

Company: PDC Energy Inc

Well: Vega #2N

Field: Wattenberg

County: Weld State: Colorado

Isolation Scanner  
Cement Bond Log  
Gamma Ray - CCLCounty: Weld  
Field: Wattenberg  
Location: 2329' FNL & 2596' FWL  
Well: Vega #2N  
Company: PDC Energy Inc

Location:	2329' FNL & 2596' FWL	Elev.:	K.B.	5004.00 ft
	SENNW 6 3N65W		G.L.	4976.00 ft
Lat/Long: 40.25528/-104.70636			D.F.	5003.00 ft
Permanent Datum:		Ground Level		Elev.: 4976.00 f
Log Measured From:		Kelly Bushing		28.00 ft
Drilling Measured From:		Kelly Bushing		above Perm.Datum
API Serial No.		Section:		Range:
05-123-48464		6	Township: 3N	65W

Logging Date 09-Apr-2022

Run Number 1A

Depth Driller 15833.00 ft

Schlumberger Depth 15833.00 ft

Bottom Log Interval 7369.00 ft

Top Log Interval 65.00 ft

Casing Fluid Type Water

Salinity

Density 8.4 lbm/gal

Fluid Level 8.00 ft

BIT/CASING/TUBING STRING

Bit Size 8.50 in

From 1705.00 ft

To 15833.00 ft

Casing/Tubing Size 5.5 in

Weight 20 lbm/ft

Grade N/A

From 0.00 ft

To 15833.00 ft

Max Recorded Temperatures 244.61 degF

Logger on Bottom 10-Apr-2022

Unit Number TAM

Recorded By E.Morrone/W. Armstrong

Witnessed By B. Myers

## 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.

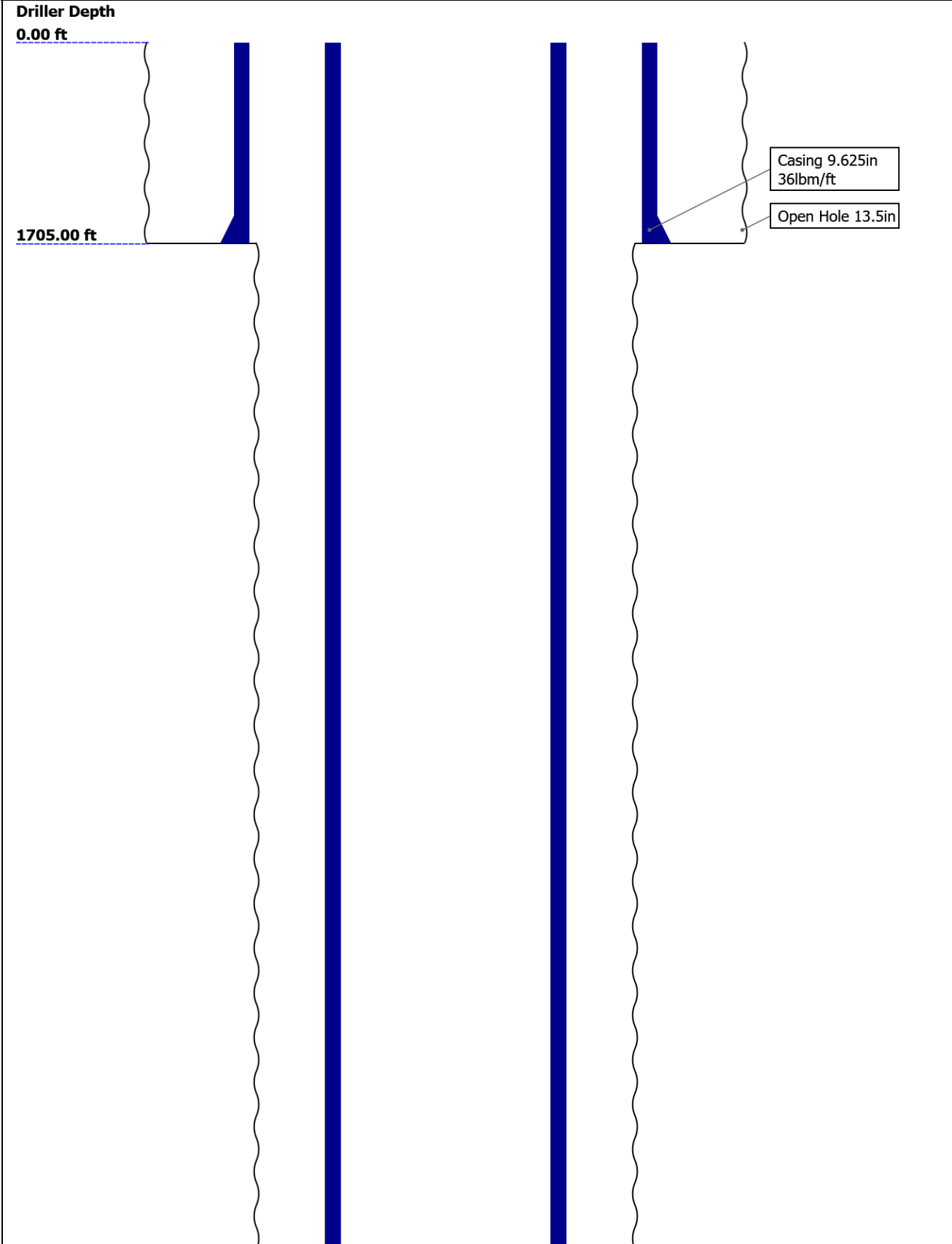
## Contents

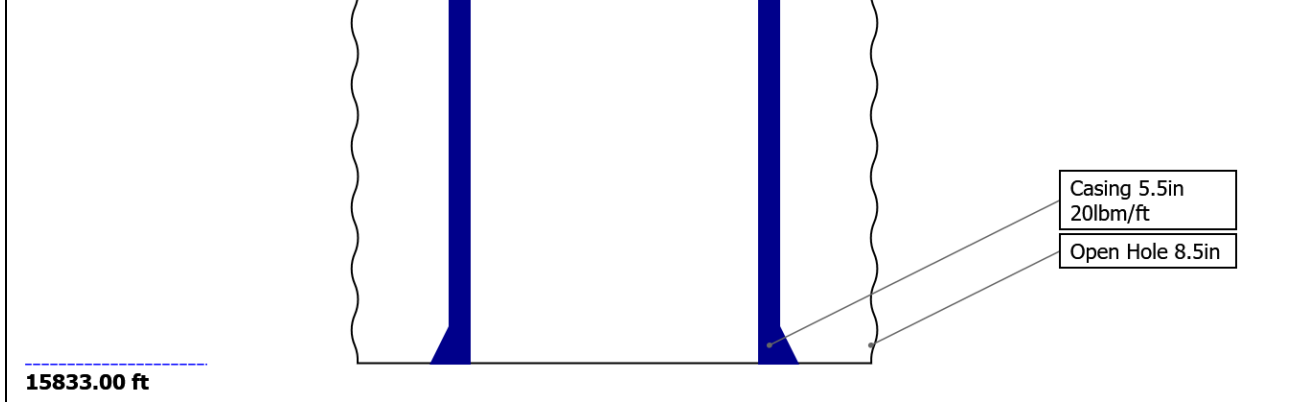
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Well Sketch





## Borehole Size/Casing/Tubing Record

Bit						
Bit Size ( in )	13.5	8.5				
Top Driller ( ft )	0	1705				
Top Logger ( ft )	0	1705				
Bottom Driller ( ft )	1705	15833				
Bottom Logger ( ft )	1705	15833				
Casing						
Size ( in )	9.625	5.5				
Weight ( lbm/ft )	36	20				
Inner Diameter ( in )	8.921	4.778				
Grade	N/A	N/A				
Top Driller ( ft )	0	0				
Top Logger ( ft )	0	0				
Bottom Driller ( ft )	1705	15833				
Bottom Logger ( ft )	1705	15833				

## USIT - Fluid Properties Measurement

Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Run 1	Main[3]:Up	7386.89	2751.53

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 : 56.19m(184.36ft) to 90.23m(296.03ft)  
MUD\_N\_FRP = 1.31  
DFD = 1.01g/cm3(8.40lbm/gal)  
CZMD median computed in free pipe normalization interval = 1.93 MRayl

Start Depth(ft)	Stop Depth(ft)	Start Value(Mrayl)	End Value(Mrayl)
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## Composite 1

## Software Version

Acquisition System	Version
Maxwell 2022.0	12.0.215014.3100
Application Patch	Wireline_Hotfix-Mandatory-2022.0_12.0.216515

## Composite Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
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1A	Main[3]:Up	Up	2751.53 ft	7386.89 ft	09-Apr-2022 4:20:47 PM	09-Apr-2022 5:39:40 PM	ON	17.59 ft	Yes
1A	Main[4]:Up	Up	80.62 ft	3067.46 ft	09-Apr-2022 5:51:15 PM	09-Apr-2022 6:36:43 PM	ON	15.59 ft	Yes

All depths are referenced to toolstring zero

Log	Company:PDC Energy Inc	Well:Vega #2N
	Composite 1:S004	

Description: USI IBC SLG    Format: Log ( IBC SLG CBL DCBL-VDL )    Index Scale: 5 in per 100 ft    Index Unit: ft    Index Type: Measured Depth    Creation Date: 10-Apr-2022 02:03:39

USIT Processing Flags (UFLG[0]) USIT-E[1]

- 1 - UFLG 1 Value within [0.0 - 1.5] - :  
2 - UFLG 2 Value within [1.5 - 2.5] - :  
3 - UFLG 3 Value within [2.5 - 3.5] - :  
4 - UFLG 4    UFLG 5    UFLG 6 Value within [3.5 - 6.5] - :  
5 - UFLG 7    UFLG 8    UFLG 9 Value within [6.5 - 10 ] - :
- UTIM Error

