

Company: Noble Energy Inc

Well: Bison Ridge Y22-786

Field: Wattenberg

County: Weld State: CO

UltraSonic Summary Print

County:	Weld
Field:	Wattenberg
Location:	NESW Sec. 10, T2N, R64W
Well:	Bison Ridge Y22-786
Company:	Noble Energy Inc
Location:	
NESW Sec. 10, T2N, R64W	Elev.: K.B. 4960.00 ft
SHL: 2230' FSL & 1980' FEL	G.L. 4930.00 ft
Lat/Long: 40.151830/-104.539980	D.F. 4960.00 ft
Permanent Datum:	Ground Level
Log Measured From:	Kelly Bushing
Drilling Measured From:	Kelly Bushing
API Serial No.	Section: 10
05-123-45373	Township: 2N
	Range: 64W
Logging Date	03-Feb-2018

Run Number	ONE
Depth Driller	17304.00 ft
Schlumberger Depth	6830.00 ft
Bottom Log Interval	6830.00 ft
Top Log Interval	80.00 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	2054.00 ft
To	6830.00 ft
Casing/Tubing Size	5.5 in
Weight	20 lbm/ft
Grade	P110
From	0.00 ft
To	17290.00 ft
Max Recorded Temperatures	171 degF
Logger on Bottom	03-Feb-2018
Unit Number	2161
Recorded By	A. Rosacker/T. Savoe
Witnessed By	Bill Manfield

Disclaimer

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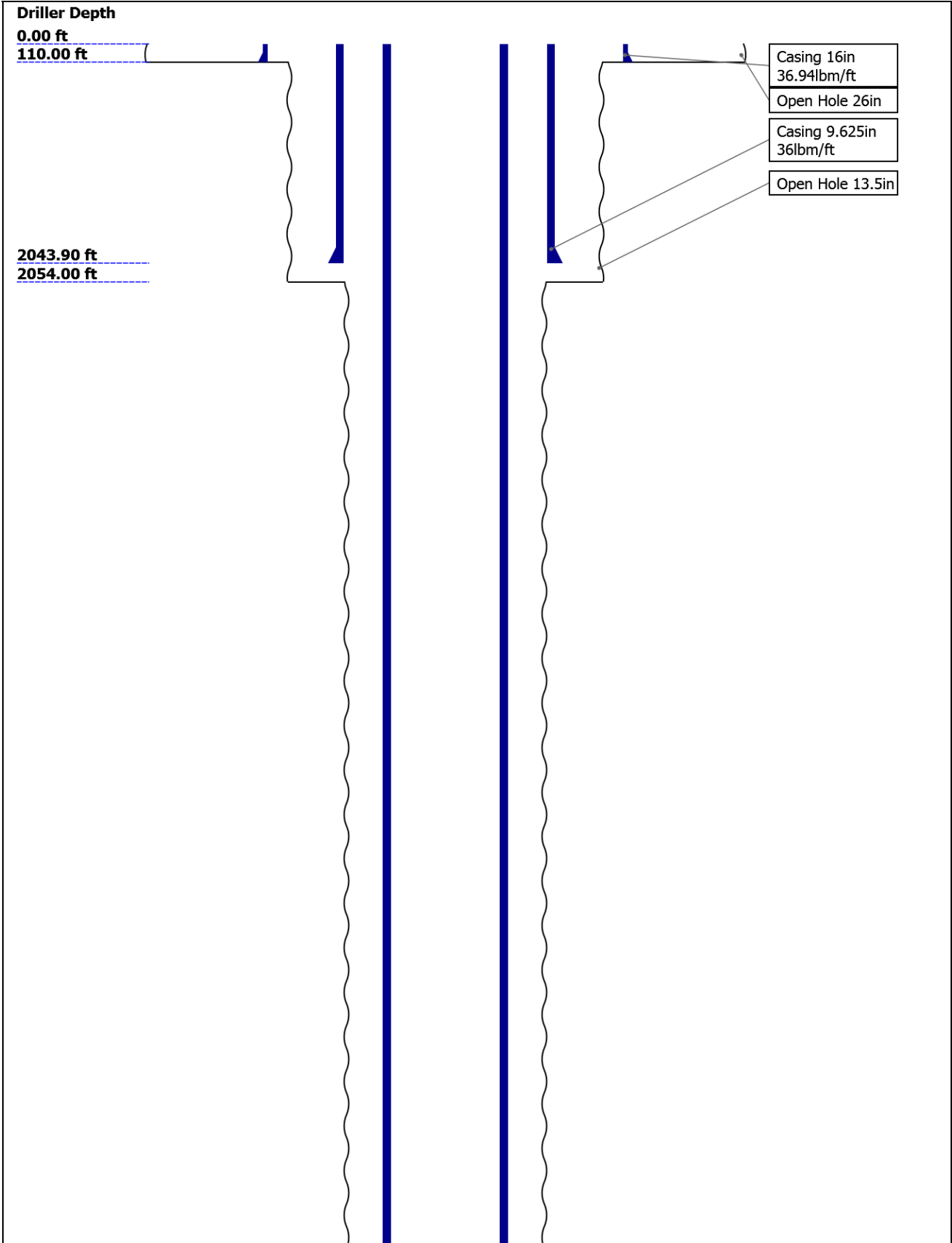
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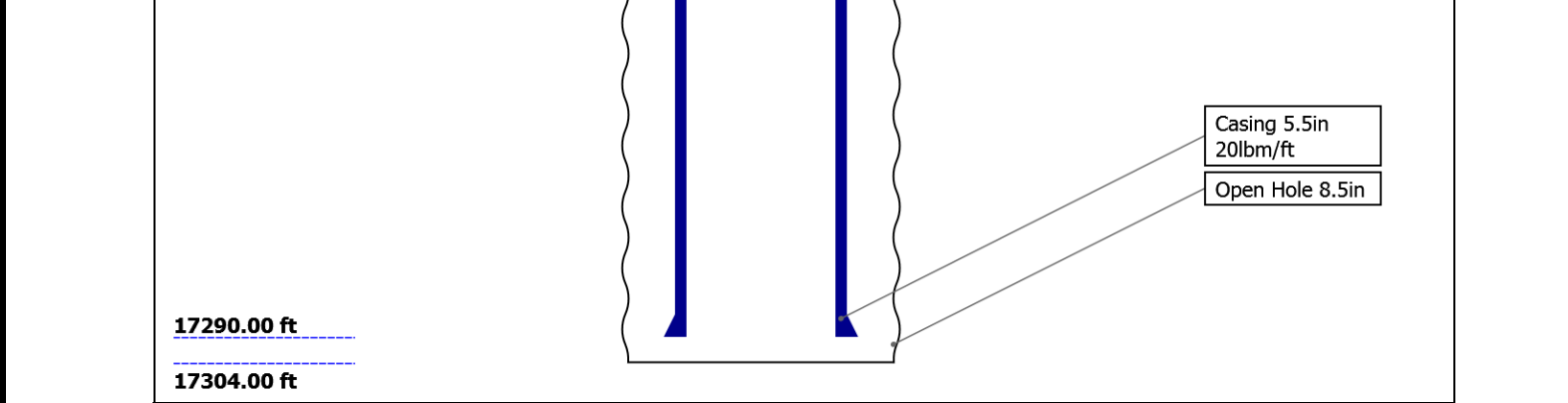
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Well Sketch





Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	26	13.5	8.5			
Top Driller (ft)	0	110	2054			
Top Logger (ft)	0	110	2054			
Bottom Driller (ft)	110	2054	17304			
Bottom Logger (ft)	110	2054	6830			
Casing						
Size (in)	16	9.625	5.5			
Weight (lbm/ft)	36.94	36	20			
Inner Diameter (in)	15.572	8.921	4.778			
Grade	N/A	J55	P110			
Top Driller (ft)	0	0	0			
Top Logger (ft)	0	0	0			
Bottom Driller (ft)	110	2043.9	17290			
Bottom Logger (ft)	110	2043.9	17290			

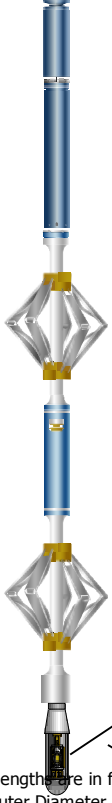
Remarks and Equipment Summary

ONE: Toolstring				ONE: Remarks	
Equip name	Length	MP name	Offset	Thank you for choosing Schlumberger!	
LEH-QT:2	33.83			Toolstring ran as per tool sketch and client logging program	
353				4.75" Gemcos ran on USC and EDTC for centralization	
LEH-QT:23				This is the first log in well	
53				Main Pass logged at 2500 PSI; Repat pass logged at 0 PSI	
SAH-F:18	30.91			BHT: 171 deg F	
17				Estimated Top of Cement is 1900 ft	
EDTC-B:8	26.06				
424					
EDTH-B:84					
32					
EDTG-B					
EDTC-B:84					
24					
AH-184[19.56				
2]:2765					
AH-184[17.56				

1J:2826

USIT-E:94 15.56
3

ECH-MFA:
1928
USAC-A:9
43
USIS-A:27
20
USSC-B:75
8
USRS-AB:
873
USI-SENS
OR
USI-TX



USI Sen 0.37
sor
TOOL_ZERO
nsion
Length in ft
Maximum Outer Diameter = 3.875 in
Line: Sensor Location, Value: Gating Offset
All measurements are relative to TOOL_ZERO

Depth Summary

ONE

Depth Measuring Device

Type	IDW-JA		
Serial Number	6483		
Calibration Date			
Calibrator Serial Number			
Calibration Cable Type	7-46 PI-XXS		
Wheel Correction 1	-4		
Wheel Correction 2	-5		

Tension Device

Type	CMTD-B/A		
Serial Number	466		
Calibration Date	11-Jan-2018		
Calibrator Serial Number	84749A		
Number of Calibration Points	10		
Calibration Root Mean Square Error	15		
Calibration Peak Error	24		

Logging Cable

Type	7-46PI-XXS		
Serial Number	F716045		
Length	24000.00 ft		
Conveyance Type	Wireline		
Rig Type	Crane		

ONE:Depth Control Parameters	Depth Control Remarks
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Log Sequence	First Log In the Well	All Schlumberger depth control policies followed
Rig Up Length At Surface		IDW used as primary depth reference
Rig Up Length At Bottom		Z-Chart used as secondary depth reference
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	6830.81	79.32

Fluid Velocity = "Automatic".
CFVL equals DFSL channel

Start Depth(ft)	Stop Depth(ft)	Start Value(us/ft)	End Value(us/ft)
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Mud Impedance = "FreePipe Norm."
Free Pipe normalization zone is : 27.61m(90.59ft) to 28.82m(94.55ft)
MUD_N_FRP = 1.13
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)
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ONE

2500 PSI Main Pass

Software Version

Acquisition System	Version
Maxwell 2017 SP3	7.3.92069.3100
Application Patch	Wireline_NPD-ICE2-2017SP3_7.3.93033

Pass Summary

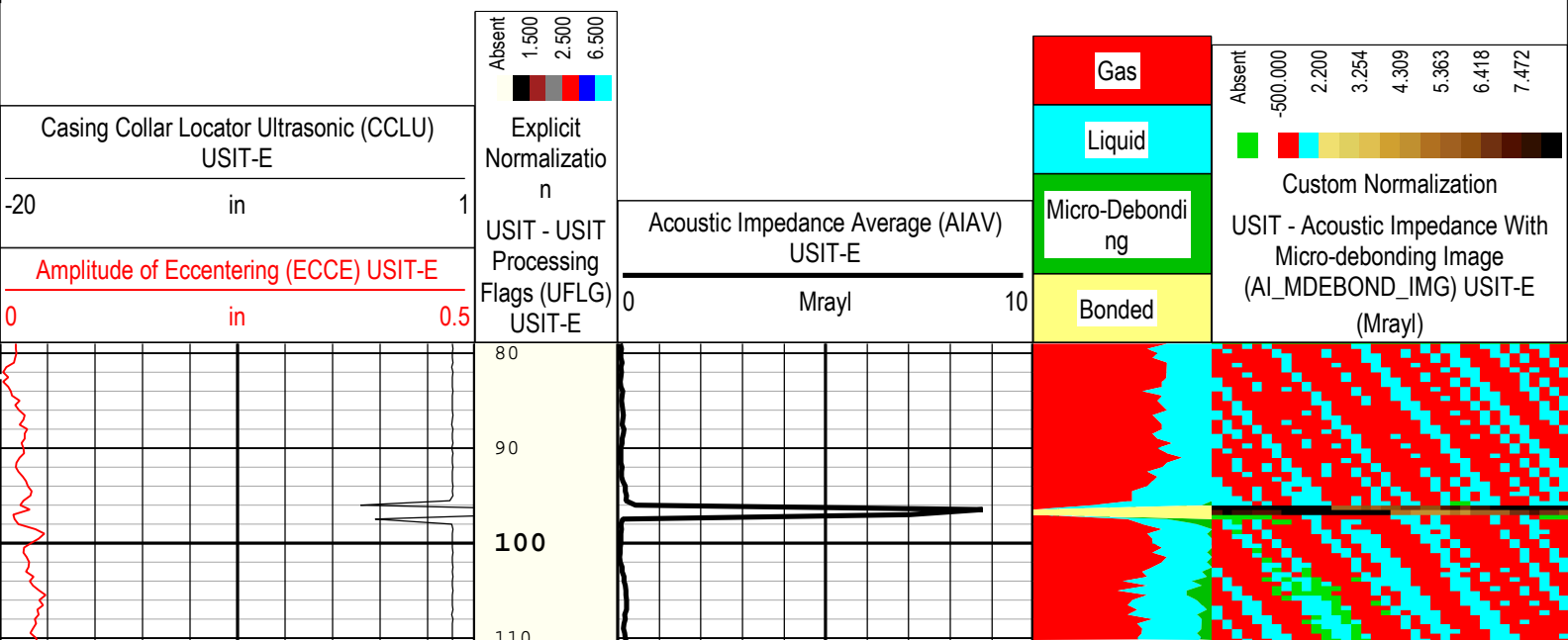
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[4]:Up	Up	79.32 ft	6830.81 ft	03-Feb-2018 2:08:56 PM	03-Feb-2018 2:57:09 PM	ON	8.85 ft	Yes

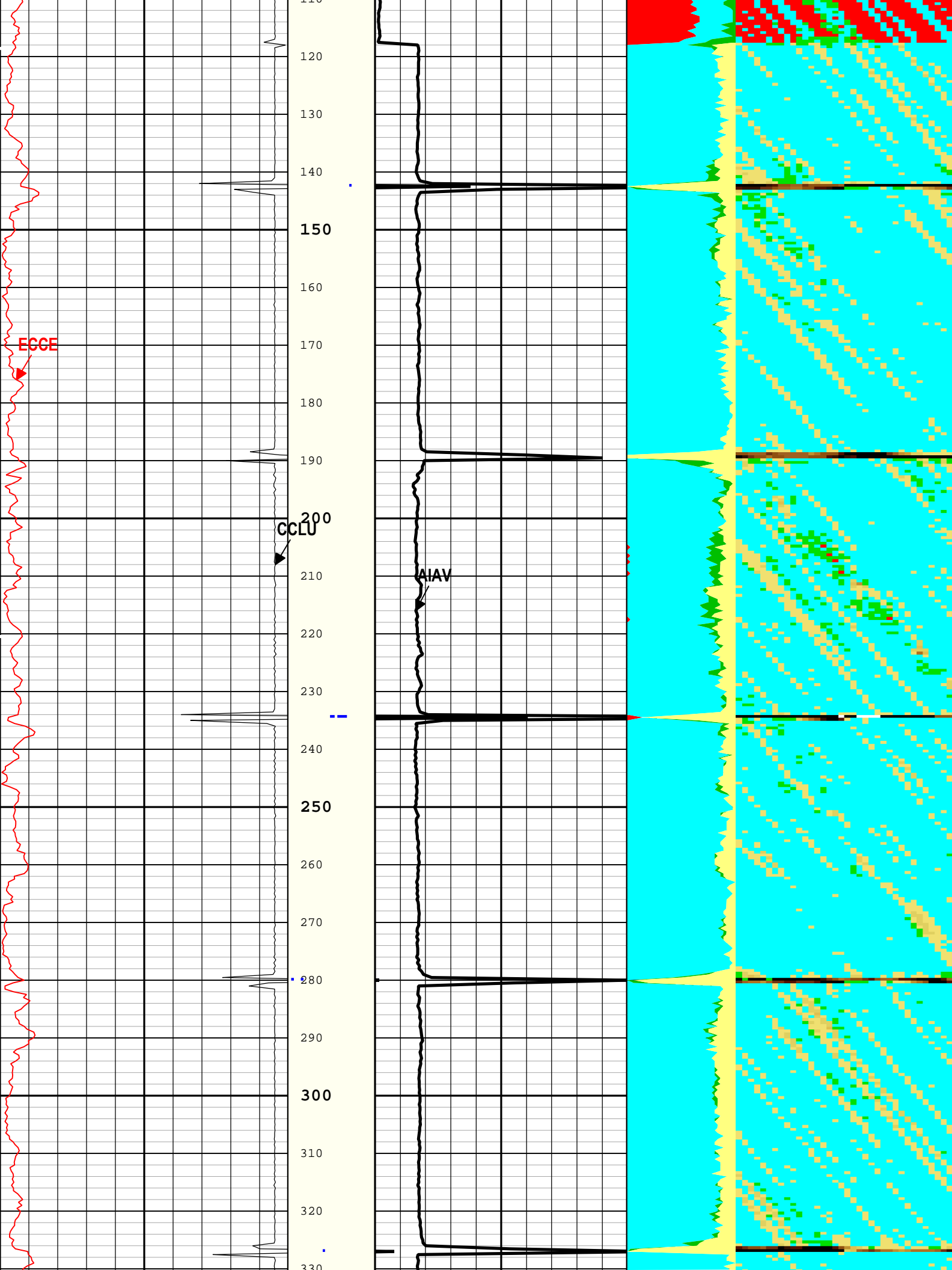
All depths are referenced to toolstring zero

