

Company: Crestone Peak Resources Operating LLC

Well: Herren #1H-33H-H367

Field: Wattenberg

County: Weld State: Colorado

Isolation Scanner  
Cement Evaluation  
Gamma Ray - CCL Log

County:	Weld
Field:	Wattenberg
Location:	SENE
Well:	Herren #1H-33H-H367
Company:	Crestone Peak Resources Operating LLC
Location:	
SENE	Elev.: K.B. 4872.00 ft
2299 FNL 411 FEL	G.L. 4849.00 ft
Permanent Datum:	D.F. 4872.00 ft
Log Measured From:	Ground Level
Drilling Measured From:	Kelly Bushing
API Serial No.	Kelly Bushing
05-123-47732	Section: 33
	Township: 3N
	Range: 67W

Logging Date	21-Jan-2019
Run Number	Isolation Scanner
Depth Driller	12001.00 ft
Schlumberger Depth	6390.00 ft
Bottom Log Interval	6390.00 ft
Top Log Interval	78.00 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	1974.00 ft
To	12001.00 ft
Casing/Tubing Size	5.5 in
Weight	20 lbm/ft
Grade	N/A
From	0.00 ft
To	12001.00 ft
Max Recorded Temperatures	182 degF
Logger on Bottom	21-Jan-2019
Unit Number	2143
Recorded By	A. Voyage / L. Awalt
Witnessed By	Keith Miller

Disclaimer

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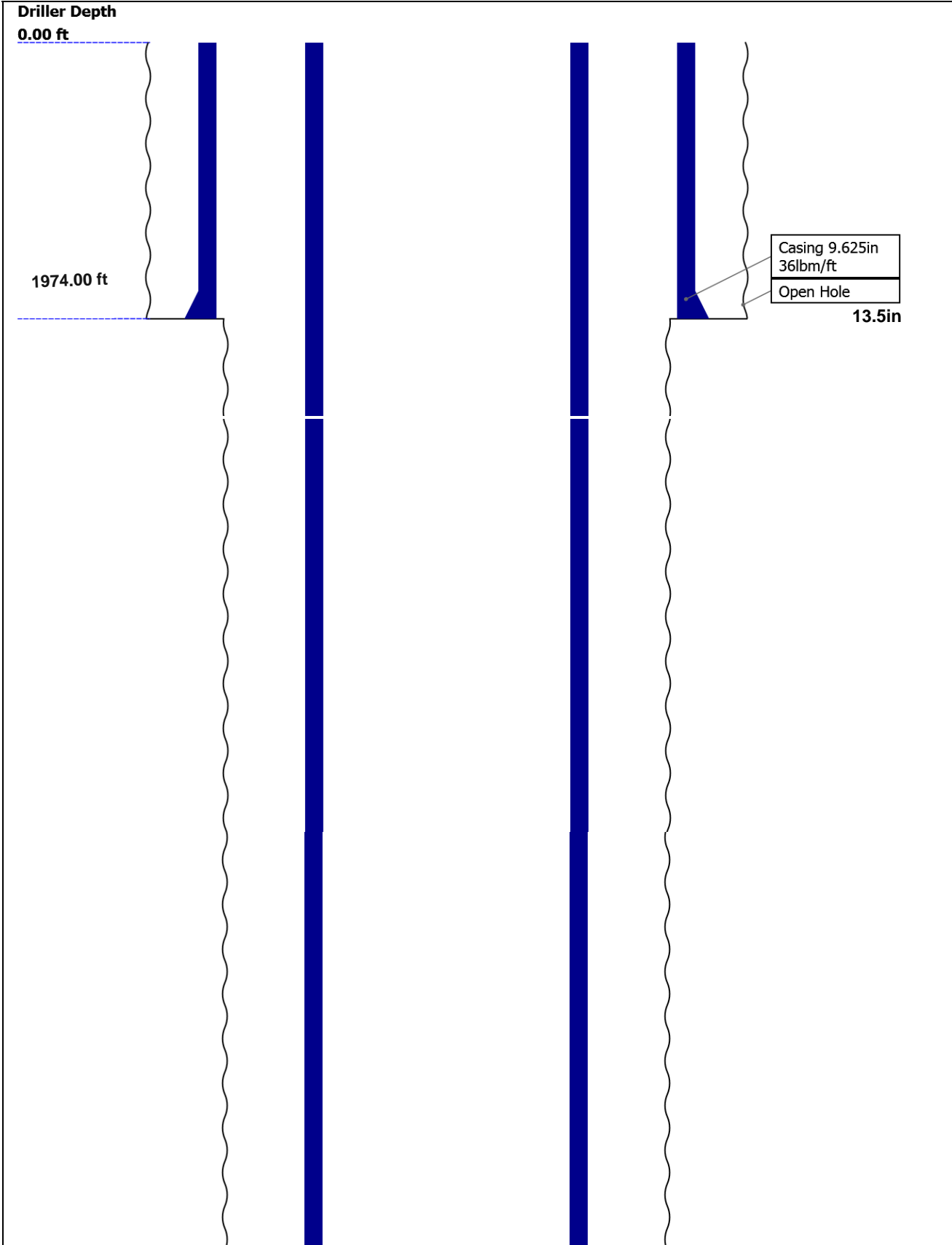
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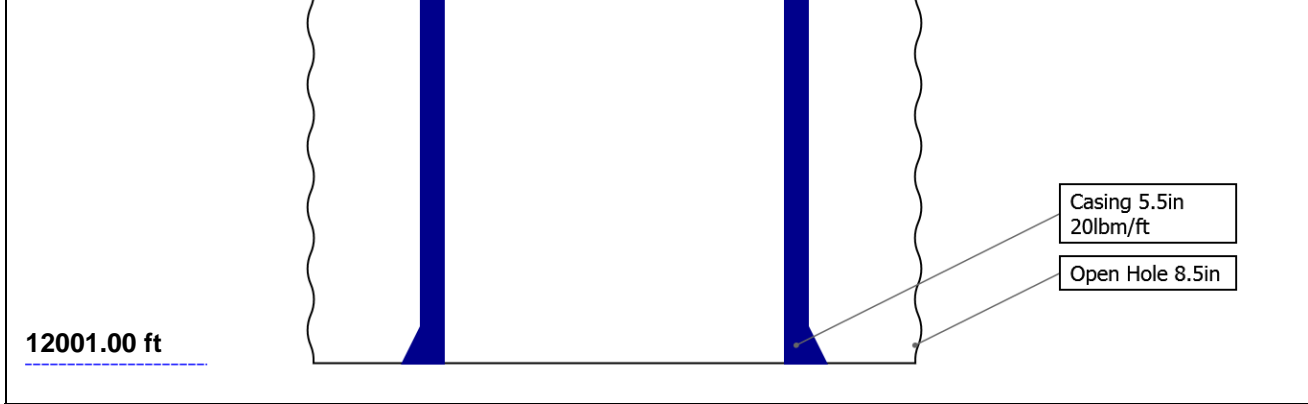
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Well Sketch

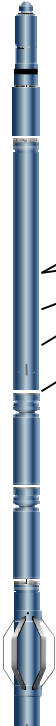




## Borehole Size/Casing/Tubing Record

Bit						
Bit Size ( in )	11.5	8.5				
Top Driller ( ft )	0	1959				
Top Logger ( ft )	0	1959				
Bottom Driller ( ft )	1959	12006				
Bottom Logger ( ft )	1959	12006				
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 )	1959	12006				
Bottom Logger ( ft )	1959	12006				

## Remarks and Equipment Summary

Isolation Scanner: Toolstring			Isolation Scanner: Remarks		
<div><div><div>Equip nameLength</div><div>LEH-QT30.73</div><div>LEH-QT</div></div><div><div>EDTC-B:827.24</div><div>962</div><div>EDTH-B:9293</div><div>EDTG-A:79146</div><div>EDTC-B:8962</div></div><div><div>AH-184[2]:2765</div><div>AH-184[1]:2826</div><div>USIT-E:900</div><div>ECH-MFA:1818</div><div>USAC-A:900</div><div>USIT-A:90</div></div></div> <div></div> <div><div>MP nameOffset</div><div>CTEM23.74</div><div>ACCZ0.00</div><div>HV0.00</div><div>Gamma21.87</div><div>Ray</div><div>TelStatu20.74</div><div>s</div></div>			Thank you for choosing Schlumberger Wireline!		
			Log objective: cement evaluation.		
			Toolstring ran as per tool sketch.		
			Tool centralized using GEMCOs on EDTC and USAC and booster kit on in-line centralizers.		
			Spacer: 12.0 ppg Lead: 13.0 ppg Tail: 13.5 ppg		
			Crew: F. Maldonado, K. Howington.		

USIS-A:98  
8  
USSC-B:77  
7  
IBCS-A:75  
3  
FAR-SENS  
OR:3636  
IBC-TX  
NEAR-SEN  
SOR:4784  
IBC-TX  
USI-SENS  
OR:4615  
IBC-TX  
EMITTER-  
SENSOR:4  
495  
IBC-TX

**USI Sensor Head Tension**  
TOOL\_ZERO

Lengths are in ft  
Maximum Outer Diameter = 6.250 in  
Line: Sensor Location, Value: Gating Offset  
All measurements are relative to TOOL\_ZERO

Depth Summary			
Isolation Scanner			
Depth Measuring Device			
Type	IDW-B		
Serial Number	225		
Calibration Date	24-OCT-2017		
Calibrator Serial Number	57		
Calibration Cable Type	IDWC-C		
Wheel Correction 1	-4		
Wheel Correction 2	-4		
Tension Device			
Type	CMTD-B/A		
Serial Number	151		
Calibration Date	13-aug-2018		
Calibrator Serial Number	1018		
Number of Calibration Points	10		
Calibration Root Mean Square Error	11		
Calibration Peak Error	21		
Logging Cable			
Type	7-46P-XS		
Serial Number	7072		
Length	24000.00 ft		
Conveyance Type	Wireline		
Rig Type			
Isolation Scanner:Depth Control Parameters		Depth Control Remarks	
Log Sequence	First Log In the Well	All standard Schlumberger depth controls and procedures followed.	
Rig Up Length At Surface		IDW used as primary depth control device.	
Rig Up Length At Bottom		Z-chart used as secondary depth control device.	
Rig Up Length Correction		All logs correlated to down pass.	

## Tool Zero Check At Surface

Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Run 1	Log[3]:Up	6390.07	78.17

Start Depth(ft)	Stop Depth(ft)	Start Value(us/ft)	End Value(us/ft)
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**CZMD median computed in free pipe normalization interval = 2.06 MRayl**

Isolation Scanner

Software Version	
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Acquisition System	Version
Maxwell 2018 SP2	8.2.104493.3100

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Isolation Scanner	Log[3]:Up	Up	78.17 ft	6390.07 ft	21-Jan-2019 2:32:33 PM	21-Jan-2019 4:00:38 PM	ON	3.22 ft	Yes

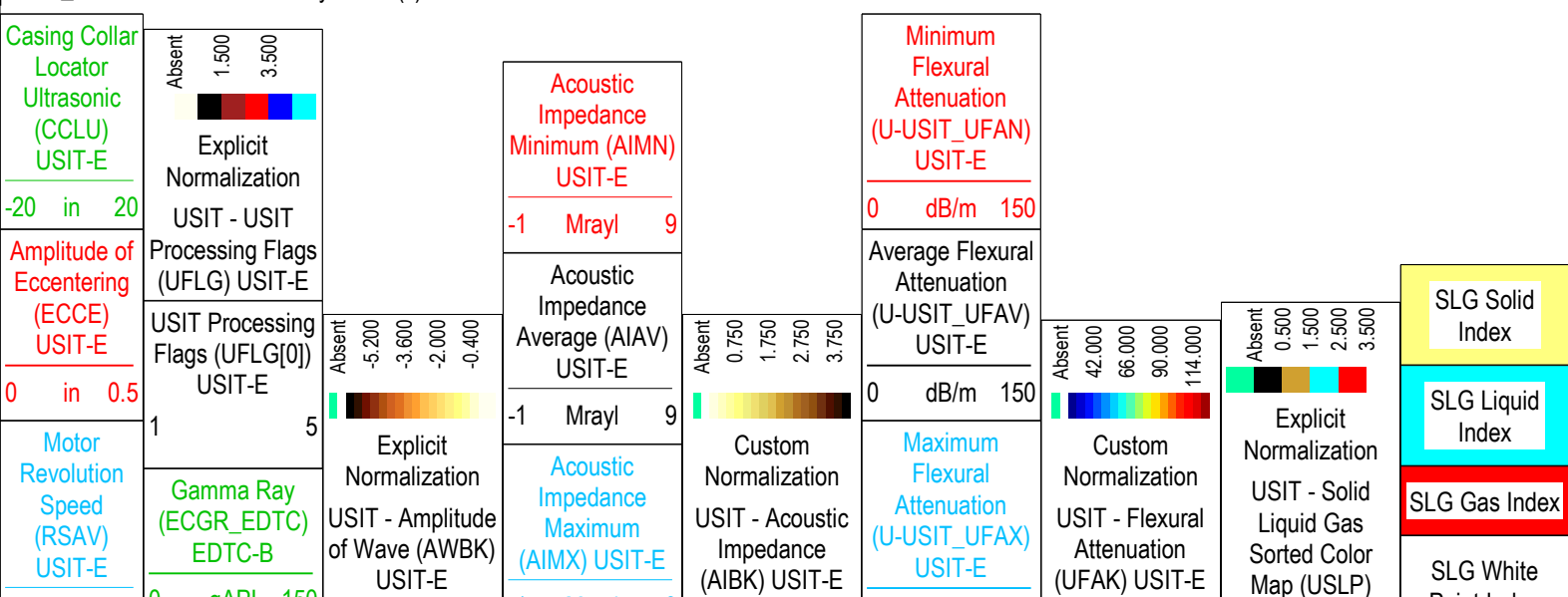
Log	Company:Crestone Peak Resources Operating LLC	Well:Herren #1H-33H-H367
		Isolation Scanner: Log[3]:Up:S005

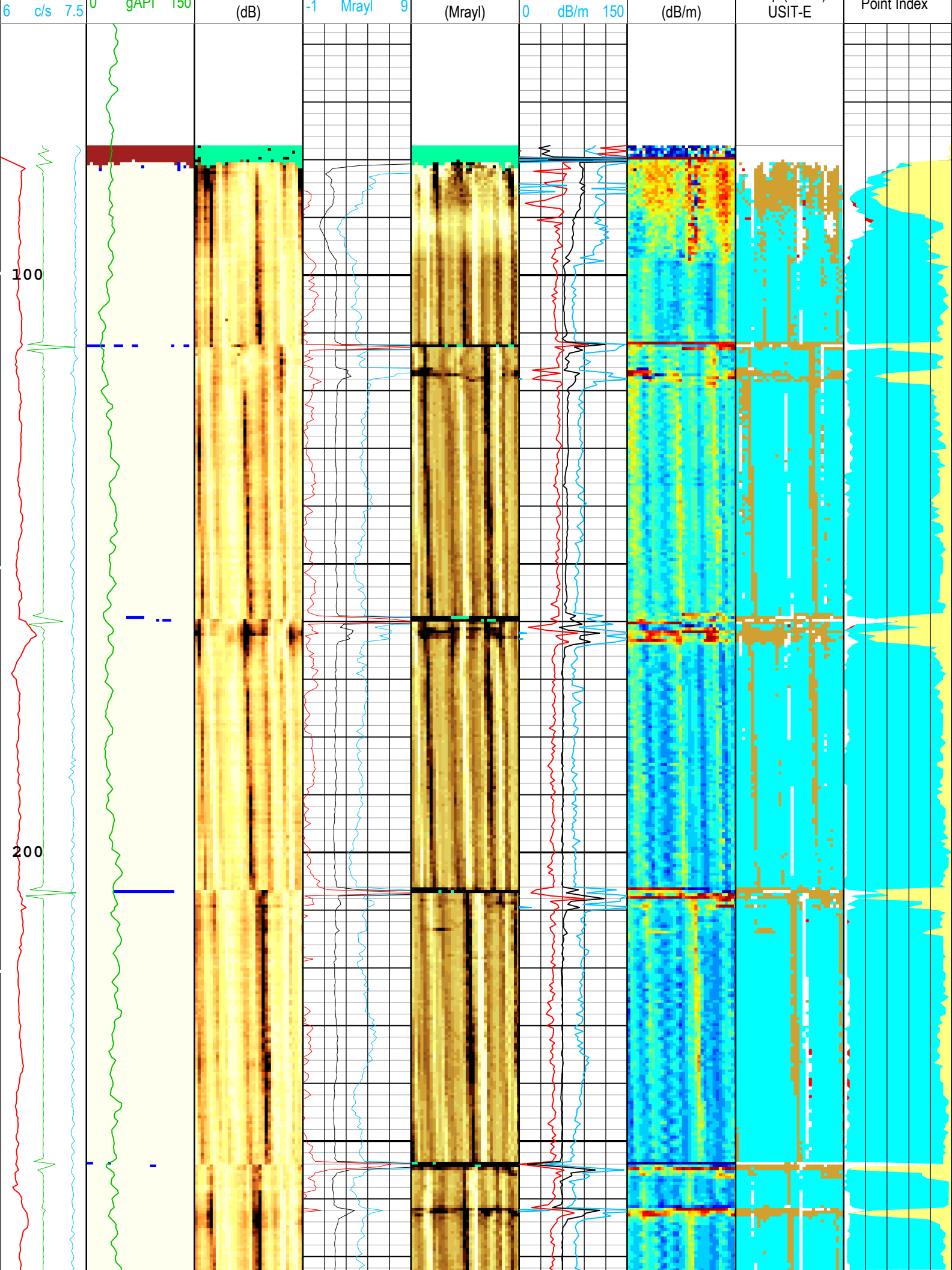
Description: USI IBC SLG   Format: Log ( IBC SLG )   Index Scale: 5 in per 100 ft   Index Unit: ft   Index Type: Measured Depth   Creation Date: 21-Jan-2019 16:23:27

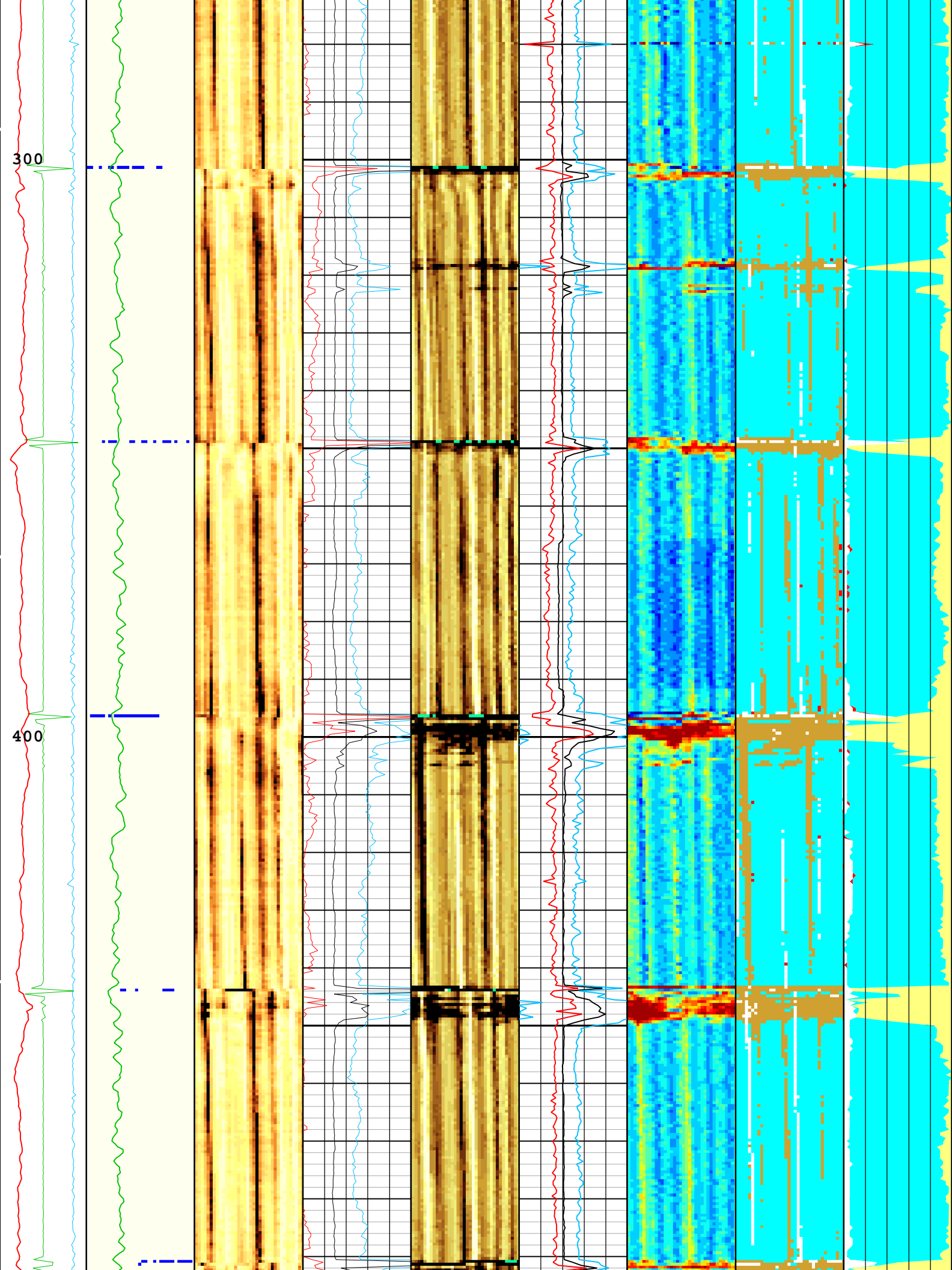
USIT Processing Flags (UFLG[0]) USIT-E

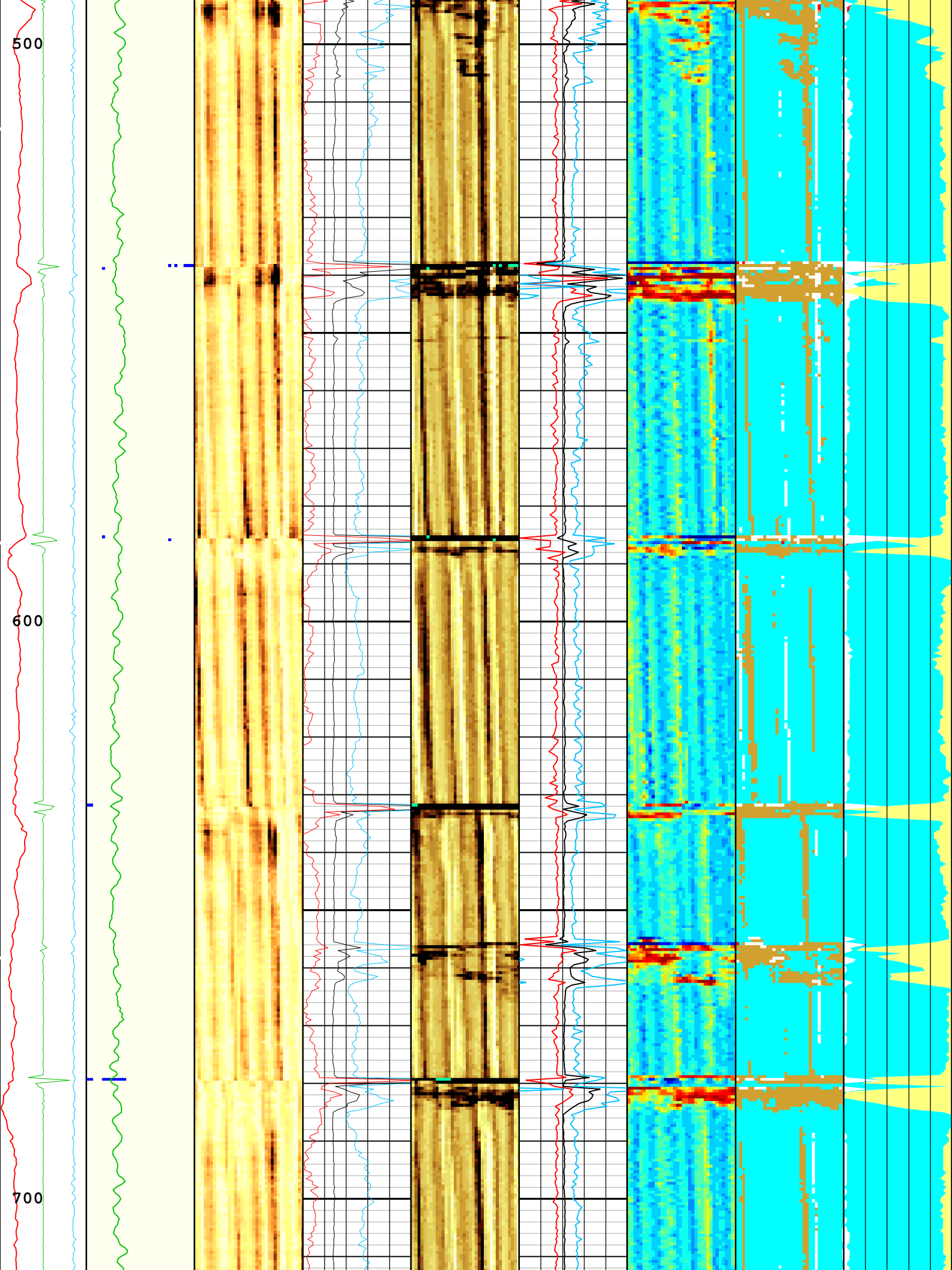
1 - UFLG 1 Value within [0.0 - 1.5] - :	 UTIM Error
2 - UFLG 2 Value within [1.5 - 2.5] - :	 Pulse Origin Not Detected
3 - UFLG 3 Value within [2.5 - 3.5] - :	 WINLEN Error
4 - UFLG 4 UFLG 5 UFLG 6 Value within [3.5 - 6.5] - :	 Casing Thickness Error
5 - UFLG 7 UFLG 8 UFLG 9 Value within [6.5 - 10] -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

