



GAMMA RAY

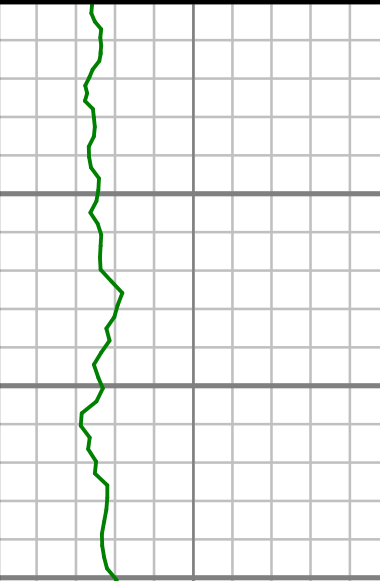
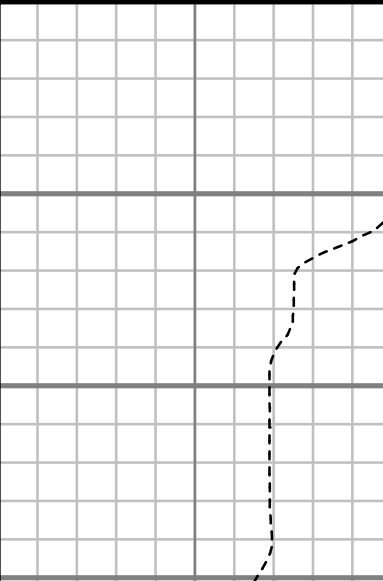
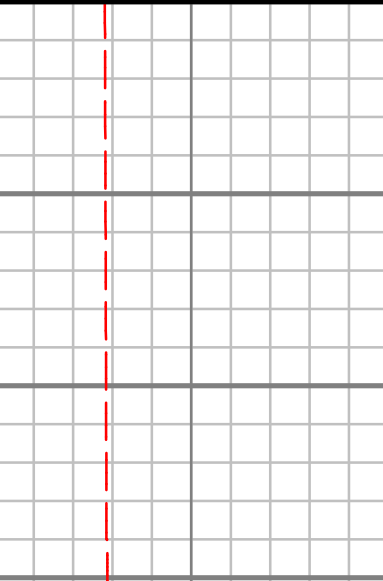
1:120 FEET MD

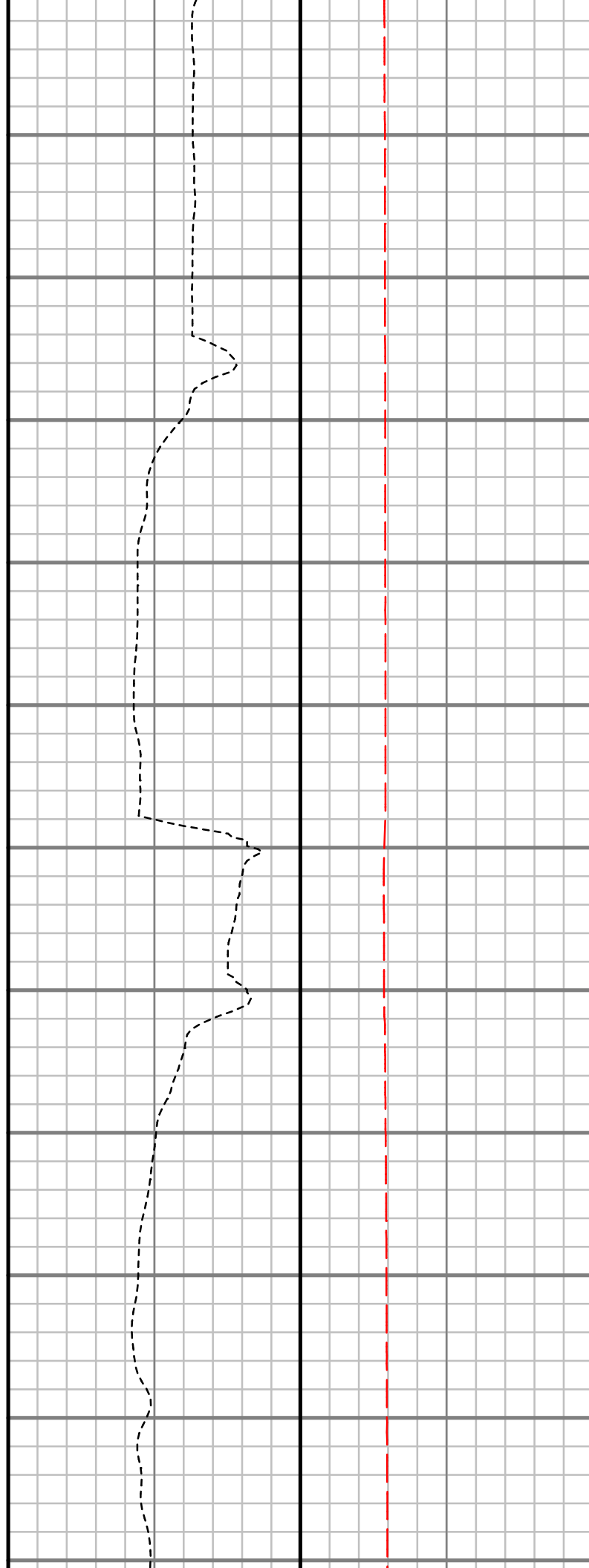
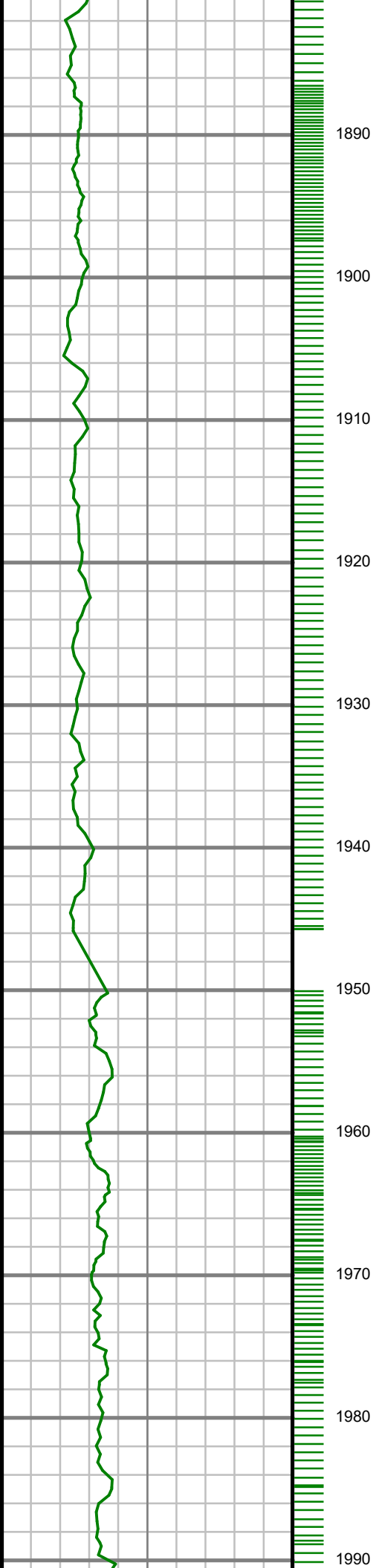
COMPANY : ANADARKO PETROLEUM CORPORATION WELL : BUTTERBALL 24N-34HZ FIELD : WATTENBERG COUNTY : WELD STATE : COLORADO COUNTRY : U.S.A. UWI : 05123443150000				COMPANY : ANADARKO PETROLEUM CORPORATION WELL : BUTTERBALL 24N-34HZ FIELD : WATTENBERG COUNTY : WELD STATE : COLORADO COUNTRY : U.S.A. UWI : 05123443150000			
DEPTH REF. : RKB REF. HEIGHT : 20.000 ft GROUND LEVEL : 4916.000 ft		RKB to Ground Level G.L. to MEAN SEA LEVEL		WELL LOCATION LAT:40.1582700°N LONG:104.8698650°W N:14584393.40 ft E:1676776.82 ft SEC:10 TWP:2N RANGE:67W		OTHER SERVICES DIRECTIONAL ROP	
BOREHOLE RECORD				DEVIATION RECORD			
HOLE SIZE in	FROM ft	TO ft	INCLINATION deg	FROM ft	TO ft		
13.5	0	1862	0 - 16	0	5200		
7.78	1862	15677	16 - 0	5200	6915		
			0 - 88	6915	7761		
			88 - 91	7761	15677		
CASING RECORD							
CASING SIZE in	FROM ft	TO ft					
9.625	0	1862					
			DRILLING CO.: PRECISION DRILLING RIG: 461 LMD UNIT NO.: WMD-00282-DISTRICT: CASPER SPUD DATE: 04/25/2017 LMD START DATE: 06/04/2017 LMD END DATE: 06/08/2017 DEPTH: 1862 ft DEPTH: 15624 ft TOTAL DEPTH: 15677 ft				

Run Data						
RUN NUMBER	1					
START DATE	06/04/2017					
START TIME	13:50					
END DATE	05/08/2017					
END TIME	11:40					
DEPTH IN (ft)	1862					
DEPTH OUT (ft)	15677					
LOG TOP (ft)	1862					
LOG BOTTOM (ft)	15624					
HOLE SIZE (in)	7.78					
MUD DATA @ (ft)	-					
MUD TYPE	OIL-BASED					
DENSITY (lb / gal)	9.3					
VISCOSITY (s / qt)	49					
pH	-					
FLUID LOSS (cm3 / 30)	-					
SALINITY (ppm)	195165					
Rm (ohmm @ deg F)	-					
Rmf (ohmm @ deg F)	-					
MAX TEMP (deg F)	257					
Rm @ MAX TEMP (ohmm)	-					
LWD ENGINEER #1	L. SHAFFER					
LWD ENGINEER #2	S. NEJAD					
LWD ENGINEER #3	-					
LOG WITNESS #1	-					
LOG WITNESS #2	-					

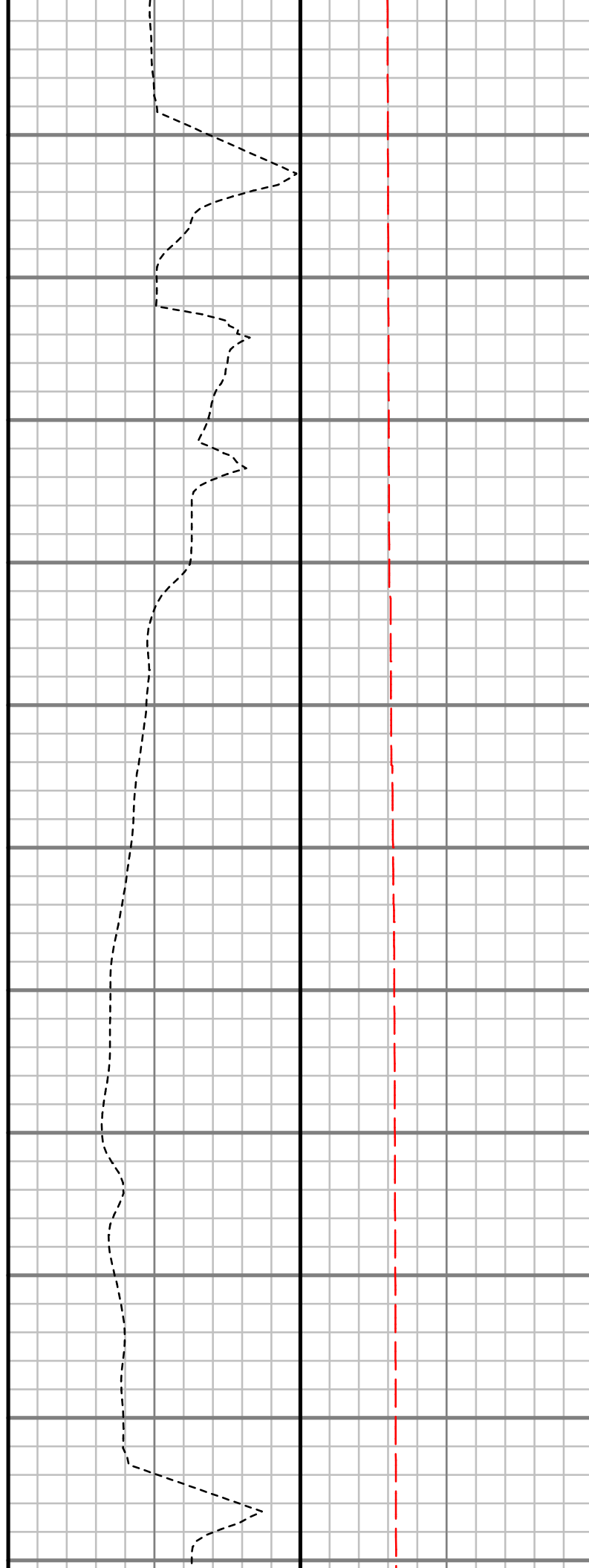
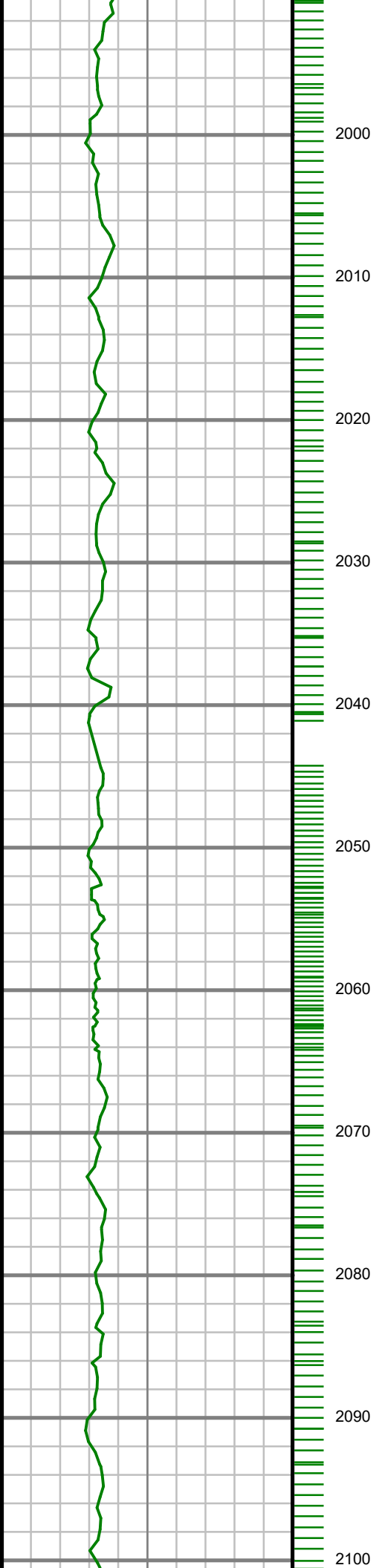
[illegible]

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions as set out in our current price schedule.

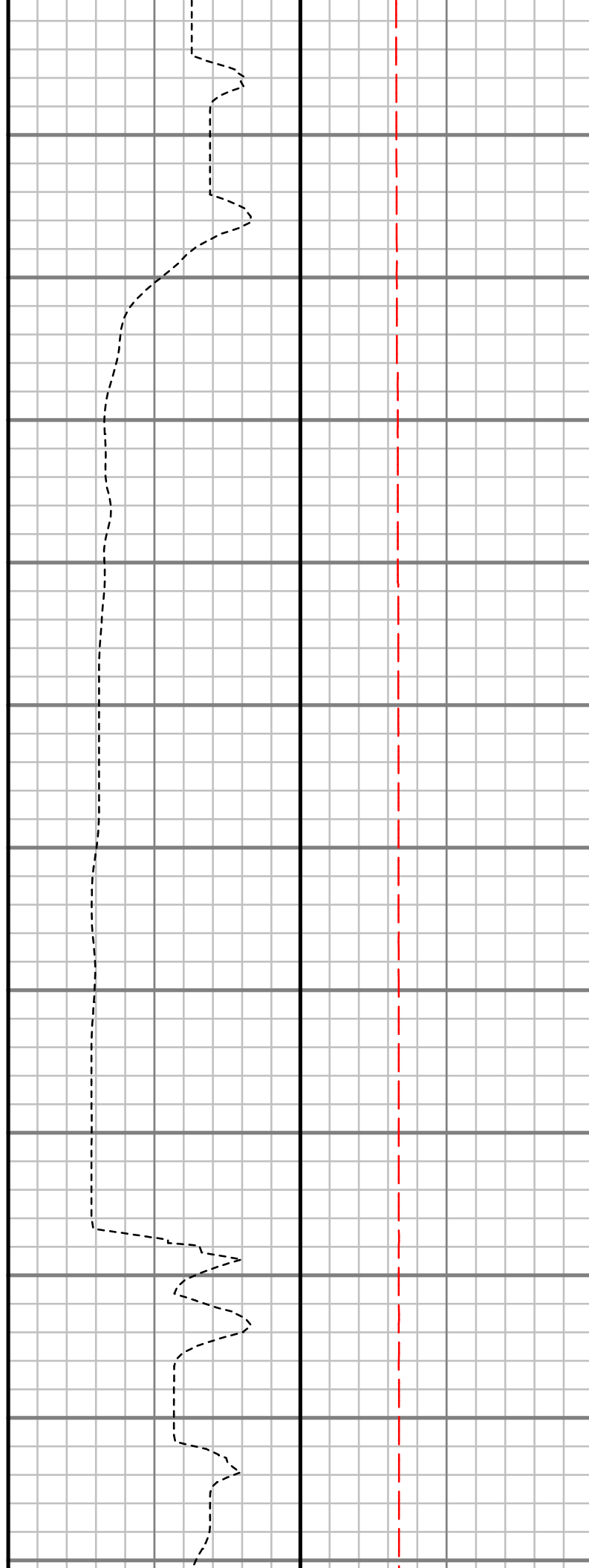
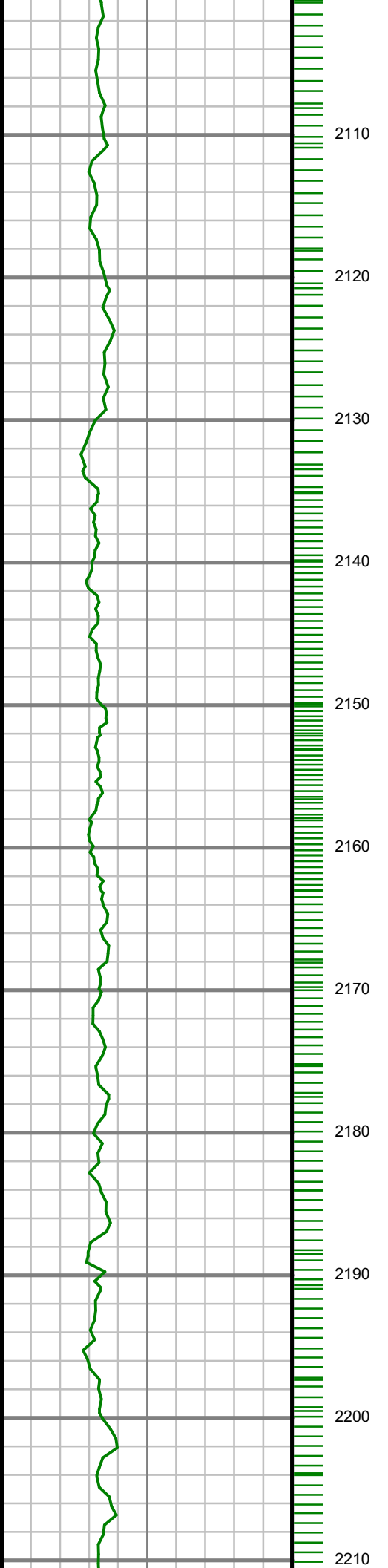
ANADARKO PETROLEUM CORPORATION BUTTERBALL 24N-34HZ WATTENBERG FIELD WELD COUNTY, COLORADO API # 05123443150000								
Gamma Ray (GR)		Rate of Penetration (ROP)		Tool Temperature (TEMP)		Comments		
0	Unit = aapi	200	800	Unit = ft/hr	0		0	Unit = °F
								



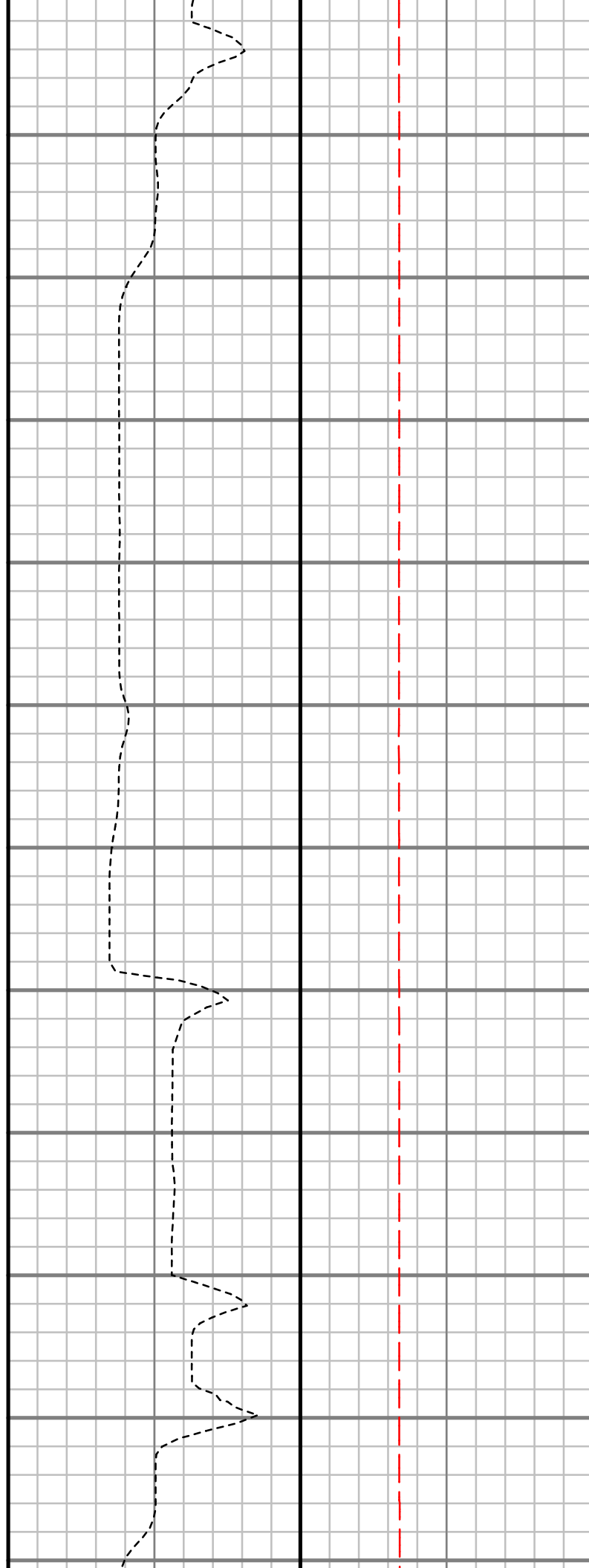
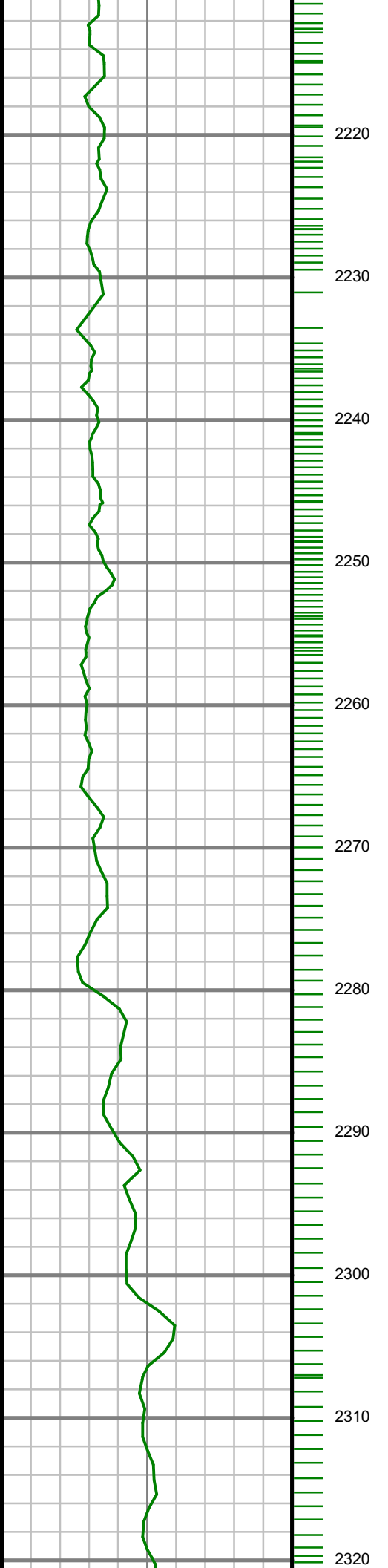
S: 21 MD: 1939.00 ft
Inc: 12.15 deg Az:
271.70 deg TVD:
1913.16 ft



S: 22 MD: 2033.00 ft
Inc: 13.37 deg Az:
269.91 deg TVD:
2004.84 ft

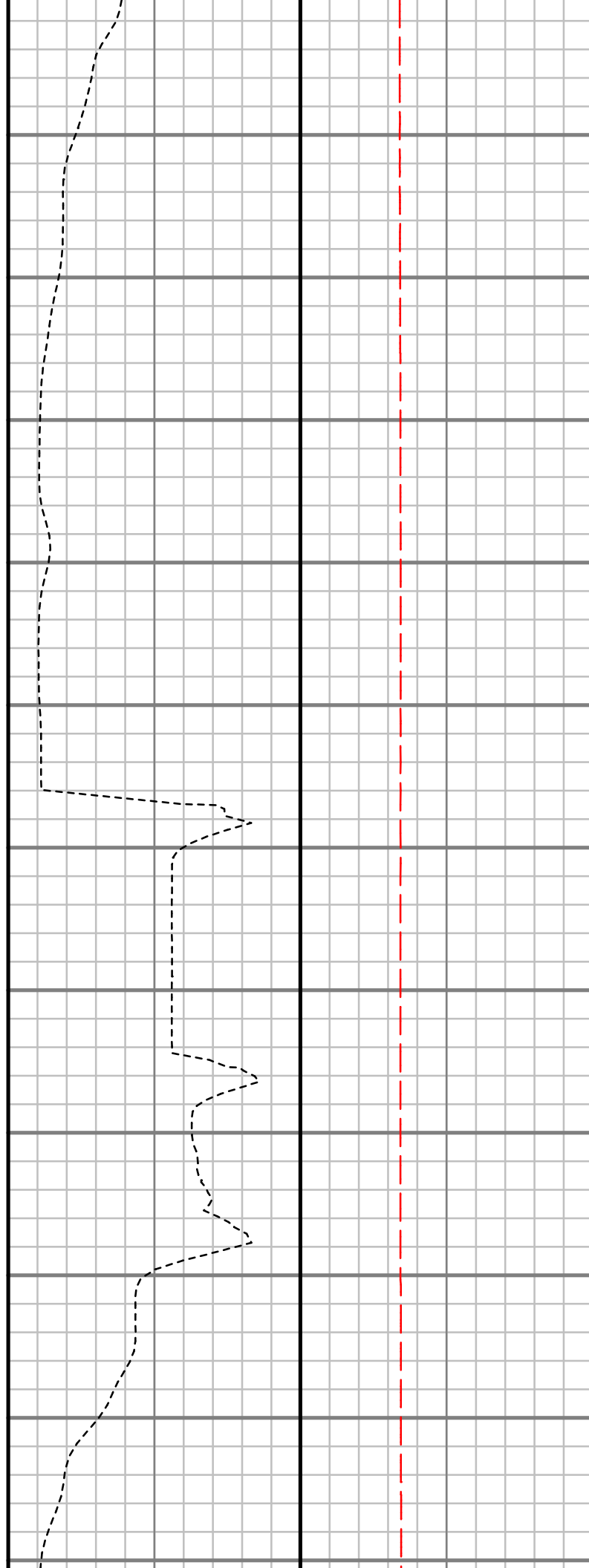
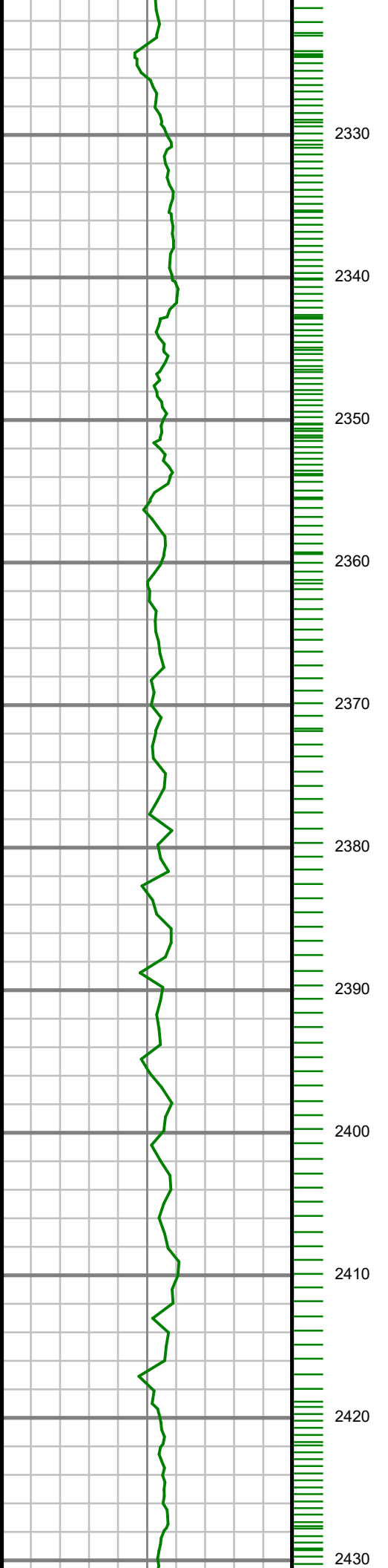


S: 23 MD: 2128.00 ft
Inc: 14.32 deg Az:
266.20 deg TVD:
2097.08 ft

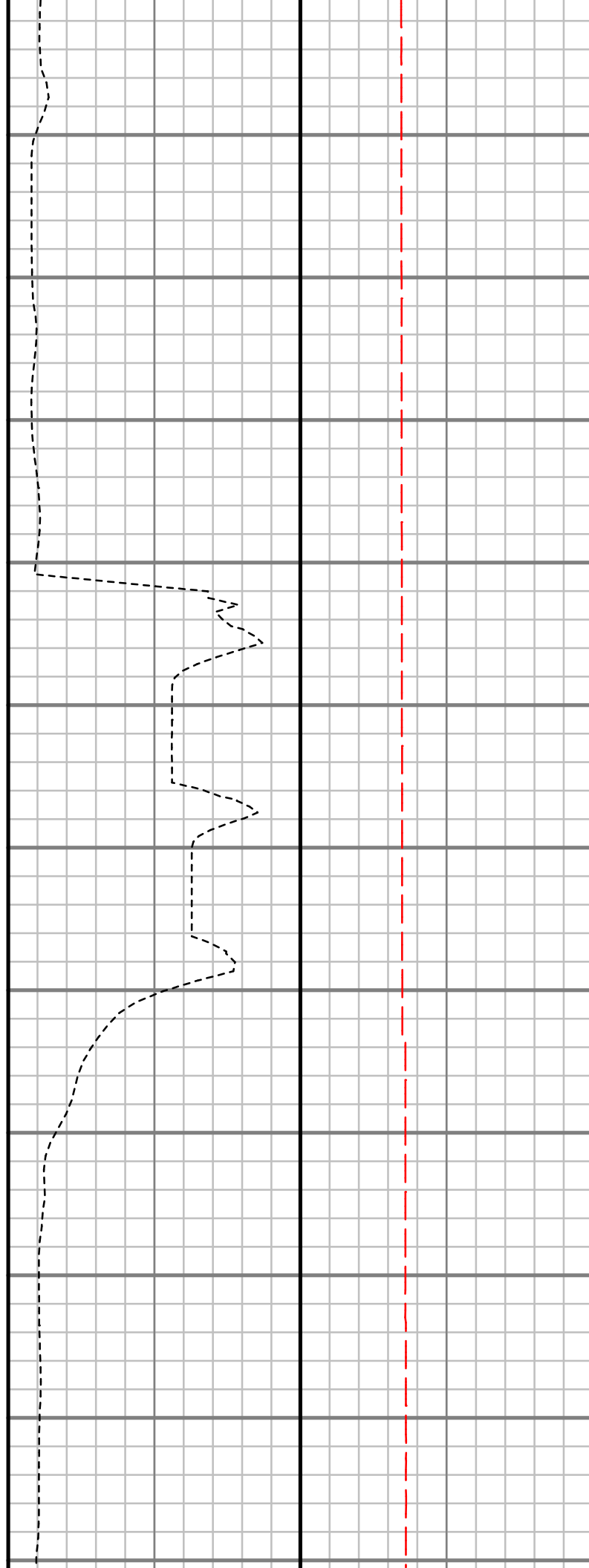
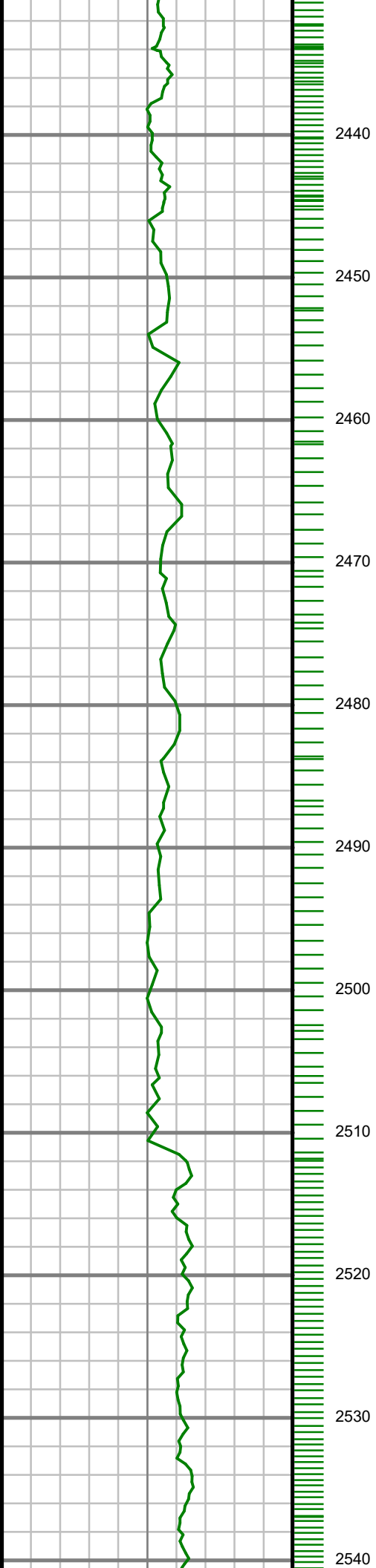


S: 24 MD: 2223.00 ft
Inc: 14.90 deg Az:
268.84 deg TVD:
2189.01 ft

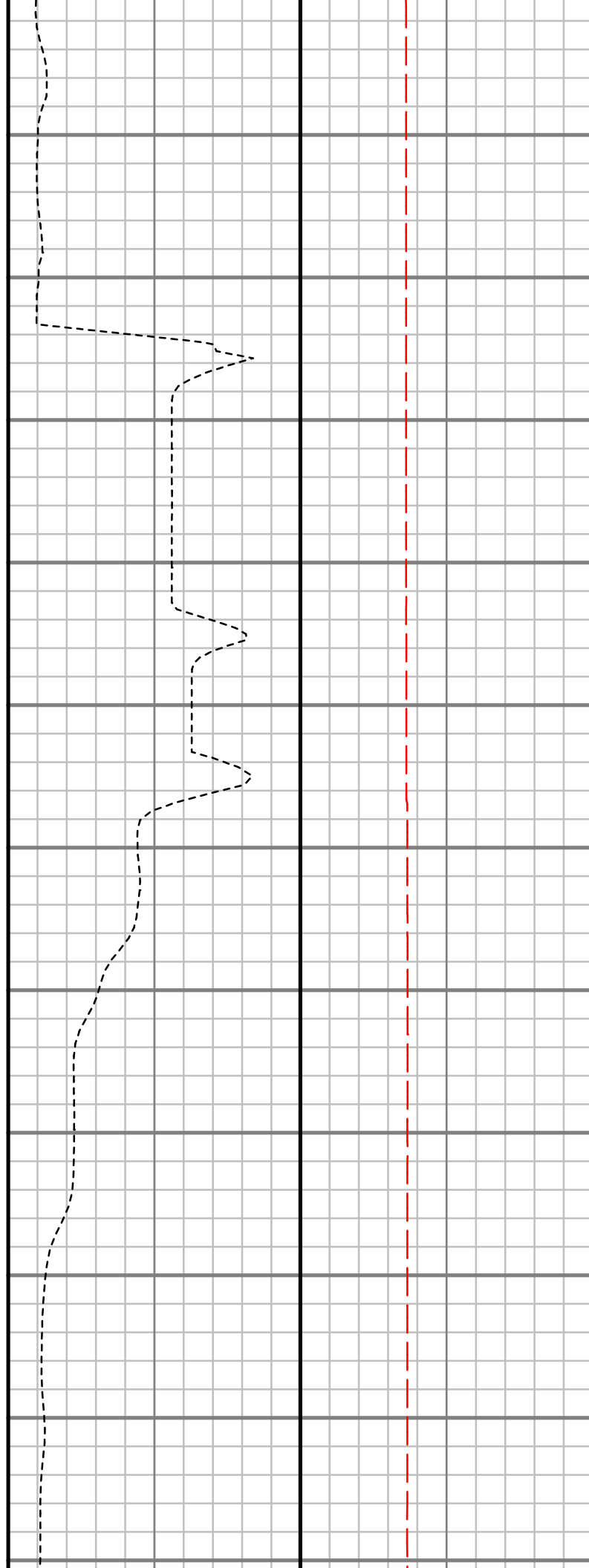
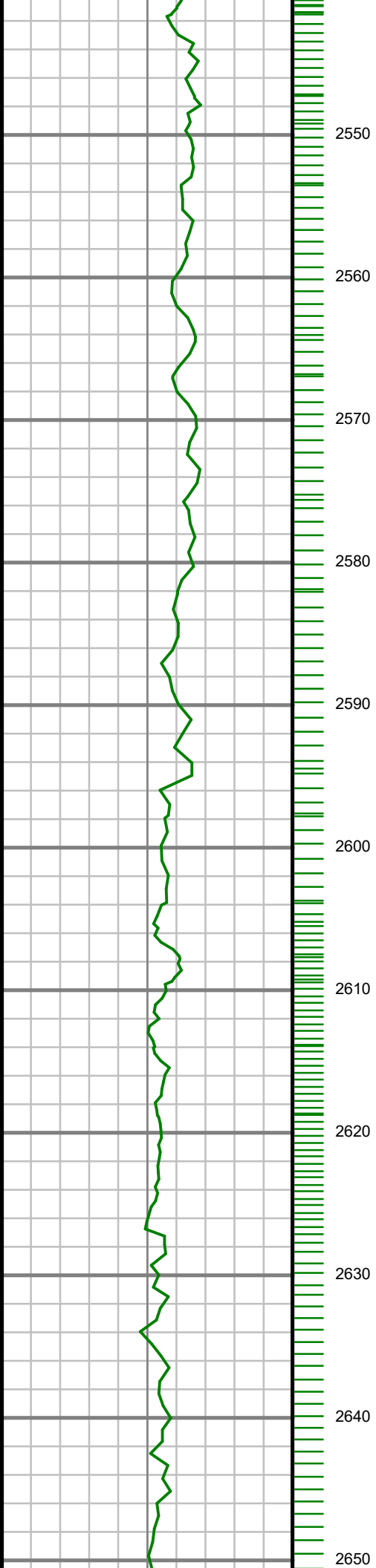
S: 25 MD: 2316.00 ft
Inc: 14.37 deg Az:
269.57 deg TVD:
2278.99 ft



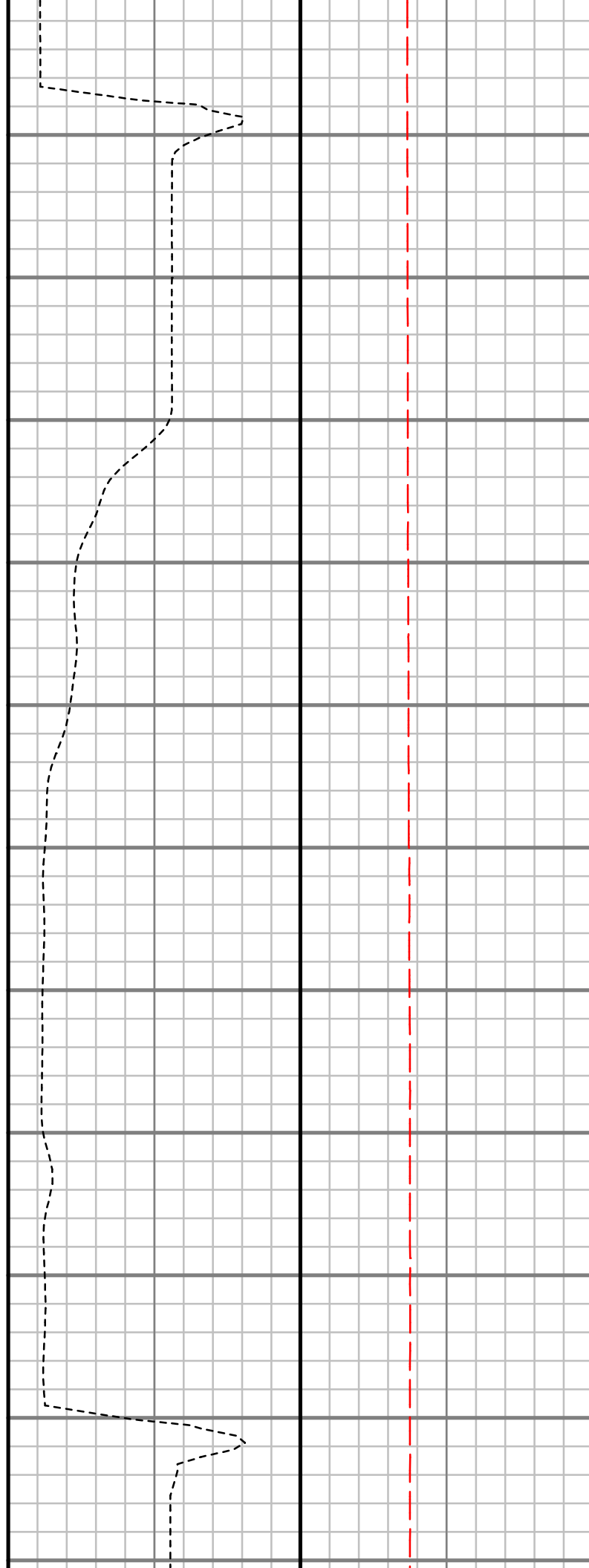
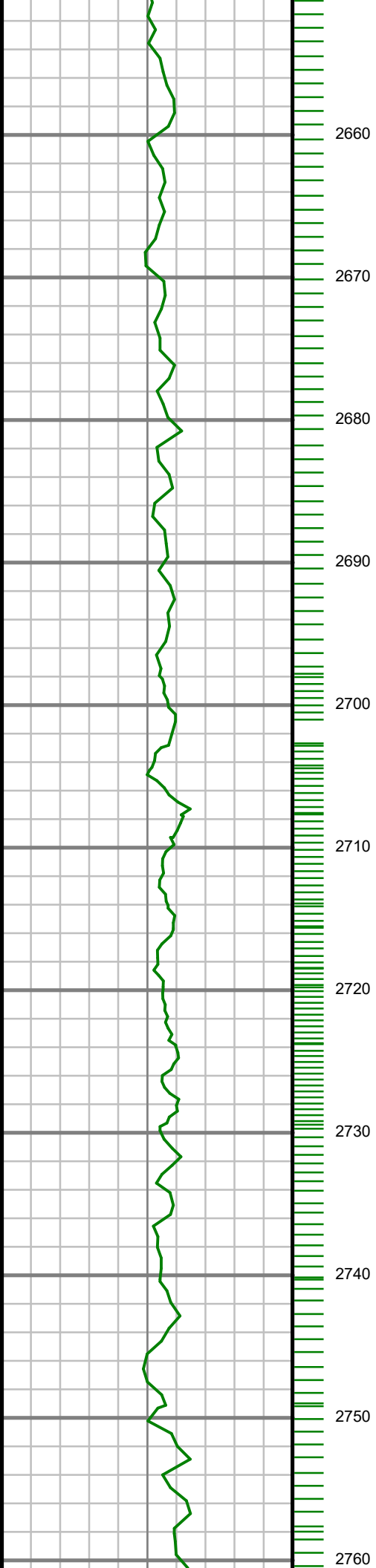
S: 26 MD: 2409.00 ft
Inc: 14.84 deg Az:
272.24 deg TVD:
2368.98 ft



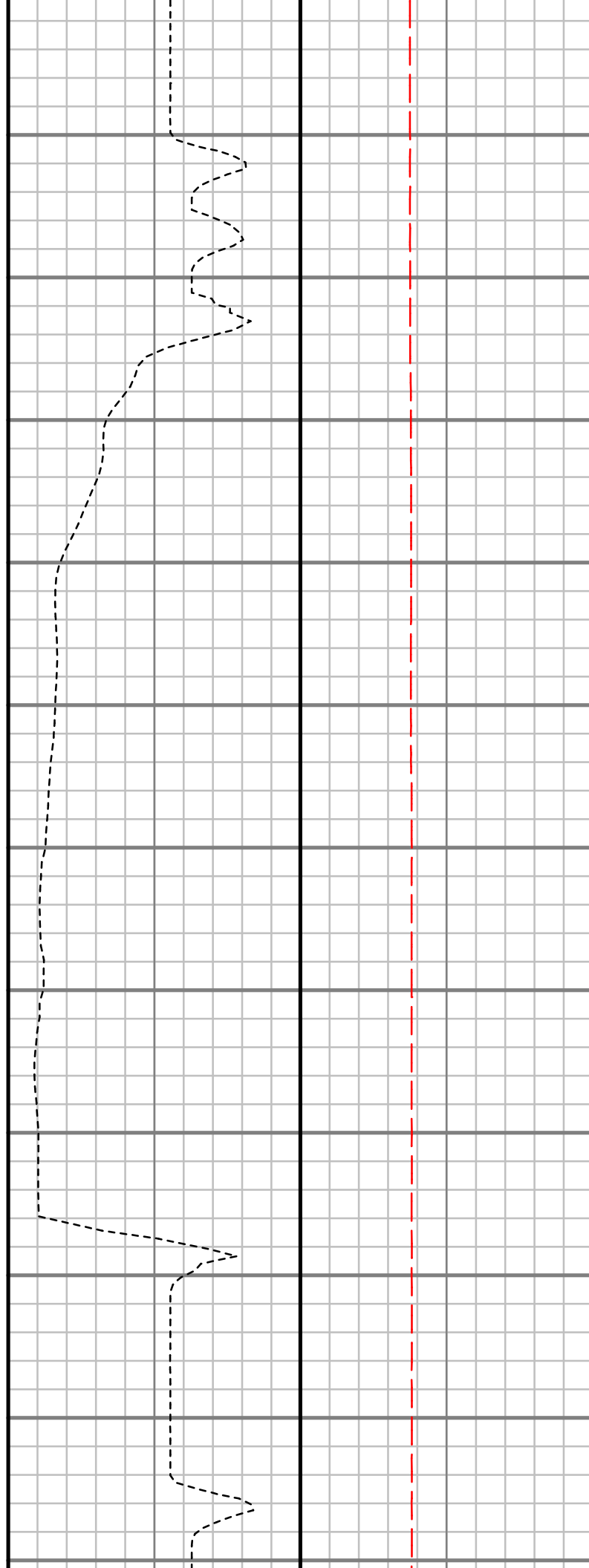
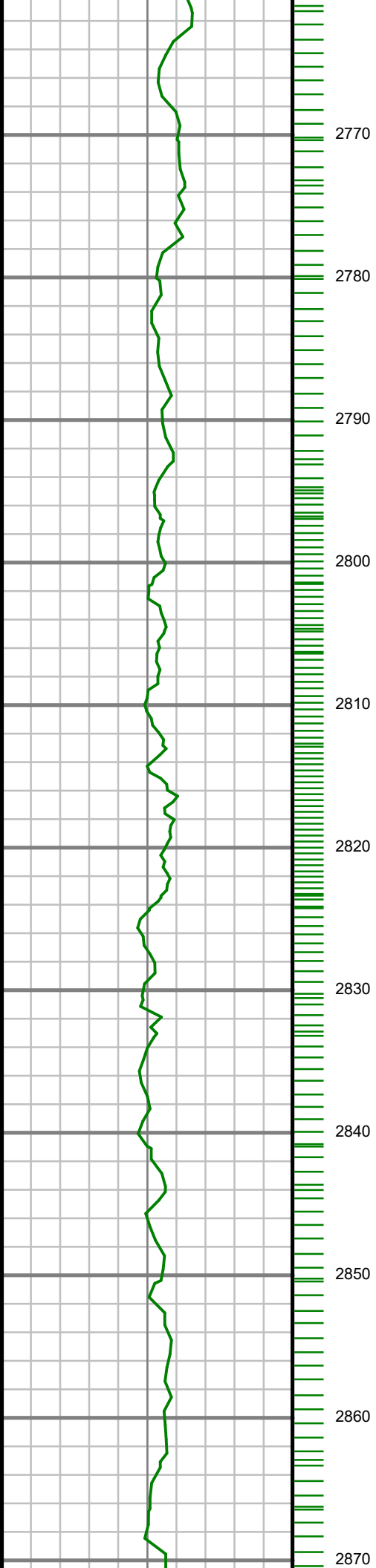
S: 27 MD: 2504.00 ft
Inc: 14.97 deg Az:
273.87 deg TVD:
2460.79 ft



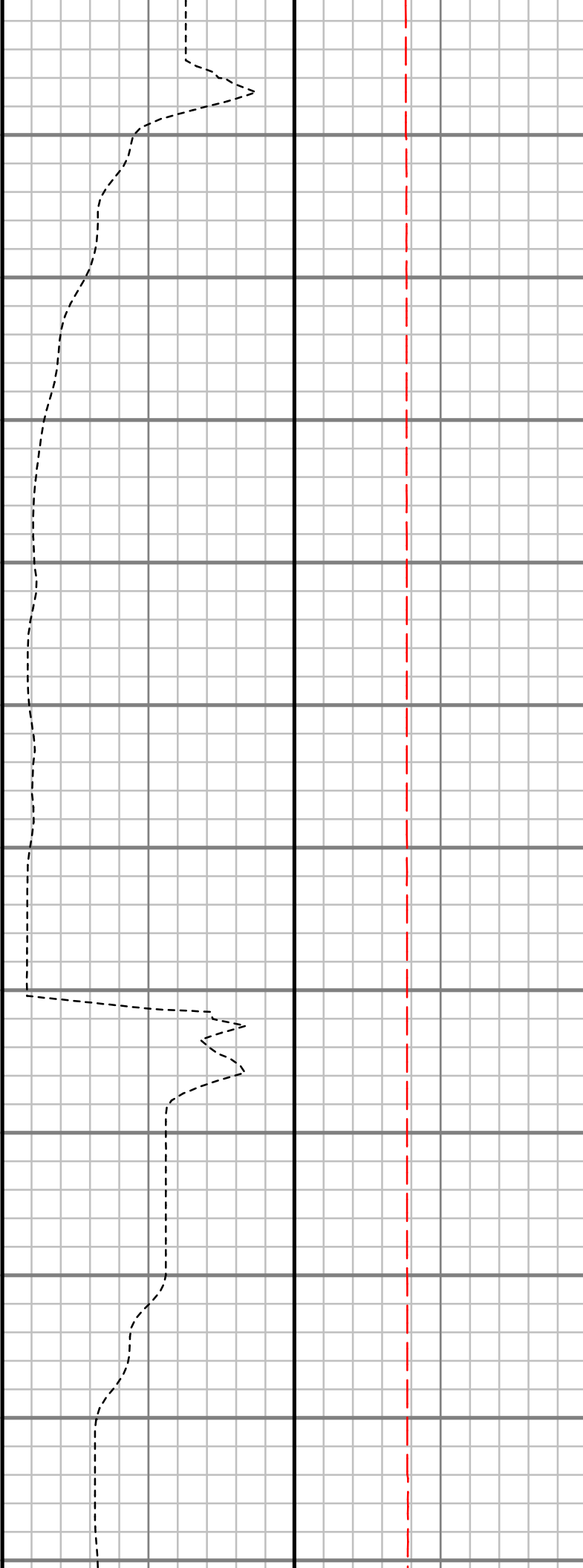
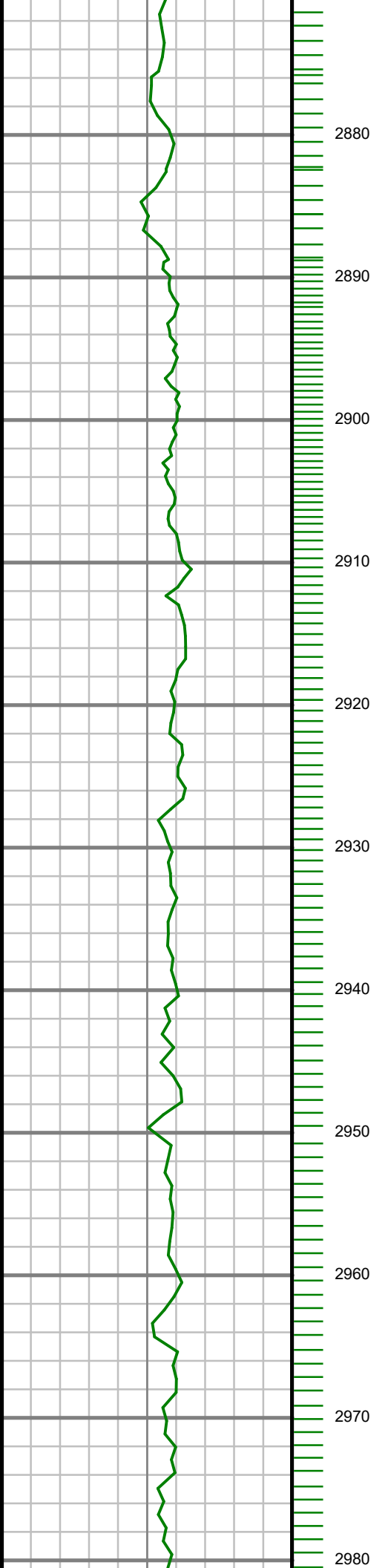
S: 28 MD: 2598.00 ft
Inc: 15.52 deg Az:
275.96 deg TVD:
2551.48 ft



S: 29 MD: 2692.00 ft
Inc: 15.09 deg Az:
275.92 deg TVD:
2642.15 ft

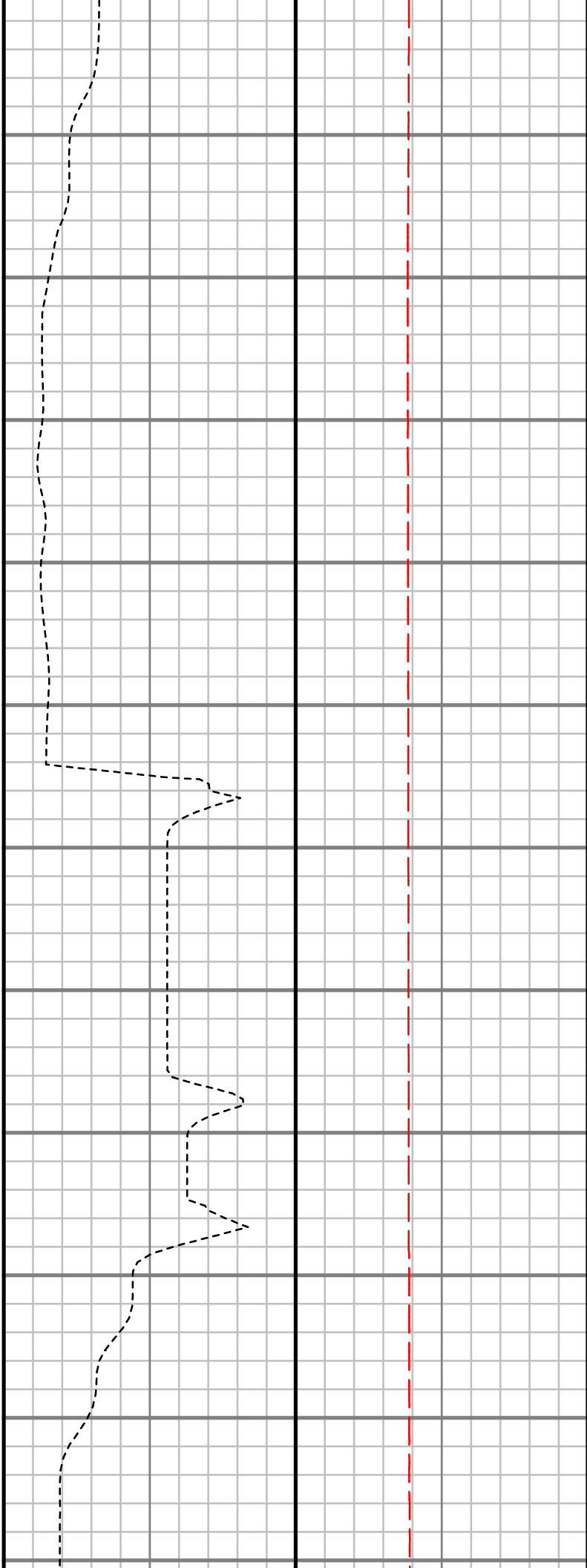
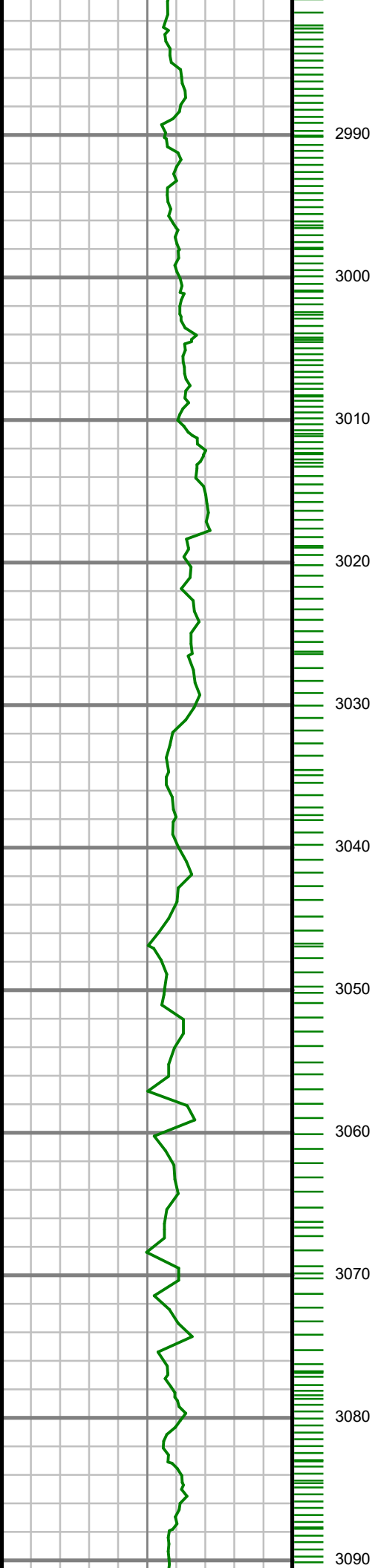


S: 30 MD: 2786.00 ft
Inc: 14.97 deg Az:
280.75 deg TVD:
2732.93 ft

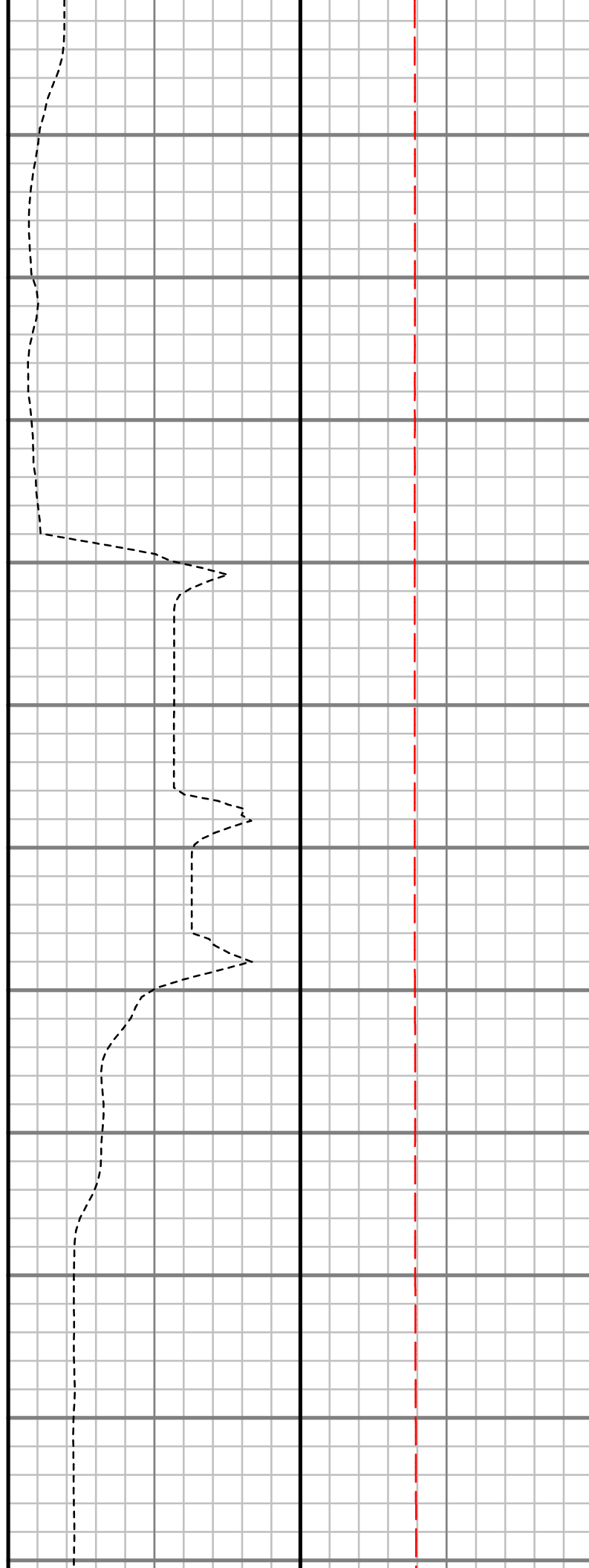
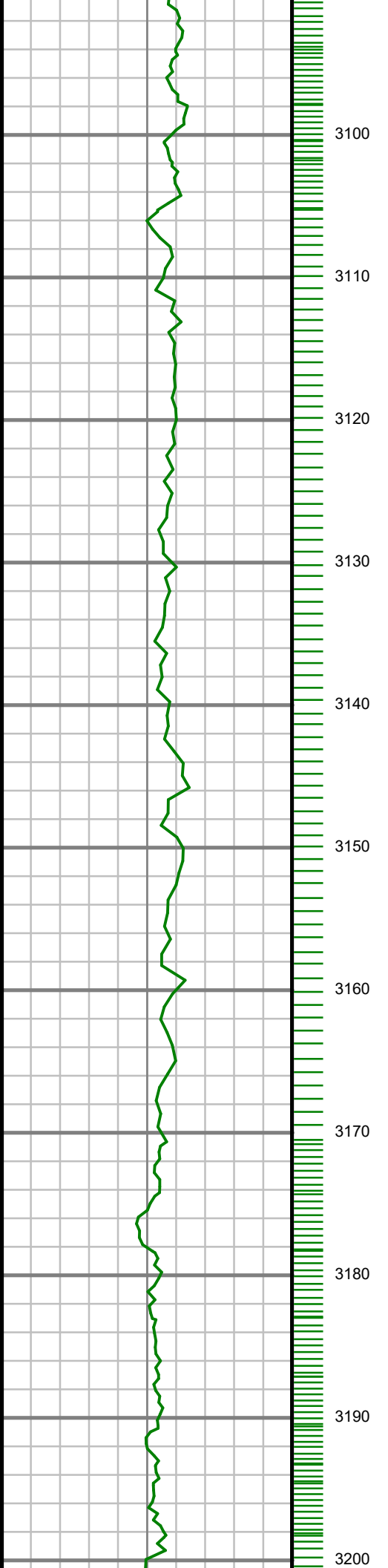


S: 31 MD: 2880.00 ft
Inc: 15.95 deg Az:
281.40 deg TVD:
2823.53 ft

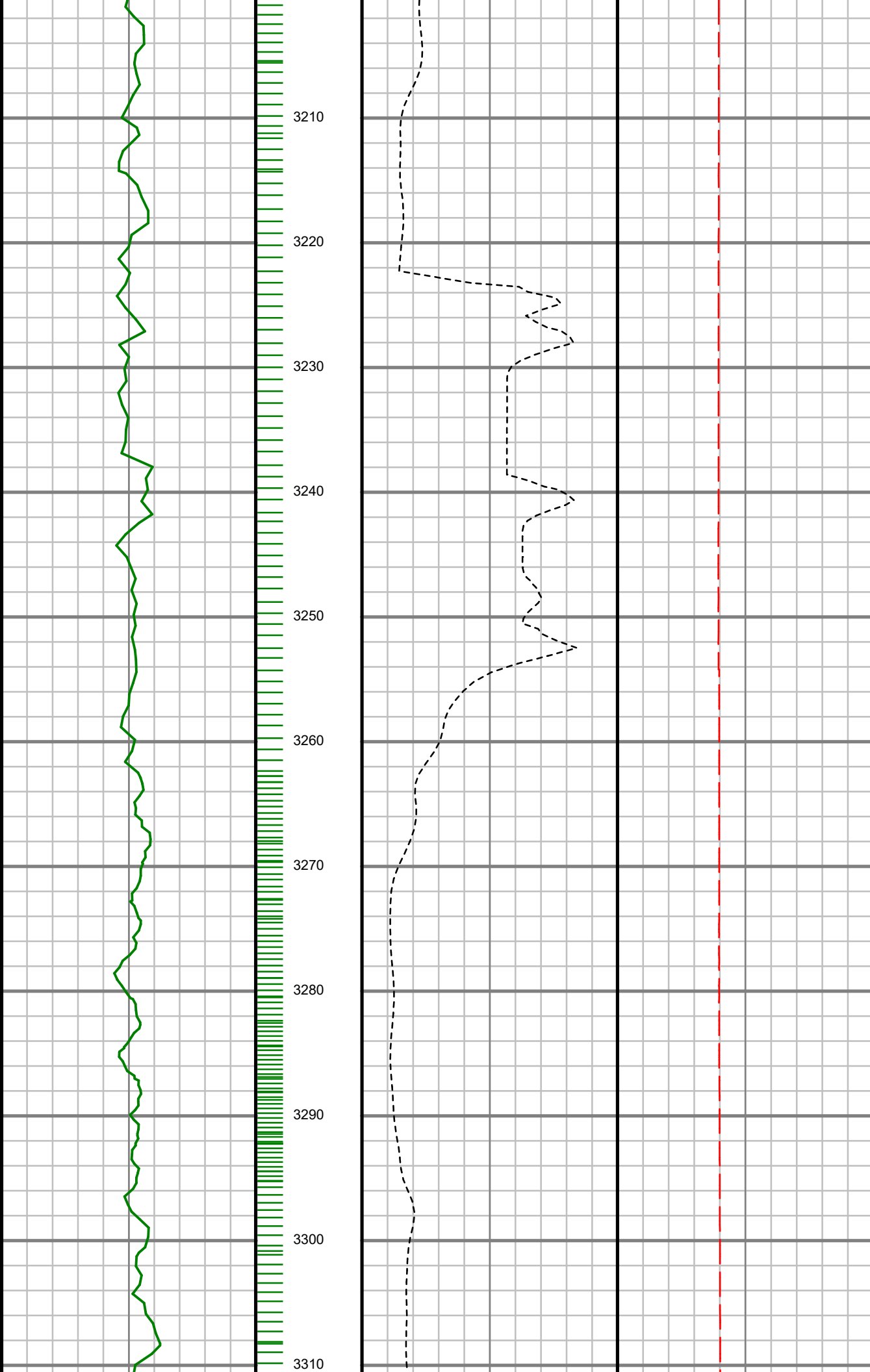
S: 32 MD: 2974.00 ft
Inc: 15.35 deg Az:
281.33 deg TVD:
2914.05 ft



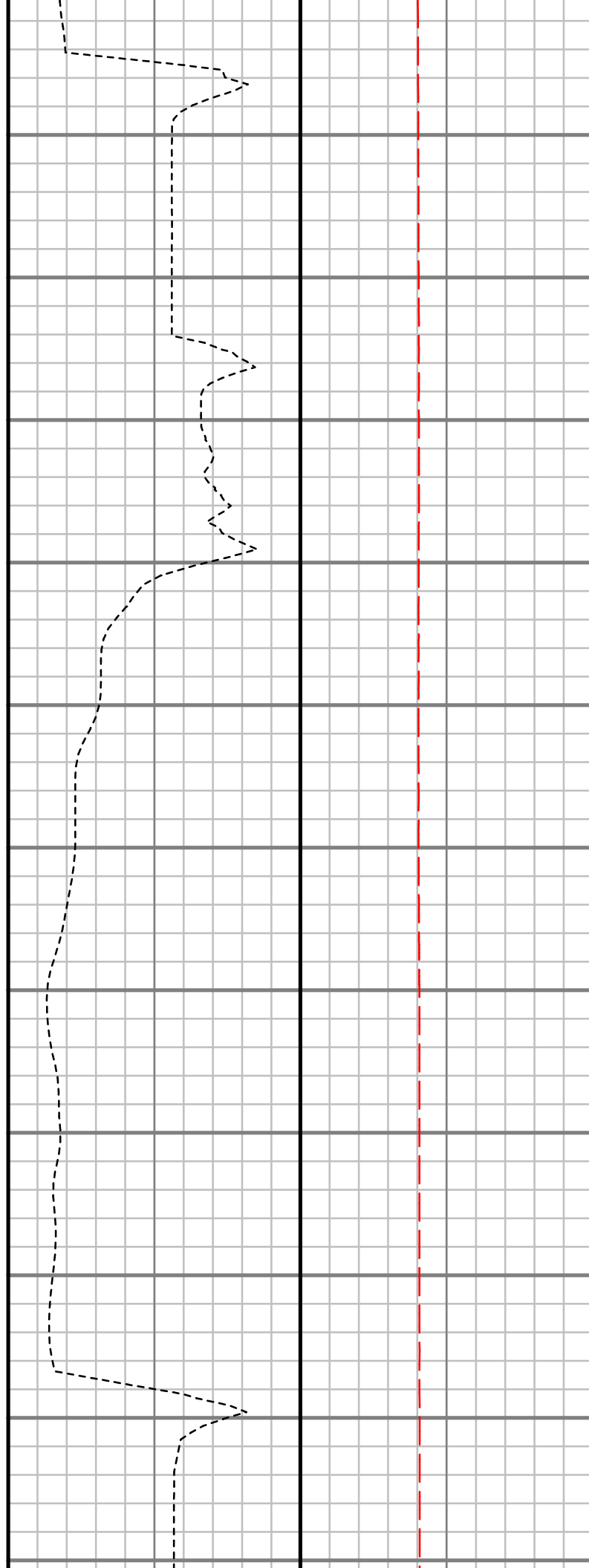
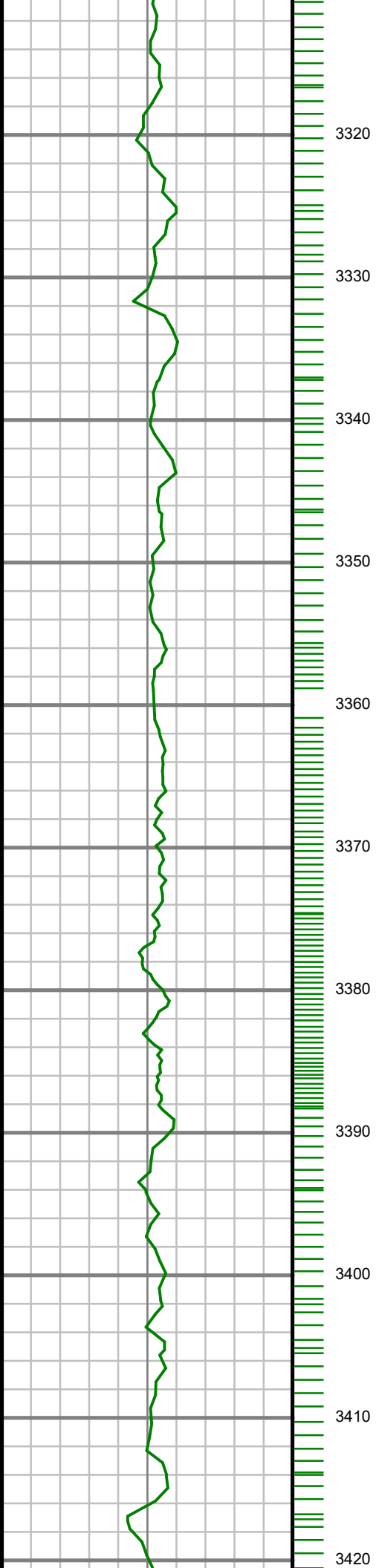
S: 33 MD: 3070.00 ft
Inc: 14.95 deg Az:
280.02 deg TVD:
3006.71 ft



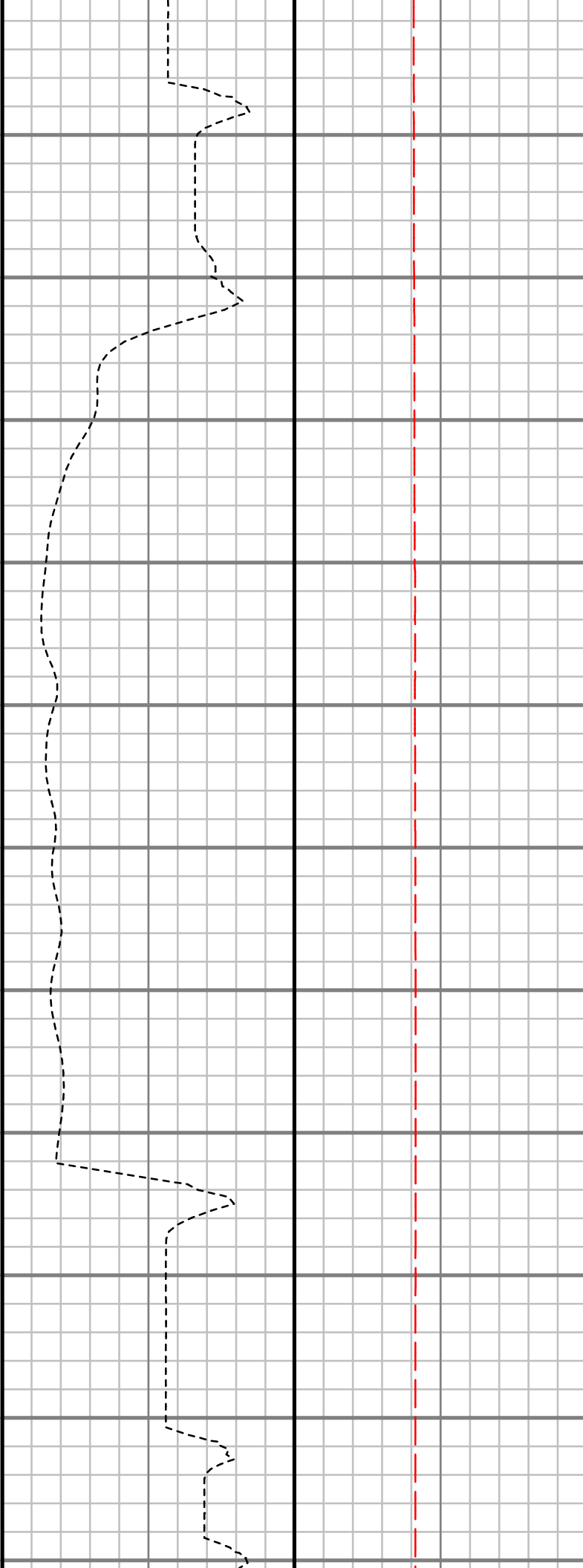
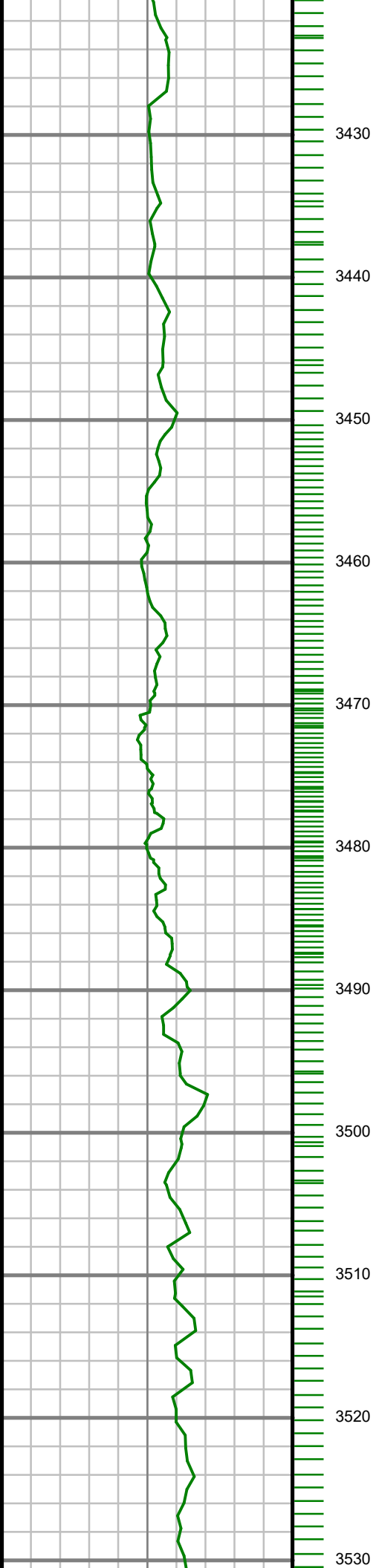
S: 34 MD: 3162.00 ft
Inc: 14.73 deg Az:
277.81 deg TVD:
3095.64 ft