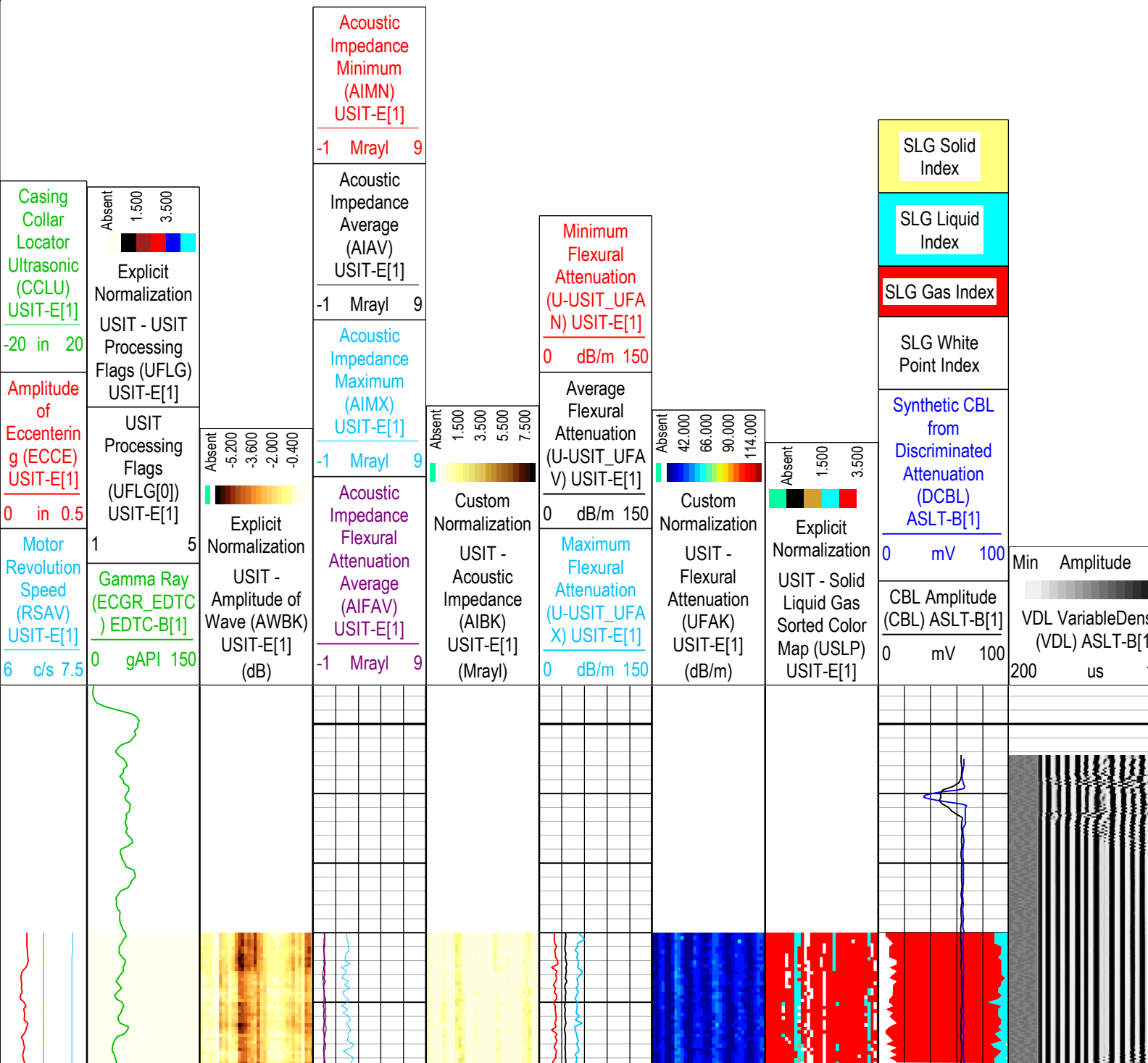
Pulse Origin Not Detected

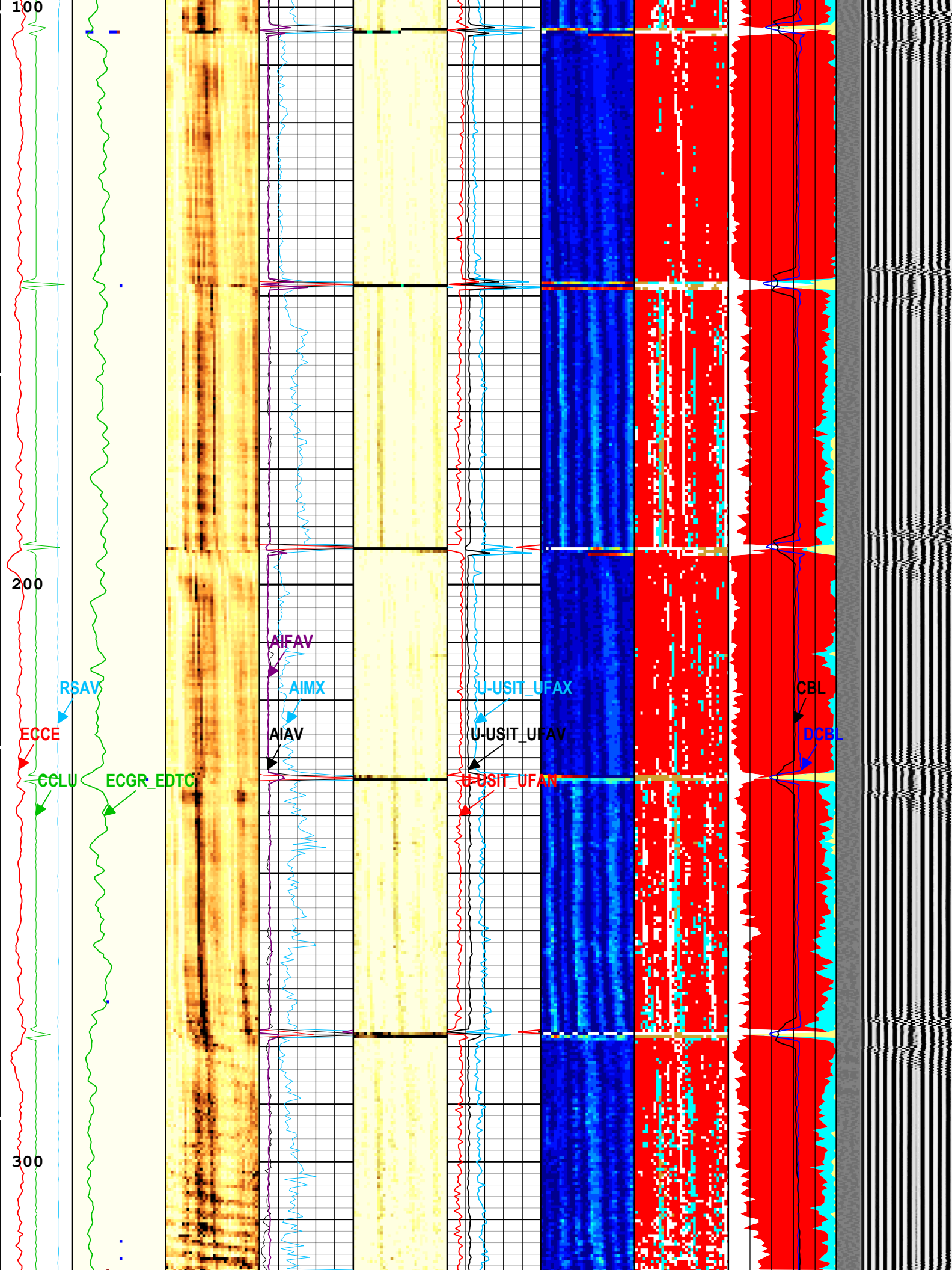
WINLEN Error

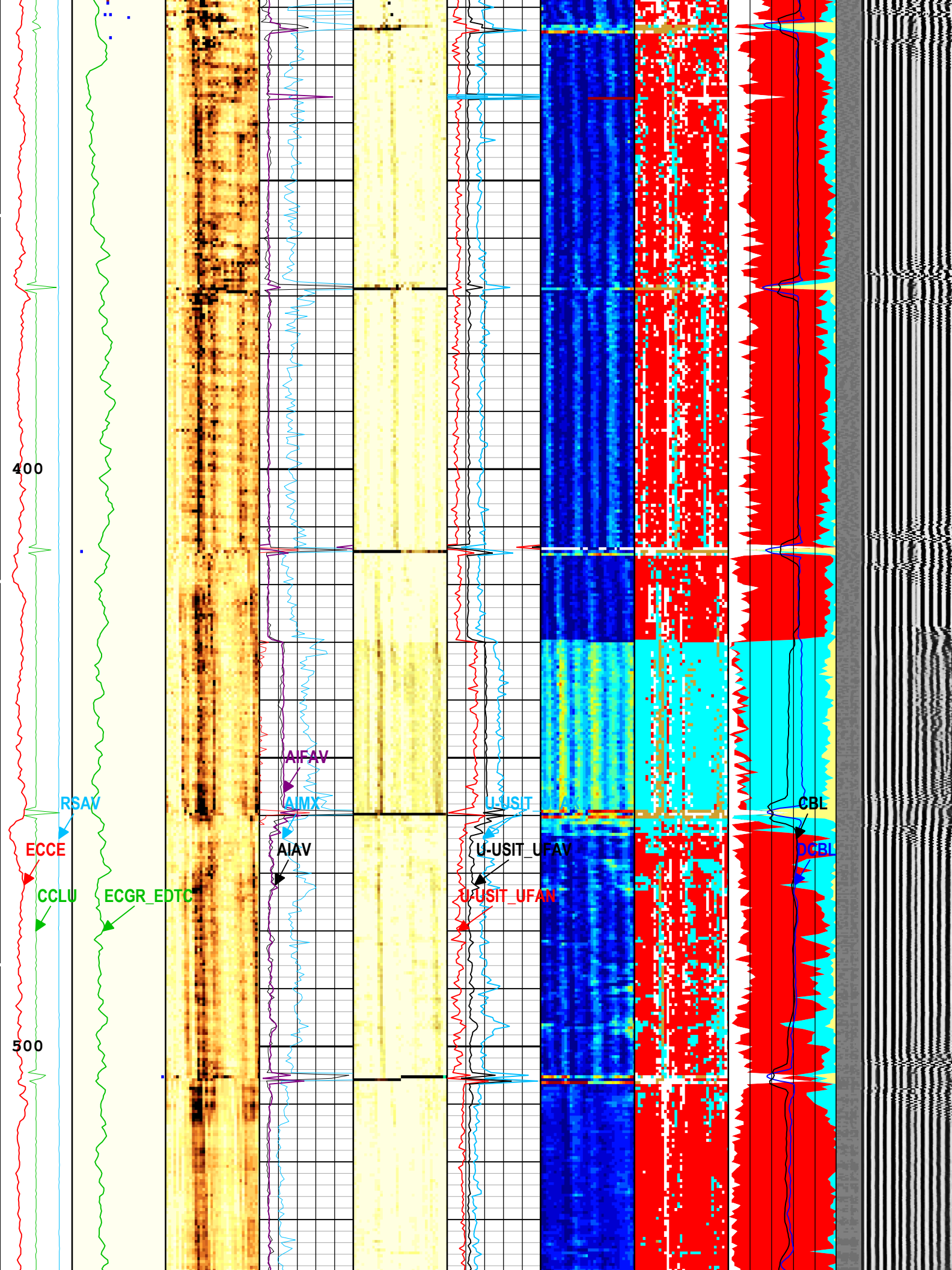
Casing Thickness Error

Loop Processing Error

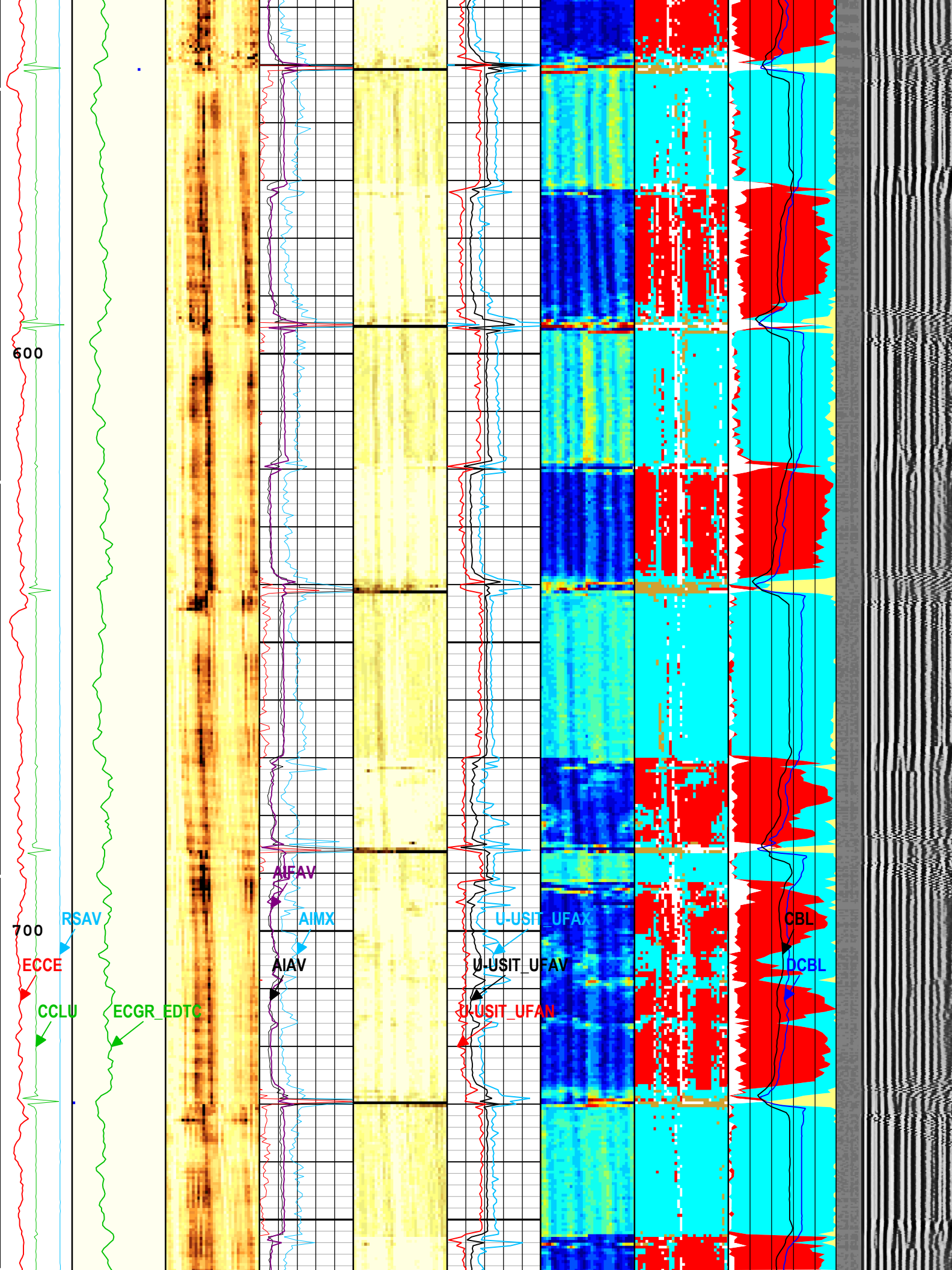
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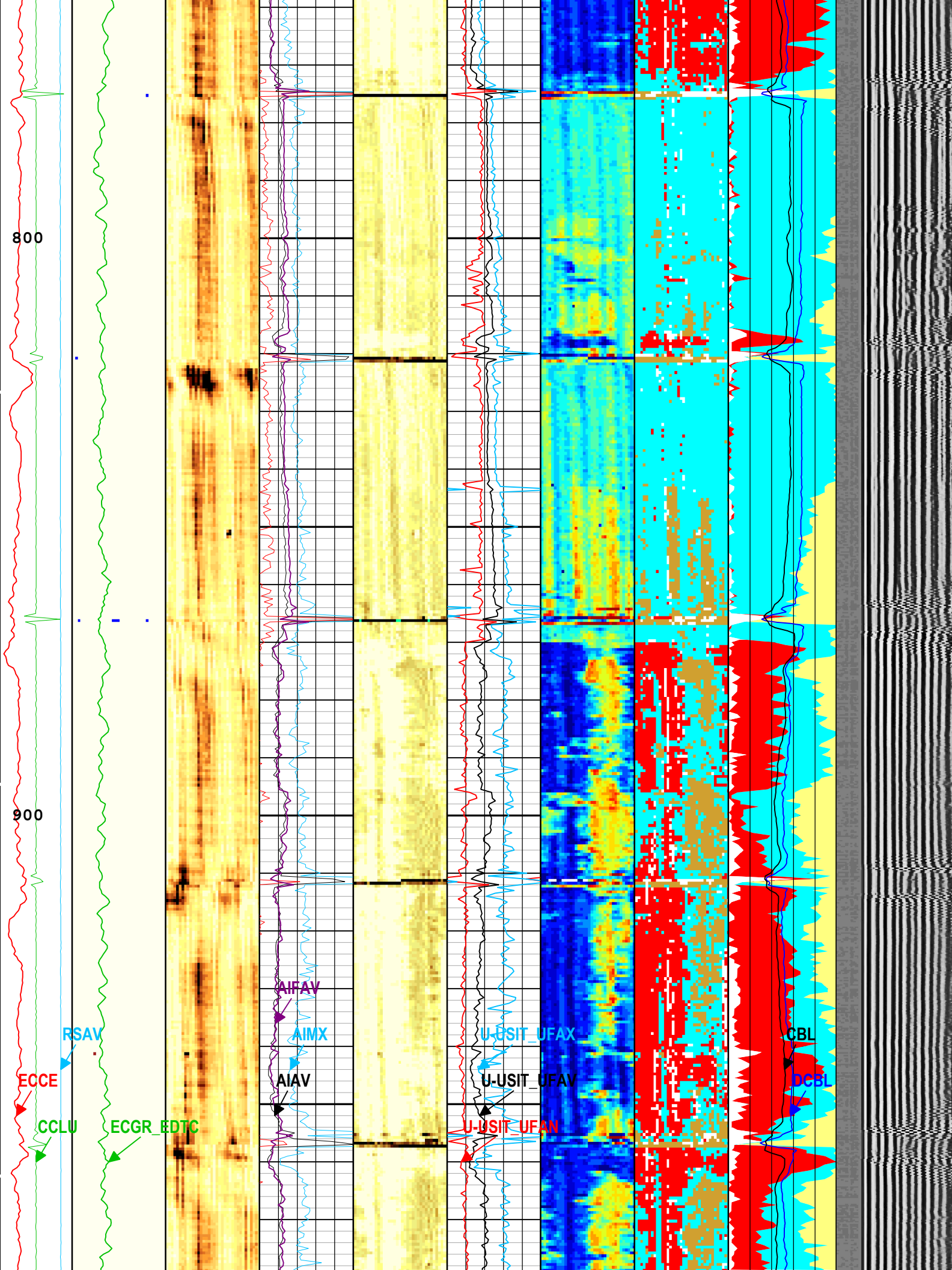




