

Company: Crestone Peak Resources Operating LLC

Well: Herren 1G-33H-H367

Field: Wattenberg

County: Weld State: Colorado

Isolation Scanner
Cement Evaluation
Gamma Ray - CCL Log

Cement Evaluation

Gamma Ray - CCL Log

Location:		SENE 33-3N-67W		Elev.:	K.B.	4872.00 ft
		2292 FNL 404 FEL			G.L.	4849.00 ft
					D.F.	4872.00 ft
Permanent Datum:		Ground Level		Elev.:	4849.00 f	
Log Measured From:		Kelly Bushing		23.00 ft	above Perm.Datum	
Drilling Measured From:		Kelly Bushing				
API Serial No.	Section:	Township:	Range:			
05-123-47731	33	3N	67W			

Logging Date	21-Jan-2019
Run Number	
Depth Driller	11921.00 ft
Schlumberger Depth	6314.00 ft
Bottom Log Interval	6310.00 ft
Top Log Interval	87.00 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	1997.00 ft
To	11921.00 ft
Casing/Tubing Size	5.5 in
Weight	20 lbm/ft
Grade	N/A
From	0.00 ft
To	11915.00 ft
Max Recorded Temperatures	180 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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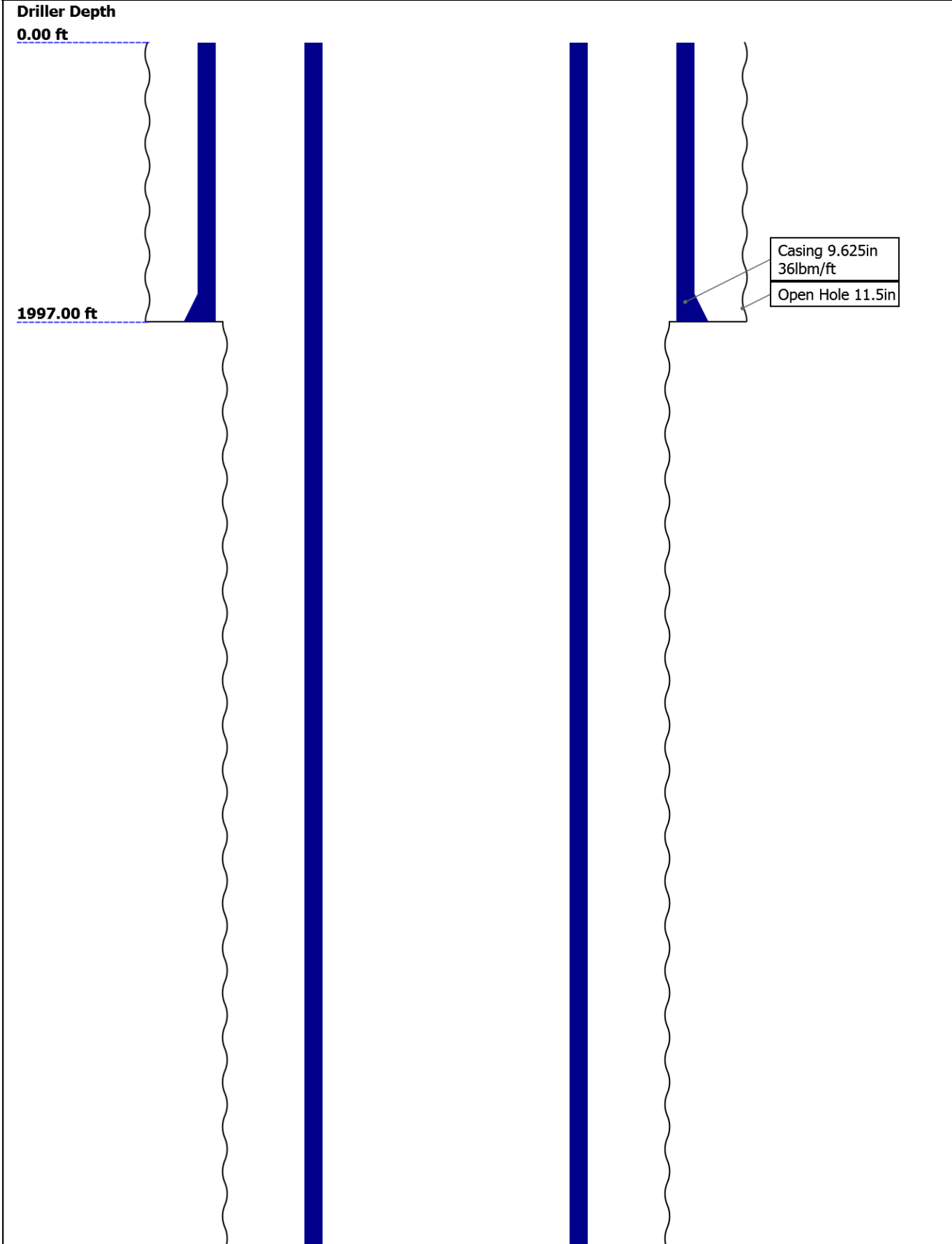
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- 12. Run 1 IBC SLG Repeat

Well Sketch



11915.00 ft

11921.00 ft

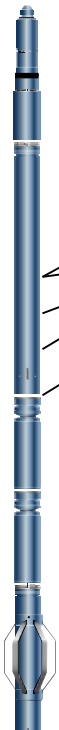
Casing 5.5in
20lbm/ft

Open Hole 8.5in

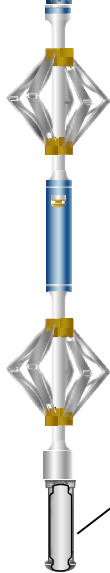
Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	11.5	8.5				
Top Driller (ft)	0	1997				
Top Logger (ft)	0	1997				
Bottom Driller (ft)	1997	11921				
Bottom Logger (ft)	1997	11921				
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)	1997	11915				
Bottom Logger (ft)	1997	11915				

Remarks and Equipment Summary

Run 1: Toolstring			Run 1: 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:92</div><div>93</div><div>EDTG-A:7</div><div>9146</div><div>EDTC-B:89</div><div>62</div></div><div><div>AH-184[2]:2765</div><div>AH-184[1]:2826</div><div>USIT-E:9016.74</div><div>0</div><div>ECH-MFA:</div><div>1818</div><div>USAC-A:9</div><div>00</div><div>USIT-A:20</div></div></div> <div></div>	MP nameOffset		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 Sen 0.84
sor
Head Te
nsion
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

Run 1

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	

Run 1:Depth Control Parameters

Log Sequence	First Log In the Well
Rig Up Length At Surface	
Rig Up Length At Bottom	
Rig Up Length Correction	

Depth Control Remarks

All standard Schlumberger depth controls and procedures followed.
IDW used as primary depth control device.
Z-chart used as secondary depth control device.
All logs correlated to down pass.

Stretch Correction3.15 ft

Tool Zero Check At Surface

USIT - Fluid Properties Measurement

Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Run 1	Log[5]:Up	6314.52	87.29

Fluid Velocity = "Automatic".
CFVL equals DFSL channel

Start Depth(ft)	Stop Depth(ft)	Start Value(us/ft)	End Value(us/ft)
-----------------	----------------	--------------------	------------------

Mud Impedance = "FreePipe Norm."
Free Pipe normalization zone is : 400.01m(1312.35ft) to 405.36m(1329.94ft)
MUD_N_FRP = 1.41
DFD = 1.01g/cm3(8.40lbm/gal)
CZMD median computed in free pipe normalization interval = 2.05 MRayl

Start Depth(ft)	Stop Depth(ft)	Start Value(Mrayl)	End Value(Mrayl)
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Run 1

IBC SLG

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
Run 1	Log[5]:Up	Up	87.29 ft	6314.52 ft	21-Jan-2019 12:22:21 PM	21-Jan-2019 1:48:39 PM	ON	3.15 ft	Yes

All depths are referenced to toolstring zero

Log	Company:Crestone Peak Resources Operating LLCWell:Herren 1G-33H-H367Run 1: Log[5]:Up:S012
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Description: USI IBC SLGFormat: Log (IBC SLG)Index Scale: 5 in per 100 ftIndex Unit: ftIndex Type: Measured DepthCreation Date: 21-Jan-2019 15:39:17

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

Casing Collar Locator Ultrasonic (CCLU) USIT-E

-20 in 20

Amplitude of Eccentering (ECCE) USIT-E

0 in 0.5

Motor Revolution Speed (RSAV) USIT-E

Absent1.5003.500

Explicit Normalization

USIT - USIT

Processing Flags (UFLG) USIT-E

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

15

Gamma Ray (ECGR_EDTC) EDTC-B

0.0001500

Absent-5.200-3.600-2.000-0.400

Explicit Normalization

USIT - Amplitude of Wave (AWBK) USIT-E

Absent1.5003.5005.5007.500

Custom Normalization

USIT - Acoustic Impedance (AIBK) USIT-E

Absent42.00066.00090.000114.000

Custom Normalization

USIT - Flexural Attenuation (UFAK) USIT-E

Absent0.5001.5002.5003.500

Explicit Normalization

USIT - Solid Liquid Gas Sorted Color Map (USLP)

SLG Solid Index

SLG Liquid Index

SLG Gas Index

SLG White

Acoustic Impedance Minimum (AIMN) USIT-E

-1 Mrayl9

Acoustic Impedance Average (AIAV) USIT-E

-1 Mrayl9

Acoustic Impedance Maximum (AIMX) USIT-E

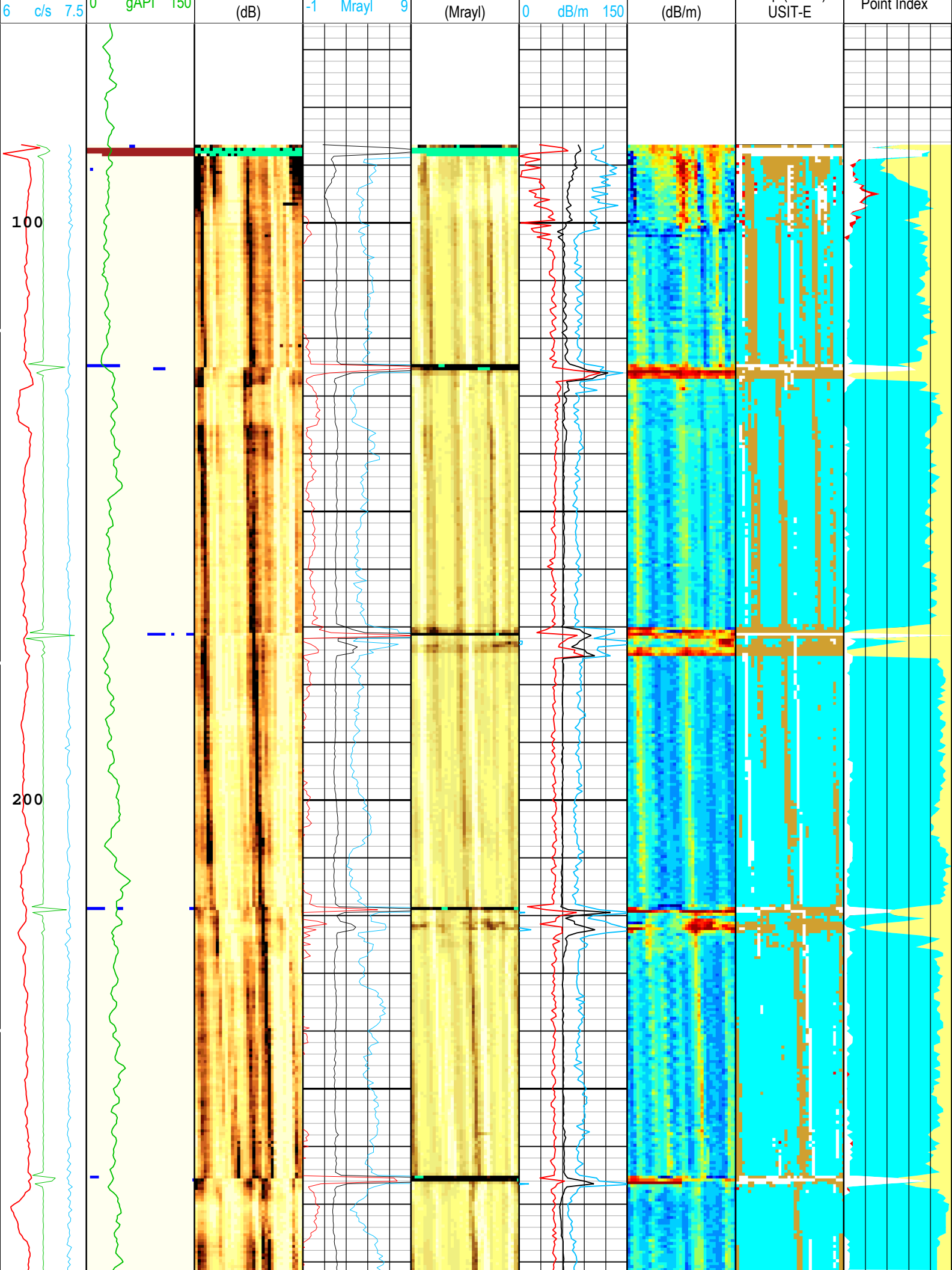
Minimum Flexural Attenuation (U-USIT_UFAN) USIT-E

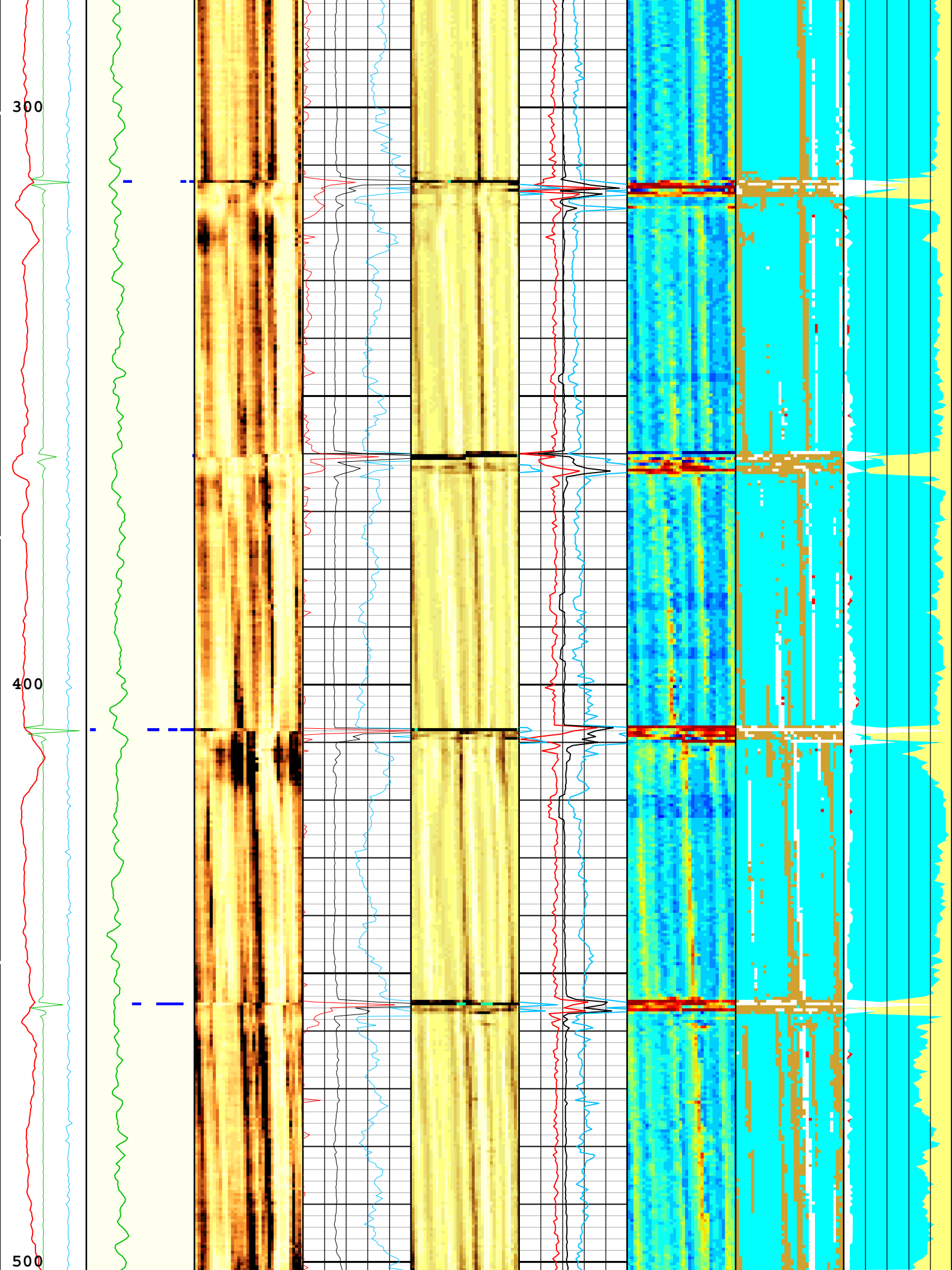
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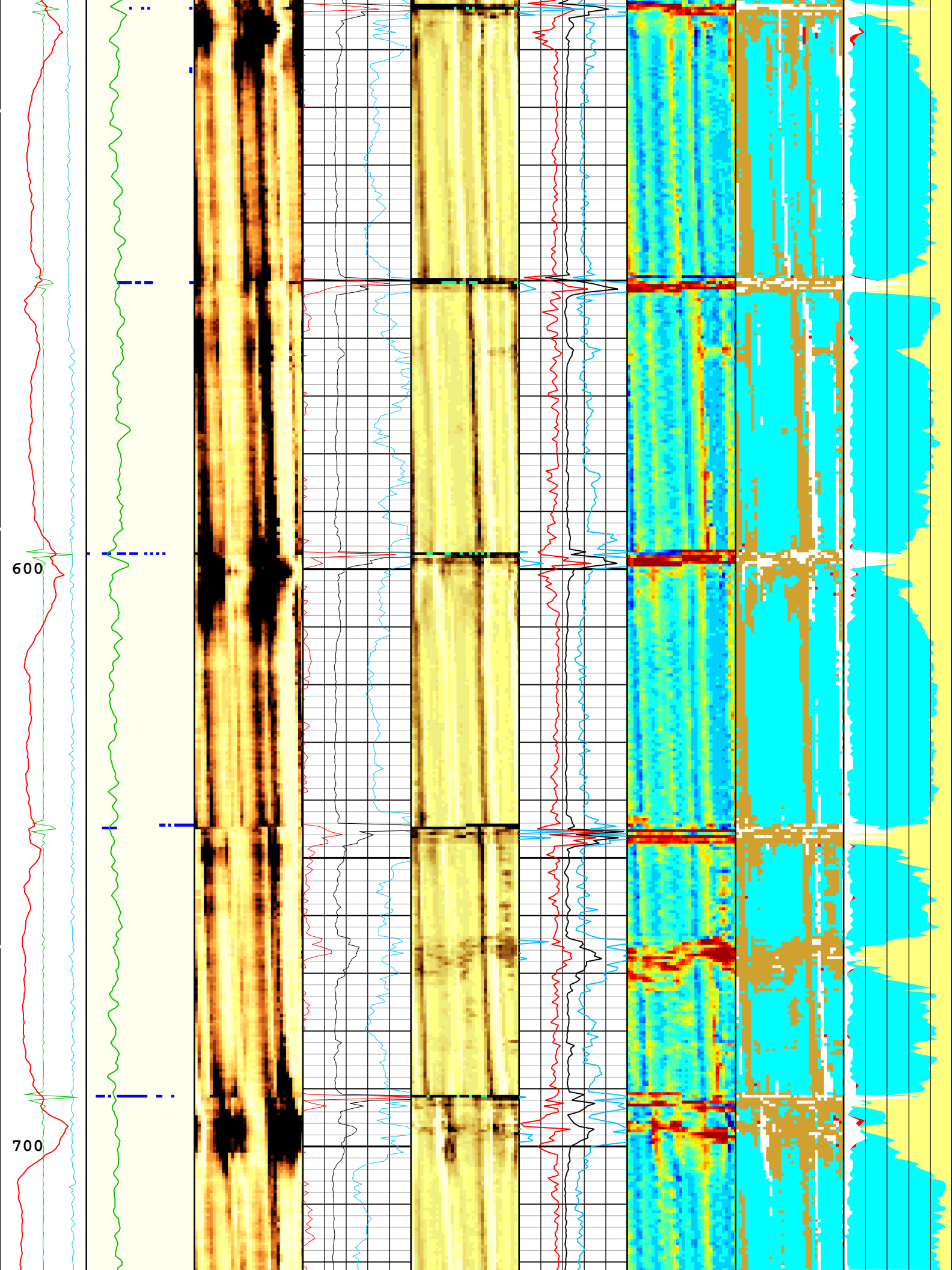
Average Flexural Attenuation (U-USIT_UFAV) USIT-E