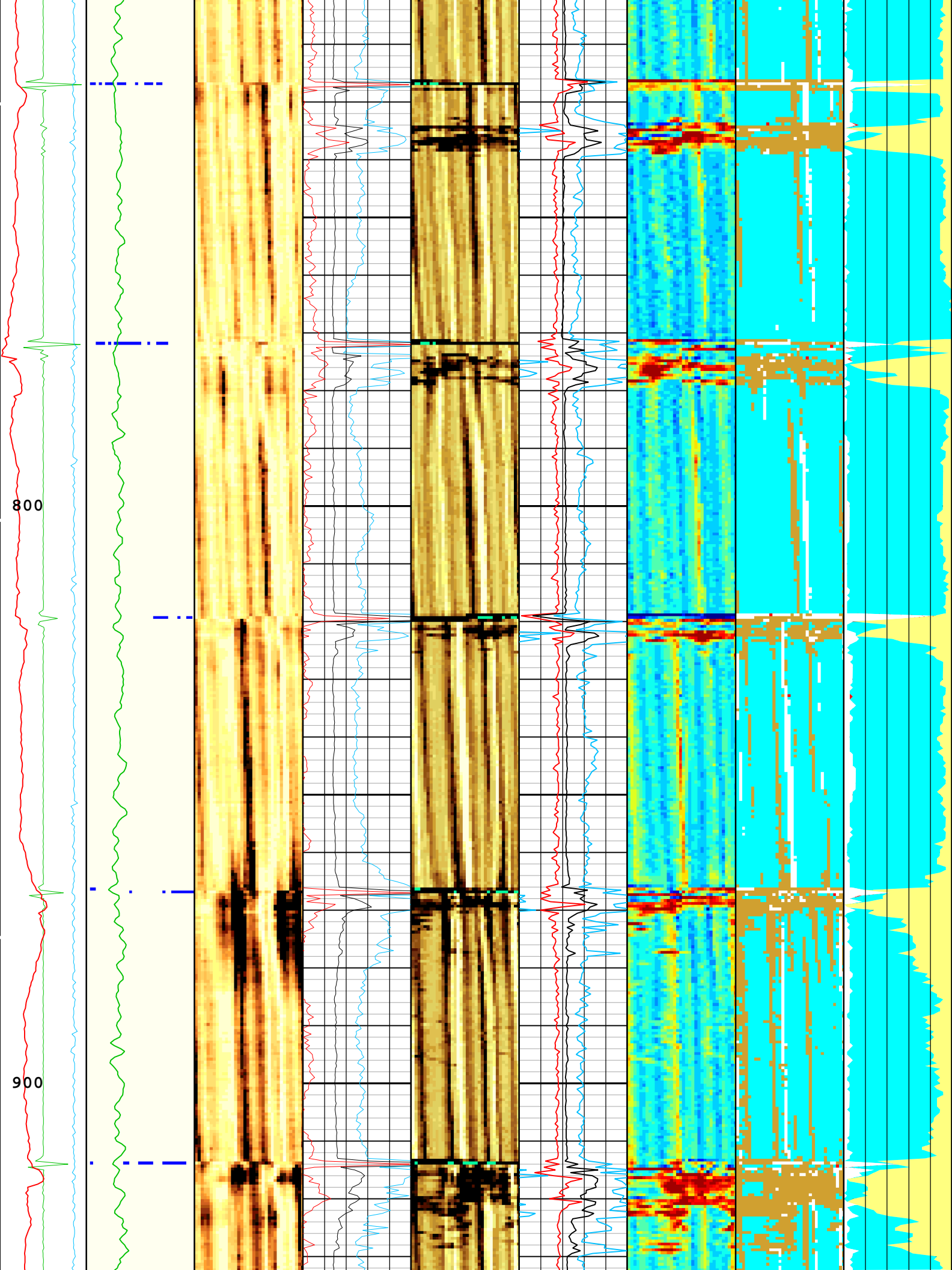
TIME\_1900 - Time Marked every 60.00 (s)

