APPENDIX F
DOWNHOLE TELEVIEWER (COBL) REPORT

All boreholes drilled for Phase IC upslope from I-90 in 2007 and 2008 were surveyed using downhole optical and acoustical televiewer methods, expect for the MRE boreholes (MRE-05-08 through MRE-09-08). CRUX Optical Borehole Logging (COBL), a division of CRUX Subsurface Inc (CRUX), provided all necessary equipment and staff to complete the downhole surveys and process the data. The Wyllie & Norrish team reviewed the preliminary data before COBL issued their final report. The televiewer logs and various summary tables of the orientation data are provided in this Appendix.

The downhole optical televiewer generates a continuous 360 degree image of the borehole wall. The image is oriented using a magnetometer and accelerometer to correct for borehole deviation and to provide corrected structural data for all visible linear features. In addition to structural data the optical image provides additional information to assist with lithologic characterization. The acoustical televiewer generates a digital image of the borehole by transmitting ultrasound pulses from a rotating sensor and recording the amplitude and travel time of the reflected signal. The amplitude of the returning signal is representative of the acoustic (elastic) properties of the surrounding material while the travel time log provides borehole diameter data. The logs are displayed by relative difference in a grading color scale.

The downhole image instrumentation used on the project are listed below. Summary data sheets for these instruments are included in this Appendix.

Optical Televiewer:
OBI 40 (Mark 4) – Manufactured by Advanced Logic Technology

Acoustical Televiewer:
ABI 40 – Manufactured by Advanced Logic Technology

Summary of Figures and Tables:

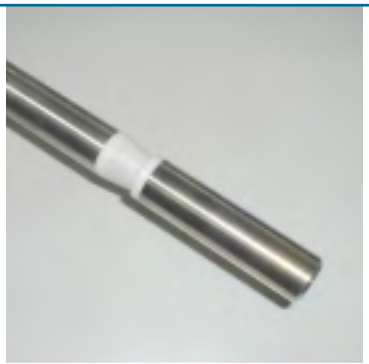
Downhole COBL logs from the three years are provided for each borehole in sequential order. Following the logs are Tables for each borehole which include all data collected from the OBI and ABI tools with an average value provided. The average value is shown by number on the COBL logs for boreholes surveyed in 2007 and 2008.

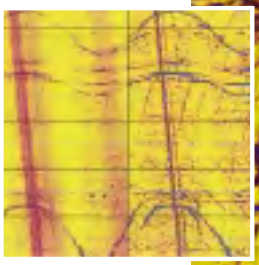
DISCLAIMER:

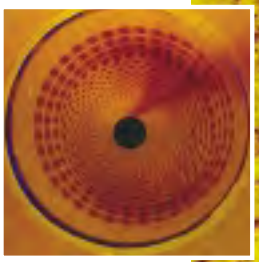
Data represented on the COBL logs includes all identifiable features that appear to have an orientation. This includes but was not limited to joints, faults, shears, bedding, healed joints or fractures and lineated or foliated structure. No attempt was made by COBL personnel to screen the data for a specific type of discontinuity or orientation on the feature. The purpose was to consistently mark all identifiable features. The attached tables provide a reduction of all marked features to those that W&N interpreted to be of engineering significance.

ABI 40

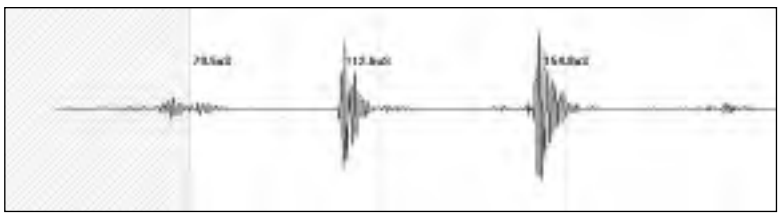
slimhole acoustic televiewer

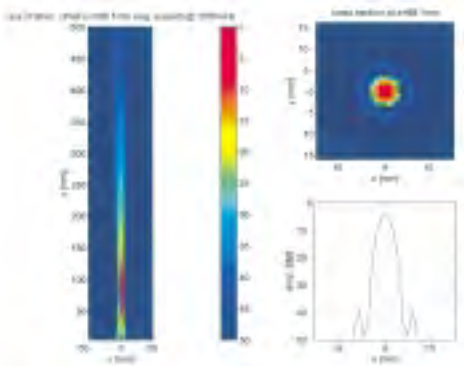


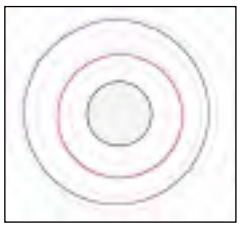




The ABI40 is the latest generation of the FAC40. Based on 8 years of experience and market leadership with BHTV technology, the new system consists of industry standard focused acoustic head with completely new deviation subsystem and redesigned electronics. The new electronic architecture uses a A/D converter 14 Bit directly coupled to a super FAST 75Mops DSP processor. The DSP is performing complex data processing operations in real time on each individual ultrasonic wave train enabling higher dynamic range of signal detection and easy field operation in a wide variety of logging applications.







Advanced Logic Technology

Bâtiment A, Route de Niederpallen,
L-8506 Redange-sur-Attert.
Grand-Duché de Luxembourg

T:(352)23 649 289 • F:(352)23 649 364
e-mail: sales@alt.lu www.alt.lu

ABI 40

slimhole acoustic televiewer

- Direct linear 14 Bit,10mhz A/D conversion (automatic gain settings)
- Dynamic range of amplitude measurement is 84dB
- Caliper resolution is better than 0.1mm
- New orientation sensor (3 accelerometers and 3 axis magnetometer)
- New orientation sensor (3 accelerometers and 3 axis magnetometer) which does not require field calibration
- Increased telemetry bandwidth (data transmission rate up to 500 Kbits depending on wireline), 166 kbps typical on 3000m four-conductor.
- Full wave form recording and real time display for quality control
- Multiecho mode to realize acoustic measurements through plastic pipes (require the plastic pipe to be centralized inside the borehole.
- Pipe-inspection mode to detect inner corrosion, outer corrosion, and wall thickness
- Automatic measurement window definition to gain optimum performance and variable borehole conditions

Tool design philosophy :

Acoustic borehole scanner tools generates an image of the borehole wall by transmitting ultrasound pulses from a rotating sensor and recording the amplitude and travel time of the signals reflected at the interface between mud and formation (borehole wall). Compared to the FAC40, which measures one echo (one amplitude and one travel time), the ABI is a multi-echo system. This is achieved by digital recording of the reflected acoustic wave train. On line analysis of the acoustic data is made by a DSP (digital Signal Processor). Sophisticated algorithms allow the system to detect the reflection from the acoustic window and to separate/classify all subsequent echoes. Minimum input of the operator is needed to enable:

- Automatic optimisation of measurement window under all borehole conditions
- Automatic adaptation to variable borehole conditions
- Improvement of dynamic range of signal detection
- Very high travel time resolution
- Implementation of different operating modes.

E.g. when run inside plastic casing, the tool can record both the echo of the casing and of the borehole wall. Tool upgrades and implementations of customised operating modes can be simply made by downloading new firmware into the tool from the surface computer.

Technical specifications

Diameter:	40mm
Length:	1.6 m
Weight:	6kgs
Max temp:	70°C
Max pressure:	200 bar
Borehole diameter:	2" to 21" depending on mud conditions
Logging speed:	variable function of resolution and wireline. i.e 2.0 m/min at 144x3mm

Cable:

Cable type:	mono, four-conductor, seven-conductor
digital data transmission:	up to 500 Kbits per second depending on wireline.
compatibility:	ALTlogger - ALTboxOX - Mount Sopris MgxII (limited to 41 Kbps)

sensor:

acoustic sensor:	fixed transducer and rotating focusing mirror
focusing:	3" or 6"
frequency:	1.2 MHz
acoustic beam width:	1.5 mm (-3db) focal distance
rotation speed:	up to 10 revolutions per second - automatic
samples per revolution:	72, 144, 288 user defined
caliper resolution:	0.08mm
orientation:	3 axis magnetometer, 3 accelerometers
Inclination accuracy:	+/- 0.5 degree
Azimuth accuracy:	+/- 1.0 degree

The specifications are not contractual and are subject to modification without notice.

Applications:

The purpose of the acoustic borehole imaging tool is to provide detailed, oriented caliper and structural information on the basis of high resolution, ultrasonic travel time and amplitude images. The travel time is used to determine exceptionally accurate borehole diameter data, which makes the tool ideal for borehole deformation description (stress field analysis) and casing inspection. Travel time is also used for quality control of the amplitude measurement. The amplitude of the reflection from the borehole wall is representative of the acoustic (elastic) properties of the surrounding rock. Therefore, the tool is ideal for fracture detection and geotechnical rock classification. Cement bond quality can be checked if the reflection signal from behind casing is analyzed.

Most common applications are:

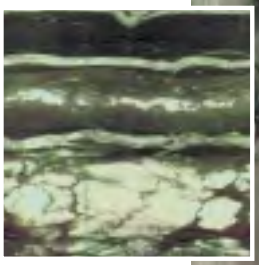
- fracture detection and evaluation
- detection of thin beds
- determination of bedding dip
- lithological characterization
- breakout analysis
- monitoring of earth stress field
- casing inspection
- high resolution caliper measurements

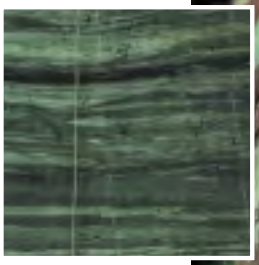
Advanced Logic Technology

* released in 2002

OBI 40

slimhole optical televiewer





The tool generates a continuous oriented 360° image of the borehole wall using an optical imaging system. (downhole CCD camera which views a image of the borehole wall in a prism). The tool includes a orientation device consisting of a precision 3 axis magnetometer and 3 accelerometers thus allowing accurate borehole deviation data to be obtained during the same logging run (accurate and precise orientation of the image).

Optical and acoustic televiewer data are complimentary tools especially when the purpose of the survey is structural analysis.

A common data display option is the projection on a virtual core that can be rotated and viewed from any orientation. Actually, an optical televiewer image will complement and even replace coring survey and its associated problem of core recovery and orientation.

The optical televiewer is fully downhole digital and can be run on any standard wireline (mono, four-conductor, seven-conductor). Resolution is user definable (up to 0.5mm vertical resolution and 720 pixels azimuthal resolution)

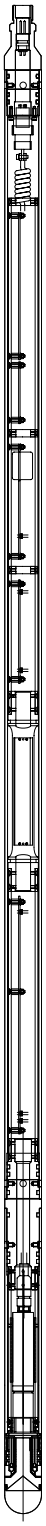
Advanced Logic Technology

Bâtiment A, Route de Niederpallen,
L-8506 Redange-sur-Attert.
Grand-Duché de Luxembourg

T:(352) 23 649 289 • F:(352) 23 649 364
e-mail: sales@alt.lu www.alt.lu

OBI 40

slimhole optical televiewer



Applications:

The purpose of the optical imaging tool is to provide detailed, oriented, structural information. Possible applications are :

- fracture detection and evaluation
- detection of thin beds
- bedding dip
- lithological characterization
- casing inspection

Technical specifications

Diameter	40mm
Length	approx. 1.7m
Weight	approx 7 kgs
Max temp	50°C
Max pressure	200 bars
Borehole diameter	1 3/4" to 24" depending on borehole conditions
Logging speed	variable function of resolution and wireline

Cable:

Cable type	mono, four-conductor, seven-conductor
Digital data transmission	up to 500 Kbps depending on wireline, realtime compressed
Compatibility	ALTlogger- ALT-Abox- Mount Sopris MgXII (limited to 41 Kbps)

sensor:

Sensor type	downhole DSP based digital CCD camera
Optics	plain polycarbonate conic prism system
Azimuthal resolution	user definable 90/180/360 or 720 pixels /360°
Vertical resolution	user definable, depth or time sampling rate
Color resolution	24 bit RGB value
White balance:	automatic or user adjustable
Aperture & Shutter	automatic or user adjustable
Special functions	User configurable real time digital edge enhancing User configurable ultra low light condition mode
Orientation	3 axis magnetometer and 3 accelerometers.
Inclination accuracy	0.5 degree
Azimuth accuracy:	1.0 degree

Logging parameters:

- 360° RGB orientated optical image
- Borehole azimuth and dip
- Tool internal Temperature

The specifications are not contractual and are subject to modification without notice.

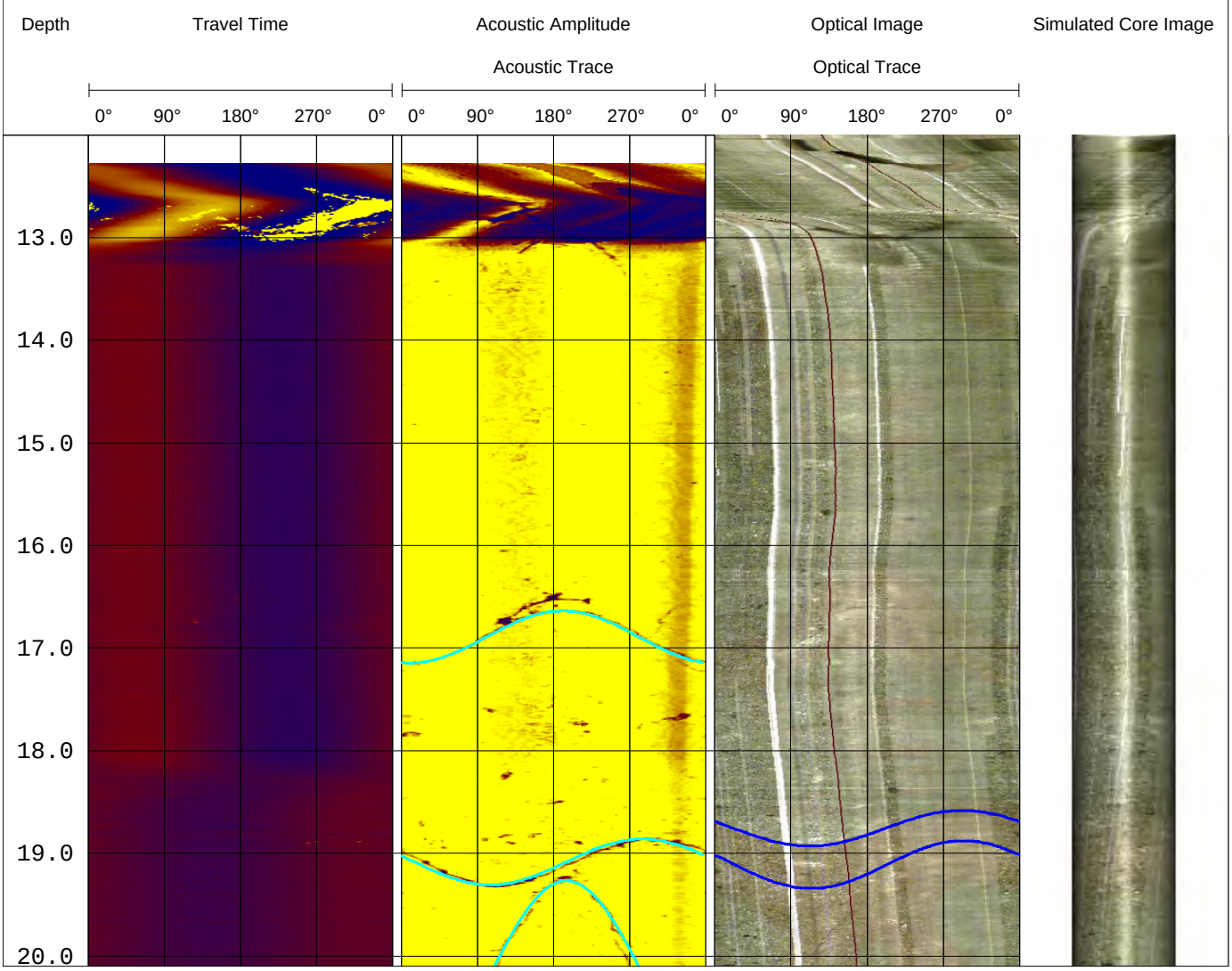
Advanced Logic Technology

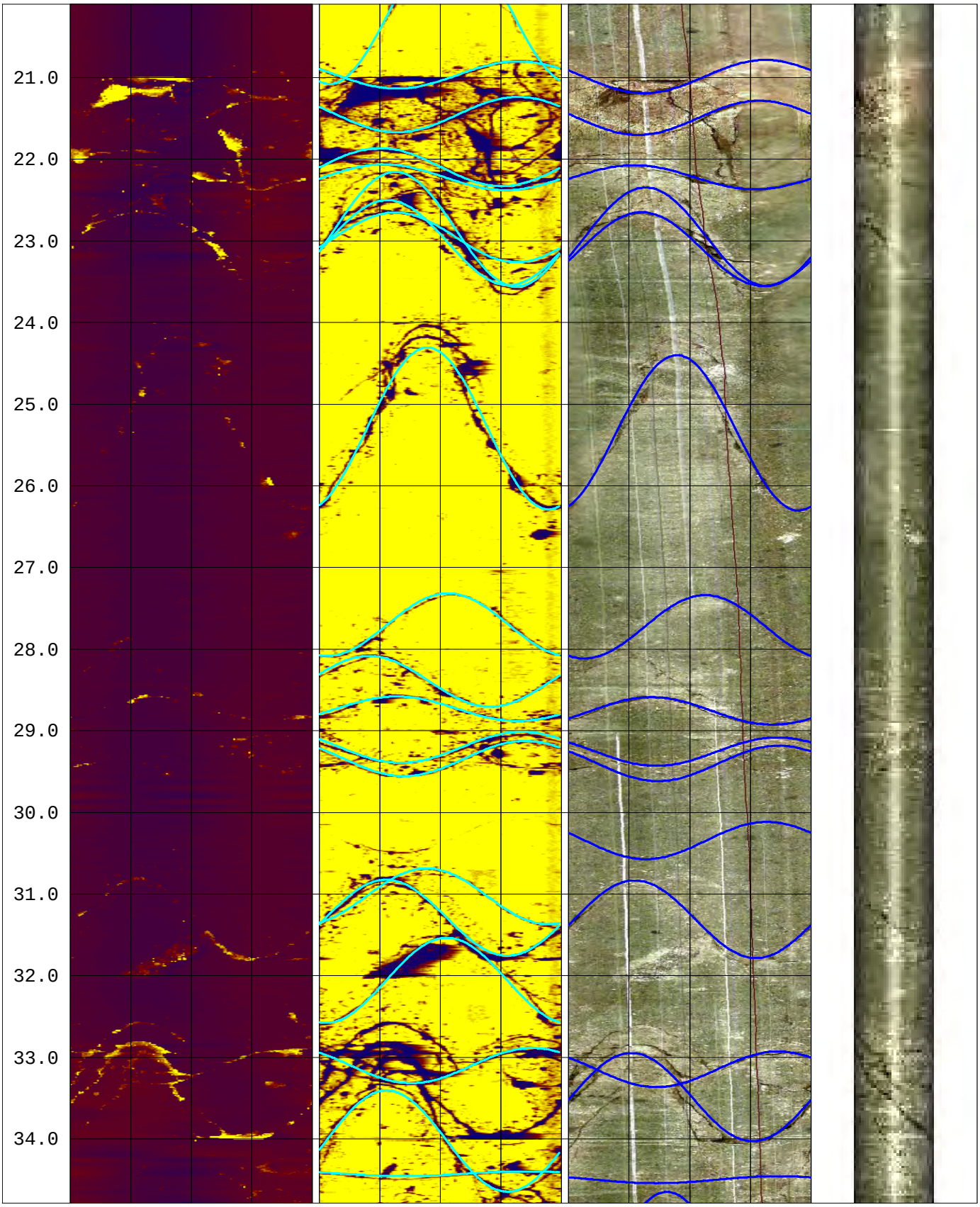
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	I-90 Milepost 59
	Project:	Snoqualmie Pass East Realignment

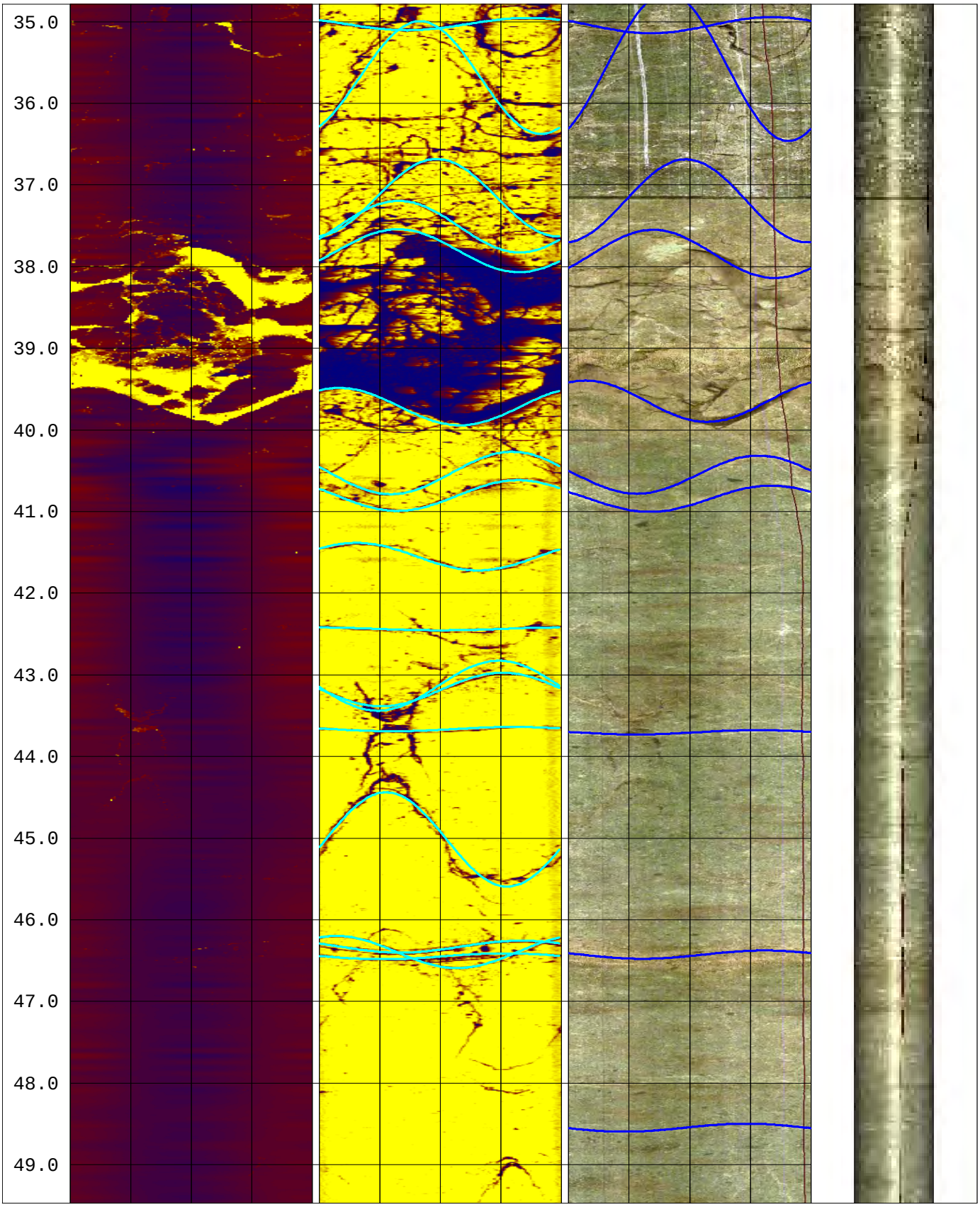
Date Logged:	September 29, 2006	Borehole ID: H-110-06
File Name:	H110-2M.wcl	Logged By: F G Kruger

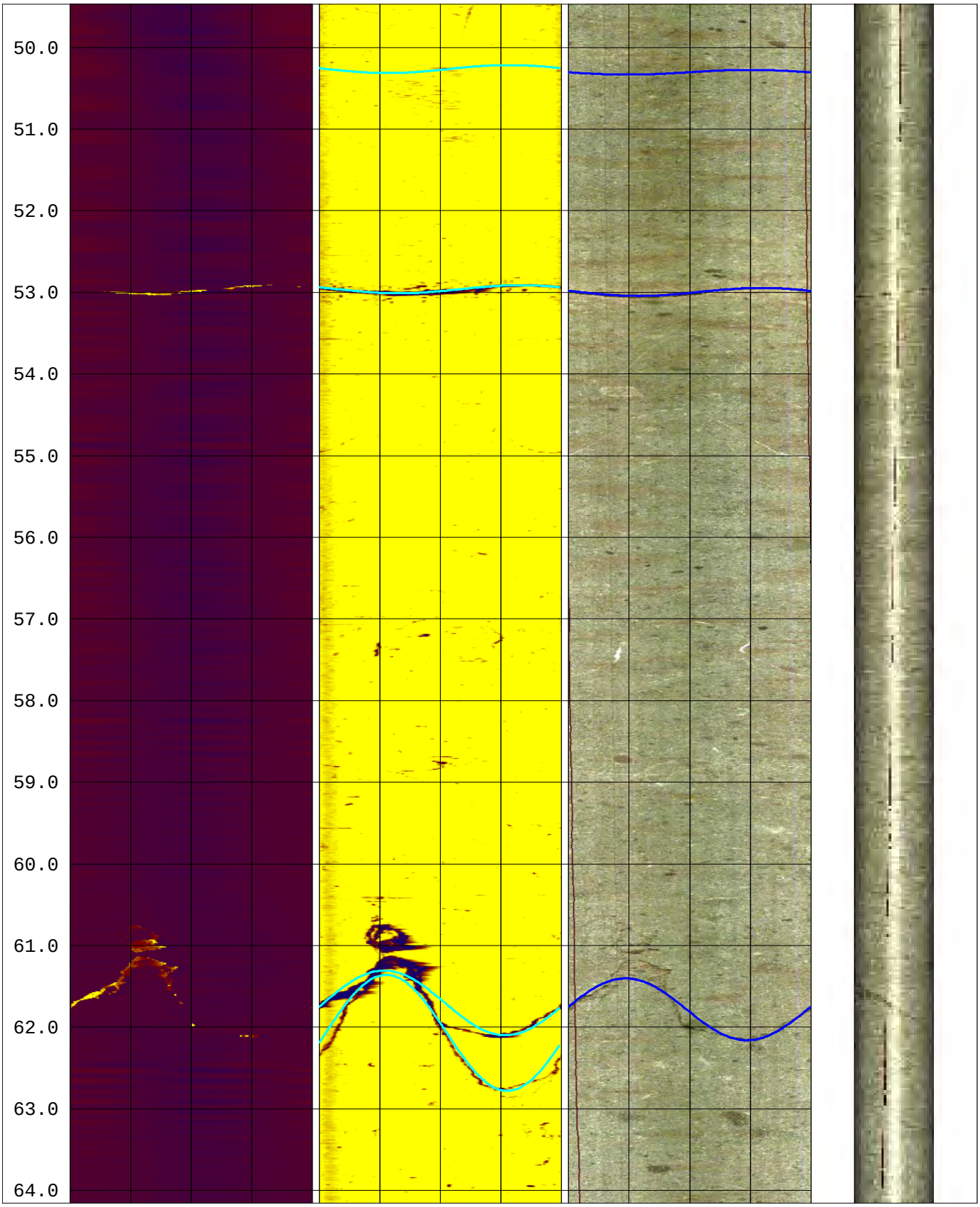
Notes:

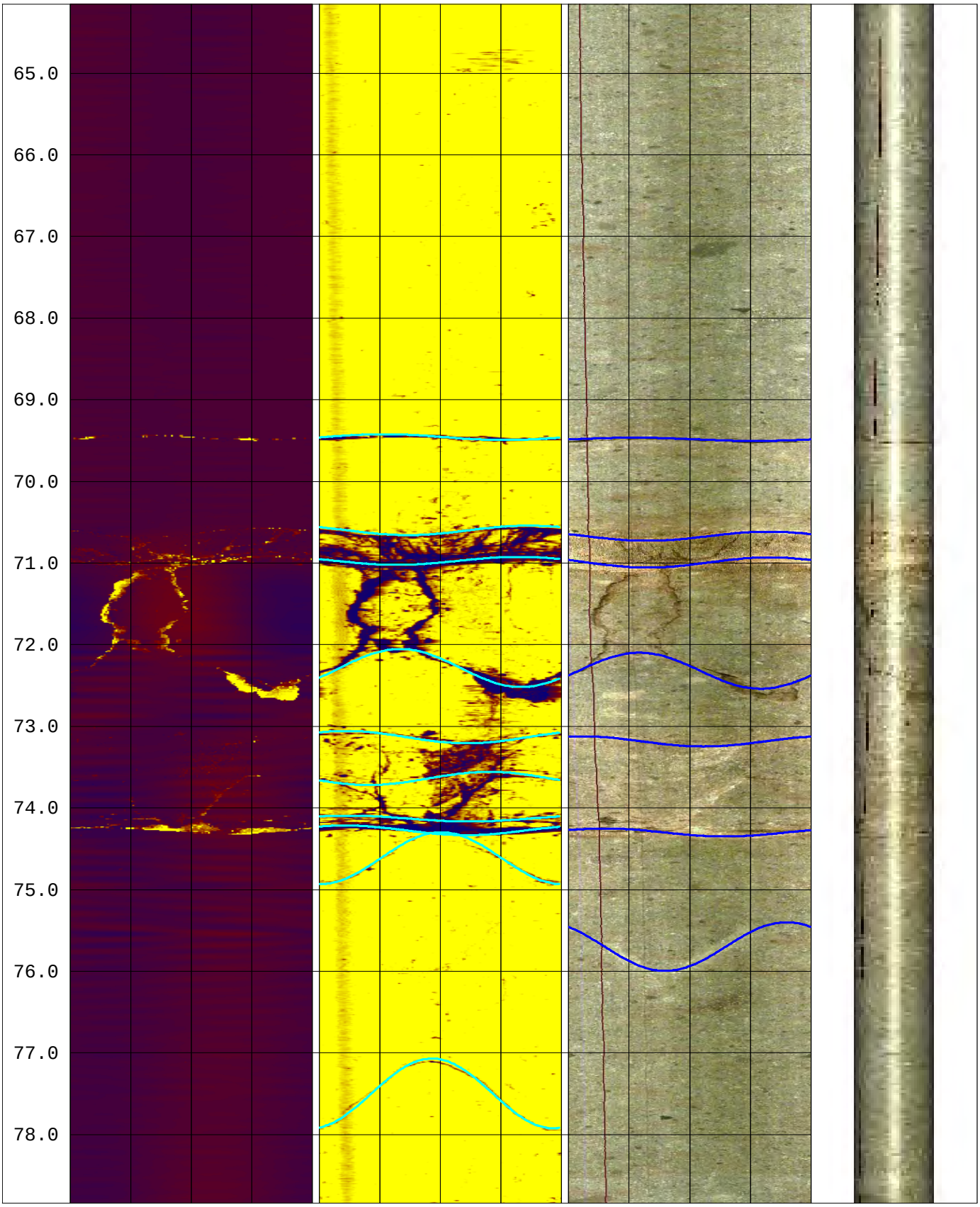
1) Azimuths reference True North. Magnetix declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.

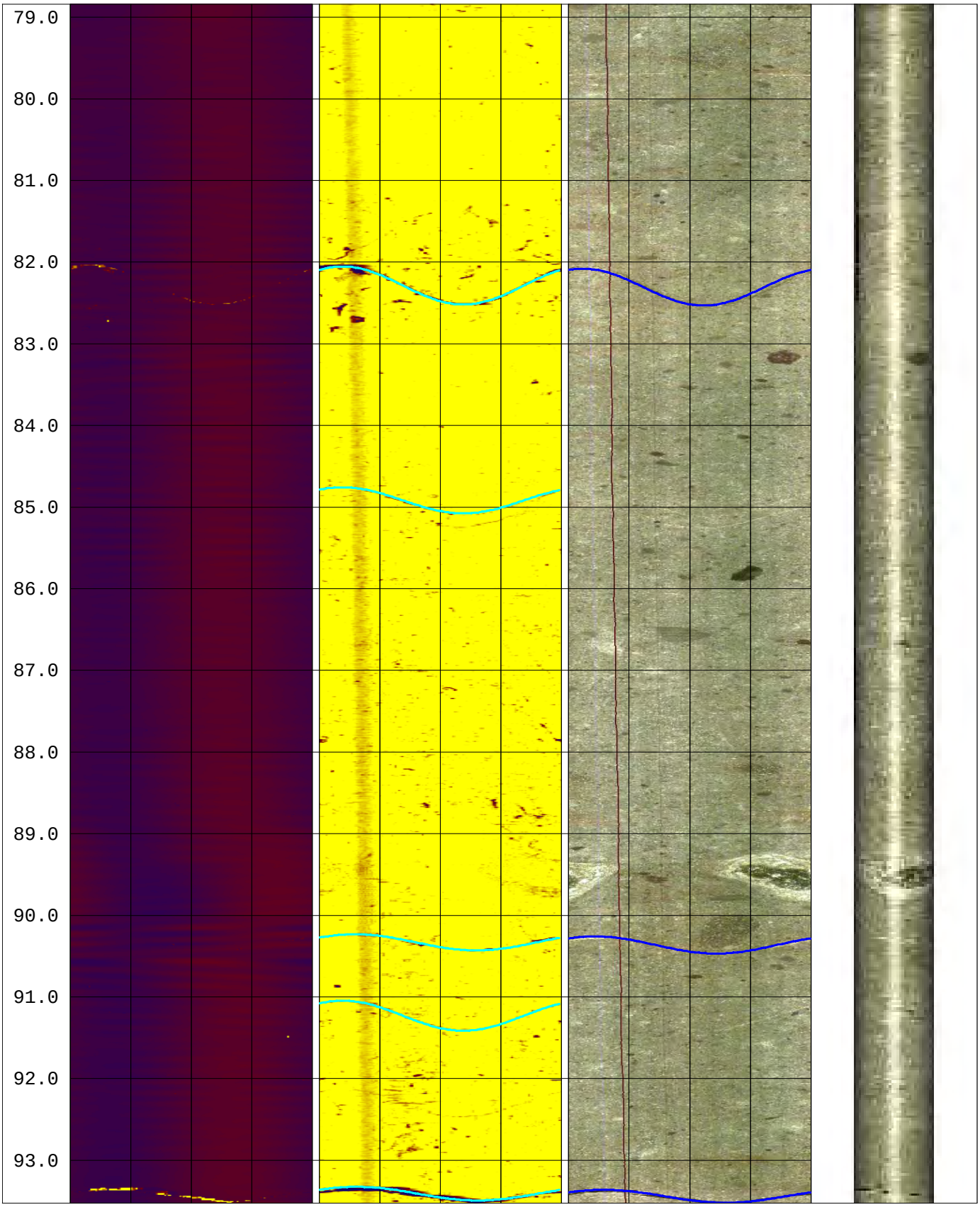


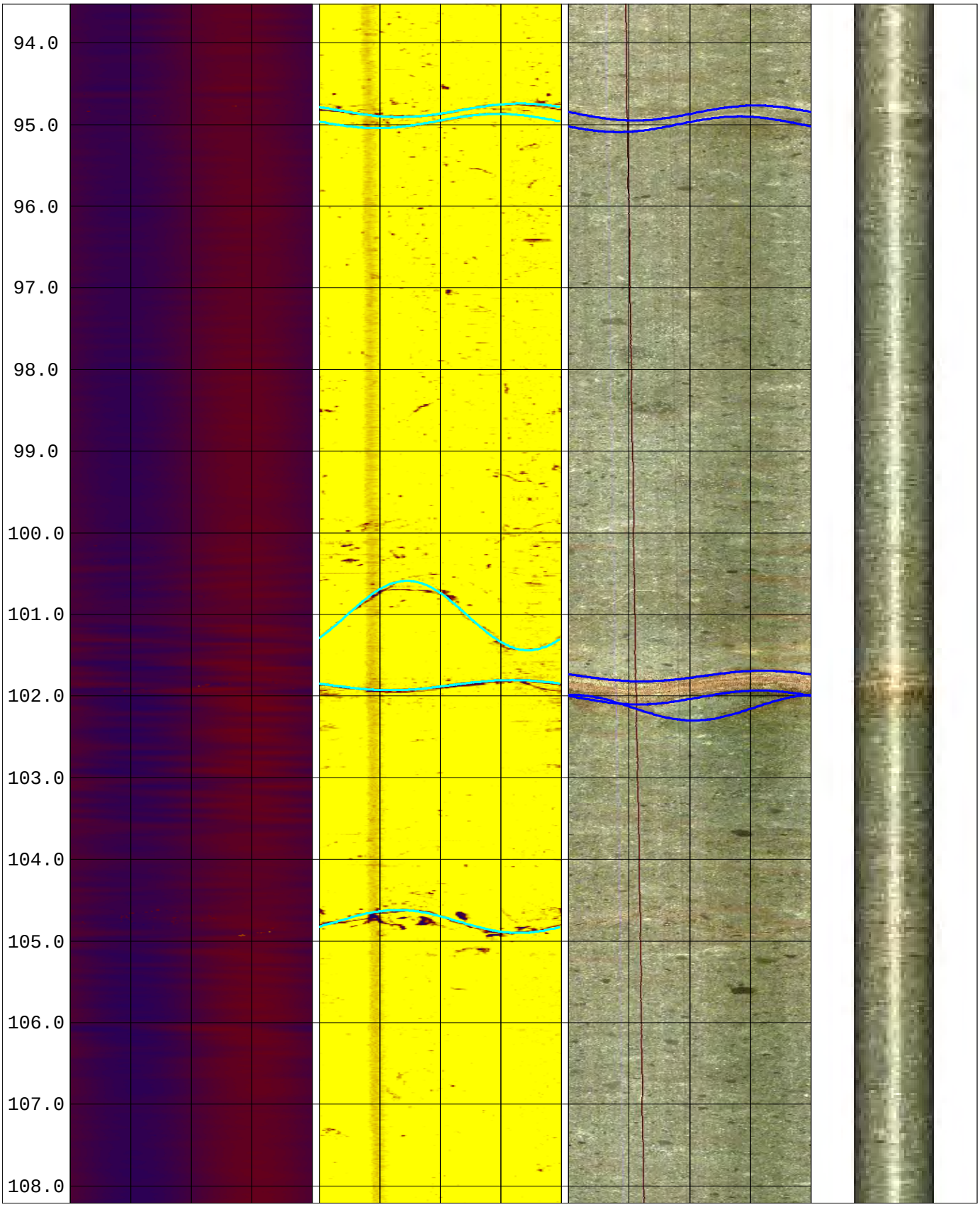

21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
30.0
31.0
32.0
33.0
34.0

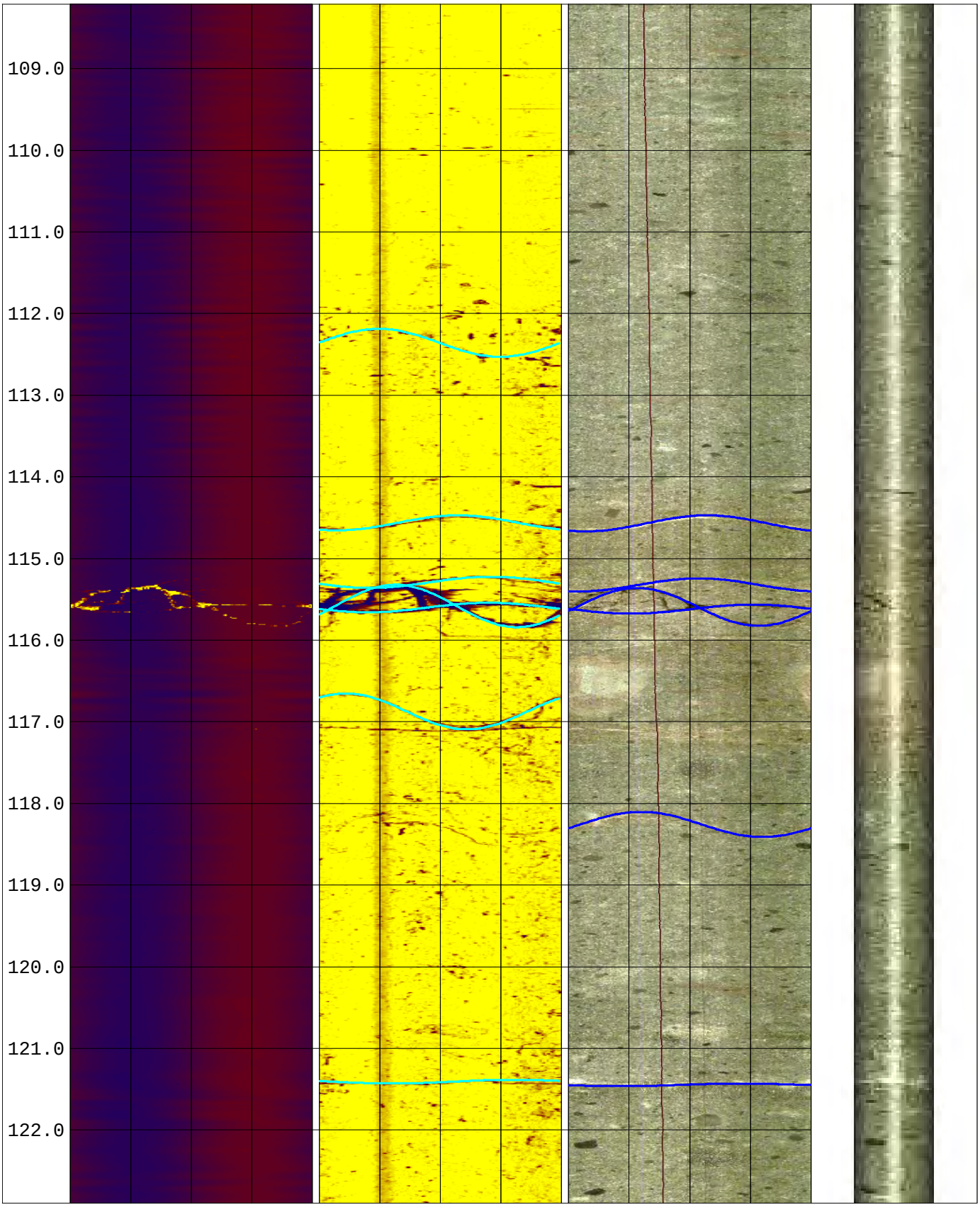

35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
45.0
46.0
47.0
48.0
49.0

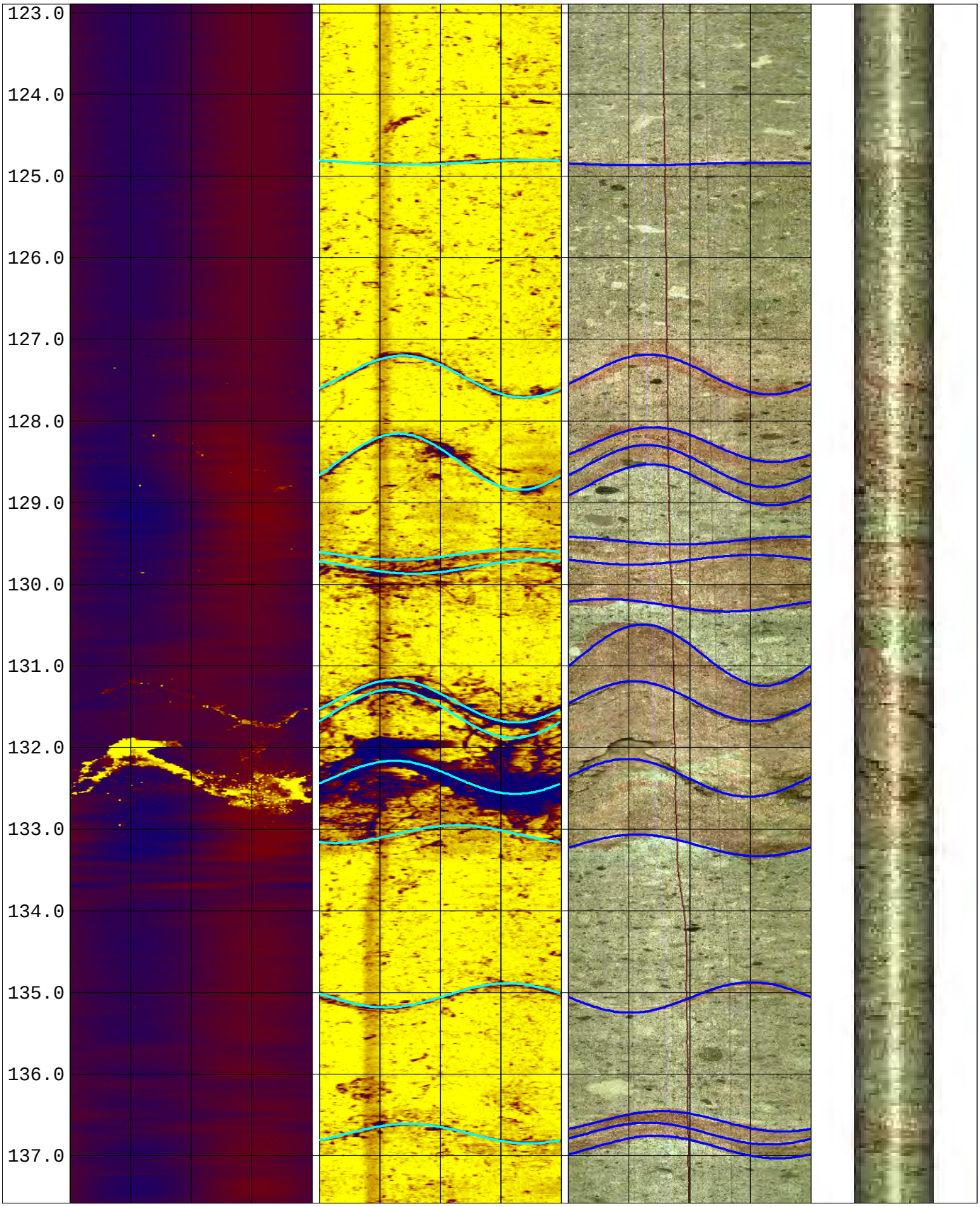

50.0
51.0
52.0
53.0
54.0
55.0
56.0
57.0
58.0
59.0
60.0
61.0
62.0
63.0
64.0

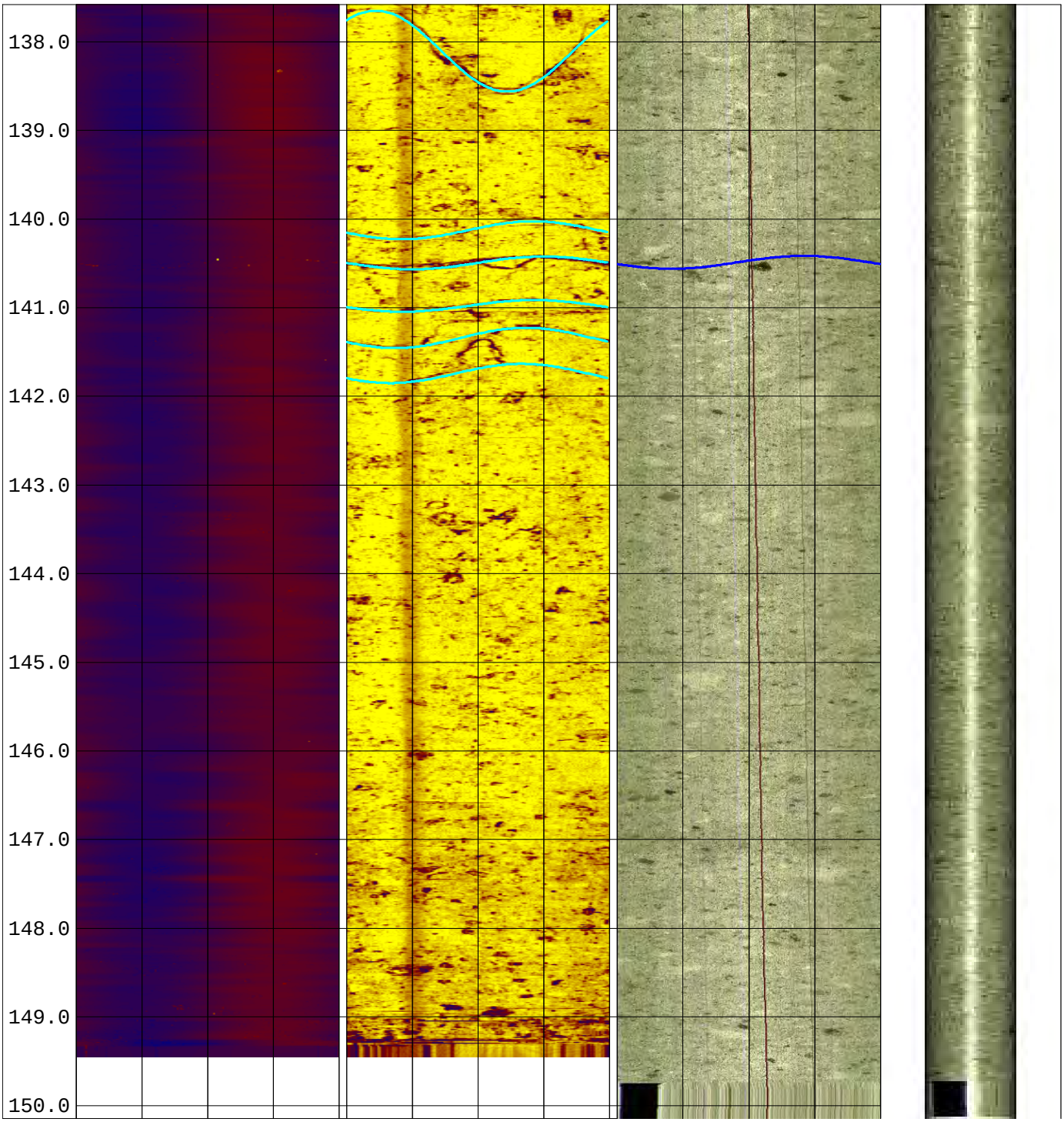

65.0
66.0
67.0
68.0
69.0
70.0
71.0
72.0
73.0
74.0
75.0
76.0
77.0
78.0


79.0
80.0
81.0
82.0
83.0
84.0
85.0
86.0
87.0
88.0
89.0
90.0
91.0
92.0
93.0


94.0
95.0
96.0
97.0
98.0
99.0
100.0
101.0
102.0
103.0
104.0
105.0
106.0
107.0
108.0


109.0
110.0
111.0
112.0
113.0
114.0
115.0
116.0
117.0
118.0
119.0
120.0
121.0
122.0


123.0
124.0
125.0
126.0
127.0
128.0
129.0
130.0
131.0
132.0
133.0
134.0
135.0
136.0
137.0

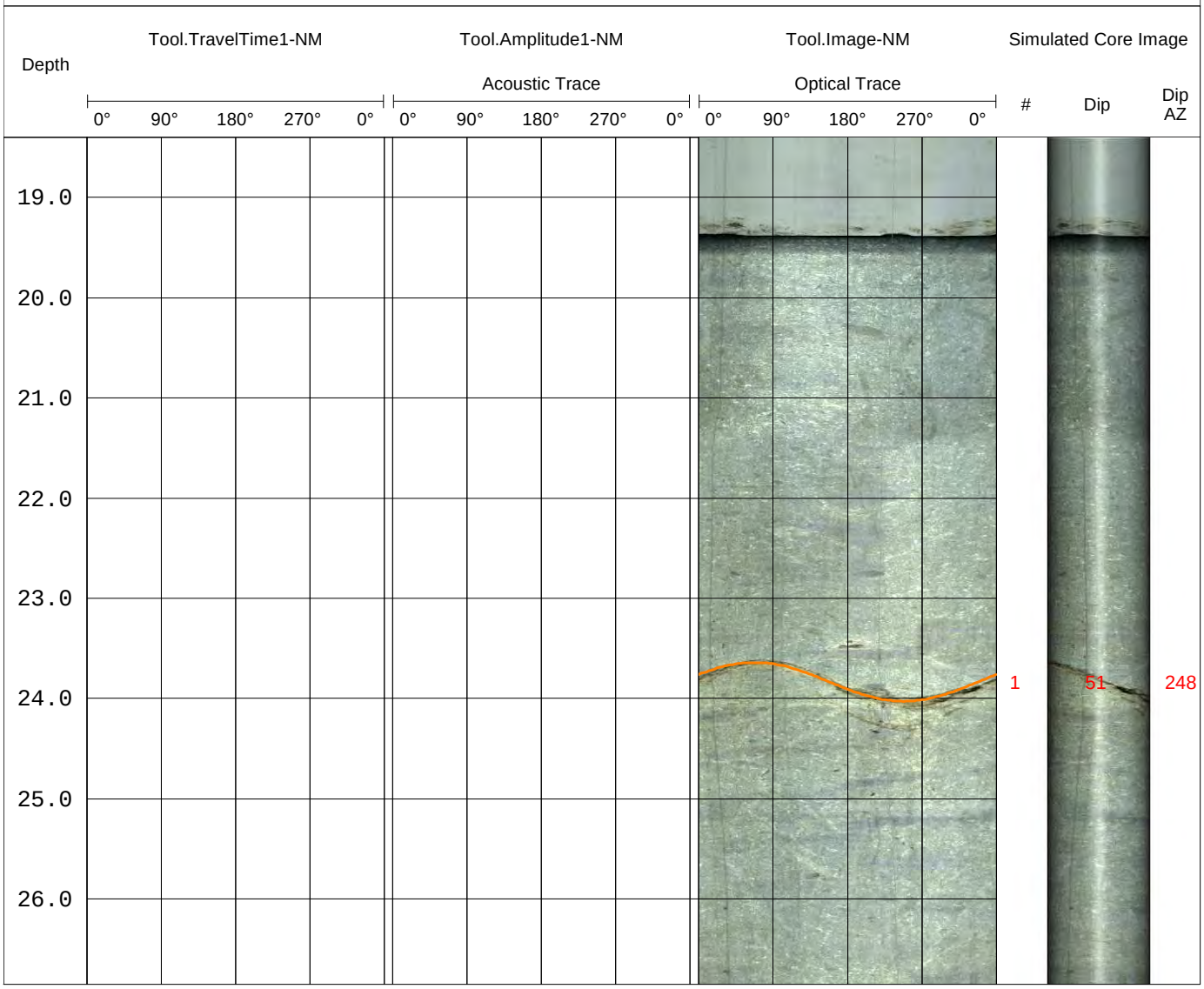

138.0
139.0
140.0
141.0
142.0
143.0
144.0
145.0
146.0
147.0
148.0
149.0
150.0

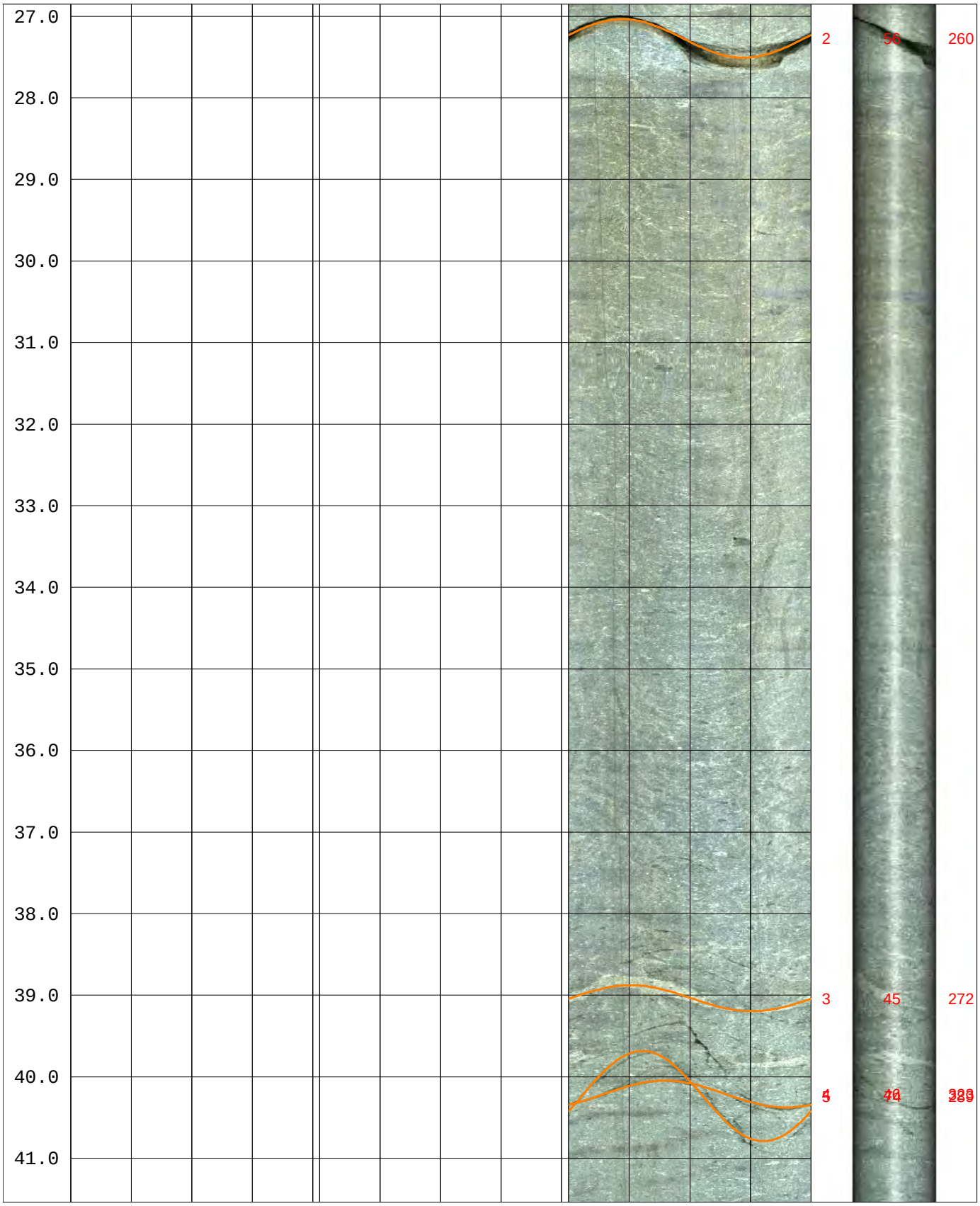
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2007 Geotechnical Program

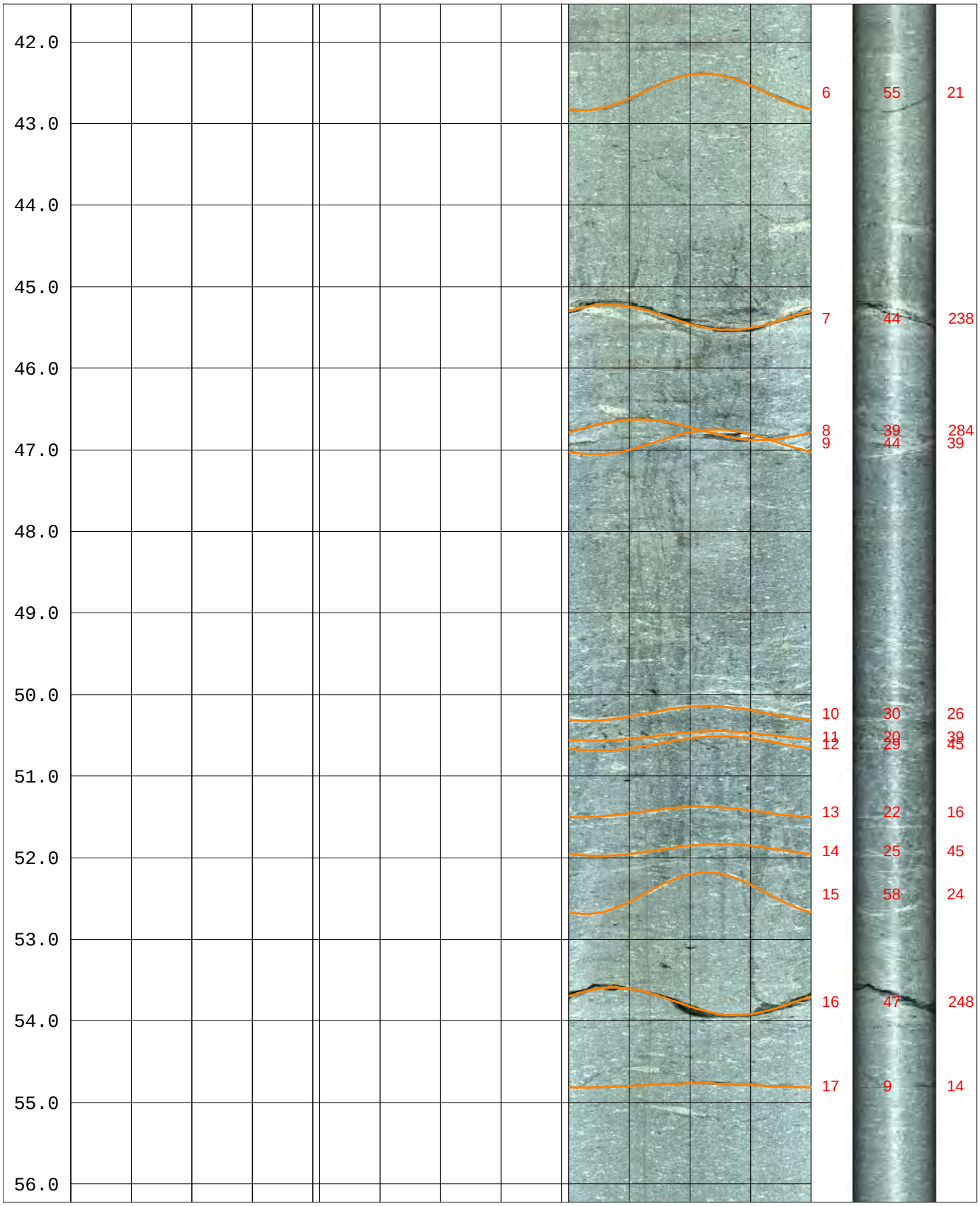
Date Logged:	August 22, 2007	Borehole ID:	RKS-08-07
File Name:	RKS0807-1M.wcl	Logged By:	F G Kruger

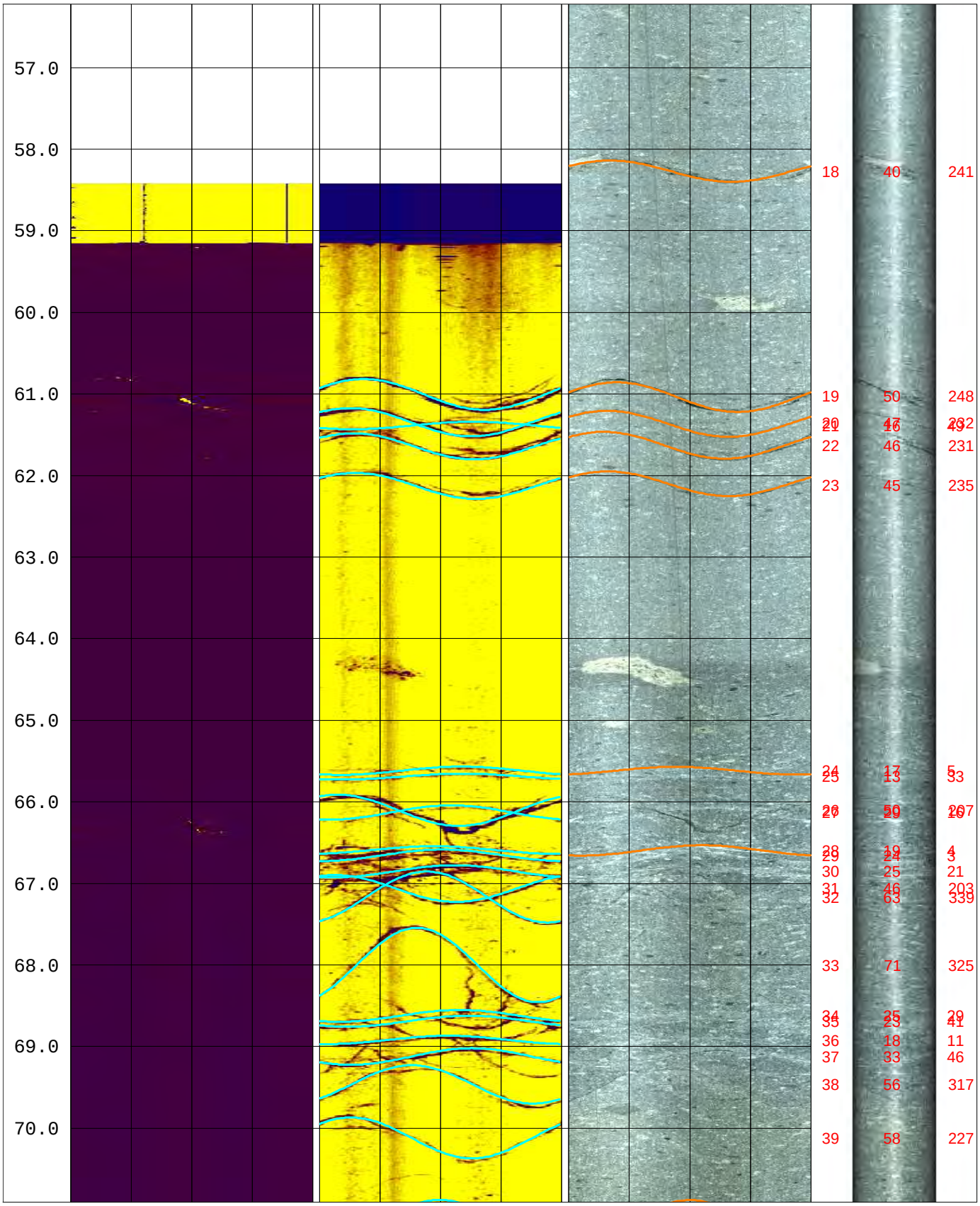
Notes:

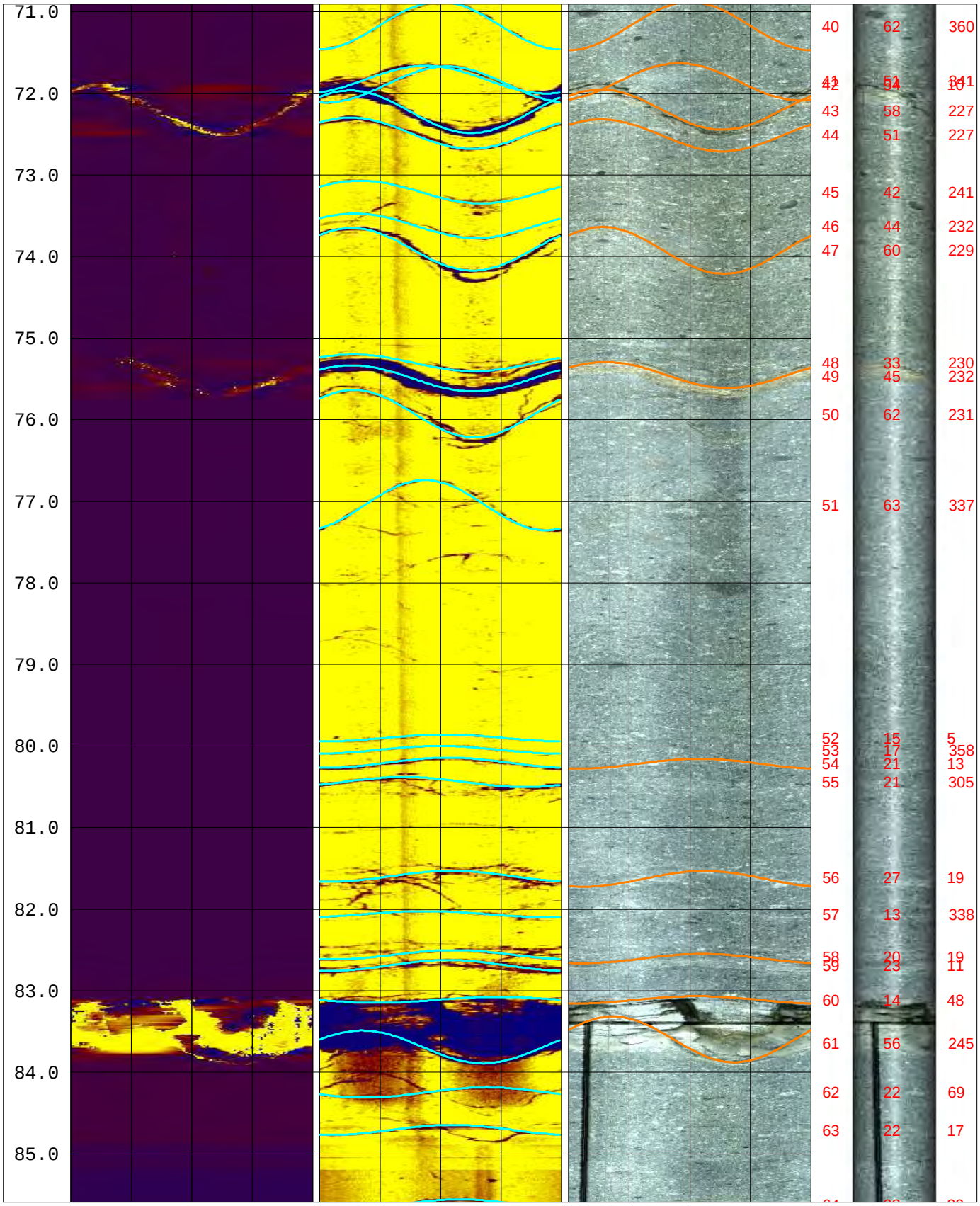
1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.

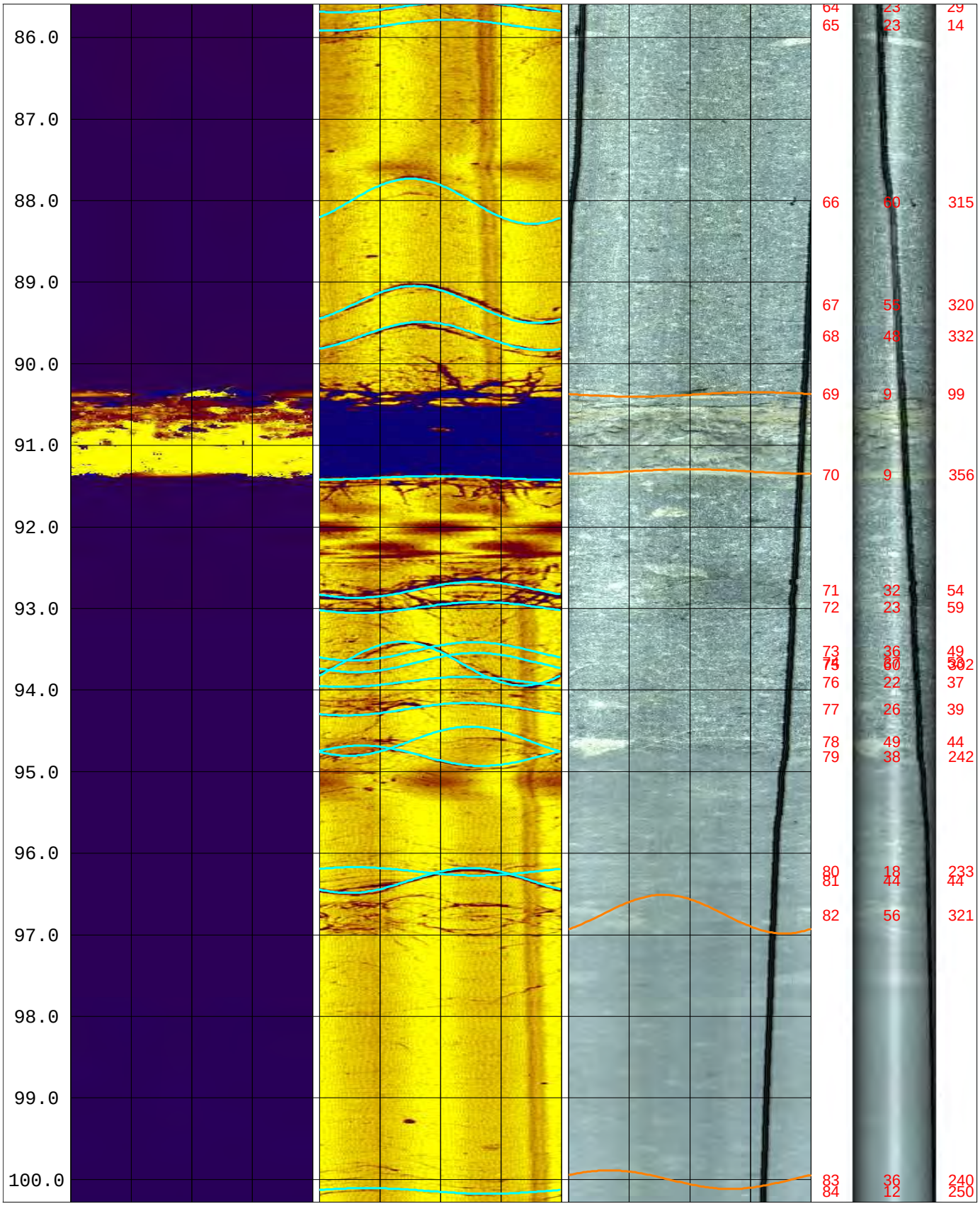


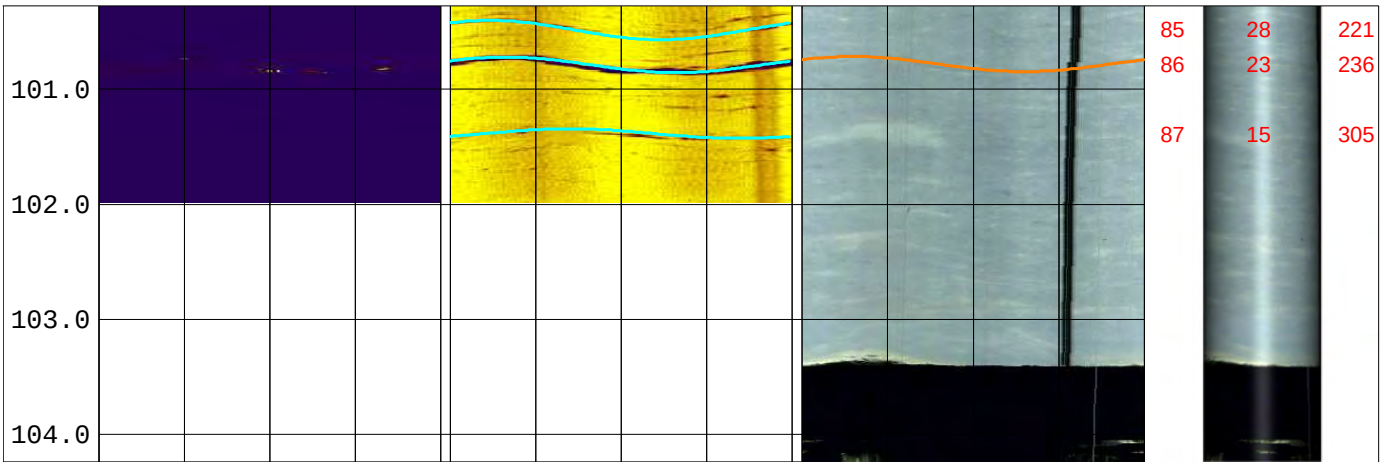

27.0
28.0
29.0
30.0
31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
2
56
260
3
45
272
4
5
40
41
288
289


42.0
43.0
44.0
45.0
46.0
47.0
48.0
49.0
50.0
51.0
52.0
53.0
54.0
55.0
56.0
6 55 21
7 44 238
8 39 284
9 44 39
10 30 26
11 20 39
12 29 45
13 22 16
14 25 45
15 58 24
16 47 248
17 9 14


57.0
58.0
59.0
60.0
61.0
62.0
63.0
64.0
65.0
66.0
67.0
68.0
69.0
70.0
18 40 241
19 50 248
20 47 262
21 16 49
22 46 231
23 45 235
24 17 5
25 13 33
26 50 207
27 29 10
28 19 4
29 24 3
30 25 21
31 46 203
32 63 339
33 71 325
34 25 29
35 23 41
36 18 11
37 33 46
38 56 317
39 58 227


71.0
72.0
73.0
74.0
75.0
76.0
77.0
78.0
79.0
80.0
81.0
82.0
83.0
84.0
85.0
40 62 360
41 51 241
42 54 10
43 58 227
44 51 227
45 42 241
46 44 232
47 60 229
48 33 230
49 45 232
50 62 231
51 63 337
52 15 5
53 17 358
54 21 13
55 21 305
56 27 19
57 13 338
58 20 19
59 23 11
60 14 48
61 56 245
62 22 69
63 22 17


86.0
87.0
88.0
89.0
90.0
91.0
92.0
93.0
94.0
95.0
96.0
97.0
98.0
99.0
100.0
64 23 29
65 23 14
66 60 315
67 55 320
68 48 332
69 9 99
70 9 356
71 32 54
72 23 59
73 36 49
75 60 302
76 22 37
77 26 39
78 49 44
79 38 242
80 18 233
81 44 44
82 56 321
83 36 240
84 12 250

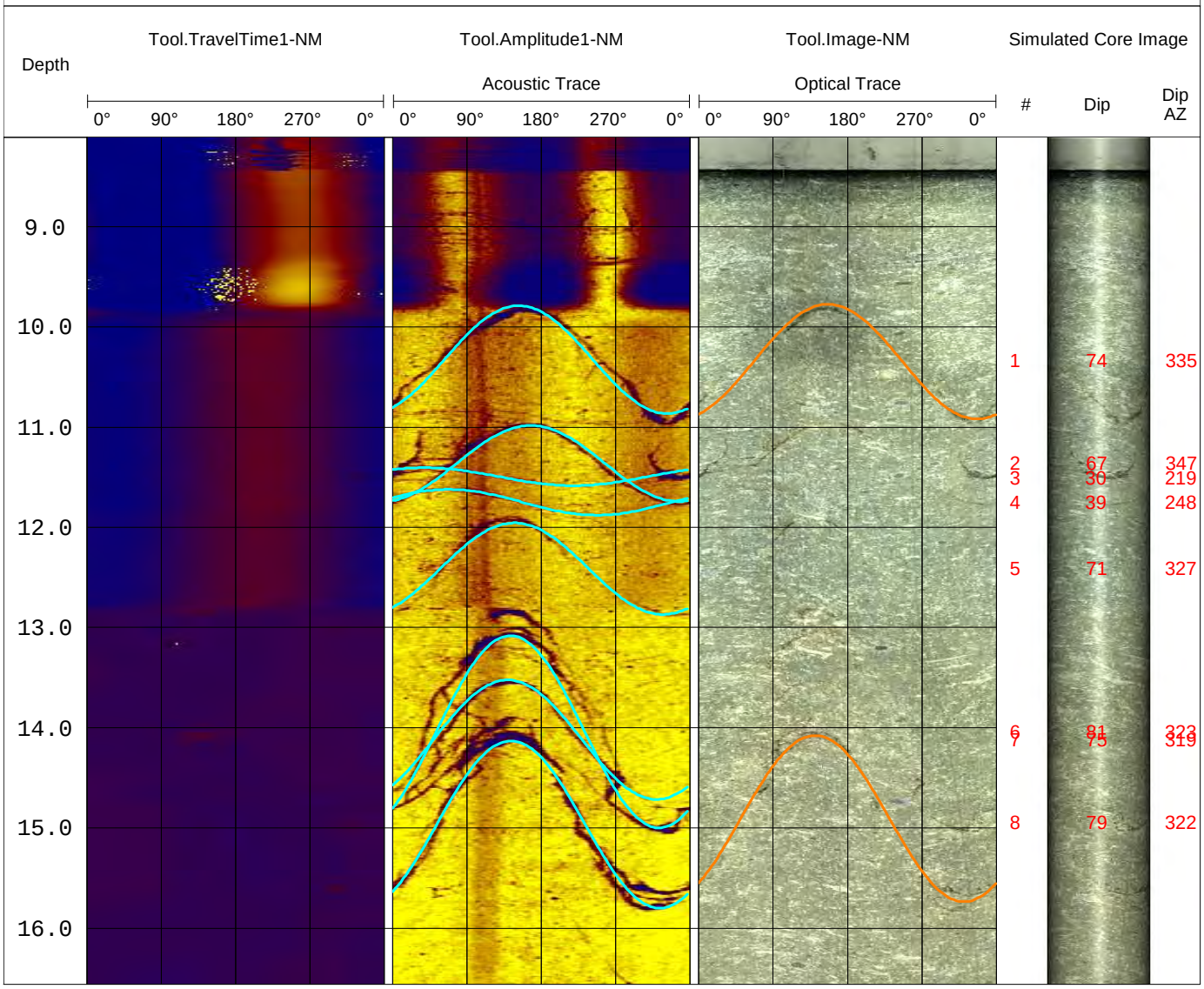

101.0
102.0
103.0
104.0
85
86
87
28
23
15
221
236
305

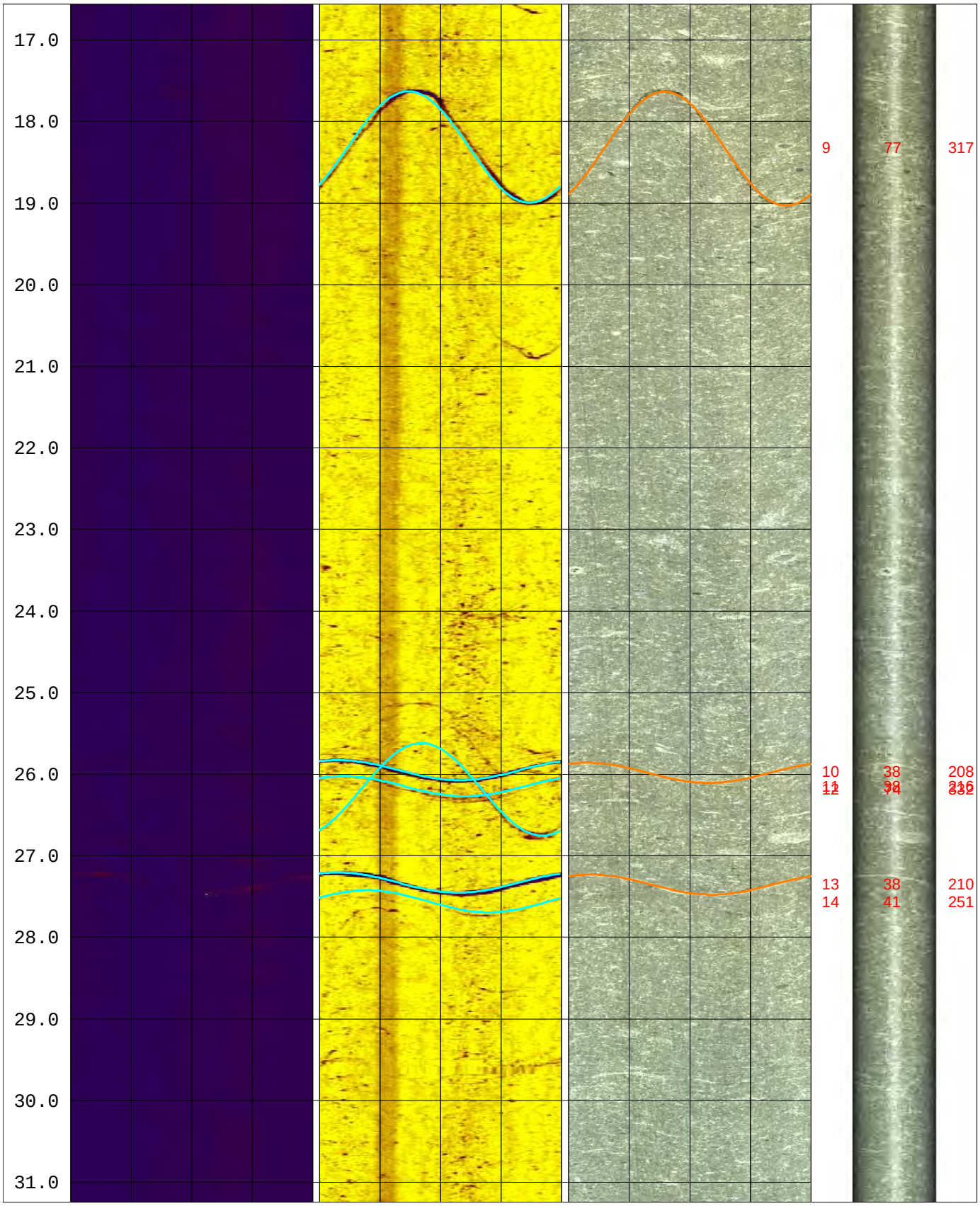
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2007 Geotechnical Program

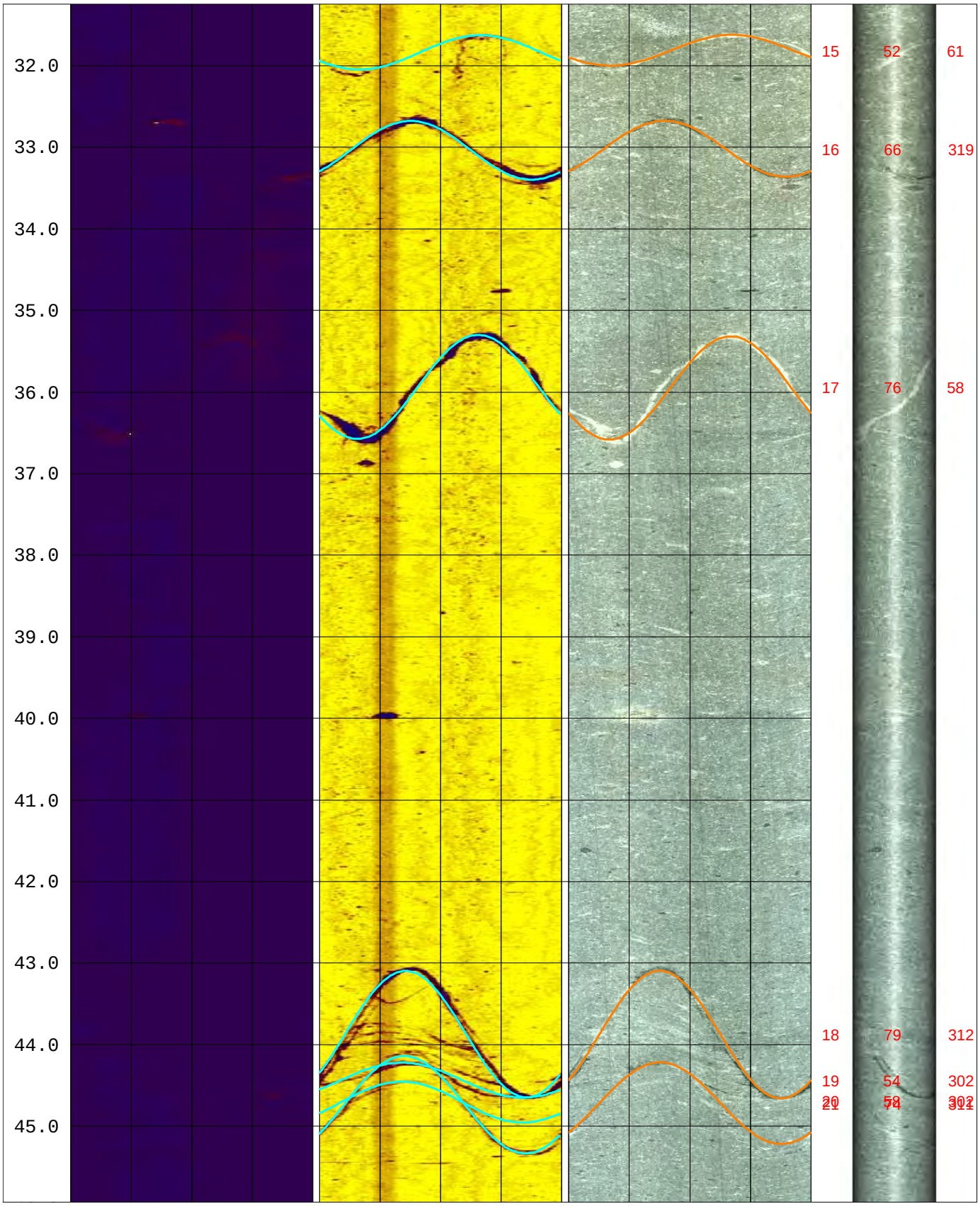
Date Logged:	September 4, 2007	Borehole ID:	RKS-09-07
File Name:	RKS0907-1M.wcl	Logged By:	F G Kruger

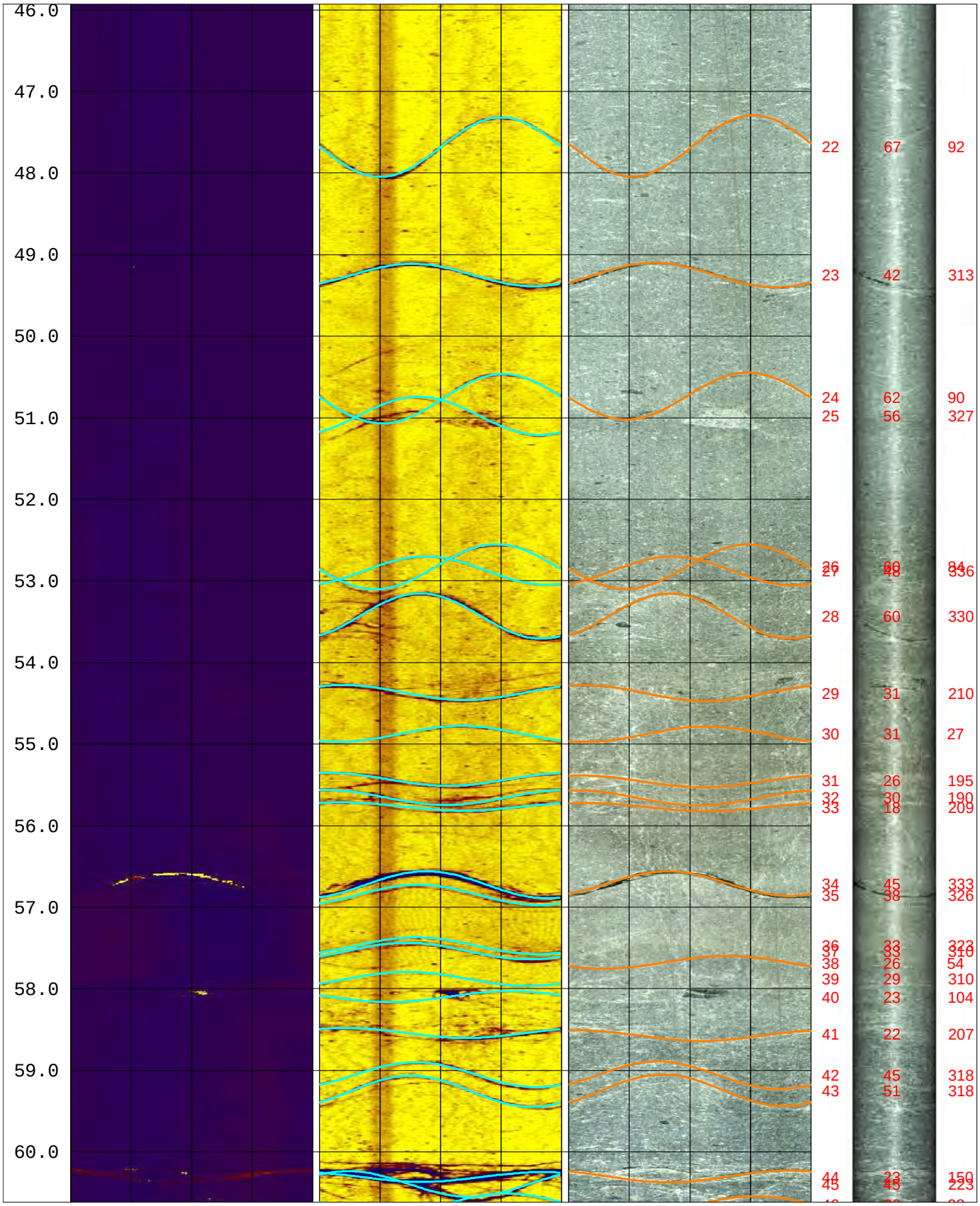
Notes:

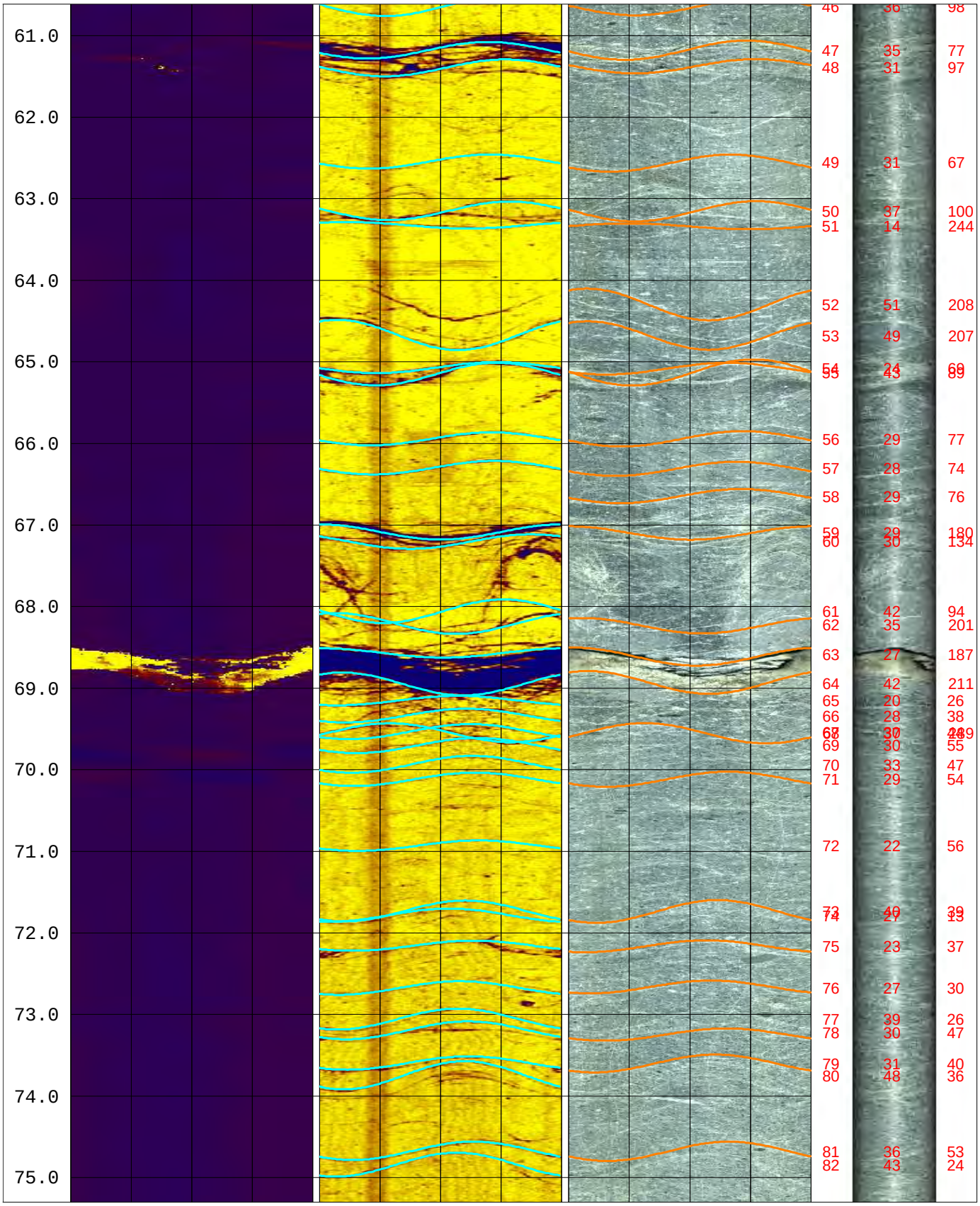
1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.