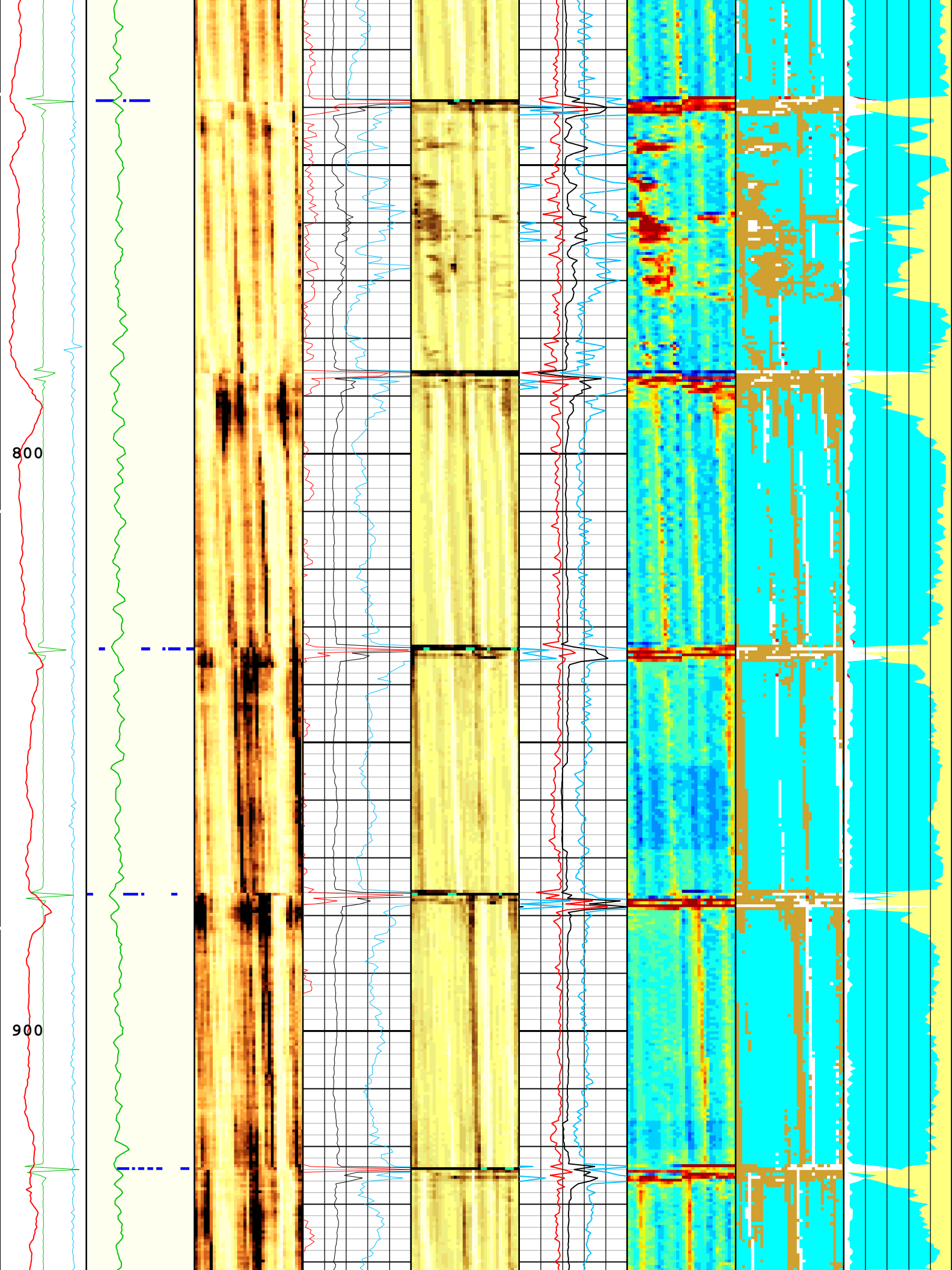
0 dB/m150

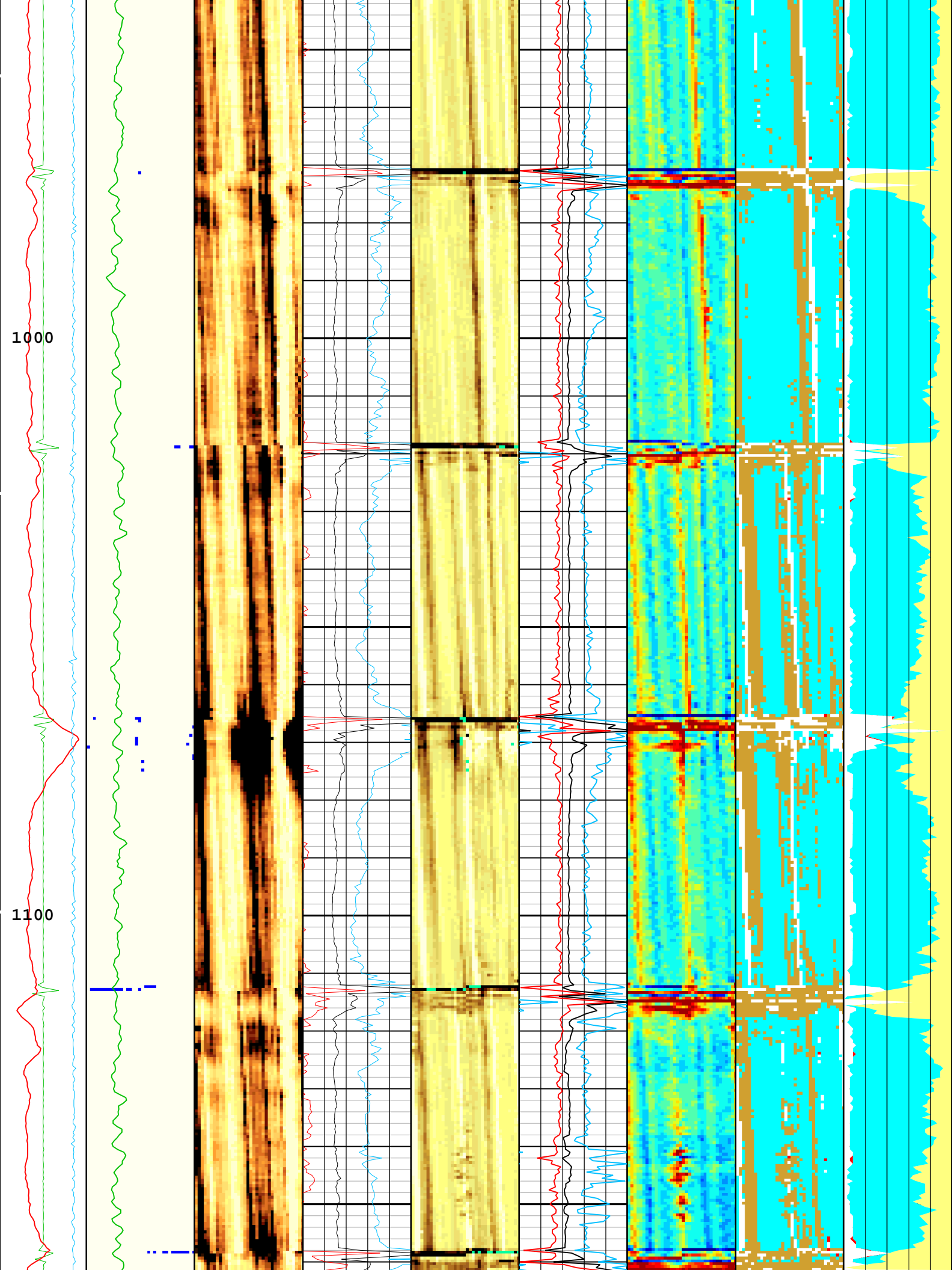
Maximum Flexural Attenuation (U-USIT_UFAX) USIT-E