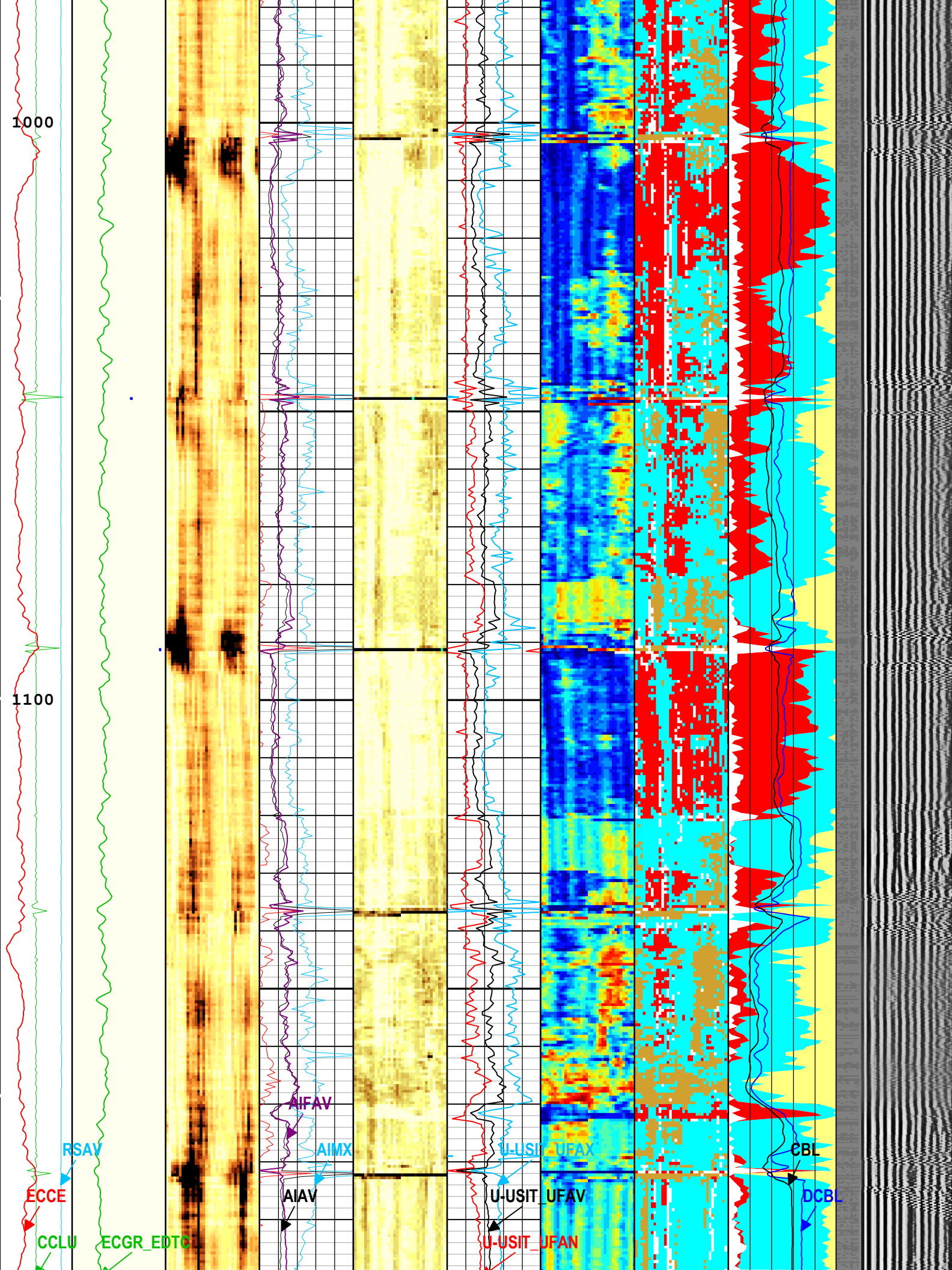


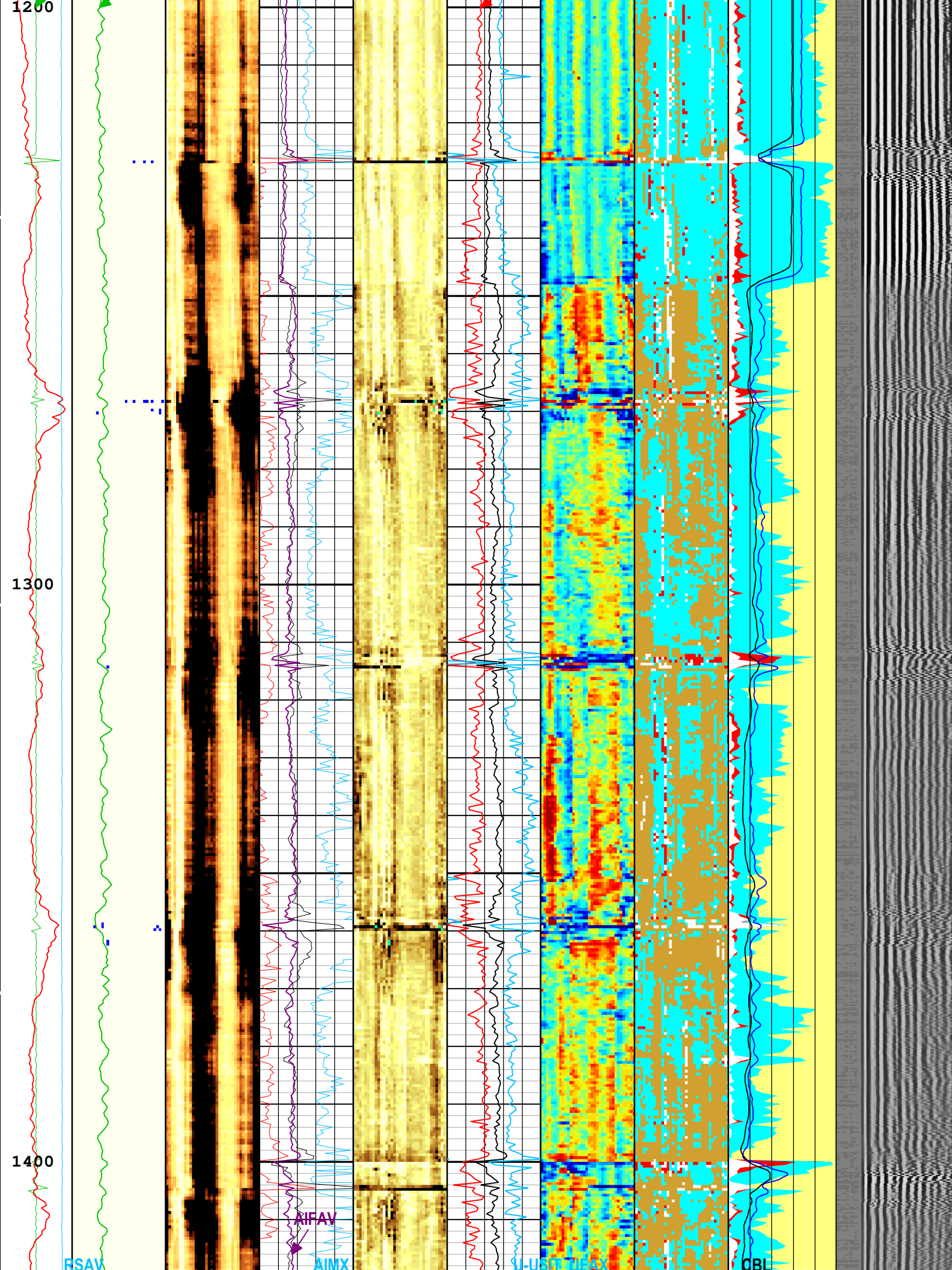


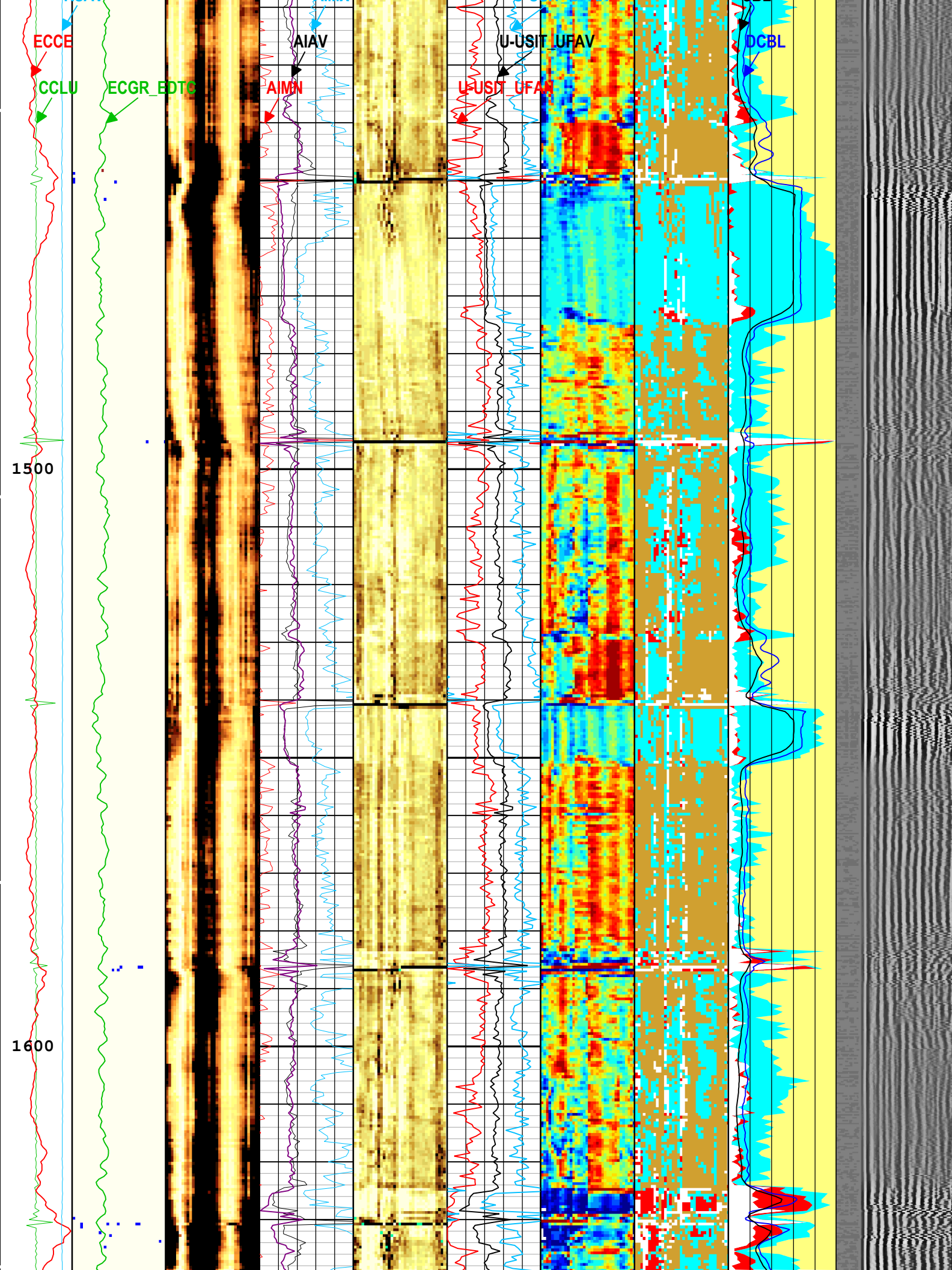




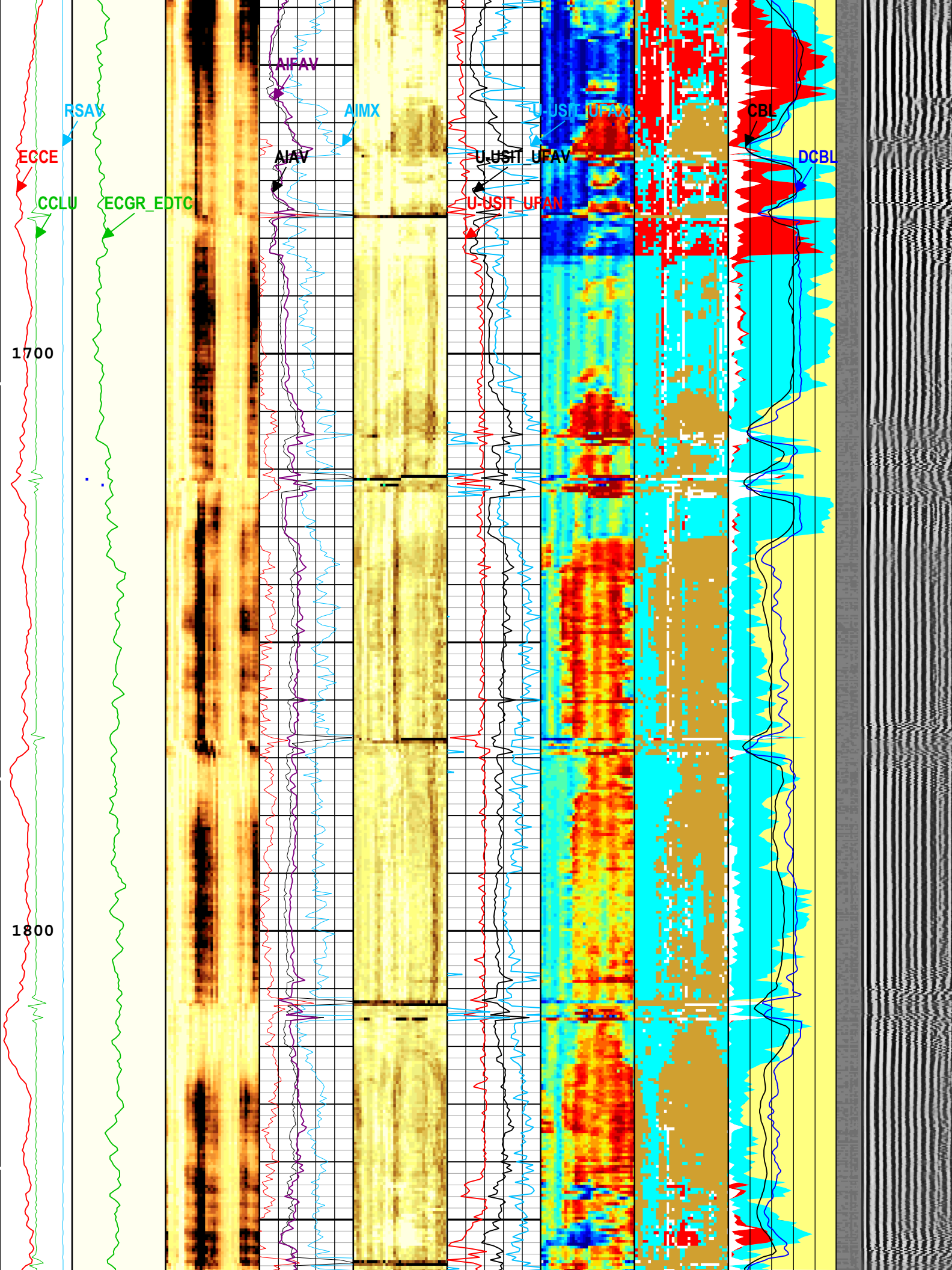


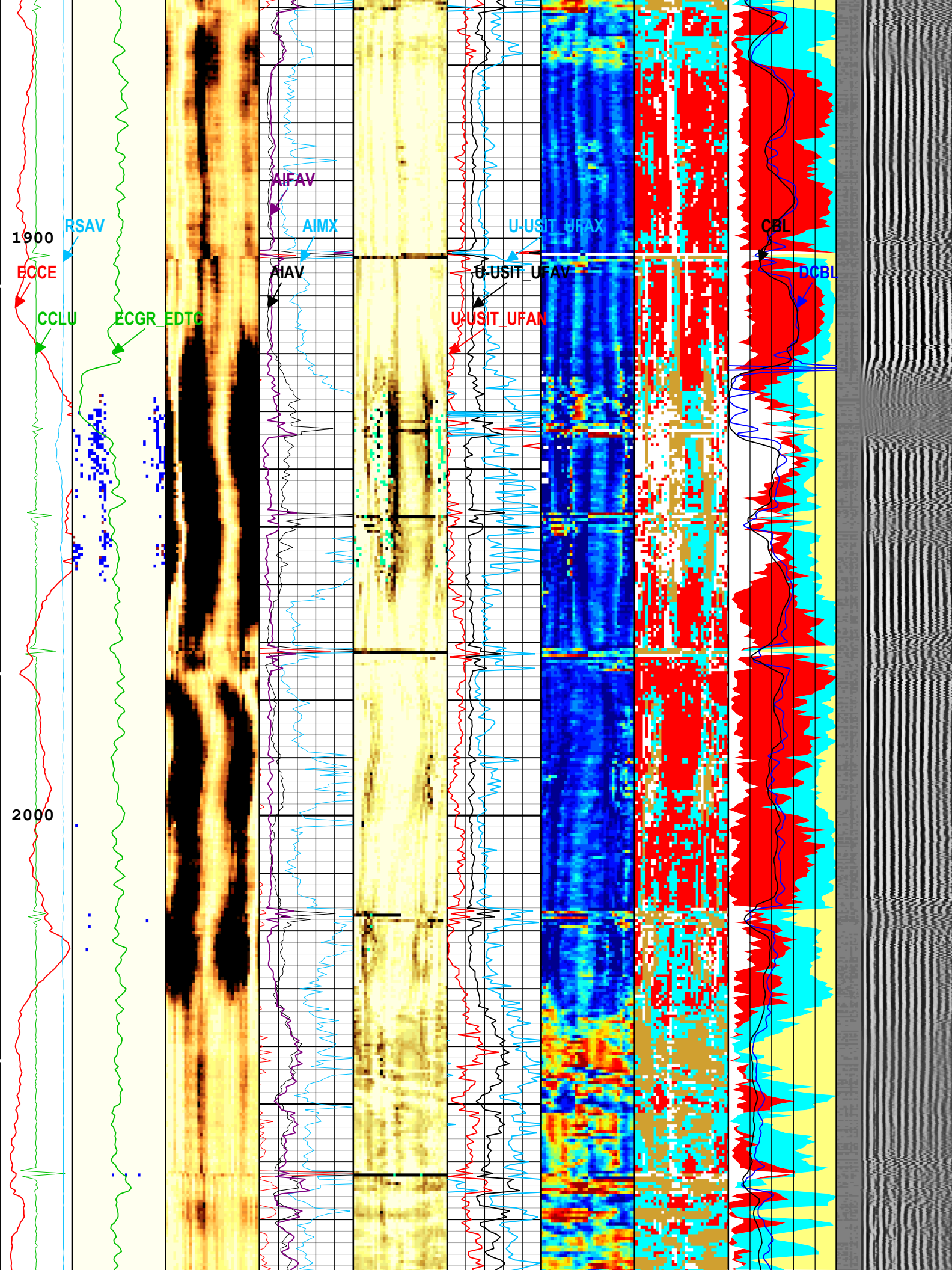




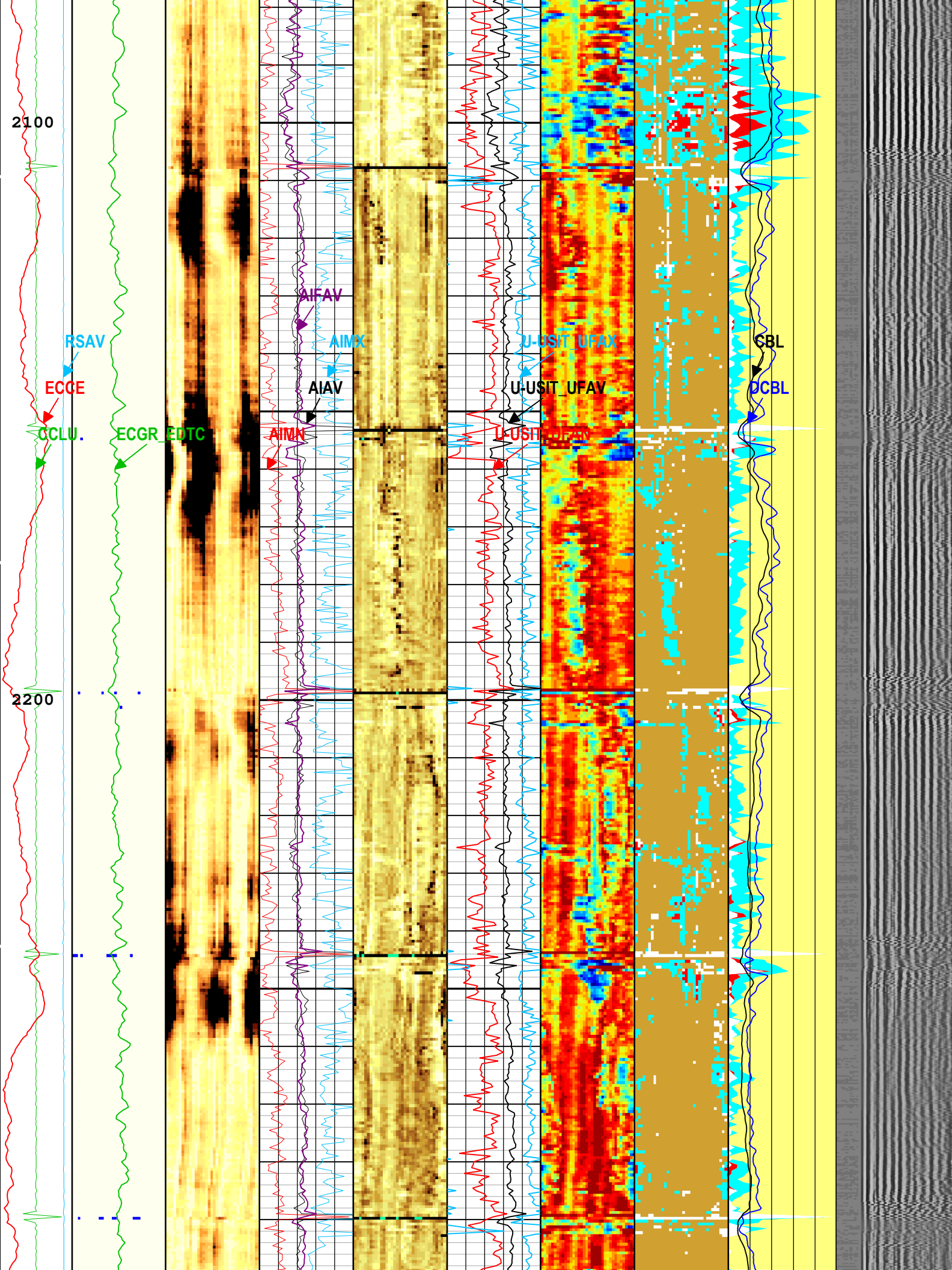


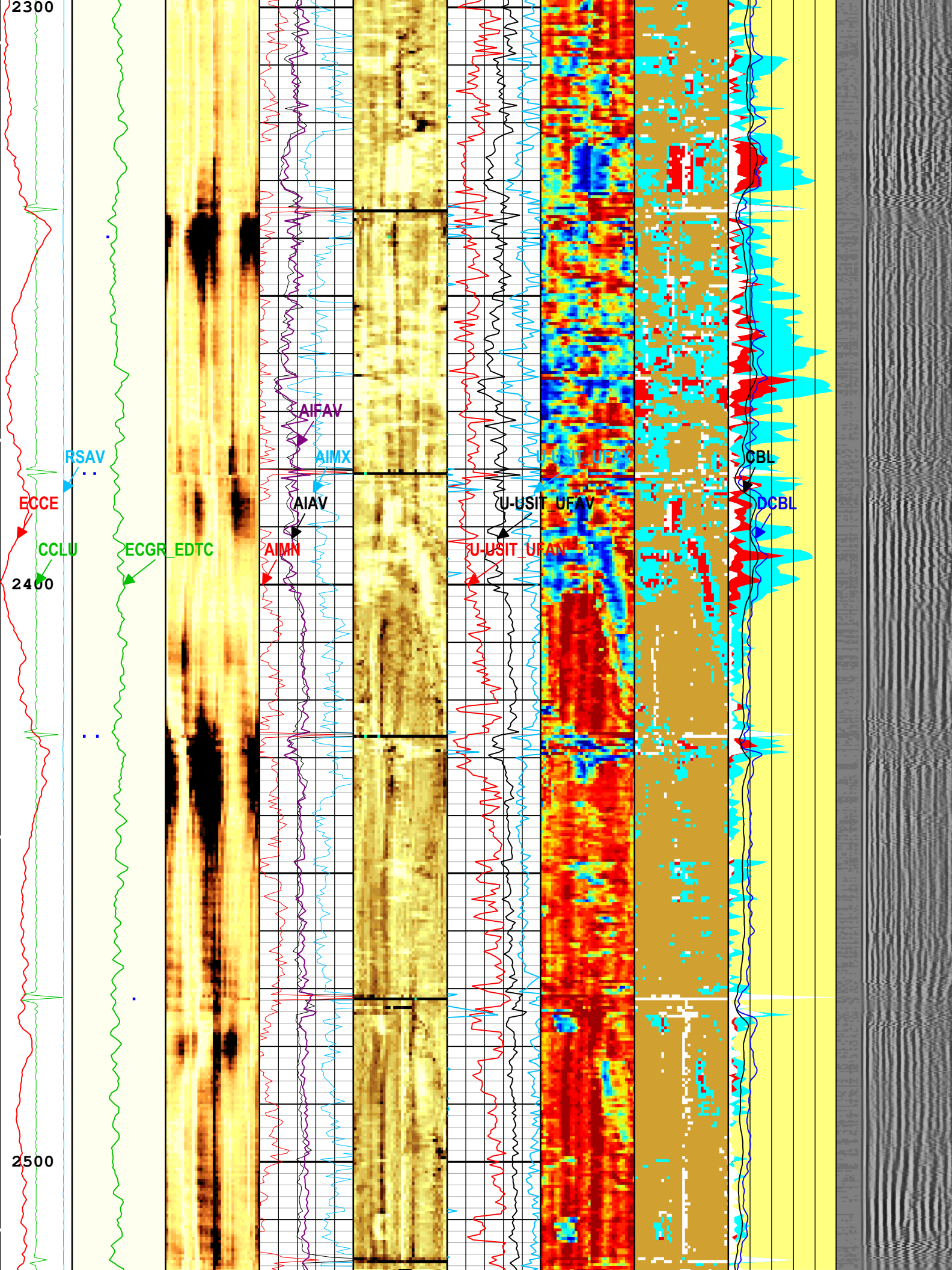


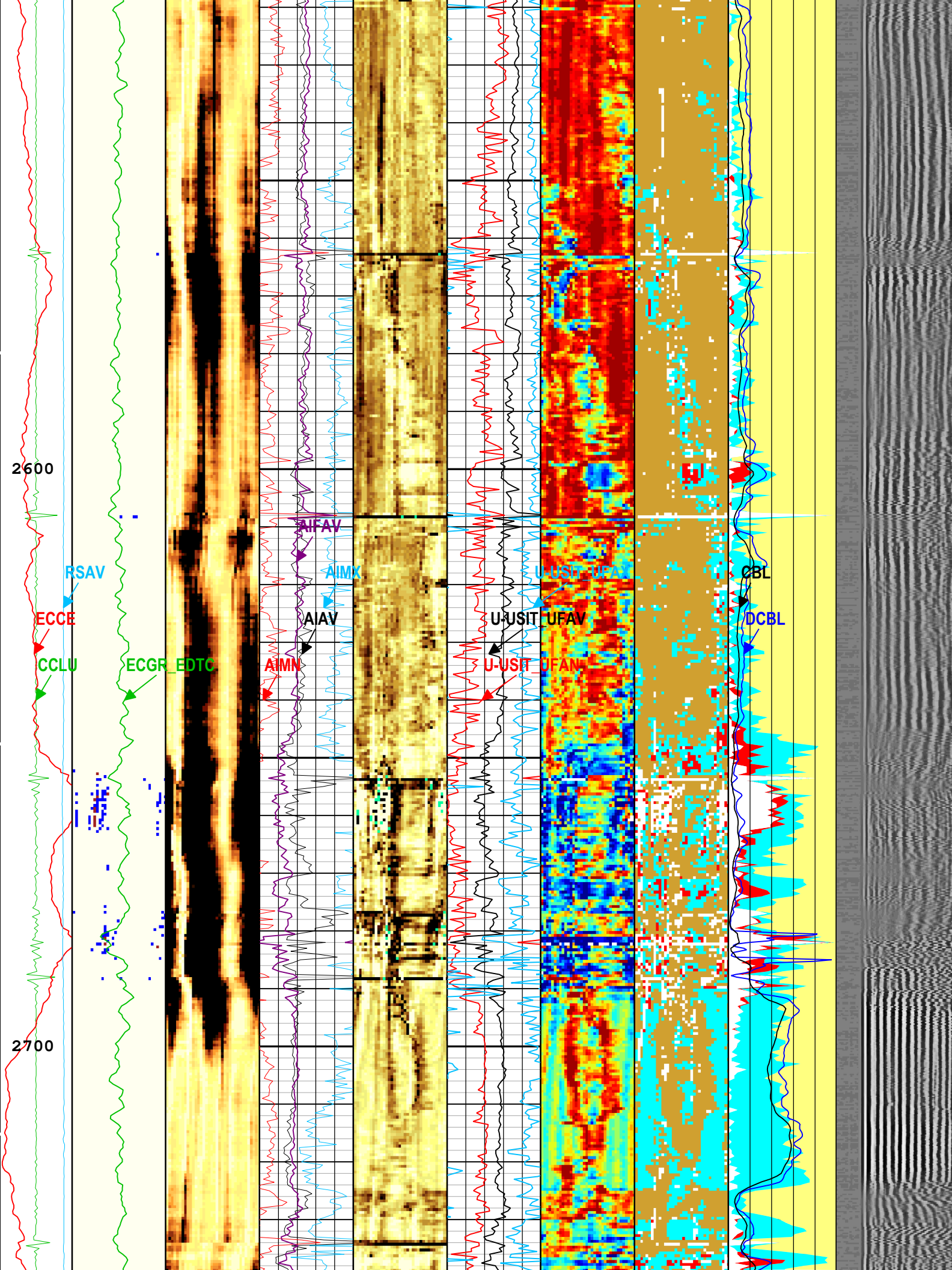




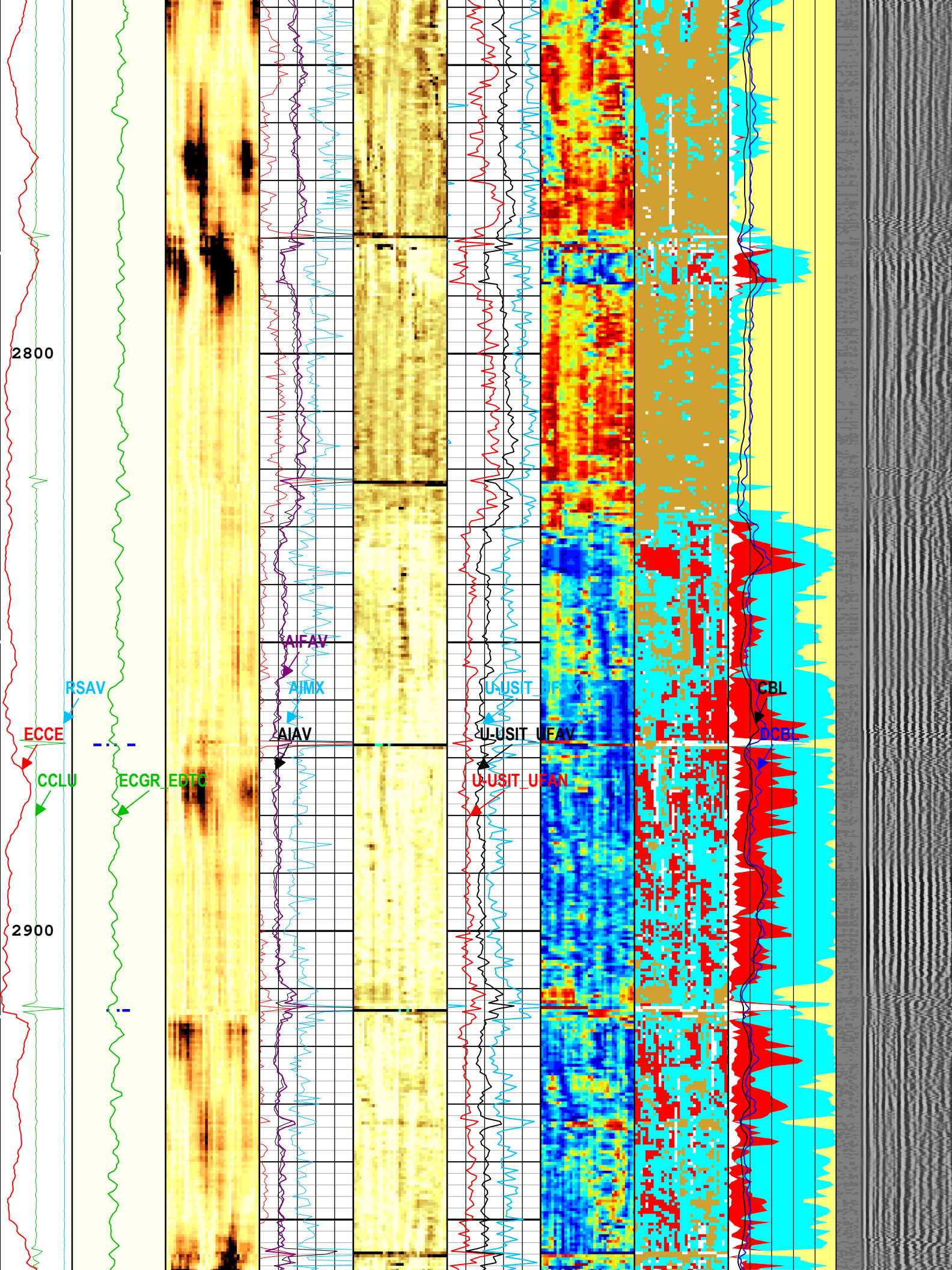


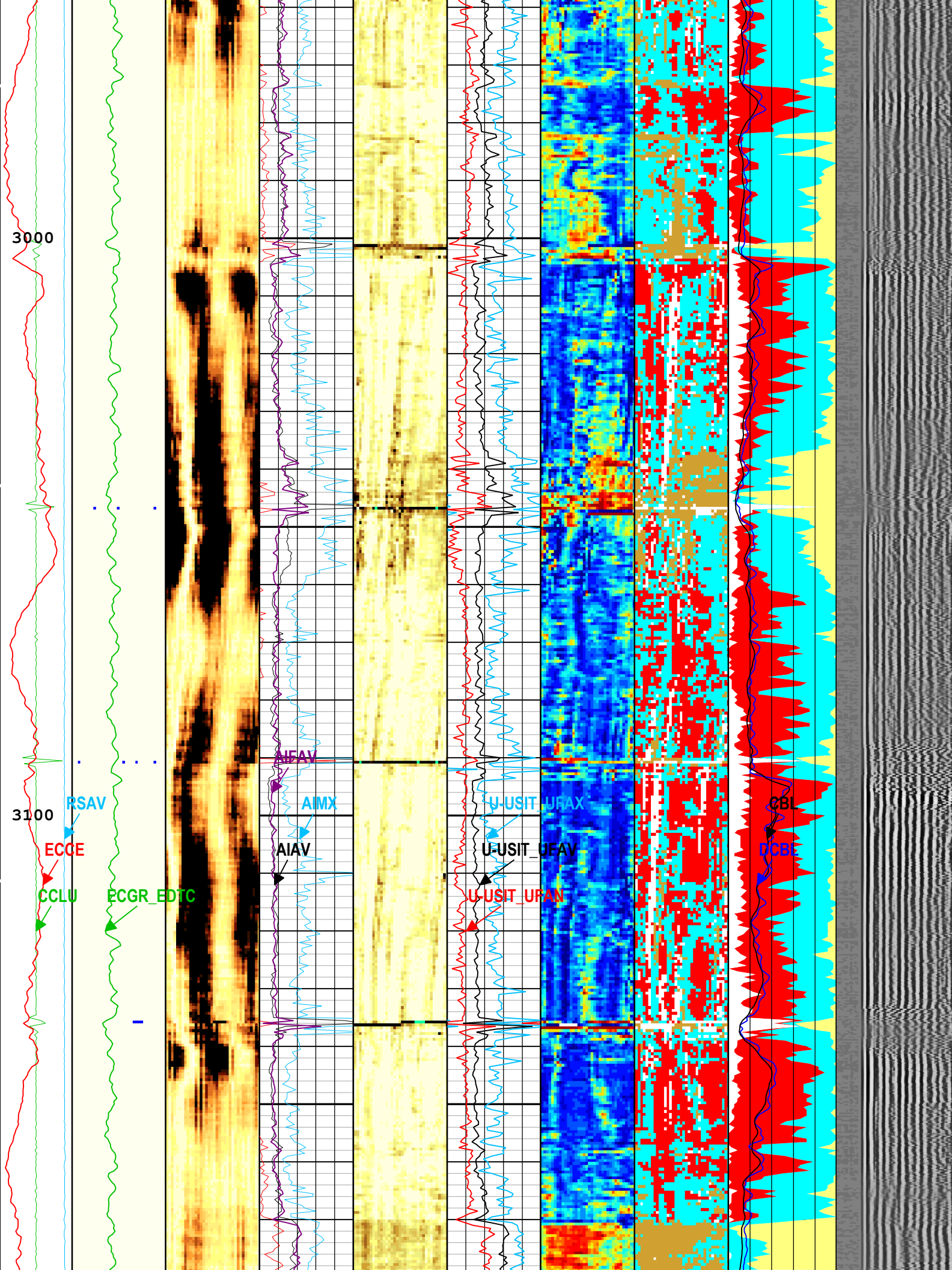




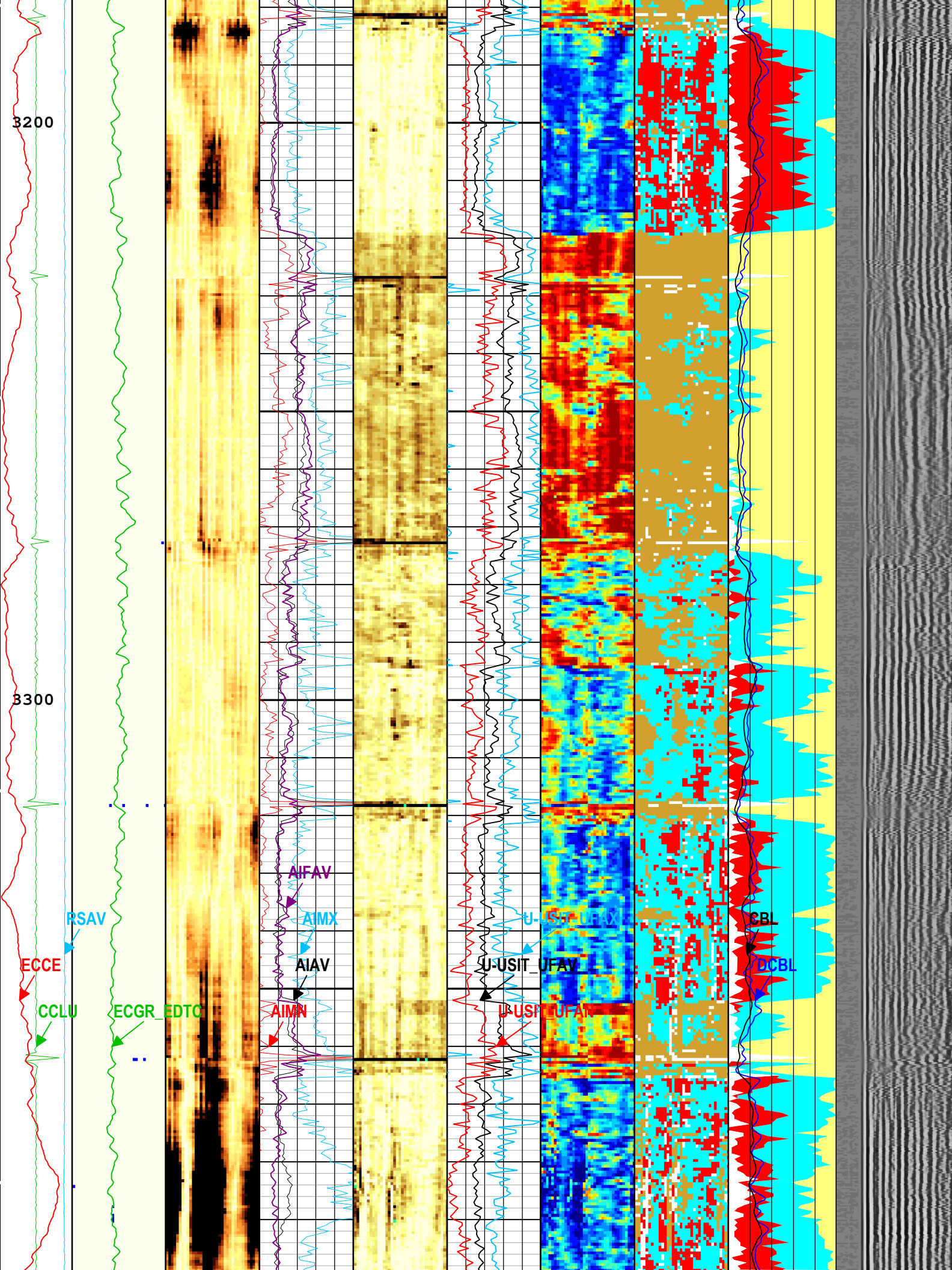


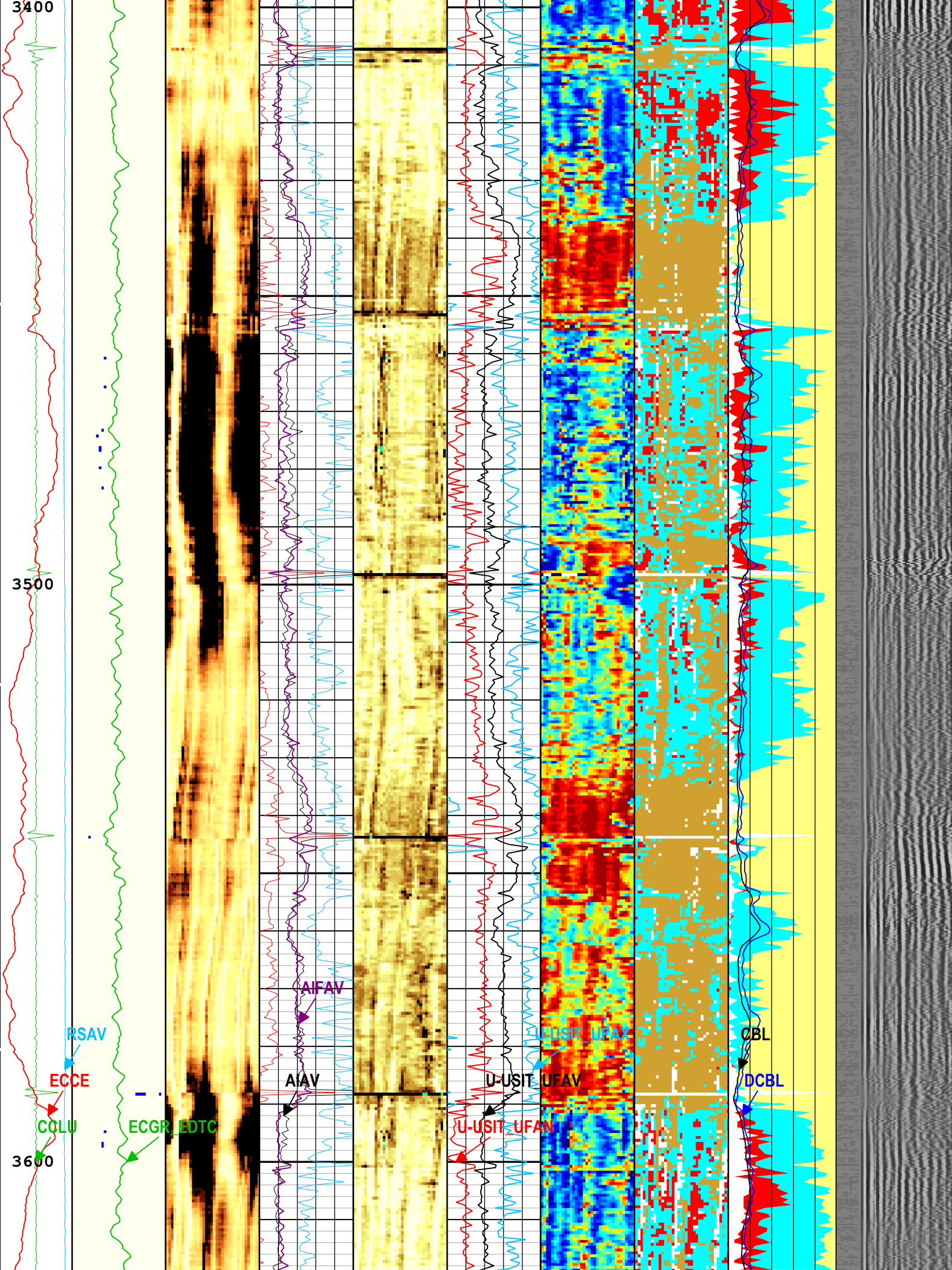




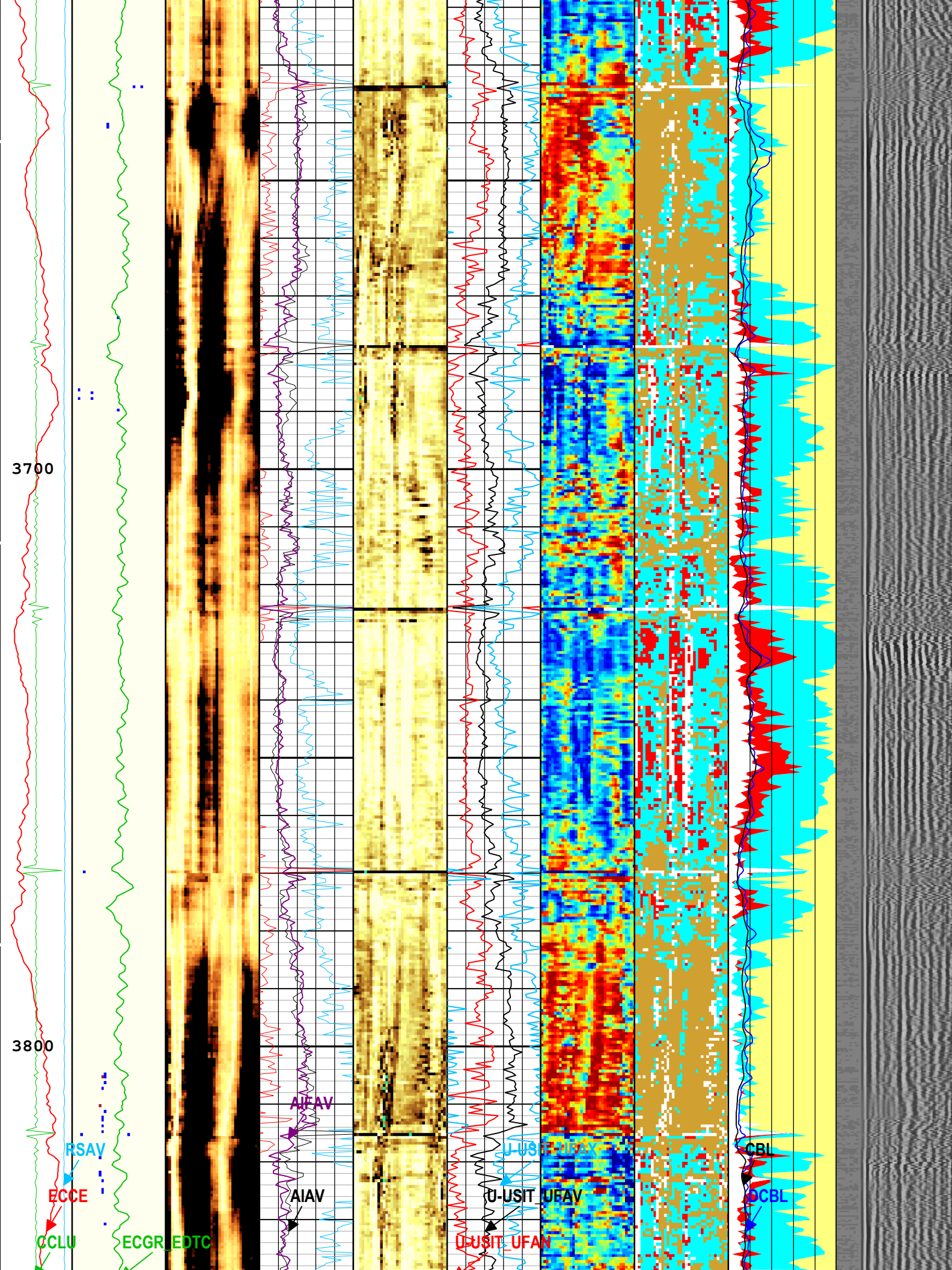


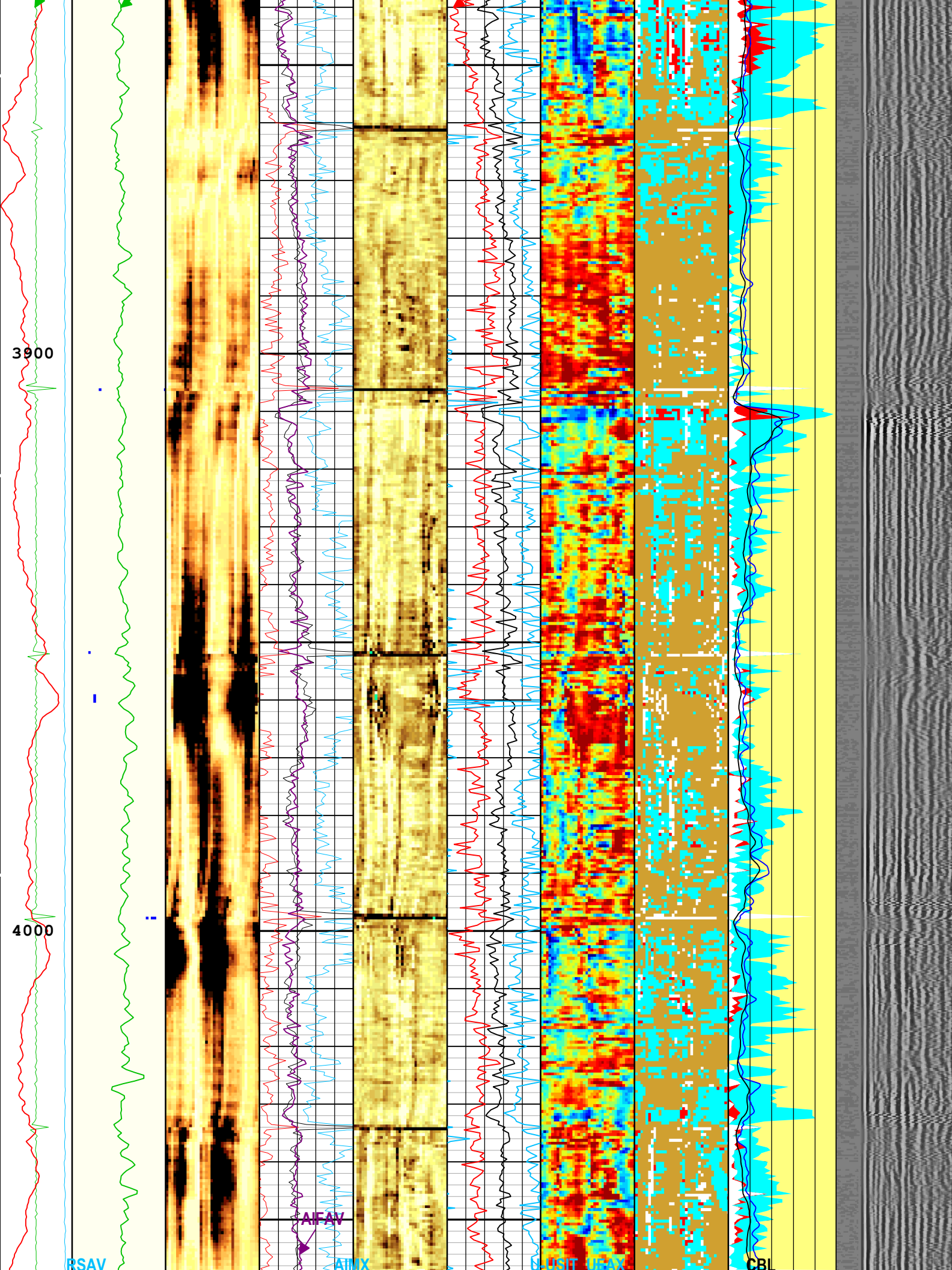




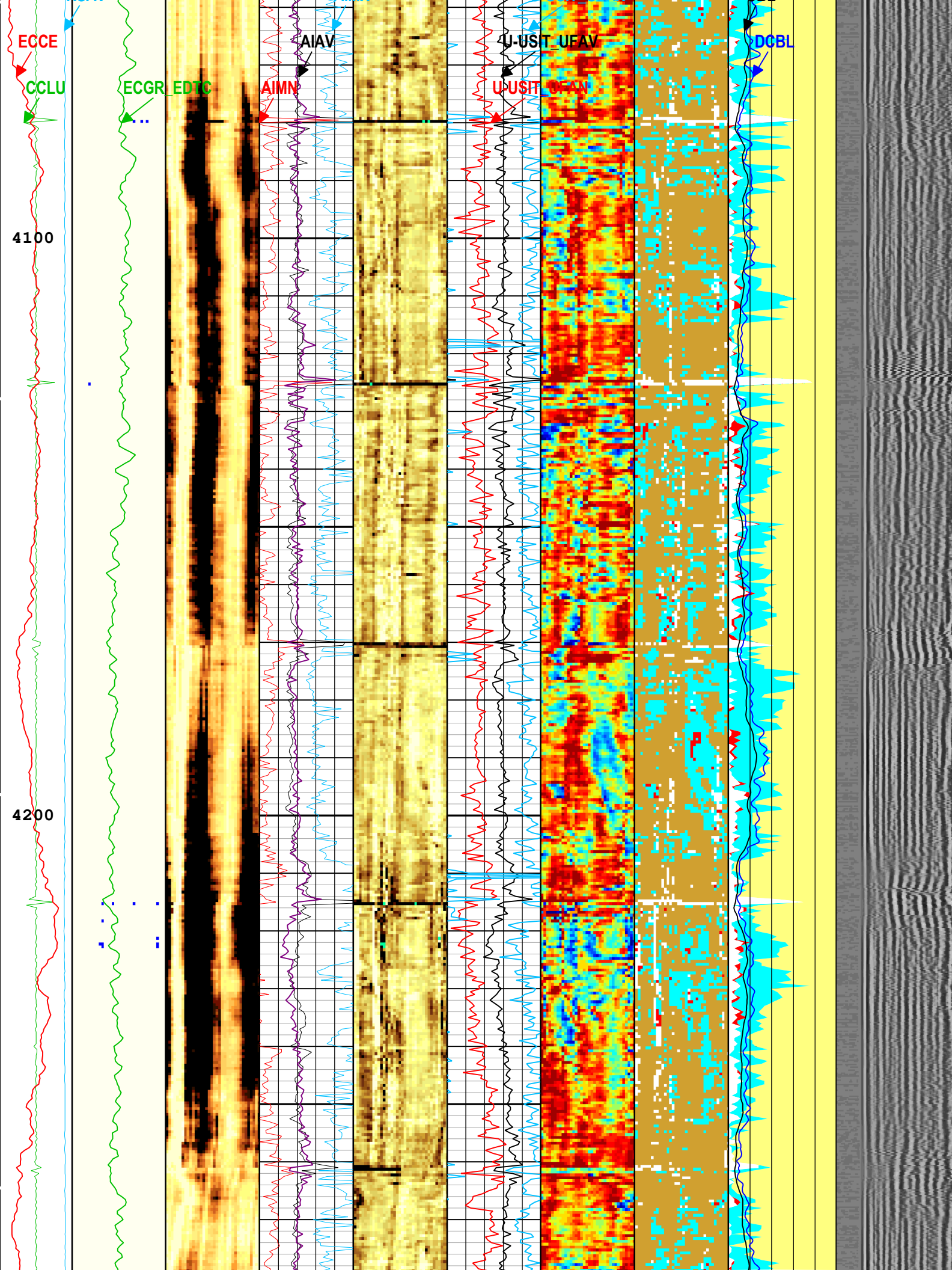




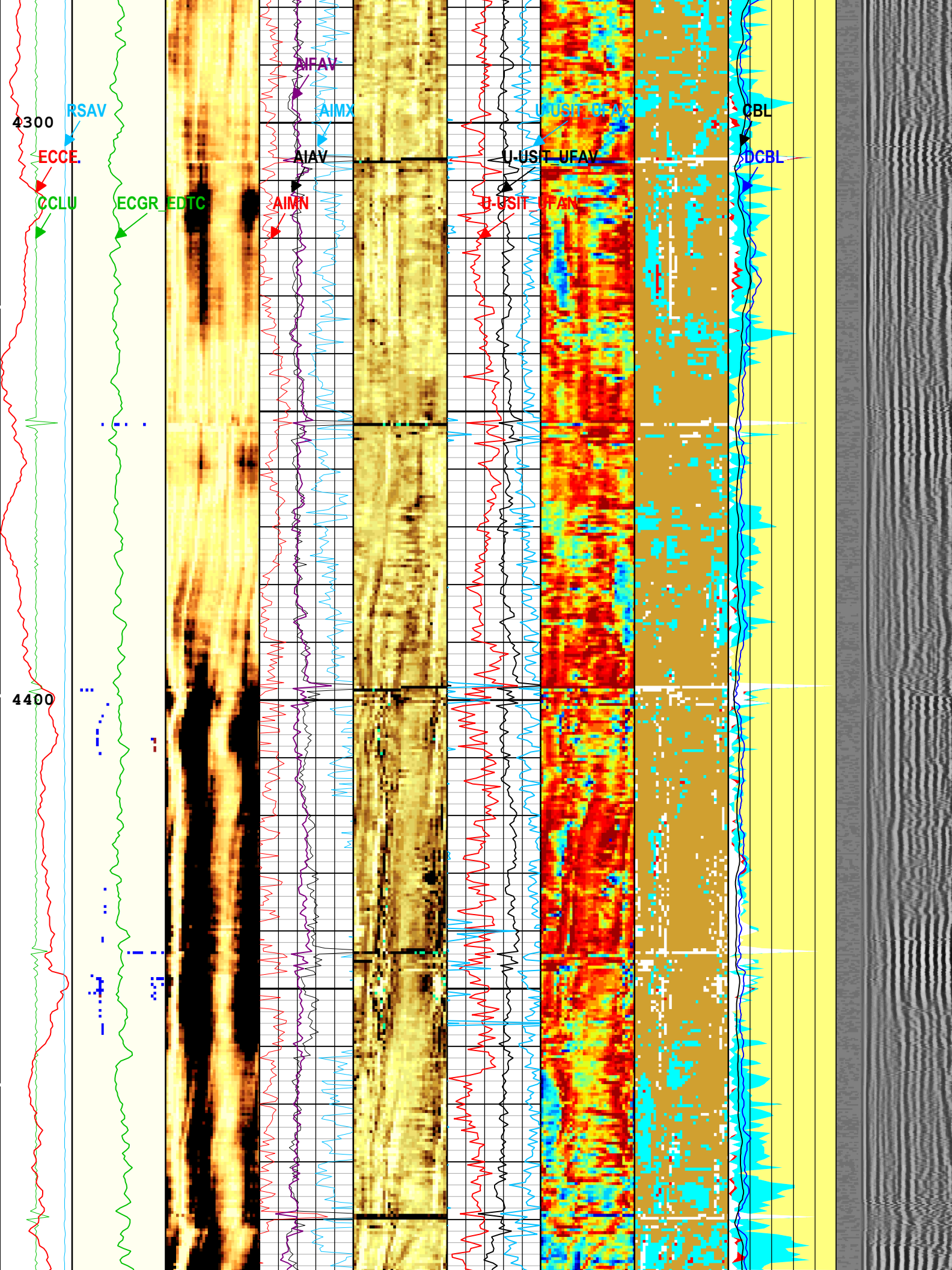


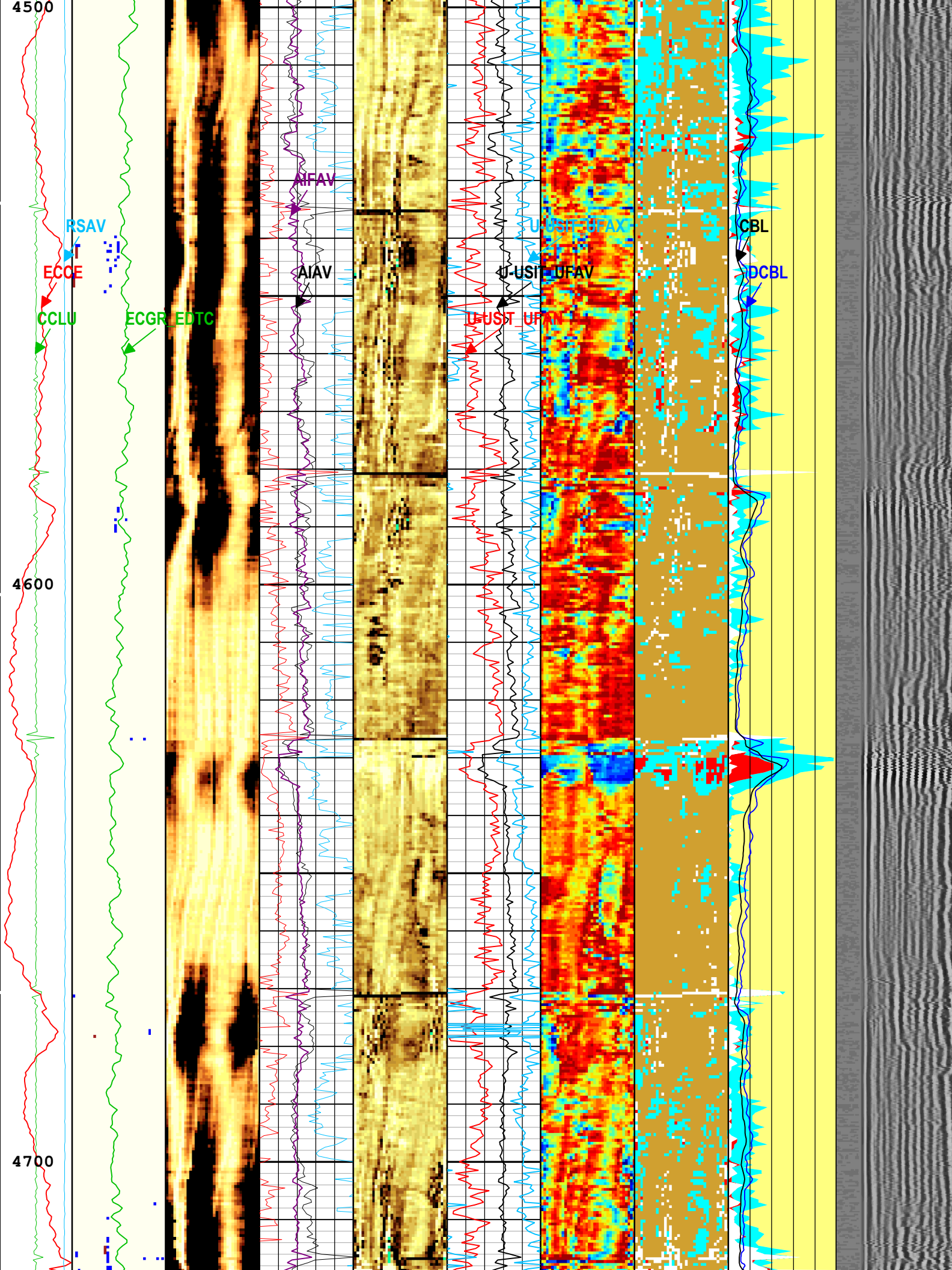


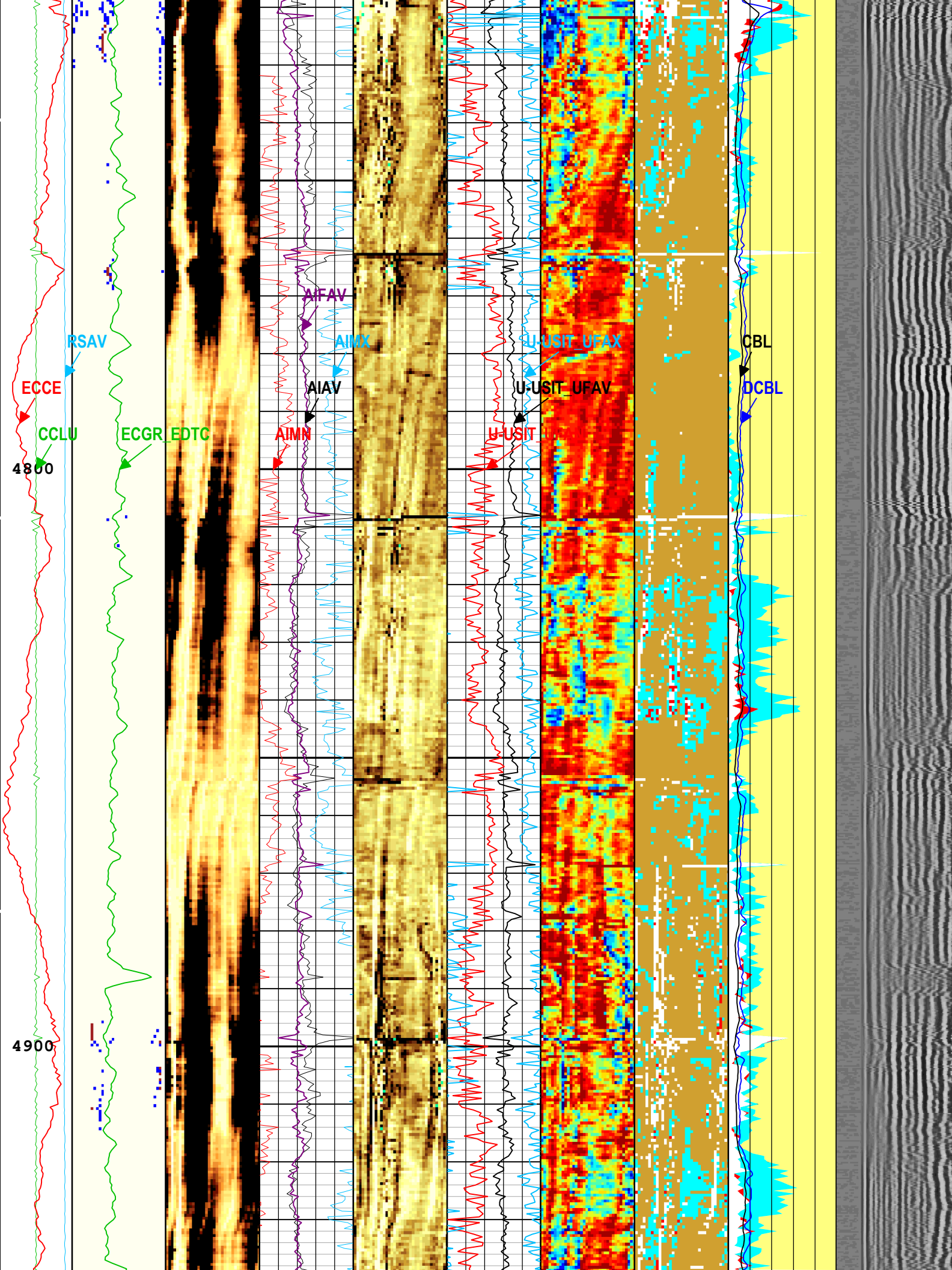




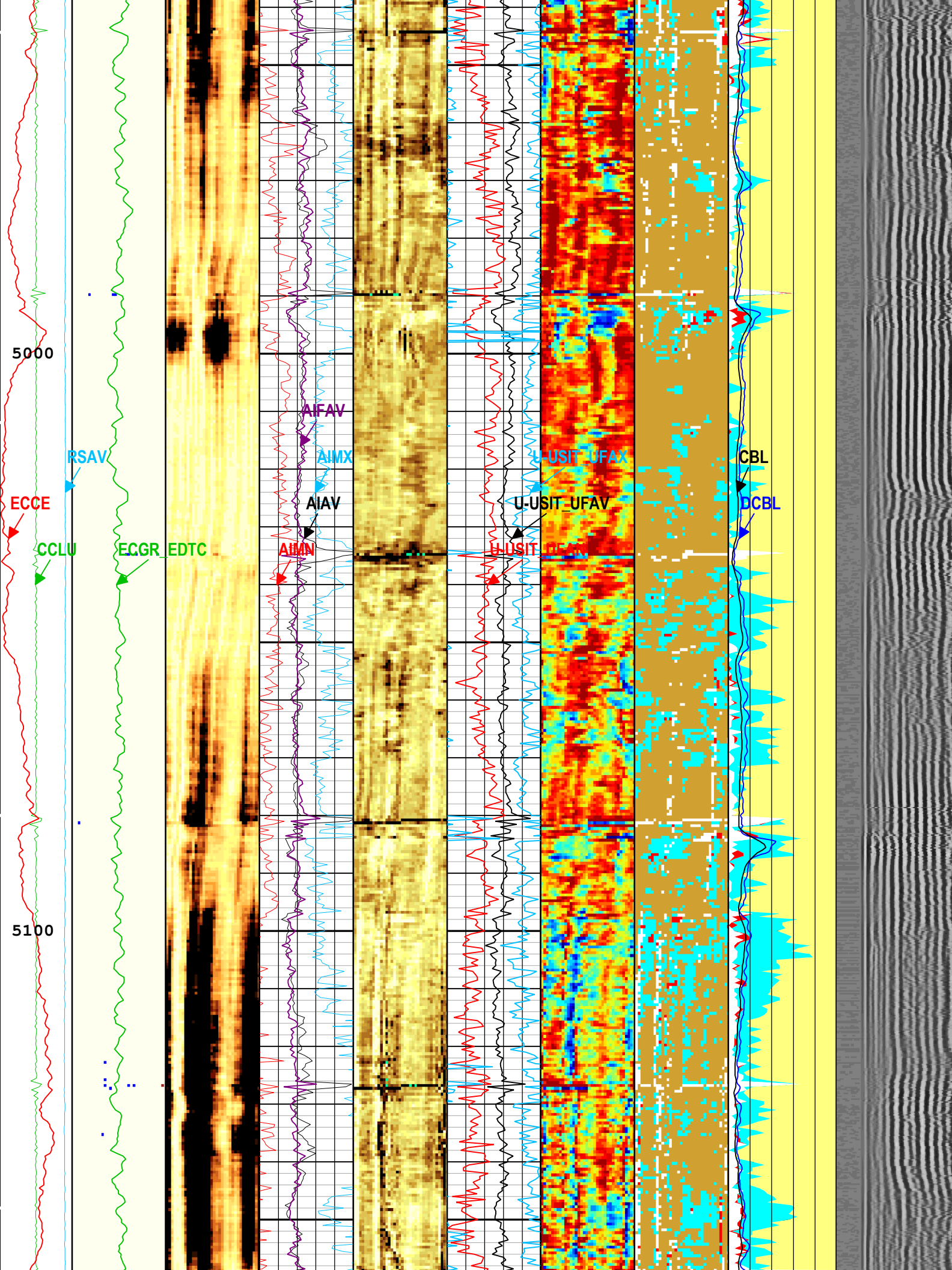


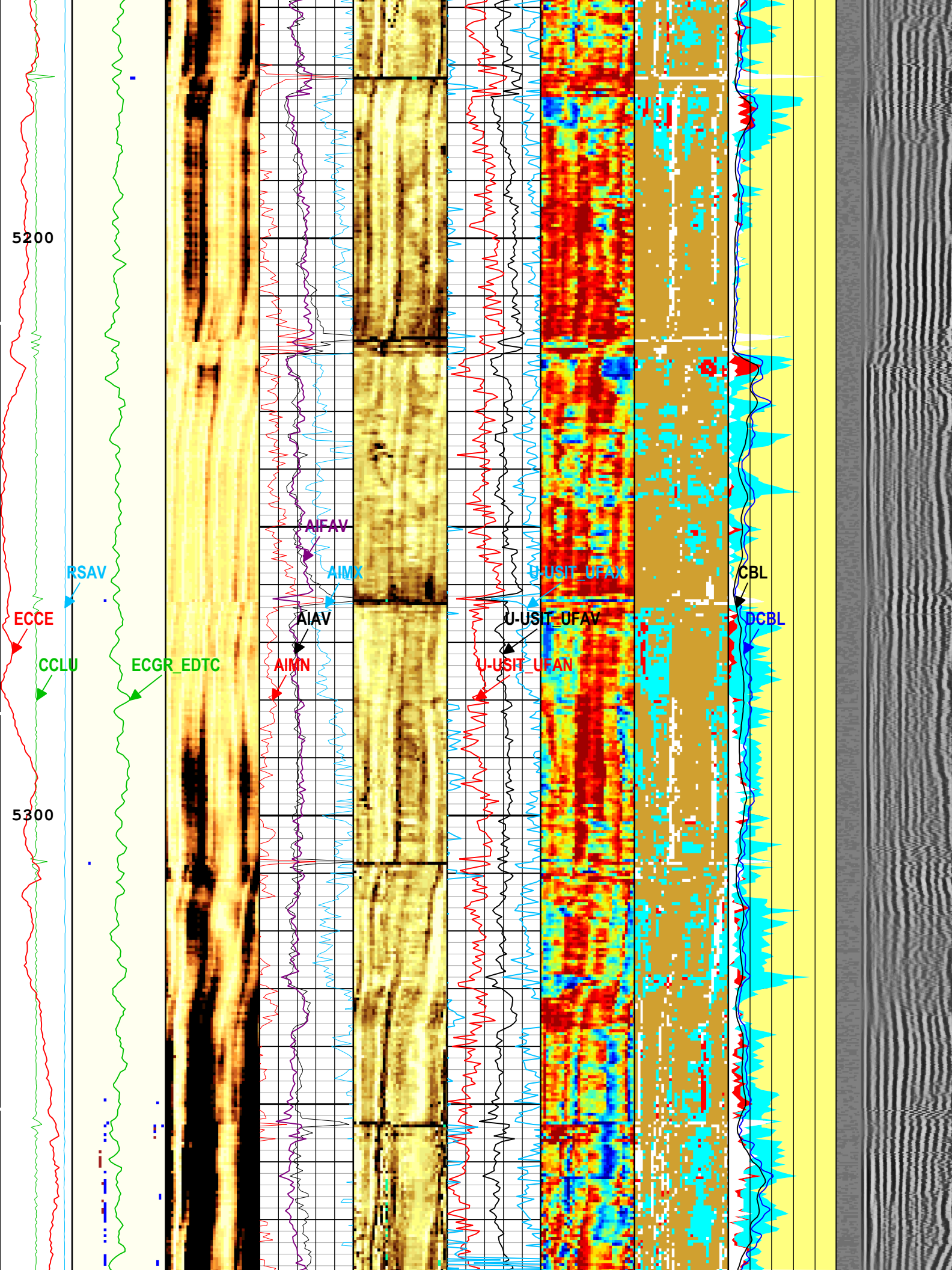




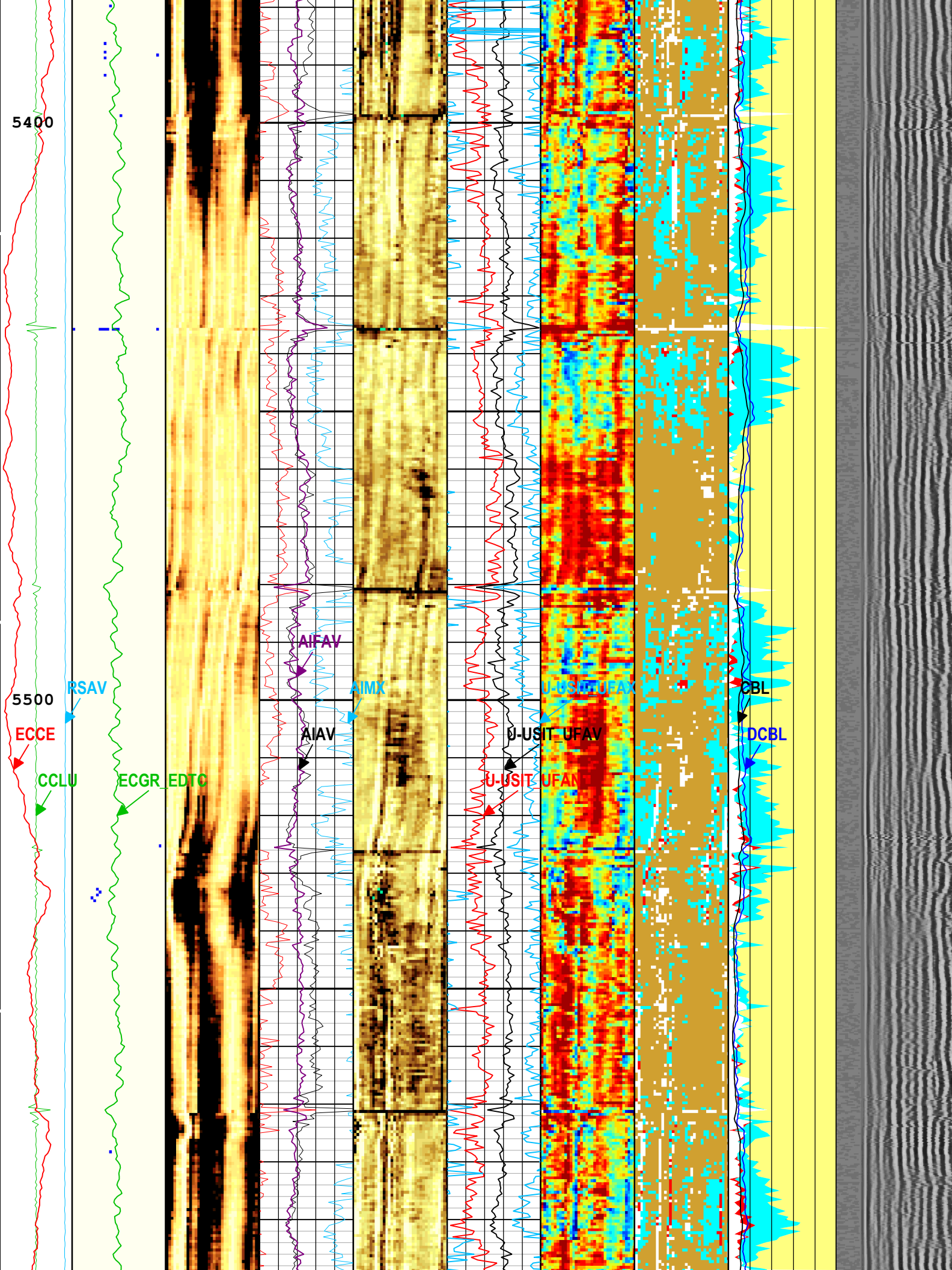


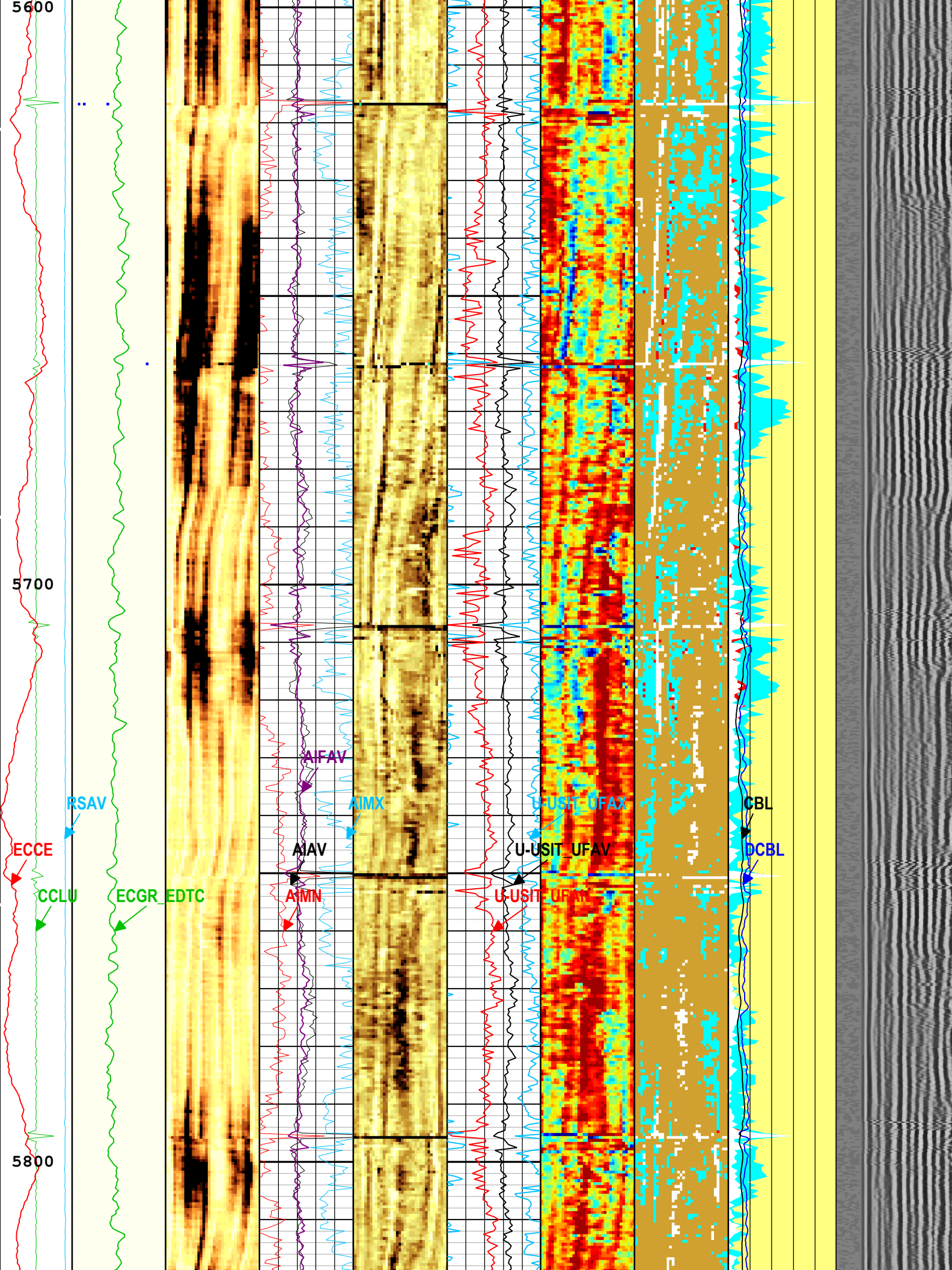


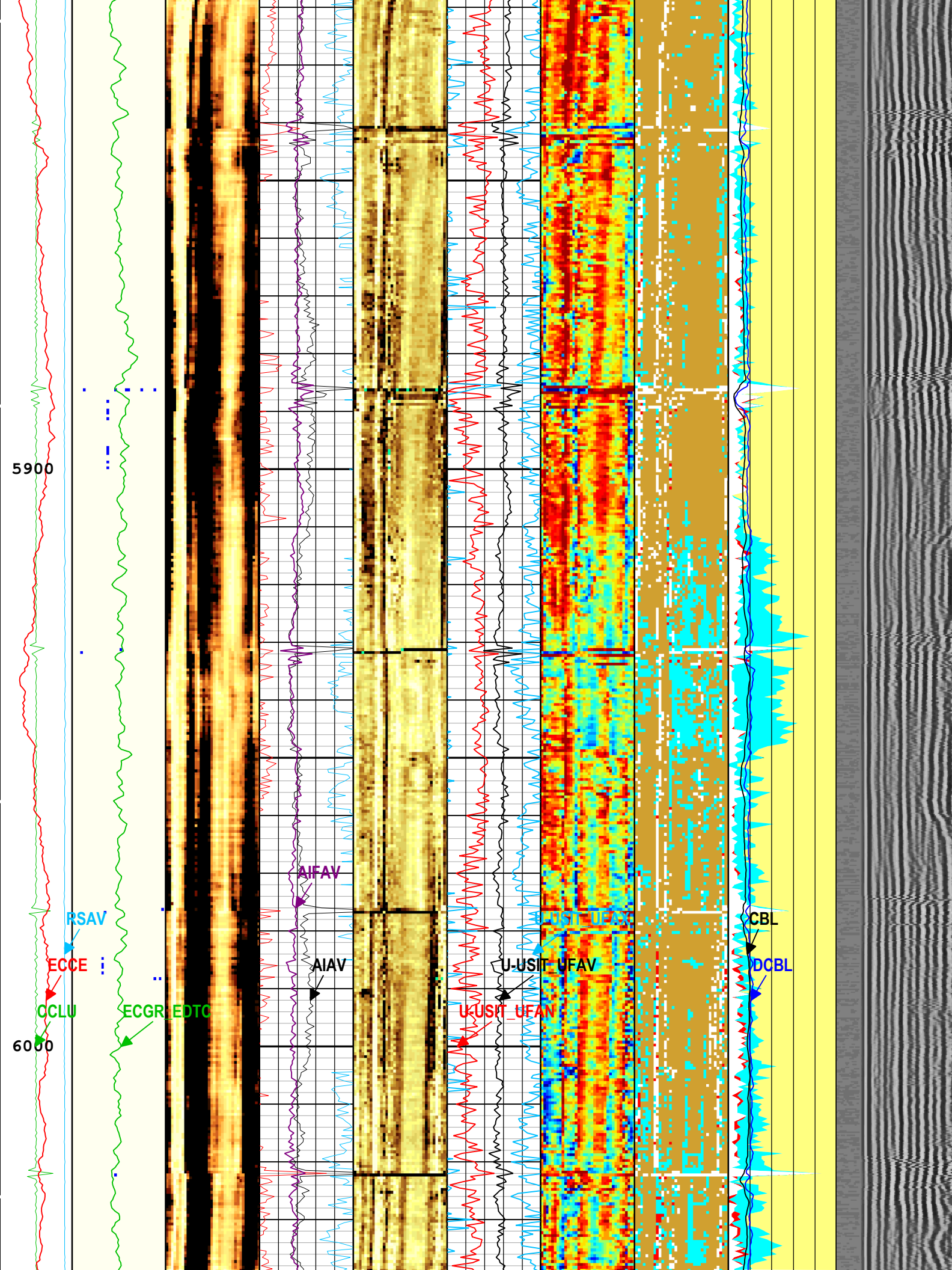




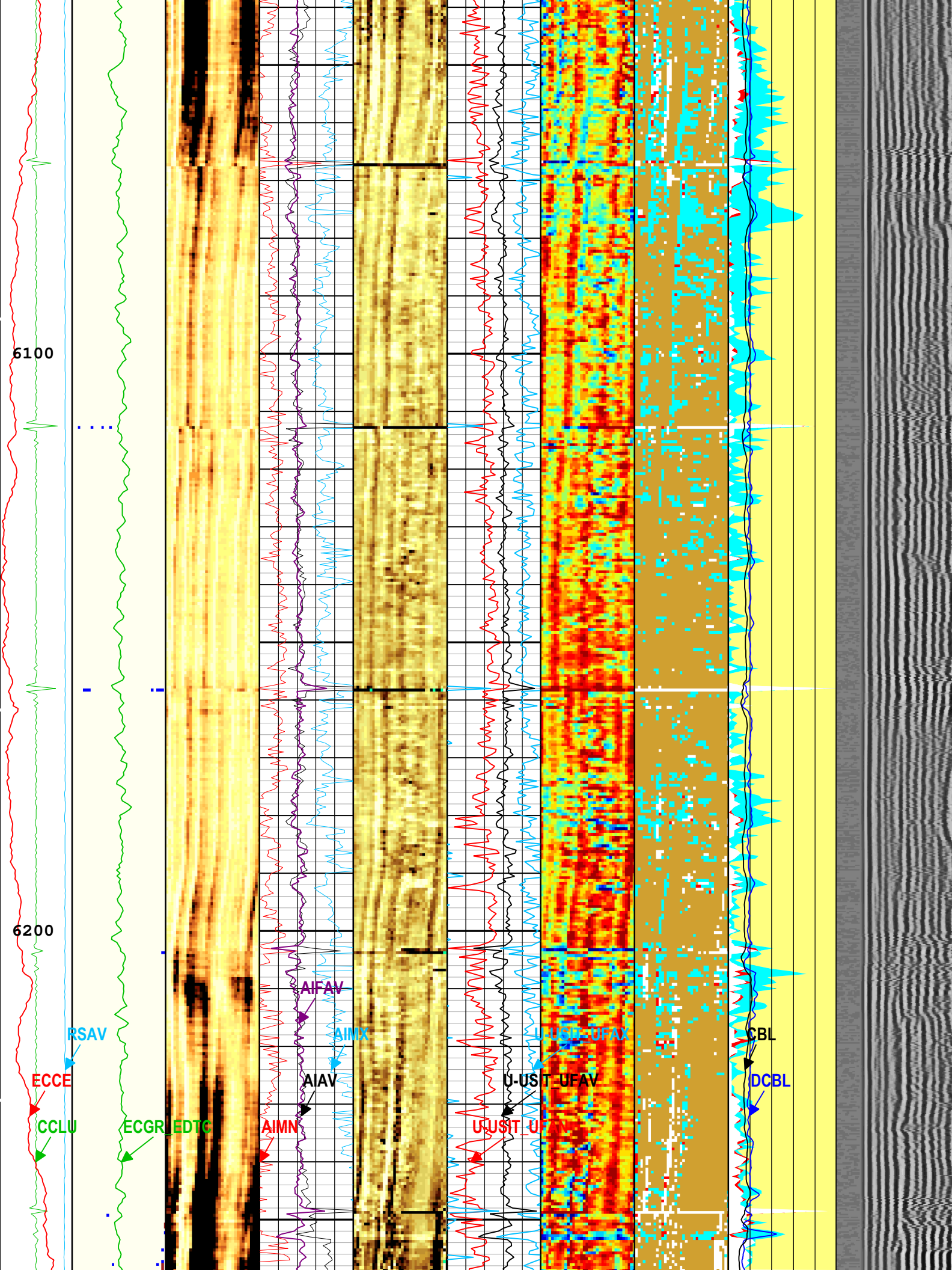


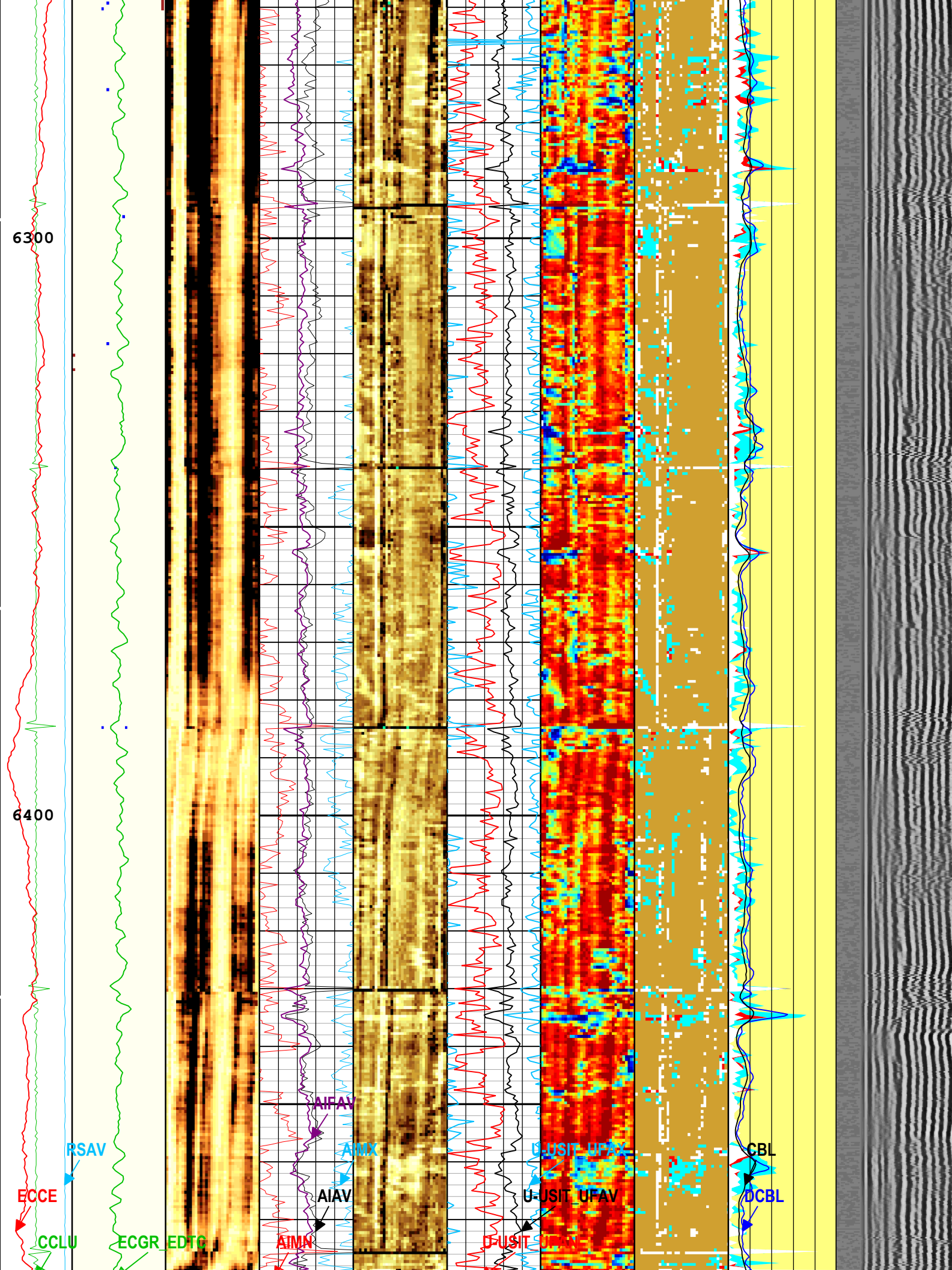


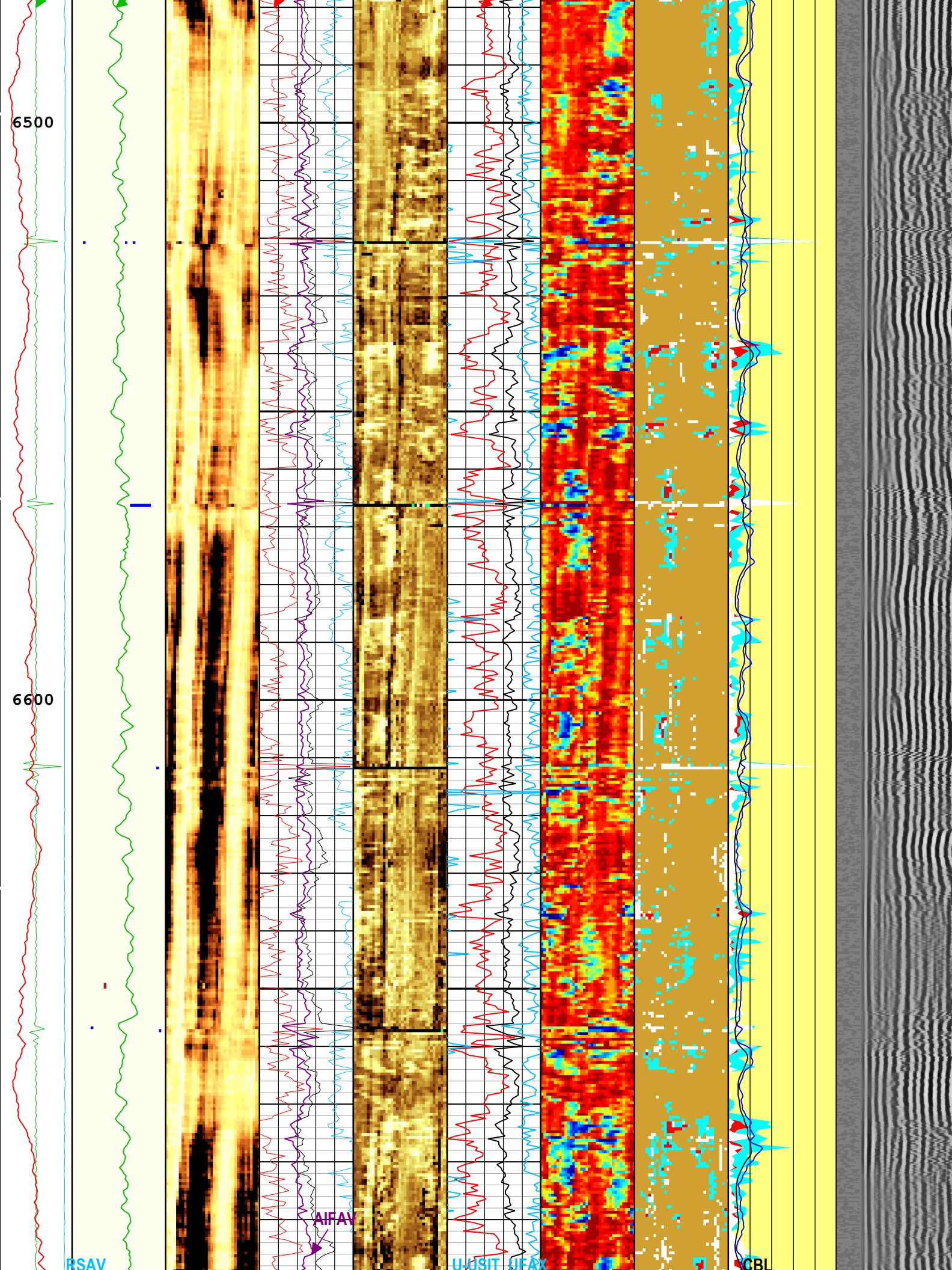




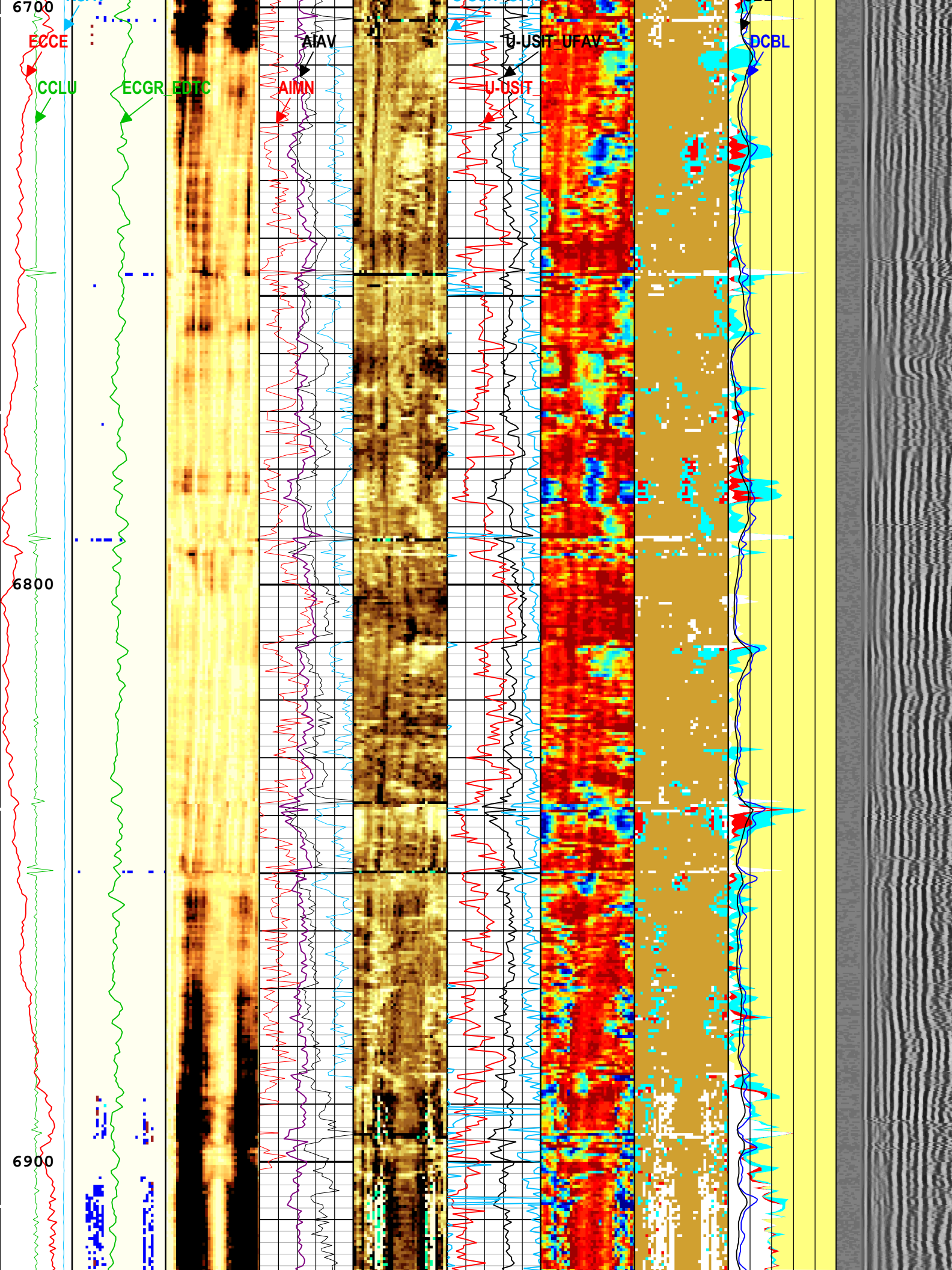


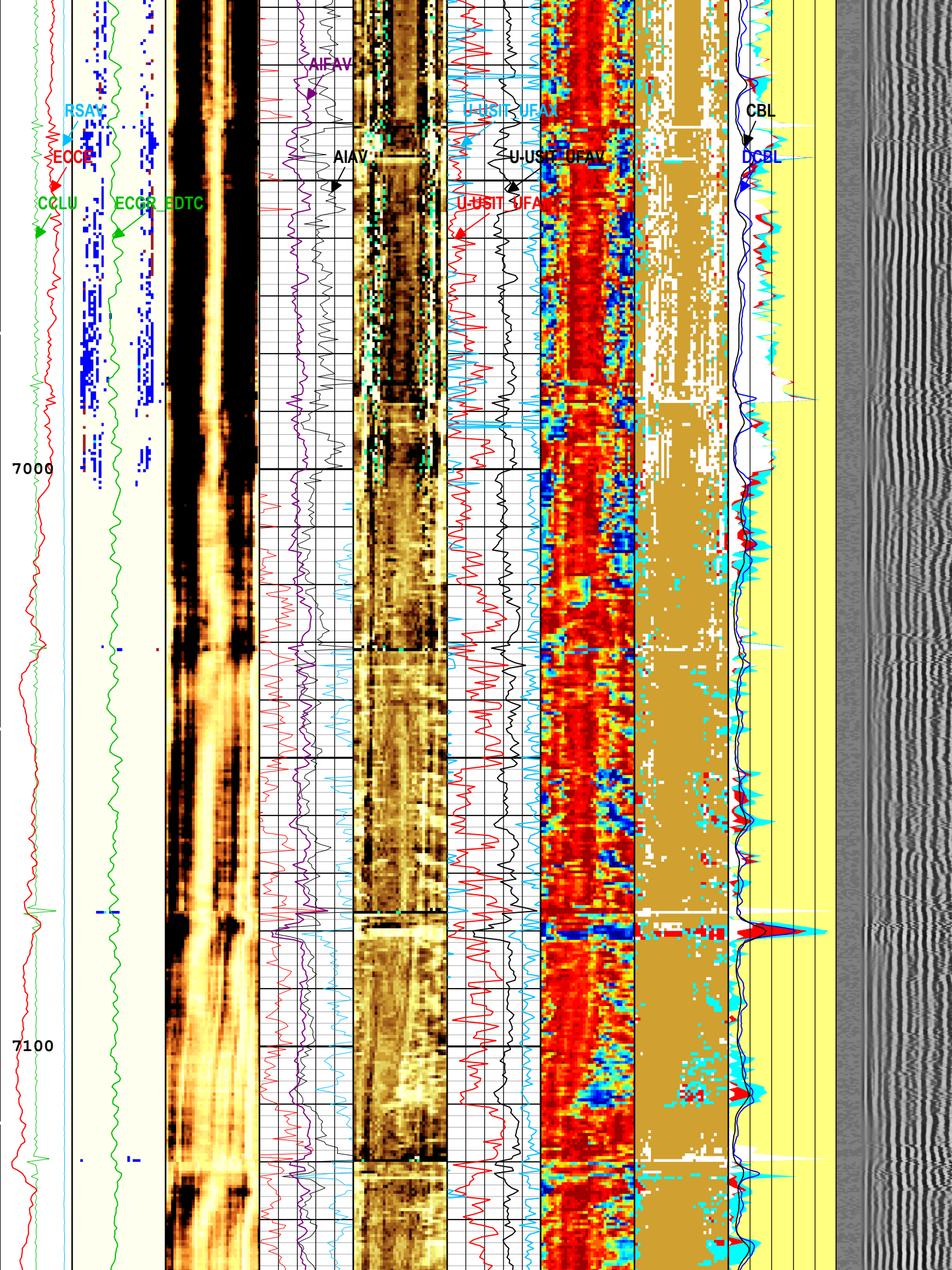


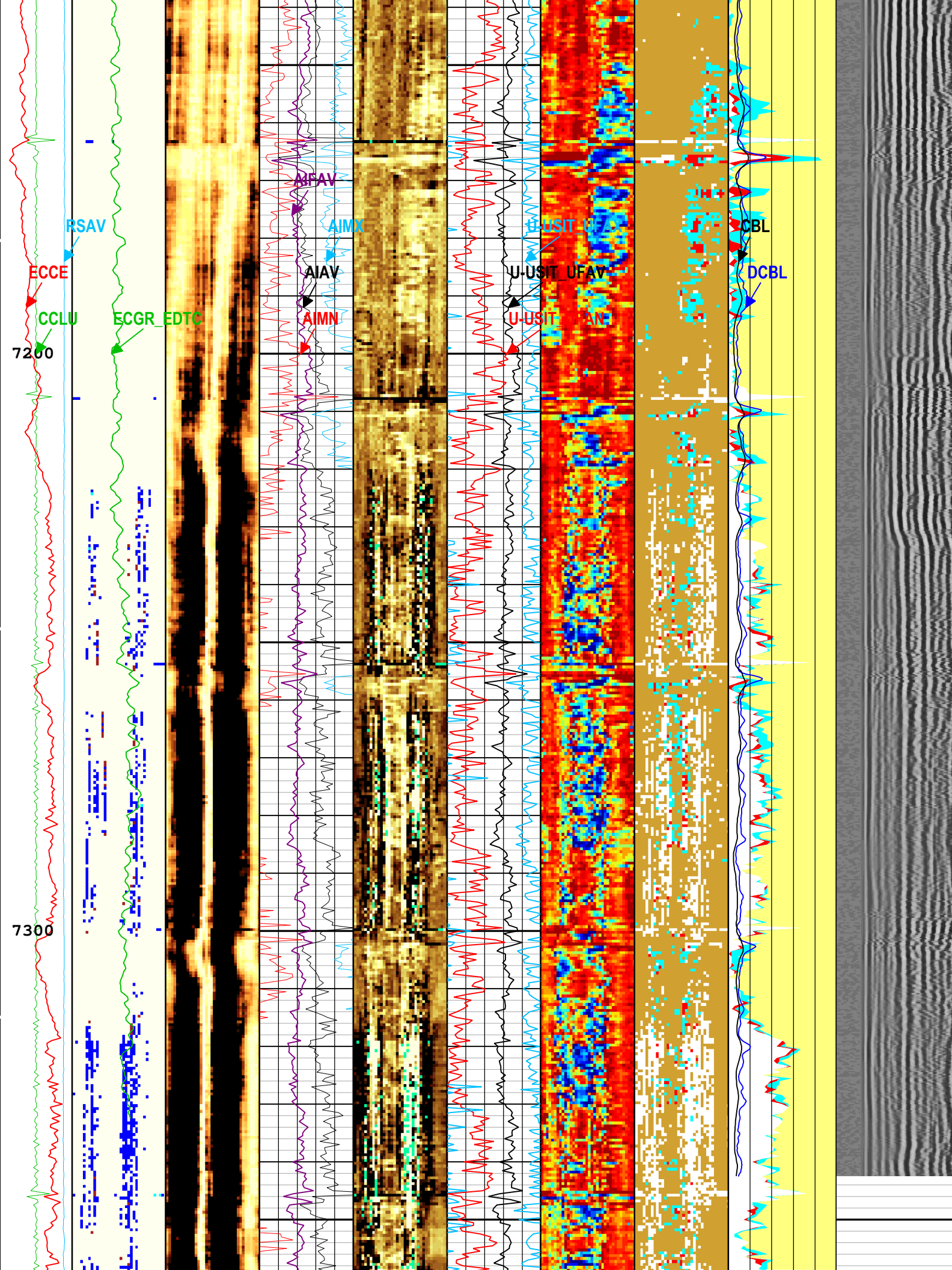




