

Company: Noble Energy Inc.

Well: Emmy State-H25-764

Field: Wattenberg

County: Weld State: Colorado

UltraSonic Summary Print

County:	Weld				
Field:	Wattenberg				
Location:	SESW Sec. 25, T3N, R65W				
Well:	Emmy State-H25-764				
Company:	Noble Energy Inc.				
Location:	SESW Sec. 25, T3N, R65W	Elev.:	K.B.	4876.00 ft	
	SHL: 285 FSL 1163 FWL		G.L.	4846.00 ft	
	Lat/Long: 40.18967/-104.61683		D.F.	4876.00 ft	
	Permanent Datum:	Ground Level	Elev.:	4846.00 f	
	Log Measured From:	Kelly Bushing	30.00 ft	above Perm.Datum	
Drilling Measured From:	Kelly Bushing				
API Serial No.	Section:	Township:	Range:		
05-123-46973	26	3N	65W		

Run Number	ONE	
Depth Driller	17494.00 ft	
Schlumberger Depth	6817.00 ft	
Bottom Log Interval	6817.00 ft	
Top Log Interval	180.00 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	1946.00 ft	
To	17494.00 ft	
Casing/Tubing Size	5.5 in	
Weight	20 lbm/ft	
Grade	P110	
From	0.00 ft	
To	17479.00 ft	
Max Recorded Temperatures	242.64 degF	
Logger on Bottom	11-Oct-2018	18:35:00
Unit Number	Location: 2377	Fort Morgan
Recorded By	Ali AlRamadhan	
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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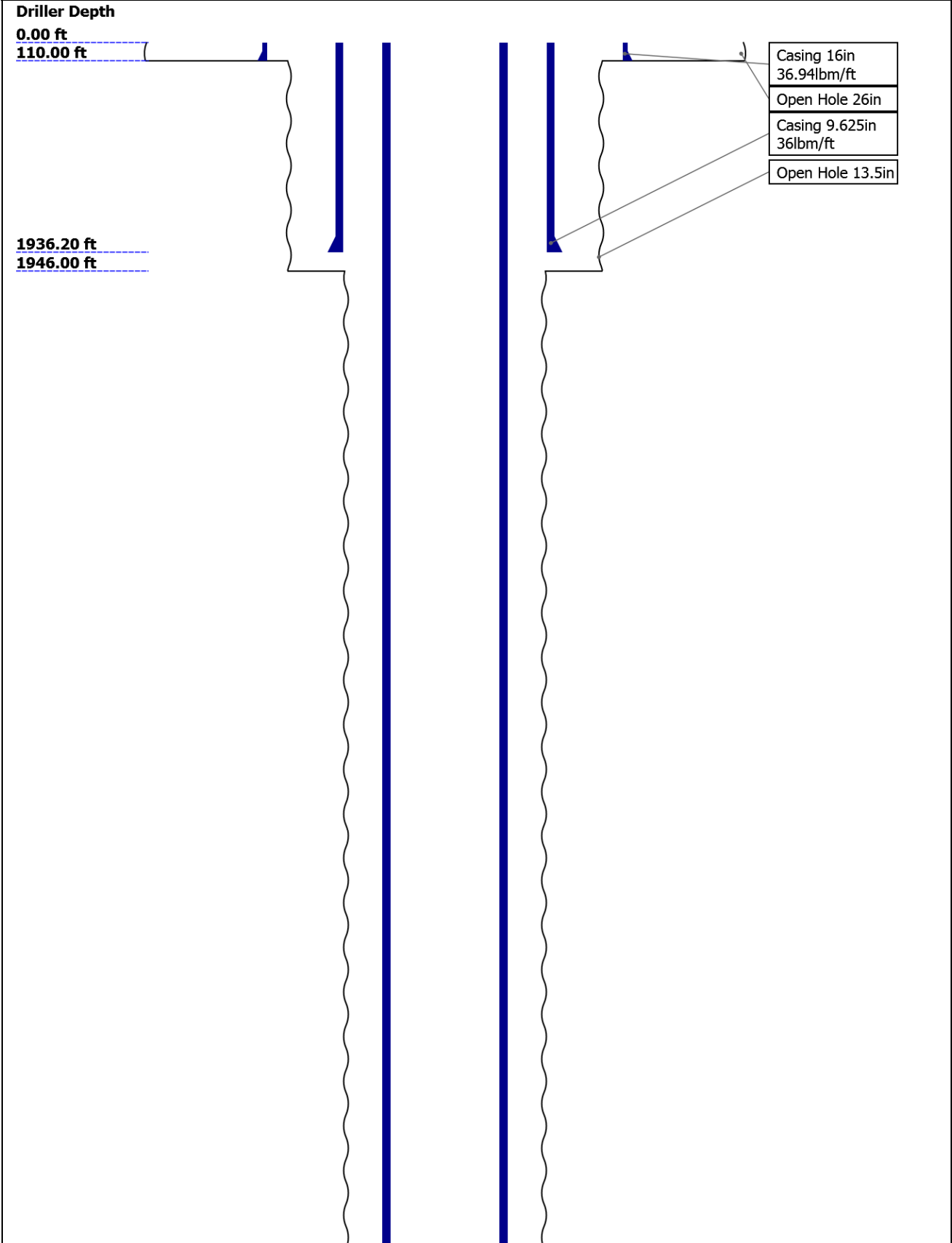
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Well Sketch



17479.00 ft

17494.00 ft


Casing 5.5in  
20lbm/ft

Open Hole 8.5in

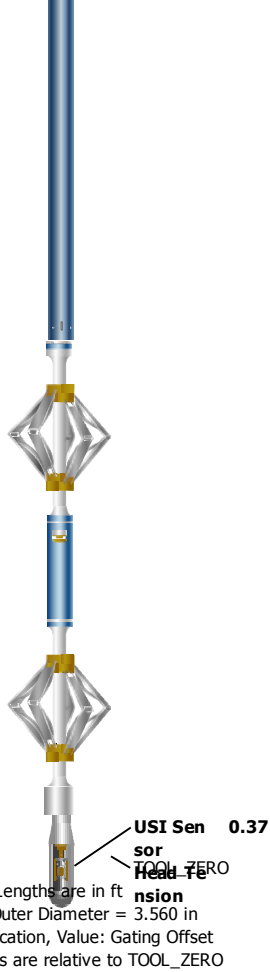
Borehole Size/Casing/Tubing Record

Bit						
Bit Size ( in )	26	13.5	8.5			
Top Driller ( ft )	0	110	1946			
Top Logger ( ft )	0	110	1946			
Bottom Driller ( ft )	110	1946	17494			
Bottom Logger ( ft )	110	1946	17494			
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	K55	P110			
Top Driller ( ft )	0	0	0			
Top Logger ( ft )	0	0	0			
Bottom Driller ( ft )	110	1936.2	17479			
Bottom Logger ( ft )	110	1936.2	17479			

Remarks and Equipment Summary

ONE: Toolstring				ONE: Remarks	
<b>Equip name</b> <b>LEH-QT</b> LEH-QT	<b>Length</b> <b>34.56</b>	<b>MP name</b> <b>Offset</b>		Thank you for choosing Schlumberger!	
				Toolstring run as per tool sketch and client logging program.	
				5" gemcos run on DTC and USIT forcentralization.	
				This is the first log in well.	
				Main pass logged at 2500 PSI. Repeat pass logged at 0 PSI.	
				BHT: 242.64 degF	
				Little flag between 6760 to 6750 due to ECCE spike in two logs.	
<b>Equip name</b> <b>LEH-QT</b> LEH-QT	<b>Length</b> <b>34.56</b>	<b>MP name</b> <b>Offset</b>			
<b>DTC-H</b> ECH-KC DTC-H	<b>31.07</b>	<b>CTEM HV</b> <b>30.17</b> <b>0.00</b> <b>TelStatus</b> <b>28.07</b> <b>ToolStatus</b> <b>28.07</b> <b>GR</b> <b>27.16</b>			
<b>SGT-N</b> SGH-K SGC-TB SGD-TAA	<b>28.07</b>				
<b>AH-184</b>	<b>22.57</b>				
<b>USIT-D</b> ECH-MRA USIC-D USIS-A USCC-A	<b>20.57</b>				

USSC-A  
USRS-A  
USI-SENS  
OR  
USI-TX



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	7-46A-XS		
Serial Number			
Length	24000.00 ft		
Conveyance Type	Wireline		
Rig Type	Land		

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		Log depth shifted to marker joint at 6356.3 ft.
Stretch Correction		
Tool Zero Check At Surface		

USIT - Fluid Properties Measurement

Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Run 1	Log[7]:Up	6819.28	108.91

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 : 45.22m(148.36ft) to 49.35m(161.90ft)  
MUD\_N\_FRP = 1.08  
DFD = 1.01g/cm3(8.40lbm/gal)  
CZMD median computed in free pipe normalization interval = 1.67 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 2018 SP2	8.2.102758.3100

Pass Summary

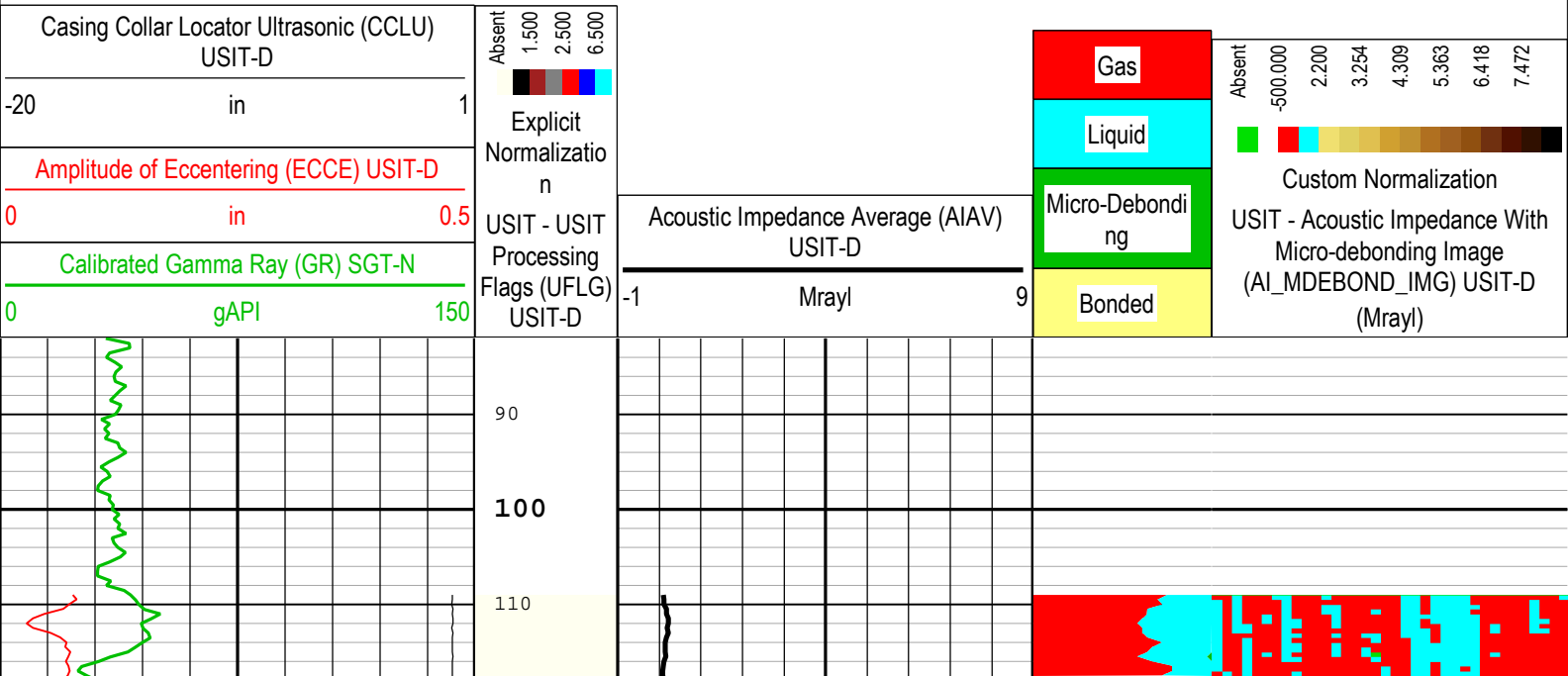
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[7]:Up	Up	108.91 ft	6819.28 ft	11-Oct-2018 5:55:03 PM	11-Oct-2018 6:47:04 PM	ON	4.07 ft	No

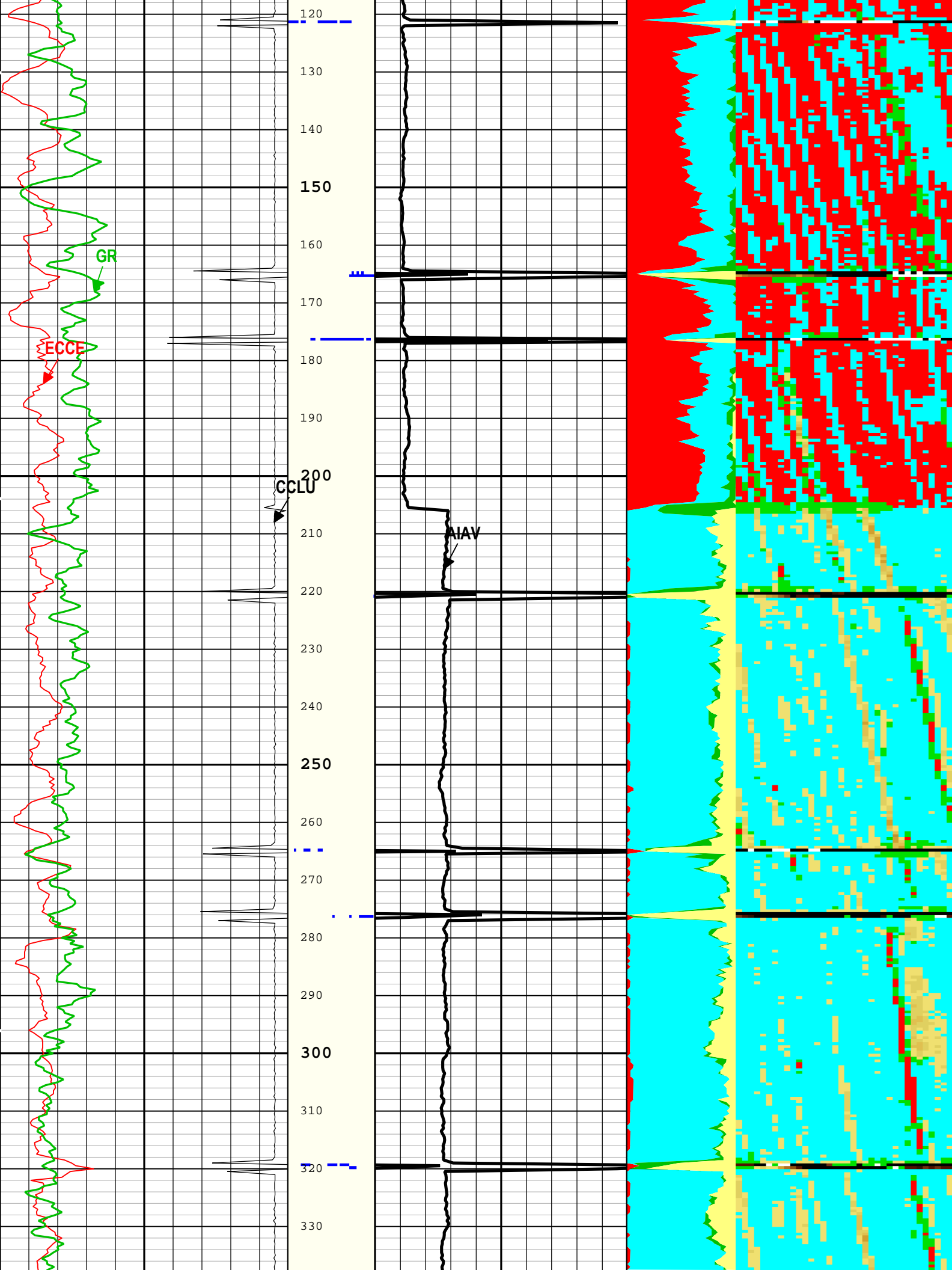
All depths are referenced to toolstring zero