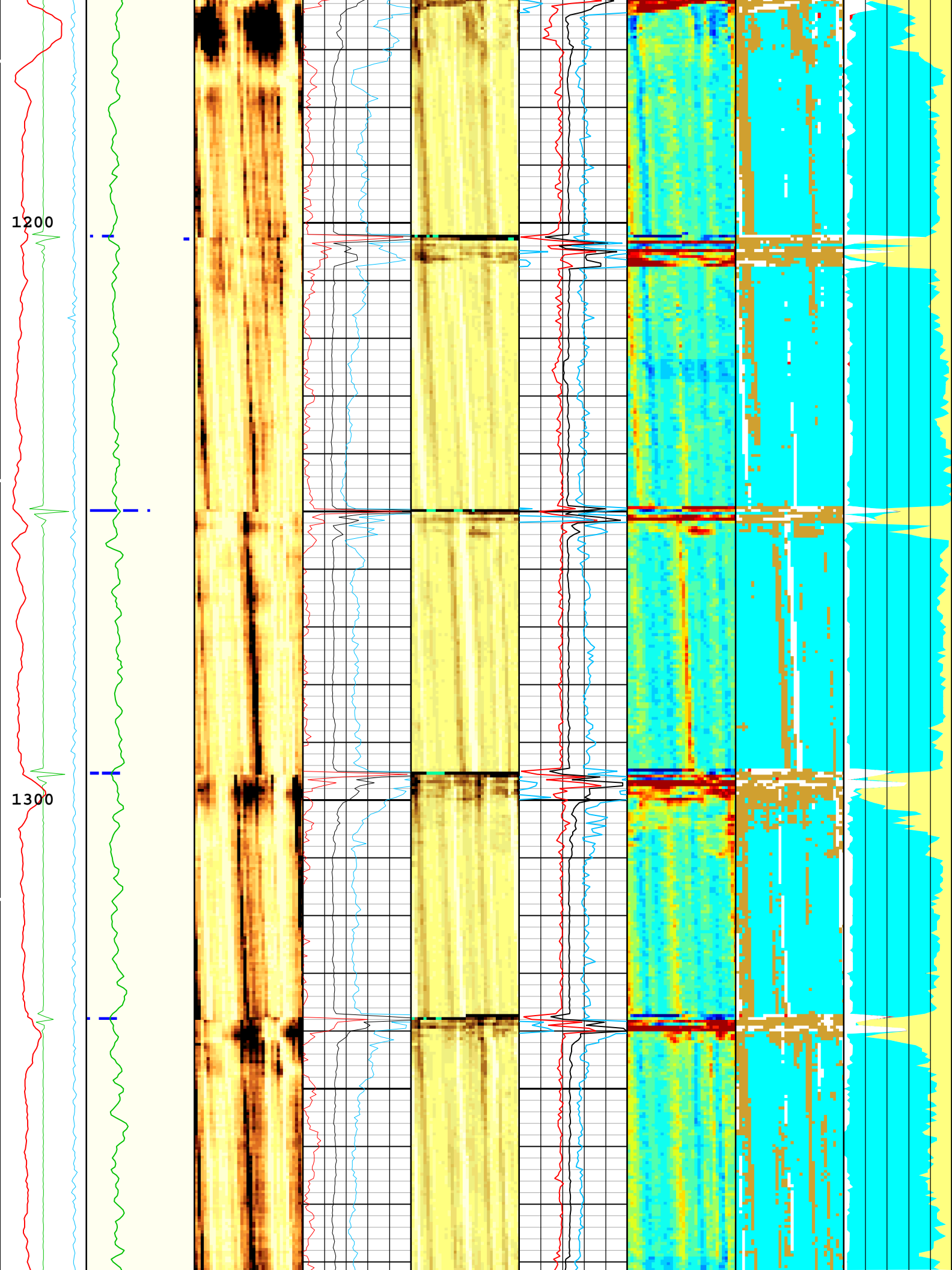


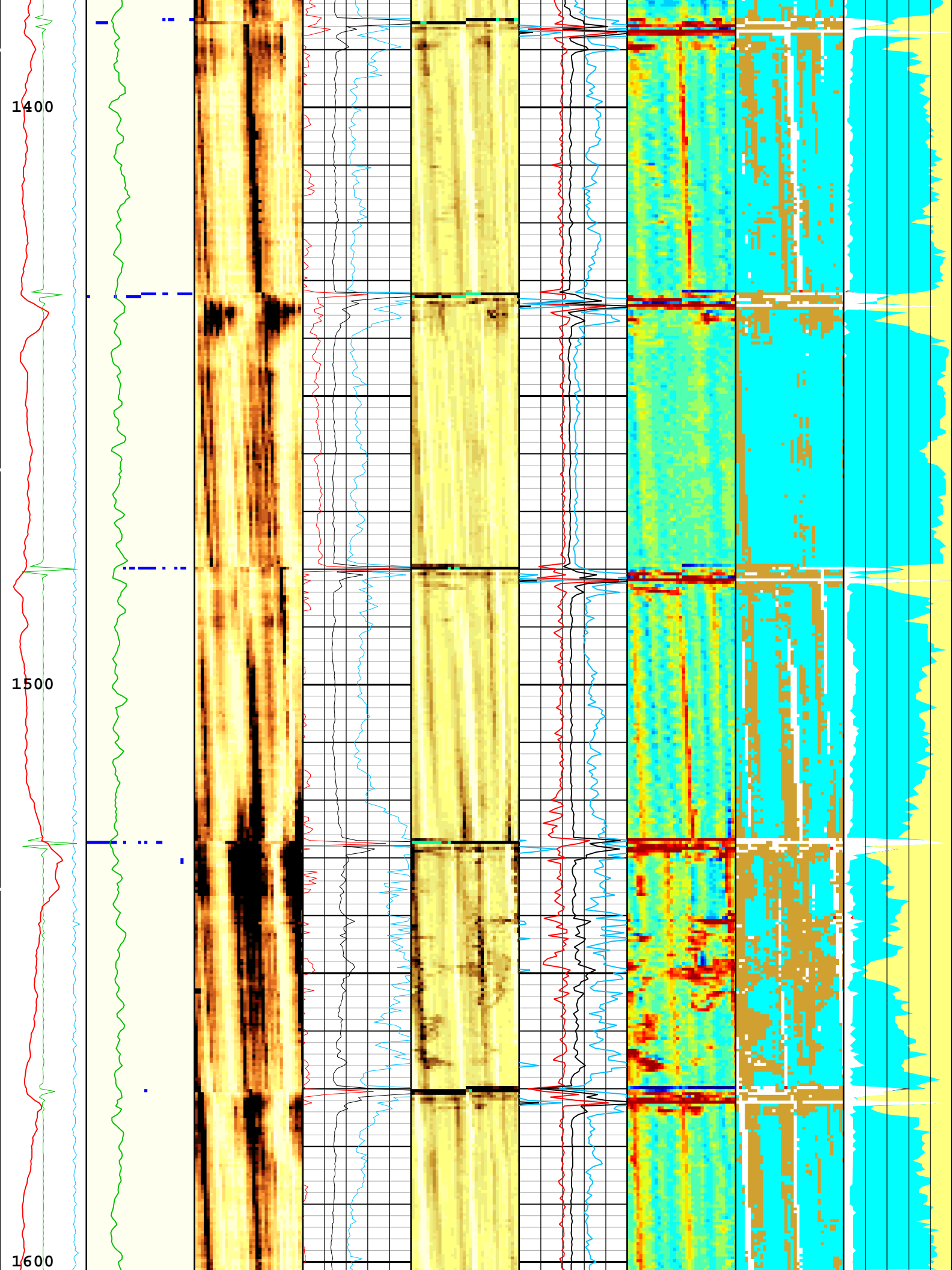


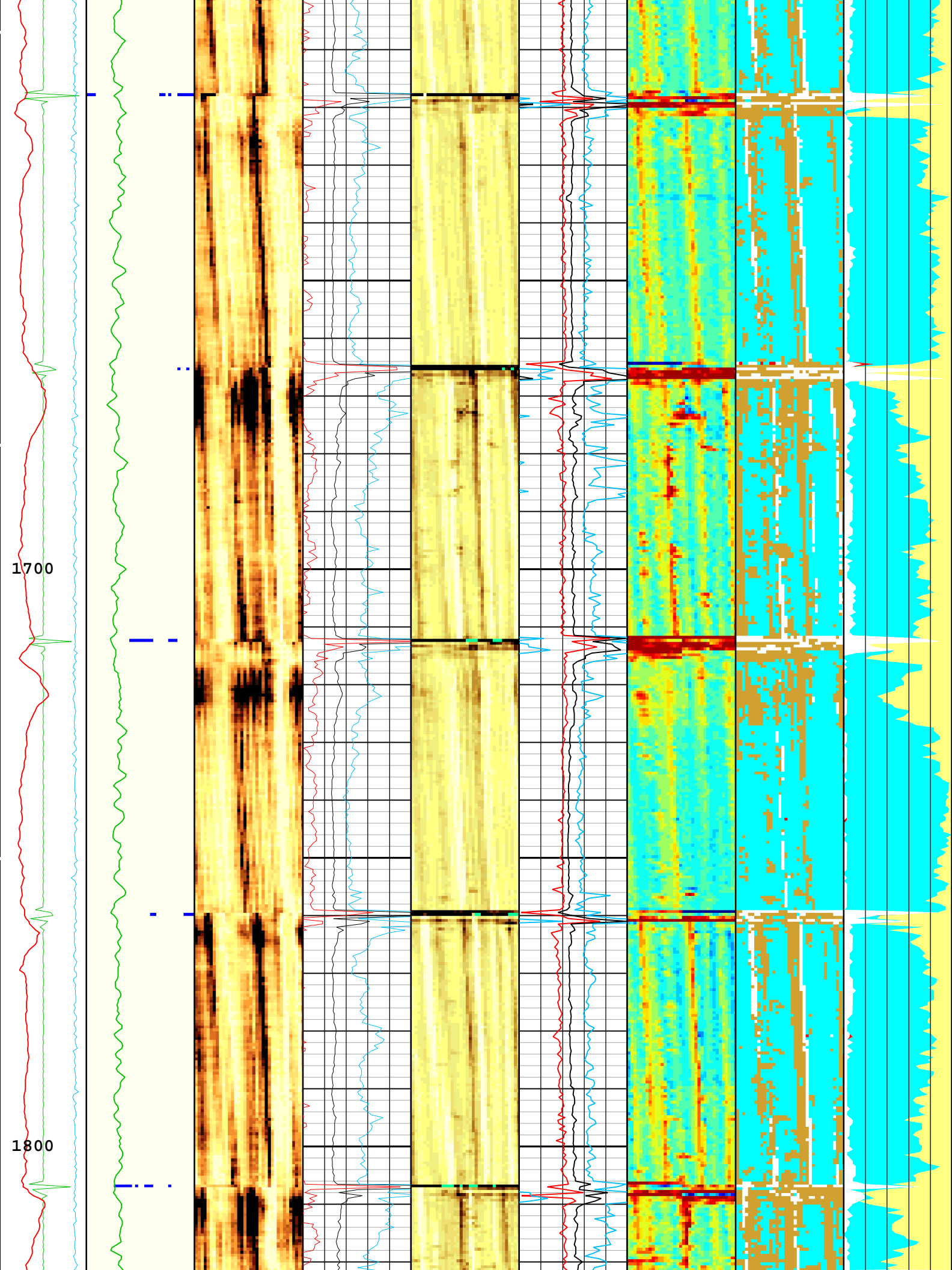


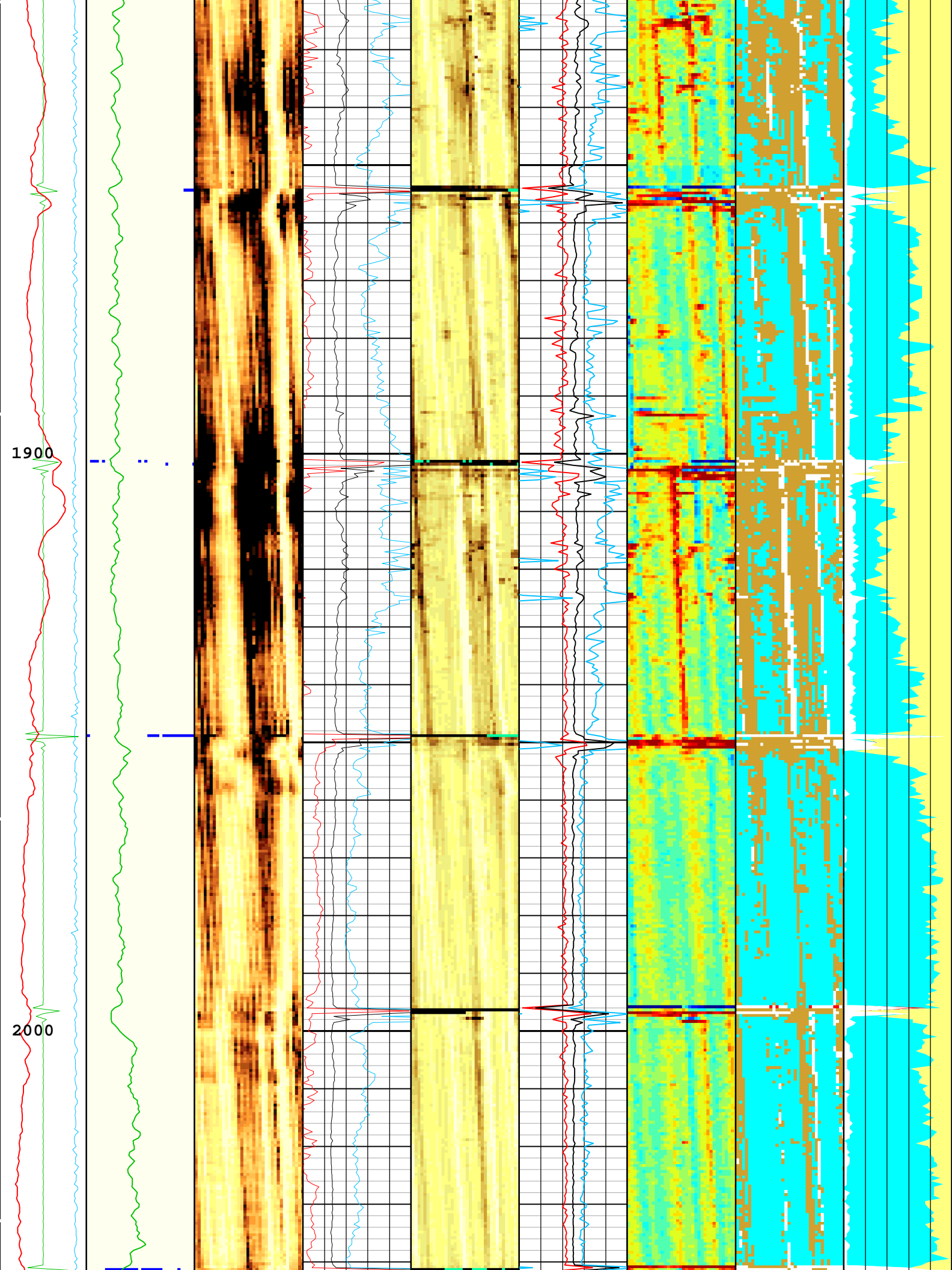


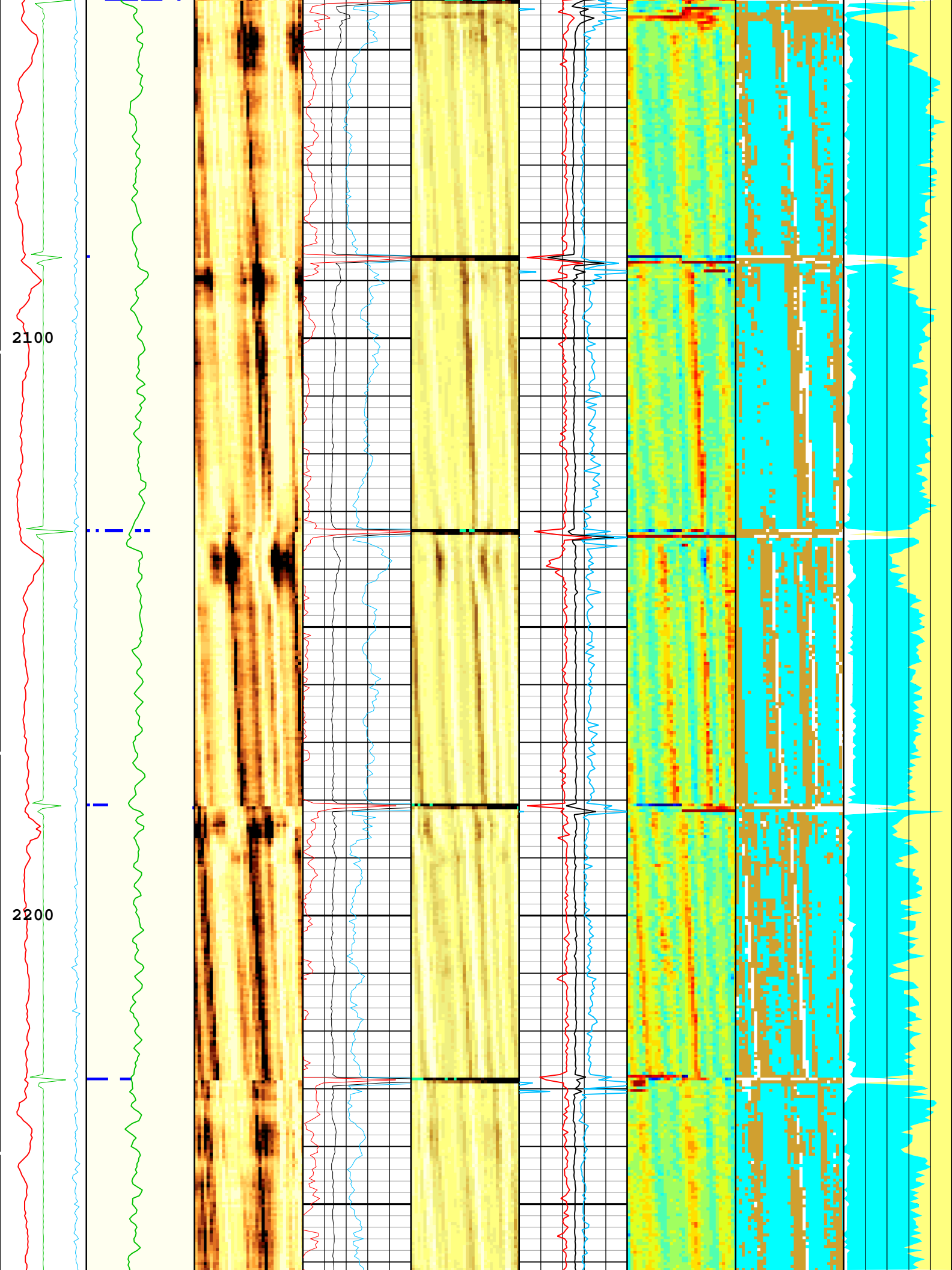


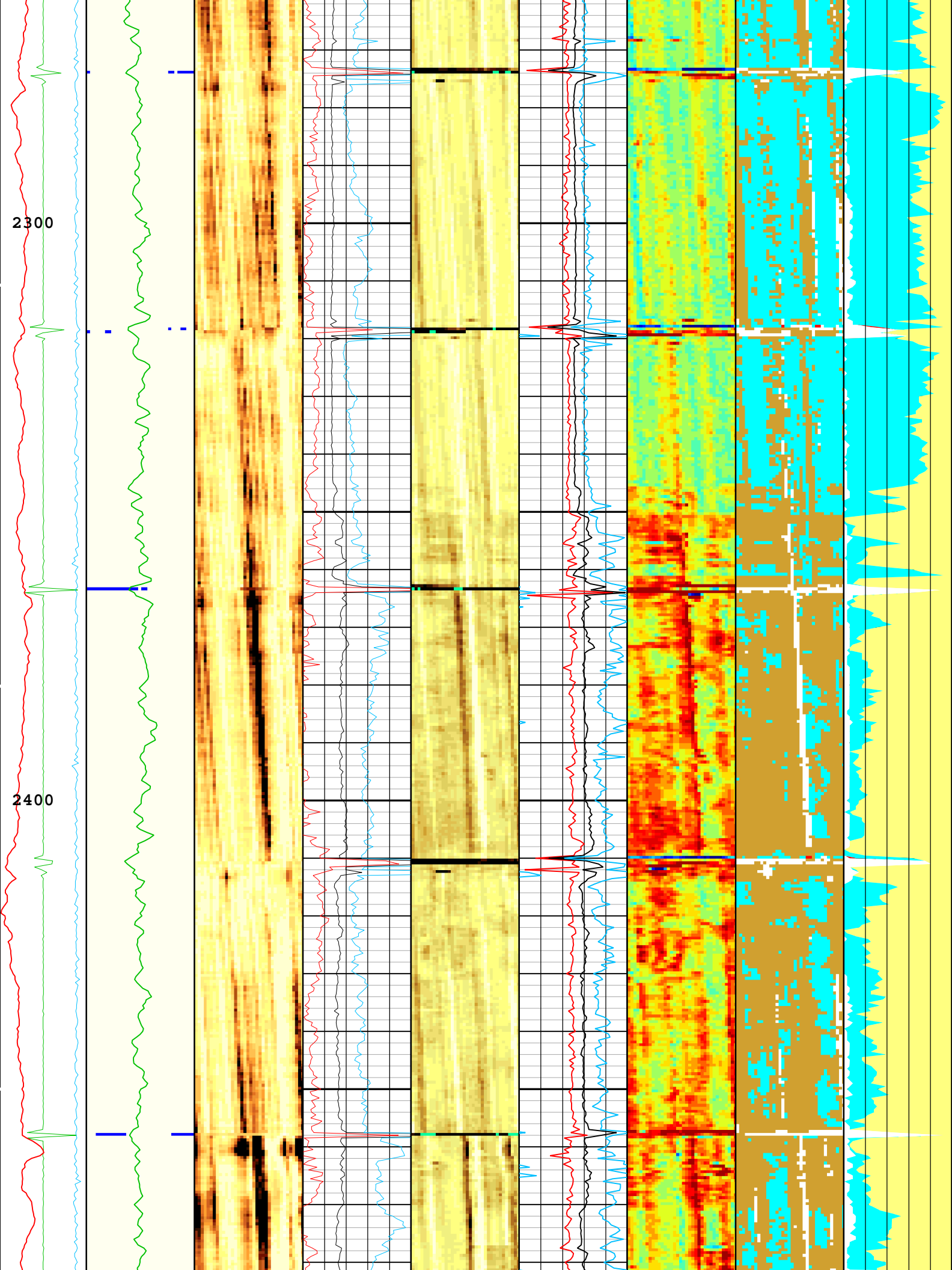


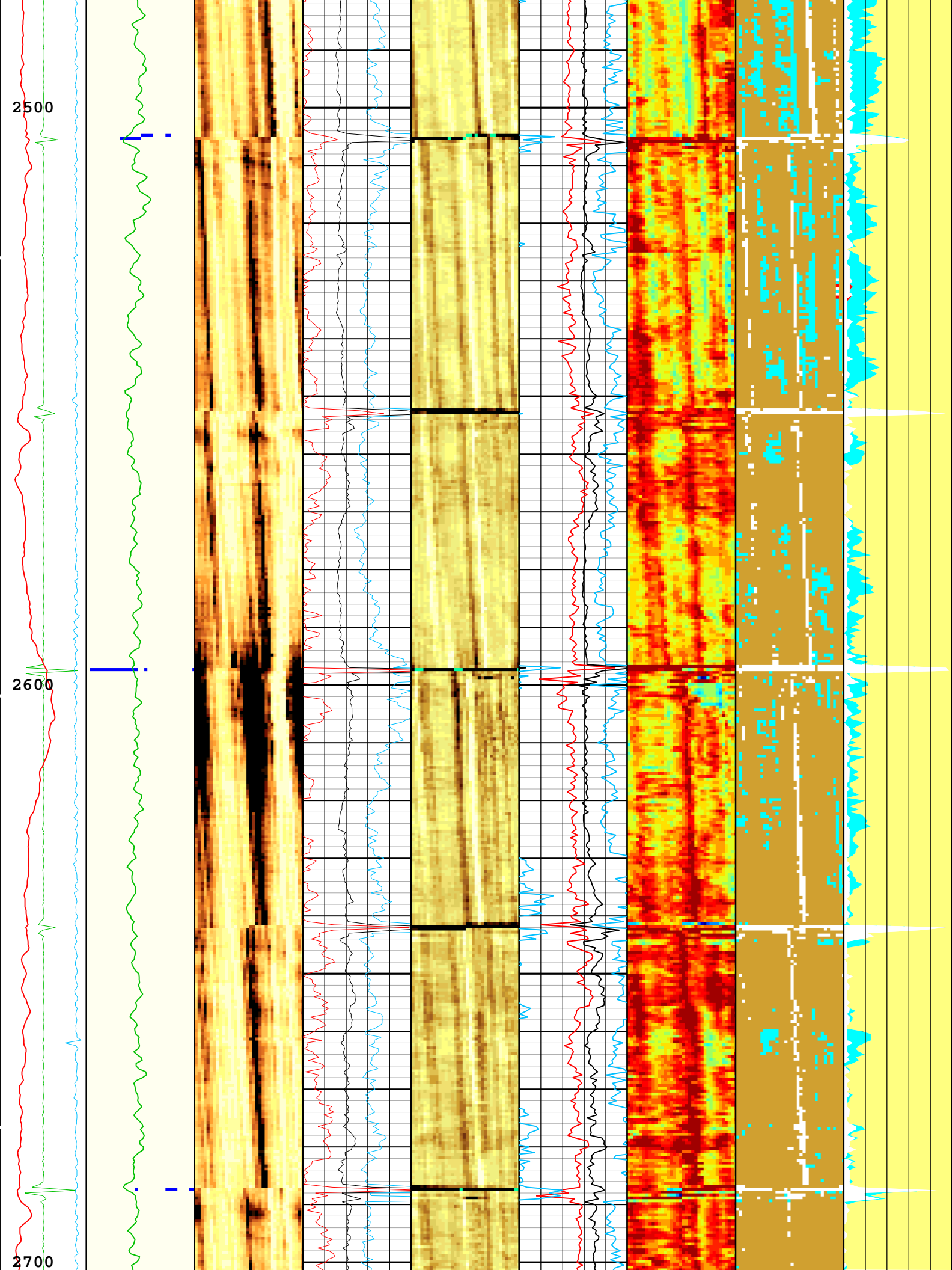


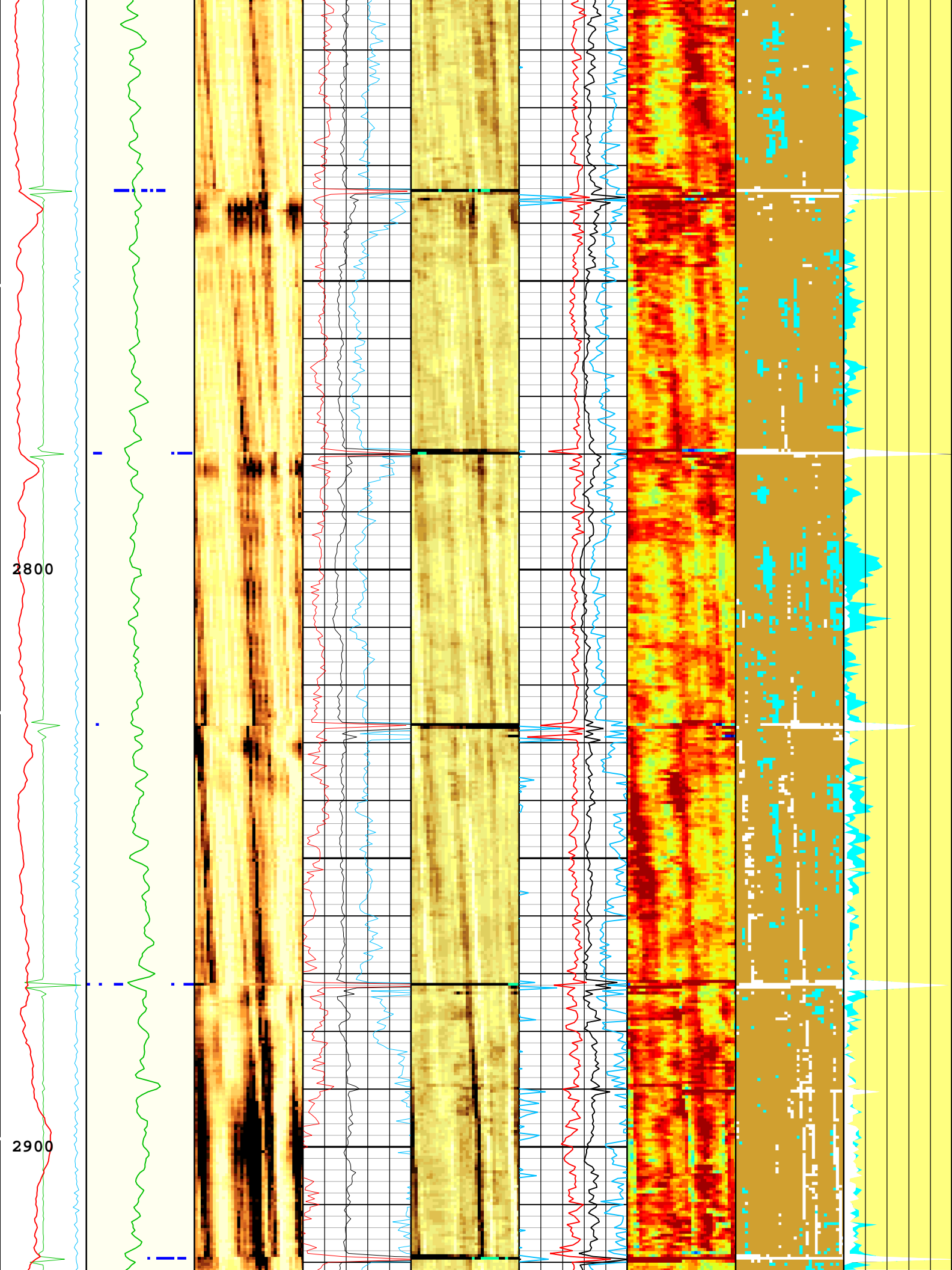


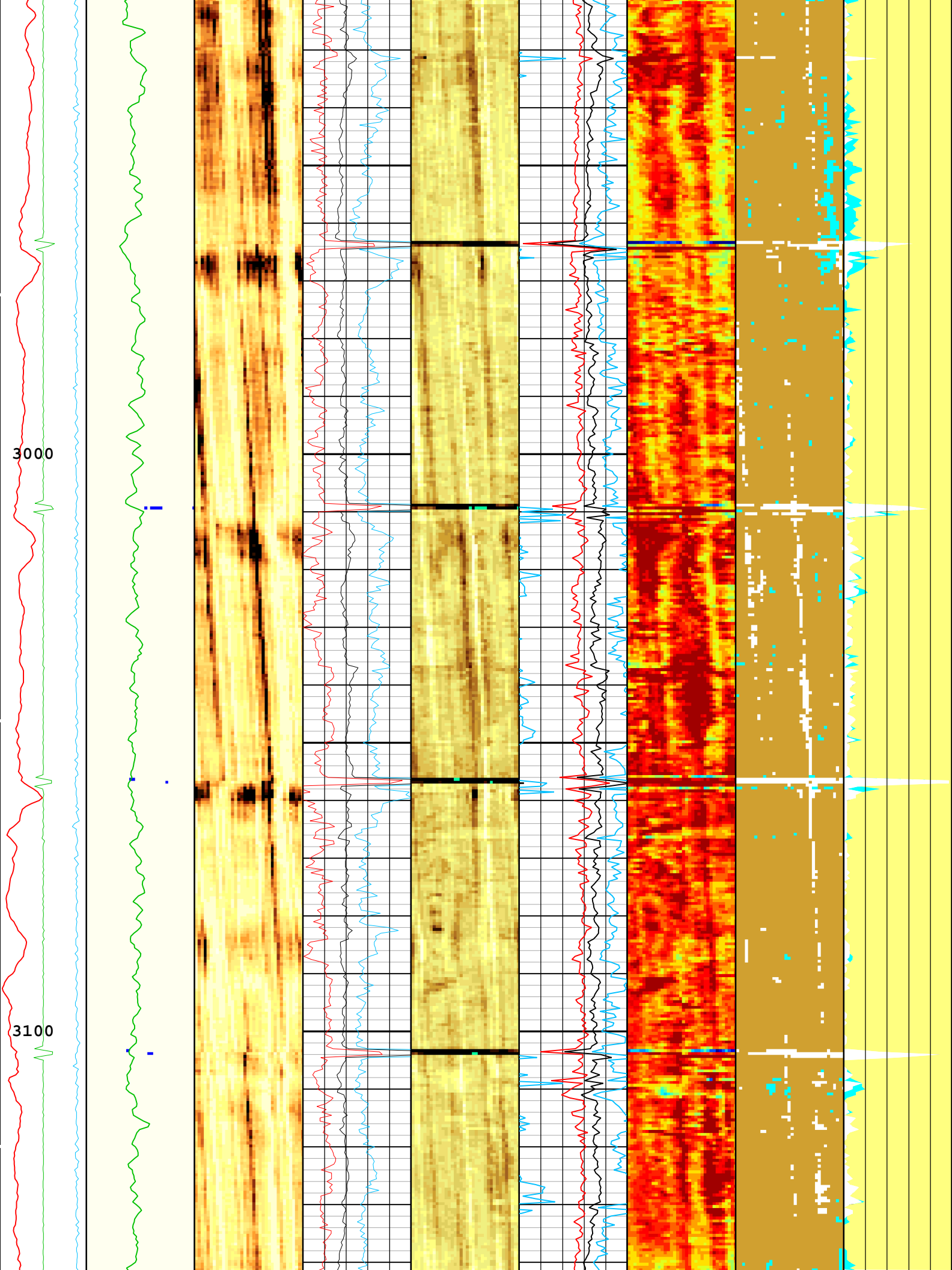


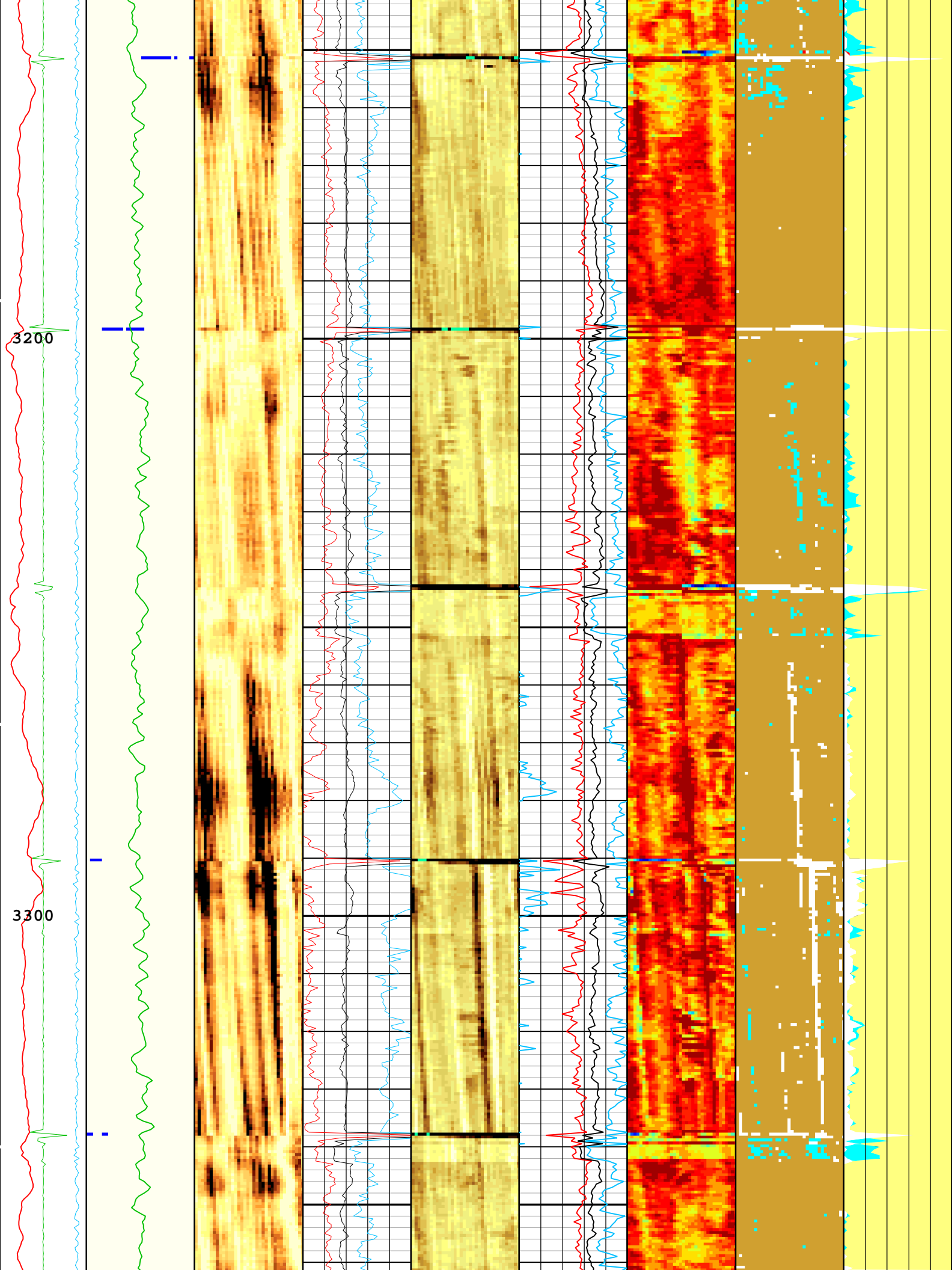


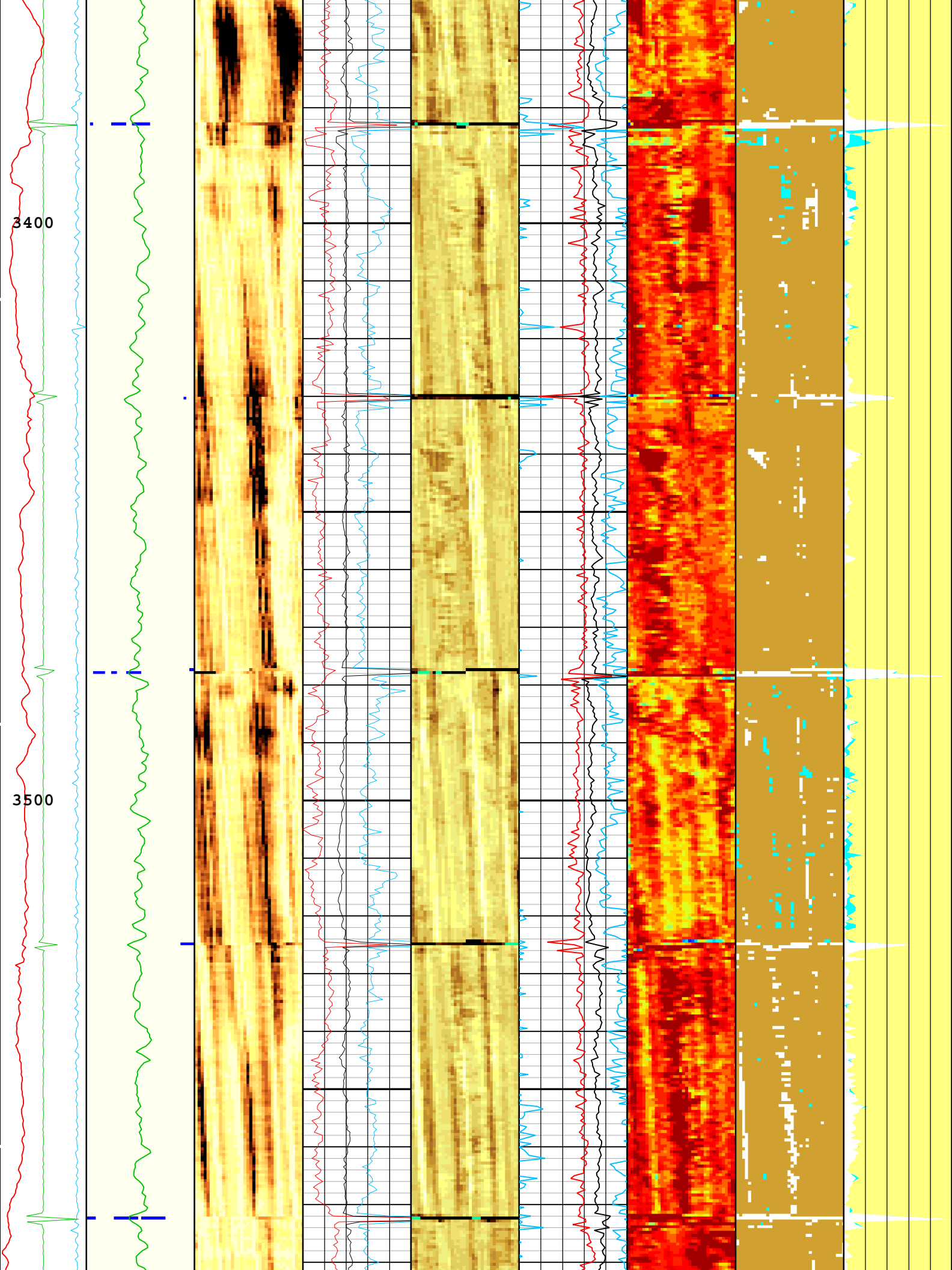


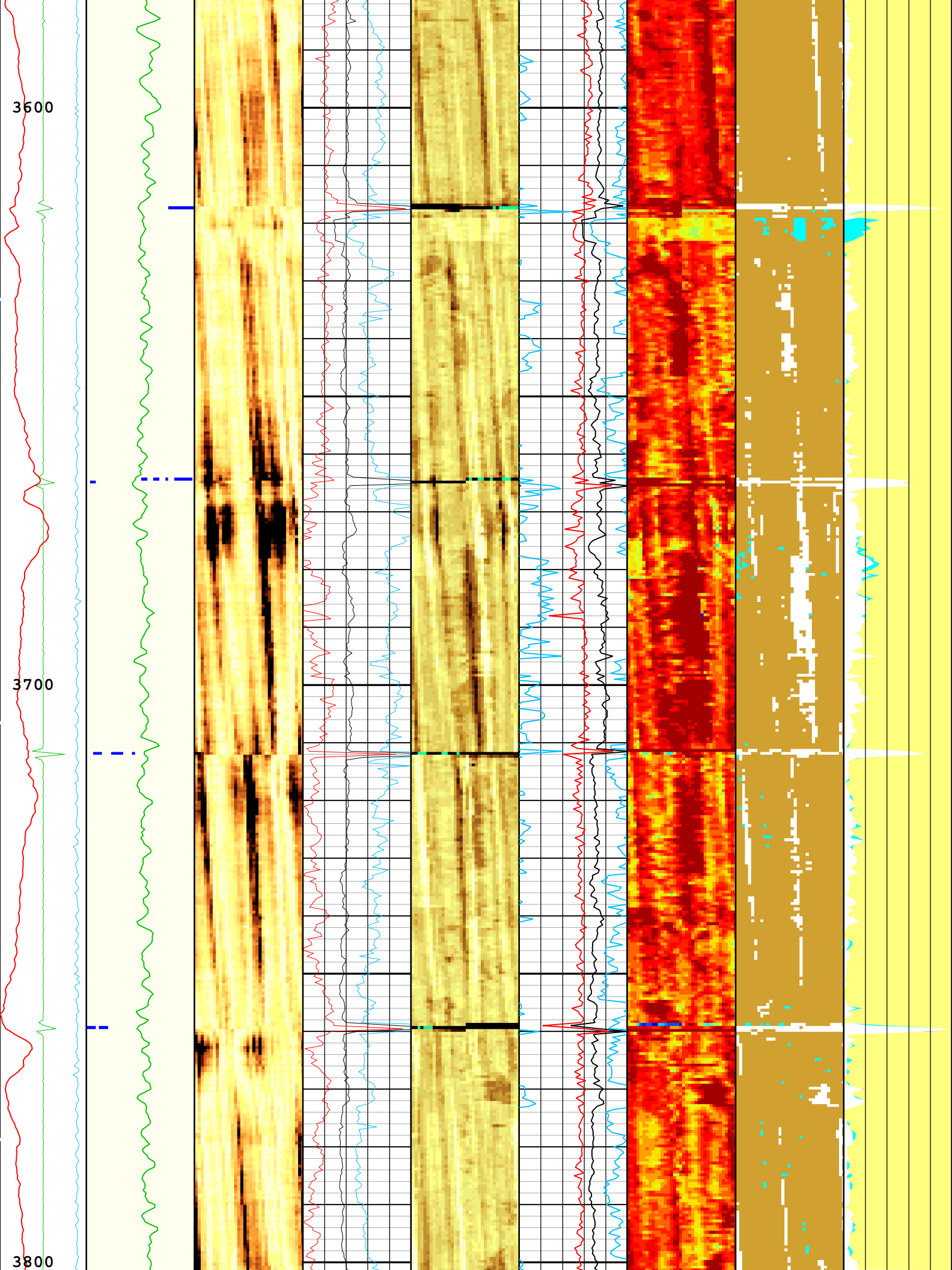


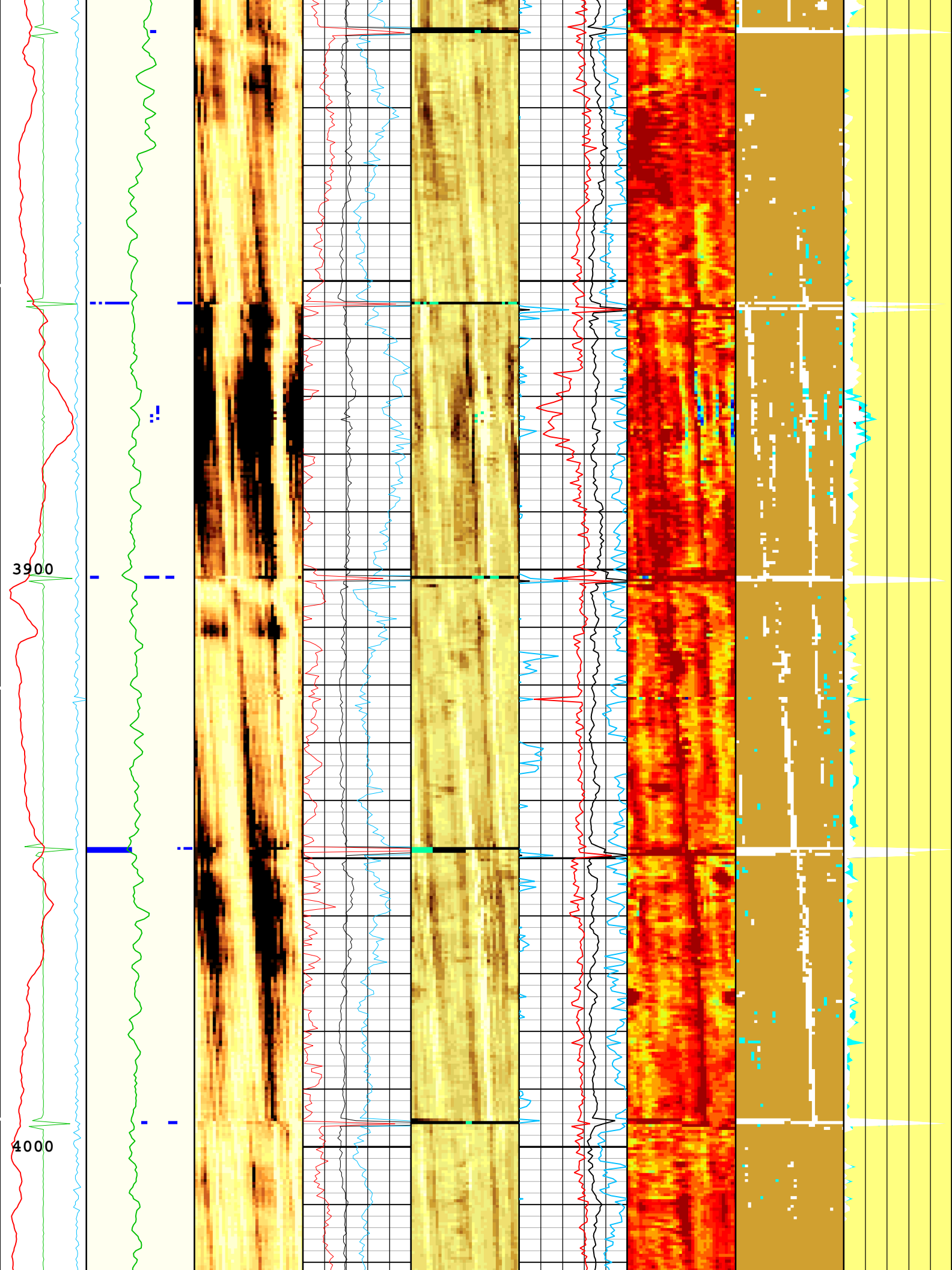


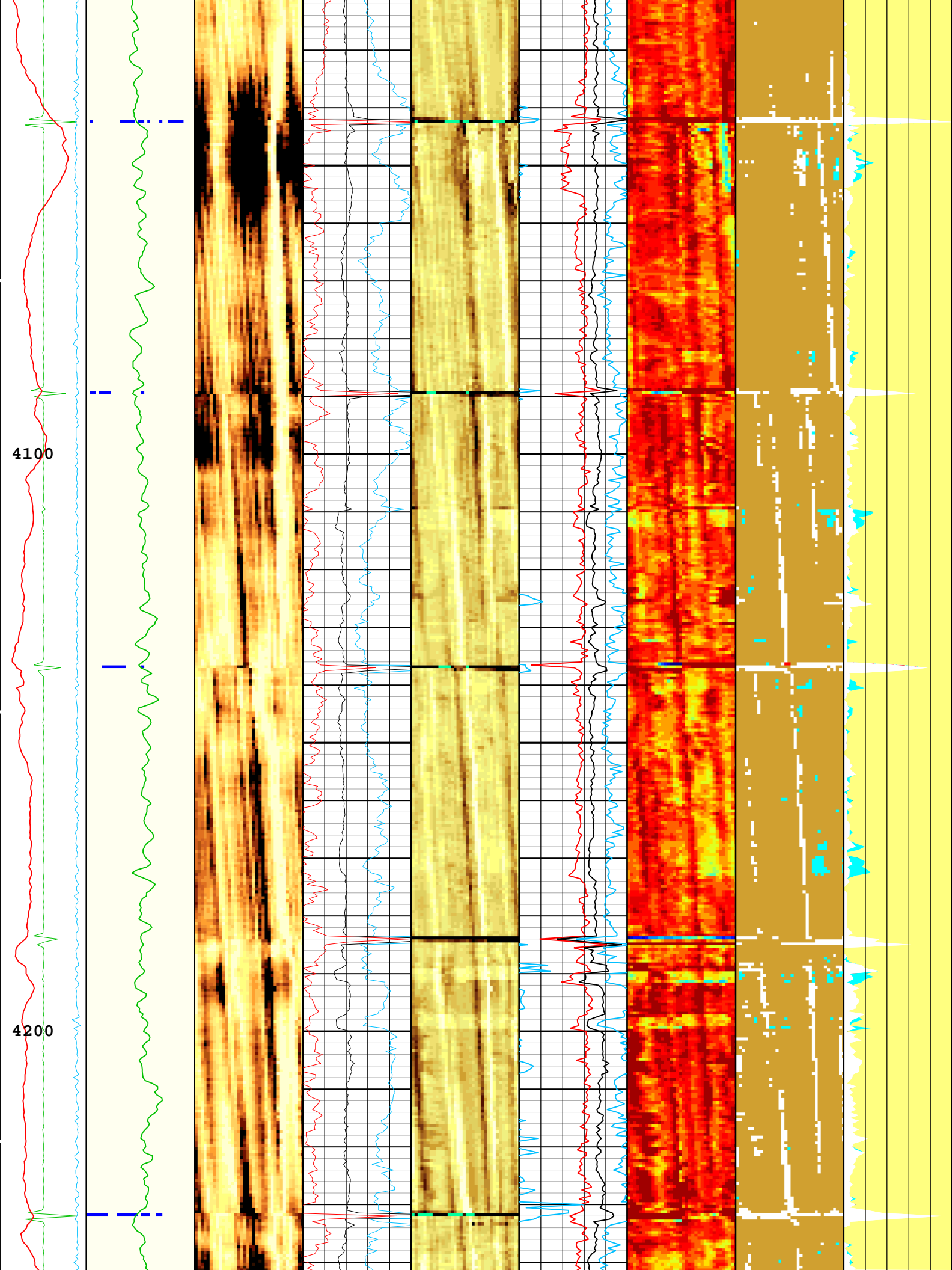


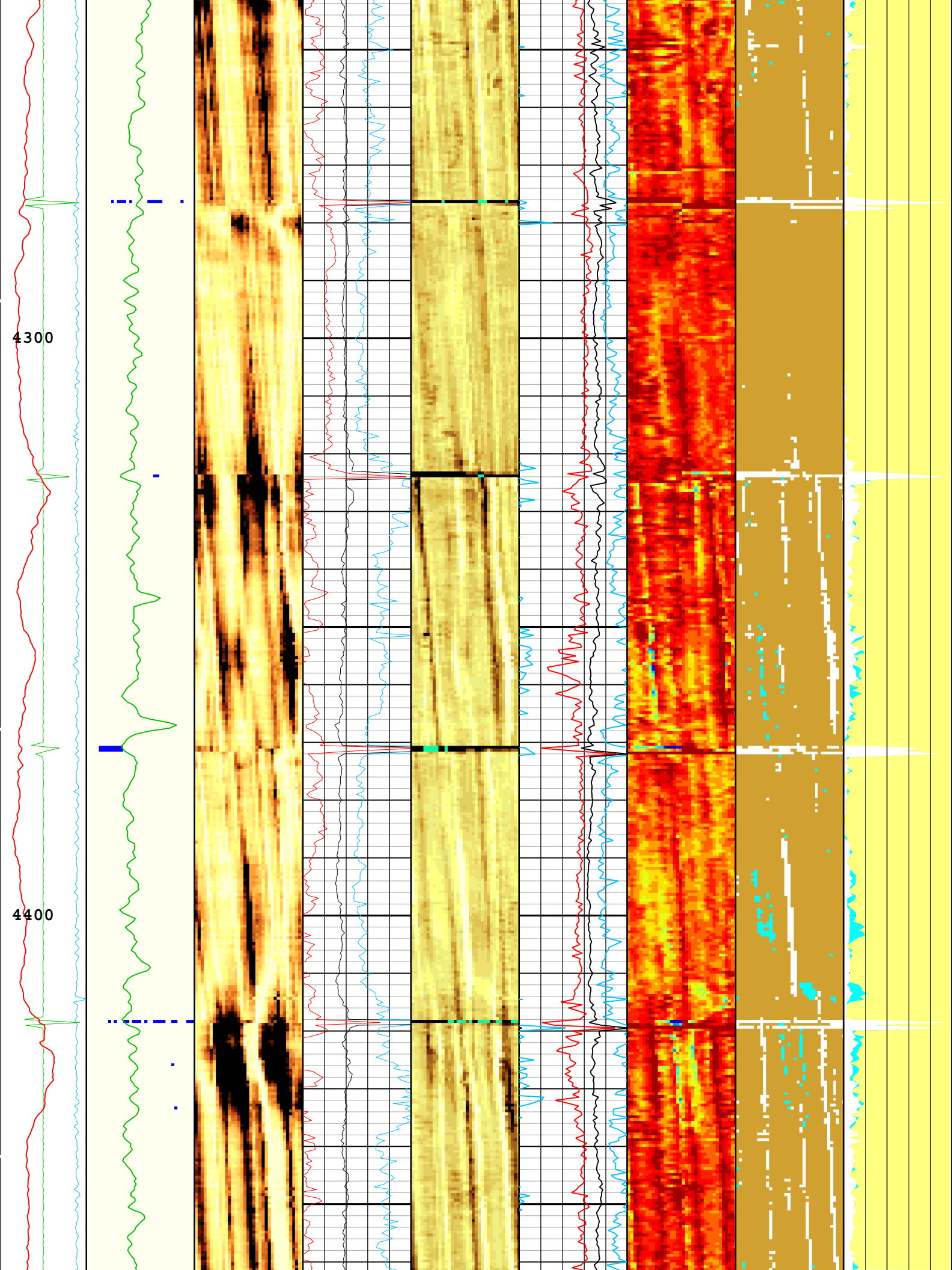