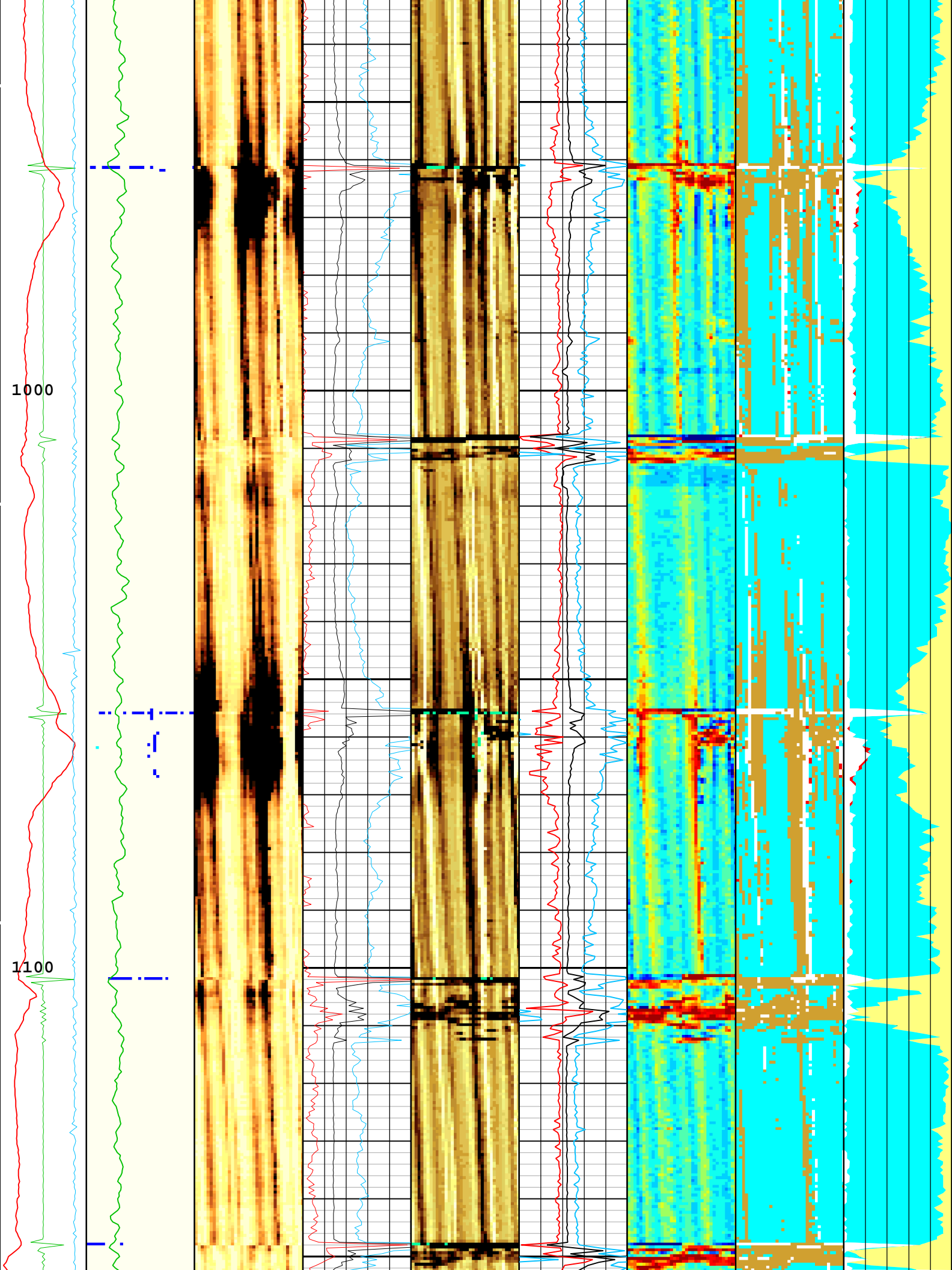


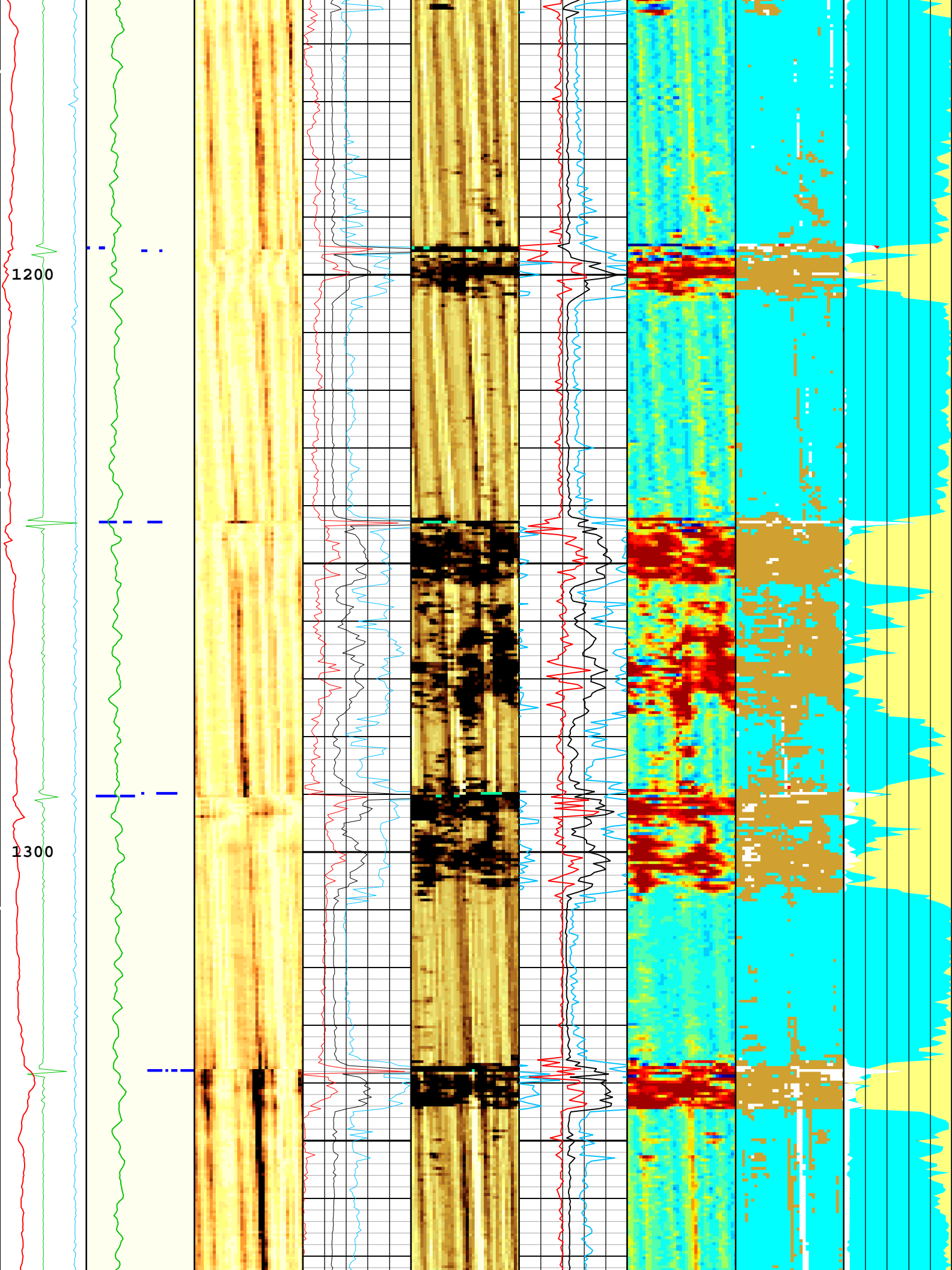


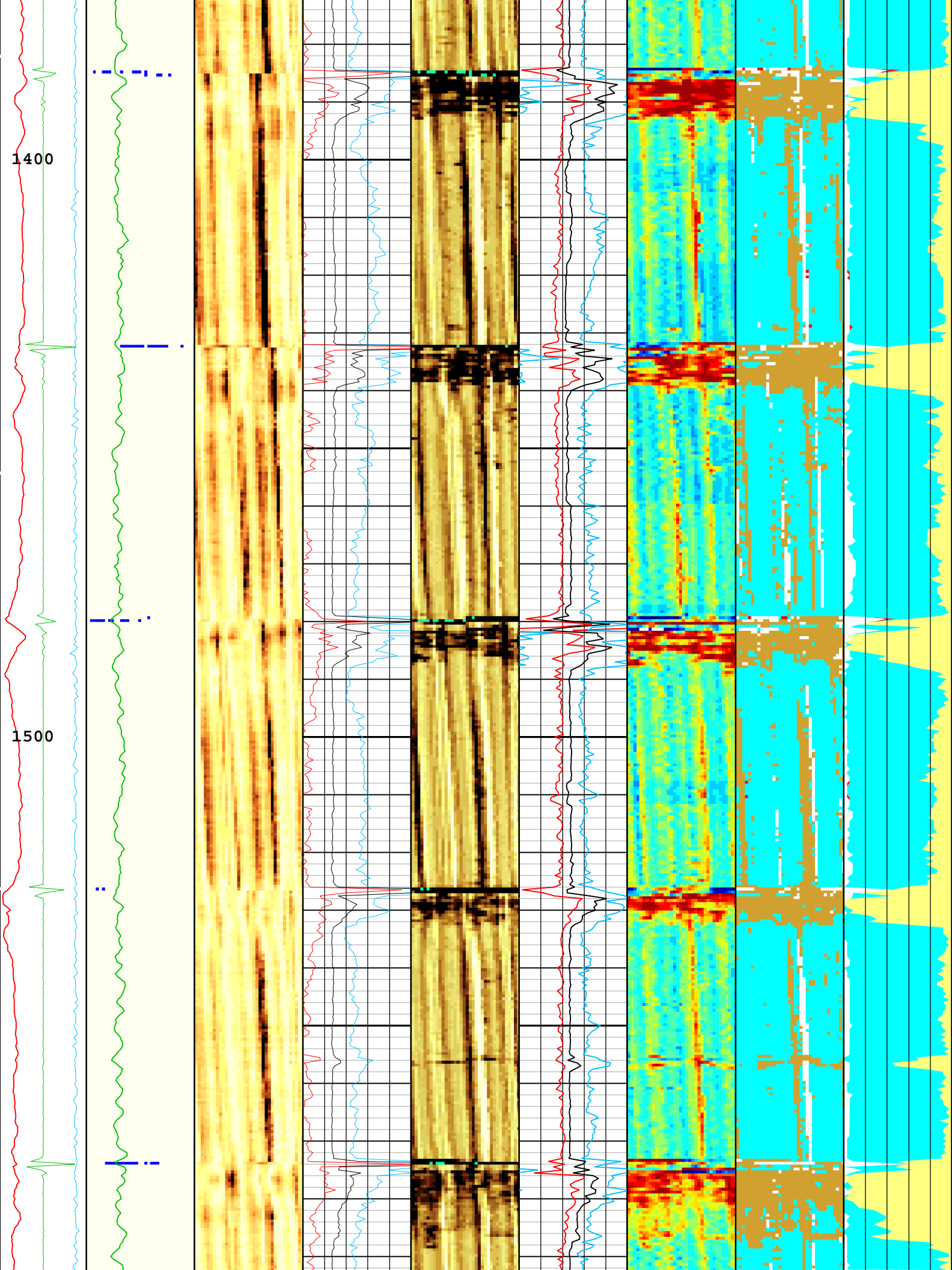


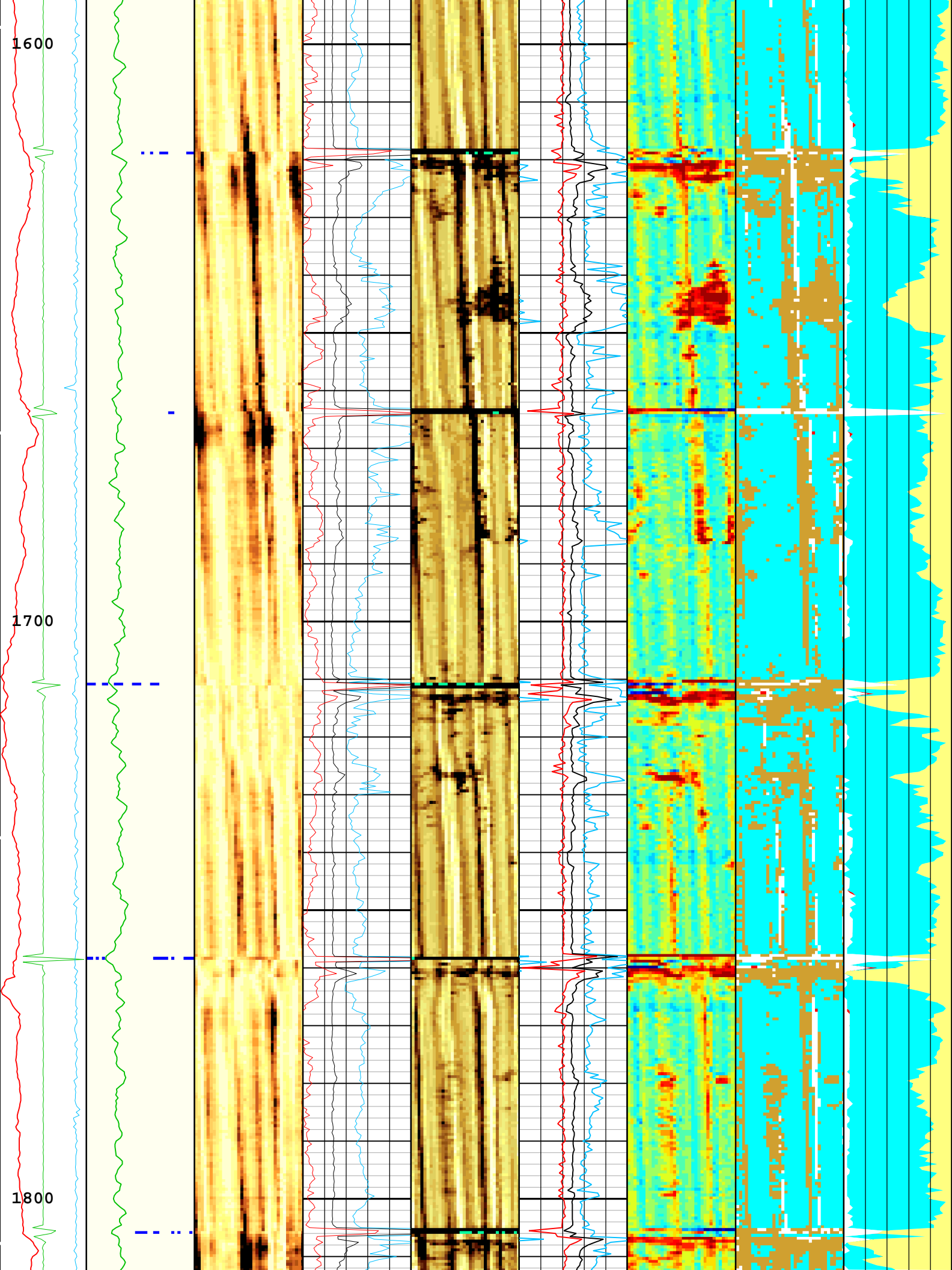


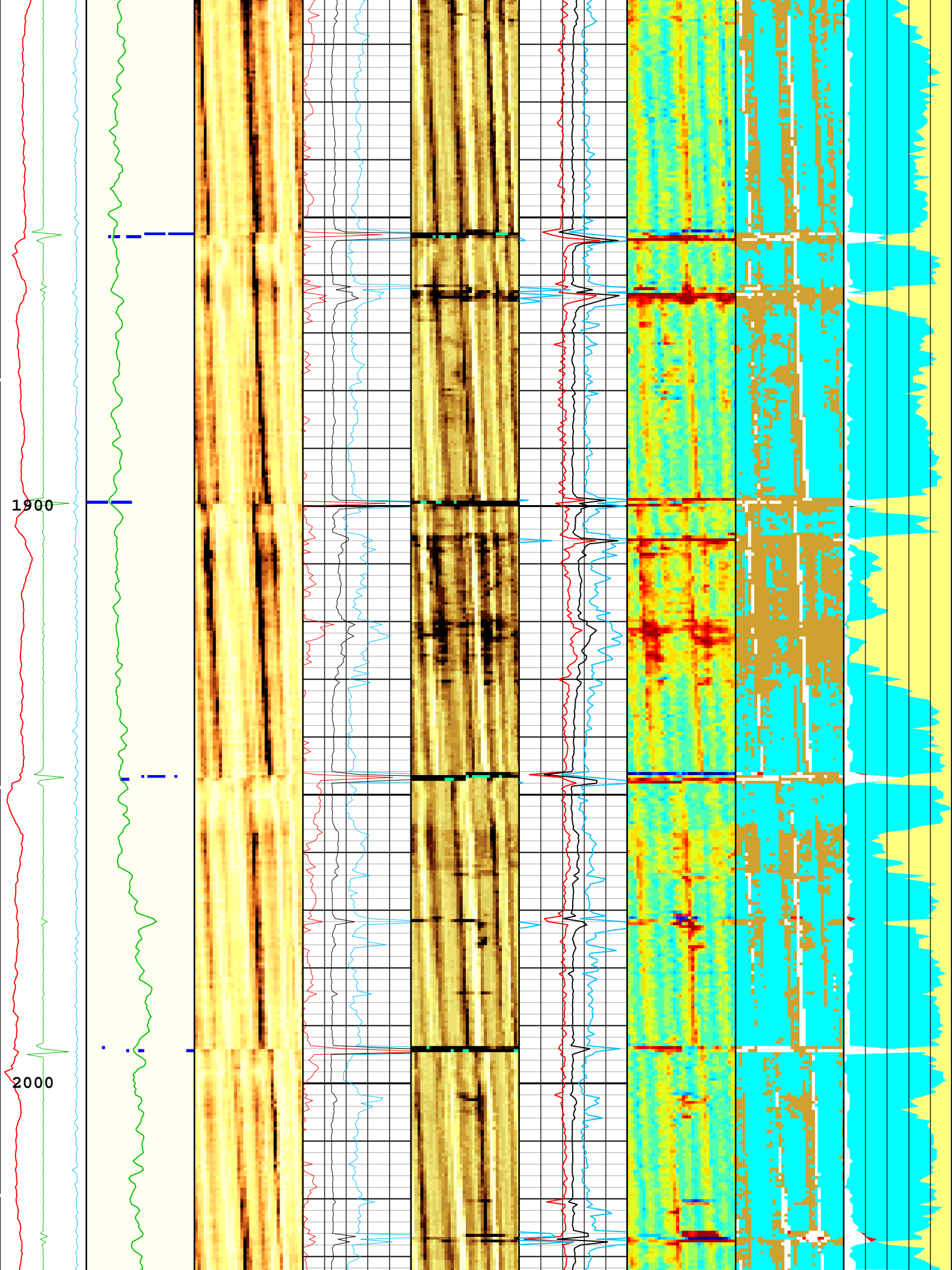


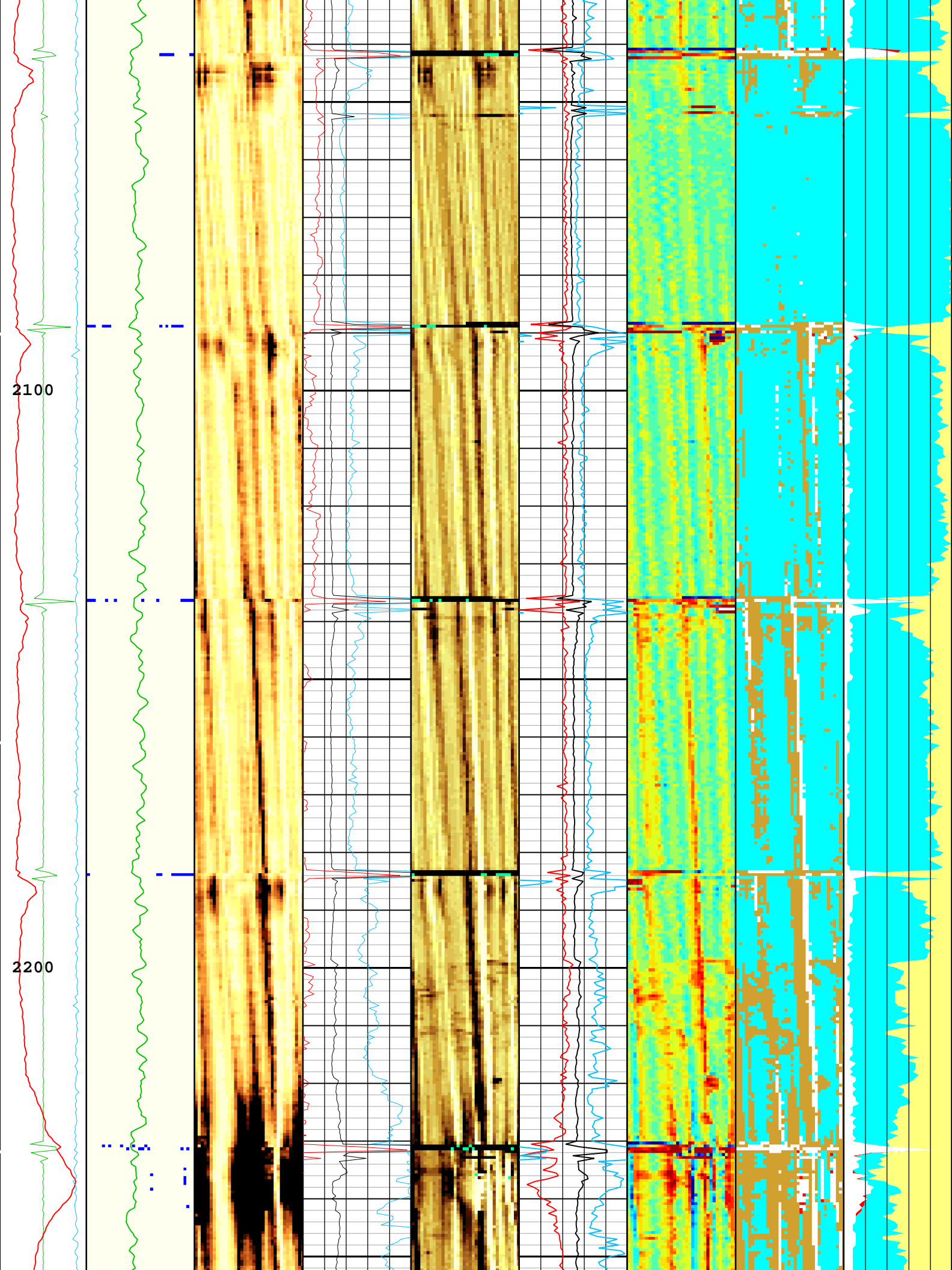


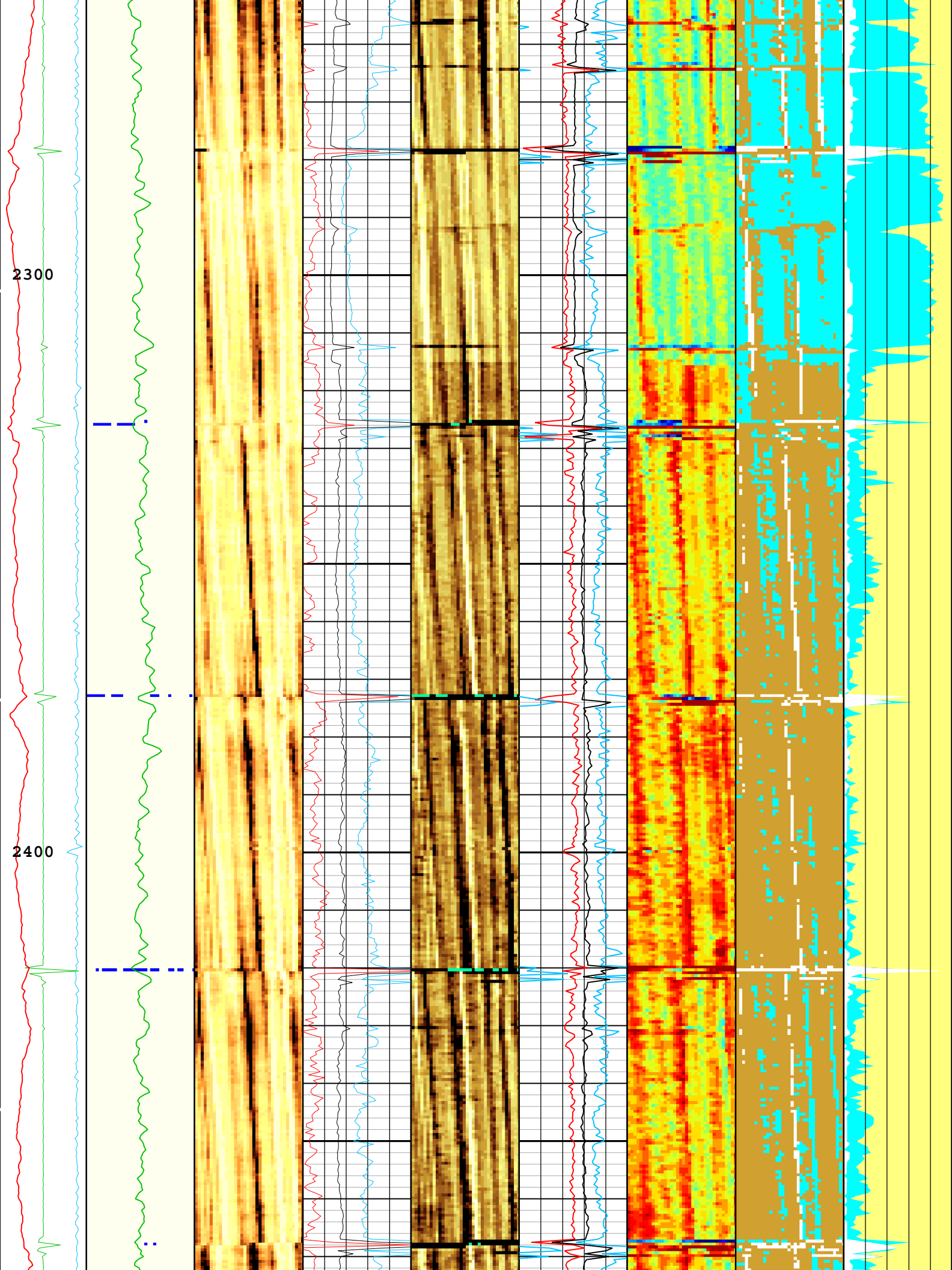


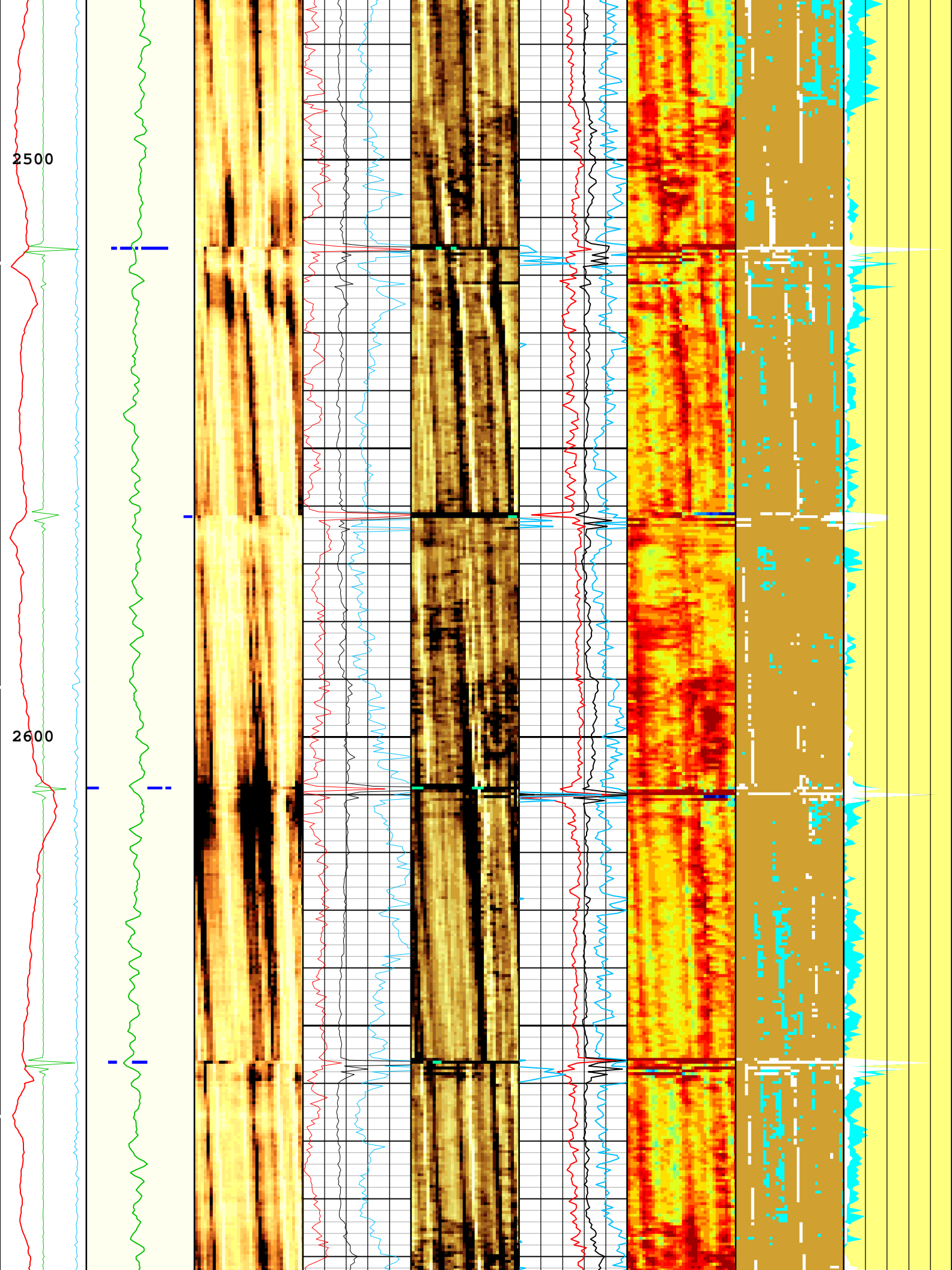


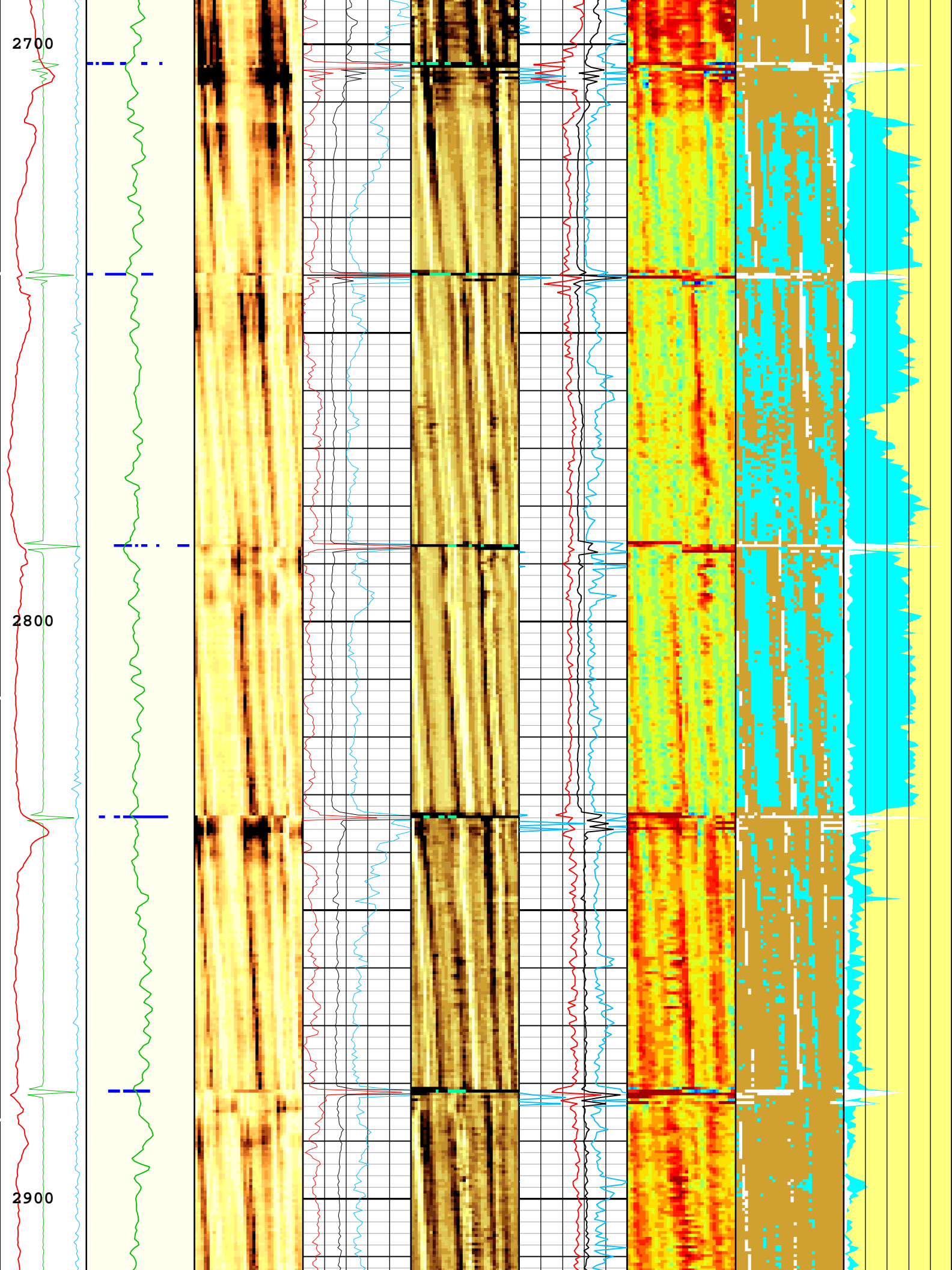


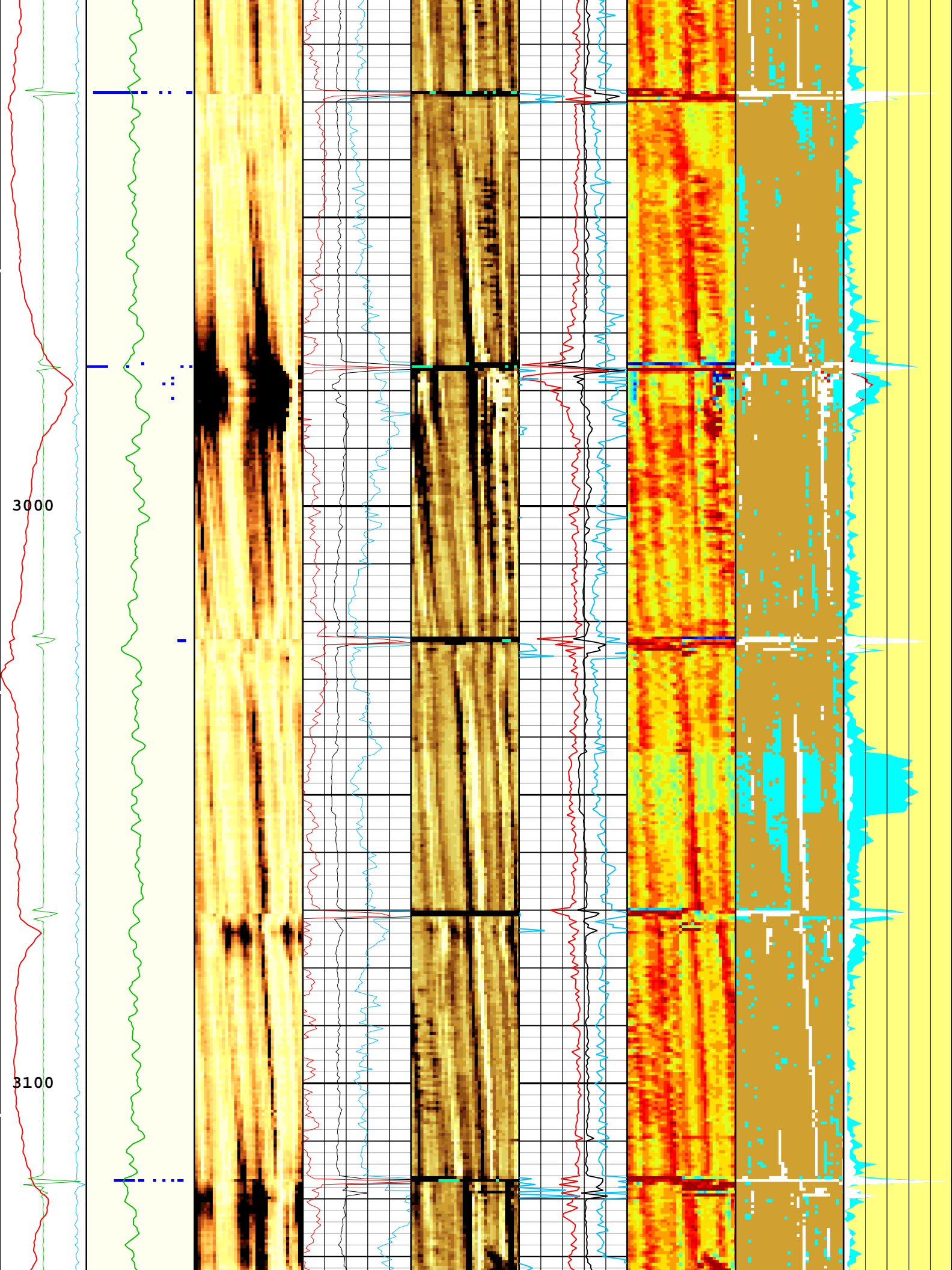


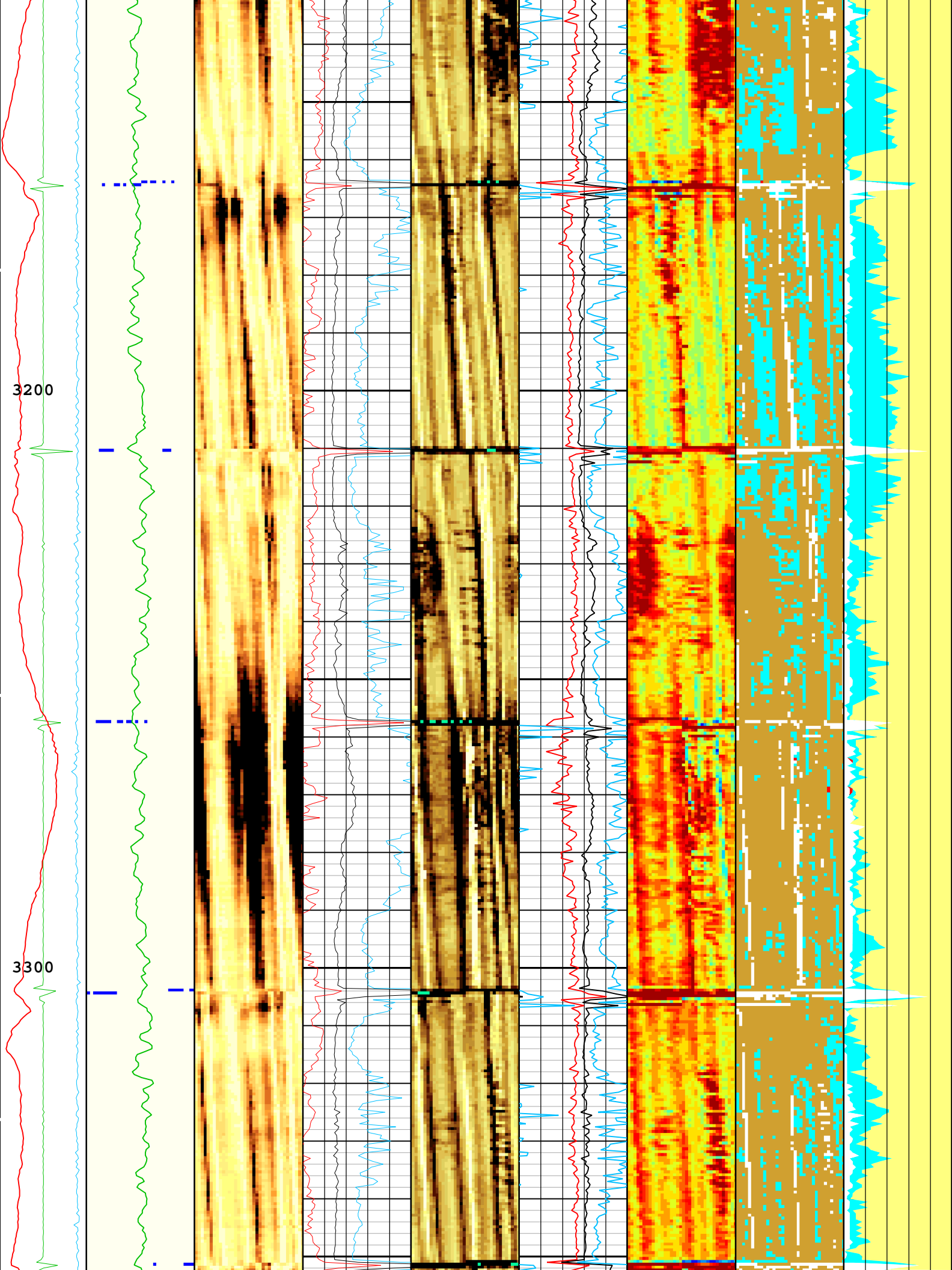


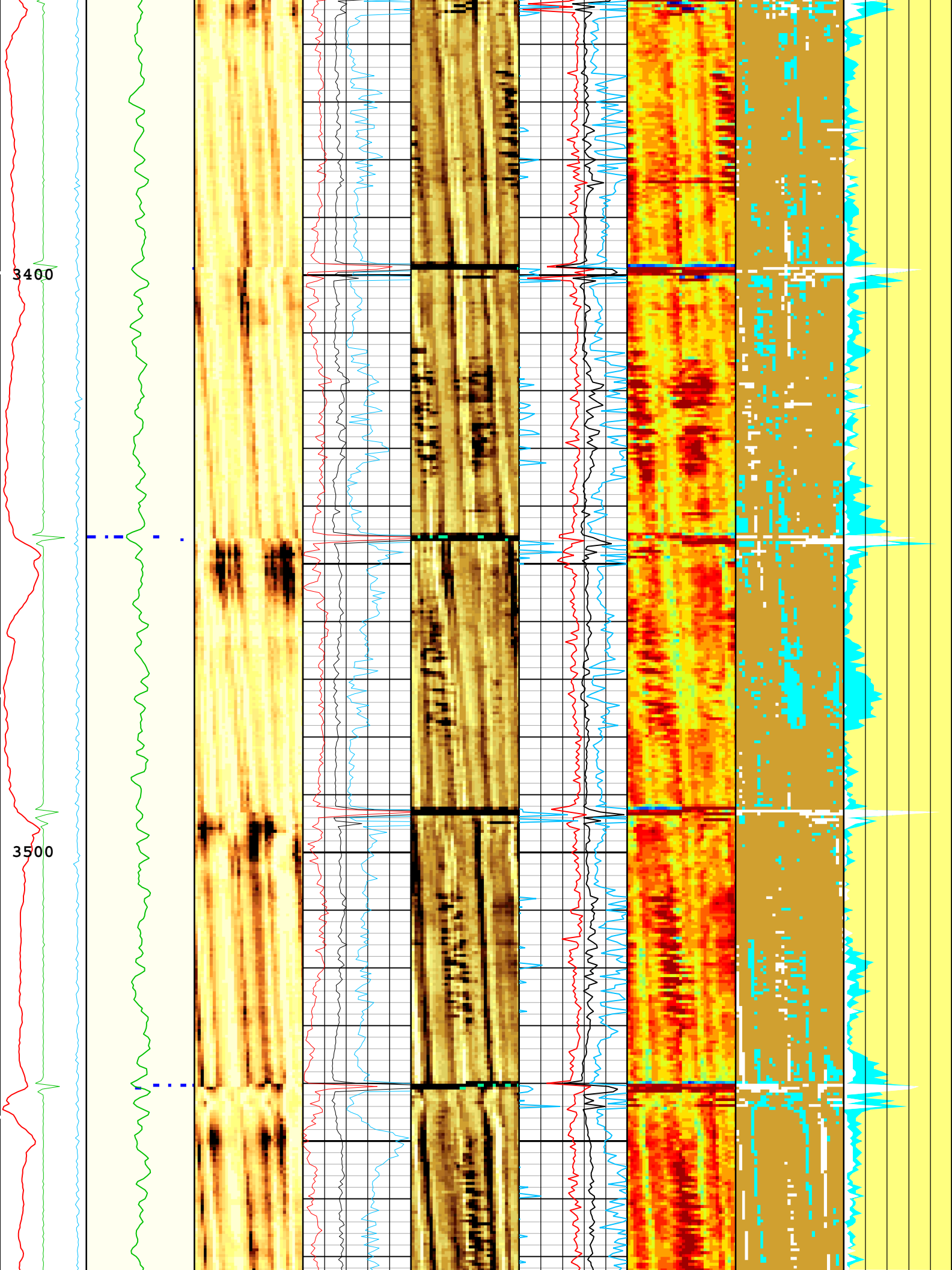


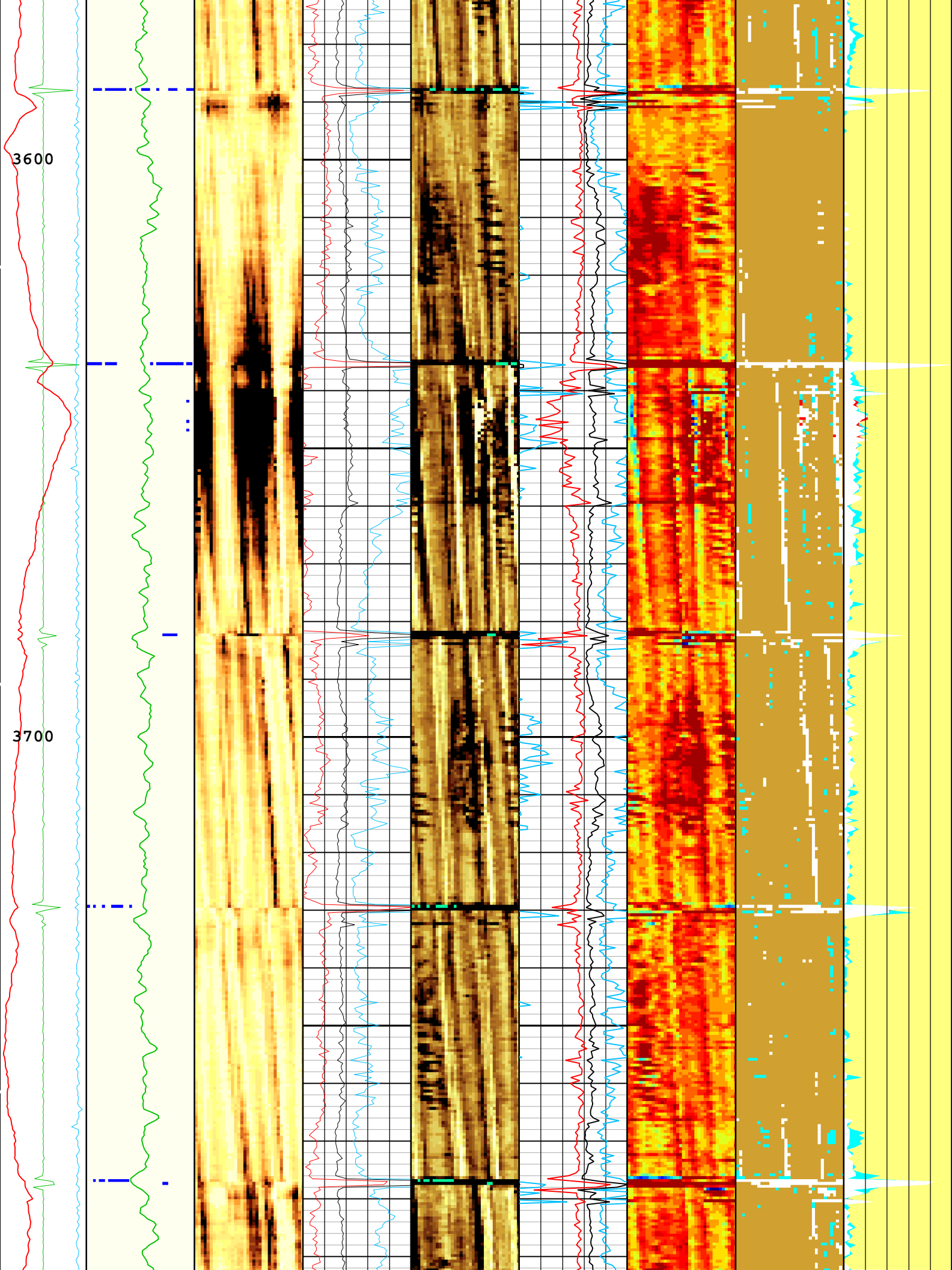


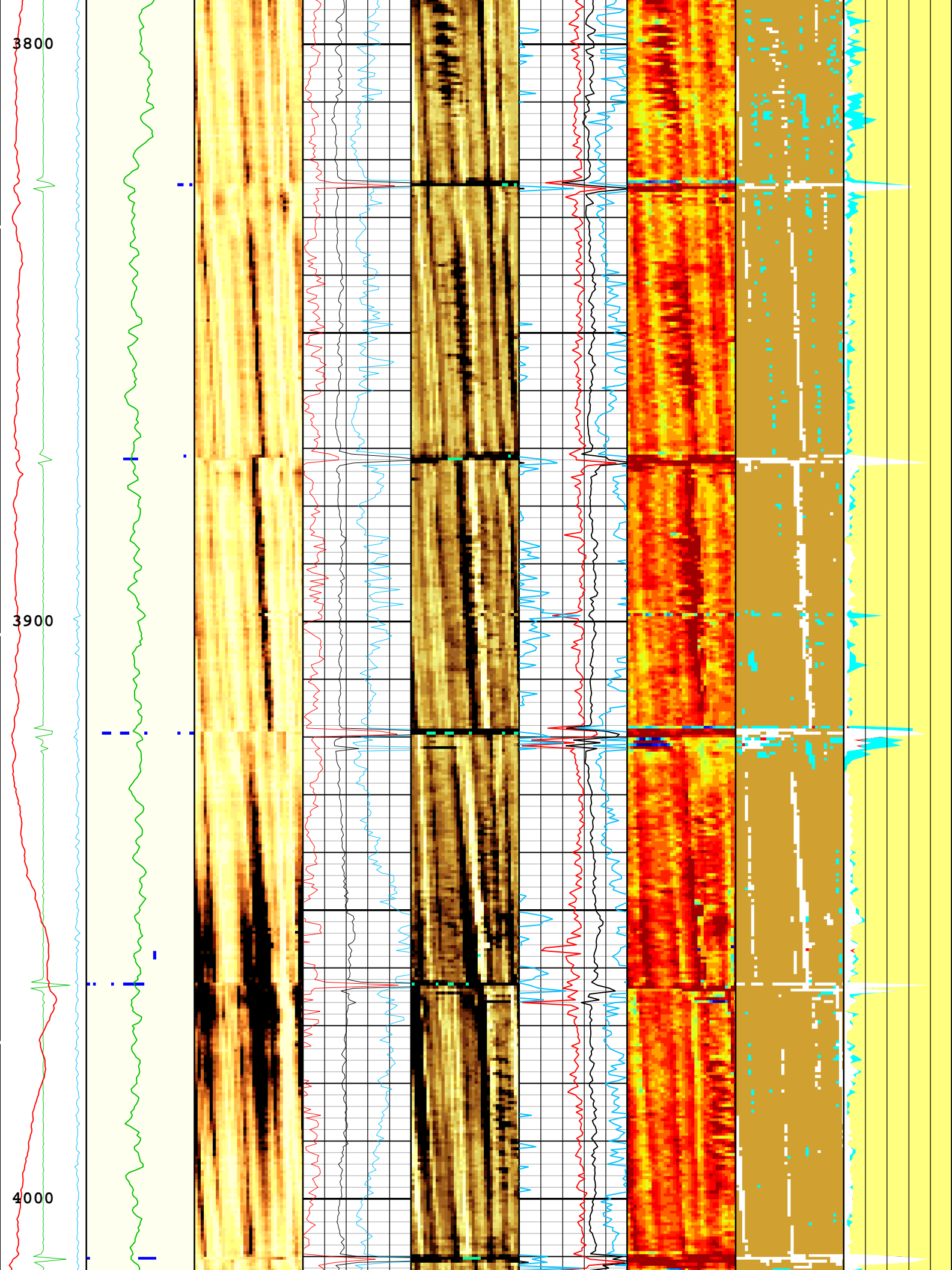


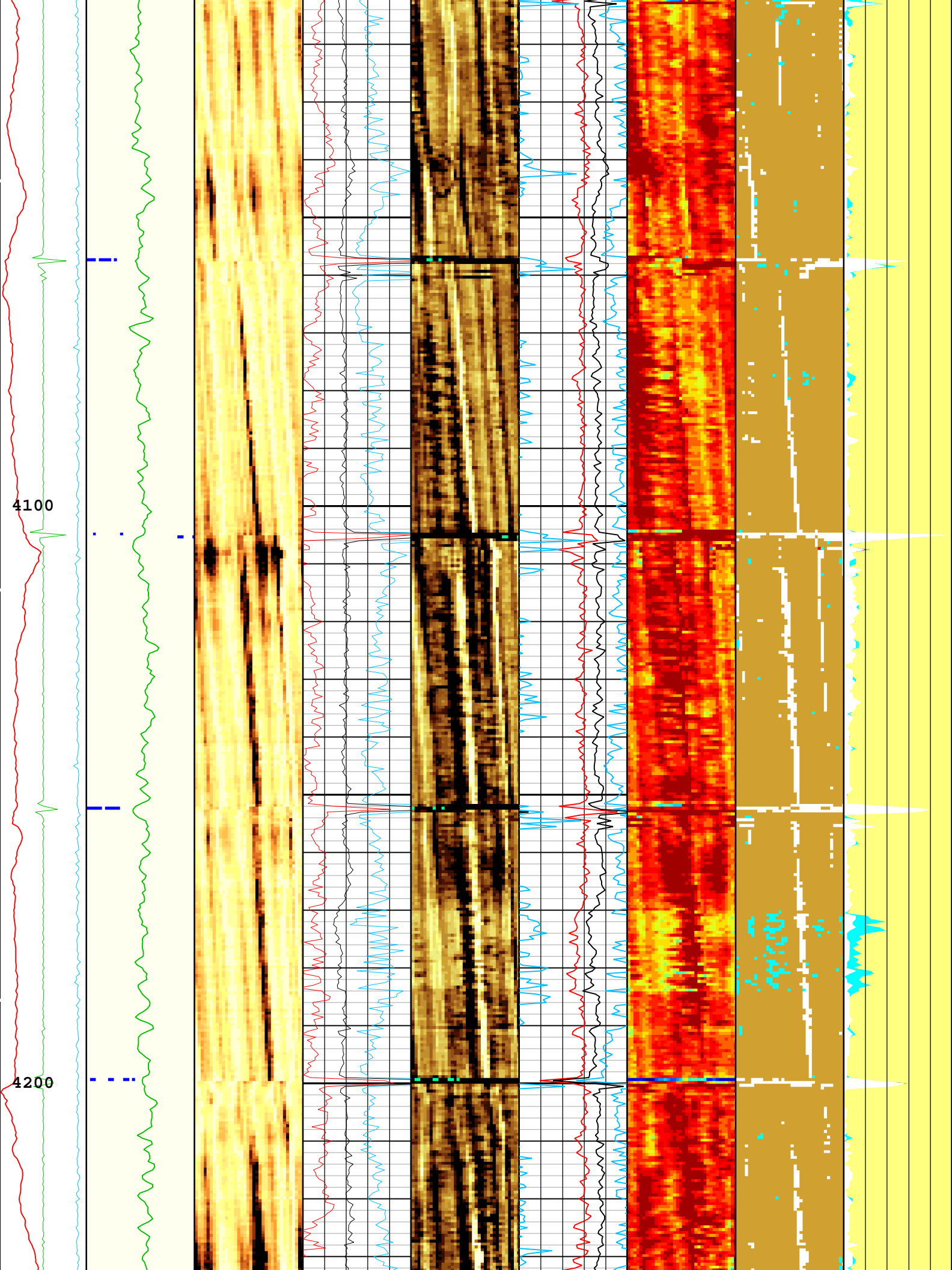


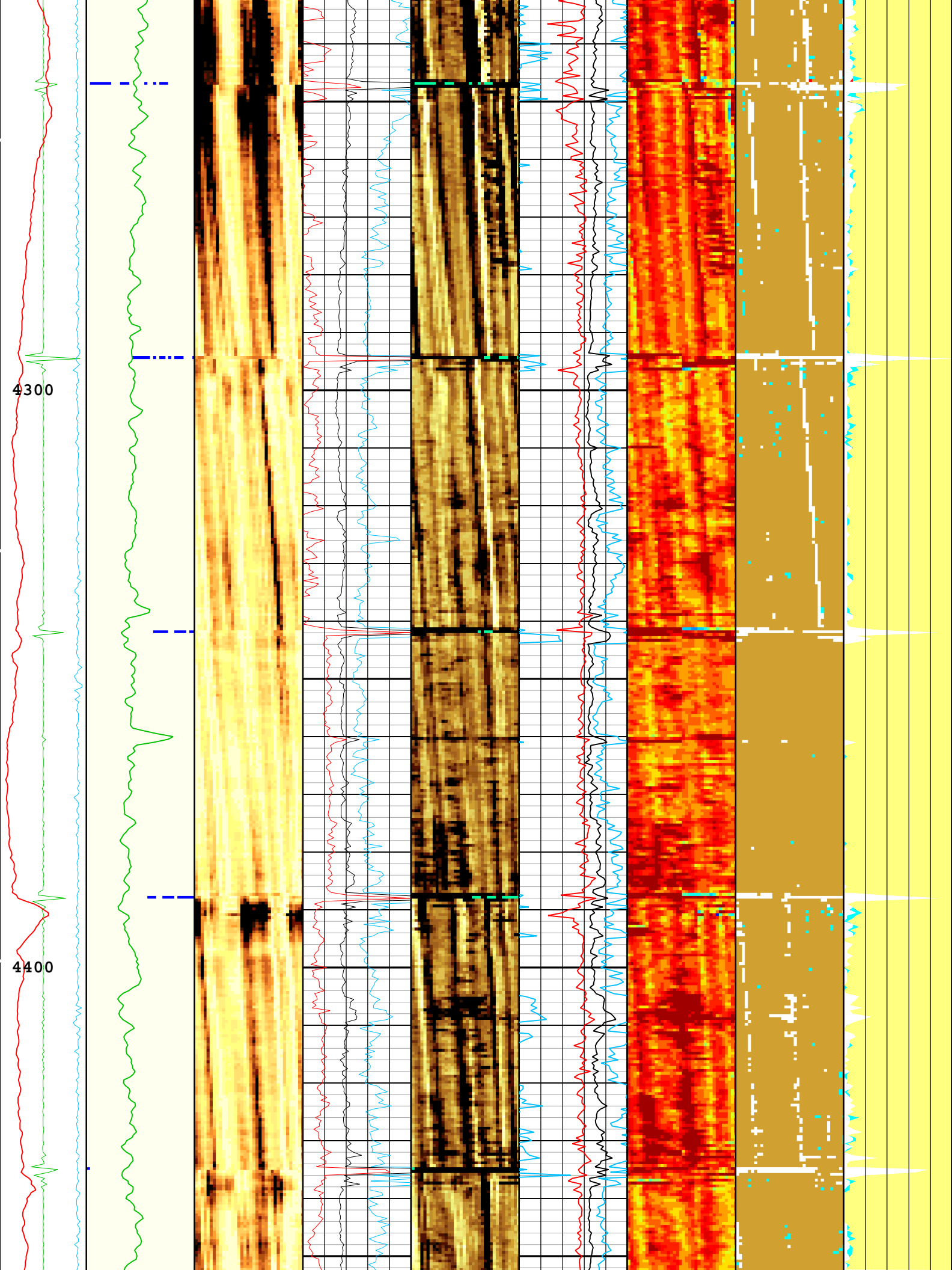


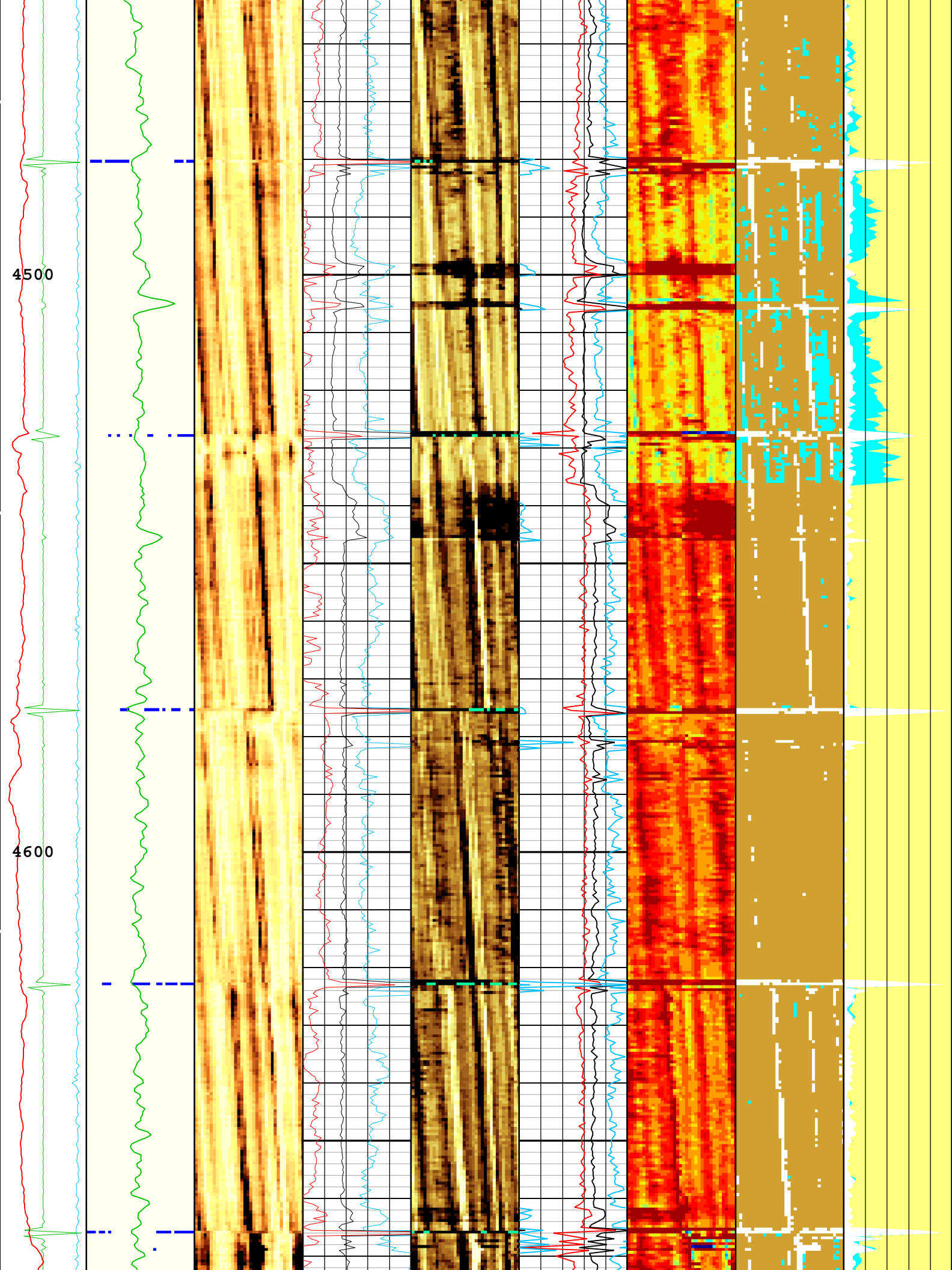


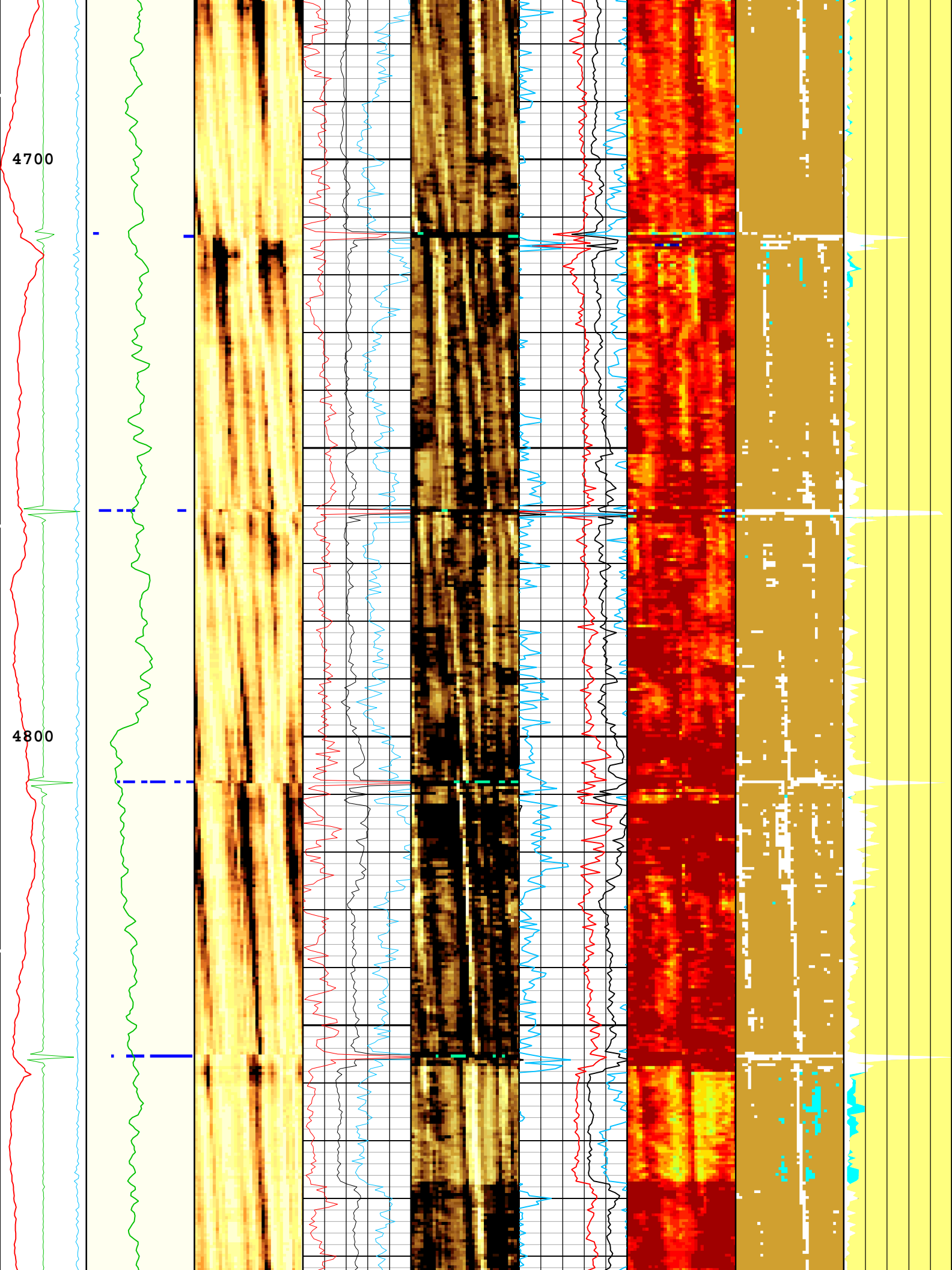


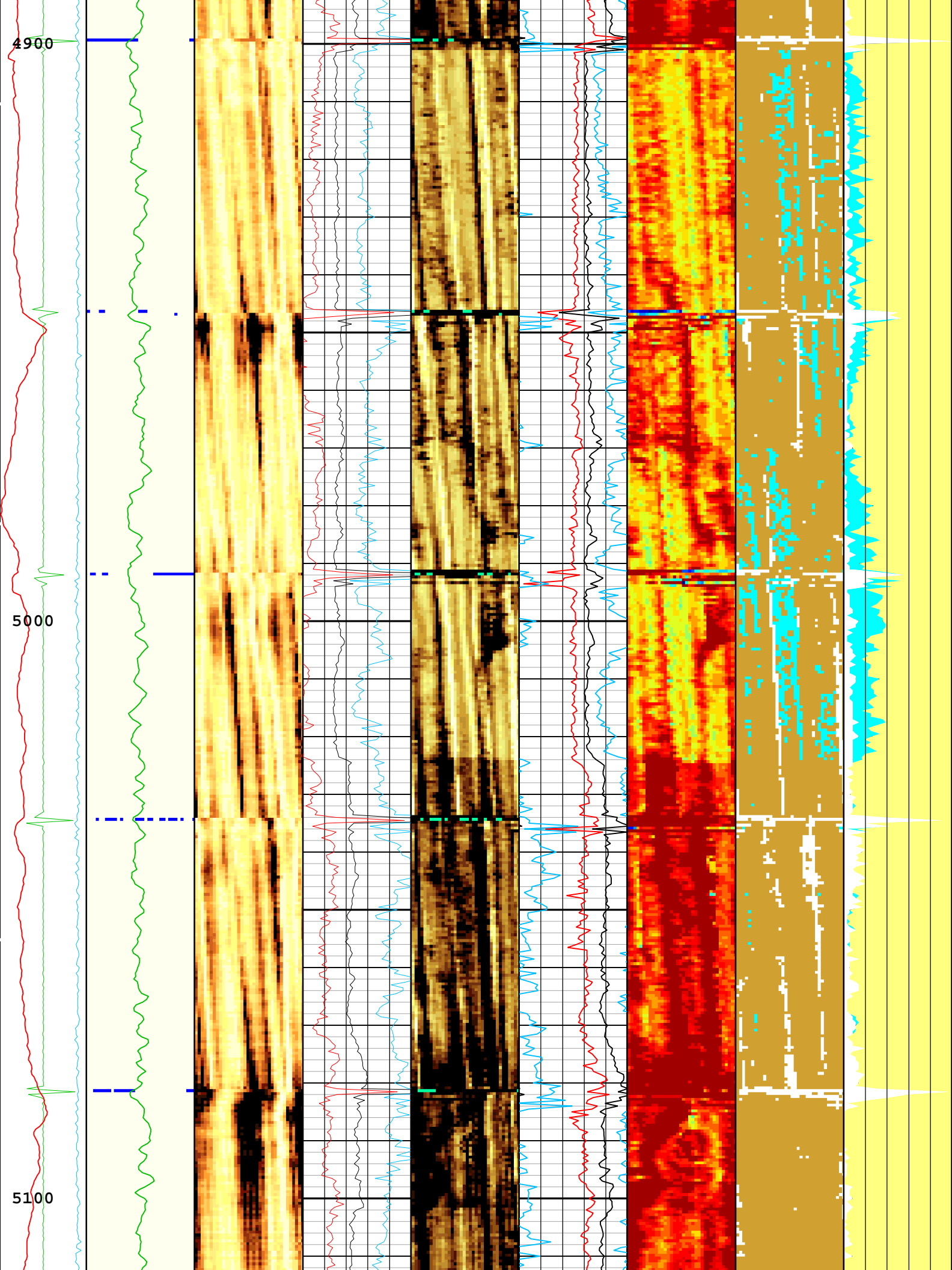


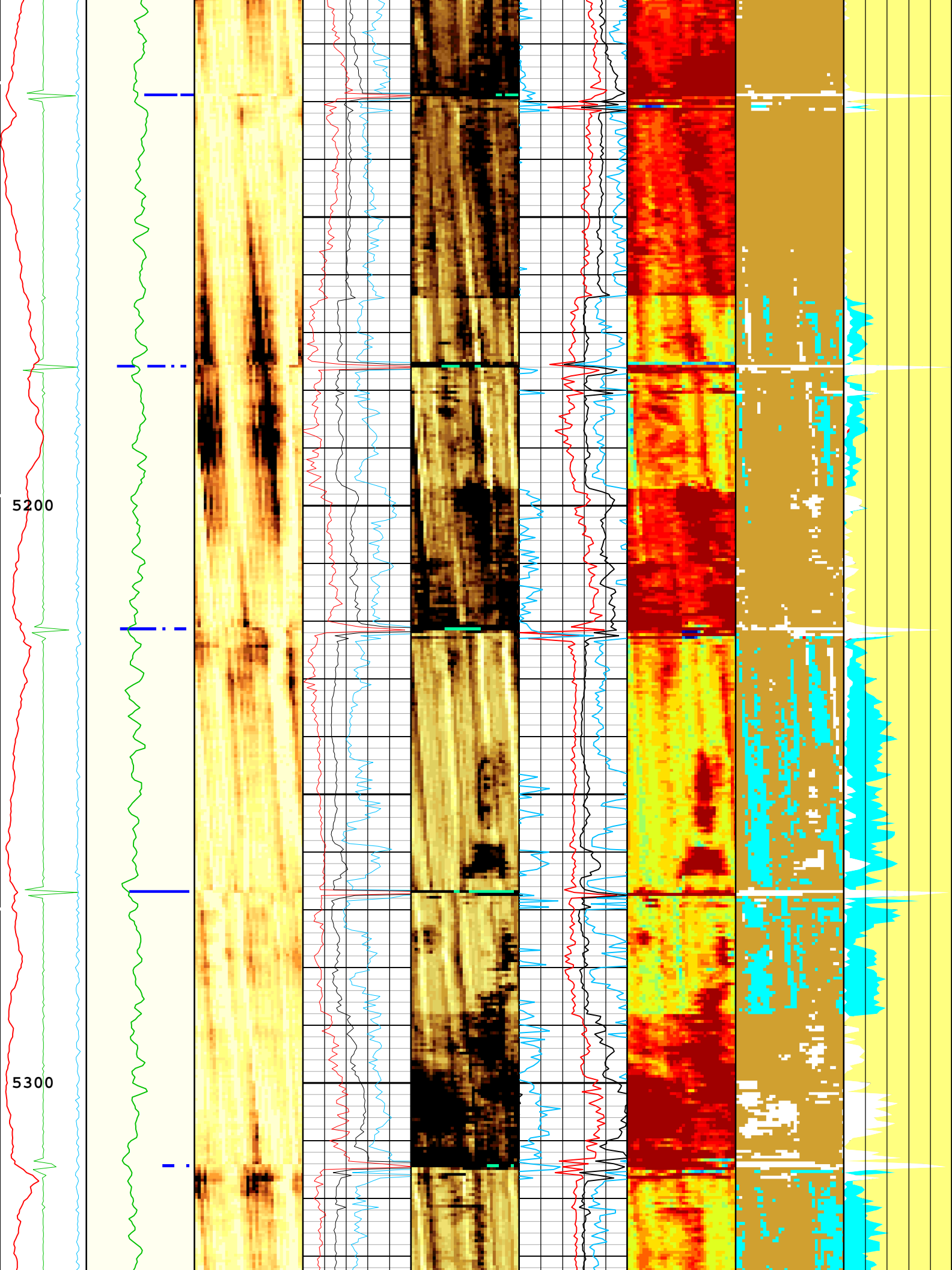


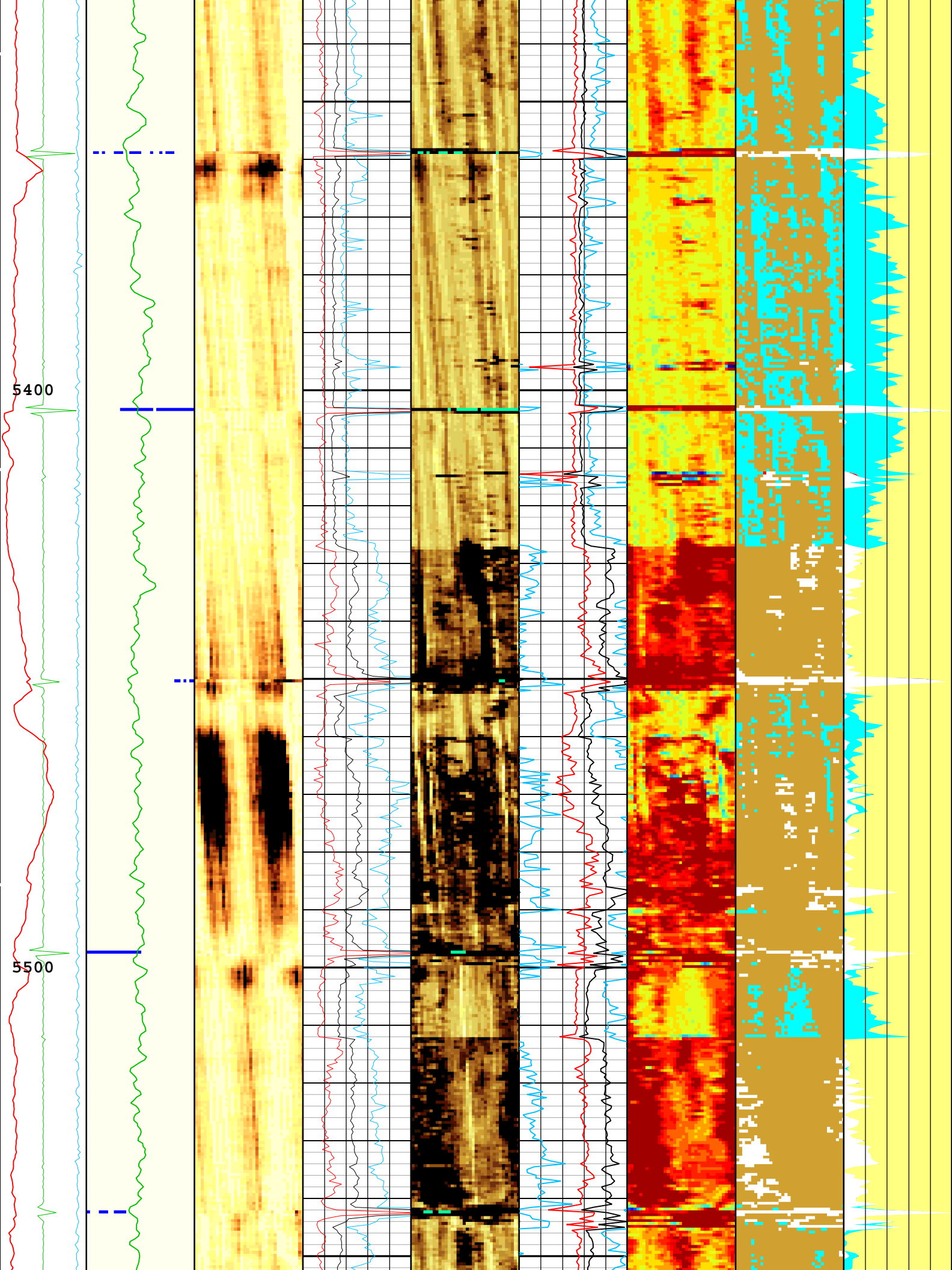


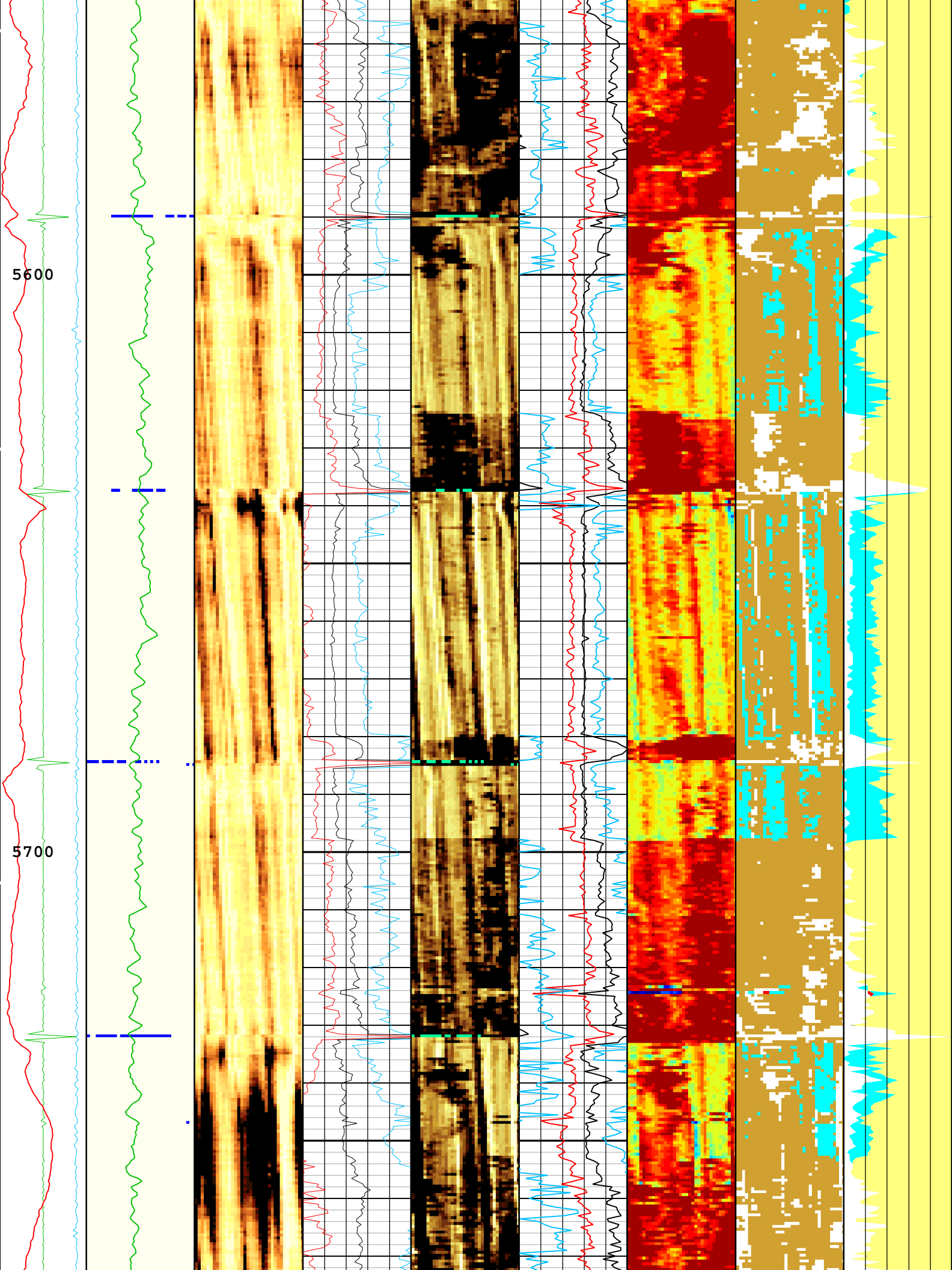


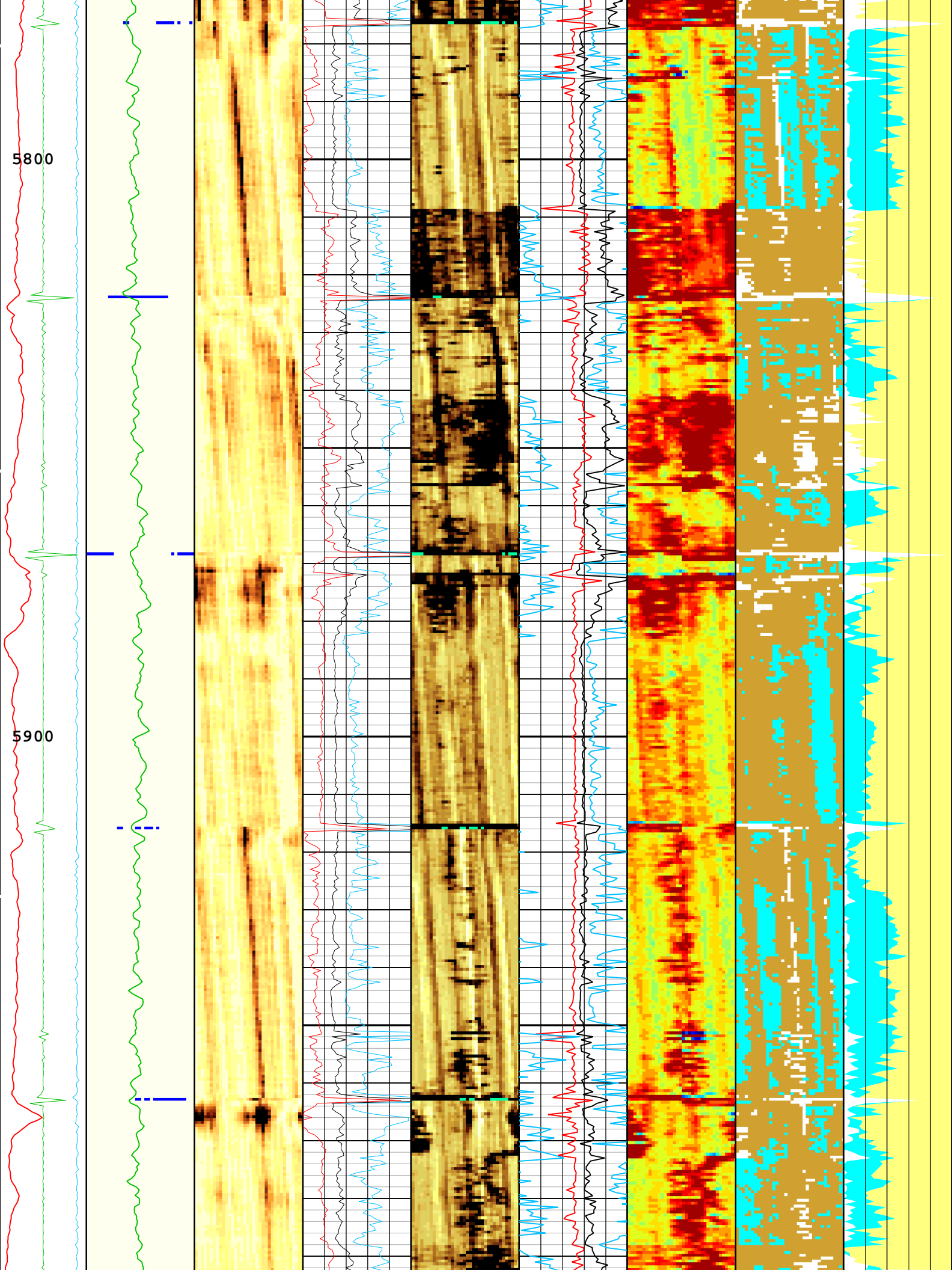


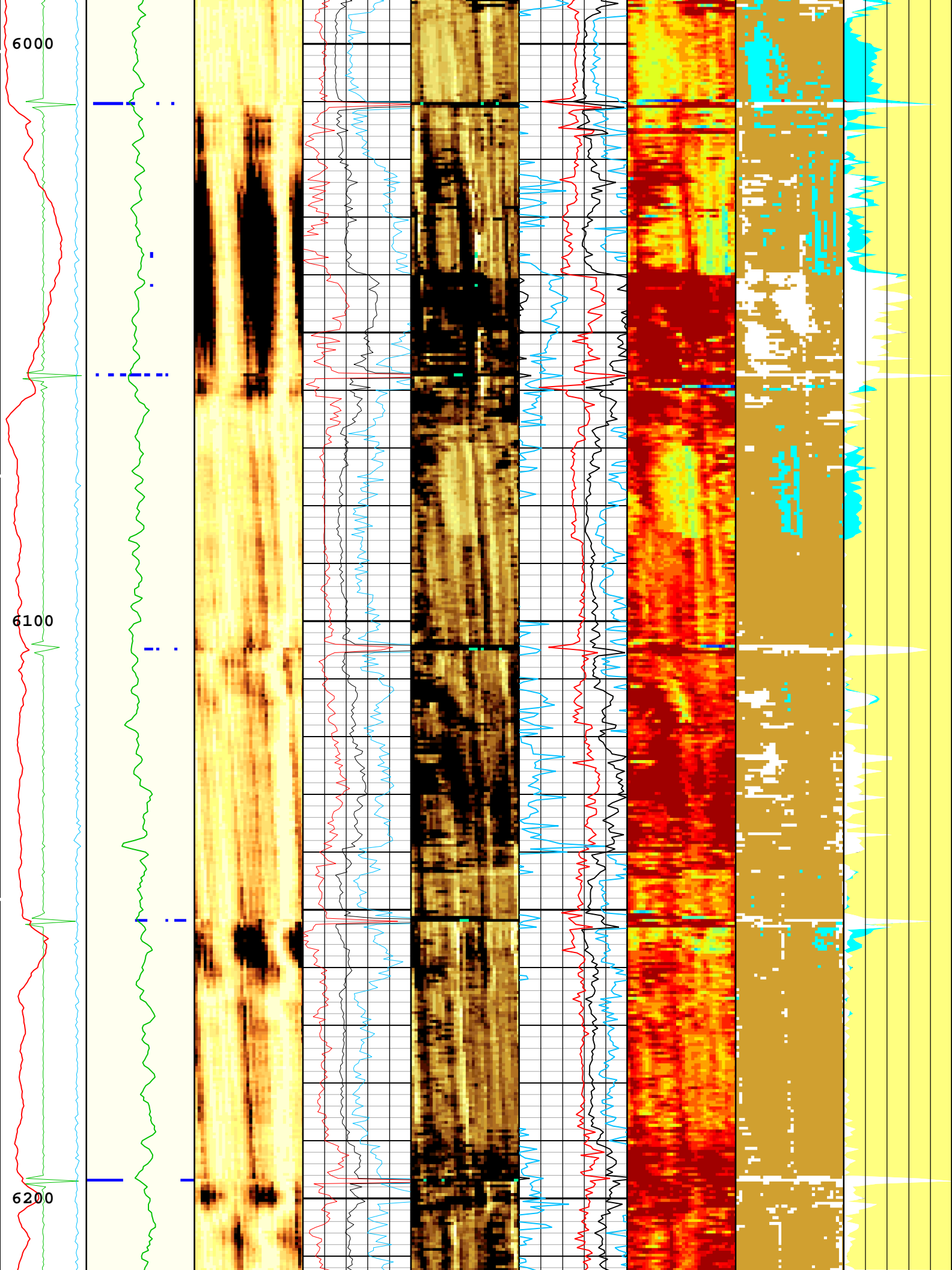


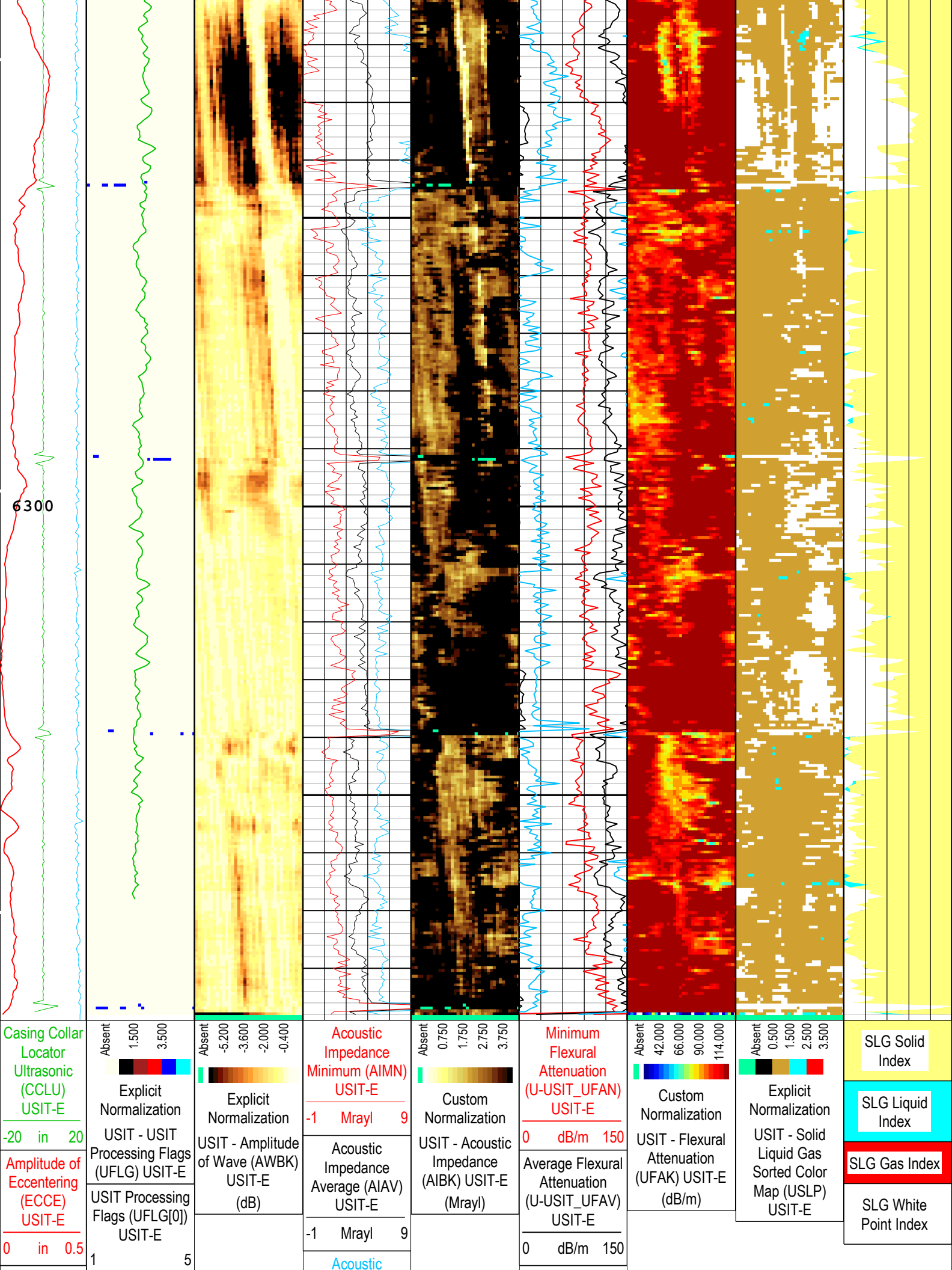












Motor Revolution Speed (RSAV) USIT-E	Gamma Ray (ECGR_EDTC) EDTC-B	Impedance Maximum (AIMX) USIT-E	Maximum Flexural Attenuation (U-USIT_UFAX) USIT-E
6 c/s 7.5	0 gAPI 150	-1 Mrayl 9	0 dB/m 150

TIME\_1900 - Time Marked every 60.00 (s)

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

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

Description: USI IBC SLG Format: Log ( IBC SLG ) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 21-Jan-2019 16:23:27

Channel Processing Parameters				
Isolation Scanner: Parameters				