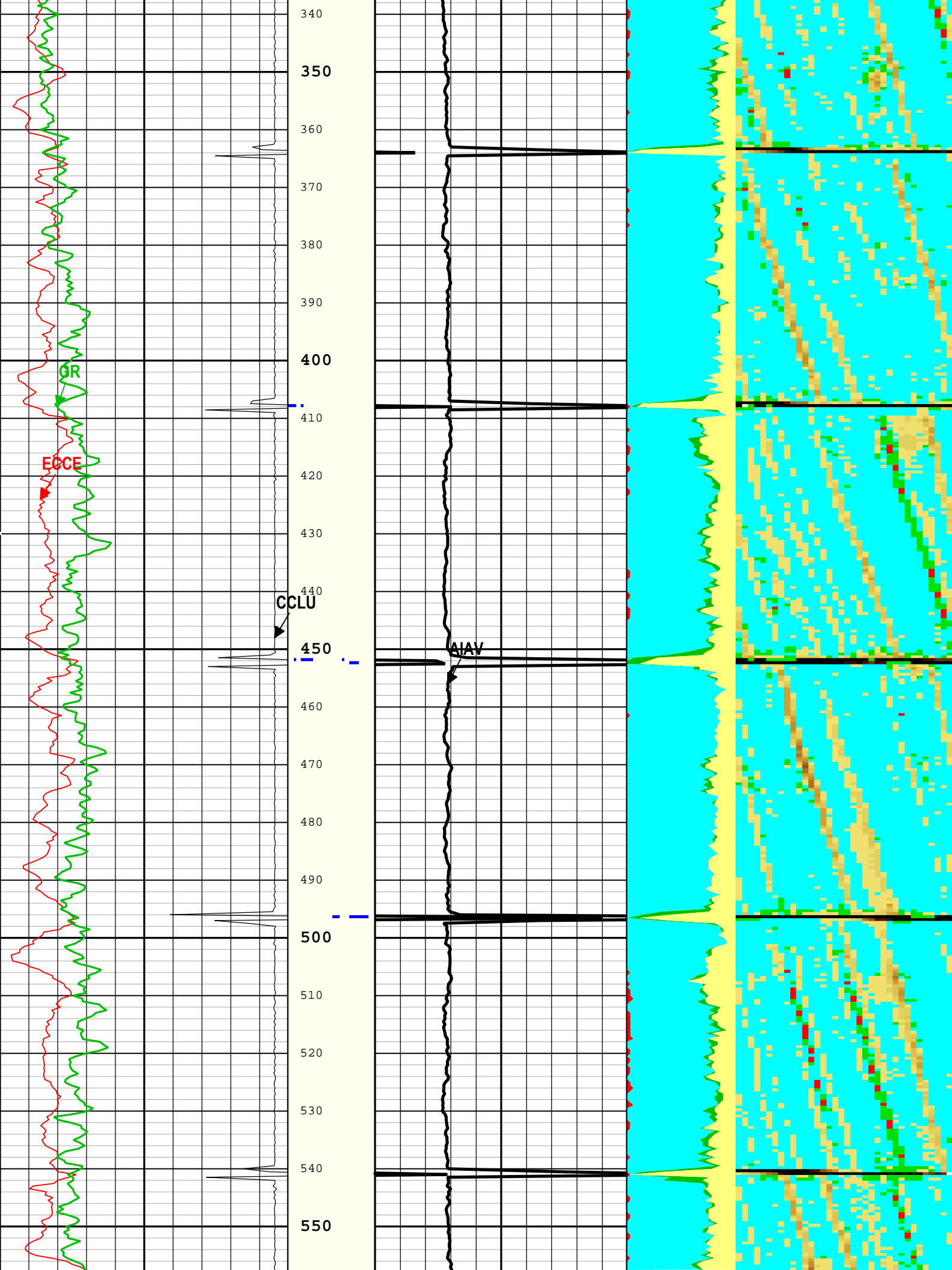
Log	Company:Noble Energy Inc.      Well:Emmy State-H25-764 ONE: Log[7]:Up:S005
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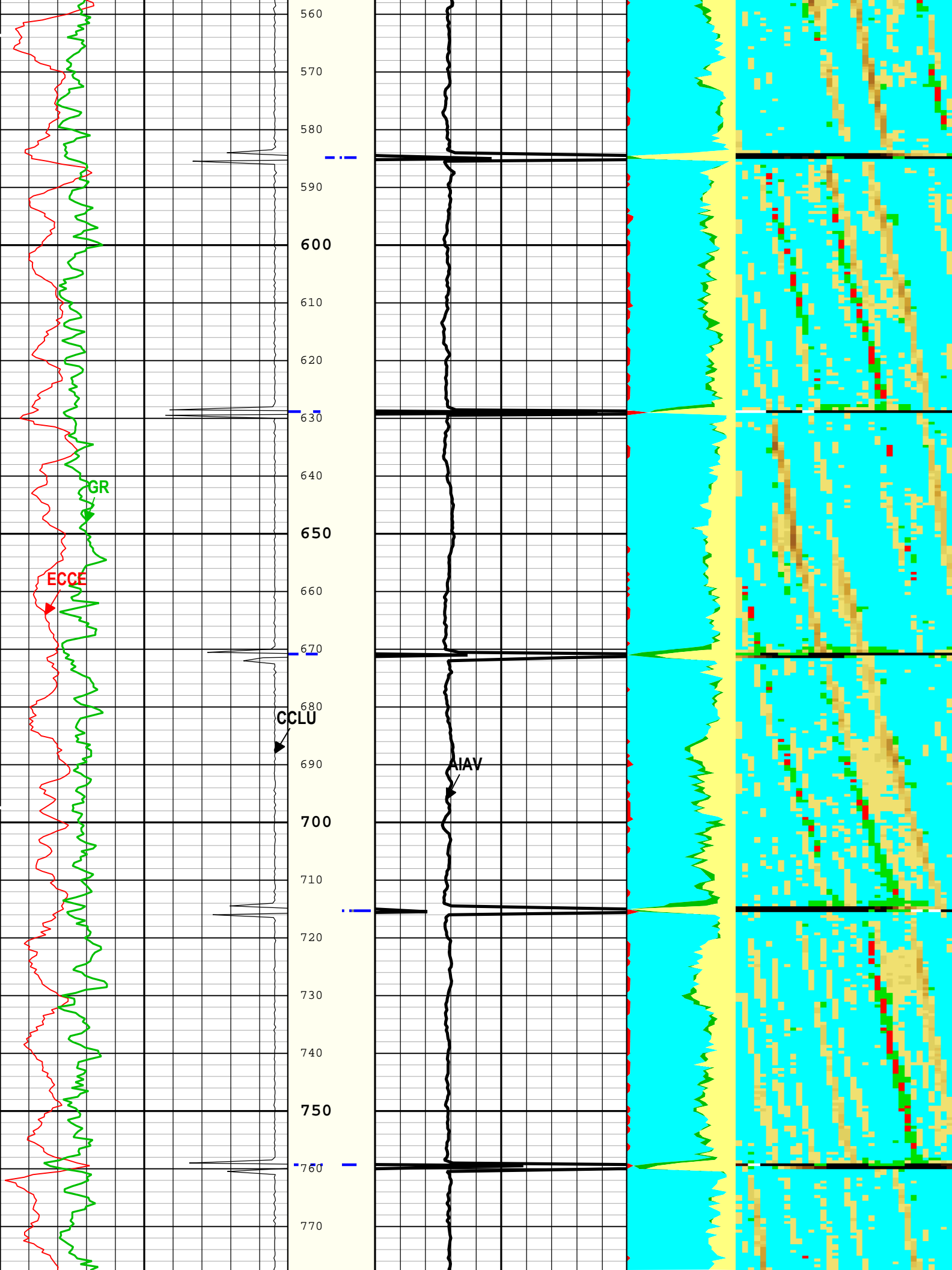
Description:    Format: Log ( DJ Basin Ultrasonic Cement Summary Report )    Index Scale: 5 in per 100 ft    Index Unit: ft    Index Type: Measured Depth  
Creation Date: 11-Oct-2018 19:58:18

TIME\_1900 - Time Marked every 60.00 (s)