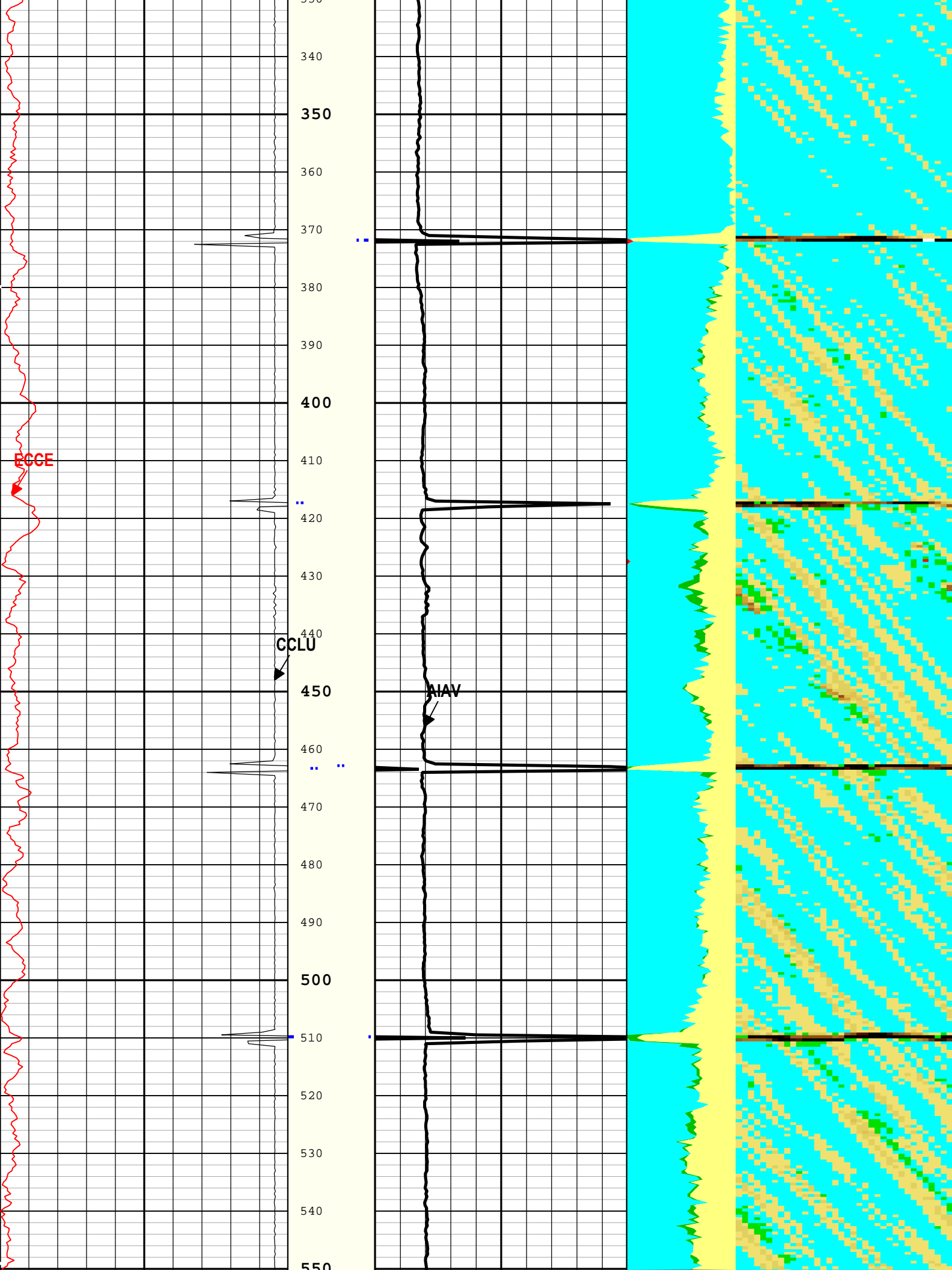
Log	Company:Noble Energy Inc Well:Bison Ridge Y22-786 ONE: Log[4]:Up:S003
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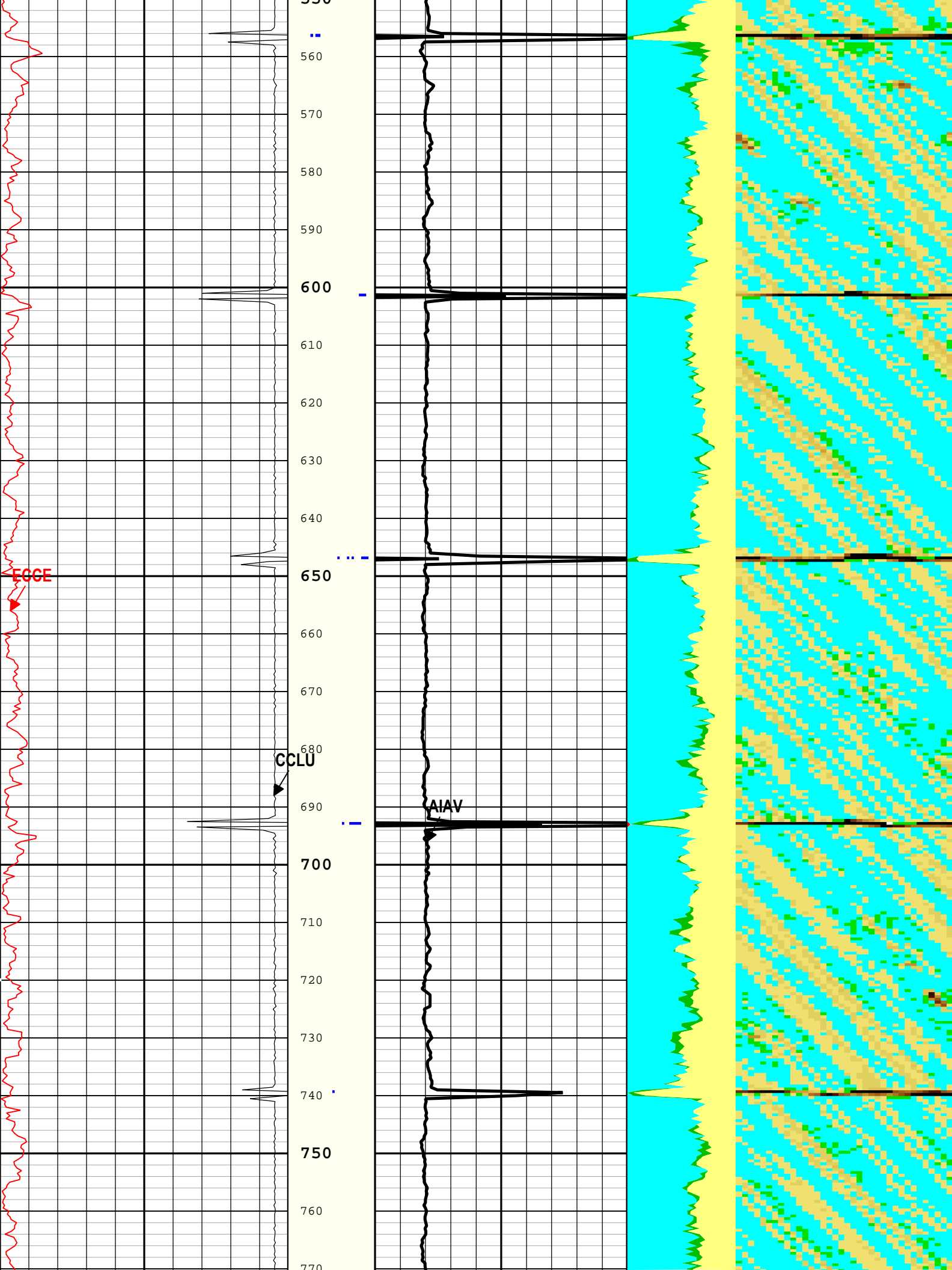
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Creation Date: 03-Feb-2018 15:17:57

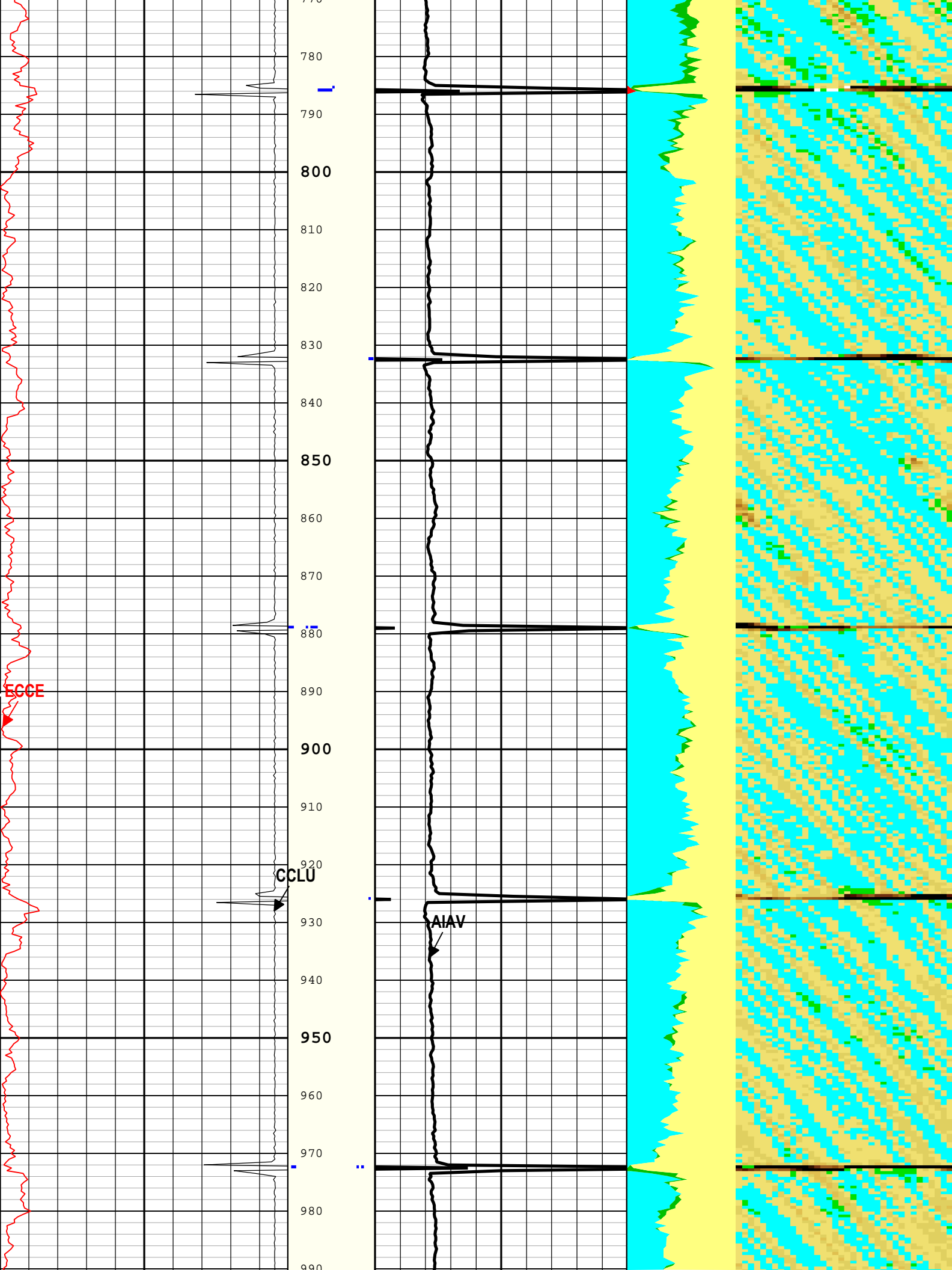
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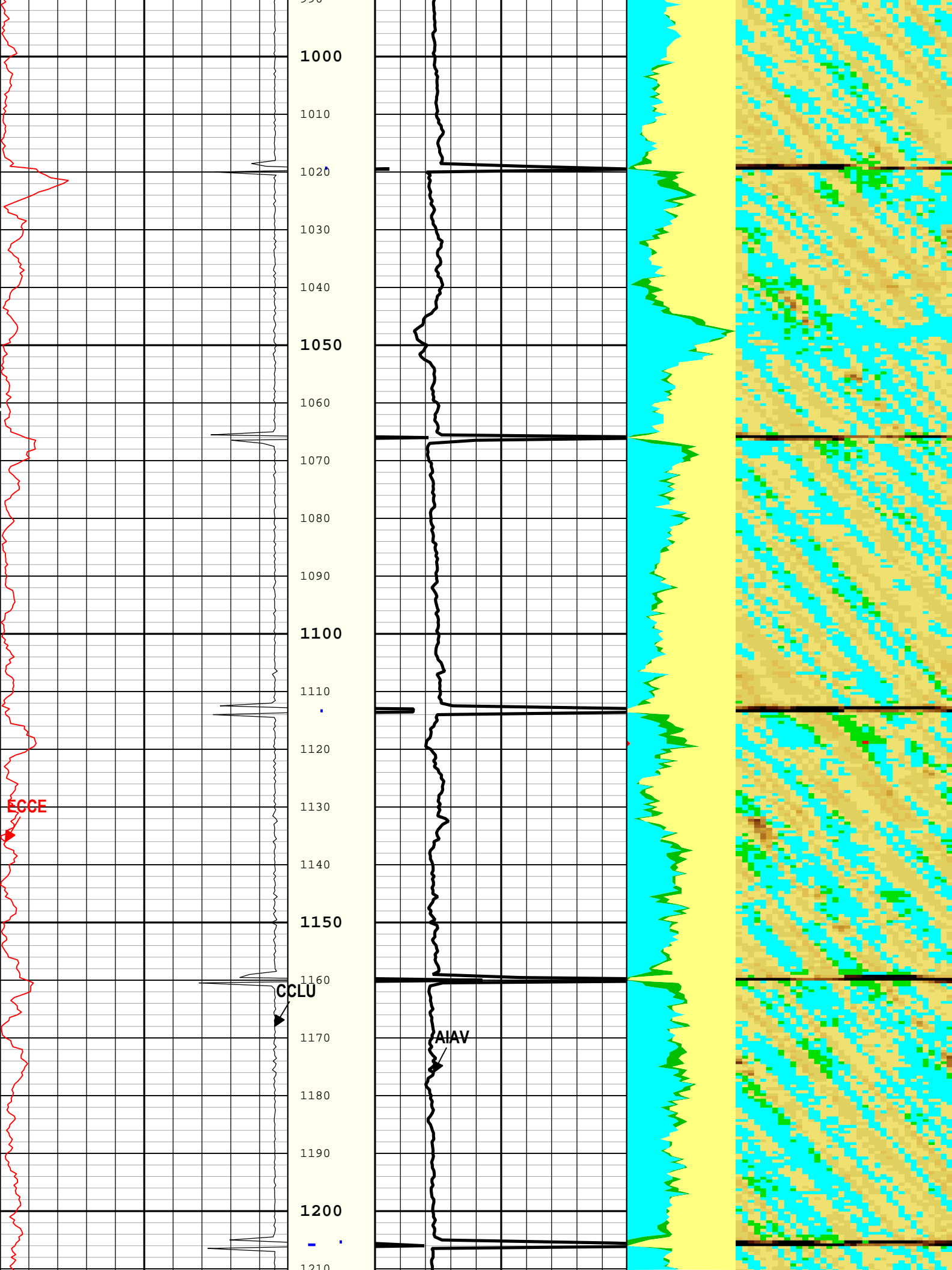