Parameter	Description	Tool	Value	Unit
BARI(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BERJ	Bad Echo Rejection	USIT-E	On	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BS	Bit Size	WLSESSION	Depth Zoned	in
CASING_PRATIO	Casing Poisson Ratio	USIT-E	Standard Poisson Ratio	
CBLO	Casing Bottom (Logger)	WLSESSION	12006	ft
CDEN	Cement Density	USIT-E	12.5	lbm/gal
CDEN	Cement Density	EDTC-B	16.69	lbm/gal
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Light 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
FD	Fluid Density	USIT-E	10	lbm/gal
FDII	FPM Data Interpolation Interval	USIT-E	0	ft
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)	
GR_MULTIPLIER	Gamma Ray Multiplier	EDTC-B	1	
HEMA	Hematite Presence Flag	Borehole	No	
IBC_FRP_OFFSET	IBC Flexural Offset from Free Pipe	USIT-E	21.96	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.	
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	1.41	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1.15	
RCOD	Reference Calibrator Outer Diameter	USIT-E	4.5	in
RCSO	Reference Calibrator Standoff	USIT-E	0.842	in
RCTH	Reference Calibrator Thickness	USIT-E	0.216	in
SOCN	Standoff Distance	EDTC-B	0.125	in
SOCO	Standoff Correction Option	EDTC-B	No	

THDH	Maximum Search Thickness (percentage of nominal)	USIT-E	130	%
THDL	Minimum Search Thickness (percentage of nominal)	USIT-E	70	%
TPOS_EDTC	Tool Position: Centered or Eccentered	EDTC-B	Eccentered	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.8	Mrayl
U-USIT_UFAO	SIT Flexural Attenuation Offset	USIT-E	30.17	dB/m
U-USIT_UIAP	IBC Answer Product Enabled	USIT-E	SolidLiquidGasMap	
