

Company: Noble Energy Inc

Well: Shadow A26-646

Field: Wattenberg

County: Weld

State: Colorado

UltraSonic Summary Print

County:	Weld		
Field:	Wattenberg		
Location:	NWSE Sec 30 T6N R63W		
Well:	Shadow A26-646		
Company:	Noble Energy Inc		
Location:			
NWSE Sec 30 T6N R63W			
2257 FSL 1728 FEL			
Latitude: 40.45645 Longitude: -104.47644			
Permanent Datum:	Ground Level		
Log Measured From:	Kelly Bushing		
Drilling Measured From:	Kelly Bushing		
API Serial No.	Section:	Township:	Range:
05-123-42882	30	6N	63W

Logging Date	16-Jun-2016
Run Number	USI
Depth Driller	17659.00 ft
Schlumberger Depth	17659.00 ft
Bottom Log Interval	6650.00 ft
Top Log Interval	0.00 ft
Casing Fluid Type	Brine
Salinity	
Density	8.4 lbm/gal
Fluid Level	8.00 ft
BIT/CASING/TUBING STRING	
Bit Size	8.50 in
From	1927.00 ft
To	17659.00 ft
Casing/Tubing Size	5.5 in
Weight	20 lbm/ft
Grade	P110
From	30.00 ft
To	17643.00 ft
Max Recorded Temperatures	227 degF
Logger on Bottom	16-Jun-2016
Unit Number	2161
Recorded By	Avery Becker / Stephen Tang
Witnessed By	

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.

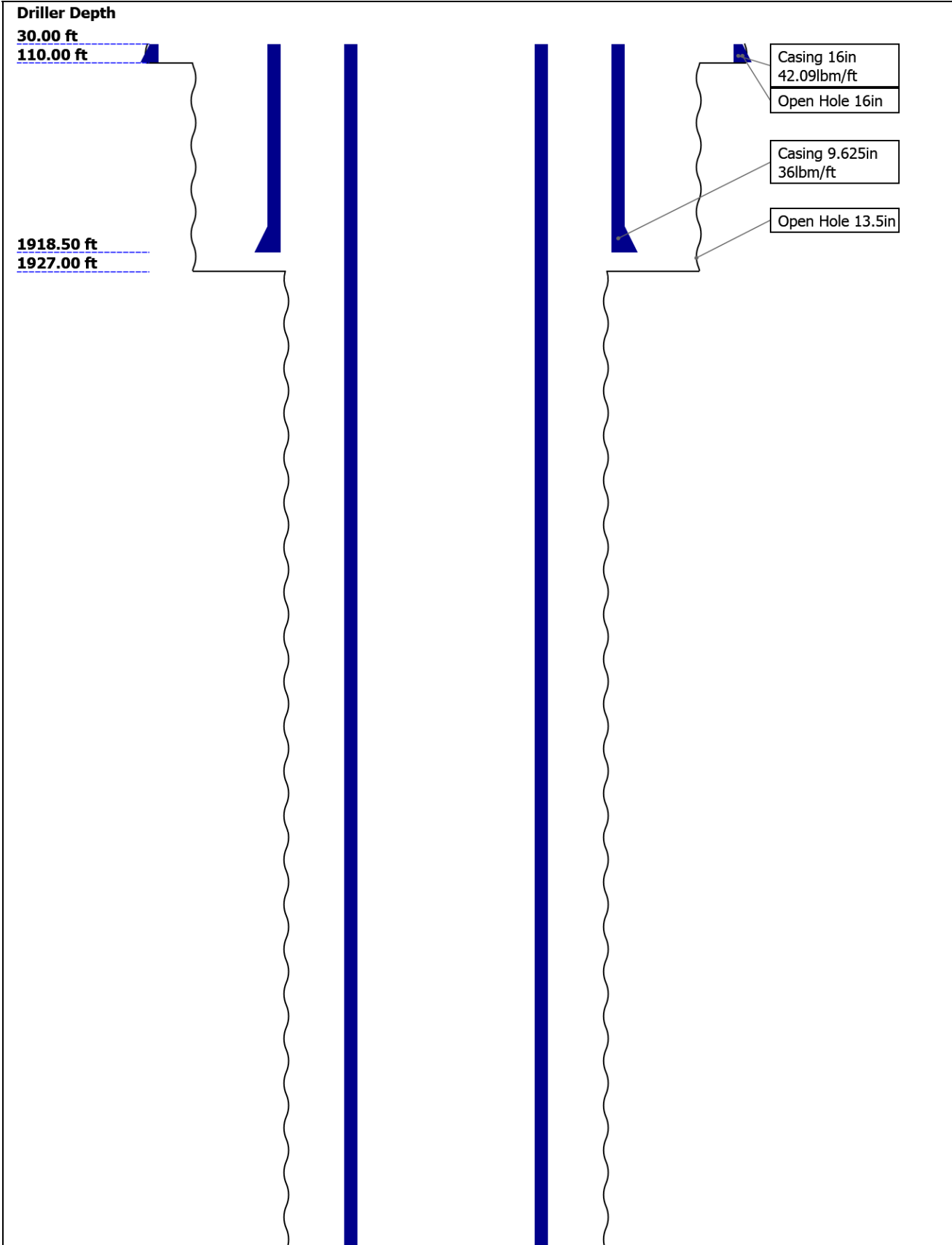
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Well Sketch



17643.00 ft

17659.00 ft

Casing 5.5in  
20lbm/ft

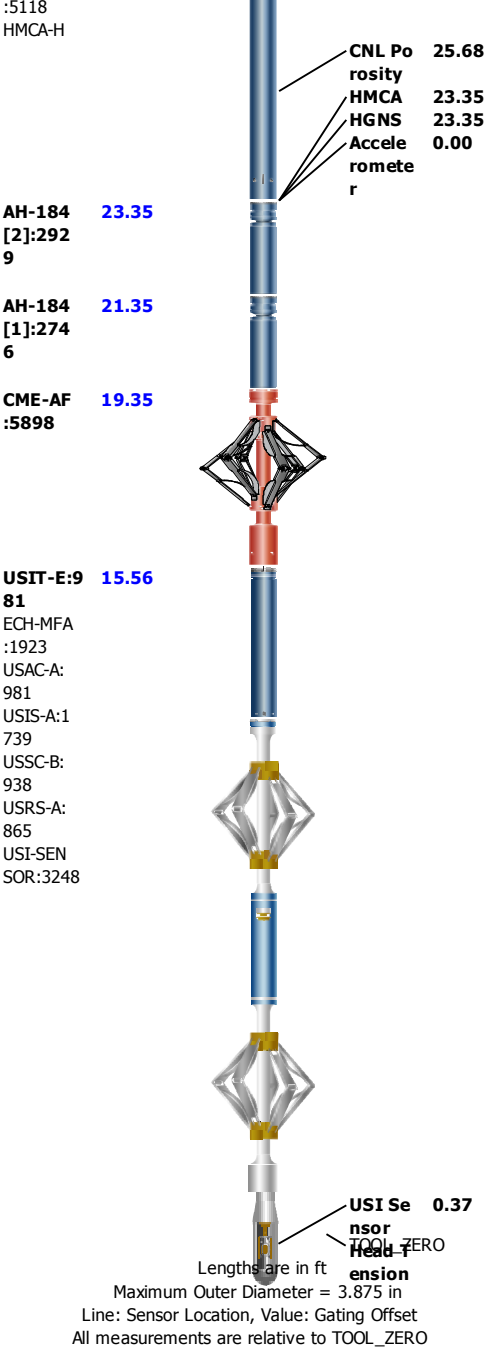
Open Hole 8.5in

Borehole Size/Casing/Tubing Record

Bit						
Bit Size ( in )	16	13.5	8.5			
Top Driller ( ft )	30	110	1927			
Top Logger ( ft )	30	110	1927			
Bottom Driller ( ft )	110	1927	17659			
Bottom Logger ( ft )	110	1927	17659			
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	N/A	P110			
Top Driller ( ft )	30	30	30			
Top Logger ( ft )	30	30	30			
Bottom Driller ( ft )	110	1918.5	17643			
Bottom Logger ( ft )	110	1918.5	17643			

Remarks and Equipment Summary

USI: Toolstring		USI: Remarks	
<div><div>Equip nameLength</div><div>LEH-QT43.53</div><div>LEH-QT</div></div> <div><div>SAH-F:140.61</div><div>817</div></div> <div><div>DTC-H:835.76</div><div>803</div><div>ECH-KC:10354</div><div>DTC-H:8803</div><div>HGNS-H:2987</div><div>HGNH:4736</div><div>NSR-F:5069</div><div>NPV-N</div><div>HGNS-H:2987</div><div>HACCZ-H</div></div> <div><div>CTEM34.86</div><div>HV0.00</div><div>TelStatus32.76</div><div>ToolStatus32.76</div><div>Temperature32.73</div><div>GR32.02</div></div>		This is the first run in hole.	
		Tool ran as per tool sketch.	
		CSG: 5.5" 20lb/ft	
		Cement: no cement data provided by client.	
		Logs recorded at 10 deg 6"	
		Main pass recorded at 2500psi, repeat pass at 0psi.	



Depth Summary			
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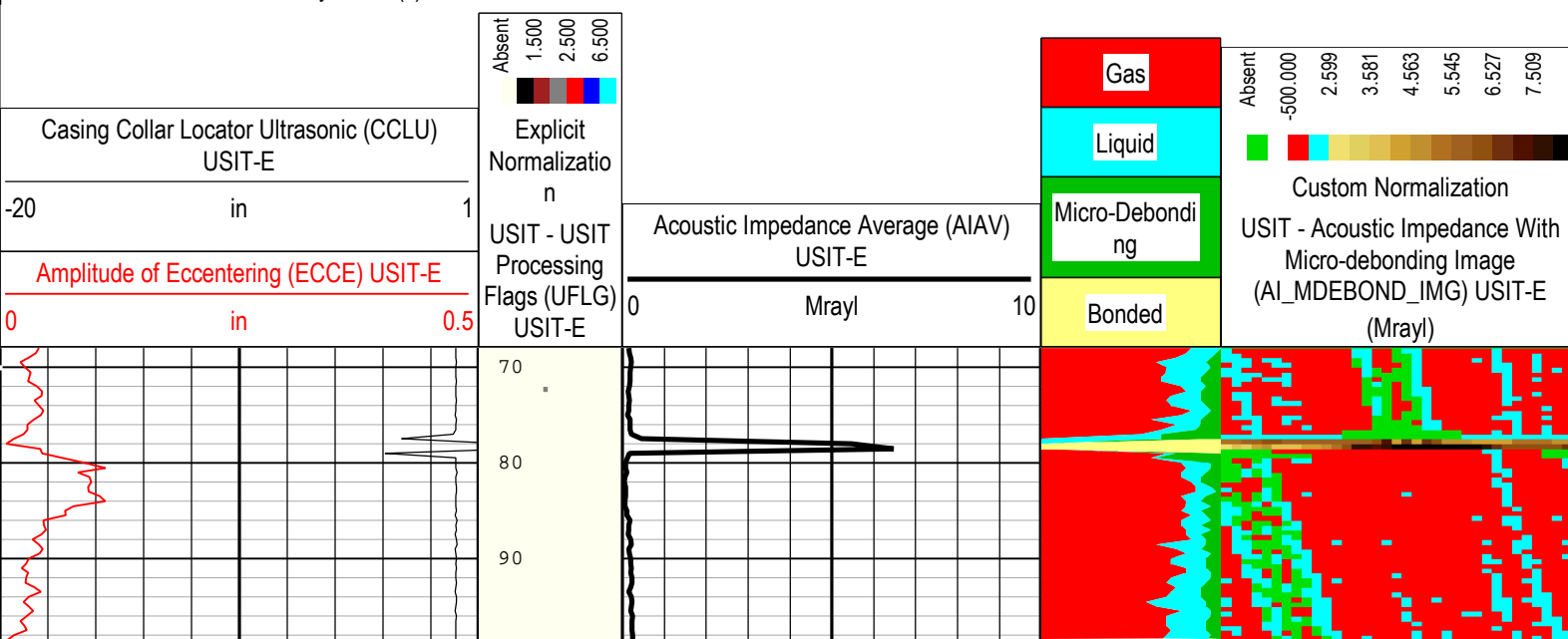
	USI		
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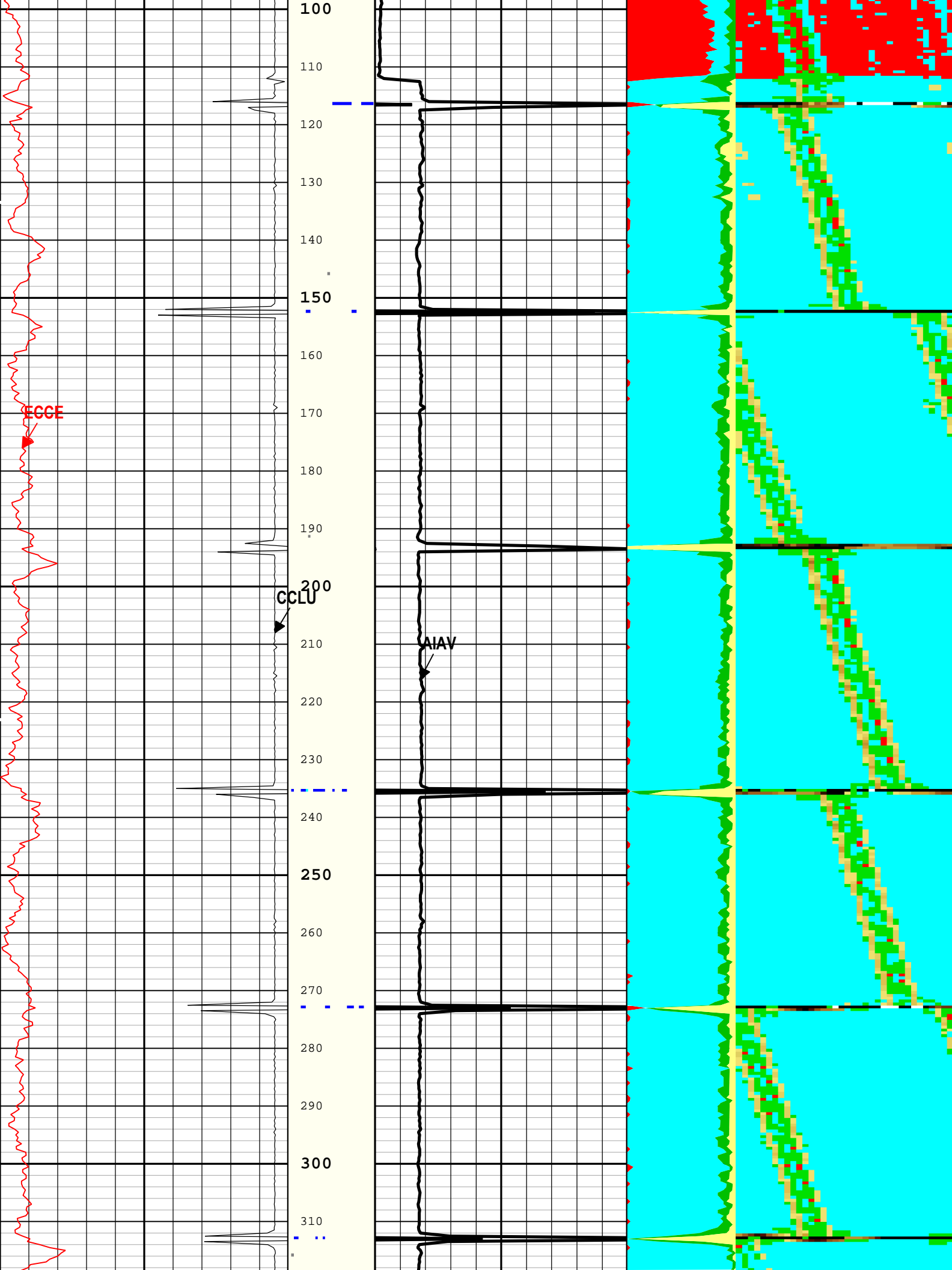
Depth Measuring Device			
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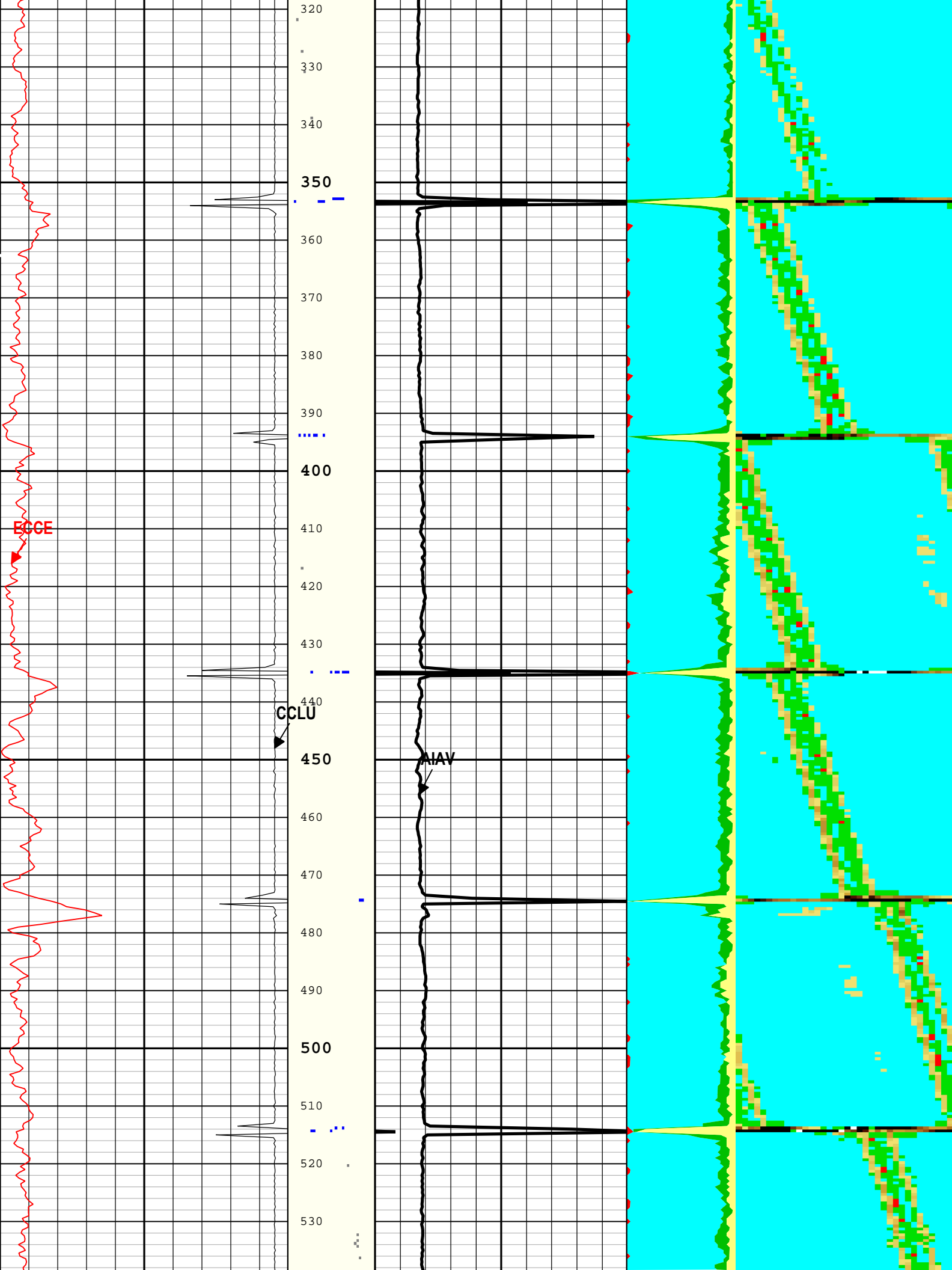
Type	IDW-JA		
Serial Number	5896		
Calibration Date			
Calibrator Serial Number	16		
Calibration Cable Type	7-46 PLX		
Wheel Correction 1	-1		
Wheel Correction 2	-3		

