Schlumberger

Company: **HUSKY OIL OPERATIONS LIMITED**

Well: **HUSKY LITTLE BEAR N-09**
Field: **SLATER RIVER**
Province: **NORTHWEST TERRITORIES**

Province: NORTHWEST TERRITORIES
Field: SLATER RIVER
Location: SURFACE: 300N96500126300
Well: HUSKY LITTLE BEAR N-09
Company: HUSKY OIL OPERATIONS LIMIT

CASING EVALUATION
ULTRASONIC IMAGING LOG

LOCATION

SURFACE: 300N96500126300		Elev.: K.B.	258.80 m
UWID: 300N96500126300		G.L.	253.52 m
		D.F.	
Permanent Datum:	GROUND LEVEL	Elev.:	253.52 m
Log Measured From:	KELLY BUSHING	5.28 m	above Perm. Datum
Drilling Measured From:	KELLY BUSHING		

API Serial No.			
1204			

Logging Date		29-Jan-2013				
Run Number		ONE				
Depth Driller		1844 m				
Schlumberger Depth		1840 m				
Bottom Log Interval		1840 m				
Top Log Interval		20 m				
Casing Fluid Type		FRAC OIL				
Salinity						
Density		810 kg/m3				
Fluid Level		0 m				
BIT/CASING/TUBING STRING						
Bit Size		222.000 mm				
From		639 m				
To		1670 m				
Casing/Tubing Size		177.800 mm				
Weight		34.2 kg/m				
Grade		L-80				
From		5.47 m				
To		1868 m				
Maximum Recorded Temperatures						
Logger On Bottom	Time	29-Jan-2013	12:45			
Unit Number	Location	3139	NORMAN WELLS			
Recorded By		SHAWN REID				
Witnessed By		WARREN WATSON				

		Run 1	Run 2	Run
PVT DATA	Oil Density			
	Water Salinity			
	Gas Gravity			
	Bo			
	Bw			
	1/Bg			
	Bubble Point Pressure			
	Bubble Point Temperature			
	Solution GOR			
Maximum Deviation		0 deg		
CEMENTING DATA				
Primary/Squeeze		Primary		
Casing String No				
Lead Cement Type		HI LITE 1400		
Volume		24.1 m3		
Density		1400 kg/m3		
Water Loss				
Additives				
Tail Cement Type				
Volume				
Density				
Water Loss				
Additives				
Expected Cement Top				
Logging Date				
Run Number				
Depth Driller				
Schlumberger Depth				
Bottom Log Interval				
Top Log Interval				
Casing Fluid Type				
Salinity				
Density				
Fluid Level				
BIT/CASING/TUBING STRING				
Bit Size				
From				
To				
Casing/Tubing Size				
Weight				
Grade				
From				
To				
Maximum Recorded Temperatures				
Logger On Bottom	Time			
Unit Number	Location			
Recorded By				
Witnessed By				

3

Run 4

DEPTH SUMMARY LISTING

Date Created: 29-JAN-2013 20:33:14

Depth System Equipment

Depth Measuring Device		Tension Device		Logging Cable	
Type:	IDW-B	Type:	CMTD-B/A	Type:	7-39P LXS
Serial Number:	6162	Serial Number:		Serial Number:	
Calibration Date:		Calibration Date:	16-AUG-2012	Length:	5600 M
Calibrator Serial Number:	4	Calibrator Serial Number:	0	Conveyance Method:	Wireline
Calibration Cable Type:	7-39P LXS	Number of Calibration Points:	10	Rig Type:	LAND
Wheel Correction 1:	-3	Calibration RMS:	13		
Wheel Correction 2:	-1	Calibration Peak Error:	20		

Depth Control Parameters

Log Sequence:	First Log In the Well
Rig Up Length At Surface:	0.00 M
Rig Up Length At Bottom:	0.00 M
Rig Up Length Correction:	0.00 M
Stretch Correction:	
Tool Zero Check At Surface:	

Depth Control Remarks

1.
2.
3.
4.
5.
6.

DISCLAIMER
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OTHER SERVICES1	OTHER SERVICES2
OS1: CEMENT BOND LOG	OS1:
OS2:	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:
REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
LOG CORRELATED TO BAKER HUGHES	
SURFACE CASING: 244.48 KG/M, 53.57 KG/M LANDED AT 639 MKB	
PRODUCTION CASING: 177.8 KG/M, 34.23 KG/M LANDED AT 1868 MKB	
CEMENTED WITH 18.3 TONNES OF HI-LITE 1400 WITH 1.0% CaCL2, 0.2% D046 - ANTI FOAM	
1.2% FLAC B348 AND TAILED WITH 15.2 TONNES 'G' CEMENT WITH 0.2% ANTI FOAM,	

0.5% DISPERSANT, 0.4% FLUID LOSS AND 0.2% RETARDER

WELL LOGGED AT 0, 7, AND 28 MPA FROM TD TO 20 MKB

EXPLORATION LICENSE#: EL463 AND NEB OPERATING
LICENSE#: 1204

RUN 1			RUN 2		
SERVICE ORDER #:		BW5Q-00313	SERVICE ORDER #:		
PROGRAM VERSION:		17C0-154	PROGRAM VERSION:		
FLUID LEVEL:		0 m	FLUID LEVEL:		
LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

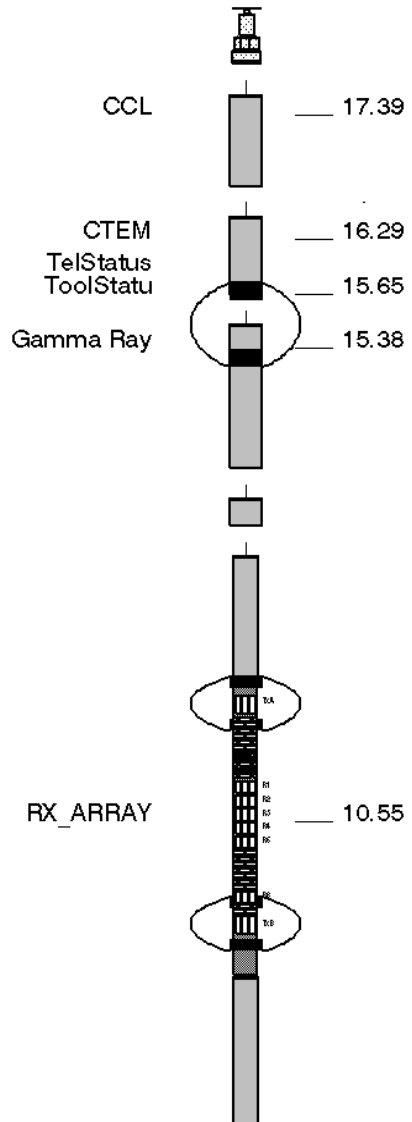
EQUIPMENT DESCRIPTION

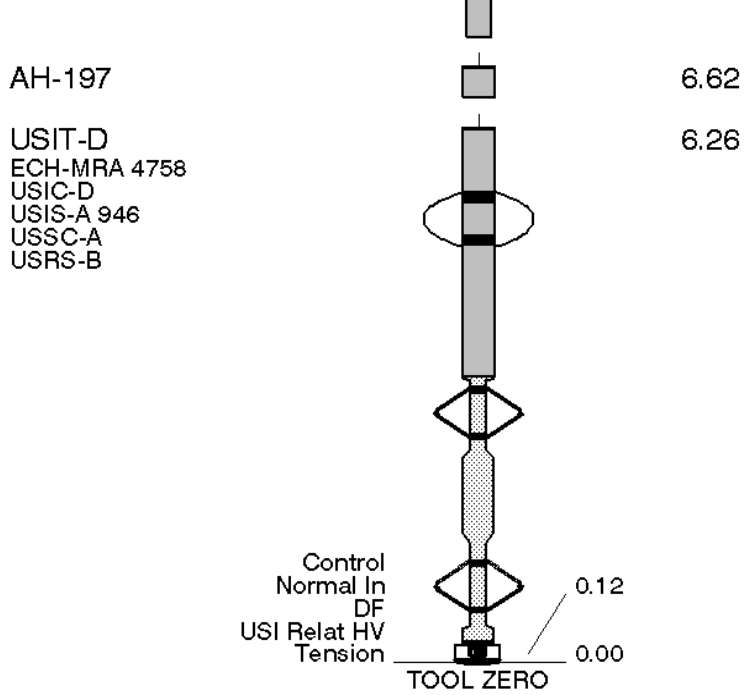
RUN 1 | RUN 2

SURFACE EQUIPMENT

GSR-U/Y
WITM (DTS)-A

DOWNHOLE EQUIPMENT





MAXIMUM STRING DIAMETER 191 MM
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN METERS

Schlumberger

MAIN PASS
28.0 MPA

MAXIS Field Log

Input DLIS Files

USI_SONIC_021LUP	FN:19	29-Jan-2013 18:43	1837.2 M	25.0 M

Output DLIS Files

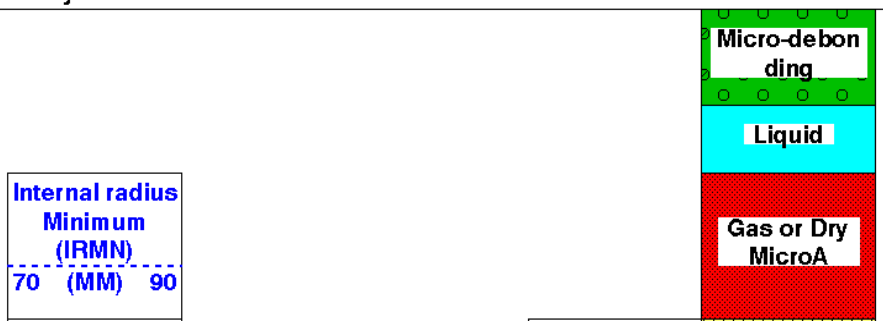
DEFAULT	USI_SONIC_023PUP	FN:21	PRODUCER	29-Jan-2013 20:06	1840.8 M	28.7 M

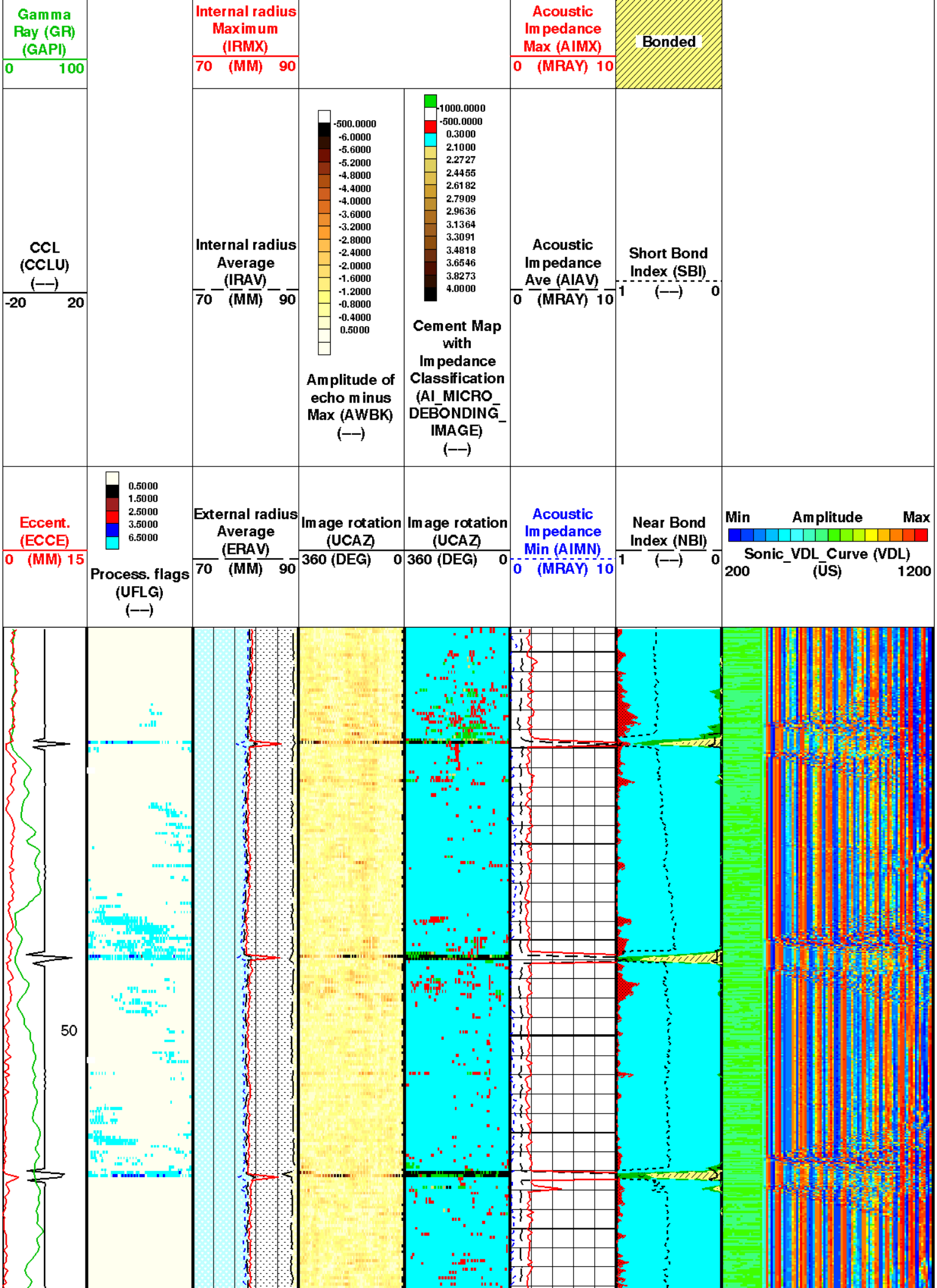
OP System Version: 17C0-154

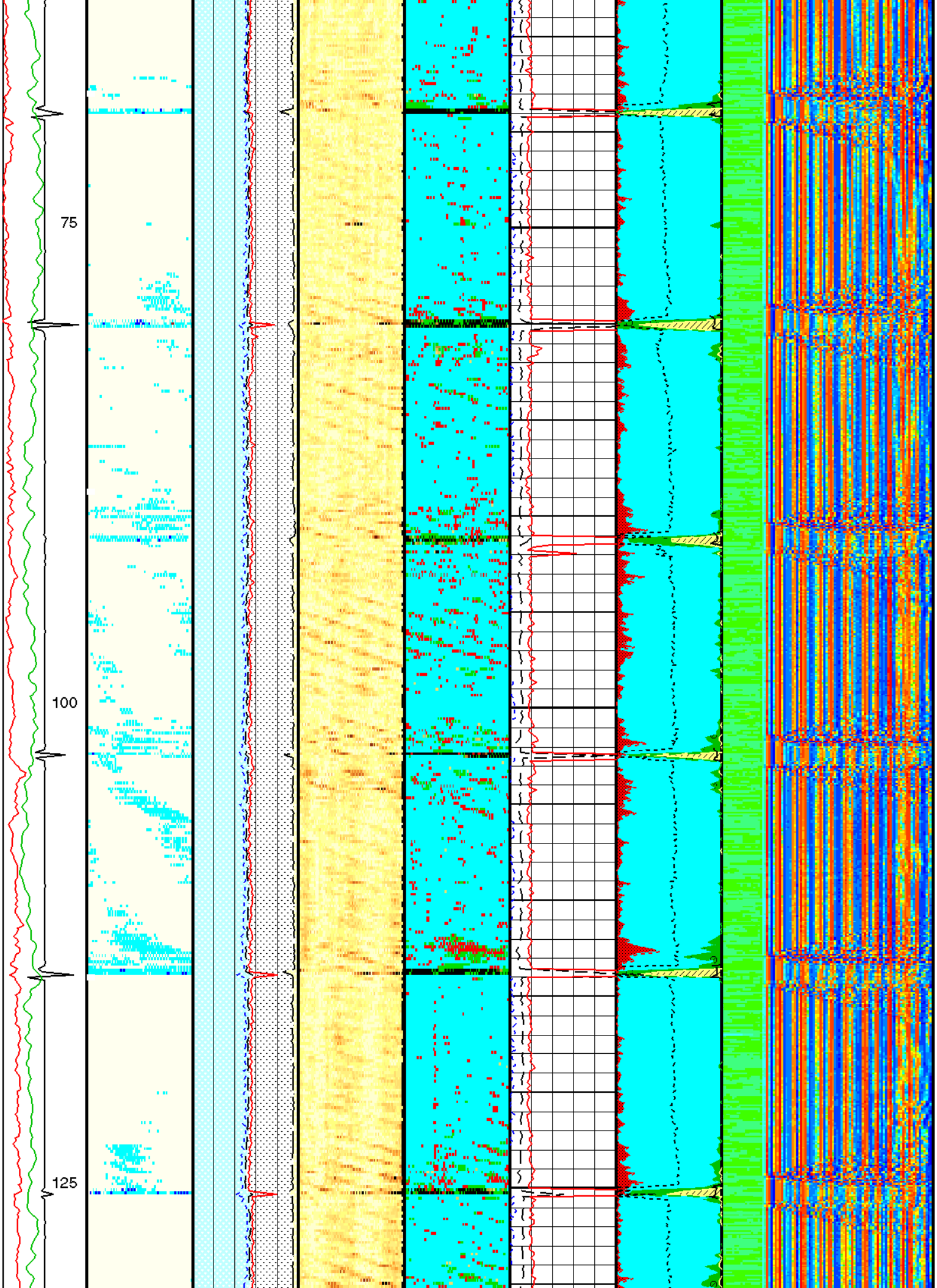
USIT-D	17C0-154	SSLT-C	17C0-154
SGT-N	17C0-154	DTC-H	17C0-154
CAL-Y	17C0-154		