USI_RPLUS	Ultrasonic R+ Processing	USIT-E	No	
THDP	Thickness Detection Policy	USIT-E	Fundamental	
VCAS	Ultrasonic Transversal Velocity in Casing	USIT-E	51.4	us/ft
ZCAS	Acoustic Impedance of Casing	USIT-E	46.25	Mrayl
ZINI	Initial Estimate of Cement Impedance	USIT-E	-1	Mrayl
ZMUD	Acoustic Impedance of Mud	Borehole	1.8	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	11.5	56.5	1959
BS	8.5	1959	6389

All depth are actual.

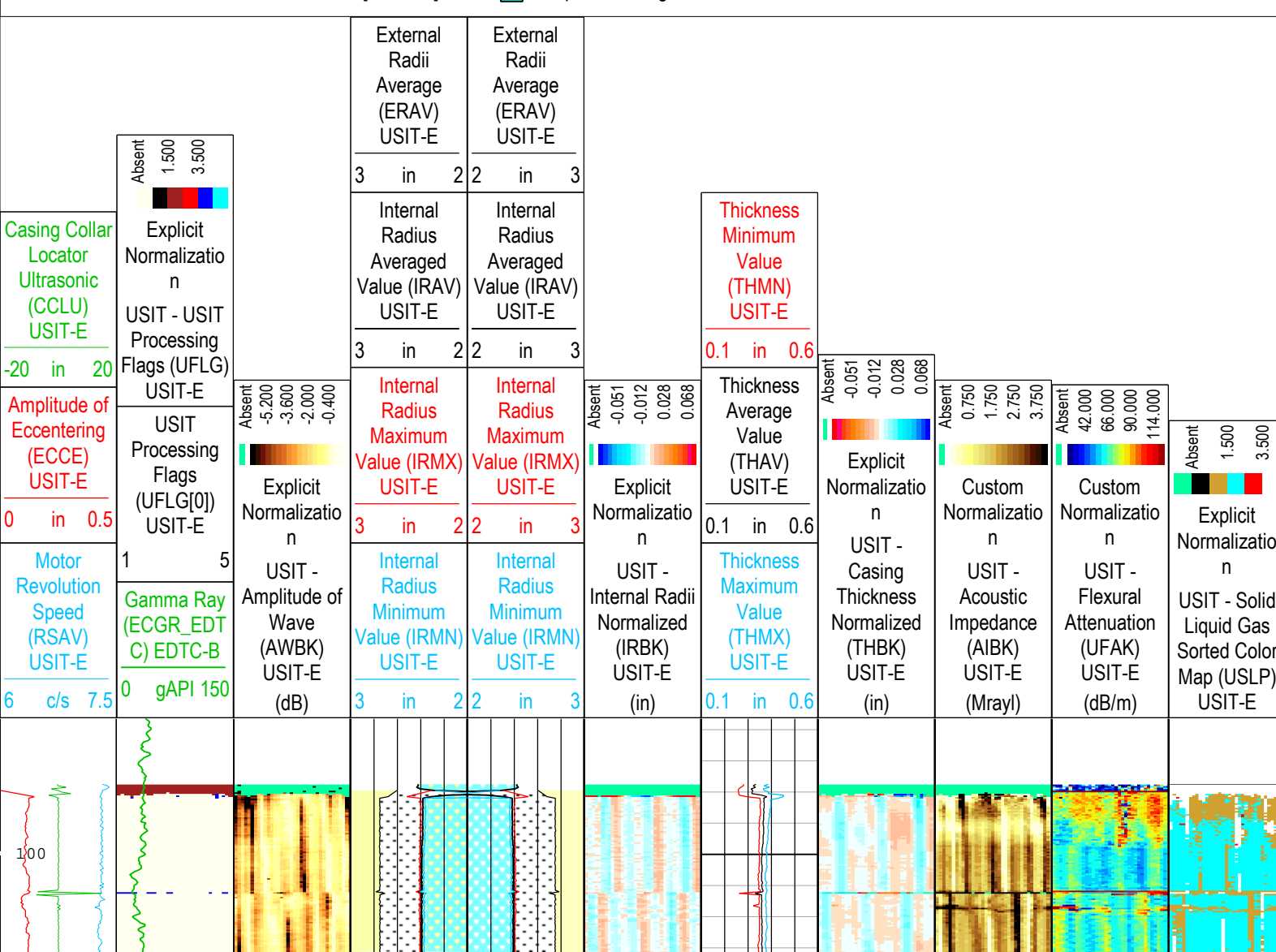
Tool Control Parameters

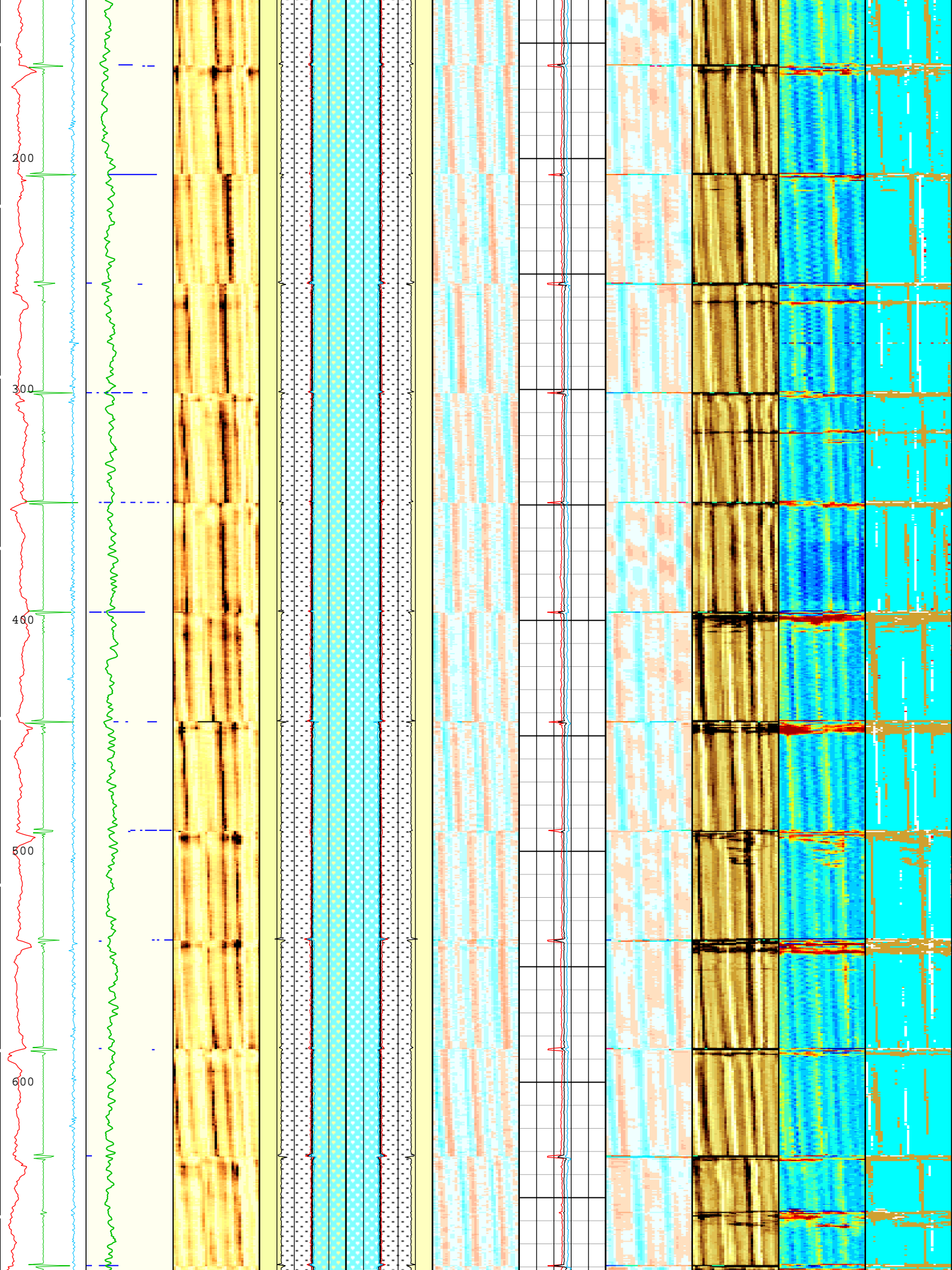
## Isolation Scanner: Parameters

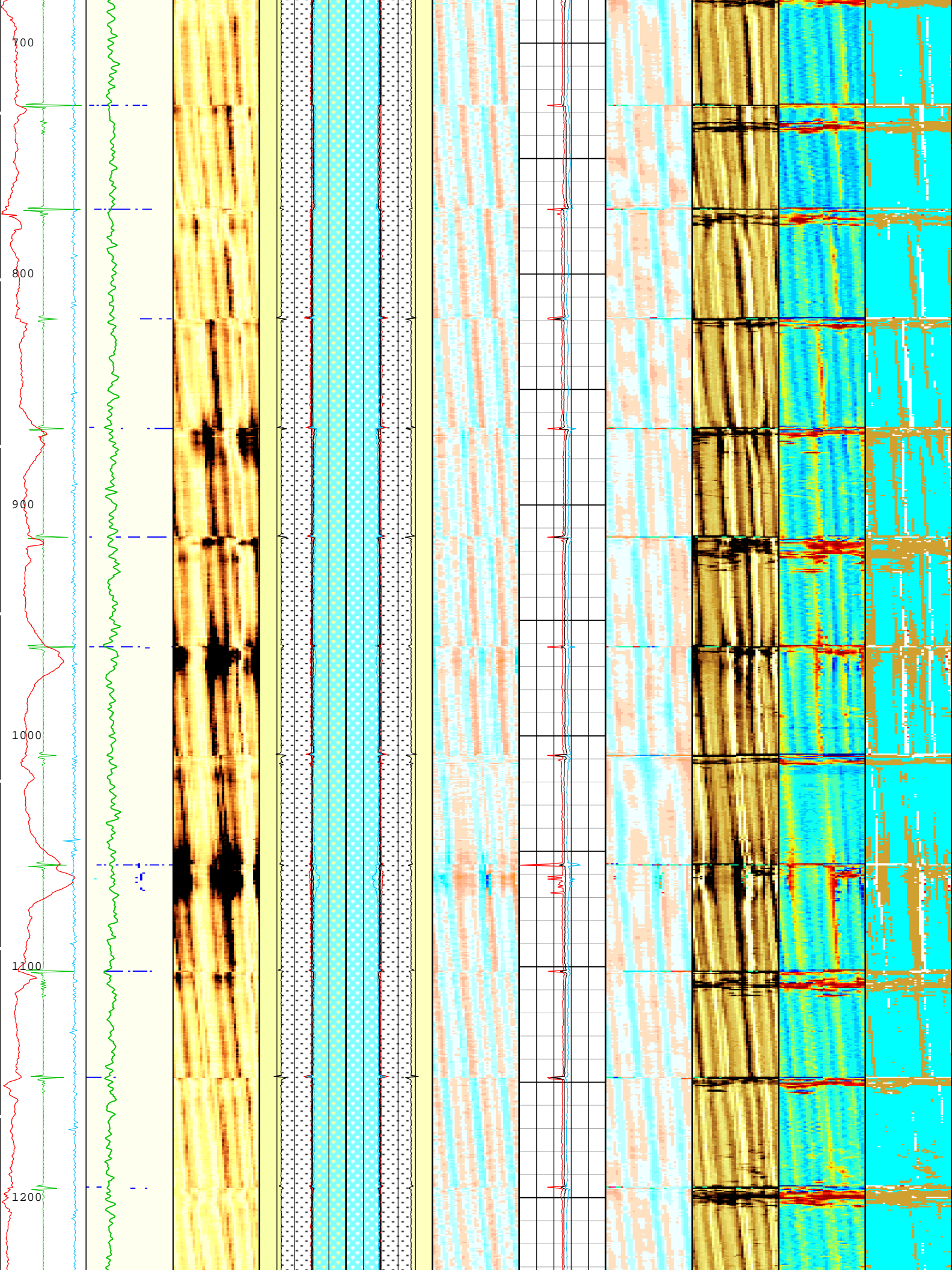
Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-E	-12	dB
AGMX	Maximum Gain of Cartridge	USIT-E	48	dB
U-USIT_DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
DOT(DOS)	Distance between Opposite Transducer Faces	USIT-E	1.756	in
EMXV	EMEX Voltage	USIT-E	Time Zoned	V
HRES	Horizontal Resolution	USIT-E	10 deg	
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	
MOTOR_PROTECT	Motor Protection	USIT-E	On	
UACLV_PERM	Ultrasonic ACLV Permanent	USIT-E	Yes	
U-USIT_UFWB	Far Receiver Window Begin Time	USIT-E	137	us
U-USIT_UFWE	Far Receiver Window End Time	USIT-E	177	us
U-USIT_UNWB	Near Receiver Window Begin Time	USIT-E	106	us
U-USIT_UNWE	Near Receiver Window End Time	USIT-E	146	us
USFR	Ultrasonic Sampling Frequency	USIT-E	666667	Hz
UPAT	USIT Emission Pattern	USIT-E	Pattern 375 KHz	
UWKM	USIT Working Mode	USIT-E	10 deg at 6.0 in	
USSP	Ultrasonic Service	USIT-E	IBC	
U-USIT_UTAN	Transducer Angles	USIT-E	33_DEG	
VRES	Vertical Resolution	USIT-E	6.0 in	
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	71.88	us