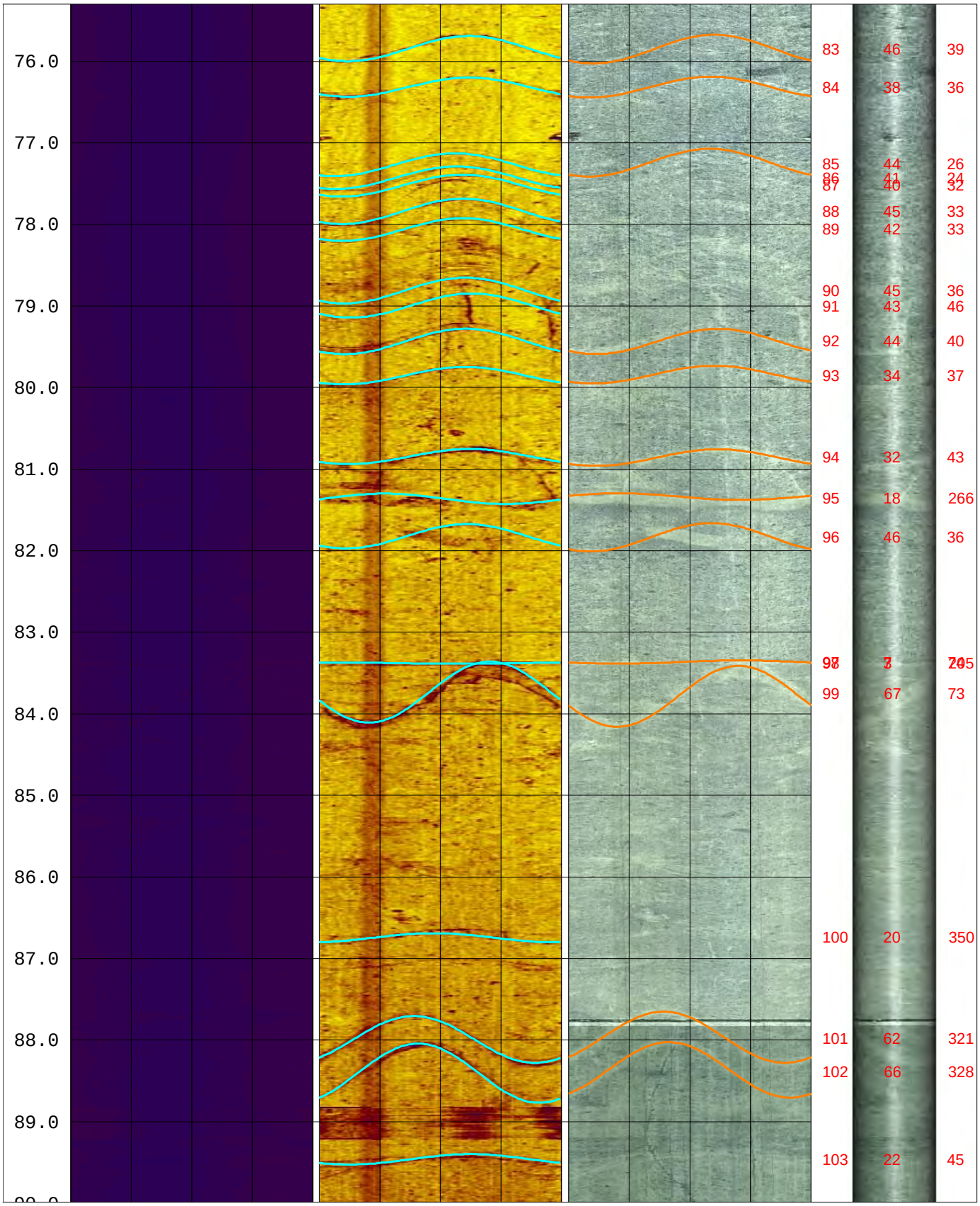


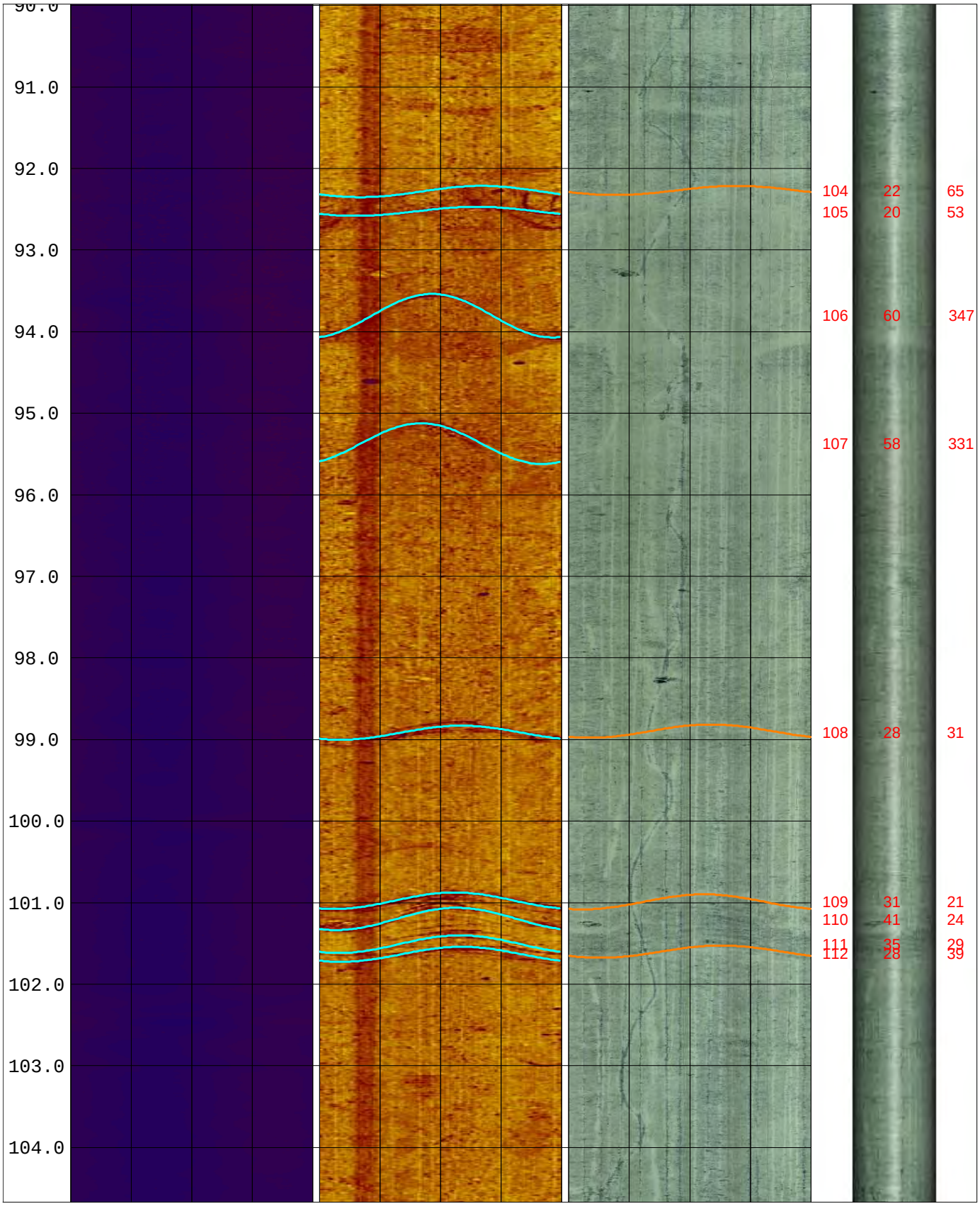

17.0
18.0
19.0
20.0
21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
30.0
31.0
9 77 317
10 38 208
11 38 216
12 94 332
13 38 210
14 41 251

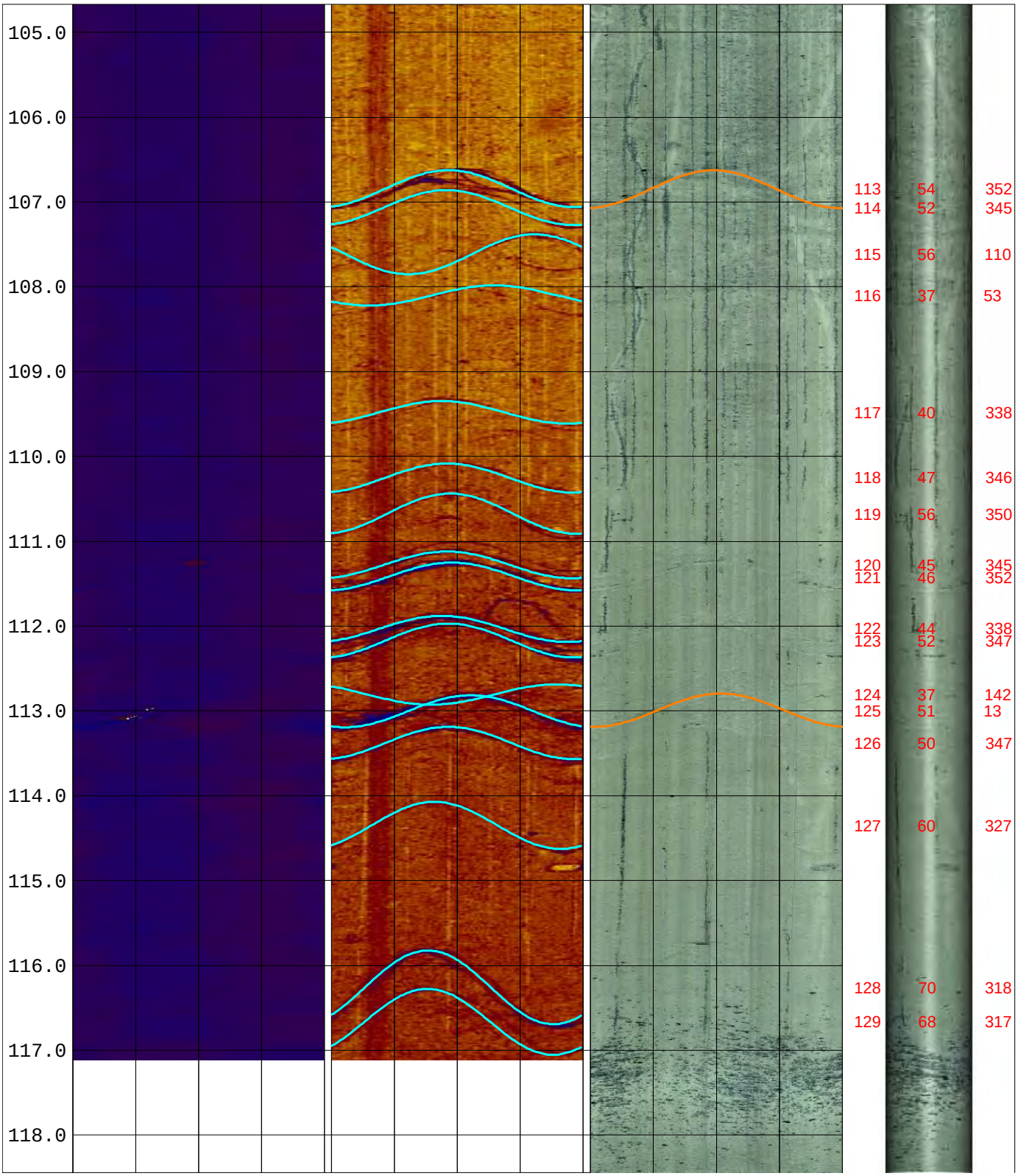

32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
45.0
15 52 61
16 66 319
17 76 58
18 79 312
19 54 302
20 58 302
21 74 311


46.0
47.0
48.0
49.0
50.0
51.0
52.0
53.0
54.0
55.0
56.0
57.0
58.0
59.0
60.0
22 67 92
23 42 313
24 62 90
25 56 327
28 60 330
29 31 210
30 31 27
31 26 195
32 30 190
33 18 209
34 45 333
35 38 326
38 26 54
39 29 310
40 23 104
41 22 207
42 45 318
43 51 318


61.0
62.0
63.0
64.0
65.0
66.0
67.0
68.0
69.0
70.0
71.0
72.0
73.0
74.0
75.0
46 36 98
47 35 77
48 31 97
49 31 67
50 37 100
51 14 244
52 51 208
53 49 207
54 24 69
55 43 89
56 29 77
57 28 74
58 29 76
59 29 180
60 30 134
61 42 94
62 35 201
63 27 187
64 42 211
65 20 26
66 28 38
67 30 49
68 28 48
69 30 55
70 33 47
71 29 54
72 22 56
73 40 39
74 27 13
75 23 37
76 27 30
77 39 26
78 30 47
79 31 40
80 48 36
81 36 53
82 43 24


76.0
77.0
78.0
79.0
80.0
81.0
82.0
83.0
84.0
85.0
86.0
87.0
88.0
89.0
83 46 39
84 38 36
85 44 26
86 41 24
87 40 32
88 45 33
89 42 33
90 45 36
91 43 46
92 44 40
93 34 37
94 32 43
95 18 266
96 46 36
97 7 205
98 7 20
99 67 73
100 20 350
101 62 321
102 66 328
103 22 45


90.0
91.0
92.0
93.0
94.0
95.0
96.0
97.0
98.0
99.0
100.0
101.0
102.0
103.0
104.0
104 22 65
105 20 53
106 60 347
107 58 331
108 28 31
109 31 21
110 41 24
111 35 29
112 28 39

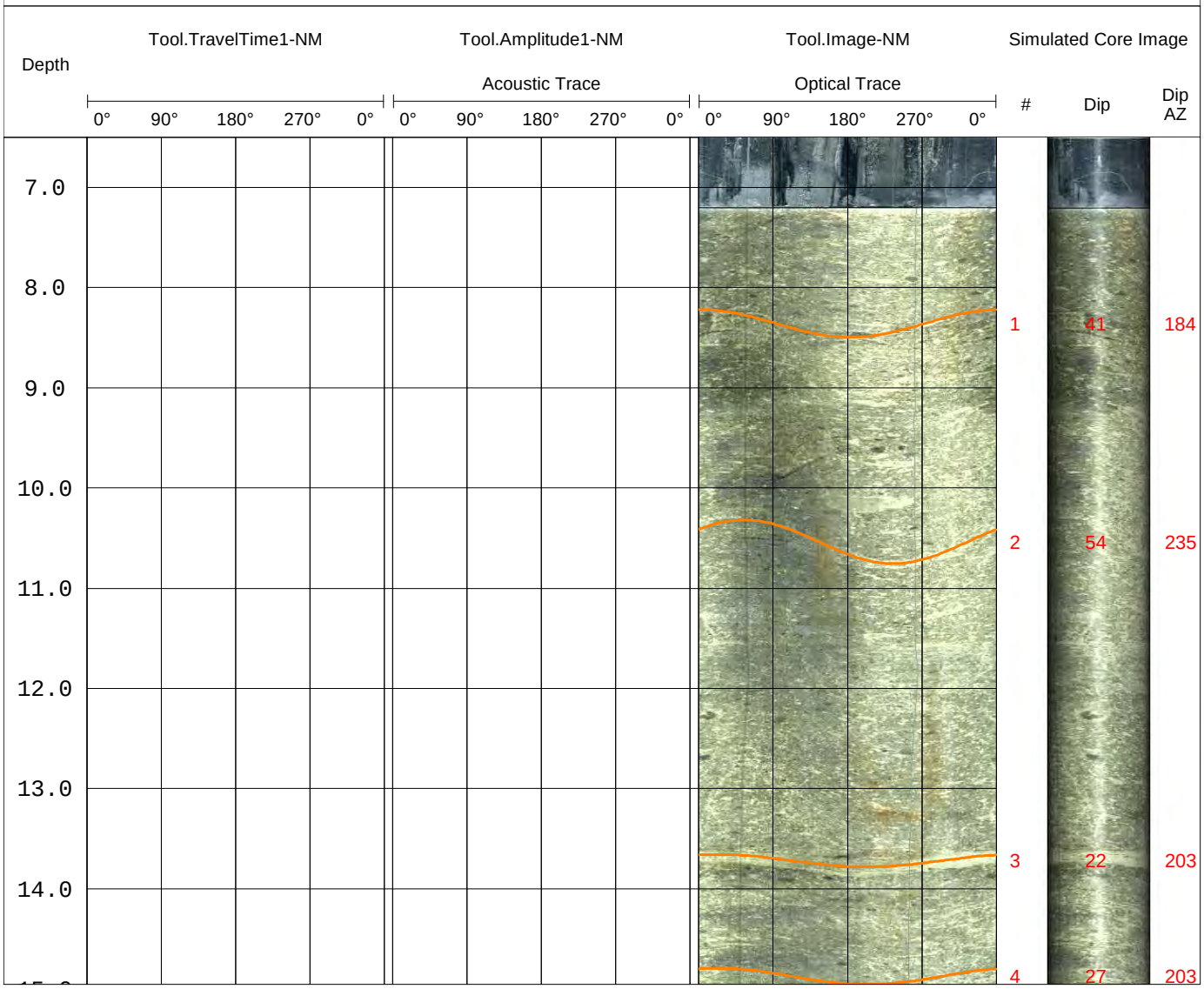

105.0
106.0
107.0
108.0
109.0
110.0
111.0
112.0
113.0
114.0
115.0
116.0
117.0
118.0
113 54 352
114 52 345
115 56 110
116 37 53
117 40 338
118 47 346
119 56 350
120 45 345
121 46 352
122 44 338
123 52 347
124 37 142
125 51 13
126 50 347
127 60 327
128 70 318
129 68 317

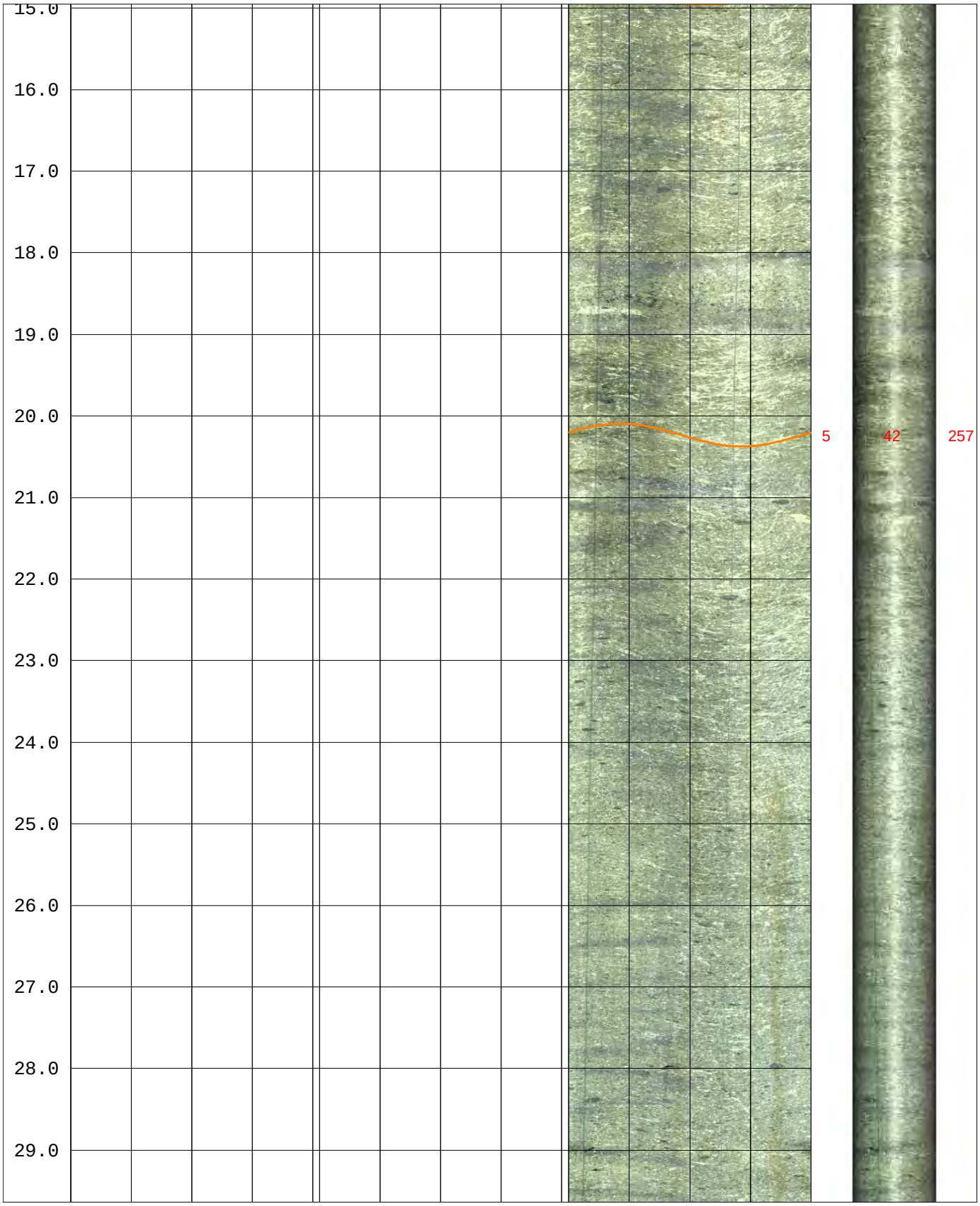
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2007 Geotechnical Program

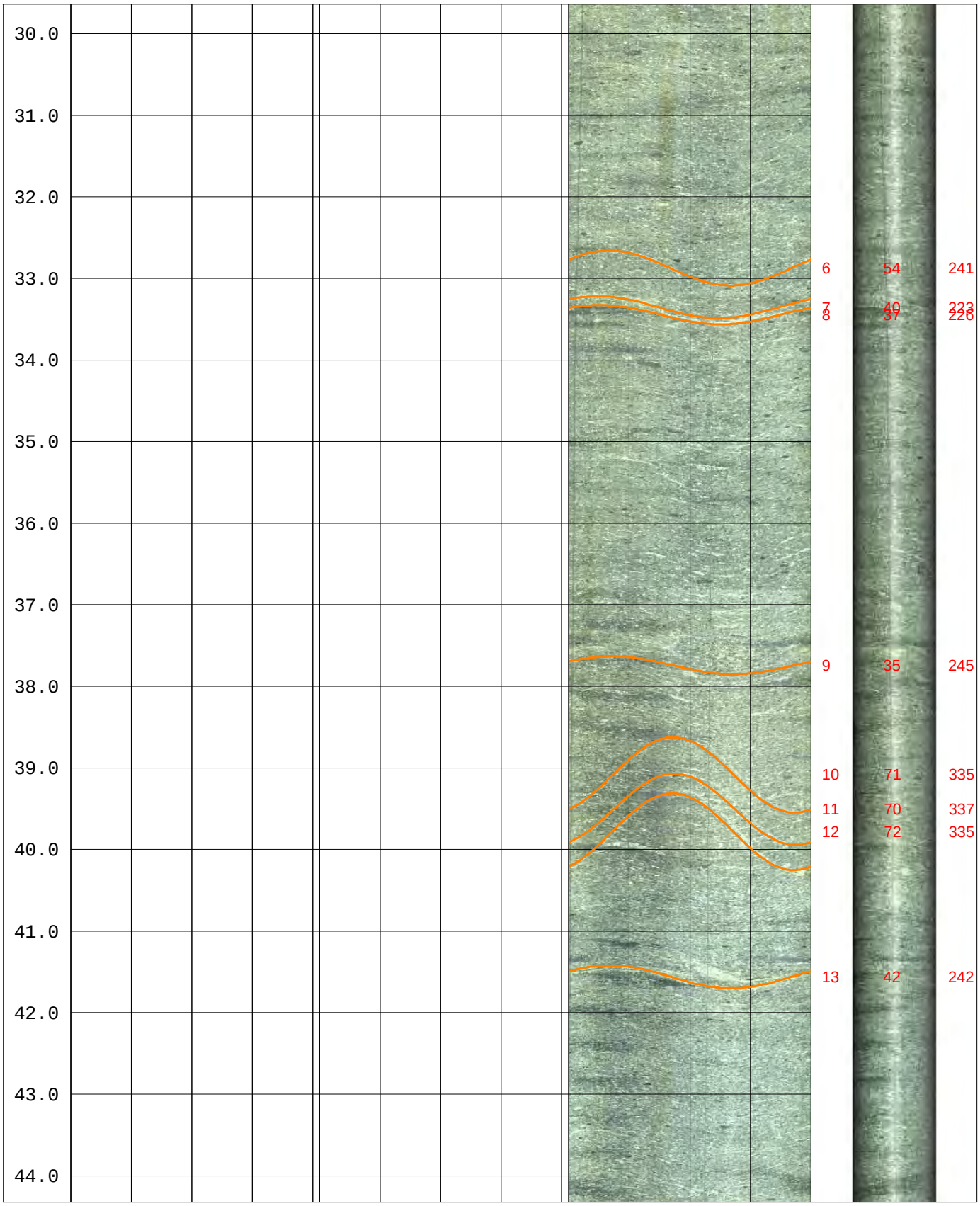
Date Logged:	August 11, 2007	Borehole ID:	RKS-10-07
File Name:	RKS1007-1M.wcl	Logged By:	F G Kruger

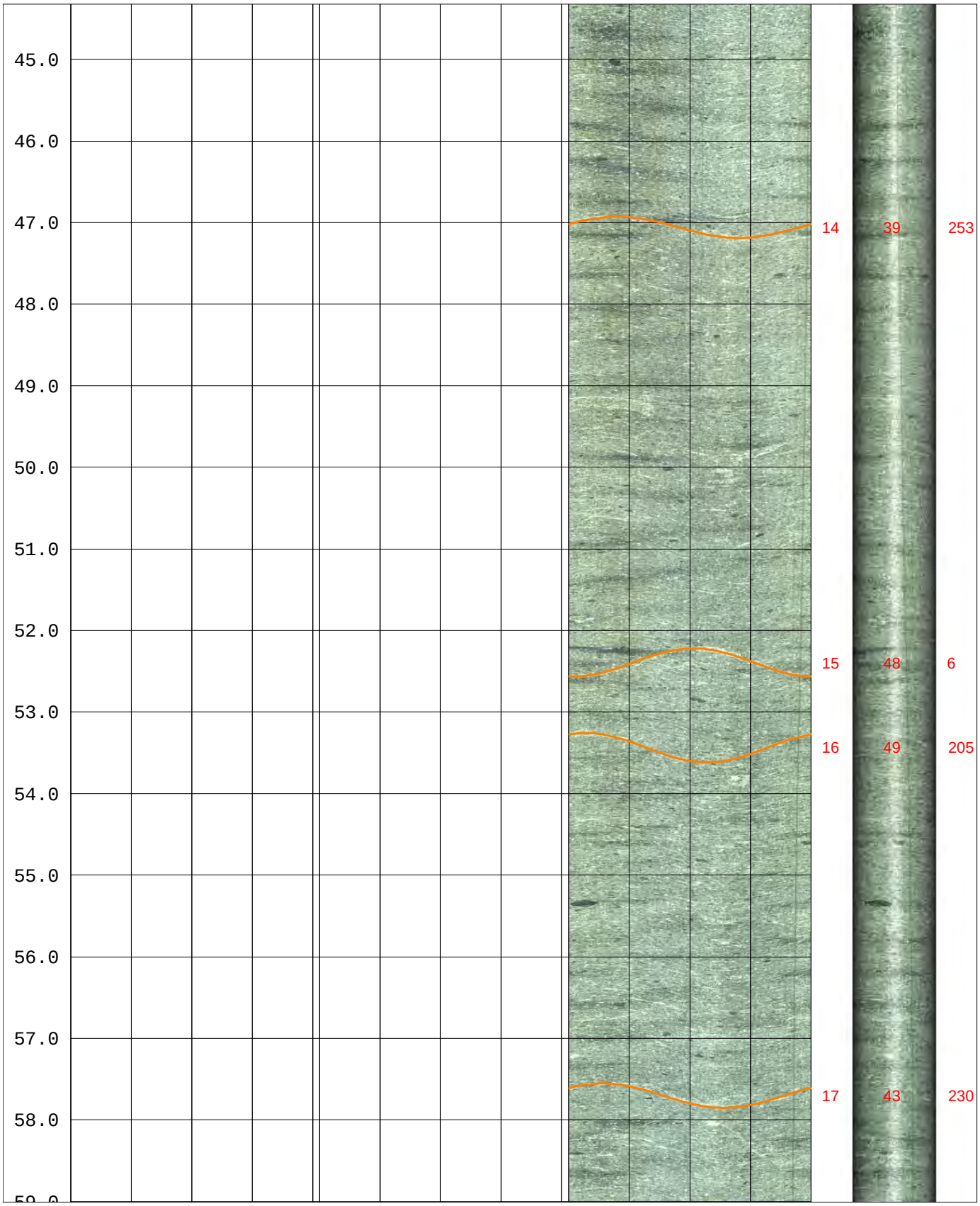
Notes:

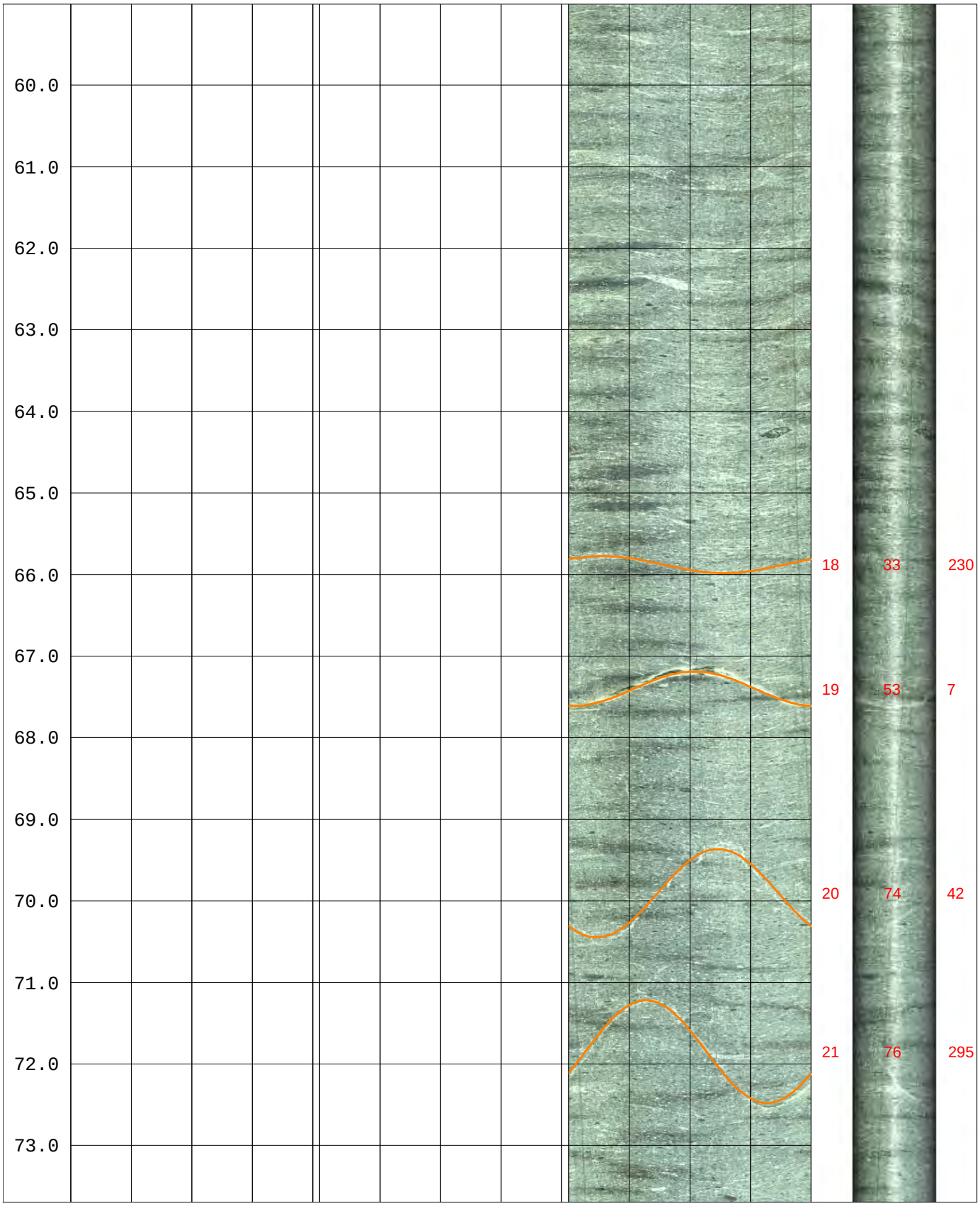
1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.

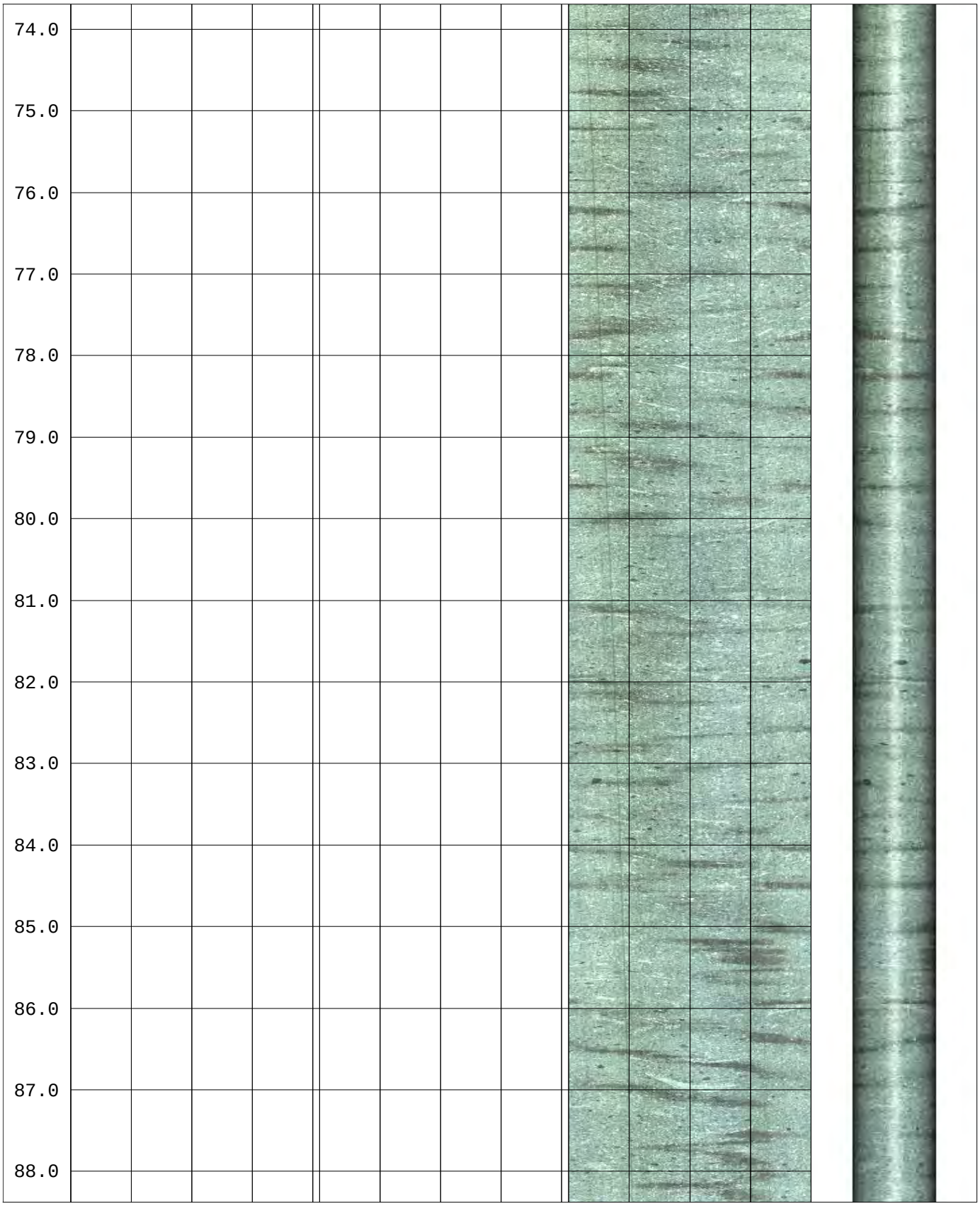


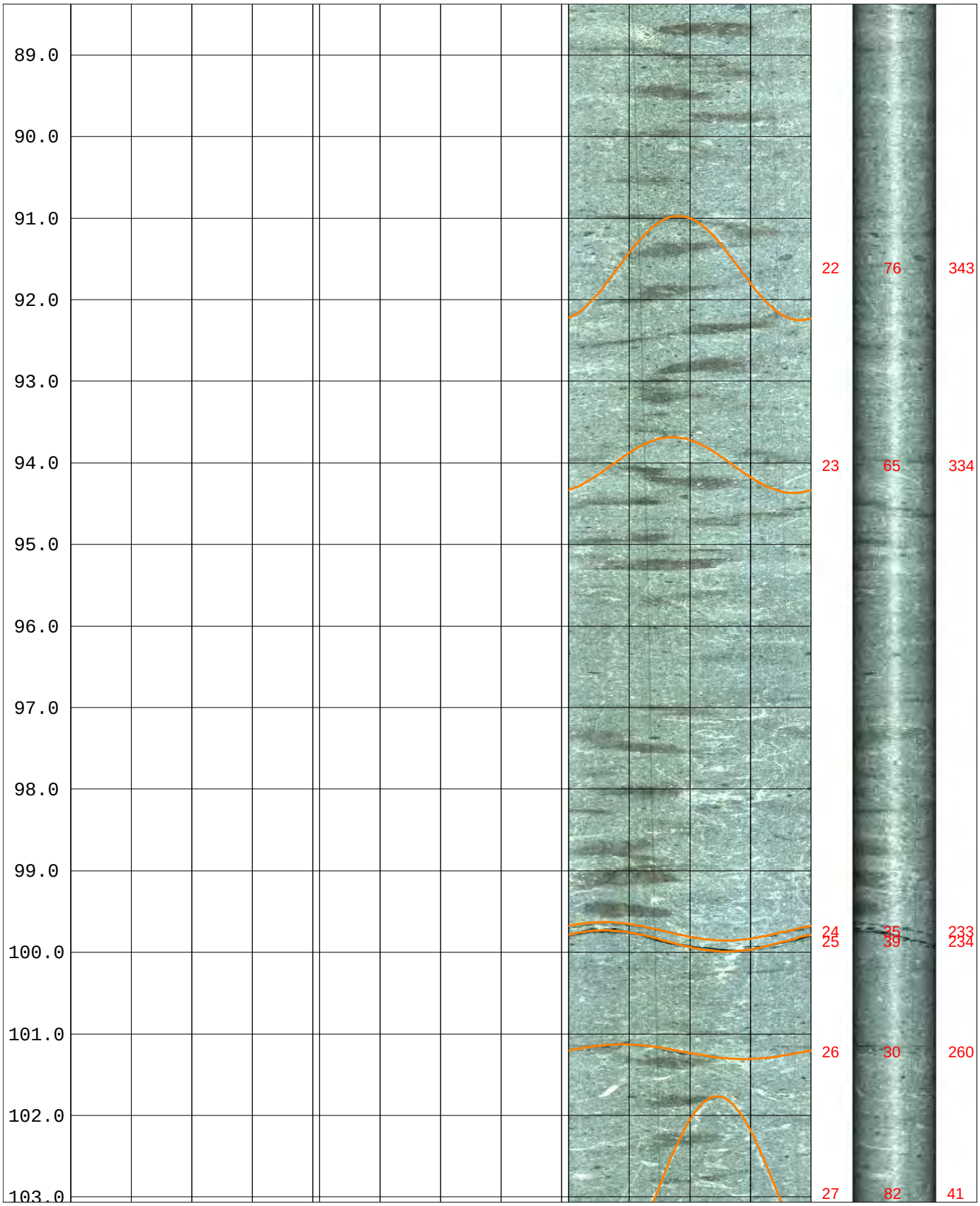

15.0
16.0
17.0
18.0
19.0
20.0
21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
5
42
257

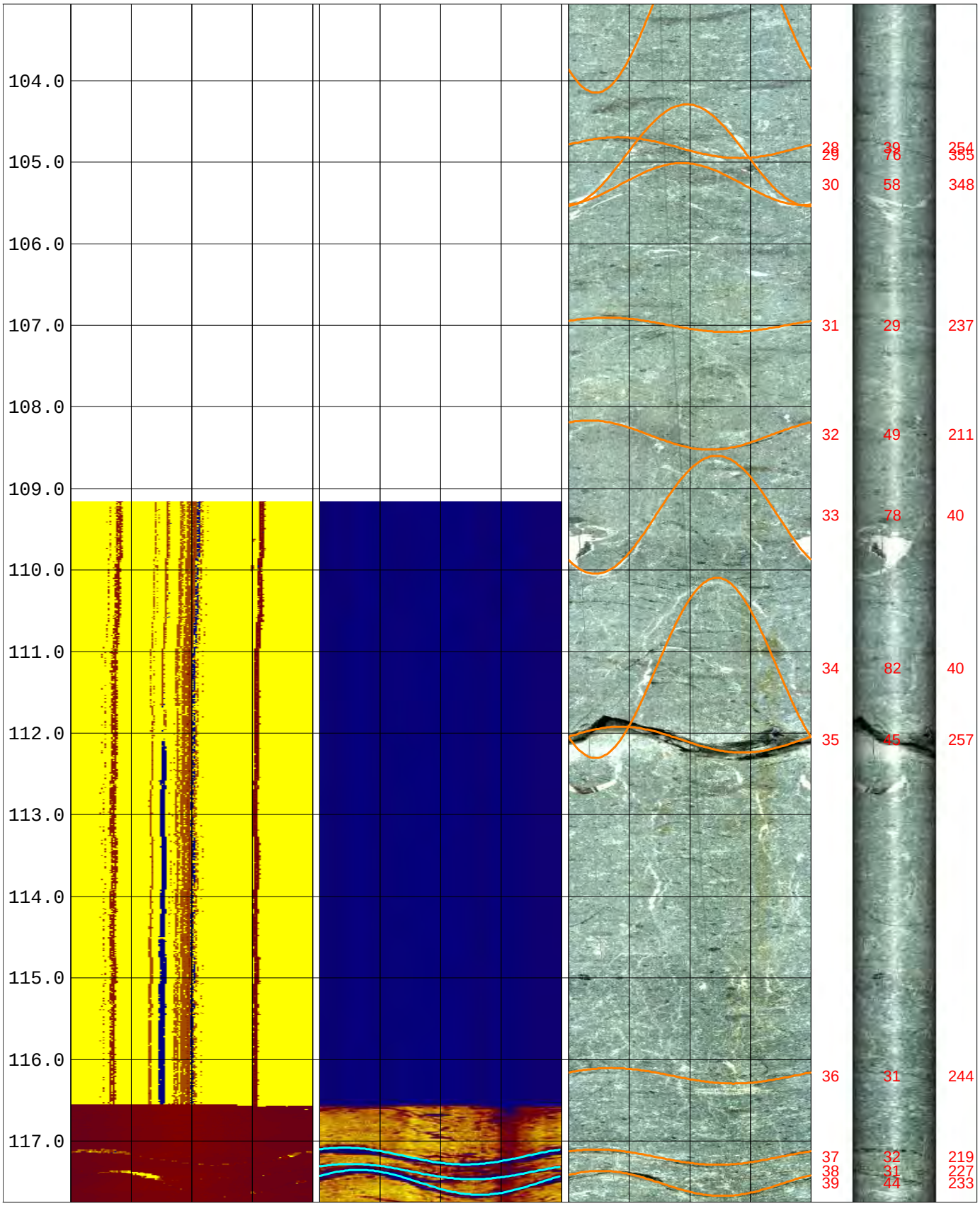

30.0
31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
6 54 241
7 40 223
8 37 226
9 35 245
10 71 335
11 70 337
12 72 335
13 42 242

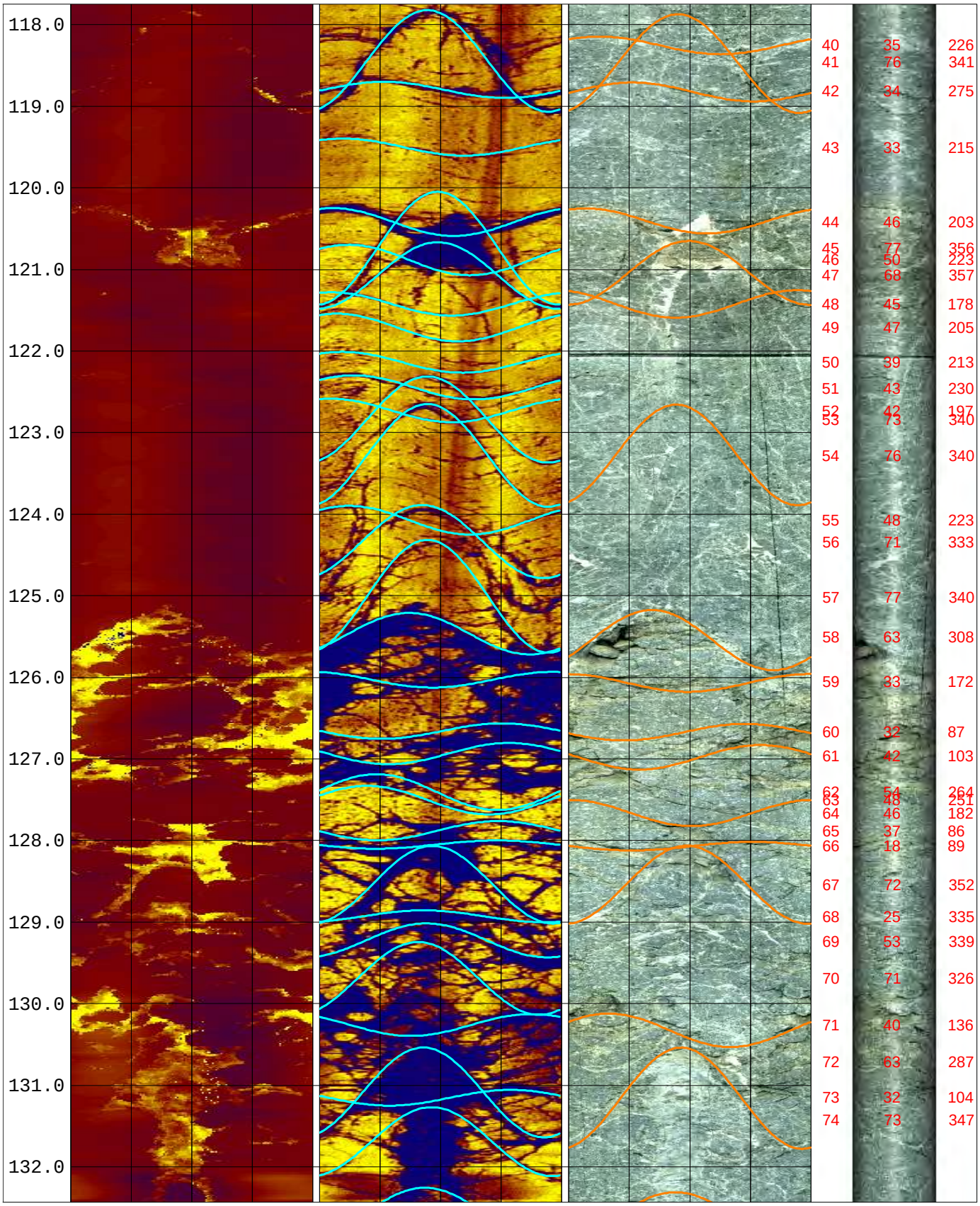

45.0
46.0
47.0
48.0
49.0
50.0
51.0
52.0
53.0
54.0
55.0
56.0
57.0
58.0
14 39 253
15 48 6
16 49 205
17 43 230

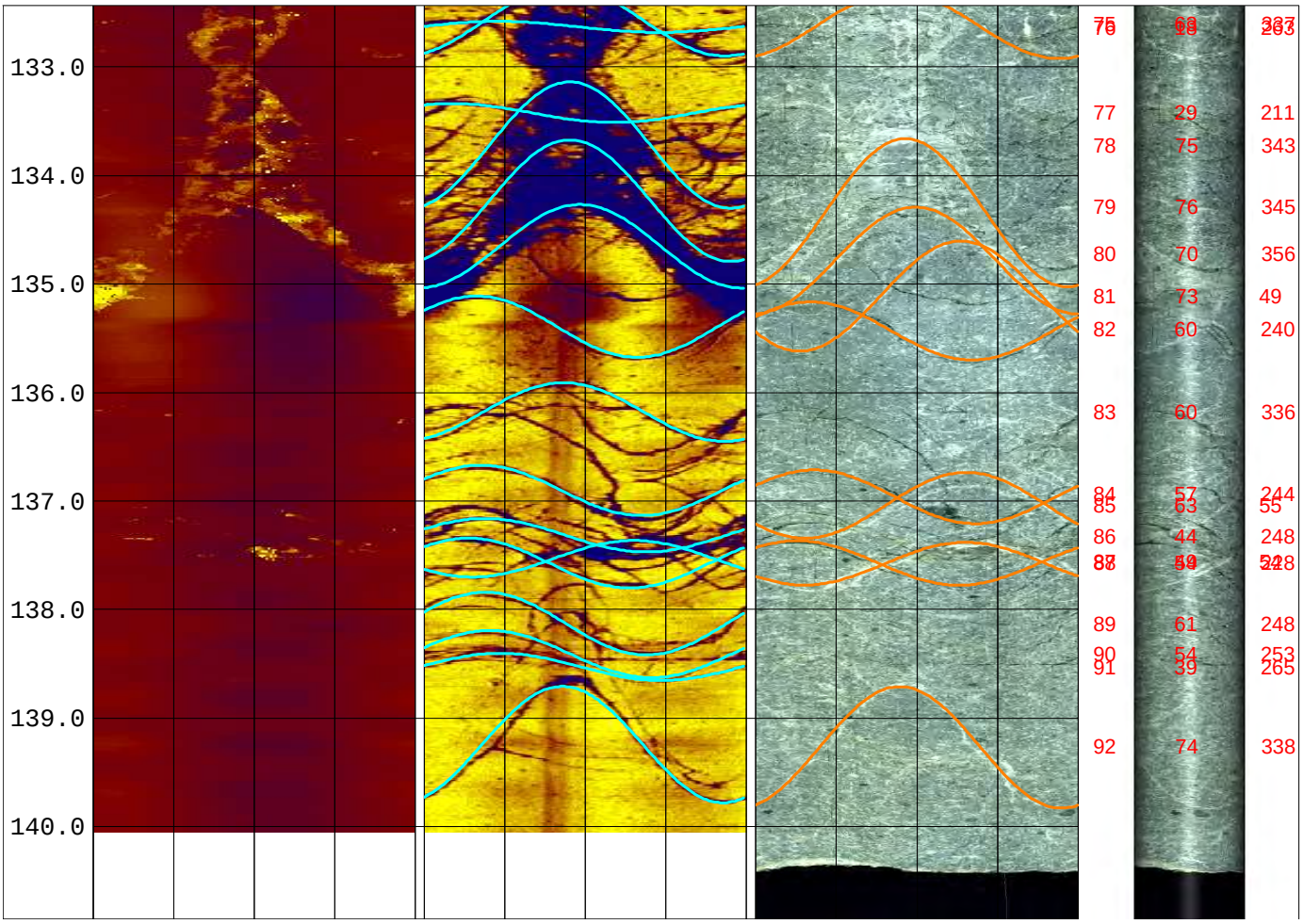

60.0
61.0
62.0
63.0
64.0
65.0
66.0
67.0
68.0
69.0
70.0
71.0
72.0
73.0
18
33
230
19
53
7
20
74
42
21
76
295


74.0
75.0
76.0
77.0
78.0
79.0
80.0
81.0
82.0
83.0
84.0
85.0
86.0
87.0
88.0


89.0
90.0
91.0
92.0
93.0
94.0
95.0
96.0
97.0
98.0
99.0
100.0
101.0
102.0
103.0
22 76 343
23 65 334
24 25 233
25 39 234
26 30 260
27 82 41


104.0
105.0
106.0
107.0
108.0
109.0
110.0
111.0
112.0
113.0
114.0
115.0
116.0
117.0
28 39 254
29 76 335
30 58 348
31 29 237
32 49 211
33 78 40
34 82 40
35 45 257
36 31 244
37 32 219
38 31 227
39 44 233

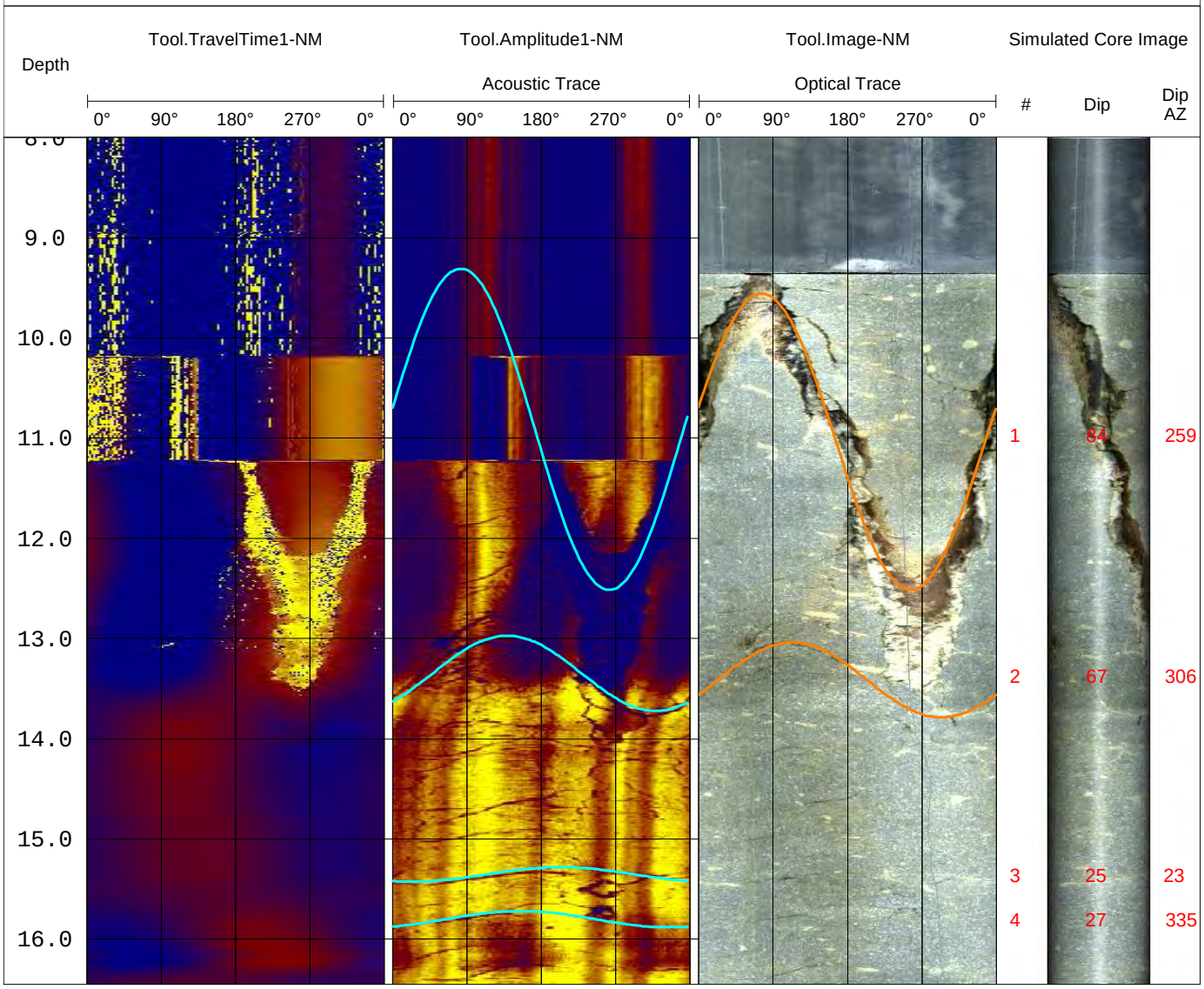

118.0
119.0
120.0
121.0
122.0
123.0
124.0
125.0
126.0
127.0
128.0
129.0
130.0
131.0
132.0
40 35 226
41 76 341
42 34 275
43 33 215
44 46 203
45 77 356
46 50 223
47 68 357
48 45 178
49 47 205
50 39 213
51 43 230
52 42 197
53 73 340
54 76 340
55 48 223
56 71 333
57 77 340
58 63 308
59 33 172
60 32 87
61 42 103
62 54 264
63 48 231
64 46 182
65 37 86
66 18 89
67 72 352
68 25 335
69 53 339
70 71 326
71 40 136
72 63 287
73 32 104
74 73 347

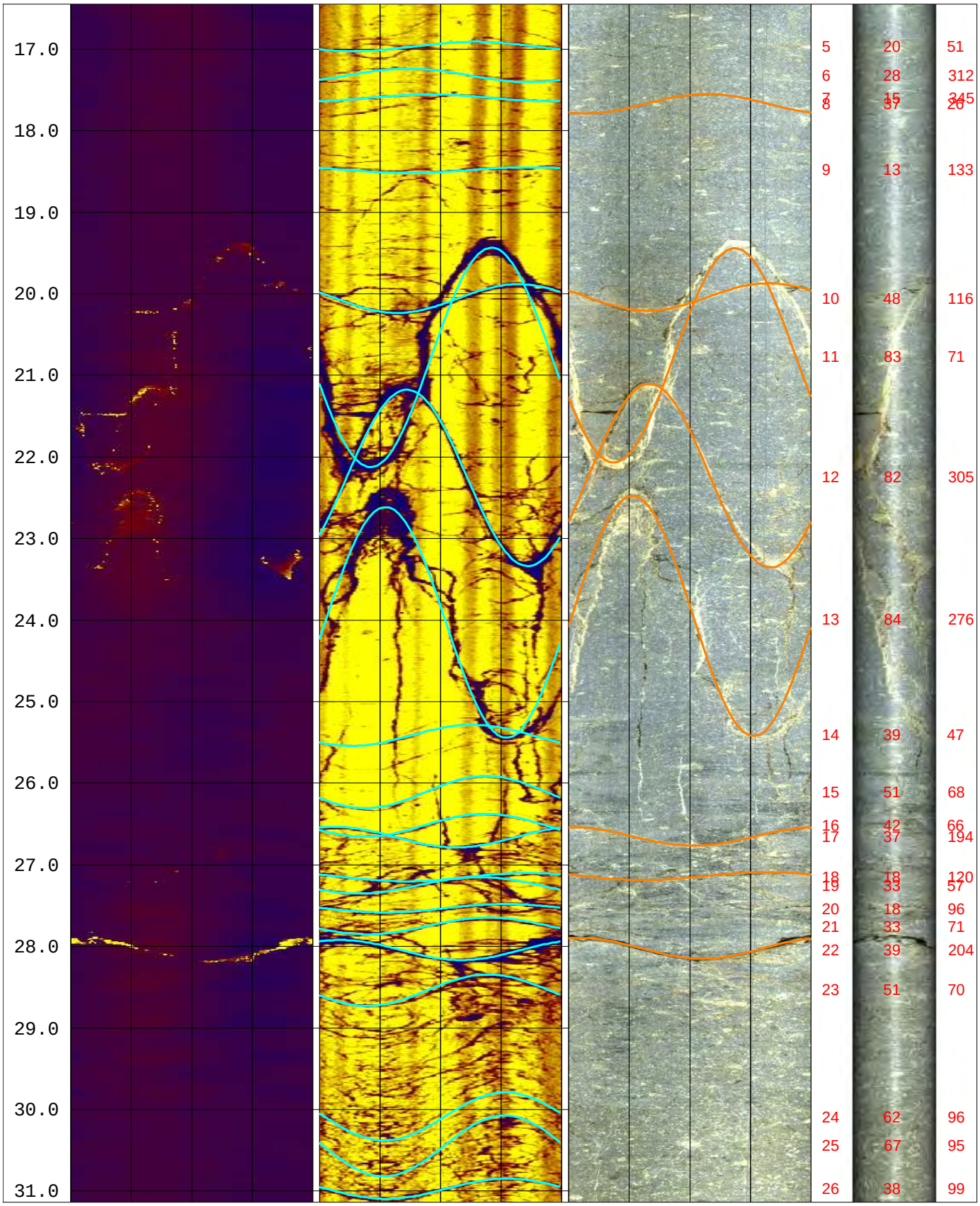

133.0
134.0
135.0
136.0
137.0
138.0
139.0
140.0
75 68 337
76 58 263
77 29 211
78 75 343
79 76 345
80 70 356
81 73 49
82 60 240
83 60 336
84 57 244
85 63 55
86 44 248
87 50 248
88 50 248
89 61 248
90 54 253
91 39 265
92 74 338

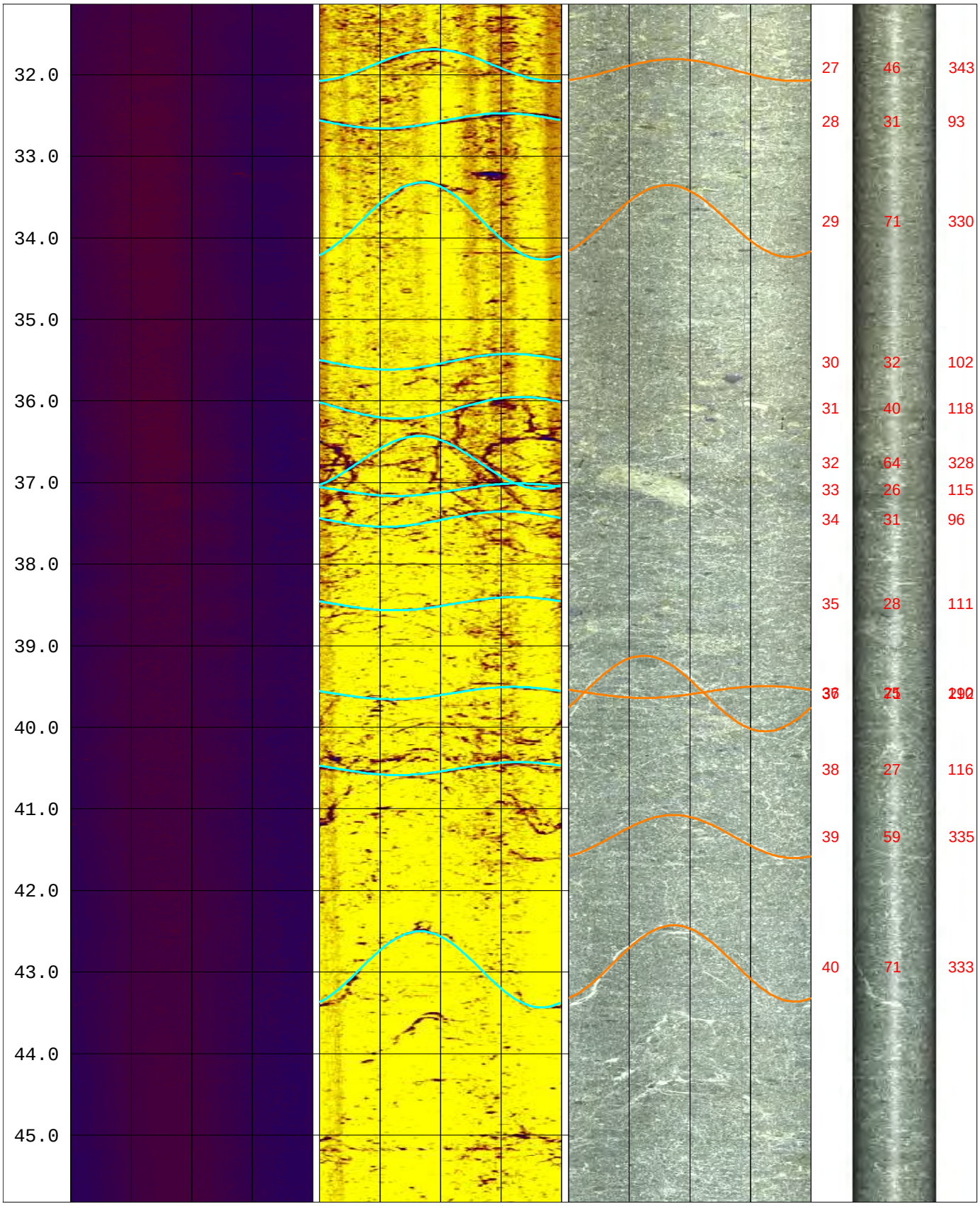
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2007 Geotechnical Program
Date Logged:	August 9, 2007	Borehole ID: RKS-11-07
File Name:	RKS1107-1M.wcl	Logged By: F G Kruger

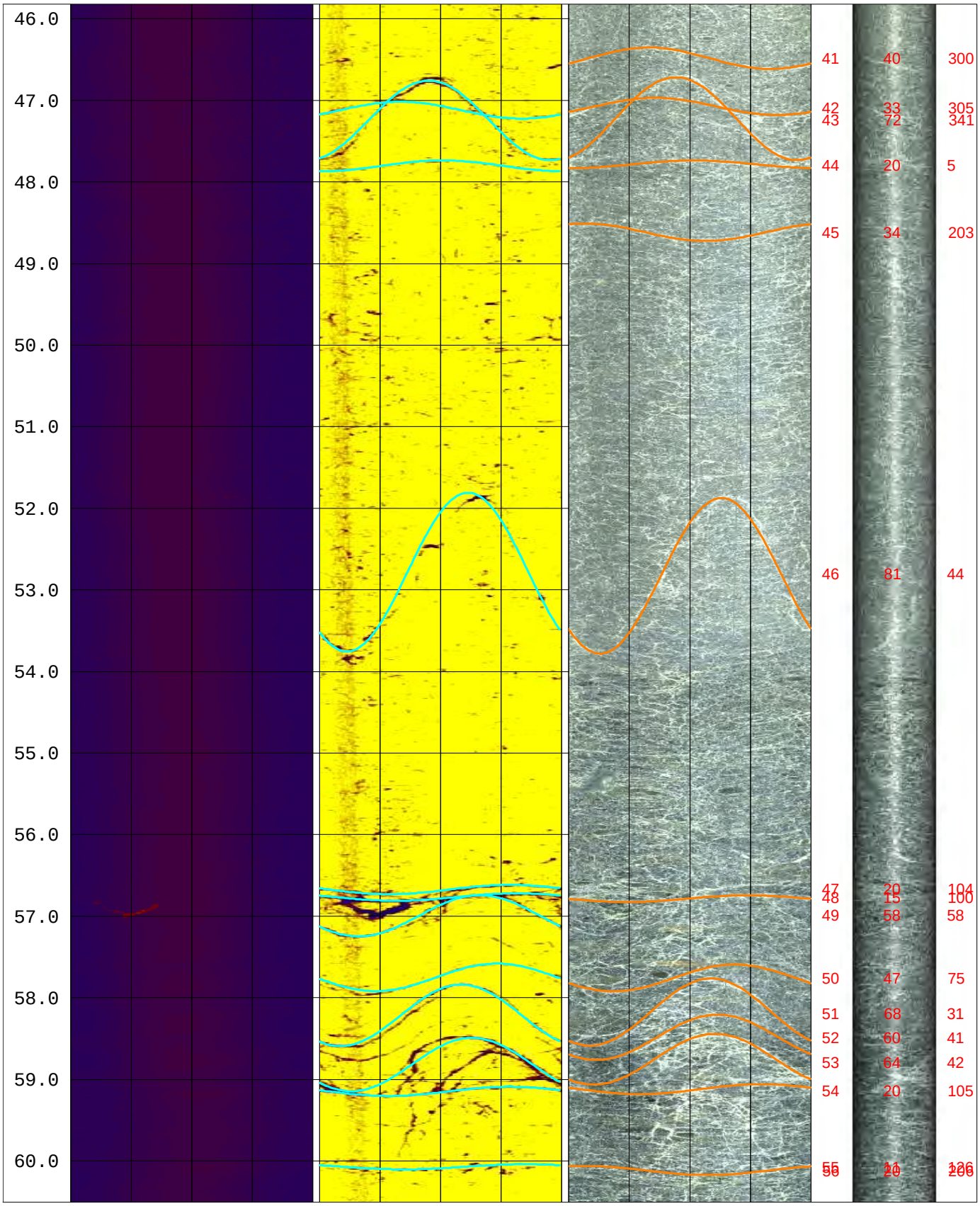
Notes:

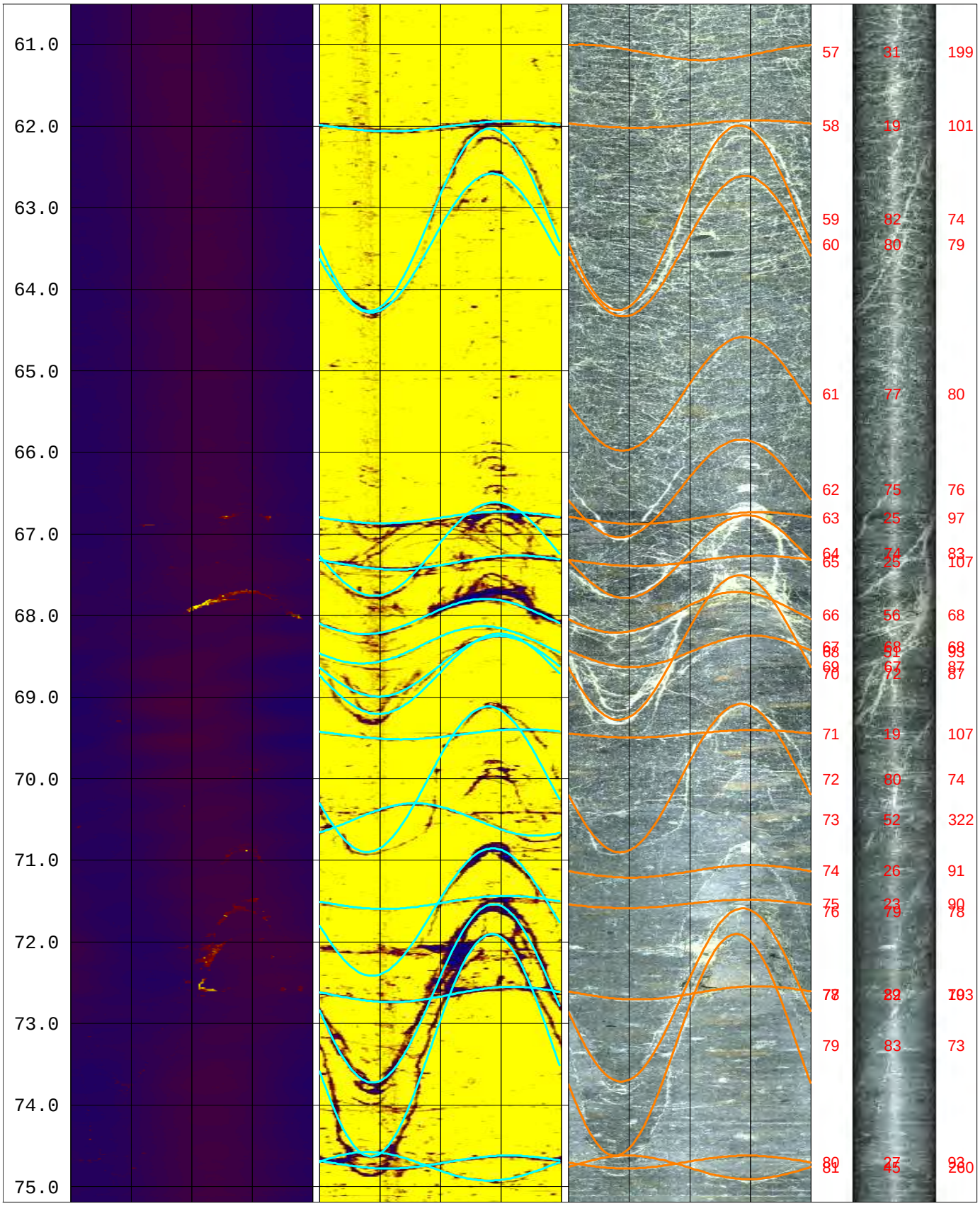
1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.

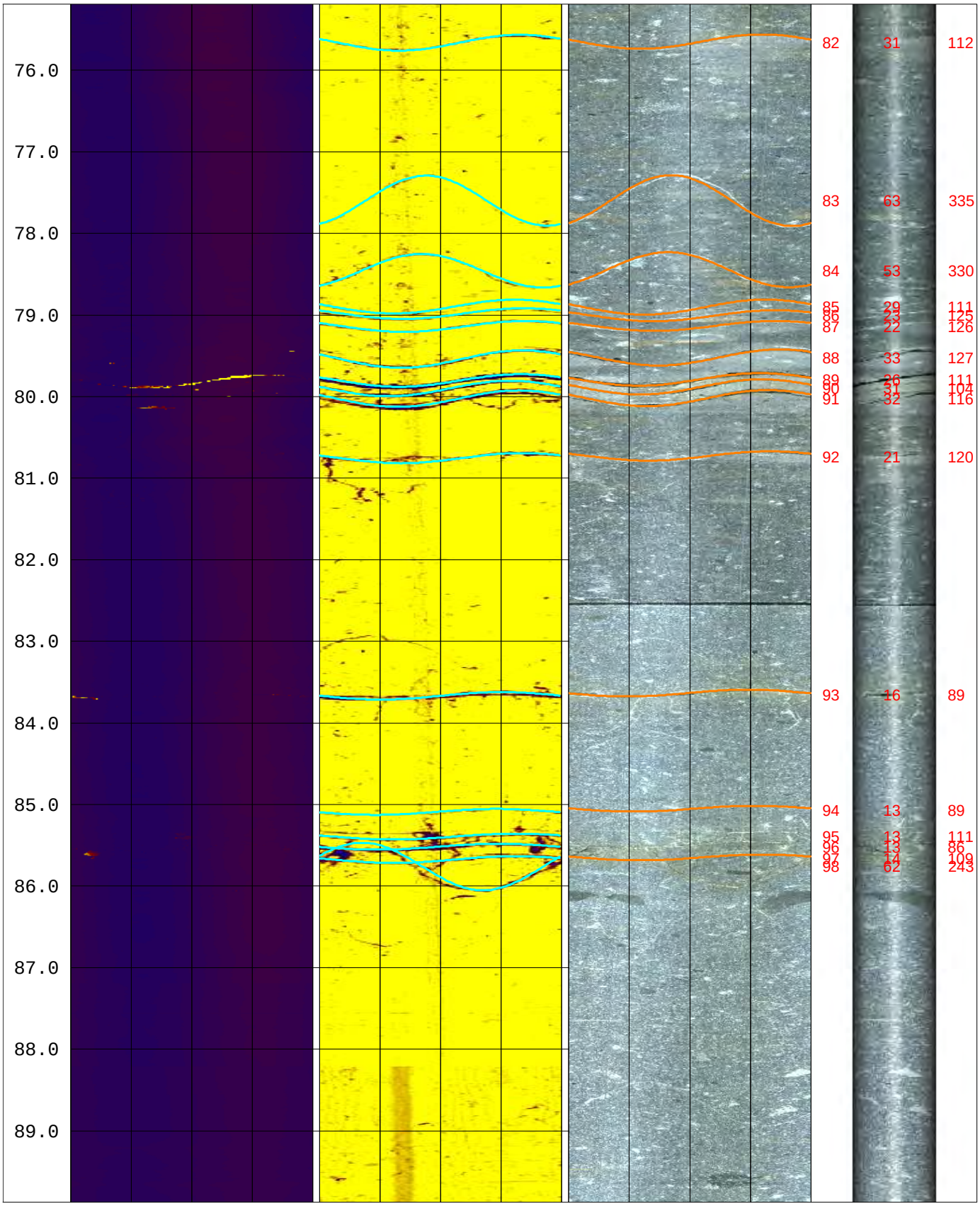


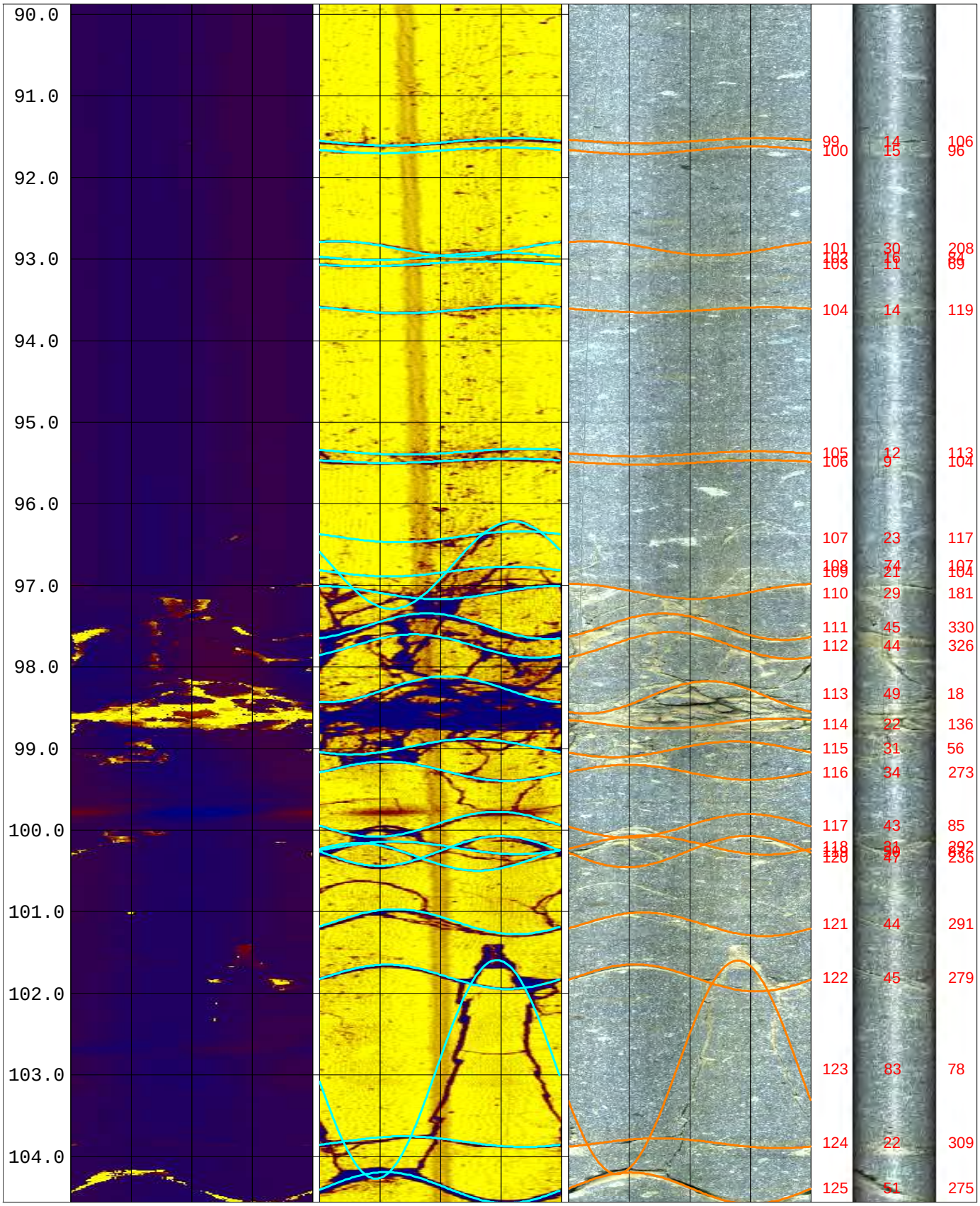

17.0
18.0
19.0
20.0
21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
30.0
31.0
5 20 51
6 28 312
7 15 345
8 37 26
9 13 133
10 48 116
11 83 71
12 82 305
13 84 276
14 39 47
15 51 68
16 42 66
17 37 194
18 18 120
19 33 57
20 18 96
21 33 71
22 39 204
23 51 70
24 62 96
25 67 95
26 38 99

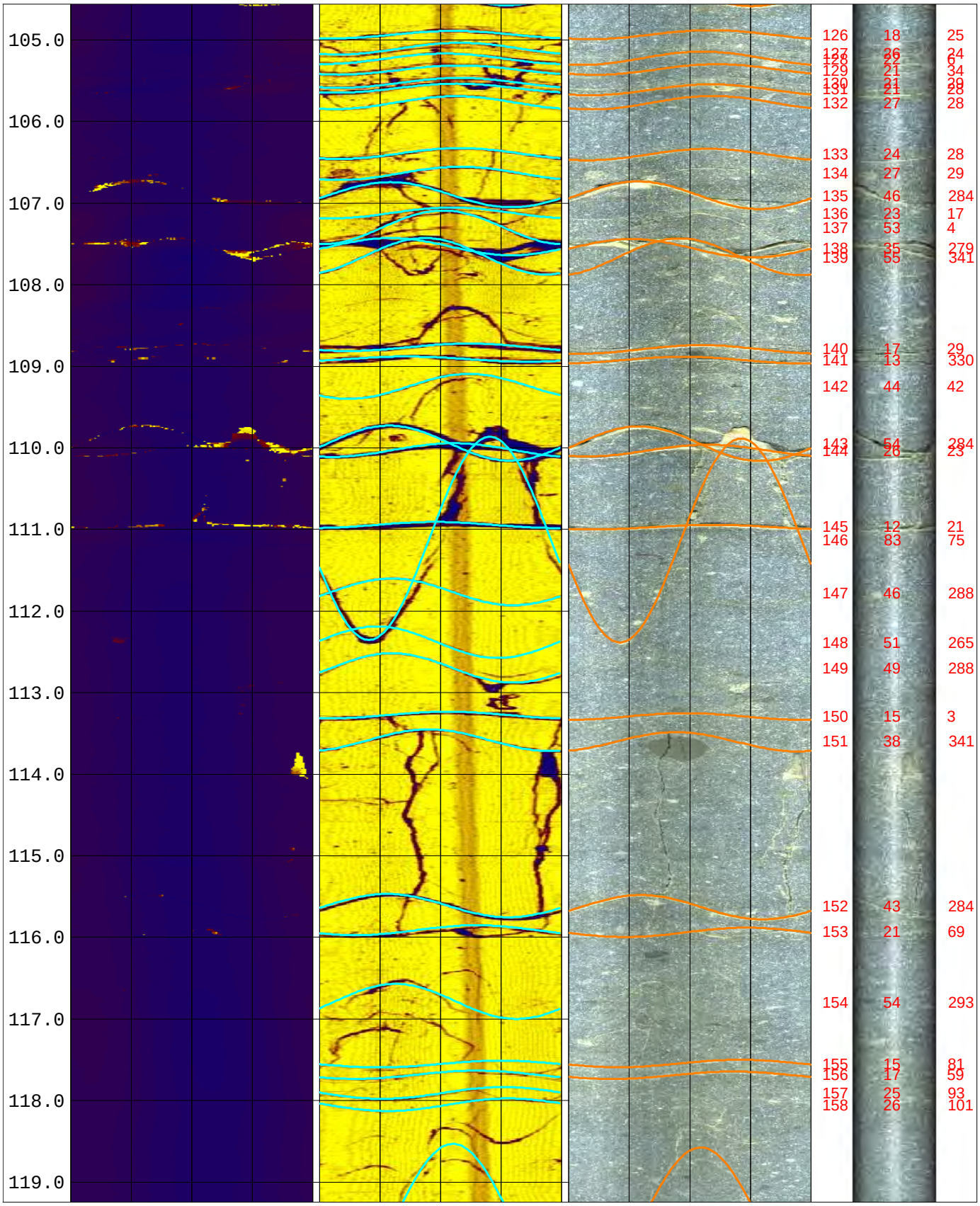

32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
45.0
27 46 343
28 31 93
29 71 330
30 32 102
31 40 118
32 64 328
33 26 115
34 31 96
35 28 111
38 27 116
39 59 335
40 71 333

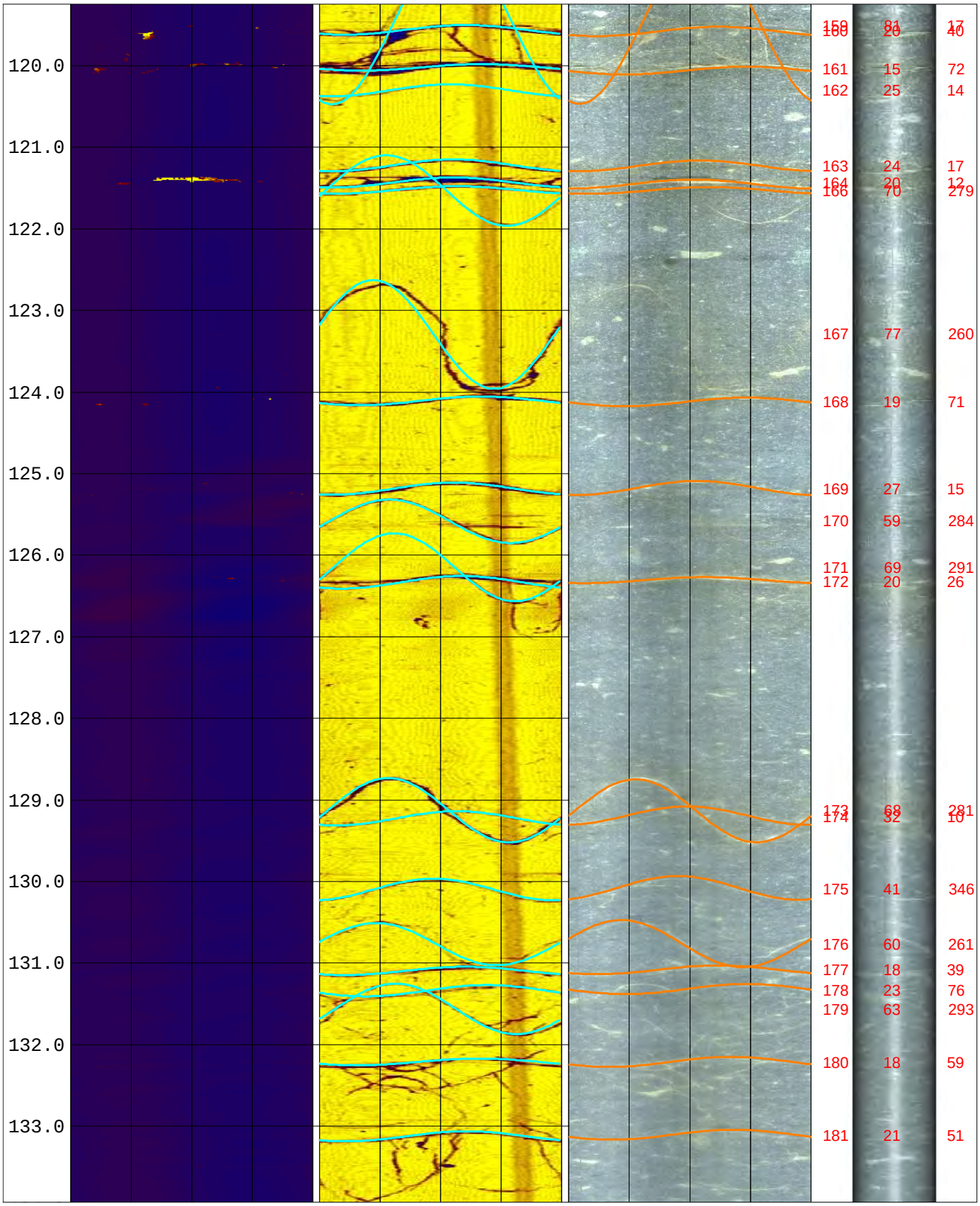

46.0
47.0
48.0
49.0
50.0
51.0
52.0
53.0
54.0
55.0
56.0
57.0
58.0
59.0
60.0
41 40 300
42 33 305
43 72 341
44 20 5
45 34 203
46 81 44
47 20 104
48 15 100
49 58 58
50 47 75
51 68 31
52 60 41
53 64 42
54 20 105

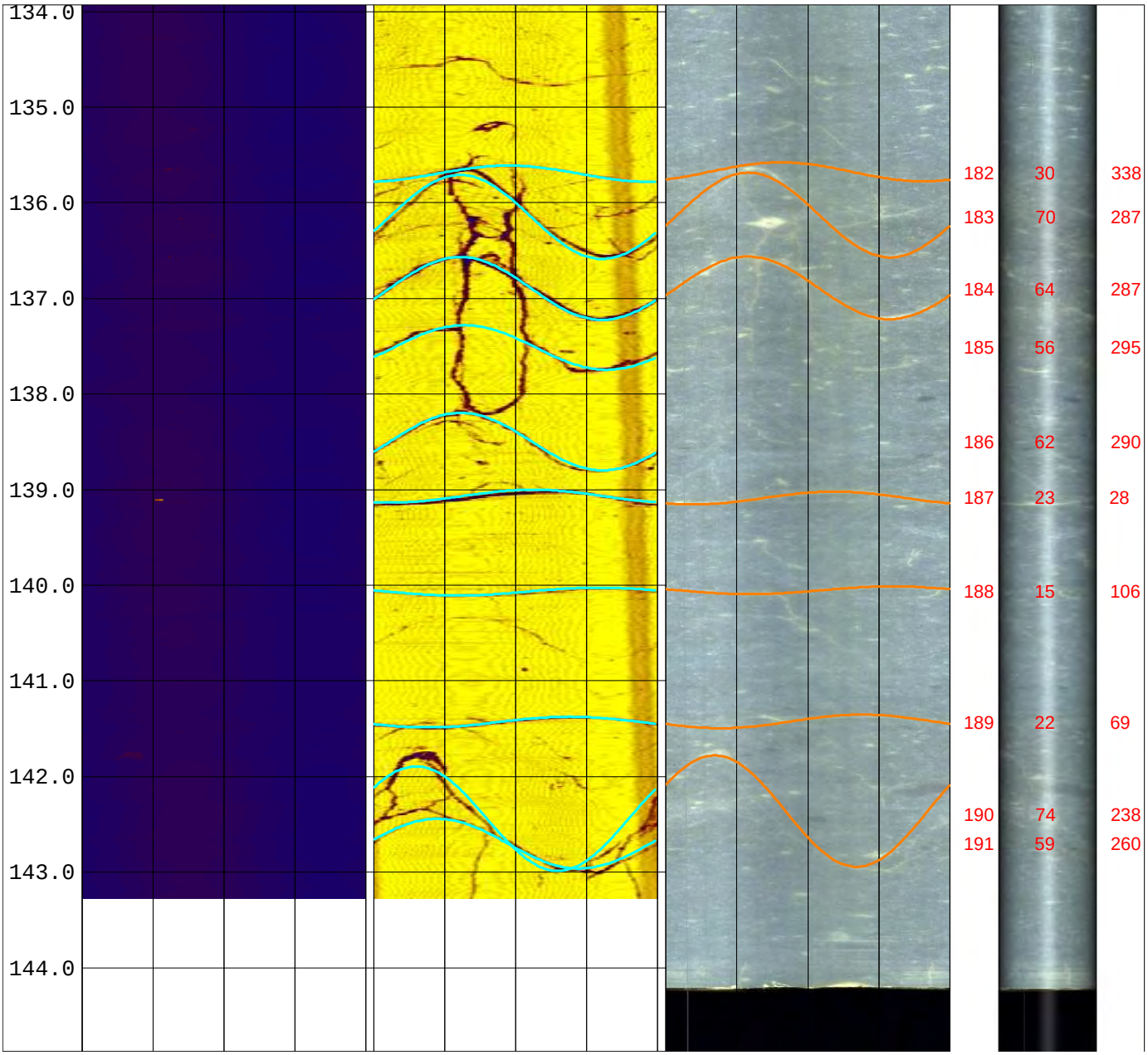

61.0
62.0
63.0
64.0
65.0
66.0
67.0
68.0
69.0
70.0
71.0
72.0
73.0
74.0
75.0
57 31 199
58 19 101
59 82 74
60 80 79
61 77 80
62 75 76
63 25 97
64 74 83
65 25 107
66 56 68
67 68 68
68 31 99
69 67 87
70 72 87
71 19 107
72 80 74
73 52 322
74 26 91
75 23 90
76 79 78
77 22 103
78 82 103
79 83 73
80 27 93
81 45 260


76.0
77.0
78.0
79.0
80.0
81.0
82.0
83.0
84.0
85.0
86.0
87.0
88.0
89.0
82 31 112
83 63 335
84 53 330
85 29 111
86 53 125
87 22 126
88 33 127
89 26 111
90 31 104
91 32 116
92 21 120
93 16 89
94 13 89
95 13 111
96 13 86
97 14 109
98 62 243


90.0
91.0
92.0
93.0
94.0
95.0
96.0
97.0
98.0
99.0
100.0
101.0
102.0
103.0
104.0
99 14 106
100 15 96
101 30 208
103 11 69
104 14 119
105 12 113
106 9 104
107 23 117
108 74 107
109 21 104
110 29 181
111 45 330
112 44 326
113 49 18
114 22 136
115 31 56
116 34 273
117 43 85
120 47 236
121 44 291
122 45 279
123 83 78
124 22 309
125 51 275


105.0
106.0
107.0
108.0
109.0
110.0
111.0
112.0
113.0
114.0
115.0
116.0
117.0
118.0
119.0
126 18 25
127 26 24
128 22 6
129 21 34
130 21 29
131 21 28
132 27 28
133 24 28
134 27 29
135 46 284
136 23 17
137 53 4
138 35 279
139 55 341
140 17 29
141 13 330
142 44 42
143 54 284
144 26 23
145 12 21
146 83 75
147 46 288
148 51 265
149 49 288
150 15 3
151 38 341
152 43 284
153 21 69
154 54 293
155 15 81
156 17 59
157 25 93
158 26 101


120.0
121.0
122.0
123.0
124.0
125.0
126.0
127.0
128.0
129.0
130.0
131.0
132.0
133.0
159 81 17
160 20 40
161 15 72
162 25 14
163 24 17
164 20 12
166 70 279
167 77 260
168 19 71
169 27 15
170 59 284
171 69 291
172 20 26
173 68 281
174 32 10
175 41 346
176 60 261
177 18 39
178 23 76
179 63 293
180 18 59
181 21 51

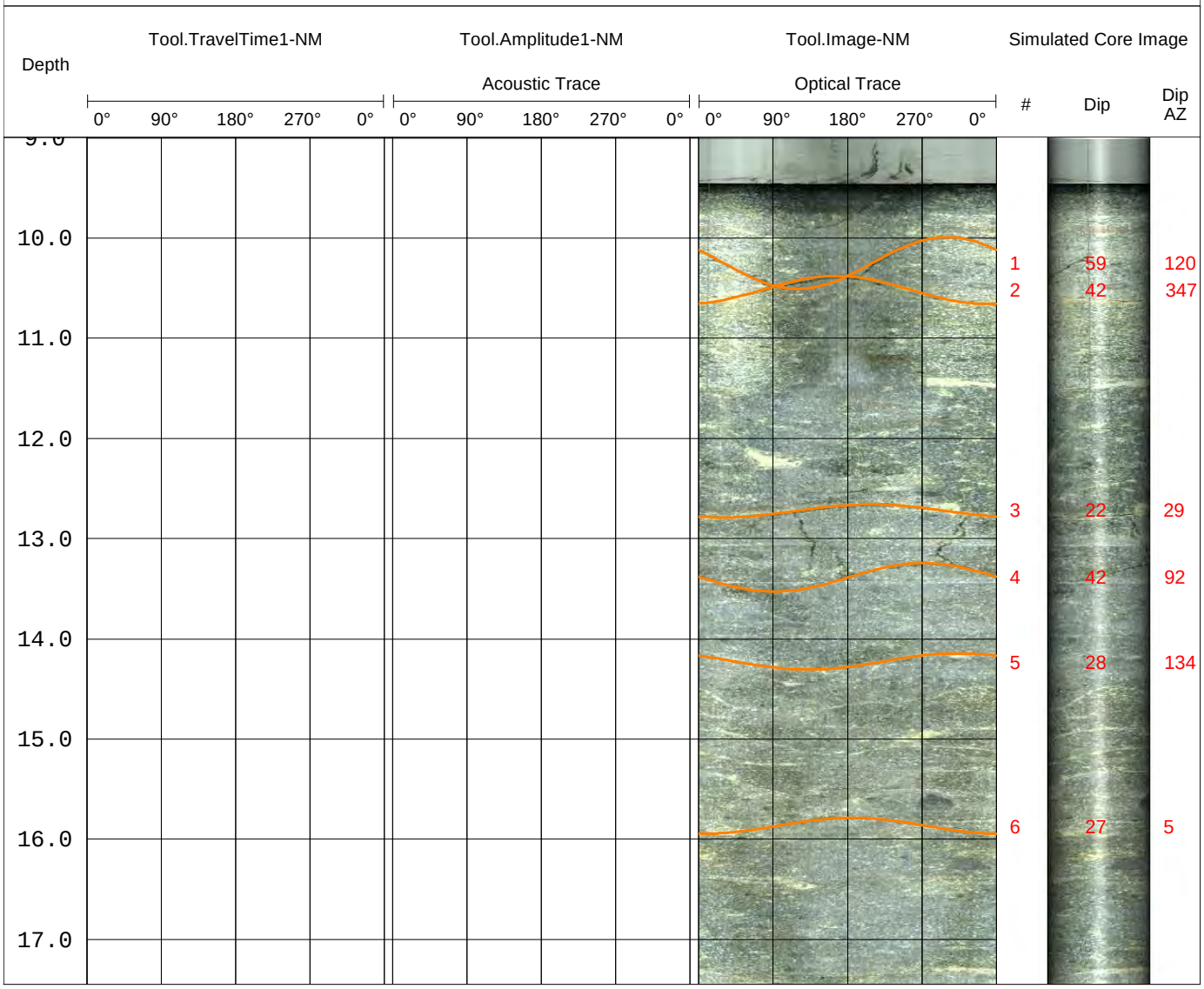

134.0
135.0
136.0
137.0
138.0
139.0
140.0
141.0
142.0
143.0
144.0
182 30 338
183 70 287
184 64 287
185 56 295
186 62 290
187 23 28
188 15 106
189 22 69
190 74 238
191 59 260

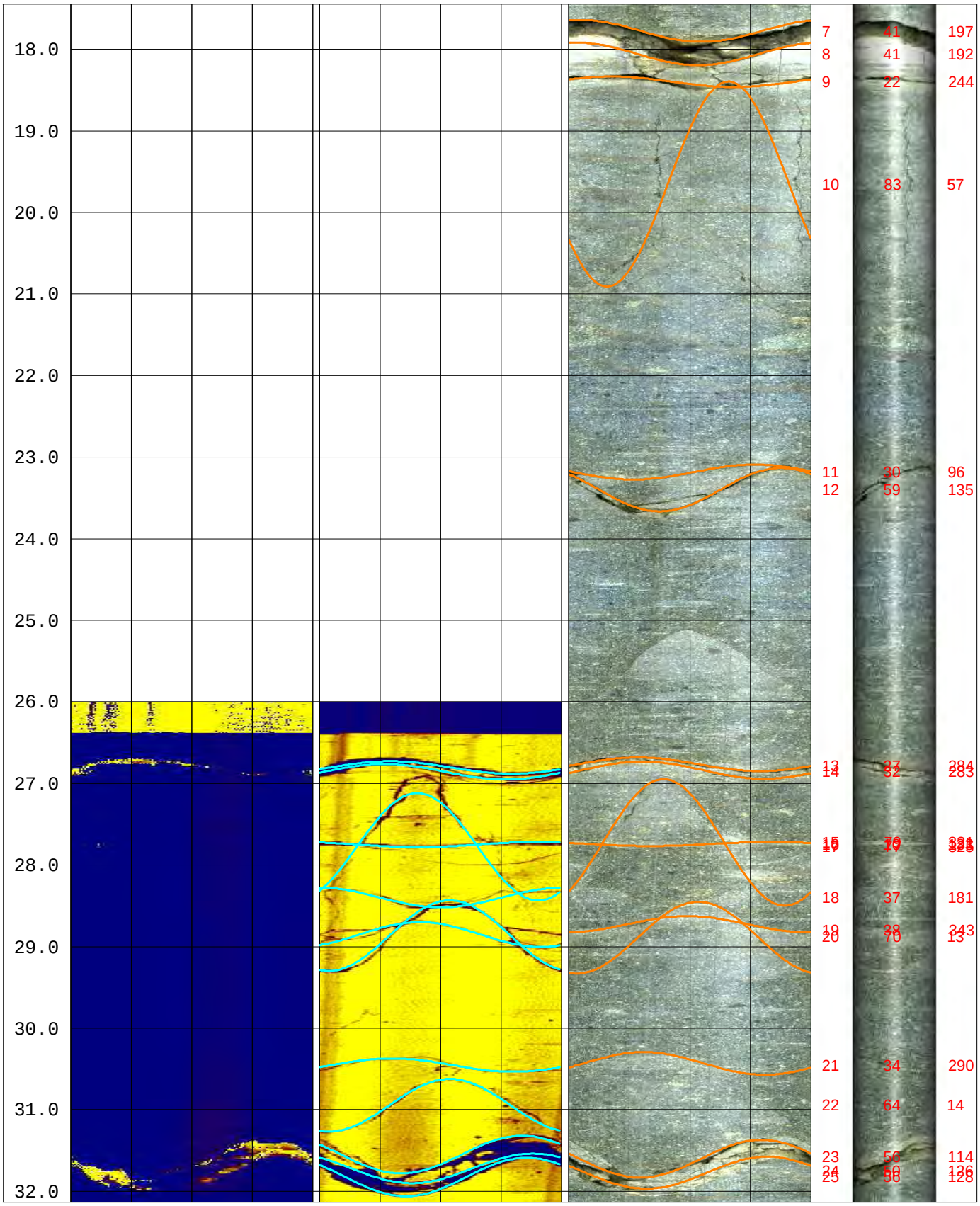
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2007 Geotechnical Program

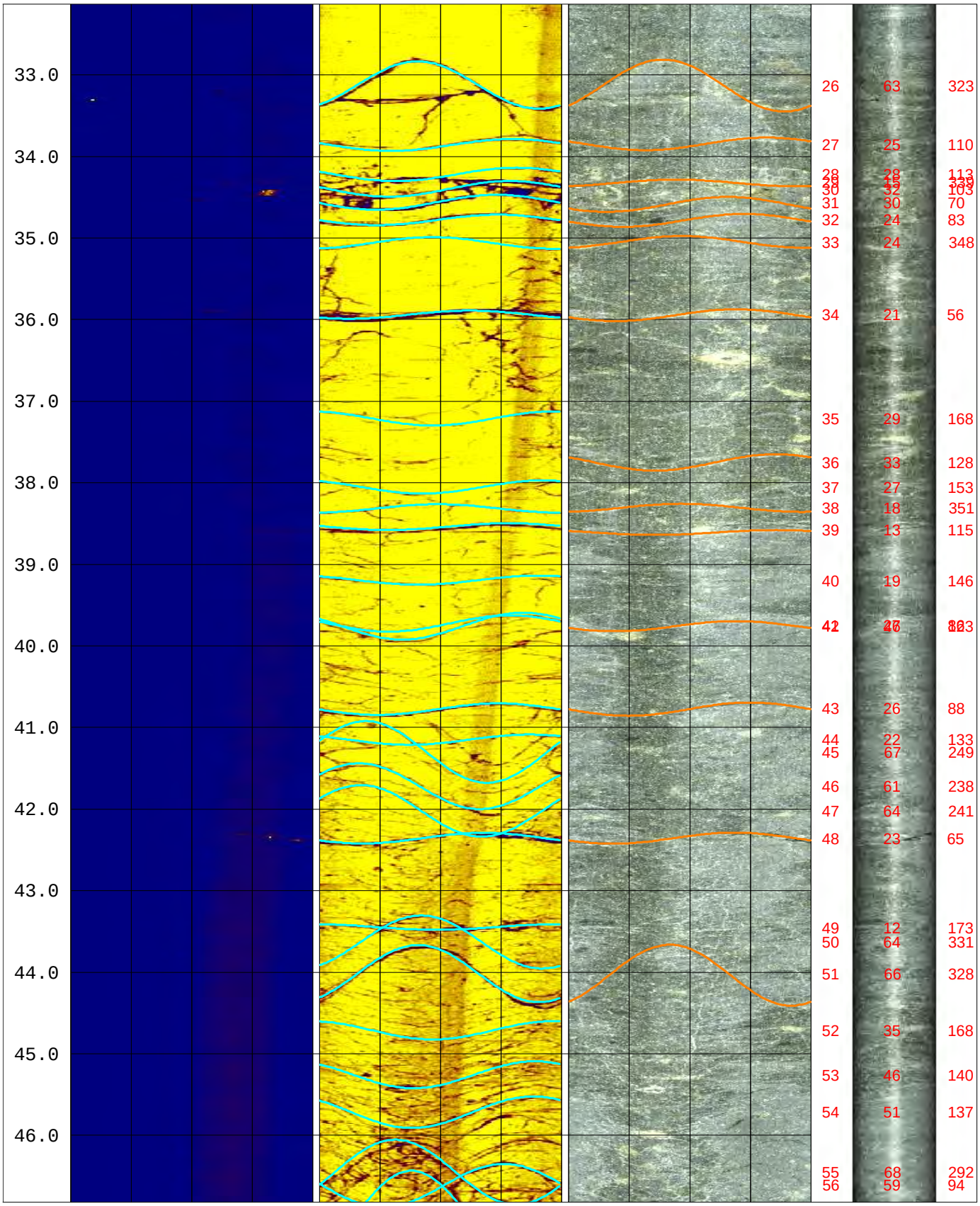
Date Logged:	September 6, 2007	Borehole ID:	RKS-12-07
File Name:	RKS1207-1M.wcl	Logged By:	F G Kruger

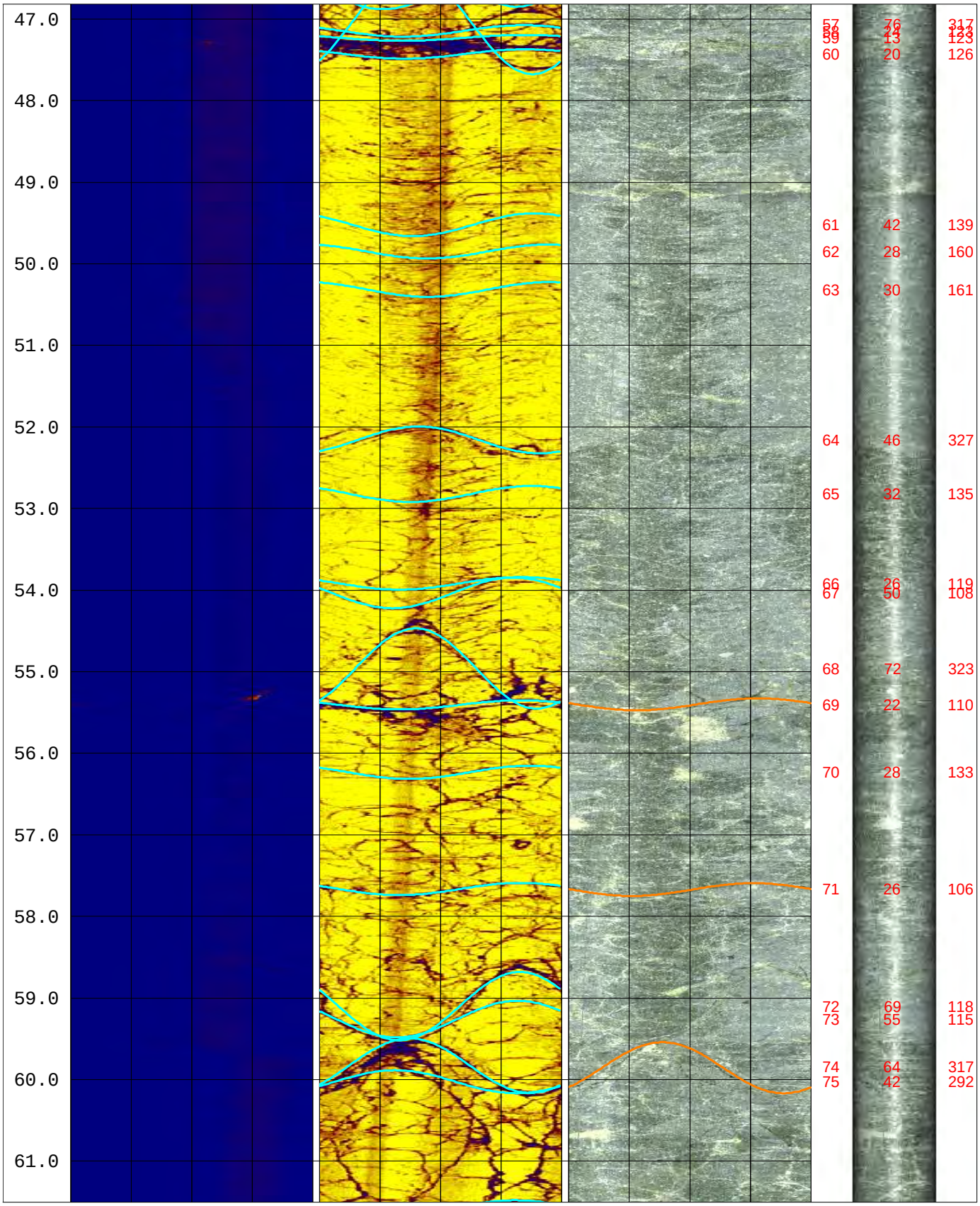
Notes:

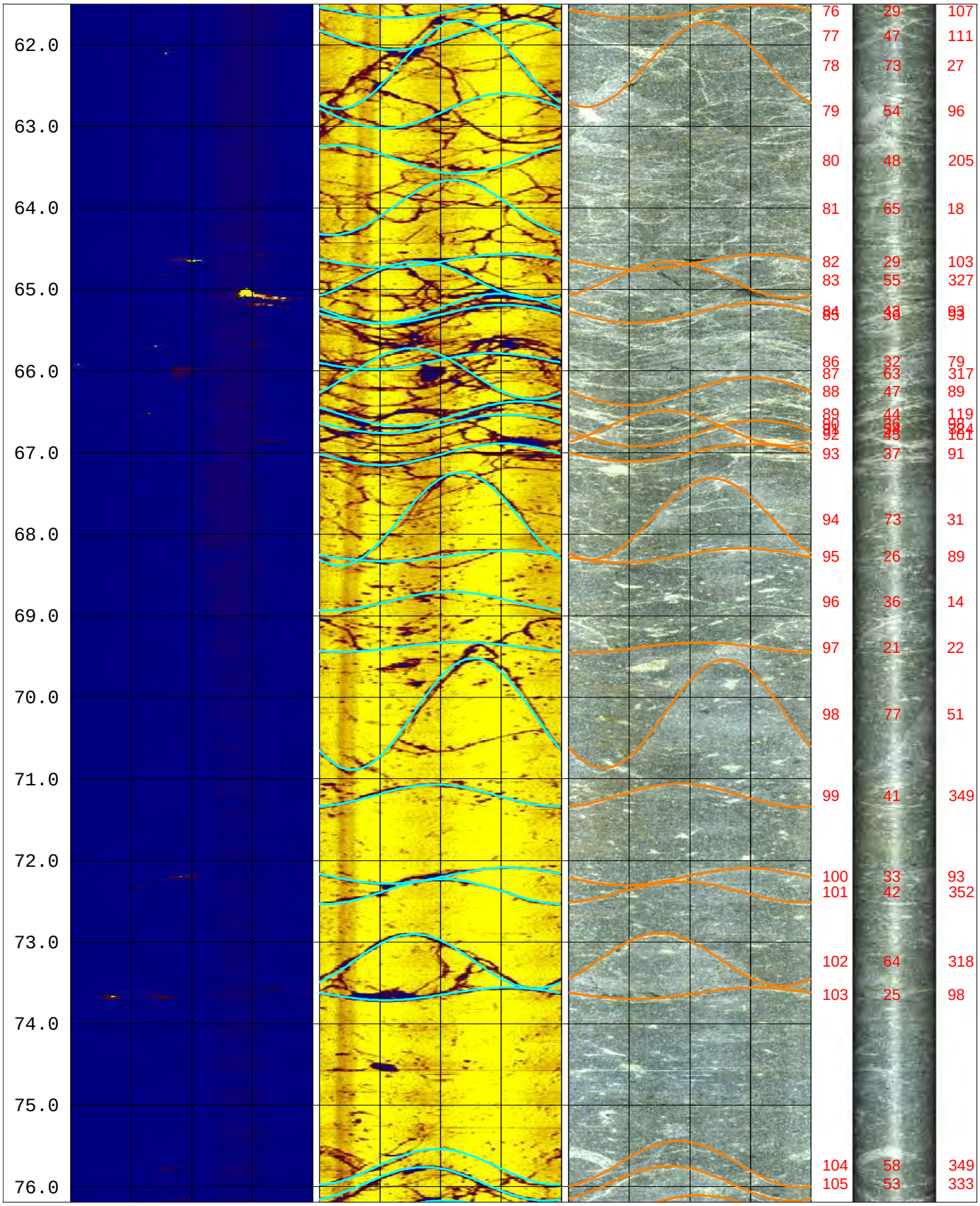
1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.

