GSA Data Repository Item 2016298
Passchier, S., Ciarletta, D.J., Miriagos, T.E., Bijl, P.K., and Bohaty, S.M., 2016, An Antarctic stratigraphic record of step-wise ice growth through the Eocene-Oligocene transition: GSA Bulletin, doi:10.1130/B31482.1.

Supplemental Materials for:

An Antarctic stratigraphic record of step-wise ice growth through the Eocene-Oligocene transition

Authors: Sandra Passchier, Daniel J. Ciarletta, Triantafilo E. Miriagos, Peter K. Bijl, Steven M. Bohaty

A data table with the geochemical data, calculated CIAs and MATs and ages, is supplied on the next page.

This file also contains core descriptions that were carried out in June 2013 in the IODP Gulf Coast Repository by Sandra Passchier and Daniel J. Ciarletta. The cores were collected by the Ocean Drilling Program. The core description standards used were:

Bann, K.L., Fielding, C.R., MacEachern, J.A., and Tye, S.C., 2006. Sedimentology and ichnology of mixed wave- and storm-dominated deltaic deposits: examples from the Permian of Australia. In: Hampson, G.J., Dalrymple, R. and Burgess, P. (eds.). Advances in Shelf and Shoreline Stratigraphy, SEPM Spec. Publ.

Mazzullo, J. and Graham, A.G. (eds.), 1988. Handbook for Shipboard Sedimentologists. ODP Tech. Note, 8: 45-67. http://www-odp.tamu.edu/publications/tnotes/digital/tnote_08.pdf

Moncrieff, A.C.M., 1989. Classification of poorly sorted sedimentary rocks. Sedimentary Geology, 65: 191-194.

Terry, R.D., and Chilingar, G.V., 1955. Summary of "Concerning some additional aids in studying sedimentary formations" by M. S. Shvetsov. J. Sediment. Petrol., 25:229-234.

Wentworth, C. K., 1922. A scale of grade and class terms of clastic sediments. J. Geol., 30:377-390.

The core descriptions were incorporated into PSICAT, a program developed by Josh Reed, with support from the National Science Foundation.

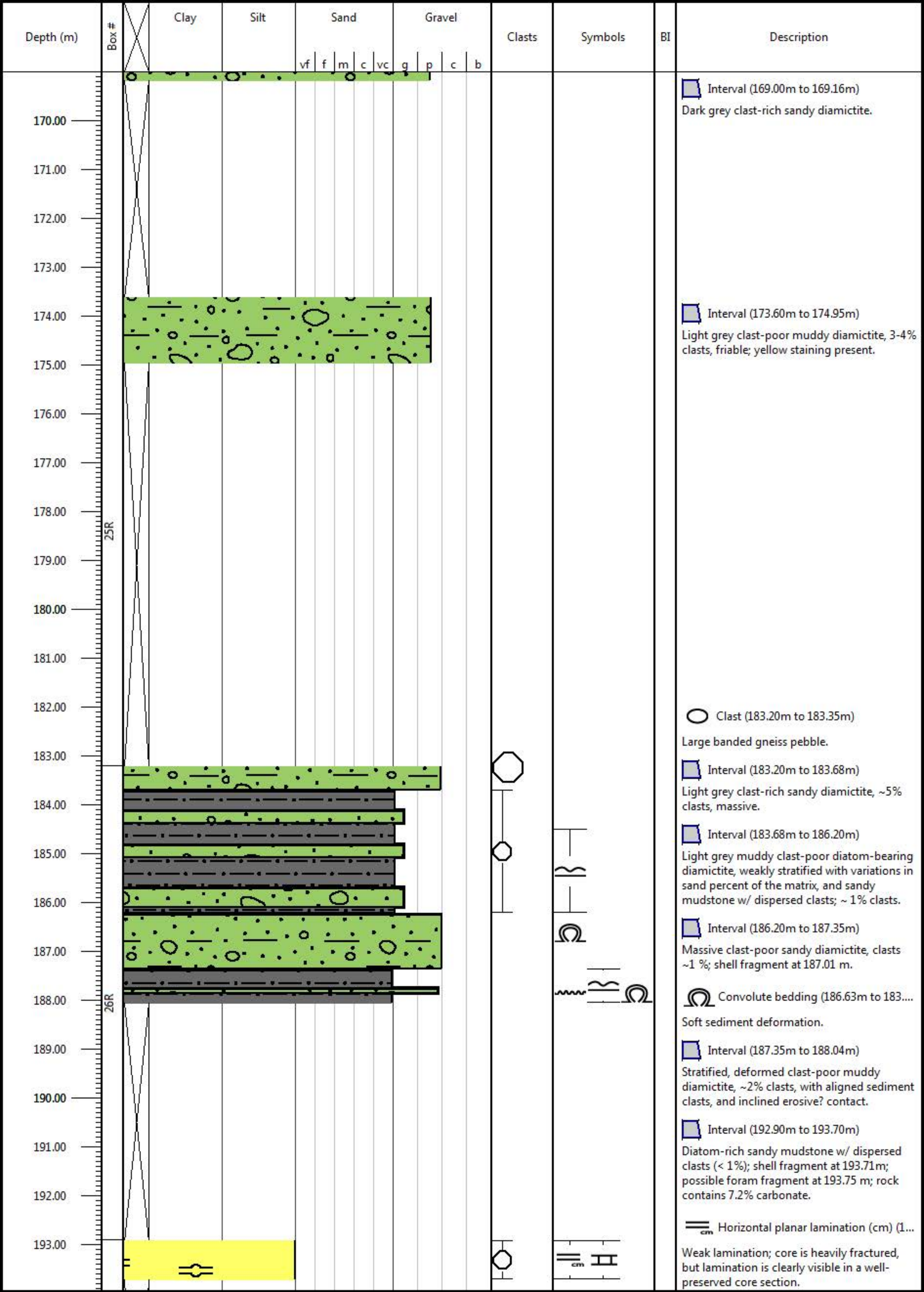
The data collection for this study was supported by NSF award # ANT 1245283.

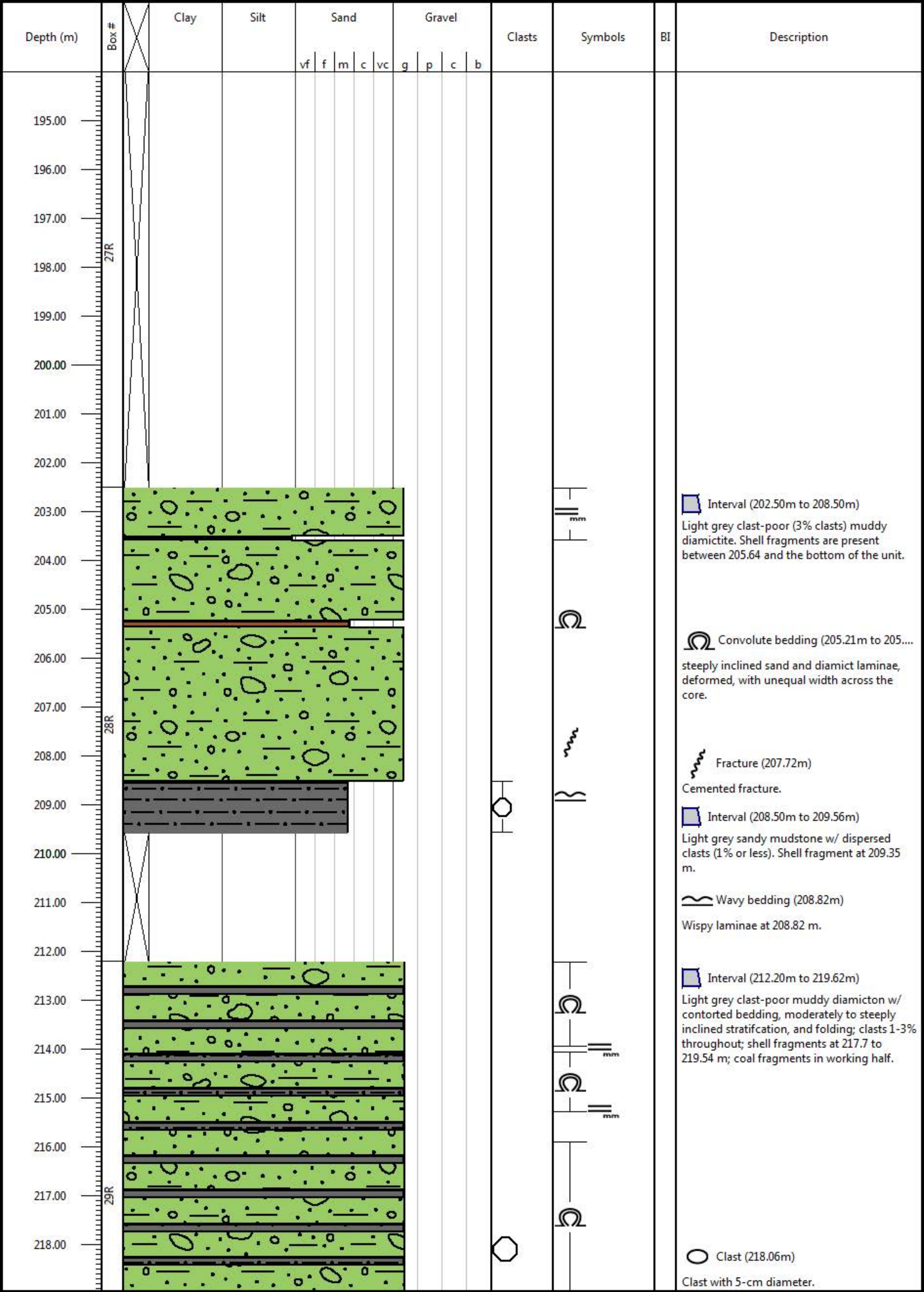
Hole	Core	Section	Top (cm)	Bottom (cm)	Depth (mbsf)	wt. % Al2O3	wt. % CaO	wt. % Na2O	wt. % K2O	CIA	K+Na/Al	MAT	Age (Ma)
739C	28R	1	38	40	202.88	9.40	0.99	1.37	2.16	59.50	0.488452	8.26	32.92
739C	29R	3	90	92	216.1	11.25	1.37	1.57	2.61	58.74	0.480598	8.40	33.01
739C	30R	1	101	103	222.81	12.07	1.47	1.73	2.72	58.76	0.479912	8.41	33.05
739C	30R	5	101	103	228.81	10.08	1.24	1.54	2.36	57.85	0.504263	7.96	33.09
739C	31R	4	94	96	236.84	11.20	1.12	1.63	2.64	59.65	0.495159	8.13	33.15
739C	33R	2	64	66	252.84	12.09	1.17	1.94	3.10	58.22	0.541863	7.27	33.26
739C	33R	6	22	24	258.42	11.85	1.40	1.94	2.87	57.26	0.532094	7.45	33.29
739C	34R	3	78	80	264.18	12.83	1.33	1.91	3.09	59.01	0.505924	7.93	33.33
739C	35R	3	17	19	273.17	12.30	1.19	1.95	3.01	58.80	0.524989	7.58	33.39
739C	36R	2	57	59	281.77	11.45	1.49	1.71	2.93	56.87	0.522365	7.63	33.45
739C	36R	5	78	80	286.48	11.30	1.54	1.80	2.65	56.68	0.515923	7.75	33.48
739C	38R	4	15	17	303.55	10.28	1.11	1.54	2.41	58.97	0.49966	8.05	33.60
739C	39R	2	43	45	310.53	9.87	0.96	1.25	2.36	60.83	0.466387	8.67	33.65
739C	40R	1	40	42	318.6	8.50	0.56	1.07	2.29	61.76	0.498656	8.07	33.70
739C	41R	2	57	59	329.87	10.25	1.22	1.25	2.32	60.16	0.445427	9.05	33.78
739C	42R	1	60	62	338.1	8.09	0.63	1.03	2.02	61.71	0.478678	8.44	33.84
739C	46R	2	32	34	378.02	9.54	0.64	1.07	2.29	63.86	0.443694	9.09	34.11
739C	47R	1	40	42	386.3	10.36	1.02	1.19	2.55	61.19	0.456085	8.86	34.16
739C	48R	1	61	63	396.21	9.16	0.55	0.91	2.47	63.97	0.454478	8.89	34.23
739C	51R	2	62	64	426.62	11.65	0.58	1.19	2.57	66.78	0.406962	9.77	34.44
739C	56R	1	7	9	453.57	10.06	0.43	0.92	2.55	66.54	0.42549	9.42	34.62
739C	58R	2	50	52	465.2	11.30	0.64	0.87	2.68	67.32	0.382832	10.21	34.70
739C	60R	1	72	74	473.62	14.00	0.67	1.30	3.08	67.72	0.39009	10.08	34.76
739C	62R	CC	8	9	482.68	11.52	0.49	0.96	2.74	67.99	0.393863	10.01	34.82
742A	20R	1	137	139	172.67	14.66	0.45	1.25	3.09	70.19	0.369177	10.46	34.83
742A	20R	2	48	50	173.28	24.06	0.39	1.34	3.01	79.57	0.227362	13.09	34.83
742A	20R	2	77	79	173.57	12.56	0.42	1.17	2.87	68.46	0.400215	9.89	34.83
742A	20R	3	56	58	174.86	24.93	0.53	1.62	3.01	78.37	0.237555	12.90	34.84
742A	21R	1	12	14	181.12	13.95	0.49	1.13	2.78	70.76	0.349502	10.83	34.89
742A	21R	1	87	89	181.87	13.27	0.24	1.07	2.90	71.29	0.370097	10.45	34.89
742A	21R	2	37	39	182.87	11.52	0.21	1.01	2.61	70.30	0.389161	10.09	34.90
742A	21R	3	48	50	184.48	13.98	0.36	1.08	2.93	71.46	0.353125	10.76	34.91
742A	22R	1	71	73	191.41	11.63	0.51	1.01	2.61	68.25	0.385907	10.15	34.96
742A	22R	1	137	139	192.07	17.58	0.64	1.37	3.18	71.96	0.323837	11.30	34.96
742A	22R	2	103	105	193.23	13.78	0.24	1.07	2.85	72.26	0.352066	10.78	34.97
742A	22R	3	85	87	194.55	12.67	0.26	1.03	2.77	71.10	0.369724	10.45	34.98
742A	26R	1	38	40	229.58	14.91	0.60	1.33	3.08	69.28	0.369933	10.45	35.21
742A	26R	2	61	63	231.31	12.51	0.34	1.14	2.96	68.66	0.406341	9.78	35.23
742A	27R	7	41	43	248.21	11.70	0.72	0.92	2.74	66.87	0.38372	10.20	35.34
742A	28R	4	28	30	253.28	11.39	0.27	1.04	2.70	69.01	0.406079	9.78	35.38
742A	28R	5	55	57	255.05	10.89	0.28	0.98	2.58	68.86	0.405145	9.80	35.39
742A	28R	5	55	57	255.05	10.81	0.29	0.97	2.57	68.79	0.405405	9.79	35.39
742A	28R	5	55	57	255.05	10.86	0.28	0.95	2.57	69.07	0.400977	9.88	35.39
742A	29R	6	79	81	266.39	10.20	0.29	0.87	2.49	68.71	0.404113	9.82	35.47
742A	30R	4	80	82	273.1	11.00	0.25	0.95	2.56	69.70	0.393786	10.01	35.51
742A	31R	4	110	112	283	10.30	0.29	0.90	2.45	68.82	0.401557	9.87	35.58
742A	32R	4	142	144	293.02	10.58	0.31	0.95	2.60	68.18	0.414007	9.63	35.65
742A	33R	6	9	11	304.29	11.93	0.29	1.00	2.81	69.58	0.393834	10.01	35.72
742A	33R	6	76	78	304.96	12.60	0.39	1.02	2.80	69.91	0.374	10.38	35.73
742A	34R	1	99	101	307.29	18.05	0.34	0.98	3.17	76.10	0.279337	12.13	35.74
742A	34R	2	24	26	308.04	15.33	0.34	1.04	2.98	73.42	0.322247	11.33	35.75
742A	34R	3	51	53	309.81	12.68	0.29	0.93	2.63	72.07	0.345351	10.91	35.76
1166A	15R	5	81	84	139.36	14.86	0.64	0.81	2.56	78.34	0.276448	12.18	35.73
1166A	16R	3	29	31	145.49	11.98	0.51	0.68	2.18	74.97	0.290169	11.93	35.74
1166A	17R	3	26	29	154.66	12.29	0.51	0.95	2.52	74.10	0.349486	10.83	35.75
1166A	18R	1	36	39	161.36	8.89	0.43	0.86	2.39	68.99	0.449472	8.98	35.77
1166A	22R	1	52	56	200.02	9.01	0.49	0.68	2.26	71.64	0.395884	9.97	35.82
1166A	24R	1	52	56	219.22	8.11	0.41	0.68	2.04	69.07	0.409866	9.71	35.85
1166A	03R	1	76	78	20.56	12.49	2.11	2.17	3.22	56.29			Quaternary
1166A	05R	1	65	67	38.85	12.53	2.01	2.28	3.14	56.27			Quaternary
1166A	08R	1	13	15	65.53	11.78	2.00	2.12	3.01	54.93			Quaternary
1166A	09R	1	44	47	75.44	12.25	2.02	2.22	3.20	55.49			Quaternary
1166A	10R	1	41	43	84.81	12.26	2.03	2.25	3.12	55.69			Quaternary
1166A	11R	1	73	77	94.73	12.48	2.10	2.46	3.11	53.88			Quaternary
1166A	12R	1	98	100	104.68	12.52	1.80	2.30	3.29	54.37			Quaternary