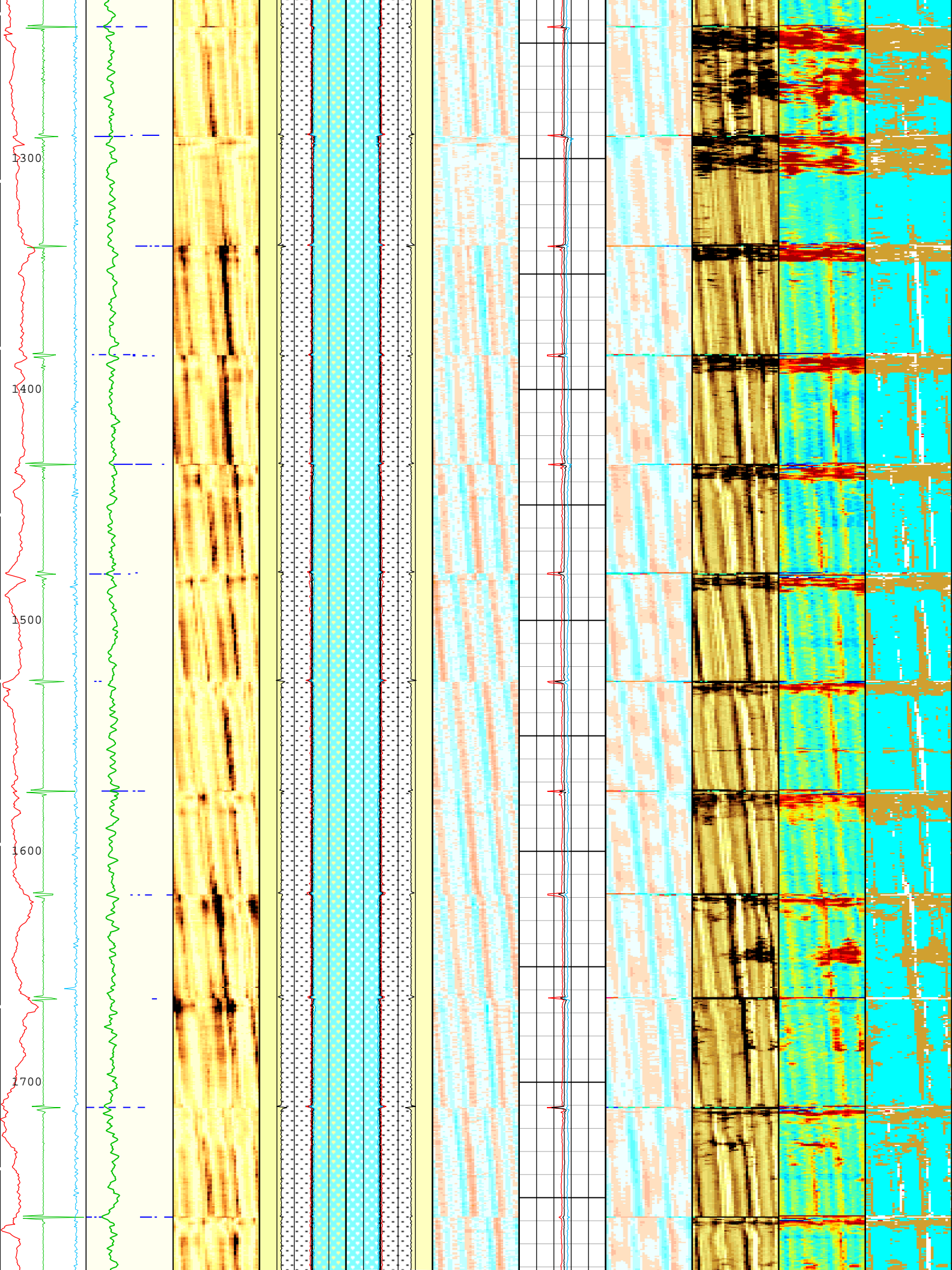
## Time Zone Parameters

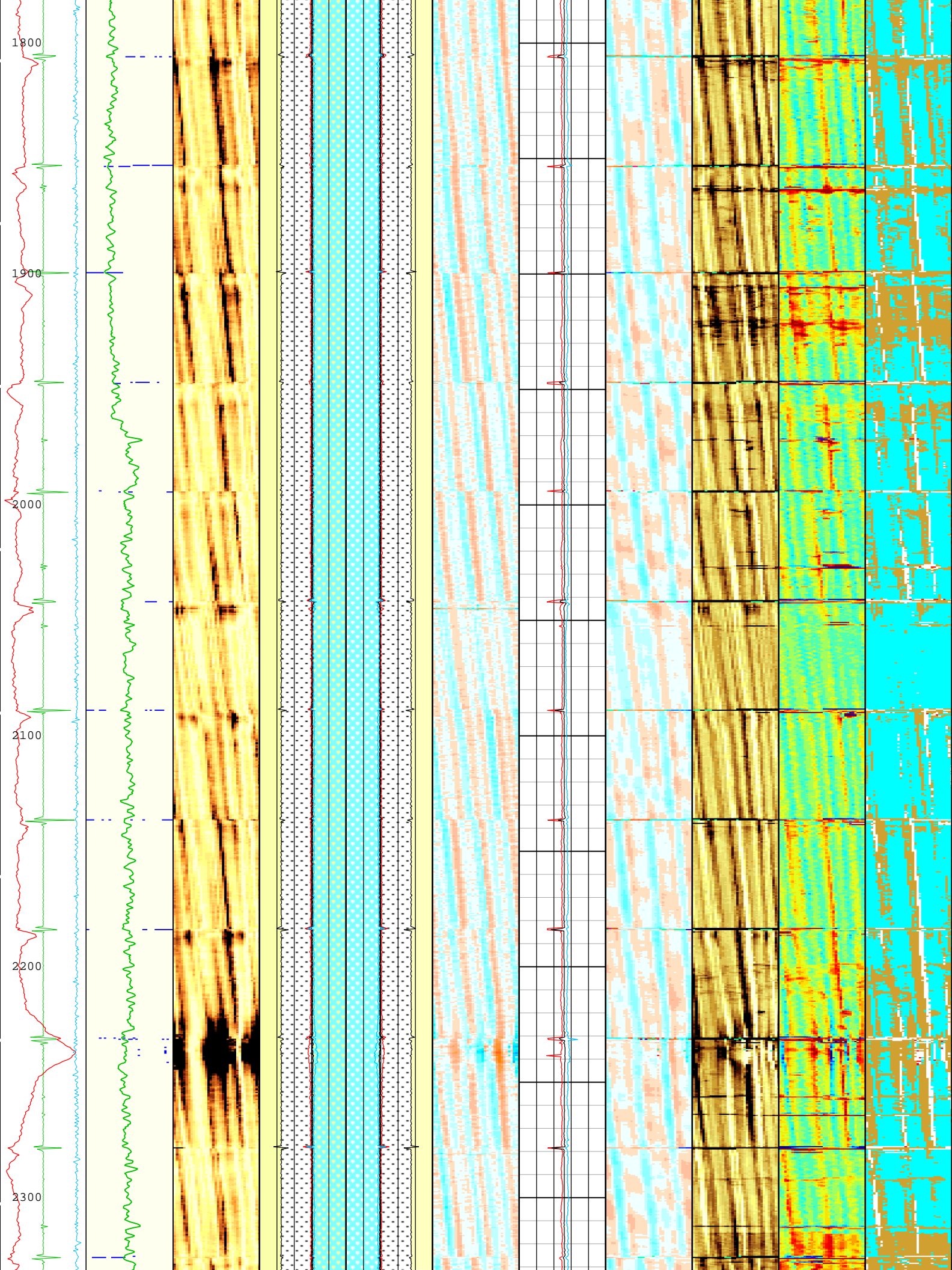
Parameter	Value	Start Time	Stop Time	Start Depth ( ft )	Stop Depth ( ft )
EMXV	60	21-Jan-2019 14:32:33	21-Jan-2019 14:36:02	6390.07	6145.61