PIP SUMMARY

Time Mark Every 60 S




Gamma Ray (GR) (GAPI)
0 100
Internal radius Maximum (IRMX)
70 (MM) 90
Acoustic Impedance Max (AIMX)
0 (MRAY) 10
Bonded
CCL (CCLU) (---)
-20 20
Internal radius Average (IRAV)
70 (MM) 90
-500.0000
-6.0000
-5.6000
-5.2000
-4.8000
-4.4000
-4.0000
-3.6000
-3.2000
-2.8000
-2.4000
-2.0000
-1.6000
-1.2000
-0.8000
-0.4000
0.5000
Amplitude of echo minus Max (AWBK) (---)
-1000.0000
-500.0000
0.3000
2.1000
2.2727
2.4455
2.6182
2.7909
2.9636
3.1364
3.3091
3.4818
3.6546
3.8273
4.0000
Cement Map with Impedance Classification (AI_MICRO_DEBONDING_IMAGE) (---)
Acoustic Impedance Ave (AIAV)
0 (MRAY) 10
Short Bond Index (SBI)
1 (---) 0
Eccent. (ECCE)
0 (MM) 15
0.5000
1.5000
2.5000
3.5000
6.5000
Process. flags (UFLG) (---)
External radius Average (ERAV)
70 (MM) 90
Image rotation (UCAZ)
360 (DEG) 0
Image rotation (UCAZ)
360 (DEG) 0
Acoustic Impedance Min (AIMN)
0 (MRAY) 10
Near Bond Index (NBI)
1 (---) 0
Min Amplitude Max
Sonic_VDL_Curve (VDL)
200 (US) 1200
50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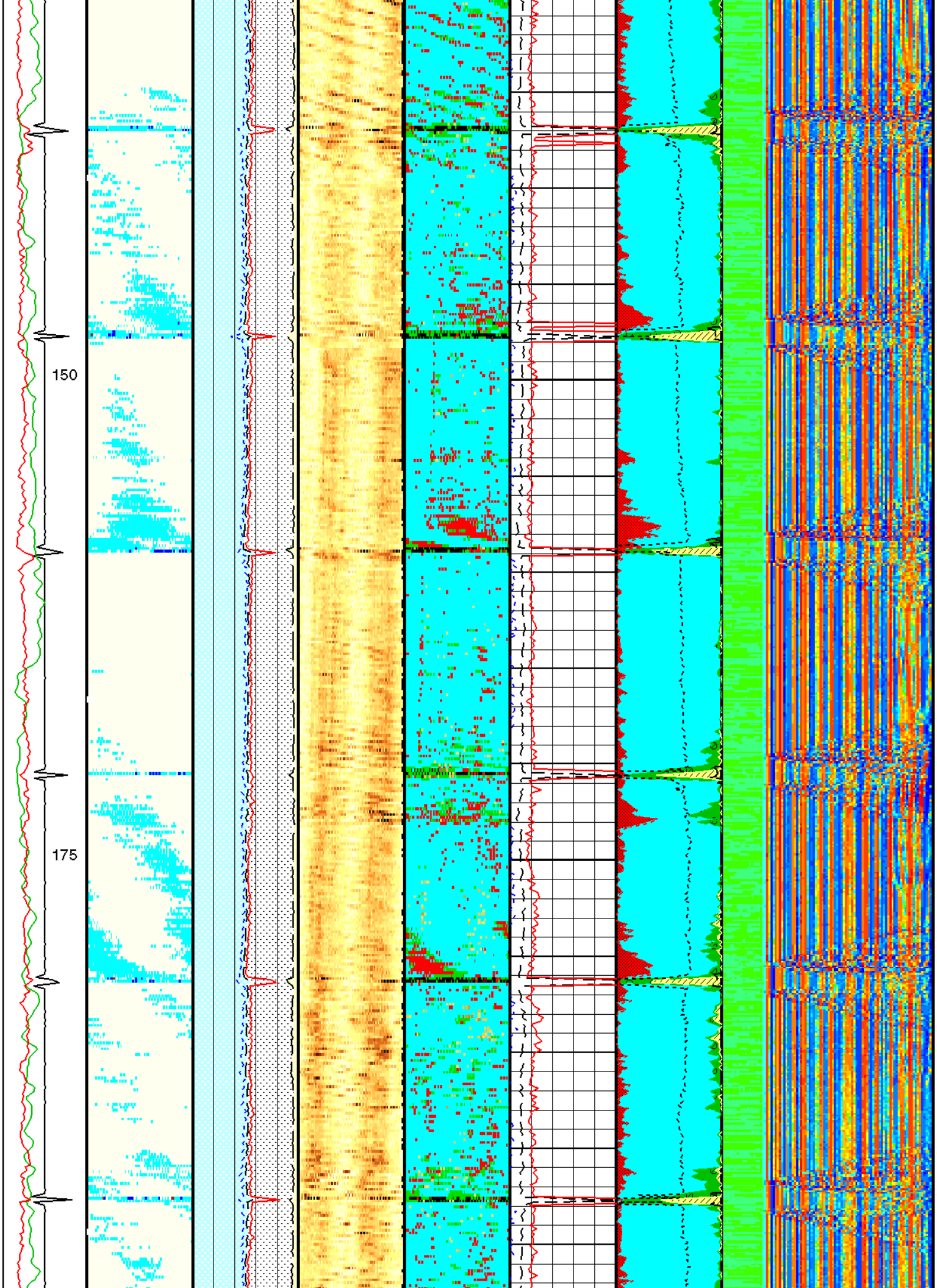
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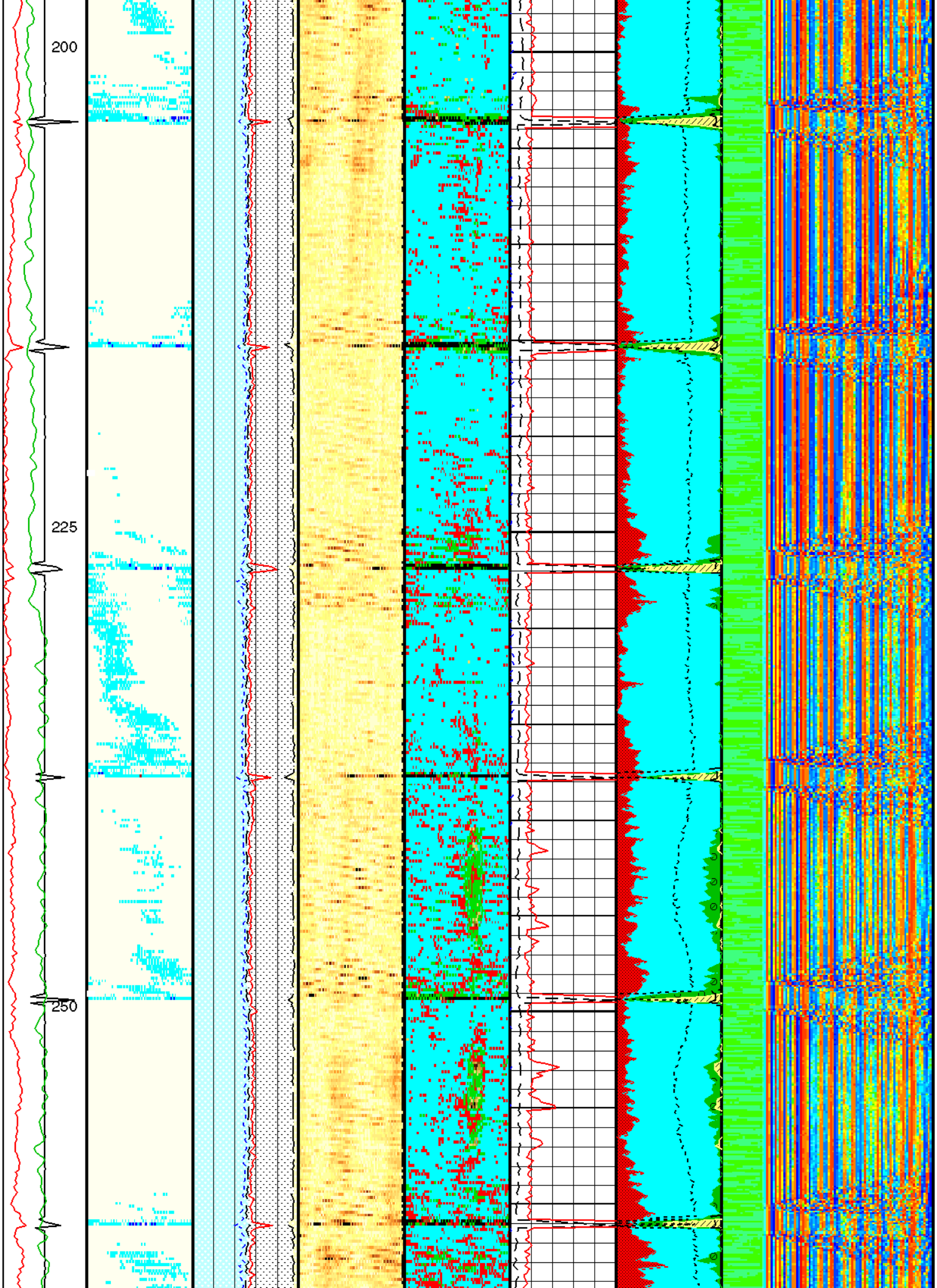
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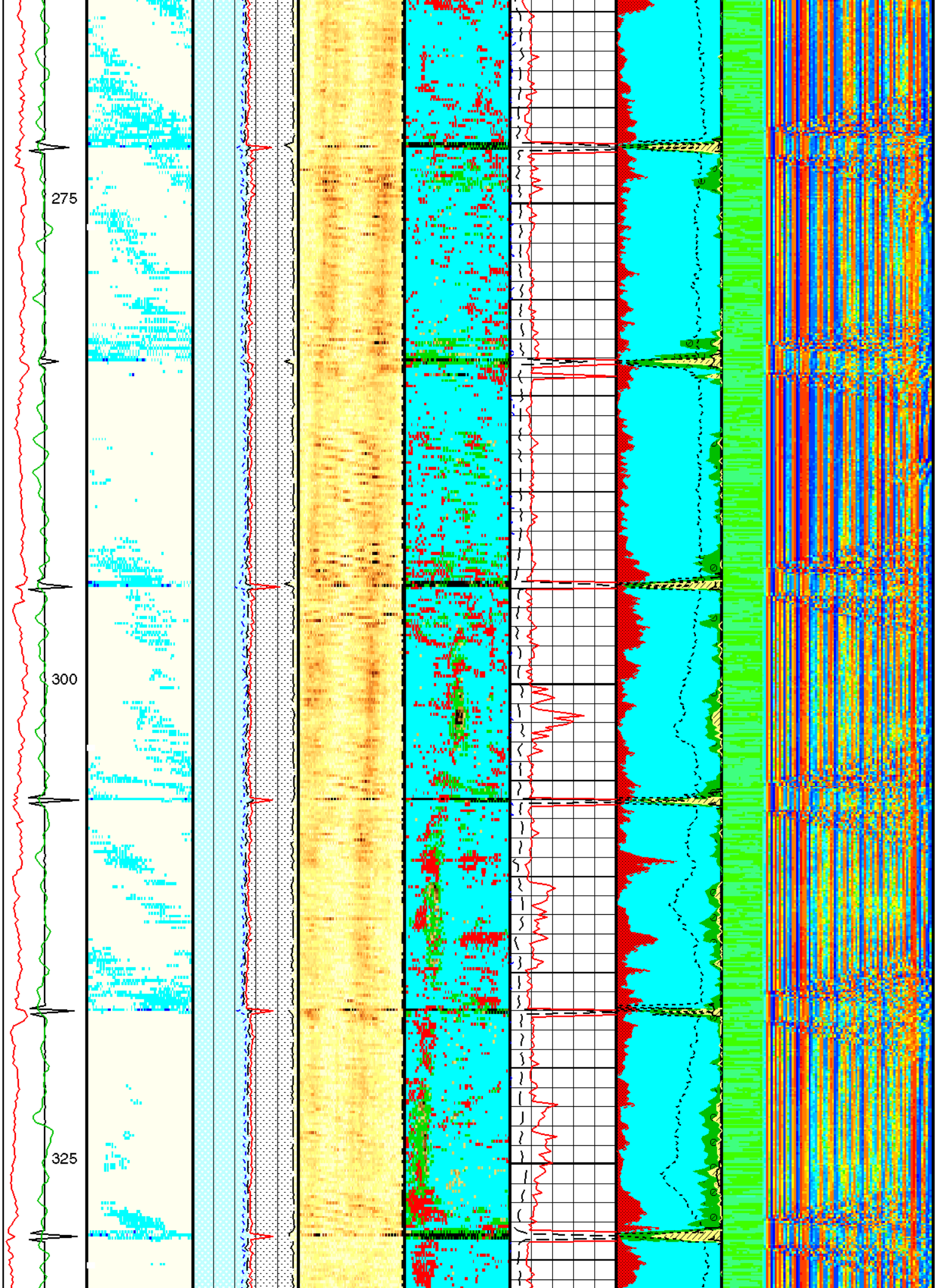
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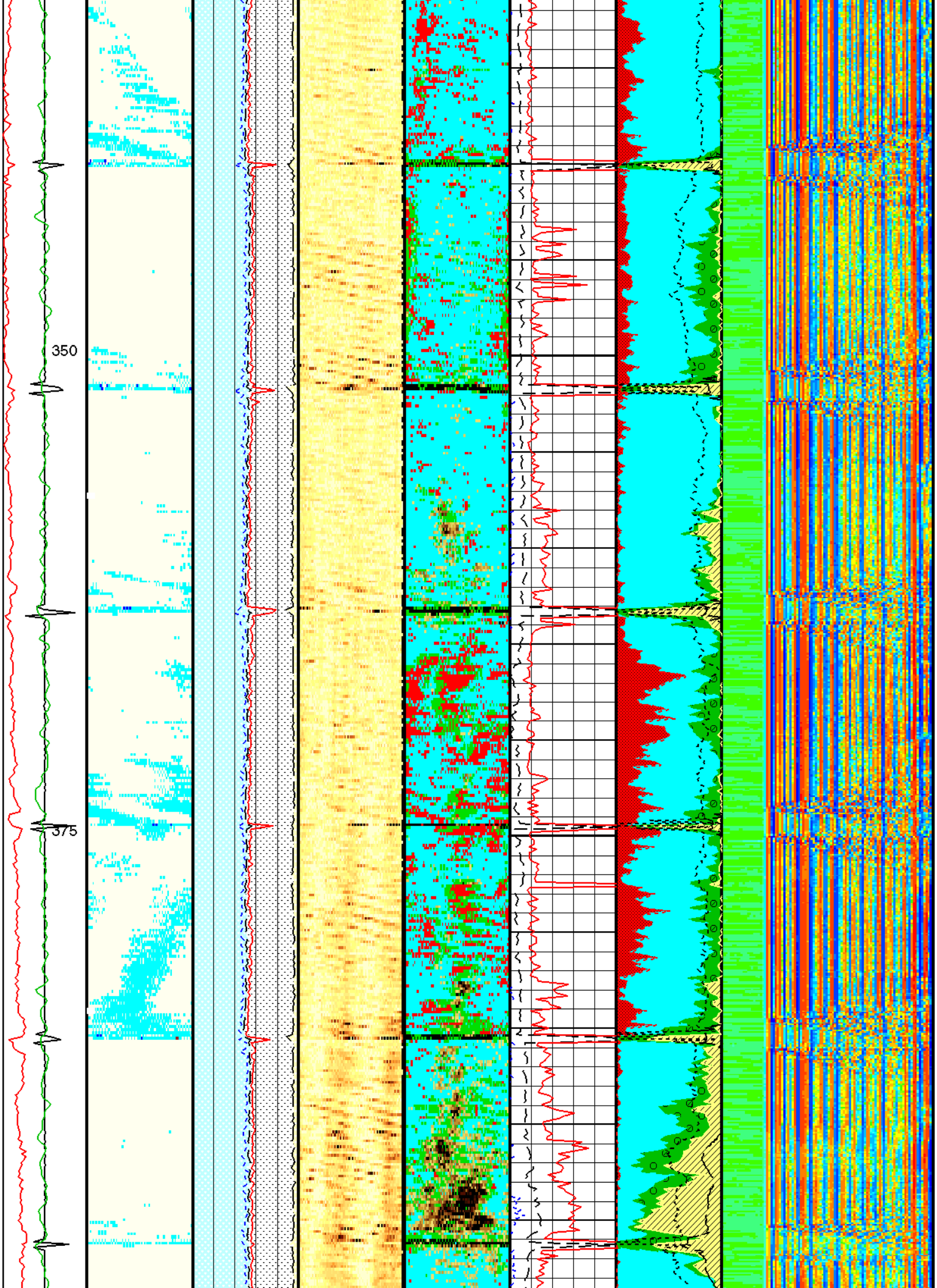
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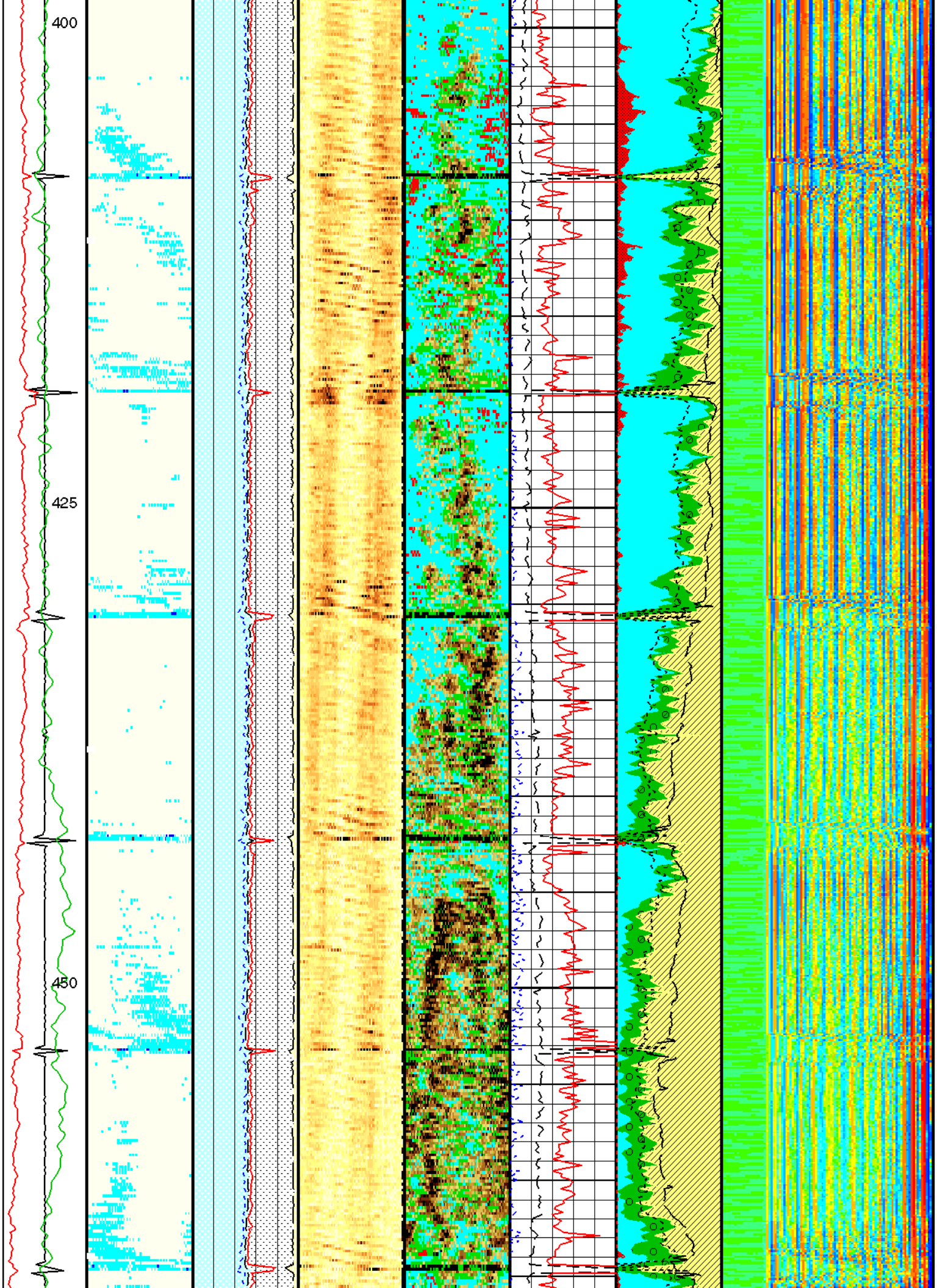
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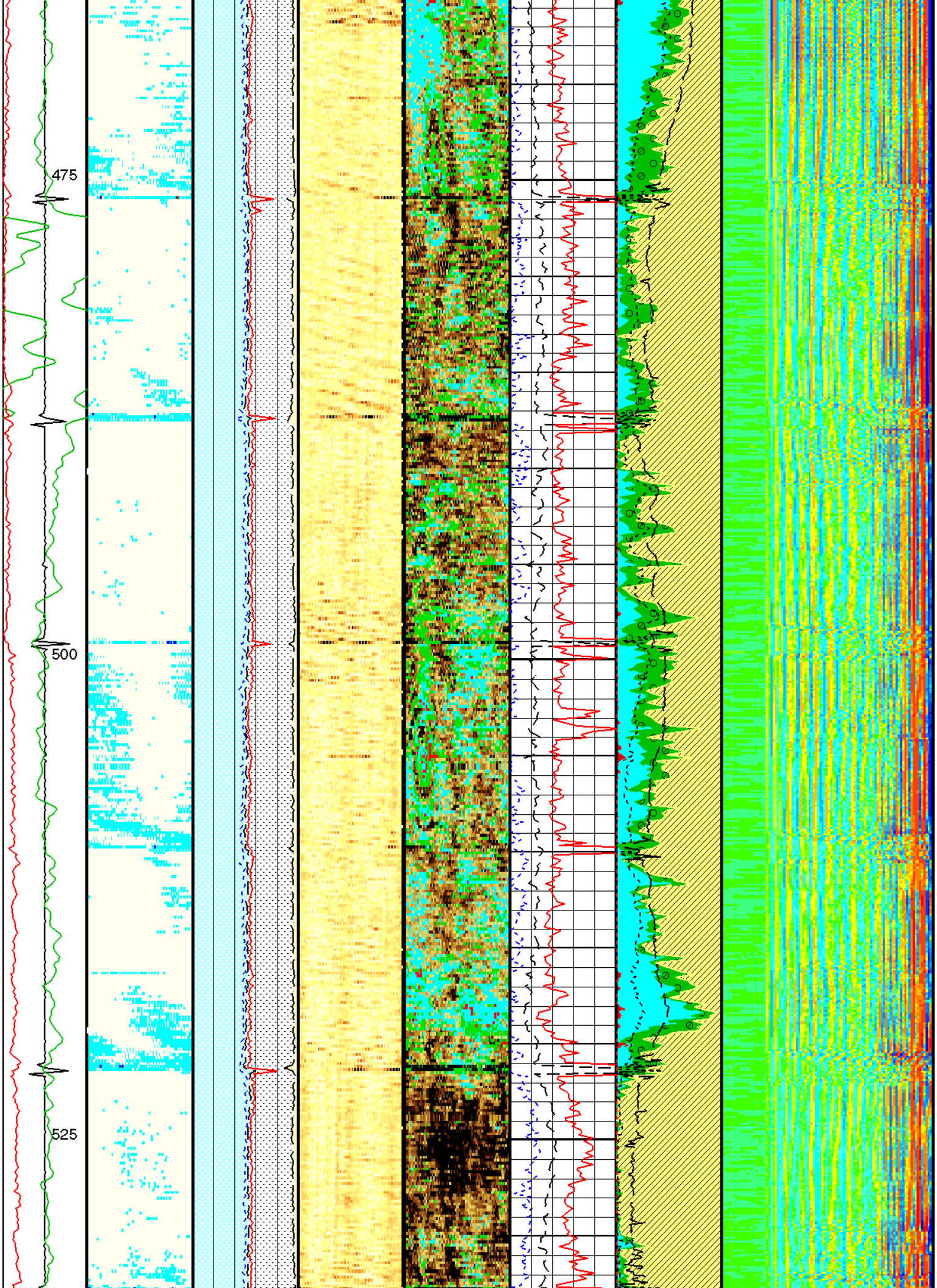
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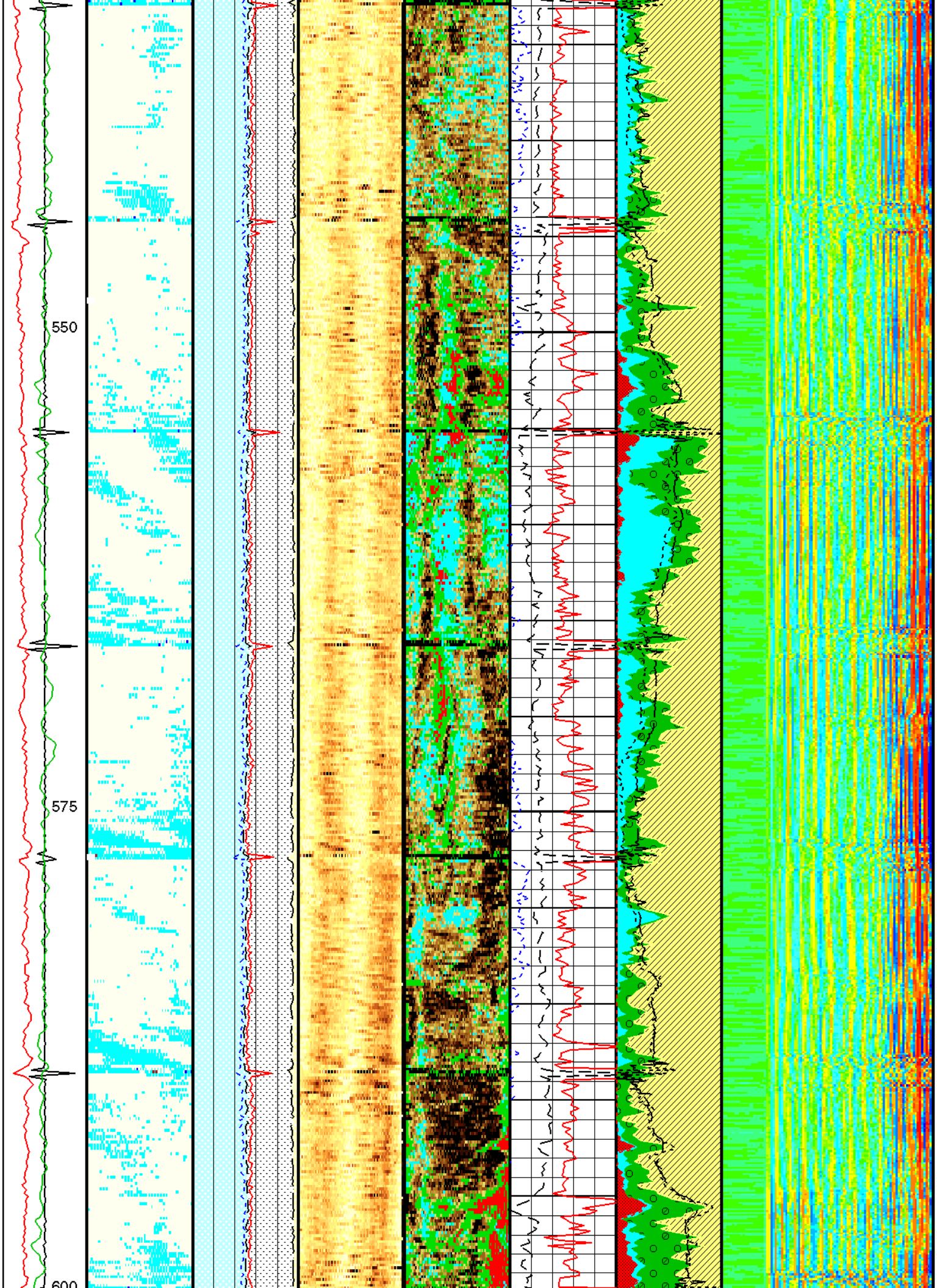
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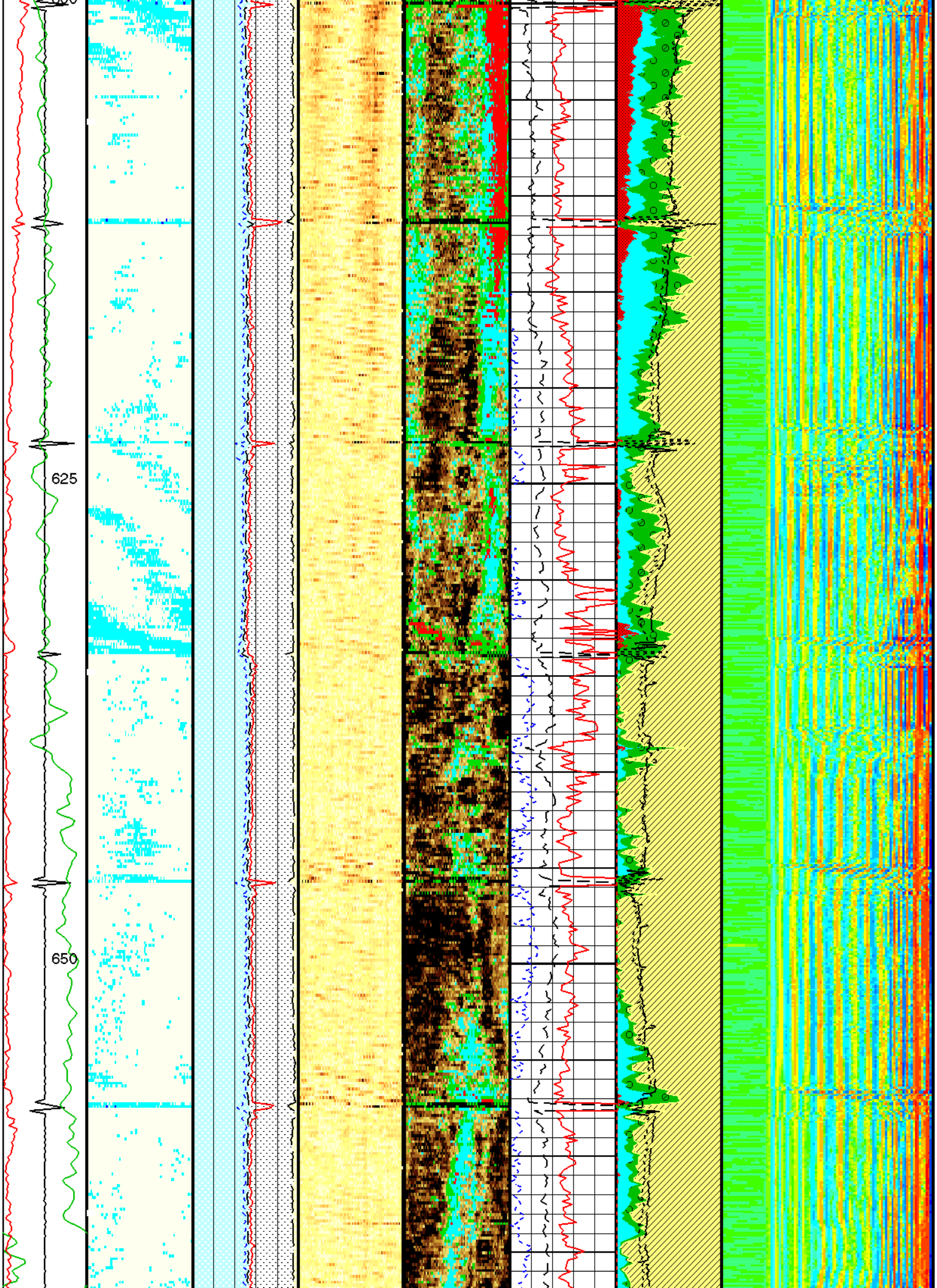
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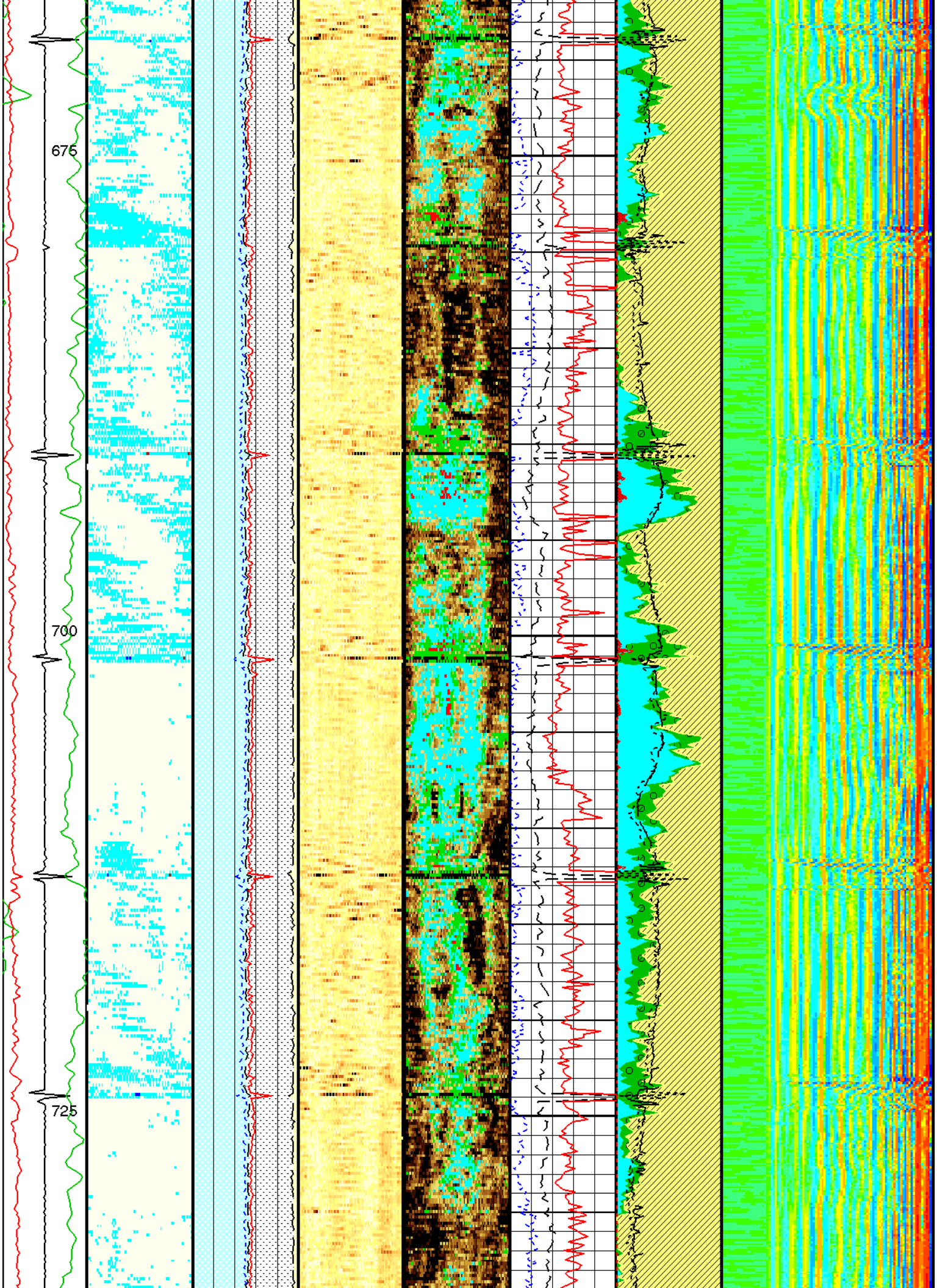
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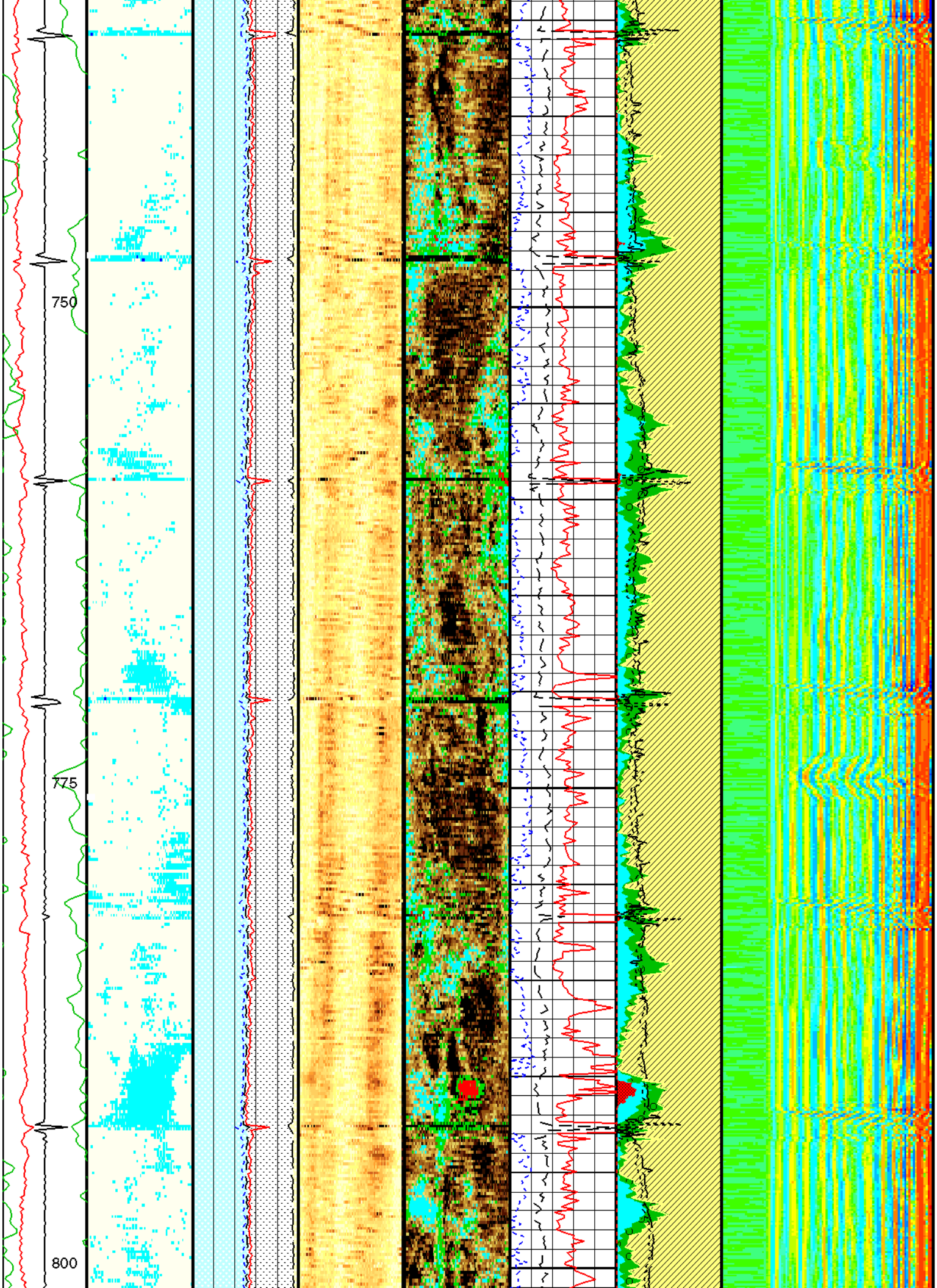
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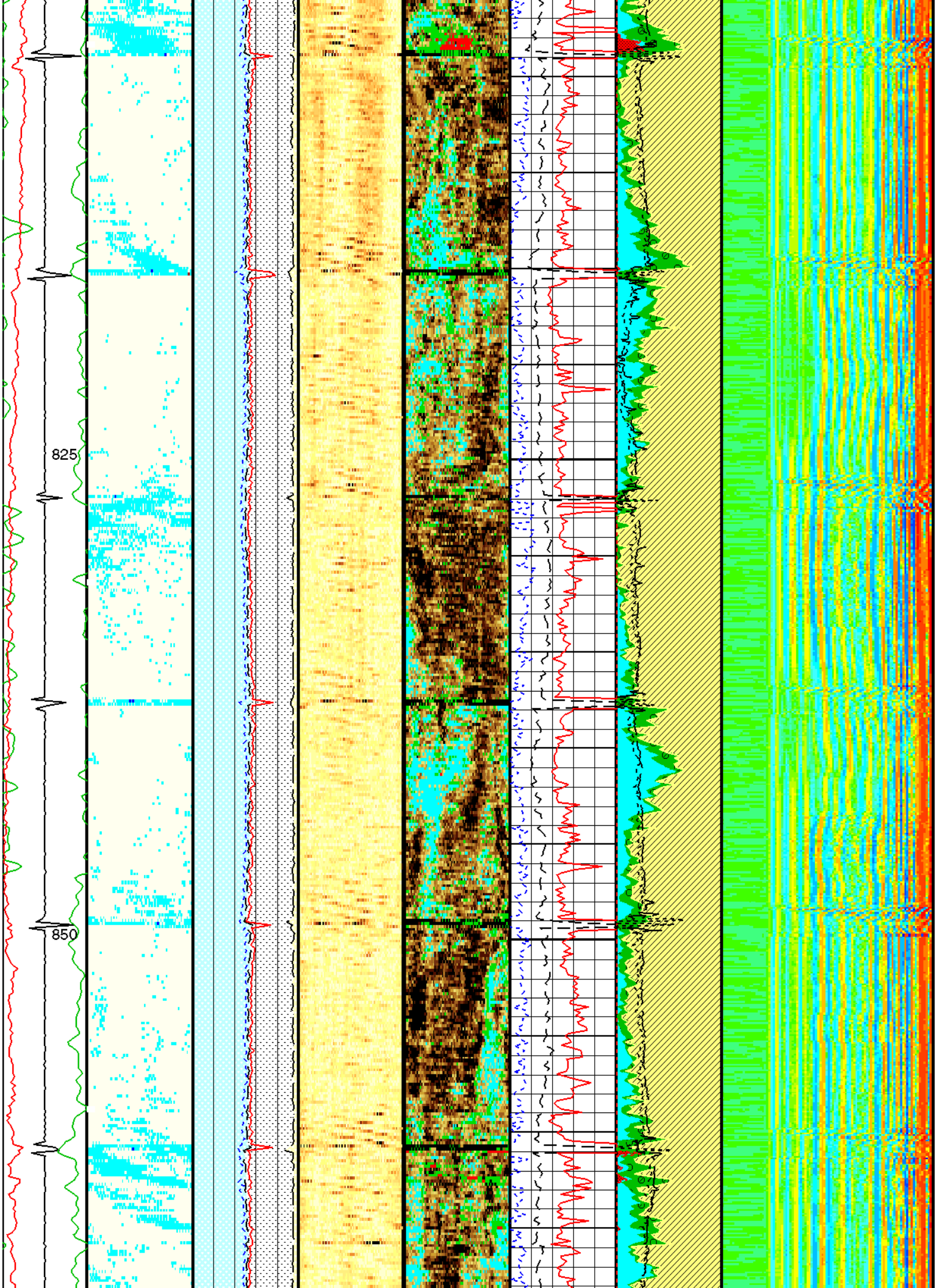
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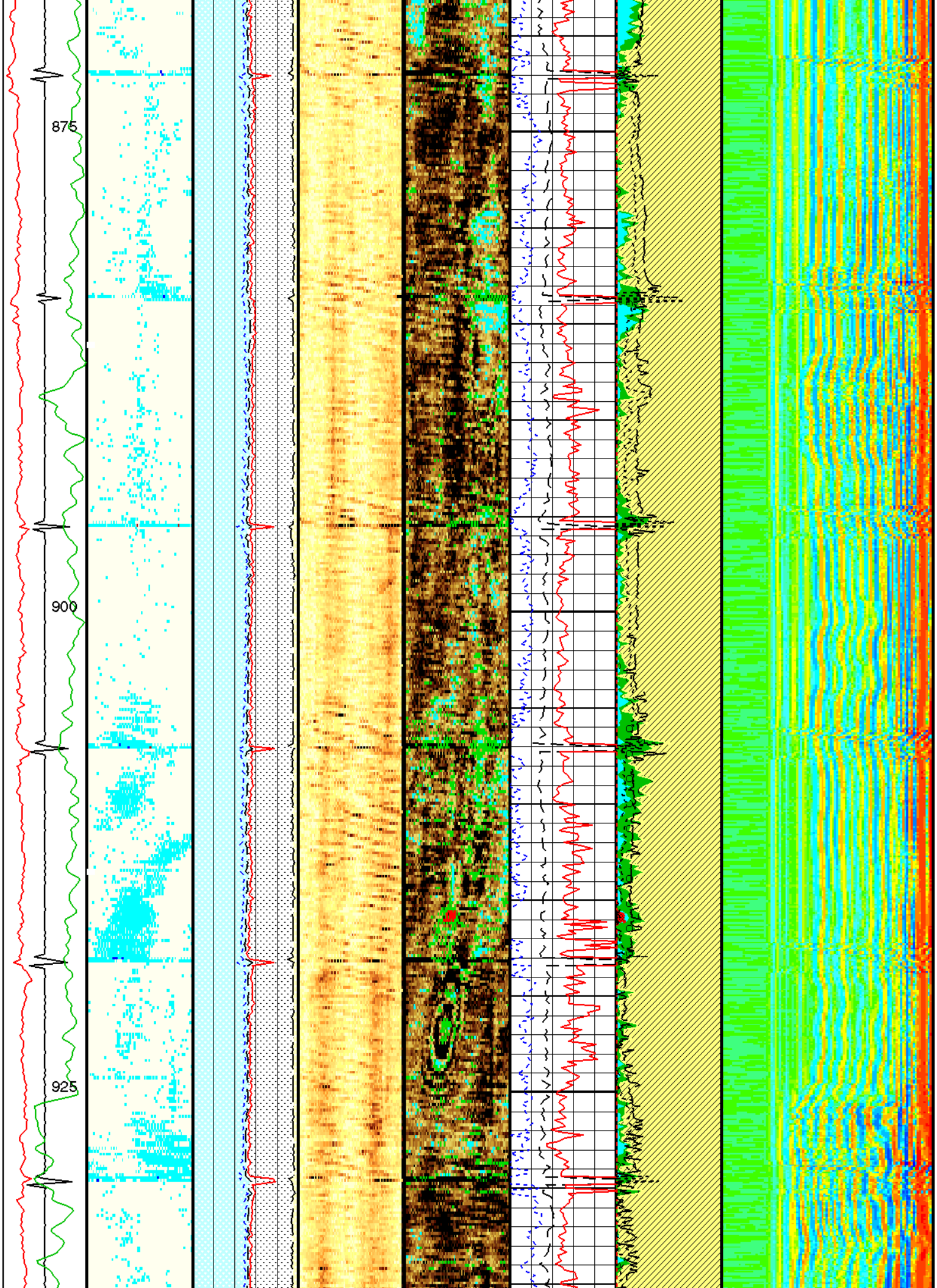
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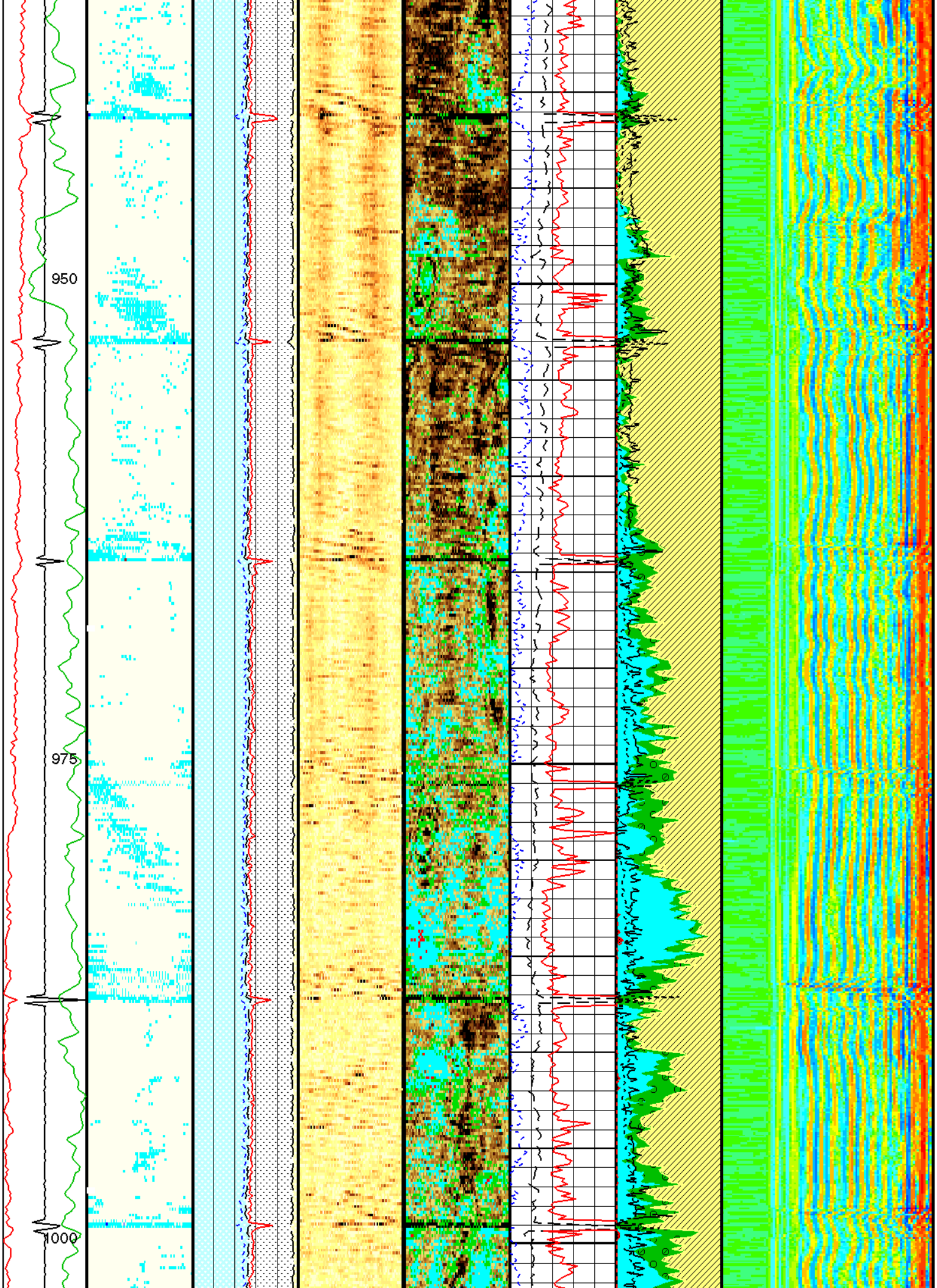
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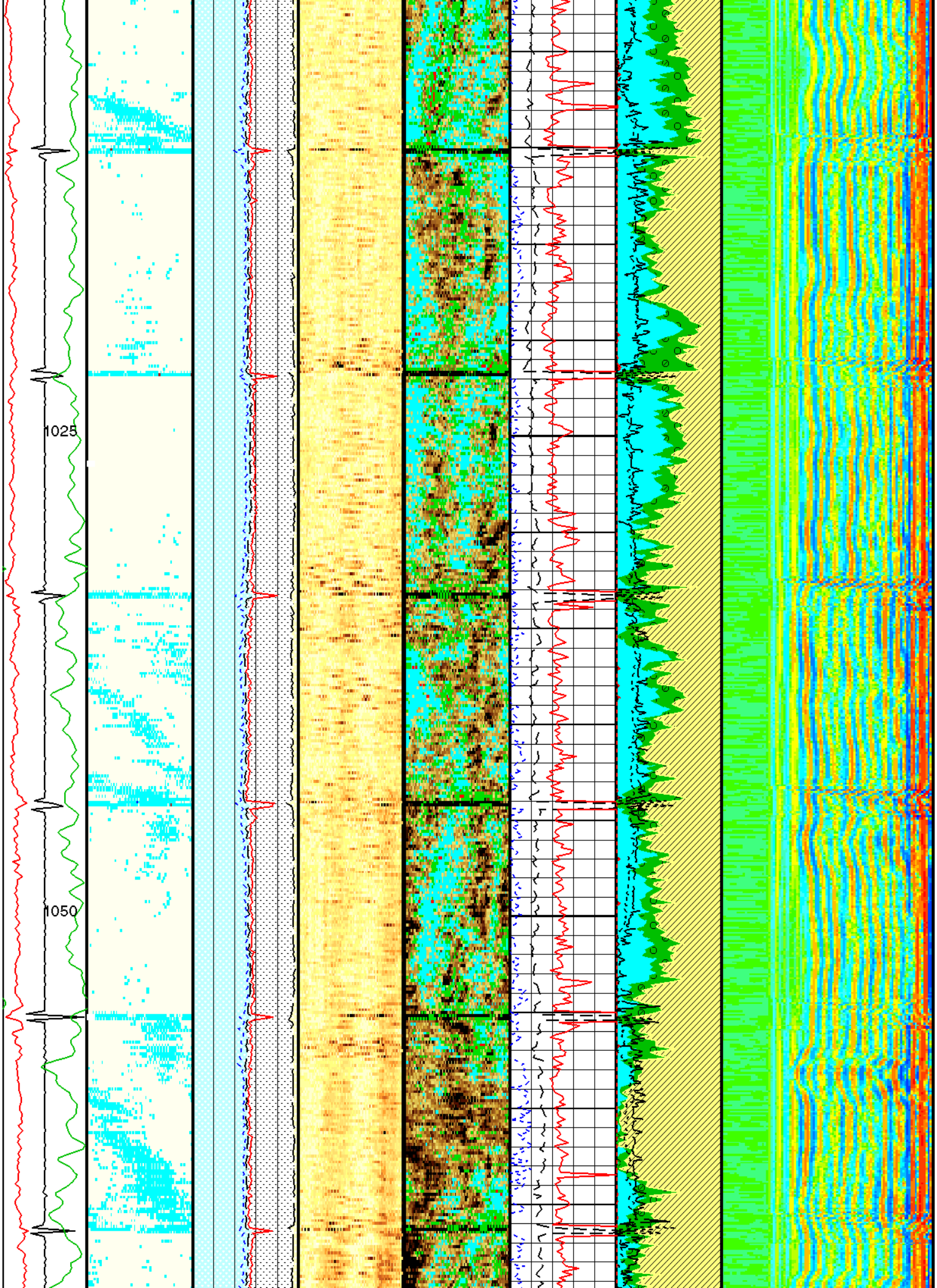
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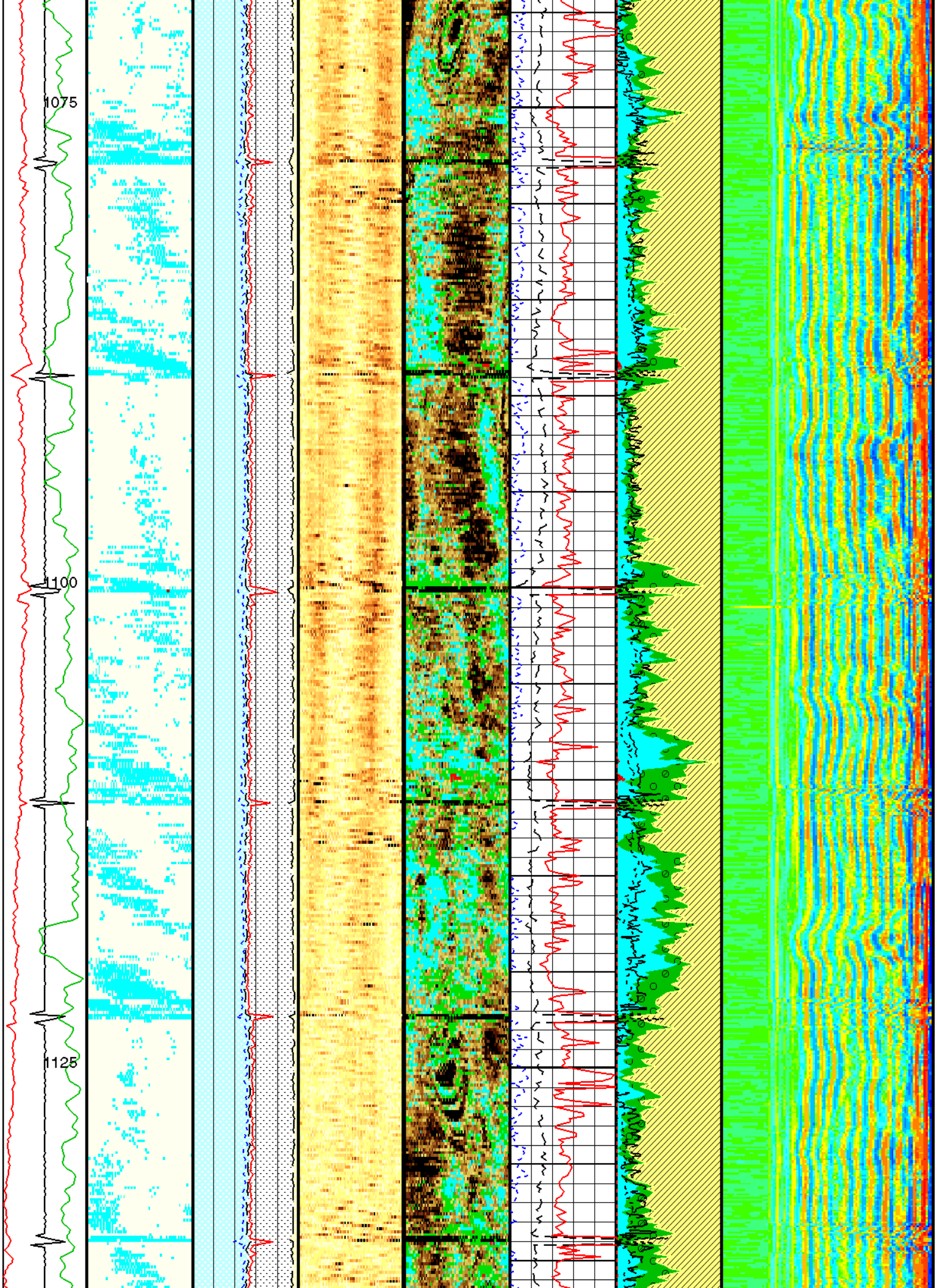
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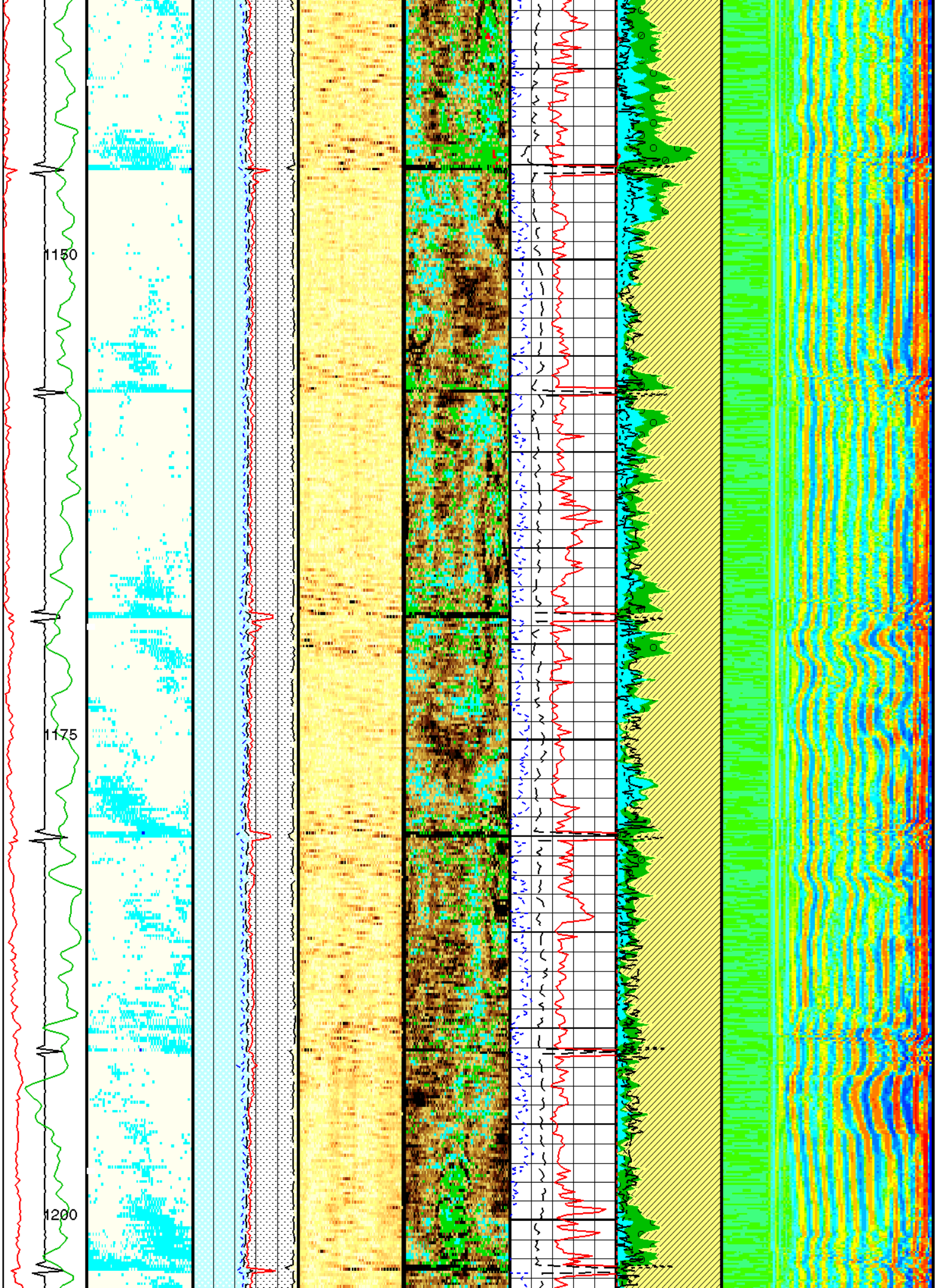
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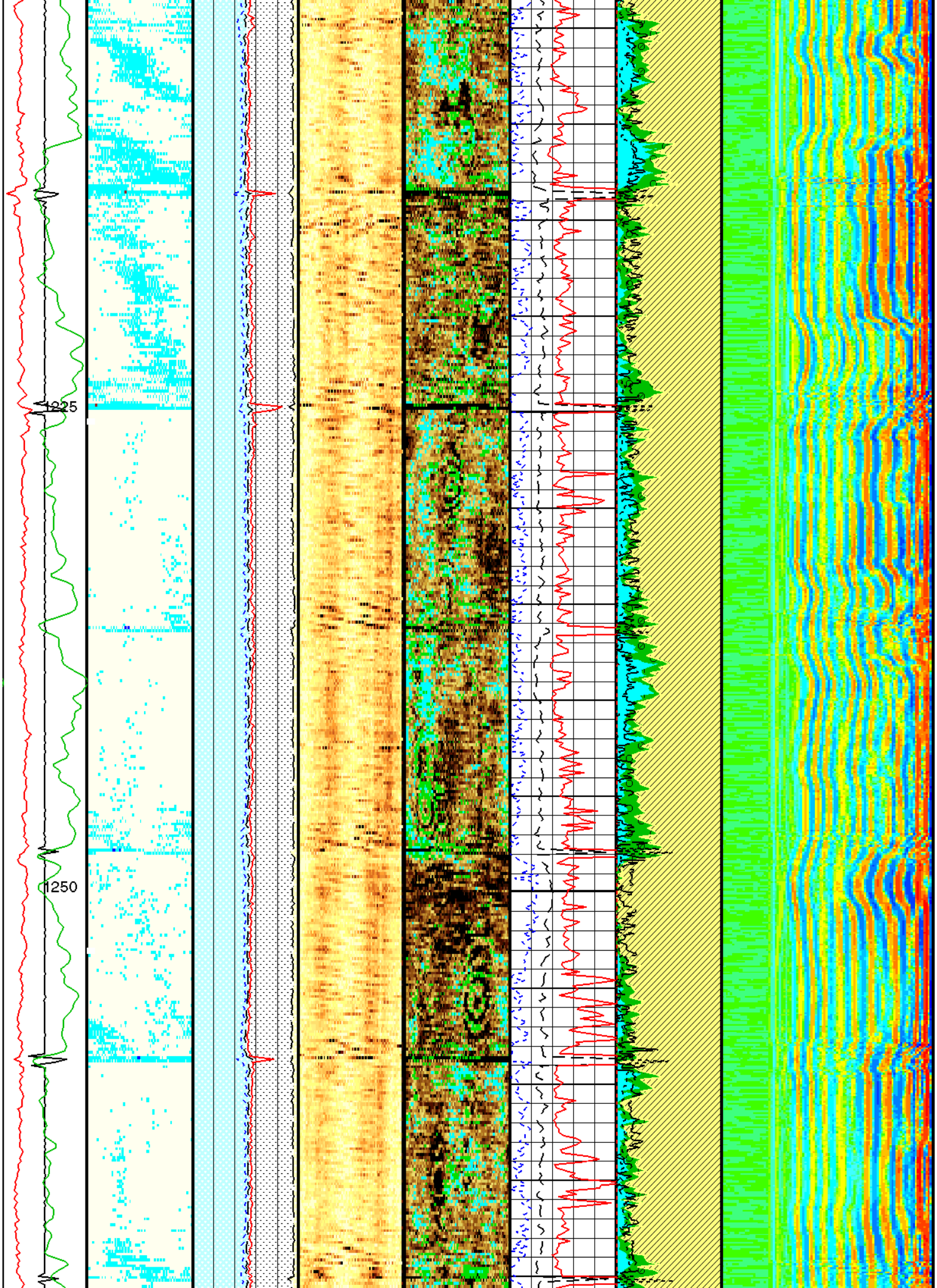
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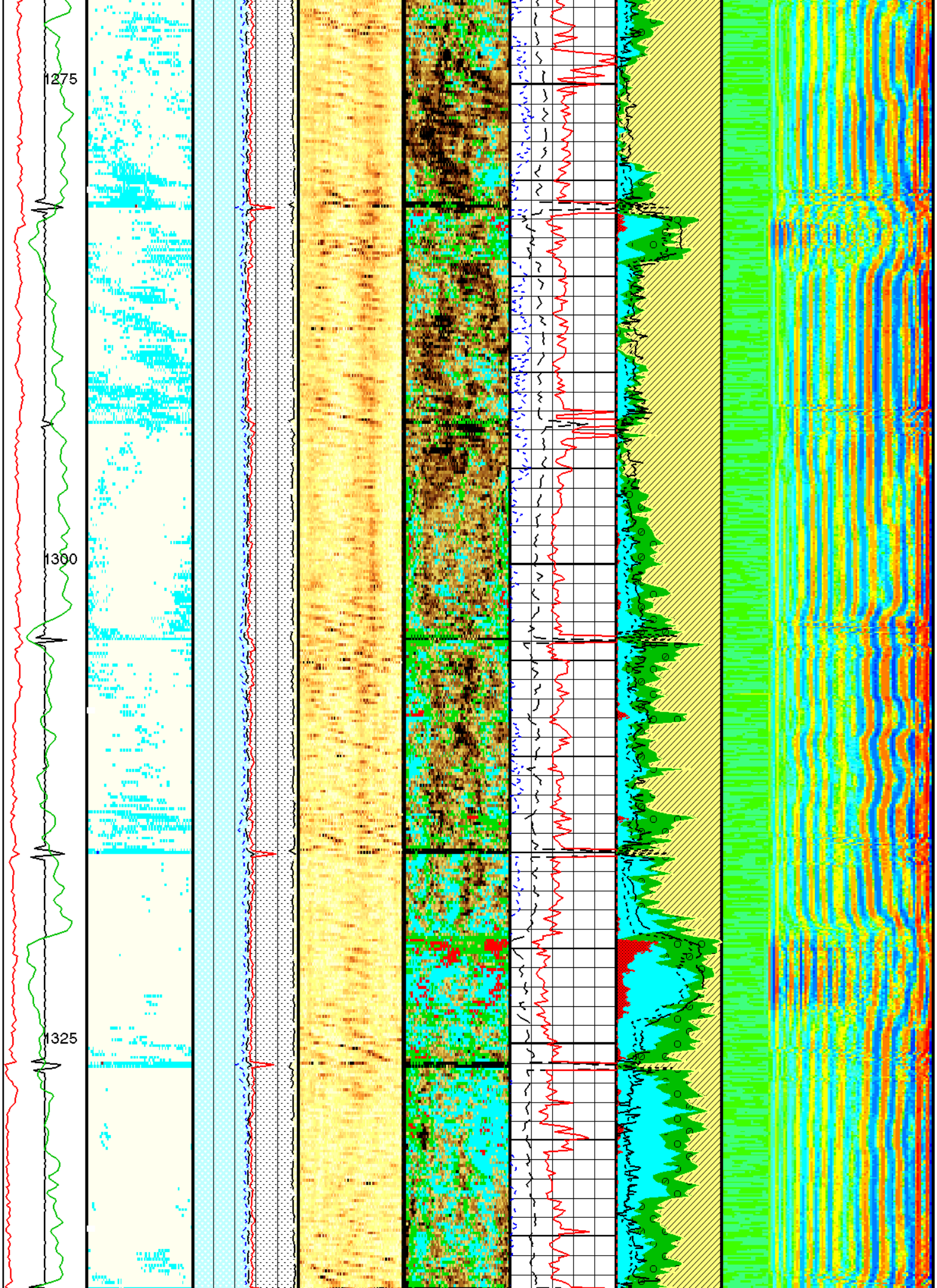
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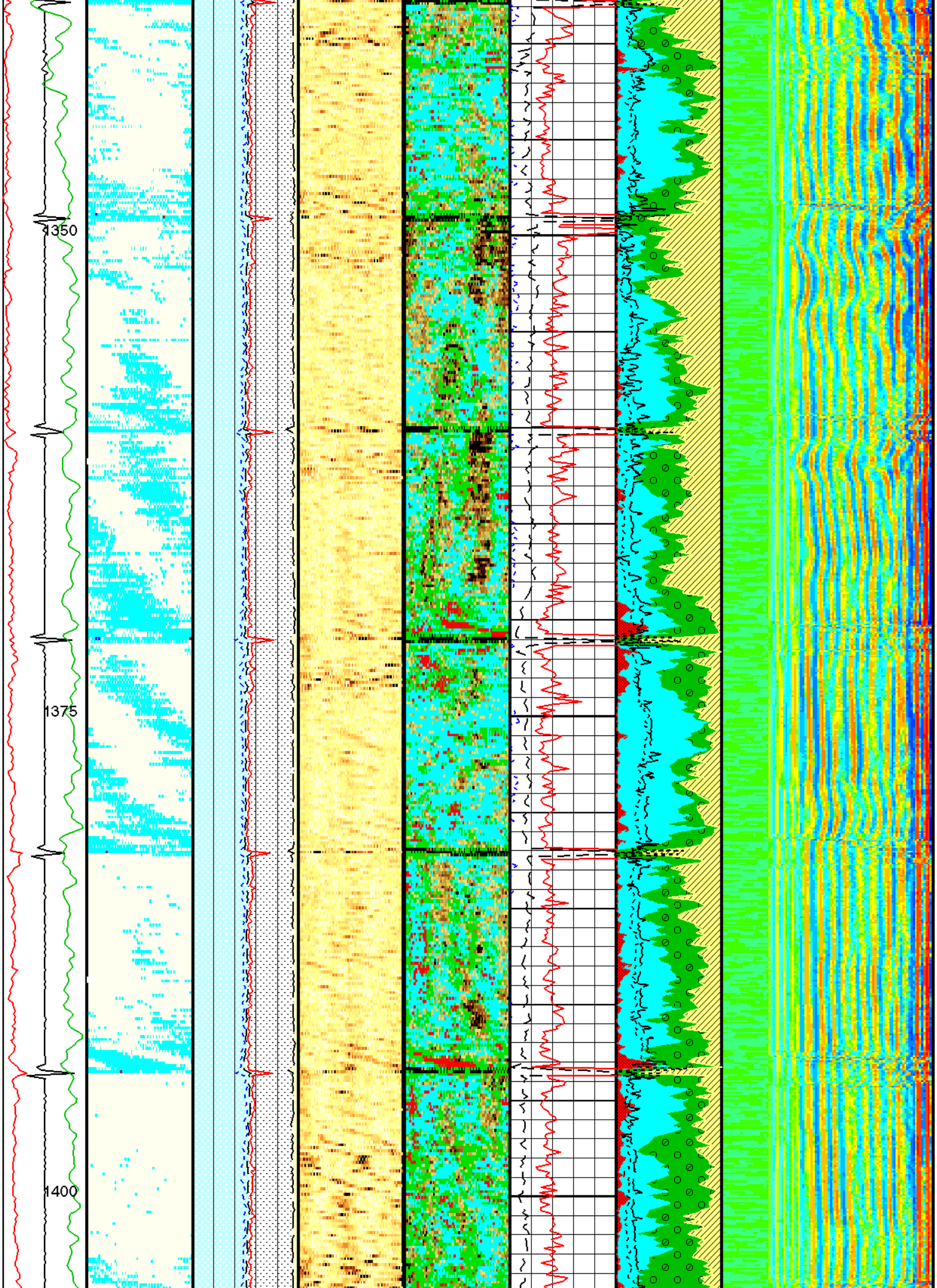
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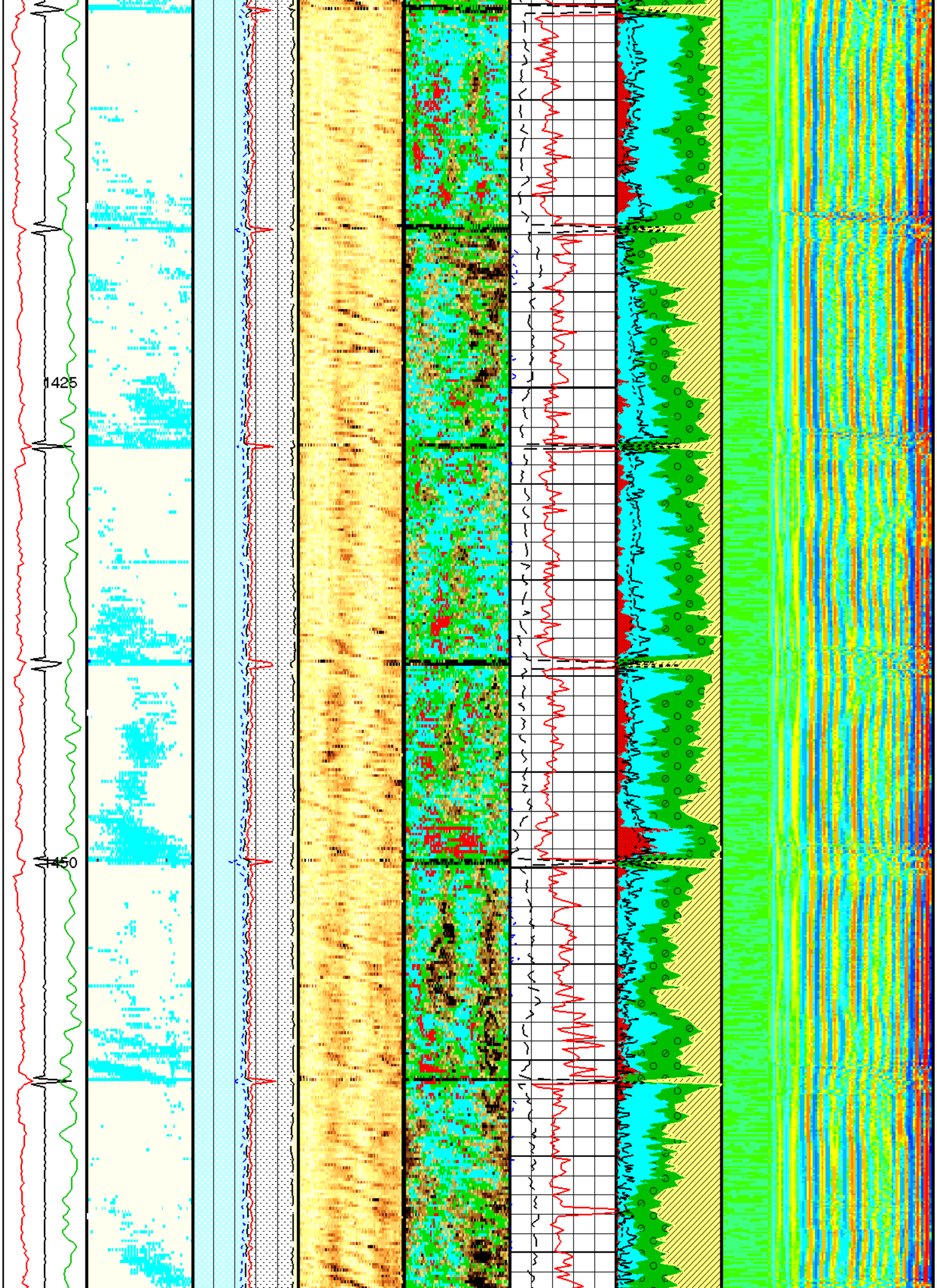
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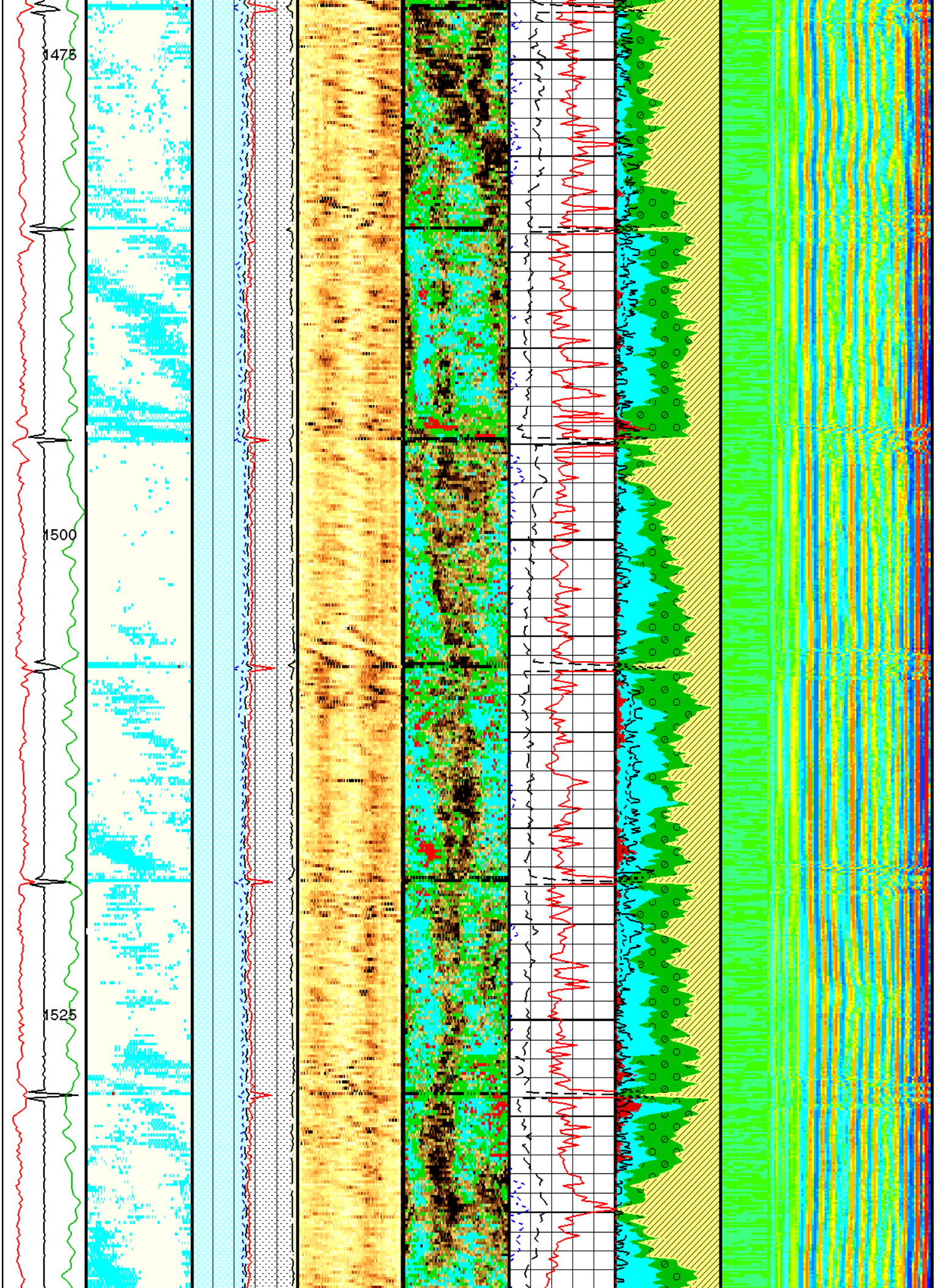
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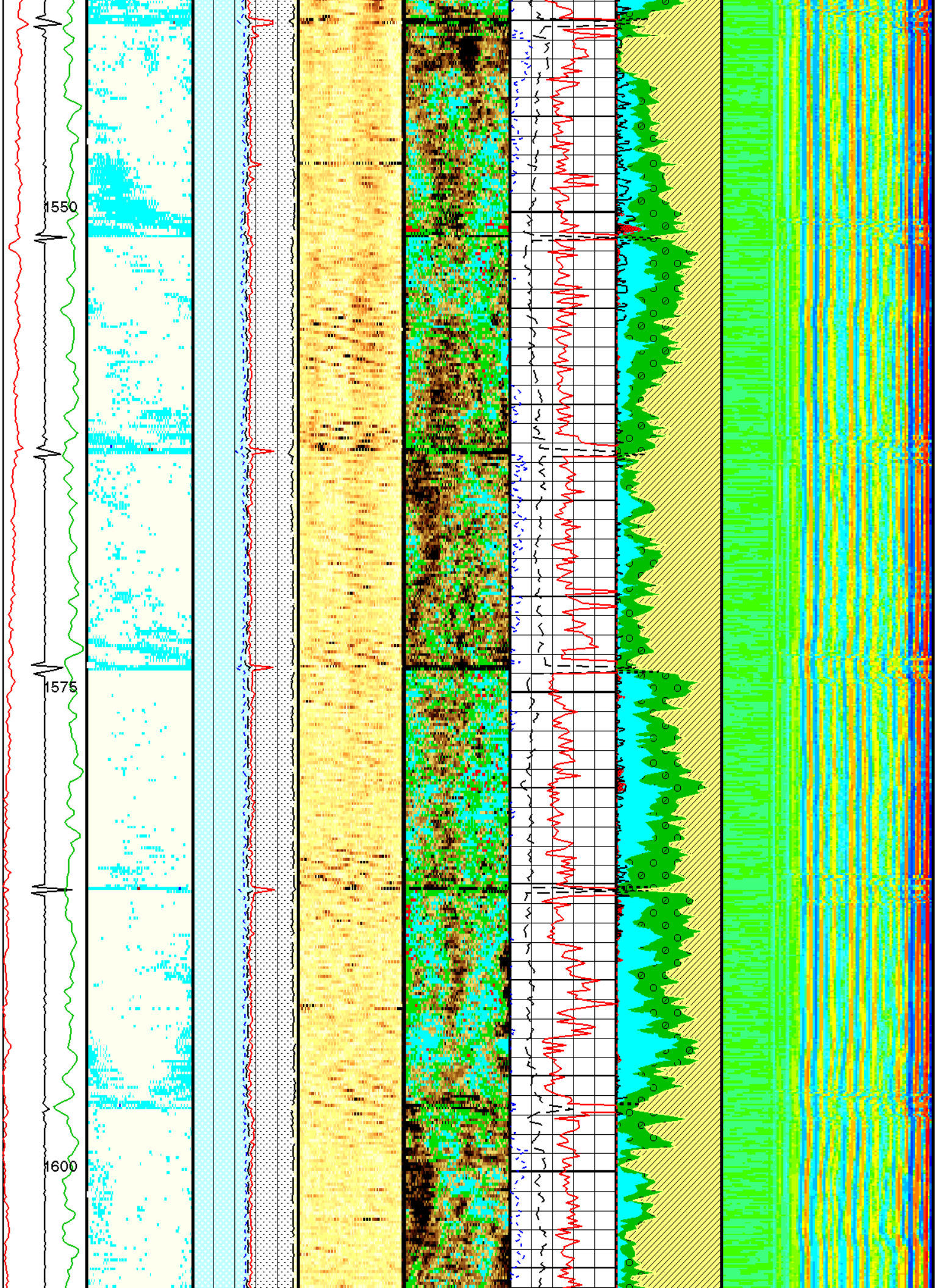
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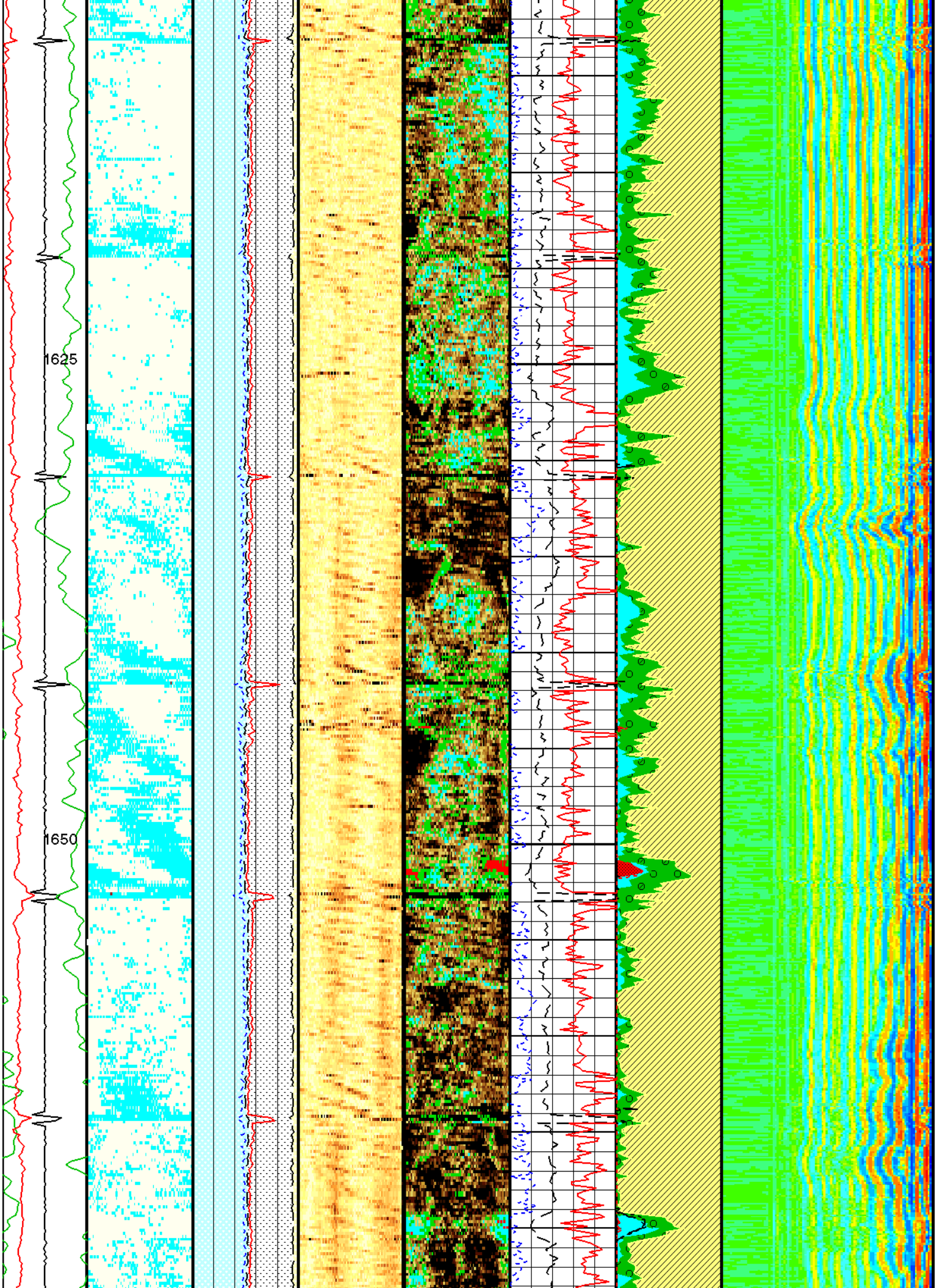
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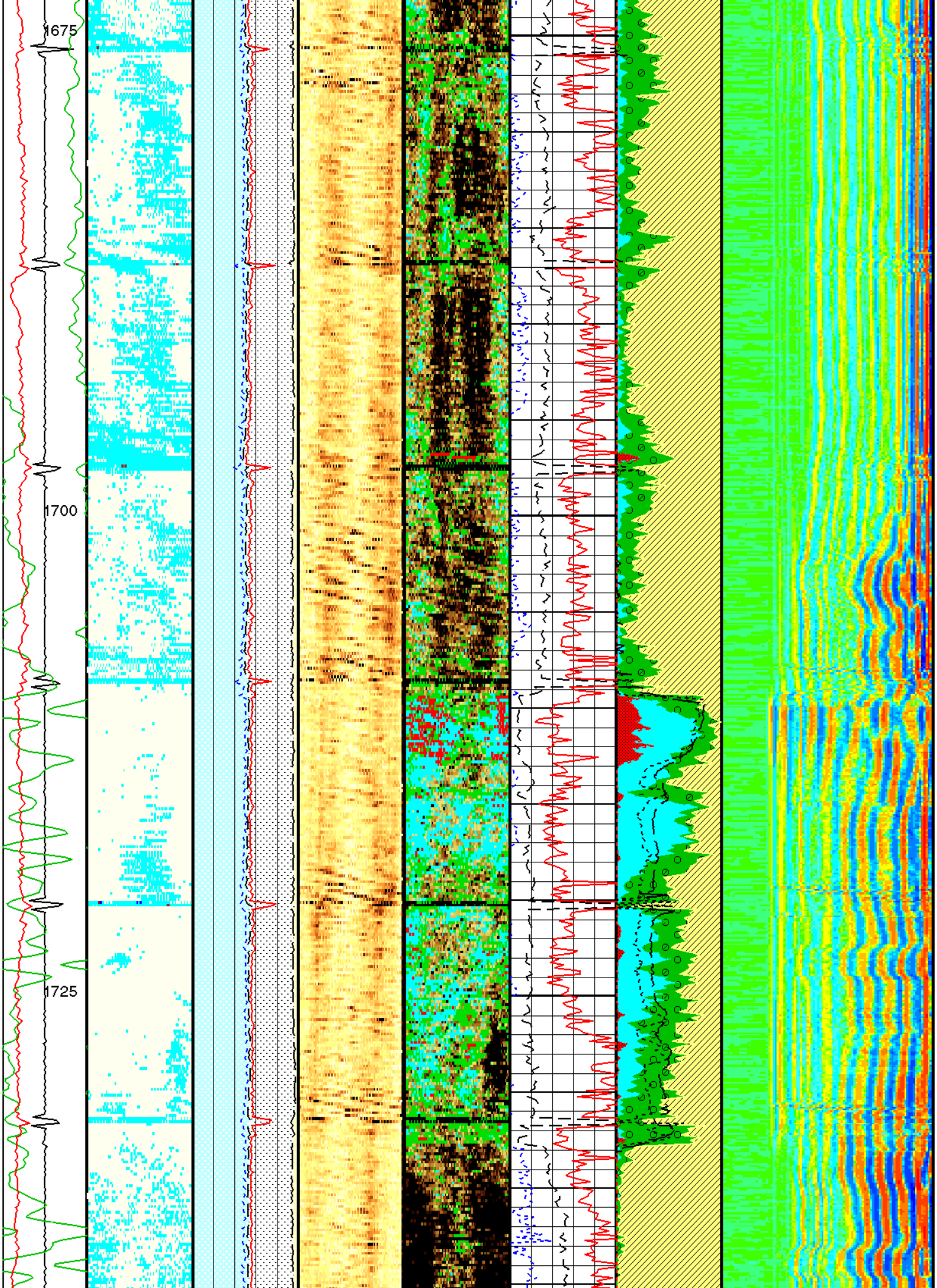
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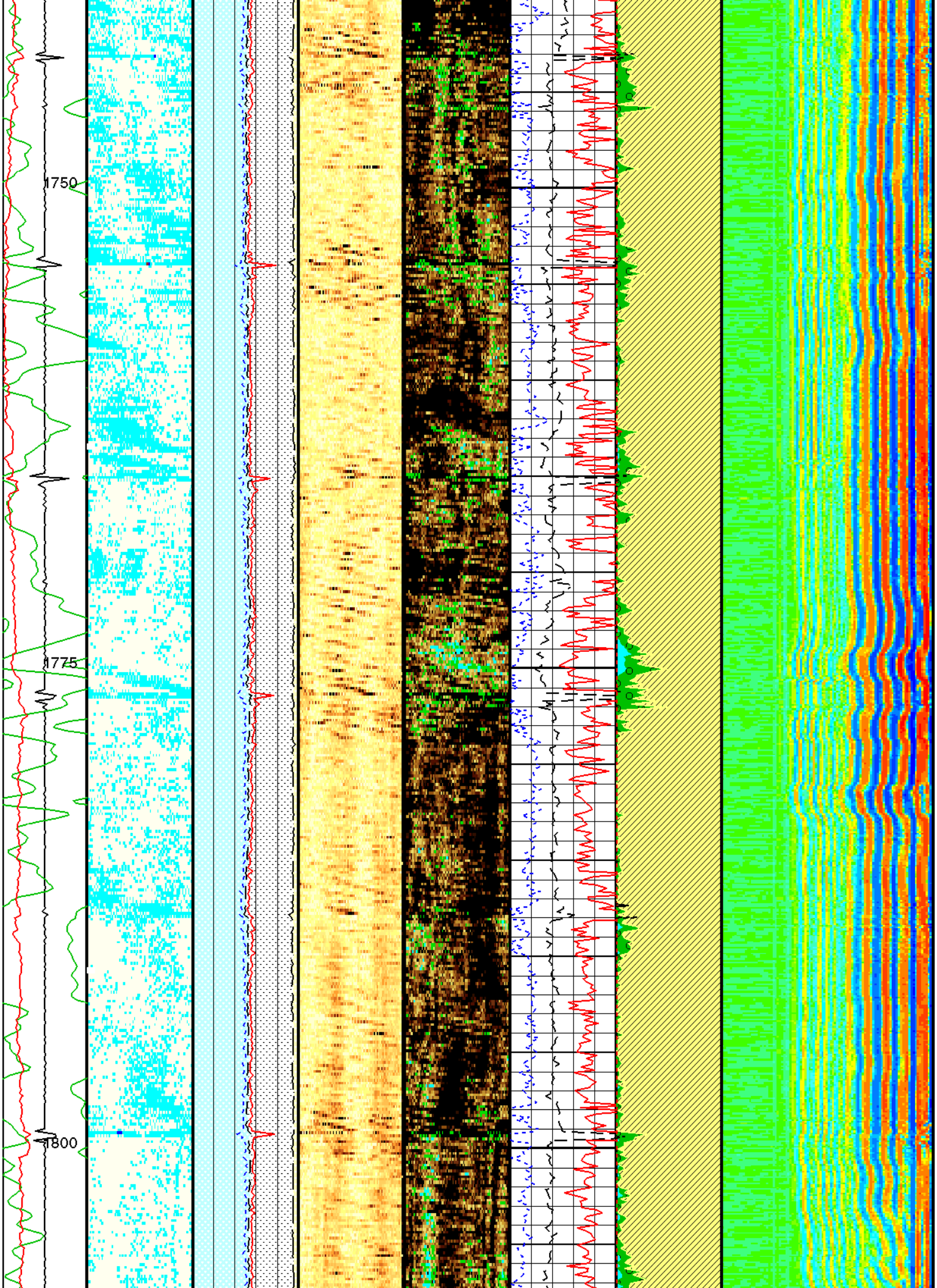
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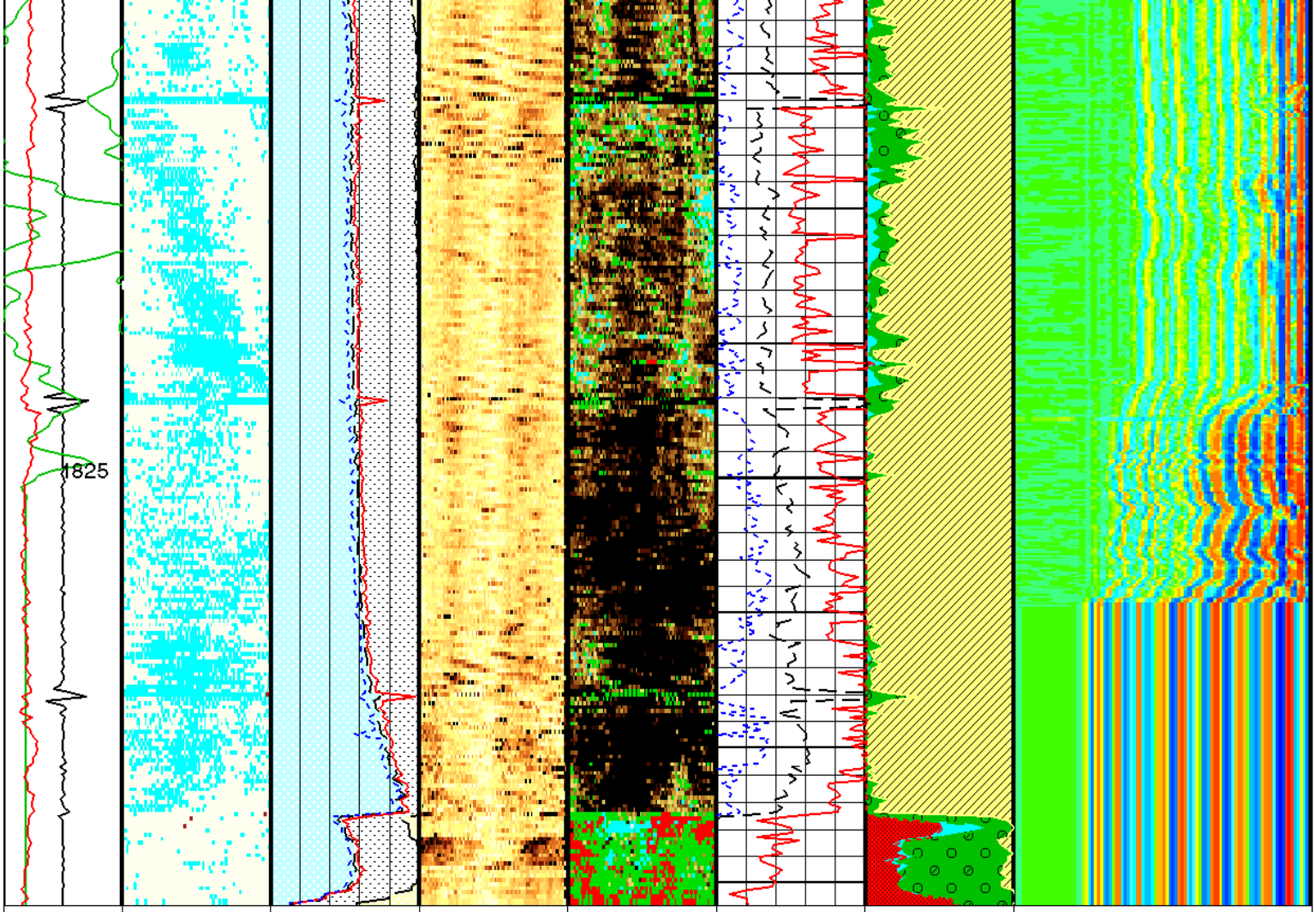
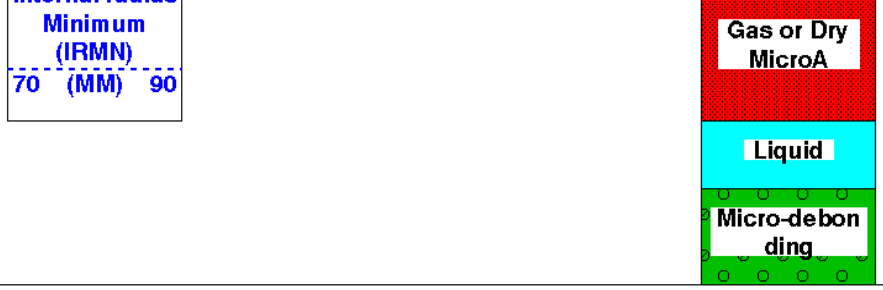