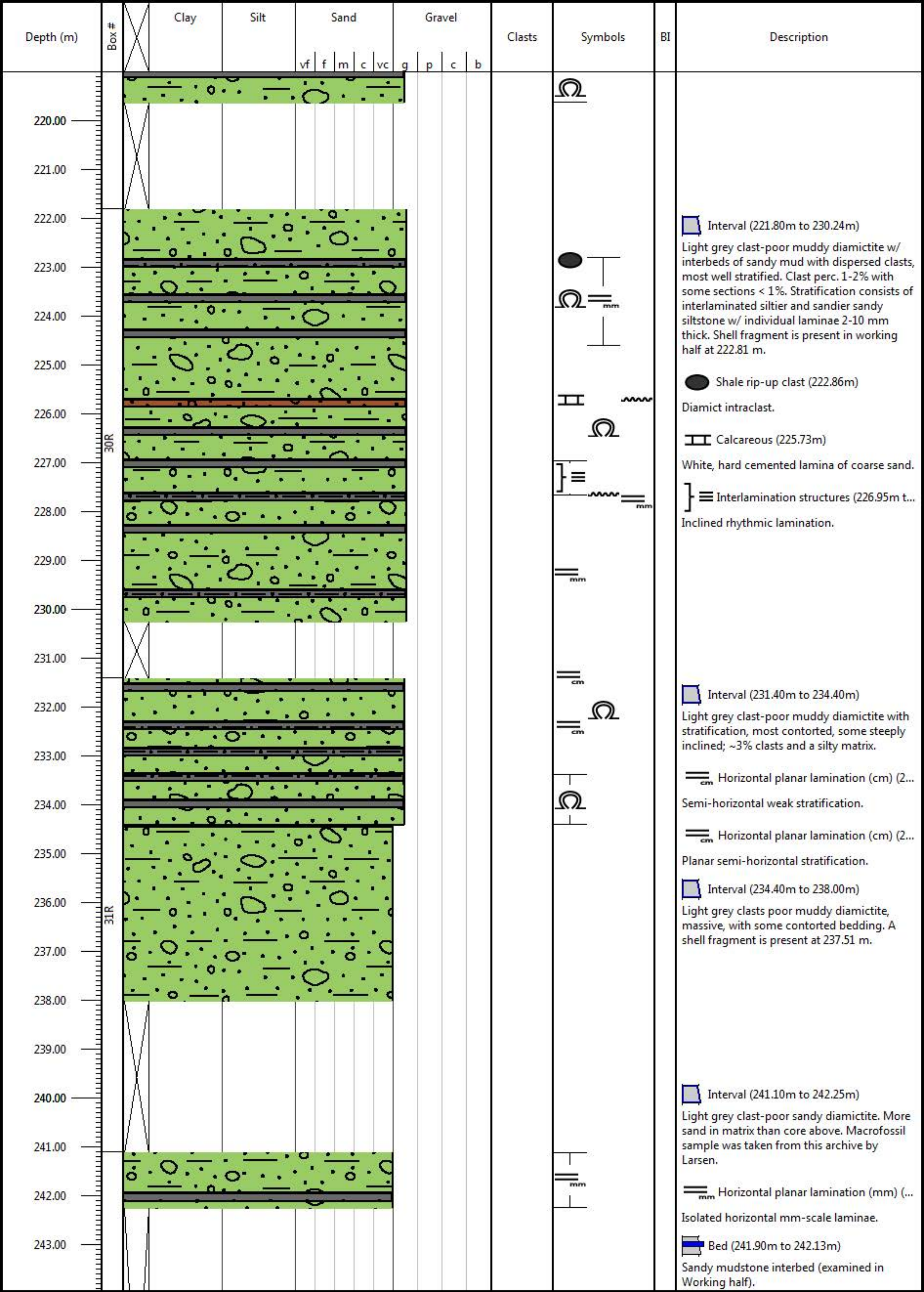
Lithological logs for

ODP Hole 739C

169-483 mbsf


Depth (m)
Box #
Clay
Silt
Sand
vf
f
m
c
vc
Gravel
g
p
c
b
Clasts
Symbols
BI
Description
170.00
171.00
172.00
173.00
174.00
175.00
176.00
177.00
178.00
179.00
180.00
181.00
182.00
183.00
184.00
185.00
186.00
187.00
188.00
189.00
190.00
191.00
192.00
193.00
25R
26R
Interval (169.00m to 169.16m)
Dark grey clast-rich sandy diamictite.
Interval (173.60m to 174.95m)
Light grey clast-poor muddy diamictite, 3-4% clasts, friable; yellow staining present.
Clast (183.20m to 183.35m)
Large banded gneiss pebble.
Interval (183.20m to 183.68m)
Light grey clast-rich sandy diamictite, ~5% clasts, massive.
Interval (183.68m to 186.20m)
Light grey muddy clast-poor diatom-bearing diamictite, weakly stratified with variations in sand percent of the matrix, and sandy mudstone w/ dispersed clasts; ~ 1% clasts.
Interval (186.20m to 187.35m)
Massive clast-poor sandy diamictite, clasts ~1 %; shell fragment at 187.01 m.
Convolute bedding (186.63m to 183....
Soft sediment deformation.
Interval (187.35m to 188.04m)
Stratified, deformed clast-poor muddy diamictite, ~2% clasts, with aligned sediment clasts, and inclined erosive? contact.
Interval (192.90m to 193.70m)
Diatom-rich sandy mudstone w/ dispersed clasts (< 1%); shell fragment at 193.71m; possible foram fragment at 193.75 m; rock contains 7.2% carbonate.
Horizontal planar lamination (cm) (1...
Weak lamination; core is heavily fractured, but lamination is clearly visible in a well-preserved core section.


Depth (m)
Box #
Clay
Silt
Sand
vf
f
m
c
vc
Gravel
g
p
c
b
Clasts
Symbols
BI
Description
195.00
196.00
197.00
198.00
199.00
200.00
201.00
202.00
203.00
204.00
205.00
206.00
207.00
208.00
209.00
210.00
211.00
212.00
213.00
214.00
215.00
216.00
217.00
218.00
27R
28R
29R
mm
Interval (202.50m to 208.50m)
Light grey clast-poor (3% clasts) muddy diamictite. Shell fragments are present between 205.64 and the bottom of the unit.
Convolute bedding (205.21m to 205....
steeply inclined sand and diamict laminae, deformed, with unequal width across the core.
Fracture (207.72m)
Cemented fracture.
Interval (208.50m to 209.56m)
Light grey sandy mudstone w/ dispersed clasts (1% or less). Shell fragment at 209.35 m.
Wavy bedding (208.82m)
Wispy laminae at 208.82 m.
Interval (212.20m to 219.62m)
Light grey clast-poor muddy diamicton w/ contorted bedding, moderately to steeply inclined stratifcation, and folding; clasts 1-3% throughout; shell fragments at 217.7 to 219.54 m; coal fragments in working half.
Clast (218.06m)
Clast with 5-cm diameter.


Depth (m)
Box #
Clay
Silt
Sand
vf f m c vc
Gravel
g p c b
Clasts
Symbols
BI
Description
220.00
221.00
222.00
223.00
224.00
225.00
226.00
227.00
228.00
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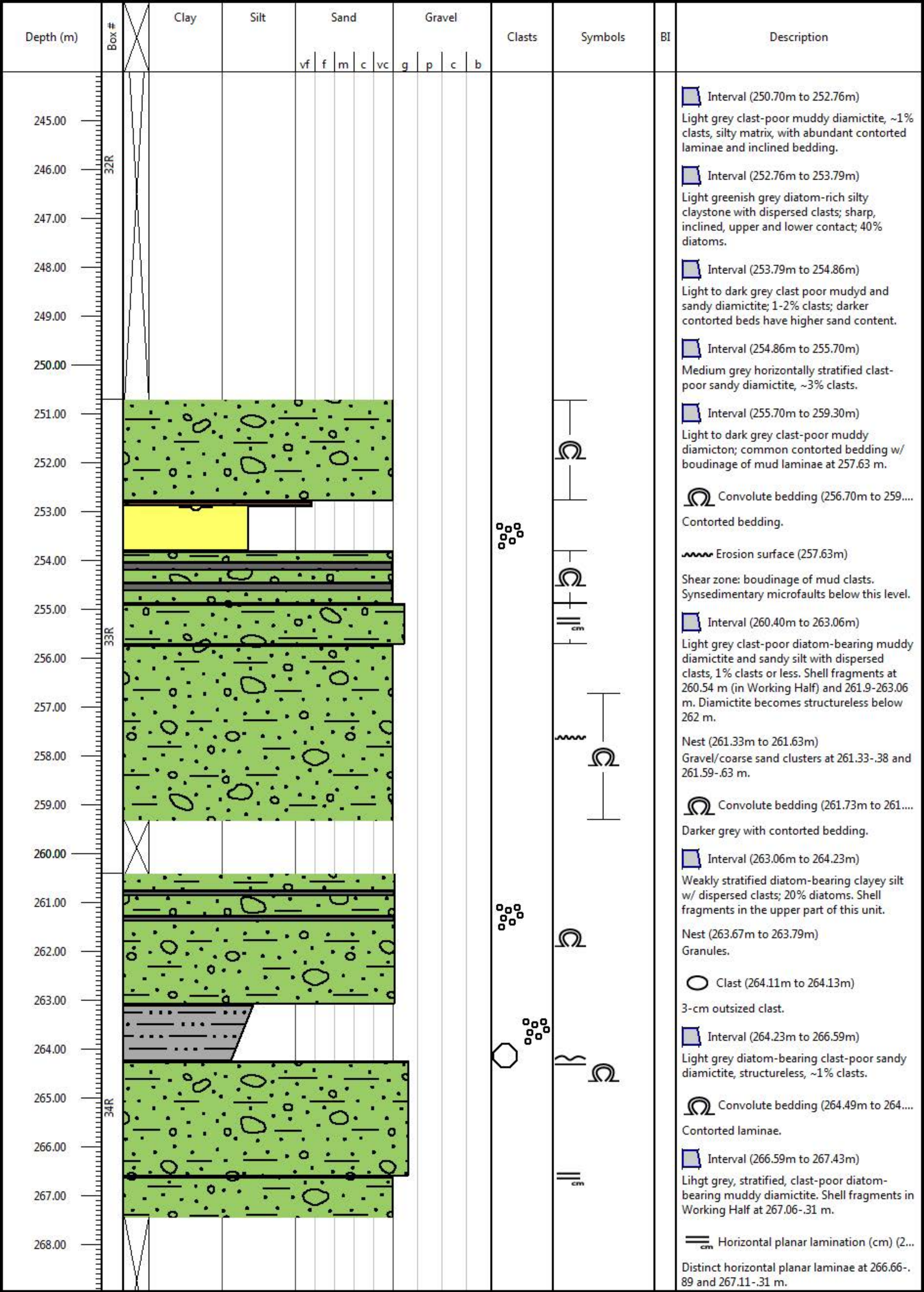
233.00
234.00
235.00
236.00
237.00
238.00
239.00
240.00
241.00
242.00
243.00
30R
31R
Interval (221.80m to 230.24m)
Light grey clast-poor muddy diamictite w/ interbeds of sandy mud with dispersed clasts, most well stratified. Clast perc. 1-2% with some sections < 1%. Stratification consists of interlaminated siltier and sandier sandy siltstone w/ individual laminae 2-10 mm thick. Shell fragment is present in working half at 222.81 m.
Shale rip-up clast (222.86m)
Diamict intraclast.
Calcareous (225.73m)
White, hard cemented lamina of coarse sand.
Interlamination structures (226.95m t...
Inclined rhythmic lamination.
Interval (231.40m to 234.40m)
Light grey clast-poor muddy diamictite with stratification, most contorted, some steeply inclined; ~3% clasts and a silty matrix.
Horizontal planar lamination (cm) (2...
Semi-horizontal weak stratification.
Horizontal planar lamination (cm) (2...
Planar semi-horizontal stratification.
Interval (234.40m to 238.00m)
Light grey clasts poor muddy diamictite, massive, with some contorted bedding. A shell fragment is present at 237.51 m.
Interval (241.10m to 242.25m)
Light grey clast-poor sandy diamictite. More sand in matrix than core above. Macrofossil sample was taken from this archive by Larsen.
Horizontal planar lamination (mm) (...
Isolated horizontal mm-scale laminae.
Bed (241.90m to 242.13m)
Sandy mudstone interbed (examined in Working half).