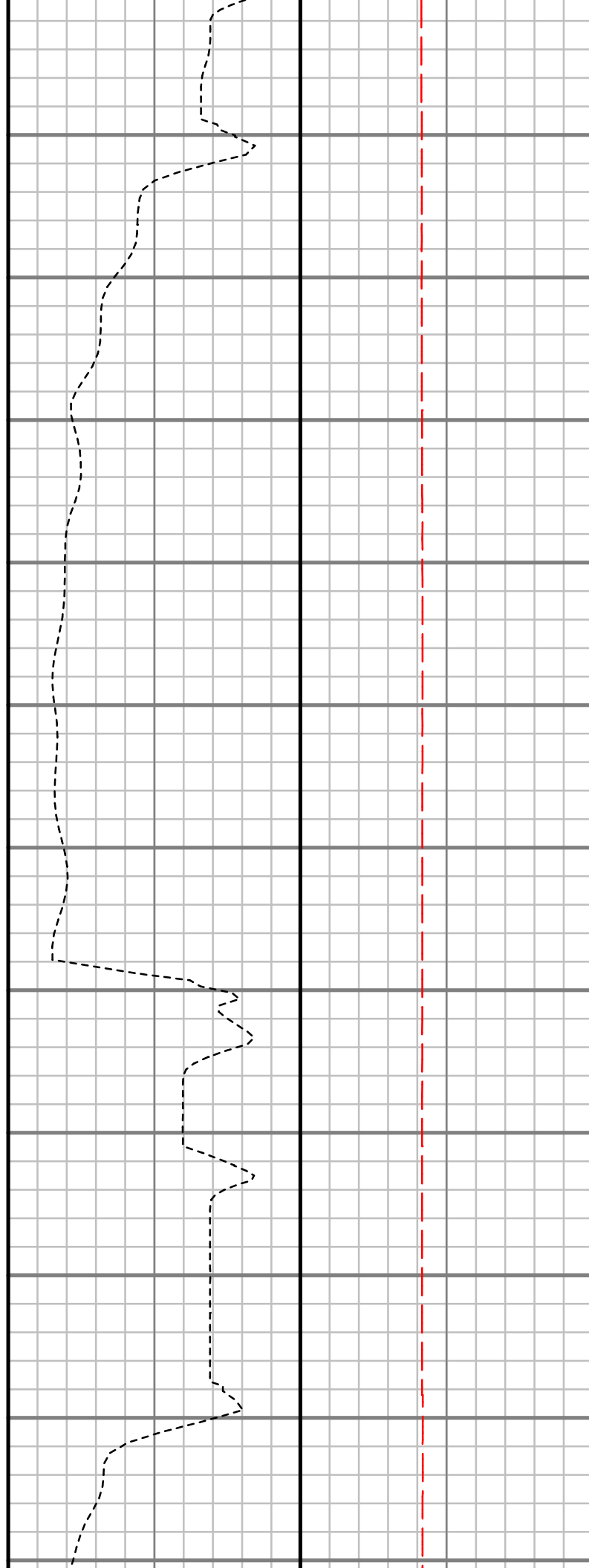
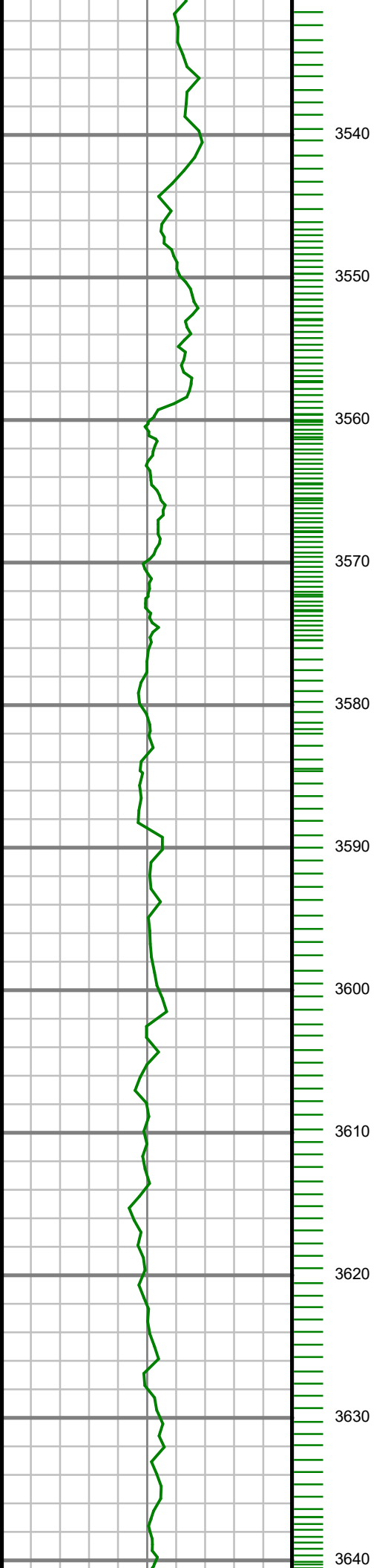
S: 35 MD: 3256.00 ft
Inc: 14.81 deg Az:
274.50 deg TVD:
3186.54 ft



S: 36 MD: 3350.00 ft
Inc: 14.92 deg Az:
272.96 deg TVD:
3277.39 ft

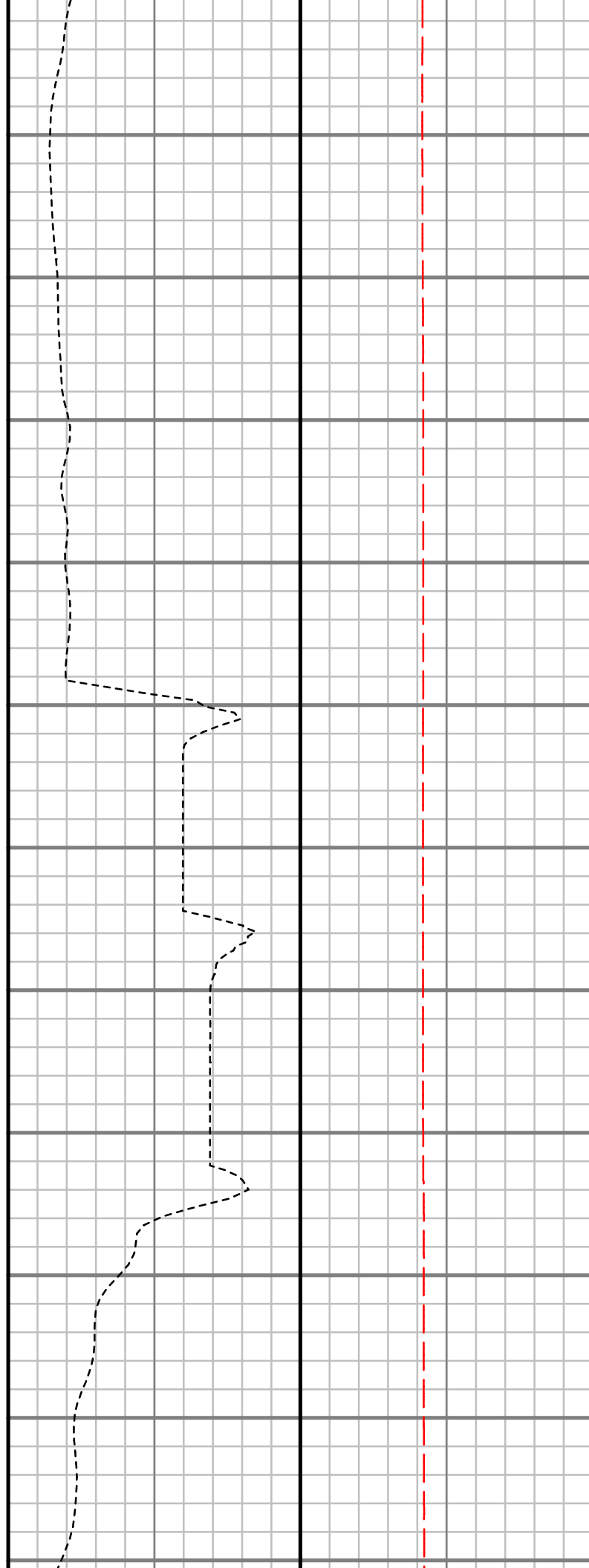
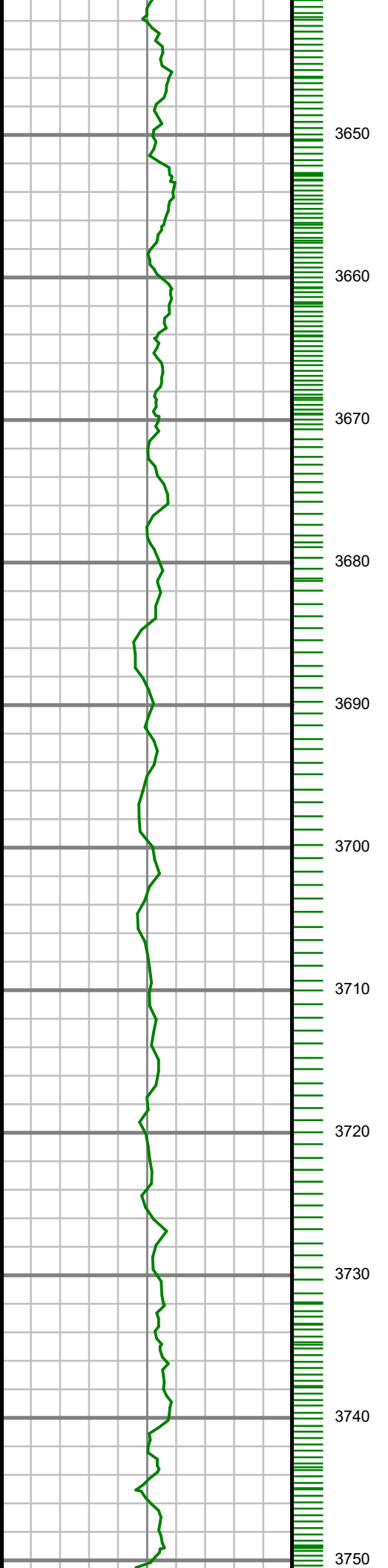


S: 37 MD: 3442.00 ft
Inc: 14.64 deg Az:
272.14 deg TVD:
3366.35 ft

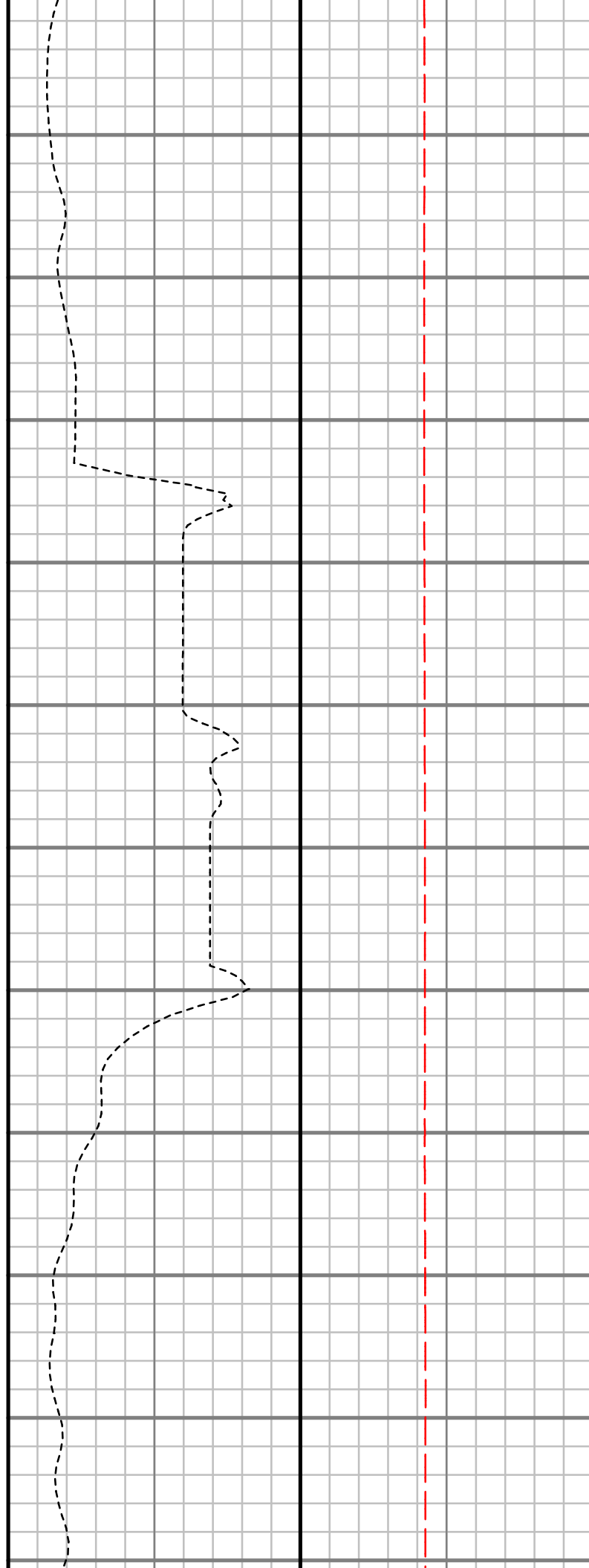
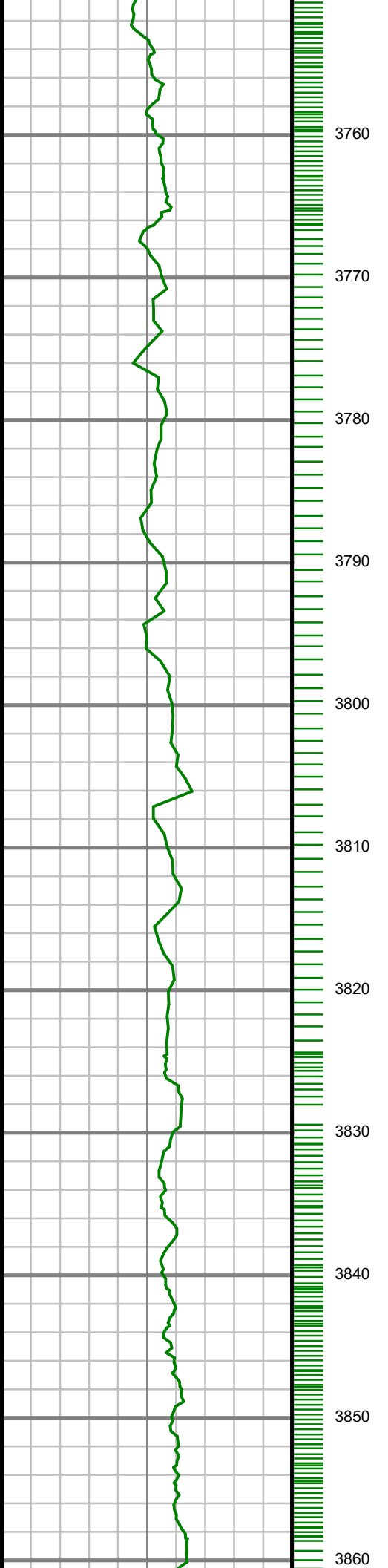


S: 38 MD: 3536.00 ft
Inc: 13.19 deg Az:
274.79 deg TVD:
3457.59 ft

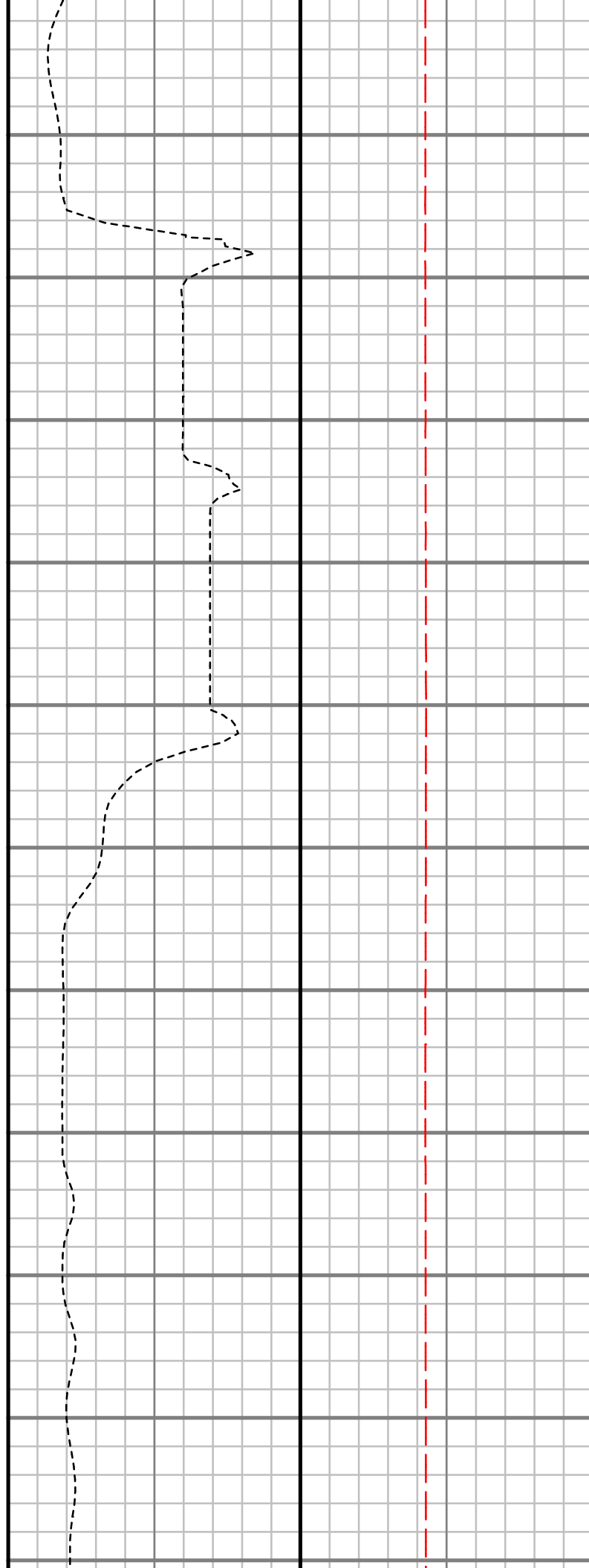
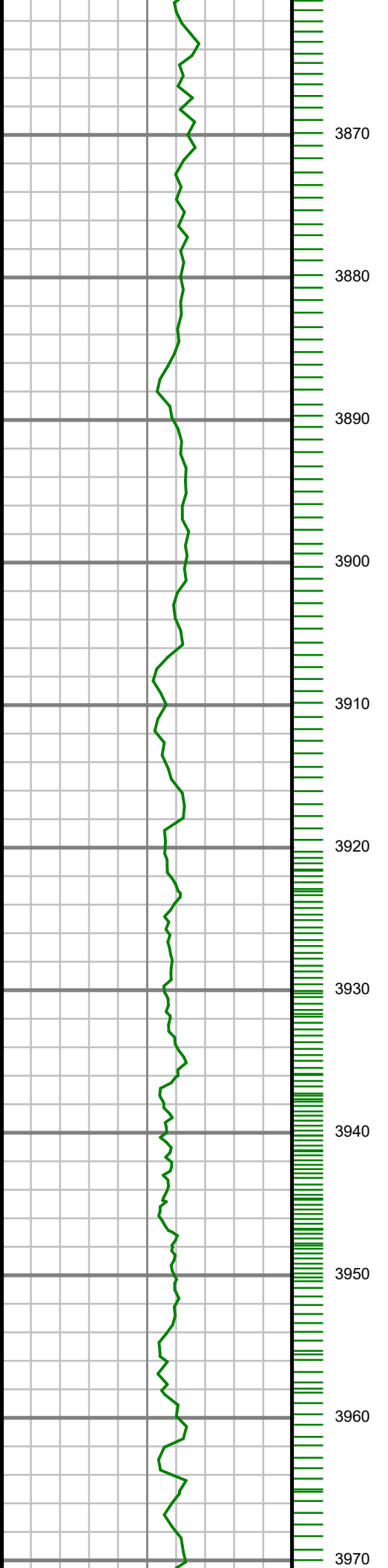
S: 39 MD: 3630.00 ft
Inc: 13.22 deg Az:
275.37 deg TVD:
3549.10 ft



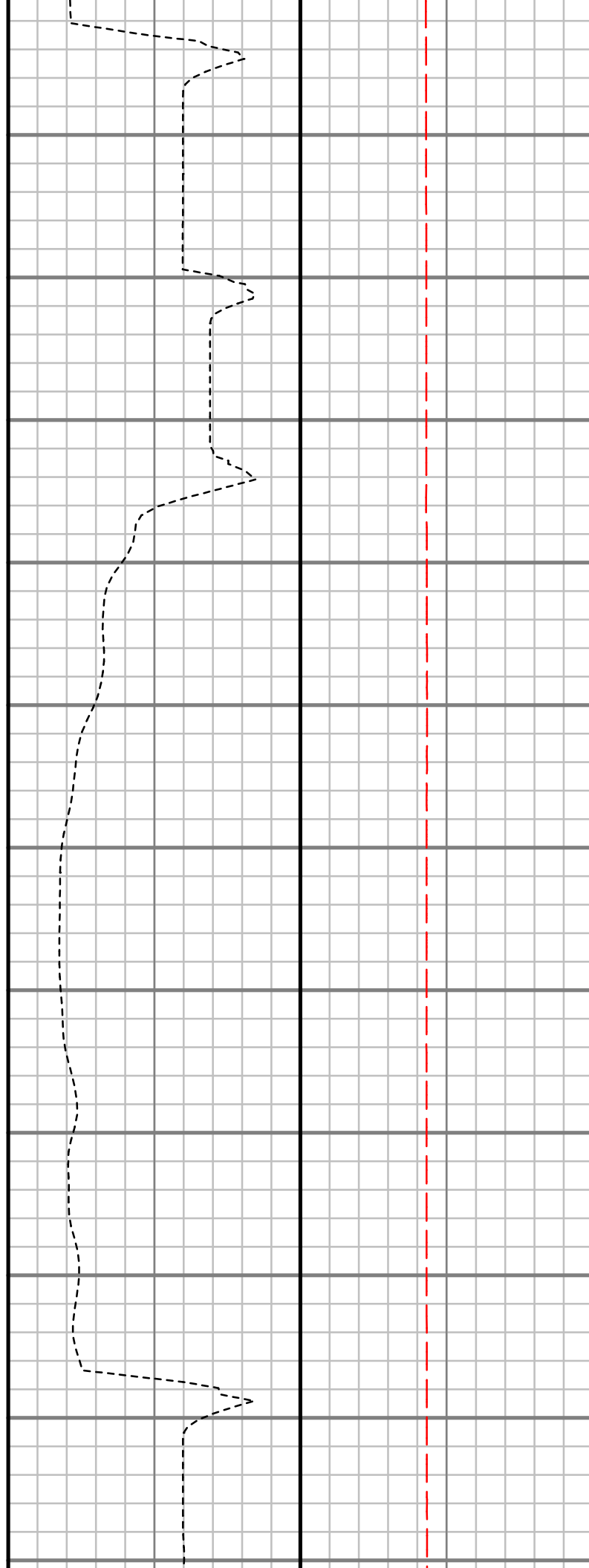
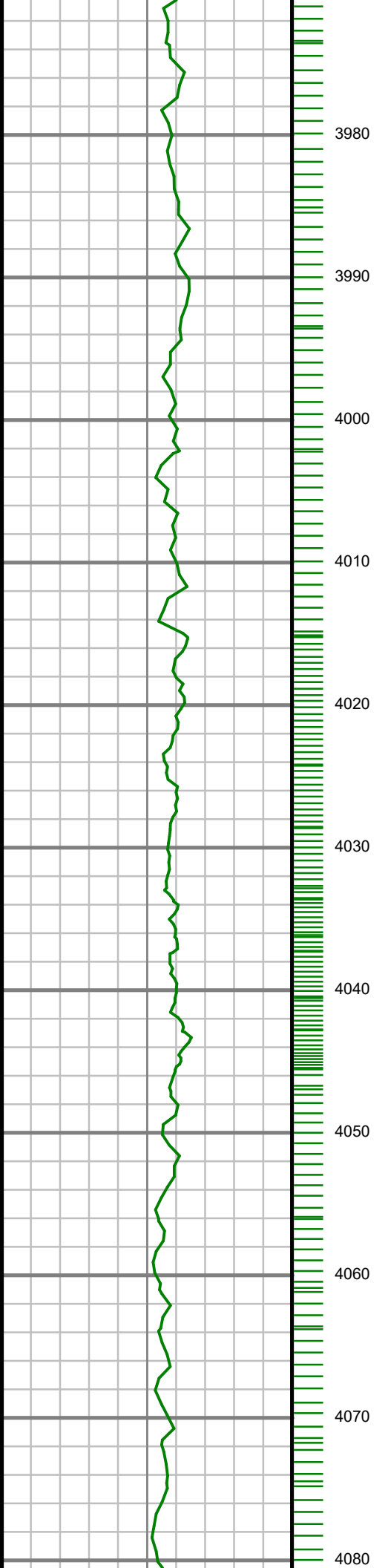
S: 40 MD: 3725.00 ft
Inc: 13.99 deg Az:
272.56 deg TVD:
3641.44 ft



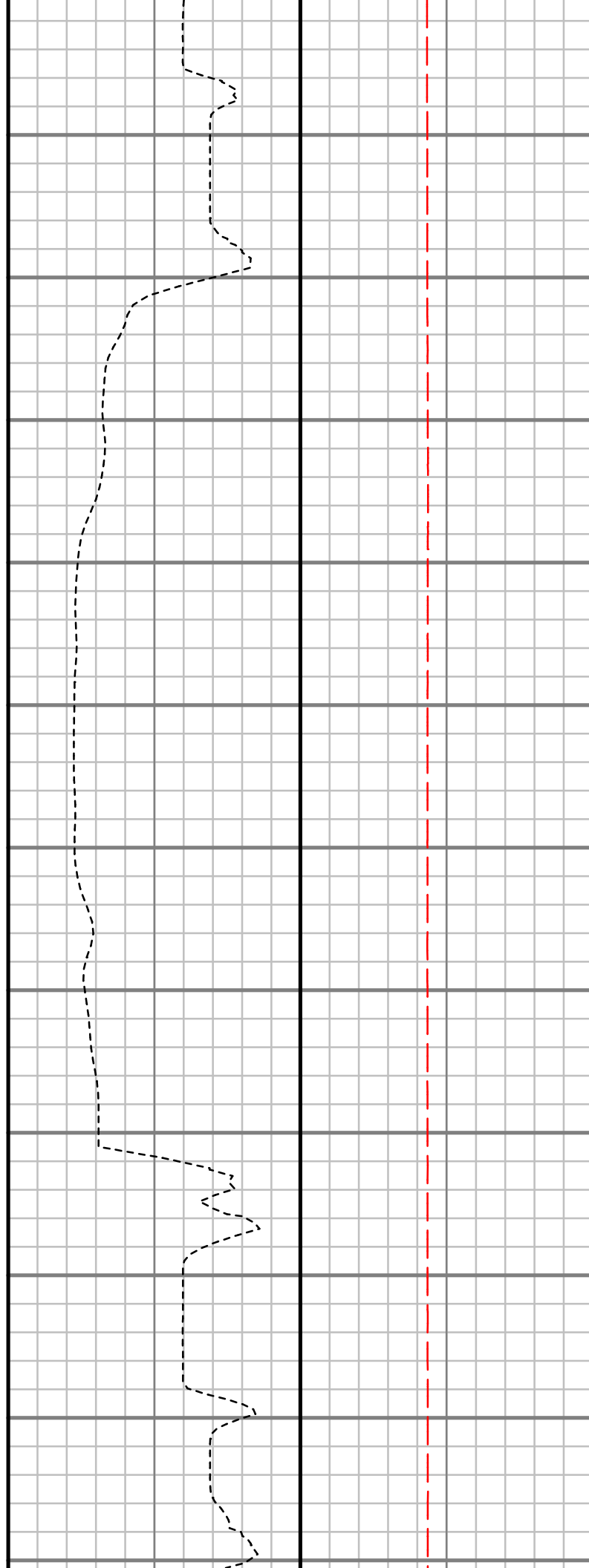
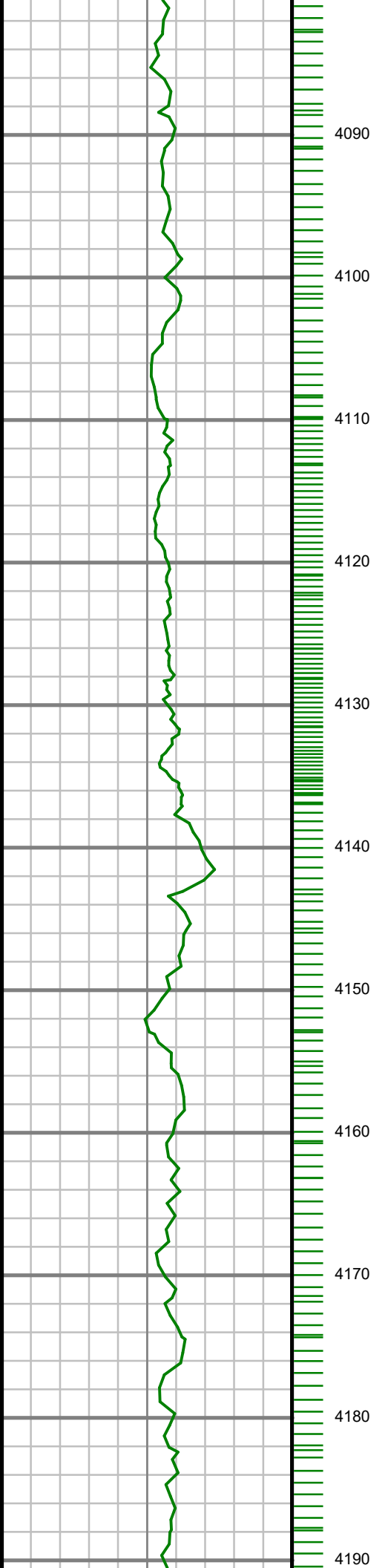
S: 41 MD: 3818.00 ft
Inc: 14.11 deg Az:
270.16 deg TVD:
3731.66 ft



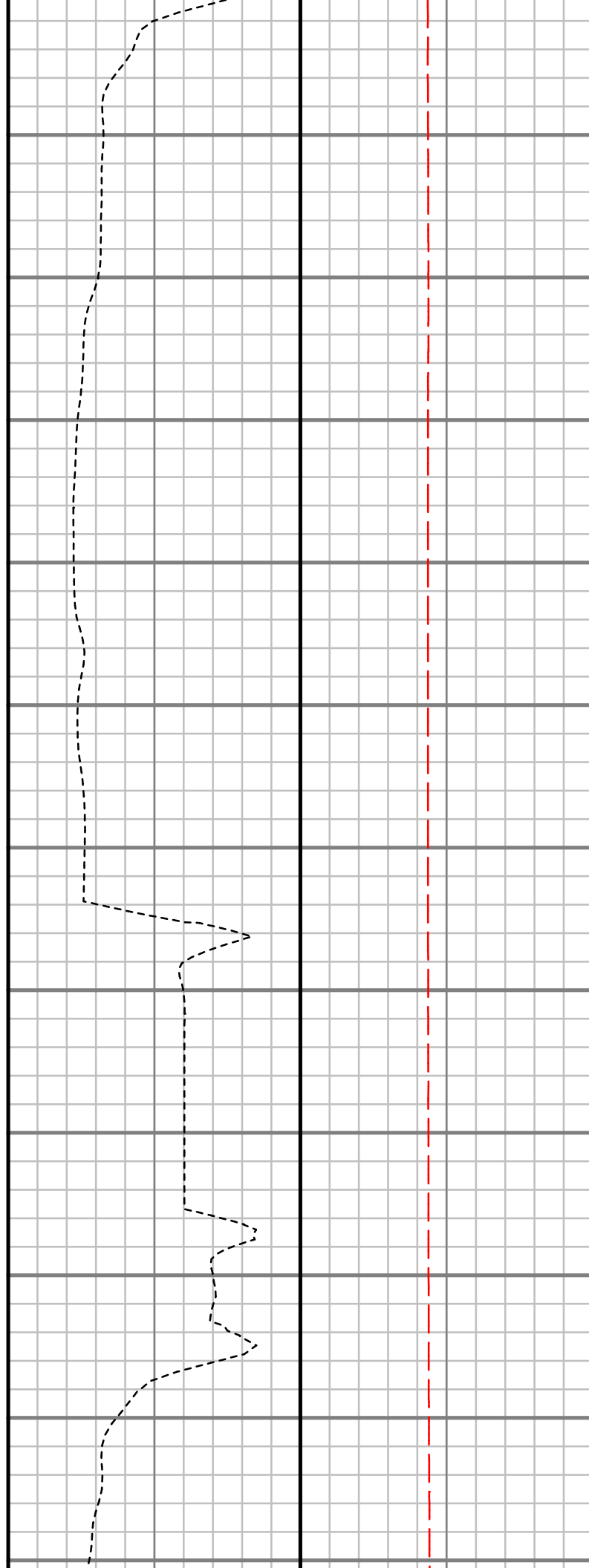
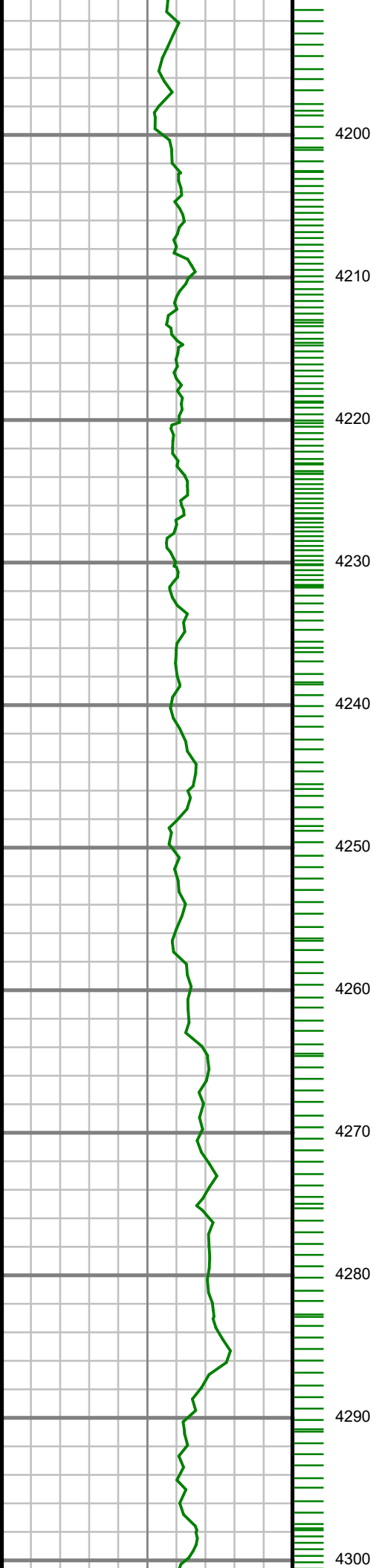
S: 42 MD: 3911.00 ft
Inc: 14.80 deg Az:
273.21 deg TVD:
3821.71 ft



S: 43 MD: 4006.00 ft
Inc: 15.00 deg Az:
271.22 deg TVD:
3913.52 ft

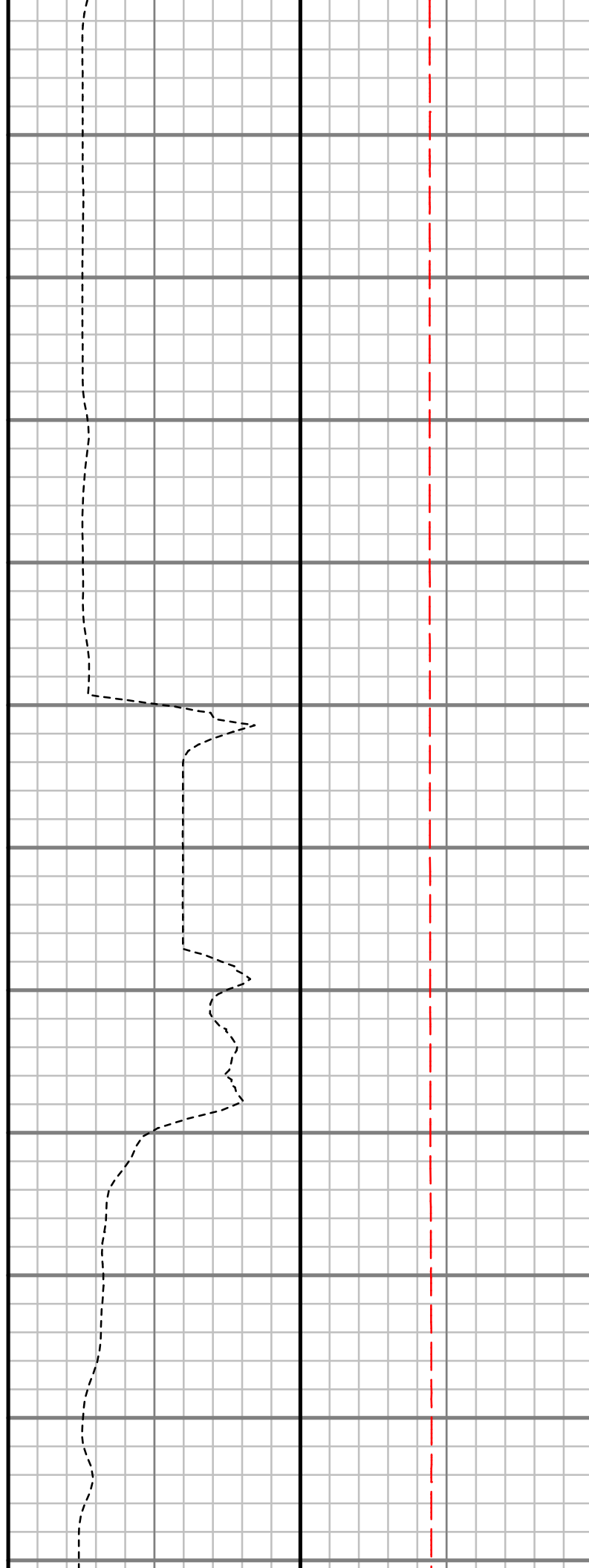
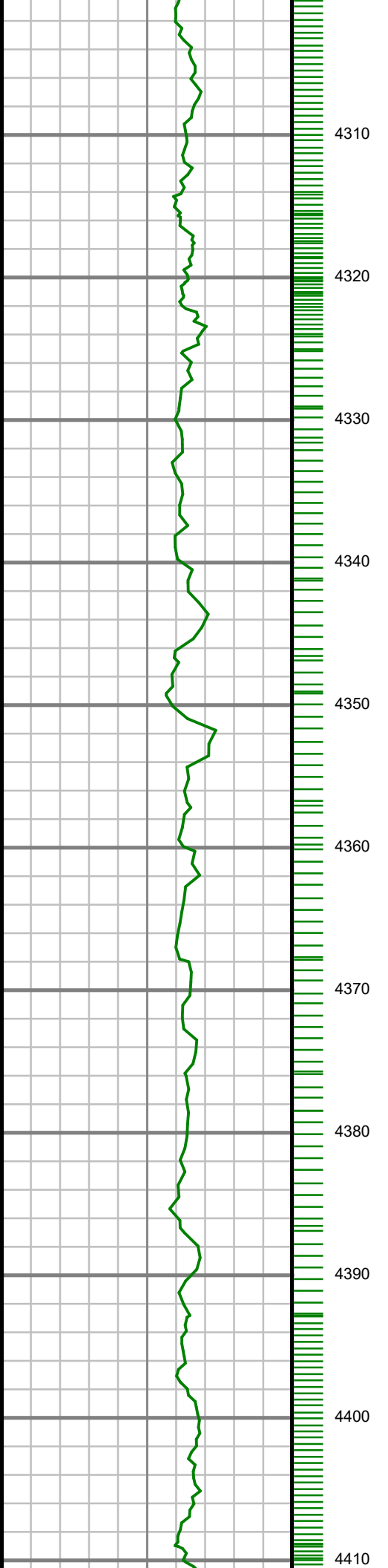


S: 44 MD: 4101.00 ft
Inc: 15.14 deg Az:
270.37 deg TVD:
4005.25 ft

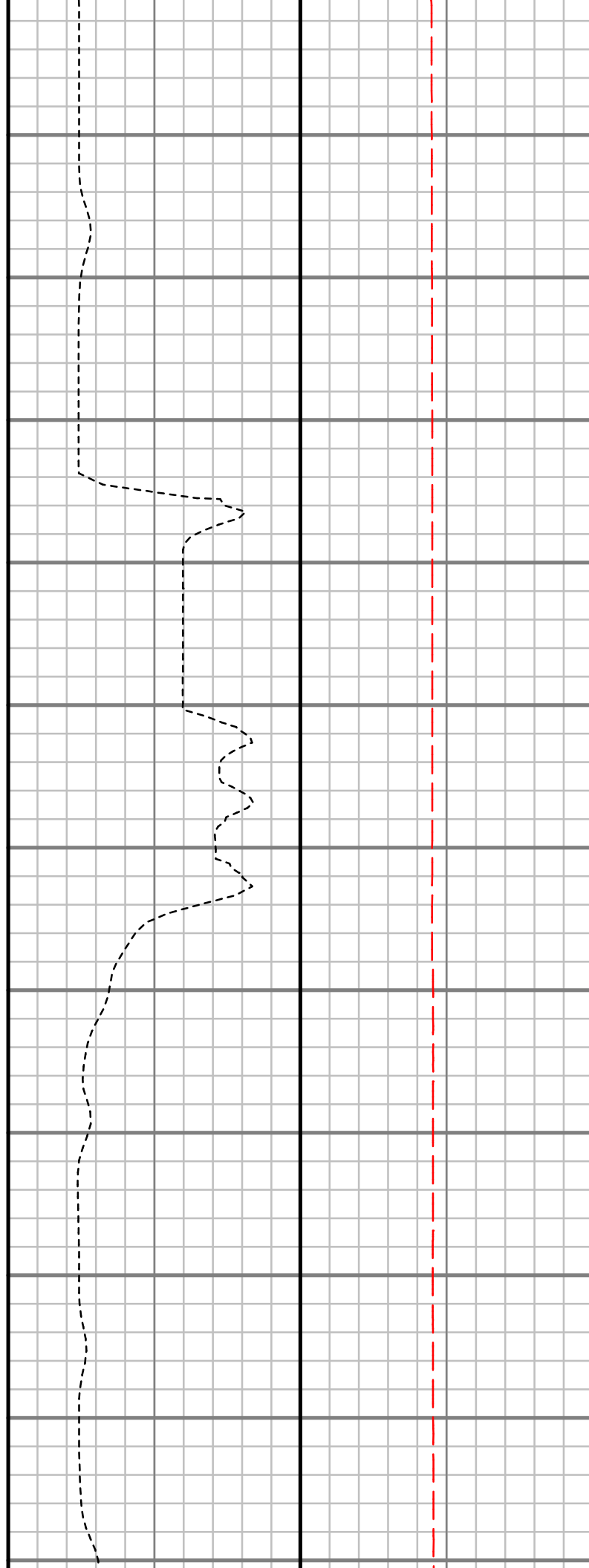
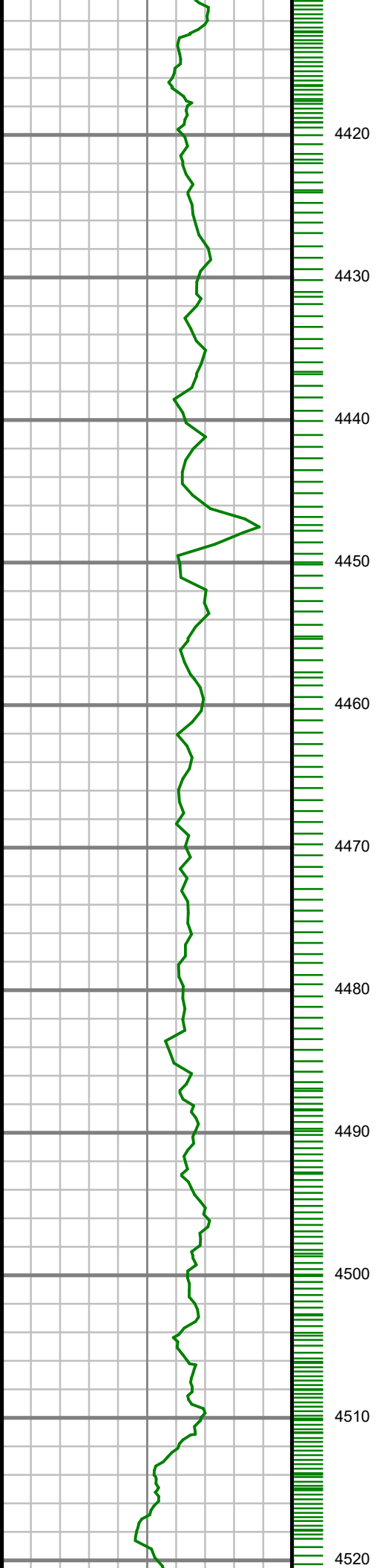


S: 45 MD: 4195.00 ft
Inc: 15.36 deg Az:
272.25 deg TVD:
4095.94 ft

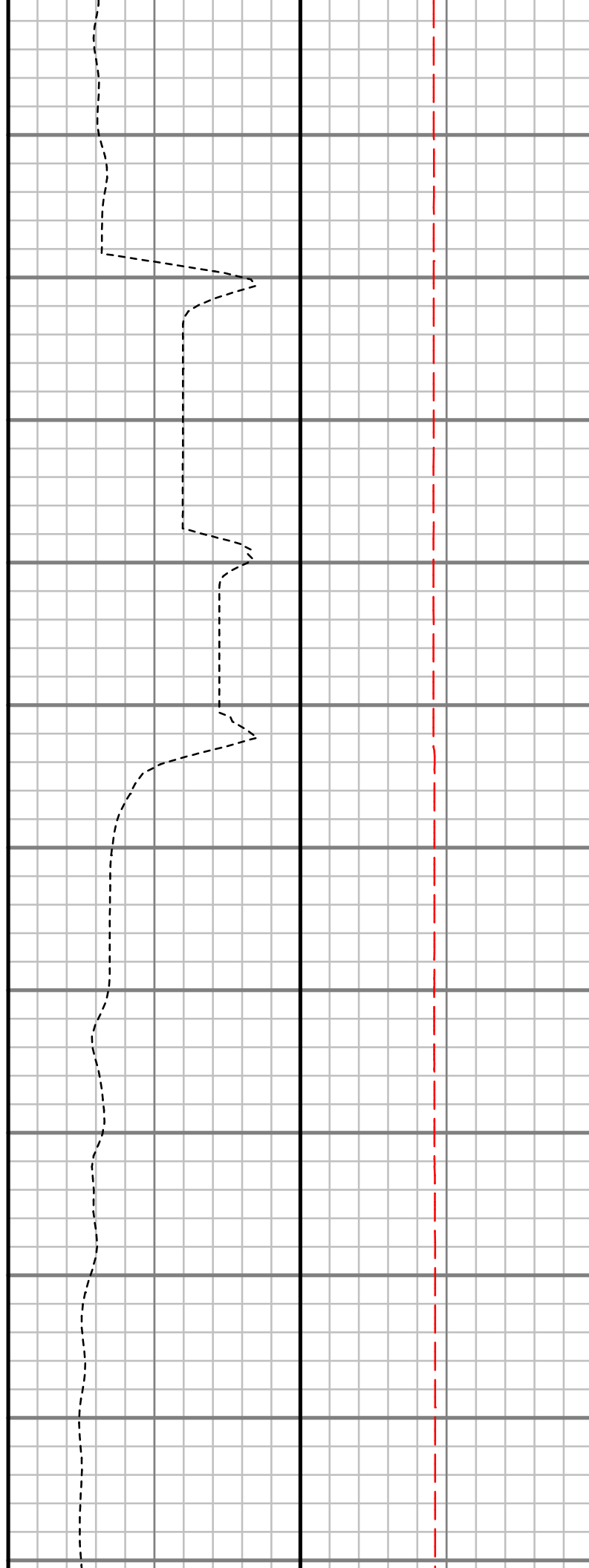
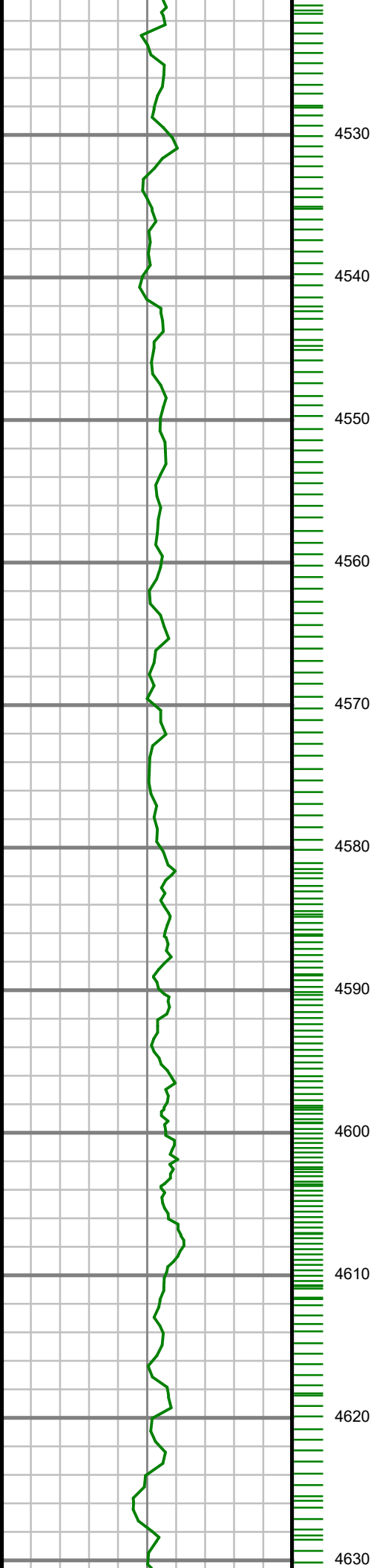
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Inc: 15.40 deg Az:
272.21 deg TVD:
4186.58 ft



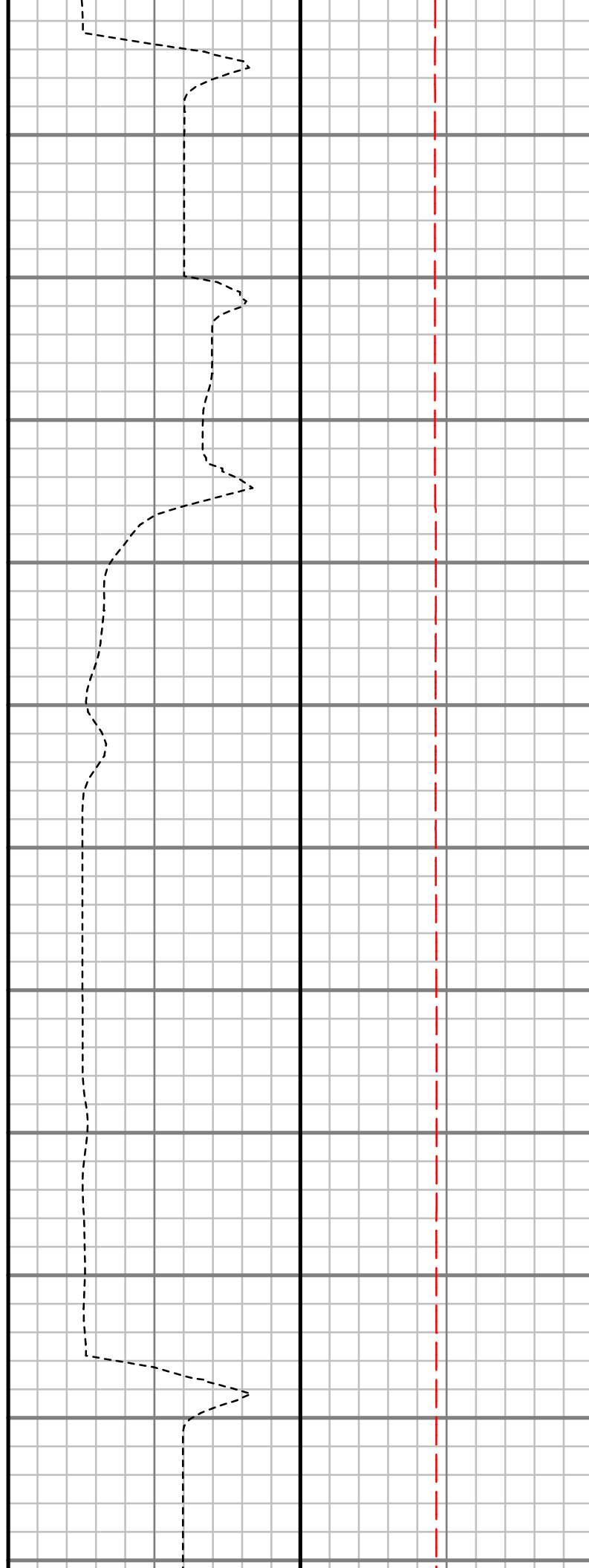
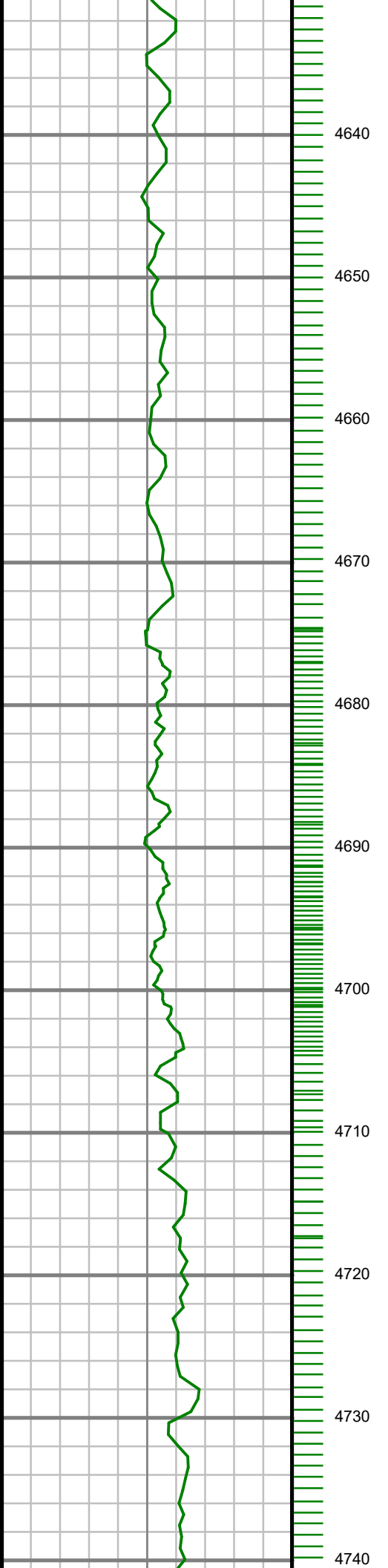
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Inc: 14.45 deg Az:
272.26 deg TVD:
4278.37 ft



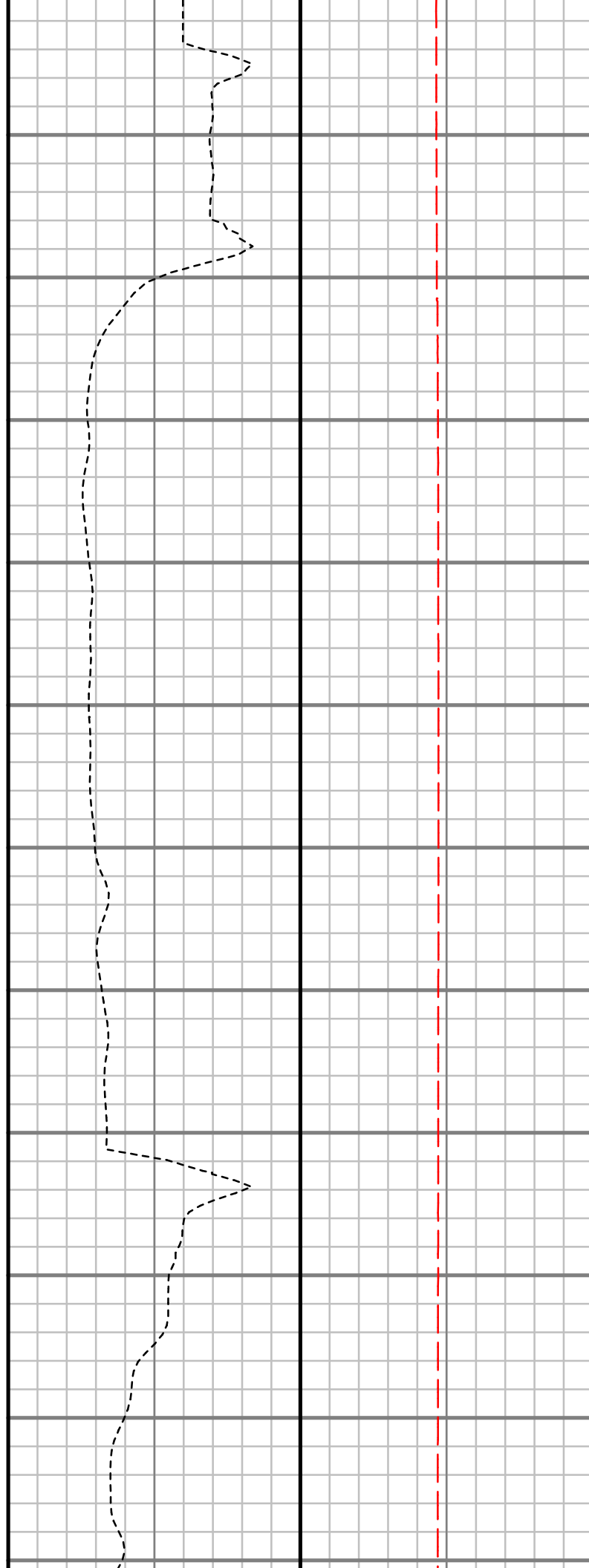
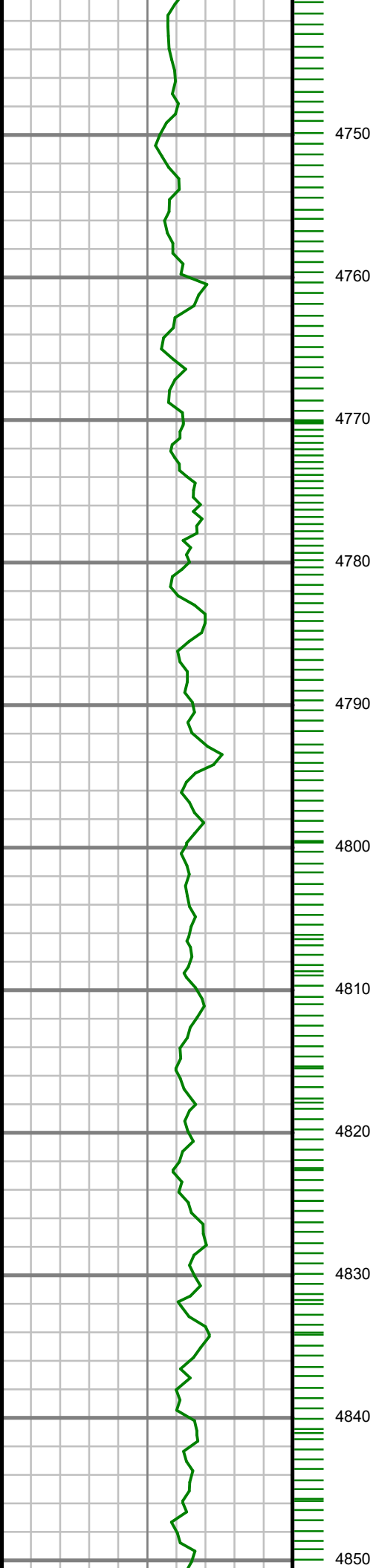
S: 48 MD: 4478.00 ft
Inc: 14.04 deg Az:
271.09 deg TVD:
4369.48 ft



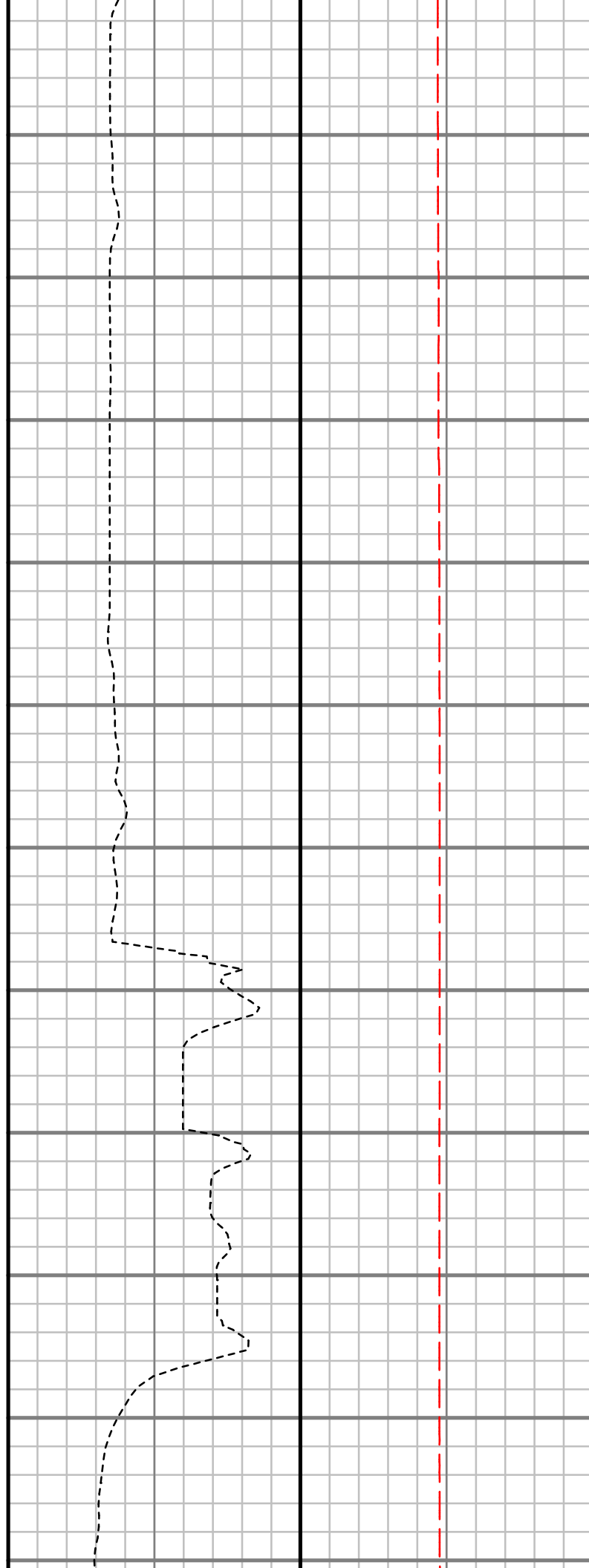
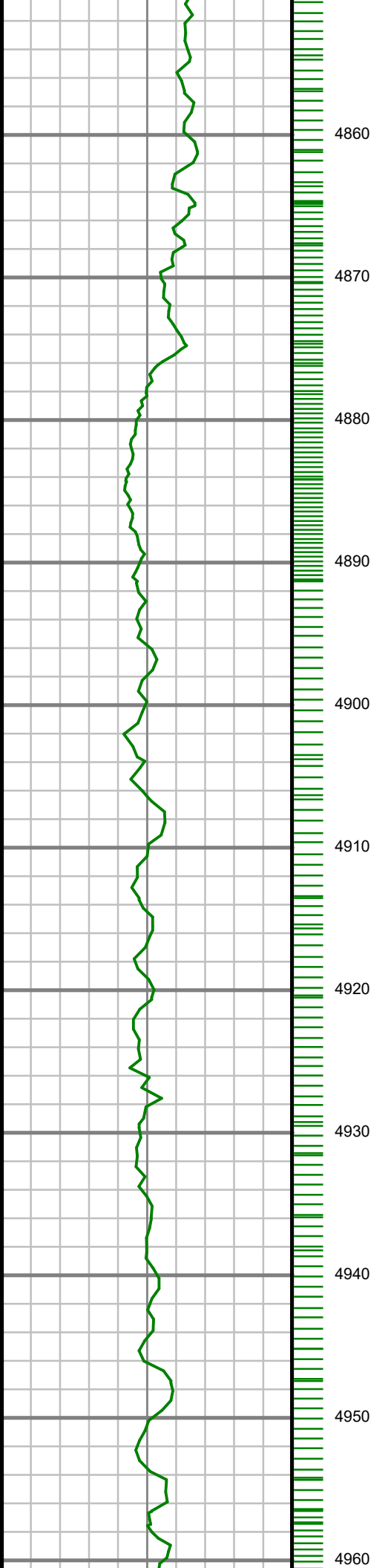
S: 49 MD: 4573.00 ft
Inc: 14.04 deg Az:
274.03 deg TVD:
4461.64 ft



S: 50 MD: 4666.00 ft
Inc: 14.24 deg Az:
280.87 deg TVD:
4551.83 ft

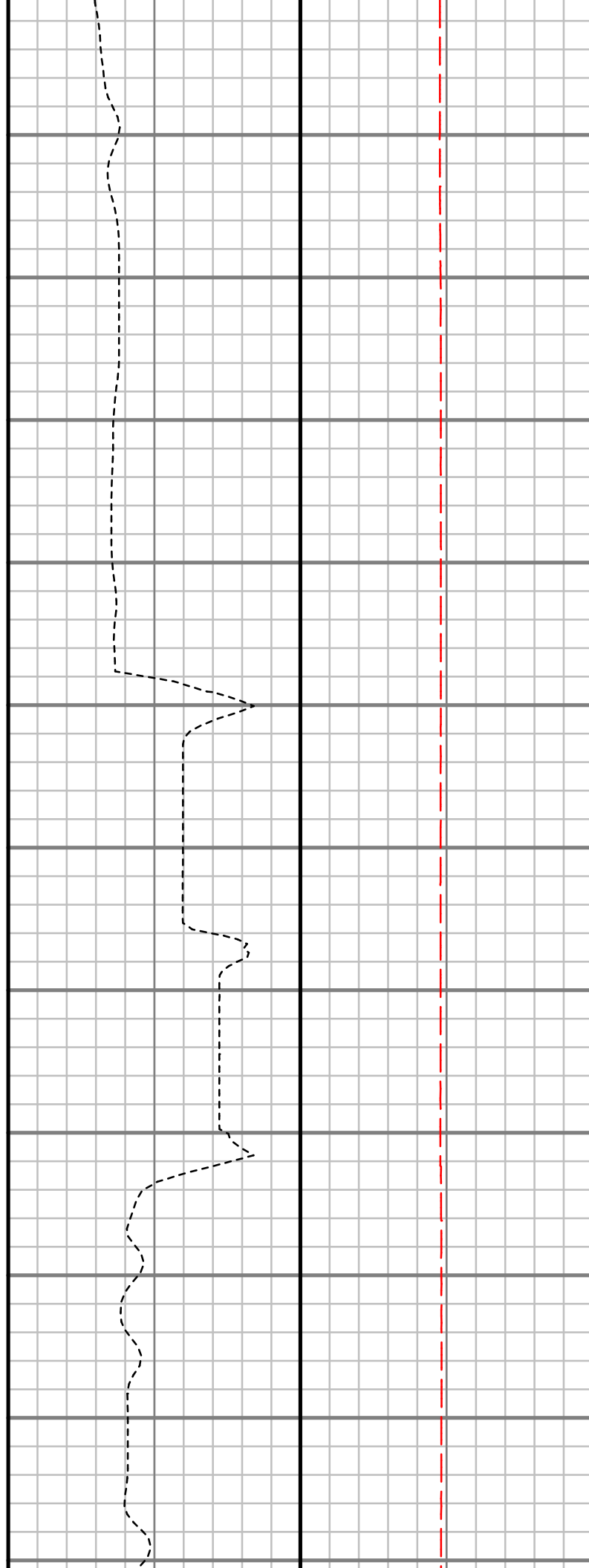
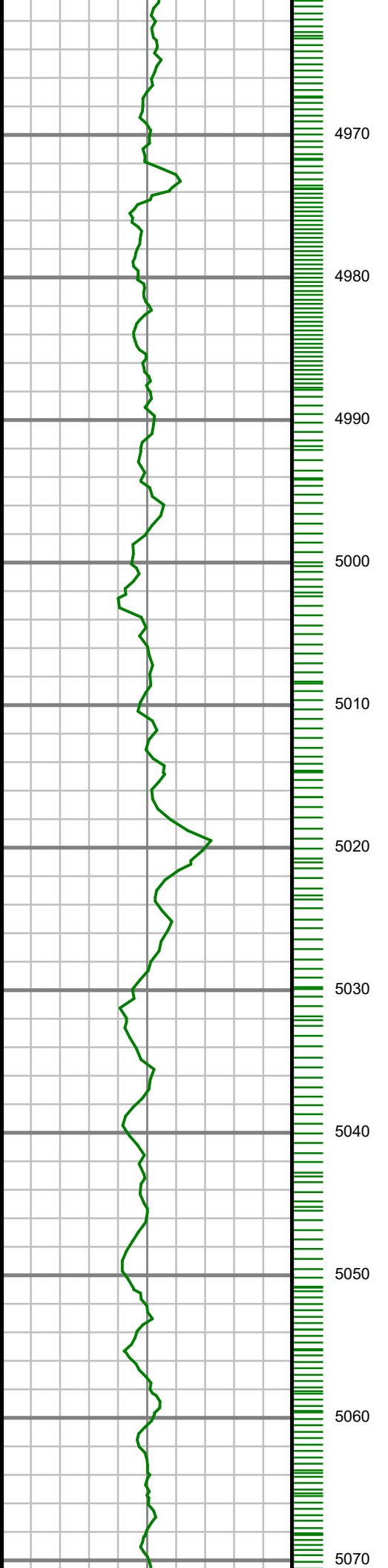


S: 51 MD: 4760.00 ft
Inc: 15.50 deg Az:
281.04 deg TVD:
4642.68 ft

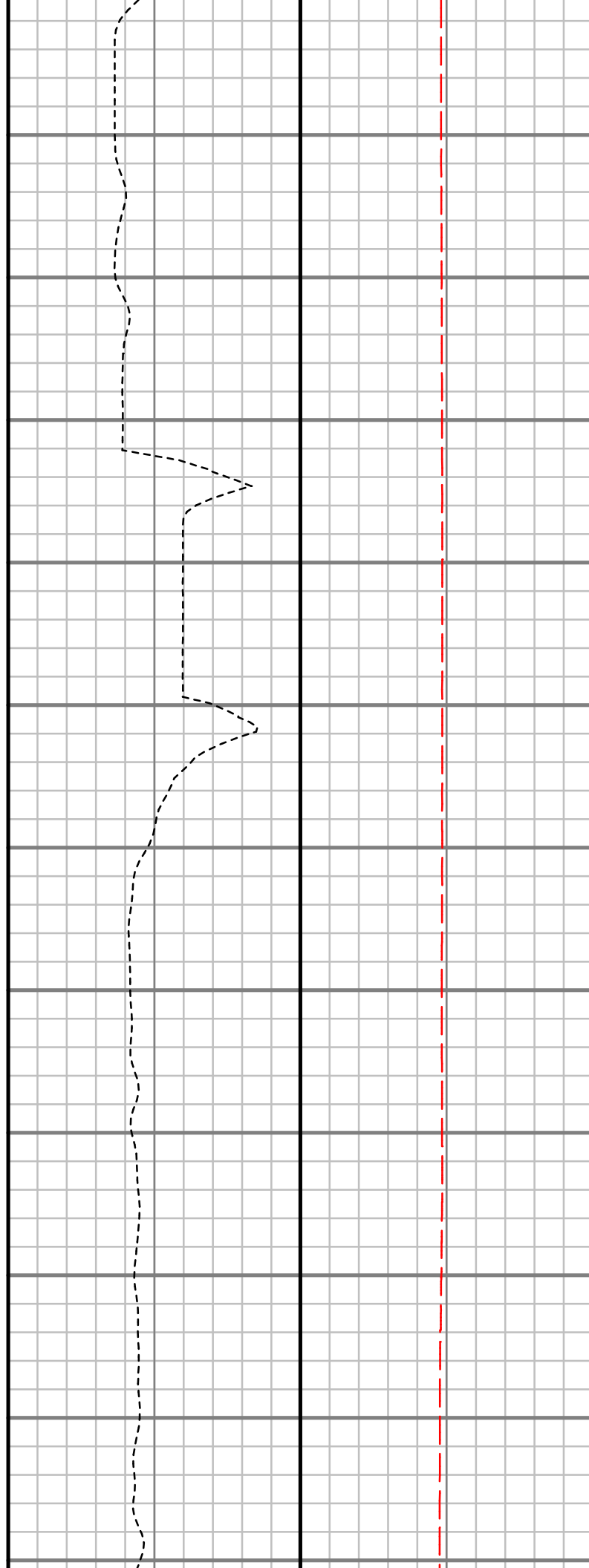
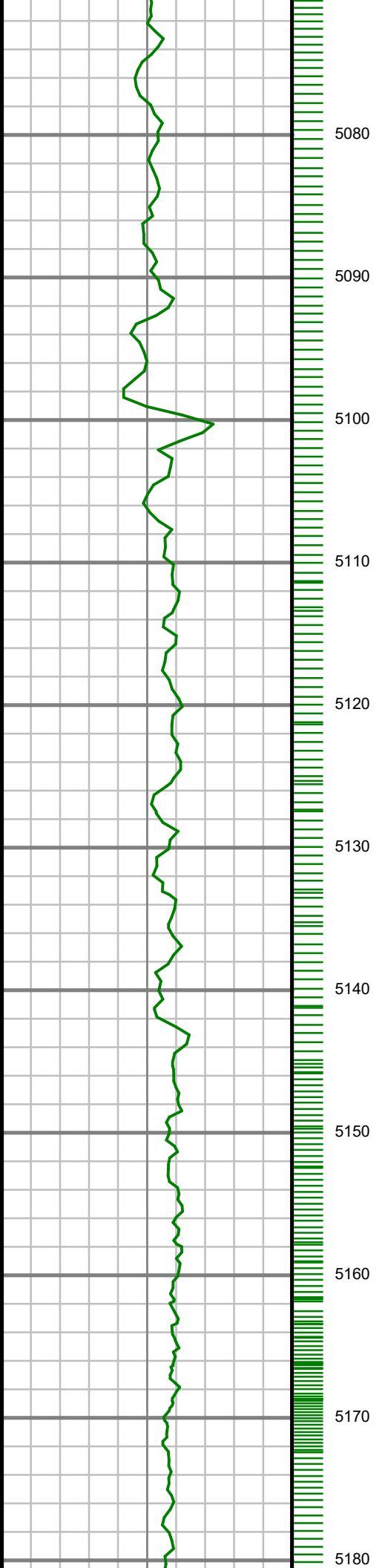


S: 52 MD: 4854.00 ft
Inc: 13.89 deg Az:
279.04 deg TVD:
4733.60 ft

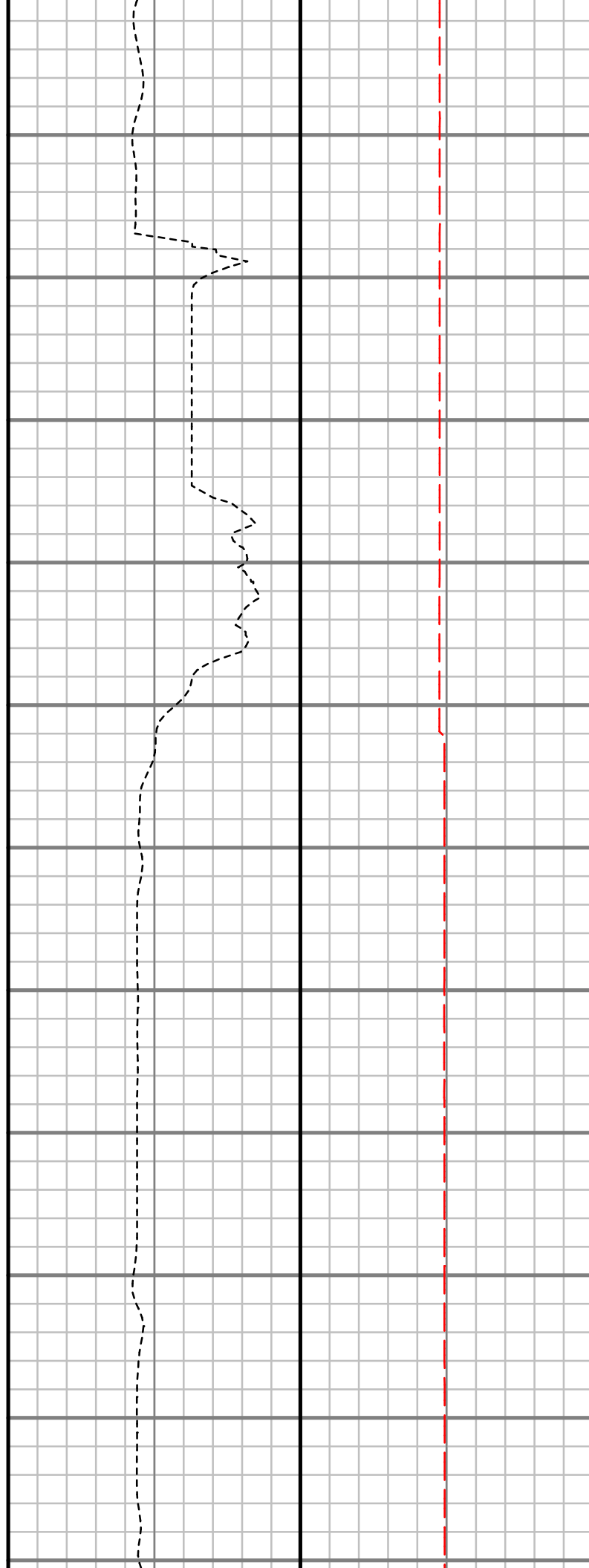
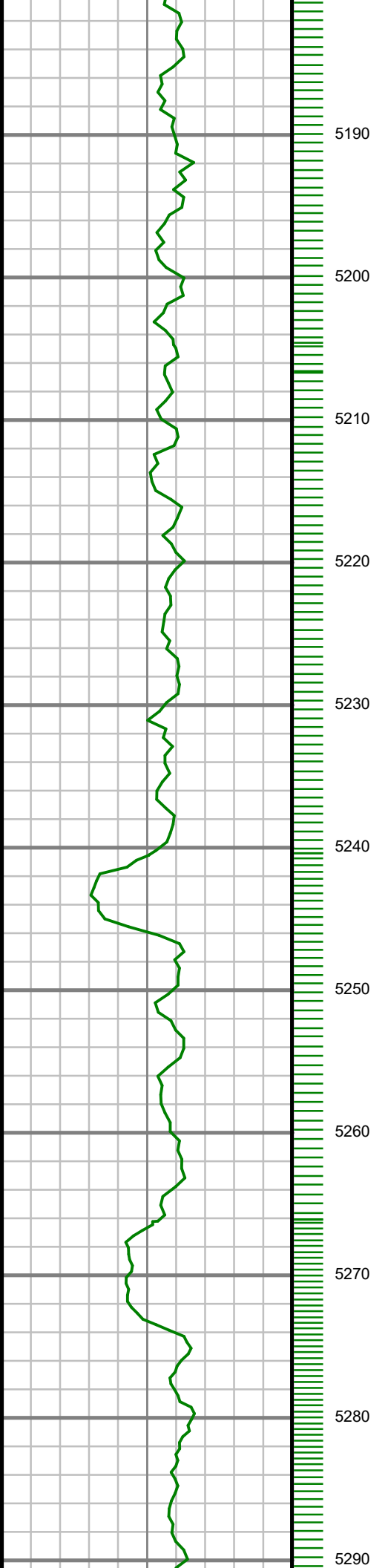
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Inc: 13.61 deg Az:
276.32 deg TVD:
4825.88 ft



