

Company: Noble Energy Inc.

Well: Waste Management Y23-712

Field: Wattenberg

County: WELD State: Colorado

UltraSonic Summary Print

County:	WELD
Field:	Wattenberg
Location:	NENE Sec. 11, T2N, R64W
Well:	Waste Management Y23-712
Company:	Noble Energy Inc.
Location:	
NENE Sec. 11, T2N, R64W	Elev.: K.B. 4925.00 ft
SHL: 550' FNL & 128' FEL	G.L. 4895.00 ft
Lat: 40.15799, Long: -104.51194	D.F. 4925.00 ft
Permanent Datum:	Ground Level
Log Measured From:	Kelly Bushing
Drilling Measured From:	Kelly Bushing
API Serial No.	Section: 11
05-123-44840	Township: 2N
	Range: 64W

Logging Date	05-Jan-2018
Run Number	ONE
Depth Driller	19916.00 ft
Schlumberger Depth	6650.00 ft
Bottom Log Interval	6650.00 ft
Top Log Interval	100.00 ft
Casing Fluid Type	Brine
Salinity	
Density	8.4 lbm/gal
Fluid Level	0.00 ft
BIT/CASING/TUBING STRING	
Bit Size	8.50 in
From	2039.00 ft
To	6650.00 ft
Casing/Tubing Size	5.5 in
Weight	20 lbm/ft
Grade	P110
From	30.00 ft
To	6650.00 ft
Max Recorded Temperatures	209 degF
Logger on Bottom	05-Jan-2018 10:03:00
Unit Number	9115
Recorded By	Camila Lang
Witnessed By	Bill Mansfield

Disclaimer

THE USE OF AND RELIANCE UPON THIS RECORDED-DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED-DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE AND RELIANCE UPON THE RECORDED-DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED-DATA.

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12.1 Integration Summary

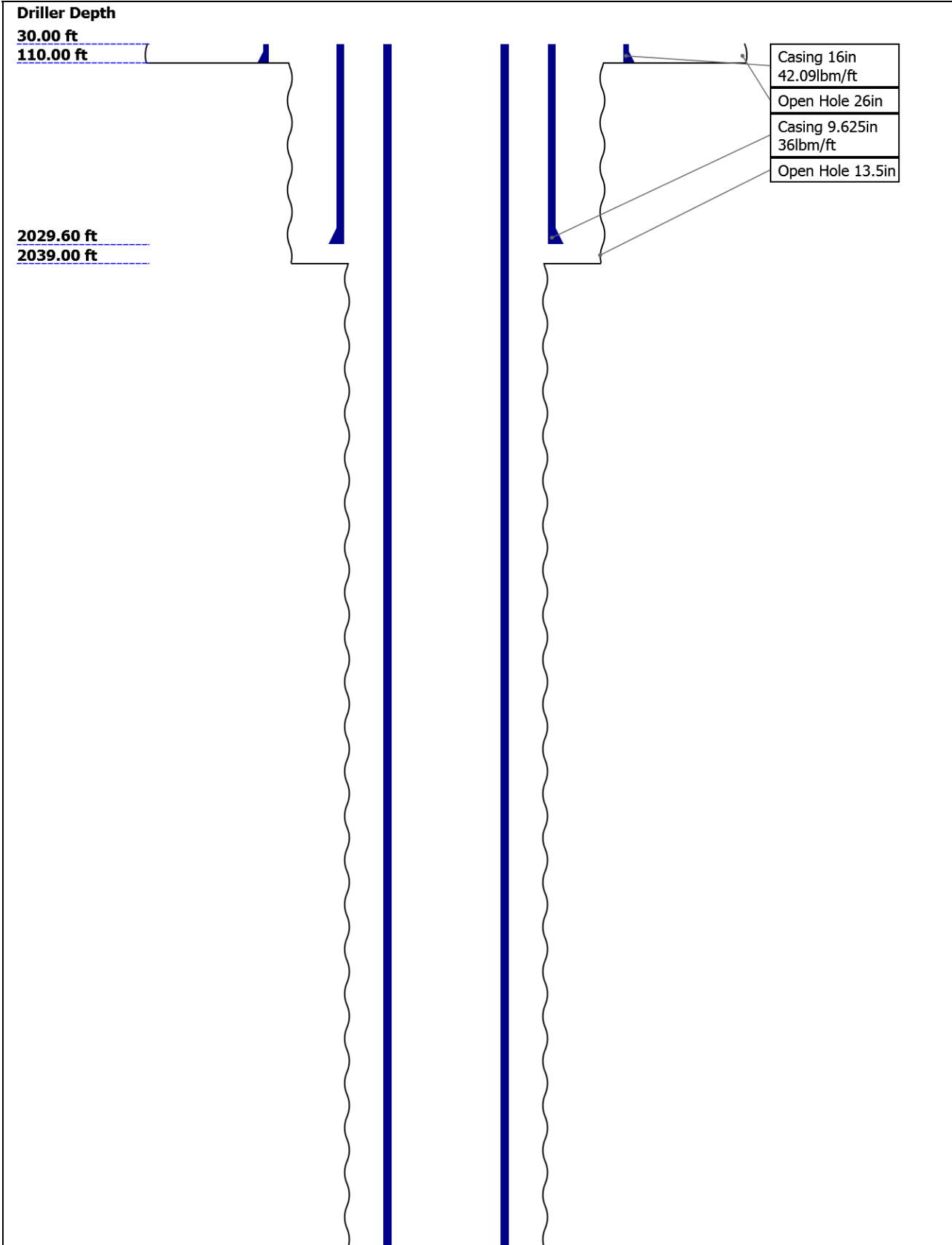
12.2 Software Version

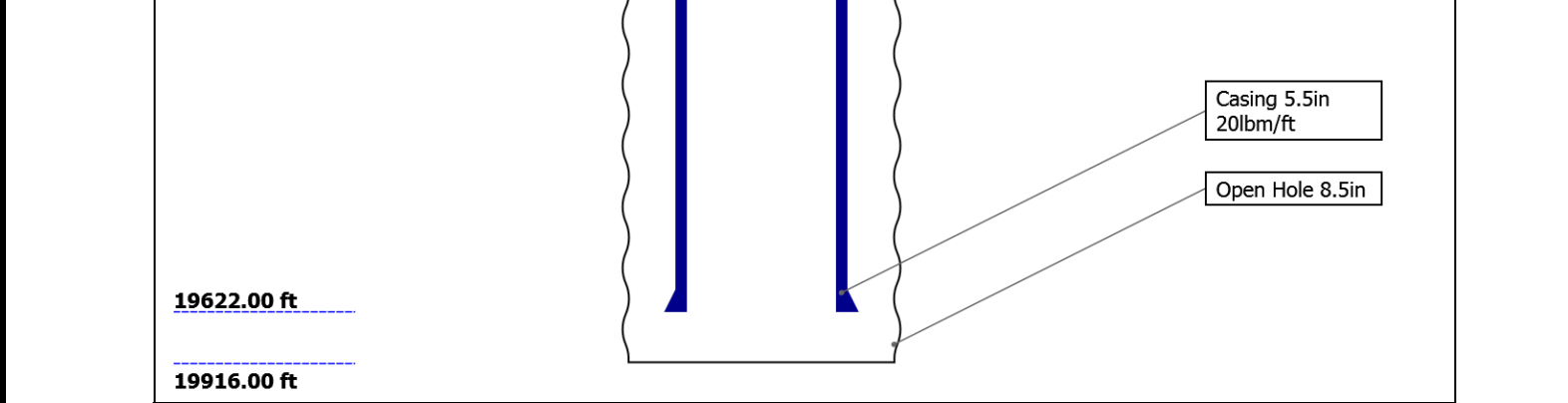
12.3 Composite Summary

12.4 Log (DJ Basin Ultrasonic Cement Summary Report)

12.5 Parameter Listing

Well Sketch





Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	26	13.5	8.5			
Top Driller (ft)	30	110	2039			
Top Logger (ft)	30	110	2039			
Bottom Driller (ft)	110	2039	19916			
Bottom Logger (ft)	110	2039	6650			
Casing						
Size (in)	16	9.625	5.5			
Weight (lbm/ft)	42.09	36	20			
Inner Diameter (in)	15.511	8.921	4.778			
Grade	N/A	90	P110			
Top Driller (ft)	30	30	30			
Top Logger (ft)	30	30	30			
Bottom Driller (ft)	110	2029.6	19622			
Bottom Logger (ft)	110	2029.6	6650			

Operational Run Summary

Parameter (unit)	ONE					
Date Log Started	05-Jan-2018					
Time Log Started	09:13:07					
Date Log Finished	05-Jan-2018					
Time Log Finished	11:06:53					
Top Log Interval (ft)	100.00					
Bottom Log Interval (ft)	6650.00					
Total Depth (ft)	6650.00					
Max Hole Deviation (deg)	0.00					
Azimuth of Max Deviation (deg)	0.00					
Bit Size (in)	8.500					
Logging Unit Number	9115					
Logging Unit Location	Fort Morgan					
Recorded By	Camila Lang					

Depth Summary			
	ONE		
Depth Measuring Device			
Type	IDW-B		
Serial Number			
Calibration Date			
Calibrator Serial Number			
Calibration Cable Type			
Wheel Correction 1	0		
Wheel Correction 2	0		
Tension Device			
Type	CMTD-B/A		
Serial Number			
Calibration Date			
Calibrator Serial Number			
Number of Calibration Points	0		
Logging Cable			
Type	7-46NT-XS		
Serial Number			
Length	24000.00 ft		
Conveyance Type	Wireline		
Rig Type	Crane USA		
ONE:Depth Control Parameters		Depth Control Remarks	
Log Sequence	First Log In the Well	All Schlumberger depth control policies and standards were followed. IDW used as a primary depth reference. Z-chart used as a secondary depth reference.	
Rig Up Length At Surface			
Rig Up Length At Bottom			
Rig Up Length Correction			
Stretch Correction			
Tool Zero Check At Surface			
USIT - Fluid Properties Measurement			
Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Run 1	Log[4]:Up	6791.71	55.73
Fluid Velocity = "Automatic". CFVL equals DFSL channel			
Start Depth(ft)	Stop Depth(ft)	Start Value(us/ft)	End Value(us/ft)
Mud Impedance = "FreePipe Norm." Free Pipe normalization zone is : 37.95m(124.52ft) to 40.43m(132.64ft) MUD_N_FRP = 1.16 DFD = 1.01g/cm3(8.40lbm/gal) CZMD median computed in free pipe normalization interval = 1.71 MRayl			
Start Depth(ft)	Stop Depth(ft)	Start Value(Mrayl)	End Value(Mrayl)
ONE			
2500 PSI Main Pass			
Software Version			
Acquisition System		Version	
Maxwell 2017 SP3		7.3.92069.3100	

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[4]:Up	Up	55.73 ft	6791.71 ft	05-Jan-2018 10:03:35 AM	05-Jan-2018 10:59:47 AM	ON	5.45 ft	Yes

All depths are referenced to toolstring zero

Log

Company:Noble Energy Inc.

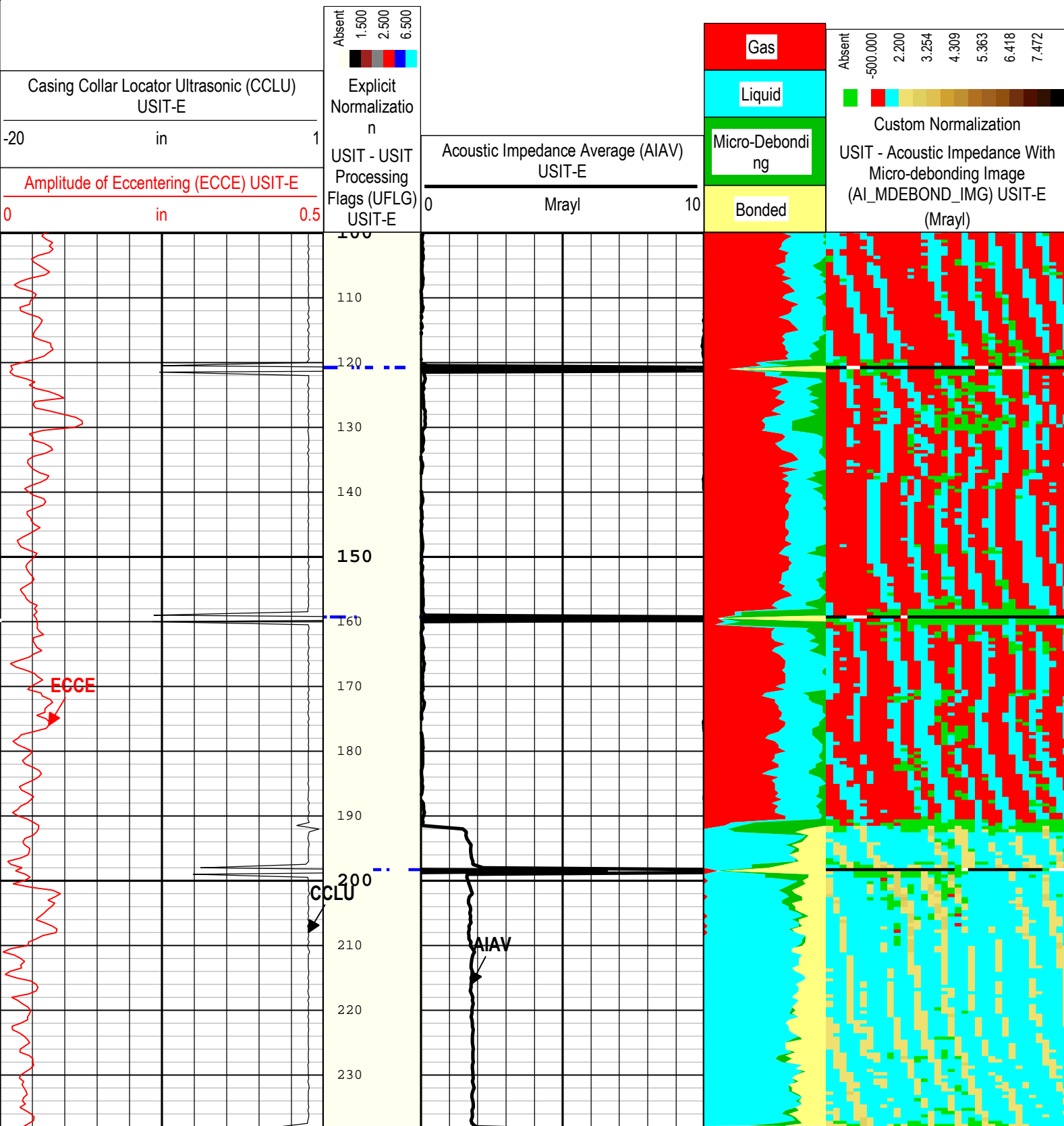
Well:Waste Management Y23-712

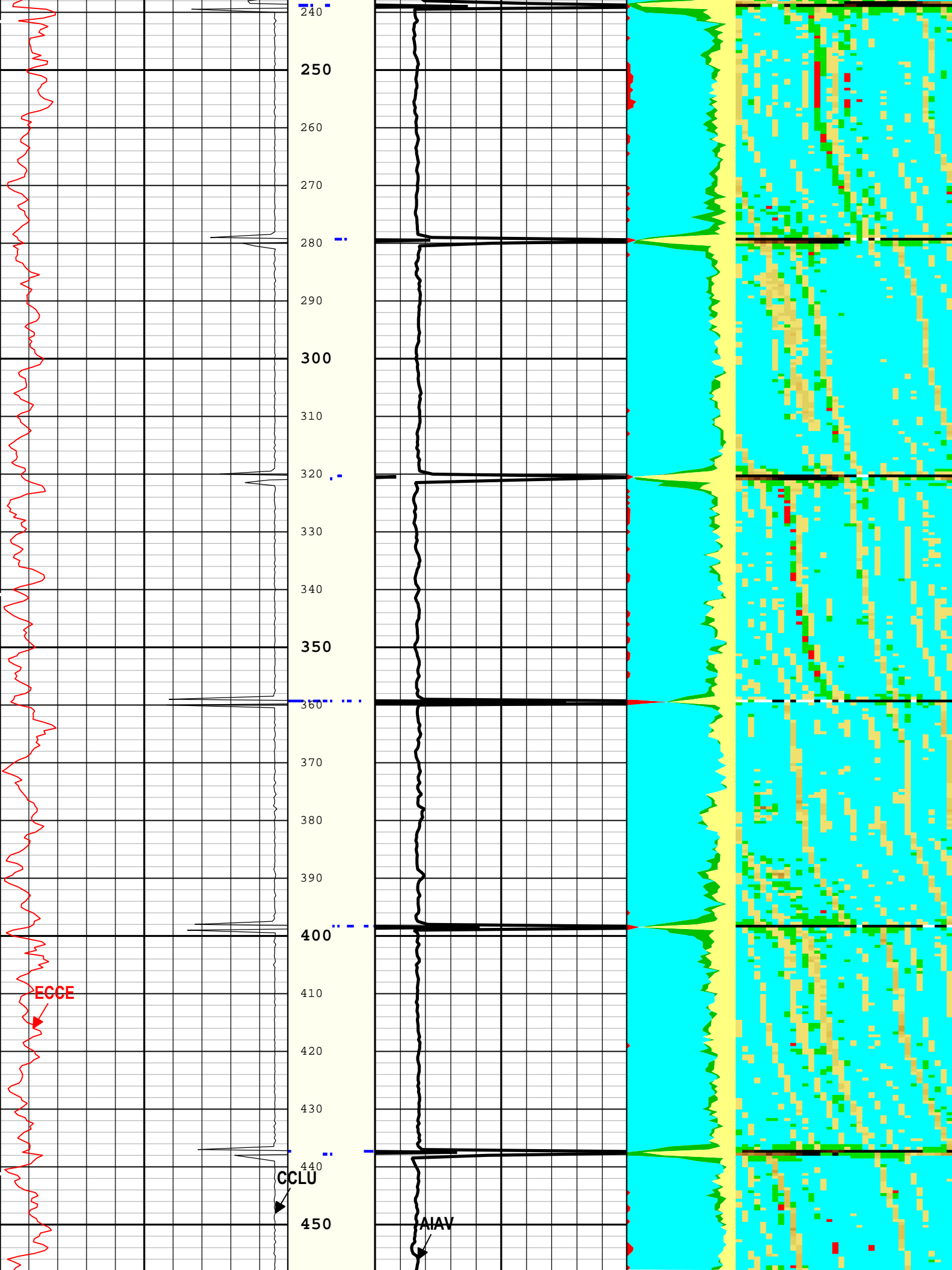
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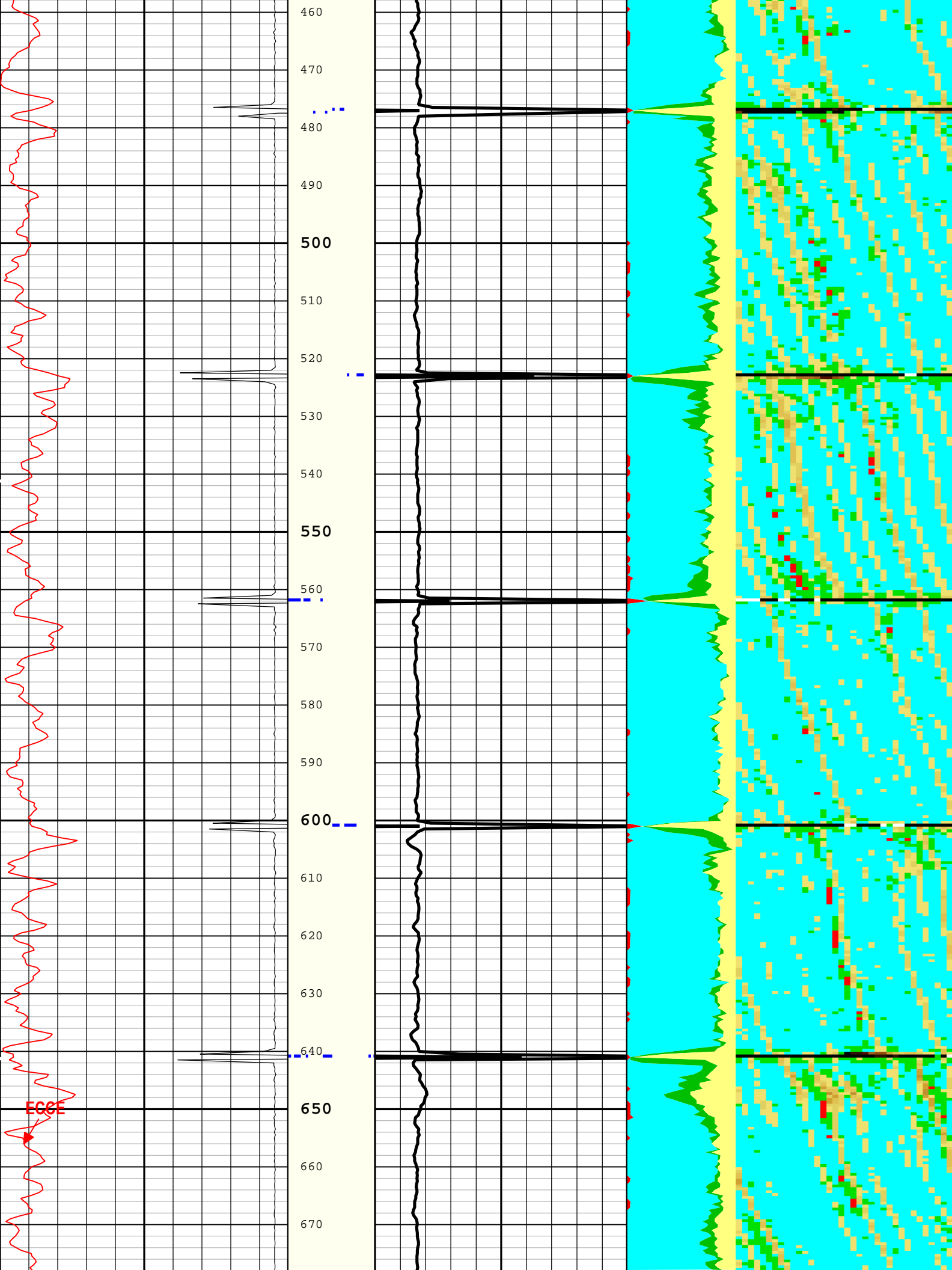
Description: Format: Log (DJ Basin Ultrasonic Cement Summary Report) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth

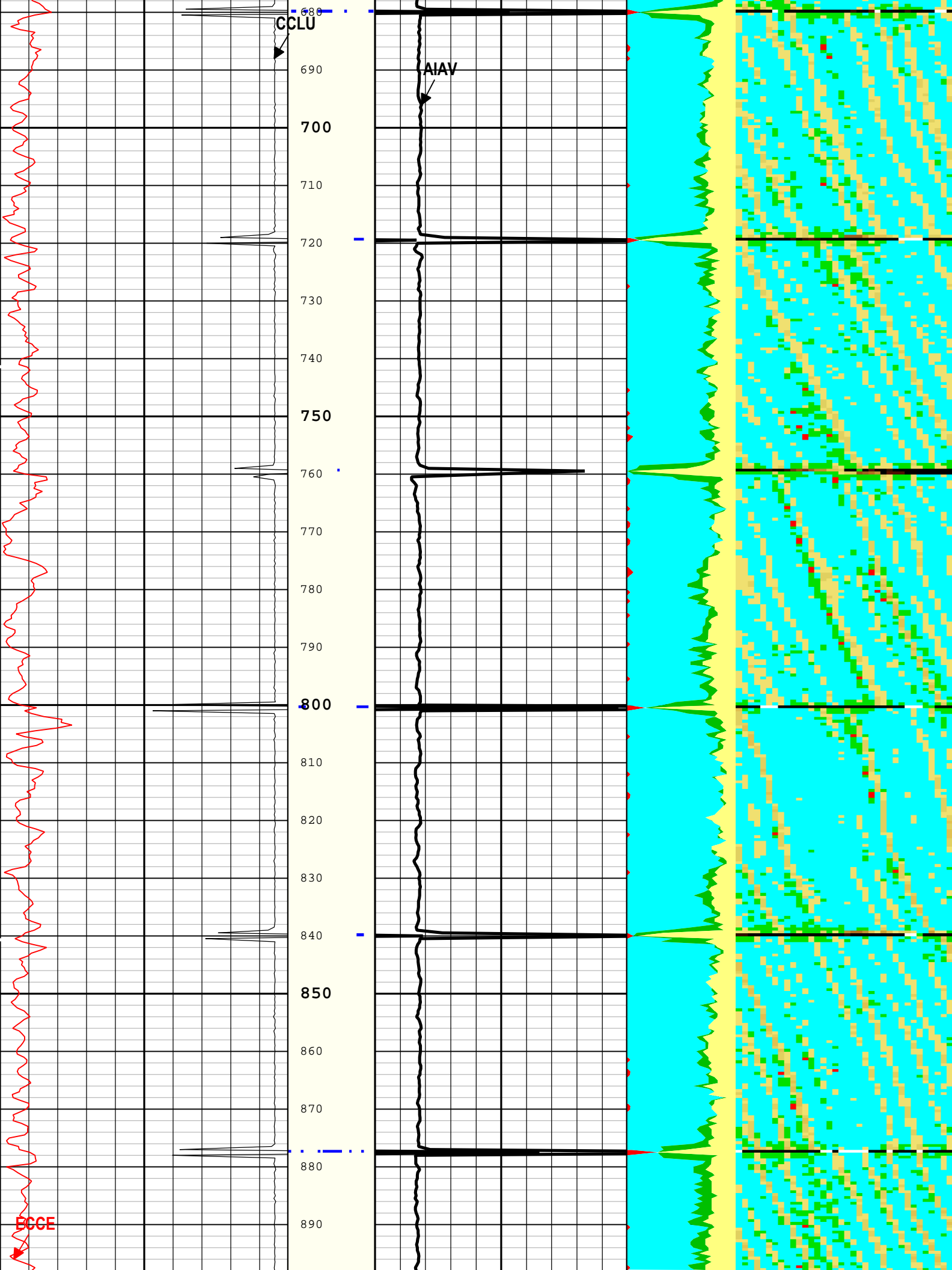
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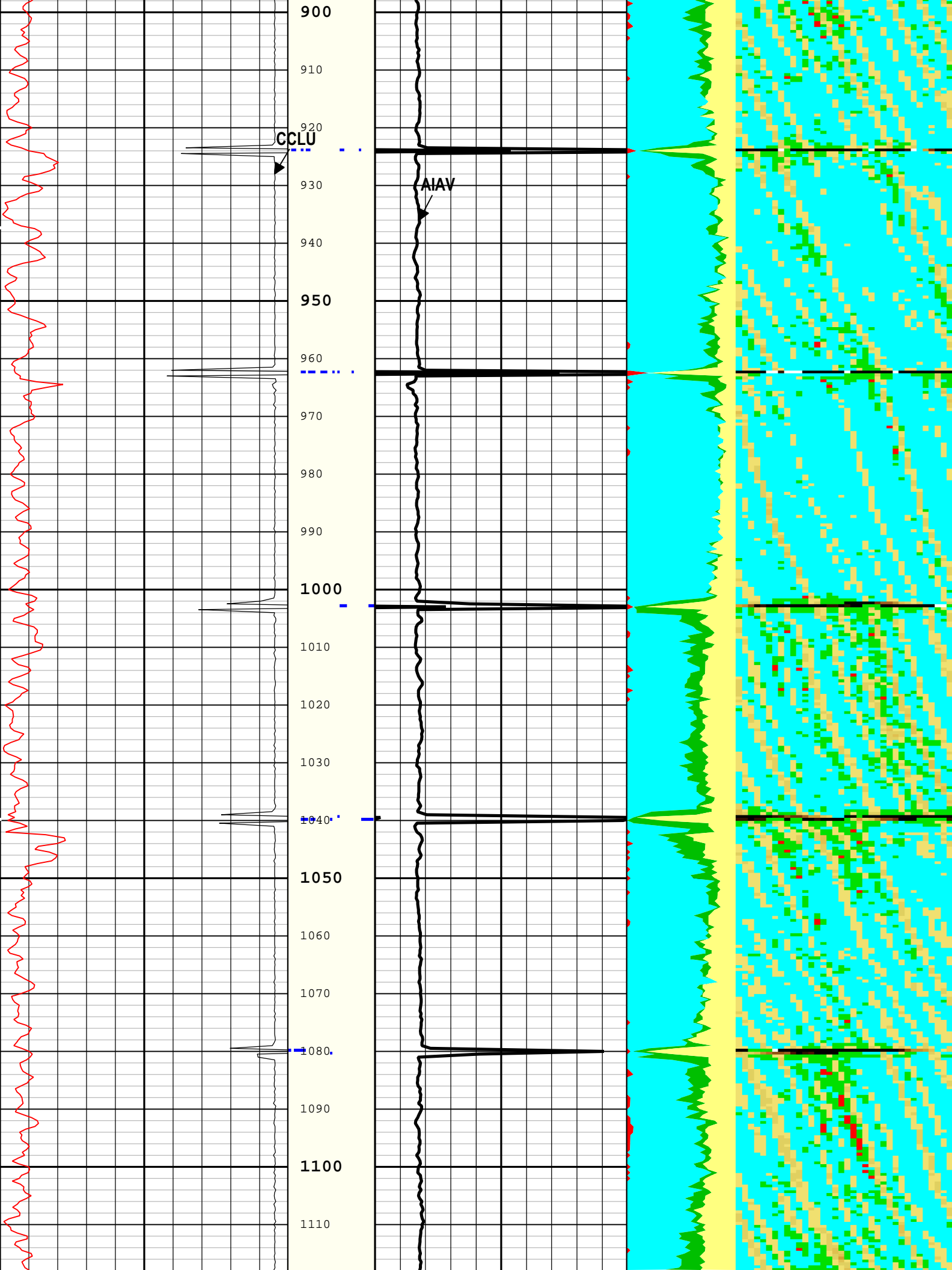
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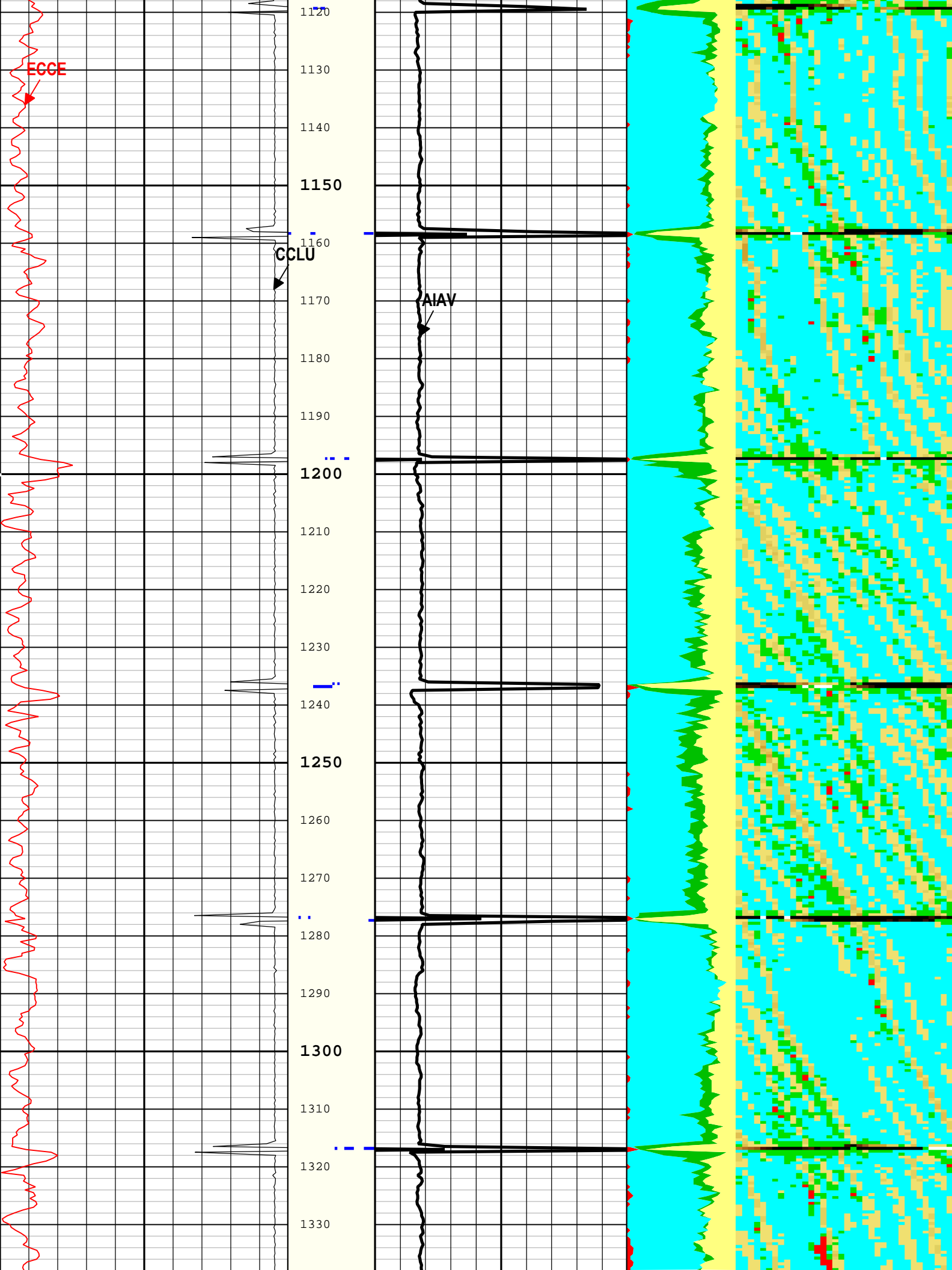


