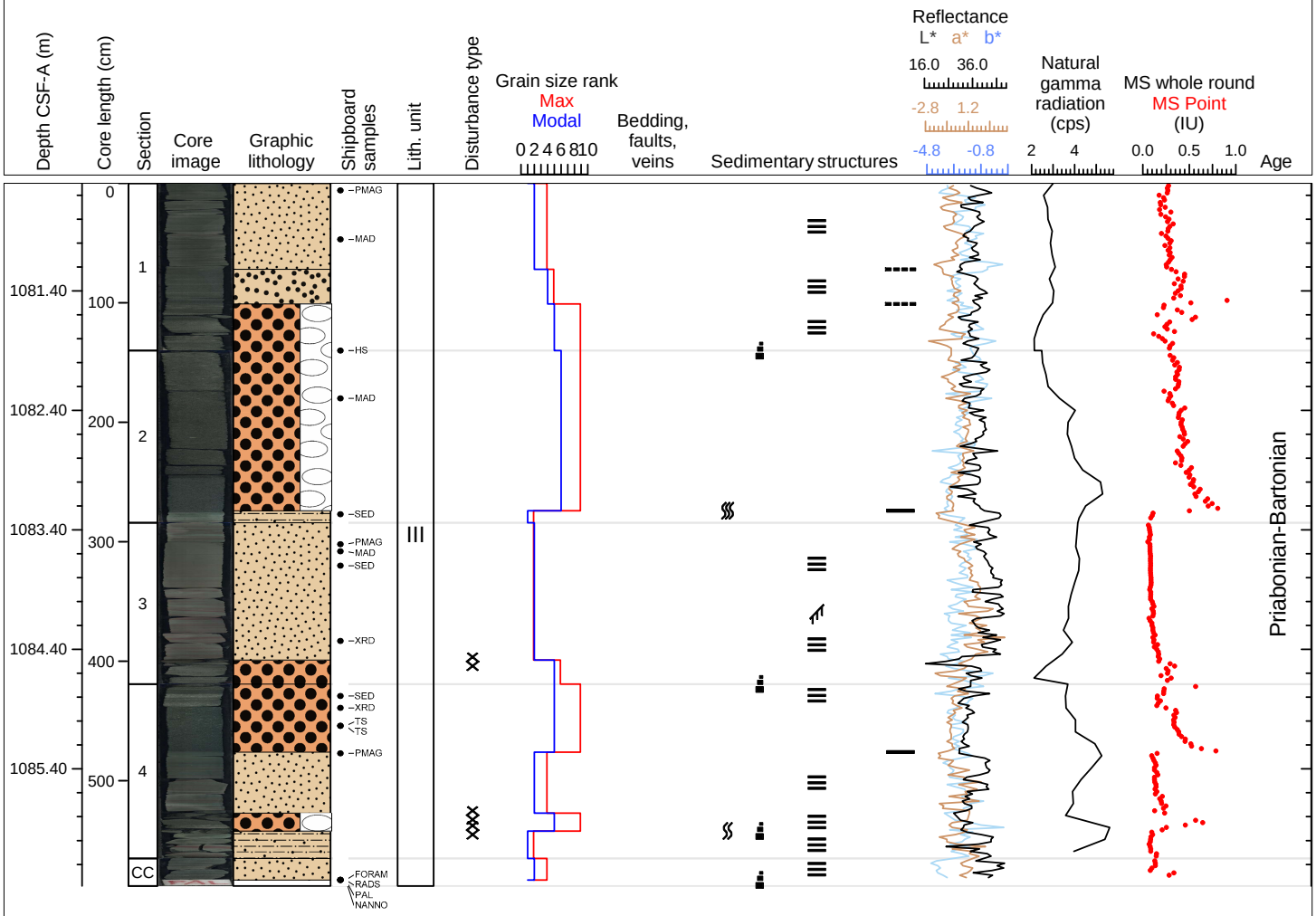
Hole 351-U1438E Core 25R, Interval 1070.8-1079.05 m (CSF-A)

TUFFACEOUS SANDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS BRECCIA-CONGLOMERATE: Core 25R is dominated by horizontal beds (5-100 cm) of mostly dark greenish gray (5G 4/1) and greyish green (5G 5/2, 10G 4/2) and greyish (5Y 2/1) tuffaceous fine-to-coarse sandstone with planar laminations. The sandstones are interbedded with tuffaceous siltstone and tuffaceous breccia-conglomerate. Both normal and reverse graded intervals occur throughout the Core. The core contains very little drilling disturbance and very little bioturbation is present in the Core.



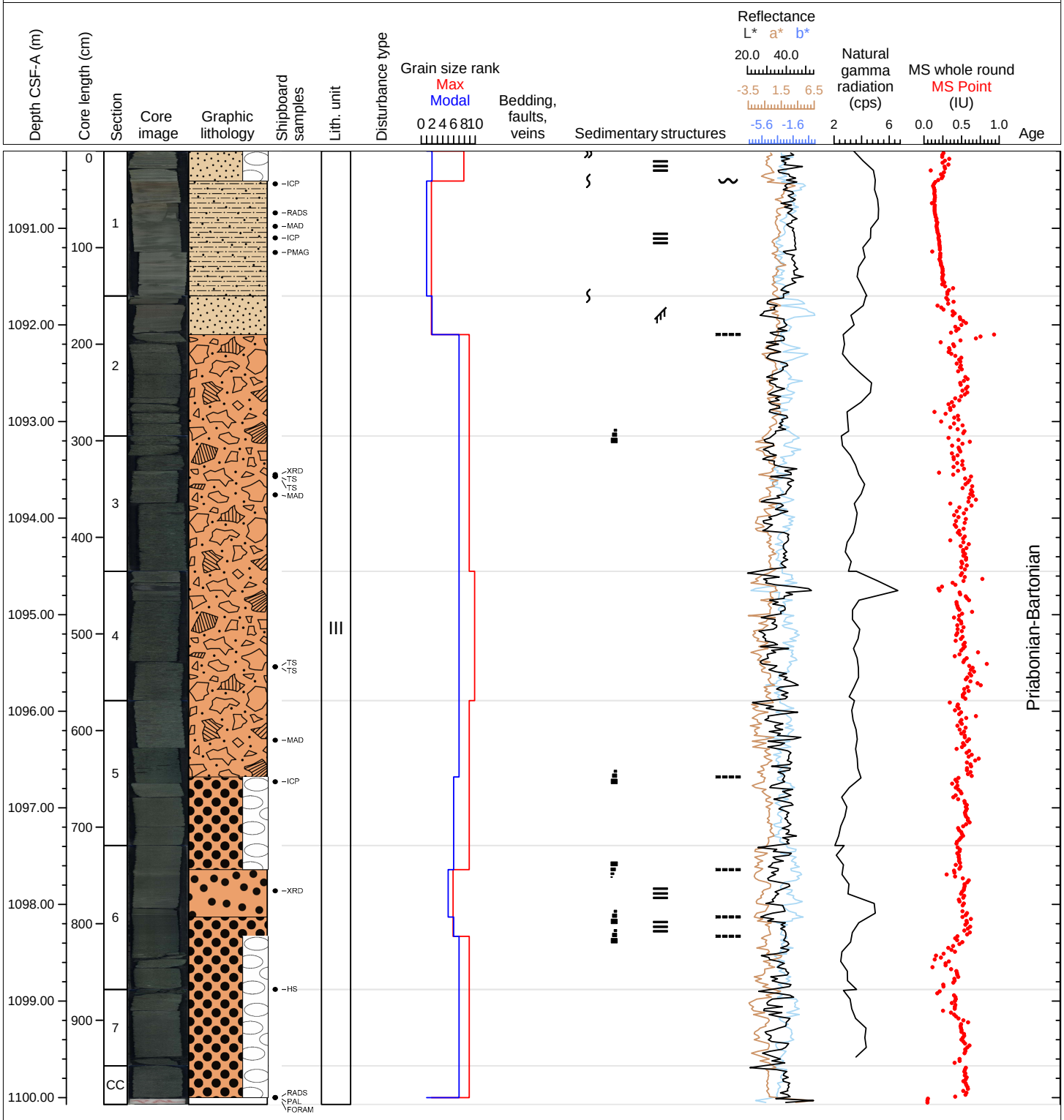
Hole 351-U1438E Core 26R, Interval 1080.5-1086.38 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS MUDSTONE: Core 26R contains three dm-scale normal graded sequences from tuffaceous medium to coarse sandstone to tuffaceous siltstone and bioturbated tuffaceous mudstone. Contacts within the sequences are gradational. Between the fining upward sequences, the contacts are sharp, planar and horizontal. Planar laminations are present at several intervals throughout the core. Cross laminations are present only in Section 3. Minor drilling disturbances (brecciation) were observed in Sections 3 and 4.



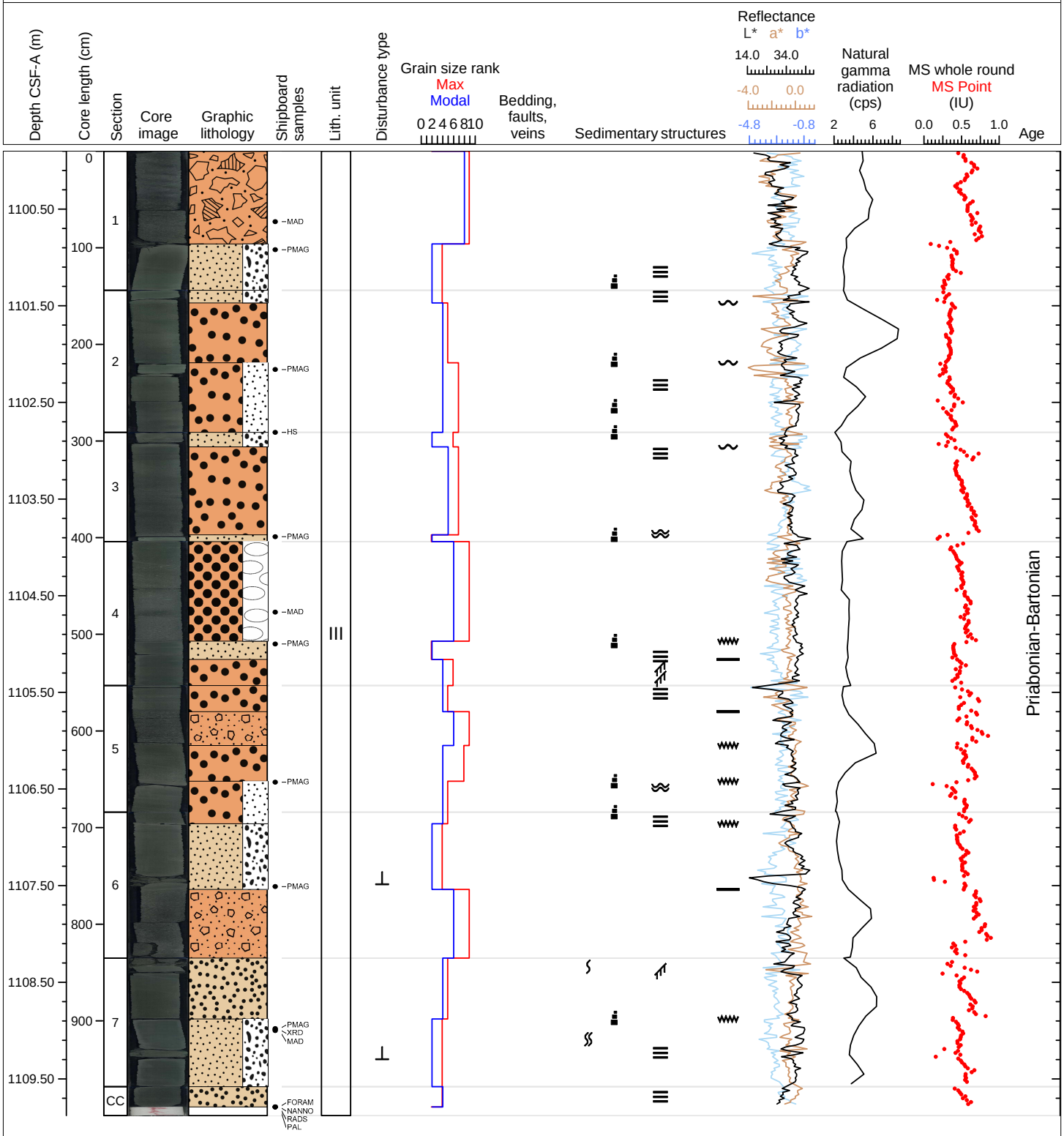
Hole 351-U1438E Core 27R, Interval 1090.2-1100.07 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE, TUFFACEOUS BRECCIA-CONGLOMERATE: The first 1.5 sections of Core 27R consist of planar laminated tuffaceous mudstone, overlain by irregularly laminated tuffaceous siltstone with gravel. Below these lithologies, the core consists of greyish green (5G 5/2) poorly sorted, massive tuffaceous breccia-conglomerate with clasts up to 60 mm. The upper 20 cm of this lithology is normally graded. Beneath the tuffaceous breccia-conglomerate, rocks show reverse grading: coarse sandstone with gravel and then tuffaceous sandstone with gradational boundaries. The lower part of the core consists of tuffaceous medium to coarse sandstone with gravel. Drilling disturbance (brecciation and biscuiting) occurs in sections 2, 6, and 7.



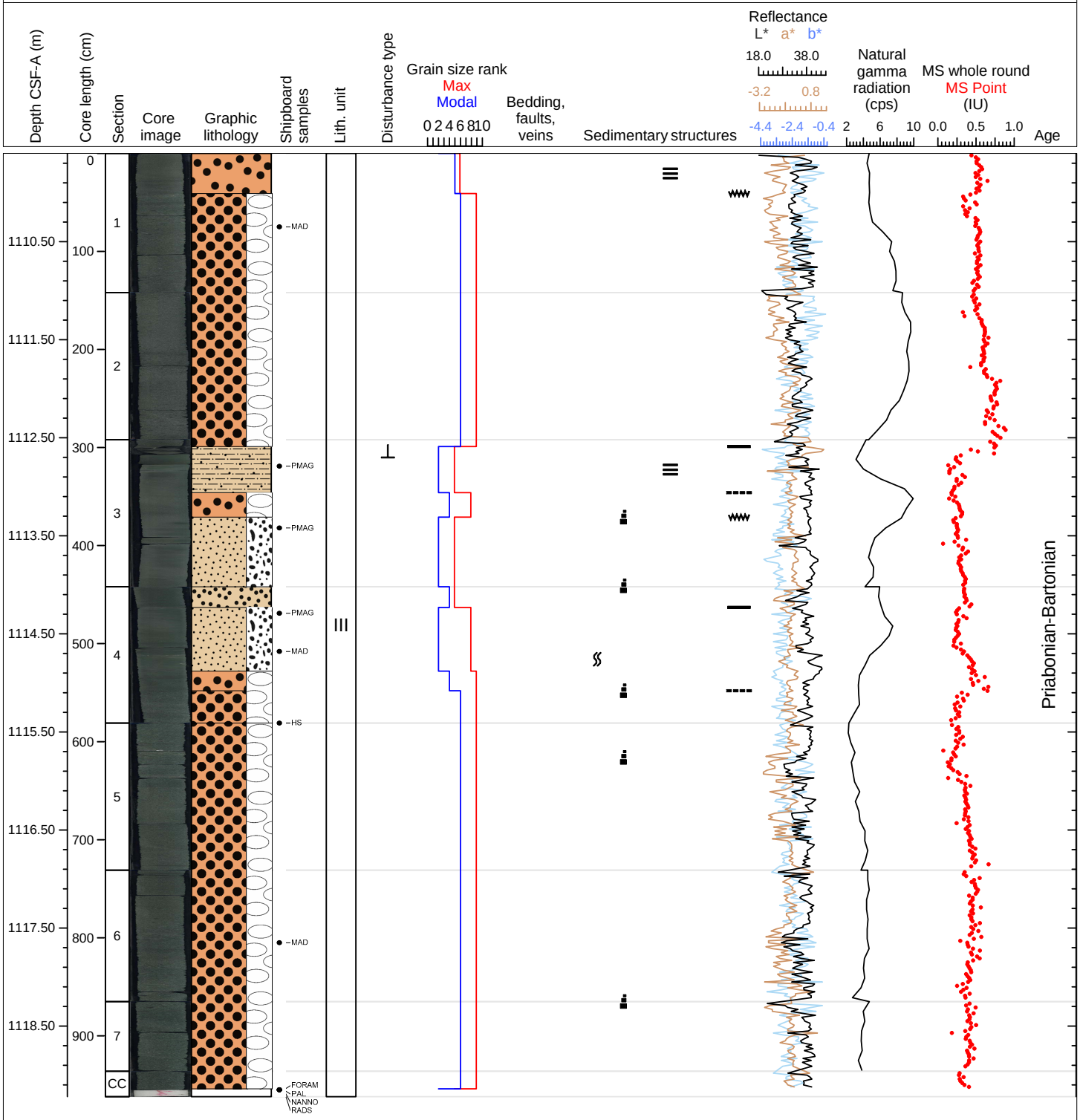
Hole 351-U1438E Core 28R, Interval 1099.9-1109.88 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE WITH GRAVEL, TUFFACEOUS SANDSTONE WITH SILT, TUFFACEOUS MATRIX-SUPPORTED POLYMICT CONGLOMERATE, TUFFACEOUS FINE SANDSTONE, TUFFACEOUS SILTSTONE WITH SAND: Core 28R is best described as subequal amounts of alternating decimeter-thick beds of grayish green (10G 4/2) tuffaceous siltstone (with sand) and grayish green (10G 4/2) tuffaceous sandstone (with silt). Minor grayish green (10G 4/2) tuffaceous matrix-supported polymict conglomerates also are present. The sandstones tend to be normally graded, and also display both planar and cross-laminations. Contact on the cut face appear horizontal, but are inclined when viewed in three dimensions. Bioturbation is not present for most of the core, although two sections show slight to moderate characteristics. Drilling disturbance is absent or restricted to short intervals.



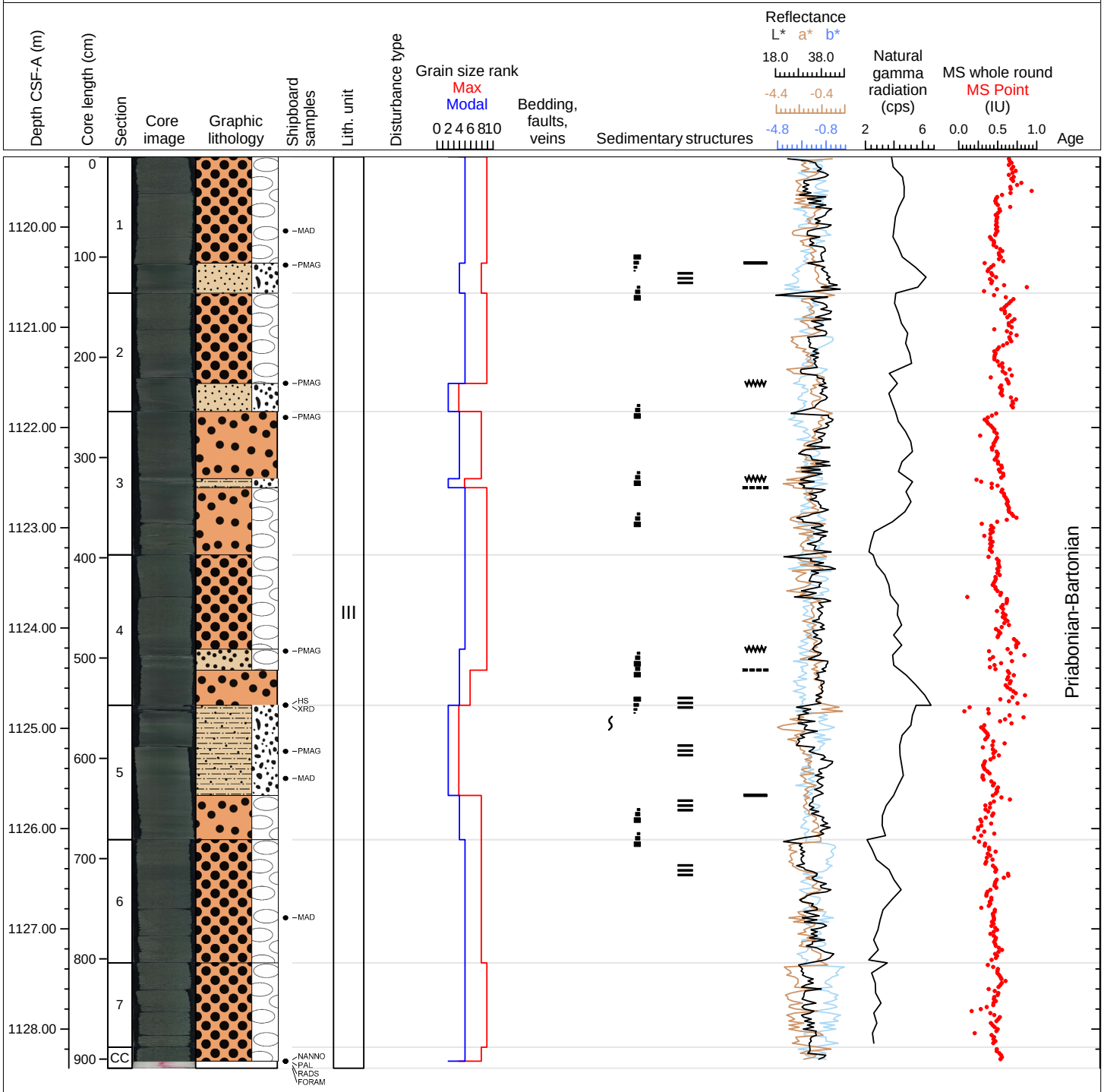
Hole 351-U1438E Core 29R, Interval 1109.6-1119.22 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE WITH GRAVEL, TUFFACEOUS SANDSTONE WITH SILT, TUFFACEOUS SANDSTONE WITH GRAVEL, TUFFACEOUS FINE SANDSTONE, TUFFACEOUS SILTSTONE: In Core 29R, dm- to m-thick beds of grayish green (10G 4/2) tuffaceous sandstones and tuffaceous medium to coarse sandstone with gravel is the dominantly lithology. The coarse sandstones are interrupted by minor grayish green (10G 4/2) tuffaceous siltstones and very dark green (5G 3/2) tuffaceous mudstones. The sandstones tend to be normally graded. Bioturbation is not present for most of the core, although one small section shows moderate characteristics. Drilling disturbance is absent or restricted to short intervals.



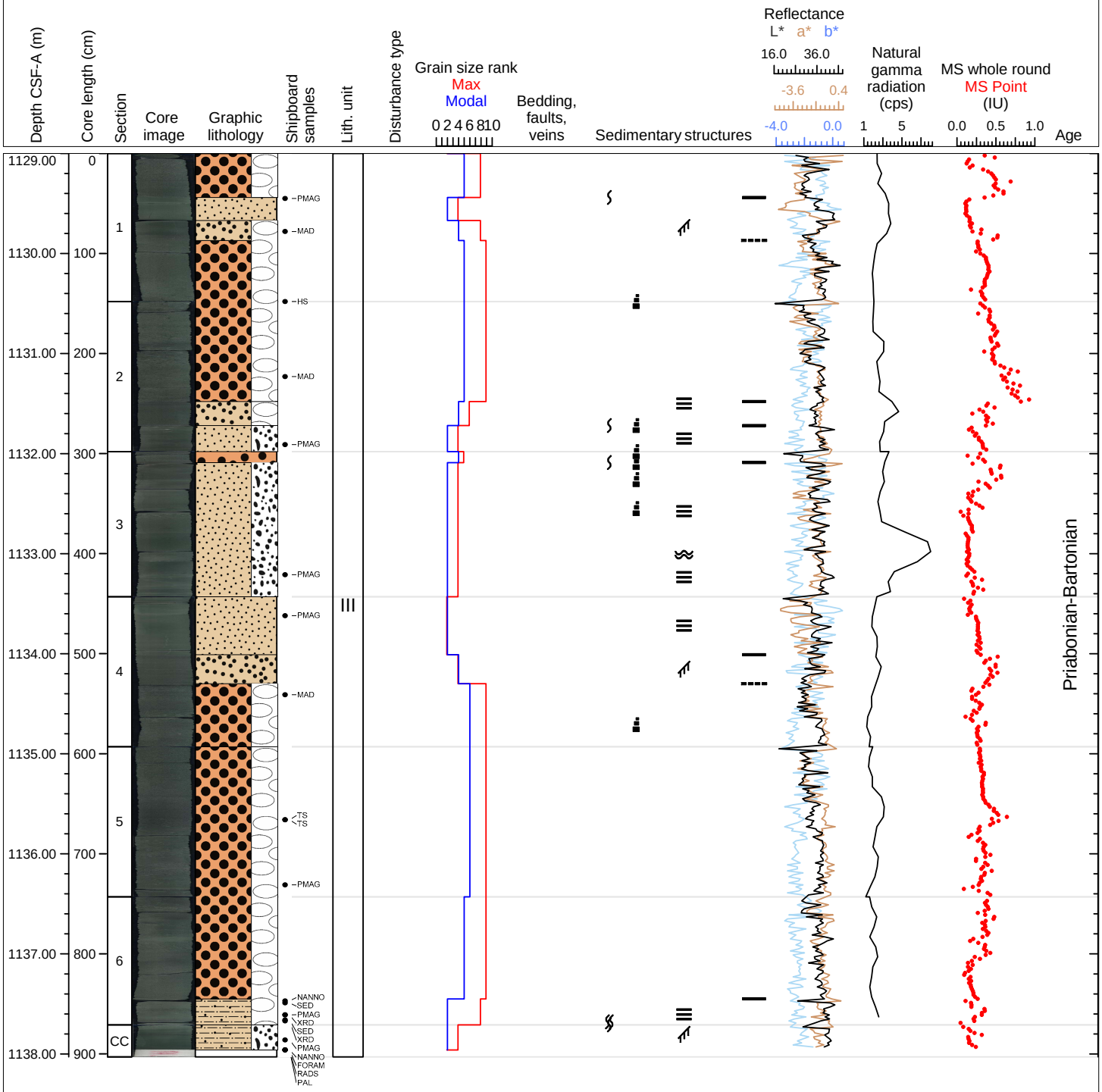
Hole 351-U1438E Core 30R, Interval 1119.3-1128.39 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE WITH GRAVEL, TUFFACEOUS SANDSTONE (WITH GRAVEL), TUFFACEOUS MUDSTONE WITH SAND, TUFFACEOUS SILTSTONE WITH SAND, TUFFACEOUS FINE SANDSTONE WITH GRAVEL: Core 30R is dominated by grayish green (10G 4/2 and 5G 5/2) tuffaceous medium to coarse sandstone with gravel. Dm- to m-thick packages of those sandstones are intercalated by tuffaceous fine sand-, silt- and mudstones. The lithologies are more massive and sedimentary structures (some planar lamination) are rare. Few normal graded sequences are present. Bioturbation is restricted to a short interval in the mudstone. Drilling disturbance is almost absent.



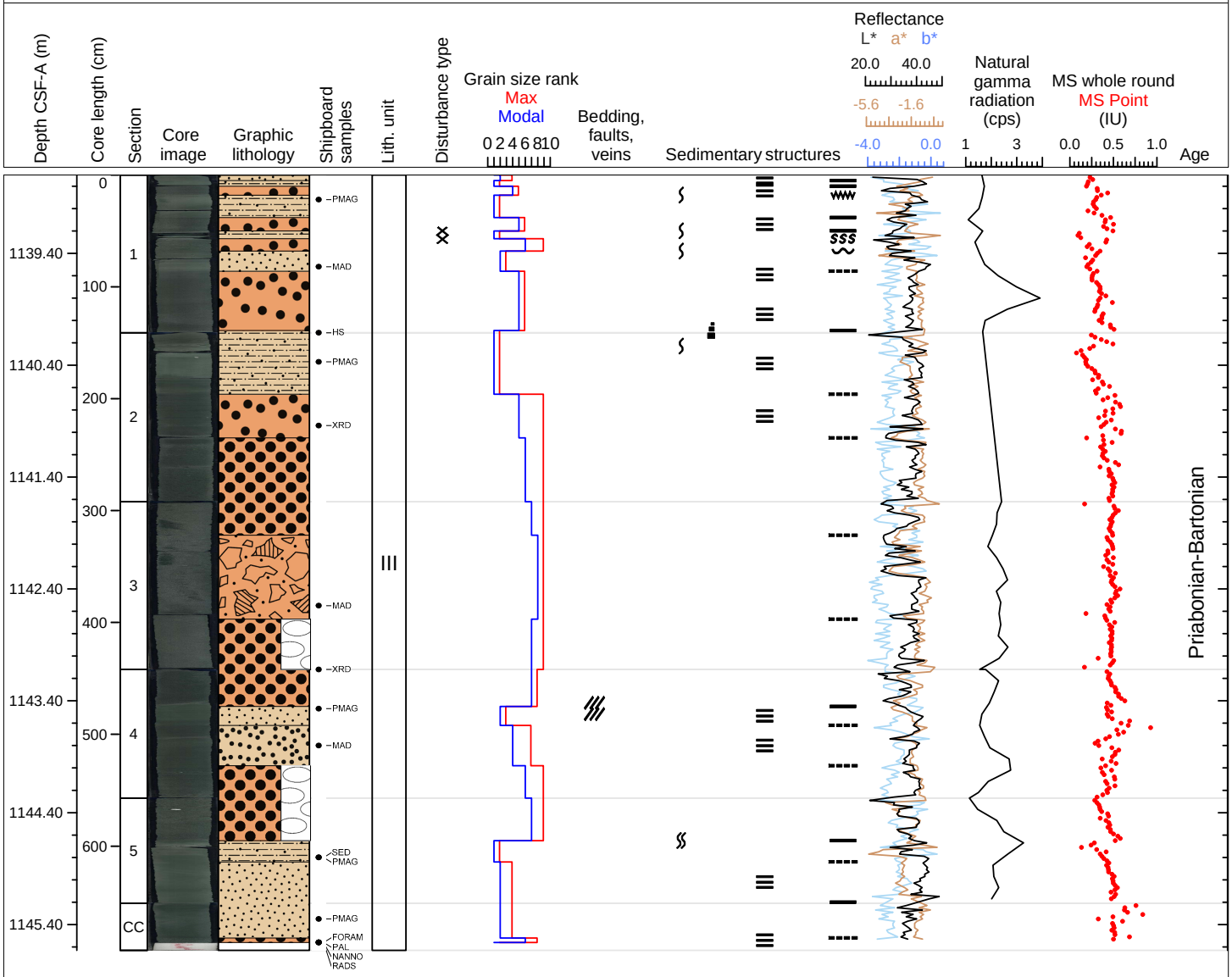
Hole 351-U1438E Core 31R, Interval 1129.0-1138.03 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE WITH GRAVEL, TUFFACEOUS FINE SANDSTONE (WITH GRAVEL), TUFFACEOUS SANDSTONE, TUFFACEOUS SILTSTONE (WITH SAND), TUFFACEOUS MUDSTONE WITH SAND/GRAVEL): In Core 31R, dm-- to m-thick beds of pale green (10G 6/2), grayish green (10G 4/2) and very dark grayish (5G 3/2) tuffaceous sandstone with gravel (up to 10 mm) and tuffaceous siltstone are the dominantly lithology. Some sandstones and siltstones show decimeter scale normal grading. Some siltstones and fine sandstones show planer, cross and convolute lamination. In Section 1 and 4, small fractures occur. Sandstones of Section 5 and 6 show dewatering or slump structures. Bioturbation is minor and drilling disturbance is absent or restricted to short intervals.



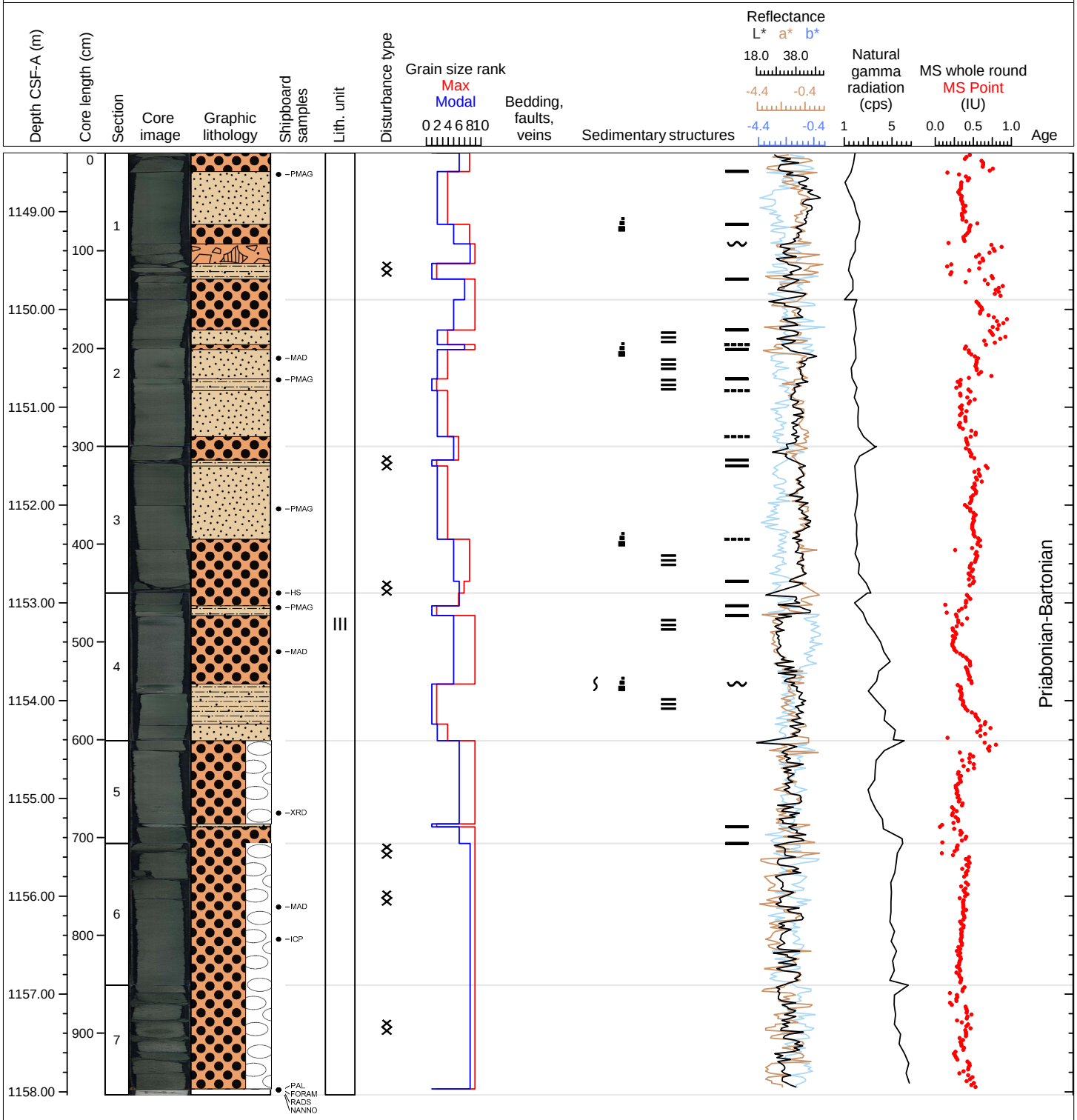
Hole 351-U1438E Core 32R, Interval 1138.7-1145.63 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE WITH GRAVEL, TUFFACEOUS FINE SANDSTONE, TUFFACEOUS BRECCIA-CONGLOMERATE, TUFFACEOUS SILTSTONE and MUDSTONE: Core 32R contains medium to thick beds of grayish green (5G 5/2) tuffaceous sandstone interbedded with tuffaceous siltstone and breccia-conglomerate. Some of the beds have planar lamination and normal grading. Unlike previous cores most beds from this core contained no cross lamination or reverse grading and five of the contacts were inclined, all in the same orientation. Bioturbation is mostly slight and restricted to the siltstone and mudstone.



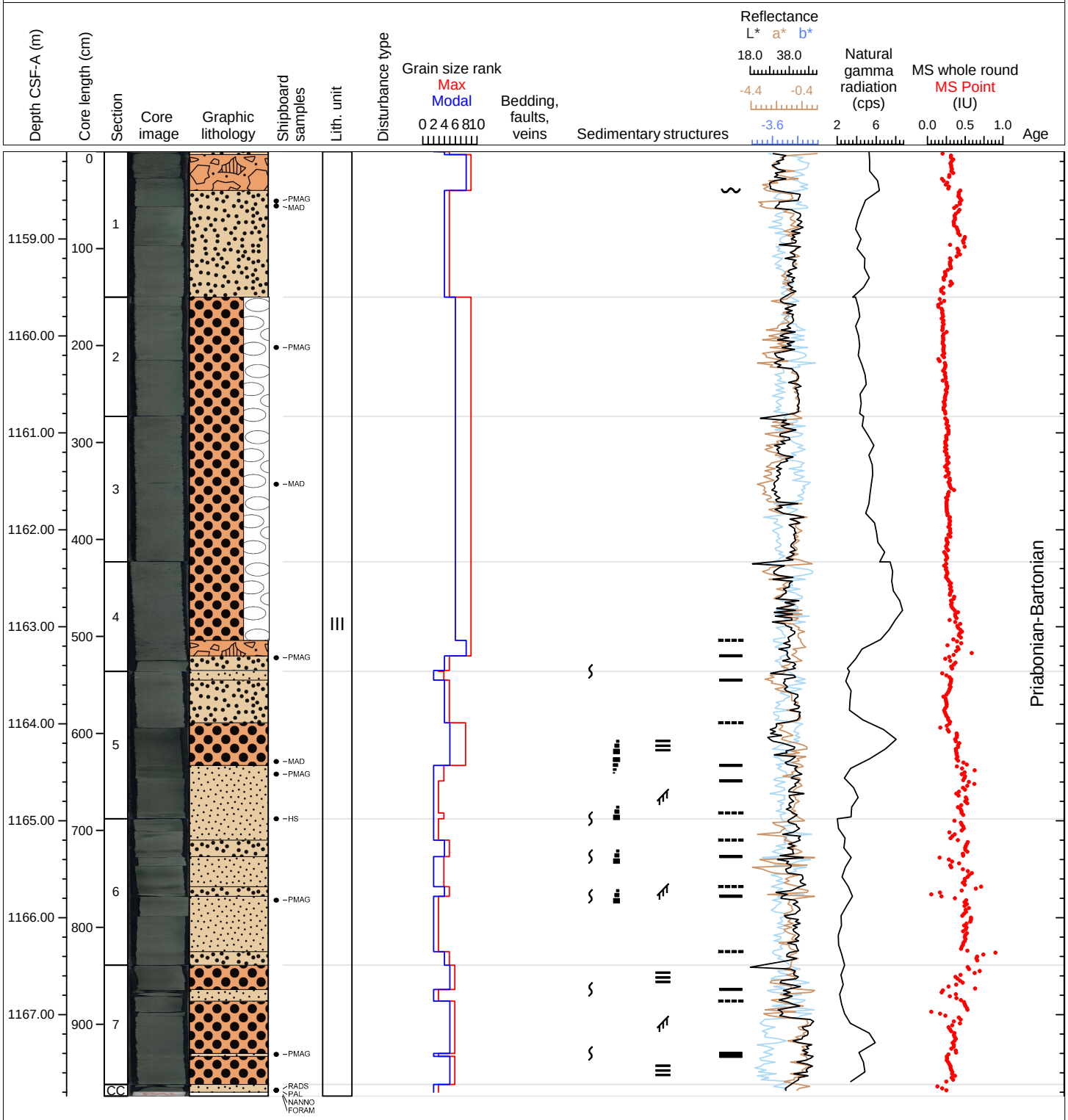
Hole 351-U1438E Core 33R, Interval 1148.4-1158.03 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE WITH GRAVEL, TUFFACEOUS FINE SANDSTONE, TUFFACEOUS BRECCIA-CONGLOMERATE, TUFFACEOUS SILTSTONE and MUDSTONE: Core 33R contains medium to thick beds of grayish green (5G 5/2) tuffaceous sandstone interbedded with tuffaceous siltstone, mudstone and breccia-conglomerate. Some of the beds have planar lamination and normal grading. Bioturbation is restricted to a single mudstone layer. Moderate to severe brecciation caused by drilling is present in several Intervals of this Core.



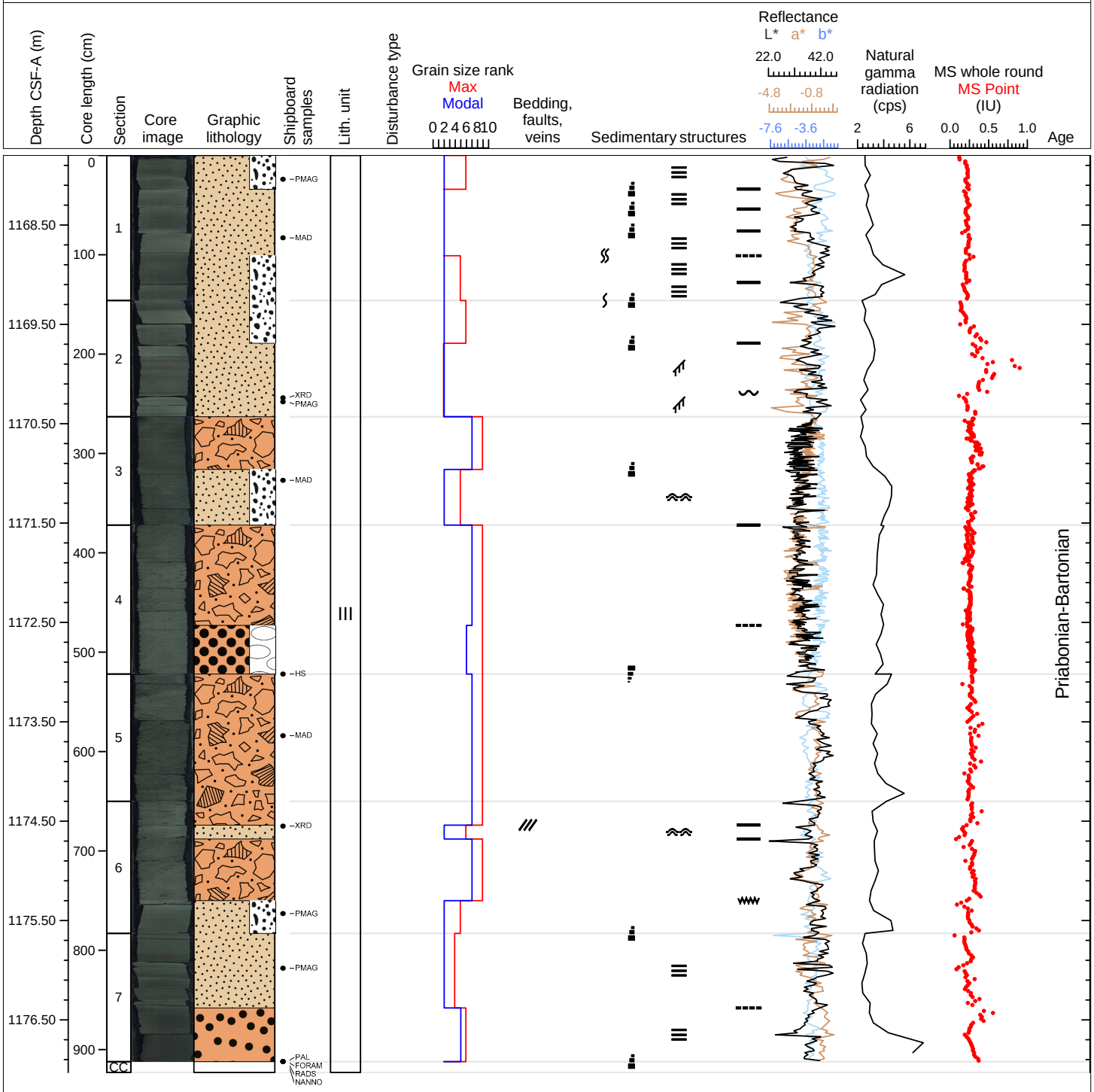
Hole 351-U1438E Core 34R, Interval 1158.1-1167.84 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE WITH GRAVEL, TUFFACEOUS FINE SANDSTONE, TUFFACEOUS BRECCIA-CONGLOMERATE, TUFFACEOUS SILTSTONE: Core 34R contains medium to thick beds of monochromatic grayish green (5G 5/2) tuffaceous sandstone with gravel (up to 30 mm) interbedded with subordinate tuffaceous siltstone and tuffaceous breccia-conglomerate. Some of the beds have planar and cross lamination and show both reverse and normal grading. Bioturbation is slight and restricted to the siltstone. Drilling disturbance is absent.



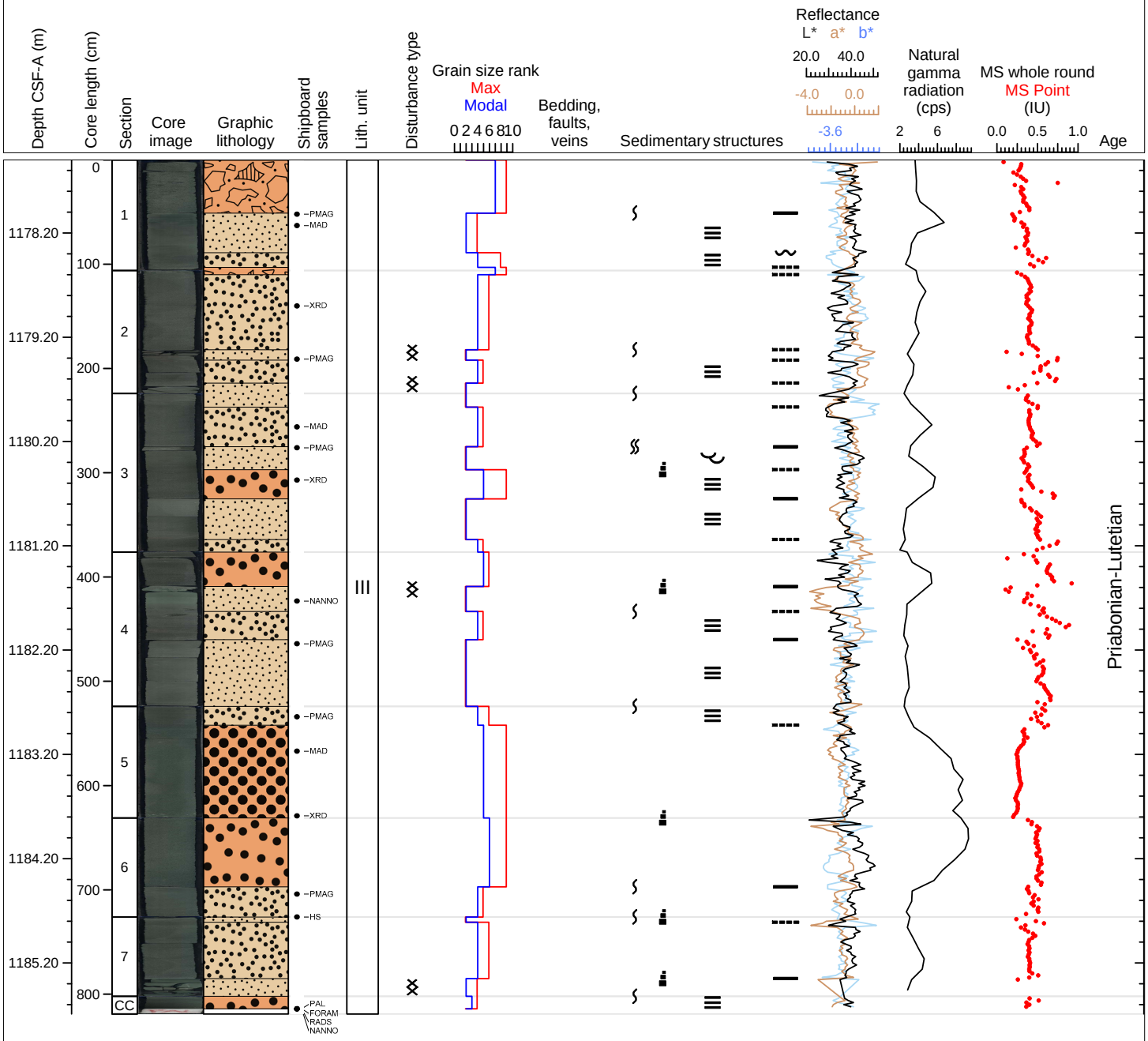
Hole 351-U1438E Core 35R, Interval 1167.8-1177.03 m (CSF-A)

TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE, TUFFACEOUS BRECCIA-CONGLOMERATE: The major lithology in Core 35R is greyish green (5G 5/2) massive, poorly sorted tuffaceous breccia-conglomerate with clasts averaging 5-10 mm. Tuffaceous coarse sandstone with gravel grades upward and downward into breccia-conglomerate in section 4. Tuffaceous siltstone is present in Sections 1, 2 and 7, typically in 20-40 cm normal graded intervals with thin (1 cm) layers of sandstone at the bottom contacts. Siltstones show both planar and cross-lamination. There are clastic dikes in sections 3 and 6. Bioturbation is absent except in siltstone in Section 1 and 2, where it is slight to moderate. There is minimal drilling disturbance.



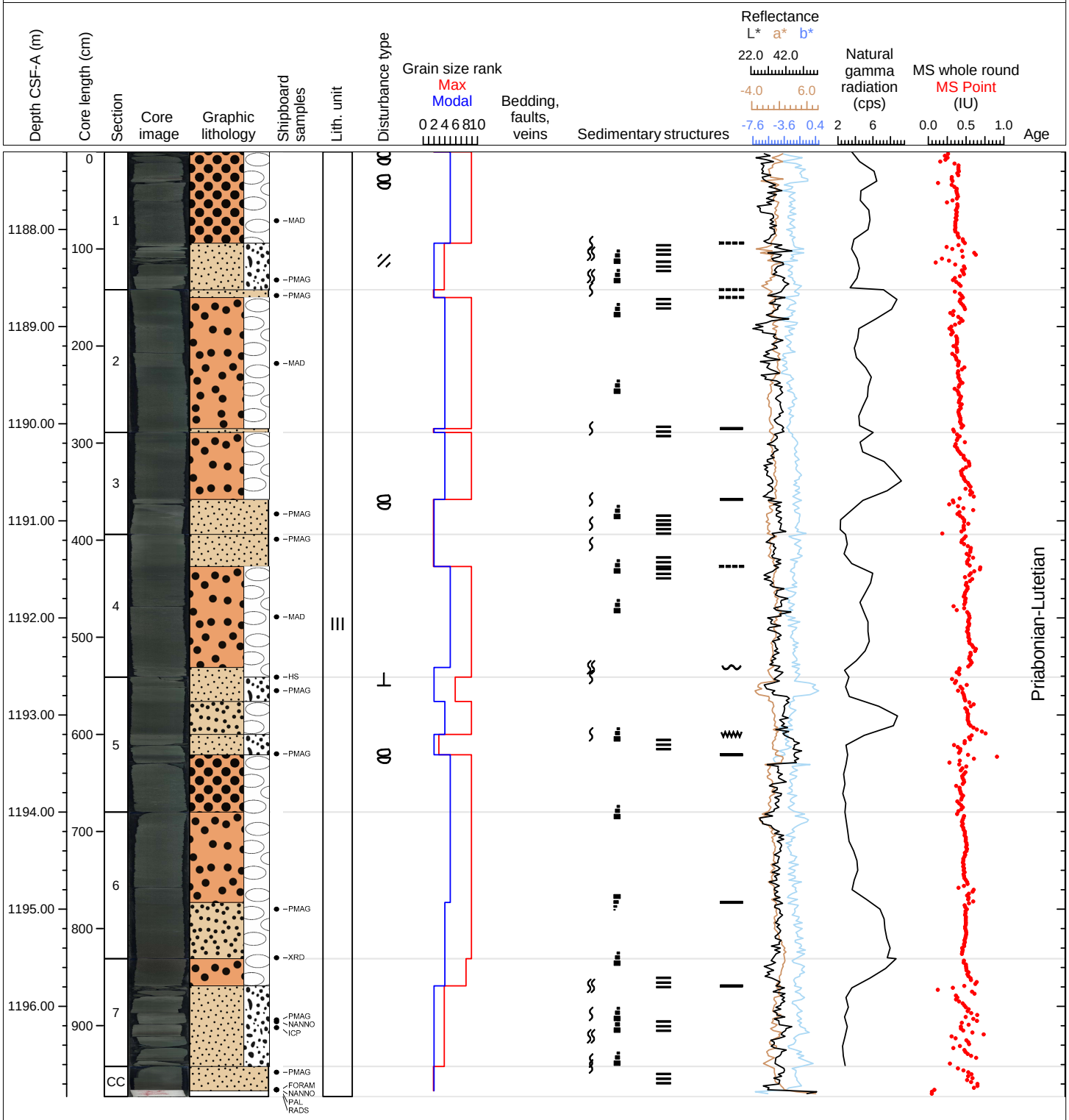
Hole 351-U1438E Core 36R, Interval 1177.5-1185.69 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE, TUFFACEOUS FINE SANDSTONE, TUFFACEOUS BRECCIA-CONGLOMERATE, TUFFACEOUS SILTSTONE: Core 36R contains beds of dark greenish grey (5G 4/1, 10G 4/1) to greyish green (5G 5/2, 10G 4/2) tuffaceous sandstone interbedded with tuffaceous siltstone and tuffaceous breccia-conglomerate. Some of the beds have planar and cross lamination and normal grading. Bioturbation is slight and restricted to the siltstone and fine sandstone. Slight to moderate brecciation affected this Core during drilling.



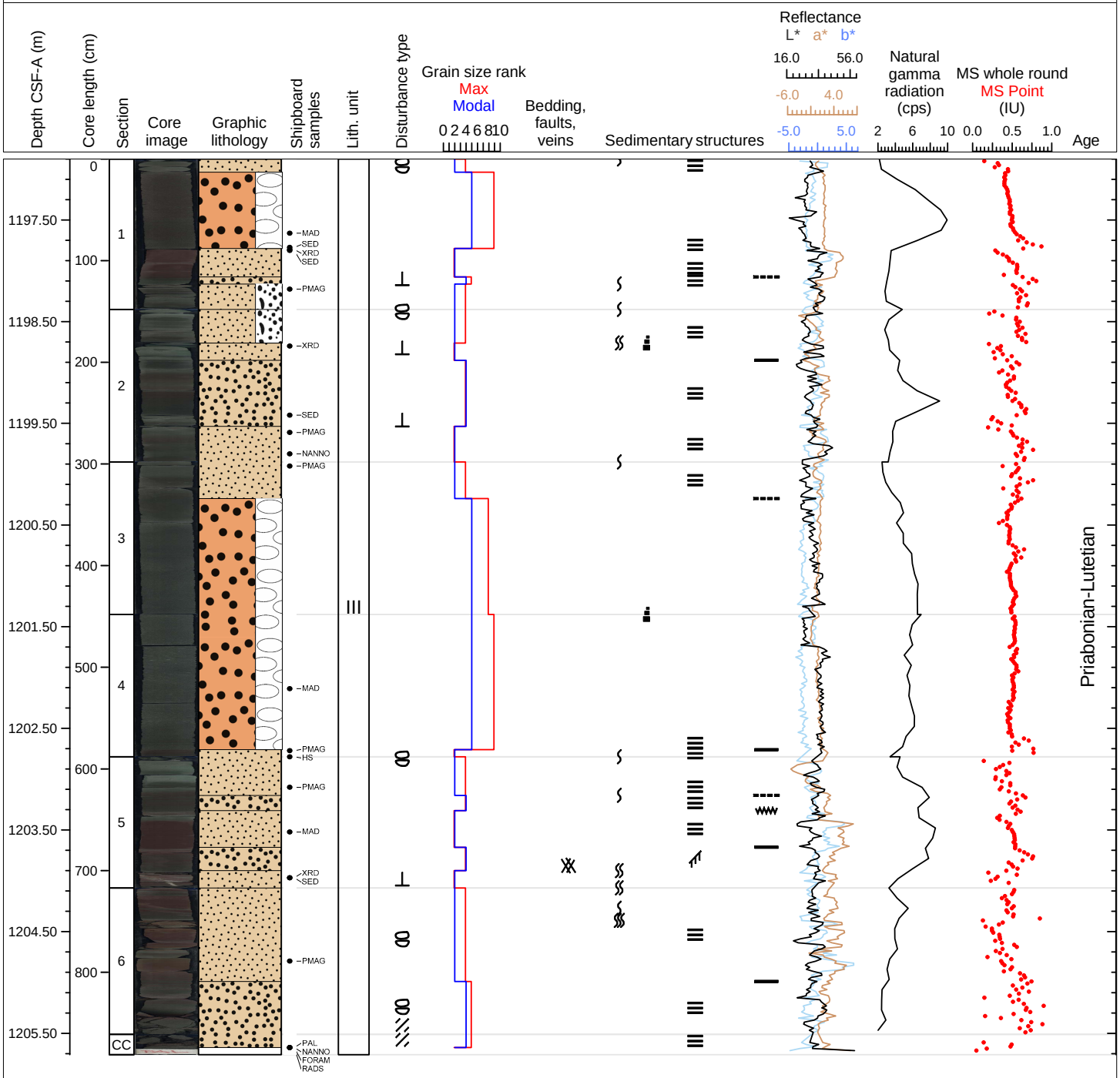
Hole 351-U1438E Core 37R, Interval 1187.2-1196.93 m (CSF-A)

TUFFACEOUS SANDSTONE WITH GRAVEL, TUFFACEOUS SILTSTONE (WITH SAND/WITH GRAVEL), TUFFACEOUS FINE SANDSTONE WITH GRAVEL, TUFFACEOUS MEDIUM TO COARSE SANDSTONE WITH GRAVEL: Core 37R is dominated by tuffaceous sandstone with gravel (up to 21 mm), with decimeter-thick tuffaceous siltstone (with sand/gravel) intercalated. In Section 1 to 5, color of the sandstones and siltstones is very dark grayish green (5G 3/2) and grayish green (10G 4/2 and 5G 5/2), which gradationally change to dark dray (5YR 4/1) in lower of section 6. Some sandstones and siltstones show dm-scale normal grading. Some siltstones and fine sandstones show planar and cross lamination and slight to moderate bioturbation. Drilling disturbance is restricted to short intervals.