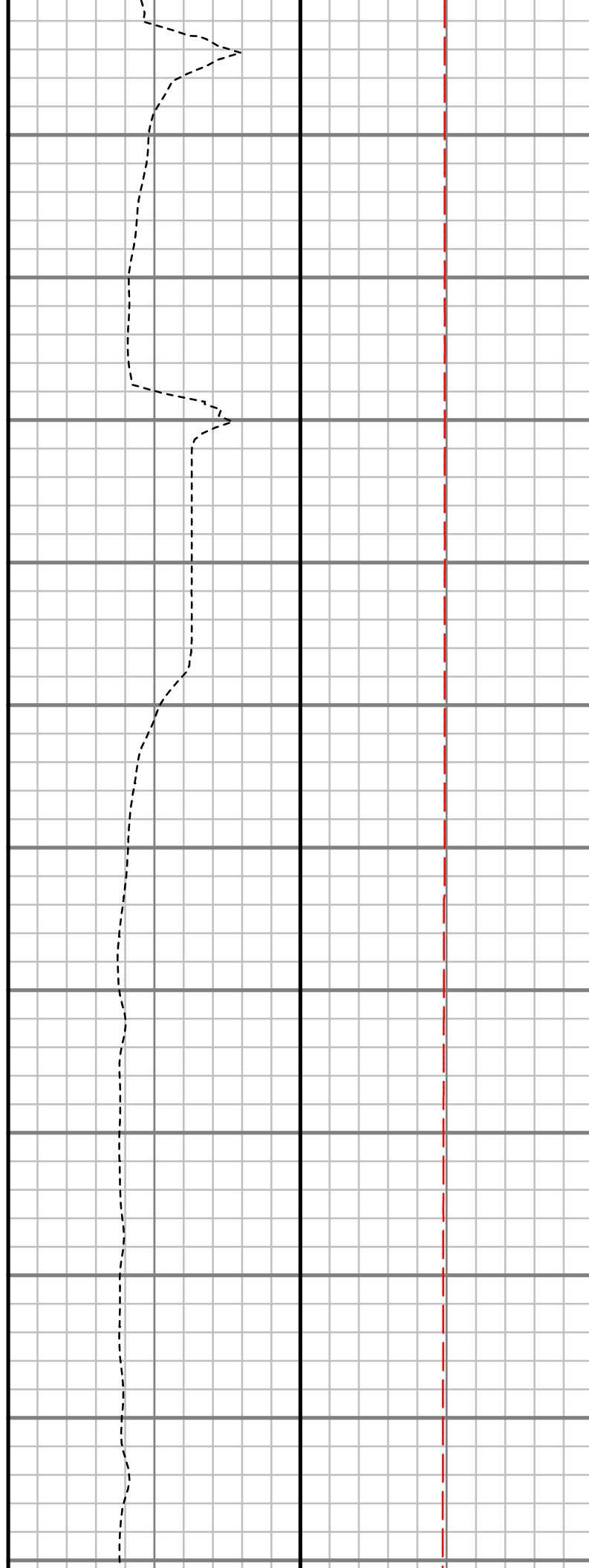
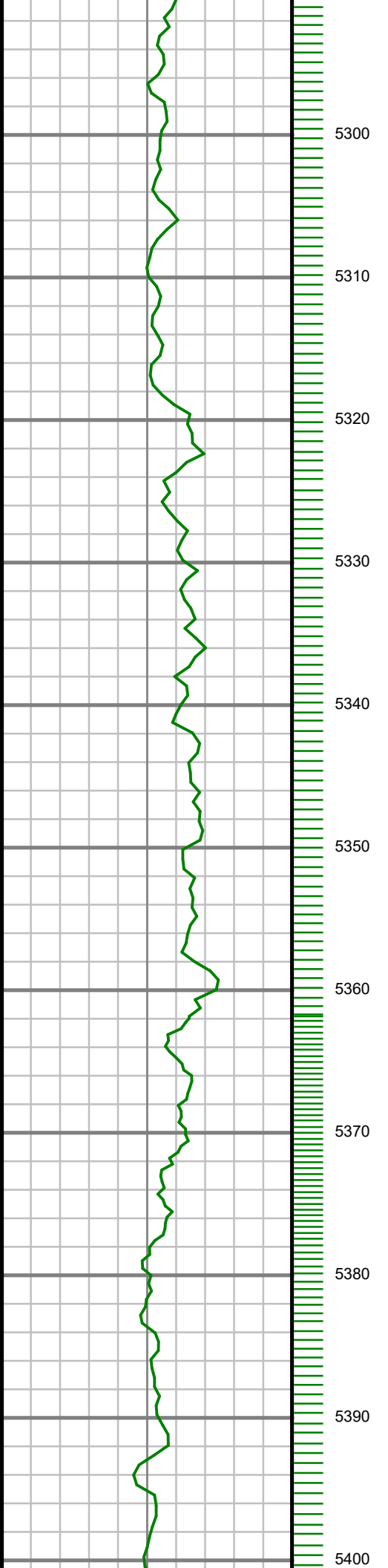
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Inc: 13.83 deg Az:
273.40 deg TVD:
4918.17 ft



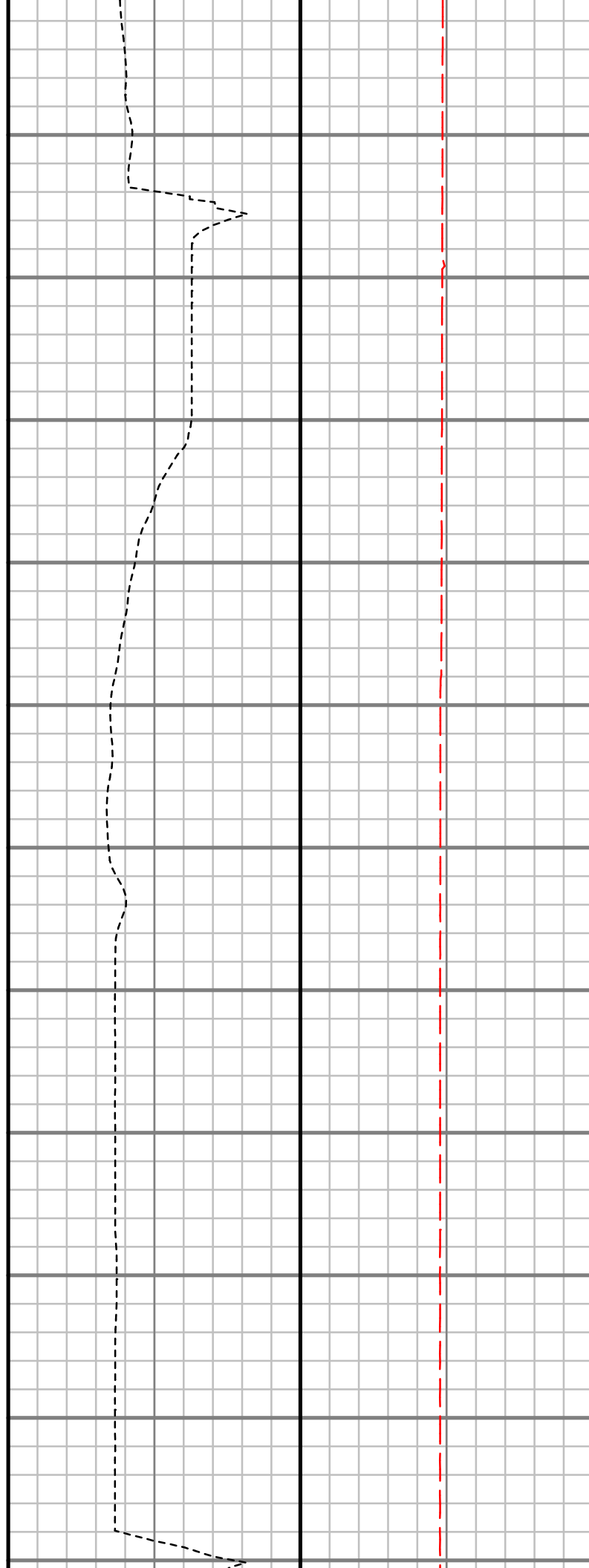
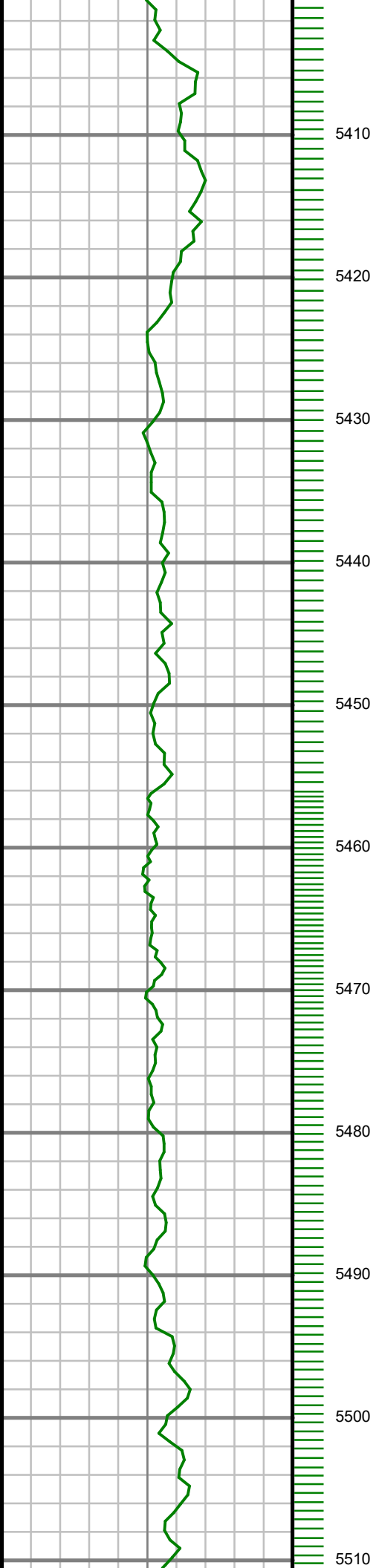
S: 55 MD: 5137.00 ft
Inc: 13.83 deg Az:
274.97 deg TVD:
5008.48 ft



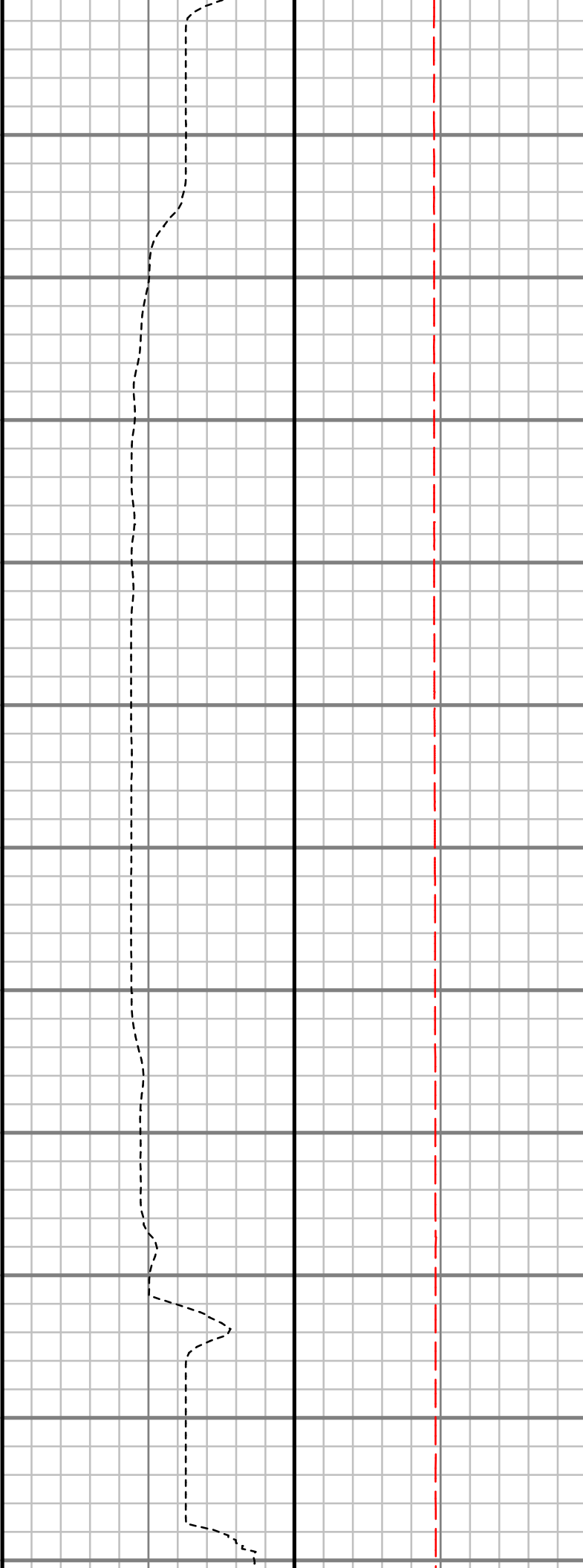
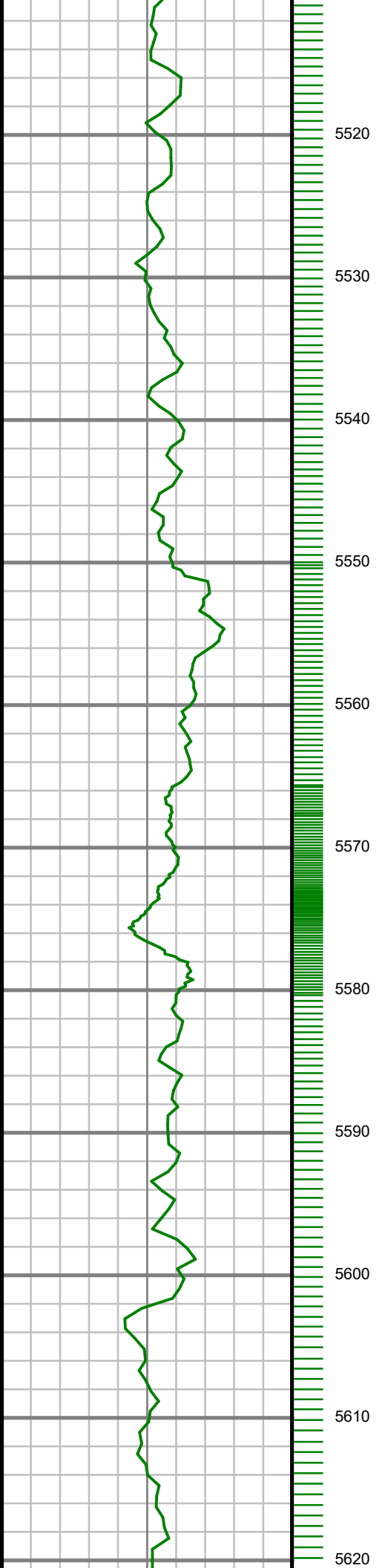
S: 56 MD: 5257.00 ft
Inc: 11.59 deg Az:
271.92 deg TVD:
5125.53 ft



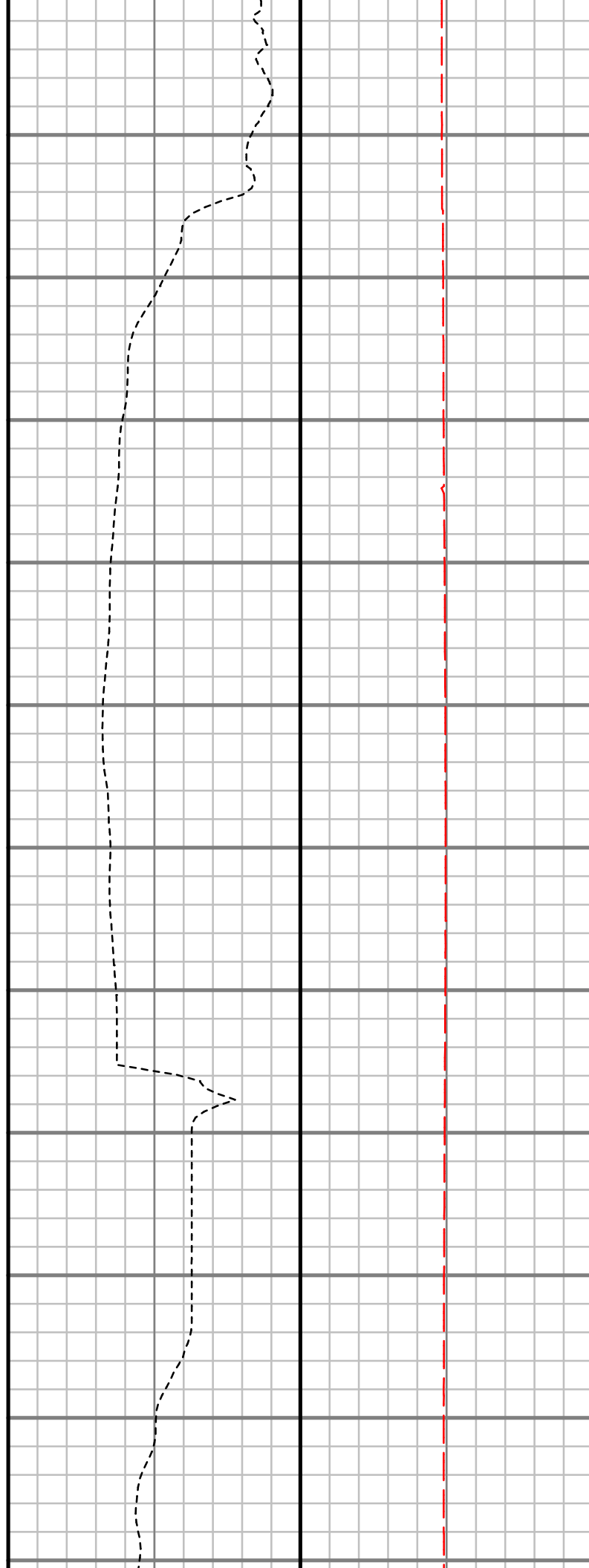
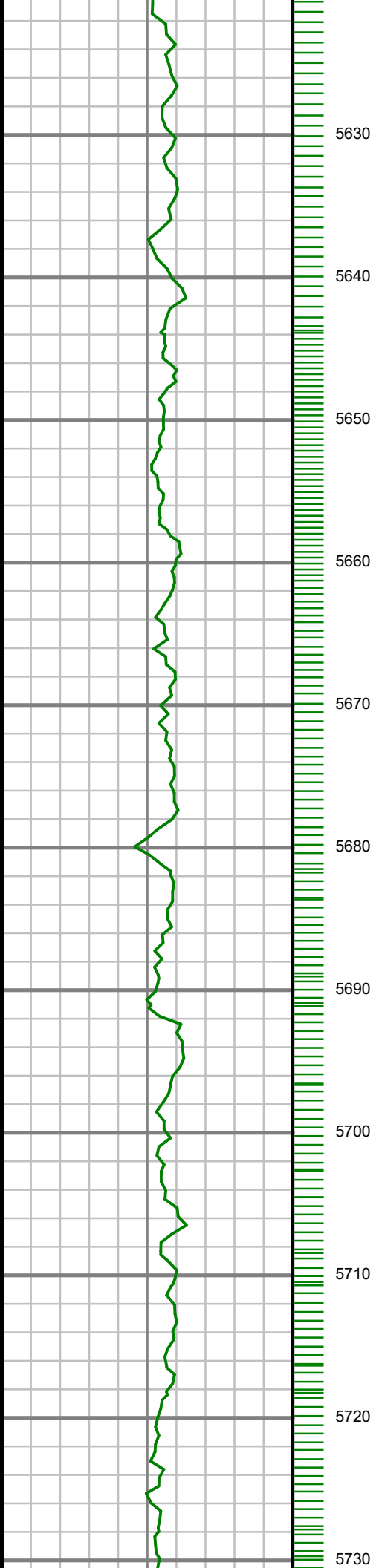
S: 57 MD: 5352.00 ft
Inc: 9.63 deg Az:
270.67 deg TVD:
5218.90 ft



S: 58 MD: 5447.00 ft
Inc: 7.75 deg Az:
271.14 deg TVD:
5312.81 ft

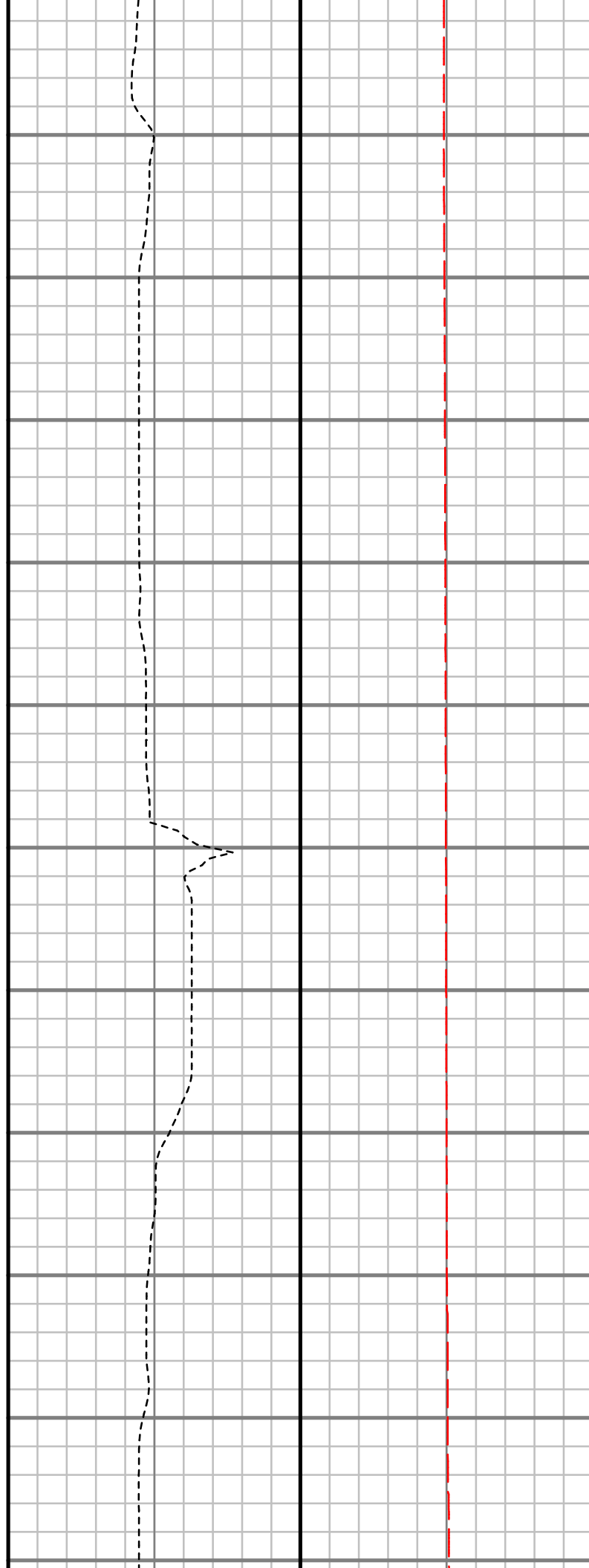
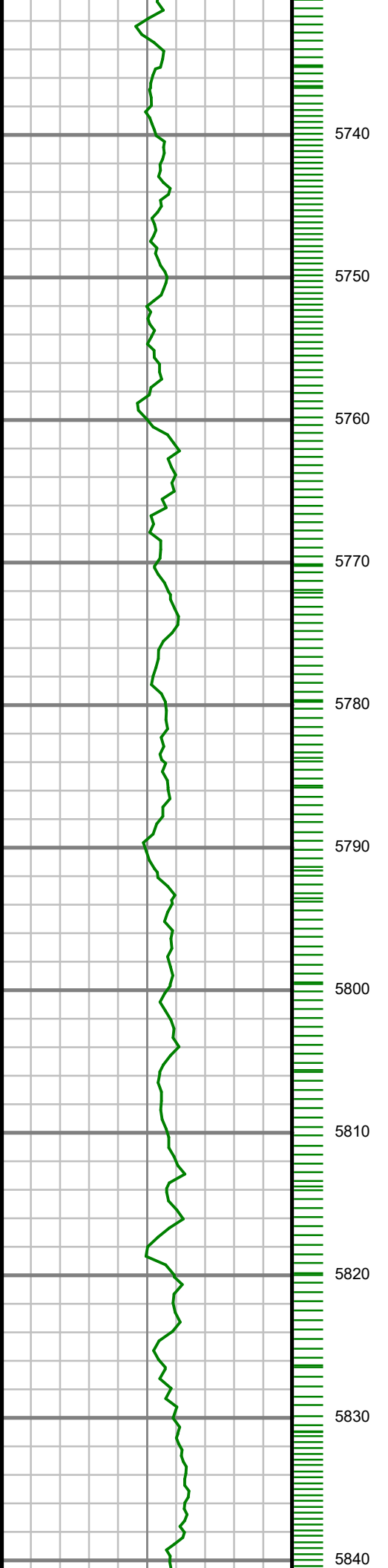


S: 59 MD: 5542.00 ft
Inc: 7.08 deg Az:
271.01 deg TVD:
5407.01 ft



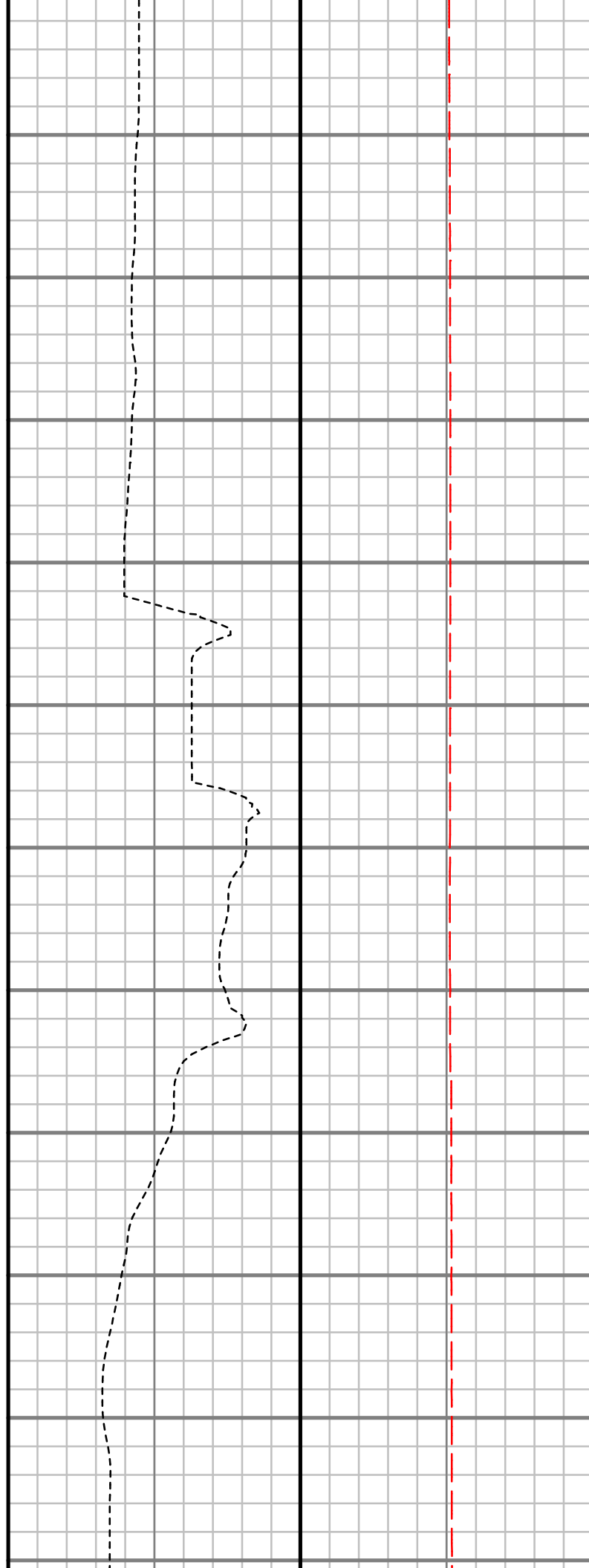
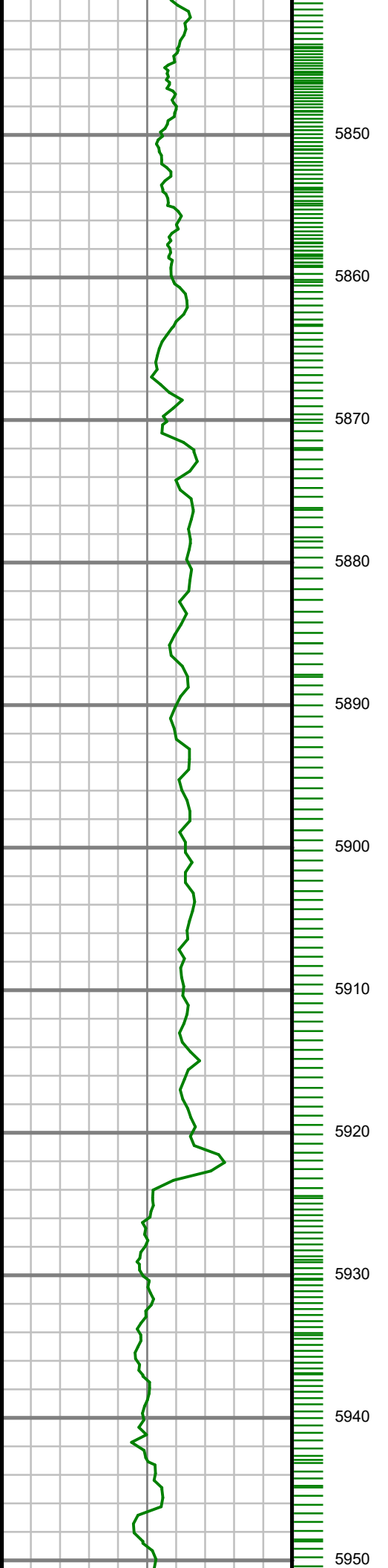
S: 60 MD: 5635.00 ft
Inc: 5.07 deg Az:
278.90 deg TVD:
5499.49 ft

S: 61 MD: 5727.00 ft
Inc: 3.72 deg Az:
275.11 deg TVD:

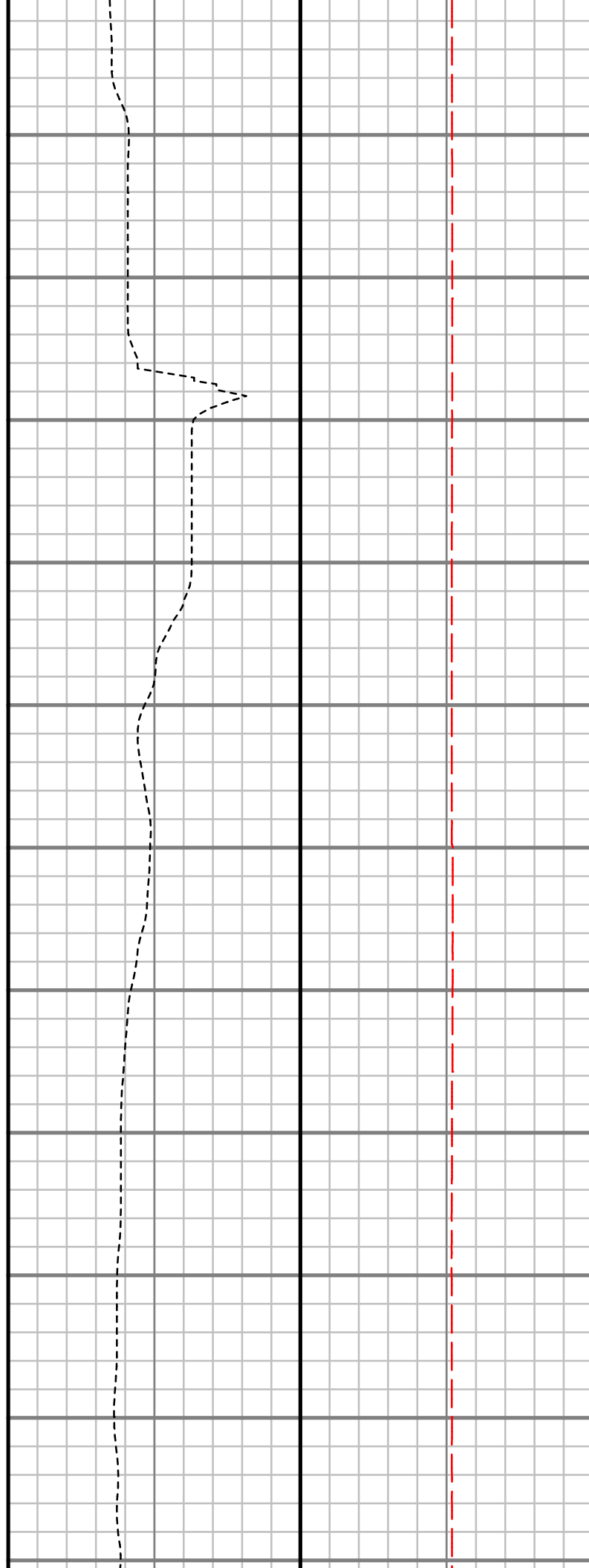
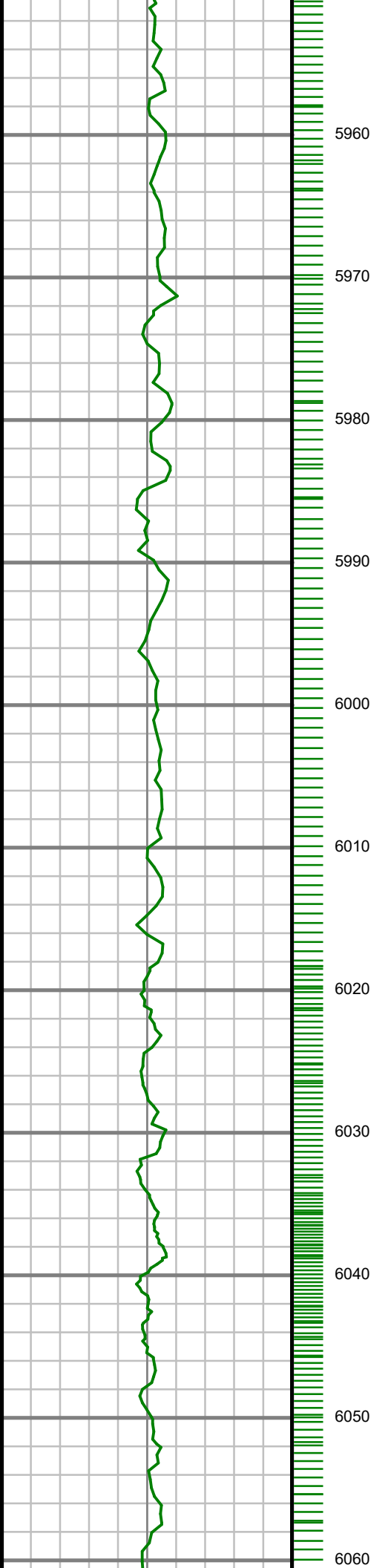


5591.21 ft

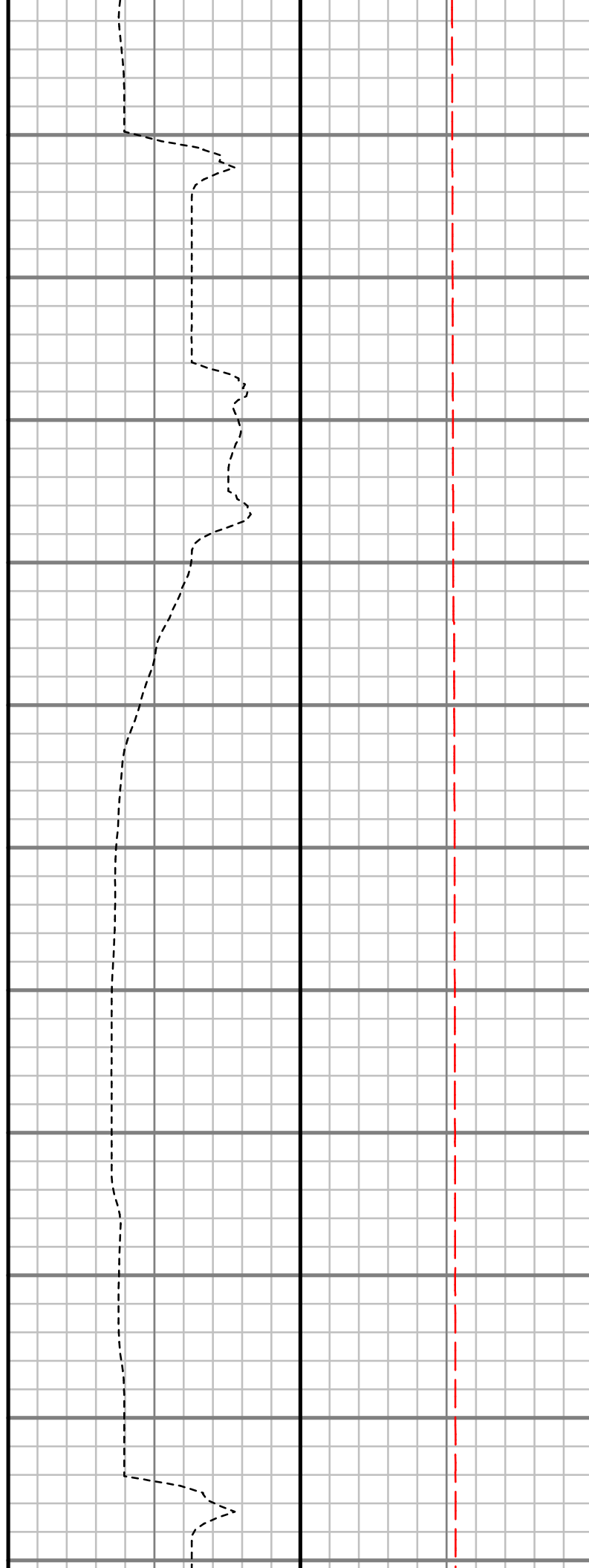
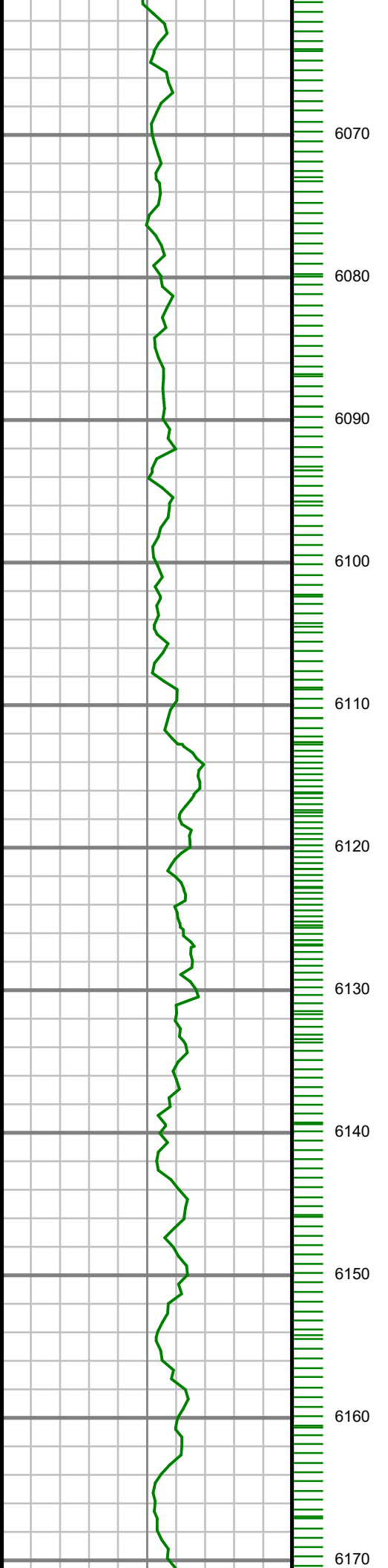
S: 62 MD: 5820.00 ft
Inc: 3.01 deg Az:
275.12 deg TVD:
5684.05 ft



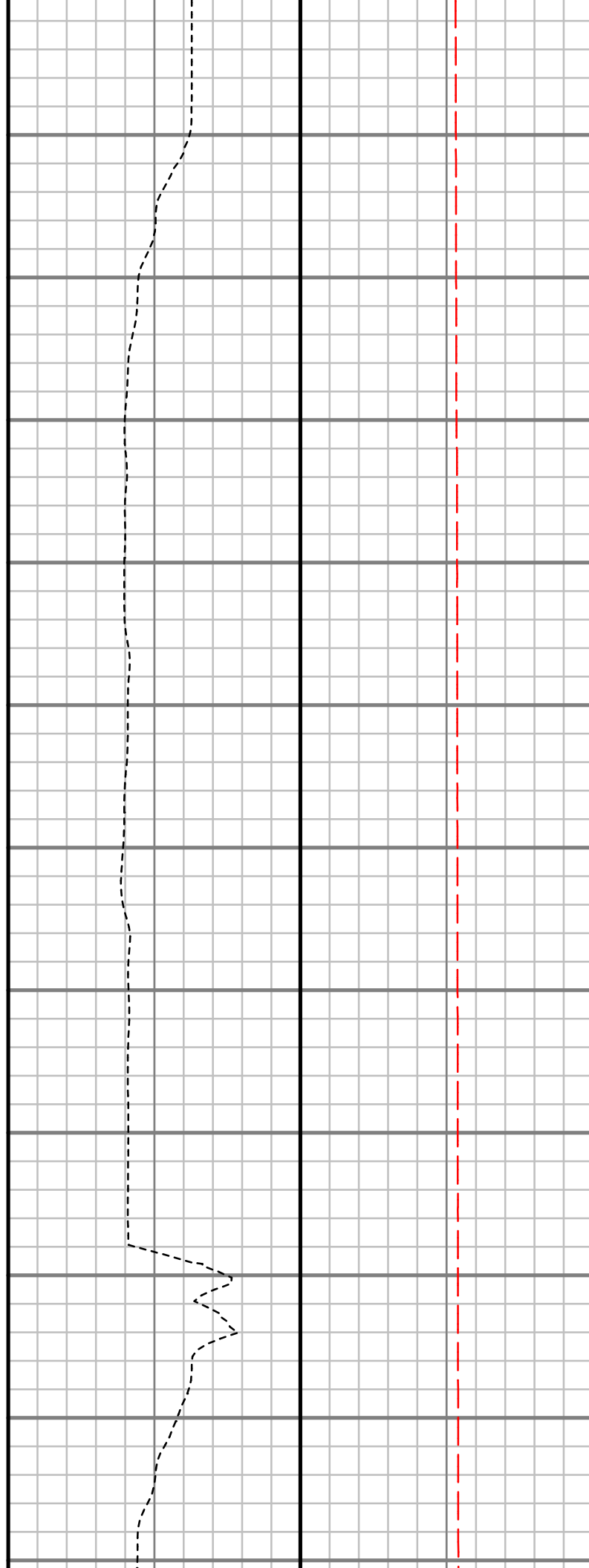
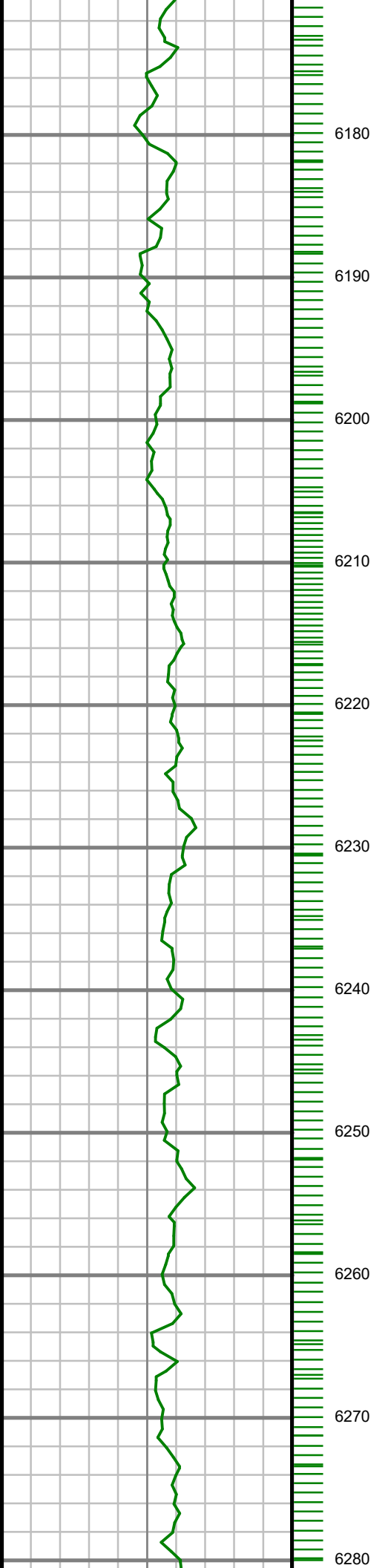
S: 63 MD: 5915.00 ft
Inc: 2.30 deg Az:
244.23 deg TVD:
5778.96 ft



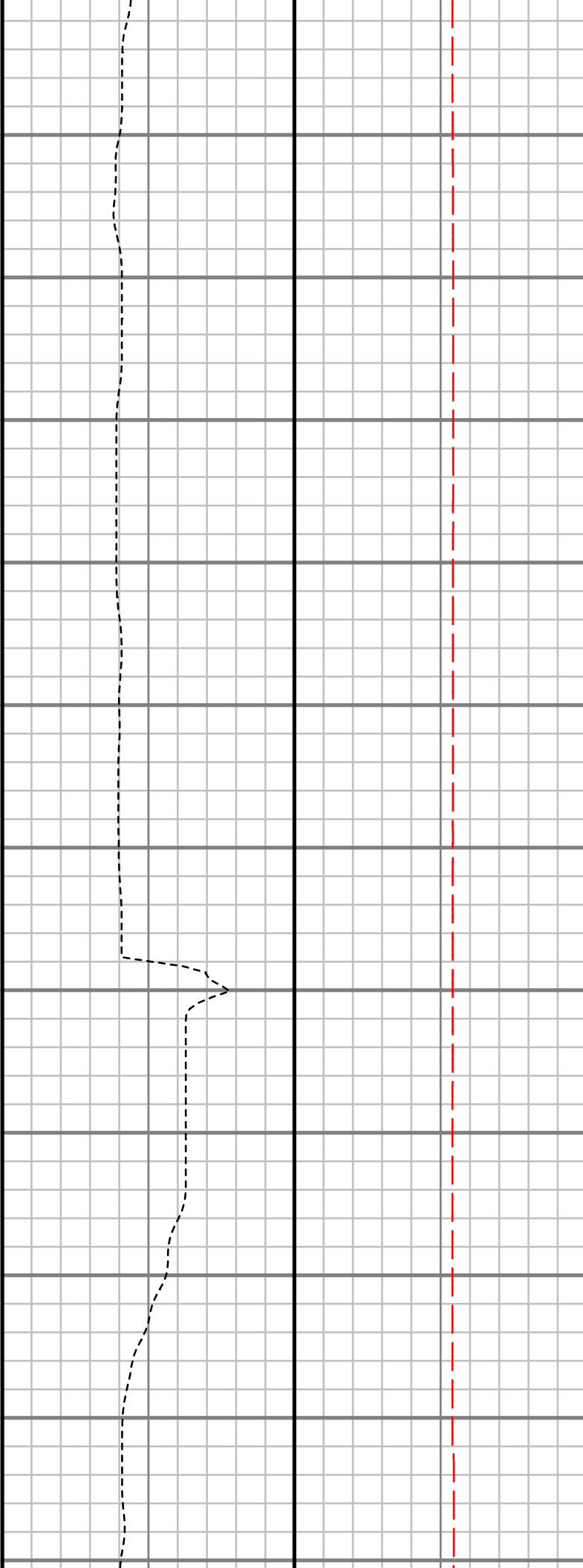
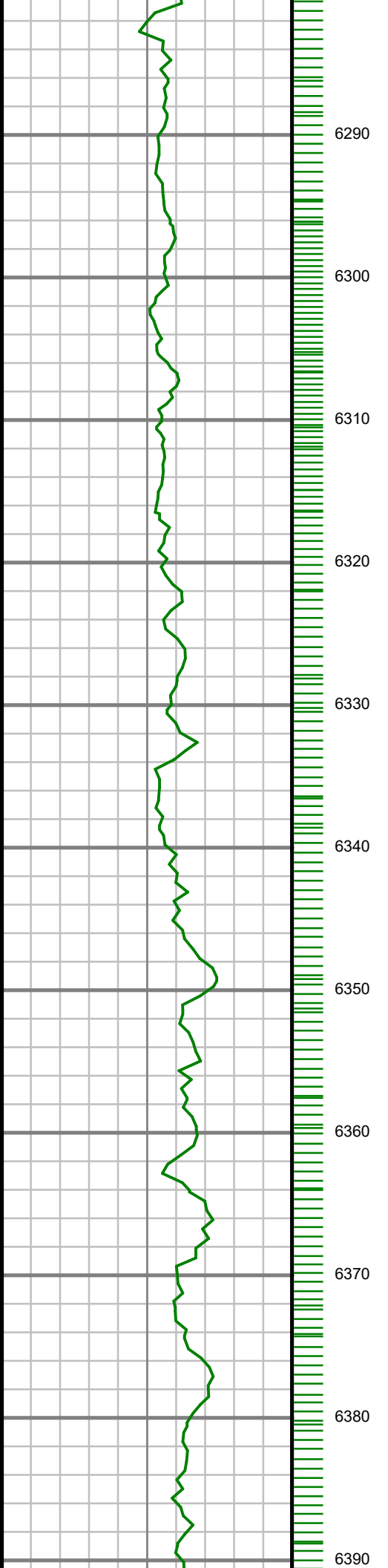
S: 64 MD: 6007.00 ft
Inc: 1.82 deg Az:
256.35 deg TVD:
5870.90 ft



S: 65 MD: 6101.00 ft
Inc: 0.85 deg Az:
241.47 deg TVD:
5964.87 ft

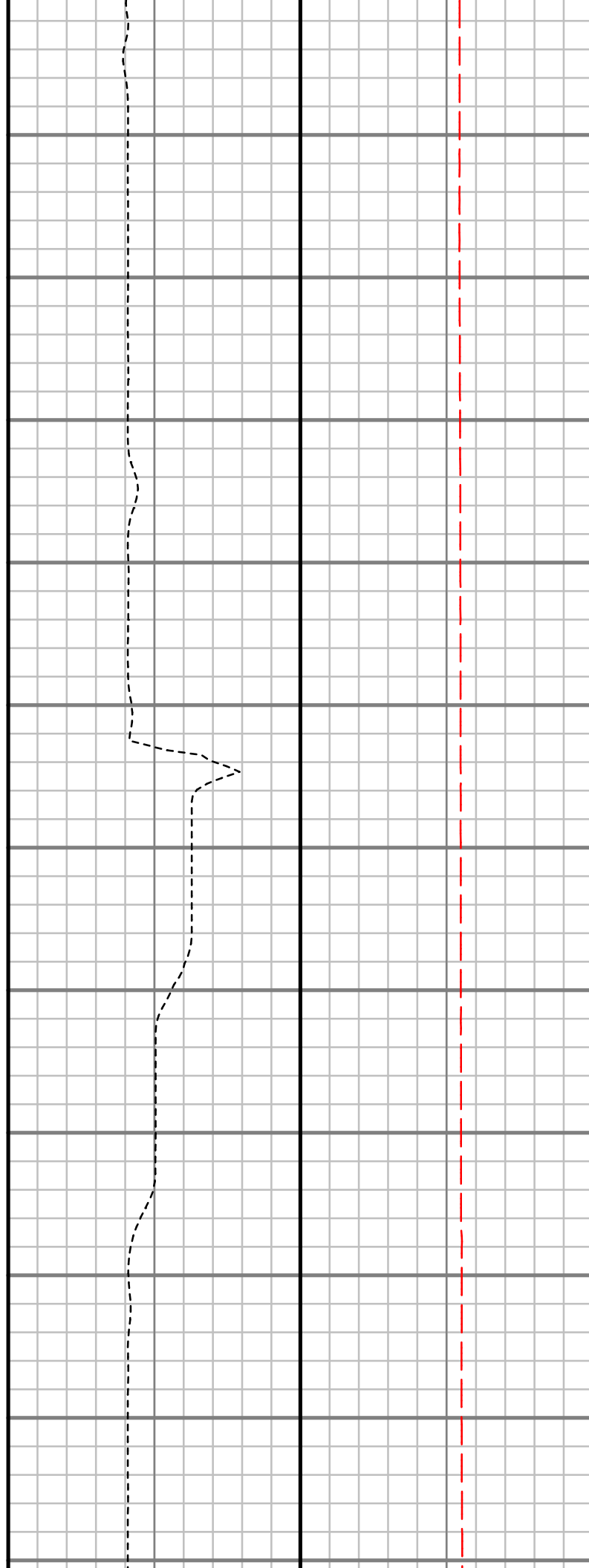
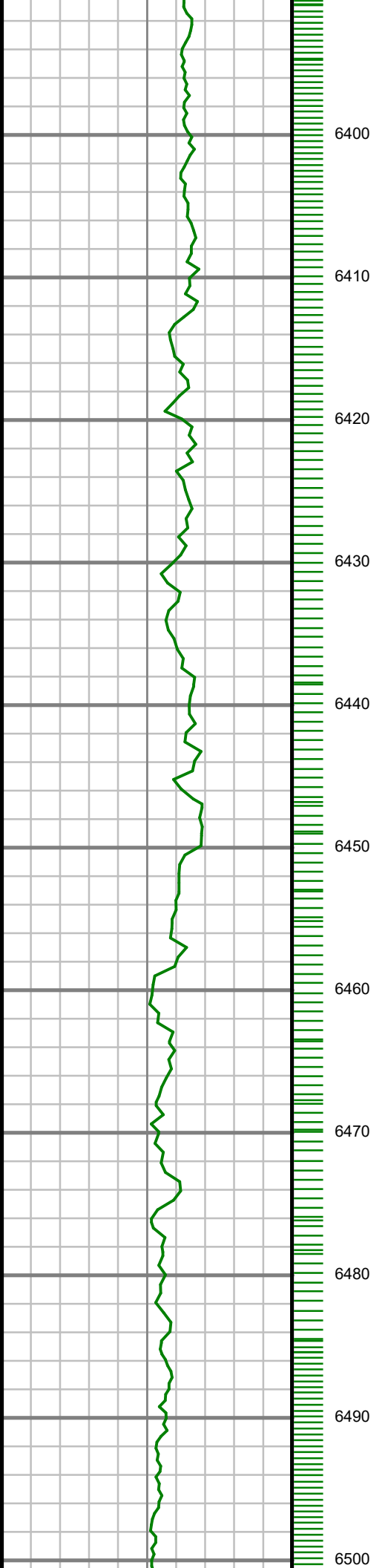


S: 66 MD: 6194.00 ft
Inc: 0.77 deg Az:
252.24 deg TVD:
6057.86 ft

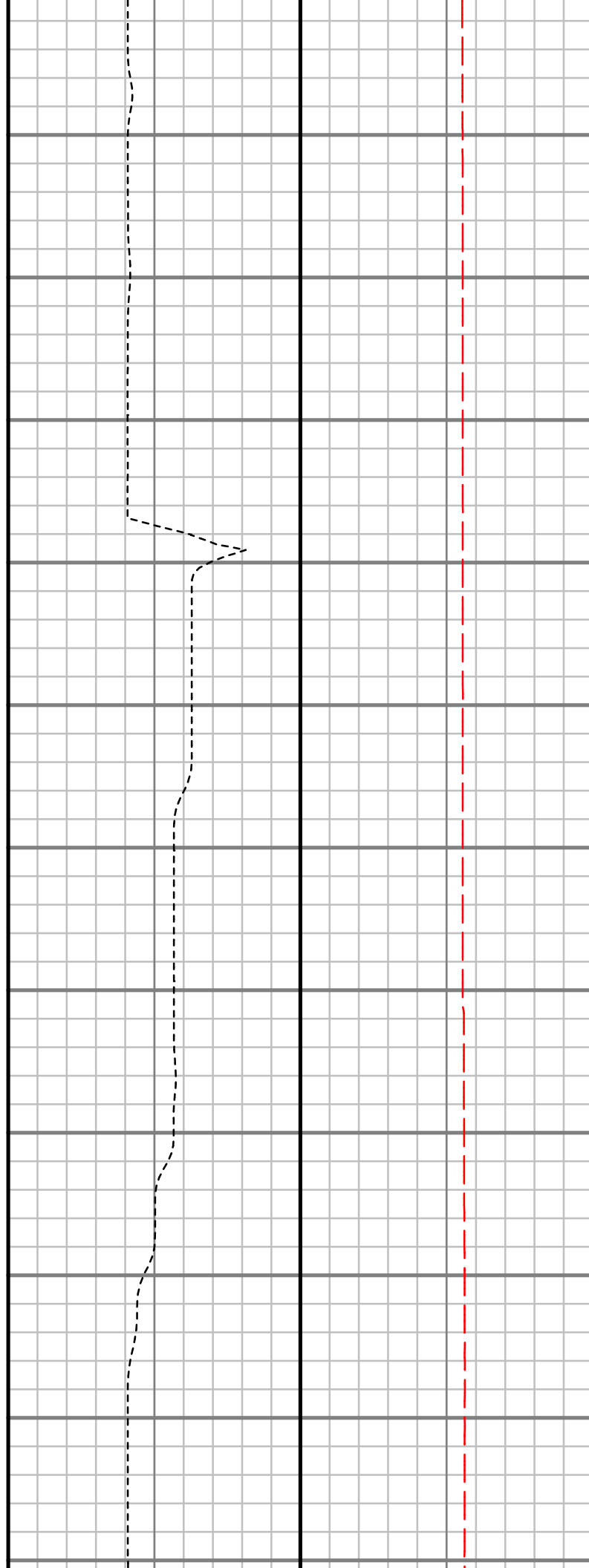
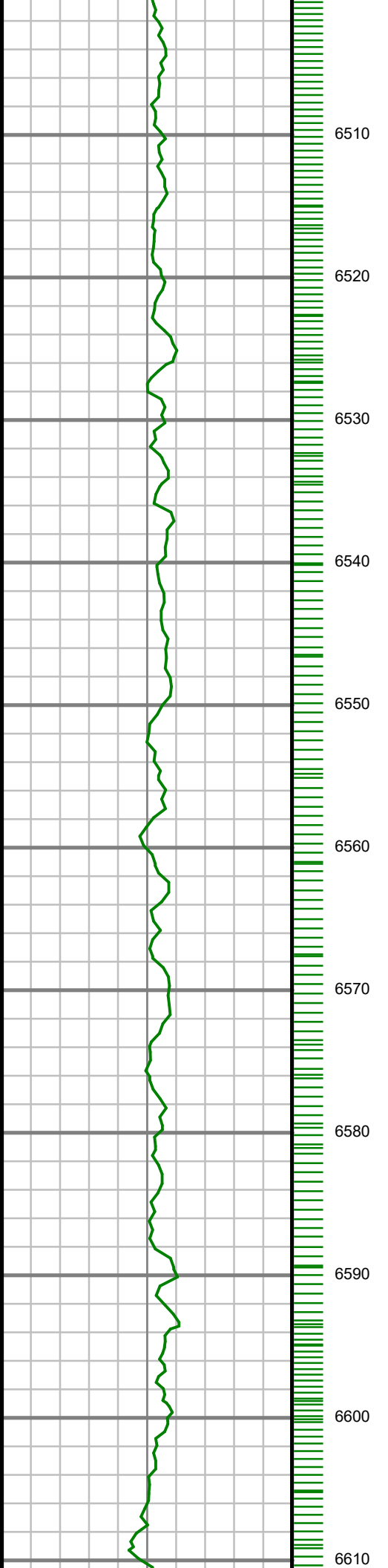


S: 67 MD: 6288.00 ft
Inc: 0.72 deg Az:
246.69 deg TVD:
6151.85 ft

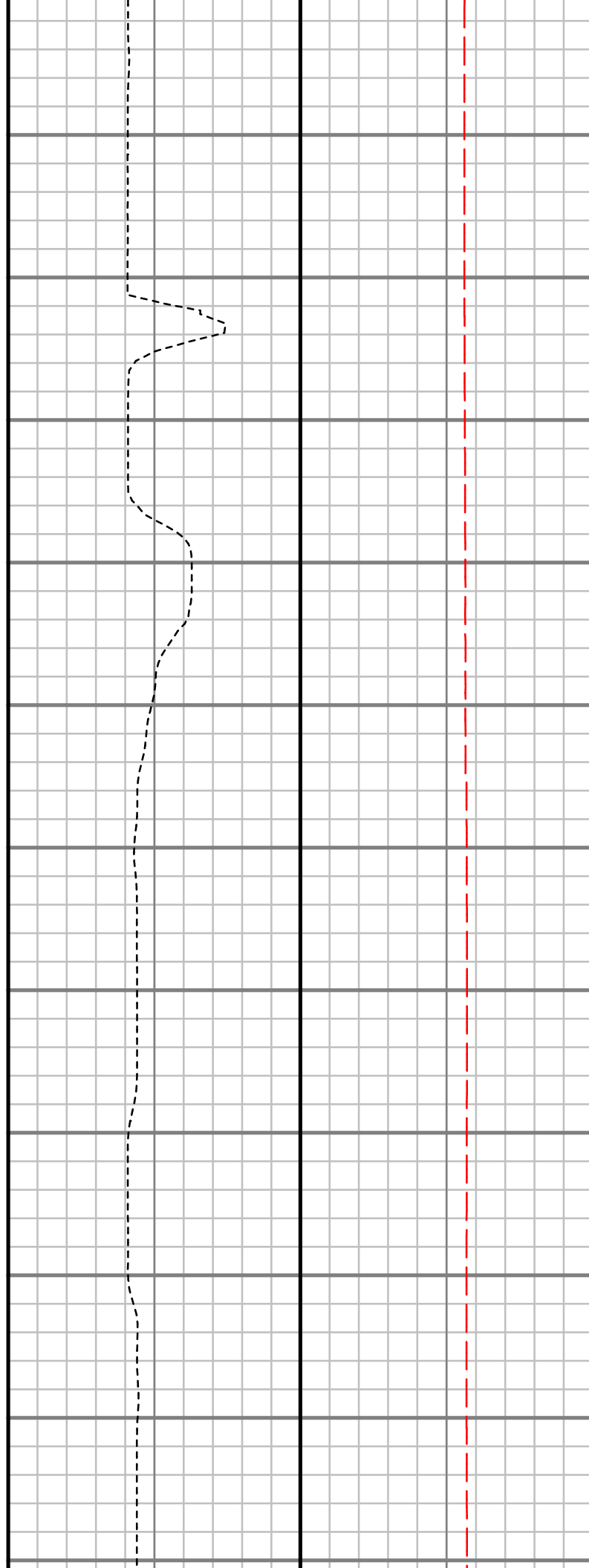
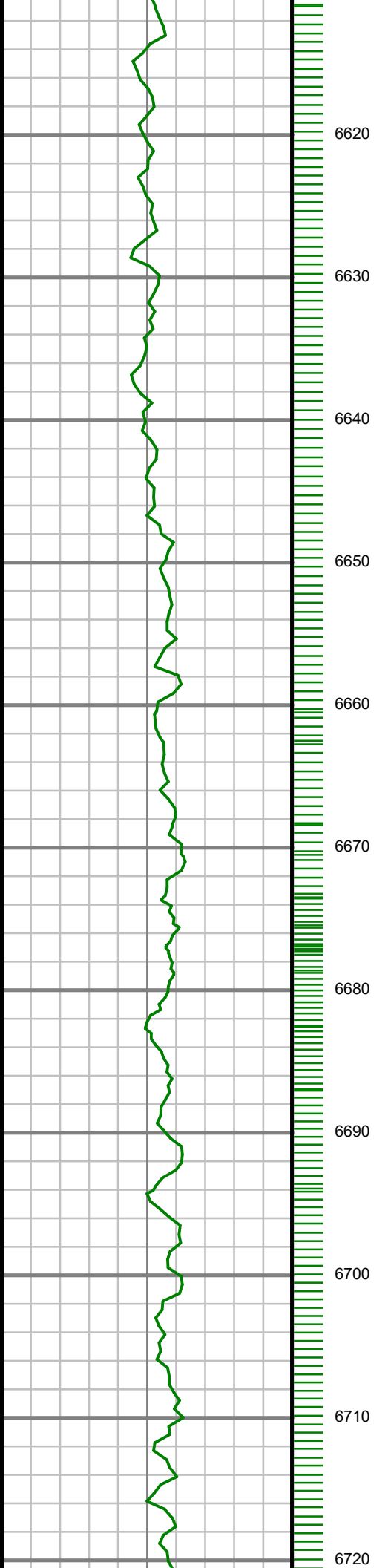
S: 68 MD: 6383.00 ft
Inc: 0.48 deg Az:
231.13 deg TVD:
6246.85 ft



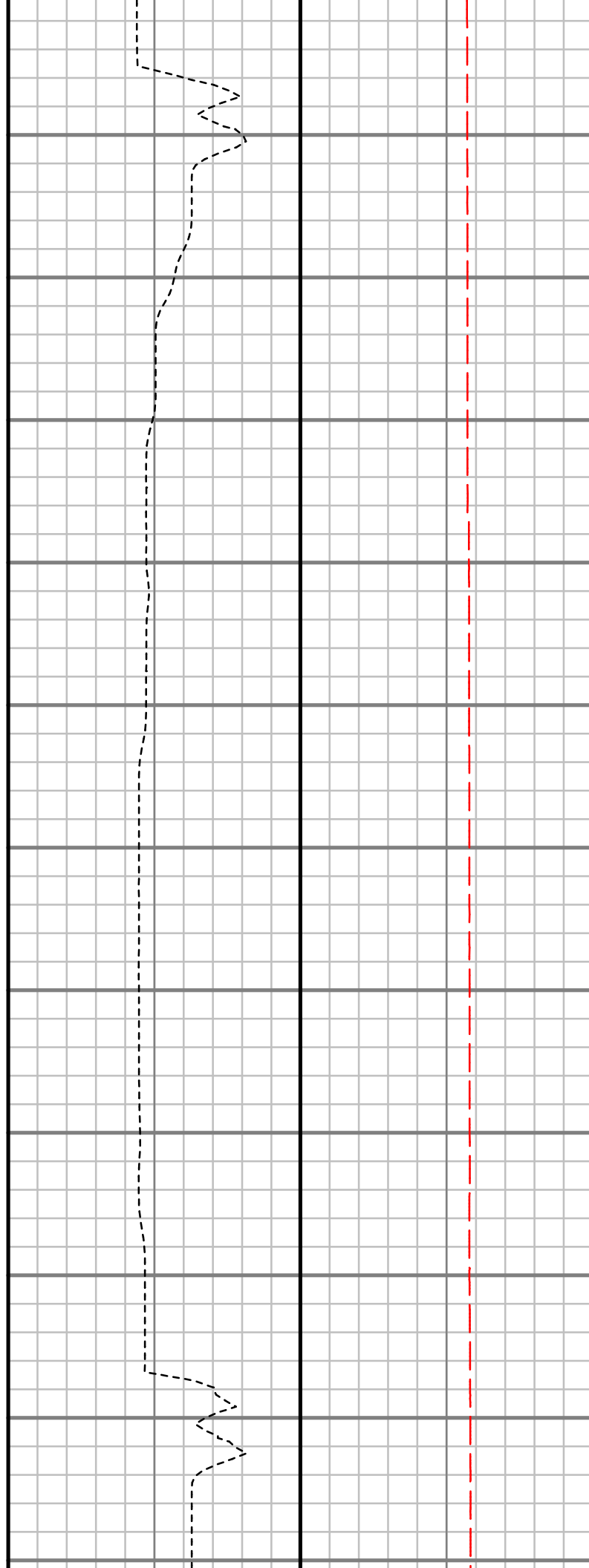
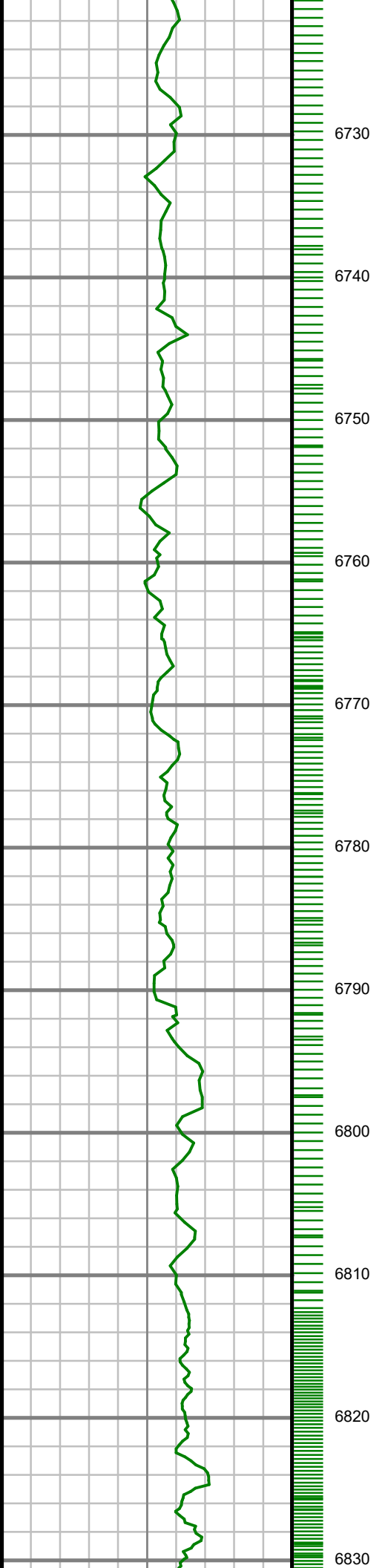
S: 69 MD: 6477.00 ft
Inc: 0.57 deg Az:
219.69 deg TVD:
6340.84 ft



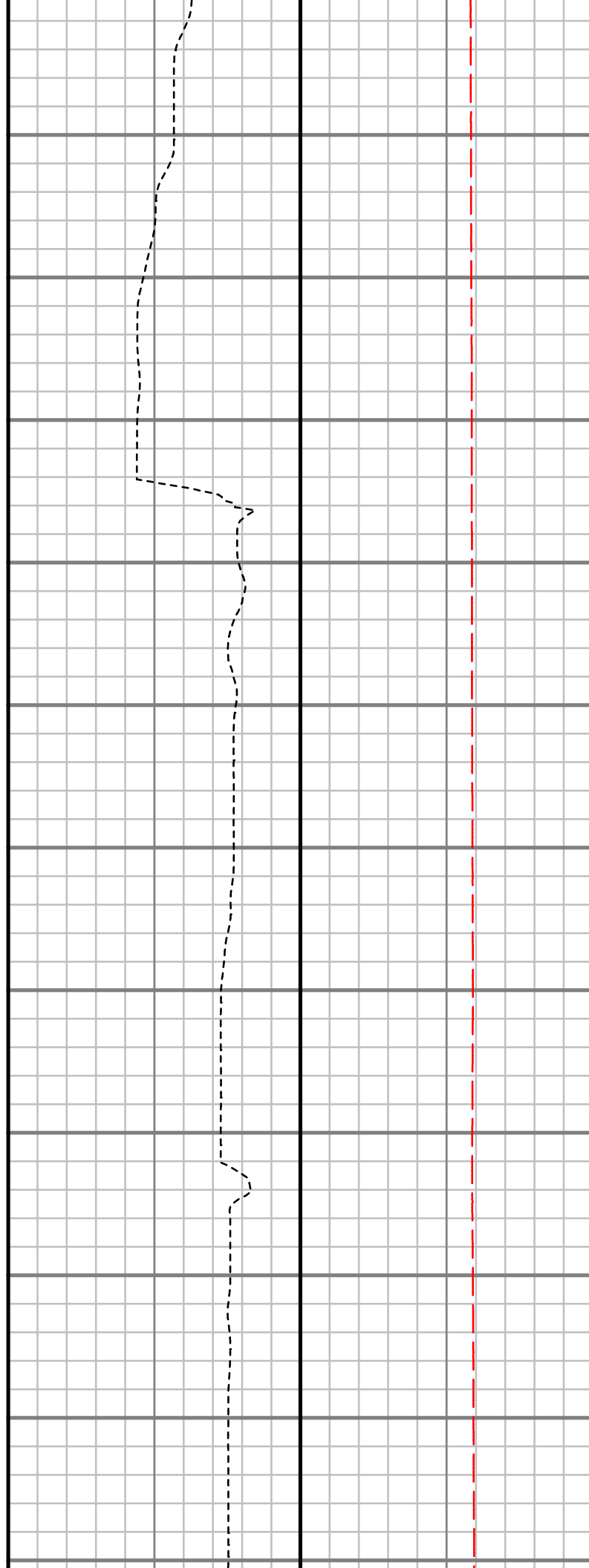
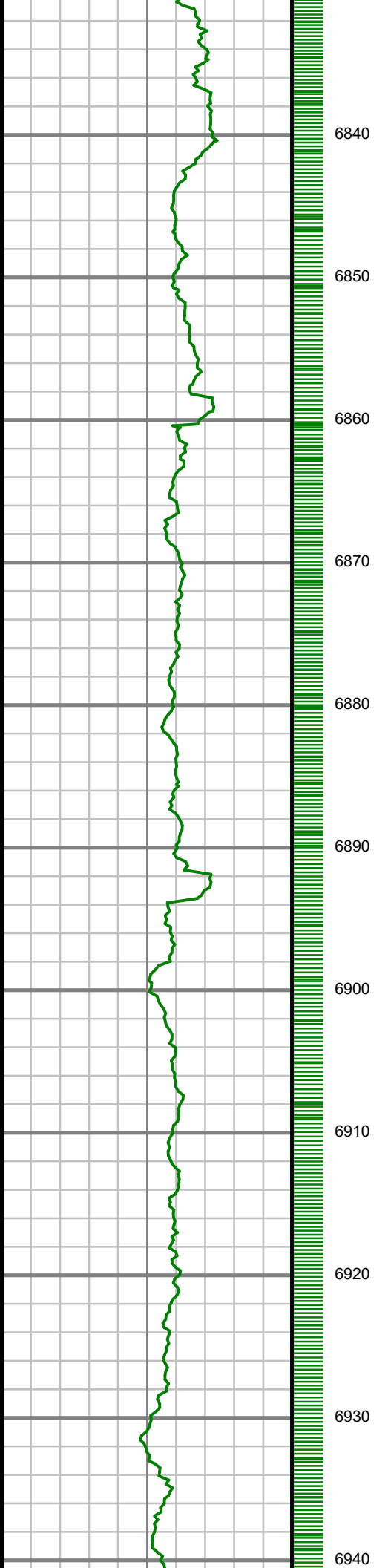
S: 70 MD: 6570.00 ft
Inc: 0.71 deg Az:
204.00 deg TVD:
6433.84 ft



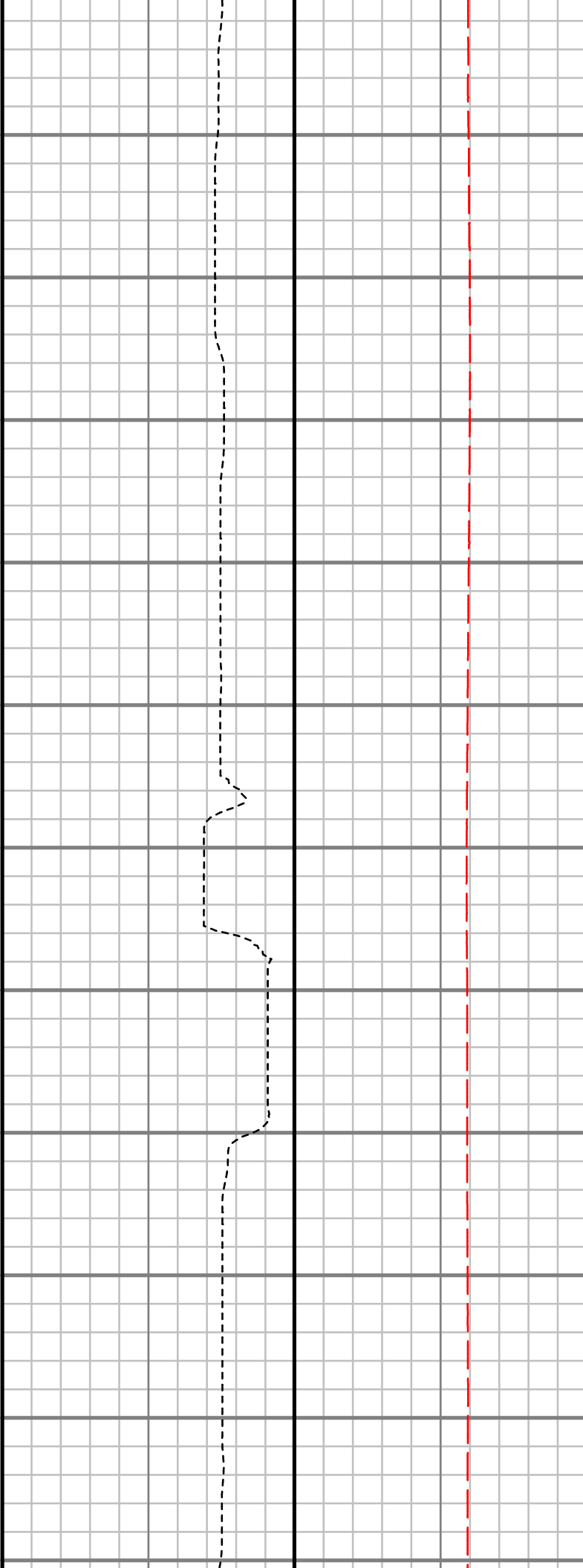
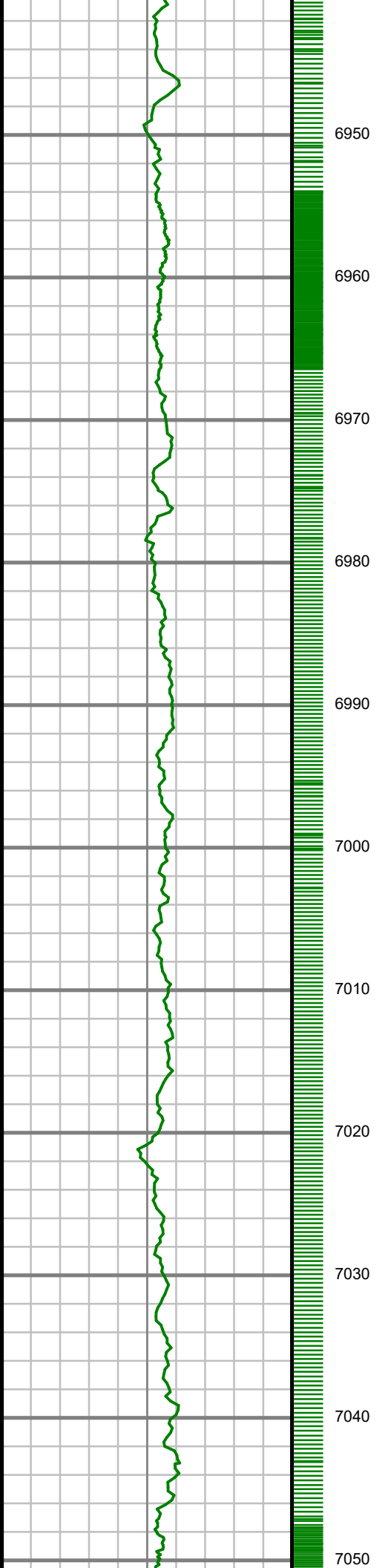
S: 71 MD: 6664.00 ft
Inc: 0.55 deg Az:
188.14 deg TVD:
6527.83 ft