1825
0.5000
1.5000
2.5000
3.5000
6.5000
Eccent. (ECCE)
0 (MM) 15
Process. flags (UFLG) (---)
External radius Average (ERAV)
70 (MM) 90
Image rotation (UCAZ)
360 (DEG) 0
Image rotation (UCAZ)
360 (DEG) 0
Acoustic Impedance Min (AIMN)
0 (MRAY) 10
Near Bond Index (NBI)
1 (---) 0
Min Amplitude Max
Sonic_VDL_Curve (VDL)
200 (US) 1200
CCL (CCLU) (---)
-20 20
Internal radius Average (IRAV)
70 (MM) 90
-500.0000
-6.0000
-5.6000
-5.2000
-4.8000
-4.4000
-4.0000
-3.6000
-3.2000
-2.8000
-2.4000
-2.0000
-1.6000
-1.2000
-0.8000
-0.4000
0.5000
Amplitude of echo minus Max (AWBK) (---)
-1000.0000
-500.0000
0.3000
2.1000
2.2727
2.4455
2.6182
2.7909
2.9636
3.1364
3.3091
3.4818
3.6546
3.8273
4.0000
Cement Map with Impedance Classification (AI_MICRO_DEBONDING_IMAGE) (---)
Acoustic Impedance Ave (AIAV)
0 (MRAY) 10
Short Bond Index (SBI)
1 (---) 0
Gamma Ray (GR) (GAPI)
0 100
Internal radius Maximum (IRMX)
70 (MM) 90
Acoustic Impedance Max (AIMX)
0 (MRAY) 10
Bonded
Internal radius



PIP SUMMARY

Time Mark Every 60 S

Format: USIT_SSLT_177.8_GAS_MIGRATION Vertical Scale: 1:240 Graphics File Created: 29-Jan-2013 20:06

OP System Version: 17C0-154

USIT-D	17C0-154	SSLT-C	17C0-154
SGT-N	17C0-154	DTC-H	17C0-154
CAL-Y	17C0-154		

USI : LOW Frequency Compression Mode Used For Logging.

Recommended casing thickness range for optimum cement impedance measurement : 0.27 to 0.6 IN.