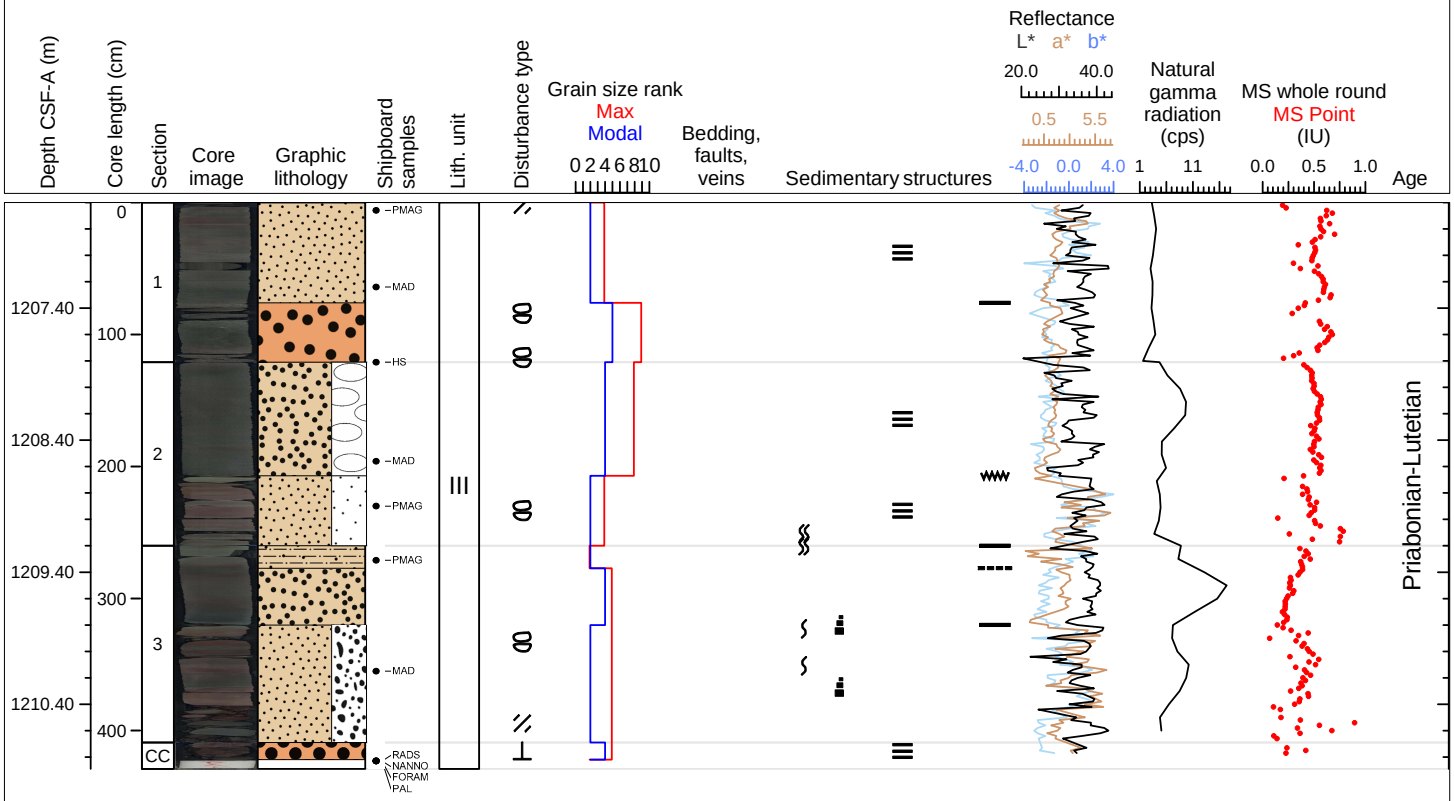
Hole 351-U1438E Core 38R, Interval 1196.9-1205.71 m (CSF-A)

TUFFACEOUS SANDSTONE (WITH GRAVEL), TUFFACEOUS SILTSTONE (WITH SAND), TUFFACEOUS FINE SANDSTONE: Core 38R is composed of alternating beds of tuffaceous sandstones and tuffaceous siltstones. The colors range from different shades of green (olive gray [5Y 4/1], dark greenish gray [5G 4/1], grayish green [5G 5/2]) to various shades of red (pale red [10R 6/2, grayish red [10R 4/2], pale reddish brown [10R 5/4]). The reddish colors (hematite staining according to smear slide analysis) become more dominant in the lower part of Core 38R and are alternating with thin (cm-scale) greenish layers. ?Gypsum geoids and a gypsum/quartz vein are present. Sorting is often well or moderate and planar laminations are common. Bioturbation is slight to moderate in the siltstones. Drilling disturbance is slight with the exception of some intervals especially in the lower part of the Core.



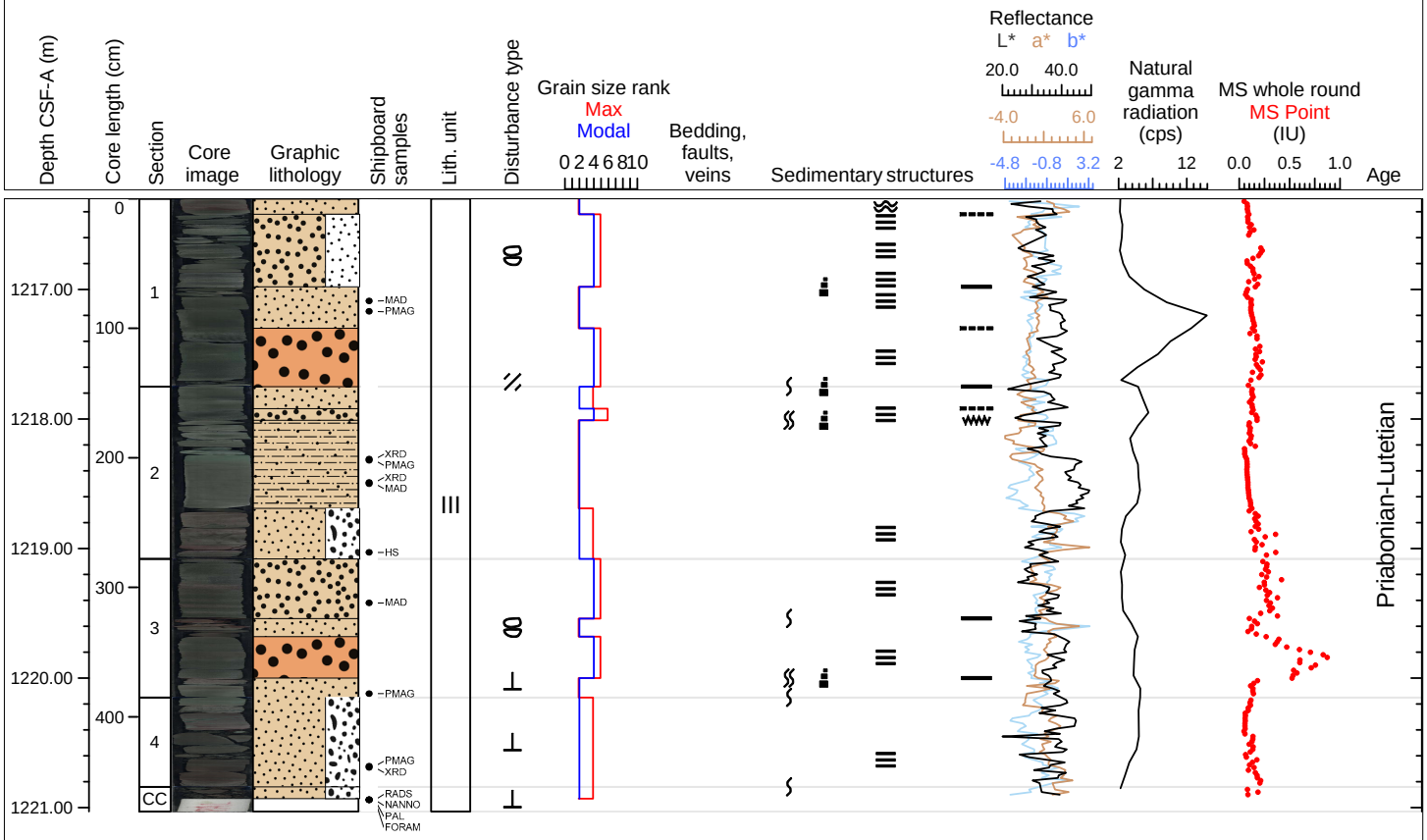
Hole 351-U1438E Core 39R, Interval 1206.6-1210.89 m (CSF-A)

TUFFACEOUS SILTSTONE (WITH SAND), TUFFACEOUS FINE SANDSTONE (WITH GRAVEL), TUFFACEOUS SANDSTONE, TUFFACEOUS MUDSTONE, MEDIUM TO COARSE SANDSTONE: Section 1 to 3 of Core 39R are composed of alternating beds of dm-thick tuffaceous sandstones and tuffaceous siltstones (or mudstone). Greenish (dark gray [5Y 5/2] and grayish green [5G 5/2]) and reddish (weak red [10R 4/2] and red [10R 4/6]) layers alternate in cm to decimeter scale. Section CC consists of dark reddish gray laminated sandstone. Quartz and Gypsum geoids are present in Section 1. Sorting is often well or moderate and planar laminations are common. Some sand- and siltstones show normal grading. Bioturbation is slight to moderate in the siltstones and mudstone. Drilling disturbance is moderate to severe in dm-intervals in some Sections.



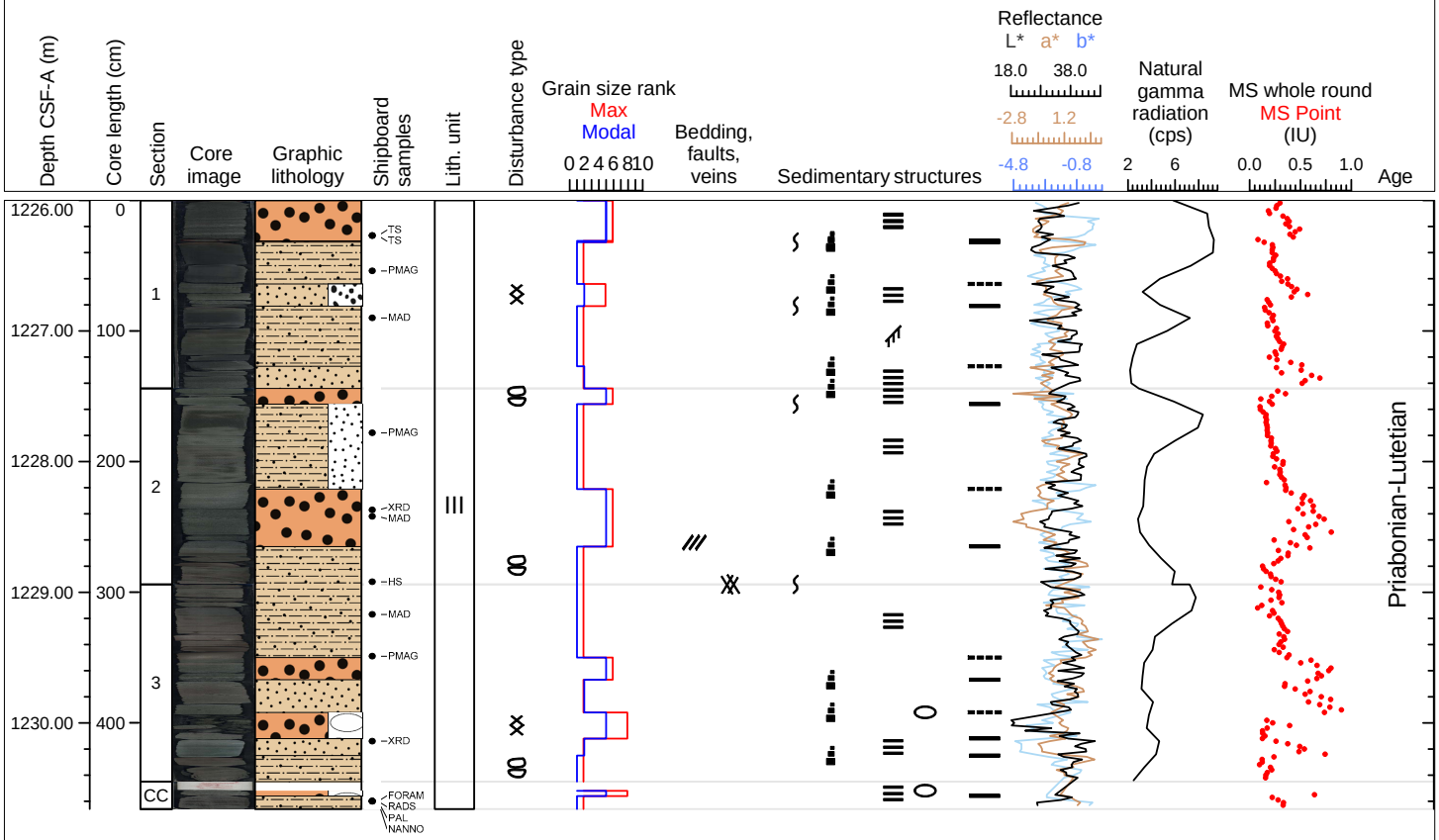
Hole 351-U1438E Core 40R, Interval 1216.3-1221.03 m (CSF-A)

TUFFACEOUS SILTSTONE (WITH SAND), TUFFACEOUS FINE SANDSTONE, TUFFACEOUS SANDSTONE, TUFFACEOUS MUDSTONE: Core 40R is composed of alternating beds of dm-thick tuffaceous sandstones and tuffaceous siltstones (or mudstone). Greenish (dark greenish gray [5YR 4/2 and 5G 4/1], grayish green [10G 4/2], very dark grayish green [5G 3/2], dark greenish gray [5G4/1] and dark gray [5YR 4/1]) layers are dominant with cm to decimeter scale reddish (weak red [10R 4/2] and grayish red purple [5RP 4/2]) layers intercalated. Sorting is often well or moderate and planar laminations are common. Some sandstone and siltstone show normal grading. Bioturbation is slight to moderate in the siltstones and mudstone. Drilling disturbance is moderate to severe in dm-intervals in some Sections.



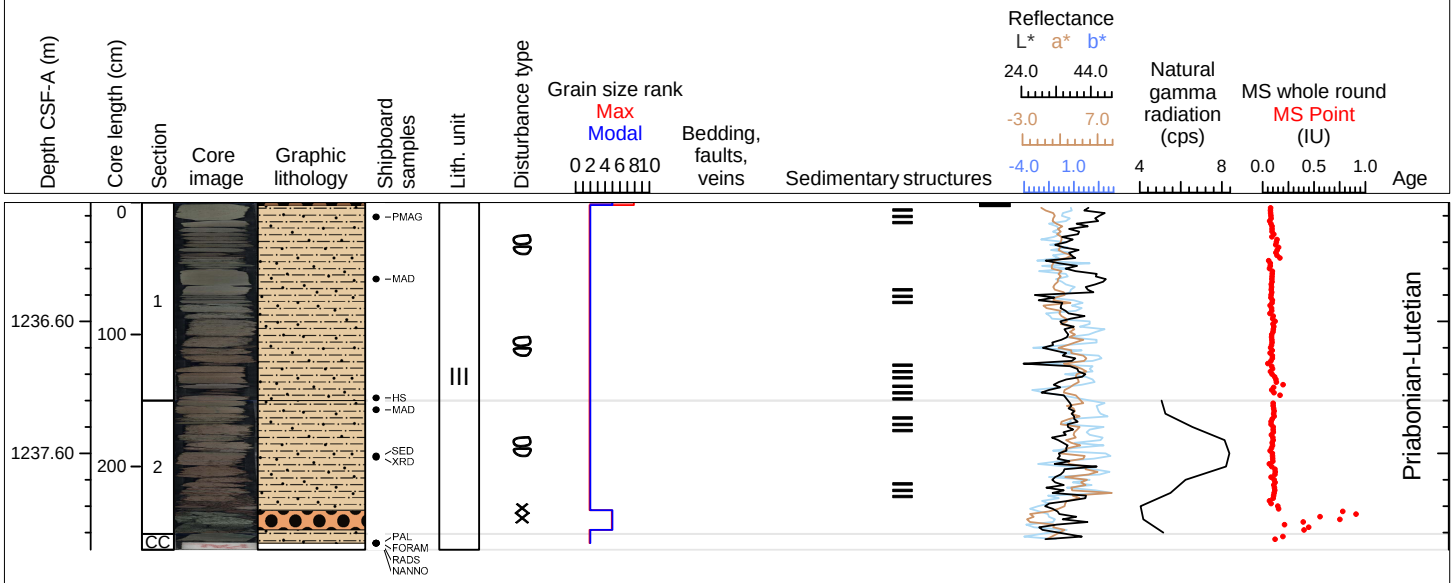
Hole 351-U1438E Core 41R, Interval 1226.0-1230.66 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE: Core 41R consists of intercalated 10-40 cm intervals of dark greenish grey (5G 4/1) tuffaceous silt- and sandstones and dark greenish grey to greyish red (10R 4/2) tuffaceous mudstone. Silt- and sandstone intervals have planar laminations and normal grading. Mudstones have slight bioturbation. Drilling disturbance is severe in Section 3 (brecciation) and some Intervals of other Sections are affected by biscuiting.



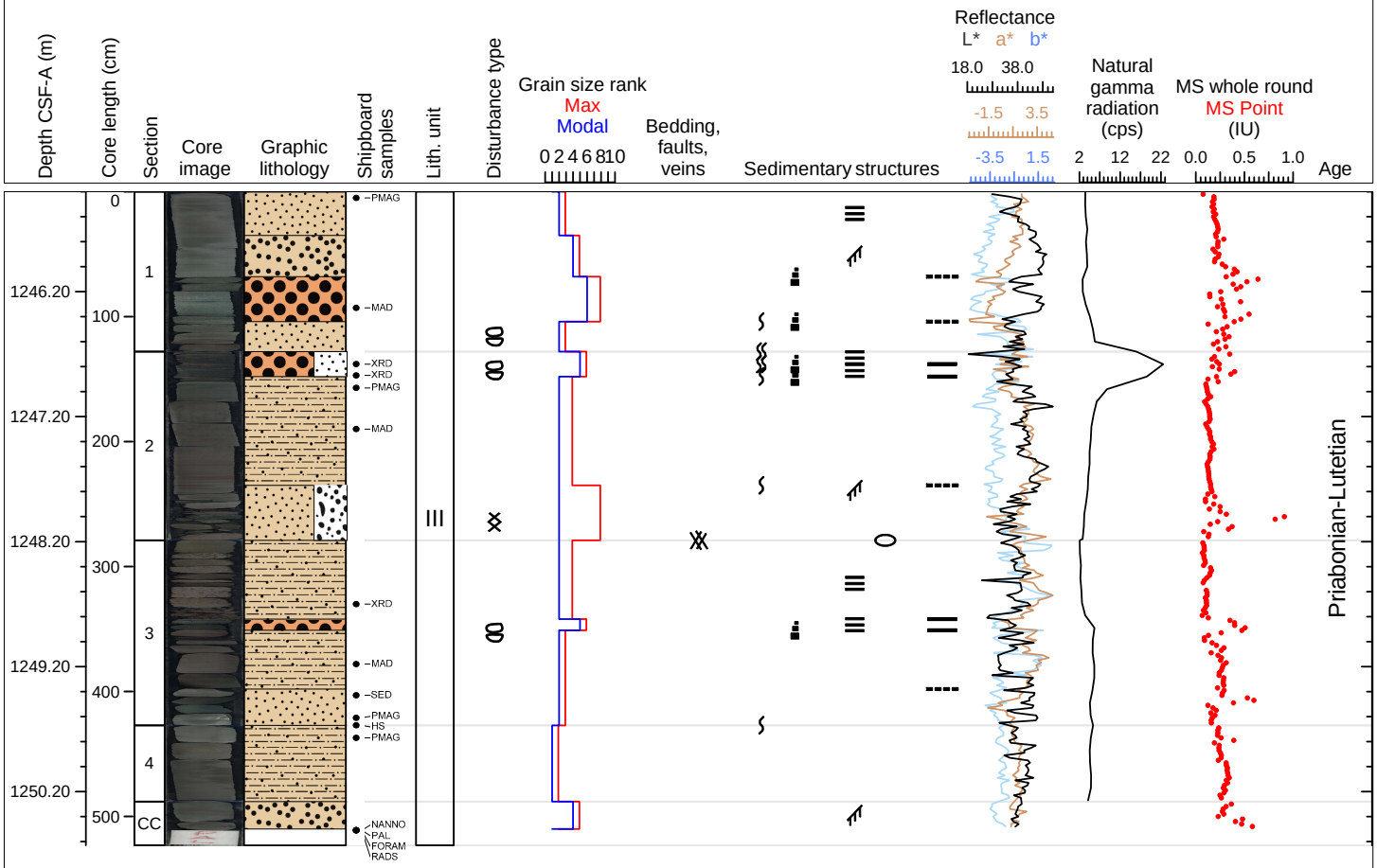
Hole 351-U1438E Core 42R, Interval 1235.7-1238.33 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SANDSTONE: Core 42R is dominated by various colors: Reddish and greenish gray (greenish gray [10Y 5/1], dark olive gray [5Y 3/2], reddish gray [5YR 5/2], dark greenish gray [5G 4/1]). Tuffaceous mudstone is dominant and is partly laminated. The mudstones contain granule size spherules (recrystallized?). Tuffaceous sandstone at Section 2, 83-98 cm consists of grayish green (10G 4/2) medium sand. The sedimentary structure is severely disturbed by drilling.



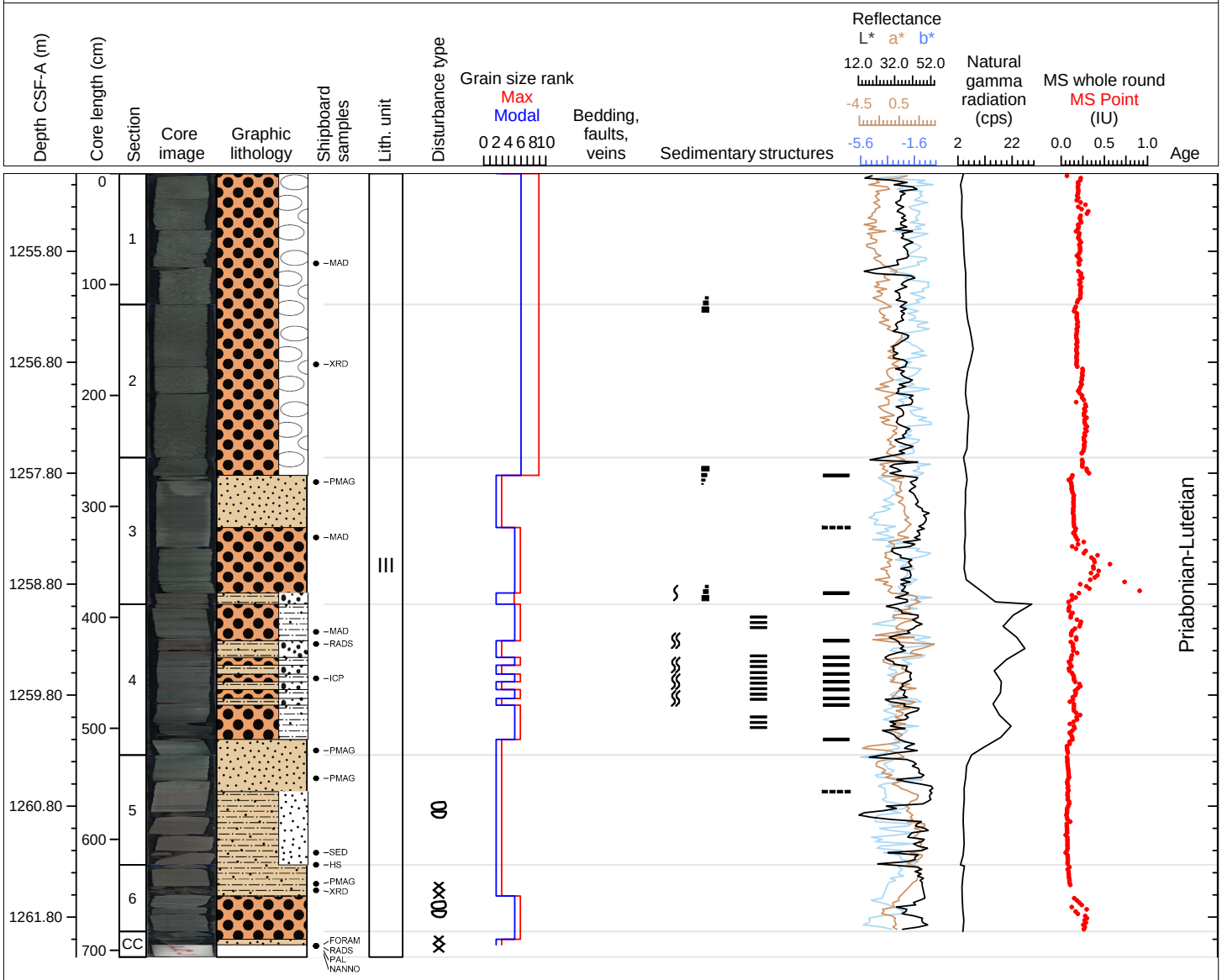
Hole 351-U1438E Core 43R, Interval 1245.4-1250.63 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE: Core 43R contains thick (20-80 cm) beds of reddish tuffaceous mudstone interbedded with thin beds (3-25 cm) beds of greenish tuffaceous siltstones and sandstone with planar and cross laminated intervals. Some of the mudstones contain concretion type structures. Severe drilling disturbance at the bottom of Section 2 and all of Section 3.



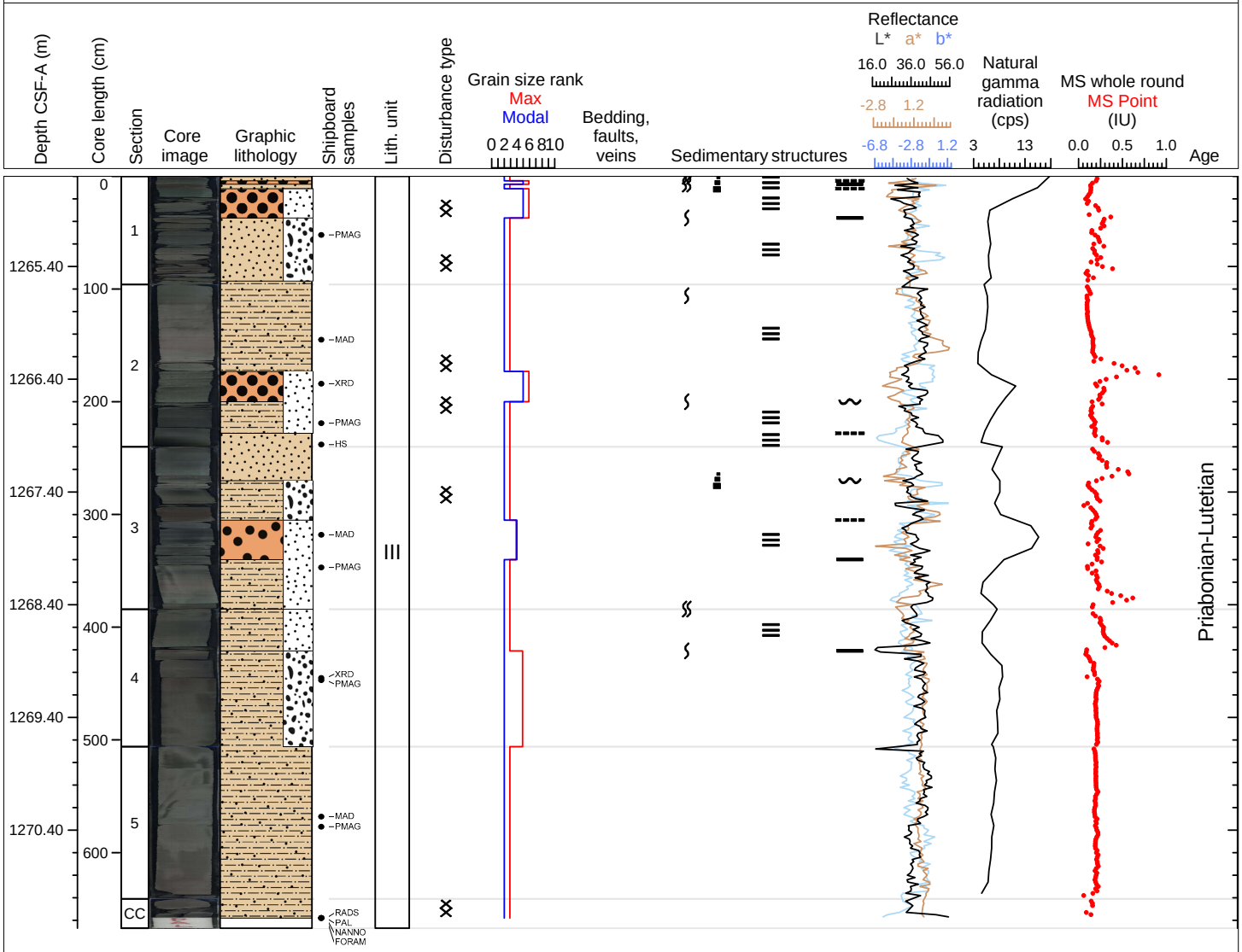
Hole 351-U1438E Core 44R, Interval 1255.1-1262.16 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE (WITH GRAVEL), TUFFACEOUS MUDSTONE, TUFFACEOUS SILTSTONE: Core 44R is dominated by dark greenish grey (5G 4/1, 5GY 4/1) tuffaceous medium to coarse sandstone (with gravel). Section 4 contains thin beds of greenish grey (5G 6/1) medium to coarse sandstones interbedded with thin (2-5 cm) dusky red (10R 3/4) mudstone beds. Moderate bioturbation in the mudstones and slight drilling disturbance.



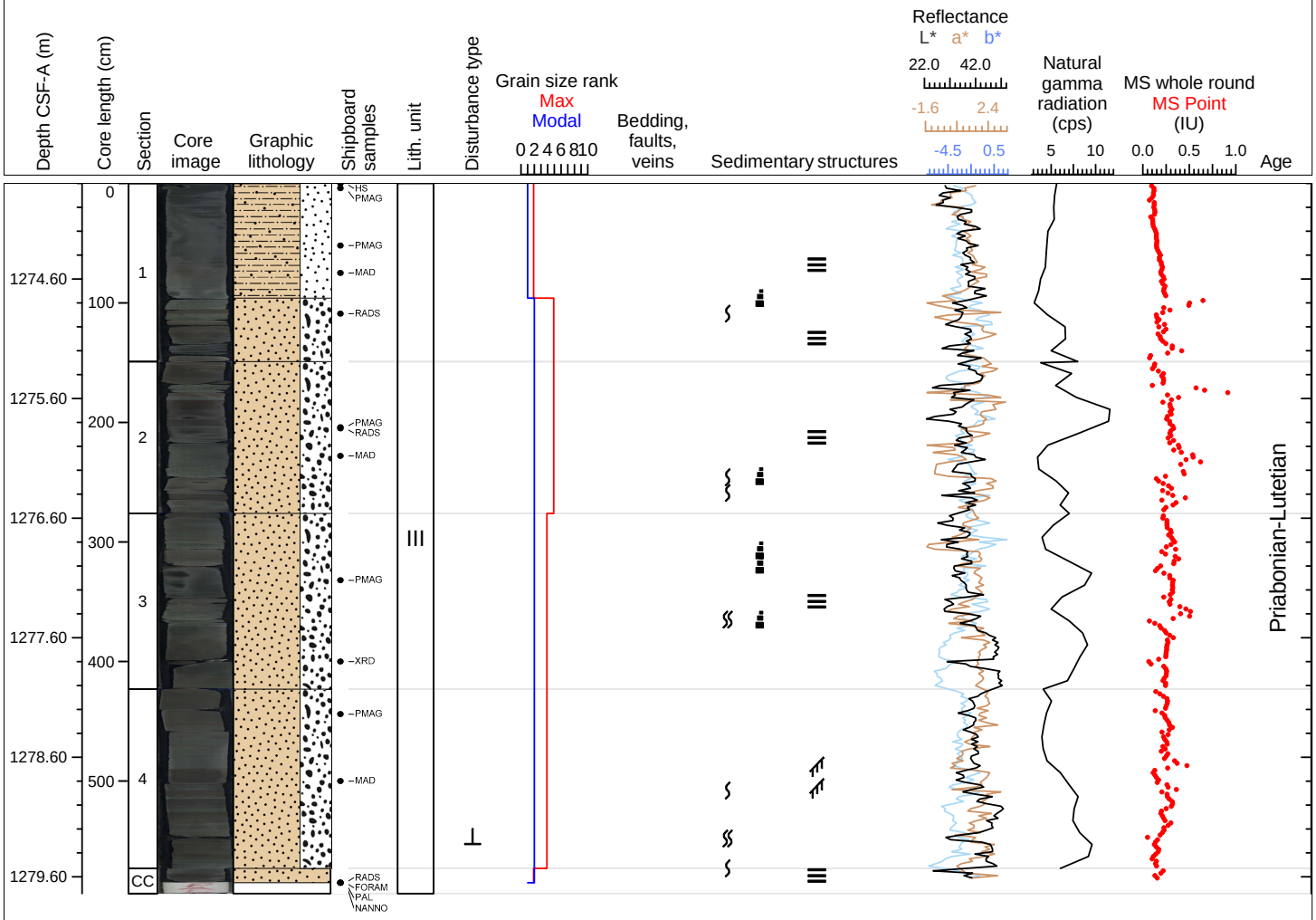
Hole 351-U1438E Core 45R, Interval 1264.6-1271.27 m (CSF-A)

TUFFACEOUS SILTSTONE WITH SAND, TUFFACEOUS MUDSTONE: Core 45R is dominated by tuffaceous siltstone and tuffaceous mudstone with greenish sandstones intercalated. Dark gray (5YR 4/1) layers are dominant, and mm- to decimeter-thick greenish layers intercalated. Sorting is often well or moderate and planar and cross laminations are common. Some sandstone and siltstone show normal grading. Bioturbation is slight to moderate in limited intervals of siltstones. Drilling disturbance is restricted to short intervals.



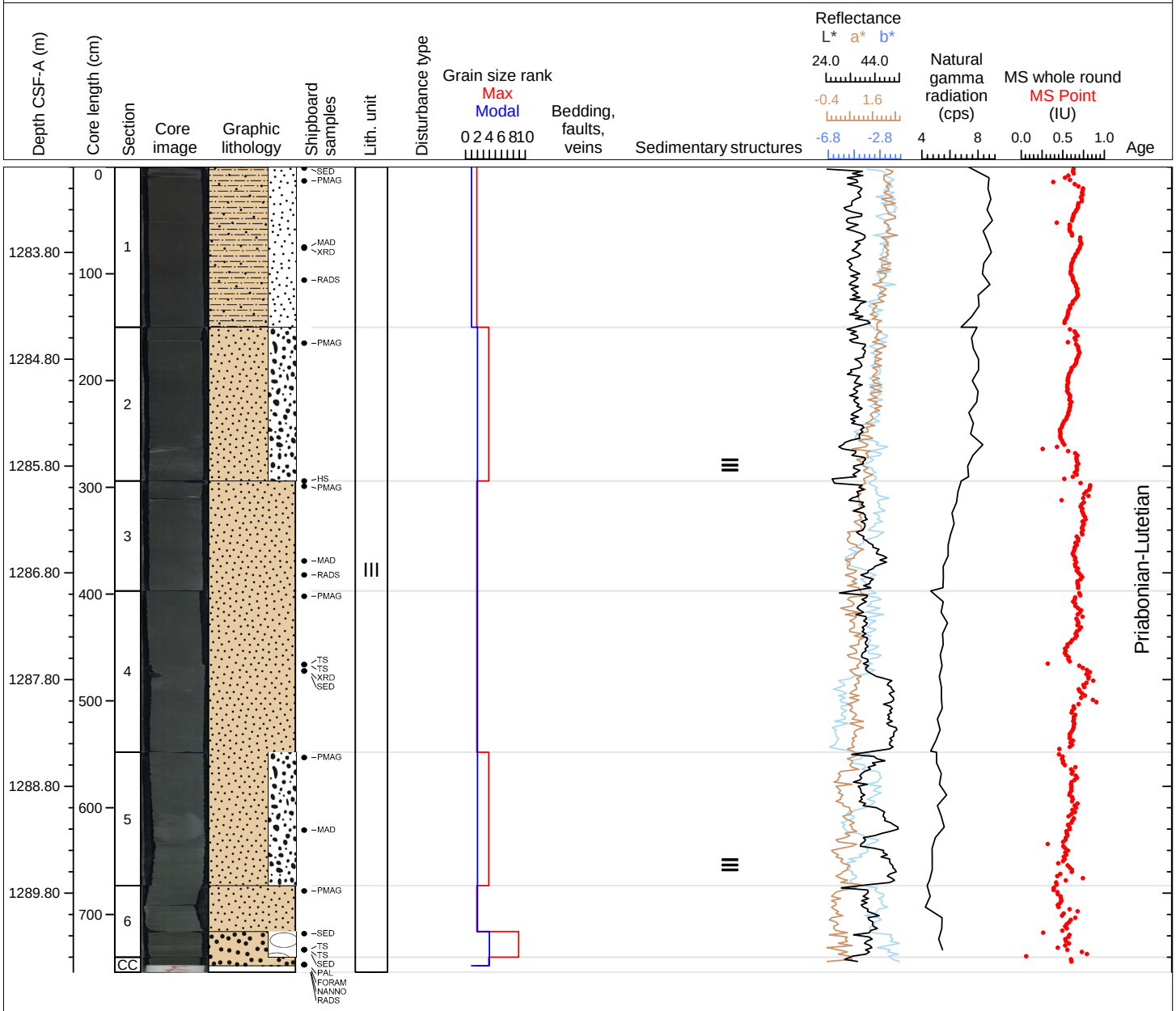
Hole 351-U1438E Core 46R, Interval 1273.8-1279.74 m (CSF-A)

TUFFACEOUS SILTSTONE WITH SAND, TUFFACEOUS MUDSTONE: Core 46R is dominated by tuffaceous siltstone and tuffaceous mudstone with greenish sandstones intercalated. Dark gray (5YR 4/1) layers are dominant, and mm- to decimeter-thick greenish layers intercalated. Sorting is often well or moderate and planar and cross laminations are common. Some sandstone and siltstone show normal grading. Bioturbation is slight to moderate in limited intervals of siltstones. Drilling disturbance is restricted to short intervals.



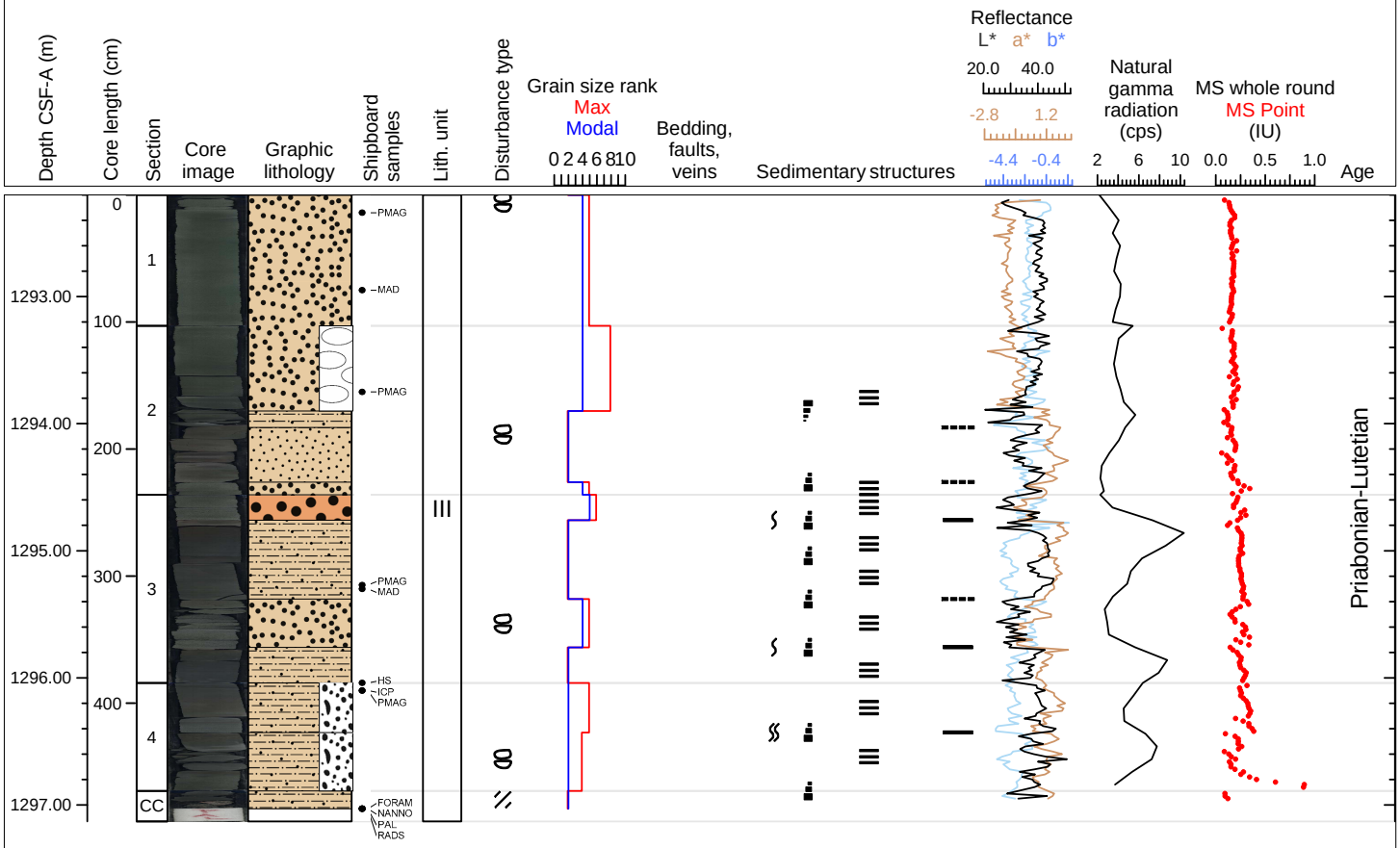
Hole 351-U1438E Core 47R, Interval 1283.0-1290.54 m (CSF-A)

TUFFACEOUS SILTSTONE (WITH SAND), TUFFACEOUS MUDSTONE WITH SILT, TUFFACEOUS FINE SANDSTONE (WITH GRAVEL): Core 47R is dominated by tuffaceous mud- to siltstone. Tuffaceous fine sandstones (with pebbles up to 6 mm) occur in the lower parts of Sections 6 and CC. Color gradationally changes from brownish black (5YR 2/1) through greenish black (5GY 2/1) to dark greenish gray (5G 4/1) and dark gray (5Y 4/1). Sorting is well or moderate. Very thin planar laminations occur in some part of the siltstones. There is neither bioturbation or drilling disturbance.



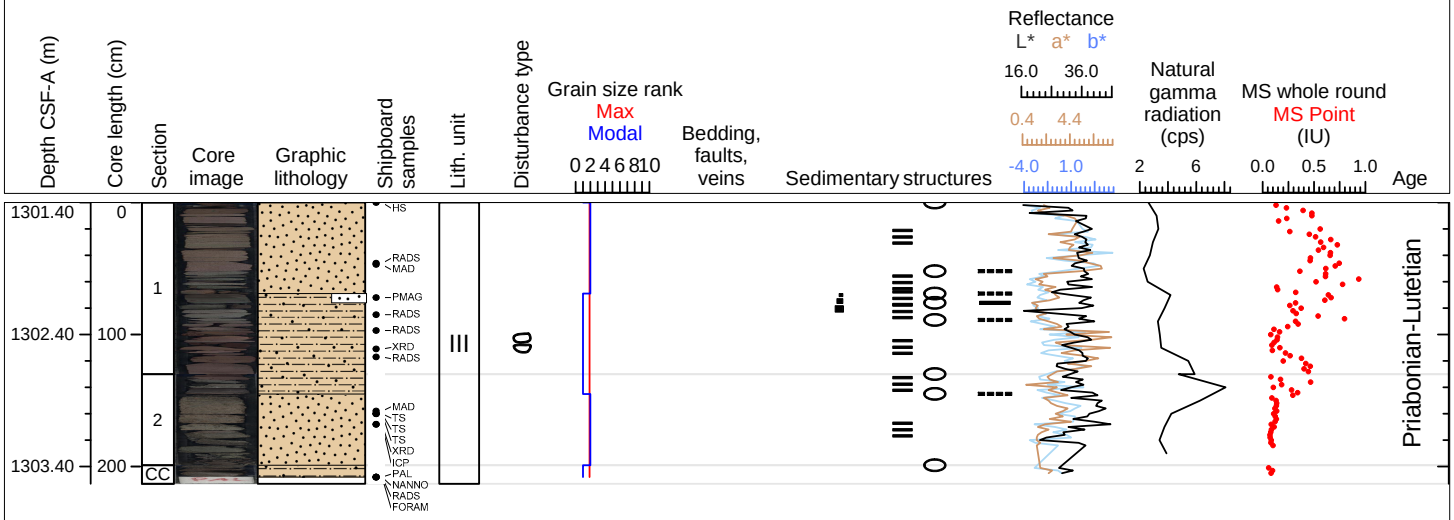
Hole 351-U1438E Core 48R, Interval 1292.2-1297.13 m (CSF-A)

TUFFACEOUS MUDSTONE (WITH SAND), TUFFACEOUS FINE SANDSTONE (WITH GRAVEL), TUFFACEOUS SILTSTONE, TUFFACEOUS SANDSTONE: Core 48R is dominated by alternating sequences of brownish gray (5YR 4/1) mud- and siltstone grading into grayish green (10G 4/2) to dark greenish gray (5G 4/1) fine sandstones and sandstones. Planar laminations and normal grading is common throughout the core. Bioturbation is slight to moderate at the top of the mudstone intervals, just below the sharp contact to each of the overlying sandstone intervals. Drilling disturbance caused moderate biscuting and fragmenting in some intervals throughout the core.



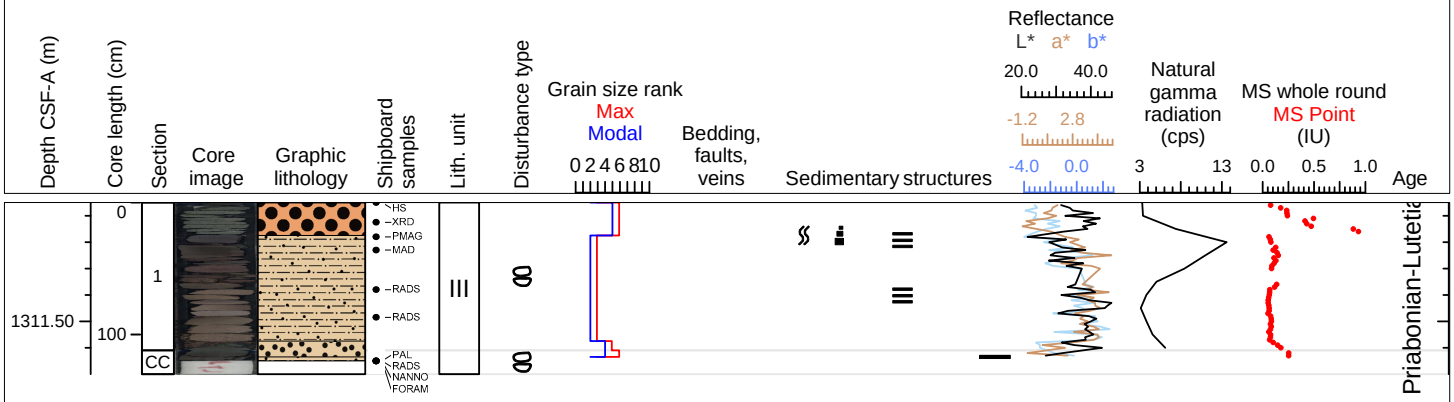
Hole 351-U1438E Core 49R, Interval 1301.4-1303.53 m (CSF-A)

TUFFACEOUS MUDSTONE AND SILTSTONE The core consists of intercalated layers of reddish brown (10R 4/2 and 10R 3/4) tuffaceous mudstone and greenish grey (10G 4/2) siltstone. The rocks have some planar laminations shown by change in color. There is one graded interval at 69-76 cm in section 1. Much of the rock contains 2-3 mm concretions which form rounded pieces when broken. Drilling disturbance is severe, with biscuiting and brecciation.



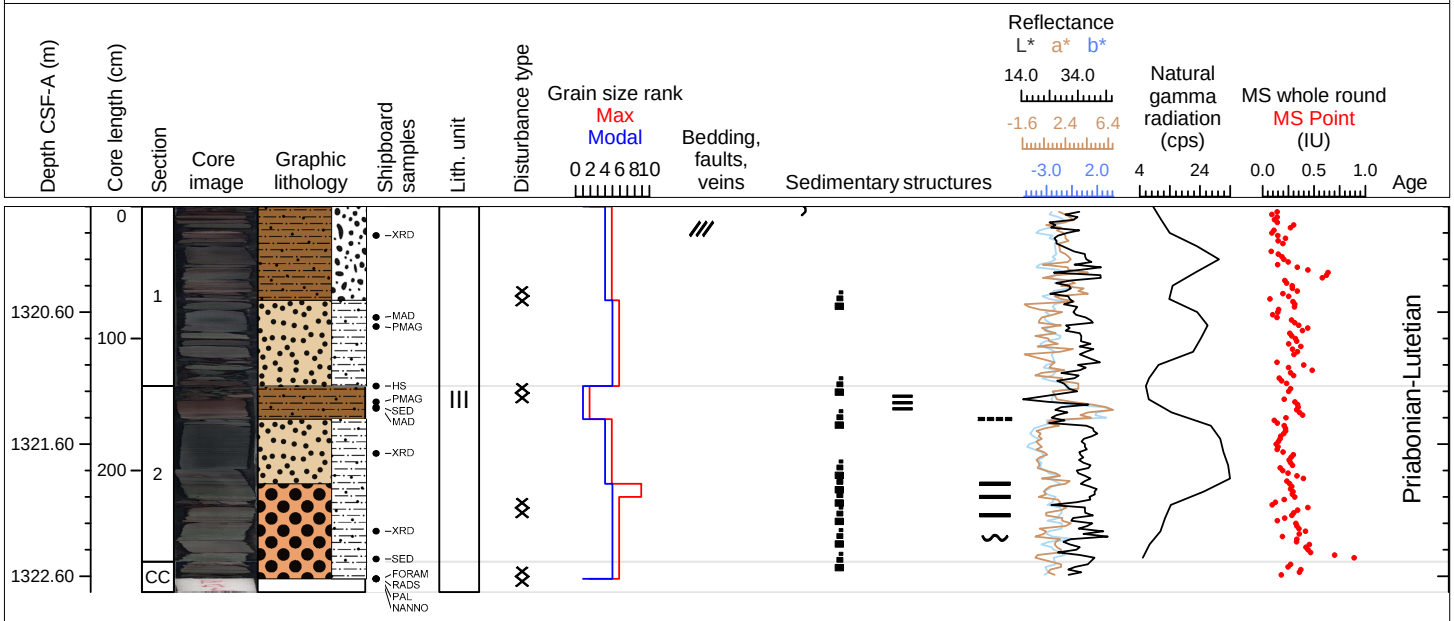
Hole 351-U1438E Core 50R, Interval 1310.6-1311.9 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SANDSTONE: Core 50R is dominated by layers of pale brown (5YR 5/2) and dark reddish brown mud siltstone and greenish gray (5G Y6/1) to dark greenish gray (5G 4/1) tuffaceous sandstones. Planar laminations occur in thin(30 cm) intervals. Bioturbation is slight to moderate at the top of the mudstone intervals. Drilling disturbance occurs throughout the core (moderate biscuiting).



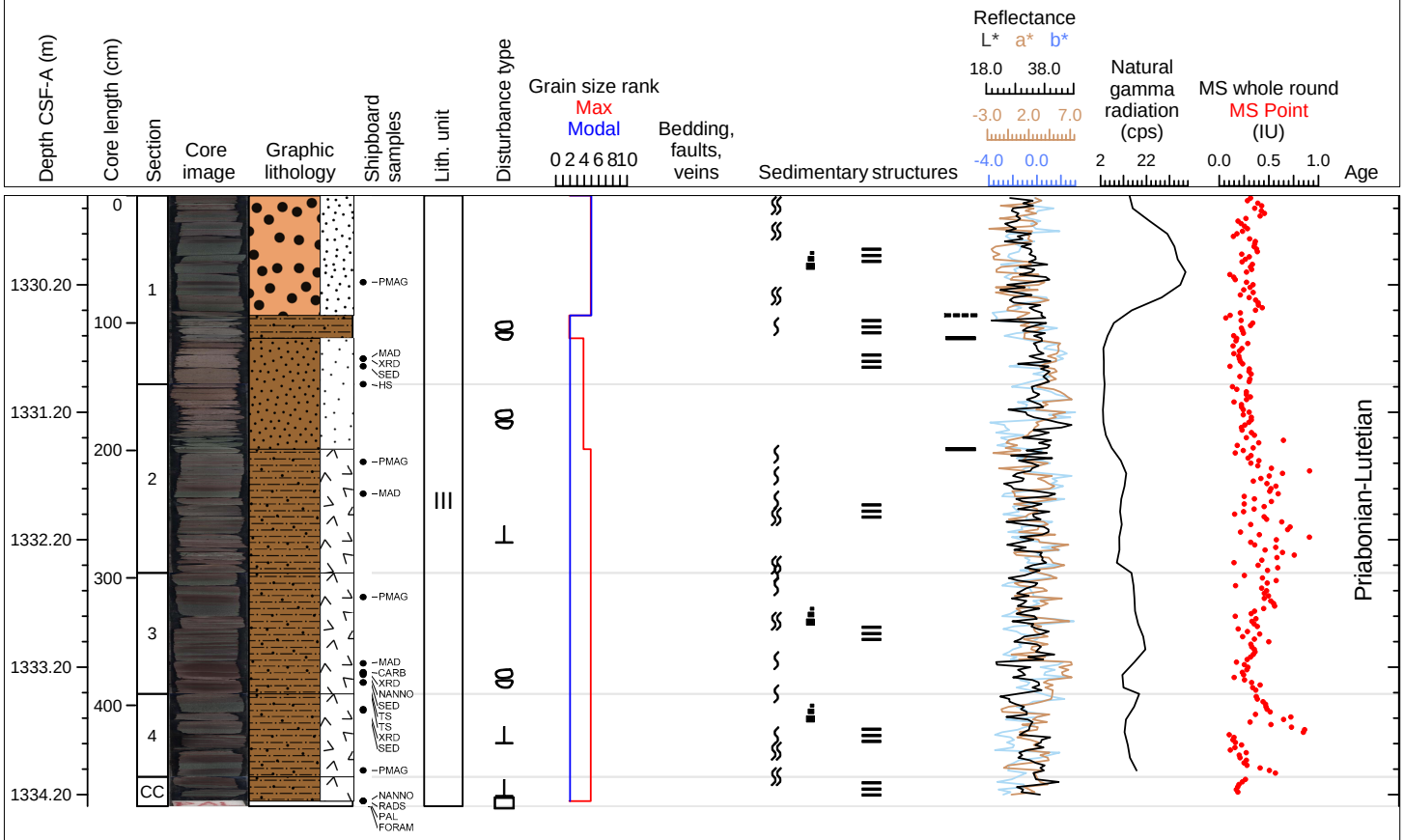
Hole 351-U1438E Core 51R, Interval 1319.8-1322.72 m (CSF-A)

MUDSTONE, MUDSTONE WITH SAND, TUFFACEOUS SANDSTONE WITH MUD: Core 51R consists of intercalated mm- to dm-thick beds of dusky red (10R 3/4) mudstone and grayish green (10G 4/2) tuffaceous fine to medium sandstones. Slight bioturbation occurs at the top of the mudstone intervals. The descriptive interval has been named after the dominant lithology due to the small scale of intercalation. Normal grading is common in the sandstone intervals. Drilling disturbance is moderate throughout the core and locally severe in Section 2.



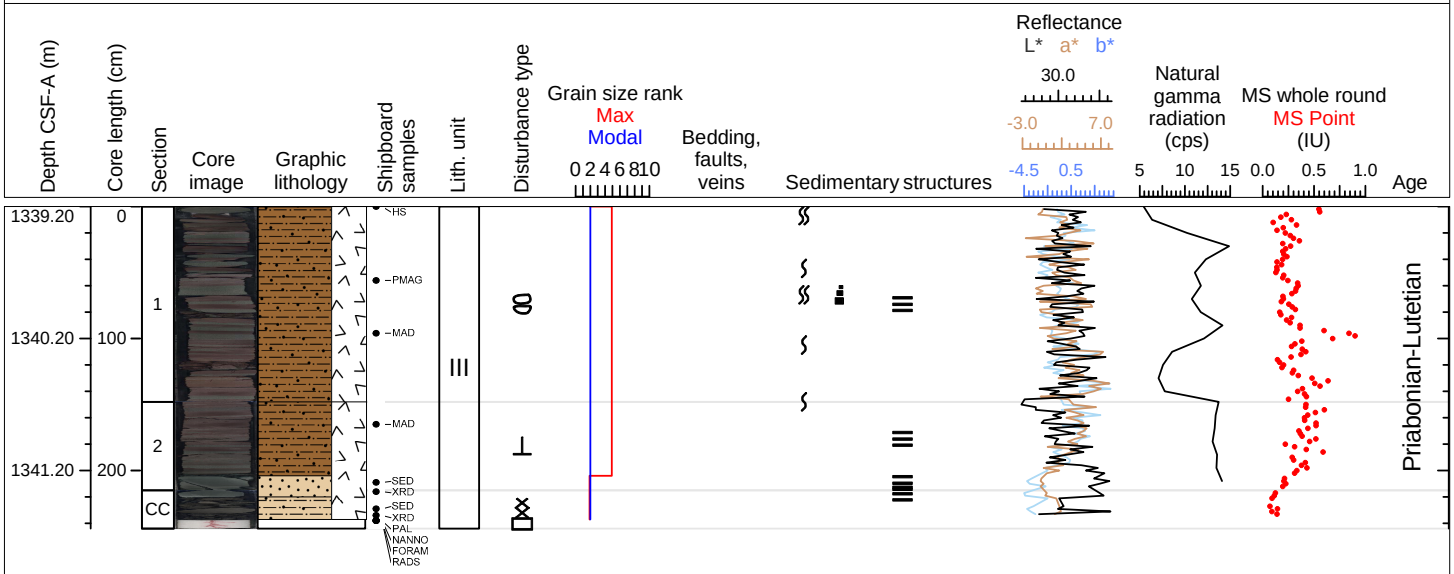
Hole 351-U1438E Core 52R, Interval 1329.5-1334.29 m (CSF-A)

MUDSTONE WITH ASH, SILTSTONE WITH FINE SAND, TUFFACEOUS SANDSTONE WITH SILT, MUDSTONE: Core 52R is composed of mm- to dm-scale intercalated beds of dark greenish grey (5G 4/1) fine to medium sandstone and grayish red (10R 4/2) mudstone with ash. The descriptive interval has been named after the dominant lithology due to the small scale of the intercalation. Planar lamination is present throughout the core except for the grayish red (10R 4/2) siltstone with fine sand at the bottom of Section 1 and top of Section 2. This interval shows numerous mm-size diagenetic spherules. Normal grading is common the in the sandstone intervals and bioturbation is slight to moderate in the carbonate-bearing red mudstones. Drilling disturbance caused moderate biscuiting, especially in Sections 1 and 2.



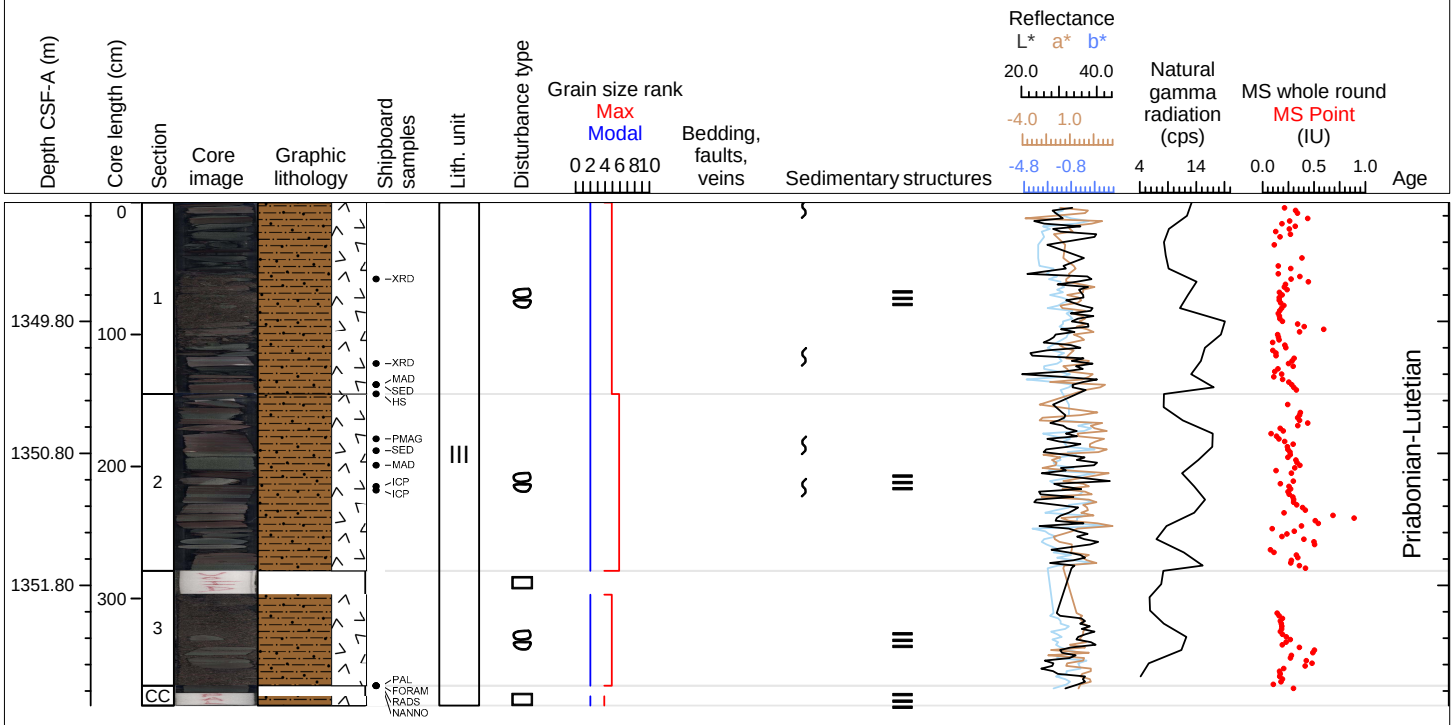
Hole 351-U1438E Core 53R, Interval 1339.2-1341.64 m (CSF-A)

MUDSTONE WITH ASH, TUFFACEOUS SILTSTONE, TUFFACEOUS MUDSTONE: Core 53R is mainly composed of mm- to dm-scale intercalated beds of dark greenish grey (5G 4/1) tuffaceous fine to medium sandstone and grayish red (10R 4/2) mudstone with ash. The lowermost part of Section 2 and cc consist of grayish blue green (5BG 5/2) tuffaceous siltstone and dark gray (N4) tuffaceous mudstone. Planar lamination is present throughout the core. Normal grading is common in the sandstone intervals and bioturbation is slight to moderate in the grayish red mudstones. Drilling disturbance caused moderate biscuiting and fracturing and severe brecciation in Sections 1, 2 and CC, respectively.