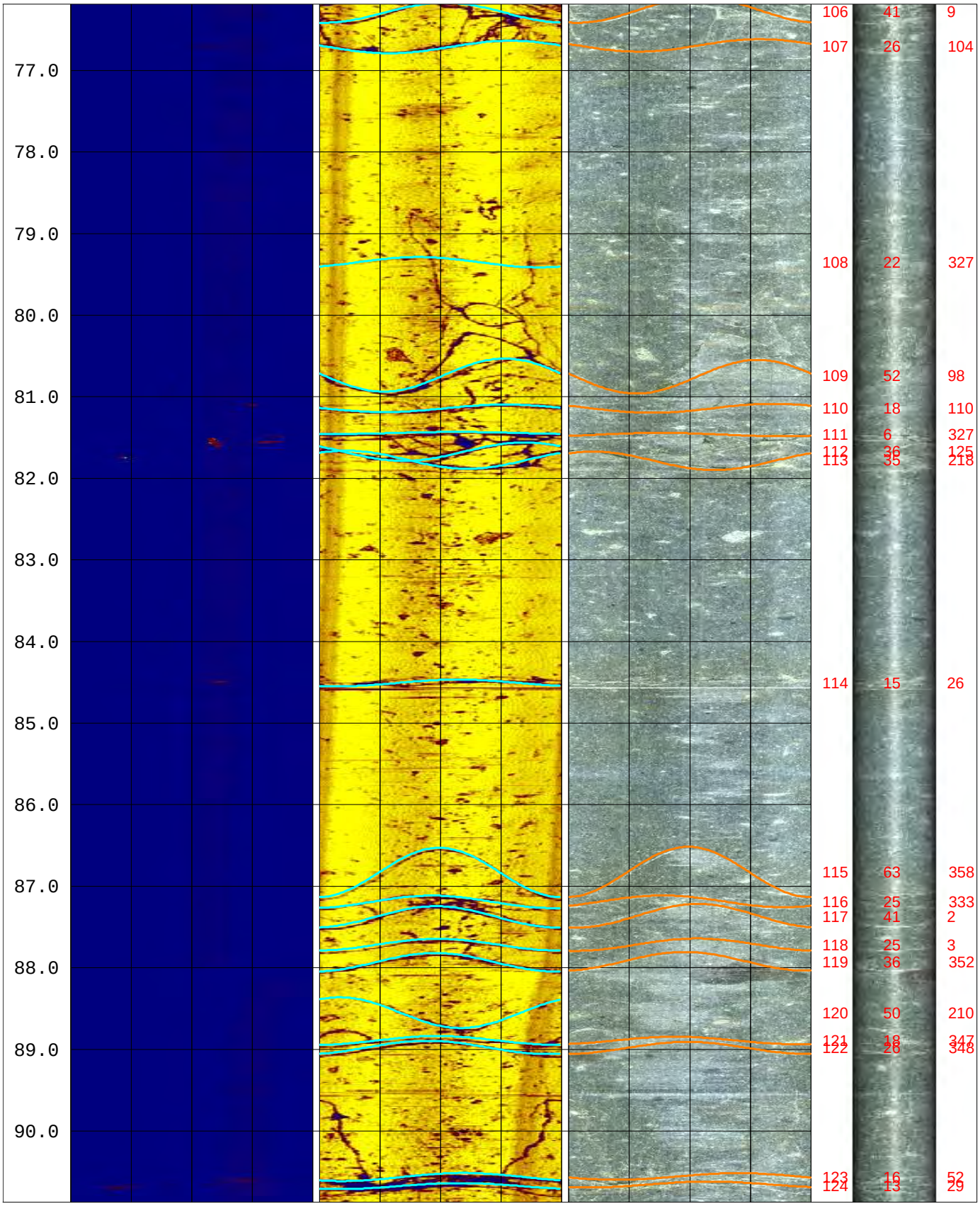


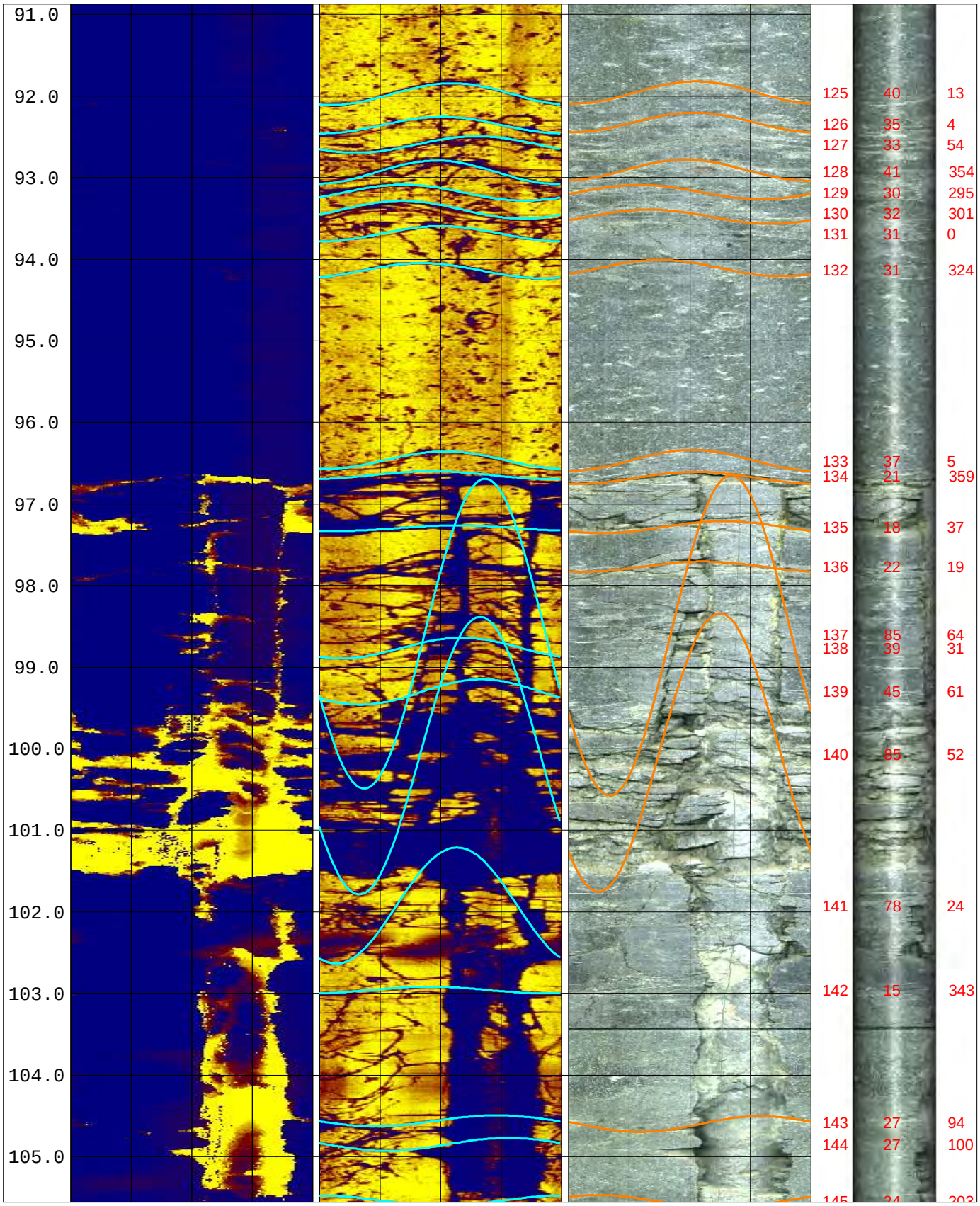

18.0
19.0
20.0
21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
30.0
31.0
32.0
7 41 197
8 41 192
9 22 244
10 83 57
11 30 96
12 59 135
13 27 284
14 32 283
15 70 324
16 70 326
17
18 37 181
19 38 343
20 70 13
21 34 290
22 64 14
23 56 114
24 50 126
25 56 128

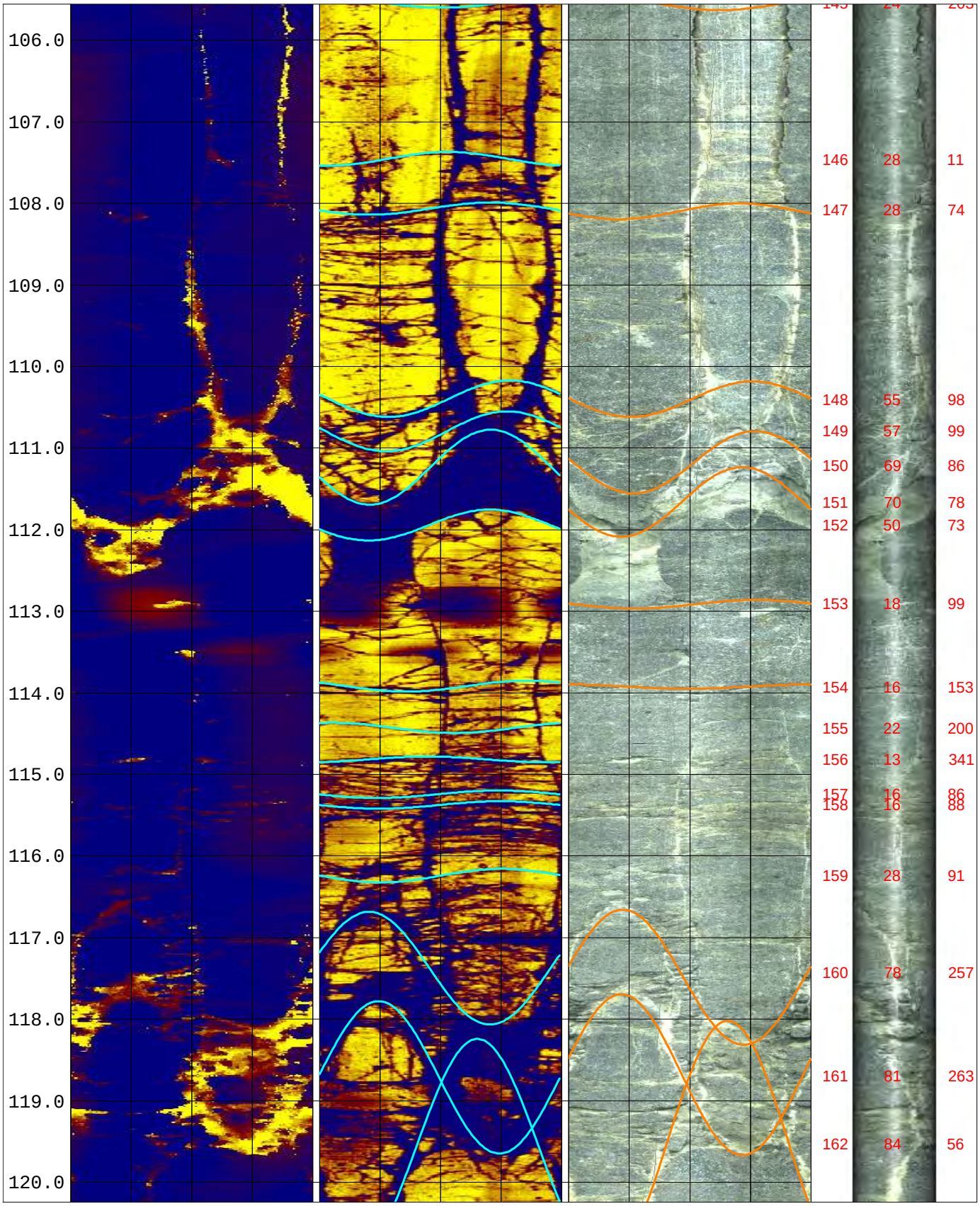

33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
45.0
46.0
26 63 323
27 25 110
28 28 113
30 32 103
31 30 70
32 24 83
33 24 348
34 21 56
35 29 168
36 33 128
37 27 153
38 18 351
39 13 115
40 19 146
43 26 88
44 22 133
45 67 249
46 61 238
47 64 241
48 23 65
49 12 173
50 64 331
51 66 328
52 35 168
53 46 140
54 51 137
55 68 292
56 59 94

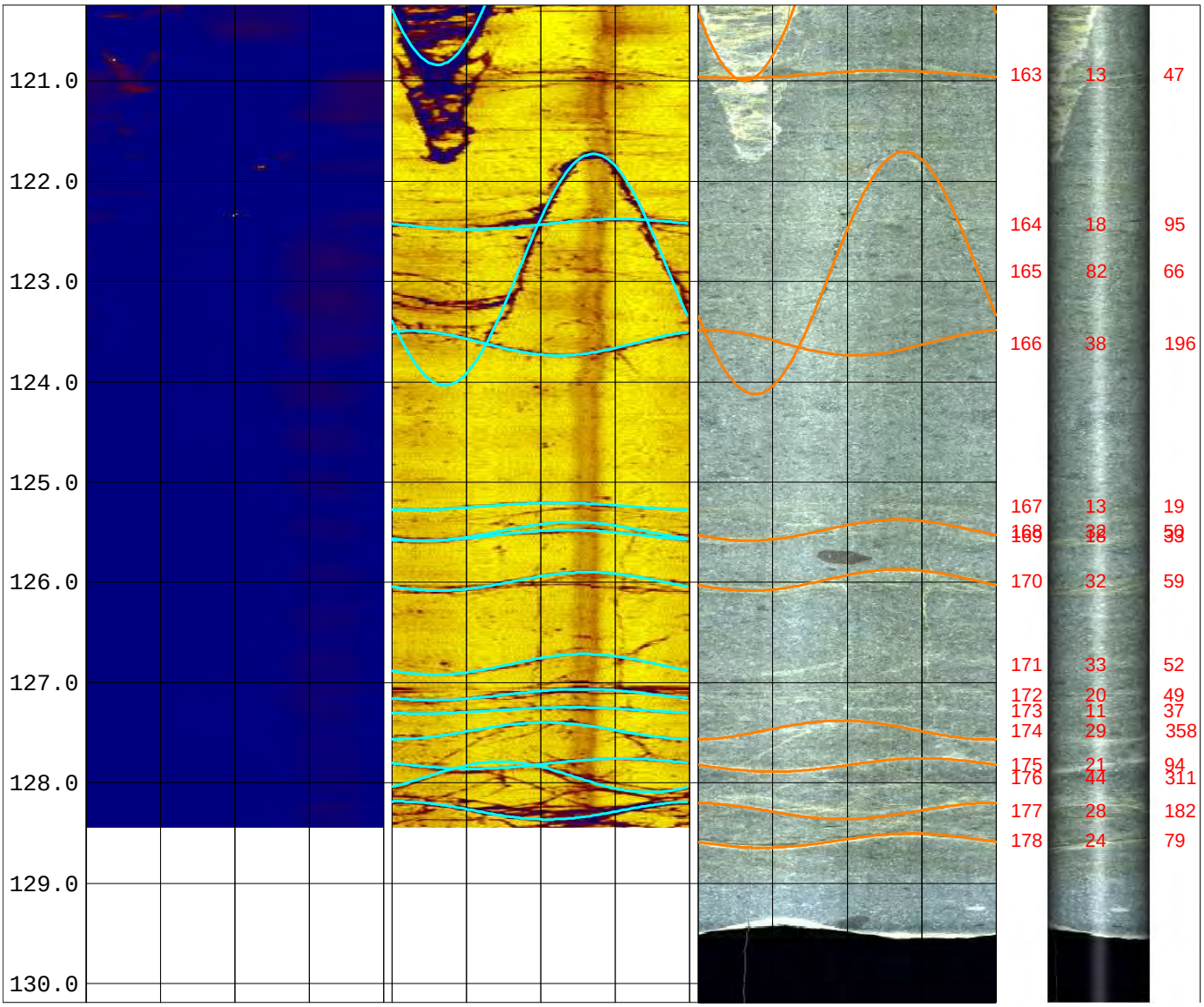

47.0
48.0
49.0
50.0
51.0
52.0
53.0
54.0
55.0
56.0
57.0
58.0
59.0
60.0
61.0
57 76 317
58 24 123
59 13 123
60 20 126
61 42 139
62 28 160
63 30 161
64 46 327
65 32 135
66 26 119
67 50 108
68 72 323
69 22 110
70 28 133
71 26 106
72 69 118
73 55 115
74 64 317
75 42 292


62.0
63.0
64.0
65.0
66.0
67.0
68.0
69.0
70.0
71.0
72.0
73.0
74.0
75.0
76.0
76 29 107
77 47 111
78 73 27
79 54 96
80 48 205
81 65 18
82 29 103
83 55 327
86 32 79
87 63 317
88 47 89
89 44 119
93 37 91
94 73 31
95 26 89
96 36 14
97 21 22
98 77 51
99 41 349
100 33 93
101 42 352
102 64 318
103 25 98
104 58 349
105 53 333


77.0
78.0
79.0
80.0
81.0
82.0
83.0
84.0
85.0
86.0
87.0
88.0
89.0
90.0
106 41 9
107 26 104
108 22 327
109 52 98
110 18 110
111 6 327
112 36 125
113 35 218
114 15 26
115 63 358
116 25 333
117 41 2
118 25 3
119 36 352
120 50 210
121 18 347
122 28 348
123 16 52
124 13 29


91.0
92.0
93.0
94.0
95.0
96.0
97.0
98.0
99.0
100.0
101.0
102.0
103.0
104.0
105.0
125 40 13
126 35 4
127 33 54
128 41 354
129 30 295
130 32 301
131 31 0
132 31 324
133 37 5
134 21 359
135 18 37
136 22 19
137 85 64
138 39 31
139 45 61
140 85 52
141 78 24
142 15 343
143 27 94
144 27 100


106.0
107.0
108.0
109.0
110.0
111.0
112.0
113.0
114.0
115.0
116.0
117.0
118.0
119.0
120.0
146 28 11
147 28 74
148 55 98
149 57 99
150 69 86
151 70 78
152 50 73
153 18 99
154 16 153
155 22 200
156 13 341
157 16 86
158 16 88
159 28 91
160 78 257
161 81 263
162 84 56

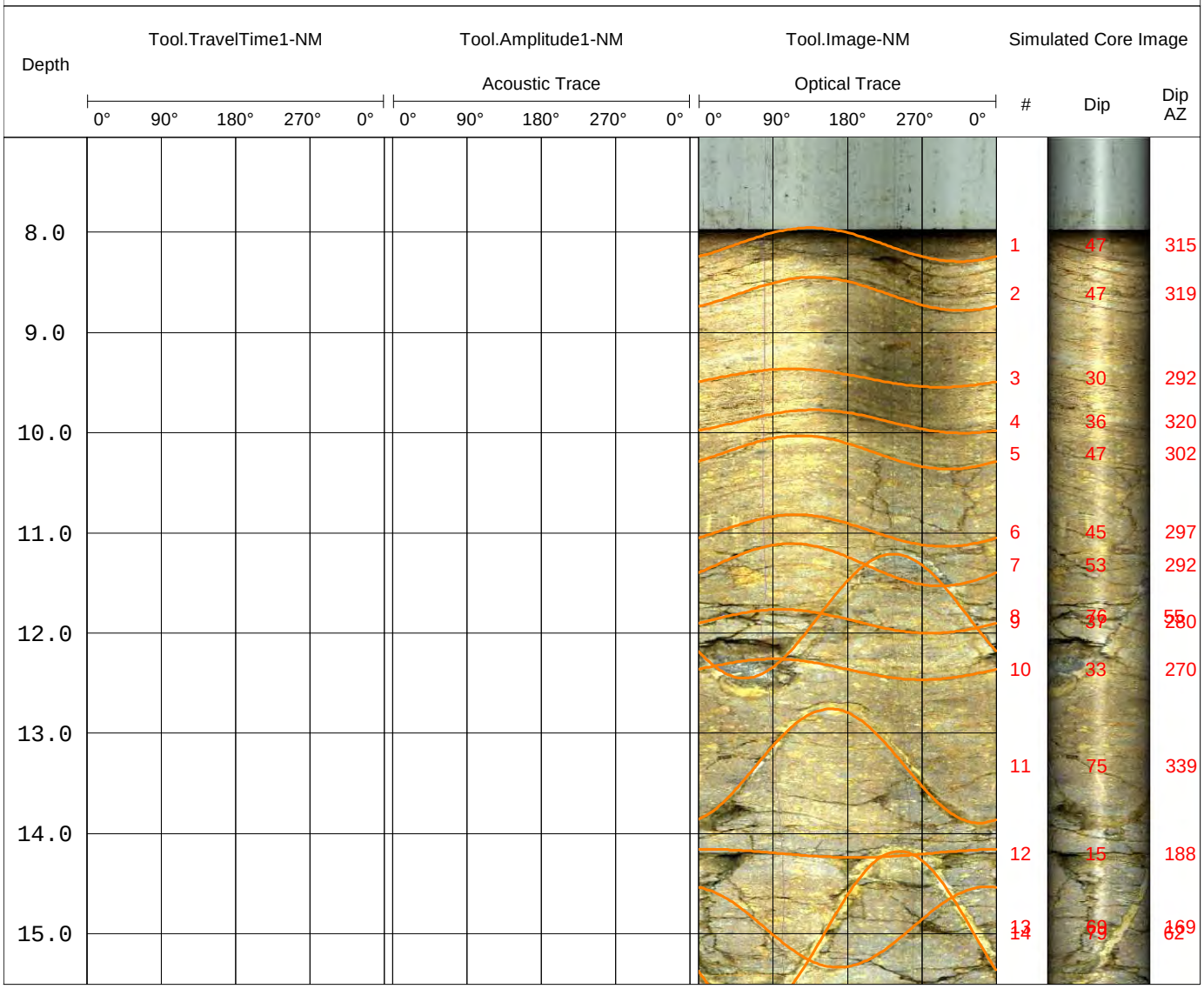

121.0
122.0
123.0
124.0
125.0
126.0
127.0
128.0
129.0
130.0
163 13 47
164 18 95
165 82 66
166 38 196
167 13 19
170 32 59
171 33 52
172 20 49
173 11 37
174 29 358
175 21 94
176 44 311
177 28 182
178 24 79

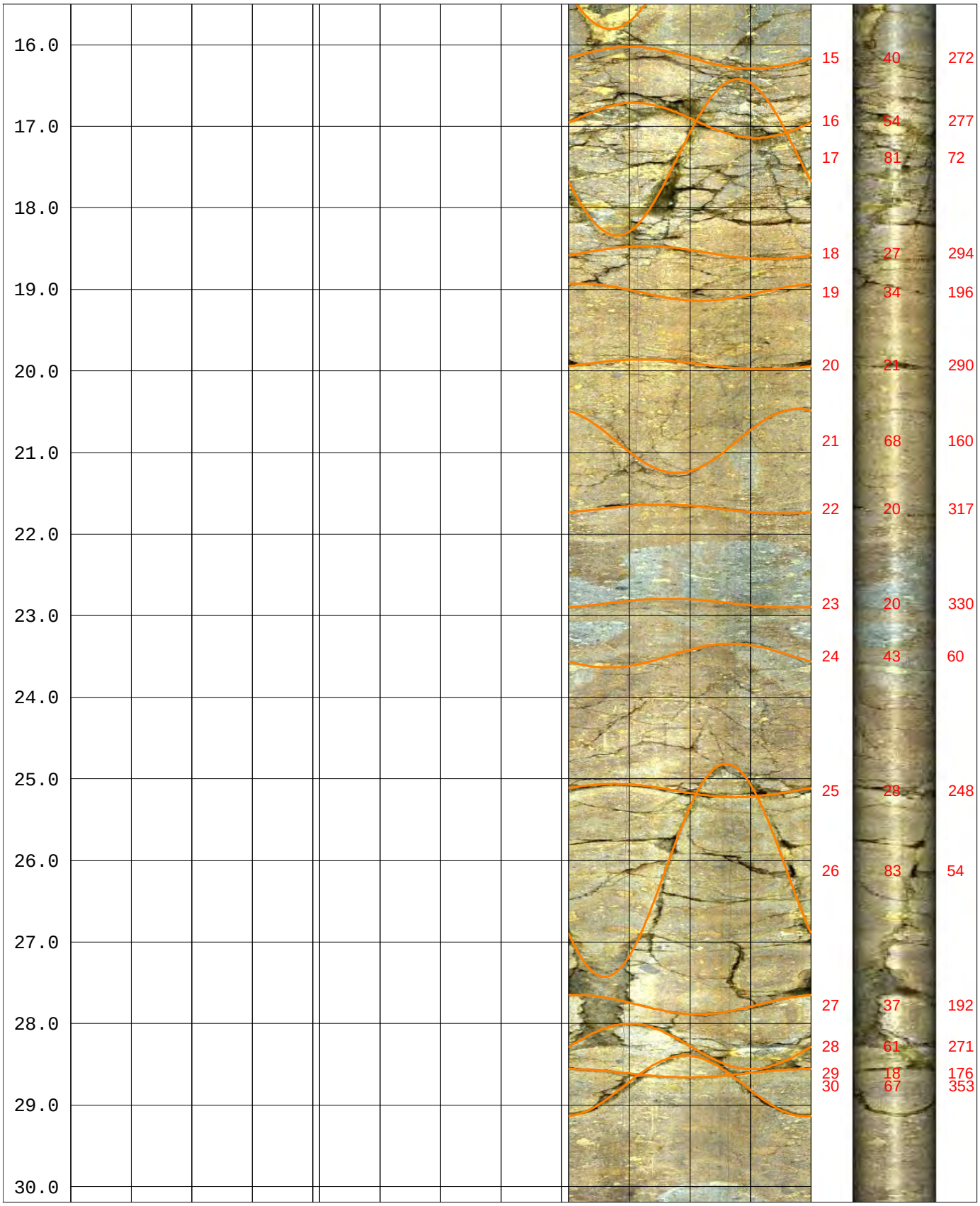
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2007 Geotechnical Program

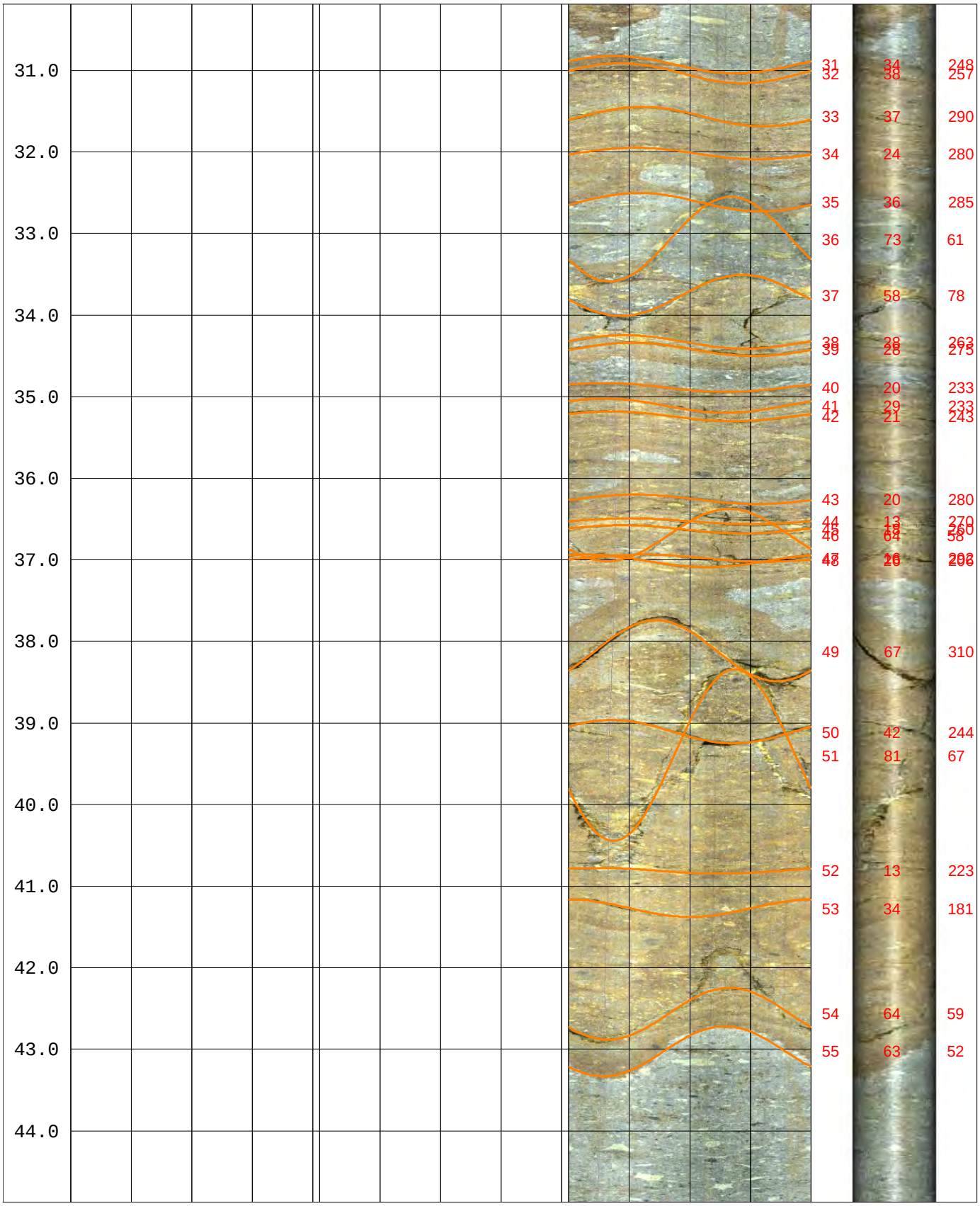
Date Logged:	September 26, 2007	Borehole ID:	RKS-13-07
File Name:	RKS1307-1M.wcl	Logged By:	F G Kruger

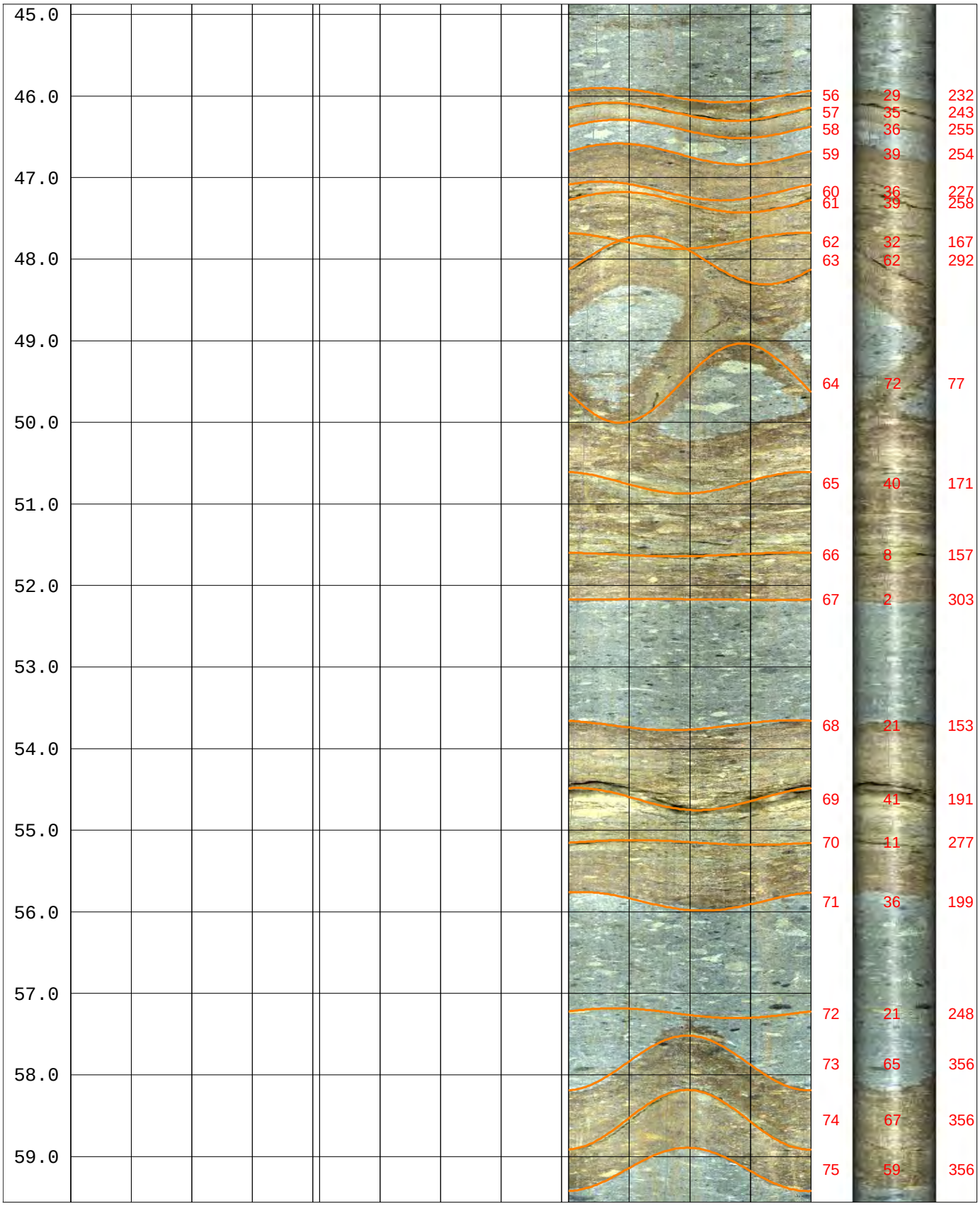
Notes:

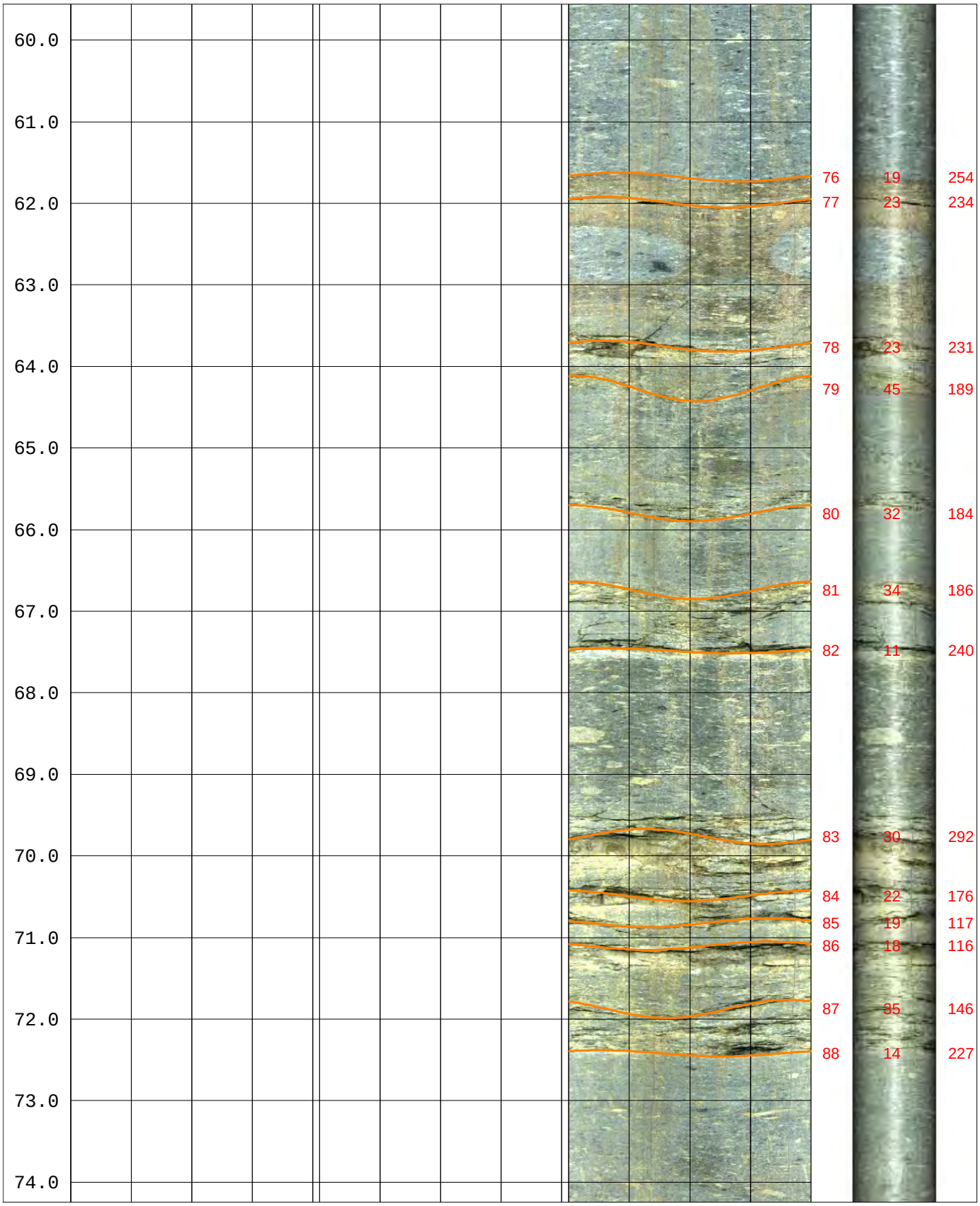
1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.

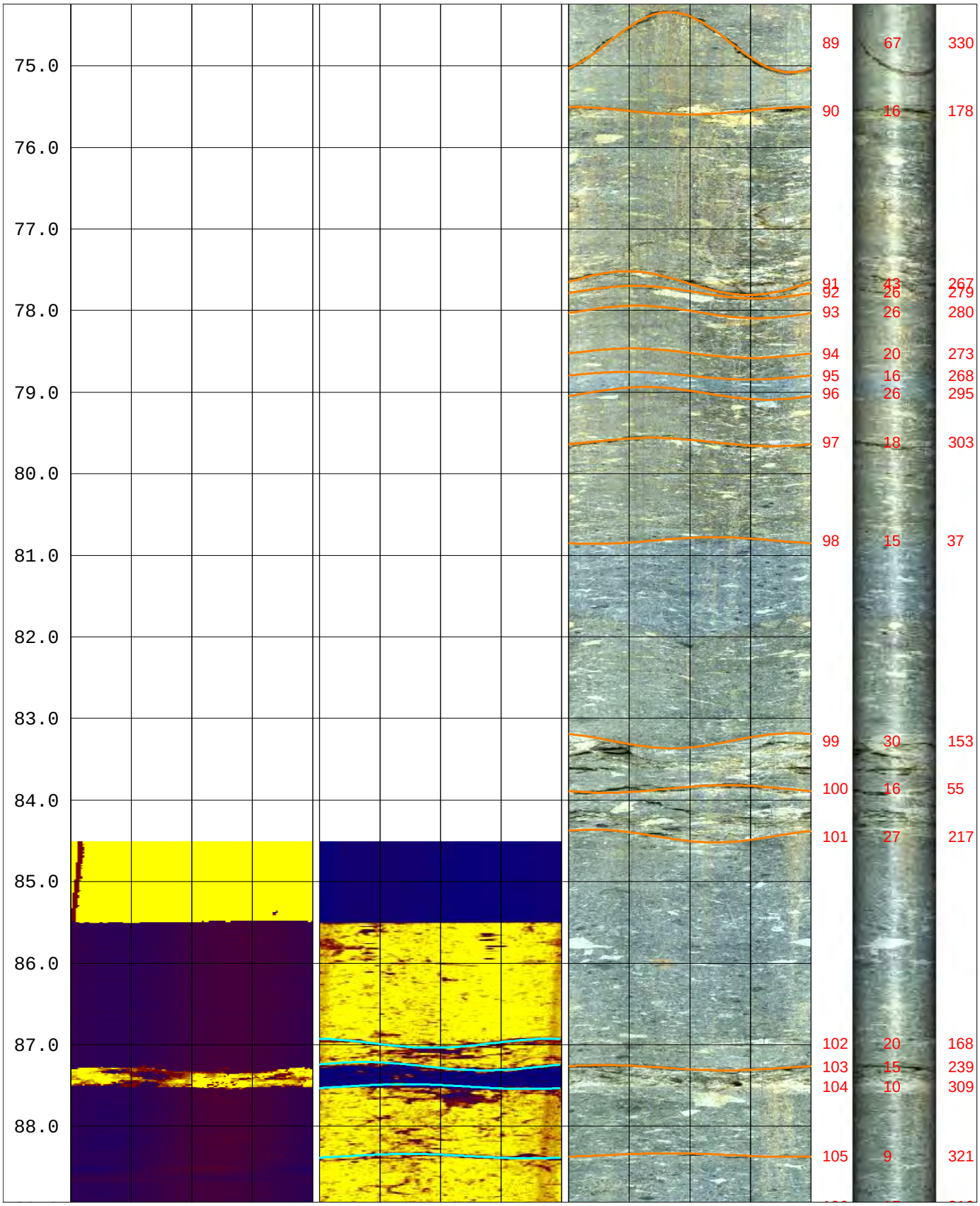


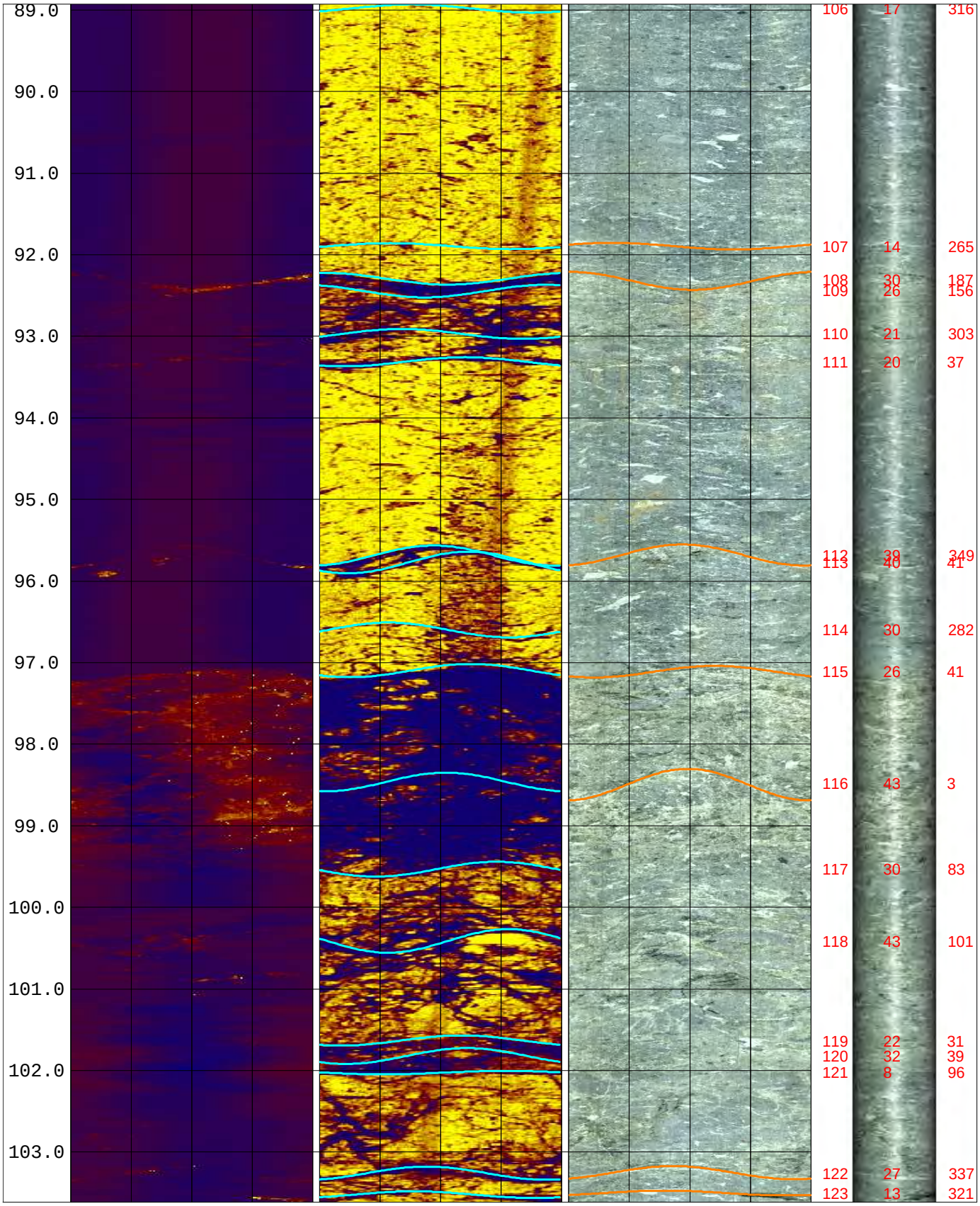

16.0
17.0
18.0
19.0
20.0
21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
30.0
15 40 272
16 54 277
17 81 72
18 27 294
19 34 196
20 21 290
21 68 160
22 20 317
23 20 330
24 43 60
25 28 248
26 83 54
27 37 192
28 61 271
29 18 176
30 67 353

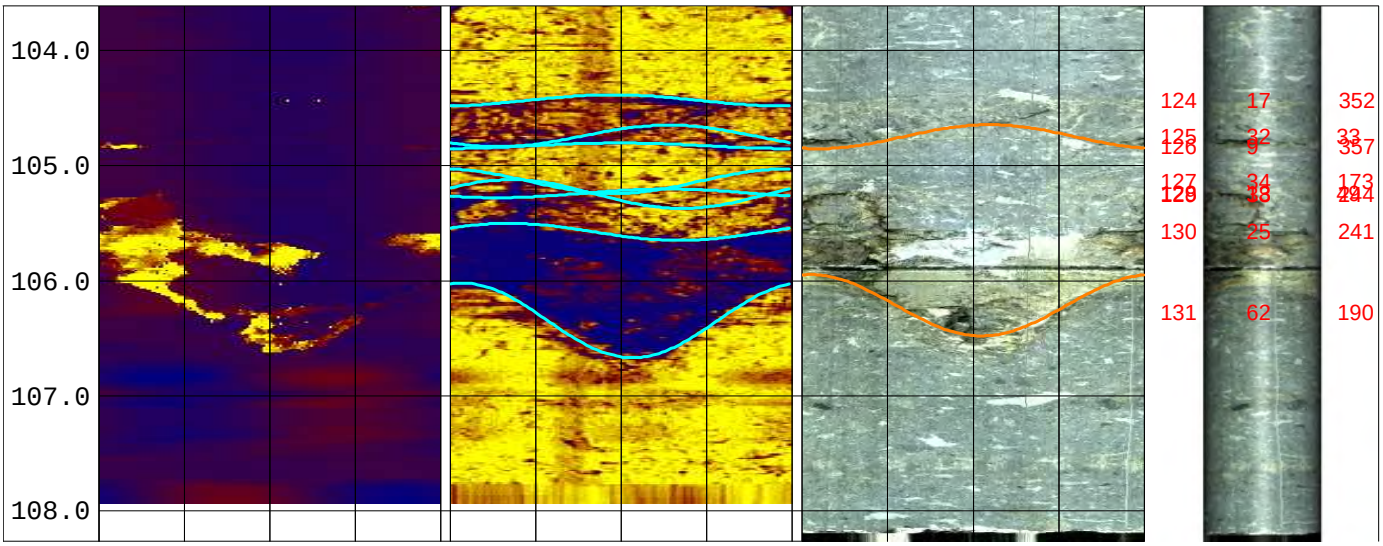

31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
31 34 248
32 38 257
33 37 290
34 24 280
35 36 285
36 73 61
37 58 78
38 28 263
39 28 275
40 20 233
41 29 233
42 21 243
43 20 280
44 13 270
45 13 260
46 64 58
47 16 202
48 26 206
49 67 310
50 42 244
51 81 67
52 13 223
53 34 181
54 64 59
55 63 52


45.0
46.0
47.0
48.0
49.0
50.0
51.0
52.0
53.0
54.0
55.0
56.0
57.0
58.0
59.0
56 29 232
57 35 243
58 36 255
59 39 254
60 36 227
61 39 258
62 32 167
63 62 292
64 72 77
65 40 171
66 8 157
67 2 303
68 21 153
69 41 191
70 11 277
71 36 199
72 21 248
73 65 356
74 67 356
75 59 356


60.0
61.0
62.0
63.0
64.0
65.0
66.0
67.0
68.0
69.0
70.0
71.0
72.0
73.0
74.0
76 19 254
77 23 234
78 23 231
79 45 189
80 32 184
81 34 186
82 11 240
83 30 292
84 22 176
85 19 117
86 18 116
87 35 146
88 14 227


75.0
76.0
77.0
78.0
79.0
80.0
81.0
82.0
83.0
84.0
85.0
86.0
87.0
88.0
89 67 330
90 16 178
91 43 267
92 26 279
93 26 280
94 20 273
95 16 268
96 26 295
97 18 303
98 15 37
99 30 153
100 16 55
101 27 217
102 20 168
103 15 239
104 10 309
105 9 321

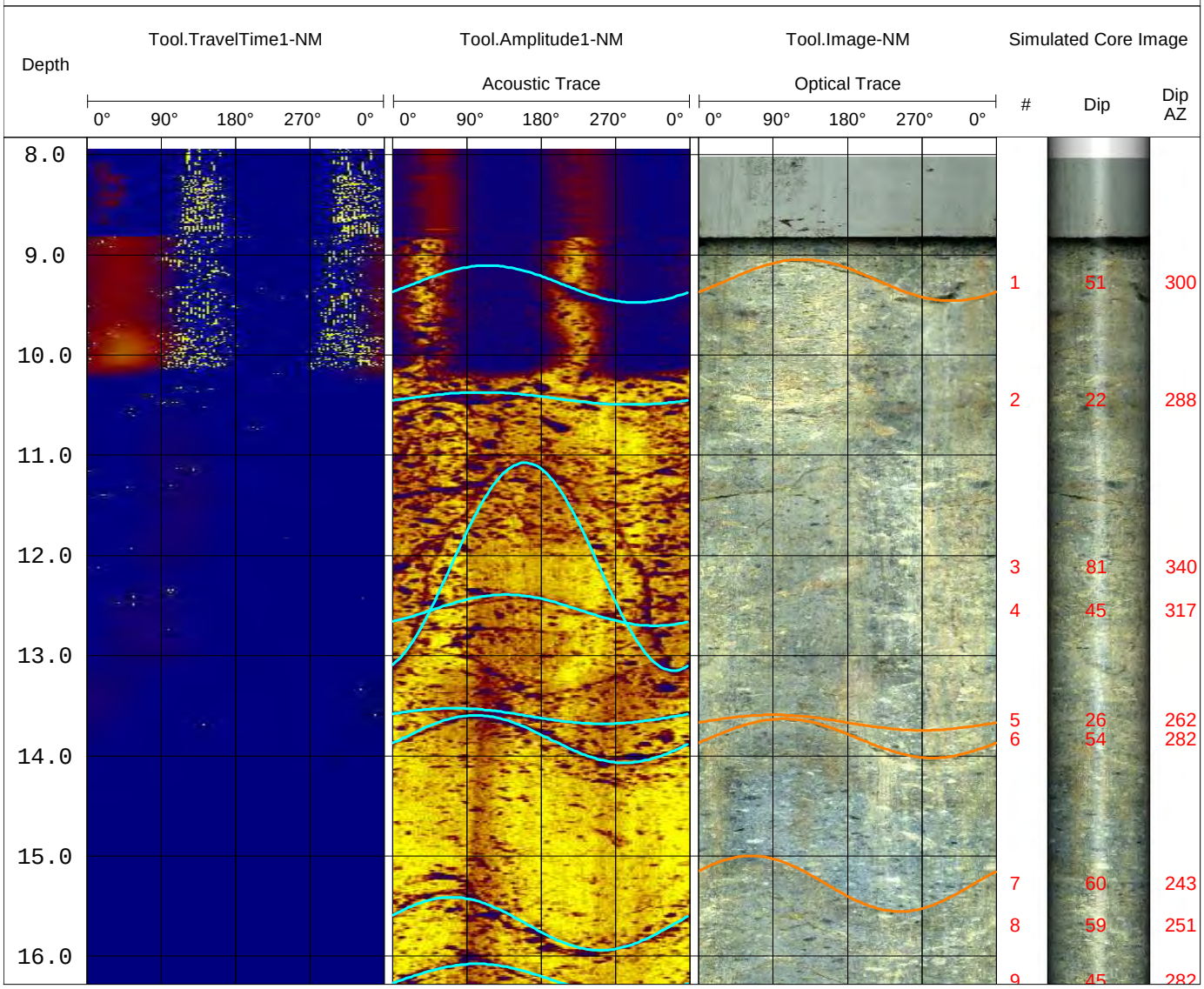

89.0
90.0
91.0
92.0
93.0
94.0
95.0
96.0
97.0
98.0
99.0
100.0
101.0
102.0
103.0
106 17 316
107 14 265
108 30 187
109 26 156
110 21 303
111 20 37
112 39 349
113 40 41
114 30 282
115 26 41
116 43 3
117 30 83
118 43 101
119 22 31
120 32 39
121 8 96
122 27 337
123 13 321

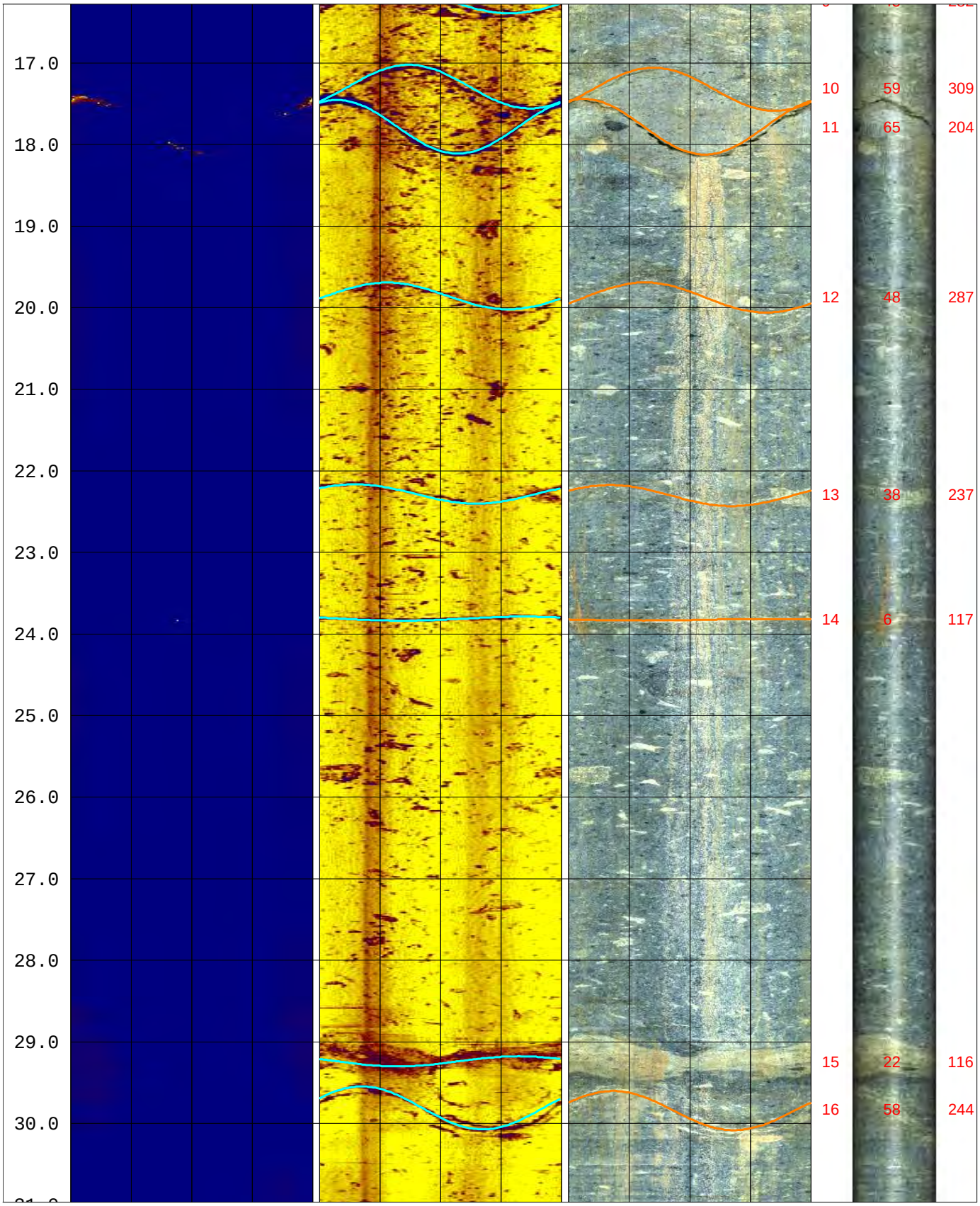

104.0
105.0
106.0
107.0
108.0
124 17 352
125 22 33
126 9 357
127 34 173
128 38 244
129 42
130 25 241
131 62 190

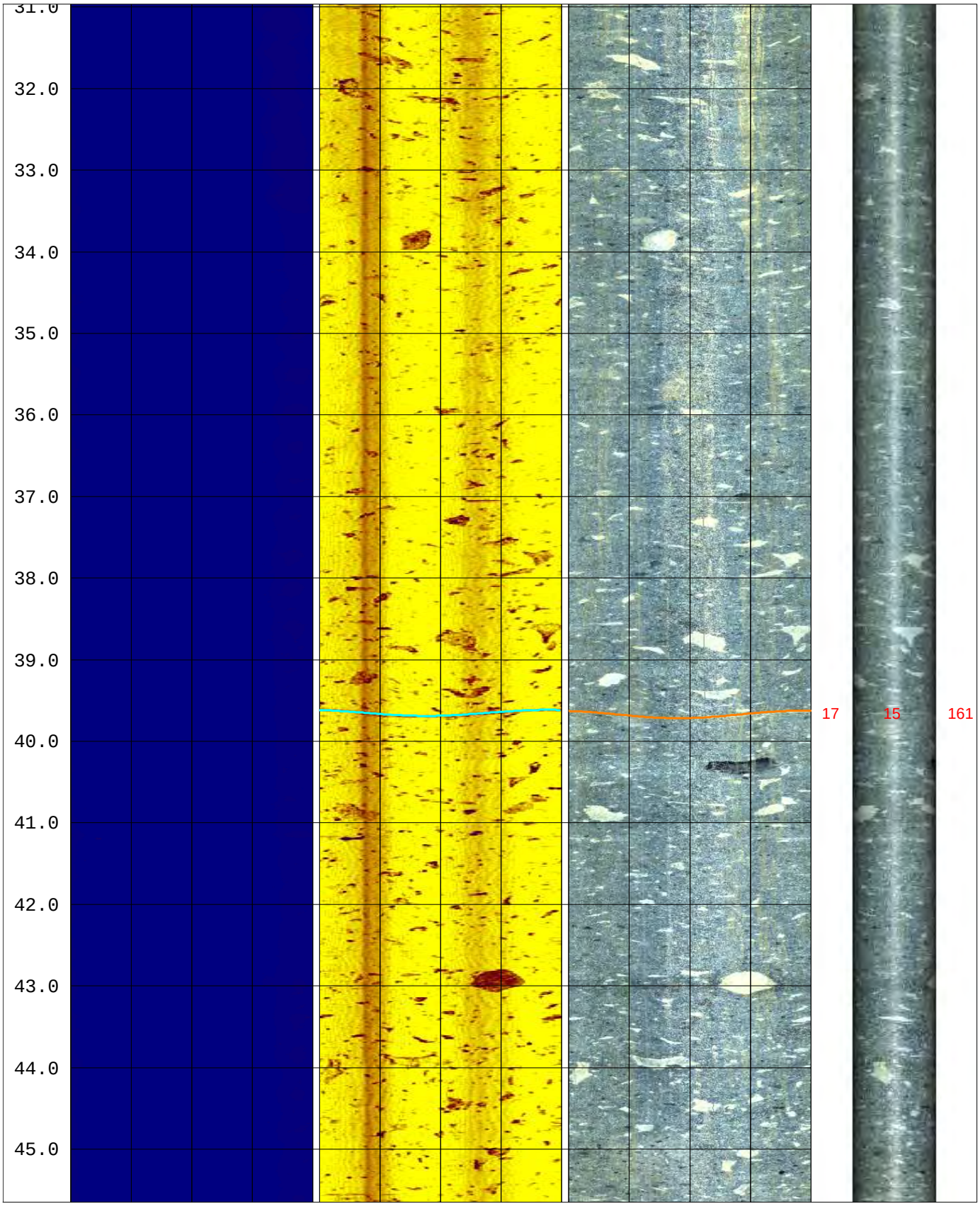
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2007 Geotechnical Program
Date Logged:	September 7, 2007	Borehole ID: RKS-14-07
File Name:	RKS1407-1M.wcl	Logged By: F G Kruger

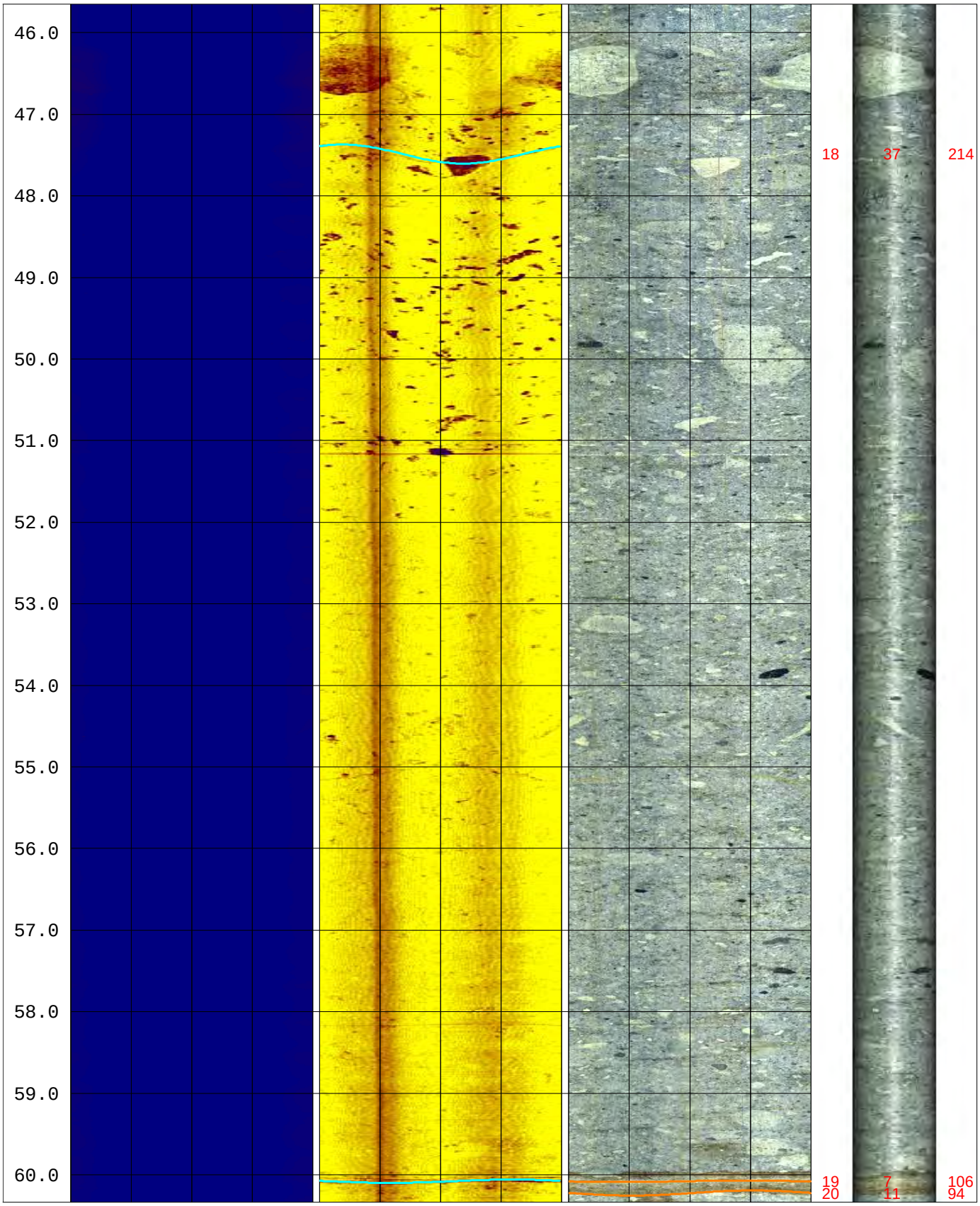
Notes:

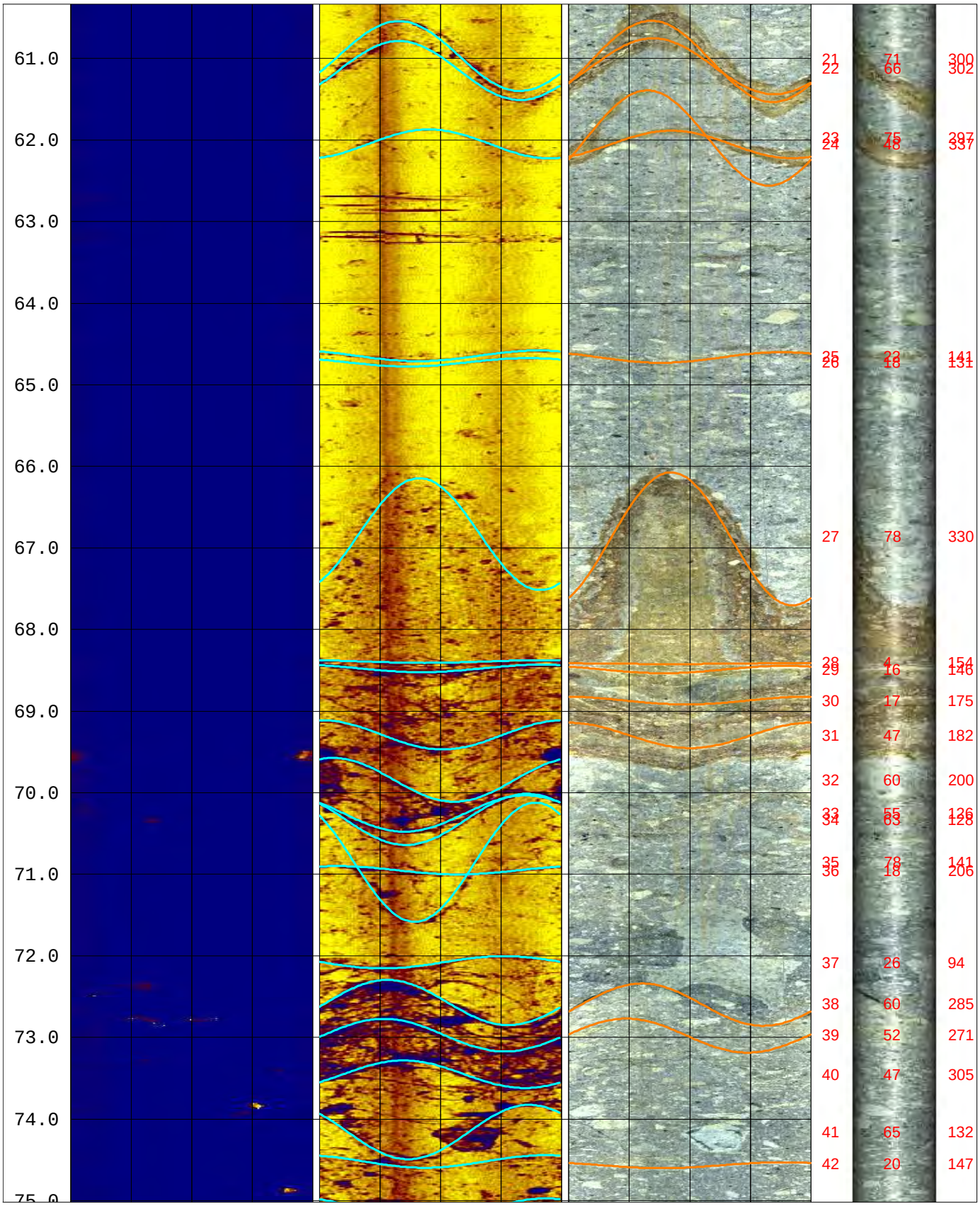
1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.

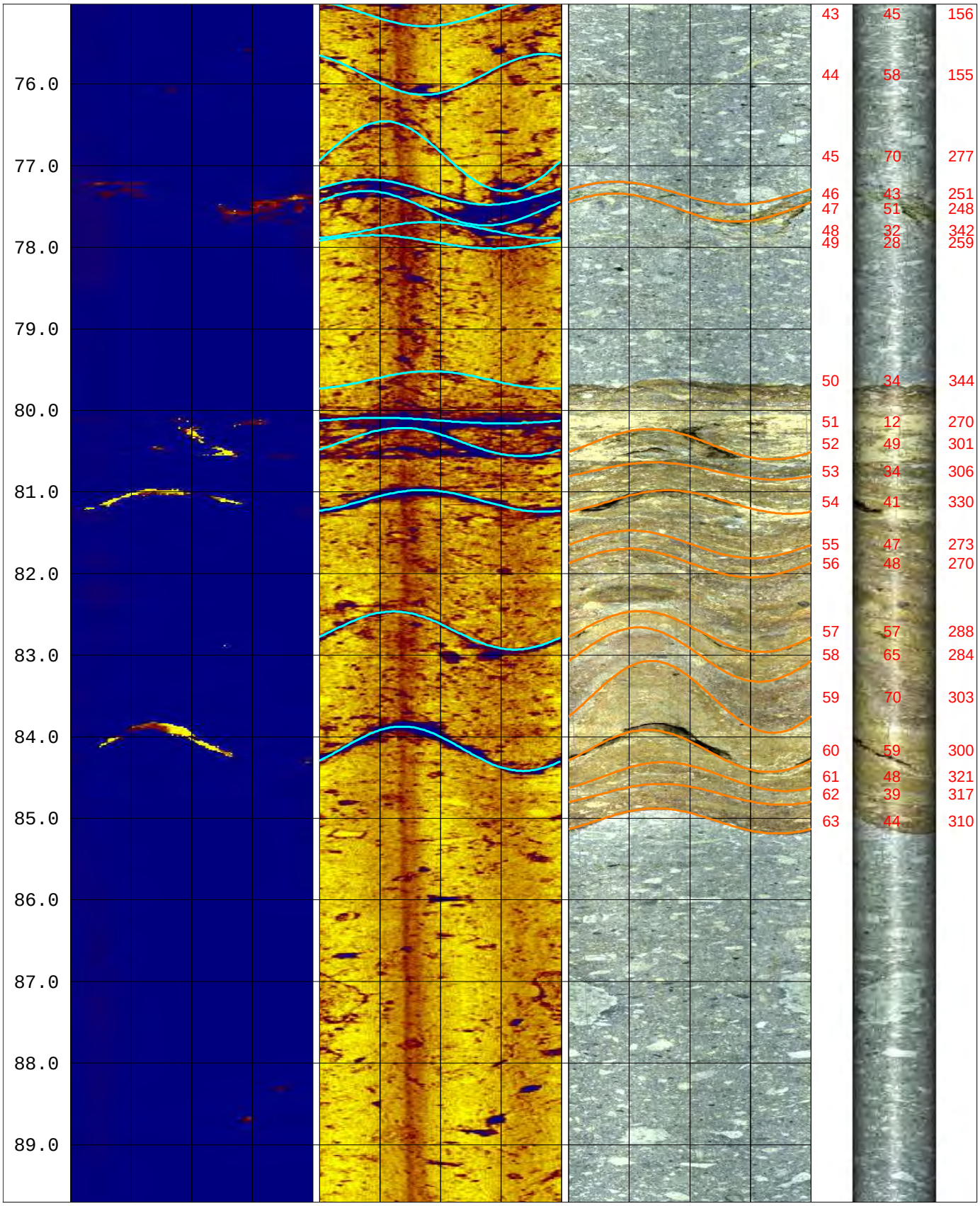


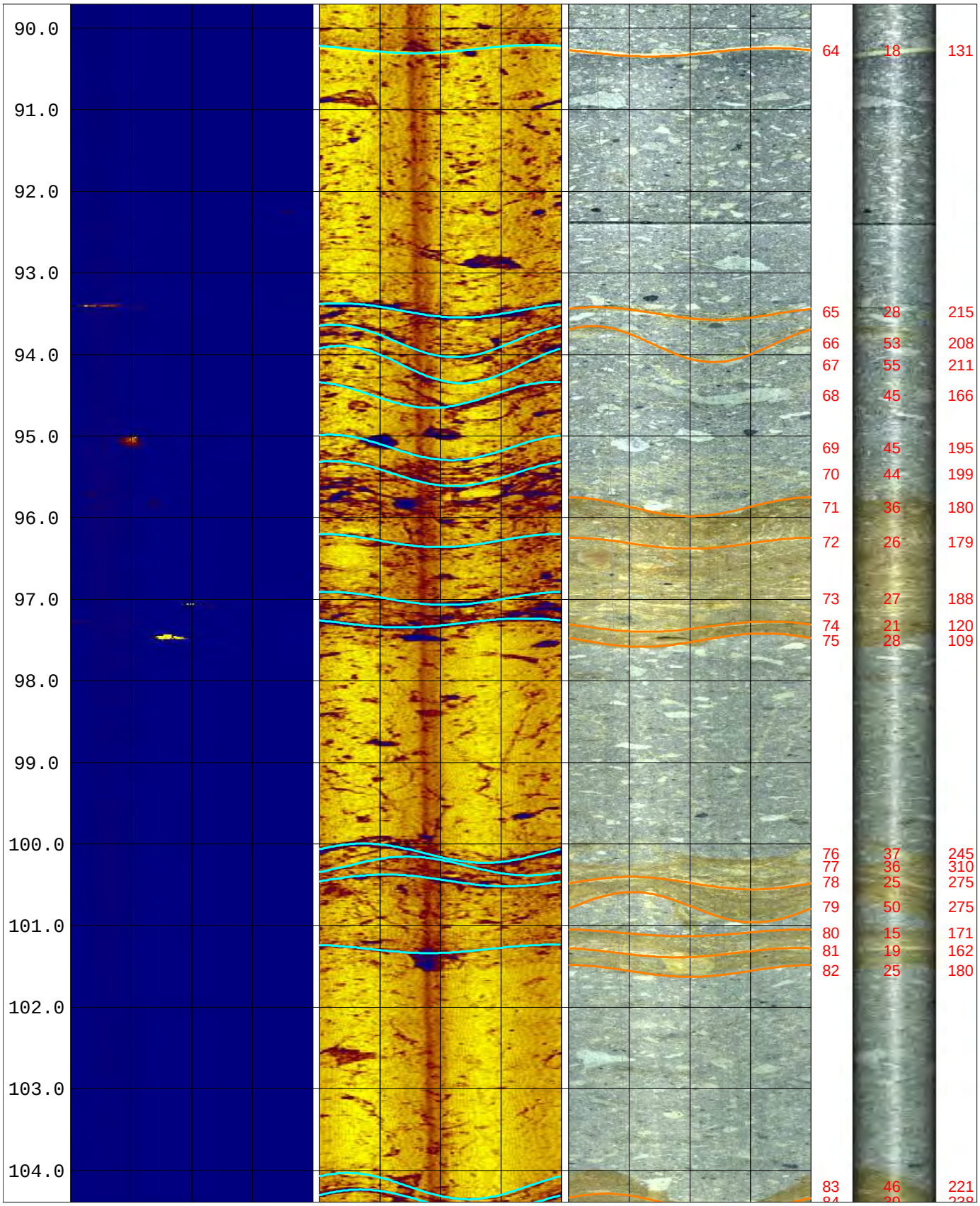

17.0
18.0
19.0
20.0
21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
30.0
10 59 309
11 65 204
12 48 287
13 38 237
14 6 117
15 22 116
16 58 244

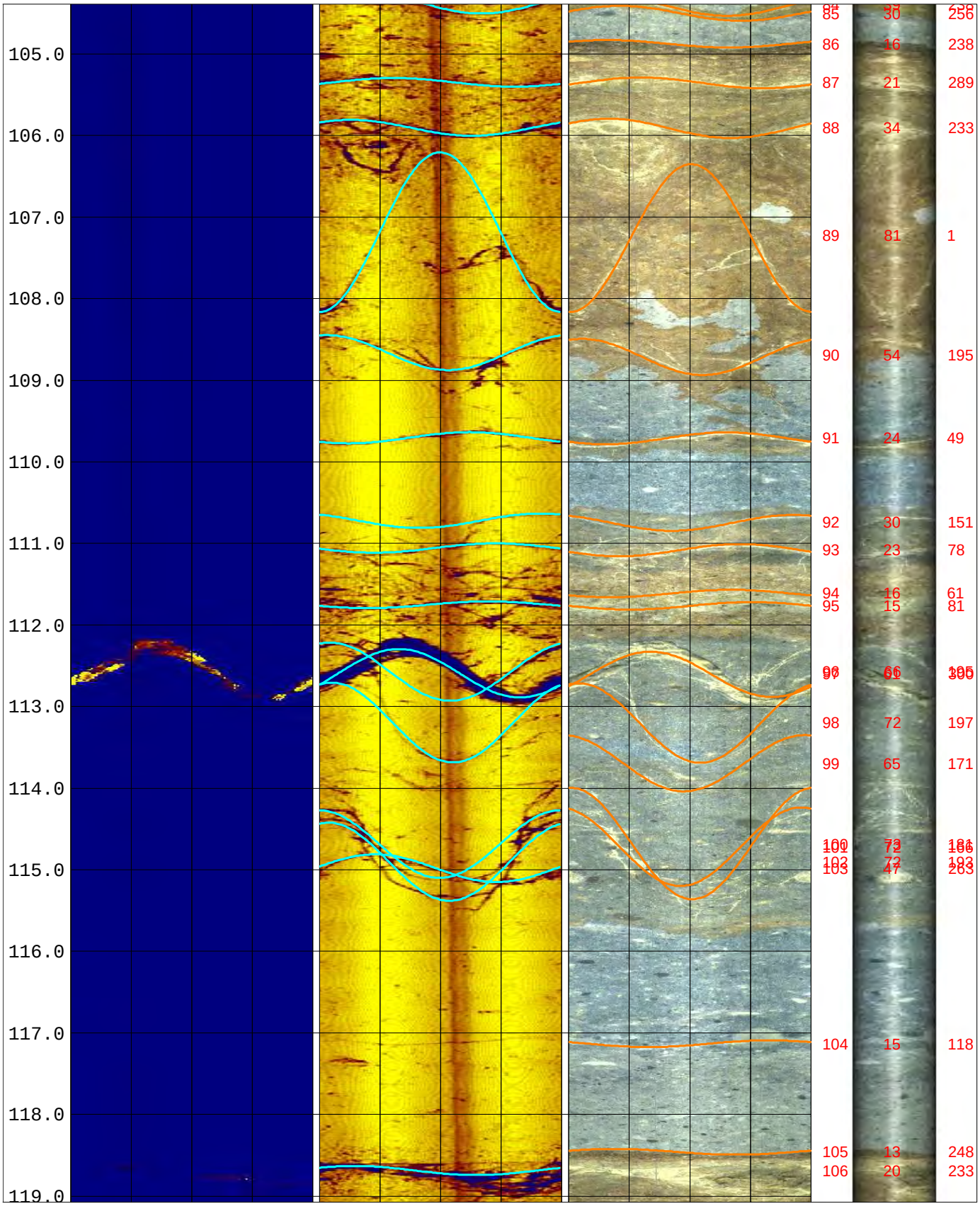

31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
45.0
17
15
161

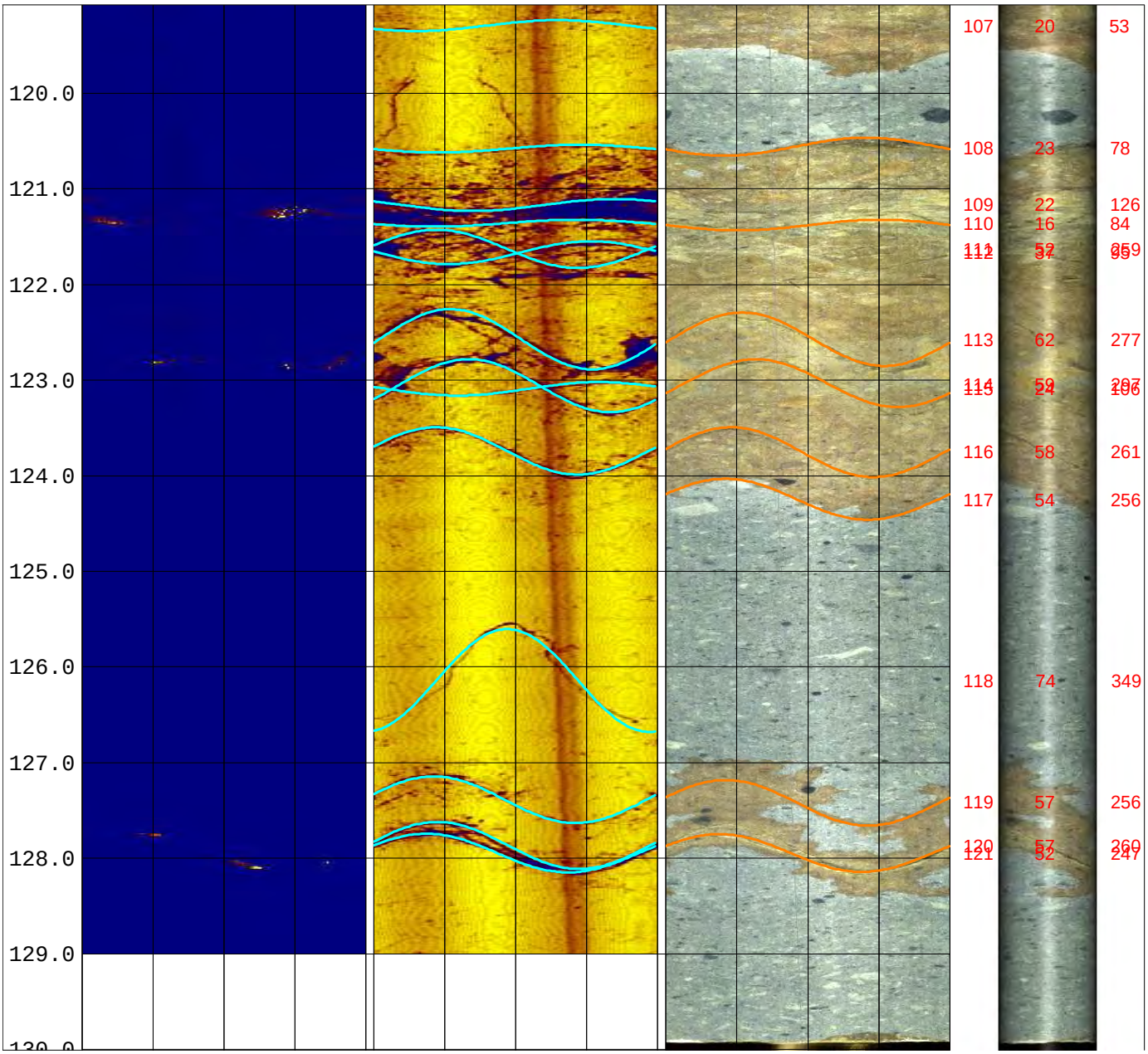

46.0
47.0
48.0
49.0
50.0
51.0
52.0
53.0
54.0
55.0
56.0
57.0
58.0
59.0
60.0
18
37
214
19
20
7
11
106
94


61.0
62.0
63.0
64.0
65.0
66.0
67.0
68.0
69.0
70.0
71.0
72.0
73.0
74.0
75.0
21 71 300
22 66 302
23 75 297
24 48 337
25 23 141
26 18 131
27 78 330
28 4 154
29 16 146
30 17 175
31 47 182
32 60 200
33 55 126
34 63 128
35 78 141
36 18 206
37 26 94
38 60 285
39 52 271
40 47 305
41 65 132
42 20 147


76.0
77.0
78.0
79.0
80.0
81.0
82.0
83.0
84.0
85.0
86.0
87.0
88.0
89.0
43 45 156
44 58 155
45 70 277
46 43 251
47 51 248
48 32 342
49 28 259
50 34 344
51 12 270
52 49 301
53 34 306
54 41 330
55 47 273
56 48 270
57 57 288
58 65 284
59 70 303
60 59 300
61 48 321
62 39 317
63 44 310


90.0
91.0
92.0
93.0
94.0
95.0
96.0
97.0
98.0
99.0
100.0
101.0
102.0
103.0
104.0
64 18 131
65 28 215
66 53 208
67 55 211
68 45 166
69 45 195
70 44 199
71 36 180
72 26 179
73 27 188
74 21 120
75 28 109
76 37 245
77 36 310
78 25 275
79 50 275
80 15 171
81 19 162
82 25 180
83 46 221

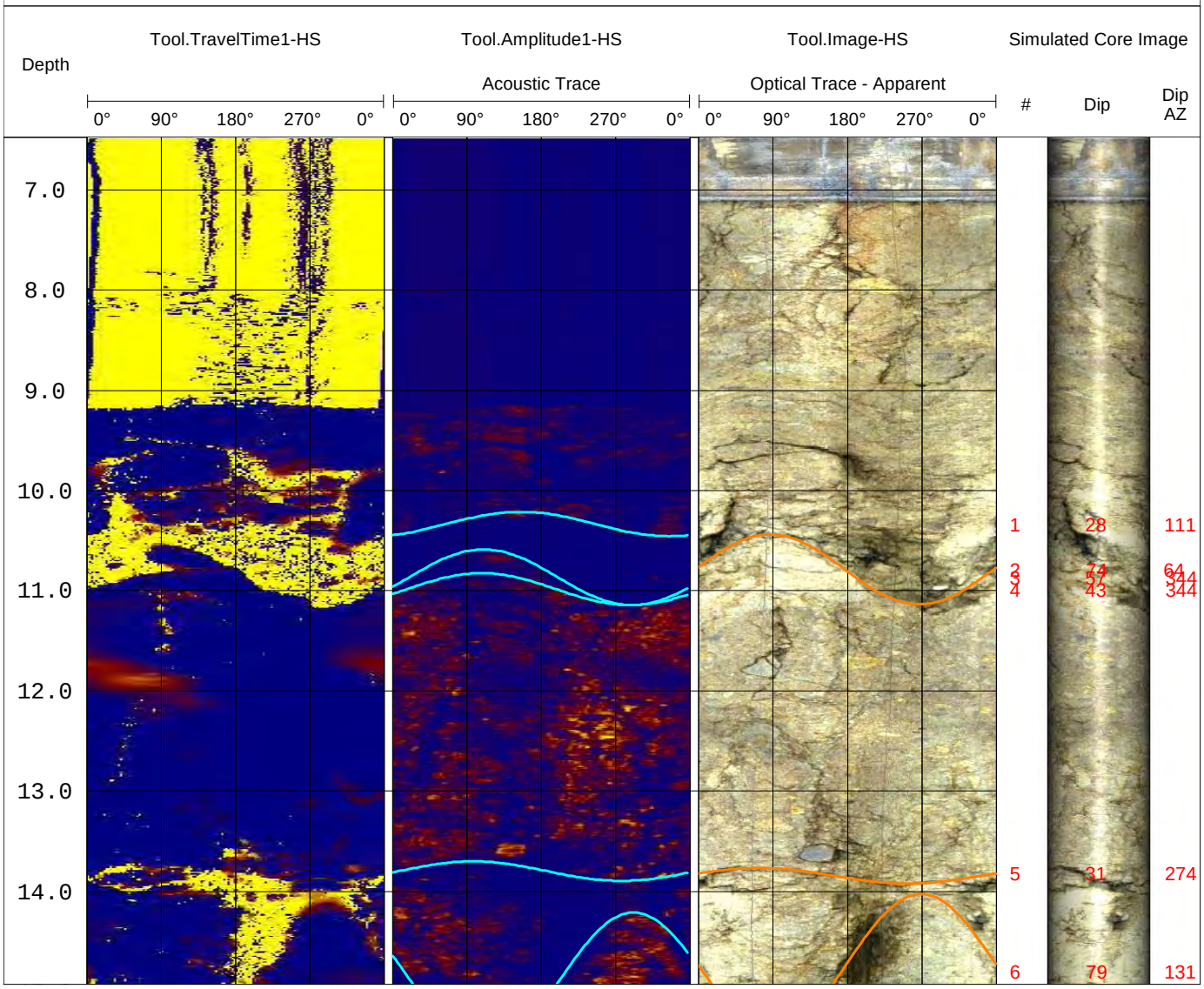

105.0
106.0
107.0
108.0
109.0
110.0
111.0
112.0
113.0
114.0
115.0
116.0
117.0
118.0
119.0
85 30 256
86 16 238
87 21 289
88 34 233
89 81 1
90 54 195
91 24 49
92 30 151
93 23 78
94 16 61
95 15 81
98 72 197
99 65 171
104 15 118
105 13 248
106 20 233

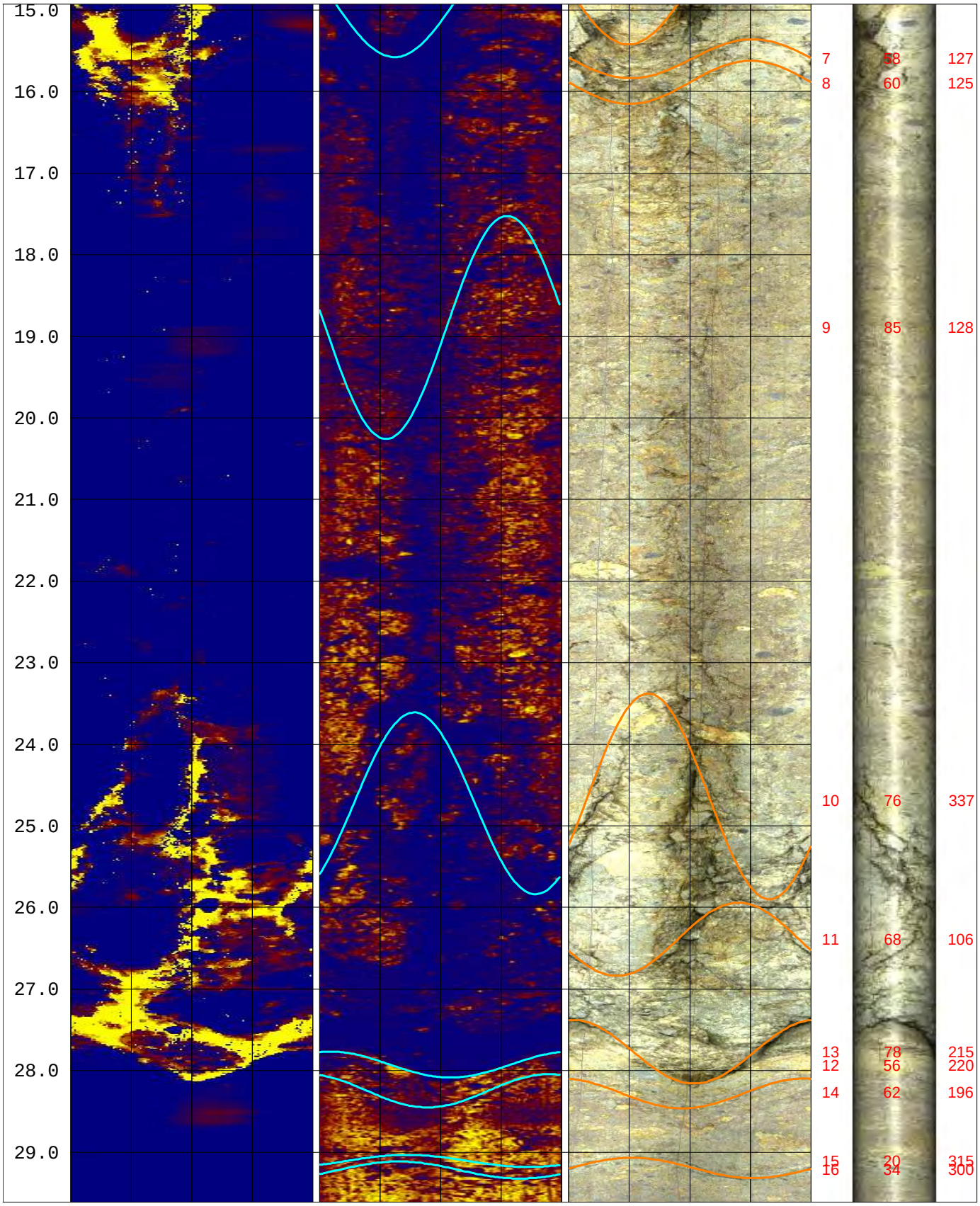

120.0
121.0
122.0
123.0
124.0
125.0
126.0
127.0
128.0
129.0
107 20 53
108 23 78
109 22 126
110 16 84
113 62 277
116 58 261
117 54 256
118 74 349
119 57 256

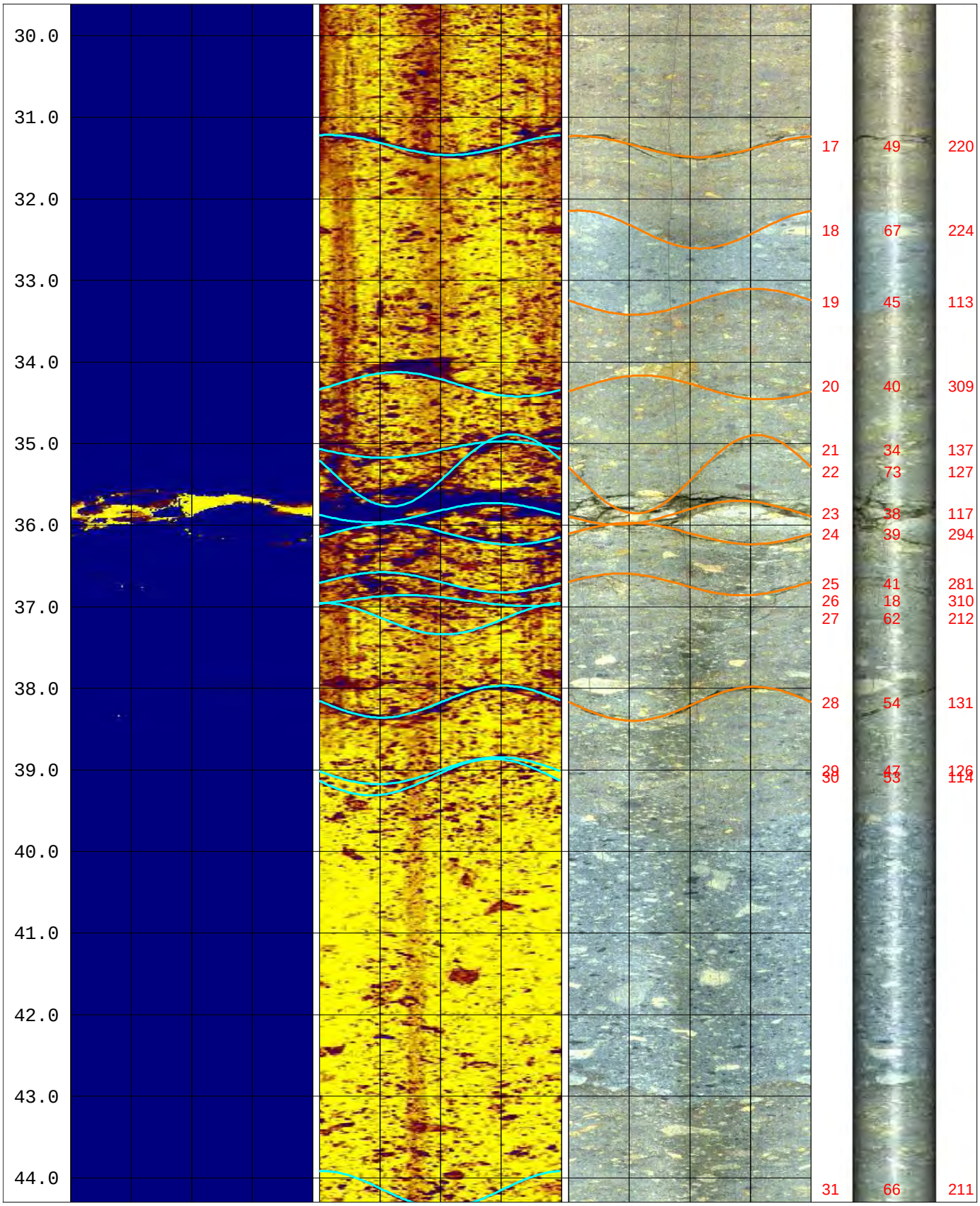
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2007 Geotechnical Program
Date Logged:	September 18, 2007	Borehole ID: RKS-15-07
File Name:	RKS1507-1M.wcl	Logged By: F G Kruger

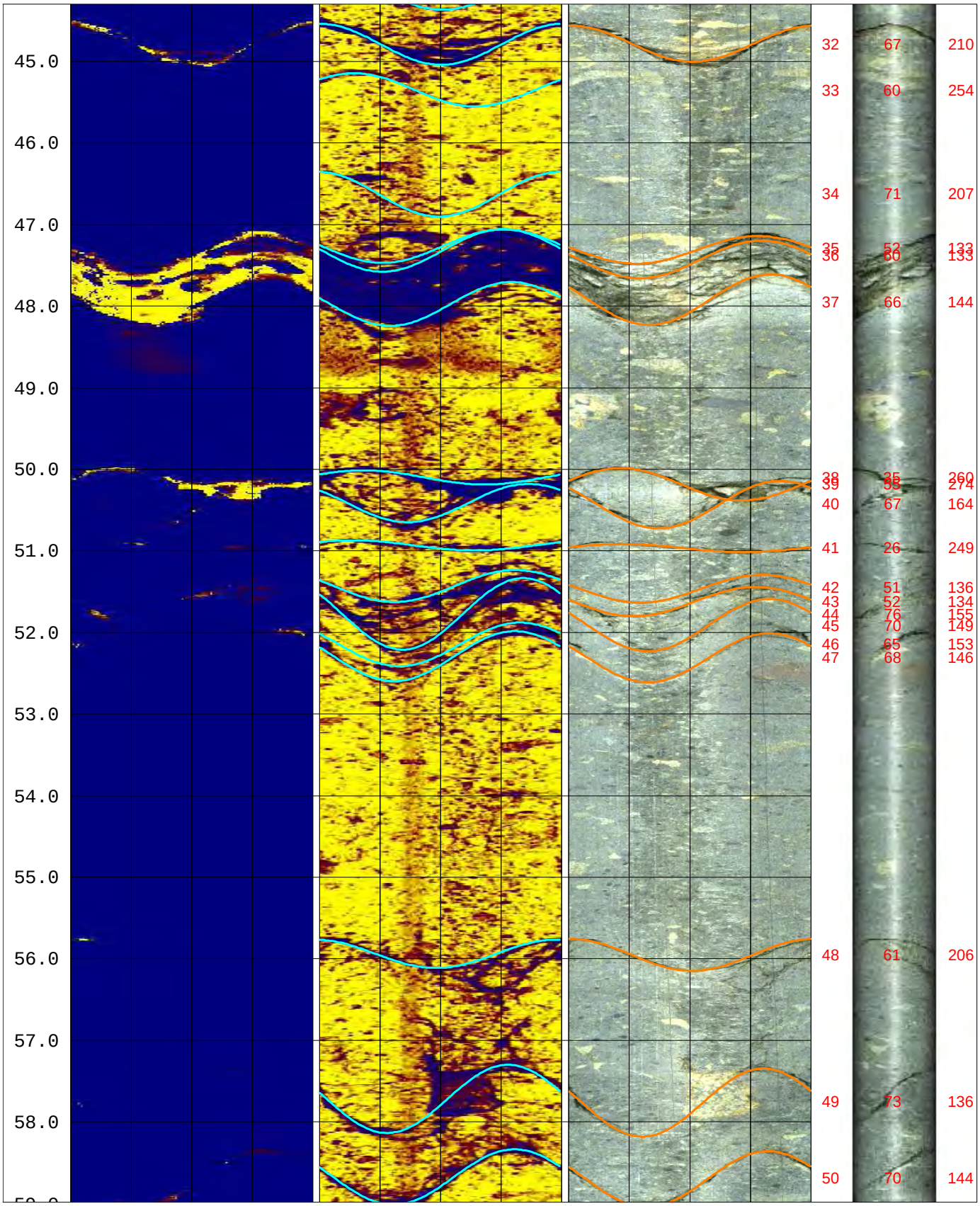
Notes:

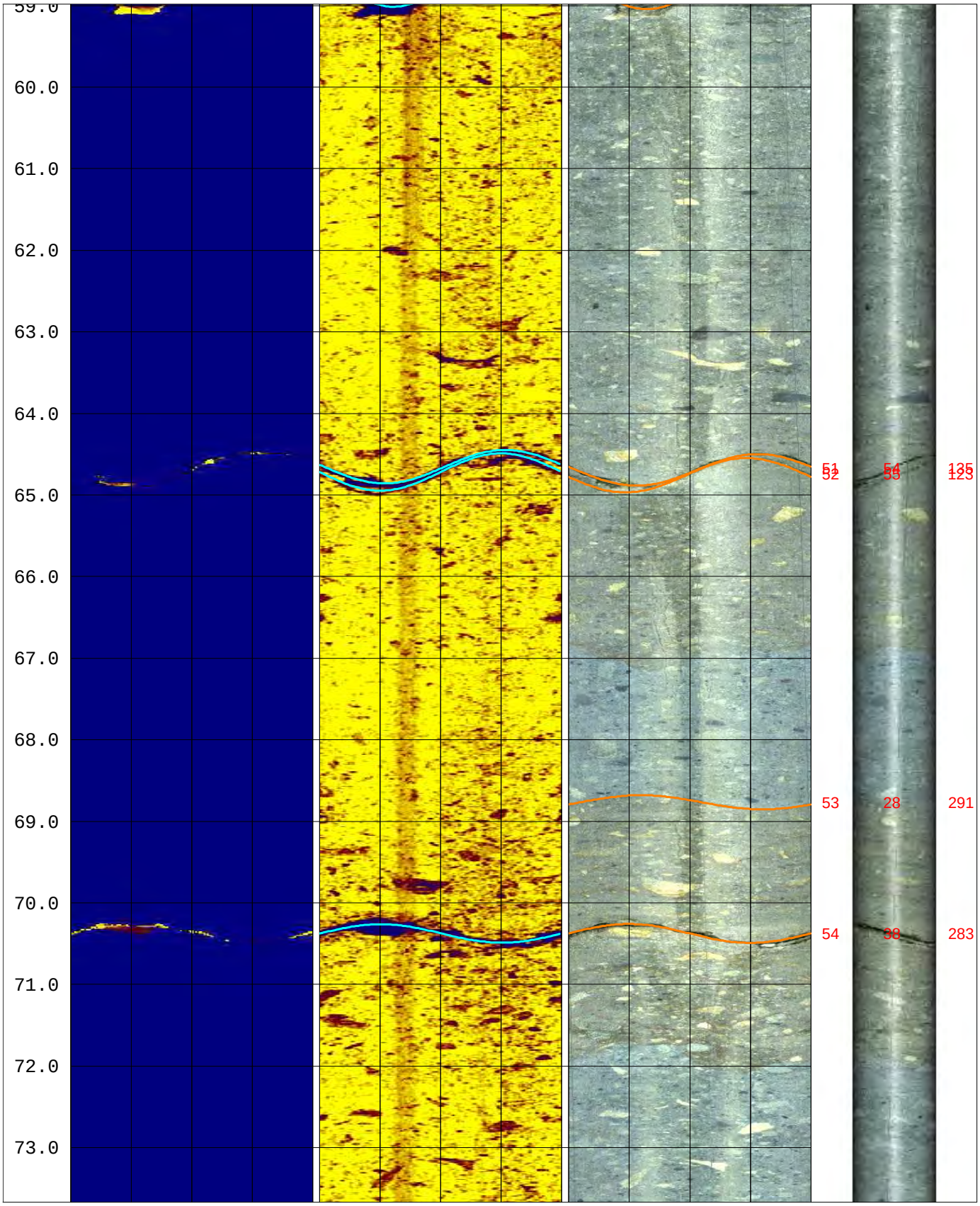
1) NA. Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.
6) Median orientation of borehole is Dip of 79.8 degrees, Dip AZ of 29.1 degrees.