Parameters

DLIS Name	Description	Value	
	USIT-D: Ultrasonic Imaging - D		
AGMN	Minimum Gain of Cartridge	-4	DB
AGMX	Maximum Gain of Cartridge	48	DB
BERJ	Bad Echo Rejection	ON	
CDIA	Casing Outer Diameter	177.8	MM
CSDE	Casing Density	7800	K/M3
CSID	Casing Inner Diameter	161.707	MM
DFVL	Default Fluid Velocity	760	US/M
DOT	Diameter of Transducer Sensor	72.9996	MM
EMXV	EMEX Voltage	40	V
FSOD	Fluid Slowness Fits Casing Outer Diameter	1_UTFS_N_MW	
IMAR	Image Rotation	OFF	
MW	Mud Weight	810	K/M3
RCOD	Reference Calibrator Outer Diameter	177.8	MM
RCSO	Reference Calibrator Standoff	29.9999	MM
RCTH	Reference Calibrator Thickness	7.49808	MM
SDNV	Number of Vertical Samples used for Micro-debonding Computation	5	
SDTHOR	Acoustic Impedance STD Horizontal Threshold for Micro-debonding	0.5	
SDTVER	Acoustic Impedance STD Vertical Threshold for Micro-debonding	0.3	
TCUB	T^3 Processing Level	Vax_Loop	
THDH	Maximum Search Thickness (percentage of nominal)	130	
THDL	Minimum Search Thickness (percentage of nominal)	70	
THDP	Thickness Detection Policy	Fundamental	
THNO	Nominal Thickness of Casing	8.04628	MM
UMAO	USIT Measurement Angular Offset	-10	DEG
USTO	Ultrasonic Time Offset	-2	US
USUB	Ultrasonic Subassembly Identifier	Sub_7_inch	
UWKM	Ultrasonic Working Mode	5DEG_6IN_60U_LF	
VCAS	Ultrasonic Transversal Velocity in Casing	168.635	US/M
WLEN	T^3 Processing Length	18.9963	US
ZCAS	Acoustic Impedance of Casing	46.25	MRAY
ZINI	Initial Estimate of Cement Impedance	-1	MRAY
ZMUD	Acoustic Impedance of Mud	1.3	MRAY
ZTCM	Acoustic Impedance Threshold for Cement	2.1	MRAY
ZTGS	Acoustic Impedance Threshold for Gas	0.3	MRAY
	SSLT-C: SlimAccess Sonic Logging Tool		
CBAF	CBL Adjustment Factor	1	
CBRA	CBL LQC Reference Amplitude in Free Pipe	62	MV
CTHI	Casing Thickness	8.17523	MM
DTF	Delta-T Fluid	790	US/M
MATT	Maximum Attenuation	28.7082	DB/M
NFPI_L5	Free Pipe amplitude for LT-R5	1500	
NFPI_U1	Free Pipe amplitude for UT-R1	1100	
SFPI	Short Free Pipe Sonic Amplitude	2500	
VDLG	VDL Manual Gain	5	
VDM	VDL Display Mode	R5	
ZCMT	Acoustic Impedance of Cement	4	MRAY
	System and Miscellaneous		

System and Miscellaneous

CSIZ	Current Casing Size	177.800	MM
CWEI	Casing Weight	34.20	KG/M
DO	Depth Offset for Playback	3.6	M
PP	Playback Processing	NORMAL	

Input DLIS Files

USI_SONIC_021LUP	FN:19	29-Jan-2013 18:43	1837.2 M	25.0 M

Output DLIS Files

DEFAULT	USI_SONIC_023PUP	FN:21	PRODUCER	29-Jan-2013 20:06	

Schlumberger

MAIN PASS
7.0 MPA

MAXIS Field Log

Input DLIS Files

DEFAULT	USI_SONIC_016LUP	FN:14	PRODUCER	29-Jan-2013 15:44	1838.6 M	18.1 M

Output DLIS Files

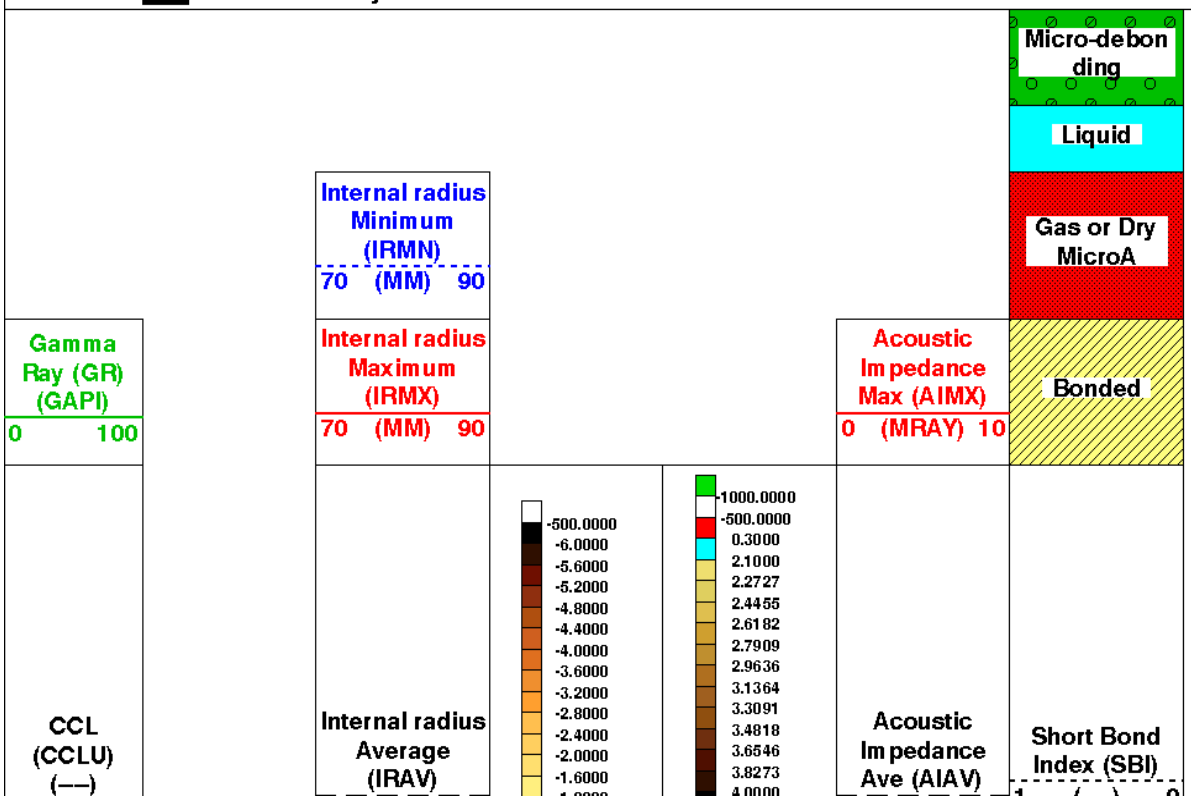
DEFAULT	USI_SONIC_018PUP	FN:16	PRODUCER	29-Jan-2013 17:16	1841.1 M	20.7 M