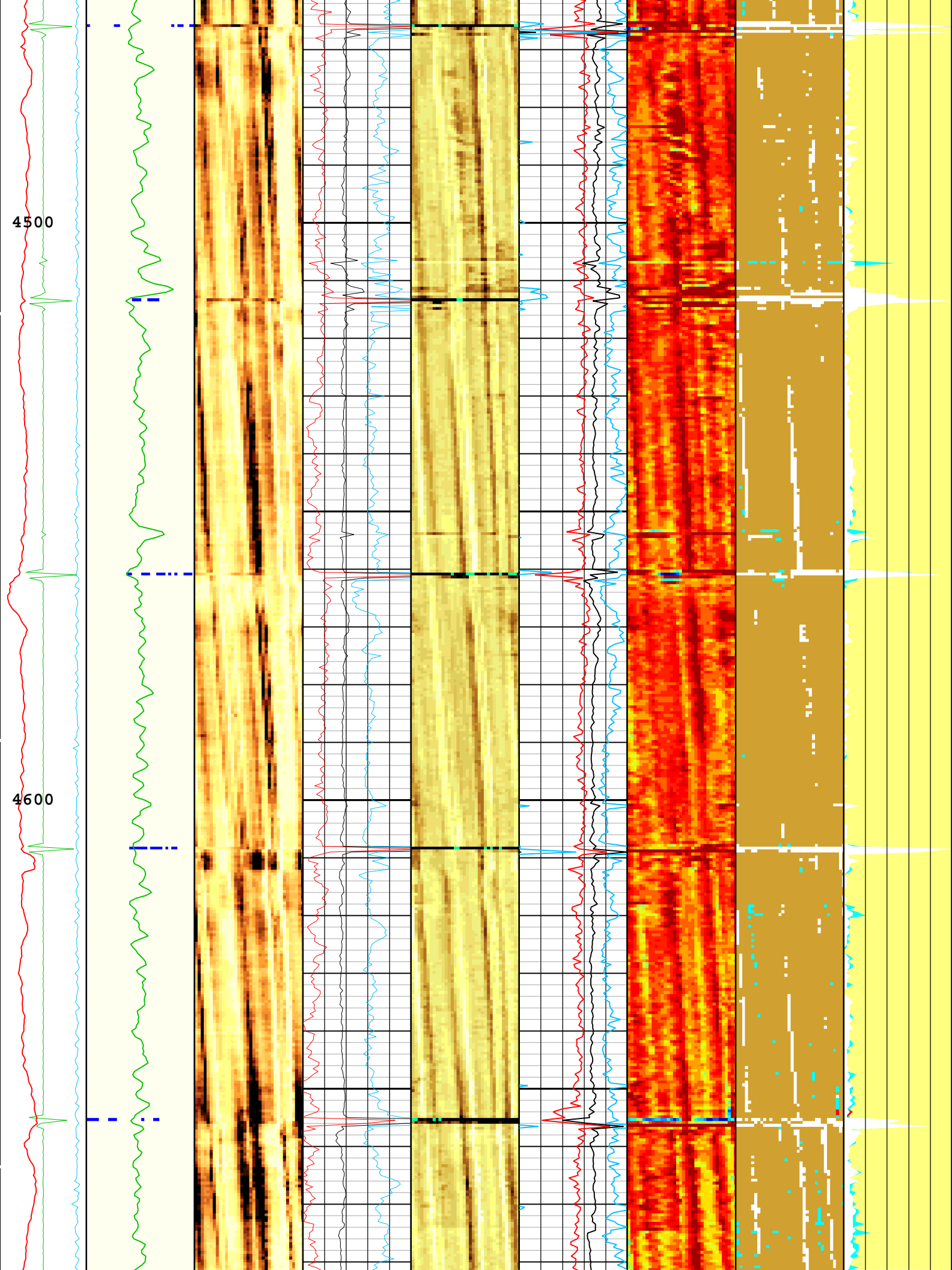


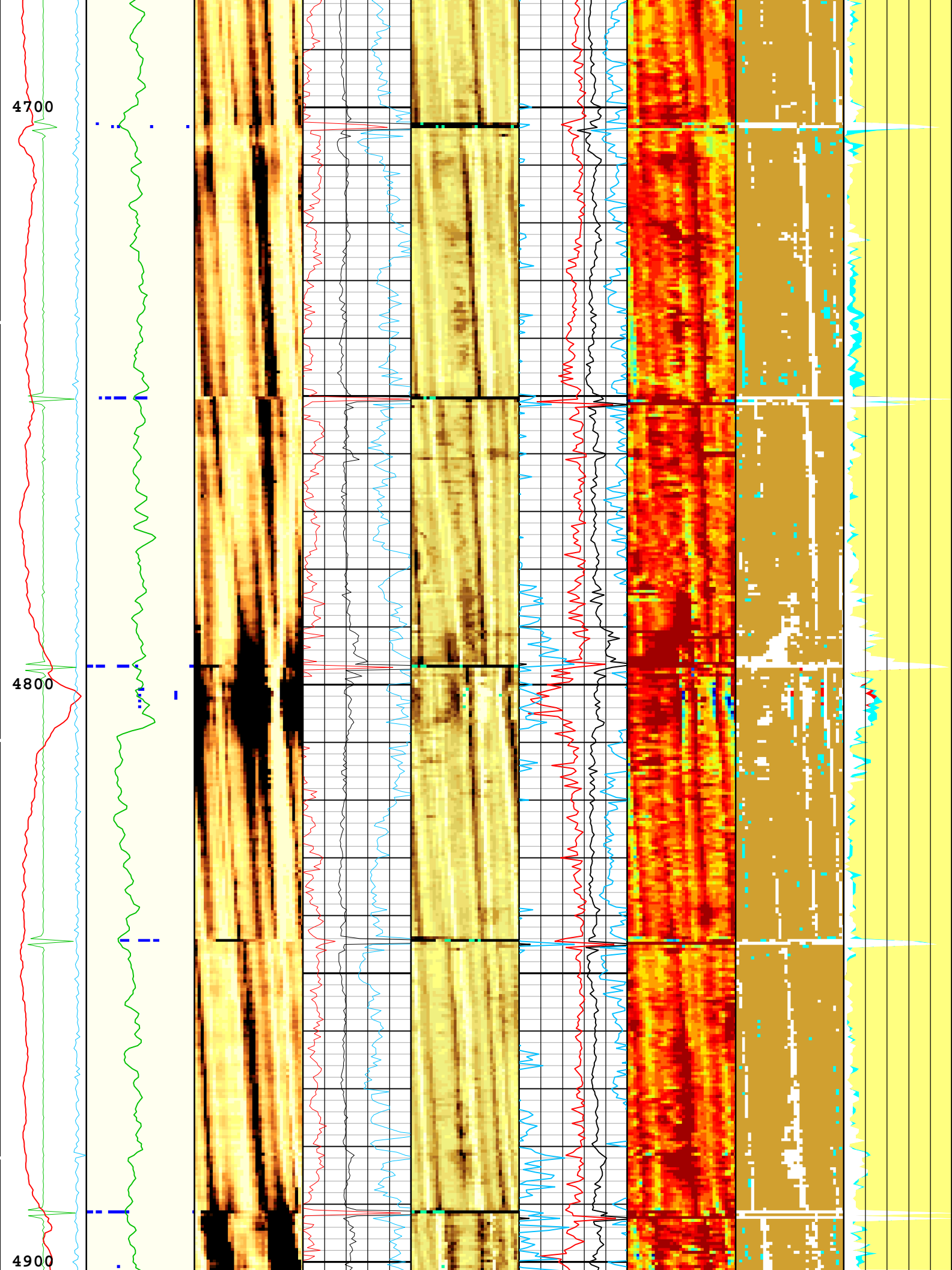


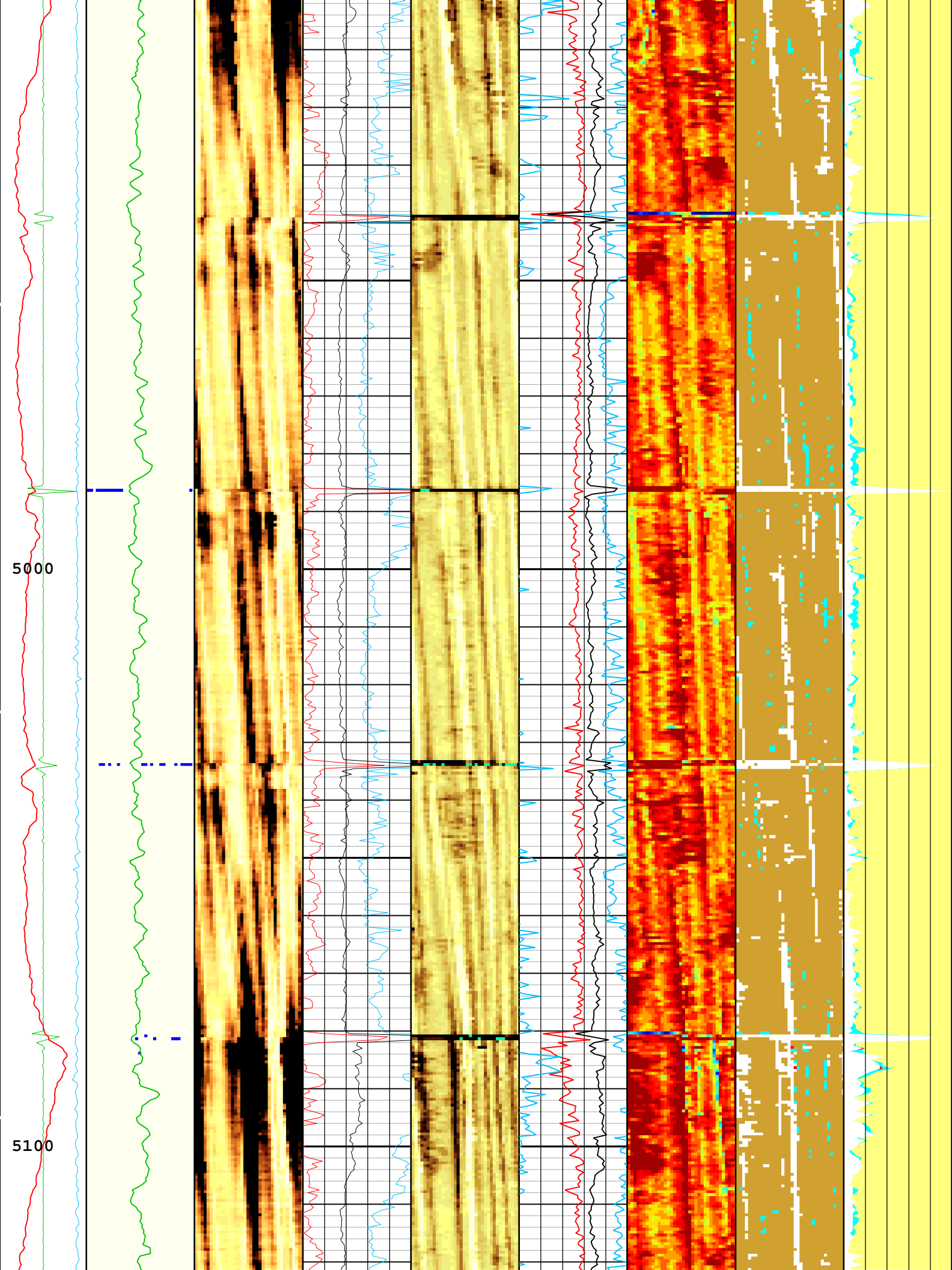


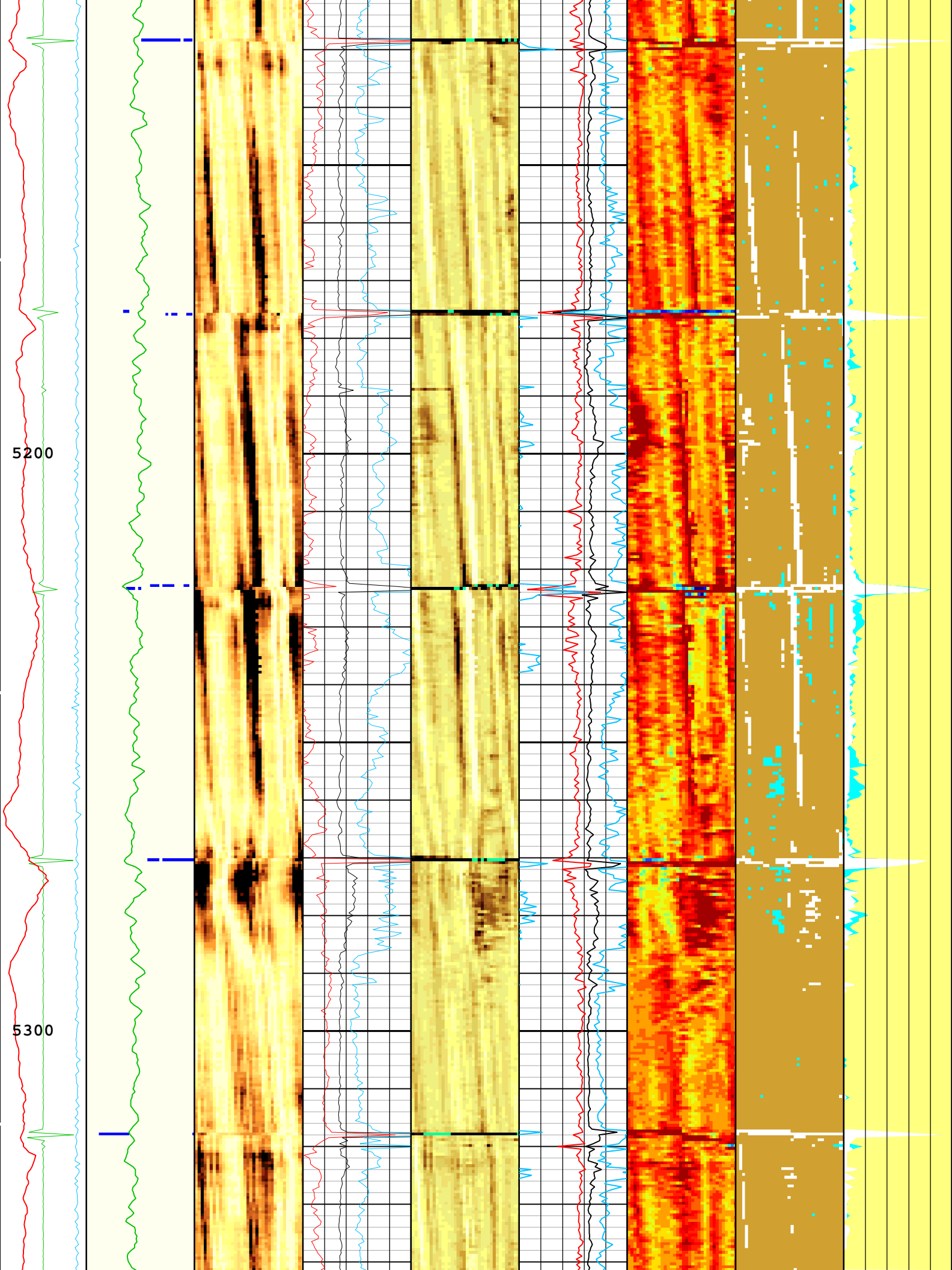


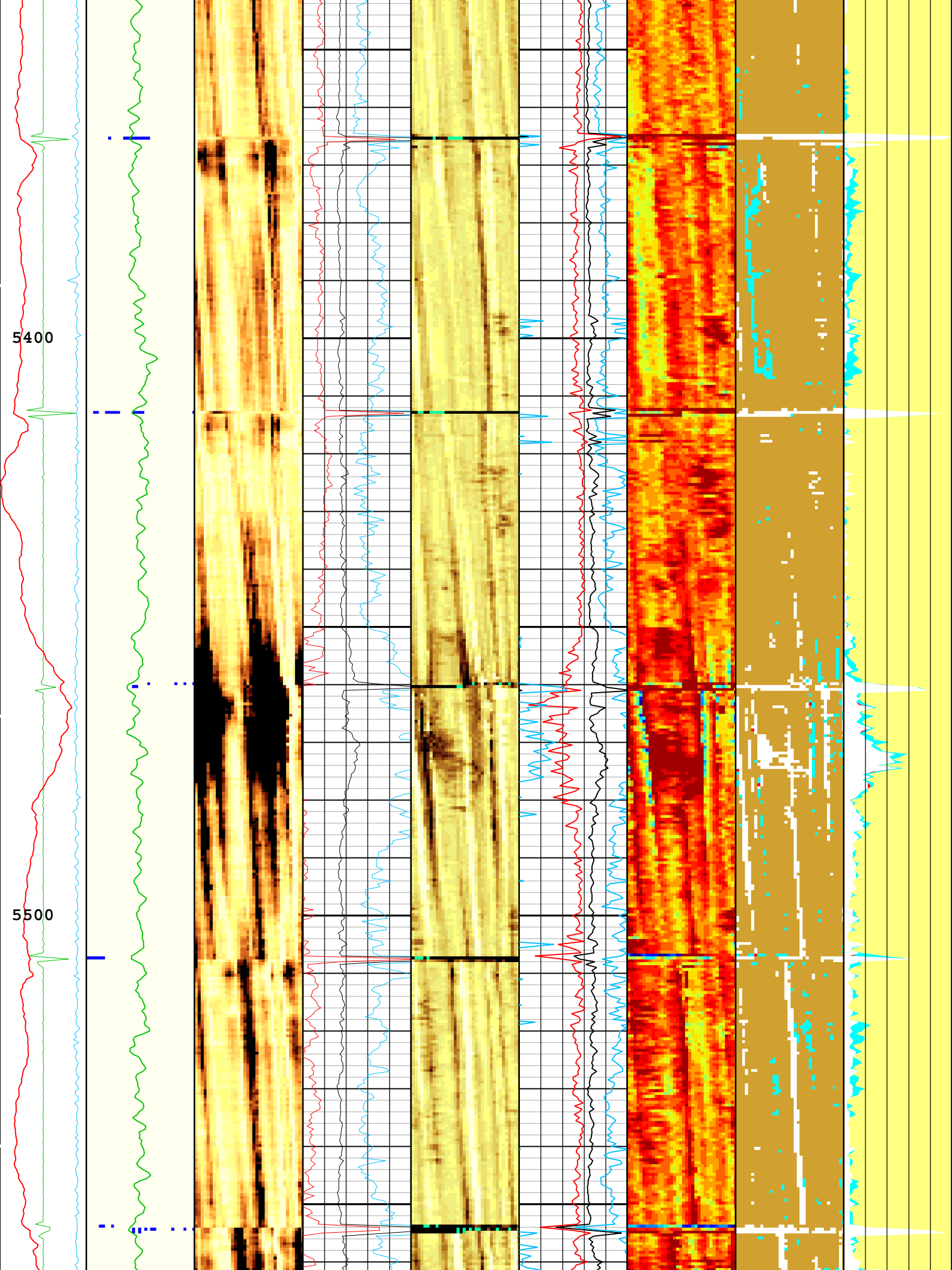


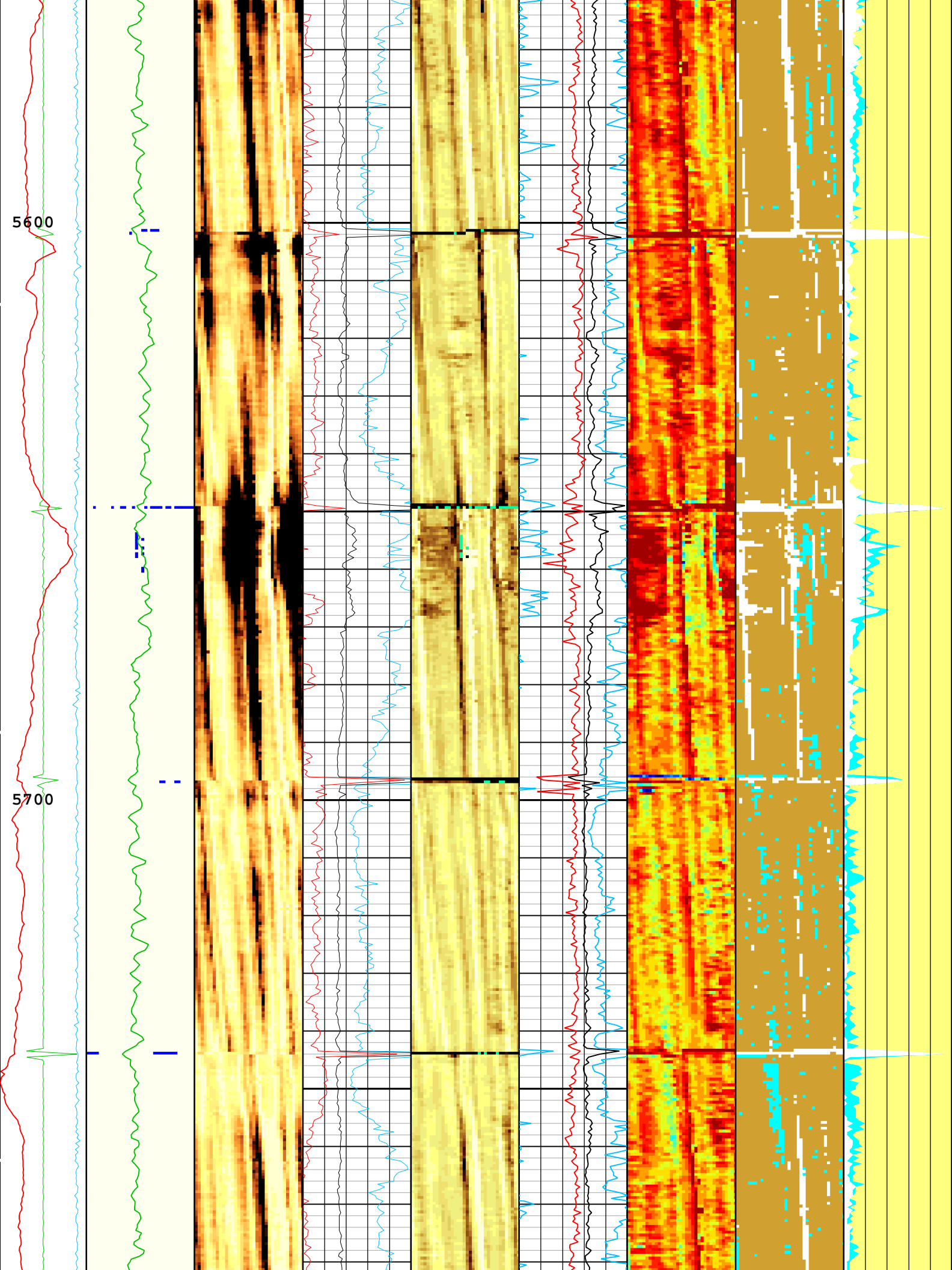


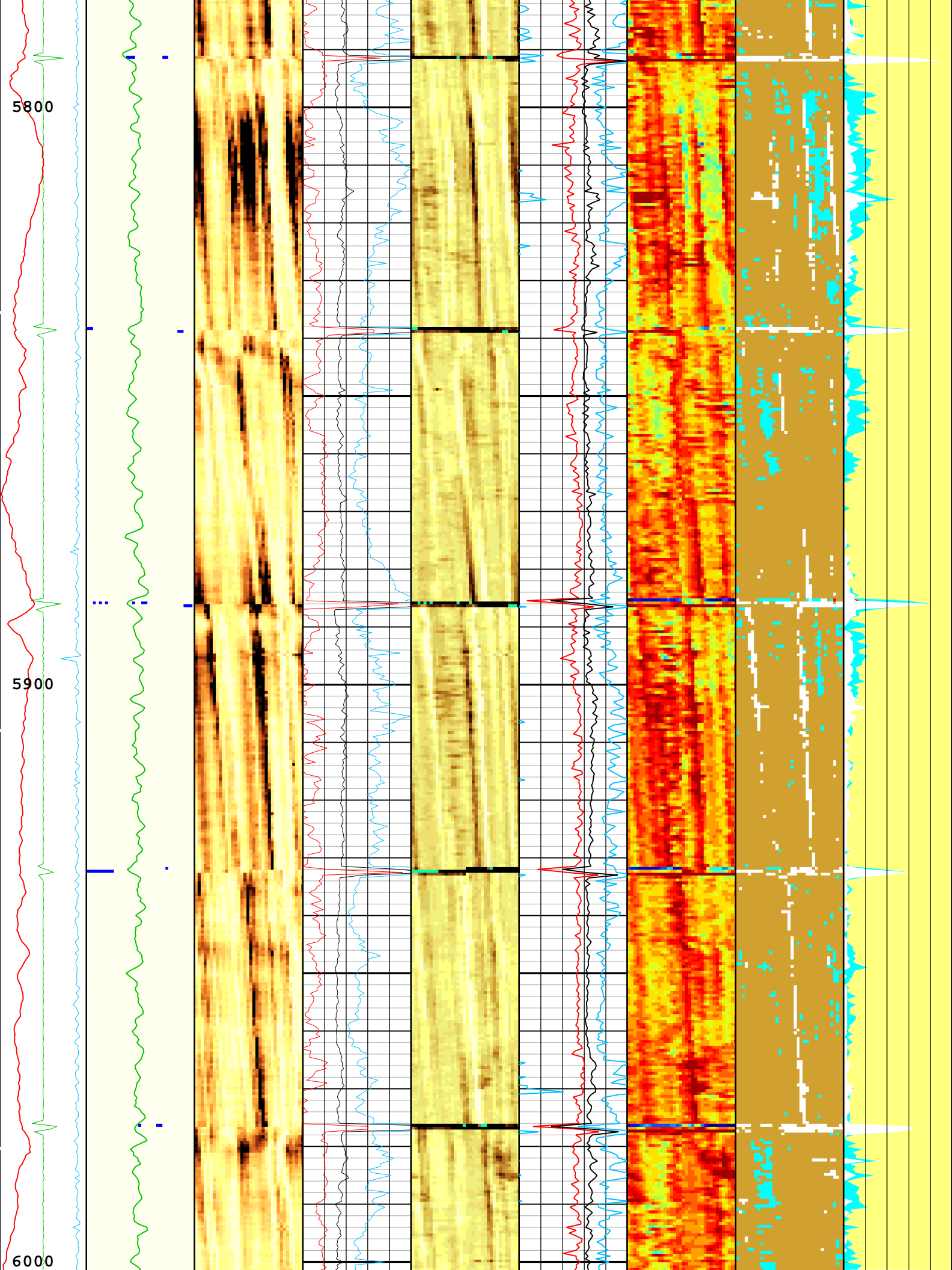


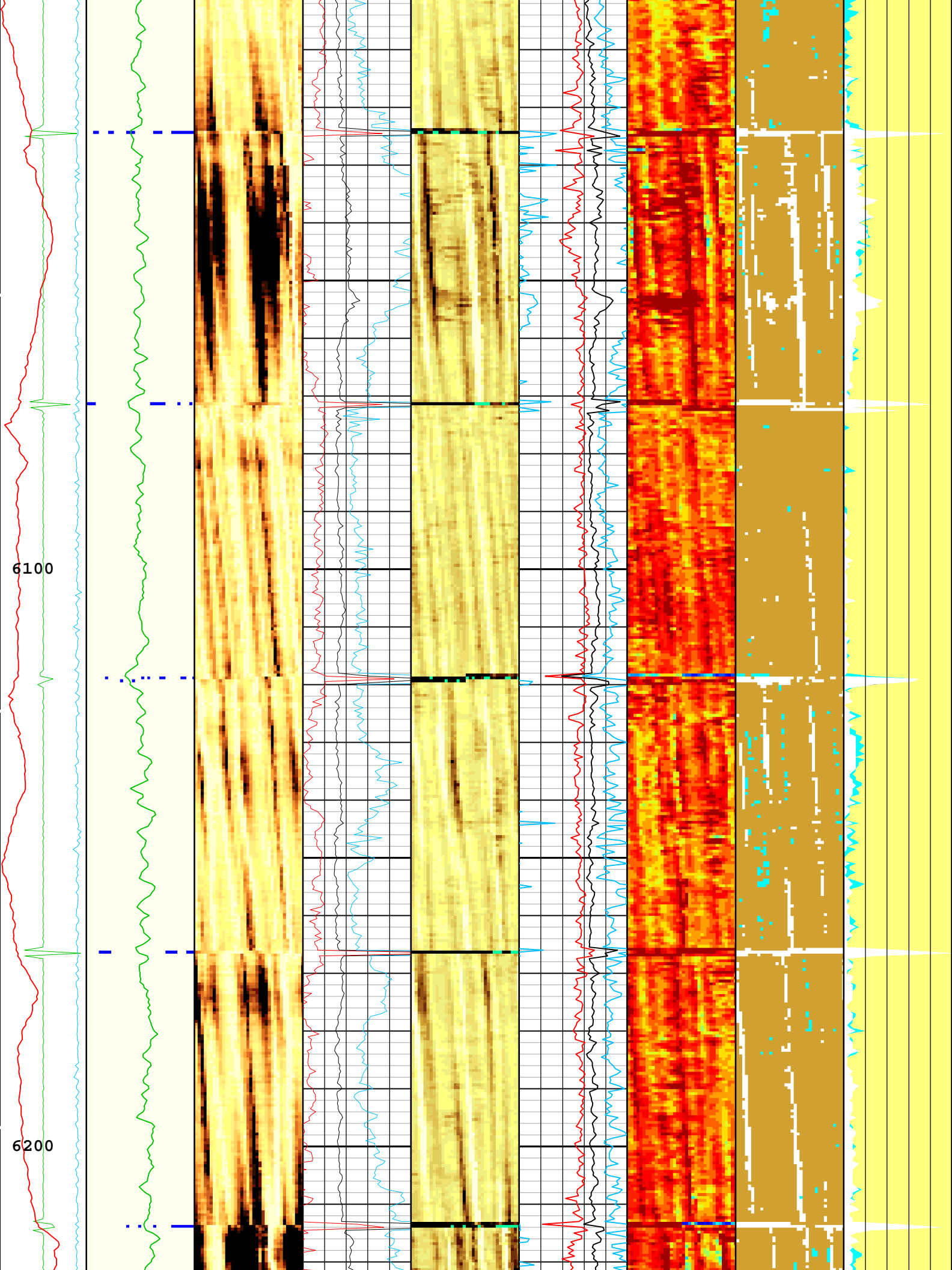


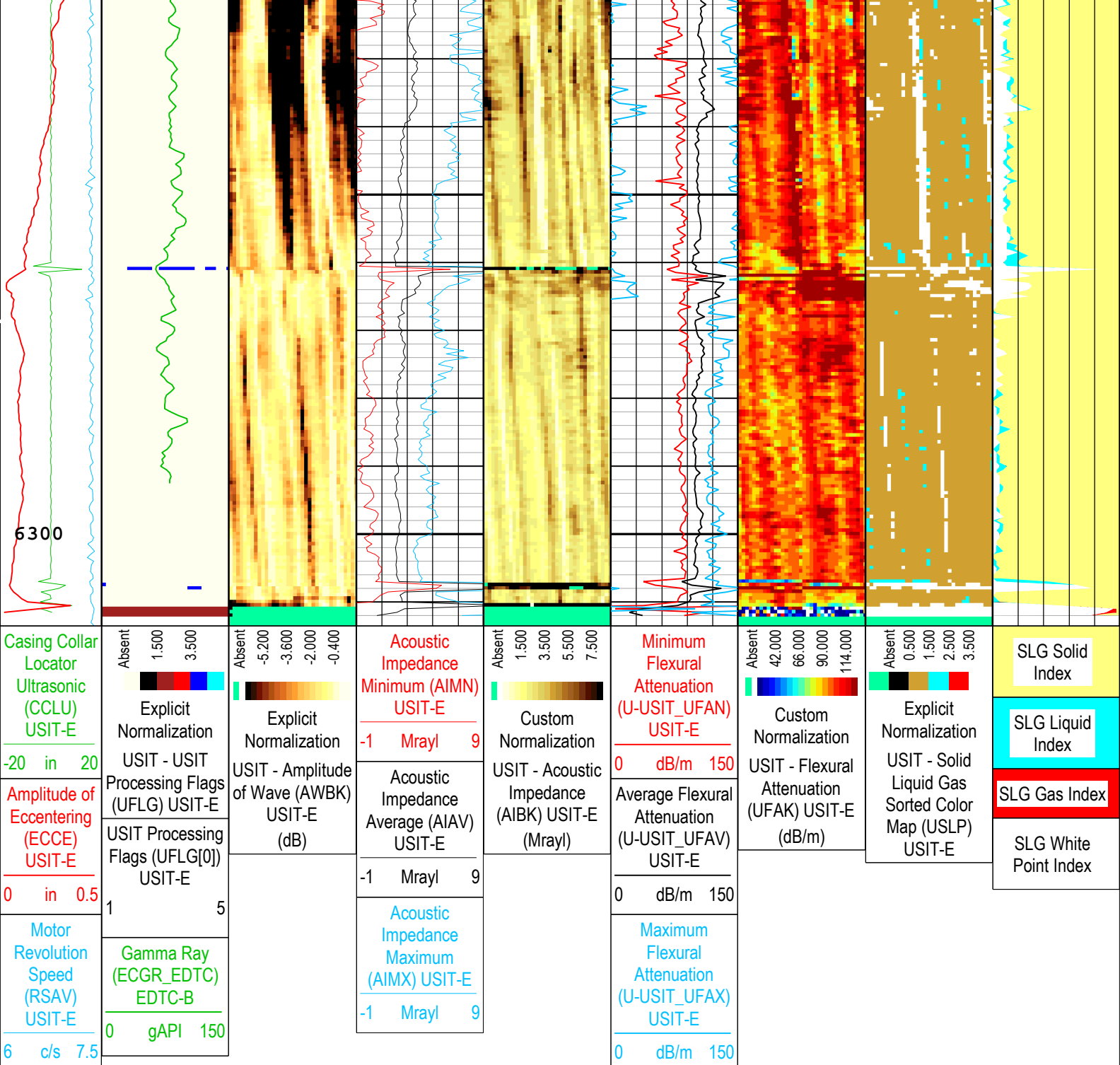












USIT Processing Flags (UFLG[0]) USIT-E

- | | |
|---|---------------------------|
| 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 15:39:17

Channel Processing Parameters				
Run 1: Parameters				
Parameter	Description	Tool	Value	Unit