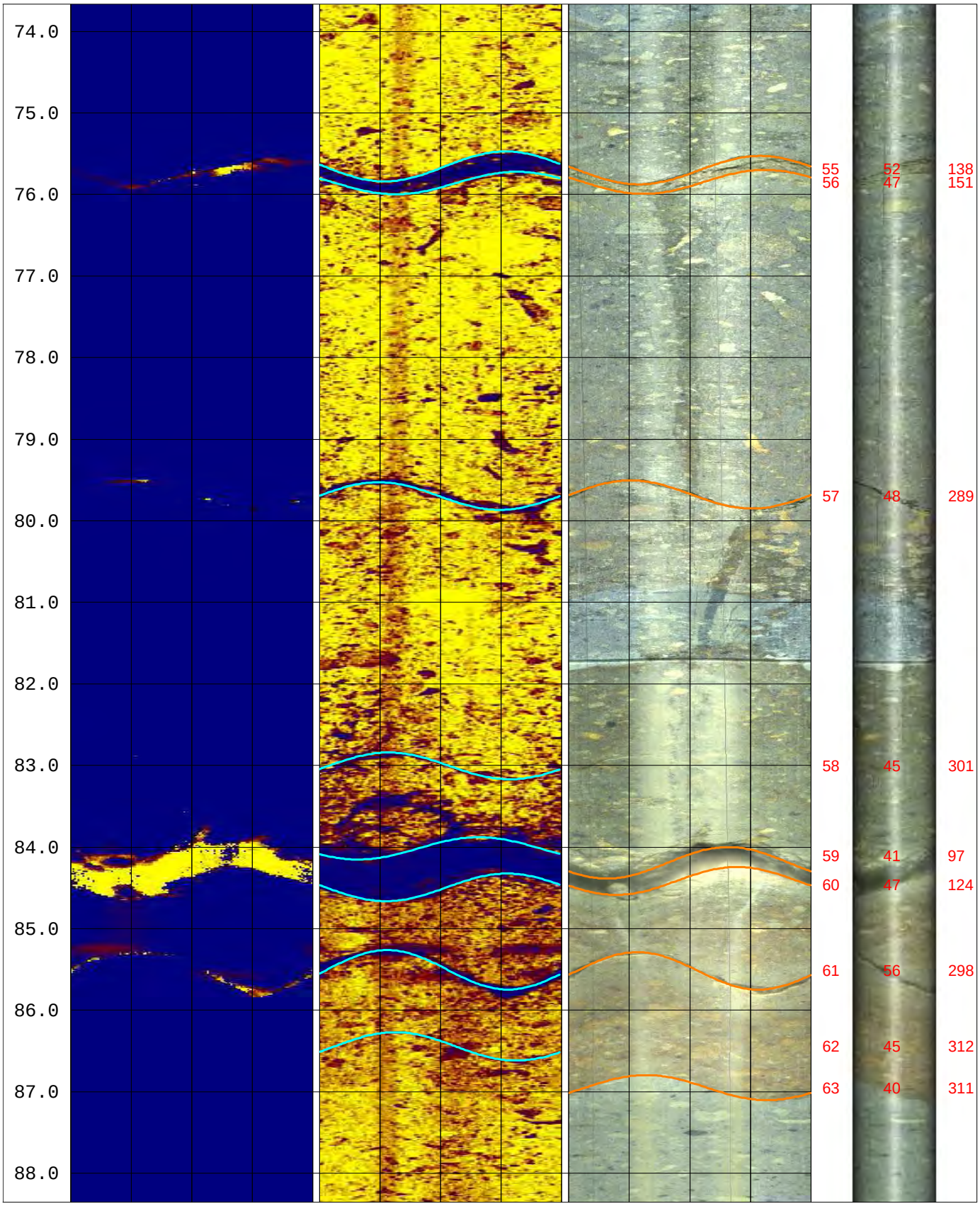


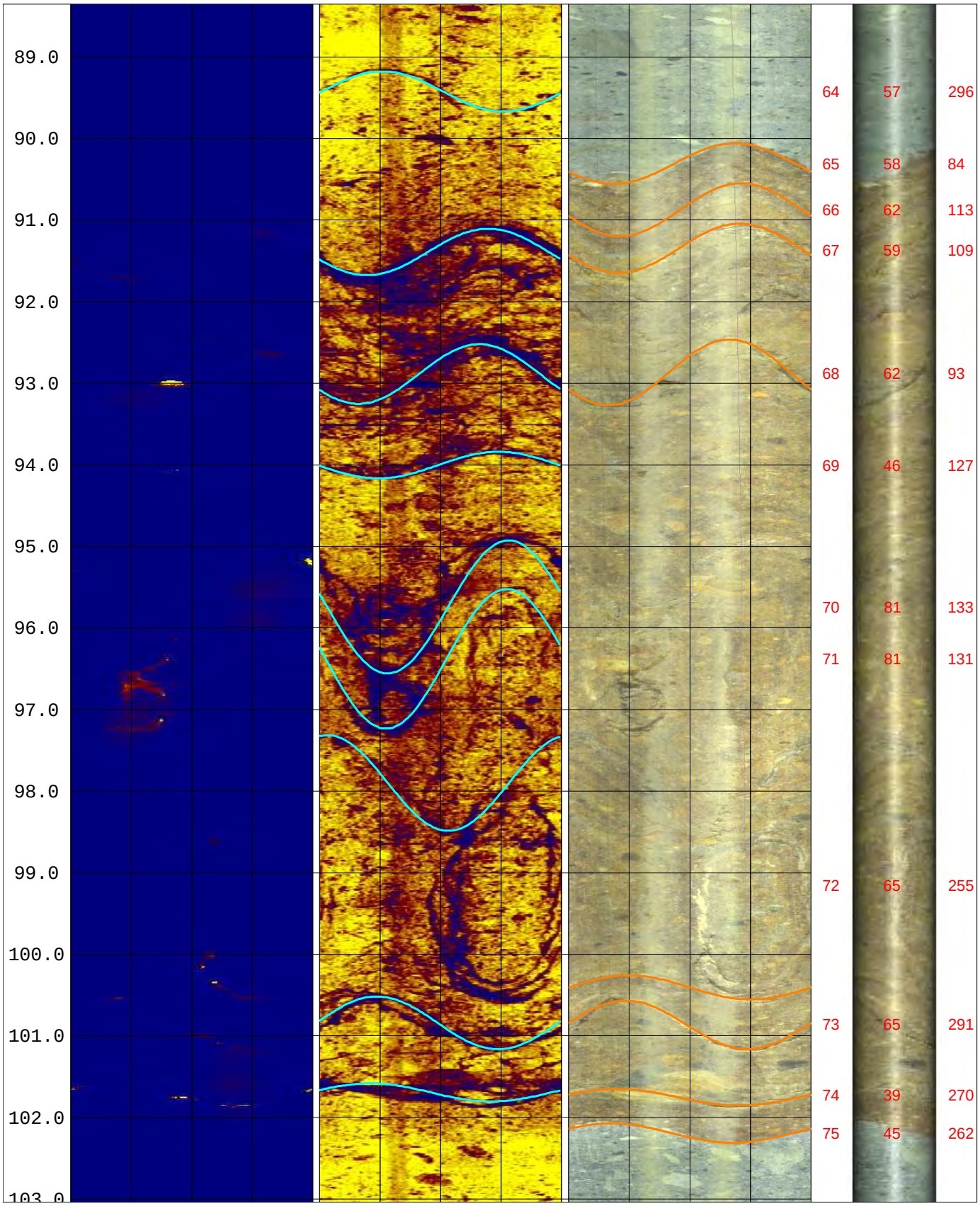

15.0
16.0
17.0
18.0
19.0
20.0
21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
7 58 127
8 60 125
9 85 128
10 76 337
11 68 106
13 78 215
12 56 220
14 62 196
15 20 315
16 34 300

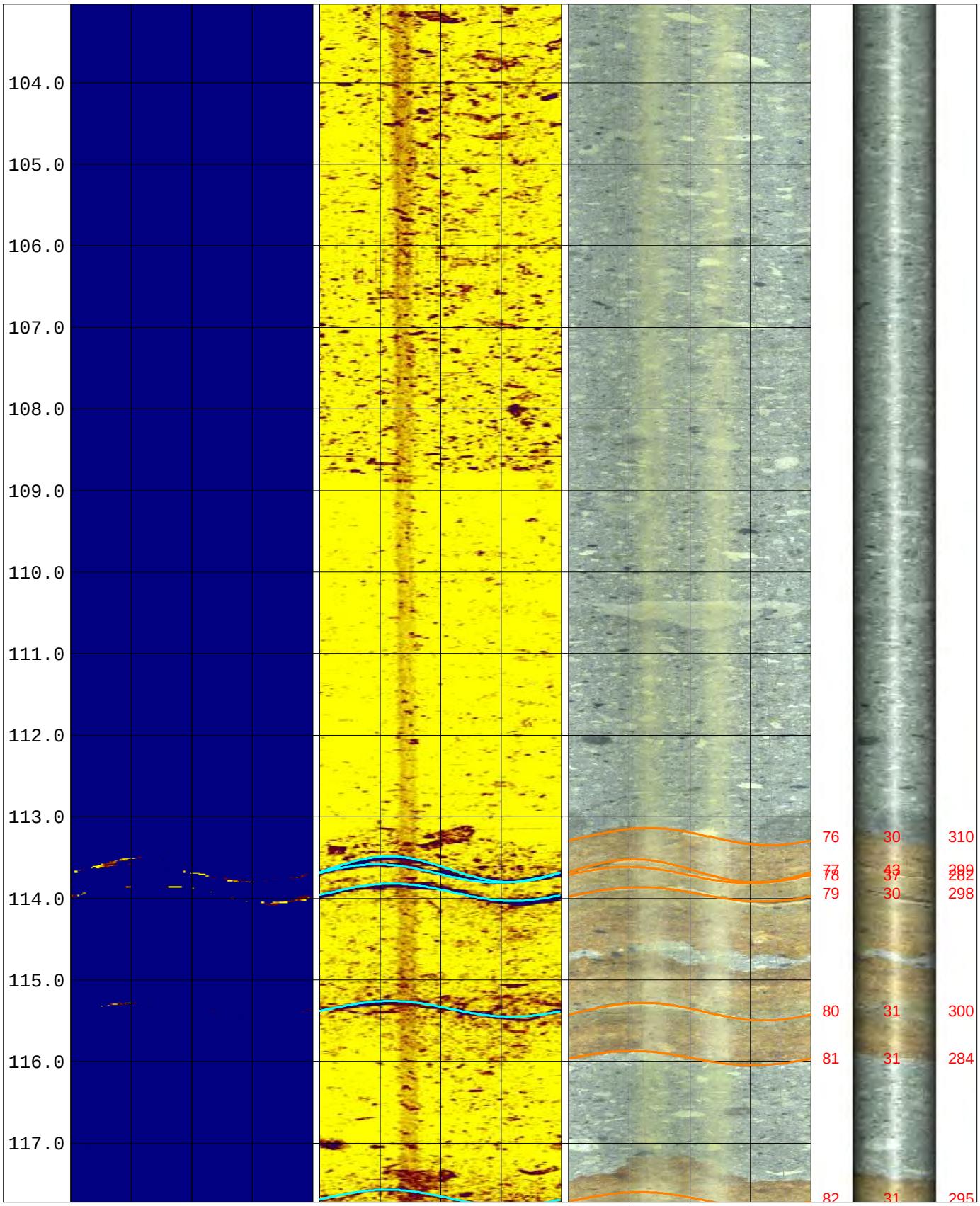

30.0
31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
17 49 220
18 67 224
19 45 113
20 40 309
21 34 137
22 73 127
23 38 117
24 39 294
25 41 281
26 18 310
27 62 212
28 54 131
29 47 126
30 53 114
31 66 211

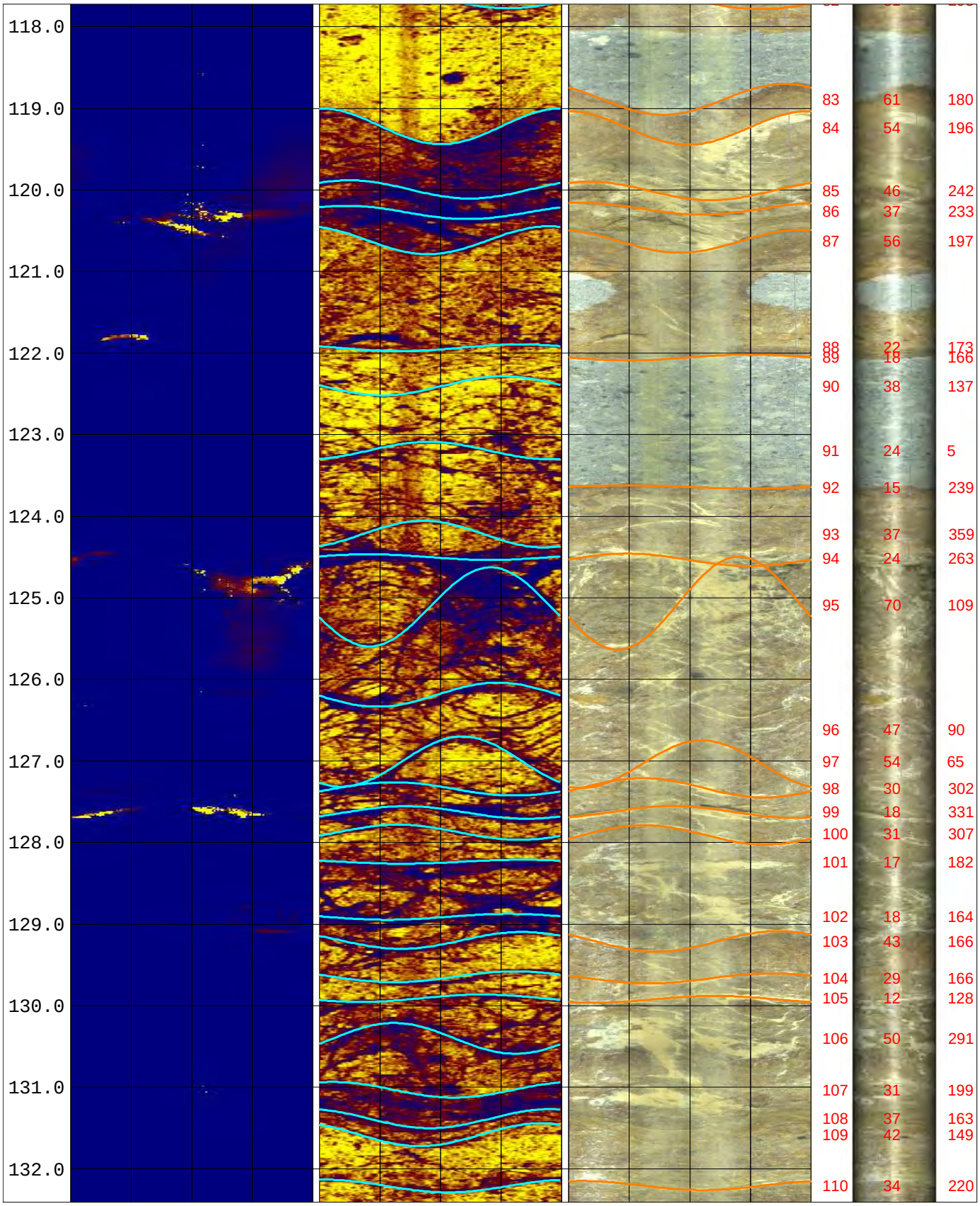

45.0
46.0
47.0
48.0
49.0
50.0
51.0
52.0
53.0
54.0
55.0
56.0
57.0
58.0
32 67 210
33 60 254
34 71 207
35 52 133
36 60 133
37 66 144
38 35 260
39 55 274
40 67 164
41 26 249
42 51 136
43 52 134
44 76 155
45 70 149
46 65 153
47 68 146
48 61 206
49 73 136
50 70 144

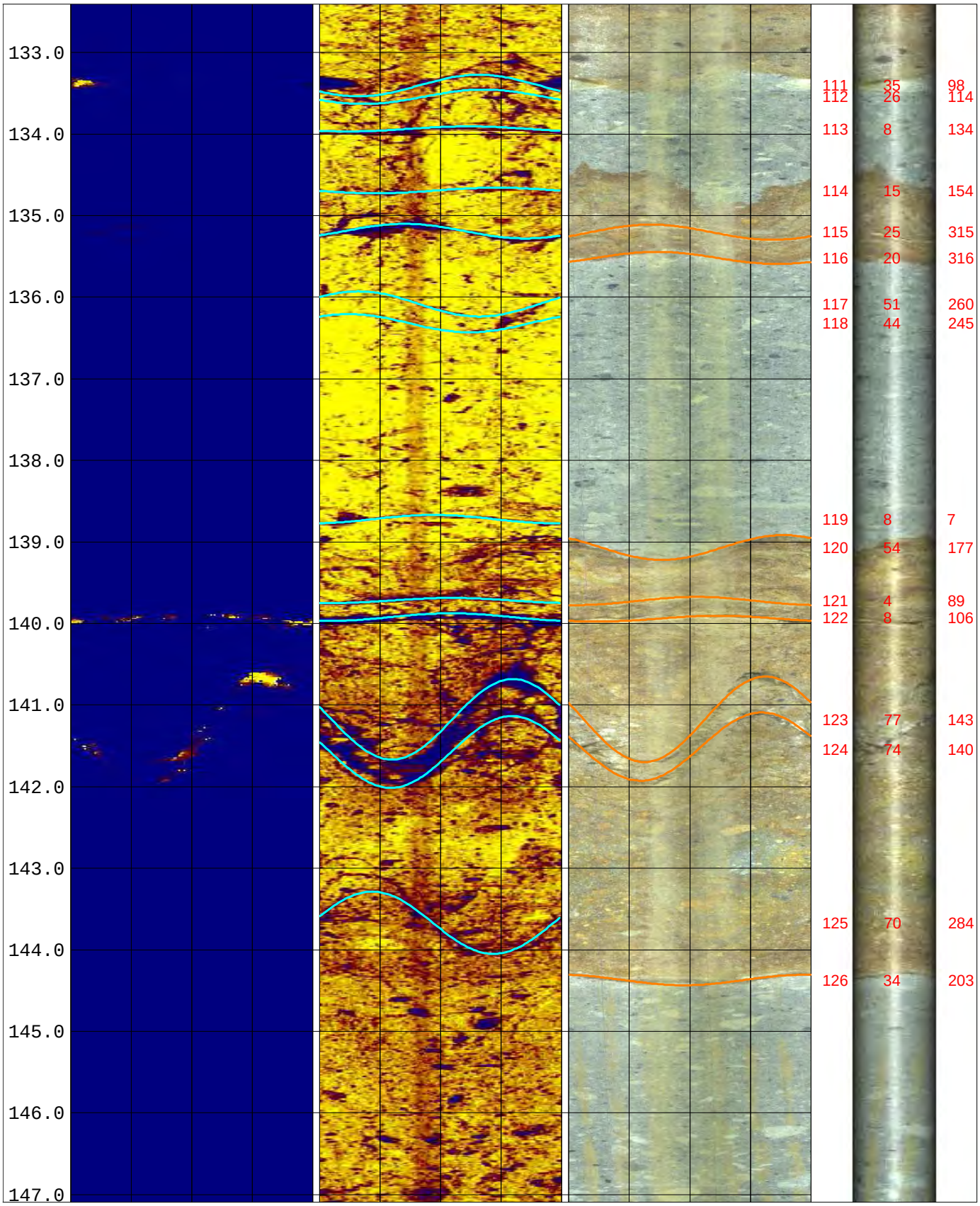

59.0
60.0
61.0
62.0
63.0
64.0
65.0
66.0
67.0
68.0
69.0
70.0
71.0
72.0
73.0
51
52
54
53
123
125
28
291
54
283

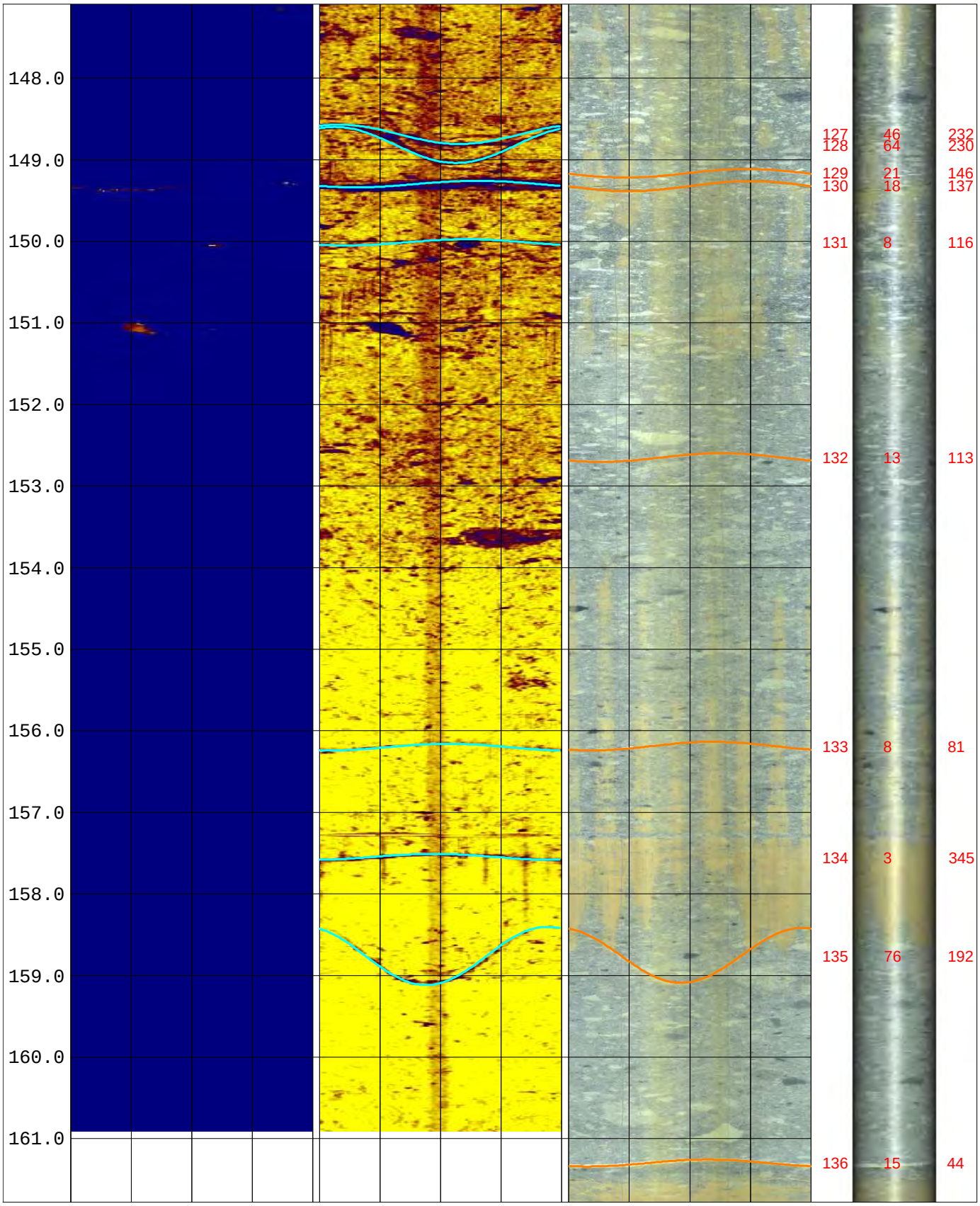

74.0
75.0
76.0
77.0
78.0
79.0
80.0
81.0
82.0
83.0
84.0
85.0
86.0
87.0
88.0
55 52 138
56 47 151
57 48 289
58 45 301
59 41 97
60 47 124
61 56 298
62 45 312
63 40 311

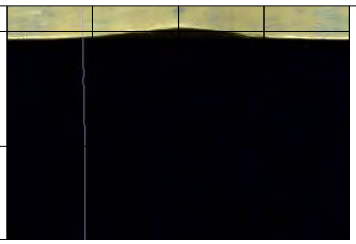

89.0
90.0
91.0
92.0
93.0
94.0
95.0
96.0
97.0
98.0
99.0
100.0
101.0
102.0
103.0
64 57 296
65 58 84
66 62 113
67 59 109
68 62 93
69 46 127
70 81 133
71 81 131
72 65 255
73 65 291
74 39 270
75 45 262


104.0
105.0
106.0
107.0
108.0
109.0
110.0
111.0
112.0
113.0
114.0
115.0
116.0
117.0
76 30 310
77 43 299
78 37 282
79 30 298
80 31 300
81 31 284
82 31 295


118.0
119.0
120.0
121.0
122.0
123.0
124.0
125.0
126.0
127.0
128.0
129.0
130.0
131.0
132.0
83 61 180
84 54 196
85 46 242
86 37 233
87 56 197
88 22 173
89 18 166
90 38 137
91 24 5
92 15 239
93 37 359
94 24 263
95 70 109
96 47 90
97 54 65
98 30 302
99 18 331
100 31 307
101 17 182
102 18 164
103 43 166
104 29 166
105 12 128
106 50 291
107 31 199
108 37 163
109 42 149
110 34 220


133.0
134.0
135.0
136.0
137.0
138.0
139.0
140.0
141.0
142.0
143.0
144.0
145.0
146.0
147.0
111 35 98
112 26 114
113 8 134
114 15 154
115 25 315
116 20 316
117 51 260
118 44 245
119 8 7
120 54 177
121 4 89
122 8 106
123 77 143
124 74 140
125 70 284
126 34 203

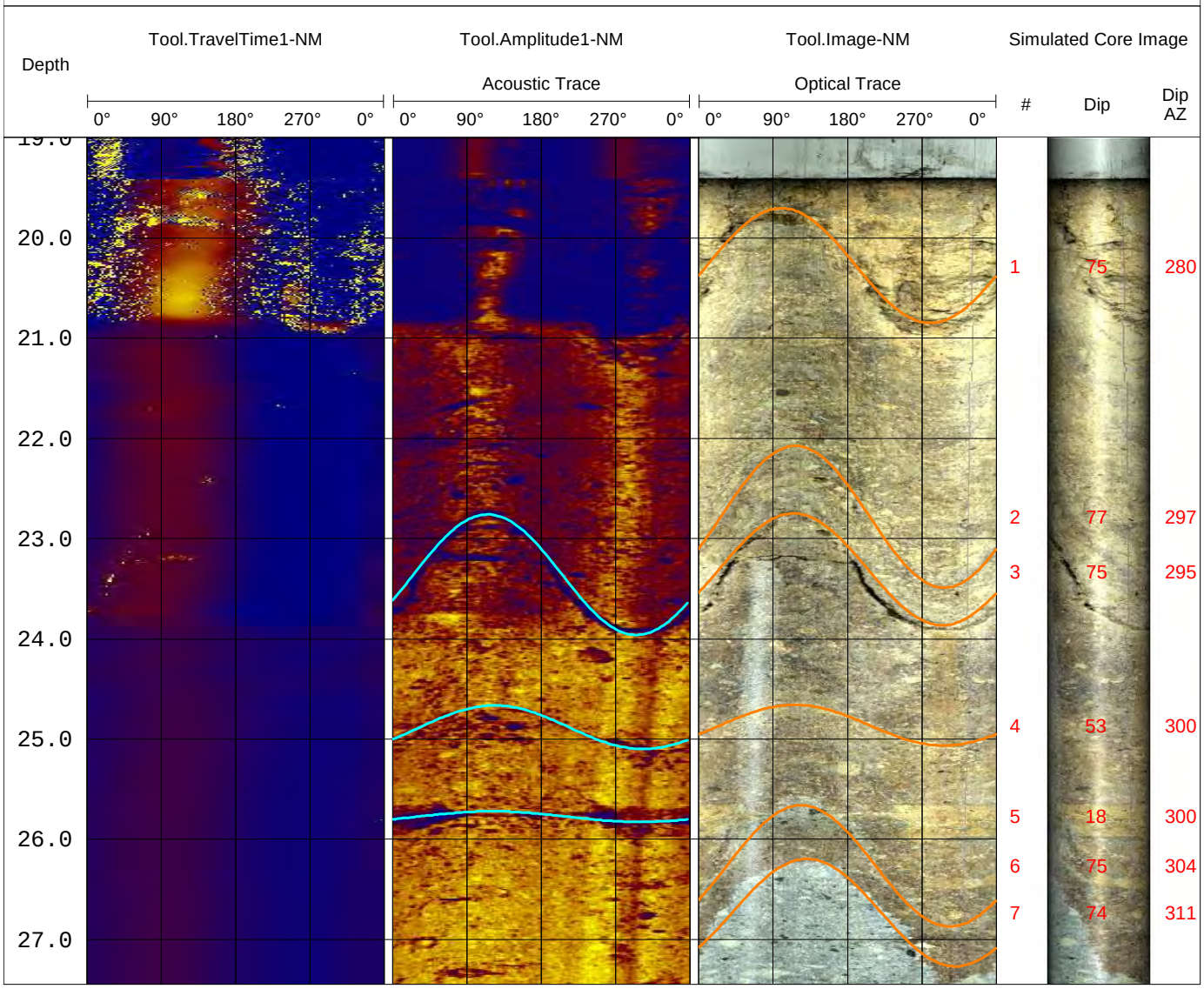

148.0
149.0
150.0
151.0
152.0
153.0
154.0
155.0
156.0
157.0
158.0
159.0
160.0
161.0
127 46 232
128 64 230
129 21 146
130 18 137
131 8 116
132 13 113
133 8 81
134 3 345
135 76 192
136 15 44

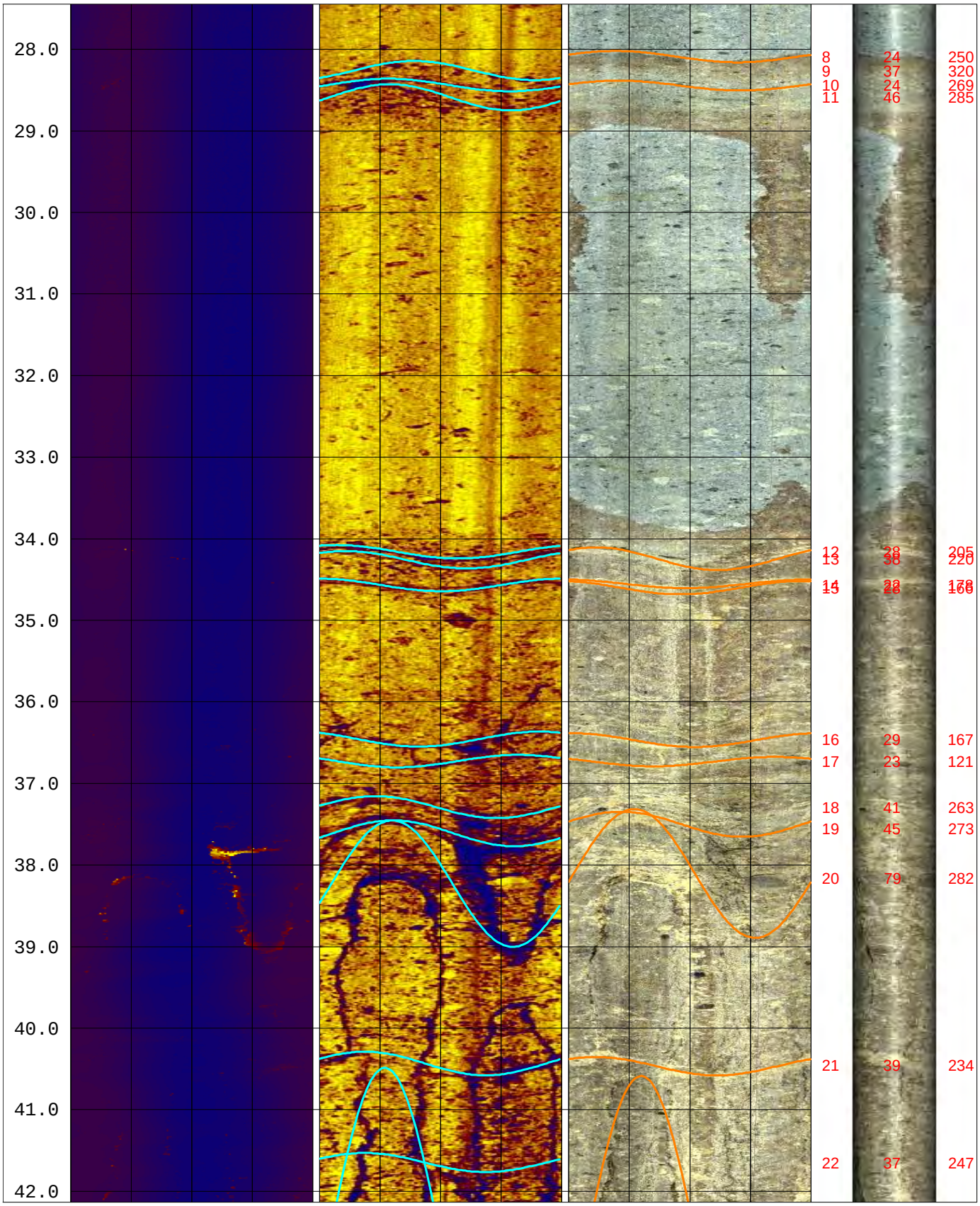
162.0												
163.0												

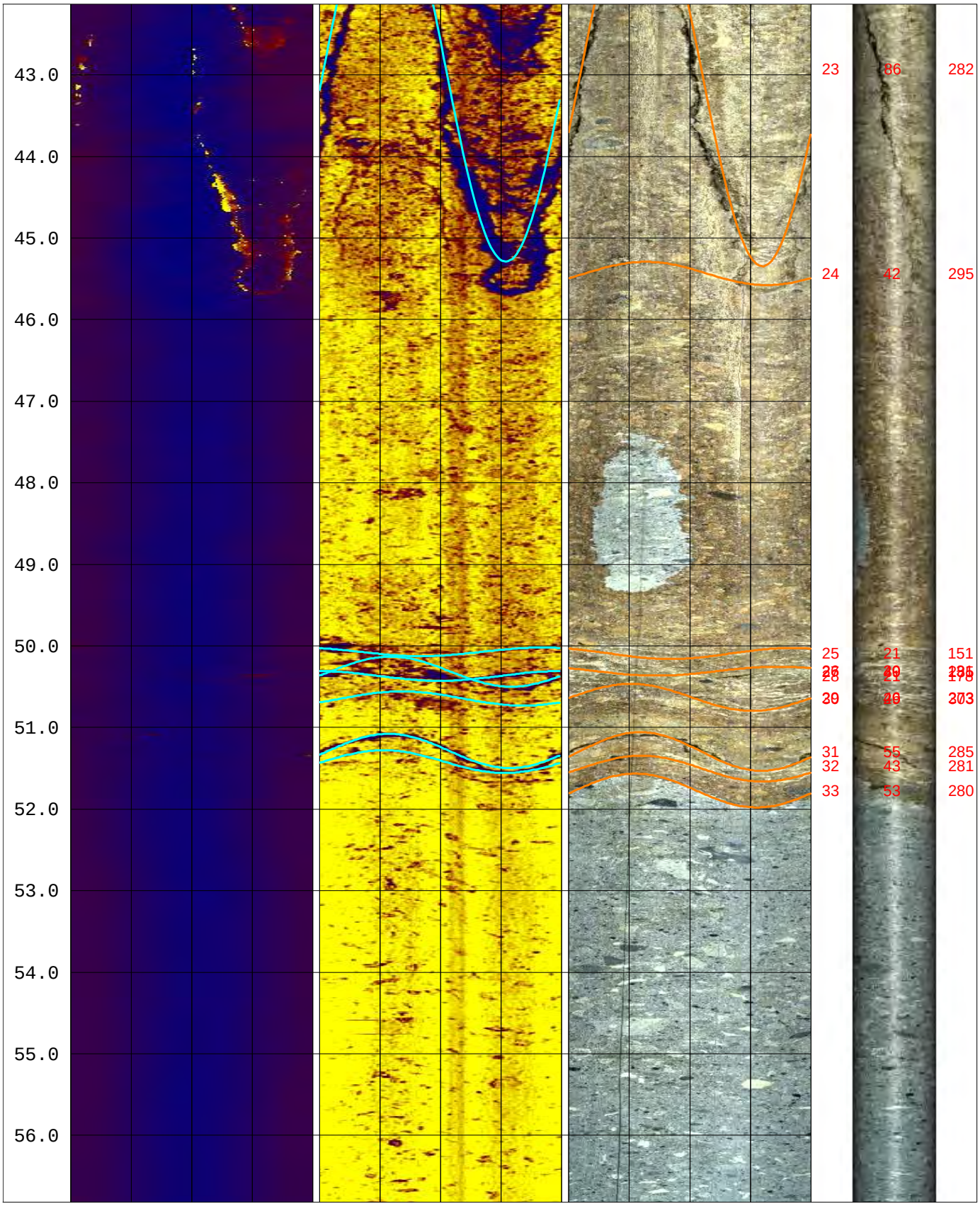
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2007 Geotechnical Program
Date Logged:	September 7, 2007	Borehole ID: RKS-16-07
File Name:	RKS1607-1M.wcl	Logged By: F G Kruger

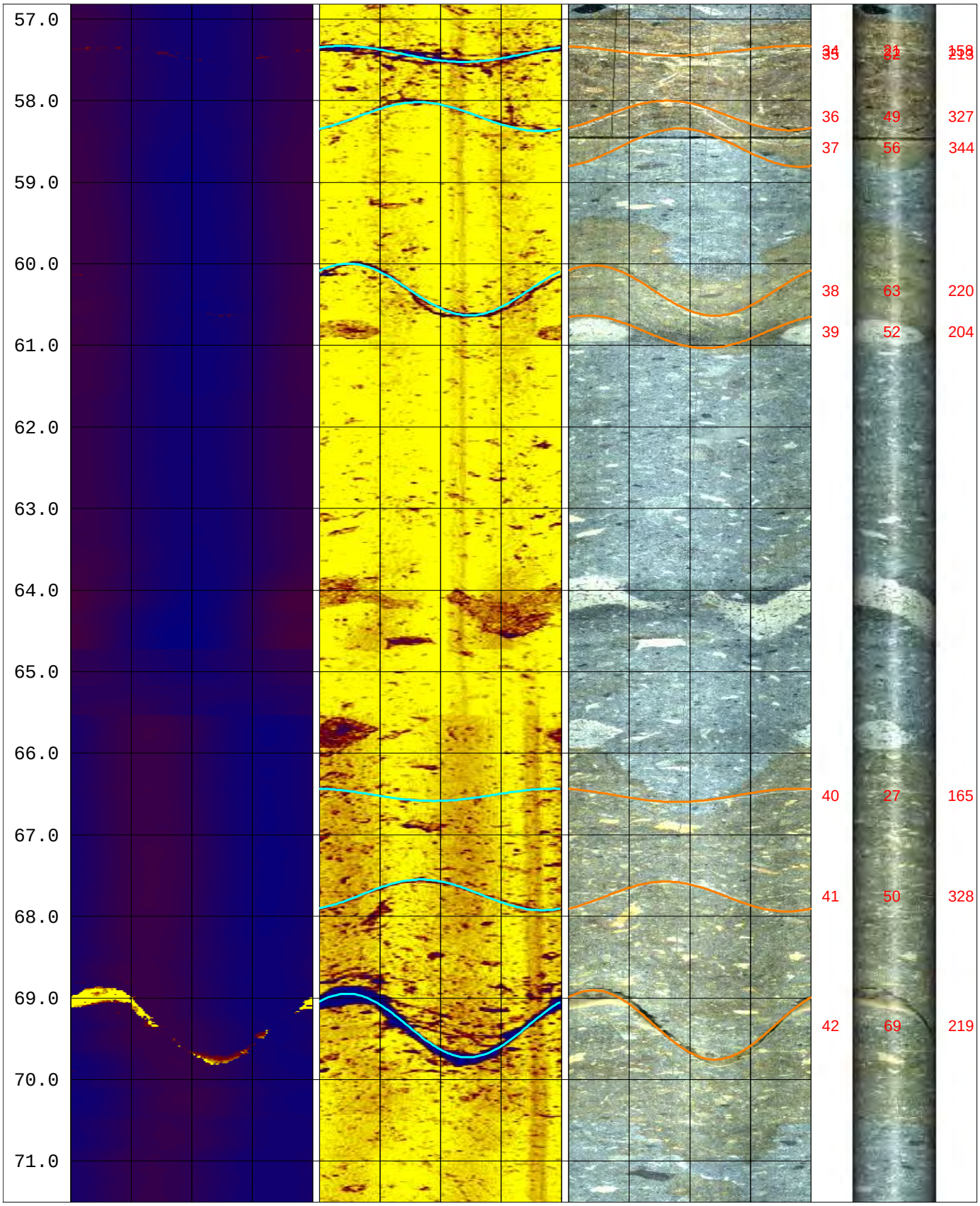
Notes:

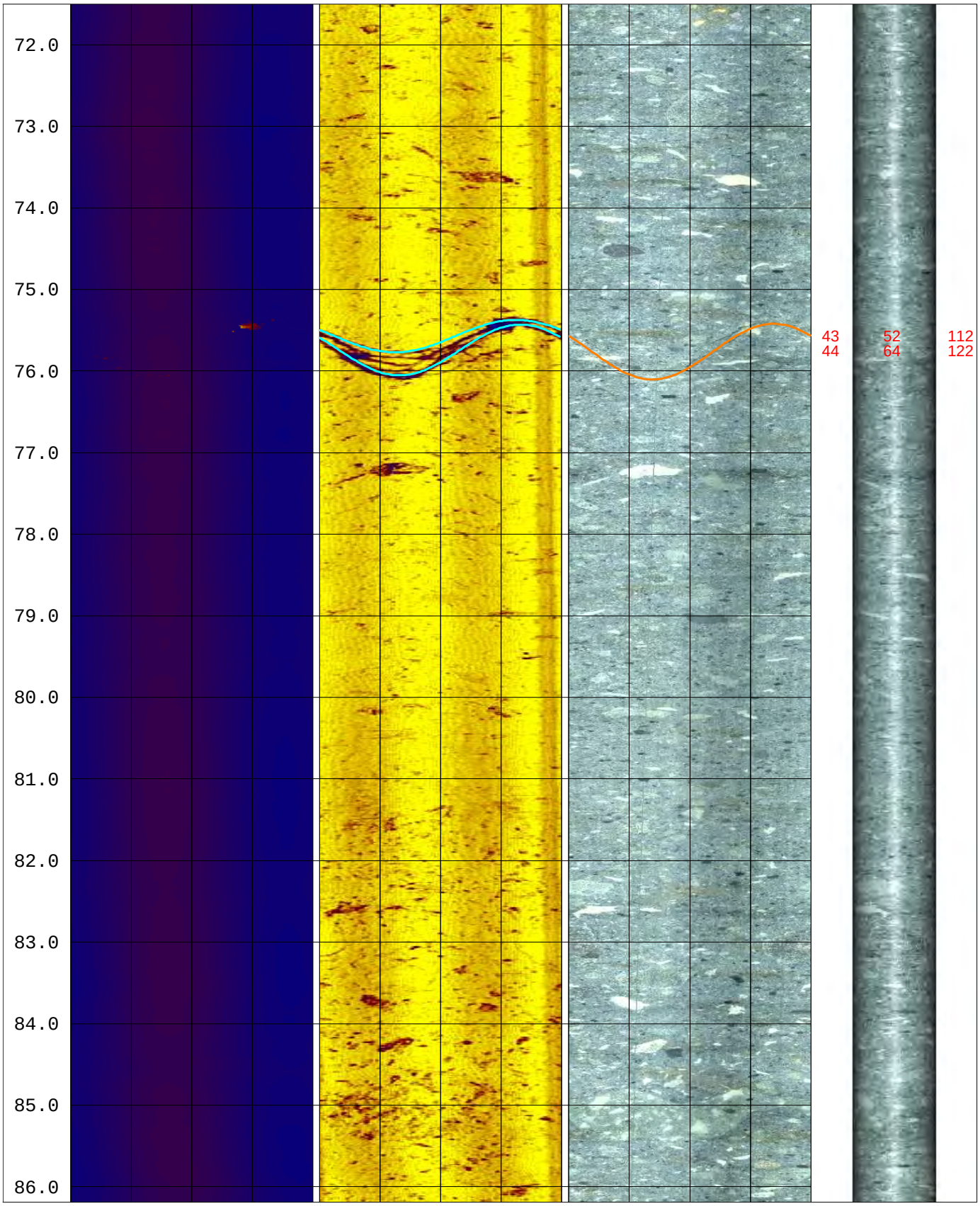
1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.

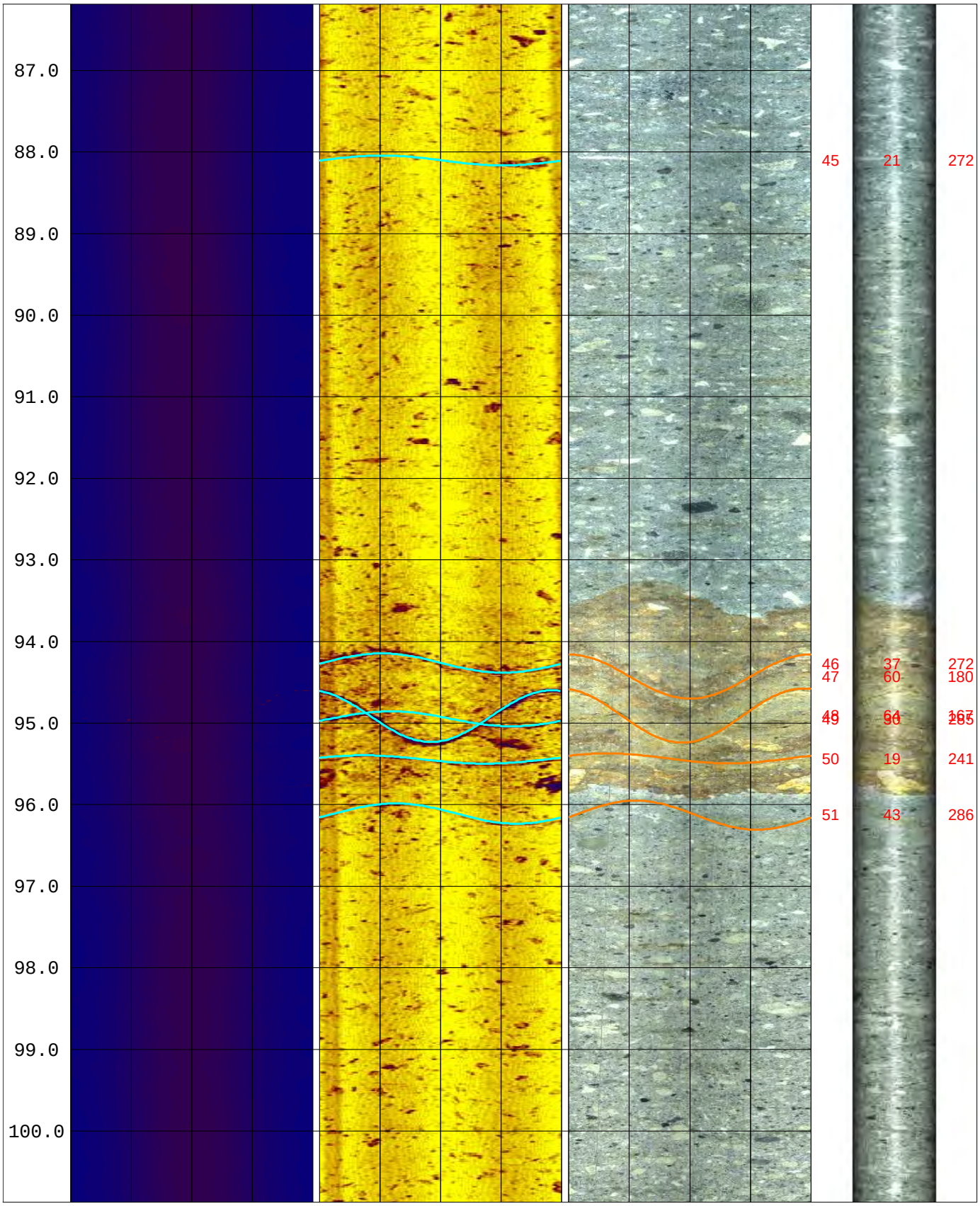


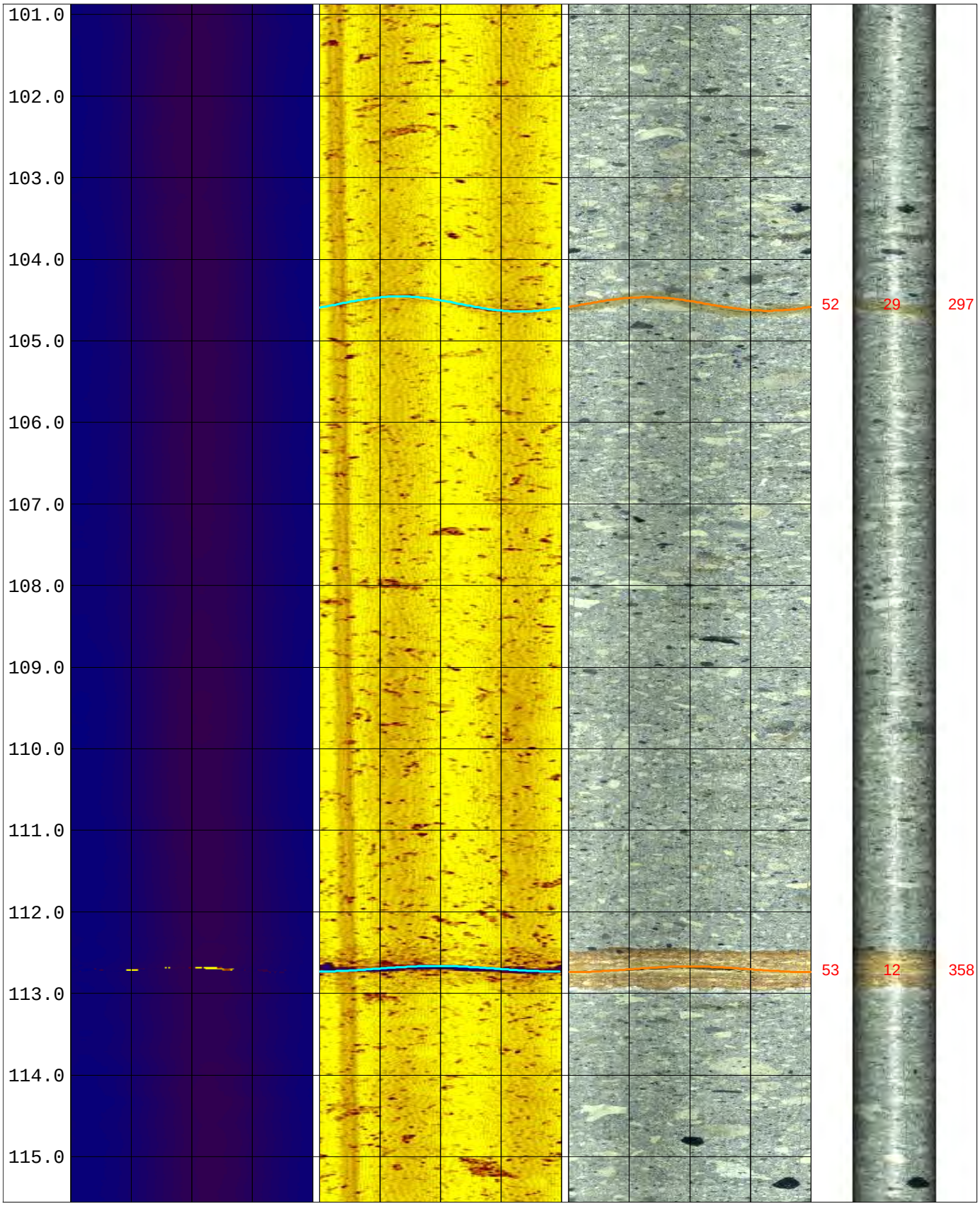

28.0
29.0
30.0
31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
8 24 250
9 37 320
10 24 269
11 46 285
12 28 205
13 38 220
14 23 178
15 28 166
16 29 167
17 23 121
18 41 263
19 45 273
20 79 282
21 39 234
22 37 247

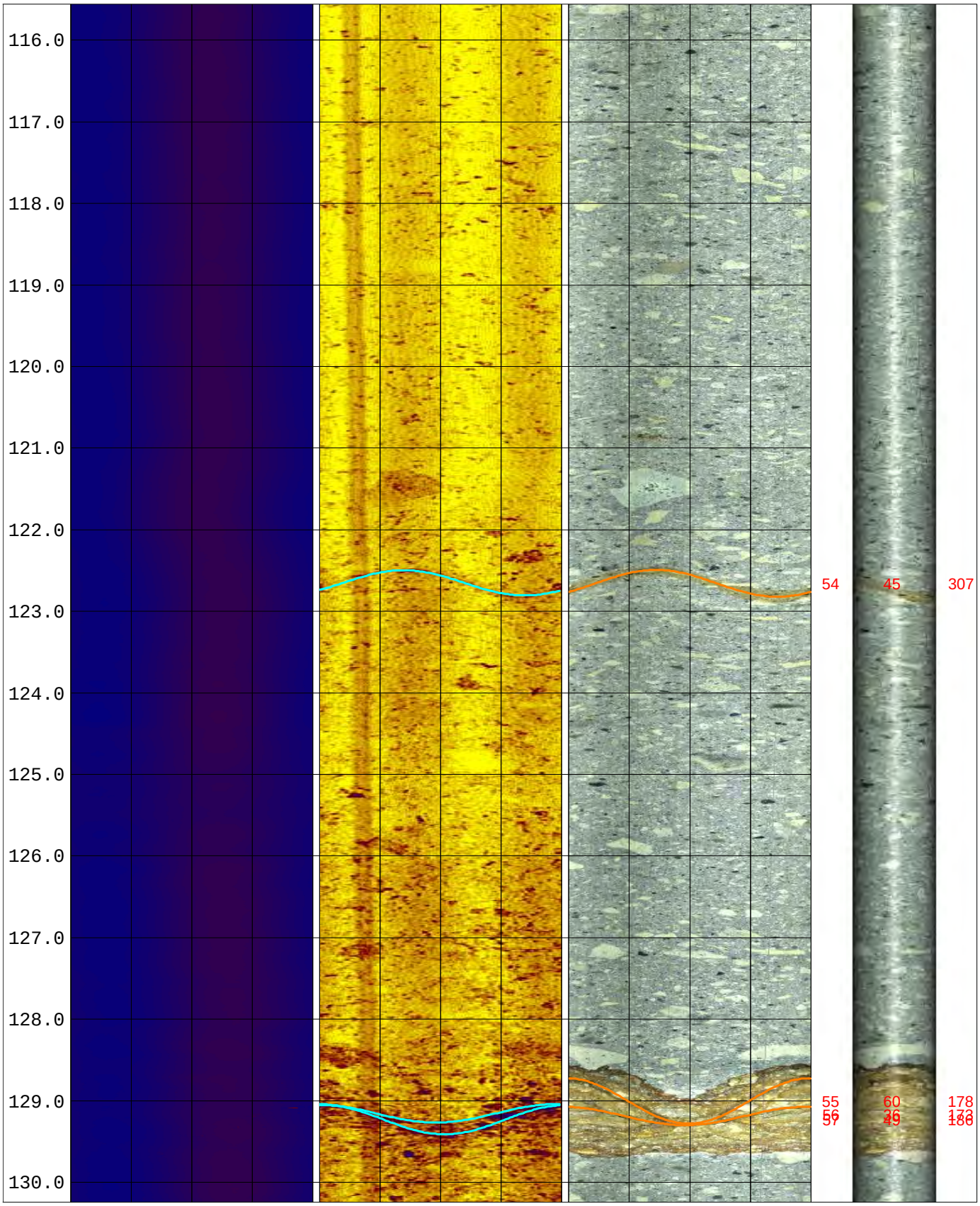

43.0
44.0
45.0
46.0
47.0
48.0
49.0
50.0
51.0
52.0
53.0
54.0
55.0
56.0
23 86 282
24 42 295
25 21 151
31 55 285
32 43 281
33 53 280

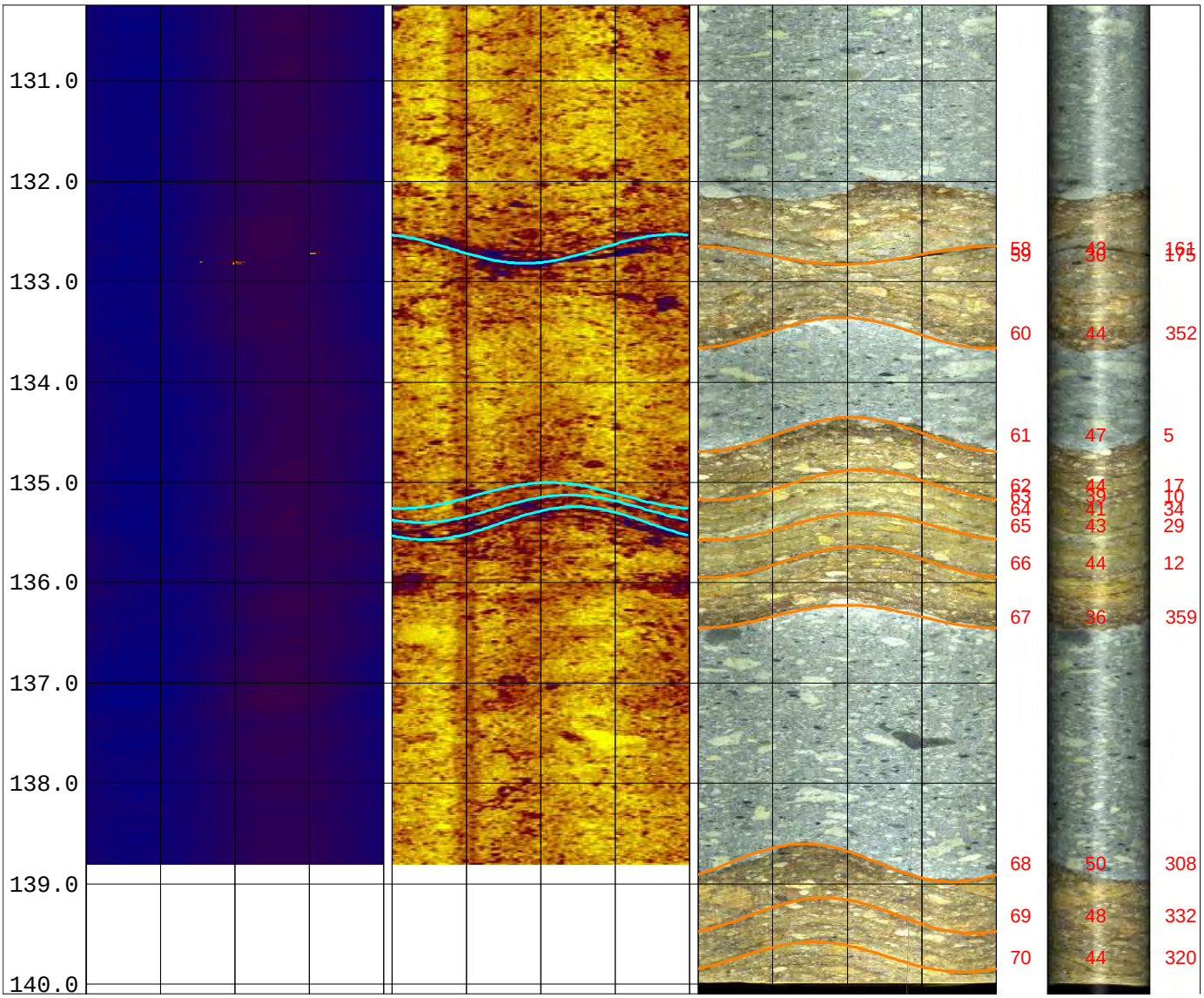

57.0
58.0
59.0
60.0
61.0
62.0
63.0
64.0
65.0
66.0
67.0
68.0
69.0
70.0
71.0
34 31 158
35 32 218
36 49 327
37 56 344
38 63 220
39 52 204
40 27 165
41 50 328
42 69 219


72.0
73.0
74.0
75.0
76.0
77.0
78.0
79.0
80.0
81.0
82.0
83.0
84.0
85.0
86.0
43
44
52
64
112
122


87.0
88.0
89.0
90.0
91.0
92.0
93.0
94.0
95.0
96.0
97.0
98.0
99.0
100.0
45 21 272
46 37 272
47 60 180
48 64 167
49 50 285
50 19 241
51 43 286


101.0
102.0
103.0
104.0
105.0
106.0
107.0
108.0
109.0
110.0
111.0
112.0
113.0
114.0
115.0
52
29
297
53
12
358


116.0
117.0
118.0
119.0
120.0
121.0
122.0
123.0
124.0
125.0
126.0
127.0
128.0
129.0
130.0
54
45
307
55
60
178
56
36
173
57
49
186

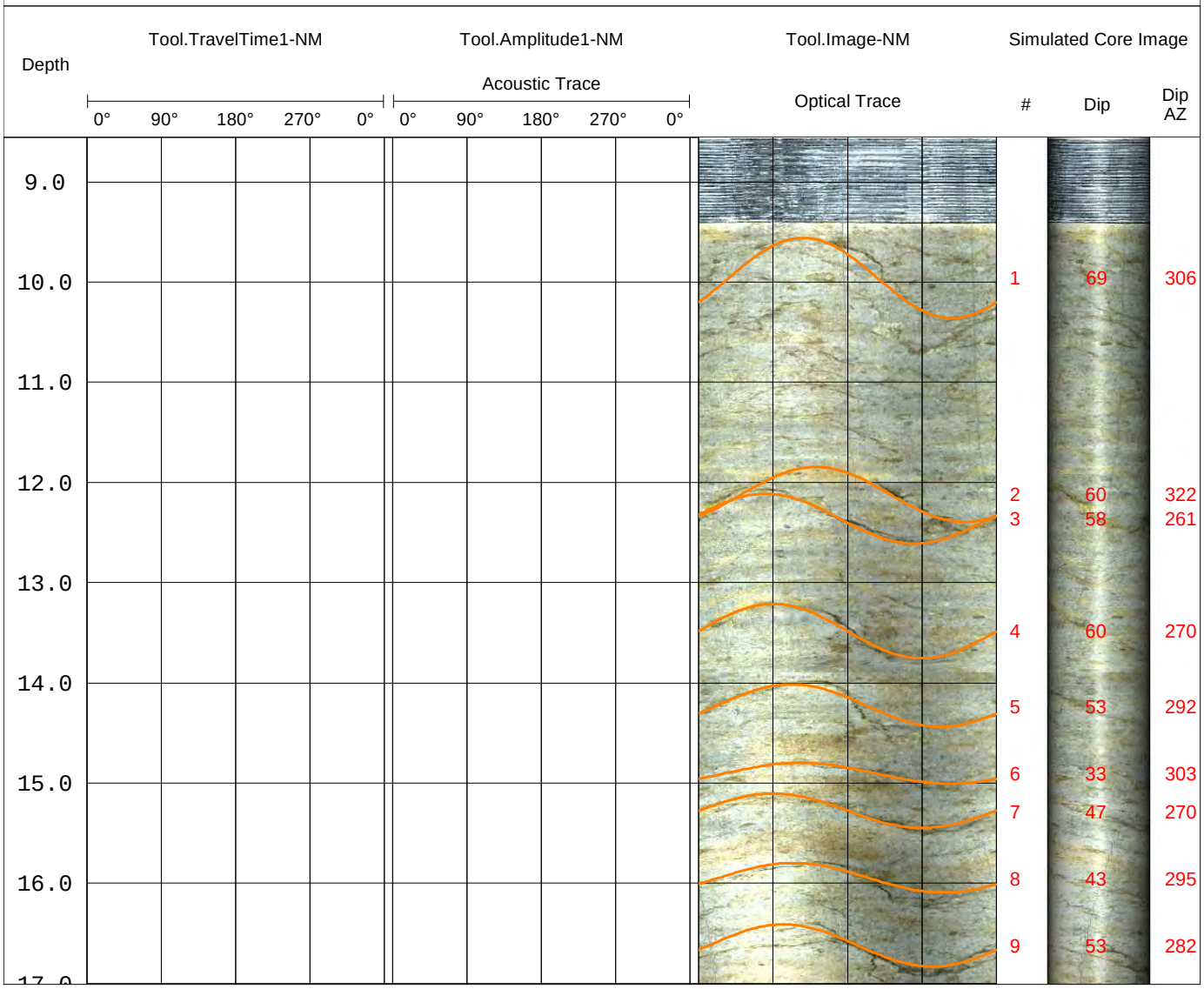

131.0
132.0
133.0
134.0
135.0
136.0
137.0
138.0
139.0
140.0
58 40 161
59 38 175
60 44 352
61 47 5
62 44 17
63 39 10
64 41 34
65 43 29
66 44 12
67 36 359
68 50 308
69 48 332
70 44 320

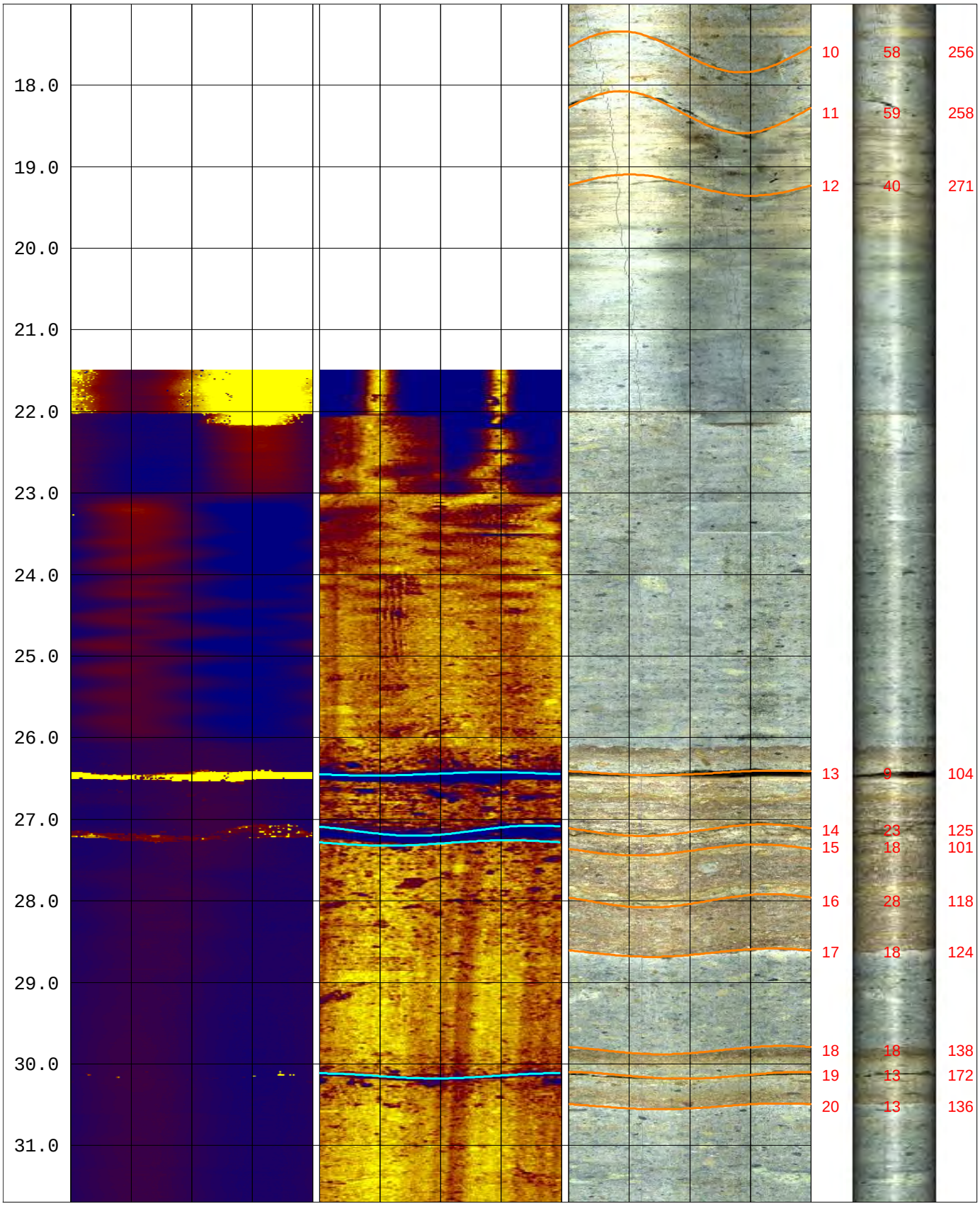
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2007 Geotechnical Program

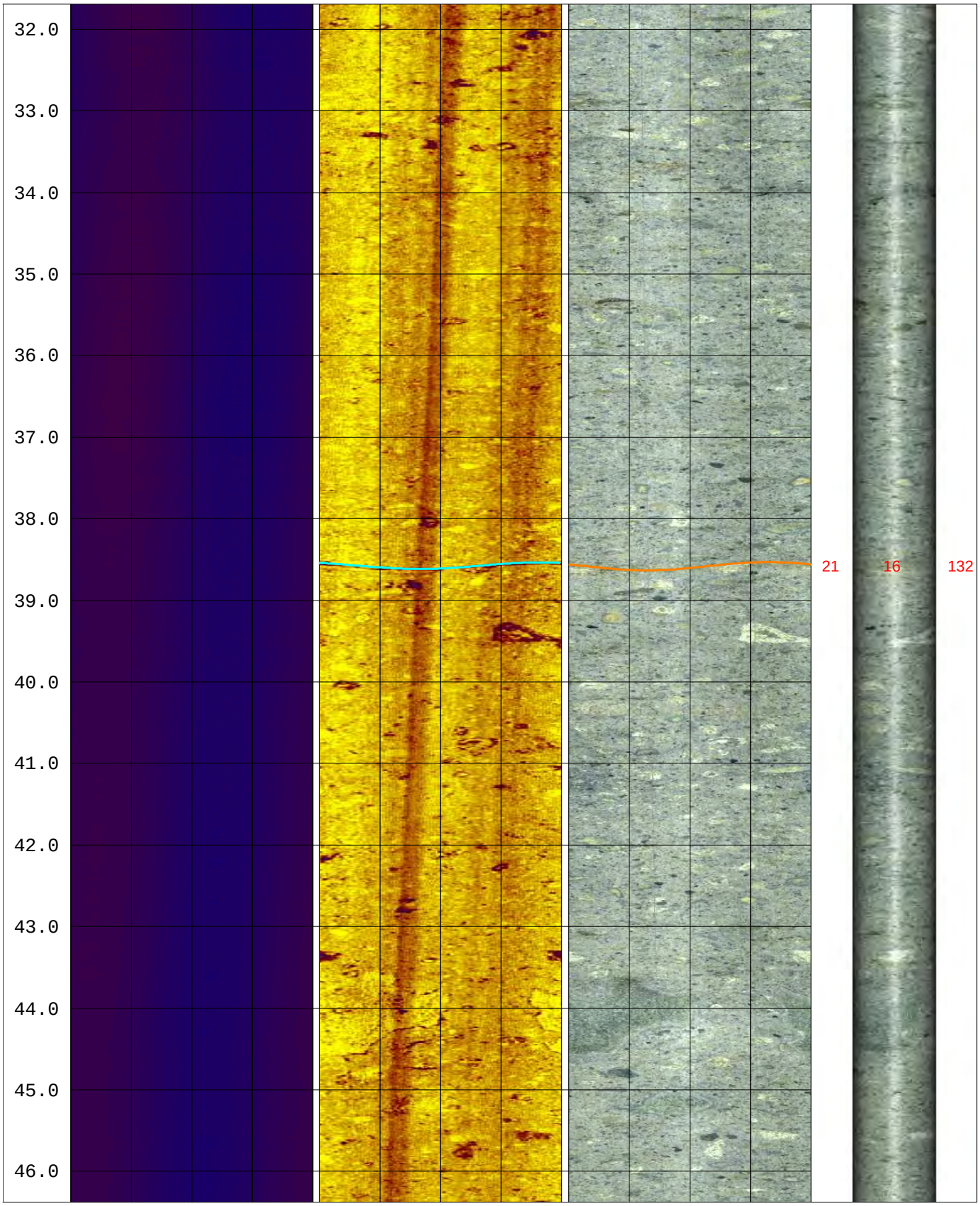
Date Logged:	September 5,2007	Borehole ID:	RKS-17-07
File Name:	RKS1707-1M.wcl	Logged By:	F G Kruger

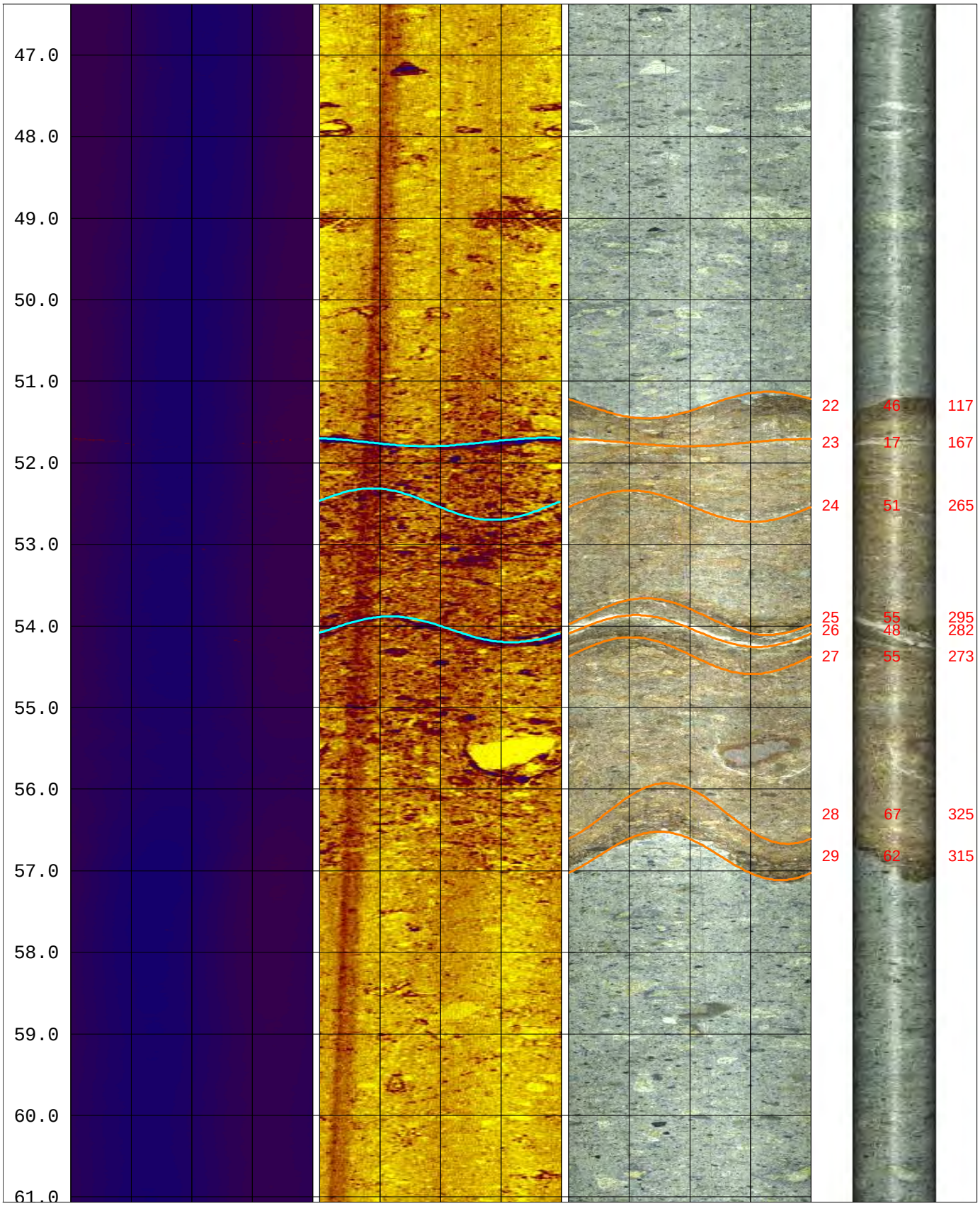
Notes:

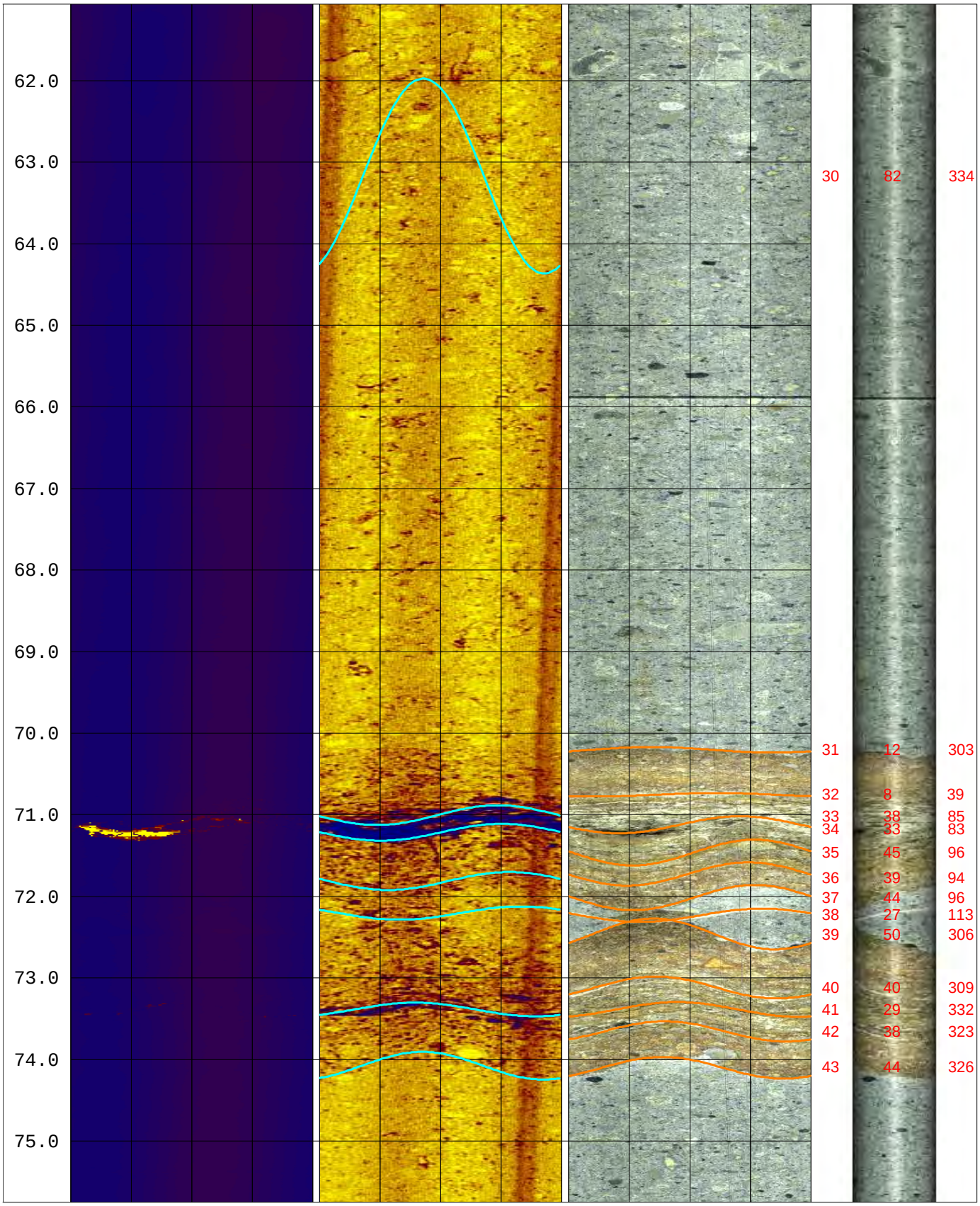
1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.