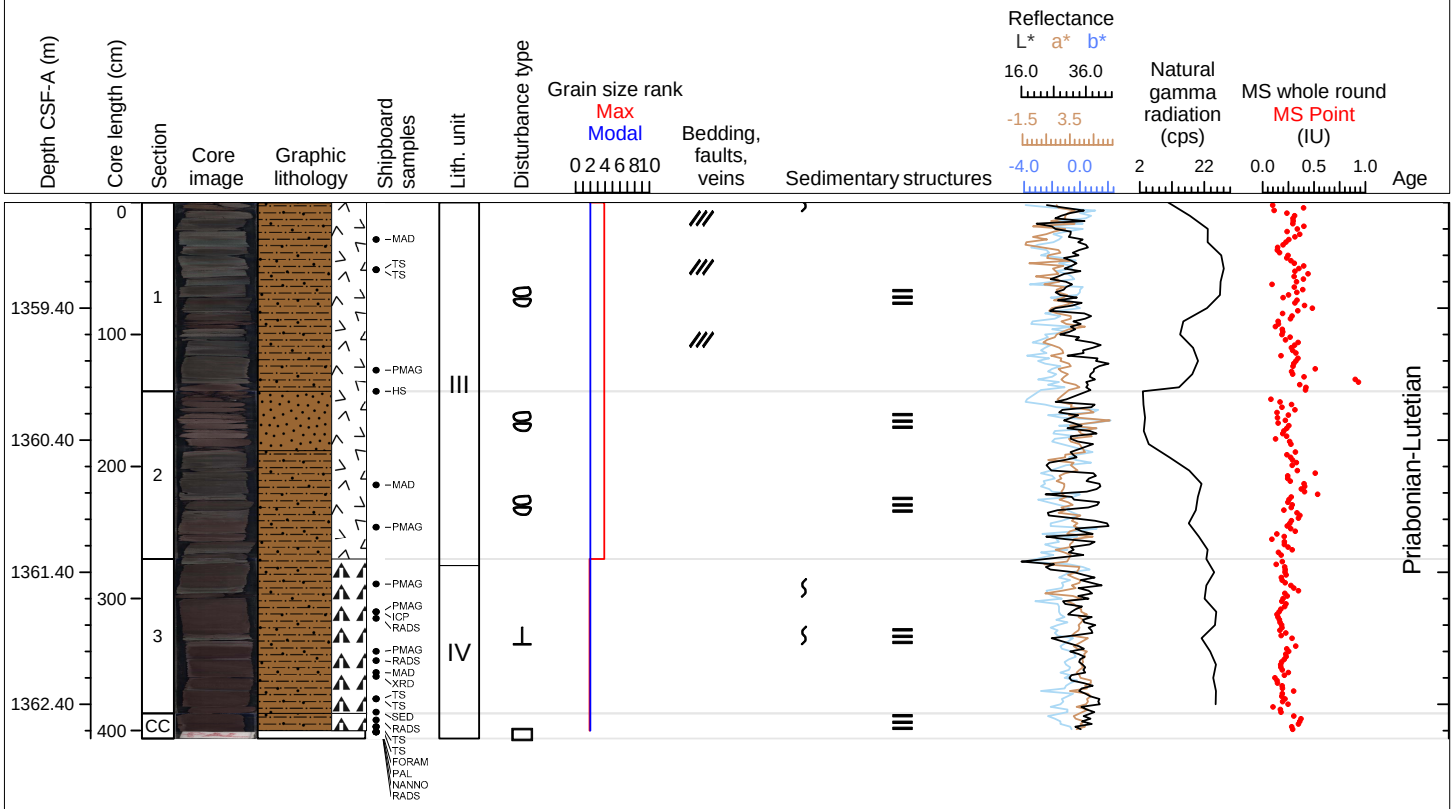
Hole 351-U1438E Core 54R, Interval 1348.9-1352.71 m (CSF-A)

MUDSTONE WITH ASH: Core 54R is mainly composed of mm- to dm-scale intercalated beds of dark greenish grey (5G 4/1) tuffaceous fine- to medium-sandstone and grayish red (10R 4/2) mudstone with ash. Planar laminations are present throughout the core. Bioturbation is slight in the grayish red mudstones. Drilling disturbance caused moderate to severe biscuiting and decimeter long granule to pebble-sized drill cuttings in Sections 1 and 3.



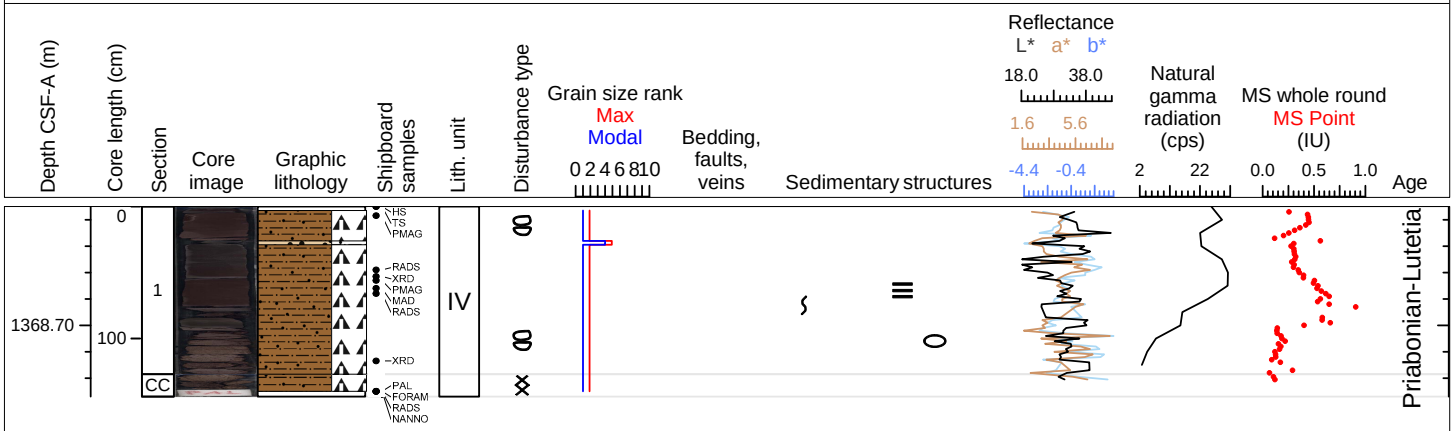
Hole 351-U1438E Core 55R, Interval 1358.6-1362.66 m (CSF-A)

MUDSTONE WITH ASH, SILTSTONE WITH ASH: Core 55R is mainly composed of mm- to cm-scale intercalated beds of greenish (10G 4/2, 5BG 5/2) tuffaceous fine to medium sandstone and grayish red (10R 4/2 and 5R 4/2) and dusky red (10R 3/4) mudstone with ash. The reddish mudstones are dominant in Section 2, 3 and CC. Mudstone includes diagenetic spherules in the top of Section 2. Planar lamination is present throughout the core. Bioturbation is slight or absent. Drilling disturbance ranges from destroyed intervals to moderate biscuiting and slight fracturing.



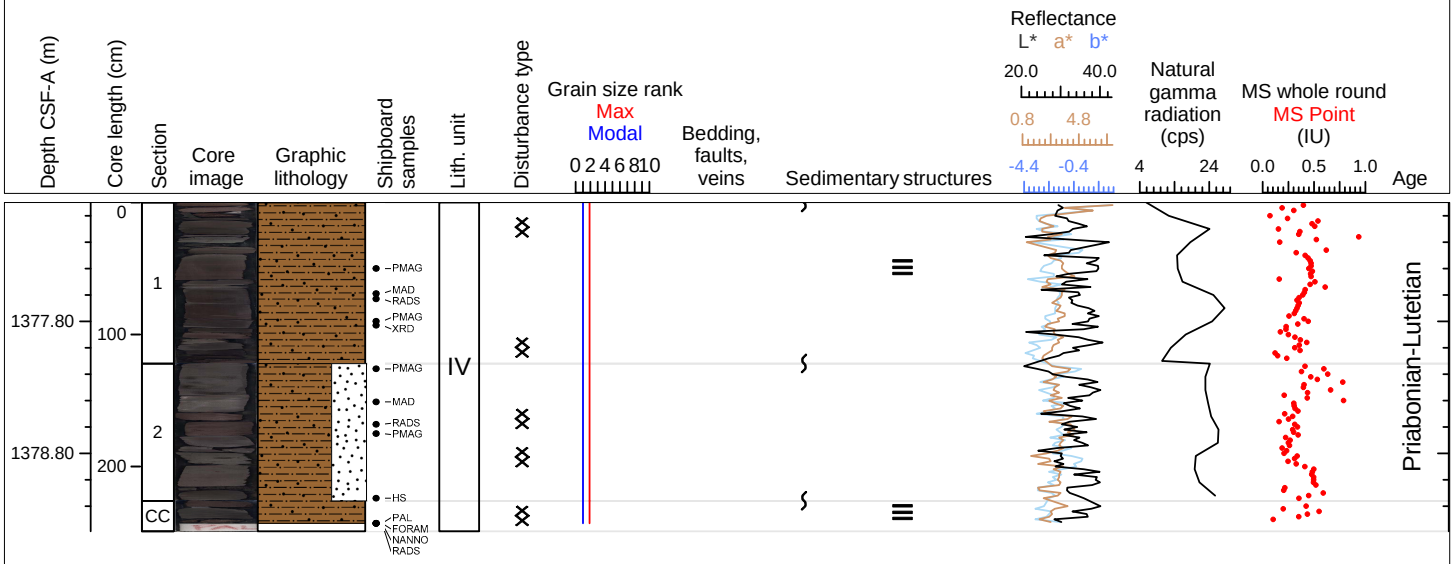
Hole 351-U1438E Core 56R, Interval 1367.8-1369.24 m (CSF-A)

MUDSTONE WITH RADIOLARIA, TUFFACEOUS SANDSTONE: Core 56 is dominated by dusky red (10R 3/4) mudstone with radiolaria and rare cm-thick greenish gray (5G 6/1) tuffaceous fine sandstone with pebbles. Slight bioturbation occurs locally in Section 1. Planar laminations occur throughout Section 1. Zeolite concretions are present in the mudstone interval in the lower part of Section 1 and CC.There is one 3 cm rounded porphyritic, amygdaloidal andesite pebble at the top of the core, which is likely infall. Drilling disturbance is slight to moderate throughout the core.



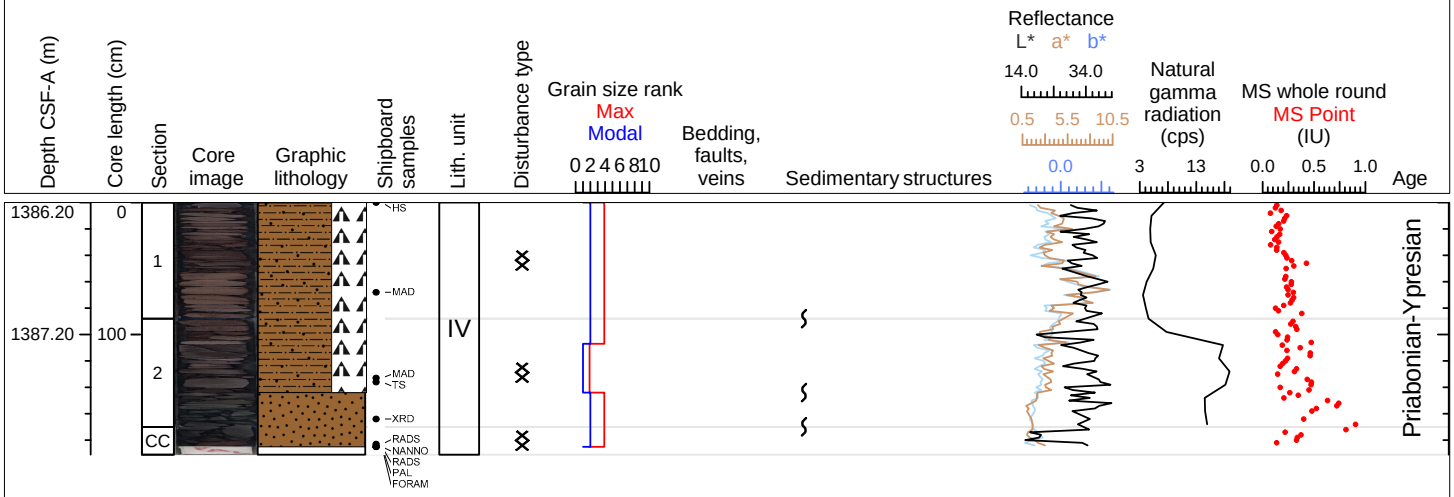
Hole 351-U1438E Core 57R, Interval 1376.9-1379.39 m (CSF-A)

MUDSTONE WITH RADIOLARIA, MUDSTONE WITH SILTSTONE: Core 57R is dominated by greenish red (5R 4/2) mudstone with radiolaria with rare, thin, slightly more green siltstone. Slight bioturbation and planar laminations occurs locally in in both Sections. A thin, bedding parallel layer of zeolite and chlorite occurs in the middle of Section 2. Drilling disturbance is moderate to severe throughout the Core.



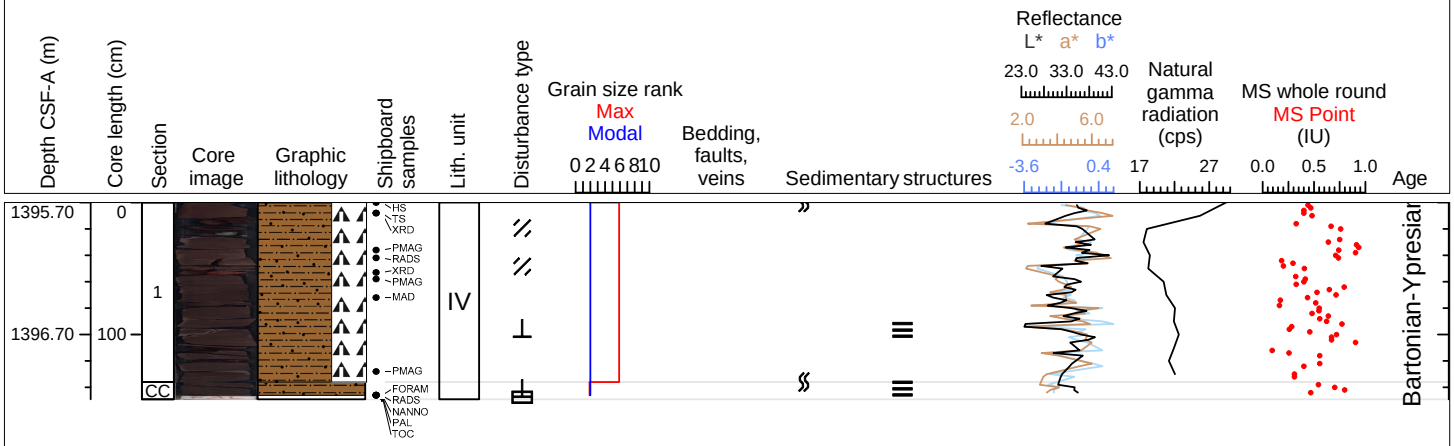
Hole 351-U1438E Core 58R, Interval 1386.2-1388.11 m (CSF-A)

MUDSTONE WITH RADIOLARIA, MUDSTONE WITH SILTSTONE: Core 58R contains dark red brown (10R 3/4) mudstone with radiolaria and dusky blue green (5BG 3/2) siltstone. Slight bioturbation and planar laminations occurs locally in both Sections and in the core catcher. Drilling disturbance is severe throughout the Core (breccia).



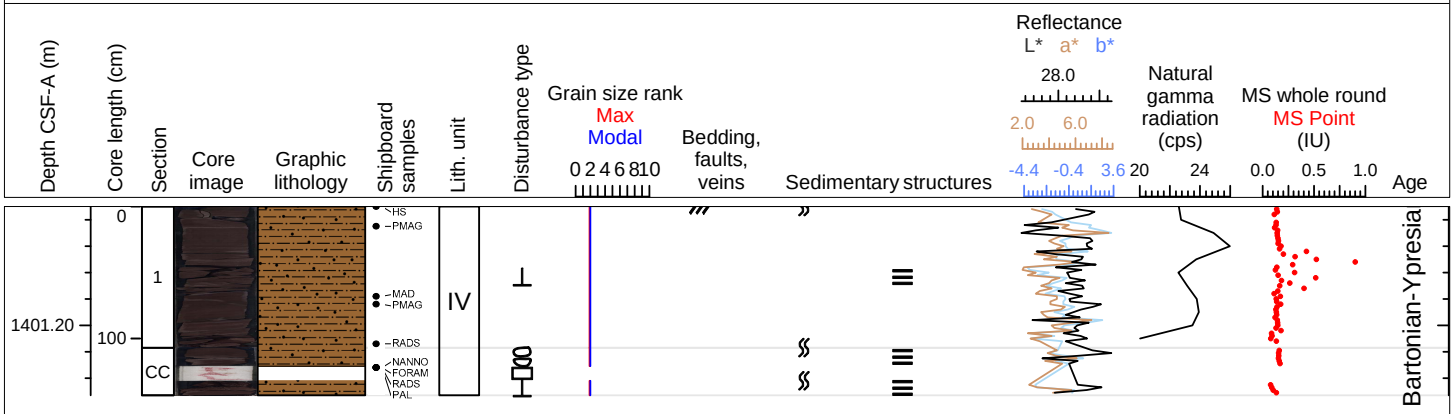
Hole 351-U1438E Core 59R, Interval 1395.7-1397.19 m (CSF-A)

MUDSTONE: Core 59R is composed of dusky red (10R 3/4) mudstone with rare dispersed mm-sized crystals and clasts along lamina. A few fragments of reddish brown (10R 4/6) and greenish gray (5G 6/1) mudstone occur. Inclined lamination and moderate bioturbation occur throughout most of the core. Some mm-thick black layers are concentrated manganese oxides. Drilling disturbance is moderate to severe throughout the Core.



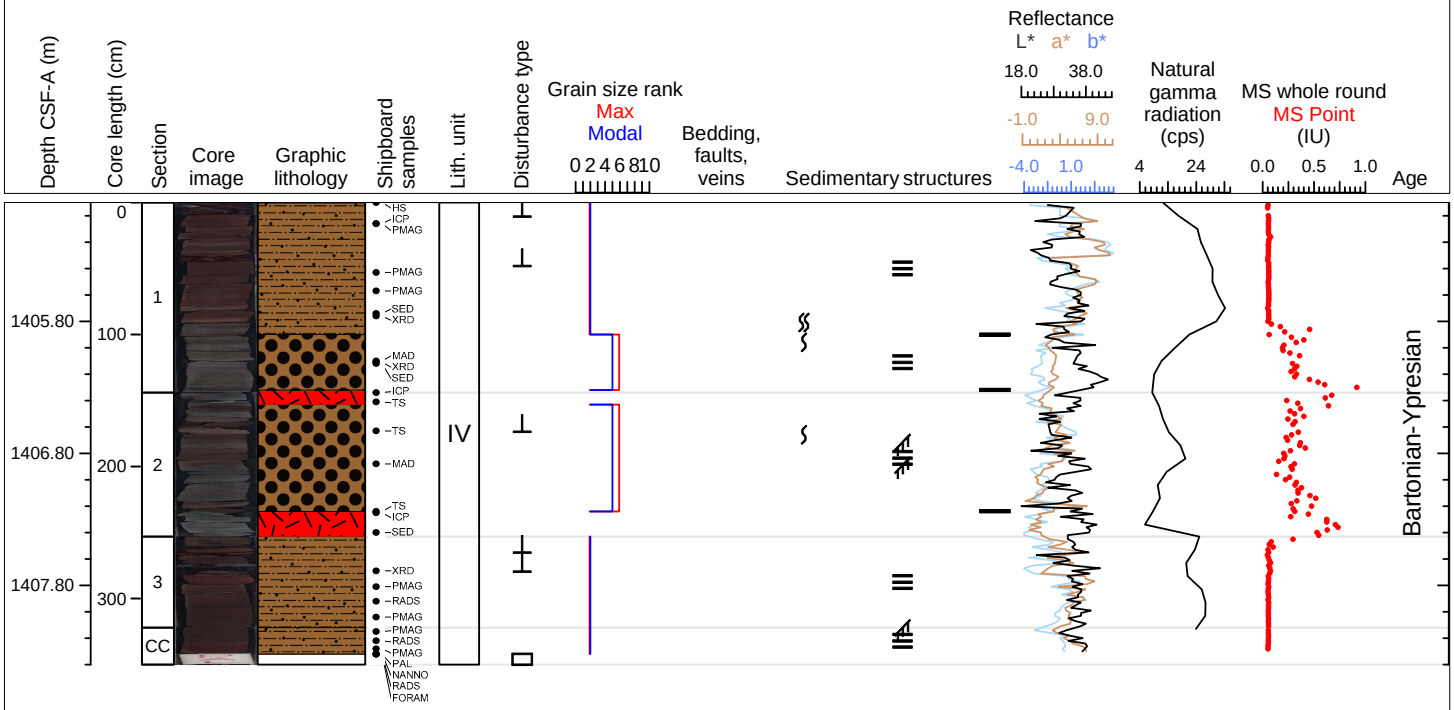
Hole 351-U1438E Core 60R, Interval 1400.3-1401.73 m (CSF-A)

MUDSTONE: Core 60R is composed of dusky red (10R 3/4) mudstone. Inclined lamination and moderate bioturbation occur throughout the core. Some mm-thick black layers are concentrated manganese oxides. Drilling disturbance is moderate fracturing throughout the Core.



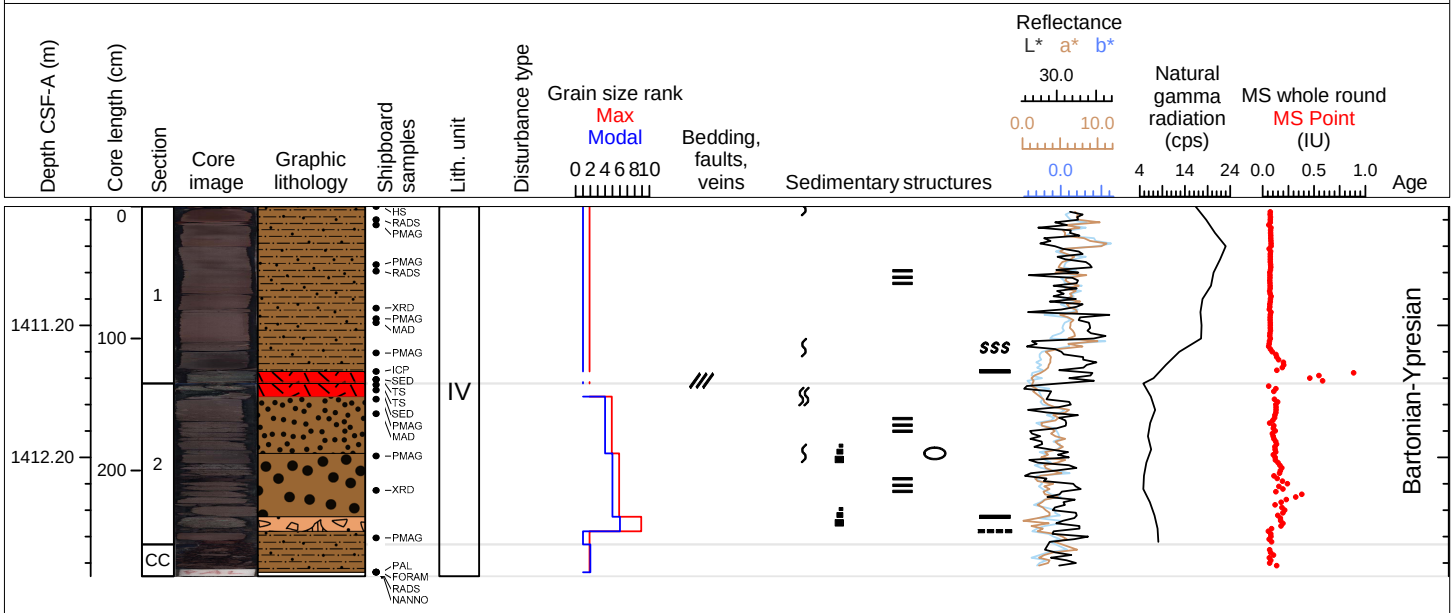
Hole 351-U1438E Core 61R, Interval 1404.9-1408.4 m (CSF-A)

MUDSTONE, MEDIUM TO COARSE SANDSTONE: Core 61R is composed mostly of dusky red (10R 3/4) mudstone with intercalated, cm- dm-scale dark gray (5YR 4/1) medium to coarse sandstone. A porphyritic basalt cobble at least 19 cm thick occurs between Section 1 and 2. Planar laminations are common in the mudstone, cross bedding occurs in the sandstone, and slight to moderate bioturbation occurs in the mudstone. Drilling disturbance occurs as moderate to severe fracturing at various locations in the Core.



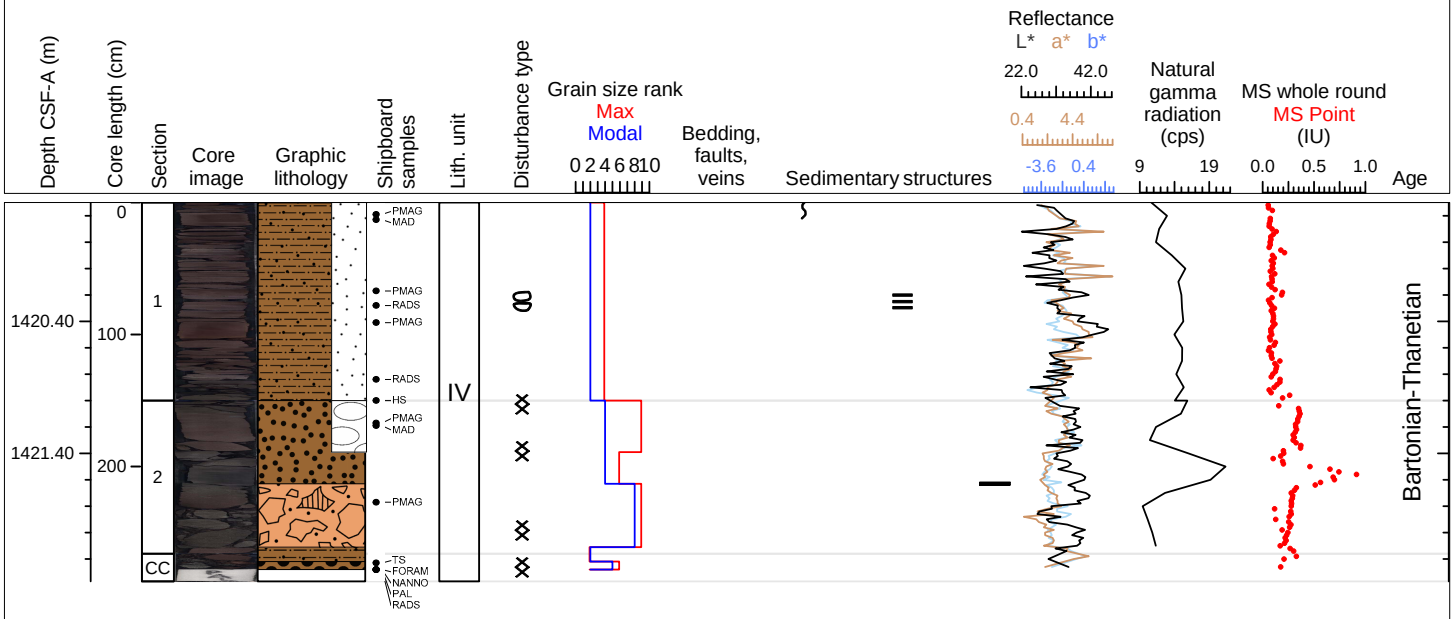
Hole 351-U1438E Core 62R, Interval 1410.3-1413.1 m (CSF-A)

MUDSTONE, SANDSTONE, BRECCIA-CONGLOMERATE AND BASALT: Core 62R consists of 3 intervals of finely laminated reddish brown (5R 2/2 and 10R 3/4) mudstone, and two intervals of normally graded coarser grained rocks. An interval of breccia-conglomerate with mixed volcanic and sedimentary clasts grades upward to fine sandstone, and the overlying medium sandstone grades upward to slightly bioturbated mudstone. An interval of basalt at the base of Section 1 and top of Section 2 appears to have mixed and interacted with the surrounding mudstone. Drilling disturbance varies from none to biscuiting and brecciation.



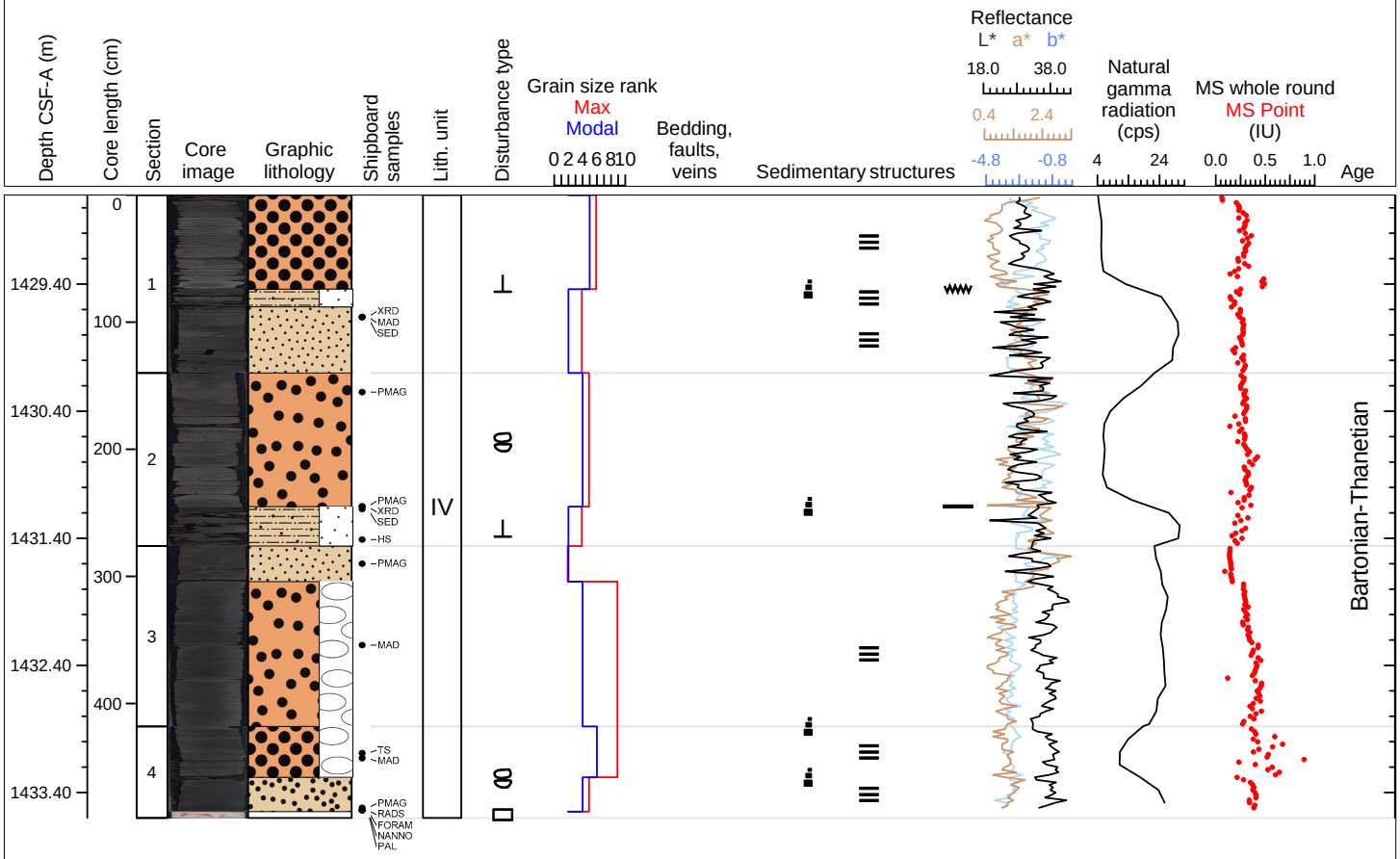
Hole 351-U1438E Core 63R, Interval 1419.5-1422.37 m (CSF-A)

MUDSTONE, SANDSTONE, BRECCIA-CONGLOMERATE: Core 63R consists of finely laminated reddish brown (10R 3/4) mudstone and intervals of breccia-conglomerate with mixed volcanic and sedimentary clasts and fine sandstone. Section CC is strongly affected by drilling disturbance and contains mixed fragments of reddish brown mudstone and grey well sorted, crystal-rich sandstone.



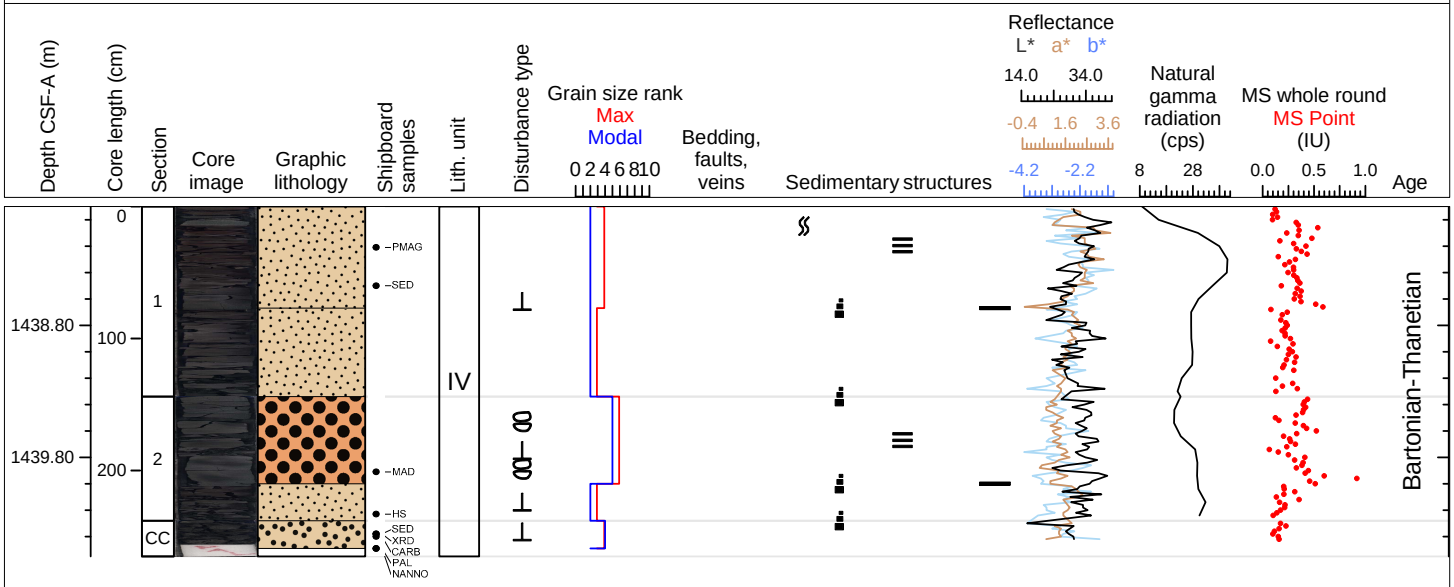
Hole 351-U1438E Core 64R, Interval 1428.7-1433.6 m (CSF-A)

TUFFACEOUS SANDSTONE, TUFFACEOUS MEDIUM TO COARSE SANDSTONE WITH GRAVEL, TUFFACEOUS MUDSTONE WITH FINE SAND, TUFFACEOUS SILTSTONE, TUFFACEOUS FINE SANDSTONE: Core 64R is dominated by dark greenish grey (5G 4/1) to (very) dark grey (N3, N4) tuffaceous sandstone with normal-graded sequences from fine sandstone to medium to coarse sandstone. Most intervals show planar laminations and brownish black (5YR 2/1) to very dark grey (N3) silt- and mudstones seem to form the uppermost part of each normal-graded interval. Siltstones often have up to 1cm thick greenish fine sandstone layers intercalated. Up to 1 mm large white spherules are present in Section 3 and 4. No bioturbation has been observed. Drilling disturbance is slight to moderate throughout Sections 1 and 2 (fractured and biscuited).



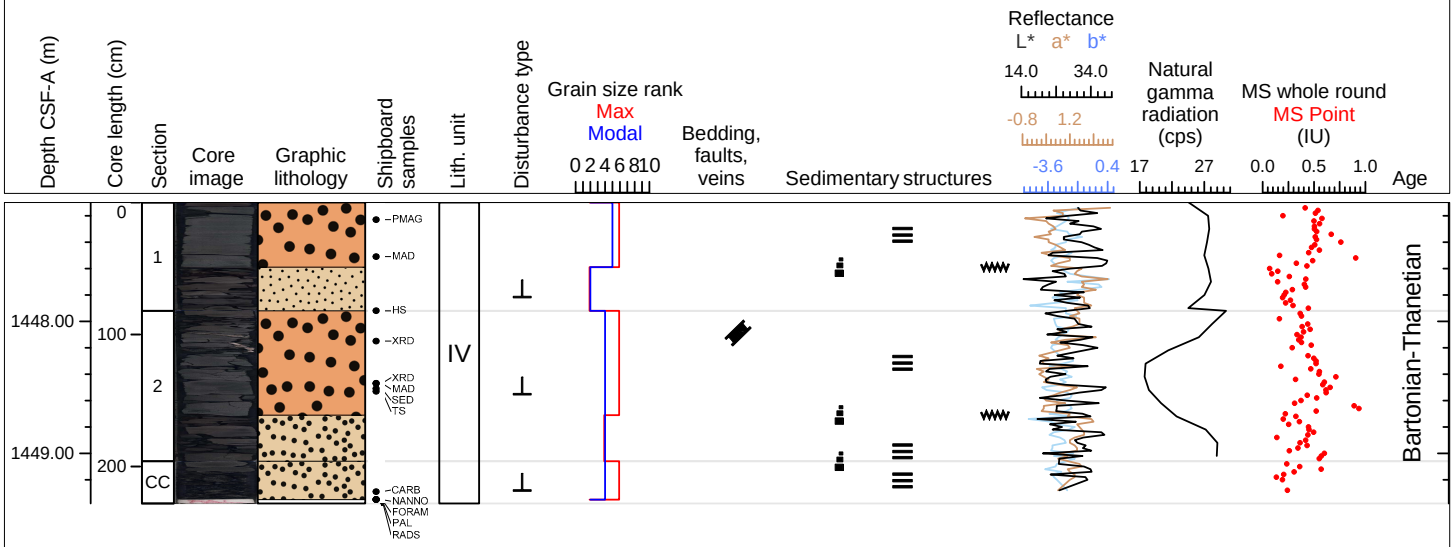
Hole 351-U1438E Core 65R, Interval 1437.9-1440.55 m (CSF-A)

TUFFACEOUS MEDIUM TO COARSE SANDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS FINE SANDSTONE: Core 65R is dominated by grayish black (N 2) and weak red (10R 4/2) tuffaceous siltstone and fine sandstone with normal-graded sequences from siltstone and fine sandstone to grayish black (N 2) medium to coarse sandstone. Most intervals show planar laminations, and the tuffaceous siltstones seem to form the uppermost part of each normal-graded interval. Planar laminations are common in the siltstones. Any contacts between sandstones and siltstones are planar and sharp. Slight or no bioturbation is observed. Drilling disturbance is severe fracturing.



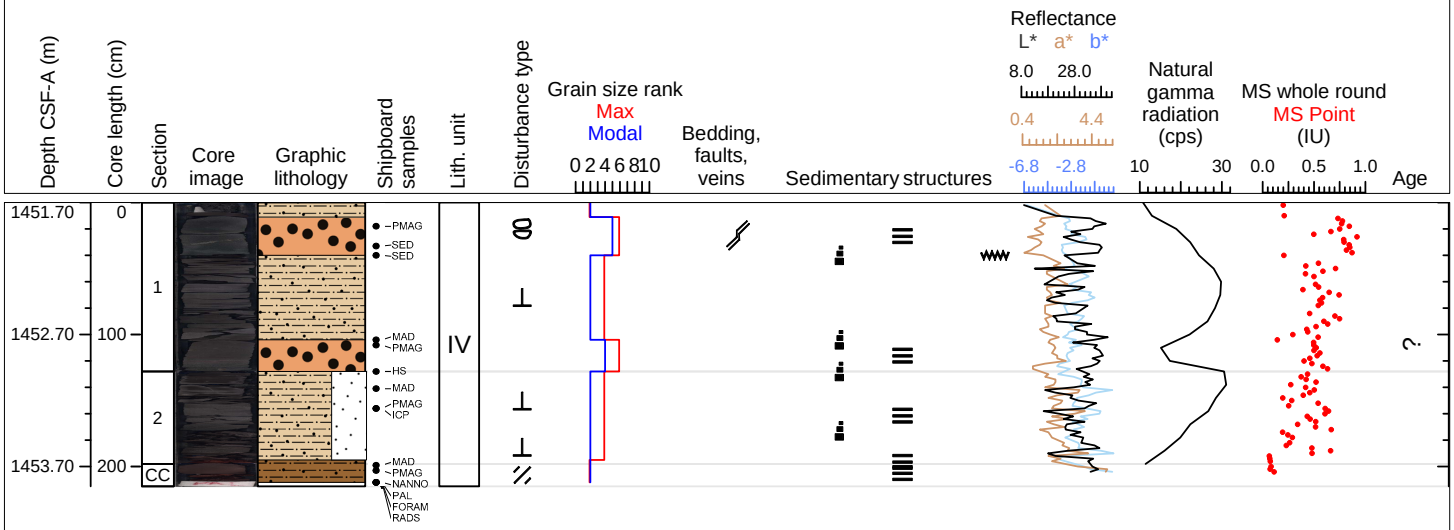
Hole 351-U1438E Core 66R, Interval 1447.1-1449.38 m (CSF-A)

TUFFACEOUS SANDSTONE, TUFFACEOUS SILTSTONE, TUFFACEOUS FINE SANDSTONE: Core 66R is dominated by normally graded sequences of grayish black (N 2) tuffaceous sandstone, grayish black (N 2) fine sandstone, to grayish black (N 2) and brownish black (5Y 2.5/1) tuffaceous siltstone. Most intervals show planar laminations, and the tuffaceous siltstones seem to form the uppermost part of each normal-graded interval. Any contacts between sandstones and siltstones are irregular and scoured. No bioturbation is observed. Drilling disturbance is severe fracturing.



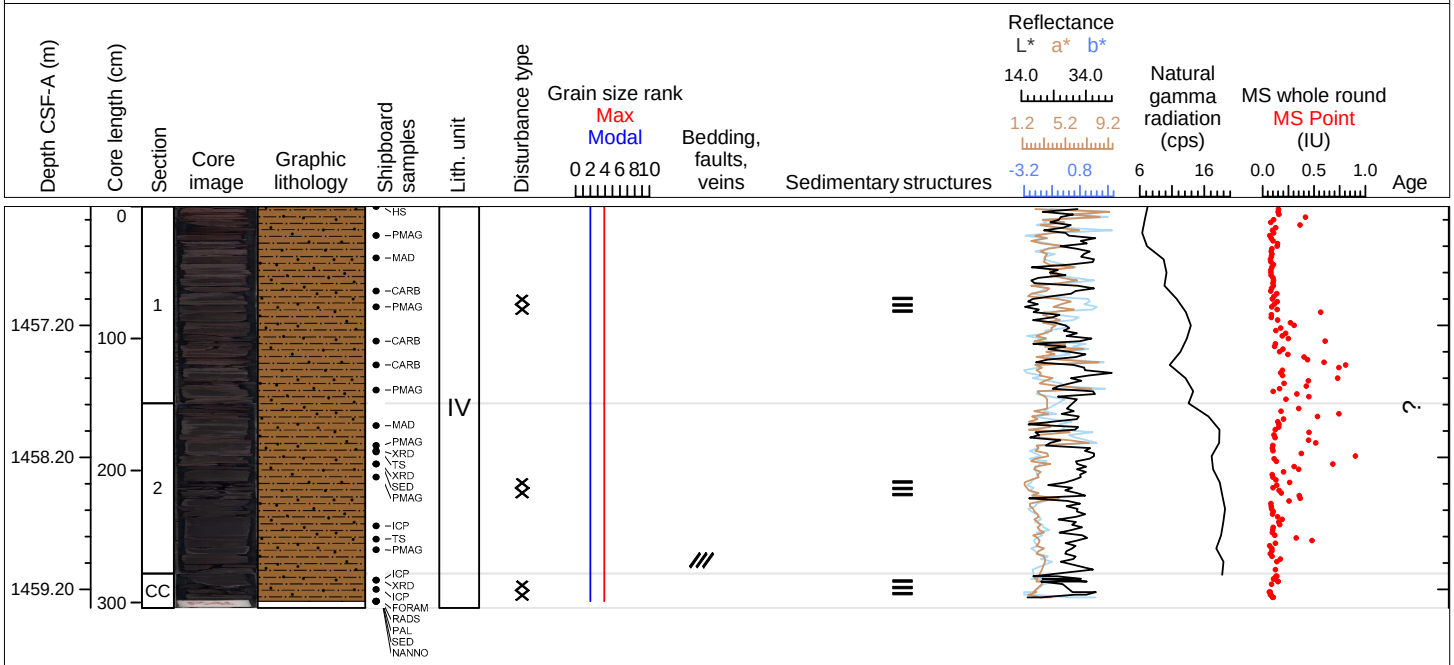
Hole 351-U1438E Core 67R, Interval 1451.7-1453.85 m (CSF-A)

TUFFACEOUS MUDSTONE, TUFFACEOUS SANDSTONE, MUDSTONE: Core 67R is dominated by three normal graded sequences from brownish black (5YR 2/1) or grayish black (N2) tuffaceous mudstones to very dark gray (N 3) tuffaceous sandstones with planar lamination. The lowermost 3 cm of Section 2 and CC are of dusky red (10R 3/4) mudstone with planar lamination. An en echelon diffuse carbonate vein is present in Section 1, 25-33 cm. No bioturbation has been observed. Drilling disturbance caused slight to severe fracturing.



Hole 351-U1438E Core 68R, Interval 1456.3-1459.34 m (CSF-A)

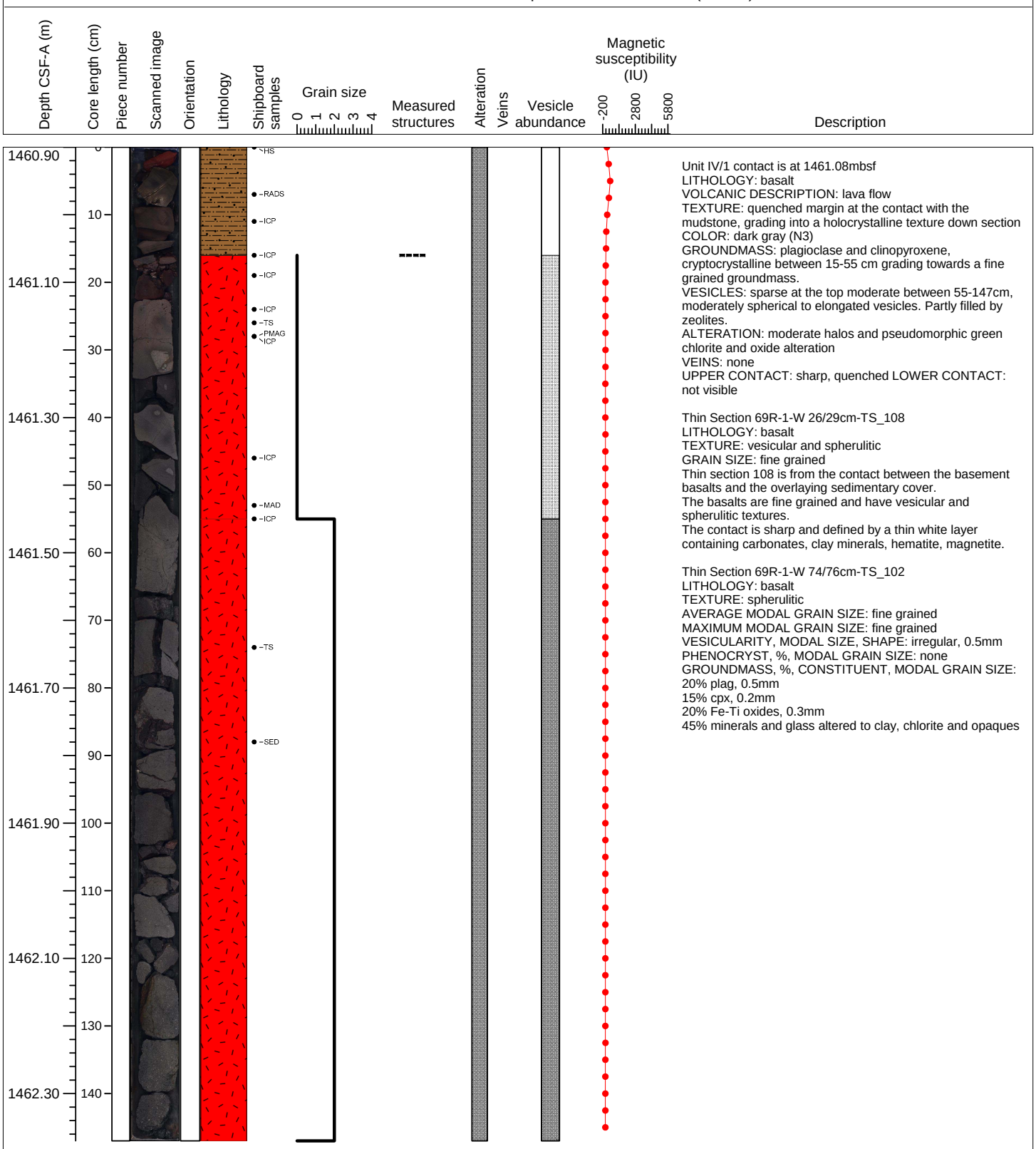
MUDSTONE, SANDSTONE: Core 68R is dominated by blackish red (5R 2/2) mudstones with planar lamination. Some of the thin sandy layers at the top of Section 2 contain abundant detrital amphiboles. No bioturbation was observed. Drilling disturbance caused slight to moderate brecciation.



Hole 351-U1438E Core 69R, Interval 1460.9-1462.69 m (CSF-A)

MUDSTONE, DOLERITE: Core 69R is dominated by medium grained dark gray dolerite. The top of the hole contains reddish brown mudstone that is intruded by the dolerite. The dolerite is very fine grained, vesicular and slightly altered near the contact

Hole 351-U1438E-69R Section 1, Top of Section: 1460.9 m (CSF-A)

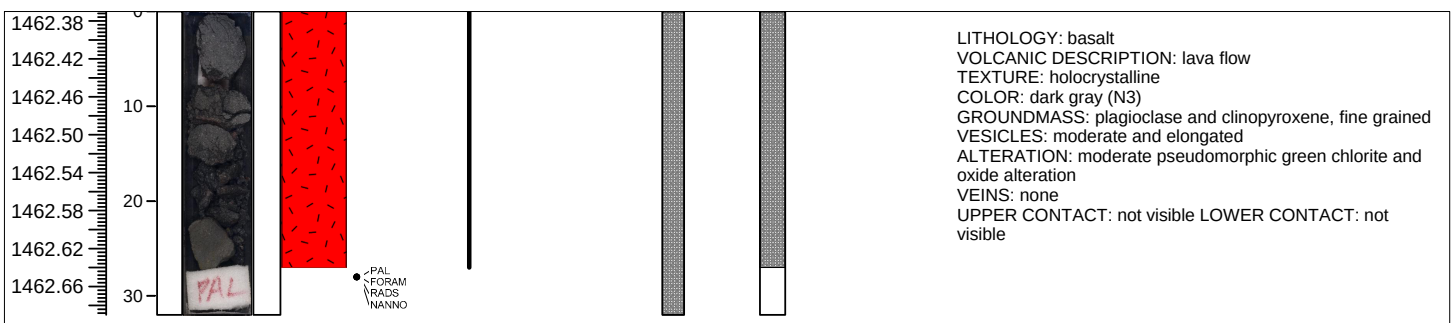


Unit IV/1 contact is at 1461.08mbsf
LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: quenched margin at the contact with the mudstone, grading into a holocrystalline texture down section
COLOR: dark gray (N3)
GROUNDMASS: plagioclase and clinopyroxene, cryptocrystalline between 15-55 cm grading towards a fine grained groundmass.
VESICLES: sparse at the top moderate between 55-147cm, moderately spherical to elongated vesicles. Partly filled by zeolites.
ALTERATION: moderate halos and pseudomorphic green chlorite and oxide alteration
VEINS: none
UPPER CONTACT: sharp, quenched LOWER CONTACT: not visible

Thin Section 69R-1-W 26/29cm-TS_108
LITHOLOGY: basalt
TEXTURE: vesicular and spherulitic
GRAIN SIZE: fine grained
Thin section 108 is from the contact between the basement basalts and the overlaying sedimentary cover.
The basalts are fine grained and have vesicular and spherulitic textures.
The contact is sharp and defined by a thin white layer containing carbonates, clay minerals, hematite, magnetite.