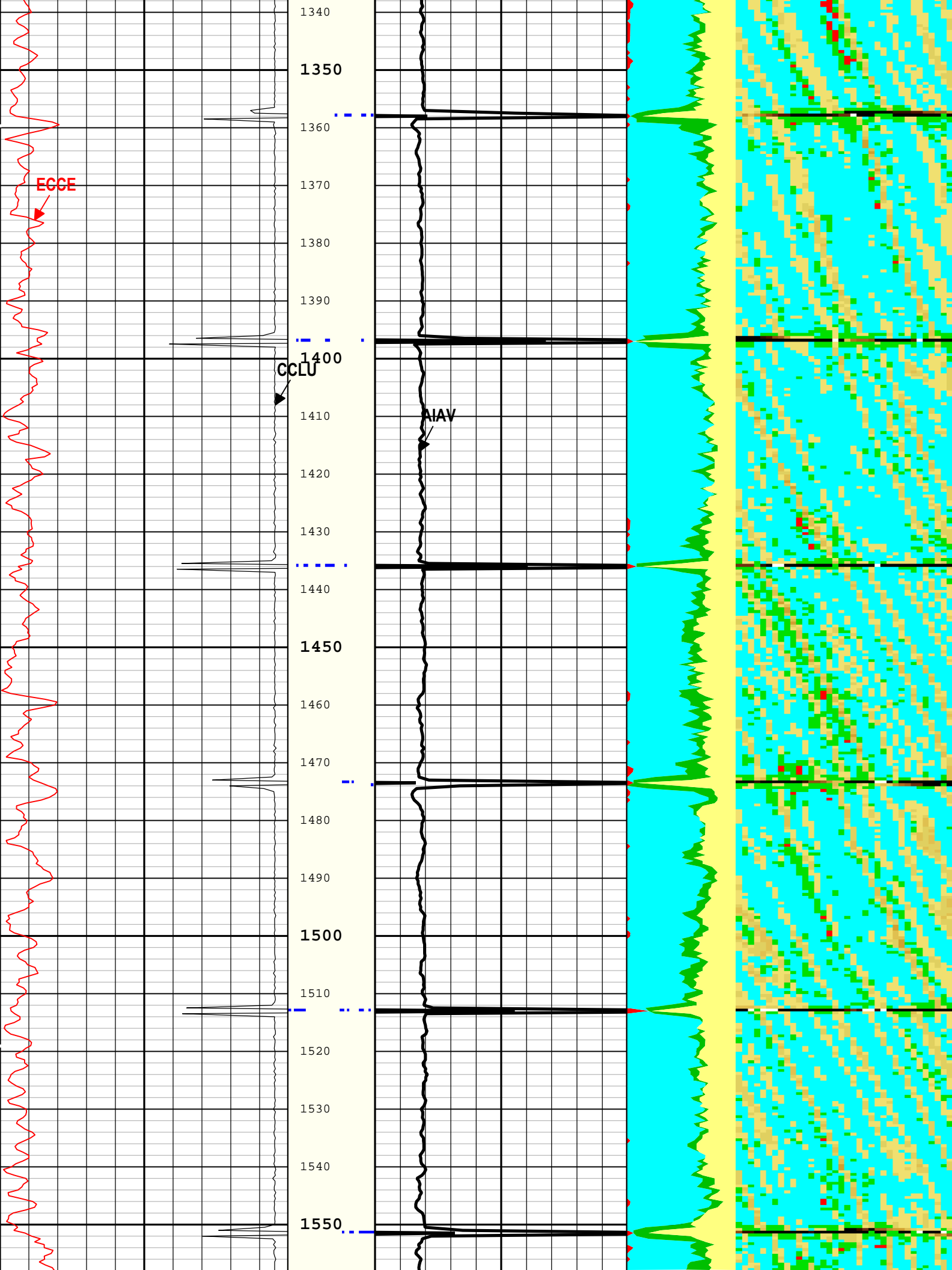


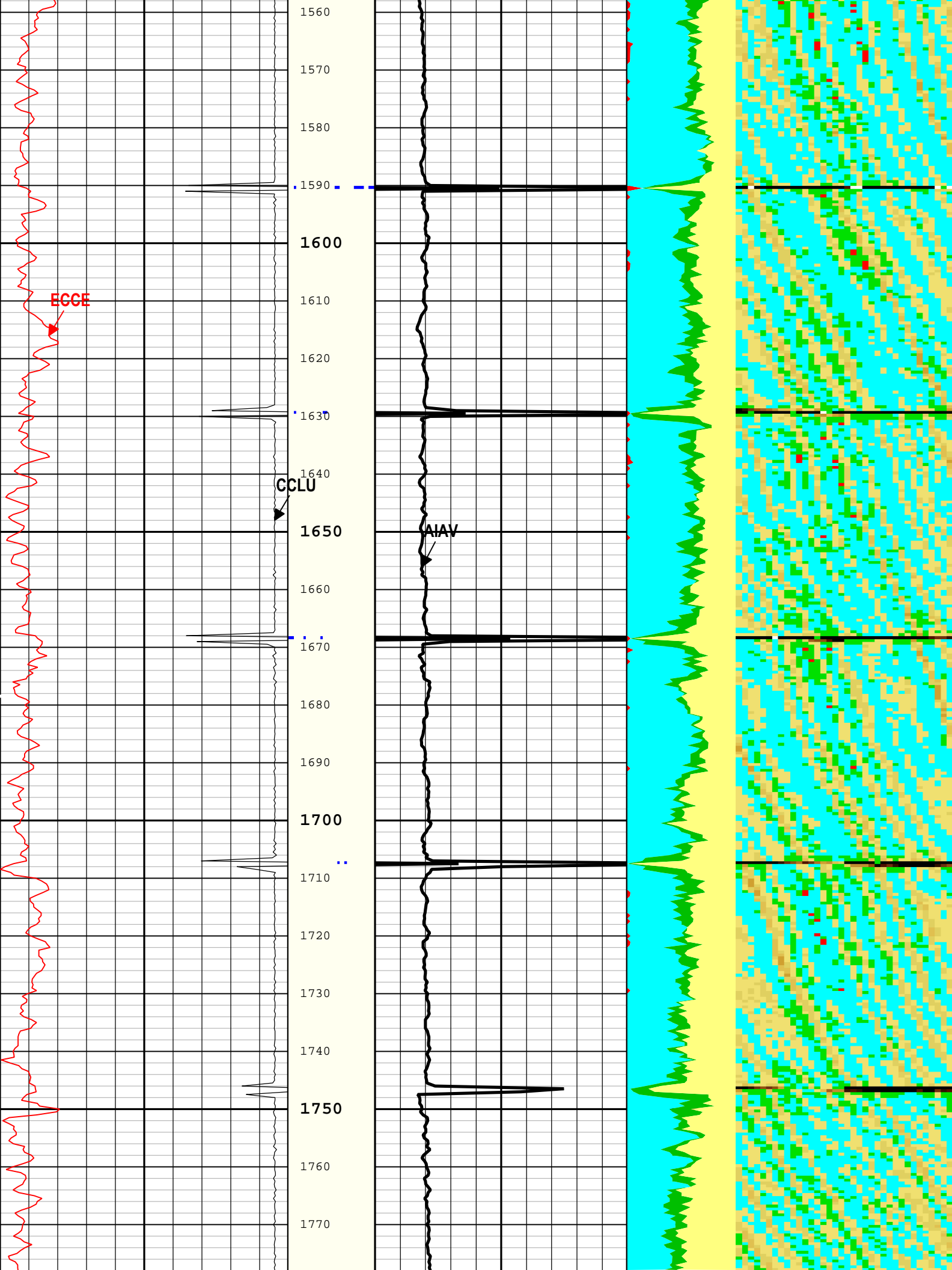


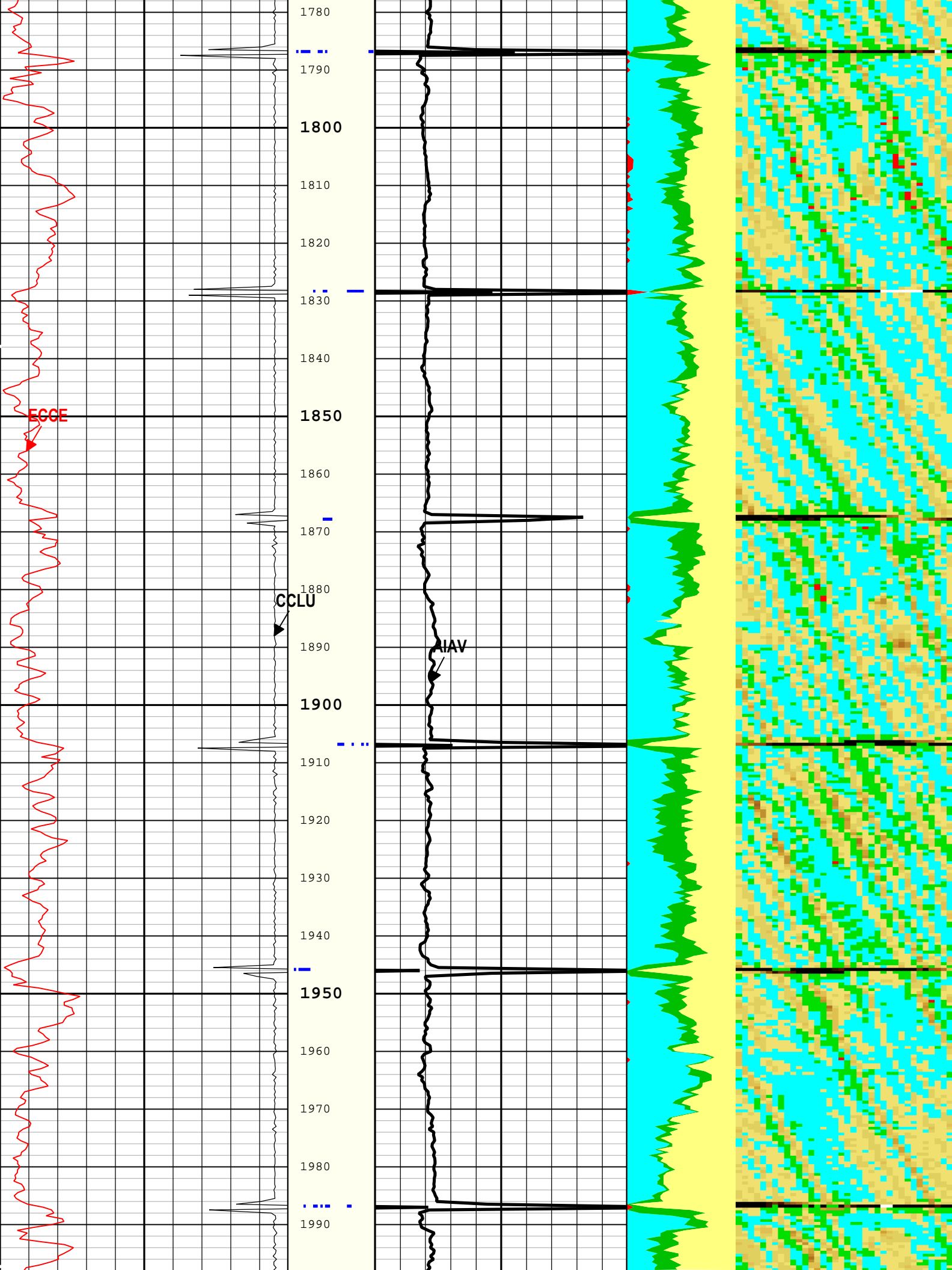


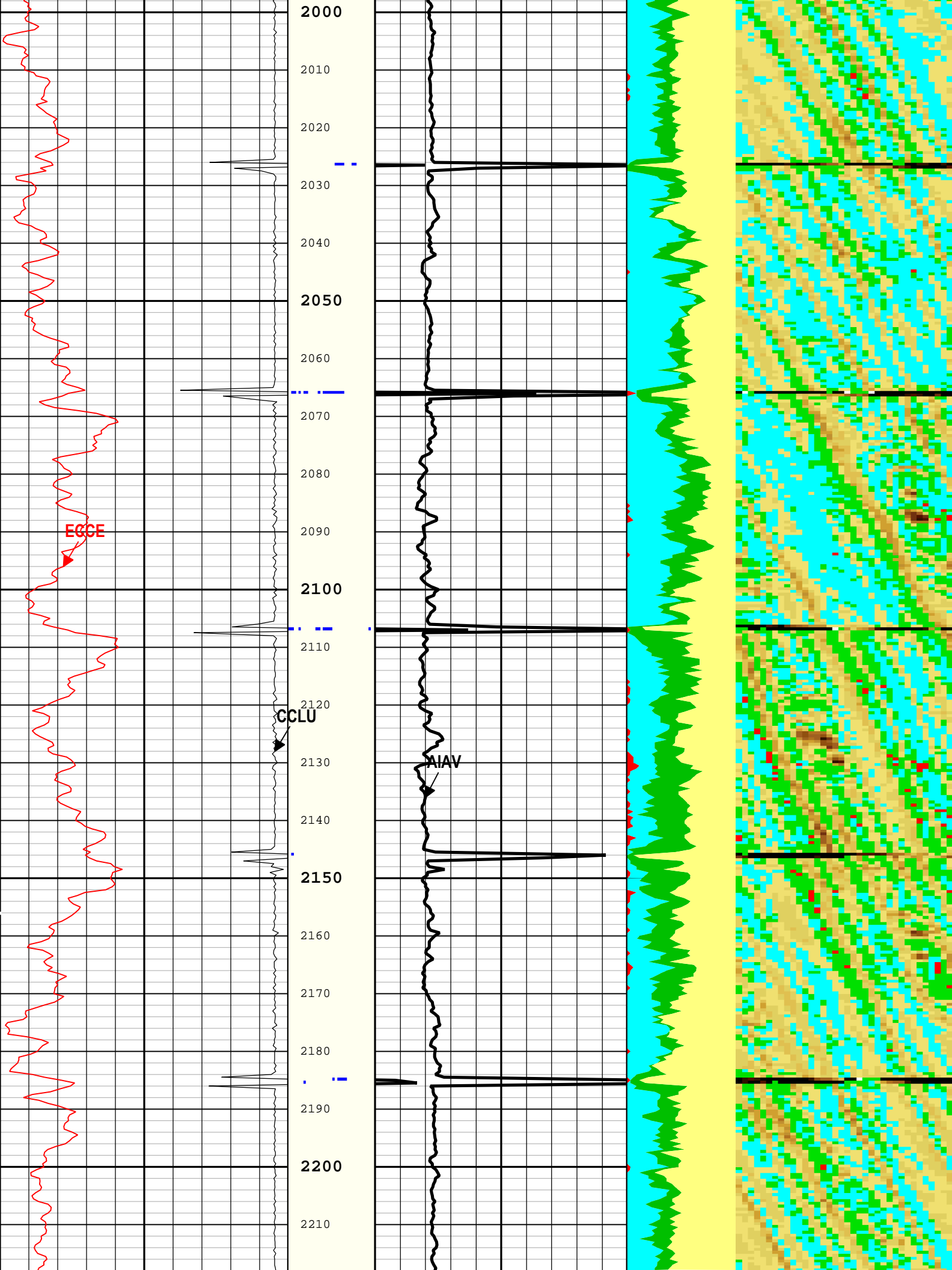


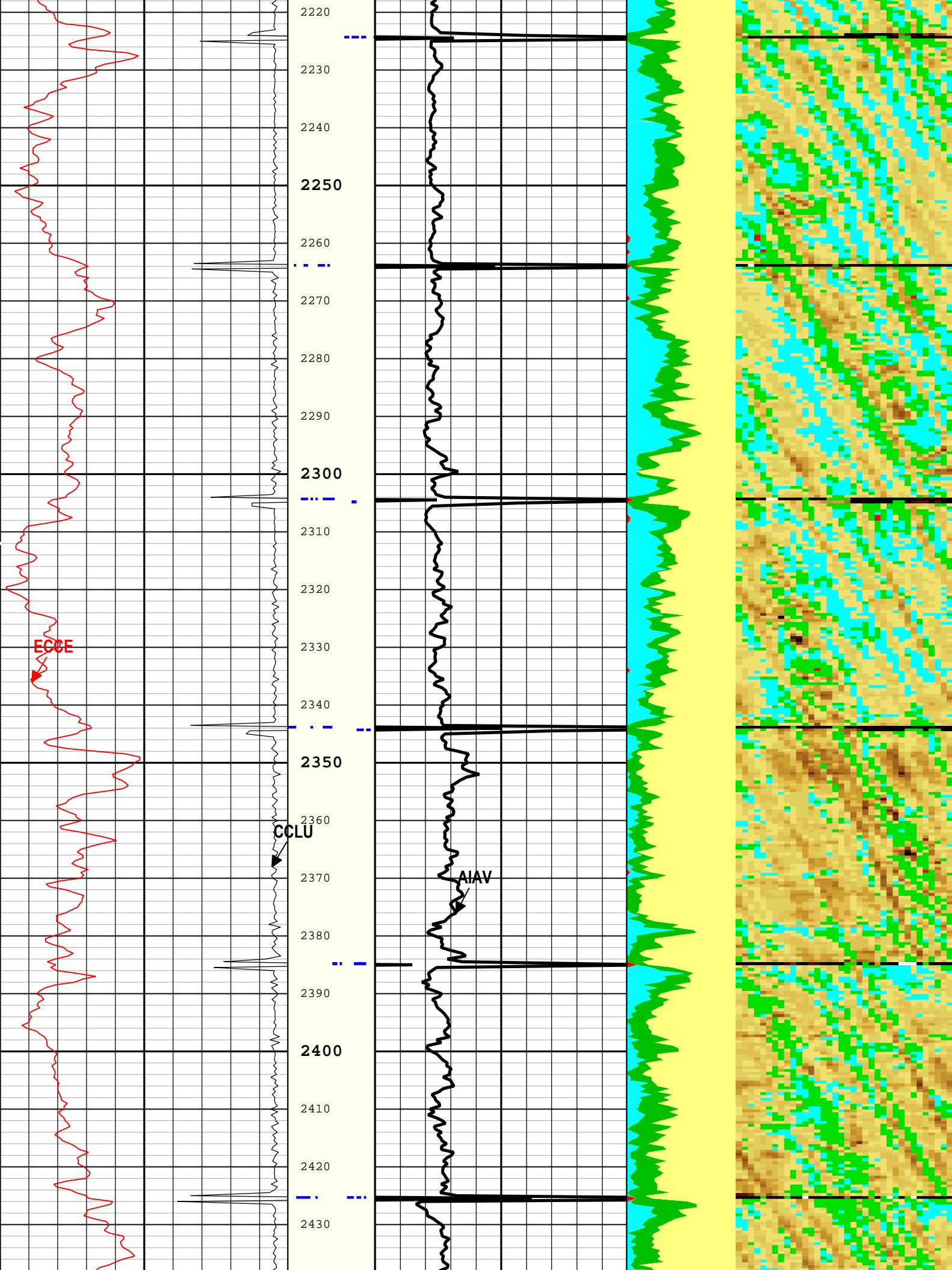


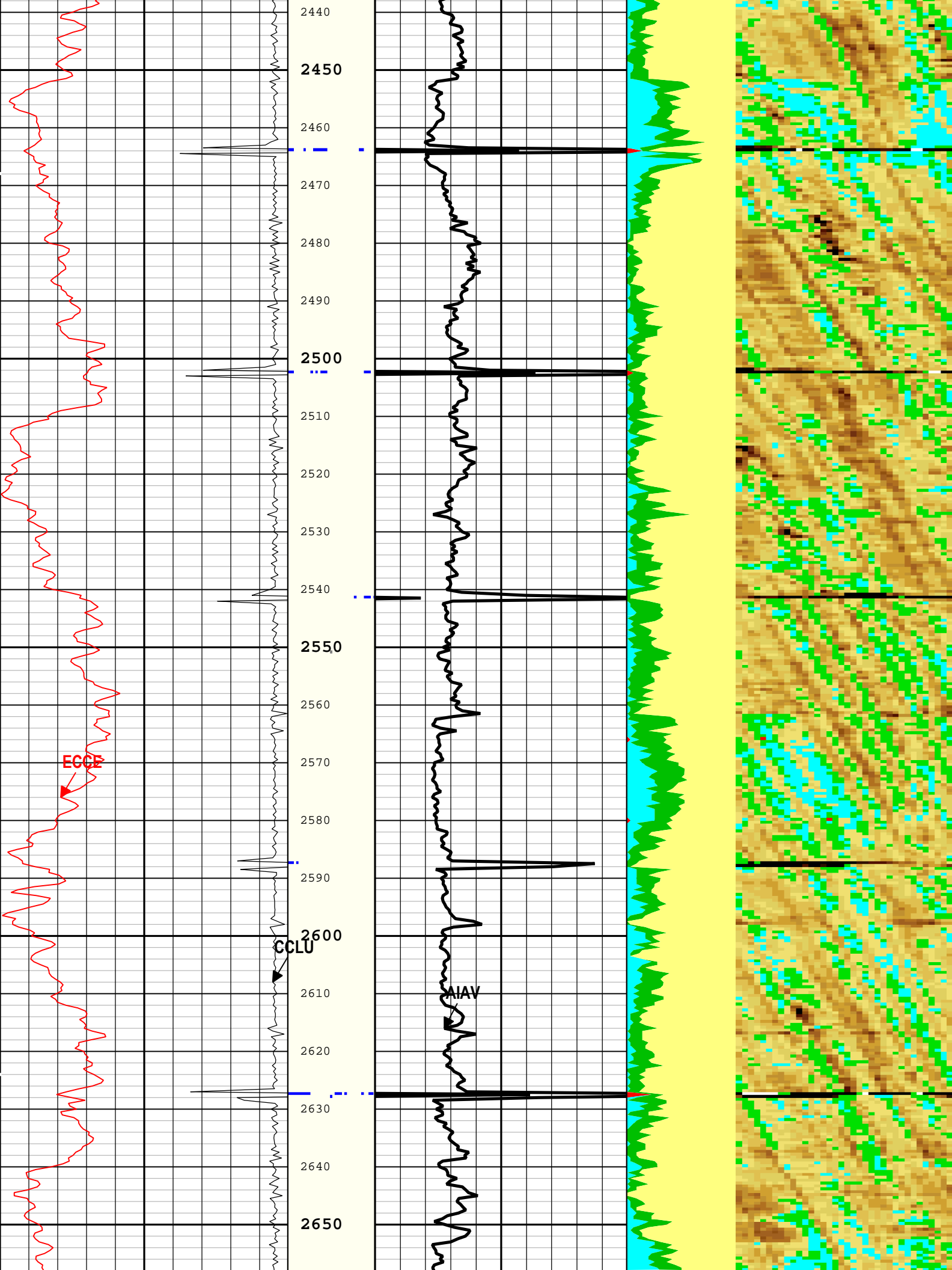


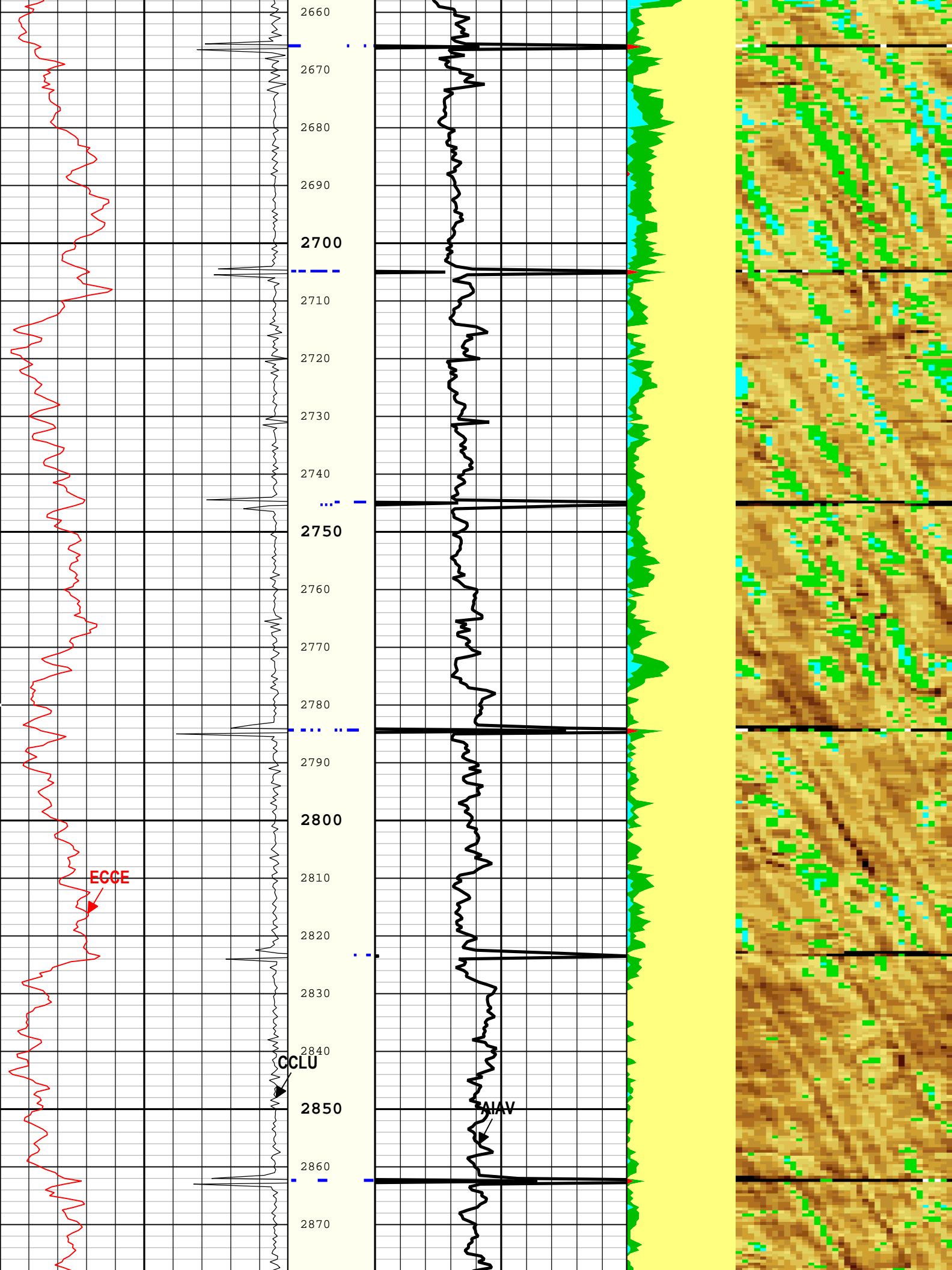


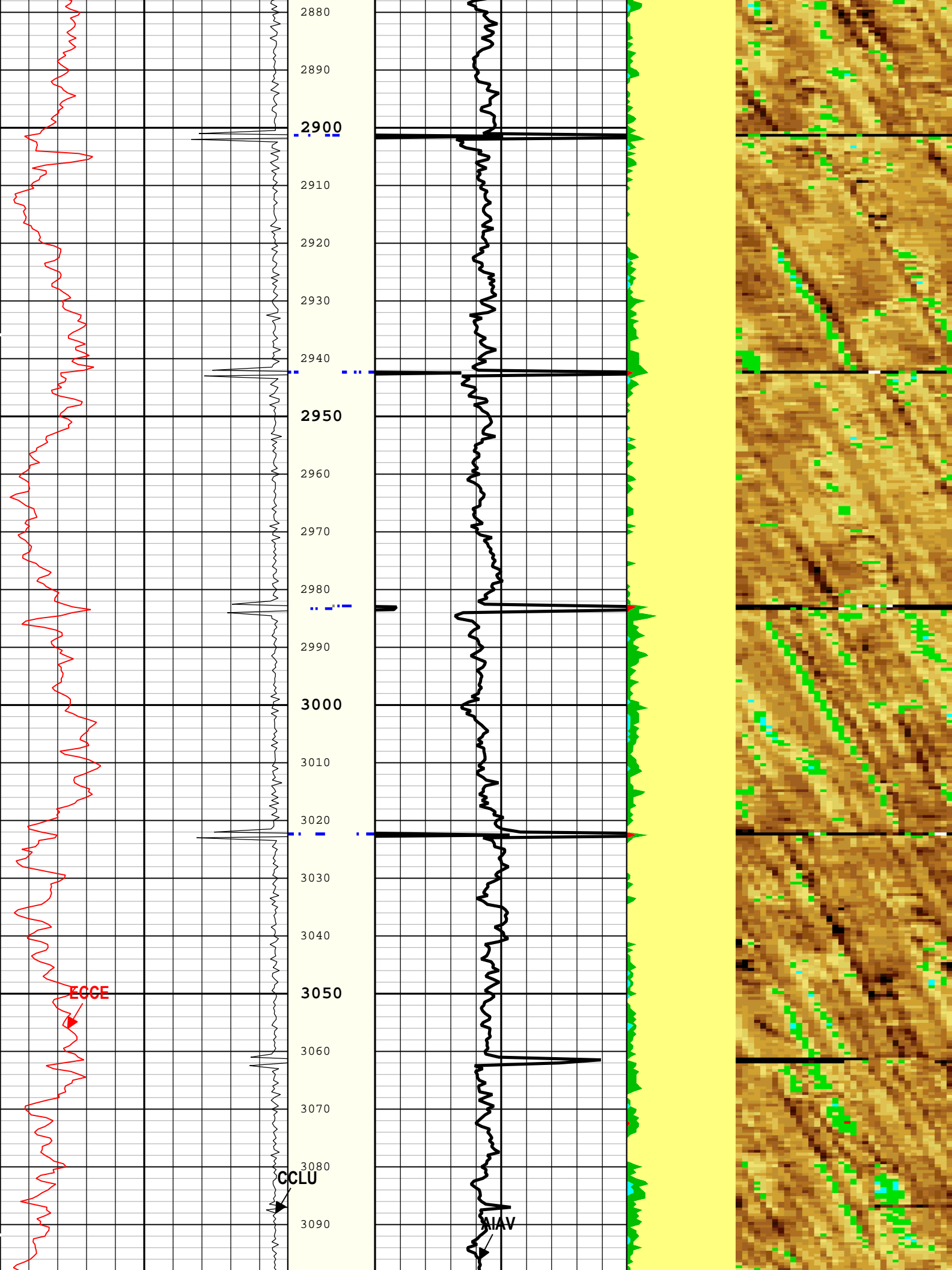


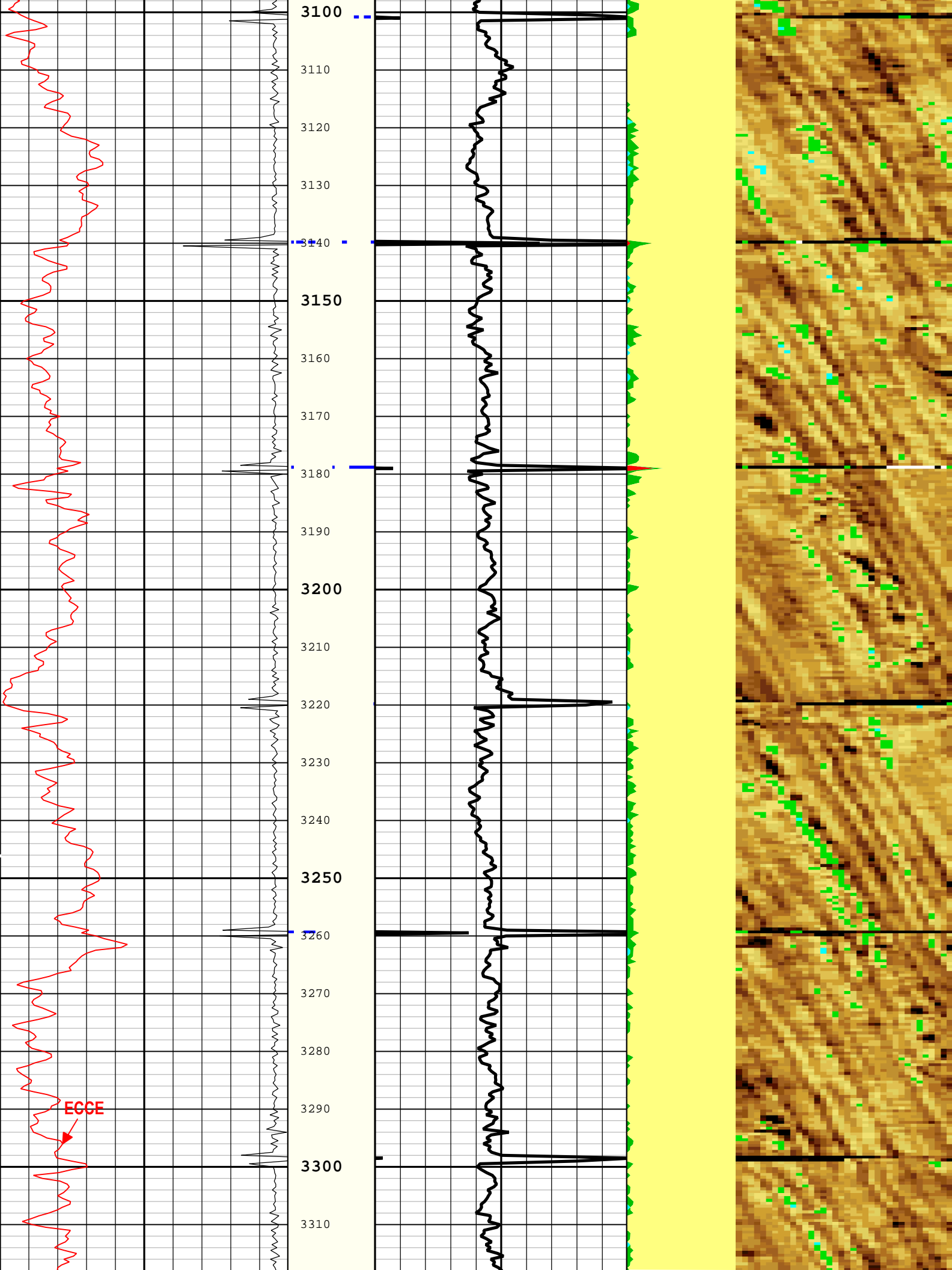


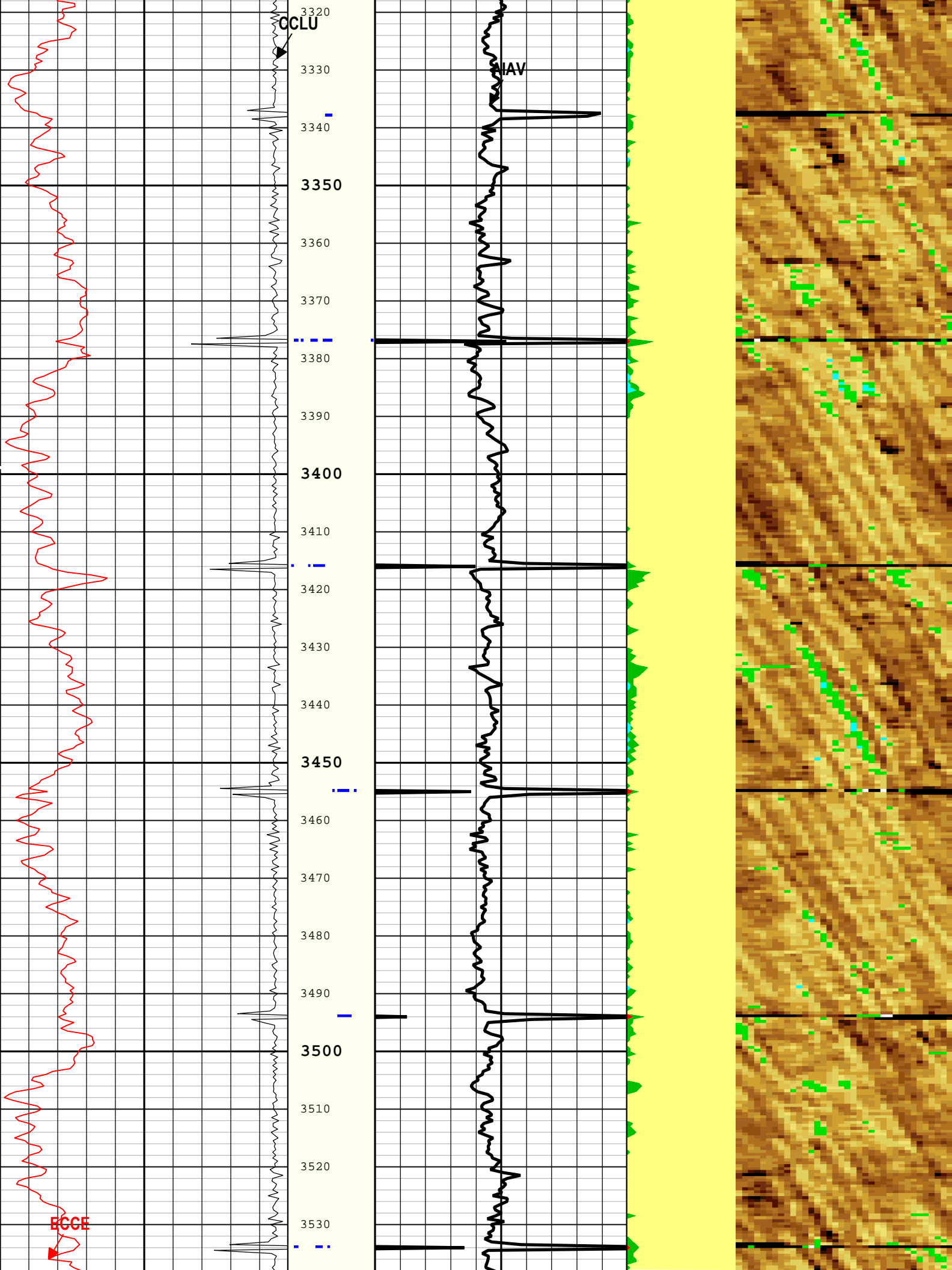


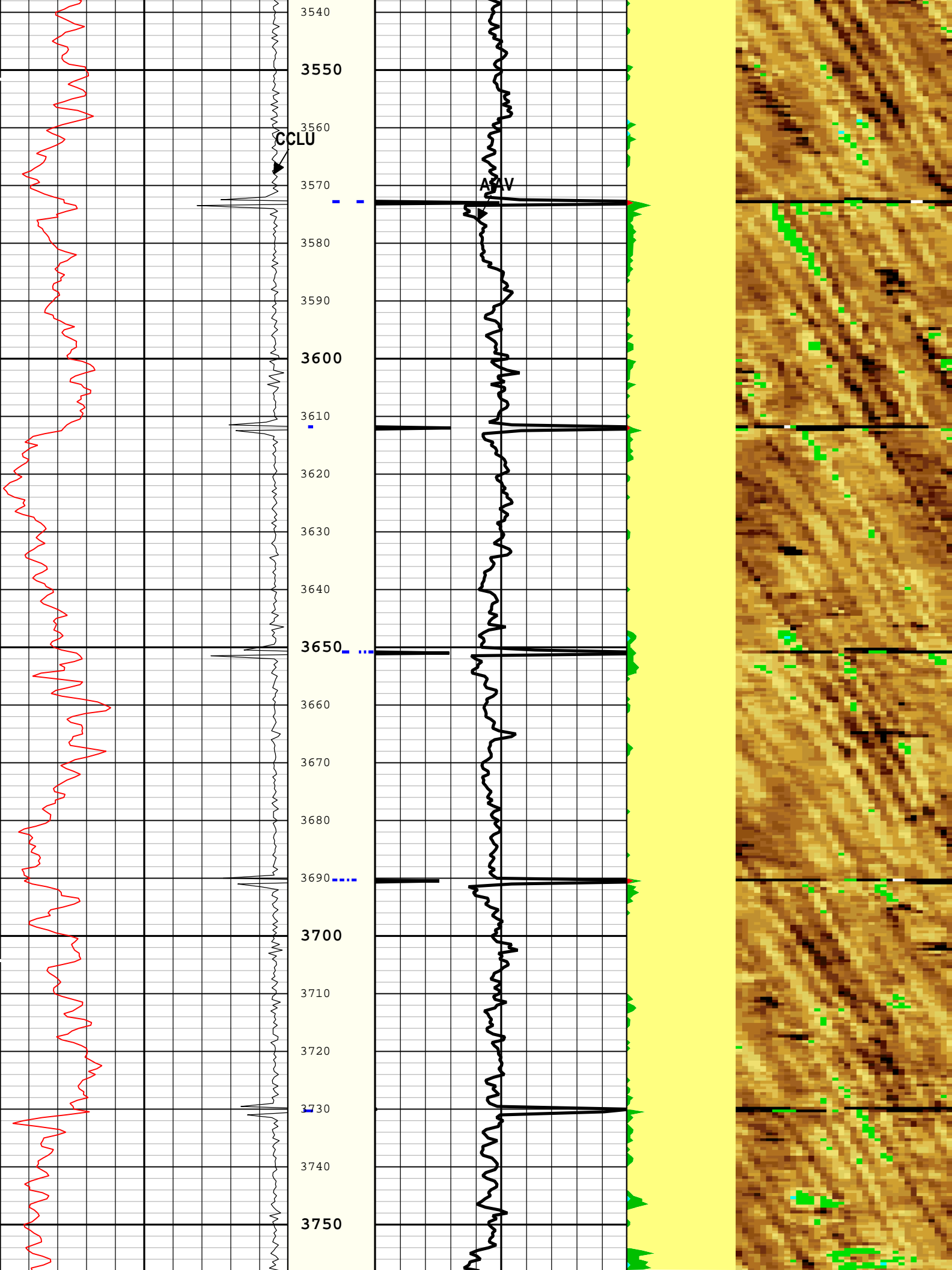


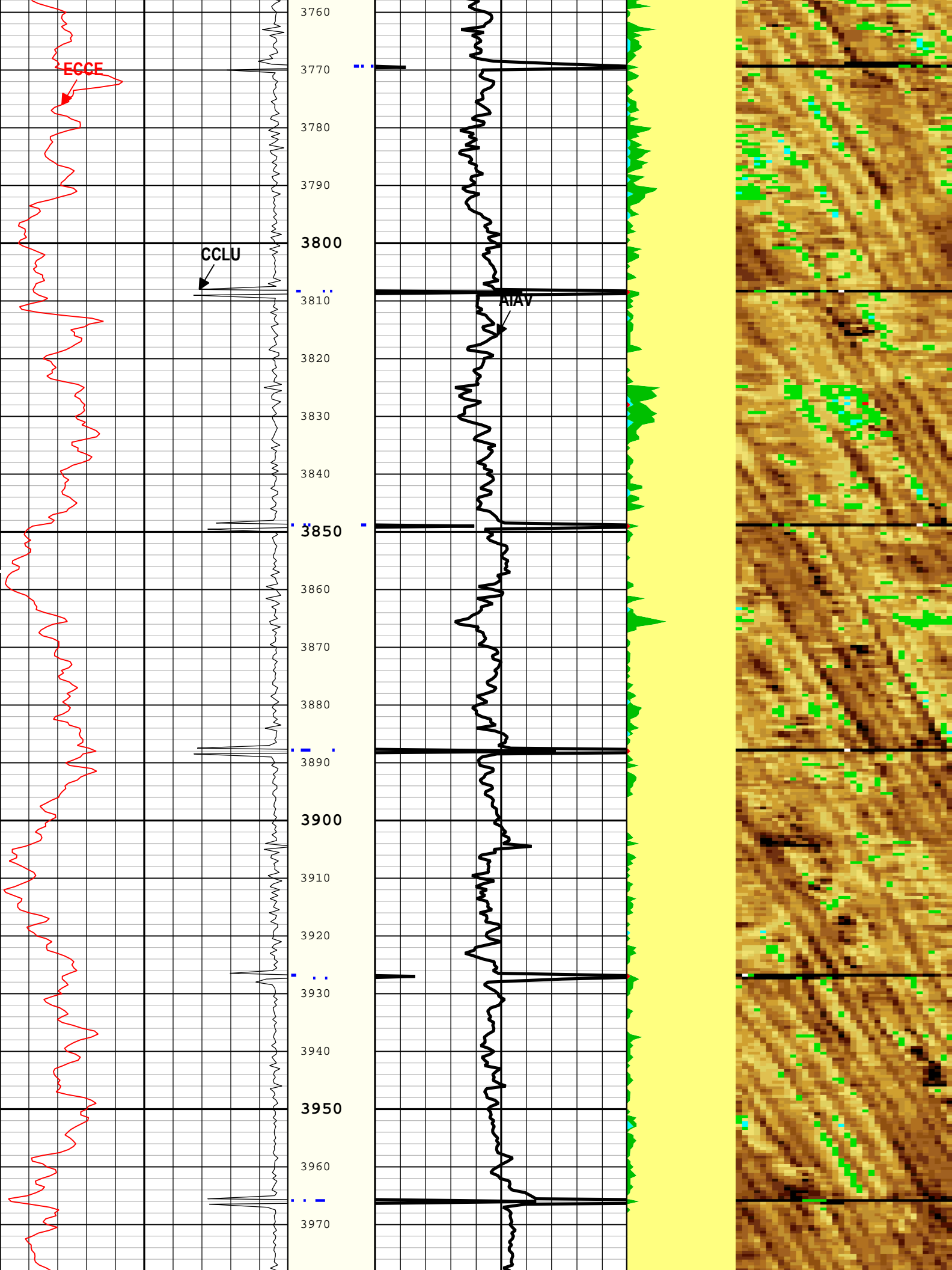


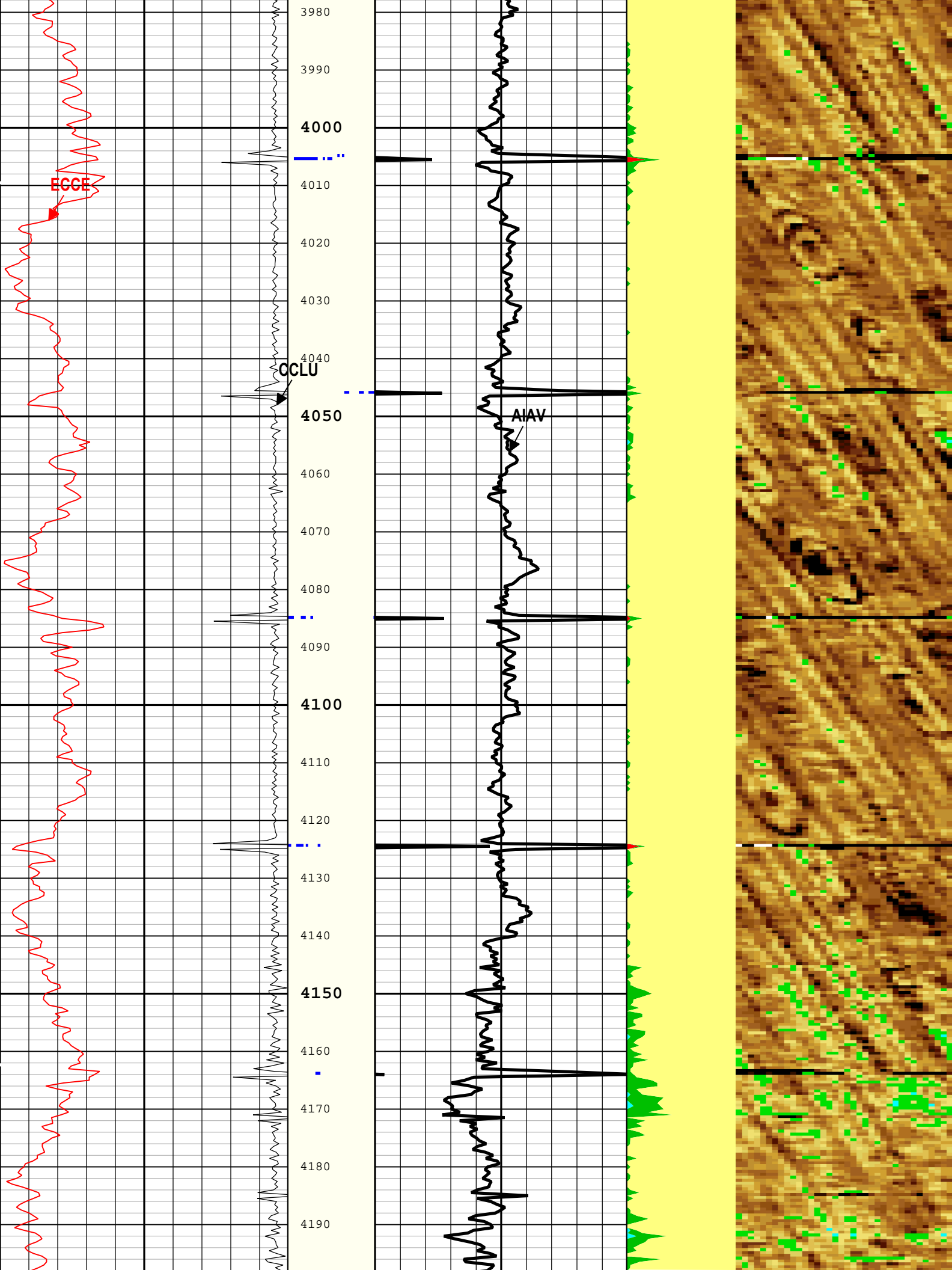


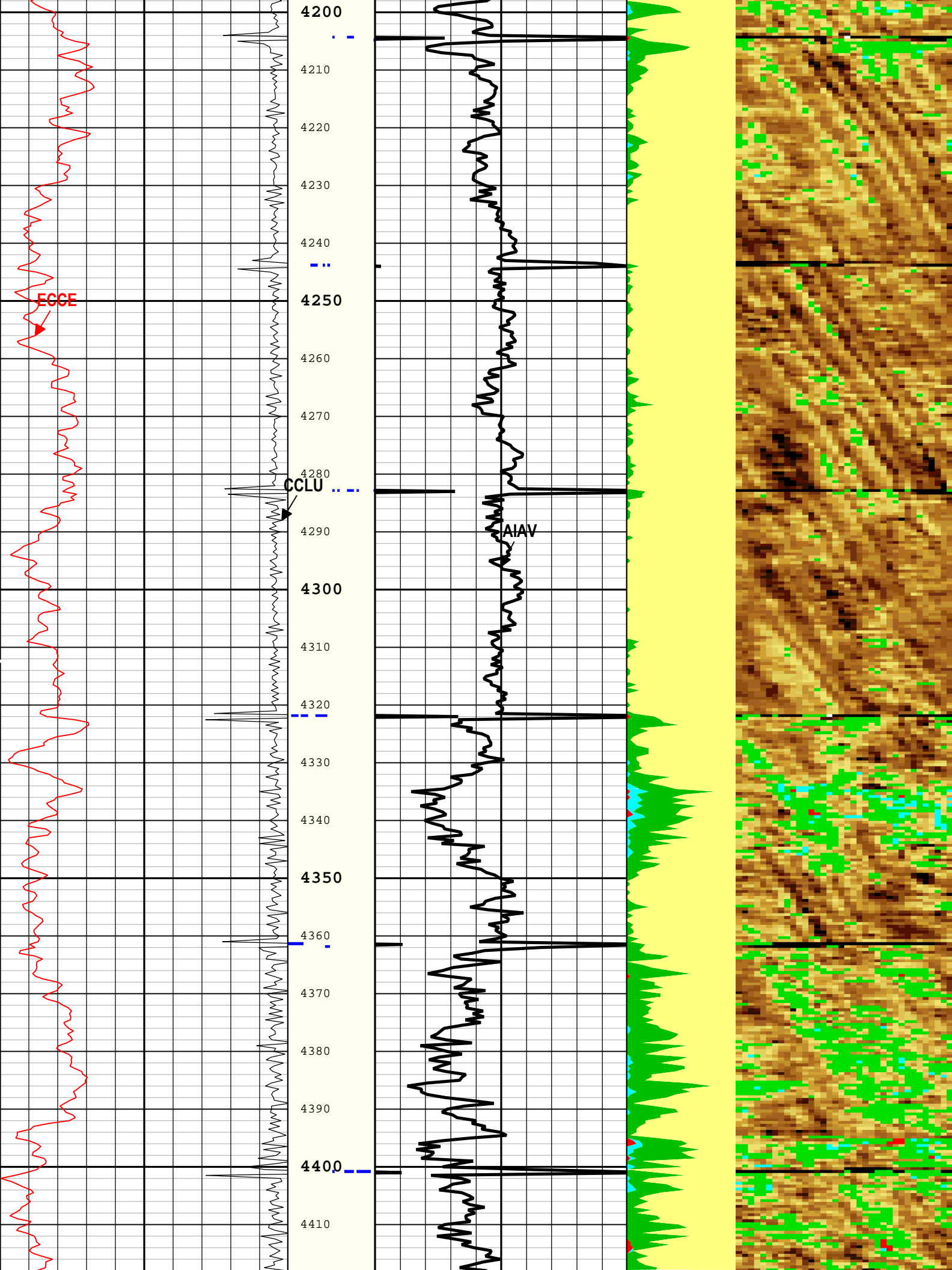


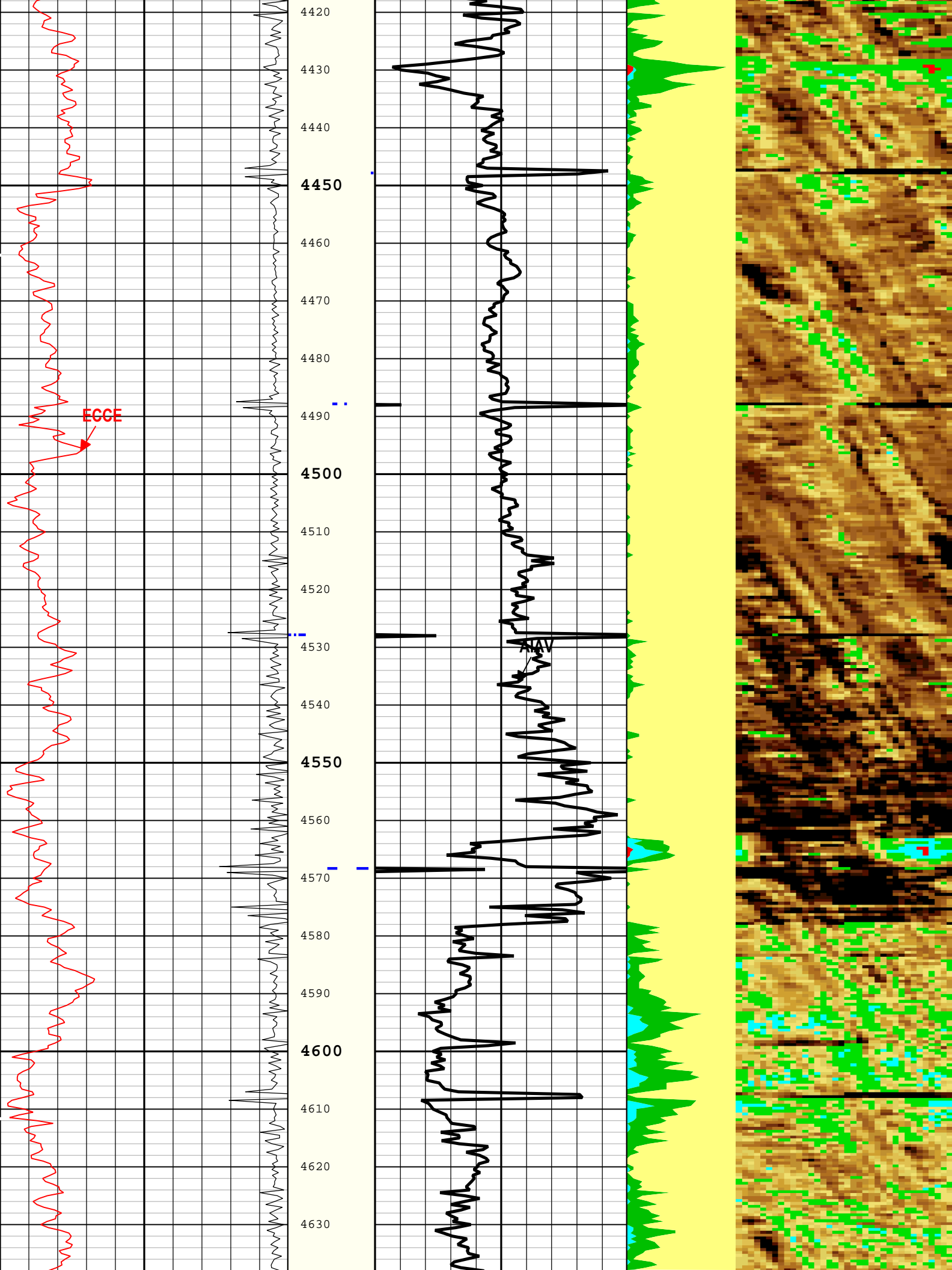


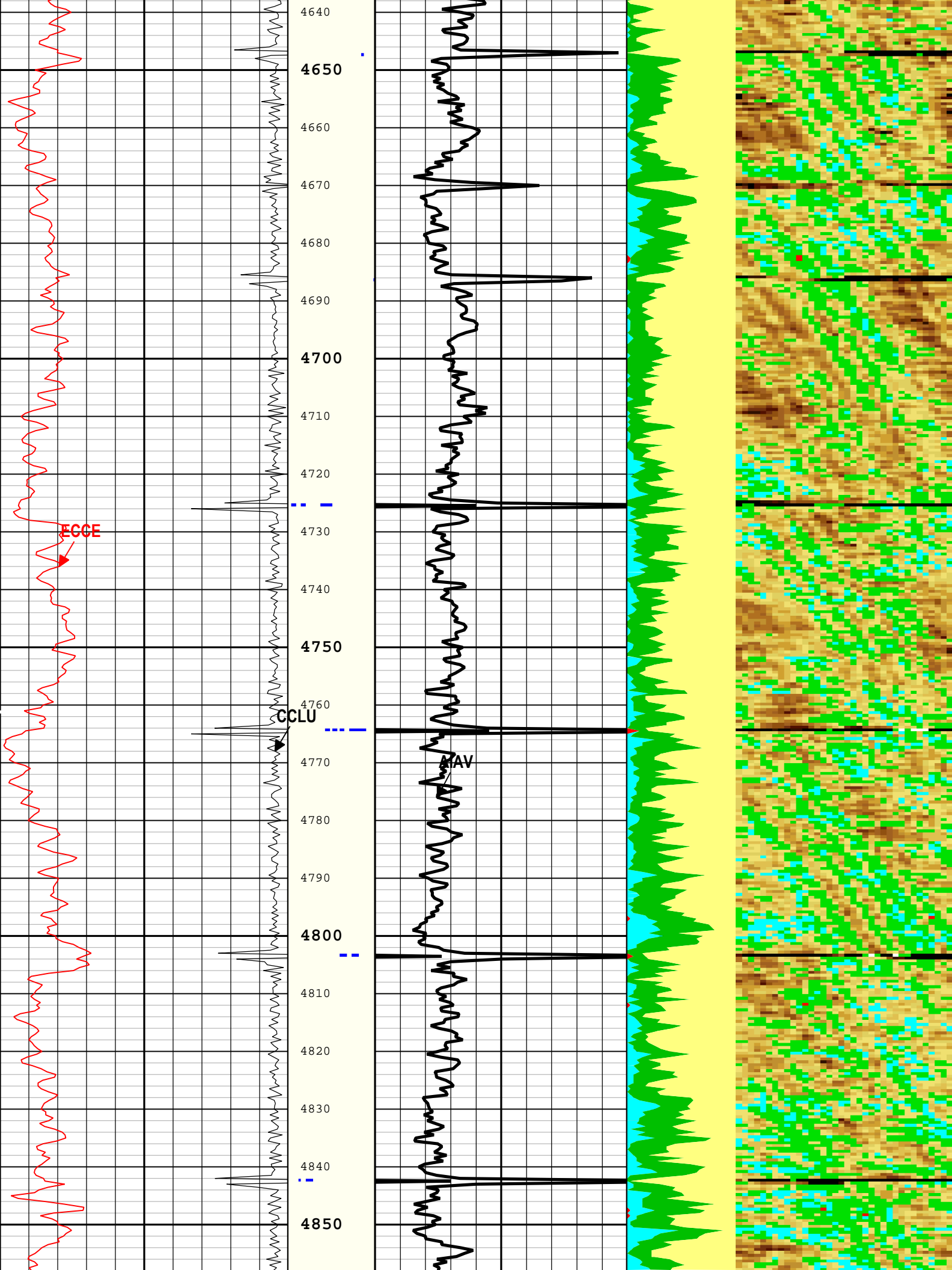


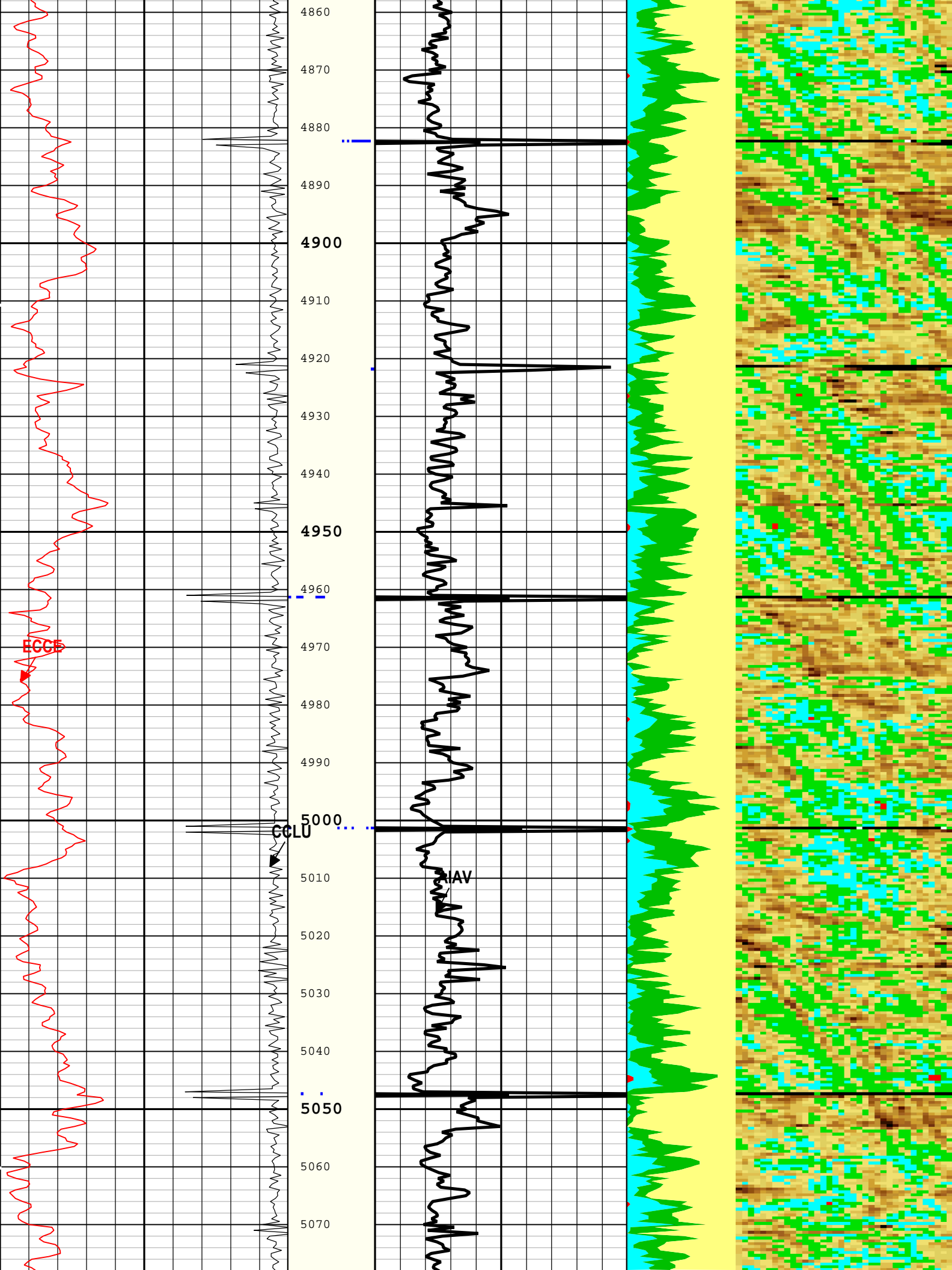


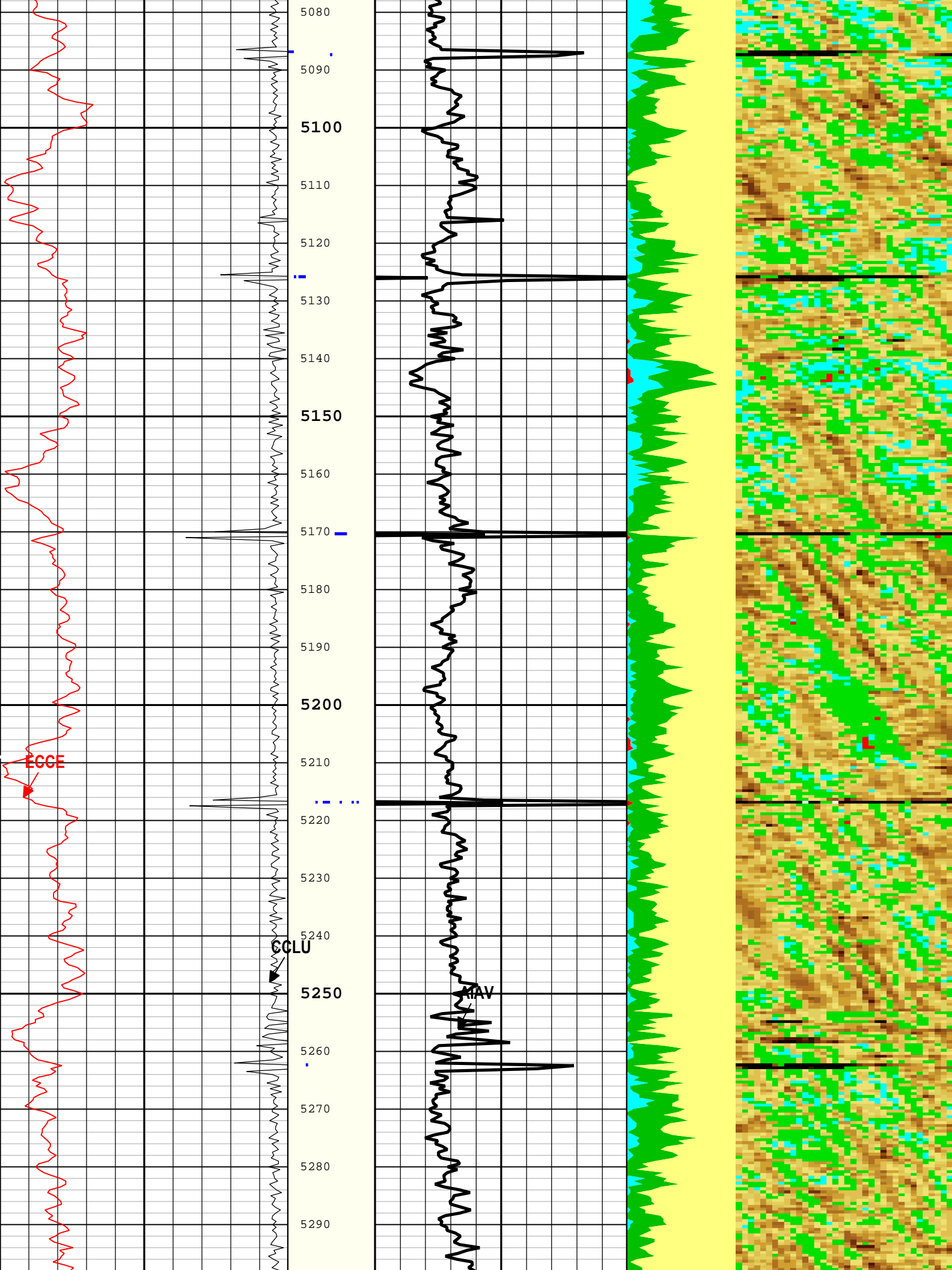