S: 72 MD: 6758.00 ft
Inc: 0.49 deg Az:
207.15 deg TVD:
6621.83 ft

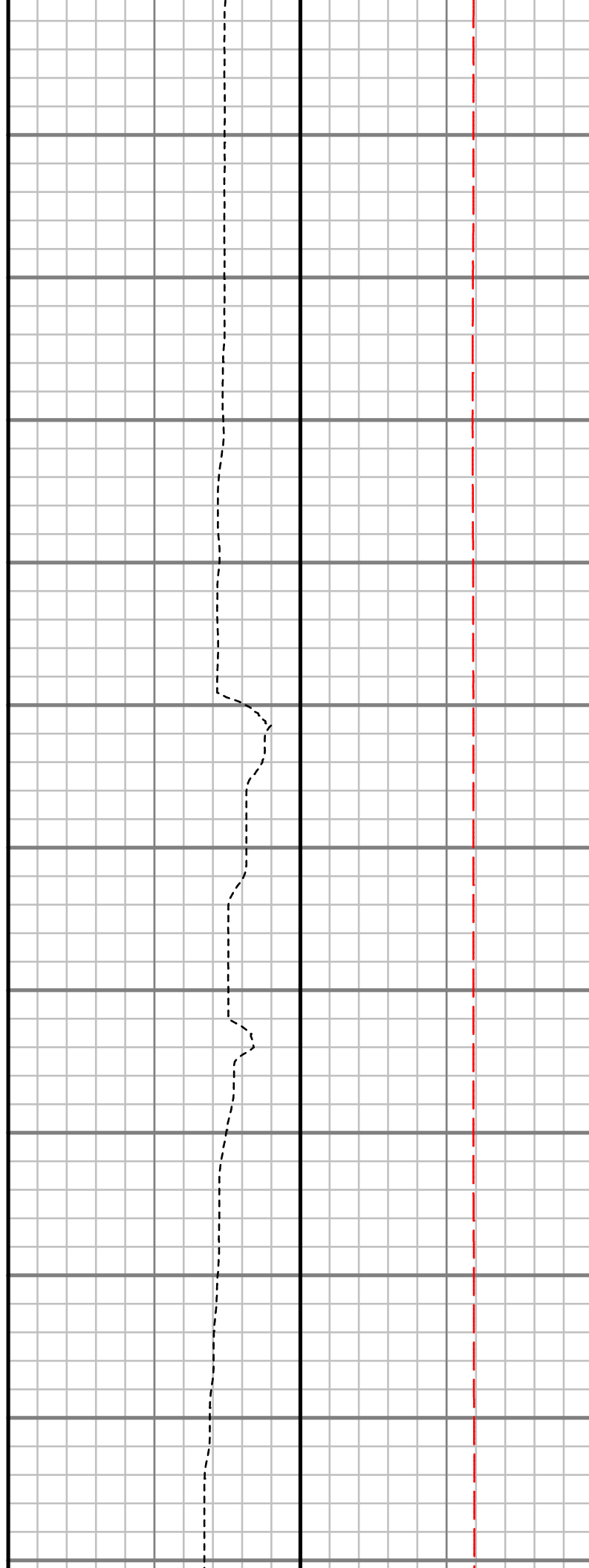
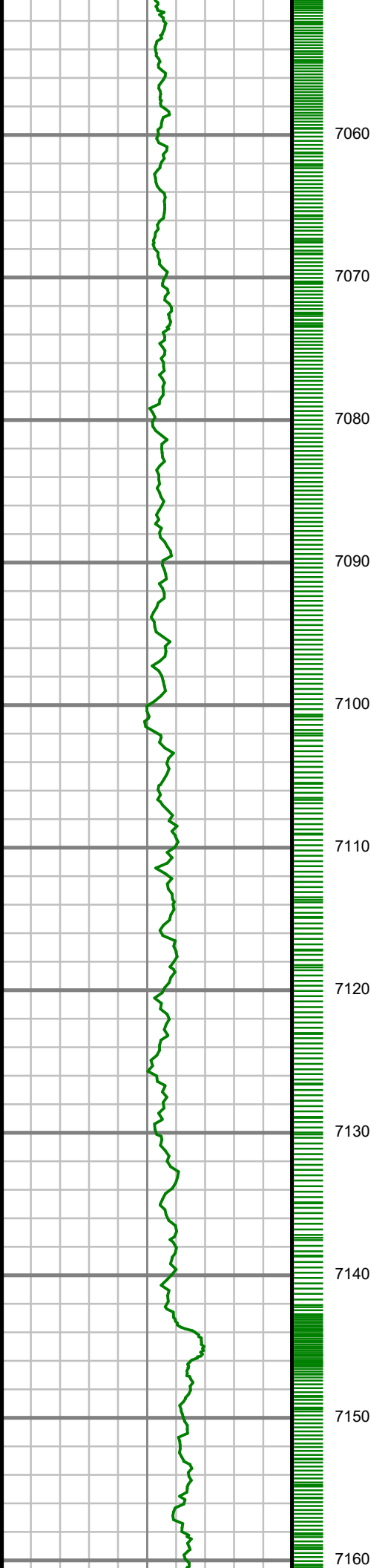


S: 73 MD: 6852.00 ft
Inc: 0.46 deg Az:
222.09 deg TVD:
6715.83 ft

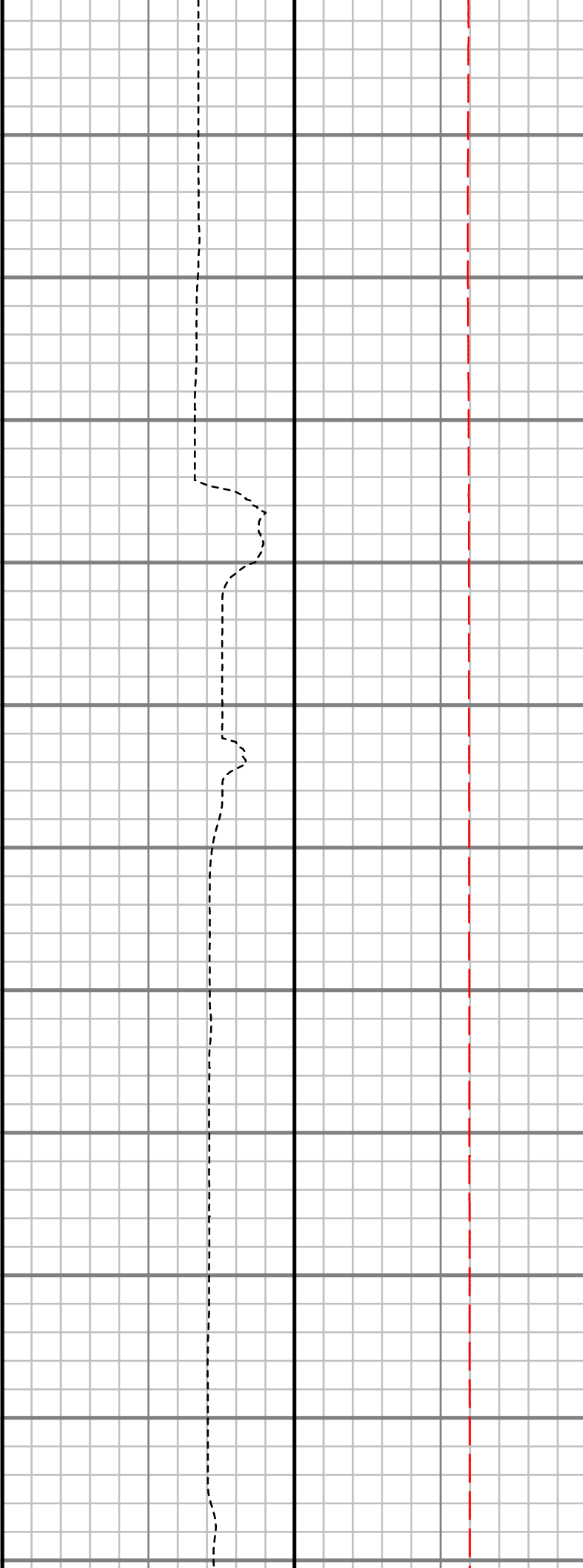
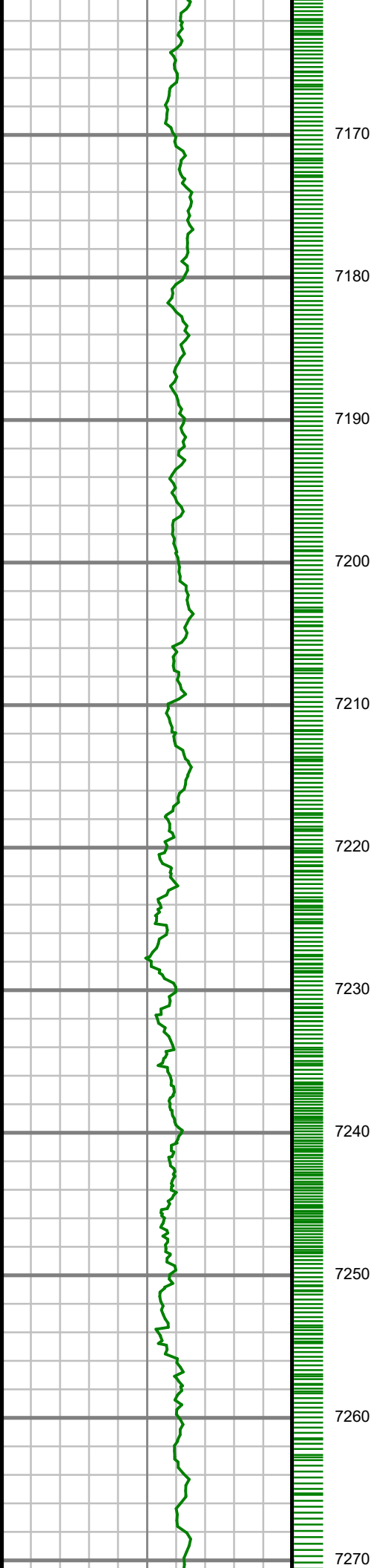


S: 74 MD: 6946.00 ft
Inc: 10.76 deg Az:
12.67 deg TVD:
6809.29 ft

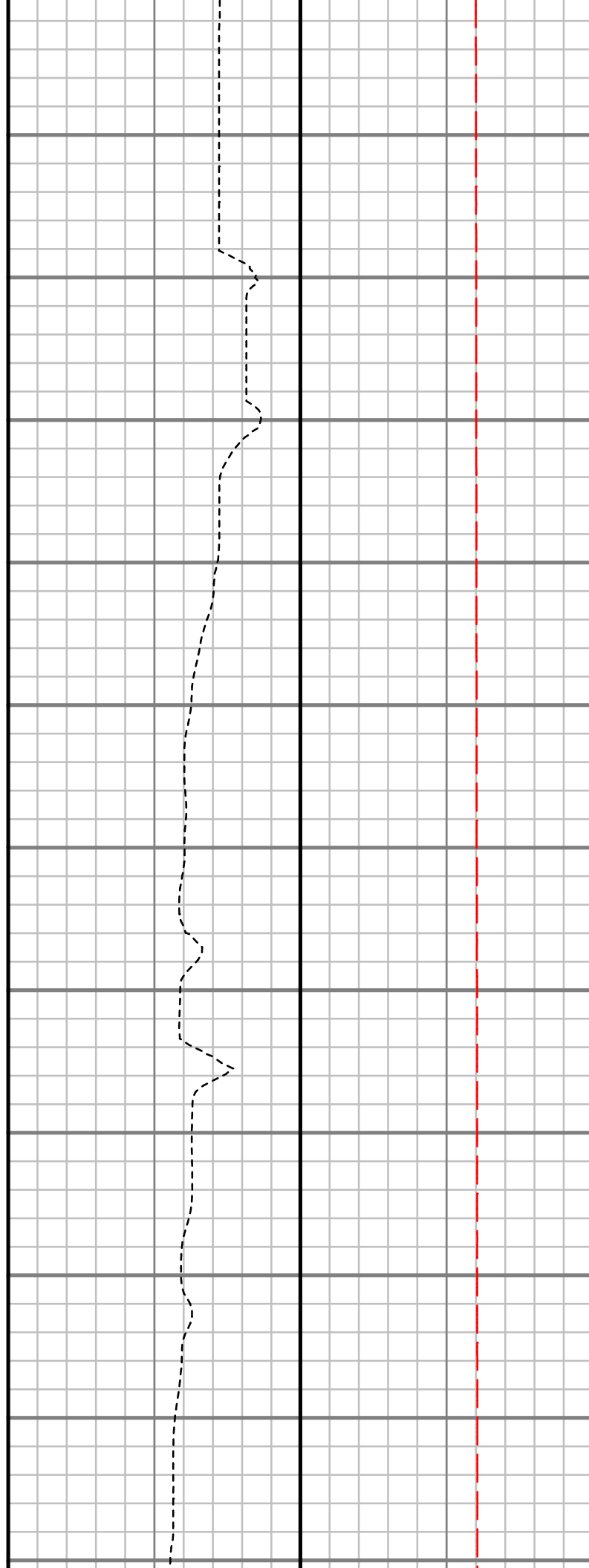
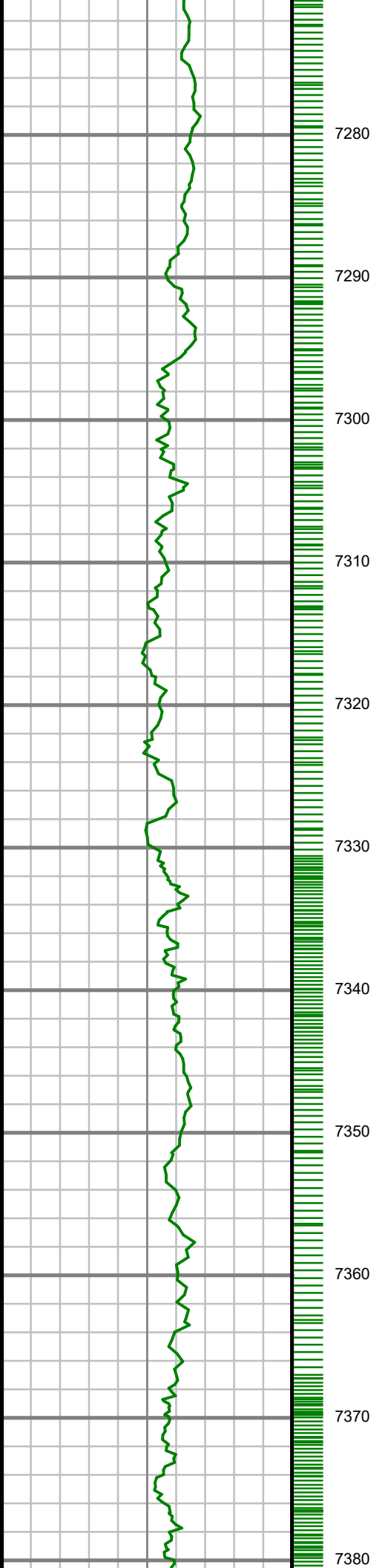
S: 75 MD: 7040.00 ft
Inc: 19.22 deg Az: 6.91
deg TVD: 6900.02 ft



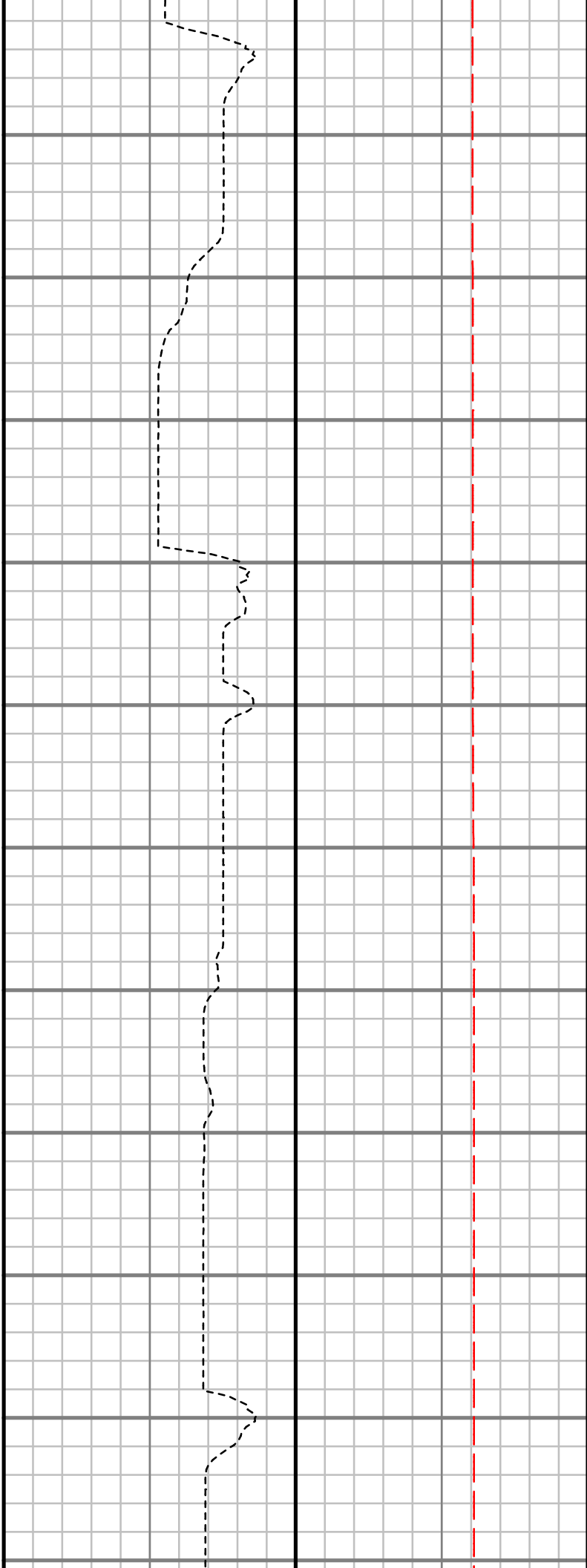
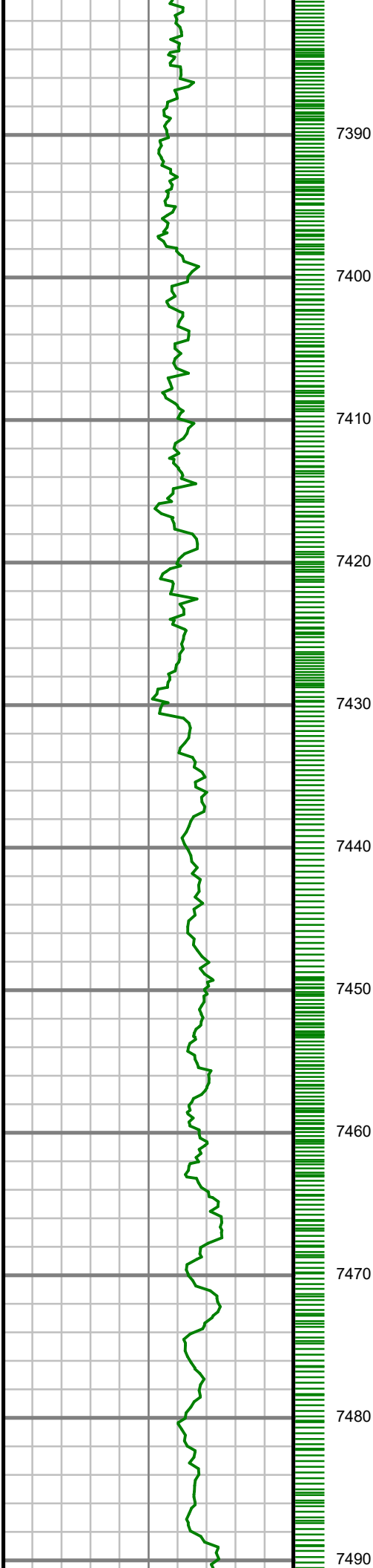
S: 76 MD: 7134.00 ft
Inc: 26.70 deg Az: 7.19
deg TVD: 6986.51 ft



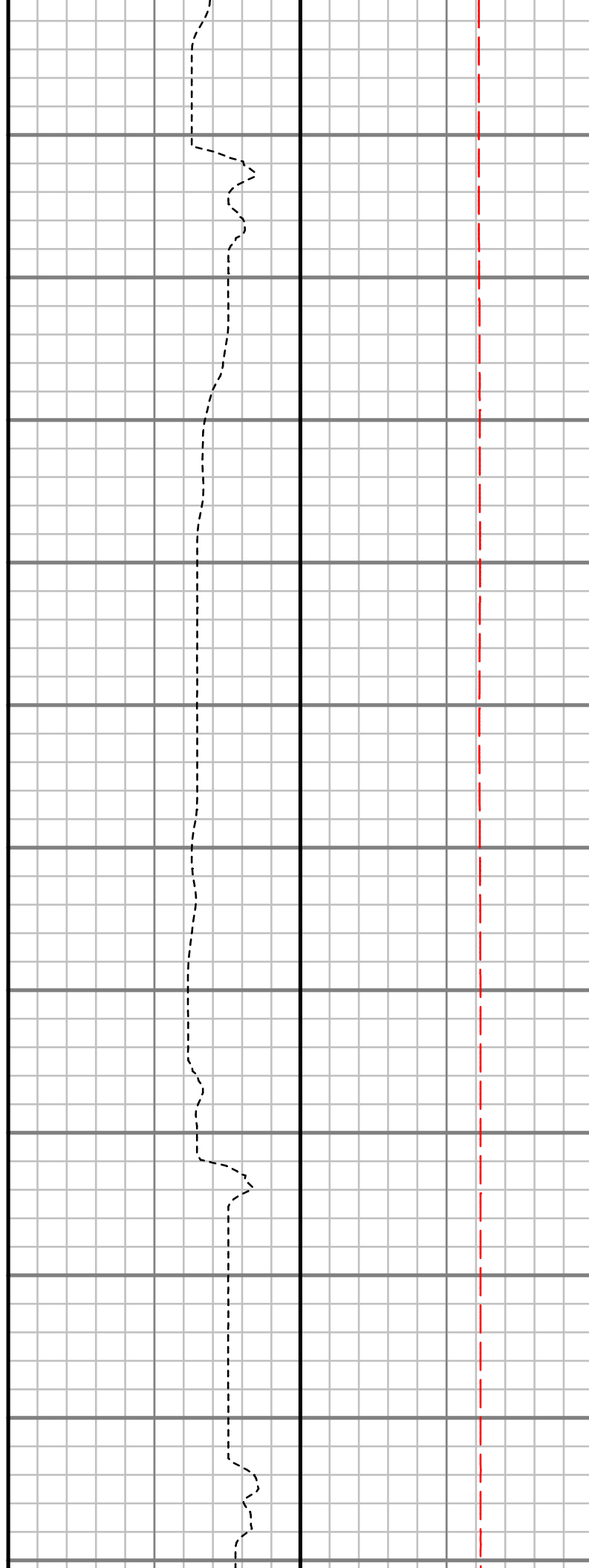
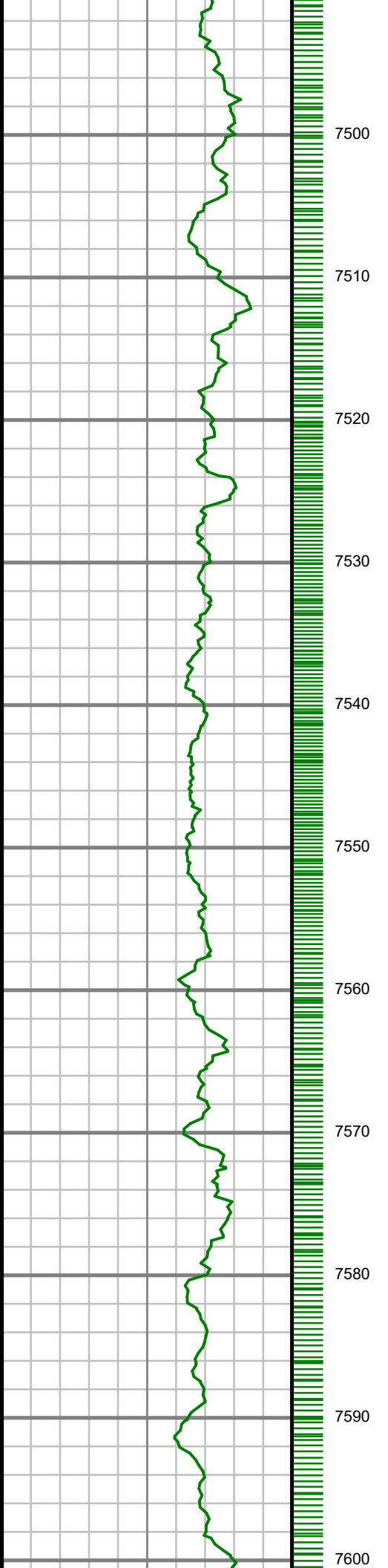
S: 77 MD: 7229.00 ft
Inc: 34.14 deg Az: 6.86
deg TVD: 7068.37 ft



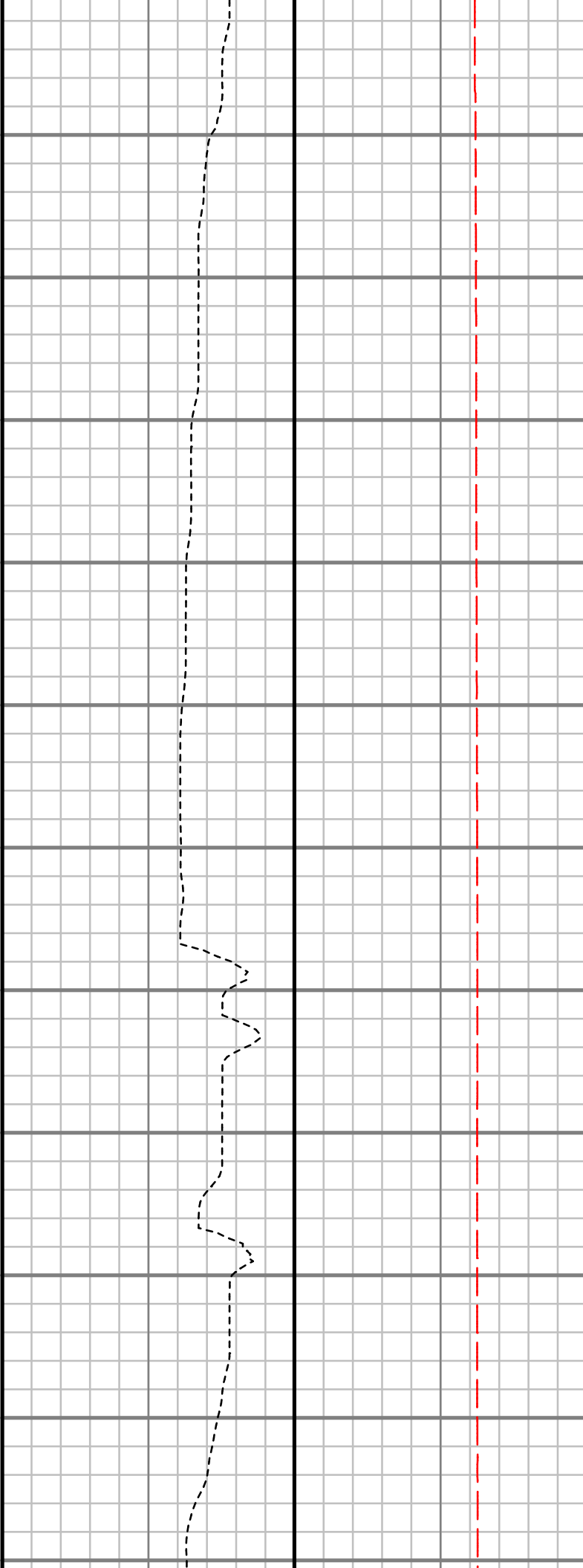
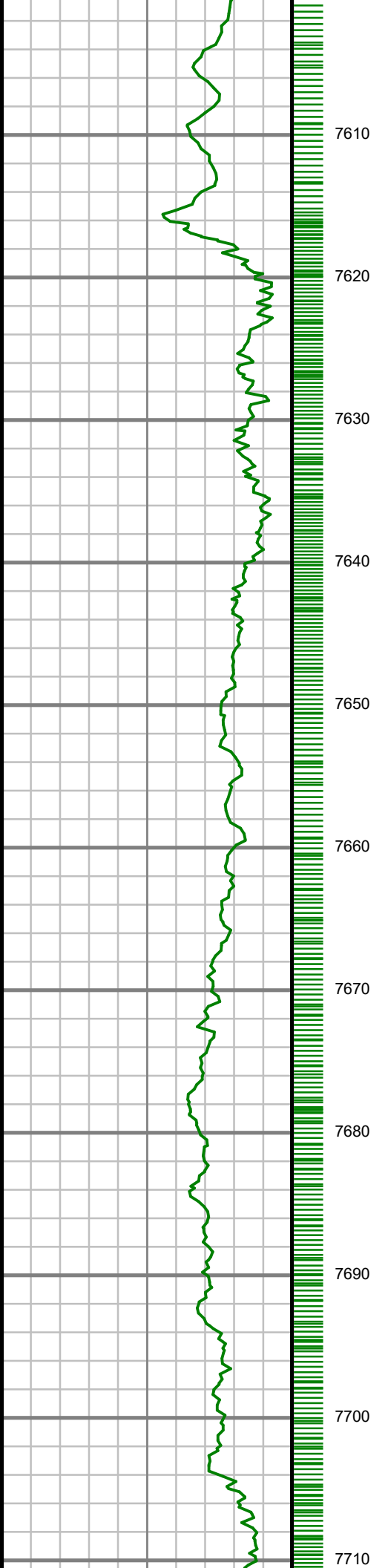
S: 78 MD: 7323.00 ft
Inc: 44.64 deg Az: 2.88
deg TVD: 7140.93 ft



S: 79 MD: 7418.00 ft
Inc: 51.80 deg Az: 1.58
deg TVD: 7204.19 ft

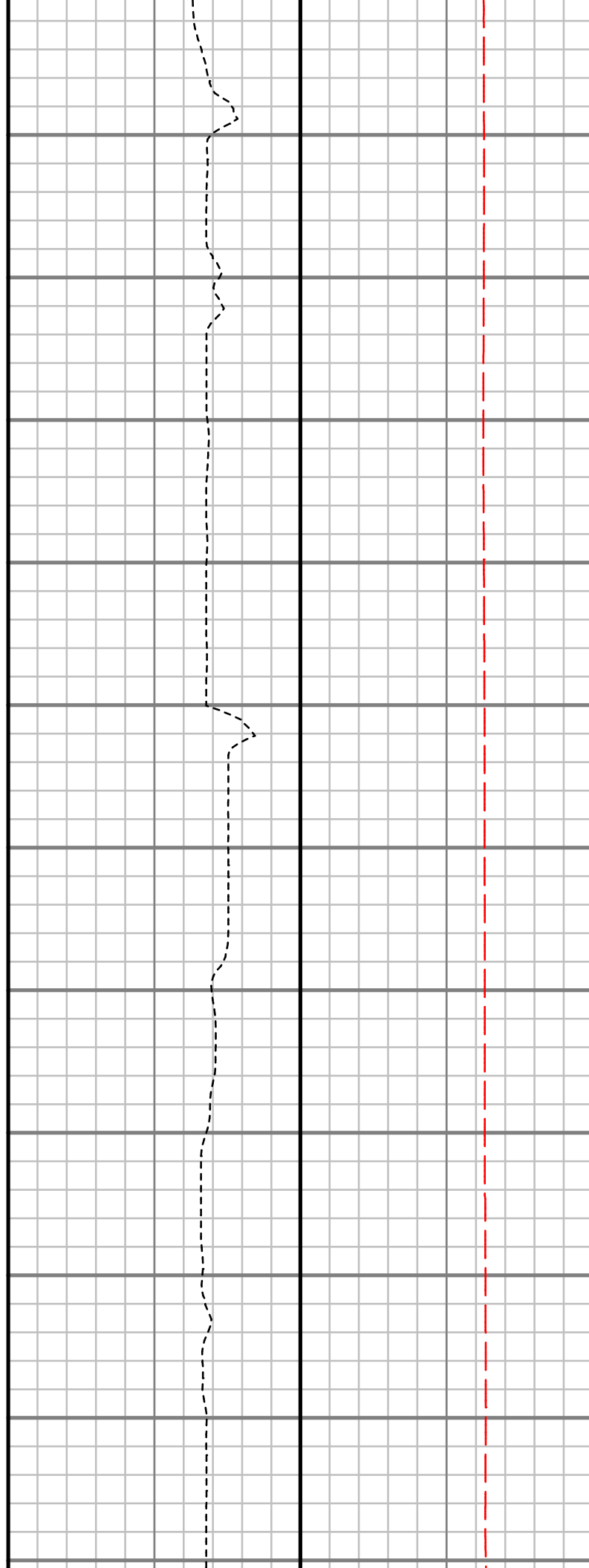
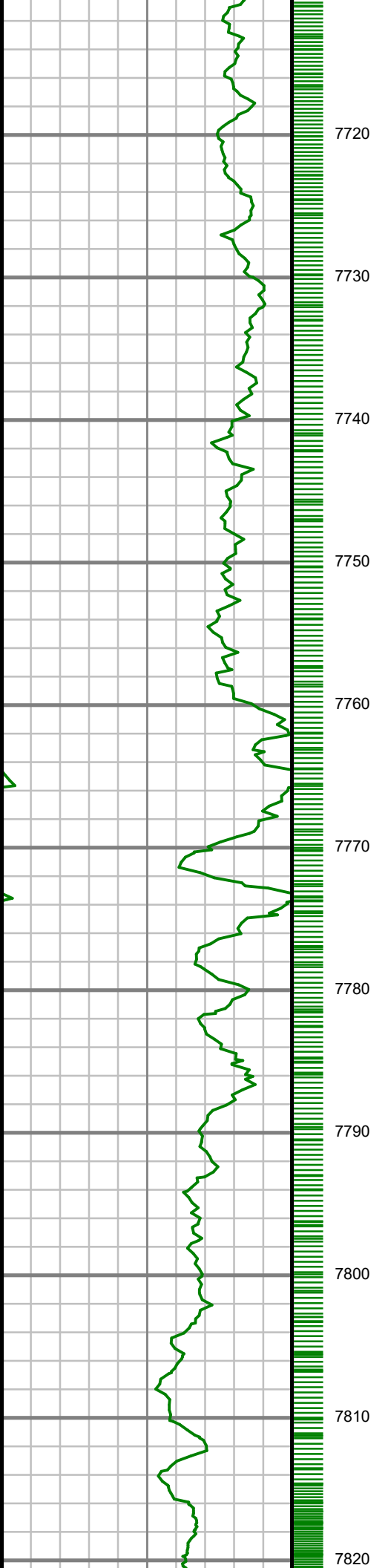


S: 80 MD: 7512.00 ft
Inc: 59.91 deg Az:
358.80 deg TVD:
7256.91 ft

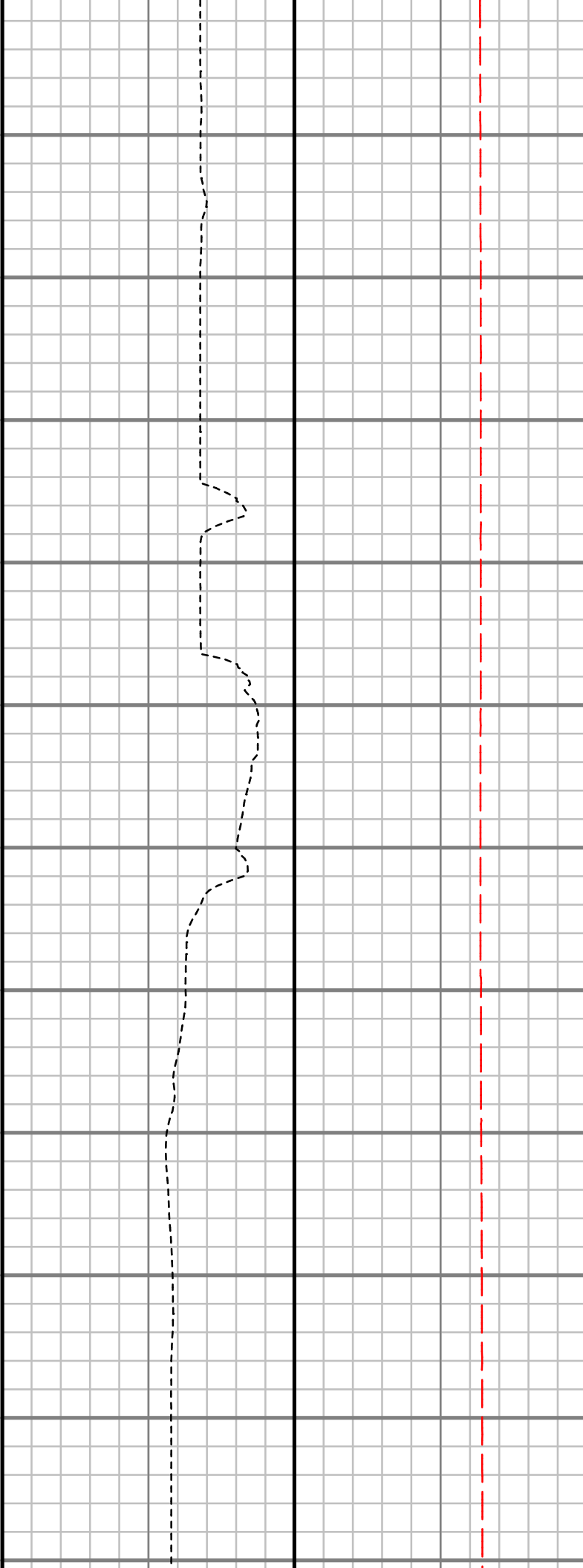
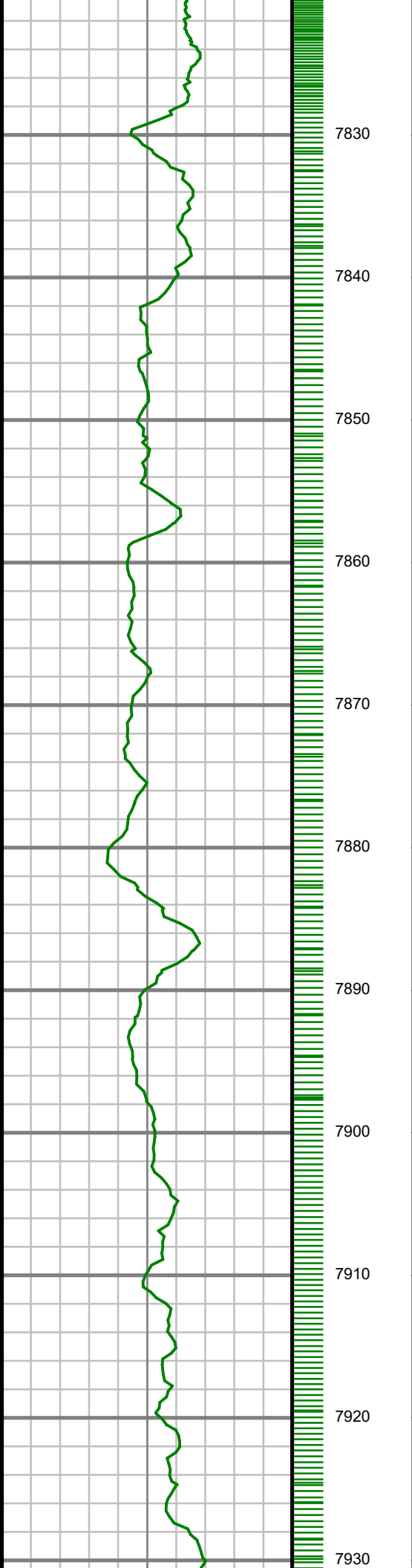


S: 81 MD: 7606.00 ft
Inc: 69.18 deg Az: 0.32
deg TVD: 7297.27 ft

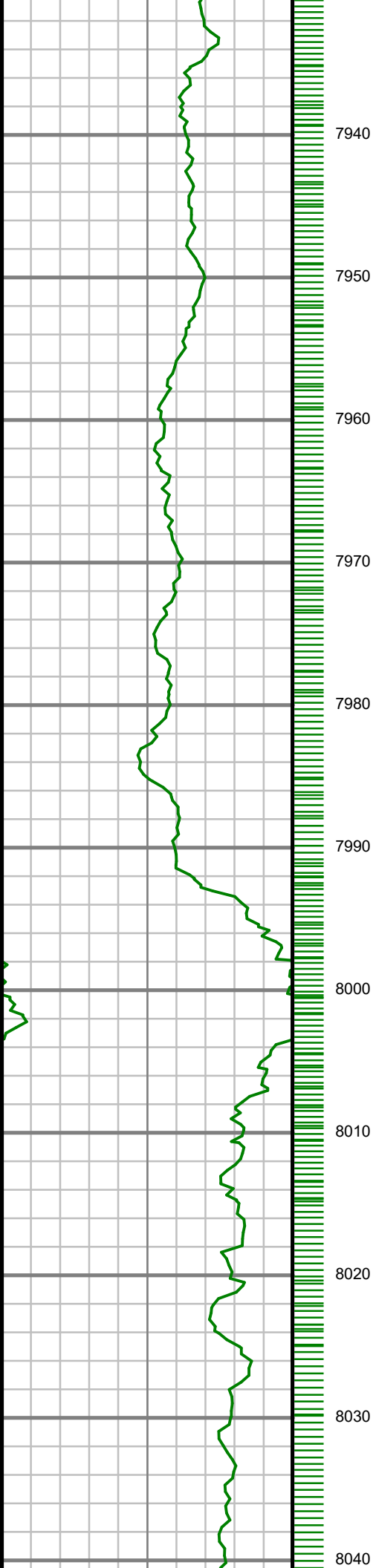
S: 82 MD: 7702.00 ft
Inc: 79.98 deg Az: 1.54
deg TVD: 7322.76 ft



S: 83 MD: 7795.00 ft
Inc: 87.79 deg Az: 1.40
deg TVD: 7332.66 ft



S: 84 MD: 7889.00 ft
Inc: 88.86 deg Az: 0.38
deg TVD: 7335.41 ft



7940

7950

7960

7970

7980

7990

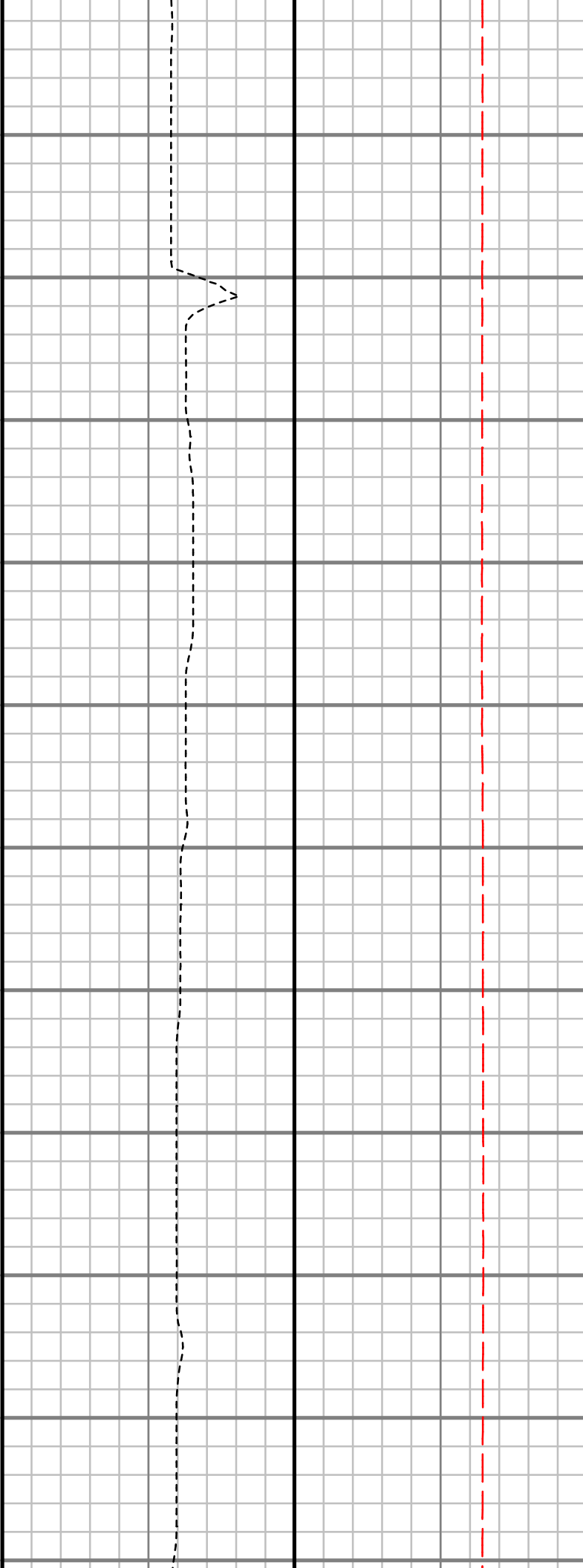
8000

8010

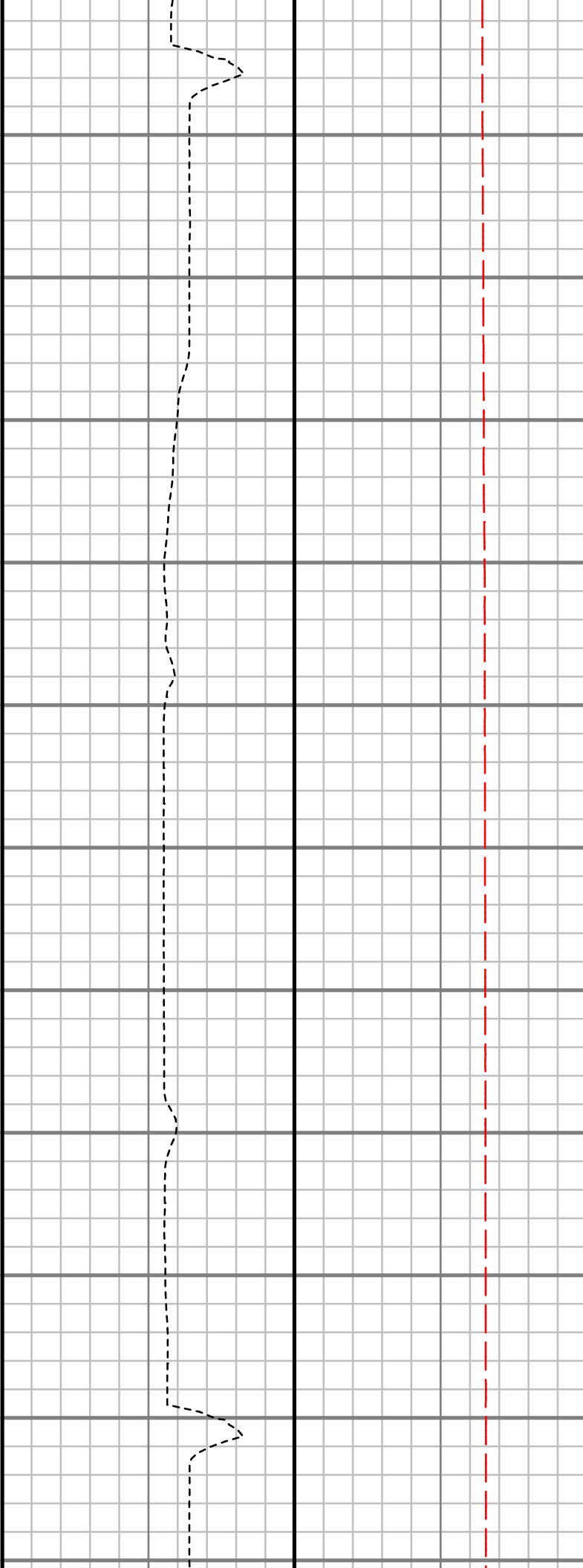
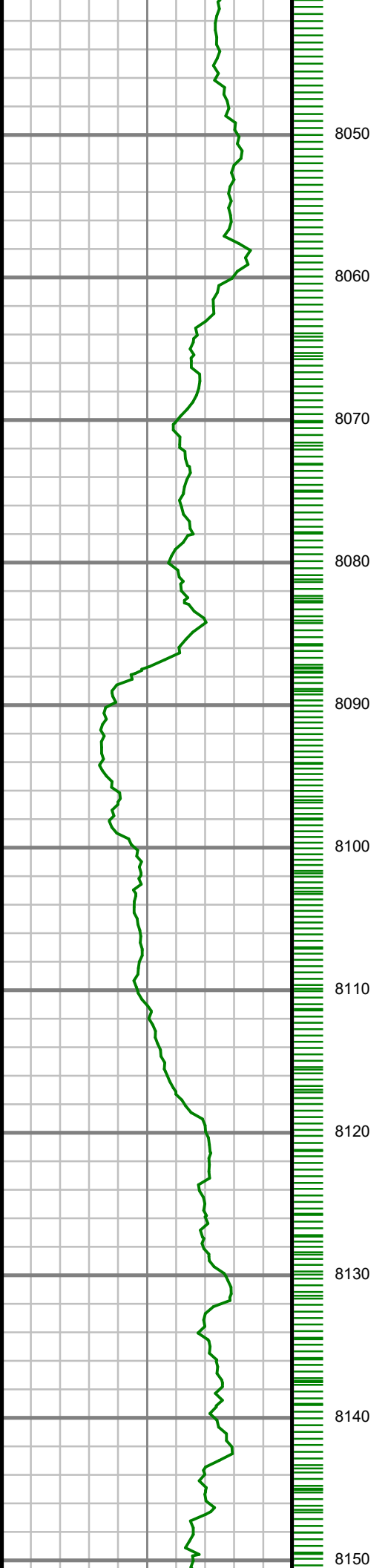
8020

8030

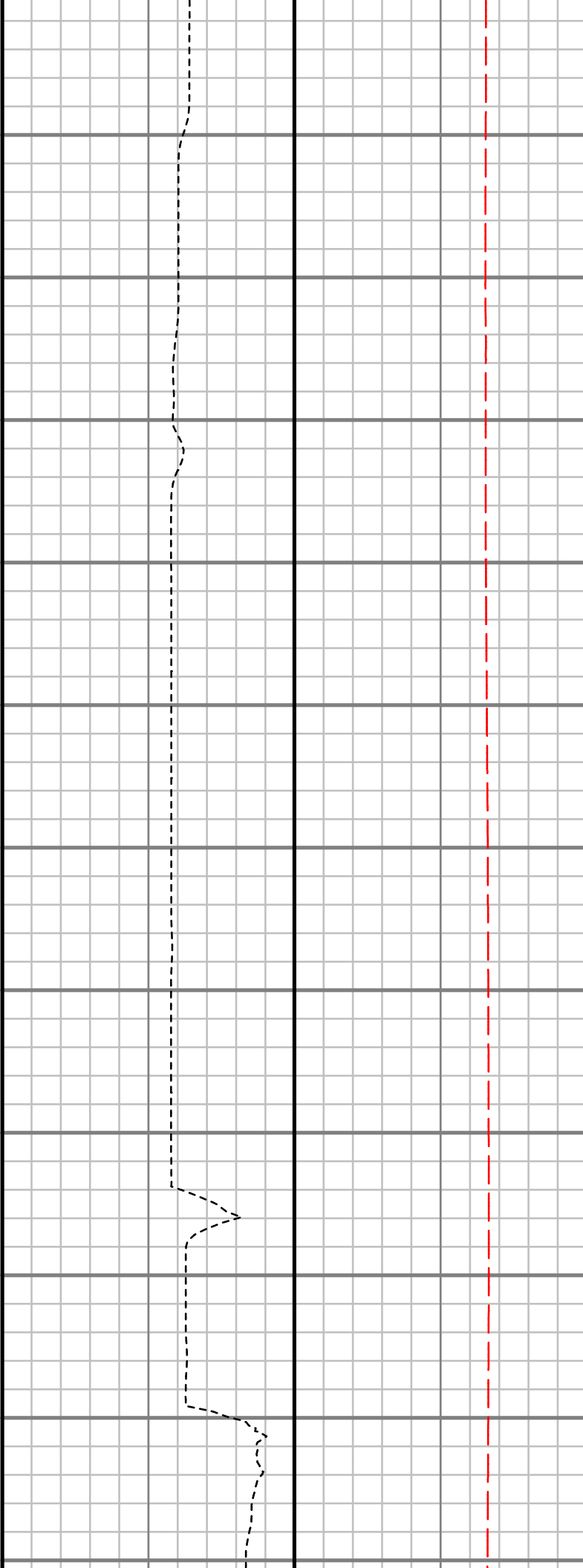
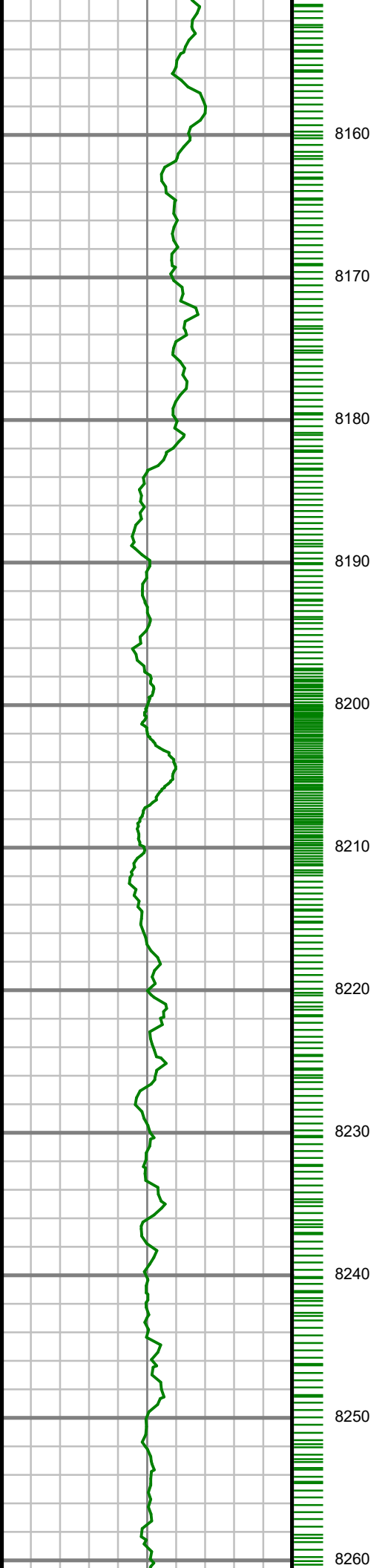
8040



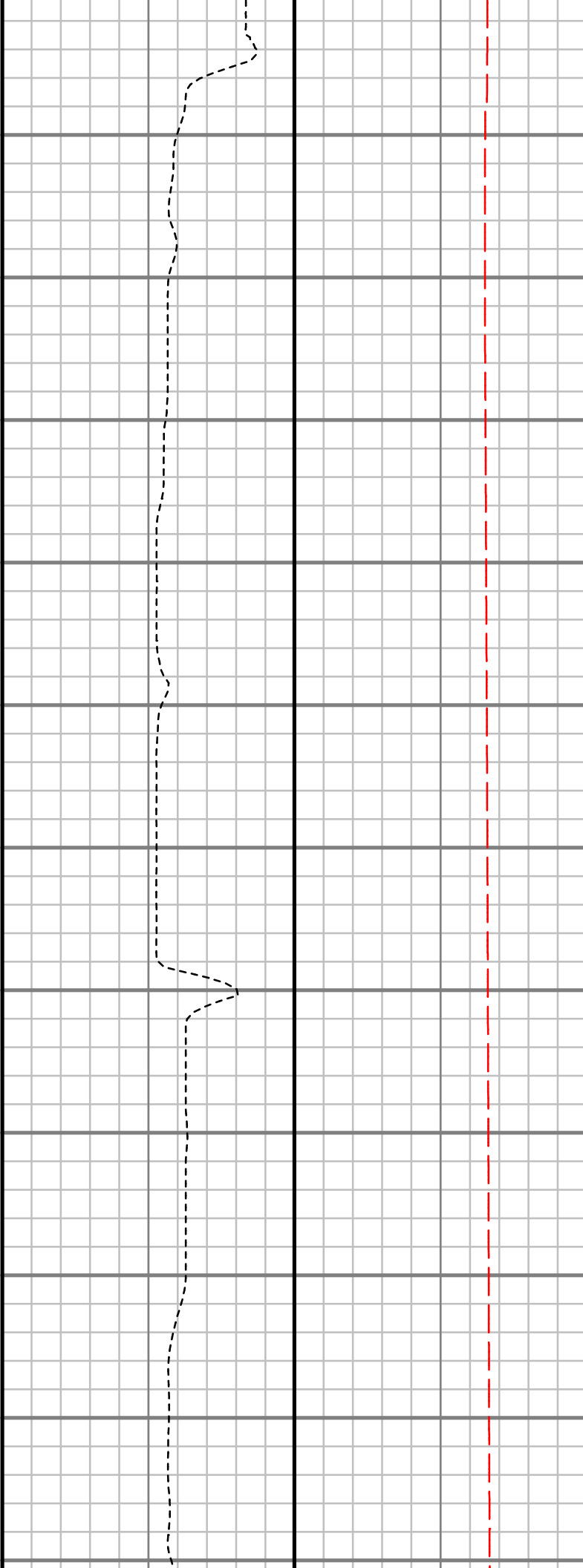
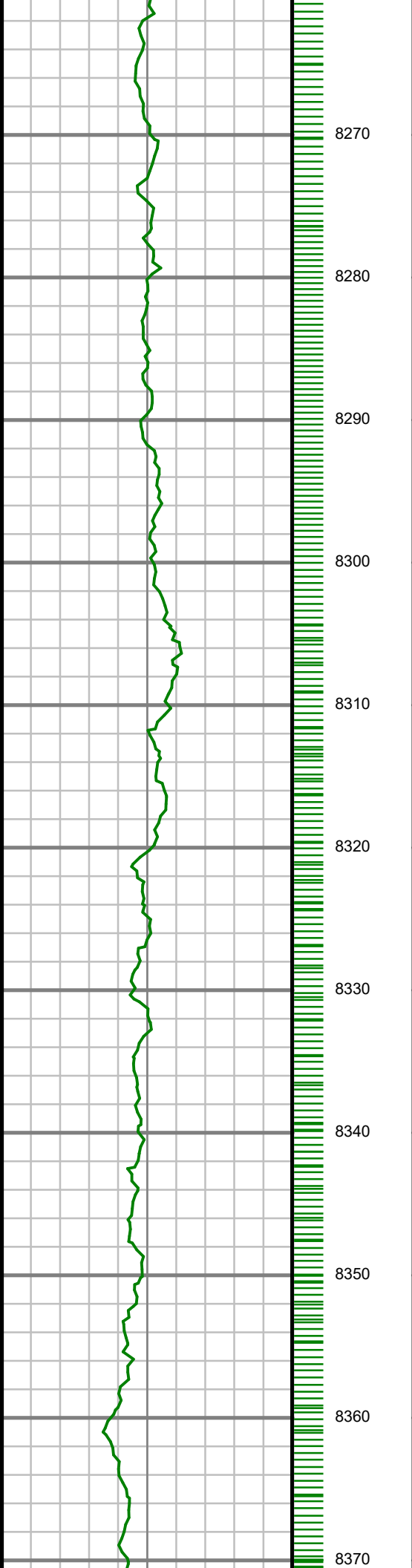
S: 85 MD: 7984.00 ft
Inc: 89.46 deg Az:
359.69 deg TVD:
7336.80 ft



S: 86 MD: 8078.00 ft
Inc: 89.46 deg Az:
358.85 deg TVD:
7337.68 ft

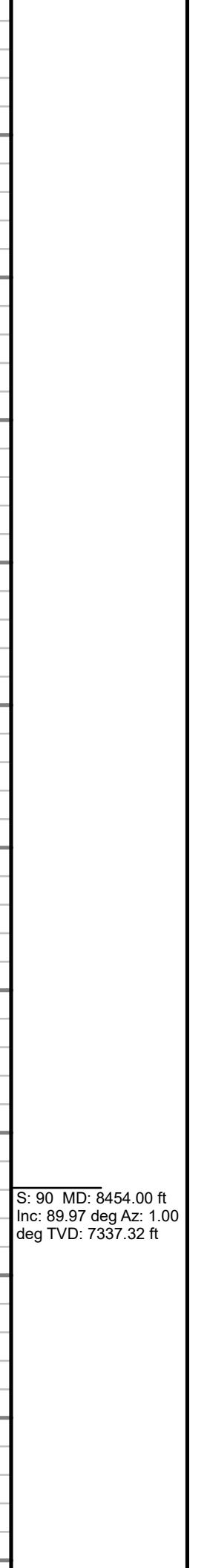
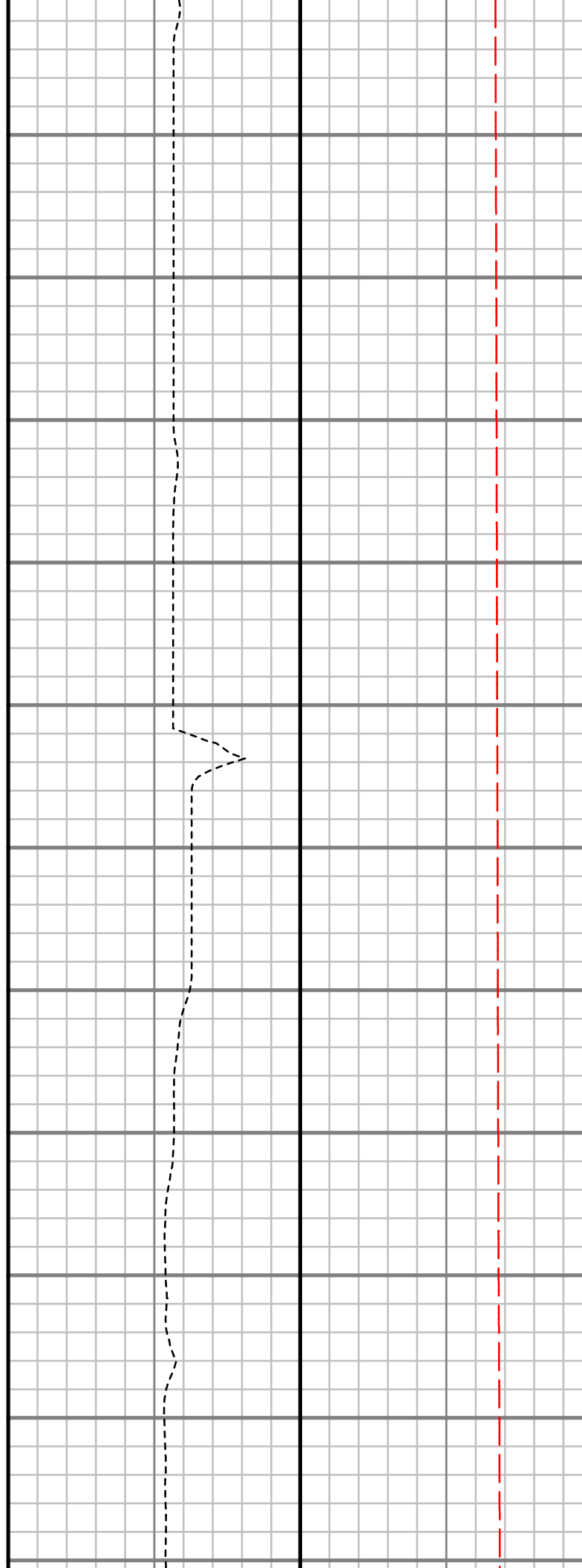
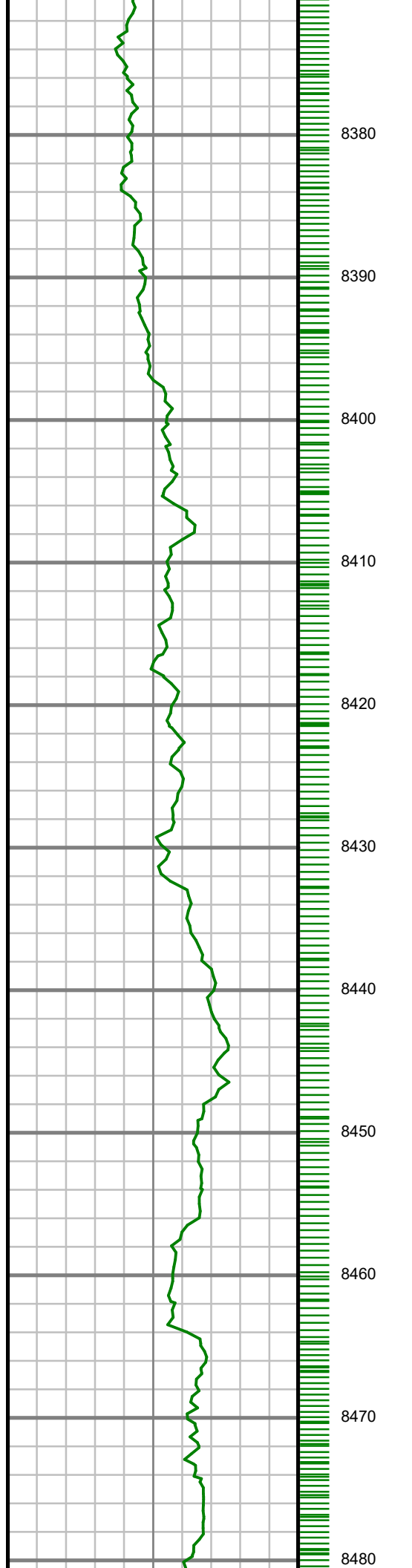


S: 87 MD: 8172.00 ft
Inc: 90.44 deg Az:
358.38 deg TVD:
7337.77 ft

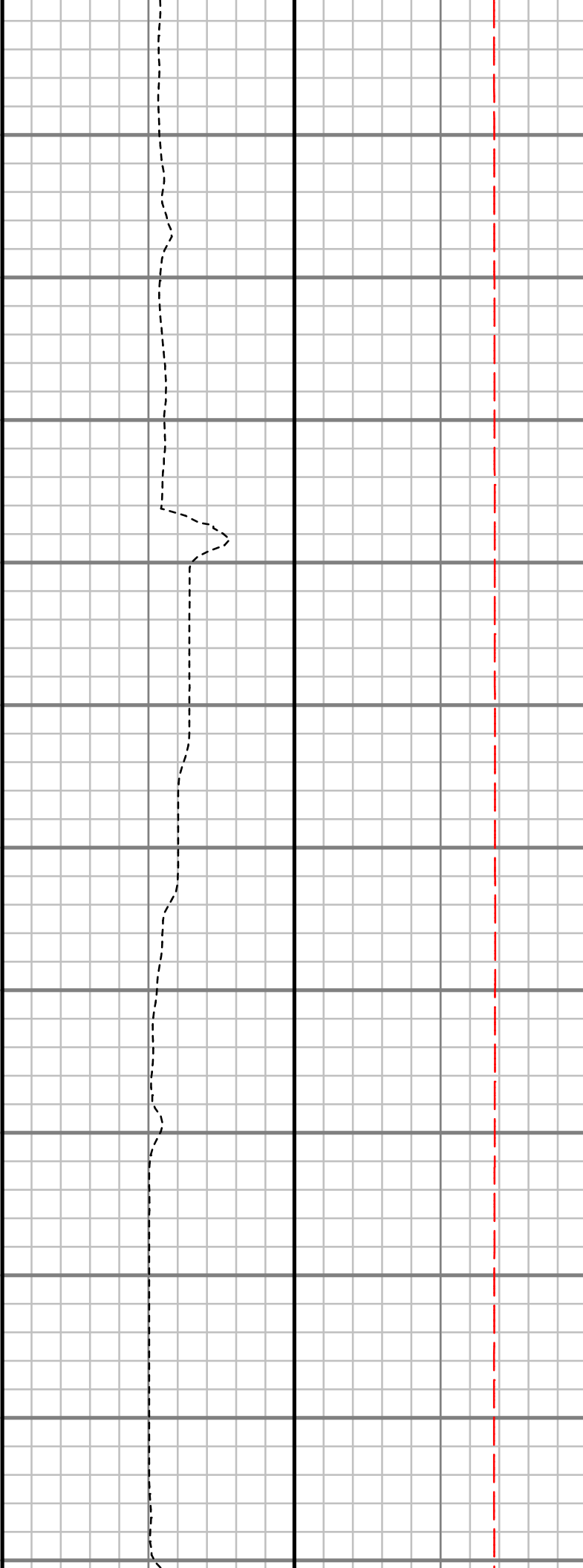
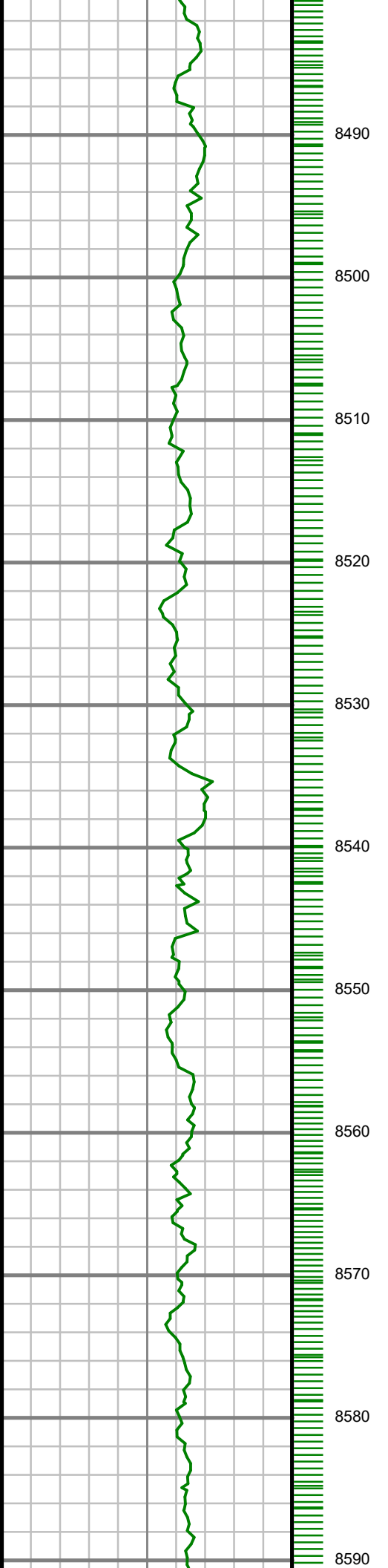


S: 88 MD: 8266.00 ft
Inc: 89.80 deg Az: 0.19
deg TVD: 7337.57 ft

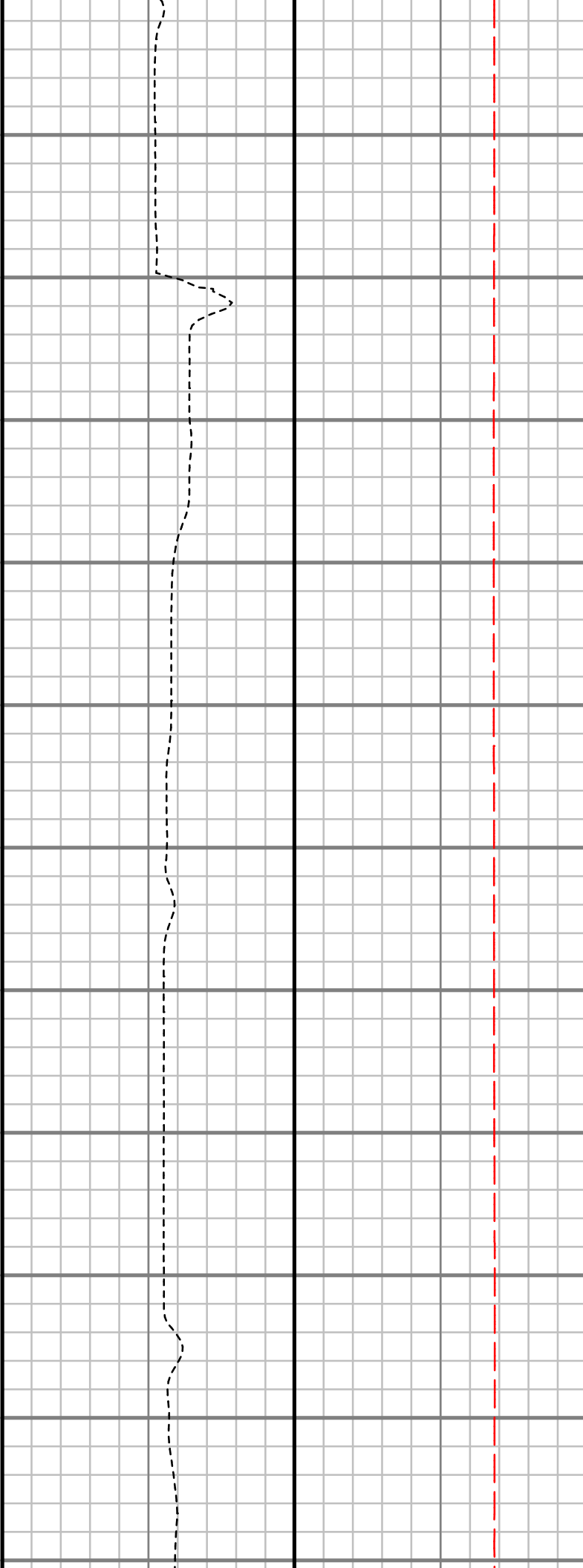
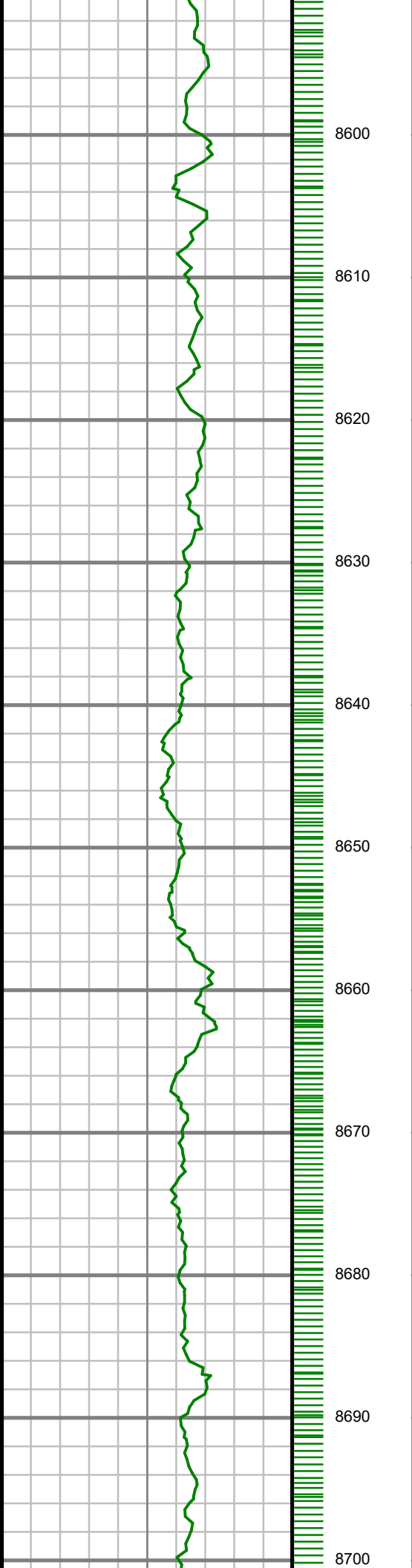
S: 89 MD: 8360.00 ft
Inc: 90.27 deg Az: 1.04
deg TVD: 7337.51 ft



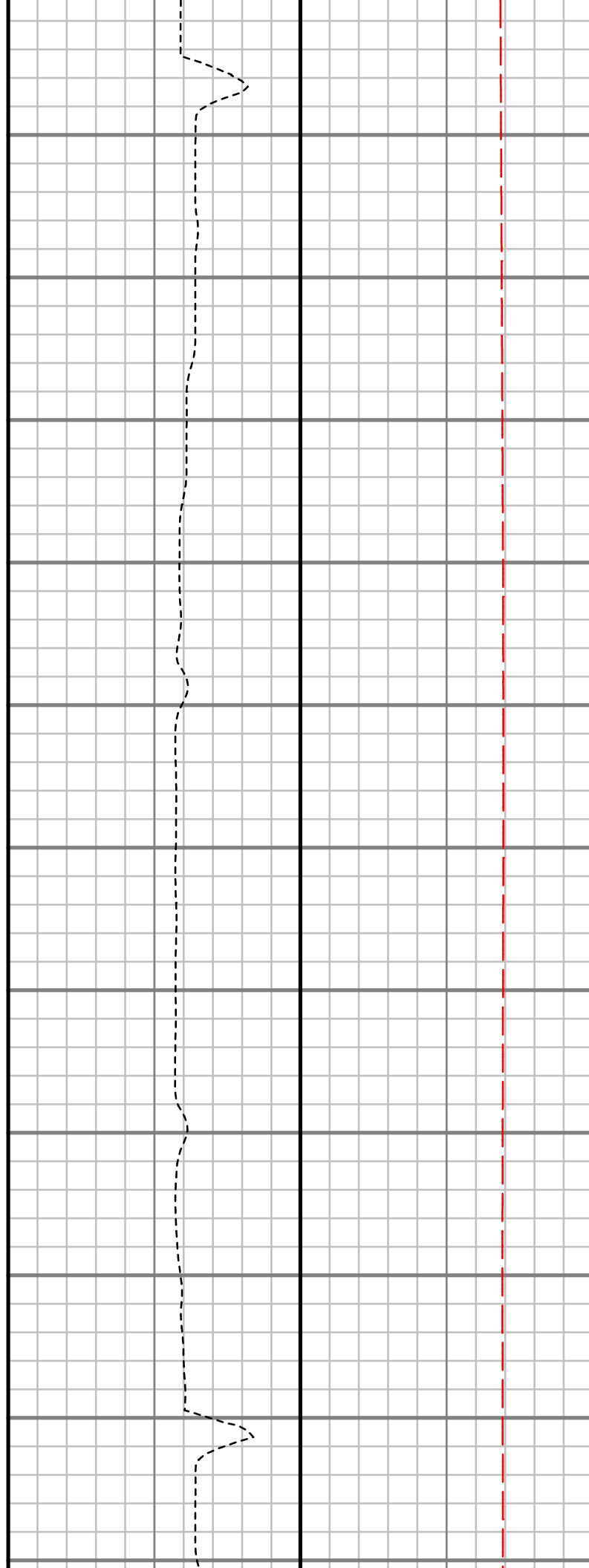
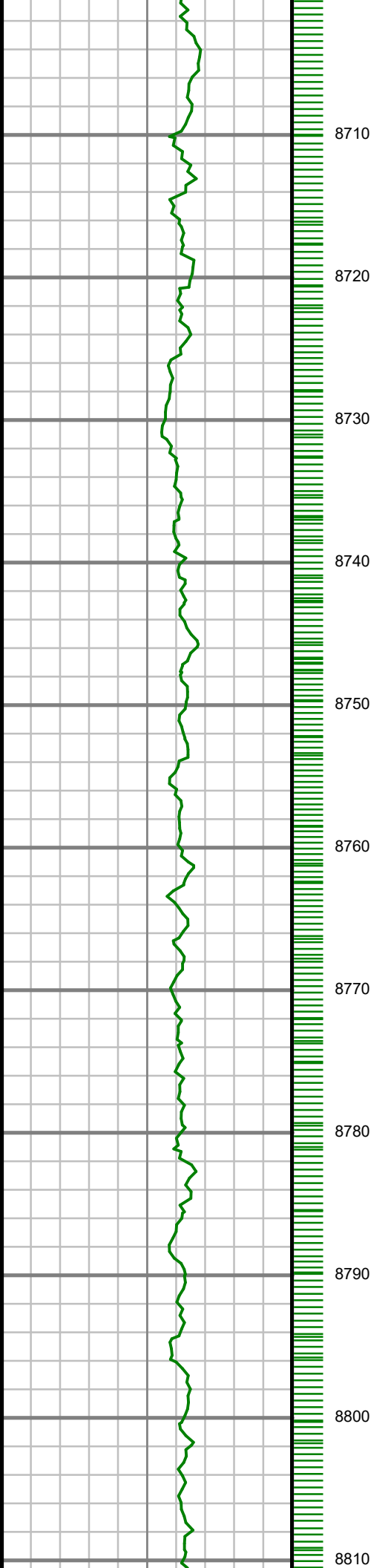
S: 90 MD: 8454.00 ft
Inc: 89.97 deg Az: 1.00
deg TVD: 7337.32 ft