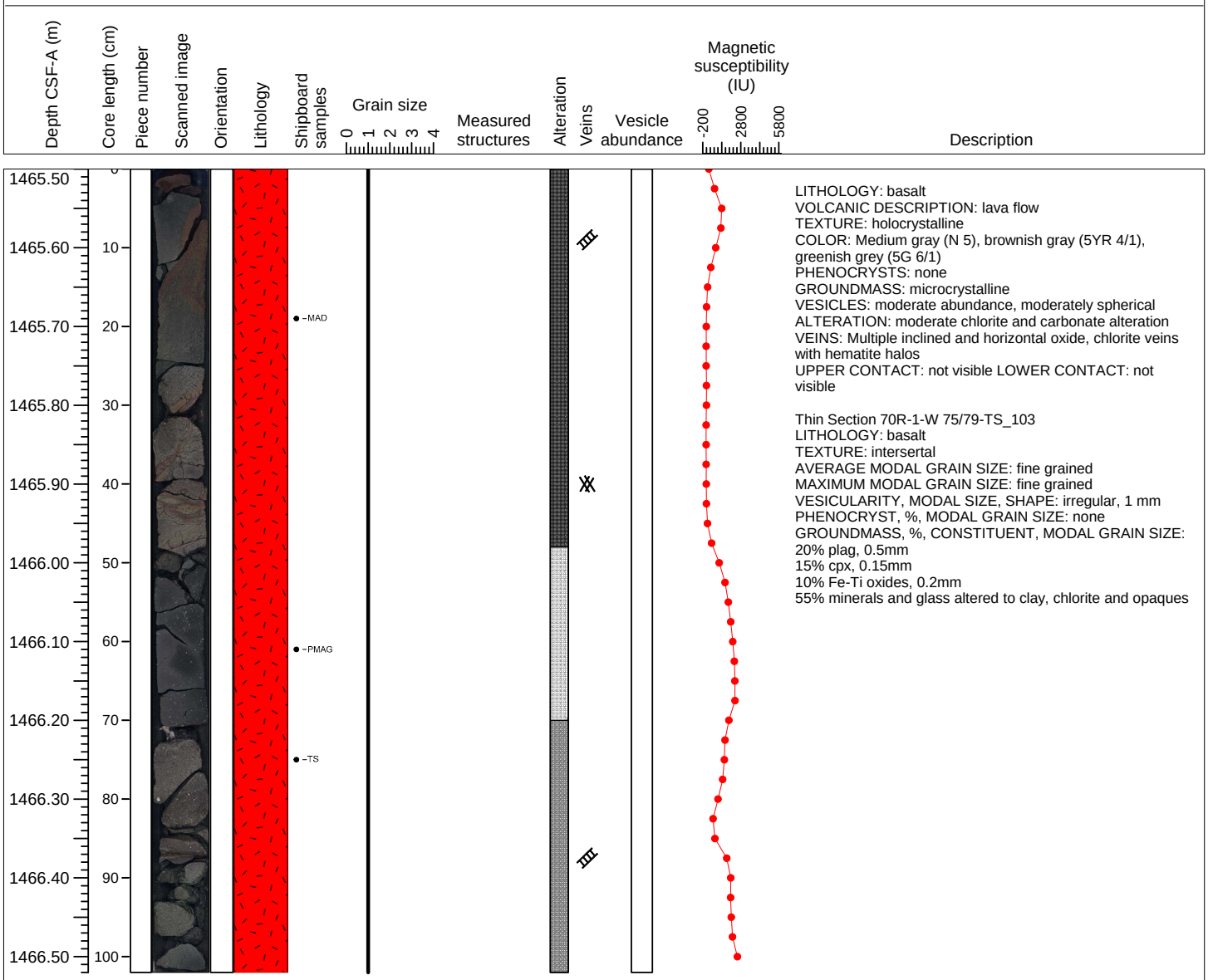
Thin Section 69R-1-W 74/76cm-TS_102
LITHOLOGY: basalt
TEXTURE: spherulitic
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: irregular, 0.5mm
PHENOCRYST, %, MODAL GRAIN SIZE: none
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
20% plag, 0.5mm
15% cpx, 0.2mm
20% Fe-Ti oxides, 0.3mm
45% minerals and glass altered to clay, chlorite and opaques

Hole 351-U1438E-69R Section CC, Top of Section: 1462.37 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: dark gray (N3)
GROUNDMASS: plagioclase and clinopyroxene, fine grained
VESICLES: moderate and elongated
ALTERATION: moderate pseudomorphic green chlorite and oxide alteration
VEINS: none
UPPER CONTACT: not visible LOWER CONTACT: not visible

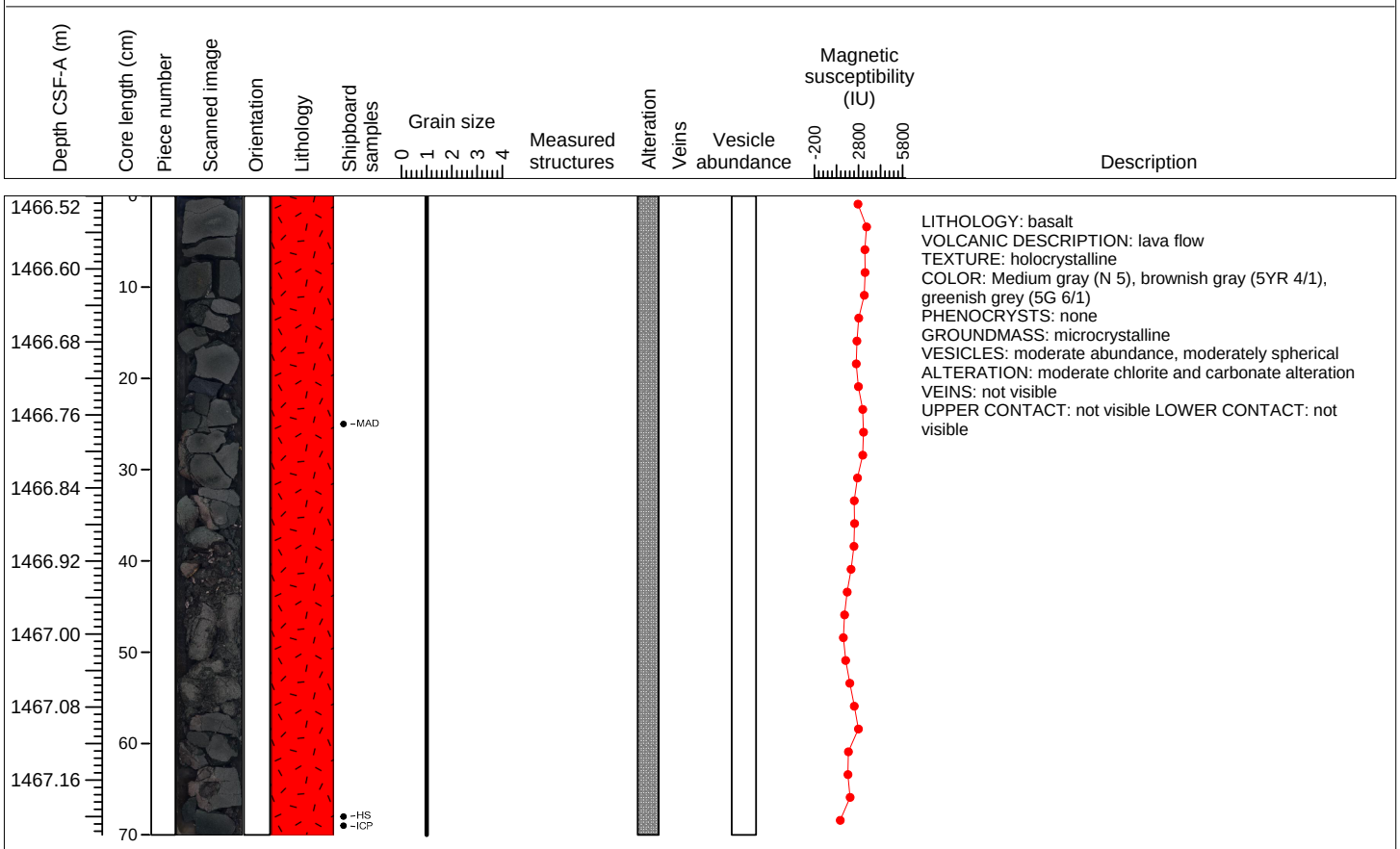
Hole 351-U1438E-70R Section 1, Top of Section: 1465.5 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: Medium gray (N 5), brownish gray (5YR 4/1), greenish grey (5G 6/1)
PHENOCRYSTS: none
GROUNDMASS: microcrystalline
VESICLES: moderate abundance, moderately spherical
ALTERATION: moderate chlorite and carbonate alteration
VEINS: Multiple inclined and horizontal oxide, chlorite veins with hematite halos
UPPER CONTACT: not visible LOWER CONTACT: not visible

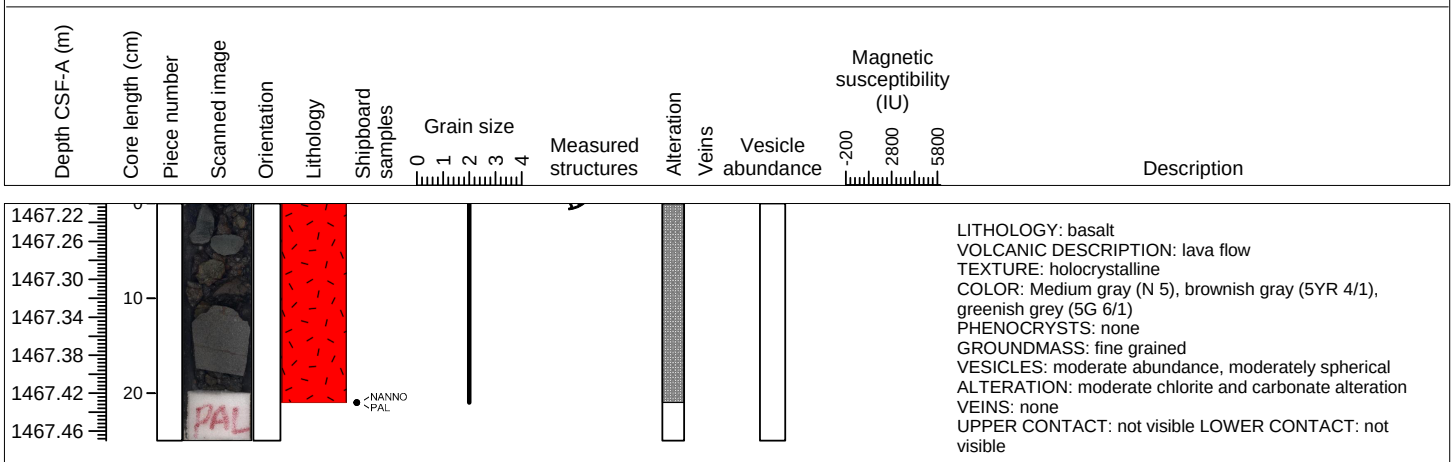
Thin Section 70R-1-W 75/79-TS_103
LITHOLOGY: basalt
TEXTURE: intersertal
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: irregular, 1 mm
PHENOCRYST, %, MODAL GRAIN SIZE: none
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
20% plag, 0.5mm
15% cpx, 0.15mm
10% Fe-Ti oxides, 0.2mm
55% minerals and glass altered to clay, chlorite and opaques

Hole 351-U1438E-70R Section 2, Top of Section: 1466.52 m (CSF-A)



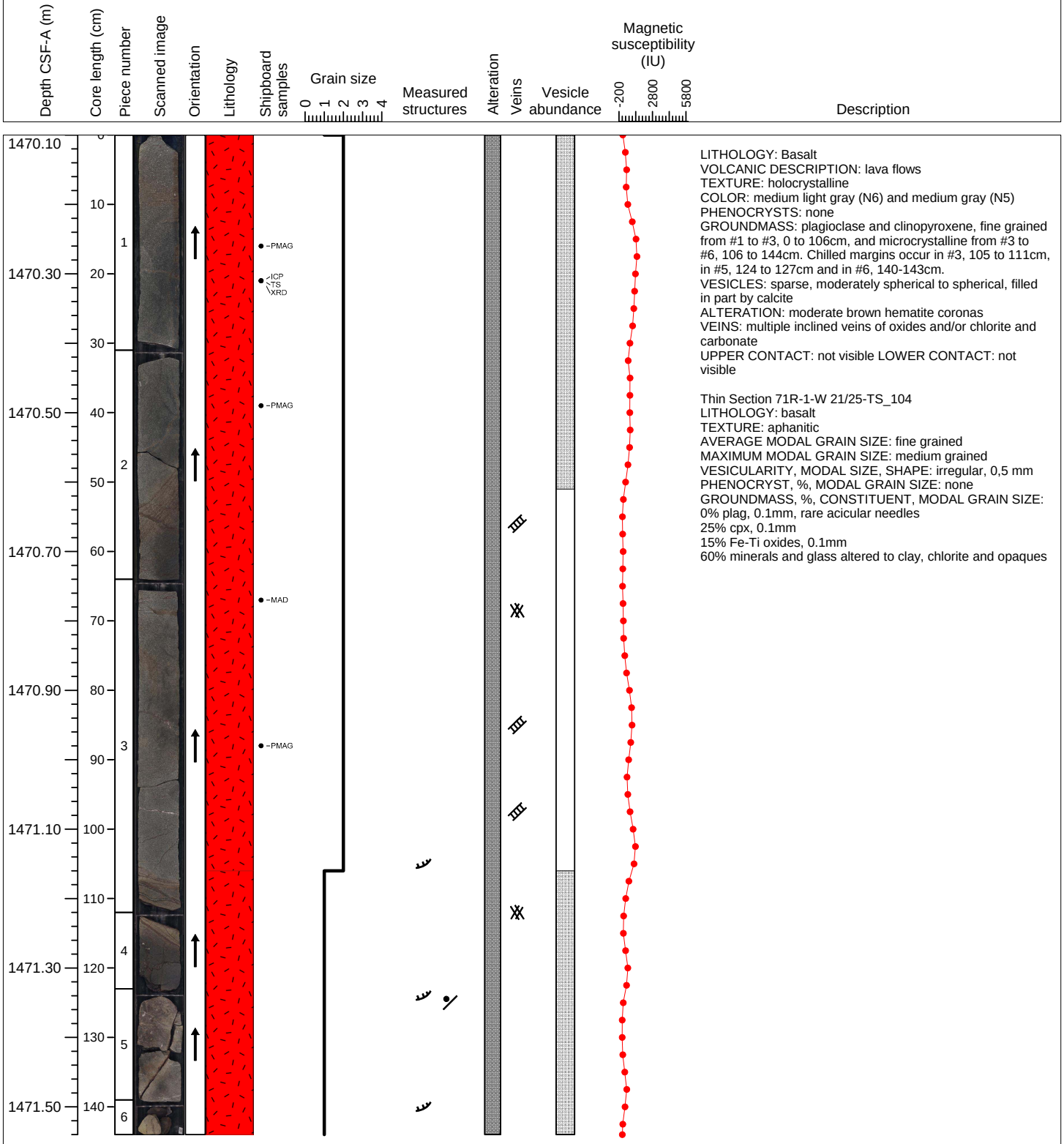
LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: Medium gray (N 5), brownish gray (5YR 4/1), greenish grey (5G 6/1)
PHENOCRYSTS: none
GROUNDMASS: microcrystalline
VESICLES: moderate abundance, moderately spherical
ALTERATION: moderate chlorite and carbonate alteration
VEINS: not visible
UPPER CONTACT: not visible LOWER CONTACT: not visible

Hole 351-U1438E-70R Section CC, Top of Section: 1467.22 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: Medium gray (N 5), brownish gray (5YR 4/1), greenish grey (5G 6/1)
PHENOCRYSTS: none
GROUNDMASS: fine grained
VESICLES: moderate abundance, moderately spherical
ALTERATION: moderate chlorite and carbonate alteration
VEINS: none
UPPER CONTACT: not visible LOWER CONTACT: not visible

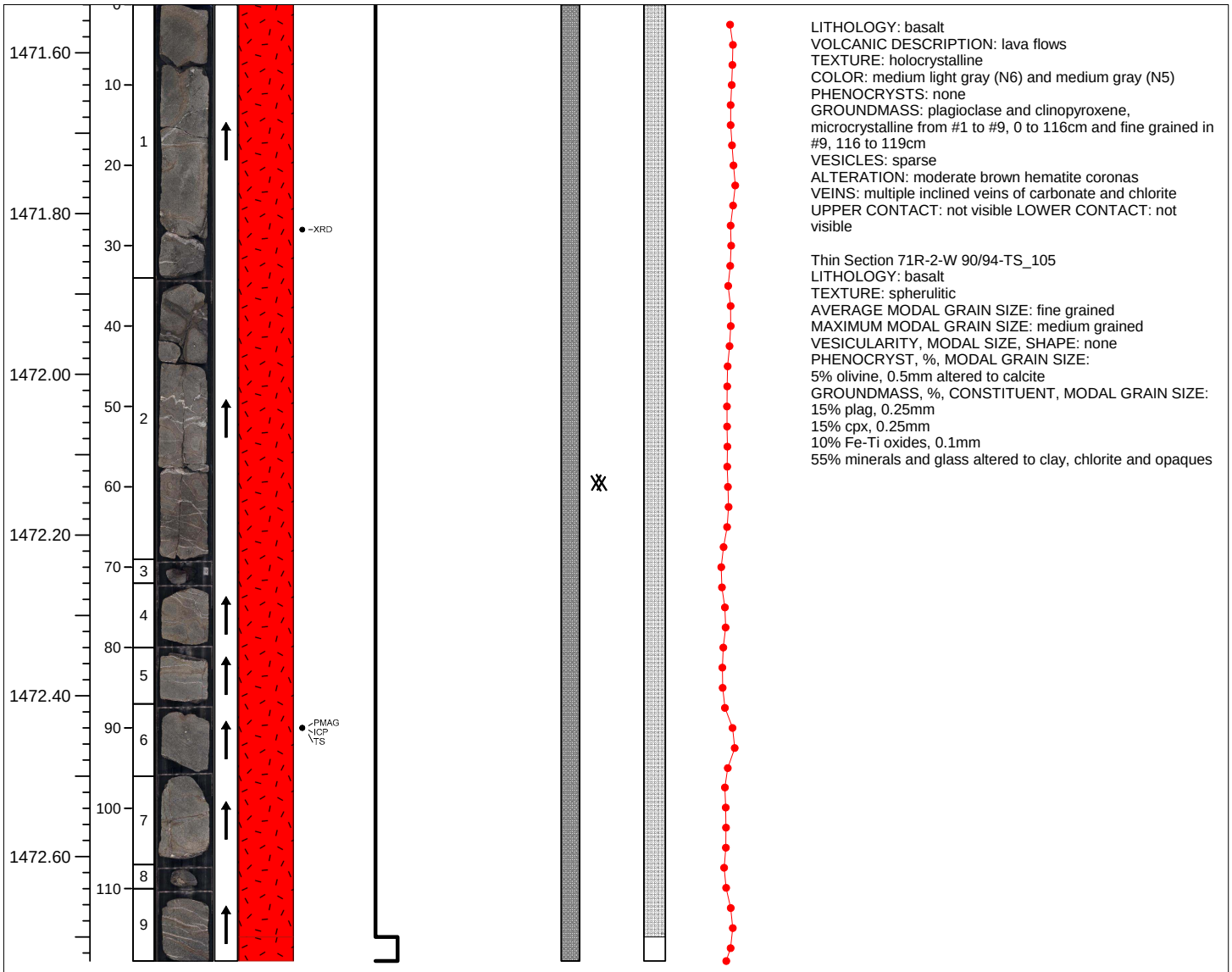
Hole 351-U1438E-71R Section 1, Top of Section: 1470.1 m (CSF-A)



LITHOLOGY: Basalt
VOLCANIC DESCRIPTION: lava flows
TEXTURE: holocrystalline
COLOR: medium light gray (N6) and medium gray (N5)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, fine grained from #1 to #3, 0 to 106cm, and microcrystalline from #3 to #6, 106 to 144cm. Chilled margins occur in #3, 105 to 111cm, in #5, 124 to 127cm and in #6, 140-143cm.
VESICLES: sparse, moderately spherical to spherical, filled in part by calcite
ALTERATION: moderate brown hematite coronas
VEINS: multiple inclined veins of oxides and/or chlorite and carbonate
UPPER CONTACT: not visible LOWER CONTACT: not visible

Thin Section 71R-1-W 21/25-TS_104
LITHOLOGY: basalt
TEXTURE: aphanitic
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: medium grained
VESICULARITY, MODAL SIZE, SHAPE: irregular, 0,5 mm
PHENOCRYST, %, MODAL GRAIN SIZE: none
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
0% plag, 0.1mm, rare acicular needles
25% cpx, 0.1mm
15% Fe-Ti oxides, 0.1mm
60% minerals and glass altered to clay, chlorite and opaques

Hole 351-U1438E-71R Section 2, Top of Section: 1471.54 m (CSF-A)

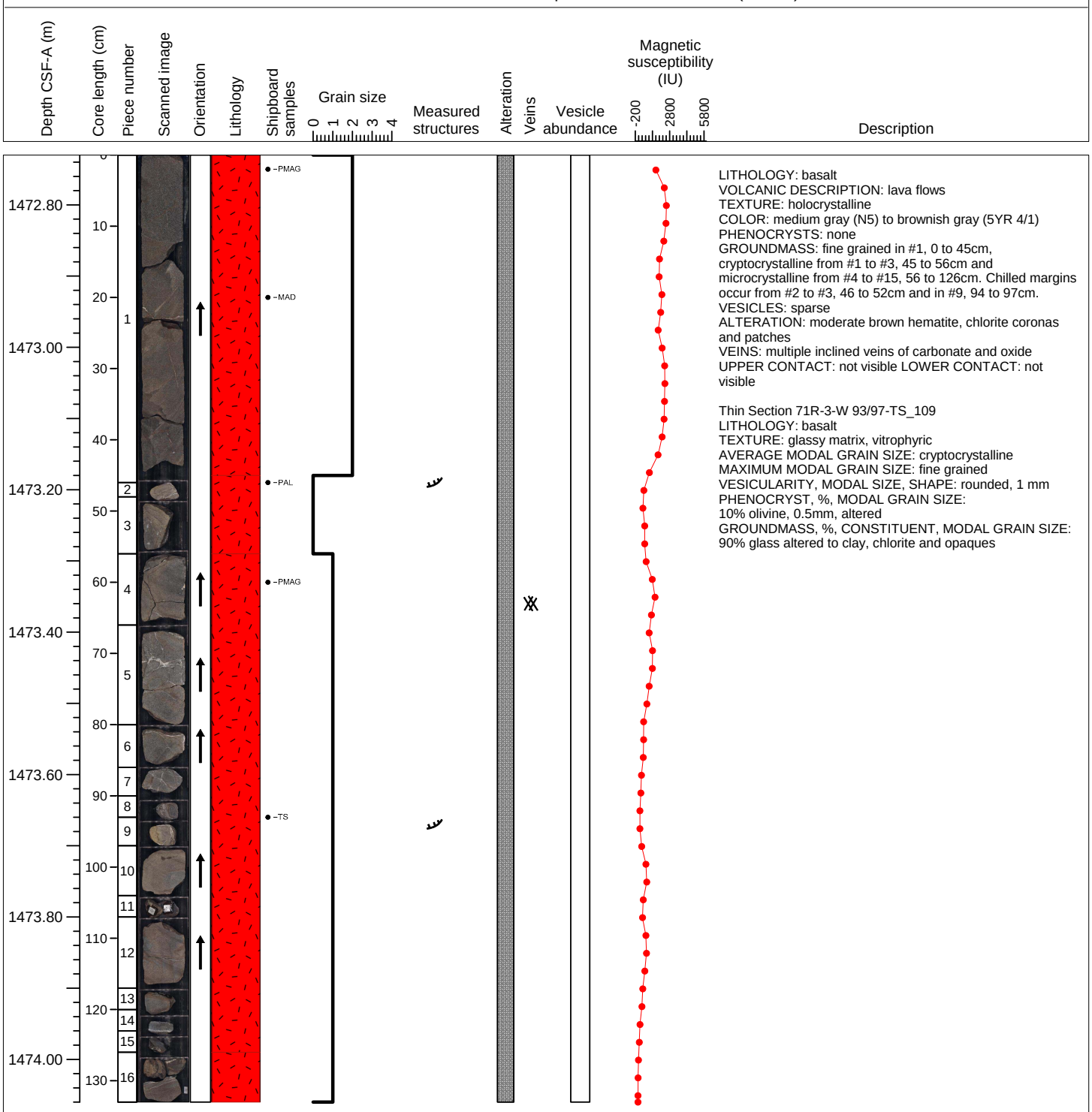


Description

LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flows
TEXTURE: holocrystalline
COLOR: medium light gray (N6) and medium gray (N5)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, microcrystalline from #1 to #9, 0 to 116cm and fine grained in #9, 116 to 119cm
VESICLES: sparse
ALTERATION: moderate brown hematite coronas
VEINS: multiple inclined veins of carbonate and chlorite
UPPER CONTACT: not visible LOWER CONTACT: not visible

Thin Section 71R-2-W 90/94-TS_105
LITHOLOGY: basalt
TEXTURE: spherulitic
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: medium grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE:
5% olivine, 0.5mm altered to calcite
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
15% plag, 0.25mm
15% cpx, 0.25mm
10% Fe-Ti oxides, 0.1mm
55% minerals and glass altered to clay, chlorite and opaques

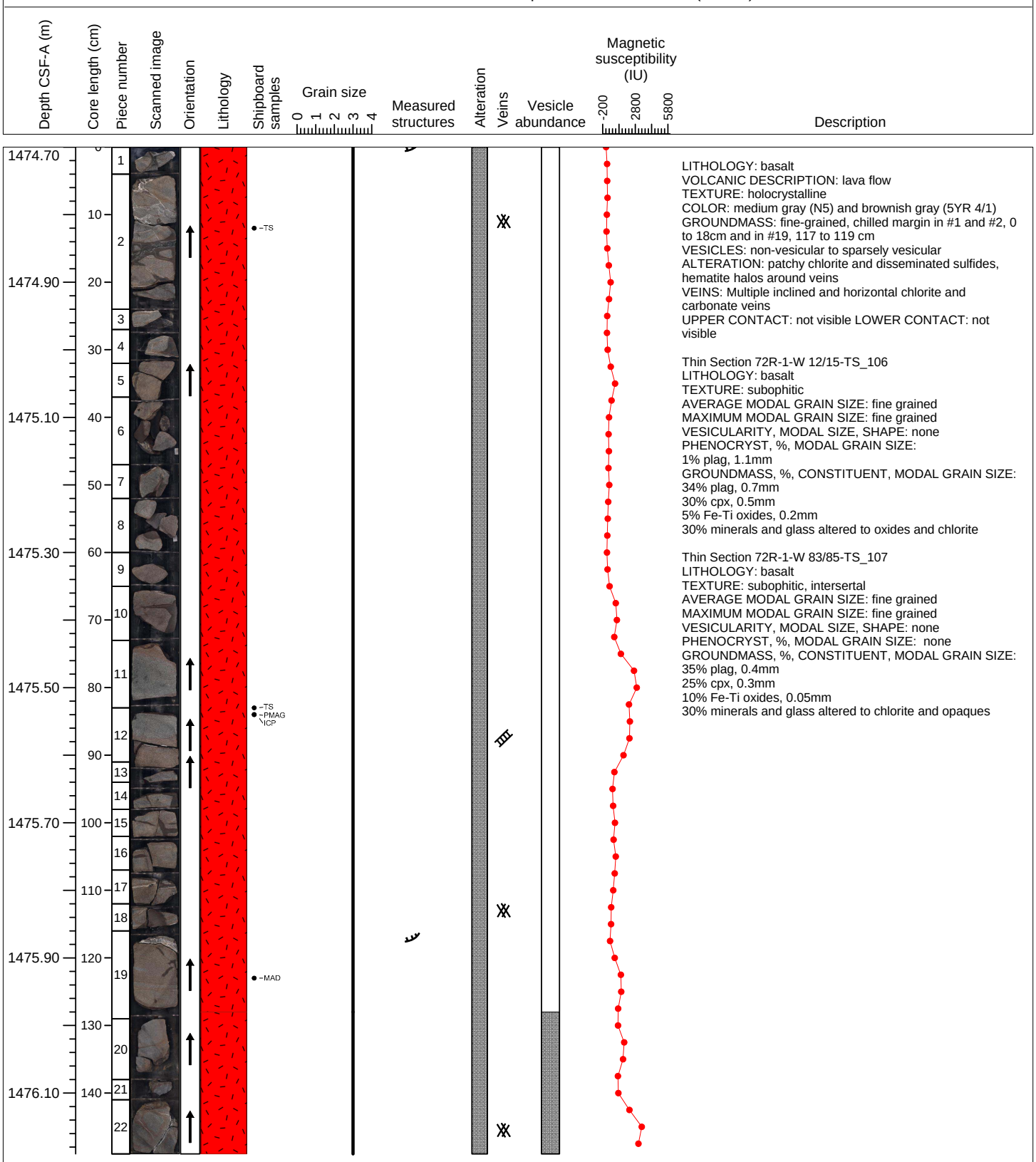
Hole 351-U1438E-71R Section 3, Top of Section: 1472.73 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flows
TEXTURE: holocrystalline
COLOR: medium gray (N5) to brownish gray (5YR 4/1)
PHENOCRYSTS: none
GROUNDMASS: fine grained in #1, 0 to 45cm, cryptocrystalline from #1 to #3, 45 to 56cm and microcrystalline from #4 to #15, 56 to 126cm. Chilled margins occur from #2 to #3, 46 to 52cm and in #9, 94 to 97cm.
VESICLES: sparse
ALTERATION: moderate brown hematite, chlorite coronas and patches
VEINS: multiple inclined veins of carbonate and oxide
UPPER CONTACT: not visible LOWER CONTACT: not visible

Thin Section 71R-3-W 93/97-TS_109
LITHOLOGY: basalt
TEXTURE: glassy matrix, vitrophyric
AVERAGE MODAL GRAIN SIZE: cryptocrystalline
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: rounded, 1 mm
PHENOCRYST, %, MODAL GRAIN SIZE:
10% olivine, 0.5mm, altered
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
90% glass altered to clay, chlorite and opaques

Hole 351-U1438E-72R Section 1, Top of Section: 1474.7 m (CSF-A)

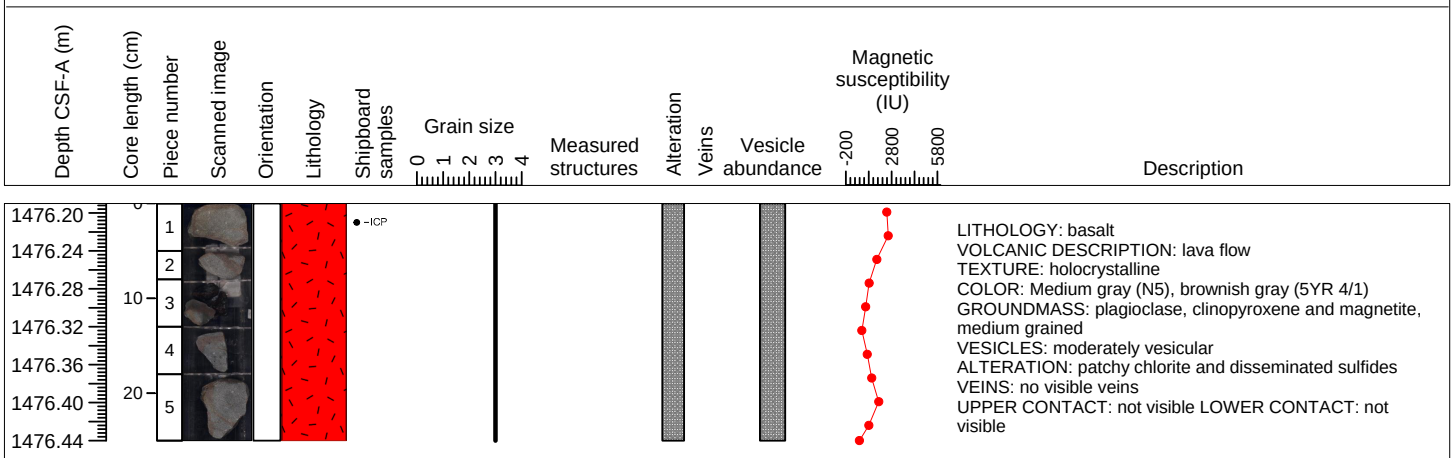


LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium gray (N5) and brownish gray (5YR 4/1)
GROUNDMASS: fine-grained, chilled margin in #1 and #2, 0 to 18cm and in #19, 117 to 119 cm
VESICLES: non-vesicular to sparsely vesicular
ALTERATION: patchy chlorite and disseminated sulfides, hematite halos around veins
VEINS: Multiple inclined and horizontal chlorite and carbonate veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

Thin Section 72R-1-W 12/15-TS_106
LITHOLOGY: basalt
TEXTURE: subophitic
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE:
1% plag, 1.1mm
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
34% plag, 0.7mm
30% cpx, 0.5mm
5% Fe-Ti oxides, 0.2mm
30% minerals and glass altered to oxides and chlorite

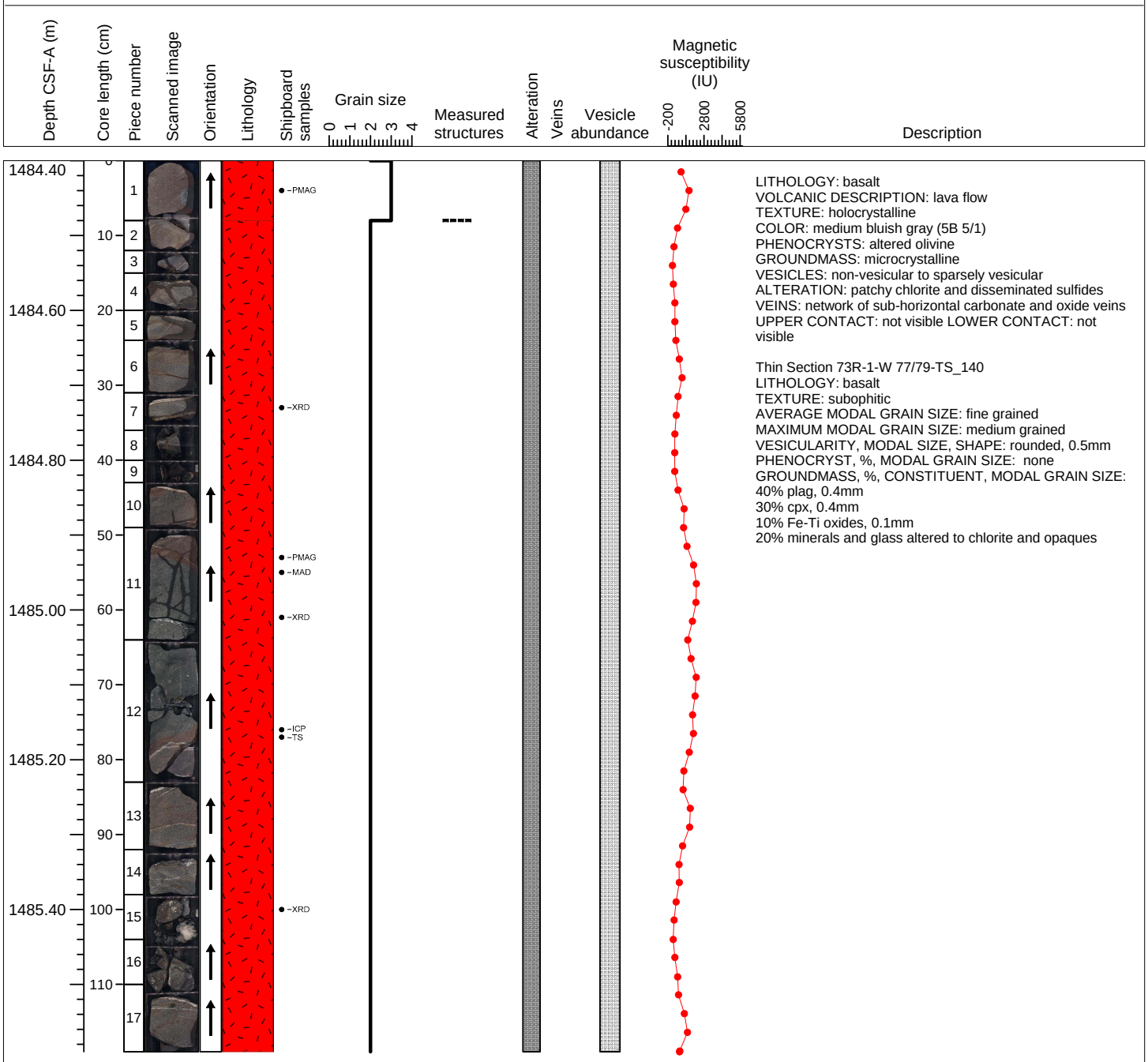
Thin Section 72R-1-W 83/85-TS_107
LITHOLOGY: basalt
TEXTURE: subophitic, intersertal
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE: none
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
35% plag, 0.4mm
25% cpx, 0.3mm
10% Fe-Ti oxides, 0.05mm
30% minerals and glass altered to chlorite and opaques

Hole 351-U1438E-72R Section 2, Top of Section: 1476.19 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: Medium gray (N5), brownish gray (5YR 4/1)
GROUNDMASS: plagioclase, clinopyroxene and magnetite, medium grained
VESICLES: moderately vesicular
ALTERATION: patchy chlorite and disseminated sulfides
VEINS: no visible veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

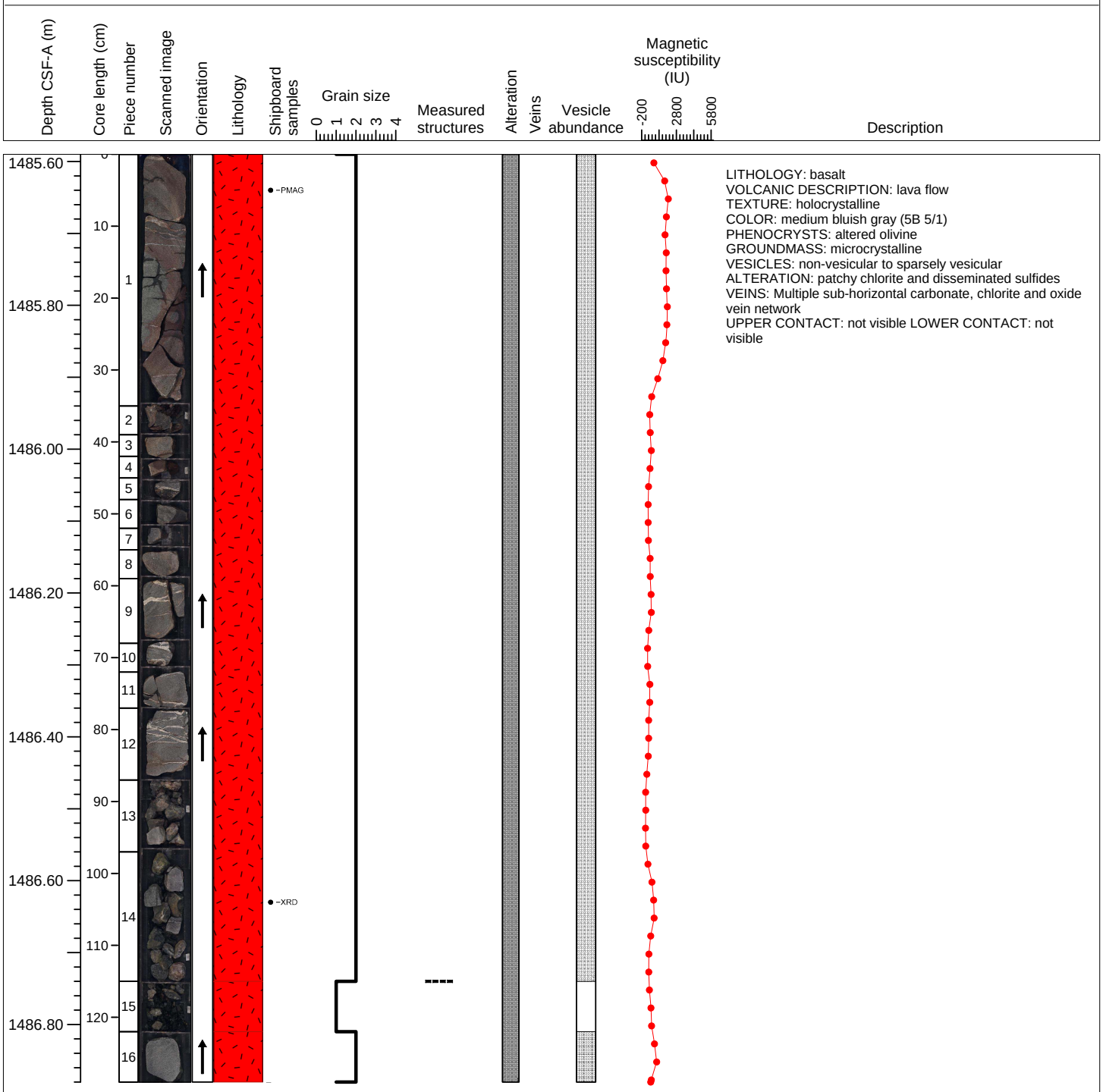
Hole 351-U1438E-73R Section 1, Top of Section: 1484.4 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium bluish gray (5B 5/1)
PHENOCRYSTS: altered olivine
GROUNDMASS: microcrystalline
VESICLES: non-vesicular to sparsely vesicular
ALTERATION: patchy chlorite and disseminated sulfides
VEINS: network of sub-horizontal carbonate and oxide veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

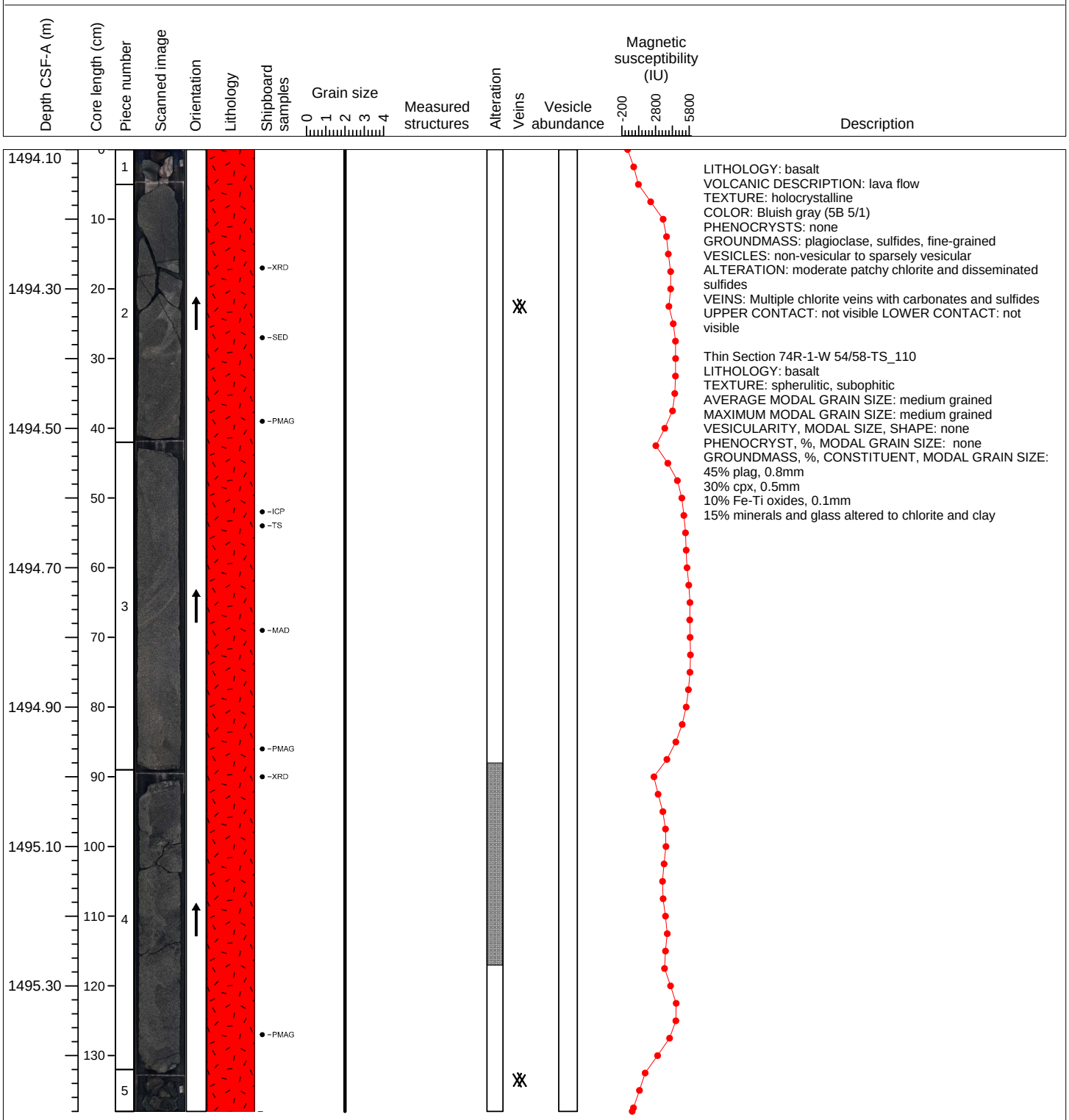
Thin Section 73R-1-W 77/79-TS_140
LITHOLOGY: basalt
TEXTURE: subophitic
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: medium grained
VESICULARITY, MODAL SIZE, SHAPE: rounded, 0.5mm
PHENOCRYST, %, MODAL GRAIN SIZE: none
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
40% plag, 0.4mm
30% cpx, 0.4mm
10% Fe-Ti oxides, 0.1mm
20% minerals and glass altered to chlorite and opaques

Hole 351-U1438E-73R Section 2, Top of Section: 1485.59 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium bluish gray (5B 5/1)
PHENOCRYSTS: altered olivine
GROUNDMASS: microcrystalline
VESICLES: non-vesicular to sparsely vesicular
ALTERATION: patchy chlorite and disseminated sulfides
VEINS: Multiple sub-horizontal carbonate, chlorite and oxide vein network
UPPER CONTACT: not visible LOWER CONTACT: not visible

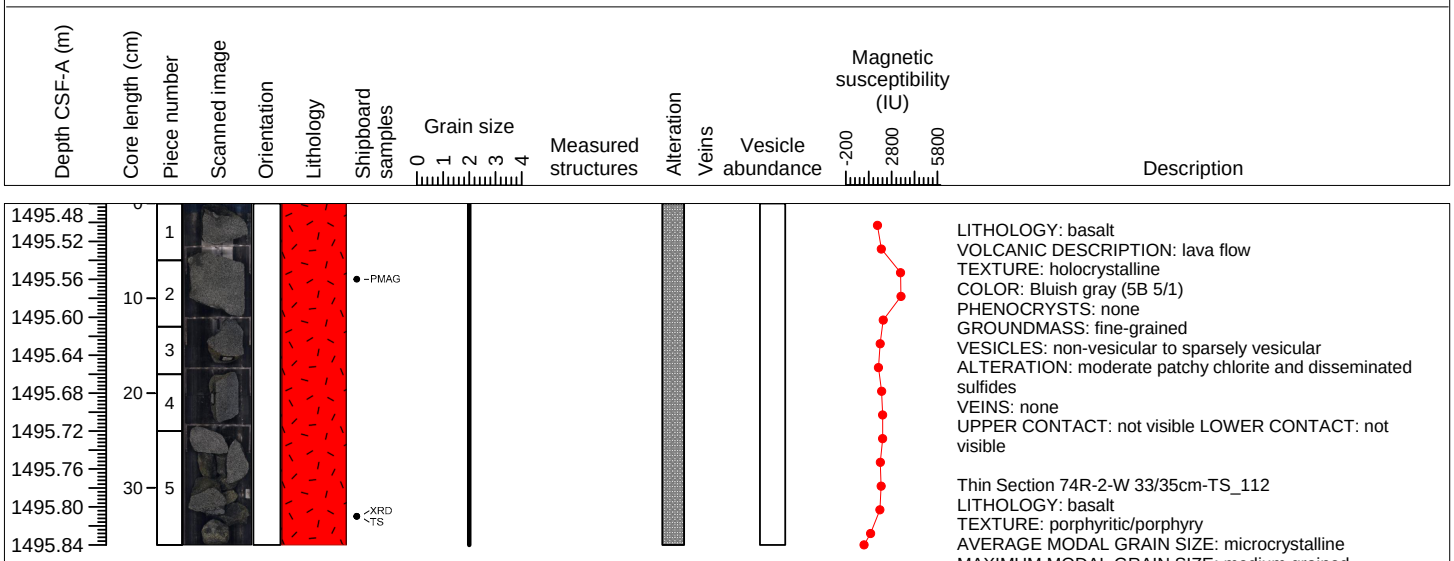
Hole 351-U1438E-74R Section 1, Top of Section: 1494.1 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: Bluish gray (5B 5/1)
PHENOCRYSTS: none
GROUNDMASS: plagioclase, sulfides, fine-grained
VESICLES: non-vesicular to sparsely vesicular
ALTERATION: moderate patchy chlorite and disseminated sulfides
VEINS: Multiple chlorite veins with carbonates and sulfides
UPPER CONTACT: not visible LOWER CONTACT: not visible

Thin Section 74R-1-W 54/58-TS_110
LITHOLOGY: basalt
TEXTURE: spherulitic, subophitic
AVERAGE MODAL GRAIN SIZE: medium grained
MAXIMUM MODAL GRAIN SIZE: medium grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE: none
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
45% plag, 0.8mm
30% cpx, 0.5mm
10% Fe-Ti oxides, 0.1mm
15% minerals and glass altered to chlorite and clay

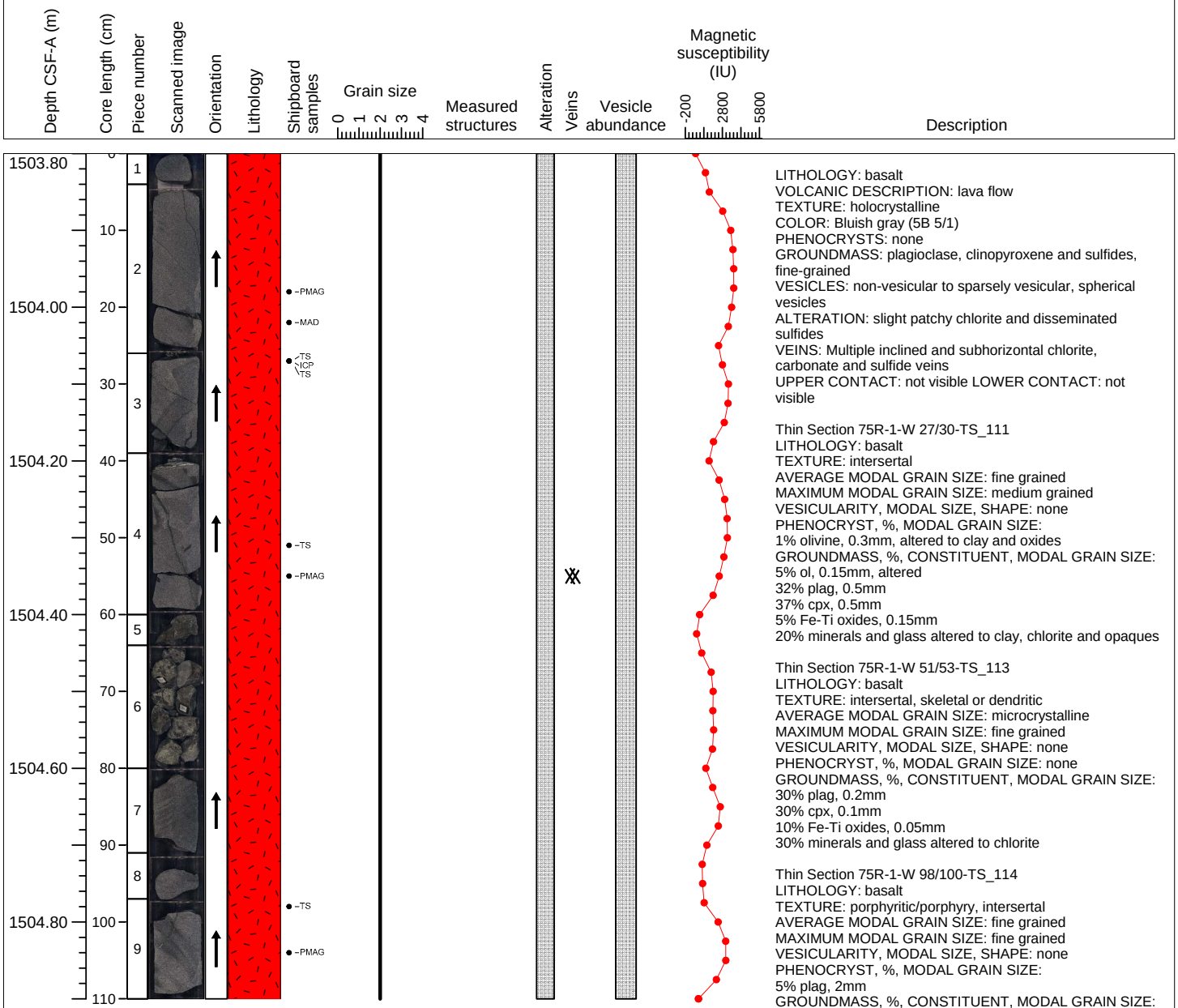
Hole 351-U1438E-74R Section 2, Top of Section: 1495.48 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: Bluish gray (5B 5/1)
PHENOCRYSTS: none
GROUNDMASS: fine-grained
VESICLES: non-vesicular to sparsely vesicular
ALTERATION: moderate patchy chlorite and disseminated sulfides
VEINS: none
UPPER CONTACT: not visible LOWER CONTACT: not visible

Thin Section 74R-2-W 33/35cm-TS_112
LITHOLOGY: basalt
TEXTURE: porphyritic/porphyry
AVERAGE MODAL GRAIN SIZE: microcrystalline
MAXIMUM MODAL GRAIN SIZE: medium grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE:
10% plag, 0.4mm
10% opaques, 0.3mm
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
5% plag, 0.1mm
5% cpx, 0.1mm
5% Fe-Ti oxides, 0.05mm
65% minerals and glass altered to quartz, chlorite, and oxides

Hole 351-U1438E-75R Section 1, Top of Section: 1503.8 m (CSF-A)



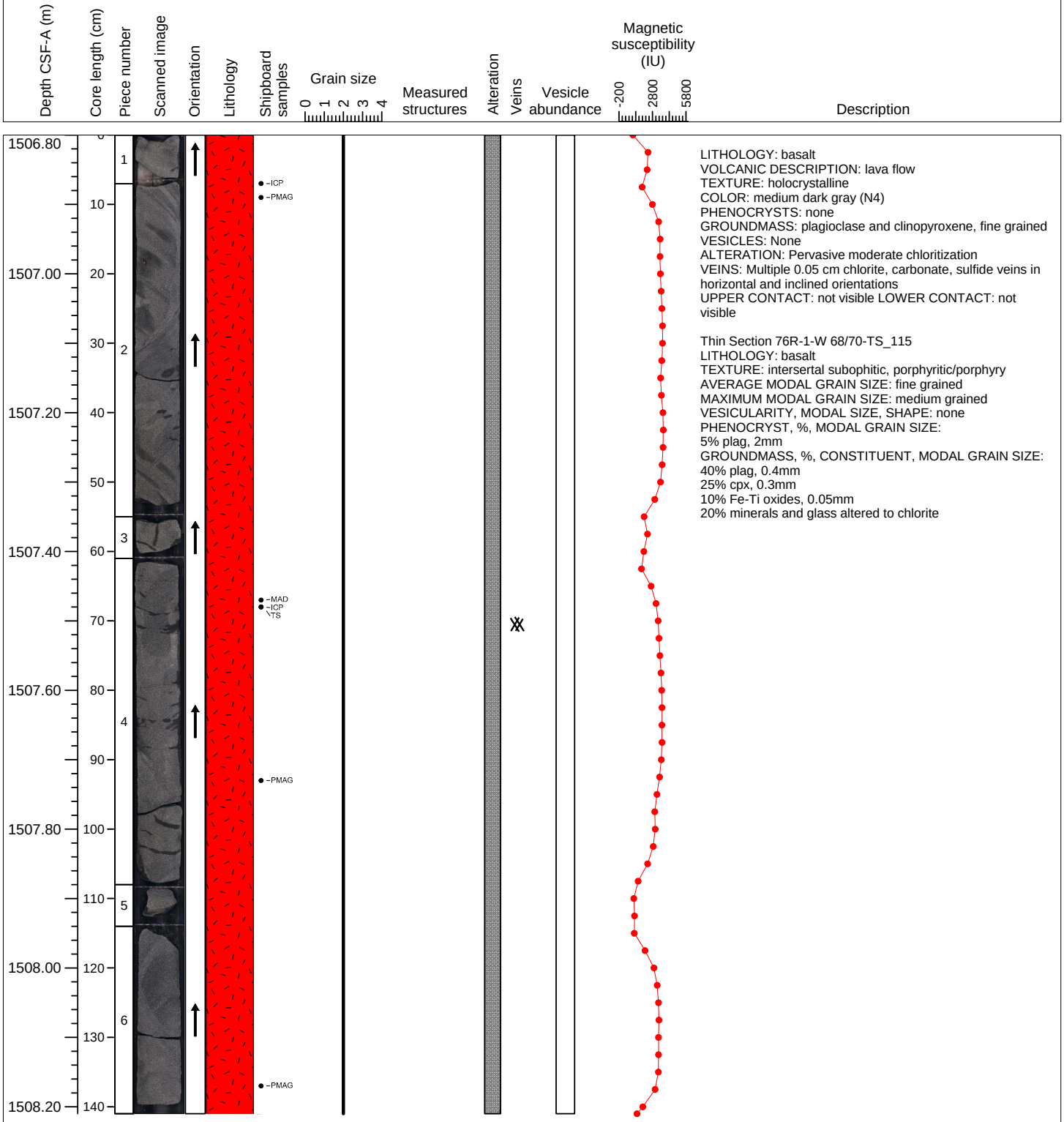
LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: Bluish gray (5B 5/1)
PHENOCRYSTS: none
GROUNDMASS: plagioclase, clinopyroxene and sulfides, fine-grained
VESICLES: non-vesicular to sparsely vesicular, spherical vesicles
ALTERATION: slight patchy chlorite and disseminated sulfides
VEINS: Multiple inclined and subhorizontal chlorite, carbonate and sulfide veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

Thin Section 75R-1-W 27/30-TS_111
LITHOLOGY: basalt
TEXTURE: intersertal
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: medium grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE:
1% olivine, 0.3mm, altered to clay and oxides
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
5% ol, 0.15mm, altered
32% plag, 0.5mm
37% cpx, 0.5mm
5% Fe-Ti oxides, 0.15mm
20% minerals and glass altered to clay, chlorite and opaques

Thin Section 75R-1-W 51/53-TS_113
LITHOLOGY: basalt
TEXTURE: intersertal, skeletal or dendritic
AVERAGE MODAL GRAIN SIZE: microcrystalline
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE: none
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
30% plag, 0.2mm
30% cpx, 0.1mm
10% Fe-Ti oxides, 0.05mm
30% minerals and glass altered to chlorite

Thin Section 75R-1-W 98/100-TS_114
LITHOLOGY: basalt
TEXTURE: porphyritic/porphyry, intersertal
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE:
5% plag, 2mm
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
30% plag, 0.5mm
30% cpx, 0.3mm
10% Fe-Ti oxides, 0.05mm
25% minerals and glass altered to chlorite

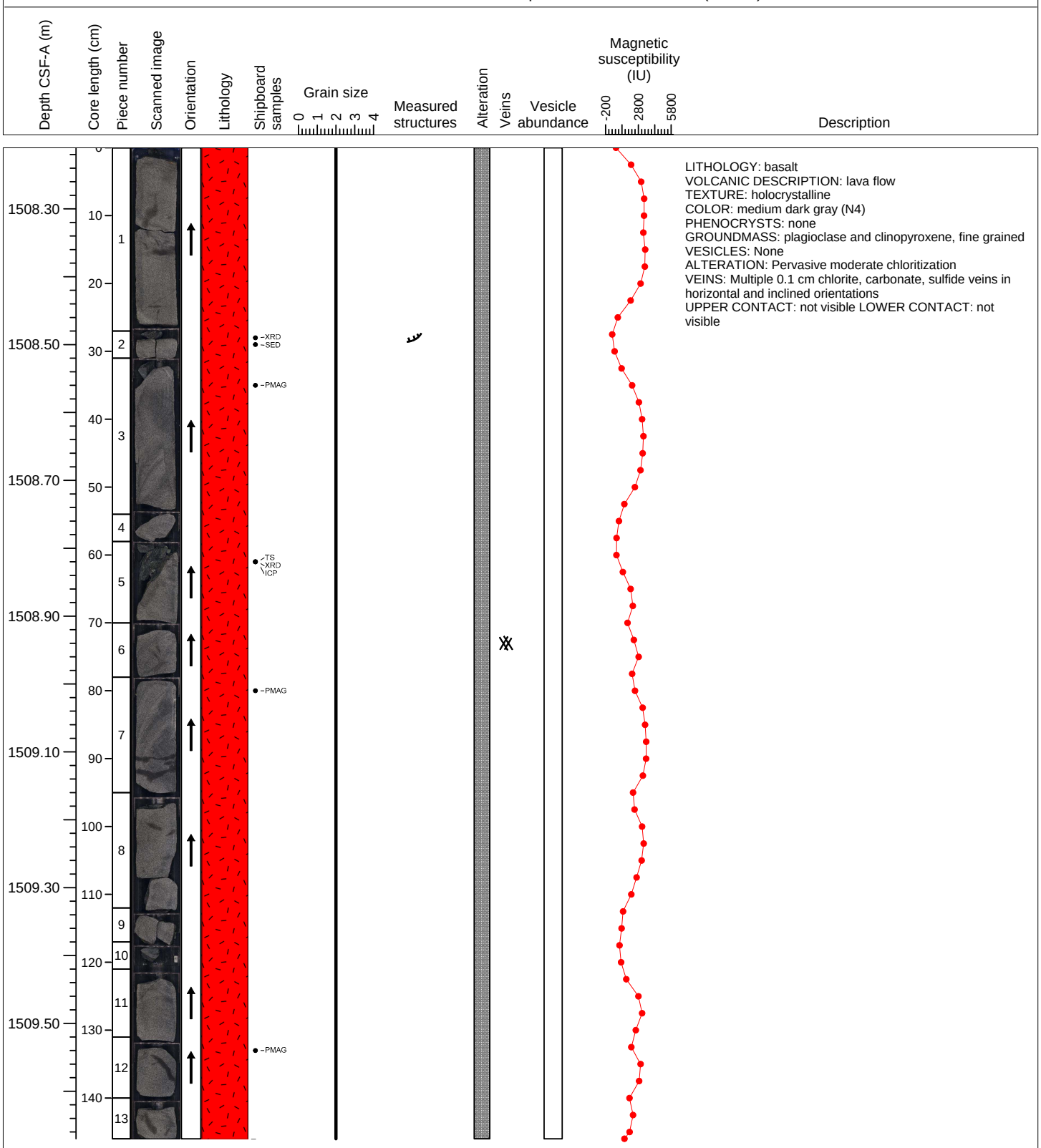
Hole 351-U1438E-76R Section 1, Top of Section: 1506.8 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium dark gray (N4)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, fine grained
VESICLES: None
ALTERATION: Pervasive moderate chloritization
VEINS: Multiple 0.05 cm chlorite, carbonate, sulfide veins in horizontal and inclined orientations
UPPER CONTACT: not visible LOWER CONTACT: not visible