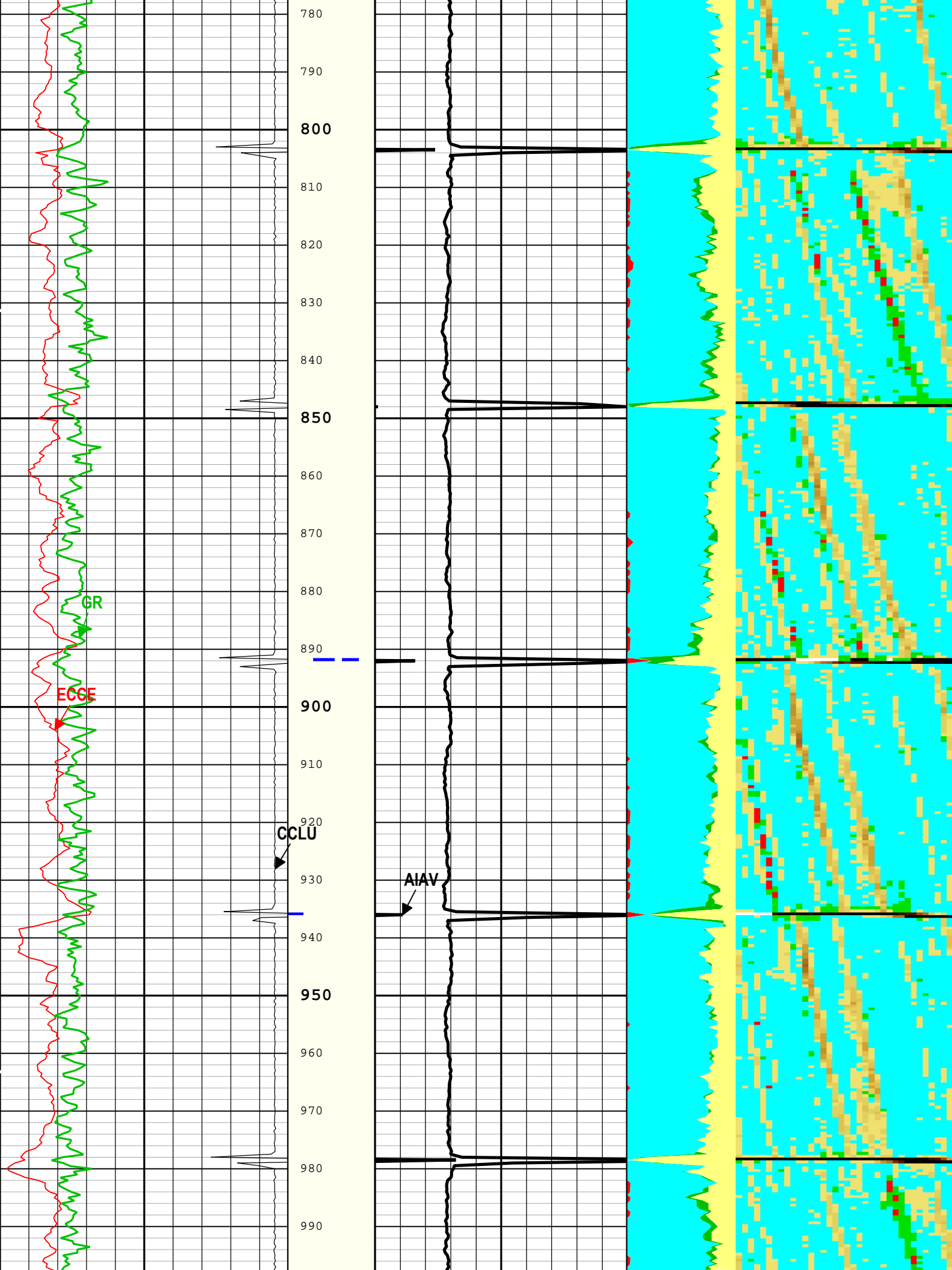


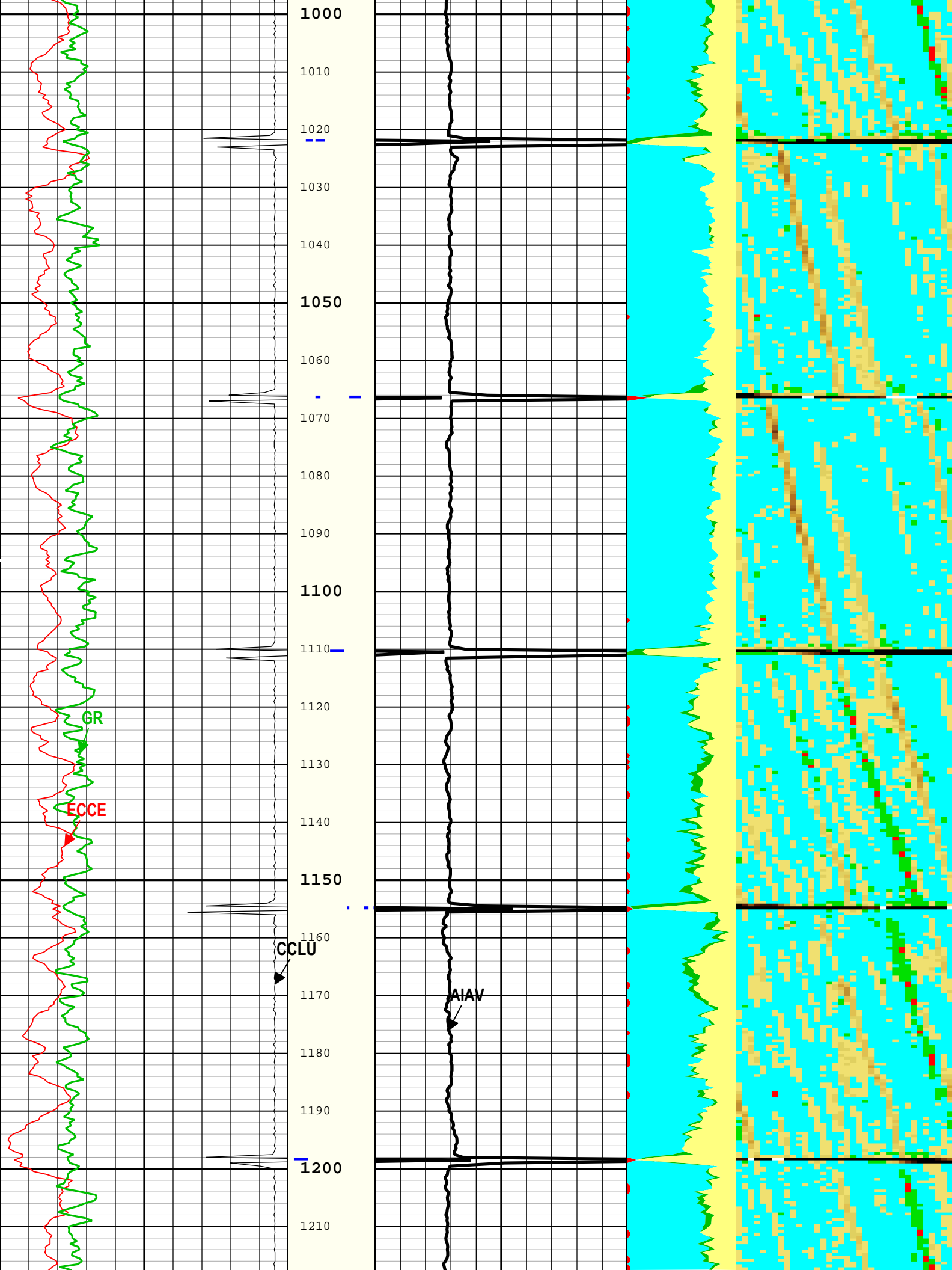


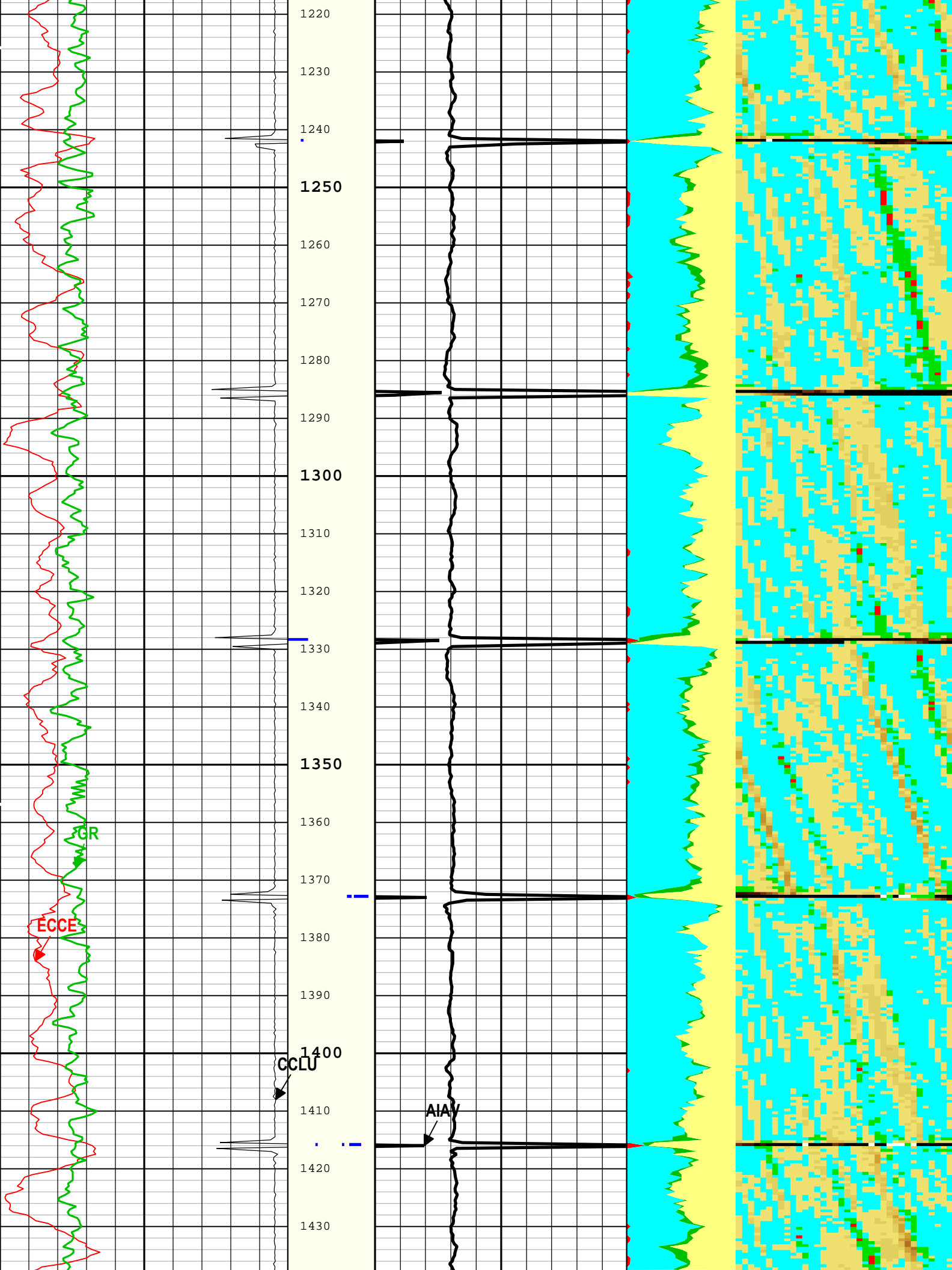


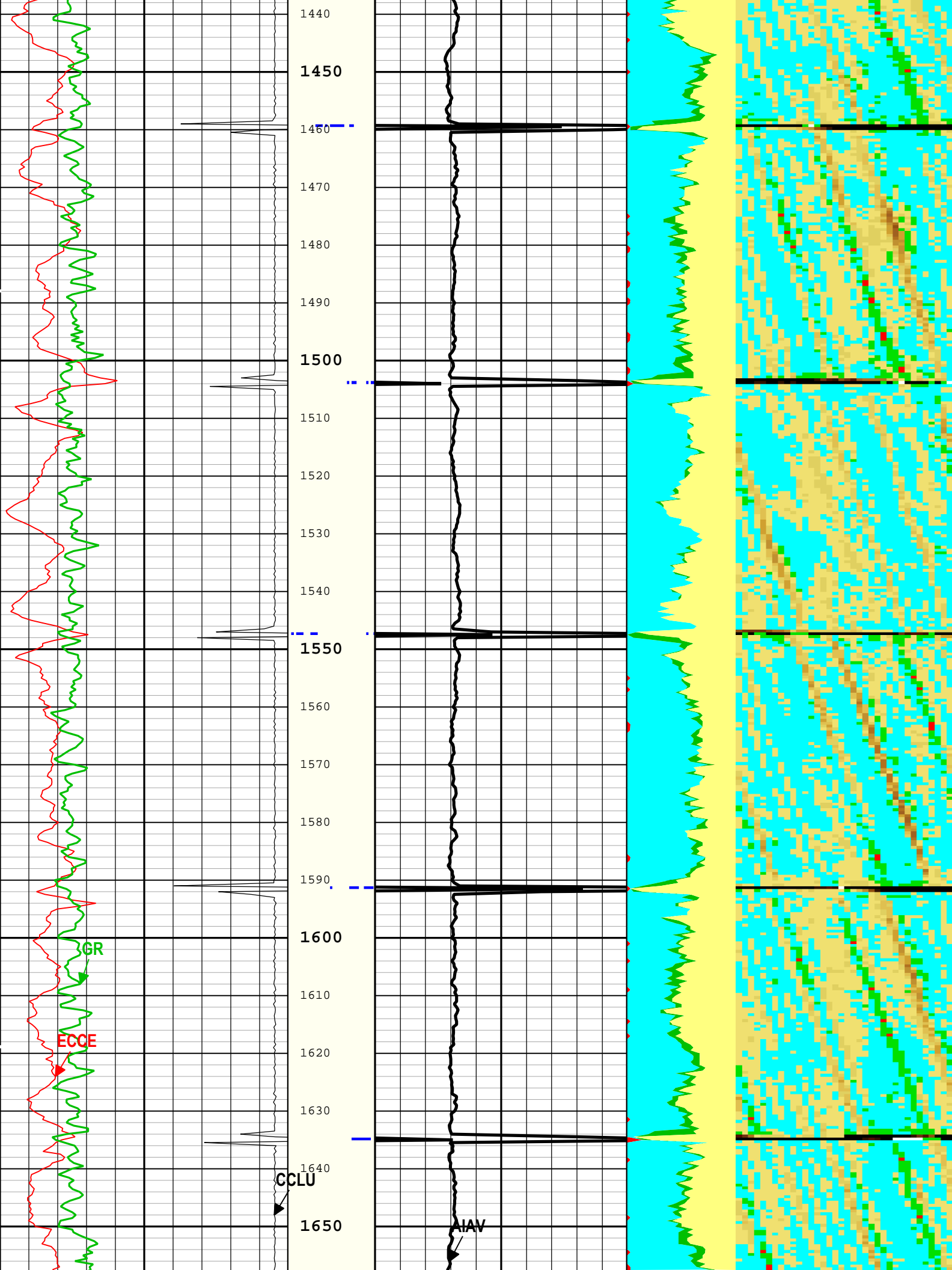


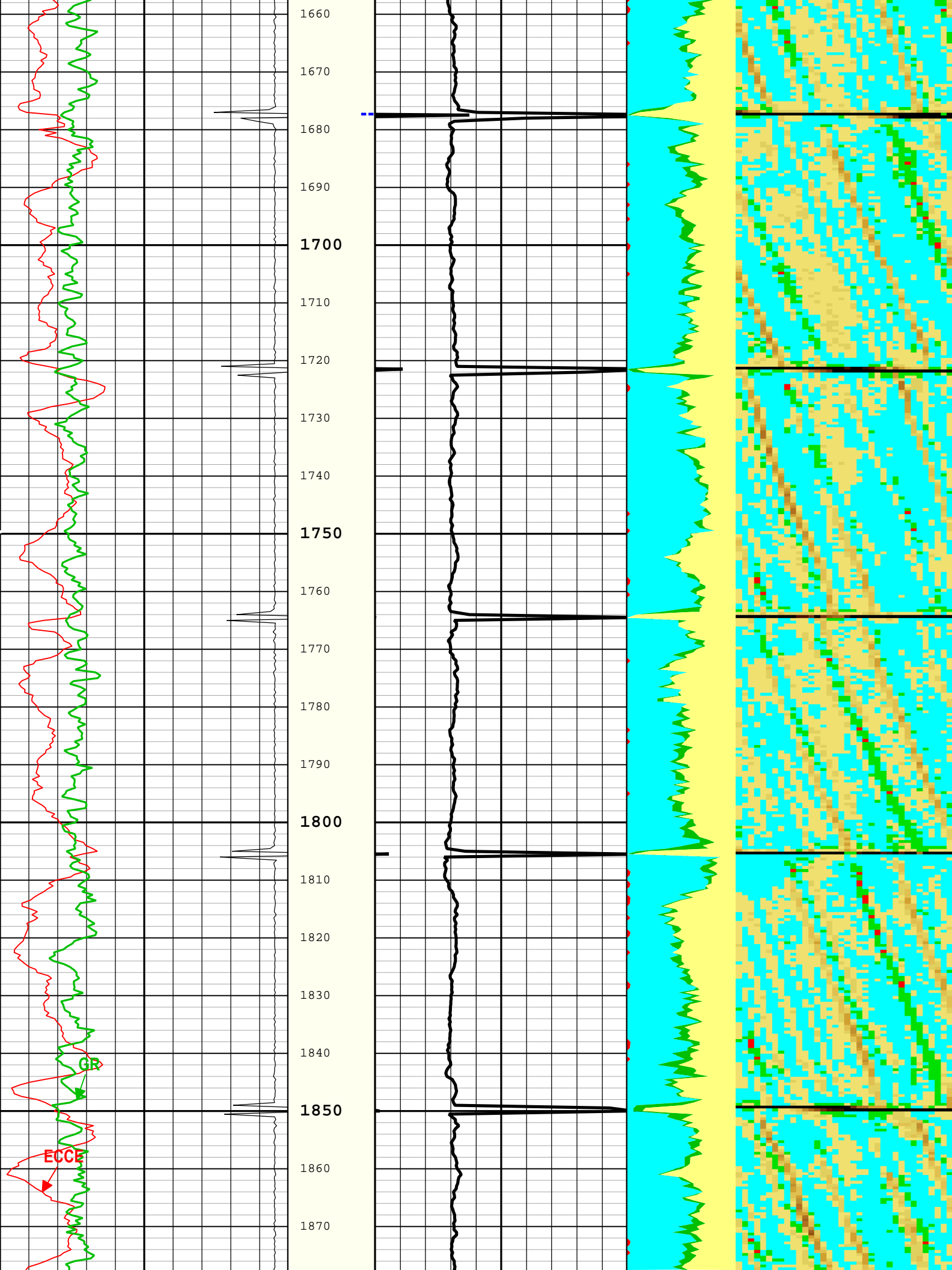


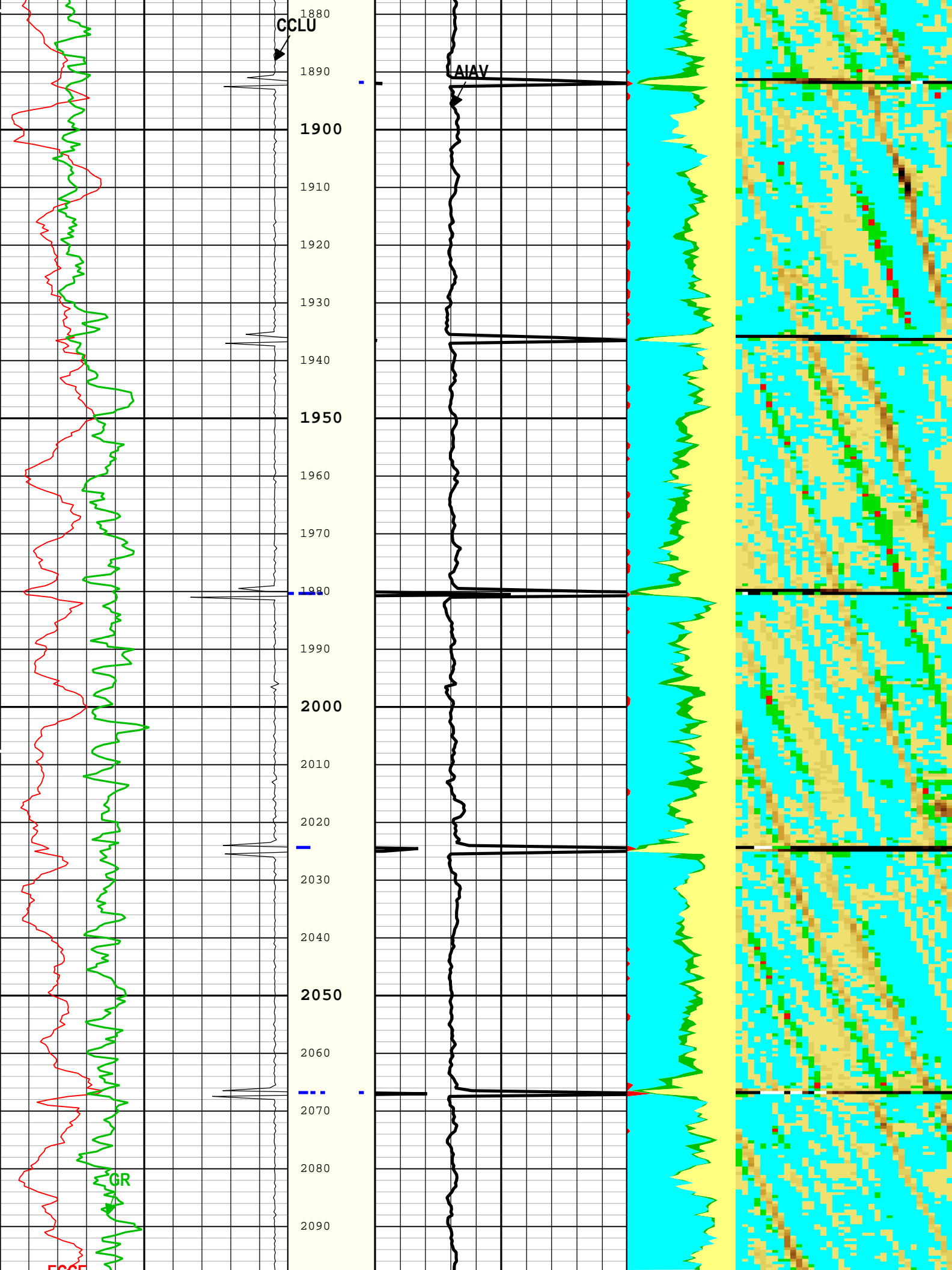


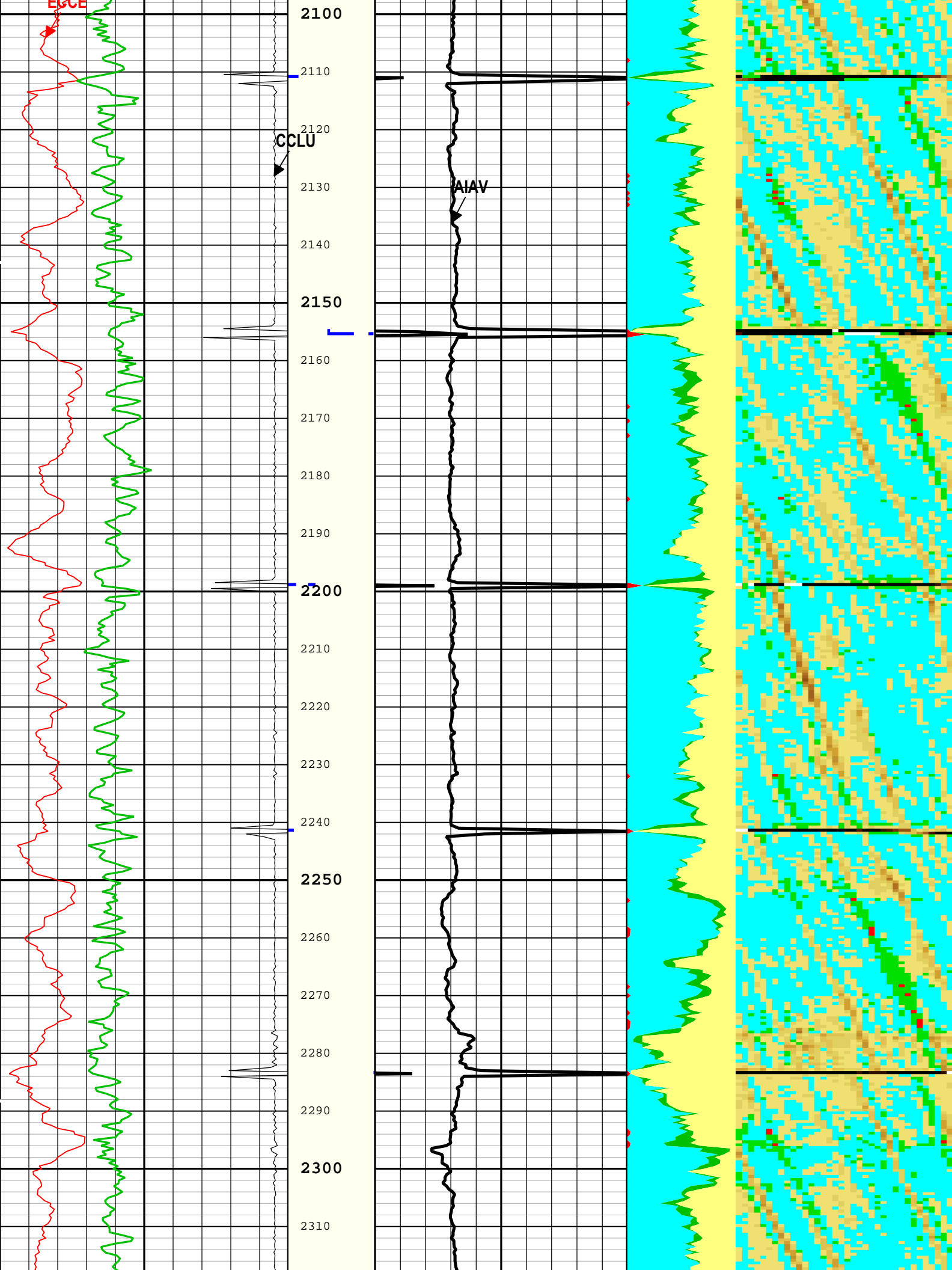


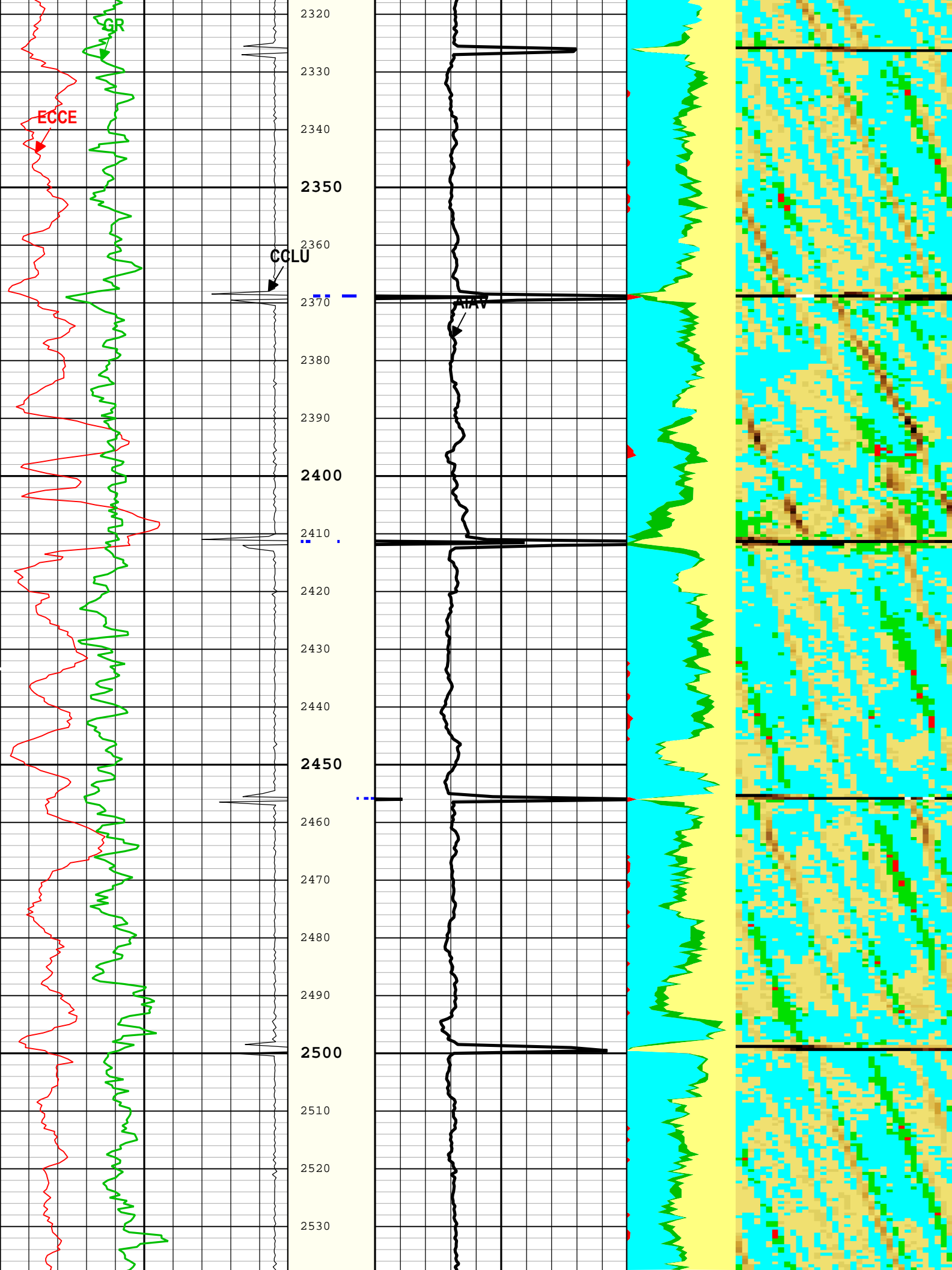




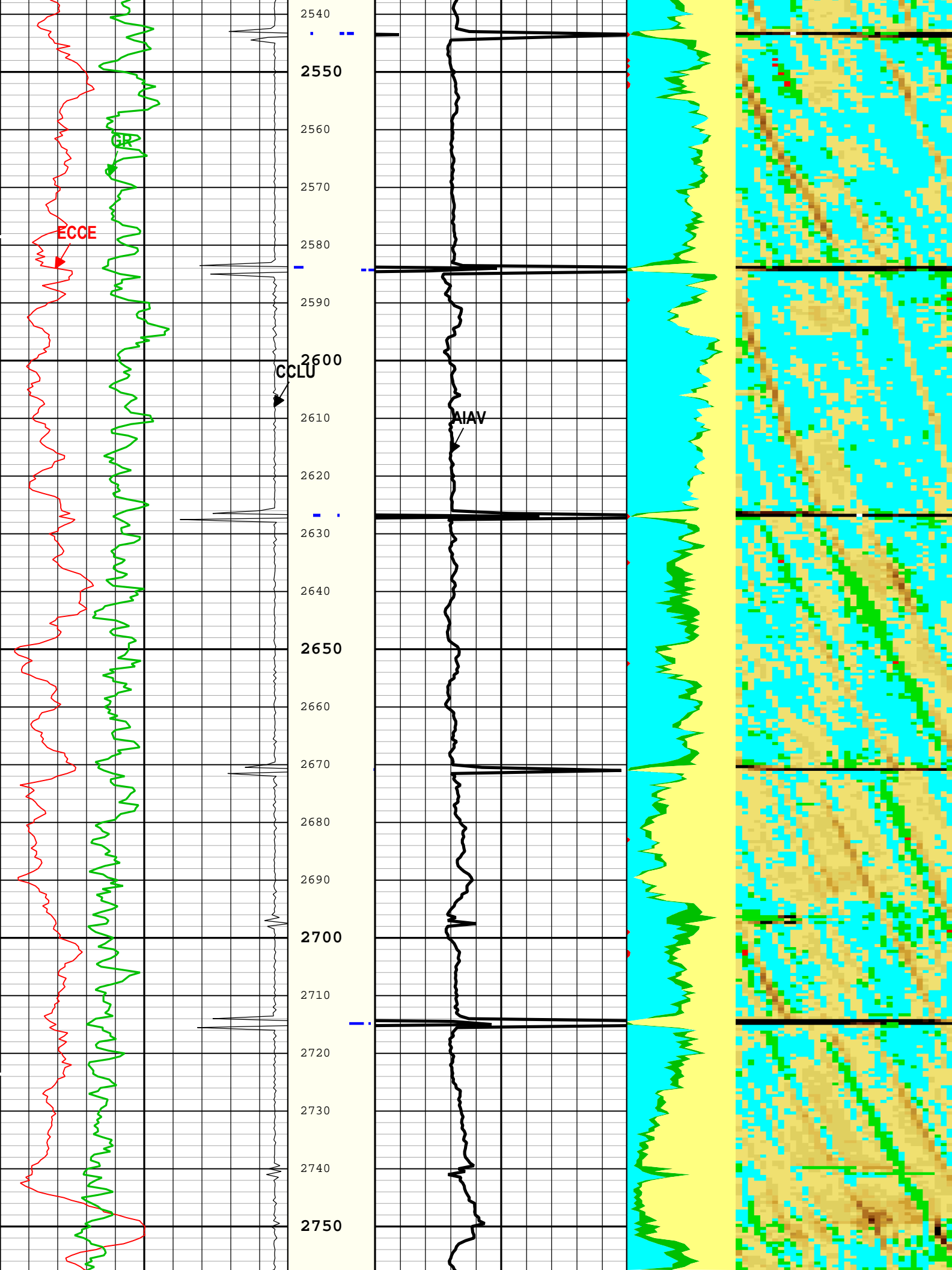


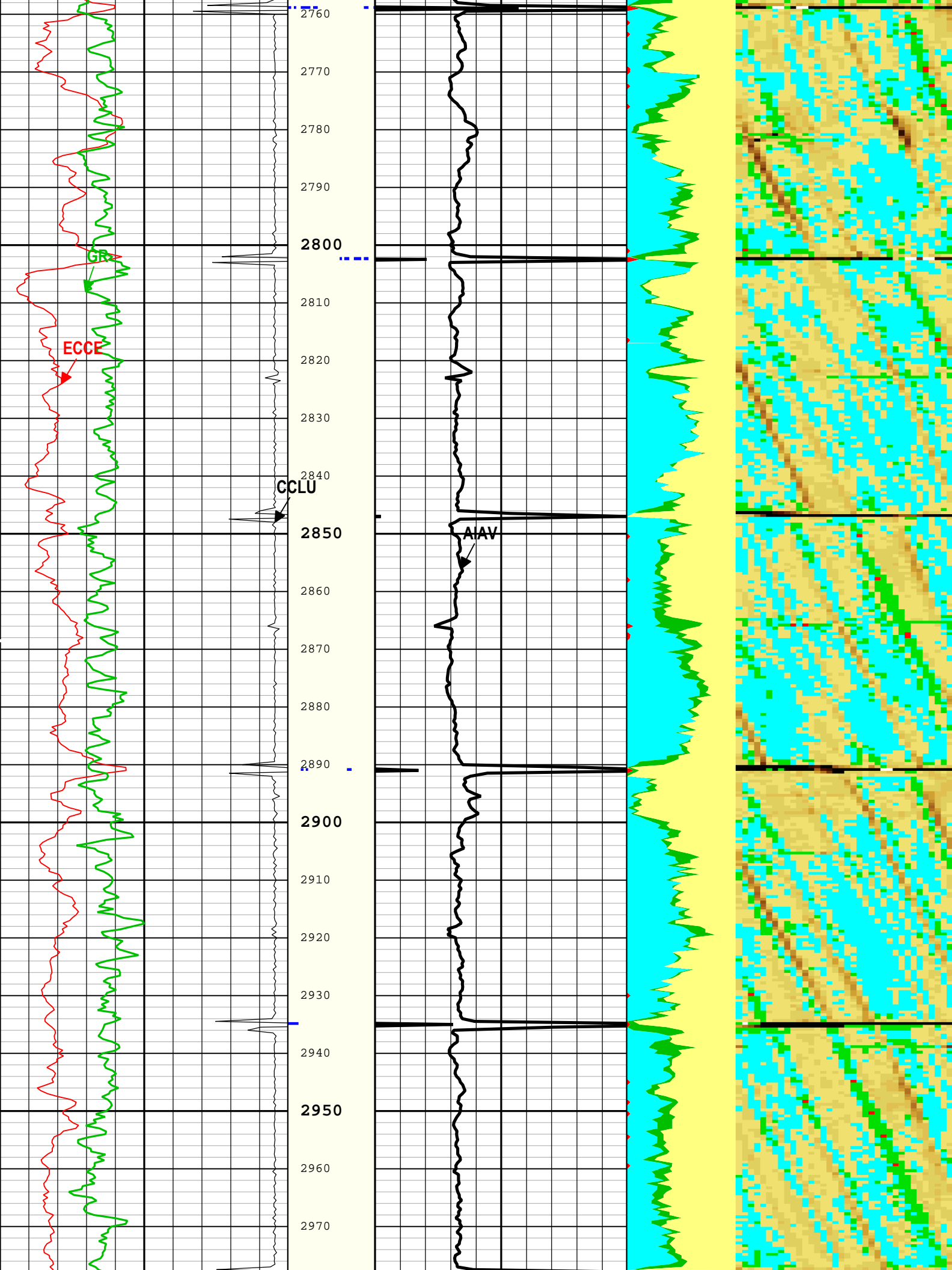


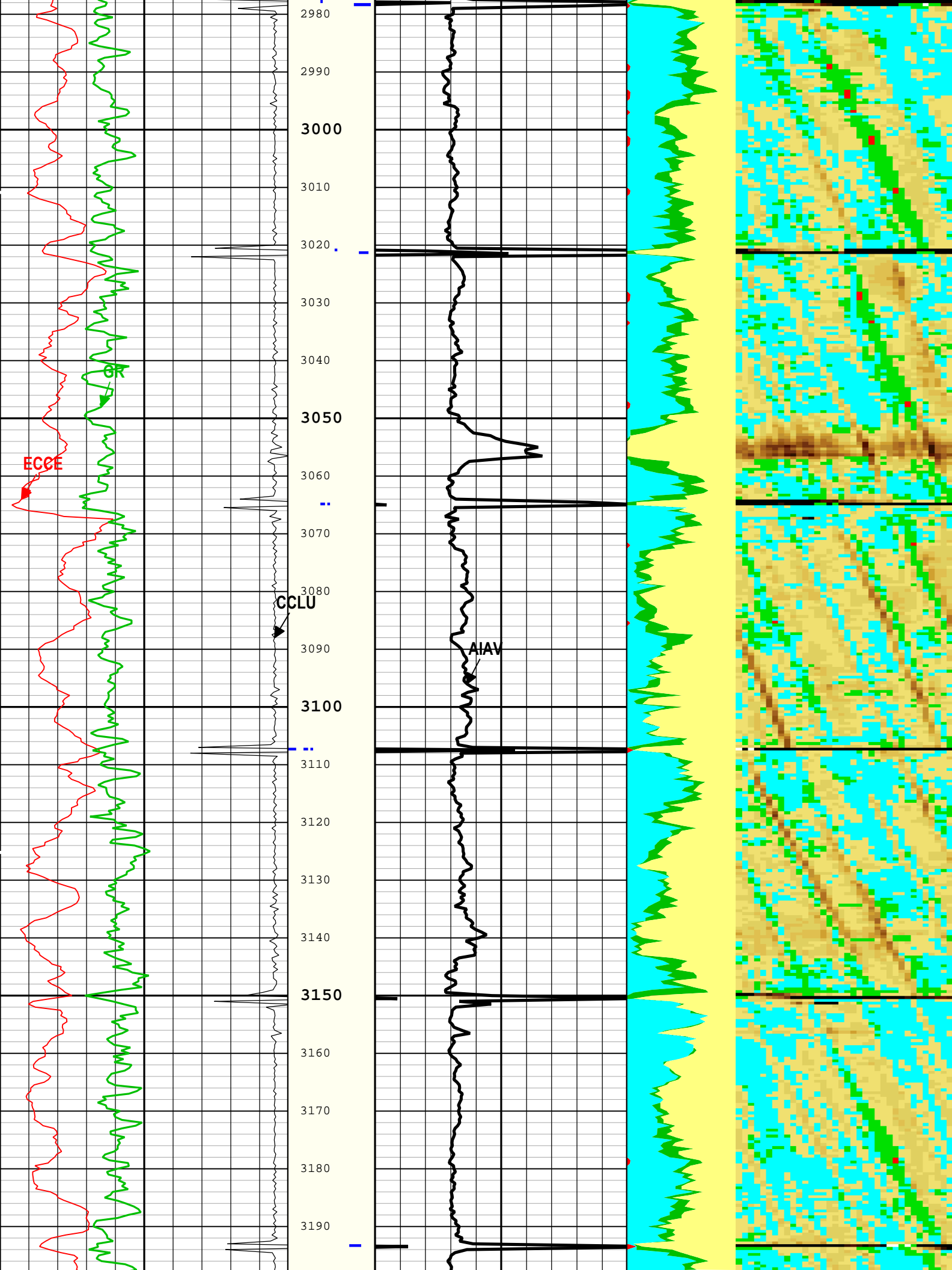


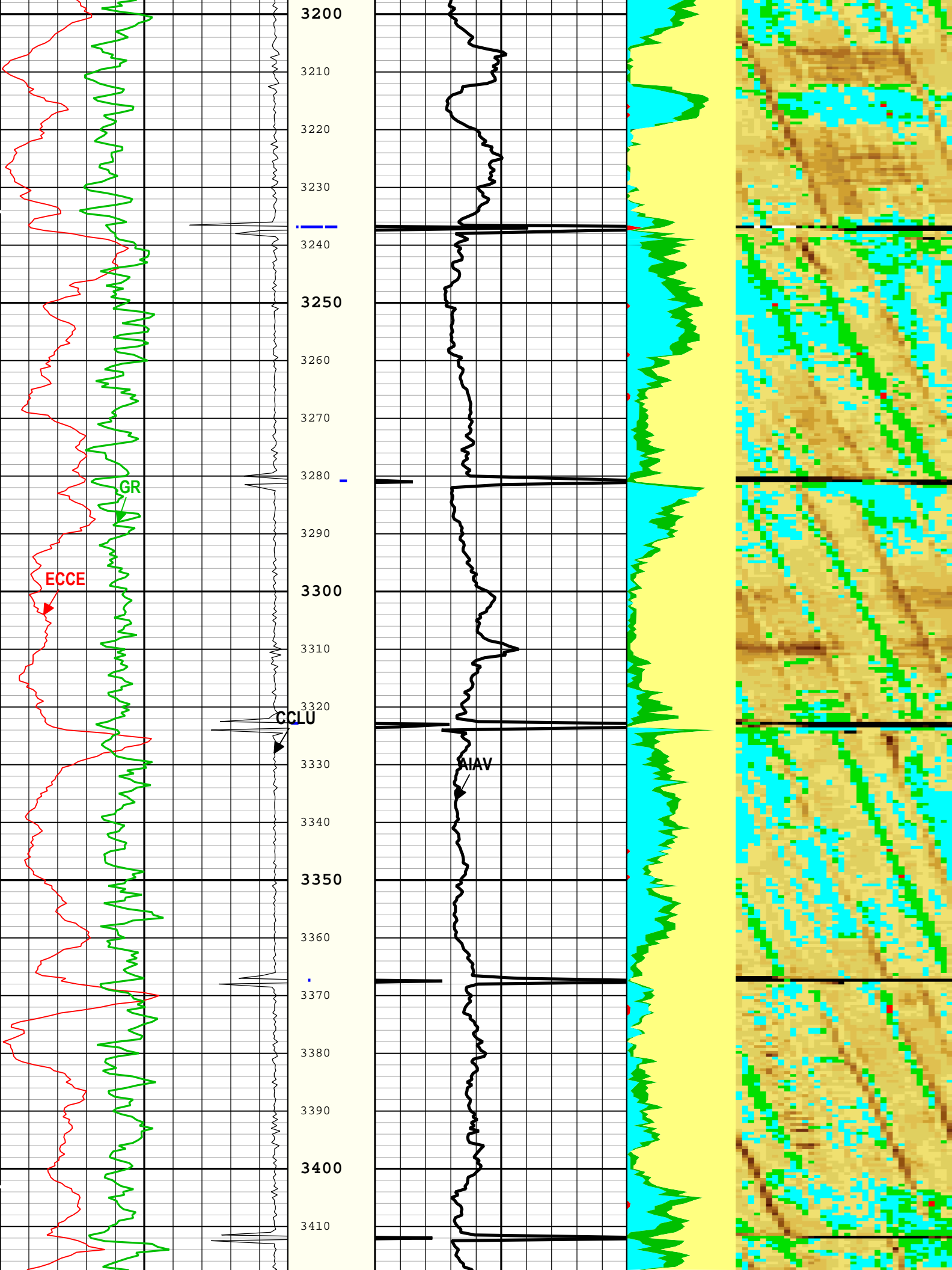


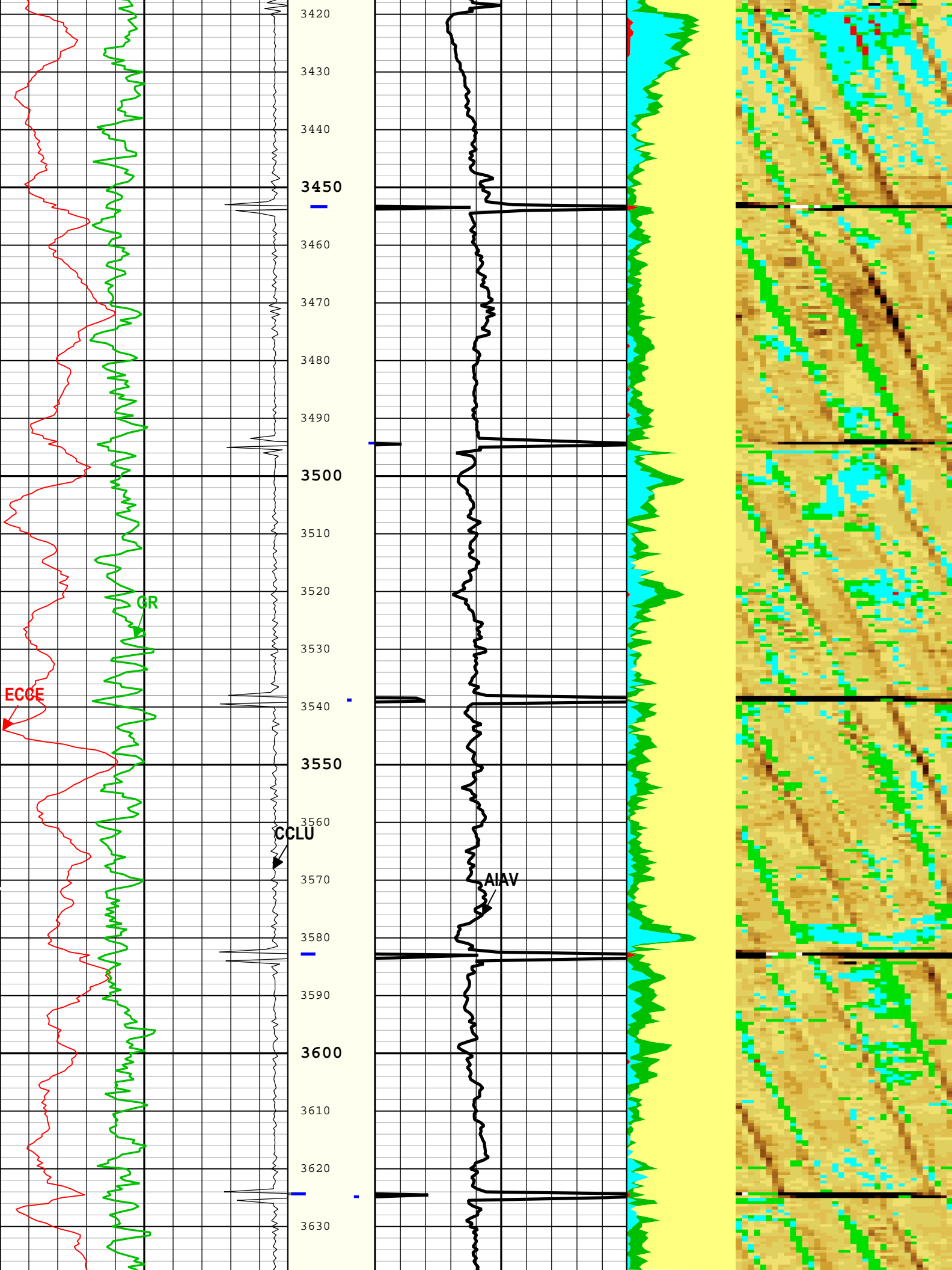


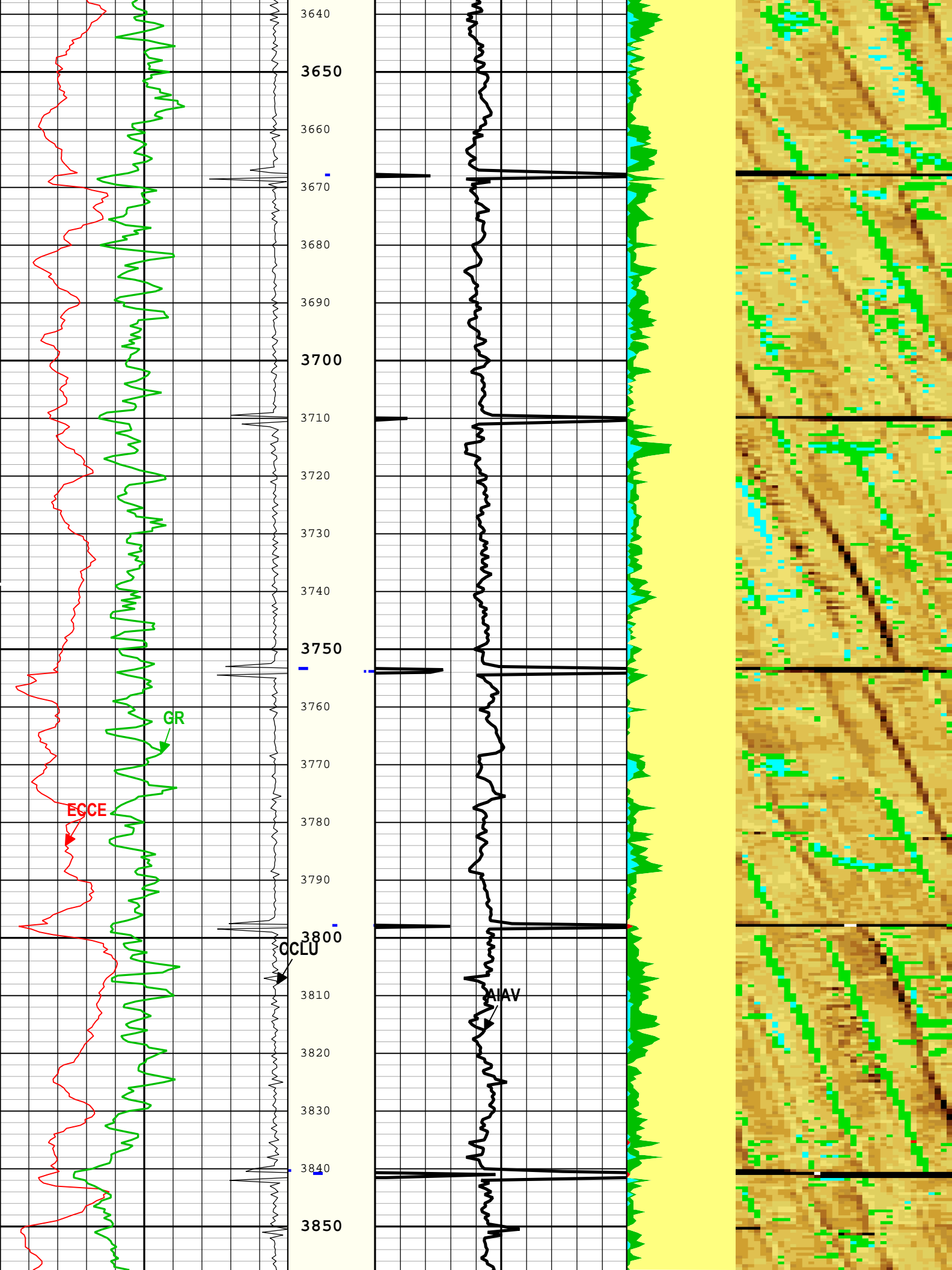


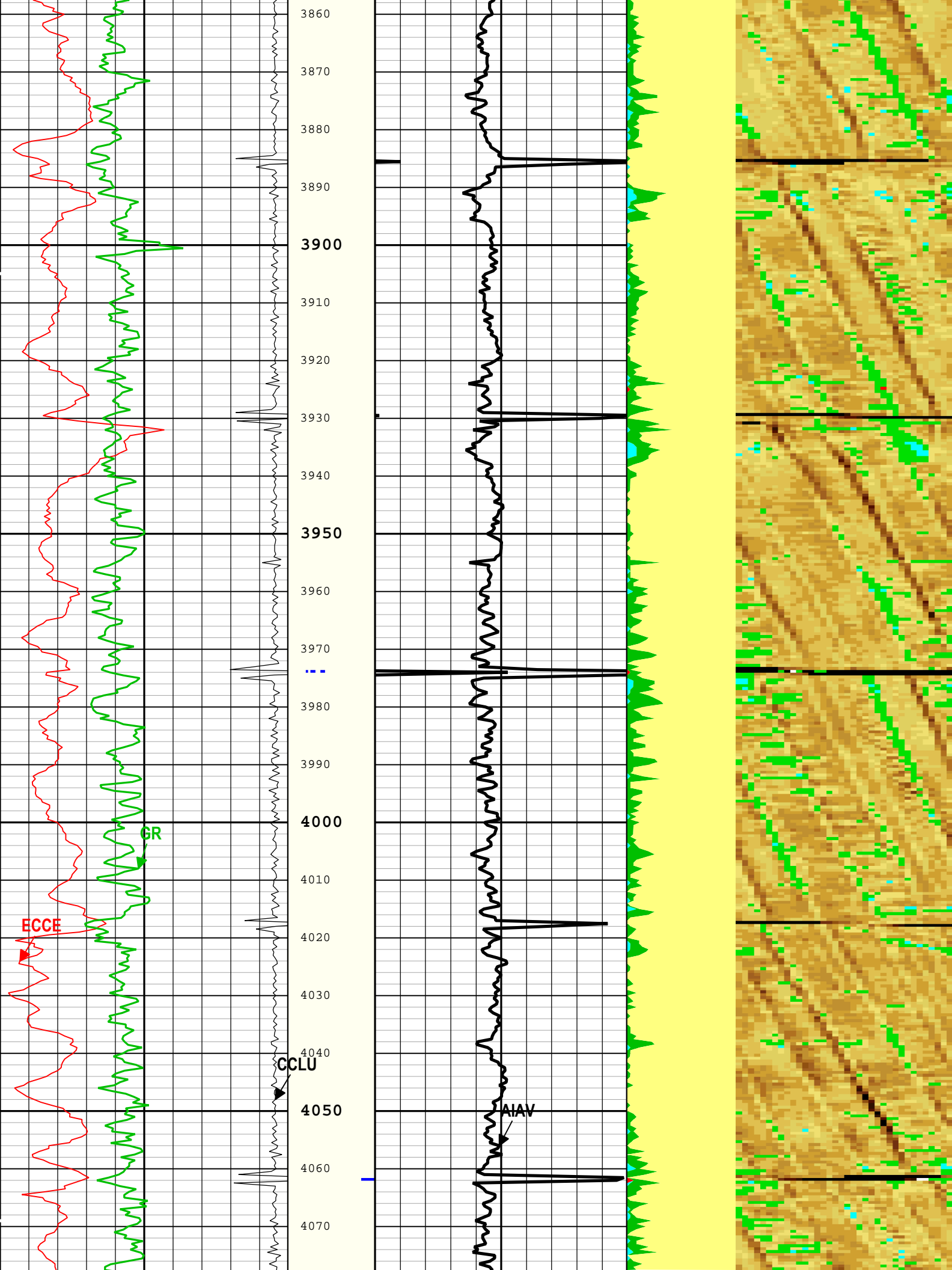


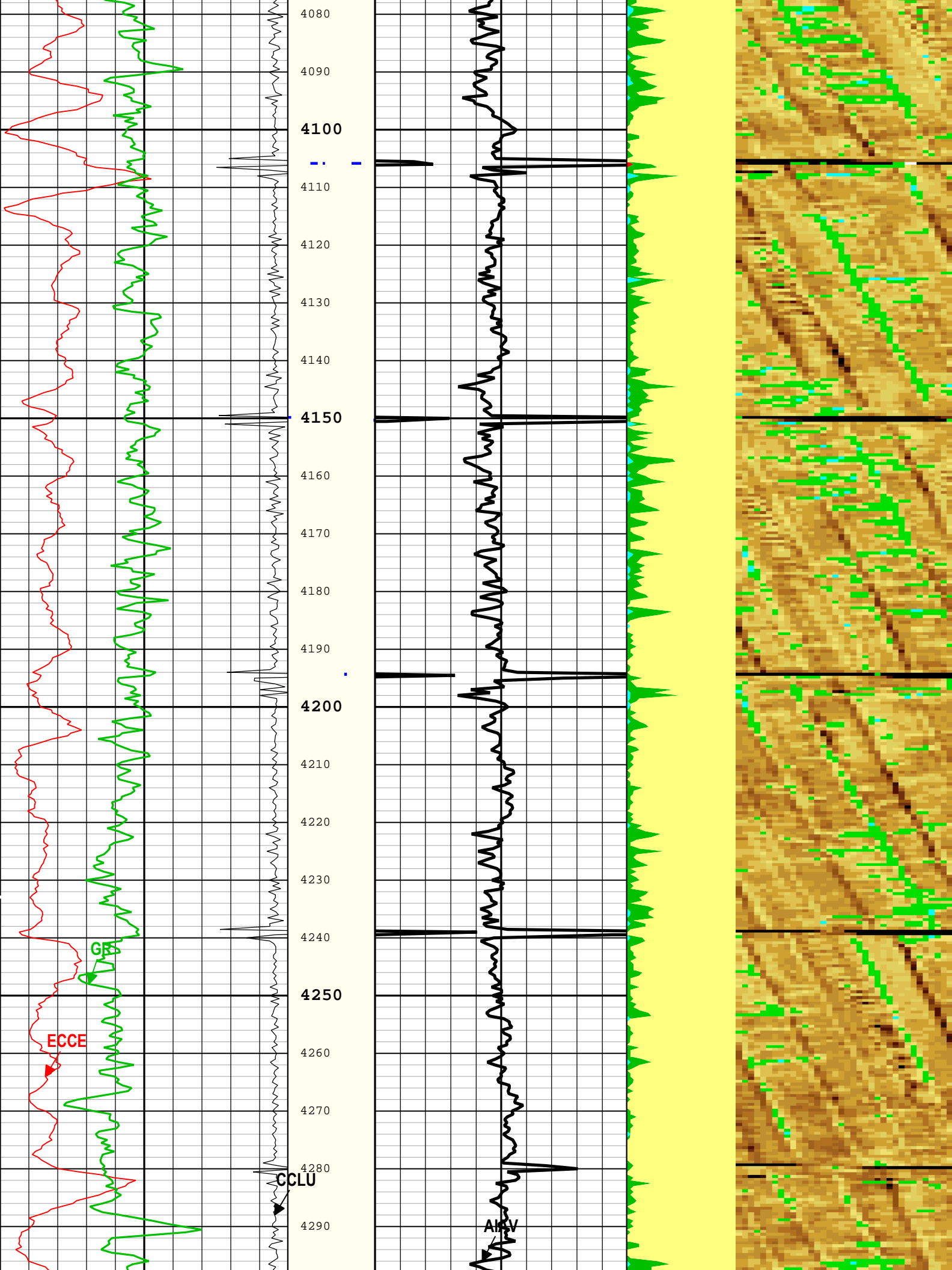