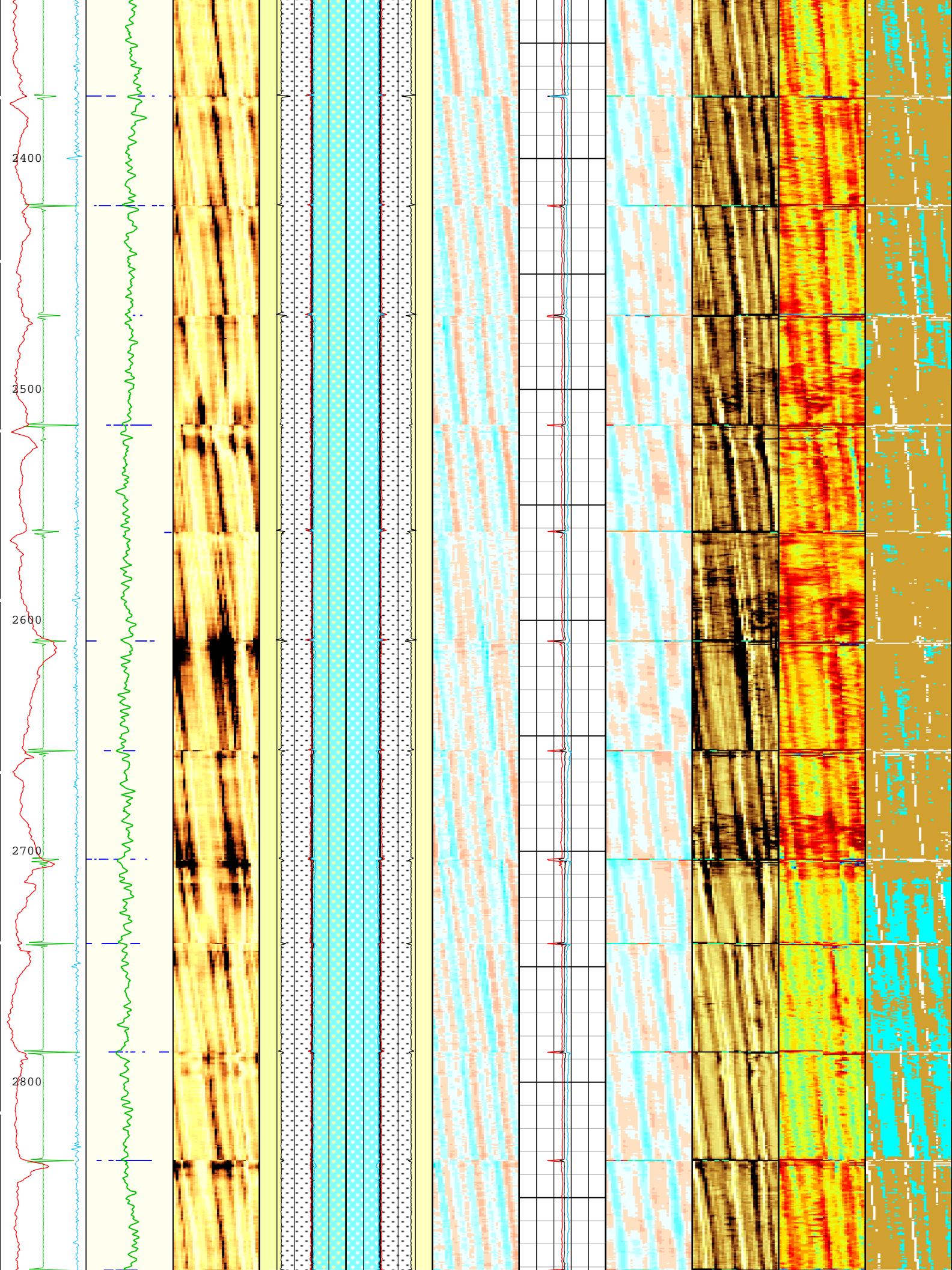


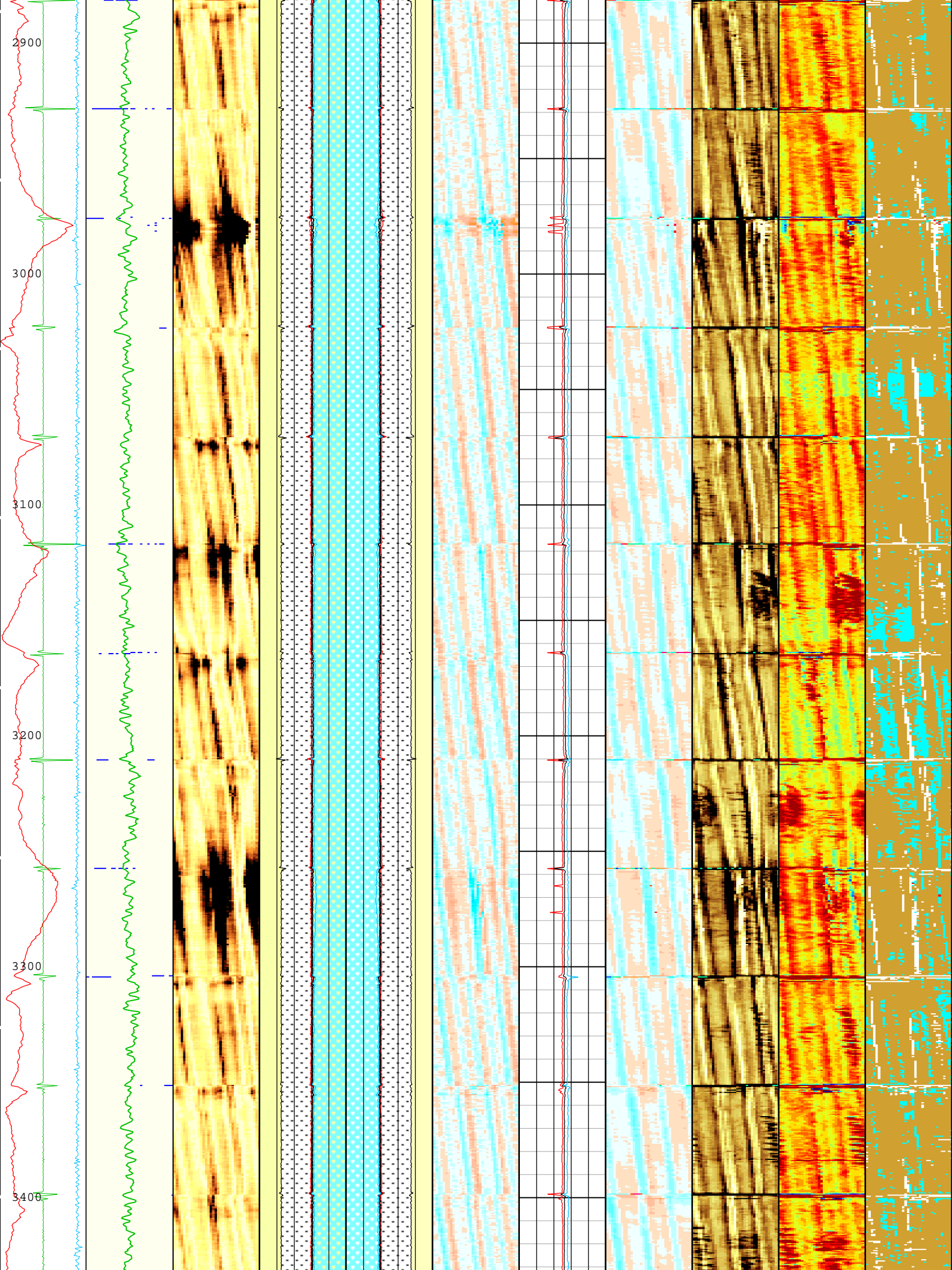


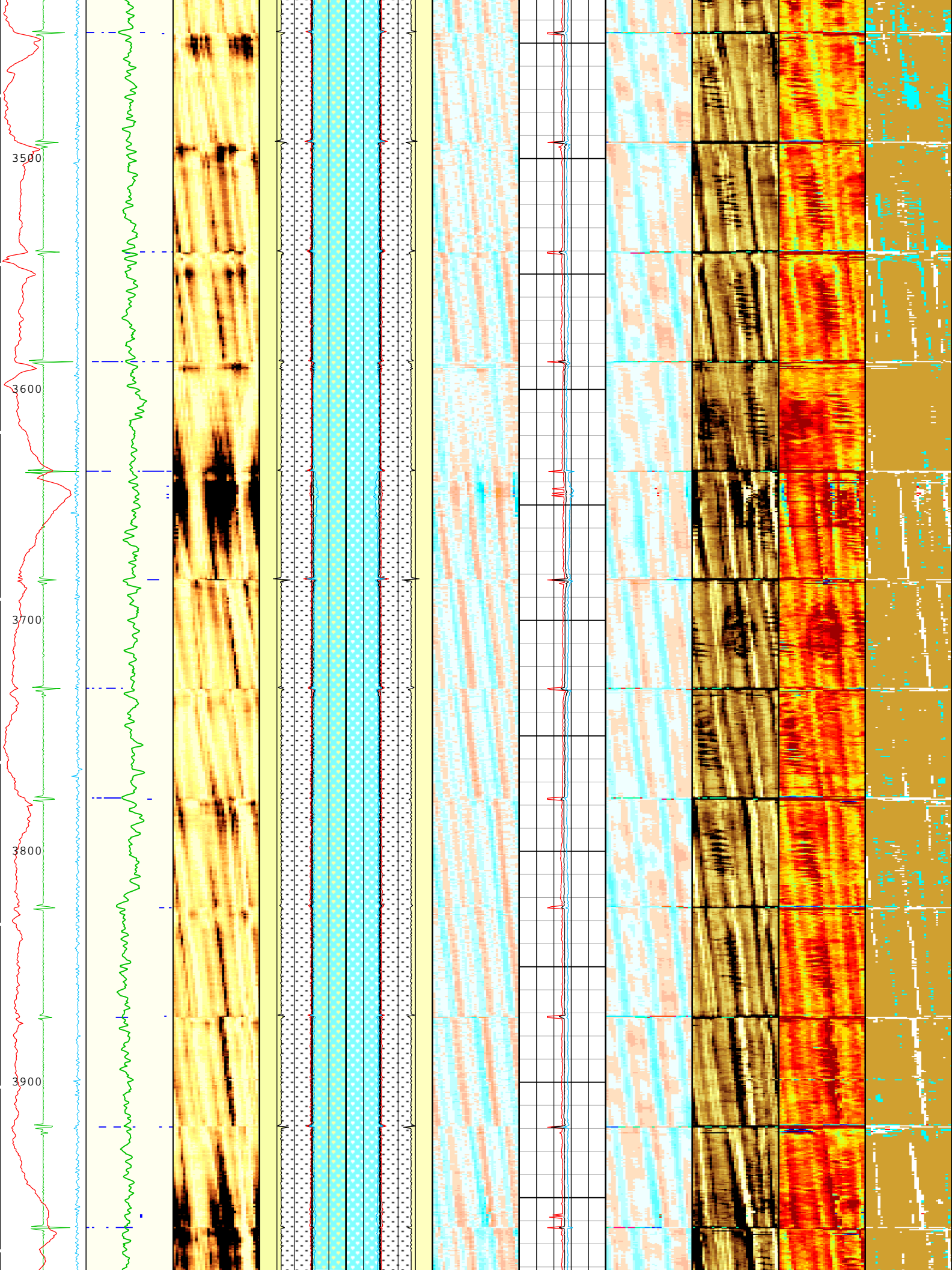


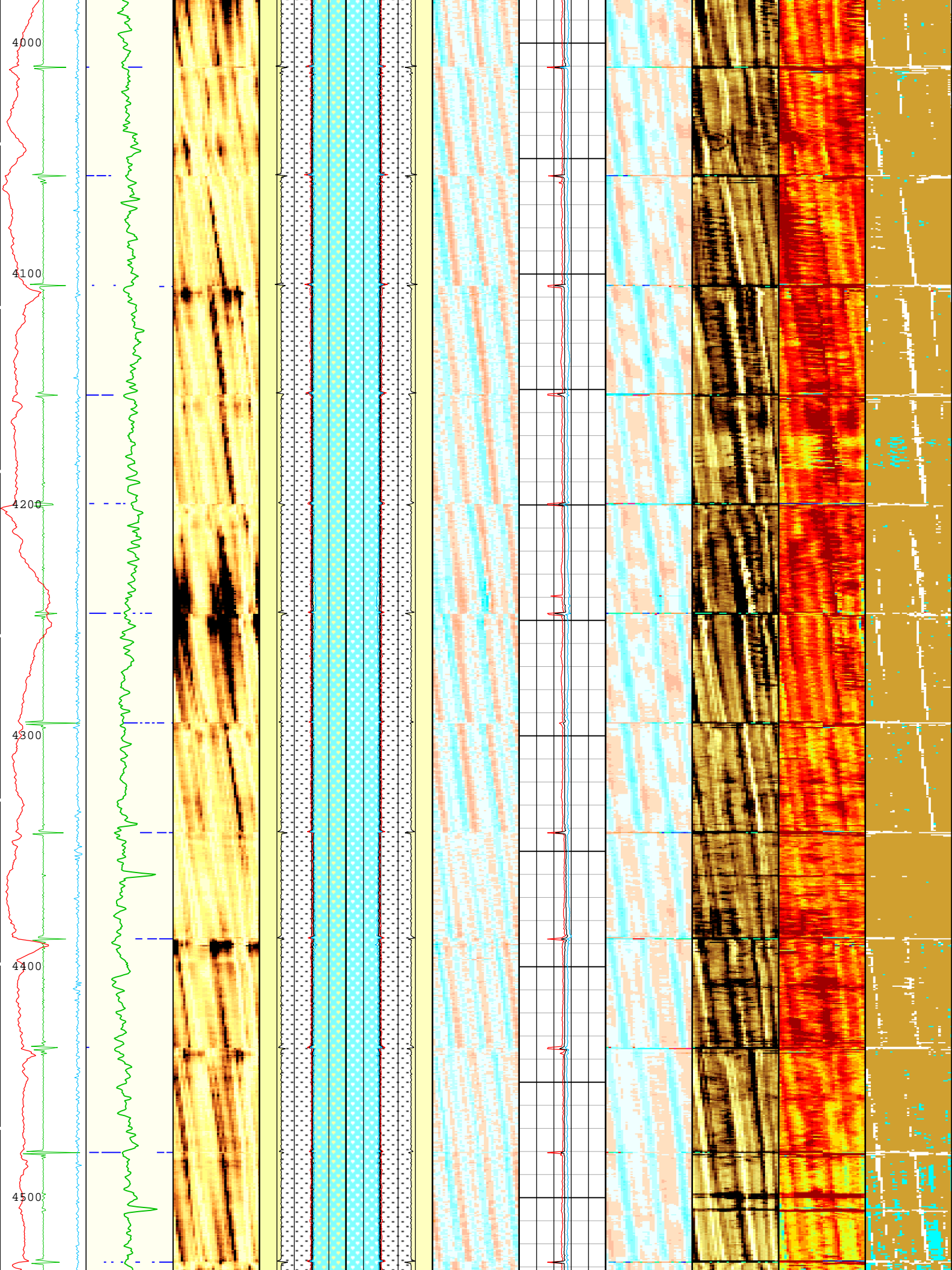


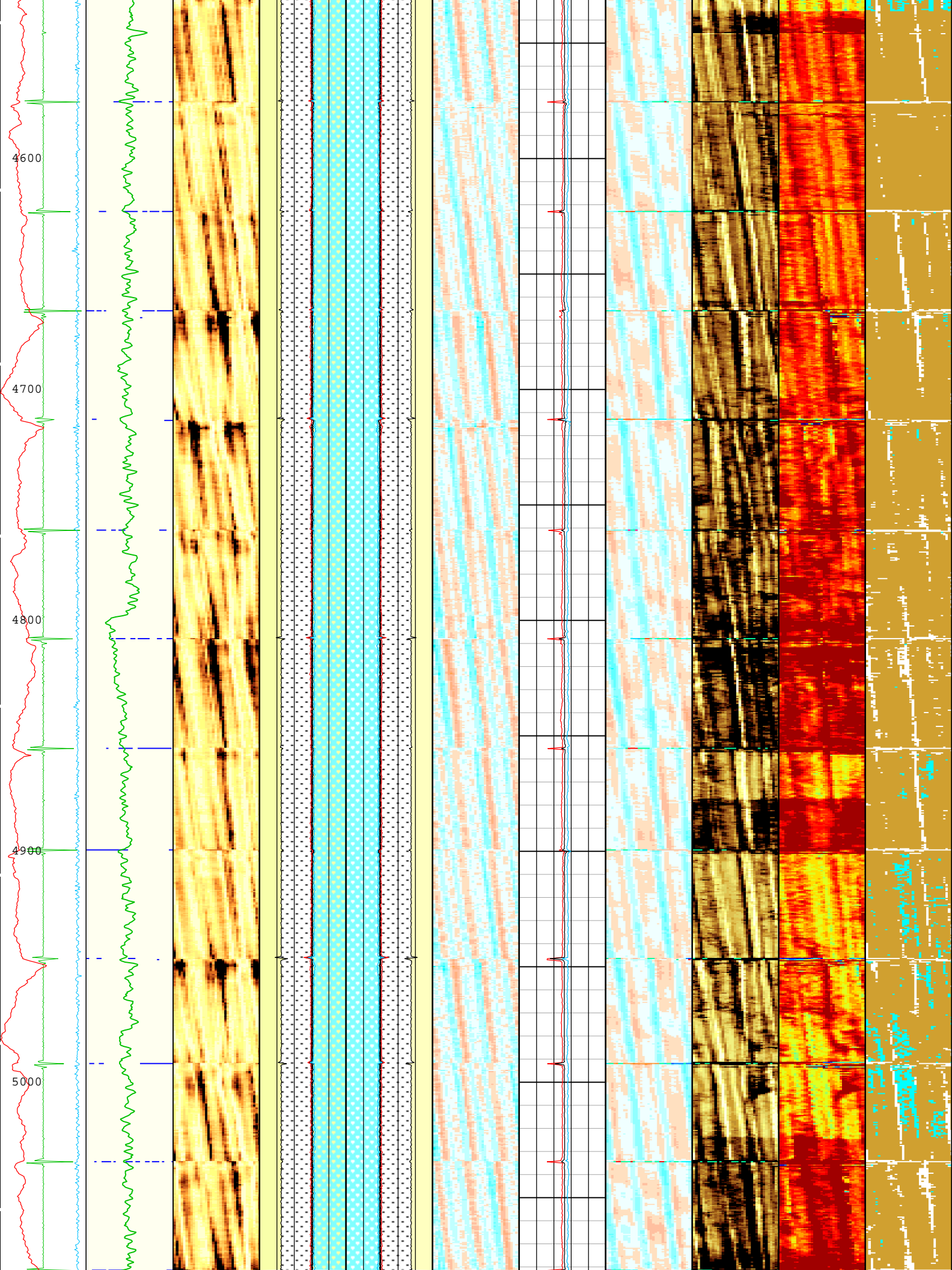


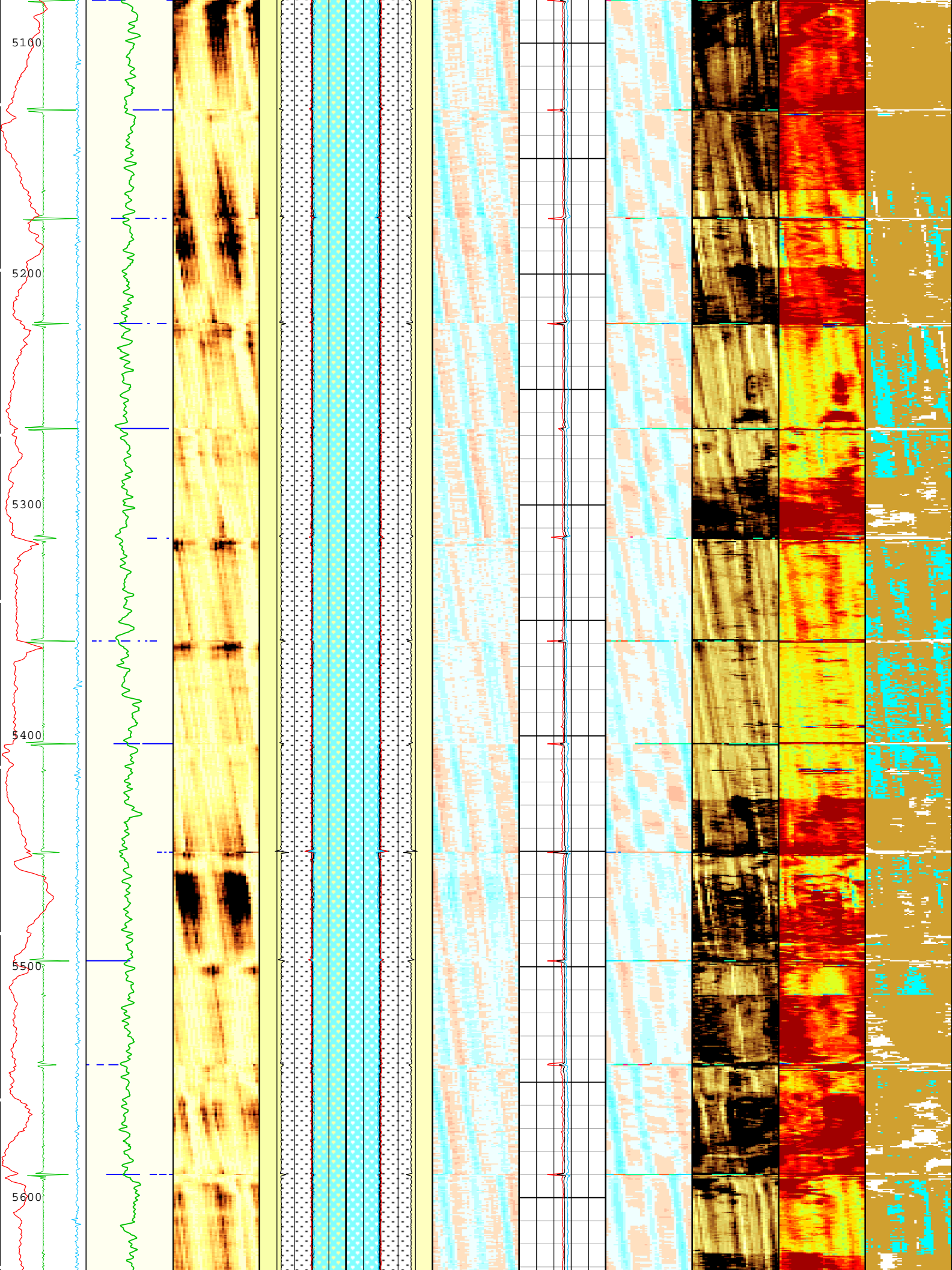


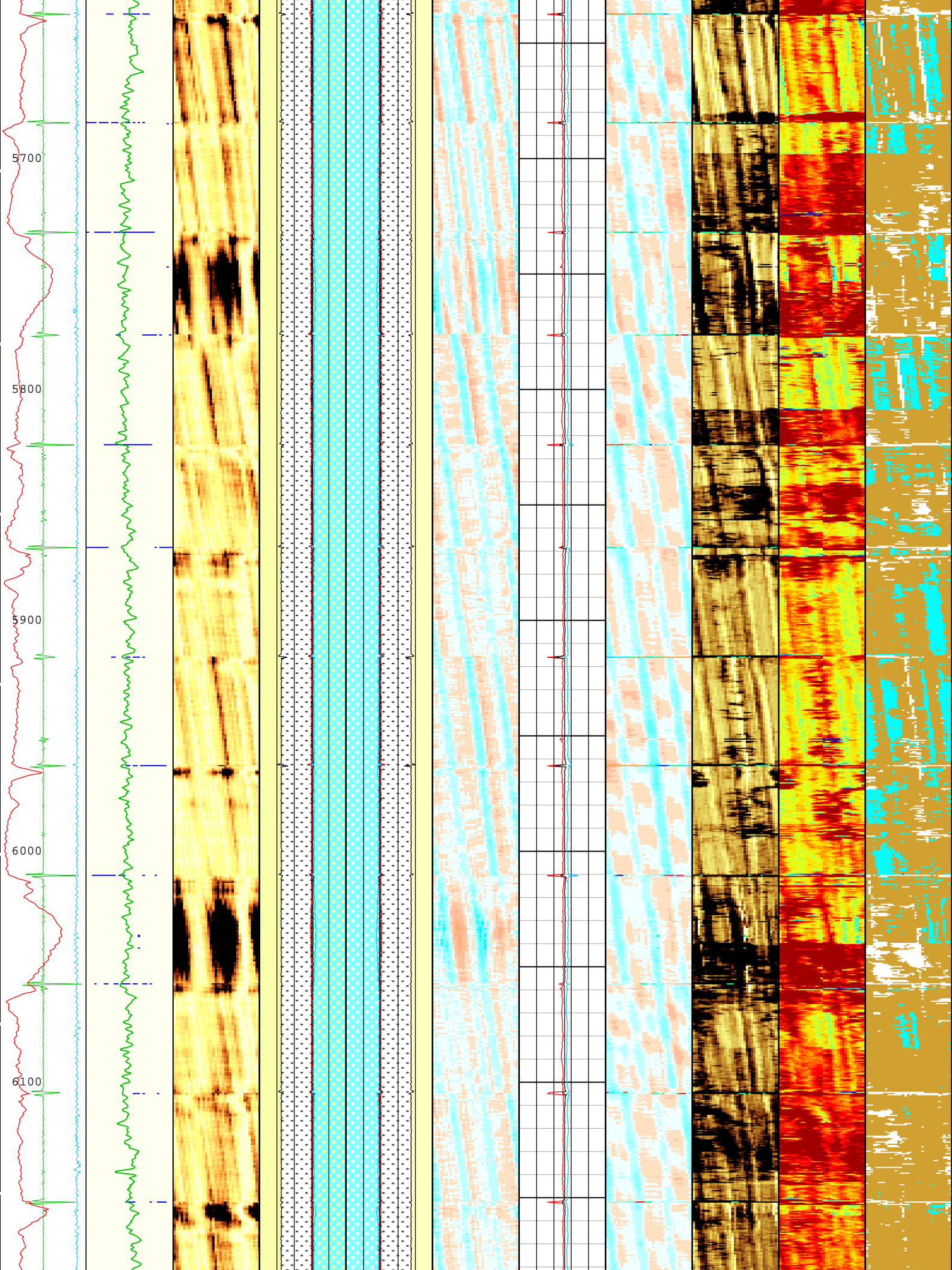


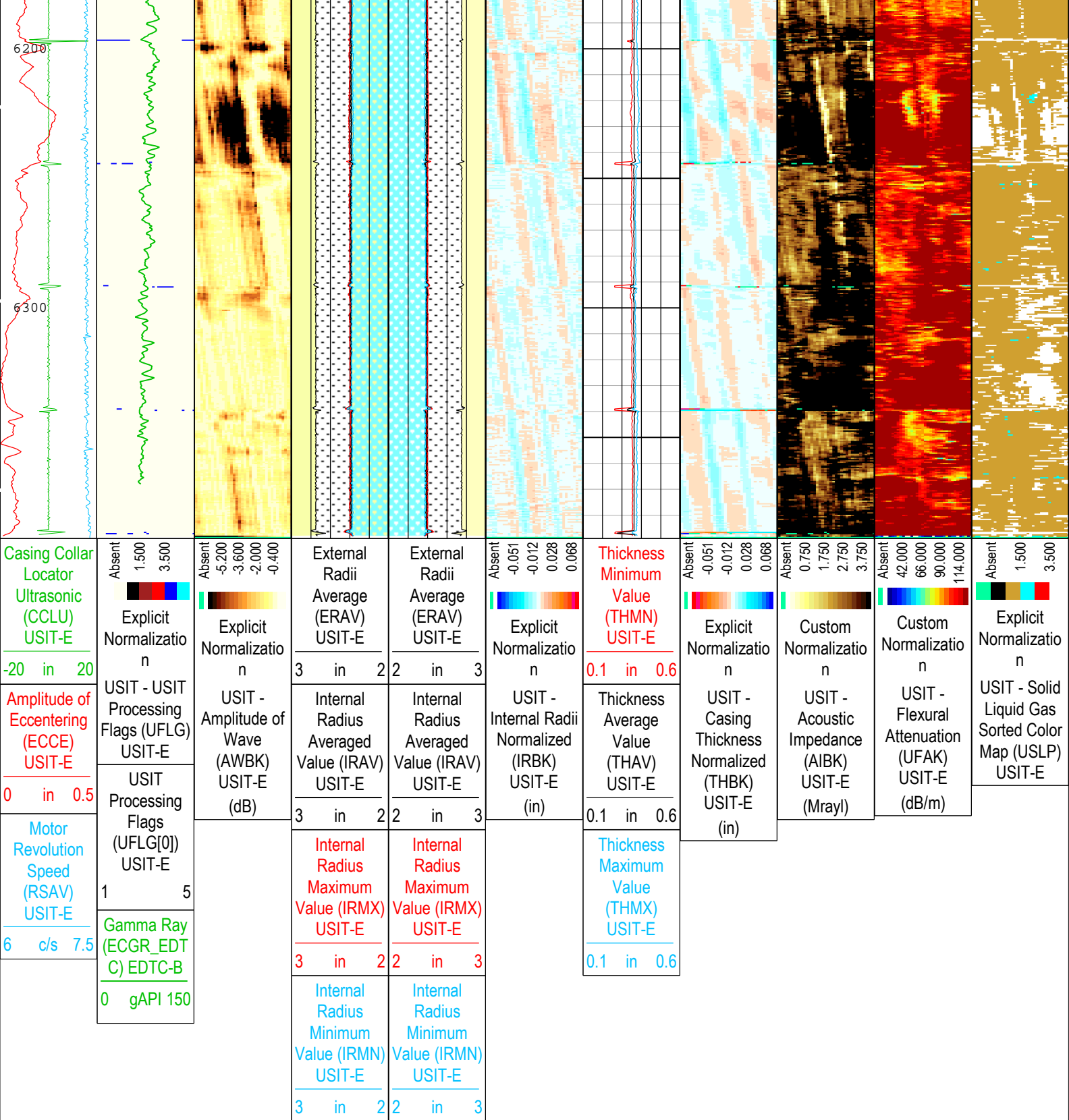












USIT Processing Flags (UFLG[0]) USIT-E

- 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

TIME\_1900 - Time Marked every 60.00 (s)

Description: USI IBC SLG Composite Format: Log ( IBC SLG Composite ) Index Scale: 2 in per 100 ft Index Unit: ft Index Type: Measured Depth  
Creation Date: 21-Jan-2019 16:23:57

## Channel Processing Parameters

Isolation Scanner: 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	12006	ft
CDEN	Cement Density	USIT-E	12.5	lbm/gal
CDEN	Cement Density	EDTC-B	16.69	lbm/gal
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Light 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
FD	Fluid Density	USIT-E	10	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)	
HEMA	Hematite Presence Flag	Borehole	No	
IBC_FRP_OFFSET	IBC Flexural Offset from Free Pipe	USIT-E	21.96	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.	
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	1.41	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1.15	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.8	Mrayl
U-USIT_UFAO	SIT Flexural Attenuation Offset	USIT-E	30.17	dB/m
U-USIT_UIAP	IBC Answer Product Enabled	USIT-E	SolidLiquidGasMap	
ZMUD	Acoustic Impedance of Mud	Borehole	1.8	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	11.5	56.5	1959
BS	8.5	1959	6389
All depth are actual.			

Tool Control Parameters

Isolation Scanner: 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	
U-USIT_UFWB	Far Receiver Window Begin Time	USIT-E	137	us
U-USIT_UFWE	Far Receiver Window End Time	USIT-E	177	us
U-USIT_UNWB	Near Receiver Window Begin Time	USIT-E	106	us
U-USIT_UNWE	Near Receiver Window End Time	USIT-E	146	us

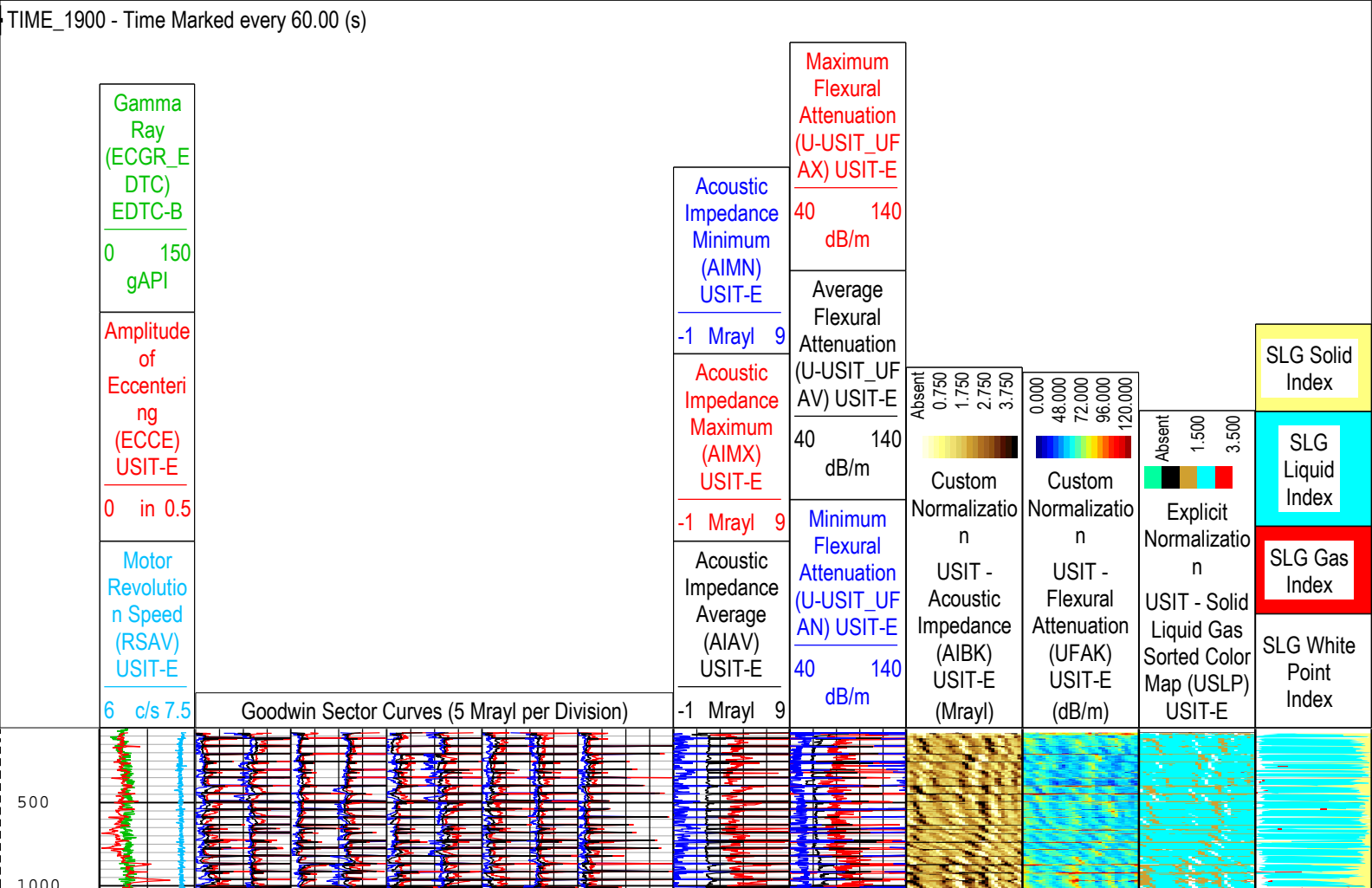
USIT_E	Near Receive Window End Time	USIT_E	71.8	us
UPAT	USIT Emission Pattern	USIT-E	Pattern 375 KHz	
UWKM	USIT Working Mode	USIT-E	10 deg at 6.0 in	
U-USIT_UTAN	Transducer Angles	USIT-E	33_DEG	
VRES	Vertical Resolution	USIT-E	6.0 in	
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	71.88	us

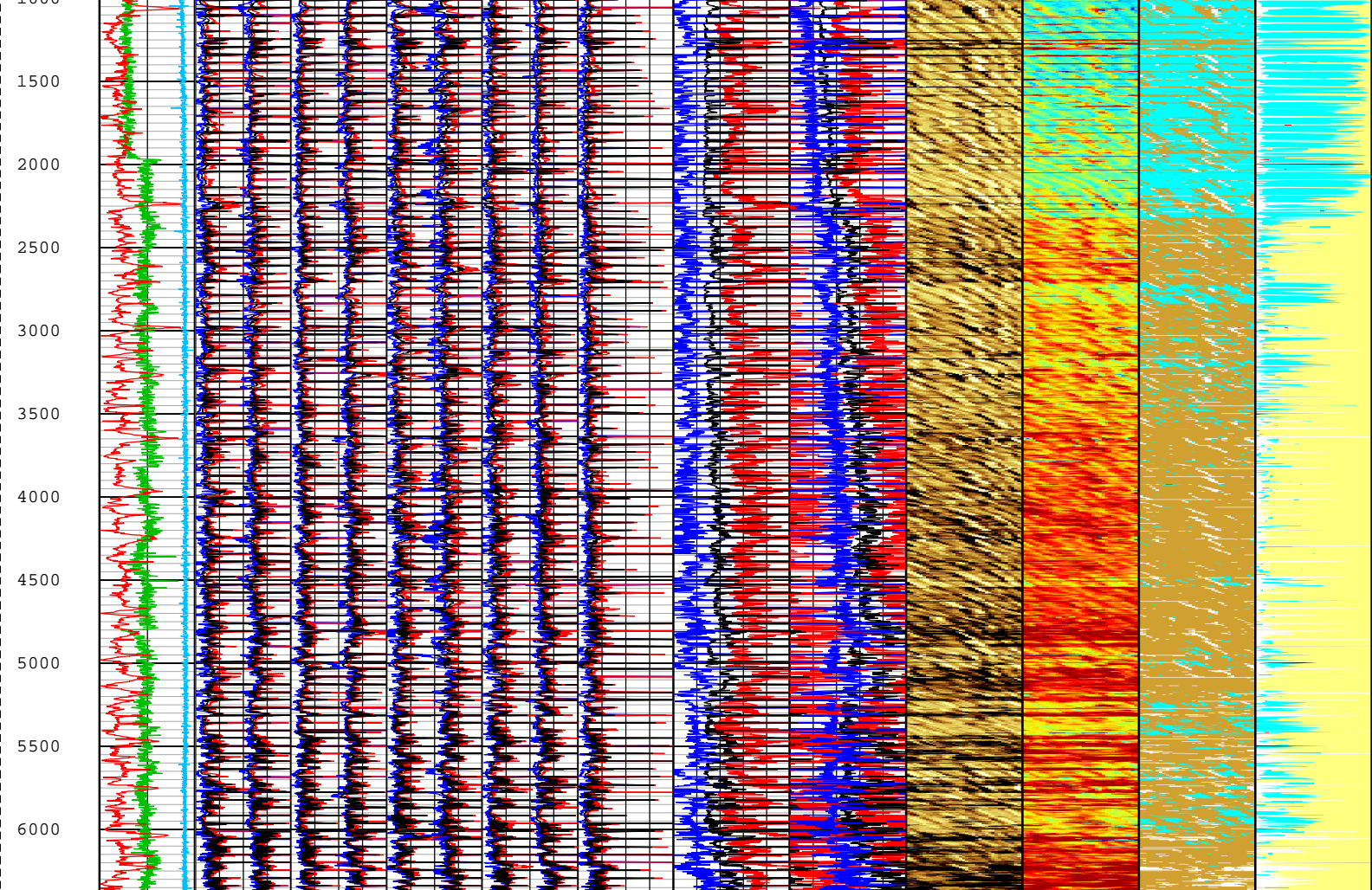
Time Zone Parameters					
Parameter	Value	Start Time	Stop Time	Start Depth ( ft )	Stop Depth ( ft )
EMXV	60	21-Jan-2019 14:32:33	21-Jan-2019 14:36:02	6390.07	6145.61
EMXV	65	21-Jan-2019 14:36:02	21-Jan-2019 15:09:17	6145.61	3741.59
EMXV	55	21-Jan-2019 15:09:17	21-Jan-2019 16:00:38	3741.59	78.17

All depth are at tool zero.					
Isolation Scanner					
IBC Goodwin Compressed					

Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Isolation Scanner	Log[3]:Up	Up	78.17 ft	6390.07 ft	21-Jan-2019 2:32:33 PM	21-Jan-2019 4:00:38 PM	ON	3.22 ft	Yes

Log	Company:Crestone Peak Resources Operating LLC		Well:Herren #1H-33H-H367	
	Isolation Scanner: Log[3]:Up:S005			
Description: USI Goodwin   Format: Log ( IBC Goodwin )   Index Scale: 0.1 in per 100 ft   Index Unit: ft   Index Type: Measured Depth   Creation Date: 21-Jan-2019 16:24:21				





Gamma Ray  
(ECGR\_E  
DTC)  
EDTC-B

0 150  
gAPI

Amplitude  
of  
Eccenteri  
ng  
(ECCE)  
USIT-E

0 in 0.5

Motor  
Revolutio  
n Speed  
(RSAV)  
USIT-E

6 c/s 7.5

Goodwin Sector Curves (5 Mrayl per Division)

Acoustic  
Impedance  
Minimum  
(AIMN)  
USIT-E

-1 Mrayl 9

Acoustic  
Impedance  
Maximum  
(AIMX)  
USIT-E

-1 Mrayl 9

Acoustic  
Impedance  
Average  
(AIAV)  
USIT-E

-1 Mrayl 9

Maximum  
Flexural  
Attenuation  
(U-USIT\_UF  
AX) USIT-E

40 140  
dB/m

Average  
Flexural  
Attenuation  
(U-USIT\_UF  
AV) USIT-E

40 140  
dB/m

Minimum  
Flexural  
Attenuation  
(U-USIT\_UF  
AN) USIT-E

40 140  
dB/m

Absent  
0.750  
1.750  
2.750  
3.750

Custom  
Normalizatio  
n  
USIT -  
Acoustic  
Impedance  
(AIBK)  
USIT-E  
(Mrayl)

0.000  
48.000  
72.000  
96.000  
120.000

Custom  
Normalizatio  
n  
USIT -  
Flexural  
Attenuation  
(UFAK)  
USIT-E  
(dB/m)

Absent  
1.500  
3.500

Explicit  
Normalizatio  
n  
USIT - Solid  
Liquid Gas  
Sorted Color  
Map (USLP)  
USIT-E

SLG Solid  
Index

SLG  
Liquid  
Index

SLG Gas  
Index

SLG White  
Point  
Index

TIME\_1900 - Time Marked every 60.00 (s)

Description: USI Goodwin Format: Log ( IBC Goodwin ) Index Scale: 0.1 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 21-Jan-2019 16:24:21

Isolation Scanner

IBC SLG Repeat

Software Version

Acquisition System	Version
Maxwell 2018 SP2	8.2.104493.3100

## Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Isolation Scanner	Log[1]:Up	Up	2166.02 ft	2504.85 ft	21-Jan-2019 2:08:34 PM	21-Jan-2019 2:13:18 PM	ON	1.77 ft	Yes