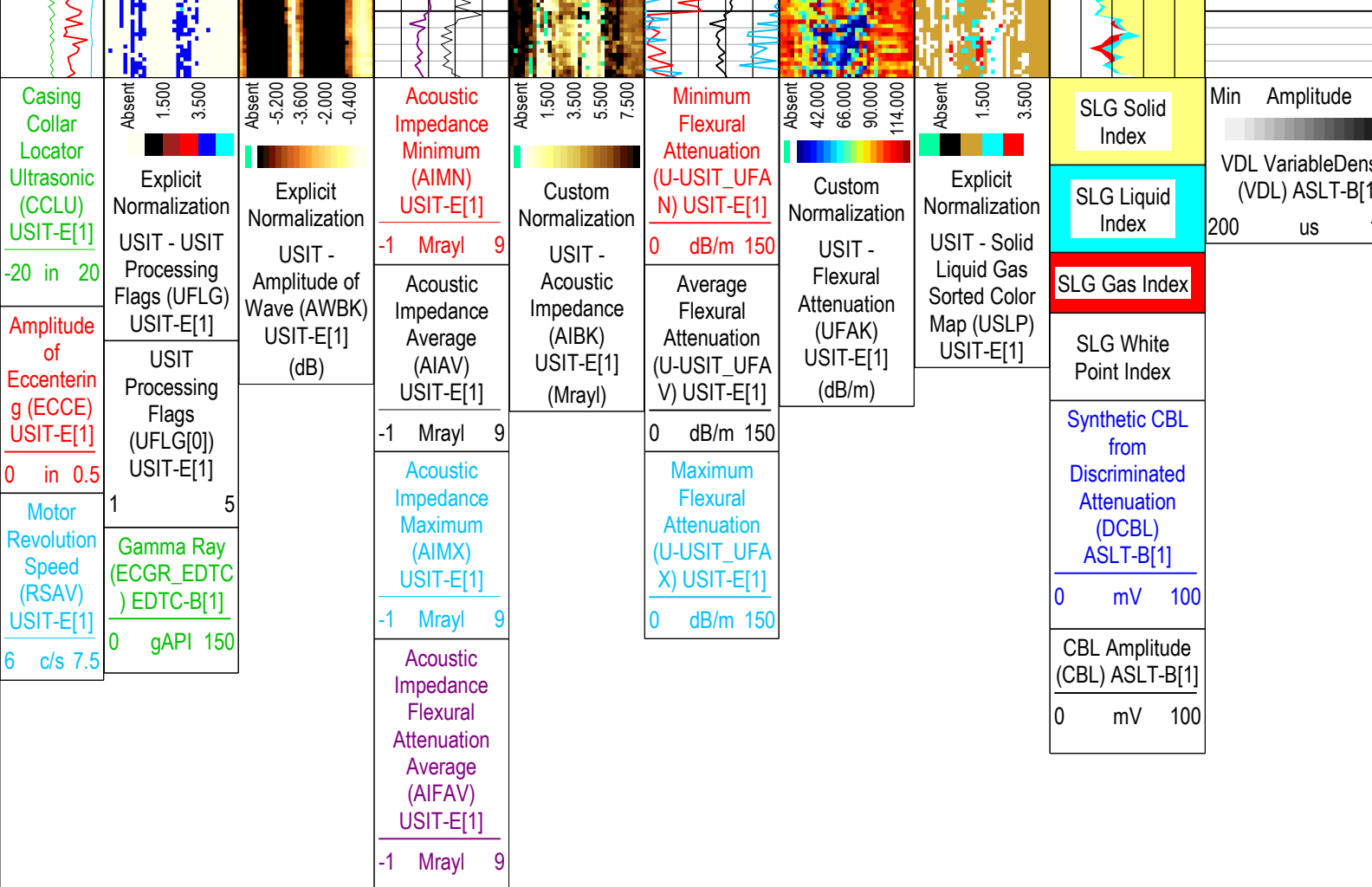












TIME\_1900 - Time Marked every 60.00 (s)

USIT Processing Flags (UFLG[0]) USIT-E[1]

- 1 - UFLG 1 Value within [0.0 - 1.5] - : UTIM Error
- 2 - UFLG 2 Value within [1.5 - 2.5] - : Pulse Origin Not Detected
- 3 - UFLG 3 Value within [2.5 - 3.5] - : WINLEN Error
- 4 - UFLG 4 UFLG 5 UFLG 6 Value within [3.5 - 6.5] - : Casing Thickness Error
- 5 - UFLG 7 UFLG 8 UFLG 9 Value within [6.5 - 10] - : Loop Processing Error

Description: USI IBC SLG    Format: Log ( IBC SLG CBL DCBL-VDL )    Index Scale: 5 in per 100 ft    Index Unit: ft    Index Type: Measured Depth    Creation Date: 10-Apr-2022 02:03:39

Channel Processing Parameters				
1A: Parameters				
Parameter	Description	Tool	Value	Unit
BARI(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BS	Bit Size	WLSESSION	Depth Zoned	in
CBLO	Casing Bottom (Logger)	WLSESSION	15833	ft
CBRA	CBL LQC Reference Amplitude in Free Pipe	ASLT-B	72	mV
CDEN	Cement Density	USIT-E	12.9	lbm/gal
CDEN	Cement Density	EDTC-B	16.69	lbm/gal
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Regular Cement	
THNO	Nominal Casing Thickness - Zoned along logger depths	WLSESSION	0.361	in
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
DTF	Delta-T Fluid	Borehole	189	us/ft

DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
FCF	CBL Fluid Compensation Factor	ASLT-B	1.01	
FD	Fluid Density	USIT-E	12	lbm/gal
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS(RT)	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	BS(RT)	
GOBO_CURR	Good Bond in Arbitrary Cement	ASLT-B	4.3	mV
HEMA	Hematite Presence Flag	Borehole	No	
IBC_CTHI_SEL	IBC Casing Thickness Selector	USIT-E	THBK+THAV	
IBC_FRP_OFFSET	IBC Flexural Offset from Free Pipe	USIT-E	-7.85	dB/m
IBC_FVEL_SEL	IBC Fluid Velocity Selection	USIT-E	Automatic	
IBC_OFFSET_SEL	IBC Flexural Offset Selector	USIT-E	IBC_FRP_OFFSET	
IBC_ZMUD_SEL	IBC Mud Impedance Selection	USIT-E	FreePipe Norm.	
IMAR	Image Rotation	USIT-E	Off	
MATT	Maximum Attenuation	ASLT-B	38.88	dB/m
MATT_CURR	Maximum Attenuation in Arbitrary Cement	ASLT-B	38.88	dB/m
MEAS_WLEN	Tcube Processing Window Length in Measurement Mode	USIT-E	22.44	us
MSA	Minimum Sonic Amplitude	ASLT-B	2.12	mV
MSA_CURR	Minimum Sonic Amplitude in Arbitrary Cement	ASLT-B	2.12	mV
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.31	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1.29	
RUN_SNUM	Run Sequence Number	WSDRUN	1	
THDH	Maximum Search Thickness (percentage of nominal)	USIT-E	120	%
THDL	Minimum Search Thickness (percentage of nominal)	USIT-E	80	%