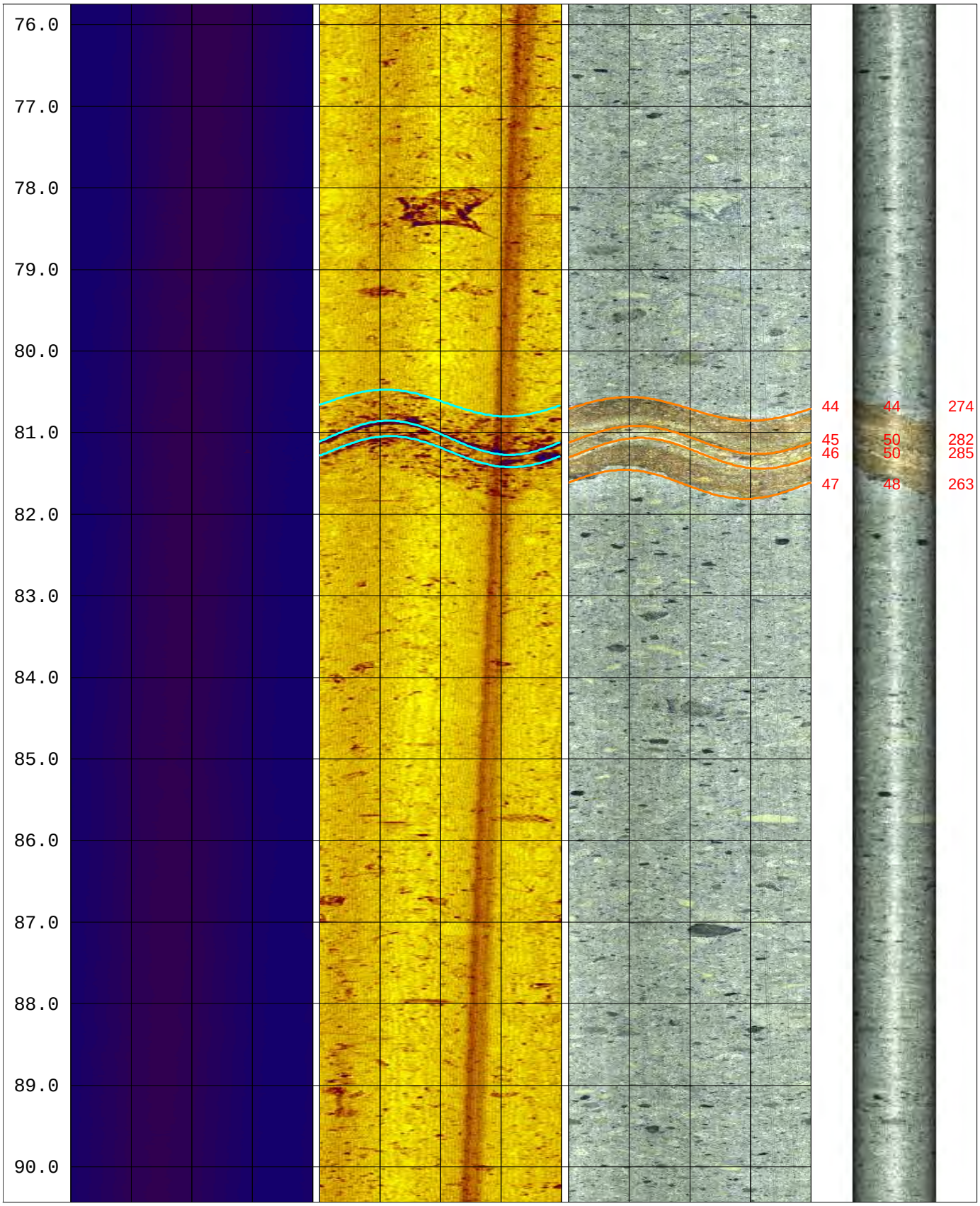


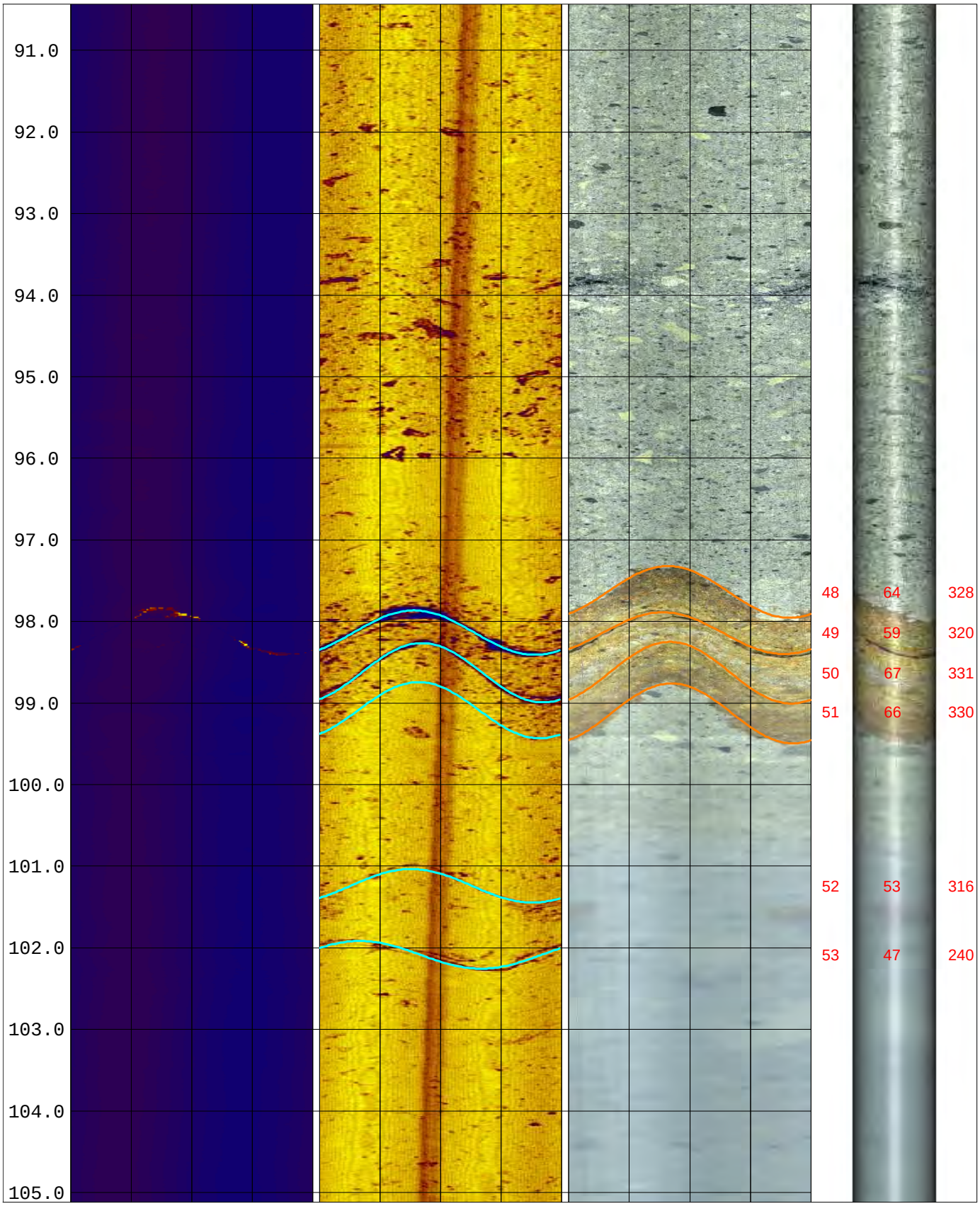

18.0
19.0
20.0
21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
30.0
31.0
10 58 256
11 59 258
12 40 271
13 9 104
14 23 125
15 18 101
16 28 118
17 18 124
18 18 138
19 13 172
20 13 136

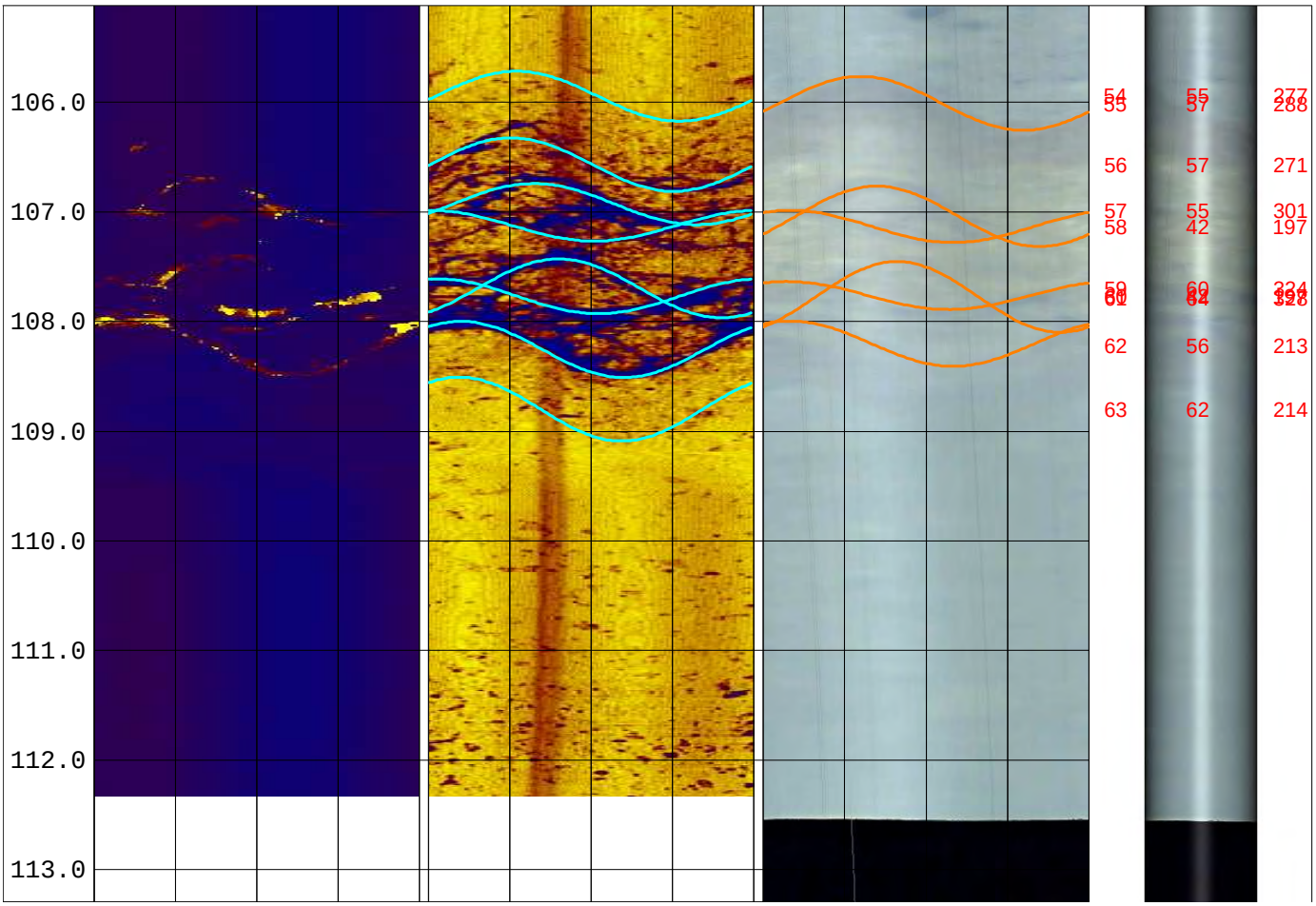

32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
45.0
46.0
21
16
132


47.0
48.0
49.0
50.0
51.0
52.0
53.0
54.0
55.0
56.0
57.0
58.0
59.0
60.0
61.0
22 46 117
23 17 167
24 51 265
25 55 295
26 48 282
27 55 273
28 67 325
29 62 315


62.0
63.0
64.0
65.0
66.0
67.0
68.0
69.0
70.0
71.0
72.0
73.0
74.0
75.0
30 82 334
31 12 303
32 8 39
33 38 85
34 33 83
35 45 96
36 39 94
37 44 96
38 27 113
39 50 306
40 40 309
41 29 332
42 38 323
43 44 326


76.0
77.0
78.0
79.0
80.0
81.0
82.0
83.0
84.0
85.0
86.0
87.0
88.0
89.0
90.0
44 44 274
45 50 282
46 50 285
47 48 263


91.0
92.0
93.0
94.0
95.0
96.0
97.0
98.0
99.0
100.0
101.0
102.0
103.0
104.0
105.0
48 64 328
49 59 320
50 67 331
51 66 330
52 53 316
53 47 240

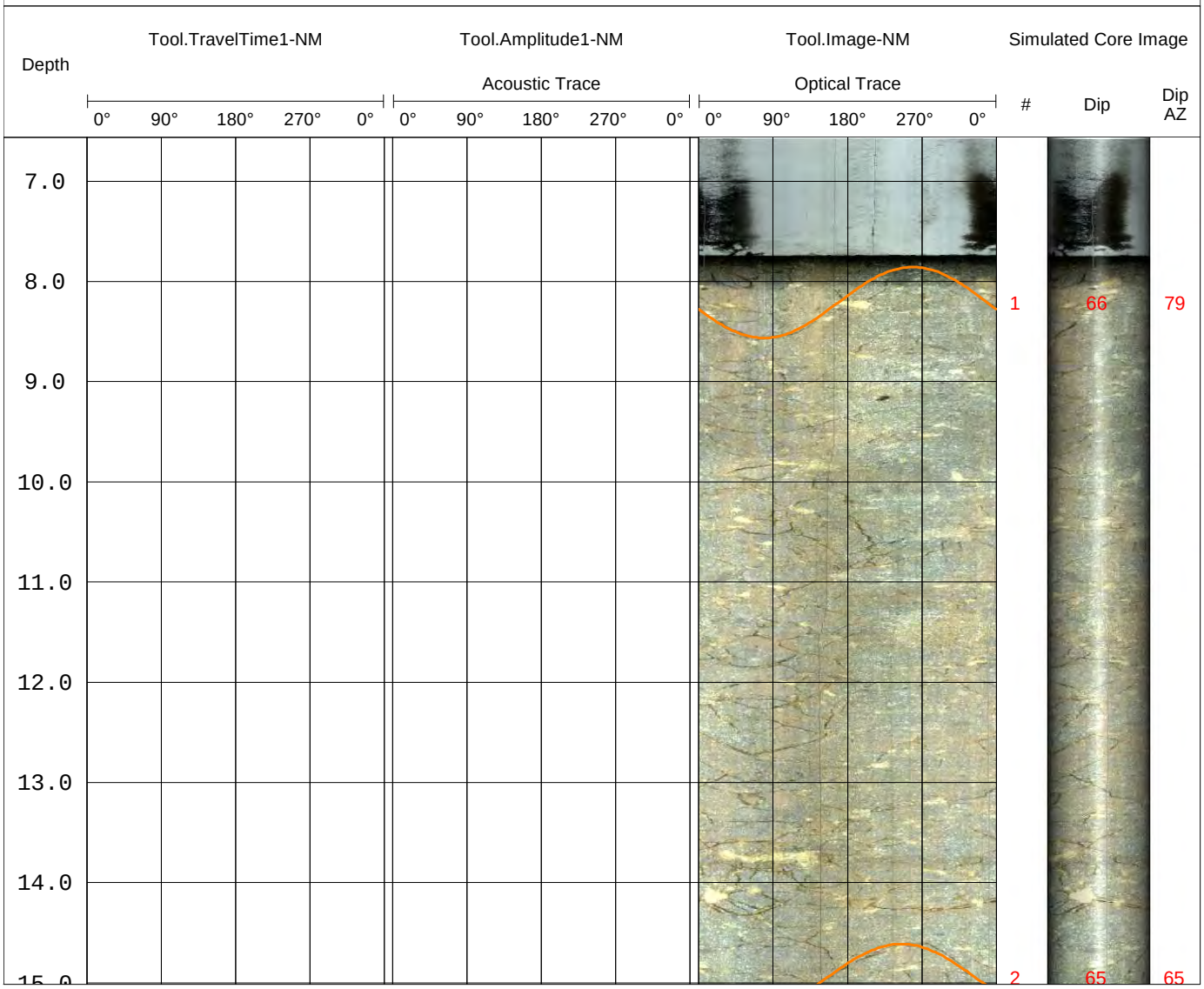

106.0
107.0
108.0
109.0
110.0
111.0
112.0
113.0
54
55
56
57
58
59
60
61
62
63
55
57
56
55
42
60
62
56
62
277
288
271
301
197
324
326
213
214

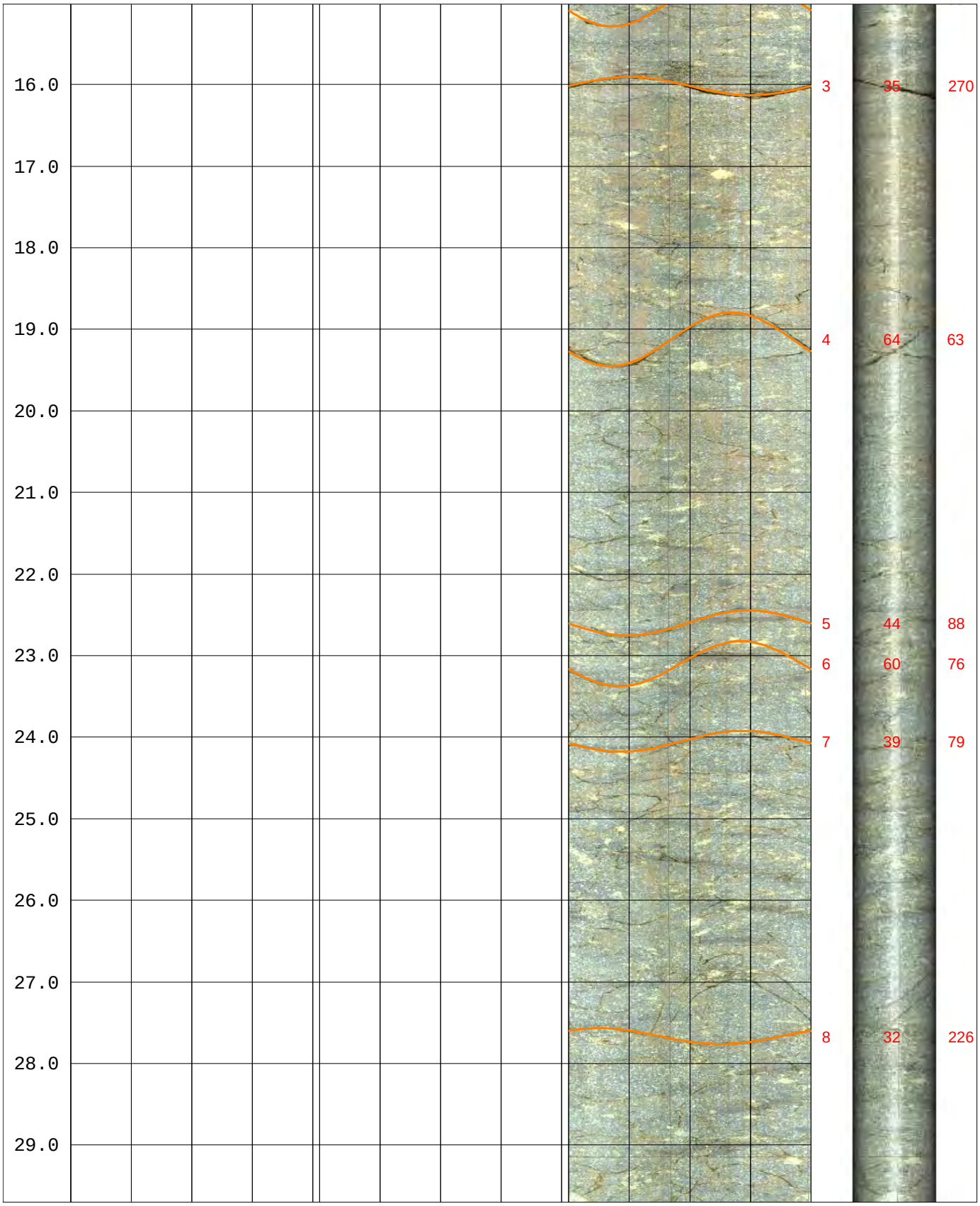
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2007 Geotechnical Program

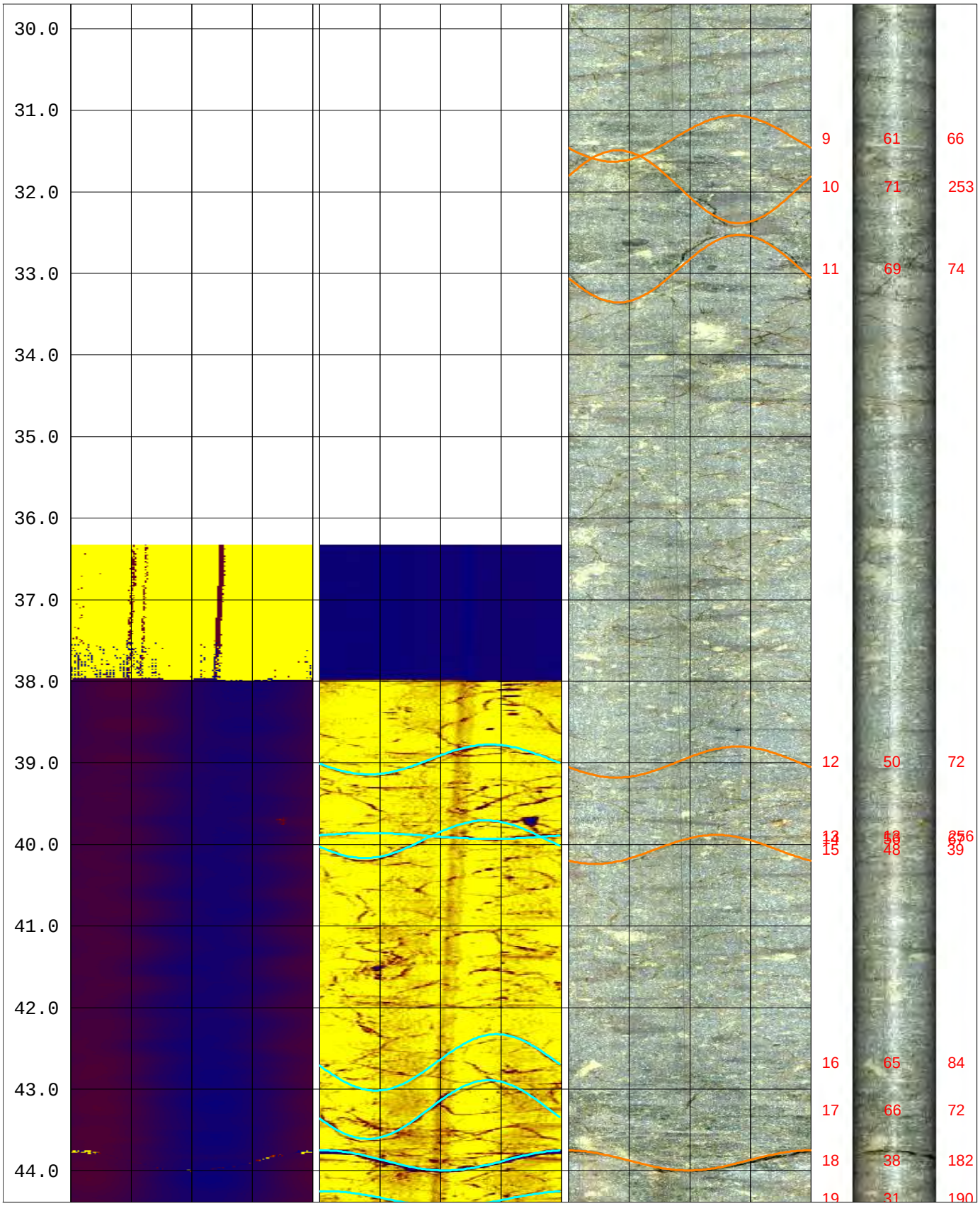
Date Logged:	September 22, 2007	Borehole ID:	RKS-18-07
File Name:	RKS1807-1M.wcl	Logged By:	F G Kruger

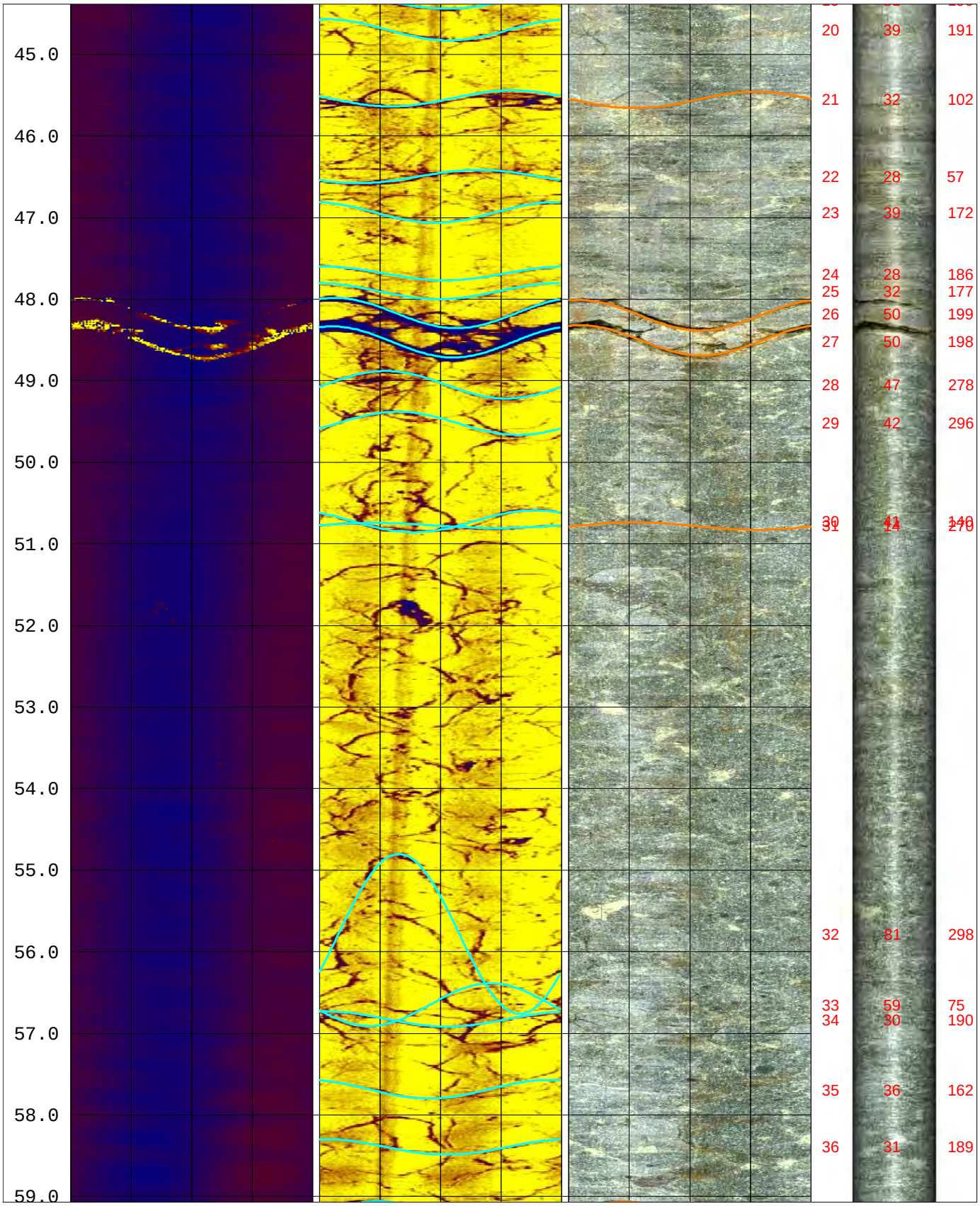
Notes:

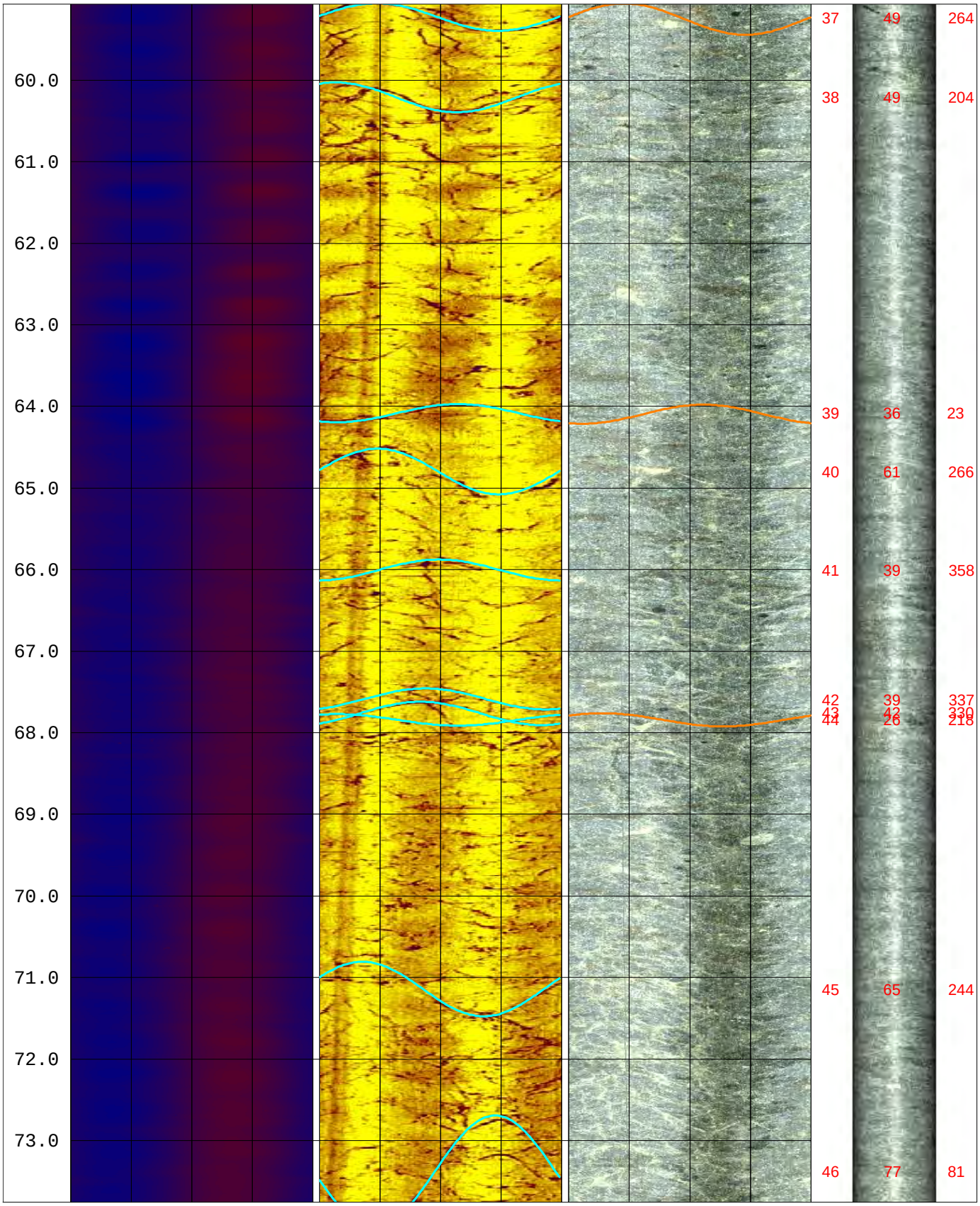
1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.

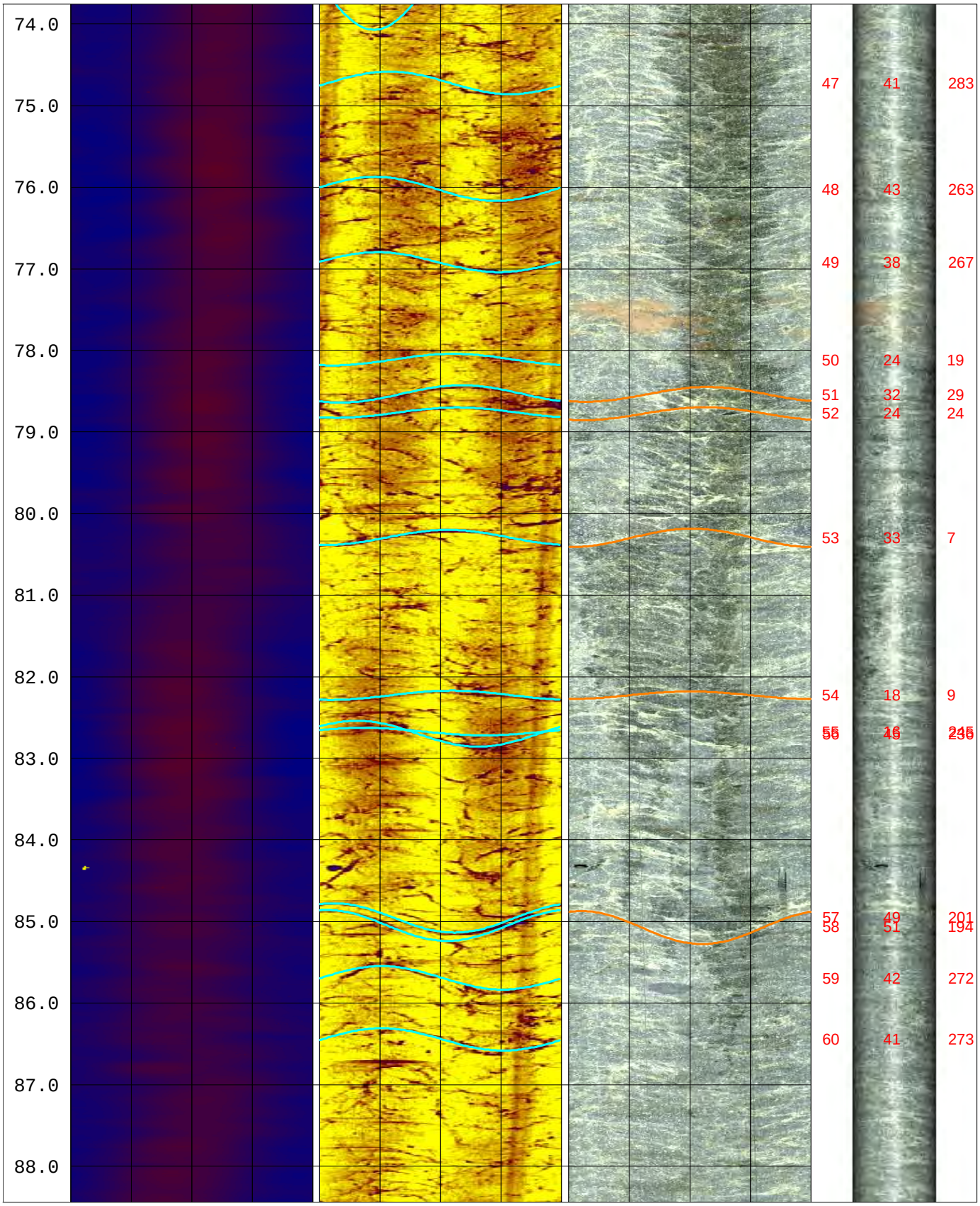


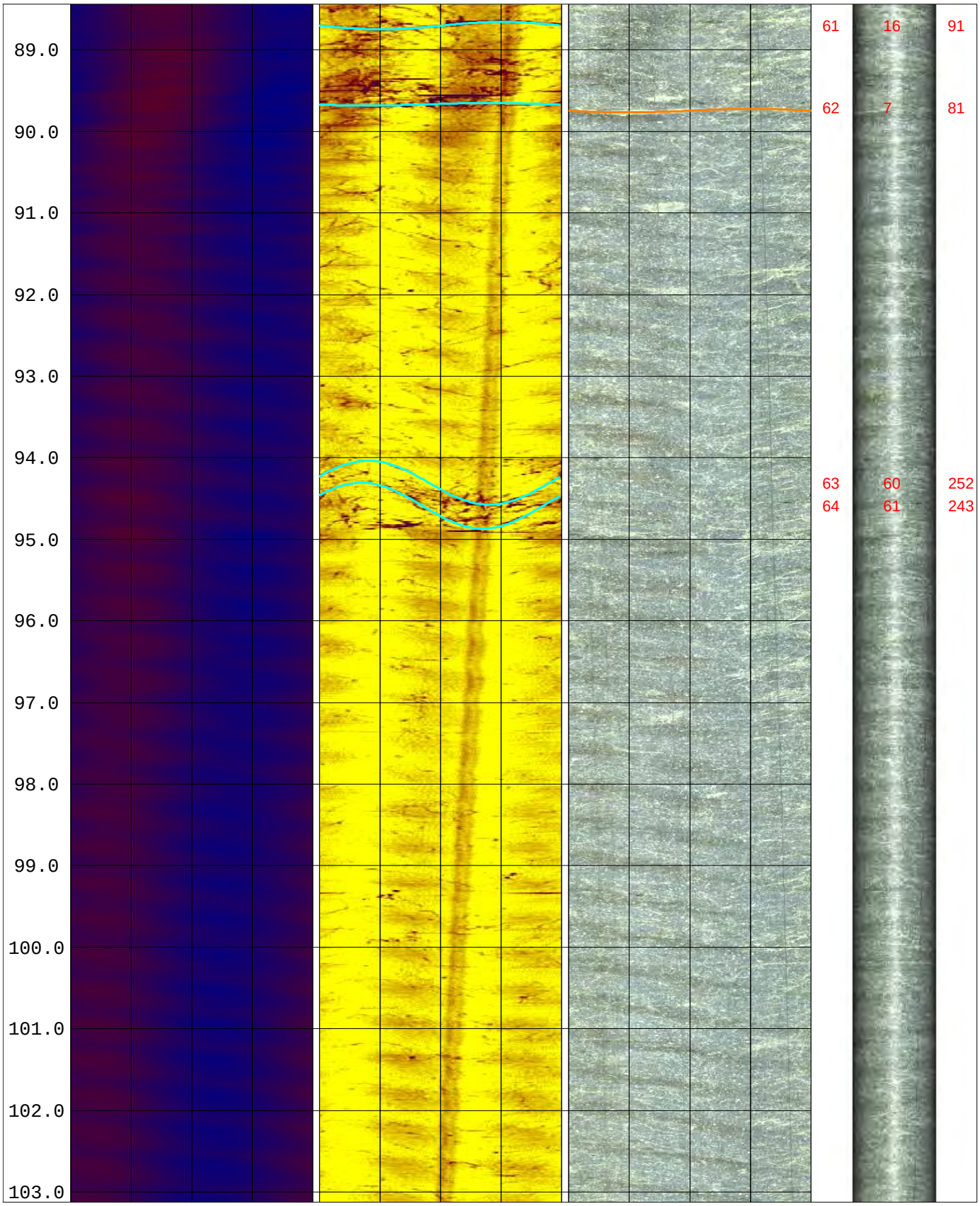

16.0
17.0
18.0
19.0
20.0
21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
3 35 270
4 64 63
5 44 88
6 60 76
7 39 79
8 32 226

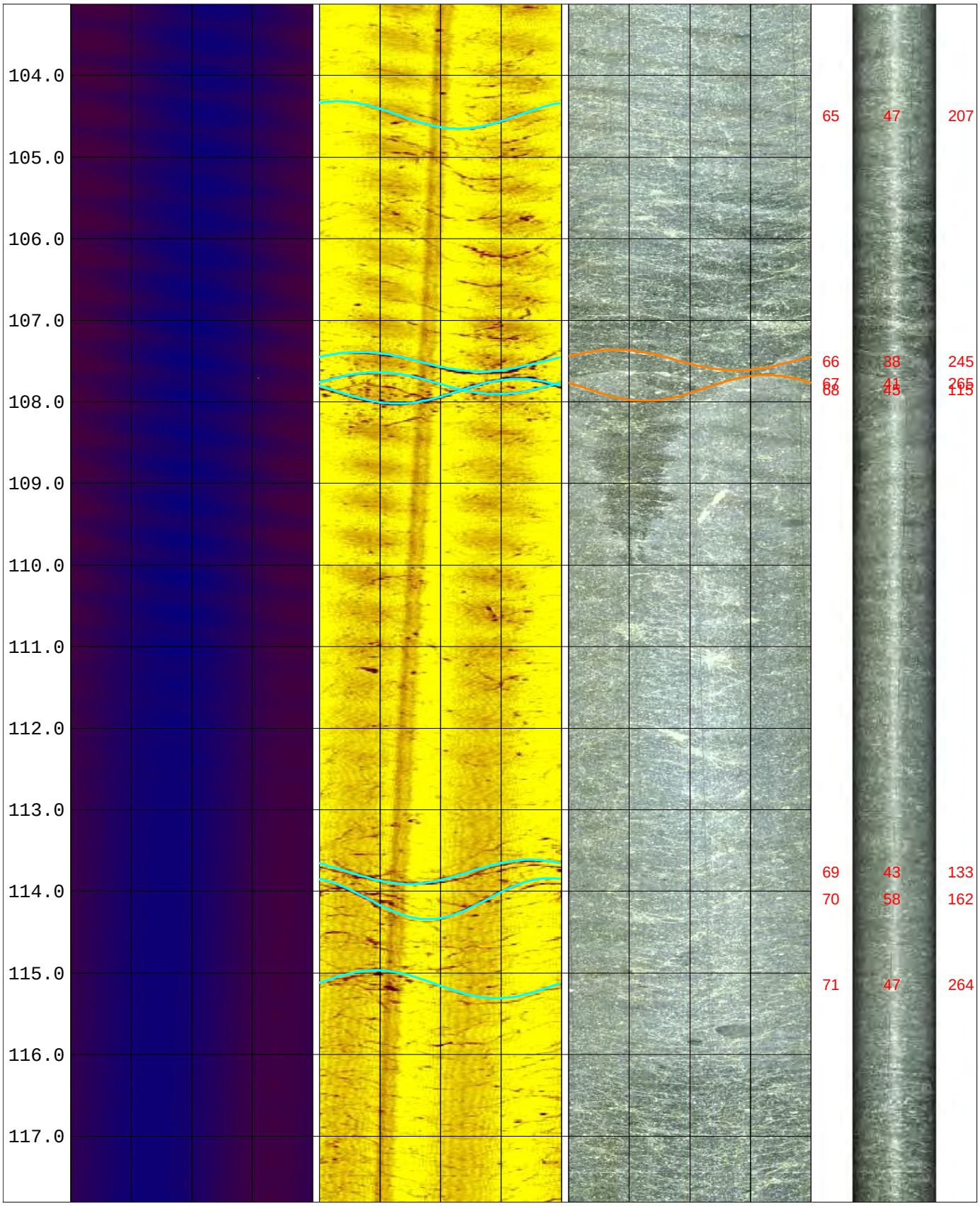

30.0
31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
9 61 66
10 71 253
11 69 74
12 50 72
12 256
15 48 39
16 65 84
17 66 72
18 38 182
19 31 190

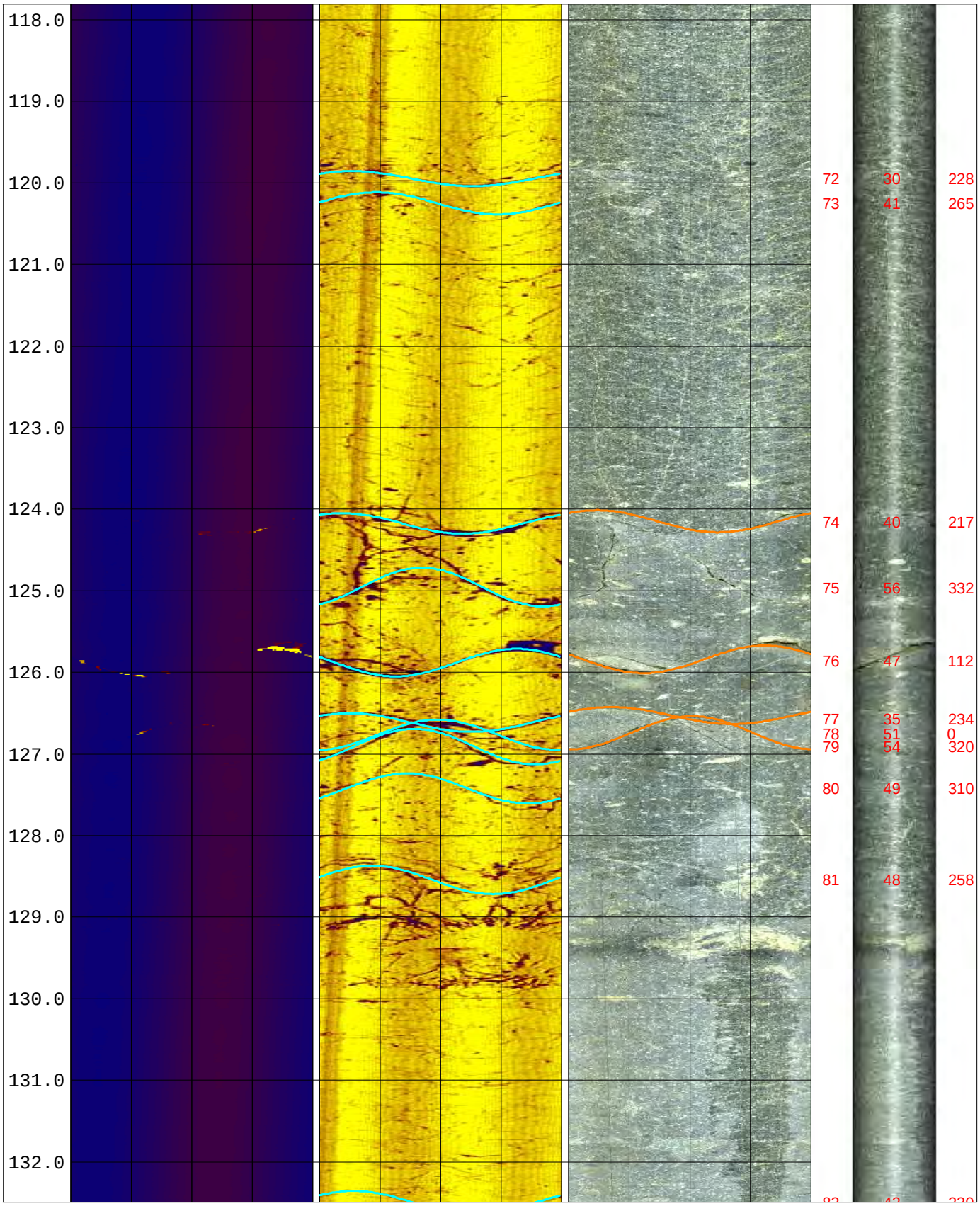

45.0
46.0
47.0
48.0
49.0
50.0
51.0
52.0
53.0
54.0
55.0
56.0
57.0
58.0
59.0
20 39 191
21 32 102
22 28 57
23 39 172
24 28 186
25 32 177
26 50 199
27 50 198
28 47 278
29 42 296
30 41 140
31 14 270
32 81 298
33 59 75
34 30 190
35 36 162
36 31 189

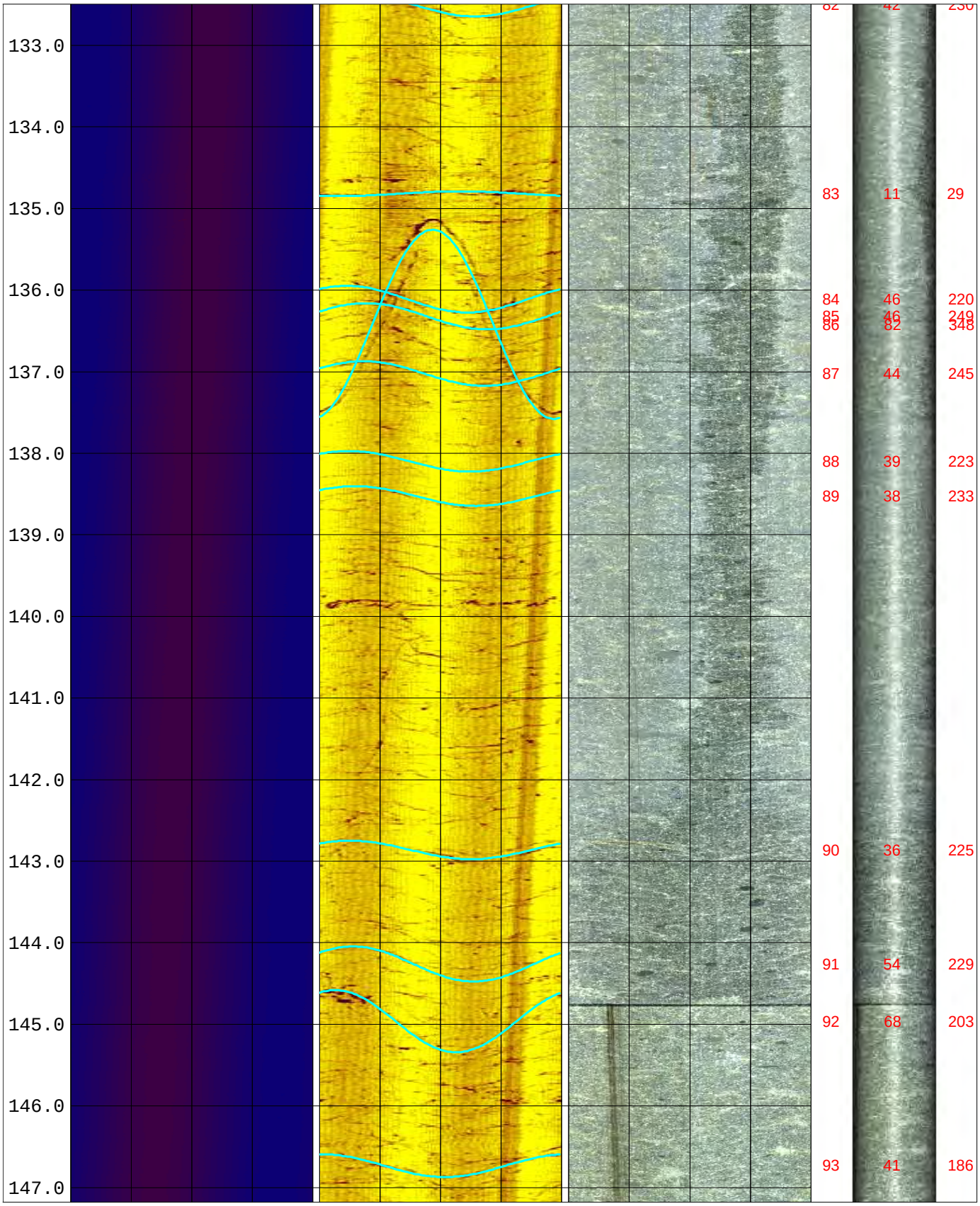

60.0
61.0
62.0
63.0
64.0
65.0
66.0
67.0
68.0
69.0
70.0
71.0
72.0
73.0
37 49 264
38 49 204
39 36 23
40 61 266
41 39 358
42 39 337
43 42 330
44 26 218
45 65 244
46 77 81

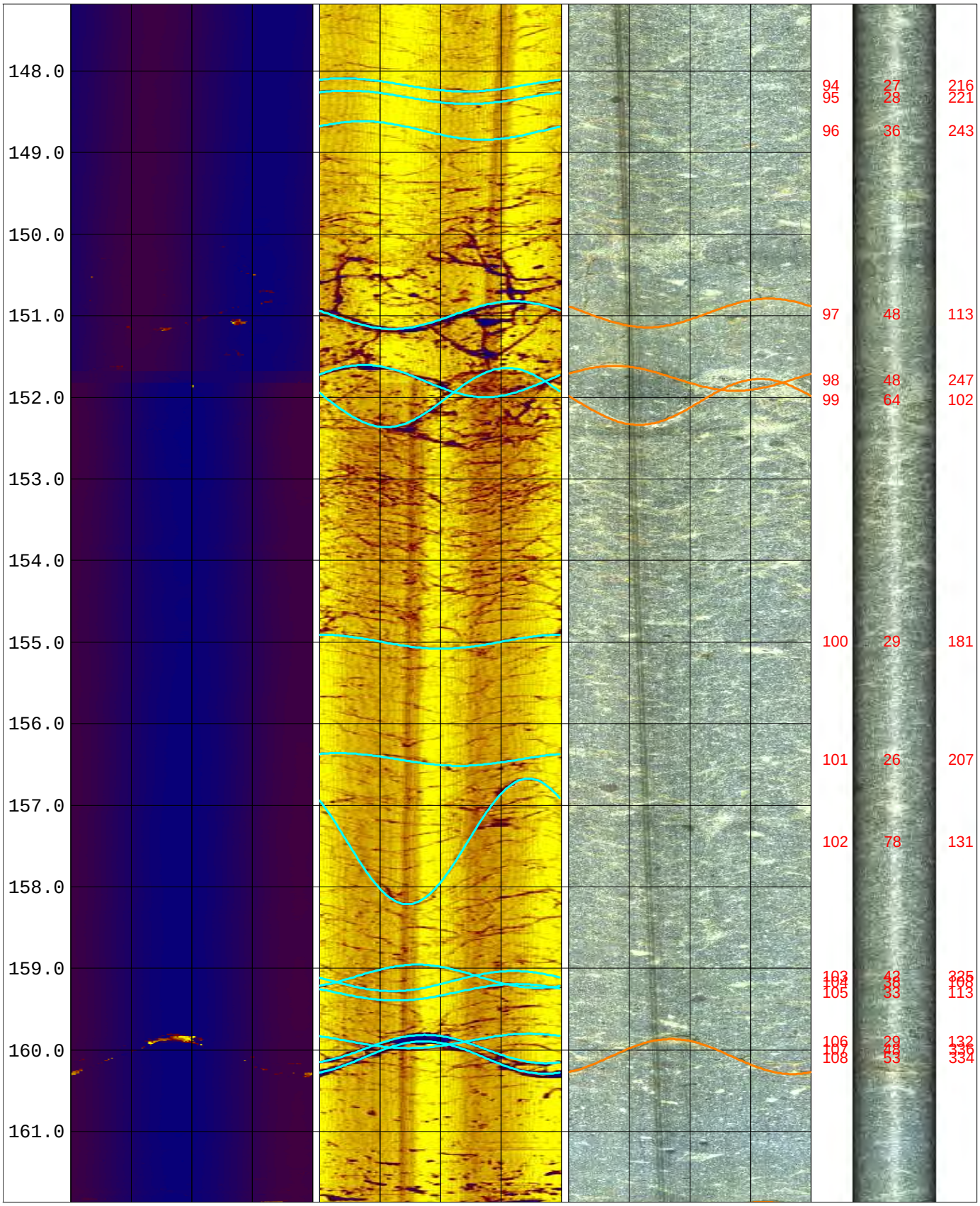

74.0
75.0
76.0
77.0
78.0
79.0
80.0
81.0
82.0
83.0
84.0
85.0
86.0
87.0
88.0
47 41 283
48 43 263
49 38 267
50 24 19
51 32 29
52 24 24
53 33 7
54 18 9
55 16 245
56 49 236
57 49 201
58 51 194
59 42 272
60 41 273

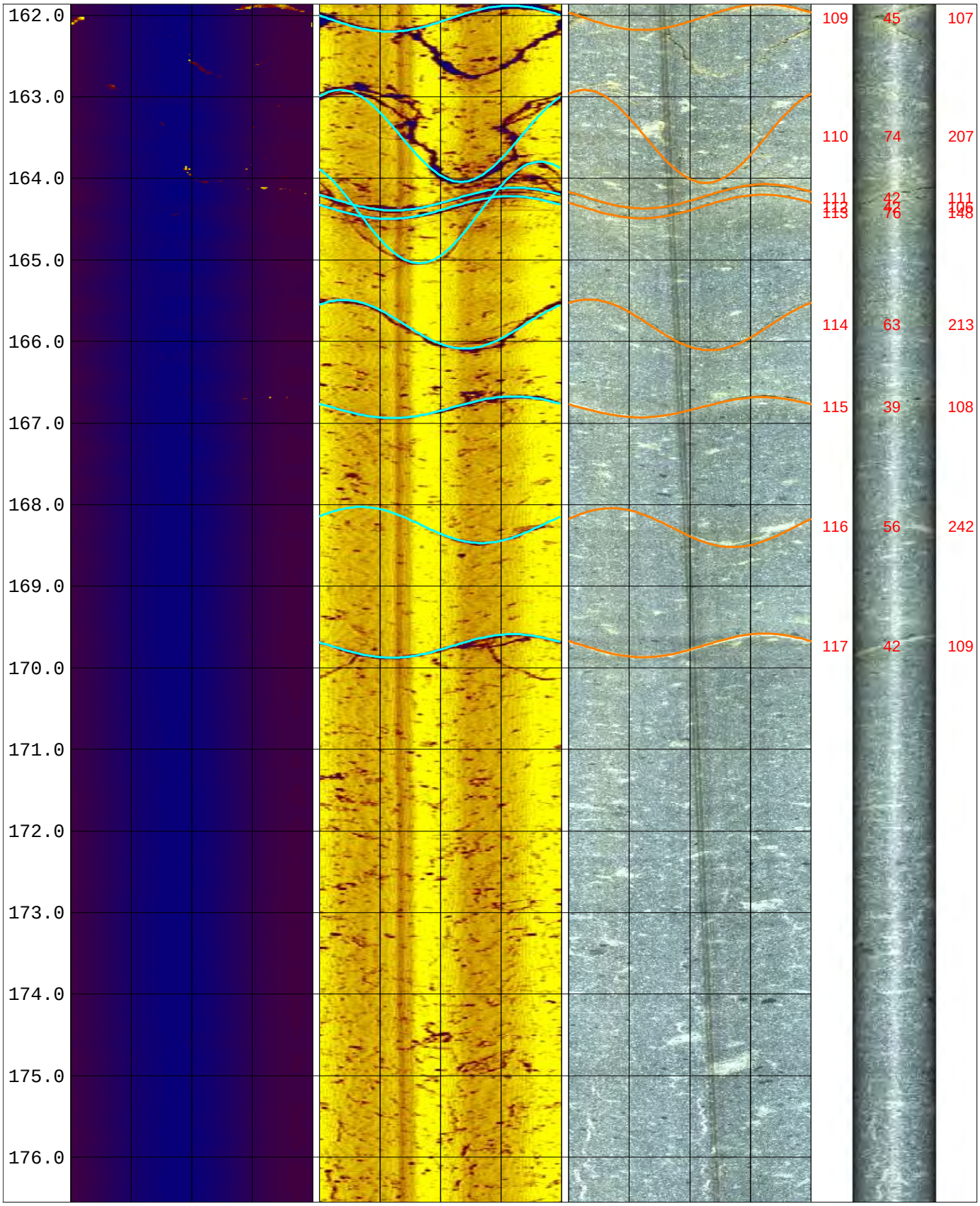

89.0
90.0
91.0
92.0
93.0
94.0
95.0
96.0
97.0
98.0
99.0
100.0
101.0
102.0
103.0
61 16 91
62 7 81
63 60 252
64 61 243

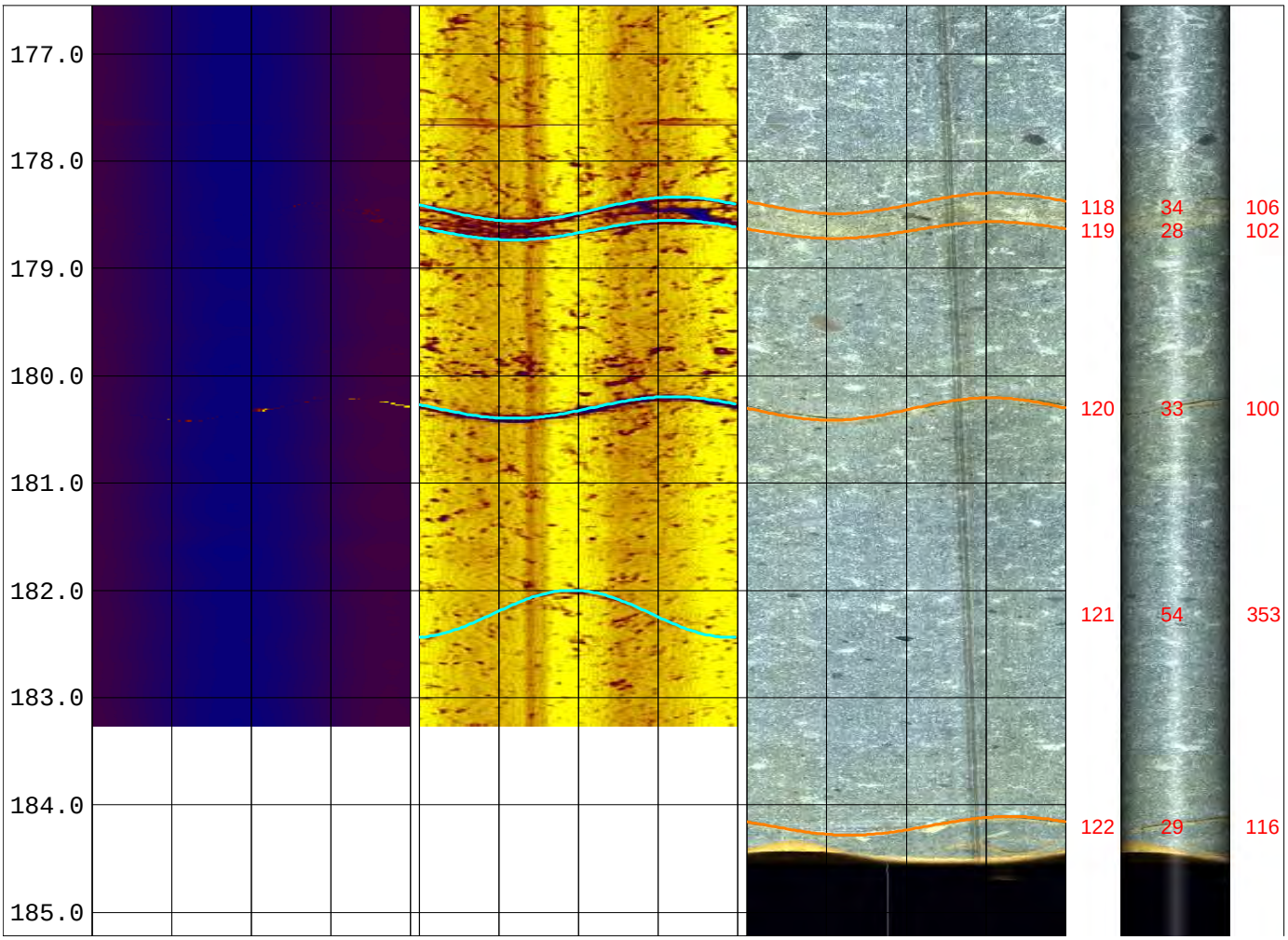

104.0
105.0
106.0
107.0
108.0
109.0
110.0
111.0
112.0
113.0
114.0
115.0
116.0
117.0
65 47 207
66 38 245
67 41 265
68 45 115
69 43 133
70 58 162
71 47 264


118.0
119.0
120.0
121.0
122.0
123.0
124.0
125.0
126.0
127.0
128.0
129.0
130.0
131.0
132.0
72 30 228
73 41 265
74 40 217
75 56 332
76 47 112
77 35 234
78 51 0
79 54 320
80 49 310
81 48 258


133.0
134.0
135.0
136.0
137.0
138.0
139.0
140.0
141.0
142.0
143.0
144.0
145.0
146.0
147.0
83 11 29
84 46 220
85 46 249
86 82 348
87 44 245
88 39 223
89 38 233
90 36 225
91 54 229
92 68 203
93 41 186


148.0
149.0
150.0
151.0
152.0
153.0
154.0
155.0
156.0
157.0
158.0
159.0
160.0
161.0
94 27 216
95 28 221
96 36 243
97 48 113
98 48 247
99 64 102
100 29 181
101 26 207
102 78 131
103 42 225
104 36 108
105 33 113
106 29 132
107 48 330
108 53 334


162.0
163.0
164.0
165.0
166.0
167.0
168.0
169.0
170.0
171.0
172.0
173.0
174.0
175.0
176.0
109 45 107
110 74 207
111 42 111
112 42 106
113 76 148
114 63 213
115 39 108
116 56 242
117 42 109

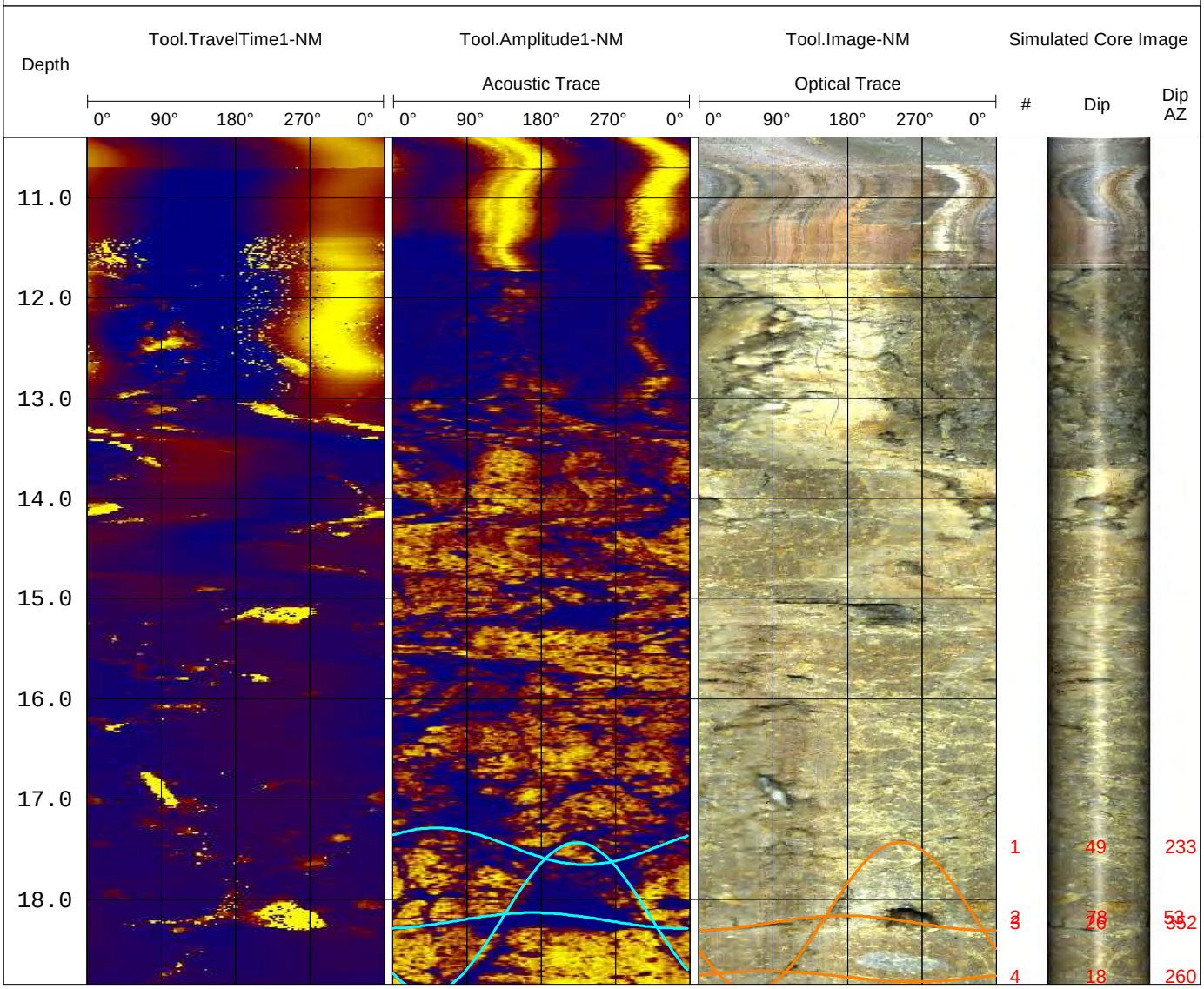

177.0
178.0
179.0
180.0
181.0
182.0
183.0
184.0
185.0
118 34 106
119 28 102
120 33 100
121 54 353
122 29 116

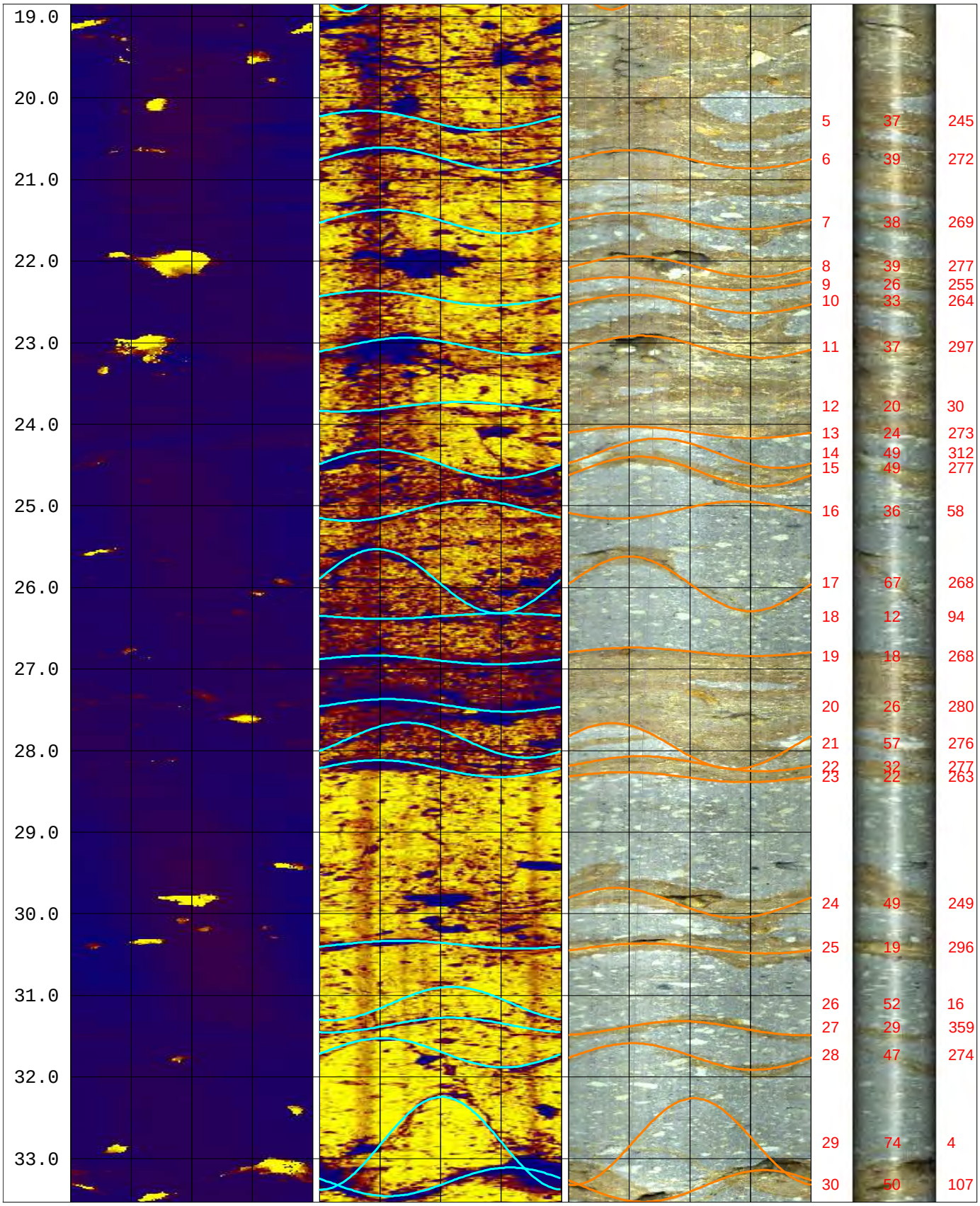
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2007 Geotechnical Program

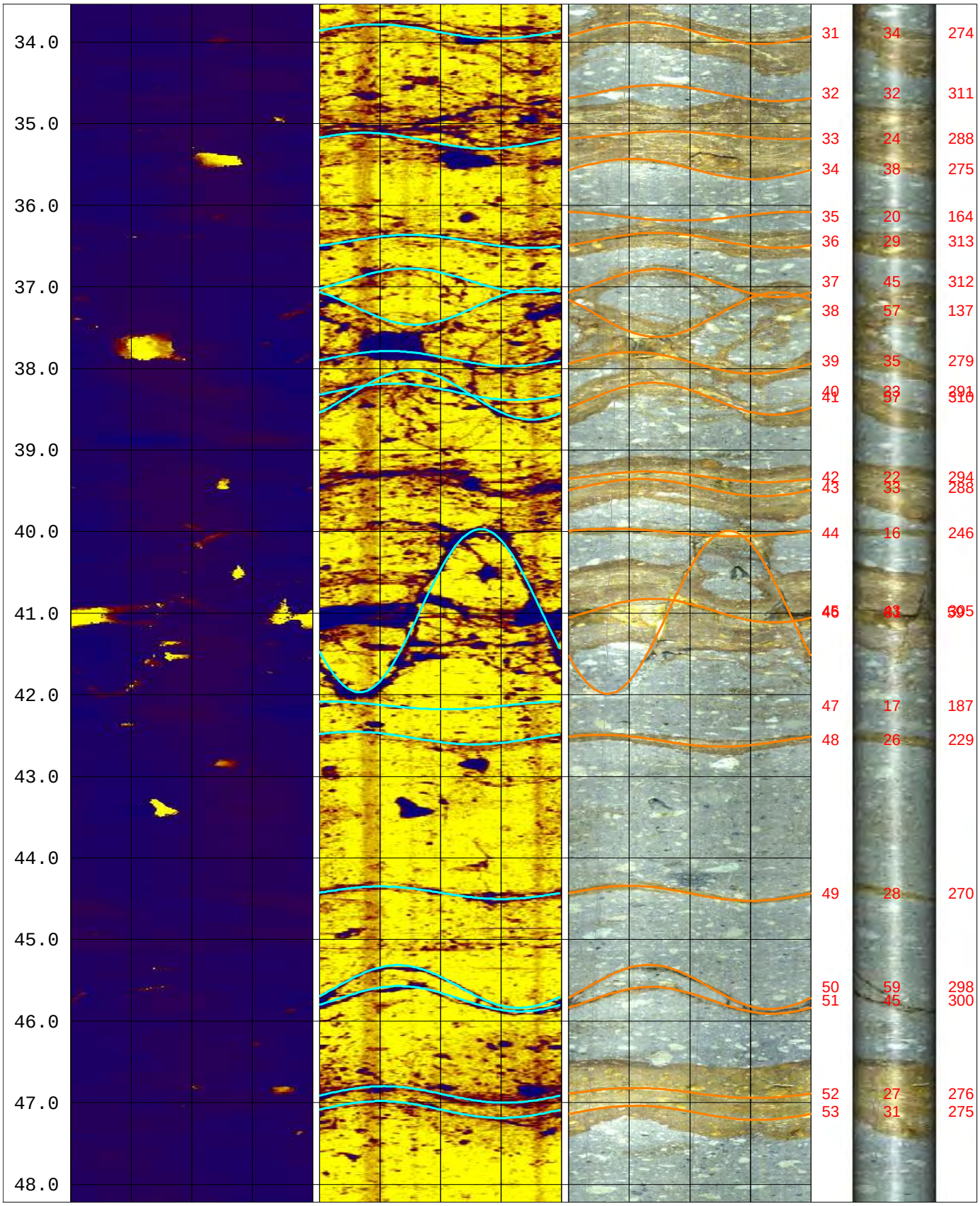
Date Logged:	September 21, 2007	Borehole ID:	RKS-19-07
File Name:	RKS1907-1M.wcl	Logged By:	F G Kruger

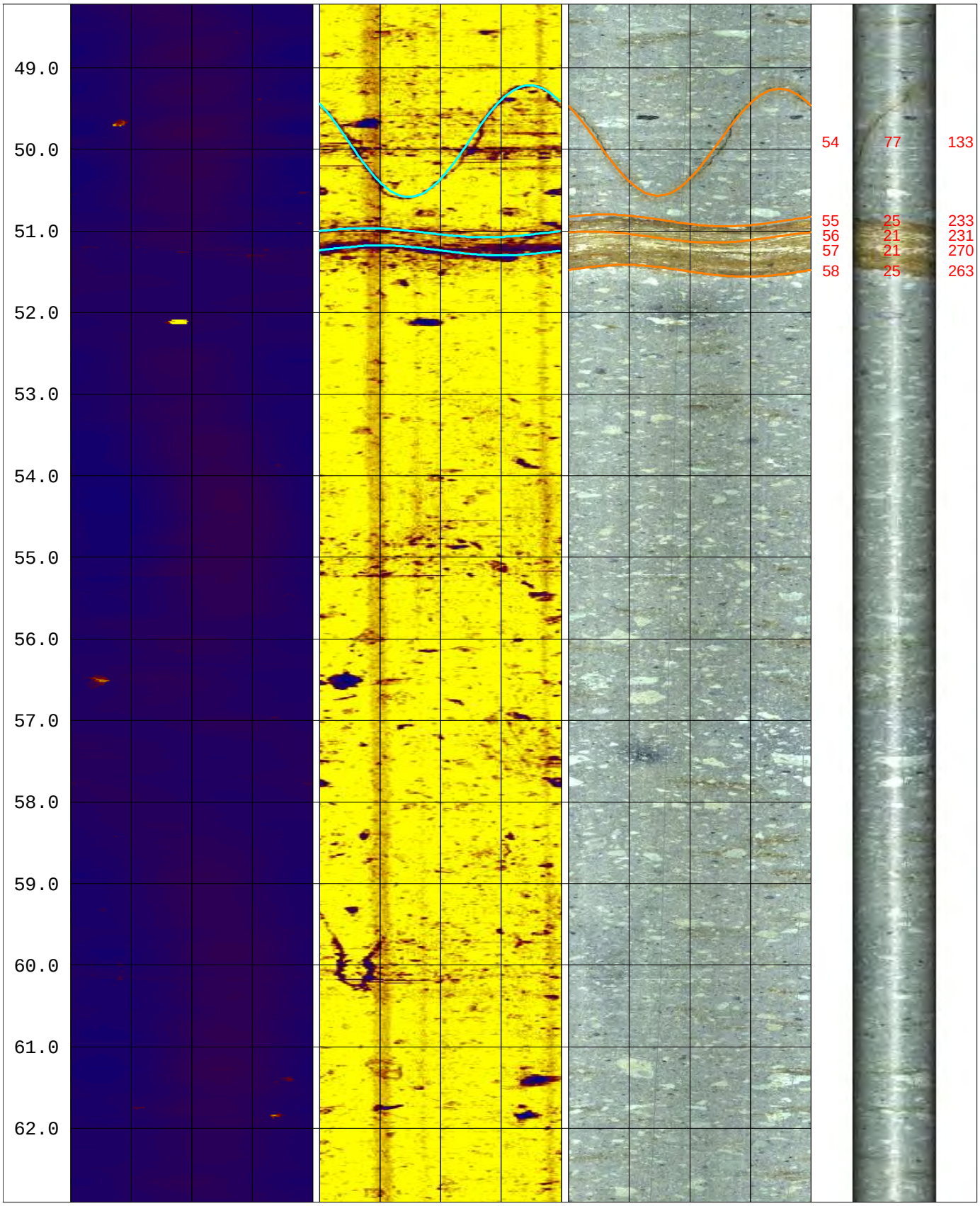
Notes:

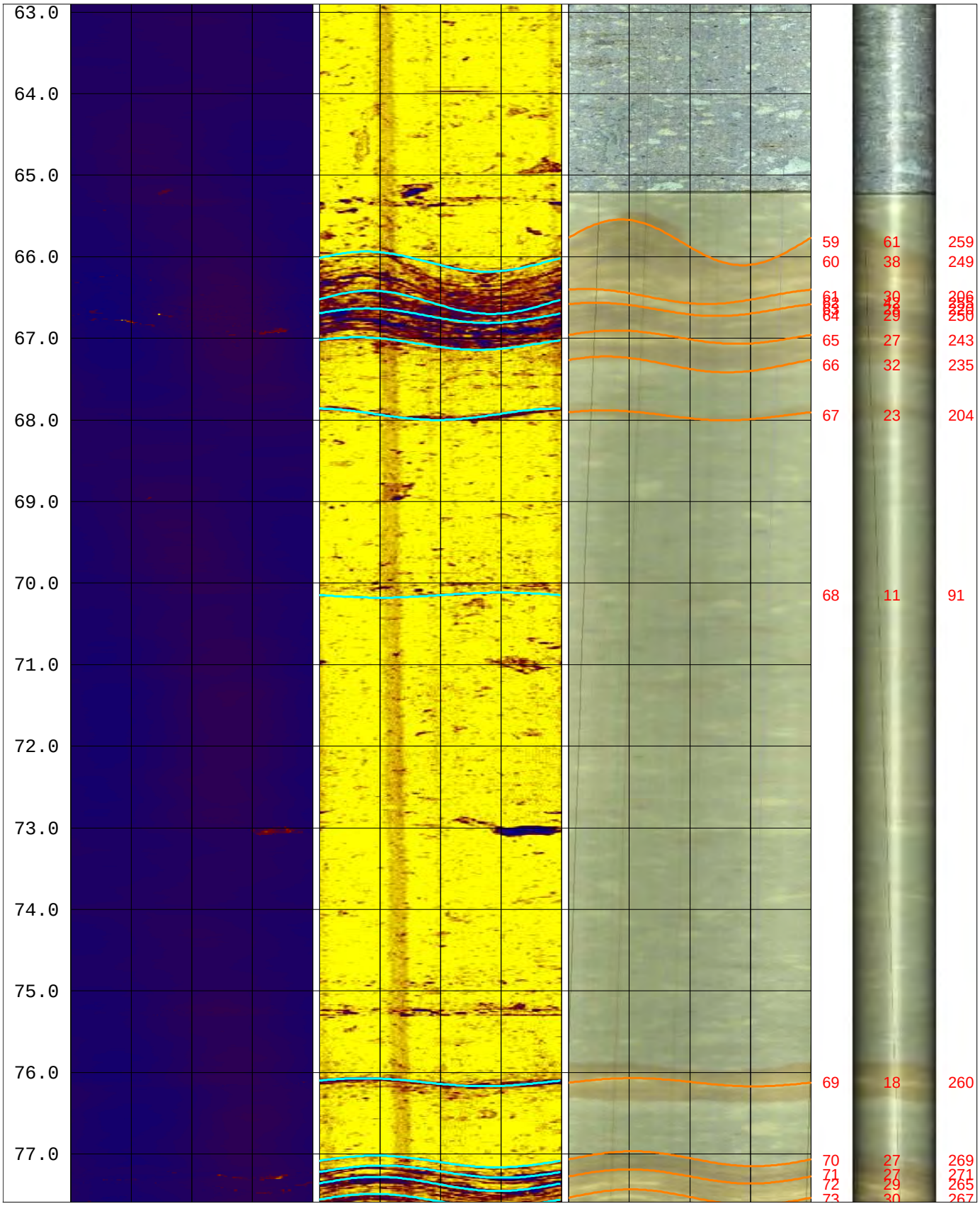
1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.

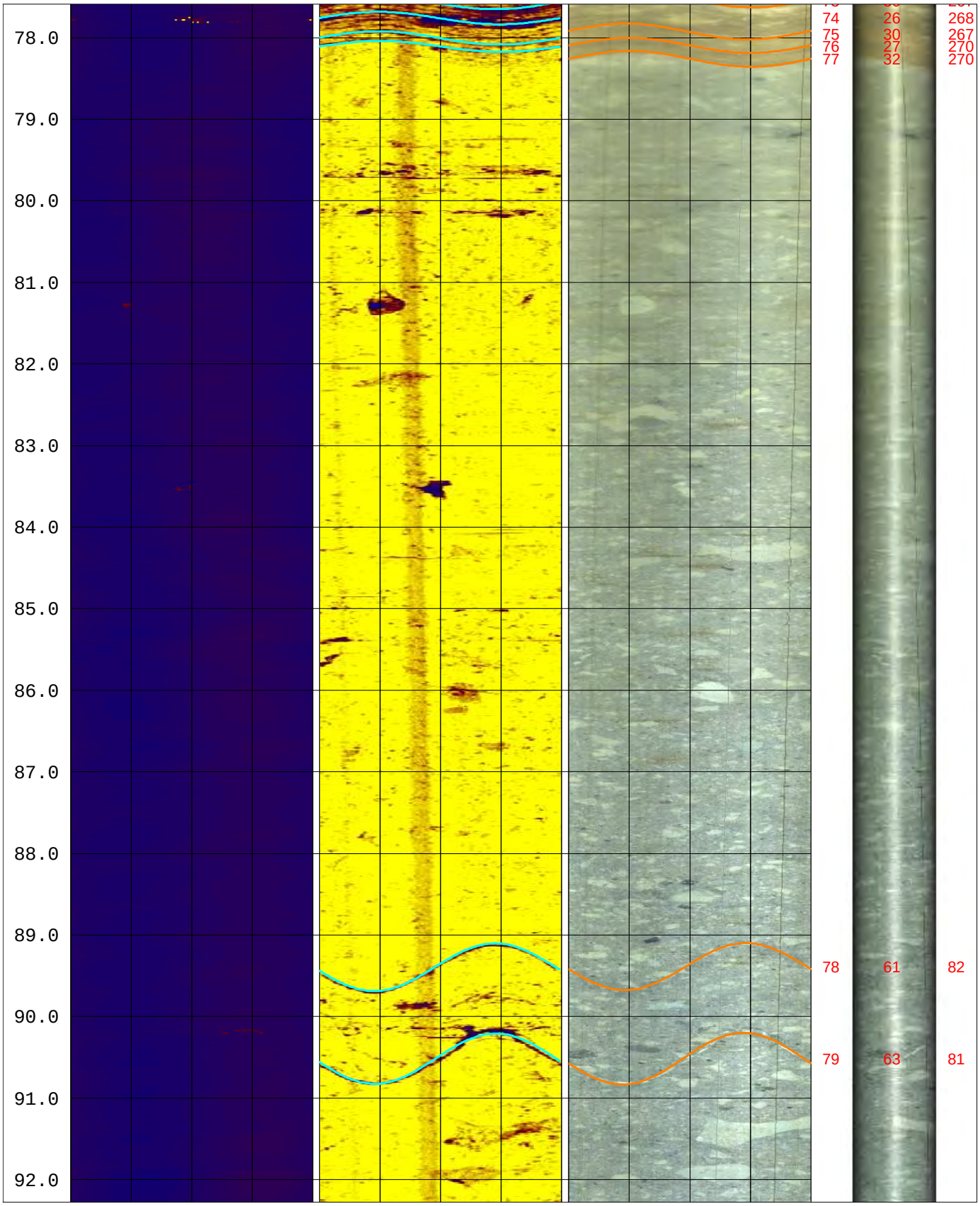


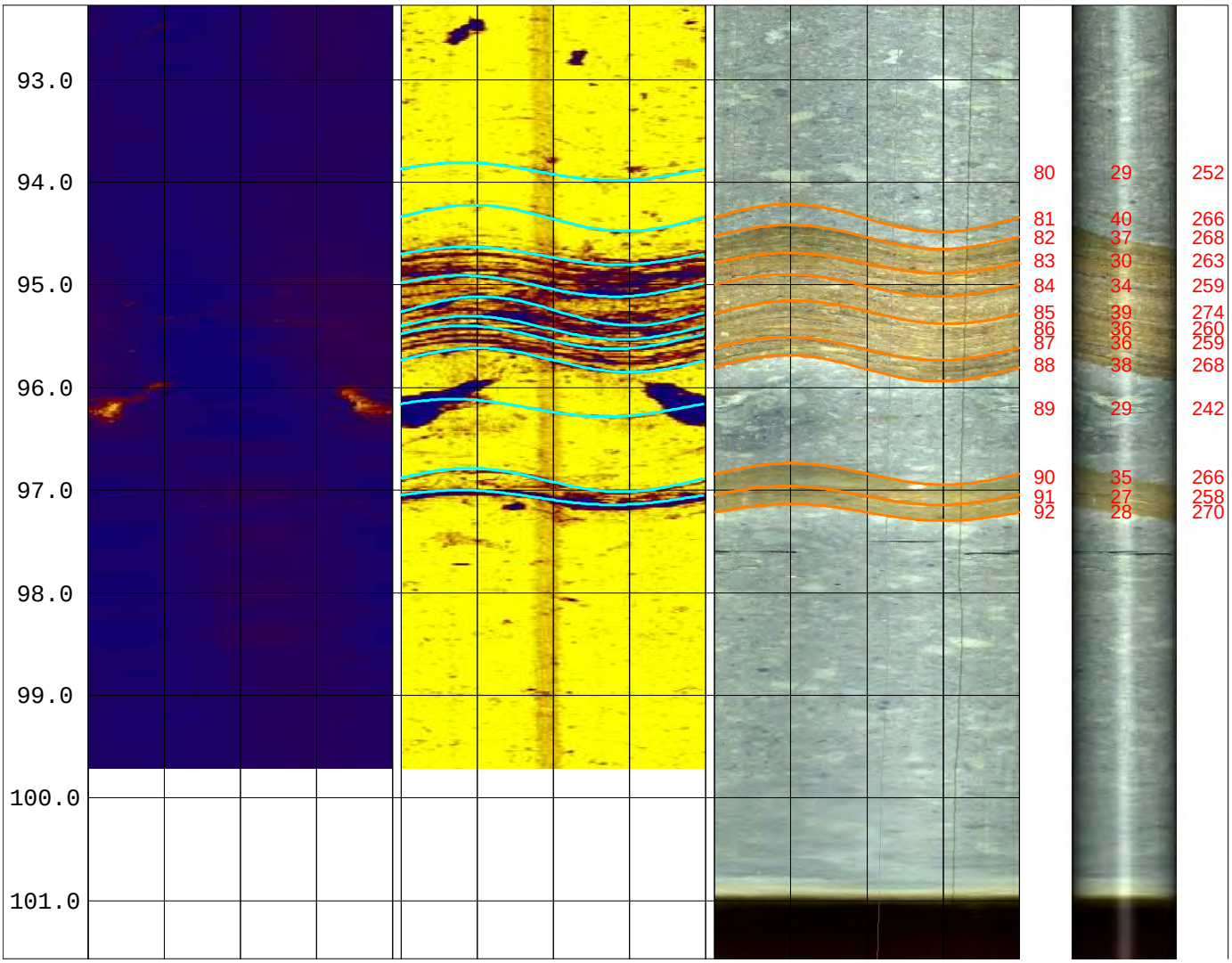

19.0
20.0
21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
30.0
31.0
32.0
33.0
5 37 245
6 39 272
7 38 269
8 39 277
9 26 255
10 33 264
11 37 297
12 20 30
13 24 273
14 49 312
15 49 277
16 36 58
17 67 268
18 12 94
19 18 268
20 26 280
21 57 276
22 32 277
23 22 263
24 49 249
25 19 296
26 52 16
27 29 359
28 47 274
29 74 4
30 50 107


34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
45.0
46.0
47.0
48.0
31 34 274
32 32 311
33 24 288
34 38 275
35 20 164
36 29 313
37 45 312
38 57 137
39 35 279
40 23 291
41 57 310
42 22 294
43 33 288
44 16 246
45 63 305
46 59
47 17 187
48 26 229
49 28 270
50 59 298
51 45 300
52 27 276
53 31 275


49.0
50.0
51.0
52.0
53.0
54.0
55.0
56.0
57.0
58.0
59.0
60.0
61.0
62.0
54 77 133
55 25 233
56 21 231
57 21 270
58 25 263


63.0
64.0
65.0
66.0
67.0
68.0
69.0
70.0
71.0
72.0
73.0
74.0
75.0
76.0
77.0
59 61 259
60 38 249
61 30 206
64 29 250
65 27 243
66 32 235
67 23 204
68 11 91
69 18 260
70 27 269
71 27 271
72 29 265
73 30 267


78.0
79.0
80.0
81.0
82.0
83.0
84.0
85.0
86.0
87.0
88.0
89.0
90.0
91.0
92.0
74 26 268
75 30 267
76 27 270
77 32 270
78 61 82
79 63 81

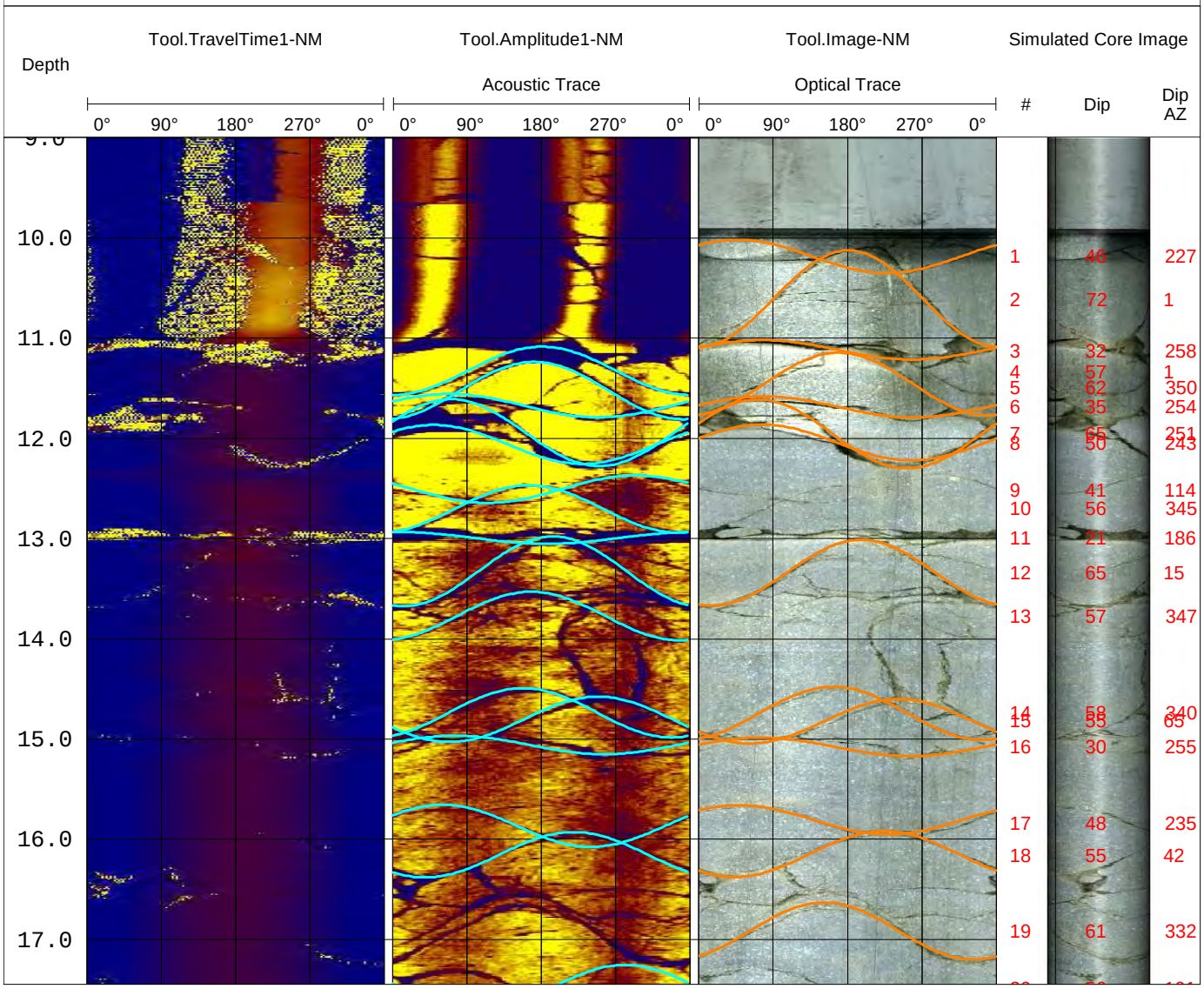

93.0
94.0
95.0
96.0
97.0
98.0
99.0
100.0
101.0
80 29 252
81 40 266
82 37 268
83 30 263
84 34 259
85 39 274
86 36 260
87 36 259
88 38 268
89 29 242
90 35 266
91 27 258
92 28 270

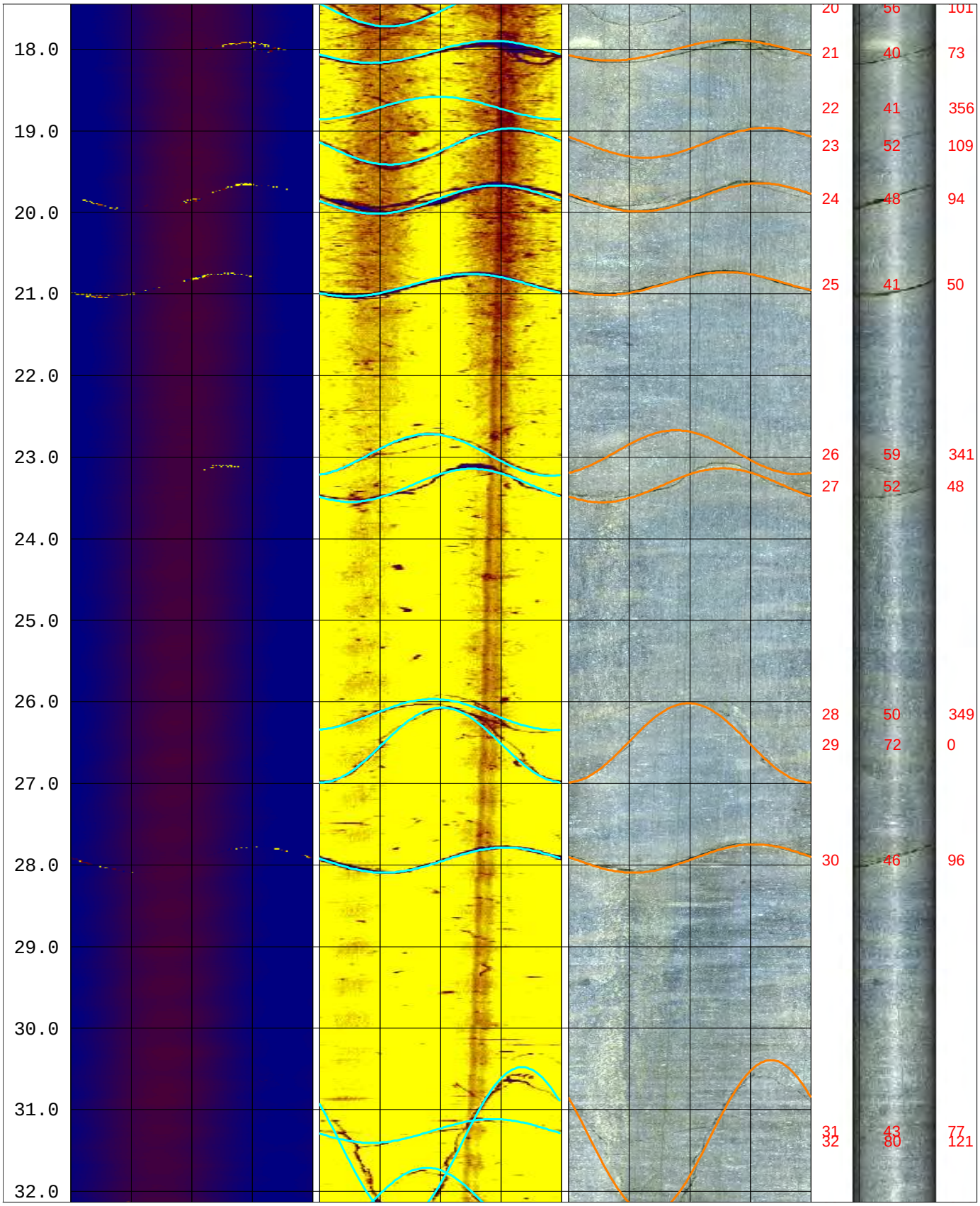
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2008 Geotechnical Program

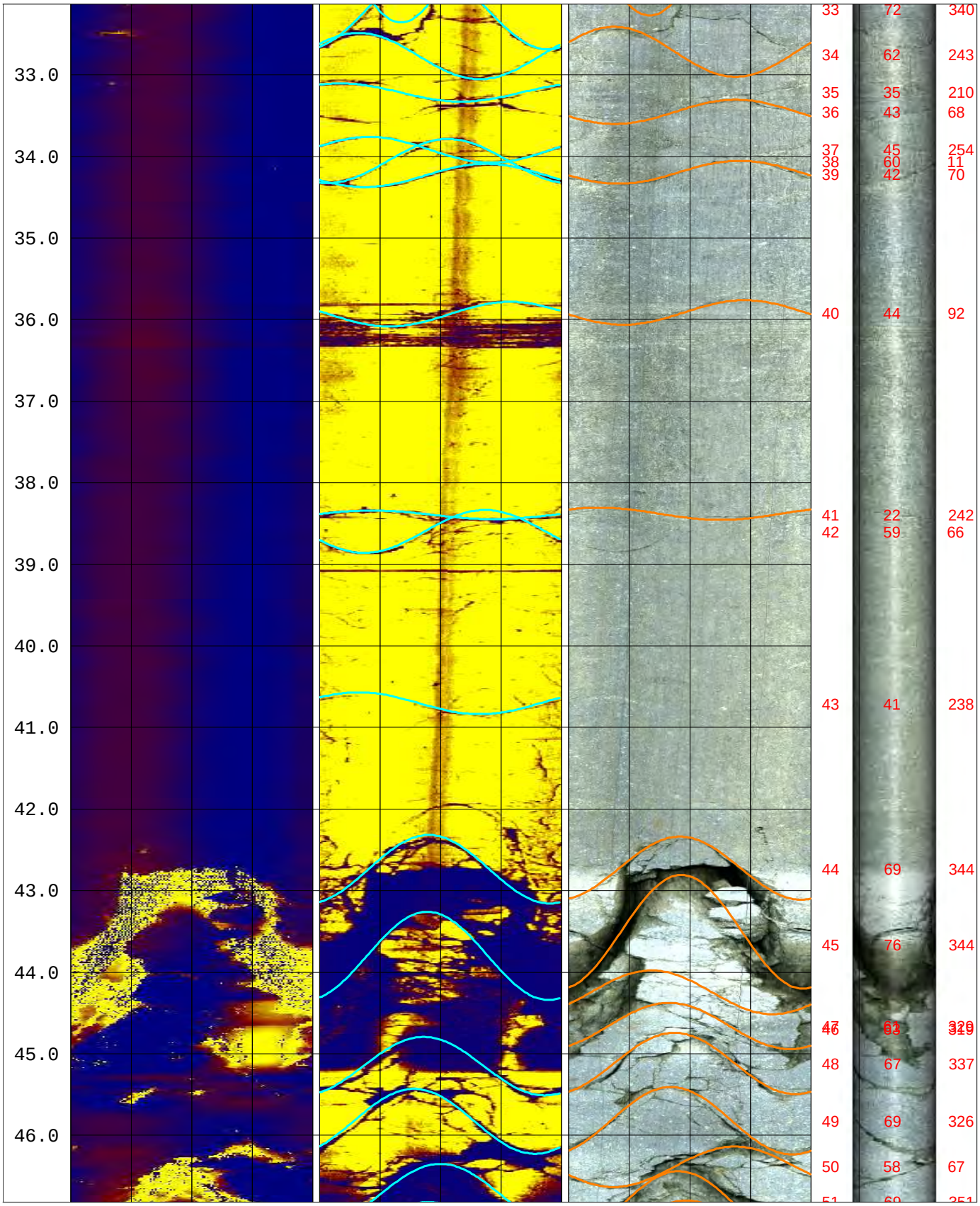
Date Logged:	October 25, 2008	Borehole ID:	RKS-38-08
File Name:	RKS3808-1M.wcl	Logged By:	F G Kruger

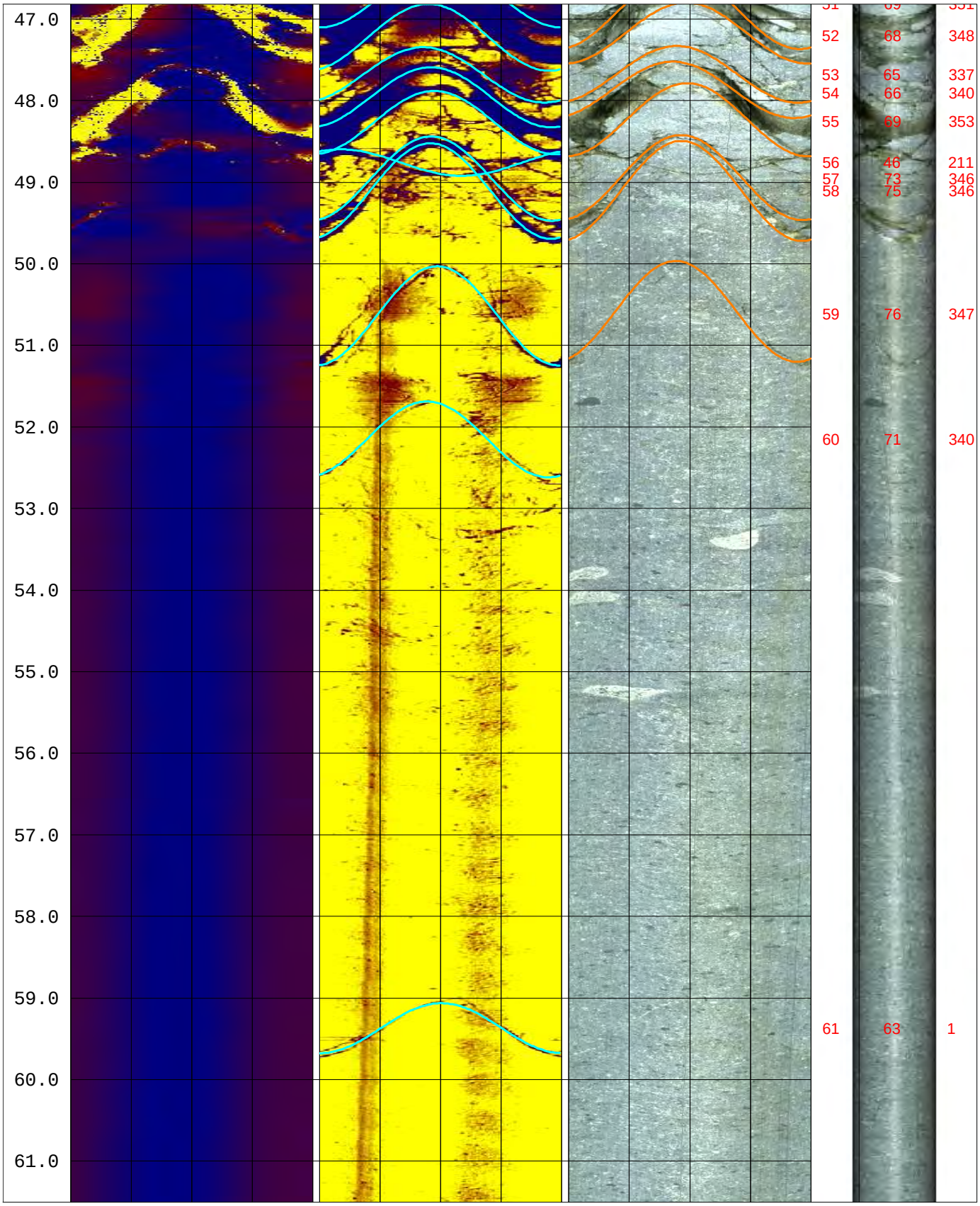
Notes:

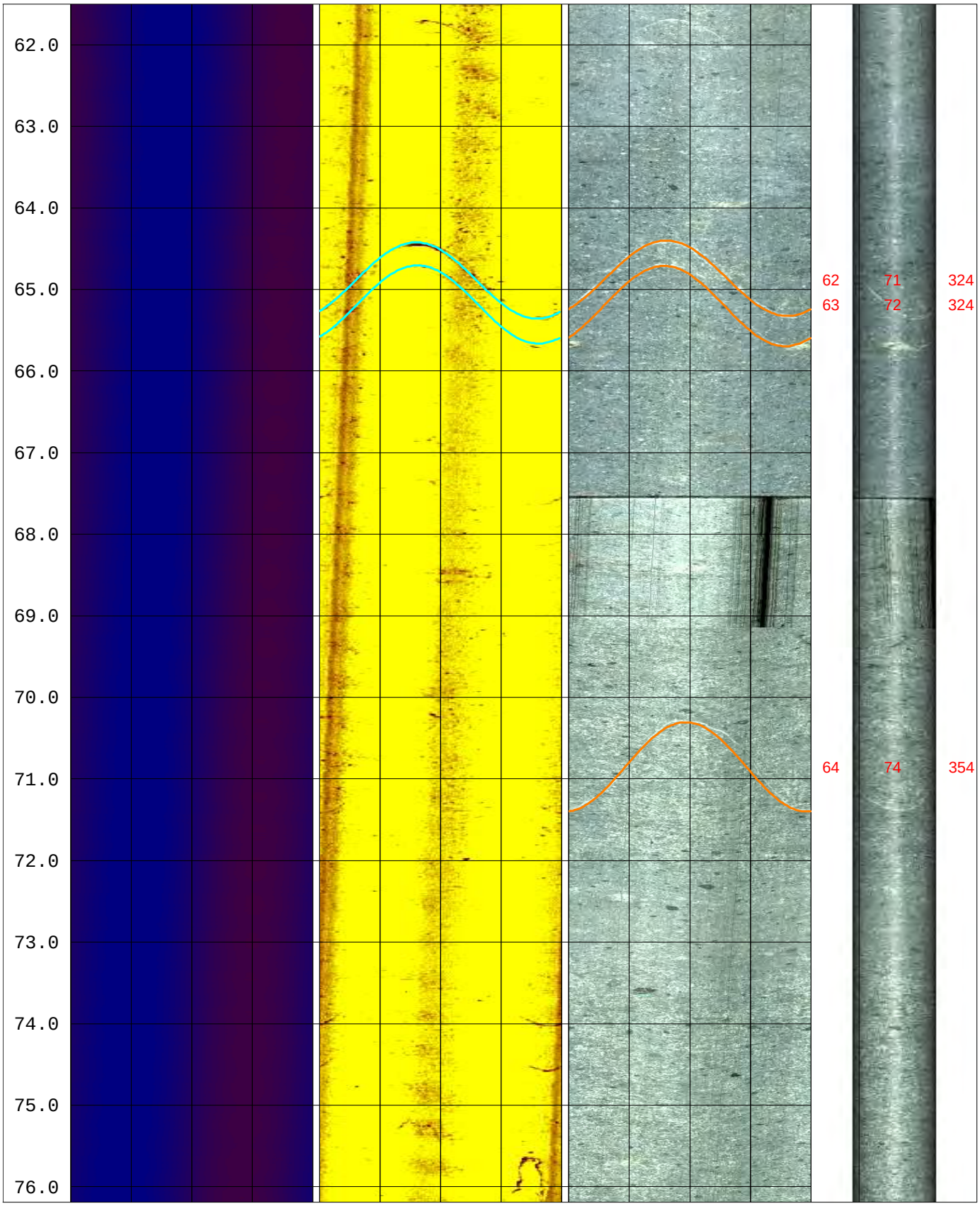
1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.