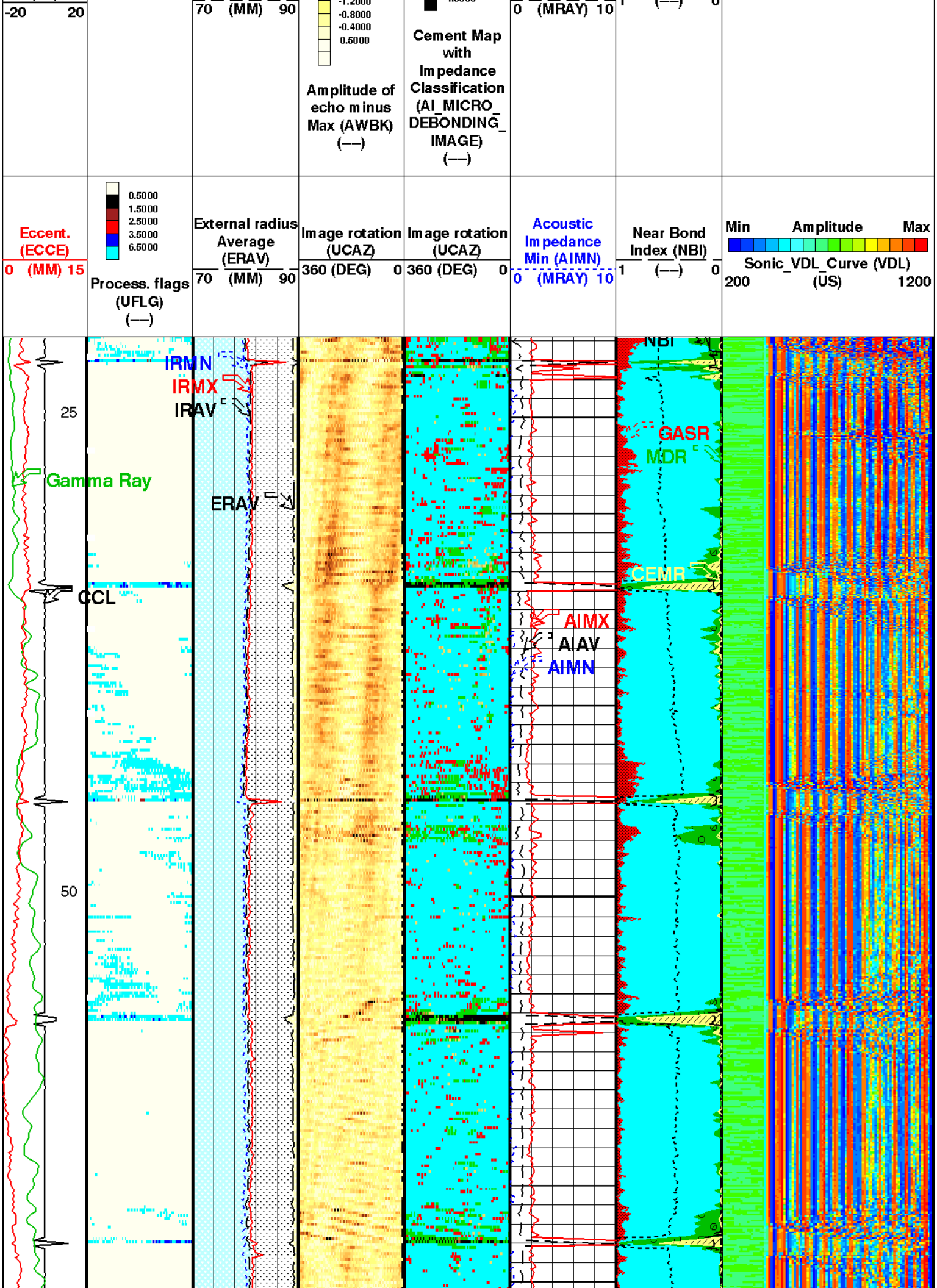
OP System Version: 17C0-154

USIT-D	17C0-154	SSLT-C	17C0-154
SGT-N	17C0-154	DTC-H	17C0-154
CAL-Y	17C0-154		

PIP SUMMARY

Time Mark Every 60 S

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70 (MM) 90
-1.2000
-0.8000
-0.4000
0.5000
Amplitude of echo minus Max (AWBK) (---)
Cement Map with Impedance Classification (AI_MICRO_DEBONDING_IMAGE) (---)
0 (MRAY) 10
1 (---) 0
Eccent. (ECCE)
0 (MM) 15
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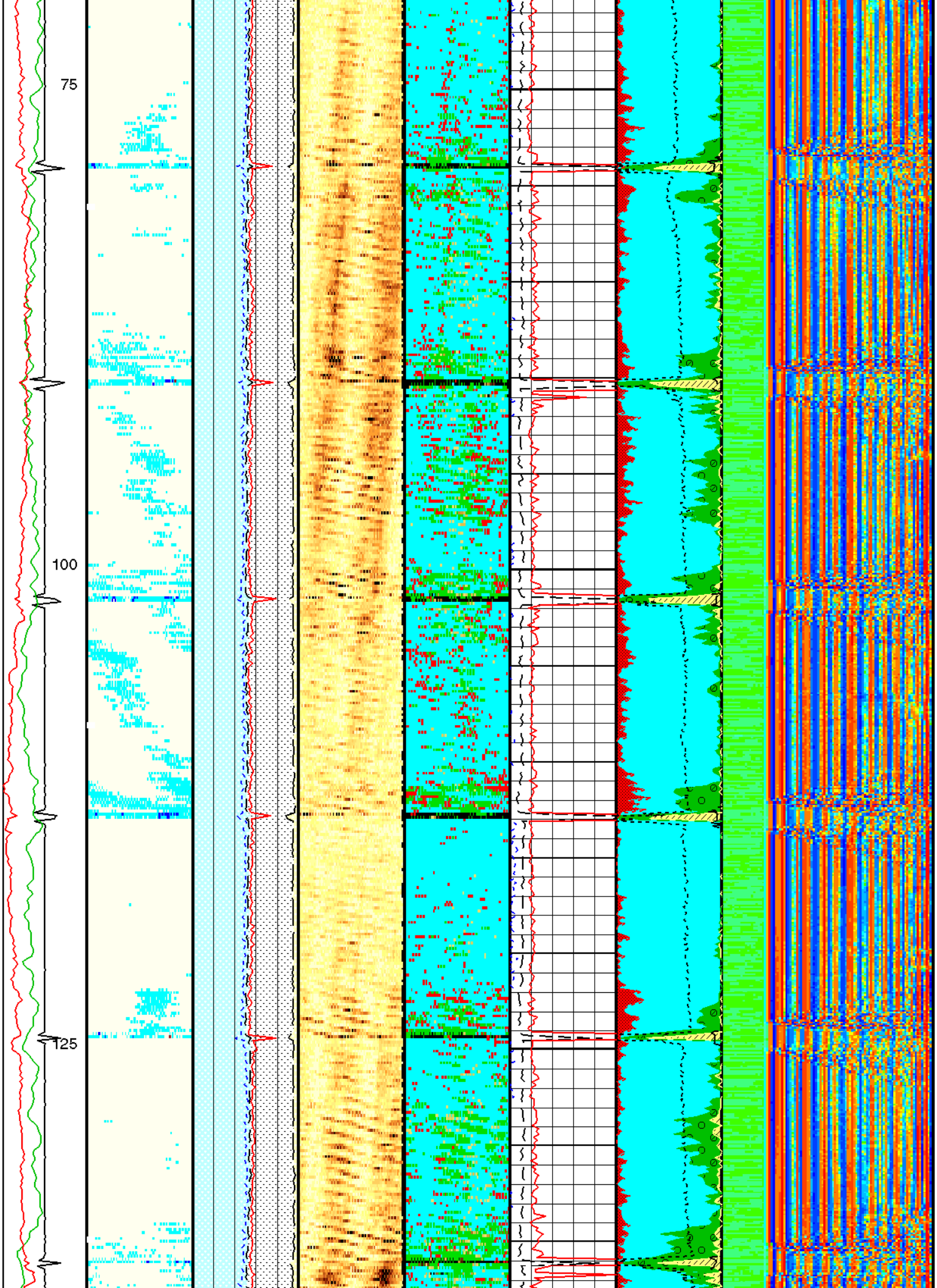
1.5000
2.5000
3.5000
6.5000
Process. flags (UFLG) (---)
External radius Average (ERAV)
70 (MM) 90
Image rotation (UCAZ)
360 (DEG) 0
Image rotation (UCAZ)
360 (DEG) 0
Acoustic Impedance Min (AIMN)
0 (MRAY) 10
Near Bond Index (NBI)
1 (---) 0
Min Amplitude Max
Sonic_VDL_Curve (VDL)
200 (US) 1200
IRMN
IRMX
IRAV
25
Gamma Ray
ERAV
CCL
50
NBI
GASR
MDR
CEMR
AIMX
AIAV
AIMN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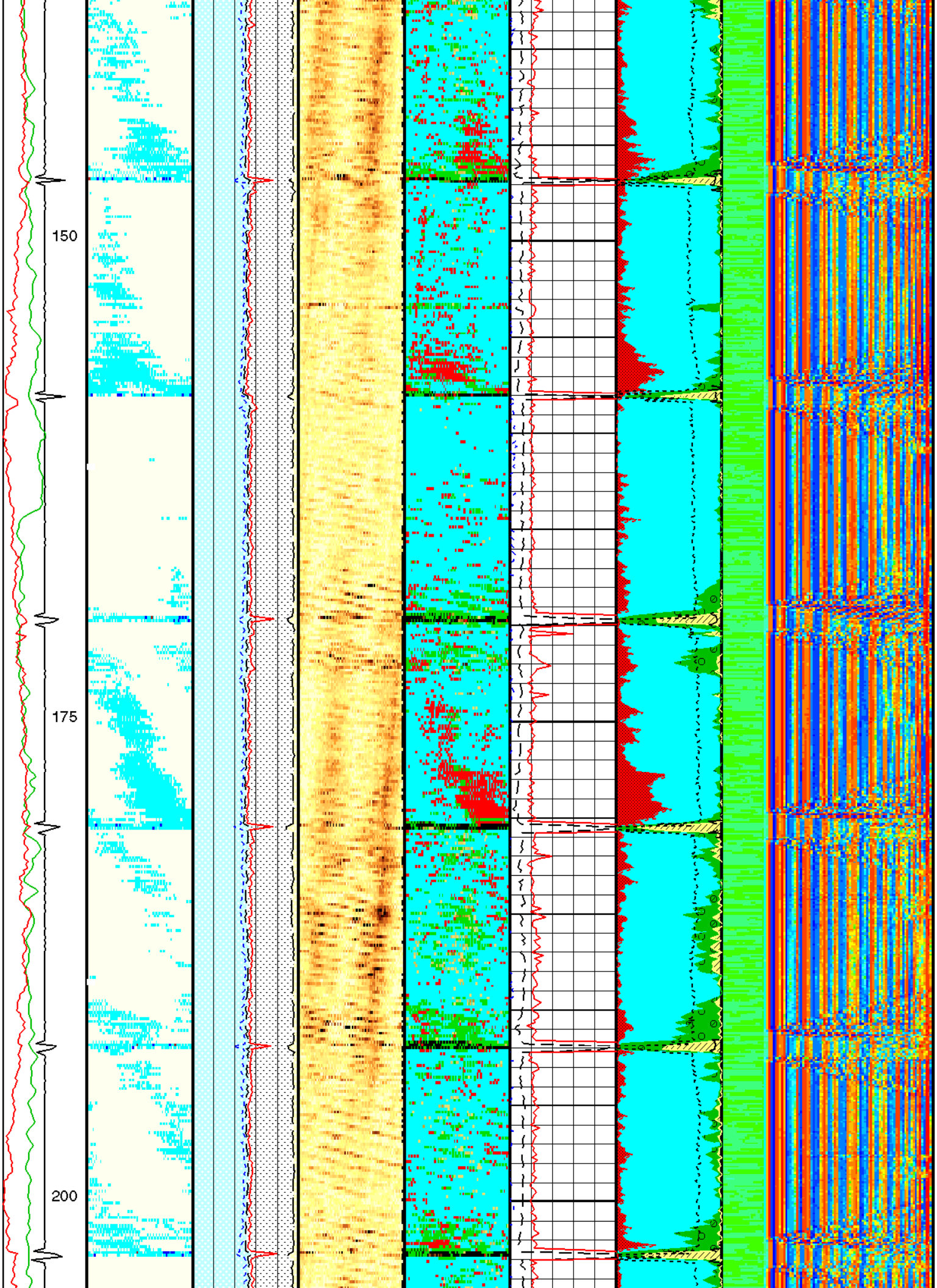
100
125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175
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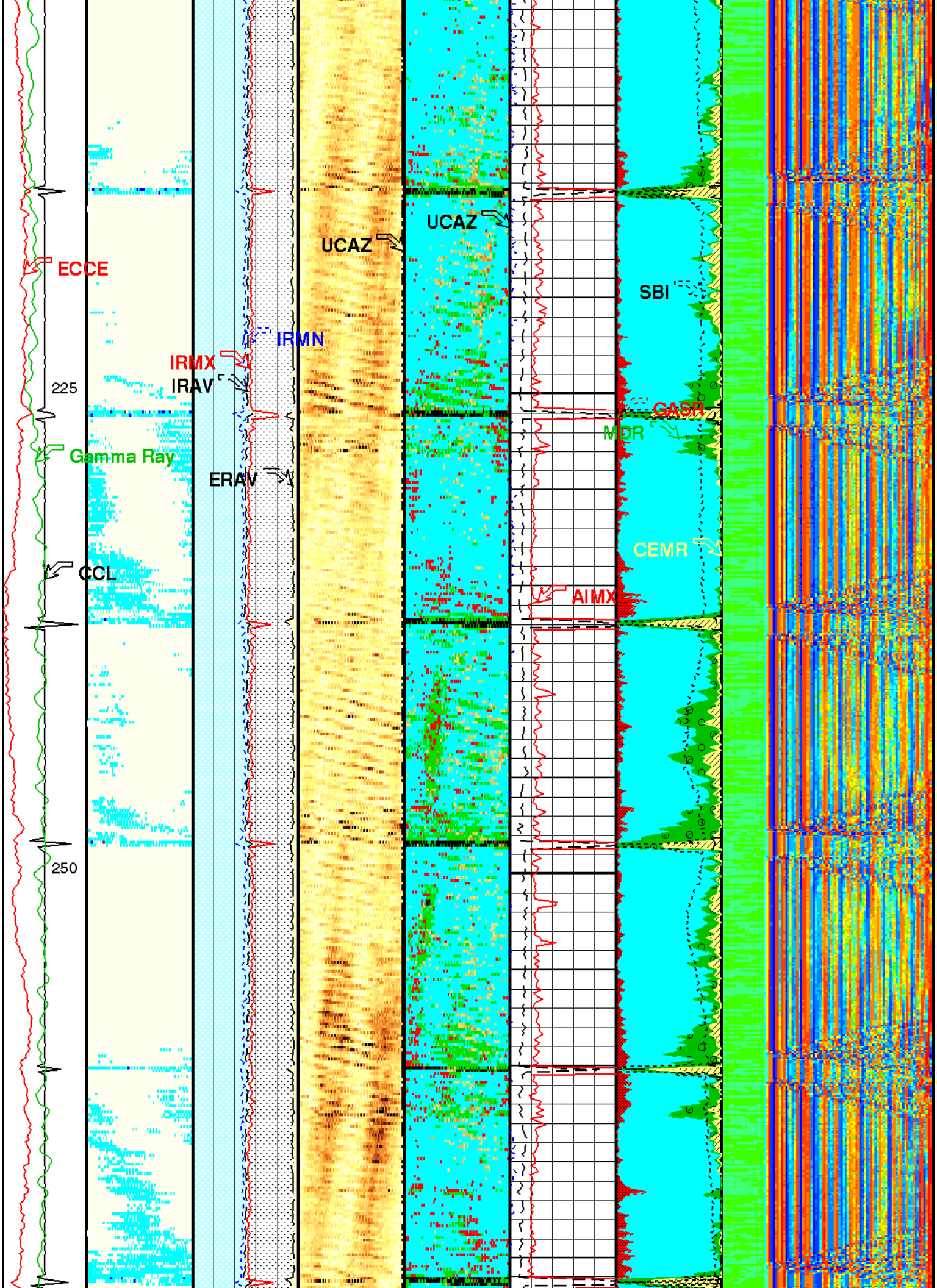
ECCE
Gamma Ray
CCL
225
250
IRMX
IRAV
IRMN
ERAV
UCAZ
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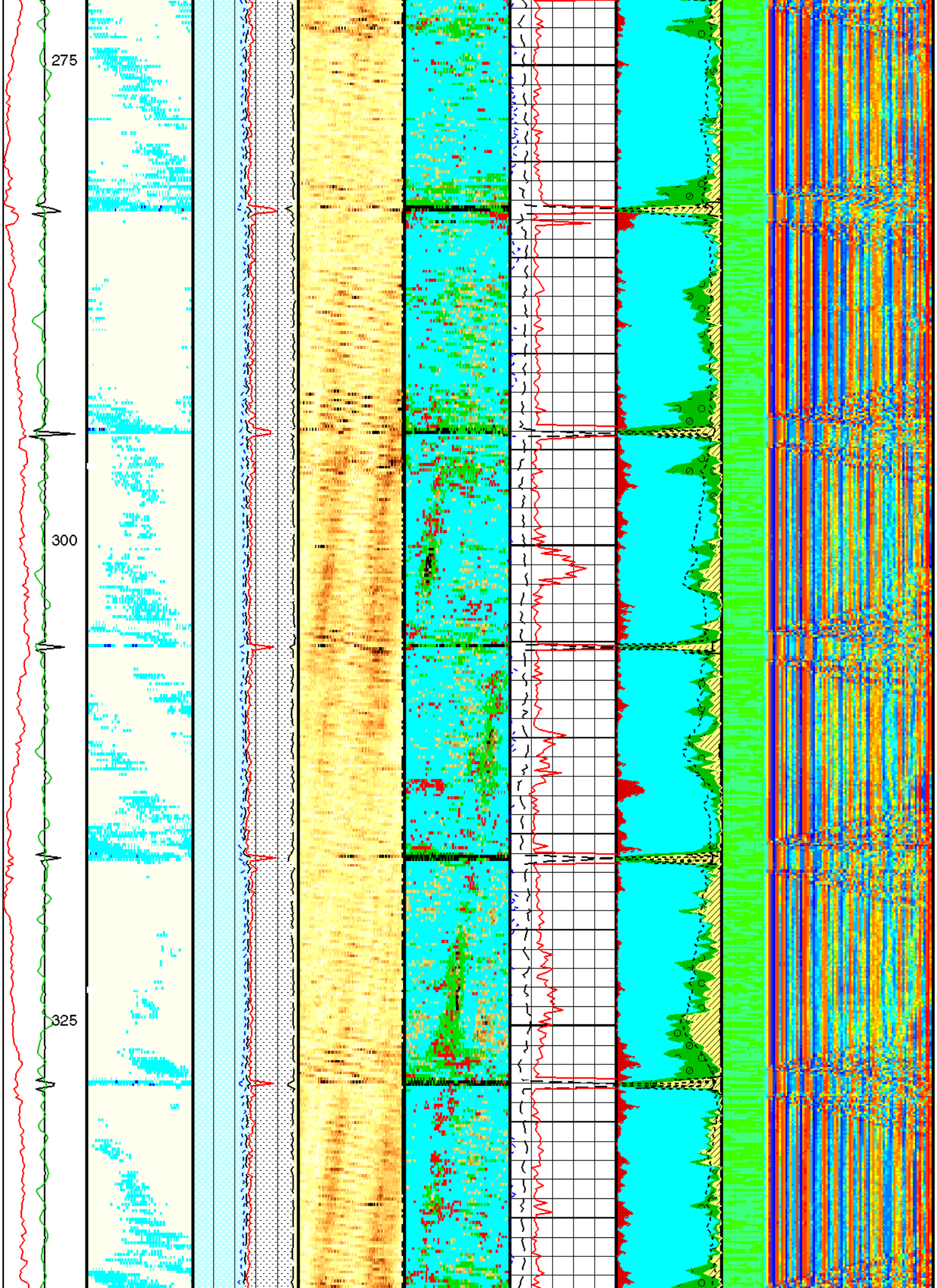
SBI
CASR
MDR
CEMR
AIMX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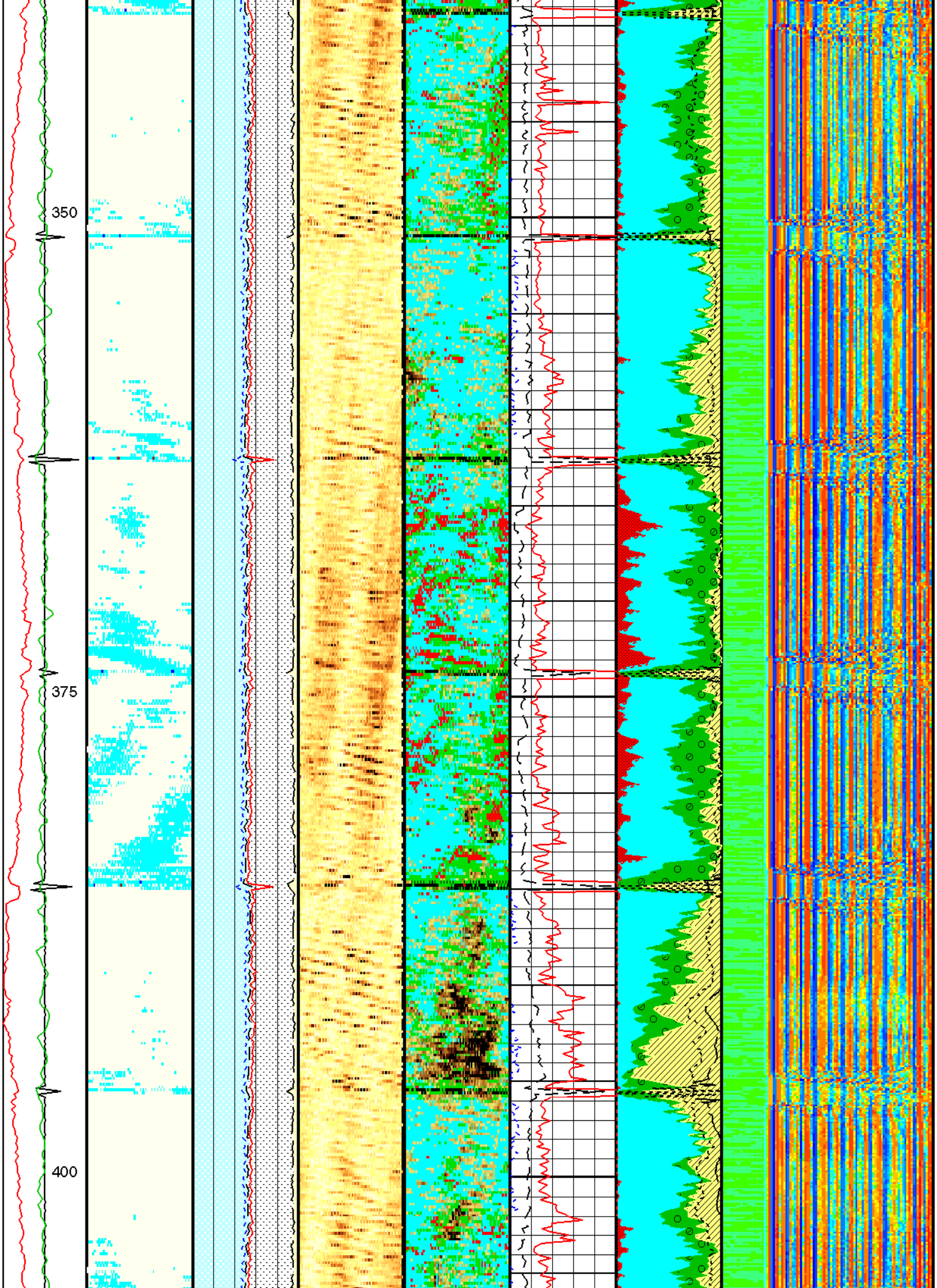
300
325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375
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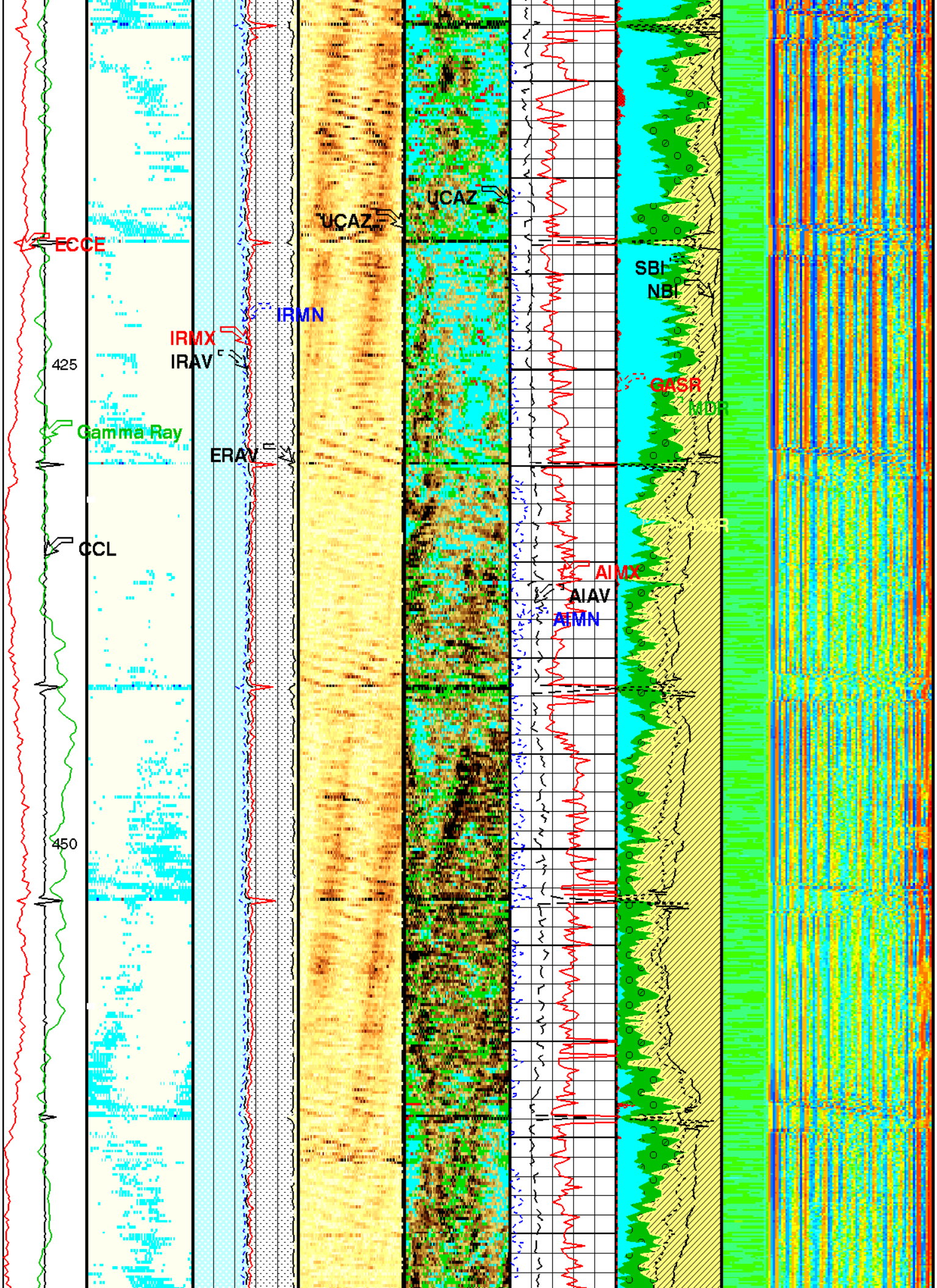
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425
Gamma Ray
CCL
450
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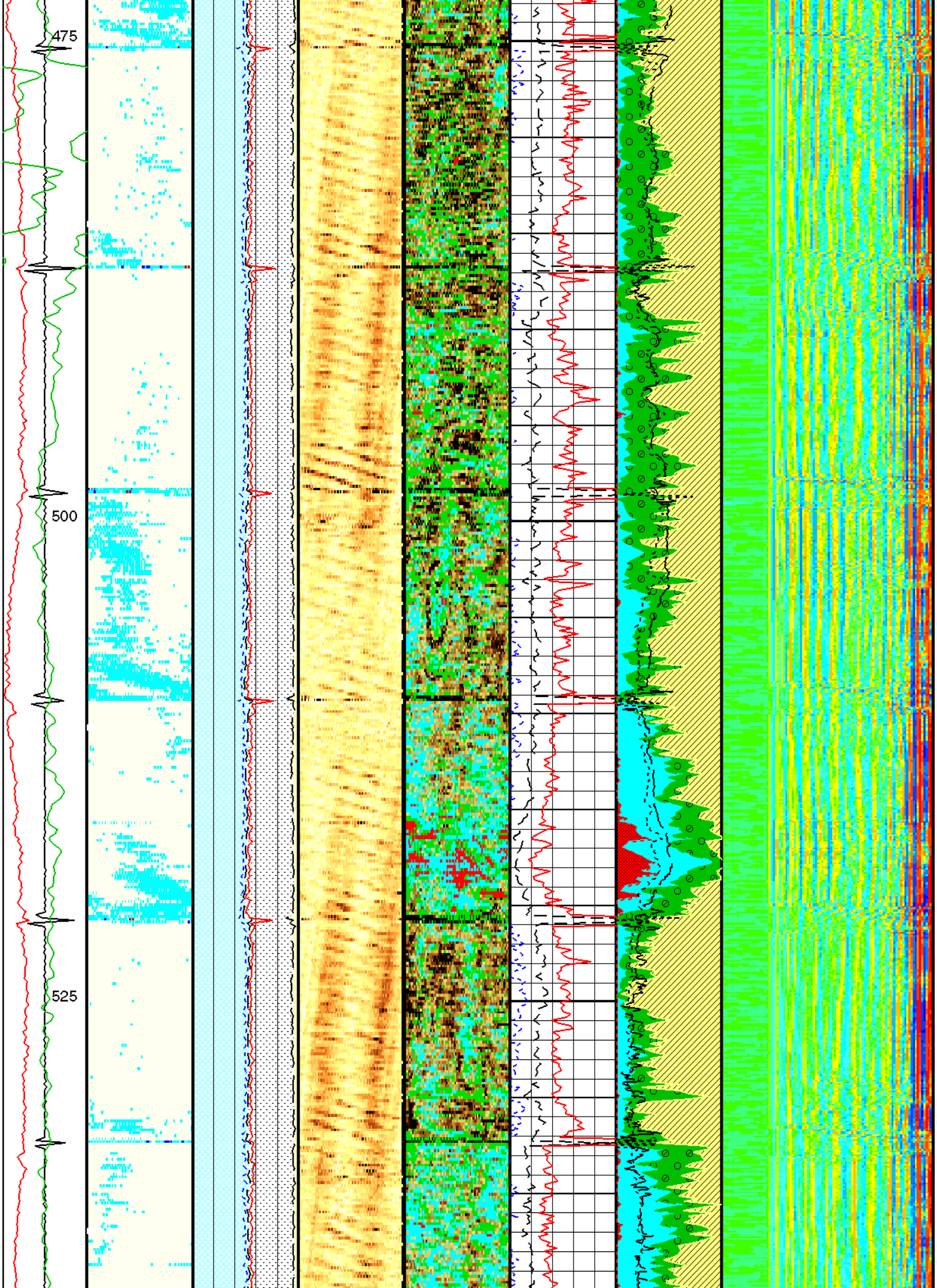
IRAV
IRMN
ERAV
UCAZ
UCAZ
SBI
NBI
GASR
MDR
AIMX
AIAV
AIMN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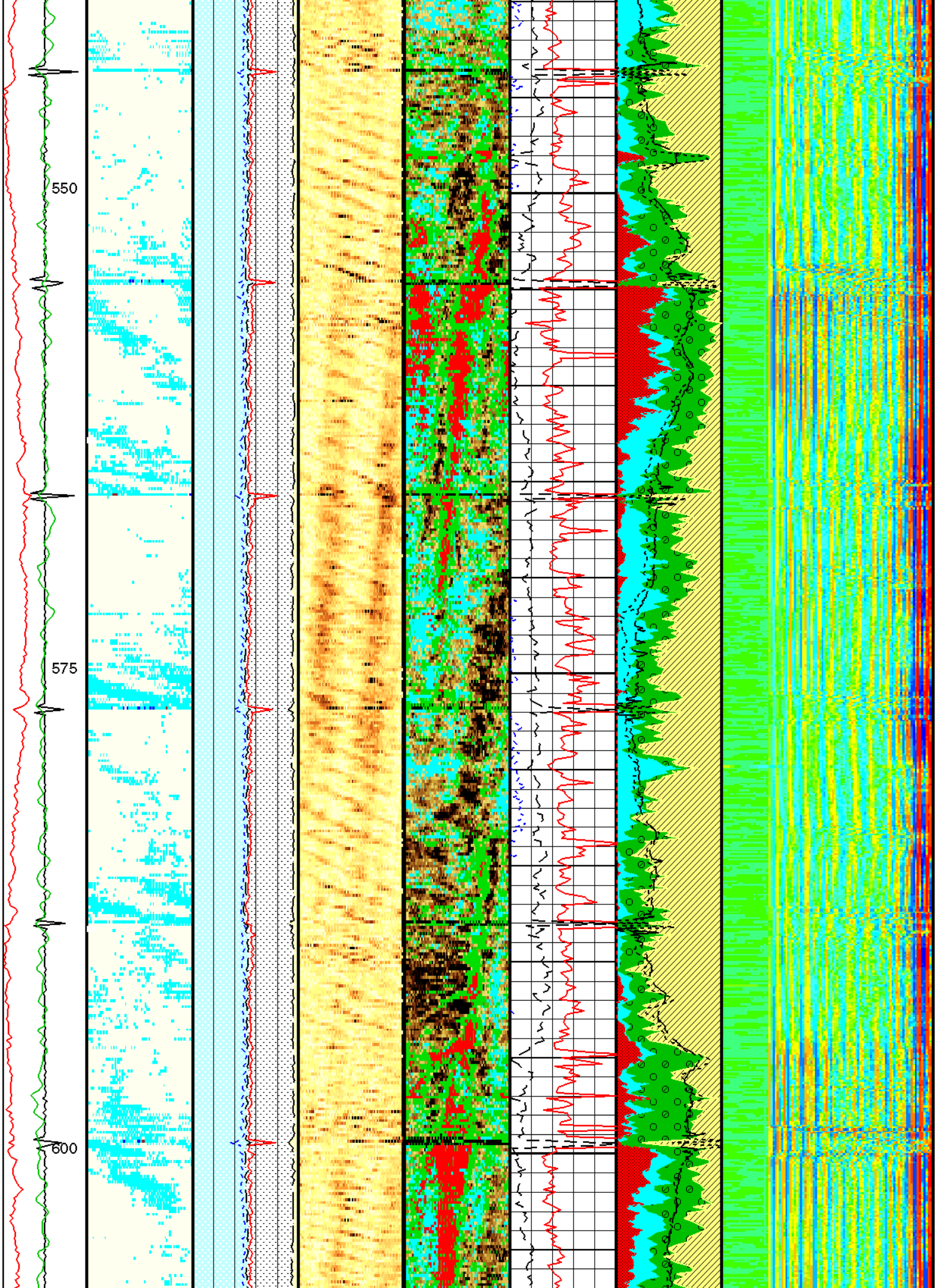
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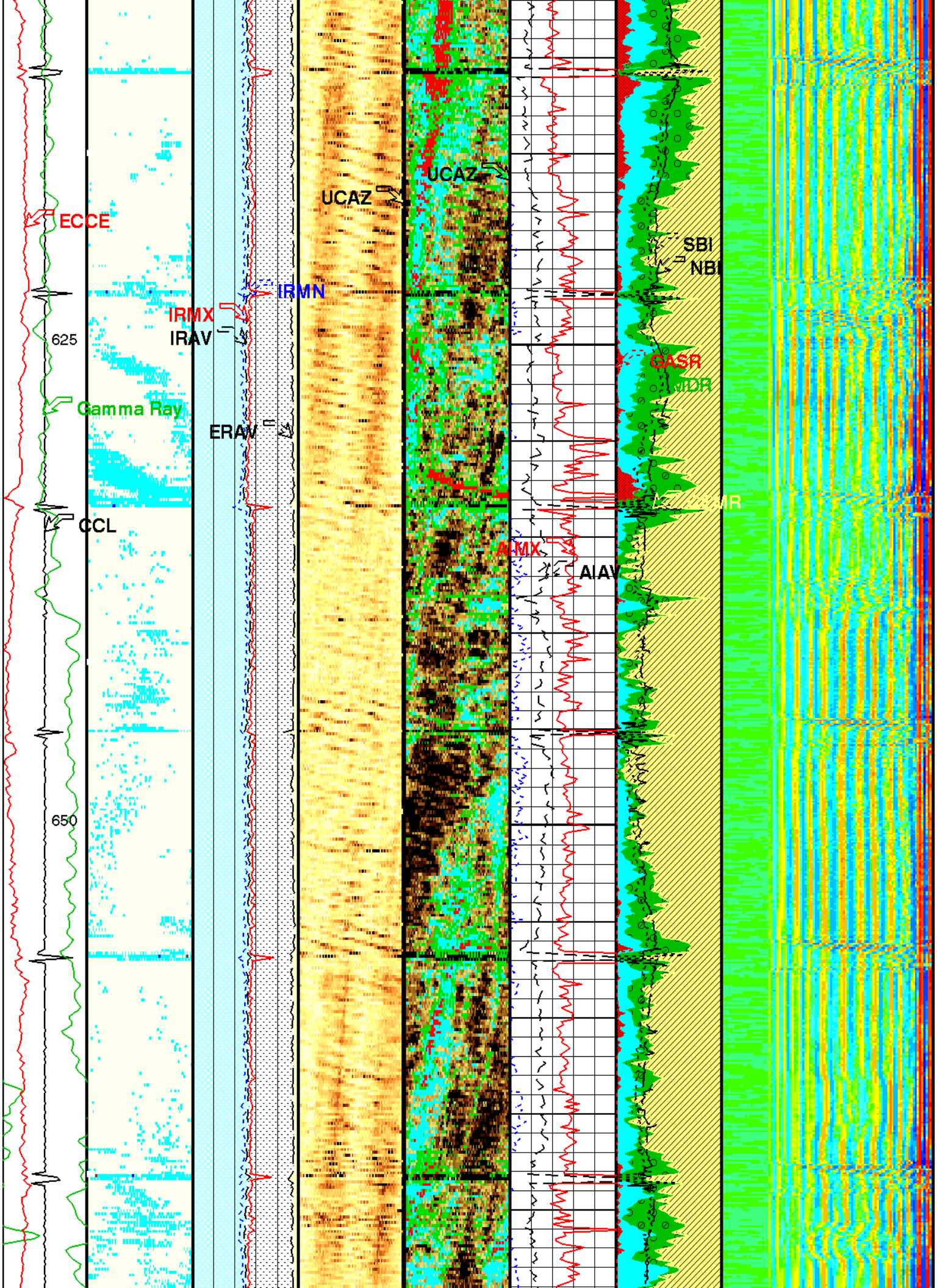
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625
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CCL
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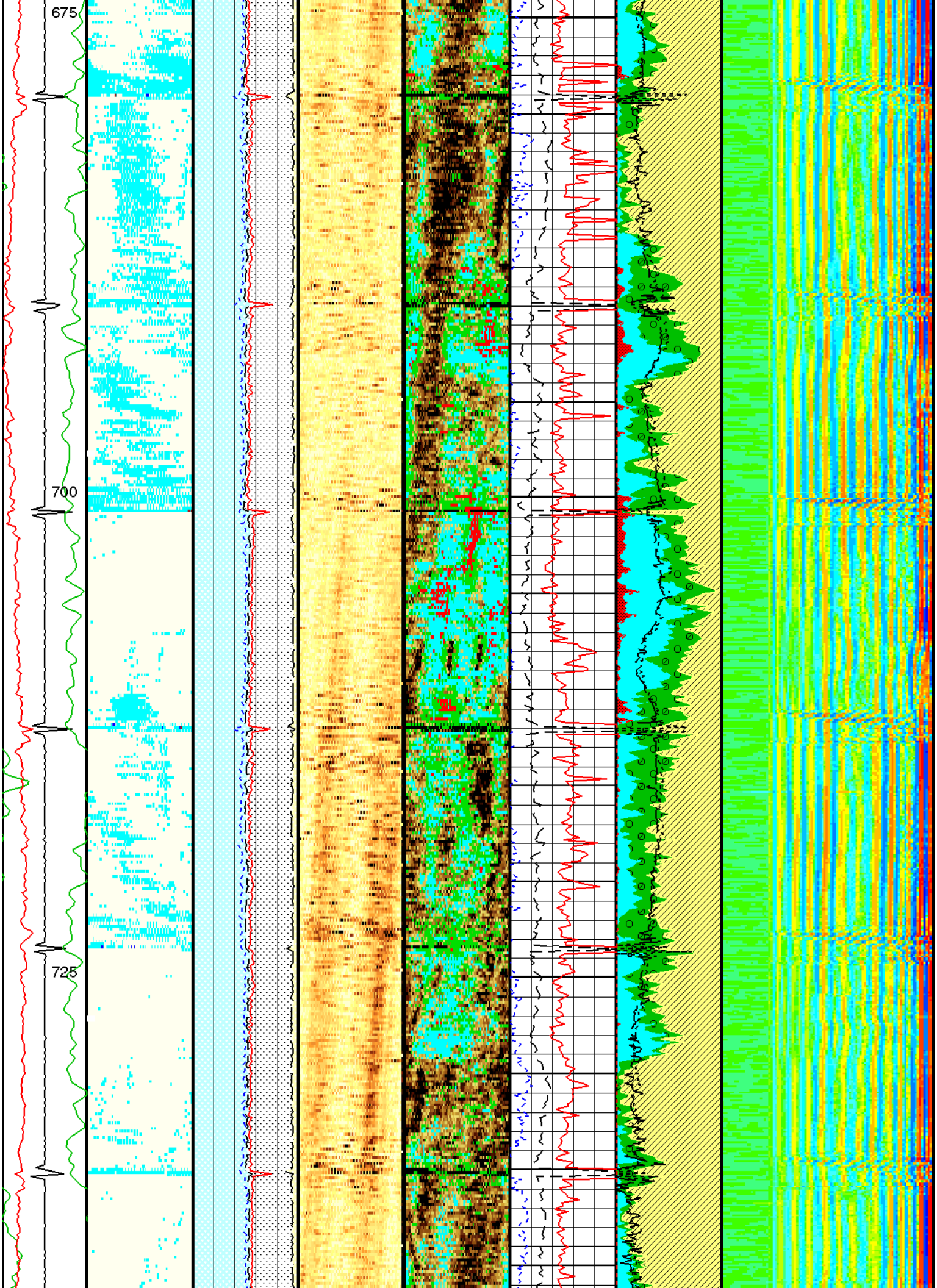
SBI
NBI
GASR
MDR
ALMX
ALAV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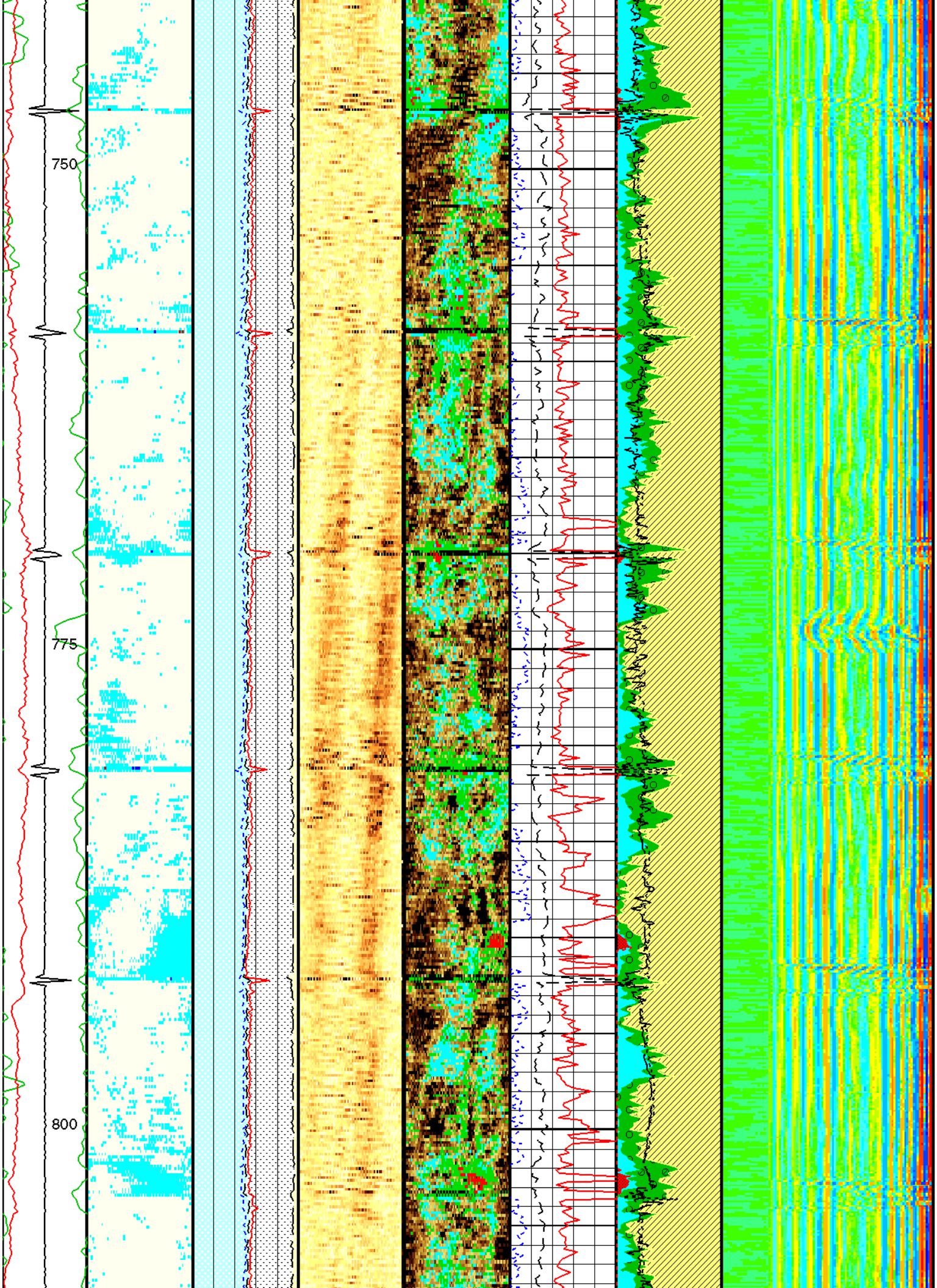
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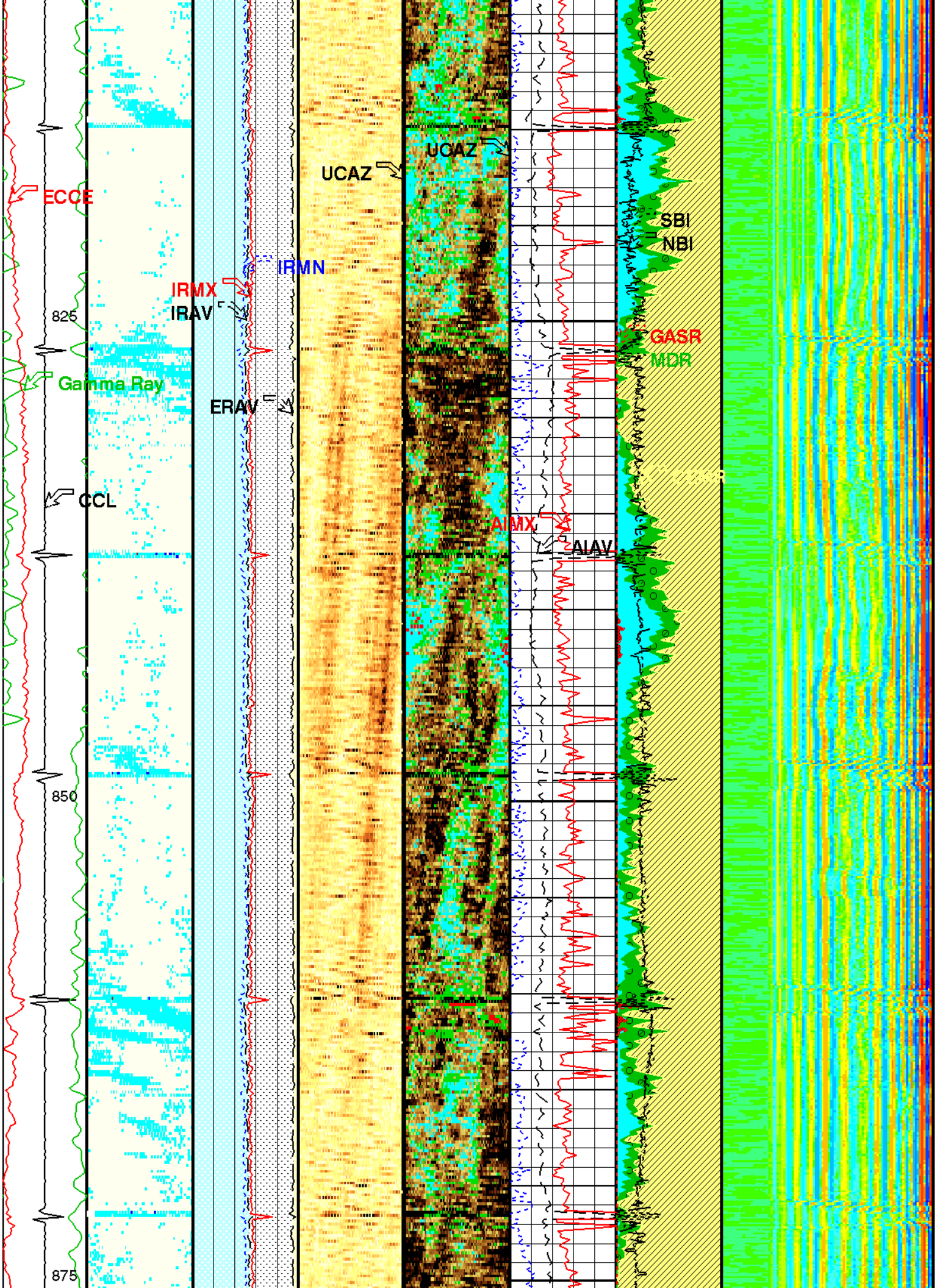
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IRMN
ERAV
UCAZ
UCAZ
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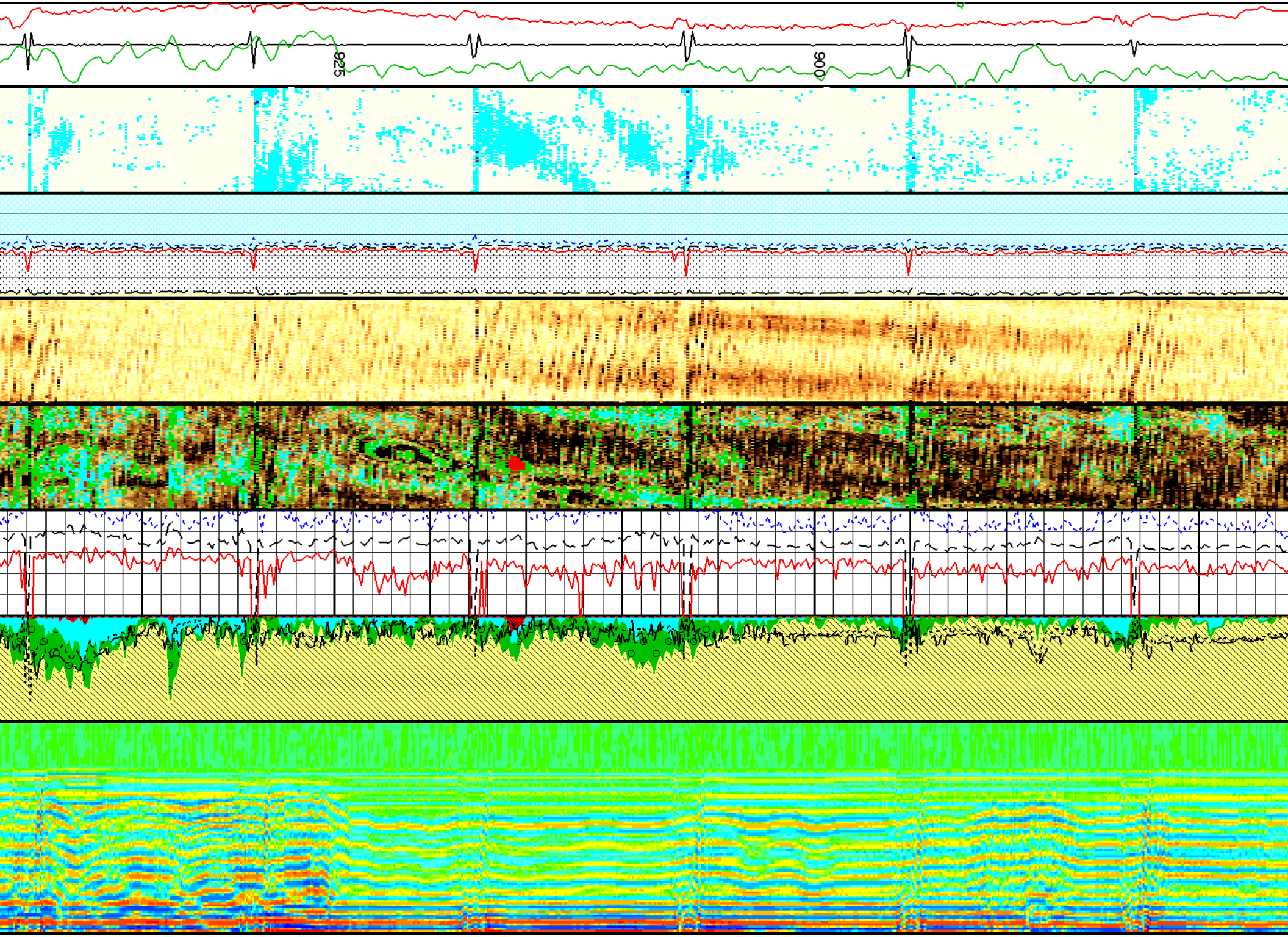
SBI
NBI
GASR
MDR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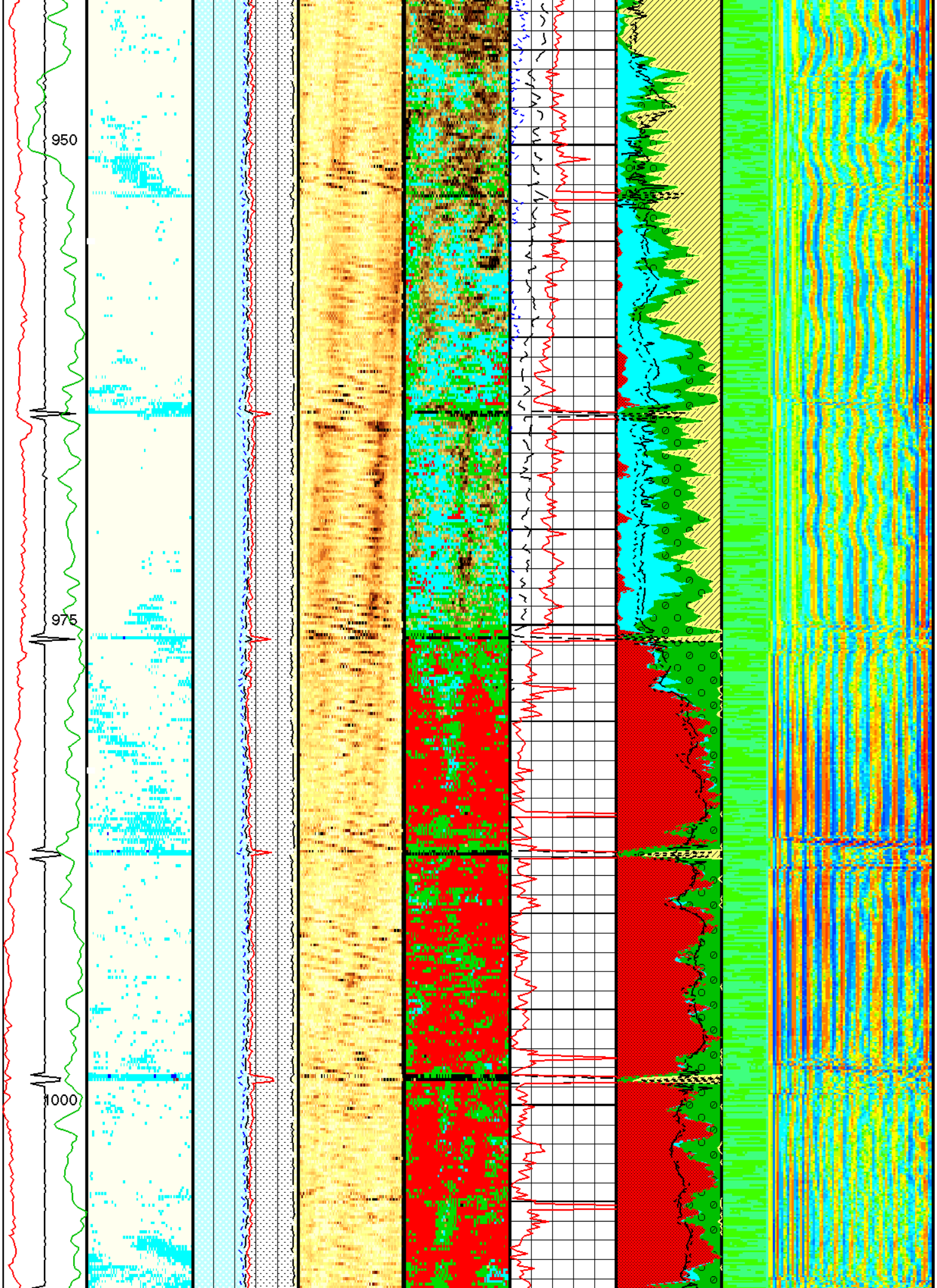
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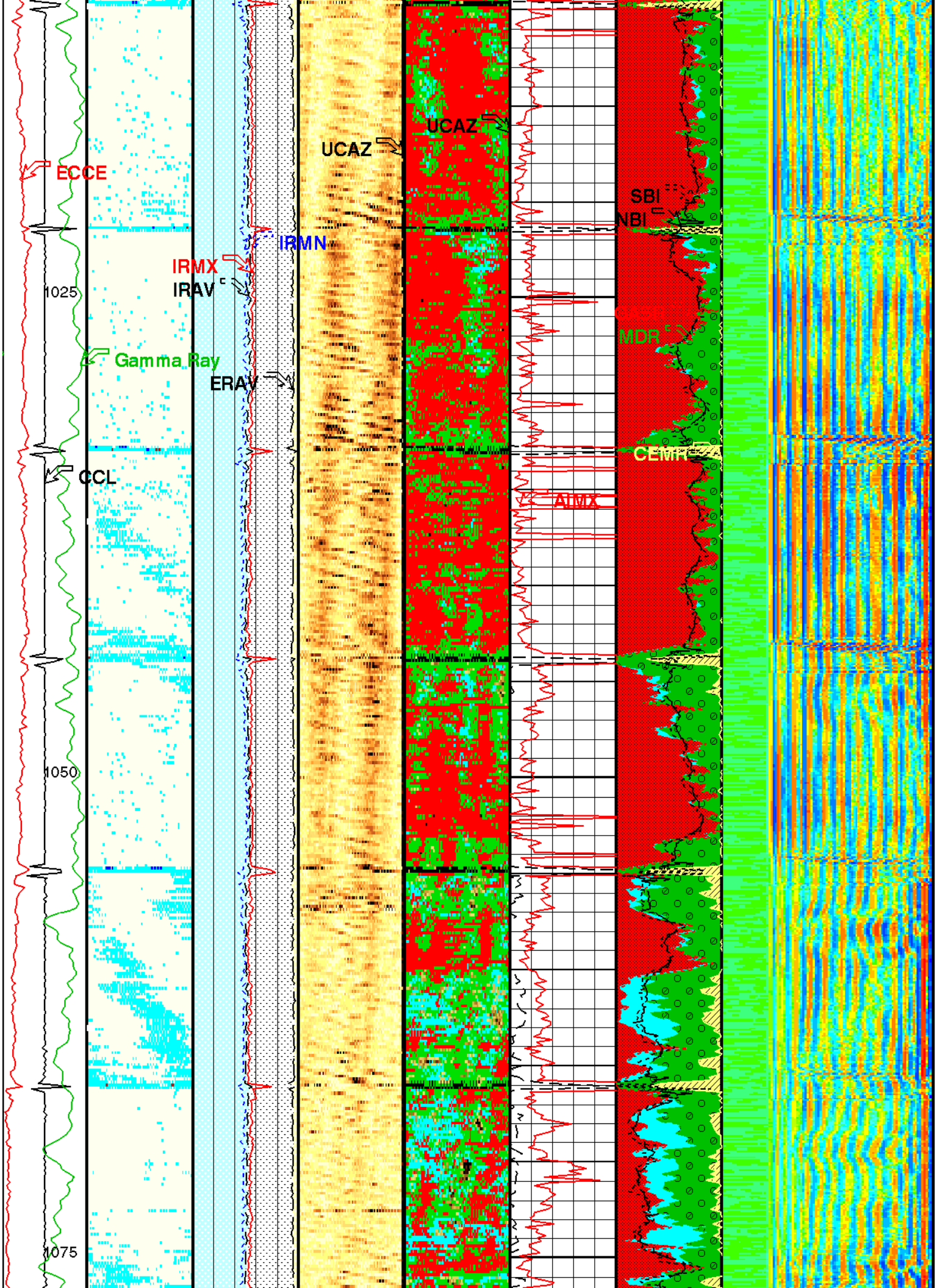
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IRMN
IRMX
IRAV
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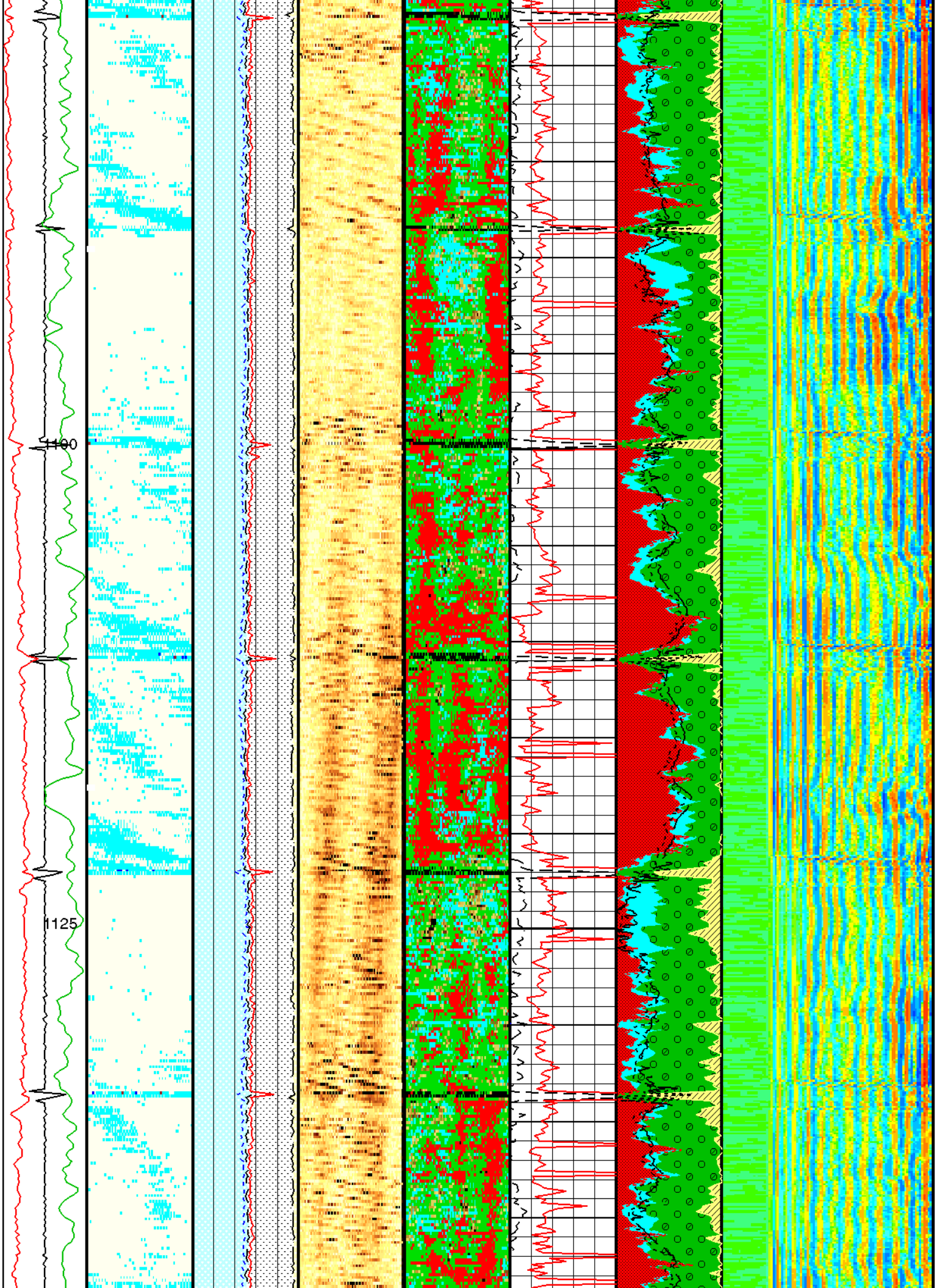
ERAV
CCL
1050
1075
UCAZ
UCAZ
SBI
NBI
MDR
CEMR
AIMX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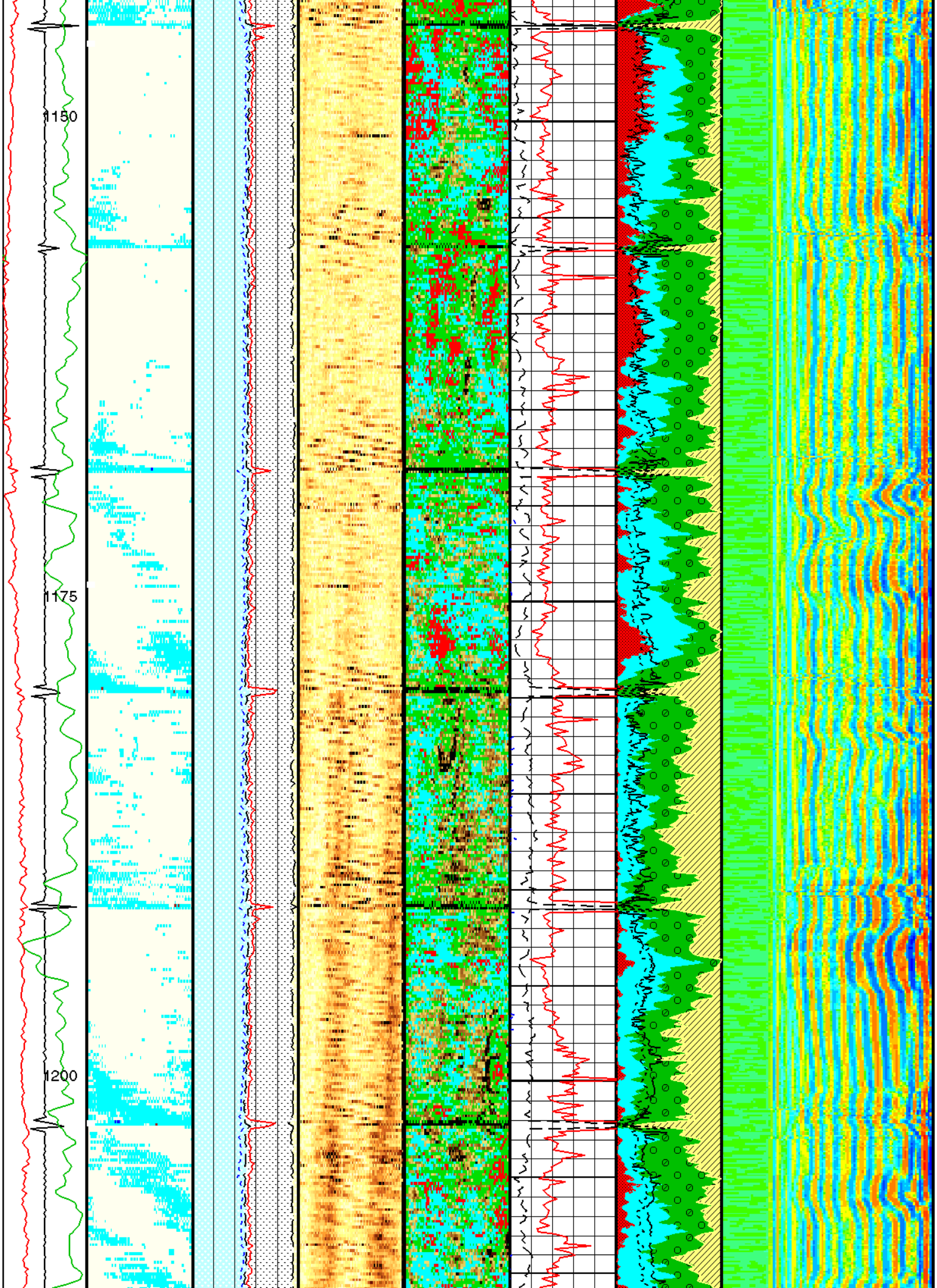
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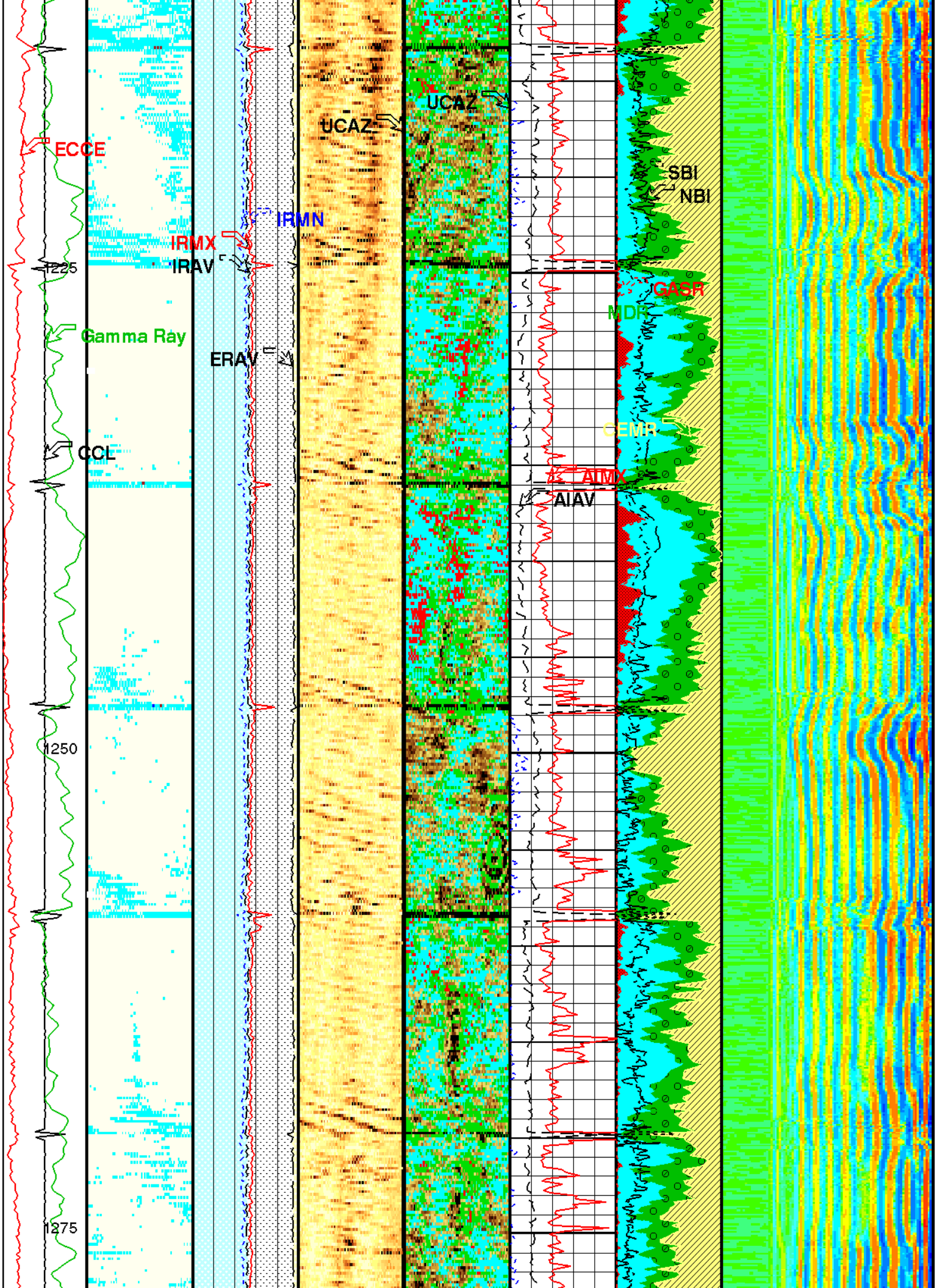
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CCL
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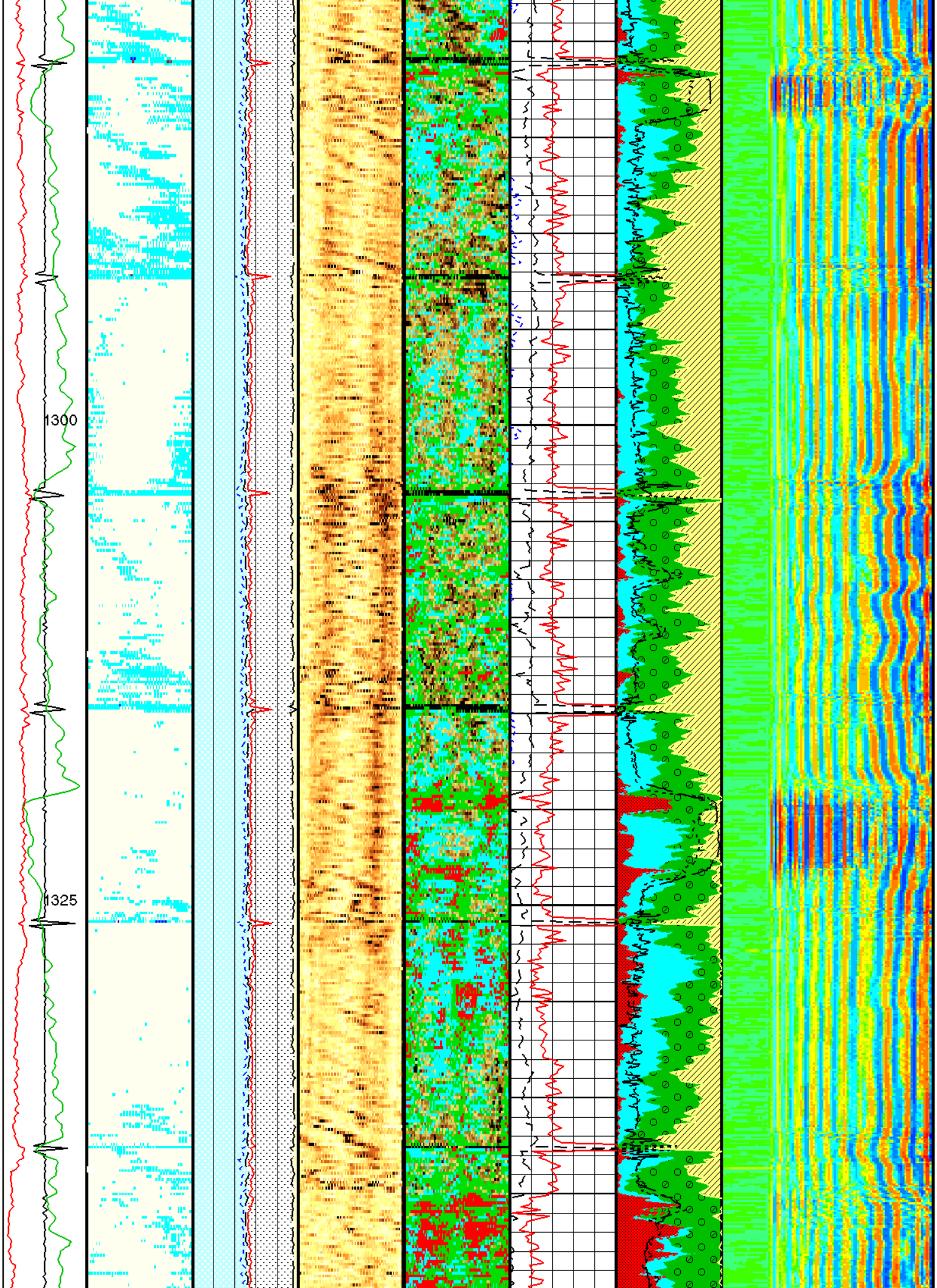
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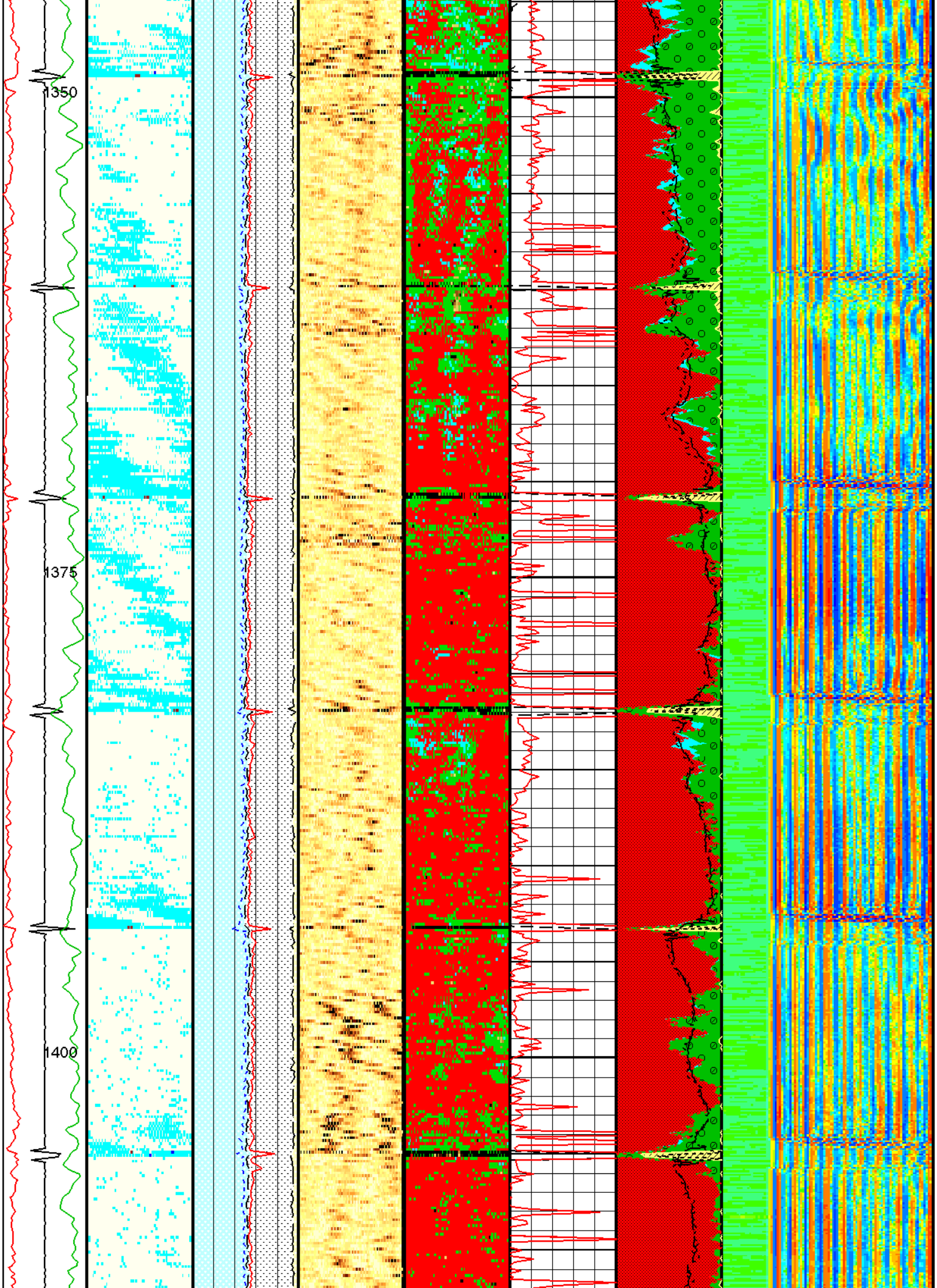
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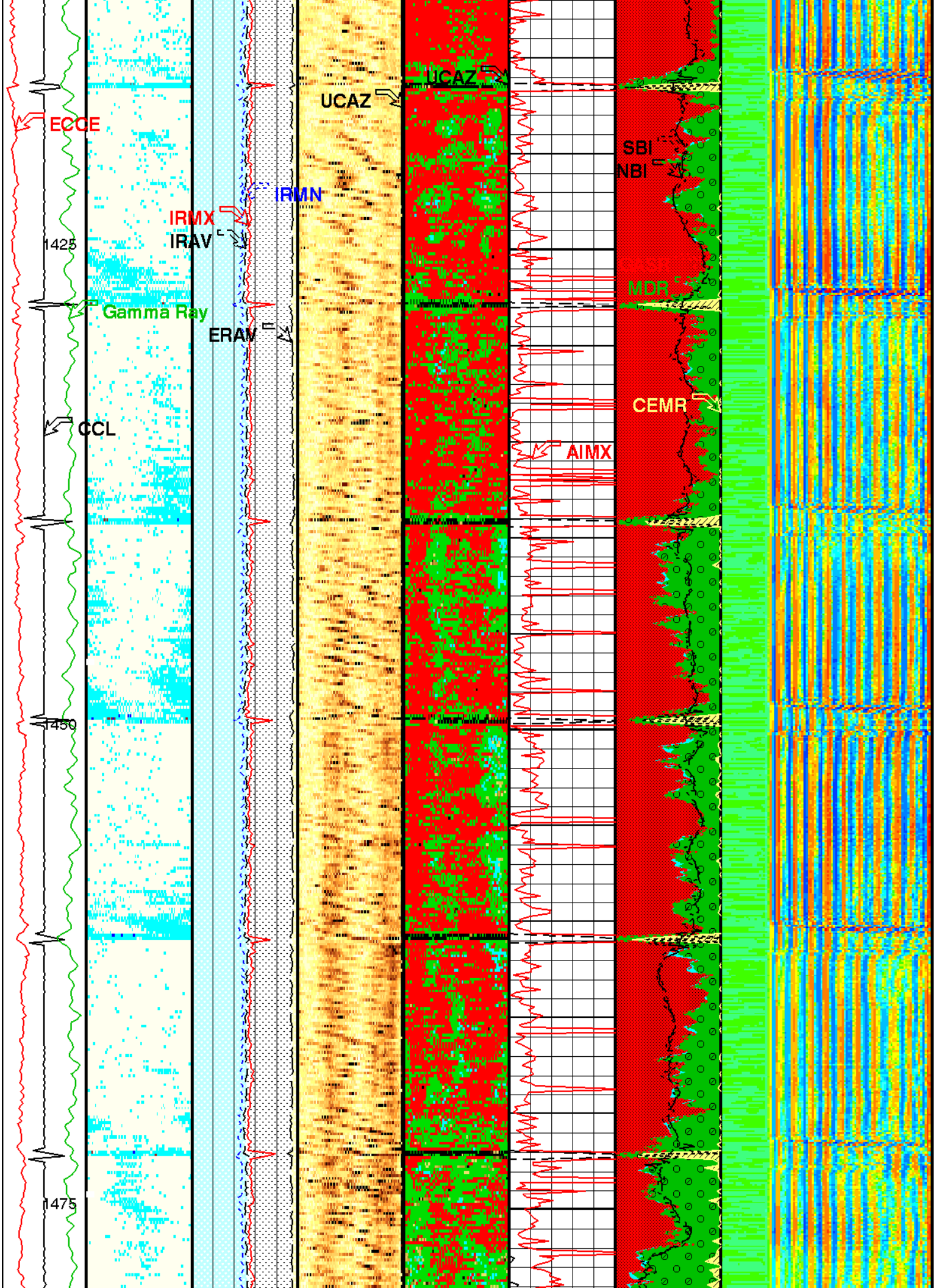
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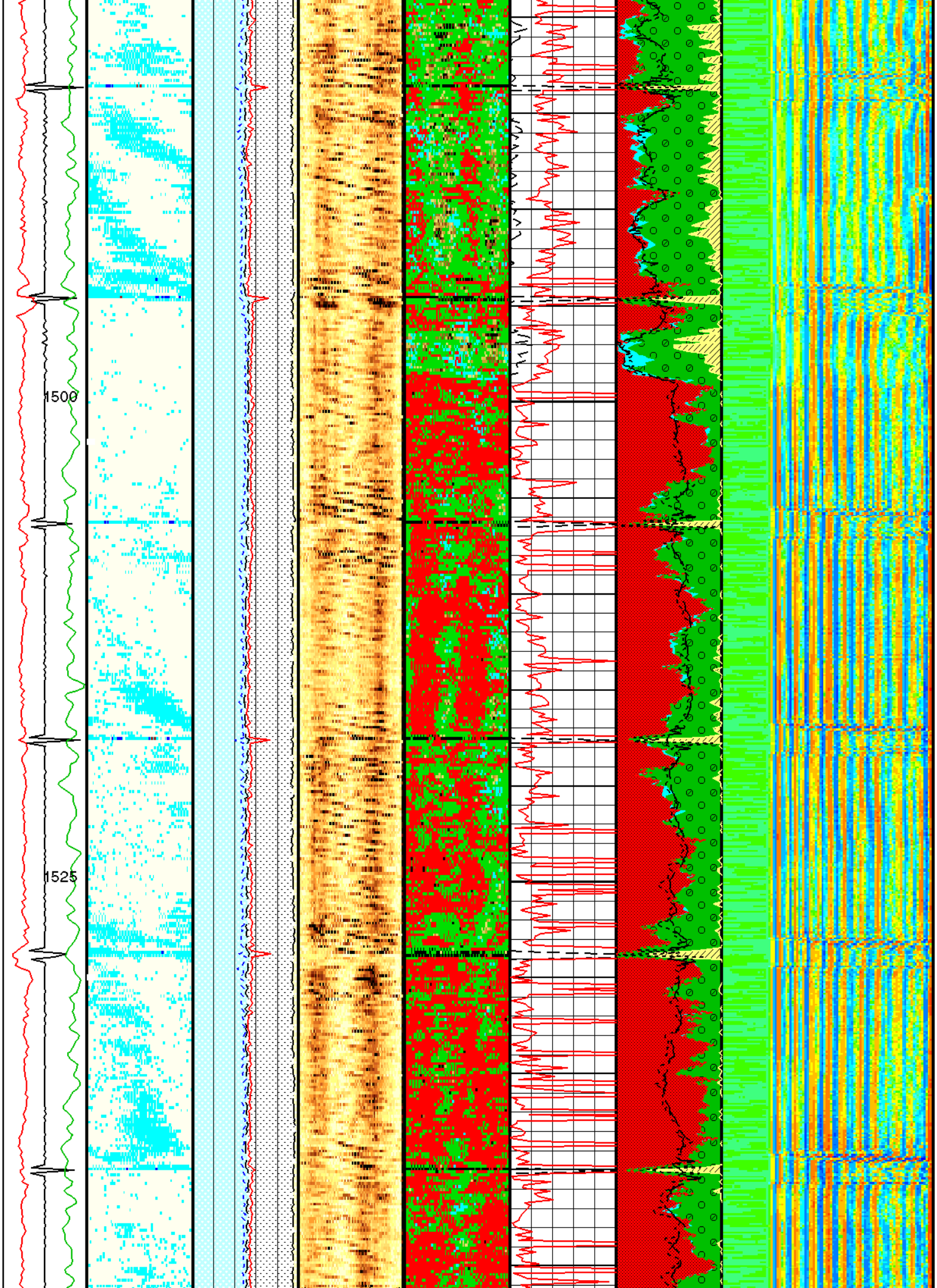
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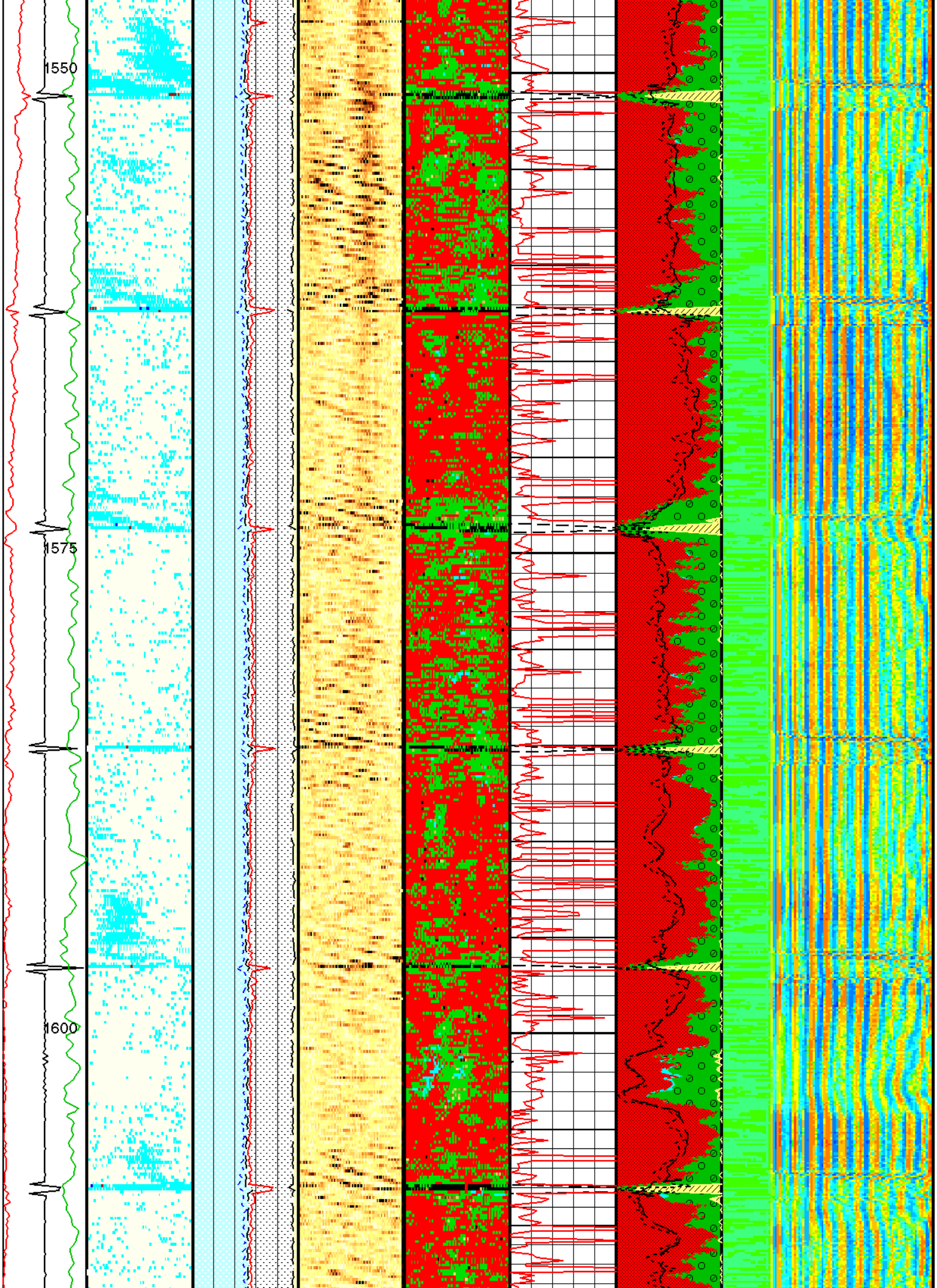
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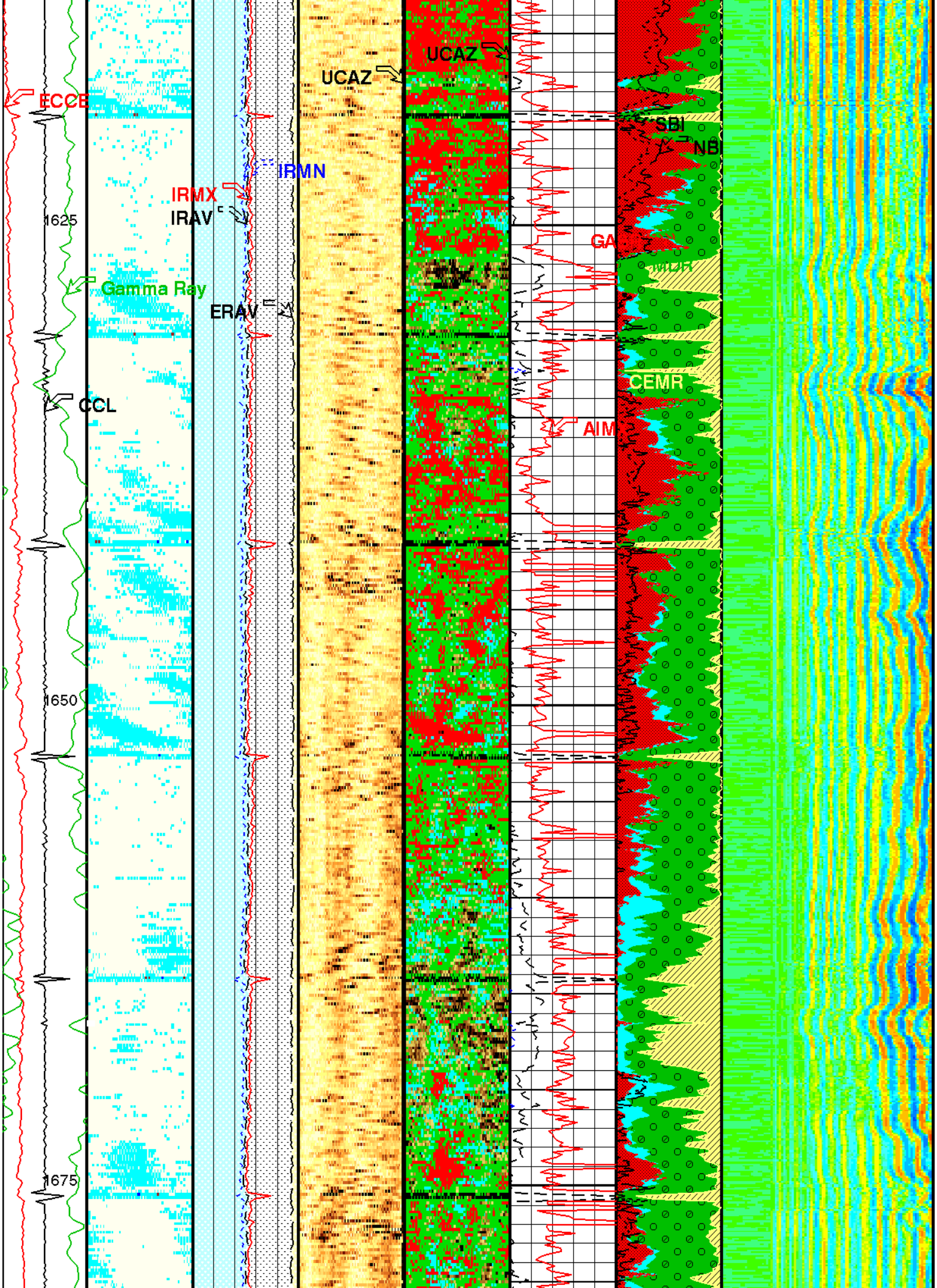
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NBI
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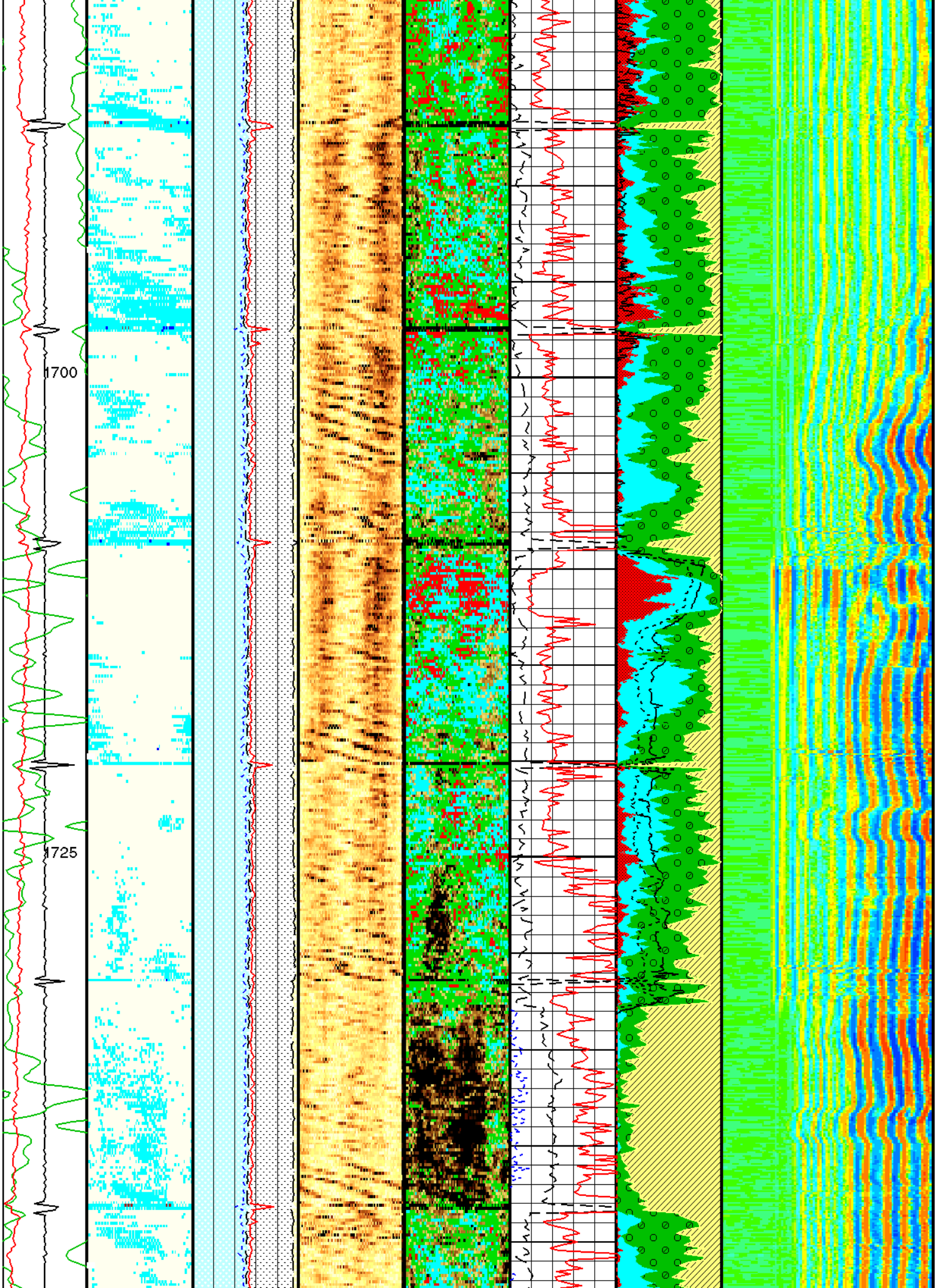
CEMR
AIM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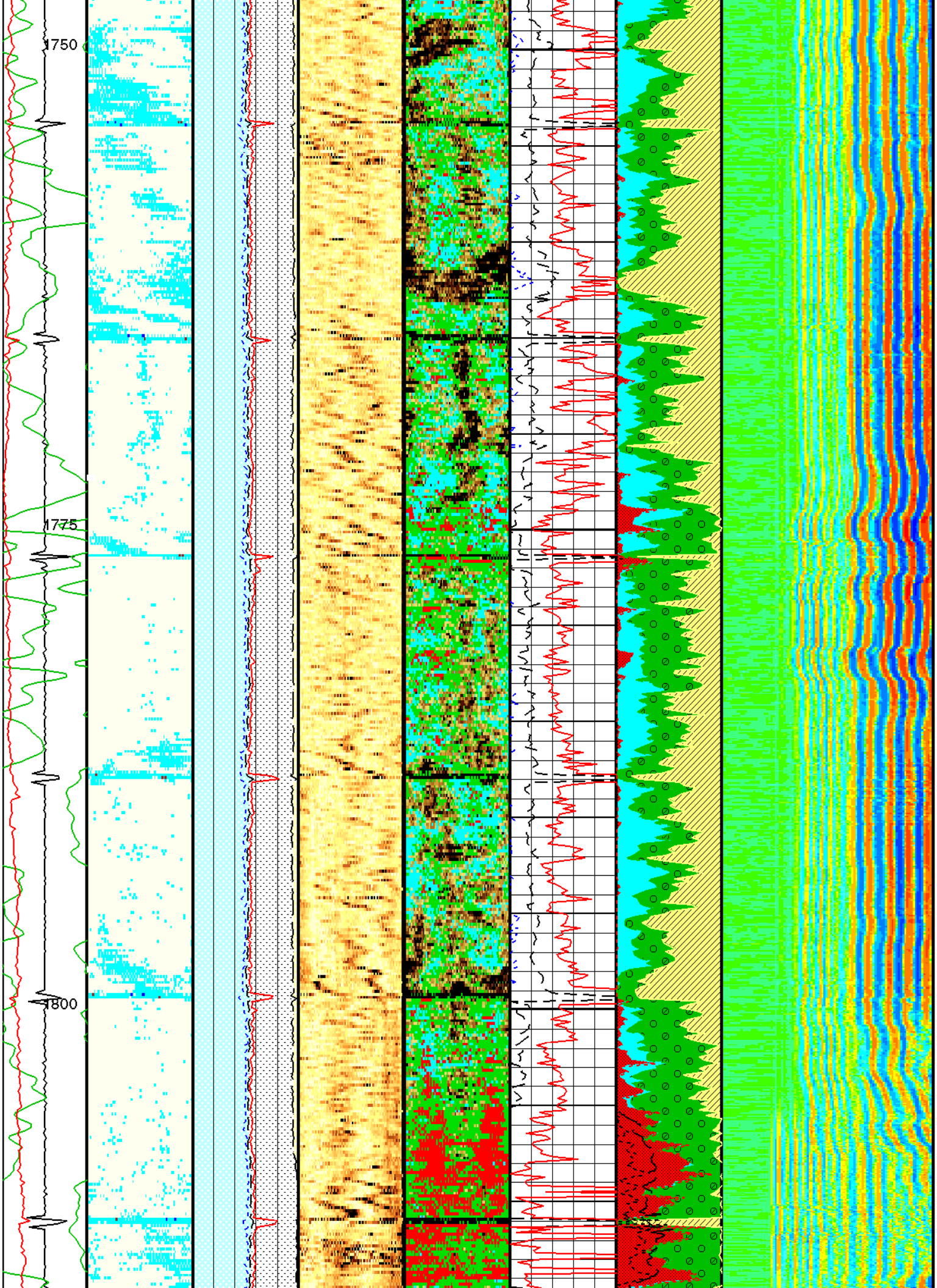
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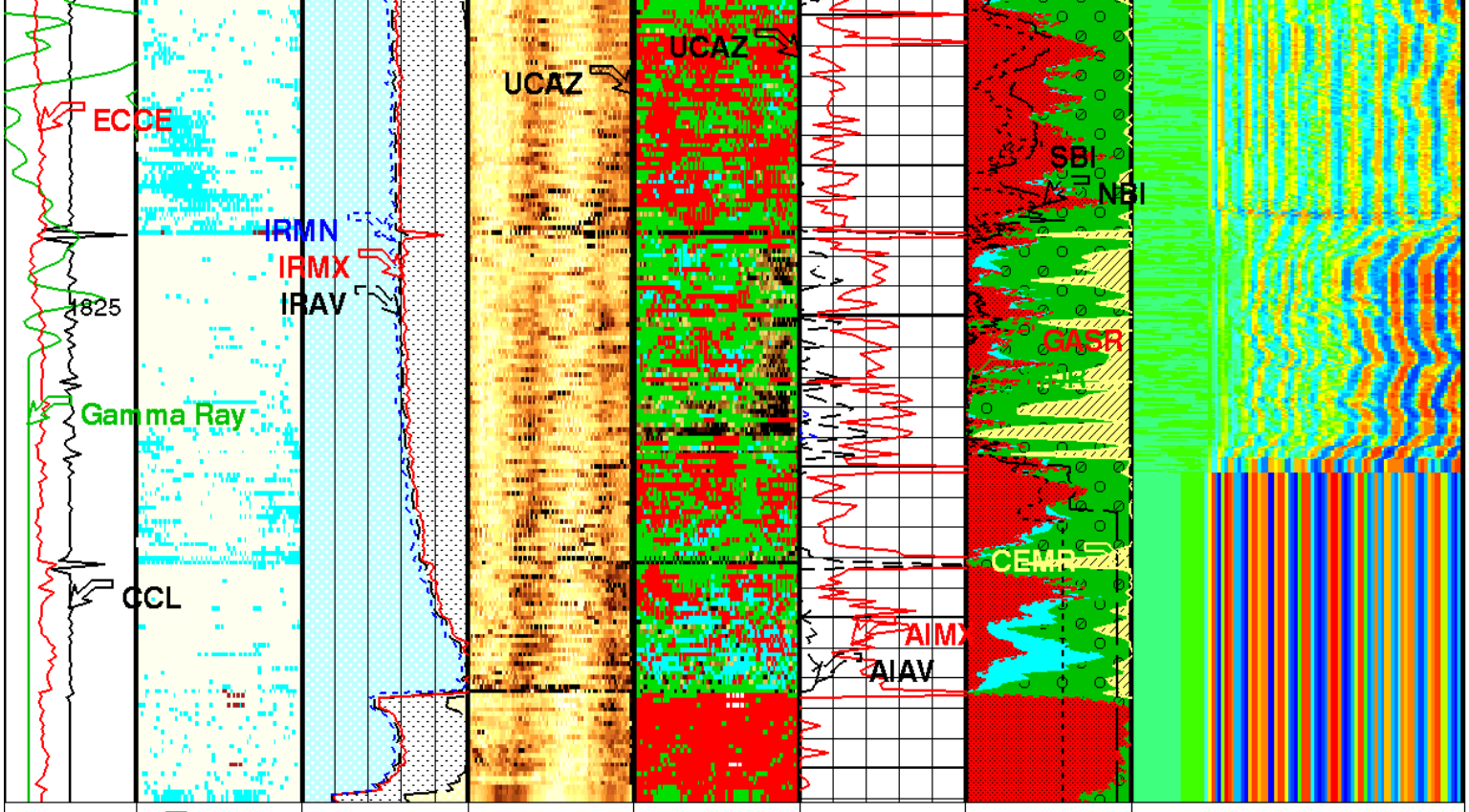