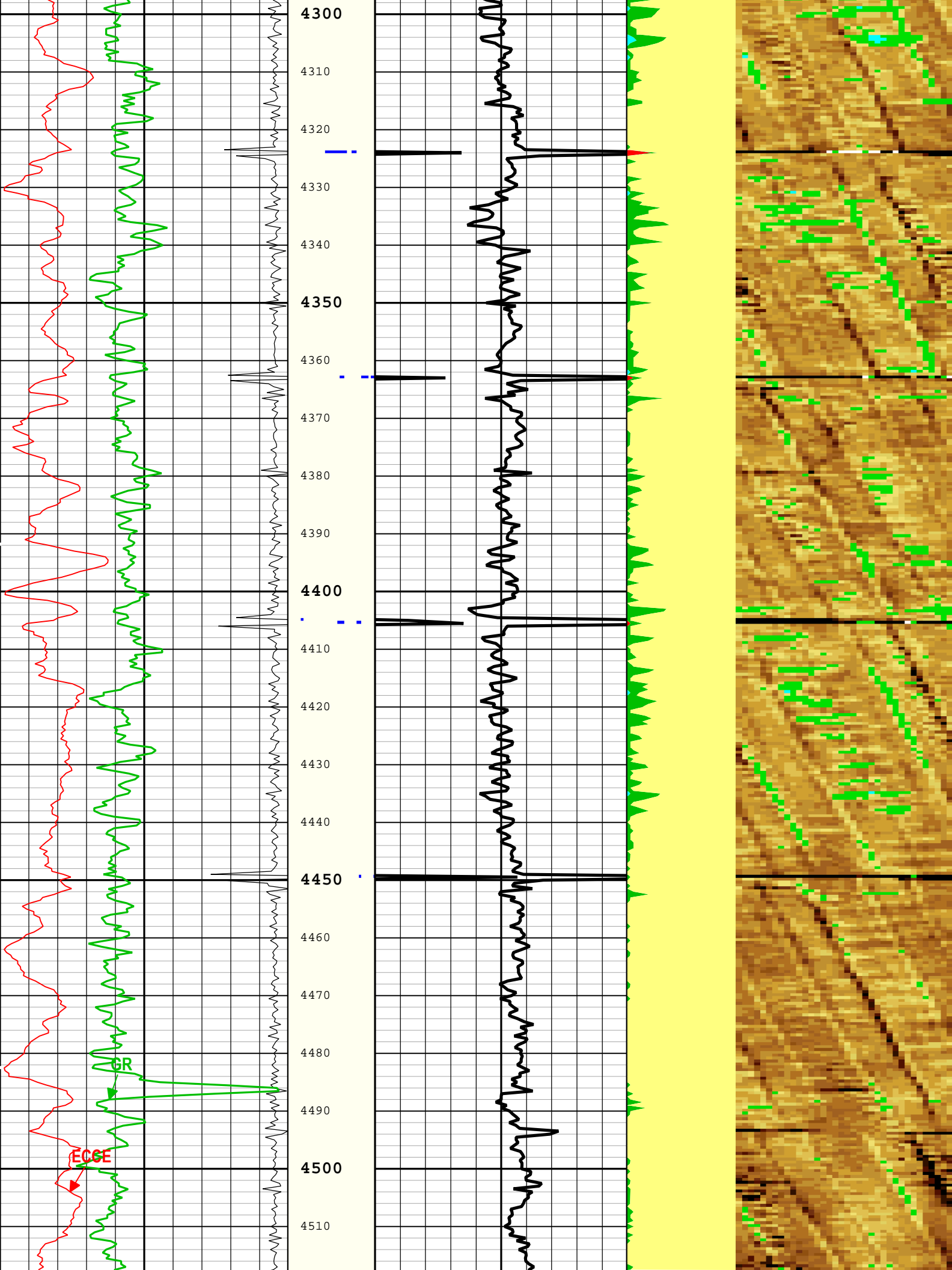


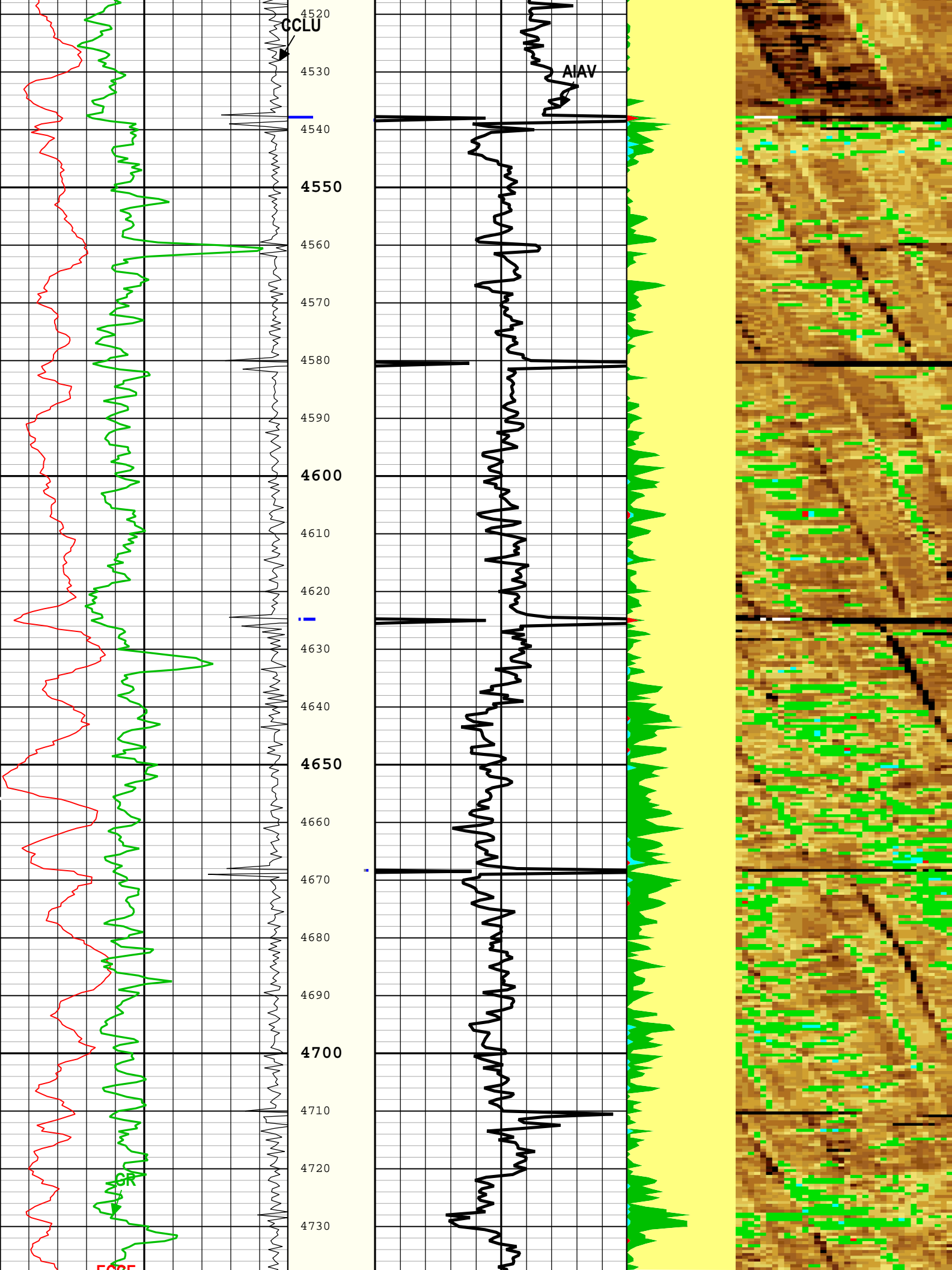


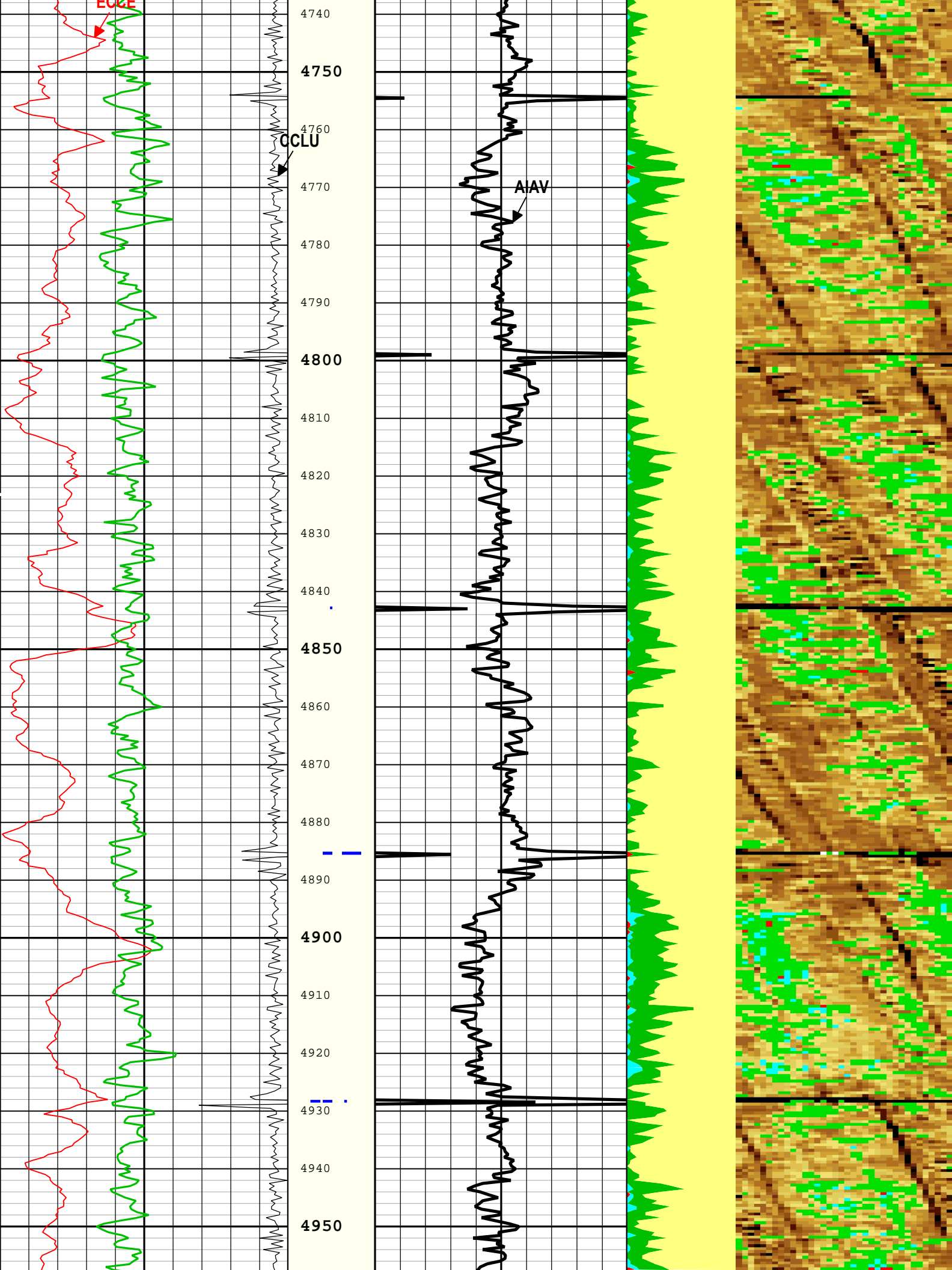


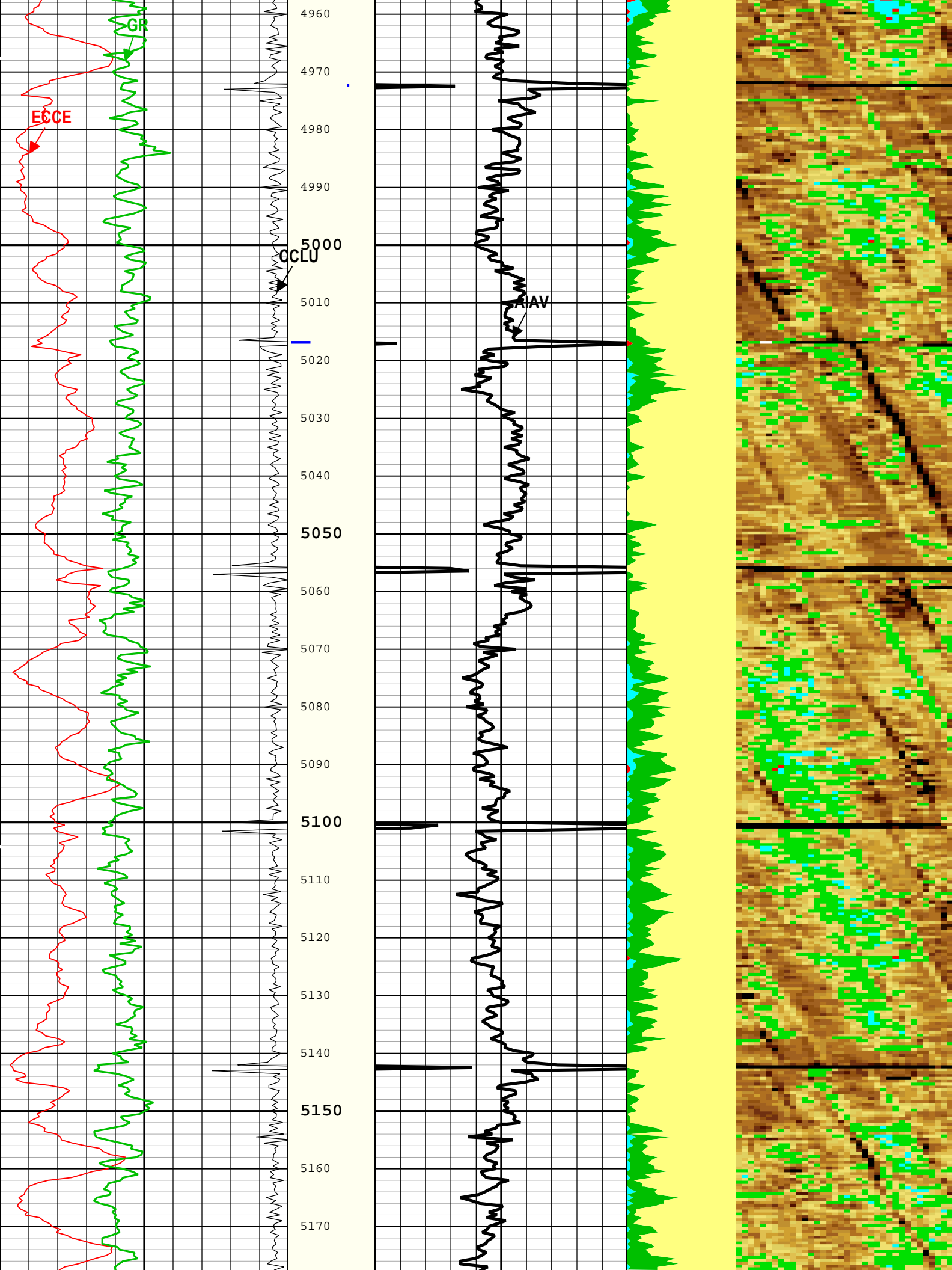


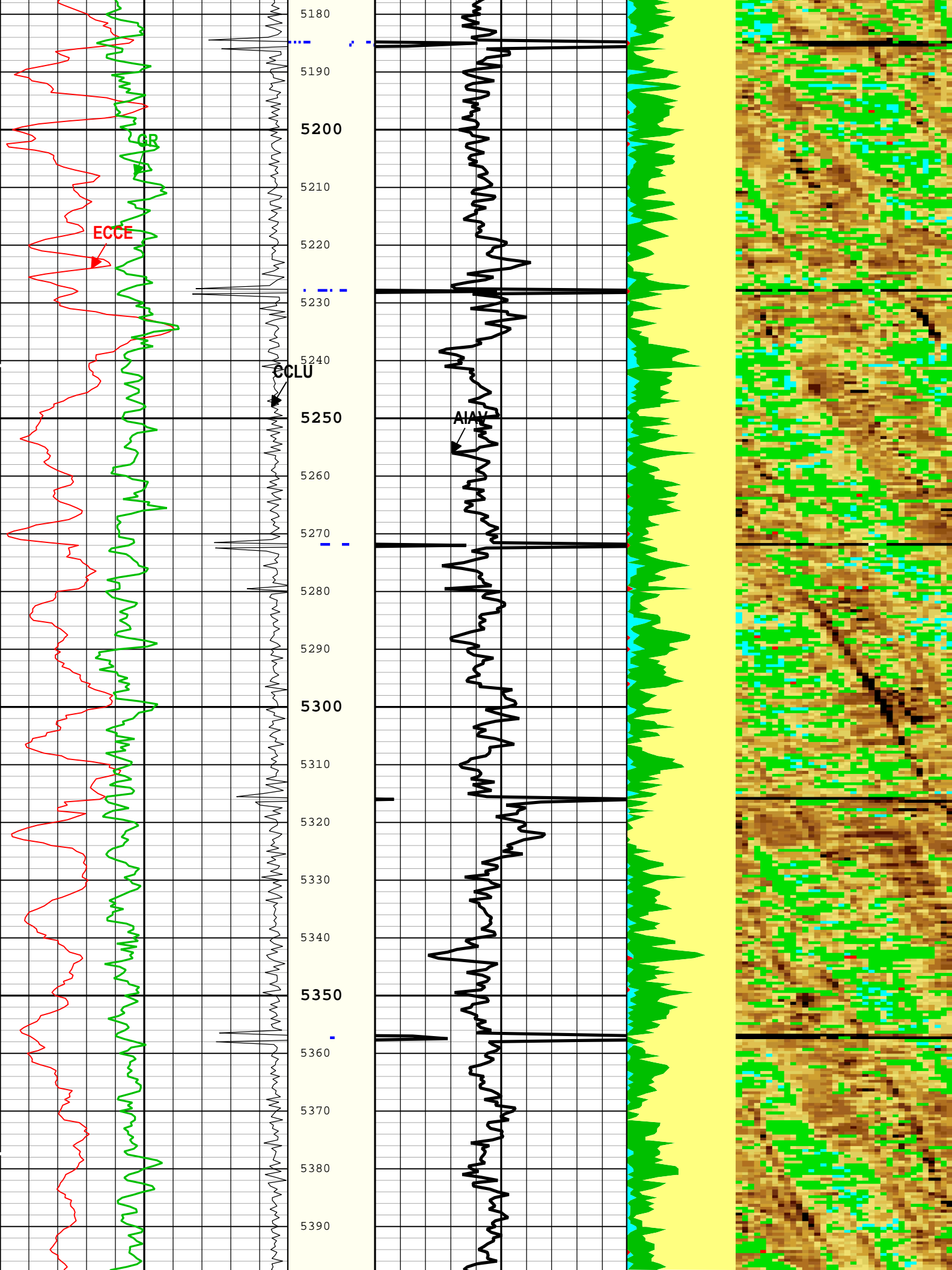


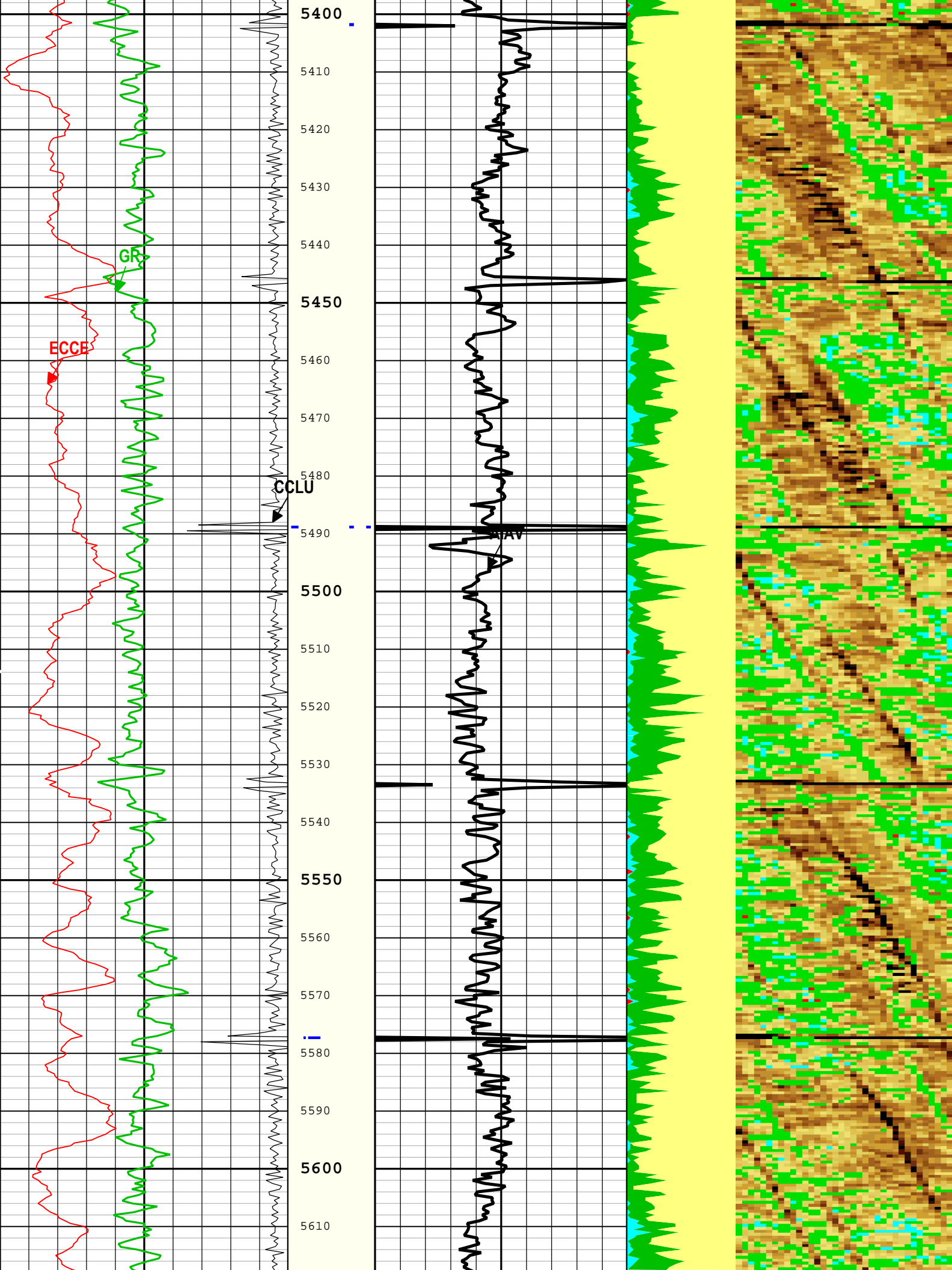


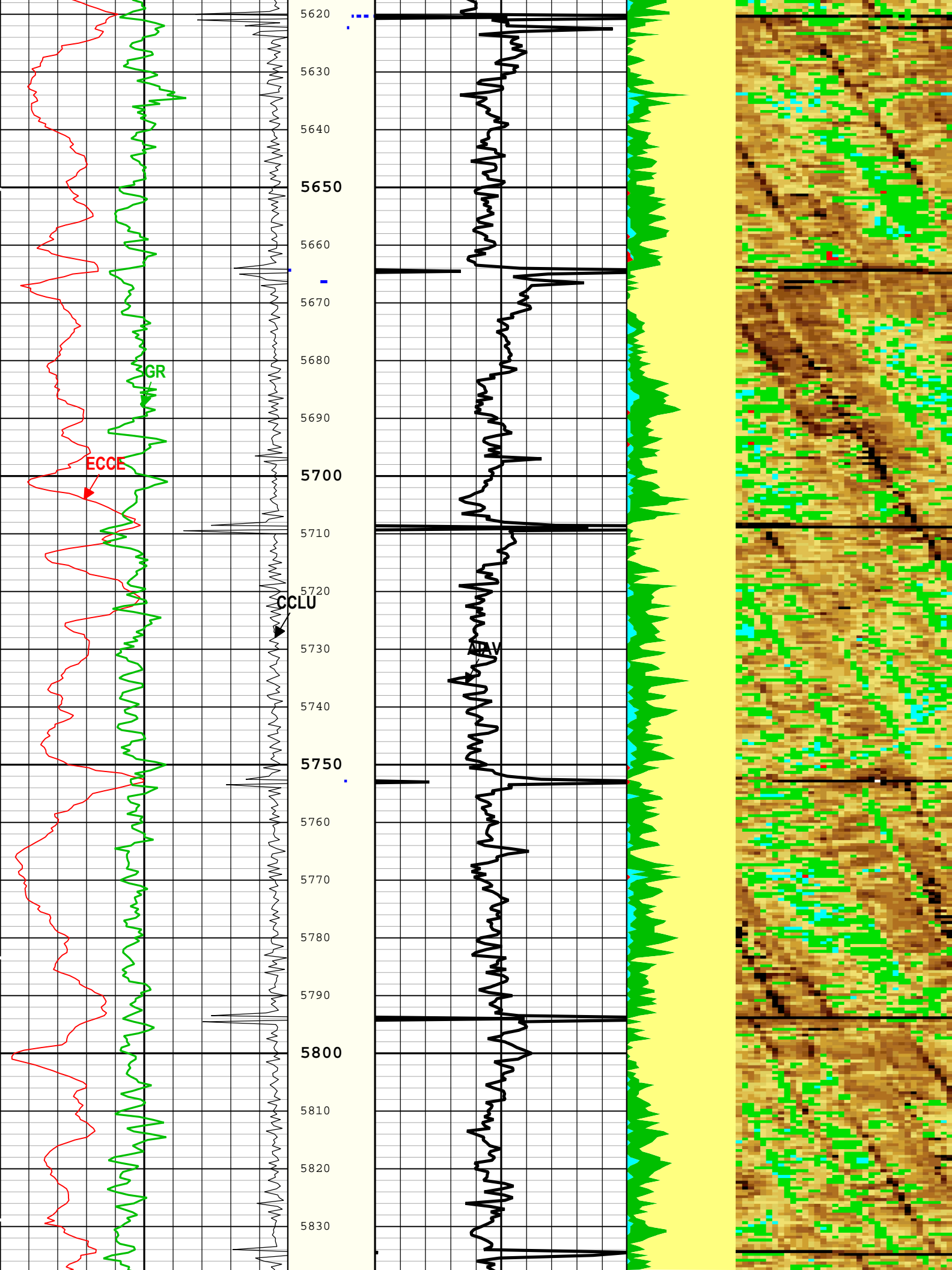




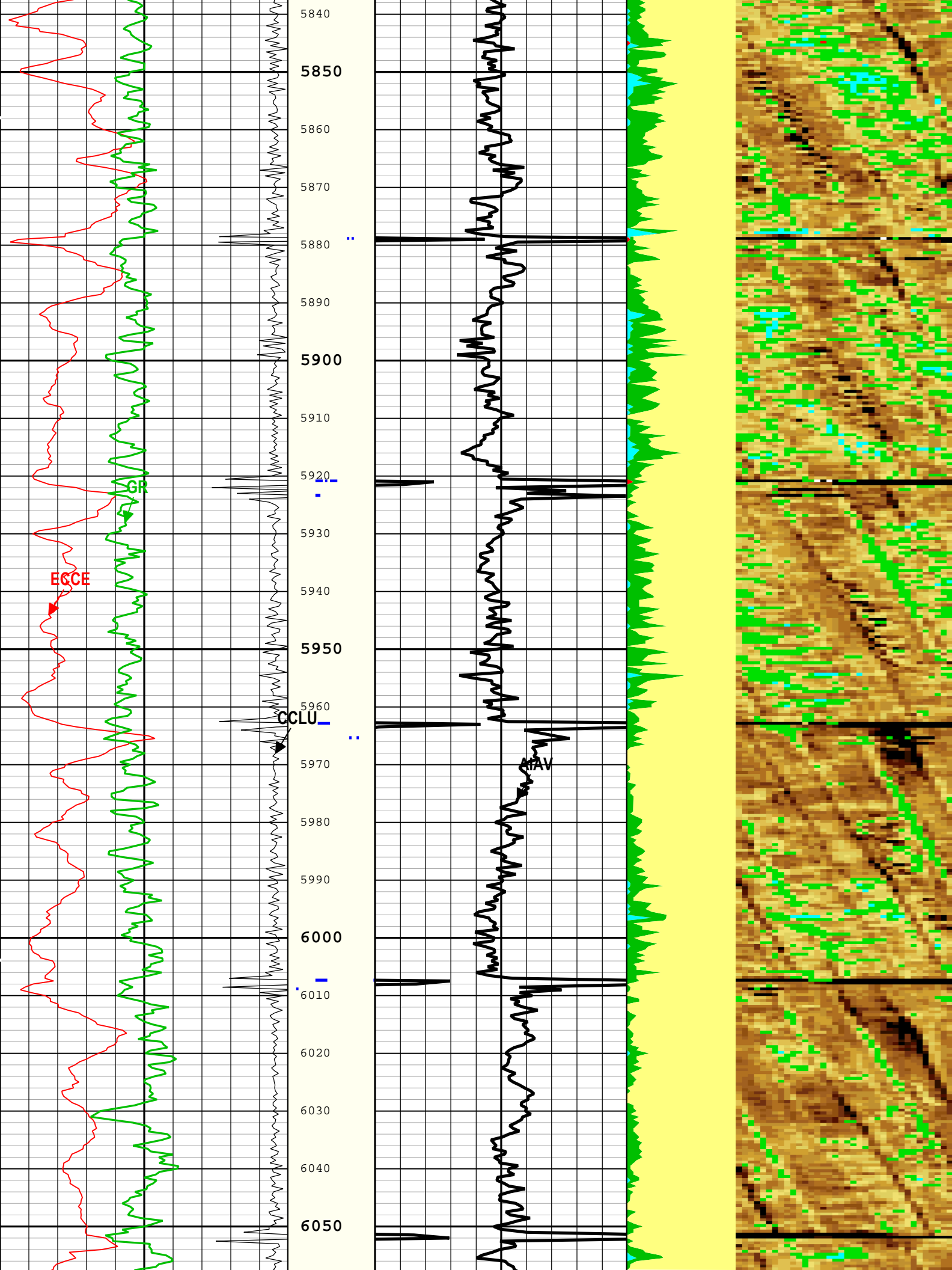




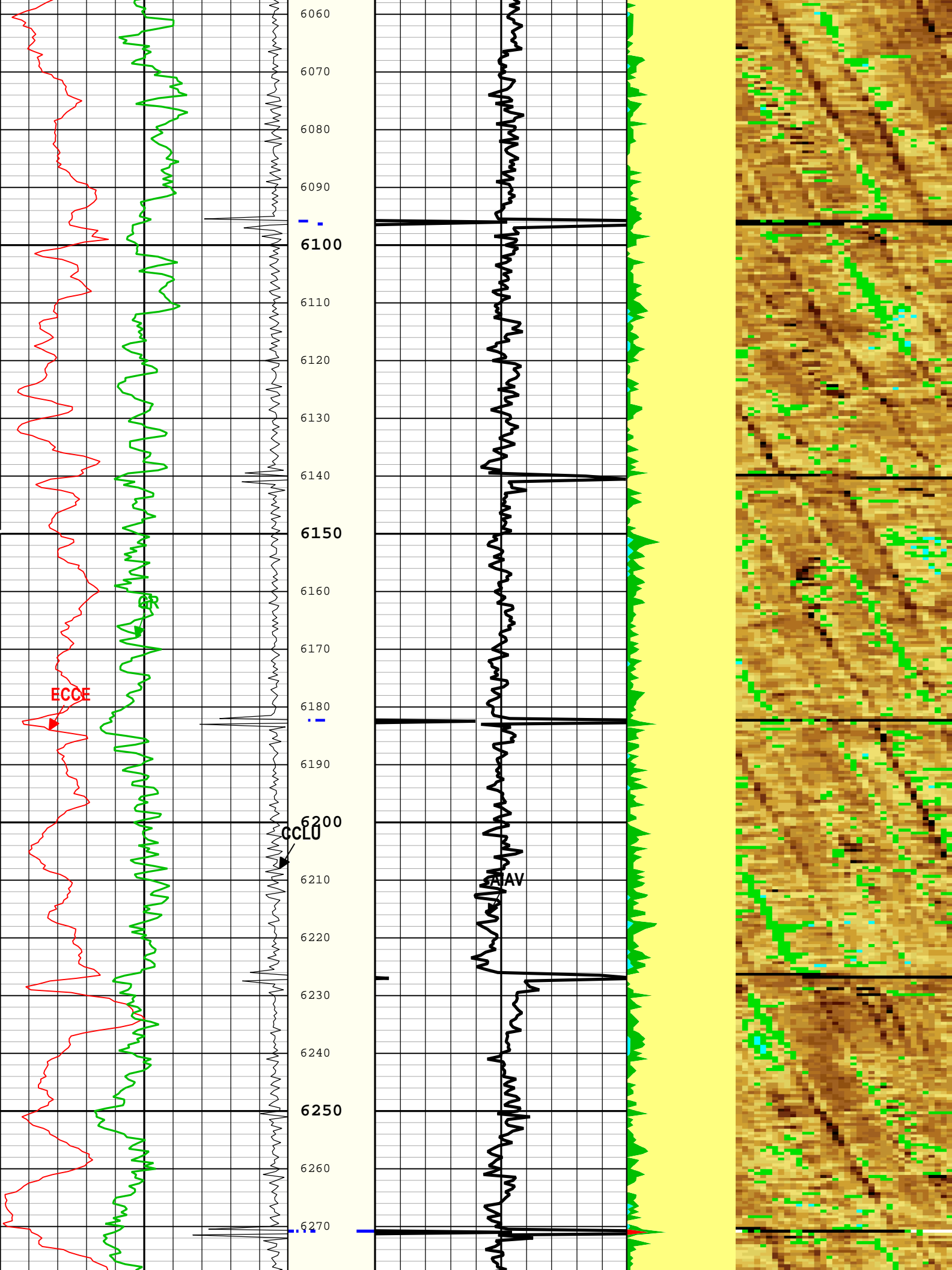


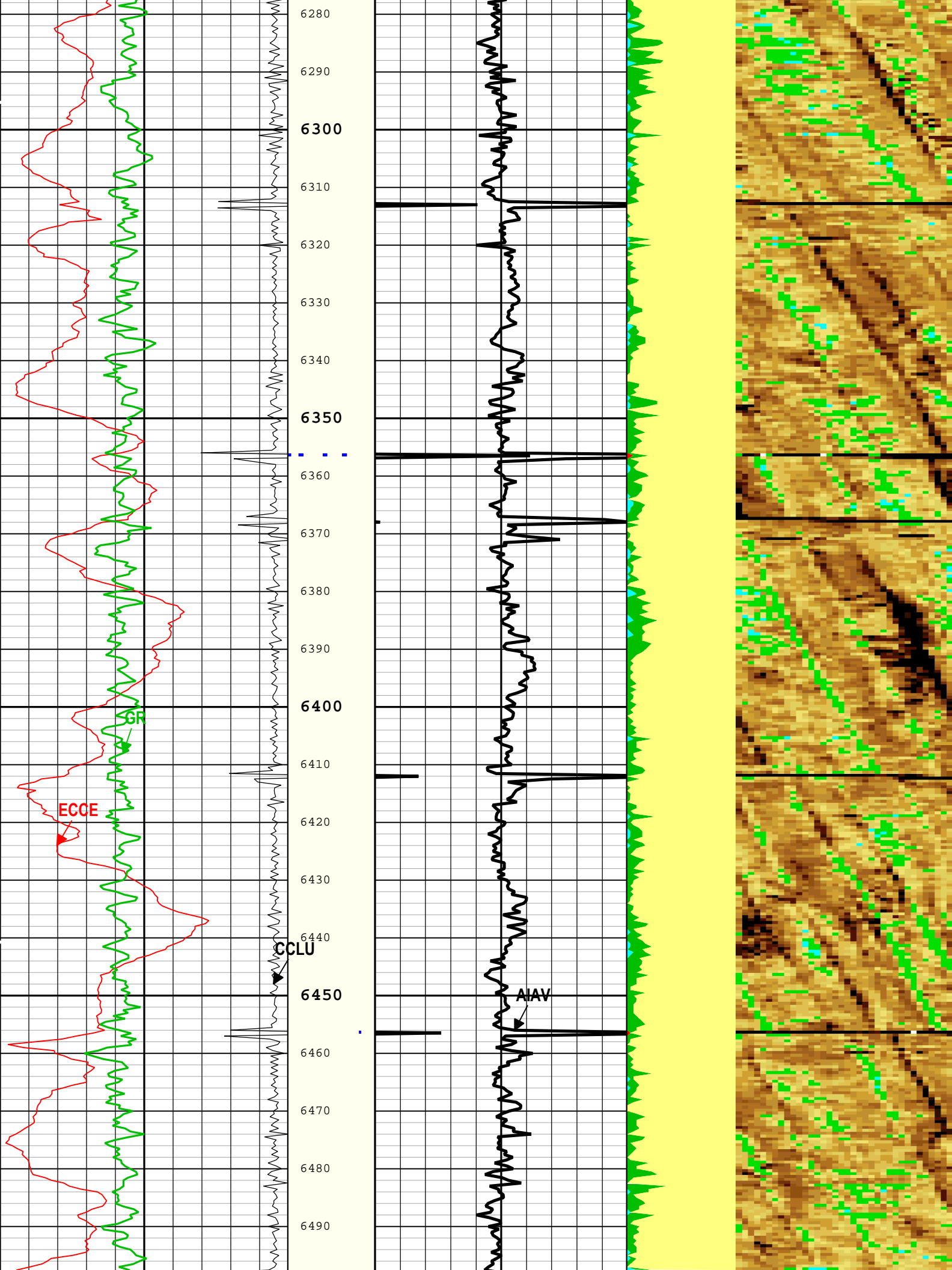


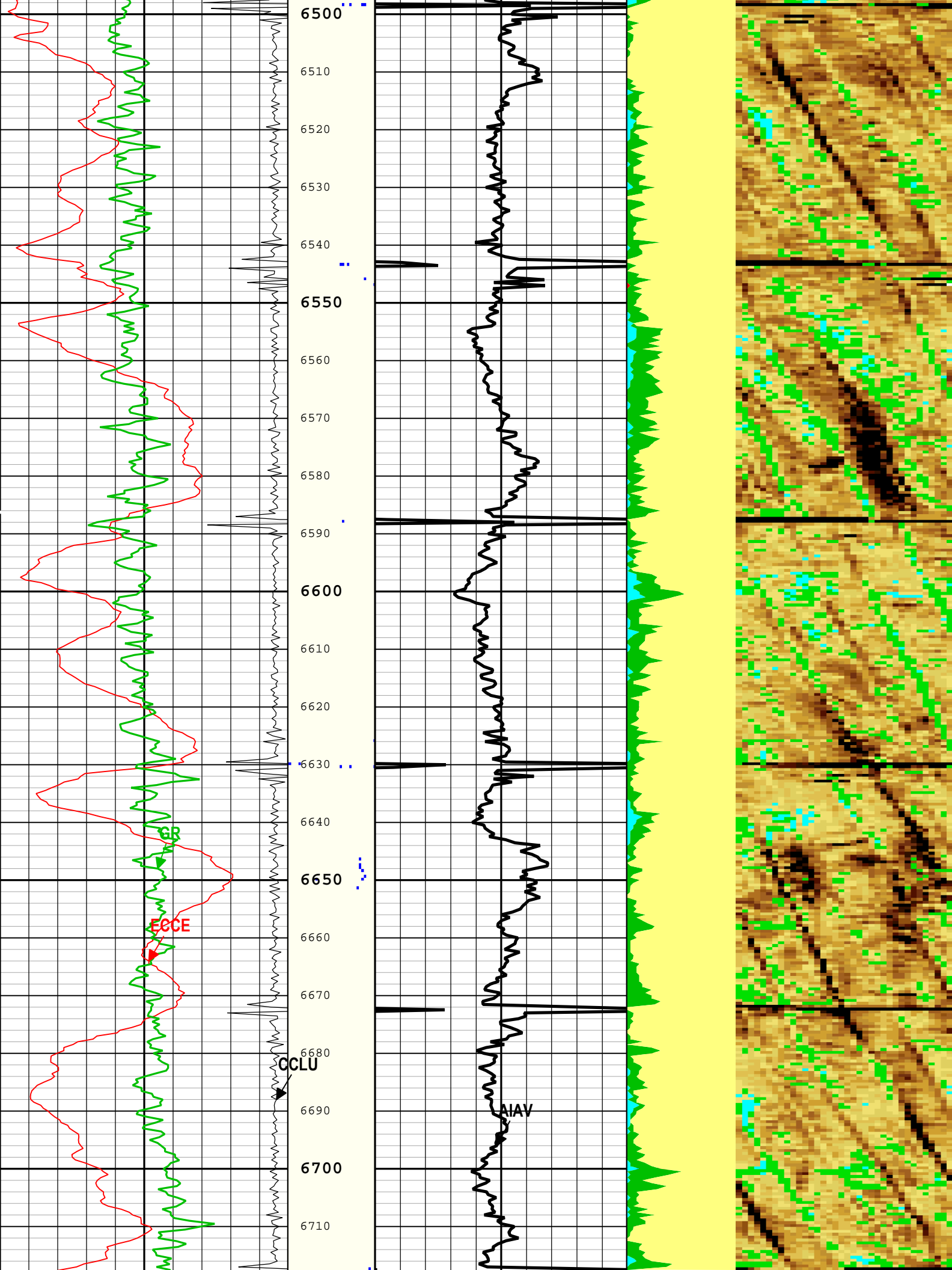


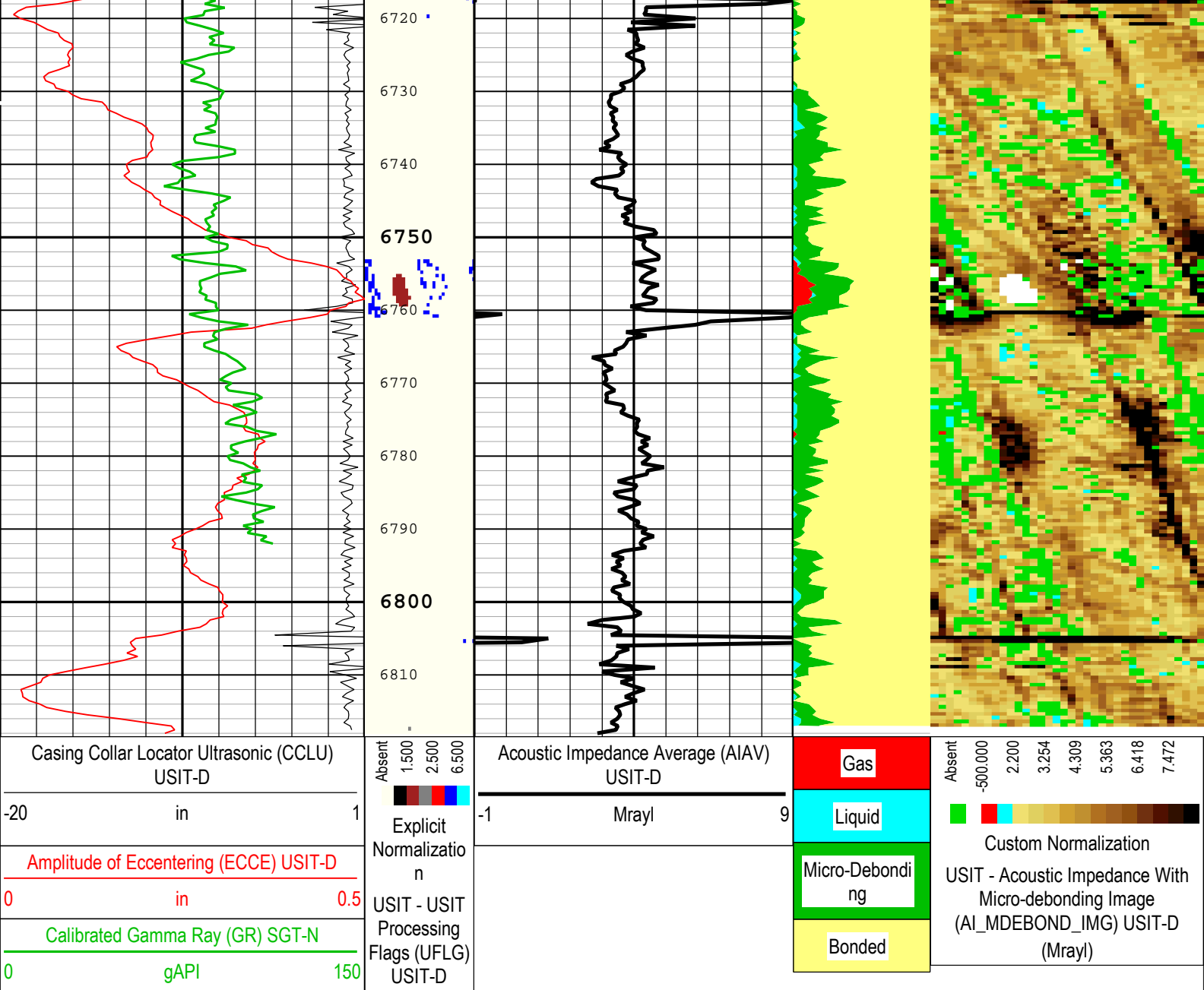












Channel Processing Parameters				
ONE: Parameters				
Parameter	Description	Tool	Value	Unit
BARI(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BS	Bit Size	WLSESSION	Depth Zoned	in