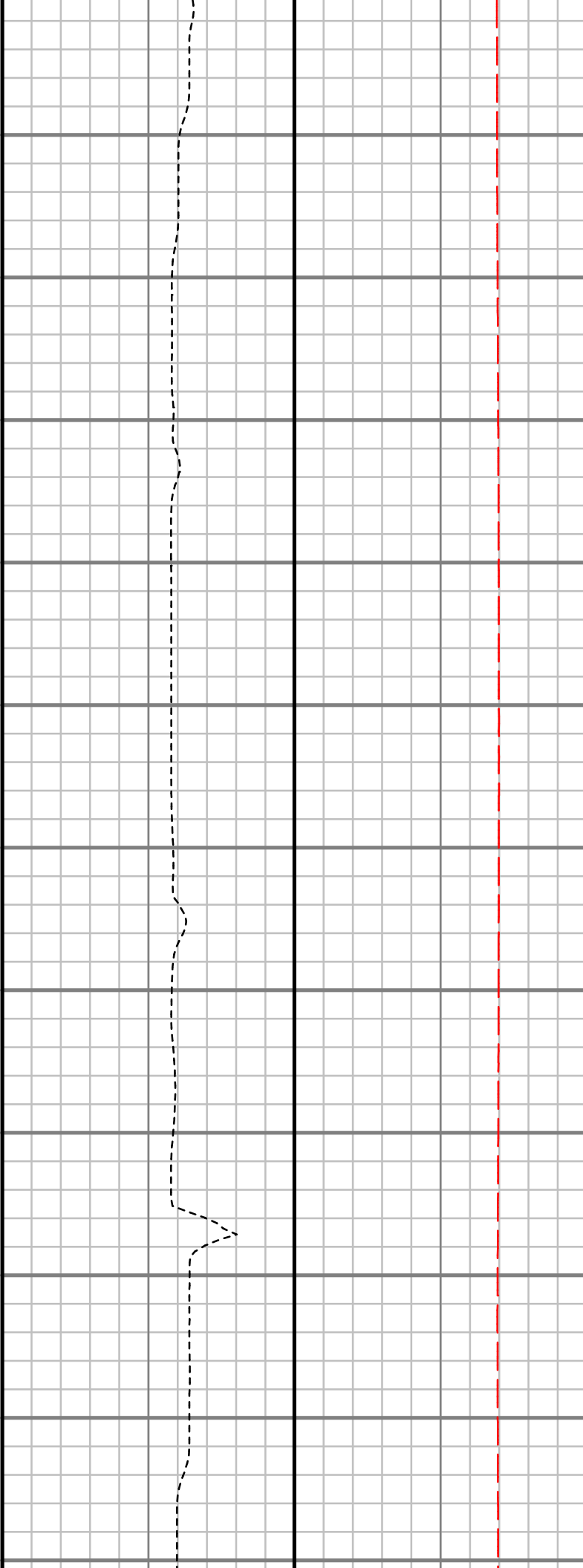
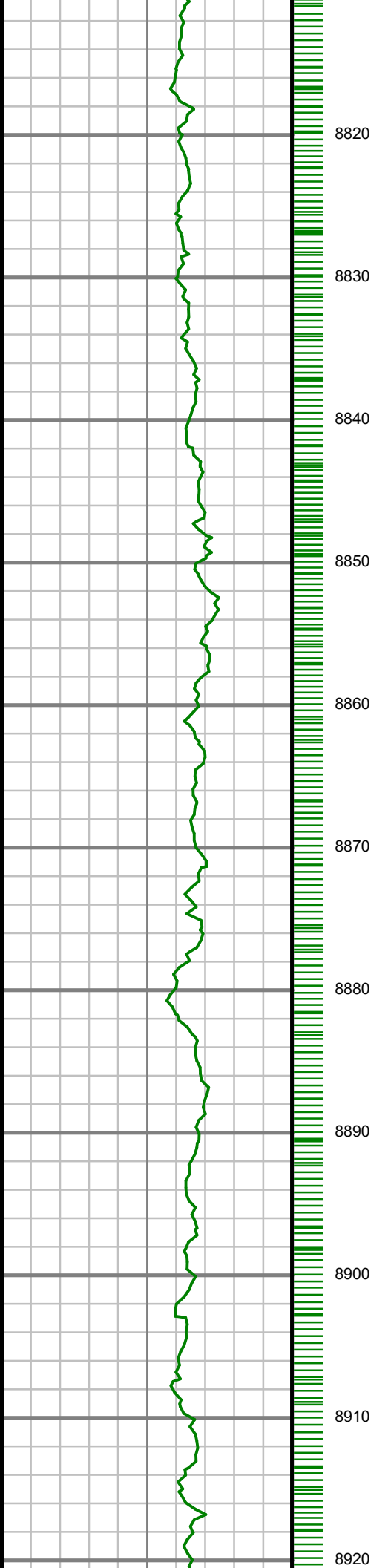
S: 91 MD: 8548.00 ft
Inc: 89.90 deg Az: 0.59
deg TVD: 7337.42 ft



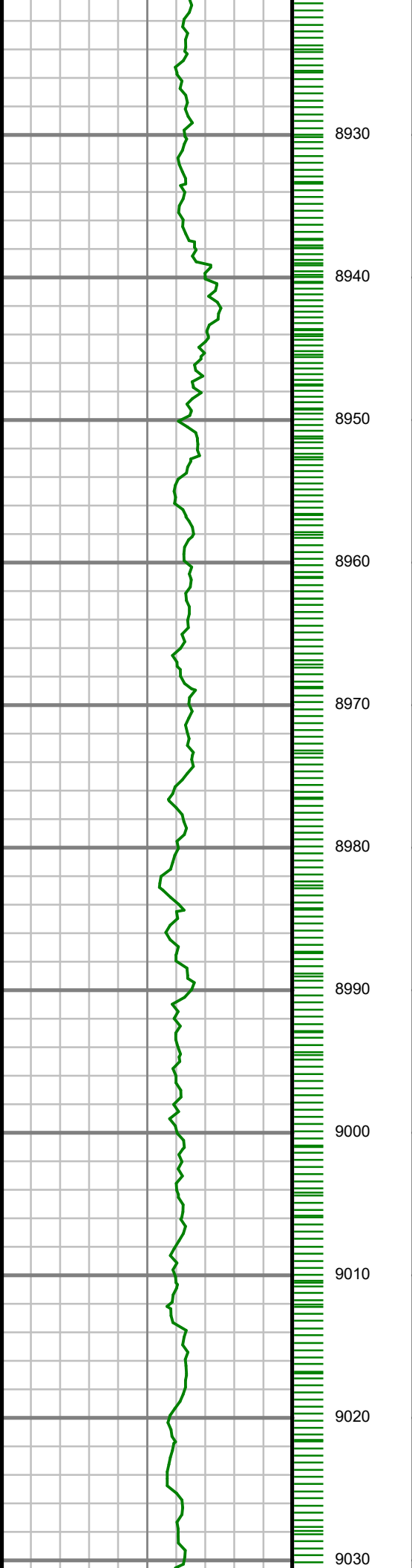
S: 92 MD: 8642.00 ft
Inc: 90.67 deg Az: 0.92
deg TVD: 7336.95 ft



S: 93 MD: 8737.00 ft
Inc: 89.87 deg Az: 1.08
deg TVD: 7336.51 ft

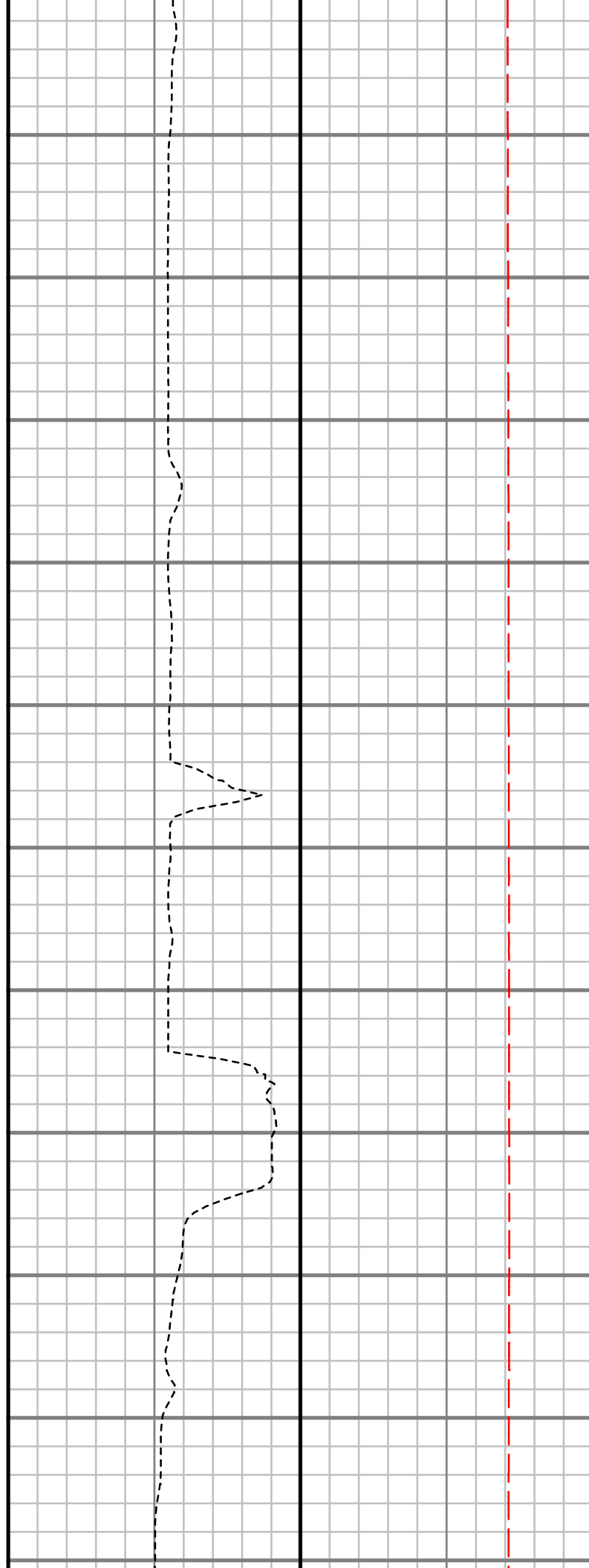
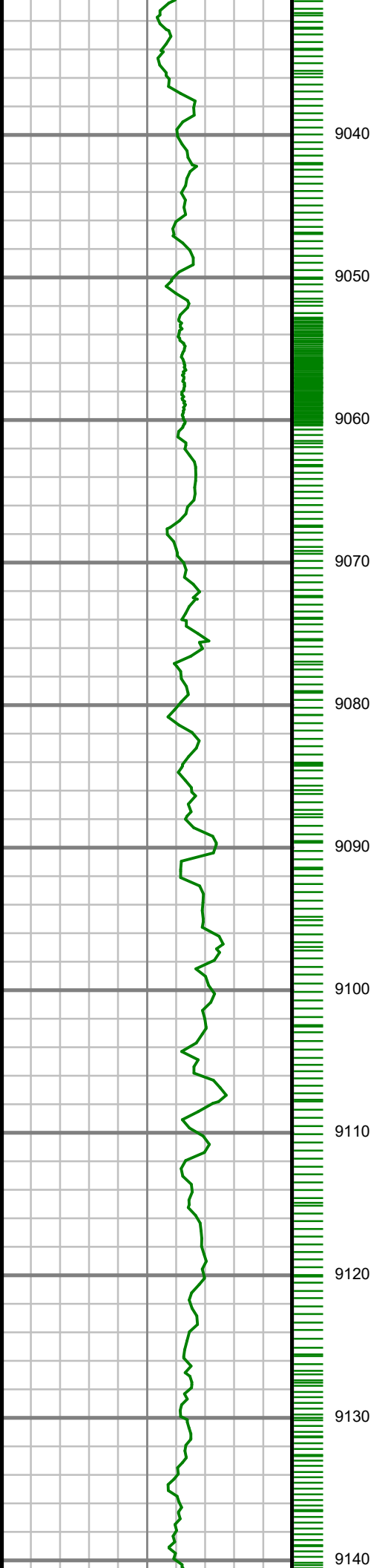


S: 94 MD: 8831.00 ft
Inc: 89.66 deg Az: 1.08
deg TVD: 7336.89 ft

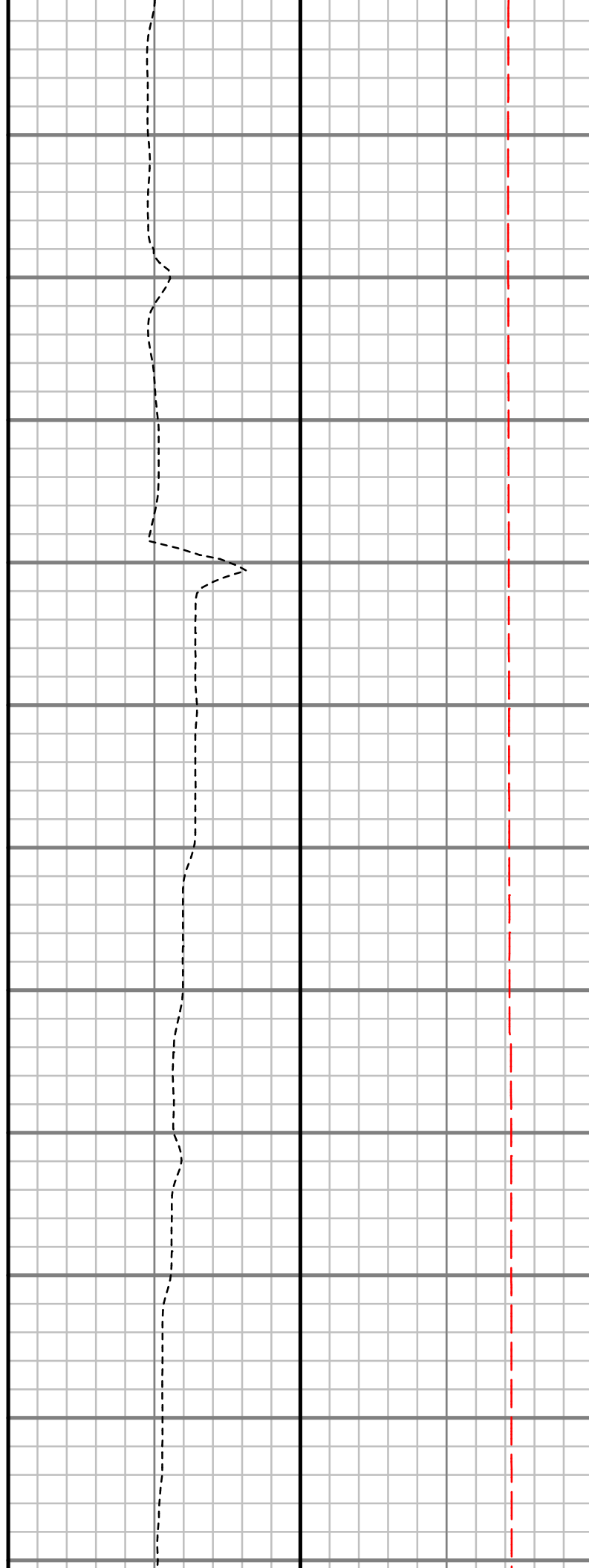
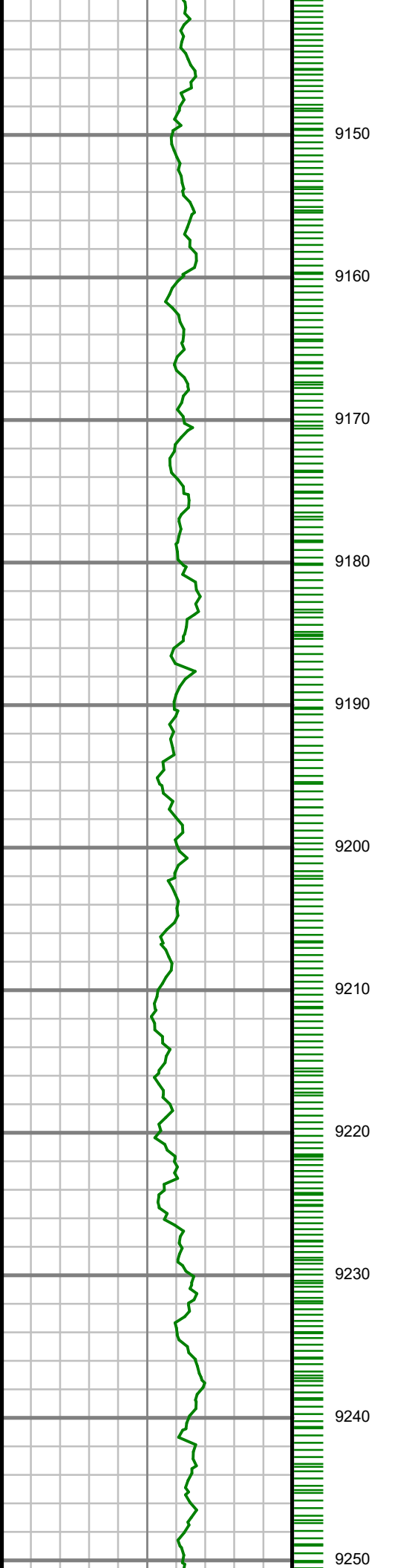


S: 95 MD: 8926.00 ft
Inc: 89.50 deg Az: 0.91
deg TVD: 7337.59 ft

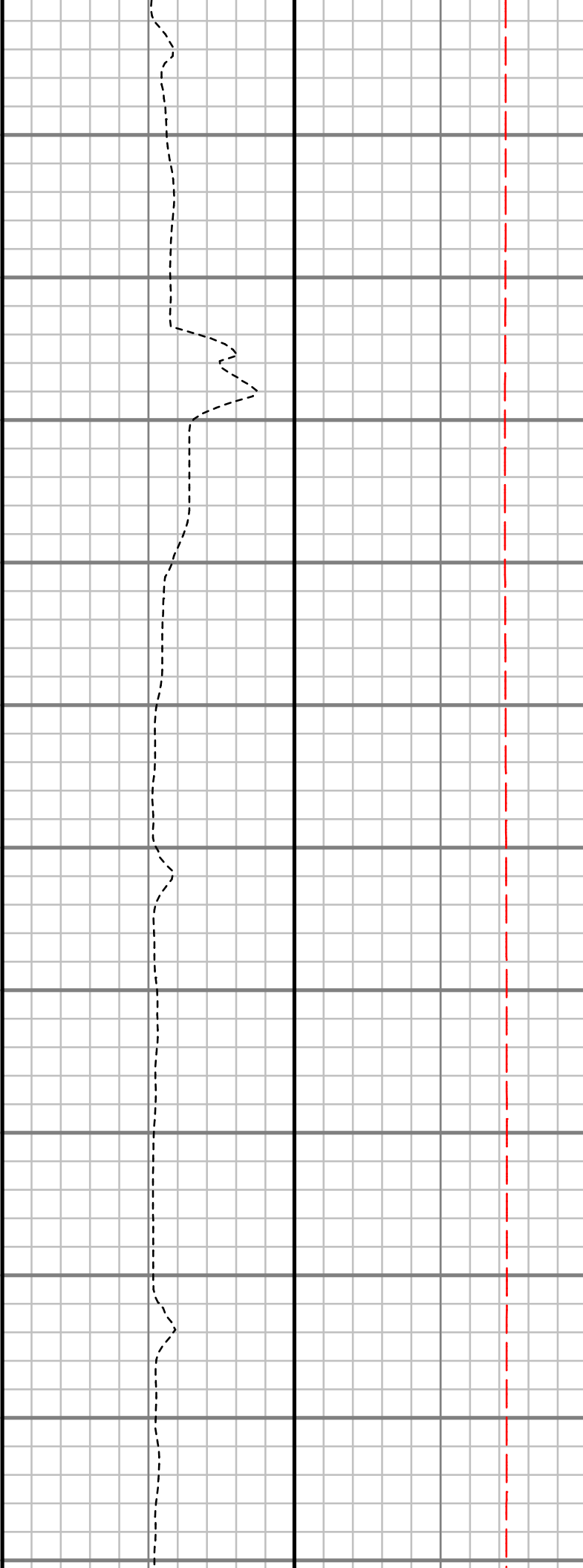
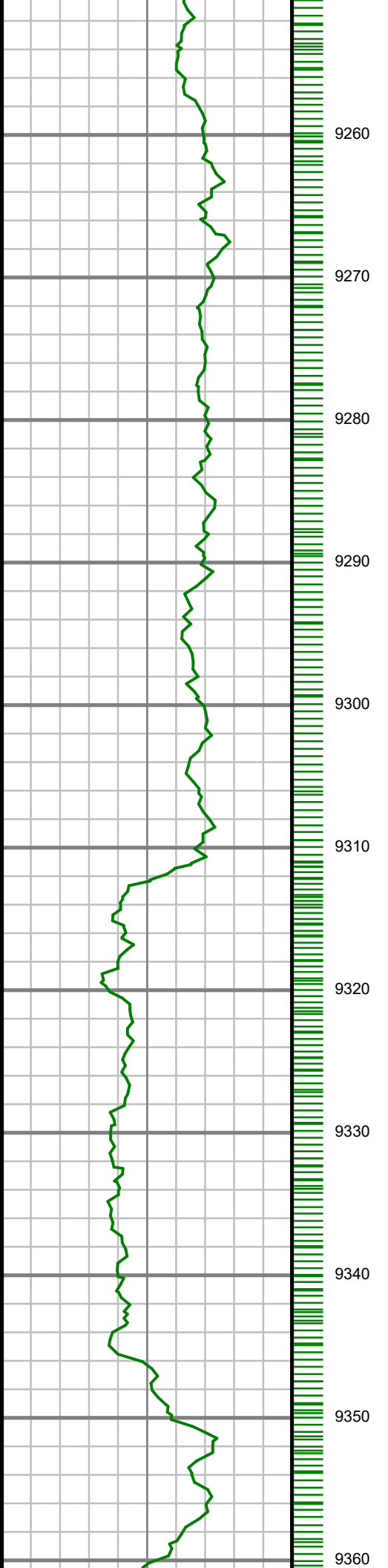
S: 96 MD: 9020.00 ft
Inc: 89.36 deg Az: 0.34
deg TVD: 7338.52 ft



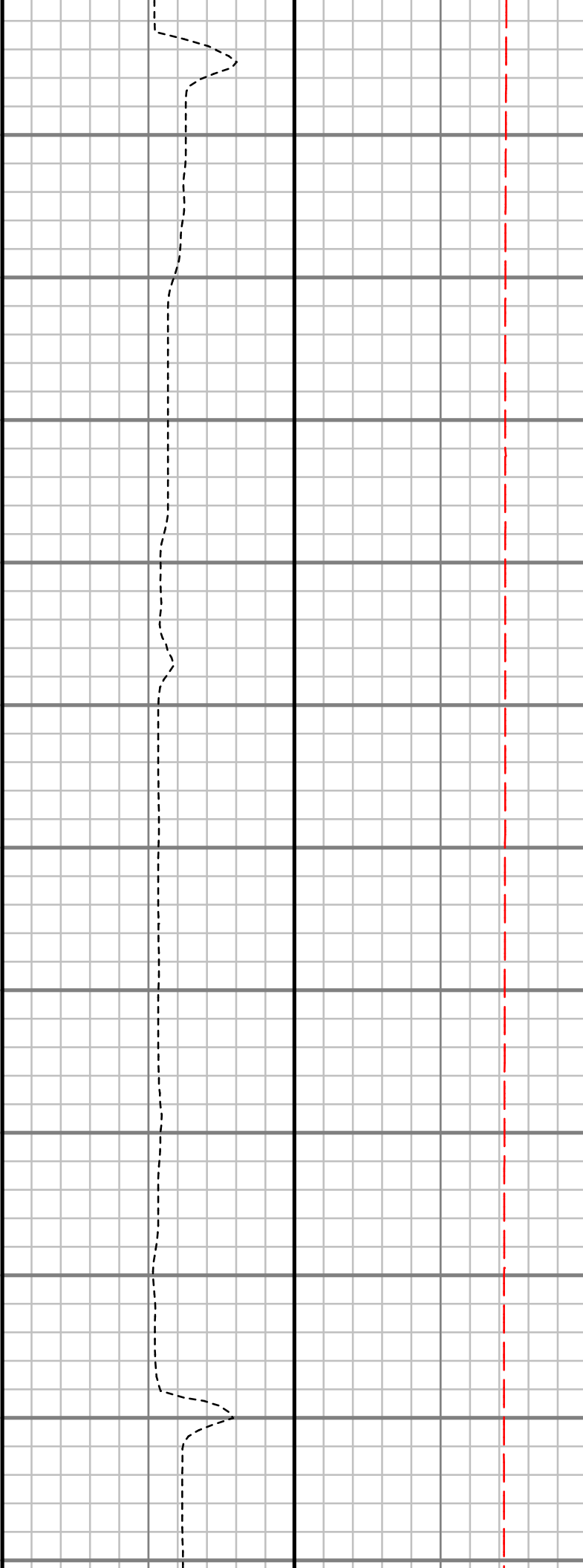
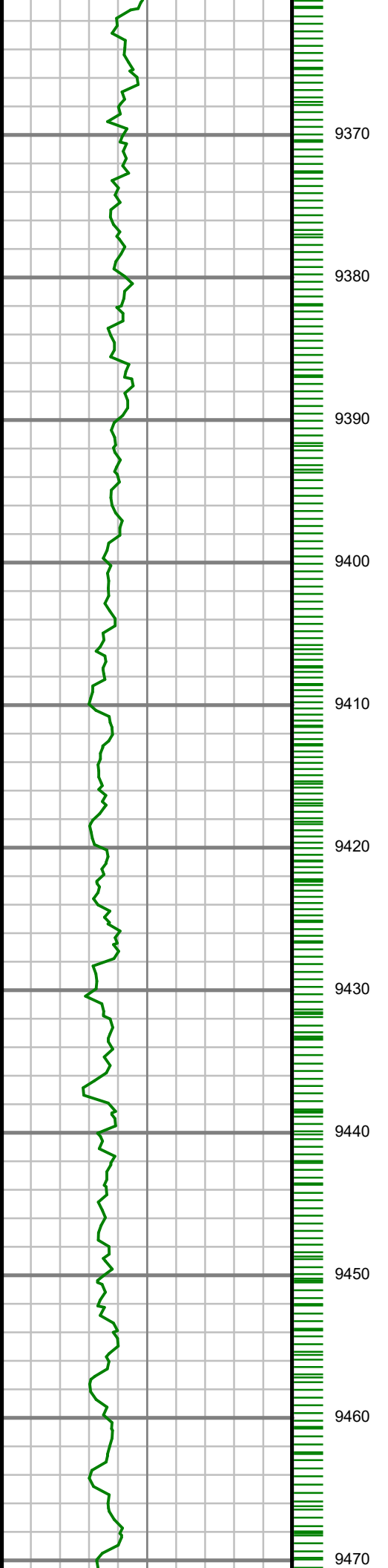
S: 97 MD: 9115.00 ft
Inc: 90.24 deg Az: 0.62
deg TVD: 7338.86 ft



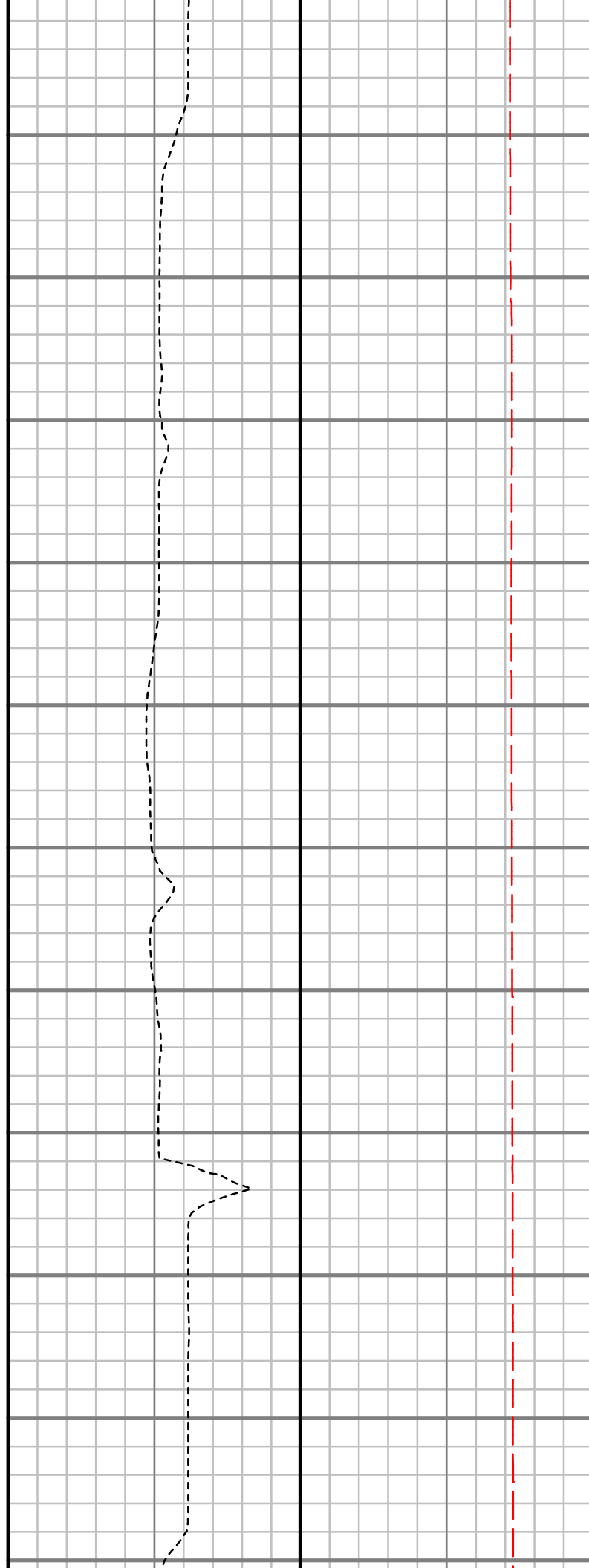
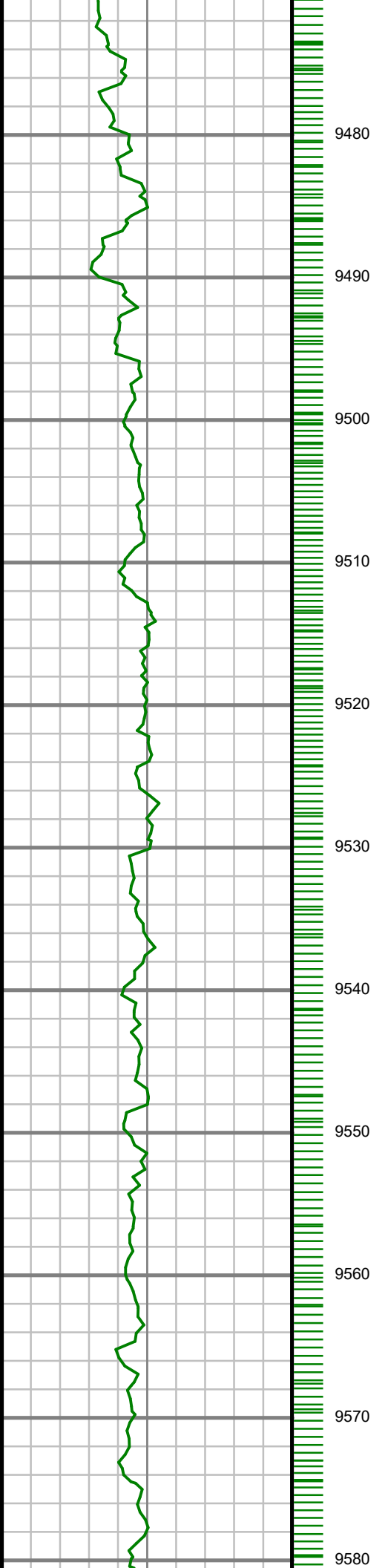
S: 98 MD: 9208.00 ft
Inc: 91.01 deg Az: 0.86
deg TVD: 7337.84 ft



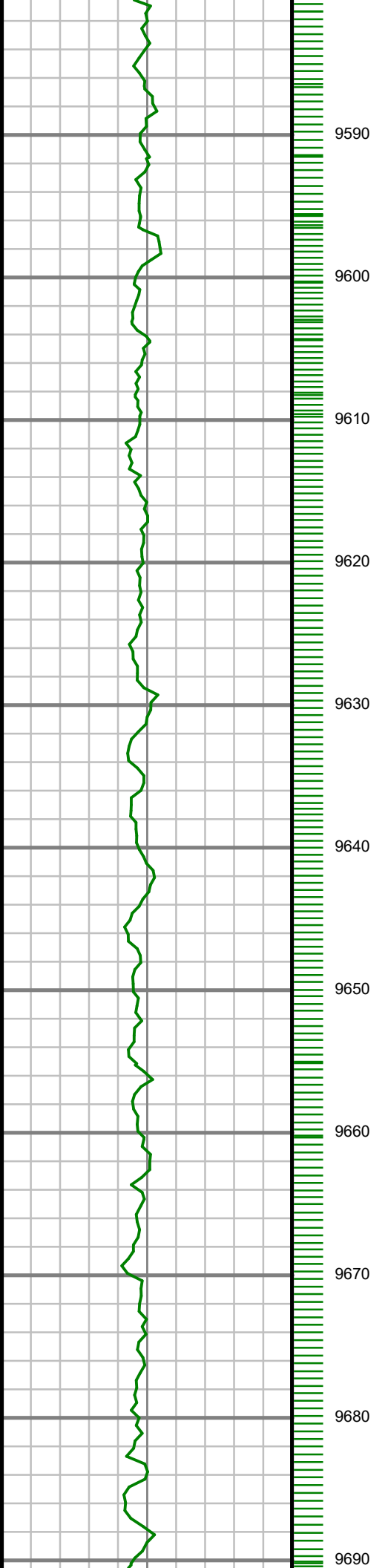
S: 99 MD: 9304.00 ft
Inc: 89.90 deg Az: 0.24
deg TVD: 7337.08 ft



S: 100 MD: 9398.00 ft
Inc: 90.03 deg Az: 0.08
deg TVD: 7337.14 ft

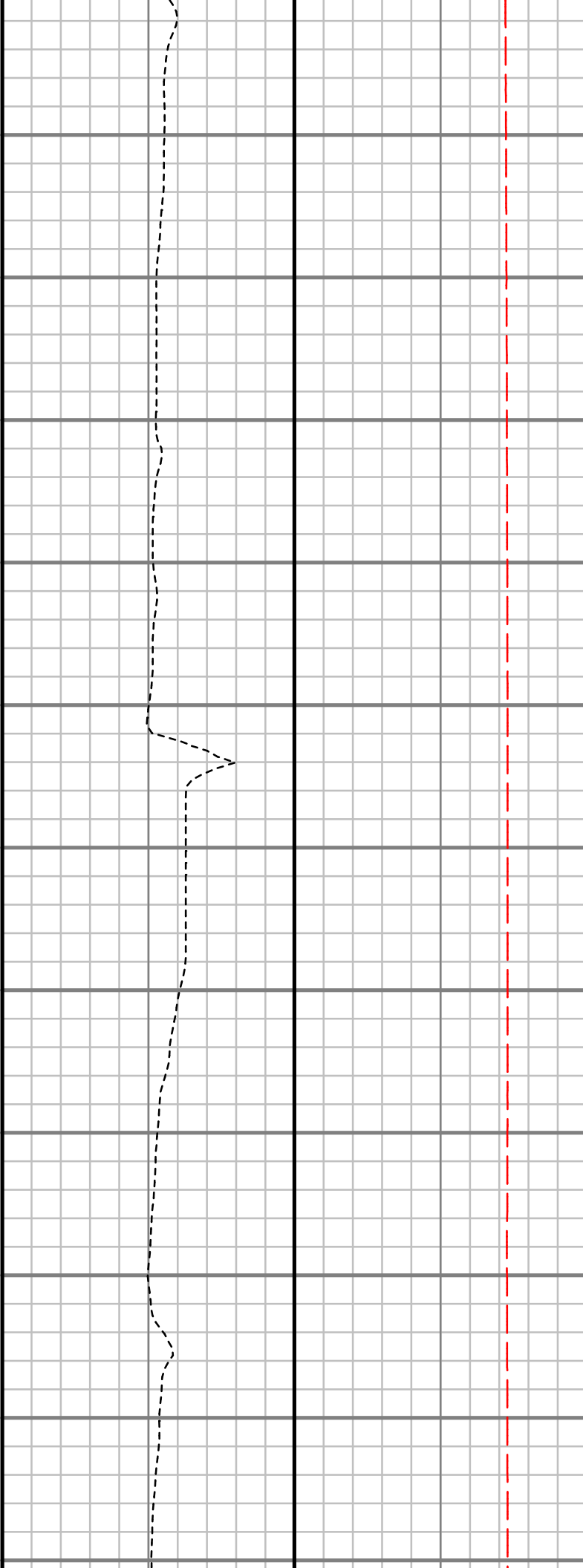
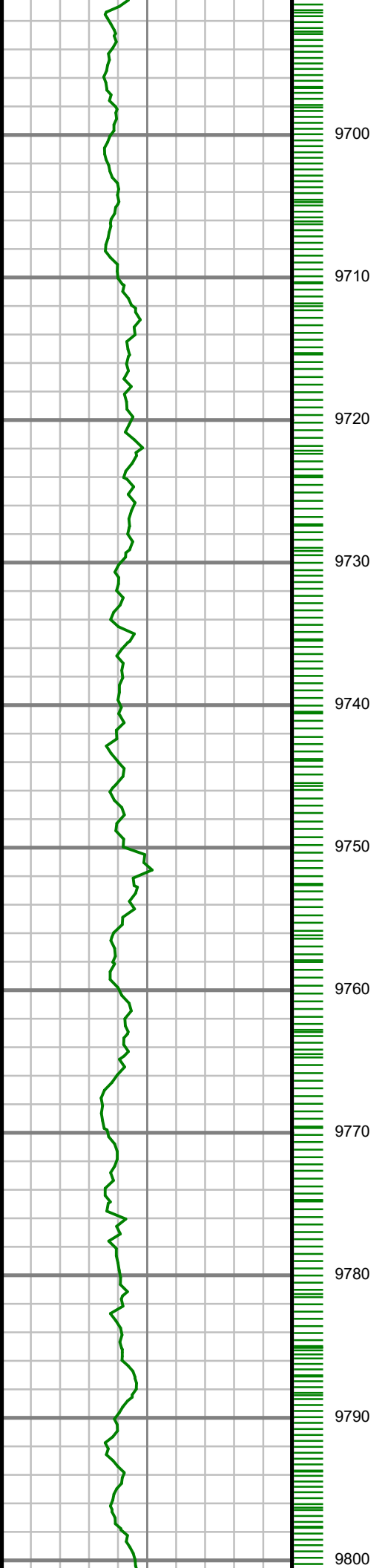


S: 101 MD: 9493.00 ft
Inc: 90.91 deg Az: 0.46
deg TVD: 7336.36 ft

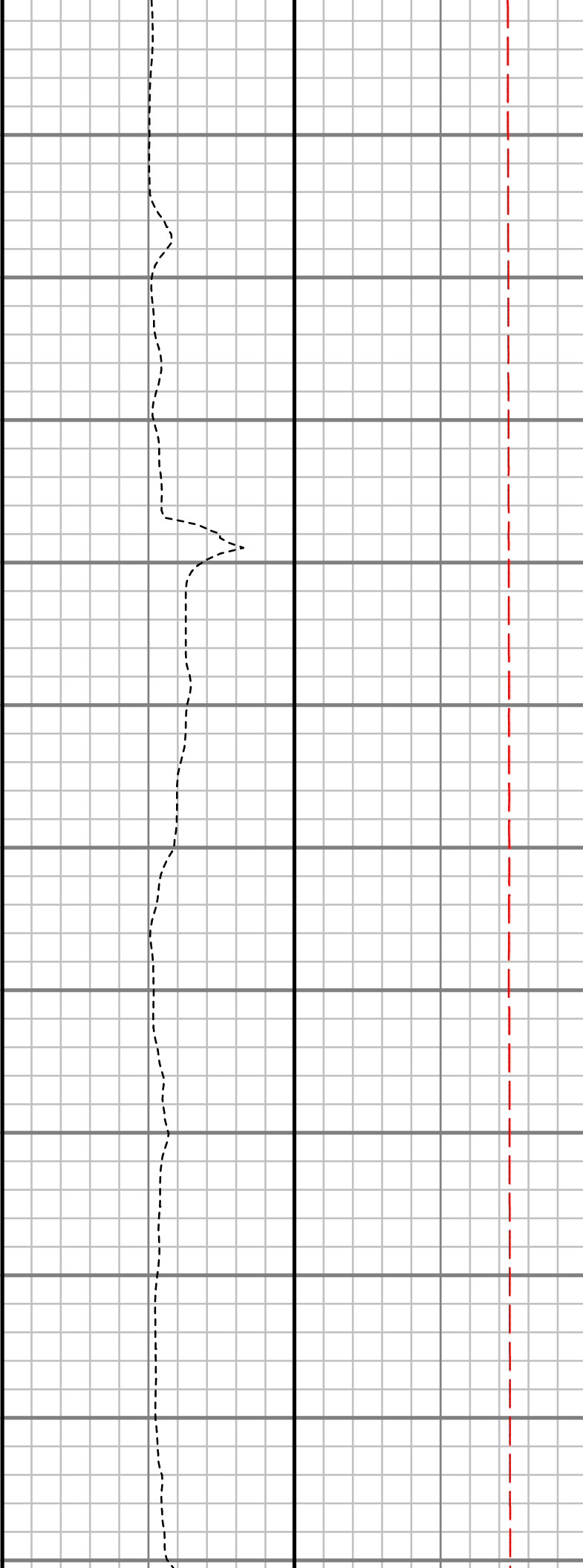
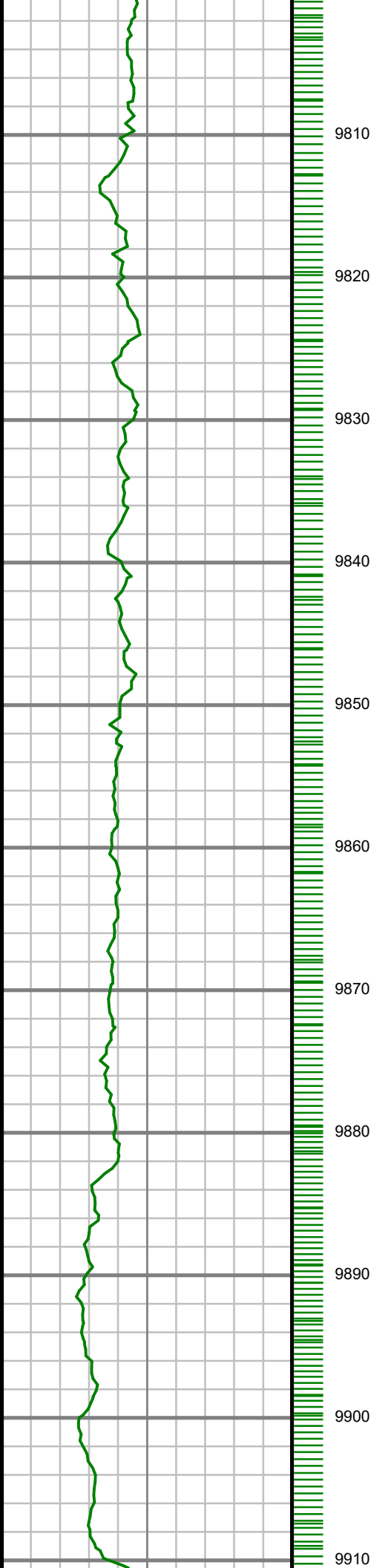


S: 102 MD: 9587.00 ft
Inc: 90.50 deg Az: 0.26
deg TVD: 7335.20 ft

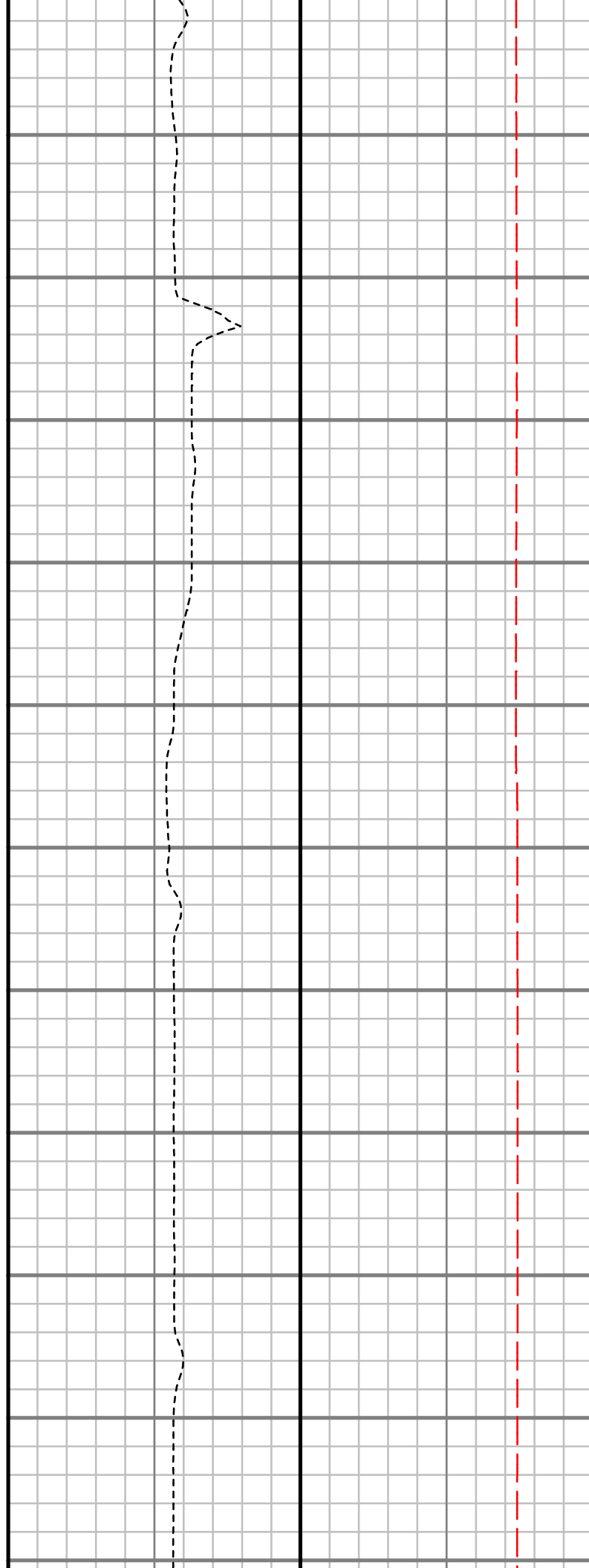
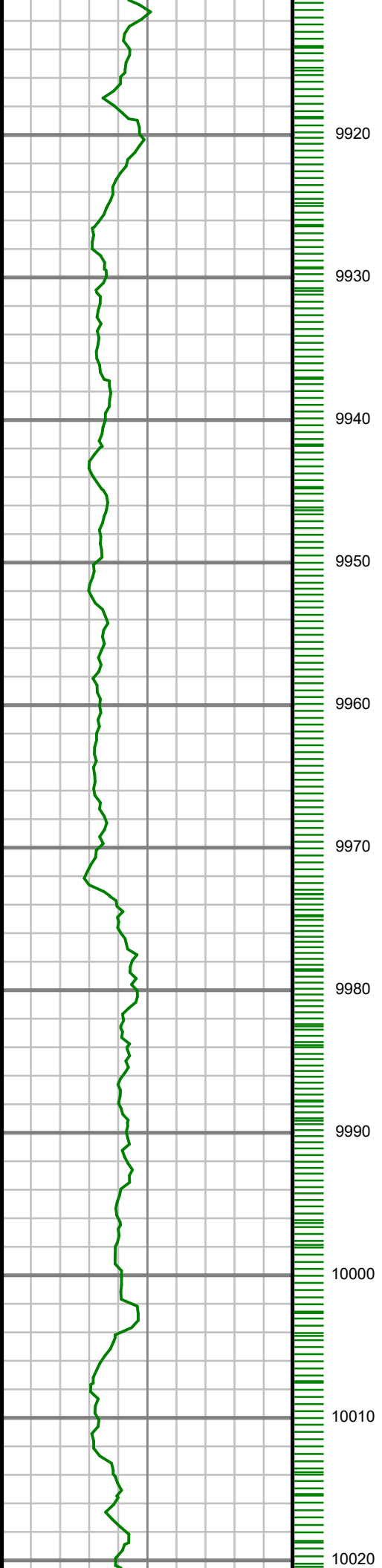
S: 103 MD: 9682.00 ft
Inc: 90.97 deg Az: 0.51
deg TVD: 7333.98 ft



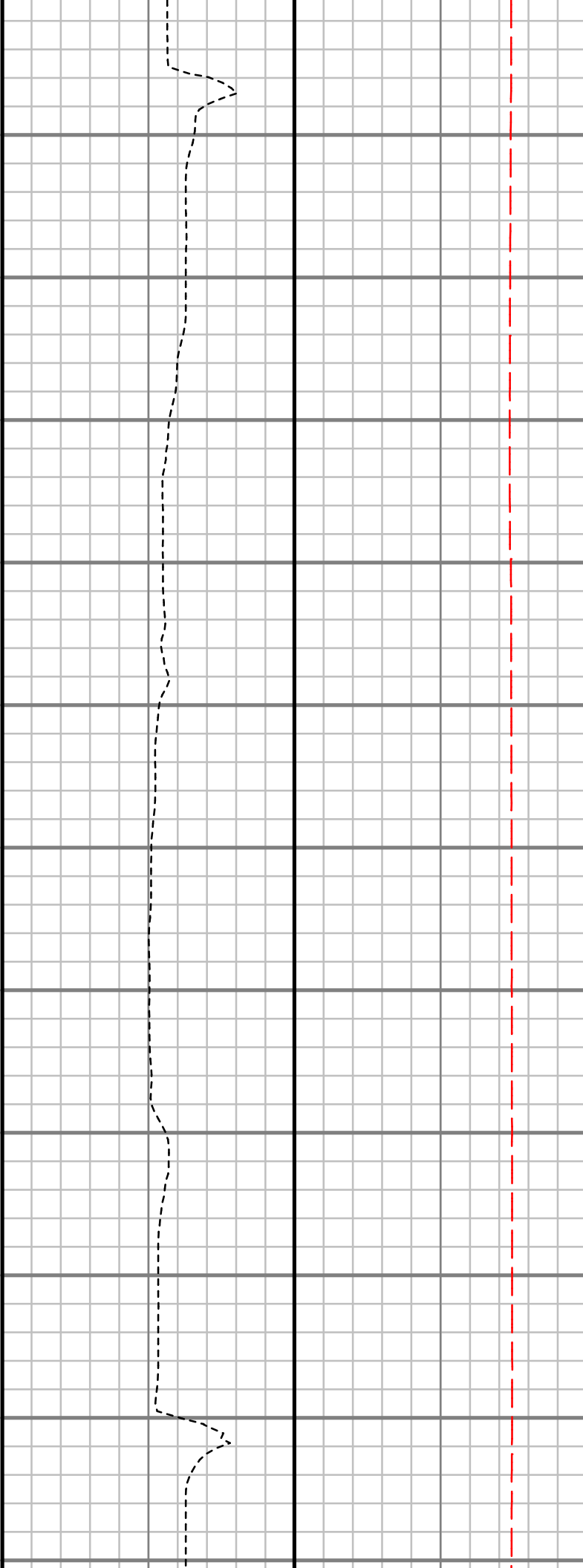
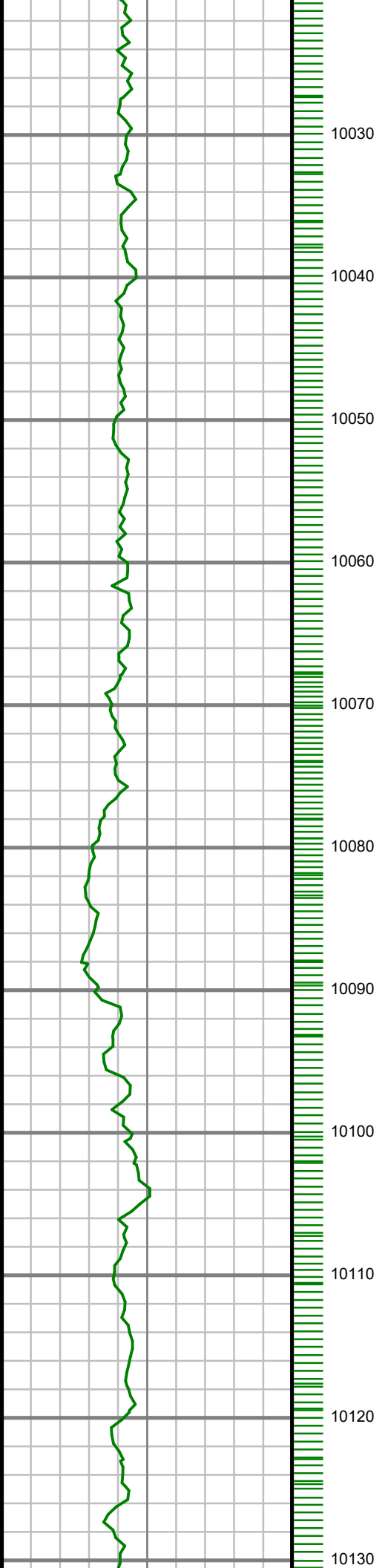
S: 104 MD: 9775.00 ft
Inc: 90.50 deg Az: 0.59
deg TVD: 7332.79 ft



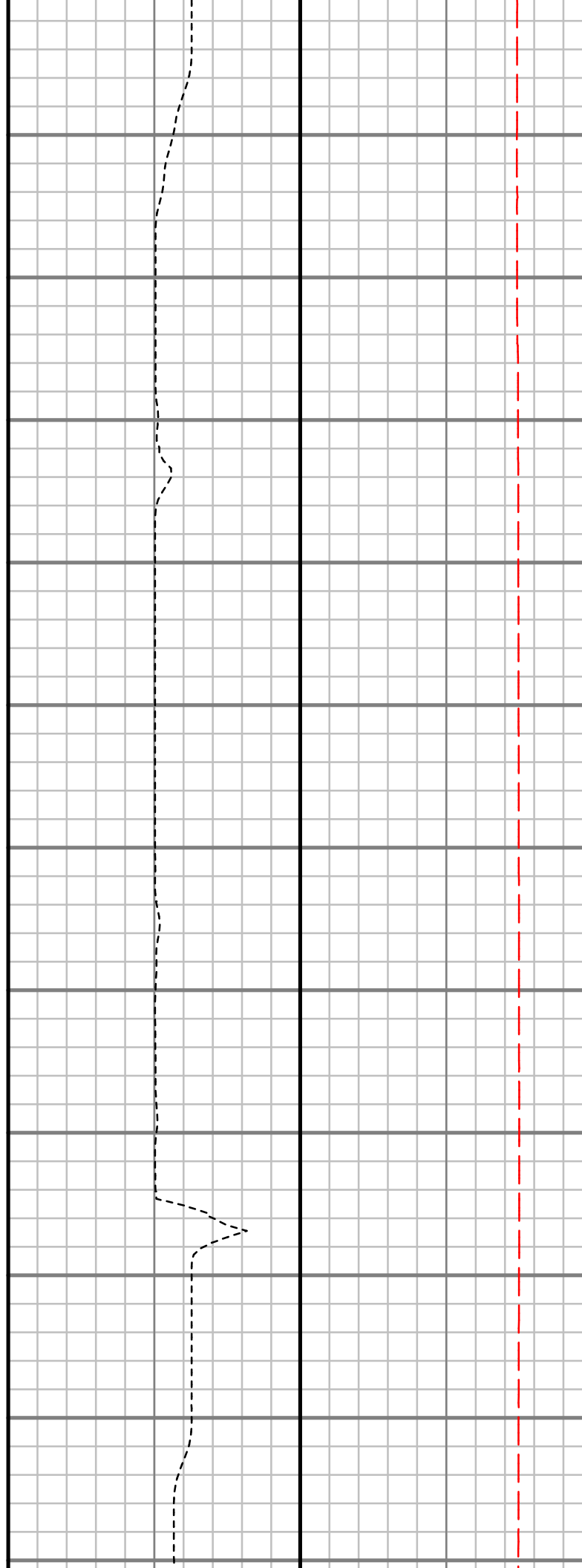
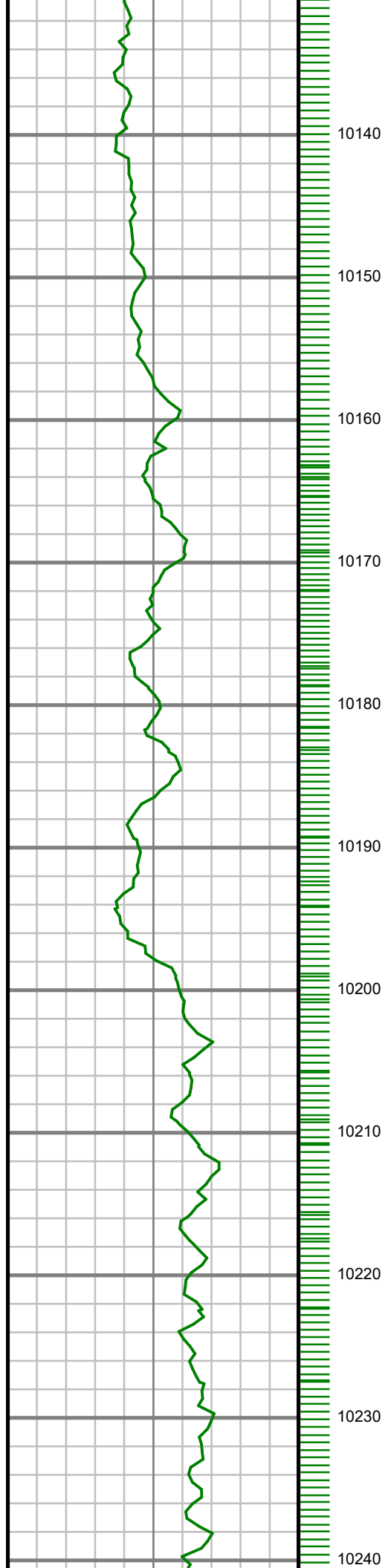
S: 105 MD: 9869.00 ft
Inc: 90.37 deg Az: 0.33
deg TVD: 7332.07 ft



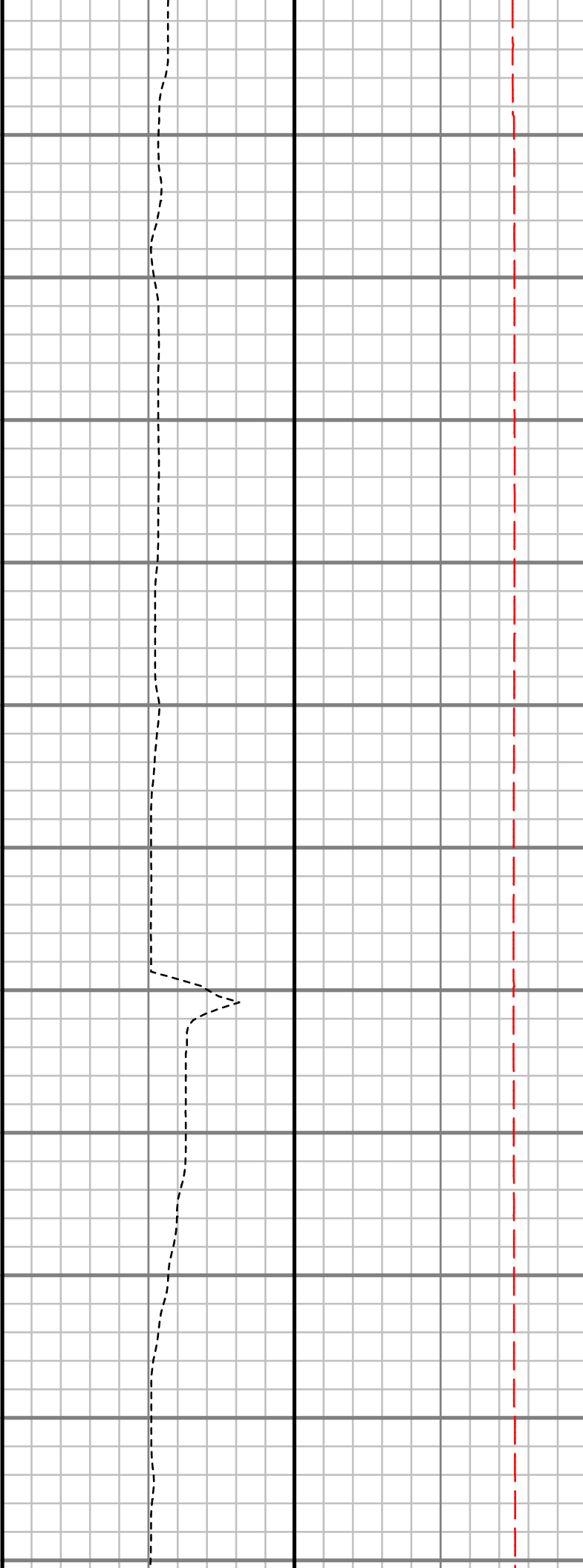
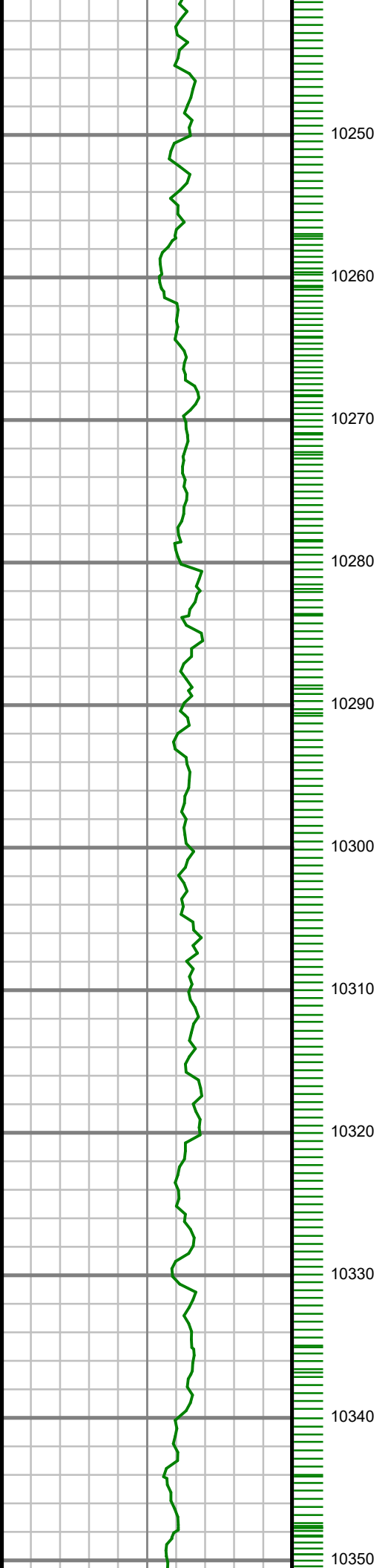
S: 106 MD: 9964.00 ft
Inc: 90.44 deg Az: 0.52
deg TVD: 7331.40 ft



S: 107 MD: 10057.00 ft
Inc: 90.57 deg Az: 0.30
deg TVD: 7330.58 ft

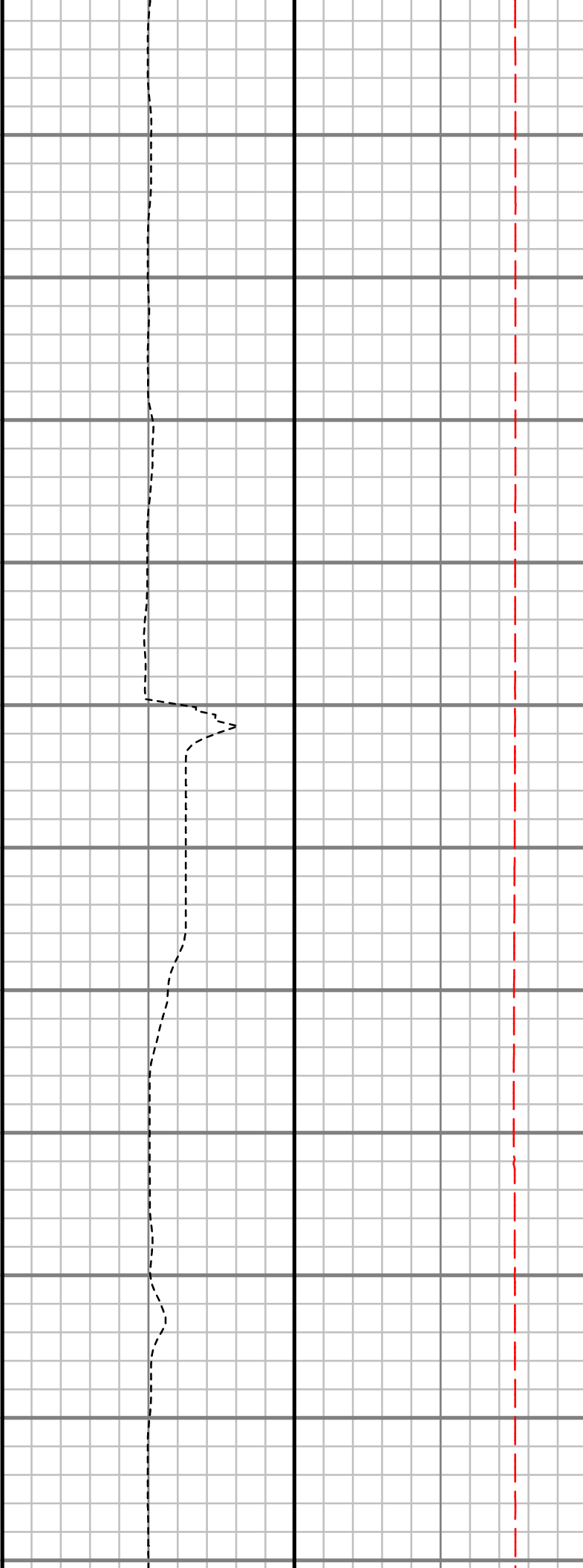
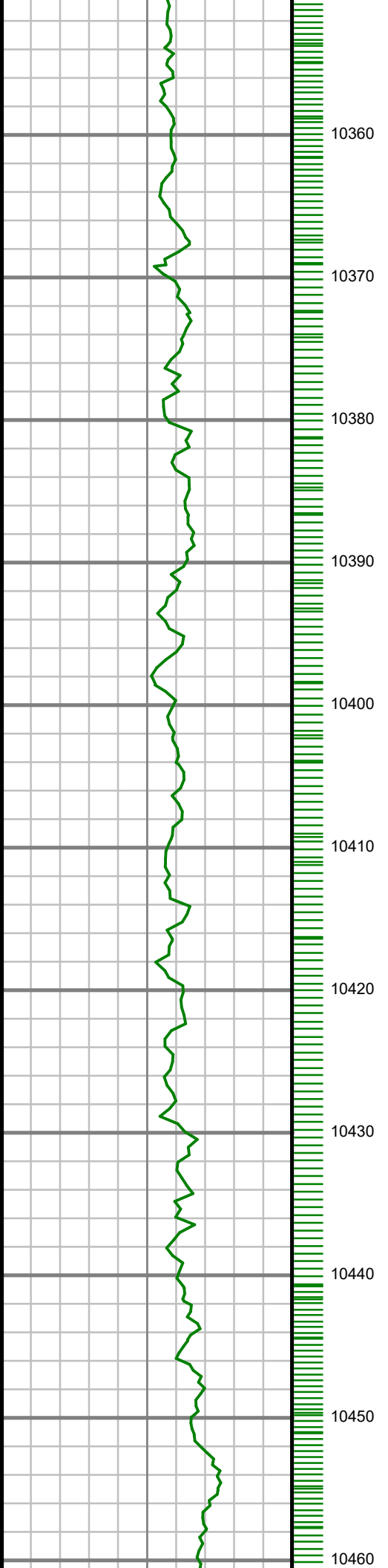


S: 108 MD: 10151.00 ft
Inc: 90.77 deg Az:
359.89 deg TVD:
7329.48 ft

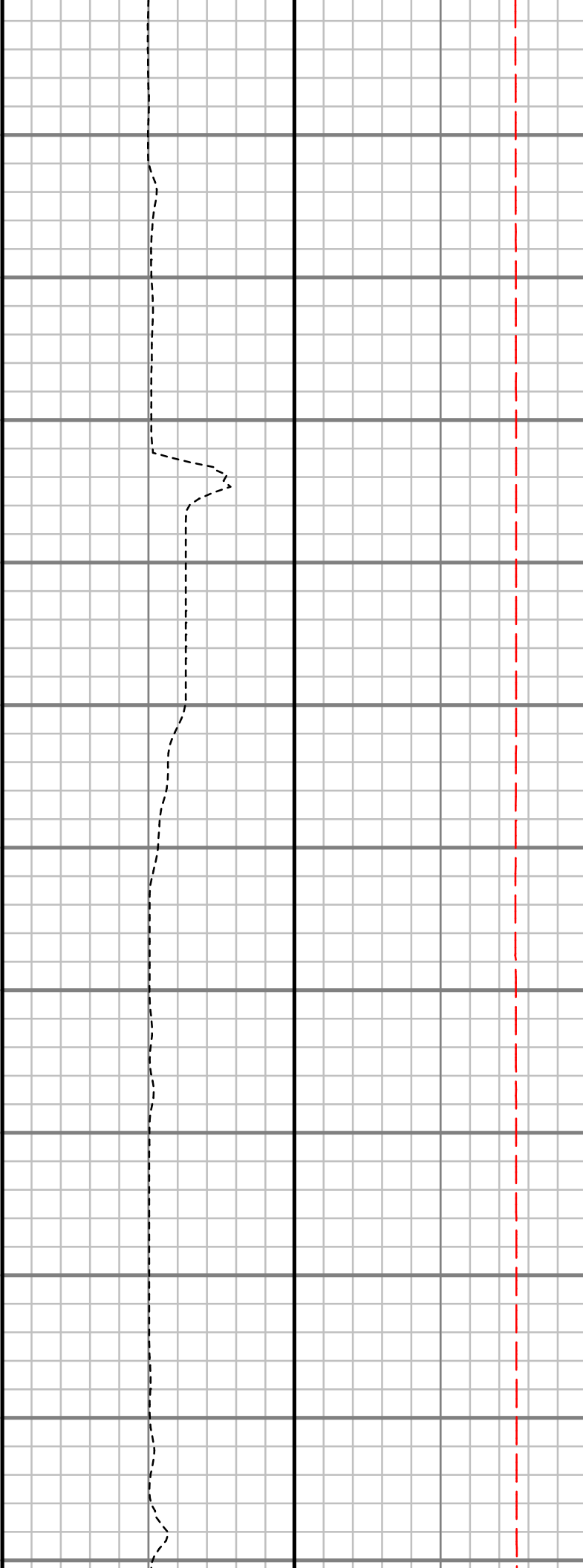
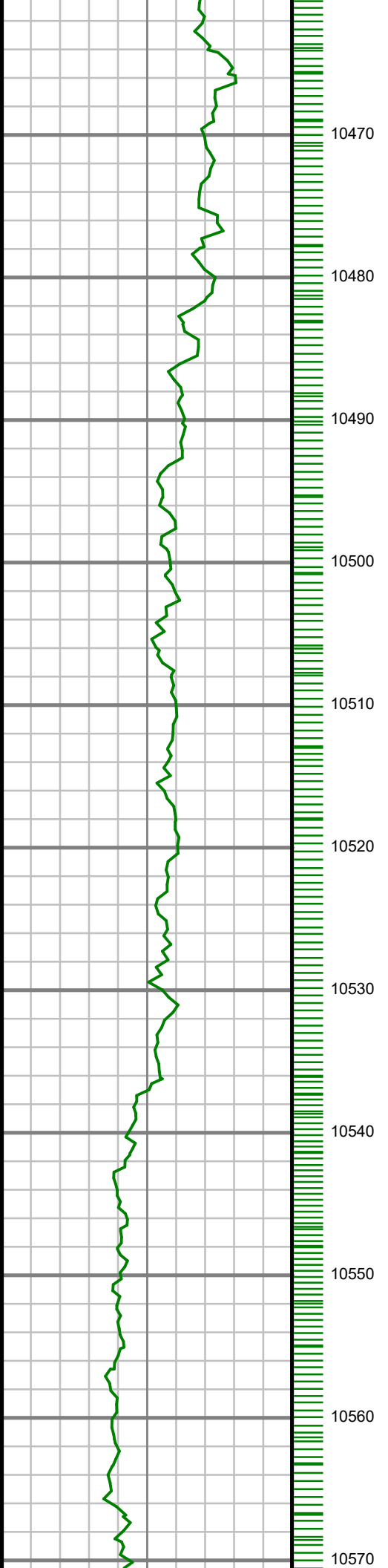


S: 109 MD: 10246.00 ft
Inc: 90.07 deg Az:
359.71 deg TVD:
7328.79 ft

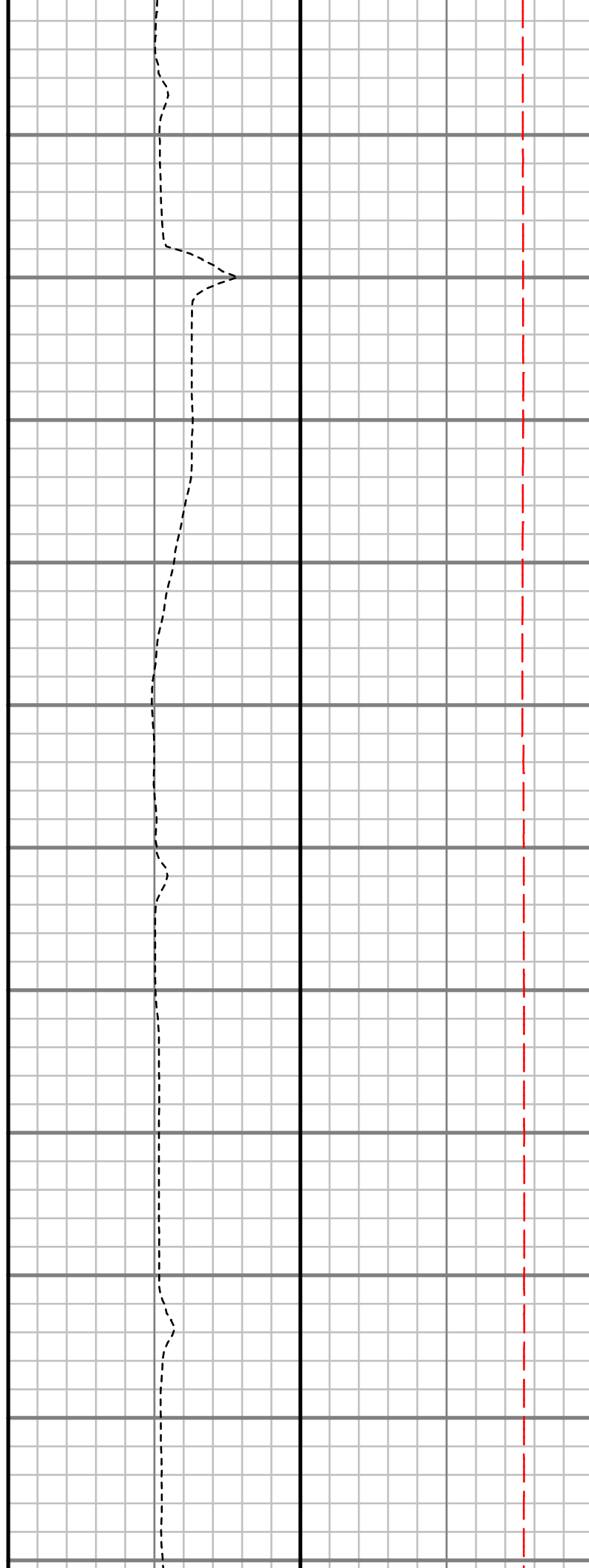
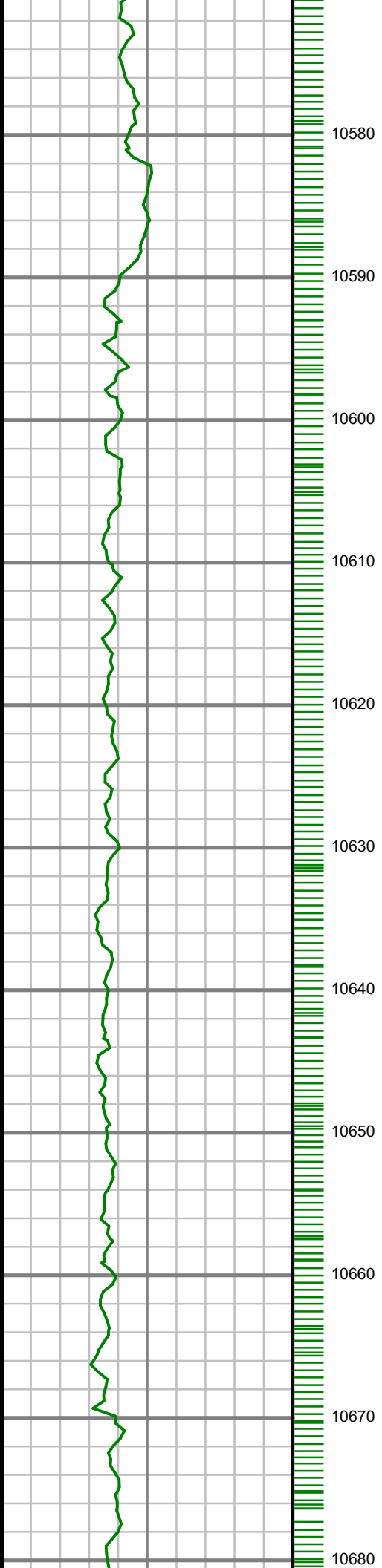
S: 110 MD: 10339.00 ft
Inc: 90.34 deg Az:
359.64 deg TVD:
7328.46 ft



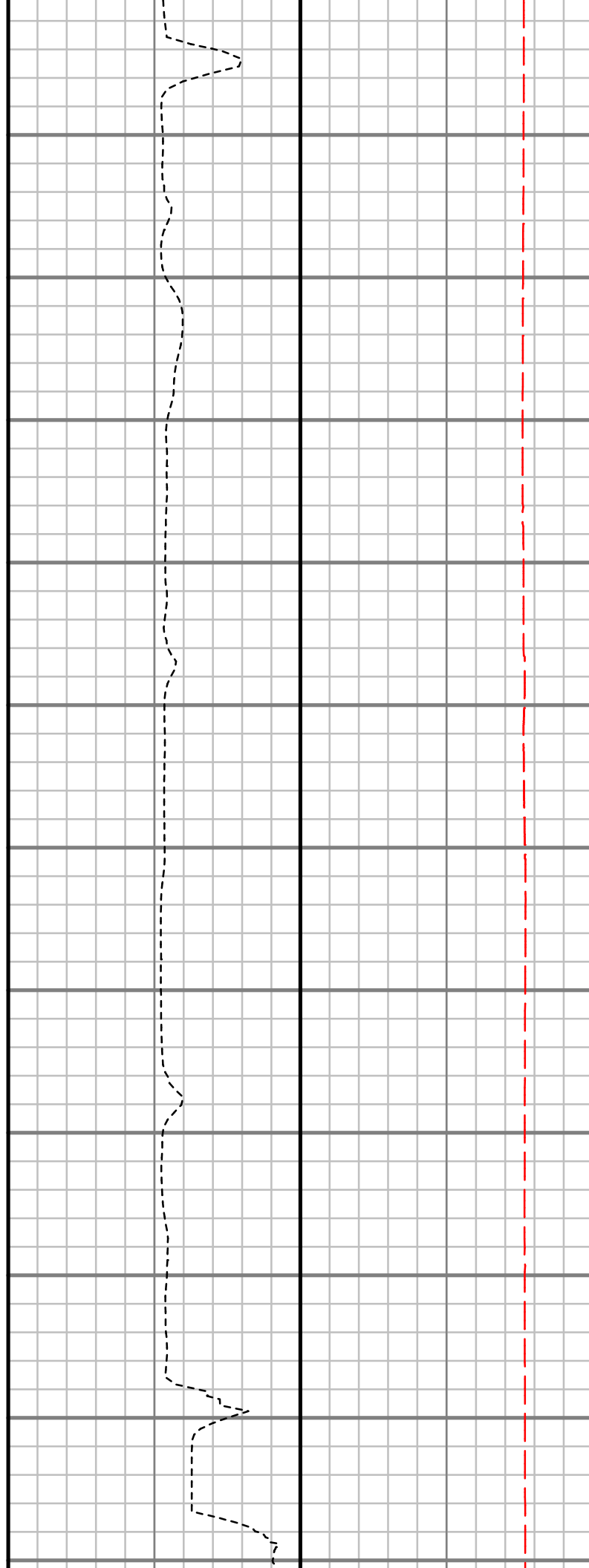
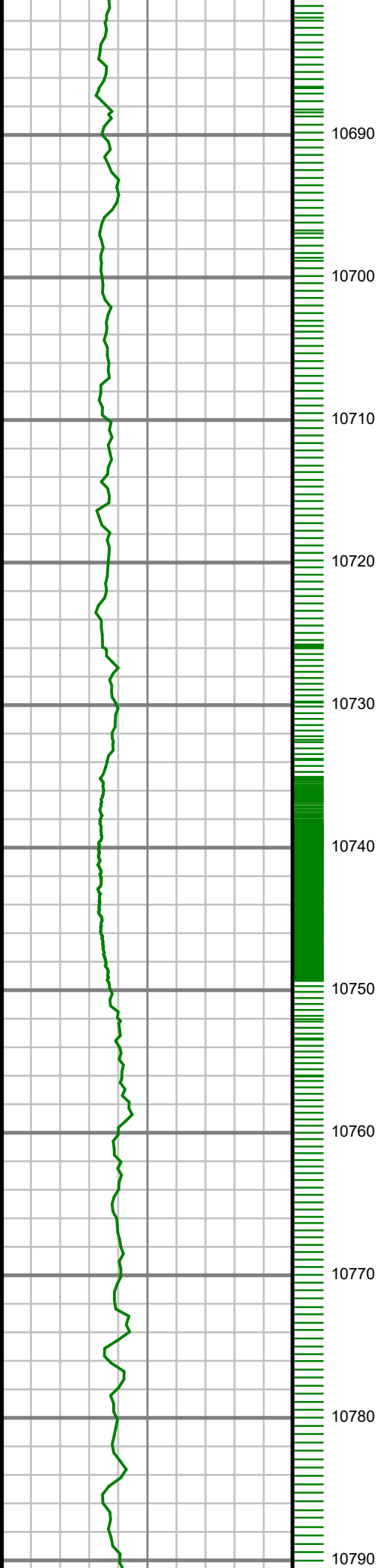
S: 111 MD: 10433.00 ft
Inc: 90.57 deg Az:
359.49 deg TVD:
7327.71 ft