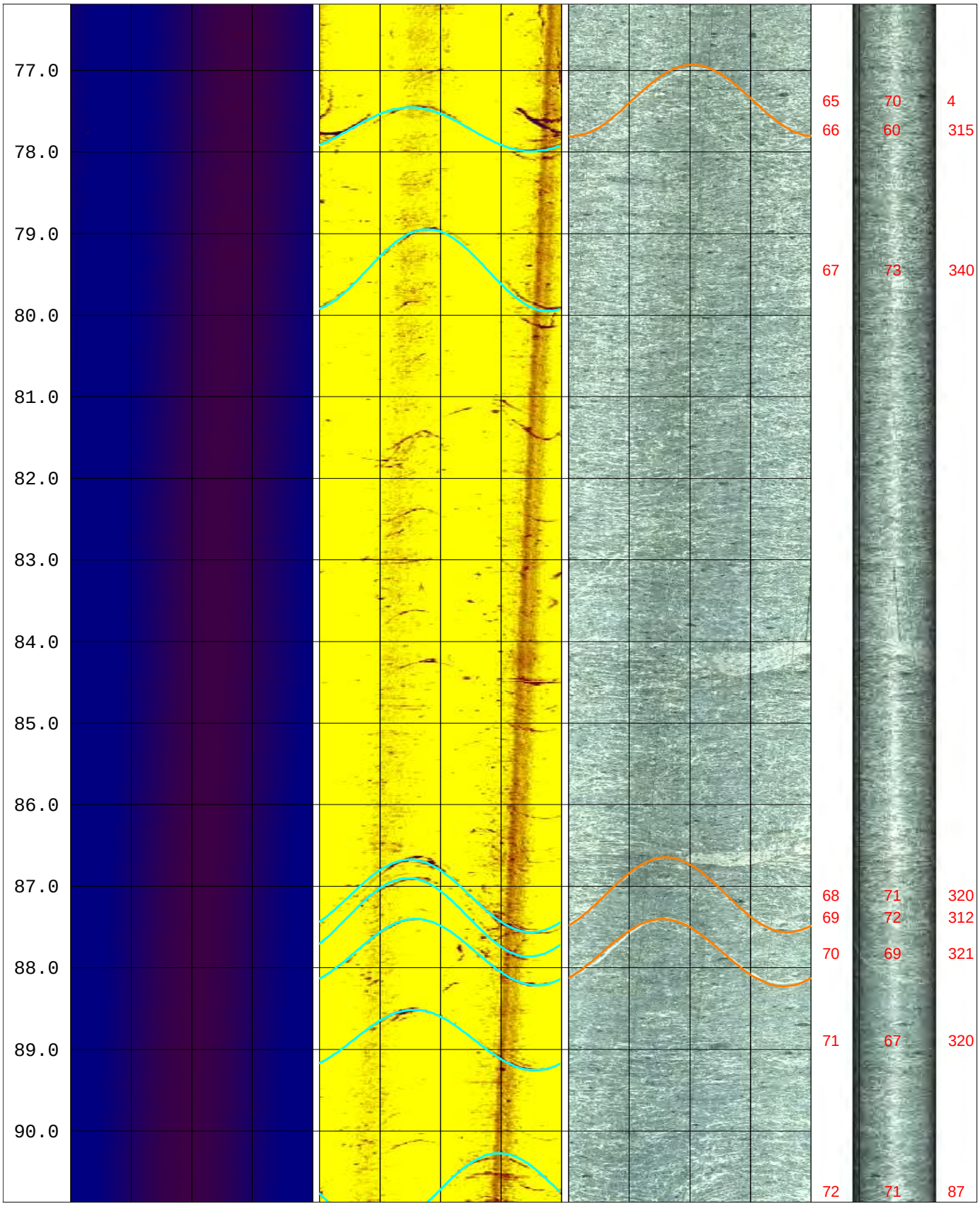


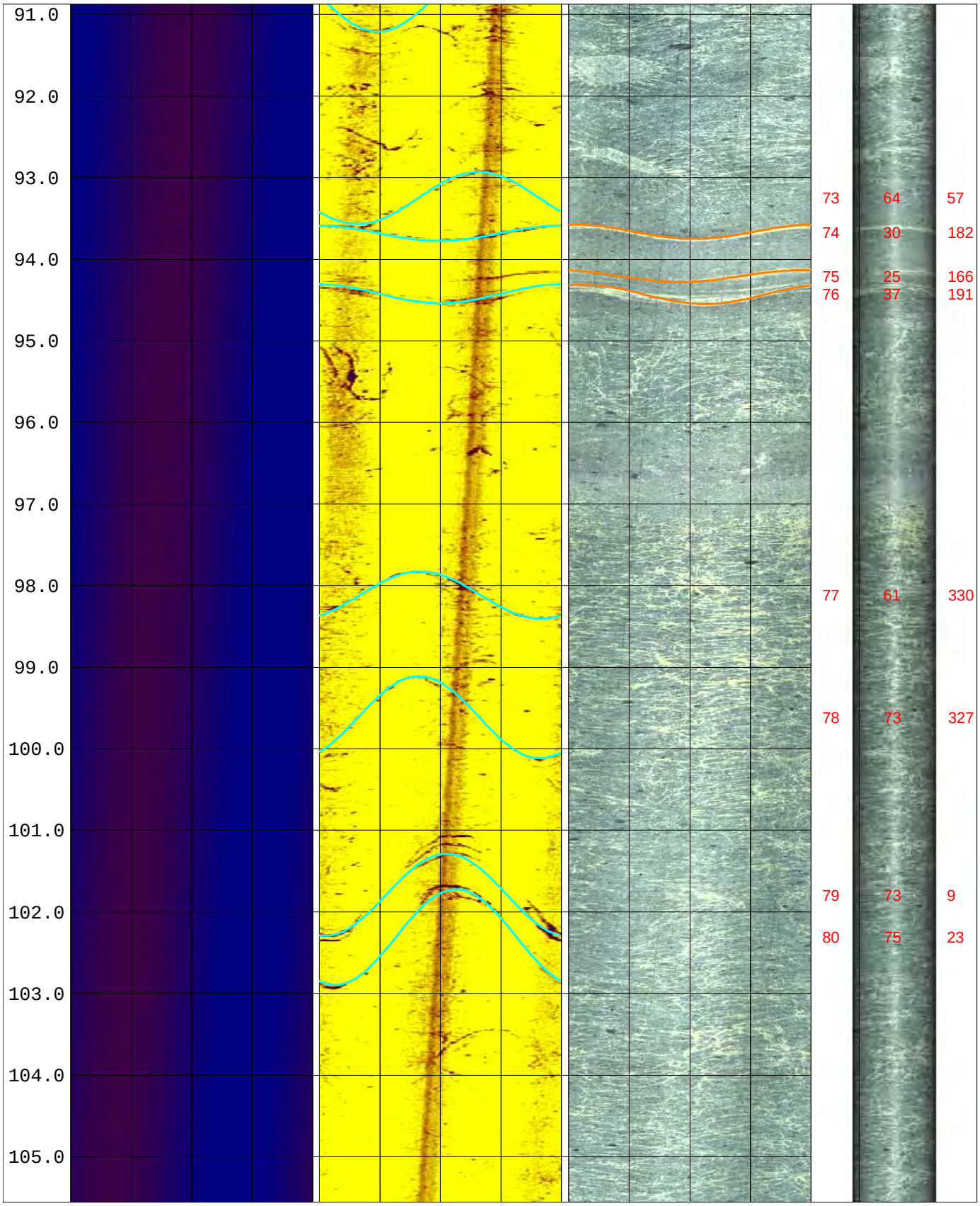

18.0
19.0
20.0
21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
30.0
31.0
32.0
20 56 101
21 40 73
22 41 356
23 52 109
24 48 94
25 41 50
26 59 341
27 52 48
28 50 349
29 72 0
30 46 96
31 43 77
32 80 121

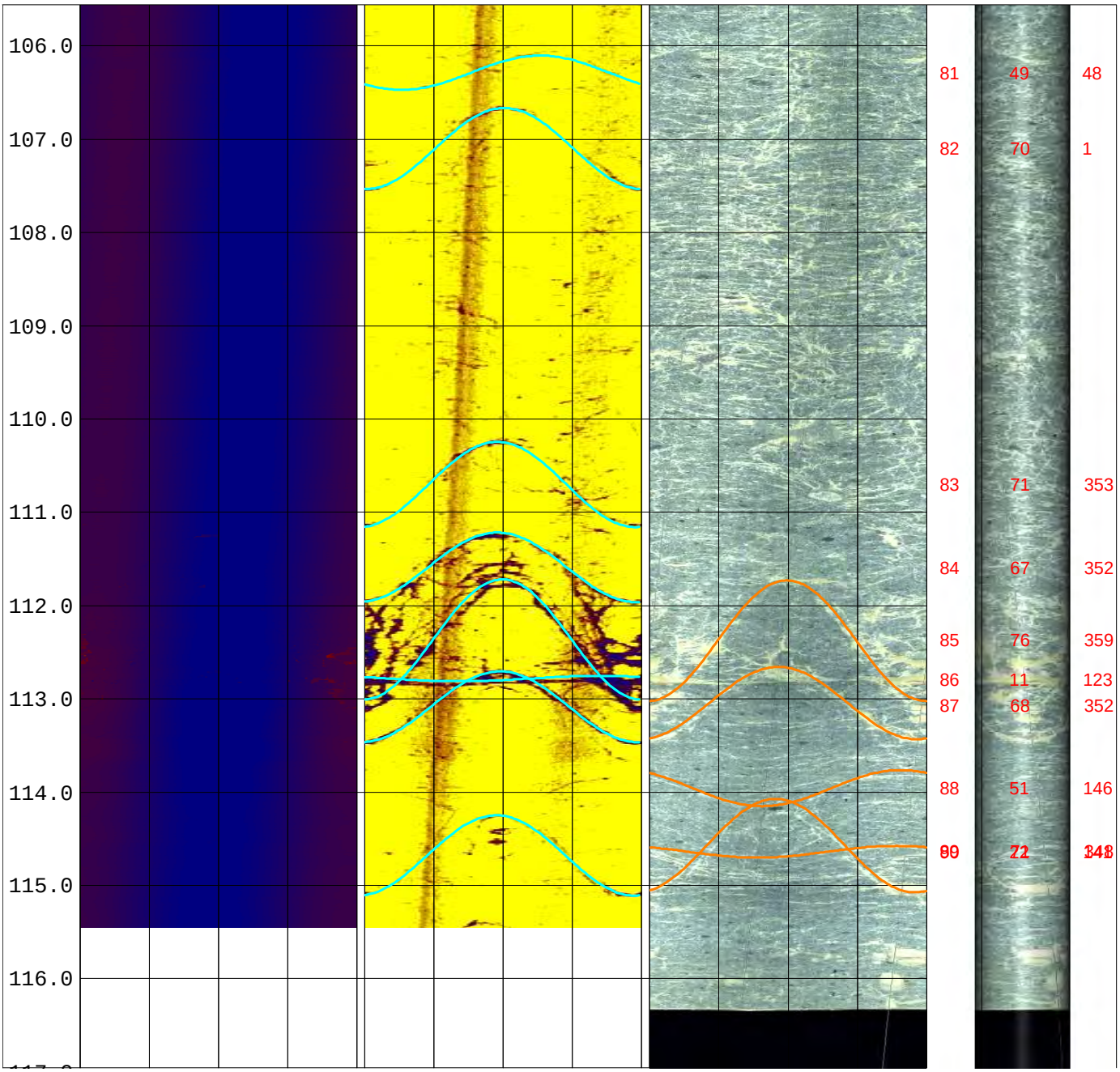

33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
45.0
46.0
33 72 340
34 62 243
35 35 210
36 43 68
37 45 254
38 60 11
39 42 70
40 44 92
41 22 242
42 59 66
43 41 238
44 69 344
45 76 344
48 67 337
49 69 326
50 58 67


47.0
48.0
49.0
50.0
51.0
52.0
53.0
54.0
55.0
56.0
57.0
58.0
59.0
60.0
61.0
52 68 348
53 65 337
54 66 340
55 69 353
56 46 211
57 73 346
58 75 346
59 76 347
60 71 340
61 63 1


62.0
63.0
64.0
65.0
66.0
67.0
68.0
69.0
70.0
71.0
72.0
73.0
74.0
75.0
76.0
62
63
71
72
324
324
64
74
354


77.0
78.0
79.0
80.0
81.0
82.0
83.0
84.0
85.0
86.0
87.0
88.0
89.0
90.0
65 70 4
66 60 315
67 73 340
68 71 320
69 72 312
70 69 321
71 67 320
72 71 87


91.0
92.0
93.0
94.0
95.0
96.0
97.0
98.0
99.0
100.0
101.0
102.0
103.0
104.0
105.0
73 64 57
74 30 182
75 25 166
76 37 191
77 61 330
78 73 327
79 73 9
80 75 23

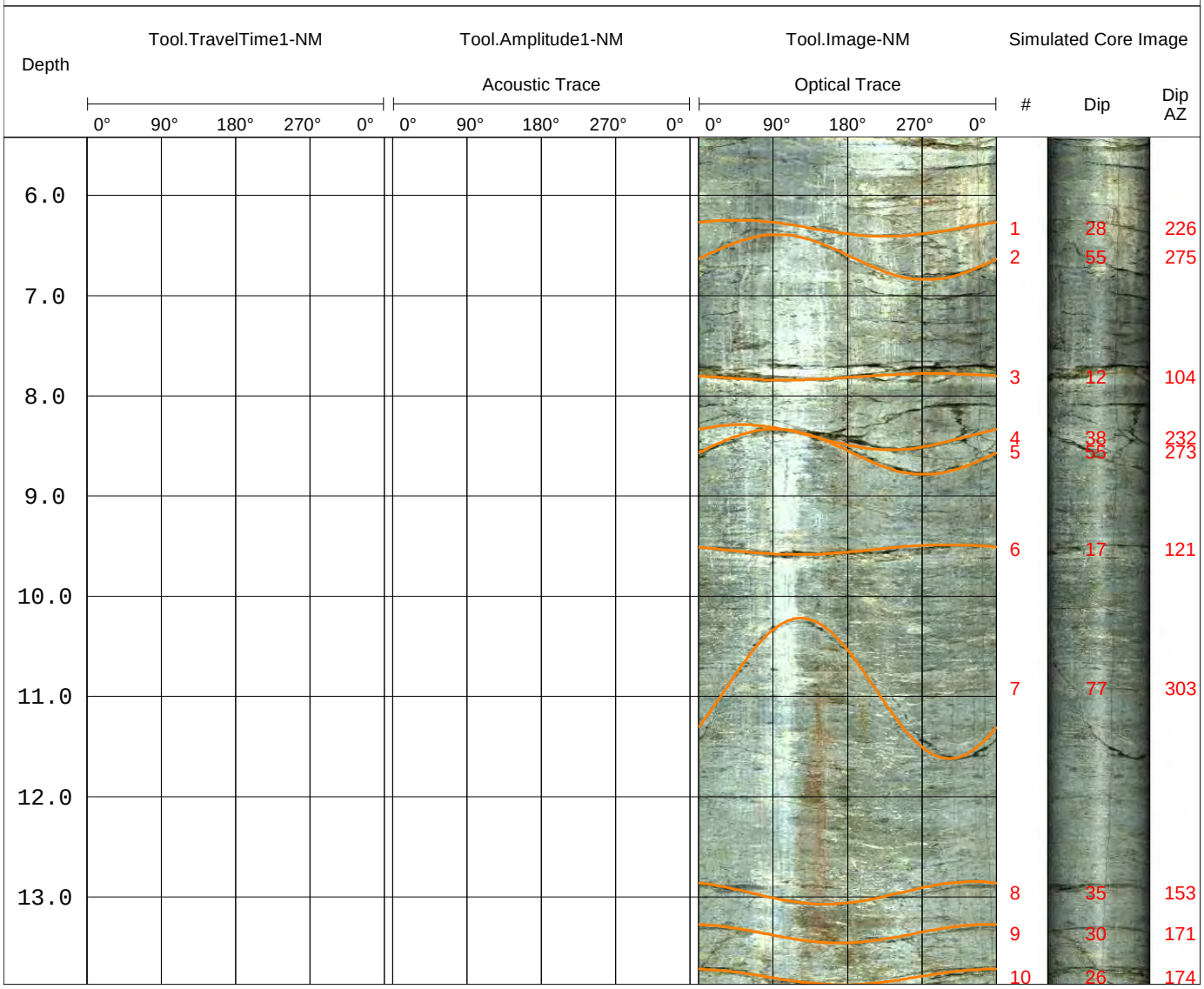

106.0
107.0
108.0
109.0
110.0
111.0
112.0
113.0
114.0
115.0
116.0
81 49 48
82 70 1
83 71 353
84 67 352
85 76 359
86 11 123
87 68 352
88 51 146

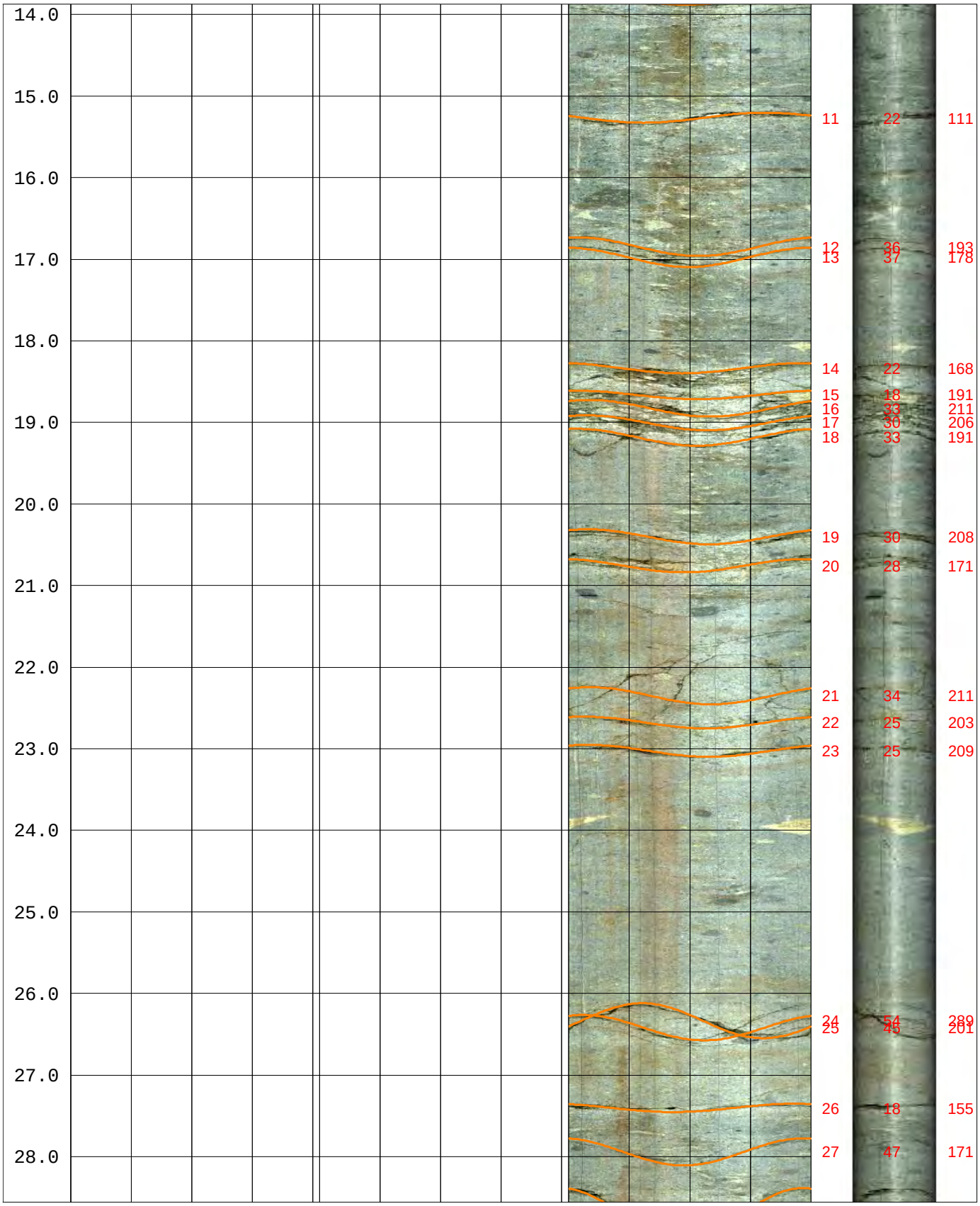
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2008 Geotechnical Program

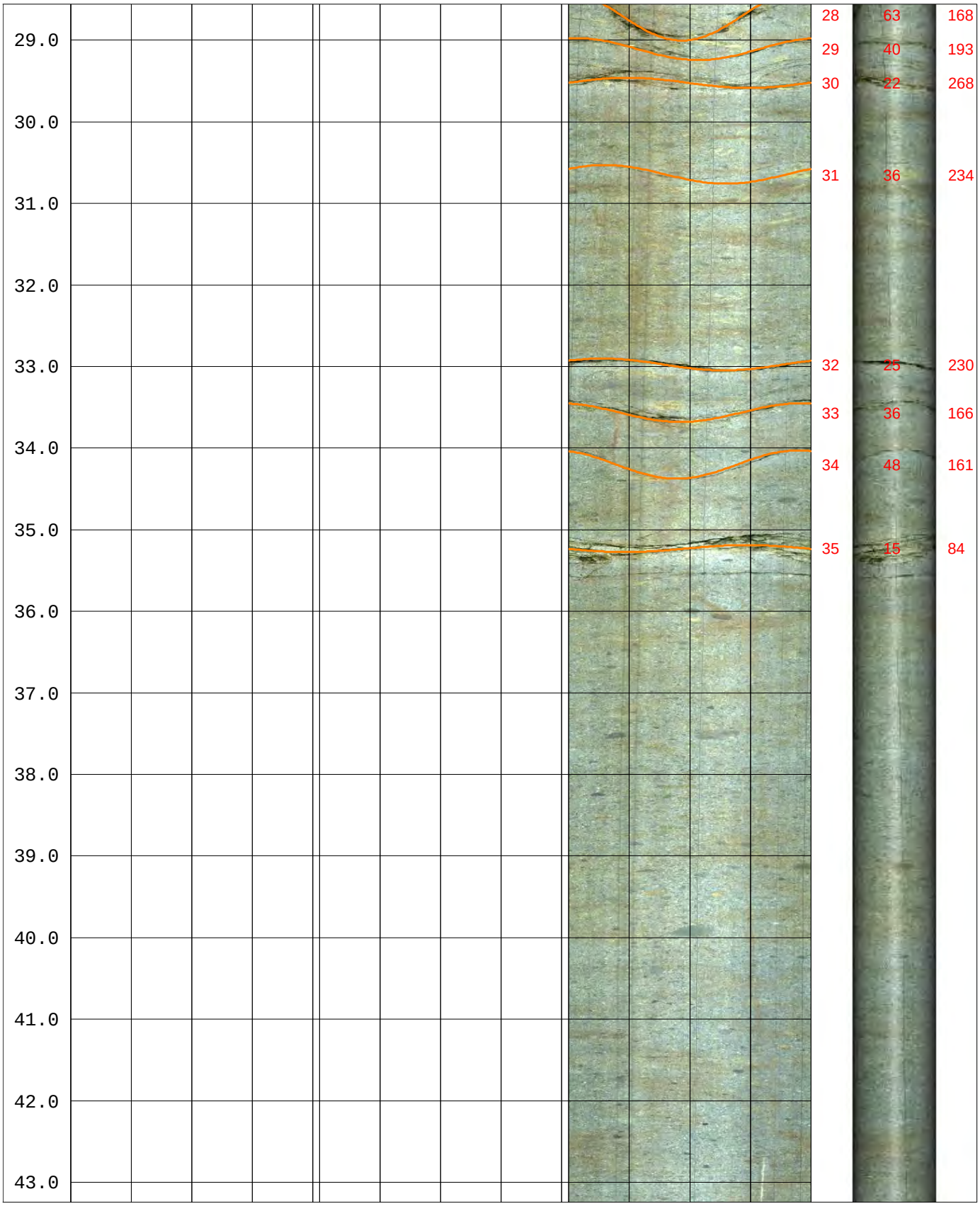
Date Logged:	October 24, 2008	Borehole ID:	RKS-39-08
File Name:	RKS3908-1M.wcl	Logged By:	F G Kruger

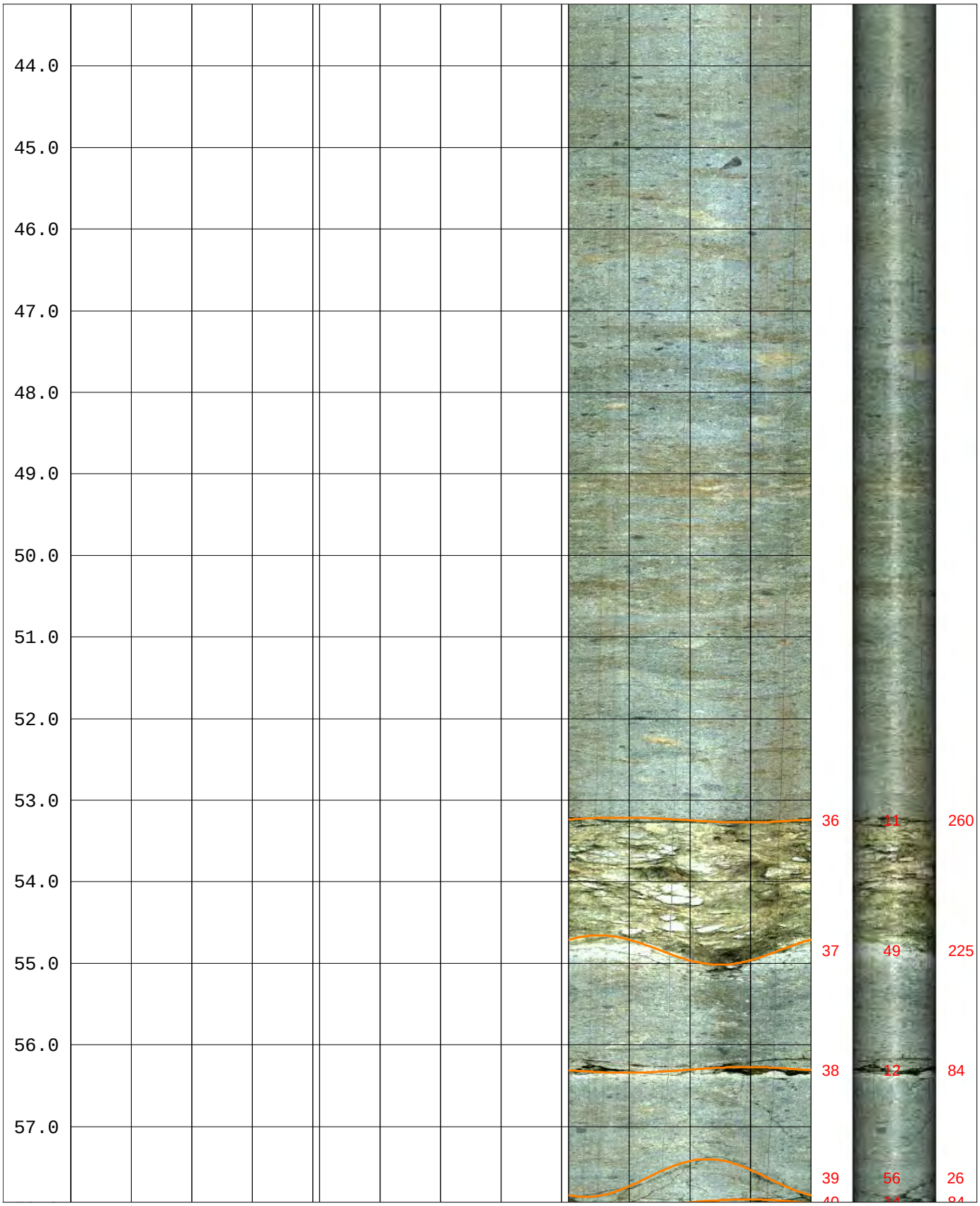
Notes:

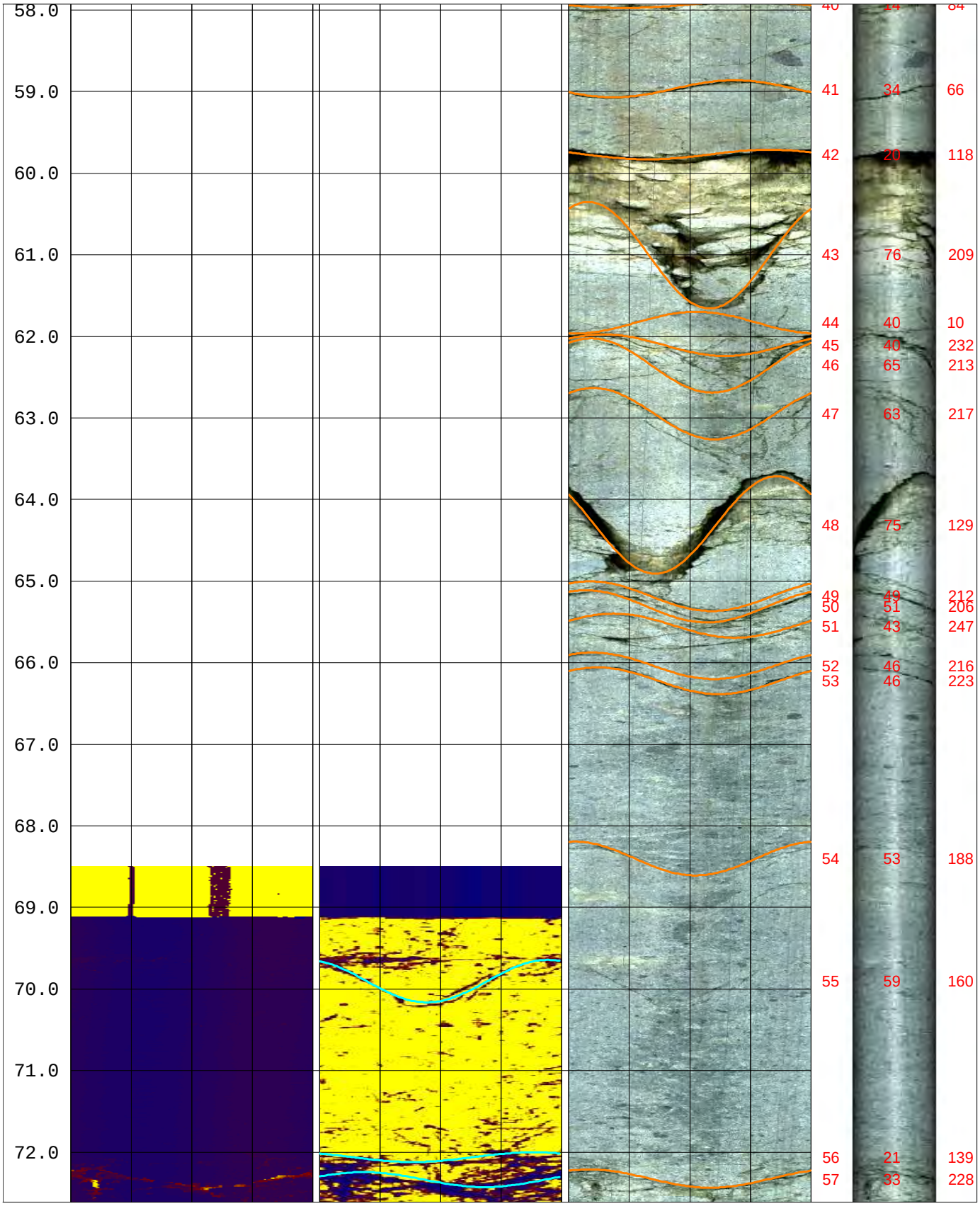
1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.

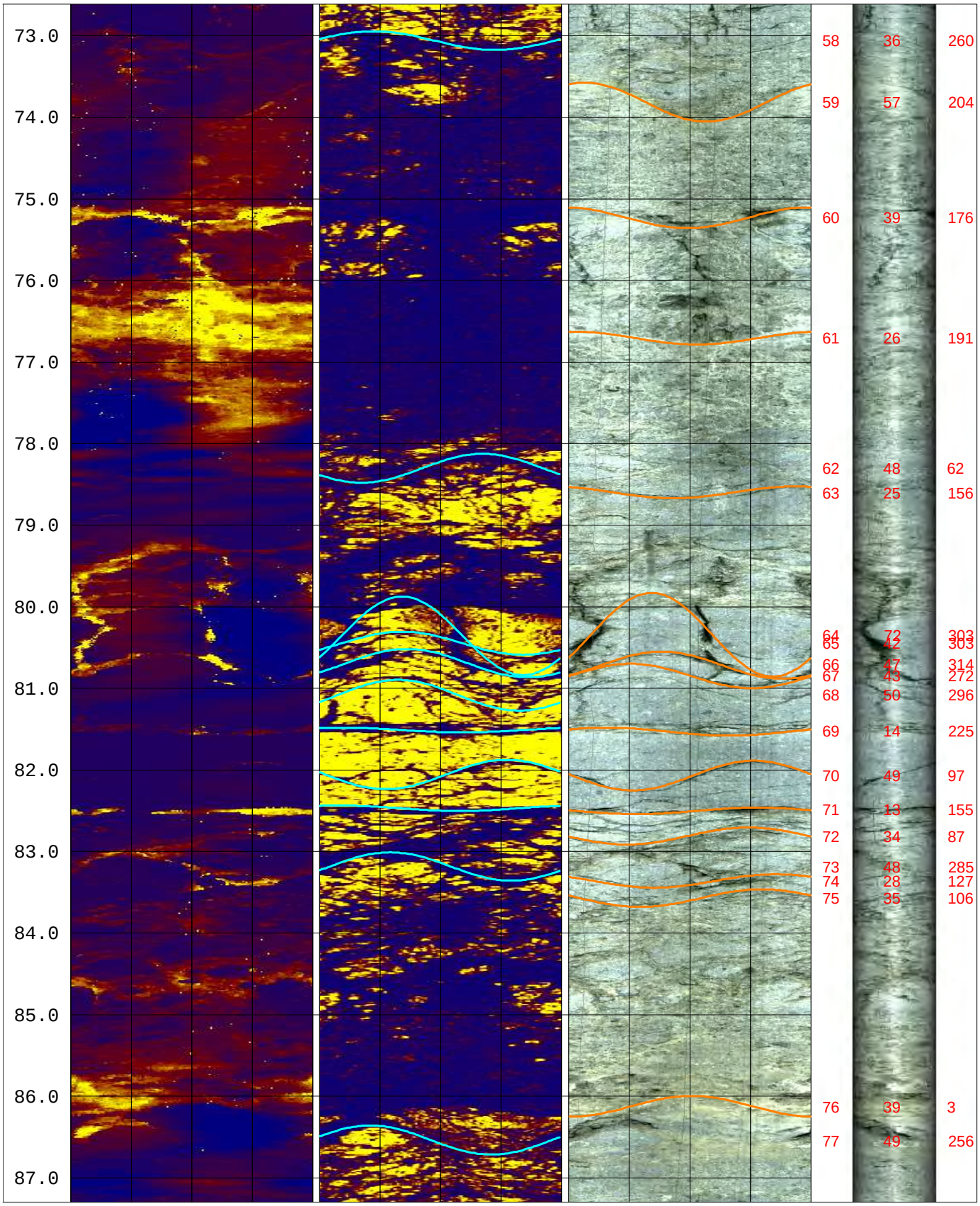


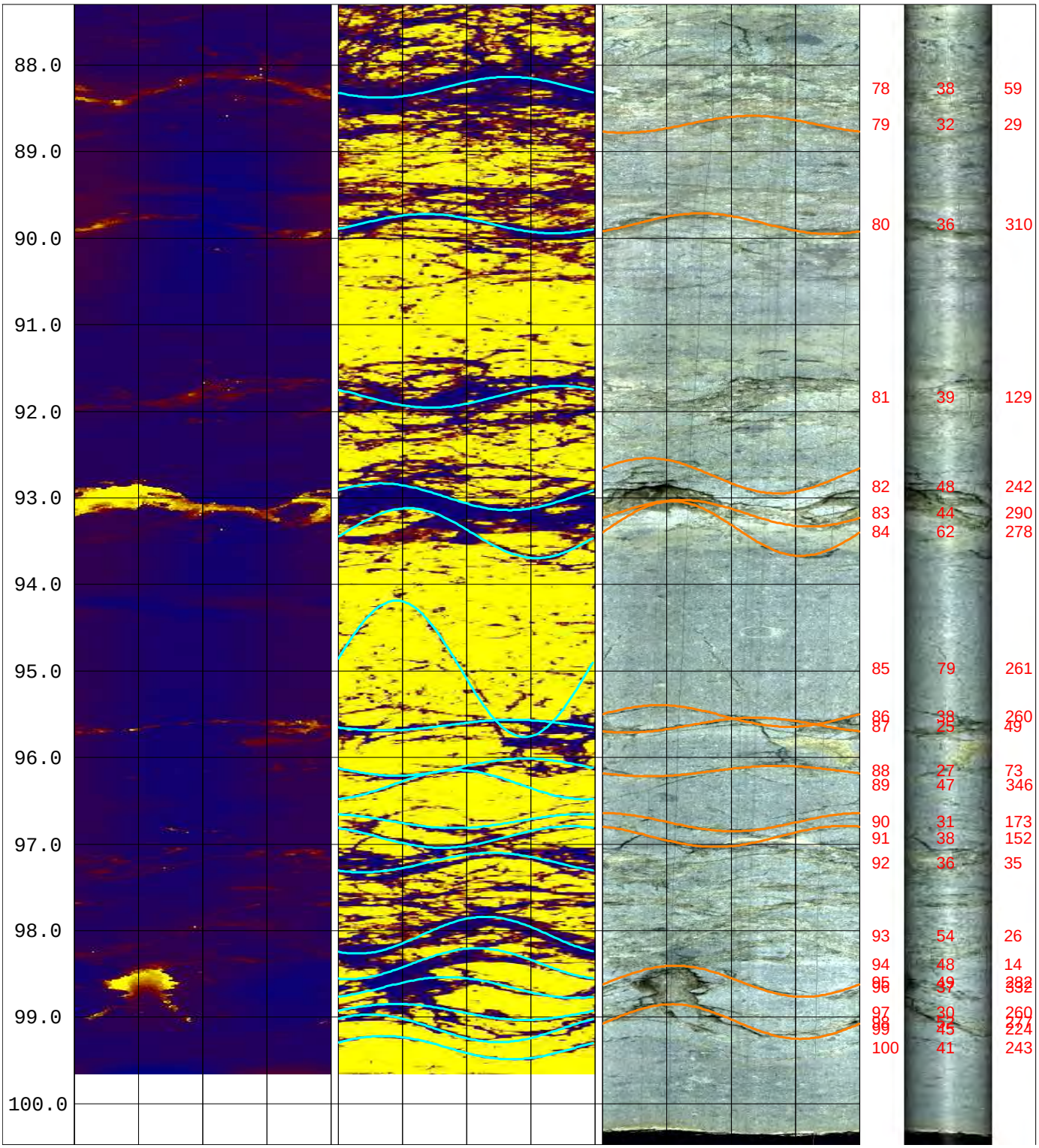

14.0
15.0
16.0
17.0
18.0
19.0
20.0
21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
11 22 111
12 36 193
13 37 178
14 22 168
15 18 191
16 33 211
17 30 206
18 33 191
19 30 208
20 28 171
21 34 211
22 25 203
23 25 209
24 54 289
25 45 201
26 18 155
27 47 171


29.0
30.0
31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
28 63 168
29 40 193
30 22 268
31 36 234
32 25 230
33 36 166
34 48 161
35 15 84


44.0
45.0
46.0
47.0
48.0
49.0
50.0
51.0
52.0
53.0
54.0
55.0
56.0
57.0
36 11 260
37 49 225
38 12 84
39 56 26


58.0
59.0
60.0
61.0
62.0
63.0
64.0
65.0
66.0
67.0
68.0
69.0
70.0
71.0
72.0
41 34 66
42 20 118
43 76 209
44 40 10
45 40 232
46 65 213
47 63 217
48 75 129
49 49 212
50 51 206
51 43 247
52 46 216
53 46 223
54 53 188
55 59 160
56 21 139
57 33 228


73.0
74.0
75.0
76.0
77.0
78.0
79.0
80.0
81.0
82.0
83.0
84.0
85.0
86.0
87.0
58 36 260
59 57 204
60 39 176
61 26 191
62 48 62
63 25 156
64 72 303
65 42 303
66 47 314
67 43 272
68 50 296
69 14 225
70 49 97
71 13 155
72 34 87
73 48 285
74 28 127
75 35 106
76 39 3
77 49 256

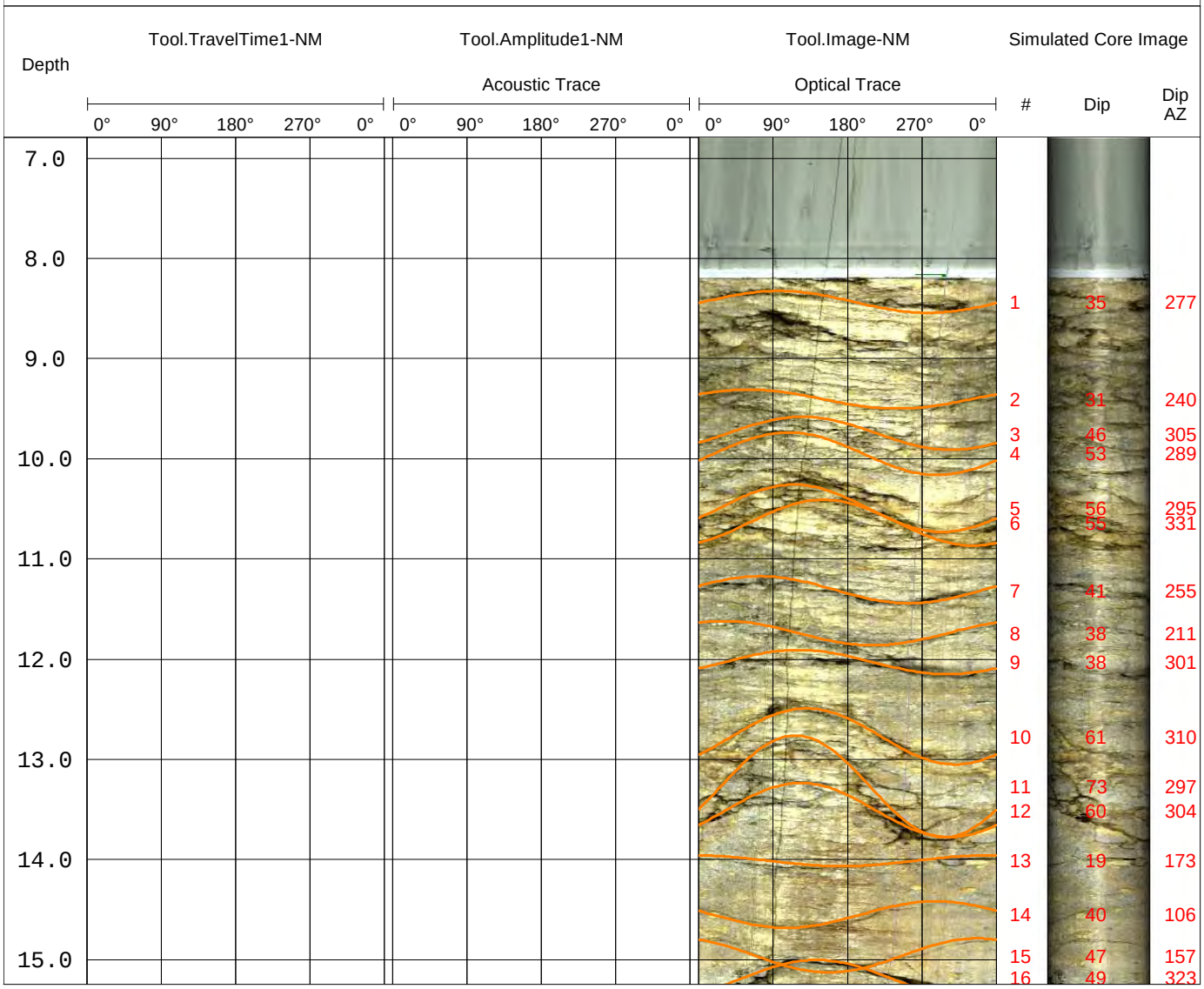

88.0
89.0
90.0
91.0
92.0
93.0
94.0
95.0
96.0
97.0
98.0
99.0
100.0
78 38 59
79 32 29
80 36 310
81 39 129
82 48 242
83 44 290
84 62 278
85 79 261
86 38 260
87 25 49
88 27 73
89 47 346
90 31 173
91 38 152
92 36 35
93 54 26
94 48 14
95 49 282
96 37 332
97 30 260
98 45 224
99 41 243
100

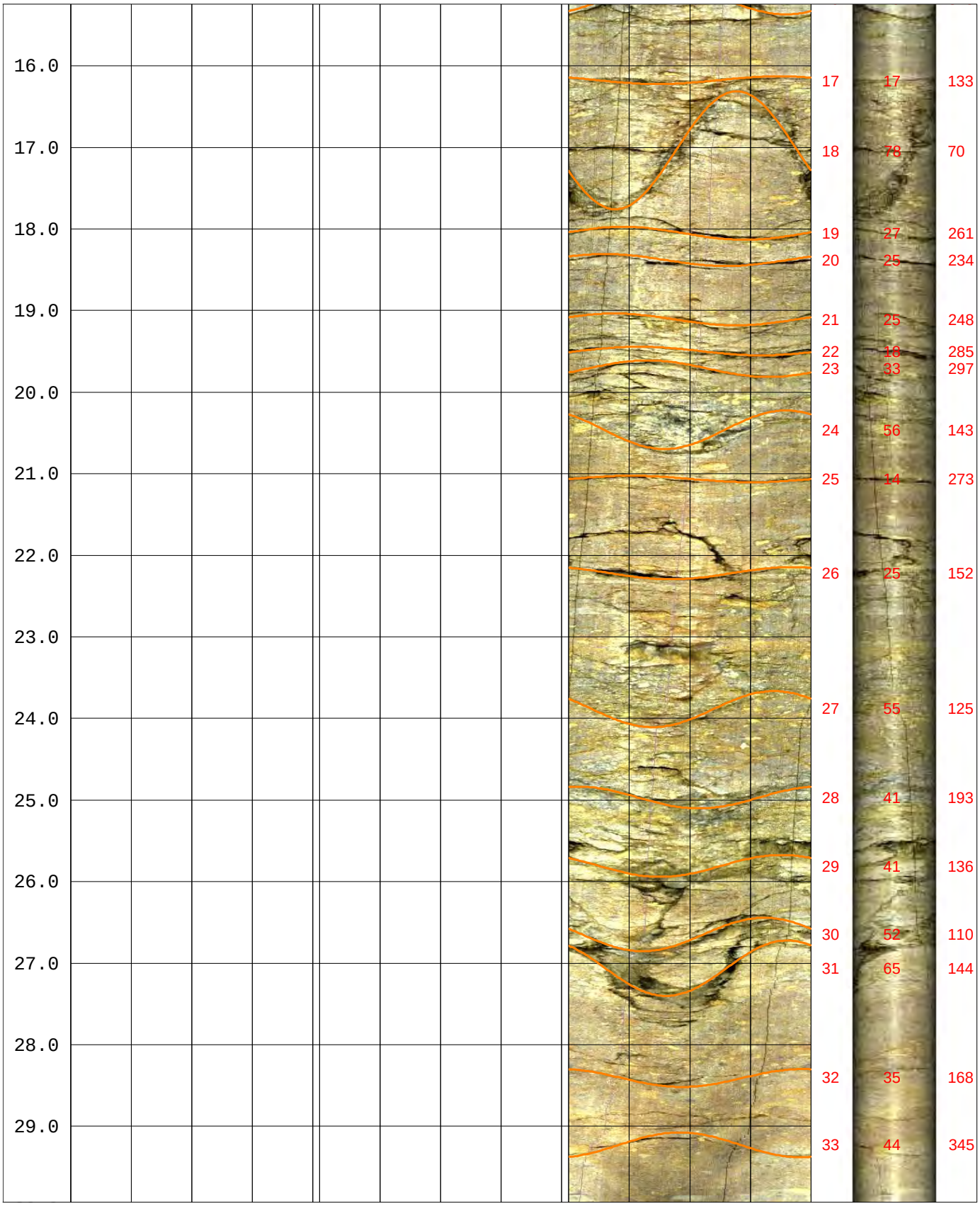
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2008 Geotechnical Program

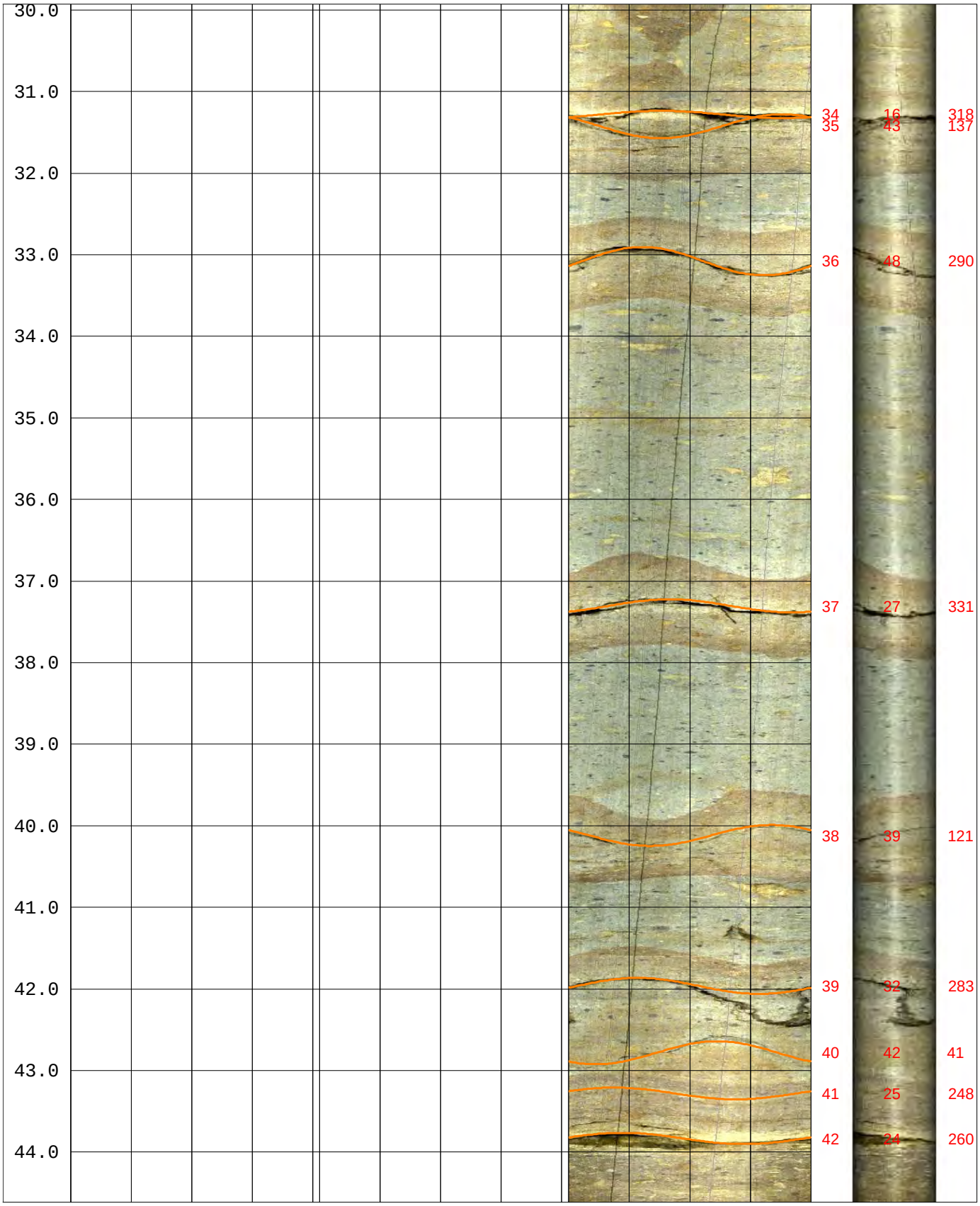
Date Logged:	October 14, 2008	Borehole ID:	RKS-40-08
File Name:	RKS4008-1M.wcl	Logged By:	F G Kruger

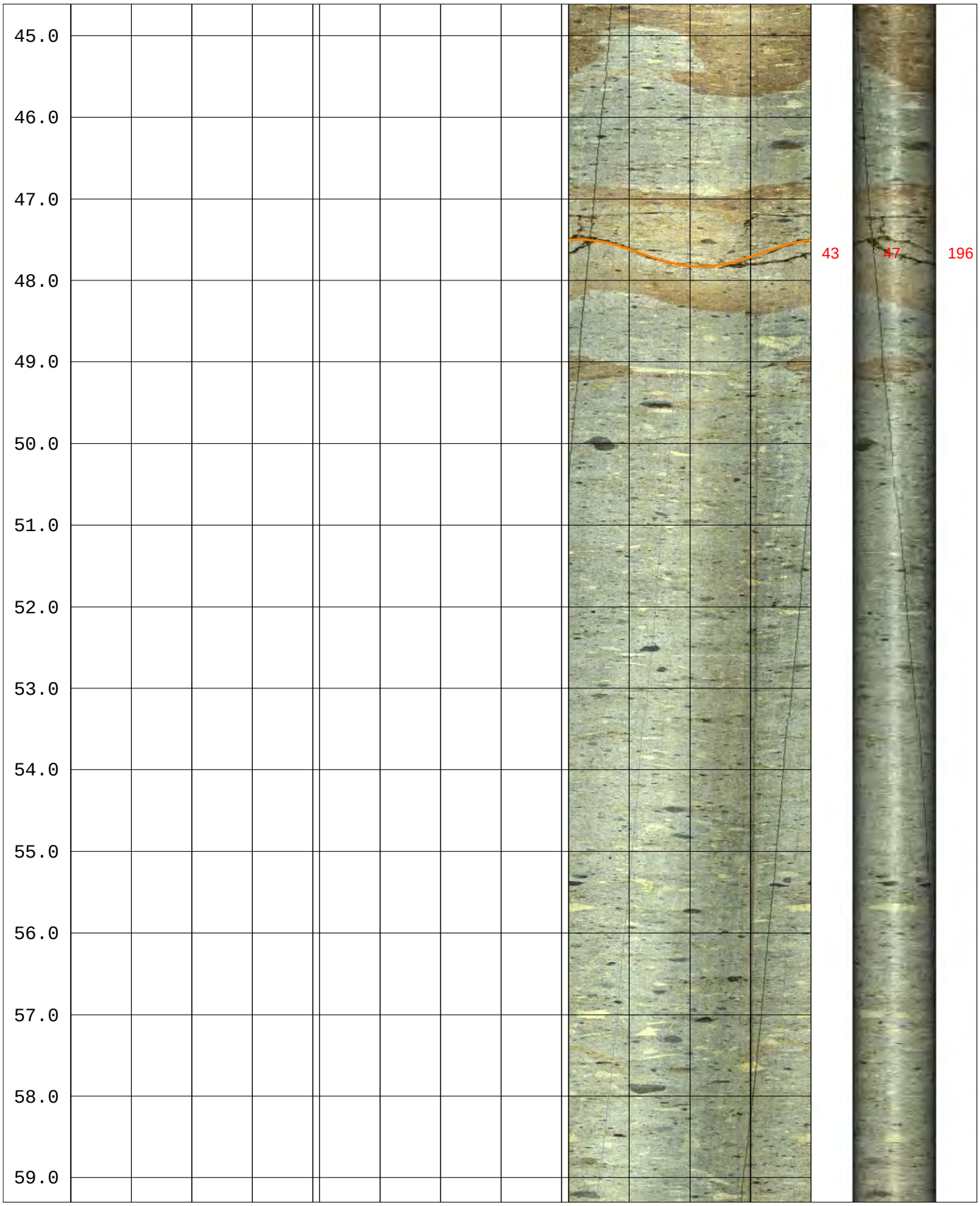
Notes:

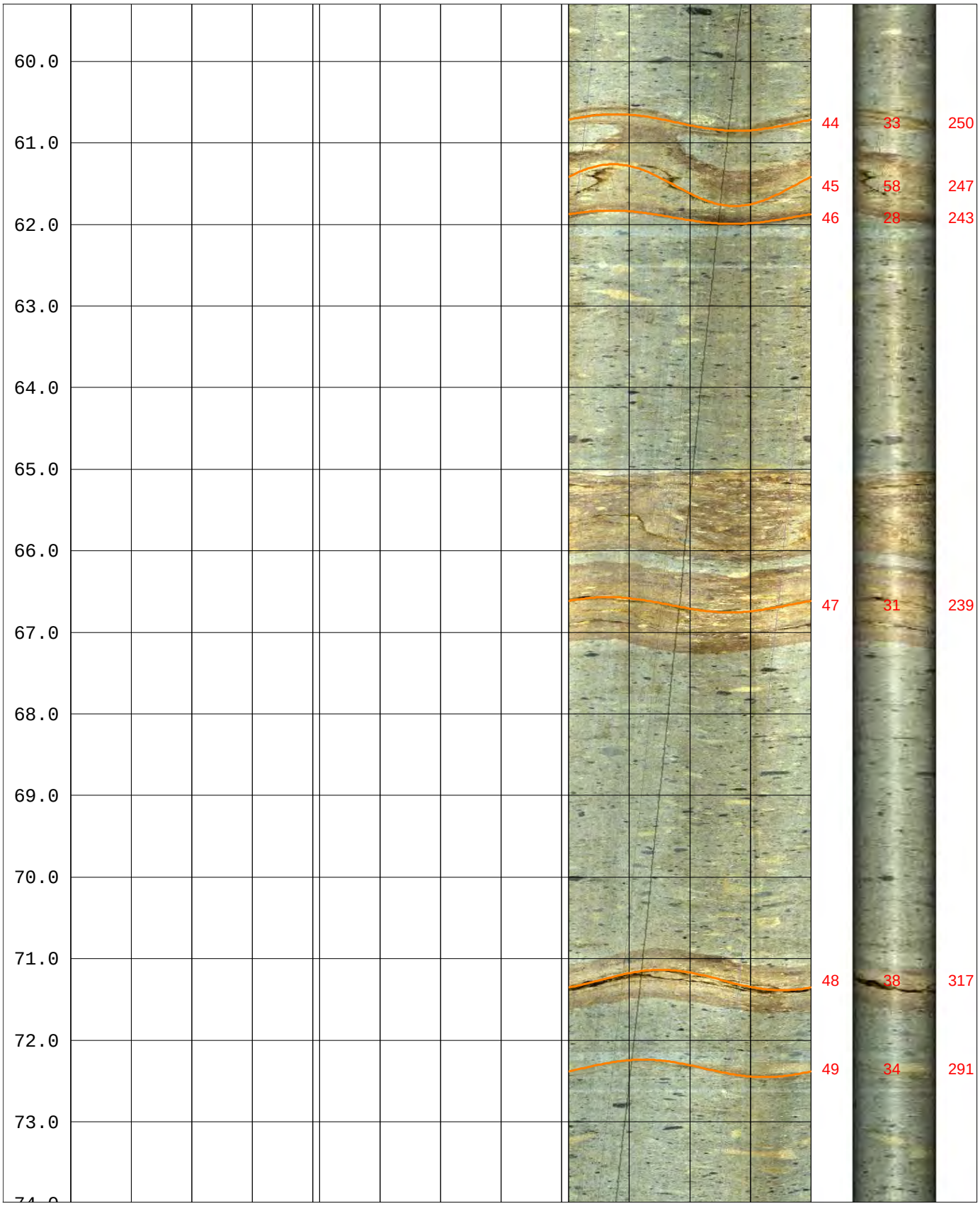
1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.

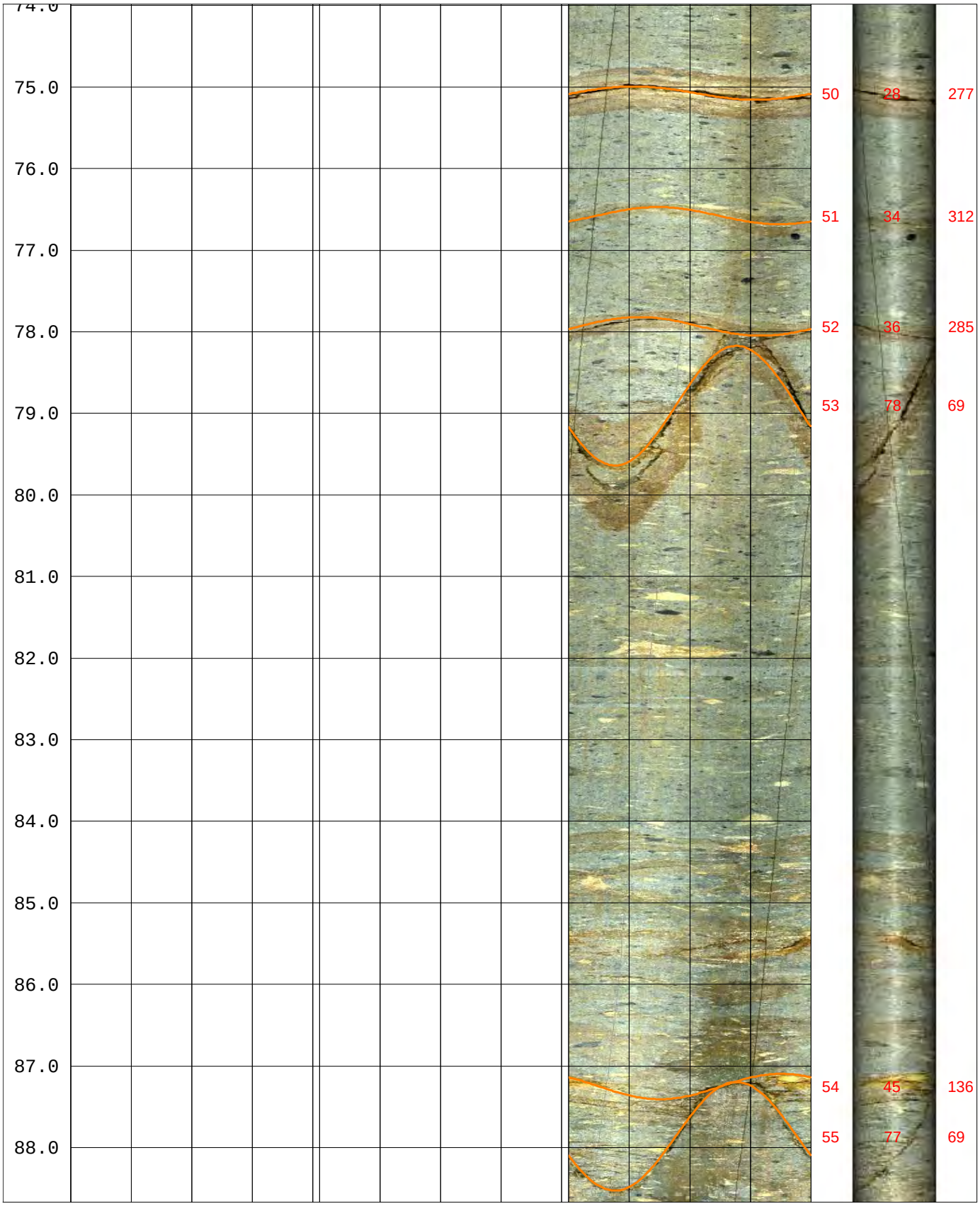


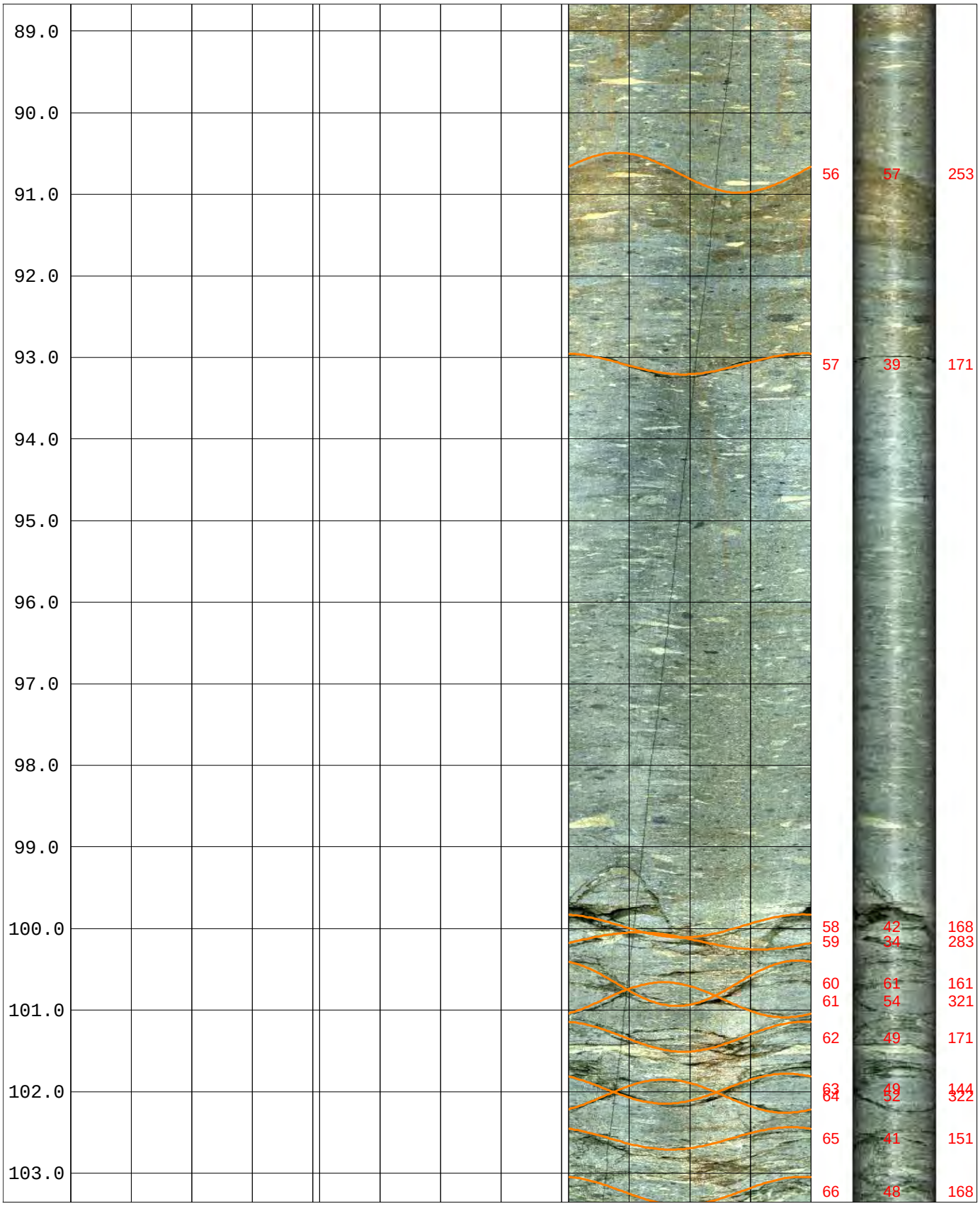

16.0
17.0
18.0
19.0
20.0
21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
17 17 133
18 78 70
19 27 261
20 25 234
21 25 248
22 10 285
23 33 297
24 56 143
25 14 273
26 25 152
27 55 125
28 41 193
29 41 136
30 52 110
31 65 144
32 35 168
33 44 345

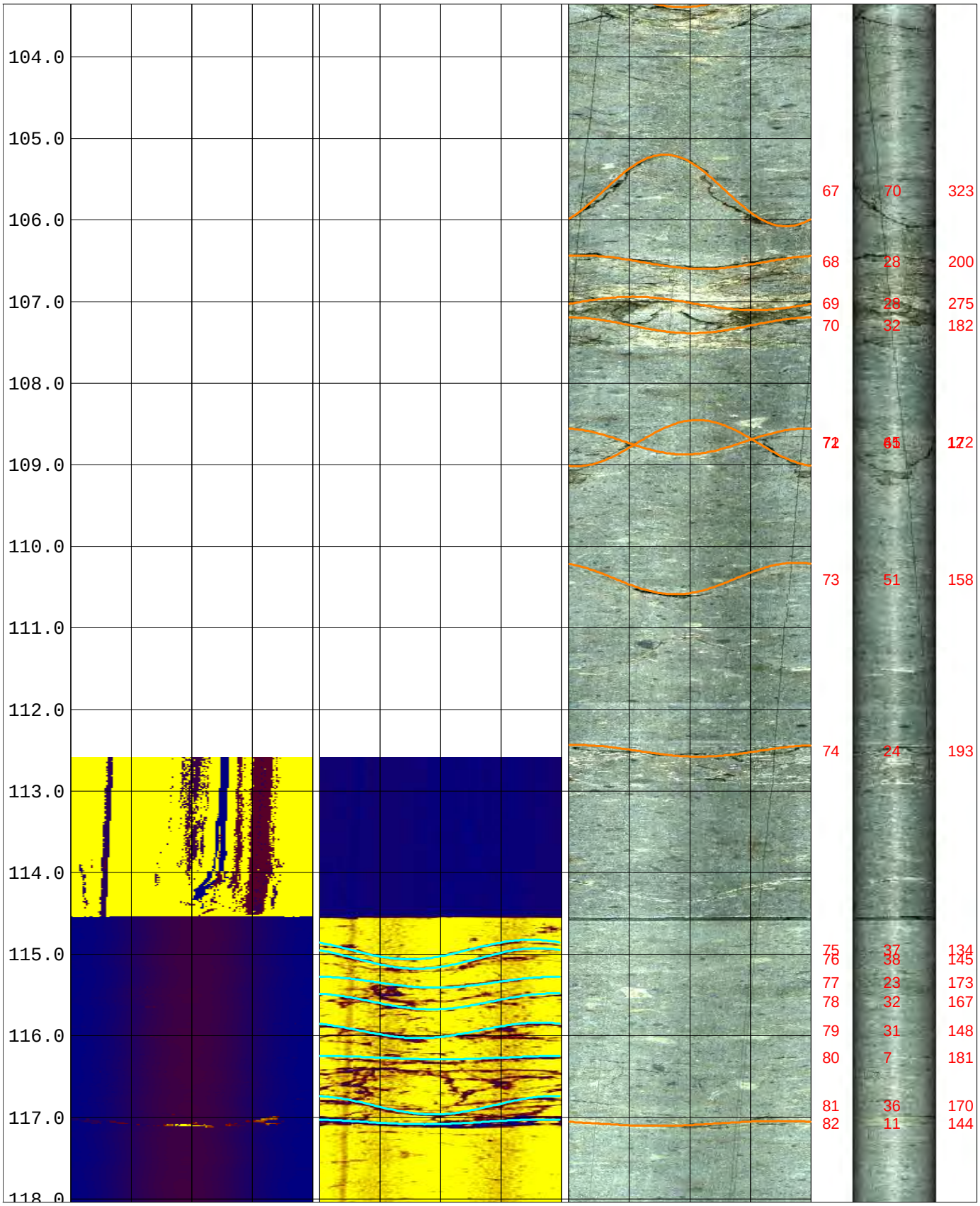

30.0
31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
34
35
16
43
318
137
36
48
290
37
27
331
38
39
121
39
32
283
40
42
41
41
25
248
42
24
260

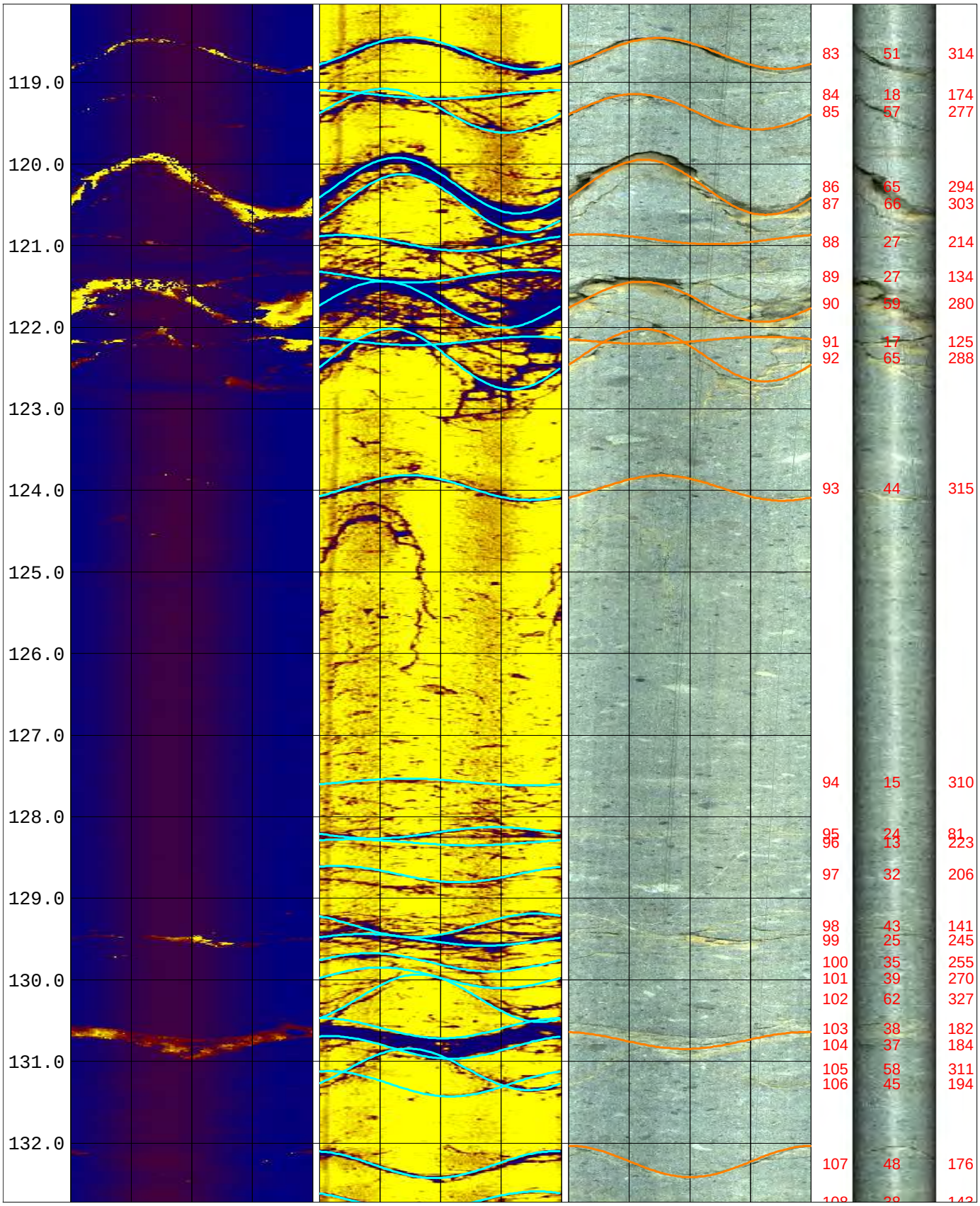

45.0
46.0
47.0
48.0
49.0
50.0
51.0
52.0
53.0
54.0
55.0
56.0
57.0
58.0
59.0
43
47
196

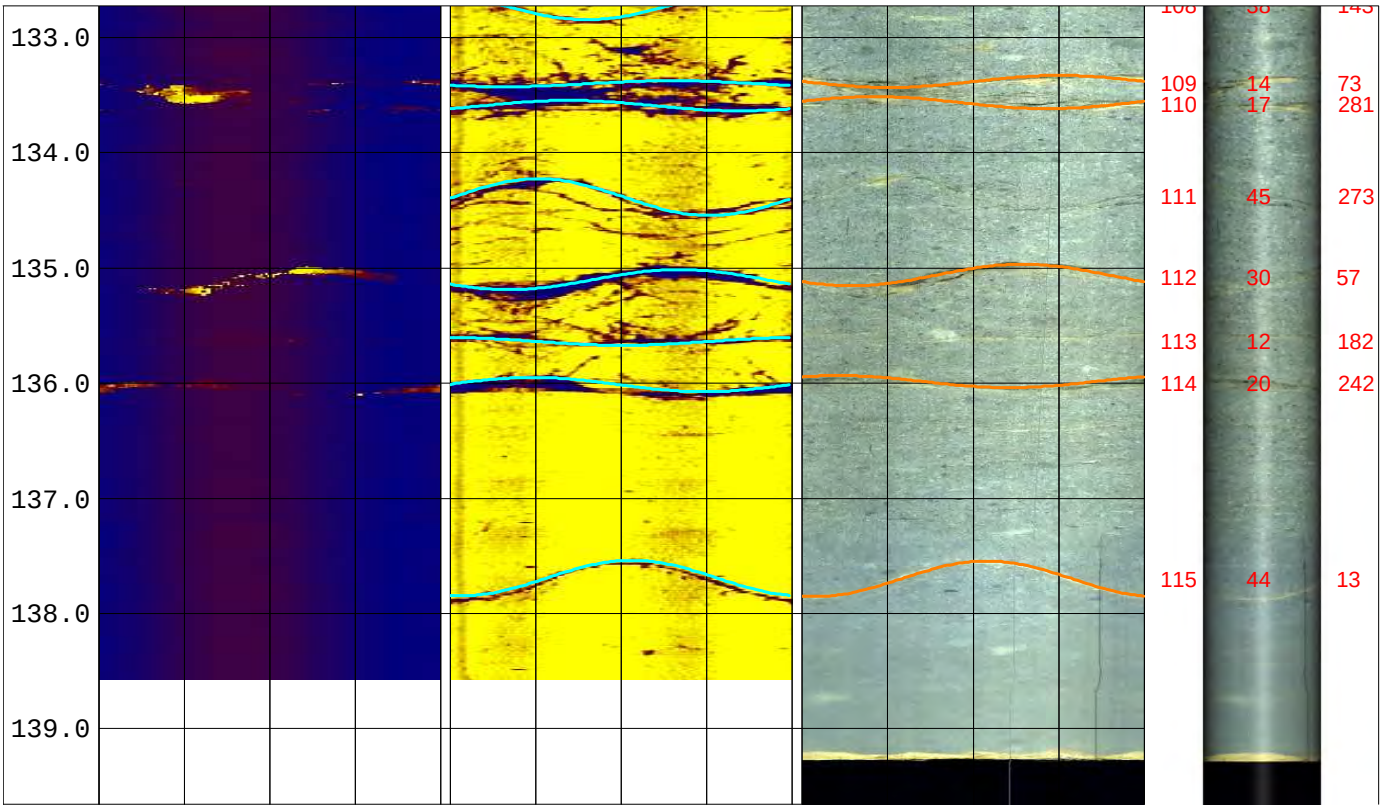

60.0
61.0
62.0
63.0
64.0
65.0
66.0
67.0
68.0
69.0
70.0
71.0
72.0
73.0
44 33 250
45 58 247
46 28 243
47 31 239
48 38 317
49 34 291


74.0
75.0
76.0
77.0
78.0
79.0
80.0
81.0
82.0
83.0
84.0
85.0
86.0
87.0
88.0
50 28 277
51 34 312
52 36 285
53 78 69
54 45 136
55 77 69


89.0
90.0
91.0
92.0
93.0
94.0
95.0
96.0
97.0
98.0
99.0
100.0
101.0
102.0
103.0
56 57 253
57 39 171
58 42 168
59 34 283
60 61 161
61 54 321
62 49 171
63 49 144
64 52 322
65 41 151
66 48 168


104.0
105.0
106.0
107.0
108.0
109.0
110.0
111.0
112.0
113.0
114.0
115.0
116.0
117.0
118.0
67 70 323
68 28 200
69 28 275
70 32 182
72 65 122
73 51 158
74 24 193
75 37 134
76 38 145
77 23 173
78 32 167
79 31 148
80 7 181
81 36 170
82 11 144


119.0
120.0
121.0
122.0
123.0
124.0
125.0
126.0
127.0
128.0
129.0
130.0
131.0
132.0
83 51 314
84 18 174
85 57 277
86 65 294
87 66 303
88 27 214
89 27 134
90 59 280
91 17 125
92 65 288
93 44 315
94 15 310
95 24 81
96 13 223
97 32 206
98 43 141
99 25 245
100 35 255
101 39 270
102 62 327
103 38 182
104 37 184
105 58 311
106 45 194
107 48 176

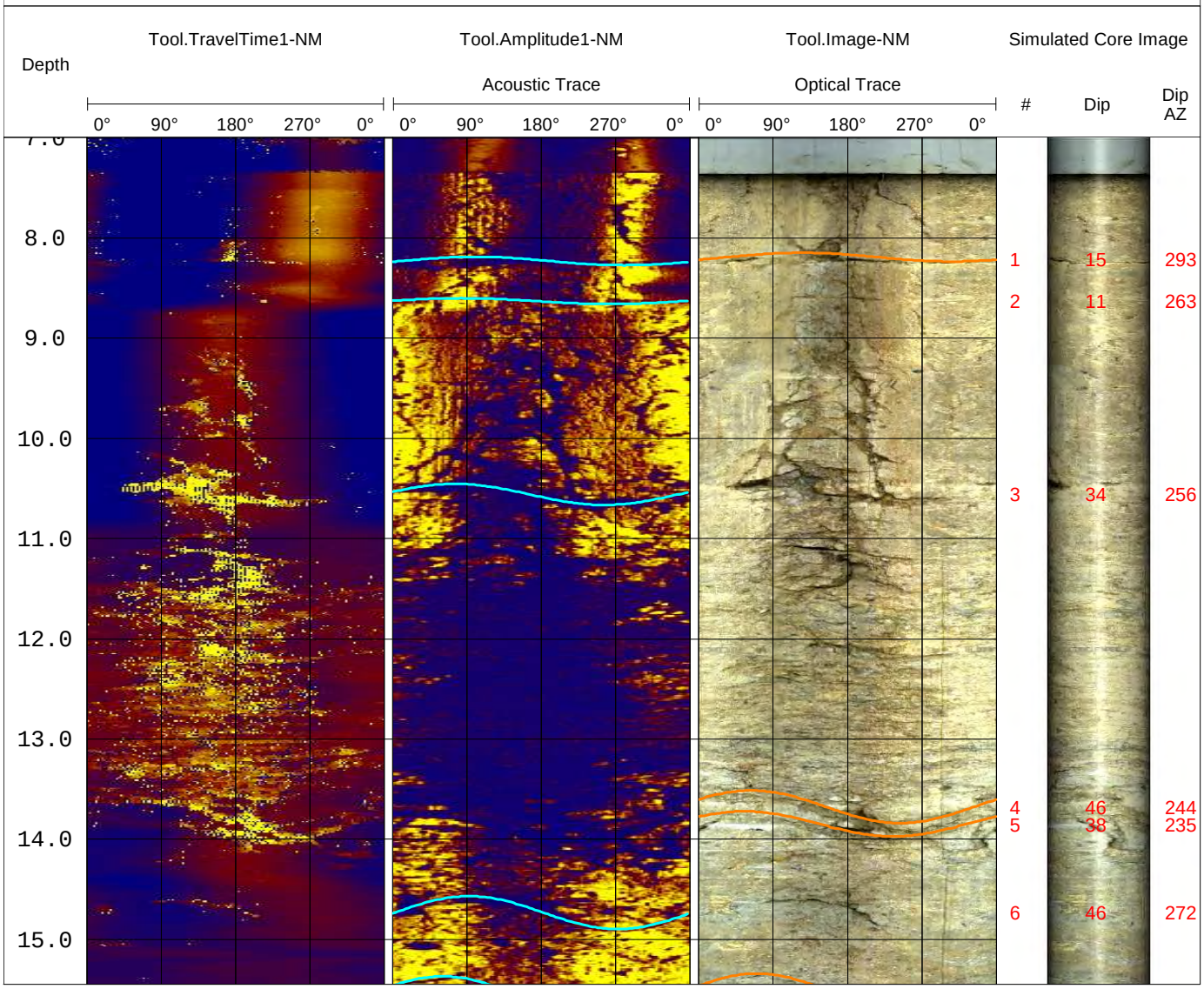

133.0
134.0
135.0
136.0
137.0
138.0
139.0
109 14 73
110 17 281
111 45 273
112 30 57
113 12 182
114 20 242
115 44 13

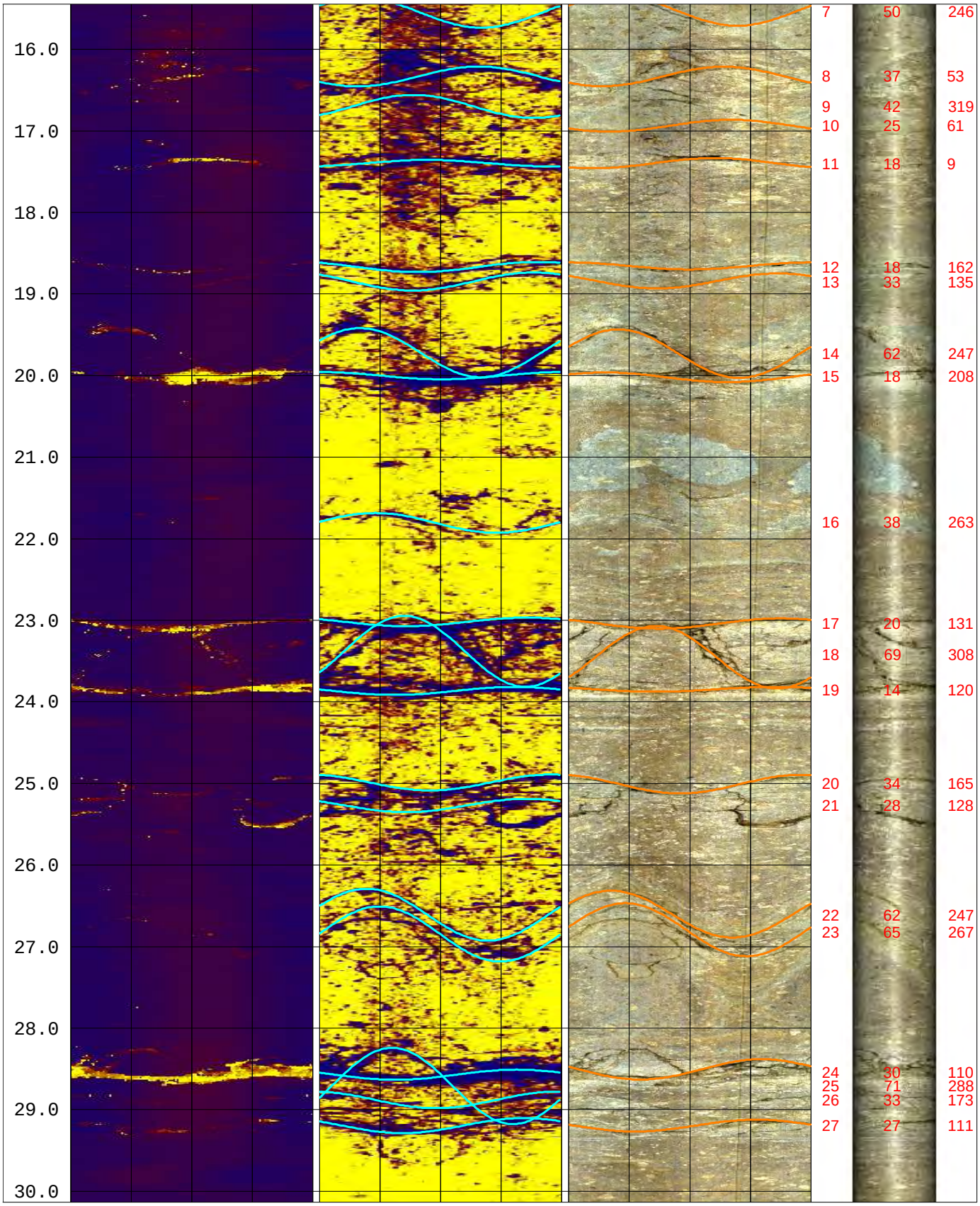
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2008 Geotechnical Program

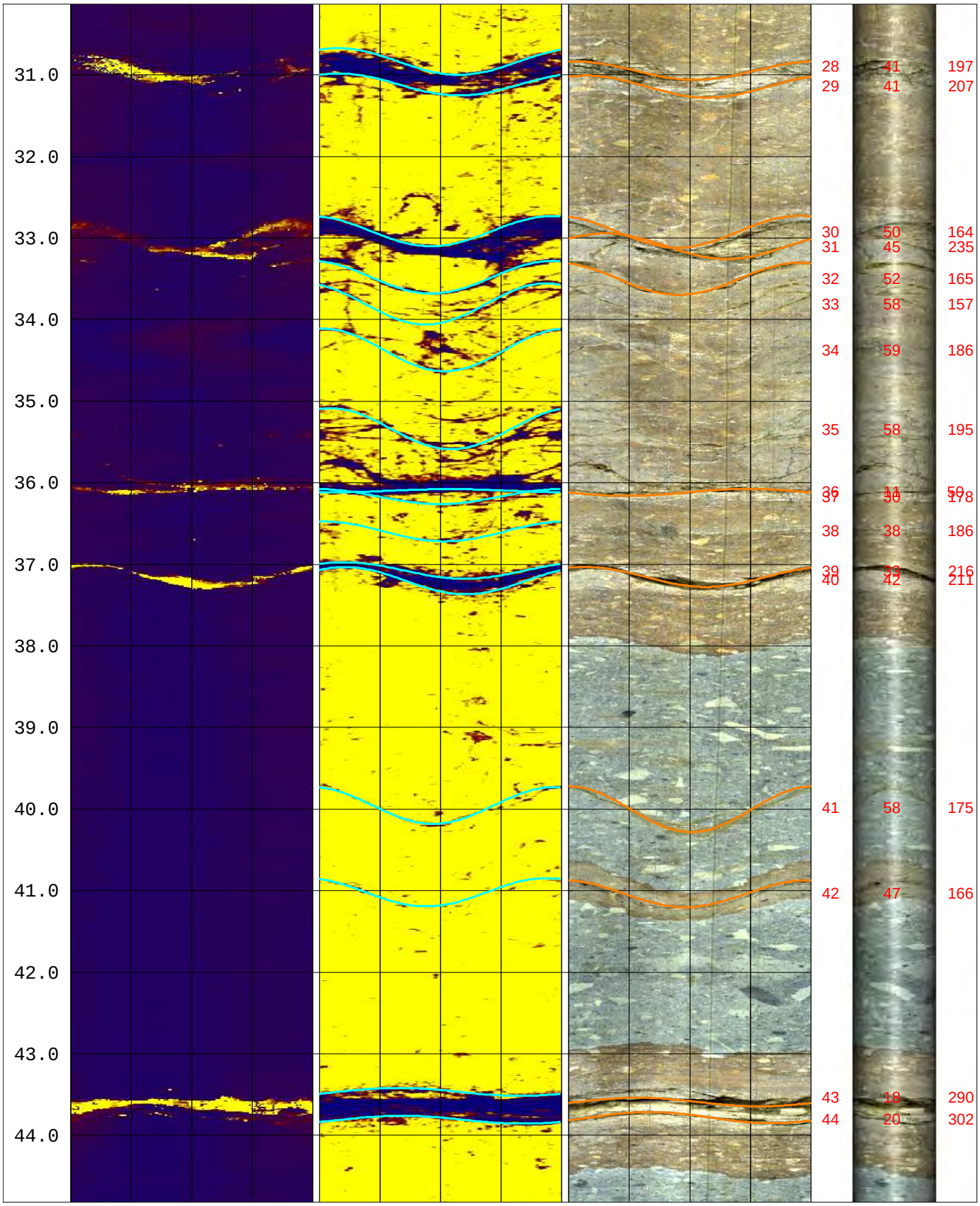
Date Logged:	October 14, 2008	Borehole ID:	RKS-41-08
File Name:	RKS4108-1M.wcl	Logged By:	F G Kruger

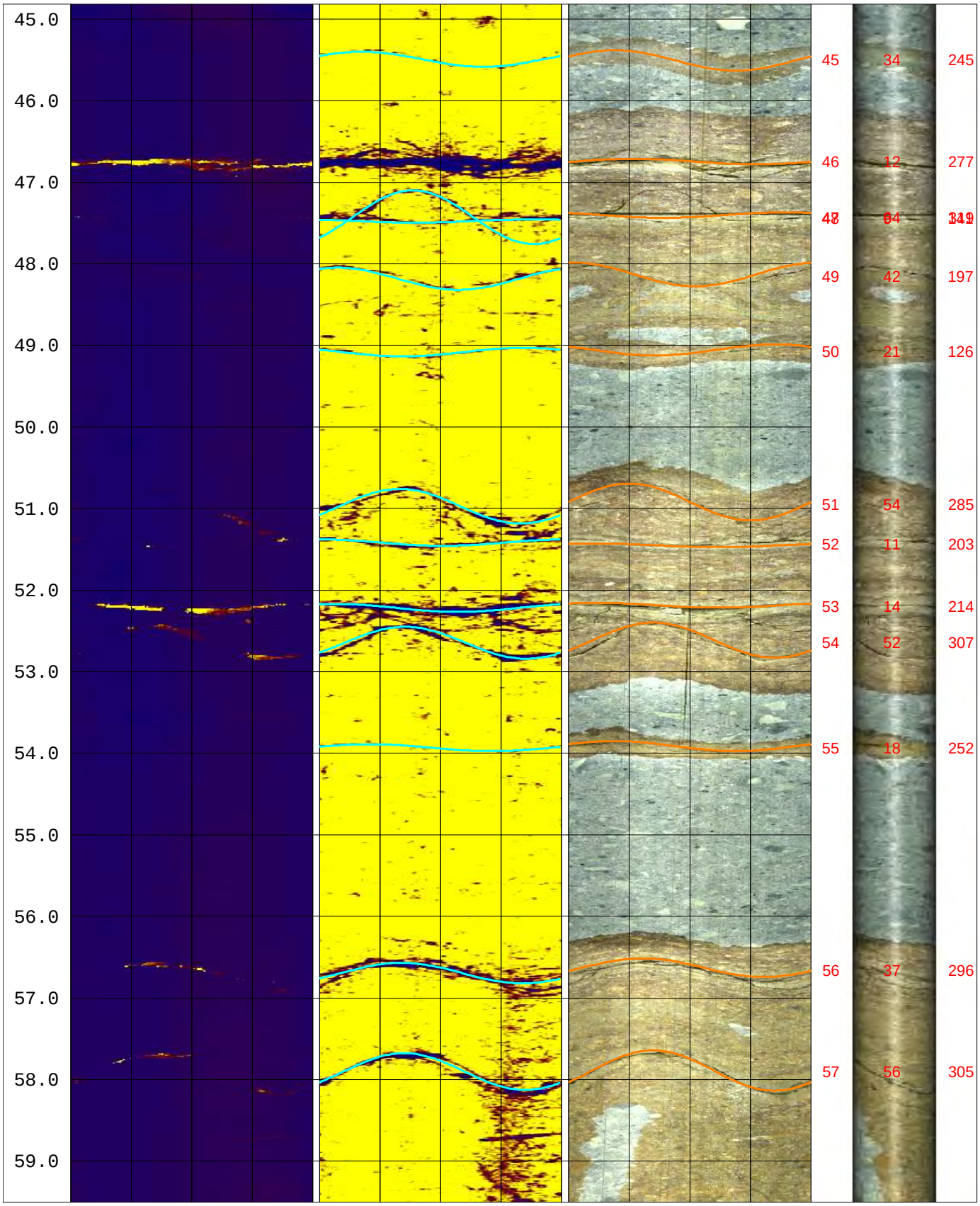
Notes:

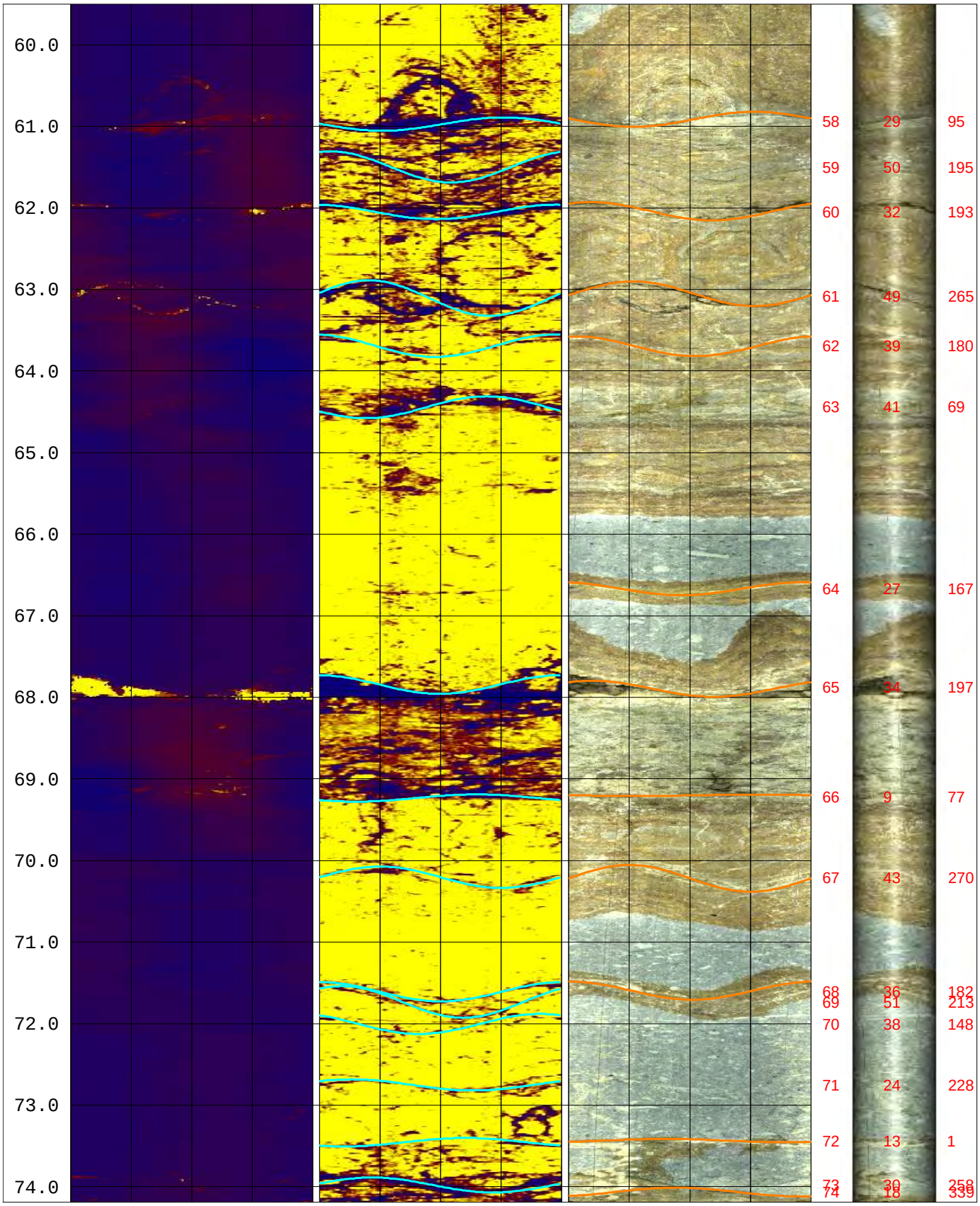
1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.