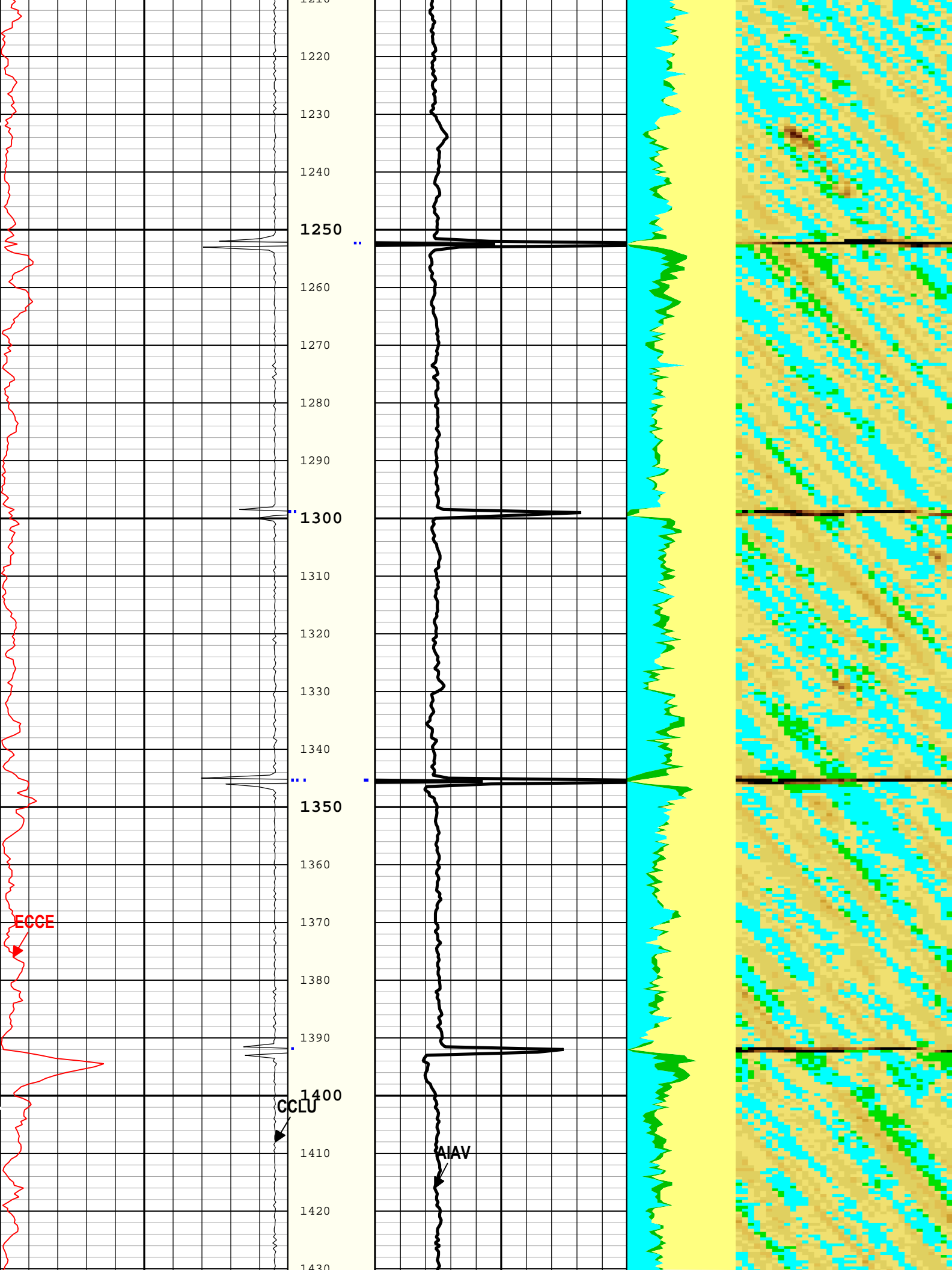


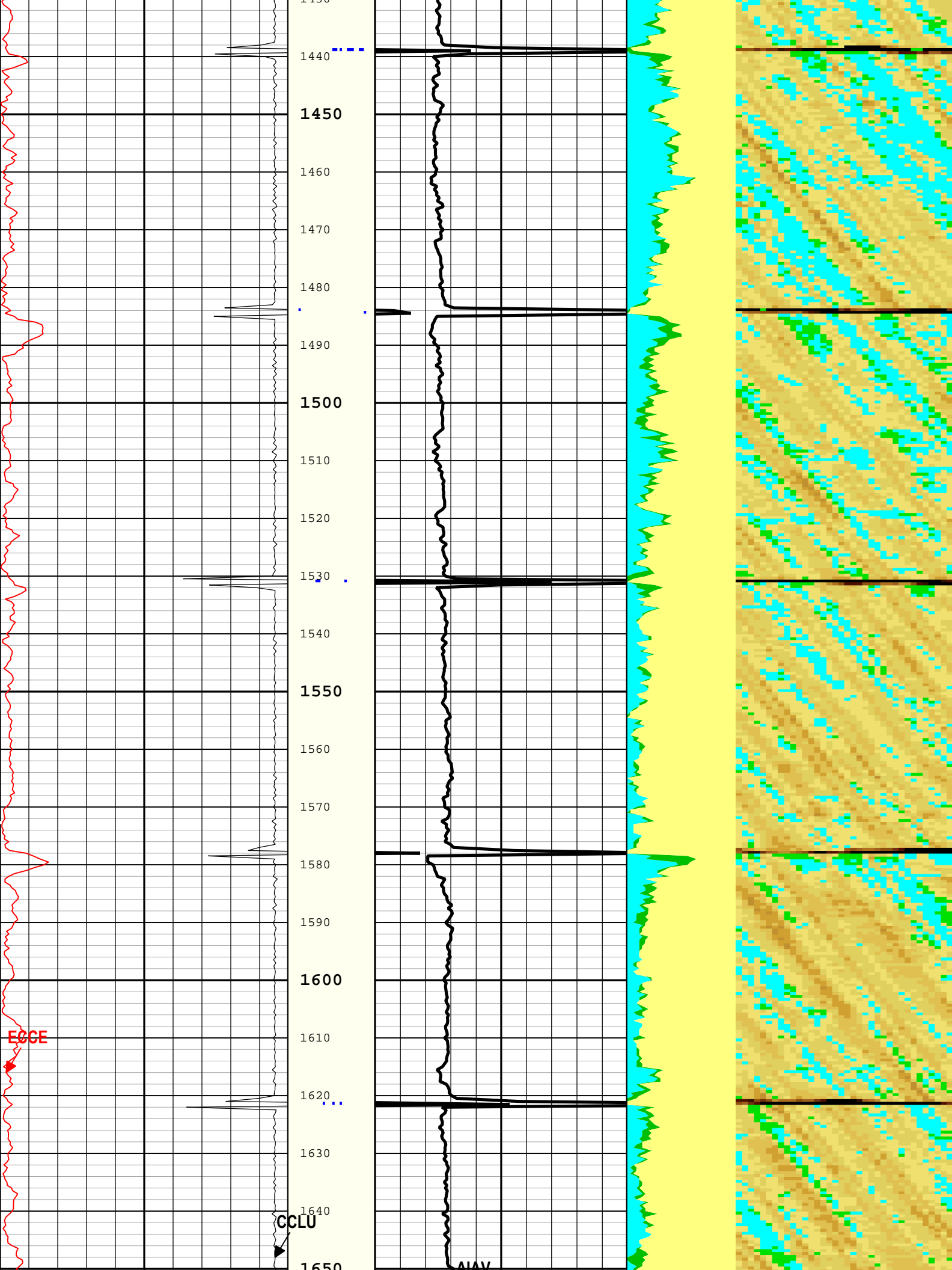


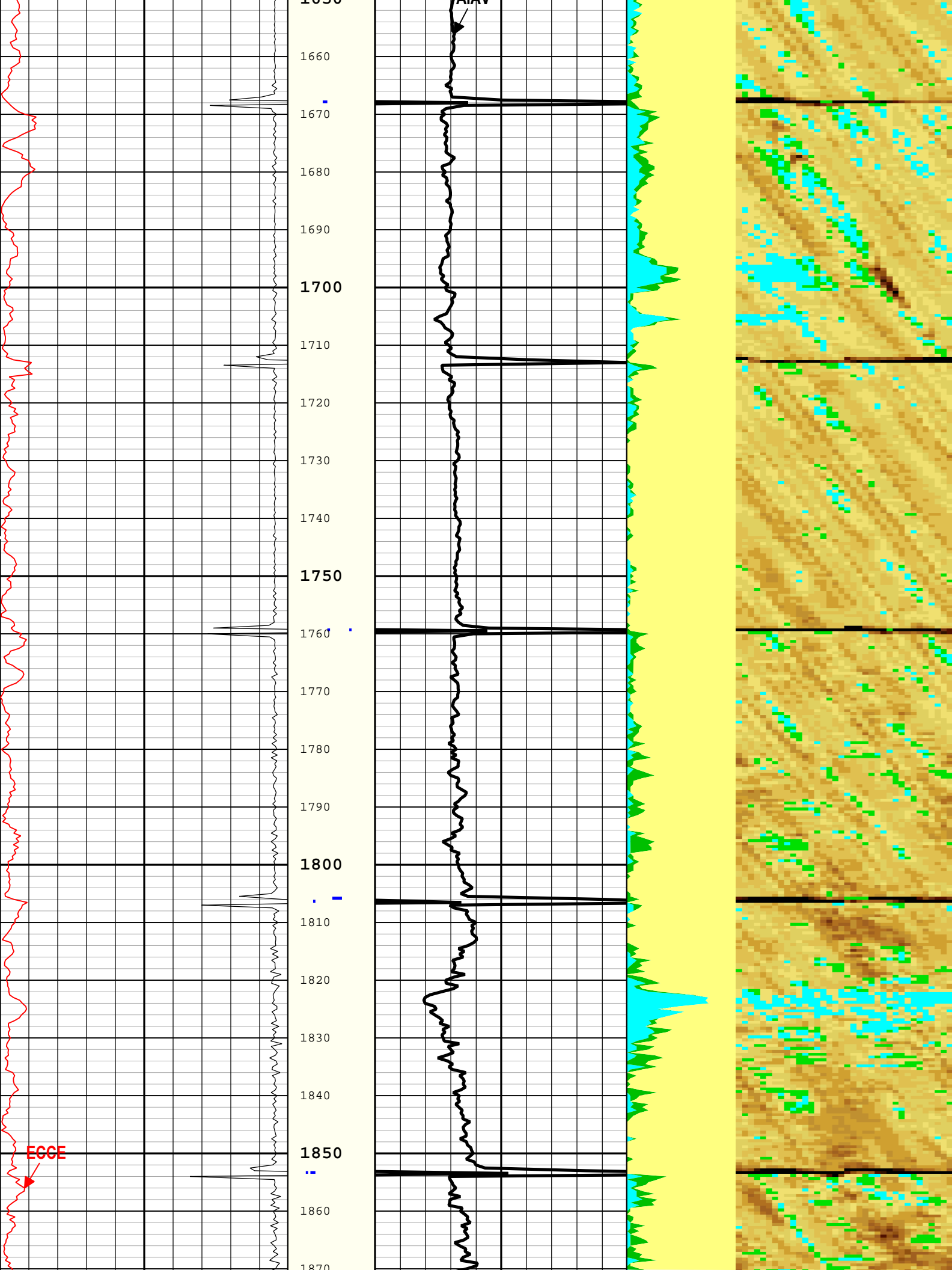


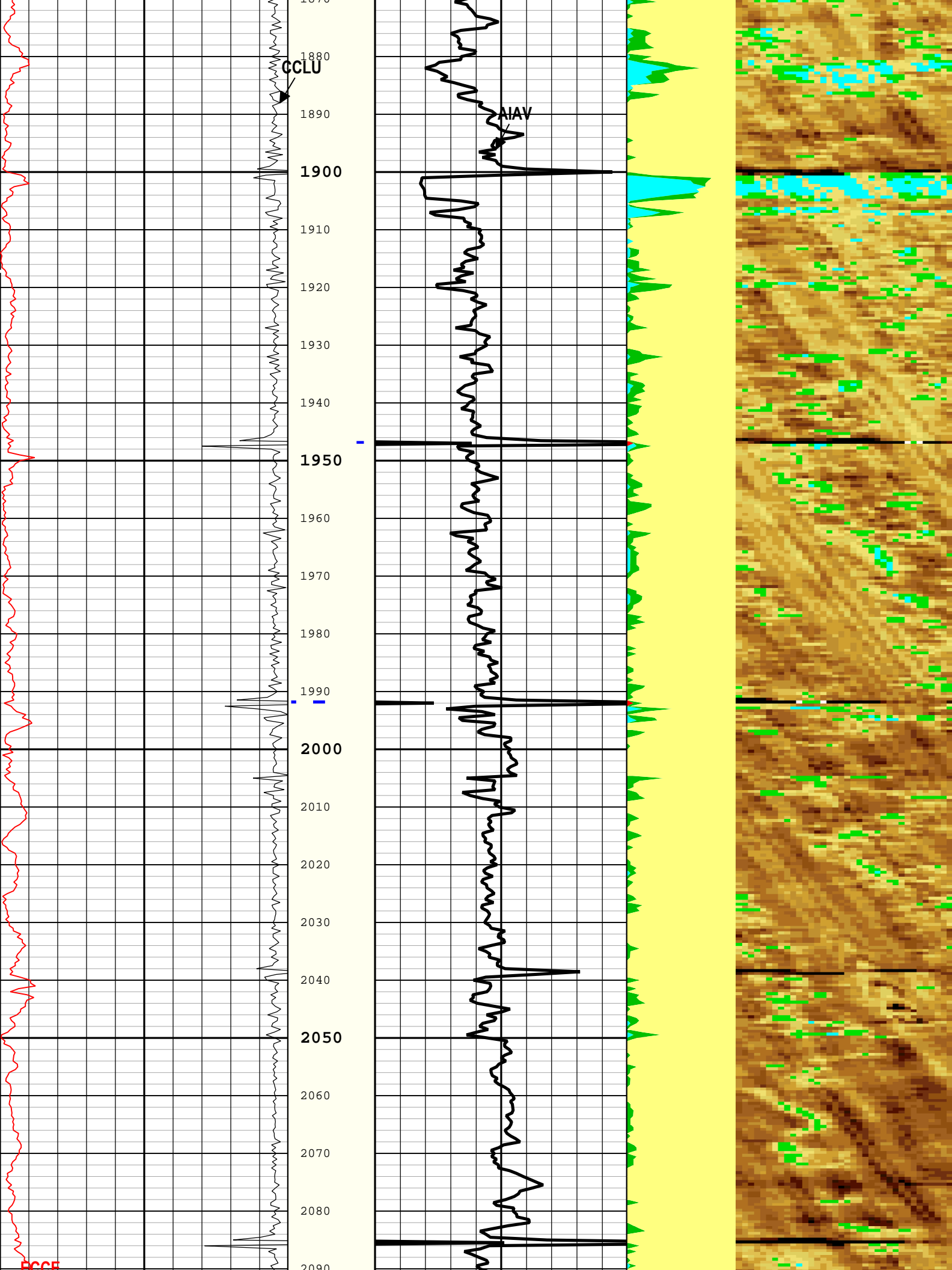


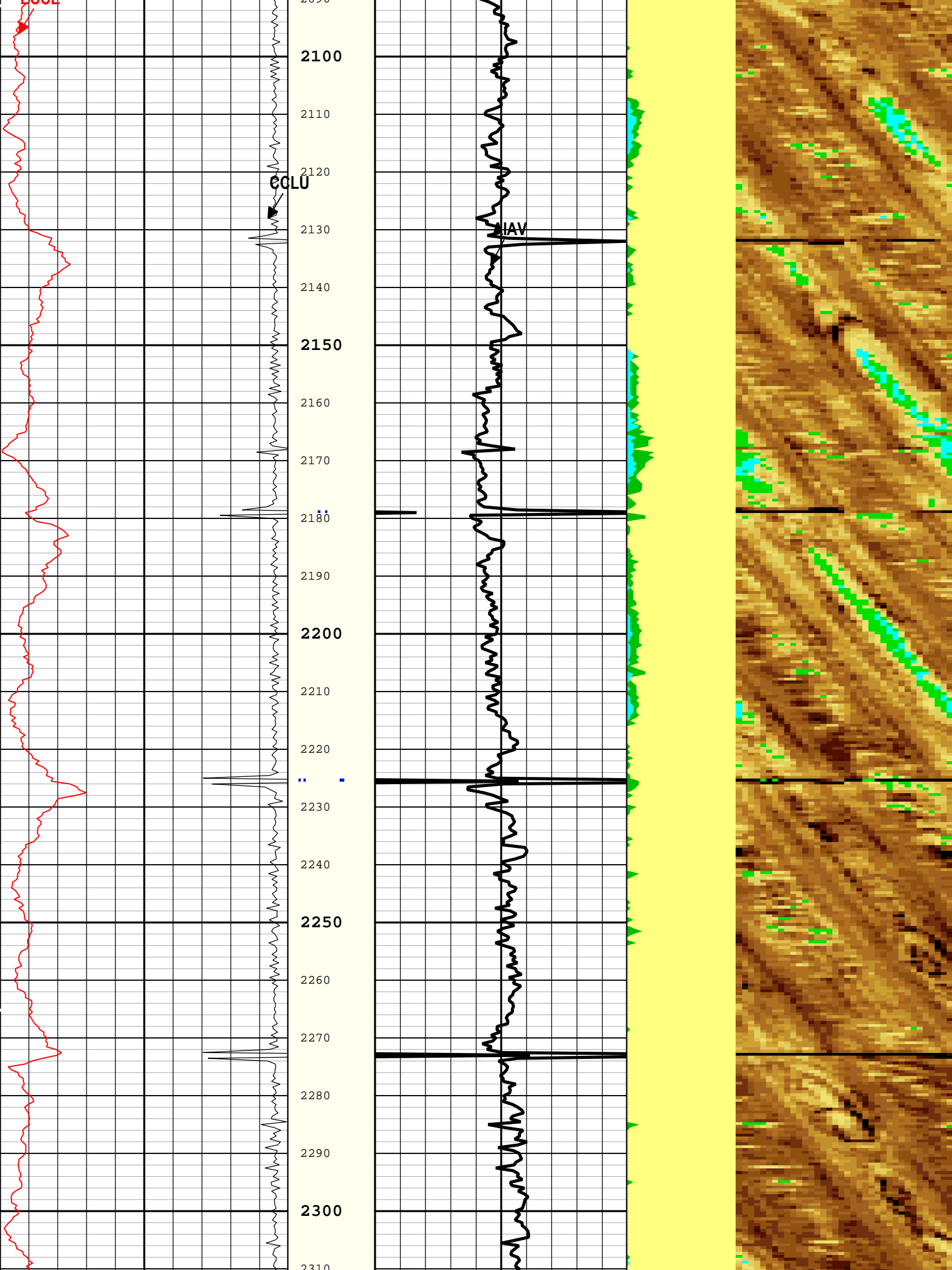


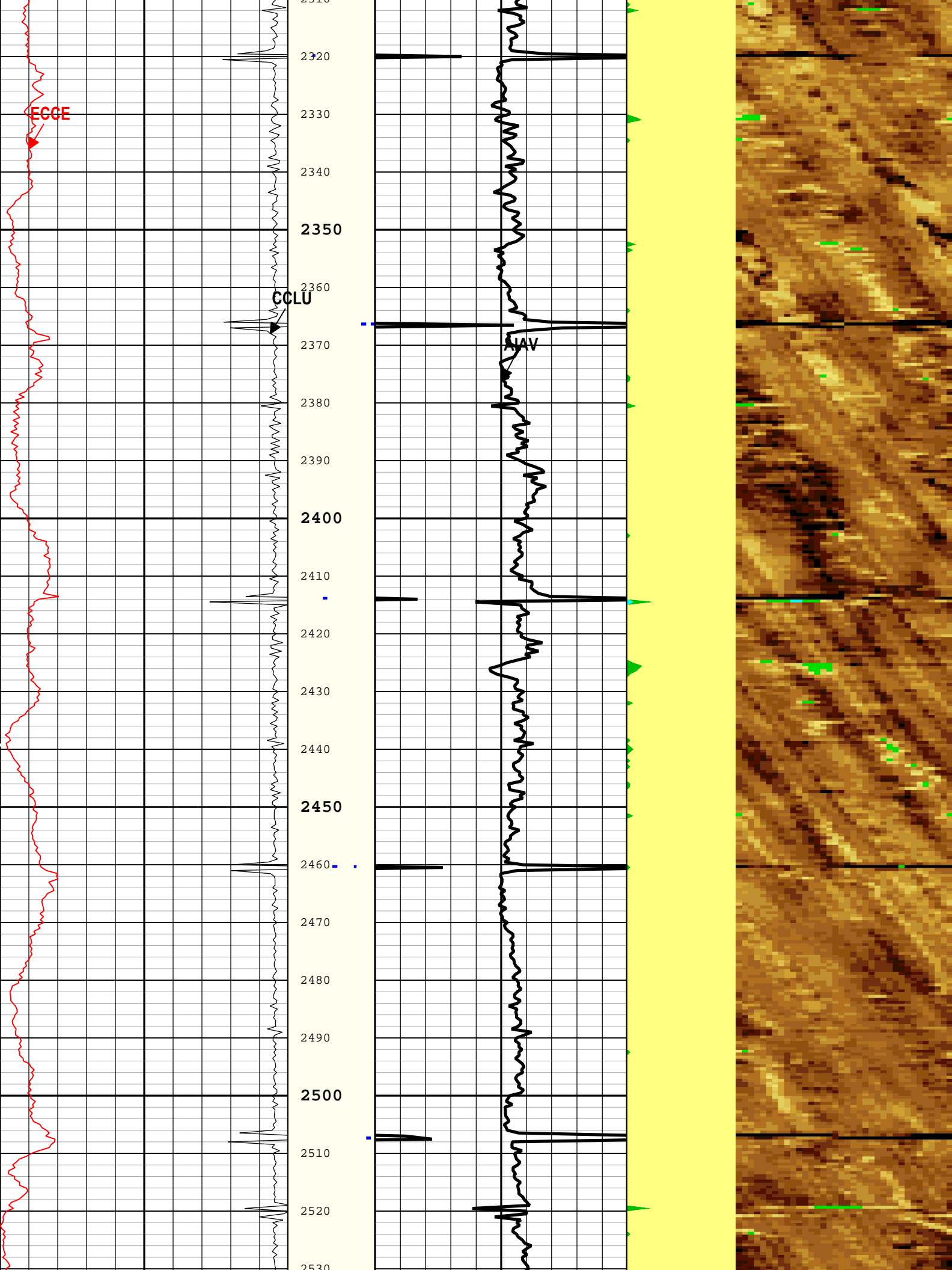


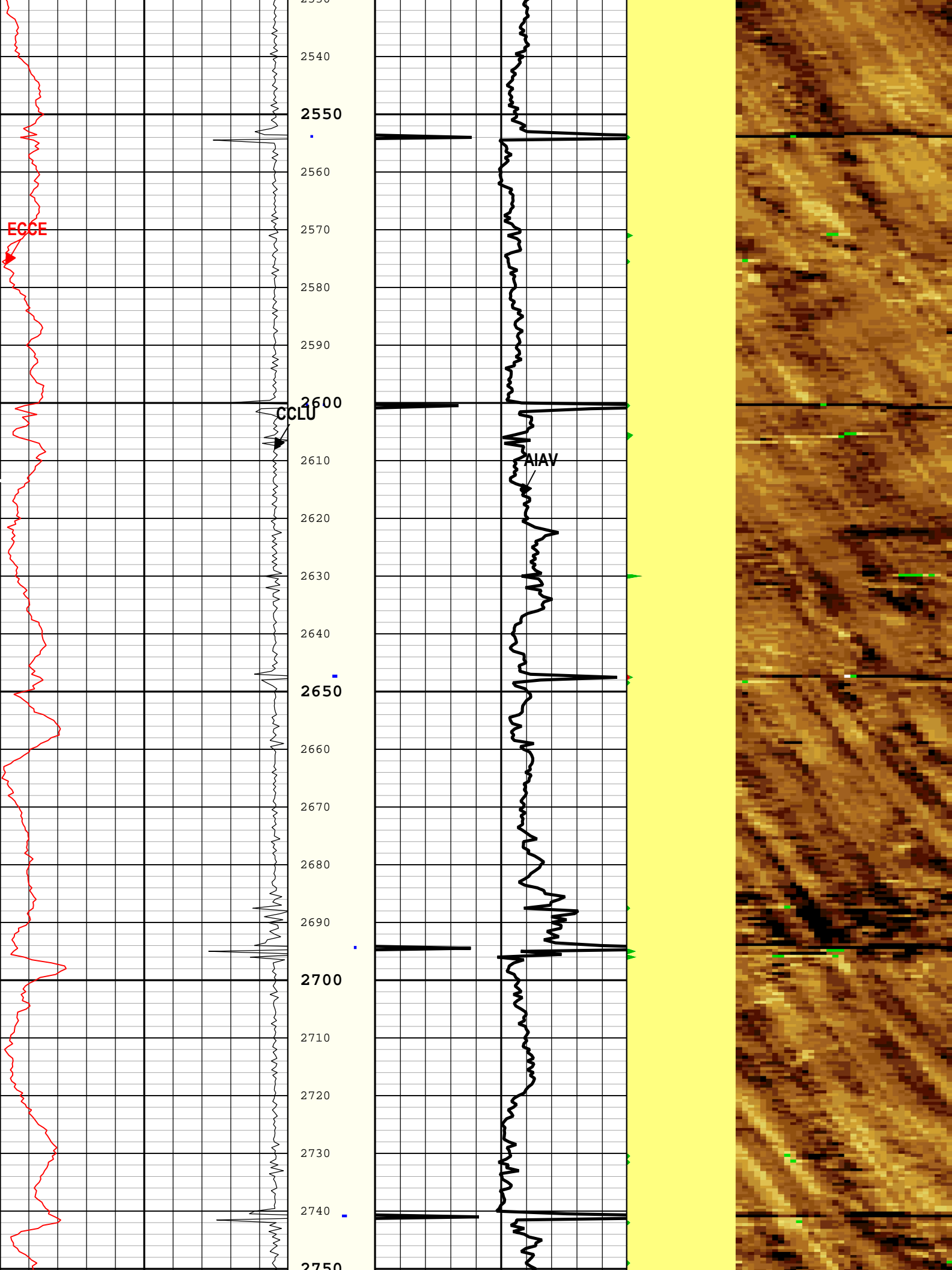


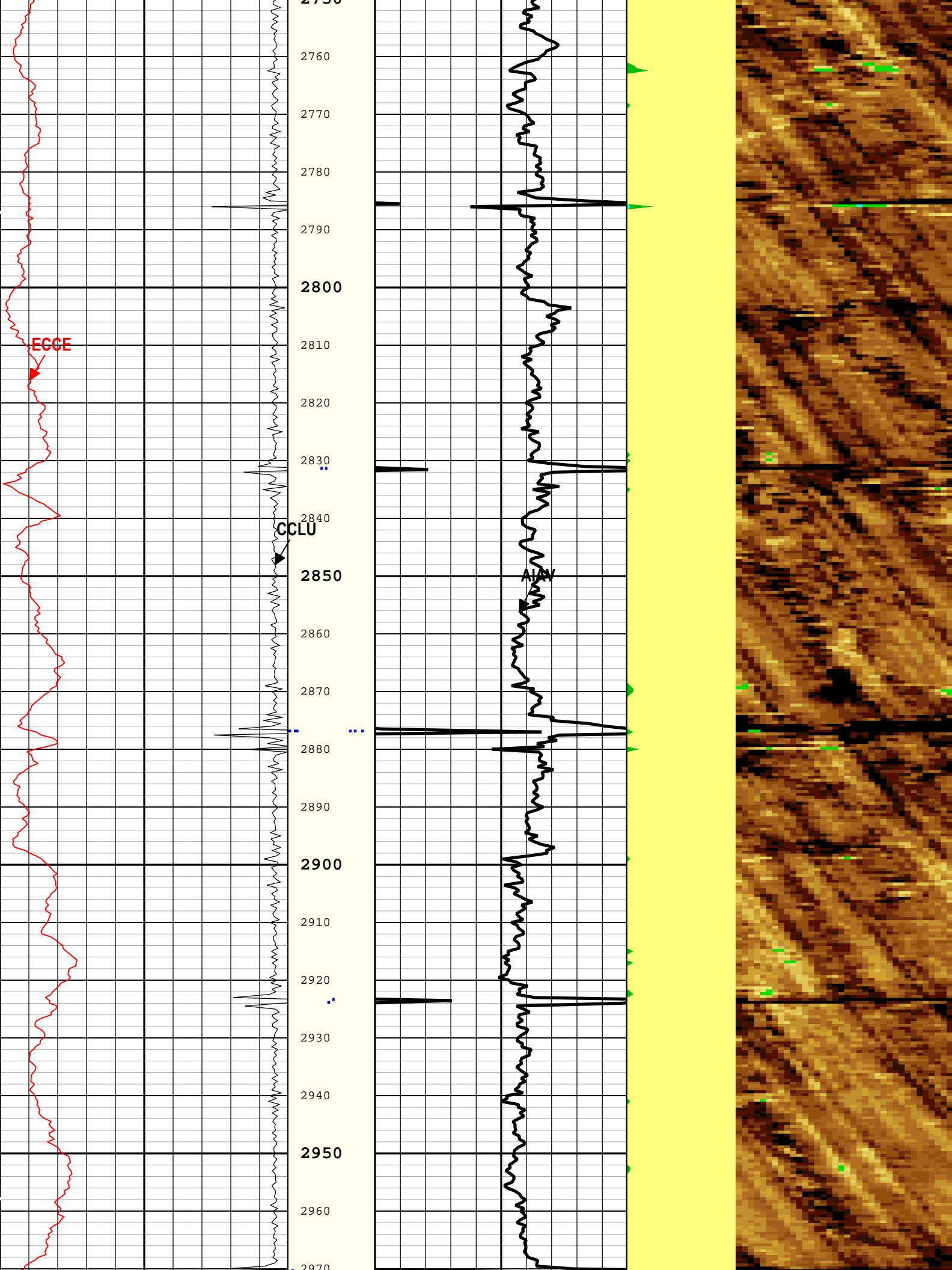


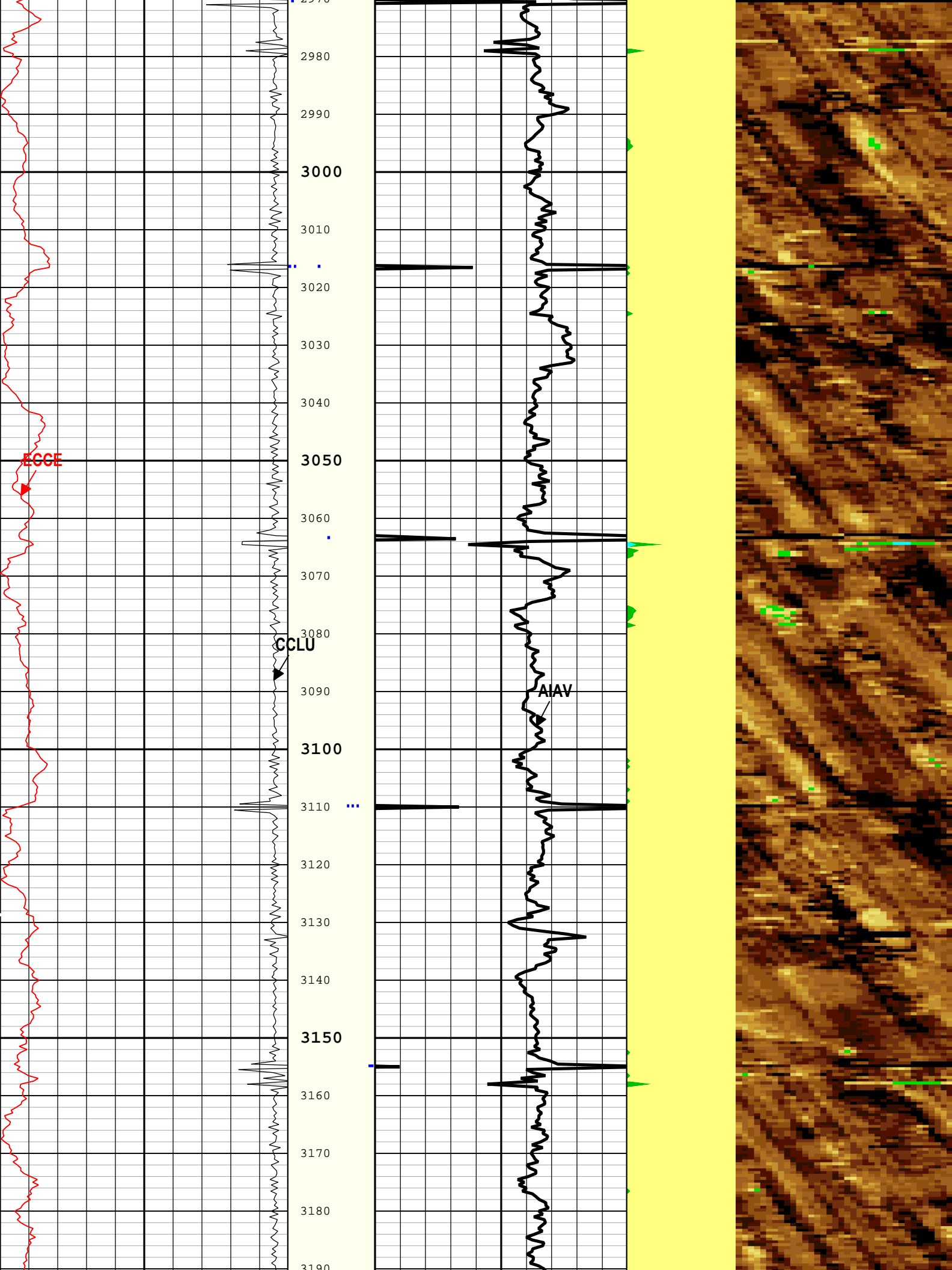


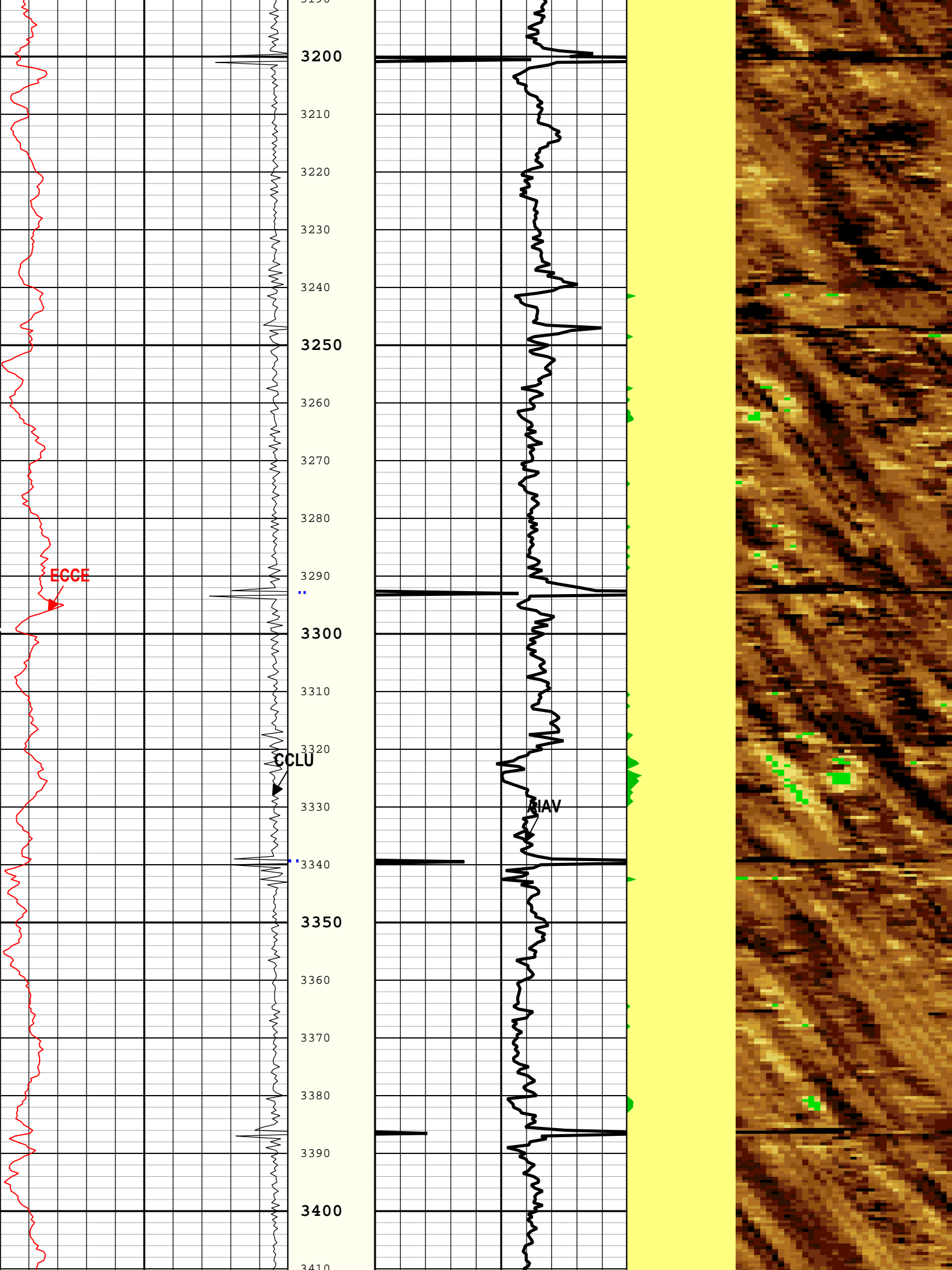


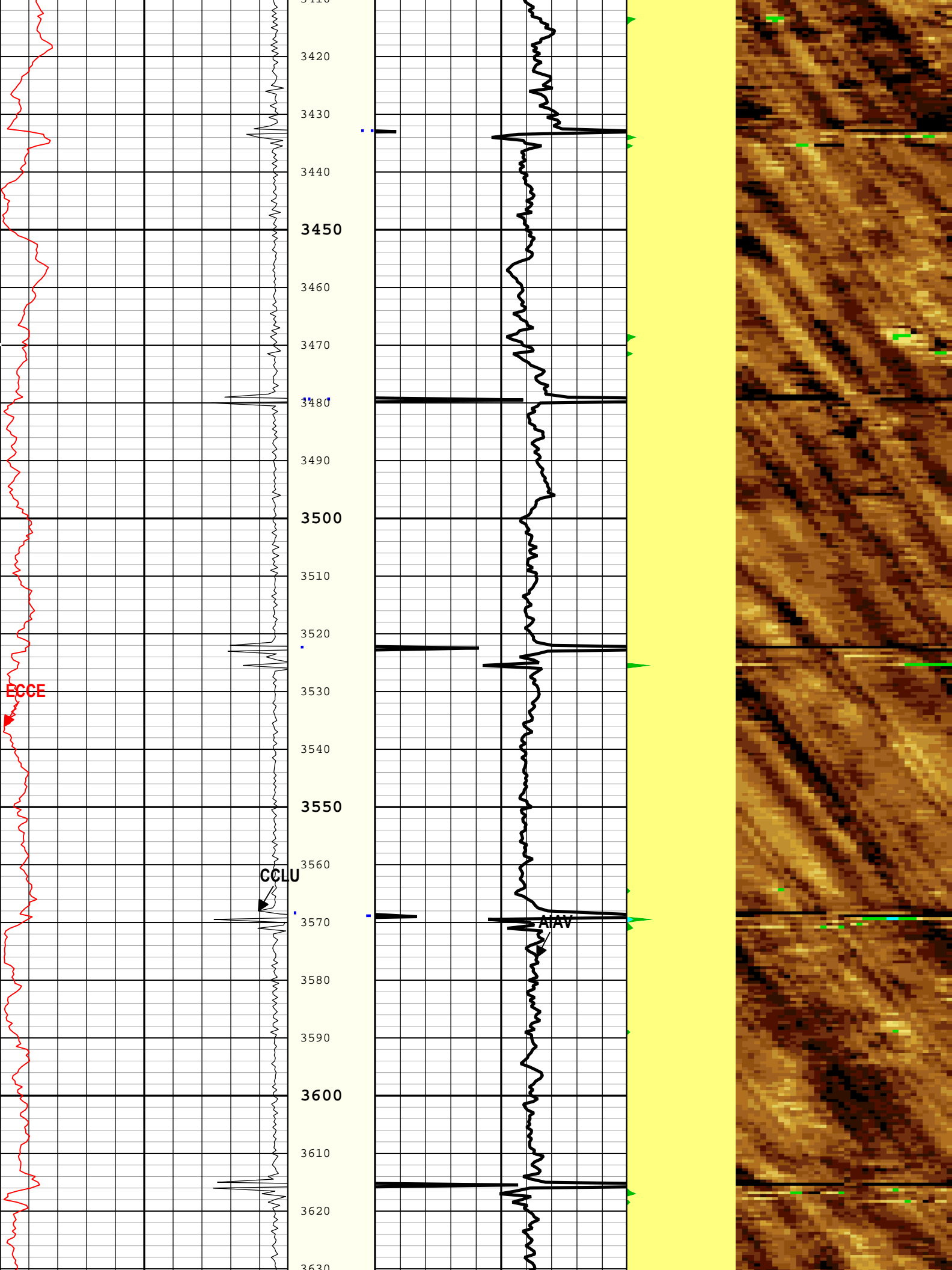


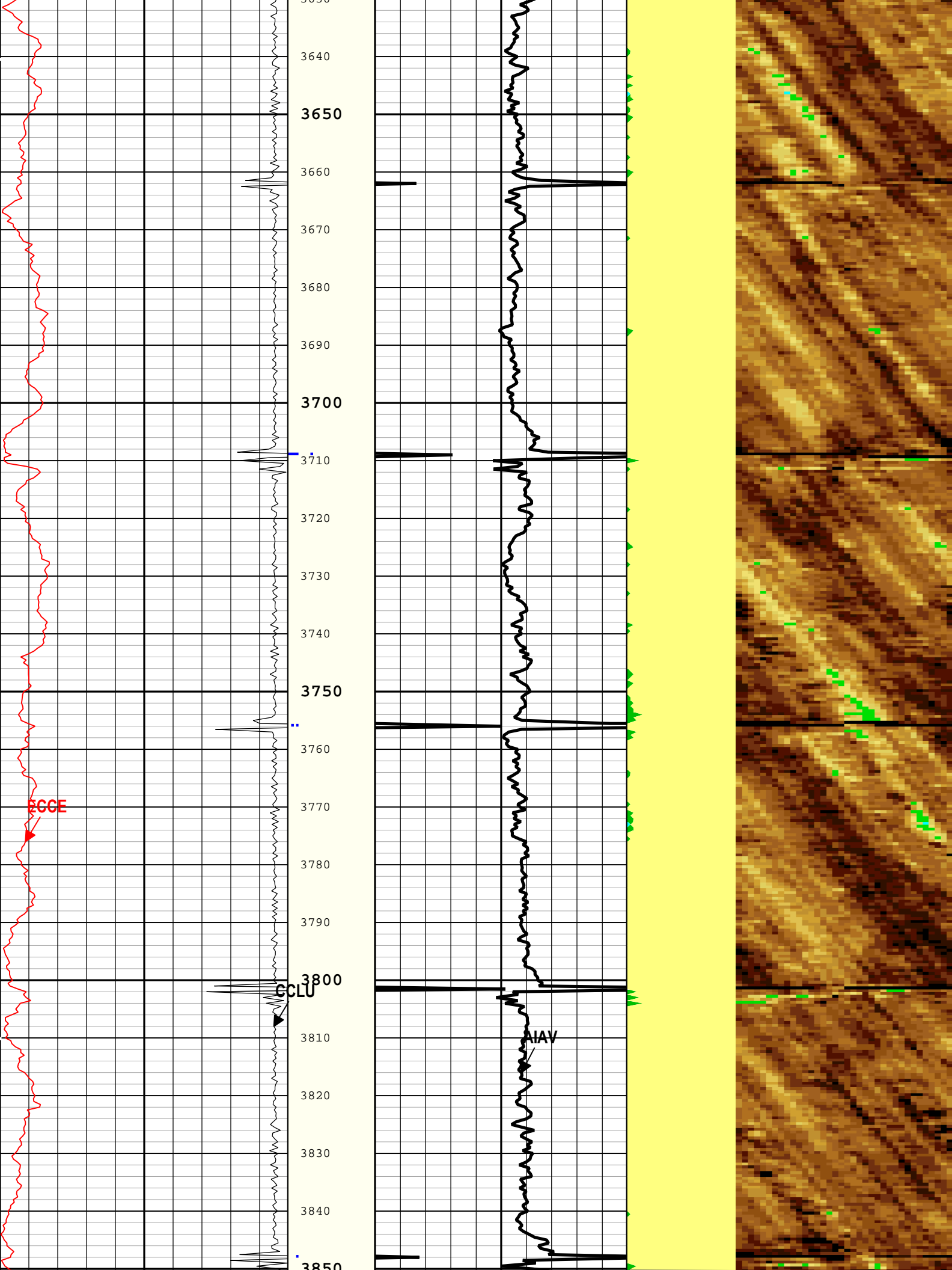