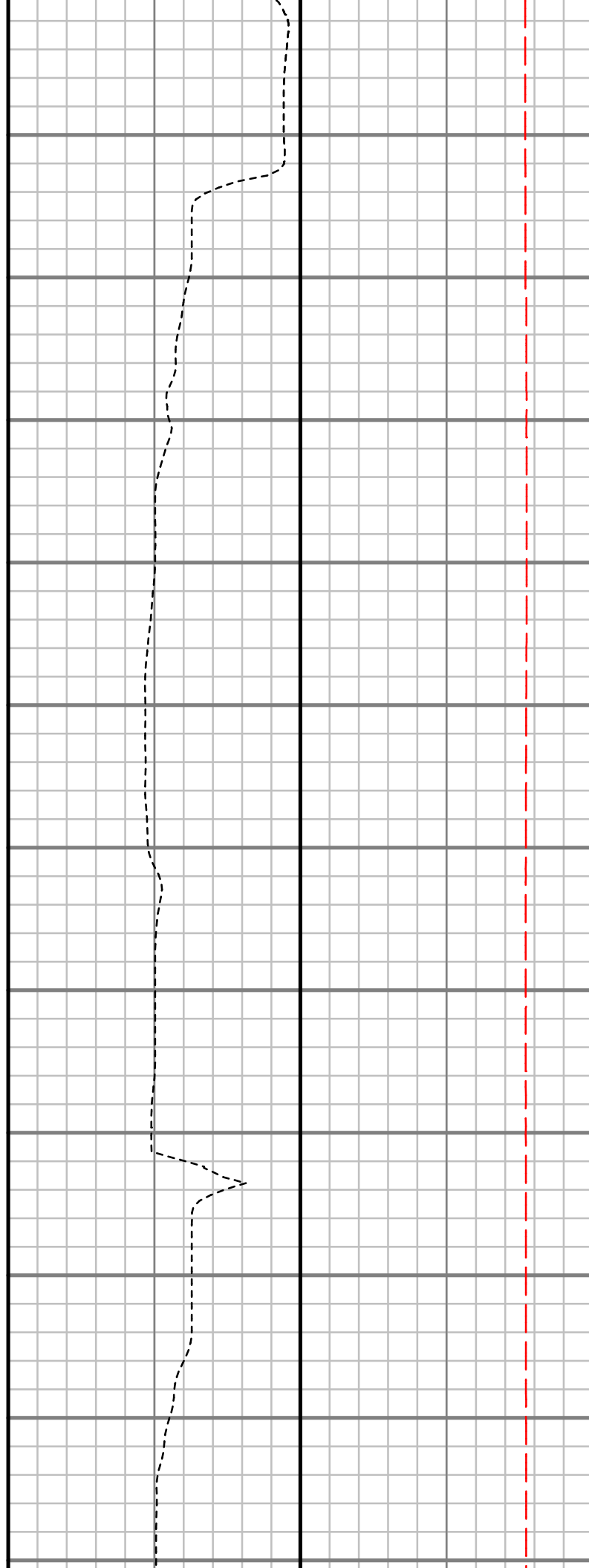
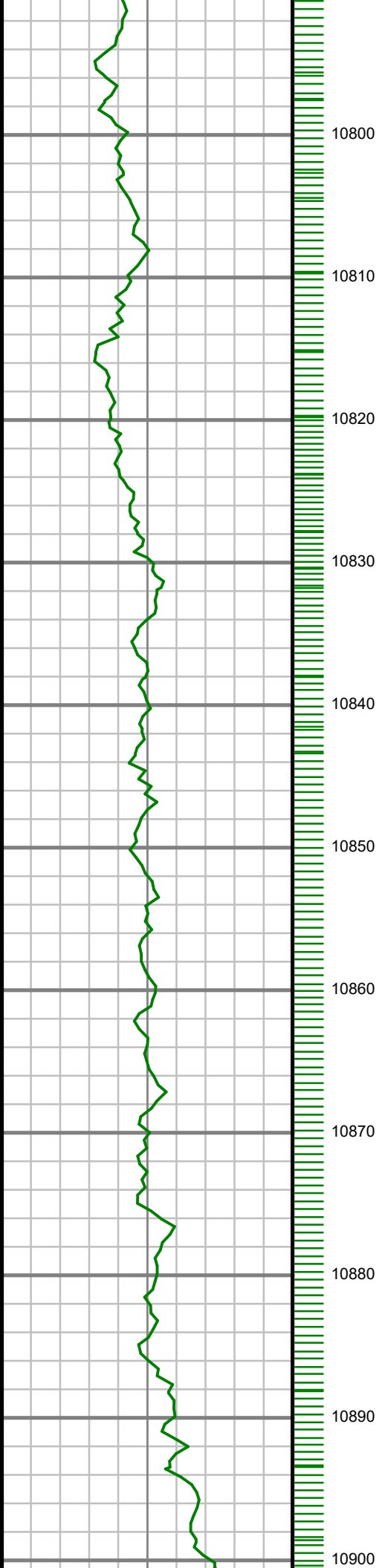
S: 112 MD: 10526.00 ft
Inc: 91.01 deg Az:
359.51 deg TVD:
7326.43 ft



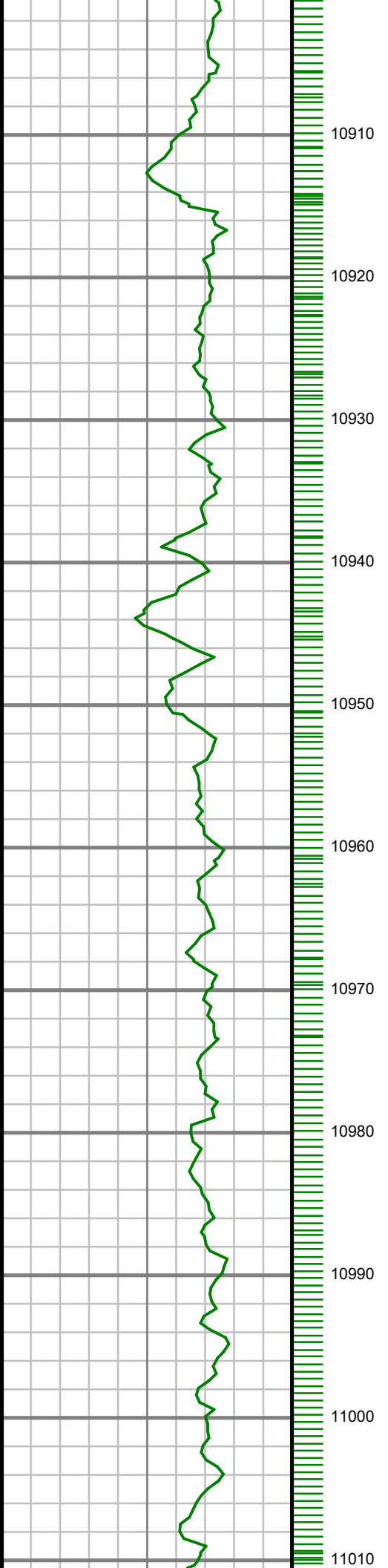
S: 113 MD: 10621.00 ft
Inc: 90.97 deg Az:
359.23 deg TVD:
7324.79 ft



S: 114 MD: 10716.00 ft
Inc: 90.71 deg Az:
358.76 deg TVD:
7323.39 ft



S: 115 MD: 10809.00 ft
Inc: 89.56 deg Az: 1.05
deg TVD: 7323.17 ft



10910

10920

10930

10940

10950

10960

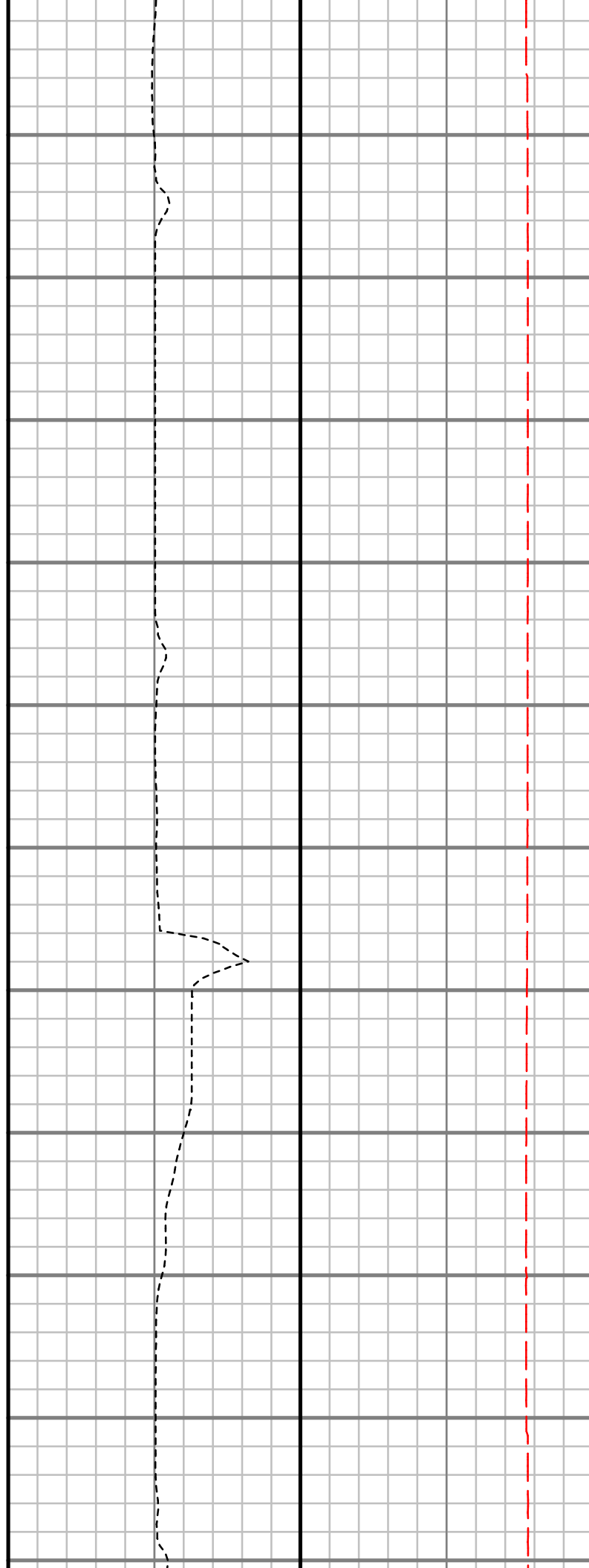
10970

10980

10990

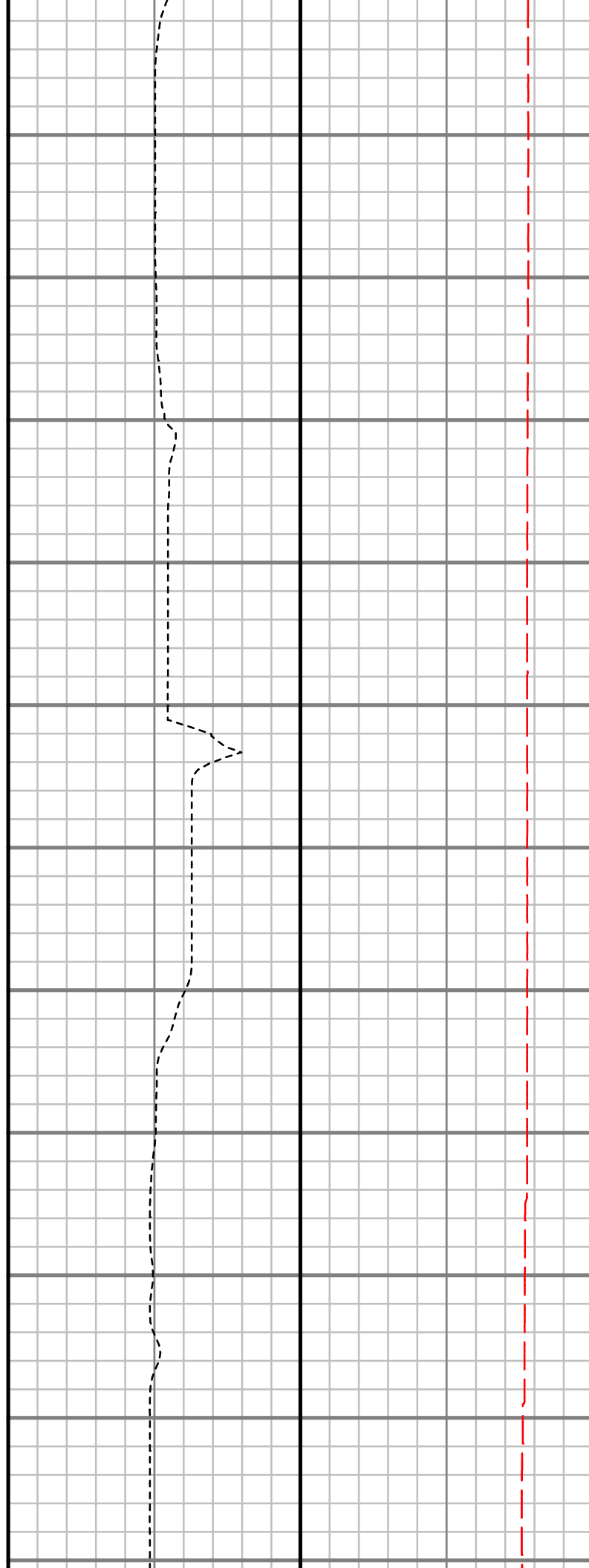
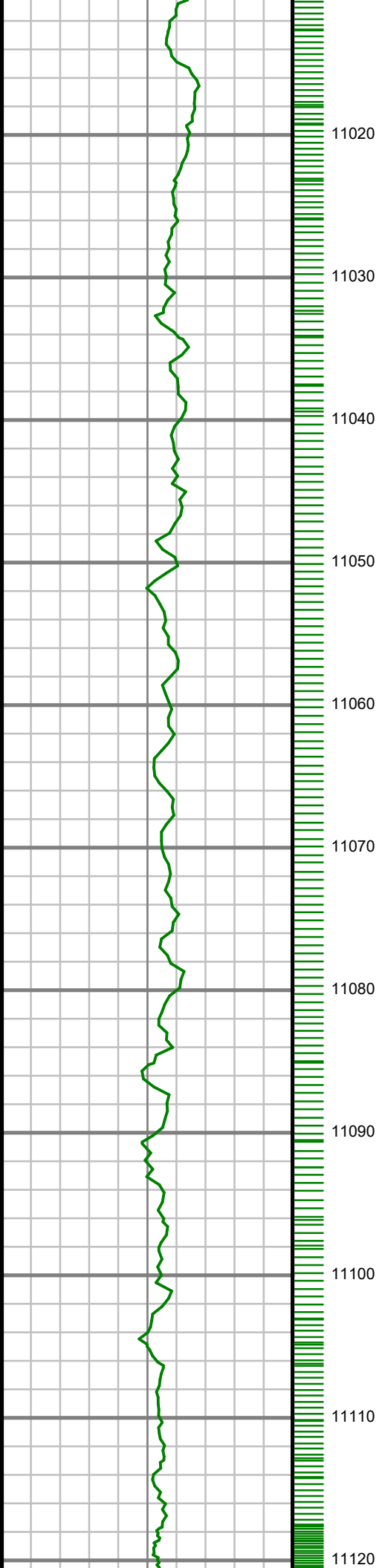
11000

11010

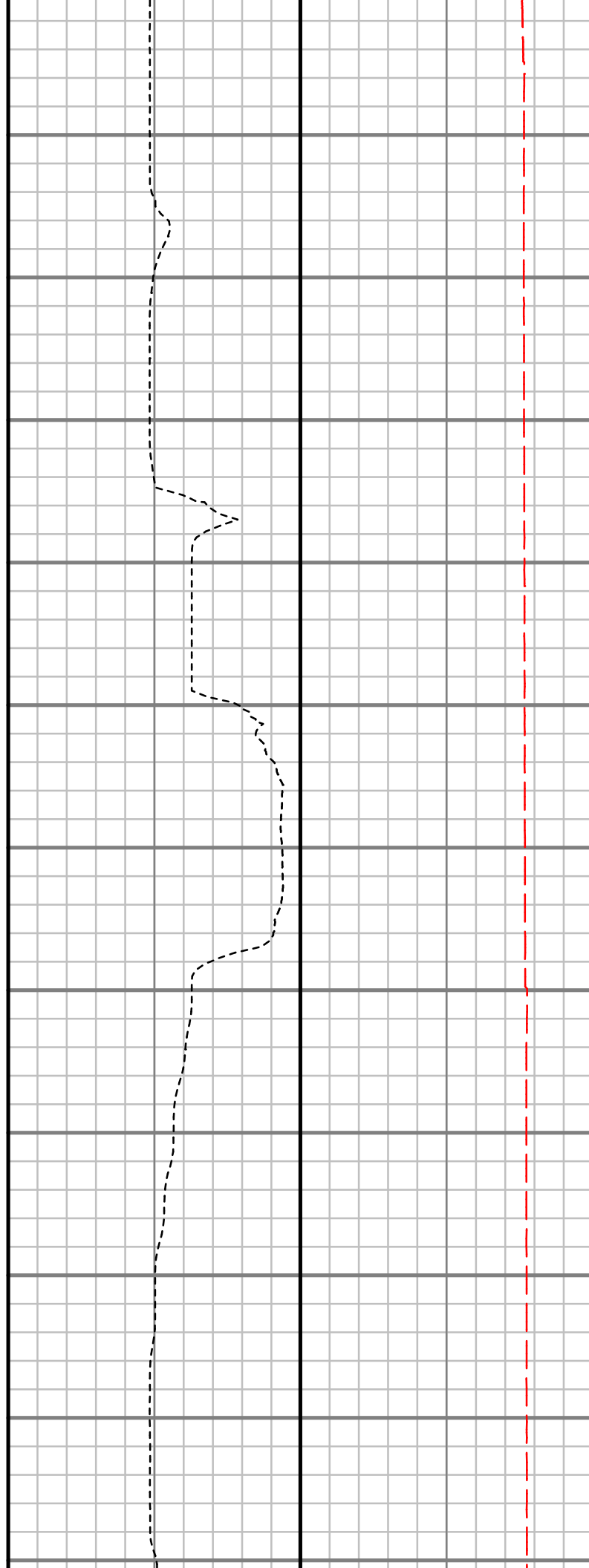
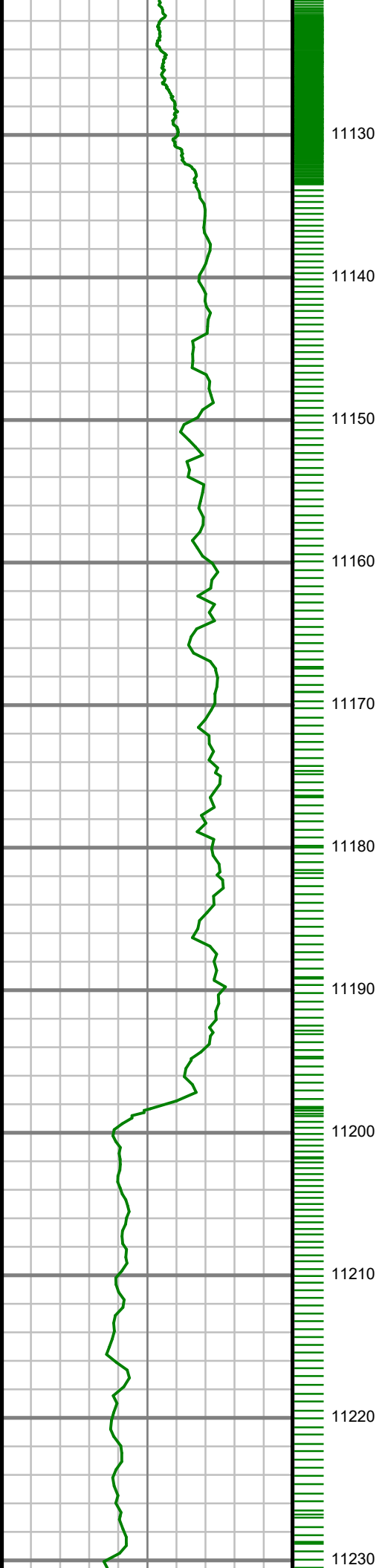


S: 116 MD: 10903.00 ft
Inc: 89.33 deg Az: 0.36
deg TVD: 7324.08 ft

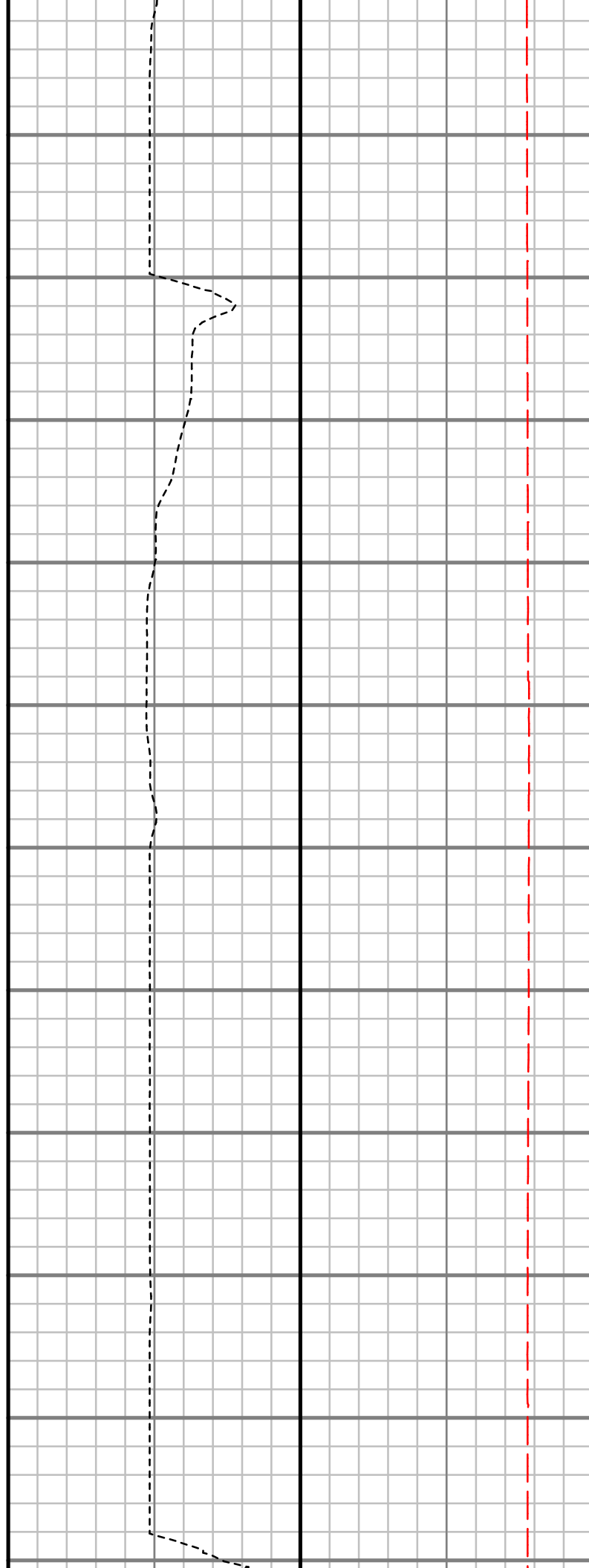
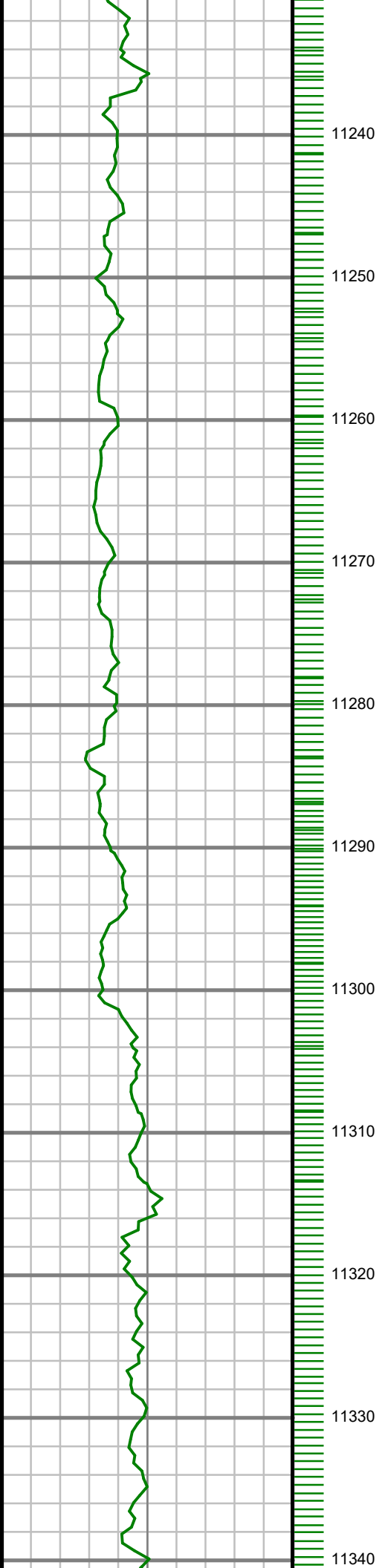
S: 117 MD: 10998.00 ft
Inc: 89.16 deg Az: 0.47
deg TVD: 7325.34 ft



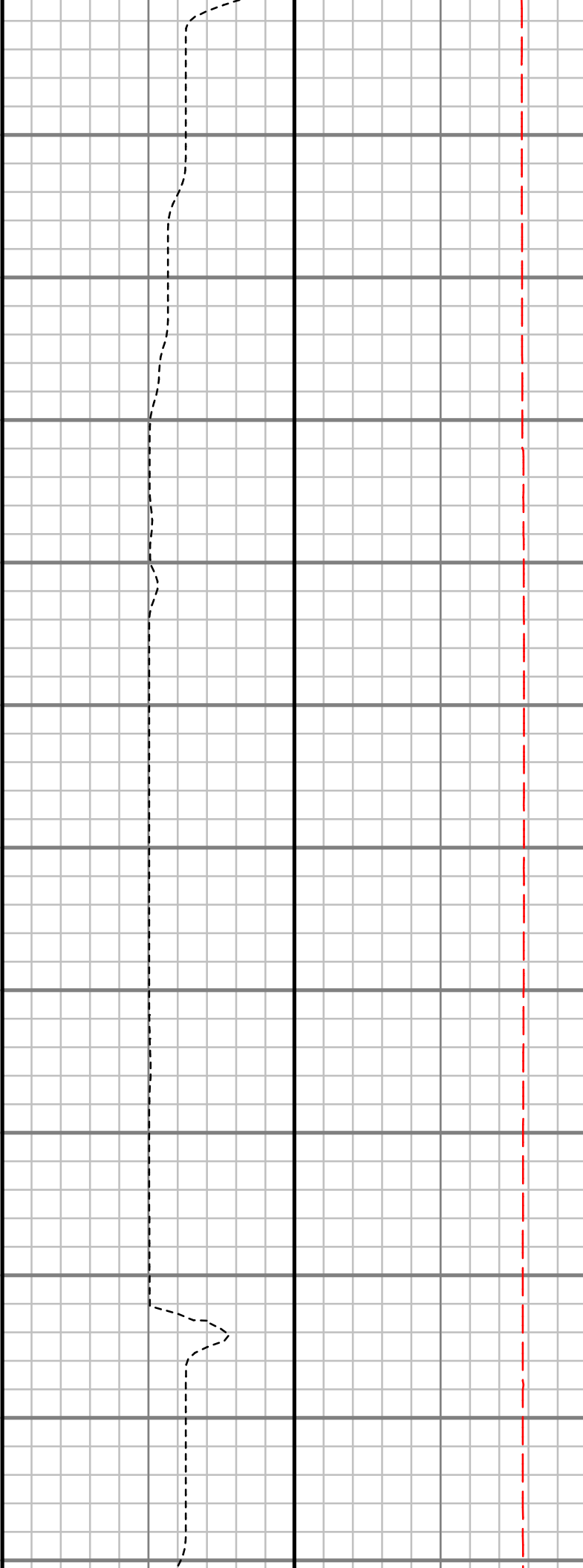
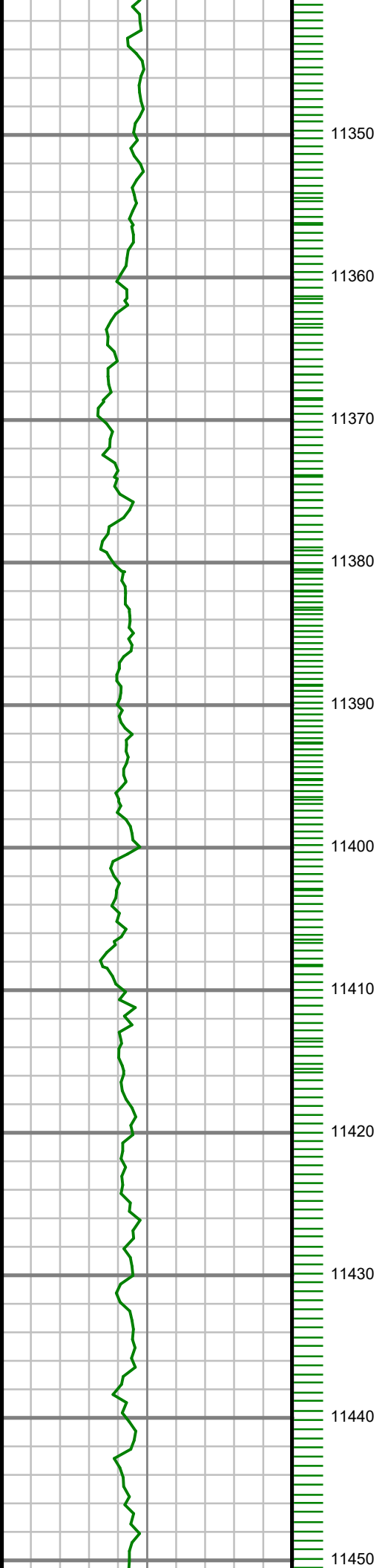
S: 118 MD: 11093.00 ft
Inc: 88.56 deg Az: 0.06
deg TVD: 7327.23 ft



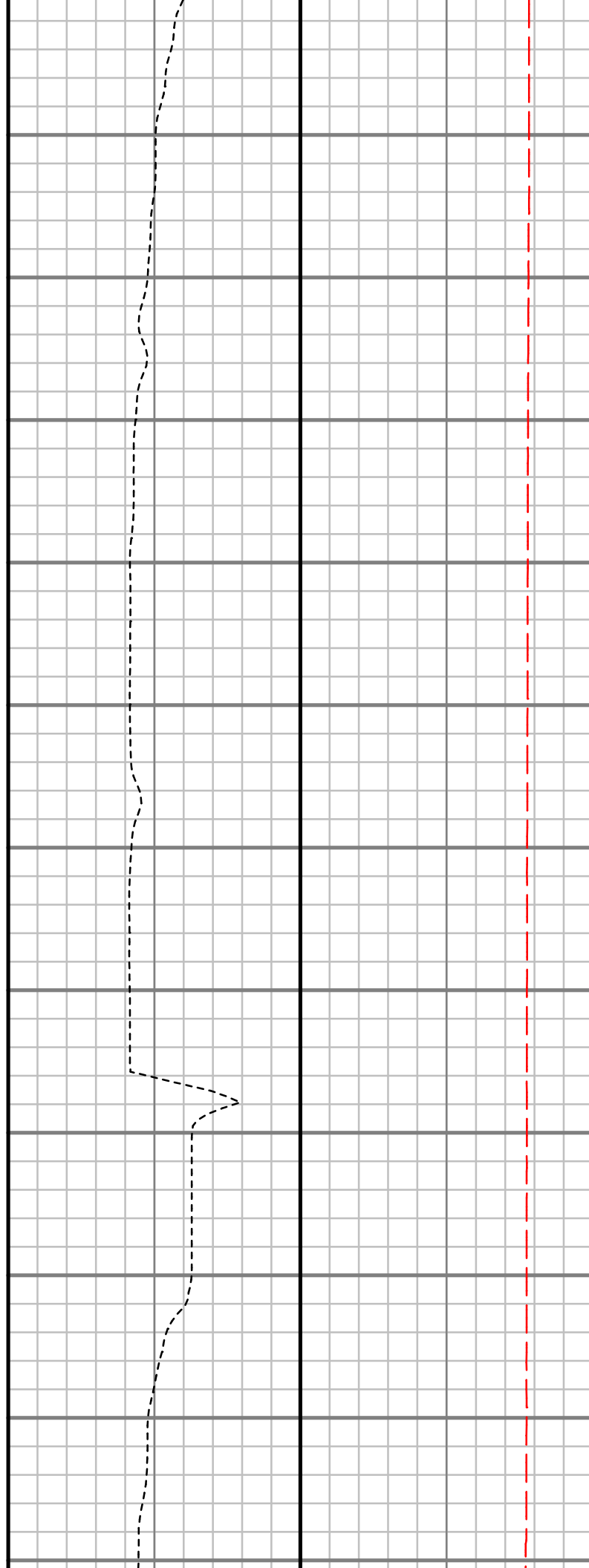
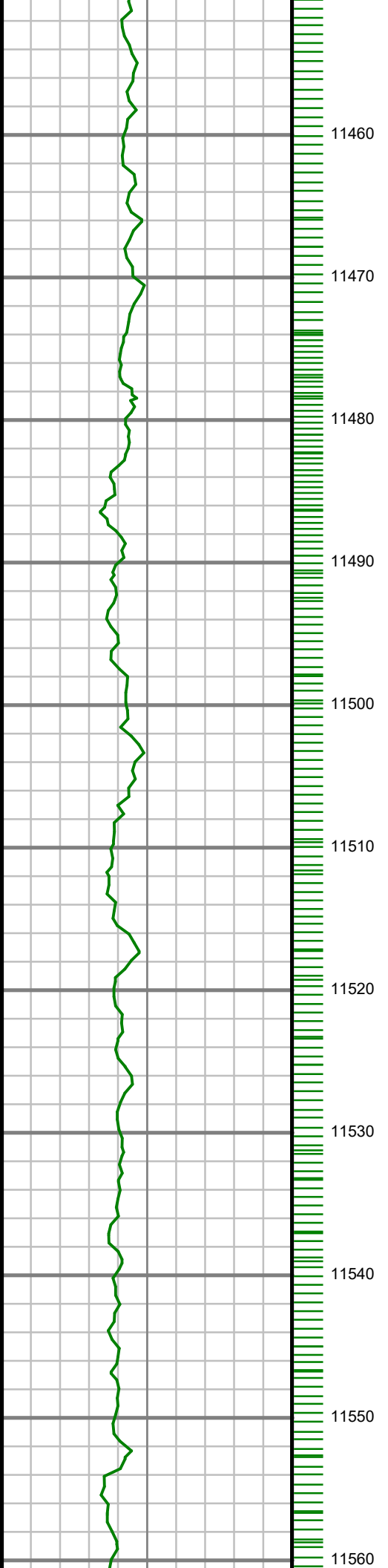
S: 119 MD: 11185.00 ft
Inc: 89.50 deg Az: 0.54
deg TVD: 7328.78 ft



S: 120 MD: 11279.00 ft
Inc: 90.91 deg Az: 1.52
deg TVD: 7328.45 ft



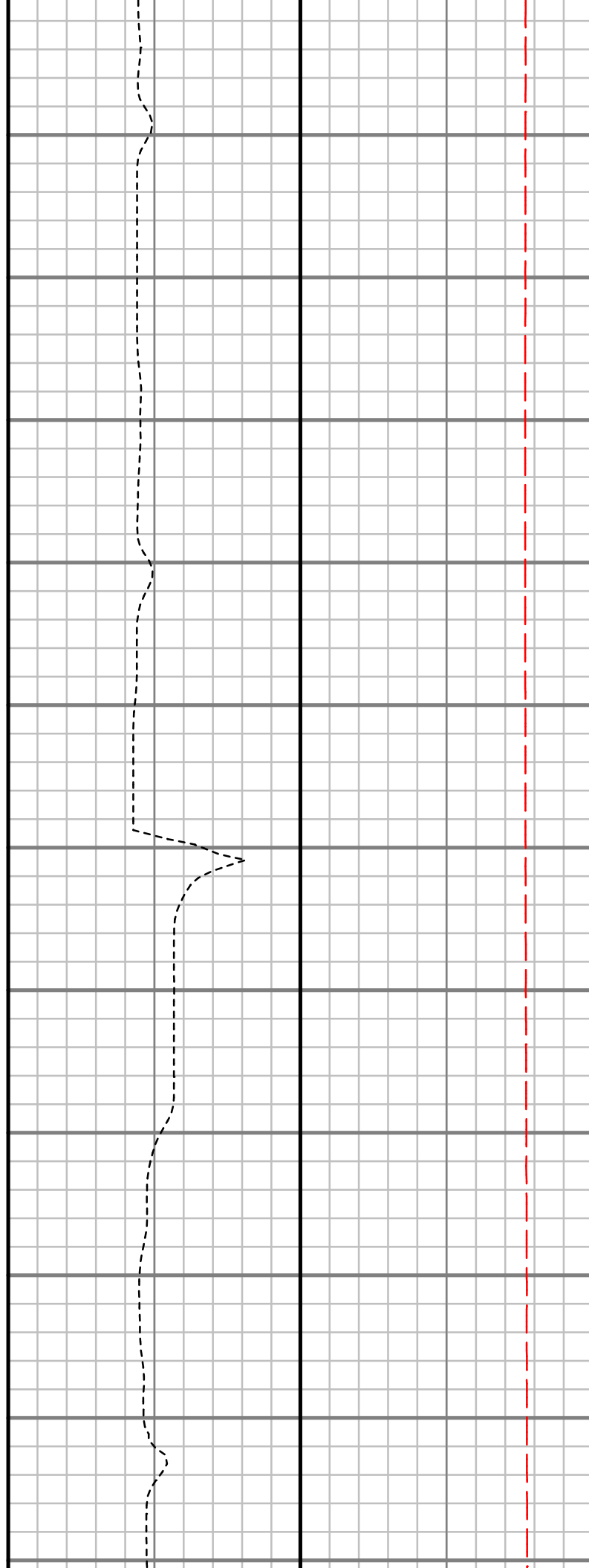
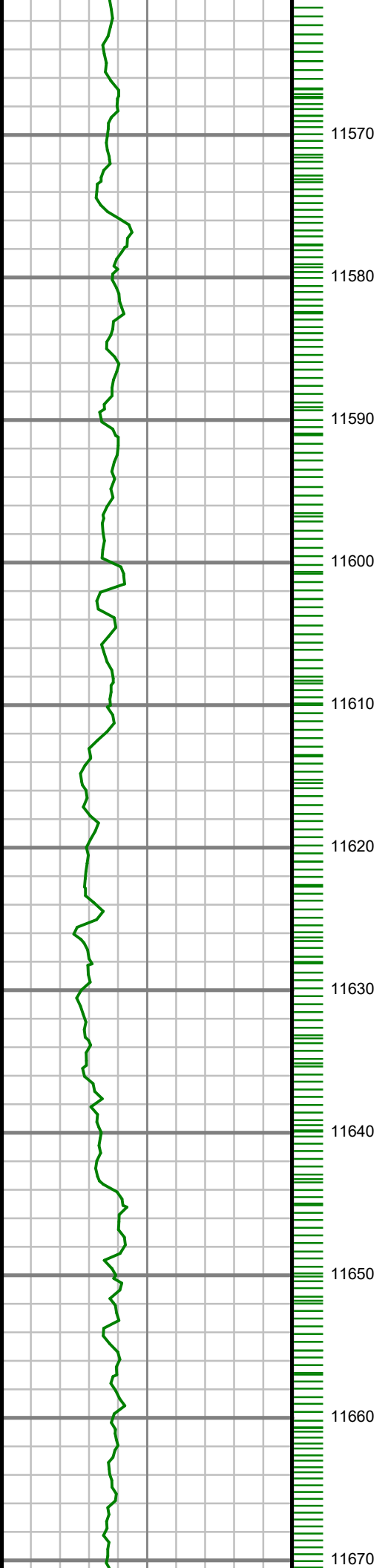
S: 121 MD: 11373.00 ft
Inc: 90.70 deg Az: 2.20
deg TVD: 7327.13 ft



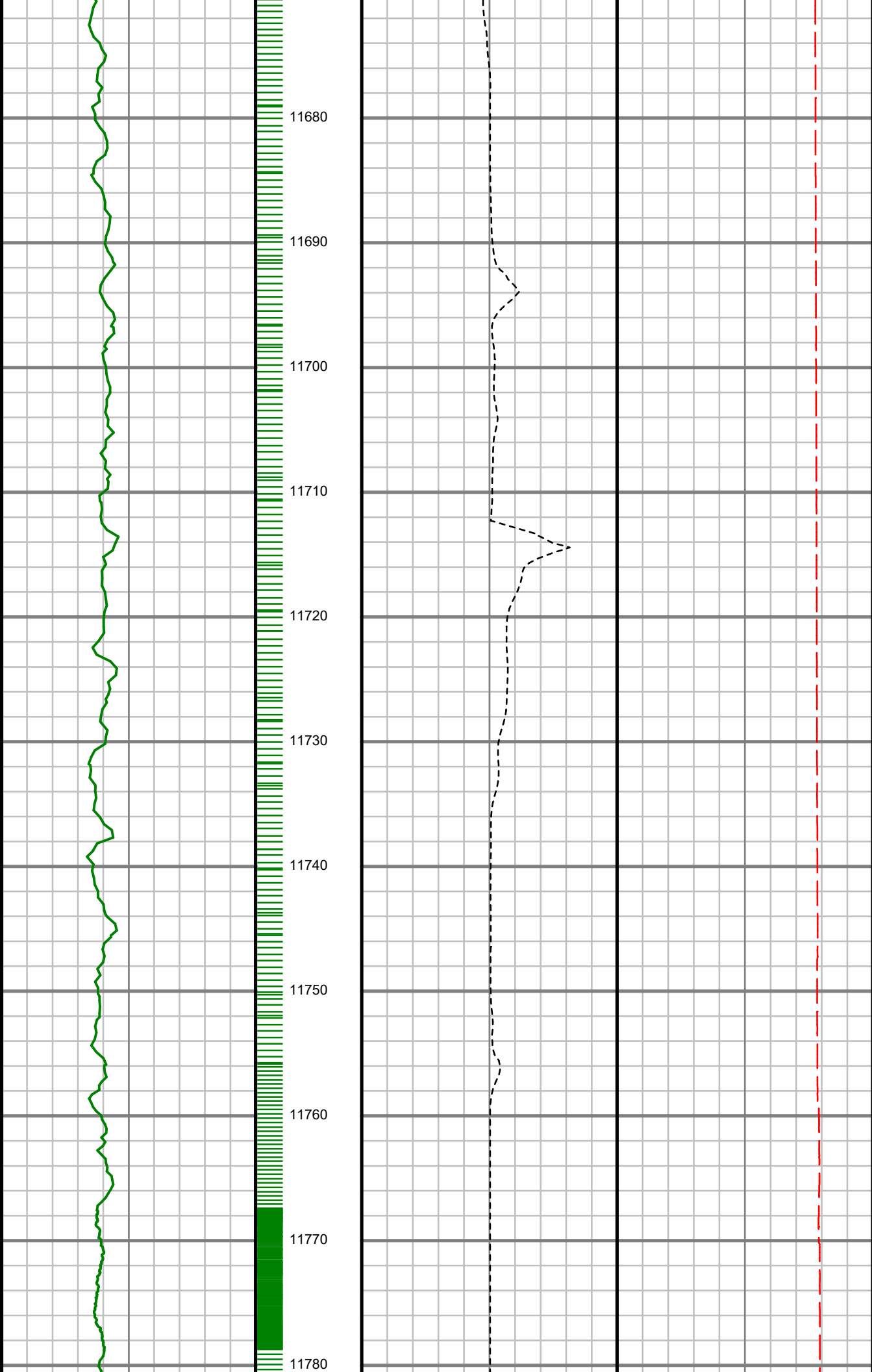
S: 122 MD: 11466.00 ft
Inc: 90.94 deg Az: 1.67
deg TVD: 7325.80 ft

S: 122 MD: 11560.00 ft

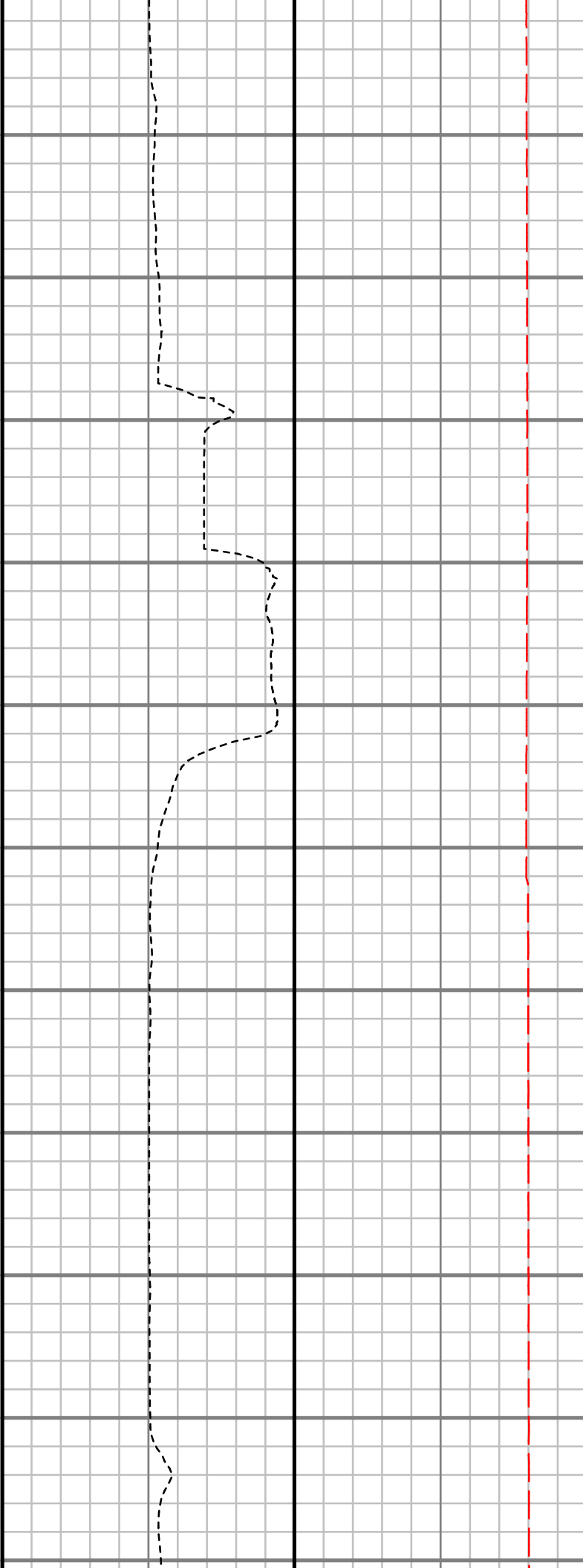
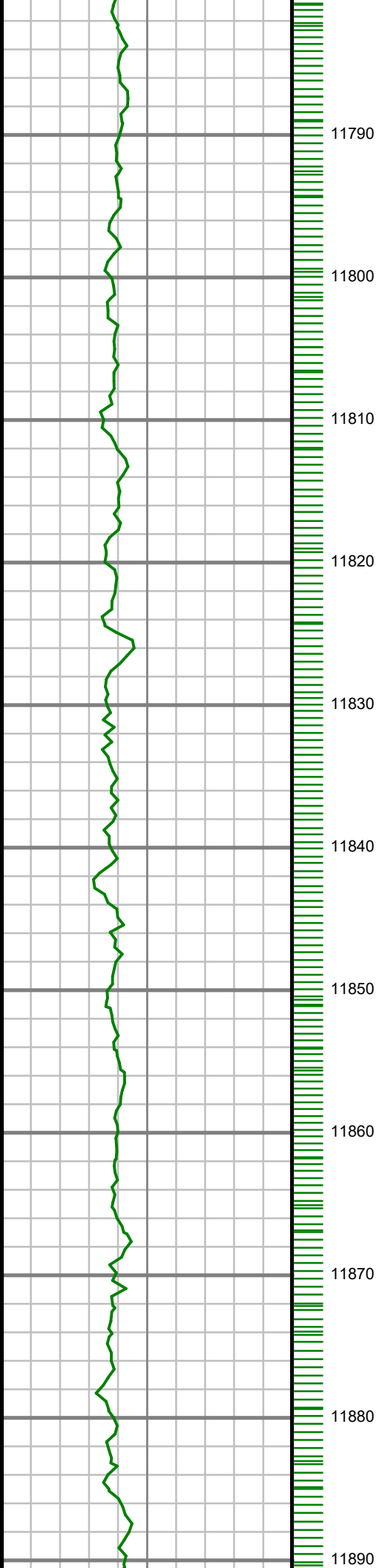
S: 123 MD: 11560.00 ft
Inc: 90.44 deg Az: 1.24
deg TVD: 7324.66 ft



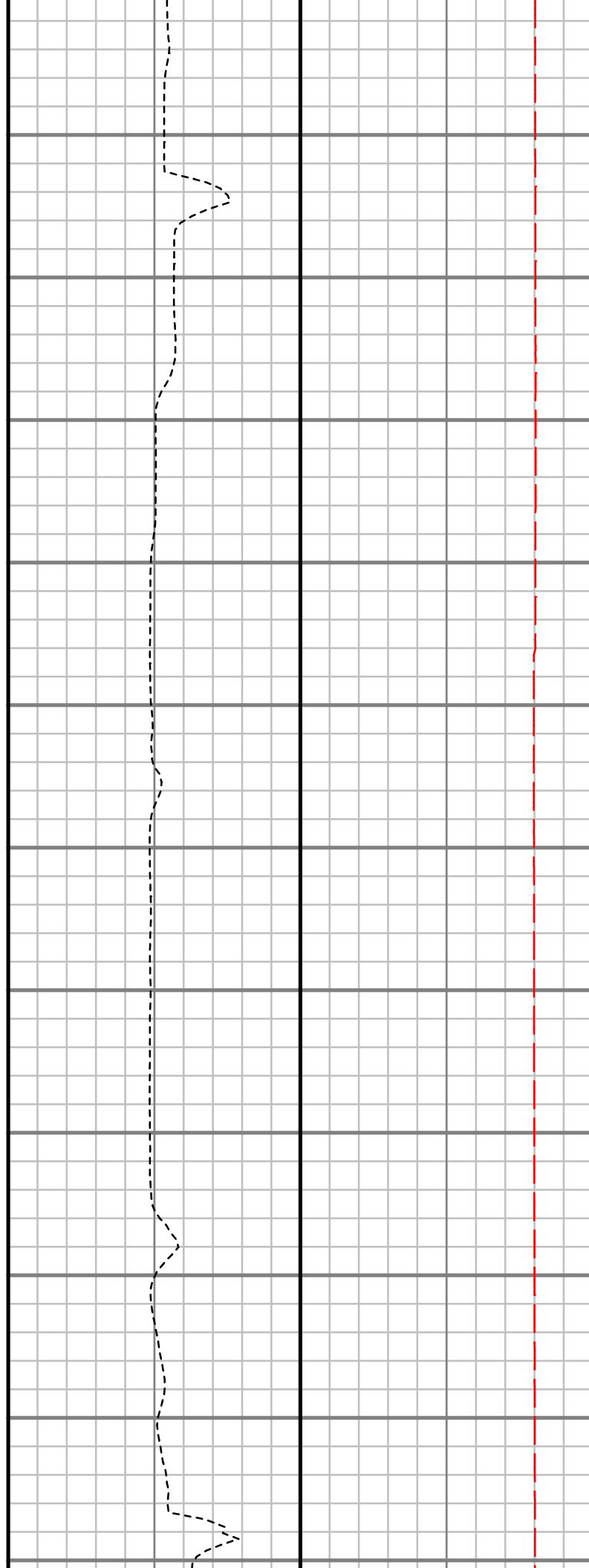
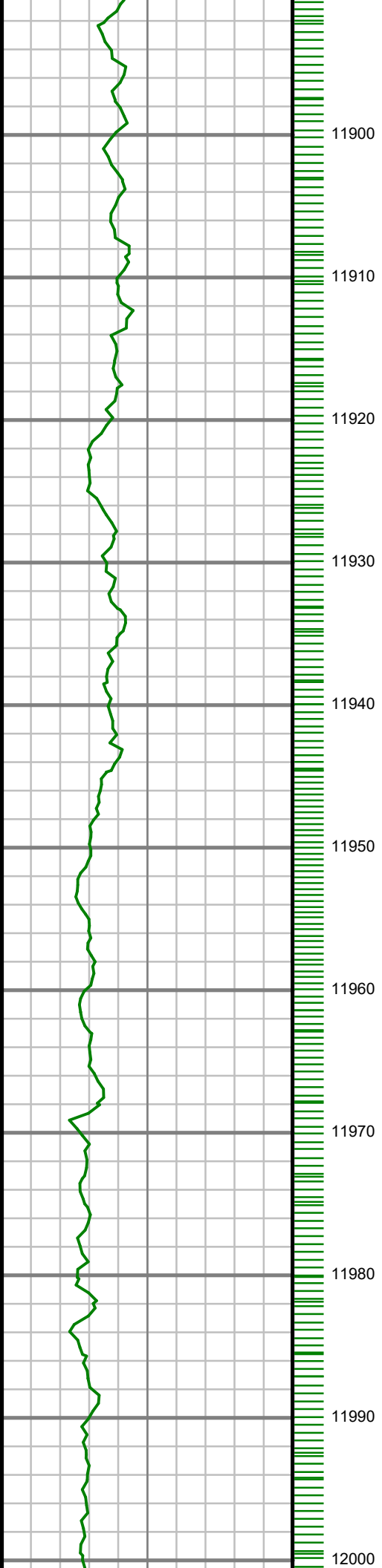
S: 124 MD: 11653.00 ft
Inc: 91.04 deg Az: 1.51
deg TVD: 7323.46 ft



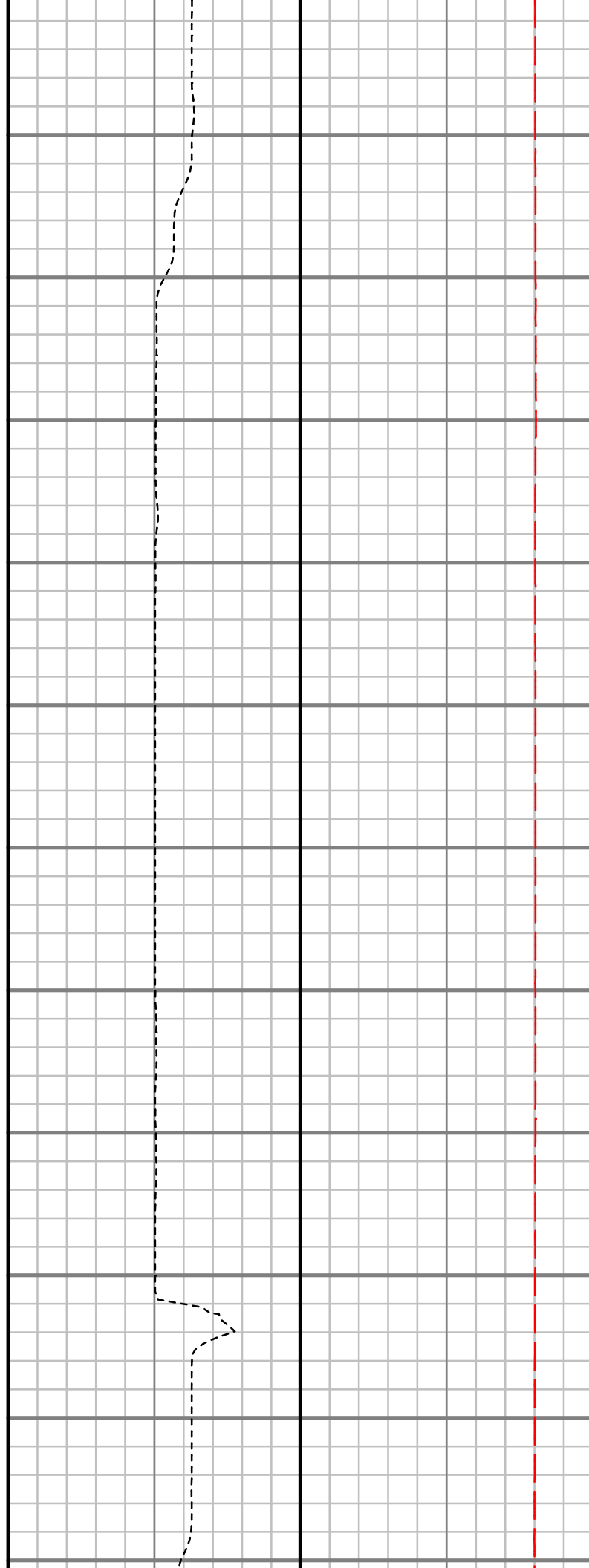
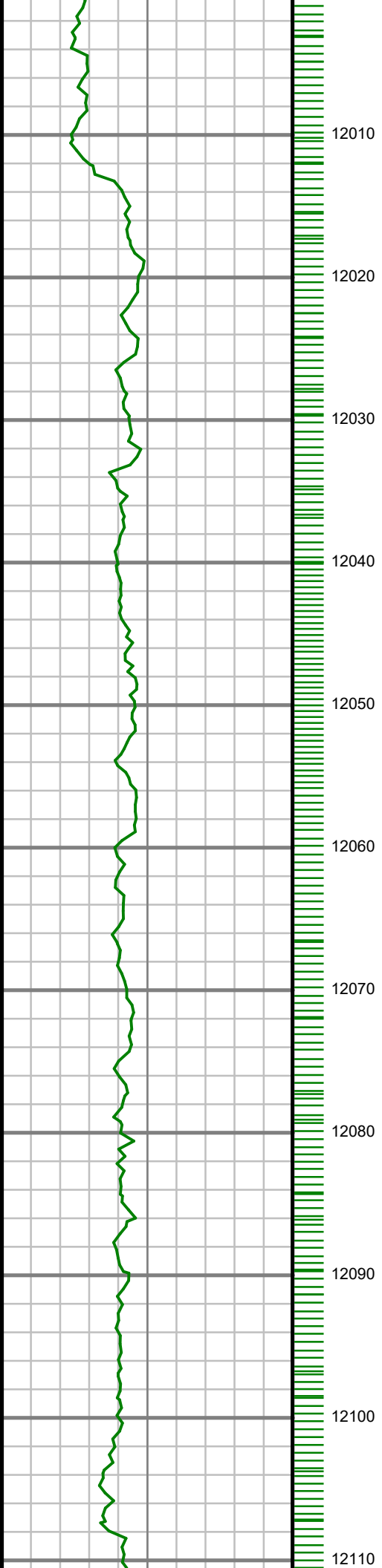
S: 125 MD: 11746.00 ft
Inc: 92.42 deg Az: 1.87
deg TVD: 7320.65 ft



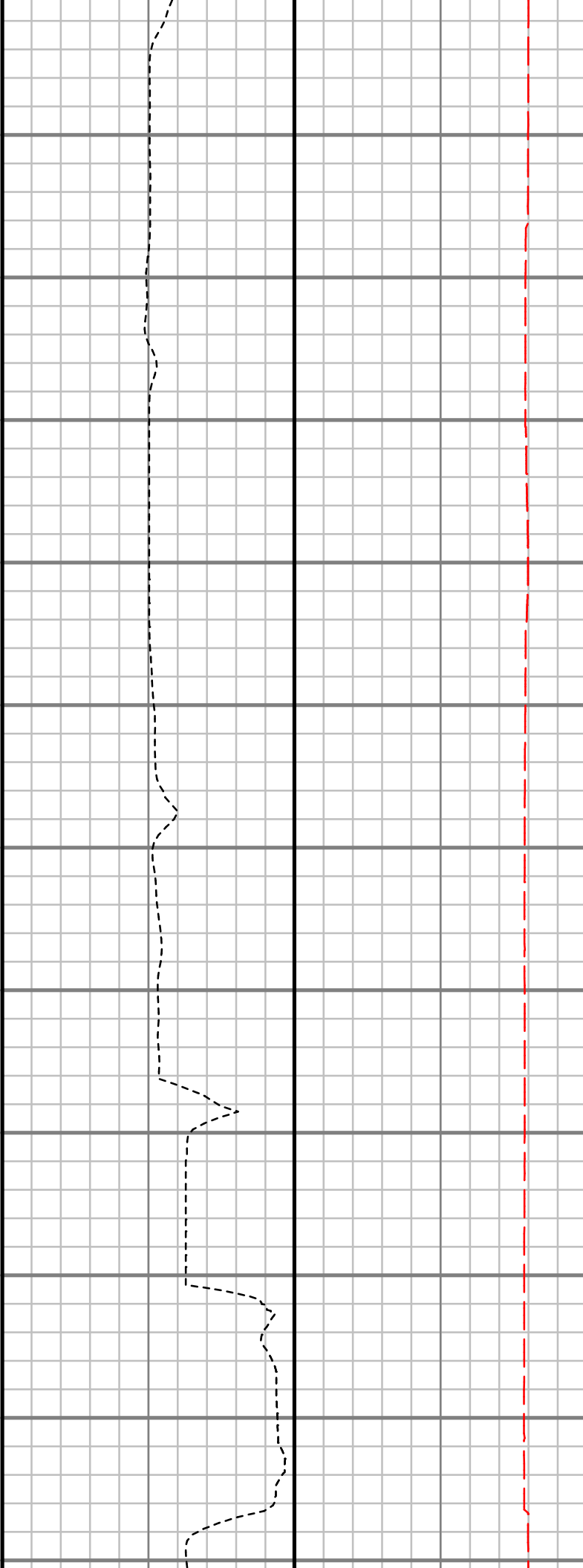
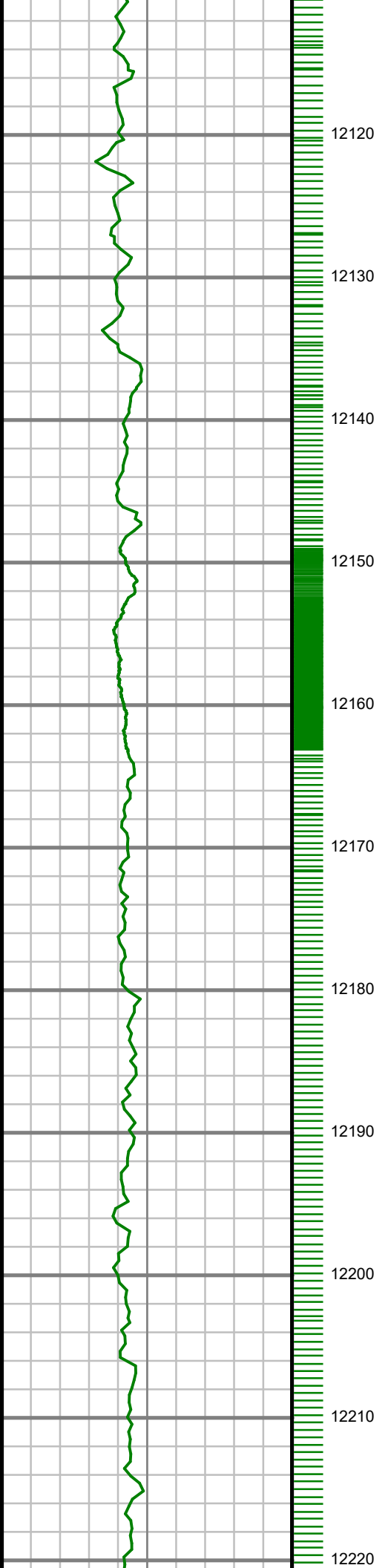
S: 126 MD: 11841.00 ft
Inc: 91.07 deg Az: 1.06
deg TVD: 7317.76 ft



S: 127 MD: 11934.00 ft
Inc: 89.09 deg Az:
359.63 deg TVD:
7317.63 ft

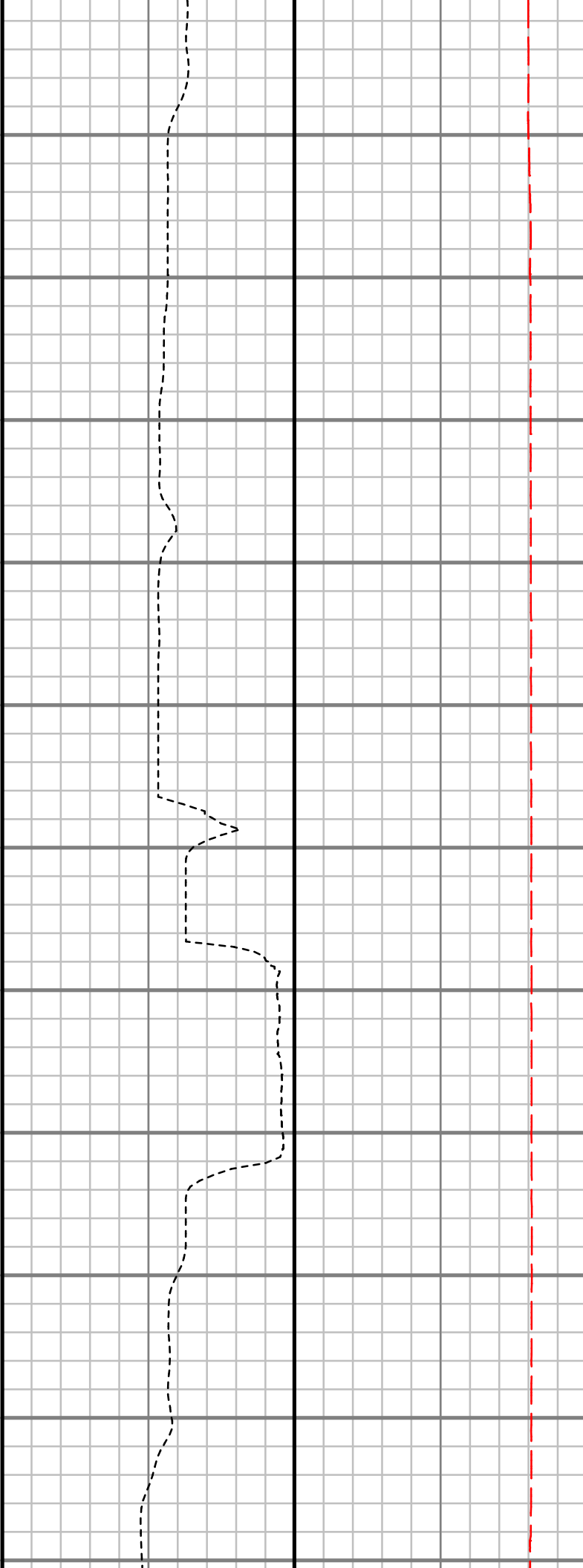
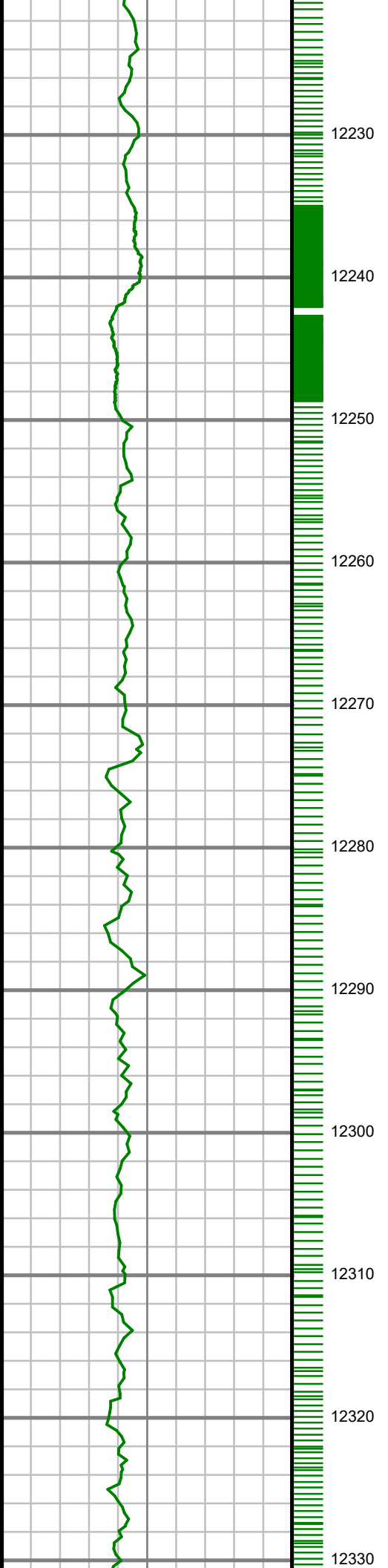


S: 128 MD: 12029.00 ft
Inc: 89.23 deg Az:
359.51 deg TVD:
7319.02 ft



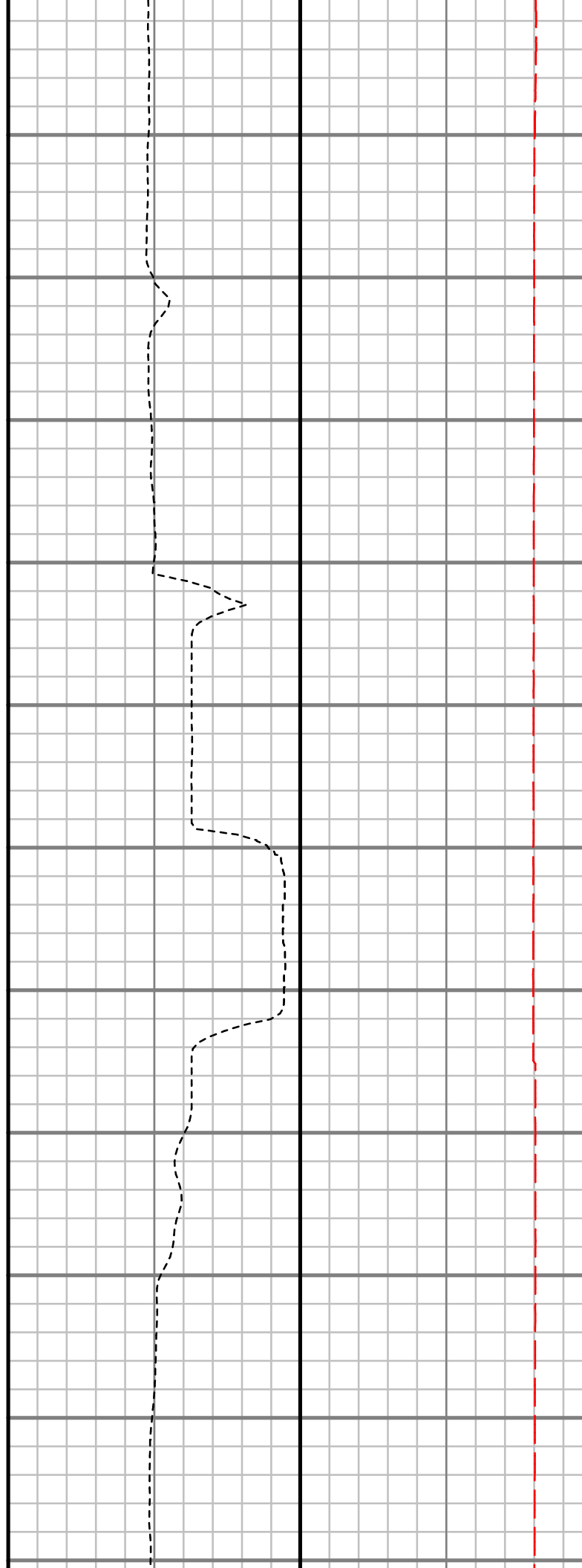
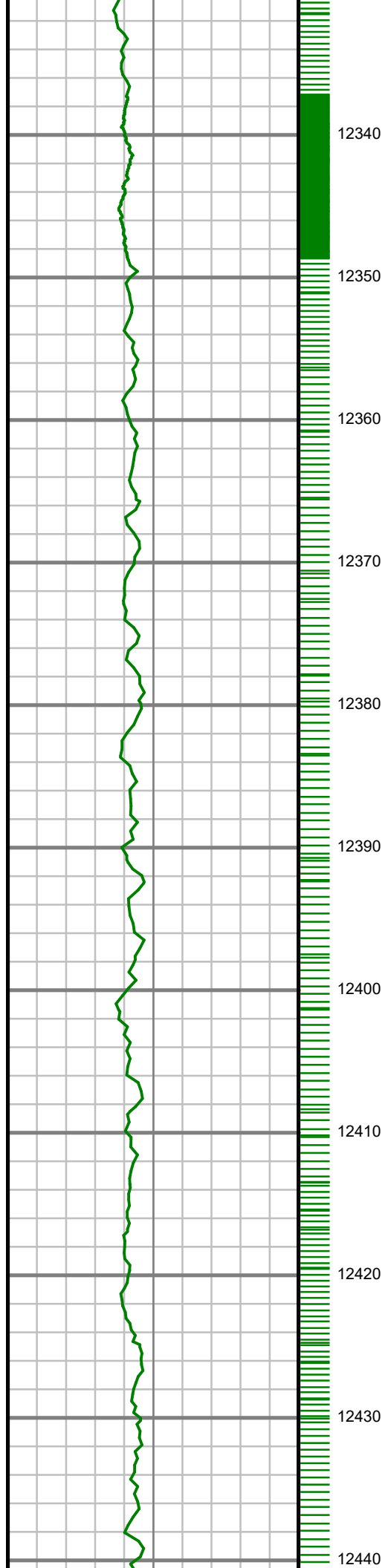
S: 129 MD: 12123.00 ft
Inc: 88.46 deg Az:
358.07 deg TVD:
7320.92 ft

S: 130 MD: 12217.00 ft
Inc: 88.49 deg Az:
359.70 deg TVD:

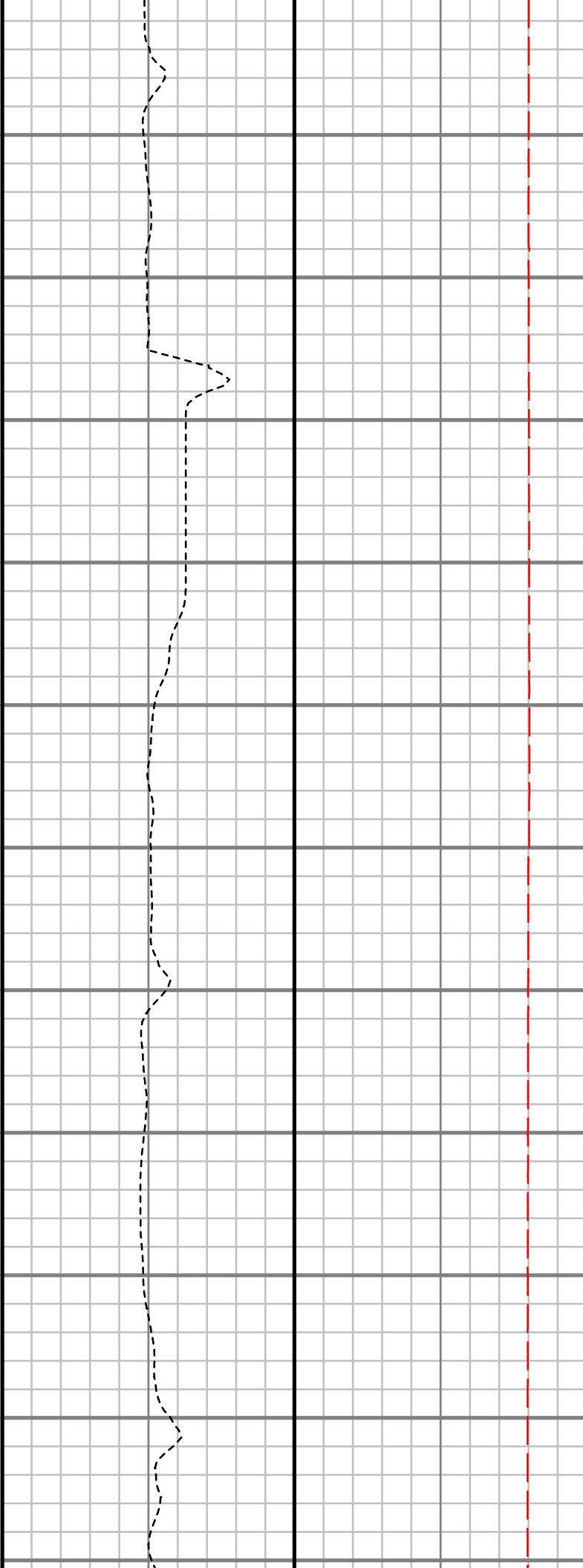
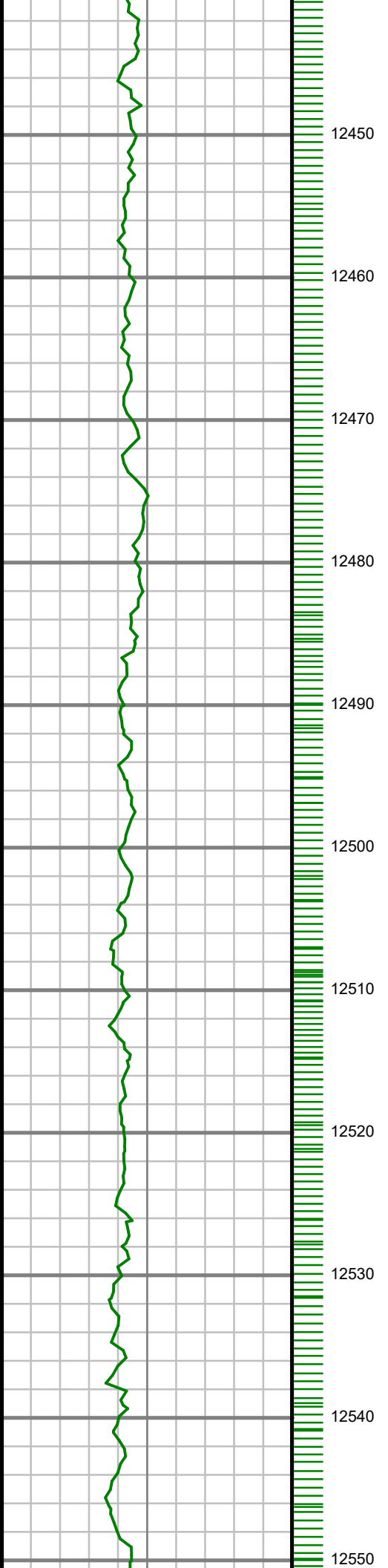