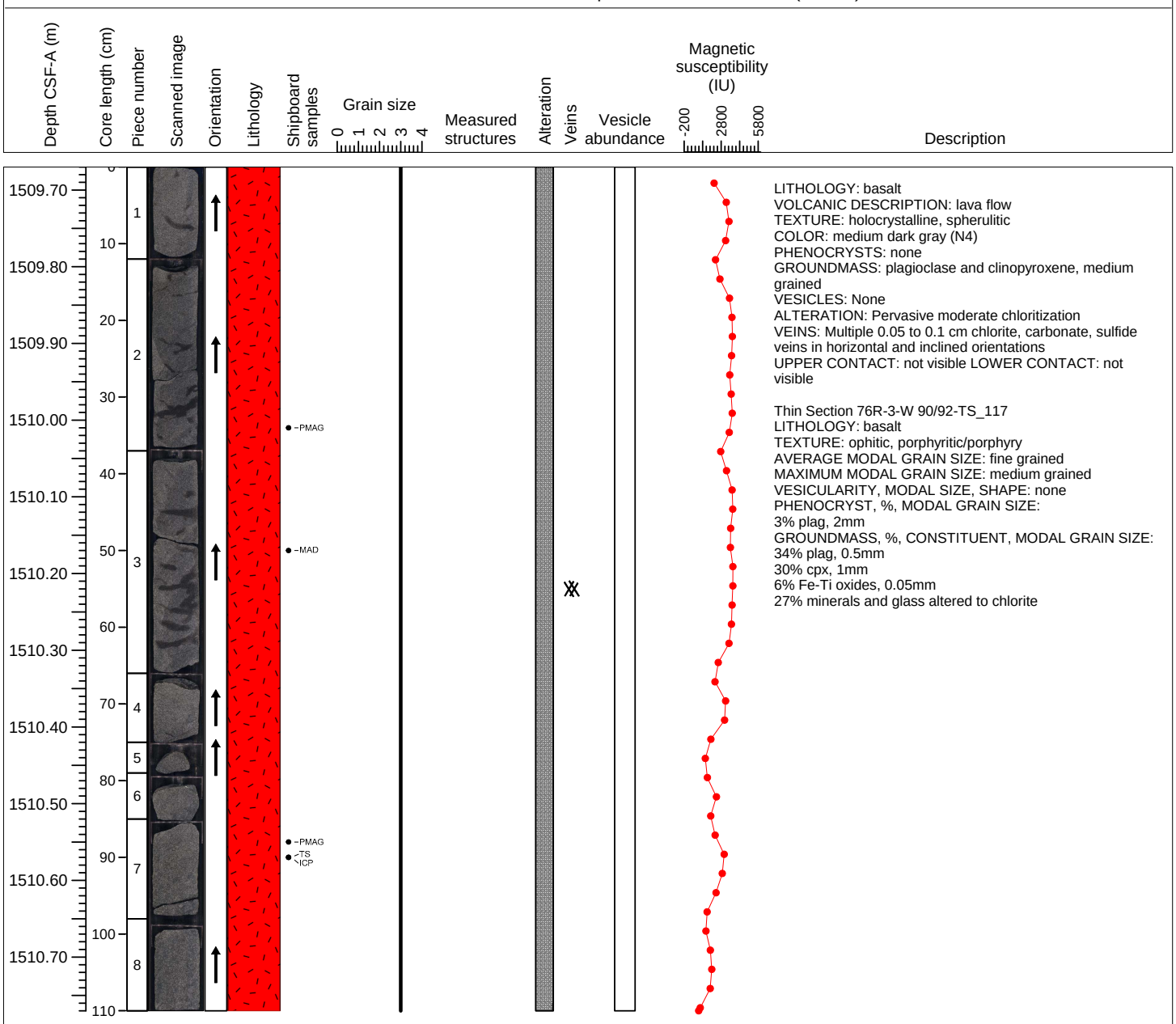
Thin Section 76R-1-W 68/70-TS_115
LITHOLOGY: basalt
TEXTURE: intersertal subophitic, porphyritic/porphyry
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: medium grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE:
5% plag, 2mm
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
40% plag, 0.4mm
25% cpx, 0.3mm
10% Fe-Ti oxides, 0.05mm
20% minerals and glass altered to chlorite

Hole 351-U1438E-76R Section 2, Top of Section: 1508.21 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium dark gray (N4)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, fine grained
VESICLES: None
ALTERATION: Pervasive moderate chloritization
VEINS: Multiple 0.1 cm chlorite, carbonate, sulfide veins in horizontal and inclined orientations
UPPER CONTACT: not visible LOWER CONTACT: not visible

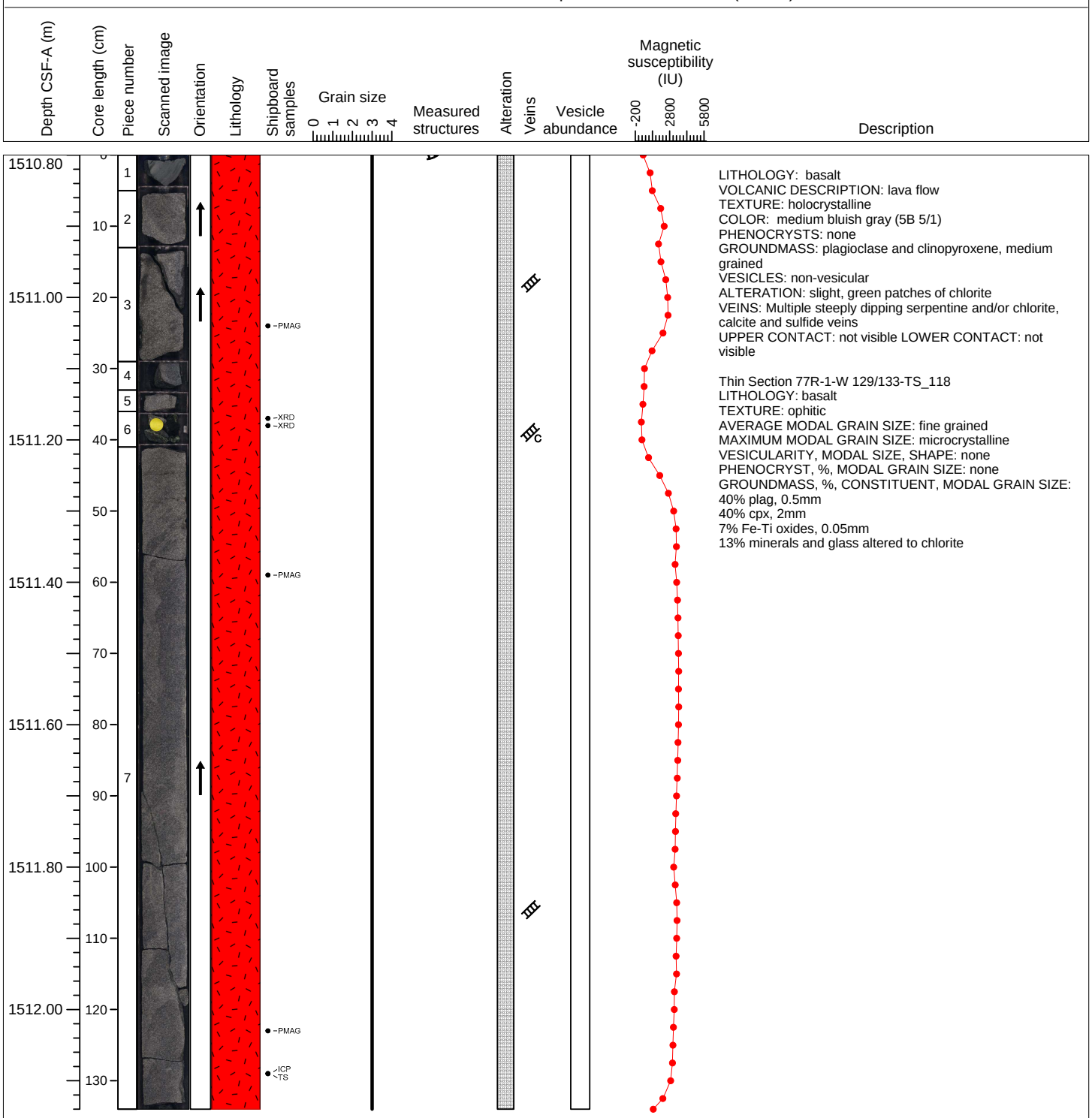
Hole 351-U1438E-76R Section 3, Top of Section: 1509.67 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline, spherulitic
COLOR: medium dark gray (N4)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, medium grained
VESICLES: None
ALTERATION: Pervasive moderate chloritization
VEINS: Multiple 0.05 to 0.1 cm chlorite, carbonate, sulfide veins in horizontal and inclined orientations
UPPER CONTACT: not visible LOWER CONTACT: not visible

Thin Section 76R-3-W 90/92-TS_117
LITHOLOGY: basalt
TEXTURE: ophitic, porphyritic/porphyry
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: medium grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE:
3% plag, 2mm
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
34% plag, 0.5mm
30% cpx, 1mm
6% Fe-Ti oxides, 0.05mm
27% minerals and glass altered to chlorite

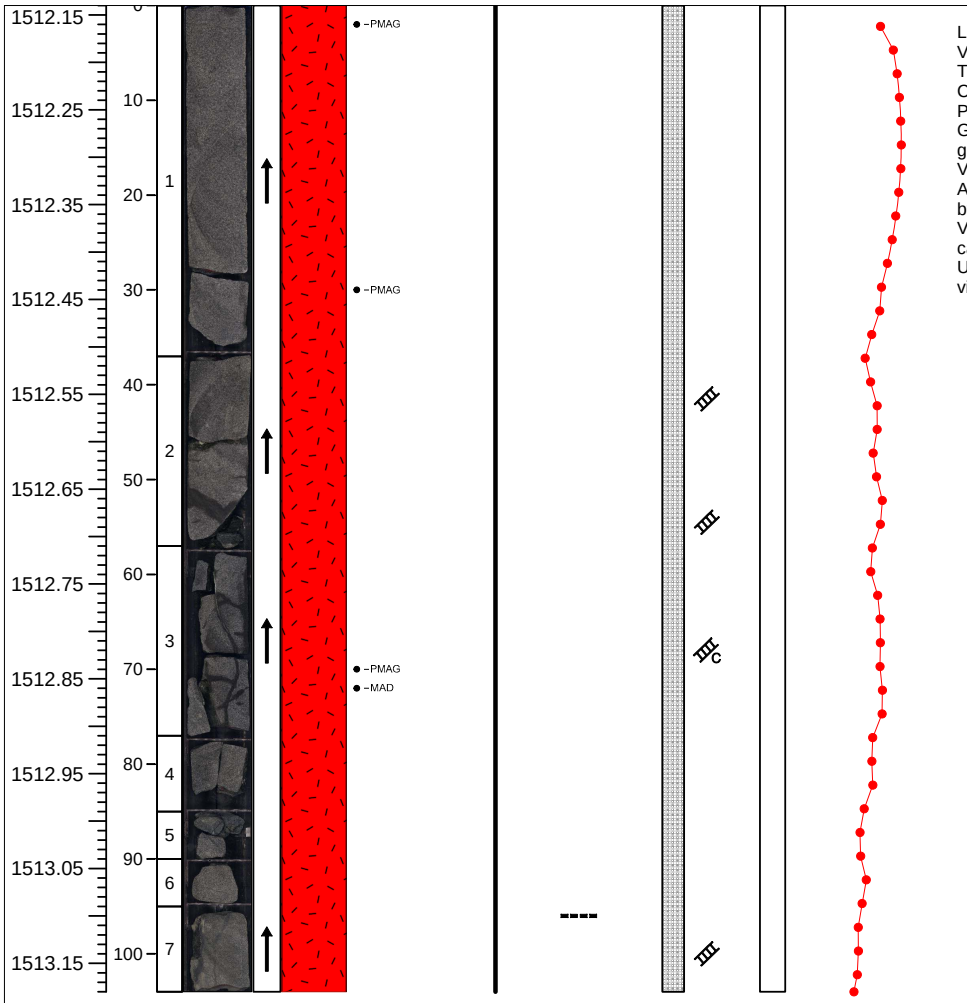
Hole 351-U1438E-77R Section 1, Top of Section: 1510.8 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium bluish gray (5B 5/1)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, medium grained
VESICLES: non-vesicular
ALTERATION: slight, green patches of chlorite
VEINS: Multiple steeply dipping serpentine and/or chlorite, calcite and sulfide veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

Thin Section 77R-1-W 129/133-TS_118
LITHOLOGY: basalt
TEXTURE: ophitic
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: microcrystalline
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE: none
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
40% plag, 0.5mm
40% cpx, 2mm
7% Fe-Ti oxides, 0.05mm
13% minerals and glass altered to chlorite

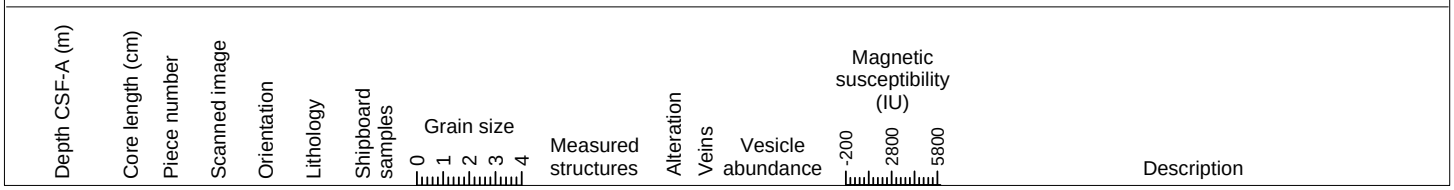
Hole 351-U1438E-77R Section 2, Top of Section: 1512.14 m (CSF-A)



Description

LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium bluish gray (5B 5/1)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, medium grained
VESICLES: non-vesicular
ALTERATION: green colored moderate alteration dominated by chlorites and carbonates
VEINS: Multiple steeply dipping serpentine and/or chlorite, calcite and sulfide veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

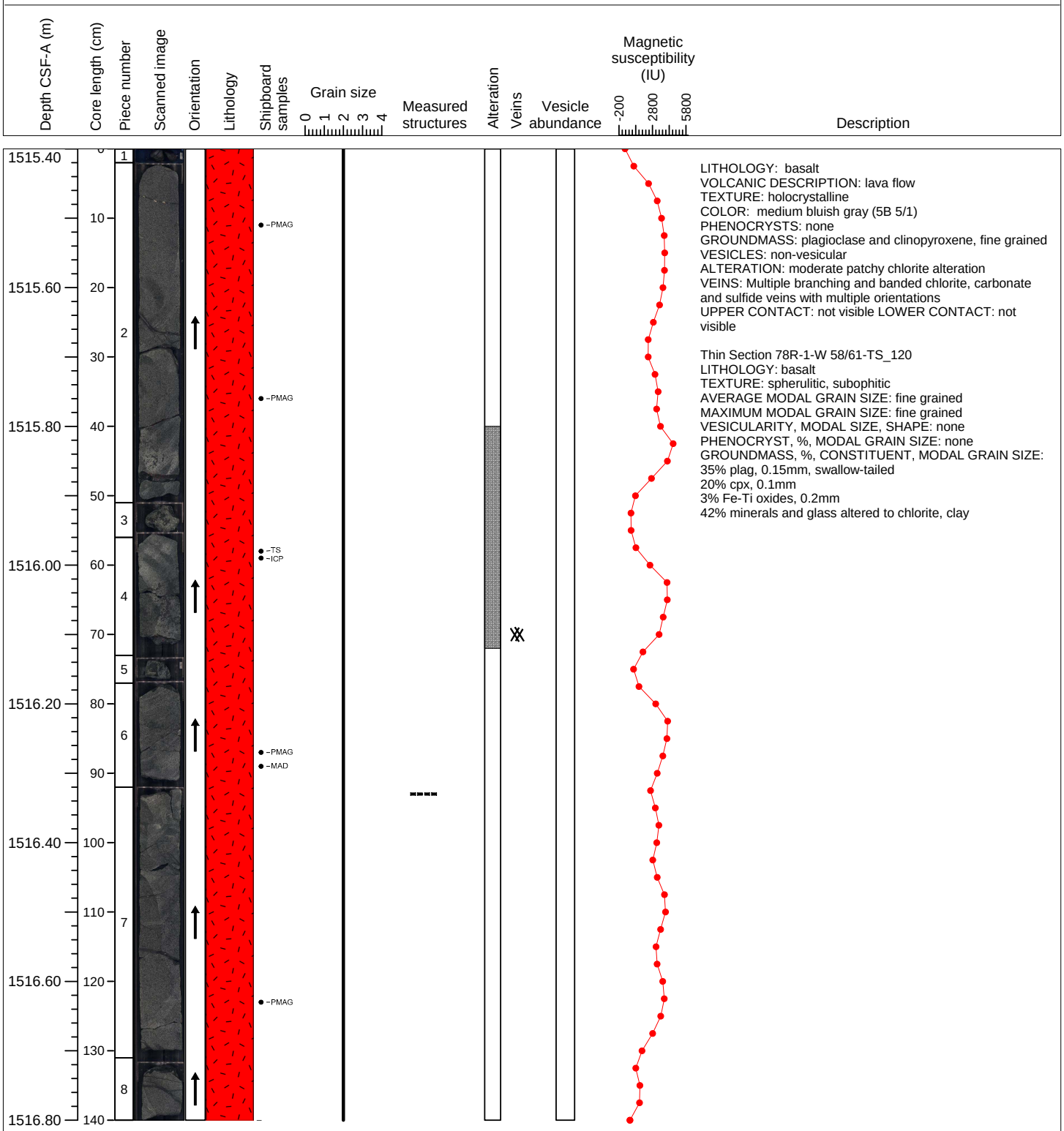
Hole 351-U1438E-77R Section 3, Top of Section: 1513.18 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium bluish gray (5B 5/1)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, fine grained
VESICLES: non-vesicular
ALTERATION: green colored patchy to pseudomorphic moderate chlorites, carbonate and oxide alteration
VEINS: Multiple variably oriented thin sulfide, chlorite veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

Thin Section 77R-3-W 4/7-TS_119
LITHOLOGY: basalt
TEXTURE: subophitic, spherulitic
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE: none
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
35% plag, 0.1mm
25% cpx, 0.1mm
2% Fe-Ti oxides, 0.05 mm
38% minerals and glass altered to chlorite

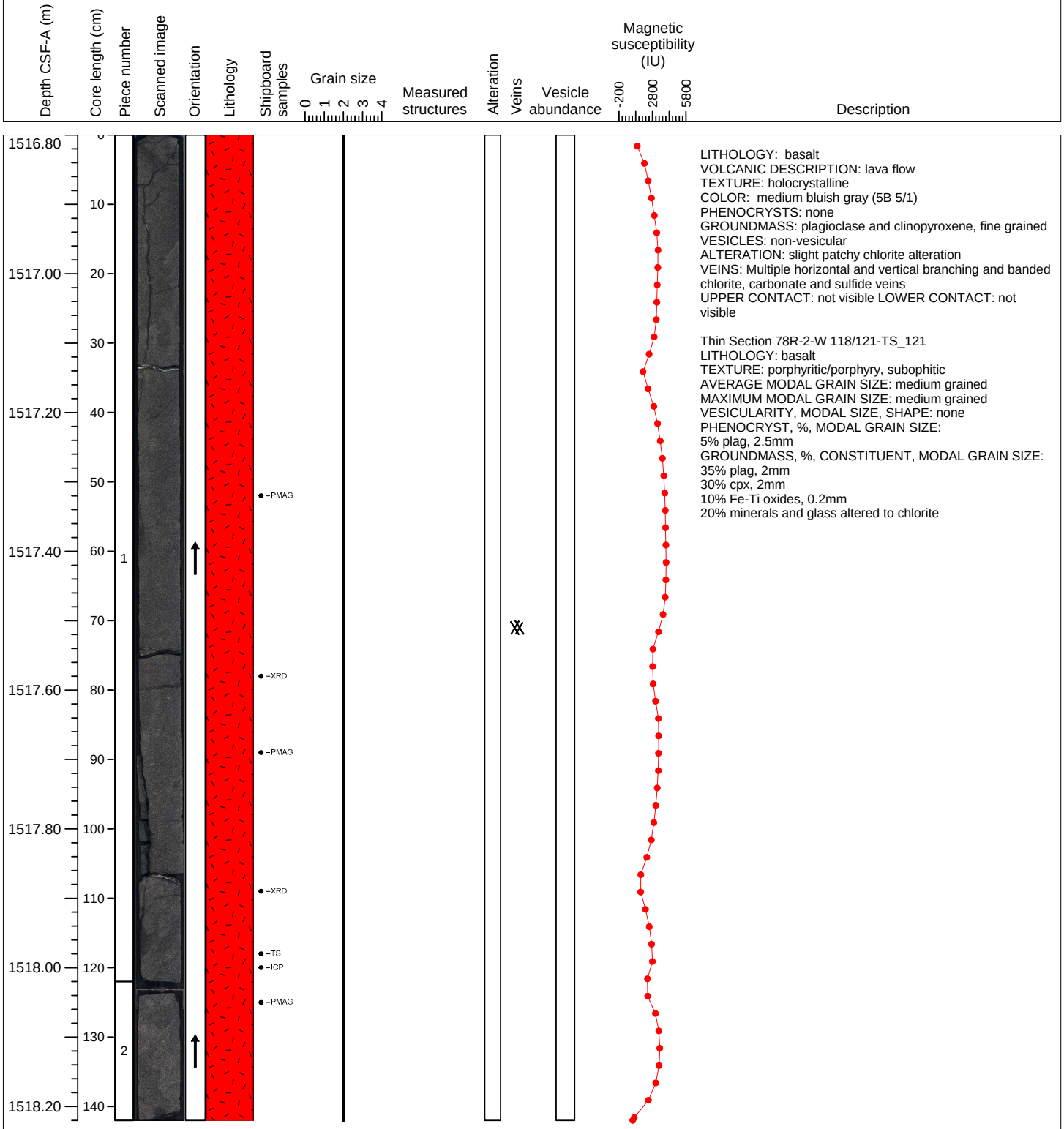
Hole 351-U1438E-78R Section 1, Top of Section: 1515.4 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium bluish gray (5B 5/1)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, fine grained
VESICLES: non-vesicular
ALTERATION: moderate patchy chlorite alteration
VEINS: Multiple branching and banded chlorite, carbonate and sulfide veins with multiple orientations
UPPER CONTACT: not visible LOWER CONTACT: not visible

Thin Section 78R-1-W 58/61-TS_120
LITHOLOGY: basalt
TEXTURE: spherulitic, subophitic
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE: none
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
35% plag, 0.15mm, swallow-tailed
20% cpx, 0.1mm
3% Fe-Ti oxides, 0.2mm
42% minerals and glass altered to chlorite, clay

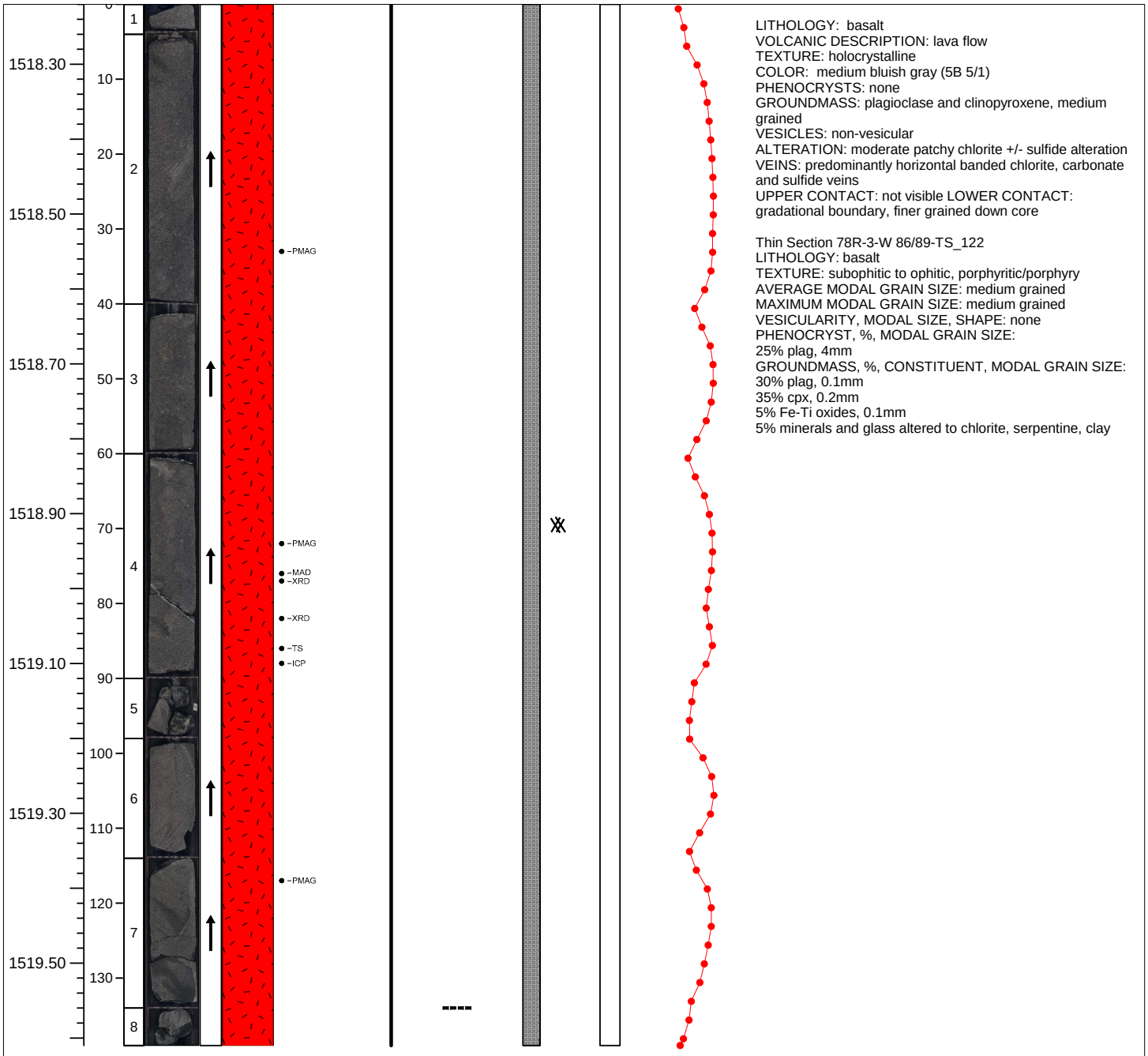
Hole 351-U1438E-78R Section 2, Top of Section: 1516.8 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium bluish gray (5B 5/1)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, fine grained
VESICLES: non-vesicular
ALTERATION: slight patchy chlorite alteration
VEINS: Multiple horizontal and vertical branching and banded chlorite, carbonate and sulfide veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

Thin Section 78R-2-W 118/121-TS_121
LITHOLOGY: basalt
TEXTURE: porphyritic/porphyry, subophitic
AVERAGE MODAL GRAIN SIZE: medium grained
MAXIMUM MODAL GRAIN SIZE: medium grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE:
5% plag, 2.5mm
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
35% plag, 2mm
30% cpx, 2mm
10% Fe-Ti oxides, 0.2mm
20% minerals and glass altered to chlorite

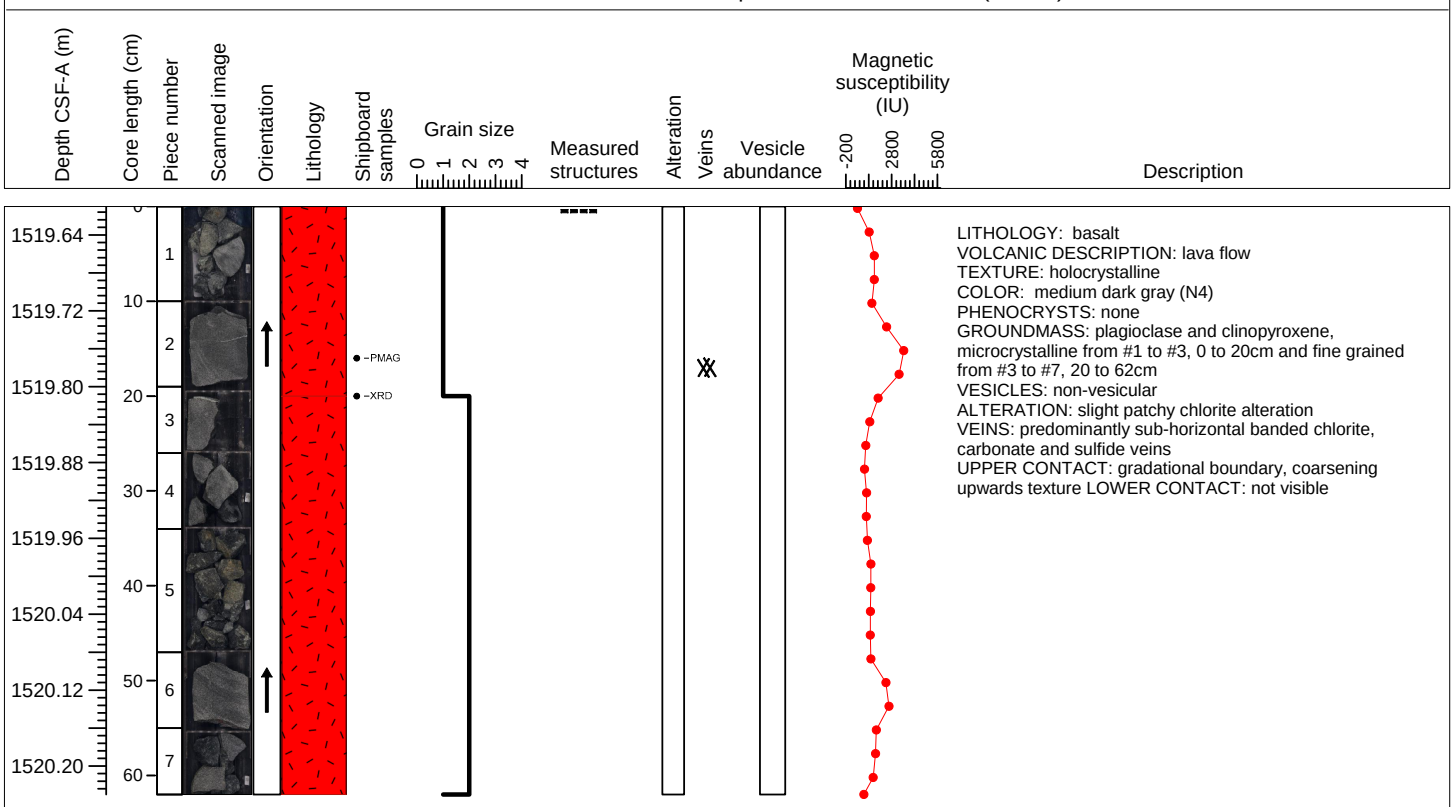
Hole 351-U1438E-78R Section 3, Top of Section: 1518.22 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium bluish gray (5B 5/1)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, medium grained
VESICLES: non-vesicular
ALTERATION: moderate patchy chlorite +/- sulfide alteration
VEINS: predominantly horizontal banded chlorite, carbonate and sulfide veins
UPPER CONTACT: not visible LOWER CONTACT: gradational boundary, finer grained down core

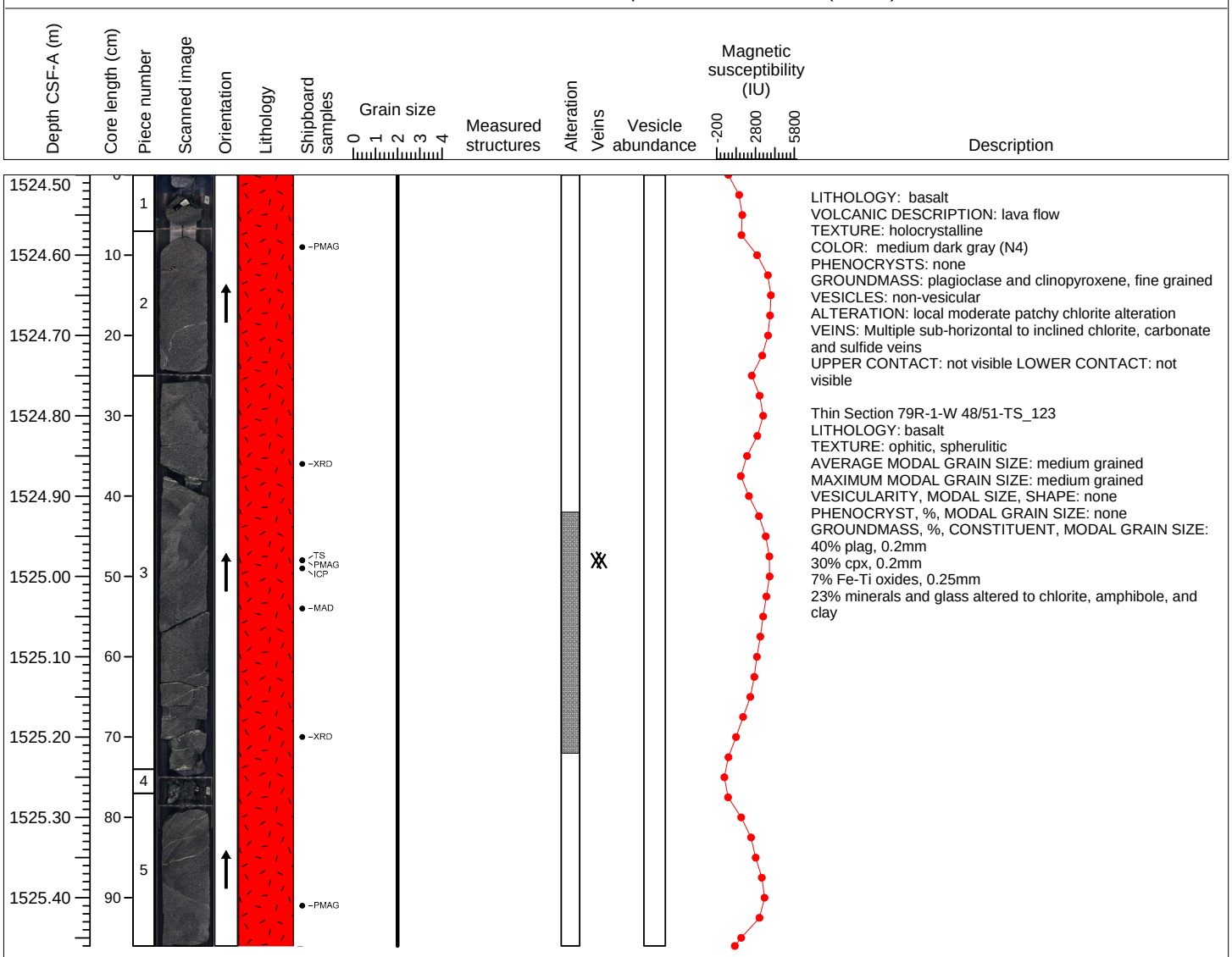
Thin Section 78R-3-W 86/89-TS_122
LITHOLOGY: basalt
TEXTURE: subophitic to ophitic, porphyritic/porphyry
AVERAGE MODAL GRAIN SIZE: medium grained
MAXIMUM MODAL GRAIN SIZE: medium grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE:
25% plag, 4mm
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
30% plag, 0.1mm
35% cpx, 0.2mm
5% Fe-Ti oxides, 0.1mm
5% minerals and glass altered to chlorite, serpentine, clay

Hole 351-U1438E-78R Section 4, Top of Section: 1519.61 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium dark gray (N4)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, microcrystalline from #1 to #3, 0 to 20cm and fine grained from #3 to #7, 20 to 62cm
VESICLES: non-vesicular
ALTERATION: slight patchy chlorite alteration
VEINS: predominantly sub-horizontal banded chlorite, carbonate and sulfide veins
UPPER CONTACT: gradational boundary, coarsening upwards texture LOWER CONTACT: not visible

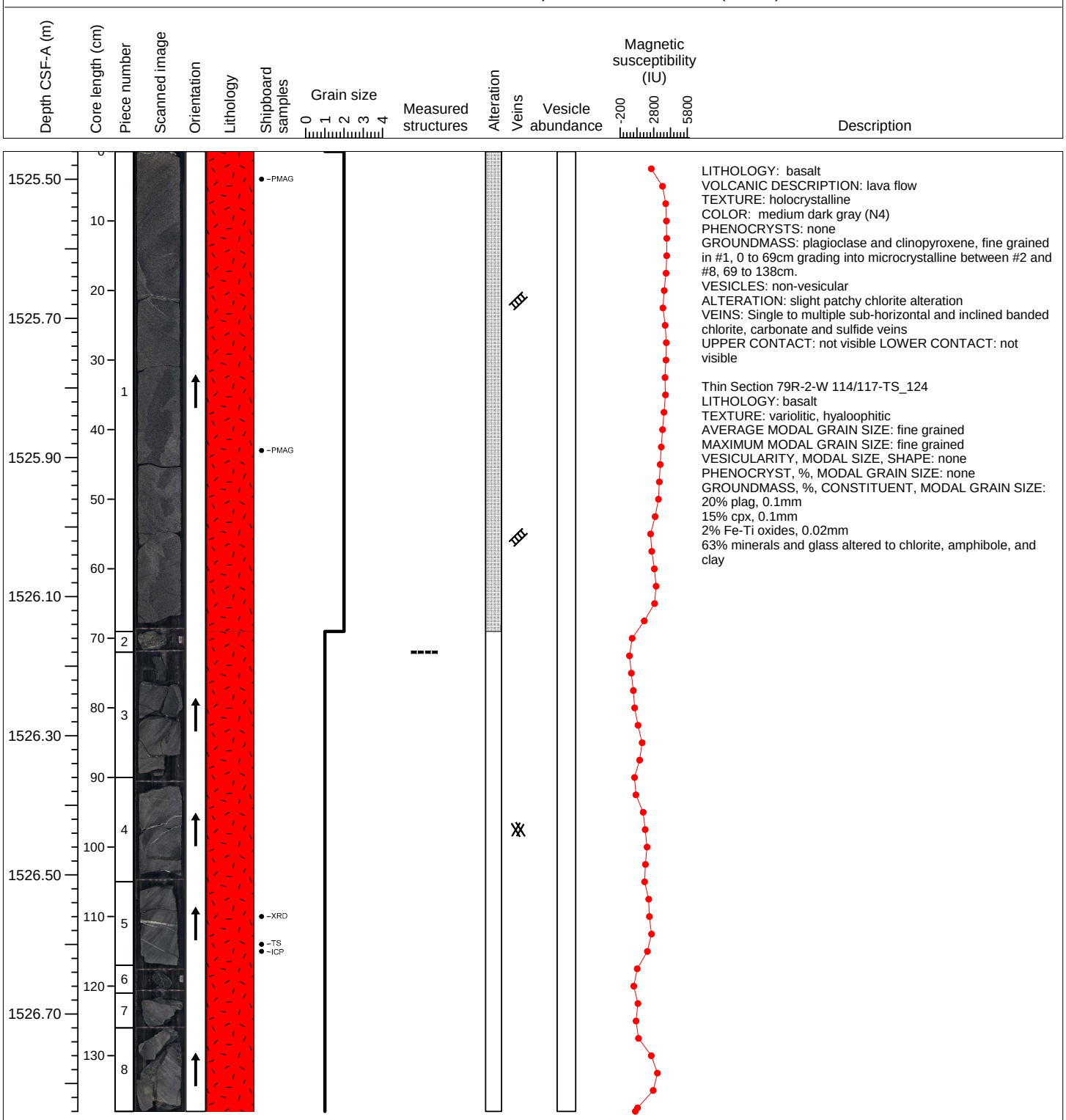
Hole 351-U1438E-79R Section 1, Top of Section: 1524.5 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium dark gray (N4)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, fine grained
VESICLES: non-vesicular
ALTERATION: local moderate patchy chlorite alteration
VEINS: Multiple sub-horizontal to inclined chlorite, carbonate and sulfide veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

Thin Section 79R-1-W 48/51-TS_123
LITHOLOGY: basalt
TEXTURE: ophitic, spherulitic
AVERAGE MODAL GRAIN SIZE: medium grained
MAXIMUM MODAL GRAIN SIZE: medium grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE: none
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
40% plag, 0.2mm
30% cpx, 0.2mm
7% Fe-Ti oxides, 0.25mm
23% minerals and glass altered to chlorite, amphibole, and clay

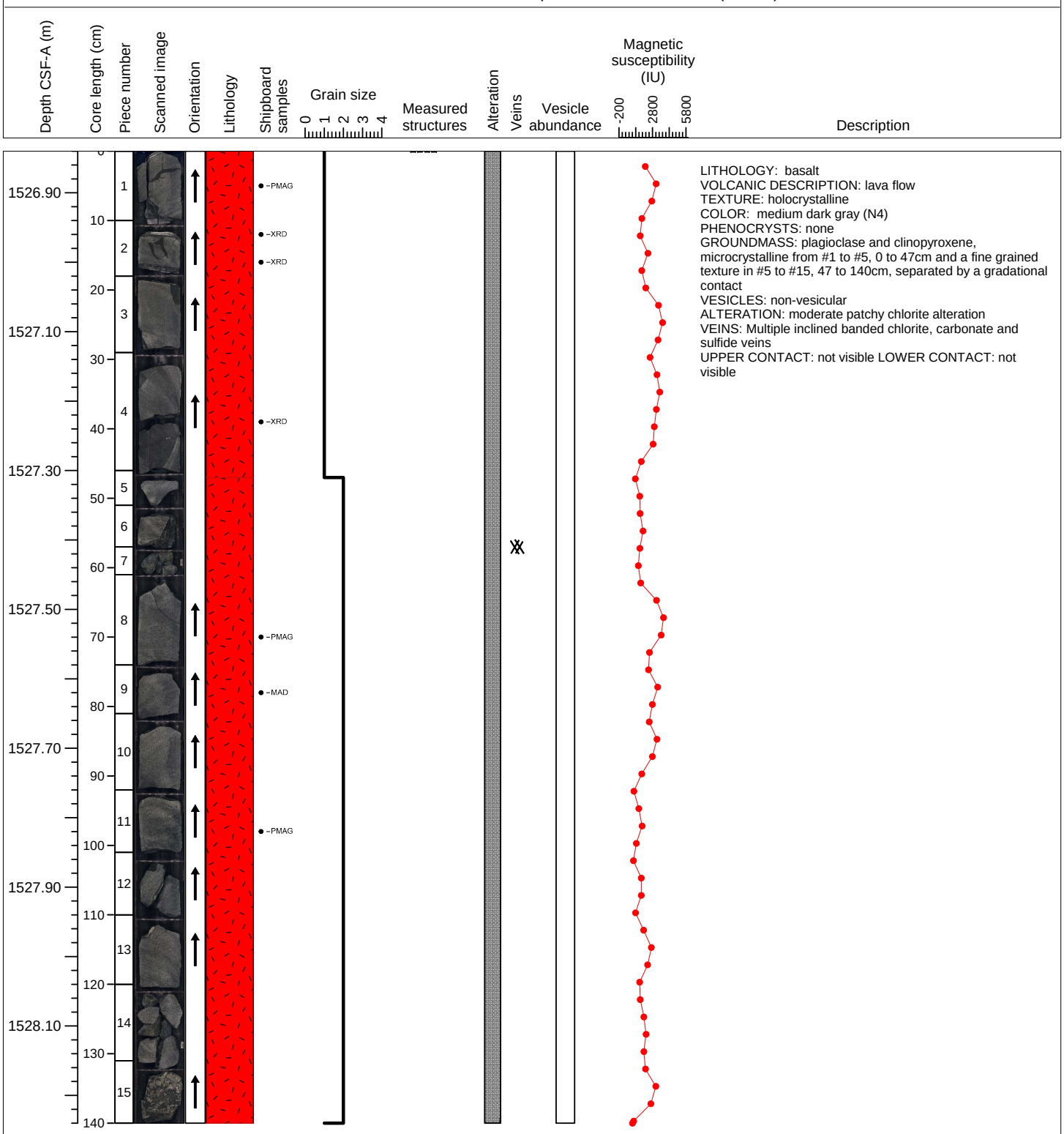
Hole 351-U1438E-79R Section 2, Top of Section: 1525.46 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium dark gray (N4)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, fine grained in #1, 0 to 69cm grading into microcrystalline between #2 and #8, 69 to 138cm.
VESICLES: non-vesicular
ALTERATION: slight patchy chlorite alteration
VEINS: Single to multiple sub-horizontal and inclined banded chlorite, carbonate and sulfide veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

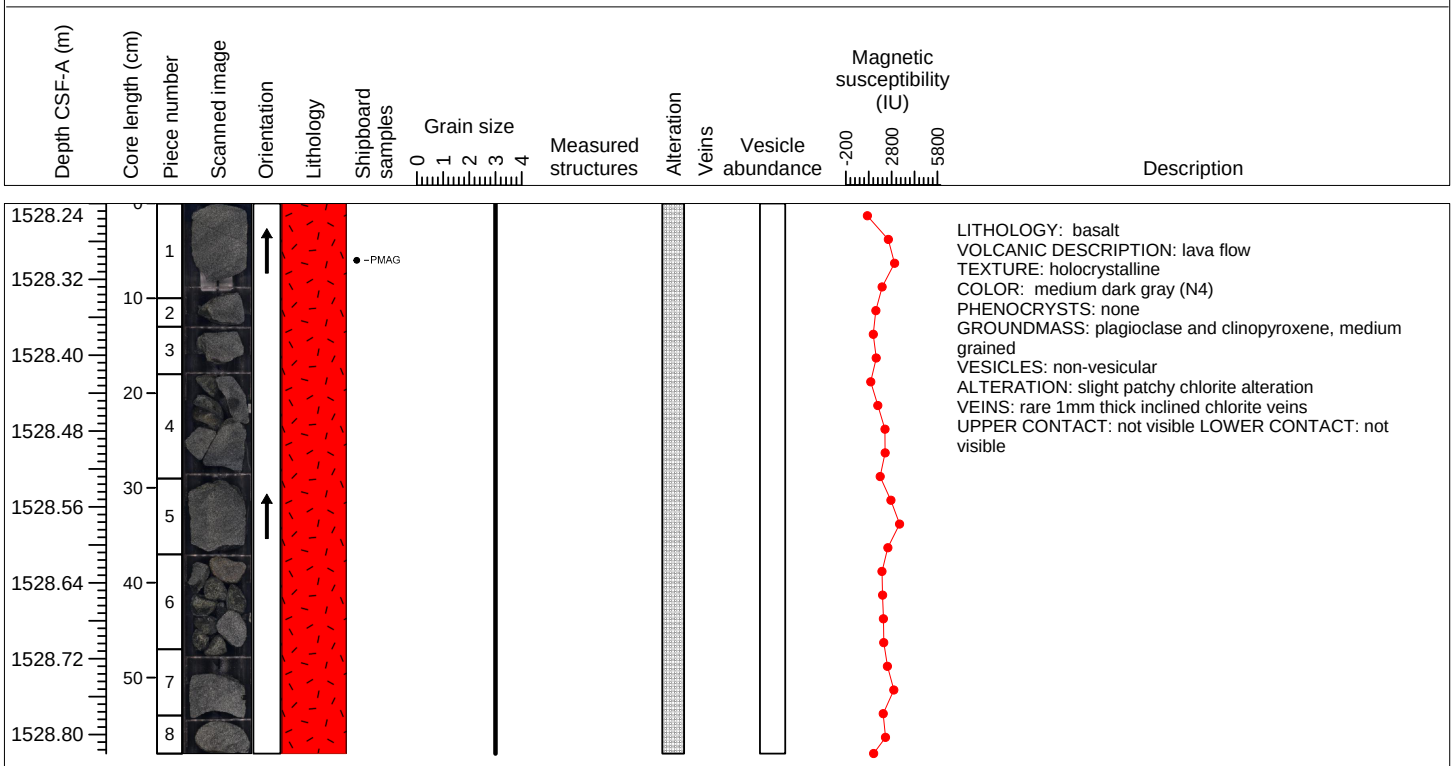
Thin Section 79R-2-W 114/117-TS_124
LITHOLOGY: basalt
TEXTURE: variolitic, hyaloophitic
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE: none
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
20% plag, 0.1mm
15% cpx, 0.1mm
2% Fe-Ti oxides, 0.02mm
63% minerals and glass altered to chlorite, amphibole, and clay

Hole 351-U1438E-79R Section 3, Top of Section: 1526.84 m (CSF-A)



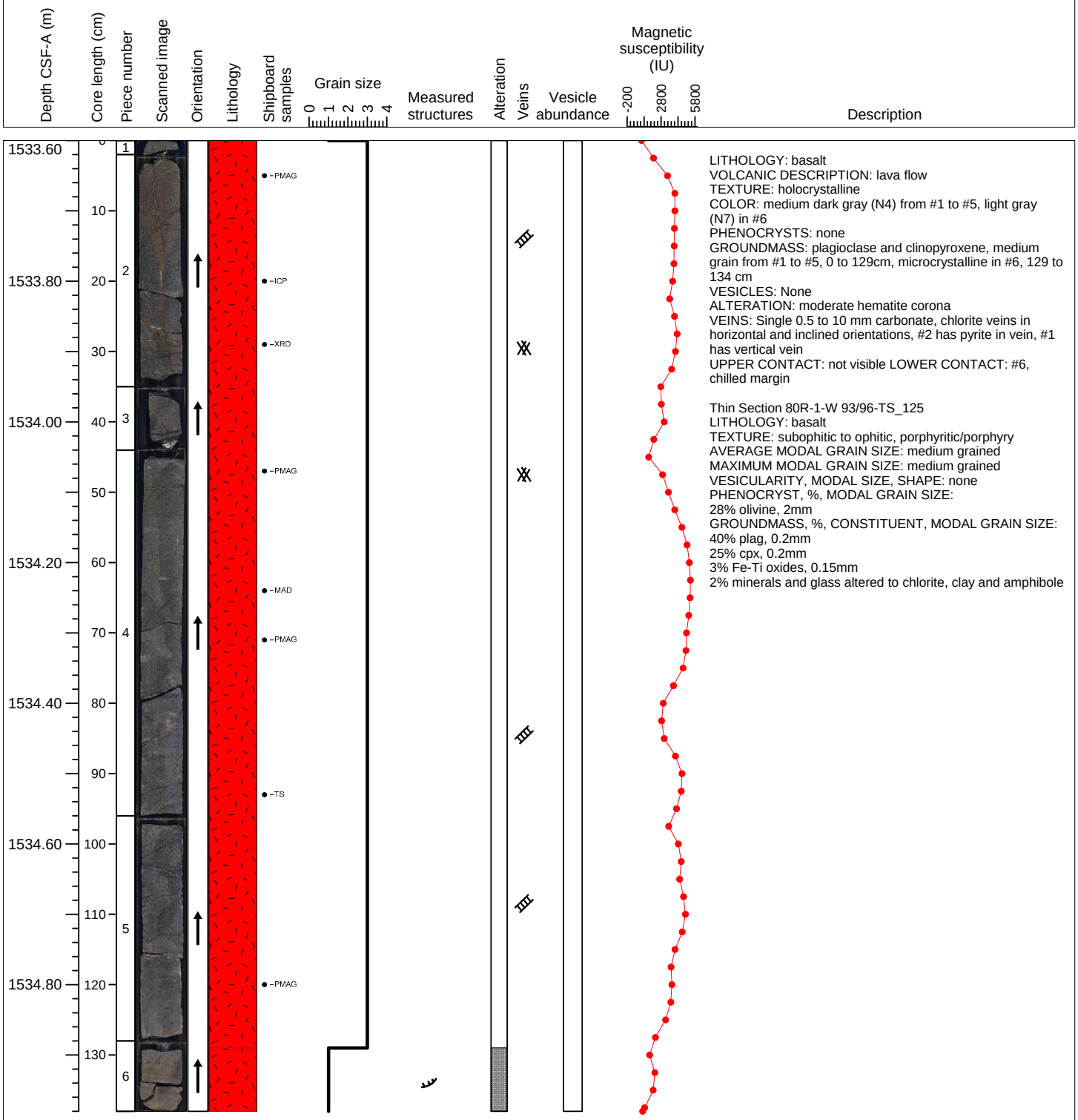
LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium dark gray (N4)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, microcrystalline from #1 to #5, 0 to 47cm and a fine grained texture in #5 to #15, 47 to 140cm, separated by a gradational contact
VESICLES: non-vesicular
ALTERATION: moderate patchy chlorite alteration
VEINS: Multiple inclined banded chlorite, carbonate and sulfide veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

Hole 351-U1438E-79R Section 4, Top of Section: 1528.24 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium dark gray (N4)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, medium grained
VESICLES: non-vesicular
ALTERATION: slight patchy chlorite alteration
VEINS: rare 1mm thick inclined chlorite veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

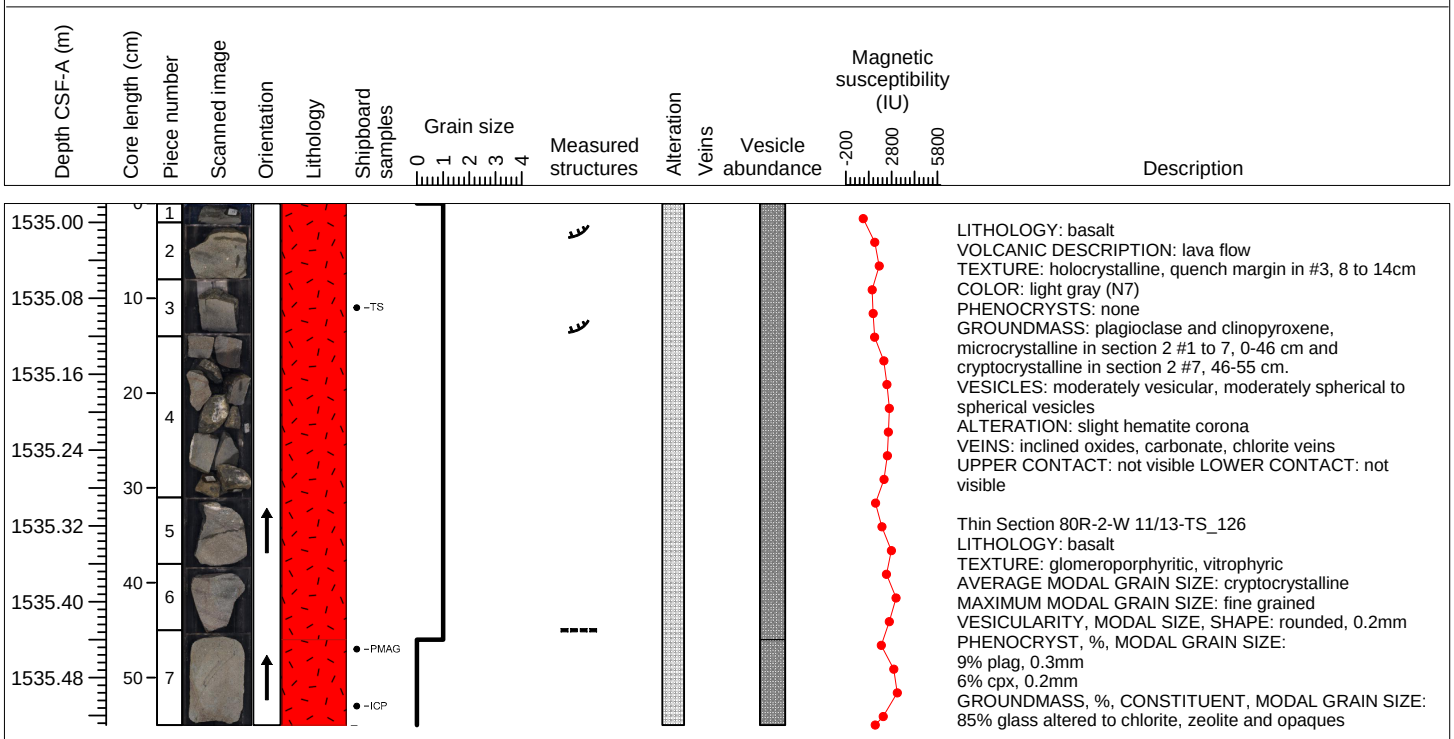
Hole 351-U1438E-80R Section 1, Top of Section: 1533.6 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium dark gray (N4) from #1 to #5, light gray (N7) in #6
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, medium grain from #1 to #5, 0 to 129cm, microcrystalline in #6, 129 to 134 cm
VESICLES: None
ALTERATION: moderate hematite corona
VEINS: Single 0.5 to 10 mm carbonate, chlorite veins in horizontal and inclined orientations, #2 has pyrite in vein, #1 has vertical vein
UPPER CONTACT: not visible LOWER CONTACT: #6, chilled margin

Thin Section 80R-1-W 93/96-TS_125
LITHOLOGY: basalt
TEXTURE: subophitic to ophitic, porphyritic/porphyry
AVERAGE MODAL GRAIN SIZE: medium grained
MAXIMUM MODAL GRAIN SIZE: medium grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE:
28% olivine, 2mm
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
40% plag, 0.2mm
25% cpx, 0.2mm
3% Fe-Ti oxides, 0.15mm
2% minerals and glass altered to chlorite, clay and amphibole

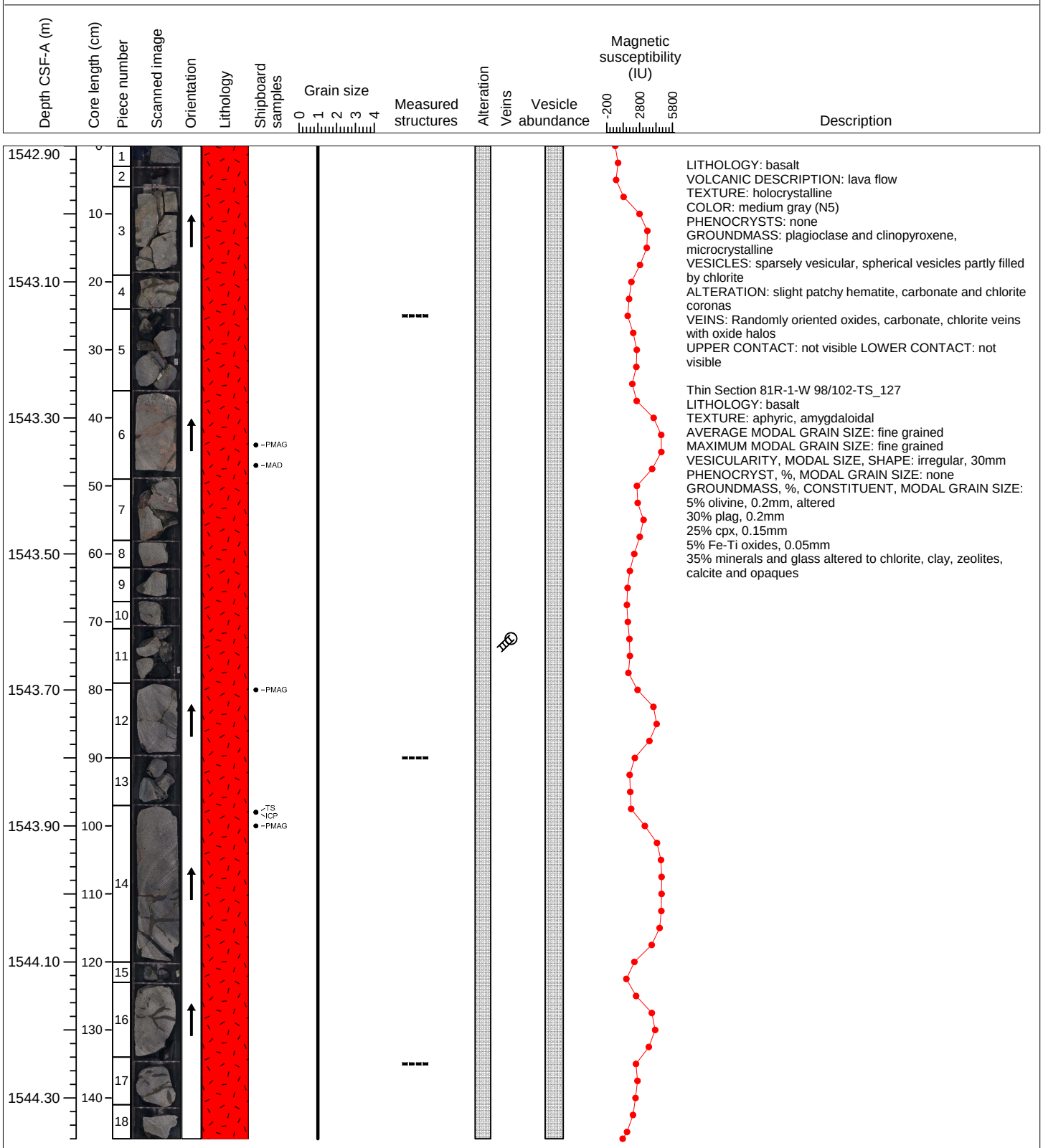
Hole 351-U1438E-80R Section 2, Top of Section: 1534.98 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline, quench margin in #3, 8 to 14cm
COLOR: light gray (N7)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, microcrystalline in section 2 #1 to 7, 0-46 cm and cryptocrystalline in section 2 #7, 46-55 cm.
VESICLES: moderately vesicular, moderately spherical to spherical vesicles
ALTERATION: slight hematite corona
VEINS: inclined oxides, carbonate, chlorite veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

Thin Section 80R-2-W 11/13-TS_126
LITHOLOGY: basalt
TEXTURE: glomeroporphyritic, vitrophyric
AVERAGE MODAL GRAIN SIZE: cryptocrystalline
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: rounded, 0.2mm
PHENOCRYST, %, MODAL GRAIN SIZE:
9% plag, 0.3mm
6% cpx, 0.2mm
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
85% glass altered to chlorite, zeolite and opaques