Eccent. (ECCE)
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1.5000
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3.5000
6.5000
Process. flags (UFLG) (---)

External radius Average (ERAV)
70 (MM) 90

Image rotation (UCAZ)
360 (DEG) 0

Image rotation (UCAZ)
360 (DEG) 0

Acoustic Impedance Min (AIMN)
0 (MRAY) 10

Near Bond Index (NBI)
1 (---) 0

Min Amplitude Max
Sonic_VDL_Curve (VDL)
200 (US) 1200

CCL (CCLU) (---)
-20 20

Internal radius Average (IRAV)
70 (MM) 90

-500.0000
-6.0000
-5.6000
-5.2000
-4.8000
-4.4000
-4.0000
-3.6000
-3.2000
-2.8000
-2.4000
-2.0000
-1.6000
-1.2000
-0.8000
-0.4000
0.5000
Amplitude of echo minus Max (AWBK) (---)

-1000.0000
-500.0000
0.3000
2.1000
2.2727
2.4455
2.6182
2.7909
2.9636
3.1364
3.3091
3.4818
3.6546
3.8273
4.0000
Cement Map with Impedance Classification (AI_MICRO_DEBONDING_IMAGE) (---)

Acoustic Impedance Ave (AIAV)
0 (MRAY) 10

Short Bond Index (SBI)
1 (---) 0

Gamma Ray (GR) (GAPI)
0 100

Internal radius Maximum (IRMX)
70 (MM) 90

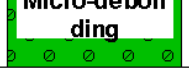
Internal radius Minimum (IRMN)
70 (MM) 90

Acoustic Impedance Max (AIMX)
0 (MRAY) 10

Bonded

Gas or Dry MicroA

Liquid



PIP SUMMARY

Time Mark Every 60 S

Format: USIT_SSLT_177.8_GAS_MIGRATION Vertical Scale: 1:240 Graphics File Created: 29-Jan-2013 17:16

OP System Version: 17C0-154

USIT-D	17C0-154	SSLT-C	17C0-154
SGT-N	17C0-154	DTC-H	17C0-154
CAL-Y	17C0-154		

USI : LOW Frequency Compression Mode Used For Logging.

Recommended casing thickness range for optimum cement impedance measurement : 0.27 to 0.6 IN.

Parameters

DLIS Name	Description	Value	
USIT-D: Ultrasonic Imaging - D			
AGMN	Minimum Gain of Cartridge	-4	DB
AGMX	Maximum Gain of Cartridge	48	DB
BERJ	Bad Echo Rejection	ON	
CDIA	Casing Outer Diameter	177.8	MM
CSDE	Casing Density	7800	K/M3
CSID	Casing Inner Diameter	161.707	MM
DFVL	Default Fluid Velocity	760	US/M
DOT	Diameter of Transducer Sensor	72.9996	MM
EMXV	EMEX Voltage	40	V
FSOD	Fluid Slowness Fits Casing Outer Diameter	1_UTFS_N_MW	
IMAR	Image Rotation	OFF	
MW	Mud Weight	810	K/M3
RCOD	Reference Calibrator Outer Diameter	177.8	MM
RCSO	Reference Calibrator Standoff	29.9999	MM
RCTH	Reference Calibrator Thickness	7.49808	MM
SDNV	Number of Vertical Samples used for Micro-debonding Computation	5	
SDTHOR	Acoustic Impedance STD Horizontal Threshold for Micro-debonding	0.5	
SDTVER	Acoustic Impedance STD Vertical Threshold for Micro-debonding	0.3	
TCUB	T^3 Processing Level	Vax_Loop	
THDH	Maximum Search Thickness (percentage of nominal)	130	
THDL	Minimum Search Thickness (percentage of nominal)	70	
THDP	Thickness Detection Policy	Fundamental	
THNO	Nominal Thickness of Casing	8.04628	MM
UMAO	USIT Measurement Angular Offset	-10	DEG
USTO	Ultrasonic Time Offset	-2	US
USUB	Ultrasonic Subassembly Identifier	Sub_7_inch	
UWKM	Ultrasonic Working Mode	5DEG_6IN_60U_LF	
VCAS	Ultrasonic Transversal Velocity in Casing	168.635	US/M
WLEN	T^3 Processing Length	18.9963	US
ZCAS	Acoustic Impedance of Casing	46.25	MRAY
ZINI	Initial Estimate of Cement Impedance	-1	MRAY
ZMUD	Acoustic Impedance of Mud	1.3	MRAY
ZTCM	Acoustic Impedance Threshold for Cement	2.1	MRAY
ZTGS	Acoustic Impedance Threshold for Gas	0.3	MRAY
SSLT-C: SlimAccess Sonic Logging Tool			
CBAF	CBL Adjustment Factor	1	
CBRA	CBL LQC Reference Amplitude in Free Pipe	62	MV
CTHI	Casing Thickness	8.17523	MM
DTF	Delta-T Fluid	790	US/M
MATT	Maximum Attenuation	28.7082	DB/M
NFPI_L5	Free Pipe amplitude for LT-R5	1500	
NFPI_U1	Free Pipe amplitude for UT-R1	1100	
SFPI	Short Free Pipe Sonic Amplitude	2500	
VDLG	VDL Manual Gain	5	
VDM	VDL Display Mode	R5	
ZCMT	Acoustic Impedance of Cement	4	MRAY
System and Miscellaneous			
CSIZ	Current Casing Size	177.800	MM
CWEI	Casing Weight	34.20	KG/M
DO	Depth Offset for Playback	2.6	M
PP	Playback Processing	NORMAL	

Input DLIS Files

DEFAULT	USI SONIC 016LUP	FN:14	PRODUCER	29-Jan-2013 15:44	1838.6 M	18.1 M

Output DLIS Files

DEFAULT	USI_SONIC_018PUP	FN:16	PRODUCER	29-Jan-2013 17:16		

Schlumberger

MAIN PASS
0 MPA

MAXIS Field Log

Input DLIS Files

DEFAULT	SPLICE_USI_SONIC_013	FN:1	PRODUCER	29-Jan-2013 14:58	1840.5 M	22.4 M

Output DLIS Files

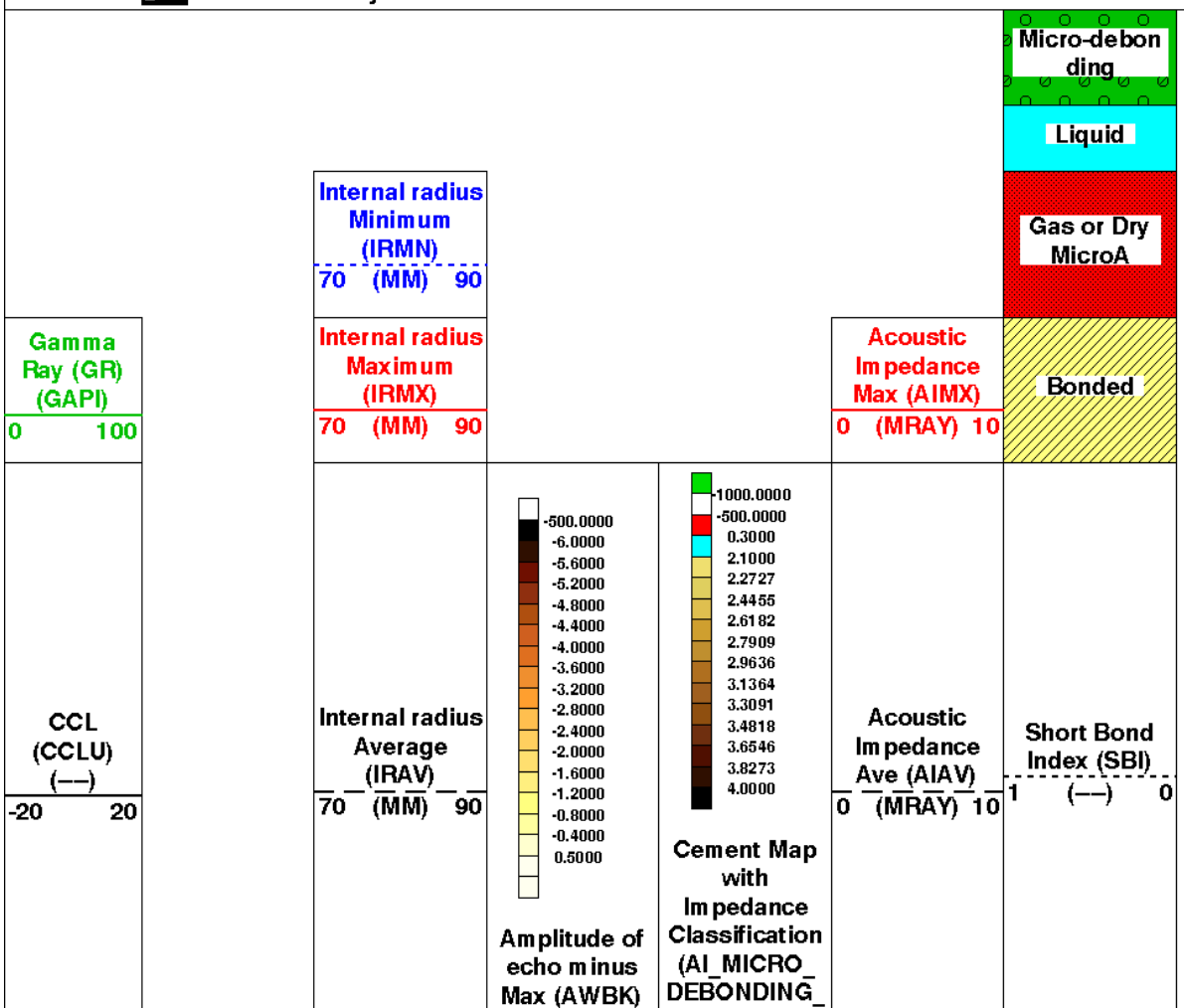
DEFAULT	USI_SONIC_015PUP	FN:13	PRODUCER	29-Jan-2013 15:05	1840.5 M	22.6 M