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.87	Mrayl
U-USIT_UFAO	USIT Flexural Attenuation Offset	USIT-E	-5.7	dB/m
UFSFILT	Ultrasonic Flexural Surface Filter	USIT-E	LPF 250k	
U-USIT_UIAP	IBC Answer Product Enabled	USIT-E	SolidLiquidGasMap	
ZMUD	Acoustic Impedance of Mud	Borehole	1.5	Mrayl
ZTCM	Acoustic Impedance Threshold for Cement	USIT-E	2.2	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

1ADepth Zoned Parameters			
Parameter	Value	Start ( ft )	Stop ( ft )
BS	13.5	44.5	1705
BS	8.5	1705	7368
All depth are actual.			

Tool Control Parameters	
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1A: Parameters				
Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-E	-12	dB
AGMX	Maximum Gain of Cartridge	USIT-E	48	dB
EMXV	EMEX Voltage	USIT-E	Time Zoned	V
IBC_ACQTYPE	IBC Acquisition type	USIT-E	1 MHz	
IBC_FLEXDBP	IBC Flex Duration Before Peak	USIT-E	30	us
ICE2_ACQ	Ultrasonic ICE2 Acquisition	USIT-E	Yes	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	4010	ft/h
MODE	SSLT Firing Mode	ASLT-B	Attenuation	
UPAT	USIT Emission Pattern	USIT-E	Pattern 375 KHz	
UWKM	USIT Working Mode	USIT-E	10 deg at 6.0 in	
U-USIT_UTAN	Transducer Anoles	USIT-E	33 DEG	

VDM	SSLT VDL Display Mode	ASLT-B	R5	