BARI(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
REFL	Bad Echo Rejection	USIT-E	On	

BLN	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	11915	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	Regular Cement	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
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	20.42	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	
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	16.5	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

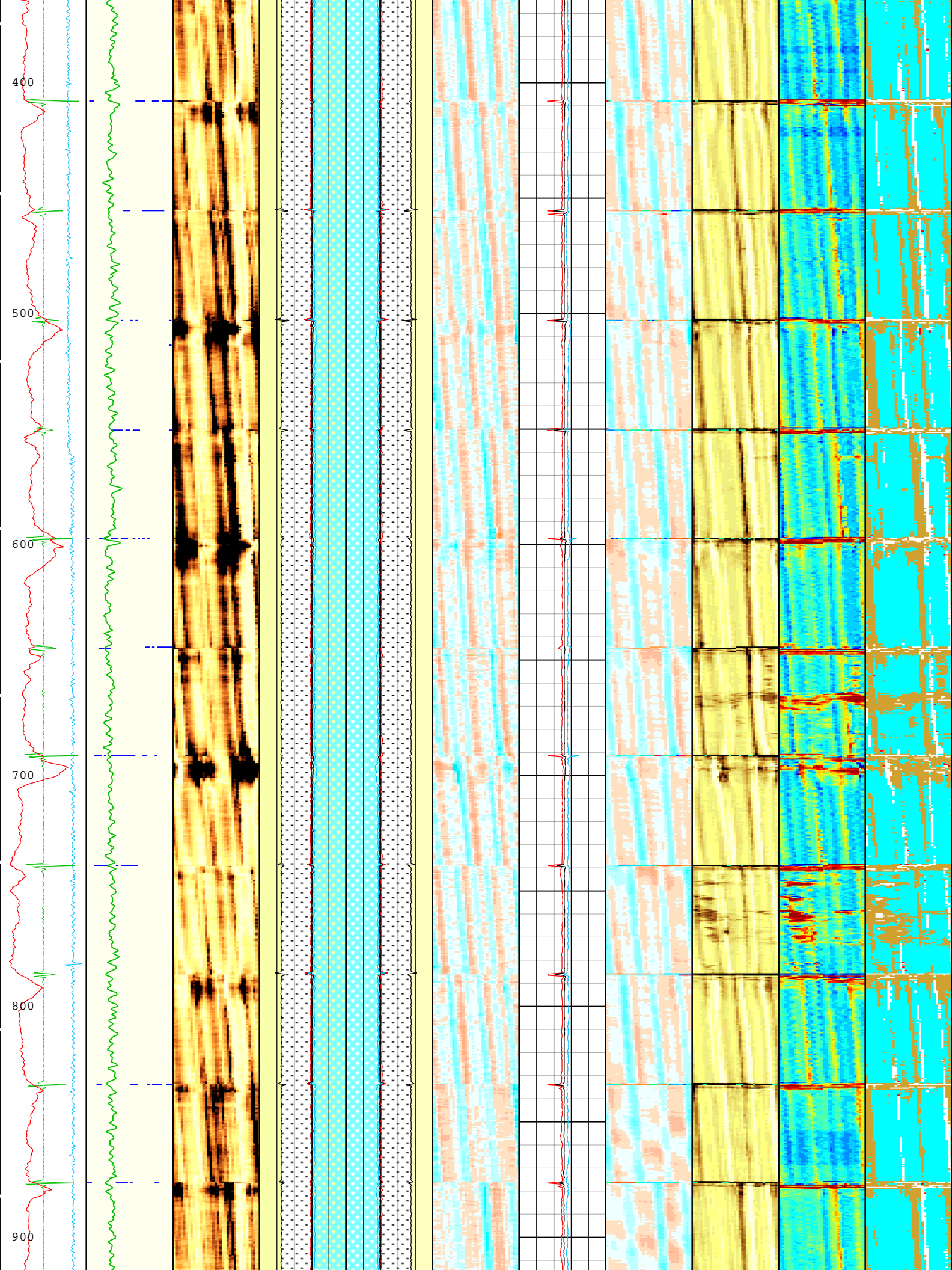
Depth Zone Parameters			
Parameter	Value	Start (ft)	Stop (ft)
BS	11.5	65.5	1997
BS	8.5	1997	6313.5