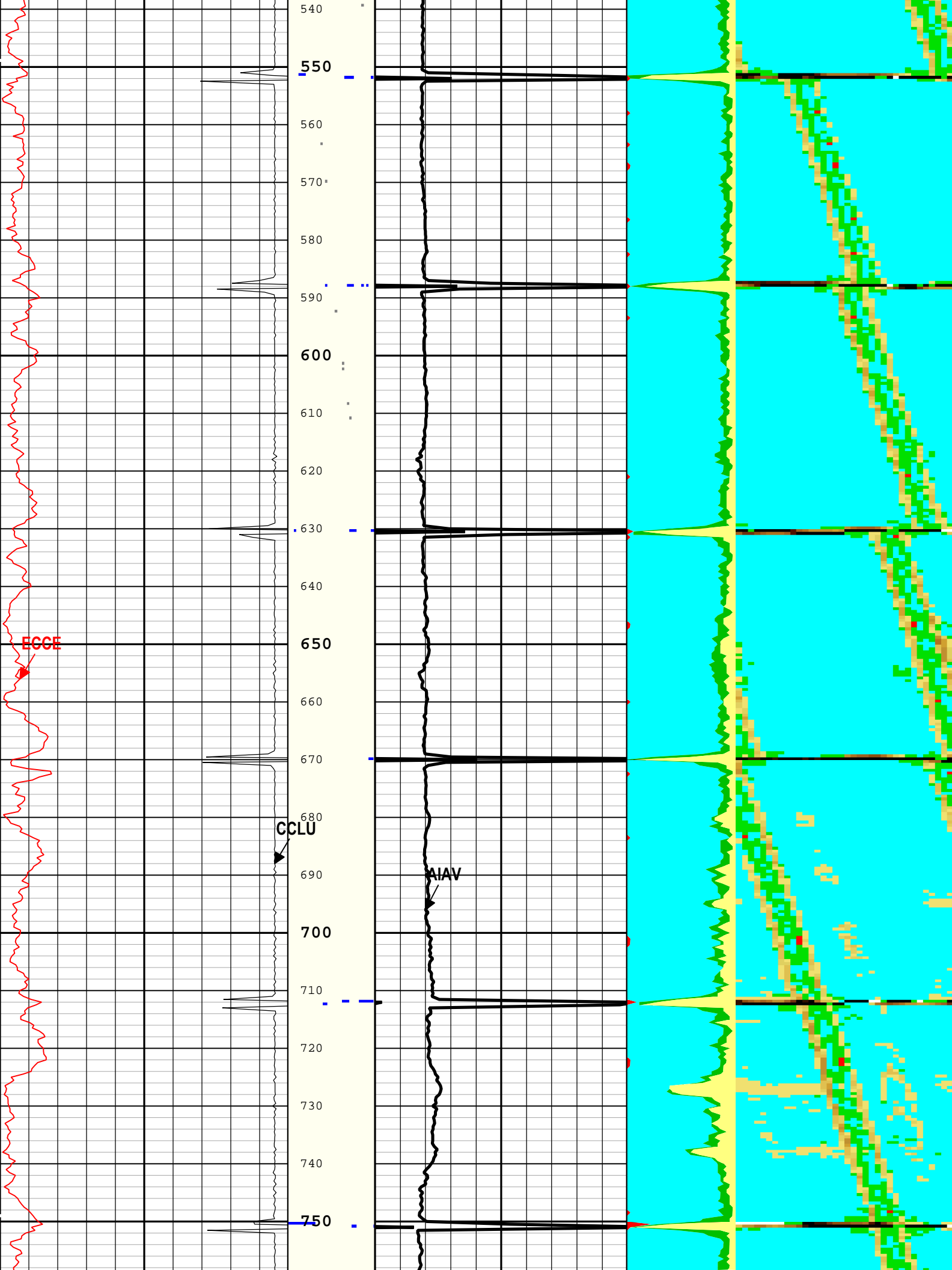
Tension Device			
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Type	CMTD-B/A		
Serial Number	1109		
Calibration Date	13-Apr-2016		
Calibrator Serial Number	441435A		