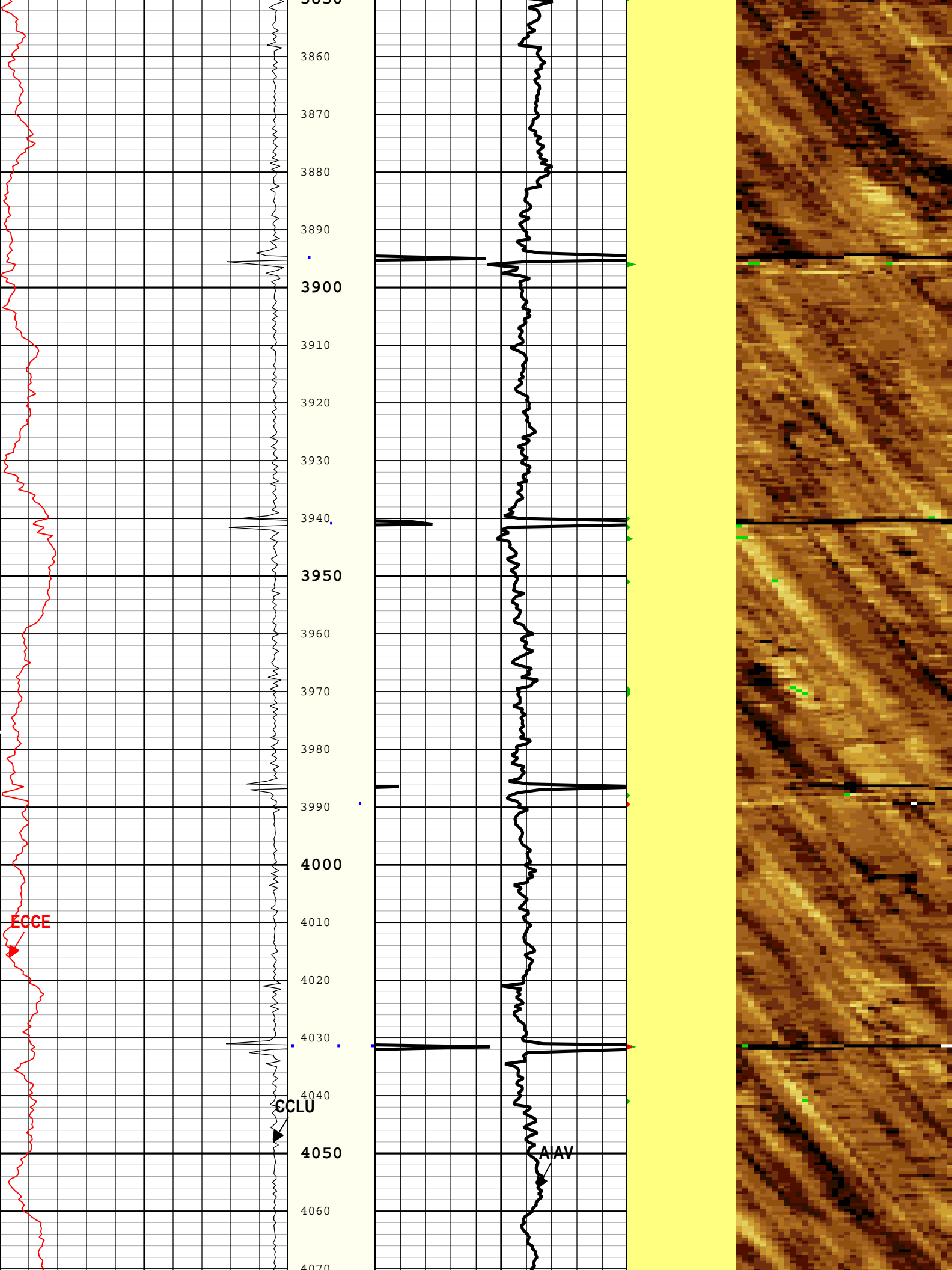


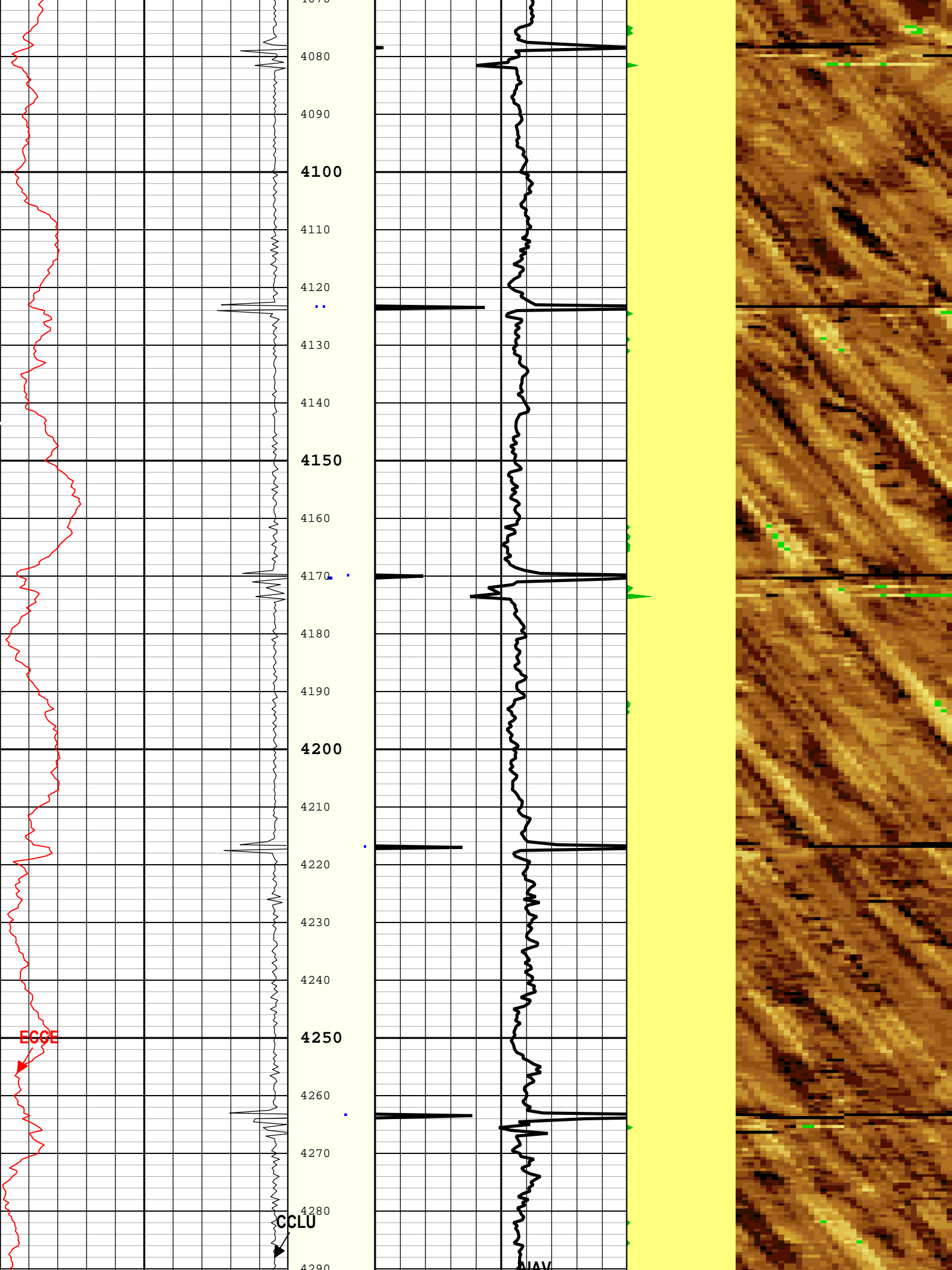


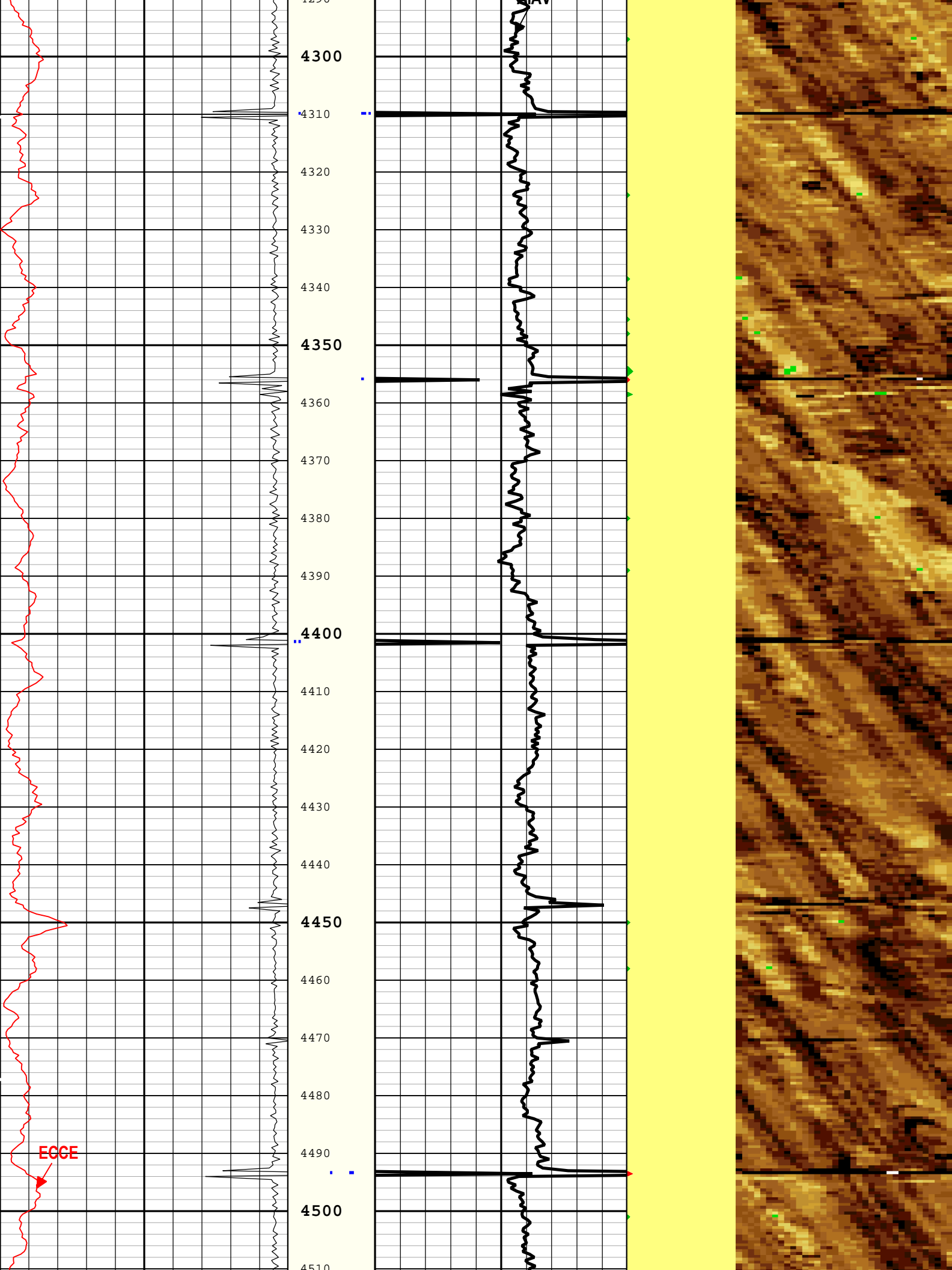


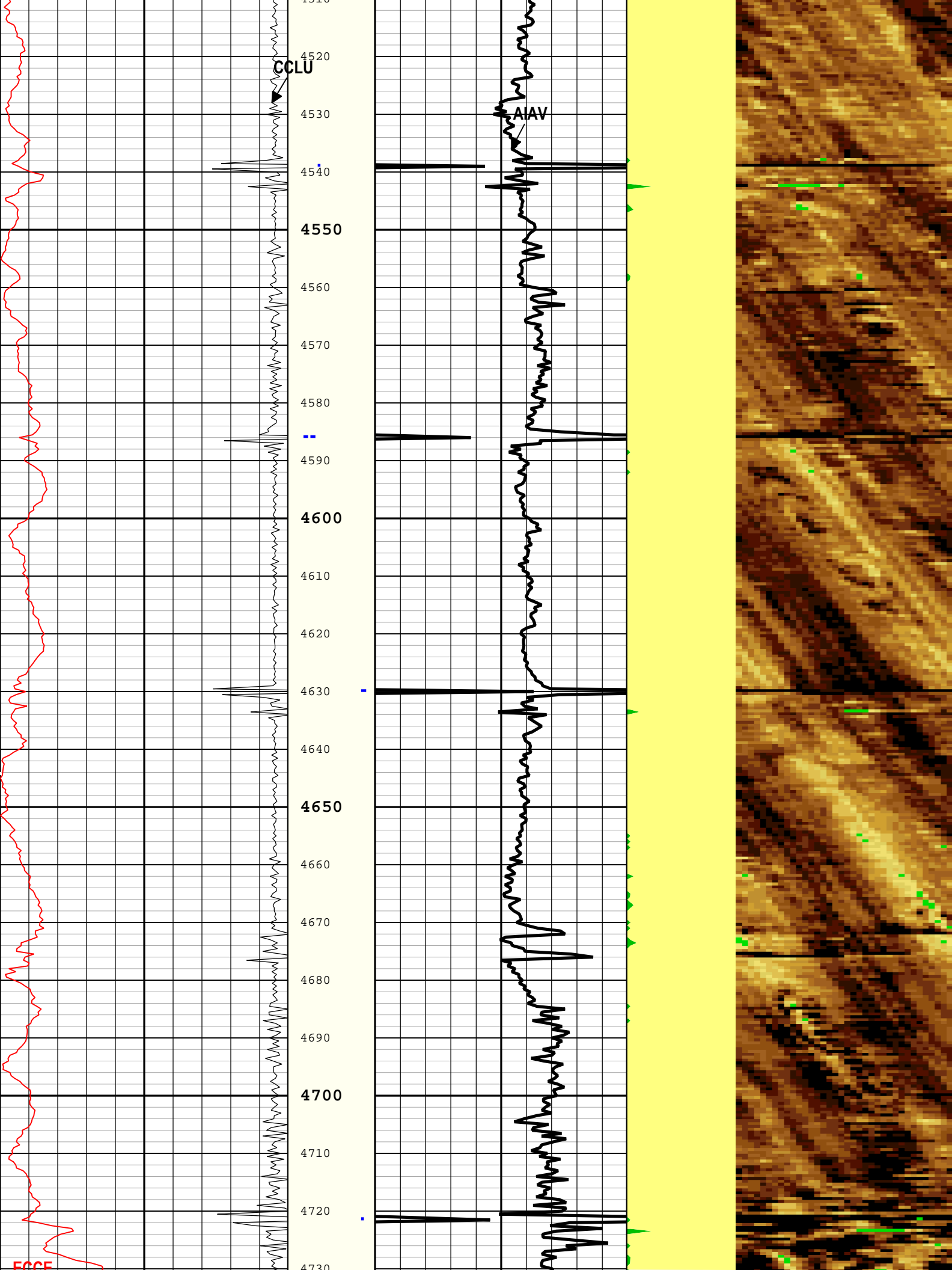


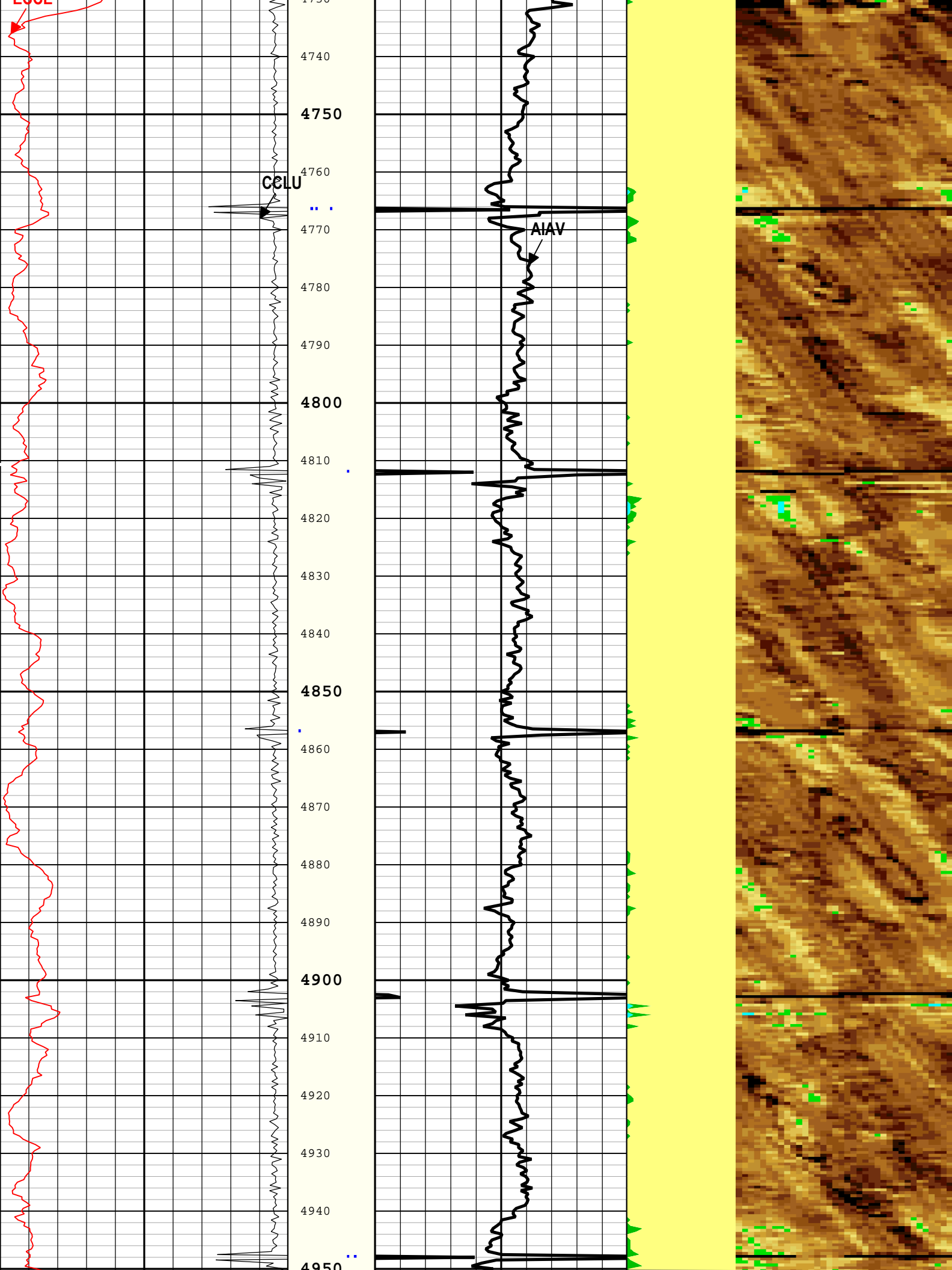


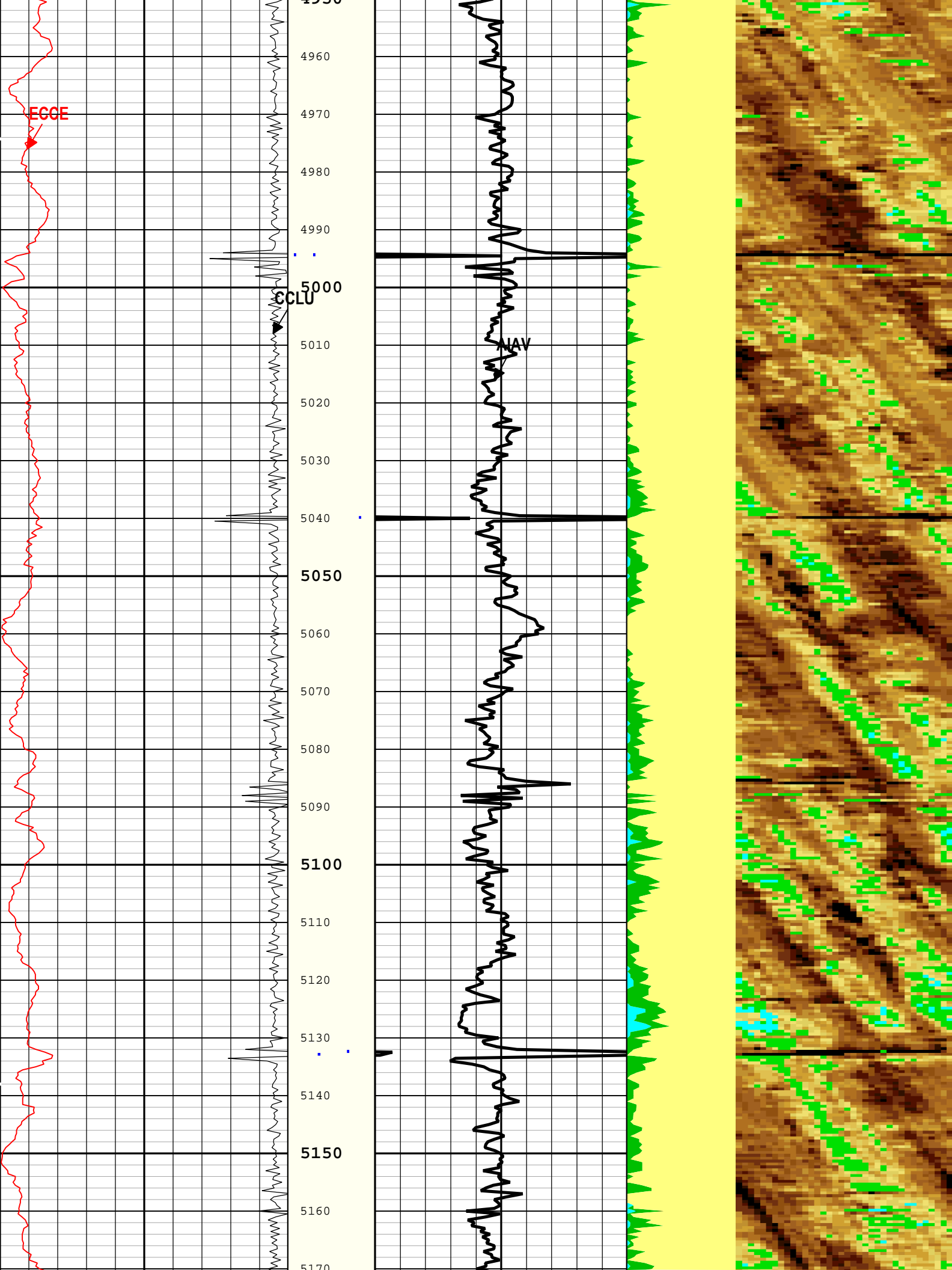


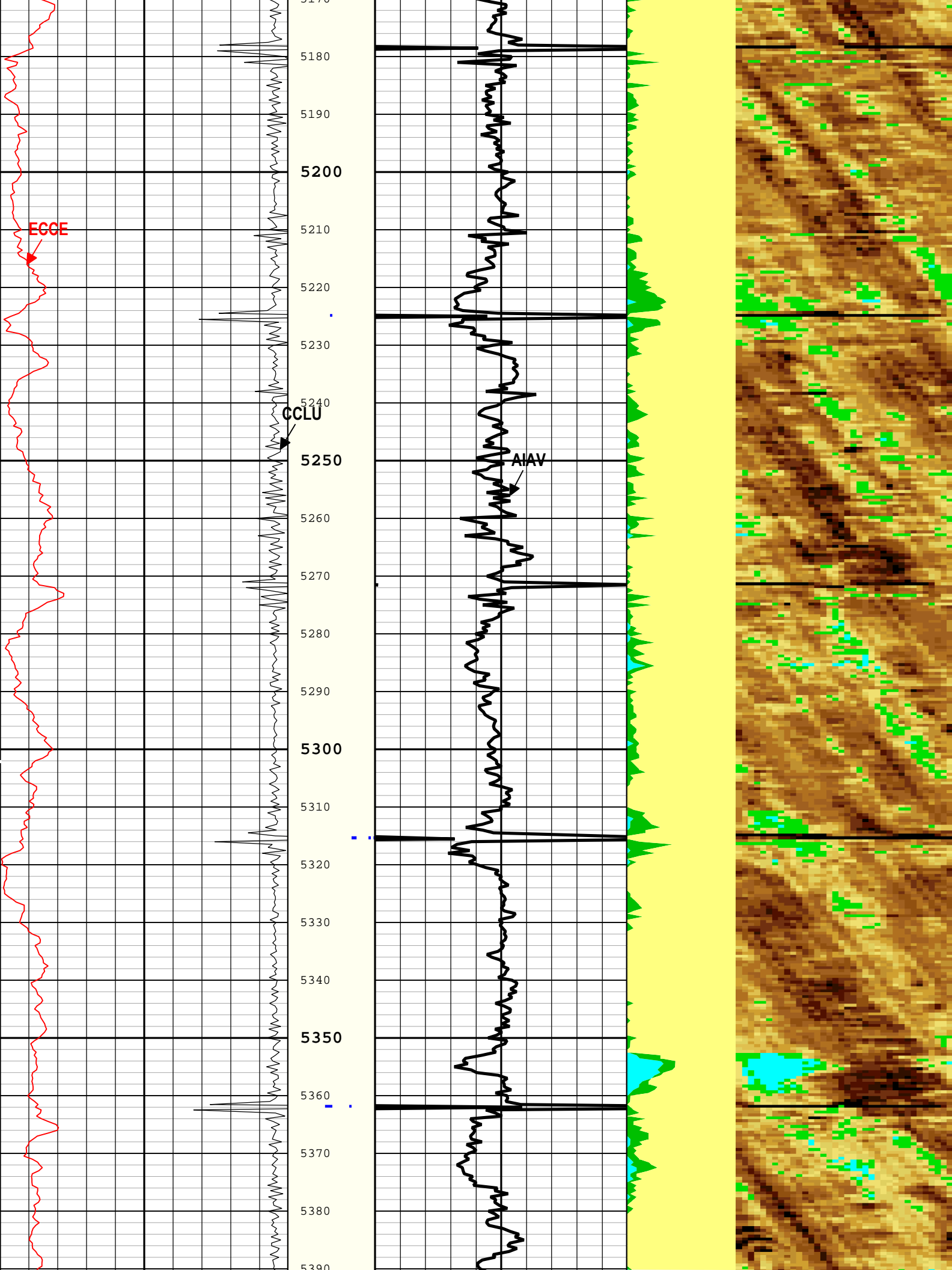


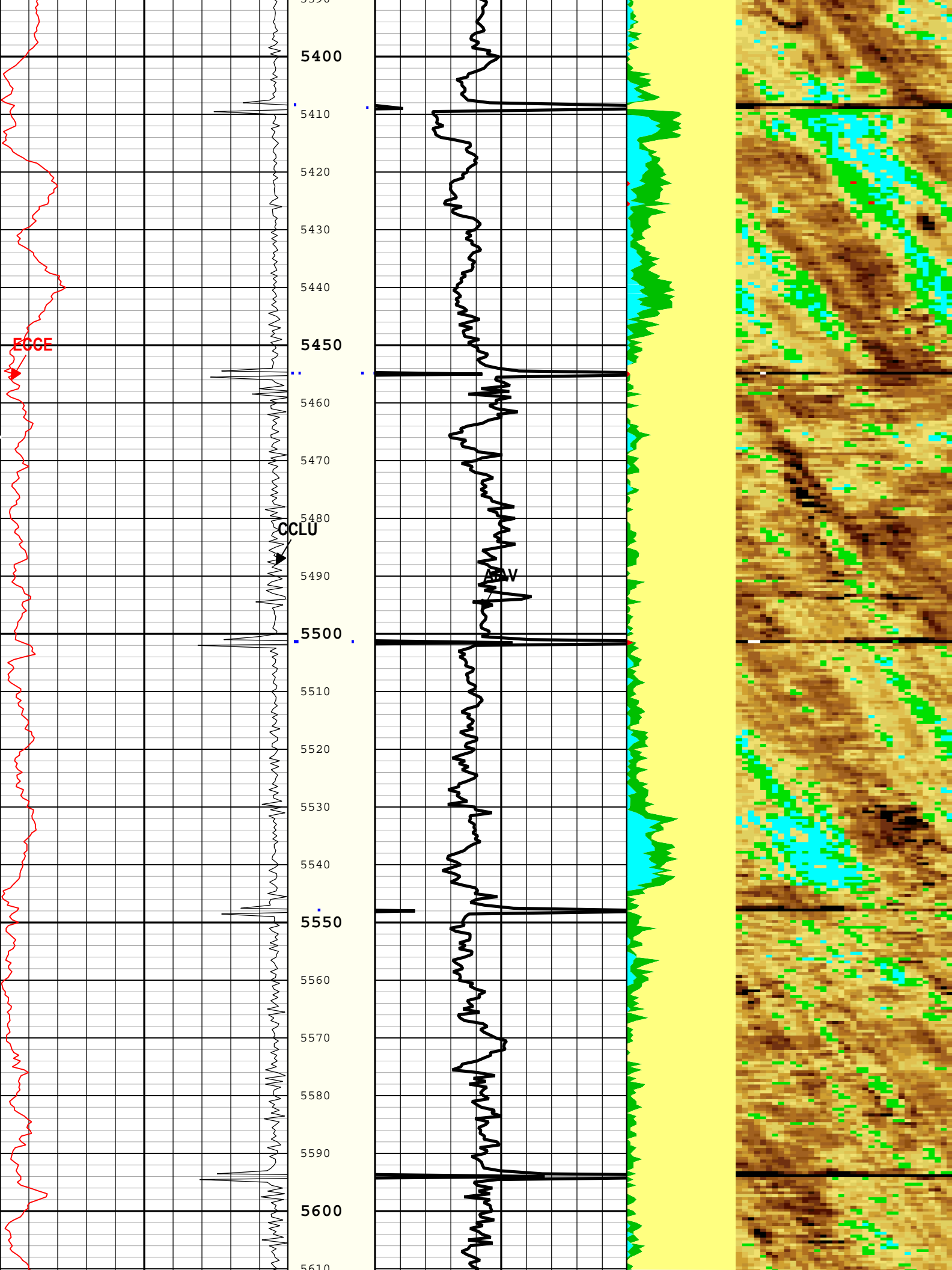


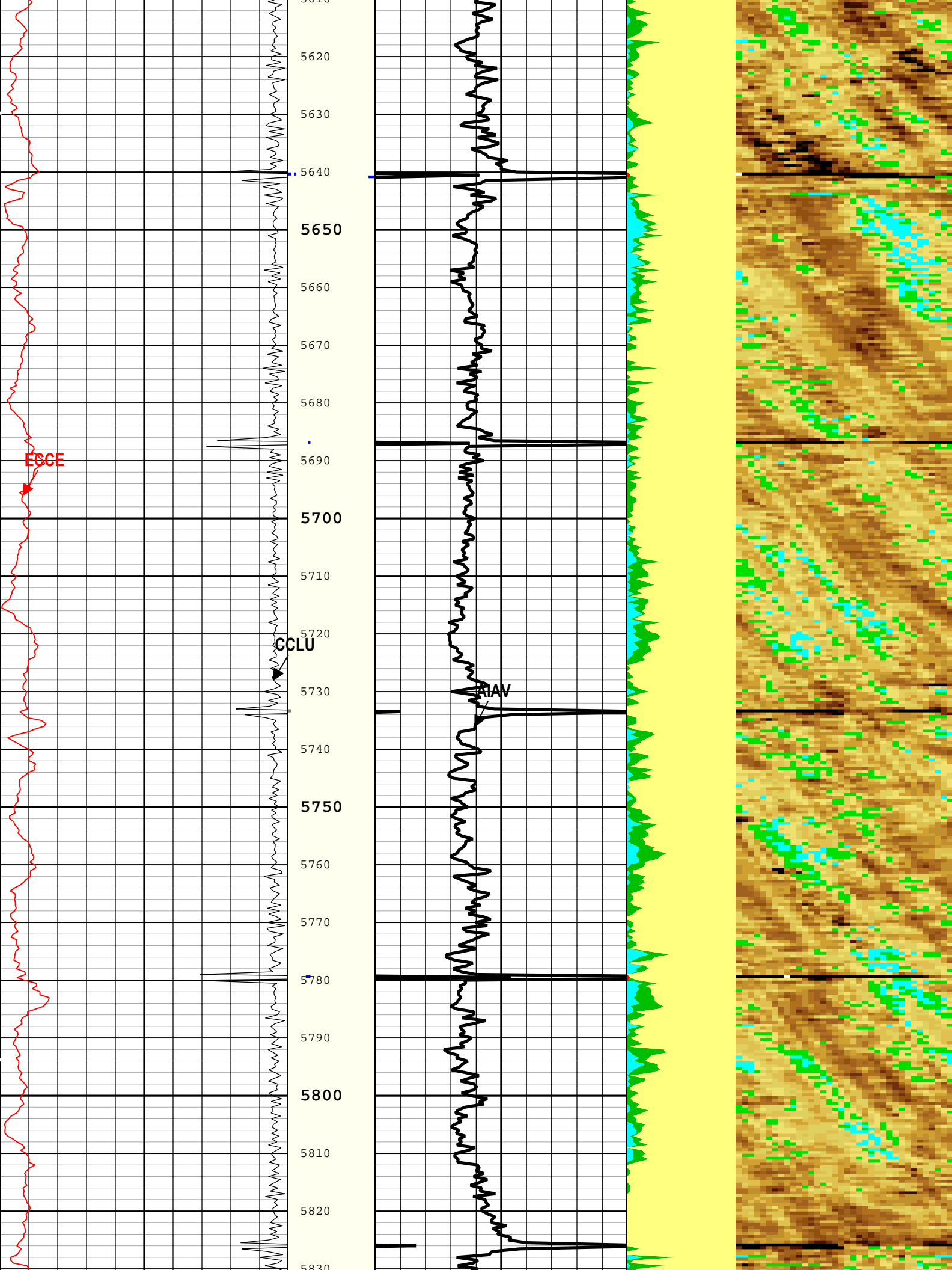


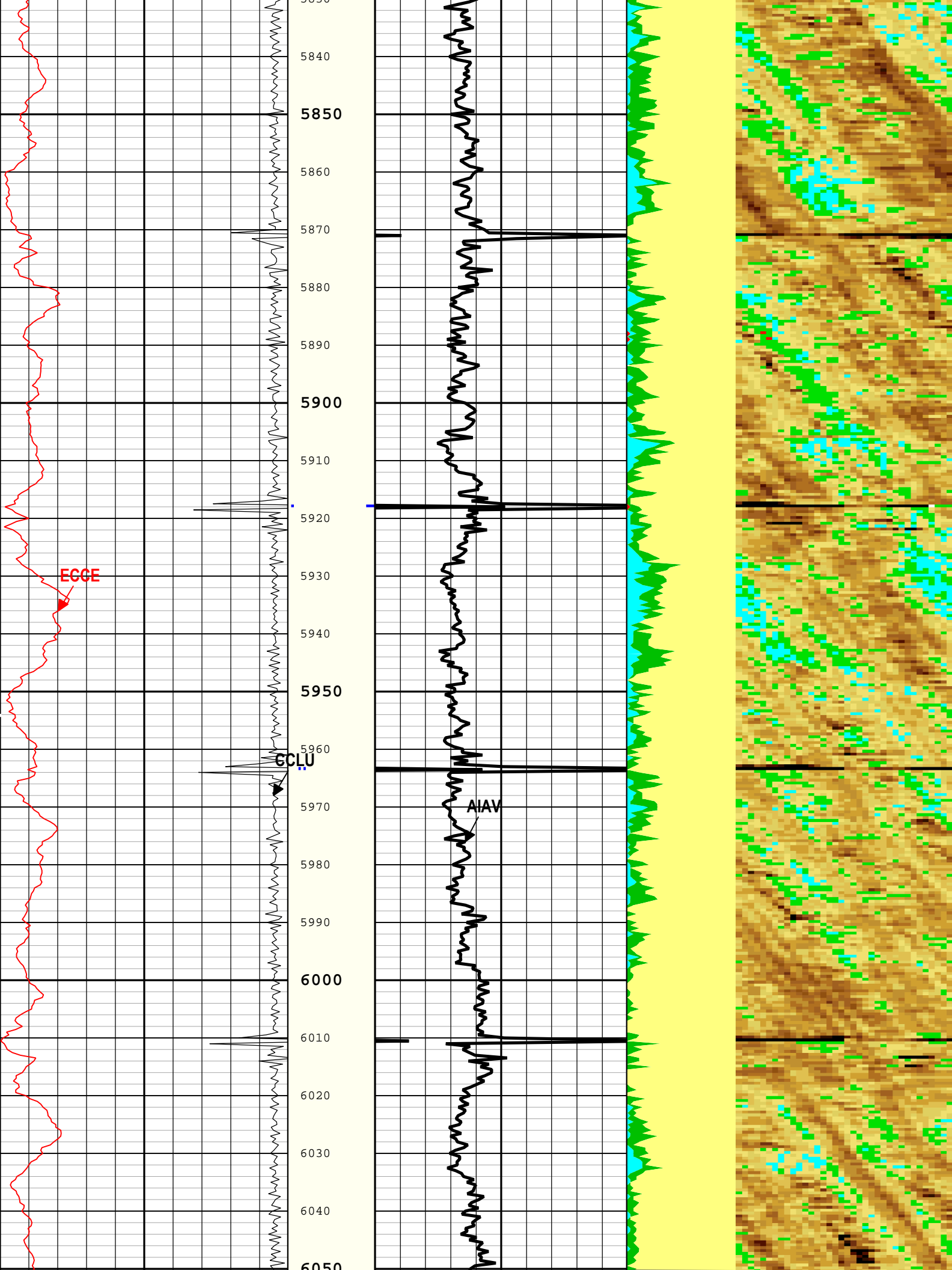


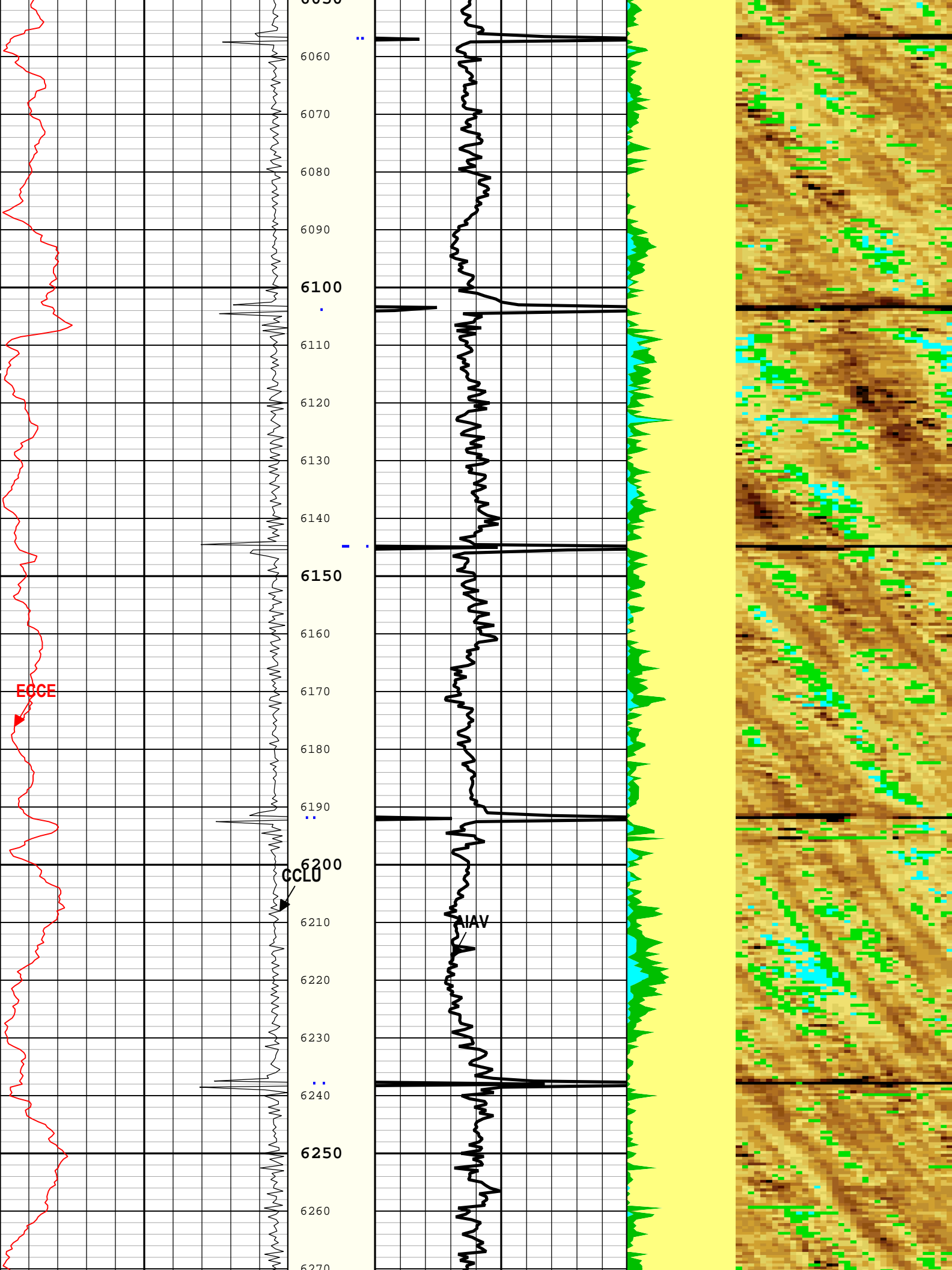


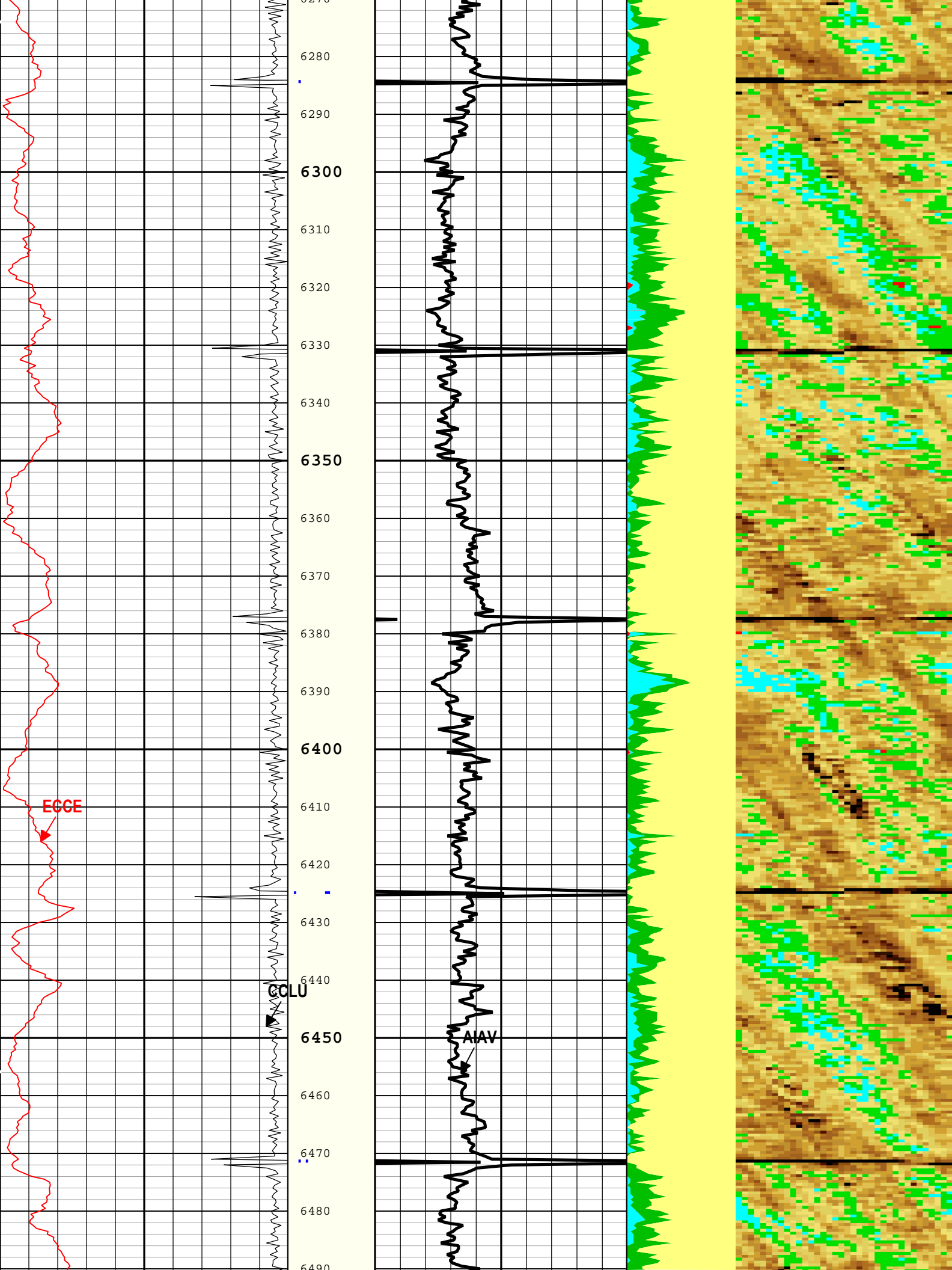


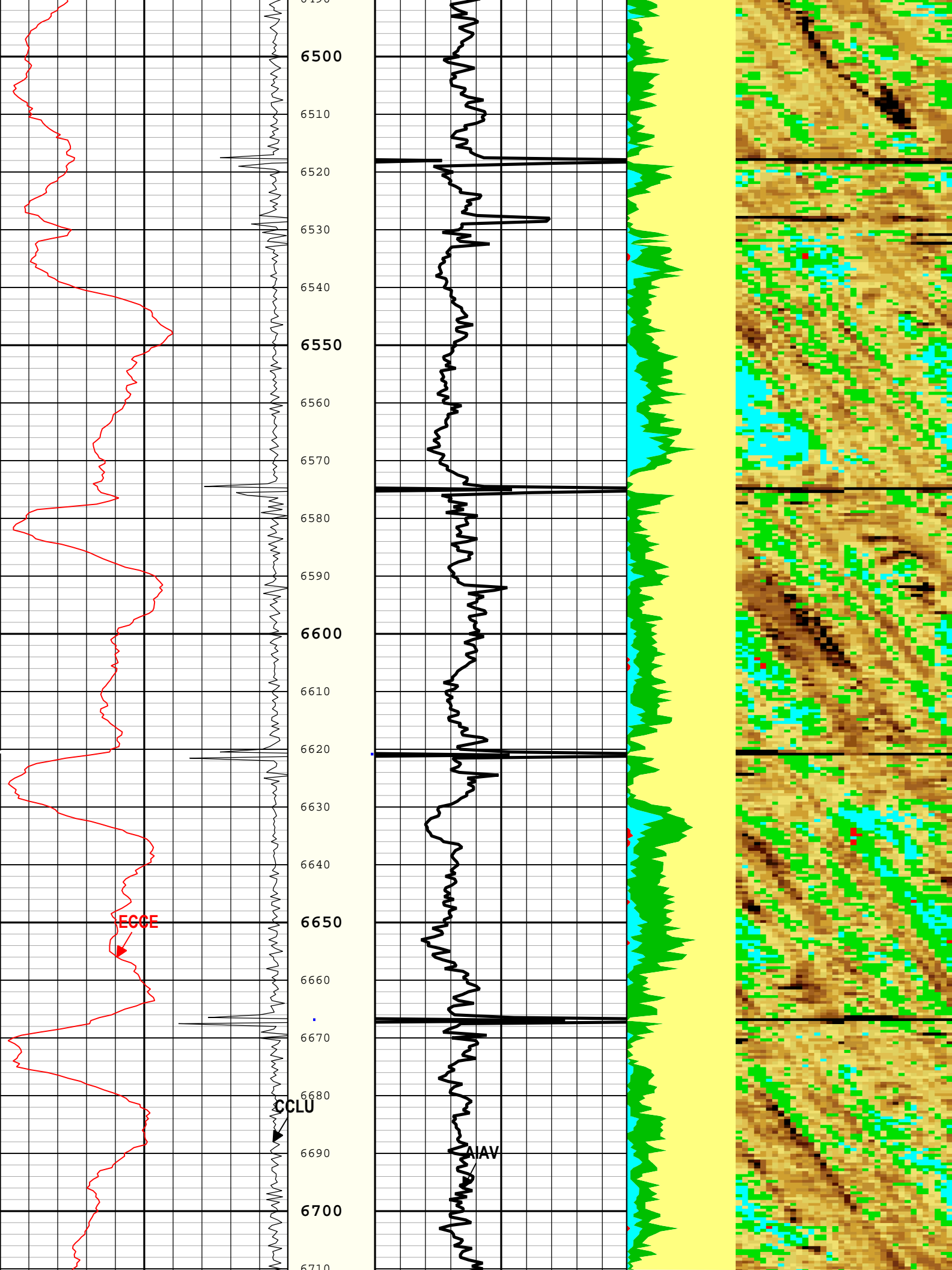