VRES	Vertical Resolution	USIT-E	6.0 in	

1A

Time Zoned Parameters

Pass Main[3]:Up					
Parameter	Value	Start Time	Stop Time	Start Depth ( ft )	Stop Depth ( ft )
EMXV	40	09-Apr-2022 16:20:47	09-Apr-2022 16:50:54	7368.84	5356.61
EMXV	35	09-Apr-2022 16:50:54	09-Apr-2022 17:05:09	5356.61	4389.09
EMXV	30	09-Apr-2022 17:05:09	09-Apr-2022 17:39:40	4389.09	2914.84

Pass Main[4]:Up					
EMXV	30	09-Apr-2022 17:51:15	09-Apr-2022 18:14:52	2914.84	1512.77
EMXV	40	09-Apr-2022 18:14:52	09-Apr-2022 18:36:43	1512.77	80.84
All depth are at tool zero.					

1A

Software Version

Acquisition System		Version
Maxwell 2022.0		12.0.215014.3100
Application Patch		Wireline_Hotfix-Mandatory-2022.0_12.0.216515

Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
1A	Repeat[2]:Up	Up	7016.04 ft	7387.49 ft	09-Apr-2022 3:49:12 PM	09-Apr-2022 4:17:31 PM	ON	17.78 ft	Yes

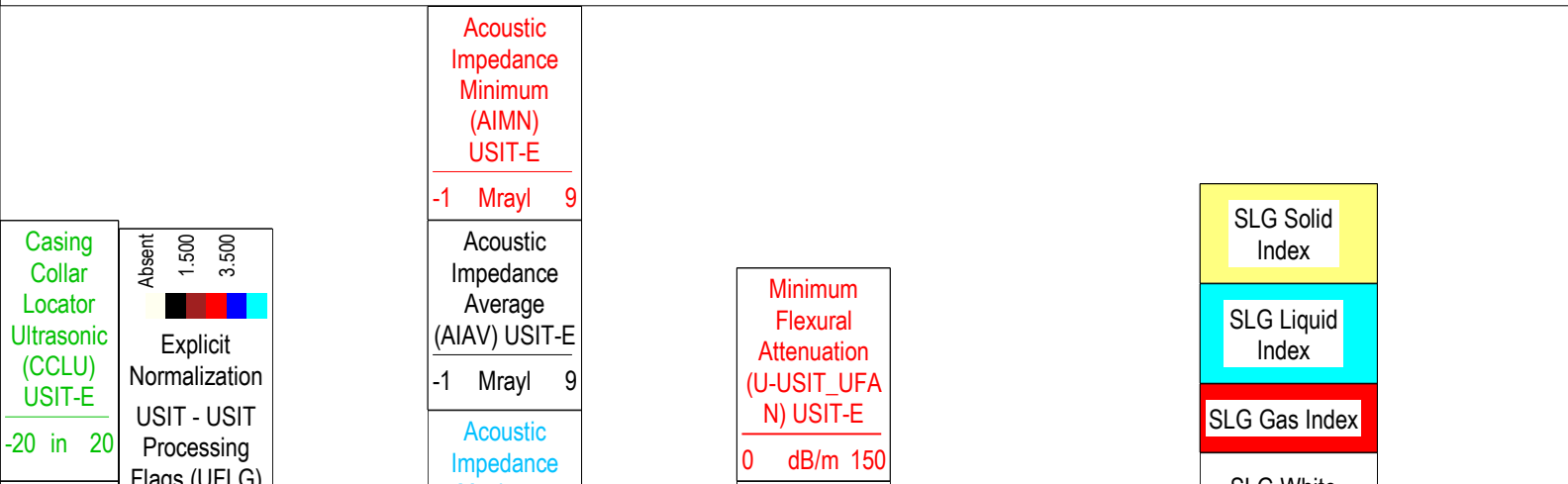
All depths are referenced to toolstring zero

Log		Company:PDC Energy Inc      Well:Vega #2N 1A: Repeat[2]:Up:S004
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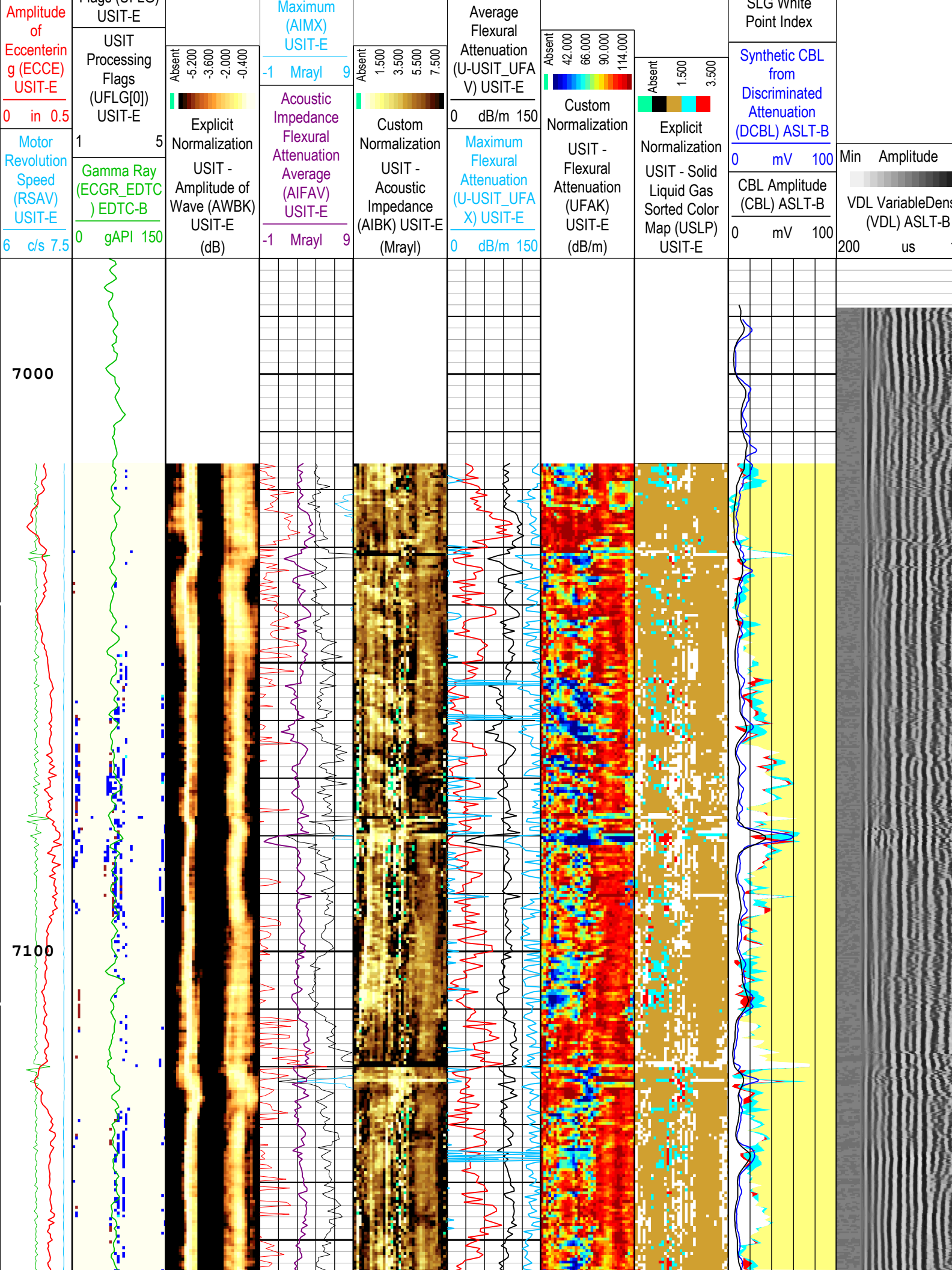
Description: USI IBC SLG    Format: Log ( IBC SLG CBL DCBL-VDL )    Index Scale: 5 in per 100 ft    Index Unit: ft    Index Type: Measured Depth    Creation Date: 10-Apr-2022 02:04:02