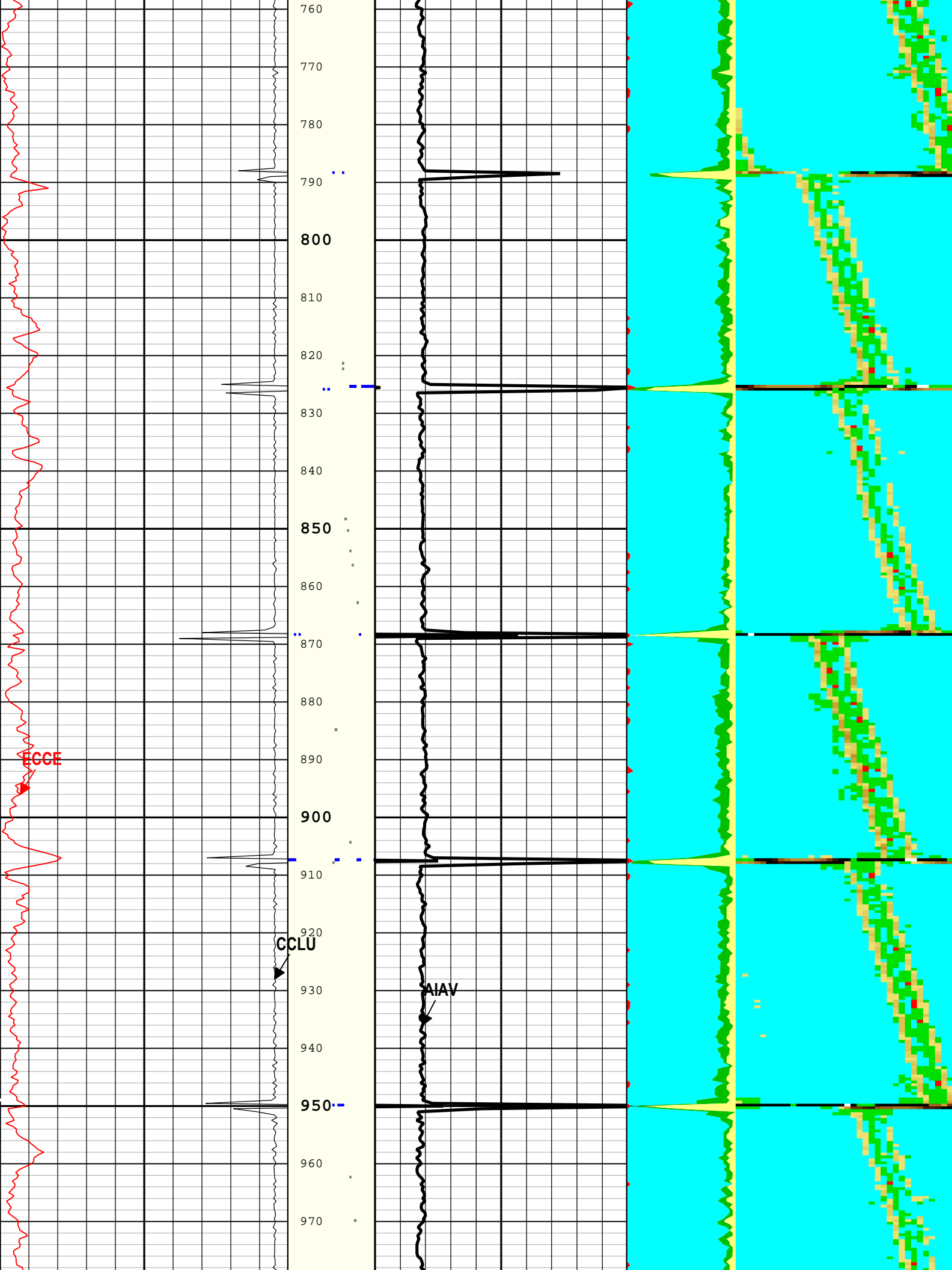


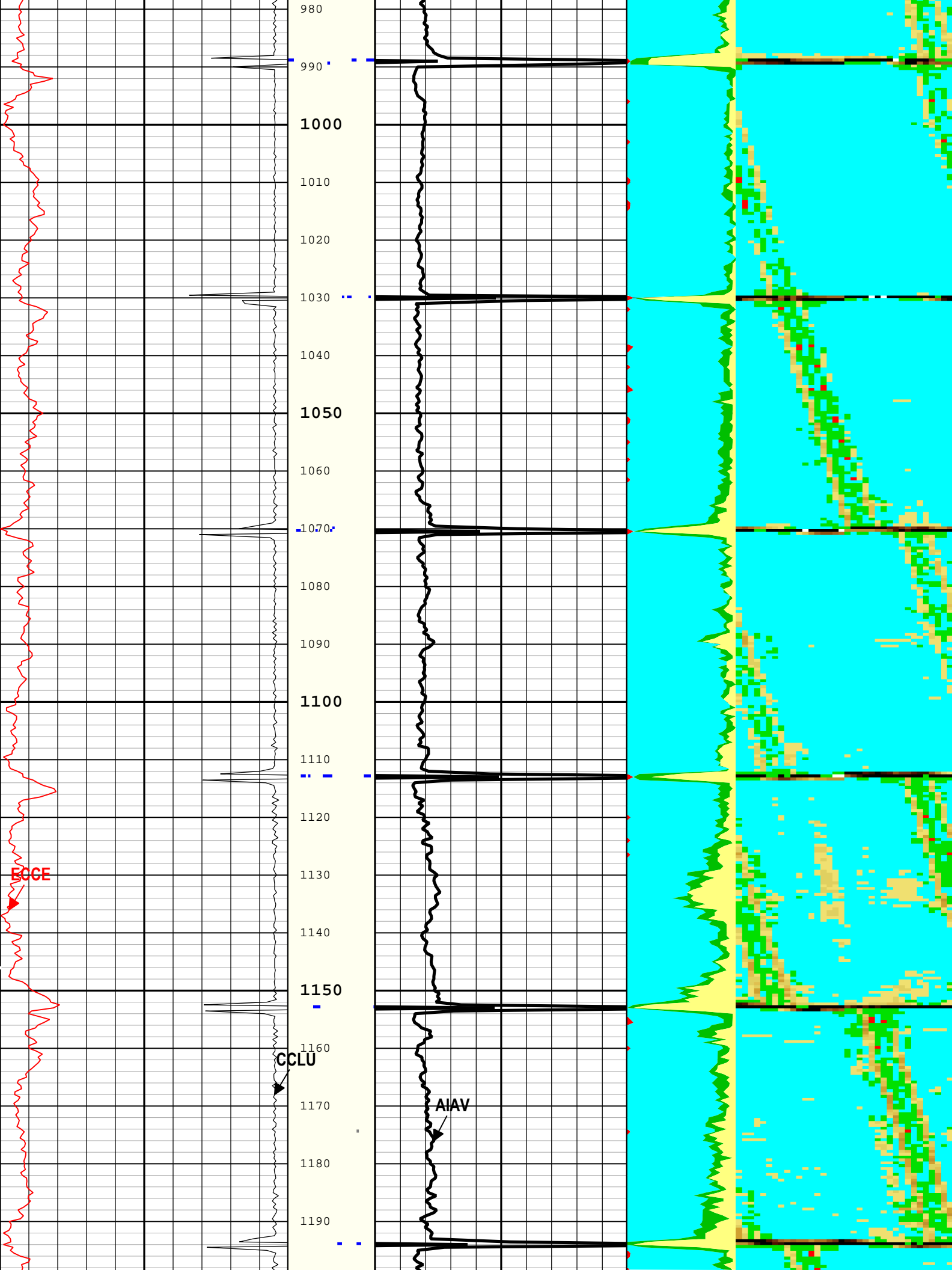


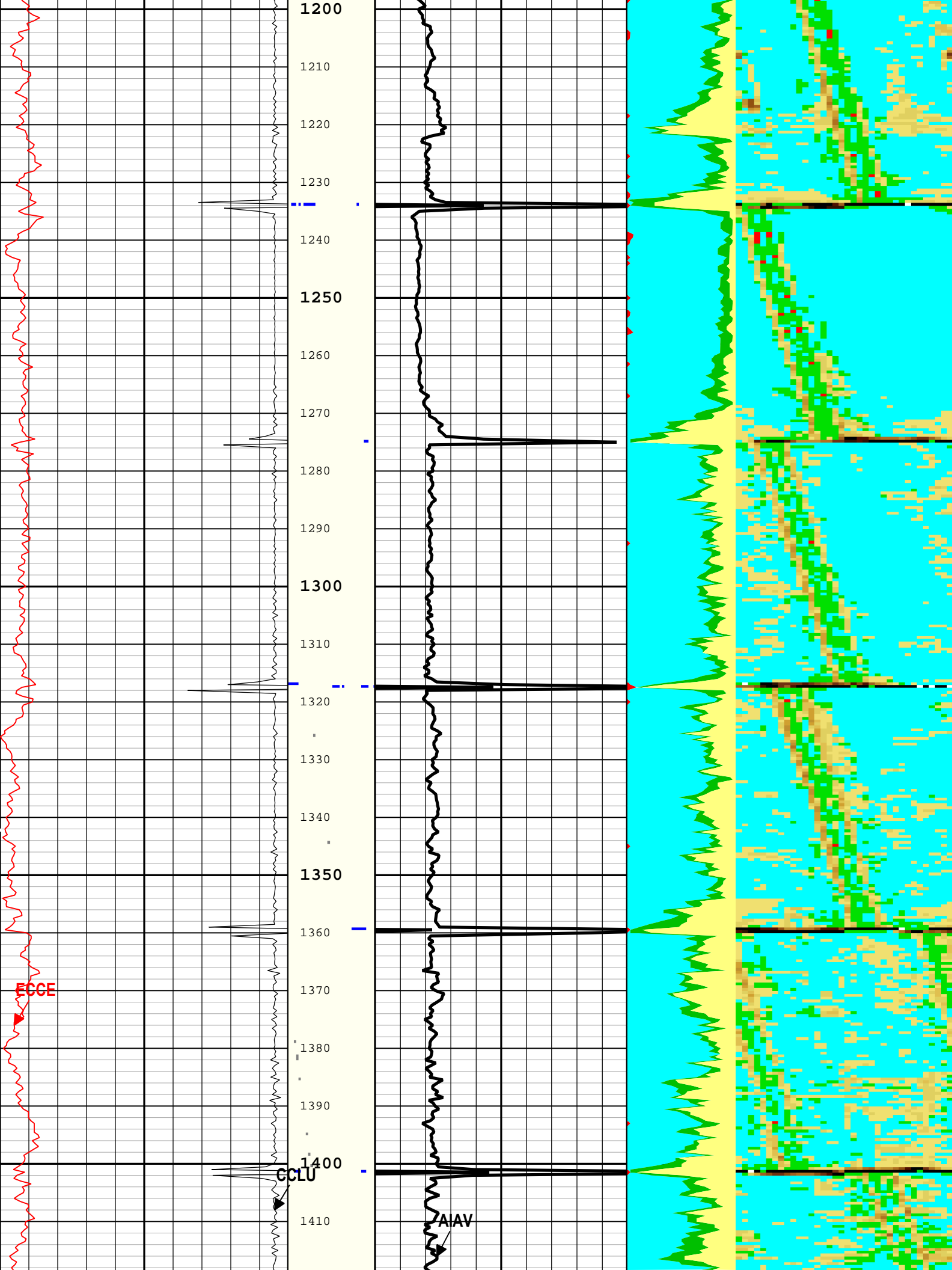


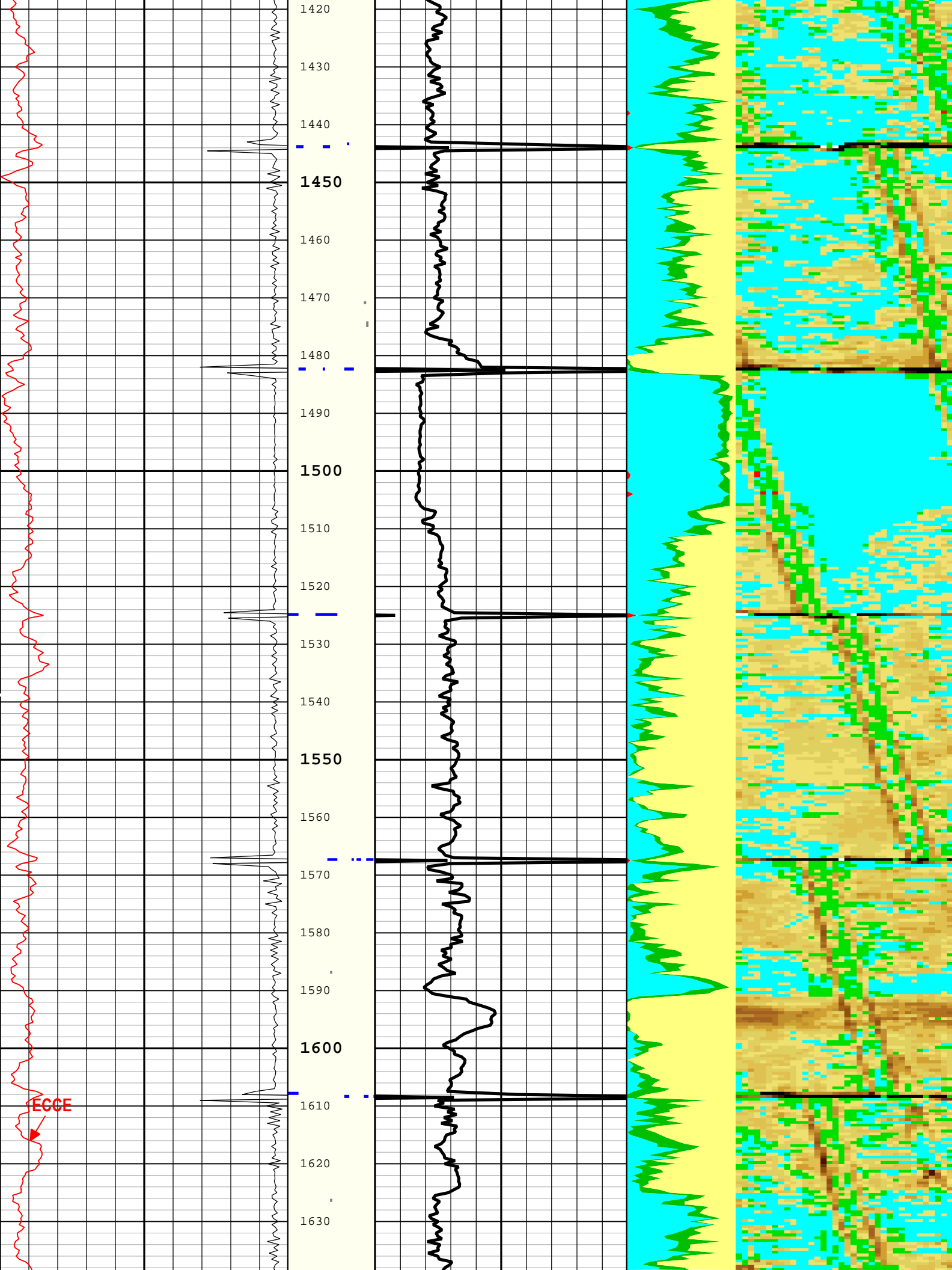


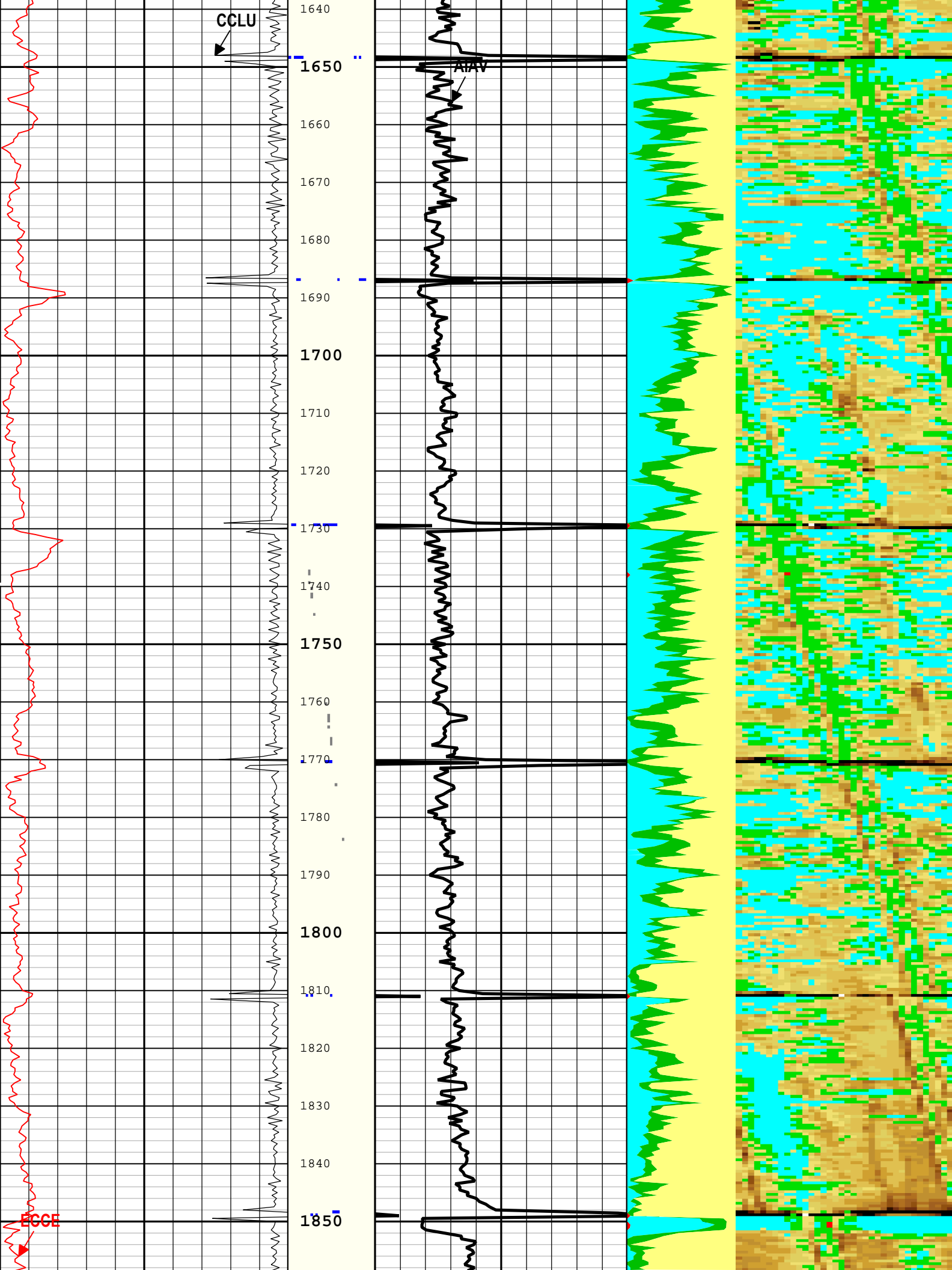


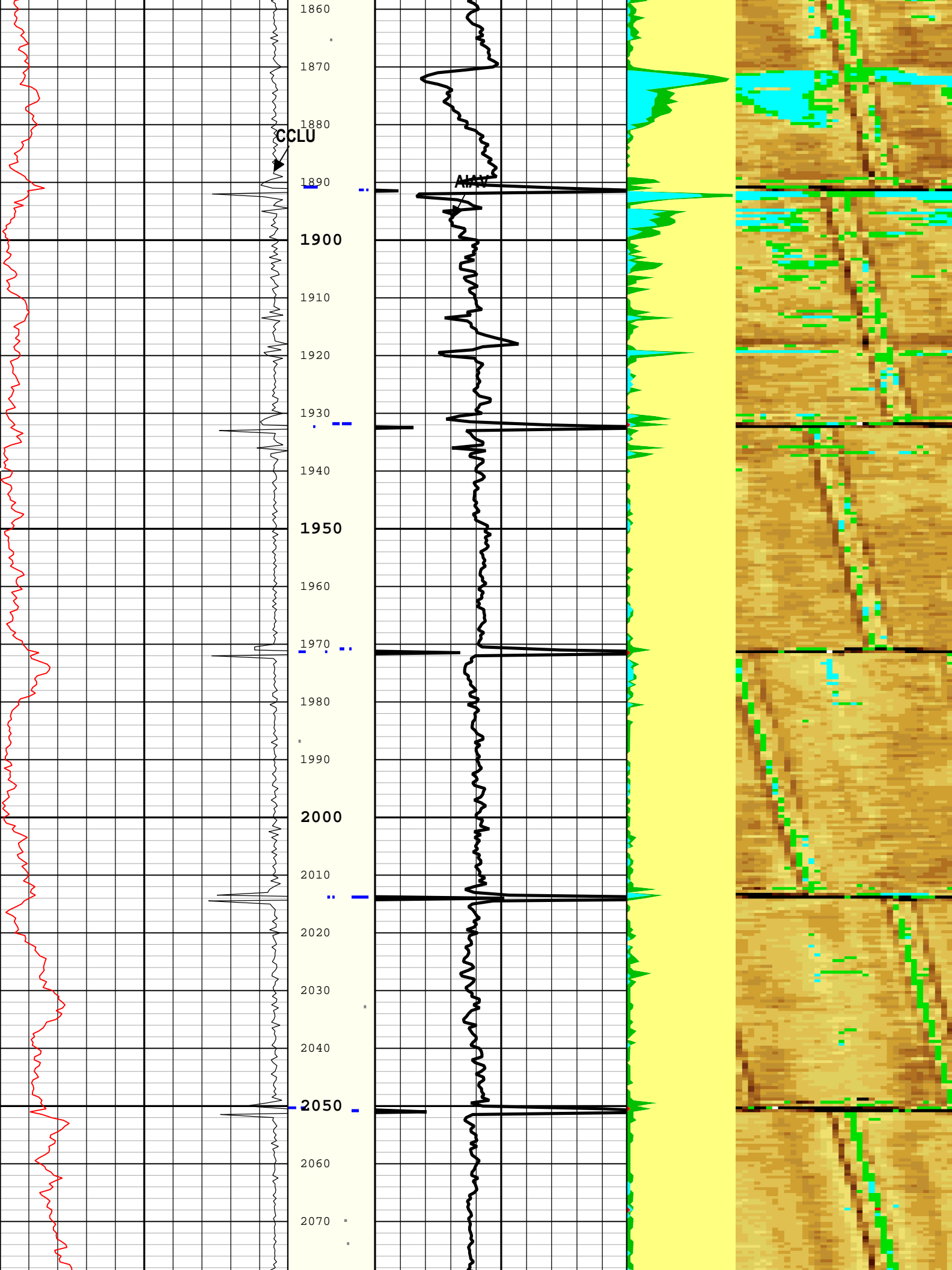


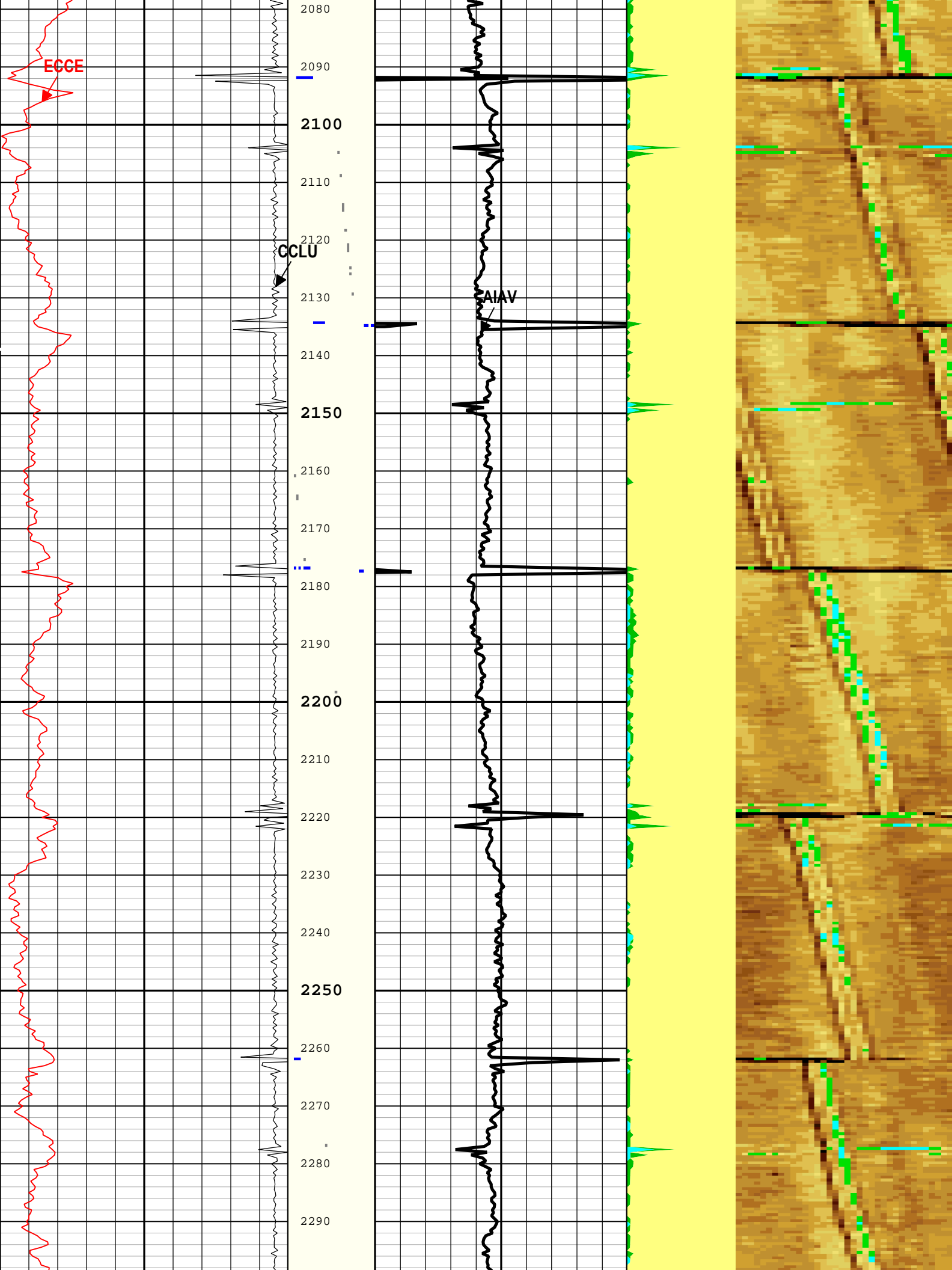


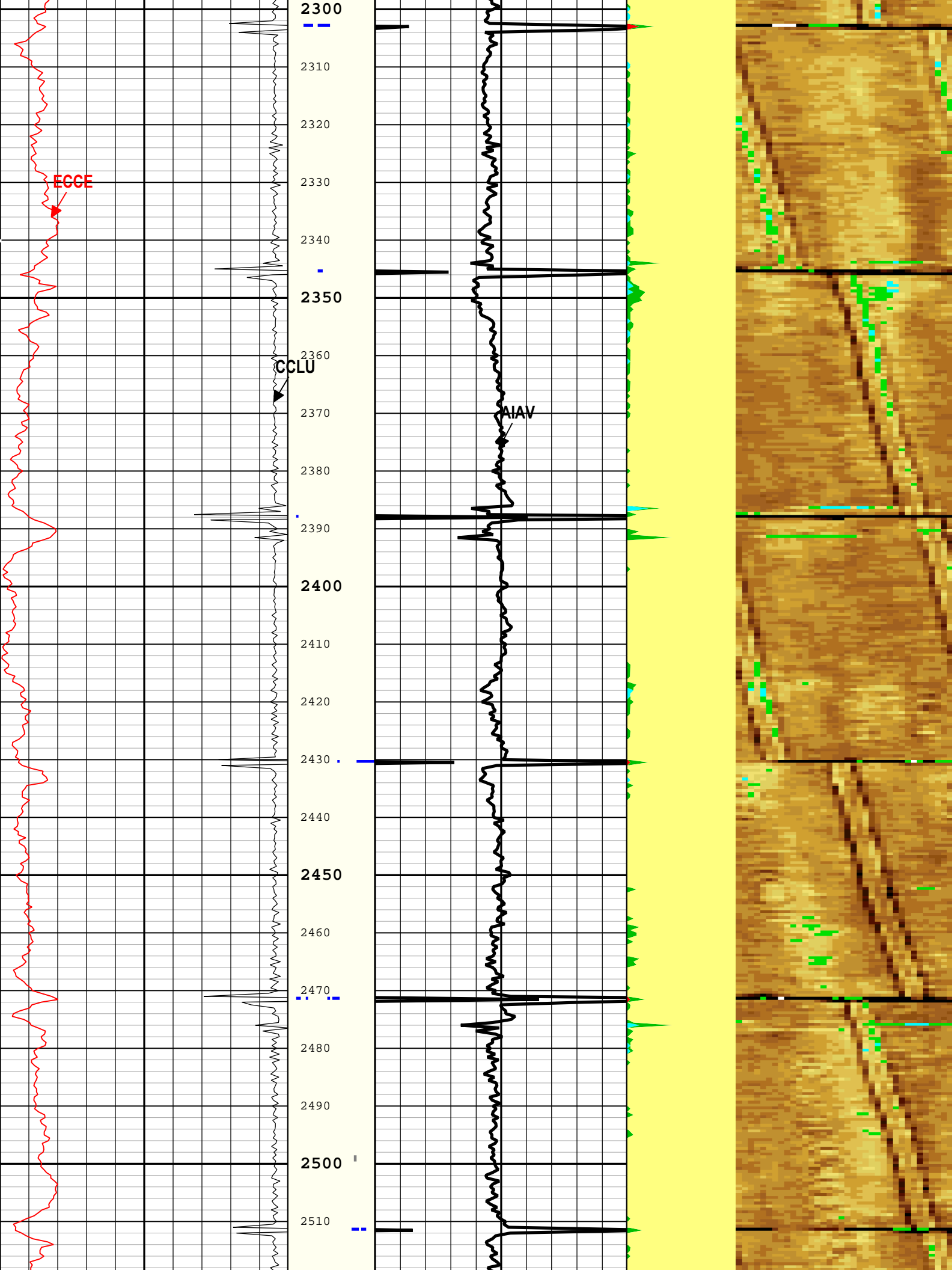




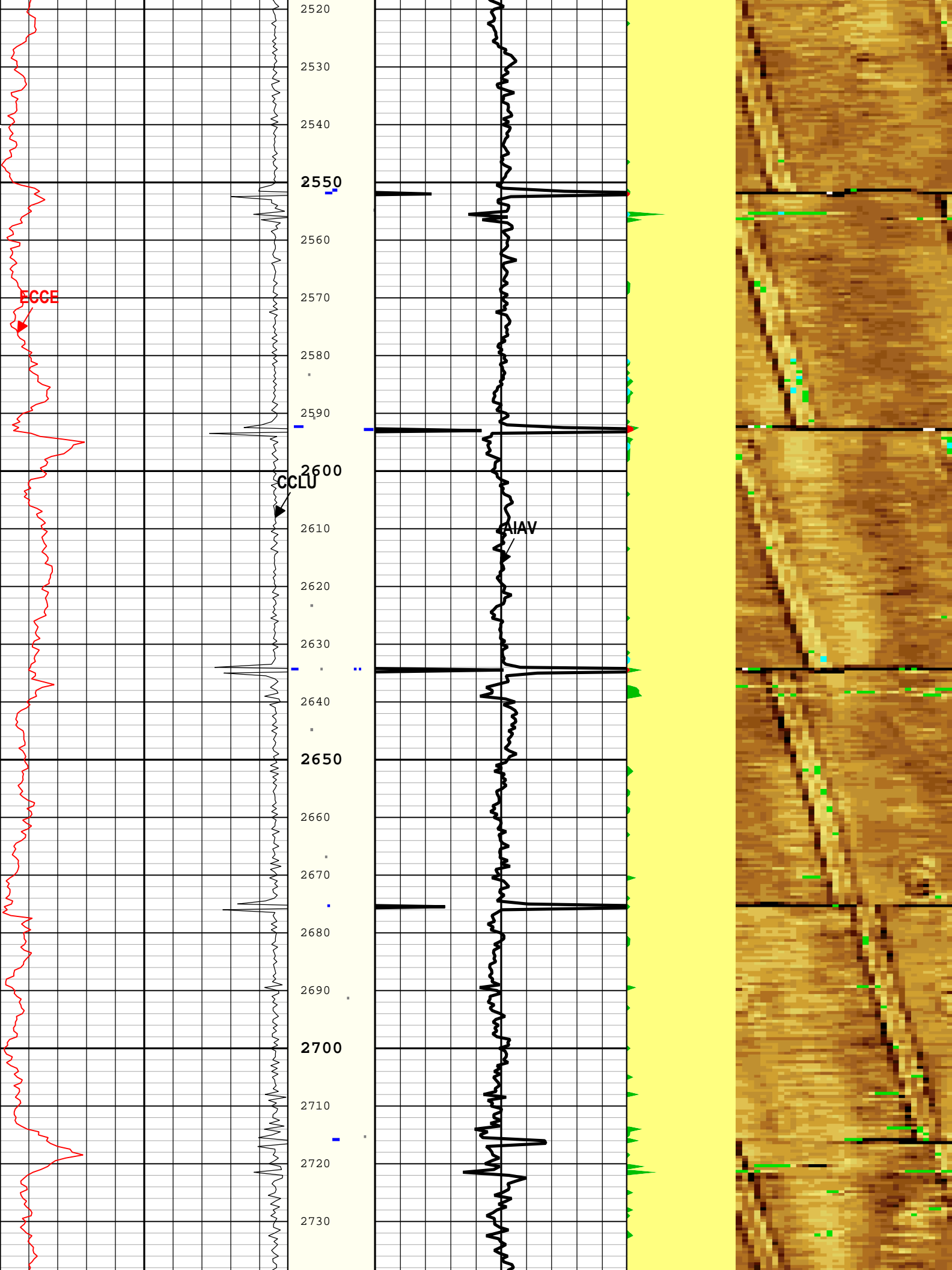


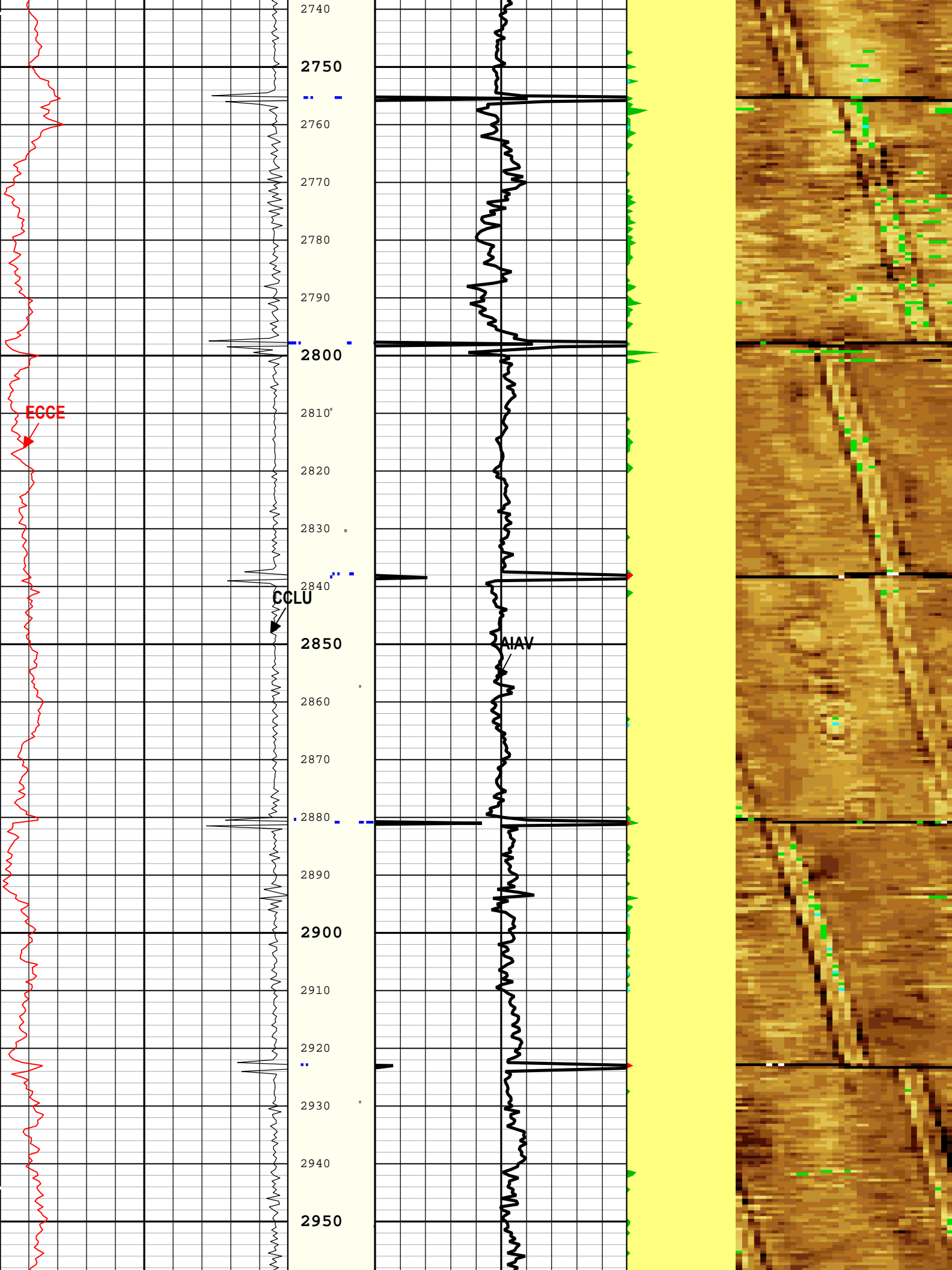


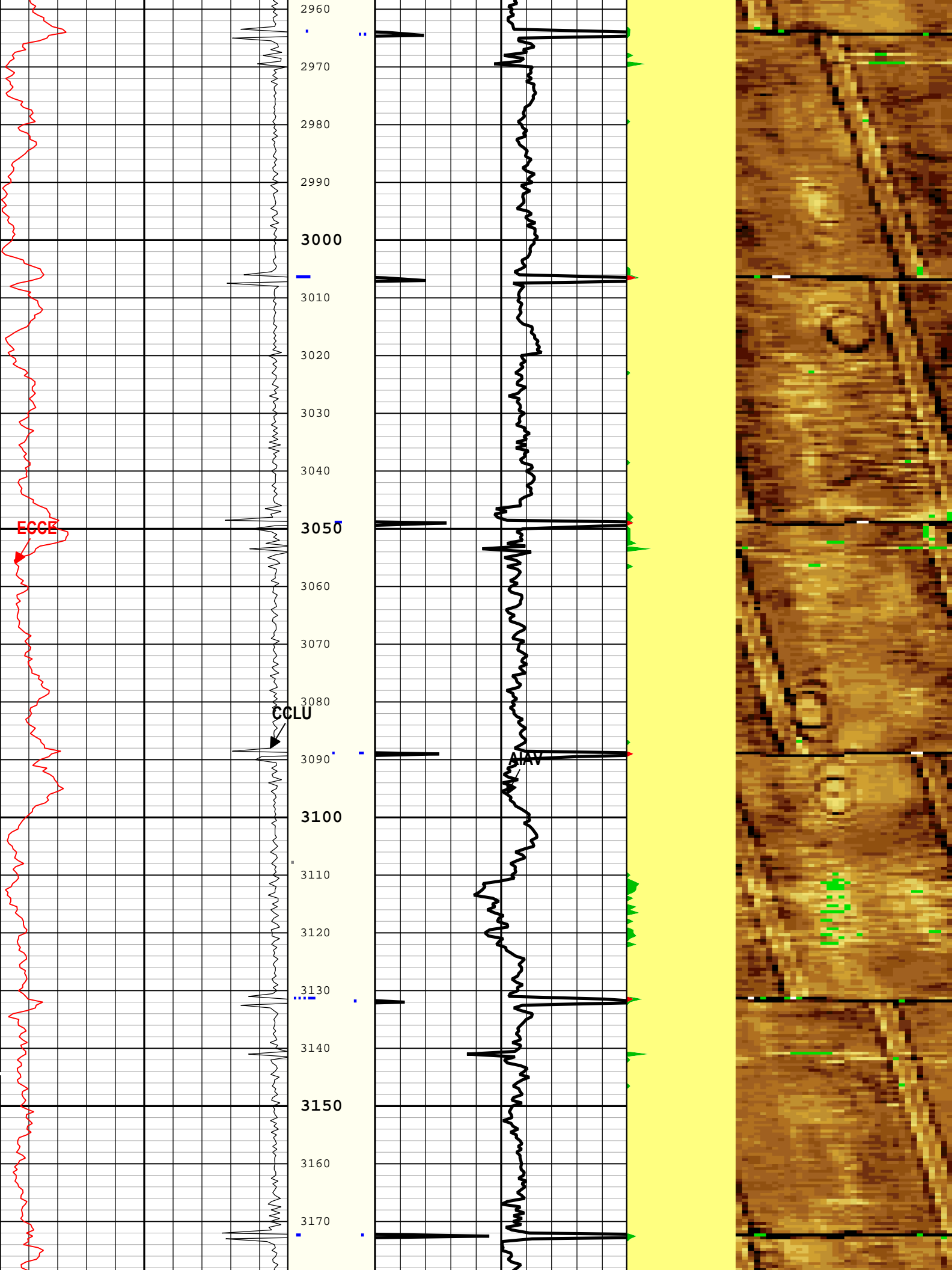


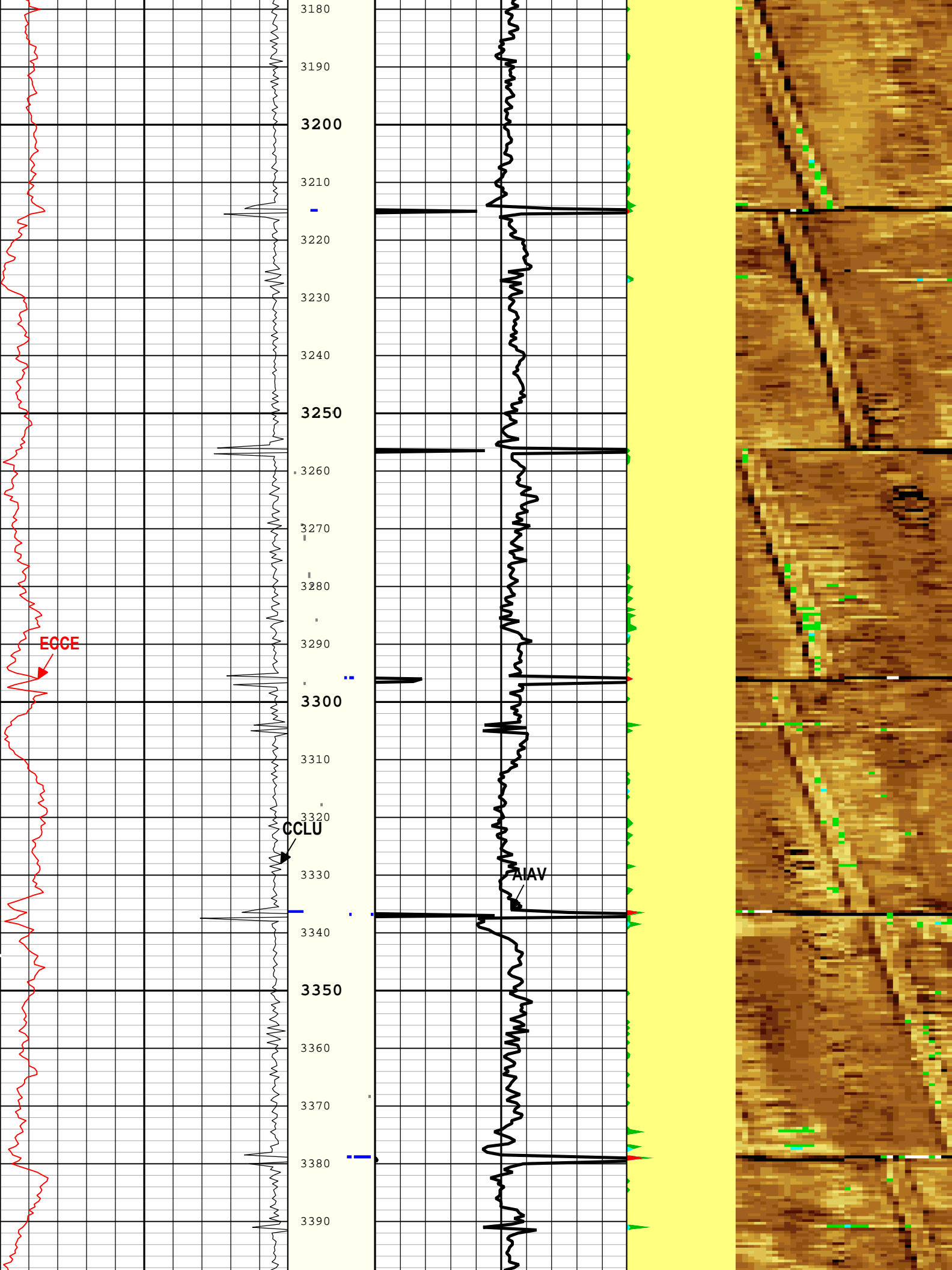


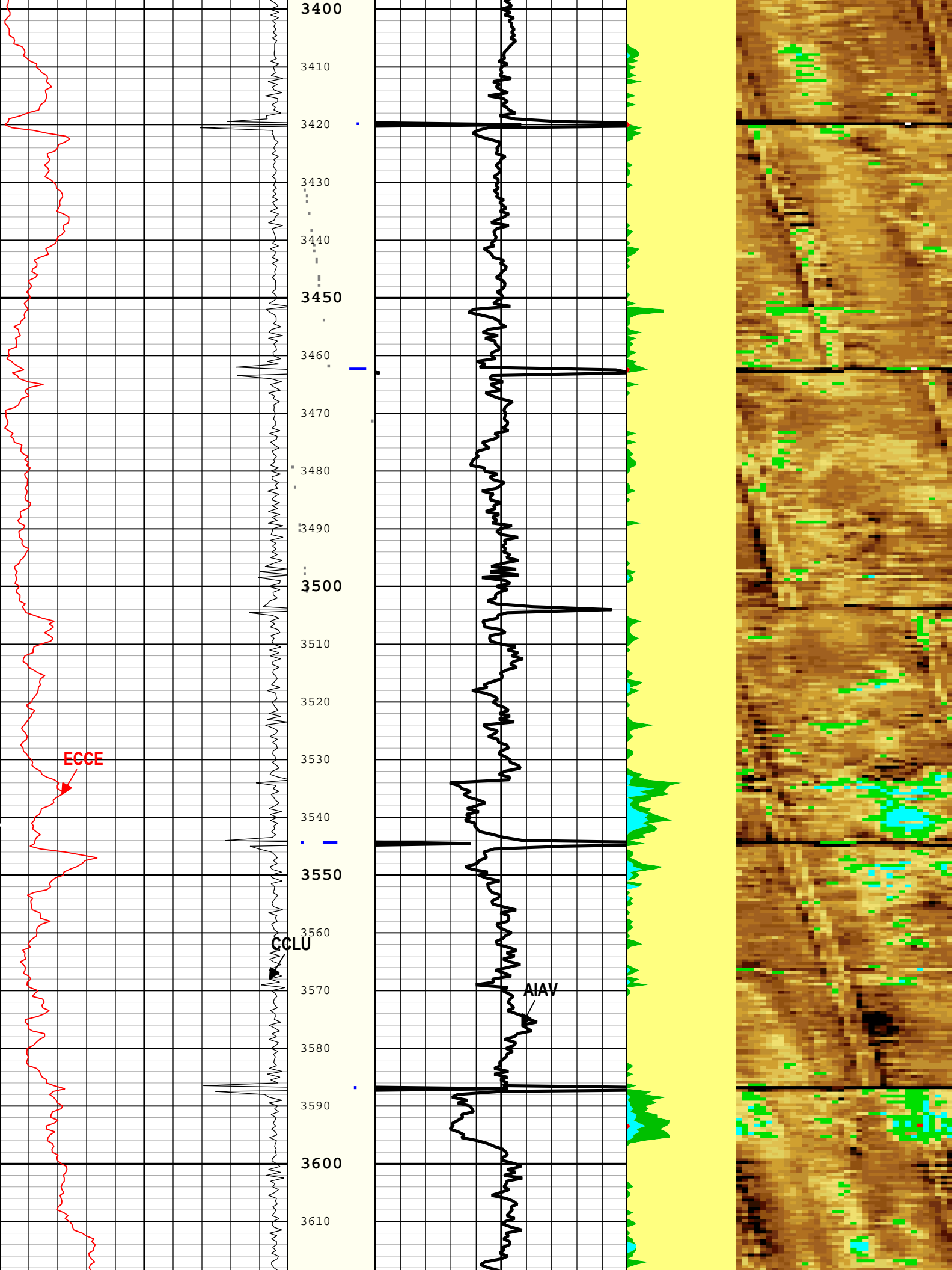


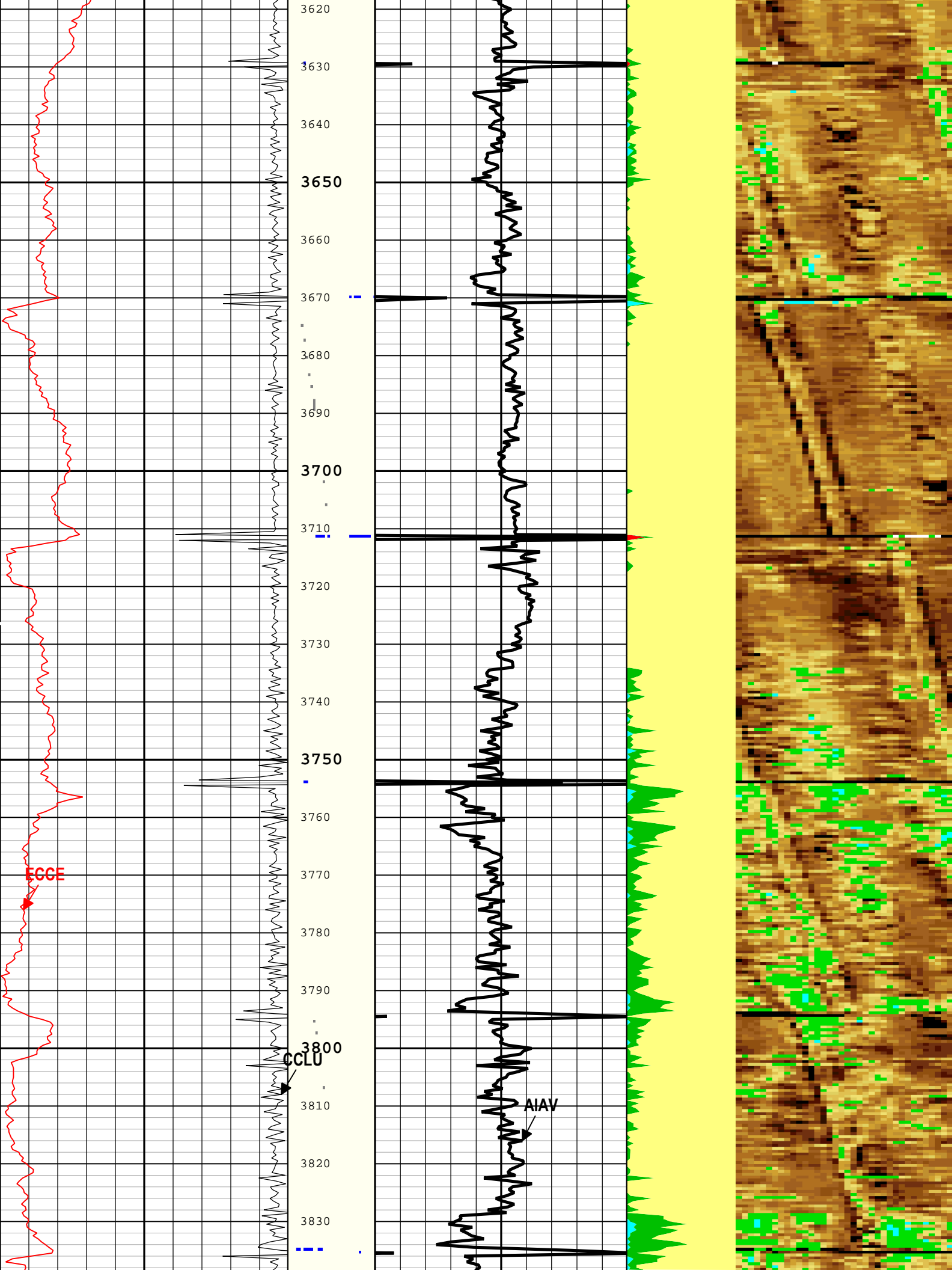


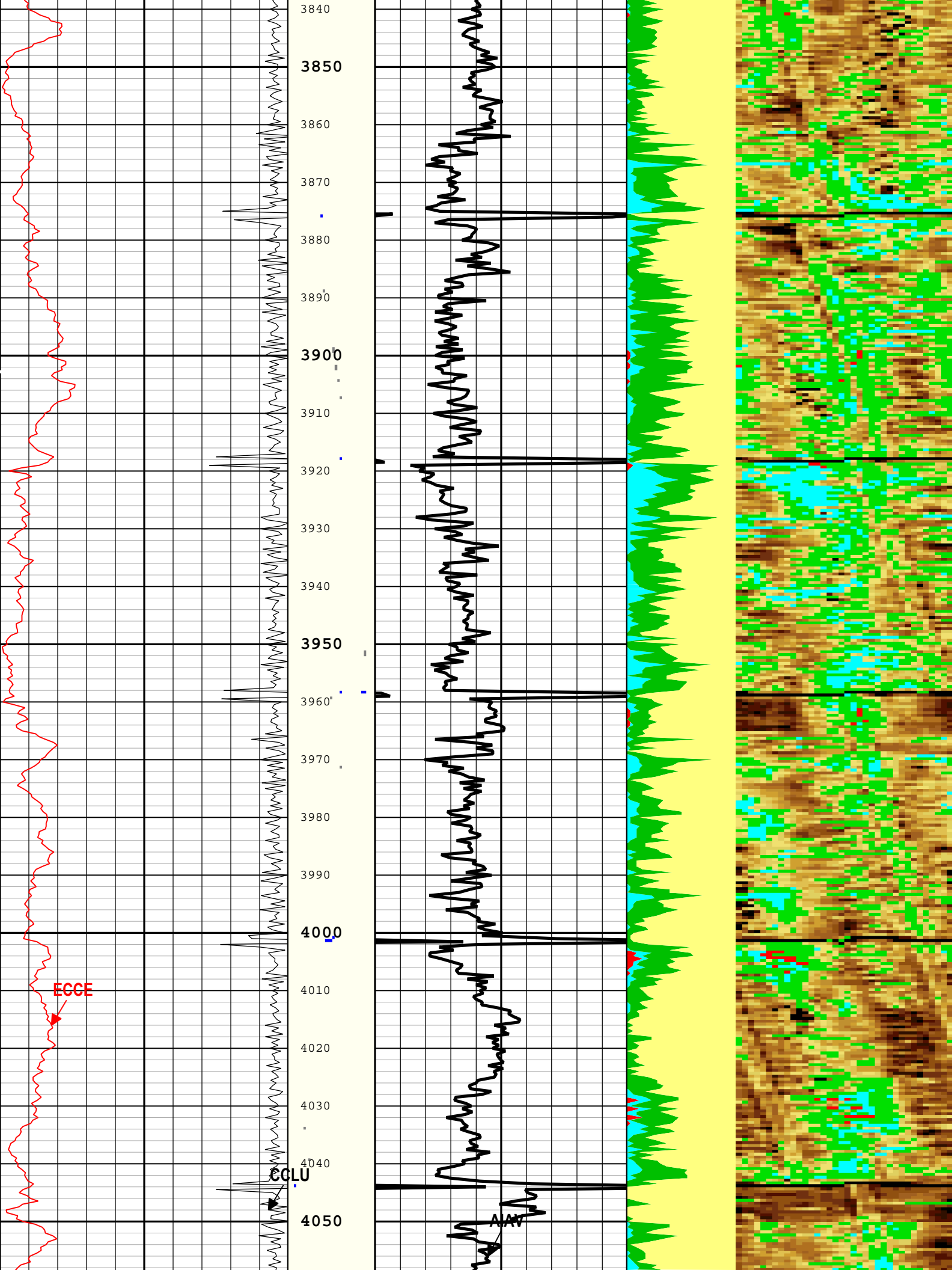