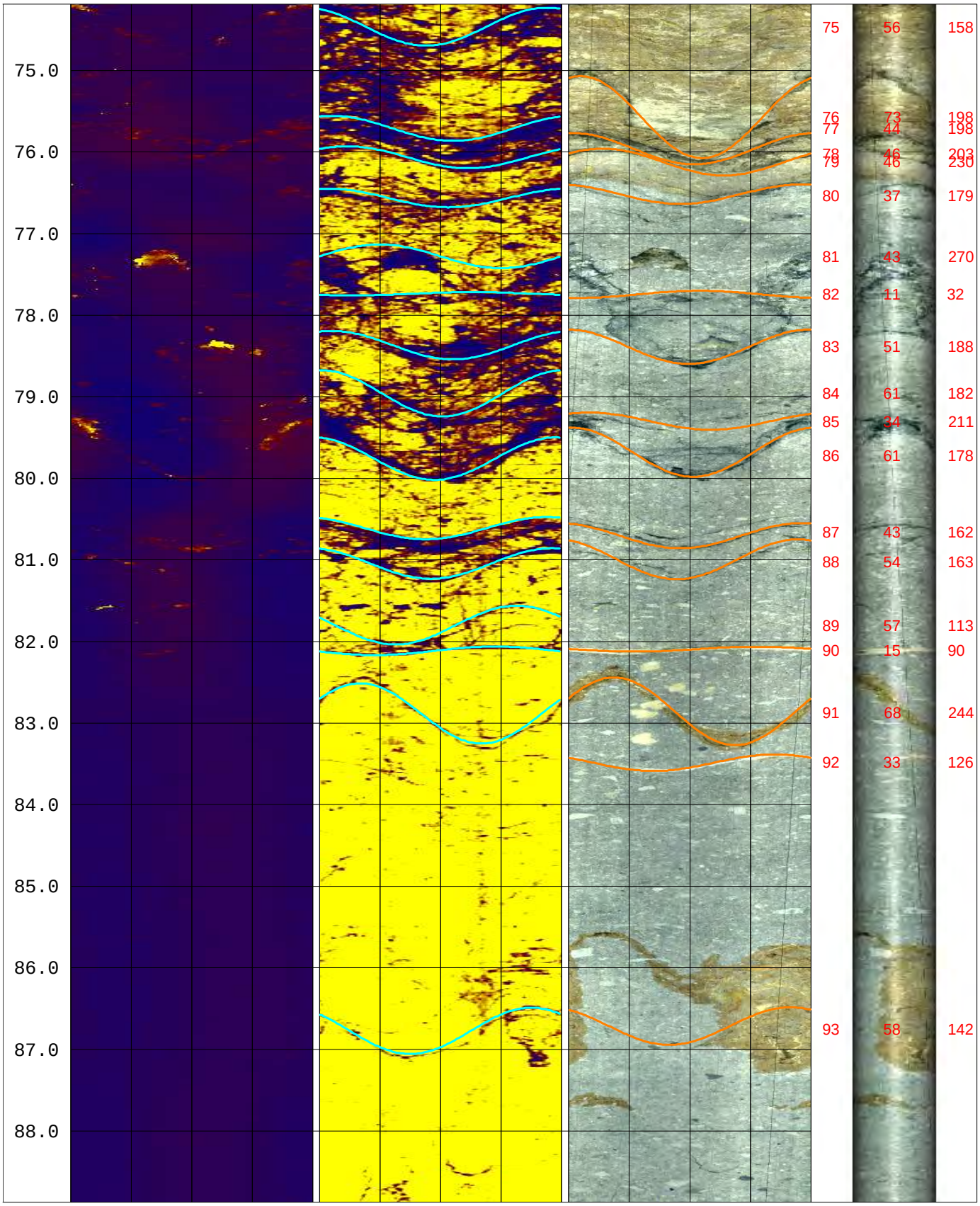



16.0
17.0
18.0
19.0
20.0
21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
30.0
7 50 246
8 37 53
9 42 319
10 25 61
11 18 9
12 18 162
13 33 135
14 62 247
15 18 208
16 38 263
17 20 131
18 69 308
19 14 120
20 34 165
21 28 128
22 62 247
23 65 267
24 30 110
25 71 288
26 33 173
27 27 111


31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
28 41 197
29 41 207
30 50 164
31 45 235
32 52 165
33 58 157
34 59 186
35 58 195
36 41 50
37 30 178
38 38 186
39 33 216
40 42 211
41 58 175
42 47 166
43 18 290
44 20 302


45.0
46.0
47.0
48.0
49.0
50.0
51.0
52.0
53.0
54.0
55.0
56.0
57.0
58.0
59.0
45 34 245
46 12 277
47 84 319
48 42 197
49 21 126
50 54 285
51 11 203
52 14 214
53 52 307
54 18 252
55 37 296
56 56 305
57


60.0
61.0
62.0
63.0
64.0
65.0
66.0
67.0
68.0
69.0
70.0
71.0
72.0
73.0
74.0
58 29 95
59 50 195
60 32 193
61 49 265
62 39 180
63 41 69
64 27 167
65 34 197
66 9 77
67 43 270
68 36 182
69 51 213
70 38 148
71 24 228
72 13 1
73 30 258
74 18 339


75.0
76.0
77.0
78.0
79.0
80.0
81.0
82.0
83.0
84.0
85.0
86.0
87.0
88.0
75 56 158
76 73 198
77 44 198
78 46 203
79 46 230
80 37 179
81 43 270
82 11 32
83 51 188
84 61 182
85 34 211
86 61 178
87 43 162
88 54 163
89 57 113
90 15 90
91 68 244
92 33 126
93 58 142

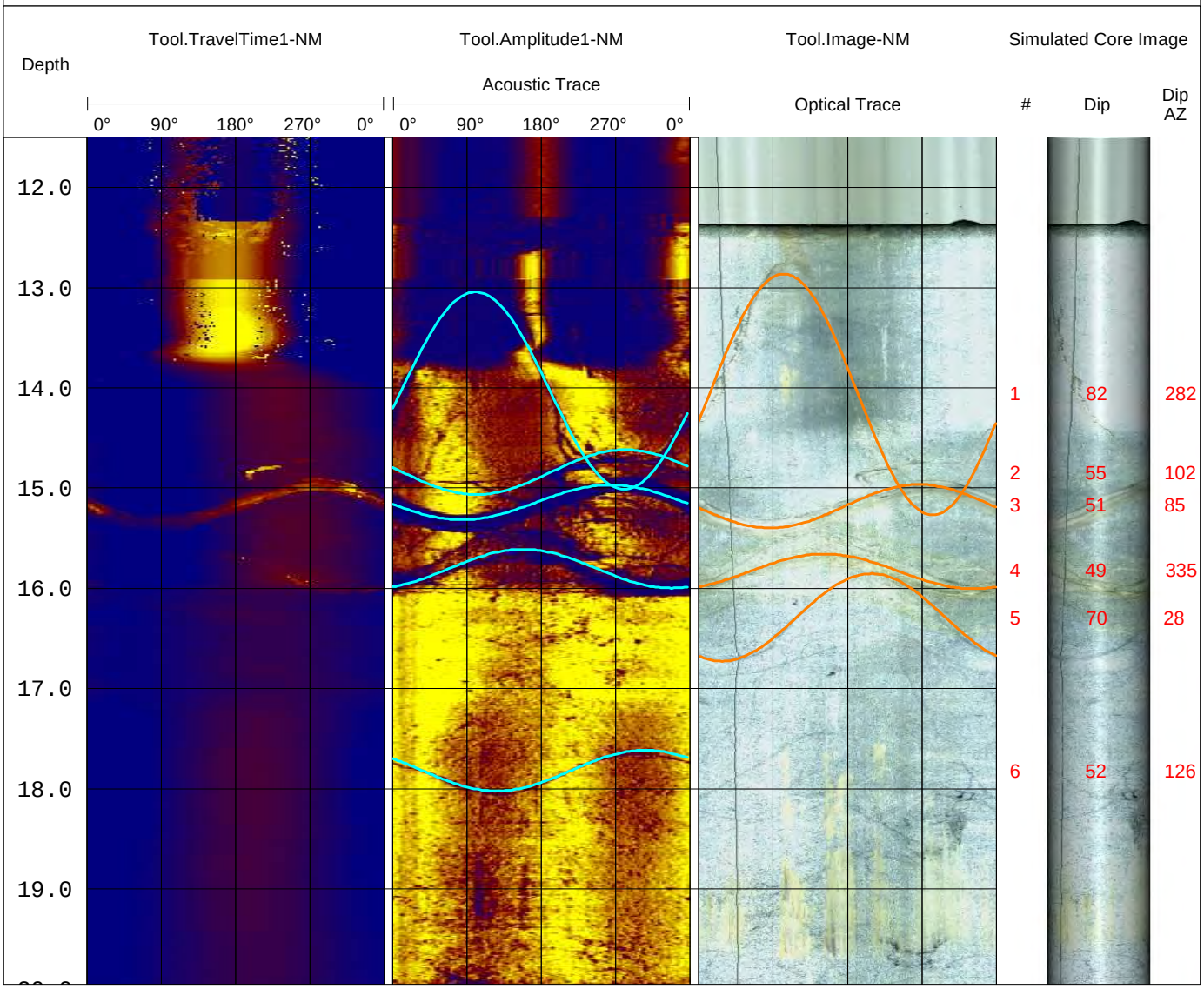
89.0														

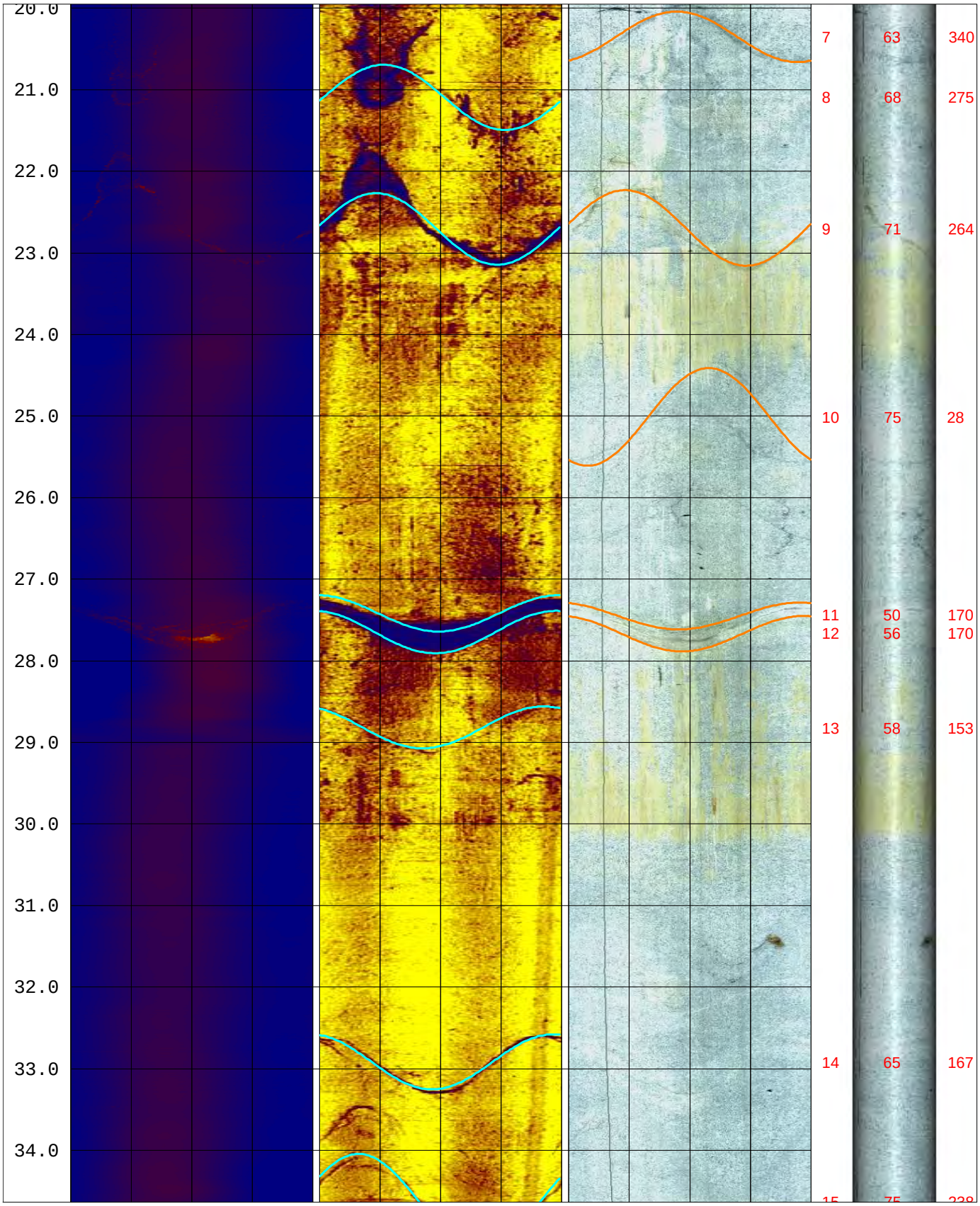
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2008 Geotechnical Program

Date Logged:	November 8, 2008	Borehole ID:	RKS-42-08
File Name:	RKS4208-1M.wcl	Logged By:	C Mills / F G Kruger

Notes:

1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.




20.0
21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
30.0
31.0
32.0
33.0
34.0
7 63 340
8 68 275
9 71 264
10 75 28
11 50 170
12 56 170
13 58 153
14 65 167

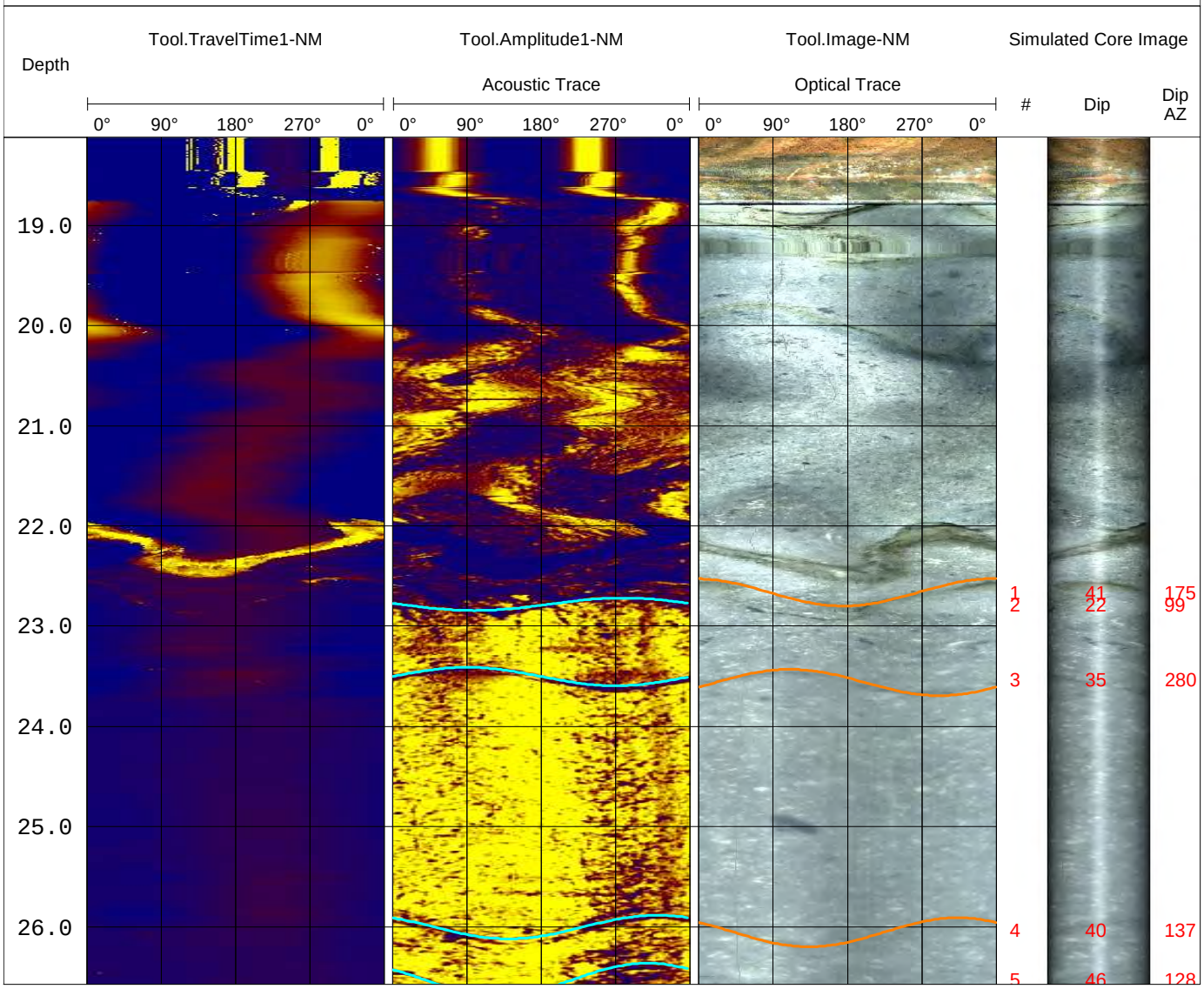
35.0												

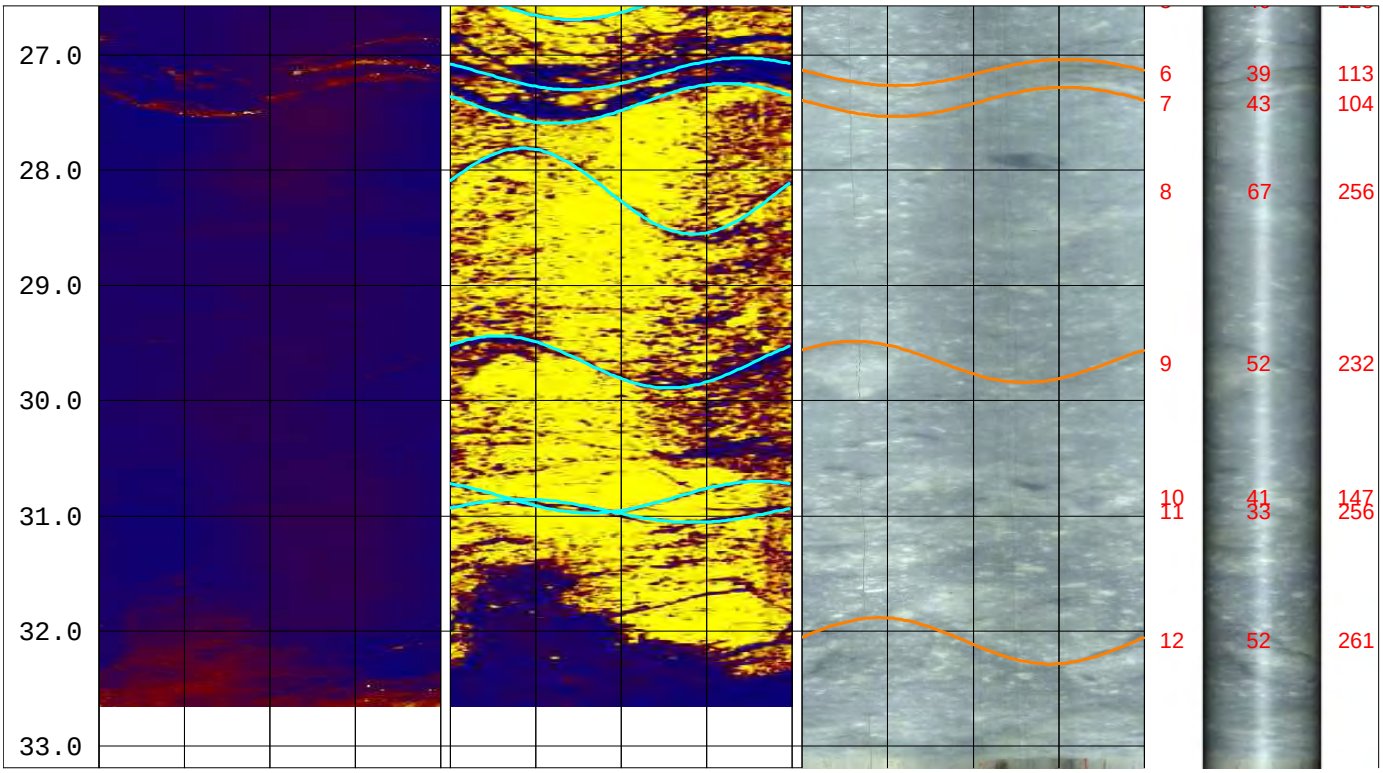
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2008 Geotechnical Program

Date Logged:	November 8, 2008	Borehole ID:	RKS-43-08
File Name:	RKS4308-1M.wcl	Logged By:	C Mills / F G Kruger

Notes:

1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.



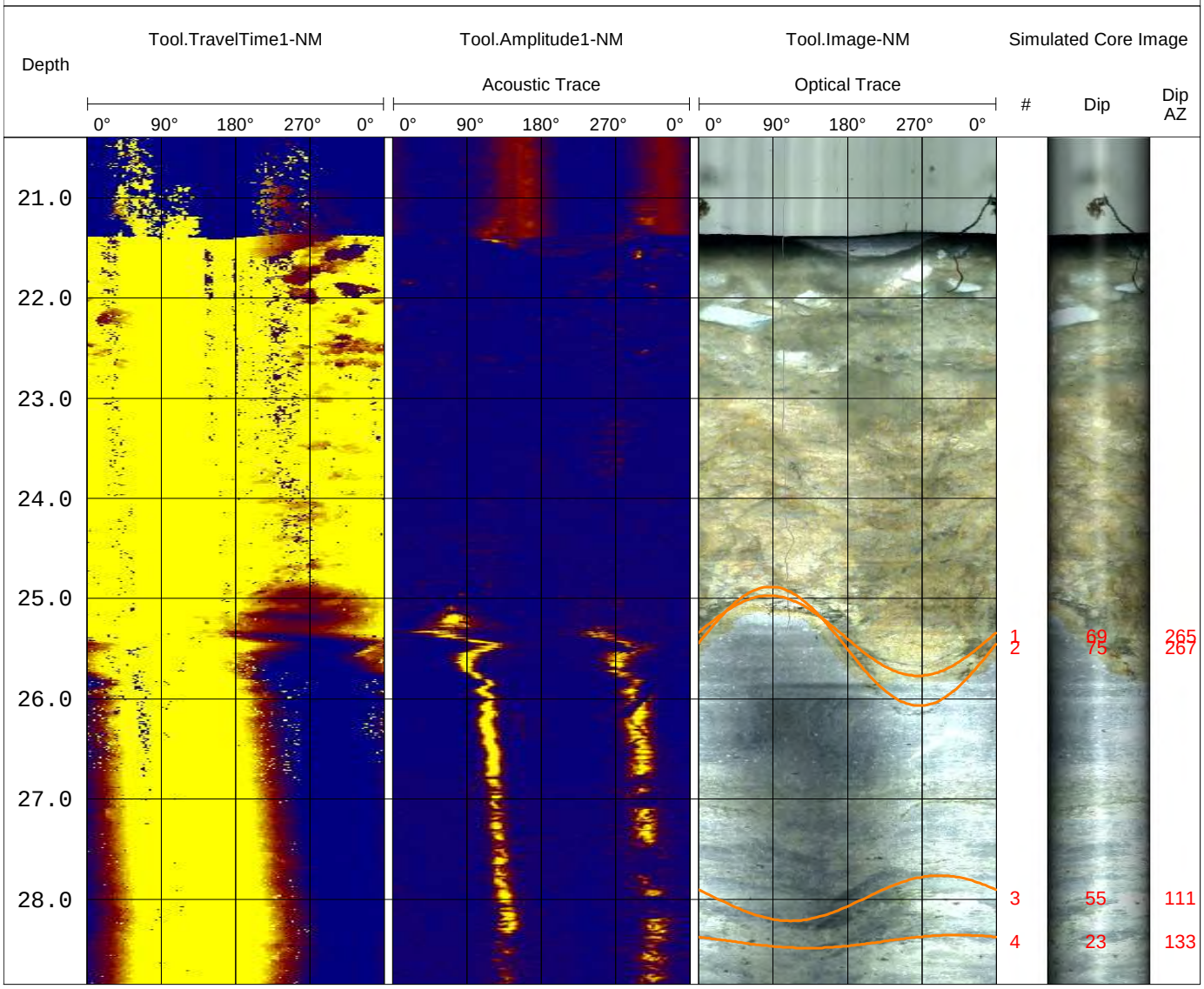

27.0
28.0
29.0
30.0
31.0
32.0
33.0
6 39 113
7 43 104
8 67 256
9 52 232
10 41 147
11 33 256
12 52 261

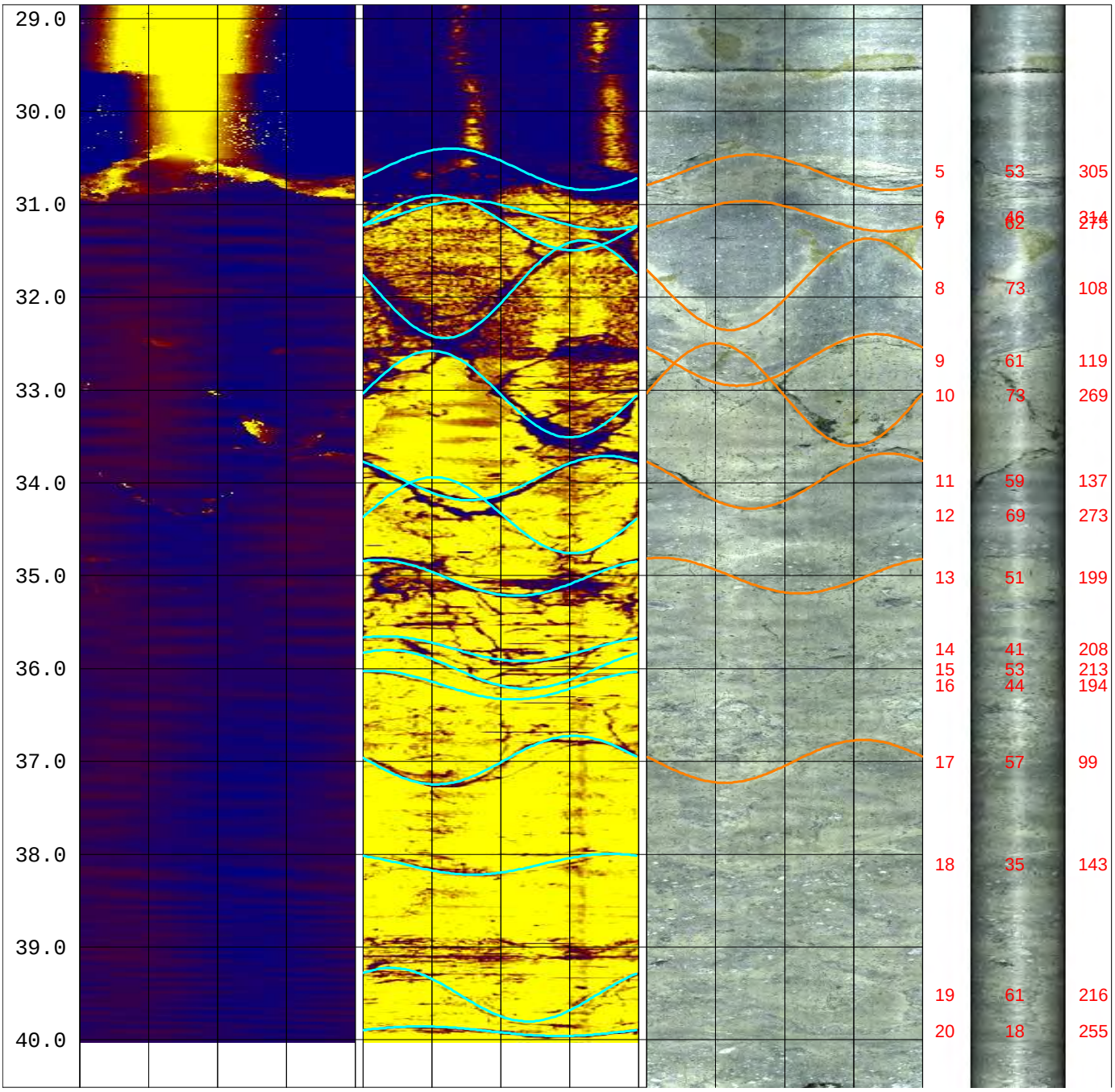
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2008 Geotechnical Program

Date Logged:	November 8, 2008	Borehole ID:	RKS-44-08
File Name:	RKS4408-1M.wcl	Logged By:	C Mills / F G Kruger

Notes:

1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.



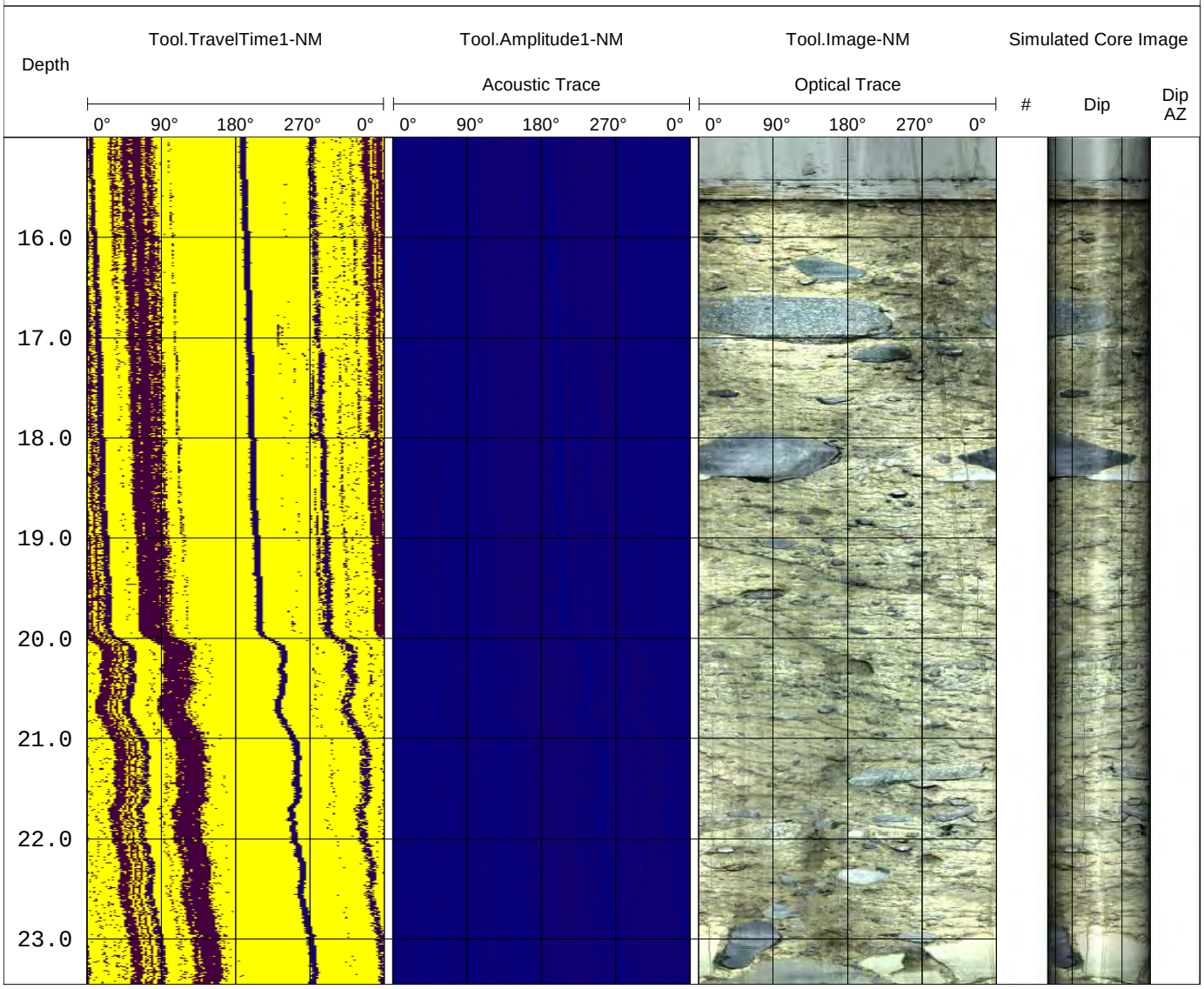

29.0
30.0
31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
5 53 305
6 46 314
7 62 275
8 73 108
9 61 119
10 73 269
11 59 137
12 69 273
13 51 199
14 41 208
15 53 213
16 44 194
17 57 99
18 35 143
19 61 216
20 18 255

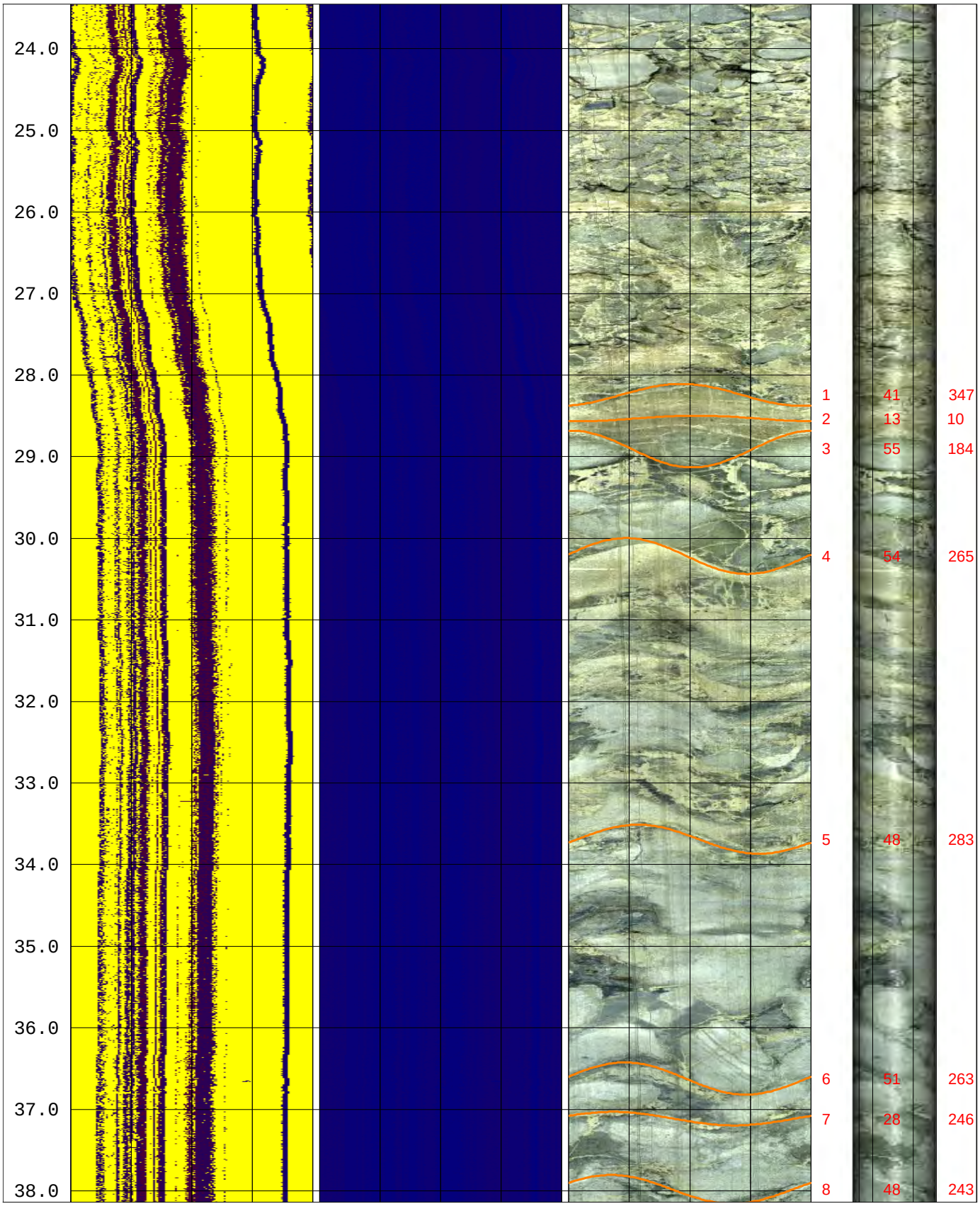
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2008 Geotechnical Program

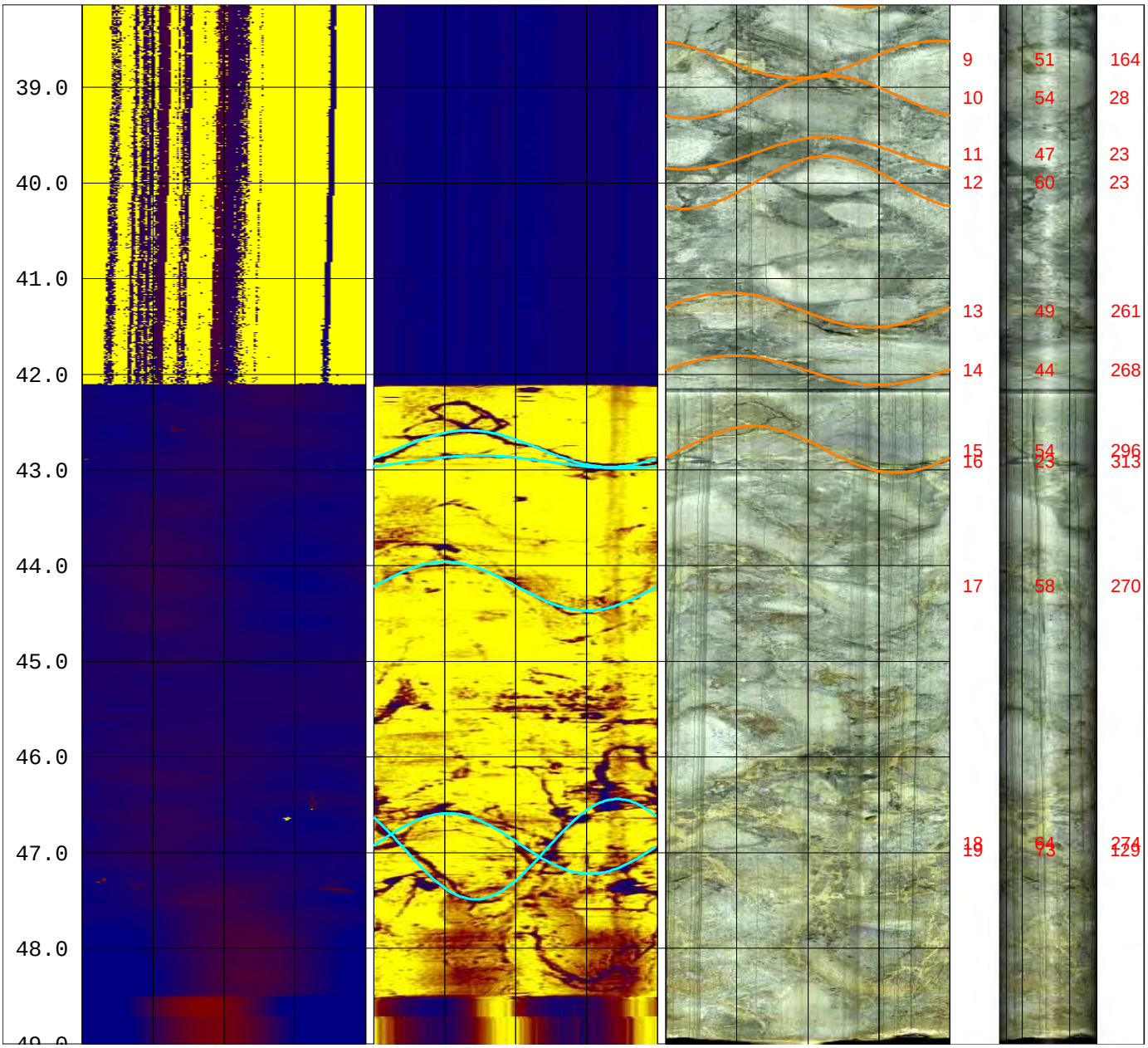
Date Logged:	November 6, 2008	Borehole ID:	RKS-45-08
File Name:	RKS4508-1M.wcl	Logged By:	F G Kruger

Notes:

1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.




24.0
25.0
26.0
27.0
28.0
29.0
30.0
31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
1 41 347
2 13 10
3 55 184
4 54 265
5 48 283
6 51 263
7 28 246
8 48 243

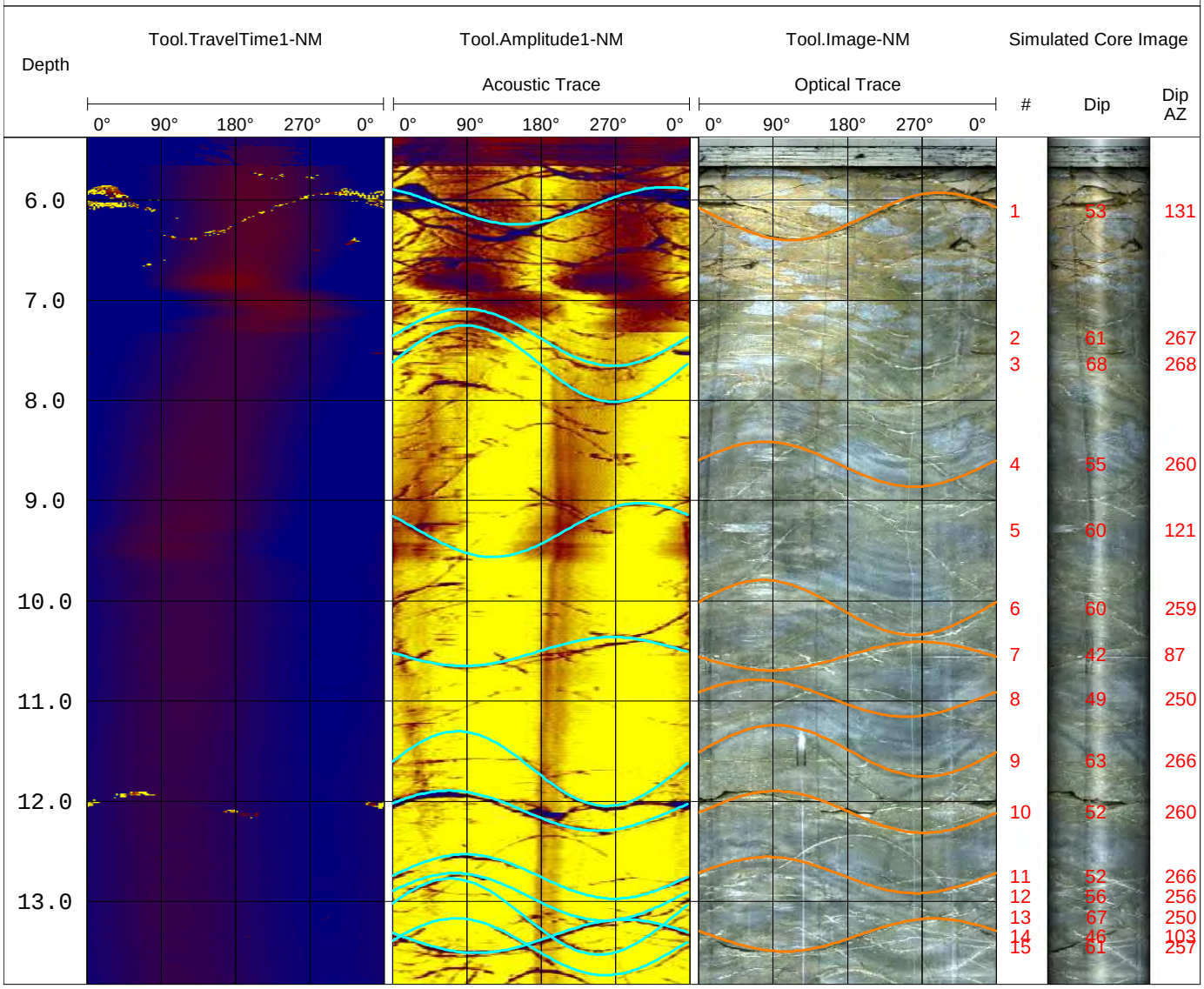

39.0
40.0
41.0
42.0
43.0
44.0
45.0
46.0
47.0
48.0
9 51 164
10 54 28
11 47 23
12 60 23
13 49 261
14 44 268
15 54 296
16 23 313
17 58 270
18 64 274
19 73 129

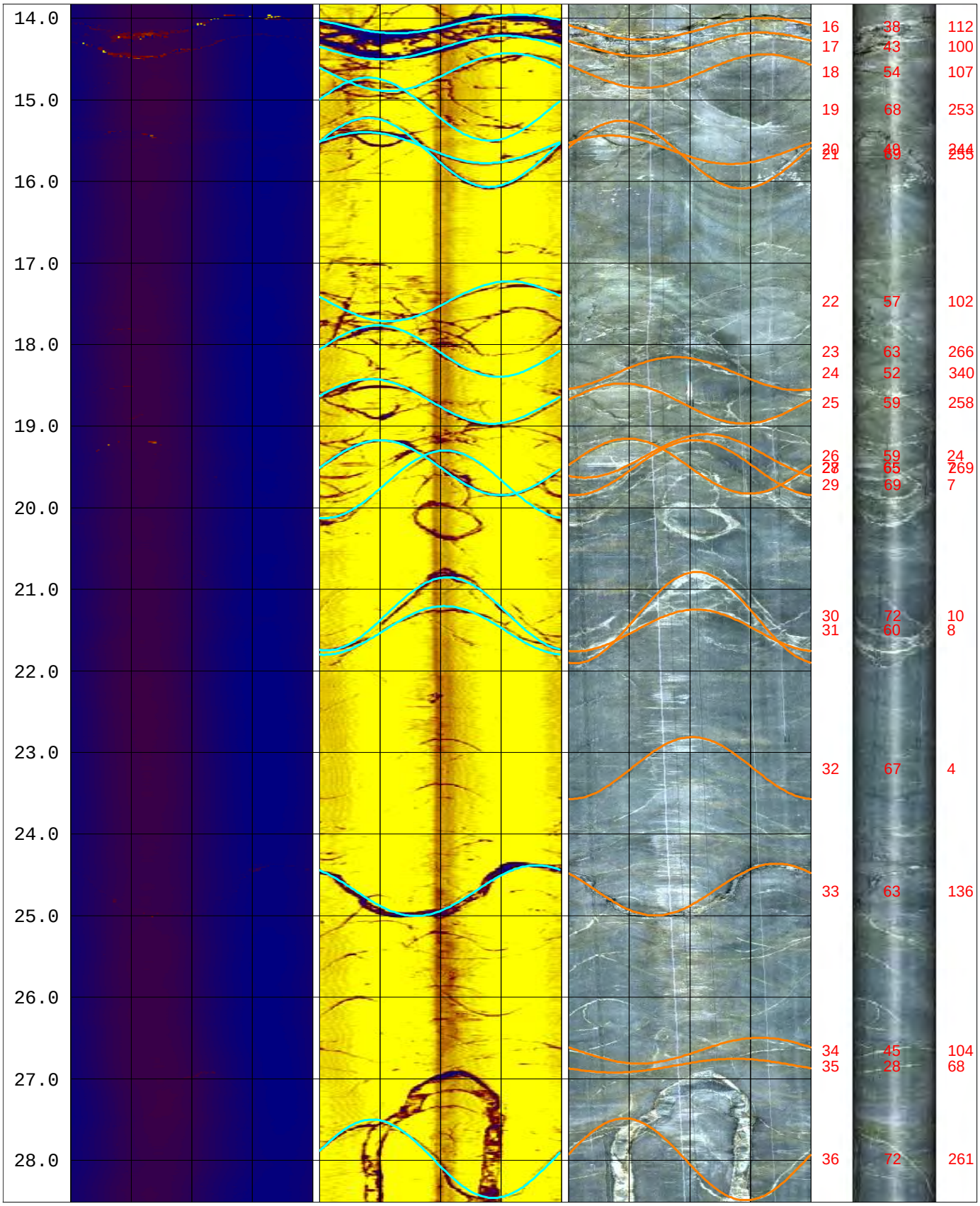
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2008 Geotechnical Program

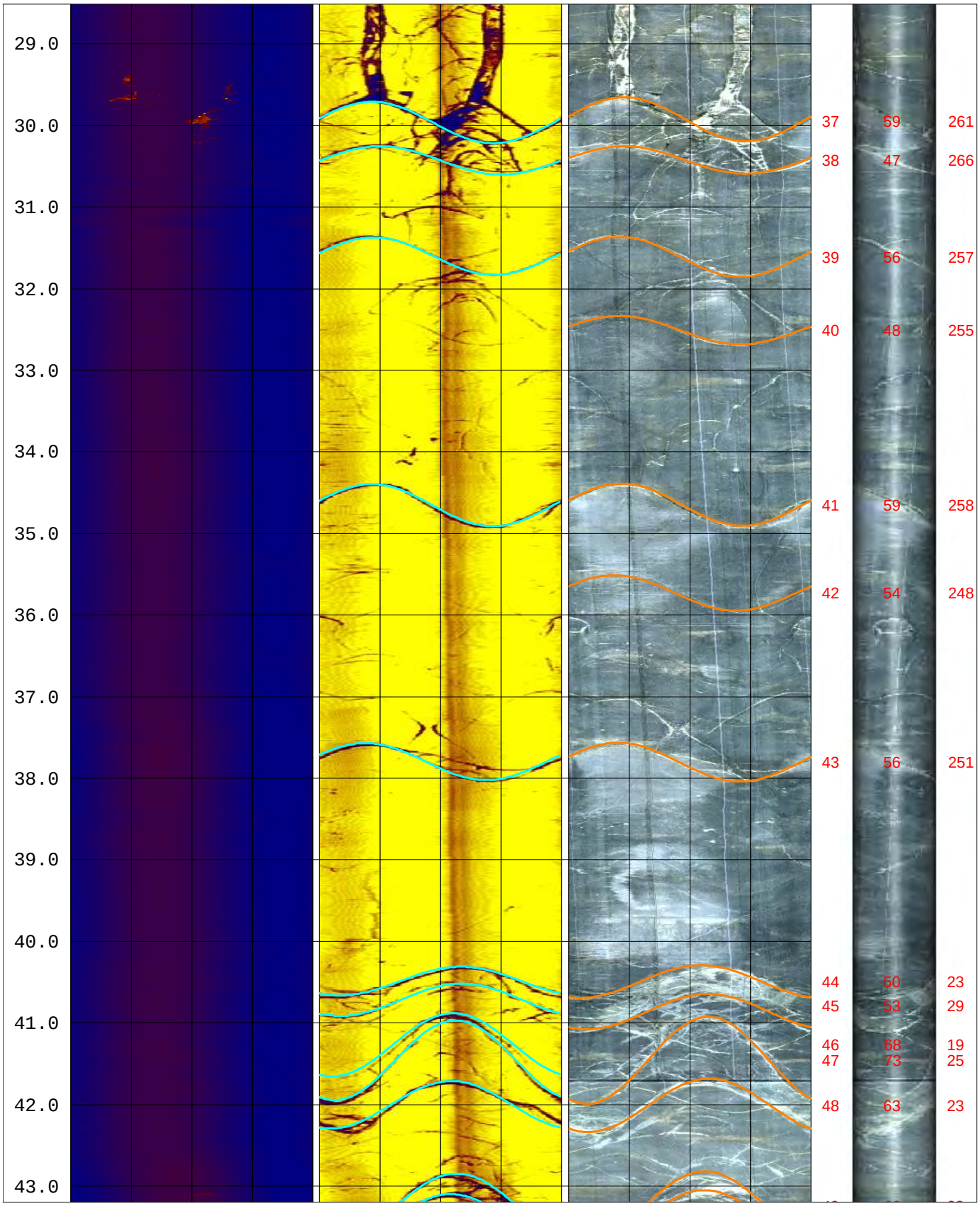
Date Logged:	November 7, 2008	Borehole ID:	RKS-46-08
File Name:	RKS4608-1M.wcl	Logged By:	C Mills / F G Kruger

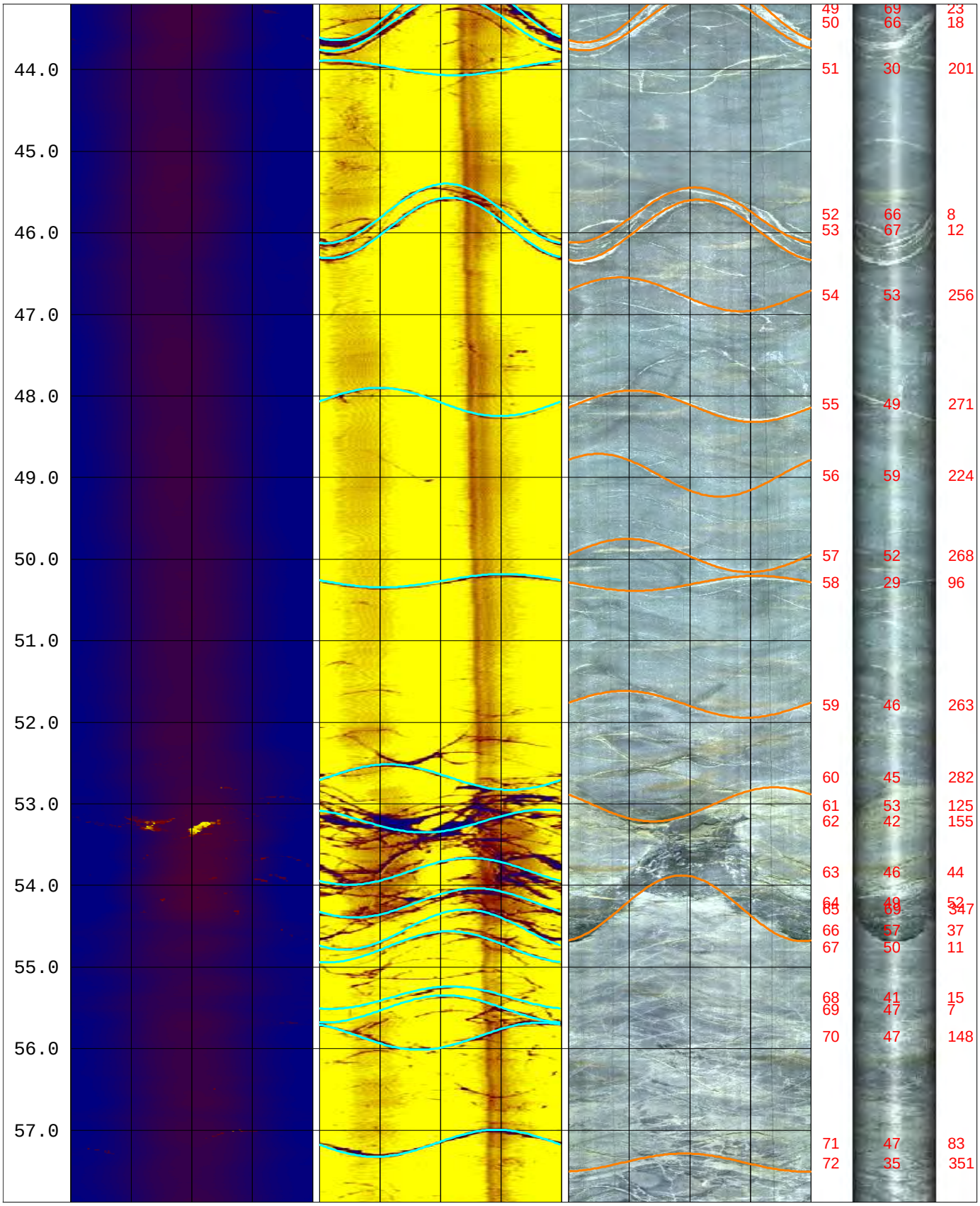
Notes:

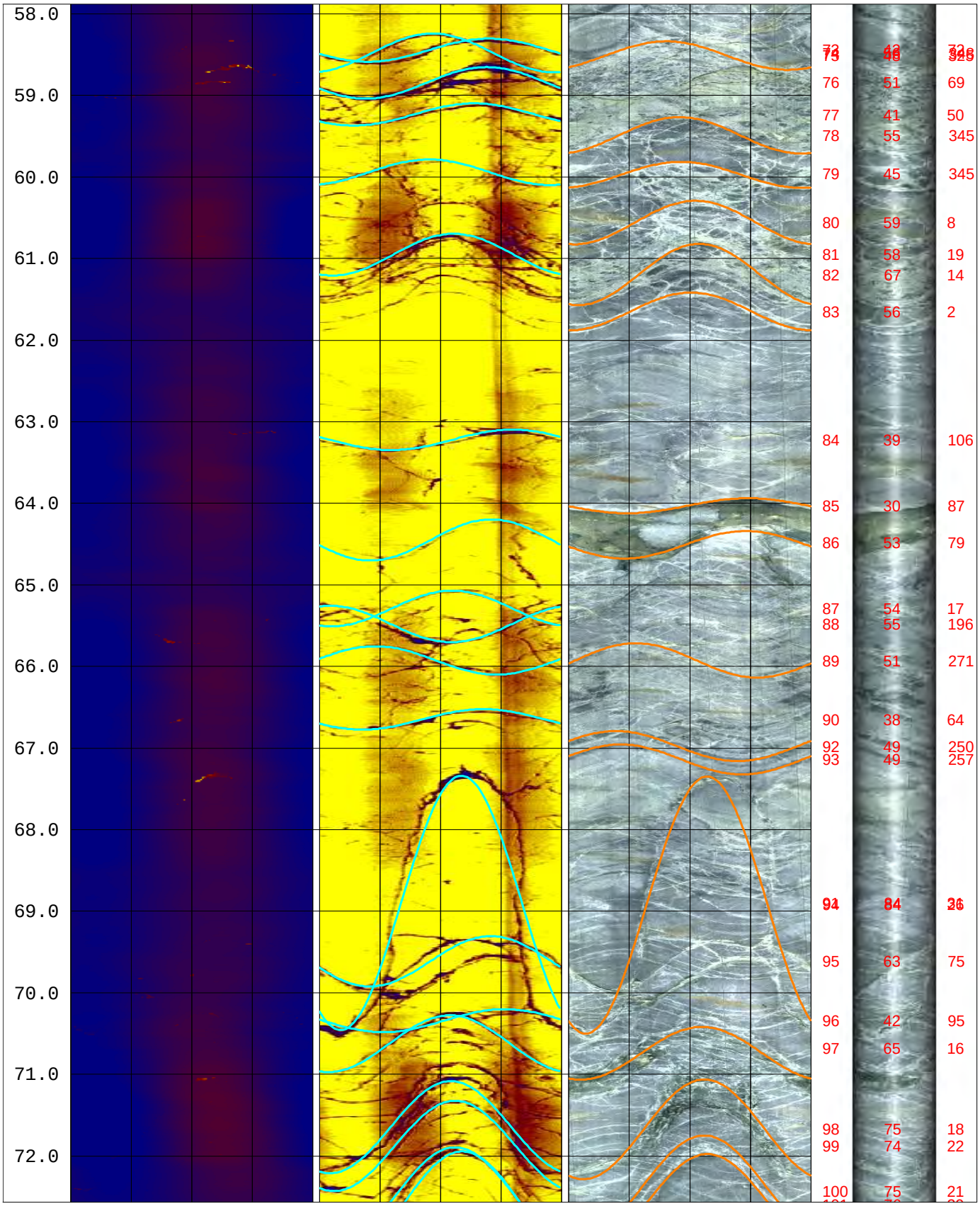
1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.

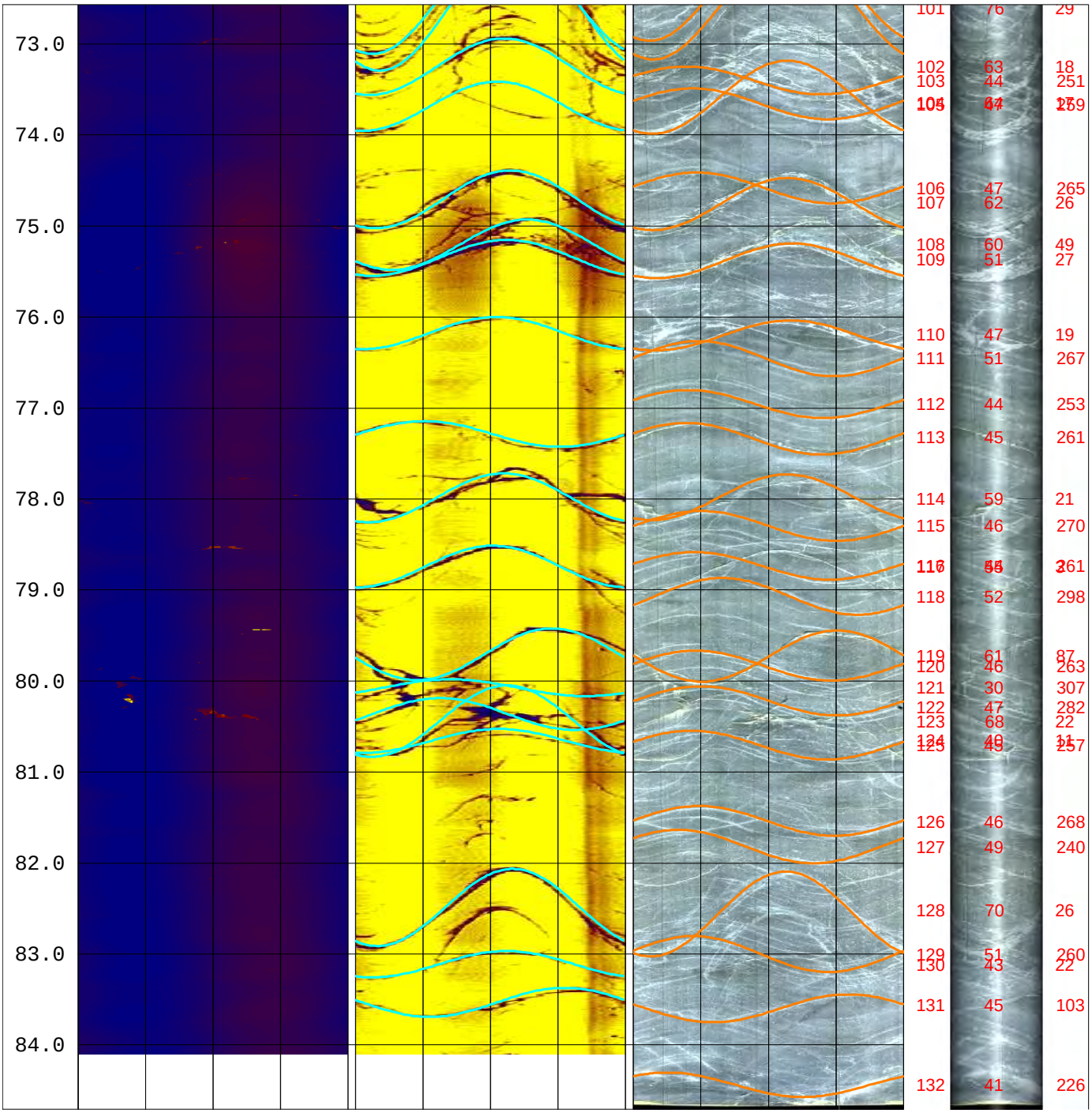



14.0
15.0
16.0
17.0
18.0
19.0
20.0
21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
16 38 112
17 43 100
18 54 107
19 68 253
20 49 244
21 69 255
22 57 102
23 63 266
24 52 340
25 59 258
26 59 24
27 65 269
28
29 69 7
30 72 10
31 60 8
32 67 4
33 63 136
34 45 104
35 28 68
36 72 261


29.0
30.0
31.0
32.0
33.0
34.0
35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
37 59 261
38 47 266
39 56 257
40 48 255
41 59 258
42 54 248
43 56 251
44 50 23
45 53 29
46 68 19
47 73 25
48 63 23


44.0
45.0
46.0
47.0
48.0
49.0
50.0
51.0
52.0
53.0
54.0
55.0
56.0
57.0
49 69 23
50 66 18
51 30 201
52 66 8
53 67 12
54 53 256
55 49 271
56 59 224
57 52 268
58 29 96
59 46 263
60 45 282
61 53 125
62 42 155
63 46 44
64 49 52
65 69 347
66 57 37
67 50 11
68 41 15
69 47 7
70 47 148
71 47 83
72 35 351


58.0
59.0
60.0
61.0
62.0
63.0
64.0
65.0
66.0
67.0
68.0
69.0
70.0
71.0
72.0
76 51 69
77 41 50
78 55 345
79 45 345
80 59 8
81 58 19
82 67 14
83 56 2
84 39 106
85 30 87
86 53 79
87 54 17
88 55 196
89 51 271
90 38 64
92 49 250
93 49 257
95 63 75
96 42 95
97 65 16
98 75 18
99 74 22
100 75 21

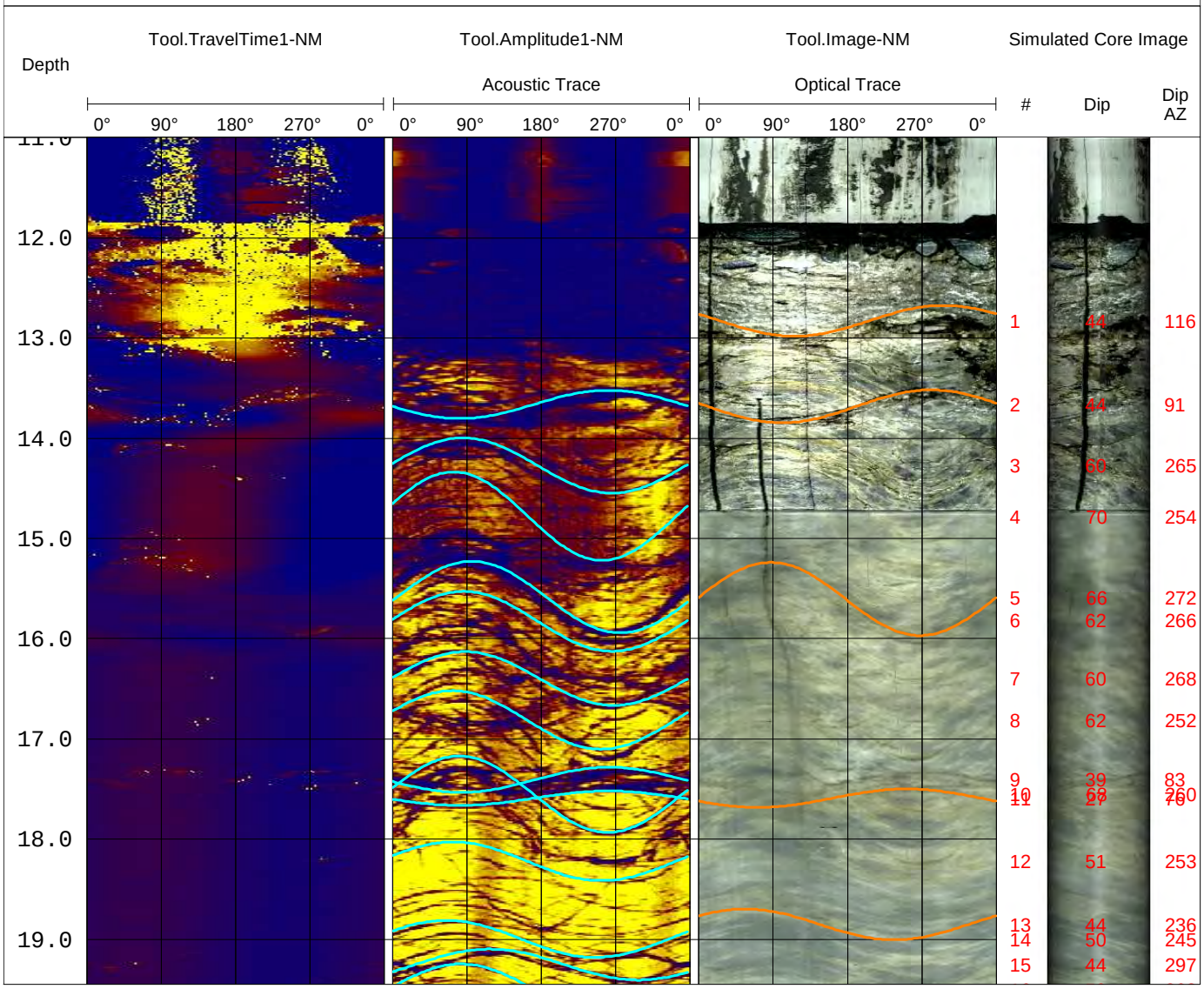

73.0
74.0
75.0
76.0
77.0
78.0
79.0
80.0
81.0
82.0
83.0
84.0
101 76 29
102 63 18
103 44 251
104 64 17
105 64 259
106 47 265
107 62 26
108 60 49
109 51 27
110 47 19
111 51 267
112 44 253
113 45 261
114 59 21
115 46 270
116 55 261
117 55 3
118 52 298
119 61 87
120 46 263
121 30 307
122 47 282
123 68 22
124 40 11
125 45 257
126 46 268
127 49 240
128 70 26
129 51 260
130 43 22
131 45 103
132 41 226

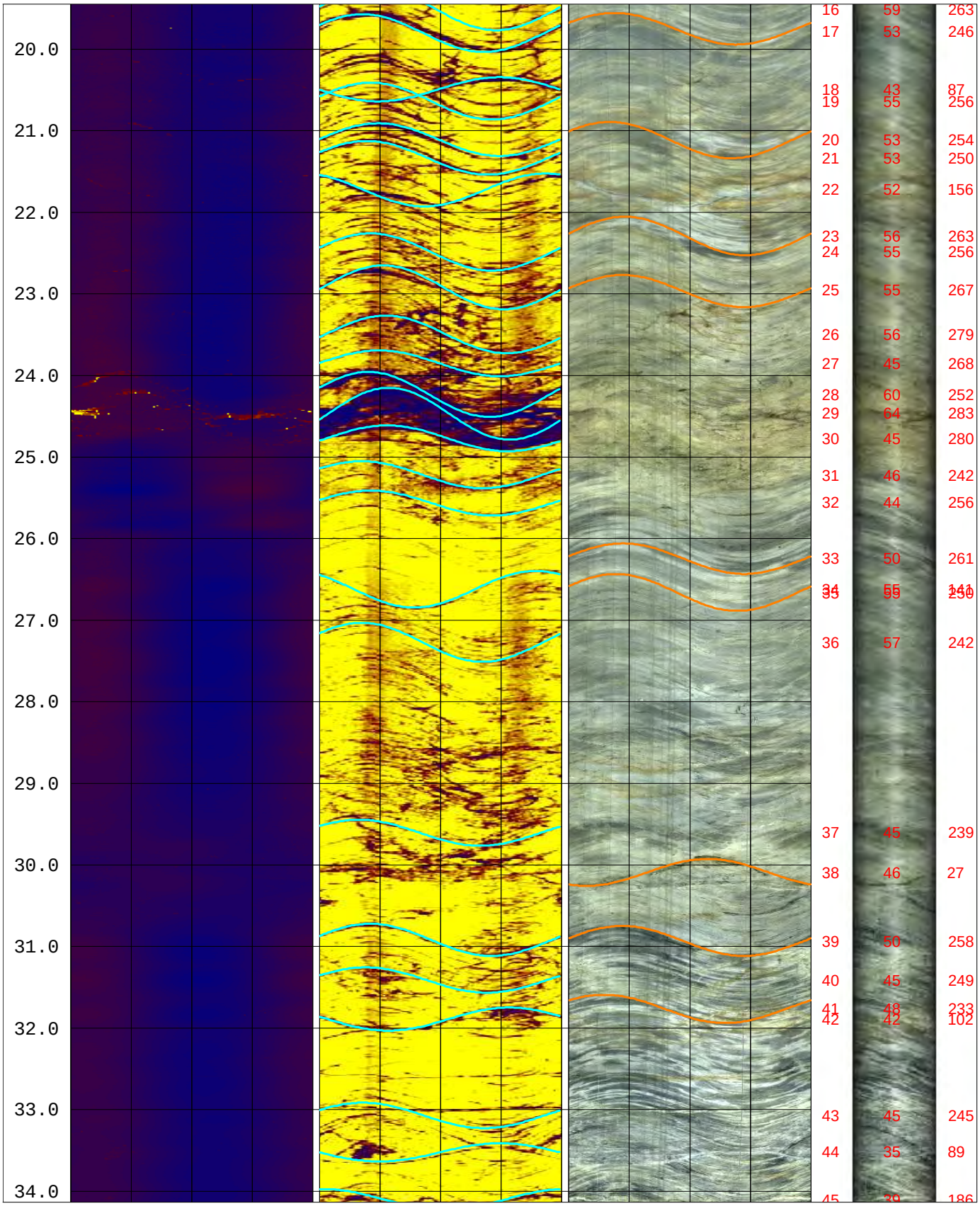
COBL CRUX Oriented Borehole Logging	Company	Washington State Dept. of Transportation
	Location:	Interstate 90 - Snoqualmie Pass
	Project:	2008 Geotechnical Program

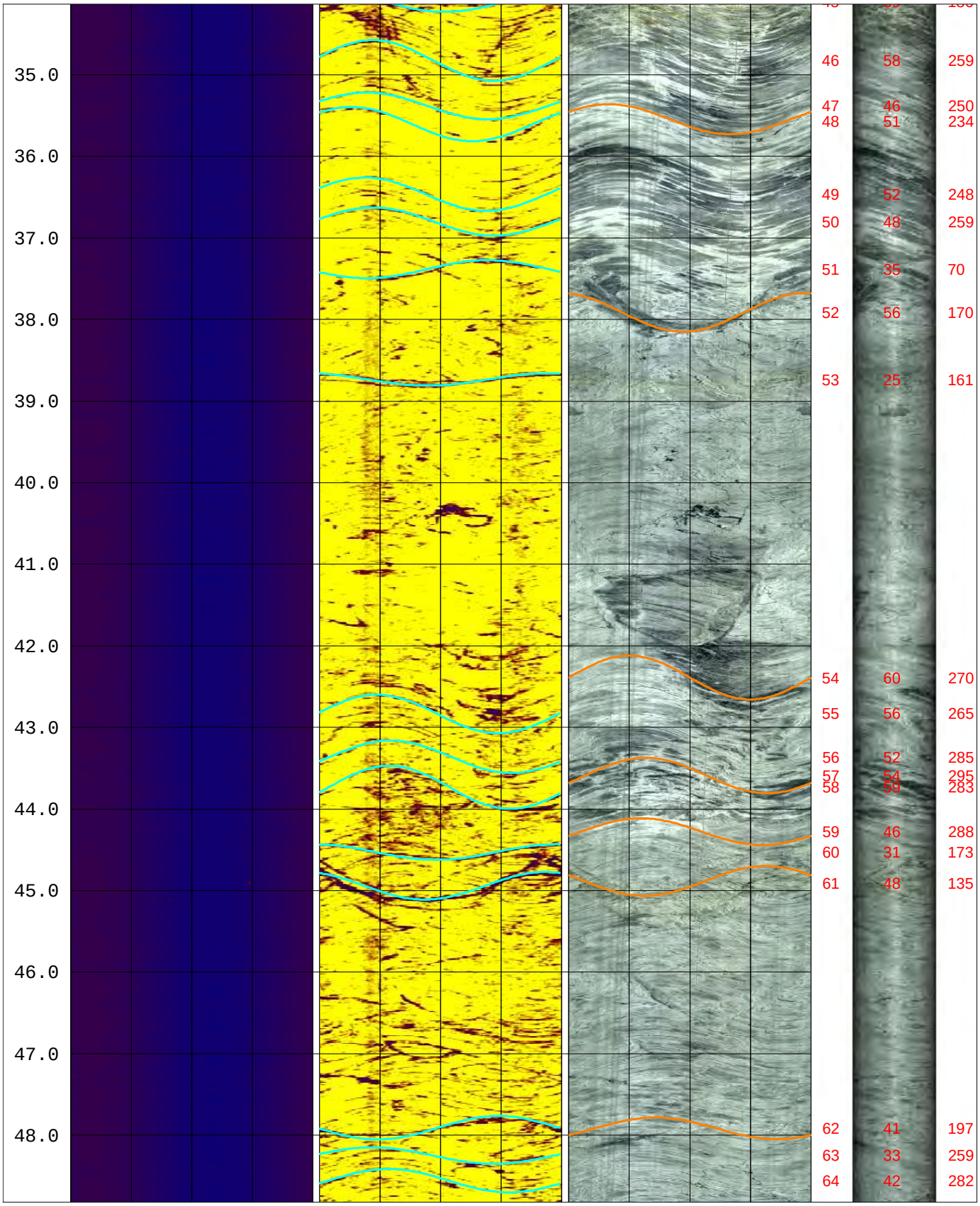
Date Logged:	October 25, 2008	Borehole ID:	RKS-47-08
File Name:	RKS4708-1M.wcl	Logged By:	F G Kruger

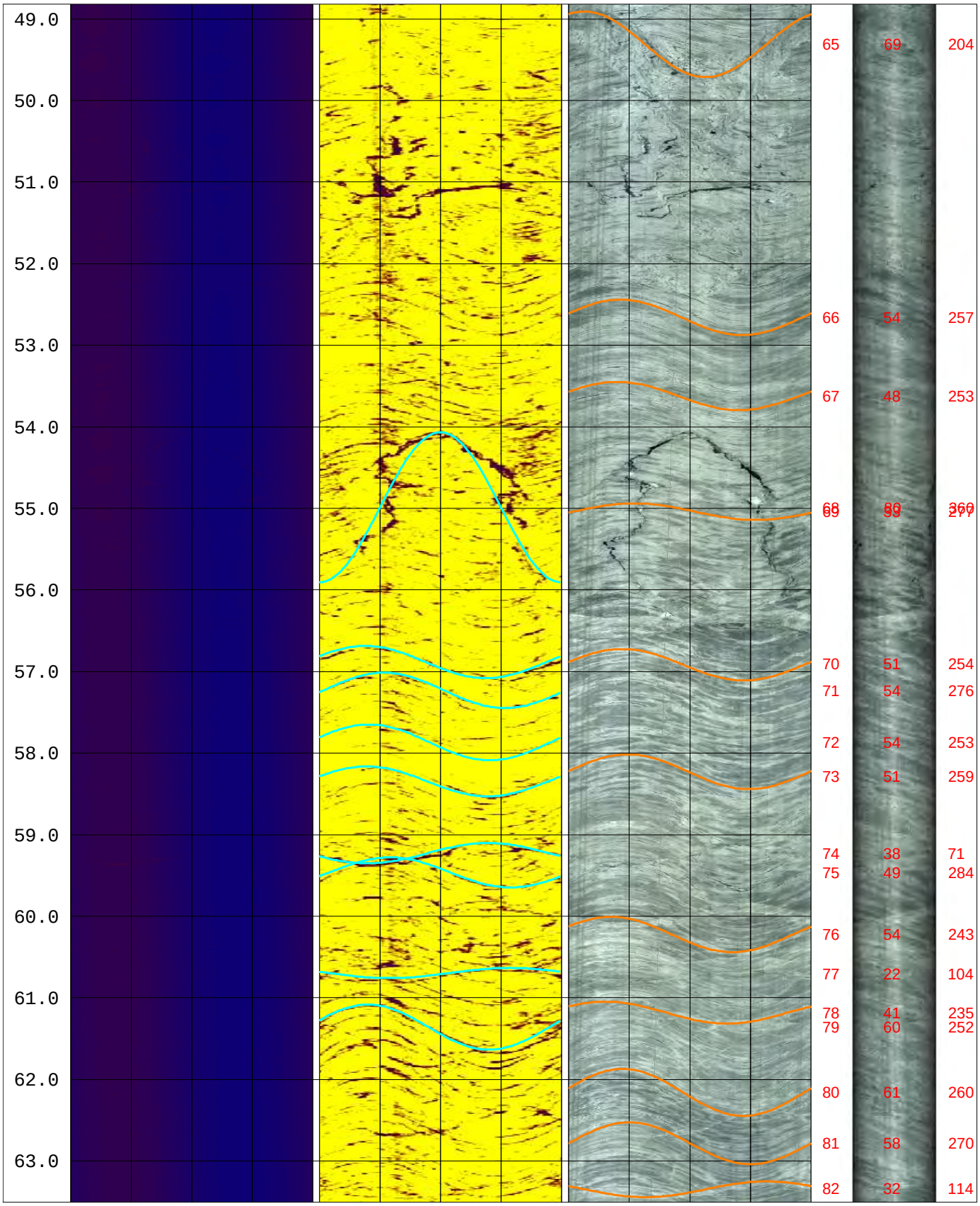
Notes:

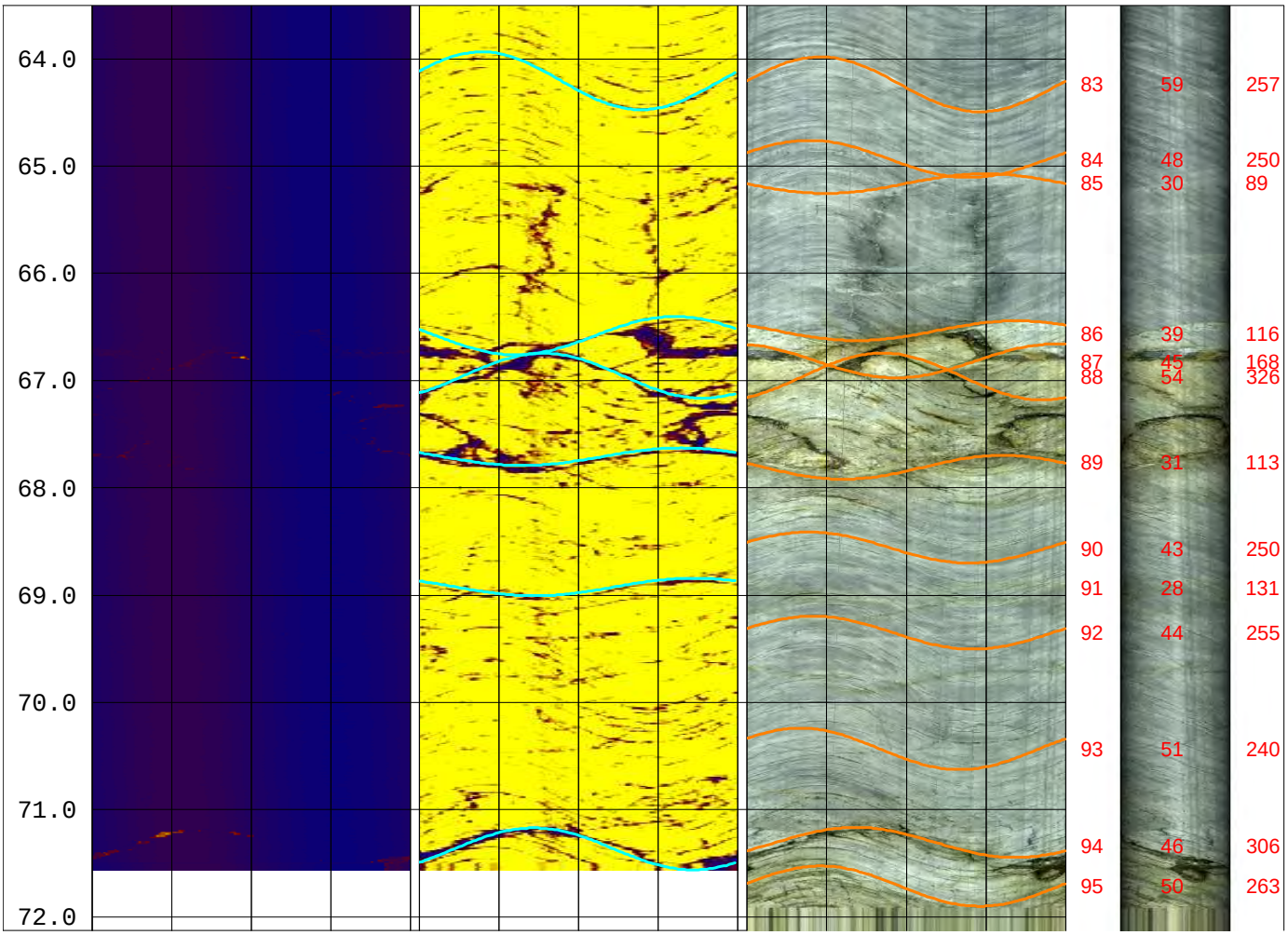
1) Azimuths reference True North. Magnetic declination of +17 degrees applied.
2) 3x Horizontal Exaggeration on Televiewer Images.
3) Dip values presented in degrees from horizontal.
4) Dip direction presented in degrees of azimuth.
5) Simulated Core Image is viewed from north, east on left, west on right.