Depth (m)
Box #
Clay
Silt
Sand
vf f m c vc
Gravel
g p c b
Clasts
Symbols
BI
Description
245.00
246.00
247.00
248.00
249.00
250.00
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252.00
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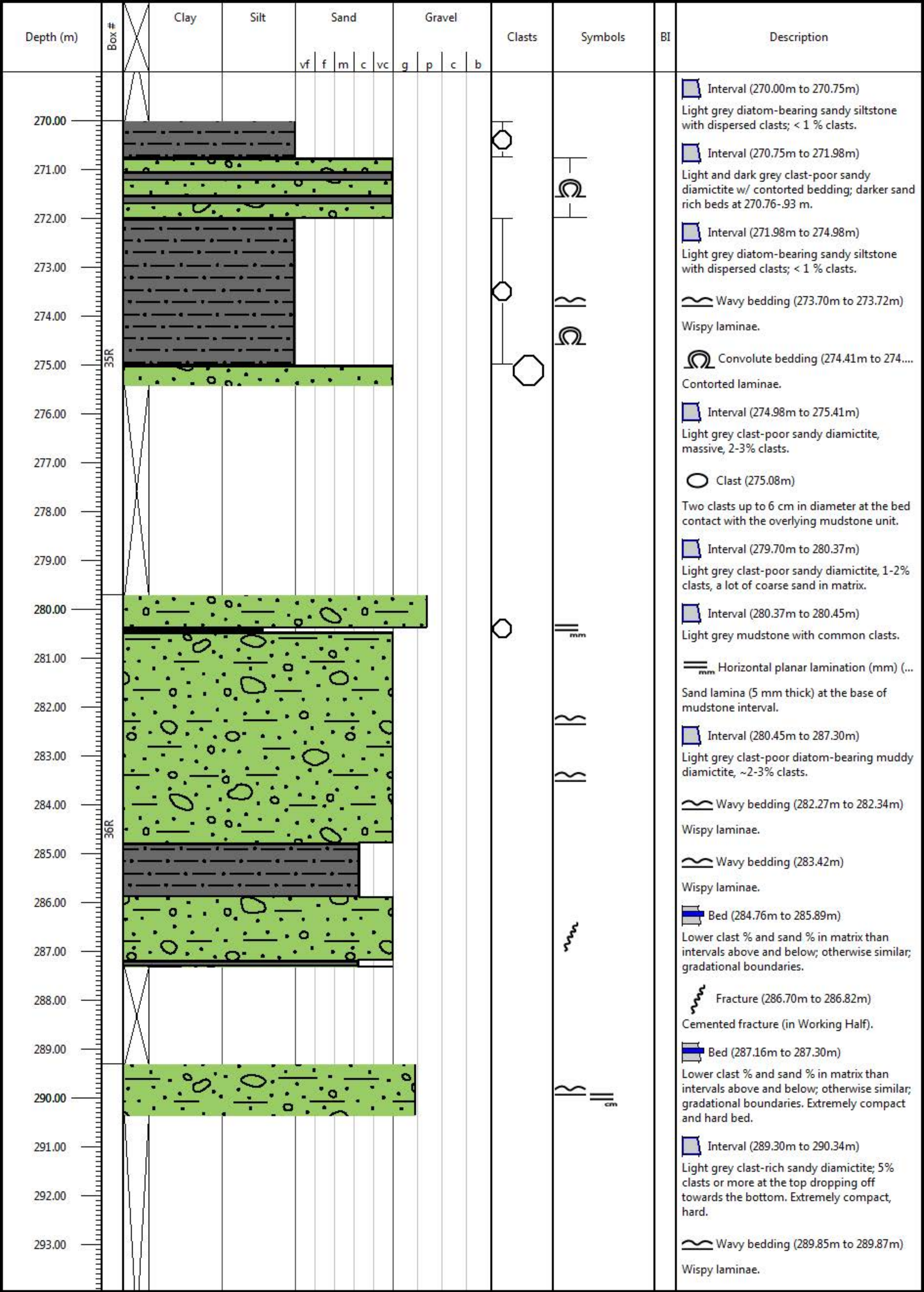
254.00
255.00
256.00
257.00
258.00
259.00
260.00
261.00
262.00
263.00
264.00
265.00
266.00
267.00
268.00
32R
33R
34R
Interval (250.70m to 252.76m)
Light grey clast-poor muddy diamictite, ~1% clasts, silty matrix, with abundant contorted laminae and inclined bedding.
Interval (252.76m to 253.79m)
Light greenish grey diatom-rich silty claystone with dispersed clasts; sharp, inclined, upper and lower contact; 40% diatoms.
Interval (253.79m to 254.86m)
Light to dark grey clast poor mudyd and sandy diamictite; 1-2% clasts; darker contorted beds have higher sand content.
Interval (254.86m to 255.70m)
Medium grey horizontally stratified clast-poor sandy diamictite, ~3% clasts.
Interval (255.70m to 259.30m)
Light to dark grey clast-poor muddy diamicton; common contorted bedding w/ boudinage of mud laminae at 257.63 m.
Convolute bedding (256.70m to 259....
Contorted bedding.
Erosion surface (257.63m)
Shear zone: boudinage of mud clasts. Synsedimentary microfaults below this level.
Interval (260.40m to 263.06m)
Light grey clast-poor diatom-bearing muddy diamictite and sandy silt with dispersed clasts, 1% clasts or less. Shell fragments at 260.54 m (in Working Half) and 261.9-263.06 m. Diamictite becomes structureless below 262 m.
Nest (261.33m to 261.63m)
Gravel/coarse sand clusters at 261.33-.38 and 261.59-.63 m.
Convolute bedding (261.73m to 261....
Darker grey with contorted bedding.
Interval (263.06m to 264.23m)
Weakly stratified diatom-bearing clayey silt w/ dispersed clasts; 20% diatoms. Shell fragments in the upper part of this unit.
Nest (263.67m to 263.79m)
Granules.
Clast (264.11m to 264.13m)
3-cm outsized clast.
Interval (264.23m to 266.59m)
Light grey diatom-bearing clast-poor sandy diamictite, structureless, ~1% clasts.
Convolute bedding (264.49m to 264....
Contorted laminae.
Interval (266.59m to 267.43m)
Lihgt grey, stratified, clast-poor diatom-bearing muddy diamictite. Shell fragments in Working Half at 267.06-.31 m.
Horizontal planar lamination (cm) (2...
Distinct horizontal planar laminae at 266.66-.89 and 267.11-.31 m.