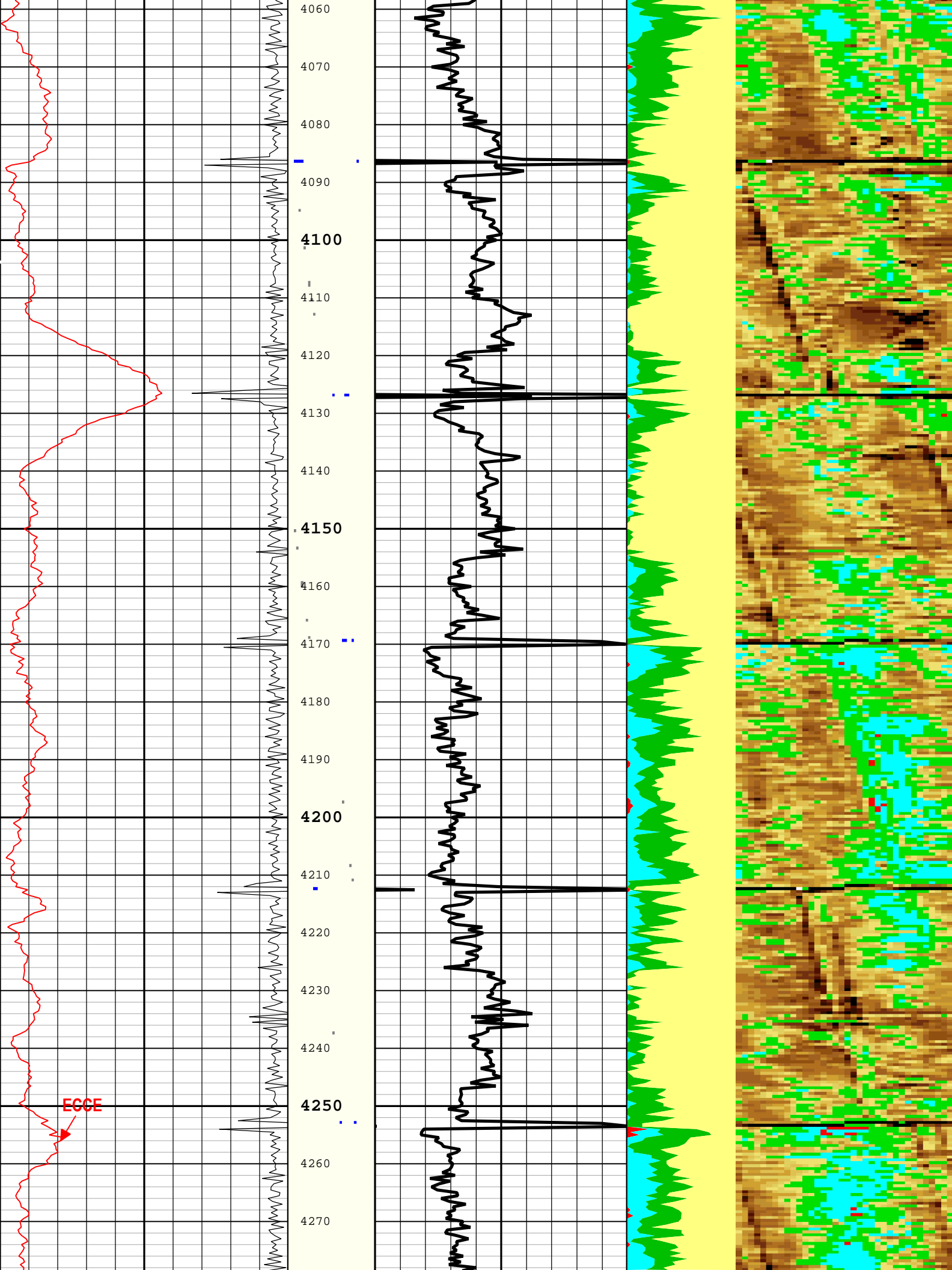




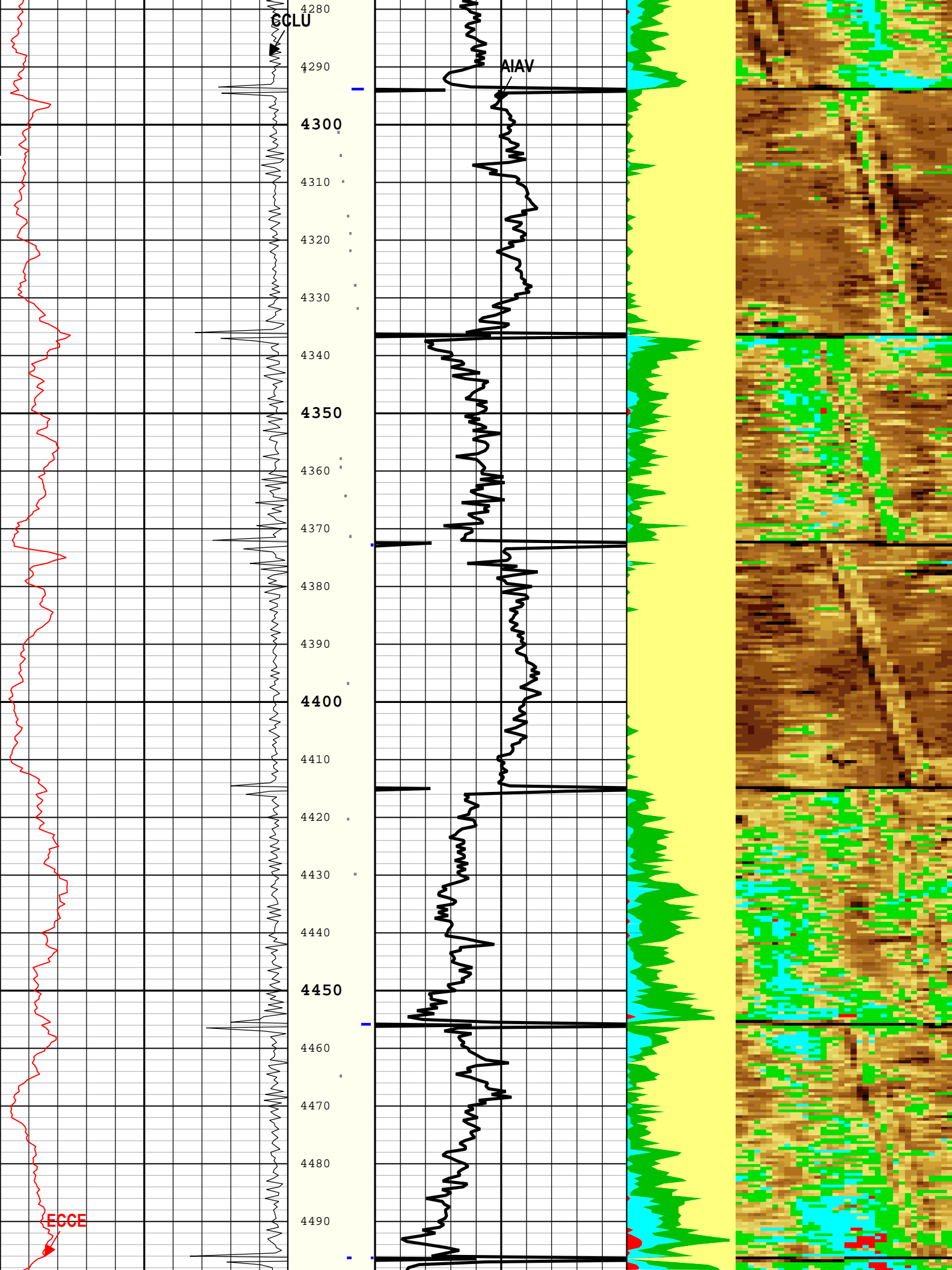


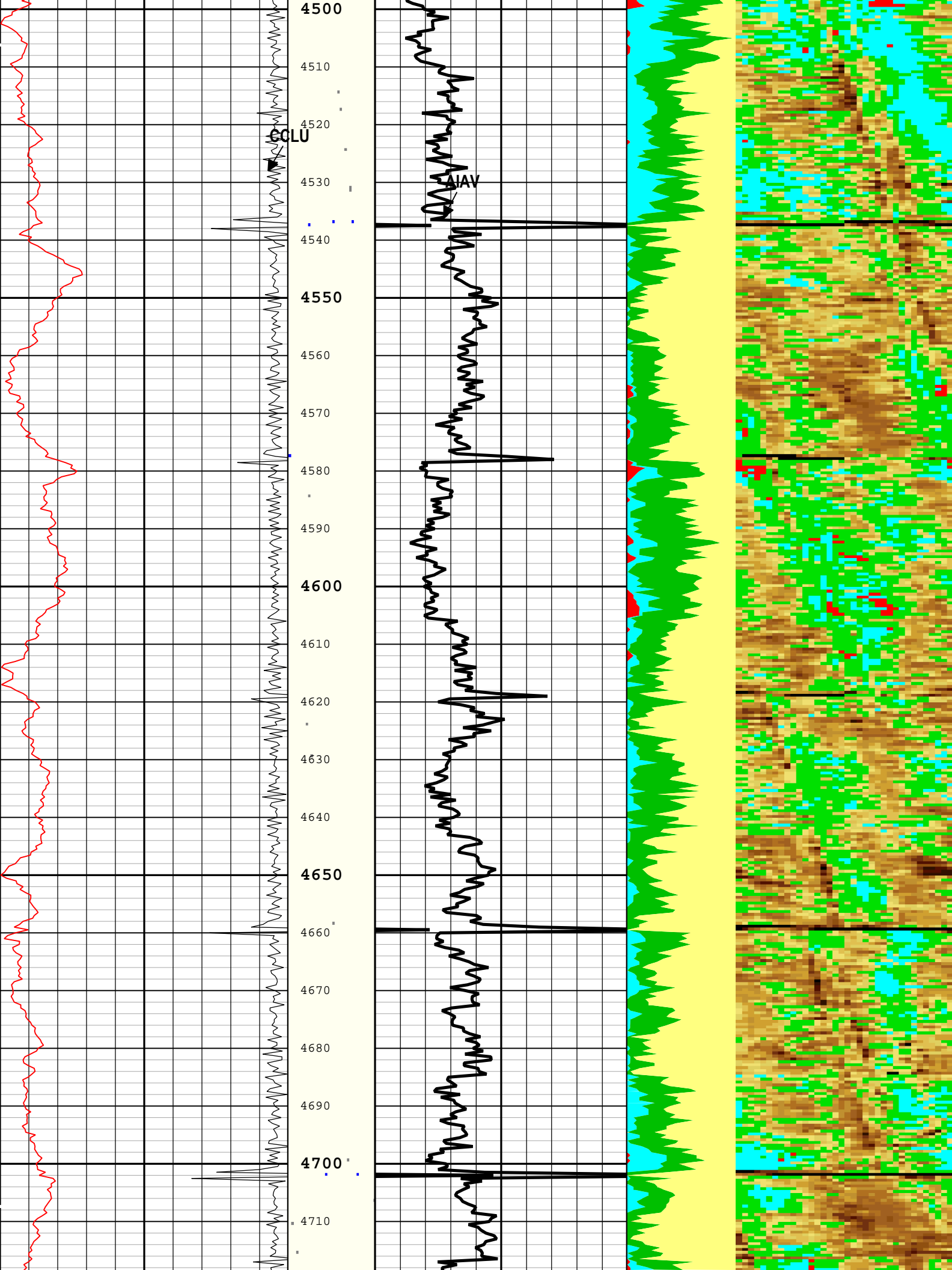


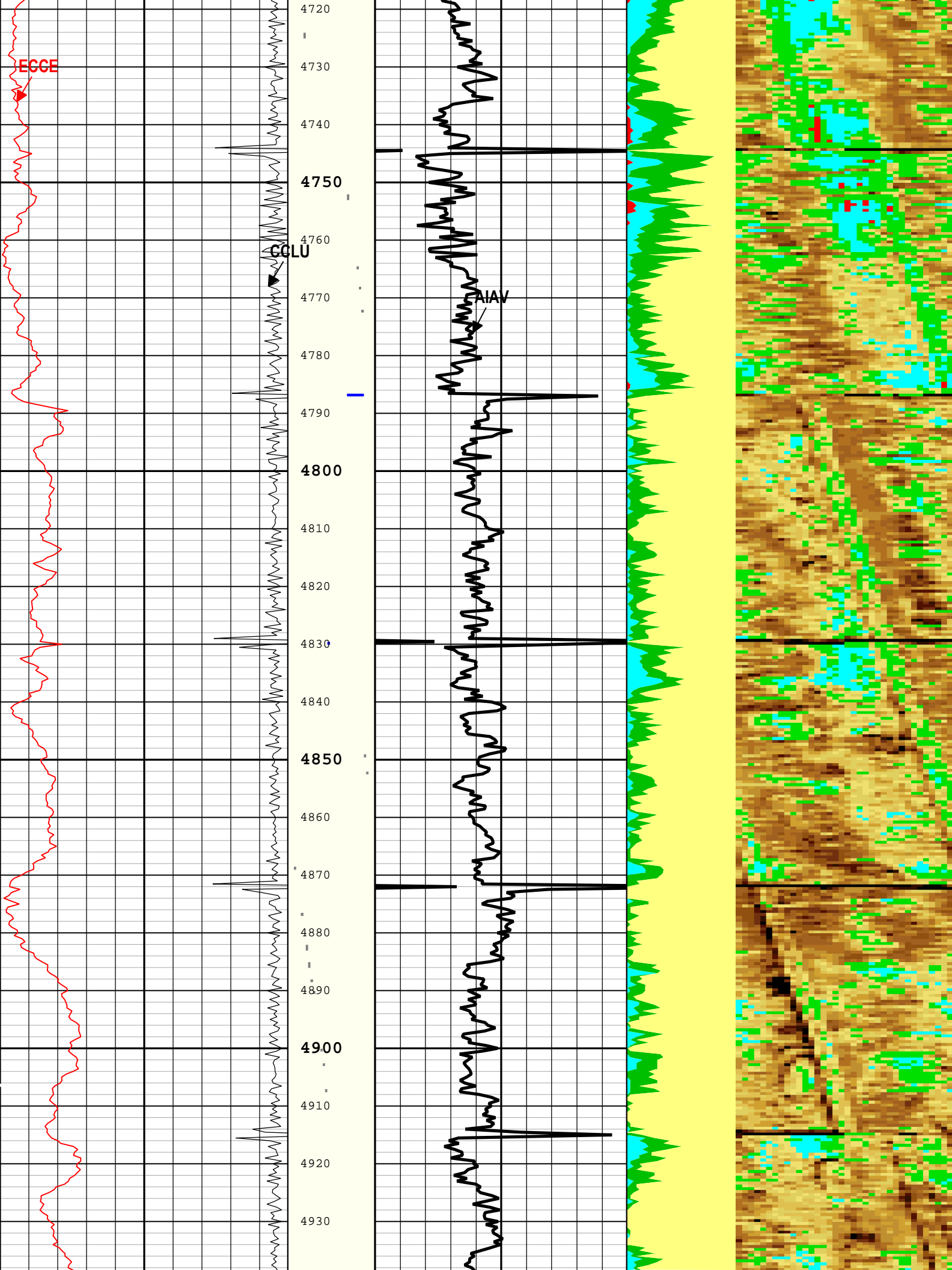


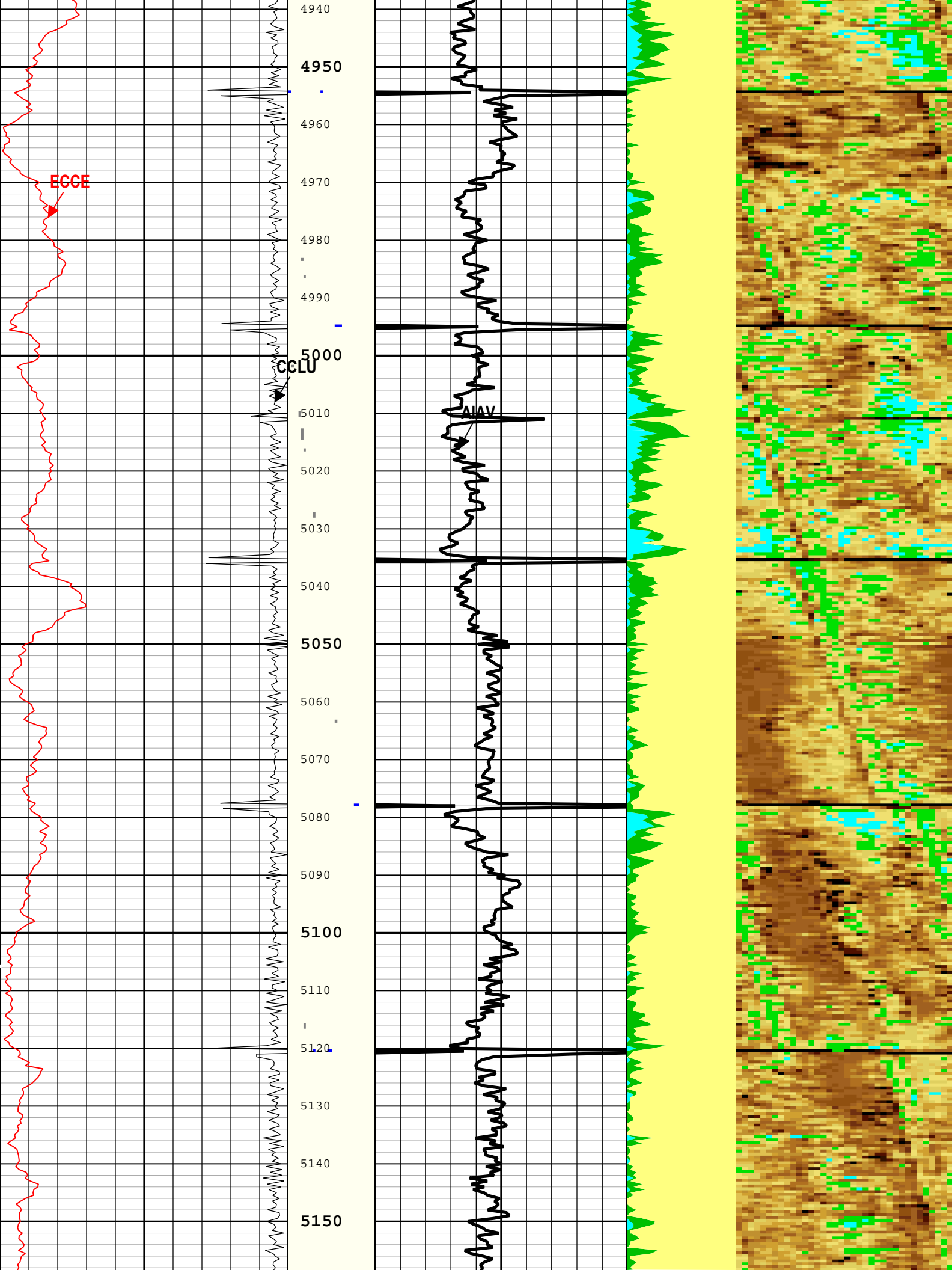


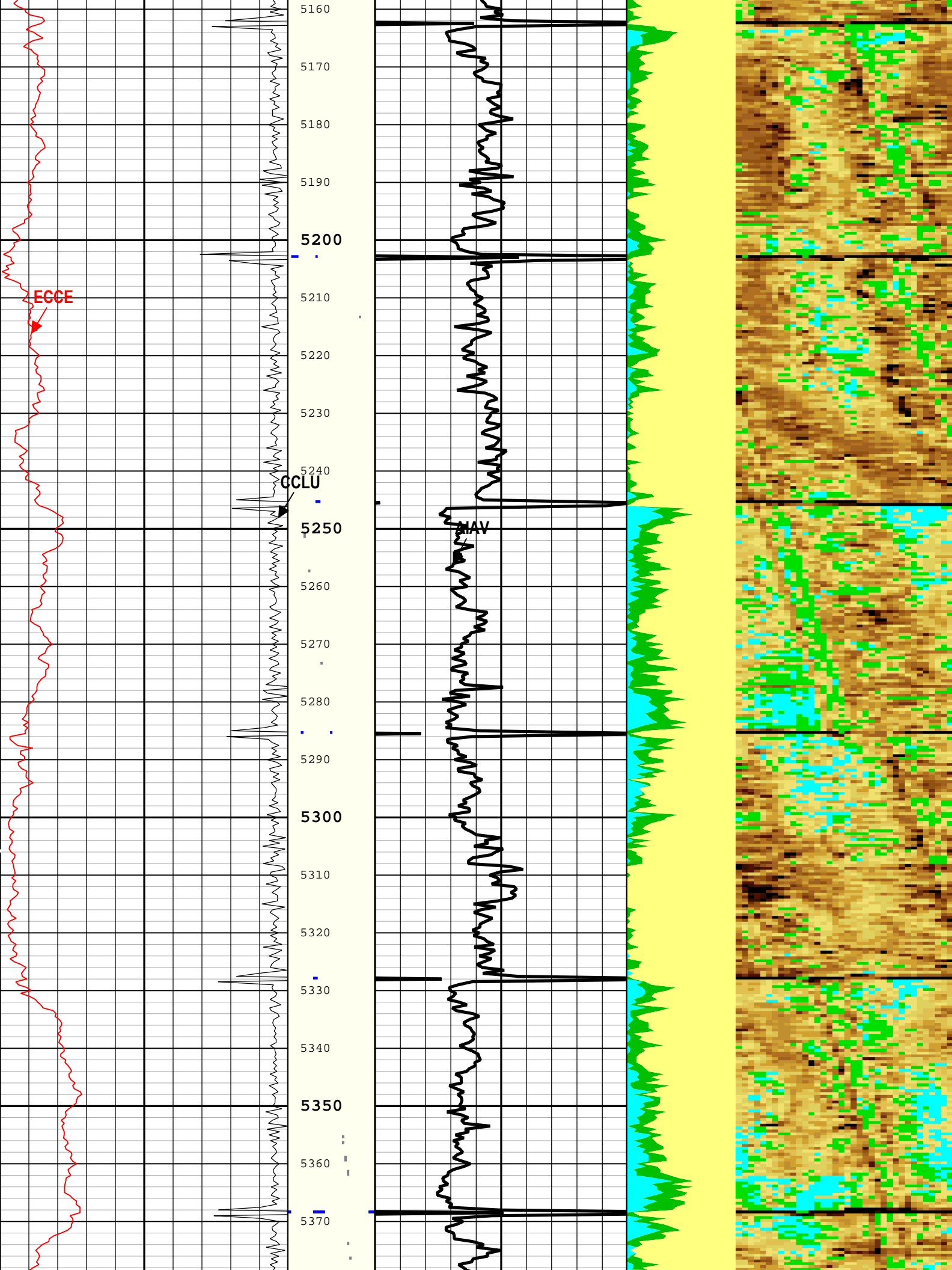


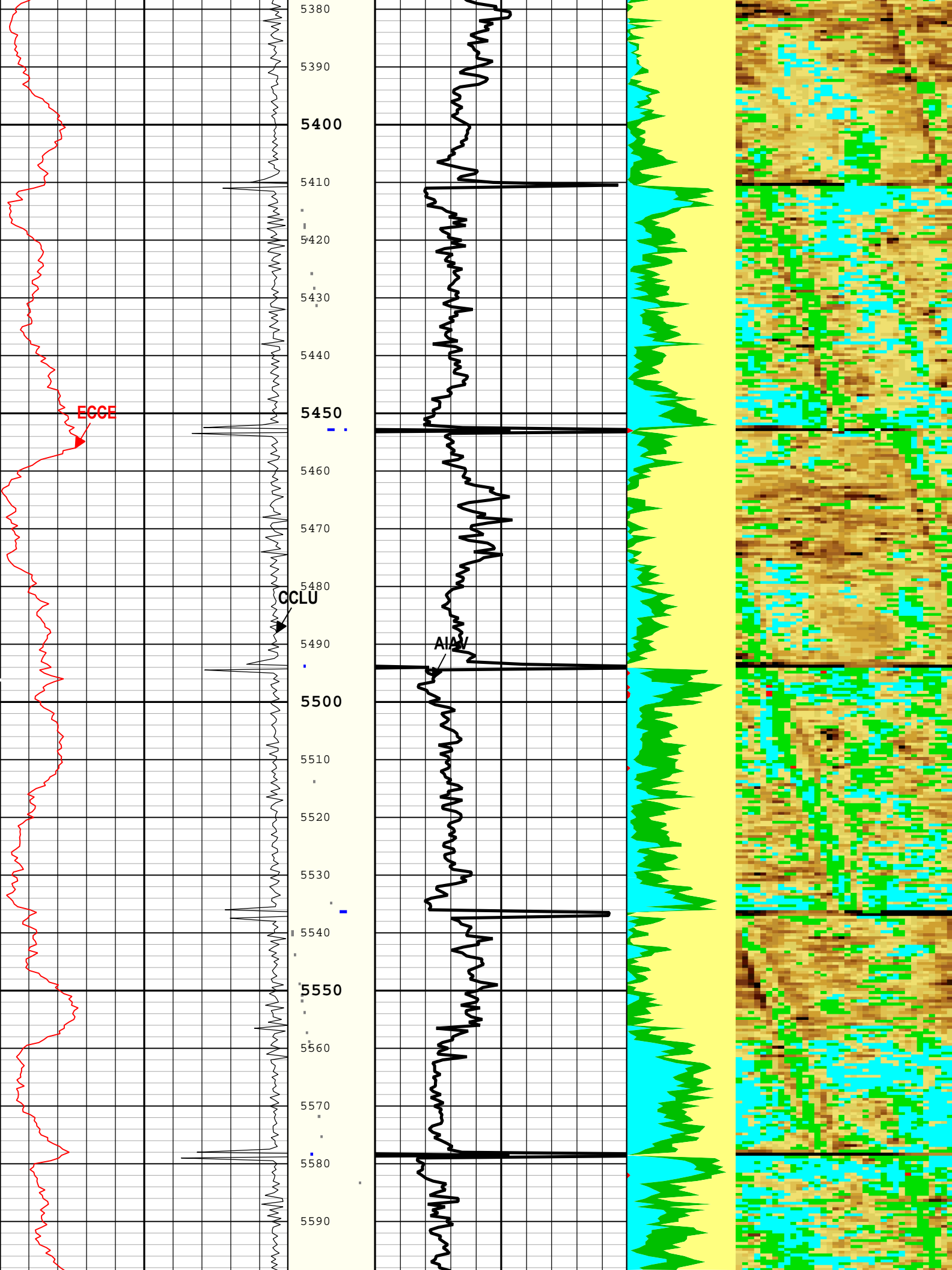


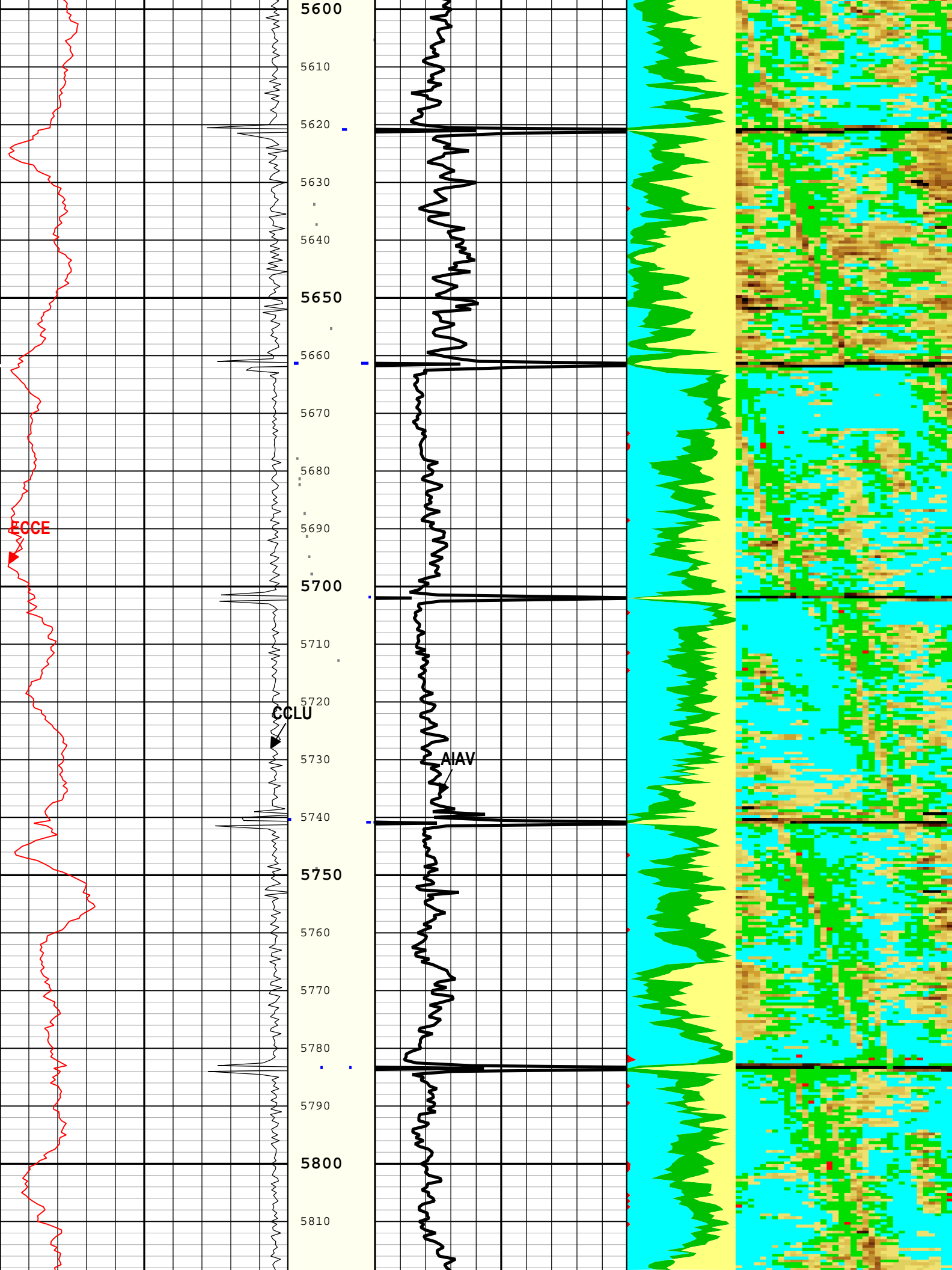


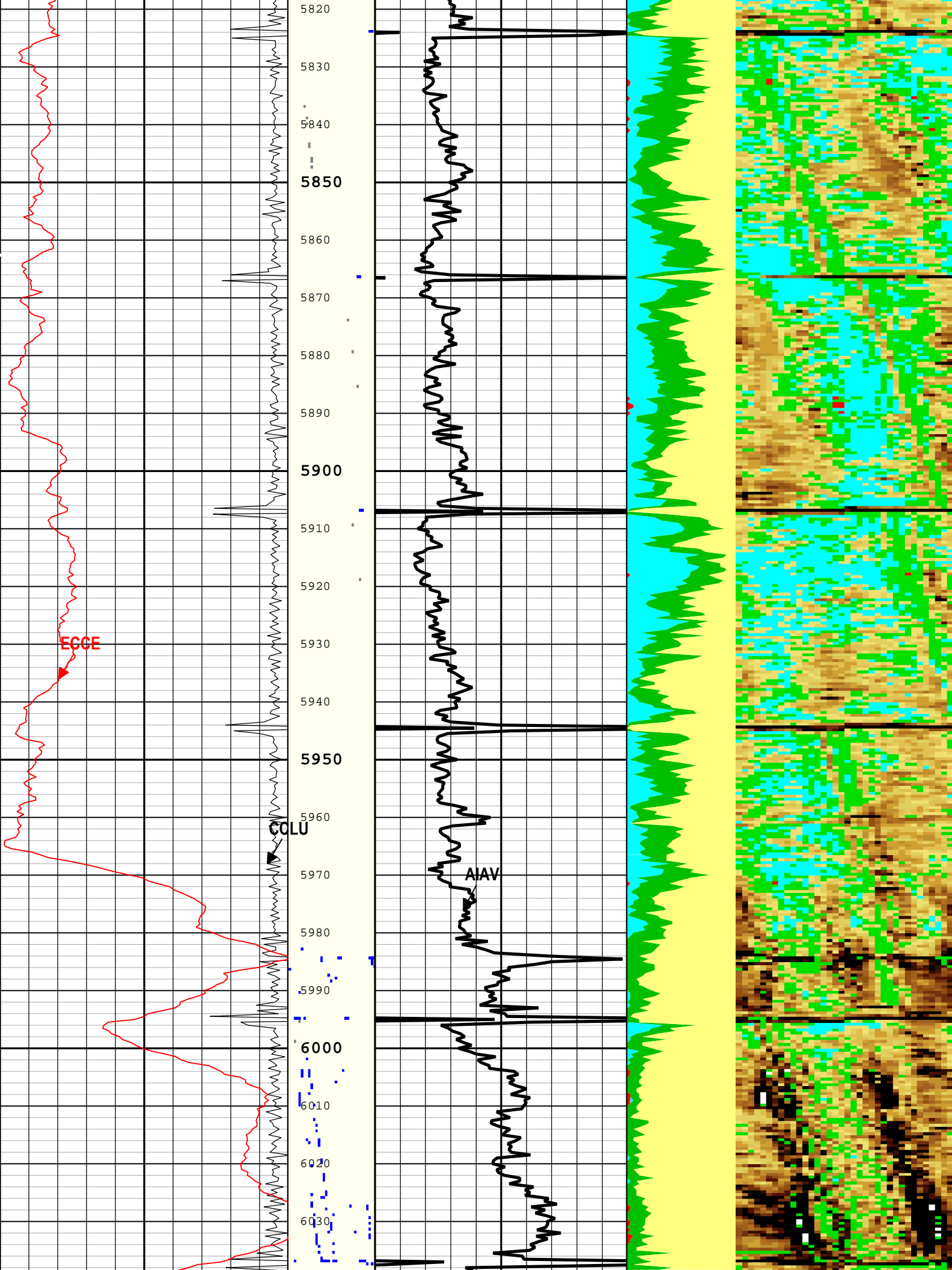




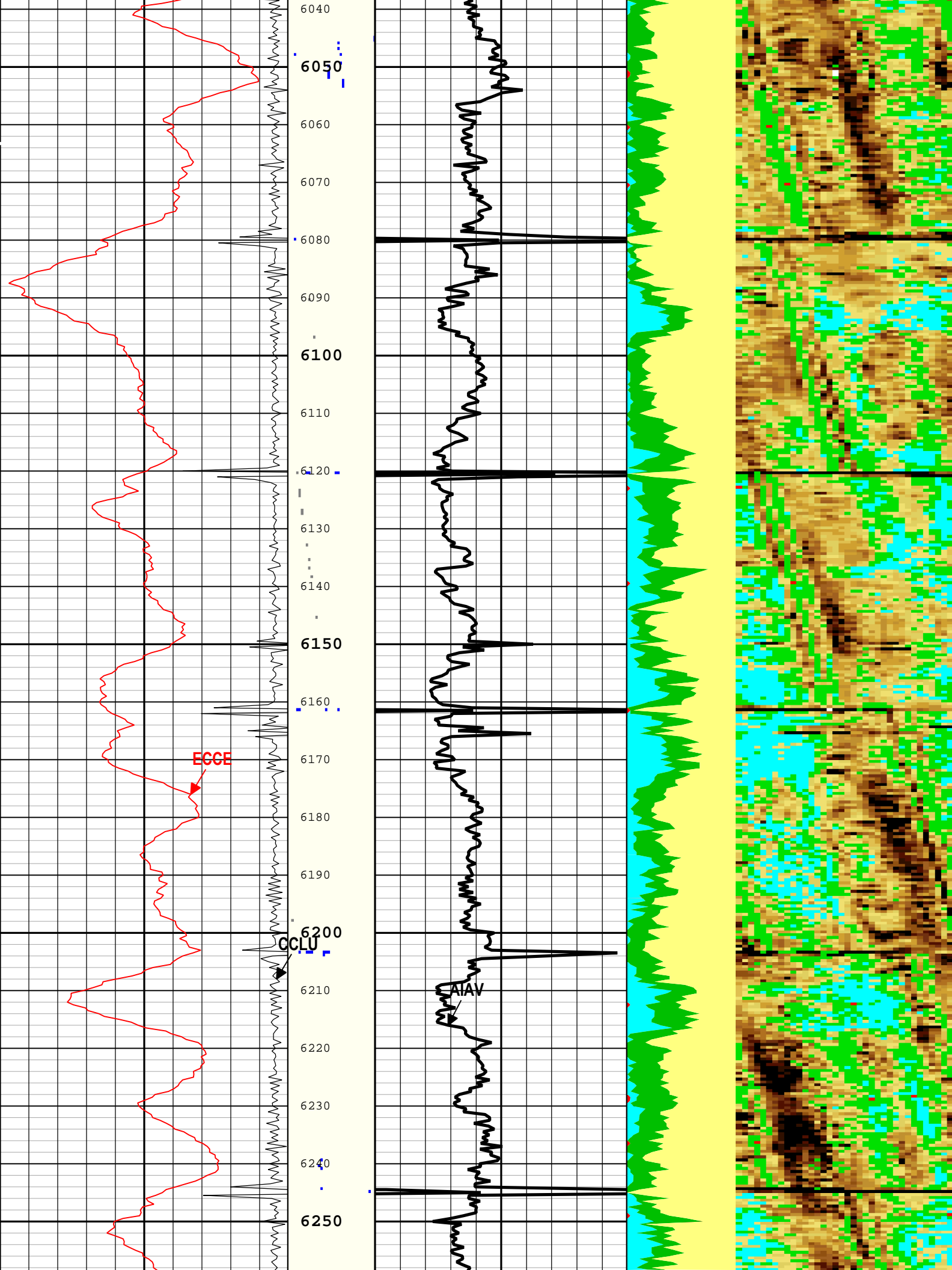


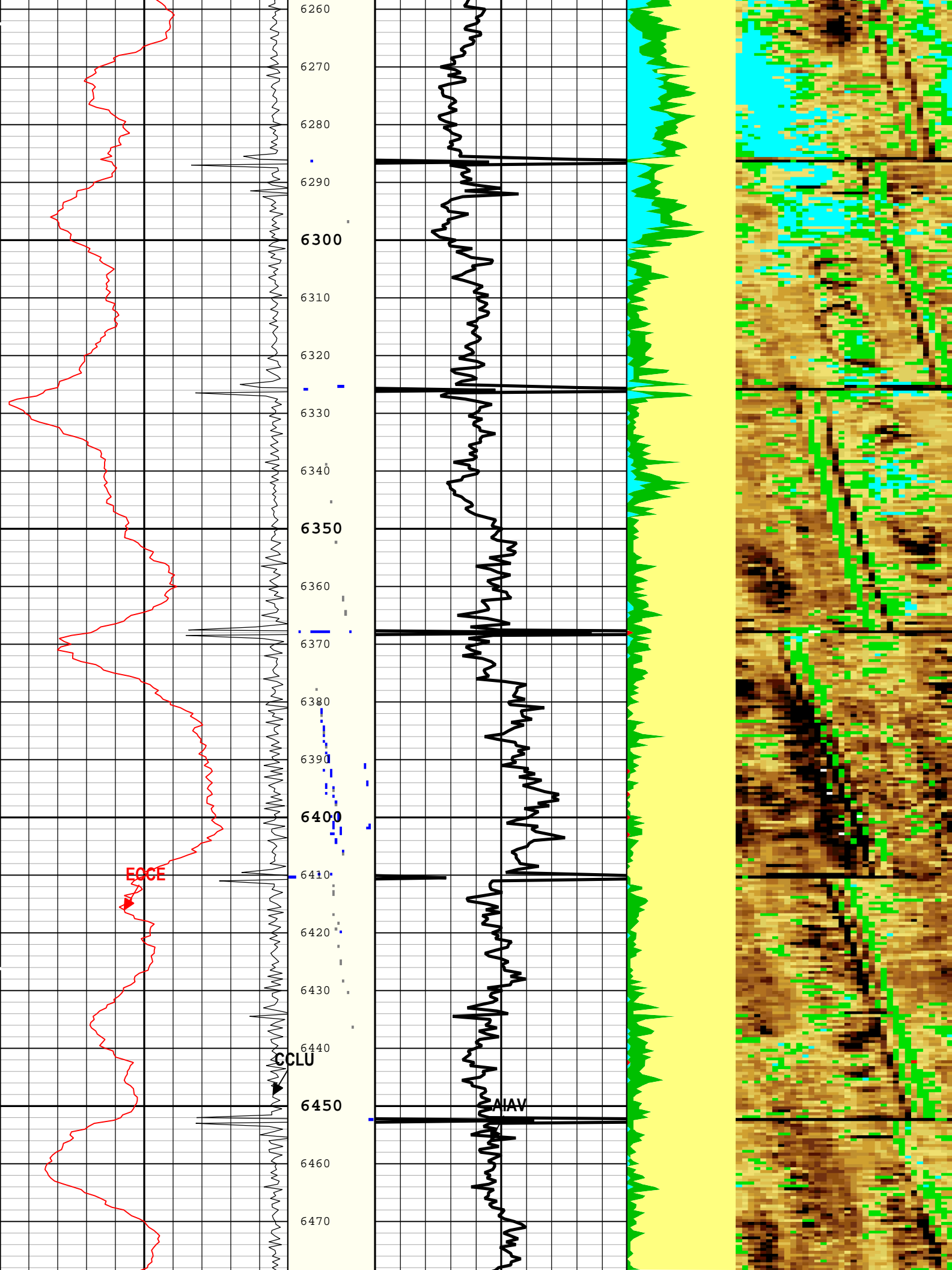


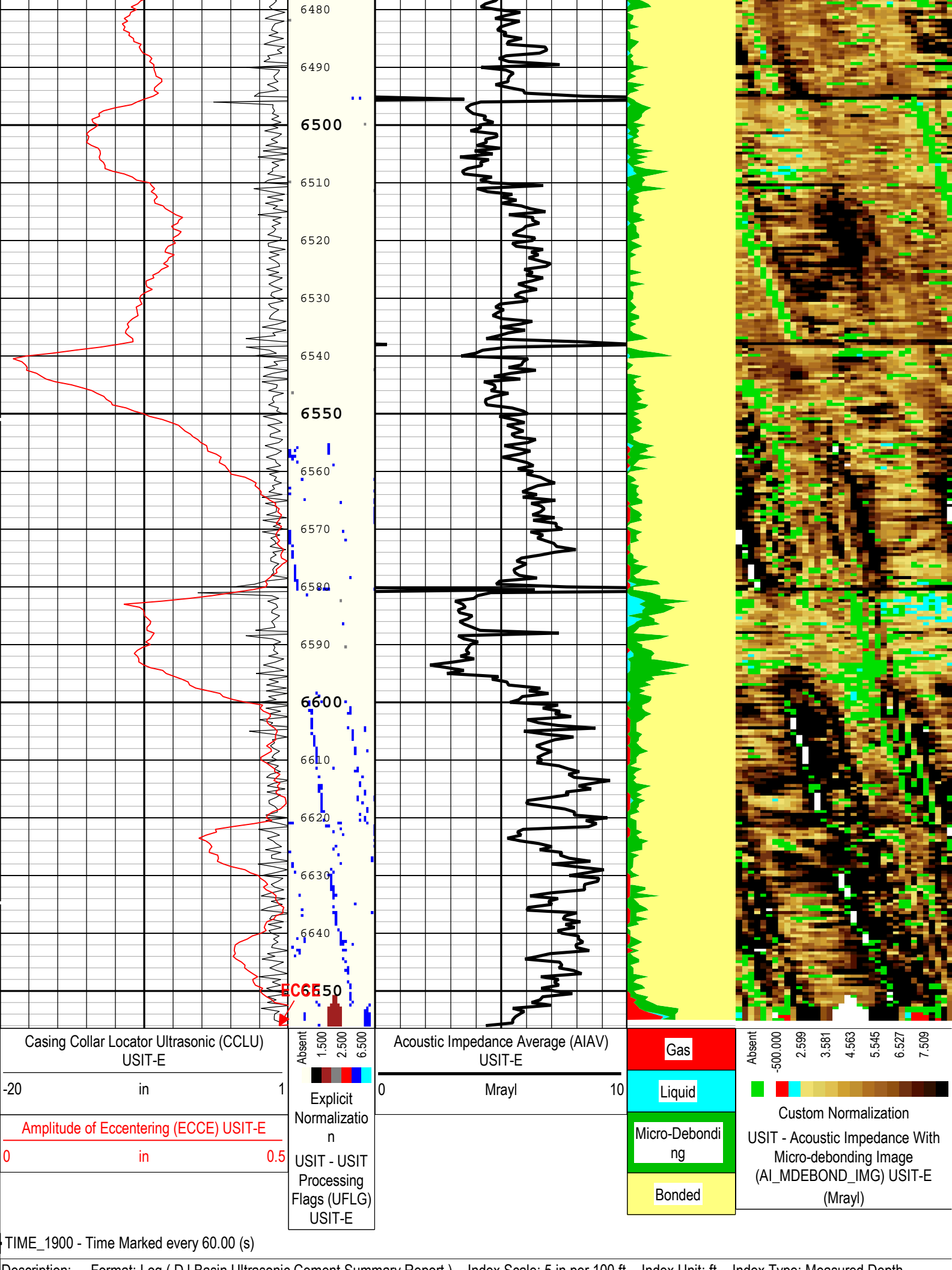








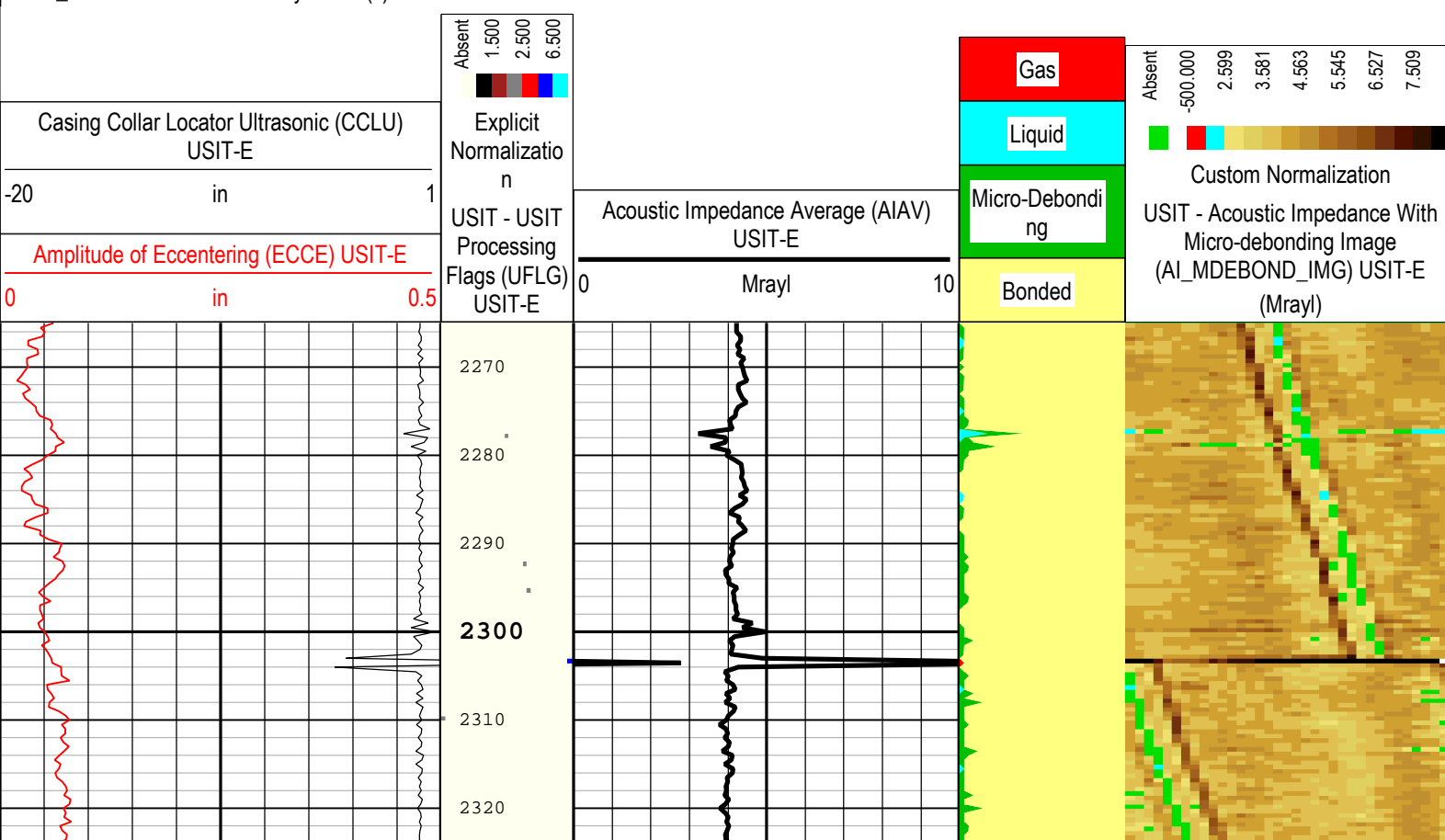


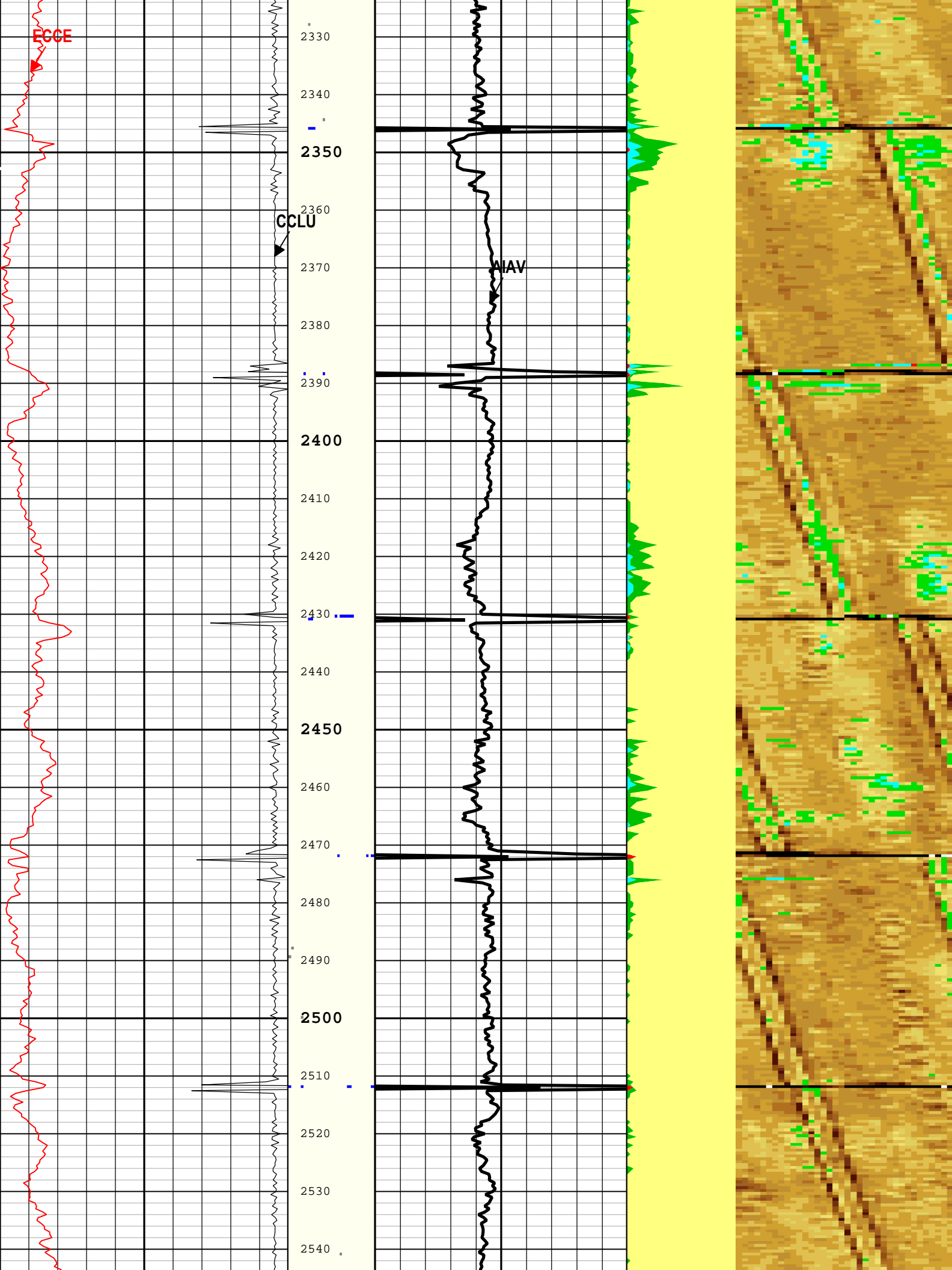


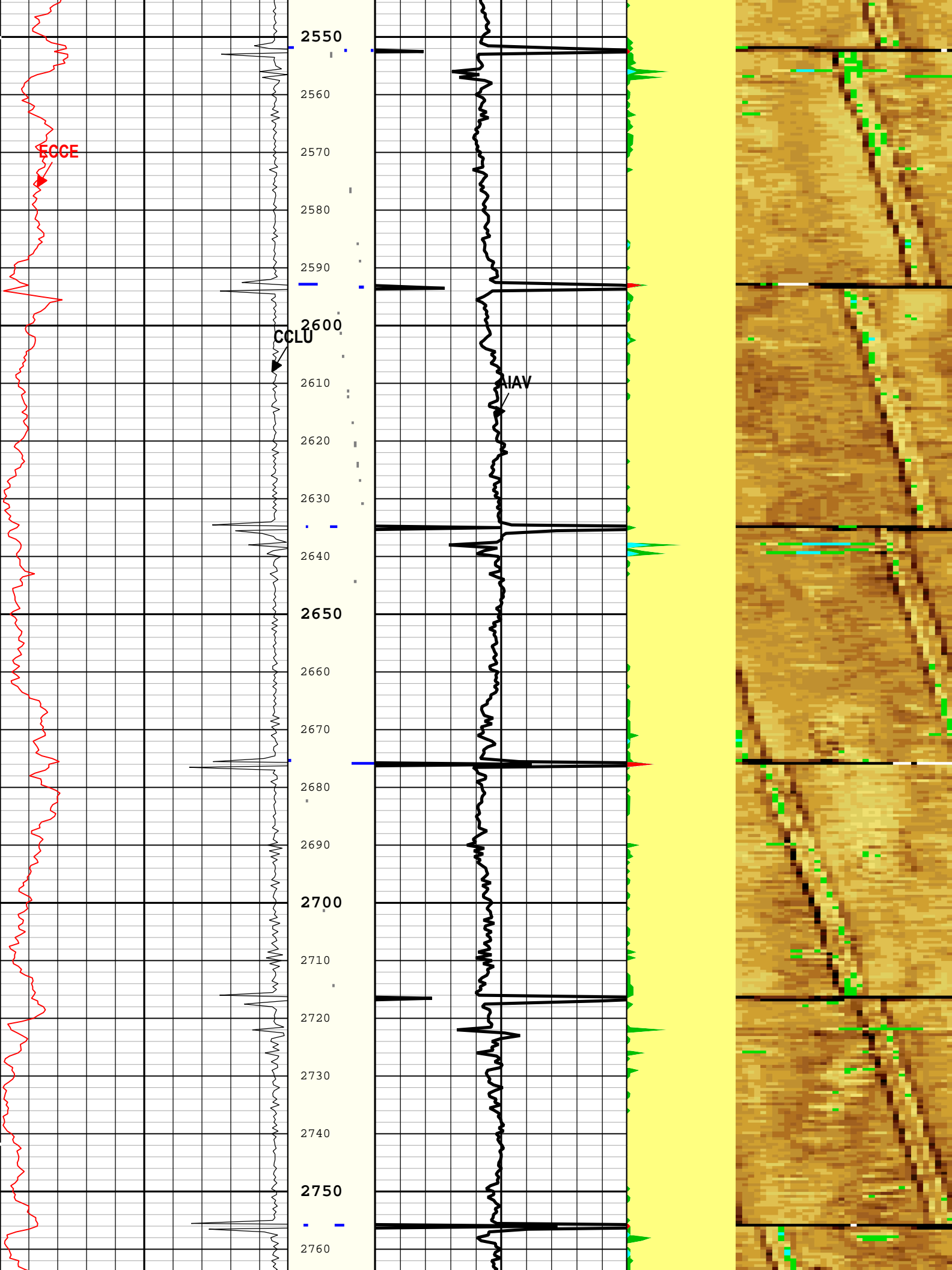
Channel Processing Parameters				