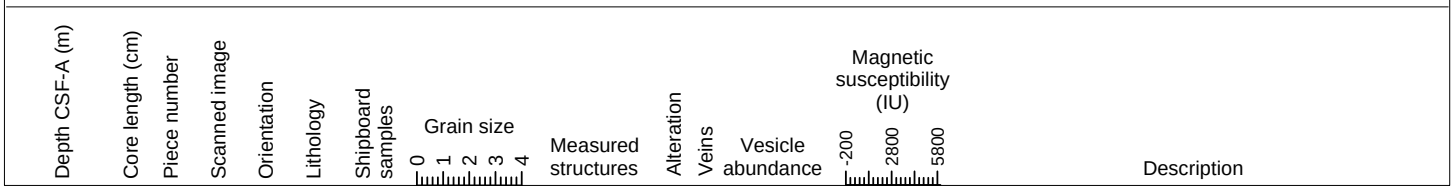
Hole 351-U1438E-81R Section 1, Top of Section: 1542.9 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium gray (N5)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, microcrystalline
VESICLES: sparsely vesicular, spherical vesicles partly filled by chlorite
ALTERATION: slight patchy hematite, carbonate and chlorite coronas
VEINS: Randomly oriented oxides, carbonate, chlorite veins with oxide halos
UPPER CONTACT: not visible LOWER CONTACT: not visible

Thin Section 81R-1-W 98/102-TS_127
LITHOLOGY: basalt
TEXTURE: aphyric, amygdaloidal
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: irregular, 30mm
PHENOCRYST, %, MODAL GRAIN SIZE: none
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
5% olivine, 0.2mm, altered
30% plag, 0.2mm
25% cpx, 0.15mm
5% Fe-Ti oxides, 0.05mm
35% minerals and glass altered to chlorite, clay, zeolites, calcite and opaques

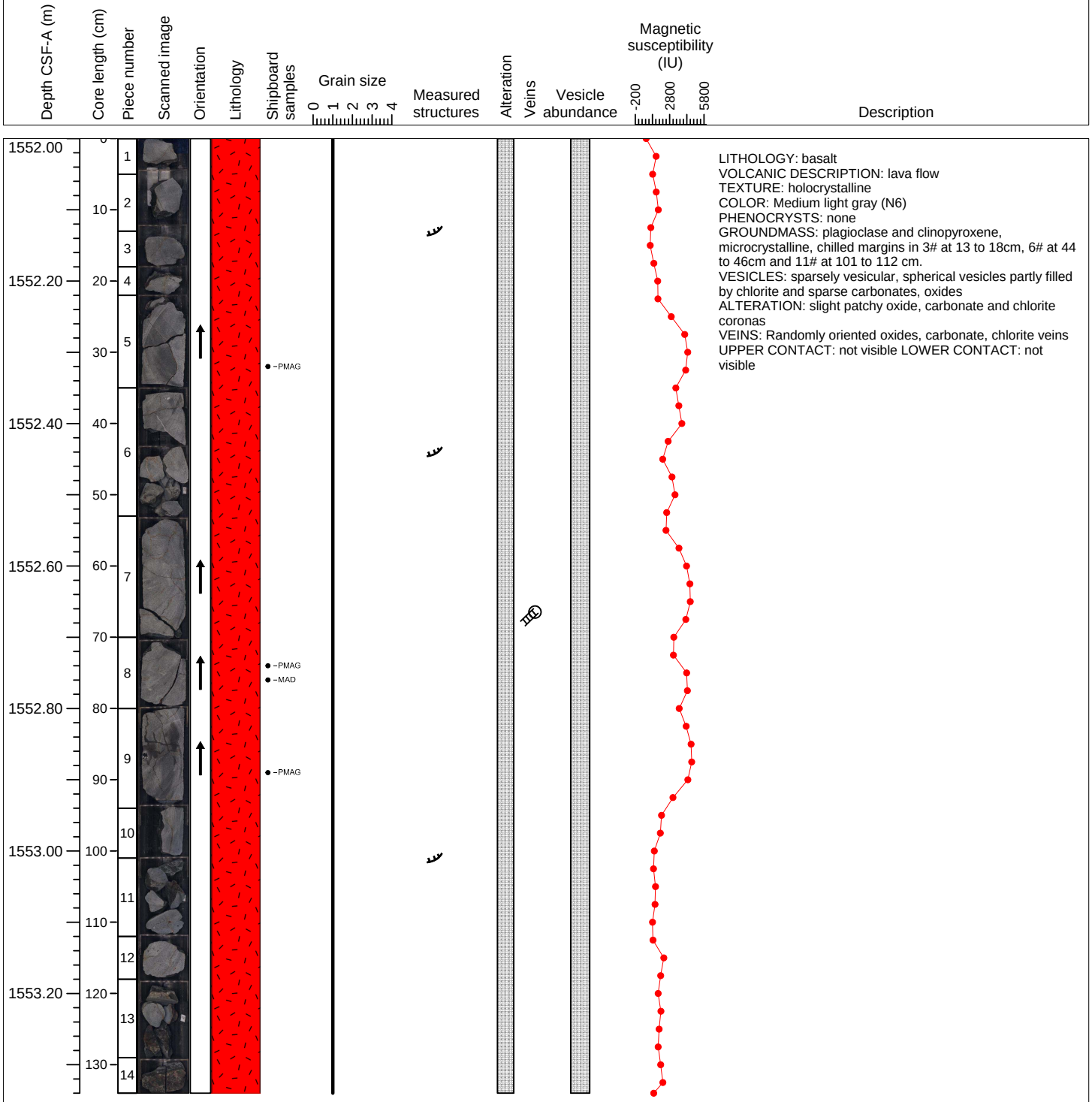
Hole 351-U1438E-81R Section 2, Top of Section: 1544.36 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium gray (N5)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, microcrystalline
VESICLES: sparsely vesicular, spherical vesicles partly filled by chlorite
ALTERATION: slight patchy hematite, carbonate and chlorite coronas
VEINS: Randomly oriented thin carbonate, chlorite veins with oxide halos
UPPER CONTACT: not visible LOWER CONTACT: not visible

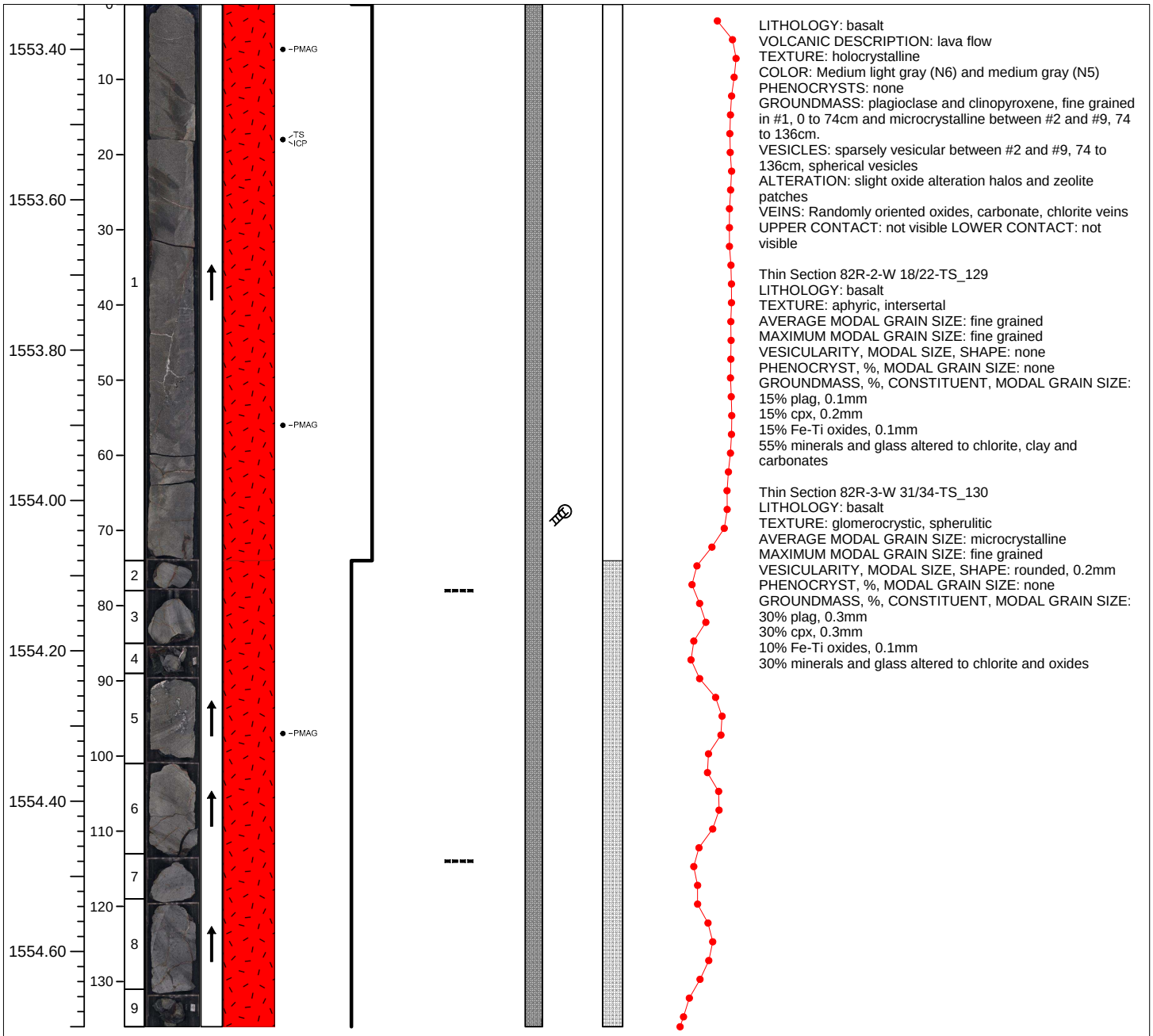
Thin Section 81R-2-W 16/20-TS_128
LITHOLOGY: basalt
TEXTURE: spherulitic, holohyaline / glassy
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE: none
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
10% plag, 0.1mm, swallow-tailed
11% cpx, 0.2mm
4% Fe-Ti oxides, 0.05 mm
75% minerals and glass altered to chlorite, clay and carbonates

Hole 351-U1438E-82R Section 1, Top of Section: 1552.0 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: Medium light gray (N6)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, microcrystalline, chilled margins in 3# at 13 to 18cm, 6# at 44 to 46cm and 11# at 101 to 112 cm.
VESICLES: sparsely vesicular, spherical vesicles partly filled by chlorite and sparse carbonates, oxides
ALTERATION: slight patchy oxide, carbonate and chlorite coronas
VEINS: Randomly oriented oxides, carbonate, chlorite veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

Hole 351-U1438E-82R Section 2, Top of Section: 1553.34 m (CSF-A)

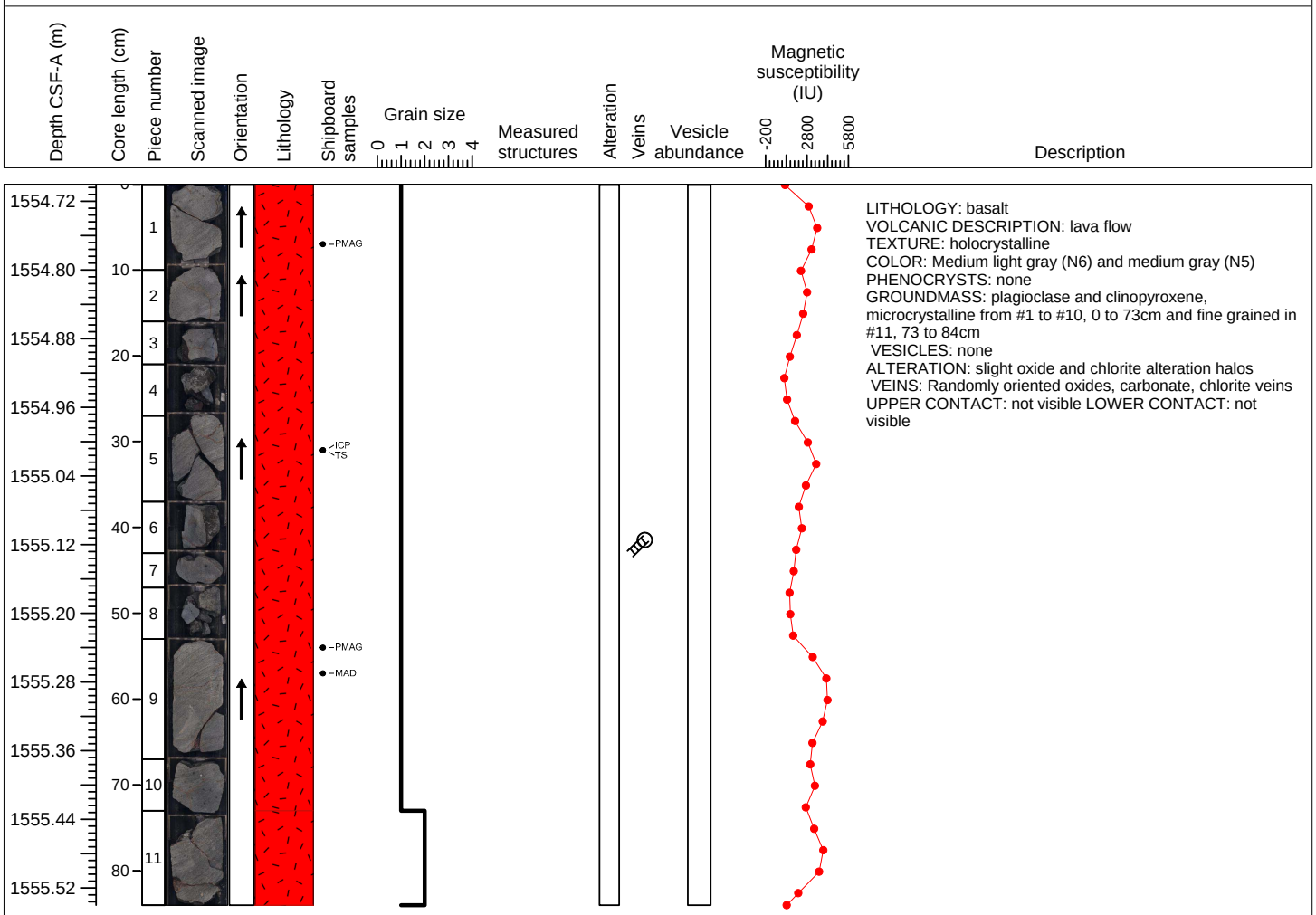


LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: Medium light gray (N6) and medium gray (N5)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, fine grained in #1, 0 to 74cm and microcrystalline between #2 and #9, 74 to 136cm.
VESICLES: sparsely vesicular between #2 and #9, 74 to 136cm, spherical vesicles
ALTERATION: slight oxide alteration halos and zeolite patches
VEINS: Randomly oriented oxides, carbonate, chlorite veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

Thin Section 82R-2-W 18/22-TS_129
LITHOLOGY: basalt
TEXTURE: aphyric, intersertal
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE: none
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
15% plag, 0.1mm
15% cpx, 0.2mm
15% Fe-Ti oxides, 0.1mm
55% minerals and glass altered to chlorite, clay and carbonates

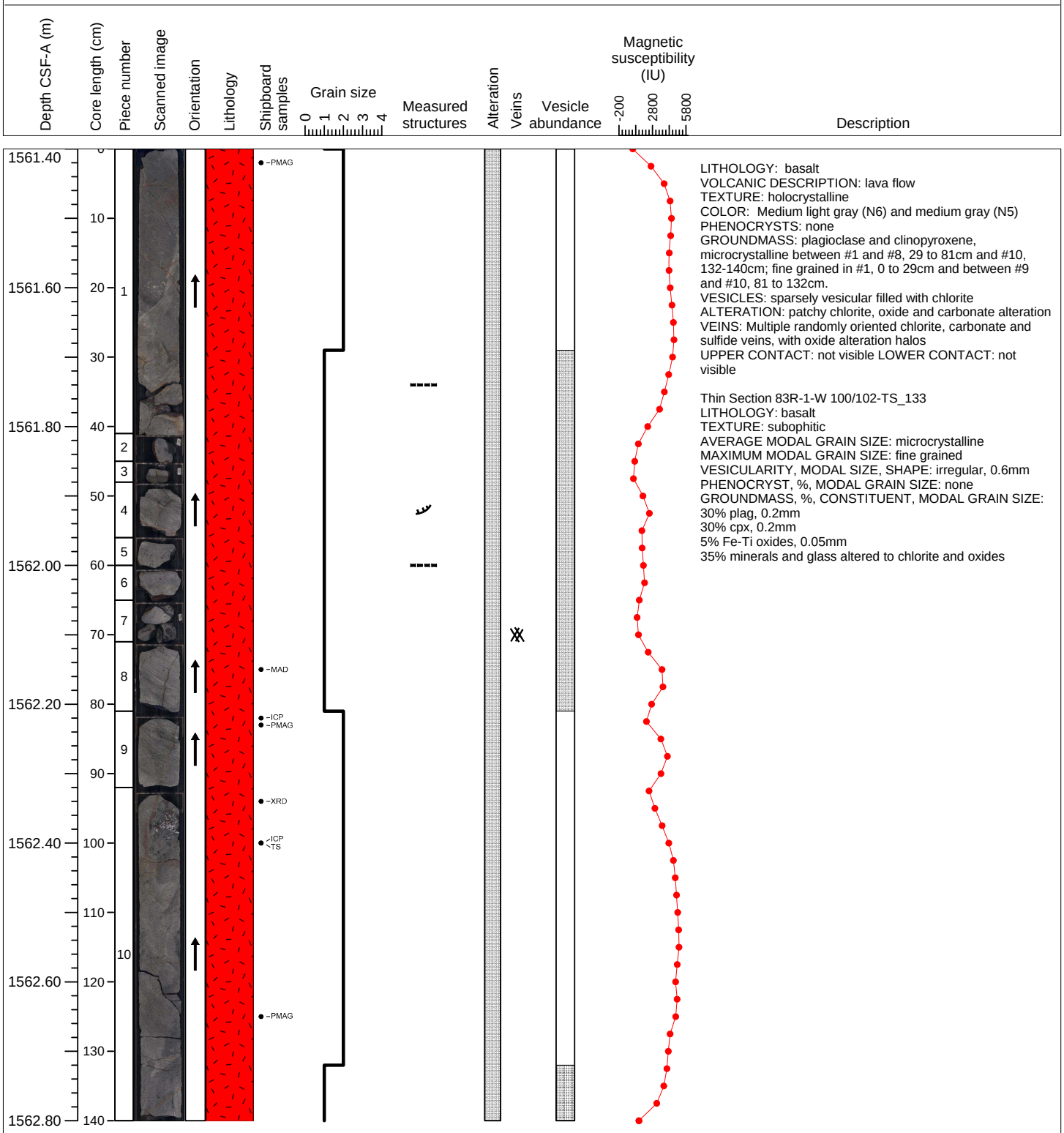
Thin Section 82R-3-W 31/34-TS_130
LITHOLOGY: basalt
TEXTURE: glomerocrystic, spherulitic
AVERAGE MODAL GRAIN SIZE: microcrystalline
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: rounded, 0.2mm
PHENOCRYST, %, MODAL GRAIN SIZE: none
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
30% plag, 0.3mm
30% cpx, 0.3mm
10% Fe-Ti oxides, 0.1mm
30% minerals and glass altered to chlorite and oxides

Hole 351-U1438E-82R Section 3, Top of Section: 1554.7 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: Medium light gray (N6) and medium gray (N5)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, microcrystalline from #1 to #10, 0 to 73cm and fine grained in #11, 73 to 84cm
VESICLES: none
ALTERATION: slight oxide and chlorite alteration halos
VEINS: Randomly oriented oxides, carbonate, chlorite veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

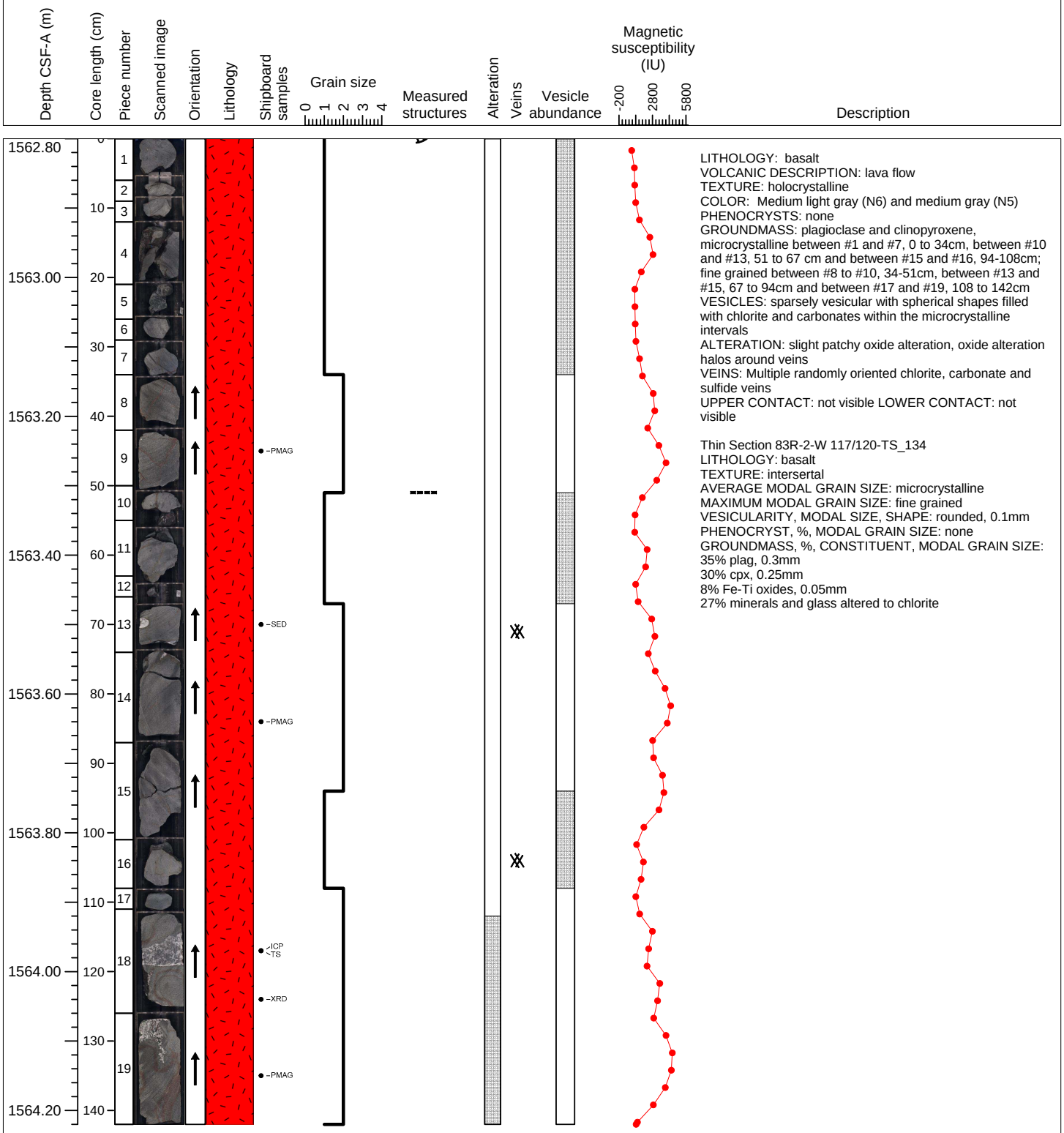
Hole 351-U1438E-83R Section 1, Top of Section: 1561.4 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: Medium light gray (N6) and medium gray (N5)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, microcrystalline between #1 and #8, 29 to 81cm and #10, 132-140cm; fine grained in #1, 0 to 29cm and between #9 and #10, 81 to 132cm.
VESICLES: sparsely vesicular filled with chlorite
ALTERATION: patchy chlorite, oxide and carbonate alteration
VEINS: Multiple randomly oriented chlorite, carbonate and sulfide veins, with oxide alteration halos
UPPER CONTACT: not visible LOWER CONTACT: not visible

Thin Section 83R-1-W 100/102-TS_133
LITHOLOGY: basalt
TEXTURE: subophitic
AVERAGE MODAL GRAIN SIZE: microcrystalline
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: irregular, 0.6mm
PHENOCRYST, %, MODAL GRAIN SIZE: none
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
30% plag, 0.2mm
30% cpx, 0.2mm
5% Fe-Ti oxides, 0.05mm
35% minerals and glass altered to chlorite and oxides

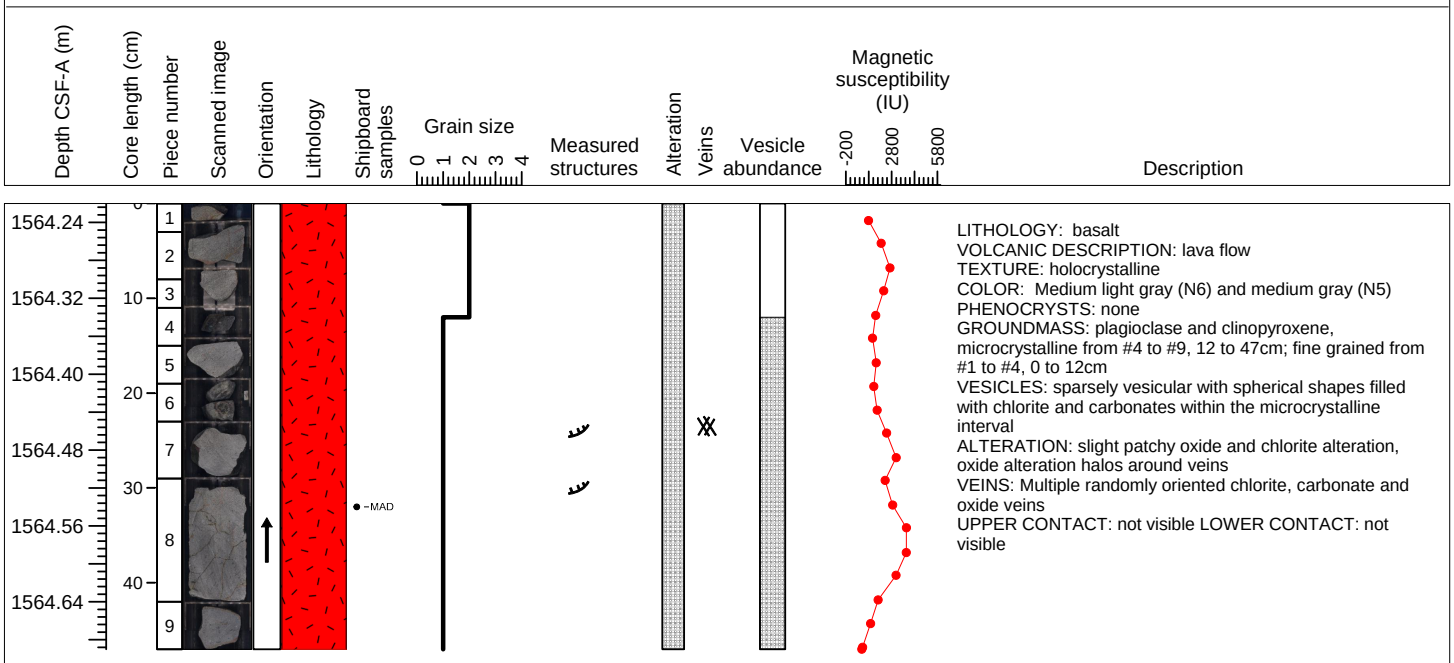
Hole 351-U1438E-83R Section 2, Top of Section: 1562.8 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: Medium light gray (N6) and medium gray (N5)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, microcrystalline between #1 and #7, 0 to 34cm, between #10 and #13, 51 to 67 cm and between #15 and #16, 94-108cm; fine grained between #8 to #10, 34-51cm, between #13 and #15, 67 to 94cm and between #17 and #19, 108 to 142cm
VESICLES: sparsely vesicular with spherical shapes filled with chlorite and carbonates within the microcrystalline intervals
ALTERATION: slight patchy oxide alteration, oxide alteration halos around veins
VEINS: Multiple randomly oriented chlorite, carbonate and sulfide veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

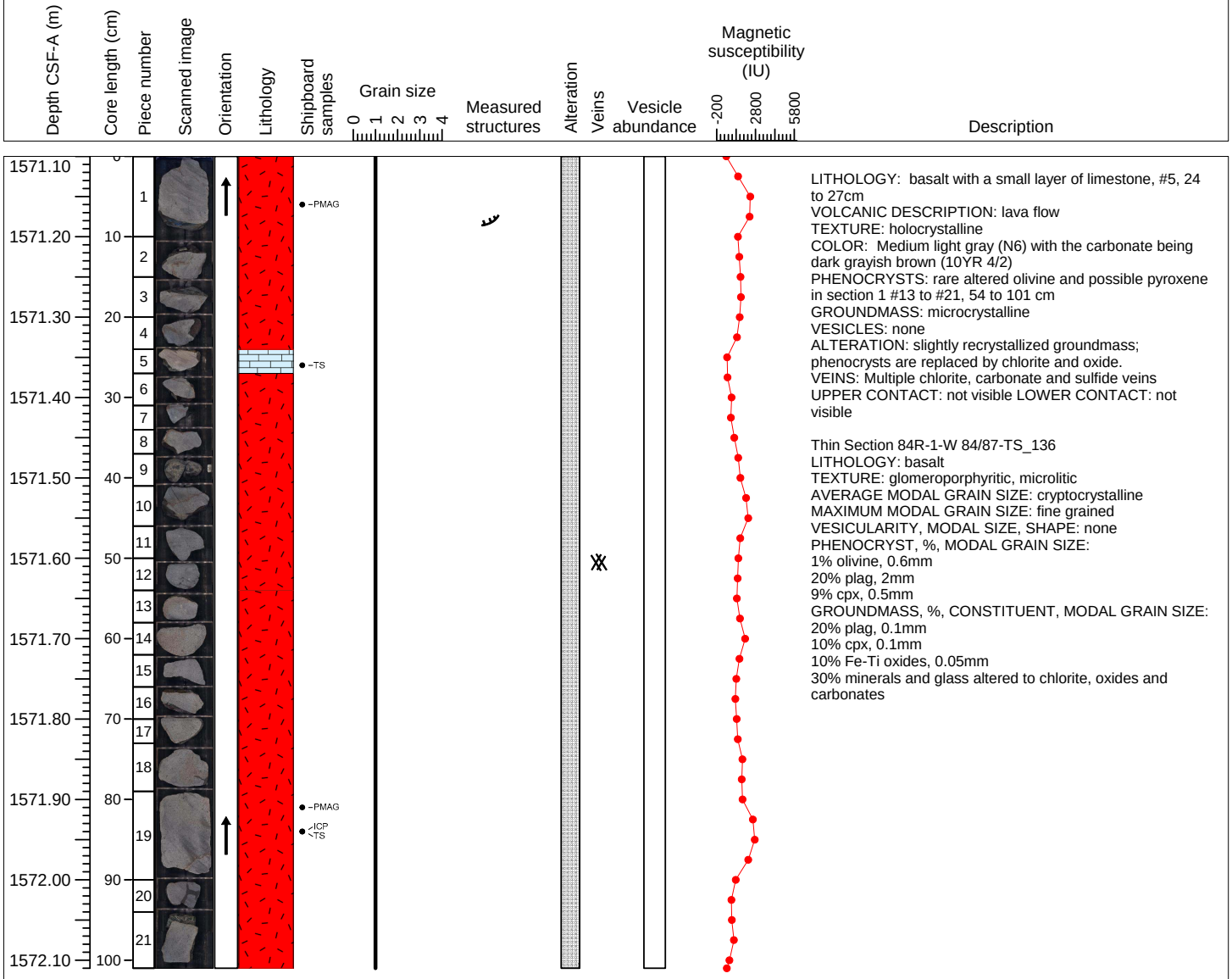
Thin Section 83R-2-W 117/120-TS_134
LITHOLOGY: basalt
TEXTURE: intersertal
AVERAGE MODAL GRAIN SIZE: microcrystalline
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: rounded, 0.1mm
PHENOCRYST, %, MODAL GRAIN SIZE: none
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
35% plag, 0.3mm
30% cpx, 0.25mm
8% Fe-Ti oxides, 0.05mm
27% minerals and glass altered to chlorite

Hole 351-U1438E-83R Section 3, Top of Section: 1564.22 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: Medium light gray (N6) and medium gray (N5)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, microcrystalline from #4 to #9, 12 to 47cm; fine grained from #1 to #4, 0 to 12cm
VESICLES: sparsely vesicular with spherical shapes filled with chlorite and carbonates within the microcrystalline interval
ALTERATION: slight patchy oxide and chlorite alteration, oxide alteration halos around veins
VEINS: Multiple randomly oriented chlorite, carbonate and oxide veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

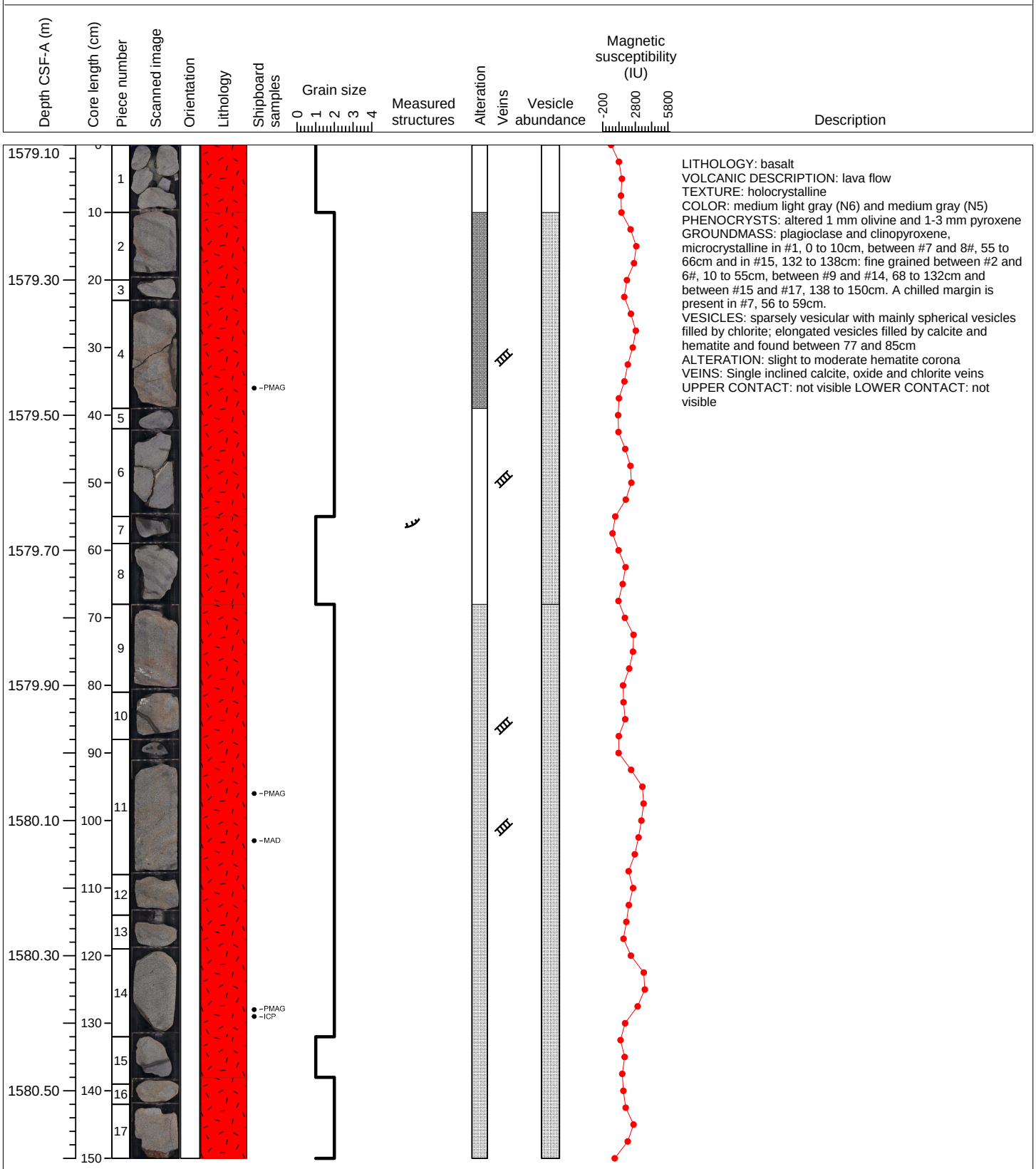
Hole 351-U1438E-84R Section 1, Top of Section: 1571.1 m (CSF-A)



LITHOLOGY: basalt with a small layer of limestone, #5, 24 to 27cm
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: Medium light gray (N6) with the carbonate being dark grayish brown (10YR 4/2)
PHENOCRYSTS: rare altered olivine and possible pyroxene in section 1 #13 to #21, 54 to 101 cm
GROUNDMASS: microcrystalline
VESICLES: none
ALTERATION: slightly recrystallized groundmass; phenocrysts are replaced by chlorite and oxide.
VEINS: Multiple chlorite, carbonate and sulfide veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

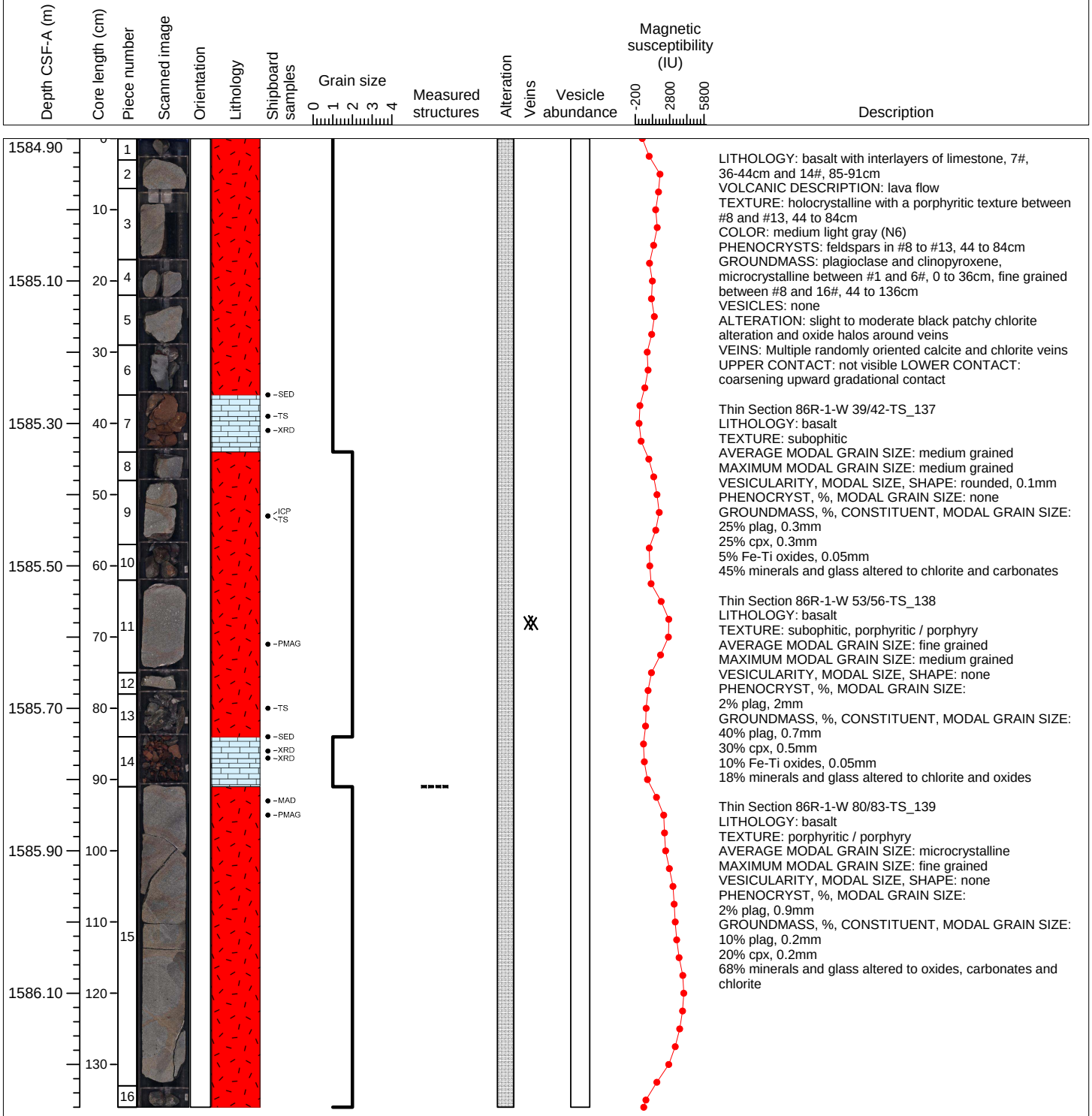
Thin Section 84R-1-W 84/87-TS_136
LITHOLOGY: basalt
TEXTURE: glomeroporphyritic, microlitic
AVERAGE MODAL GRAIN SIZE: cryptocrystalline
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE:
1% olivine, 0.6mm
20% plag, 2mm
9% cpx, 0.5mm
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
20% plag, 0.1mm
10% cpx, 0.1mm
10% Fe-Ti oxides, 0.05mm
30% minerals and glass altered to chlorite, oxides and carbonates

Hole 351-U1438E-85R Section 1, Top of Section: 1579.1 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium light gray (N6) and medium gray (N5)
PHENOCRYSTS: altered 1 mm olivine and 1-3 mm pyroxene
GROUNDMASS: plagioclase and clinopyroxene, microcrystalline in #1, 0 to 10cm, between #7 and 8#, 55 to 66cm and in #15, 132 to 138cm: fine grained between #2 and 6#, 10 to 55cm, between #9 and #14, 68 to 132cm and between #15 and #17, 138 to 150cm. A chilled margin is present in #7, 56 to 59cm.
VESICLES: sparsely vesicular with mainly spherical vesicles filled by chlorite; elongated vesicles filled by calcite and hematite and found between 77 and 85cm
ALTERATION: slight to moderate hematite corona
VEINS: Single inclined calcite, oxide and chlorite veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

Hole 351-U1438E-86R Section 1, Top of Section: 1584.9 m (CSF-A)



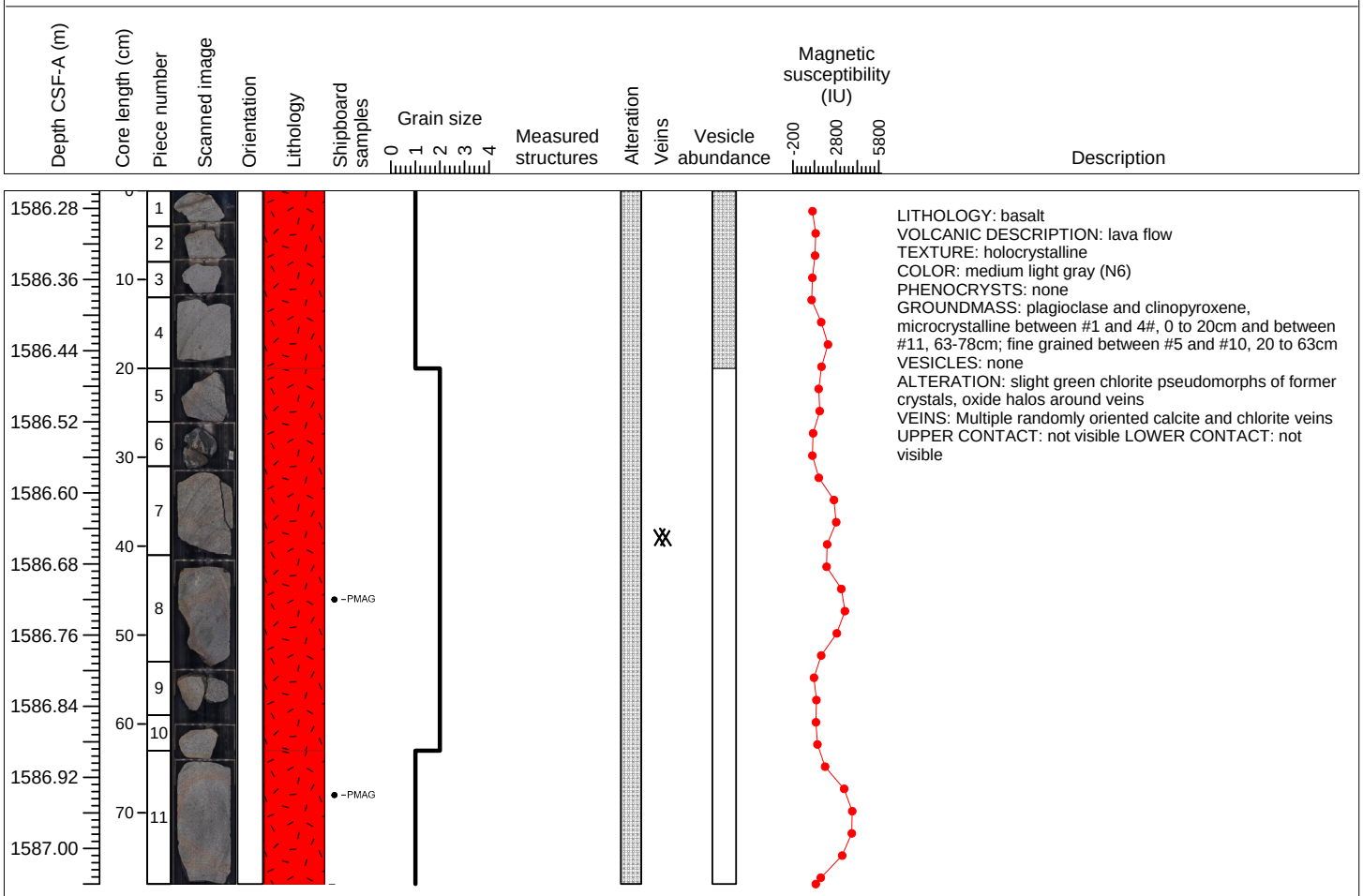
LITHOLOGY: basalt with interlayers of limestone, 7#, 36-44cm and 14#, 85-91cm
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline with a porphyritic texture between #8 and #13, 44 to 84cm
COLOR: medium light gray (N6)
PHENOCRYSTS: feldspars in #8 to #13, 44 to 84cm
GROUNDMASS: plagioclase and clinopyroxene, microcrystalline between #1 and 6#, 0 to 36cm, fine grained between #8 and 16#, 44 to 136cm
VESICLES: none
ALTERATION: slight to moderate black patchy chlorite alteration and oxide halos around veins
VEINS: Multiple randomly oriented calcite and chlorite veins
UPPER CONTACT: not visible LOWER CONTACT: coarsening upward gradational contact

Thin Section 86R-1-W 39/42-TS_137
LITHOLOGY: basalt
TEXTURE: subophitic
AVERAGE MODAL GRAIN SIZE: medium grained
MAXIMUM MODAL GRAIN SIZE: medium grained
VESICULARITY, MODAL SIZE, SHAPE: rounded, 0.1mm
PHENOCRYST, %, MODAL GRAIN SIZE: none
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
25% plag, 0.3mm
25% cpx, 0.3mm
5% Fe-Ti oxides, 0.05mm
45% minerals and glass altered to chlorite and carbonates

Thin Section 86R-1-W 53/56-TS_138
LITHOLOGY: basalt
TEXTURE: subophitic, porphyritic / porphyry
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: medium grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE:
2% plag, 2mm
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
40% plag, 0.7mm
30% cpx, 0.5mm
10% Fe-Ti oxides, 0.05mm
18% minerals and glass altered to chlorite and oxides

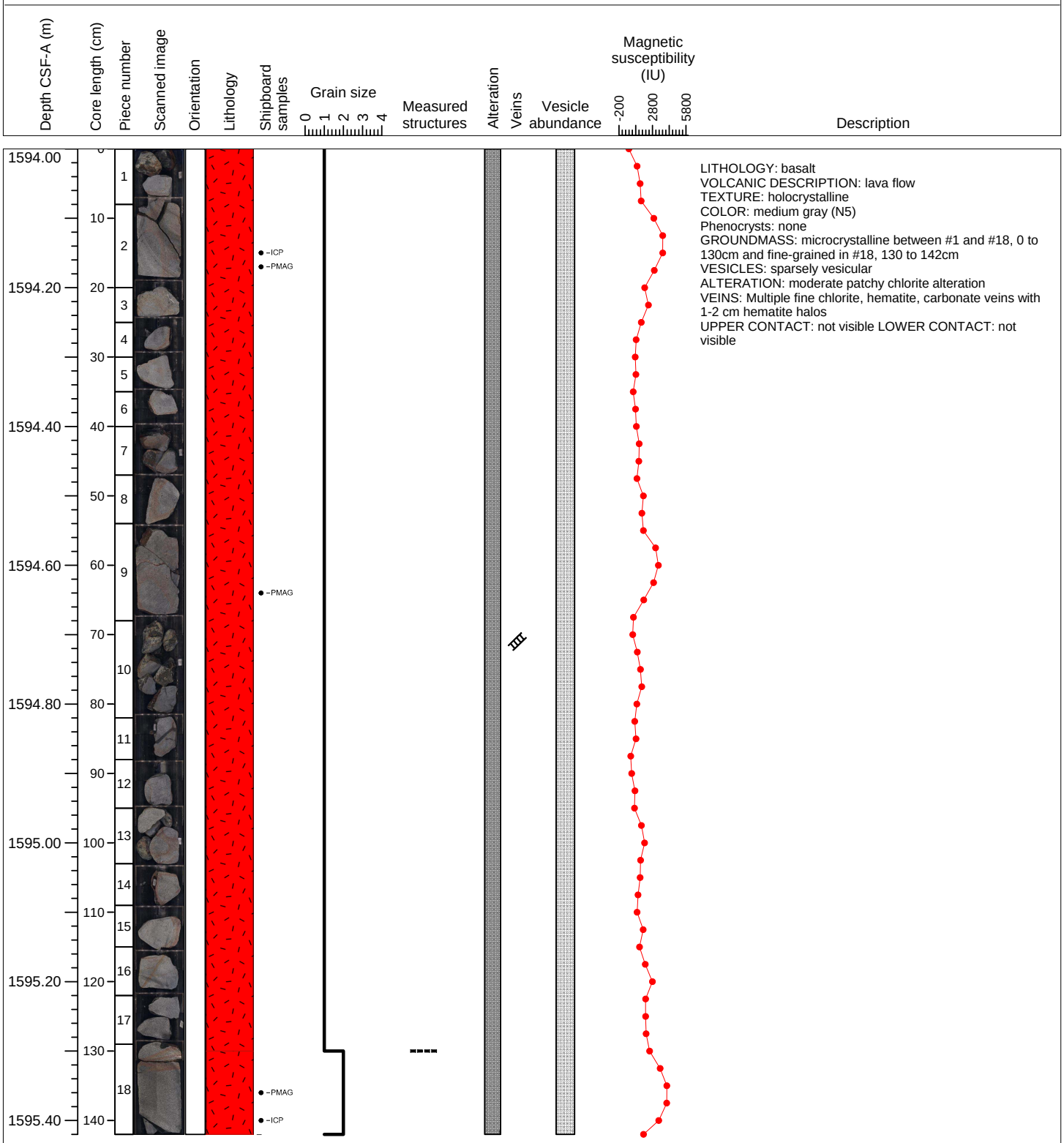
Thin Section 86R-1-W 80/83-TS_139
LITHOLOGY: basalt
TEXTURE: porphyritic / porphyry
AVERAGE MODAL GRAIN SIZE: microcrystalline
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE:
2% plag, 0.9mm
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
10% plag, 0.2mm
20% cpx, 0.2mm
68% minerals and glass altered to oxides, carbonates and chlorite

Hole 351-U1438E-86R Section 2, Top of Section: 1586.26 m (CSF-A)



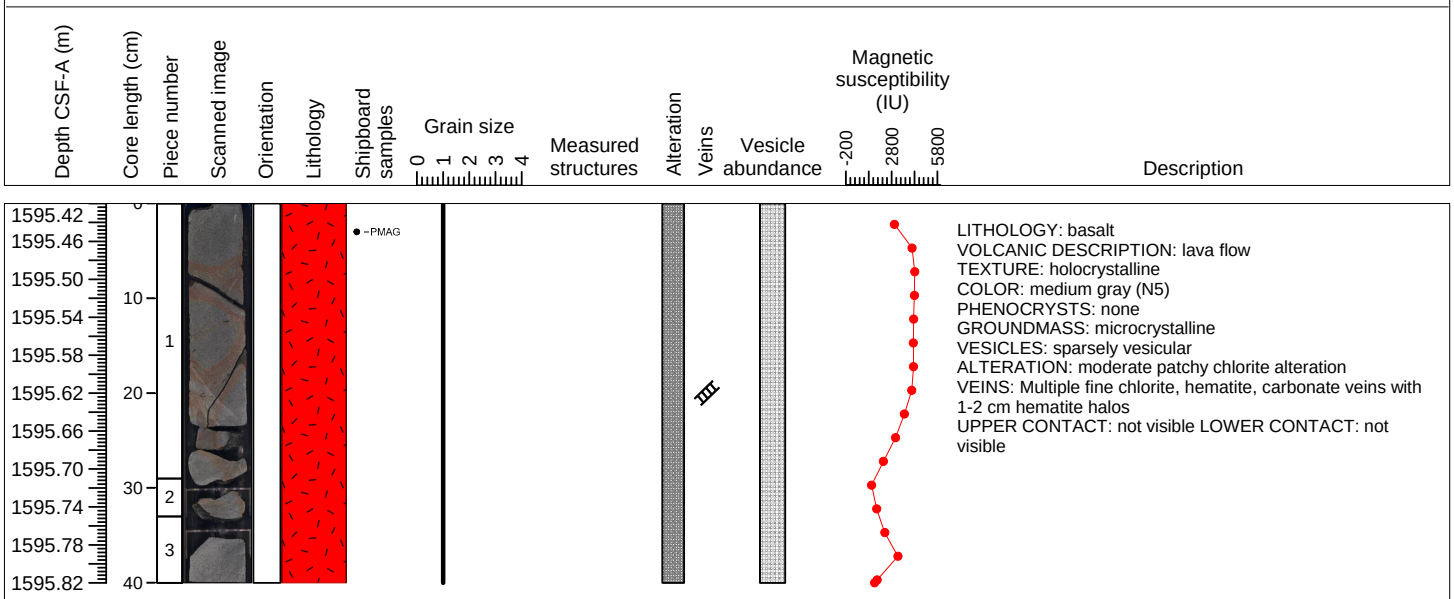
LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium light gray (N6)
PHENOCRYSTS: none
GROUNDMASS: plagioclase and clinopyroxene, microcrystalline between #1 and 4#, 0 to 20cm and between #11, 63-78cm; fine grained between #5 and #10, 20 to 63cm
VESICLES: none
ALTERATION: slight green chlorite pseudomorphs of former crystals, oxide halos around veins
VEINS: Multiple randomly oriented calcite and chlorite veins
UPPER CONTACT: not visible LOWER CONTACT: not visible

Hole 351-U1438E-87R Section 1, Top of Section: 1594.0 m (CSF-A)



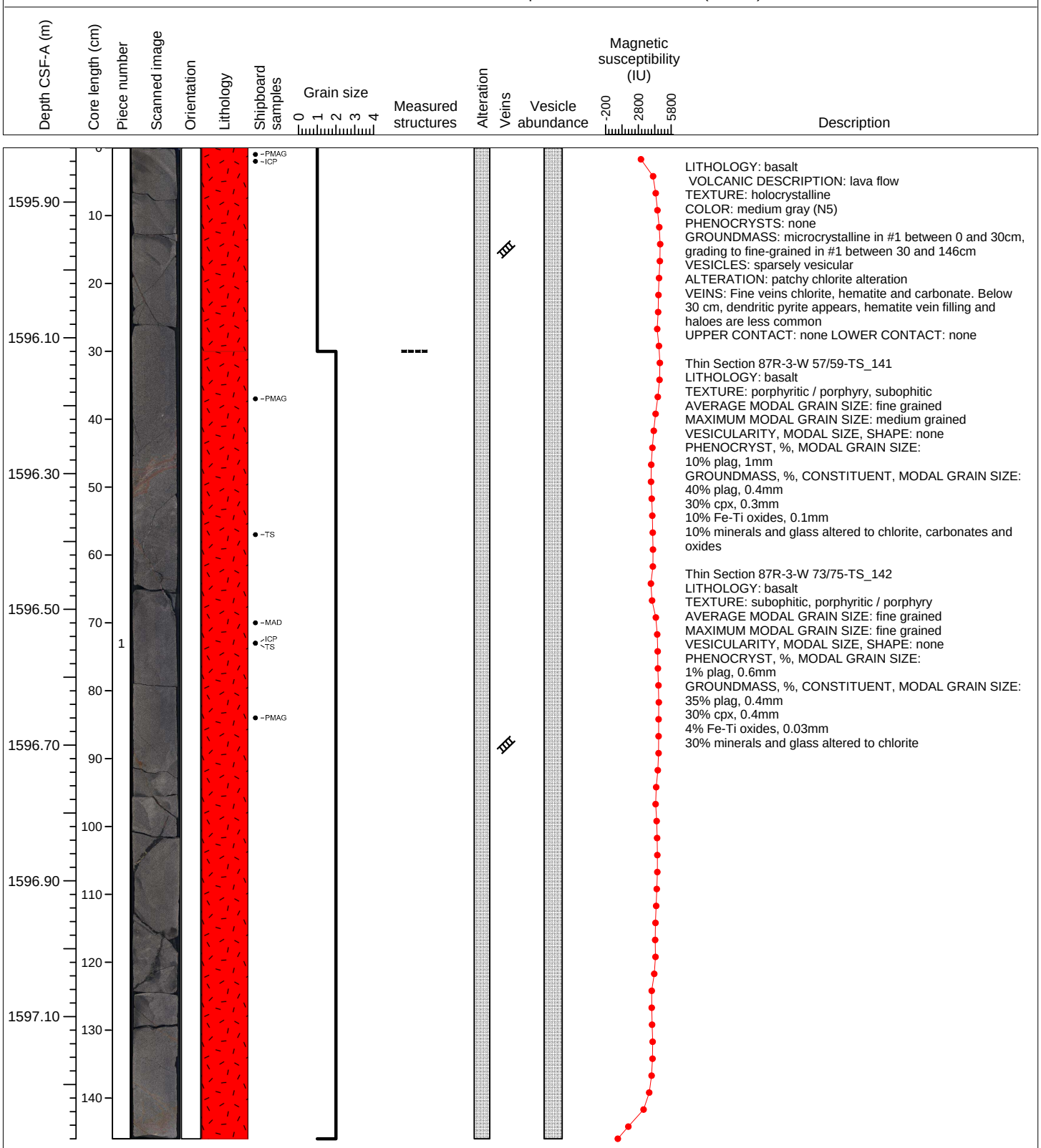
LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium gray (N5)
Phenocrysts: none
GROUNDMASS: microcrystalline between #1 and #18, 0 to 130cm and fine-grained in #18, 130 to 142cm
VESICLES: sparsely vesicular
ALTERATION: moderate patchy chlorite alteration
VEINS: Multiple fine chlorite, hematite, carbonate veins with 1-2 cm hematite halos
UPPER CONTACT: not visible LOWER CONTACT: not visible

Hole 351-U1438E-87R Section 2, Top of Section: 1595.42 m (CSF-A)



LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium gray (N5)
PHENOCRYSTS: none
GROUNDMASS: microcrystalline
VESICLES: sparsely vesicular
ALTERATION: moderate patchy chlorite alteration
VEINS: Multiple fine chlorite, hematite, carbonate veins with 1-2 cm hematite halos
UPPER CONTACT: not visible LOWER CONTACT: not visible

Hole 351-U1438E-87R Section 3, Top of Section: 1595.82 m (CSF-A)