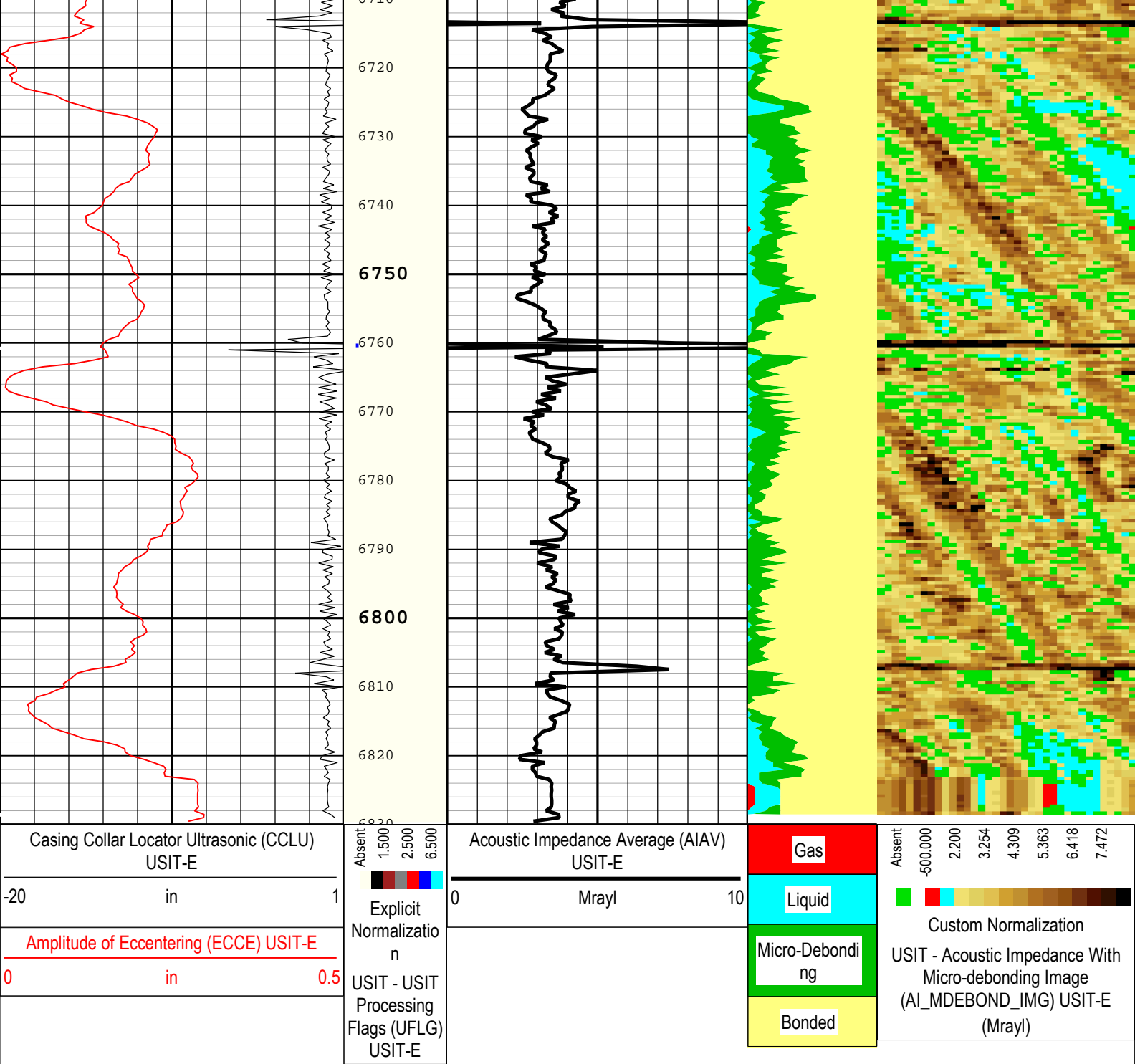












Description: Format: Log (DJ Basin Ultrasonic Cement Summary Report) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth
Creation Date: 03-Feb-2018 15:17:57

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_CENT)	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	

MAR	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	1.13	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	0.1	Mrayl
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	79	110