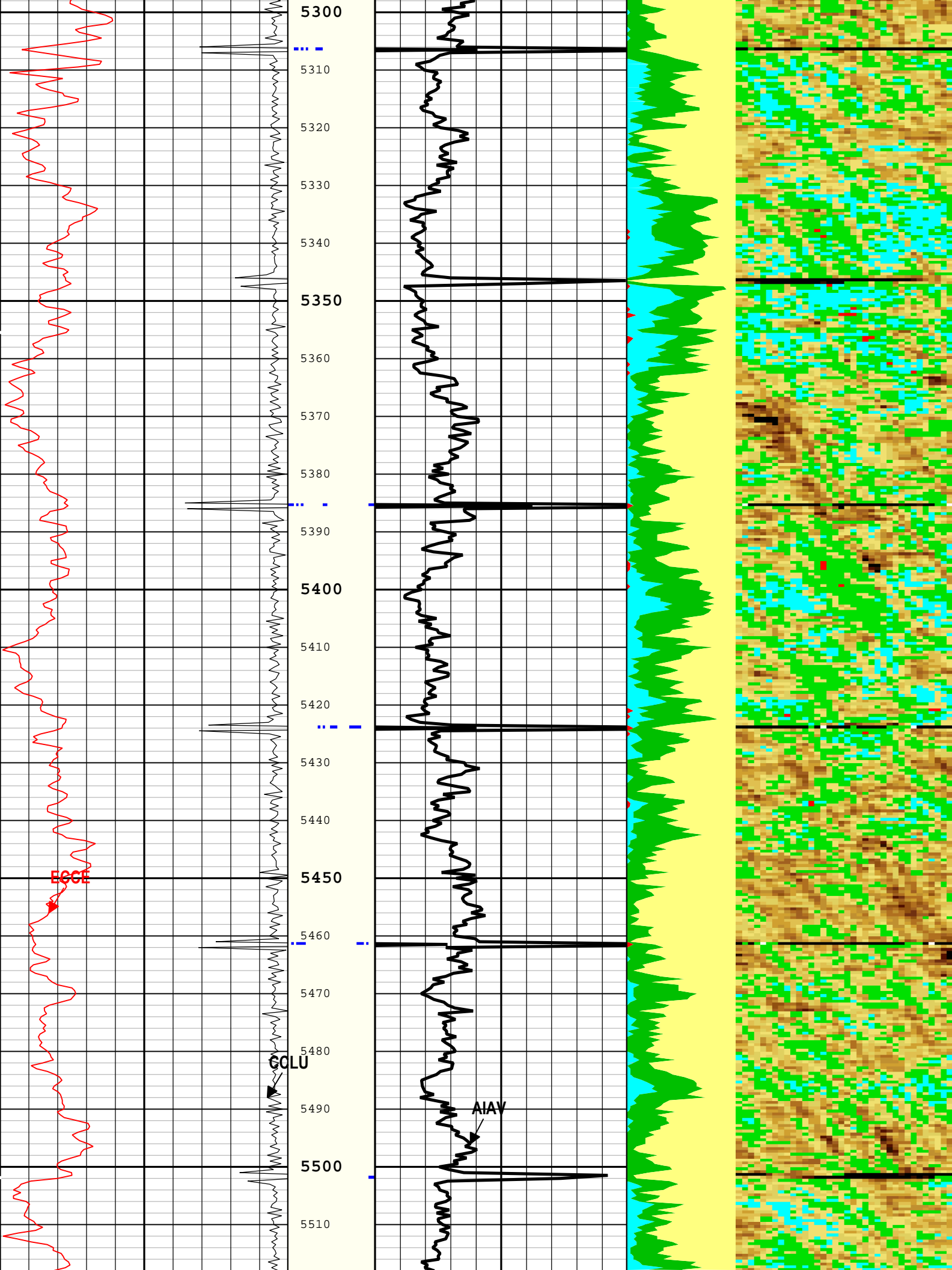


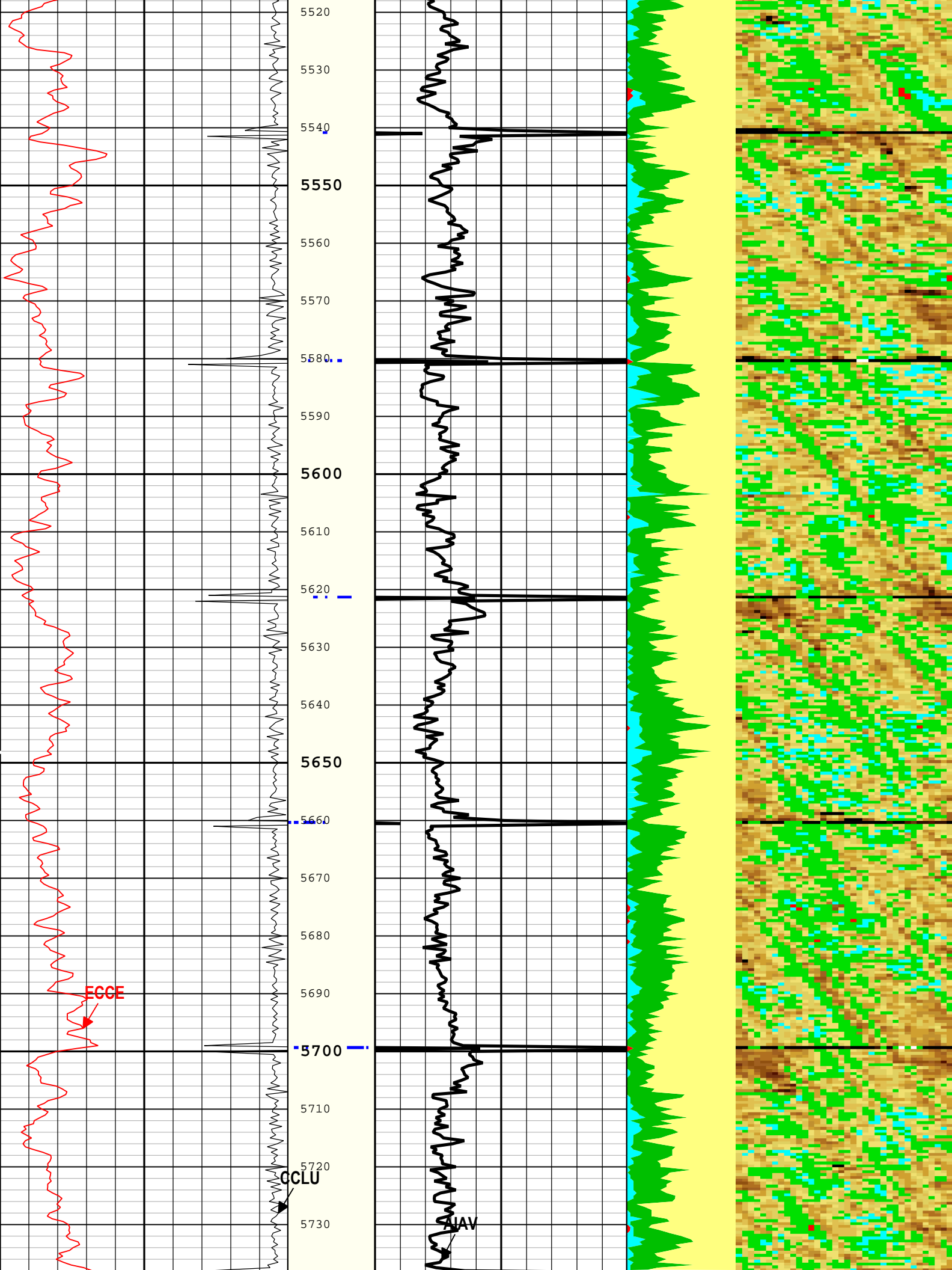


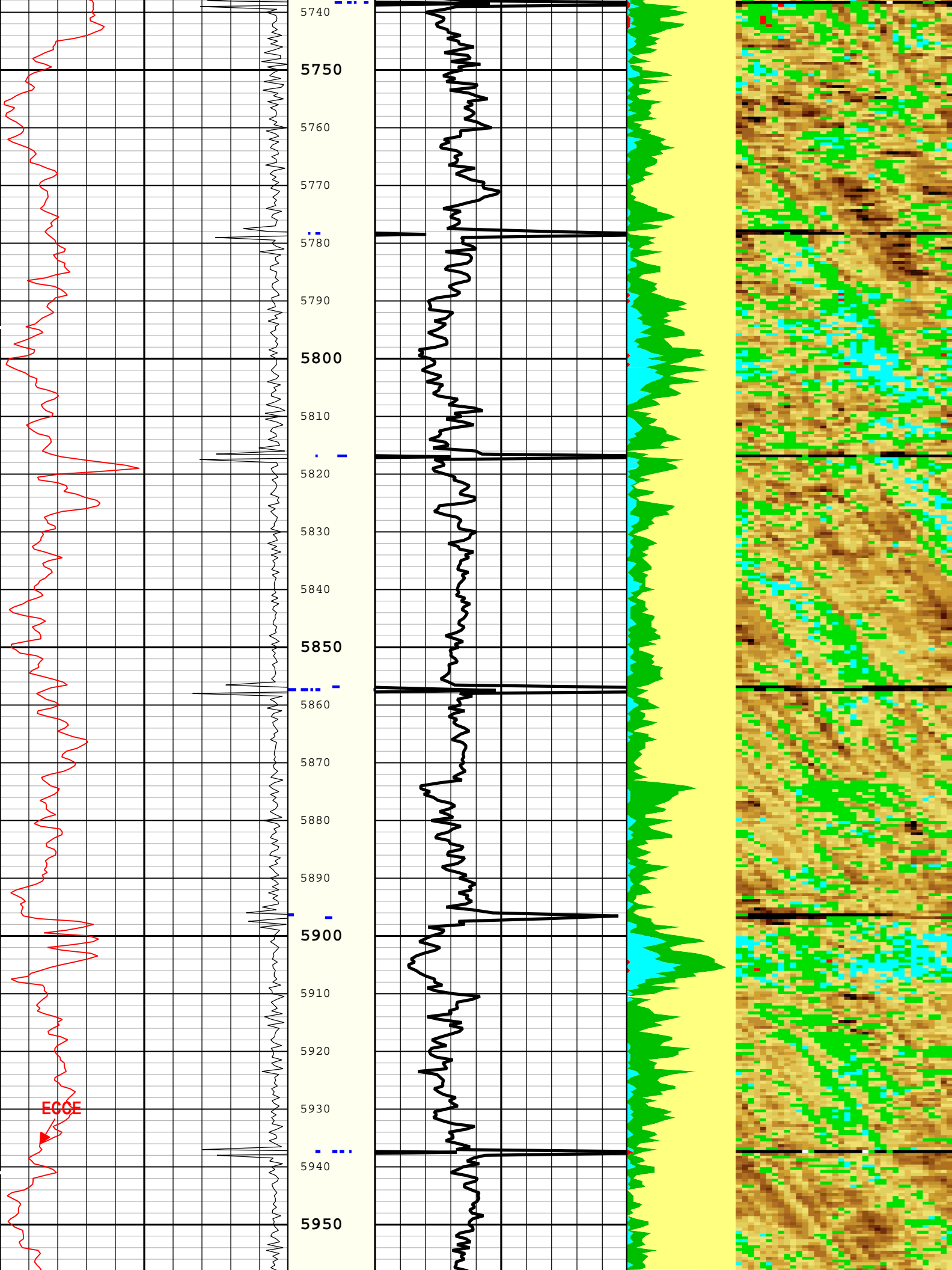


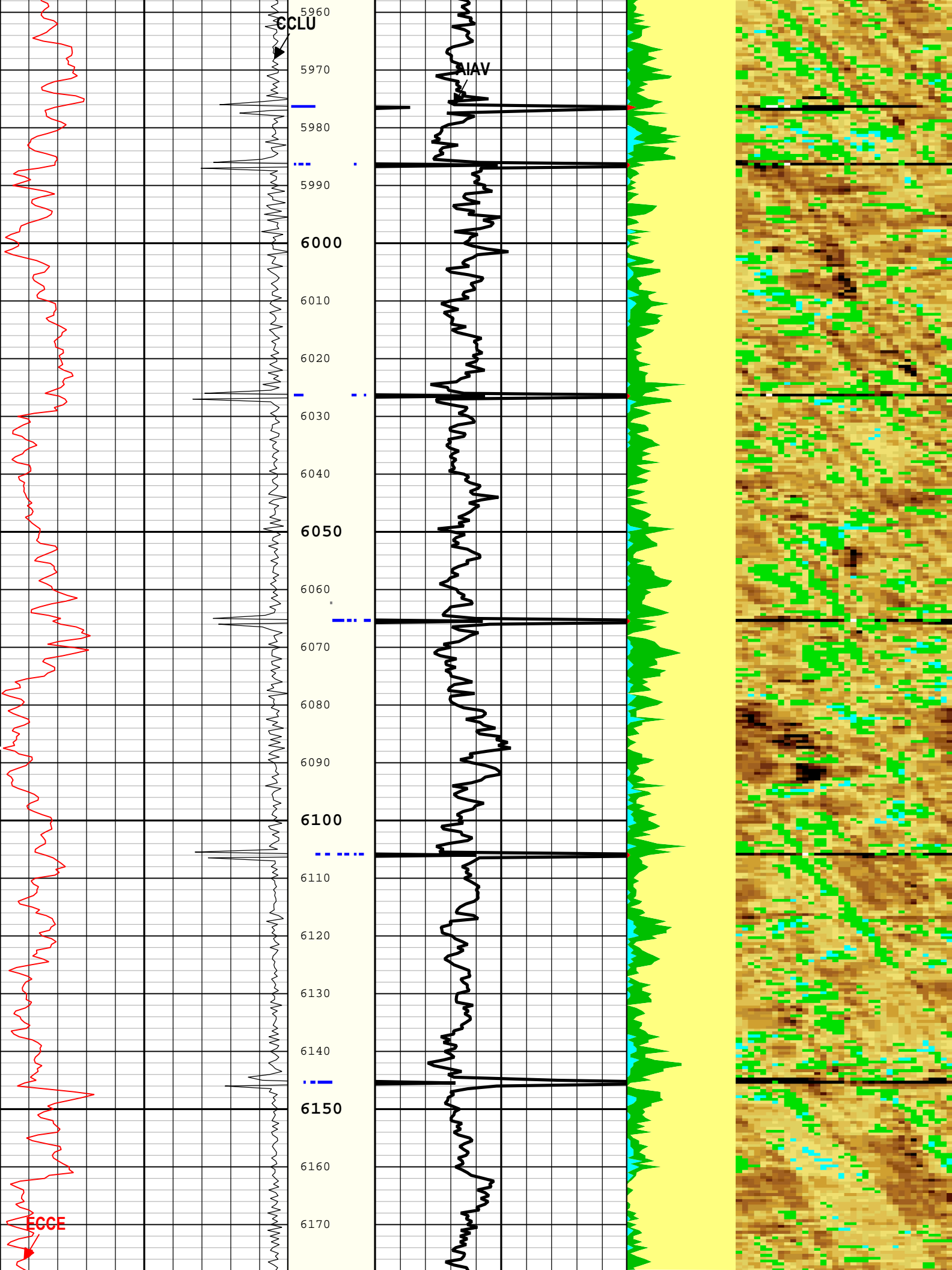


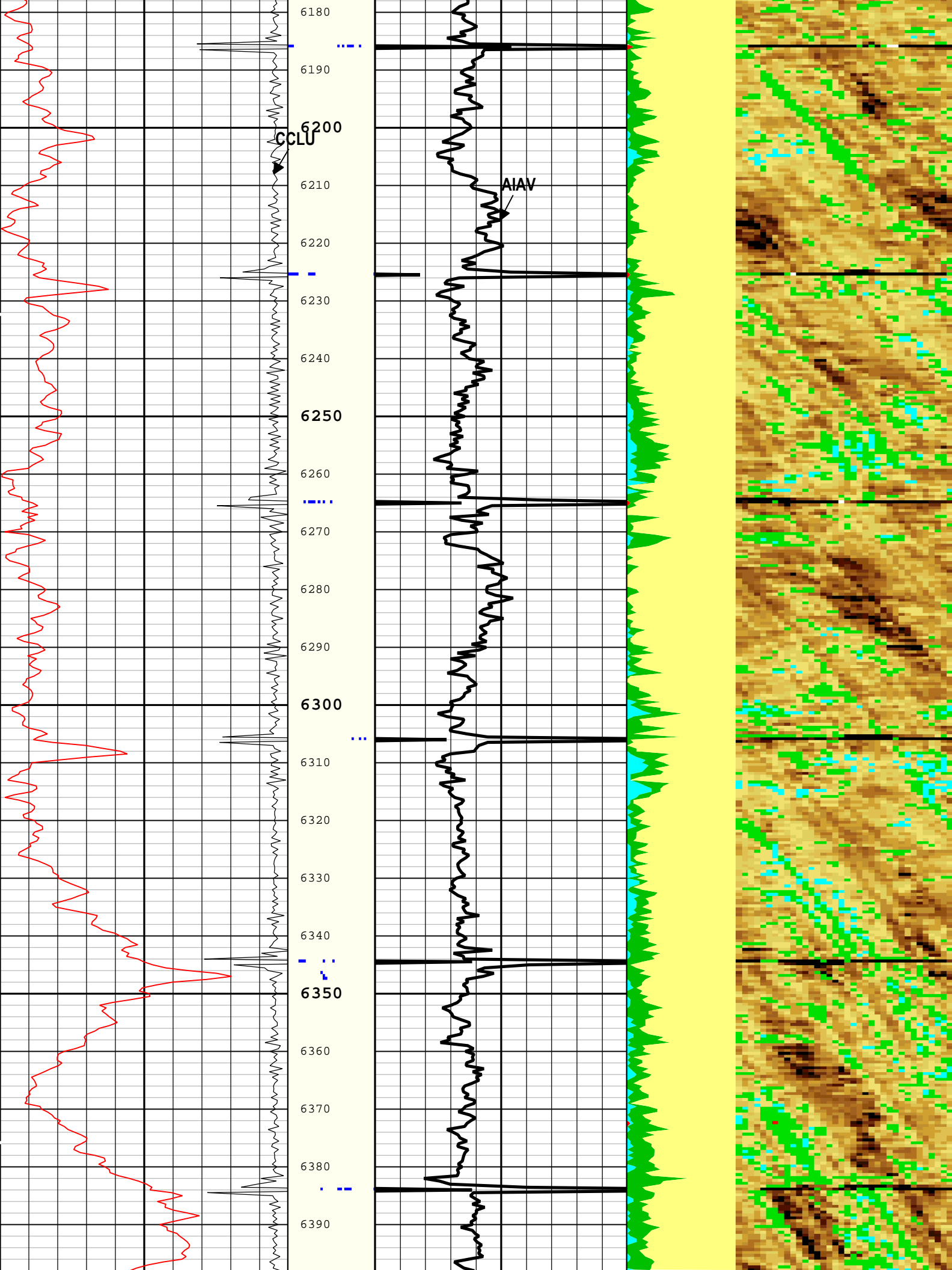


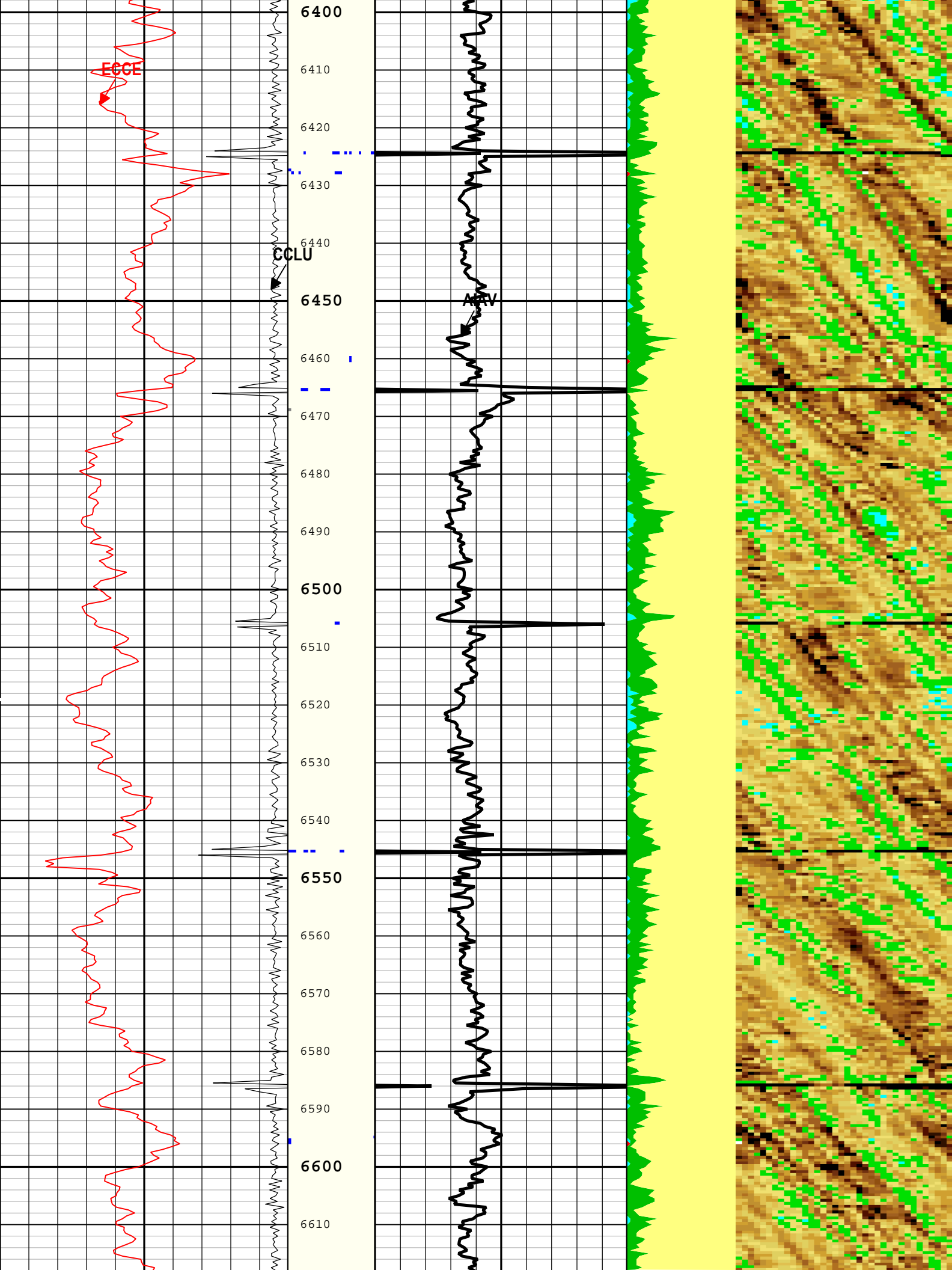


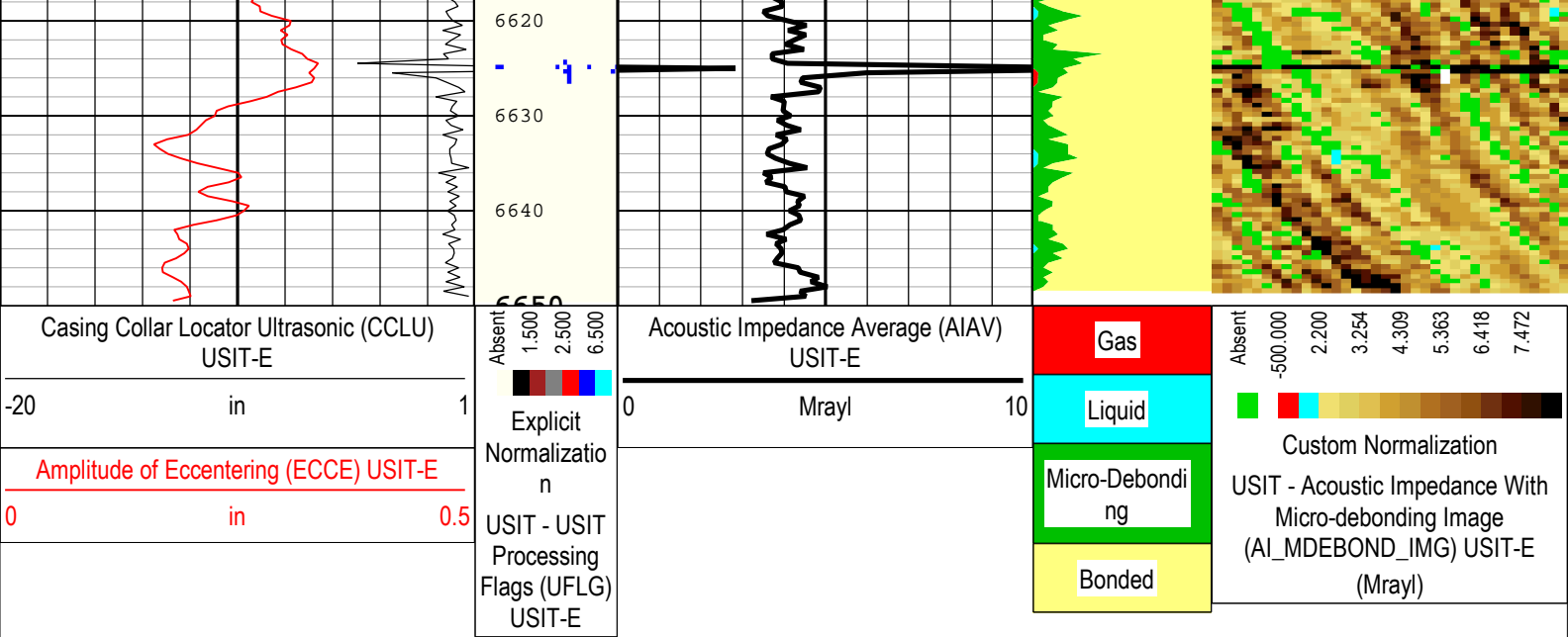












TIME_1900 - Time Marked every 60.00 (s)

Description: Format: Log (DJ Basin Ultrasonic Cement Summary Report) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth
Creation Date: 05-Jan-2018 11:30:03

Channel Processing Parameters

ONE: Parameters

Parameter	Description	Tool	Value	Unit
ISSBAR	Barite Mud Presence Flag	Borehole	No	
BS	Bit Size	WLSESSION	Depth Zoned	in
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Regular Cement	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