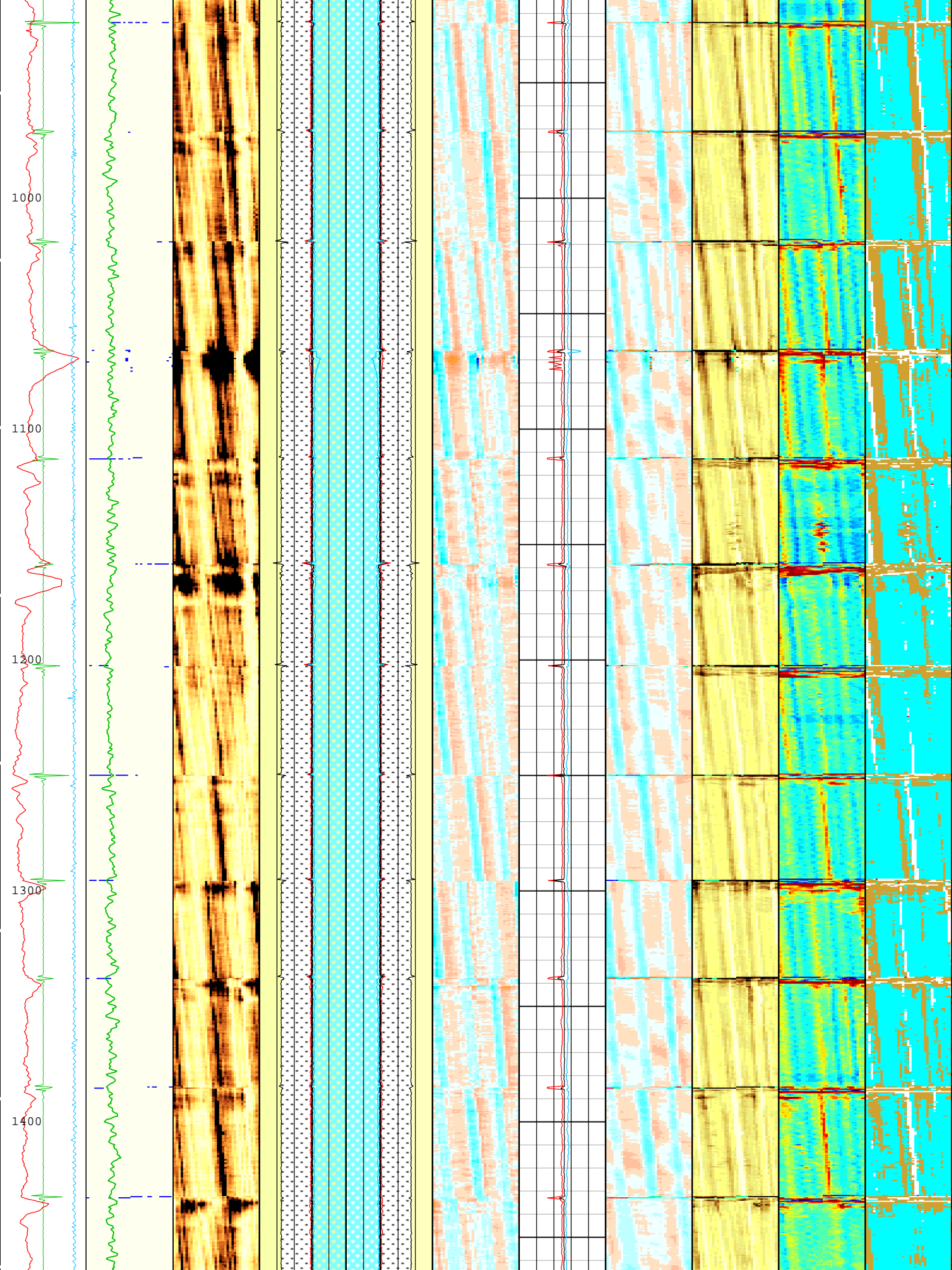
All depth are actual.

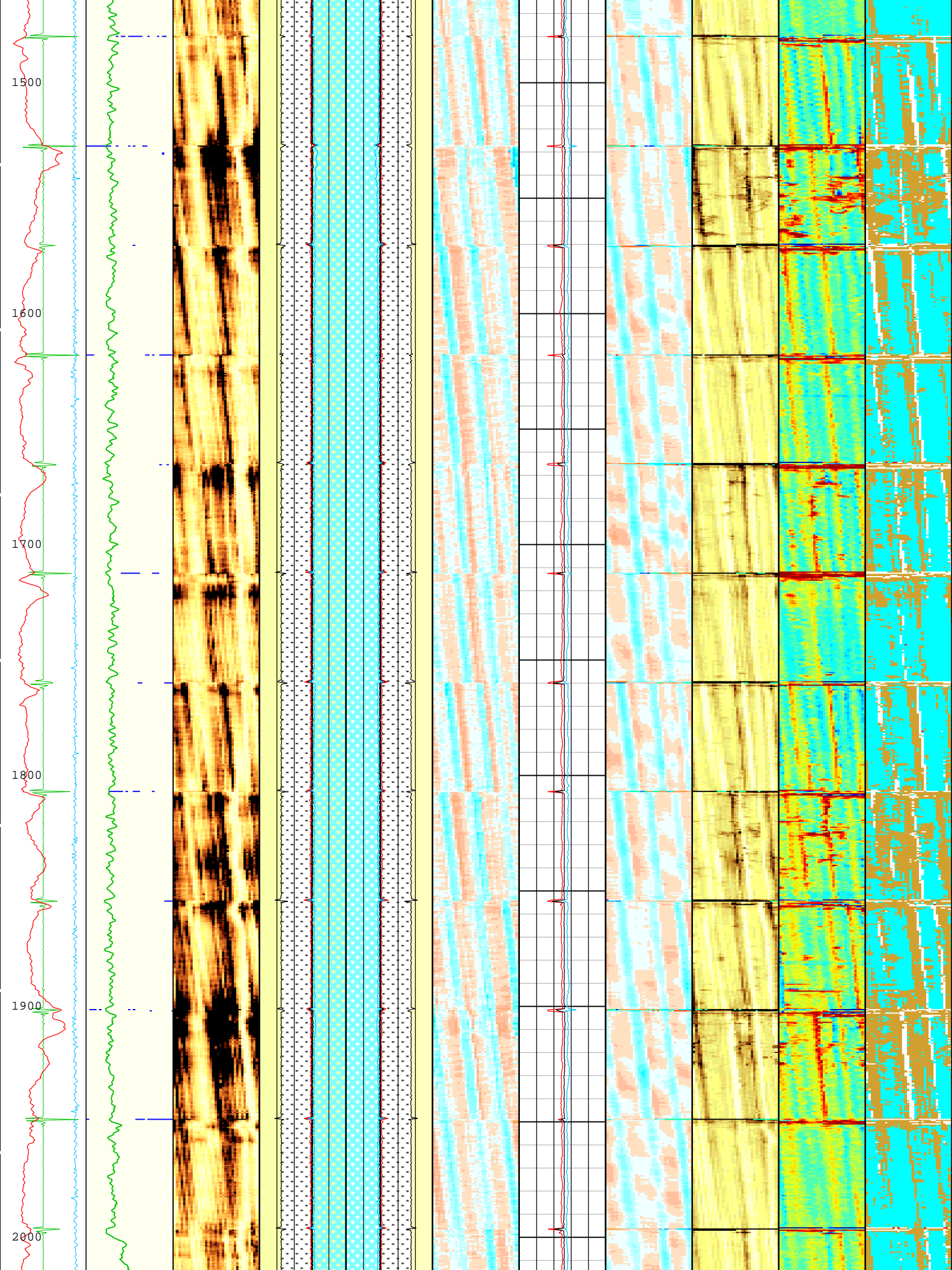
Tool Control Parameters										
Run 1: Parameters										
Parameter		Description			Tool		Value		Unit	
AGMN		Minimum Gain of Cartridge			USIT-E		-12		dB	
AGMX		Maximum Gain of Cartridge			USIT-E		48		dB	
U-USIT_DDT5		USIC Downhole Decimation for T5 only			USIT-E		0_NONE			
DOT(DOS)		Distance between 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		65		21-Jan-2019 12:22:21		21-Jan-2019 12:51:44		6314.52		4164.17
EMXV		60		21-Jan-2019 12:51:44		21-Jan-2019 13:48:39		4164.17		87.29
All depth are at tool zero.										
Run 1										
IBC SLG Composite										
Pass Summary										
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data	
Run 1	Log[5]:Up	Up	87.29 ft	6314.52 ft	21-Jan-2019 12:22:21 PM	21-Jan-2019 1:48:39 PM	ON	3.15 ft	Yes	
All depths are referenced to toolstring zero										
Log	Company:Crestone Peak Resources Operating LLC						Well:Herren 1G-33H-H367			
Run 1: Log[5]:Up:S012										
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 15:39:29										
TIME_1900 - Time Marked every 60.00 (s)										
USIT Processing Flags (UFLG[0]) USIT-E										
1 - UFLG 1 Value within [0.0 - 1.5] - :				<div>UTIM Error</div>						
2 - UFLG 2 Value within [1.5 - 2.5] - :				<div>Pulse Origin Not Detected</div>						
3 - UFLG 3 Value within [2.5 - 3.5] - :				<div>WINLEN Error</div>						

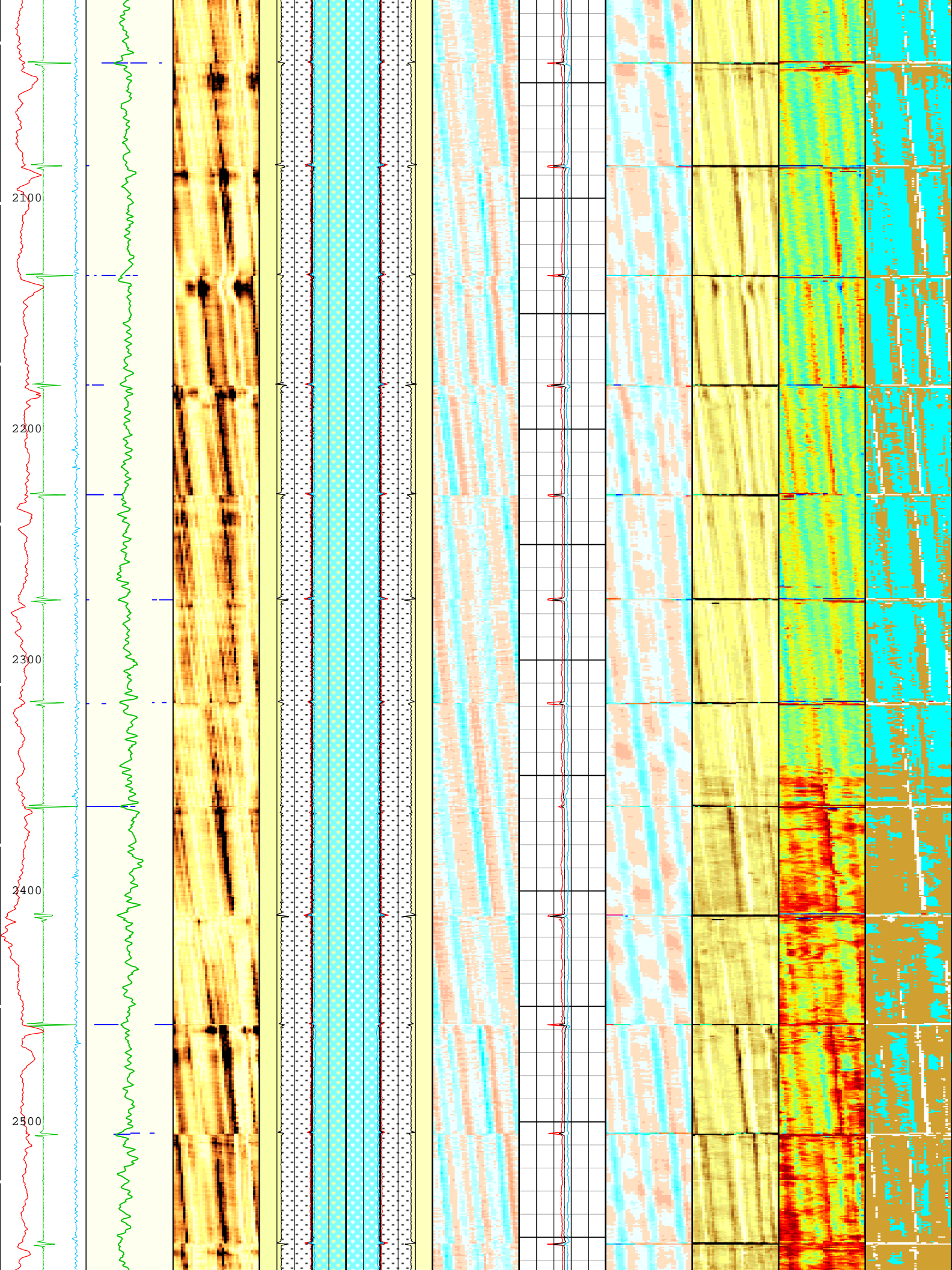
5 - UFLG 7 UFLG 8 UFLG 9 Value within [6.5 - 10] - : ■ Loop Processing Error

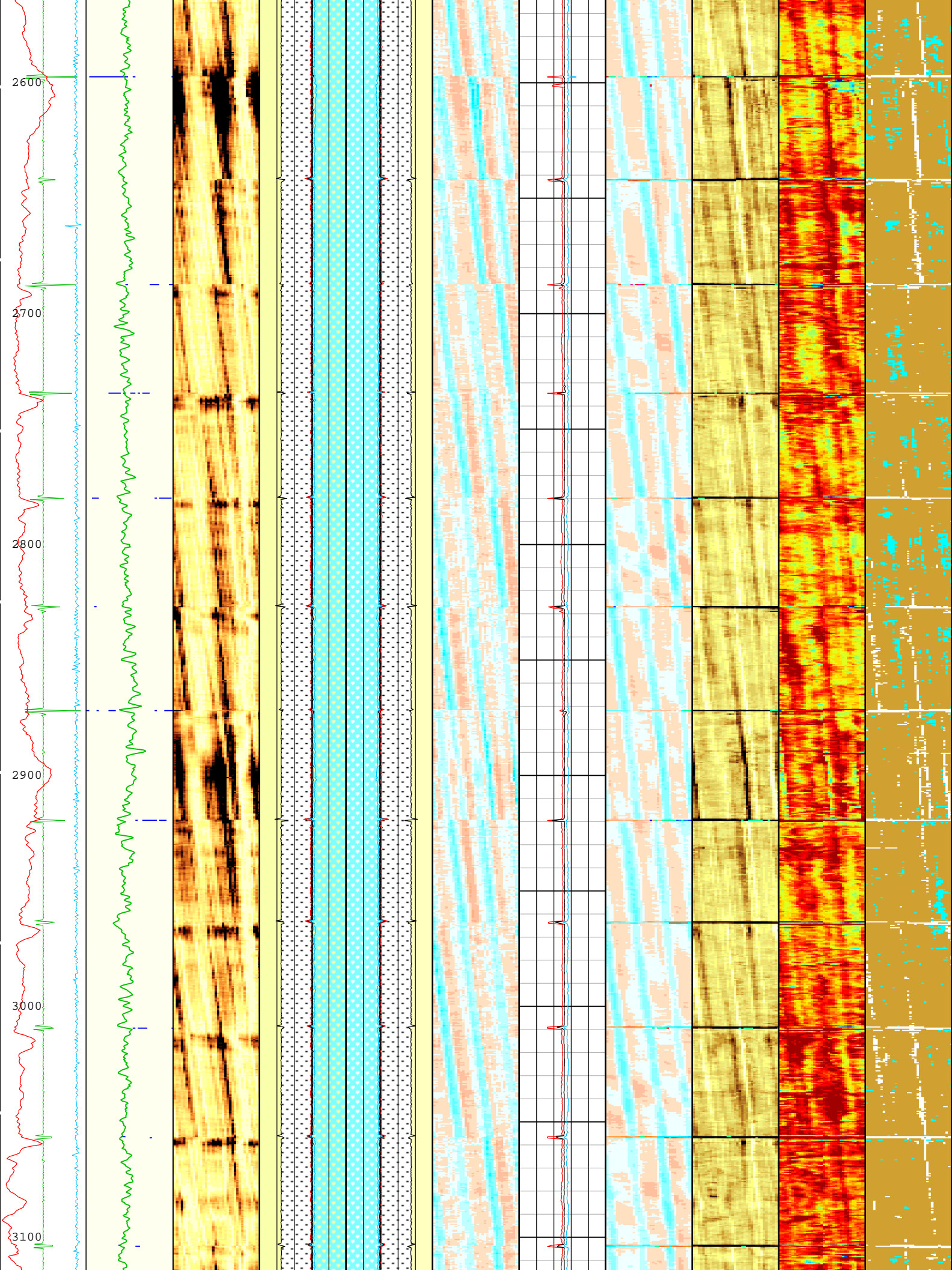
Casing Collar Locator Ultrasonic (CCLU) USIT-E		Amplitude of Eccentering (ECCE) USIT-E		Motor Revolution Speed (RSAV) USIT-E		Explicit Normalization		USIT - USIT Processing Flags (UFLG) USIT-E		USIT Processing Flags (UFLG[0]) USIT-E		USIT - Amplitude of Wave (AWBK) USIT-E (dB)		External Radii Average (ERAV) USIT-E		Internal Radius Averaged Value (IRAV) USIT-E		Internal Radius Maximum Value (IRMX) USIT-E		Internal Radius Minimum Value (IRMN) USIT-E		USIT - Internal Radii Normalized (IRBK) USIT-E (in)		Thickness Minimum Value (THMN) USIT-E		Thickness Average Value (THAV) USIT-E		Thickness Maximum Value (THMX) USIT-E		Explicit Normalization		Custom Normalization		Custom Normalization		Explicit Normalization	
-20 in 20		0 in 0.5		6 c/s 7.5		1 5		0 gAPI 150		3 in 2		3 in 2		3 in 2		3 in 2		3 in 2		3 in 2		3 in 2		0.1 in 0.6		0.1 in 0.6		0.1 in 0.6		1 5		1 5		1 5		1 5	
[CCLU USIT-E]		[ECCE USIT-E]		[RSAV USIT-E]		[USIT Processing Flags]		[USIT - Amplitude of Wave]		[External Radii Average]		[Internal Radius Averaged Value]		[Internal Radius Maximum Value]		[Internal Radius Minimum Value]		[USIT - Internal Radii Normalized]		[Thickness Minimum Value]		[Thickness Average Value]		[Thickness Maximum Value]		[Explicit Normalization]		[Custom Normalization]		[Custom Normalization]		[Explicit Normalization]		[Custom Normalization]		[Custom Normalization]	
[CCLU USIT-E]		[ECCE USIT-E]		[RSAV USIT-E]		[USIT Processing Flags]		[USIT - Amplitude of Wave]		[External Radii Average]		[Internal Radius Averaged Value]		[Internal Radius Maximum Value]		[Internal Radius Minimum Value]		[USIT - Internal Radii Normalized]		[Thickness Minimum Value]		[Thickness Average Value]		[Thickness Maximum Value]		[Explicit Normalization]		[Custom Normalization]		[Custom Normalization]		[Explicit Normalization]		[Custom Normalization]		[Custom Normalization]	