BS	13.5	110	2054
BS	8.5	2054	6830
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
EMXV	EMEX Voltage	USIT-E	55	V
HRES	Horizontal Resolution	USIT-E	10 deg	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
USFR	Ultrasonic Sampling Frequency	USIT-E	666667	Hz
UPAT	USIT Emission Pattern	USIT-E	Pattern 375 KHz	
UWKM	USIT Working Mode	USIT-E	Uncompressed 10 deg at 6.0 in	
WINB	Window Begin Time	USIT-E	Time Zoned	us
WINE	Window End Time	USIT-E	71.88	us

Time Zone Parameters					
Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
WINB	31.88	03-Feb-2018 14:08:56	03-Feb-2018 14:15:15	6830.81	6825
WINB	26.8	03-Feb-2018 14:15:15	03-Feb-2018 14:57:09	6825	79.32
All depth are at tool zero.					

ONE	
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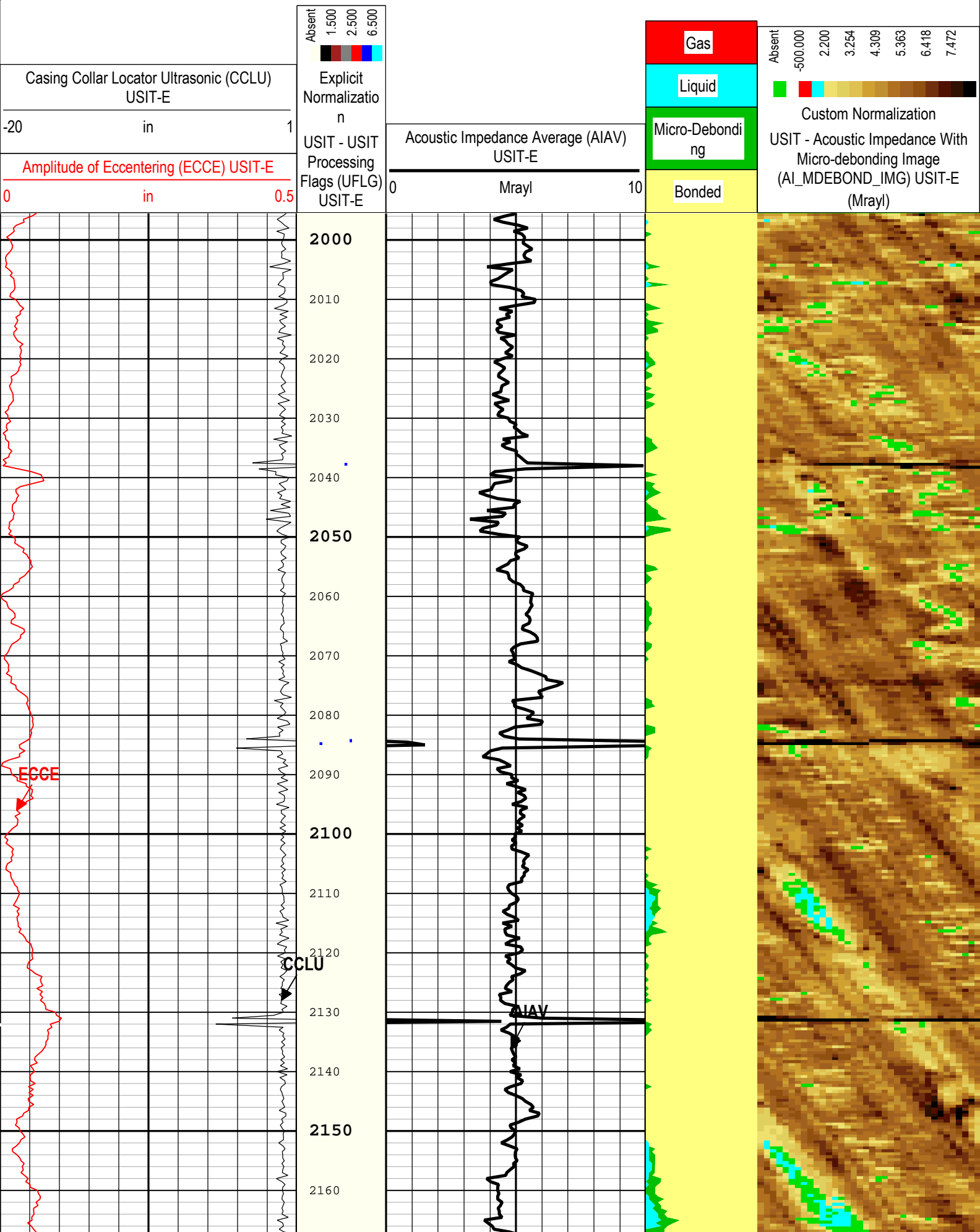
0 PSI Repeat Pass	
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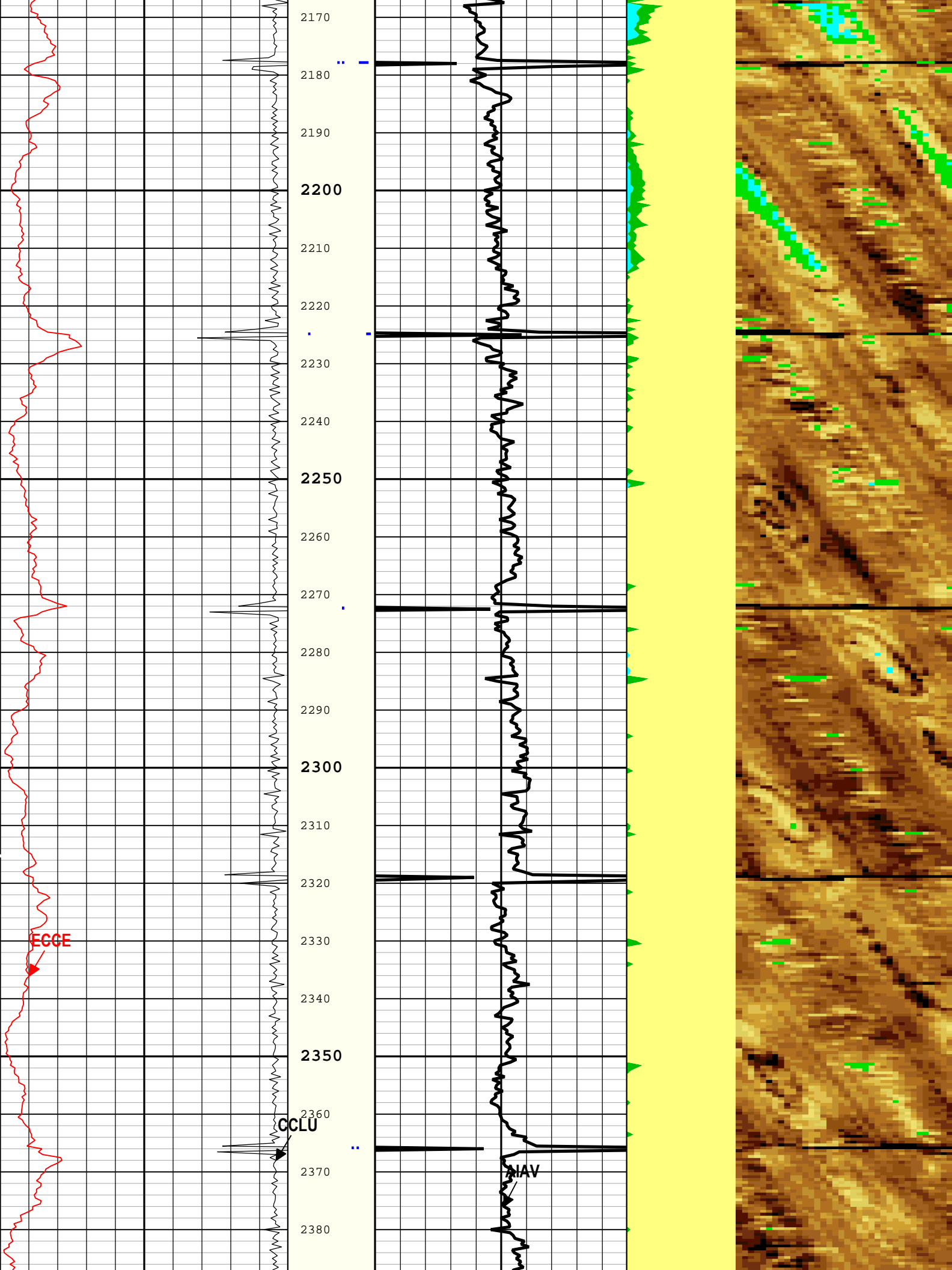
Software Version	
Acquisition System	Version
Maxwell 2017 SP3	7.3.92069.3100
Application Patch	Wireline_NPD-ICE2-2017SP3_7.3.93033