FDII	FPM Data Interpolation Interval	USIT-E	0	ft
HEMA	Hematite Presence Flag	Borehole	No	
ICE_PROCESS	ICE Processing	USIT-E	Yes	
IMAR	Image Rotation	USIT-E	Off	
MEAS_WLEN	Tcube Processing Window Length in Measurement Mode	USIT-E	22.44	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.16	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	0.1	Mrayl
UFGDE	Fiberglass Density	USIT-E	16.27	lbm/gal
UFGPS	Fiberglass Processing Selection	USIT-E	No	
UFGVL	Fiberglass Velocity	USIT-E	9678.48	ft/s
USI_FSOD	USIT USI Fluid Slowness Fits Casing Outer Diameter	USIT-E	0_OFF	
USI_FVEL_SEL	USI Fluid Velocity Selection	USIT-E	Automatic	
USI_ZMUD_SEL	USI Mud Impedance Selection	USIT-E	FreePipe Norm.	
ZMUD	Acoustic Impedance of Mud	Borehole	1.48	Mrayl
ZTCM	Acoustic Impedance Threshold for Cement	USIT-E	2.2	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	26	100	110
BS	13.5	110	2039
BS	8.5	2039	6650

All depth are actual.

Tool Control Parameters				
ONE: Parameters				
Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-E	-12	dB
AGMX	Maximum Gain of Cartridge	USIT-E	18	dB
U-USIT_DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
EMXV	EMEX Voltage	USIT-E	Time Zoned	V
HRES	Horizontal Resolution	USIT-E	10 deg	
TMUC	Type of Mud	USIT-E	BRI	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UMFR	Modulation Frequency	USIT-E	333333	Hz
USFR	Ultrasonic Sampling Frequency	USIT-E	500000	Hz
UPAT	USIT Emission Pattern	USIT-E	Pattern 375 KHz	
UWKM	USIT Working Mode	USIT-E	Uncompressed 10 deg at 6.0 in LF	
USIT_DEPTHLOG	Starting Depth Log for Ultrasonics	USIT-E	6800	ft
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	Time Zoned	us

Time Zone Parameters					
Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
EMXV	50	05-Jan-2018 10:03:35	05-Jan-2018 10:04:18	6791.71	6786.12
EMXV	65	05-Jan-2018 10:04:18	05-Jan-2018 10:13:51	6786.12	6397.18
EMXV	75	05-Jan-2018 10:13:51	05-Jan-2018 10:59:47	6397.18	55.73
WINE	71.88	05-Jan-2018 10:03:35	05-Jan-2018 10:10:53	6791.71	6773.83
WINE	82.14	05-Jan-2018 10:10:53	05-Jan-2018 10:10:57	6773.83	6768.52
WINE	79.06	05-Jan-2018 10:10:57	05-Jan-2018 10:13:43	6768.52	6415.08
WINE	76.75	05-Jan-2018 10:13:43	05-Jan-2018 10:59:47	6415.08	55.73
All depth are at tool zero.					