Depth (m)
Box #
Clay
Silt
Sand
vf f m c vc
Gravel
g p c b
Clasts
Symbols
BI
Description
270.00
271.00
272.00
273.00
274.00
275.00
276.00
277.00
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279.00
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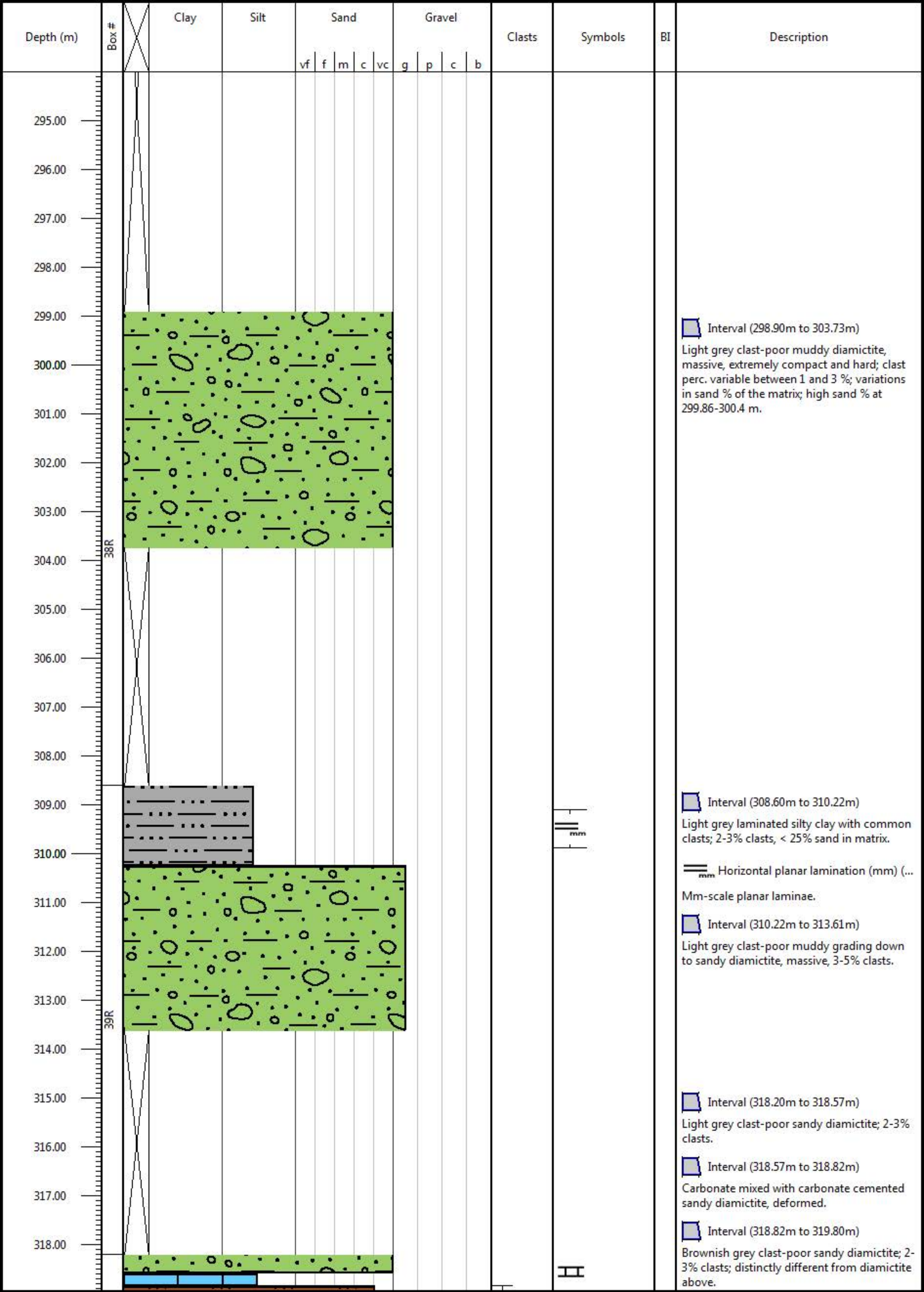
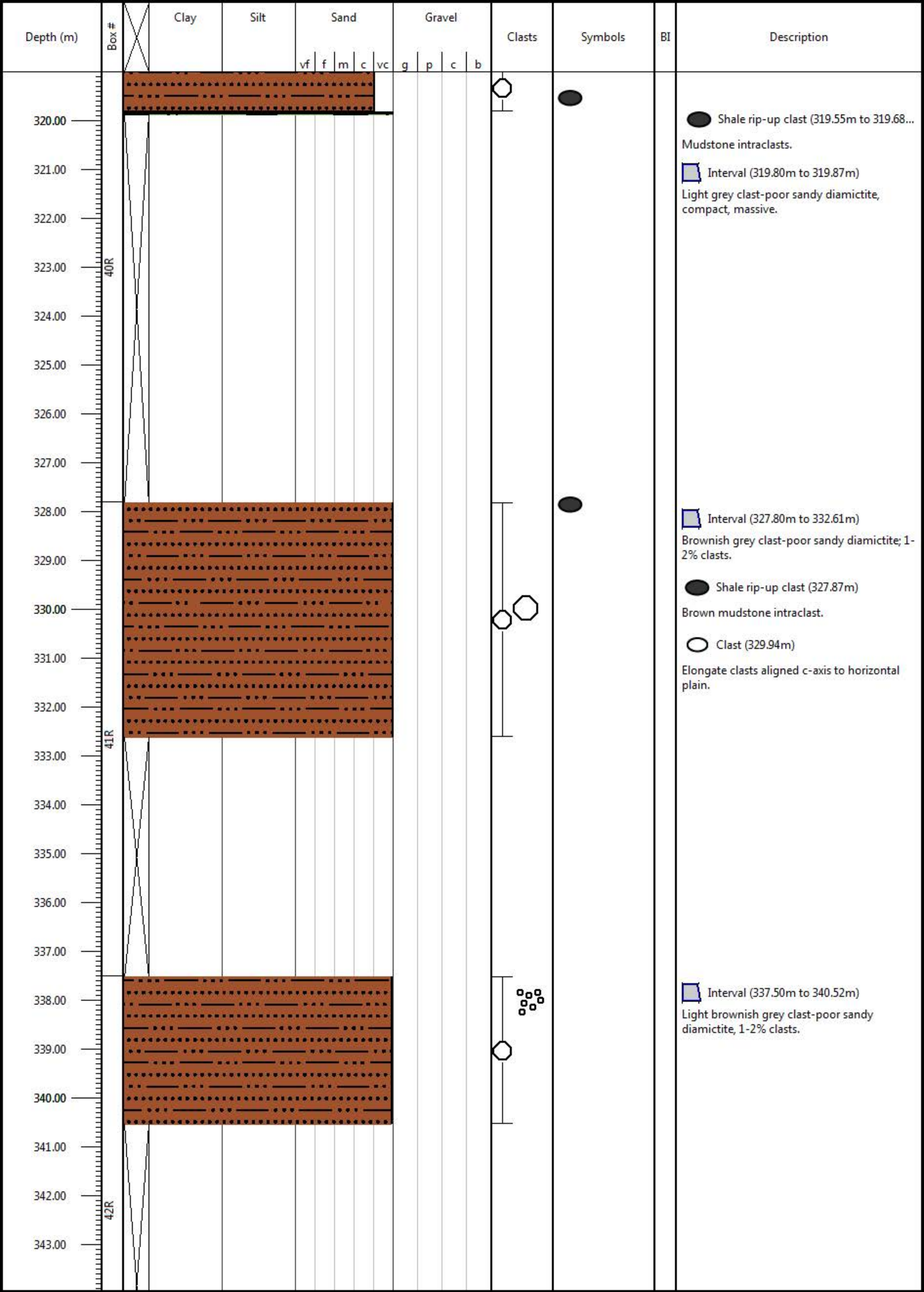
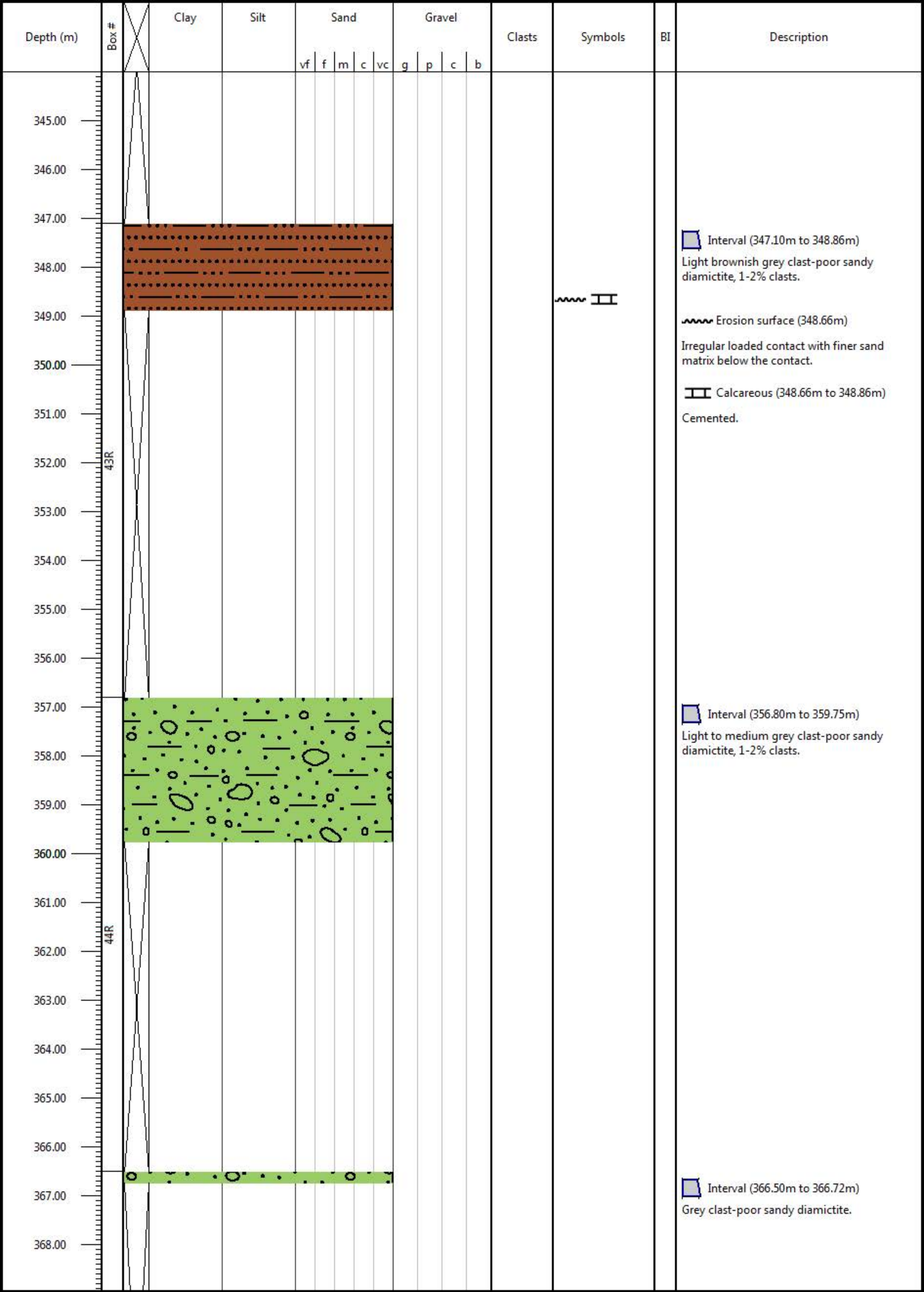
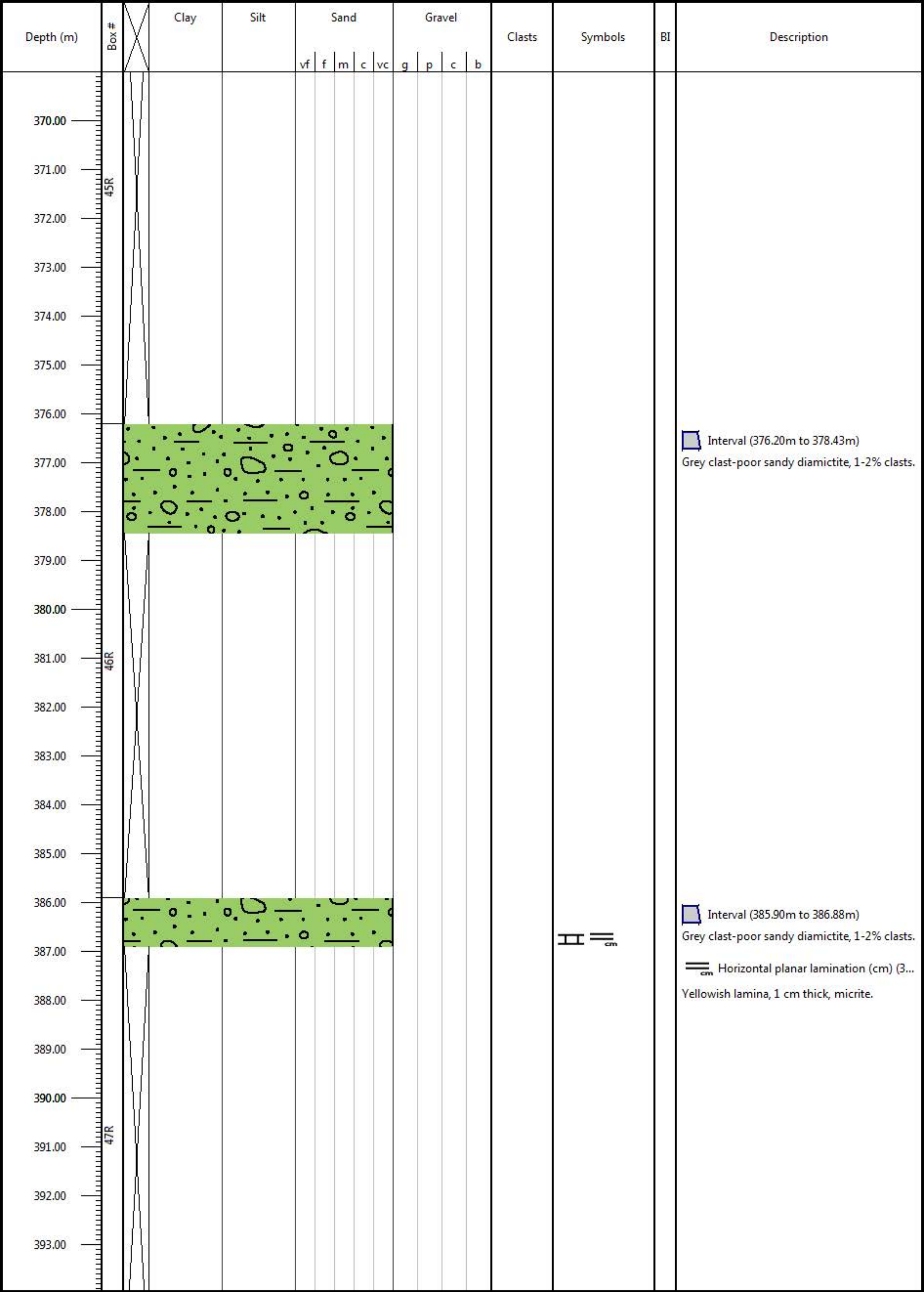
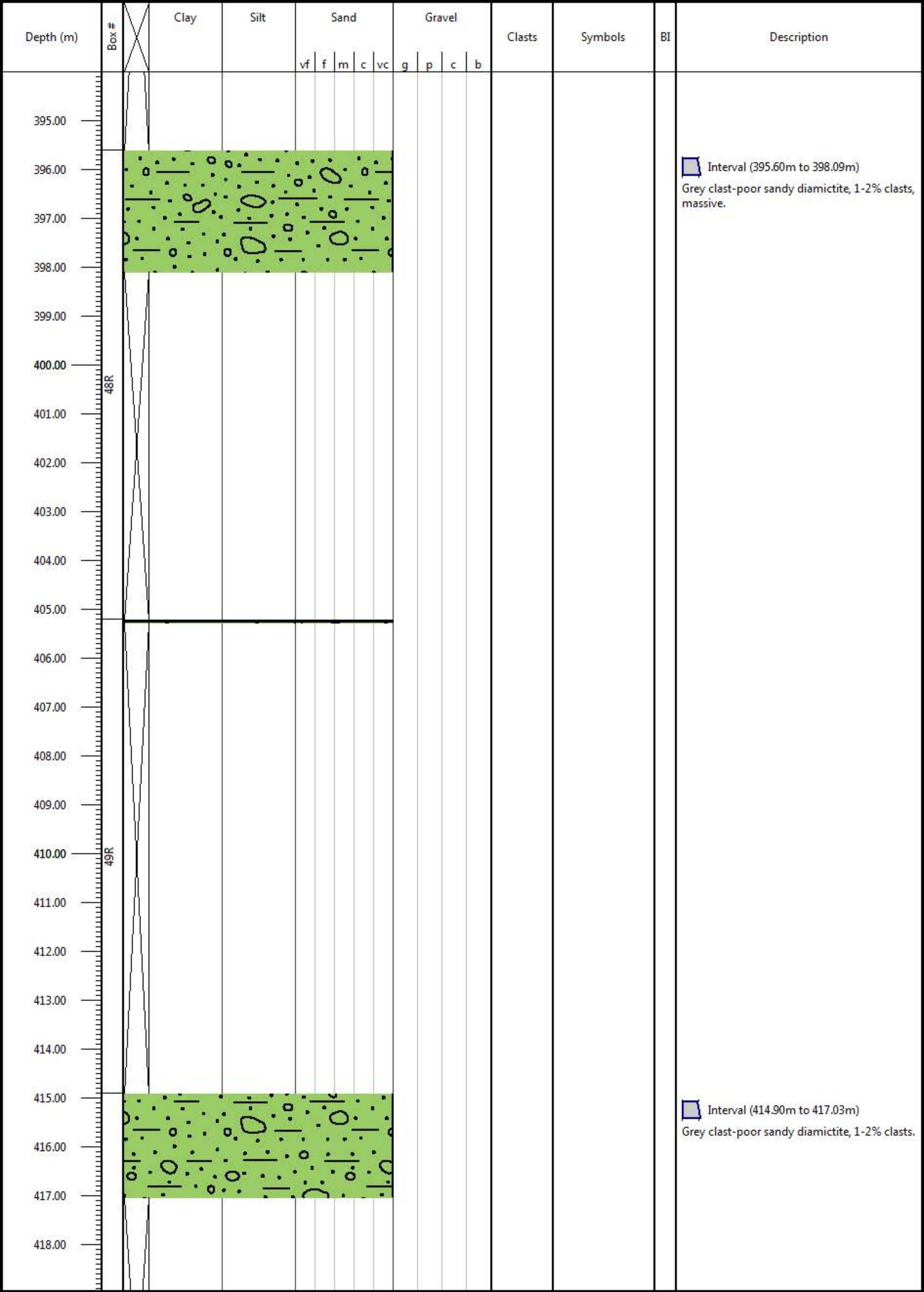
282.00
283.00
284.00
285.00
286.00
287.00
288.00
289.00
290.00
291.00
292.00
293.00
35R
36R
Interval (270.00m to 270.75m)
Light grey diatom-bearing sandy siltstone with dispersed clasts; < 1 % clasts.
Interval (270.75m to 271.98m)
Light and dark grey clast-poor sandy diamictite w/ contorted bedding; darker sand rich beds at 270.76-.93 m.
Interval (271.98m to 274.98m)
Light grey diatom-bearing sandy siltstone with dispersed clasts; < 1 % clasts.
Wavy bedding (273.70m to 273.72m)
Wispy laminae.
Convolute bedding (274.41m to 274....
Contorted laminae.
Interval (274.98m to 275.41m)
Light grey clast-poor sandy diamictite, massive, 2-3% clasts.
Clast (275.08m)
Two clasts up to 6 cm in diameter at the bed contact with the overlying mudstone unit.
Interval (279.70m to 280.37m)
Light grey clast-poor sandy diamictite, 1-2% clasts, a lot of coarse sand in matrix.
Interval (280.37m to 280.45m)
Light grey mudstone with common clasts.
Horizontal planar lamination (mm) (...
Sand lamina (5 mm thick) at the base of mudstone interval.
Interval (280.45m to 287.30m)
Light grey clast-poor diatom-bearing muddy diamictite, ~2-3% clasts.
Wavy bedding (282.27m to 282.34m)
Wispy laminae.
Wavy bedding (283.42m)
Wispy laminae.
Bed (284.76m to 285.89m)
Lower clast % and sand % in matrix than intervals above and below; otherwise similar; gradational boundaries.
Fracture (286.70m to 286.82m)
Cemented fracture (in Working Half).
Bed (287.16m to 287.30m)
Lower clast % and sand % in matrix than intervals above and below; otherwise similar; gradational boundaries. Extremely compact and hard bed.
Interval (289.30m to 290.34m)
Light grey clast-rich sandy diamictite; 5% clasts or more at the top dropping off towards the bottom. Extremely compact, hard.
Wavy bedding (289.85m to 289.87m)
Wispy laminae.