CMTY(U-USIT_CEMT)	Cement Type	USIT-D	Regular Cement	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	191	us/ft
HEMA	Hematite Presence Flag	Borehole	No	
ICE_PROCESS	ICE Processing	USIT-D	Yes	
IMAR	Image Rotation	USIT-D	Off	
MEAS_WLEN	Tcube Processing Window Length in Measurement Mode	USIT-D	22.44	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-D	1.08	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-D	1.6	Mrayl
USI_FVEL_SEL	USI Fluid Velocity Selection	USIT-D	Automatic	

USI_ZMUD_SEL	USI Mud Impedance Selection	USIT-D	FreePipe Norm.	
ZMUD	Acoustic Impedance of Mud	Borehole	1.7	Mrayl
ZTCM	Acoustic Impedance Threshold for Cement	USIT-D	2.2	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-D	0.3	Mrayl

Depth Zone Parameters			
Parameter	Value	Start ( ft )	Stop ( ft )
BS	26	82	110
BS	13.5	110	1946
BS	8.5	1946	6818.5
All depth are actual.			

Tool Control Parameters				
ONE: Parameters				
Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-D	-4	dB
AGMX	Maximum Gain of Cartridge	USIT-D	48	dB
EMXV	EMEX Voltage	USIT-D	40	V
HRES	Horizontal Resolution	USIT-D	10 deg	
ULOG	Logging Objective	USIT-D	MEASUREMENT	
USFR	Ultrasonic Sampling Frequency	USIT-D	500000	Hz
UPAT	USIT Emission Pattern	USIT-D	Pattern 375 KHz	
UWKM	USIT Working Mode	USIT-D	Uncompressed 10 deg at 6.0 in LF	
WINB	Window Begin Time	USIT-D	Time Zoned	us
WINE	Window End Time	USIT-D	Time Zoned	us