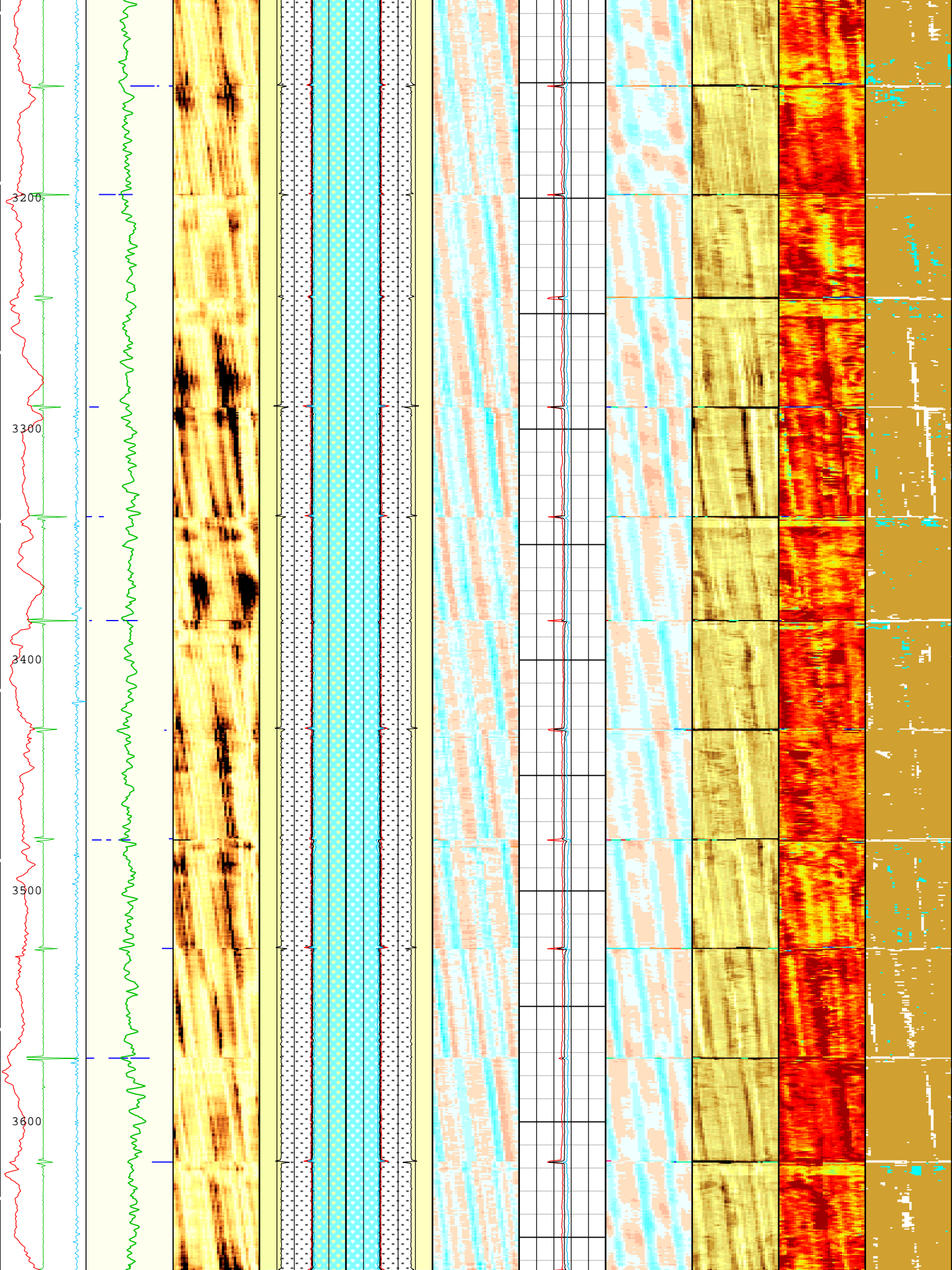


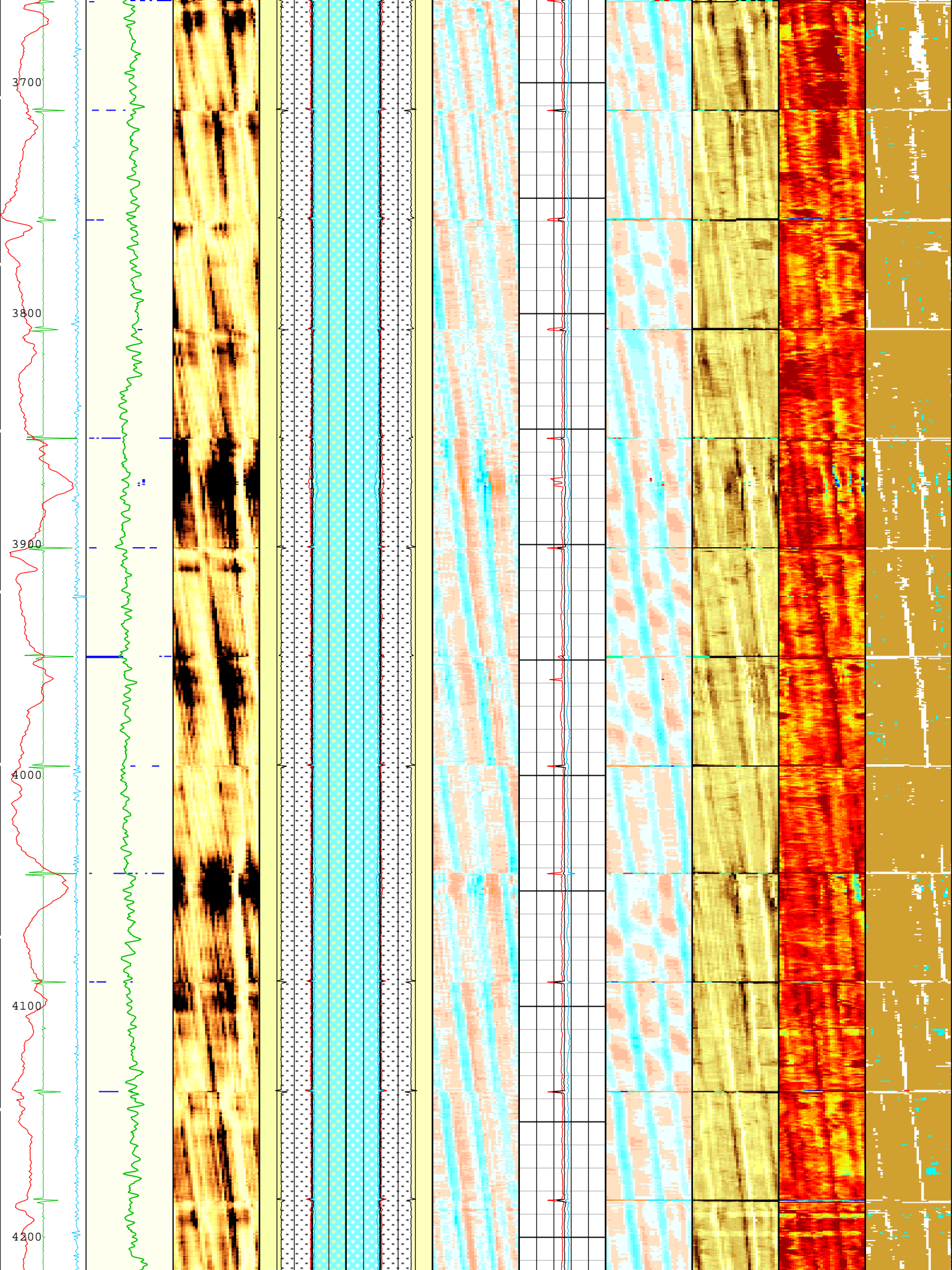


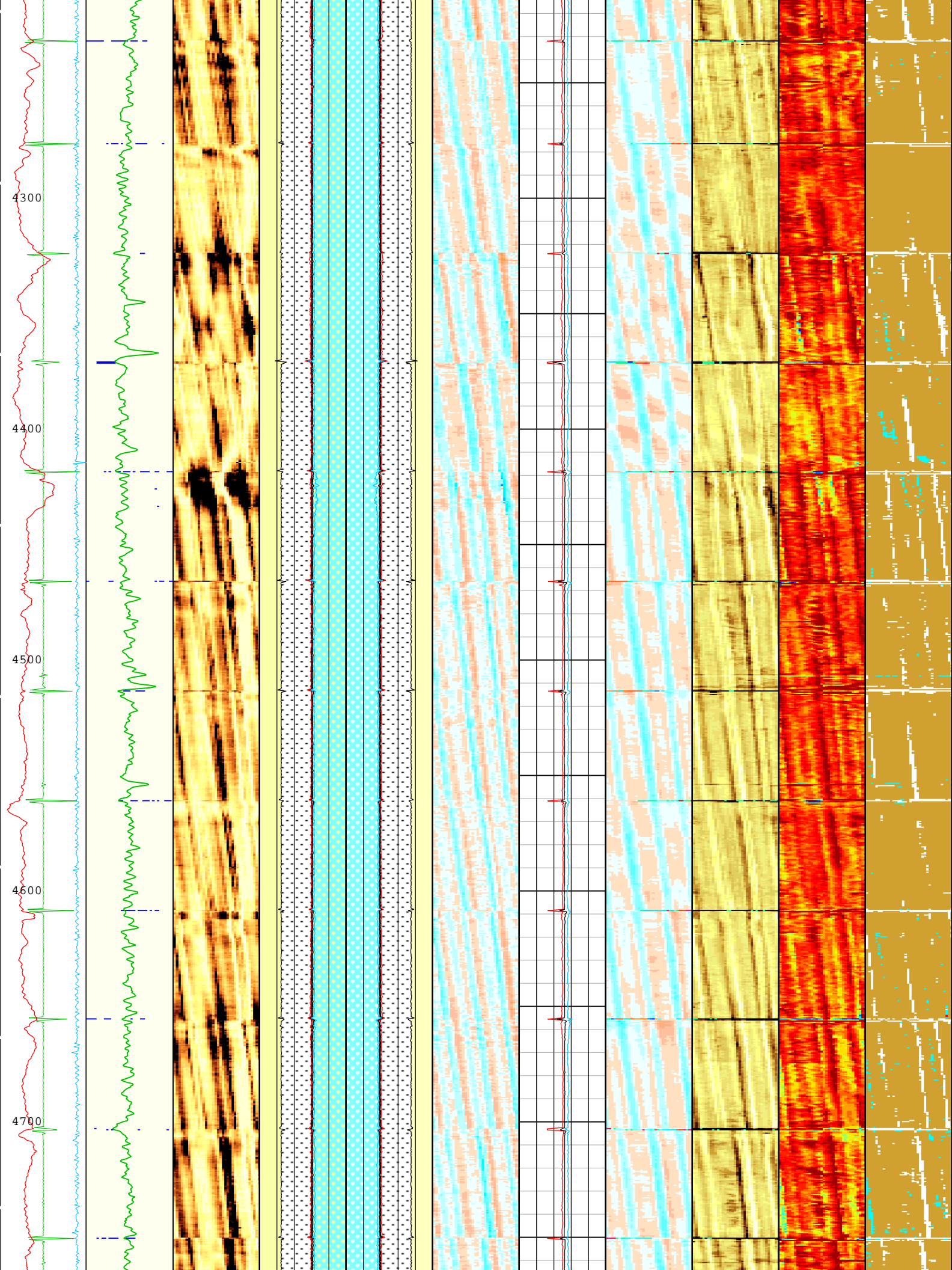


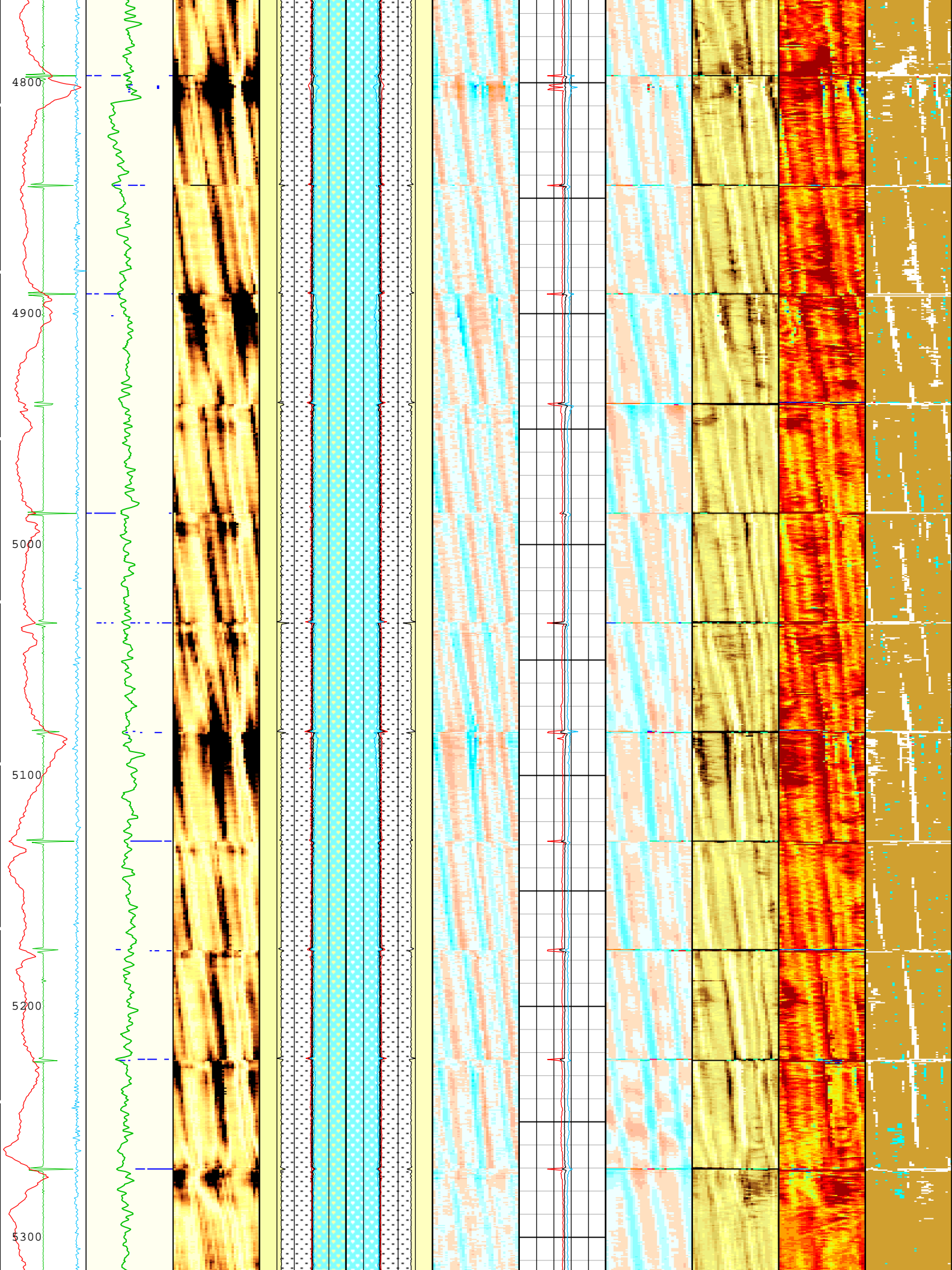


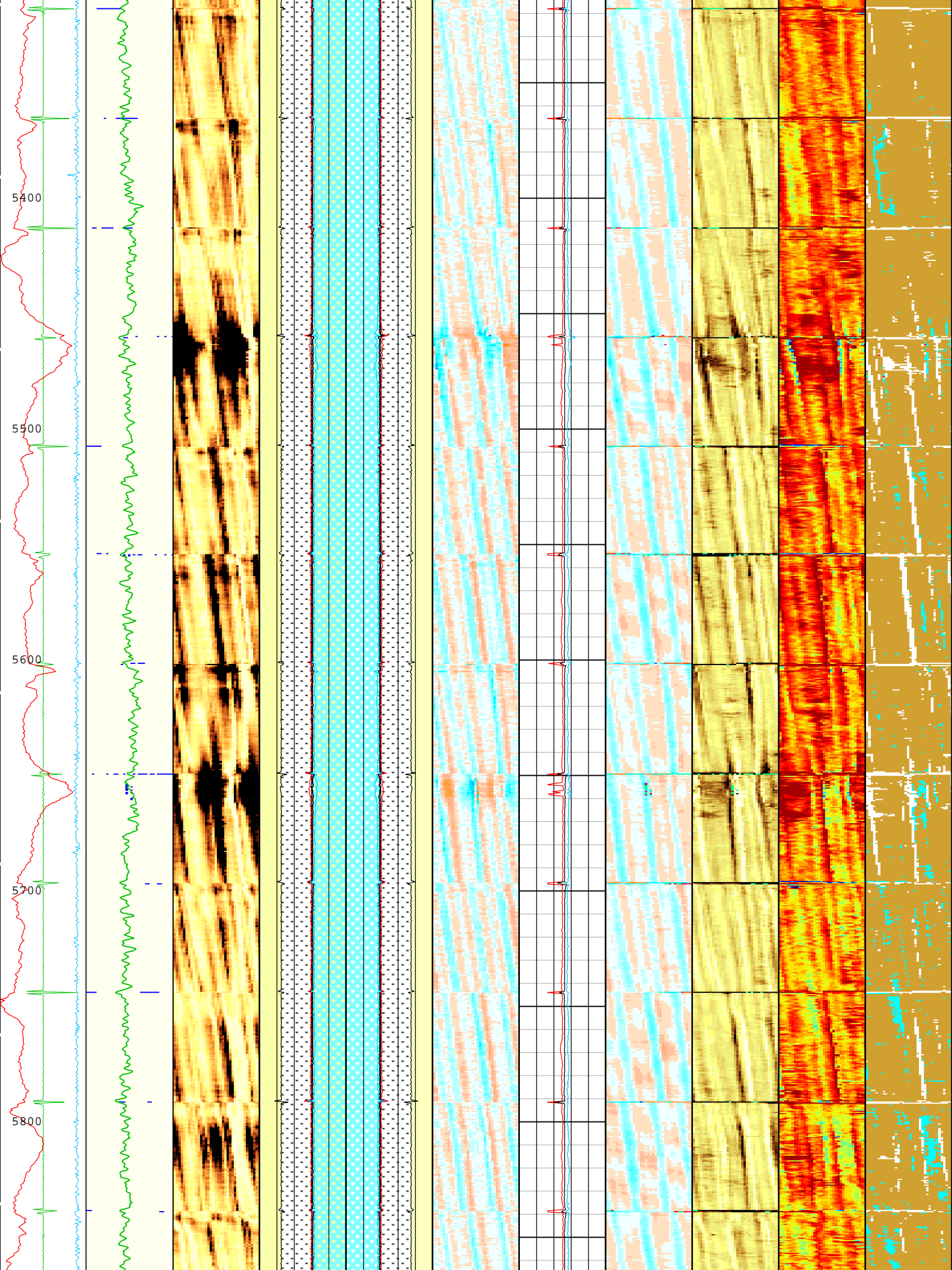


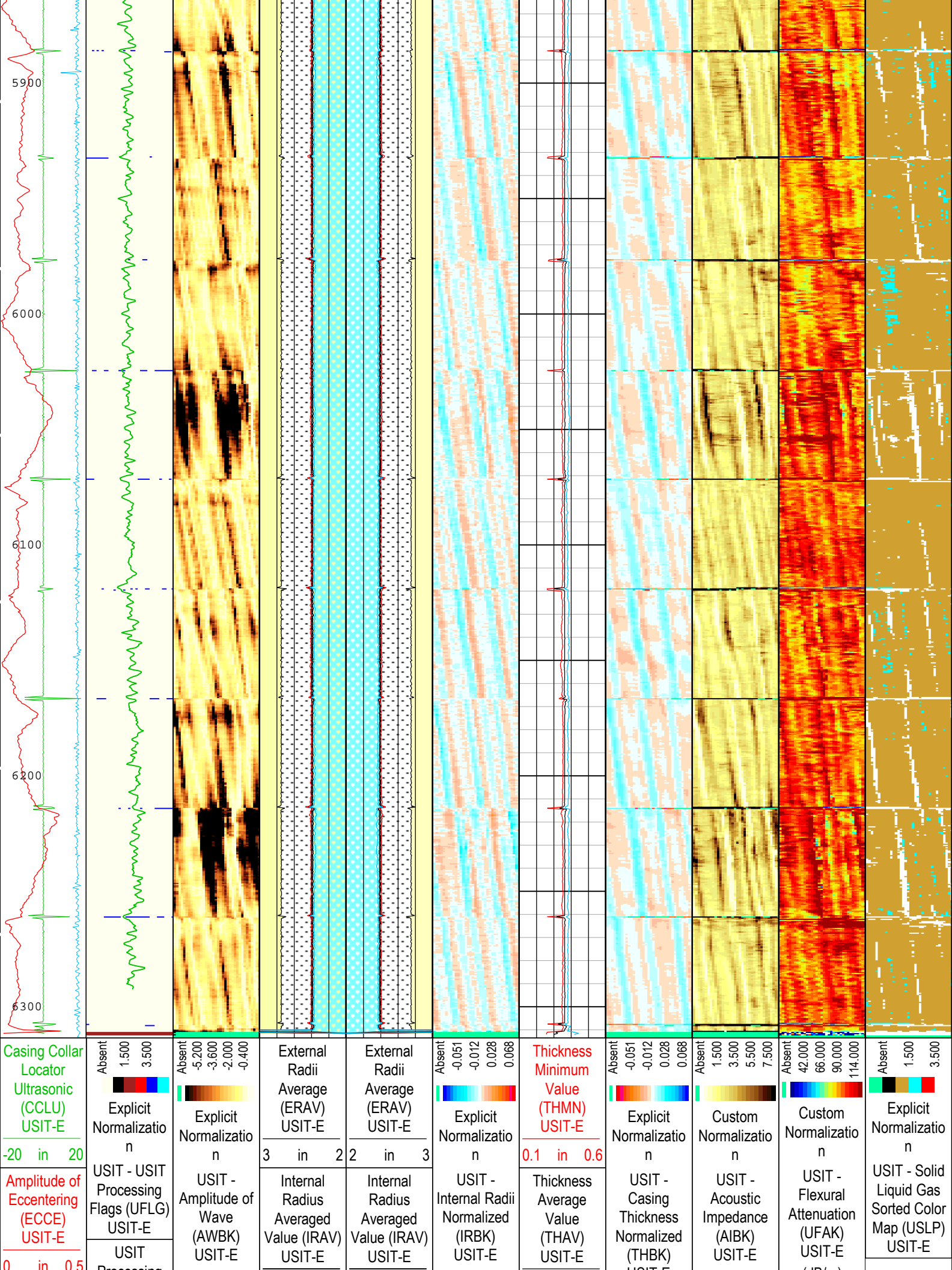












Processing Flags (UFLG[0]) USIT-E	1	5	3	in	2	2	in	3	(in)	0.1	in	0.6	USIT-E (in)	(Mrayl)	(dB/m)
Motor Revolution Speed (RSAV) USIT-E	6	c/s	7.5	Internal Radius Maximum Value (IRMX) USIT-E	3	in	2	Internal Radius Maximum Value (IRMX) USIT-E	2	in	3	Thickness Maximum Value (THMX) USIT-E	0.1	in	0.6
Gamma Ray (ECGR_EDT C) EDTC-B	0	gAPI	150	Internal Radius Minimum Value (IRMN) USIT-E	3	in	2	Internal Radius Minimum Value (IRMN) USIT-E	2	in	3				

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

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 15:39:29

Channel Processing Parameters				
Run 1: 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	11915	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	Regular Cement	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
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	20.42	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	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.8	Mrayl
U-USIT_UFAO	SIT Flexural Attenuation Offset	USIT-E	16.5	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	
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	11.5	65.5	1997
BS	8.5	1997	6313.5

All depth are actual.

Tool Control Parameters

Run 1: 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
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	65	21-Jan-2019 12:22:21	21-Jan-2019 12:51:44	6314.52	4164.17
EMXV	60	21-Jan-2019 12:51:44	21-Jan-2019 13:48:39	4164.17	87.29

All depth are at tool zero.

Run 1

IBC Goodwin Compressed

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Run 1	Log[5]:Up	Up	87.29 ft	6314.52 ft	21-Jan-2019 12:22:21 PM	21-Jan-2019 1:48:39 PM	ON	3.15 ft	Yes

All depths are referenced to toolstring zero

Log

Company:Crestone Peak Resources Operating LLC

Well:Herren 1G-33H-H367

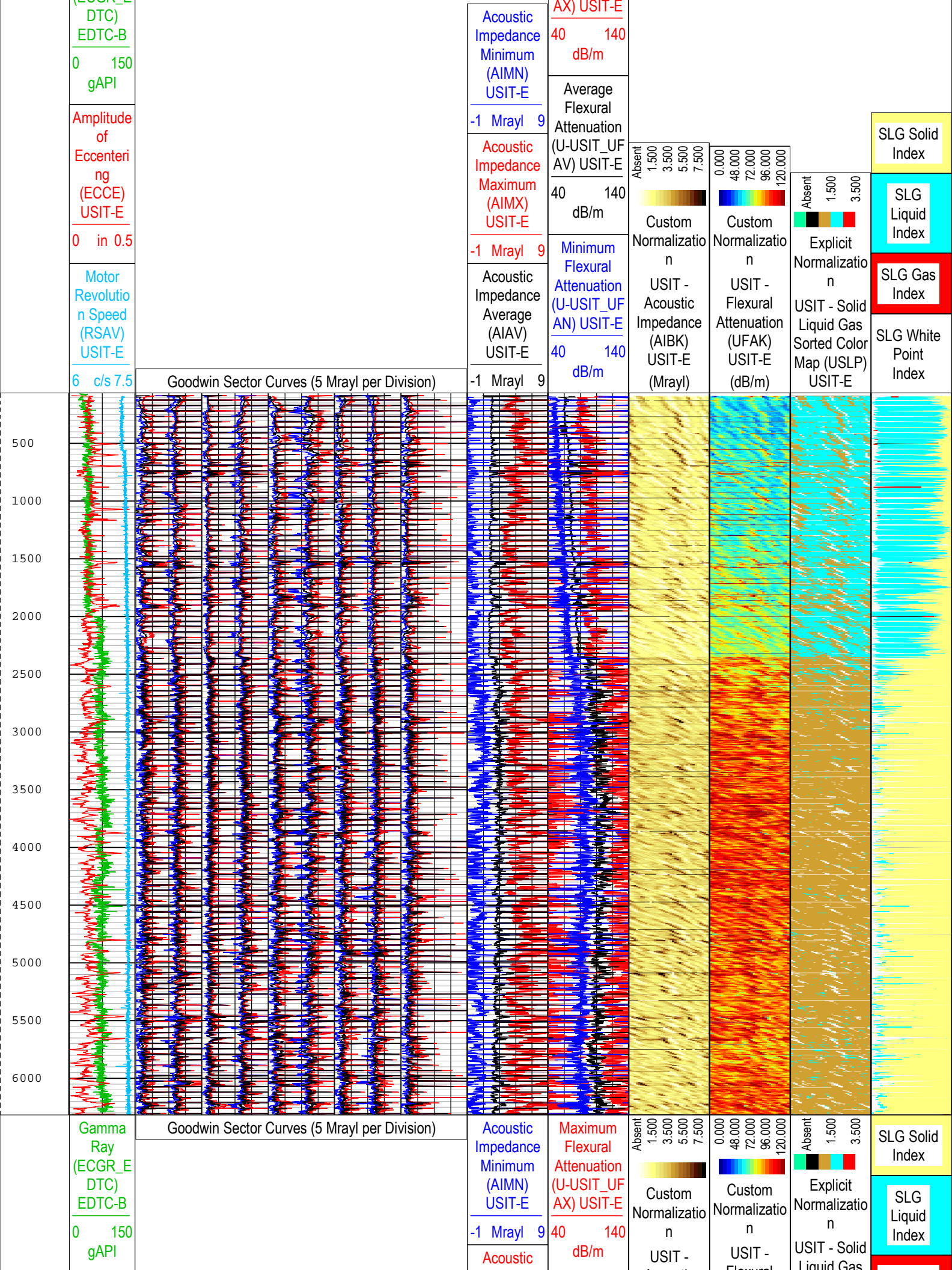
Run 1: Log[5]:Up:S012

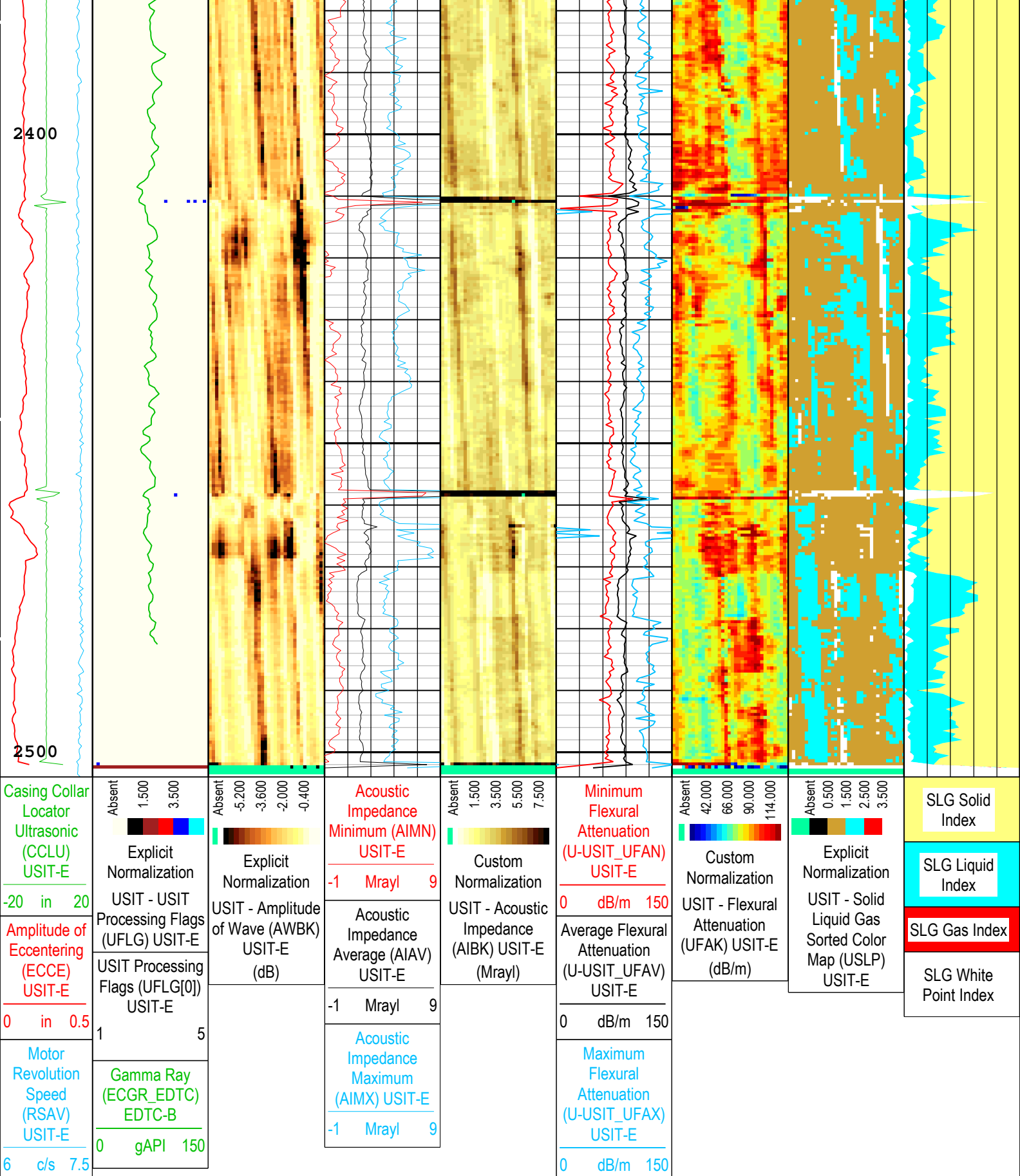
Description: USI Goodwin Format: Log (IBC Goodwin) Index Scale: 0.1 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 21-Jan-2019 15:39:38