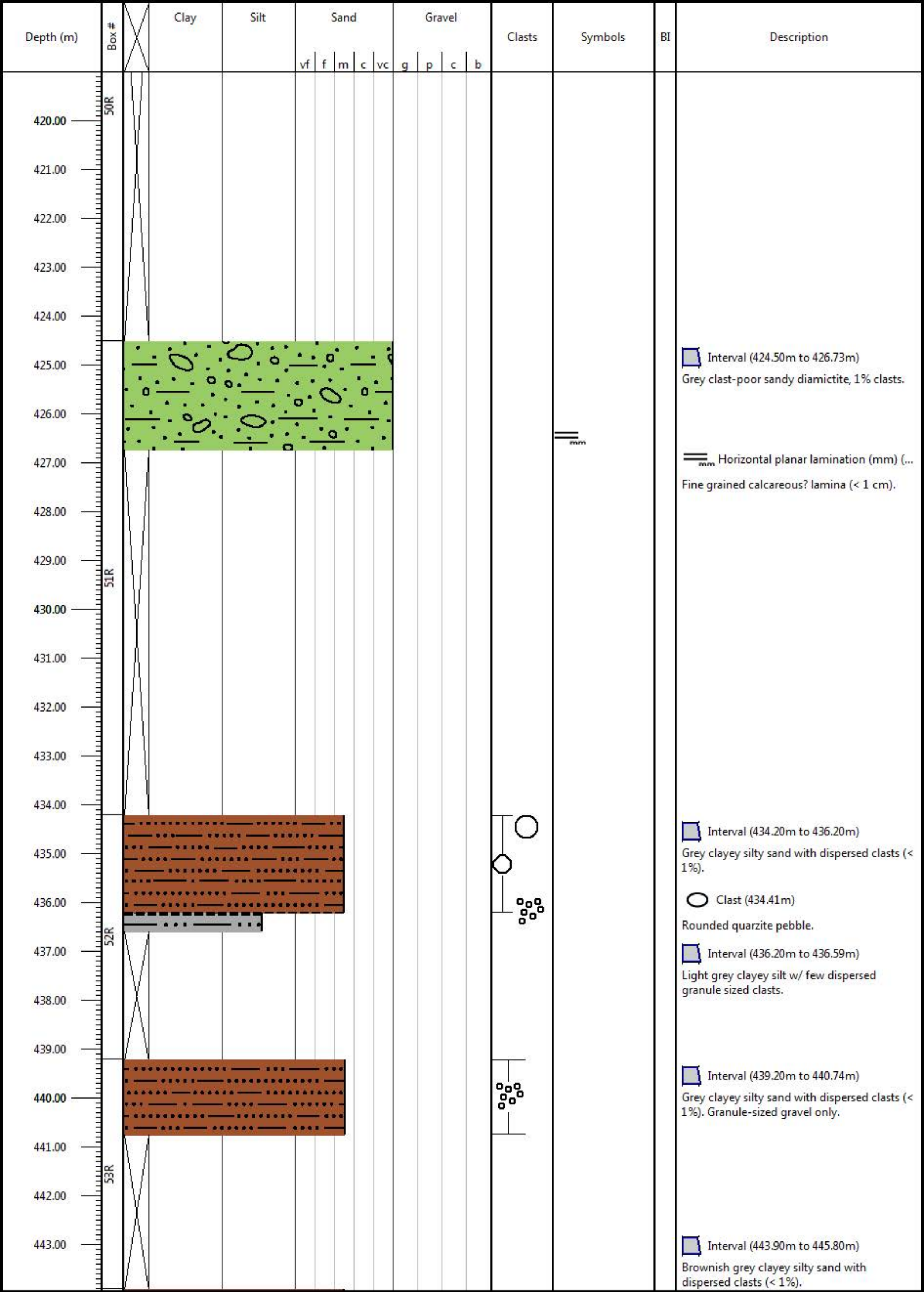

Depth (m)
Box #
Clay
Silt
Sand
vf
f
m
c
vc
Gravel
g
p
c
b
Clasts
Symbols
BI
Description
295.00
296.00
297.00
298.00
299.00
300.00
301.00
302.00
303.00
304.00
305.00
306.00
307.00
308.00
309.00
310.00
311.00
312.00
313.00
314.00
315.00
316.00
317.00
318.00
38R
39R
mm
Interval (298.90m to 303.73m)
Light grey clast-poor muddy diamictite, massive, extremely compact and hard; clast perc. variable between 1 and 3 %; variations in sand % of the matrix; high sand % at 299.86-300.4 m.
Interval (308.60m to 310.22m)
Light grey laminated silty clay with common clasts; 2-3% clasts, < 25% sand in matrix.
Horizontal planar lamination (mm) (...
Mm-scale planar laminae.
Interval (310.22m to 313.61m)
Light grey clast-poor muddy grading down to sandy diamictite, massive, 3-5% clasts.
Interval (318.20m to 318.57m)
Light grey clast-poor sandy diamictite; 2-3% clasts.
Interval (318.57m to 318.82m)
Carbonate mixed with carbonate cemented sandy diamictite, deformed.
Interval (318.82m to 319.80m)
Brownish grey clast-poor sandy diamictite; 2-3% clasts; distinctly different from diamictite above.

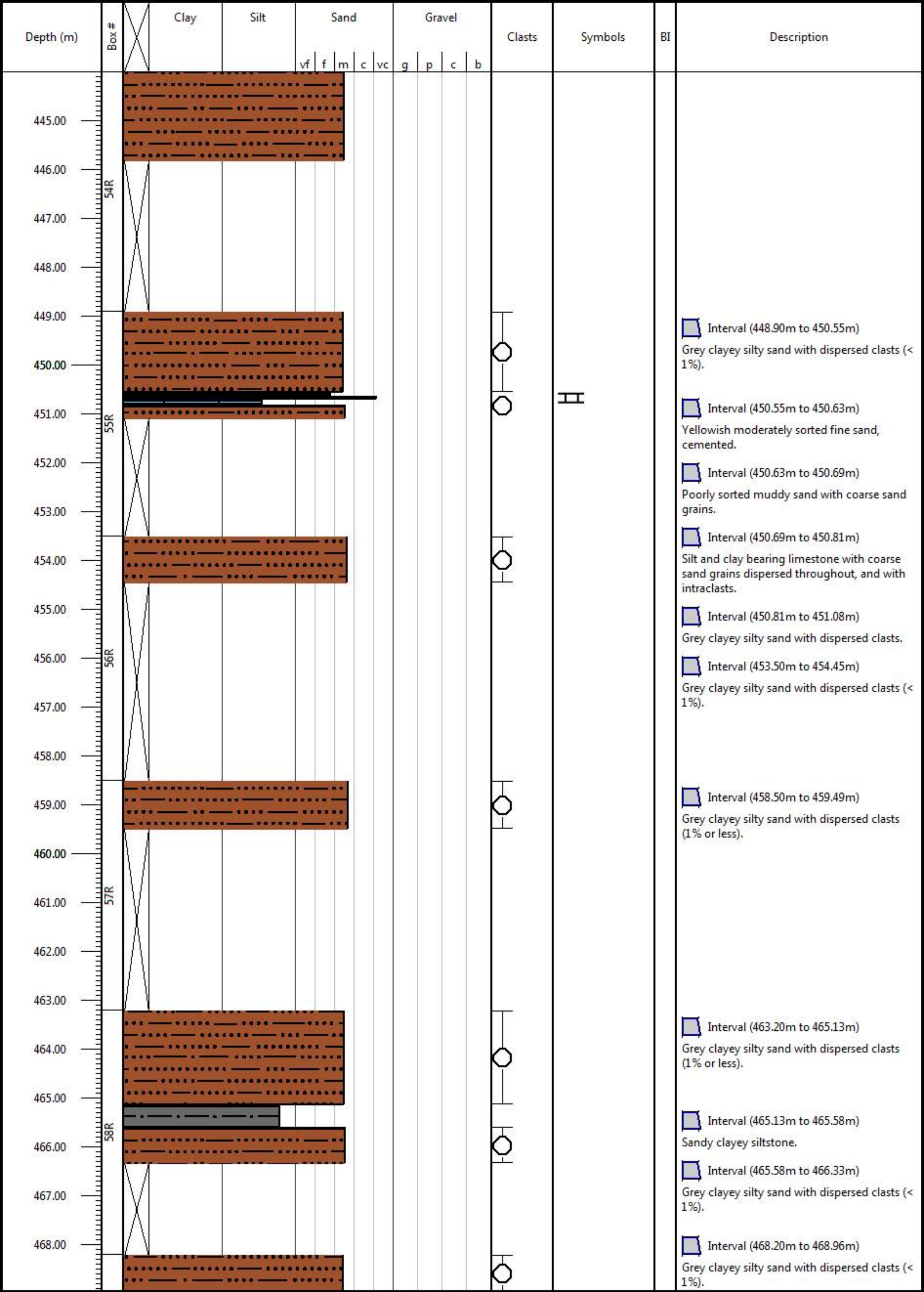

Depth (m)
Box #
Clay
Silt
Sand
vf f m c vc
Gravel
g p c b
Clasts
Symbols
BI
Description
320.00
321.00
322.00
323.00
324.00
325.00
326.00
327.00
328.00
329.00
330.00
331.00
332.00
333.00
334.00
335.00
336.00
337.00
338.00
339.00
340.00
341.00
342.00
343.00
40R
41R
42R
Shale rip-up clast (319.55m to 319.68...
Mudstone intraclasts.
Interval (319.80m to 319.87m)
Light grey clast-poor sandy diamictite, compact, massive.
Interval (327.80m to 332.61m)
Brownish grey clast-poor sandy diamictite; 1-2% clasts.
Shale rip-up clast (327.87m)
Brown mudstone intraclast.
Clast (329.94m)
Elongate clasts aligned c-axis to horizontal plain.
Interval (337.50m to 340.52m)
Light brownish grey clast-poor sandy diamictite, 1-2% clasts.

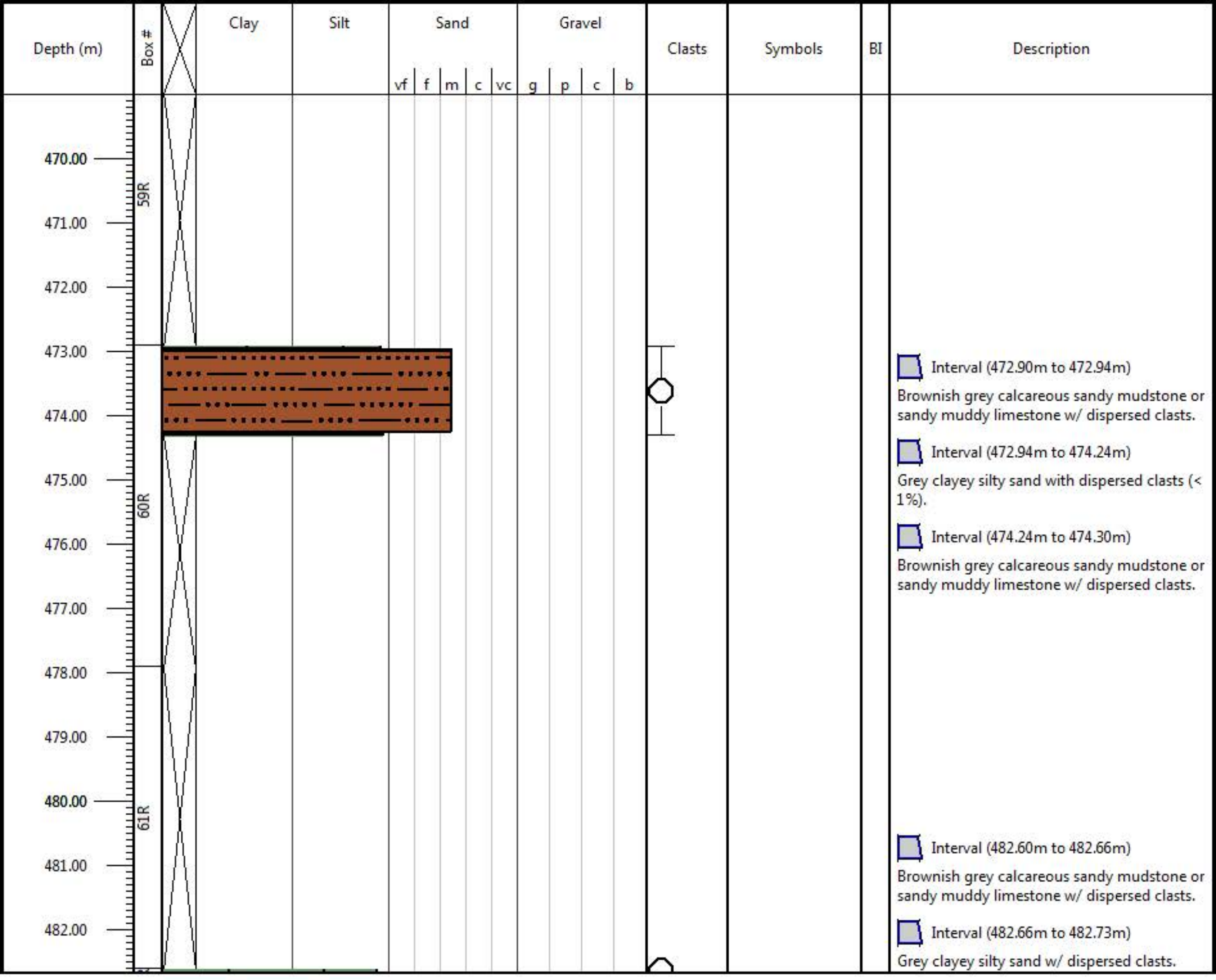

Depth (m)
Box #
Clay
Silt
Sand
vf f m c vc
Gravel
g p c b
Clasts
Symbols
BI
Description
345.00
346.00
347.00
348.00
349.00
350.00
351.00
352.00
353.00
354.00
355.00
356.00
357.00
358.00
359.00
360.00
361.00
362.00
363.00
364.00
365.00
366.00
367.00
368.00
43R
44R
Interval (347.10m to 348.86m)
Light brownish grey clast-poor sandy diamictite, 1-2% clasts.
Erosion surface (348.66m)
Irregular loaded contact with finer sand matrix below the contact.
Calcareous (348.66m to 348.86m)
Cemented.
Interval (356.80m to 359.75m)
Light to medium grey clast-poor sandy diamictite, 1-2% clasts.
Interval (366.50m to 366.72m)
Grey clast-poor sandy diamictite.


Depth (m)
Box #
Clay
Silt
Sand
vf
f
m
c
vc
Gravel
g
p
c
b
Clasts
Symbols
BI
Description
370.00
371.00
372.00
373.00
374.00
375.00
376.00
377.00
378.00
379.00
380.00
381.00
382.00
383.00
384.00
385.00
386.00
387.00
388.00
389.00
390.00
391.00
392.00
393.00
45R
46R
47R
Interval (376.20m to 378.43m)
Grey clast-poor sandy diamictite, 1-2% clasts.
Interval (385.90m to 386.88m)
Grey clast-poor sandy diamictite, 1-2% clasts.
Horizontal planar lamination (cm) (3...
Yellowish lamina, 1 cm thick, micrite.


Depth (m)
Box #
Clay
Silt
Sand
vf f m c vc
Gravel
g p c b
Clasts
Symbols
BI
Description
395.00
396.00
397.00
398.00
399.00
400.00
401.00
402.00
403.00
404.00
405.00
406.00
407.00
408.00
409.00
410.00
411.00
412.00
413.00
414.00
415.00
416.00
417.00
418.00
48R
49R
Interval (395.60m to 398.09m)
Grey clast-poor sandy diamictite, 1-2% clasts, massive.
Interval (414.90m to 417.03m)
Grey clast-poor sandy diamictite, 1-2% clasts.


Depth (m)
Box #
Clay
Silt
Sand
vf
f
m
c
vc
Gravel
g
p
c
b
Clasts
Symbols
BI
Description
50R
51R
52R
53R
420.00
421.00
422.00
423.00
424.00
425.00
426.00
427.00
428.00
429.00
430.00
431.00
432.00
433.00
434.00
435.00
436.00
437.00
438.00
439.00
440.00
441.00
442.00
443.00
mm
Interval (424.50m to 426.73m)
Grey clast-poor sandy diamictite, 1% clasts.
Horizontal planar lamination (mm) (...
Fine grained calcareous? lamina (< 1 cm).
Interval (434.20m to 436.20m)
Grey clayey silty sand with dispersed clasts (< 1%).
Clast (434.41m)
Rounded quarzite pebble.
Interval (436.20m to 436.59m)
Light grey clayey silt w/ few dispersed granule sized clasts.
Interval (439.20m to 440.74m)
Grey clayey silty sand with dispersed clasts (< 1%). Granule-sized gravel only.
Interval (443.90m to 445.80m)
Brownish grey clayey silty sand with dispersed clasts (< 1%).