Time Zone Parameters					
Parameter	Value	Start Time	Stop Time	Start Depth ( ft )	Stop Depth ( ft )
WINB	30.58	11-Oct-2018 17:55:03	11-Oct-2018 17:55:50	6819.28	6753.41
WINB	26.39	11-Oct-2018 17:55:50	11-Oct-2018 17:56:30	6753.41	6658.81
WINB	23.6	11-Oct-2018 17:56:30	11-Oct-2018 18:47:04	6658.81	108.91
WINE	73.14	11-Oct-2018 17:55:03	11-Oct-2018 17:56:32	6819.28	6653.29
WINE	74.88	11-Oct-2018 17:56:32	11-Oct-2018 18:47:04	6653.29	108.91
All depth are at tool zero.					

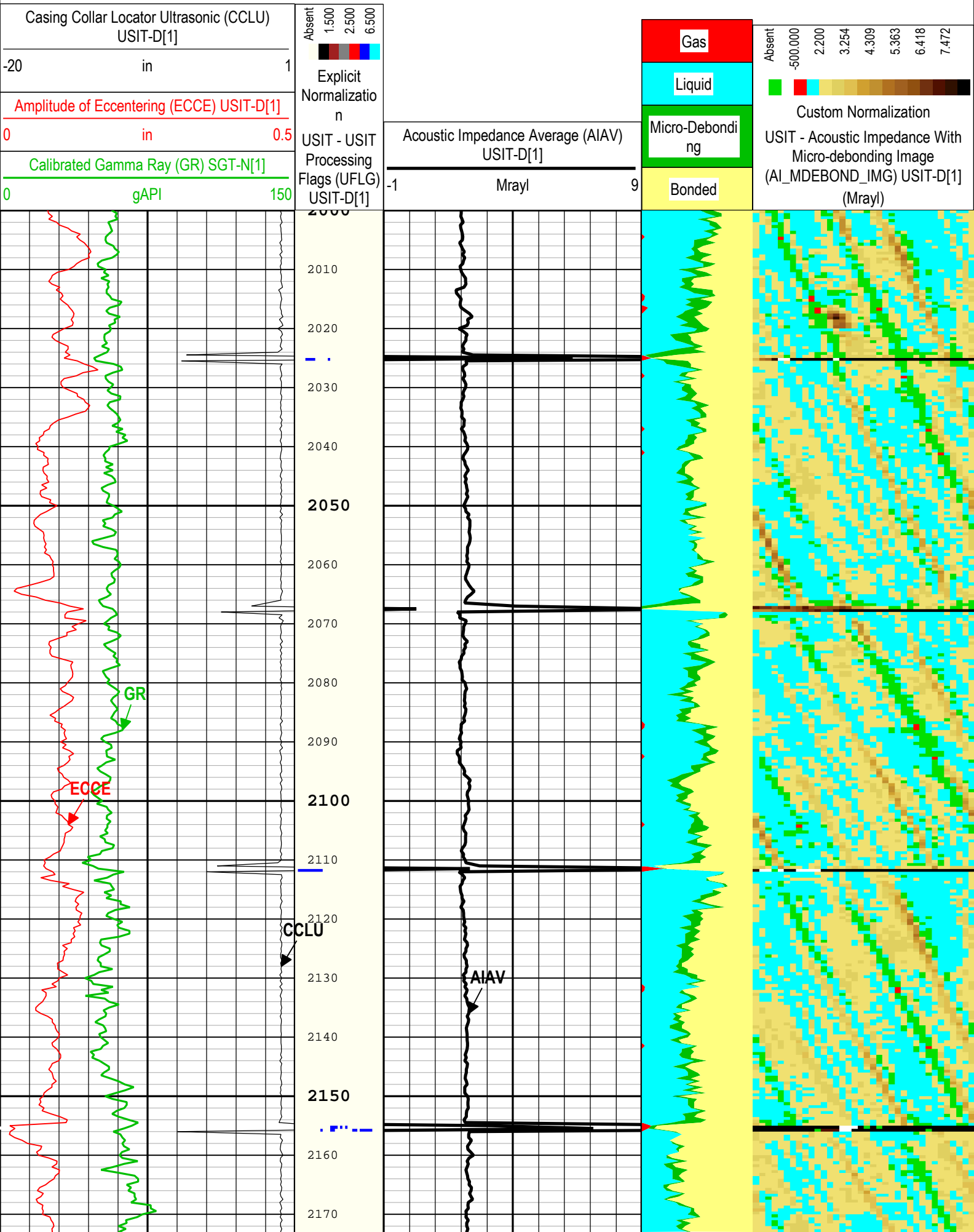
Composite 1				
0 PSI Repeat Pass				

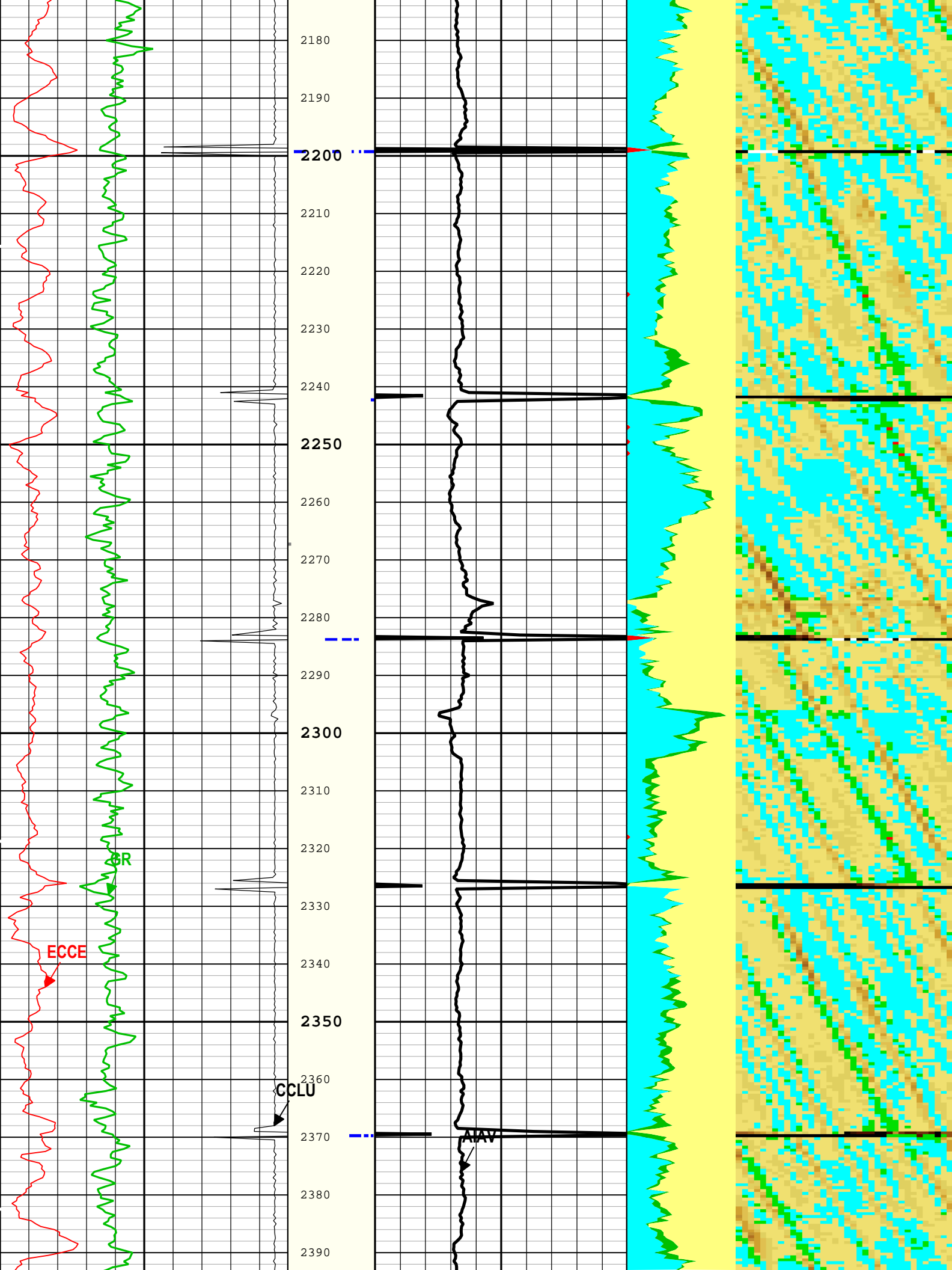
Software Version	
Acquisition System	Version
Maxwell 2018 SP2	8.2.102758.3100