7323.42 ft

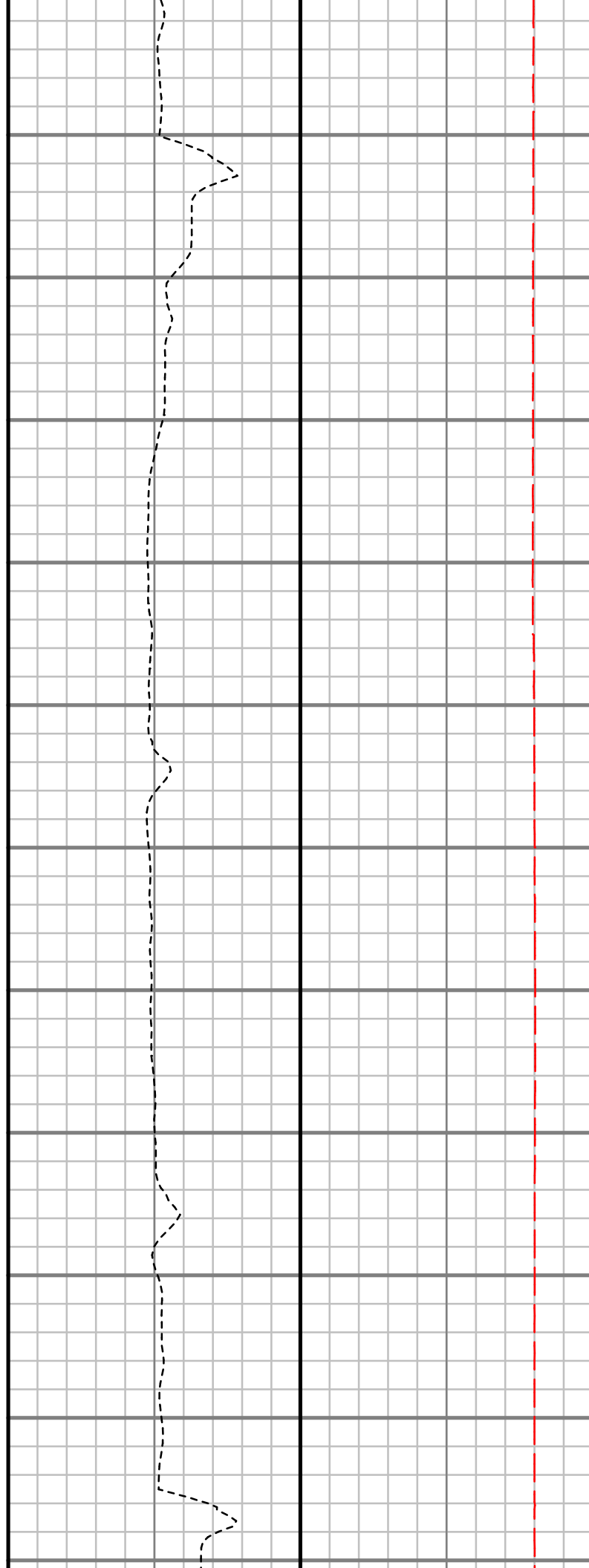
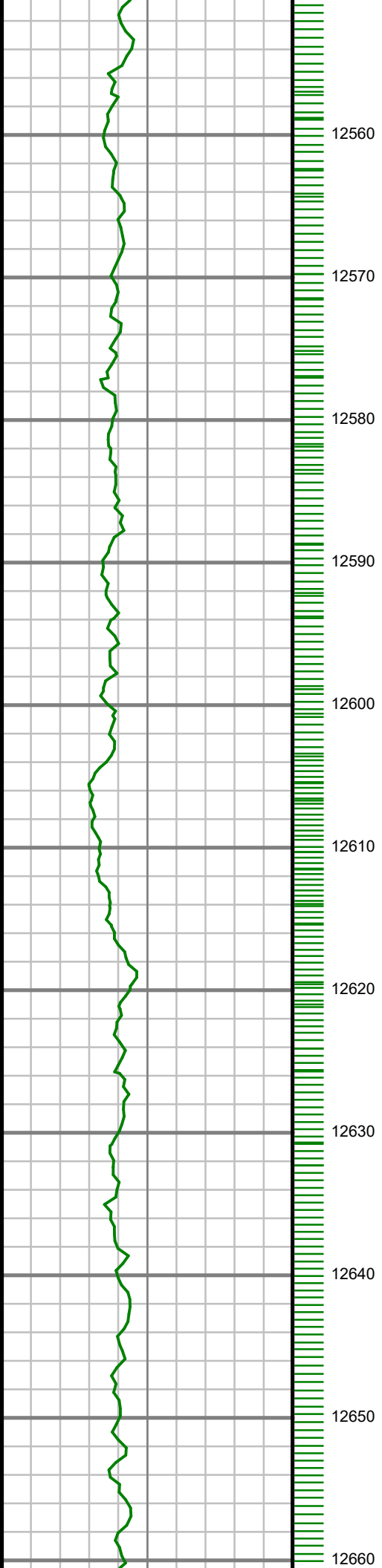
S: 131 MD: 12312.00 ft
Inc: 89.43 deg Az: 1.09
deg TVD: 7325.15 ft



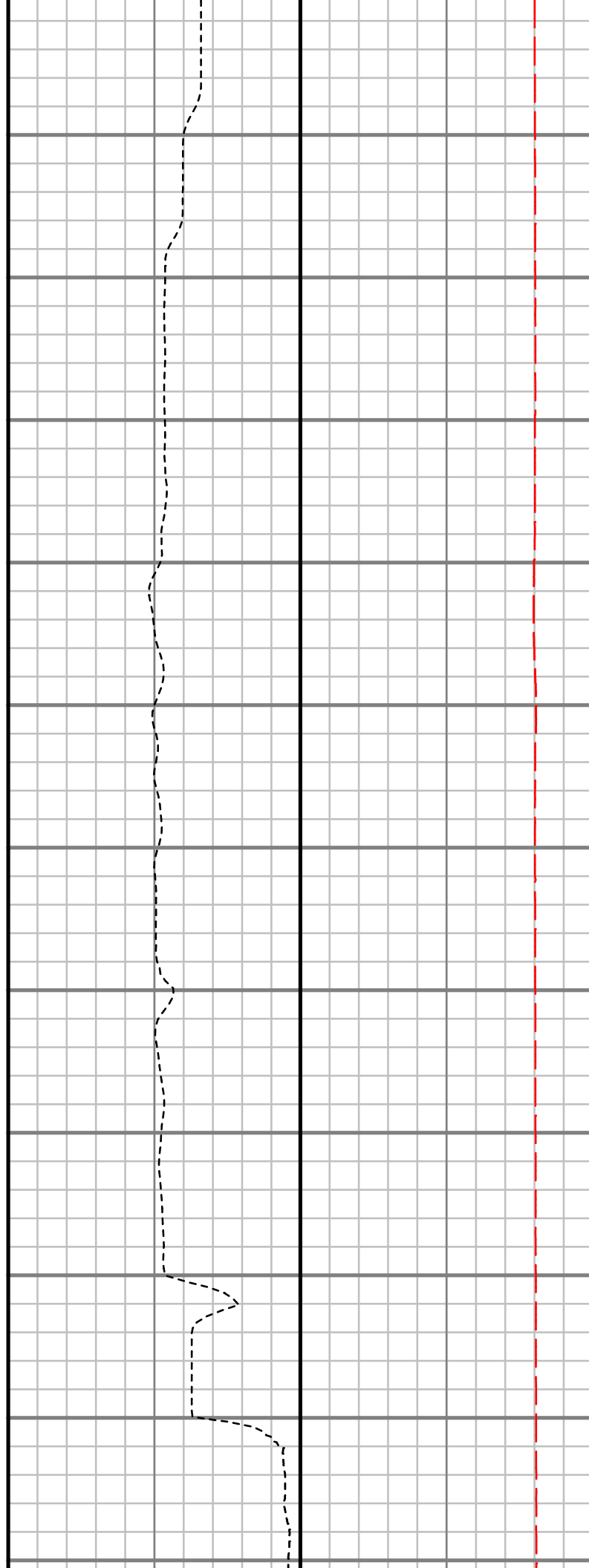
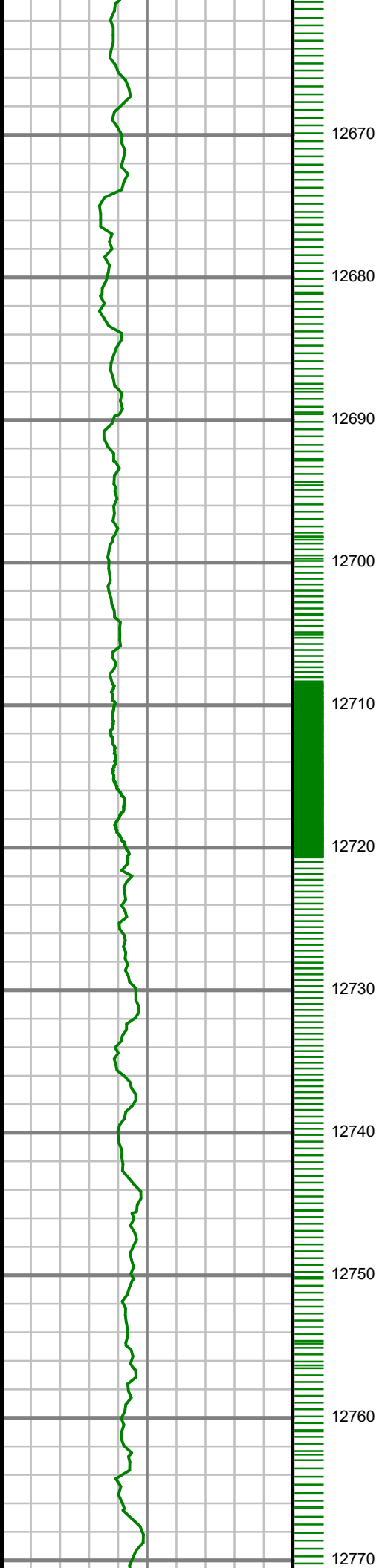
S: 132 MD: 12405.00 ft
Inc: 90.74 deg Az: 0.74
deg TVD: 7325.01 ft



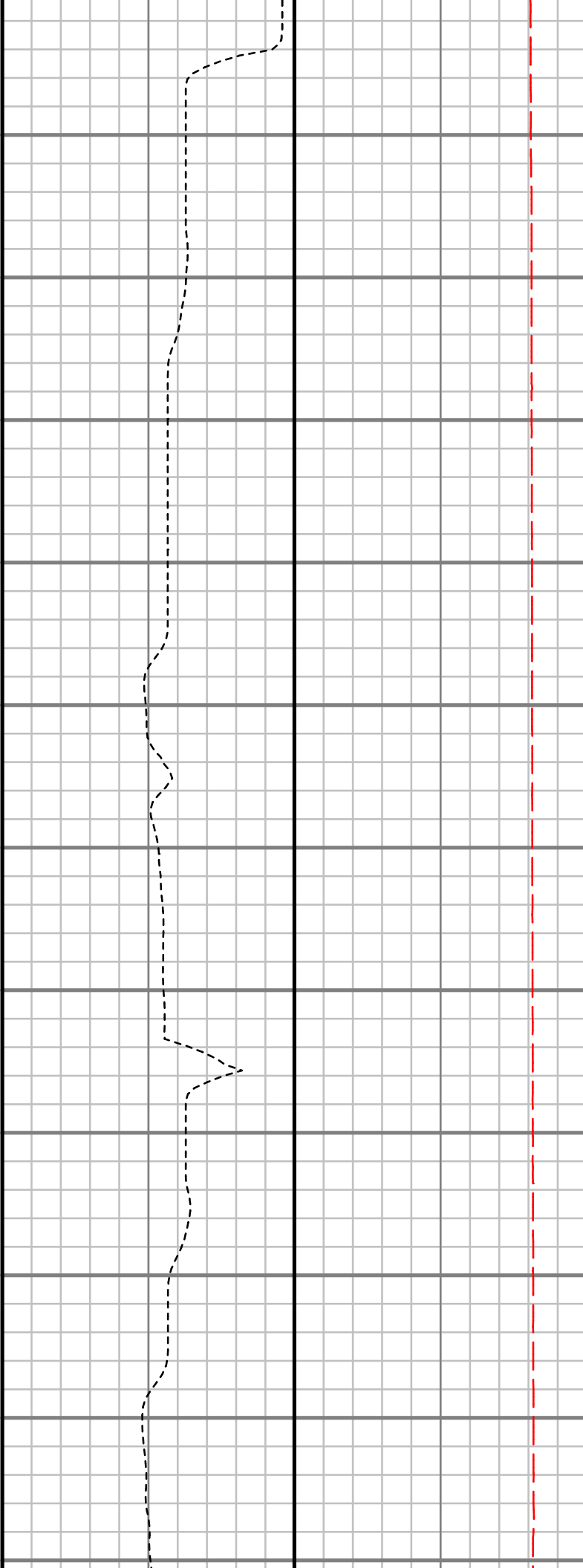
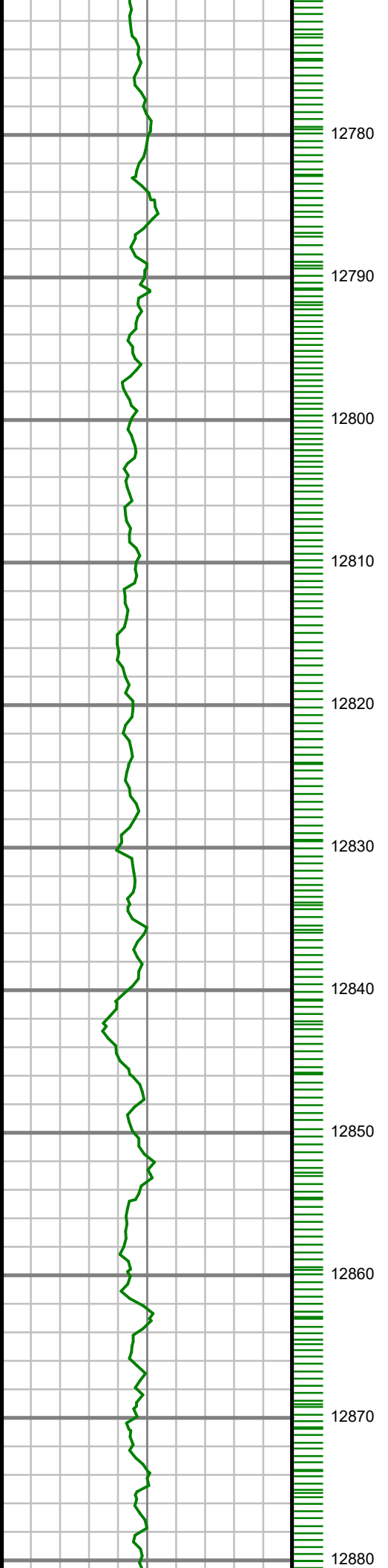
S: 133 MD: 12500.00 ft
Inc: 90.47 deg Az: 0.06
deg TVD: 7324.00 ft



S: 134 MD: 12594.00 ft
Inc: 90.57 deg Az:
359.66 deg TVD:
7323.15 ft

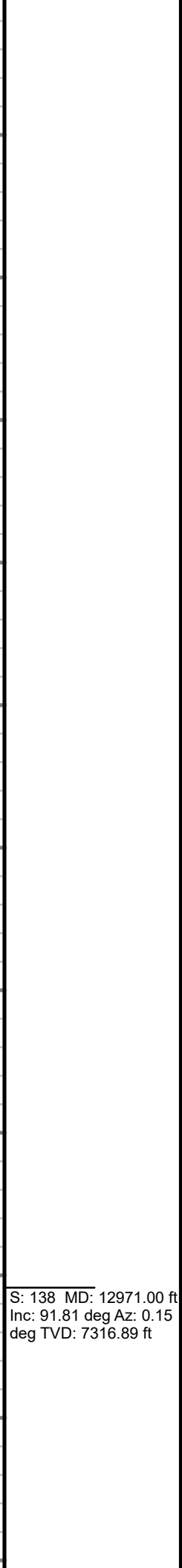
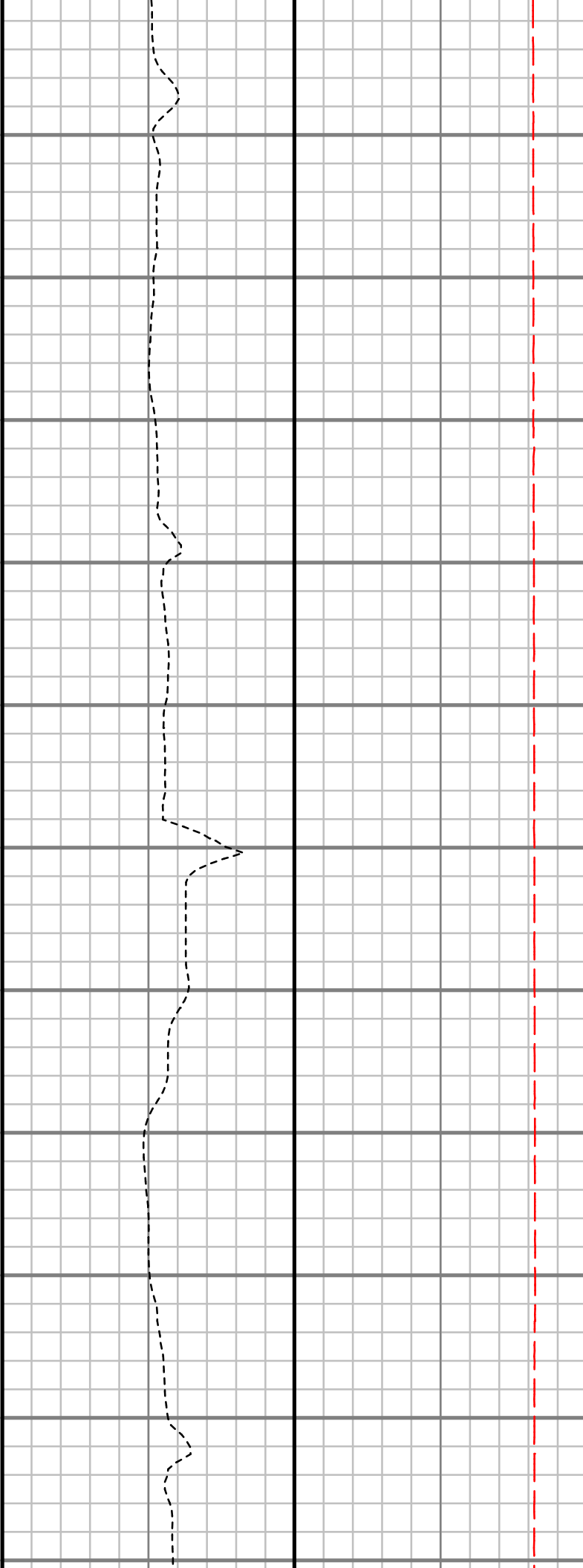
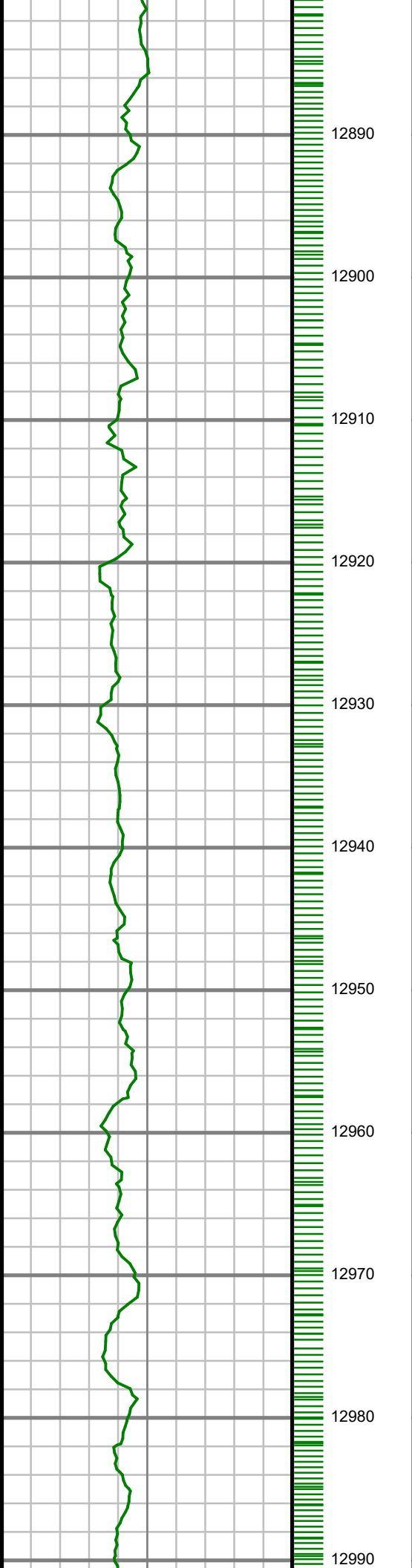


S: 135 MD: 12689.00 ft
Inc: 90.20 deg Az:
359.21 deg TVD:
7322.51 ft

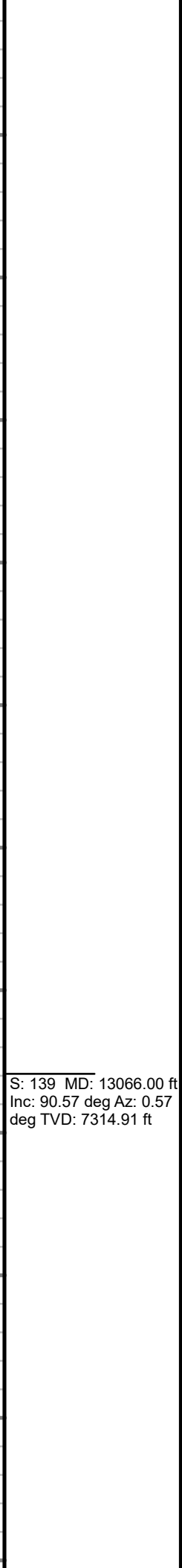
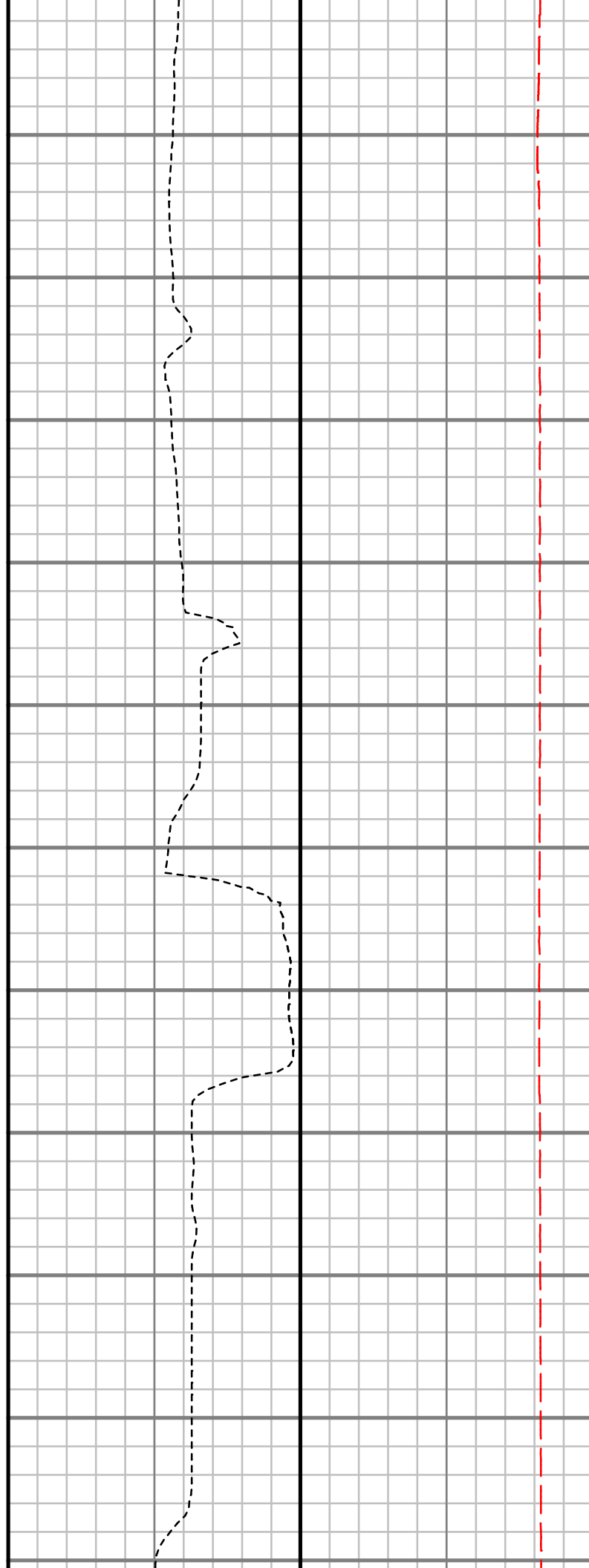
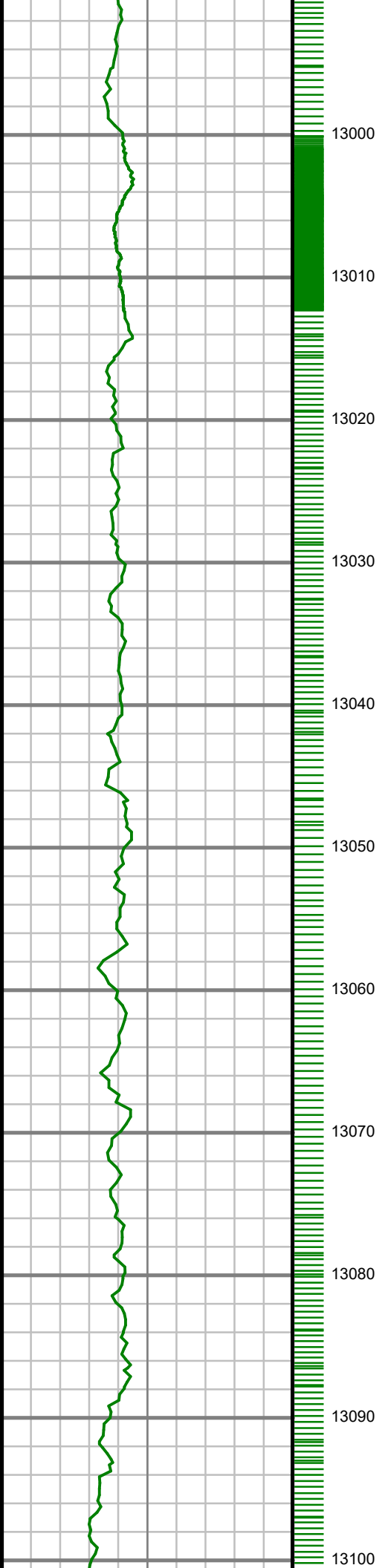


S: 136 MD: 12783.00 ft
Inc: 91.04 deg Az: 0.62
deg TVD: 7321.50 ft

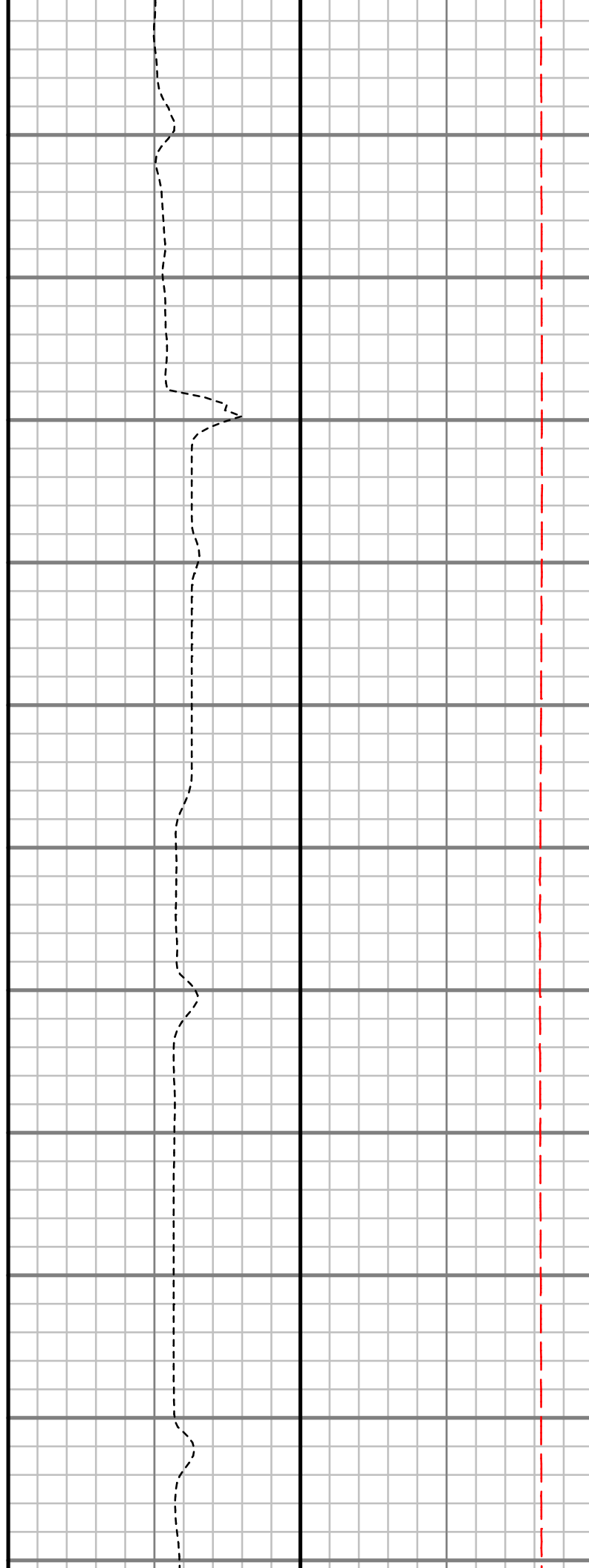
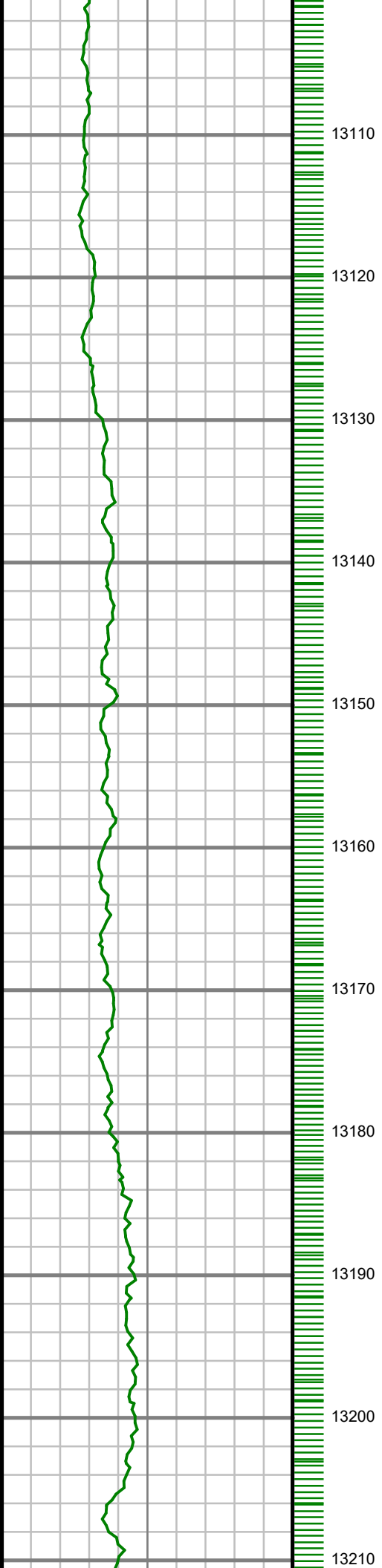
S: 137 MD: 12876.00 ft
Inc: 91.38 deg Az: 0.40
deg TVD: 7319.53 ft



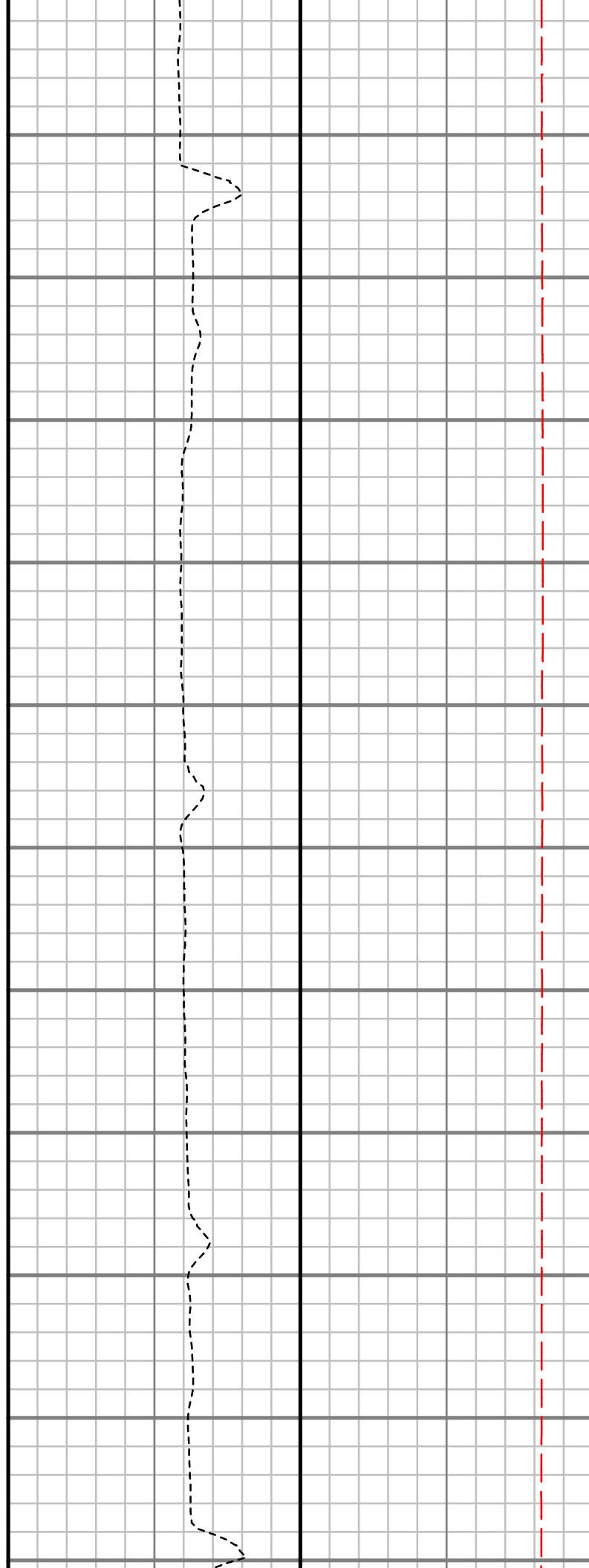
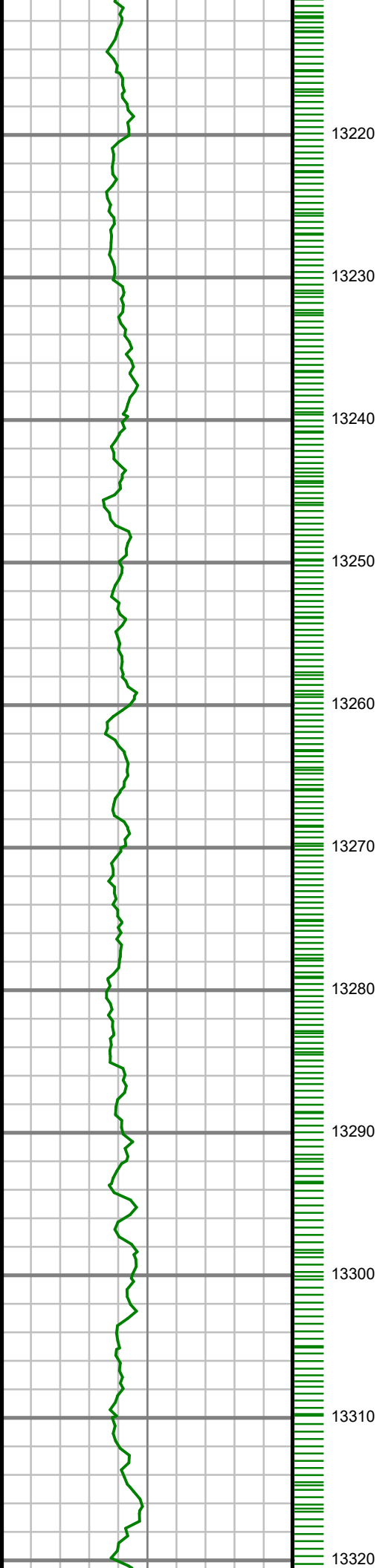
S: 138 MD: 12971.00 ft
Inc: 91.81 deg Az: 0.15
deg TVD: 7316.89 ft



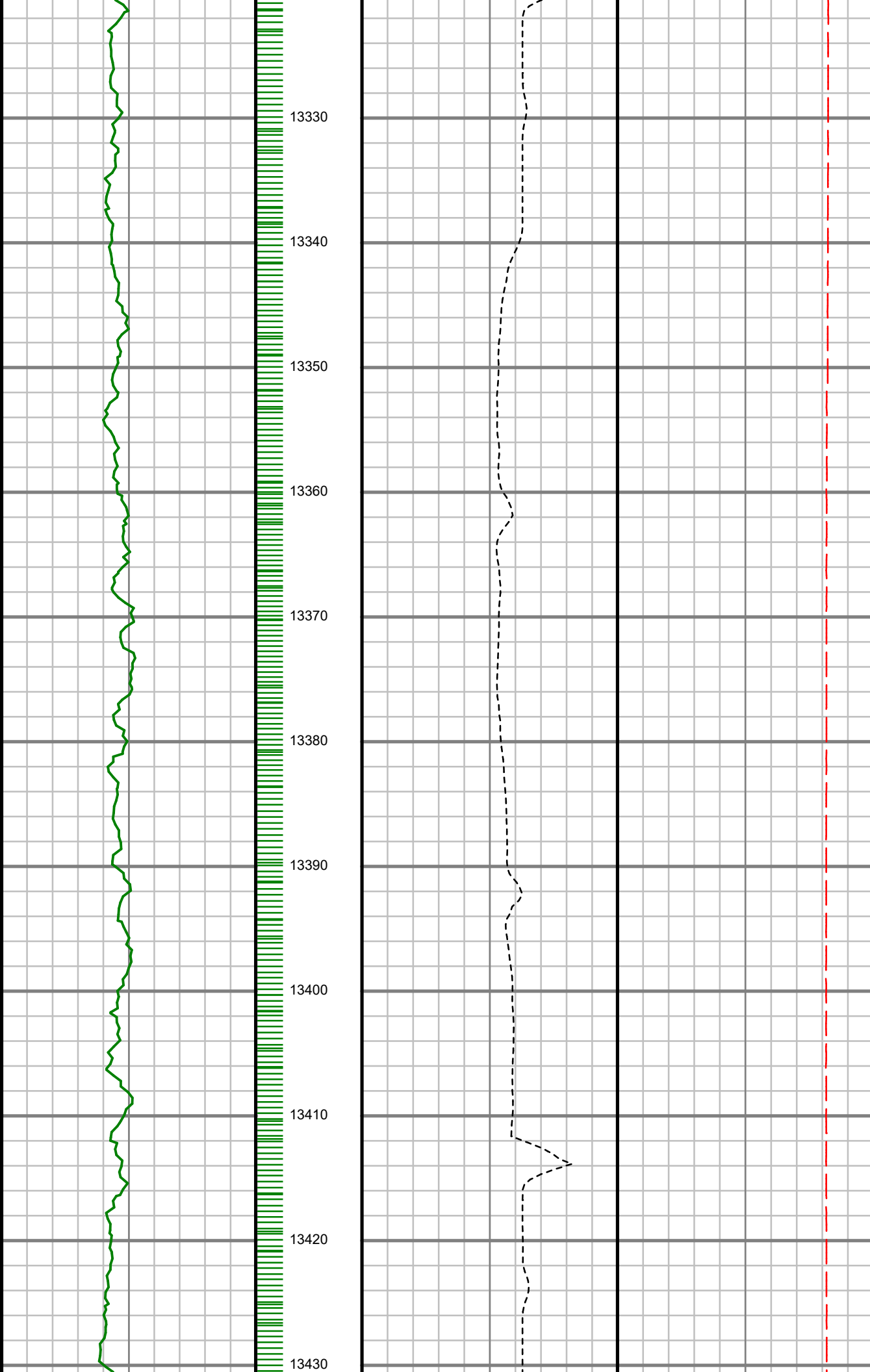
S: 139 MD: 13066.00 ft
Inc: 90.57 deg Az: 0.57
deg TVD: 7314.91 ft



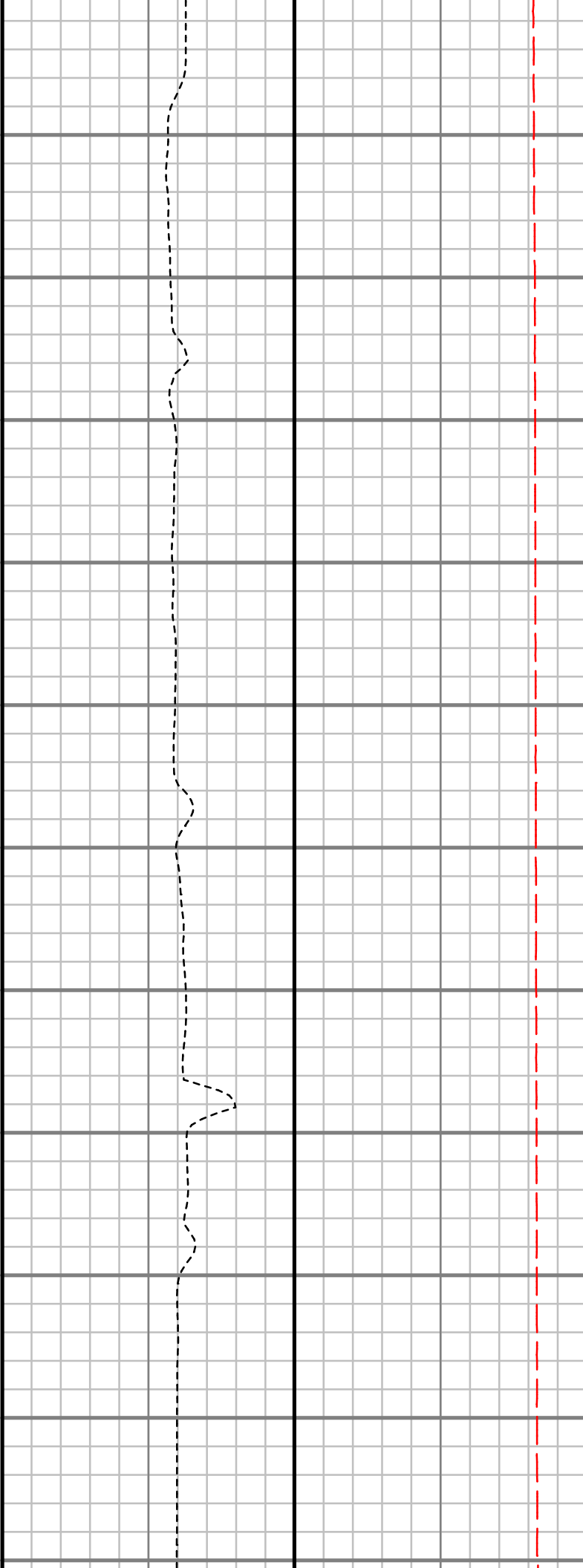
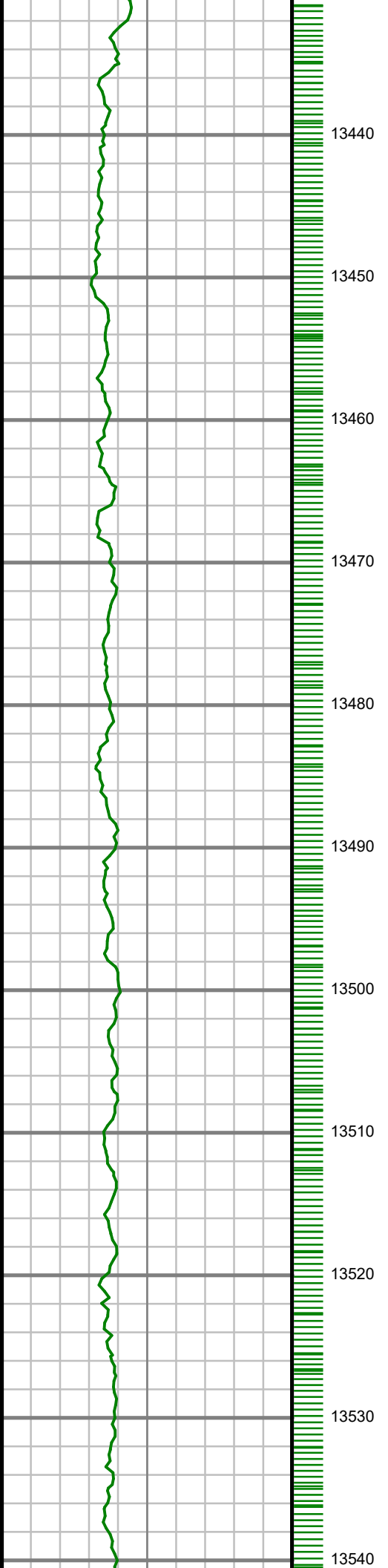
S: 140 MD: 13159.00 ft
Inc: 90.00 deg Az: 0.66
deg TVD: 7314.45 ft



S: 141 MD: 13254.00 ft
Inc: 90.17 deg Az: 0.15
deg TVD: 7314.31 ft

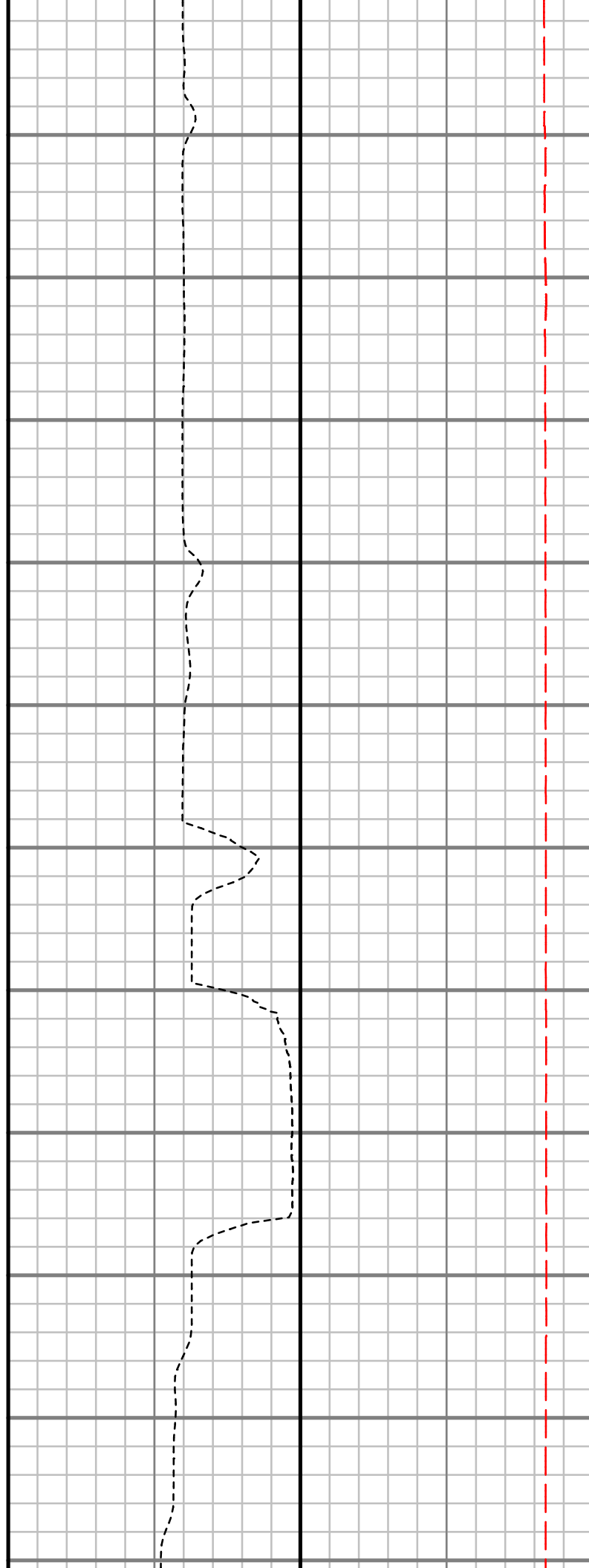
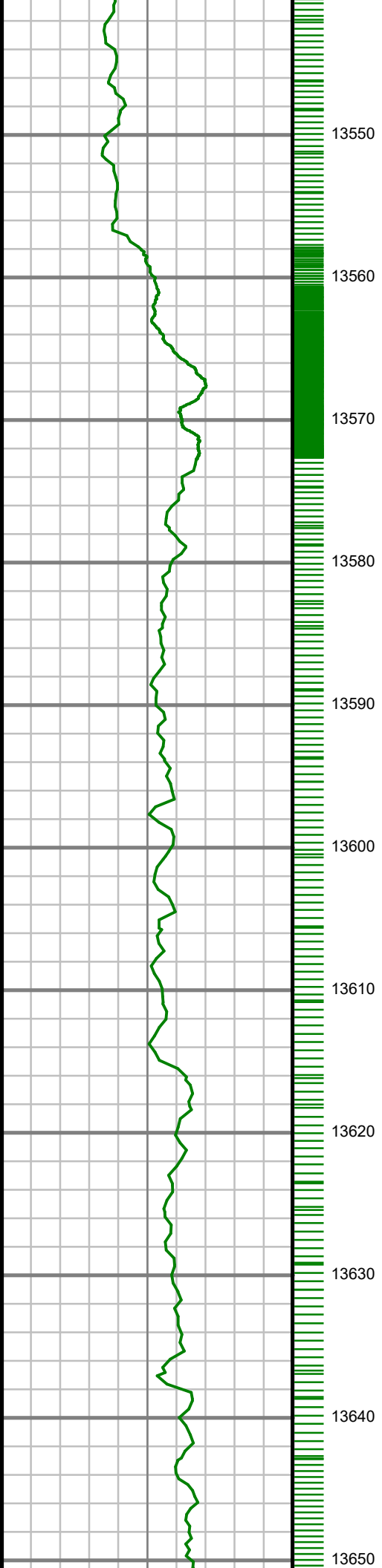


S: 142 MD: 13349.00 ft
Inc: 90.81 deg Az: 0.50
deg TVD: 7313.50 ft

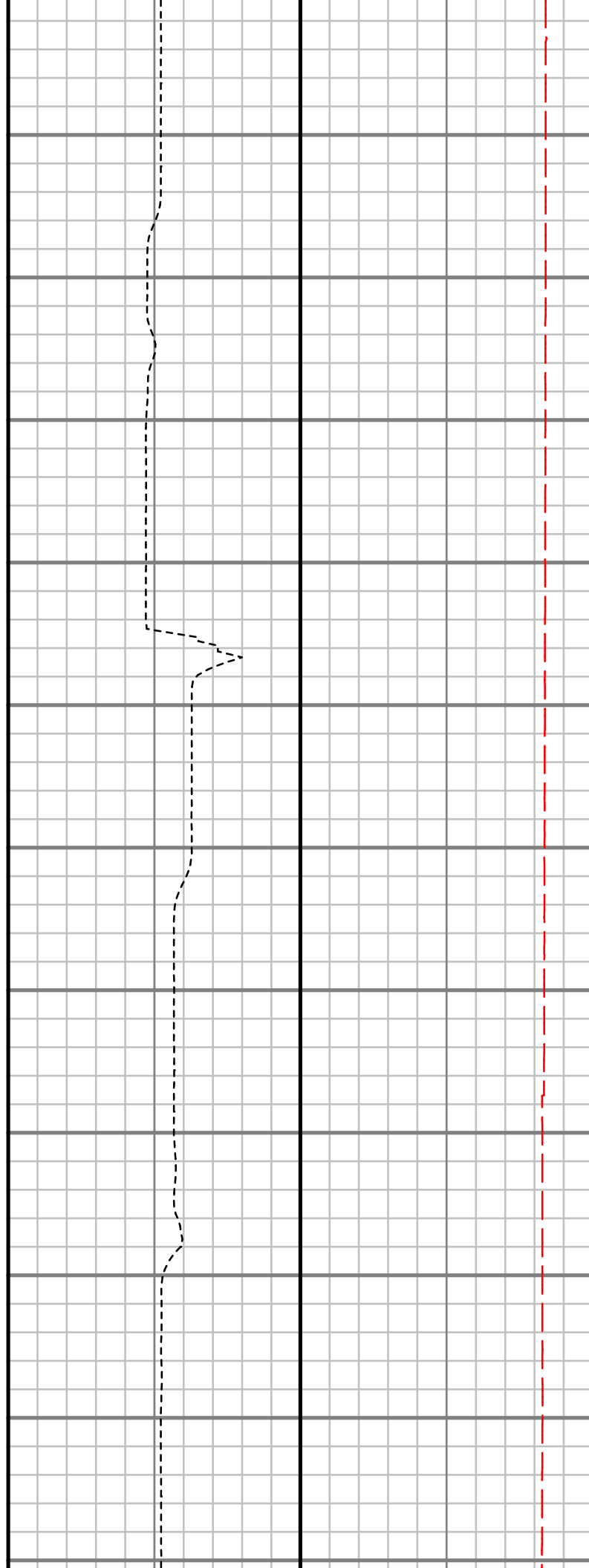
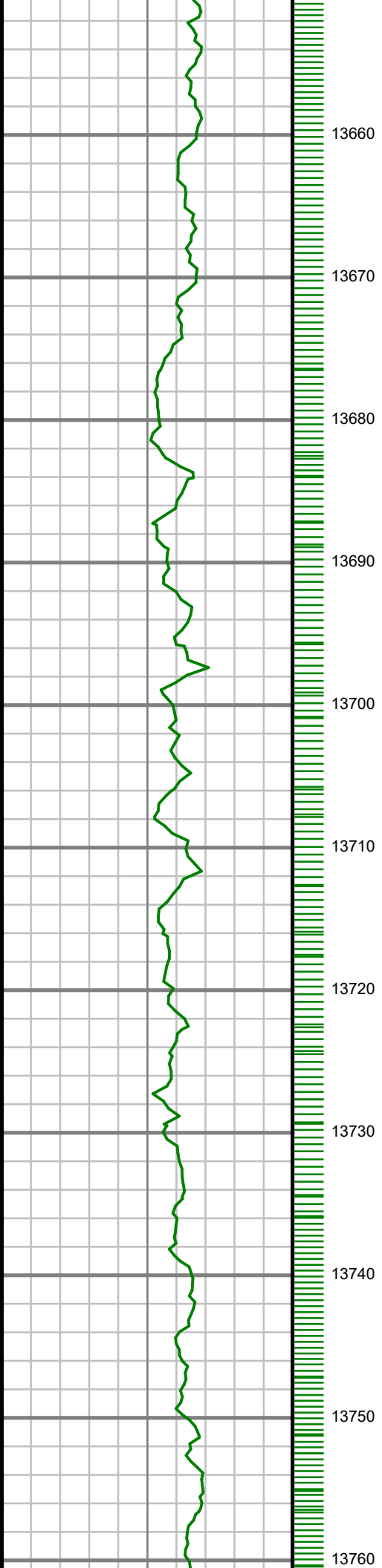


S: 143 MD: 13443.00 ft
Inc: 90.97 deg Az: 0.09
deg TVD: 7312.04 ft

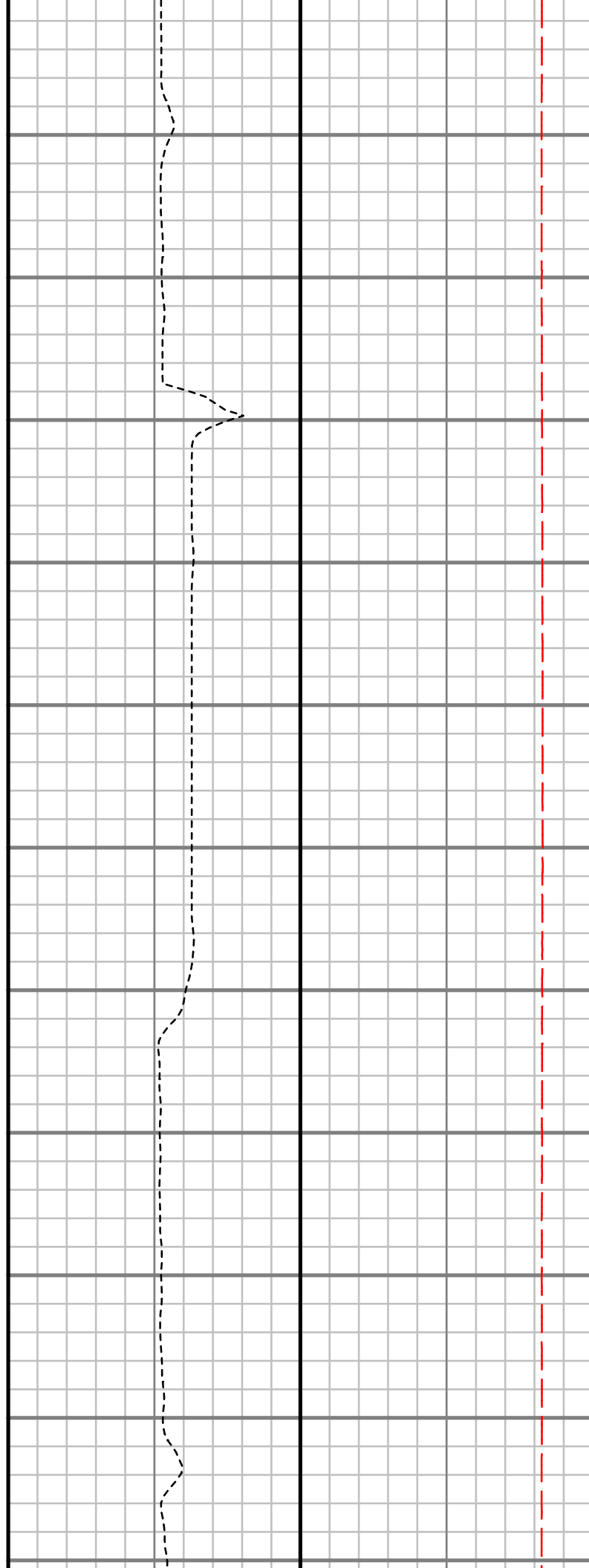
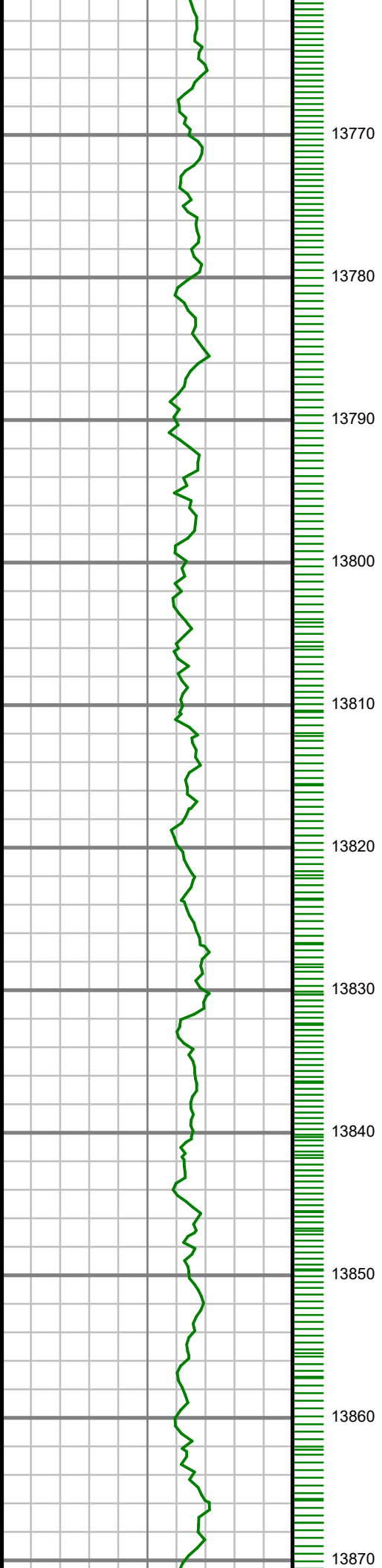
S: 144 MD: 13536.00 ft
Inc: 91.38 deg Az:
359.96 deg TVD:
7310 13 ft



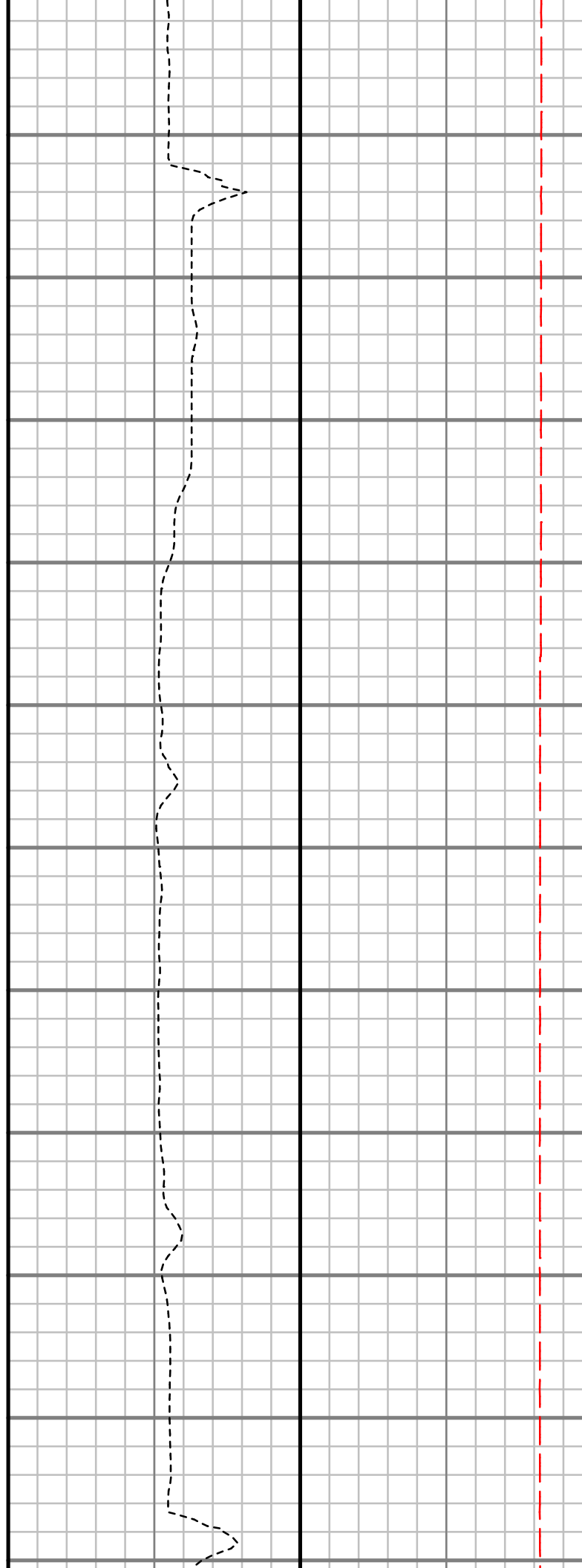
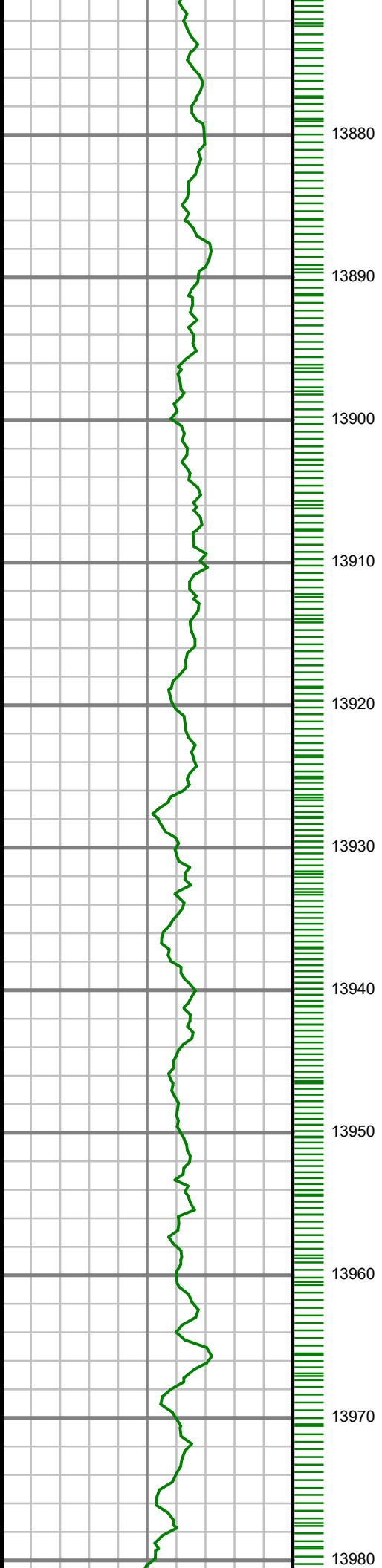
S: 145 MD: 13631.00 ft
Inc: 90.23 deg Az: 1.03
deg TVD: 7308.80 ft



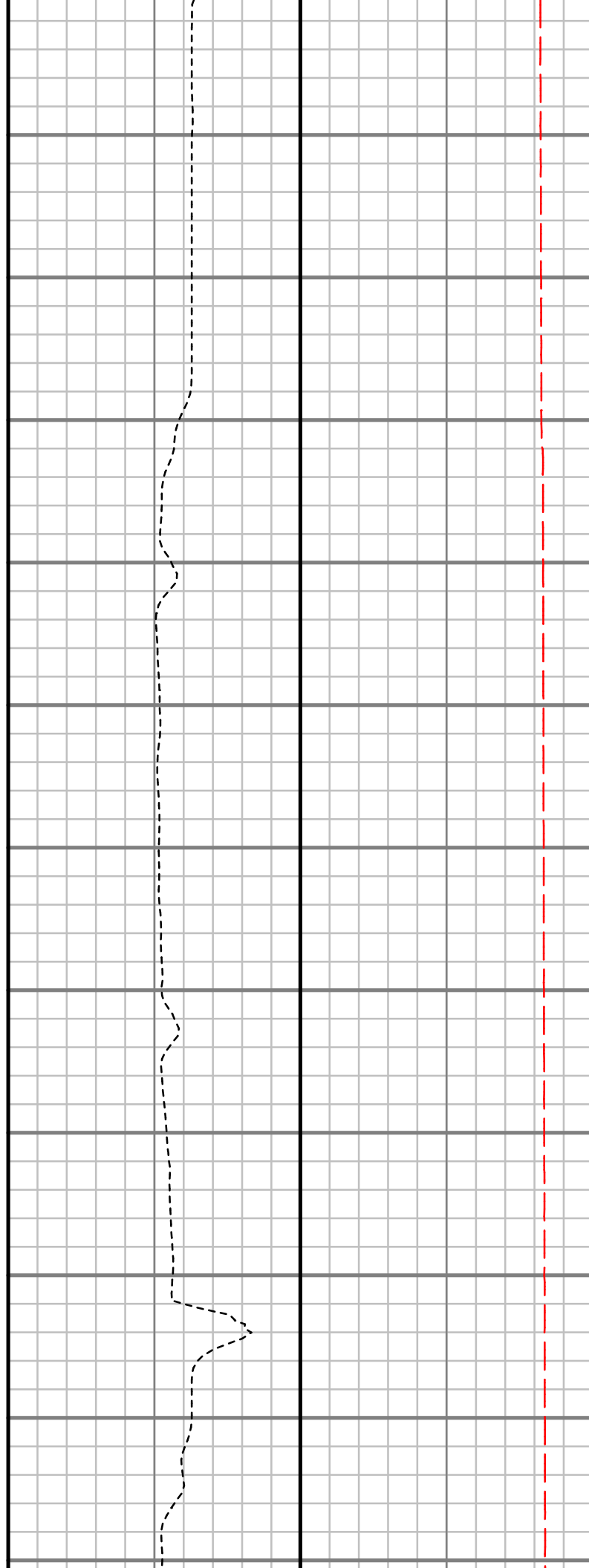
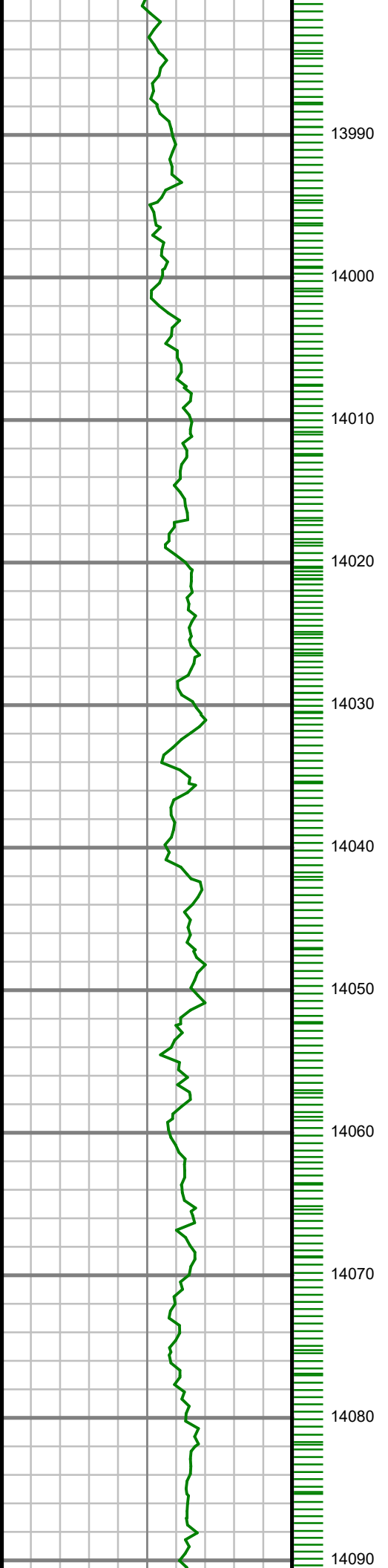
S: 146 MD: 13725.00 ft
Inc: 90.44 deg Az: 1.10
deg TVD: 7308.25 ft



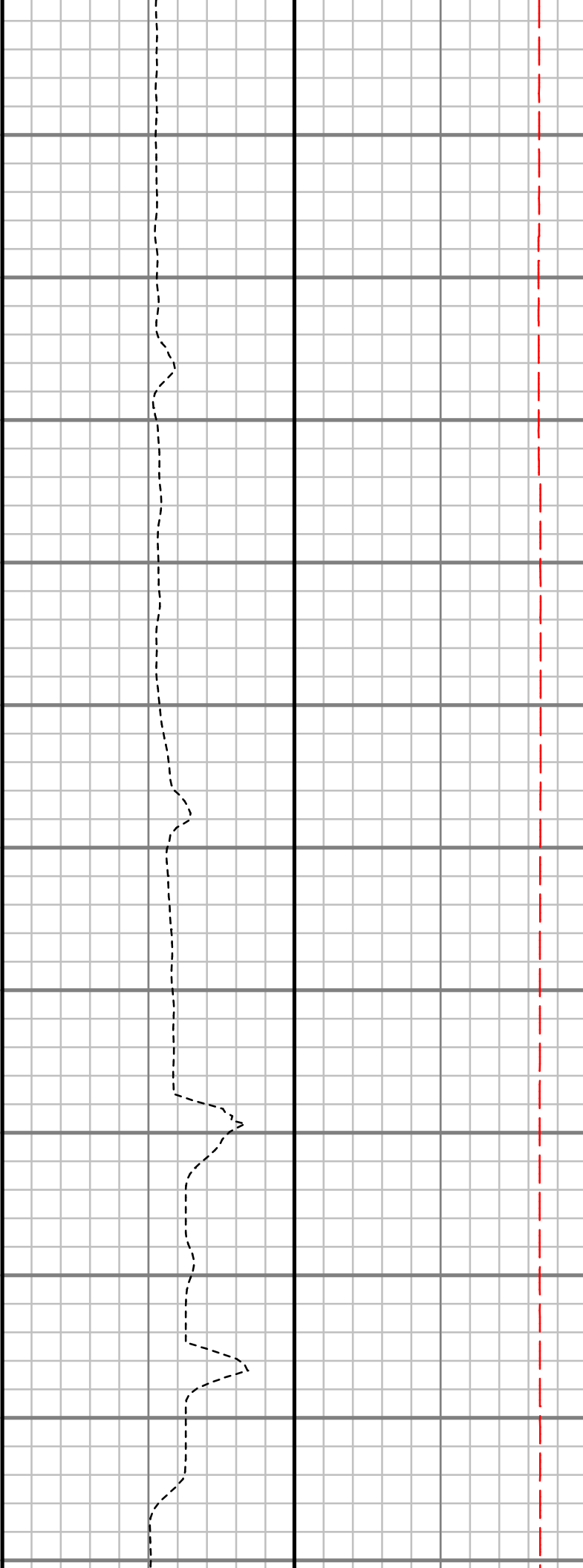
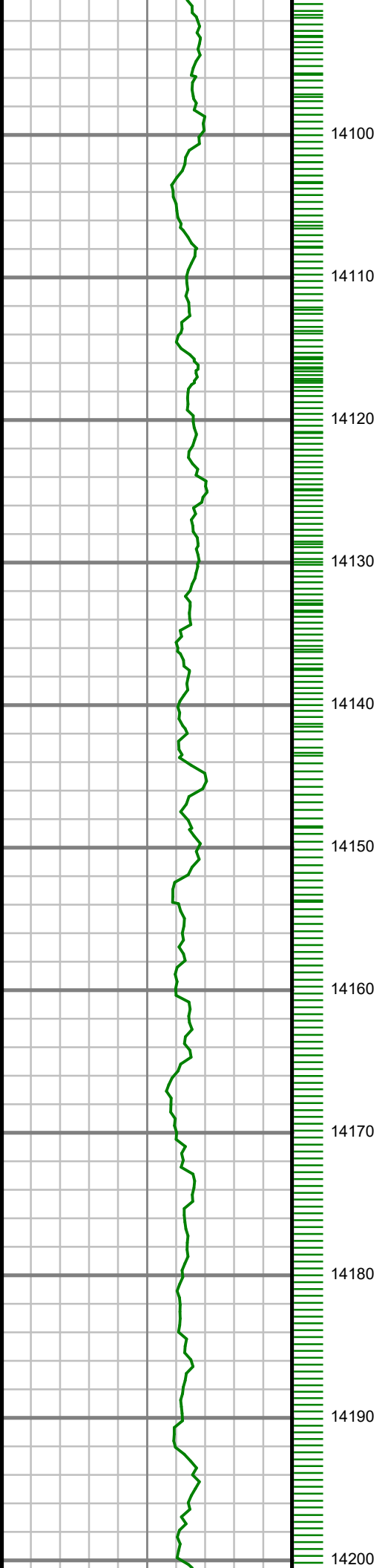
S: 147 MD: 13819.00 ft
Inc: 90.30 deg Az: 0.76
deg TVD: 7307.64 ft



S: 148 MD: 13912.00 ft
Inc: 89.97 deg Az: 0.27
deg TVD: 7307.42 ft

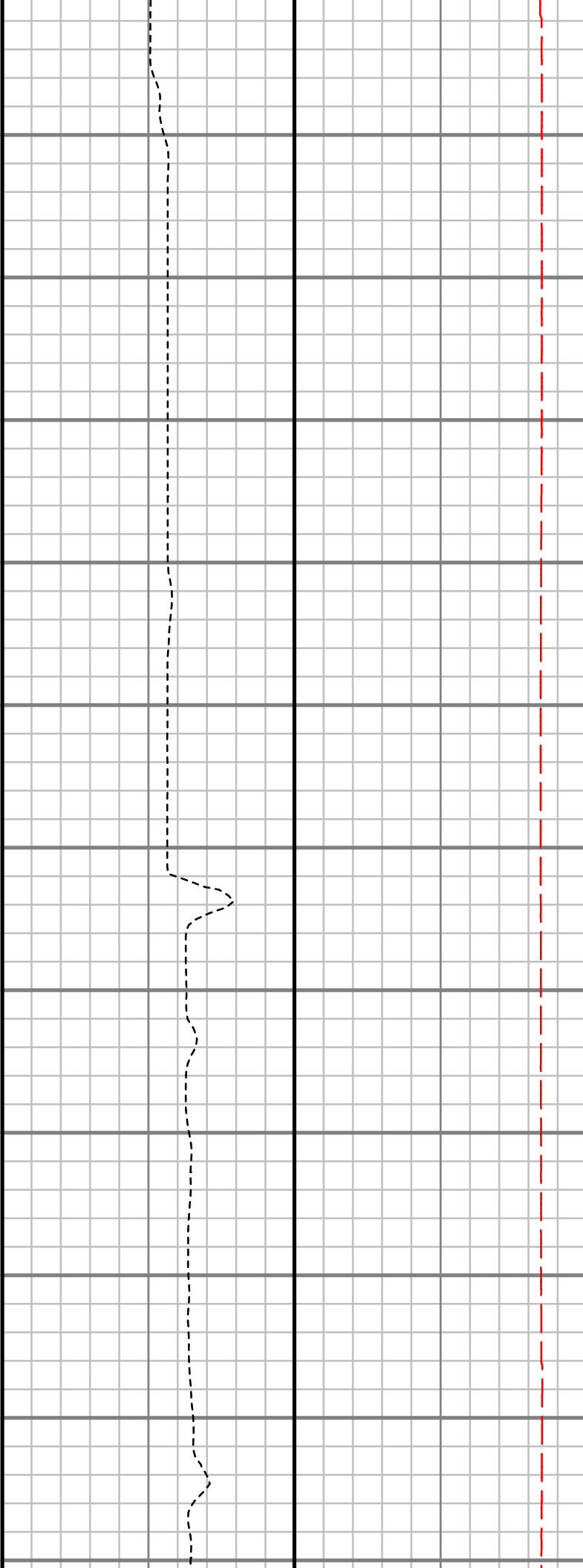
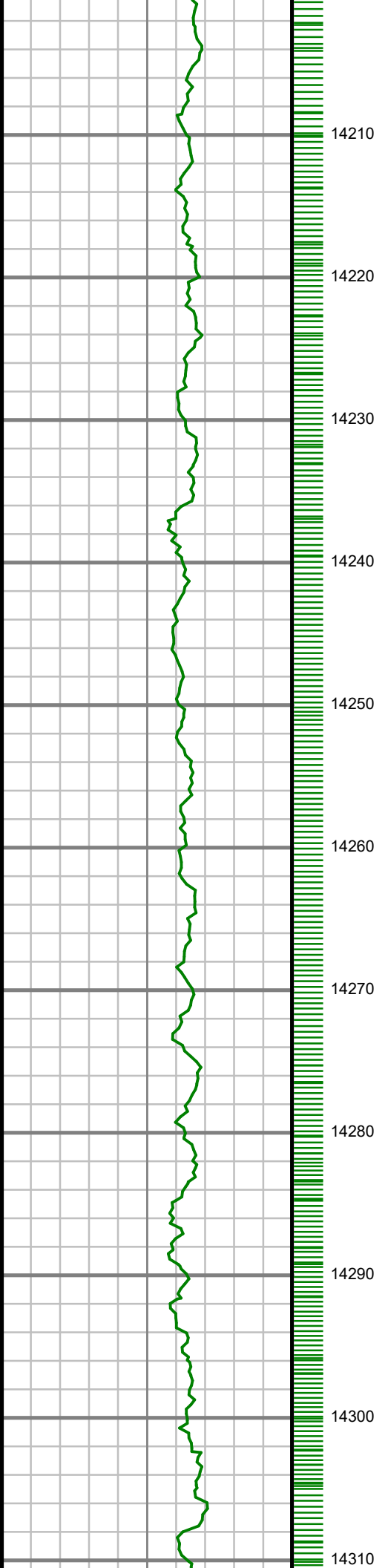