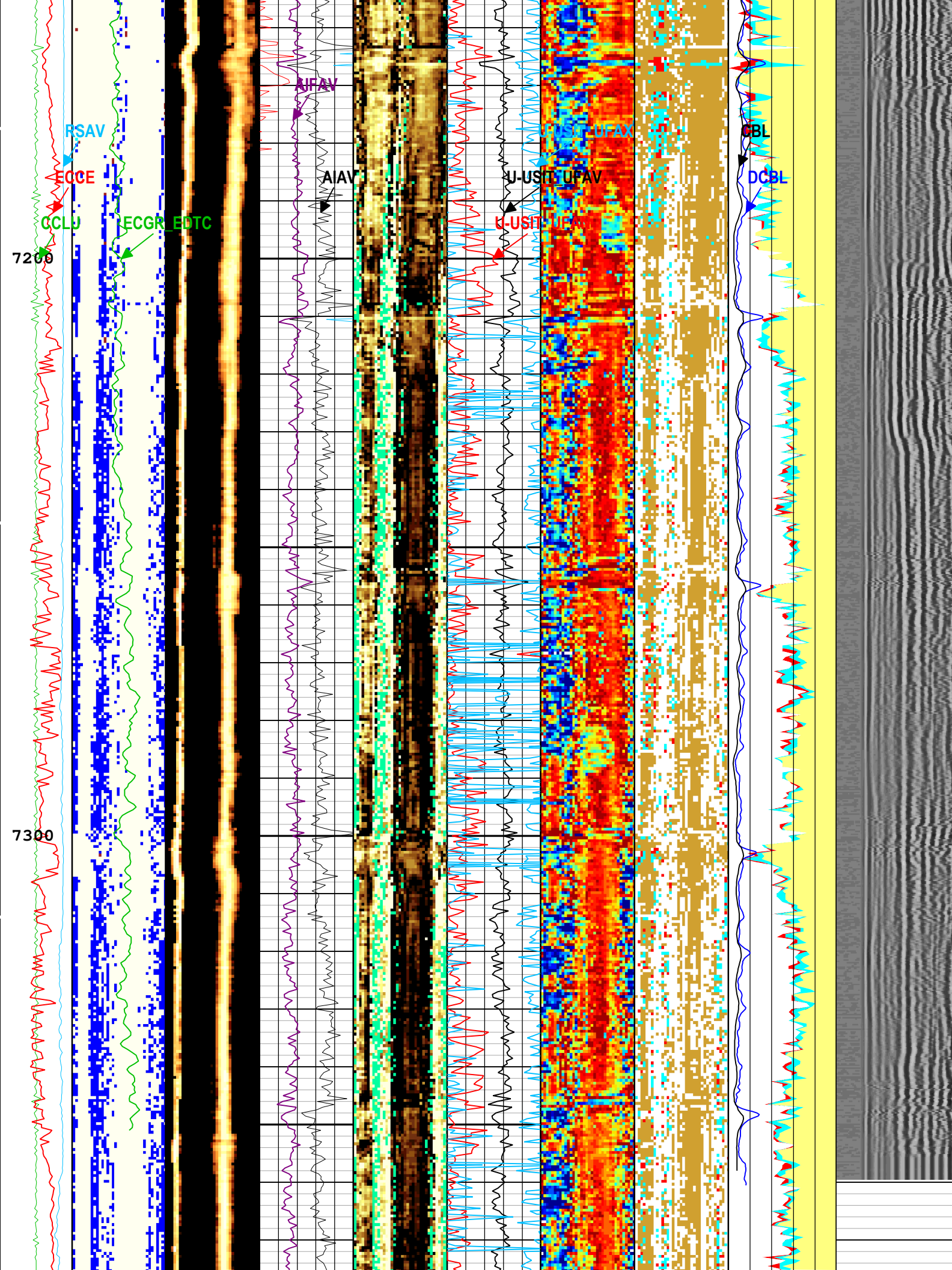
TIME\_1900 - Time Marked every 60.00 (s)

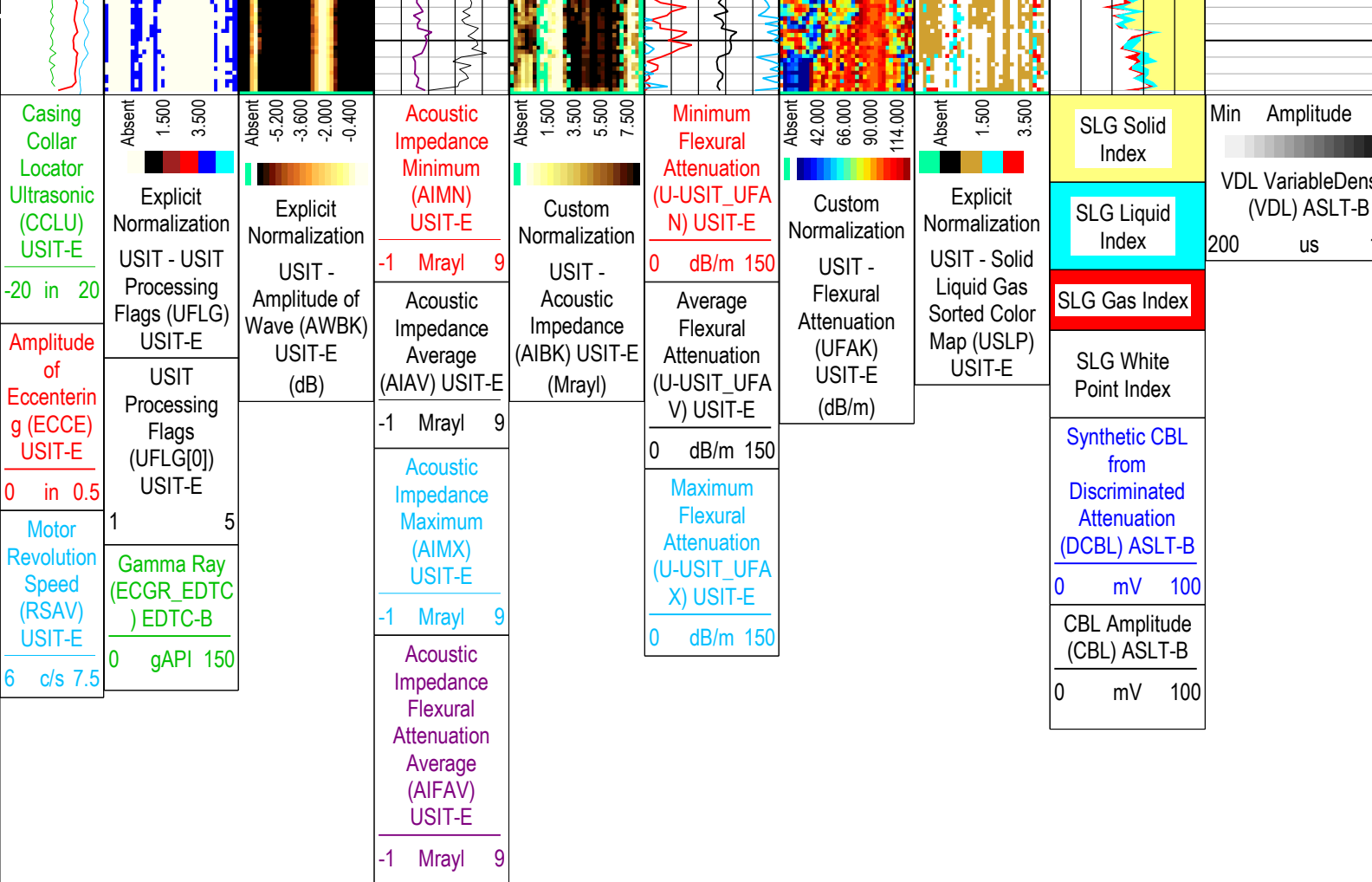
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4 - UFLG 4    UFLG 5    UFLG 6 Value within [3.5 - 6.5] - :	Casing Thickness Error
5 - UFLG 7    UFLG 8    UFLG 9 Value within [6.5 - 10 ] - :	Loop Processing Error
















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Description: USI IBC SLG    Format: Log ( IBC SLG CBL DCBL-VDL )    Index Scale: 5 in per 100 ft    Index Unit: ft    Index Type: Measured Depth    Creation Date: 10-Apr-2022 02:04:02

Channel Processing Parameters				
1A: Parameters				
Parameter	Description	Tool	Value	Unit
BARI(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BS	Bit Size	WLSESSION	8.5	in
CBLO	Casing Bottom (Logger)	WLSESSION	15833	ft
CBRA	CBL LQC Reference Amplitude in Free Pipe	ASLT-B	72	mV
CDEN	Cement Density	USIT-E	12.9	lbm/gal
CDEN	Cement Density	EDTC-B	16.69	lbm/gal
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Regular Cement	
THNO	Nominal Casing Thickness - Zoned along logger depths	WLSESSION	0.361	in
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
DTF	Delta-T Fluid	Borehole	189	us/ft



DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
FCF	CBL Fluid Compensation Factor	ASLT-B	1.01	
FD	Fluid Density	USIT-E	12	lbm/gal
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS(RT)	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	BS(RT)	
GOBO_CURR	Good Bond in Arbitrary Cement	ASLT-B	4.3	mV
HEMA	Hematite Presence Flag	Borehole	No	
IBC_CTHI_SEL	IBC Casing Thickness Selector	USIT-E	THBK+THAV	
IBC_FRP_OFFSET	IBC Flexural Offset from Free Pipe	USIT-E	-7.85	dB/m
IBC_FVEL_SEL	IBC Fluid Velocity Selection	USIT-E	Automatic	
IBC_OFFSET_SEL	IBC Flexural Offset Selector	USIT-E	IBC_FRP_OFFSET	
IBC_ZMUD_SEL	IBC Mud Impedance Selection	USIT-E	FreePipe Norm.	
IMAR	Image Rotation	USIT-E	Off	
MATT	Maximum Attenuation	ASLT-B	38.88	dB/m
MATT_CURR	Maximum Attenuation in Arbitrary Cement	ASLT-B	38.88	dB/m
MEAS_WLEN	Tcube Processing Window Length in Measurement Mode	USIT-E	22.44	us
MSA	Minimum Sonic Amplitude	ASLT-B	2.12	mV
MSA_CURR	Minimum Sonic Amplitude in Arbitrary Cement	ASLT-B	2.12	mV
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.31	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1.29	
RUN_SNUM	Run Sequence Number	WSDRUN	1	
THDH	Maximum Search Thickness (percentage of nominal)	USIT-E	120	%
THDL	Minimum Search Thickness (percentage of nominal)	USIT-E	80	%
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.87	Mrayl
U-USIT_UFAO	USIT Flexural Attenuation Offset	USIT-E	-5.7	dB/m
UFSFILT	Ultrasonic Flexural Surface Filter	USIT-E	LPF 250k	
U-USIT_UIAP	IBC Answer Product Enabled	USIT-E	SolidLiquidGasMap	
ZMUD	Acoustic Impedance of Mud	Borehole	1.5	Mrayl
ZTCM	Acoustic Impedance Threshold for Cement	USIT-E	2.2	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

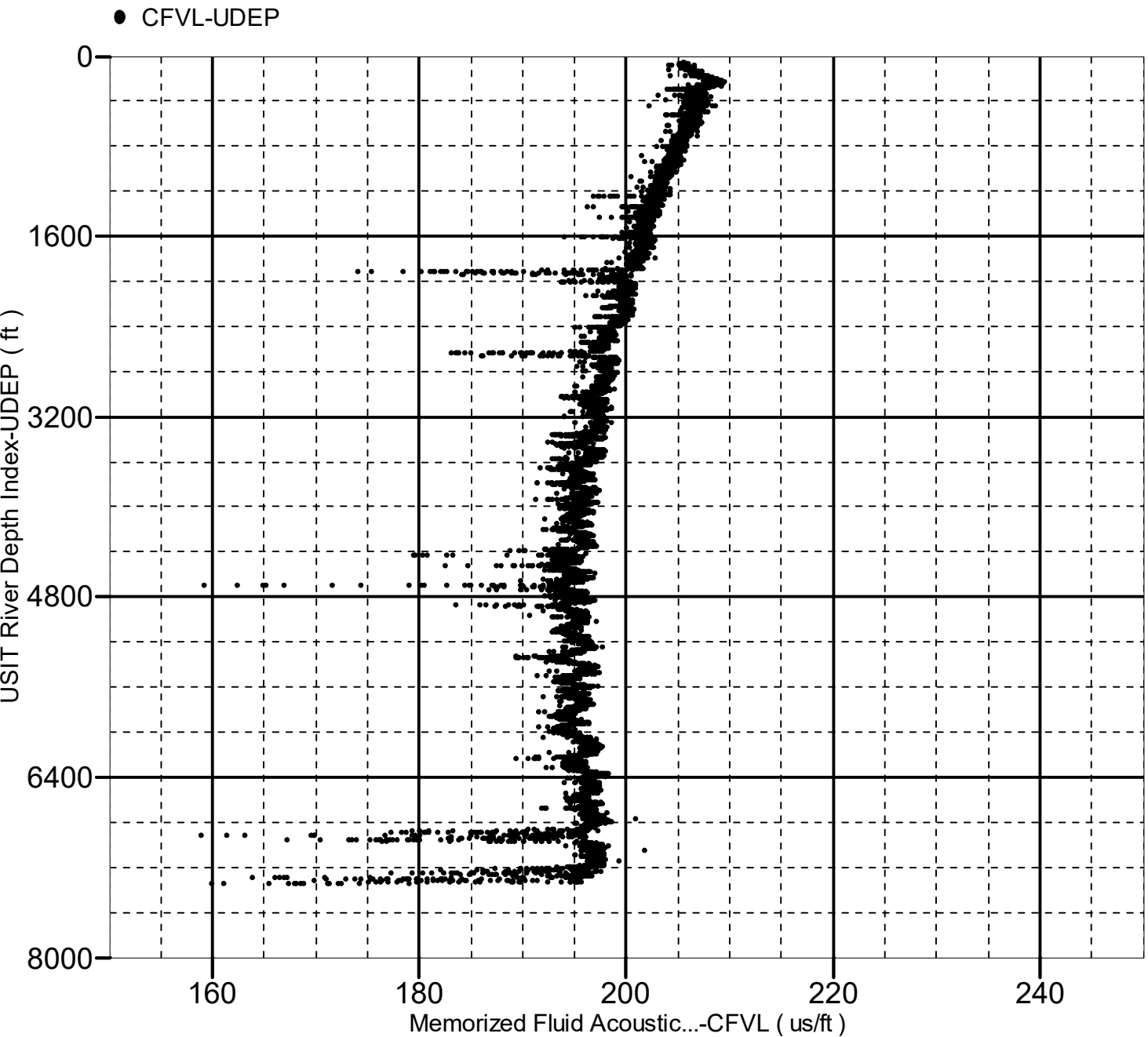
Tool Control Parameters

1A: Parameters				
Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-E	-12	dB
AGMX	Maximum Gain of Cartridge	USIT-E	48	dB
EMXV	EMEX Voltage	USIT-E	40	V
IBC_ACQTYPE	IBC Acquisition type	USIT-E	1 MHz	
IBC_FLEXDBP	IBC Flex Duration Before Peak	USIT-E	30	us
ICE2_ACQ	Ultrasonic ICE2 Acquisition	USIT-E	Yes	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	4010	ft/h
MODE	SSLT Firing Mode	ASLT-B	Attenuation	
UPAT	USIT Emission Pattern	USIT-E	Pattern 375 KHz	
UWKM	USIT Working Mode	USIT-E	10 deg at 6.0 in	
U-USIT_UTAN	Transducer Angles	USIT-E	33_DEG	
VDM	SSLT VDL Display Mode	ASLT-B	R5	
VRES	Vertical Resolution	USIT-E	6.0 in	

# Fluid Acoustic Slowness vs Depth

## 2D Cross Plot

Index Range: From 80.00 to 7368.00 ft



XYZ

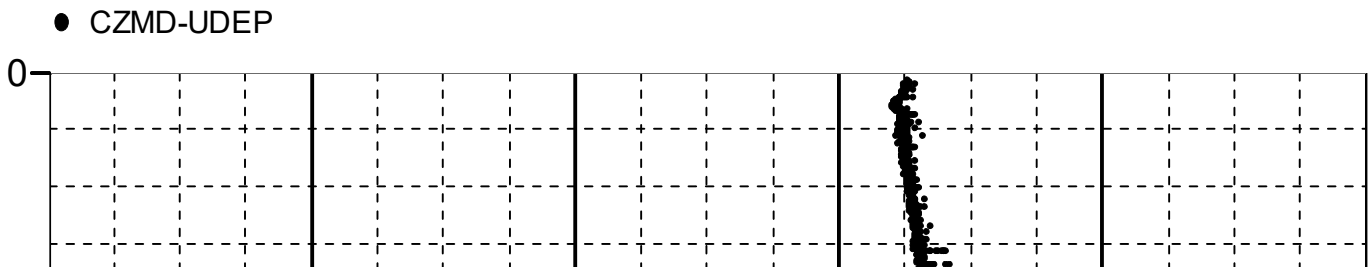
Company:PDC Energy Inc Well:Vega #2N

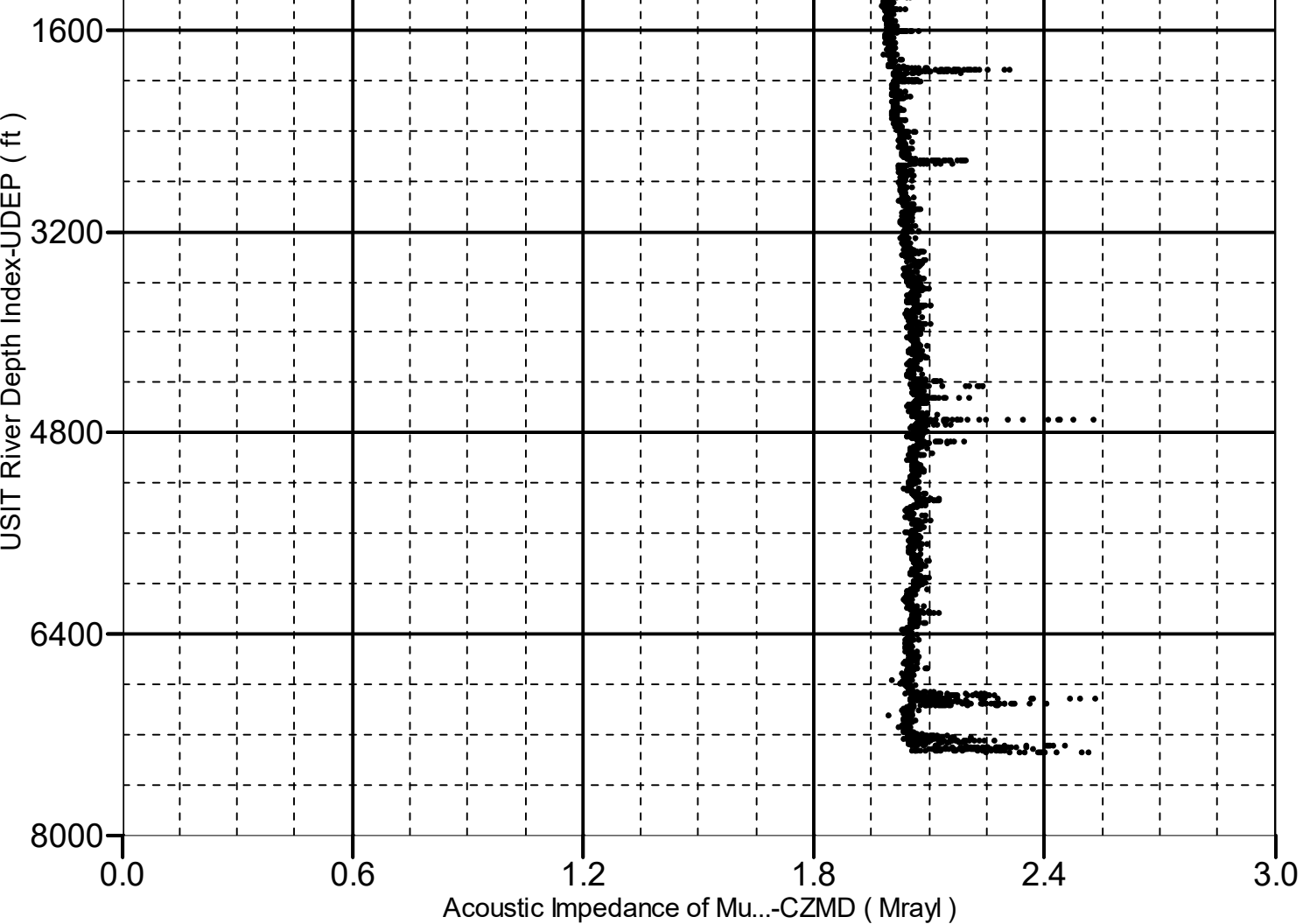
Composite 1:S004

# Acoustic Impedance of Mud vs Depth

## 2D Cross Plot

Index Range: From 80.00 to 7368.00 ft







Company:	PDC Energy Inc	<b>Schlumberger</b>
Well:	Vega #2N	
Field:	Wattenberg	
County:	Weld	
State:	Colorado	
Isolation Scanner		
Cement Bond Log		
Gamma Ray - CCL		