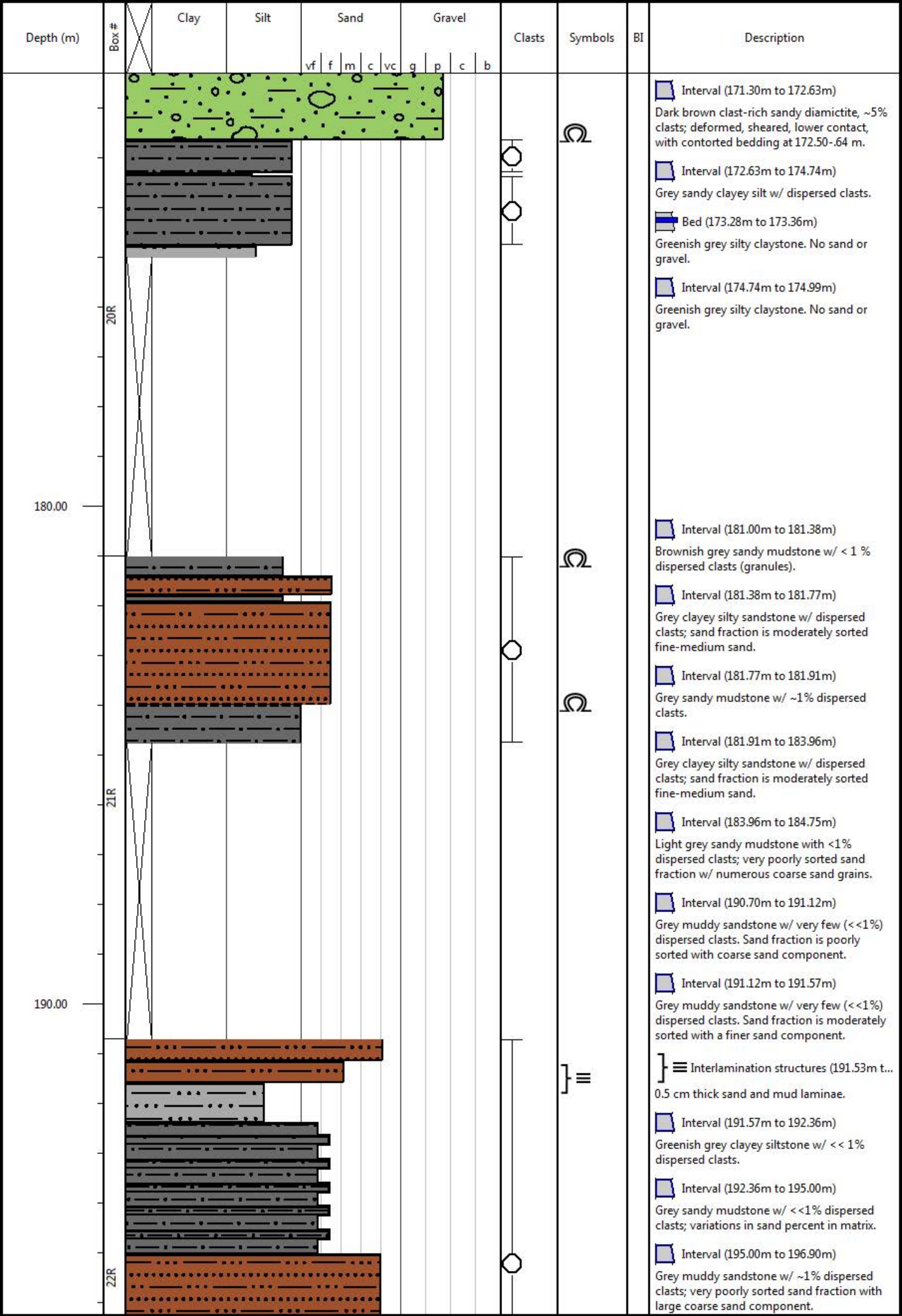

Depth (m)
Box #
Clay
Silt
Sand
vf f m c vc
Gravel
g p c b
Clasts
Symbols
BI
Description
445.00
446.00
447.00
448.00
449.00
450.00
451.00
452.00
453.00
454.00
455.00
456.00
457.00
458.00
459.00
460.00
461.00
462.00
463.00
464.00
465.00
466.00
467.00
468.00
54R
55R
56R
57R
58R
Interval (448.90m to 450.55m)
Grey clayey silty sand with dispersed clasts (< 1%).
Interval (450.55m to 450.63m)
Yellowish moderately sorted fine sand, cemented.
Interval (450.63m to 450.69m)
Poorly sorted muddy sand with coarse sand grains.
Interval (450.69m to 450.81m)
Silt and clay bearing limestone with coarse sand grains dispersed throughout, and with intraclasts.
Interval (450.81m to 451.08m)
Grey clayey silty sand with dispersed clasts.
Interval (453.50m to 454.45m)
Grey clayey silty sand with dispersed clasts (< 1%).
Interval (458.50m to 459.49m)
Grey clayey silty sand with dispersed clasts (1% or less).
Interval (463.20m to 465.13m)
Grey clayey silty sand with dispersed clasts (1% or less).
Interval (465.13m to 465.58m)
Sandy clayey siltstone.
Interval (465.58m to 466.33m)
Grey clayey silty sand with dispersed clasts (< 1%).
Interval (468.20m to 468.96m)
Grey clayey silty sand with dispersed clasts (< 1%).

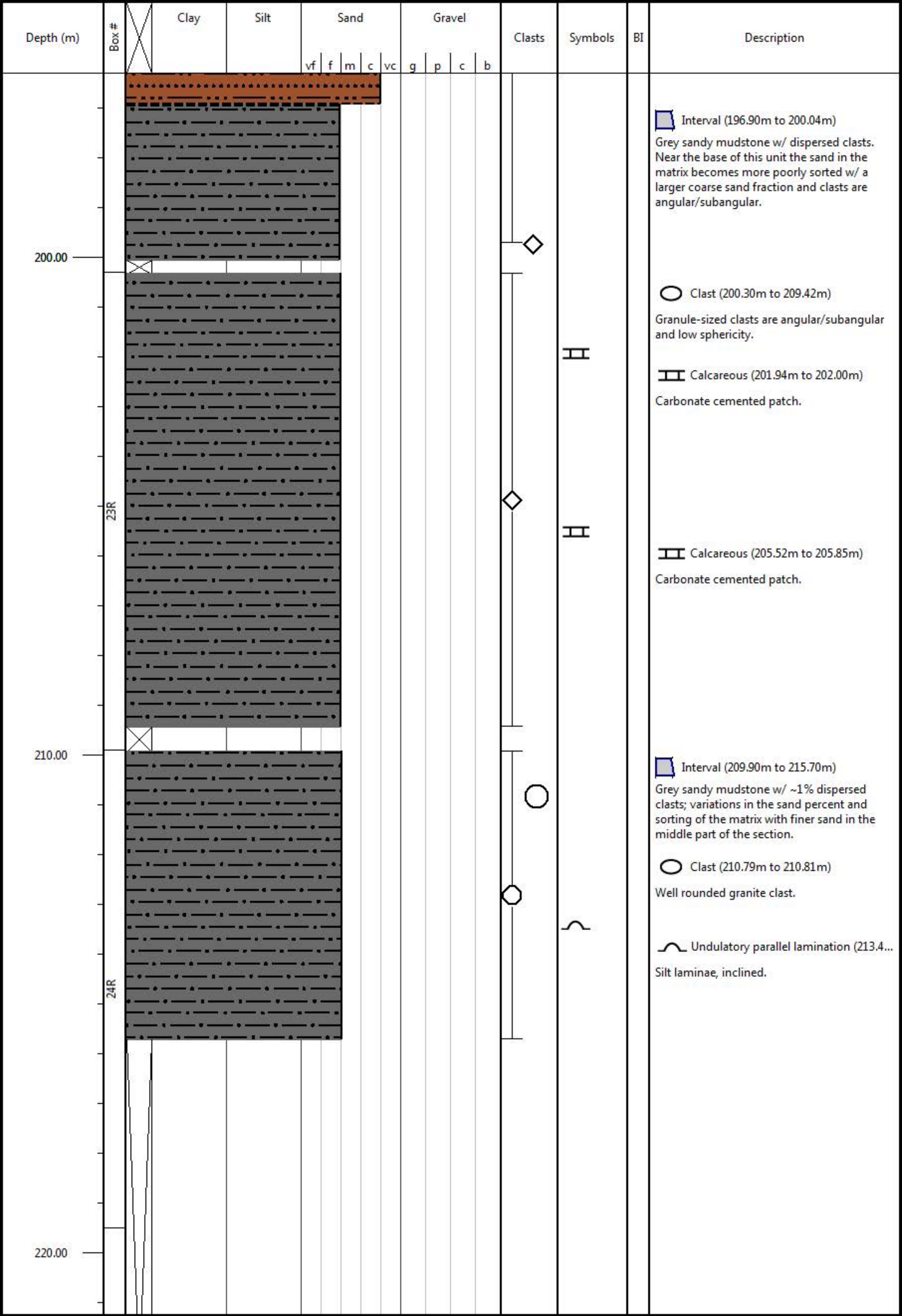

Depth (m)
Box #
Clay
Silt
Sand
vf
f
m
c
vc
Gravel
g
p
c
b
Clasts
Symbols
BI
Description
470.00
471.00
472.00
473.00
474.00
475.00
476.00
477.00
478.00
479.00
480.00
481.00
482.00
59R
60R
61R
Interval (472.90m to 472.94m)
Brownish grey calcareous sandy mudstone or sandy muddy limestone w/ dispersed clasts.
Interval (472.94m to 474.24m)
Grey clayey silty sand with dispersed clasts (< 1%).
Interval (474.24m to 474.30m)
Brownish grey calcareous sandy mudstone or sandy muddy limestone w/ dispersed clasts.
Interval (482.60m to 482.66m)
Brownish grey calcareous sandy mudstone or sandy muddy limestone w/ dispersed clasts.
Interval (482.66m to 482.73m)
Grey clayey silty sand w/ dispersed clasts.