USI: Parameters				
Parameter	Description	Tool	Value	Unit
ISSBAR	Barite Mud Presence Flag	Borehole	No	
BS	Bit Size	WLSESSION	Depth Zoned	in
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Regular Cement	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT	Drilling Fluid Type	Borehole	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	1.2	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1.05	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.75	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	1.78	Mrayl
ZTCM	Acoustic Impedance Threshold for Cement	USIT-E	2.6	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

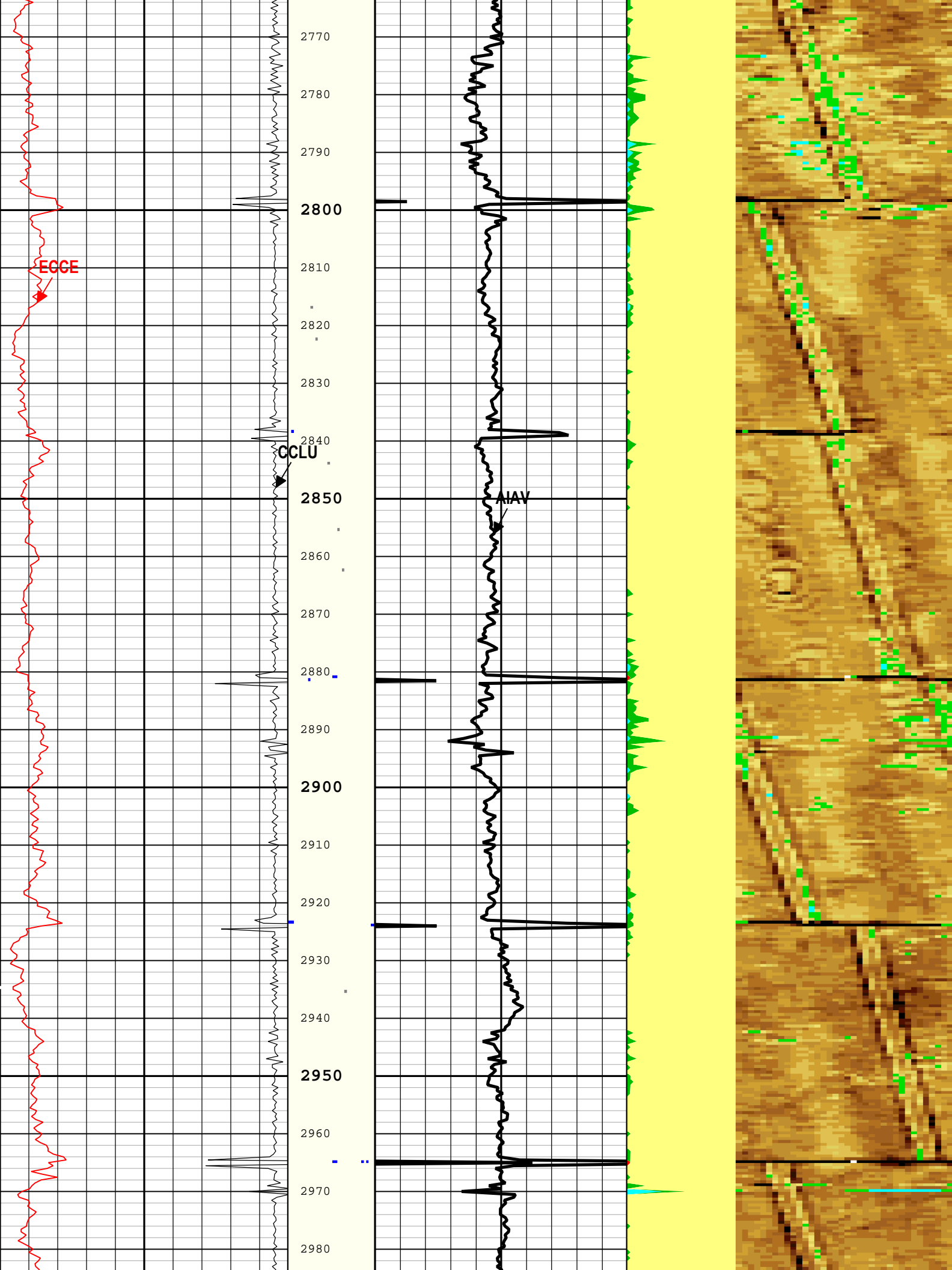
Depth Zone Parameters			
Parameter	Value	Start ( ft )	Stop ( ft )
BS	16	68	110
BS	13.5	110	1927
BS	8.5	1927	6656.5
All depth are actual.			

Tool Control Parameters				
USI: 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	55	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_DEPTHLOC	Starting Depth Log for Ultrasonic	USIT-E	5000	ft

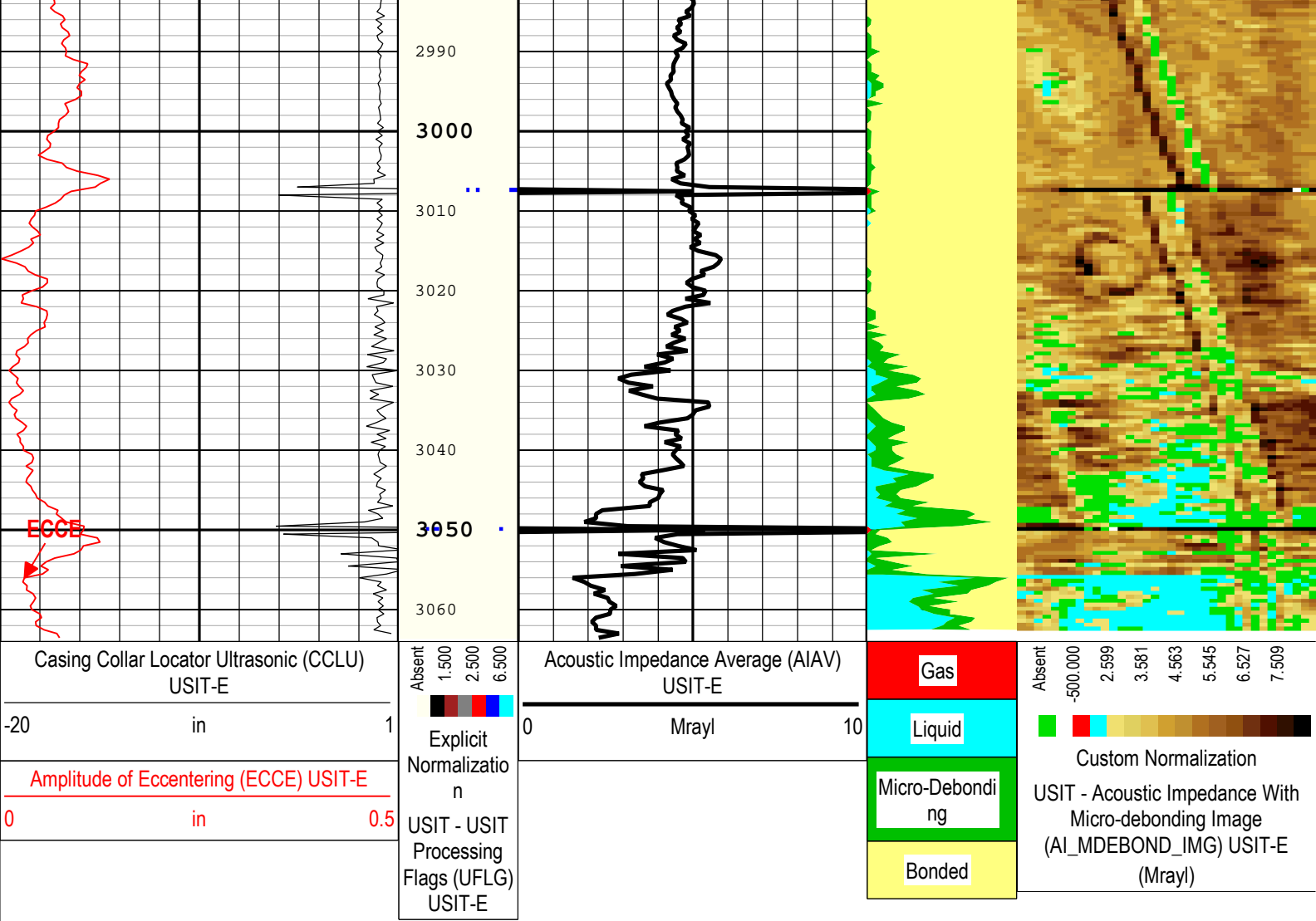












TIME\_1900 - Time Marked every 60.00 (s)

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: 16-Jun-2016 15:00:02

Channel Processing Parameters				
USI: Parameters				
Parameter	Description	Tool	Value	Unit