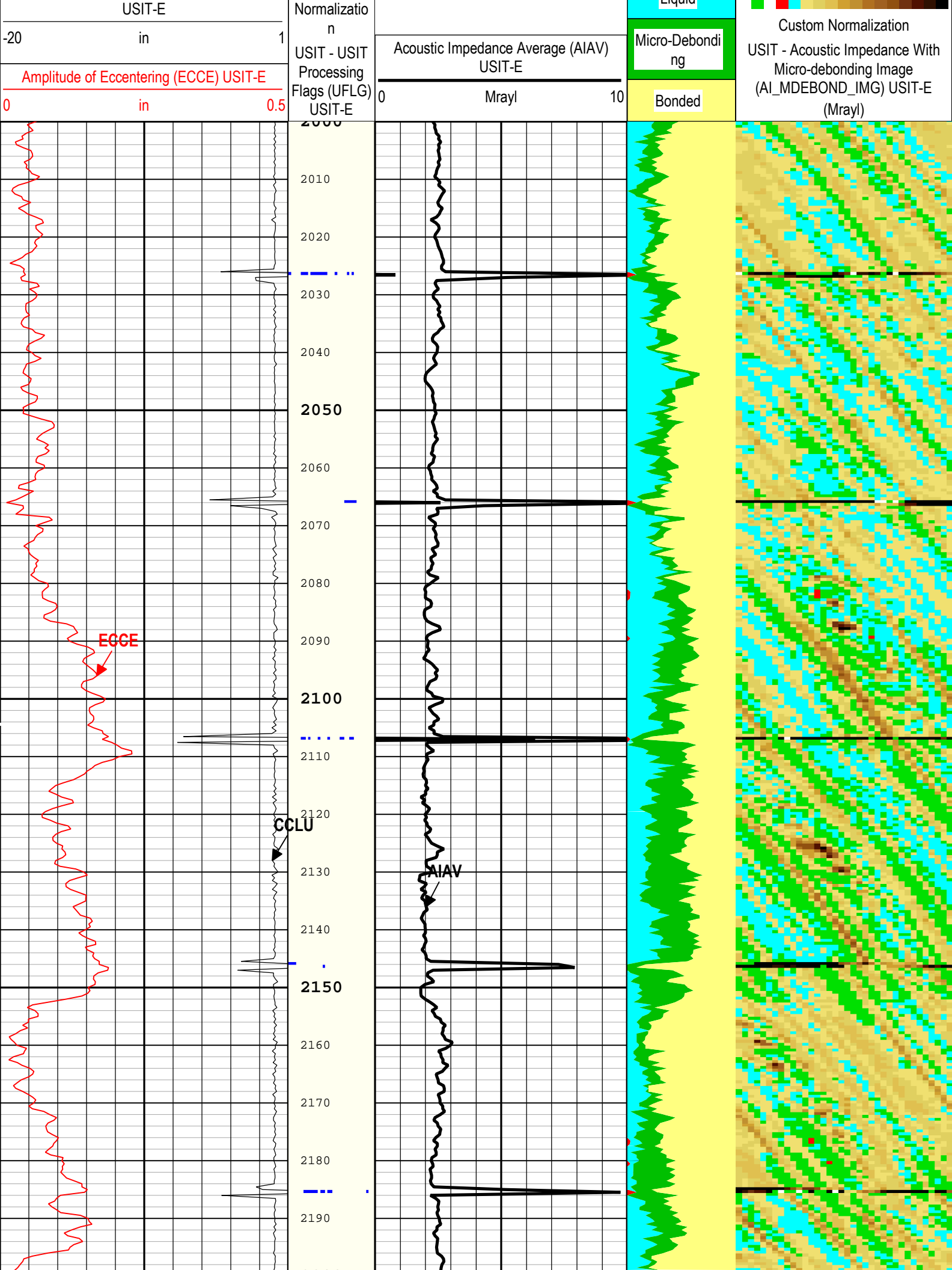
ONE					
0 PSI Repeat Pass					

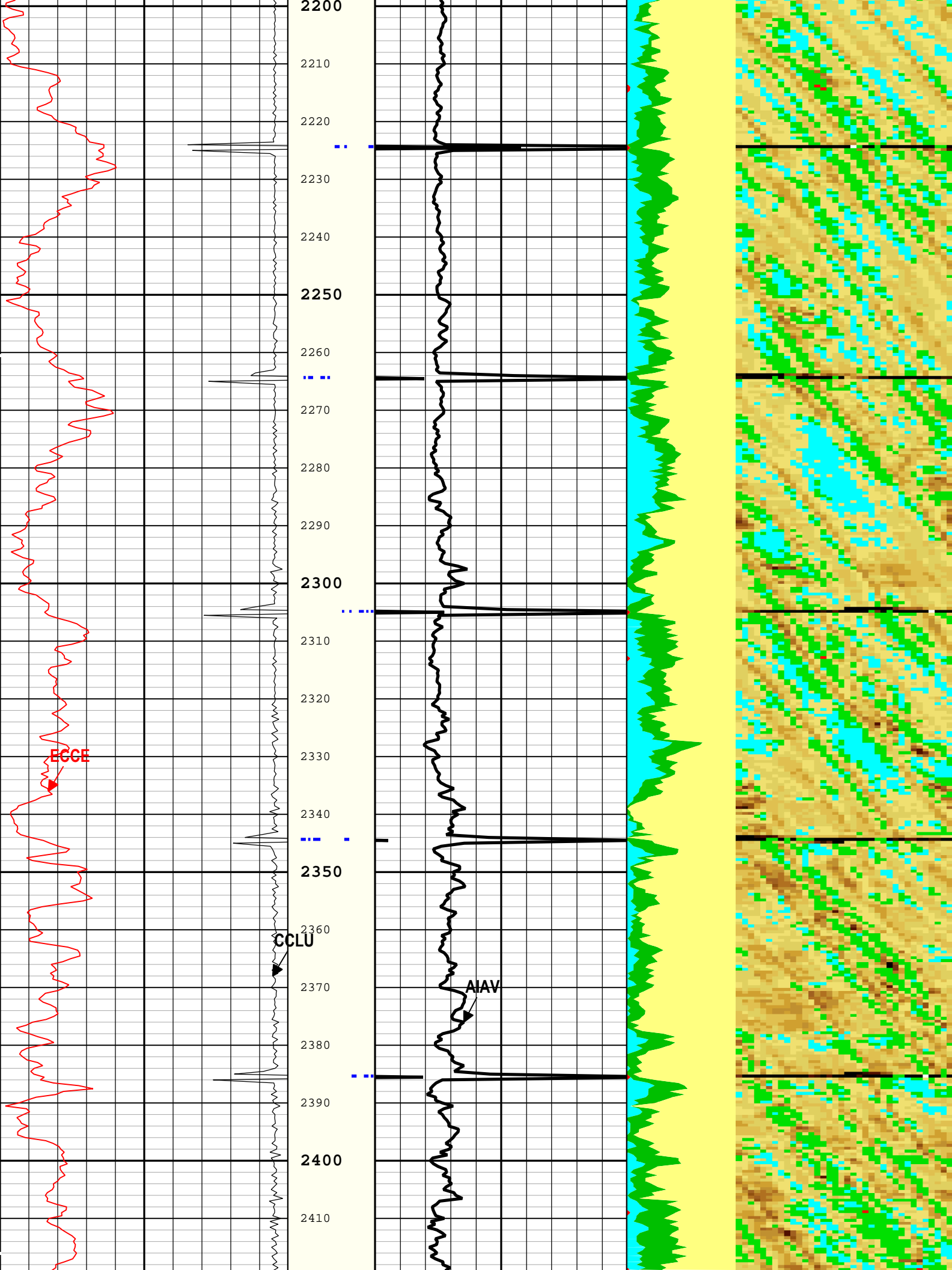
Software Version	
Acquisition System	Version
Maxwell 2017 SP3	7.3.92069.3100

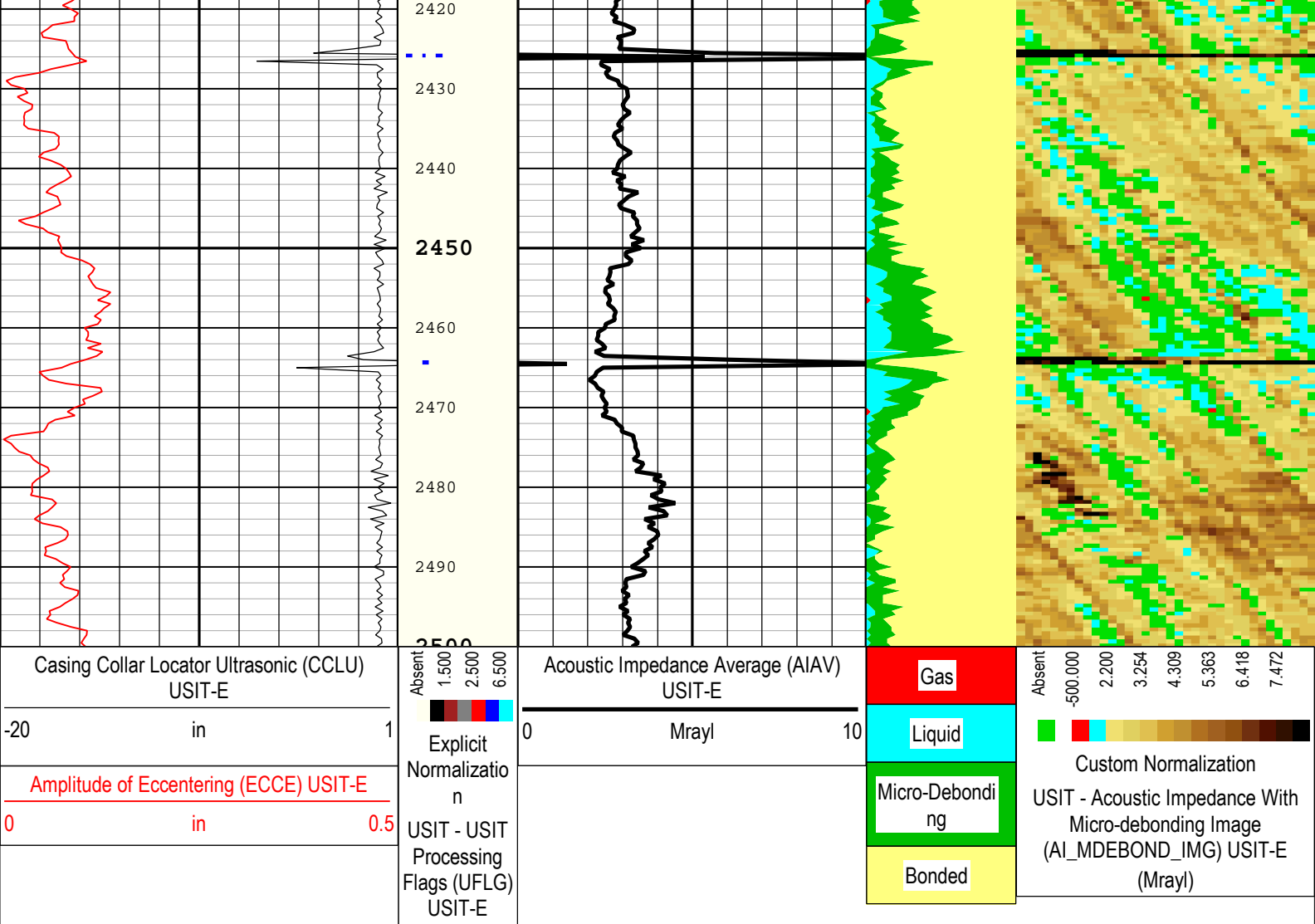
Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[2]:Up	Up	1964.25 ft	2508.35 ft	05-Jan-2018 9:36:01 AM	05-Jan-2018 9:40:59 AM	ON	4.46 ft	Yes
All depths are referenced to toolstring zero									

Log	Company:Noble Energy Inc. Well:Waste Management Y23-712 ONE: Log[2]:Up:S006
Description: Format: Log (DJ Basin Ultrasonic Cement Summary Report) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 05-Jan-2018 11:30:10	

TIME_1900 - Time Marked every 60.00 (s)	<div> <div>Absent</div> <div>1.500</div> <div>2.500</div> <div>6.500</div> <div>Explicit</div> </div>	<div> <div>Gas</div> <div>Liquid</div> </div> <div> <div>Absent</div> <div>-500.000</div> <div>2.200</div> <div>3.254</div> <div>4.309</div> <div>5.363</div> <div>6.418</div> <div>7.472</div> </div>
Casing Collar Locator Ultrasonic (CCLU)		







TIME_1900 - Time Marked every 60.00 (s)

Description: Format: Log (DJ Basin Ultrasonic Cement Summary Report) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth
Creation Date: 05-Jan-2018 11:30:10

Channel Processing Parameters				
ONE: Parameters				
Parameter	Description	Tool	Value	Unit
ISSBAR	Barite Mud Presence Flag	Borehole	No	
BS	Bit Size	WLSESSION	Depth Zoned	in
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Regular Cement	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
FDII	FPM Data Interpolation Interval	USIT-E	0	ft
HEMA	Hematite Presence Flag	Borehole	No	
ICE_PROCESS	ICE Processing	USIT-E	Yes	
IMAR	Image Rotation	USIT-E	Off	
MEAS_WLEN	Tcube Processing Window Length in Measurement Mode	USIT-E	22.44	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.16	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	0.1	Mrayl
UFGDE	Fiberglass Density	USIT-E	16.27	lbm/gal
UFGPS	Fiberglass Processing Selection	USIT-E	No	
UFGVL	Fiberglass Velocity	USIT-E	9678.48	ft/s
USI_FSOD	USIT USI Fluid Slowness Fits Casing Outer Diameter	USIT-E	0_OFF	

USI_FVEL_SEL	USI Fluid Velocity Selection	USIT-E	Automatic	
USI_ZMUD_SEL	USI Mud Impedance Selection	USIT-E	FreePipe Norm.	
ZMUD	Acoustic Impedance of Mud	Borehole	1.48	Mrayl
ZTCM	Acoustic Impedance Threshold for Cement	USIT-E	2.2	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	13.5	2000	2039
BS	8.5	2039	2500

All depth are actual.

Tool Control Parameters

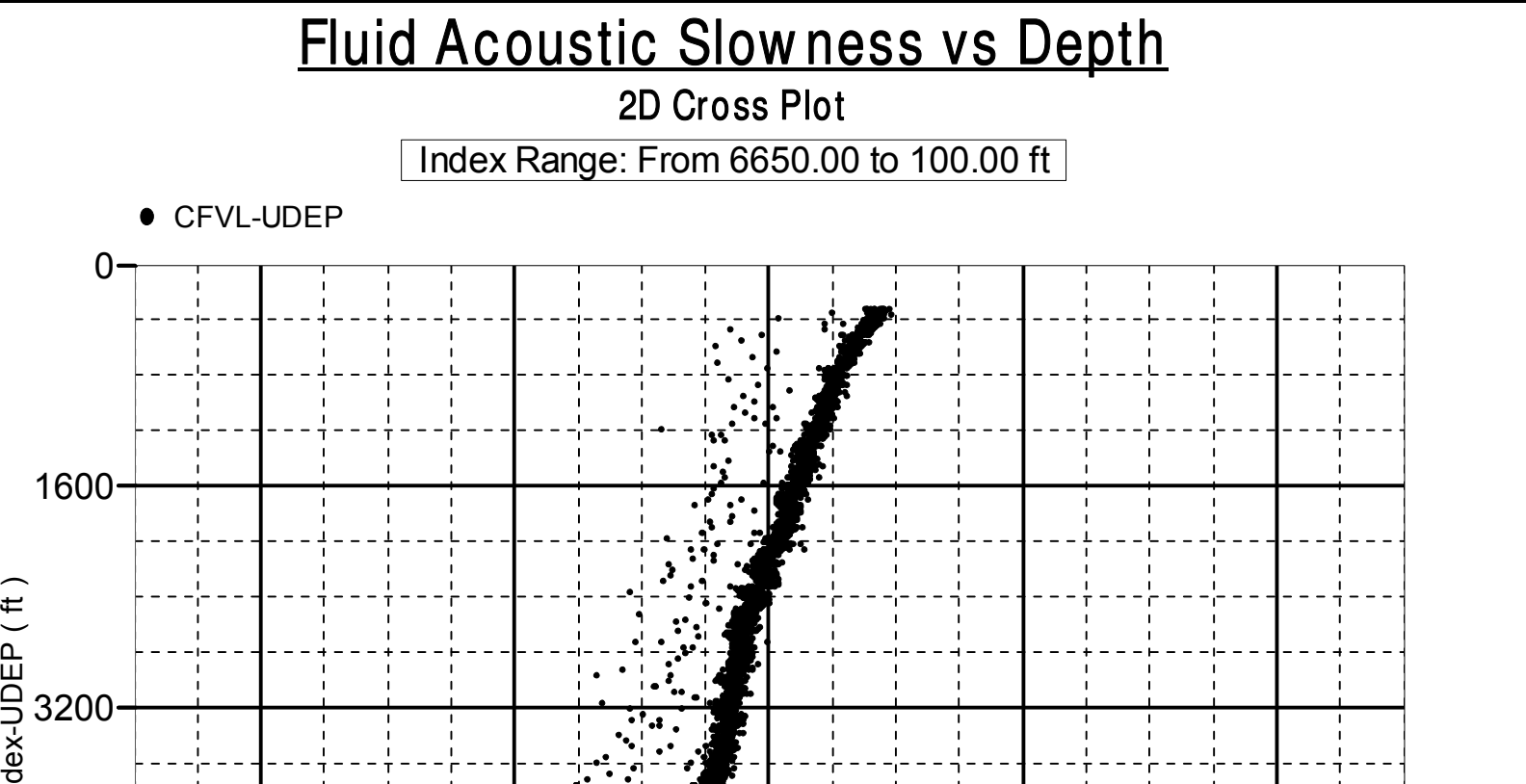
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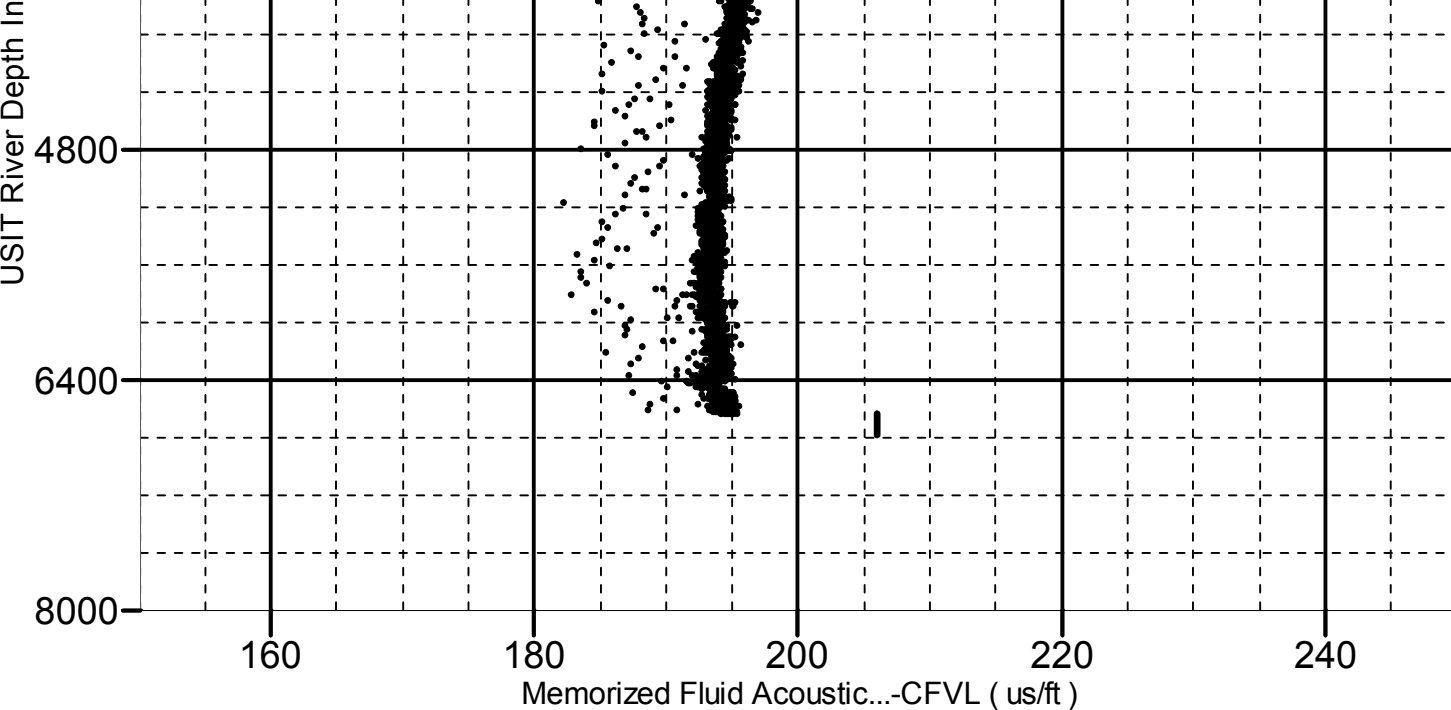
Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-E	-12	dB
AGMX	Maximum Gain of Cartridge	USIT-E	18	dB
U-USIT_DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
EMXV	EMEX Voltage	USIT-E	50	V
HRES	Horizontal Resolution	USIT-E	10 deg	
TMUC	Type of Mud	USIT-E	BRI	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UMFR	Modulation Frequency	USIT-E	333333	Hz
USFR	Ultrasonic Sampling Frequency	USIT-E	500000	Hz
UPAT	USIT Emission Pattern	USIT-E	Pattern 375 KHz	
UWKM	USIT Working Mode	USIT-E	Uncompressed 10 deg at 6.0 in LF	
USIT_DEPTHLOG	Starting Depth Log for Ultrasonics	USIT-E	2600	ft
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	71.88	us

XYZ

Company:Noble Energy Inc. Well:Waste Management Y23-712

ONE: Log[4]:Up:S006



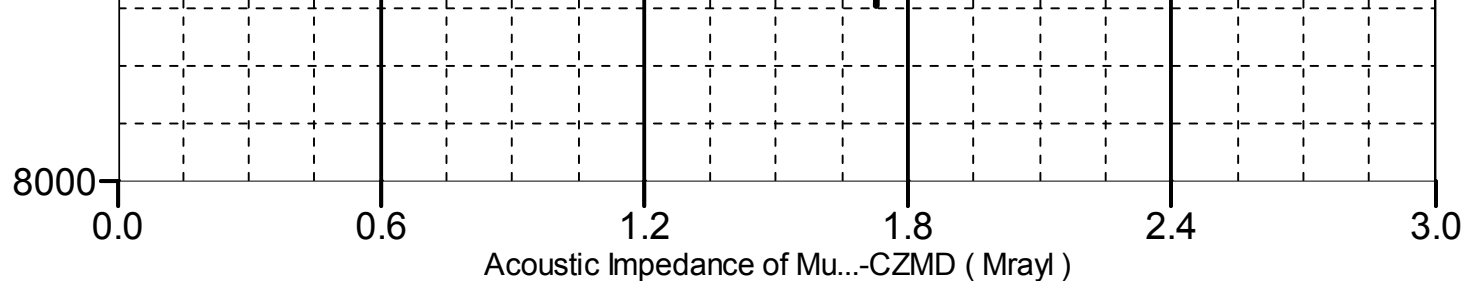


Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6650.00 to 100.00 ft





Company: Noble Energy Inc.

Schlumberger

Well: Waste Management Y23-712

Field: Wattenberg

County:	WELD
State:	Colorado

UltraSonic Summary Print