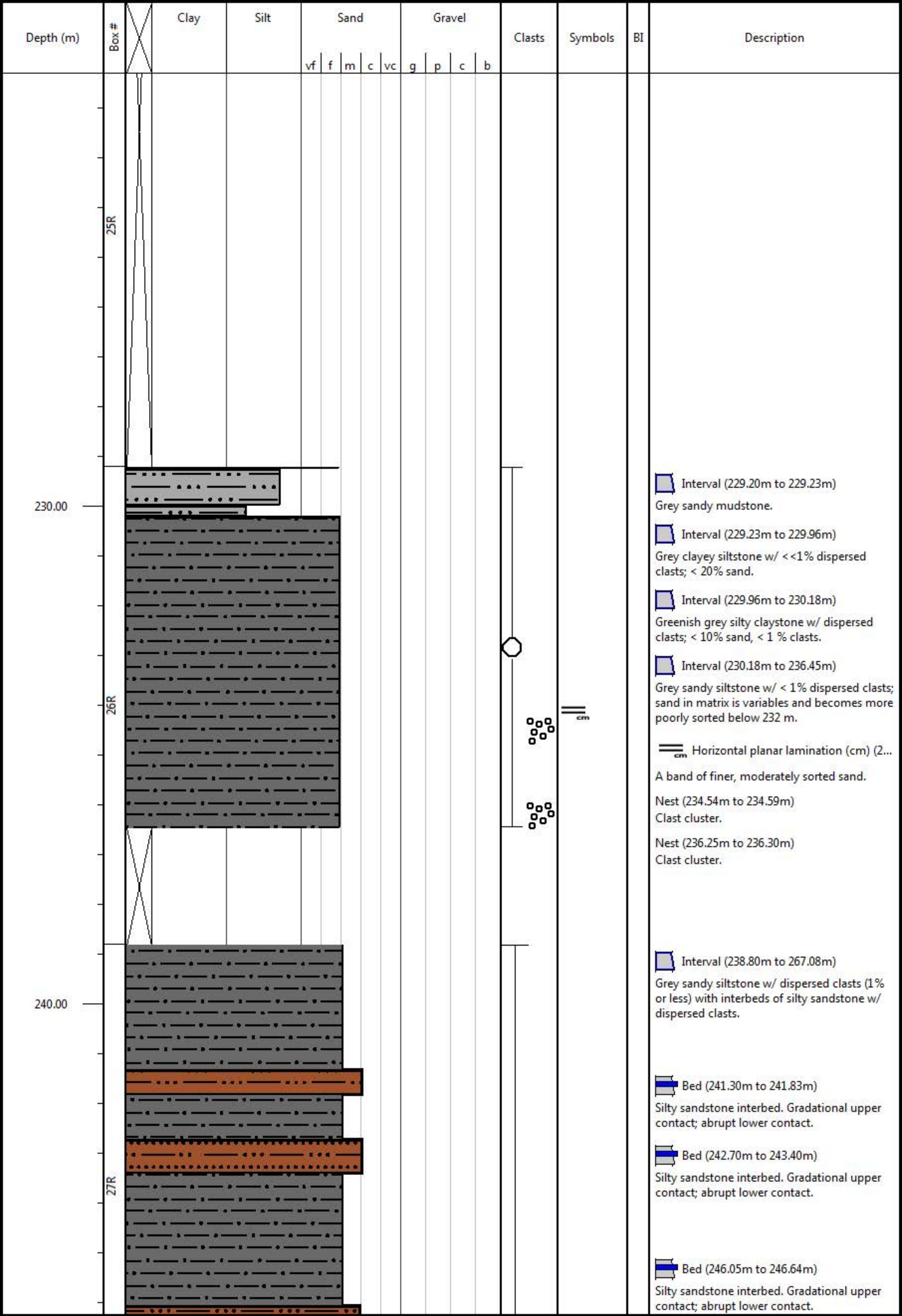
Lithological logs for

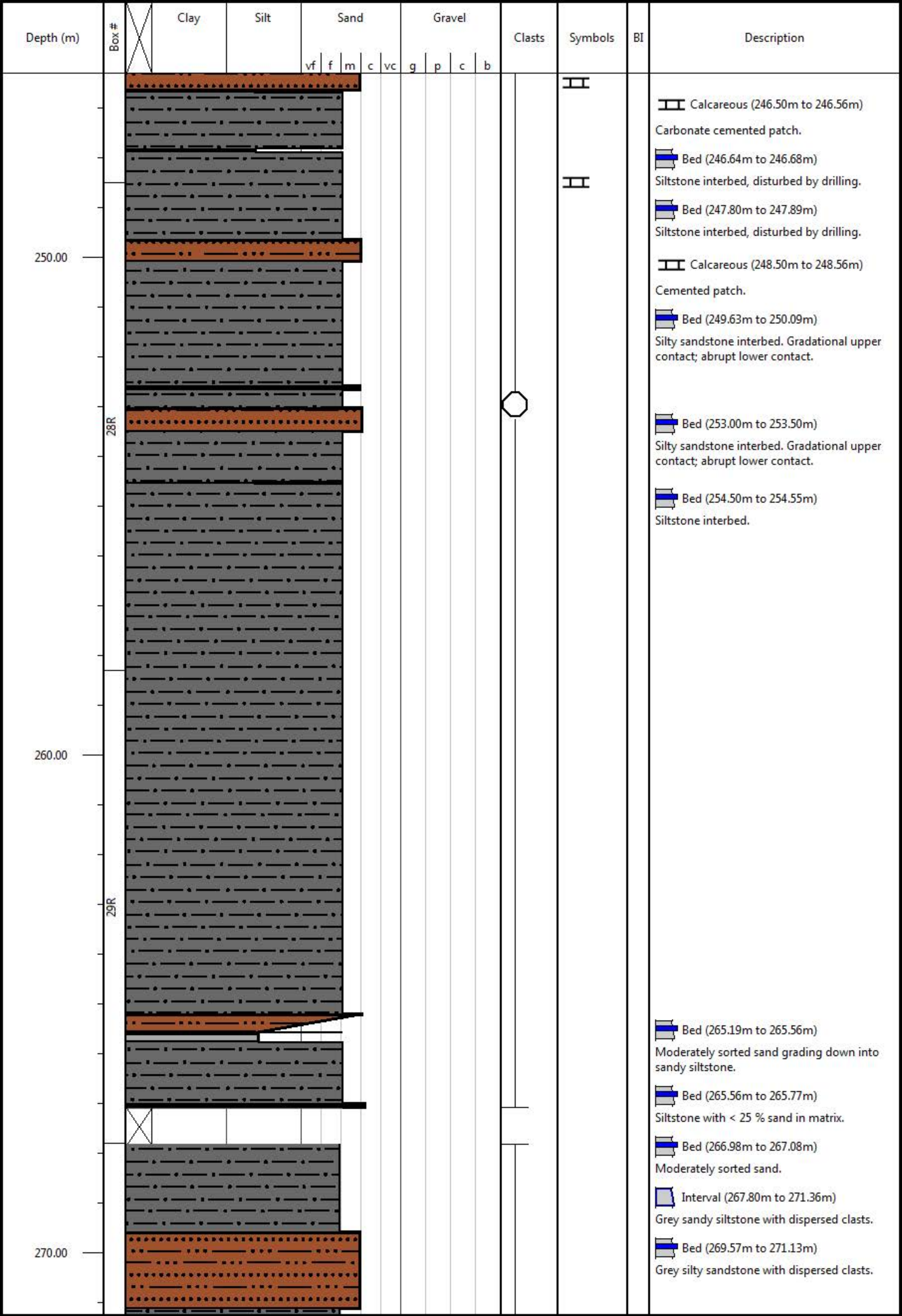
ODP Hole 742A

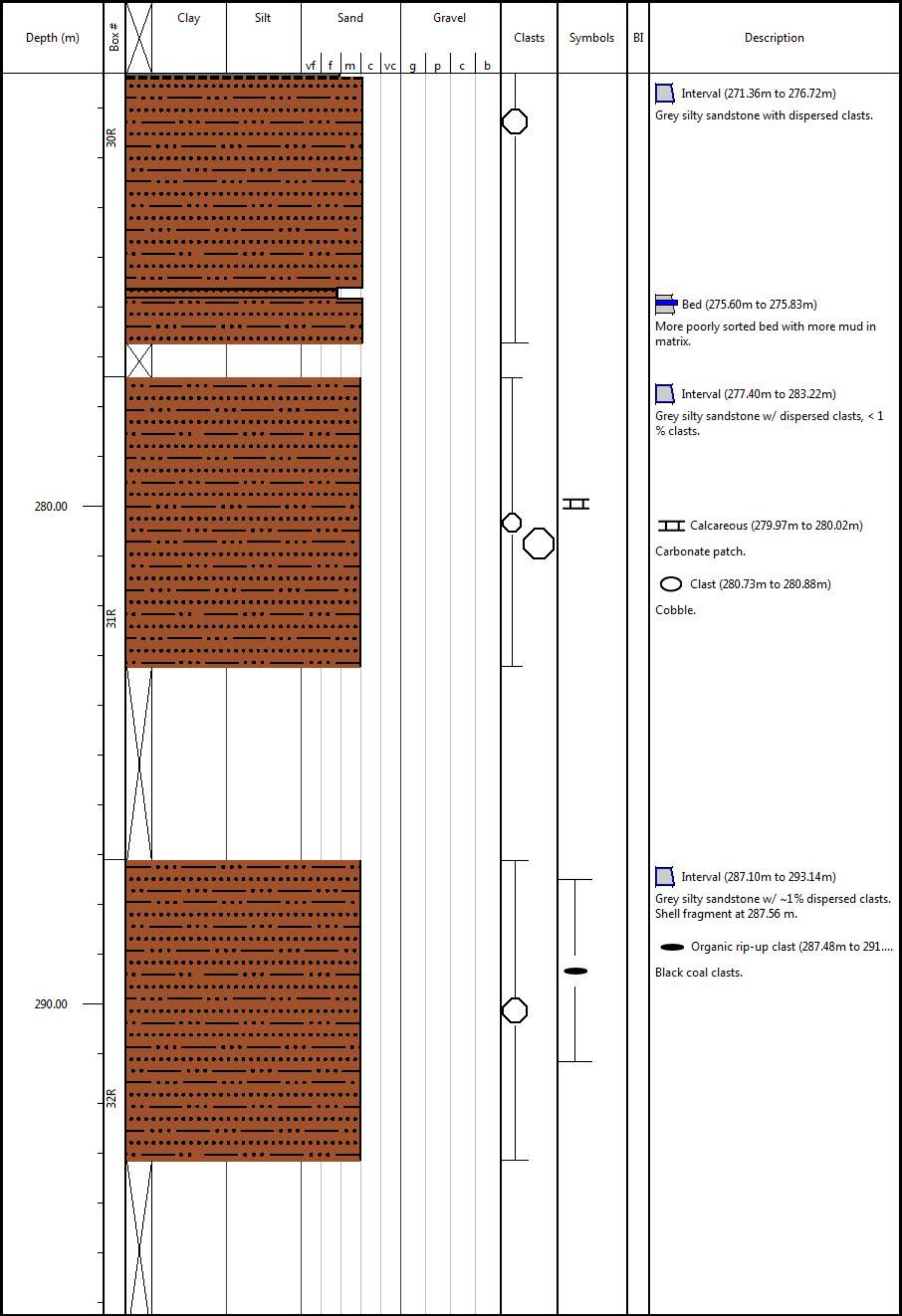
171-315 mbsf

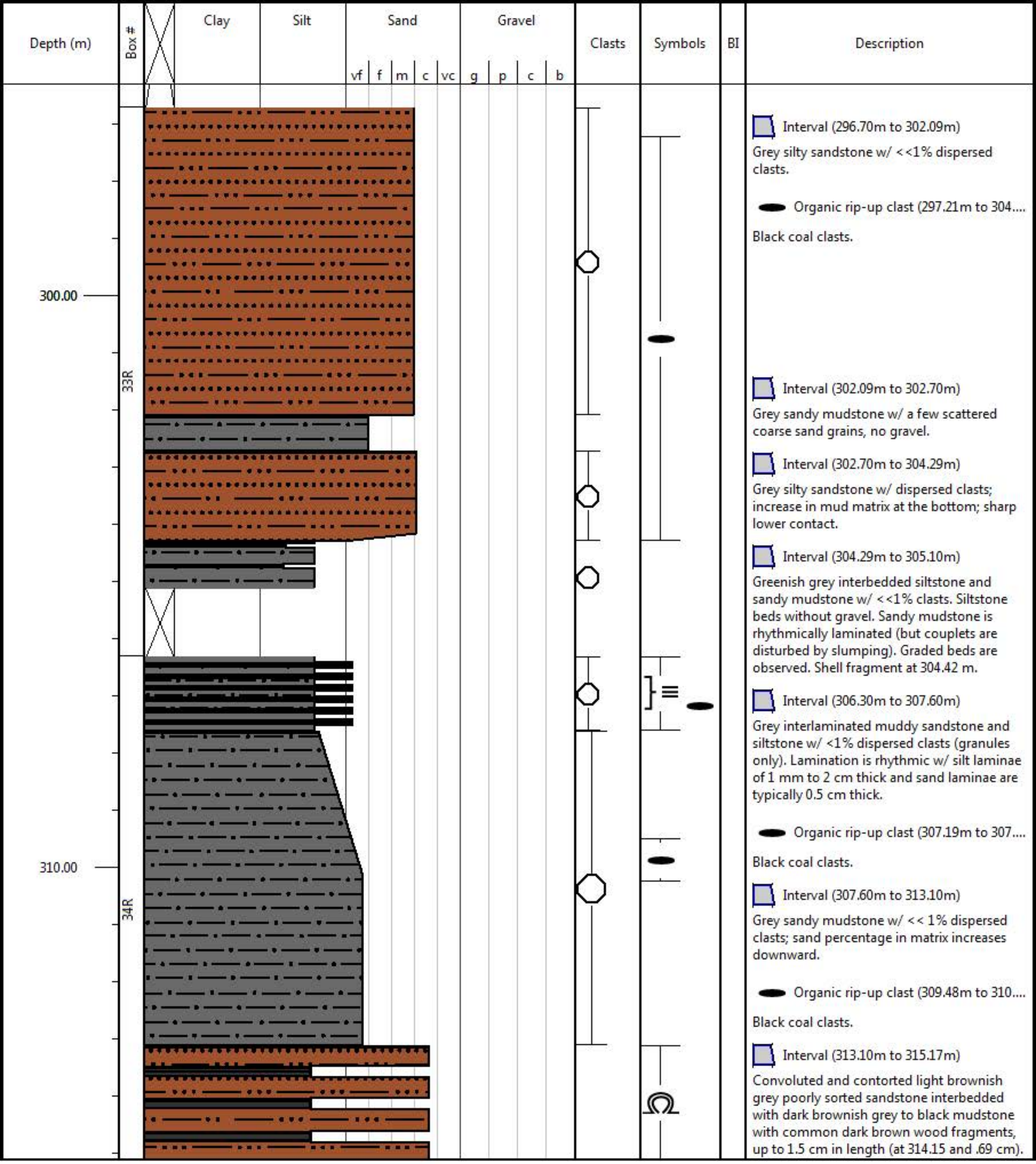

Depth (m)
Box #
Clay
Silt
Sand
Gravel
vf
f
m
c
vc
g
p
c
b
Clasts
Symbols
BI
Description
20R
21R
22R
180.00
190.00
Interval (171.30m to 172.63m)
Dark brown clast-rich sandy diamictite, ~5% clasts; deformed, sheared, lower contact, with contorted bedding at 172.50-.64 m.
Interval (172.63m to 174.74m)
Grey sandy clayey silt w/ dispersed clasts.
Bed (173.28m to 173.36m)
Greenish grey silty claystone. No sand or gravel.
Interval (174.74m to 174.99m)
Greenish grey silty claystone. No sand or gravel.
Interval (181.00m to 181.38m)
Brownish grey sandy mudstone w/ < 1 % dispersed clasts (granules).
Interval (181.38m to 181.77m)
Grey clayey silty sandstone w/ dispersed clasts; sand fraction is moderately sorted fine-medium sand.
Interval (181.77m to 181.91m)
Grey sandy mudstone w/ ~1% dispersed clasts.
Interval (181.91m to 183.96m)
Grey clayey silty sandstone w/ dispersed clasts; sand fraction is moderately sorted fine-medium sand.
Interval (183.96m to 184.75m)
Light grey sandy mudstone with <1% dispersed clasts; very poorly sorted sand fraction w/ numerous coarse sand grains.
Interval (190.70m to 191.12m)
Grey muddy sandstone w/ very few (<<1%) dispersed clasts. Sand fraction is poorly sorted with coarse sand component.
Interval (191.12m to 191.57m)
Grey muddy sandstone w/ very few (<<1%) dispersed clasts. Sand fraction is moderately sorted with a finer sand component.
Interlamination structures (191.53m t...
0.5 cm thick sand and mud laminae.
Interval (191.57m to 192.36m)
Greenish grey clayey siltstone w/ << 1% dispersed clasts.
Interval (192.36m to 195.00m)
Grey sandy mudstone w/ <<1% dispersed clasts; variations in sand percent in matrix.
Interval (195.00m to 196.90m)
Grey muddy sandstone w/ ~1% dispersed clasts; very poorly sorted sand fraction with large coarse sand component.


Depth (m)
Box #
Clay
Silt
Sand
vf f m c vc
Gravel
g p c b
Clasts
Symbols
BI
Description
200.00
210.00
220.00
23R
24R
Interval (196.90m to 200.04m)
Grey sandy mudstone w/ dispersed clasts. Near the base of this unit the sand in the matrix becomes more poorly sorted w/ a larger coarse sand fraction and clasts are angular/subangular.
Clast (200.30m to 209.42m)
Granule-sized clasts are angular/subangular and low sphericity.
Calcareous (201.94m to 202.00m)
Carbonate cemented patch.
Calcareous (205.52m to 205.85m)
Carbonate cemented patch.
Interval (209.90m to 215.70m)
Grey sandy mudstone w/ ~1% dispersed clasts; variations in the sand percent and sorting of the matrix with finer sand in the middle part of the section.
Clast (210.79m to 210.81m)
Well rounded granite clast.
Undulatory parallel lamination (213.4...
Silt laminae, inclined.


Depth (m)
Box #
Clay
Silt
Sand
vf
f
m
c
vc
Gravel
g
p
c
b
Clasts
Symbols
BI
Description
25R
230.00
26R
240.00
27R
cm
Interval (229.20m to 229.23m)
Grey sandy mudstone.
Interval (229.23m to 229.96m)
Grey clayey siltstone w/ <<1% dispersed clasts; < 20% sand.
Interval (229.96m to 230.18m)
Greenish grey silty claystone w/ dispersed clasts; < 10% sand, < 1 % clasts.
Interval (230.18m to 236.45m)
Grey sandy siltstone w/ < 1% dispersed clasts; sand in matrix is variables and becomes more poorly sorted below 232 m.
Horizontal planar lamination (cm) (2...
A band of finer, moderately sorted sand.
Nest (234.54m to 234.59m)
Clast cluster.
Nest (236.25m to 236.30m)
Clast cluster.
Interval (238.80m to 267.08m)
Grey sandy siltstone w/ dispersed clasts (1% or less) with interbeds of silty sandstone w/ dispersed clasts.
Bed (241.30m to 241.83m)
Silty sandstone interbed. Gradational upper contact; abrupt lower contact.
Bed (242.70m to 243.40m)
Silty sandstone interbed. Gradational upper contact; abrupt lower contact.
Bed (246.05m to 246.64m)
Silty sandstone interbed. Gradational upper contact; abrupt lower contact.


Depth (m)
Box #
Clay
Silt
Sand
vf f m c vc
Gravel
g p c b
Clasts
Symbols
BI
Description
250.00
260.00
270.00
28R
29R
Calcareous (246.50m to 246.56m)
Carbonate cemented patch.
Bed (246.64m to 246.68m)
Siltstone interbed, disturbed by drilling.
Bed (247.80m to 247.89m)
Siltstone interbed, disturbed by drilling.
Calcareous (248.50m to 248.56m)
Cemented patch.
Bed (249.63m to 250.09m)
Silty sandstone interbed. Gradational upper contact; abrupt lower contact.
Bed (253.00m to 253.50m)
Silty sandstone interbed. Gradational upper contact; abrupt lower contact.
Bed (254.50m to 254.55m)
Siltstone interbed.
Bed (265.19m to 265.56m)
Moderately sorted sand grading down into sandy siltstone.
Bed (265.56m to 265.77m)
Siltstone with < 25 % sand in matrix.
Bed (266.98m to 267.08m)
Moderately sorted sand.
Interval (267.80m to 271.36m)
Grey sandy siltstone with dispersed clasts.
Bed (269.57m to 271.13m)
Grey silty sandstone with dispersed clasts.