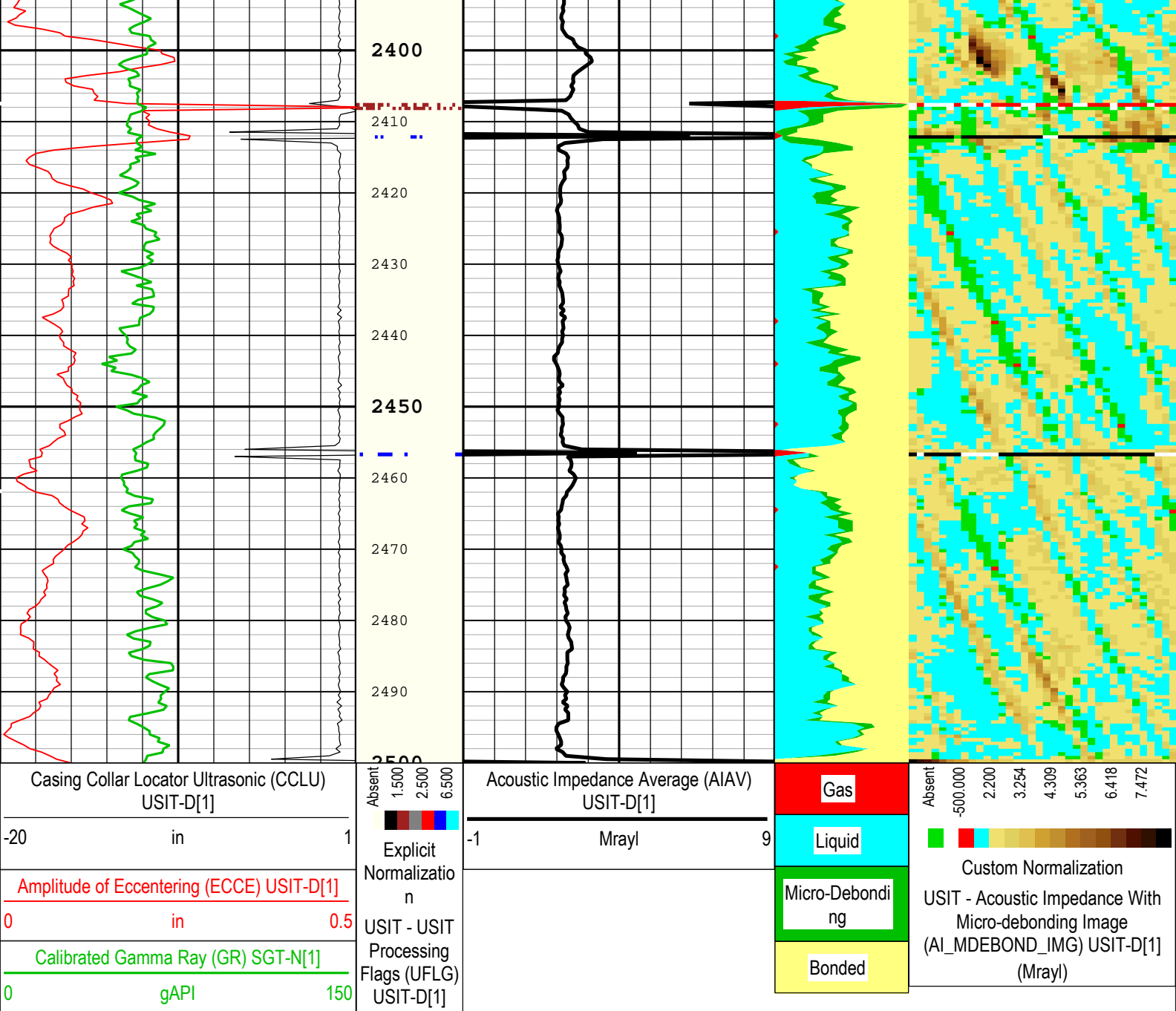
Composite Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[3]:Up	Up	1977.82 ft	2610.38 ft	11-Oct-2018 4:49:08 PM	11-Oct-2018 4:59:51 PM	ON	1.41 ft	No
ONE	Log[4]:Up	Up	2139.42 ft	2422.83 ft	11-Oct-2018 5:02:12 PM	11-Oct-2018 5:06:17 PM	ON	1.52 ft	No
All depths are referenced to toolstring zero									

Log	Company:Noble Energy Inc.	Well:Emmy State-H25-764
Composite 1:S005		

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: 11-Oct-2018 19:58:43

Channel Processing Parameters				
ONE: Parameters				
Parameter	Description	Tool	Value	Unit
BARI(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BS	Bit Size	WLSESSION	8.5	in
CMTY(U-USIT_CEMT)	Cement Type	USIT-D	Regular Cement	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	191	us/ft
HEMA	Hematite Presence Flag	Borehole	No	
ICE_PROCESS	ICE Processing	USIT-D	Yes	
IMAR	Image Rotation	USIT-D	Off	
MEAS_WLEN	Tcube Processing Window Length in Measurement Mode	USIT-D	22.44	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-D	1.08	



U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-D	1.6	Mrayl
USI_FVEL_SEL	USI Fluid Velocity Selection	USIT-D	Automatic	
USI_ZMUD_SEL	USI Mud Impedance Selection	USIT-D	FreePipe Norm.	
ZMUD	Acoustic Impedance of Mud	Borehole	1.7	Mrayl
ZTCM	Acoustic Impedance Threshold for Cement	USIT-D	2.2	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-D	0.3	Mrayl

## Tool Control Parameters

### ONE: Parameters

Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-D	-4	dB
AGMX	Maximum Gain of Cartridge	USIT-D	Time Zoned	dB
EMXV	EMEX Voltage	USIT-D	Time Zoned	V
HRES	Horizontal Resolution	USIT-D	10 deg	
ULOG	Logging Objective	USIT-D	MEASUREMENT	
USFR	Ultrasonic Sampling Frequency	USIT-D	500000	Hz
UPAT	USIT Emission Pattern	USIT-D	Pattern 250 KHz	
UWKM	USIT Working Mode	USIT-D	Uncompressed 10 deg at 6.0 in LF	
WINB	Window Begin Time	USIT-D	Time Zoned	us
WINE	Window End Time	USIT-D	Time Zoned	us

### ONETime Zoned Parameters

#### Pass Log[3]:Up

Parameter	Value	Start Time	Stop Time	Start Depth ( ft )	Stop Depth ( ft )
AGMX	20	11-Oct-2018 16:49:08	11-Oct-2018 16:51:17	2610.38	2434.73
AGMX	48	11-Oct-2018 16:51:17	11-Oct-2018 16:59:51	2434.73	1977.82
EMXV	40	11-Oct-2018 16:49:08	11-Oct-2018 16:51:12	2610.38	2441.41
EMXV	60	11-Oct-2018 16:51:12	11-Oct-2018 16:53:20	2441.41	2239.42
EMXV	40	11-Oct-2018 16:53:20	11-Oct-2018 16:59:51	2239.42	1977.82
WINB	21.84	11-Oct-2018 16:49:08	11-Oct-2018 16:50:13	2610.38	2541.22
WINB	25.7	11-Oct-2018 16:50:13	11-Oct-2018 16:50:18	2541.22	2531.78
WINB	30.58	11-Oct-2018 16:50:18	11-Oct-2018 16:51:25	2531.78	2429.13
WINB	36.58	11-Oct-2018 16:51:25	11-Oct-2018 16:51:37	2429.13	2410.12
WINB	29.67	11-Oct-2018 16:51:37	11-Oct-2018 16:59:51	2410.12	1977.82
WINE	61.84	11-Oct-2018 16:49:08	11-Oct-2018 16:49:50	2610.38	2578.82
WINE	64.97	11-Oct-2018 16:49:50	11-Oct-2018 16:49:57	2578.82	2566.87
WINE	72.44	11-Oct-2018 16:49:57	11-Oct-2018 16:50:16	2566.87	2534.7
WINE	74.53	11-Oct-2018 16:50:16	11-Oct-2018 16:59:51	2534.7	1977.82

#### Pass Log[4]:Up

AGMX	48	11-Oct-2018 17:02:45	11-Oct-2018 17:06:17	2407.49	2155.41
EMXV	40	11-Oct-2018 17:02:45	11-Oct-2018 17:06:17	2407.49	2155.41
WINB	29.67	11-Oct-2018 17:02:45	11-Oct-2018 17:06:17	2407.49	2155.41
WINE	74.53	11-Oct-2018 17:02:45	11-Oct-2018 17:06:17	2407.49	2155.41

All depth are at tool zero.

XYZ

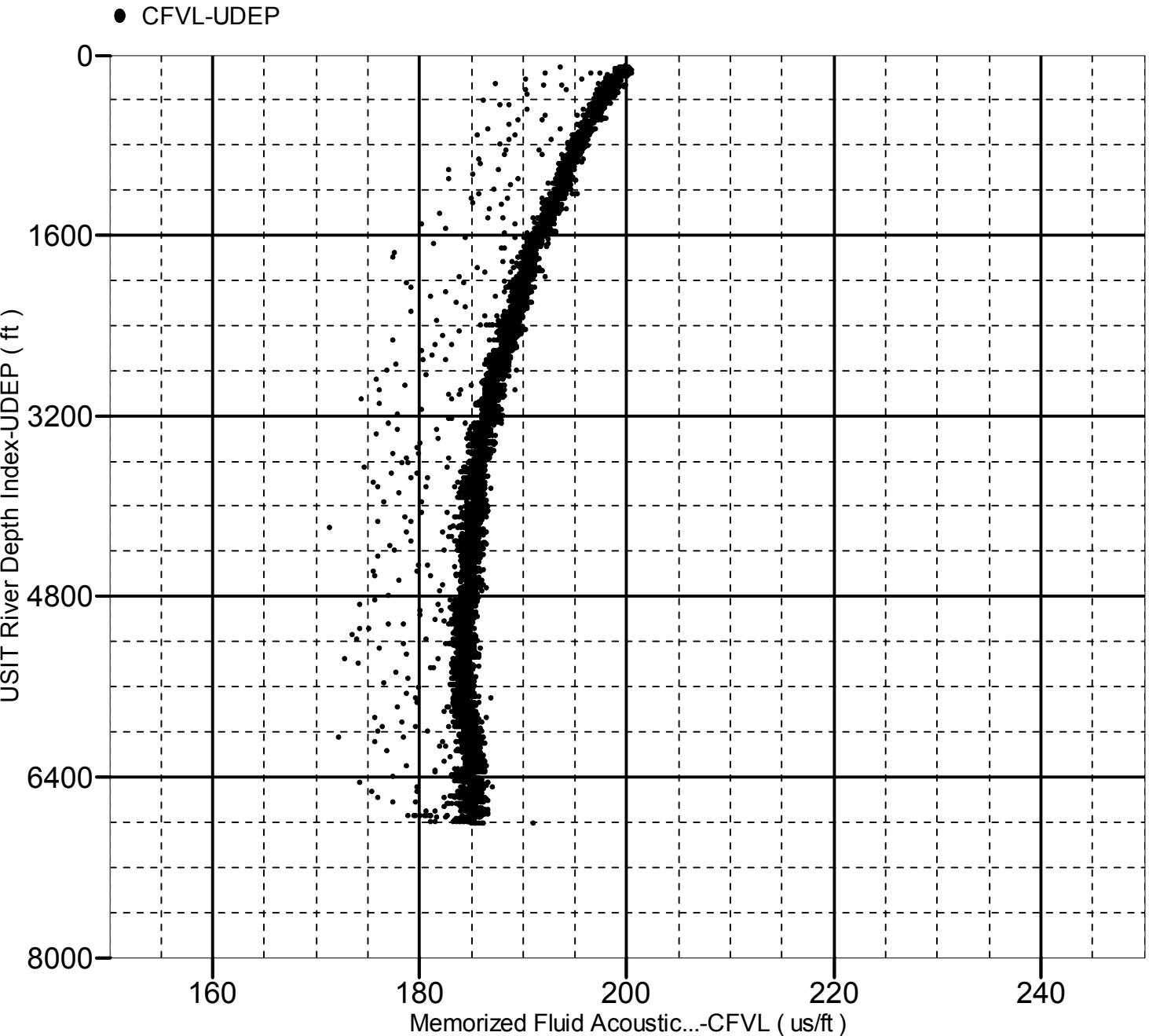
Company:Noble Energy Inc. Well:Emmy State-H25-764  
ONE: Log[7]:Up:S005

Fluid Acoustic Slowness vs Depth

# Fluid Acoustic Slowness vs Depth

## 2D Cross Plot

Index Range: From 6819.00 to 109.00 ft



XYZ

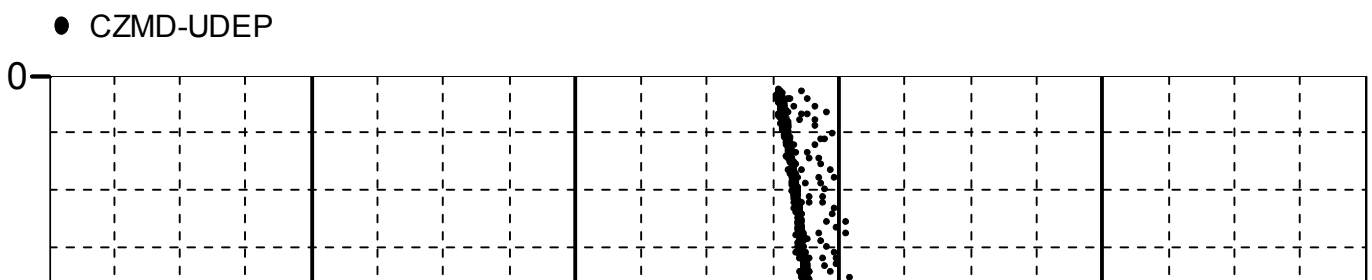
Company:Noble Energy Inc. Well:Emmy State-H25-764

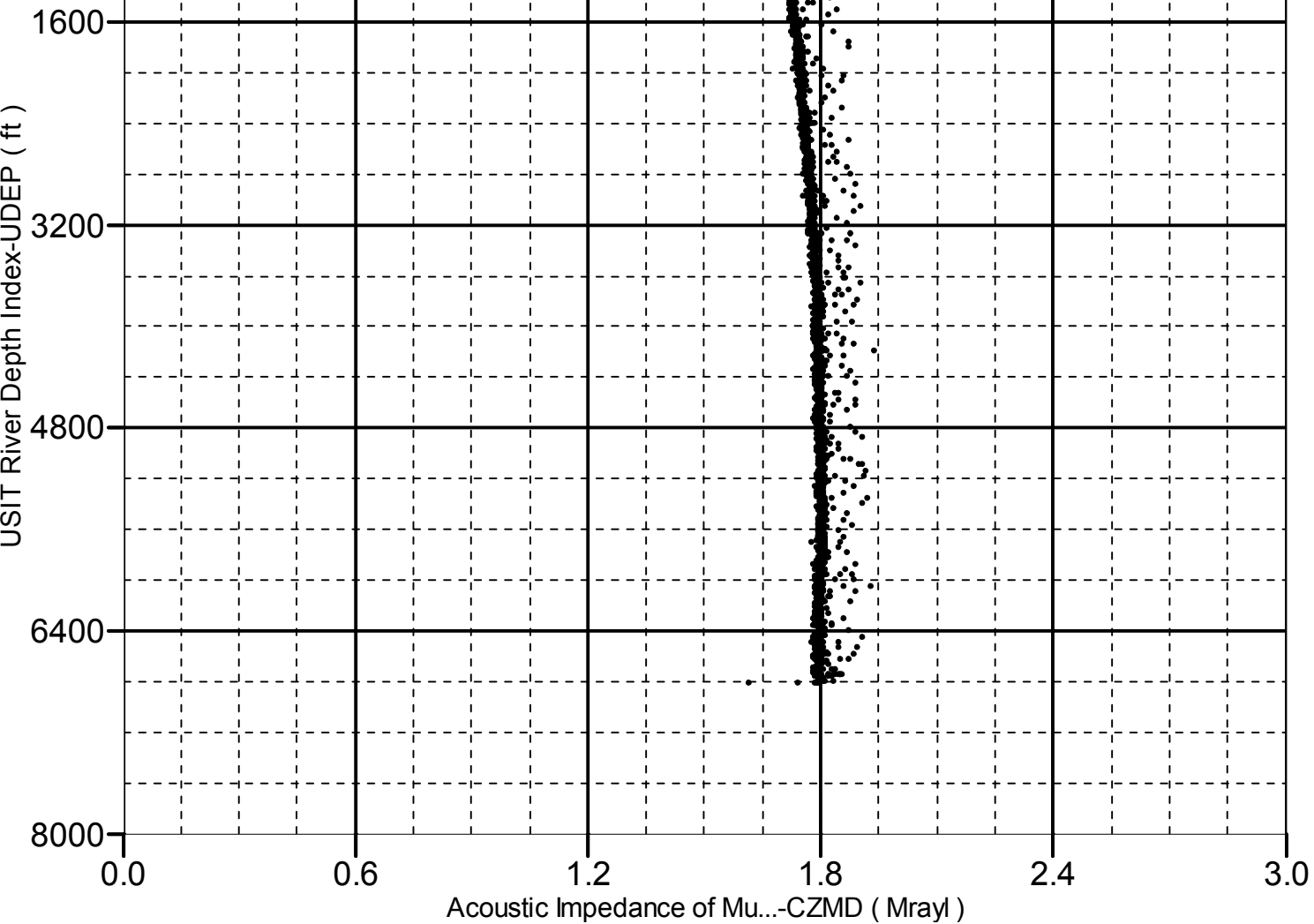
ONE: Log[7]:Up:S005

# Acoustic Impedance of Mud vs Depth

## 2D Cross Plot

Index Range: From 6819.00 to 109.00 ft





Company: Noble Energy Inc.

**Schlumberger**

Well: Emmy State-H25-764

Field: Wattenberg

County:	Weld
State:	Colorado
UltraSonic Summary Print	