20.0
21.0
22.0
23.0
24.0
25.0
26.0
27.0
28.0
29.0
30.0
31.0
32.0
33.0
34.0
16 59 263
17 53 246
18 43 87
19 55 256
20 53 254
21 53 250
22 52 156
23 56 263
24 55 256
25 55 267
26 56 279
27 45 268
28 60 252
29 64 283
30 45 280
31 46 242
32 44 256
33 50 261
36 57 242
37 45 239
38 46 27
39 50 258
40 45 249
41 48 233
42 42 102
43 45 245
44 35 89


35.0
36.0
37.0
38.0
39.0
40.0
41.0
42.0
43.0
44.0
45.0
46.0
47.0
48.0
46 58 259
47 46 250
48 51 234
49 52 248
50 48 259
51 35 70
52 56 170
53 25 161
54 60 270
55 56 265
56 52 285
57 54 295
58 59 283
59 46 288
60 31 173
61 48 135
62 41 197
63 33 259
64 42 282


49.0
50.0
51.0
52.0
53.0
54.0
55.0
56.0
57.0
58.0
59.0
60.0
61.0
62.0
63.0
65 69 204
66 54 257
67 48 253
68 89 360
69 55 277
70 51 254
71 54 276
72 54 253
73 51 259
74 38 71
75 49 284
76 54 243
77 22 104
78 41 235
79 60 252
80 61 260
81 58 270
82 32 114


64.0
65.0
66.0
67.0
68.0
69.0
70.0
71.0
72.0
83 59 257
84 48 250
85 30 89
86 39 116
87 45 168
88 54 326
89 31 113
90 43 250
91 28 131
92 44 255
93 51 240
94 46 306
95 50 263

Interstate 90 East Hyak Realignment Project
2006 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: H-110-06

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
						1	16.89	58	011
						2	18.76	48	112
						3	19.11	56	114
						4	20.17	80	015
						5	20.99	52	112
						6	21.49	53	103
						7	22.10	56	271
						8	22.22	43	277
						9	22.86	77	293
						10	22.95	75	295
						11	23.10	71	289
						12	25.35	81	341
						13	27.73	68	023
						14	28.40	63	254
						15	28.76	47	303
						16	29.26	48	130
						17	29.40	54	133
						18	30.34	55	115
						19	31.03	65	340
						20	31.31	72	278
						21	32.06	73	010
						22	33.15	54	131
						23	33.49	74	273
						24	34.03	76	280
						25	34.49	15	130
						26	35.03	26	131
						27	35.56	80	326
						28	37.19	73	354
						29	37.51	63	298
						30	37.85	62	306
						31	39.65	58	206
						32	40.54	56	102
						33	40.84	46	121
						34	41.55	47	235
						35	42.44	06	179
						36	43.13	63	087
						37	43.18	53	092
						38	43.70	09	100
						39	45.02	75	279
						40	46.33	25	121
						41	46.39	51	205
						42	46.43	18	110
						43	48.55	17	083

Interstate 90 East Hyak Realignment Project
2006 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: H-110-06

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
						44	50.30	11	088
						45	52.99	17	105
						46	61.78	67	265
						47	62.07	77	280
						48	69.48	07	277
						49	70.67	19	117
						50	70.99	22	118
						51	72.32	54	285
						52	73.18	22	200
						53	73.64	27	073
						54	74.13	13	223
						55	74.30	17	233
						56	74.62	64	001
						57	75.70	62	143
						58	77.50	70	348
						59	82.31	55	201
						60	84.92	45	214
						61	90.36	34	219
						62	91.23	49	214
						63	93.44	27	233
						64	94.86	30	098
						65	94.99	31	074
						66	101.01	70	310
						67	101.76	23	109
						68	101.87	22	107
						69	102.02	28	103
						70	102.14	45	185
						71	104.76	42	297
						72	112.36	47	269
						73	114.57	32	025
						74	115.33	27	014
						75	115.59	56	282
						76	115.62	19	093
						77	116.87	54	220
						78	118.25	44	288
						79	121.44	06	078
						80	124.85	06	103
						81	127.43	57	299
						82	128.29	54	304
						83	128.50	65	298
						84	128.78	58	301
						85	129.47	17	161
						86	129.70	21	093

Interstate 90 East Hyak Realignment Project
2006 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: H-110-06

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
						87	129.79	28	140
						88	130.26	26	235
						89	130.87	67	290
						90	131.43	57	277
						91	131.58	62	288
						92	132.37	56	267
						93	133.06	35	024
						94	133.20	40	282
						95	135.07	50	091
						96	136.58	38	318
						97	136.73	40	298
						98	136.89	41	310
						99	138.10	71	220
						100	140.13	33	075
						101	140.49	25	075
						102	140.98	23	076
						103	141.34	36	066
						104	141.74	35	060

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-08-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
23.83	51	248				1	23.83	51	248
27.27	56	260				2	27.27	56	260
39.04	45	272				3	39.04	45	272
40.21	46	323				4	40.21	46	323
40.24	74	289				5	40.24	74	289
42.61	55	21				6	42.61	55	021
45.38	44	238				7	45.38	44	238
46.75	39	284				8	46.75	39	284
46.91	44	39				9	46.91	44	039
50.23	30	26				10	50.23	30	026
50.51	20	39				11	50.51	20	039
50.60	29	45				12	50.60	29	045
51.44	22	16				13	51.44	22	016
51.91	25	45				14	51.91	25	045
52.44	58	24				15	52.44	58	024
53.76	47	248				16	53.76	47	248
54.79	9	14				17	54.79	09	014
58.27	40	241				18	58.27	40	241
61.04	49	251	61.01	50	245	19	61.03	50	248
61.37	45	238	61.35	48	225	20	61.36	47	232
			61.39	16	49	21	61.39	16	049
61.63	46	232	61.64	45	230	22	61.64	46	231
62.10	44	238	62.13	45	233	23	62.12	45	235
65.62	17	339	65.62	18	31	24	65.62	17	005
			65.69	13	33	25	65.69	13	033
			66.10	50	207	26	66.10	50	207
			66.13	29	16	27	66.13	29	016
66.60	22	18	66.59	16	350	28	66.60	19	004
			66.66	24	3	29	66.66	24	003
			66.85	25	21	30	66.85	25	021
			67.06	46	203	31	67.06	46	203
			67.17	63	339	32	67.17	63	339
			68.00	71	325	33	68.00	71	325
			68.62	25	29	34	68.62	25	029
			68.69	23	41	35	68.69	23	041
			68.92	18	11	36	68.92	18	011
			69.12	33	46	37	69.12	33	046
			69.46	56	317	38	69.46	56	317
			70.12	58	227	39	70.12	58	227
71.18	62	1	71.17	62	359	40	71.18	62	360
71.86	55	344	71.83	47	338	41	71.85	51	341
			71.89	54	10	42	71.89	54	010
72.20	57	228	72.22	59	225	43	72.21	58	227
72.52	51	228	72.49	50	225	44	72.51	51	227

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-08-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
			73.21	42	241	45	73.21	42	241
			73.62	44	232	46	73.62	44	232
73.93	61	231	73.91	59	228	47	73.92	60	229
			75.30	33	230	48	75.30	33	230
75.45	45	235	75.49	45	228	49	75.47	45	232
			75.93	62	231	50	75.93	62	231
			77.05	63	337	51	77.05	63	337
			79.90	15	5	52	79.90	15	005
			80.05	17	358	53	80.05	17	358
80.22	21	14	80.21	21	11	54	80.22	21	013
			80.44	21	305	55	80.44	21	305
81.63	32	21	81.60	23	17	56	81.62	27	019
			82.06	13	338	57	82.06	13	338
82.61	20	19	82.56	20	19	58	82.59	20	019
			82.69	23	11	59	82.69	23	011
83.11	16	11	83.11	13	86	60	83.11	14	048
83.60	61	246	83.69	52	243	61	83.65	56	245
			84.24	22	69	62	84.24	22	069
			84.71	22	17	63	84.71	22	017
			85.62	23	29	64	85.62	23	029
			85.85	23	14	65	85.85	23	014
			88.01	60	315	66	88.01	60	315
			89.27	55	320	67	89.27	55	320
			89.66	48	332	68	89.66	48	332
90.37	9	99				69	90.37	09	099
91.32	10	360	91.40	8	352	70	91.36	09	356
			92.77	32	54	71	92.77	32	054
			92.98	23	59	72	92.98	23	059
			93.52	36	49	73	93.52	36	049
			93.66	37	53	74	93.66	37	053
			93.68	60	302	75	93.68	60	302
			93.90	22	37	76	93.90	22	037
			94.23	26	39	77	94.23	26	039
			94.63	49	44	78	94.63	49	044
			94.81	38	242	79	94.81	38	242
			96.22	18	233	80	96.22	18	233
			96.33	44	44	81	96.33	44	044
96.75	56	321				82	96.75	56	321
100.00	36	240				83	100.00	36	240
			100.14	12	250	84	100.14	12	250
			100.48	28	221	85	100.48	28	221
100.78	22	233	100.79	23	238	86	100.79	23	236
			101.39	15	305	87	101.39	15	305

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-08-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-09-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
10.35	75	337	10.32	74	332	1	10.34	74	335
			11.36	67	347	2	11.36	67	347
			11.50	30	219	3	11.50	30	219
			11.75	39	248	4	11.75	39	248
			12.41	71	327	5	12.41	71	327
			14.04	81	323	6	14.04	81	323
			14.12	75	319	7	14.12	75	319
14.91	79	321	14.97	79	323	8	14.94	79	322
18.33	77	323	18.31	77	312	9	18.32	77	317
25.98	38	208	25.95	38	208	10	25.97	38	208
			26.15	38	216	11	26.15	38	216
			26.18	74	332	12	26.18	74	332
27.36	38	213	27.33	38	206	13	27.35	38	210
			27.56	41	251	14	27.56	41	251
31.81	50	063	31.84	53	060	15	31.83	52	061
33.02	65	323	33.04	66	315	16	33.03	66	319
35.95	76	061	35.94	76	056	17	35.95	76	058
43.88	79	316	43.87	79	308	18	43.88	79	312
			44.44	54	302	19	44.44	54	302
			44.70	58	302	20	44.70	58	302
44.71	73	316	44.74	75	306	21	44.73	74	311
47.67	67	095	47.68	67	090	22	47.68	67	092
49.25	43	308	49.25	41	318	23	49.25	42	313
50.74	61	086	50.77	63	093	24	50.76	62	090
			50.98	56	327	25	50.98	56	327
52.83	60	085	52.83	60	083	26	52.83	60	084
52.88	48	334	52.88	48	338	27	52.88	48	336
53.43	60	330	53.43	60	330	28	53.43	60	330
54.38	32	204	54.37	30	216	29	54.38	31	210
54.88	31	024	54.87	32	030	30	54.88	31	027
55.46	24	198	55.43	27	191	31	55.45	26	195
55.66	30	193	55.65	30	188	32	55.66	30	190
55.78	18	206	55.77	18	213	33	55.78	18	209
56.71	43	327	56.72	46	338	34	56.72	45	333
			56.85	38	326	35	56.85	38	326
			57.47	33	323	36	57.47	33	323
			57.54	33	310	37	57.54	33	310
57.68	26	054				38	57.68	26	054
			57.88	29	310	39	57.88	29	310
			58.10	23	104	40	58.10	23	104
58.57	22	197	58.54	21	218	41	58.56	22	207
59.06	47	312	59.06	44	323	42	59.06	45	318
59.24	51	319	59.26	51	316	43	59.25	51	318
60.30	25	149	60.31	21	151	44	60.31	23	150

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-09-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
			60.39	45	223	45	60.39	45	223
60.65	33	099	60.64	39	098	46	60.65	36	098
61.18	37	084	61.18	33	071	47	61.18	35	077
61.38	29	099	61.40	33	096	48	61.39	31	097
62.56	34	061	62.55	29	073	49	62.56	31	067
63.16	38	098	63.15	36	103	50	63.16	37	100
63.34	13	268	63.32	14	220	51	63.33	14	244
64.30	51	208				52	64.30	51	208
64.68	48	208	64.67	50	206	53	64.68	49	207
65.09	24	055	65.07	23	084	54	65.08	24	069
65.13	45	094	65.15	41	084	55	65.14	43	089
65.95	31	079	65.94	27	075	56	65.95	29	077
66.31	29	069	66.30	28	080	57	66.31	28	074
66.65	29	076				58	66.65	29	076
67.10	28	181	67.08	31	180	59	67.09	29	180
			67.20	30	134	60	67.20	30	134
			68.06	42	094	61	68.06	42	094
68.23	31	198	68.21	39	203	62	68.22	35	201
68.61	35	190	68.57	20	183	63	68.59	27	187
68.93	42	208	68.95	42	214	64	68.94	42	211
			69.15	20	026	65	69.15	20	026
			69.34	28	038	66	69.34	28	038
			69.54	30	044	67	69.54	30	044
69.55	38	293	69.54	36	284	68	69.55	37	289
			69.70	30	055	69	69.70	30	055
			69.94	33	047	70	69.94	33	047
70.12	30	056	70.12	28	051	71	70.12	29	054
			70.93	22	056	72	70.93	22	056
71.74	42	041	71.73	39	037	73	71.74	40	039
			71.79	27	013	74	71.79	27	013
72.17	25	025	72.16	22	049	75	72.17	23	037
72.67	27	031	72.68	28	028	76	72.68	27	030
			73.06	39	026	77	73.06	39	026
73.25	26	054	73.19	35	040	78	73.22	30	047
73.60	35	038	73.60	28	041	79	73.60	31	040
			73.75	48	036	80	73.75	48	036
74.68	37	058	74.67	35	049	81	74.68	36	053
			74.84	43	024	82	74.84	43	024
75.85	48	037	75.84	44	042	83	75.85	46	039
76.32	39	031	76.32	37	042	84	76.32	38	036
77.24	47	030	77.27	42	022	85	77.26	44	026
			77.43	41	024	86	77.43	41	024
			77.52	40	032	87	77.52	40	032

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-09-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
			77.84	45	033	88	77.84	45	033
			78.06	42	033	89	78.06	42	033
			78.81	45	036	90	78.81	45	036
			79.00	43	046	91	79.00	43	046
79.43	44	042	79.43	45	037	92	79.43	44	040
79.85	35	037	79.86	34	037	93	79.86	34	037
80.86	33	041	80.85	30	044	94	80.86	32	043
81.34	15	255	81.36	22	276	95	81.35	18	266
81.84	48	032	81.82	43	039	96	81.83	46	036
83.37	7	074				97	83.37	07	074
			83.38	3	205	98	83.38	03	205
83.78	67	073	83.73	67	073	99	83.76	67	073
			86.74	20	350	100	86.74	20	350
87.97	63	321	87.99	61	320	101	87.98	62	321
88.37	65	329	88.40	67	327	102	88.39	66	328
			89.46	22	045	103	89.46	22	045
92.27	20	069	92.28	24	061	104	92.28	22	065
			92.53	20	053	105	92.53	20	053
			93.80	60	347	106	93.80	60	347
			95.37	58	331	107	95.37	58	331
98.90	28	032	98.92	29	031	108	98.91	28	031
100.99	30	021	100.98	33	021	109	100.99	31	021
			101.20	41	024	110	101.20	41	024
			101.51	35	029	111	101.51	35	029
101.60	26	047	101.64	30	031	112	101.62	28	039
106.85	55	356	106.84	54	347	113	106.85	54	352
			107.07	52	345	114	107.07	52	345
			107.62	56	110	115	107.62	56	110
			108.10	37	053	116	108.10	37	053
			109.48	40	338	117	109.48	40	338
			110.25	47	346	118	110.25	47	346
			110.68	56	350	119	110.68	56	350
			111.28	45	345	120	111.28	45	345
			111.42	46	352	121	111.42	46	352
			112.03	44	338	122	112.03	44	338
			112.17	52	347	123	112.17	52	347
			112.81	37	142	124	112.81	37	142
112.99	51	007	113.00	50	019	125	113.00	51	013
			113.38	50	347	126	113.38	50	347
			114.35	60	327	127	114.35	60	327
			116.26	70	318	128	116.26	70	318
			116.66	68	317	129	116.66	68	317

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-09-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-10-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
8.36	41	184				1	8.36	41	184
10.54	54	235				2	10.54	54	235
13.72	22	203				3	13.72	22	203
14.87	27	203				4	14.87	27	203
20.24	42	257				5	20.24	42	257
32.87	54	241				6	32.87	54	241
33.35	40	223				7	33.35	40	223
33.44	37	226				8	33.44	37	226
37.74	35	245				9	37.74	35	245
39.08	71	335				10	39.08	71	335
39.50	70	337				11	39.50	70	337
39.78	72	335				12	39.78	72	335
41.56	42	242				13	41.56	42	242
47.06	39	253				14	47.06	39	253
52.40	48	6				15	52.40	48	006
53.43	49	205				16	53.43	49	205
57.70	43	230				17	57.70	43	230
65.88	33	230				18	65.88	33	230
67.40	53	7				19	67.40	53	007
69.91	74	42				20	69.91	74	042
71.85	76	295				21	71.85	76	295
91.61	76	343				22	91.61	76	343
94.03	65	334				23	94.03	65	334
99.74	35	233				24	99.74	35	233
99.86	39	234				25	99.86	39	234
101.22	30	260				26	101.22	30	260
102.96	82	41				27	102.96	82	041
104.82	39	254				28	104.82	39	254
104.91	76	355				29	104.91	76	355
105.27	58	348				30	105.27	58	348
107.00	29	237				31	107.00	29	237
108.34	49	211				32	108.34	49	211
109.32	78	40				33	109.32	78	040
111.20	82	40				34	111.20	82	040
112.08	45	257				35	112.08	45	257
116.20	31	244				36	116.20	31	244
117.20	31	221	117.18	33	217	37	117.19	32	219
			117.37	31	227	38	117.37	31	227
117.52	44	228	117.51	44	238	39	117.52	44	233
118.25	35	226				40	118.25	35	226
118.47	75	343	118.45	76	340	41	118.46	76	341
118.82	36	275	118.80	32	276	42	118.81	34	275
			119.50	33	215	43	119.50	33	215
120.40	44	206	120.42	47	200	44	120.41	46	203

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-10-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
			120.74	77	356	45	120.74	77	356
			120.88	50	223	46	120.88	50	223
121.04	68	358	121.08	69	356	47	121.06	68	357
121.42	47	159	121.42	42	197	48	121.42	45	178
			121.71	47	205	49	121.71	47	205
			122.14	39	213	50	122.14	39	213
			122.45	43	230	51	122.45	43	230
			122.73	42	197	52	122.73	42	197
			122.84	73	340	53	122.84	73	340
123.28	76	340	123.28	76	340	54	123.28	76	340
			124.07	48	223	55	124.07	48	223
			124.34	71	333	56	124.34	71	333
			125.01	77	340	57	125.01	77	340
125.54	67	304	125.47	58	313	58	125.51	63	308
126.07	35	177	126.03	31	167	59	126.05	33	172
126.67	33	82	126.66	31	91	60	126.67	32	087
126.98	44	105	126.94	40	102	61	126.96	42	103
			127.40	54	264	62	127.40	54	264
			127.50	48	251	63	127.50	48	251
127.66	46	182				64	127.66	46	182
			127.88	37	86	65	127.88	37	086
128.07	18	94	128.05	18	84	66	128.06	18	089
128.54	72	355	128.54	72	348	67	128.54	72	352
			128.93	25	335	68	128.93	25	335
			129.23	53	339	69	129.23	53	339
			129.69	71	326	70	129.69	71	326
			130.26	40	136	71	130.26	40	136
130.33	52	240	131.09	74	334	72	130.71	63	287
			131.15	32	104	73	131.15	32	104
131.16	76	347	131.69	70	347	74	131.43	73	347
132.62	63	339	132.58	64	336	75	132.60	63	337
			132.63	18	263	76	132.63	18	263
			133.42	29	211	77	133.42	29	211
			133.72	75	343	78	133.72	75	343
134.34	77	347	134.23	74	343	79	134.29	76	345
134.78	72	359	134.65	68	354	80	134.72	70	356
135.11	73	49				81	135.11	73	049
135.43	60	241	135.39	61	238	82	135.41	60	240
			136.18	60	336	83	136.18	60	336
136.96	58	245	136.90	56	243	84	136.93	57	244
137.04	63	55				85	137.04	63	055
			137.32	44	248	86	137.32	44	248
137.58	51	54	137.53	47	54	87	137.56	49	054

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-10-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
137.57	52	227	137.57	56	229	88	137.57	54	228
			138.13	61	248	89	138.13	61	248
			138.41	54	253	90	138.41	54	253
			138.53	39	265	91	138.53	39	265
139.27	74	341	139.24	74	334	92	139.26	74	338

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-11-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
11.03	84	256	10.91	84	262	1	10.97	84	259
13.41	67	293	13.34	67	319	2	13.38	67	306
			15.36	25	023	3	15.36	25	023
			15.80	27	335	4	15.80	27	335
			16.97	20	051	5	16.97	20	051
			17.32	28	312	6	17.32	28	312
			17.60	15	345	7	17.60	15	345
17.67	37	026				8	17.67	37	026
			18.48	13	133	9	18.48	13	133
20.04	47	117	20.06	48	115	10	20.05	48	116
20.75	83	067	20.78	83	076	11	20.77	83	071
22.23	82	300	22.26	82	310	12	22.25	82	305
23.95	84	275	24.03	84	278	13	23.99	84	276
			25.41	39	047	14	25.41	39	047
			26.11	51	068	15	26.11	51	068
			26.51	42	066	16	26.51	42	066
26.65	36	186	26.66	39	202	17	26.66	37	194
27.14	17	112	27.15	18	128	18	27.15	18	120
			27.25	33	057	19	27.25	33	057
			27.53	18	096	20	27.53	18	096
			27.75	33	071	21	27.75	33	071
28.03	39	198	28.05	38	210	22	28.04	39	204
			28.53	51	070	23	28.53	51	070
			30.09	62	096	24	30.09	62	096
			30.44	67	095	25	30.44	67	095
			30.97	38	099	26	30.97	38	099
31.94	40	336	31.88	51	349	27	31.91	46	343
			32.57	31	093	28	32.57	31	093
33.79	70	327	33.79	72	332	29	33.79	71	330
			35.52	32	102	30	35.52	32	102
			36.09	40	118	31	36.09	40	118
			36.75	64	328	32	36.75	64	328
			37.08	26	115	33	37.08	26	115
			37.45	31	096	34	37.45	31	096
			38.48	28	111	35	38.48	28	111
39.57	25	112	39.58	26	108	36	39.58	25	110
39.59	71	292				37	39.59	71	292
			40.51	27	116	38	40.51	27	116
41.34	59	335				39	41.34	59	335
42.90	71	336	42.97	71	330	40	42.94	71	333
46.48	40	300				41	46.48	40	300
47.07	34	309	47.12	33	300	42	47.10	33	305
47.22	73	339	47.25	72	342	43	47.24	72	341
47.79	16	007	47.80	23	003	44	47.80	20	005

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-11-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
48.62	34	203				45	48.62	34	203
52.83	81	047	52.78	81	041	46	52.81	81	044
			56.67	20	104	47	56.67	20	104
56.78	15	087	56.77	16	113	48	56.78	15	100
			56.99	58	058	49	56.99	58	058
57.76	46	067	57.75	47	084	50	57.76	47	075
58.18	69	031	58.21	67	031	51	58.20	68	031
58.49	60	041				52	58.49	60	041
58.76	63	038	58.82	64	047	53	58.79	64	042
59.12	21	106	59.15	20	103	54	59.14	20	105
			60.07	11	126	55	60.07	11	126
60.12	20	206				56	60.12	20	206
61.09	31	199				57	61.09	31	199
61.98	16	099	62.00	21	103	58	61.99	19	101
63.13	82	074	63.15	82	073	59	63.14	82	074
63.47	80	081	63.43	80	076	60	63.45	80	079
65.28	77	080				61	65.28	77	080
66.45	75	076				62	66.45	75	076
66.80	25	102	66.80	24	092	63	66.80	25	097
67.28	73	084	67.19	75	081	64	67.24	74	083
67.33	22	101	67.35	29	112	65	67.34	25	107
67.96	58	070	68.01	54	066	66	67.99	56	068
68.40	80	074	68.36	55	063	67	68.38	68	068
68.44	51	093				68	68.44	51	093
			68.63	67	087	69	68.63	67	087
			68.71	72	087	70	68.71	72	087
69.45	16	094	69.45	22	121	71	69.45	19	107
70.00	80	077	70.01	80	071	72	70.01	80	074
			70.50	52	322	73	70.50	52	322
71.13	26	091				74	71.13	26	091
71.54	18	084	71.52	28	096	75	71.53	23	090
			71.63	79	078	76	71.63	79	078
72.62	28	101	72.65	31	106	77	72.64	29	103
72.65	82	079	72.63	82	079	78	72.64	82	079
73.26	83	069	73.27	83	076	79	73.27	83	073
74.70	27	085	74.70	27	101	80	74.70	27	093
74.77	43	268	74.75	48	252	81	74.76	45	260
75.65	29	106	75.66	32	118	82	75.66	31	112
77.60	63	332	77.60	63	338	83	77.60	63	335
78.45	54	327	78.46	52	332	84	78.46	53	330
78.90	30	112	78.90	28	110	85	78.90	29	111
79.01	23	126	78.99	23	123	86	79.00	23	125
79.14	21	126	79.14	23	126	87	79.14	22	126

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-11-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
79.52	32	134	79.54	34	121	88	79.53	33	127
79.79	26	104	79.80	26	119	89	79.80	26	111
79.89	30	106	79.90	31	103	90	79.90	31	104
80.02	32	116	80.03	33	116	91	80.03	32	116
80.73	20	118	80.75	22	121	92	80.74	21	120
83.64	15	086	83.67	16	091	93	83.66	16	089
85.06	13	096	85.09	13	083	94	85.08	13	089
			85.39	13	111	95	85.39	13	111
			85.52	13	086	96	85.52	13	086
85.65	13	106	85.68	15	111	97	85.67	14	109
			85.76	62	243	98	85.76	62	243
91.55	11	109	91.56	16	104	99	91.56	14	106
91.67	16	096	91.67	13	095	100	91.67	15	096
92.87	29	211	92.87	31	206	101	92.87	30	208
			92.97	16	084	102	92.97	16	084
			93.06	11	069	103	93.06	11	069
93.62	11	116	93.62	17	121	104	93.62	14	119
95.39	11	099	95.36	13	126	105	95.38	12	113
95.49	9	106	95.47	9	101	106	95.48	09	104
			96.41	23	117	107	96.41	23	117
			96.75	74	107	108	96.75	74	107
			96.83	21	104	109	96.83	21	104
97.08	30	186	97.09	28	176	110	97.09	29	181
97.51	46	320	97.50	45	339	111	97.51	45	330
97.73	46	331	97.74	42	320	112	97.74	44	326
98.37	52	027	98.27	46	008	113	98.32	49	018
98.70	22	136				114	98.70	22	136
99.01	32	067	98.98	31	045	115	99.00	31	056
99.29	30	268	99.28	37	278	116	99.29	34	273
99.95	43	087	99.93	44	084	117	99.94	43	085
100.18	37	292	100.22	26	292	118	100.20	31	292
100.26	51	086	100.26	49	089	119	100.26	50	087
			100.33	47	236	120	100.33	47	236
101.16	43	290	101.12	44	292	121	101.14	44	291
101.81	46	278	101.80	44	280	122	101.81	45	279
102.90	83	072	102.94	83	084	123	102.92	83	078
103.84	21	313	103.82	23	305	124	103.83	22	309
104.39	51	271	104.38	50	278	125	104.39	51	275
104.93	20	032	104.94	16	019	126	104.94	18	025
105.23	28	019	105.10	25	029	127	105.17	26	024
			105.23	22	006	128	105.23	22	006
105.36	22	040	105.37	20	029	129	105.37	21	034
			105.53	21	029	130	105.53	21	029

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-11-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
105.61	23	032	105.59	20	024	131	105.60	21	028
105.77	28	034	105.77	26	022	132	105.77	27	028
106.41	24	027	106.39	23	029	133	106.40	24	028
			106.63	27	029	134	106.63	27	029
106.90	47	283	106.90	44	285	135	106.90	46	284
			107.12	23	017	136	107.12	23	017
			107.30	53	004	137	107.30	53	004
107.56	36	274	107.53	34	285	138	107.55	35	279
107.66	55	345	107.65	55	336	139	107.66	55	341
108.79	18	017	108.77	16	041	140	108.78	17	029
108.93	15	350	108.91	11	310	141	108.92	13	330
			109.24	44	042	142	109.24	44	042
109.95	53	285	109.94	54	283	143	109.95	54	284
110.04	25	027	110.03	28	019	144	110.04	26	023
110.97	10	035	110.94	13	352	145	110.96	12	021
111.13	83	076	111.11	83	073	146	111.12	83	075
			111.77	46	288	147	111.77	46	288
			112.38	51	265	148	112.38	51	265
			112.70	49	288	149	112.70	49	288
113.30	15	355	113.28	15	011	150	113.29	15	003
113.60	37	340	113.58	40	342	151	113.59	38	341
115.63	43	288	115.61	42	280	152	115.62	43	284
115.94	20	084	115.91	21	053	153	115.93	21	069
			116.79	54	293	154	116.79	54	293
117.55	16	074	117.55	15	088	155	117.55	15	081
117.69	16	064	117.68	18	053	156	117.69	17	059
			117.91	25	093	157	117.91	25	093
			118.05	26	101	158	118.05	26	101
119.52	81	016	119.50	81	018	159	119.51	81	017
119.58	20	042	119.56	21	037	160	119.57	20	040
120.06	17	083	120.02	14	061	161	120.04	15	072
			120.30	25	014	162	120.30	25	014
121.23	23	014	121.22	25	019	163	121.23	24	017
121.45	19	005	121.43	21	019	164	121.44	20	012
121.53	15	029	121.53	16	024	165	121.53	15	027
			121.53	70	279	166	121.53	70	279
			123.29	77	260	167	123.29	77	260
124.12	18	083	124.11	19	060	168	124.12	19	071
125.18	29	010	125.19	25	020	169	125.19	27	015
			125.58	59	284	170	125.58	59	284
			126.15	69	291	171	126.15	69	291
126.31	13	022	126.33	26	031	172	126.32	20	026
129.13	68	279	129.13	68	282	173	129.13	68	281

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-11-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
129.19	36	356	129.22	29	024	174	129.21	32	010
130.08	43	343	130.10	40	350	175	130.09	41	346
130.76	61	258	130.77	59	264	176	130.77	60	261
131.08	19	042	131.09	18	037	177	131.09	18	039
131.32	22	084	131.34	24	068	178	131.33	23	076
			131.56	63	293	179	131.56	63	293
132.21	22	061	132.21	15	057	180	132.21	18	059
133.10	21	064	133.12	21	038	181	133.11	21	051
135.68	32	326	135.70	28	350	182	135.69	30	338
136.13	70	285	136.15	70	290	183	136.14	70	287
136.89	64	284	136.90	64	290	184	136.90	64	287
			137.51	56	295	185	137.51	56	295
			138.50	62	290	186	138.50	62	290
139.09	23	034	139.07	23	022	187	139.08	23	028
140.05	15	106	140.07	15	106	188	140.06	15	106
141.43	24	069	141.43	20	069	189	141.43	22	069
142.36	75	242	142.44	74	233	190	142.40	74	238
			142.70	59	260	191	142.70	59	260

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-12-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
10.25	59	120				1	10.25	59	120
10.52	42	347				2	10.52	42	347
12.72	22	029				3	12.72	22	029
13.38	42	092				4	13.38	42	092
14.23	28	134				5	14.23	28	134
15.87	27	005				6	15.87	27	005
17.78	41	197				7	17.78	41	197
18.06	41	192				8	18.06	41	192
18.40	22	244				9	18.40	22	244
19.65	83	057				10	19.65	83	057
23.18	30	096				11	23.18	30	096
23.40	59	135				12	23.40	59	135
26.76	28	284	26.80	26	285	13	26.78	27	284
26.84	34	290	26.86	31	276	14	26.85	32	283
27.72	79	321				15	27.72	79	321
27.74	9	121	27.75	11	146	16	27.75	10	133
			27.77	77	325	17	27.77	77	325
			28.40	37	181	18	28.40	37	181
28.73	32	356	28.85	44	329	19	28.79	38	343
28.89	70	013	28.86	70	014	20	28.88	70	013
30.44	41	291	30.46	28	288	21	30.45	34	290
			30.94	64	014	22	30.94	64	014
31.60	56	106	31.55	56	121	23	31.58	56	114
31.77	51	115	31.72	49	137	24	31.75	50	126
			31.82	56	128	25	31.82	56	128
33.13	64	320	33.13	61	326	26	33.13	63	323
33.85	26	114	33.86	25	106	27	33.86	25	110
			34.22	28	113	28	34.22	28	113
34.32	15	339				29	34.32	15	339
			34.40	32	103	30	34.40	32	103
34.58	30	056	34.56	30	084	31	34.57	30	070
34.79	27	080	34.77	22	085	32	34.78	24	083
35.04	24	348	35.06	24	347	33	35.05	24	348
35.94	25	069	35.94	18	043	34	35.94	21	056
			37.21	29	168	35	37.21	29	168
37.75	33	128				36	37.75	33	128
			38.05	27	153	37	38.05	27	153
38.31	17	347	38.31	18	355	38	38.31	18	351
38.61	11	129	38.54	15	101	39	38.58	13	115
			39.20	19	146	40	39.20	19	146
39.76	22	069	39.73	32	103	41	39.75	27	086
			39.76	46	123	42	39.76	46	123
40.77	28	089	40.77	24	086	43	40.77	26	088
			41.15	22	133	44	41.15	22	133

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-12-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
			41.30	67	249	45	41.30	67	249
			41.72	61	238	46	41.72	61	238
			42.02	64	241	47	42.02	64	241
42.36	23	066	42.36	23	064	48	42.36	23	065
			43.45	12	173	49	43.45	12	173
			43.63	64	331	50	43.63	64	331
44.04	67	330	44.01	66	326	51	44.03	66	328
			44.71	35	168	52	44.71	35	168
			45.26	46	140	53	45.26	46	140
			45.71	51	137	54	45.71	51	137
			46.45	68	292	55	46.45	68	292
			46.61	59	094	56	46.61	59	094
			47.06	76	317	57	47.06	76	317
			47.15	24	123	58	47.15	24	123
			47.23	13	123	59	47.23	13	123
			47.43	20	126	60	47.43	20	126
			49.52	42	139	61	49.52	42	139
			49.85	28	160	62	49.85	28	160
			50.32	30	161	63	50.32	30	161
			52.16	46	327	64	52.16	46	327
			52.82	32	135	65	52.82	32	135
			53.92	26	119	66	53.92	26	119
			54.03	50	108	67	54.03	50	108
			54.96	72	323	68	54.96	72	323
55.40	25	101	55.41	20	119	69	55.41	22	110
			56.23	28	133	70	56.23	28	133
57.67	26	094	57.66	26	119	71	57.67	26	106
			59.10	69	118	72	59.10	69	118
			59.26	55	115	73	59.26	55	115
59.86	63	320	59.83	65	314	74	59.85	64	317
			60.03	42	292	75	60.03	42	292
61.59	28	104	61.58	31	111	76	61.59	29	107
			61.89	47	111	77	61.89	47	111
62.25	73	026	62.25	74	029	78	62.25	73	027
			62.81	54	096	79	62.81	54	096
			63.41	48	205	80	63.41	48	205
			64.00	65	018	81	64.00	65	018
64.66	30	104	64.65	27	101	82	64.66	29	103
64.88	54	330	64.89	56	324	83	64.89	55	327
65.29	38	099	65.23	49	088	84	65.26	43	093
			65.30	36	093	85	65.30	36	093
			65.88	32	079	86	65.88	32	079
			66.03	63	317	87	66.03	63	317

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-12-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
66.25	47	089				88	66.25	47	089
			66.52	44	119	89	66.52	44	119
			66.65	36	098	90	66.65	36	098
66.70	54	324				91	66.70	54	324
66.77	45	101				92	66.77	45	101
67.00	34	091	67.02	40	091	93	67.01	37	091
67.82	72	033	67.81	75	029	94	67.82	73	031
68.26	29	077	68.27	22	100	95	68.27	26	089
			68.82	36	014	96	68.82	36	014
69.39	22	014	69.38	21	030	97	69.39	21	022
70.21	77	052	70.20	77	049	98	70.21	77	051
71.20	43	345	71.20	40	352	99	71.20	41	349
72.20	33	084	72.18	32	101	100	72.19	33	093
72.39	39	347	72.38	44	004	101	72.39	42	356
73.22	64	316	73.24	65	320	102	73.23	64	318
73.63	24	098	73.64	26	099	103	73.64	25	098
75.72	61	343	75.75	54	354	104	75.74	58	349
75.96	53	330	75.96	53	336	105	75.96	53	333
76.26	45	013	76.29	38	006	106	76.28	41	009
76.70	26	104	76.71	26	104	107	76.71	26	104
			79.35	22	327	108	79.35	22	327
80.75	53	101	80.73	52	095	109	80.74	52	098
81.14	20	124	81.14	16	096	110	81.14	18	110
81.47	8	317	81.45	4	024	111	81.46	06	327
			81.67	36	125	112	81.67	36	125
81.78	36	216	81.77	35	220	113	81.78	35	218
			84.51	15	026	114	84.51	15	026
86.82	63	358	86.83	62	358	115	86.83	63	358
87.19	25	319	87.19	26	347	116	87.19	25	333
87.36	43	012	87.38	39	353	117	87.37	41	002
87.72	26	011	87.72	25	355	118	87.72	25	003
87.92	36	352	87.93	36	352	119	87.93	36	352
			88.55	50	210	120	88.55	50	210
88.89	16	339	88.89	19	355	121	88.89	18	347
88.98	25	356	88.98	28	340	122	88.98	26	348
90.56	15	072	90.57	18	033	123	90.57	16	052
90.66	13	029	90.68	13	029	124	90.67	13	029
91.95	41	009	91.97	40	017	125	91.96	40	013
92.32	37	006	92.36	33	002	126	92.34	35	004
			92.59	33	054	127	92.59	33	054
92.91	39	354	92.93	42	354	128	92.92	41	354
93.18	29	285	93.18	32	305	129	93.18	30	295
93.48	29	300	93.40	35	303	130	93.44	32	301

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-12-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
			93.69	31	000	131	93.69	31	000
94.11	33	315	94.14	30	332	132	94.13	31	324
96.47	39	004	96.47	34	007	133	96.47	37	005
96.68	25	010	96.64	17	347	134	96.66	21	359
97.28	25	050	97.29	12	025	135	97.29	18	037
97.77	22	019				136	97.77	22	019
98.61	85	061	98.59	85	066	137	98.60	85	064
			98.77	39	031	138	98.77	39	031
			99.30	45	061	139	99.30	45	061
100.05	85	045	100.08	85	059	140	100.07	85	052
			101.92	78	024	141	101.92	78	024
			102.96	15	343	142	102.96	15	343
104.60	31	106	104.56	23	083	143	104.58	27	094
			104.85	27	100	144	104.85	27	100
105.55	27	224	105.54	21	182	145	105.55	24	203
			107.46	28	011	146	107.46	28	011
108.10	32	074	108.06	25	073	147	108.08	28	074
110.40	54	093	110.40	55	103	148	110.40	55	098
			110.79	57	099	149	110.79	57	099
111.18	68	097	111.23	71	075	150	111.21	69	086
111.66	70	078				151	111.66	70	078
			111.94	50	073	152	111.94	50	073
112.91	18	099				153	112.91	18	099
113.93	9	177	113.92	23	129	154	113.93	16	153
			114.43	22	200	155	114.43	22	200
			114.82	13	341	156	114.82	13	341
			115.24	16	086	157	115.24	16	086
			115.37	16	088	158	115.37	16	088
			116.24	28	091	159	116.24	28	091
117.49	79	260	117.37	77	253	160	117.43	78	257
118.68	81	258	118.71	80	268	161	118.70	81	263
119.51	84	056	119.54	83	055	162	119.53	84	056
120.93	13	047				163	120.93	13	047
			122.43	18	095	164	122.43	18	095
122.91	83	069	122.88	82	064	165	122.90	82	066
123.61	39	190	123.62	38	202	166	123.62	38	196
			125.24	13	019	167	125.24	13	019
125.48	33	062	125.49	31	039	168	125.49	32	050
			125.53	18	033	169	125.53	18	033
125.98	34	062	125.99	30	056	170	125.99	32	059
			126.82	33	052	171	126.82	33	052
			127.12	20	049	172	127.12	20	049
			127.28	11	037	173	127.28	11	037

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-12-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
127.48	31	353	127.48	28	004	174	127.48	29	358
127.82	23	091	127.81	18	096	175	127.82	21	094
			127.94	44	311	176	127.94	44	311
128.28	27	176	128.27	30	188	177	128.28	28	182
128.57	24	079				178	128.57	24	079

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-13-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
8.12	47	315				1	8.12	47	315
8.61	47	319				2	8.61	47	319
9.45	30	292				3	9.45	30	292
9.88	36	320				4	9.88	36	320
10.20	47	302				5	10.20	47	302
10.98	45	297				6	10.98	45	297
11.32	53	292				7	11.32	53	292
11.83	76	055				8	11.83	76	055
11.88	37	280				9	11.88	37	280
12.36	33	270				10	12.36	33	270
13.32	75	339				11	13.32	75	339
14.20	15	188				12	14.20	15	188
14.93	69	169				13	14.93	69	169
14.99	79	062				14	14.99	79	062
16.16	40	272				15	16.16	40	272
16.93	54	277				16	16.93	54	277
17.38	81	072				17	17.38	81	072
18.55	27	294				18	18.55	27	294
19.03	34	196				19	19.03	34	196
19.92	21	290				20	19.92	21	290
20.86	68	160				21	20.86	68	160
21.69	20	317				22	21.69	20	317
22.85	20	330				23	22.85	20	330
23.49	43	060				24	23.49	43	060
25.14	28	248				25	25.14	28	248
26.12	83	054				26	26.12	83	054
27.77	37	192				27	27.77	37	192
28.28	61	271				28	28.28	61	271
28.61	18	176				29	28.61	18	176
28.76	67	353				30	28.76	67	353
30.93	34	248				31	30.93	34	248
31.04	38	257				32	31.04	38	257
31.56	37	290				33	31.56	37	290
32.02	24	280				34	32.02	24	280
32.62	36	285				35	32.62	36	285
33.07	73	061				36	33.07	73	061
33.76	58	078				37	33.76	58	078
34.33	28	263				38	34.33	28	263
34.42	28	275				39	34.42	28	275
34.89	20	233				40	34.89	20	233
35.11	29	233				41	35.11	29	233
35.24	21	243				42	35.24	21	243
36.26	20	280				43	36.26	20	280
36.53	13	270				44	36.53	13	270

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-13-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
36.62	18	260				45	36.62	18	260
36.70	64	058				46	36.70	64	058
36.98	16	292				47	36.98	16	292
37.01	26	206				48	37.01	26	206
38.12	67	310				49	38.12	67	310
39.11	42	244				50	39.11	42	244
39.40	81	067				51	39.40	81	067
40.81	13	223				52	40.81	13	223
41.27	34	181				53	41.27	34	181
42.56	64	059				54	42.56	64	059
43.02	63	052				55	43.02	63	052
45.99	29	232				56	45.99	29	232
46.20	35	243				57	46.20	35	243
46.40	36	255				58	46.40	36	255
46.71	39	254				59	46.71	39	254
47.17	36	227				60	47.17	36	227
47.31	39	258				61	47.31	39	258
47.78	32	167				62	47.78	32	167
48.01	62	292				63	48.01	62	292
49.52	72	077				64	49.52	72	077
50.74	40	171				65	50.74	40	171
51.62	8	157				66	51.62	08	157
52.17	2	303				67	52.17	02	303
53.71	21	153				68	53.71	21	153
54.62	41	191				69	54.62	41	191
55.15	11	277				70	55.15	11	277
55.87	36	199				71	55.87	36	199
57.24	21	248				72	57.24	21	248
57.86	65	356				73	57.86	65	356
58.55	67	356				74	58.55	67	356
59.16	59	356				75	59.16	59	356
61.68	19	254				76	61.68	19	254
61.99	23	234				77	61.99	23	234
63.76	23	231				78	63.76	23	231
64.27	45	189				79	64.27	45	189
65.80	32	184				80	65.80	32	184
66.74	34	186				81	66.74	34	186
67.48	11	240				82	67.48	11	240
69.76	30	292				83	69.76	30	292
70.49	22	176				84	70.49	22	176
70.82	19	117				85	70.82	19	117
71.10	18	116				86	71.10	18	116
71.87	35	146				87	71.87	35	146

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-13-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
72.42	14	227				88	72.42	14	227
74.71	67	330				89	74.71	67	330
75.55	16	178				90	75.55	16	178
77.66	43	267				91	77.66	43	267
77.77	26	279				92	77.77	26	279
78.02	26	280				93	78.02	26	280
78.52	20	273				94	78.52	20	273
78.80	16	268				95	78.80	16	268
79.01	26	295				96	79.01	26	295
79.61	18	303				97	79.61	18	303
80.82	15	037				98	80.82	15	037
83.27	30	153				99	83.27	30	153
83.86	16	055				100	83.86	16	055
84.44	27	217				101	84.44	27	217
			86.98	20	168	102	86.98	20	168
87.28	11	233	87.26	18	245	103	87.27	15	239
			87.51	10	309	104	87.51	10	309
88.35	8	330	88.37	9	312	105	88.36	09	321
			88.98	17	316	106	88.98	17	316
91.90	14	245	91.89	13	285	107	91.90	14	265
92.32	35	184	92.30	24	190	108	92.31	30	187
			92.44	26	156	109	92.44	26	156
			92.97	21	303	110	92.97	21	303
			93.32	20	037	111	93.32	20	037
95.68	39	349	95.69	38	350	112	95.69	39	349
			95.77	40	041	113	95.77	40	041
			96.60	30	282	114	96.60	30	282
97.11	24	037	97.10	27	045	115	97.11	26	041
98.49	51	357	98.47	36	008	116	98.48	43	003
			99.53	30	083	117	99.53	30	083
			100.42	43	101	118	100.42	43	101
			101.64	22	031	119	101.64	22	031
			101.82	32	039	120	101.82	32	039
			102.02	8	096	121	102.02	08	096
103.26	27	335	103.26	27	339	122	103.26	27	337
103.50	11	323	103.52	15	320	123	103.51	13	321
			104.43	17	352	124	104.43	17	352
104.75	33	017	104.74	31	050	125	104.75	32	033
			104.83	9	357	126	104.83	09	357
			105.14	34	173	127	105.14	34	173
			105.24	13	049	128	105.24	13	049
			105.25	38	244	129	105.25	38	244
			105.57	25	241	130	105.57	25	241

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-13-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
106.21	59	189	106.34	64	192	131	106.28	62	190

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-14-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
9.25	53	305	9.29	50	295	1	9.27	51	300
			10.44	22	288	2	10.44	22	288
			12.11	81	340	3	12.11	81	340
			12.54	45	317	4	12.54	45	317
13.67	26	270	13.60	26	254	5	13.64	26	262
13.83	51	283	13.83	56	280	6	13.83	54	282
15.27	60	243				7	15.27	60	243
			15.68	59	251	8	15.68	59	251
			16.24	45	282	9	16.24	45	282
17.32	59	306	17.29	60	313	10	17.31	59	309
17.78	65	202	17.78	64	205	11	17.78	65	204
19.87	49	293	19.86	46	280	12	19.87	48	287
22.30	39	242	22.28	37	233	13	22.29	38	237
23.82	4	111	23.81	9	123	14	23.82	06	117
			29.24	22	116	15	29.24	22	116
29.84	57	246	29.81	59	243	16	29.83	58	244
39.67	16	164	39.65	13	159	17	39.66	15	161
			47.49	37	214	18	47.49	37	214
60.08	4	079	60.08	7	106	19	60.08	07	106
60.22	11	094				20	60.22	11	094
61.04	72	303	60.97	70	298	21	61.01	71	300
61.10	65	305	61.15	66	298	22	61.13	66	302
61.97	75	297				23	61.97	75	297
62.05	47	332	62.05	48	343	24	62.05	48	337
64.66	22	137	64.65	22	146	25	64.66	22	141
			64.72	18	131	26	64.72	18	131
66.89	79	332	66.83	77	328	27	66.86	78	330
68.42	2	151	68.39	6	156	28	68.41	04	154
68.49	16	141	68.48	16	151	29	68.49	16	146
68.87	17	175				30	68.87	17	175
69.30	45	180	69.29	49	183	31	69.30	47	182
			69.84	60	200	32	69.84	60	200
			70.25	55	126	33	70.25	55	126
			70.33	63	128	34	70.33	63	128
			70.85	78	141	35	70.85	78	141
			70.95	18	206	36	70.95	18	206
			72.08	26	094	37	72.08	26	094
72.60	59	289	72.57	60	280	38	72.59	60	285
72.98	53	266	72.97	52	276	39	72.98	52	271
			73.45	47	305	40	73.45	47	305
			74.16	65	132	41	74.16	65	132
74.57	13	138	74.52	26	156	42	74.55	20	147
			75.13	45	156	43	75.13	45	156
			75.88	58	155	44	75.88	58	155

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-14-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
			76.88	70	277	45	76.88	70	277
77.34	42	250	77.33	44	252	46	77.34	43	251
77.52	48	248	77.52	53	247	47	77.52	51	248
			77.79	32	342	48	77.79	32	342
			77.94	28	259	49	77.94	28	259
			79.63	34	344	50	79.63	34	344
			80.13	12	270	51	80.13	12	270
80.41	50	301	80.39	48	302	52	80.40	49	301
80.74	34	306				53	80.74	34	306
81.12	42	327	81.11	40	333	54	81.12	41	330
81.64	47	273				55	81.64	47	273
81.87	48	270				56	81.87	48	270
82.71	58	286	82.70	56	290	57	82.71	57	288
82.99	65	284				58	82.99	65	284
83.51	70	303				59	83.51	70	303
84.17	59	297	84.15	60	303	60	84.16	59	300
84.49	48	321				61	84.49	48	321
84.70	39	317				62	84.70	39	317
85.03	44	310				63	85.03	44	310
90.29	18	121	90.26	18	141	64	90.28	18	131
93.50	26	220	93.46	29	209	65	93.48	28	215
93.87	54	215	93.83	52	201	66	93.85	53	208
			94.12	55	211	67	94.12	55	211
			94.50	45	166	68	94.50	45	166
			95.14	45	195	69	95.14	45	195
			95.46	44	199	70	95.46	44	199
95.87	36	180				71	95.87	36	180
96.31	24	180	96.28	28	178	72	96.30	26	179
			96.99	27	188	73	96.99	27	188
97.34	22	116	97.29	20	123	74	97.32	21	120
97.50	28	109				75	97.50	28	109
			100.11	37	245	76	100.11	37	245
			100.27	36	310	77	100.27	36	310
100.48	26	273	100.44	25	278	78	100.46	25	275
100.77	50	275				79	100.77	50	275
101.09	15	171				80	101.09	15	171
101.33	20	161	101.28	18	163	81	101.31	19	162
101.55	25	180				82	101.55	25	180
			104.19	46	221	83	104.19	46	221
104.41	38	235	104.37	41	241	84	104.39	39	238
104.50	30	256				85	104.50	30	256
104.88	16	238				86	104.88	16	238
105.36	23	288	105.34	18	290	87	105.35	21	289

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-14-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
105.91	37	240	105.90	32	226	88	105.91	34	233
107.26	80	002	107.19	81	359	89	107.23	81	001
108.71	55	199	108.66	54	191	90	108.69	54	195
109.71	25	055	109.70	24	043	91	109.71	24	049
110.75	32	153	110.72	29	148	92	110.74	30	151
111.09	25	075	111.06	20	081	93	111.08	23	078
111.61	16	061				94	111.61	16	061
111.77	16	091	111.75	15	071	95	111.76	15	081
			112.57	66	195	96	112.57	66	195
112.61	60	302	112.59	62	298	97	112.60	61	300
113.20	72	196	113.19	72	198	98	113.20	72	197
113.70	65	171				99	113.70	65	171
114.68	77	184	114.69	69	178	100	114.69	73	181
114.72	72	166				101	114.72	72	166
			114.90	72	193	102	114.90	72	193
			114.98	47	263	103	114.98	47	263
117.13	15	118				104	117.13	15	118
118.46	13	248				105	118.46	13	248
			118.69	20	233	106	118.69	20	233
			119.29	20	053	107	119.29	20	053
120.56	31	074	120.58	15	081	108	120.57	23	078
			121.16	22	126	109	121.16	22	126
121.37	20	091	121.36	13	076	110	121.37	16	084
			121.63	52	259	111	121.63	52	259
			121.67	37	095	112	121.67	37	095
122.57	61	277	122.57	63	277	113	122.57	62	277
123.03	58	294	123.06	60	300	114	123.05	59	297
			123.09	24	106	115	123.09	24	106
123.75	59	263	123.74	58	259	116	123.75	58	261
124.25	54	256				117	124.25	54	256
			126.14	74	349	118	126.14	74	349
127.42	57	256	127.39	57	256	119	127.41	57	256
			127.87	57	260	120	127.87	57	260
127.94	51	248	127.95	52	246	121	127.95	52	247

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-15-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
			10.34	28	111	1	10.34	28	111
10.79	74	064				2	10.79	74	064
			10.87	57	344	3	10.87	57	344
			10.99	43	344	4	10.99	43	344
13.84	31	262	13.80	32	287	5	13.82	31	274
14.72	77	119	14.89	81	143	6	14.81	79	131
15.59	58	127				7	15.59	58	127
15.89	60	125				8	15.89	60	125
			18.89	85	128	9	18.89	85	128
24.64	78	326	24.73	74	348	10	24.69	76	337
26.39	68	106				11	26.39	68	106
			27.93	56	220	12	27.93	56	220
27.77	78	215				13	27.77	78	215
28.28	61	201	28.25	63	191	14	28.27	62	196
			29.11	20	315	15	29.11	20	315
29.19	39	291	29.22	30	309	16	29.21	34	300
31.36	50	222	31.34	49	219	17	31.35	49	220
32.38	67	224				18	32.38	67	224
33.26	45	113				19	33.26	45	113
34.31	41	308	34.27	40	311	20	34.29	40	309
			35.07	34	137	21	35.07	34	137
35.37	72	117	35.33	74	137	22	35.35	73	127
35.85	41	114	35.85	36	120	23	35.85	38	117
36.11	41	289	36.11	38	299	24	36.11	39	294
36.73	44	276	36.70	39	287	25	36.72	41	281
			36.92	18	310	26	36.92	18	310
			37.14	62	212	27	37.14	62	212
38.19	55	133	38.16	52	130	28	38.18	54	131
			39.01	47	126	29	39.01	47	126
			39.09	53	114	30	39.09	53	114
			44.14	66	211	31	44.14	66	211
44.79	66	210	44.79	69	209	32	44.79	67	210
			45.35	60	254	33	45.35	60	254
			46.62	71	207	34	46.62	71	207
47.31	50	136	47.26	54	130	35	47.29	52	133
47.43	60	138	47.32	60	128	36	47.38	60	133
47.92	69	149	47.97	63	139	37	47.95	66	144
			50.10	35	260	38	50.10	35	260
50.18	55	274				39	50.18	55	274
50.43	71	163	50.41	64	165	40	50.42	67	164
50.97	23	254	50.94	30	244	41	50.96	26	249
51.46	47	124	51.43	56	148	42	51.45	51	136
51.62	52	134				43	51.62	52	134
			51.77	76	155	44	51.77	76	155

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-15-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
51.91	70	149				45	51.91	70	149
			52.14	65	153	46	52.14	65	153
52.31	69	148	52.29	67	145	47	52.30	68	146
55.95	64	209	55.94	59	203	48	55.95	61	206
57.76	74	139	57.72	72	133	49	57.74	73	136
58.70	71	146	58.68	69	143	50	58.69	70	144
64.69	54	136	64.65	54	134	51	64.67	54	135
64.76	53	120	64.72	56	126	52	64.74	55	123
68.77	28	291				53	68.77	28	291
70.37	38	281	70.38	37	286	54	70.38	38	283
75.70	52	142	75.66	51	135	55	75.68	52	138
75.85	49	150	75.86	46	152	56	75.86	47	151
79.68	48	290	79.70	48	287	57	79.69	48	289
			83.00	45	301	58	83.00	45	301
84.20	45	096	84.02	36	099	59	84.11	41	097
84.42	44	111	84.50	50	138	60	84.46	47	124
85.52	56	299	85.50	57	297	61	85.51	56	298
			86.44	45	312	62	86.44	45	312
86.95	40	311				63	86.95	40	311
			89.42	57	296	64	89.42	57	296
90.31	58	084				65	90.31	58	084
90.87	62	113				66	90.87	62	113
91.34	60	111	91.39	58	107	67	91.37	59	109
92.87	63	094	92.89	61	092	68	92.88	62	093
			94.00	46	127	69	94.00	46	127
			95.74	81	133	70	95.74	81	133
			96.38	81	131	71	96.38	81	131
100.41	45	288	97.90	85	222	72	99.16	65	255
100.86	64	291	100.84	65	292	73	100.85	65	291
101.75	39	267	101.69	39	273	74	101.72	39	270
102.19	45	262				75	102.19	45	262
113.24	30	310				76	113.24	30	310
113.66	42	295	113.64	44	303	77	113.65	43	299
113.71	35	281	113.70	38	282	78	113.71	37	282
113.95	28	294	113.93	32	302	79	113.94	30	298
115.39	32	303	115.36	30	298	80	115.38	31	300
115.96	31	284				81	115.96	31	284
117.69	29	295	117.67	32	294	82	117.68	31	295
118.89	61	180				83	118.89	61	180
119.24	53	194	119.22	54	198	84	119.23	54	196
120.01	48	237	120.00	43	246	85	120.01	46	242
120.23	38	225	120.28	36	240	86	120.26	37	233
120.63	54	201	120.62	57	194	87	120.63	56	197

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-15-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
			121.93	22	173	88	121.93	22	173
122.05	18	166				89	122.05	18	166
			122.40	38	137	90	122.40	38	137
			123.19	24	005	91	123.19	24	005
123.64	15	239				92	123.64	15	239
			124.22	37	359	93	124.22	37	359
124.53	29	275	124.50	18	251	94	124.52	24	263
125.06	71	110	125.11	69	108	95	125.09	70	109
127.04	50	053	126.19	43	126	96	126.62	47	090
			127.01	54	065	97	127.01	54	065
127.33	34	305	127.34	26	298	98	127.34	30	302
127.62	15	346	127.63	21	315	99	127.63	18	331
127.91	34	307	127.87	27	308	100	127.89	31	307
			128.24	17	182	101	128.24	17	182
			128.91	18	164	102	128.91	18	164
129.21	47	171	129.20	40	162	103	129.21	43	166
129.67	30	172	129.65	28	159	104	129.66	29	166
129.92	9	127	129.90	14	129	105	129.91	12	128
			130.40	50	291	106	130.40	50	291
			131.03	31	199	107	131.03	31	199
			131.38	37	163	108	131.38	37	163
			131.58	42	149	109	131.58	42	149
132.20	32	223	132.21	36	217	110	132.21	34	220
			133.40	35	098	111	133.40	35	098
			133.54	26	114	112	133.54	26	114
			133.94	8	134	113	133.94	08	134
			134.69	15	154	114	134.69	15	154
135.20	26	313	135.19	25	318	115	135.20	25	315
135.52	20	316				116	135.52	20	316
			136.08	51	260	117	136.08	51	260
			136.32	44	245	118	136.32	44	245
			138.72	8	007	119	138.72	08	007
139.07	54	177				120	139.07	54	177
139.72	5	067	139.72	3	112	121	139.72	04	089
139.94	9	143	139.92	7	069	122	139.93	08	106
141.17	79	146	141.18	76	140	123	141.18	77	143
141.51	74	141	141.57	74	139	124	141.54	74	140
			143.67	70	284	125	143.67	70	284
144.37	34	203				126	144.37	34	203
			148.69	46	232	127	148.69	46	232
			148.82	64	230	128	148.82	64	230
149.16	21	146				129	149.16	21	146
149.33	24	145	149.30	12	128	130	149.32	18	137

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-15-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
			150.01	8	116	131	150.01	08	116
152.65	13	113				132	152.65	13	113
156.19	11	098	156.20	5	064	133	156.20	08	081
			157.55	3	345	134	157.55	03	345
158.76	76	195	158.76	76	188	135	158.76	76	192
161.30	15	044				136	161.30	15	044

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log
Borehole drilled at 80 degress from horizontal at dip direction of 029 degrees.
Corrected orientations have been reported

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-16-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
20.28	75	280				1	20.28	75	280
22.78	77	297				2	22.78	77	297
23.31	74	295	23.36	75	295	3	23.34	75	295
24.86	52	296	24.88	54	303	4	24.87	53	300
			25.77	18	300	5	25.77	18	300
26.26	75	304				6	26.26	75	304
26.73	74	311				7	26.73	74	311
28.09	24	250				8	28.09	24	250
			28.26	37	320	9	28.26	37	320
28.44	21	255	28.44	26	282	10	28.44	24	269
			28.59	46	285	11	28.59	46	285
			34.16	28	205	12	34.16	28	205
34.24	41	221	34.26	34	218	13	34.25	38	220
34.56	18	174	34.57	26	181	14	34.57	22	178
34.60	28	166				15	34.60	28	166
36.47	28	187	36.45	30	147	16	36.46	29	167
36.73	20	126	36.72	26	115	17	36.73	23	121
			37.29	41	263	18	37.29	41	263
37.50	44	257	37.61	45	289	19	37.56	45	273
38.10	79	277	38.23	79	288	20	38.17	79	282
40.47	36	220	40.44	43	247	21	40.46	39	234
			41.65	37	247	22	41.65	37	247
42.97	86	288	42.88	86	277	23	42.93	86	282
45.43	42	295				24	45.43	42	295
50.09	23	151	50.08	18	151	25	50.09	21	151
50.30	20	131				26	50.30	20	131
			50.31	49	285	27	50.31	49	285
			50.37	21	178	28	50.37	21	178
50.63	46	273				29	50.63	46	273
			50.64	29	303	30	50.64	29	303
51.29	56	286	51.29	53	283	31	51.29	55	285
51.50	45	288	51.42	42	275	32	51.46	43	281
51.77	53	280				33	51.77	53	280
57.39	21	158				34	57.39	21	158
			57.43	32	213	35	57.43	32	213
58.18	49	326	58.20	48	327	36	58.19	49	327
58.57	56	344				37	58.57	56	344
60.33	63	217	60.32	64	223	38	60.33	63	220
60.83	52	204				39	60.83	52	204
66.52	28	161	66.51	26	170	40	66.52	27	165
67.76	49	324	67.74	50	331	41	67.75	50	328
69.33	70	217	69.34	68	221	42	69.34	69	219
			75.57	52	112	43	75.57	52	112
75.76	65	124	75.74	63	119	44	75.75	64	122

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-16-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
			88.10	21	272	45	88.10	21	272
			94.27	37	272	46	94.27	37	272
94.43	60	180				47	94.43	60	180
94.91	65	169	94.91	64	165	48	94.91	64	167
			94.95	30	285	49	94.95	30	285
95.43	21	238	95.44	18	245	50	95.44	19	241
96.13	49	279	96.11	38	293	51	96.12	43	286
104.55	28	296	104.55	31	299	52	104.55	29	297
112.71	12	0	112.69	12	355	53	112.70	12	358
122.66	46	310	122.65	44	305	54	122.66	45	307
129.01	60	178				55	129.01	60	178
129.19	35	172	129.16	36	173	56	129.18	36	173
			129.23	49	186	57	129.23	49	186
			132.67	43	161	58	132.67	43	161
132.73	30	175				59	132.73	30	175
133.51	44	352				60	133.51	44	352
134.52	47	5				61	134.52	47	005
135.03	44	17				62	135.03	44	017
			135.13	39	10	63	135.13	39	010
			135.26	41	34	64	135.26	41	034
135.44	40	17	135.41	46	41	65	135.43	43	029
135.80	44	12				66	135.80	44	012
136.34	36	359				67	136.34	36	359
138.79	50	308				68	138.79	50	308
139.32	48	332				69	139.32	48	332
139.73	44	320				70	139.73	44	320

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-17-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
9.96	69	306				1	9.96	69	306
12.12	60	322				2	12.12	60	322
12.36	58	261				3	12.36	58	261
13.48	60	270				4	13.48	60	270
14.23	53	292				5	14.23	53	292
14.90	33	303				6	14.90	33	303
15.28	47	270				7	15.28	47	270
15.95	43	295				8	15.95	43	295
16.62	53	282				9	16.62	53	282
17.59	58	256				10	17.59	58	256
18.34	59	258				11	18.34	59	258
19.23	40	271				12	19.23	40	271
26.43	10	130	26.45	7	079	13	26.44	09	104
27.13	24	110	27.14	22	141	14	27.14	23	125
27.38	23	101	27.29	12	101	15	27.34	18	101
28.00	28	118				16	28.00	28	118
28.63	18	124				17	28.63	18	124
29.83	18	138				18	29.83	18	138
30.14	15	171	30.14	11	173	19	30.14	13	172
30.52	13	136				20	30.52	13	136
38.58	18	116	38.58	14	149	21	38.58	16	132
51.29	46	117				22	51.29	46	117
51.75	16	175	51.74	18	159	23	51.75	17	167
52.53	51	273	52.51	51	258	24	52.52	51	265
53.89	55	295				25	53.89	55	295
54.06	51	280	54.04	45	285	26	54.05	48	282
54.37	55	273				27	54.37	55	273
56.30	67	325				28	56.30	67	325
56.82	62	315				29	56.82	62	315
			63.17	82	334	30	63.17	82	334
70.20	12	303				31	70.20	12	303
70.75	8	039				32	70.75	08	039
			71.01	38	085	33	71.01	38	085
71.13	34	075	71.21	33	091	34	71.17	33	083
71.46	45	096				35	71.46	45	096
71.73	42	087	71.81	35	102	36	71.77	39	094
72.01	44	096				37	72.01	44	096
72.23	27	107	72.20	28	119	38	72.22	27	113
72.46	50	306				39	72.46	50	306
73.12	40	309				40	73.12	40	309
73.38	30	342	73.39	28	322	41	73.39	29	332
73.65	38	323				42	73.65	38	323
74.10	40	319	74.08	47	333	43	74.09	44	326
80.71	43	270	80.63	46	278	44	80.67	44	274

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-17-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
81.09	48	281	81.06	53	283	45	81.08	50	282
81.25	50	286	81.24	50	285	46	81.25	50	285
81.63	48	263				47	81.63	48	263
97.64	64	328				48	97.64	64	328
98.14	58	320	98.13	60	320	49	98.14	59	320
98.63	67	331	98.63	67	332	50	98.63	67	331
99.13	67	333	99.09	65	327	51	99.11	66	330
			101.24	53	316	52	101.24	53	316
			102.08	47	240	53	102.08	47	240
			105.94	55	277	54	105.94	55	277
106.01	57	288				55	106.01	57	288
			106.57	57	271	56	106.57	57	271
107.04	60	306	106.93	50	297	57	106.99	55	301
107.14	43	210	107.12	42	183	58	107.13	42	197
			107.70	60	324	59	107.70	60	324
107.77	39	206	107.77	45	188	60	107.77	42	197
107.78	64	328				61	107.78	64	328
108.20	53	210	108.25	58	216	62	108.23	56	213
			108.80	62	214	63	108.80	62	214

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-18-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
8.21	66	079				1	8.21	66	079
14.95	65	065				2	14.95	65	065
16.02	35	270				3	16.02	35	270
19.12	64	063				4	19.12	64	063
22.60	44	088				5	22.60	44	088
23.10	60	076				6	23.10	60	076
24.05	39	079				7	24.05	39	079
27.67	32	226				8	27.67	32	226
31.34	61	066				9	31.34	61	066
31.94	71	253				10	31.94	71	253
32.94	69	074				11	32.94	69	074
38.99	50	071	38.96	49	074	12	38.98	50	072
			39.89	13	256	13	39.89	13	256
			39.93	56	067	14	39.93	56	067
40.06	48	039				15	40.06	48	039
			42.67	65	084	16	42.67	65	084
			43.25	66	072	17	43.25	66	072
43.87	38	178	43.87	38	186	18	43.87	38	182
			44.34	31	190	19	44.34	31	190
			44.70	39	191	20	44.70	39	191
45.56	32	098	45.54	32	106	21	45.55	32	102
			46.50	28	057	22	46.50	28	057
			46.94	39	172	23	46.94	39	172
			47.69	28	186	24	47.69	28	186
			47.90	32	177	25	47.90	32	177
48.19	50	195	48.17	50	203	26	48.18	50	199
48.51	50	198	48.52	50	198	27	48.52	50	198
			49.05	47	278	28	49.05	47	278
			49.52	42	296	29	49.52	42	296
			50.72	41	140	30	50.72	41	140
50.78	16	278	50.77	11	263	31	50.78	14	270
			55.78	81	298	32	55.78	81	298
			56.65	59	075	33	56.65	59	075
			56.83	30	190	34	56.83	30	190
			57.69	36	162	35	57.69	36	162
			58.39	31	189	36	58.39	31	189
59.25	51	262	59.23	47	265	37	59.24	49	264
			60.21	49	204	38	60.21	49	204
64.09	37	020	64.08	35	026	39	64.09	36	023
			64.80	61	266	40	64.80	61	266
			66.01	39	358	41	66.01	39	358
			67.59	39	337	42	67.59	39	337
			67.76	42	330	43	67.76	42	330
67.84	27	230	67.84	24	205	44	67.84	26	218

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-18-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
			71.15	65	244	45	71.15	65	244
			73.38	77	081	46	73.38	77	081
			74.72	41	283	47	74.72	41	283
			76.02	43	263	48	76.02	43	263
			76.92	38	267	49	76.92	38	267
			78.11	24	019	50	78.11	24	019
78.54	30	026	78.53	34	031	51	78.54	32	029
78.77	27	022	78.76	22	025	52	78.77	24	024
80.30	36	003	80.29	30	011	53	80.30	33	007
82.23	16	001	82.22	20	016	54	82.23	18	009
			82.67	16	245	55	82.67	16	245
			82.70	45	236	56	82.70	45	236
			84.95	49	201	57	84.95	49	201
85.07	52	199	85.05	50	190	58	85.06	51	194
			85.69	42	272	59	85.69	42	272
			86.44	41	273	60	86.44	41	273
			88.70	16	091	61	88.70	16	091
89.75	8	089	89.67	5	073	62	89.71	07	081
			94.31	60	252	63	94.31	60	252
			94.59	61	243	64	94.59	61	243
			104.49	47	207	65	104.49	47	207
107.49	39	250	107.51	37	240	66	107.50	38	245
			107.77	41	265	67	107.77	41	265
107.83	45	114	107.87	44	116	68	107.85	45	115
			113.76	43	133	69	113.76	43	133
			114.09	58	162	70	114.09	58	162
			115.14	47	264	71	115.14	47	264
			119.95	30	228	72	119.95	30	228
			120.25	41	265	73	120.25	41	265
124.15	41	222	124.17	39	213	74	124.16	40	217
			124.96	56	332	75	124.96	56	332
125.84	47	111	125.88	47	113	76	125.86	47	112
126.53	33	243	126.61	36	225	77	126.57	35	234
126.74	52	003	126.77	50	356	78	126.76	51	000
			126.91	54	320	79	126.91	54	320
			127.42	49	310	80	127.42	49	310
			128.54	48	258	81	128.54	48	258
			132.50	42	230	82	132.50	42	230
			134.82	11	029	83	134.82	11	029
			136.11	46	220	84	136.11	46	220
			136.32	46	249	85	136.32	46	249
			136.42	82	348	86	136.42	82	348
			137.02	44	245	87	137.02	44	245

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-18-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
			138.10	39	223	88	138.10	39	223
			138.52	38	233	89	138.52	38	233
			142.86	36	225	90	142.86	36	225
			144.26	54	229	91	144.26	54	229
			144.96	68	203	92	144.96	68	203
			146.73	41	186	93	146.73	41	186
			148.17	27	216	94	148.17	27	216
			148.32	28	221	95	148.32	28	221
			148.73	36	243	96	148.73	36	243
150.96	48	117	150.99	47	108	97	150.98	48	113
151.77	44	248	151.80	51	246	98	151.79	48	247
152.06	61	105	152.00	67	099	99	152.03	64	102
			154.99	29	181	100	154.99	29	181
			156.44	26	207	101	156.44	26	207
			157.44	78	131	102	157.44	78	131
			159.09	42	325	103	159.09	42	325
			159.16	38	108	104	159.16	38	108
			159.29	33	113	105	159.29	33	113
			159.89	29	132	106	159.89	29	132
			159.99	48	336	107	159.99	48	336
160.08	54	333	160.09	52	335	108	160.09	53	334
162.02	45	110	162.04	45	104	109	162.03	45	107
163.49	75	203	163.48	74	210	110	163.49	74	207
164.22	43	112	164.25	42	111	111	164.24	42	111
164.34	43	109	164.36	41	103	112	164.35	42	106
			164.42	76	148	113	164.42	76	148
165.79	63	210	165.79	62	216	114	165.79	63	213
166.80	38	107	166.80	40	108	115	166.80	39	108
168.28	57	244	168.25	55	241	116	168.27	56	242
169.73	43	111	169.73	42	108	117	169.73	42	109
178.40	32	101	178.45	36	111	118	178.43	34	106
178.64	26	099	178.65	30	106	119	178.65	28	102
180.31	34	095	180.30	33	106	120	180.31	33	100
			182.22	54	353	121	182.22	54	353
184.20	29	116				122	184.20	29	116

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-19-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
			17.47	49	233	1	17.47	49	233
18.17	78	063	18.19	78	043	2	18.18	78	053
18.24	25	355	18.22	26	349	3	18.23	26	352
18.77	18	260				4	18.77	18	260
			20.27	37	245	5	20.27	37	245
20.75	35	270	20.74	42	275	6	20.75	39	272
21.51	33	263	21.52	42	275	7	21.52	38	269
22.06	39	277				8	22.06	39	277
22.28	26	255				9	22.28	26	255
22.52	36	273	22.45	30	256	10	22.49	33	264
23.05	41	287	23.04	33	307	11	23.05	37	297
			23.78	20	030	12	23.78	20	030
24.10	24	273				13	24.10	24	273
24.35	49	312				14	24.35	49	312
24.58	49	284	24.49	48	270	15	24.54	49	277
25.05	34	072	25.06	39	045	16	25.06	36	058
25.95	65	270	25.92	68	265	17	25.94	67	268
			26.35	12	094	18	26.35	12	094
26.79	18	275	26.88	19	261	19	26.84	18	268
			27.45	26	280	20	27.45	26	280
27.94	61	245	27.87	54	308	21	27.91	57	276
28.16	30	287	28.22	33	268	22	28.19	32	277
28.32	22	263				23	28.32	22	263
29.87	49	249				24	29.87	49	249
30.43	22	293	30.38	17	298	25	30.41	19	296
			31.10	52	016	26	31.10	52	016
31.40	28	345	31.37	30	013	27	31.39	29	359
31.75	46	275	31.70	49	274	28	31.73	47	274
32.79	73	006	32.81	75	002	29	32.80	74	004
33.34	51	111	33.29	48	103	30	33.32	50	107
33.89	40	285	33.87	29	263	31	33.88	34	274
34.62	32	311				32	34.62	32	311
35.14	16	327	35.21	32	248	33	35.18	24	288
35.55	38	275				34	35.55	38	275
36.13	20	164				35	36.13	20	164
36.43	31	312	36.44	27	314	36	36.44	29	313
36.95	47	313	36.92	43	312	37	36.94	45	312
37.34	60	132	37.24	55	143	38	37.29	57	137
37.93	40	275	37.88	30	283	39	37.91	35	279
			38.28	33	291	40	38.28	33	291
38.37	51	304	38.32	62	315	41	38.35	57	310
39.33	22	294				42	39.33	22	294
39.46	33	288				43	39.46	33	288

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-19-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
40.01	16	246				44	40.01	16	246
40.97	43	305				45	40.97	43	305
40.99	81	058	40.97	81	060	46	40.98	81	059
			42.13	17	187	47	42.13	17	187
42.57	25	228	42.53	26	230	48	42.55	26	229
44.43	30	270	44.43	26	270	49	44.43	28	270
45.58	60	299	45.57	59	296	50	45.58	59	298
45.75	46	303	45.73	45	298	51	45.74	45	300
46.88	22	277	46.90	33	276	52	46.89	27	276
47.12	29	280	47.09	33	270	53	47.11	31	275
49.91	76	133	49.90	77	133	54	49.91	77	133
50.87	25	233				55	50.87	25	233
51.07	23	214	51.02	20	248	56	51.05	21	231
			51.24	21	270	57	51.24	21	270
51.49	25	263				58	51.49	25	263
65.82	61	259				59	65.82	61	259
			66.06	38	249	60	66.06	38	249
66.48	30	206				61	66.48	30	206
			66.56	42	255	62	66.56	42	255
66.64	28	220				63	66.64	28	220
			66.72	29	250	64	66.72	29	250
66.99	28	250	67.06	26	236	65	67.03	27	243
67.32	32	235				66	67.32	32	235
67.94	21	233	67.93	24	175	67	67.94	23	204
			70.15	11	091	68	70.15	11	091
76.12	18	275	76.12	17	245	69	76.12	18	260
77.05	30	275	77.09	25	263	70	77.07	27	269
77.28	29	270	77.22	26	272	71	77.25	27	271
			77.37	29	265	72	77.37	29	265
77.53	32	273	77.57	28	260	73	77.55	30	267
			77.76	26	268	74	77.76	26	268
77.92	32	265	78.00	28	268	75	77.96	30	267
78.09	30	270	78.11	23	270	76	78.10	27	270
78.26	32	270				77	78.26	32	270
89.39	61	084	89.39	62	081	78	89.39	61	082
90.51	63	080	90.52	63	082	79	90.52	63	081
			93.90	29	252	80	93.90	29	252
94.35	41	268	94.35	39	265	81	94.35	40	266
94.53	37	268				82	94.53	37	268
94.79	32	268	94.72	29	258	83	94.76	30	263
95.00	34	265	95.01	33	252	84	95.01	34	259
95.27	36	275	95.25	42	274	85	95.26	39	274
			95.42	36	260	86	95.42	36	260

Interstate 90 East Hyak Realignment Project
2007 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-19-07

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
95.62	36	265	95.51	36	252	87	95.57	36	259
95.81	39	265	95.73	37	270	88	95.77	38	268
			96.20	29	242	89	96.20	29	242
96.84	34	271	96.90	36	260	90	96.87	35	266
97.05	30	265	97.07	25	250	91	97.06	27	258
97.21	28	270				92	97.21	28	270

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-38-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Log	Depth	Dip	Dip AZ		Log	#	Depth	Dip	Dip AZ
10.18	46	227				1	10.18	46	227
10.61	72	001				2	10.61	72	001
11.12	32	258				3	11.12	32	258
			11.33	57	001	4	11.33	57	001
11.46	63	349	11.52	61	351	5	11.49	62	350
11.69	34	259	11.67	36	248	6	11.68	35	254
11.95	65	252	11.94	65	251	7	11.95	65	251
12.04	49	257	12.06	51	230	8	12.05	50	243
			12.51	41	114	9	12.51	41	114
			12.70	56	345	10	12.70	56	345
			12.99	21	186	11	12.99	21	186
13.34	64	017	13.33	66	014	12	13.34	65	015
			13.77	57	347	13	13.77	57	347
14.74	59	343	14.74	57	338	14	14.74	58	340
14.82	55	062	14.80	55	069	15	14.81	55	065
15.08	30	255	15.06	30	256	16	15.07	30	255
15.81	43	229	15.87	53	240	17	15.84	48	235
16.15	55	044	16.16	55	039	18	16.16	55	042
16.91	61	332				19	16.91	61	332
			17.49	56	101	20	17.49	56	101
18.05	39	069	18.03	41	076	21	18.04	40	073
			18.72	41	356	22	18.72	41	356
19.15	49	114	19.19	54	104	23	19.17	52	109
19.81	48	104	19.84	48	084	24	19.83	48	094
20.87	42	054	20.89	41	045	25	20.88	41	050
22.94	60	339	22.97	58	342	26	22.96	59	341
23.35	53	049	23.35	52	046	27	23.35	52	048
			26.15	50	349	28	26.15	50	349
26.51	72	358	26.53	71	002	29	26.52	72	000
27.92	48	096	27.94	44	096	30	27.93	46	096
			31.26	43	077	31	31.26	43	077
31.33	80	121	31.42	80	121	32	31.38	80	121
			32.20	72	340	33	32.20	72	340
32.72	63	248	32.77	61	238	34	32.75	62	243
			33.21	35	210	35	33.21	35	210
33.45	43	068				36	33.45	43	068
			33.92	45	254	37	33.92	45	254
			34.06	60	011	38	34.06	60	011
34.20	42	074	34.23	42	067	39	34.22	42	070
35.91	44	081	35.93	44	104	40	35.92	44	092
38.38	25	225	38.39	18	258	41	38.39	22	242
			38.60	59	066	42	38.60	59	066
			40.71	41	238	43	40.71	41	238

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-38-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Log	Depth	Dip	Dip AZ		Log	#	Depth	Dip	Dip AZ
42.72	68	345	42.74	69	342	44	42.73	69	344
43.51	77	348	43.80	74	340	45	43.66	76	344
44.25	60	303	45.15	66	335	46	44.70	63	319
44.66	61	329				47	44.66	61	329
45.12	67	337				48	45.12	67	337
45.82	69	332	45.83	68	320	49	45.83	69	326
46.38	58	067				50	46.38	58	067
46.90	71	343	46.72	67	359	51	46.81	69	351
47.17	67	355	47.22	69	342	52	47.20	68	348
47.68	66	341	47.68	65	334	53	47.68	65	337
47.86	66	335	47.96	67	345	54	47.91	66	340
48.23	71	356	48.27	68	350	55	48.25	69	353
			48.76	46	211	56	48.76	46	211
48.94	73	347	48.95	73	346	57	48.95	73	346
49.10	76	347	49.11	75	345	58	49.11	75	346
50.59	76	339	50.63	75	355	59	50.61	76	347
			52.15	71	340	60	52.15	71	340
			59.37	63	001	61	59.37	63	001
64.87	71	325	64.89	71	323	62	64.88	71	324
65.20	72	322	65.18	72	326	63	65.19	72	324
70.85	74	354				64	70.85	74	354
77.37	70	004				65	77.37	70	004
			77.72	60	315	66	77.72	60	315
			79.45	73	340	67	79.45	73	340
87.10	71	325	87.12	71	314	68	87.11	71	320
			87.38	72	312	69	87.38	72	312
87.82	69	319	87.81	69	323	70	87.82	69	321
			88.89	67	320	71	88.89	67	320
			90.74	71	087	72	90.74	71	087
			93.25	64	057	73	93.25	64	057
93.66	29	186	93.68	31	178	74	93.67	30	182
94.21	25	166				75	94.21	25	166
94.43	37	202	94.42	36	179	76	94.43	37	191
			98.12	61	330	77	98.12	61	330
			99.62	73	327	78	99.62	73	327
			101.79	73	009	79	101.79	73	009
			102.31	75	023	80	102.31	75	023
			106.29	49	048	81	106.29	49	048
			107.10	70	001	82	107.10	70	001
			110.70	71	353	83	110.70	71	353
			111.59	67	352	84	111.59	67	352
112.37	76	359	112.36	76	359	85	112.37	76	359
			112.79	11	123	86	112.79	11	123

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-38-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Log	Depth	Dip	Dip AZ		Log	#	Depth	Dip	Dip AZ
113.04	68	347	113.09	67	356	87	113.07	68	352
113.95	51	146				88	113.95	51	146
114.57	73	344	114.68	70	351	89	114.63	71	348
114.64	22	141				90	114.64	22	141

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-39-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
6.32	28	226				1	6.32	28	226
6.61	55	275				2	6.61	55	275
7.81	12	104				3	7.81	12	104
8.41	38	232				4	8.41	38	232
8.56	55	273				5	8.56	55	273
9.53	17	121				6	9.53	17	121
10.92	77	303				7	10.92	77	303
12.96	35	153				8	12.96	35	153
13.37	30	171				9	13.37	30	171
13.80	26	174				10	13.80	26	174
15.27	22	111				11	15.27	22	111
16.85	36	193				12	16.85	36	193
16.97	37	178				13	16.97	37	178
18.34	22	168				14	18.34	22	168
18.66	18	191				15	18.66	18	191
18.83	33	211				16	18.83	33	211
19.00	30	206				17	19.00	30	206
19.18	33	191				18	19.18	33	191
20.40	30	208				19	20.40	30	208
20.76	28	171				20	20.76	28	171
22.35	34	211				21	22.35	34	211
22.68	25	203				22	22.68	25	203
23.02	25	209				23	23.02	25	209
26.33	54	289				24	26.33	54	289
26.42	45	201				25	26.42	45	201
27.40	18	155				26	27.40	18	155
27.94	47	171				27	27.94	47	171
28.69	63	168				28	28.69	63	168
29.11	40	193				29	29.11	40	193
29.52	22	268				30	29.52	22	268
30.65	36	234				31	30.65	36	234
32.97	25	230				32	32.97	25	230
33.57	36	166				33	33.57	36	166
34.20	48	161				34	34.20	48	161
35.23	15	084				35	35.23	15	084
53.25	11	260				36	53.25	11	260
54.84	49	225				37	54.84	49	225
56.31	12	084				38	56.31	12	084
57.63	56	026				39	57.63	56	026
57.93	14	084				40	57.93	14	084
58.97	34	066				41	58.97	34	066
59.77	20	118				42	59.77	20	118
61.00	76	209				43	61.00	76	209

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-39-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
61.83	40	010				44	61.83	40	010
62.11	40	232				45	62.11	40	232
62.35	65	213				46	62.35	65	213
62.95	63	217				47	62.95	63	217
64.31	75	129				48	64.31	75	129
65.18	49	212				49	65.18	49	212
65.31	51	206				50	65.31	51	206
65.55	43	247				51	65.55	43	247
66.04	46	216				52	66.04	46	216
66.22	46	223				53	66.22	46	223
68.40	53	188				54	68.40	53	188
			69.90	59	160	55	69.90	59	160
			72.06	21	139	56	72.06	21	139
72.32	35	211	72.34	30	245	57	72.33	33	228
			73.06	36	260	58	73.06	36	260
73.81	57	204				59	73.81	57	204
75.23	39	176				60	75.23	39	176
76.71	26	191				61	76.71	26	191
			78.30	48	062	62	78.30	48	062
78.60	25	156				63	78.60	25	156
80.34	73	303	80.36	72	303	64	80.35	72	303
			80.45	42	303	65	80.45	42	303
80.71	47	318	80.69	48	310	66	80.70	47	314
80.85	43	272				67	80.85	43	272
			81.08	50	296	68	81.08	50	296
81.53	17	238	81.51	11	213	69	81.52	14	225
82.07	49	095	82.06	49	098	70	82.07	49	097
82.50	14	101	82.47	12	208	71	82.49	13	155
82.81	34	087				72	82.81	34	087
			83.19	48	285	73	83.19	48	285
83.36	28	127				74	83.36	28	127
83.57	35	106				75	83.57	35	106
86.13	39	003				76	86.13	39	003
			86.54	49	256	77	86.54	49	256
			88.26	38	059	78	88.26	38	059
88.68	32	029				79	88.68	32	029
89.83	37	317	89.83	35	303	80	89.83	36	310
			91.83	39	129	81	91.83	39	129
92.74	52	245	92.99	44	240	82	92.87	48	242
93.17	44	290				83	93.17	44	290
93.35	63	278	93.41	61	278	84	93.38	62	278
			94.97	79	261	85	94.97	79	261
95.52	38	260				86	95.52	38	260

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-39-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
95.62	29	033	95.63	22	064	87	95.63	25	049
96.16	21	065	96.11	32	082	88	96.14	27	073
			96.31	47	346	89	96.31	47	346
96.75	34	182	96.73	28	163	90	96.74	31	173
96.91	38	158	96.92	38	146	91	96.92	38	152
			97.21	36	035	92	97.21	36	035
			98.06	54	026	93	98.06	54	026
			98.38	48	014	94	98.38	48	014
98.59	49	282				95	98.59	49	282
			98.65	37	332	96	98.65	37	332
			98.94	30	260	97	98.94	30	260
99.05	52	277				98	99.05	52	277
			99.13	45	224	99	99.13	45	224
			99.35	41	243	100	99.35	41	243

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-40-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
8.43	35	277				1	8.43	35	277
9.41	31	240				2	9.41	31	240
9.75	46	305				3	9.75	46	305
9.95	53	289				4	9.95	53	289
10.49	56	295				5	10.49	56	295
10.64	55	331				6	10.64	55	331
11.31	41	255				7	11.31	41	255
11.74	38	211				8	11.74	38	211
12.03	38	301				9	12.03	38	301
12.77	61	310				10	12.77	61	310
13.27	73	297				11	13.27	73	297
13.51	60	304				12	13.51	60	304
14.01	19	173				13	14.01	19	173
14.55	40	106				14	14.55	40	106
14.96	47	157				15	14.96	47	157
15.18	49	323				16	15.18	49	323
16.18	17	133				17	16.18	17	133
17.04	78	070				18	17.04	78	070
18.05	27	261				19	18.05	27	261
18.38	25	234				20	18.38	25	234
19.11	25	248				21	19.11	25	248
19.50	18	285				22	19.50	18	285
19.71	33	297				23	19.71	33	297
20.46	56	143				24	20.46	56	143
21.06	14	273				25	21.06	14	273
22.22	25	152				26	22.22	25	152
23.88	55	125				27	23.88	55	125
24.97	41	193				28	24.97	41	193
25.81	41	136				29	25.81	41	136
26.65	52	110				30	26.65	52	110
27.06	65	144				31	27.06	65	144
28.40	35	168				32	28.40	35	168
29.22	44	345				33	29.22	44	345
31.28	16	318				34	31.28	16	318
31.42	43	137				35	31.42	43	137
33.07	48	290				36	33.07	48	290
37.31	27	331				37	37.31	27	331
40.12	39	121				38	40.12	39	121
41.96	32	283				39	41.96	32	283
42.78	42	041				40	42.78	42	041
43.28	25	248				41	43.28	25	248
43.84	24	260				42	43.84	24	260
47.66	47	196				43	47.66	47	196

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-40-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
60.75	33	250				44	60.75	33	250
61.52	58	247				45	61.52	58	247
61.91	28	243				46	61.91	28	243
66.66	31	239				47	66.66	31	239
71.26	38	317				48	71.26	38	317
72.34	34	291				49	72.34	34	291
75.08	28	277				50	75.08	28	277
76.58	34	312				51	76.58	34	312
77.94	36	285				52	77.94	36	285
78.90	78	069				53	78.90	78	069
87.25	45	136				54	87.25	45	136
87.86	77	069				55	87.86	77	069
90.74	57	253				56	90.74	57	253
93.08	39	171				57	93.08	39	171
99.97	42	168				58	99.97	42	168
100.15	34	283				59	100.15	34	283
100.67	61	161				60	100.67	61	161
100.88	54	321				61	100.88	54	321
101.33	49	171				62	101.33	49	171
101.96	49	144				63	101.96	49	144
102.05	52	322				64	102.05	52	322
102.57	41	151				65	102.57	41	151
103.22	48	168				66	103.22	48	168
105.64	70	323				67	105.64	70	323
106.51	28	200				68	106.51	28	200
107.02	28	275				69	107.02	28	275
107.29	32	182				70	107.29	32	182
108.72	45	172				71	108.72	45	172
108.73	61	012				72	108.73	61	012
110.40	51	158				73	110.40	51	158
112.50	24	193				74	112.50	24	193
			114.94	37	134	75	114.94	37	134
			115.05	38	145	76	115.05	38	145
			115.34	23	173	77	115.34	23	173
			115.58	32	167	78	115.58	32	167
			115.93	31	148	79	115.93	31	148
			116.27	07	181	80	116.27	07	181
			116.85	36	170	81	116.85	36	170
117.08	11	131	117.06	11	156	82	117.07	11	144
118.64	50	314	118.64	51	313	83	118.64	51	314
			119.15	18	174	84	119.15	18	174
119.36	54	279	119.34	60	276	85	119.35	57	277
120.28	65	292	120.26	65	295	86	120.27	65	294

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-40-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
			120.48	66	303	87	120.48	66	303
120.92	21	214	120.97	32	213	88	120.95	27	214
			121.37	27	134	89	121.37	27	134
121.68	57	288	121.72	61	272	90	121.70	59	280
122.16	15	111	122.17	18	139	91	122.17	17	125
122.35	64	291	122.39	67	285	92	122.37	65	288
123.97	45	318	123.97	44	312	93	123.97	44	315
			127.57	15	310	94	127.57	15	310
			128.20	24	081	95	128.20	24	081
			128.31	13	223	96	128.31	13	223
			128.70	32	206	97	128.70	32	206
			129.33	43	141	98	129.33	43	141
			129.51	25	245	99	129.51	25	245
			129.78	35	255	100	129.78	35	255
			129.98	39	270	101	129.98	39	270
			130.23	62	327	102	130.23	62	327
			130.59	38	182	103	130.59	38	182
130.74	33	173	130.83	41	195	104	130.79	37	184
			131.09	58	311	105	131.09	58	311
			131.27	45	194	106	131.27	45	194
132.23	51	181	132.26	46	170	107	132.25	48	176
			132.72	38	143	108	132.72	38	143
133.38	18	091	133.40	09	055	109	133.39	14	073
133.56	18	257	133.59	16	305	110	133.58	17	281
			134.38	45	273	111	134.38	45	273
135.06	31	052	135.10	29	061	112	135.08	30	057
			135.63	12	182	113	135.63	12	182
135.98	18	218	136.01	22	267	114	136.00	20	242
137.70	44	014	137.69	44	011	115	137.70	44	013

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-41-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
8.19	16	306	8.23	15	280	1	8.21	15	293
			8.63	11	263	2	8.63	11	263
			10.56	34	256	3	10.56	34	256
13.68	46	244				4	13.68	46	244
13.85	38	235				5	13.85	38	235
			14.73	46	272	6	14.73	46	272
15.53	50	251	15.55	49	241	7	15.54	50	246
16.33	37	050	16.33	38	057	8	16.33	37	053
			16.70	42	319	9	16.70	42	319
16.94	25	061				10	16.94	25	061
17.40	22	037	17.40	14	340	11	17.40	18	009
18.66	15	179	18.67	22	146	12	18.67	18	162
18.84	30	131	18.85	35	138	13	18.85	33	135
19.73	62	253	19.72	62	240	14	19.73	62	247
20.02	21	235	20.00	16	182	15	20.01	18	208
			21.80	38	263	16	21.80	38	263
23.04	22	135	23.02	18	128	17	23.03	20	131
23.46	68	310	23.38	70	306	18	23.42	69	308
23.84	11	129	23.86	17	111	19	23.85	14	120
25.01	36	165	24.99	32	164	20	25.00	34	165
			25.27	28	128	21	25.27	28	128
26.60	61	243	26.61	64	250	22	26.61	62	247
26.79	64	264	26.85	65	269	23	26.82	65	267
28.51	38	106	28.57	22	113	24	28.54	30	110
			28.71	71	288	25	28.71	71	288
			28.88	33	173	26	28.88	33	173
29.19	25	099	29.19	30	123	27	29.19	27	111
30.94	36	188	30.84	46	207	28	30.89	41	197
31.14	41	206	31.12	41	208	29	31.13	41	207
32.92	51	162	32.91	50	166	30	32.92	50	164
33.10	45	235				31	33.10	45	235
33.50	51	164	33.48	52	167	32	33.49	52	165
			33.81	58	157	33	33.81	58	157
			34.37	59	186	34	34.37	59	186
			35.34	58	195	35	35.34	58	195
36.11	15	087	36.10	07	014	36	36.11	11	050
			36.17	30	178	37	36.17	30	178
			36.59	38	186	38	36.59	38	186
			37.08	33	216	39	37.08	33	216
37.16	38	204	37.20	47	218	40	37.18	42	211
40.00	61	182	39.95	55	169	41	39.98	58	175
41.04	46	173	41.02	48	159	42	41.03	47	166
43.59	18	283	43.46	17	298	43	43.53	18	290

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-41-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
43.78	24	301	43.81	17	303	44	43.80	20	302
45.51	38	248	45.49	30	243	45	45.50	34	245
46.75	12	277				46	46.75	12	277
			47.43	64	319	47	47.43	64	319
47.40	12	141	47.48	07	141	48	47.44	09	141
48.13	43	188	48.18	41	206	49	48.16	42	197
49.06	23	128	49.08	18	123	50	49.07	21	126
50.92	55	270	50.98	53	299	51	50.95	54	285
51.45	08	223	51.42	14	183	52	51.44	11	203
52.18	11	223	52.22	17	205	53	52.20	14	214
52.62	54	306	52.65	51	307	54	52.64	52	307
53.92	22	248	53.94	15	256	55	53.93	18	252
56.63	36	290	56.69	39	302	56	56.66	37	296
57.89	57	305	57.90	55	306	57	57.90	56	305
60.91	30	096	60.97	28	093	58	60.94	29	095
			61.50	50	195	59	61.50	50	195
62.04	35	213	62.05	29	173	60	62.05	32	193
63.05	44	276	63.10	54	253	61	63.08	49	265
63.69	38	188	63.69	41	172	62	63.69	39	180
			64.44	41	069	63	64.44	41	069
66.67	27	167				64	66.67	27	167
67.89	32	215	67.84	36	179	65	67.87	34	197
69.20	03	100	69.24	16	054	66	69.22	09	077
70.22	46	270	70.20	40	270	67	70.21	43	270
71.59	35	184	71.61	37	180	68	71.60	36	182
			71.74	51	213	69	71.74	51	213
			72.00	38	148	70	72.00	38	148
			72.75	24	228	71	72.75	24	228
73.43	07	325	73.45	18	037	72	73.44	13	001
			73.98	30	258	73	73.98	30	258
74.06	18	339				74	74.06	18	339
			74.47	56	158	75	74.47	56	158
75.57	73	198				76	75.57	73	198
			75.71	44	198	77	75.71	44	198
75.96	51	186	76.07	41	221	78	76.02	46	203
76.12	46	230				79	76.12	46	230
76.51	37	166	76.56	36	192	80	76.54	37	179
			77.28	43	270	81	77.28	43	270
77.74	16	015	77.74	07	049	82	77.74	11	032
78.39	53	178	78.36	48	198	83	78.38	51	188
			78.96	61	182	84	78.96	61	182
79.30	34	211				85	79.30	34	211
79.68	62	185	79.76	59	171	86	79.72	61	178

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-41-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
80.71	44	166	80.61	41	158	87	80.66	43	162
80.99	57	161	81.04	50	165	88	81.02	54	163
			81.80	57	113	89	81.80	57	113
82.10	11	099	82.11	18	081	90	82.11	15	090
82.86	69	247	82.88	67	241	91	82.87	68	244
83.48	33	126				92	83.48	33	126
86.72	56	150	86.77	61	135	93	86.75	58	142

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-42-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
14.07	83	283	14.03	81	280	1	14.05	82	282
			14.84	55	102	2	14.84	55	102
15.18	54	087	15.14	48	084	3	15.16	51	085
15.83	48	332	15.80	51	338	4	15.82	49	335
16.29	70	028				5	16.29	70	028
			17.82	52	126	6	17.82	52	126
20.35	63	340				7	20.35	63	340
			21.09	68	275	8	21.09	68	275
22.70	71	264	22.71	70	264	9	22.71	71	264
25.01	75	028				10	25.01	75	028
27.45	46	164	27.42	55	177	11	27.44	50	170
27.67	54	168	27.65	59	172	12	27.66	56	170
			28.82	58	153	13	28.82	58	153
			32.92	65	167	14	32.92	65	167
			34.63	75	238	15	34.63	75	238

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-43-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
22.66	41	175				1	22.66	41	175
			22.78	22	099	2	22.78	22	099
23.56	40	291	23.50	30	270	3	23.53	35	280
26.05	43	134	26.00	37	141	4	26.03	40	137
			26.53	46	128	5	26.53	46	128
27.15	36	099	27.16	41	128	6	27.16	39	113
27.41	39	096	27.42	48	111	7	27.42	43	104
			28.18	67	256	8	28.18	67	256
29.67	49	235	29.67	55	230	9	29.67	52	232
			30.84	41	147	10	30.84	41	147
			30.96	33	256	11	30.96	33	256
32.08	52	261				12	32.08	52	261

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-44-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
25.37	69	265				1	25.37	69	265
25.48	75	267				2	25.48	75	267
27.99	55	111				3	27.99	55	111
28.42	23	133				4	28.42	23	133
30.65	50	316	30.62	55	294	5	30.64	53	305
31.13	46	312	31.12	45	315	6	31.13	46	314
			31.20	62	275	7	31.20	62	275
31.86	72	109	31.91	73	106	8	31.89	73	108
32.68	61	119				9	32.68	61	119
33.05	74	269	33.04	71	269	10	33.05	73	269
33.98	62	135	33.95	56	138	11	33.97	59	137
			34.35	69	273	12	34.35	69	273
35.00	50	199	35.02	51	200	13	35.01	51	199
			35.79	41	208	14	35.79	41	208
			36.01	53	213	15	36.01	53	213
			36.18	44	194	16	36.18	44	194
37.00	56	102	36.99	59	095	17	37.00	57	099
			38.11	35	143	18	38.11	35	143
			39.51	61	216	19	39.51	61	216
			39.90	18	255	20	39.90	18	255

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-45-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
28.24	41	347				1	28.24	41	347
28.53	13	010				2	28.53	13	010
28.90	55	184				3	28.90	55	184
30.22	54	265				4	30.22	54	265
33.69	48	283				5	33.69	48	283
36.62	51	263				6	36.62	51	263
37.12	28	246				7	37.12	28	246
37.98	48	243				8	37.98	48	243
38.71	51	164				9	38.71	51	164
39.10	54	028				10	39.10	54	028
39.69	47	023				11	39.69	47	023
39.99	60	023				12	39.99	60	023
41.33	49	261				13	41.33	49	261
41.95	44	268				14	41.95	44	268
42.79	57	291	42.78	51	300	15	42.79	54	296
			42.91	23	313	16	42.91	23	313
			44.21	58	270	17	44.21	58	270
			46.90	64	274	18	46.90	64	274
			46.97	73	129	19	46.97	73	129

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-46-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
6.16	56	111	6.06	50	151	1	6.11	53	131
			7.37	61	267	2	7.37	61	267
			7.63	68	268	3	7.63	68	268
8.63	55	260				4	8.63	55	260
			9.29	60	121	5	9.29	60	121
10.07	60	259				6	10.07	60	259
10.55	42	088	10.51	43	086	7	10.53	42	087
10.97	49	250				8	10.97	49	250
11.50	58	273	11.67	67	259	9	11.59	63	266
12.10	53	272	12.09	52	248	10	12.10	52	260
12.74	49	263	12.75	55	268	11	12.75	52	266
			12.95	56	256	12	12.95	56	256
			13.15	67	250	13	13.15	67	250
13.33	46	104	13.34	47	101	14	13.34	46	103
			13.45	61	257	15	13.45	61	257
14.12	41	109	14.07	36	114	16	14.10	38	112
14.32	43	106	14.36	43	093	17	14.34	43	100
14.64	53	111	14.66	56	102	18	14.65	54	107
			15.11	68	253	19	15.11	68	253
15.61	48	241	15.58	50	247	20	15.60	49	244
15.67	69	258	15.65	70	252	21	15.66	69	255
			17.47	57	102	22	17.47	57	102
			18.08	63	266	23	18.08	63	266
18.35	52	340				24	18.35	52	340
18.72	57	260	18.70	60	256	25	18.71	59	258
19.36	59	024				26	19.36	59	024
19.49	65	268	19.51	65	270	27	19.50	65	269
19.51	65	007				28	19.51	65	007
			19.71	69	007	29	19.71	69	007
21.34	74	010	21.30	71	010	30	21.32	72	010
21.50	58	010	21.50	62	006	31	21.50	60	008
23.19	67	004				32	23.19	67	004
24.68	64	129	24.69	63	143	33	24.69	63	136
26.65	45	104				34	26.65	45	104
26.84	28	068				35	26.84	28	068
27.98	73	263	27.98	72	259	36	27.98	72	261
29.92	60	263	29.96	58	258	37	29.94	59	261
30.42	47	262	30.42	48	270	38	30.42	47	266
31.61	57	255	31.60	56	260	39	31.61	56	257
32.51	48	255				40	32.51	48	255
34.65	59	258	34.65	59	258	41	34.65	59	258
35.73	54	248				42	35.73	54	248
37.80	57	254	37.79	55	248	43	37.80	56	251

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-46-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
40.49	52	016	40.49	48	030	44	40.49	50	023
40.86	54	027	40.72	51	031	45	40.79	53	029
			41.27	68	019	46	41.27	68	019
41.45	74	028	41.46	72	022	47	41.46	73	025
42.01	64	029	42.00	62	016	48	42.01	63	023
43.24	70	022	43.24	68	024	49	43.24	69	023
43.40	66	021	43.43	65	015	50	43.42	66	018
			43.98	30	201	51	43.98	30	201
45.78	65	007	45.76	67	008	52	45.77	66	008
45.97	67	011	45.94	67	014	53	45.96	67	012
46.76	53	256				54	46.76	53	256
48.12	51	275	48.07	48	268	55	48.10	49	271
48.97	59	224				56	48.97	59	224
49.95	52	268				57	49.95	52	268
50.30	30	099	50.26	28	093	58	50.28	29	096
51.78	46	263				59	51.78	46	263
			52.67	45	282	60	52.67	45	282
53.01	53	125				61	53.01	53	125
			53.21	42	155	62	53.21	42	155
			53.83	46	044	63	53.83	46	044
			54.21	49	052	64	54.21	49	052
54.28	69	347				65	54.28	69	347
			54.54	57	037	66	54.54	57	037
			54.75	50	011	67	54.75	50	011
			55.37	41	015	68	55.37	41	015
			55.52	47	007	69	55.52	47	007
			55.85	47	148	70	55.85	47	148
			57.16	47	083	71	57.16	47	083
57.40	35	351				72	57.40	35	351
			58.44	42	072	73	58.44	42	072
			58.48	56	348	74	58.48	56	348
58.51	48	325				75	58.51	48	325
			58.84	51	069	76	58.84	51	069
			59.24	41	050	77	59.24	41	050
59.49	55	345				78	59.49	55	345
59.97	45	347	59.94	45	343	79	59.96	45	345
60.56	59	008				80	60.56	59	008
			60.95	58	019	81	60.95	58	019
61.20	67	014				82	61.20	67	014
61.65	56	002				83	61.65	56	002
			63.22	39	106	84	63.22	39	106
64.03	30	087				85	64.03	30	087
64.51	47	083	64.45	58	075	86	64.48	53	079

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-46-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
			65.29	54	017	87	65.29	54	017
			65.48	55	196	88	65.48	55	196
65.93	53	280	65.92	48	263	89	65.93	51	271
			66.65	38	064	90	66.65	38	064
			68.90	84	031	91	68.90	84	031
66.98	49	250				92	66.98	49	250
67.14	49	257				93	67.14	49	257
68.92	84	026				94	68.92	84	026
			69.61	63	075	95	69.61	63	075
			70.34	42	095	96	70.34	42	095
70.74	64	018	70.62	66	014	97	70.68	65	016
71.68	76	022	71.65	74	015	98	71.67	75	018
			71.88	74	022	99	71.88	74	022
72.35	75	021	72.50	75	022	100	72.43	75	021
72.57	75	026	72.62	77	032	101	72.60	76	029
			73.25	63	018	102	73.25	63	018
73.40	44	251				103	73.40	44	251
73.59	69	025	73.68	60	009	104	73.64	64	017
73.66	47	259				105	73.66	47	259
74.58	47	265				106	74.58	47	265
74.76	61	026	74.71	64	026	107	74.74	62	026
			75.20	60	049	108	75.20	60	049
75.38	50	032	75.35	51	022	109	75.37	51	027
76.20	46	029	76.17	48	008	110	76.19	47	019
76.45	51	267				111	76.45	51	267
76.95	44	253				112	76.95	44	253
77.34	48	250	77.29	42	272	113	77.32	45	261
77.98	58	024	77.99	60	017	114	77.99	59	021
78.29	46	270				115	78.29	46	270
78.73	44	261				116	78.73	44	261
			78.74	55	003	117	78.74	55	003
79.07	52	298				118	79.07	52	298
79.72	61	092	79.71	61	082	119	79.72	61	087
79.83	46	263				120	79.83	46	263
			80.07	30	307	121	80.07	30	307
80.22	46	271	80.36	48	293	122	80.29	47	282
			80.44	68	022	123	80.44	68	022
			80.65	40	011	124	80.65	40	011
80.70	45	257				125	80.70	45	257
81.54	46	268				126	81.54	46	268
81.82	49	240				127	81.82	49	240
82.56	71	023	82.48	70	029	128	82.52	70	026
83.00	51	260				129	83.00	51	260

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-46-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
			83.11	43	022	130	83.11	43	022
83.59	44	106	83.53	45	099	131	83.56	45	103
84.43	41	226				132	84.43	41	226

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-47-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
12.83	44	116				1	12.83	44	116
13.68	46	101	13.66	42	081	2	13.67	44	091
			14.27	60	265	3	14.27	60	265
			14.78	70	254	4	14.78	70	254
15.60	67	268	15.58	66	276	5	15.59	66	272
			15.82	62	266	6	15.82	62	266
			16.40	60	268	7	16.40	60	268
			16.81	62	252	8	16.81	62	252
			17.41	39	083	9	17.41	39	083
			17.55	68	260	10	17.55	68	260
17.59	30	072	17.59	25	081	11	17.59	27	076
			18.22	51	253	12	18.22	51	253
18.85	44	236				13	18.85	44	236
			19.00	50	245	14	19.00	50	245
			19.25	44	297	15	19.25	44	297
			19.51	59	263	16	19.51	59	263
19.75	51	248	19.80	56	244	17	19.78	53	246
			20.49	43	087	18	20.49	43	087
			20.64	55	256	19	20.64	55	256
21.11	55	241	21.11	52	267	20	21.11	53	254
			21.34	53	250	21	21.34	53	250
			21.72	52	156	22	21.72	52	156
22.29	56	263				23	22.29	56	263
			22.48	55	256	24	22.48	55	256
22.97	51	260	22.92	60	274	25	22.95	55	267
			23.50	56	279	26	23.50	56	279
			23.85	45	268	27	23.85	45	268
			24.23	60	252	28	24.23	60	252
			24.46	64	283	29	24.46	64	283
			24.77	45	280	30	24.77	45	280
			25.22	46	242	31	25.22	46	242
			25.56	44	256	32	25.56	44	256
26.24	50	261				33	26.24	50	261
			26.62	55	141	34	26.62	55	141
26.66	55	250				35	26.66	55	250
			27.27	57	242	36	27.27	57	242
			29.60	45	239	37	29.60	45	239
30.09	46	027				38	30.09	46	027
30.93	49	260	30.92	51	256	39	30.93	50	258
			31.41	45	249	40	31.41	45	249
31.76	48	233				41	31.76	48	233
			31.89	42	102	42	31.89	42	102
			33.07	45	245	43	33.07	45	245

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-47-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
			33.52	35	089	44	33.52	35	089
			34.10	39	186	45	34.10	39	186
			34.82	58	259	46	34.82	58	259
			35.38	46	250	47	35.38	46	250
35.54	49	240	35.60	53	227	48	35.57	51	234
			36.46	52	248	49	36.46	52	248
			36.80	48	259	50	36.80	48	259
			37.38	35	070	51	37.38	35	070
37.91	56	170				52	37.91	56	170
			38.74	25	161	53	38.74	25	161
42.39	60	270				54	42.39	60	270
			42.83	56	265	55	42.83	56	265
			43.36	52	285	56	43.36	52	285
43.59	54	295				57	43.59	54	295
			43.73	59	283	58	43.73	59	283
44.28	46	288				59	44.28	46	288
			44.53	31	173	60	44.53	31	173
44.88	49	113	44.94	47	156	61	44.91	48	135
47.91	40	309	47.91	43	086	62	47.91	41	197
			48.24	33	259	63	48.24	33	259
			48.55	42	282	64	48.55	42	282
49.31	69	204				65	49.31	69	204
52.66	54	257				66	52.66	54	257
53.62	48	253				67	53.62	48	253
			54.99	80	360	68	54.99	80	360
55.04	33	277				69	55.04	33	277
56.92	51	260	56.88	51	248	70	56.90	51	254
			57.23	54	276	71	57.23	54	276
			57.87	54	253	72	57.87	54	253
58.23	54	268	58.35	49	250	73	58.29	51	259
			59.23	38	071	74	59.23	38	071
			59.46	49	284	75	59.46	49	284
60.22	54	243				76	60.22	54	243
			60.70	22	104	77	60.70	22	104
61.18	41	235				78	61.18	41	235
			61.36	60	252	79	61.36	60	252
62.16	61	260				80	62.16	61	260
62.78	58	270				81	62.78	58	270
63.34	32	114				82	63.34	32	114
64.24	58	263	64.21	60	250	83	64.23	59	257
64.94	48	250				84	64.94	48	250
65.16	30	089				85	65.16	30	089
66.54	30	124	66.58	49	109	86	66.56	39	116

Interstate 90 East Hyak Realignment Project
2008 Geotechnical Program
Summary of COBL Discontinuity Data
Borehole #: RKS-47-08

Optical Televiewer Data			Acoustic Televiewer Data			Average Data Set			
Depth	Dip	Dip AZ	Depth	Dip	Dip AZ	#	Depth	Dip	Dip AZ
66.82	45	168				87	66.82	45	168
66.96	54	333	66.95	53	320	88	66.96	54	326
67.81	35	109	67.71	28	116	89	67.76	31	113
68.56	43	250				90	68.56	43	250
			68.93	28	131	91	68.93	28	131
69.35	44	255				92	69.35	44	255
70.43	51	240				93	70.43	51	240
71.30	42	303	71.36	51	309	94	71.33	46	306
71.71	50	263				95	71.71	50	263

Notes:
Depth measured from ground surface to center of selected discontinuity
Azimuth corrected for 17 degrees East declination
Dip is measured from horizontal
Average data set used for analysis and presented on COBL logs
# of Average value corresponds to COBL log data presentation on simulated core image
Duplicate discontinuities selected based on geologic review of COBL log and borehole log