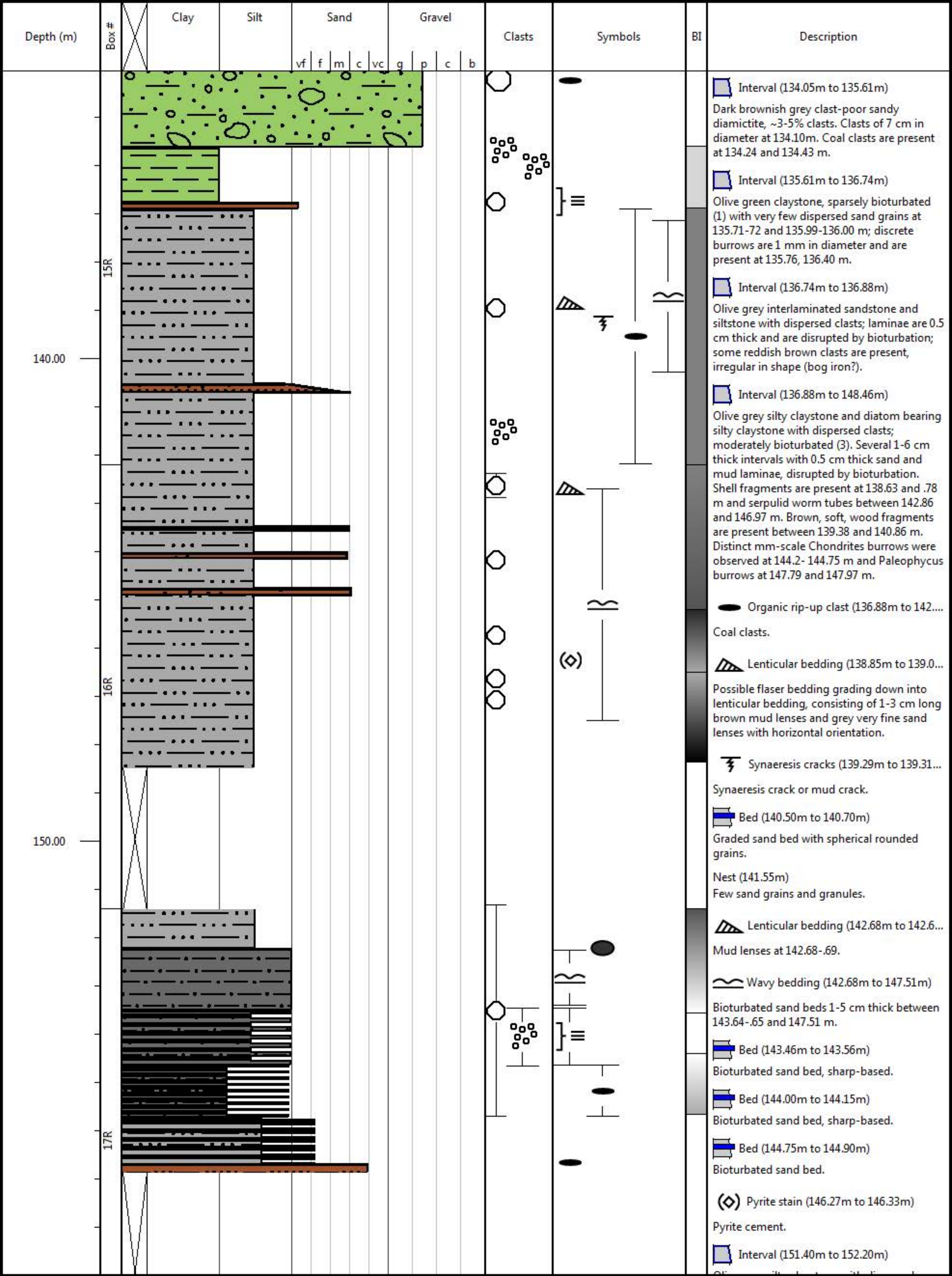

Depth (m)
Box #
Clay
Silt
Sand
vf
f
m
c
vc
Gravel
g
p
c
b
Clasts
Symbols
BI
Description
30R
31R
32R
280.00
290.00
Interval (271.36m to 276.72m)
Grey silty sandstone with dispersed clasts.
Bed (275.60m to 275.83m)
More poorly sorted bed with more mud in matrix.
Interval (277.40m to 283.22m)
Grey silty sandstone w/ dispersed clasts, < 1 % clasts.
Calcareous (279.97m to 280.02m)
Carbonate patch.
Clast (280.73m to 280.88m)
Cobble.
Interval (287.10m to 293.14m)
Grey silty sandstone w/ ~1% dispersed clasts. Shell fragment at 287.56 m.
Organic rip-up clast (287.48m to 291....
Black coal clasts.

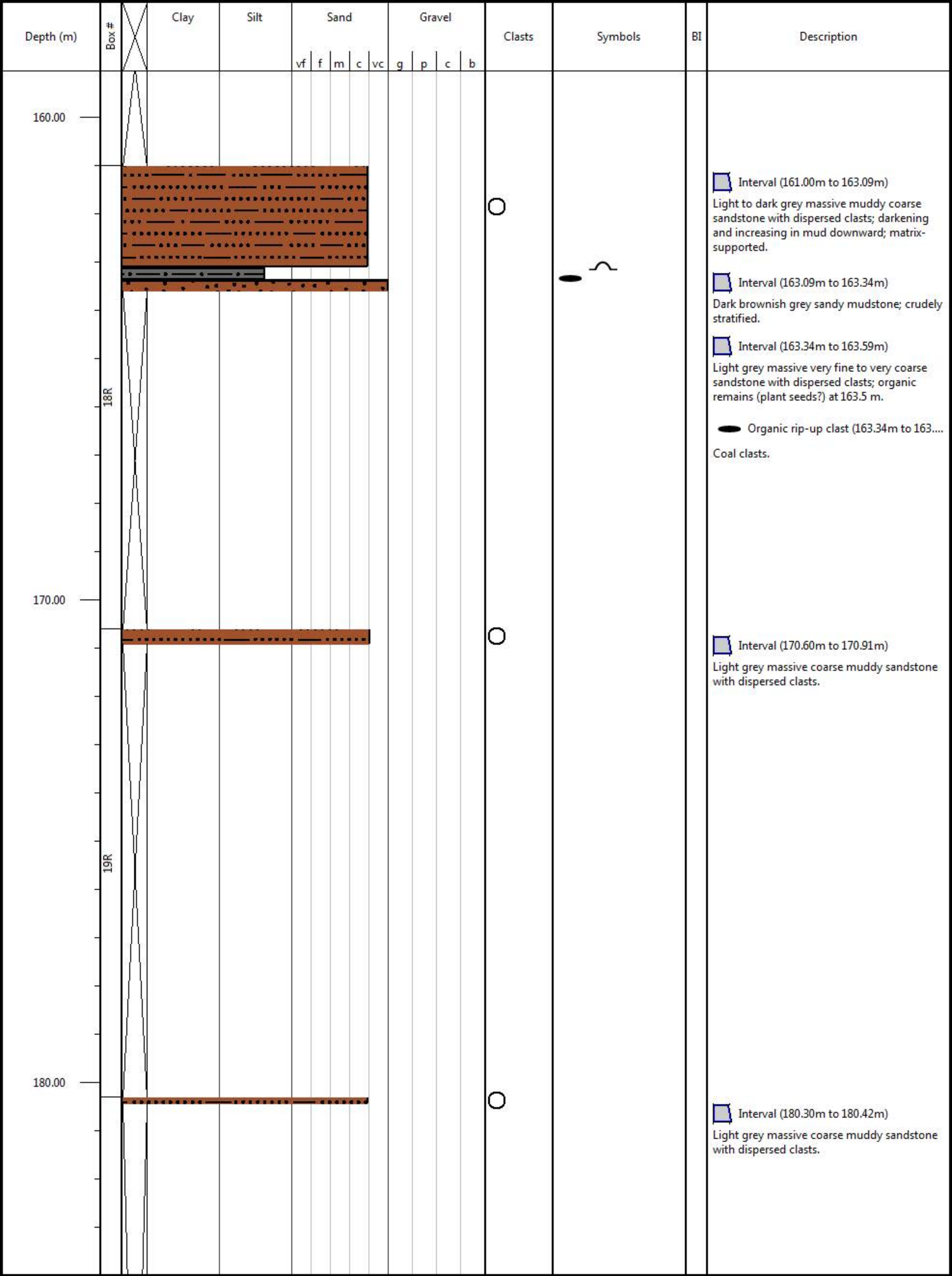

Depth (m)
Box #
Clay
Silt
Sand
vf
f
m
c
vc
Gravel
g
p
c
b
Clasts
Symbols
BI
Description
300.00
310.00
33R
34R
Interval (296.70m to 302.09m)
Grey silty sandstone w/ <<1% dispersed clasts.
Organic rip-up clast (297.21m to 304....
Black coal clasts.
Interval (302.09m to 302.70m)
Grey sandy mudstone w/ a few scattered coarse sand grains, no gravel.
Interval (302.70m to 304.29m)
Grey silty sandstone w/ dispersed clasts; increase in mud matrix at the bottom; sharp lower contact.
Interval (304.29m to 305.10m)
Greenish grey interbedded siltstone and sandy mudstone w/ <<1% clasts. Siltstone beds without gravel. Sandy mudstone is rhythmically laminated (but couplets are disturbed by slumping). Graded beds are observed. Shell fragment at 304.42 m.
Interval (306.30m to 307.60m)
Grey interlaminated muddy sandstone and siltstone w/ <1% dispersed clasts (granules only). Lamination is rhythmic w/ silt laminae of 1 mm to 2 cm thick and sand laminae are typically 0.5 cm thick.
Organic rip-up clast (307.19m to 307....
Black coal clasts.
Interval (307.60m to 313.10m)
Grey sandy mudstone w/ << 1% dispersed clasts; sand percentage in matrix increases downward.
Organic rip-up clast (309.48m to 310....
Black coal clasts.
Interval (313.10m to 315.17m)
Convoluted and contorted light brownish grey poorly sorted sandstone interbedded with dark brownish grey to black mudstone with common dark brown wood fragments, up to 1.5 cm in length (at 314.15 and .69 cm).

Lithological logs for

ODP Hole 1166A

134-209 mbsf


Depth (m)
Box #
Clay
Silt
Sand
vf f m c vc
Gravel
g p c b
Clasts
Symbols
BI
Description
140.00
150.00
15R
16R
17R
Interval (134.05m to 135.61m)
Dark brownish grey clast-poor sandy diamictite, ~3-5% clasts. Clasts of 7 cm in diameter at 134.10m. Coal clasts are present at 134.24 and 134.43 m.
Interval (135.61m to 136.74m)
Olive green claystone, sparsely bioturbated (1) with very few dispersed sand grains at 135.71-72 and 135.99-136.00 m; discrete burrows are 1 mm in diameter and are present at 135.76, 136.40 m.
Interval (136.74m to 136.88m)
Olive grey interlaminated sandstone and siltstone with dispersed clasts; laminae are 0.5 cm thick and are disrupted by bioturbation; some reddish brown clasts are present, irregular in shape (bog iron?).
Interval (136.88m to 148.46m)
Olive grey silty claystone and diatom bearing silty claystone with dispersed clasts; moderately bioturbated (3). Several 1-6 cm thick intervals with 0.5 cm thick sand and mud laminae, disrupted by bioturbation. Shell fragments are present at 138.63 and .78 m and serpulid worm tubes between 142.86 and 146.97 m. Brown, soft, wood fragments are present between 139.38 and 140.86 m. Distinct mm-scale Chondrites burrows were observed at 144.2- 144.75 m and Paleophycus burrows at 147.79 and 147.97 m.
Organic rip-up clast (136.88m to 142....
Coal clasts.
Lenticular bedding (138.85m to 139.0...
Possible flaser bedding grading down into lenticular bedding, consisting of 1-3 cm long brown mud lenses and grey very fine sand lenses with horizontal orientation.
Synaeresis cracks (139.29m to 139.31...
Synaeresis crack or mud crack.
Bed (140.50m to 140.70m)
Graded sand bed with spherical rounded grains.
Nest (141.55m)
Few sand grains and granules.
Lenticular bedding (142.68m to 142.6...
Mud lenses at 142.68-.69.
Wavy bedding (142.68m to 147.51m)
Bioturbated sand beds 1-5 cm thick between 143.64-.65 and 147.51 m.
Bed (143.46m to 143.56m)
Bioturbated sand bed, sharp-based.
Bed (144.00m to 144.15m)
Bioturbated sand bed, sharp-based.
Bed (144.75m to 144.90m)
Bioturbated sand bed.
Pyrite stain (146.27m to 146.33m)
Pyrite cement.
Interval (151.40m to 152.20m)


Depth (m)
Box #
Clay
Silt
Sand
vf
f
m
c
vc
Gravel
g
p
c
b
Clasts
Symbols
BI
Description
160.00
170.00
180.00
18R
19R
Interval (161.00m to 163.09m)
Light to dark grey massive muddy coarse sandstone with dispersed clasts; darkening and increasing in mud downward; matrix-supported.
Interval (163.09m to 163.34m)
Dark brownish grey sandy mudstone; crudely stratified.
Interval (163.34m to 163.59m)
Light grey massive very fine to very coarse sandstone with dispersed clasts; organic remains (plant seeds?) at 163.5 m.
Organic rip-up clast (163.34m to 163....
Coal clasts.
Interval (170.60m to 170.91m)
Light grey massive coarse muddy sandstone with dispersed clasts.
Interval (180.30m to 180.42m)
Light grey massive coarse muddy sandstone with dispersed clasts.

Depth (m)	Box #	Clay	Silt	Sand (vf, f, m, c, vc)	Gravel (g, p, c, b)	Clasts	Symbols	BI	Description
	20R								
190.00									
	21R								
200.00									Interval (199.50m to 200.67m) Light grey massive coarse to very coarse muddy sand with dispersed clasts (<1%); matrix-supported; sand grains are subangular to subrounded quartz and coal composition. Yellow and brown banding (possible soil profile?). Clast (199.63m to 200.38m) Rounded to well-rounded pebbles.
	22R								

Depth (m)	Box #	Clay	Silt	Sand (vf, f, m, c, vc)	Gravel (g, p, c, b)	Clasts	Symbols	BI	Description
210.00	23R								Interval (209.10m to 209.35m) Grey massive coarse to very coarse muddy sand w/ dispersed clasts (<<1%); two plant fragments, dark brown in color.