ISSBAR	Barite Mud Presence Flag	Borehole	No	
BS	Bit Size	WLSESSION	8.5	in
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Regular Cement	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT	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	1.2	
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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.	
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ZTCM	Acoustic Impedance Threshold for Cement	USIT-E	2.6	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

Tool Control Parameters

USI: 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	55	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	5000	ft
WINB	Window Begin Time	USIT-E	25	us
WINE	Window End Time	USIT-E	75	us

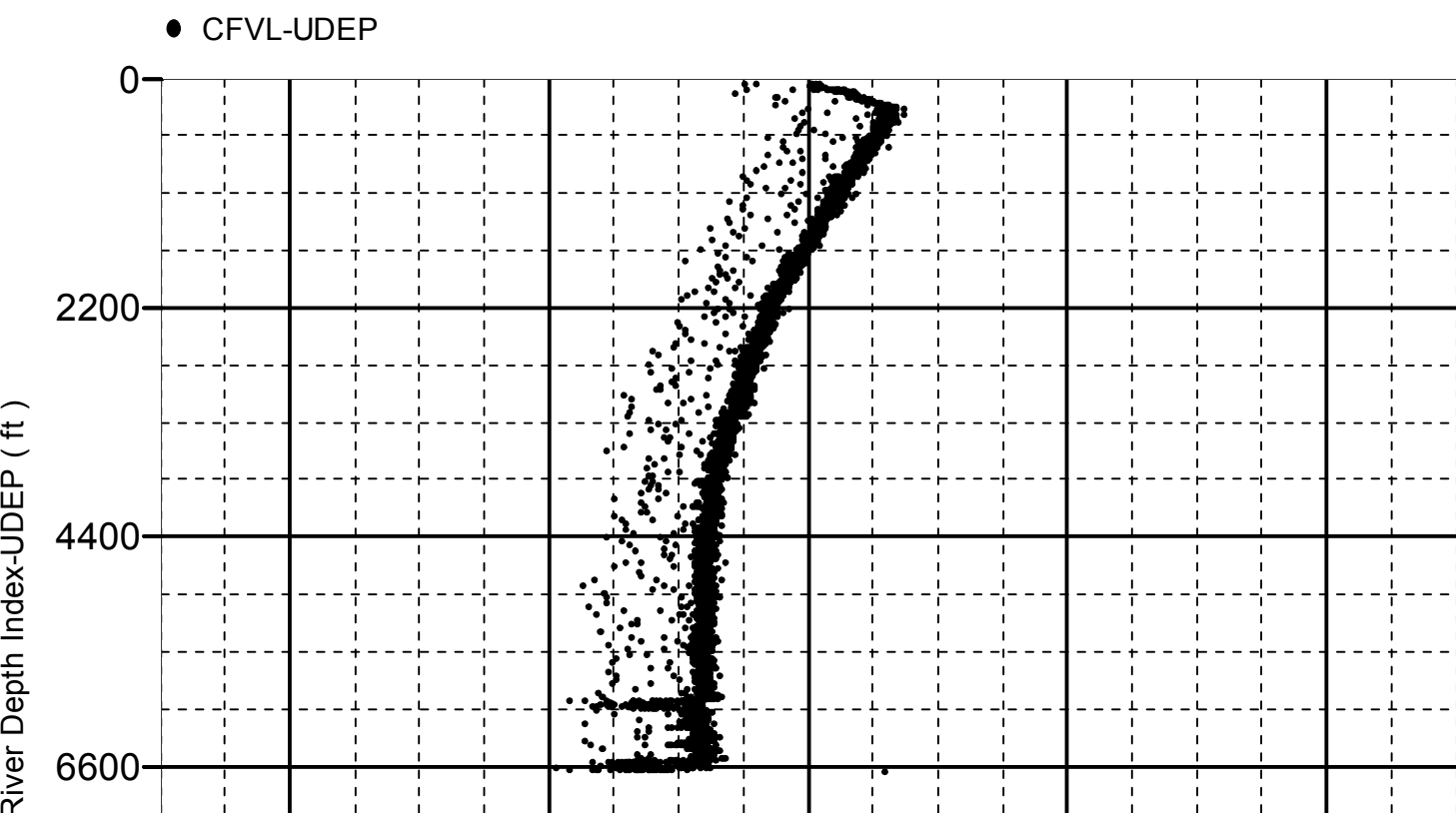
XYZ

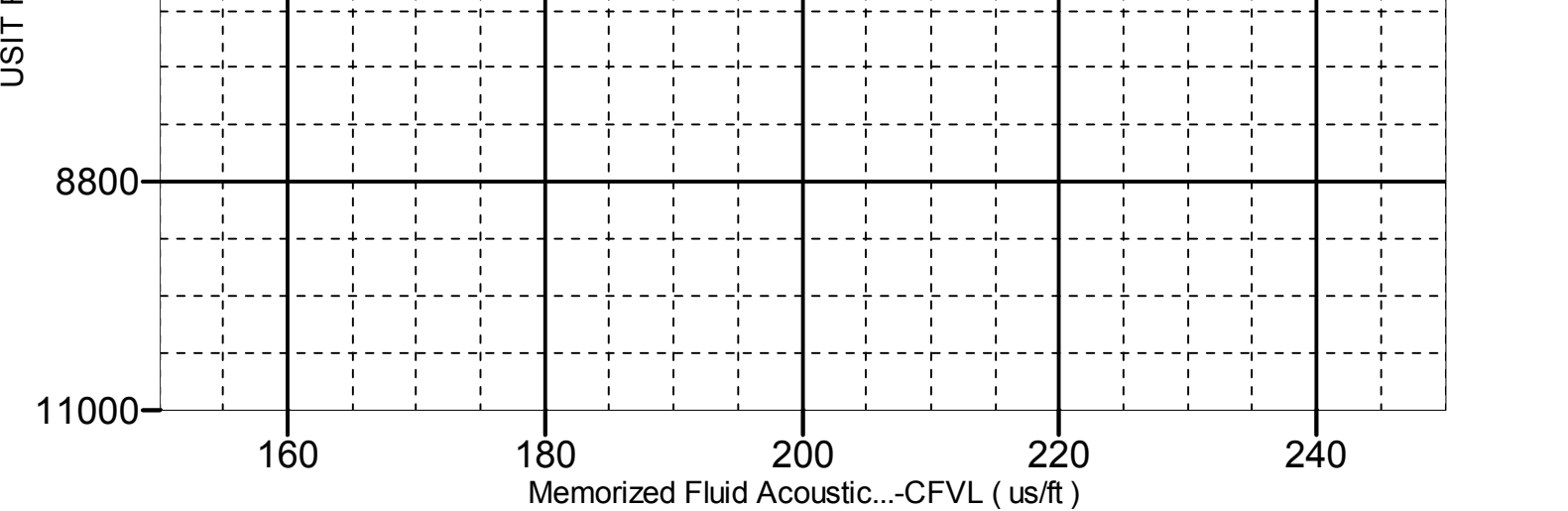
Company:Noble Energy Inc Well:Shadow A26-646  
USI: Log[2]:Up:S004

Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 6656.50 to 68.00 ft





XYZ

Company:Noble Energy Inc Well:Shadow A26-646

USI: Log[2]:Up:S004

## Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6656.50 to 68.00 ft



0.0

0.6

1.2

1.8

2.4

3.0

Acoustic Impedance of Mu...-CZMD ( Mrayl )

Company:	Noble Energy Inc	Schlumberger
Well:	Shadow A26-646	
Field:	Wattenberg	
County:	Weld	
State:	Colorado	

# UltraSonic Summary Print