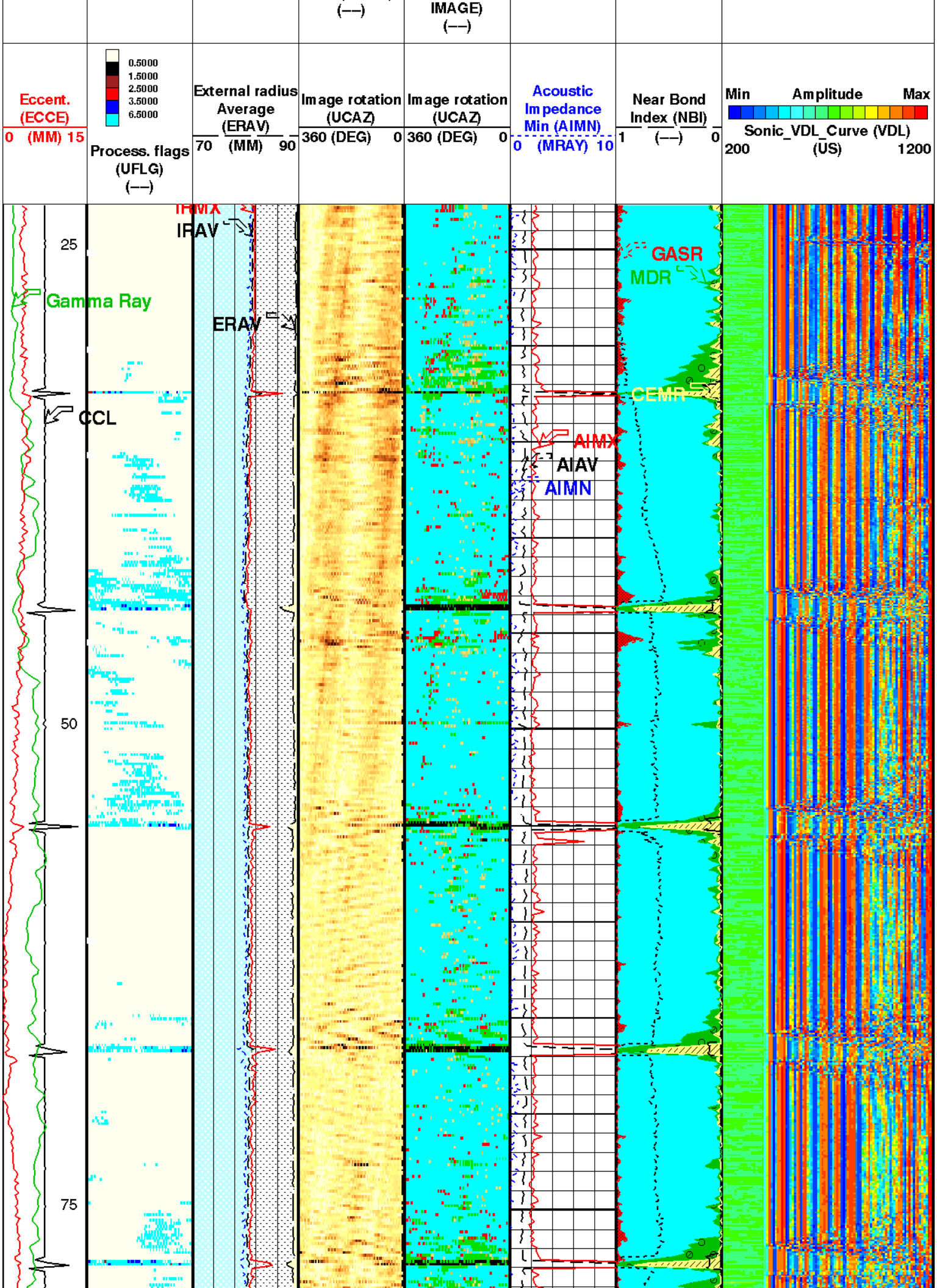
OP System Version: 17C0-154

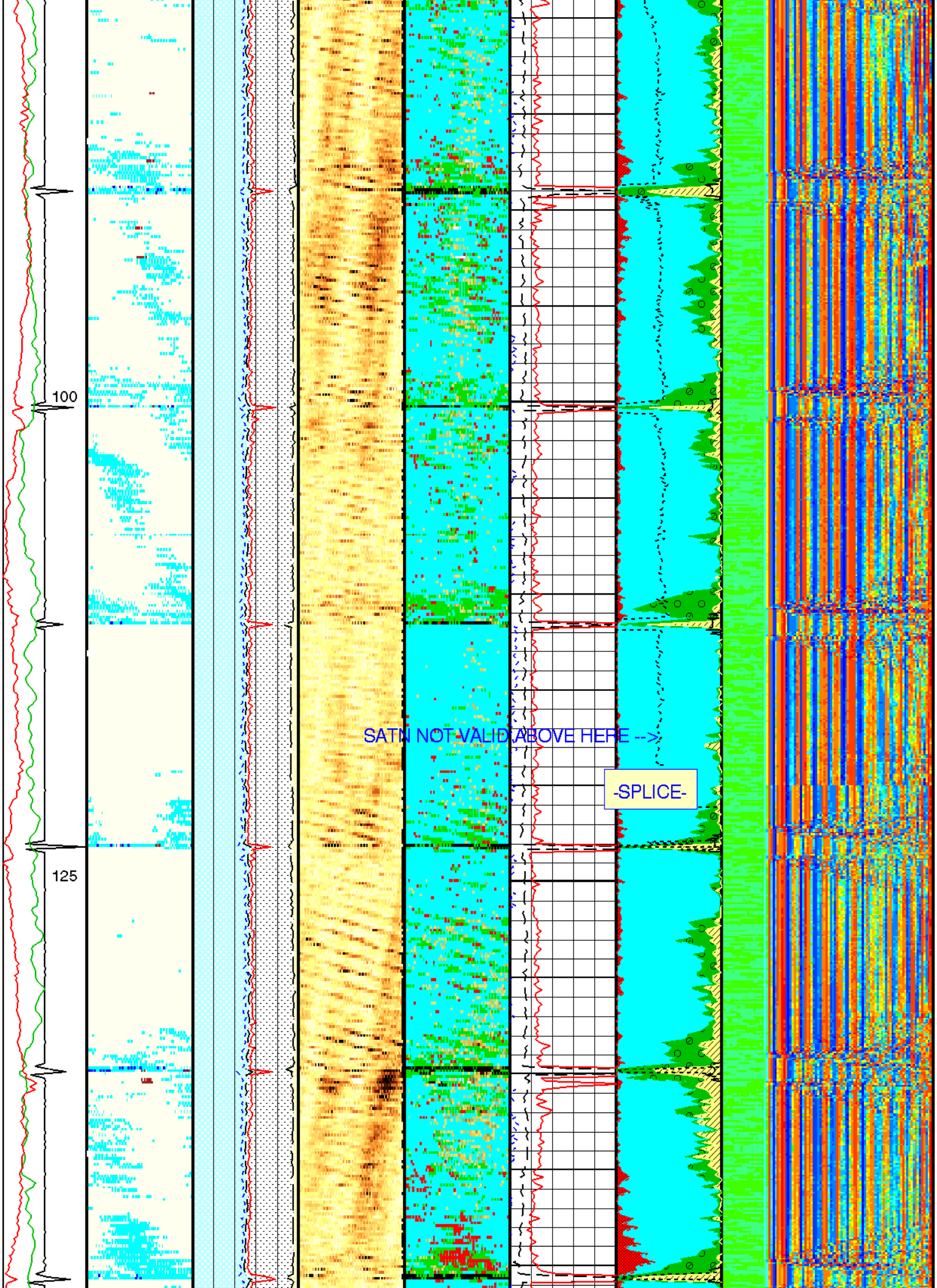
USIT-D	17C0-154	SSLT-C	17C0-154
SGT-N	17C0-154	DTC-H	17C0-154
CAL-Y	17C0-154		

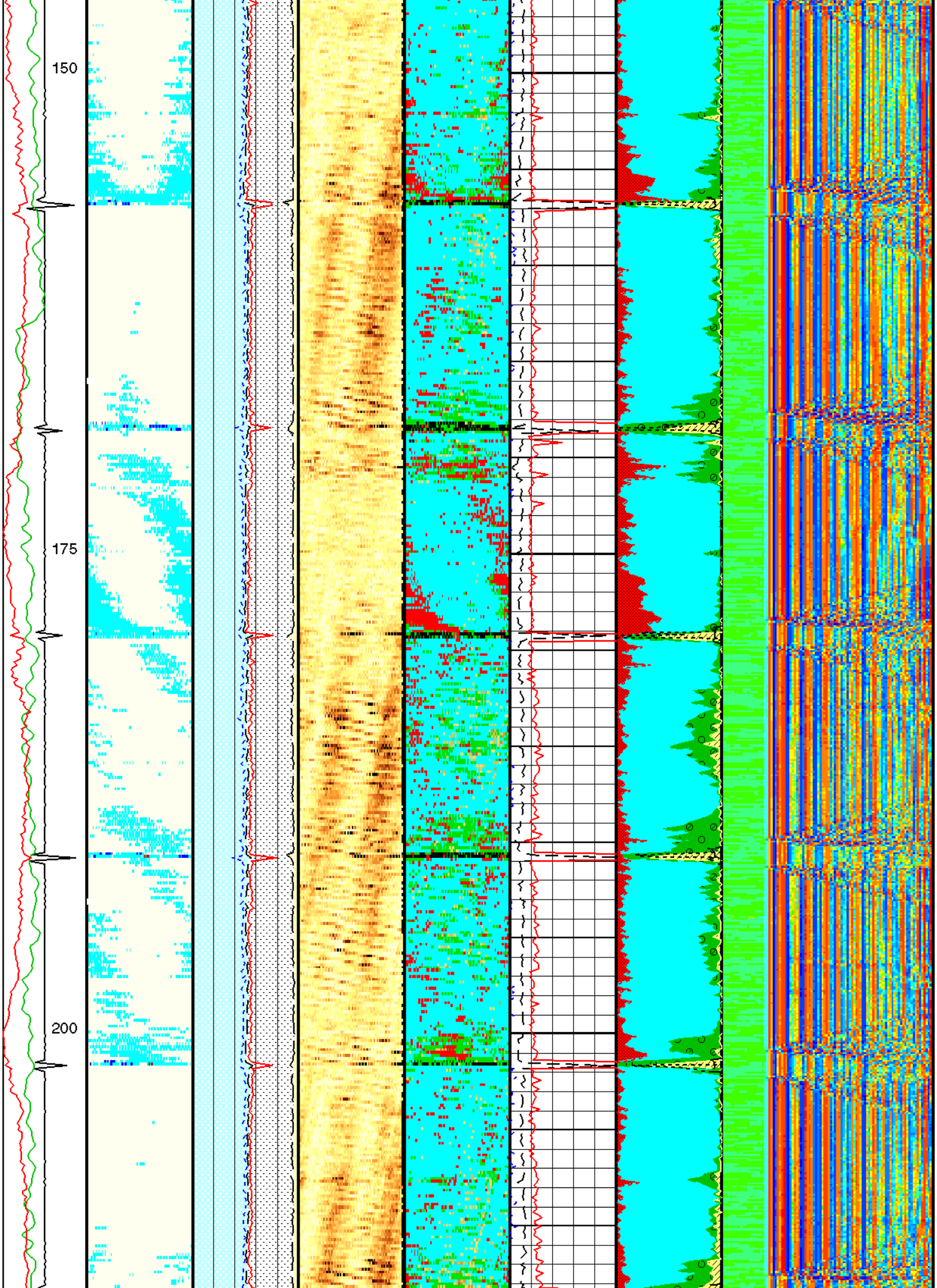
PIP SUMMARY

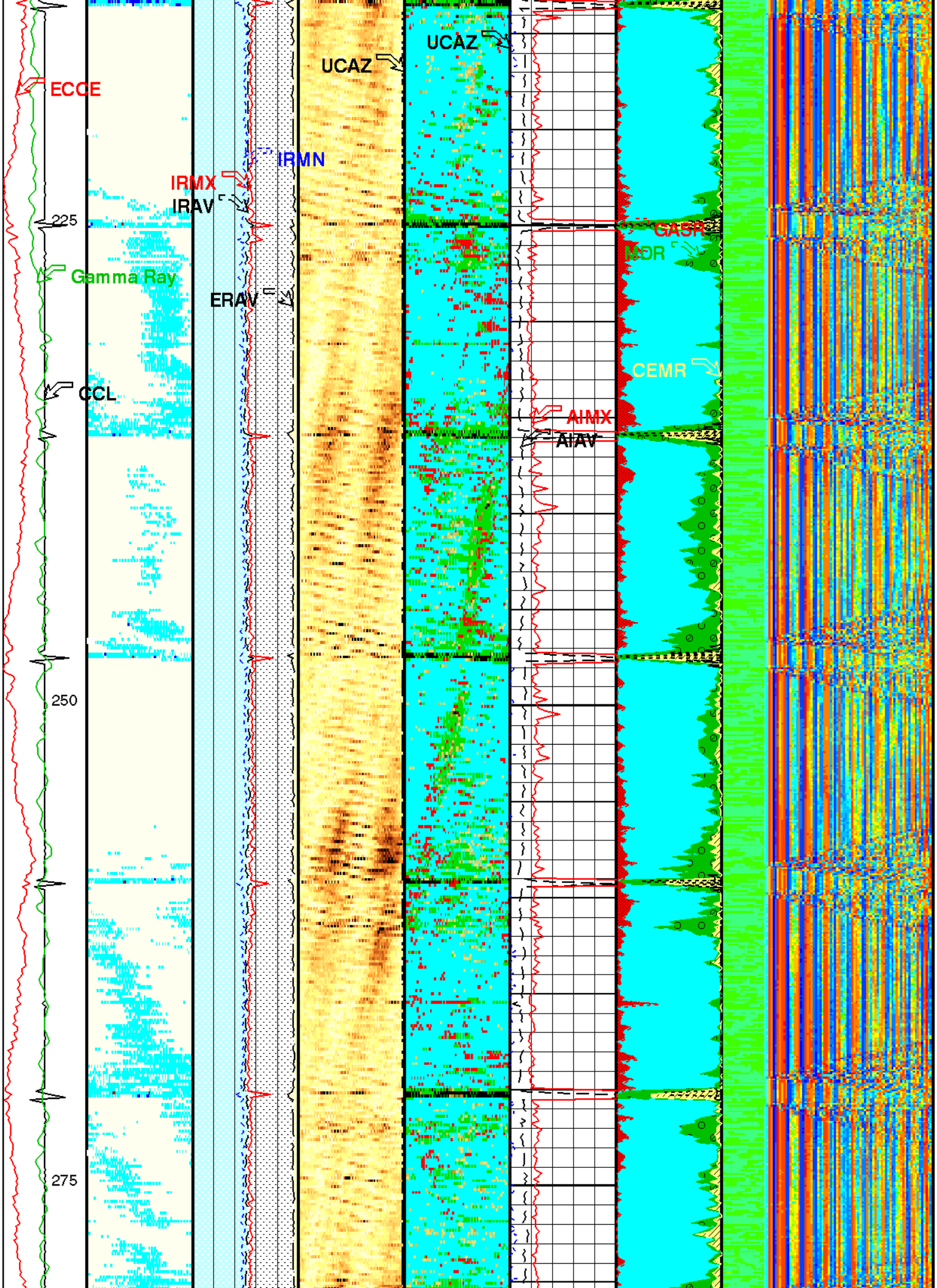
Time Mark Every 60 S

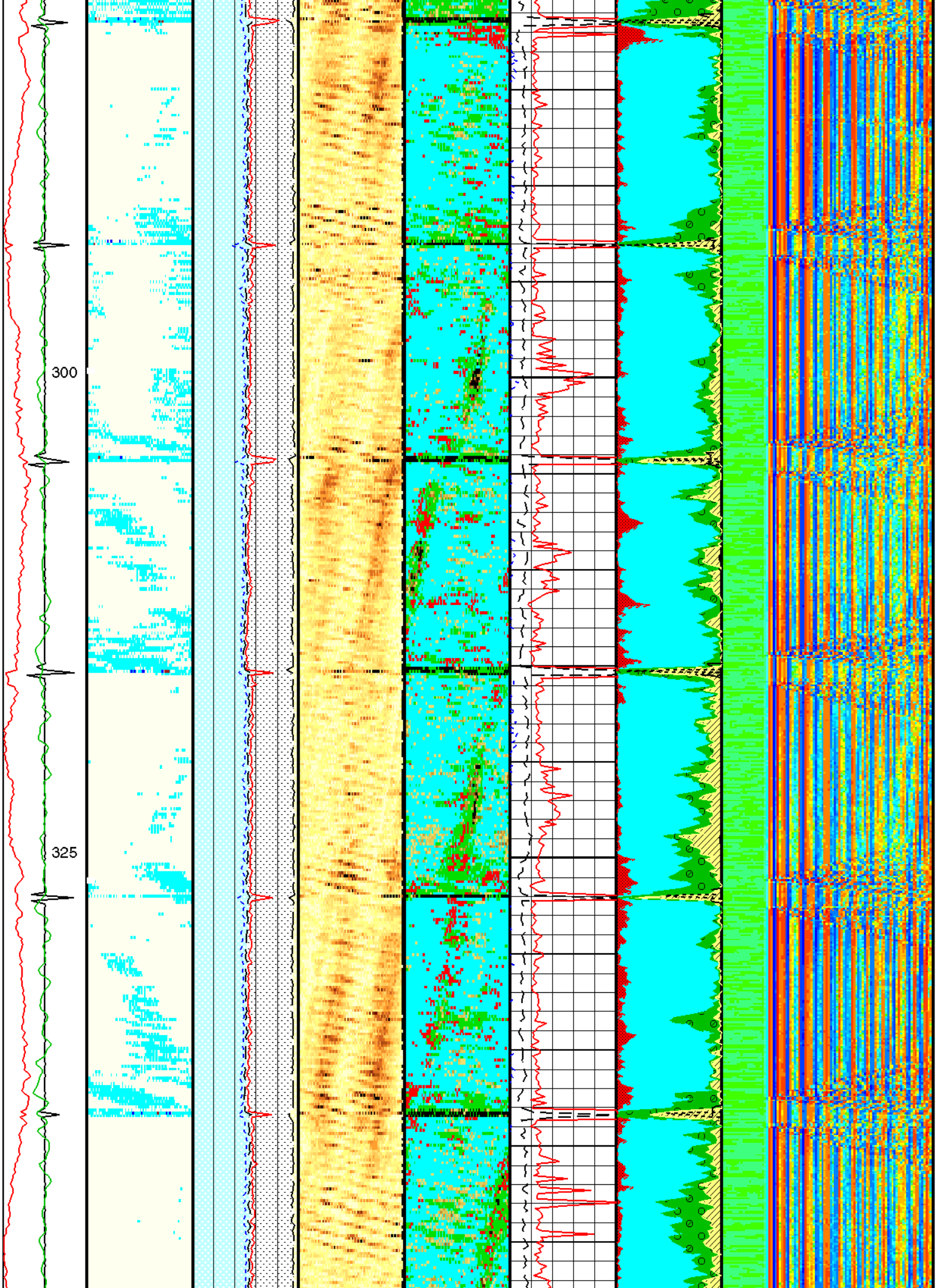


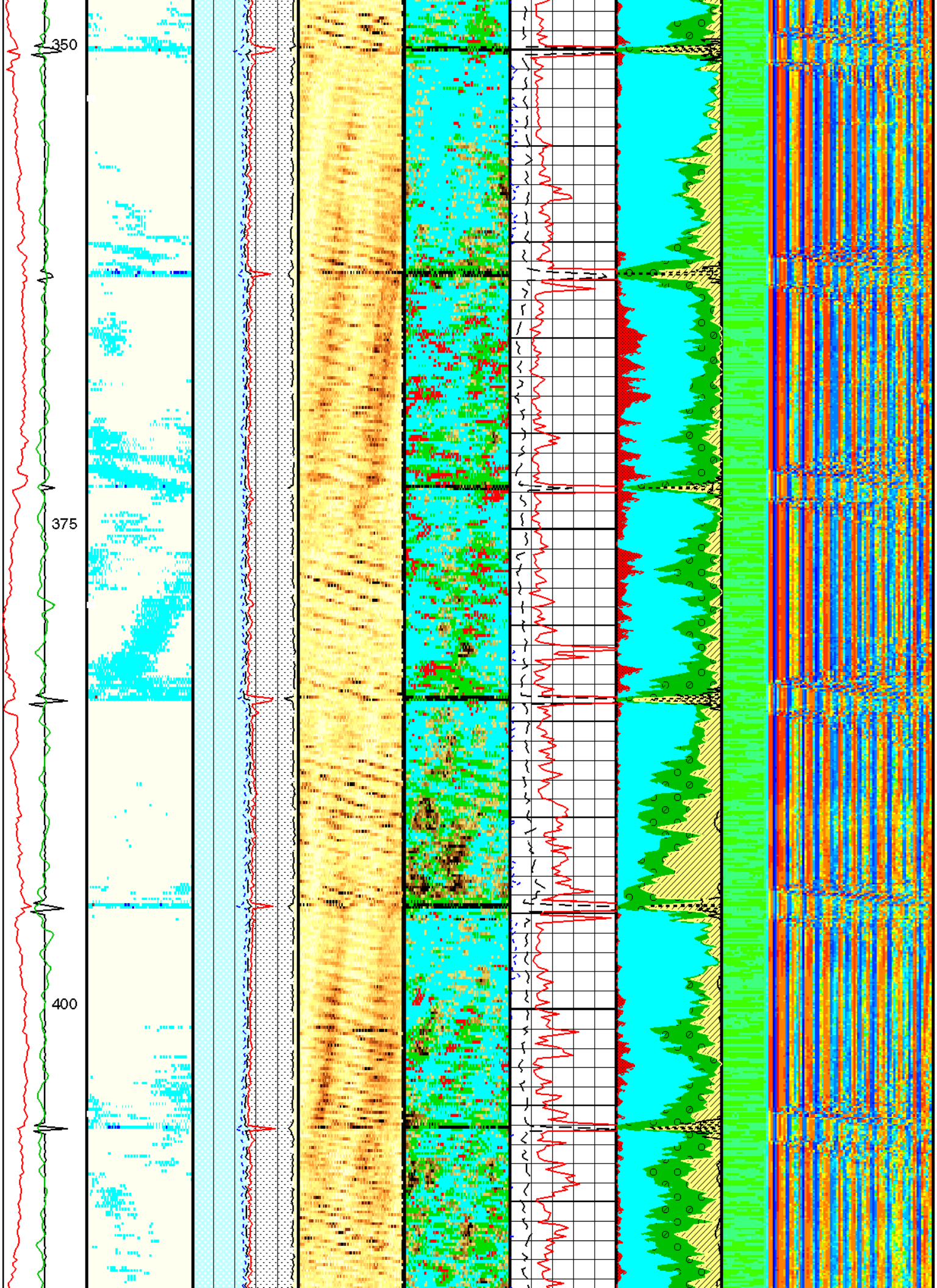

(---)
IMAGE)
(---)
Eccent. (ECCE)
0 (MM) 15
0.5000
1.5000
2.5000
3.5000
6.5000
Process. flags (UFLG)
(---)
External radius Average (ERAV)
70 (MM) 90
Image rotation (UCAZ)
360 (DEG) 0
Image rotation (UCAZ)
360 (DEG) 0
Acoustic Impedance Min (AIMN)
0 (MRAY) 10
Near Bond Index (NBI)
1 (---) 0
Min Amplitude Max
Sonic_VDL_Curve (VDL)
200 (US) 1200
25
50
75
Gamma Ray
CCL
IRMX
IRAV
ERAV
GASR
MDR
CEMR
AIMX
AIAV
AIMN


100
125
SATN NOT VALID ABOVE HERE -->
-SPLICE-


150
175
200


ECCE
Gamma Ray
CCL
225
250
275
IRMX
IRAV
IRMN
ERAV
UCAZ
UCAZ
GASR
MDR
CEMR
AIMX
AIAV


300
325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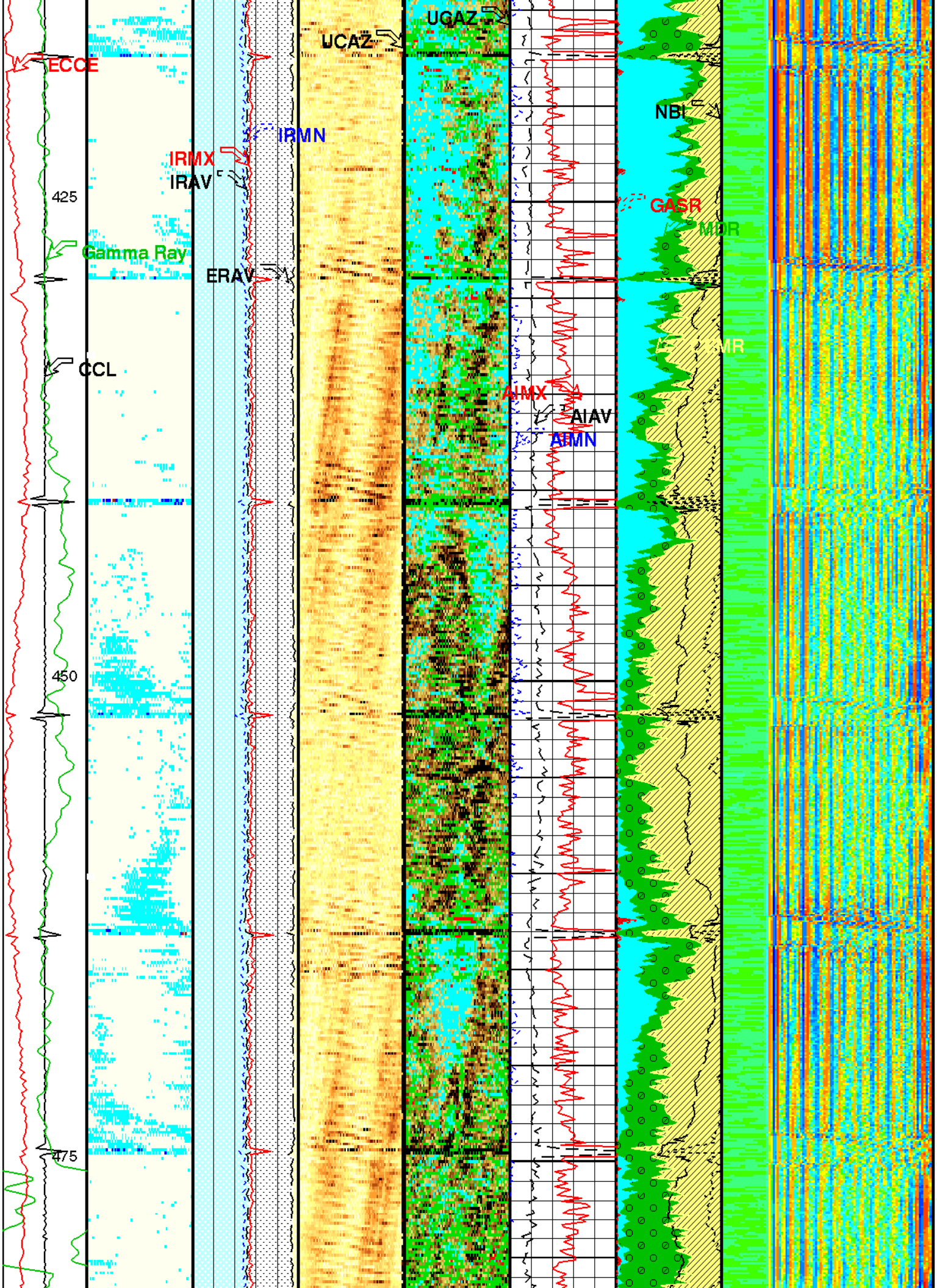
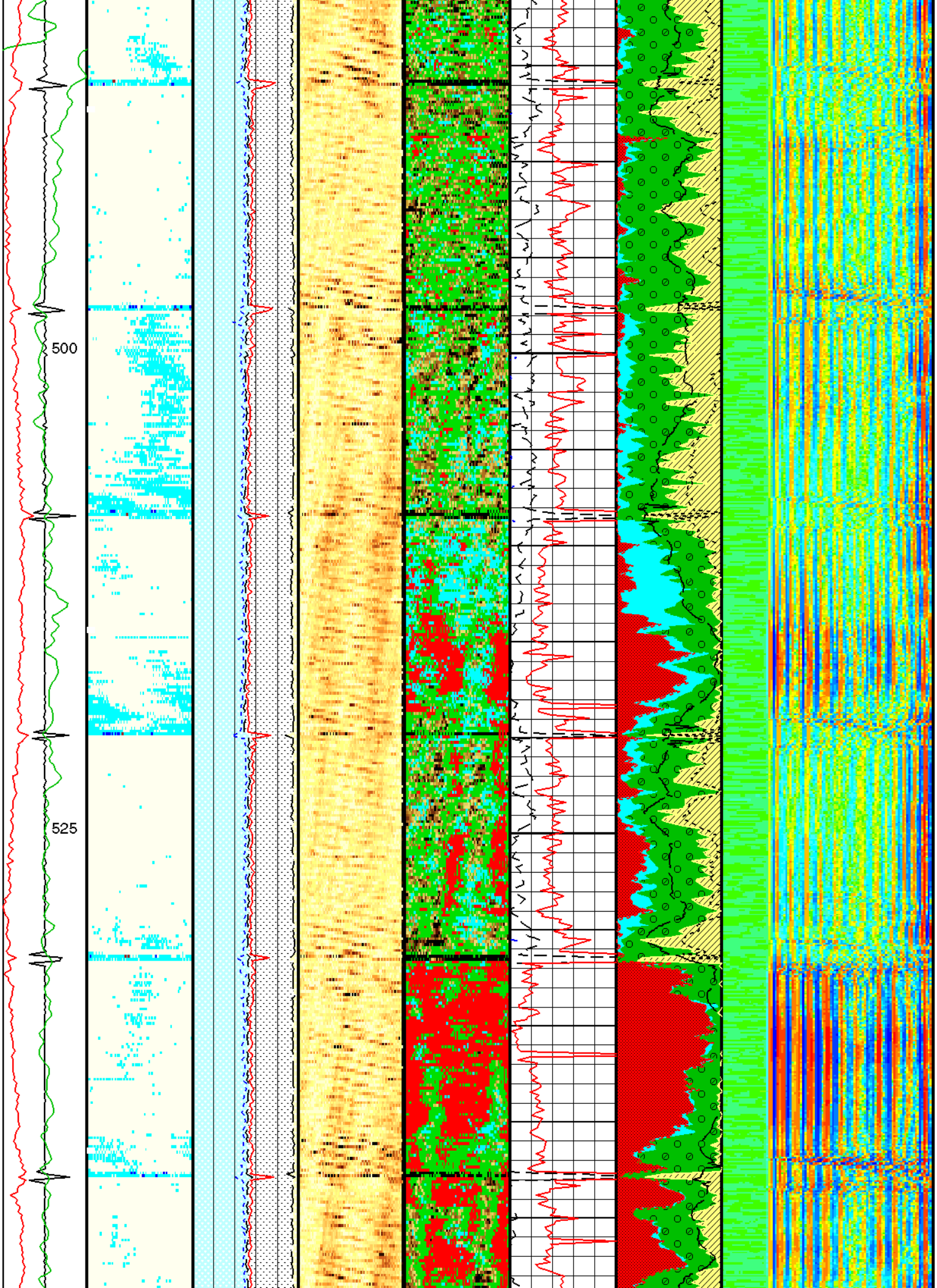
375
400


ECCE
IRMN
IRMX
IRAV
425
Gamma Ray
ERAV
CCL
450
475
UCAZ
UCAZ
NBI
GASR
MDR
MR
AIMX
AIAV
AIMN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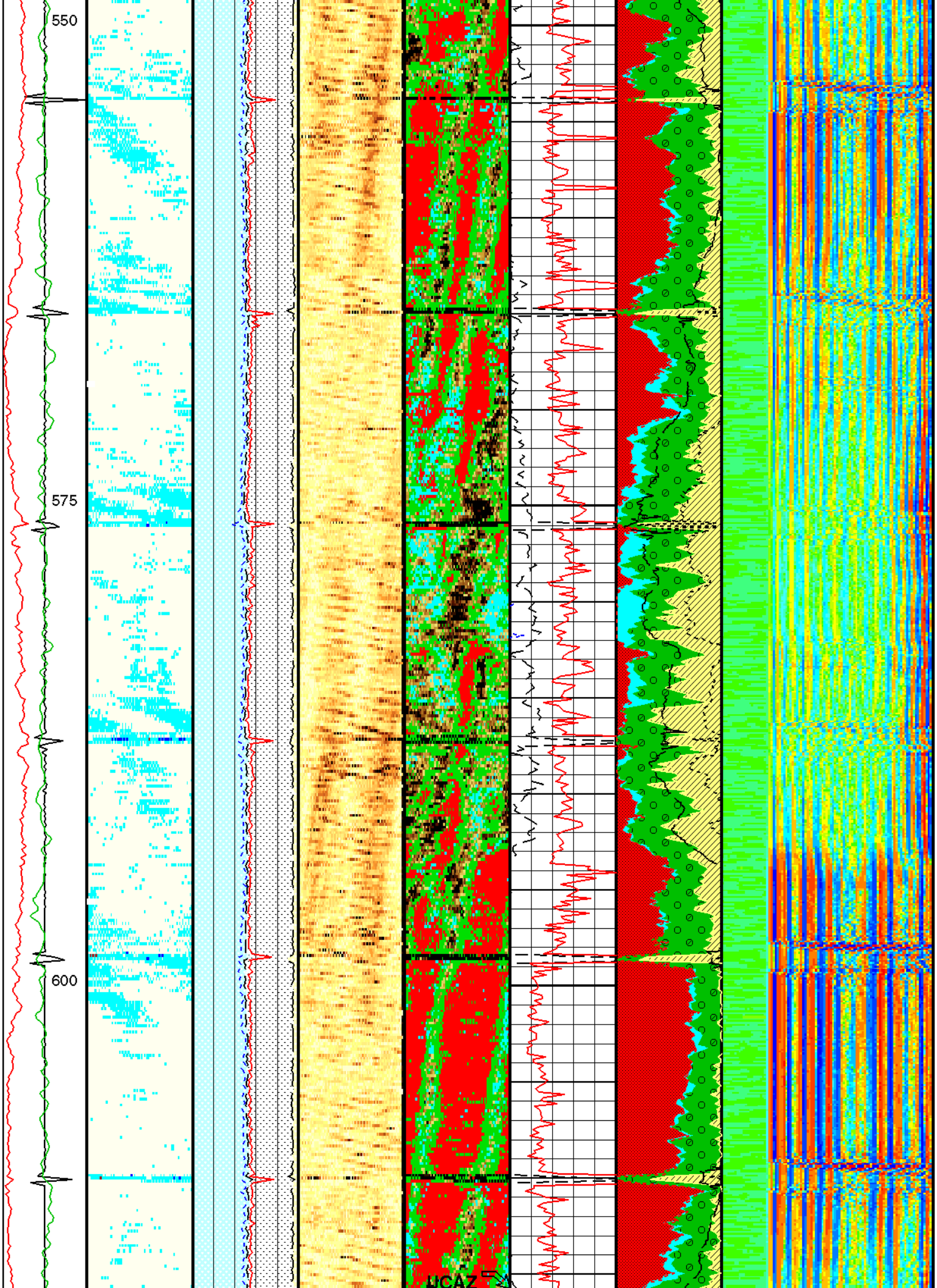
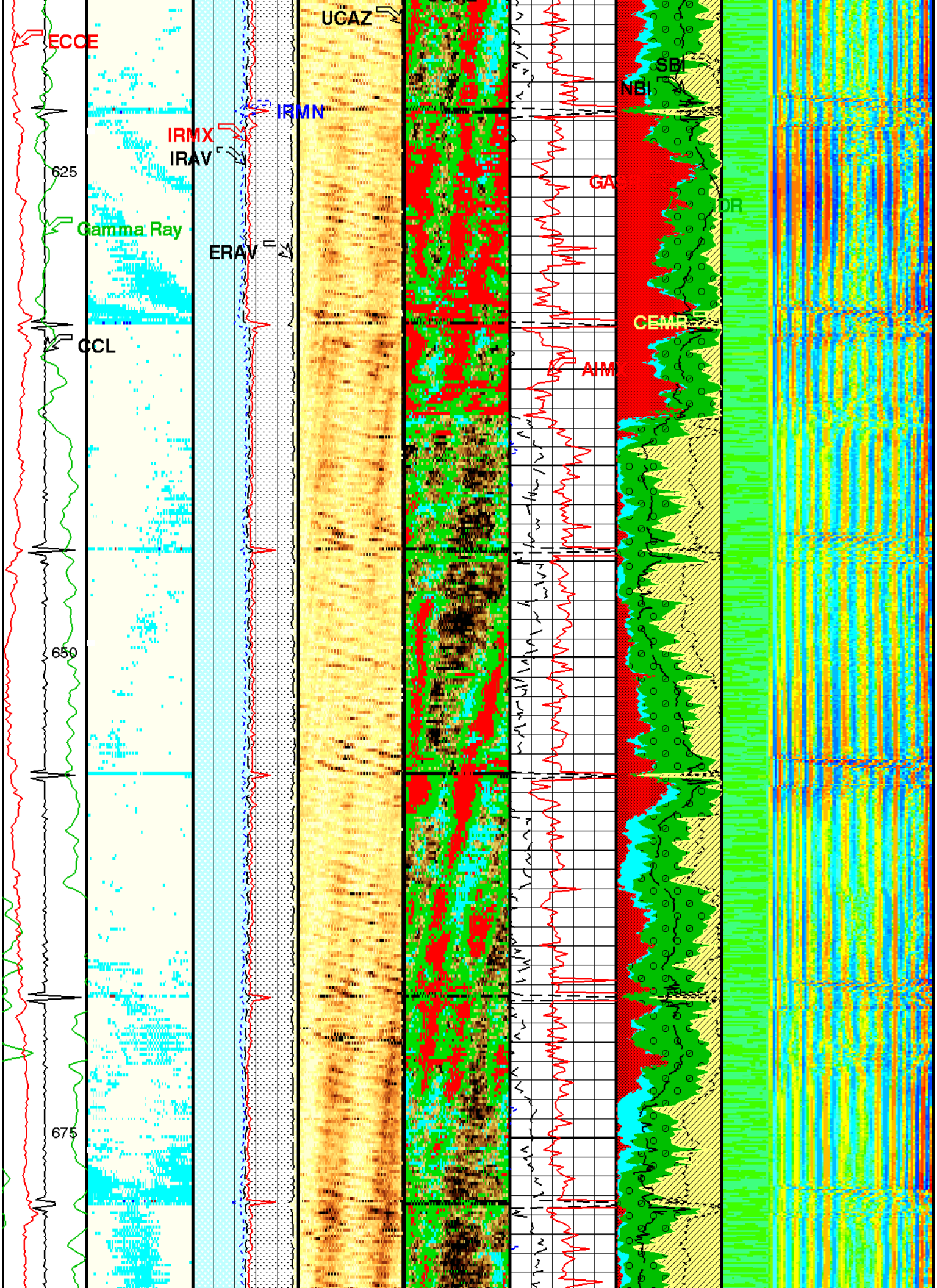
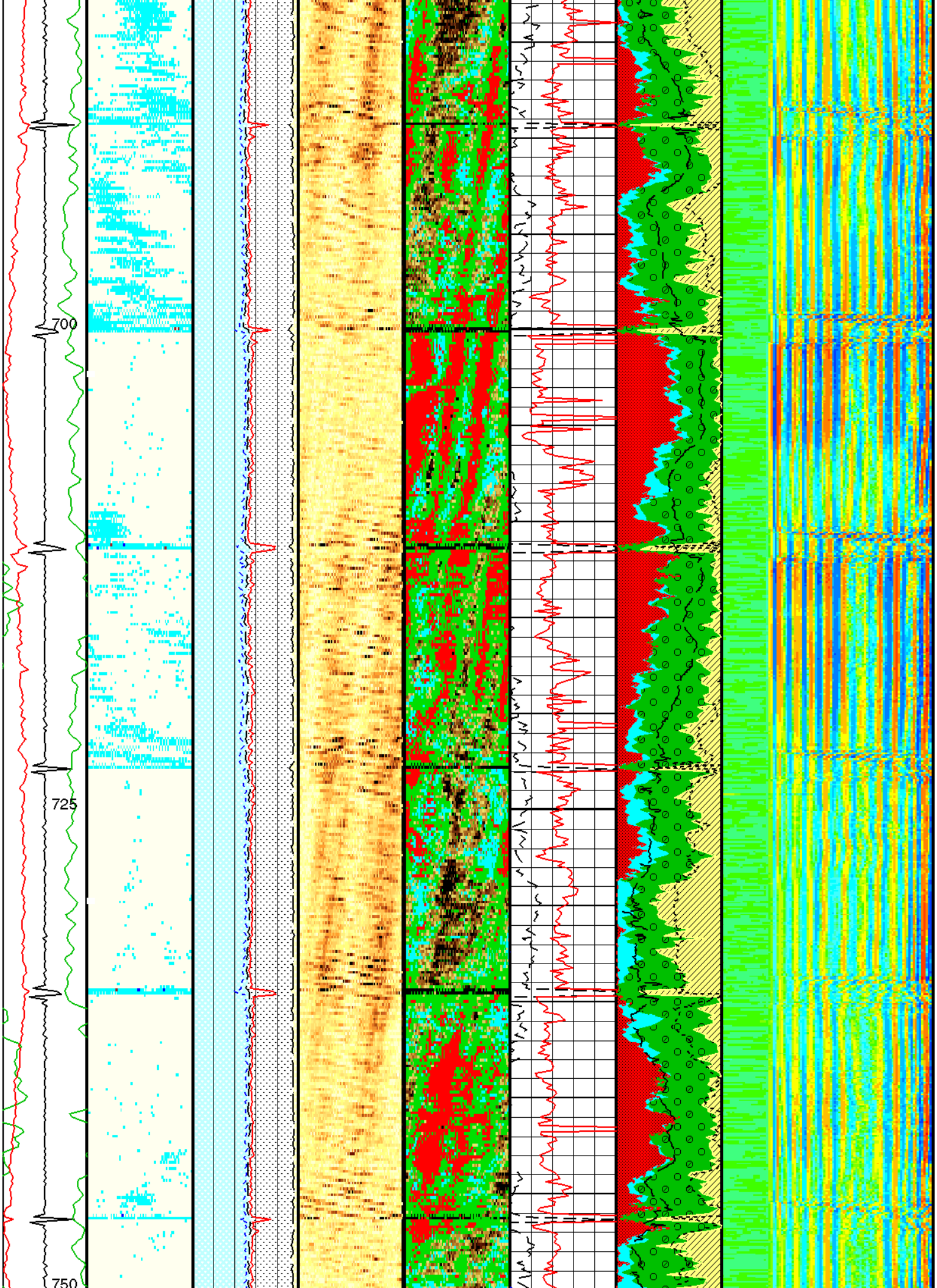
525