TIME_1900 - Time Marked every 60.00 (s)

Gamma
Ray
(ECGR F

Maximum
Flexural
Attenuation
(U-USIT_UF





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 - 10.1] - : Loop Processing Error

Channel Processing Parameters				
Run 1: 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	8.5	in
CASING_PRATIO	Casing Poisson Ratio	USIT-E	Standard Poisson Ratio	
CBLO	Casing Bottom (Logger)	WLSESSION	11915	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	Regular Cement	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
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	20.42	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	
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	16.5	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	
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Run 1: 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	
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

Run 1

IBC SLG Composite Repeat

Pass Summary	
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


Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Run 1	Log[3]:Up	Up	2194.39 ft	2504.75 ft	21-Jan-2019 12:00:20 PM	21-Jan-2019 12:05:32 PM	ON	0.54 ft	Yes

All depths are referenced to toolstring zero

Log	Company:Crestone Peak Resources Operating LLC	Well:Herren 1G-33H-H367
		Run 1: Log[3]:Up:S012

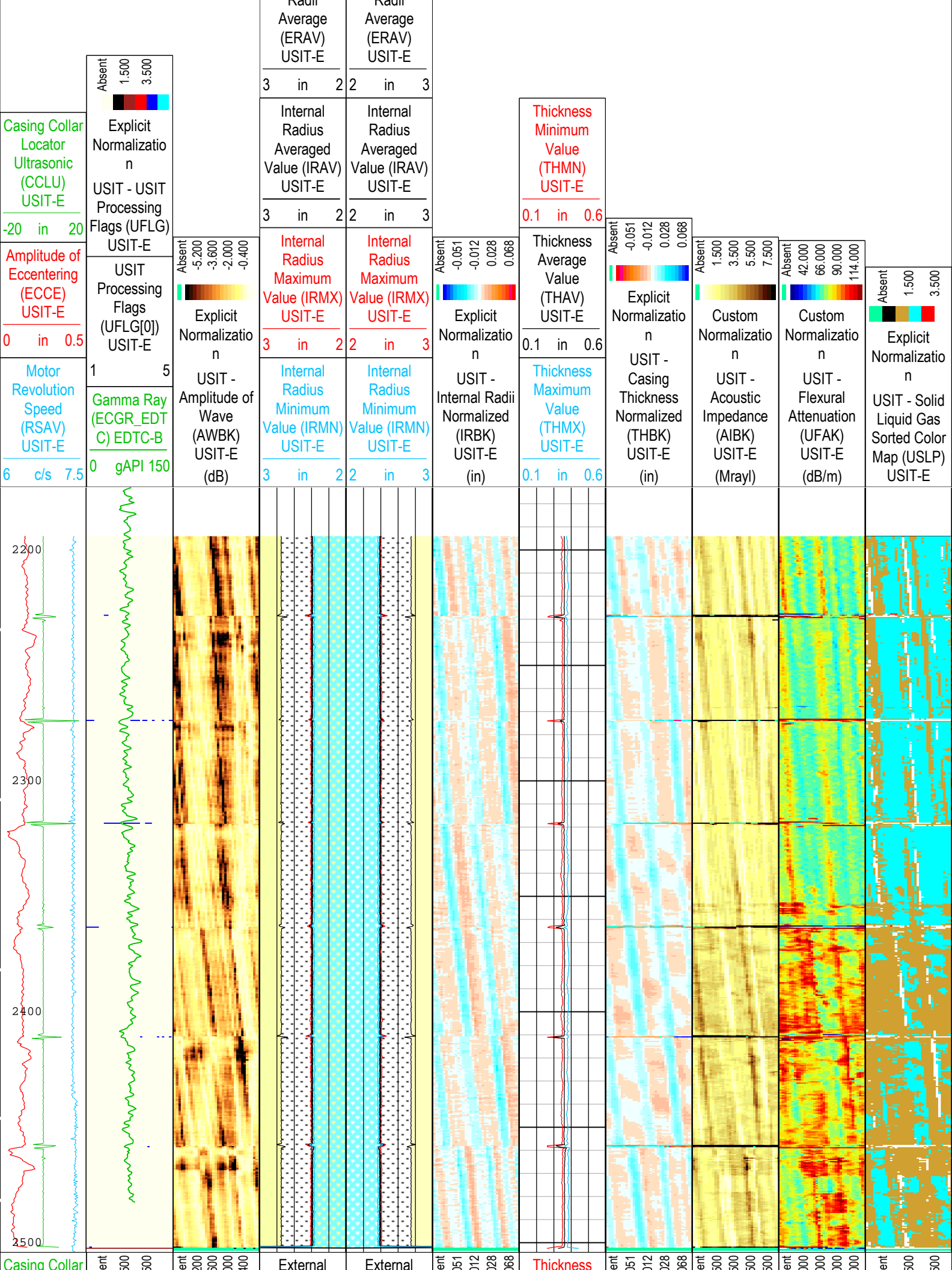
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Creation Date: 21-Jan-2019 15:39:48

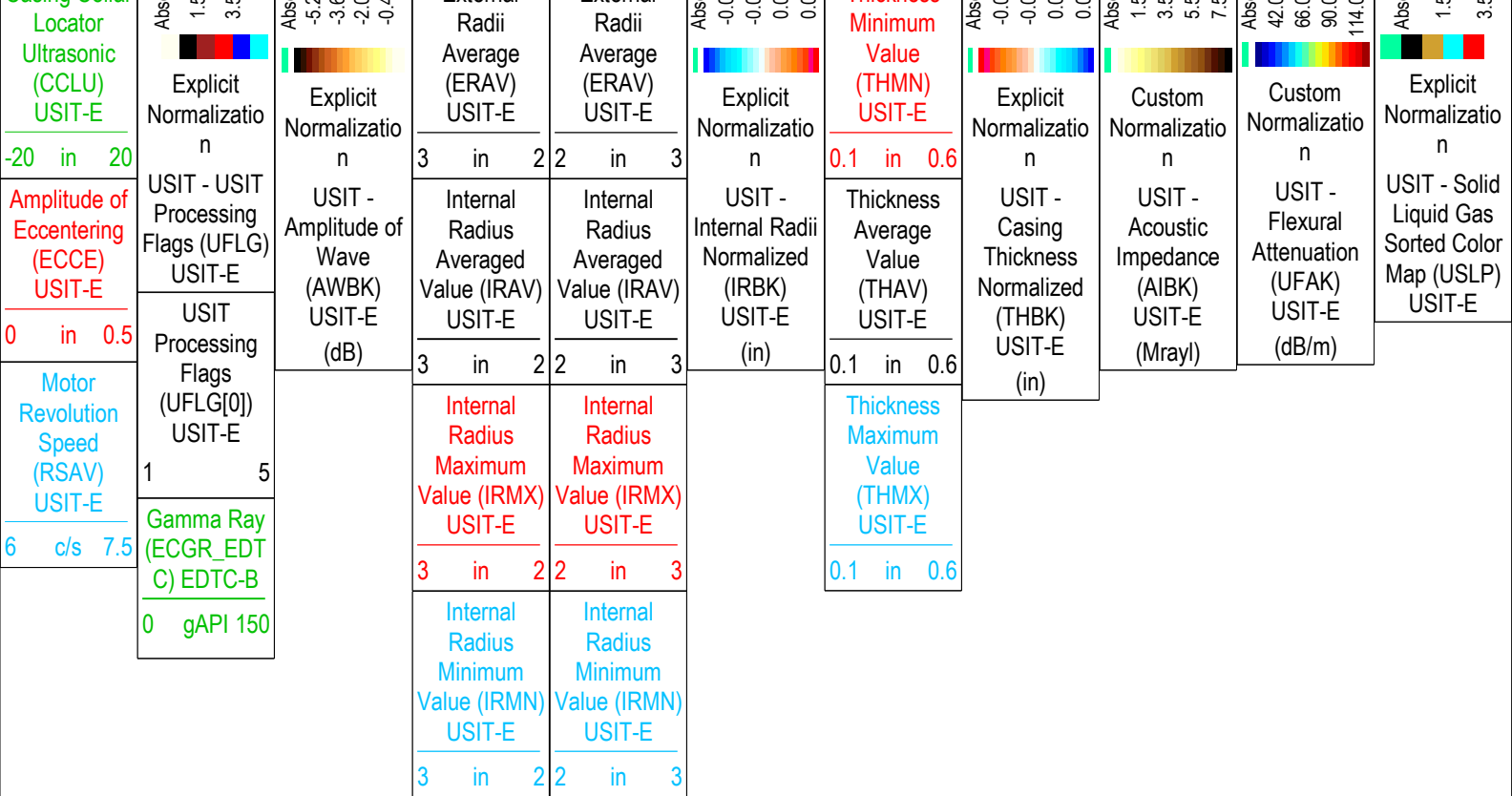
USIT Processing Flags (UFLG[0]) USIT-E

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)






External Radii	External Radii
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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

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 15:39:48

Channel Processing Parameters				
Run 1: Parameters				
Parameter	Description	Tool	Value	Unit
BAR(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	11915	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	Regular Cement	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
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	20.42	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	

IBC_ZMUD_SEL	IBC Mud Impedance Selection	USIT-E	Free Pipe 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	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.8	Mrayl
U-USIT_UFAO	SIT Flexural Attenuation Offset	USIT-E	16.5	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

Tool Control Parameters

Run 1: 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	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

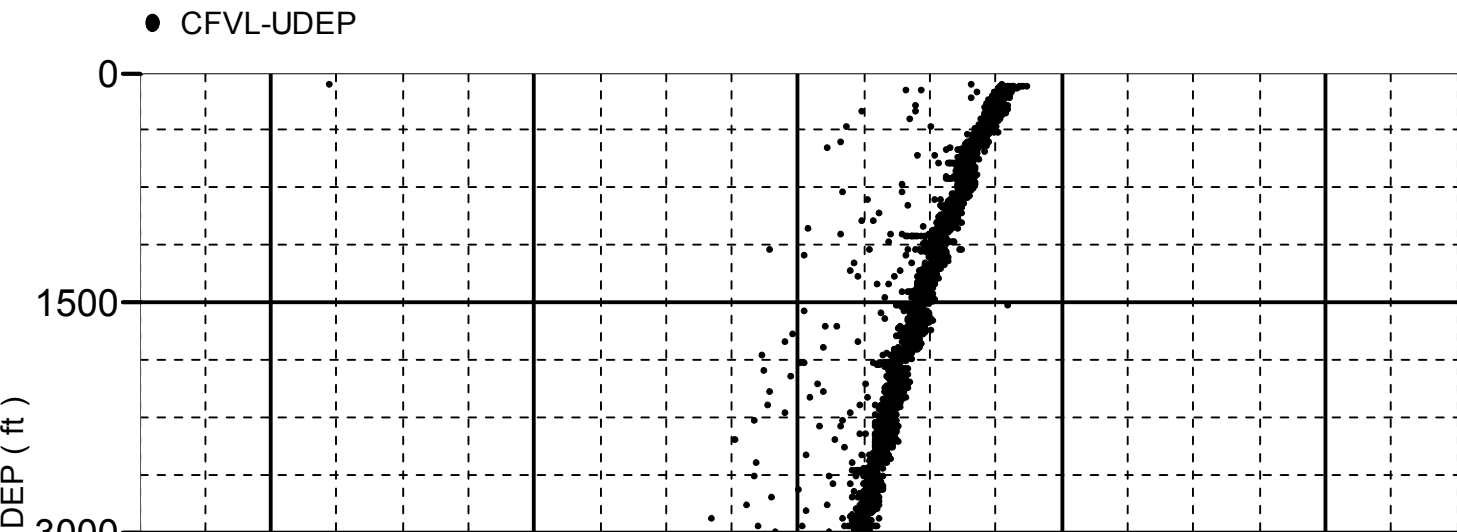
Company:Crestone Peak Resources Operating LLC Well:Herren 1G-33H-H367

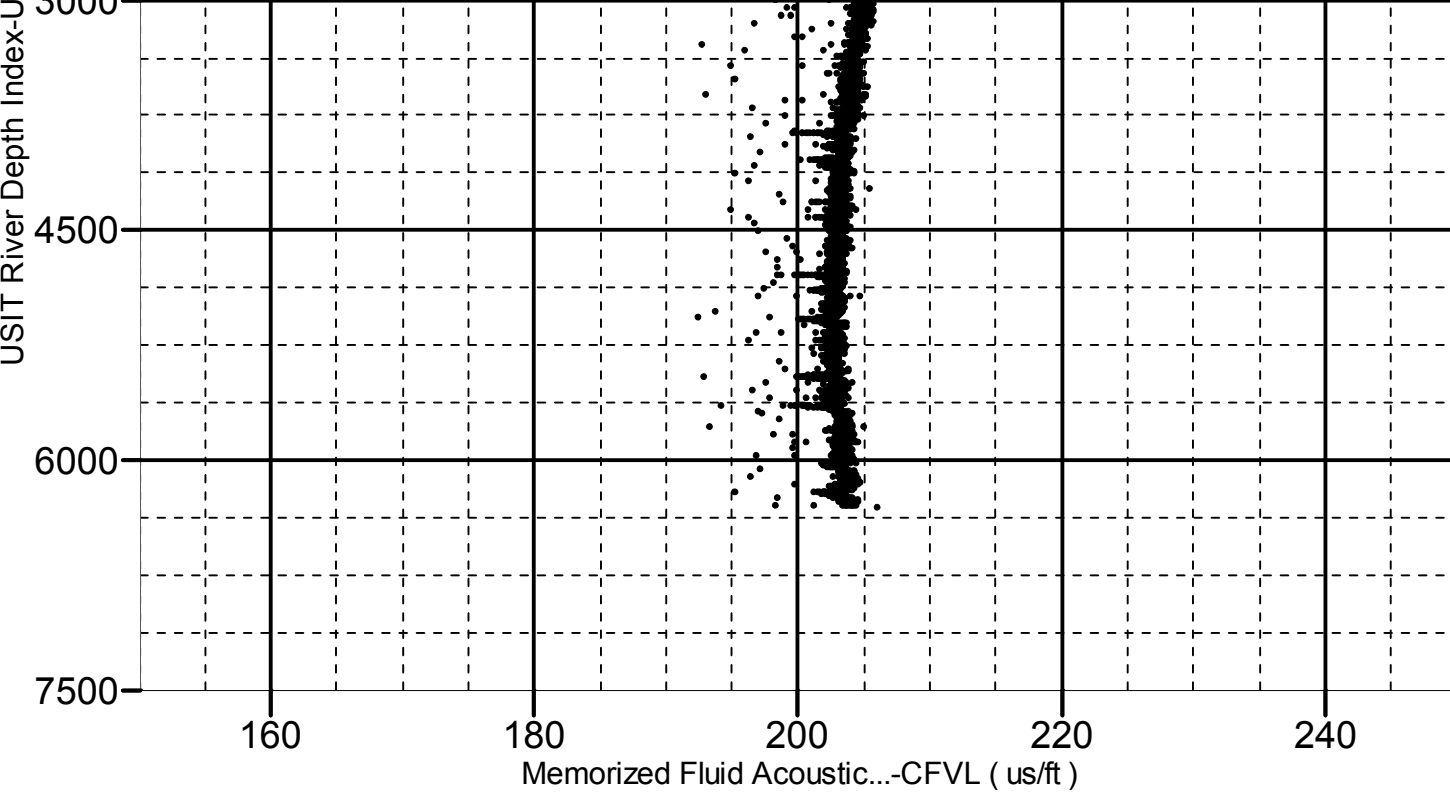
Run 1: Log[5]:Up:S012

Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 6313.50 to 86.50 ft





XYZ

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

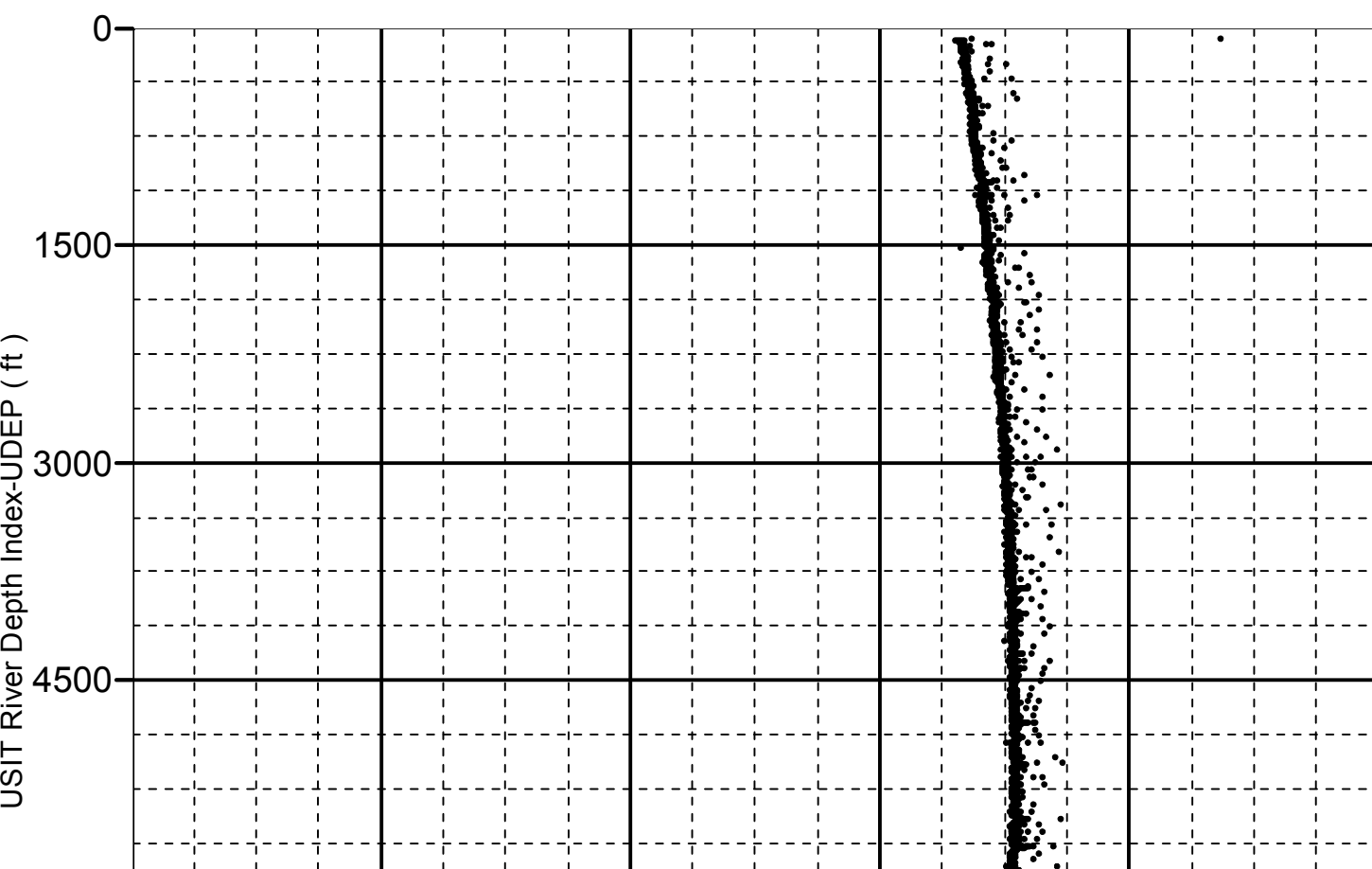
Run 1: Log[5]:Up:S012

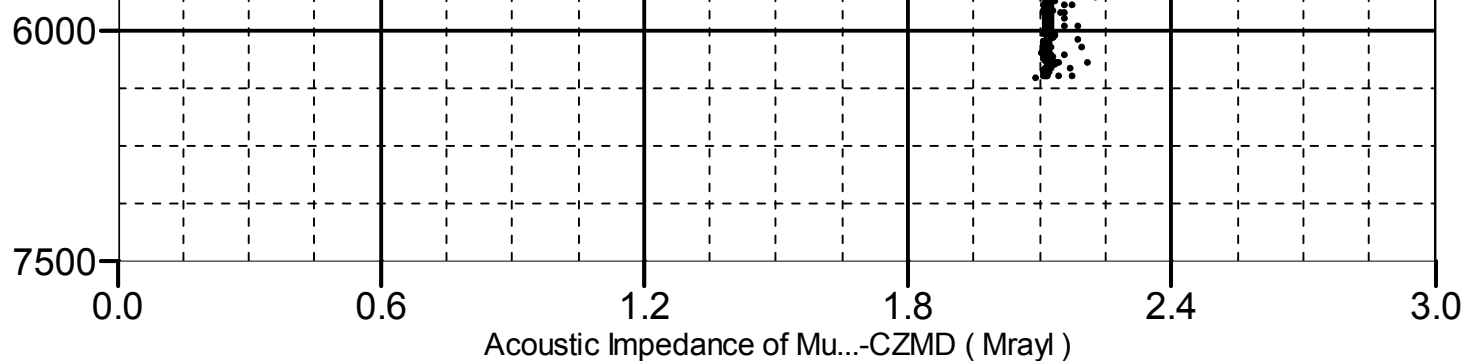
Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6313.50 to 86.50 ft

● CZMD-UDEP





Company: Crestone Peak Resources Operating LLC

Schlumberger

Well: Herren 1G-33H-H367

Field: Wattenberg

County: Weld

State: Colorado

Isolation Scanner

Cement Evaluation

Gamma Ray - CCL Log