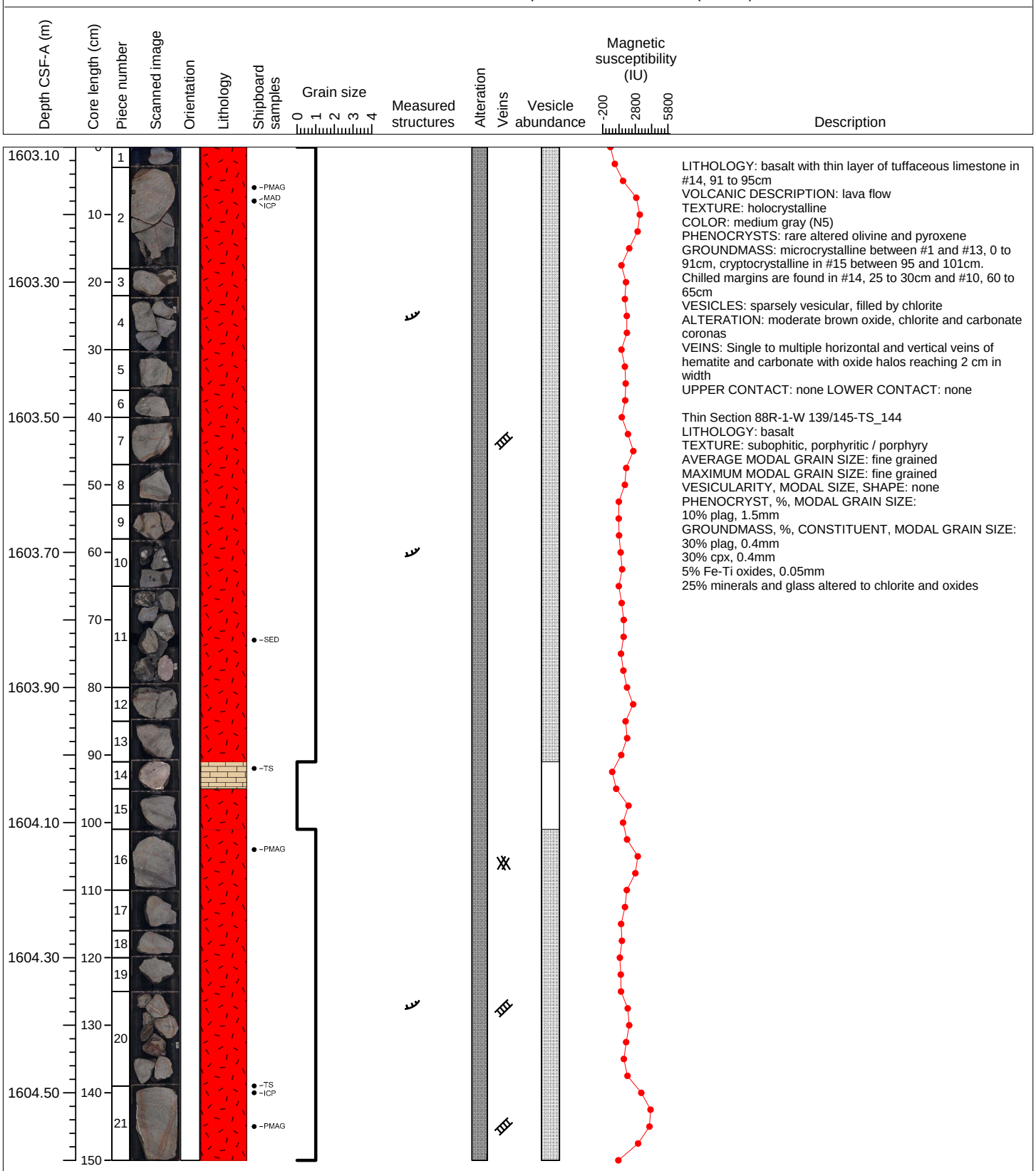


LITHOLOGY: basalt
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium gray (N5)
PHENOCRYSTS: none
GROUNDMASS: microcrystalline in #1 between 0 and 30cm, grading to fine-grained in #1 between 30 and 146cm
VESICLES: sparsely vesicular
ALTERATION: patchy chlorite alteration
VEINS: Fine veins chlorite, hematite and carbonate. Below 30 cm, dendritic pyrite appears, hematite vein filling and haloes are less common
UPPER CONTACT: none LOWER CONTACT: none

Thin Section 87R-3-W 57/59-TS_141
LITHOLOGY: basalt
TEXTURE: porphyritic / porphyry, subophitic
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: medium grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE:
10% plag, 1mm
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
40% plag, 0.4mm
30% cpx, 0.3mm
10% Fe-Ti oxides, 0.1mm
10% minerals and glass altered to chlorite, carbonates and oxides

Thin Section 87R-3-W 73/75-TS_142
LITHOLOGY: basalt
TEXTURE: subophitic, porphyritic / porphyry
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE:
1% plag, 0.6mm
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
35% plag, 0.4mm
30% cpx, 0.4mm
4% Fe-Ti oxides, 0.03mm
30% minerals and glass altered to chlorite

Hole 351-U1438E-88R Section 1, Top of Section: 1603.1 m (CSF-A)



LITHOLOGY: basalt with thin layer of tuffaceous limestone in #14, 91 to 95cm
VOLCANIC DESCRIPTION: lava flow
TEXTURE: holocrystalline
COLOR: medium gray (N5)
PHENOCRYSTS: rare altered olivine and pyroxene
GROUNDMASS: microcrystalline between #1 and #13, 0 to 91cm, cryptocrystalline in #15 between 95 and 101cm. Chilled margins are found in #14, 25 to 30cm and #10, 60 to 65cm
VESICLES: sparsely vesicular, filled by chlorite
ALTERATION: moderate brown oxide, chlorite and carbonate coronas
VEINS: Single to multiple horizontal and vertical veins of hematite and carbonate with oxide halos reaching 2 cm in width
UPPER CONTACT: none LOWER CONTACT: none

Thin Section 88R-1-W 139/145-TS_144
LITHOLOGY: basalt
TEXTURE: subophitic, porphyritic / porphyry
AVERAGE MODAL GRAIN SIZE: fine grained
MAXIMUM MODAL GRAIN SIZE: fine grained
VESICULARITY, MODAL SIZE, SHAPE: none
PHENOCRYST, %, MODAL GRAIN SIZE:
10% plag, 1.5mm
GROUNDMASS, %, CONSTITUENT, MODAL GRAIN SIZE:
30% plag, 0.4mm
30% cpx, 0.4mm
5% Fe-Ti oxides, 0.05mm
25% minerals and glass altered to chlorite and oxides

Sample	Top Depth [m]	Bottom Depth [m]	Sample domain name (if >1 domain)	Quartz [%]	Feldspar [%]	K-Feldspar [%]	Plagioclase [%]	Mica [%]	Biotite [%]	Muscovite [%]	Chlorite [%]	Glauconite [%]	Opaques [%]	Zircon [%]	Ferromagnesian - ol, pyx, amph [%]	Clay-sized fraction [%]	Barite [%]	Anhydrite [%]	Gypsum [%]	Apatite [%]	Zeolite - phillipsite, clinoptilolite [%]	Carbonate [%]	Pyrite [%]	Manganeseoxide [%]	Fe-oxide [%]	Clay minerals [%]	Opaques, authigenic [%]	Quartz, authigenic [%]	Vitric grains [%]	Lithic grains [%]	Palagonite [%]	Foraminifers [%]	Calcareous nannofossils [%]	Radiolarians [%]	Diatoms [%]	Silicoflagellate, ebridian, actinisocidian [%]	Sponge spicule fragments [%]	Pollen and spores [%]	Wood fragments [%]	Plant residuals [%]	Organic matter [%]	Total of group estimates [%]	Sand texture [%]	Silt texture [%]	Clay texture [%]	Lithology prefix	Principal lithology	Lithology suffix	Comment
351-U1438A-1H-1-A 10/11-SED	0.1	0.11	lithology domain 2 minor	2	2		2								1	43											1		30					8	2		1			7		99				tuffaceous	mud	with radiolarians	
351-U1438A-1H-2-A 148/149-SED	2.98	2.99	lithology domain 2 minor	1	1		1								1	64									4		5		1					15	5		1			2		101				radiolarian-rich	clay		
351-U1438A-1H-2-A 49/50-SED	1.99	2	lithology domain 1 major	10	10		10		1						2	40									2		1		20					10	2		2					110				radiolarian-rich	mud	with ash	
351-U1438A-1H-2-A 95/96-SED	2.45	2.46	lithology domain 2 minor	2	3		3								1														95													104					ash	with crystals	
351-U1438A-1H-3-A 6/7-SED	3.06	3.07	lithology domain 2 minor													65									2		15		10					2	1			1		4		100					mud	with ash	
351-U1438A-1H-4-A 108/109-SED	5.58	5.59	lithology domain 1 major	15			5		5	5			5			35										5			20					4			1					100				tuffaceous	mud	with radiolarians	
351-U1438A-1H-4-A 128/129-SED	5.78	5.79	lithology domain 2 minor		5		5																				10		85													105					ash	with crystals	
351-U1438A-1H-4-A 145/146-SED	5.95	5.96	lithology domain 2 minor	5	5		5								2	51									2		1		31						1					2		105				tuffaceous	mud		
351-U1438A-1H-4-A 3/4-SED	4.53	4.54	lithology domain 2 minor	5			5		1	1					1	81									1				1					1			1				2	100					mud		
351-U1438A-1H-4-A 70/71-SED	5.2	5.21	lithology domain 2 minor	6	6		6			1						59									1		1		5					10	2	1	1			3		102				radiolarian-rich	mud	with ash	
351-U1438A-1H-5-A 118/119-SED	7.18	7.19	lithology domain 1 major	2	2		2	5	1				1		1	61						1			10				16													102					mud	with ash	
351-U1438A-2H-1-A 42/43-SED	7.92	7.93	lithology domain 1 major	10	5		5		5				2			45									3	4			20			5	5	1								110				foraminifer-bearing	mud	with nannofossils	
351-U1438A-2H-1-A 96/97-SED	8.46	8.47	lithology domain 1 major	1	1	1	1						5			25									2	3			10			20	20									89				nannofossil-rich	mud	with foraminifers	
351-U1438A-2H-2-A 80/81-SED	9.3	9.31	lithology domain 1 major	25	5		5		4	5	5		5		1	50											5															110					mud		
351-U1438A-2H-3-A 33/34-SED	10.24	10.25	lithology domain 2 minor						3				5			20									5				15			2	50									100				nannofossil-rich	mud	with ash	
351-U1438A-2H-4-A 57/58-SED	11.03	11.04	lithology domain 1 major	15	10		10		10	10	5		4			20											5		20				1									110				tuffaceous	mud		
351-U1438A-2H-5-A 128/129-SED	12.89	12.9	lithology domain 1 major	20					5	5	5		2			45						1			3				20													106				tuffaceous sandy	mud		
351-U1438A-2H-5-A 35/36-SED	11.96	11.97	lithology domain 1 major	20	5		5		5	5	5		5			35									5				20													110				tuffaceous sandy	mud		
351-U1438A-2H-5-A 80/81-SED	12.41	12.42	lithology domain 1 major	5					10	5						10										5			15			30	20									100				foraminifer-rich	mud	with nannofossils	
351-U1438A-2H-6-A 19/20-SED	13.3	13.31	lithology domain 2 minor	20	10		10		3	8	7					50											2															110					mud		
351-U1438A-2H-6-A 98/99-SED	14.09	14.1	lithology domain 1 major	25	5		5		5		5		5			45									5				5													105					mud		
351-U1438A-3H-1-A 129/130-SED	18.29	18.3	lithology domain 2 minor		10		10		5						5														50			30										110				tuffaceous	mud	with foraminifers	
351-U1438A-3H-1-A 14/15-SED	17.14	17.15	lithology domain 1 major	10				5		5						50									5				20	5												100				tuffaceous	mud		
351-U1438A-3H-1-A 66/67-SED	17.66	17.67	lithology domain 1 major	23					10	5			5		5	40						5							7													100					mud	with ash	
351-U1438A-3H-1-A 89/90-SED	17.89	17.9	lithology domain 2 minor						7							10									3				80													100				intermediate	ash		
351-U1438A-3H-2-A 122/123-SED	19.72	19.73	lithology domain 1 major	30	10		10		10	5	5		5			35													5													115					mud	with ash	
351-U1438A-3H-2-A 32/33-SED	18.82	18.83	lithology domain 1 major	20	5		5		5	5	5				5	40						10							5													105					mud	with ash	
351-U1438A-3H-5-A 80/81-SED	23.8	23.81	lithology domain 1 major	15	5		5		5	10	5					60																											105					mud		
351-U1438A-3H-6-A 55/56-SED	25.05	25.06	lithology domain 2 minor													20													80													100				felsic	ash	with clay	

Sample	Top Depth [m]	Bottom Depth [m]	Sample domain name (if >1 domain)	Quartz [%]	Feldspar [%]	K-Feldspar [%]	Plagioclase [%]	Mica [%]	Biotite [%]	Muscovite [%]	Chlorite [%]	Glauconite [%]	Opaques [%]	Zircon [%]	Ferromagnesian - ol, pyx, amph [%]	Clay-sized fraction [%]	Barite [%]	Anhydrite [%]	Gypsum [%]	Apatite [%]	Zeolite - phillipsite, clinoptilolite [%]	Carbonate [%]	Pyrite [%]	Manganeseoxide [%]	Fe-oxide [%]	Clay minerals [%]	Opaques, authigenic [%]	Quartz, authigenic [%]	Vitric grains [%]	Lithic grains [%]	Palagonite [%]	Foraminifers [%]	Calcareous nannofossils [%]	Radiolarians [%]	Diatoms [%]	Silicoflagellate, ebridian, actiniscidian [%]	Sponge spicule fragments [%]	Pollen and spores [%]	Wood fragments [%]	Plant residuals [%]	Organic matter [%]	Total of group estimates [%]	Sand texture [%]	Silt texture [%]	Clay texture [%]	Lithology prefix	Principal lithology	Lithology suffix	Comment
351-U1438B-2H-2-A 99/100-SED	9.69	9.7	lithology domain 1 major													44									5							1	45									95				nannofossil-rich	clay		
351-U1438B-2H-3-A 42/43-SED	10.62	10.63	lithology domain 1 major	1	1		1		2				5		2	41						5			1				30			2	10									101				tuffaceous	mud	with nannofossils	
351-U1438B-2H-3-A 46/47-SED	10.66	10.67	lithology domain 2 minor	5	5		5		5				5		5														75													105				intermediate	ash	with crystals	
351-U1438B-2H-5-A 36/37-SED	13.56	13.57	lithology domain 1 major	5	5		5		2				5		5	71						5			2																	105					mud		
351-U1438B-2H-6-A 39/40-SED	15.09	15.1	lithology domain 2 minor	2	8		8																						15			55	20									108					foraminiferal ooze	with ash	
351-U1438B-3H-1-A 122/123-SED	17.92	17.93	lithology domain 2 minor	1	1		1		5	3			2		2	71									5		10															101					mud	with ash	
351-U1438B-3H-1-A 59/60-SED	17.29	17.3	lithology domain 2 minor	1	2		2								1														95	1												102					ash	with crystals	
351-U1438B-3H-2-A 3/4-SED	18.23	18.24	lithology domain 1 major	2	2		2		3	1	2		2		2	80						1			5																	102					mud		
351-U1438B-3H-2-A 89/90-SED	19.09	19.1	lithology domain 1 major	2	2		2		2		2		5			77									10																	102					mud		
351-U1438B-4H-1-A 132/133-SED	27.52	27.53	lithology domain 2 minor		3		3		3						3														20	1		66	3				2					104				tuffaceous	foraminiferal ooze		
351-U1438B-4H-1-A 76/77-SED	26.96	26.97	lithology domain 1 major	10	10		10		5	5			5		5	60																										110					mud		
351-U1438B-4H-2-A 60/61-SED	28.3	28.31	lithology domain 2 minor													35						25							10				30									100					nannofossil ooze	with ash	
351-U1438B-4H-3-A 101/102-SED	30.21	30.22	lithology domain 1 major	2	2		2			2					7	79									8																	102					mud		
351-U1438B-4H-6-A 48/49-SED	34.18	34.19	lithology domain 2 minor		5		5						2		2												3		83	5												105					ash	with crystals	
351-U1438B-5H-1-A 68/70-SED	36.38	36.39	lithology domain 1 major	10	10		10			5			5			35													35													110				tuffaceous	mud		
351-U1438B-5H-3-A 131/132-SED	40.01	40.02	lithology domain 1 major	5	10		10				5		5			5													70													110				felsic	ash		
351-U1438B-5H-3-A 79/80-SED	39.49	39.5	lithology domain 1 major	5	15		15						5																80													120				felsic	ash		
351-U1438B-5H-4-A 104/105-SED	41.24	41.25	lithology domain 2 minor		5		15																						85	10												115				felsic	ash		
351-U1438B-5H-4-A 28/29-SED	40.48	40.49	lithology domain 1 major	5	15		10						8		2	5													55	10												110				intermediate	ash		
351-U1438B-5H-6-A 35/36-SED	42.76	42.77	lithology domain 1 major	10	10		10			10	5	0	5			50											5		5													110					mud	with ash	
351-U1438B-6H-1-A 18/19-SED	45.38	45.39	lithology domain 2 minor	10	10		5		5		10		5			60																										105					mud		
351-U1438B-6H-1-A 97/98-SED	46.17	46.18	lithology domain 1 major	10	5		5			5			5			65									4				5					1								105					mud	with ash	
351-U1438B-6H-3-A 100/101-SED	49.2	49.21	lithology domain 1 major	10	5				5	5			5			60													10													100					mud	with ash	
351-U1438B-6H-4-A 116/117-SED	50.86	50.87	lithology domain 2 minor	5							5				5	5													60	5												85				intermediate	ash		
351-U1438B-6H-5-A 73/74-SED	51.93	51.94	lithology domain 2 minor	4	3		3						1																91	1												103				felsic	ash		
351-U1438B-7H-1-A 100/101-SED	55.7	55.71	lithology domain 1 major	5	20		20		5	10			5		5	30									5				15													120					mud	with ash	
351-U1438B-7H-1-A 24/25-SED	54.94	54.95	lithology domain 1 major													20													80													100				felsic	ash		
351-U1438B-7H-2-A 91/92-SED	57.11	57.12	lithology domain 1 major																						1																	1							
351-U1438B-7H-2-A 91/92-SED	57.11	57.12	lithology domain 1 major	10	10		10		5		5		5			60									5																	110					mud		
351-U1438B-7H-3-A 138/139-SED	59.08	59.09	lithology domain 1 major																							1			97	2												100				felsic	ash		
351-U1438B-7H-3-A 78/79-SED	58.48	58.49																								1			98													99				felsic	ash		
351-U1438B-7H-3-A 82/83-SED	58.52	58.53	lithology domain 2 minor	5	5		5		5	5	5		0		0	40													35													105				tuffaceous	clay		
351-U1438B-7H-5-A 116/117-SED	61.86	61.87	lithology domain 2 minor	5	10		10		5				5		5															70												110				intermediate	ash		
351-U1438B-8H-1-A 19/20-SED	64.39	64.4	lithology domain 2 minor	7	25		25						4	1															40	5												107					ash	with mud	
351-U1438B-8H-1-A 48/49-SED	64.68	64.69	lithology domain 1 major	10	5		5			5	5		5			65													5													105					mud	with ash	
351-U1438B-8H-2-A 105/106-SED	66.72	66.73	lithology domain 2 minor	5	10								3			60													22													100					mud	with ash	
351-U1438B-8H-2-A 24/25-SED	65.91	65.92	lithology domain 2 minor		20		20									10													45	10												105				intermediate	ash	with mud	
351-U1438B-8H-2-A 62/63-SED	66.29	66.3		5	10				2				5			5													73	0												100					ash	with mud	
351-U1438B-8H-2-A 73/74-SED	66.4	66.41	lithology domain 2 minor	5	15		15						5		5	5													60	10												120					ash	with mud	
351-U1438B-8H-2-A 75/76-SED	66.42	66.43	lithology domain 2 minor	5	5		5																						85	5												105				felsic	ash		
351-U1438B-8H-3-A 18/19-SED	67.35	67.36	lithology domain 2 minor	5	10		10						5		5	5													70													110					ash		
351-U1438B-8H-3-A 22/23-SED	67.39	67.4	lithology domain 2 minor	5	10		10						5			59													21													110					mud	with ash	
351-U1438B-8H-3-A 73/74-SED	67.9	67.91	lithology domain 2 minor	10	10		10						5			30													45													110				tuffaceous	mud		

Sample	Top Depth [m]	Bottom Depth [m]	Sample domain name (if >1 domain)	Quartz [%]	Feldspar [%]	K-Feldspar [%]	Plagioclase [%]	Mica [%]	Biotite [%]	Muscovite [%]	Chlorite [%]	Glauconite [%]	Opaques [%]	Zircon [%]	Ferromagnesian - ol, pyx, amph [%]	Clay-sized fraction [%]	Barite [%]	Anhydrite [%]	Gypsum [%]	Apatite [%]	Zeolite - phillipsite, clinoptilolite [%]	Carbonate [%]	Pyrite [%]	Manganeseoxide [%]	Fe-oxide [%]	Clay minerals [%]	Opaques, authigenic [%]	Quartz, authigenic [%]	Vitric grains [%]	Lithic grains [%]	Palagonite [%]	Foraminifers [%]	Calcareous nannofossils [%]	Radiolarians [%]	Diatoms [%]	Silicoflagellate, ebridian, actinisicidian [%]	Sponge spicule fragments [%]	Pollen and spores [%]	Wood fragments [%]	Plant residuals [%]	Organic matter [%]	Total of group estimates [%]	Sand texture [%]	Silt texture [%]	Clay texture [%]	Lithology prefix	Principal lithology	Lithology suffix	Comment
351-U1438B-9H-2-A 129/130-SED	76.49	76.5	lithology domain 2 minor		20		20						8		10	20														42												120				tuffaceous	mud		
351-U1438B-9H-2-A 94/95-SED	76.14	76.15	lithology domain 2 minor	15	5		5			5						65									5					5												105					mud		
351-U1438B-9H-3-A 83/84-SED	77.53	77.54	lithology domain 2 minor	5	5		5			5						80									5																	105					mud		
351-U1438B-9H-4-A 69/70-SED	78.89	78.9	lithology domain 2 minor	5	5			1						5	5	60									5				4													90					mud		
351-U1438B-9H-5-A 119/120-SED	80.89	80.9	lithology domain 2 minor	5	10		10			3						75									5				2													110					mud		
351-U1438B-9H-6-A 134/135-SED	82.54	82.55	lithology domain 2 minor	5	5		5			5						80									5																	105					mud		
351-U1438B-10H-1-A 96/97-SED	84.16	84.17	lithology domain 1 major	10	10		10			5			5		5	68									2					5												120					mud	with crystals	
351-U1438B-10H-2-A 119/120-SED	85.89	85.9	lithology domain 1 major	5	5		5			2			5			65									3					15												105					mud		
351-U1438B-10H-3-A 100/101-SED	87.2	87.21	lithology domain 1 major	10			15		5						5	45									5					15												100					mud		
351-U1438B-11H-1-A 24/25-SED	92.94	92.95		1	2		2		5	11			1		1	78						1																				102	0	20	80		mud		contains 0.01% zeolite - phillipsite, clinoptilolite
351-U1438B-11H-1-A 74/75-SED	93.44	93.45		2	2		2		2	15			1		1	75									2																	102	0.01	25	75		mud		
351-U1438B-11H-5-A 138/139-SED	100.08	100.09			15		15		10				5		10	10					20								20													105	20	70	10	tuffaceous	mud		
351-U1438B-11H-6-A 76/77-SED	100.96	100.97		2	4		4		1	10			2			76					1	1																				101	0.01	25	75		mud		
351-U1438B-12H-3-A 43/44-SED	105.63	105.64		5	5		5		5	30						50						1			2															1		104	0	50	50		mud		contains 0.01% opaques, 0.01% ferromagnesian - ol, pyx, amph, 0.01% zeolite - phillipsite, clinoptilolite
351-U1438B-12H-3-A 75/76-SED	105.95	105.96		10	10		10		2	5					2	56						3			5	1			5											1		110	0.01	40	60		mud		contains 0.01% eolite - phillipsite, clinoptilolite
351-U1438B-12H-5-A 102/103-SED	109.22	109.23			20		20		20						2														58													120	30	70	0		ash		contains muscovite
351-U1438B-14H-1-A 125/126-SED	122.45	122.46			10		10			1			10			76									1		1													1		110	10	10	80		clay	with ash	
351-U1438B-14H-2-A 67/68-SED	123.37	123.38			1		1		1				1			95																										99							
351-U1438B-14H-2-A 67/68-SED	123.37	123.38																																						2	2	1	4	95	tuffaceous	clay		contains 0.01% dinoflagelattes
351-U1438B-14H-3-A 122/123-SED	125.42	125.43		1	4		4																						95													104	5	95	0		ash		
351-U1438B-14H-3-A 63/64-SED	124.83	124.84																																															
351-U1438B-14H-3-A 63/64-SED	124.83	124.84						10								78					10				2																	100	0	10	90		clay		
351-U1438B-14H-4-A 140/141-SED	126.84	126.85		1	2		2		10																				87													102	90	10	0		ash		
351-U1438B-14H-5-A 60/61-SED	127.54	127.55			3		3		1							46													40					5			5					103	45	15	40	tuffaceous	mud		
351-U1438B-15H-1-A 135/136-SED	132.05	132.06			2		2		5						1						45								47													102	30	70	0		ash		
351-U1438B-15H-3-A 20/21-SED	133.77	133.78														65					30				2											3						100	0	5	95		clay		
351-U1438B-15H-3-A 33/34-SED	133.9	133.91		10	10		10		1	1						31					10				1		25		5							5				1	110	0	40	60		mud		
351-U1438B-15H-4-A 76/77-SED	135.83	135.84		1	1		1		1	1					1	83					10						1									1						101	0	10	90		clay		
351-U1438B-16H-1-A 25/26-SED	140.45	140.46			3		3						1			96																										103	0	5	95		clay		
351-U1438B-16H-2-A 66/67-SED	142.36	142.37		1	1		1		1				1			94					1																				1	101	0	5	95		clay		
351-U1438B-16H-5-A 78/79-SED	146.98	146.99			1		1		1							72								25	1																1	102							
351-U1438B-17H-1-A 107/108-SED	150.77	150.78	lithology domain 2 minor	7	8		8			10						45									20	10																108					mud		
351-U1438B-17H-2-A 75/76-SED	151.95	151.96	lithology domain 2 minor	10	20		20			5						20									20	10																105					silt		
351-U1438B-17H-3-A 59/60-SED	153.29	153.3	lithology domain 1 major	3	2		2									80									15																	102					clay		
351-U1438B-18H-1-A 108/109-SED	160.28	160.29	lithology domain 1 major		25		25						5			20														20	10											105				sandy	mud		containa 0.01% K-feldspar
351-U1438B-18H-2-A 71/72-SED	161.41	161.42	lithology domain 1 major	15	35		35		15				20		10						2																					132				sandy	silt		
351-U1438B-18H-2-A 8/9-SED	160.78	160.79	lithology domain 1 major		30		30						10		15	20									3					20			2									130				sandy	mud	with crystals	
351-U1438B-18H-3-A 95/96-SED	163.15	163.16	lithology domain 1 major		15		15						10		5	40									5				5	20												115				sandy	mud	with crystals	
351-U1438B-18H-5-A 44/45-SED	165.64	165.65	lithology domain 1 major	10	30		30		5				30		25																											130					sand	with silt	
351-U1438B-18H-5-A 56/57-SED	165.76	165.77	lithology domain 1 major													40																	55						5			100				nannofossil	clay		
351-U1438B-19H-1-A 108/109-SED	167.78	167.79	lithology domain 1 major		5		5						5		2	30									5								50						3			105				nannofossil	mud		
351-U1438B-19H-1-A 24/25-SED	166.94	166.95	lithology domain 1 major		5		5				5					23									20	10			2	10			10						5			95					mud	with nannofossils	
351-U1438B-19H-2-A 20/21-SED	168.36	168.37	lithology domain 1 major		5		5						5		5	30									5								50									105				nannofossil	mud		

Sample	Top Depth [m]	Bottom Depth [m]	Sample domain name (if >1 domain)	Quartz [%]	Feldspar [%]	K-Feldspar [%]	Plagioclase [%]	Mica [%]	Biotite [%]	Muscovite [%]	Chlorite [%]	Glauconite [%]	Opaques [%]	Zircon [%]	Ferromagnesian - ol, pyx, amph [%]	Clay-sized fraction [%]	Barite [%]	Anhydrite [%]	Gypsum [%]	Apatite [%]	Zeolite - phillipsite, clinoptilolite [%]	Carbonate [%]	Pyrite [%]	Manganeseoxide [%]	Fe-oxide [%]	Clay minerals [%]	Opaques, authigenic [%]	Quartz, authigenic [%]	Vitric grains [%]	Lithic grains [%]	Palagonite [%]	Foraminifers [%]	Calcareous nannofossils [%]	Radiolarians [%]	Diatoms [%]	Silicoflagellate, ebridian, actinisicidian [%]	Sponge spicule fragments [%]	Pollen and spores [%]	Wood fragments [%]	Plant residuals [%]	Organic matter [%]	Total of group estimates [%]	Sand texture [%]	Silt texture [%]	Clay texture [%]	Lithology prefix	Principal lithology	Lithology suffix	Comment
351-U1438B-20F-1-A 93/94-SED	169.83	169.84	lithology domain 2 minor		20	5	20		5				15		15	10					10								5	15												120				sandy	silt	with ash	
351-U1438B-20F-2-A 25/26-SED	170.65	170.66	lithology domain 1 major		20		20						5		5	10									5				35	10	10											120				sandy	mud		
351-U1438B-20F-2-A 71/72-SED	171.11	171.12	lithology domain 1 major										3			8					2				2				55				30									100				tuffaceous	silt	with nannofossils	
351-U1438B-20F-2-A 96/97-SED	171.36	171.37	lithology domain 1 major		20		20						10		10	5													50	15												130				tuffaceous	silt		
351-U1438B-21F-1-A 118/119-SED	174.78	174.79	lithology domain 1 major	2	10		10		3						20	20																	65									130					nannofossil ooze		
351-U1438B-21F-1-A 25/26-SED	173.85	173.86	lithology domain 1 major				20						5		5	15									5	10			5	25			5									95				tuffaceous	sand	with nannofossils	
351-U1438B-21F-1-A 83/84-SED	174.43	174.44	lithology domain 1 major		20		20						10		10										20				10	20	10											120				sandy	mud	with crystals	
351-U1438B-21F-3-A 26/27-SED	176.76	176.77	lithology domain 1 major				20						5		5										10				15	35			10									100	60	30	10	tuffaceous	sand	with nannofossils	
351-U1438B-22F-1-A 147/148-SED	179.27	179.28	lithology domain 1 major		10		10						5		5	30									5				5				30									100				tuffaceous	mud	with nannofossils	
351-U1438B-22F-1-A 21/22-SED	178.01	178.02	lithology domain 1 major		15		15				5		10			10									10				20	20			5				5					115				tuffaceous	sand	with nannofossils	
351-U1438B-22F-2-A 111/112-SED	180.41	180.42			20		20						10		10										5				20	20		10	5									120					ash	with crystals	
351-U1438B-22F-2-A 98/99-SED	180.28	180.29			25		25						10		15														35	10			5									125					ash	with crystals	
351-U1438B-23X-1-A 13/14-SED	180.73	180.74	lithology domain 1 major		5		5						5			10									3				70				2									100				intermediate	tuff		
351-U1438B-23X-1-A 74/75-SED	181.34	181.35	lithology domain 1 major		5		5						5			15									5				20				50									105				nannofossil	mudstone	with ash	
351-U1438B-23X-1-A 9/10-SED	180.69	180.7	lithology domain 1 major		5		5		5				5			5													65				15									105				intermediate	tuff	with nannofossils	
351-U1438B-23X-2-A 112/113-SED	183.22	183.23	lithology domain 1 major		15		15						10																70				5									115				intermediate	tuff	with nannofossils	
351-U1438B-23X-3-A 33/34-SED	183.93	183.94	lithology domain 1 major		10		10						10		15	5									5				45				10									110				intermediate	tuff	with nannofossils	
351-U1438B-23X-3-A 95/96-SED	184.55	184.56	lithology domain 1 major		2		2						5			8													65				20									102				intermediate	tuff	with nannofossils	contains 0.01% sponge spicule fragments
351-U1438B-23X-4-A 64/65-SED	185.74	185.75											45		5														5				5									60				tuffaceous	sandstone	with nannofossils	
351-U1438B-23X-4-A 90/91-SED	186	186.01													1	20													59				20									100		70	30		tuff	with nannofossils	
351-U1438B-23X-4-A 97/98-SED	186.07	186.08	lithology domain 1 major		10		10								10														60				15									105				intermediate	tuff	with nannofossils	
351-U1438B-23X-4-A 98/99-SED	186.08	186.09			10		10						10		5														70				5									110		80	20		tuff	with nannofossils	
351-U1438B-25X-1-A 129/130-SED	200.39	200.4	lithology domain 1 major		10		10		1	1			5												1		7		40				30									105				tuffaceous	siltstone	with nannofossils	
351-U1438B-25X-2-A 20/21-SED	200.8	200.81	lithology domain 1 major		10		10						5		5	10													35	5			30									110					tuff	with nannofossils	
351-U1438B-25X-3-A 62/63-SED	202.63	202.64	lithology domain 1 major		10		10						5		5														40	5			30				5					110					tuff	with nannofossils	
351-U1438B-26X-2-A 125/126-SED	211.55	211.56			10		10						2		2	10													68	5			2				1					110	10	80	10		tuff	with mud	
351-U1438B-26X-3-A 10/11-SED	211.9	211.91			20		20						1		5														71	3												120	20	80	0		tuff		
351-U1438B-26X-4-A 79/80-SED	214.09	214.1			9		9								5	5					1								50	15		2	12				1					109	30	60	10	tuffaceous	sandstone	with nannofossils	contains 0.01% carbonate
351-U1438B-26X-4-A 97/98-SED	214.27	214.28			20		20						1		10	2													24	40			2									120	68	30	2	tuffaceous	sandstone	with silt	contains 0.01% foraminifers, 0.01% radiolarians, 0.01% sponge spicules
351-U1438B-26X-5-A 49/50-SED	215.29	215.3	lithology domain 2 minor		30		30						5		10	7													20	1			25				2					130	30	50	20	tuffaceous	mudstone	with nannofossils	
351-U1438B-27X-1-A 137/138-SED	219.87	219.88	lithology domain 2 minor		30		30						3		12														43	9		1	1				1					130				tuffaceous	fine sandstone		
351-U1438B-27X-1-A 60/61-SED	219.1	219.11	lithology domain 2 minor		25		25						14		10						5								25	20							1					125				tuffaceous	fine sandstone		
351-U1438B-27X-1-A 75/76-SED	219.25	219.26	lithology domain 2 minor		10		10						2		8														80													110					ash		
351-U1438B-27X-3-A 70/71-SED	222.2	222.21			20		20						5		20	5													40	5			5									120	40	55	5	tuffaceous	siltstone	with sand	contains 0.01% carbonate, 0.01% sponge spicules
351-U1438B-27X-4-A 58/59-SED	223.58	223.59			1		1						1		2	10					10								20			5	45				5					100	0	40	30	nannofossil	mudstone	with ash	
351-U1438B-28X-2-A 107/108-SED	230.77	230.78			2		2																						95	1			2									102	30	70	0		tuff		contains 0.01% zeolite - phillipsite, clinoptilolite
351-U1438B-28X-4-A 77/78-SED	233.32	233.33			5		5						1		1	5					2								51				30				5					105	10	80	10	tuffaceous	siltstone	with nannofossils	
351-U1438B-29X-4-A 124/125-SED	243.64	243.65			25		25						2		20														13	40												125	70	30	0	tuffaceous	sandstone		
351-U1438B-30X-1-A 126/127-SED	248.86	248.87	lithology domain 1 major		5		5		1						2	10											2		20				60									105				nannofossil-bearing	claystone	with ash	
351-U1438B-30X-2-A 123/124-SED	250.33	250.34	lithology domain 1 major		2		2		1				1			10													30	1			55									102				nannofossil-bearing	mudstone	with ash	
351-U1438B-30X-5-A 103/104-SED	254.63	254.64	lithology domain 1 major		3		3		1	1						10					2						2		25			1	55									103				nannofossil-bearing	claystone	with ash	
351-U1438B-30X-5-A 95/96-SED	254.55	254.56	lithology domain 1 major		25		25						5		10	25													15	20												125				tuffaceous sandy	siltstone		
351-U1438B-30X-7-A 16/17-SED	256.37	256.38	lithology domain 1 major		15		15		3				5		2														25				50									115				nannofossil-bearing	siltstone	with ash	

Sample	Top Depth [m]	Bottom Depth [m]	Sample domain name (if >1 domain)	Quartz [%]	Feldspar [%]	K-Feldspar [%]	Plagioclase [%]	Mica [%]	Biotite [%]	Muscovite [%]	Chlorite [%]	Glauconite [%]	Opaques [%]	Zircon [%]	Ferromagnesian - ol, pyx, amph [%]	Clay-sized fraction [%]	Barite [%]	Anhydrite [%]	Gypsum [%]	Apatite [%]	Zeolite - phillipsite, clinoptilolite [%]	Carbonate [%]	Pyrite [%]	Manganeseoxide [%]	Fe-oxide [%]	Clay minerals [%]	Opaques, authigenic [%]	Quartz, authigenic [%]	Vitric grains [%]	Lithic grains [%]	Palagonite [%]	Foraminifers [%]	Calcareous nannofossils [%]	Radiolarians [%]	Diatoms [%]	Silicoflagellate, ebridian, actinisocidian [%]	Sponge spicule fragments [%]	Pollen and spores [%]	Wood fragments [%]	Plant residuals [%]	Organic matter [%]	Total of group estimates [%]	Sand texture [%]	Silt texture [%]	Clay texture [%]	Lithology prefix	Principal lithology	Lithology suffix	Comment
351-U1438D-4R-1-A 65/66-SED	230.15	230.16	lithology domain 2 minor		15								2		3														80													100					ash		
351-U1438D-4R-1-W 40/41-SED	229.9	229.91	lithology domain 2 minor		20								5		15														41	10	5	1	1	1			1					100				tuffaceous	fine sandstone		
351-U1438D-4R-1-W 41/42-SED	229.91	229.92	lithology domain 2 minor		30								3		17														35	15												100				tuffaceous	fine sandstone		
351-U1438D-6R-2-A 27/28-SED	249.59	249.6	lithology domain 1 major						2				1		1	10									1				25	25			35									100				tuffaceous	siltstone	with nannofossils	
351-U1438D-10R-2-A 45/46-SED	288.61	288.62	lithology domain 2 minor		10								5		10														40	30		2	1	1			1					100				tuffaceous	sandstone		
351-U1438D-10R-2-A 77/78-SED	288.93	288.94	lithology domain 2 minor		10										10	30													50													100	20	50	30	tuffaceous	mudstone		contains 0.01% calcareous nannofossils
351-U1438D-10R-3-A 38/39-SED	290.04	290.05	lithology domain 2 minor		2										2	54																	40				2					100				nannofossil	mudstone	with ash	contains 0.01% vitric grains, 0.01% lithic grains, 0.01% foraminifers
351-U1438D-11R-2-A 52/53-SED	298.46	298.47	lithology domain 2 minor		1										1						5						5		50			5	30	3								100	20	80		nannofossil	tuff		
351-U1438D-11R-3-A 88/89-SED	300.29	300.3	lithology domain 2 minor		2								2								30					50	10			1							5					100					tuff		
351-U1438D-12R-3-A 68/69-SED	309.53	309.54			2								1		2						53	1							30	1			10									100	5	95			tuff	with nannofossils	
351-U1438D-13R-3-A 65/66-SED	319.29	319.3			30						10		20			10														30												100				tuffaceous	siltstone		
351-U1438D-13R-3-A 89/90-SED	319.53	319.54	lithology domain 2 minor													10					90																					100				tuffaceous	sandstone		
351-U1438D-15R-5-A 75/76-SED	341.47	341.48			20						10		10			10						5								40			5									100				tuffaceous	siltstone	with nannofossils	
351-U1438D-15R-6-A 60/61-SED	342.5	342.51			20						10		5			5					20									40												100				tuffaceous	siltstone		
351-U1438D-25R-4-A 115/116-SED	437.86	437.87			15										5														80													100					ash		
351-U1438D-26R-1-A 103/104-SED	442.93	442.94														60									15				15				10									100				tuffaceous	mudstone	with nannofossils	
351-U1438D-26R-1-A 3/4-SED	441.93	441.94			1											9									40				50													100				tuffaceous	mudstone		
351-U1438D-26R-1-A 64/65-SED	442.54	442.55			1											20									40				29				10									100				tuffaceous	mudstone	with nannofossils	
351-U1438D-32R-3-A 15/16-SED	503.25	503.26	lithology domain 2 minor		30								10		10						10	10								17			10	1			2					100				tuffaceous	sandstone	with nannofossils	
351-U1438D-33R-7-A 70/71-SED	519	519.01											2			25									3				35	5			30									100				tuffaceous	mudstone	with nannofossils	
351-U1438D-36R-1-A 50/51-SED	539.4	539.41			5						5					20													40				30									100				tuffaceous	mudstone	with nannofossils	
351-U1438D-37R-2-A 41/42-SED	550.49	550.5			10								10									15							60				5									100				tuffaceous	sandstone	with nannofossils	
351-U1438D-38R-4-A 56/57-SED	562.96	562.97	lithology domain 2 minor												5	40					30						1		17	1		1	5									100	0	25	75	tuffaceous	mudstone	with nannofossils	contains 0.01% feldspar, 0.01% plagioclase, 0.01% opaques
351-U1438D-38R-5-A 109/110-SED	564.82	564.83	lithology domain 1 major												1	30					20								42	2			5									100	2	68	30	tuffaceous	mudstone		contains 0.01% feldspar, 0.01% plagioclase, 0.01% opaques
351-U1438D-39R-5-A 99/100-SED	574.51	574.52	lithology domain 2 minor										1		2						55	1							40	1												100				tuffaceous	sandstone		
351-U1438D-40R-2-A 130/131-SED	580.52	580.53	lithology domain 2 minor																		90												10									100				tuffaceous	mudstone	with nannofossils	contains 0.01% opaques, 0.01% ferromagnesian - ol, pyx, amph
351-U1438D-40R-4-A 117/118-SED	583.25	583.26	clast																		90					5				5												100					lapilli		
351-U1438D-40R-5-A 111/112-SED	584.69	584.7	clast																		5								95													100				mafic	lapilli		
351-U1438D-40R-6-A 48/49-SED	585.29	585.3				5					10		5			20													20	20			20									100				tuffaceous	mudstone	with nannofossils	
351-U1438D-40R-7-A 67/68-SED	586.78	586.79	lithology domain 1 major				10				10		5			25														20			30									100				tuffaceous	sandstone		
351-U1438D-42R-1-A 3/4-SED	597.13	597.14			5								10			40													25				20									100				tuffaceous	mudstone	with nannofossils	
351-U1438D-43R-2-A 26/27-SED	608.46	608.47			10								15			25													20	20			10									100				tuffaceous	mudstone	with nannofossils	
351-U1438D-43R-4-A 102/103-SED	612.1	612.11			15								10			15													50				10									100				tuffaceous	mudstone	with nannofossils	
351-U1438D-46R-1-A 139/140-SED	637.29	637.3	lithology domain 2 minor												5	35					25				5				20				10									100	5	60	35	tuffaceous	mudstone	with nannofossils	contains 0.01% radiolarians, 0.01% dinoflagelattes
351-U1438D-46R-4-A 61/62-SED	641.01	641.02	lithology domain 2 minor																											100												100				mafic	lapilli		
351-U1438D-48R-6-A 105/106-SED	662.75	662.76	lithology domain 2 minor										1		5	30					22					5			30				3	2			2					100	5	65	30	tuffaceous	mudstone		contains 0.01% biotite, 0.01% opaques, authigenic
351-U1438D-48R-6-A 75/76-SED	662.45	662.46	lithology domain 2 minor												5	35					20					10			20	10												100				tuffaceous	mudstone		contains 0.01% opaques
351-U1438D-52R-2-A 64/65-SED	696.12	696.13	lithology domain 1 major				10						10			30									5				10	35												100				tuffaceous	mudstone		
351-U1438D-53R-5-A 129/130-SED	710.04	710.05		10	10																				10		15															45							
351-U1438D-56R-1-A 118/119-SED	734.08	734.09	lithology domain 1 major																		25				30	30								15								100				tuffaceous	mudstone		contains 0.01% ferromagnesian - ol, pyx, amph, 0.01% sponge spicules
351-U1438D-56R-3-A 115/116-SED	736.78	736.79	lithology domain 1 major		10								5		15						10					15			40	5												100	40	60		tuffaceous	siltstone		
351-U1438D-56R-6-A 32/33-SED	740.32	740.33	lithology domain 2 minor																		10					30			60													100				tuffaceous	siltstone		contains 0.01% feldspar, 0.01% plagioclase, 0.01% ferromagnesian - ol, pyx, amph, 0.01% radiolarians
351-U1438D-60R-7-A 73/74-SED	780.36	780.37	lithology domain 2 minor										5		5						30					30			30													100				tuffaceous	siltstone		contains 0.01% lithic grains

Sample	Top Depth [m]	Bottom Depth [m]	Sample domain name (if >1 domain)	Quartz [%]	Feldspar [%]	K-Feldspar [%]	Plagioclase [%]	Mica [%]	Biotite [%]	Muscovite [%]	Chlorite [%]	Glauconite [%]	Opaques [%]	Zircon [%]	Ferromagnesian - ol, pyx, amph [%]	Clay-sized fraction [%]	Barite [%]	Anhydrite [%]	Gypsum [%]	Apatite [%]	Zeolite - phillipsite, clinoptilolite [%]	Carbonate [%]	Pyrite [%]	Manganeseoxide [%]	Fe-oxide [%]	Clay minerals [%]	Opaques, authigenic [%]	Quartz, authigenic [%]	Vitric grains [%]	Lithic grains [%]	Palagonite [%]	Foraminifers [%]	Calcareous nannofossils [%]	Radiolarians [%]	Diatoms [%]	Silicoflagellate, ebridian, actiniscidian [%]	Sponge spicule fragments [%]	Pollen and spores [%]	Wood fragments [%]	Plant residuals [%]	Organic matter [%]	Total of group estimates [%]	Sand texture [%]	Silt texture [%]	Clay texture [%]	Lithology prefix	Principal lithology	Lithology suffix	Comment
351-U1438D-60R-CC-A 9/10-SED	781.52	781.53	lithology domain 1 major		25								10		25	20					10								10														100	20	60	20	tuffaceous	siltstone		
351-U1438D-67R-3-W 7/9-SED	842.46	842.48					2		1				4		1	20					5								62	5													100					tuff		
351-U1438D-67R-4-A 127/128-SED	845.12	845.13	lithology domain 2 minor																							45			54					1									100				tuffaceous	siltstone		
351-U1438D-67R-6-A 94/95-SED	847.34	847.35	lithology domain 1 major		15										5	20													30	30													100				tuffaceous	sandstone		
351-U1438D-68R-5-W 131/132-SED	855.59	855.6					3		1				2			15					8								70	1													100					tuff		
351-U1438D-69R-2-A 32/33-SED	860.62	860.63	lithology domain 2 minor		1								1		2						60					30				6													100				tuffaceous	mudstone		
351-U1438D-69R-3-A 80/81-SED	862.6	862.61	lithology domain 1 major		10								2		5						20					20			3	40													100				tuffaceous	siltstone		contains 100% foraminifers
351-U1438D-69R-4-A 50/51-SED	863.8	863.81	clast		3																30					30			30				7										100				tuffaceous	mudstone		contains 0.01% radiolarians
351-U1438D-69R-5-A 78/79-SED	865.61	865.62	lithology domain 2 minor		5										5	30					5				10				5	40													100				tuffaceous	mudstone		contains 0.01% opaques, 0.01% radiolarians
351-U1438D-70R-3-A 118/119-SED	872.7	872.71	lithology domain 2 minor																		30					30			40														100				tuffaceous	mudstone		
351-U1438D-70R-3-A 34/35-SED	871.86	871.87	lithology domain 1 major		10								3		20						7					10			30	20													100	30	70		tuffaceous	mudstone		
351-U1438D-71R-2-A 137/138-SED	881.13	881.14	lithology domain 2 minor		5										10						5				5	15			40	20													100				tuffaceous	sandstone		contains 0.01% opaques
351-U1438D-71R-2-A 42/43-SED	880.18	880.19	lithology domain 1 major										5		3										10	30			42	10													100				tuffaceous	siltstone		contains 0.01% radiolarians
351-U1438D-71R-3-A 67/68-SED	881.93	881.94	lithology domain 2 minor												5						30					20			25	20													100				tuffaceous	sandstone		contains 0.01% biotite, 0.01% opaques
351-U1438D-71R-4-A 85/86-SED	883.17	883.18	lithology domain 2 minor		5								3		5	10					27								40	10													100				tuffaceous	siltstone		
351-U1438D-71R-CC-A 10/11-SED	883.36	883.37	lithology domain 2 minor										5		25											10			50	10													100				tuffaceous	sandstone		contains 0.01% feldspar, 0.01% plagioclase

Sample	Top Depth [m]	Bottom Depth [m]	Sample domain name (if >1 domain)	Quartz [%]	Feldspar [%]	K-Feldspar [%]	Plagioclase [%]	Mica [%]	Biotite [%]	Muscovite [%]	Chlorite [%]	Glauconite [%]	Opaques [%]	Zircon [%]	Ferromagnesian - ol, pyx, amph [%]	Clay-sized fraction [%]	Barite [%]	Anhydrite [%]	Gypsum [%]	Apatite [%]	Zeolite - phillipsite, clinoptilolite [%]	Carbonate [%]	Pyrite [%]	Manganeseoxide [%]	Fe-oxide [%]	Clay minerals [%]	Opaques, authigenic [%]	Quartz, authigenic [%]	Vitric grains [%]	Lithic grains [%]	Palagonite [%]	Foraminifers [%]	Calcareous nannofossils [%]	Radiolarians [%]	Diatoms [%]	Silicoflagellate, ebridian, actinisocidian [%]	Sponge spicule fragments [%]	Pollen and spores [%]	Wood fragments [%]	Plant residuals [%]	Organic matter [%]	Total of group estimates [%]	Sand texture [%]	Silt texture [%]	Clay texture [%]	Lithology prefix	Principal lithology	Lithology suffix	Comment
351-U1438E-4R-1-A 99/100-SED	868.29	868.3	lithology domain 1 major		20								1		5											39			30	5												100	80	20		tuffaceous	sandstone		
351-U1438E-4R-2-A 113/114- SED	869.8	869.81	lithology domain 1 major										2		7						25				15	10			10	30				1								100	30	45	25	tuffaceous	mudstone	with sand	
351-U1438E-5R-1-A 69/70-SED	877.49	877.5	lithology domain 2 minor		5										5						45					15			30												100				tuffaceous	sandstone		
351-U1438E-5R-4-A 45/46-SED	881.21	881.22	lithology domain 1 major										1		2							5				20			62				5								95				tuffaceous	mudstone	with nannofossils	
351-U1438E-5R-4-A 55/56-SED	881.31	881.32	lithology domain 1 major		5								10		30						30					5			18	1				1								100				tuffaceous	sandstone		
351-U1438E-5R-7-A 38/39-SED	885.31	885.32	lithology domain 2 minor		3										2						40				15	10			30													100				tuffaceous	mudstone		
351-U1438E-6R-1-A 106/107-SED	887.56	887.57	lithology domain 2 minor										1		1						48					20			30													100				tuffaceous	siltstone		
351-U1438E-6R-1-A 124/125-SED	887.74	887.75	lithology domain 2 minor		10										20						10					30			28					1			1					100				tuffaceous	sandstone		
351-U1438E-6R-3-A 80/81-SED	889.73	889.74	lithology domain 2 minor																		100																					100					tuff		
351-U1438E-7R-2-W 70/71-SED	898.28	898.29					10						5			20					10	10			2					43												100					mudstone		
351-U1438E-7R-3-A 78/79-SED	899.67	899.68			10		5		2				2		1	10					30								30	10												100				felsic	ash		
351-U1438E-8R-4-A 30/31-SED	910.51	910.52					10																						80	10												100					tuff		
351-U1438E-12R-7-A 40/41-SED	954.05	954.06	lithology domain 2 minor		1																39					40			20													100				tuffaceous	mudstone		
351-U1438E-13R-3-A 86/87-SED	958.03	958.04	lithology domain 2 minor												10						40					40			10													100				tuffaceous	mudstone		
351-U1438E-13R-4-W 24/25-SED	958.68	958.69																100																								100							
351-U1438E-13R-5-A 41/42-SED	960.23	960.24	lithology domain 2 minor																100																							100							anhydrite and gypsum cement in vein
351-U1438E-13R-5-W 32/33-SED	960.14	960.15									20										80																					100							altered pumice near gypsum vein
351-U1438E-15R-2-A 135/136-SED	976.61	976.62	lithology domain 2 minor												1						49					49								1								100				tuffaceous, clast-supported, polymict	mudstone		
351-U1438E-15R-6-A 54/55-SED	981.18	981.19	lithology domain 1 major										4		20											16			60													100				tuffaceous, clast-supported, polymict	sandstone		
351-U1438E-15R-6-W 45/45-SED	981.09	981.09				2	2						1								6					45			30	5			10								101				tuffaceous, clast-supported, polymict	mudstone	with nannofossils	
351-U1438E-18R-7-A 38/39-SED	1011.24	1011.25					10				40		15		10						10																					85							
351-U1438E-19R-1-A 100/101-SED	1013.6	1013.61	lithology domain 1 major										5		10						35					30			15	5												100				tuffaceous, clast-supported, polymict	sandstone		
351-U1438E-19R-3-A 135/136-SED	1016.64	1016.65	lithology domain 1 major										5		10						25					25			30	5												100				tuffaceous, clast-supported, polymict	sandstone		
351-U1438E-19R-4-A 93/94-SED	1017.69	1017.7	lithology domain 1 major										1		1						8				10	30			40													90							
351-U1438E-20R-5-A 123/124-SED	1029.41	1029.42	lithology domain 1 major										3		15						20								40	20		1	1									100				tuffaceous, clast-supported, polymict	sandstone		
351-U1438E-21R-3-A 9/10-SED	1034.95	1034.96	misc lithology clasts															100																								100							Anhydrite replacing gravel clast
351-U1438E-21R-5-A 75/76-SED	1037.93	1037.94	misc lithology clasts												1						10					50			20	20												101				tuffaceous, clast-supported, polymict	mudstone		tuffaceous mudstone clast in conglomerate
351-U1438E-21R-6-A 125/126-SED	1039.95	1039.96	misc lithology clasts																		100																					100							zeolitized pumice
351-U1438E-22R-7-A 126/127-SED	1050.78	1050.79	lithology domain 2 minor												5						40					40			15													100				tuffaceous, clast-supported, polymict	mudstone		
351-U1438E-22R-CC-A 19/20-SED	1051.21	1051.22													3						17					50			25	5												100				tuffaceous, clast-supported, polymict	mudstone		
351-U1438E-23R-1-A 25/26-SED	1051.65	1051.66			8								1			40					30								20	1												100				tuffaceous, clast-supported, polymict	mudstone	with ash pods	former ash (???)
351-U1438E-23R-5-A 75/76-SED	1057.65	1057.66			15		3						7			40					20								15													100				tuffaceous, clast-supported, polymict	mudstone	with ash pods	former ash (???)
351-U1438E-26R-2-W 137/138-SED	1083.27	1083.28				15					5					20					55				5																	100					mudstone		
351-U1438E-26R-3-W 36/37-SED	1083.7	1083.71				10										50					38				2																	100					mudstone		
351-U1438E-26R-4-W 10/11-SED	1084.79	1084.8				20							10			40					30																					100					mudstone		
351-U1438E-31R-6-A 106/107-SED	1137.49	1137.5	lithology domain 1 major				5						1		3						10					40			40				1									100				tuffaceous	mudstone		
351-U1438E-31R-6-A 123/124-SED	1137.66	1137.67	lithology domain 2 minor				2								10						20					40			28													100				tuffaceous	mudstone		
351-U1438E-32R-5-A 53/54-SED	1144.8	1144.81			5																40					54							1									100		20	80	tuffaceous	mudstone		
351-U1438E-38R-1-A 87/88-SED	1197.77	1197.78	lithology domain 1 major										2		15						10					30			33	10												100				tuffaceous	sandstone		
351-U1438E-38R-1-A 90/91-SED	1197.8	1197.81	lithology domain 1 major																		20				5	45			30													100				tuffaceous	mudstone		
351-U1438E-38R-2-A 104/105-SED	1199.42	1199.43	lithology domain 2 minor																		25					69			5	1												100				tuffaceous	mudstone		
351-U1438E-38R-5-A 119/120-SED	1203.97	1203.98	lithology domain 2 minor																																														carbonate and anhydrite(?) vein filling
351-U1438E-42R-2-A 42/43-SED	1237.62	1237.63			8		2						2								20					40			28													100				tuffaceous	mudstone		

Sample	Top Depth [m]	Bottom Depth [m]	Sample domain name (if >1 domain)	Quartz [%]	Feldspar [%]	K-Feldspar [%]	Plagioclase [%]	Mica [%]	Biotite [%]	Muscovite [%]	Chlorite [%]	Glauconite [%]	Opaques [%]	Zircon [%]	Ferromagnesian - ol, pyx, amph [%]	Clay-sized fraction [%]	Barite [%]	Anhydrite [%]	Gypsum [%]	Apatite [%]	Zeolite - phillipsite, clinoptilolite [%]	Carbonate [%]	Pyrite [%]	Manganeseoxide [%]	Fe-oxide [%]	Clay minerals [%]	Opaques, authigenic [%]	Quartz, authigenic [%]	Vitric grains [%]	Lithic grains [%]	Palagonite [%]	Foraminifers [%]	Calcareous nannofossils [%]	Radiolarians [%]	Diatoms [%]	Silicoflagellate, ebridian, actinisocidian [%]	Sponge spicule fragments [%]	Pollen and spores [%]	Wood fragments [%]	Plant residuals [%]	Organic matter [%]	Total of group estimates [%]	Sand texture [%]	Silt texture [%]	Clay texture [%]	Lithology prefix	Principal lithology	Lithology suffix	Comment
351-U1438E-43R-3-W 124/125-SED	1249.43	1249.44									2		3								30					15			50													100					ash	with clay	
351-U1438E-44R-5-A 88/89-SED	1261.22	1261.23			3								3								94																					100		20	80	tuffaceous	mudstone		Isotropic mineral may be analcime
351-U1438E-47R-1-A 1/2-SED	1283.01	1283.02	lithology domain 1 major																		10				1	30			40	19												100				tuffaceous	mudstone		
351-U1438E-47R-4-A 75/76-SED	1287.72	1287.73	lithology domain 1 major												1						50	14				5			30													100				tuffaceous	mudstone		
351-U1438E-47R-6-A 45/46-SED	1290.18	1290.19	lithology domain 2 minor												1						39					30			30													100				tuffaceous	mudstone	with sand	
351-U1438E-47R-6-A 60/61-SED	1290.33	1290.34	lithology domain 2 minor												5						20					15			60													100				tuffaceous	sandstone	with mud	
351-U1438E-51R-2-A 131/132-SED	1322.47	1322.48			15	2	1				4			1							20				1	31			15	10												100							
351-U1438E-51R-2-A 16/17-SED	1321.32	1321.33			8								3								18				25	38			5	1				2								100							
351-U1438E-52R-1-A 134/135-SED	1330.84	1330.85	lithology domain 2 minor		2								2		3						55	3			5			20	10													100					mudstone	with ash	
351-U1438E-52R-3-A 80/81-SED	1333.26	1333.27	lithology domain 1 major										1		5	34					30	10			10					10												100					mudstone	with ash	
351-U1438E-52R-4-A 13/14-SED	1333.54	1333.55	lithology domain 2 minor										5		10						30					40			10	5												100				tuffaceous	sandstone		
351-U1438E-53R-2-A 61/62-SED	1341.29	1341.3	lithology domain 2 minor										1		10						15					29			25	20												100				tuffaceous	sandstone		
351-U1438E-53R-CC-A 14/15-SED	1341.49	1341.5	lithology domain 2 minor										1		4	40					30								20	5												100				tuffaceous	mudstone		
351-U1438E-54R-1-A 138/139-SED	1350.28	1350.29	lithology domain 1 major		1										5	20					20				20				30	4												100					mudstone	with ash	
351-U1438E-54R-2-A 43/44-SED	1350.78	1350.79	lithology domain 2 minor																																														Siliecous mudstone concretion
351-U1438E-55R-3-A 116/117-SED	1362.46	1362.47	lithology domain 1 major												5	70					10				10				4					1								100					mudstone		
351-U1438E-61R-1-A 122/123-SED	1406.12	1406.13	lithology domain 1 major		25								2		35	5					3				5				25													100				tuffaceous	sandstone		
351-U1438E-61R-1-A 84/85-SED	1405.74	1405.75	lithology domain 1 major												5	50					5				20				20													100					mudstone	with ash	
351-U1438E-61R-2-A 106/107-SED	1407.4	1407.41	lithology domain 2 minor																																														Altered basalt
351-U1438E-62R-1-A 131/132-SED	1411.61	1411.62					15				10		10		25															40												100							basalt clast/dyke/sill
351-U1438E-62R-2-A 5/6-SED	1411.69	1411.7																			100																					100							vein material associated with basalt
351-U1438E-64R-1-A 96/97-SED	1429.66	1429.67	lithology domain 1 major													43						1			1	20	5	2	25	2											1	100				tuffaceous	mudstone		
351-U1438E-64R-2-A 107/108-SED	1431.17	1431.18	lithology domain 2 minor													72					15					2	5		5					1								100					mudstone		
351-U1438E-65R-1-A 60/61-SED	1438.5	1438.51	lithology domain 2 minor																																												carbonate vein	
351-U1438E-65R-CC-A 10/11-SED	1440.38	1440.39	lithology domain 1 major										3								42	15				20			20													100				tuffaceous	sandstone		
351-U1438E-66R-2-A 59/60-SED	1448.51	1448.52	lithology domain 1 major				10						5		5						10	5				10			55													100				tuffaceous	sandstone		
351-U1438E-67R-1-A 33/34-SED	1452.03	1452.04	lithology domain 1 major				10						5		15						10					10			20	30												100				tuffaceous	sandstone		
351-U1438E-67R-1-A 40/41-SED	1452.1	1452.11	lithology domain 1 major										5		1	63					1				10		10		10													100					claystone		
351-U1438E-68R-2-W 46/47-SED	1458.25	1458.26					30						5		30						10									25												100					medium to coarse sand		amphiboles
351-U1438E-69R-1-W 88/90-SED	1461.78	1461.8					55						5		40																											100							dolerite
351-U1438E-74R-1-A 27/28-SED	1494.37	1494.38									100																															100							0.3-0.5 cm black vein crosscutting spherulitic basalt
351-U1438E-76R-2-A 29/30-SED	1508.5	1508.51																																															anthophillite
351-U1438E-83R-2-A 70/71-SED	1563.5	1563.51									10		20									70																				100							large vesicle
351-U1438E-86R-1-#14-SED	1585.74	1585.74																				88			2	10																100							
351-U1438E-86R-1-A 84/84-SED	1585.26	1585.34	lithology domain 2 minor																			60			10	20	10															100					limestone		impure - alteration of basalt?
351-U1438E-88R-1-A 73/74-SED	1603.83	1603.84																				90			6	3	1															100					limestone		Coarse white vein in fine grained basalt