S: 149 MD: 14007.00 ft
Inc: 89.80 deg Az: 0.15
deg TVD: 7307.61 ft



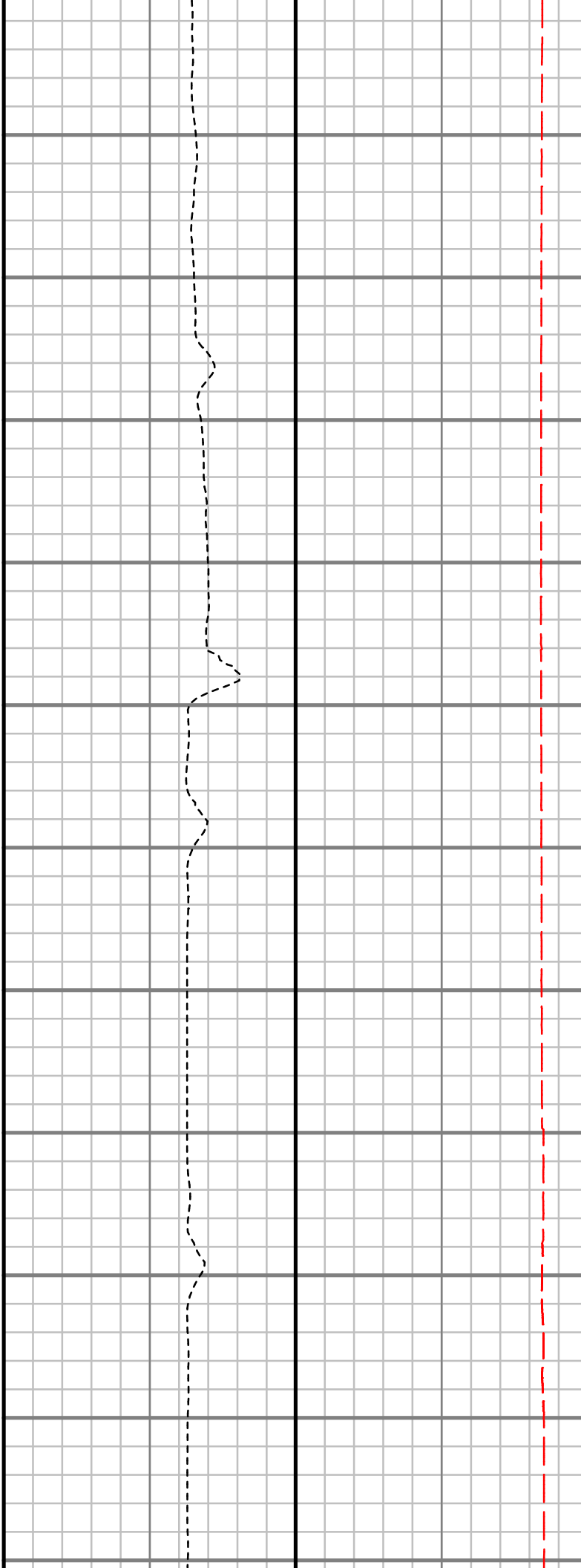
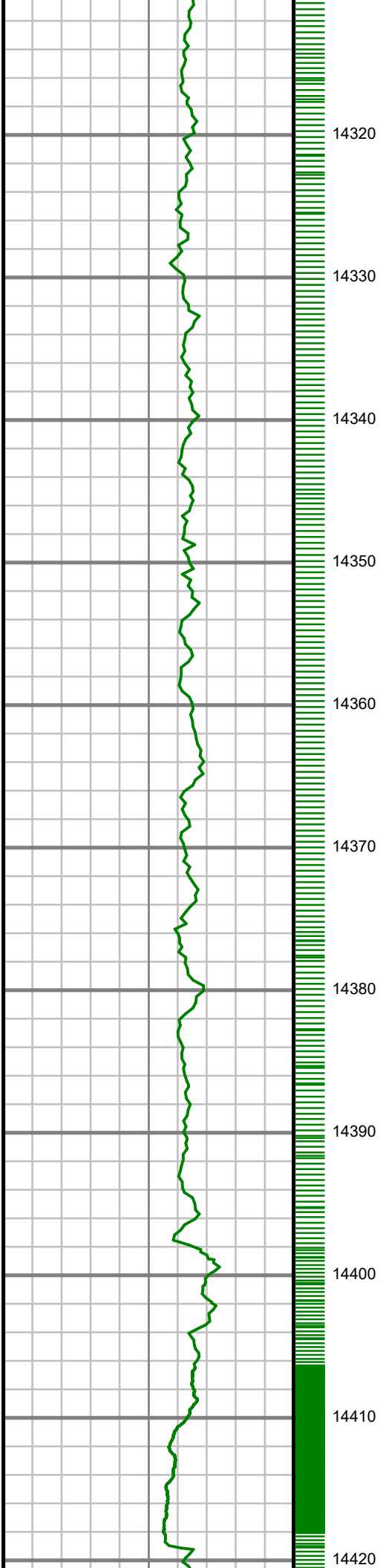
S: 150 MD: 14102.00 ft
Inc: 89.43 deg Az:
359.70 deg TVD:
7308.25 ft

S: 151 MD: 14197.00 ft
Inc: 89.83 deg Az:
359.65 deg TVD:

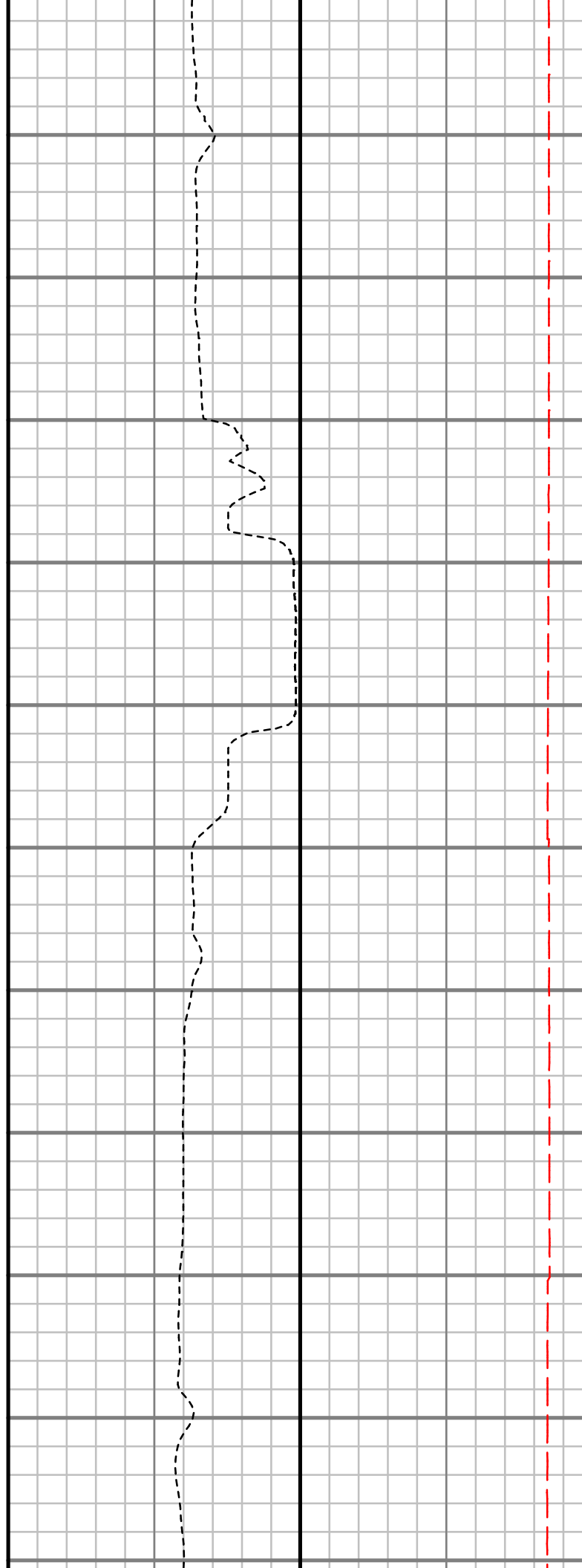
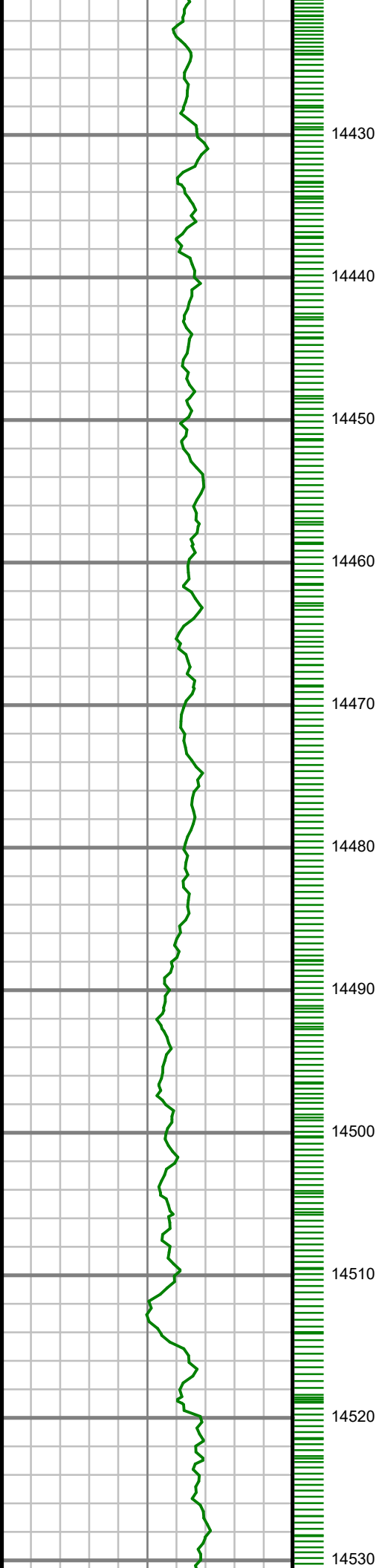


7308.86 ft

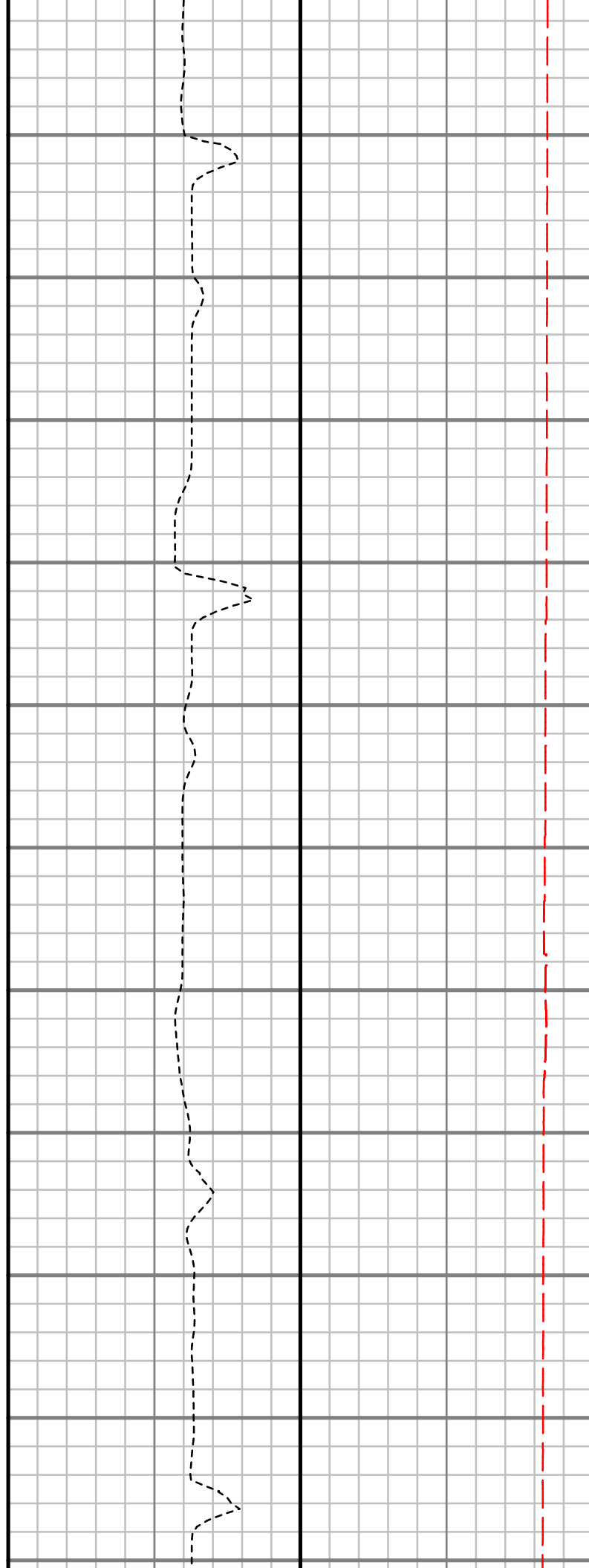
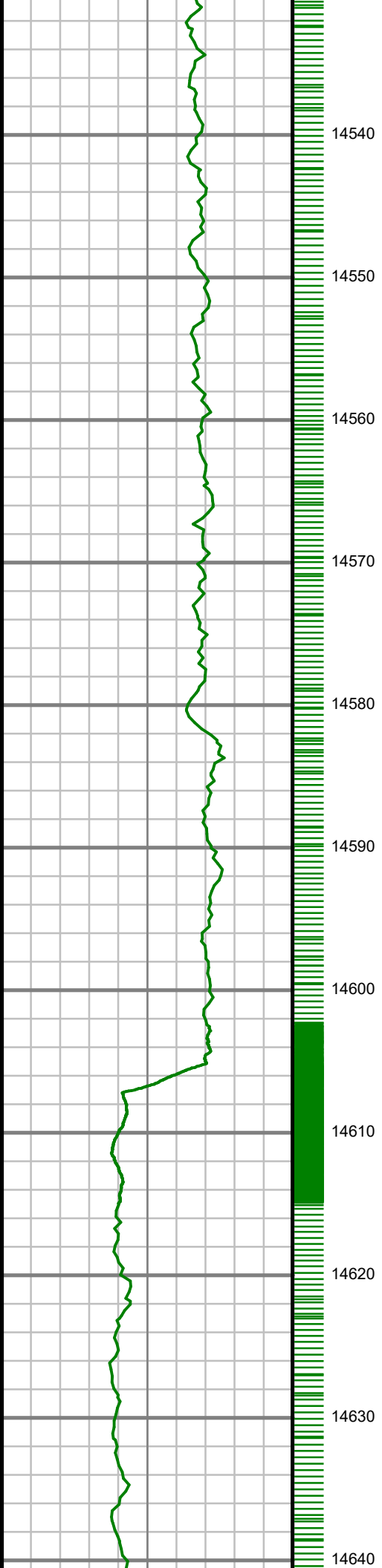
S: 152 MD: 14290.00 ft
Inc: 89.50 deg Az:
359.40 deg TVD:
7309.41 ft



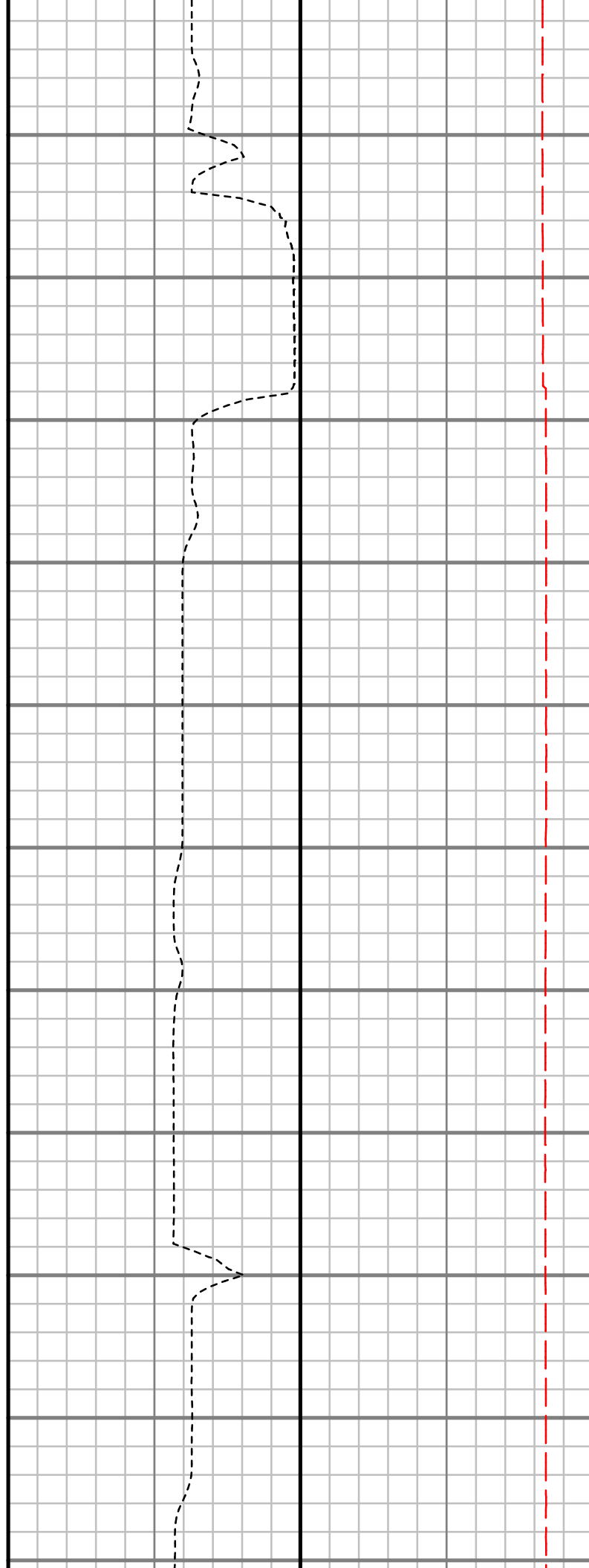
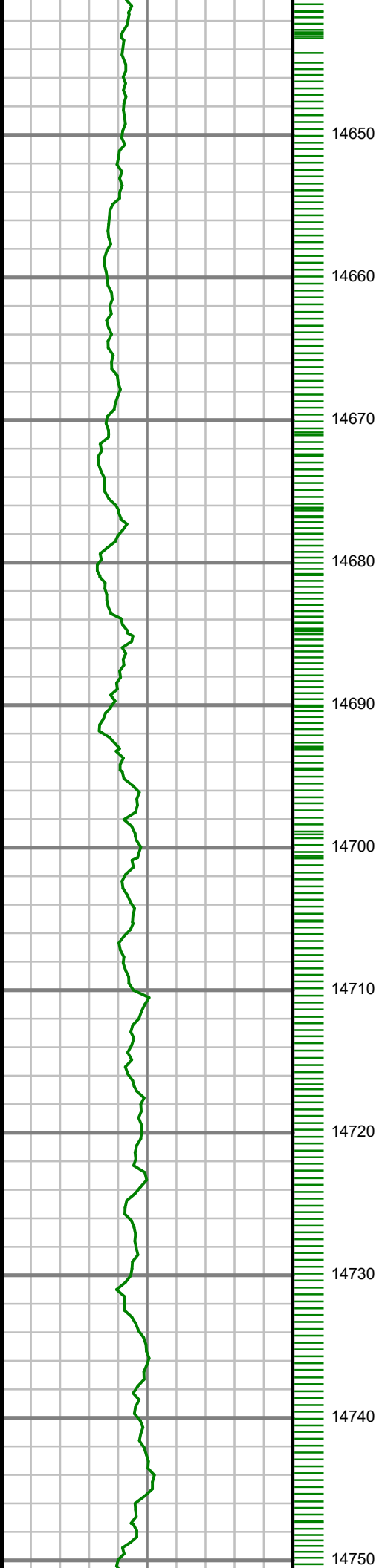
S: 153 MD: 14385.00 ft
Inc: 89.46 deg Az:
359.04 deg TVD:
7310.27 ft



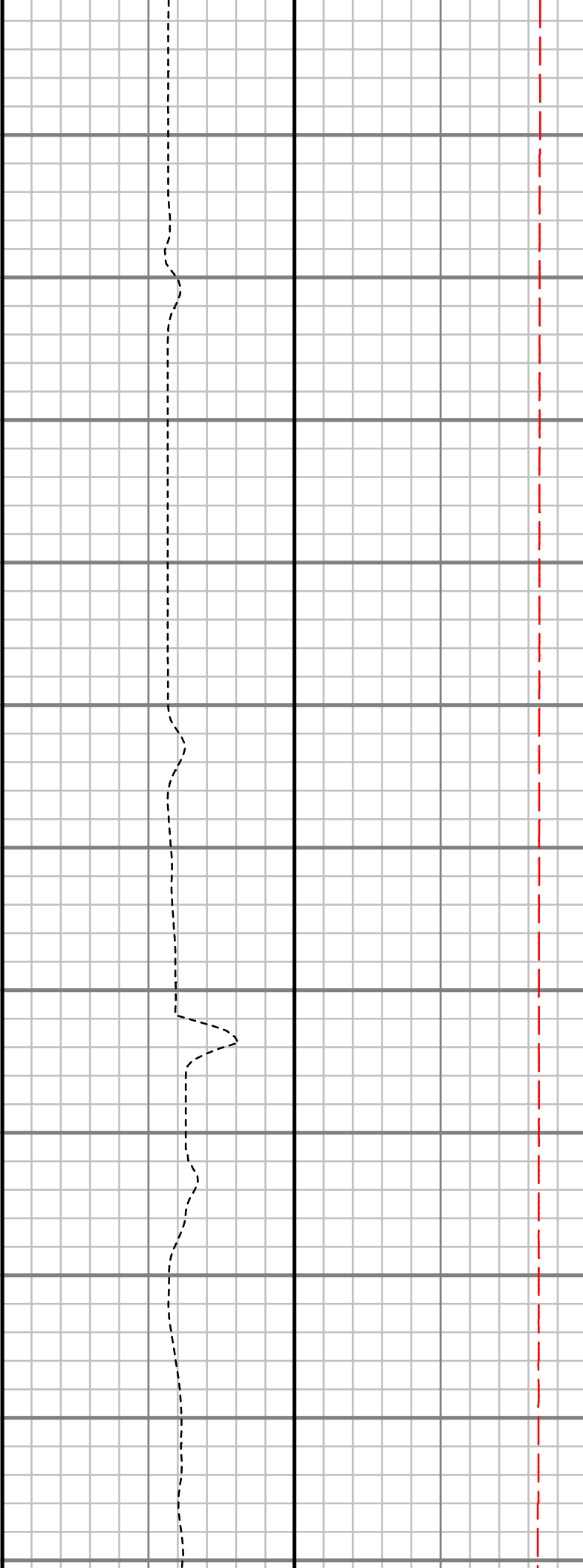
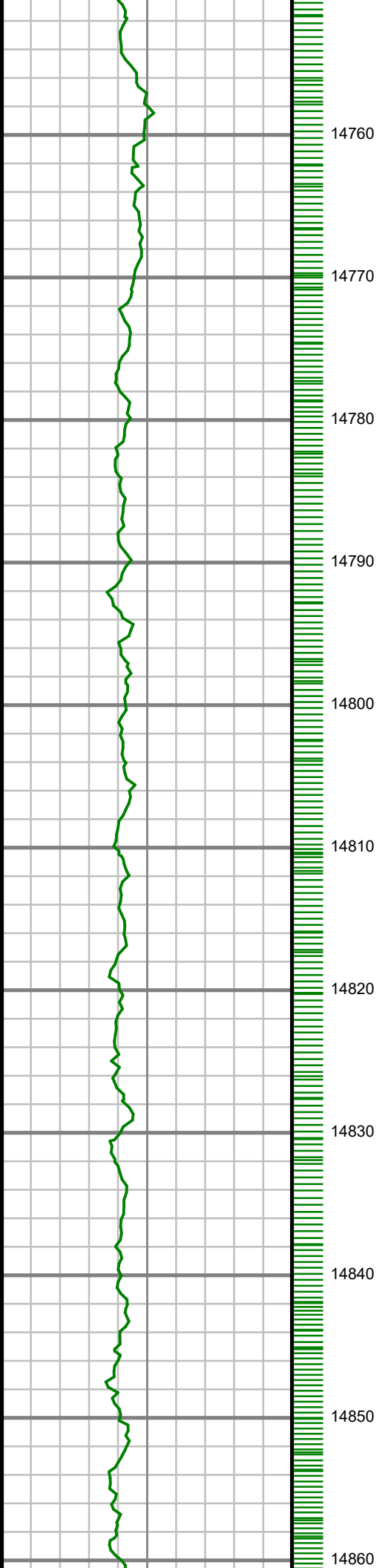
S: 154 MD: 14479.00 ft
Inc: 88.89 deg Az: 1.09
deg TVD: 7311.62 ft



S: 155 MD: 14574.00 ft
Inc: 88.76 deg Az: 0.95
deg TVD: 7313.57 ft

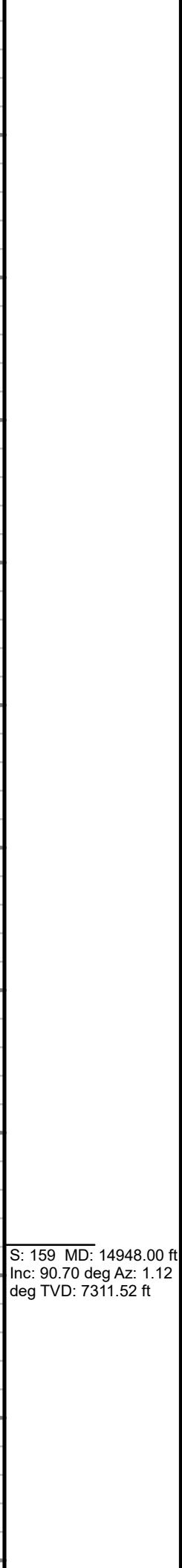
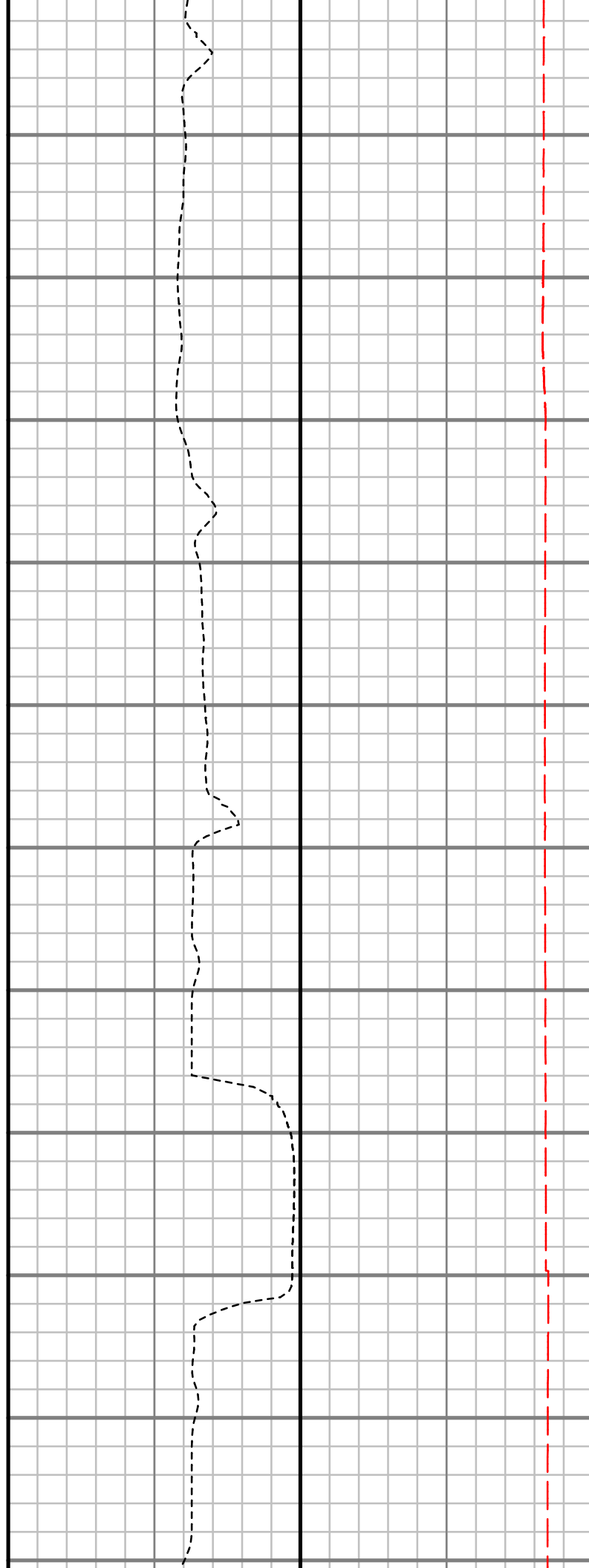
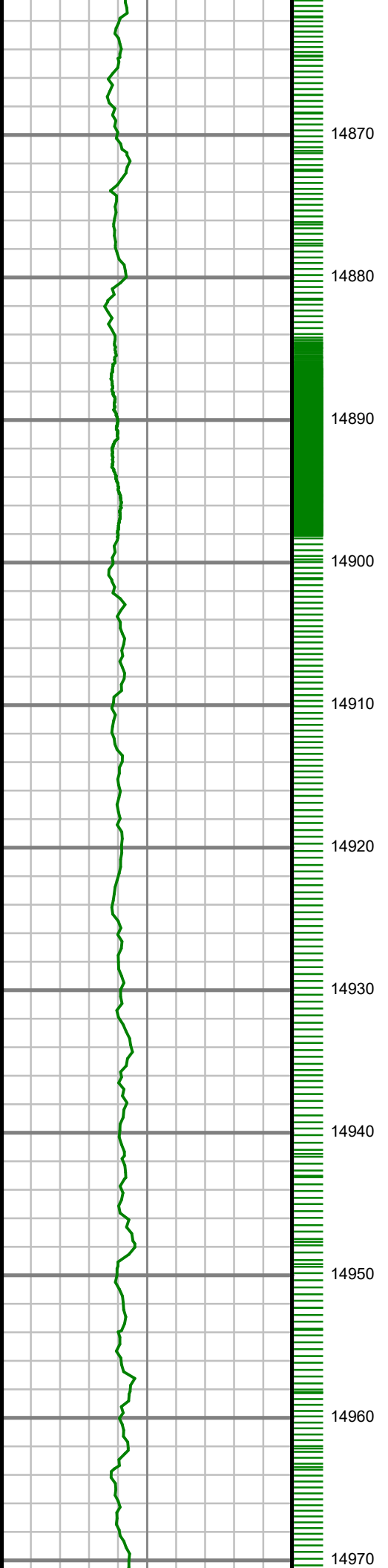


S: 156 MD: 14667.00 ft
Inc: 90.54 deg Az: 1.59
deg TVD: 7314.14 ft

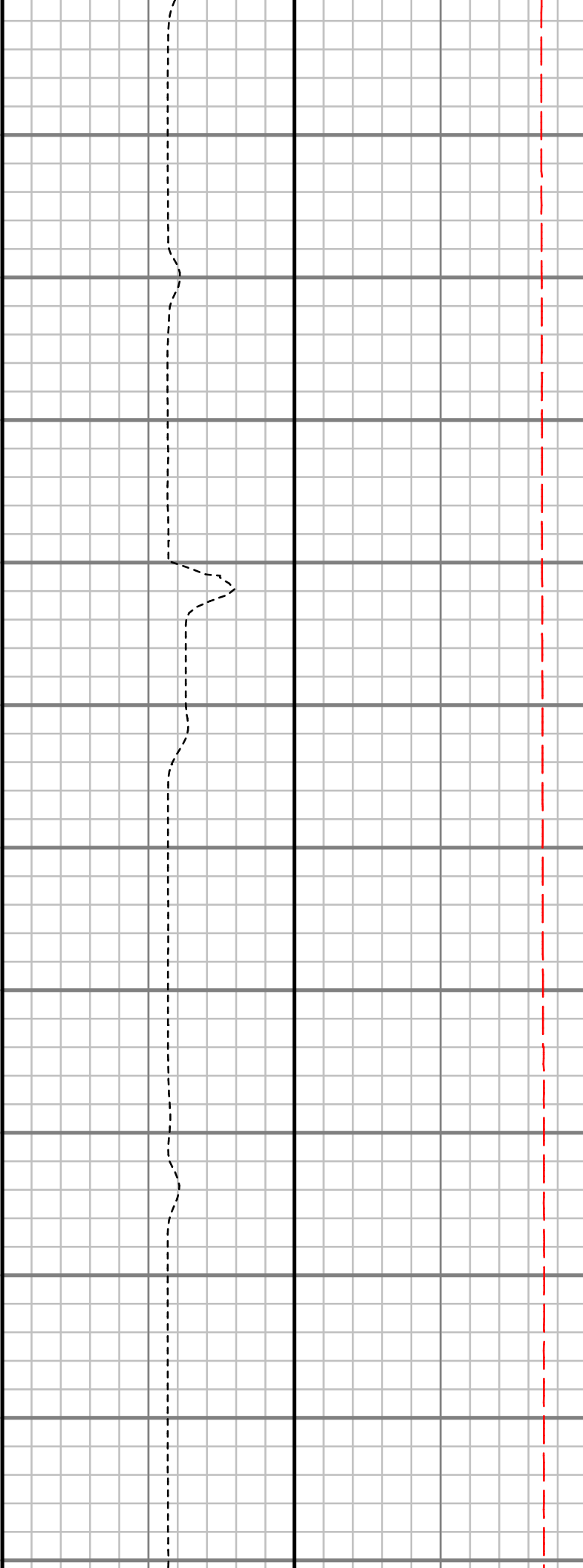
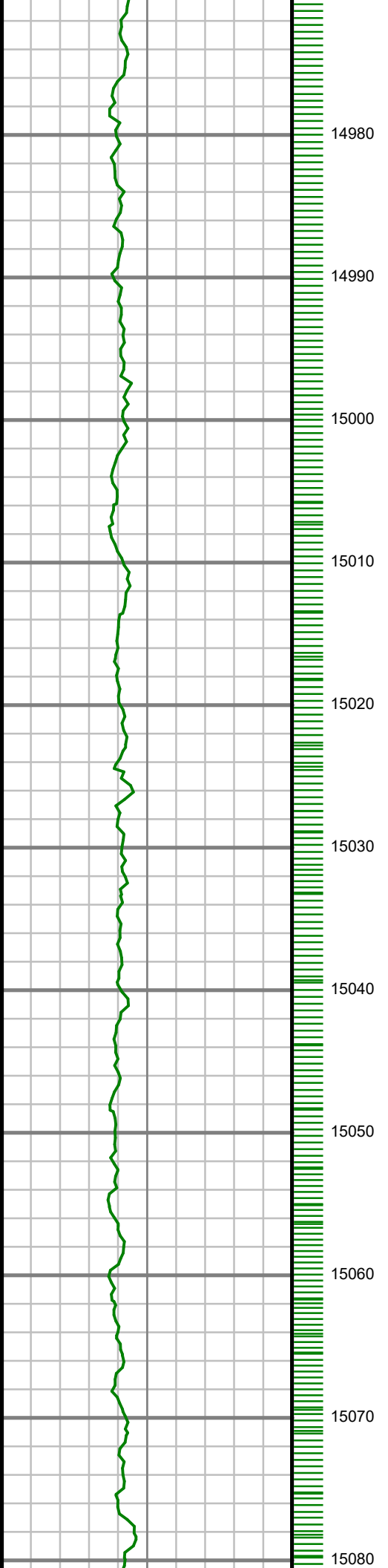


S: 157 MD: 14761.00 ft
Inc: 90.34 deg Az: 0.70
deg TVD: 7313.42 ft

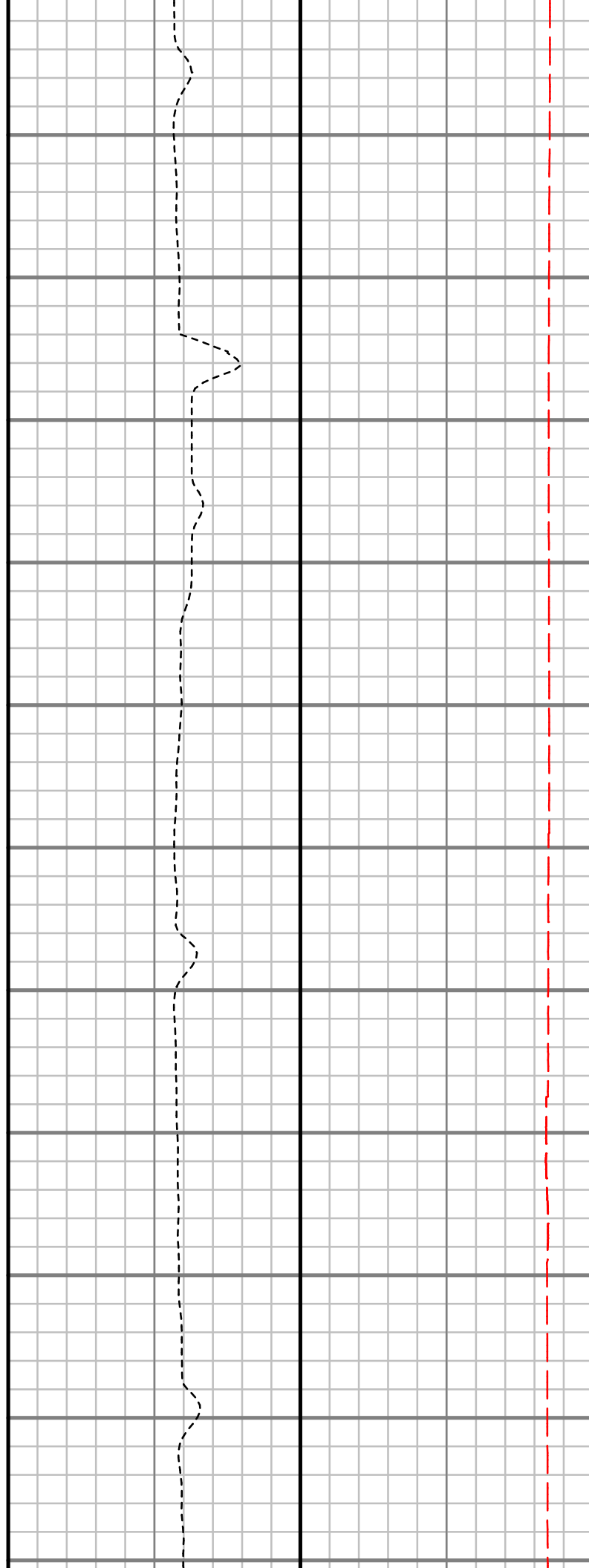
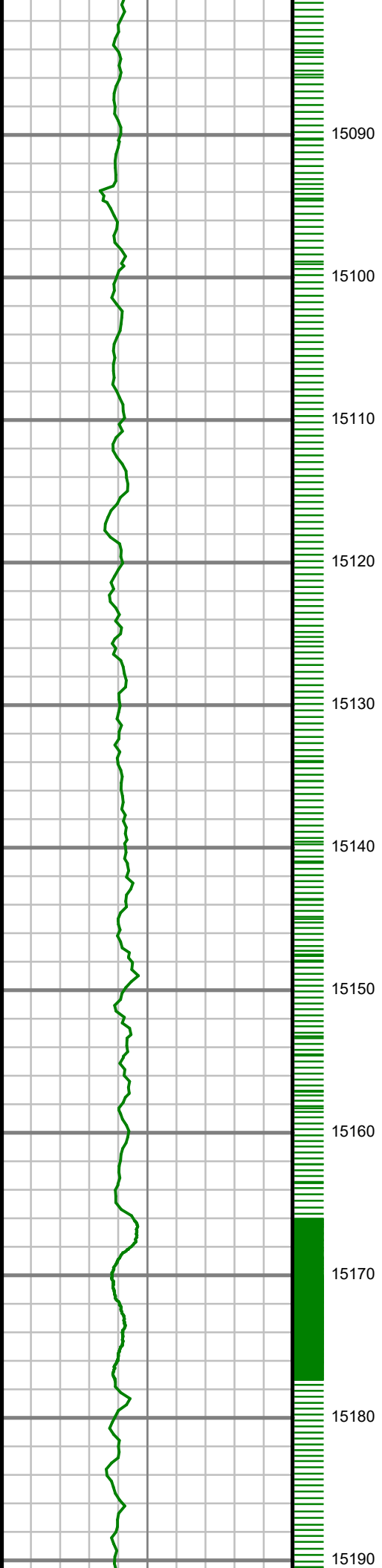
S: 158 MD: 14853.00 ft
Inc: 90.64 deg Az:
359.26 deg TVD:
7312.63 ft



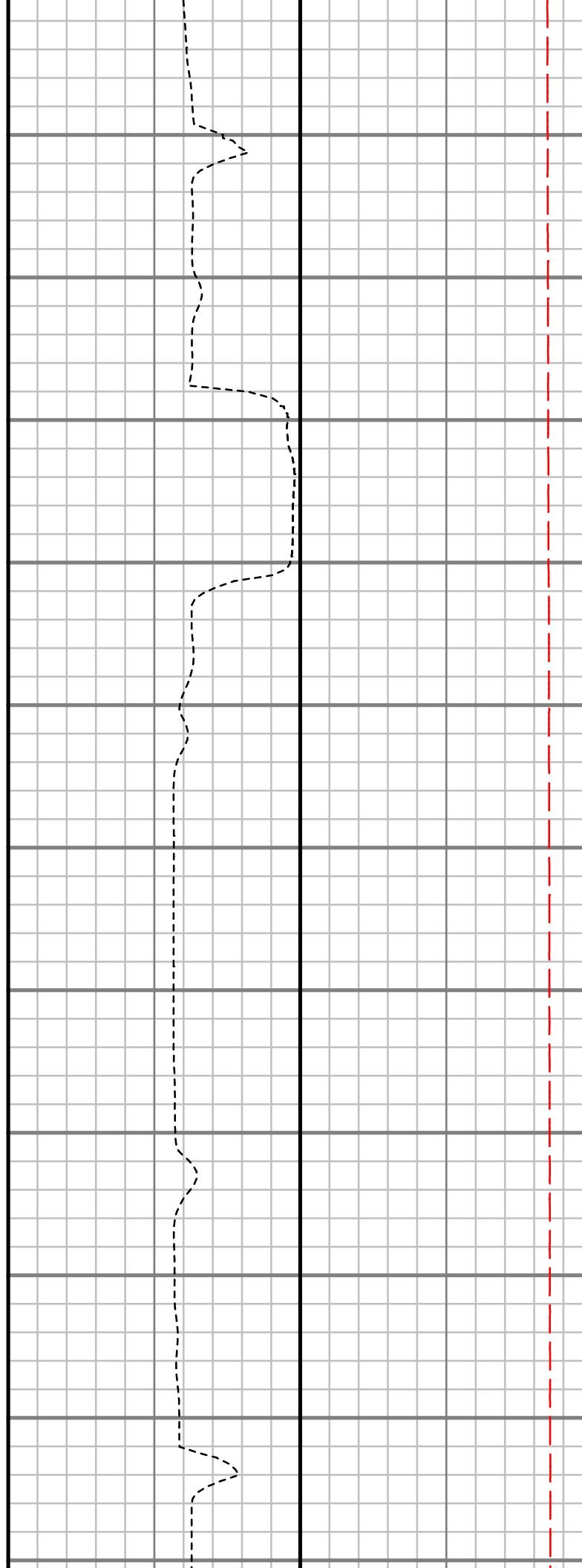
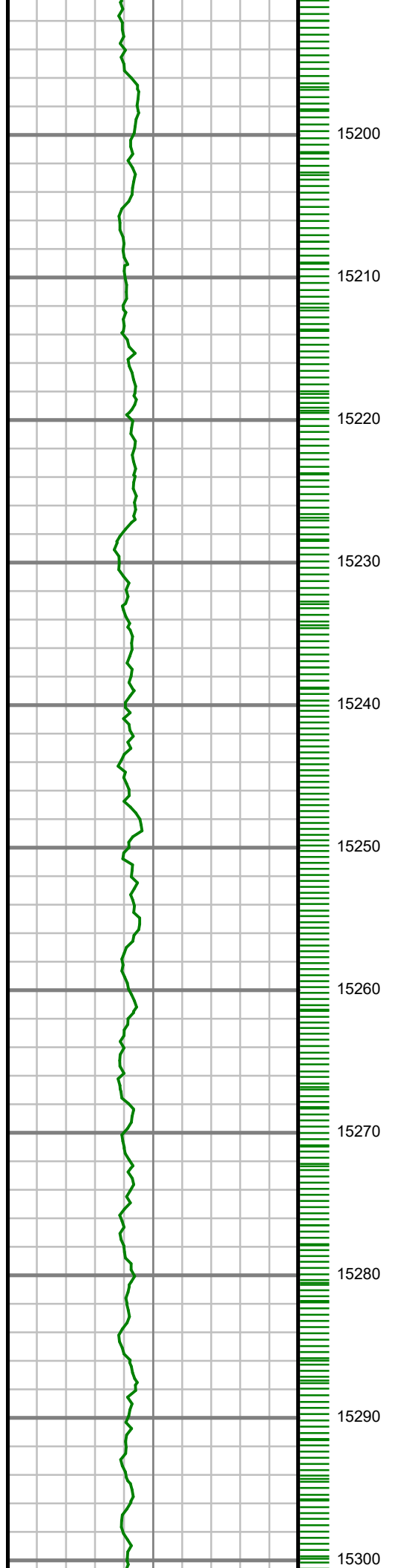
S: 159 MD: 14948.00 ft
Inc: 90.70 deg Az: 1.12
deg TVD: 7311.52 ft



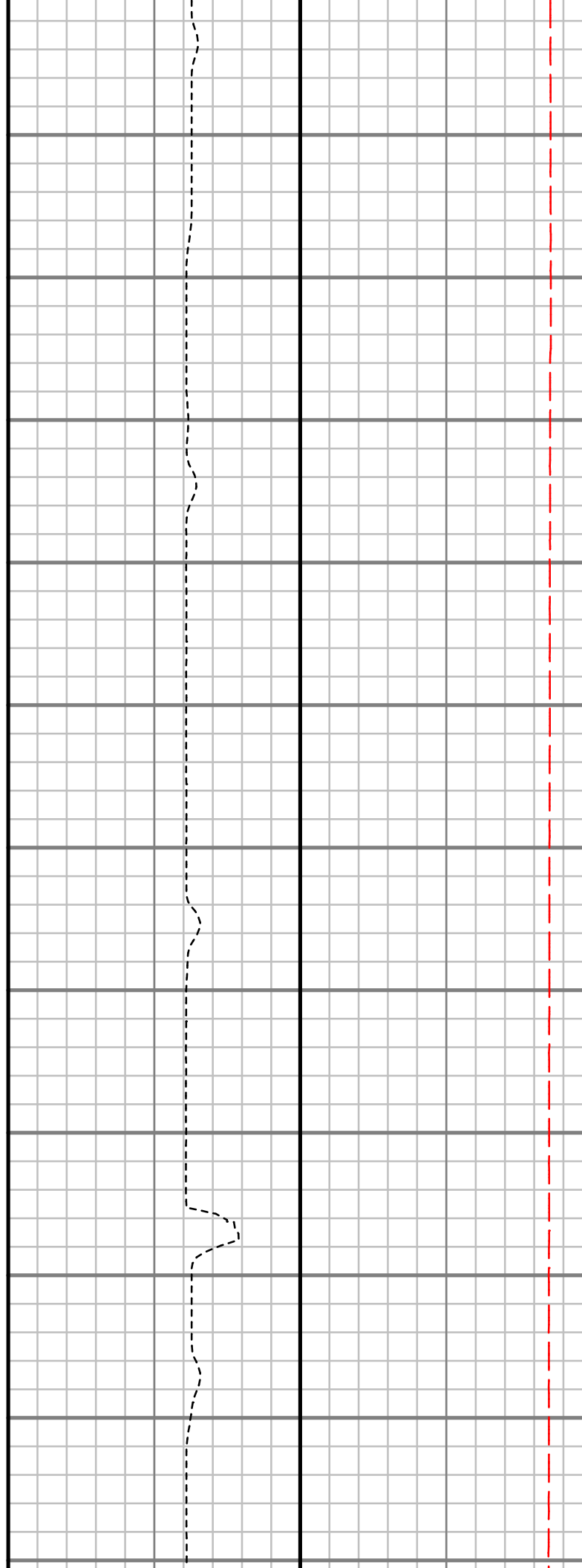
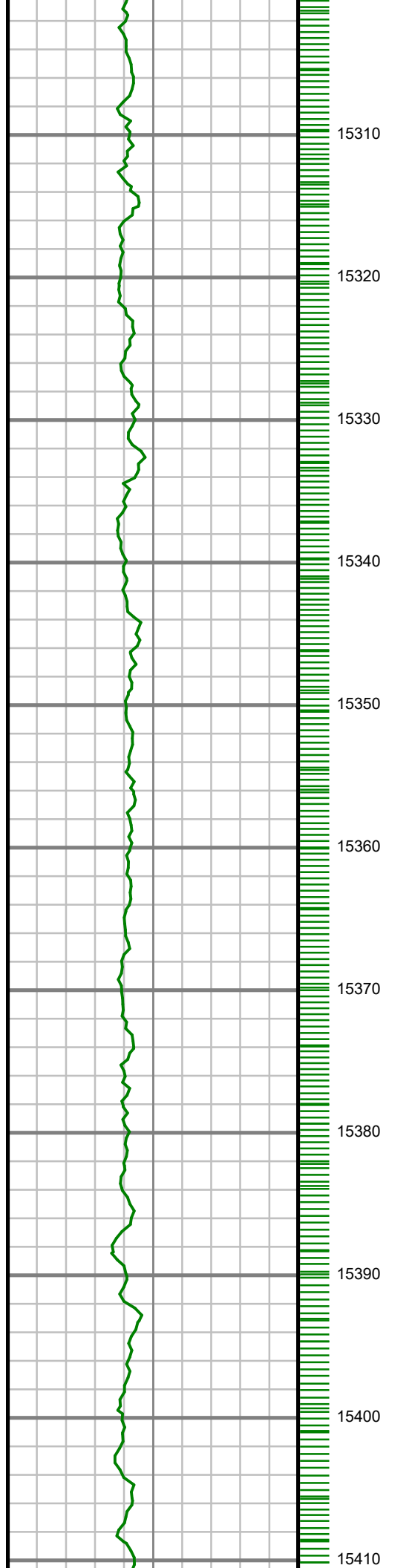
S: 160 MD: 15041.00 ft
Inc: 91.11 deg Az: 1.08
deg TVD: 7310.05 ft



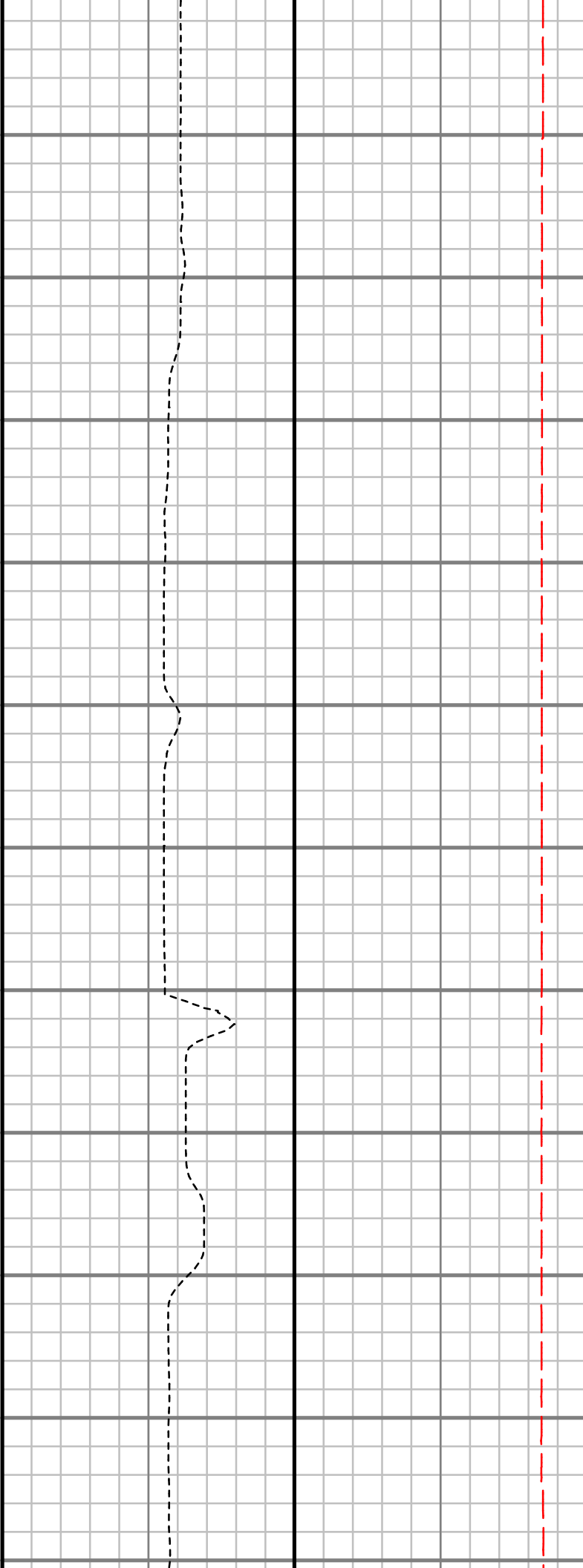
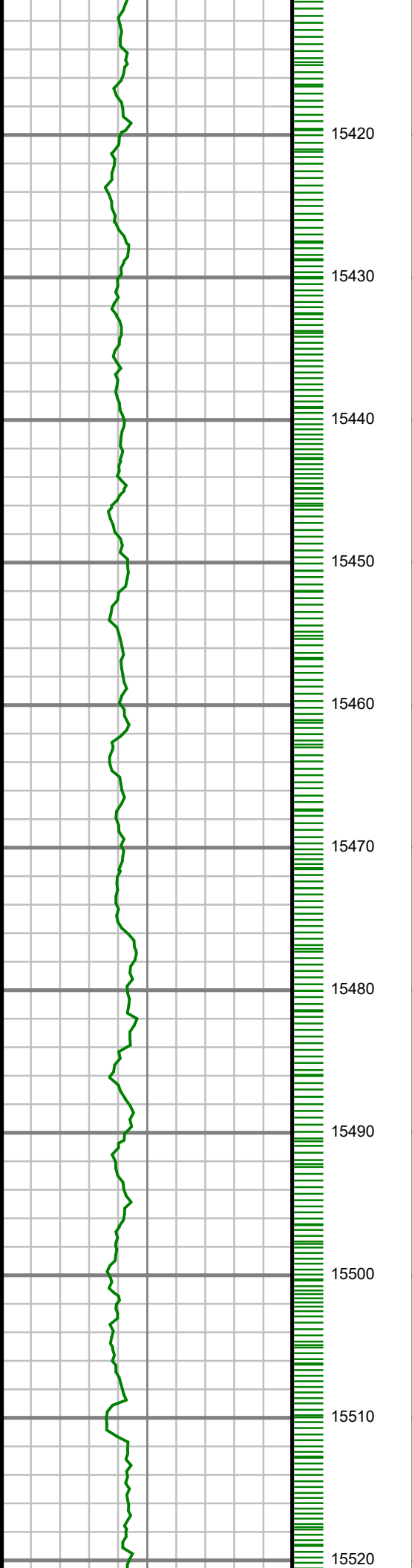
S: 161 MD: 15135.00 ft
Inc: 90.71 deg Az:
359.63 deg TVD:
7308.56 ft



S: 162 MD: 15229.00 ft
Inc: 90.37 deg Az: 0.90
deg TVD: 7307.67 ft

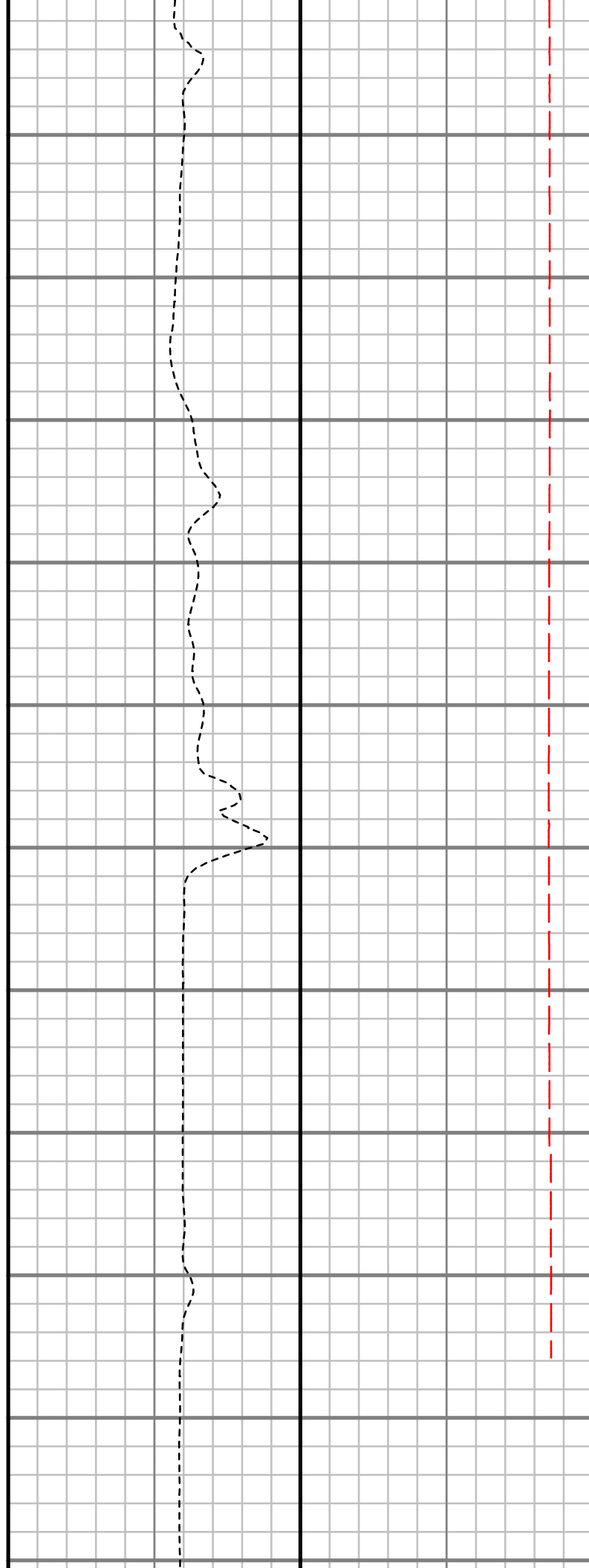
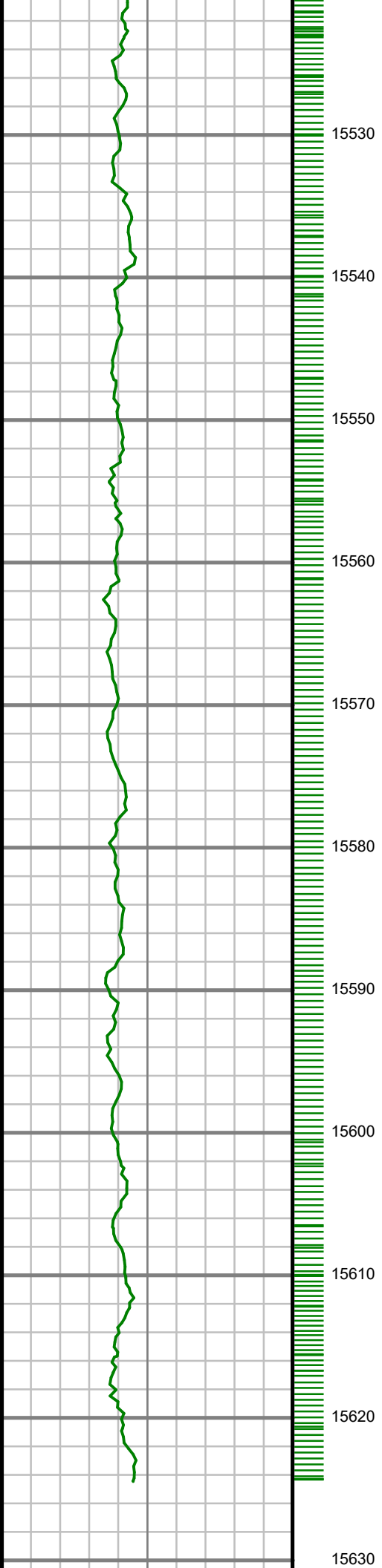


S: 163 MD: 15321.00 ft
Inc: 89.90 deg Az: 0.39
deg TVD: 7307.46 ft

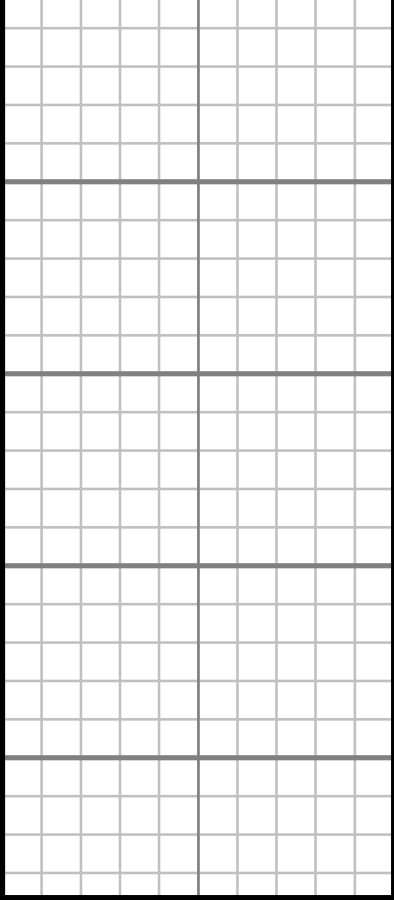


S: 164 MD: 15415.00 ft
Inc: 89.93 deg Az: 0.43
deg TVD: 7307.59 ft

S: 165 MD: 15509.00 ft
Inc: 90.30 deg Az: 0.58
deg TVD: 7307.41 ft



S: 166 MD: 15602.00 ft
Inc: 90.57 deg Az: 0.34
deg TVD: 7306.70 ft



Gamma Ray (GR)

0 Unit = aapi 200

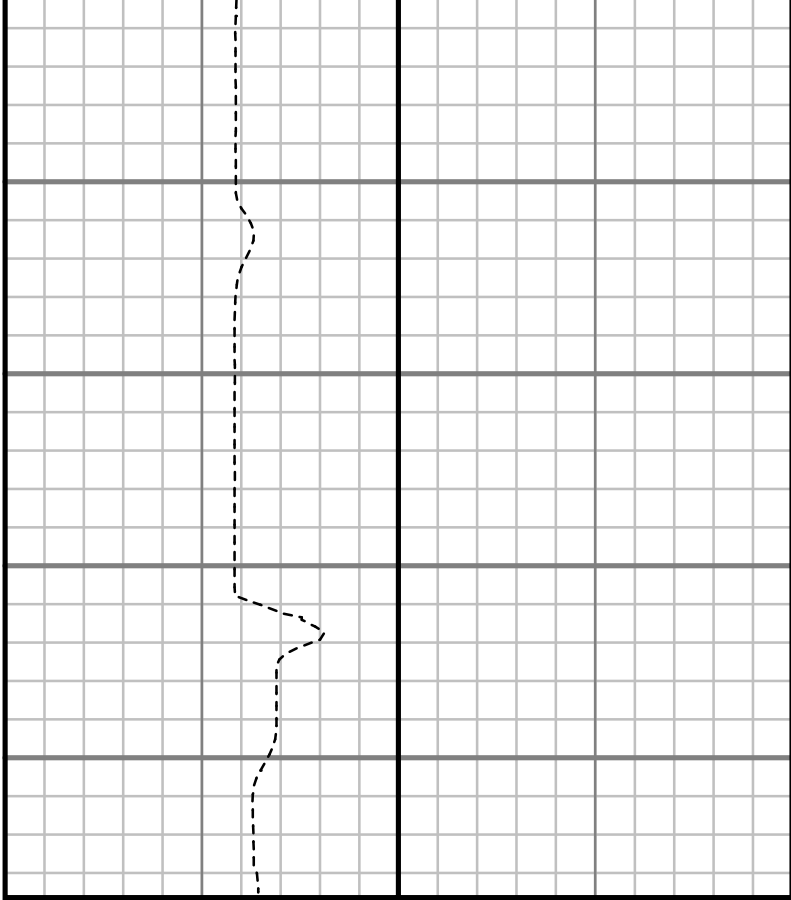
15640

15650

15660

15670

MEASURED DEPTH
1:120 (ft)



Rate of Penetration (ROP)

800 Unit = ft/hr 0

Tool Temperature (TEMP)

0 Unit = °F 300

Comments

SURVEY REPORT

BUTTERBALL 24N-34HZ MSA CORRECTED SURVEYS

CUSTOMER ANADARKO PETROLEUM CORPORATION
PROJECT US ROCKIES WATTENBERG PLANNING
 UTM83
FIELD WATTENBERG

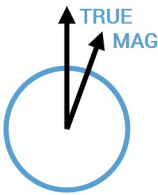
WELL INFORMATION
Lat/Long 40.15827° N, 104.869865° W
Northing 14,584,393.4 ft
Easting 1,676,776.82 ft
UWI 05123443150000

MAP INFORMATION

North Reference True North
Grid Correction
System Universal Transverse Mercator (US Survey Feet)
Datum North American Datum 1983 (GRS 1980)
Map Zone Zone 13N (108 W to 102 W)

VERTICAL SECTION REFERENCE

+N/-S 0 ft
+E/-W 0 ft
Proposal Direction 0.64°
Calculation Method Minimum Curvature



GEOMAGNETIC REFERENCE INFORMATION

Local Gravity: 999.050 mG [computed]

MD	MODEL	DATE	DECLINATION	MAG TO TRUE
0-15602 ft	ANADARKO MAGVAR	01 Jun 2017	8.36°	add 8.36°

WELL NOTES

OPERATORS

MD	Inc	Azim	TVD	VS	+N/-S	+E/-W	DLS
ft	deg	deg	ft	ft	ft	ft	°/100ft
0.00	0.00	0.00	0.00	0.00	0.00	0.00	Invalid
153.00	0.29	109.05	153.00	-0.12	-0.13	0.37	0.19
239.00	0.34	160.15	239.00	-0.43	-0.44	0.66	0.32
328.00	0.80	226.21	327.99	-1.11	-1.12	0.30	0.82
415.00	1.77	264.39	414.97	-1.68	-1.67	-1.48	1.43
503.00	3.00	270.37	502.89	-1.84	-1.79	-5.13	1.42
592.00	3.90	271.54	591.73	-1.81	-1.69	-10.49	1.01
679.00	5.13	281.07	678.46	-1.06	-0.86	-17.26	1.65
765.00	6.27	275.50	764.04	0.04	0.33	-25.71	1.47
854.00	7.76	276.44	852.37	1.06	1.47	-36.52	1.68
943.00	9.25	279.03	940.39	2.71	3.26	-49.55	1.73
1032.00	10.25	272.35	1028.10	3.99	4.71	-64.53	1.69
1121.00	11.48	273.23	1115.51	4.63	5.53	-81.29	1.39
1209.00	12.95	270.29	1201.51	4.96	6.08	-99.89	1.81
1298.00	12.61	270.65	1288.31	4.90	6.24	-119.58	0.39
1382.00	13.39	271.42	1370.15	5.04	6.58	-138.47	0.95
1469.00	12.82	272.54	1454.89	5.49	7.26	-158.18	0.72
1598.00	13.12	274.06	1580.60	6.84	8.93	-187.09	0.35
1685.00	12.52	275.74	1665.43	8.27	10.57	-206.32	0.81
1773.00	12.99	276.27	1751.26	10.09	12.61	-225.64	0.55

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft
1803.00	13.21	275.10	1780.48	10.68	13.28	-232.41	1.15
1939.00	12.15	271.70	1913.16	12.16	15.09	-262.19	0.95
2033.00	13.37	269.91	2004.84	12.20	15.36	-282.95	1.36
2128.00	14.32	266.20	2097.08	11.15	14.57	-305.65	1.37
2223.00	14.90	268.84	2189.01	9.86	13.54	-329.59	0.93
2316.00	14.37	269.57	2278.99	9.27	13.21	-353.08	0.60
2409.00	14.84	272.24	2368.98	9.38	13.59	-376.53	0.88
2504.00	14.97	273.87	2460.79	10.42	14.89	-400.92	0.46
2598.00	15.52	275.96	2551.48	12.27	17.02	-425.54	0.83
2692.00	15.09	275.92	2642.15	14.56	19.59	-450.22	0.46
2786.00	14.97	280.75	2732.93	17.81	23.11	-474.32	1.34
2880.00	15.95	281.40	2823.53	22.36	27.93	-498.91	1.06
2974.00	15.35	281.33	2914.05	27.08	32.93	-523.77	0.64
3070.00	14.95	280.02	3006.71	31.45	37.58	-548.42	0.55
3162.00	14.73	277.81	3095.64	34.85	41.23	-571.70	0.66
3256.00	14.81	274.50	3186.54	37.15	43.80	-595.52	0.90
3350.00	14.92	272.96	3277.39	38.44	45.37	-619.58	0.44
3442.00	14.64	272.14	3366.35	39.23	46.41	-643.02	0.38
3536.00	13.19	274.79	3457.59	40.32	47.75	-665.58	1.68
3630.00	13.22	275.37	3549.10	41.98	49.65	-686.97	0.14

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft
3725.00	13.99	272.56	3641.44	43.26	51.18	-709.26	1.07
3818.00	14.11	270.16	3731.66	43.54	51.72	-731.82	0.64
3911.00	14.80	273.21	3821.71	43.98	52.41	-755.02	1.10
4006.00	15.00	271.22	3913.52	44.65	53.36	-779.43	0.58
4101.00	15.14	270.37	4005.25	44.71	53.70	-804.12	0.28
4195.00	15.36	272.25	4095.94	45.00	54.27	-828.84	0.58
4289.00	15.40	272.21	4186.58	45.70	55.24	-853.75	0.04
4384.00	14.45	272.26	4278.37	46.38	56.19	-878.20	1.00
4478.00	14.04	271.09	4369.48	46.80	56.87	-901.32	0.53
4573.00	14.04	274.03	4461.64	47.57	57.90	-924.34	0.75
4666.00	14.24	280.87	4551.83	50.27	60.85	-946.82	1.81
4760.00	15.50	281.04	4642.68	54.59	65.43	-970.51	1.34
4854.00	13.89	279.04	4733.60	58.51	69.61	-993.98	1.80
4949.00	13.61	276.32	4825.88	61.28	72.63	-1016.35	0.74
5044.00	13.83	273.40	4918.17	62.93	74.54	-1038.79	0.76
5137.00	13.83	274.97	5008.48	64.30	76.16	-1060.96	0.40
5257.00	11.59	271.92	5125.53	65.66	77.81	-1087.30	1.95
5352.00	9.63	270.67	5218.90	65.87	78.22	-1104.79	2.08
5447.00	7.75	271.14	5312.81	65.93	78.44	-1119.14	1.98
5542.00	7.08	271.01	5407.01	66.03	78.67	-1131.40	0.71

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft
5635.00	5.07	278.90	5499.49	66.66	79.41	-1141.19	2.34
5727.00	3.72	275.11	5591.21	67.47	80.30	-1148.18	1.50
5820.00	3.01	275.12	5684.05	67.90	80.79	-1153.61	0.76
5915.00	2.30	244.23	5778.96	67.25	80.18	-1157.81	1.65
6007.00	1.82	256.35	5870.90	66.06	79.04	-1160.90	0.70
6101.00	0.85	241.47	5964.87	65.36	78.35	-1162.96	1.09
6194.00	0.77	252.24	6057.86	64.82	77.83	-1164.16	0.18
6288.00	0.72	246.69	6151.85	64.38	77.40	-1165.31	0.09
6383.00	0.48	231.13	6246.85	63.89	76.92	-1166.16	0.30
6477.00	0.57	219.69	6340.84	63.27	76.31	-1166.77	0.15
6570.00	0.71	204.00	6433.84	62.39	75.43	-1167.30	0.24
6664.00	0.55	188.14	6527.83	61.40	74.45	-1167.60	0.25
6758.00	0.49	207.15	6621.83	60.60	73.65	-1167.85	0.19
6852.00	0.46	222.09	6715.83	59.95	73.01	-1168.28	0.14
6946.00	10.76	12.67	6809.29	68.28	81.32	-1166.61	11.88
7040.00	19.22	6.91	6900.02	92.29	105.28	-1162.81	9.13
7134.00	26.70	7.19	6986.51	128.70	141.64	-1158.30	7.96
7229.00	34.14	6.86	7068.37	176.47	189.35	-1152.44	7.83
7323.00	44.64	2.88	7140.93	235.87	248.70	-1147.61	11.48
7418.00	51.80	1.58	7204.19	306.63	319.44	-1144.90	7.61

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft
7512.00	59.91	358.80	7256.91	384.35	397.16	-1144.74	8.97
7606.00	69.18	0.32	7297.27	469.11	481.94	-1145.34	9.97
7702.00	79.98	1.54	7322.76	561.52	574.33	-1143.82	11.32
7795.00	87.79	1.40	7332.66	653.91	666.70	-1141.45	8.40
7889.00	88.86	0.38	7335.41	747.86	760.64	-1139.99	1.57
7984.00	89.46	359.69	7336.80	842.85	855.63	-1139.93	0.96
8078.00	89.46	358.85	7337.68	936.81	949.62	-1141.13	0.89
8172.00	90.44	358.38	7337.77	1030.75	1043.59	-1143.40	1.16
8266.00	89.80	0.19	7337.57	1124.72	1137.58	-1144.57	2.04
8360.00	90.27	1.04	7337.51	1218.72	1231.57	-1143.57	1.03
8454.00	89.97	1.00	7337.32	1312.72	1325.56	-1141.89	0.32
8548.00	89.90	0.59	7337.42	1406.72	1419.55	-1140.59	0.44
8642.00	90.67	0.92	7336.95	1500.72	1513.54	-1139.35	0.89
8737.00	89.87	1.08	7336.51	1595.71	1608.52	-1137.69	0.86
8831.00	89.66	1.08	7336.89	1689.71	1702.50	-1135.92	0.22
8926.00	89.50	0.91	7337.59	1784.71	1797.49	-1134.27	0.25
9020.00	89.36	0.34	7338.52	1878.70	1891.48	-1133.25	0.62
9115.00	90.24	0.62	7338.86	1973.70	1986.47	-1132.45	0.97
9208.00	91.01	0.86	7337.84	2066.69	2079.46	-1131.25	0.87
9304.00	89.90	0.24	7337.08	2162.69	2175.45	-1130.33	1.32

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft
9398.00	90.03	0.08	7337.14	2256.68	2269.45	-1130.06	0.22
9493.00	90.91	0.46	7336.36	2351.68	2364.44	-1129.62	1.01
9587.00	90.50	0.26	7335.20	2445.67	2458.43	-1129.03	0.49
9682.00	90.97	0.51	7333.98	2540.66	2553.42	-1128.39	0.56
9775.00	90.50	0.59	7332.79	2633.65	2646.41	-1127.50	0.51
9869.00	90.37	0.33	7332.07	2727.65	2740.41	-1126.74	0.31
9964.00	90.44	0.52	7331.40	2822.65	2835.40	-1126.04	0.21
10057.00	90.57	0.30	7330.58	2915.64	2928.39	-1125.37	0.27
10151.00	90.77	359.89	7329.48	3009.63	3022.39	-1125.21	0.49
10246.00	90.07	359.71	7328.79	3104.62	3117.38	-1125.55	0.76
10339.00	90.34	359.64	7328.46	3197.60	3210.38	-1126.07	0.30
10433.00	90.57	359.49	7327.71	3291.58	3304.38	-1126.79	0.29
10526.00	91.01	359.51	7326.43	3384.56	3397.36	-1127.60	0.47
10621.00	90.97	359.23	7324.79	3479.52	3492.34	-1128.64	0.30
10716.00	90.71	358.76	7323.39	3574.47	3587.32	-1130.31	0.57
10809.00	89.56	1.05	7323.17	3667.45	3680.31	-1130.46	2.76
10903.00	89.33	0.36	7324.08	3761.45	3774.30	-1129.31	0.77
10998.00	89.16	0.47	7325.34	3856.44	3869.29	-1128.62	0.21
11093.00	88.56	0.06	7327.23	3951.42	3964.27	-1128.18	0.76
11185.00	89.50	0.54	7328.78	4043.40	4056.25	-1127.70	1.15

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft
11279.00	90.91	1.52	7328.45	4137.39	4150.23	-1126.01	1.83
11373.00	90.70	2.20	7327.13	4231.36	4244.17	-1122.96	0.76
11466.00	90.94	1.67	7325.80	4324.33	4337.11	-1119.82	0.63
11560.00	90.44	1.24	7324.66	4418.31	4431.07	-1117.43	0.70
11653.00	91.04	1.51	7323.46	4511.30	4524.04	-1115.20	0.71
11746.00	92.42	1.87	7320.65	4604.24	4616.95	-1112.46	1.53
11841.00	91.07	1.06	7317.76	4699.18	4711.87	-1110.03	1.66
11934.00	89.09	359.63	7317.63	4792.17	4804.86	-1109.47	2.63
12029.00	89.23	359.51	7319.02	4887.14	4899.85	-1110.18	0.19
12123.00	88.46	358.07	7320.92	4981.07	4993.81	-1112.17	1.74
12217.00	88.49	359.70	7323.42	5074.99	5087.75	-1114.00	1.73
12312.00	89.43	1.09	7325.15	5169.97	5182.73	-1113.34	1.77
12405.00	90.74	0.74	7325.01	5262.97	5275.72	-1111.86	1.46
12500.00	90.47	0.06	7324.00	5357.96	5370.71	-1111.19	0.77
12594.00	90.57	359.66	7323.15	5451.95	5464.71	-1111.42	0.44
12689.00	90.20	359.21	7322.51	5546.93	5559.70	-1112.36	0.61
12783.00	91.04	0.62	7321.50	5640.91	5653.69	-1112.50	1.75
12876.00	91.38	0.40	7319.53	5733.89	5746.66	-1111.67	0.44
12971.00	91.81	0.15	7316.89	5828.85	5841.63	-1111.22	0.52
13066.00	90.57	0.57	7314.91	5923.83	5936.60	-1110.62	1.38

MD	Inc	Azim	TVD	VS	+N/-S	+E/-W	DLS
ft	deg	deg	ft	ft	ft	ft	%/100ft
13159.00	90.00	0.66	7314.45	6016.82	6029.60	-1109.62	0.62
13254.00	90.17	0.15	7314.31	6111.82	6124.59	-1108.95	0.57
13349.00	90.81	0.50	7313.50	6206.82	6219.59	-1108.41	0.77
13443.00	90.97	0.09	7312.04	6300.80	6313.57	-1107.93	0.47
13536.00	91.38	359.96	7310.13	6393.78	6406.55	-1107.89	0.46
13631.00	90.23	1.03	7308.80	6488.77	6501.54	-1107.07	1.65
13725.00	90.44	1.10	7308.25	6582.76	6595.52	-1105.32	0.24
13819.00	90.30	0.76	7307.64	6676.76	6689.51	-1103.79	0.39
13912.00	89.97	0.27	7307.42	6769.76	6782.50	-1102.96	0.64
14007.00	89.80	0.15	7307.61	6864.76	6877.50	-1102.61	0.22
14102.00	89.43	359.70	7308.25	6959.75	6972.50	-1102.73	0.61
14197.00	89.83	359.65	7308.86	7054.73	7067.49	-1103.27	0.42
14290.00	89.50	359.40	7309.41	7147.71	7160.49	-1104.04	0.45
14385.00	89.46	359.04	7310.27	7242.68	7255.48	-1105.34	0.38
14479.00	88.89	1.09	7311.62	7336.66	7349.46	-1105.23	2.26
14574.00	88.76	0.95	7313.57	7431.64	7444.43	-1103.54	0.20
14667.00	90.54	1.59	7314.14	7524.62	7537.40	-1101.48	2.03
14761.00	90.34	0.70	7313.42	7618.62	7631.37	-1099.60	0.97
14853.00	90.64	359.26	7312.63	7710.60	7723.37	-1099.63	1.60
14948.00	90.70	1.12	7311.52	7805.59	7818.36	-1099.32	1.96

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft
15041.00	91.11	1.08	7310.05	7898.58	7911.33	-1097.53	0.44
15135.00	90.71	359.63	7308.56	7992.56	8005.31	-1096.95	1.60
15229.00	90.37	0.90	7307.67	8086.55	8099.31	-1096.51	1.40
15321.00	89.90	0.39	7307.46	8178.55	8191.30	-1095.48	0.75
15415.00	89.93	0.43	7307.59	8272.55	8285.30	-1094.81	0.05
15509.00	90.30	0.58	7307.41	8366.55	8379.29	-1093.98	0.42
15602.00	90.57	0.34	7306.70	8459.55	8472.29	-1093.23	0.39