All depths are referenced to toolstring zero

## Log

Company: Crestone Peak Resources Operating LLC

Well: Herren #1H-33H-H367

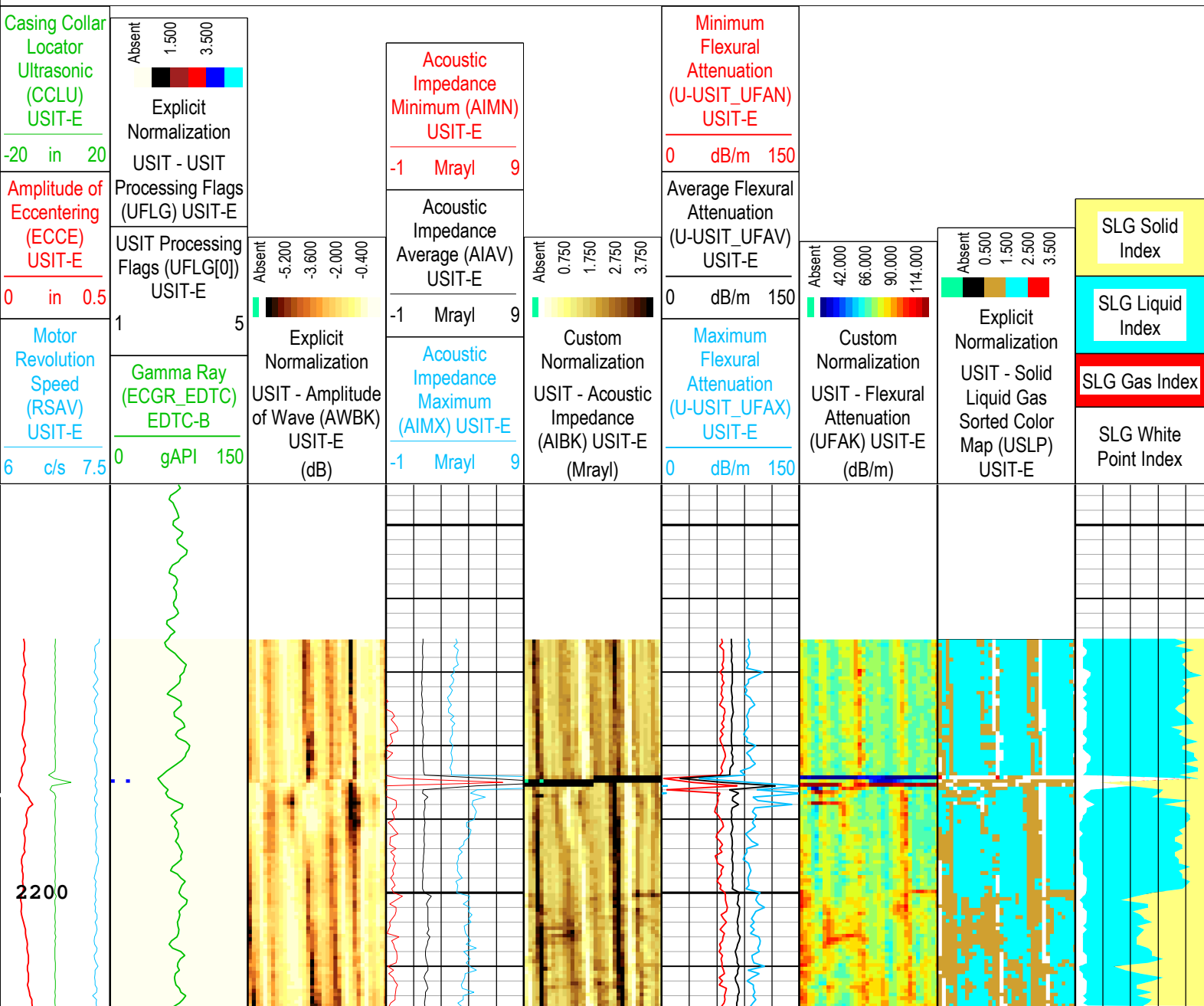
Isolation Scanner: Log[1]:Up:S005

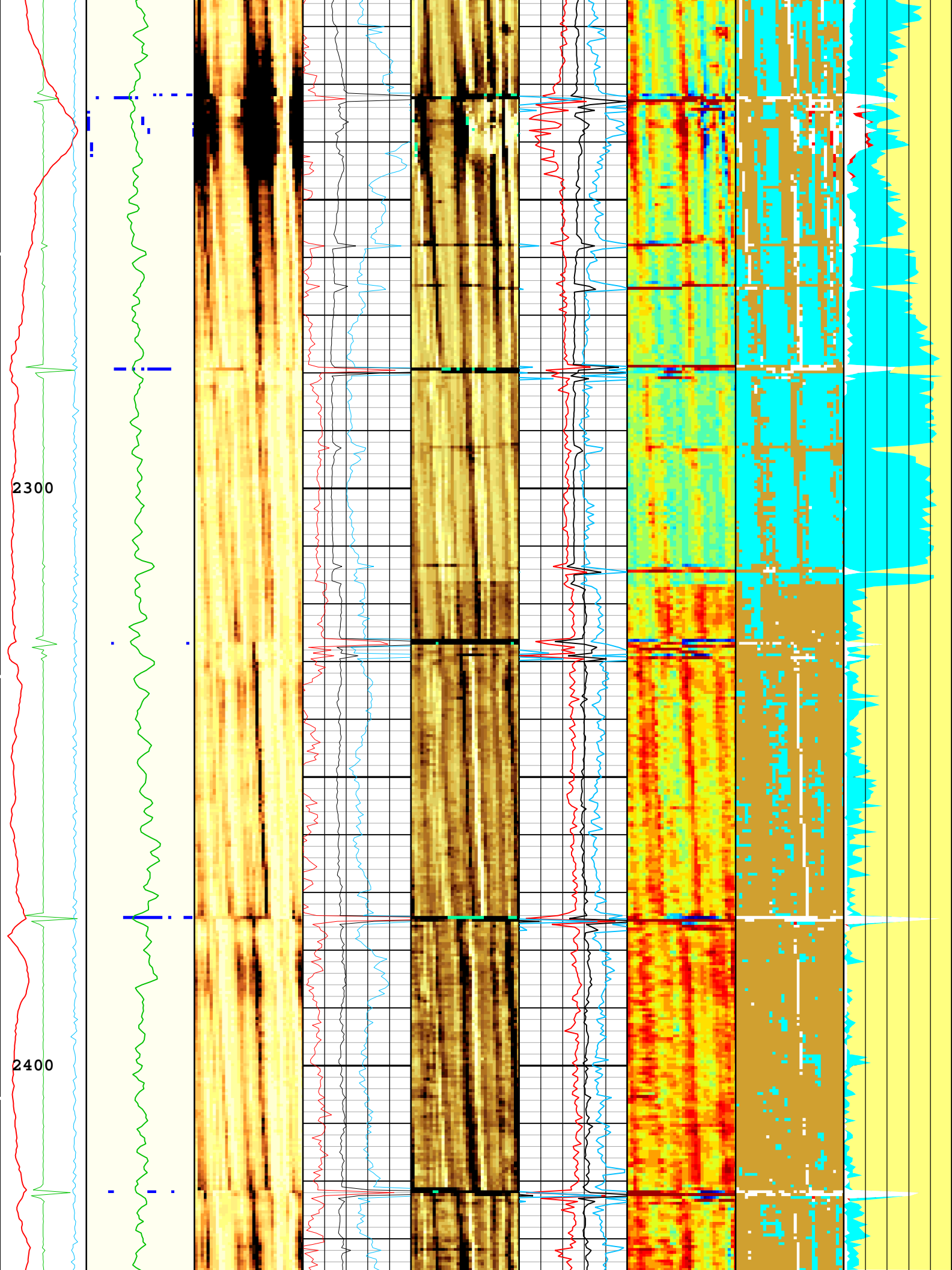
Description: USI IBC SLG Format: Log (IBC SLG) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 21-Jan-2019 16:24:31

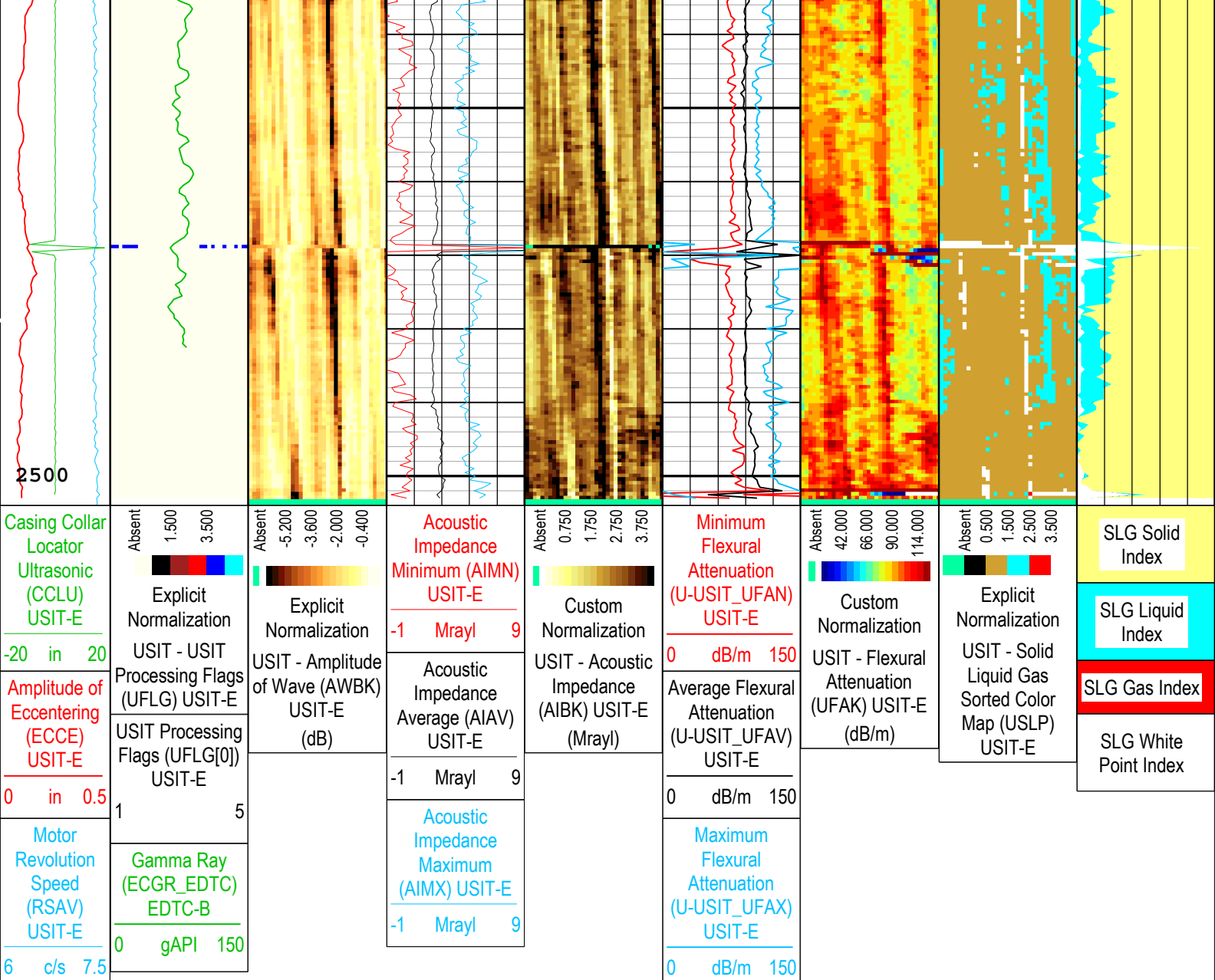
TIME\_1900 - Time Marked every 60.00 (s)






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

- |   |                             |
|---|-----------------------------|
| 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     |







USIT Processing Flags (UFLG[0]) USIT-E				
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		
TIME_1900 - Time Marked every 60.00 (s)				
Description: USI IBC SLG    Format: Log ( IBC SLG )    Index Scale: 5 in per 100 ft    Index Unit: ft    Index Type: Measured Depth    Creation Date: 21-Jan-2019 16:24:31				

Channel Processing Parameters				
Isolation Scanner: Parameters				
Parameter	Description	Tool	Value	Unit
BAR(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BERJ	Bad Echo Rejection	USIT-E	On	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BS	Bit Size	WLSESSION	8.5	in
CASING_PRATIO	Casing Poisson Ratio	USIT-E	Standard Poisson Ratio	
CBLO	Casing Bottom (Logger)	WLSESSION	12006	ft
CDEN	Cement Density	USIT-E	12.5	lbm/gal

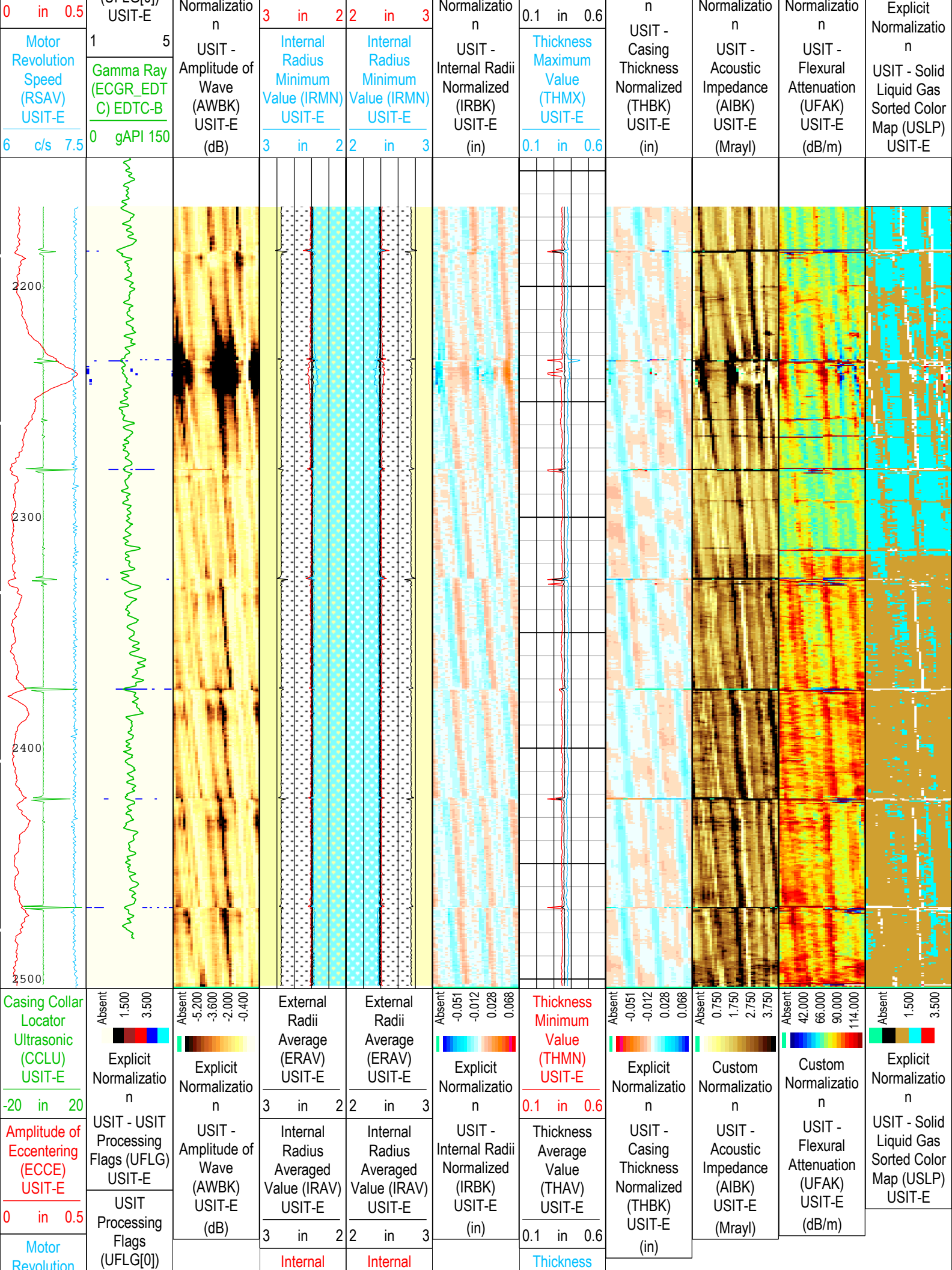
CDEN	Cement Density	EDTC-B	16.69	lbm/gal
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Light Cement	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
FD	Fluid Density	USIT-E	10	lbm/gal
FDII	FPM Data Interpolation Interval	USIT-E	0	ft
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)	
GR_MULTIPLIER	Gamma Ray Multiplier	EDTC-B	1	
HEMA	Hematite Presence Flag	Borehole	No	
IBC_FRP_OFFSET	IBC Flexural Offset from Free Pipe	USIT-E	21.96	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.	
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	1.41	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1.15	
RCOD	Reference Calibrator Outer Diameter	USIT-E	4.5	in
RCSO	Reference Calibrator Standoff	USIT-E	0.842	in
RCTH	Reference Calibrator Thickness	USIT-E	0.216	in
SOCN	Standoff Distance	EDTC-B	0.125	in
SOCO	Standoff Correction Option	EDTC-B	No	
THDH	Maximum Search Thickness (percentage of nominal)	USIT-E	130	%
THDL	Minimum Search Thickness (percentage of nominal)	USIT-E	70	%
TPOS_EDTC	Tool Position: Centered or Eccentered	EDTC-B	Eccentered	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.8	Mrayl
U-USIT_UFAO	SIT Flexural Attenuation Offset	USIT-E	30.17	dB/m
U-USIT_UIAP	IBC Answer Product Enabled	USIT-E	SolidLiquidGasMap	
USI_RPLUS	Ultrasonic R+ Processing	USIT-E	No	
THDP	Thickness Detection Policy	USIT-E	Fundamental	
VCAS	Ultrasonic Transversal Velocity in Casing	USIT-E	51.4	us/ft
ZCAS	Acoustic Impedance of Casing	USIT-E	46.25	Mrayl
ZINI	Initial Estimate of Cement Impedance	USIT-E	-1	Mrayl
ZMUD	Acoustic Impedance of Mud	Borehole	1.8	Mrayl
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

### Isolation Scanner: Parameters

Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-E	-12	dB
AGMX	Maximum Gain of Cartridge	USIT-E	48	dB
U-USIT_DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
DOT(DOS)	Distance between Opposite Transducer Faces	USIT-E	1.756	in
EMXV	EMEX Voltage	USIT-E	60	V
HRES	Horizontal Resolution	USIT-E	10 deg	
IBC_ACQTYPE	IBC Acquisition type	USIT-E	1 MHz	





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	12006	ft
CDEN	Cement Density	USIT-E	12.5	lbm/gal
CDEN	Cement Density	EDTC-B	16.69	lbm/gal
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Light 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
FD	Fluid Density	USIT-E	10	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)	
HEMA	Hematite Presence Flag	Borehole	No	
IBC_FRP_OFFSET	IBC Flexural Offset from Free Pipe	USIT-E	21.96	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.	
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	1.41	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1.15	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.8	Mrayl
U-USIT_UFAO	SIT Flexural Attenuation Offset	USIT-E	30.17	dB/m
U-USIT_UIAP	IBC Answer Product Enabled	USIT-E	SolidLiquidGasMap	
ZMUD	Acoustic Impedance of Mud	Borehole	1.8	Mrayl
ZTCM	Acoustic Impedance Threshold for Cement	USIT-E	2.6	Mrayl

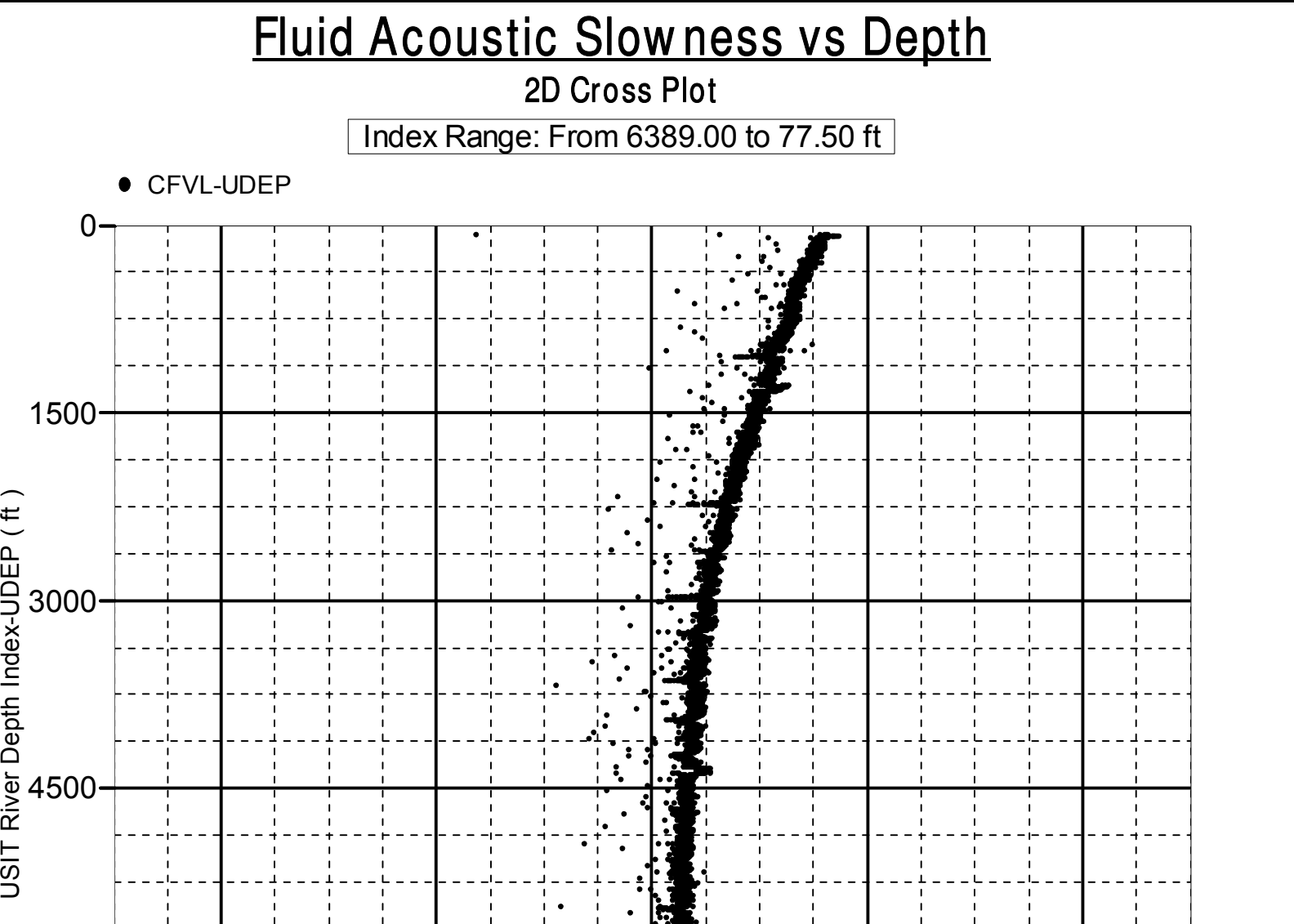
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl
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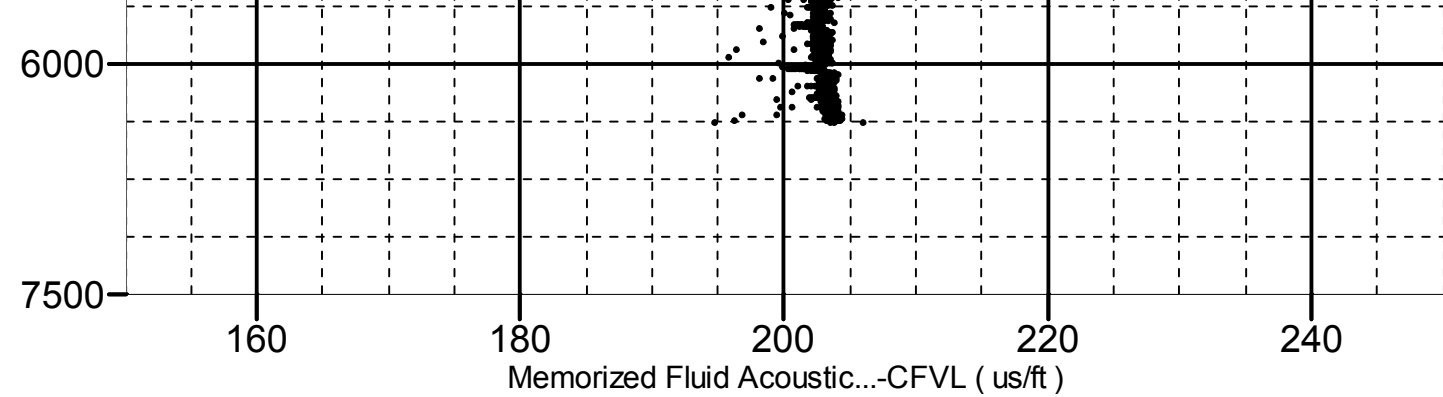
Tool Control Parameters				
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Isolation Scanner: Parameters
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Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-E	-12	dB
AGMX	Maximum Gain of Cartridge	USIT-E	48	dB
EMXV	EMEX Voltage	USIT-E	60	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	
U-USIT_UFWB	Far Receiver Window Begin Time	USIT-E	137	us
U-USIT_UFWE	Far Receiver Window End Time	USIT-E	177	us
U-USIT_UNWB	Near Receiver Window Begin Time	USIT-E	106	us
U-USIT_UNWE	Near Receiver Window End Time	USIT-E	146	us
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	
VRES	Vertical Resolution	USIT-E	6.0 in	
WINB	Window Begin Time	USIT-E	31.88	us
WINE	Window End Time	USIT-E	71.88	us

XYZ	Company:Crestone Peak Resources Operating LLC Well:Herren #1H-33H-H367 Isolation Scanner: Log[3]:Up:S005
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XYZ

Company:Crestone Peak Resources Operating LLC Well:Herren #1H-33H-H367

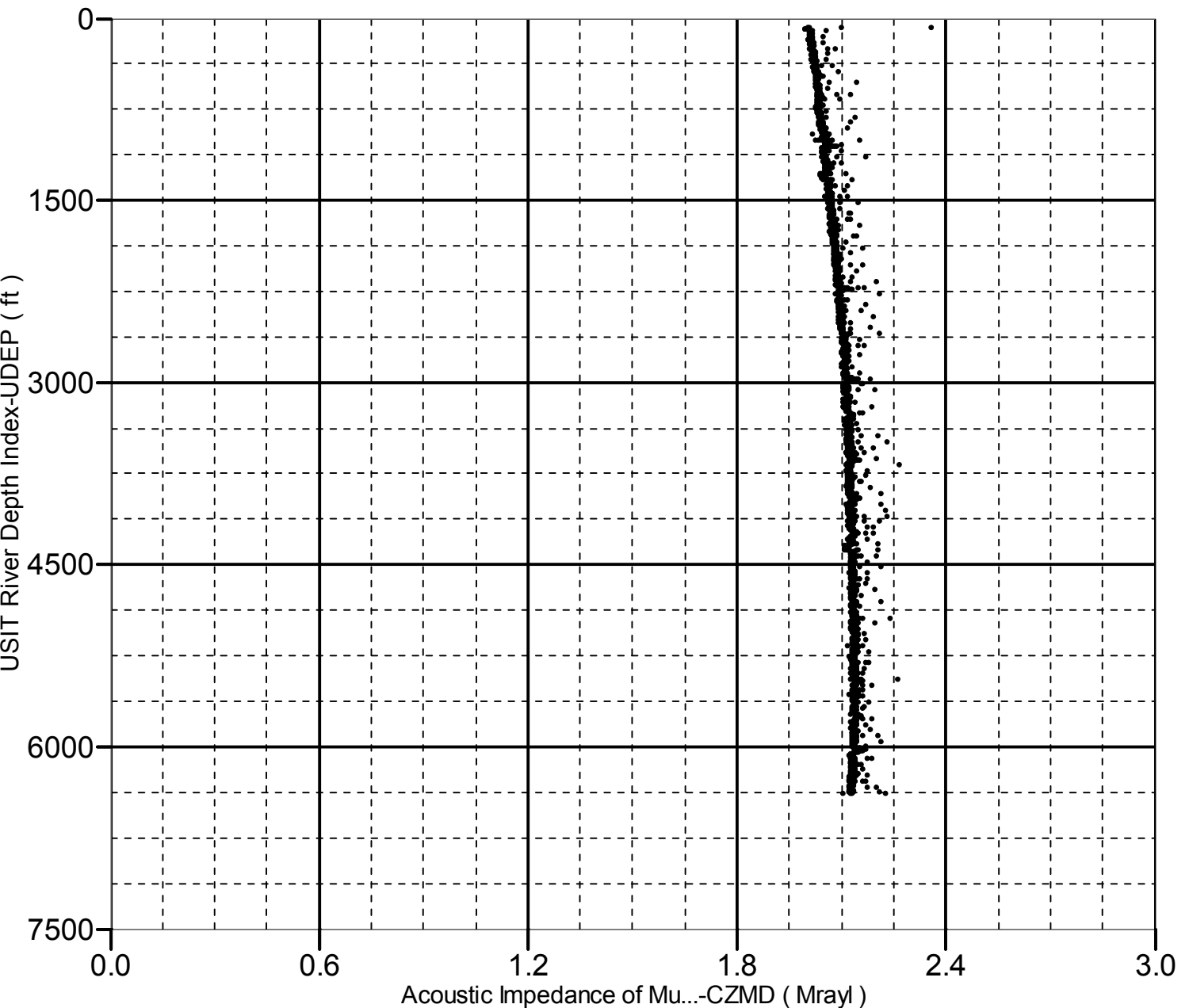
Isolation Scanner: Log[3]:Up:S005

## Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6389.00 to 77.50 ft

● CZMD-UDEP



Company: Crestone Peak Resources Operating LLC

**Schlumberger**

Well: Herren #1H-33H-H367

Field: Wattenberg

County: Weld

State: Colorado

Isolation Scanner

Cement Evaluation

Gamma Ray - CCL Log