Sample	Top Depth [m]	Bottom Depth [m]	Sample domain name (if >1 domain)	Sample domain abundance [%]	Lithology prefix	Principal lithology	Lithology suffix	Texture	Matrix - porosity	Matrix - glass [%]	Matrix - clay [%]	Matrix - carbonate [%]	Matrix - plagioclase [%]	Matrix - CPX [%]	Matrix - OPX [%]	Matrix - amphibole [%]	Matrix - biotite [%]	Matrix - quartz [%]	Matrix - opaques [%]	Matrix - other minerals [%]	Matrix - lithic components [%]	Matrix - scoria components [%]	Matrix - pumice components [%]	Matrix - biogenic components [%]	Secondary matrix minerals [%]	Matrix component - sum [%]	Clast grain size	Clast type	Groundmass in clast	Clast texture	PLAG phenocryst original [%]	CPX phenocryst original [%]	OPX phenocryst original [%]	AMPH phenocryst original [%]	BIOT phenocryst original [%]	QTZ phenocryst original [%]	OPAQUES phenocryst original [%]	Groundmass [%]	Vesicles [%]	Secondary clast minerals [%]	Clast component - sum [%]	Alteration	Comment
351-U1438D-9R-1-W 29/33-TSB(29-33)-TS_02	277.29	277.33	matrix type 1	100	tuffaceous	fine sandstone			moderate	40			20	5		3			5			3		15		91																	moderate	
351-U1438D-9R-2-W 61/64-TSB(61-64)-TS_03	279.11	279.14	matrix type 1	100	tuffaceous	mudstone	with nannofossils			10			5	2					3					70		90																	slight	Calcareous nannofossils 60% sponge spicules 10%
351-U1438D-9R-2-W 72/76-TSB(72-76)-TS_04	279.22	279.26	matrix type 1	100	tuffaceous	mudstone	with nannofossils			10			5	2					3					70		90																	slight	Calcareous nannofossils 60% sponge spicules 10%
351-U1438D-9R-CC-TSB(5-7)-TS_01	280.71	280.73	matrix type 1	100	tuffaceous	mudstone	with nannofossils			10			5						5	40				40		100																	moderate	Forams and nannofossils 40%
351-U1438D-12R-CC-W 1/3-TSB(1-3)-TS_05	310.27	310.28	matrix type 1	20	tuffaceous	medium to coarse sandstone	with gravel	clast supported / grain supported	moderate				25	10					5	30						70																	slight	
351-U1438D-12R-CC-W 1/3-TSB(1-3)-TS_05	310.27	310.28	clast type 1	30																							granule	basalt	microlitic	porphyritic	10						3	82		5	100		
351-U1438D-12R-CC-W 1/3-TSB(1-3)-TS_05	310.27	310.28	clast type 2	40																							granule	andesite	microlitic	porphyritic	10	5					3	72	10		100		
351-U1438D-12R-CC-W 1/3-TSB(1-3)-TS_05	310.27	310.28	clast type 3	30																							granule	basalt	glassy	aphyric								60		10	70	moderate	
351-U1438D-13R-1-W 95/98-TSB(95-98)-TS_07	316.75	316.78	matrix type 1	10	tuffaceous	medium to coarse sandstone	with gravel	clast supported / grain supported	high	50										50						100																	moderate	crystals of plag and pyx and ash in matrix
351-U1438D-13R-1-W 95/98-TSB(95-98)-TS_07	316.75	316.78	clast type 1	10																							granule	andesite	microlitic	porphyritic	50	2						48			100	slight	
351-U1438D-13R-1-W 95/98-TSB(95-98)-TS_07	316.75	316.78	clast type 2	20																							pebble	dacite	glassy	aphyric												high	
351-U1438D-13R-1-W 95/98-TSB(95-98)-TS_07	316.75	316.78	clast type 3	10																							pebble	andesite	glassy	porphyritic	20	5	5					70			100	slight	
351-U1438D-13R-2-W 115/117-TSB(115-117)-TS_08	318.38	318.4	clast type 1	10																							granule	andesite	microlitic	porphyritic	5						3	87			95	moderate	
351-U1438D-13R-2-W 115/117-TSB(115-117)-TS_08	318.38	318.4	clast type 2	10																							granule		microlitic	porphyritic	25	10					5	60			100	slight	
351-U1438D-13R-2-W 115/117-TSB(115-117)-TS_08	318.38	318.4	clast type 3	30																							pebble		microlitic	aphyric								65	35		100	moderate	
351-U1438D-13R-2-W 115/117-TSB(115-117)-TS_08	318.38	318.4	matrix type 1	50	tuffaceous	medium to coarse sandstone	with gravel	clast supported / grain supported		50			25	20					5							100																	slight	fresh glass
351-U1438D-13R-3-W 117/119-TSB(117-119)-TS_09	319.81	319.83	clast type 1	75																							pebble		microlitic	porphyritic	5						3	67	25		100	moderate	
351-U1438D-13R-3-W 117/119-TSB(117-119)-TS_09	319.81	319.83	matrix type 1	25	tuffaceous	breccia-conglomerate				80										20						100																		
351-U1438D-13R-3-W 138/140-TSB(138-140)-TS_10	320.02	320.04	matrix type 1	100	tuffaceous	medium to coarse sandstone	with gravel	clast supported / grain supported		60			25	10					5							100																	moderate	foraminifera
351-U1438D-13R-3-W 62/66-TSB(62-66)-TS_53	319.26	319.3			tuffaceous	mudstone			low		90		3						1						6	100																		Crosscutting vein and pods of green secondary clay
351-U1438D-14R-2-W 36/38-TSB(36-38)-TS_11	327.37	327.39	matrix type 1	40	tuffaceous	sandstone	with gravel	clast supported / grain supported		80										20						100																	moderate	crystals of plag, pyx and ash in matrix
351-U1438D-14R-2-W 36/38-TSB(36-38)-TS_11	327.37	327.39	clast type 1	50																							pebble	andesite	glassy	aphyric								90	10		100	moderate	
351-U1438D-17R-1-W 66/69-TSB(66-69)-TS_12	355.26	355.29	matrix type 1	20	tuffaceous	sandstone	with gravel	matrix supported / mud supported	moderate	50			40	10												100																		
351-U1438D-17R-1-W 66/69-TSB(66-69)-TS_12	355.26	355.29	clast type 1	50																							granule		microlitic	porphyritic	25	10	1				4	60			100	slight	
351-U1438D-17R-1-W 66/69-TSB(66-69)-TS_12	355.26	355.29	clast type 2	2																							granule		microlitic	porphyritic	5	10						60			75		clast with altered olivine and chromite
351-U1438D-17R-1-W 66/69-TSB(66-69)-TS_12	355.26	355.29	clast type 3	8																							granule		microlitic	aphyric								60	40		100	absent/ fresh	fresh brown glass
351-U1438D-17R-2-W 71/75-TSB(71-75)-TS_13	356.81	356.85	matrix type 1	60	tuffaceous	sandstone		matrix supported / mud supported		50			40	10												100																	slight	
351-U1438D-17R-2-W 71/75-TSB(71-75)-TS_13	356.81	356.85	matrix type 2	40	tuffaceous	siltstone		matrix supported / mud supported			80		18	2												100																	slight	
351-U1438D-17R-5-W 28/33-TSB(28-33)-TS_14	360.55	360.6	matrix type 1	65	tuffaceous	sandstone		matrix supported / mud supported	low																					tuffaceous	20	10						65	5		100	moderate	
351-U1438D-17R-5-W 28/33-TSB(28-33)-TS_14	360.55	360.6	clast type 1	10																							granule		glassy	aphyric												high	
351-U1438D-17R-5-W 28/33-TSB(28-33)-TS_14	360.55	360.6	clast type 2	10																							medium sand		crystalline	porphyritic												slight	
351-U1438D-17R-5-W 28/33-TSB(28-33)-TS_14	360.55	360.6	clast type 3	10																							medium sand		microlitic	aphyric													
351-U1438D-18R-3-W 118/120-TSB(118-120)-TS_47	368.11	368.13	matrix type 1	75	tuffaceous	medium to coarse sandstone	with gravel	matrix supported / mud supported	low		3		20	5		3			3		15	5	25	1		80																		
351-U1438D-18R-3-W 118/120-TSB(118-120)-TS_47	368.11	368.13	clast type 1	20																							granule	andesite	microlitic	porphyritic	20	0						70	10	0	100	moderate	
351-U1438D-18R-3-W 118/120-TSB(118-120)-TS_47	368.11	368.13	clast type 2	5																							pebble	andesite	microlitic	porphyritic	30	3						17	50		100	moderate	
351-U1438D-19R-4-W 41/43-TSB(41-43)-TS_48	378.16	378.18	clast type 1	30																			20			20	pebble	andesite	microlitic	porphyritic	10	5					5	35	45		100	moderate	
351-U1438D-19R-4-W 41/43-TSB(41-43)-TS_48	378.16	378.18	clast type 2	35																			60			60	pebble	andesite	glassy	aphyric								55	45		100	moderate	
351-U1438D-19R-4-W 41/43-TSB(41-43)-TS_48	378.16	378.18	matrix type 1	35	tuffaceous	breccia-conglomerate			high				35	10					10		10	15	20			100																	moderate	
351-U1438D-20R-6-W 32/34-TSB(32-34)-TS_49	390.82	390.84	clast type 1	45																			20			20	pebble	andesite	microlitic	porphyritic	10	5					5	55	35		110	moderate	
351-U1438D-20R-6-W 32/34-TSB(32-34)-TS_49	390.82	390.84	clast type 2	10																			60			60	pebble	andesite	glassy	aphyric								45	55		100	moderate	
351-U1438D-20R-6-W 32/34-TSB(32-34)-TS_49	390.82	390.84	matrix type 1	45	tuffaceous	medium to coarse sandstone	with gravel		high				35	10					10		10	15	20			100																	moderate	
351-U1438D-20R-6-W 32/34-TSB(32-34)-TS_49	390.82	390.84	matrix type 1	40	tuffaceous	medium to coarse sandstone		clast supported / grain supported	high		1		5	2					1		4		60			73																		
351-U1438D-20R-6-W 32/34-TSB(32-34)-TS_49	390.82	390.84	clast type 1	60																							pebble		glassy	porphyritic	10	5						60	25		100	slight	pumice partly fresh
351-U1438D-21R-2-W 72/74-TSB(72-74)-TS_50	395.46	395.48	clast type 1	40																							pebble	andesite	microlitic	porphyritic	10	5					5	35	45		100	moderate	
351-U1438D-21R-2-W 72/74-TSB(72-74)-TS_50	395.46	395.48	clast type 2	30																							pebble	andesite	glassy	aphyric								50	50		100	moderate	

Sample	Top Depth [m]	Bottom Depth [m]	Sample domain name (if >1 domain)	Sample domain abundance [%]	Lithology prefix	Principal lithology	Lithology suffix	Texture	Matrix - porosity	Matrix - glass [%]	Matrix - clay [%]	Matrix - carbonate [%]	Matrix - plagioclase [%]	Matrix - CPX [%]	Matrix - OPX [%]	Matrix - amphibole [%]	Matrix - biotite [%]	Matrix - quartz [%]	Matrix - opaques [%]	Matrix - other minerals [%]	Matrix - lithic components [%]	Matrix - scoria components [%]	Matrix - pumice components [%]	Matrix - biogenic components [%]	Secondary matrix minerals [%]	Matrix component - sum [%]	Clast grain size	Clast type	Groundmass in clast	Clast texture	PLAG phenocryst original [%]	CPX phenocryst original [%]	OPX phenocryst original [%]	AMPH phenocryst original [%]	BIOT phenocryst original [%]	QTZ phenocryst original [%]	OPAQUES phenocryst original [%]	Groundmass [%]	Vesicles [%]	Secondary clast minerals [%]	Clast component - sum [%]	Alteration	Comment
351-U1438D-21R-2-W 72/74-TSB(72-74)-TS_50	395.46	395.48	matrix type 1	30	tuffaceous	breccia-conglomerate			high				35	10					10		10	15	20			100																	moderate	
351-U1438D-22R-2-W 11/13-TSB(11-13)-TS_51	404.09	404.11	clast type 1	20																							granule	andesite	glassy	porphyritic	5	5						90			100	slight	
351-U1438D-22R-2-W 11/13-TSB(11-13)-TS_51	404.09	404.11	clast type 2	20																							coarse sand	andesite	glassy	porphyritic	9		8				8	75			100	slight	
351-U1438D-22R-2-W 11/13-TSB(11-13)-TS_51	404.09	404.11	clast type 3	20																							coarse sand	andesite	glassy	porphyritic	20							80			100	slight	
351-U1438D-22R-2-W 11/13-TSB(11-13)-TS_51	404.09	404.11	matrix type 1	70	tuffaceous	medium to coarse sandstone	with gravel	matrix supported / mud supported	moderate		30		20	5											45	100																	
351-U1438D-23R-2-W 104/106-TSB(104-106)-TS_52	415.32	415.34	matrix type 1	100	tuffaceous	sandstone			moderate		1		15	10		1			1		11	1	40		10	90																	
351-U1438D-24R-2-W 105/107-TSB(105-107)-TS_16	424.86	424.88	clast type 1	50																							coarse sand	andesite	microlitic	porphyritic	25	5					5	65			100	moderate	
351-U1438D-24R-2-W 105/107-TSB(105-107)-TS_16	424.86	424.88	clast type 2	5																																						moderate	large foraminifera
351-U1438D-24R-2-W 105/107-TSB(105-107)-TS_16	424.86	424.88	clast type 3	10																							granule	andesite	microlitic	aphyric								40	50	10	100	moderate	
351-U1438D-24R-2-W 105/107-TSB(105-107)-TS_16	424.86	424.88	matrix type 1	30	tuffaceous	sandstone			moderate			10	10	5							20				55	100																	moderate	
351-U1438D-24R-2-W 105/107-TSB(105-107)-TS_16	424.86	424.88				volcanic breccia-conglomerate																																						
351-U1438D-24R-2-W 12/15-TSB(12-15)-TS_15	423.93	423.96	clast type 1	40																							granule	andesite	microlitic	aphyric								40	50	10	100	moderate	
351-U1438D-24R-2-W 12/15-TSB(12-15)-TS_15	423.93	423.96	clast type 2	10																							coarse sand	dacite	microlitic	porphyritic	10							80		10	100	moderate	
351-U1438D-24R-2-W 12/15-TSB(12-15)-TS_15	423.93	423.96	clast type 3	10																							coarse sand	andesite	glassy	aphyric								50	50		100	moderate	
351-U1438D-24R-2-W 12/15-TSB(12-15)-TS_15	423.93	423.96	clast type 4	10																							coarse sand	andesite	microlitic	porphyritic	25	5					5	65			100	slight	
351-U1438D-24R-2-W 12/15-TSB(12-15)-TS_15	423.93	423.96	matrix type 1	30	tuffaceous	sandstone			moderate			10	10	5							30				45	100																	moderate	
351-U1438D-24R-2-W 12/15-TSB(12-15)-TS_15	423.93	423.96				volcanic breccia-conglomerate																																						
351-U1438D-24R-3-W 82/85-TSB(82-85)-TS_17	425.91	425.94	clast type 1	50																							granule	andesite	microlitic	porphyritic	25	5					5	65			100	moderate	
351-U1438D-24R-3-W 82/85-TSB(82-85)-TS_17	425.91	425.94	clast type 2	10																							granule	andesite	microlitic	porphyritic	10						5	50	30	5	100	high	
351-U1438D-24R-3-W 82/85-TSB(82-85)-TS_17	425.91	425.94	clast type 3	10																																						slight	foraminifera
351-U1438D-24R-3-W 82/85-TSB(82-85)-TS_17	425.91	425.94	matrix type 1	30	tuffaceous	sandstone			moderate			10	10	5						10	15				50	100																	moderate	
351-U1438D-24R-3-W 82/85-TSB(82-85)-TS_17	425.91	425.94				volcanic breccia-conglomerate																																						
351-U1438D-24R-4-W 101/104-TSB(101-104)-TS_54	427.6	427.63	matrix type 1	10	tuffaceous	breccia-conglomerate	with foraminifers	clast supported / grain supported	low		15		12		10						25	20	15	3		100																slight	0.8 cm foram
351-U1438D-24R-4-W 101/104-TSB(101-104)-TS_54	427.6	427.63	clast type 1																								pebble	andesite	glassy	porphyritic	20	5						50	5	20	100	moderate	groundmass glass and vesicles filled with brown clay
351-U1438D-24R-4-W 101/104-TSB(101-104)-TS_54	427.6	427.63	clast type 2																								granule	dacite	glassy	porphyritic	30	3					2	45		20	100	moderate	vesicles are filled with brown clay
351-U1438D-24R-4-W 101/104-TSB(101-104)-TS_54	427.6	427.63	clast type 3																								granule	dacite	microlitic	tuffaceous	10							80		10	100	slight	vesicles (10%) are filled with brown clay
351-U1438D-26R-6-W 46/48-TSB(46-48)-TS_18	449.03	449.05	clast type 1	45																							granule	andesite	microlitic	porphyritic	5	3					3	25	54	10	100	moderate	
351-U1438D-26R-6-W 46/48-TSB(46-48)-TS_18	449.03	449.05	clast type 2	25																							pebble	andesite	microlitic	porphyritic	20	5		10			5	55		5	100	slight	
351-U1438D-26R-6-W 46/48-TSB(46-48)-TS_18	449.03	449.05	clast type 3	10																							pebble	andesite	microlitic	aphyric								40	50	10	100	moderate	
351-U1438D-26R-6-W 46/48-TSB(46-48)-TS_18	449.03	449.05	matrix type 1	35	tuffaceous	breccia-conglomerate			moderate			15	10	5						5	5		20		40	100																	moderate	
351-U1438D-27R-2-W 86/88-TSB(86-88)-TS_19	453.85	453.87	matrix type 1	20	tuffaceous	breccia-conglomerate		clast supported / grain supported	moderate	25	15		45	5					5	5						100																	slight	
351-U1438D-27R-2-W 86/88-TSB(86-88)-TS_19	453.85	453.87	clast type 1	30																							pebble	rhyolite	glassy	porphyritic	10	5					5	50	30		100	slight	
351-U1438D-27R-2-W 86/88-TSB(86-88)-TS_19	453.85	453.87	clast type 2	20																							pebble	andesite	glassy	porphyritic	20	5						65	10		100	slight	
351-U1438D-27R-2-W 86/88-TSB(86-88)-TS_19	453.85	453.87	clast type 3	10																							pebble	andesite	microlitic	porphyritic	30						5	45	20		100	slight	
351-U1438D-28R-5-W 31/33-TSB(31-33)-TS_20	466.24	466.26	matrix type 1	25	tuffaceous	medium to coarse sandstone		matrix supported / mud supported	moderate		5		10	2					1			3	50	1	5	77																	
351-U1438D-28R-5-W 31/33-TSB(31-33)-TS_20	466.24	466.26	clast type 1	75																							pebble	dacite	glassy	porphyritic	3	1					1	70	25		100	high	
351-U1438D-29R-1-W 3/6-TSB(3-6)-TS_21	471.03	471.06	matrix type 1	80	tuffaceous	sandstone	with gravel	clast supported / grain supported	low	30	20		30	2					5					5	8	100																	moderate	
351-U1438D-30R-2-W 58/61-TSB(58-61)-TS_55	482.62	482.65	matrix type 1	90	tuffaceous	medium to coarse sandstone	with gravel	matrix supported / mud supported	low		2		20	7	1	1			1		25	5	5	1	32	100																	
351-U1438D-30R-2-W 58/61-TSB(58-61)-TS_55	482.62	482.65	clast type 1	10																							pebble	andesite	glassy	porphyritic	15	5					2	68	10		100	moderate	crystals are fresh
351-U1438D-31R-7-W 7/9-TSB(7-9)-TS_58	498.28	498.3	matrix type 1	70	tuffaceous	medium to coarse sandstone	with gravel	matrix supported / mud supported	low			25	20	7	1	1			2		32		2			90																	
351-U1438D-31R-7-W 7/9-TSB(7-9)-TS_58	498.28	498.3	clast type 1	15																							pebble		microlitic													slight	limestone fragment consists of fossil fragments
351-U1438D-31R-7-W 7/9-TSB(7-9)-TS_58	498.28	498.3	clast type 2	15																							cobble	andesite	microlitic	porphyritic	20	15						30	30	5	100	moderate	
351-U1438D-32R-2-W 59/63-TSB(59-63)-TS_56	502.19	502.23	matrix type 1	20	tuffaceous	breccia-conglomerate		clast supported / grain supported	moderate		27		20	10		1			10		10			2	20	100																	moderate	
351-U1438D-32R-2-W 59/63-TSB(59-63)-TS_56	502.19	502.23	clast type 1	50																							pebble	tuffaceous-mudstone															
351-U1438D-32R-2-W 59/63-TSB(59-63)-TS_56	502.19	502.23	clast type 2	20																							pebble	andesite	microlitic	tuffaceous	18						2	60		20	100	moderate	

Sample	Top Depth [m]	Bottom Depth [m]	Sample domain name (if >1 domain)	Sample domain abundance [%]	Lithology prefix	Principal lithology	Lithology suffix	Texture	Matrix - porosity	Matrix - glass [%]	Matrix - clay [%]	Matrix - carbonate [%]	Matrix - plagioclase [%]	Matrix - CPX [%]	Matrix - OPX [%]	Matrix - amphibole [%]	Matrix - biotite [%]	Matrix - quartz [%]	Matrix - opaques [%]	Matrix - other minerals [%]	Matrix - lithic components [%]	Matrix - scoria components [%]	Matrix - pumice components [%]	Matrix - biogenic components [%]	Secondary matrix minerals [%]	Matrix component - sum [%]	Clast grain size	Clast type	Groundmass in clast	Clast texture	PLAG phenocryst original [%]	CPX phenocryst original [%]	OPX phenocryst original [%]	AMPH phenocryst original [%]	BIOT phenocryst original [%]	QTZ phenocryst original [%]	OPAQUES phenocryst original [%]	Groundmass [%]	Vesicles [%]	Secondary clast minerals [%]	Clast component - sum [%]	Alteration	Comment
351-U1438D-32R-2-W 59/63-TSB(59-63)-TS_56	502.19	502.23	clast type 3	10																							granule	dacite	glassy	tuffaceous	5						2	83		10	100	slight	
351-U1438D-36R-6-W 0/4-TSB(0-4)-TS_57	546.36	546.4	matrix type 1	100	tuffaceous	sandstone		matrix supported / mud supported	low		3		5	2		1					10		65			86																	mineral components change along lamination
351-U1438D-37R-2-W 59/63-TSB(59-63)-TS_22	550.67	550.71	matrix type 1	100	tuffaceous	sandstone		matrix supported / mud supported	moderate		2		10	2					1		15	2	15	1	40	88																	zeolite cemented
351-U1438D-40R-4-W 123/126-TSB(123-126)-TS_23	583.31	583.34	matrix type 1	45	tuffaceous	medium to coarse sandstone	with gravel	matrix supported / mud supported	moderate	0		15	5	3		2			3	0				5	7	40																	
351-U1438D-40R-4-W 123/126-TSB(123-126)-TS_23	583.31	583.34	clast type 1	25																							pebble	andesite	microlitic	porphyritic	7	2						0	20	71	100	high	
351-U1438D-40R-4-W 123/126-TSB(123-126)-TS_23	583.31	583.34	clast type 2	15																							pebble	andesite	microlitic	porphyritic	10						5		10	75	100	high	phenocrysts are fresh
351-U1438D-40R-4-W 123/126-TSB(123-126)-TS_23	583.31	583.34	clast type 3	5																							fine sand	basalt	microlitic	aphyric								70	30		100	slight	
351-U1438D-40R-4-W 123/126-TSB(123-126)-TS_23	583.31	583.34	clast type 4	7																							fine sand	andesite	microlitic	aphyric									100		100	moderate	
351-U1438D-40R-6-W 60/63-TSB(60-63)-TS_59b	585.41	585.44	clast type 1	30																							granule	andesite		porphyritic	8	3					2			87	100	high	brown clay, zeolites and opaque minerals
351-U1438D-40R-6-W 60/63-TSB(60-63)-TS_59b	585.41	585.44	matrix type 1	70	tuffaceous	mudstone	with lapilli	matrix supported / mud supported	low		60								10					2	28	100																	
351-U1438D-40R-6-W 87/90-TSB(87-90)-TS_24	585.68	585.71	matrix type 1	75	tuffaceous	medium to coarse sandstone		matrix supported / mud supported	low				3	3					1		7	1	47		30	92																	
351-U1438D-40R-6-W 87/90-TSB(87-90)-TS_24	585.68	585.71	matrix type 2	25	tuffaceous	mudstone			low			85	10						5							100																	
351-U1438D-41R-2-W 99/103-TSB(99-103)-TS_60	589.7	589.74	matrix type 1	20	tuffaceous	breccia-conglomerate		clast supported / grain supported	low		80		10						5						5	100																moderate	
351-U1438D-41R-2-W 99/103-TSB(99-103)-TS_60	589.7	589.74	clast type 1	40																							pebble	dacite	microlitic	tuffaceous	20	3					2	63	10	2	100	moderate	
351-U1438D-41R-2-W 99/103-TSB(99-103)-TS_60	589.7	589.74	clast type 2	30																							pebble	andesite	crystalline	porphyritic	63	15					10	10		2	100	slight	
351-U1438D-41R-2-W 99/103-TSB(99-103)-TS_60	589.7	589.74	clast type 3	10																							granule	andesite	microlitic	porphyritic	20	5					2	68		5	100	moderate	
351-U1438D-42R-CC-PAL-TSB(13-28)-TS_25	599.38	599.53	clast type 1	100	tuffaceous	breccia-conglomerate		clast supported / grain supported																			cobble	basalt	microlitic	porphyritic	20	10					3	59		8	100	high	Olivine replaced by iddingsite/bowlingite
351-U1438D-45R-2-W 26/28-TSB(26-28)-TS_26	627.96	627.98	clast type 1	20																							pebble	andesite	glassy	porphyritic	10						2	60	20	8	100	high	
351-U1438D-45R-2-W 26/28-TSB(26-28)-TS_26	627.96	627.98	clast type 2	10																							pebble	andesite	glassy	porphyritic	20	10					5	50	5	10	100	moderate	
351-U1438D-45R-2-W 26/28-TSB(26-28)-TS_26	627.96	627.98	clast type 3	10																							coarse sand	basalt	microlitic	porphyritic	5	5						65	15	10	100	high	
351-U1438D-45R-2-W 26/28-TSB(26-28)-TS_26	627.96	627.98	clast type 3	10																							pebble	andesite	glassy	aphyric								40	50	10	100	high	
351-U1438D-45R-2-W 26/28-TSB(26-28)-TS_26	627.96	627.98	matrix type 1	45	tuffaceous	sandstone			moderate				20	5					5		10	5	5		50	100																	
351-U1438D-45R-2-W 90/92-TSB(90-92)-TS_27	628.6	628.62	clast type 1	30																							coarse sand	basalt	microlitic	porphyritic	5	5						65	15	10	100	high	
351-U1438D-45R-2-W 90/92-TSB(90-92)-TS_27	628.6	628.62	clast type 2	15																							granule	andesite	glassy	porphyritic	20	10					5	50	5	10	100	moderate	
351-U1438D-45R-2-W 90/92-TSB(90-92)-TS_27	628.6	628.62	clast type 3	15																							coarse sand	basalt	microlitic	aphyric								80		20	100		
351-U1438D-45R-2-W 90/92-TSB(90-92)-TS_27	628.6	628.62	clast type 4	20																							granule	andesite	glassy	aphyric								30	60	10	100	high	
351-U1438D-45R-2-W 90/92-TSB(90-92)-TS_27	628.6	628.62	matrix type 1	20	tuffaceous	breccia-conglomerate			low			2	20	13					5		40	20				100																	
351-U1438D-45R-6-W 13/15-TSB(13-15)-TS_29	633.29	633.31	matrix type 1	100	tuffaceous	siltstone		matrix supported / mud supported	low		20		8	4		2			6		55				5	100																moderate	
351-U1438D-46R-2-W 113/115-TSB(113-115)-TS_28	638.53	638.55	clast type 1	30																							granule	basalt	microlitic	porphyritic	5	10					5	60	15	5	100	moderate	
351-U1438D-46R-2-W 113/115-TSB(113-115)-TS_28	638.53	638.55	clast type 2	30																							granule	andesite	microlitic	porphyritic	20	10					5	50	5	10	100	moderate	
351-U1438D-46R-2-W 113/115-TSB(113-115)-TS_28	638.53	638.55	clast type 3	30																							coarse sand	basalt	microlitic	aphyric								80		20	100		
351-U1438D-46R-2-W 113/115-TSB(113-115)-TS_28	638.53	638.55	matrix type 1	15	tuffaceous	breccia-conglomerate			moderate				20	15					5		40	20				100																	
351-U1438D-47R-1-W 119/121-TSB(119-121)-TS_31	646.79	646.81	matrix type 1	90	tuffaceous	medium to coarse sand	with gravel		low				20	5					1	1	10	18	15		20	90																	
351-U1438D-48R-4-W 89/91-TSB(89-91)-TS_32	660.4	660.42	clast type 1	30																							granule	basalt	microlitic	porphyritic	5	10					5	60	15	5	100	moderate	
351-U1438D-48R-4-W 89/91-TSB(89-91)-TS_32	660.4	660.42	clast type 2	5																							medium sand	andesite	glassy	aphyric								50	50		100	slight	
351-U1438D-48R-4-W 89/91-TSB(89-91)-TS_32	660.4	660.42	matrix type 1	40	tuffaceous	medium to coarse sandstone	with gravel		moderate				20	20					5		35	20				100																	analcime and fibrous zeolite
351-U1438D-48R-4-W 89/91-TSB(89-91)-TS_32	660.4	660.42	clast type 3	20																							granule	andesite	glassy	porphyritic	20	5						65	10		100	moderate	
351-U1438D-49R-7-W 45/49-TSB(45-49)-TS_61	673.98	674.02	matrix type 1	100	tuffaceous	medium to coarse sandstone	with gravel		low		3		15	7		1			2		20	7	10		30	95																moderate	clay mineral cemented
351-U1438D-52R-1-W 16/19-TSB(16-19)-TS_30	694.26	694.29	matrix type 1	50	tuffaceous	mudstone			low					2					5						93	100																high	30% zeolites, 30% hematite, 38% clay, 2% opaques
351-U1438D-52R-1-W 16/19-TSB(16-19)-TS_30	694.26	694.29	matrix type 2	50	tuffaceous	siltstone			low		10		30	1					3		40				16	100																moderate	zeolites replace plag, opaques oxidized to hematite
351-U1438D-53R-5-W 125/127-TSB(125-127)-TS_33	710	710.02	clast type 1	70																																						moderate	
351-U1438D-53R-5-W 125/127-TSB(125-127)-TS_33	710	710.02	matrix type 1	40	monomictic, intermediate	volcanic breccia-conglomerate			moderate					5		5			5						85	100	pebble	andesite	glassy	aphyric										100	100	moderate	anhydrite and zeolite
351-U1438D-56R-7-W 48/52-TSB(48-52)-TS_34	741.5	741.54	matrix type 1	60	tuffaceous	mudstone			low		72			3					5						20	100																high	Spherulites of zeolites replace matrix
351-U1438D-56R-7-W 48/52-TSB(48-52)-TS_34	741.5	741.54	matrix type 2	40	tuffaceous	sandstone			low		25		20	6		1			8		40					100																moderate	Zeolites replace many plagioclase grains
351-U1438D-60R-4-W 107/111-TSB(107-111)-TS_35	777.12	777.16	matrix type 1	20	tuffaceous	breccia-conglomerate		clast supported / grain supported	moderate		80		5						5						10	100																high	

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351-U1438D-60R-4-W 107/111-TSB(107-111)-TS_35	777.12	777.16	clast type 1	40																							granule	andesite	microlitic	tuffaceous	20	5					2	58		15	100	high	
351-U1438D-60R-4-W 107/111-TSB(107-111)-TS_35	777.12	777.16	clast type 2	20																							granule	andesite	glassy	porphyritic	30	2					2	26		40	100	high	
351-U1438D-60R-4-W 107/111-TSB(107-111)-TS_35	777.12	777.16	clast type 3	20																							granule	dacite	microlitic	tuffaceous	10							60		30	100	moderate	
351-U1438D-60R-6-W 11/15-TSB(11-15)-TS_36	778.33	778.37	matrix type 1	100	tuffaceous	siltstone					47								3						50	100																	
351-U1438D-63R-2-W 24/27-TSB(24-27)-TS_37	802.54	802.57	clast type 1	30																							pebble	andesite	microlitic	porphyritic	15	10						45	30		100	moderate	large clast
351-U1438D-63R-2-W 24/27-TSB(24-27)-TS_37	802.54	802.57	matrix type 1	40	tuffaceous	volcanic breccia-conglomerate			moderate				20	8					5		35	22			10	100																moderate	
351-U1438D-63R-2-W 24/27-TSB(24-27)-TS_37	802.54	802.57	clast type 2	30																							granule	andesite	microlitic	porphyritic	10							40	50		100	moderate	
351-U1438D-63R-2-W 78/81-TSB(78-81)-TS_38	803.08	803.11	clast type 1	30																							pebble	andesite	microlitic	porphyritic	15							40	45		100	moderate	
351-U1438D-63R-2-W 78/81-TSB(78-81)-TS_38	803.08	803.11	clast type 2	25																							pebble	basalt	glassy	porphyritic	15							5			20	moderate	altered olivine with chrome spinels
351-U1438D-63R-2-W 78/81-TSB(78-81)-TS_38	803.08	803.11	clast type 3	5																							pebble	andesite	microlitic	porphyritic	25	5						65	5		100	moderate	
351-U1438D-63R-2-W 78/81-TSB(78-81)-TS_38	803.08	803.11	matrix type 1	40	tuffaceous	volcanic breccia-conglomerate			moderate				20	10					5		35	20			10	100																moderate	
351-U1438D-65R-2-W 81/85-TSB(81-85)-TS_62	822.41	822.45	matrix type 1	100		mudstone					50		2						7						41	100																	
351-U1438D-66R-1-W 122/126-TSB(122-126)-TS_39	831.12	831.16	matrix type 1	100	tuffaceous	sandstone			moderate			10		5					10						75	100																high	secondary carbonates, zeolite and anhydrite
351-U1438D-67R-3-W 6/9-TSB(6-9)-TS_63	842.45	842.48	matrix type 1	80	tuffaceous	sandstone	with gravel		low		5		10	3					2				15		65	100																high	
351-U1438D-67R-3-W 6/9-TSB(6-9)-TS_63	842.45	842.48	matrix type 2	20									30	10					2			2	10		45	99																high	5 mm thick medium sandstone layer, zeolite cemented
351-U1438D-68R-5-W 130/133-TSB(130-133)-TS_64	855.58	855.61	matrix type 1	60	tuffaceous	sandstone			low				20	5					2			3	20		50	100																high	clay mineral cemented
351-U1438D-68R-5-W 130/133-TSB(130-133)-TS_64	855.58	855.61	matrix type 2	40	tuffaceous	siltstone					5		20	5					2			10	10		45	97																high	zeolite cemented, <1 cm thick lithic fragment rich layer.
351-U1438D-68R-7-W 86/89-TSB(86-89)-TS_40	857.96	857.99	matrix type 1	100	tuffaceous	fine sandstone	with silt		low		30		3	7					5						50	95																high	anhydrite, zeolite, clays
351-U1438D-69R-5-W 30/34-TSB(30-34)-TS_65	865.13	865.17	clast type 1	30																							pebble	tuffaceous-sandstone	glassy	tuffaceous										100	100		
351-U1438D-69R-5-W 30/34-TSB(30-34)-TS_65	865.13	865.17	clast type 2	30																							granule	tuffaceous-sandstone	glassy	tuffaceous										100	100		
351-U1438D-69R-5-W 30/34-TSB(30-34)-TS_65	865.13	865.17	clast type 3	30																							granule	tuffaceous-sandstone	glassy	tuffaceous										100	100		
351-U1438D-69R-5-W 30/34-TSB(30-34)-TS_65	865.13	865.17	matrix type 1	65	tuffaceous	conglomerate					30								10						60	100																	
351-U1438D-69R-5-W 66/69-TSB(66-69)-TS_41	865.49	865.52	matrix type 1	100		breccia-conglomerate			moderate		15			8					8						67	98																high	zeolite and clay replaces most minerals
351-U1438D-70R-1-W 38/42-TSB(38-42)-TS_66	869.08	869.12	matrix type 1	60	tuffaceous	sandstone			low				10	10		2				3	20		15		30	90																moderate	pamice and glass fragments emplaced by zeolite.
351-U1438D-70R-1-W 38/42-TSB(38-42)-TS_66	869.08	869.12	matrix type 2	40	tuffaceous	mudstone			low				5	5		1			2				10		70	93																high	
351-U1438D-70R-3-W 96/99-TSB(96-99)-TS_42	872.48	872.51	matrix type 1	100					moderate					5					5						90	100																high	zeolite and clay replaces most minerals
351-U1438D-71R-4-W 81/84-TSB(81-84)-TS_43	883.13	883.16	matrix type 1	100	tuffaceous	sandstone	with gravel		low		1		10	1					2		5	0			80	99																high	zeolite cemented
351-U1438D-72R-1-W 78/82-TSB(78-82)-TS_44	888.88	888.92	matrix type 1	100		siltstone	with sand				50			3					7						40	100																	
351-U1438D-72R-3-W 25/28-TSB(25-28)-TS_45	890.91	890.94	matrix type 1	70	tuffaceous	sandstone	with gravel		low		5		10	5		1			3		3	3	30		30	90																moderate	fine sands at bottom pot.
351-U1438D-72R-3-W 25/28-TSB(25-28)-TS_45	890.91	890.94	matrix type 2	30					low		3		10	5					2						80	100																moderate	very fine sands
351-U1438D-72R-5-W 99/102-TSB(99-102)-TS_46	894.59	894.62	matrix type 1	100	tuffaceous	sandstone	with gravel		low		2		10	3	1	1			2		5	5	30		40	99																moderate	chrolite cemented

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351-U1438E-8R-4-W 29/31-TSB(29-31)-TS_68	910.5	910.52	matrix type 1	100	tuffaceous	siltstone		matrix supported / mud supported	moderate		30			1					9						60	100	zeolite																
351-U1438E-10R-4-W 122/125-TSB(122-125)-TS_69	931.02	931.05	matrix type 1		tuffaceous	sandstone			low					5					1		10				84	100																high	Plagioclase and scoria are altered to secondary minerals (zeolite?)
351-U1438E-10R-6-W 77/81-TSB(77-81)-TS_67	933.57	933.61	matrix type 1	100	tuffaceous	medium to coarse sandstone			moderate		30			8					14		5				43	100																	
351-U1438E-11R-4-W 11/14-TSB(11-14)-TS_70	939.36	939.39		100		sandstone		matrix supported / mud supported	moderate		10		3	2					1	4					80	100																high	The former glass and plagioclase are all altered to zeolites, probably phylipsite (?). There is abundant chlorite and anhydrate too. Muscovite mica grains ?. Highly altered rock.
351-U1438E-13R-2-W 107/110-TSB(107-110)-TS_72	956.8	956.83	matrix type 1	20	tuffaceous	breccia-conglomerate		clast supported / grain supported	low		5		10	5							30				50	100																	
351-U1438E-13R-2-W 107/110-TSB(107-110)-TS_72	956.8	956.83	clast type 1	35																							pebble	andesite	glassy	porphyritic	10	35					5	30		20	100	moderate	
351-U1438E-13R-2-W 107/110-TSB(107-110)-TS_72	956.8	956.83	clast type 2	25																							granule	andesite	microlitic	porphyritic	25						10	45		20	100	moderate	pod lined with green clay and radiating clay crystals
351-U1438E-13R-2-W 107/110-TSB(107-110)-TS_72	956.8	956.83	clast type 3	20																							granule	andesite	glassy	porphyritic	5	20					3			72	100	high	groundmass is entirely secondary minerals
351-U1438E-13R-2-W 95/98-TSB(95-98)-TS_71	956.68	956.71	clast type 1																								pebble	basalt	microlitic	porphyritic		5						62	20	13	100	moderate	Olivine (3%) and plagioclase (10%) are altered to secondary minerals.
351-U1438E-13R-2-W 95/98-TSB(95-98)-TS_71	956.68	956.71	clast type 2																								pebble	basalt	glassy	porphyritic		3						2	63	32	100	moderate	Glass (20%), olivine (3%) and plagioclase (10%) are altered to secondary minerals.
351-U1438E-13R-2-W 95/98-TSB(95-98)-TS_71	956.68	956.71	clast type 3																								granule	basalt	crystalline	porphyritic	1	8					1	62	1	27	100	moderate	Olivine (8%) and plagioclase (19%) are altered to secondary minerals.
351-U1438E-13R-2-W 95/98-TSB(95-98)-TS_71	956.68	956.71	matrix type 1	40										10					1		40				49	100																high	Plagioclase (5%) and scoriae (30%) are altered to secondary minerals.
351-U1438E-13R-2-W 95/98-TSB(95-98)-TS_71	956.68	956.71			tuffaceous, matrix-supported	breccia-conglomerate		matrix supported / mud supported	low																																	
351-U1438E-20R-3-W 90/93-TSB(90-93)-TS_73	1026.15	1026.18		100	tuffaceous	sandstone			low				1	3				2	1		5				88	100																high	Most of glass (40%) and plagioclase (8%) are altered to secondary minerals. Lithics (10%) are moderately altered.
351-U1438E-20R-6-W 54/58-TSB(54-58)-TS_74	1030.17	1030.21	clast type 1																								pebble		microlitic	aphyric										100	100	high	rare altered olivine
351-U1438E-20R-6-W 54/58-TSB(54-58)-TS_74	1030.17	1030.21	clast type 2																								granule		glassy	aphyric								2		98	100	high	Well vesiculated. Vesicles fillled with secondary minerals. Glass is partially altered.
351-U1438E-20R-6-W 54/58-TSB(54-58)-TS_74	1030.17	1030.21	clast type 3																								coarse sand		microlitic	porphyritic		10					1	75		14	100	moderate	Plagioclase is partially altered to zeolite? Olivine is completely altered to secondary mineral (clay?). Big clinopyroxene phenocryst.
351-U1438E-20R-6-W 54/58-TSB(54-58)-TS_74	1030.17	1030.21	matrix type 1	30										10					1		20				69	100																moderate	Plagioclase, olivine and glass are altered to secondary minerals (clay minerals, zeolite....)
351-U1438E-20R-6-W 54/58-TSB(54-58)-TS_74	1030.17	1030.21			tuffaceous	sandstone	with gravel	matrix supported / mud supported	low																																	
351-U1438E-21R-3-W 17/20-TSB(17-19)-TS_75	1035.03	1035.06	matrix type 1			volcanic conglomerate		clast supported / grain supported	low		60														40	100																high	100% clay and zeolite
351-U1438E-21R-3-W 17/20-TSB(17-19)-TS_75	1035.03	1035.06	clast type 1																								pebble	andesite	microlitic	porphyritic								75		25	100	high	anhydrite replacing plag 25%
351-U1438E-21R-3-W 17/20-TSB(17-19)-TS_75	1035.03	1035.06	clast type 2																								granule	dacite	glassy	tuffaceous							20	30		50	100	high	50% zeolite and clay
351-U1438E-21R-4-W 88/92-TSB(88-92)-TS_76	1036.9	1036.94	matrix type 1	60									1	5	1				1		30				62	100																moderate	Lithics and plagioclase are partially altered to secondary minerals.
351-U1438E-21R-4-W 88/92-TSB(88-92)-TS_76	1036.9	1036.94	matrix type 2	40										2					1		20				77	100																moderate	Lithics ans plagioclase are partially altered by secondary minerals.
351-U1438E-21R-4-W 88/92-TSB(88-92)-TS_76	1036.9	1036.94			tuffaceous	sandstone		matrix supported / mud supported	low																																	
351-U1438E-26R-4-W 35/37-TSB(35-37)-TS_77	1085.04	1085.06	clast type 1																								granule		glassy	aphyric		1								99	100	high	Plagioclase and groundmass are partially altered to secondary minerals. Vesicles filling secondary minerals (clay?)
351-U1438E-26R-4-W 35/37-TSB(35-37)-TS_77	1085.04	1085.06	clast type 2																								granule		microlitic	aphyric		1					1	2		96	100	high	Groundmass is partially altered to secondary minerals. Vesicles filling secondary minerals (clay?)
351-U1438E-26R-4-W 35/37-TSB(35-37)-TS_77	1085.04	1085.06	clast type 3																								coarse sand	andesite	microlitic	porphyritic	5	1					3	50		41	100	moderate	Groundmass and plagioclase are partially altered to secondary minerals. Altered olivine? (clay mineral)
351-U1438E-26R-4-W 35/37-TSB(35-37)-TS_77	1085.04	1085.06	matrix type 1	50									2	5	2				3		10				78	100																moderate	Plagioclase, pumice and lithics are partially altered to secondary minerals.
351-U1438E-26R-4-W 35/37-TSB(35-37)-TS_77	1085.04	1085.06		50	tuffaceous	medium to coarse sandstone		matrix supported / mud supported	low																																	
351-U1438E-27R-3-W 42/46-TSB(42-46)-TS_78	1093.57	1093.61	matrix type 1	20	tuffaceous	breccia-conglomerate		clast supported / grain supported	low		20			10					20		20				30	100																high	
351-U1438E-27R-3-W 42/46-TSB(42-46)-TS_78	1093.57	1093.61	clast type 1	45																							pebble	andesite	microlitic	porphyritic	10						20			70	100	high	clay and zeolite
351-U1438E-27R-3-W 42/46-TSB(42-46)-TS_78	1093.57	1093.61	clast type 2	25																							granule	andesite	glassy	porphyritic	5	5					60			30	100	high	clay and zeolite
351-U1438E-27R-3-W 42/46-TSB(42-46)-TS_78	1093.57	1093.61	clast type 3	10																							granule	andesite	glassy	porphyritic	15						2	68		15	100	moderate	zeolite
351-U1438E-27R-4-W 99/102-TSB(99-102)-TS_79	1095.54	1095.57	matrix type 1		tuffaceous	breccia-conglomerate		clast supported / grain supported	low																100	100																high	100% brown clay and zeolite
351-U1438E-27R-4-W 99/102-TSB(99-102)-TS_79	1095.54	1095.57	clast type 1																								pebble	andesite	microlitic	tuffaceous	20							10		70	100	high	groundmass is brown and green clay and zeolite, plag is zeolitized
351-U1438E-27R-4-W 99/102-TSB(99-102)-TS_79	1095.54	1095.57	clast type 2																								granule	andesite	microlitic	tuffaceous	5							85		10	100	high	10% green clay in groundmass, plag is zeolitized
351-U1438E-27R-4-W 99/102-TSB(99-102)-TS_79	1095.54	1095.57	clast type 3																								granule	andesite	glassy	tuffaceous	5	5					2	78		10	100	moderate	groundmass is altered to clay and zeolite, plag is zeolitized
351-U1438E-31R-5-W 73/75-TSB(73-75)-TS_80	1135.66	1135.68	clast type 1																								pebble	basalt	microlitic	porphyritic								5		95	100	high	Olivine (3%) and plagioclase (3%) are completely replaced by secondary minerals. Groundmass (74%) is highly altered. Vesicles (20%) are filled by secondary minerals.

Sample	Top Depth [m]	Bottom Depth [m]	Sample domain name (if >1 domain)	Sample domain abundance [%]	Lithology prefix	Principal lithology	Lithology suffix	Texture	Matrix - porosity	Matrix - glass [%]	Matrix - clay [%]	Matrix - carbonate [%]	Matrix - plagioclase [%]	Matrix - CPX [%]	Matrix - OPX [%]	Matrix - amphibole [%]	Matrix - biotite [%]	Matrix - quartz [%]	Matrix - opaques [%]	Matrix - other minerals [%]	Matrix - lithic components [%]	Matrix - scoria components [%]	Matrix - pumice components [%]	Matrix - biogenic components [%]	Secondary matrix minerals [%]	Matrix component - sum [%]	Clast grain size	Clast type	Groundmass in clast	Clast texture	PLAG phenocryst original [%]	CPX phenocryst original [%]	OPX phenocryst original [%]	AMPH phenocryst original [%]	BIOT phenocryst original [%]	QTZ phenocryst original [%]	OPAQUES phenocryst original [%]	Groundmass [%]	Vesicles [%]	Secondary clast minerals [%]	Clast component - sum [%]	Alteration	Comment
351-U1438E-31R-5-W 73/75-TSB(73-75)-TS_80	1135.66	1135.68	clast type 2																								pebble	basalt	microlitic	porphyritic	1	1						50		48	100	moderate	Olivine (7%) and plagioclase (15%) are completely and partially replaced by secondary minerals, respectively. Groundmass (74%) is moderately altered. Vesicles (5%) are filled by secondary minerals.
351-U1438E-31R-5-W 73/75-TSB(73-75)-TS_80	1135.66	1135.68	matrix type 1	45										10	2				1		5				82	100																high	Most of glass (40%) and plagioclase (5%) are altered to secondary minerals. Lithics (10%) are moderately altered. Altered olivine occurs (1%).
351-U1438E-31R-5-W 73/75-TSB(73-75)-TS_80	1135.66	1135.68			tuffaceous	medium to coarse sandstone	with gravel	matrix supported / mud supported	low																																		
351-U1438E-31R-5-W 73/75-TSB(73-75)-TS_80	1135.66	1135.68	clast type 3																								granule	andesite	microlitic	aphyric	1									99	100	high	Plagioclase (4%) is partially replaced by secondary minerals. Groundmass (66%) is highly altered. Vesicles (30%) are filled by secondary minerals.
351-U1438E-41R-1-W 27/31-TSB(27-31)-TS_81	1226.27	1226.31	clast type 1	7																							coarse sand		glassy	aphyric										100	100	high	Highly vesiculated pumice. Matrix glass is replaced by clay mineral. Minor altered plagioclase lath.
351-U1438E-41R-1-W 27/31-TSB(27-31)-TS_81	1226.27	1226.31	clast type 2	3																							medium sand		glassy	aphyric										100	100	high	Highly vesiculated scoria or pumice. Matrix glass is replaced by zeolite?
351-U1438E-41R-1-W 27/31-TSB(27-31)-TS_81	1226.27	1226.31	matrix type 1	80	tuffaceous	sandstone		matrix supported / mud supported					1	3	1				1		3				91	100																high	Most plagioclase (8%) are altered. Glass of pumice or scoria (~30%) is replaced by zeolite and clay minerals.
351-U1438E-41R-1-W 27/31-TSB(27-31)-TS_81	1226.27	1226.31			tuffaceous	sandstone		matrix supported / mud supported	low					5					5			5	10		75	100																high	Remnant pumice grains a completely altered to clay and zeolite. Many of the sand grains appear to be zeolites. Some lithic volcanic grains, including scoria, appear to be well preserved. Clinopyroxene grains appear clear and well preserved.
351-U1438E-47R-4-W 69/72-TSB(69-72)-TS_82	1287.66	1287.69	matrix type 1	100	tuffaceous	siltstone		matrix supported / mud supported	low		15		5	5					15						60	100																	
351-U1438E-47R-6-W 60/63-TSB(60-63)-TS_83	1290.33	1290.36	matrix type 1	100	tuffaceous	fine sandstone	with gravel	matrix supported / mud supported	moderate		6			3		1			15			15			60	100																	
351-U1438E-49R-2-W 30/33-TSB(30-33)-TS_84	1303	1303.03			tuffaceous	mudstone			low		70								5						25	100																high	Spherical patches of mudstone are replaced by zeolite
351-U1438E-52R-3-W 86/89-TSB(86-89)-TS_85	1333.32	1333.35	matrix type 2	15		siltstone		matrix supported / mud supported	moderate		30	5	40	1			1	1	2						20	100																high	
351-U1438E-52R-3-W 86/89-TSB(86-89)-TS_85	1333.32	1333.35	matrix type 1	85		mudstone		matrix supported / mud supported	moderate		55		15	1					2					2	25	100																high	
351-U1438E-55R-1-W 51/54-TSB(51-54)-TS_87	1359.11	1359.14	matrix type 1	75	tuffaceous	siltstone	with mud	matrix supported / mud supported	moderate		30		35	3			1	1	8						22	100																moderate	
351-U1438E-55R-1-W 51/54-TSB(51-54)-TS_87	1359.11	1359.14	matrix type 2	25		mudstone		matrix supported / mud supported	moderate		50		15		1				5	10					20	101																moderate	
351-U1438E-55R-3-W 106/110-TSB(106-110)-TS_88	1362.36	1362.4				mudstone	with radiolarians		low		85													15		100																	moderate	mudstone with radiolaria
351-U1438E-55R-CC-W 10/14-TSB(10-14)-TS_86	1362.57	1362.61				mudstone	with radiolarians	matrix supported / mud supported	moderate		55		5	1					5	4				20	10	100																	moderate	A large portion of the radiolarians appear to have suffered no recrystallization and may be useful for ID. Alexander Bandini (ship Radiollarian specialist) informed.
351-U1438E-58R-2-W 48/50-TSB(48-50)-TS_90	1387.56	1387.58	clast type 1	10																							pebble	dacite	glassy	porphyritic	30							70			100	moderate	
351-U1438E-58R-2-W 48/50-TSB(48-50)-TS_90	1387.56	1387.58	matrix type 1	90		mudstone	with radiolarians		low		80													20		100																	high	
351-U1438E-59R-1-W 8/11-TSB(8-11)-TS_91	1395.78	1395.81	clast type 1	5																							granule	dacite		porphyritic	70							30			100	slight	
351-U1438E-59R-1-W 8/11-TSB(8-11)-TS_91	1395.78	1395.81	matrix type 1	95		mudstone	with radiolarians		low		95													5		100																	high	
351-U1438E-61R-2-W 29/32-TSB(29-32)-TS_92	1406.63	1406.66			tuffaceous	medium to coarse sandstone	with gravel	clast supported / grain supported	moderate		10		5	5					5		40	10	5	0	20	100																moderate	
351-U1438E-62R-2-W 103/106-TSB (103-106)-TS_131	1412.67	1412.7	clast type 1																								pebble	tuffaceous-mudstone															
351-U1438E-62R-2-W 103/106-TSB (103-106)-TS_131	1412.67	1412.7	clast type 2																								granule	dacite	glassy	tuffaceous									30	70	100	clay and zeolite	Pumice clast with collapsed vesicles, glass completely replaced
351-U1438E-62R-2-W 103/106-TSB (103-106)-TS_131	1412.67	1412.7	matrix type 1		tuffaceous	breccia-conglomerate	with radiolarians	clast supported / grain supported	moderate		10	2	7	3					3		40		10		25	100																	
351-U1438E-63R-2-W 101/104-TSB (101-104)-TS_132	1422.01	1422.04	clast type 1																								pebble	tuffaceous-mudstone															
351-U1438E-63R-2-W 101/104-TSB (101-104)-TS_132	1422.01	1422.04	clast type 2																								granule	basalt	crystalline	porphyritic		80					5			15	100	moderate	mm size cpx cluster with oxide inclusions
351-U1438E-63R-2-W 101/104-TSB (101-104)-TS_132	1422.01	1422.04	clast type 3																								granule	andesite	microlitic	tuffaceous	10						3			87	100	high	Groundmass completely replaced by green clay
351-U1438E-63R-2-W 101/104-TSB (101-104)-TS_132	1422.01	1422.04	matrix type 1		tuffaceous	breccia-conglomerate	with radiolarians	clast supported / grain supported	low		10		20	5							40				25	100																	
351-U1438E-63R-CC-W 7/9-TSB(7-9)-TS_97	1422.23	1422.25			tuffaceous	sandstone		matrix supported / mud supported	low			5		5					10			15	40		25	100																	Zeolite minerals and calcite form most of the matrix in these rocks.
351-U1438E-64R-4-W 21/24-TSB(21-24)-TS_98	1433.09	1433.12			tuffaceous	sandstone		clast supported / grain supported				12		7					8			18	42		13	100																high	Glass and feldspar in this rock are completely altered. Clinopyroxene grains appear fresh.
351-U1438E-66R-2-W 61/64-TSB(61-64)-TS_99	1448.53	1448.56	matrix type 1		tuffaceous	sandstone			low			5	30	5					10		40				10	100																	
351-U1438E-68R-2-W 103/105-TSB(103-105)-TS_101	1458.82	1458.84	matrix type 1	60		sandstone					20														80	100																	Sand grains are primarily clouded zeolites but rare quartz grains are also present.
351-U1438E-68R-2-W 103/105-TSB(103-105)-TS_101	1458.82	1458.84	matrix type 2	40		mudstone					100															100																		
351-U1438E-68R-2-W 37/40-TSB(37-40)-TS_100	1458.16	1458.19				sandstone		clast supported / grain supported			10		10			30									50	100																		
351-U1438E-84R-1-W 26/27-TSB(26-27)-TS_135	1571.36	1571.37				limestone			low			85							14						1	100																	
351-U1438E-86R-1-W 39/42-TSB(39-42)-TS_137	1585.29	1585.32				limestone			low			80							15						5	100																	
351-U1438E-88R-1-W 92/94-TSB (92-94)-TS_143	1604.02	1604.04			tuffaceous	limestone			low			50							15		25				10	100																	