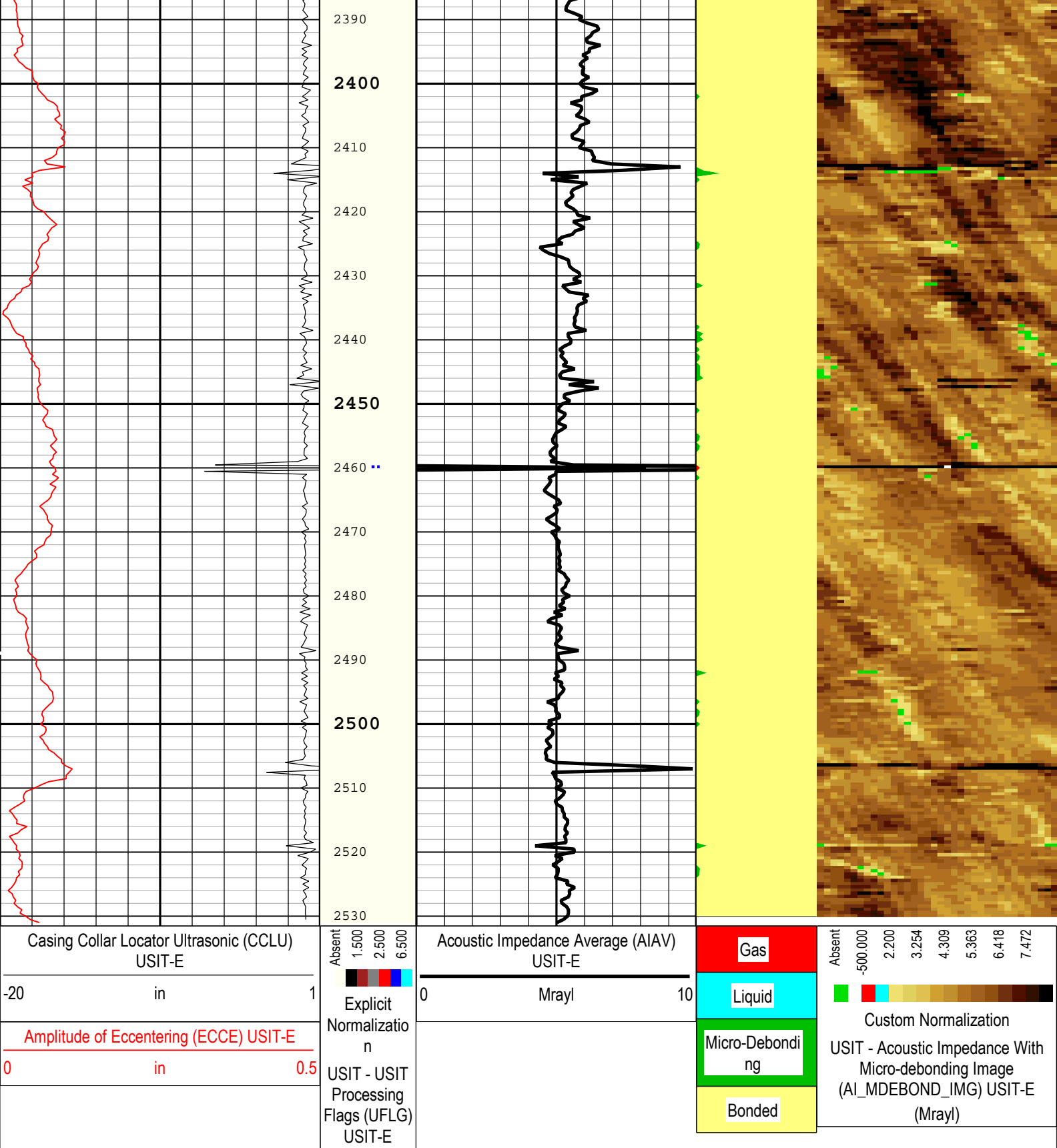
Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[2]:Up	Up	1995.70 ft	2532.33 ft	03-Feb-2018 1:51:25 PM	03-Feb-2018 1:54:56 PM	ON	4.17 ft	Yes
All depths are referenced to toolstring zero									

Log	Company:Noble Energy Inc	Well:Bison Ridge Y22-786
	ONE: Log[2]:Up:S003	

TIME_1900 - Time Marked every 60.00 (s)







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: 03-Feb-2018 15:18:03

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	
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	1.13	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	0.1	Mrayl
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	1995.5	2054
BS	8.5	2054	2531.5

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
EMXV	EMEX Voltage	USIT-E	55	V
HRES	Horizontal Resolution	USIT-E	10 deg	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
USFR	Ultrasonic Sampling Frequency	USIT-E	666667	Hz
UPAT	USIT Emission Pattern	USIT-E	Pattern 375 KHz	
UWKM	USIT Working Mode	USIT-E	Uncompressed 10 deg at 6.0 in	
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	71.88	us

XYZ

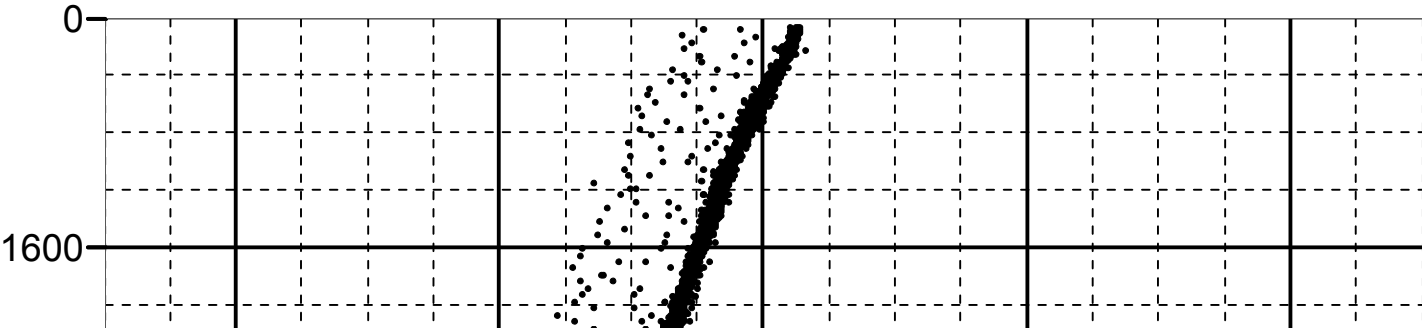
Company:Noble Energy Inc Well:Bison Ridge Y22-786
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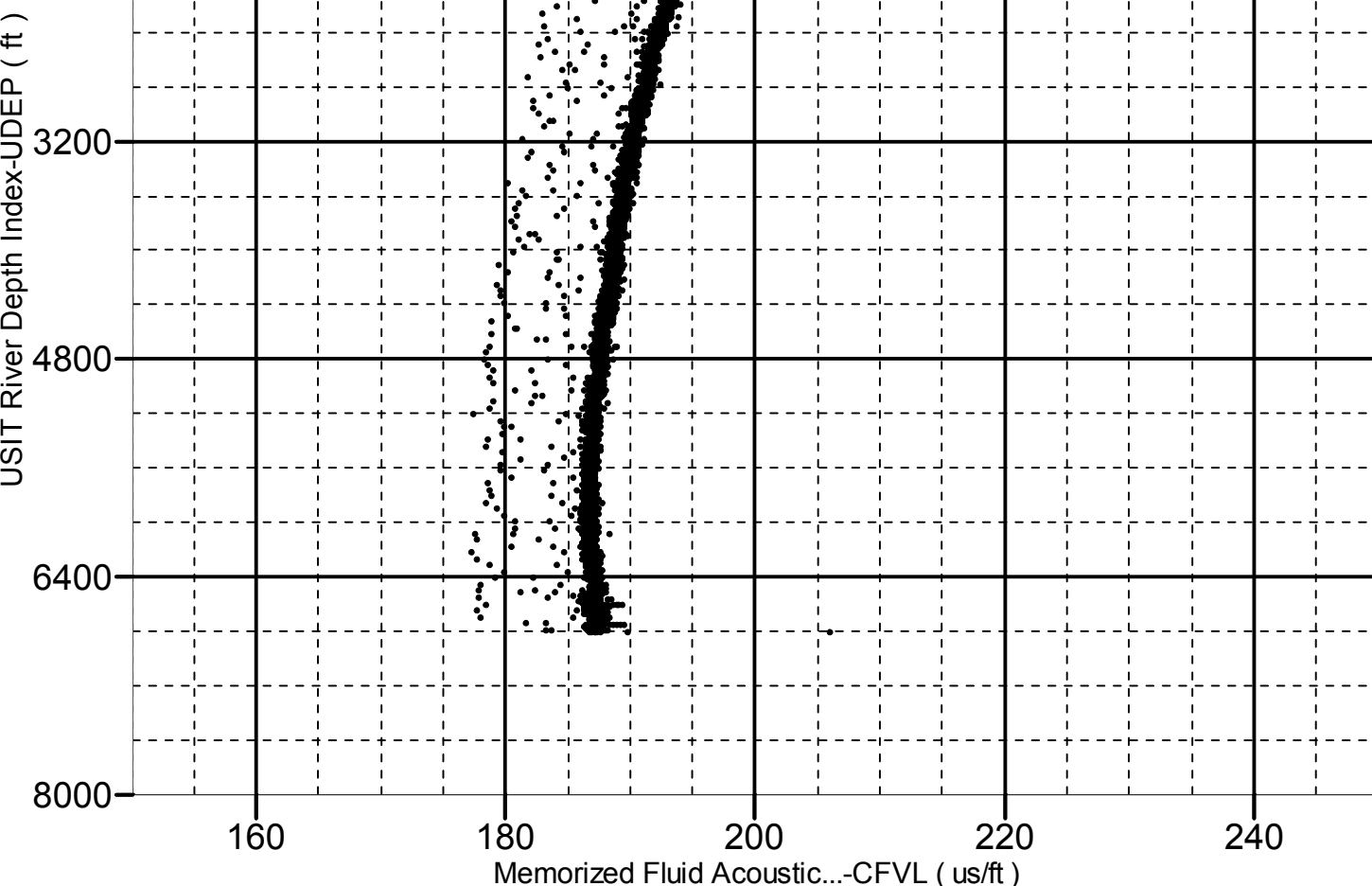
Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 6830.50 to 79.00 ft

● CFVL-UDEP





XYZ

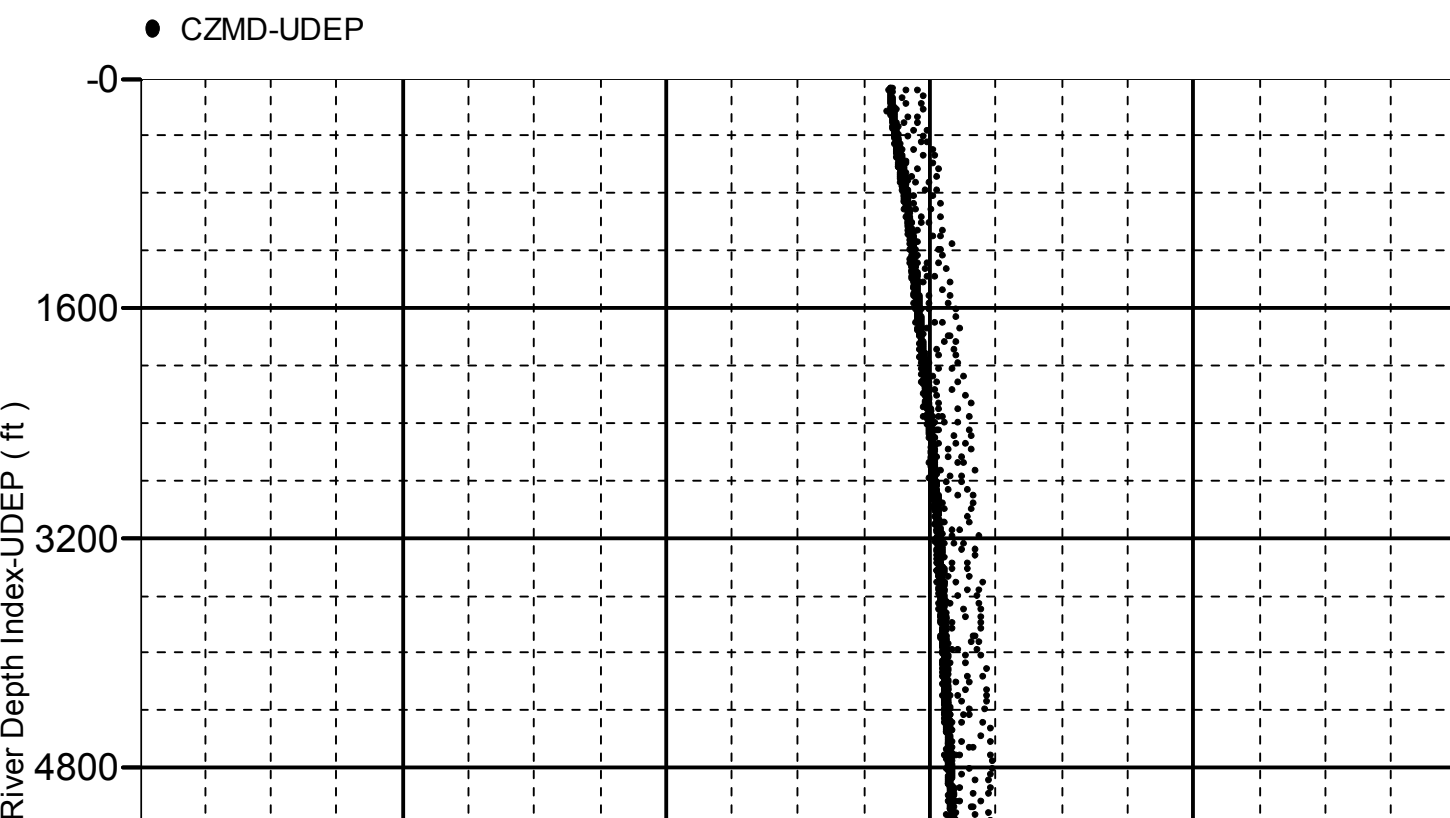
Company:Noble Energy Inc Well:Bison Ridge Y22-786

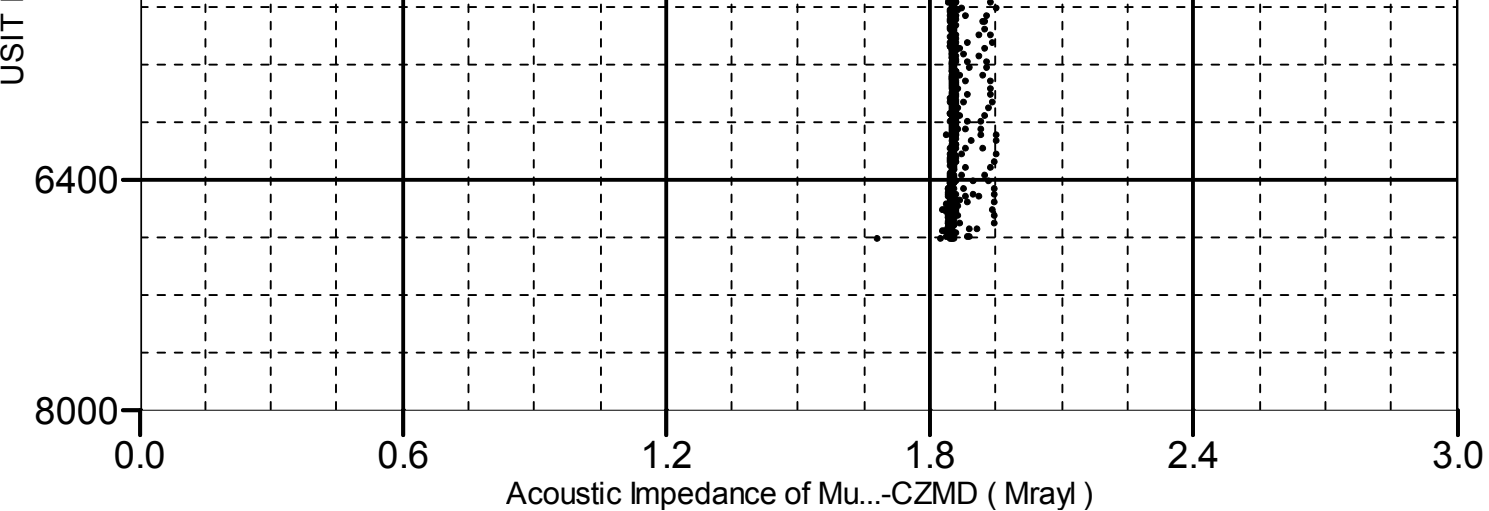
ONE: Log[4]:Up:S003

Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6830.50 to 79.00 ft





Company: Noble Energy Inc

Schlumberger

Well: Bison Ridge Y22-786

Field: Wattenberg

County:	Weld
State:	CO

UltraSonic Summary Print