550
575
600
UCAZ


ECCE
IRMN
IRMX
IRAV
625
Gamma Ray
ERAV
CCL
650
675
UCAZ
SBI
NBI
GAS
DR
CEMR
AIM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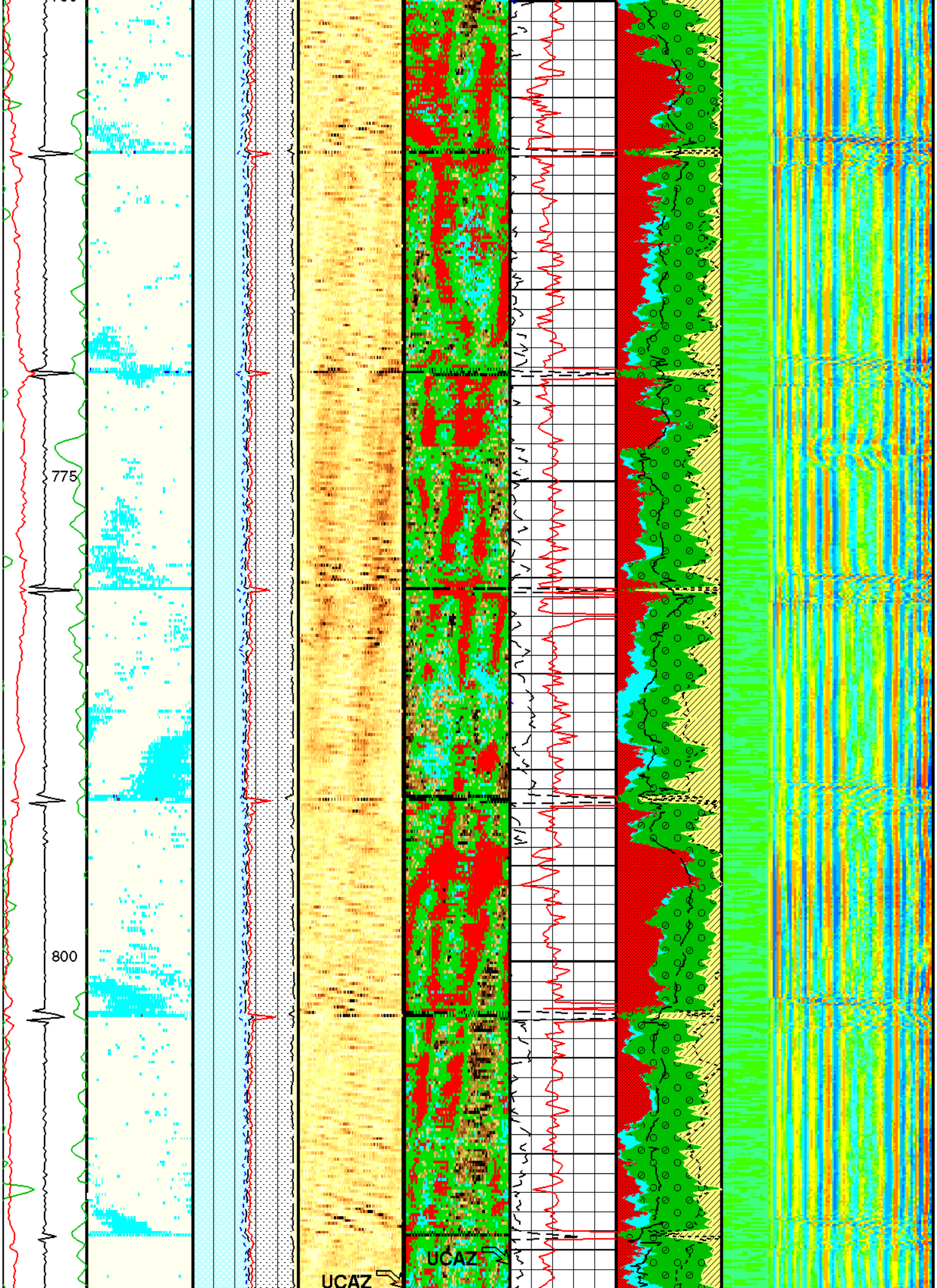
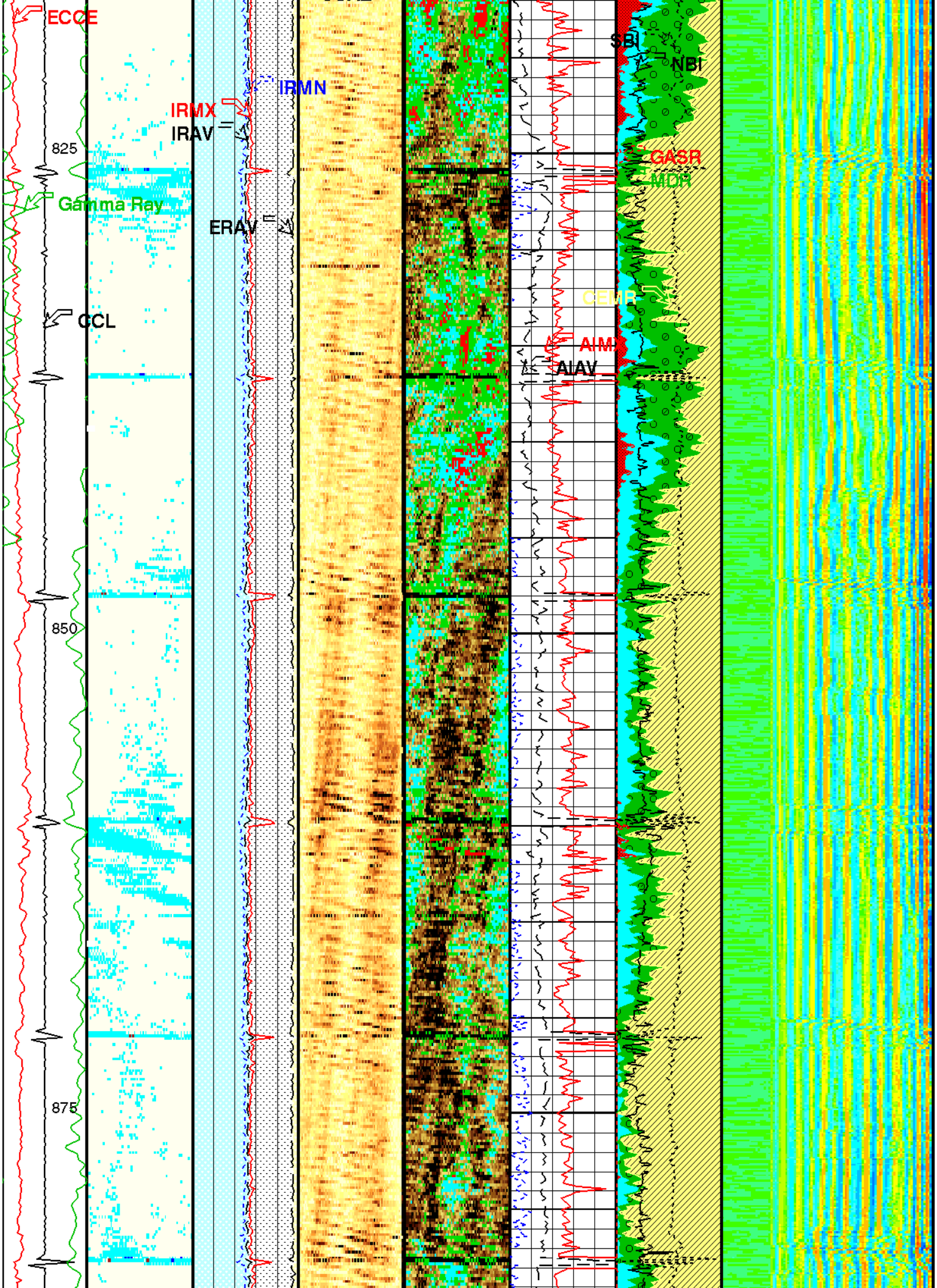
725
750


775
800
UCAZ
UCAZ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IRMN
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IRAV
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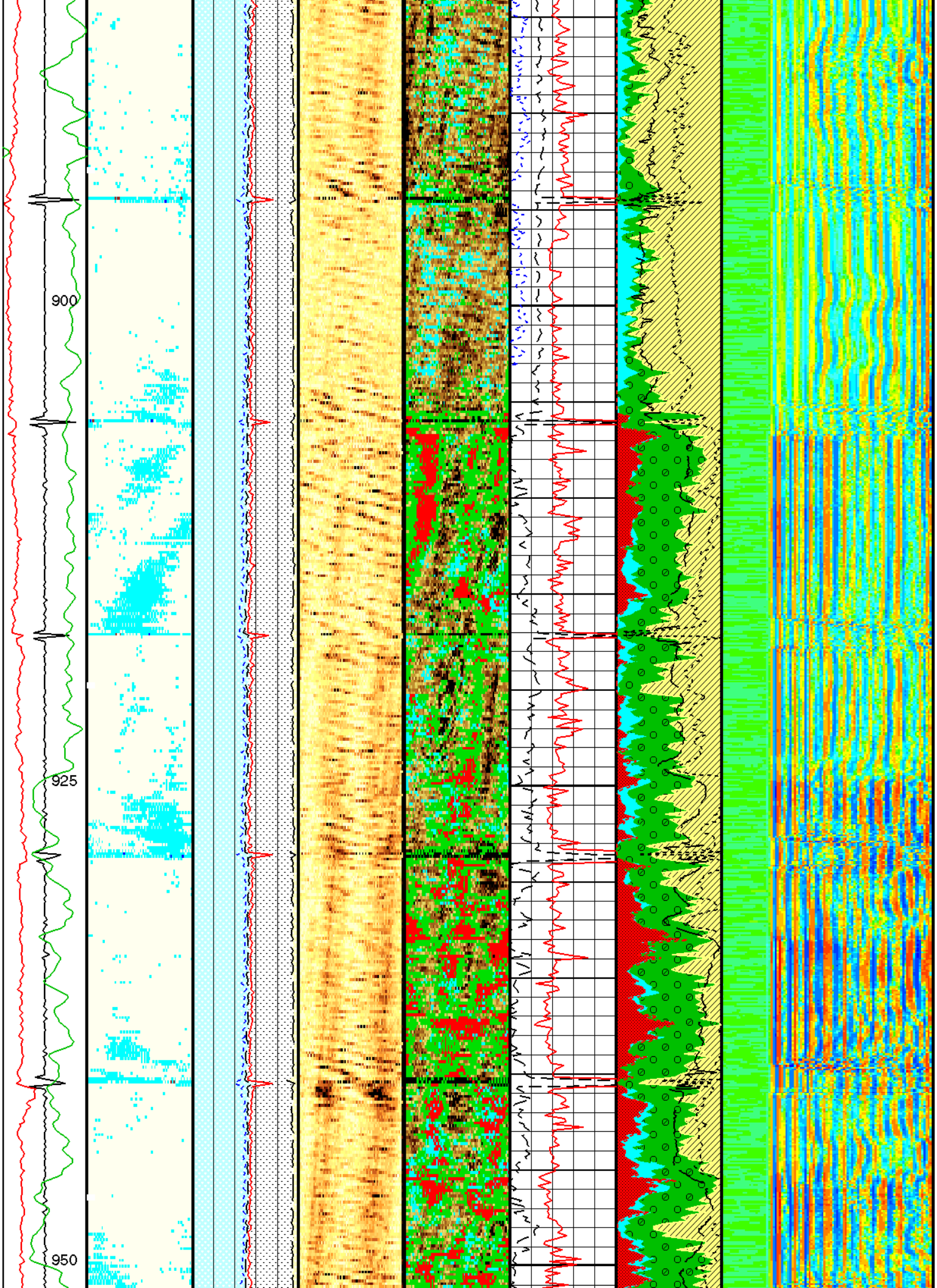
CCL
850
875
SBI
NBI
GASR
MDR
CEMR
AIMX
AIAV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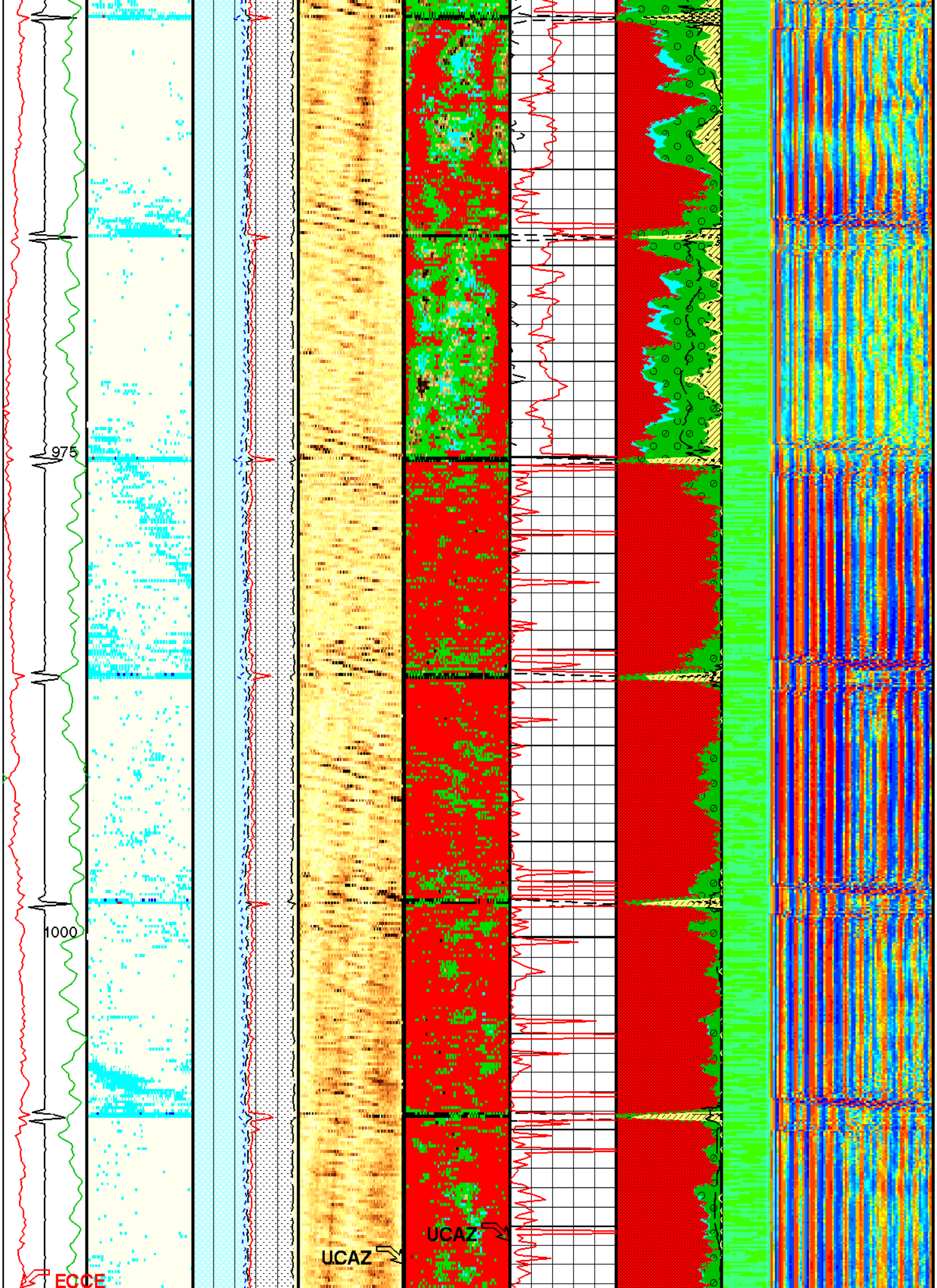
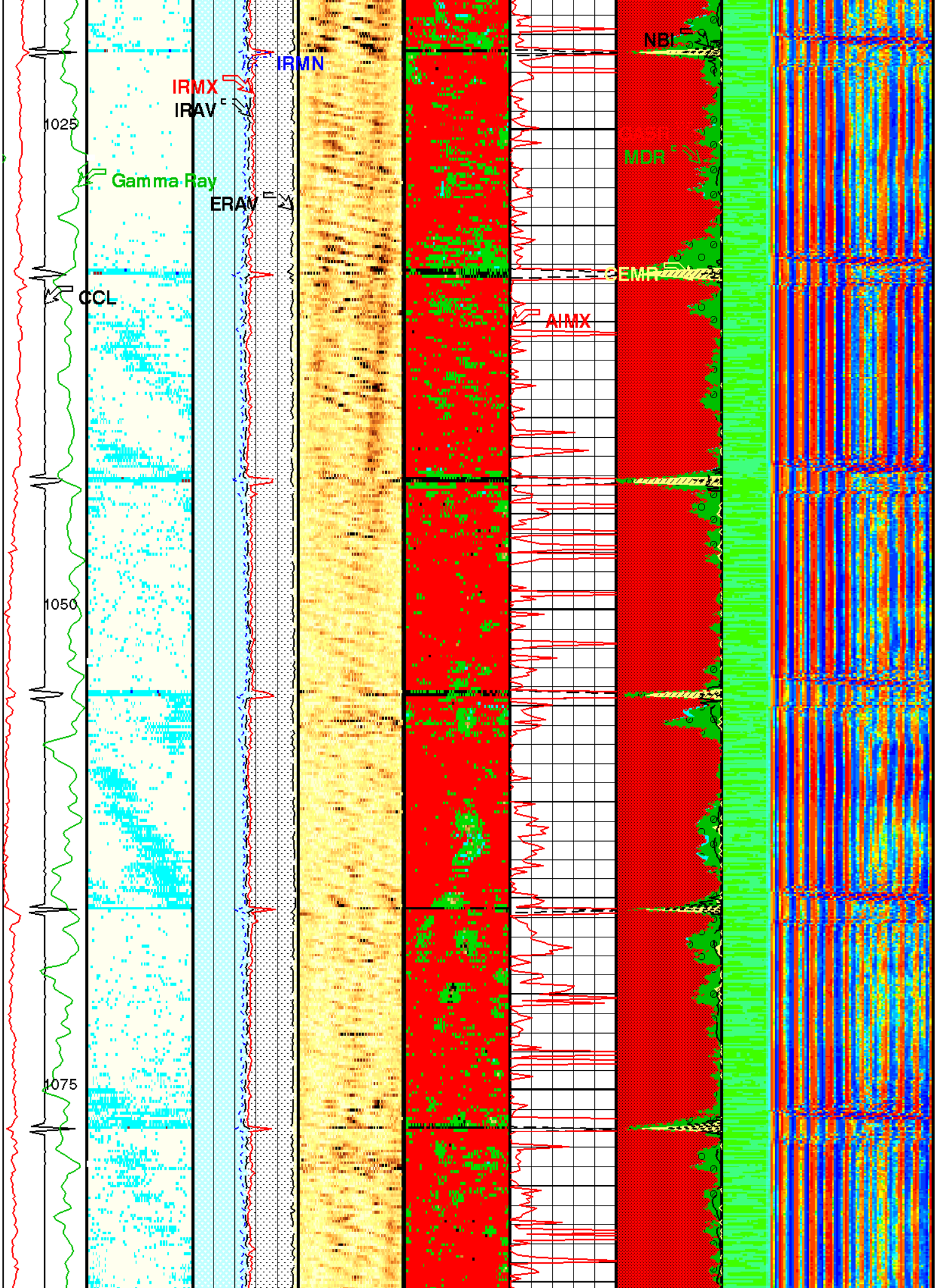
925
950


975
1000
UCAZ
UCAZ
ECCE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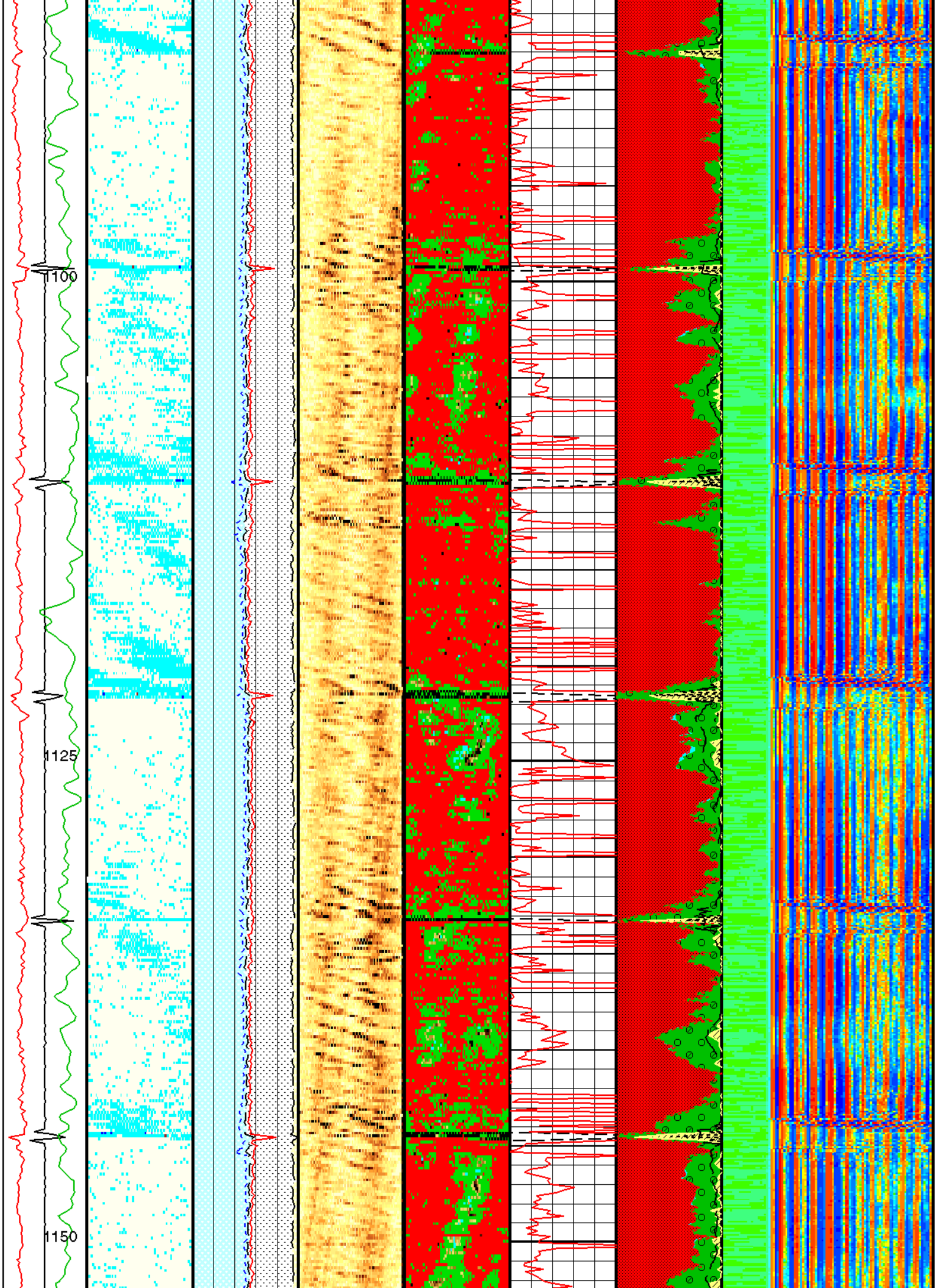
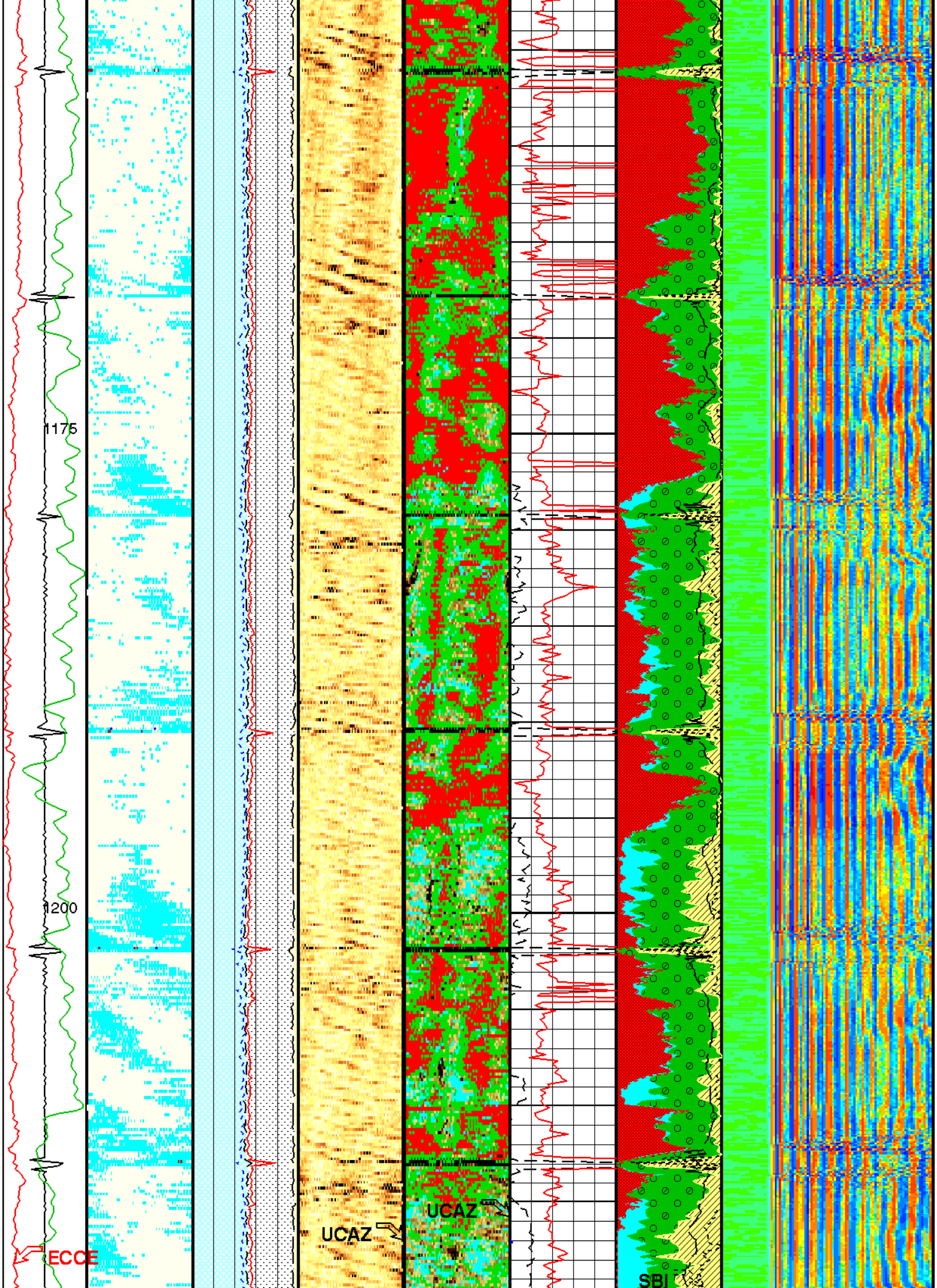
IRMX
IRAV
1025
Gamma Ray
ERAV
CCL
1050
1075
NBL
MDR
CEMR
AIMX


1100
1125
1150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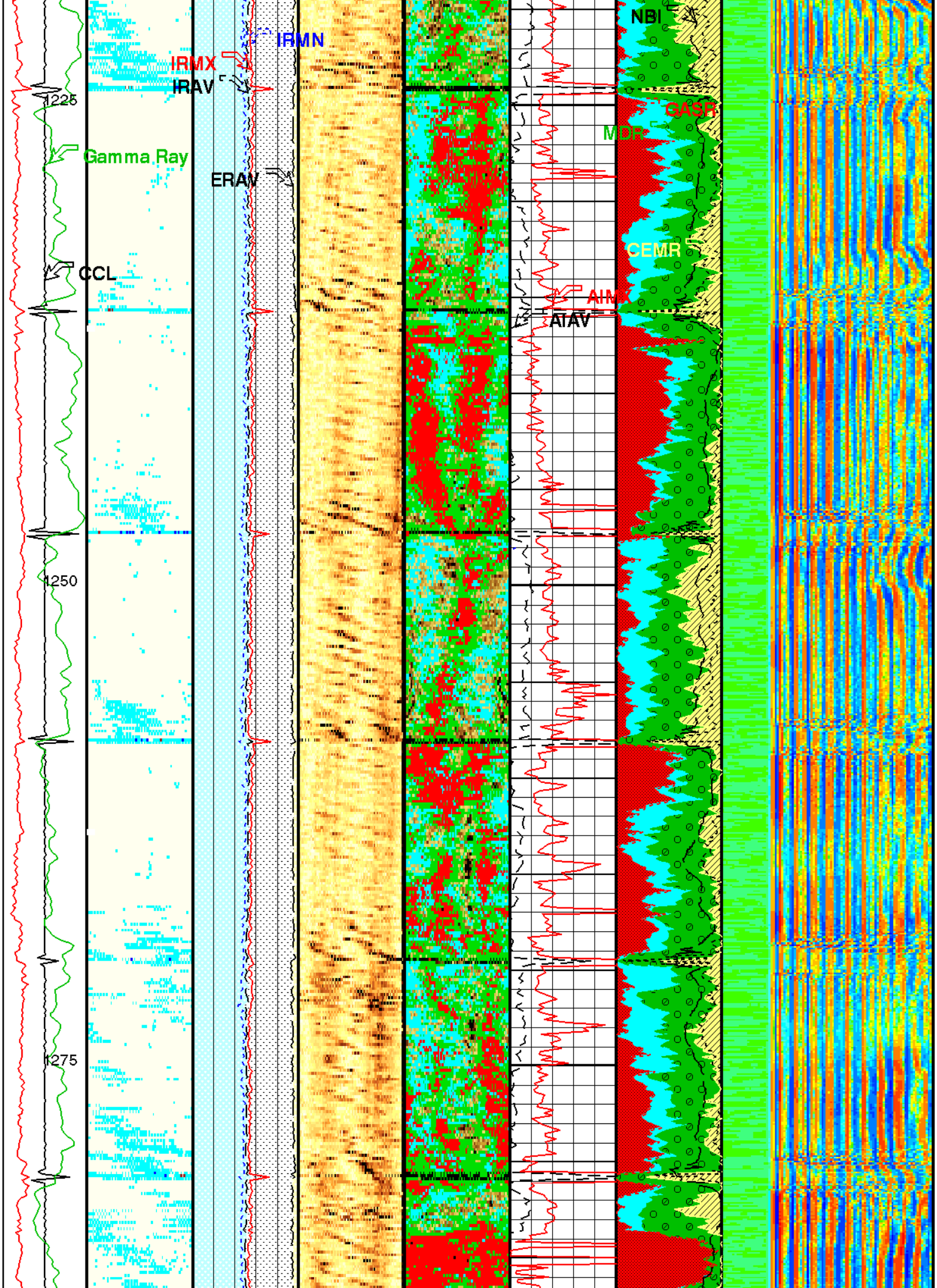
1200
ECCE
UCAZ
UCAZ
SBI


IRMN
IRMX
IRAV
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Gamma Ray
ERAV
CCL
1250
1275
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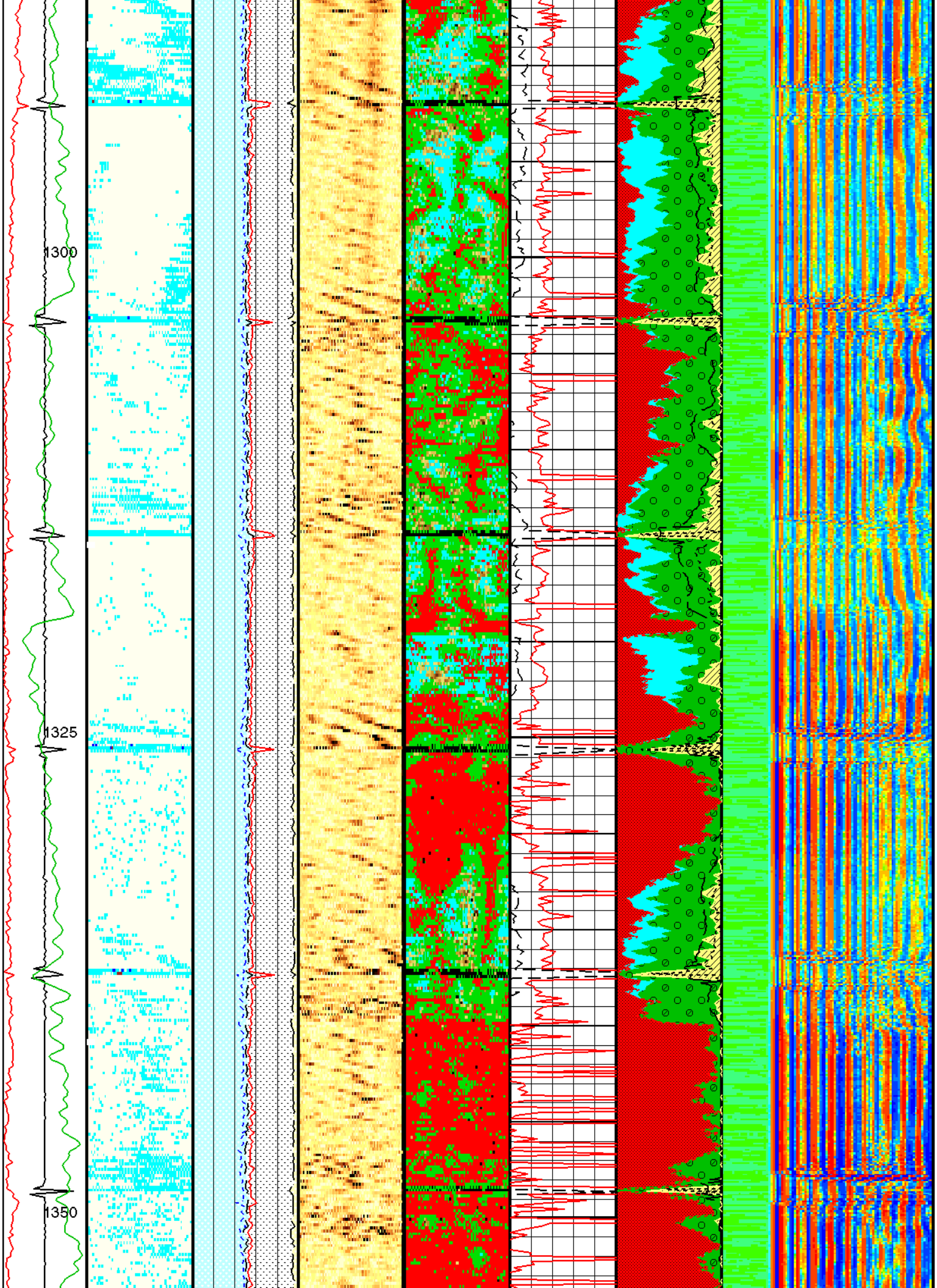
GASR
MDR
CEMR
AIMX
AIAV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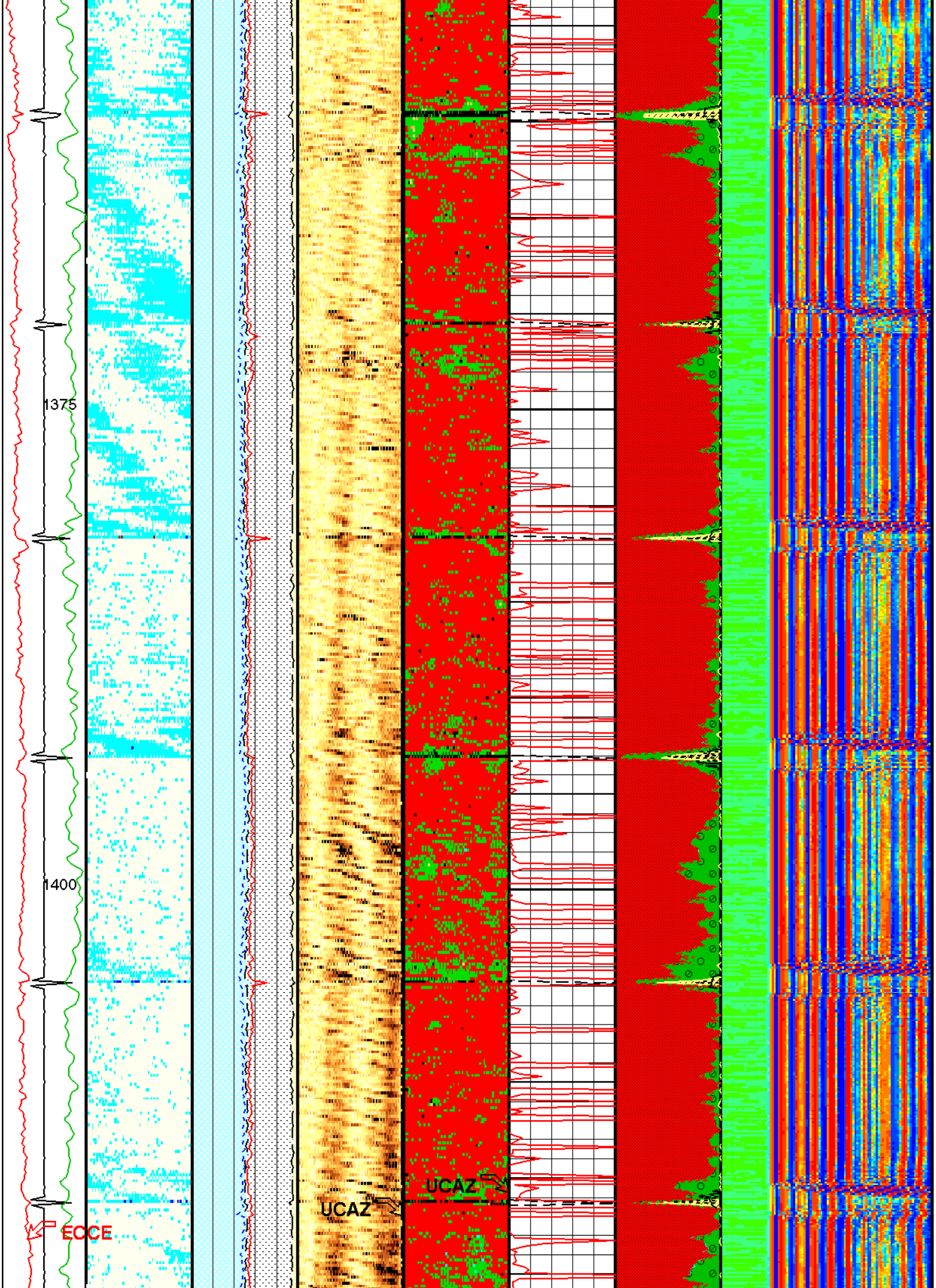
1325
1350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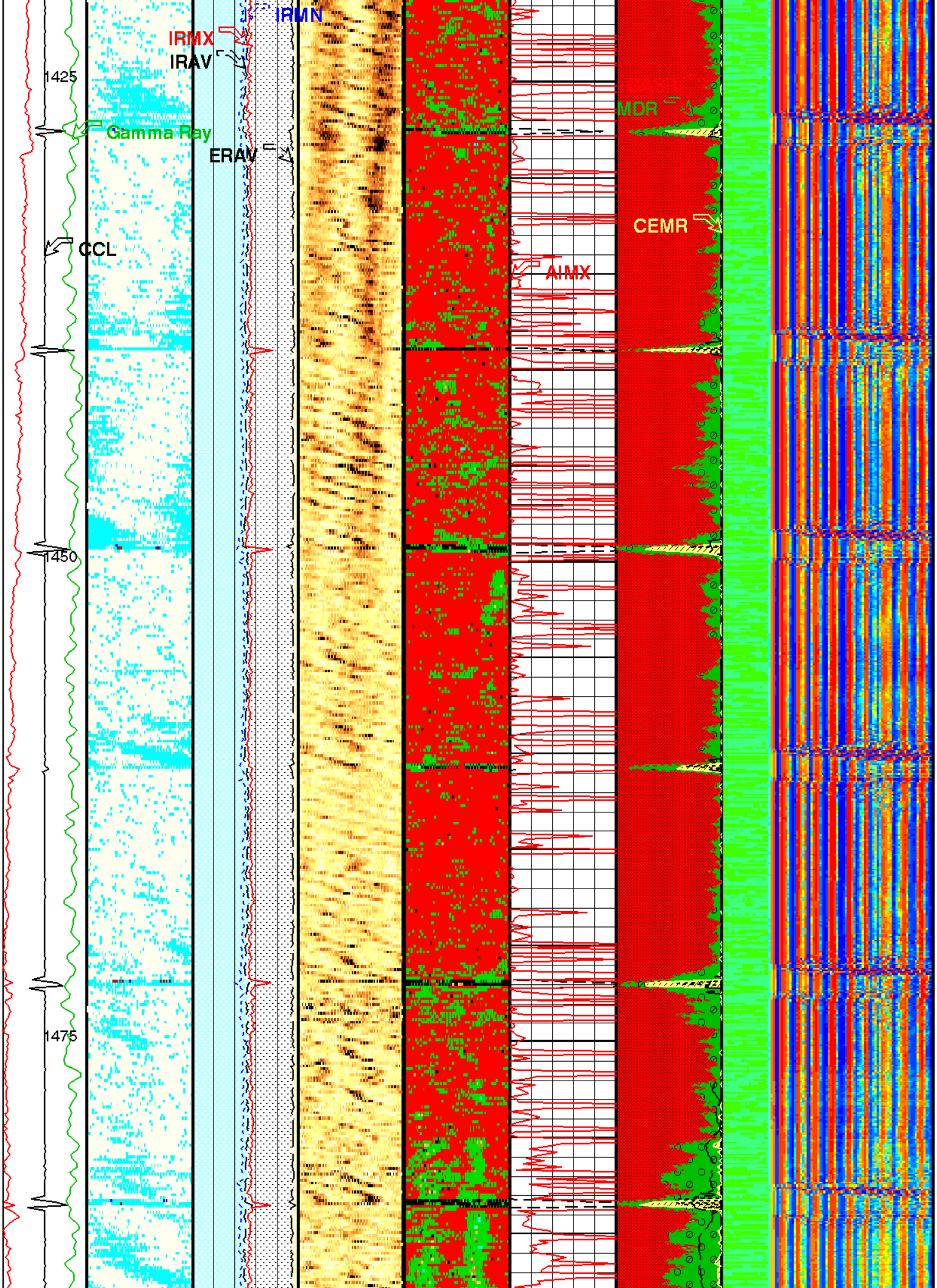
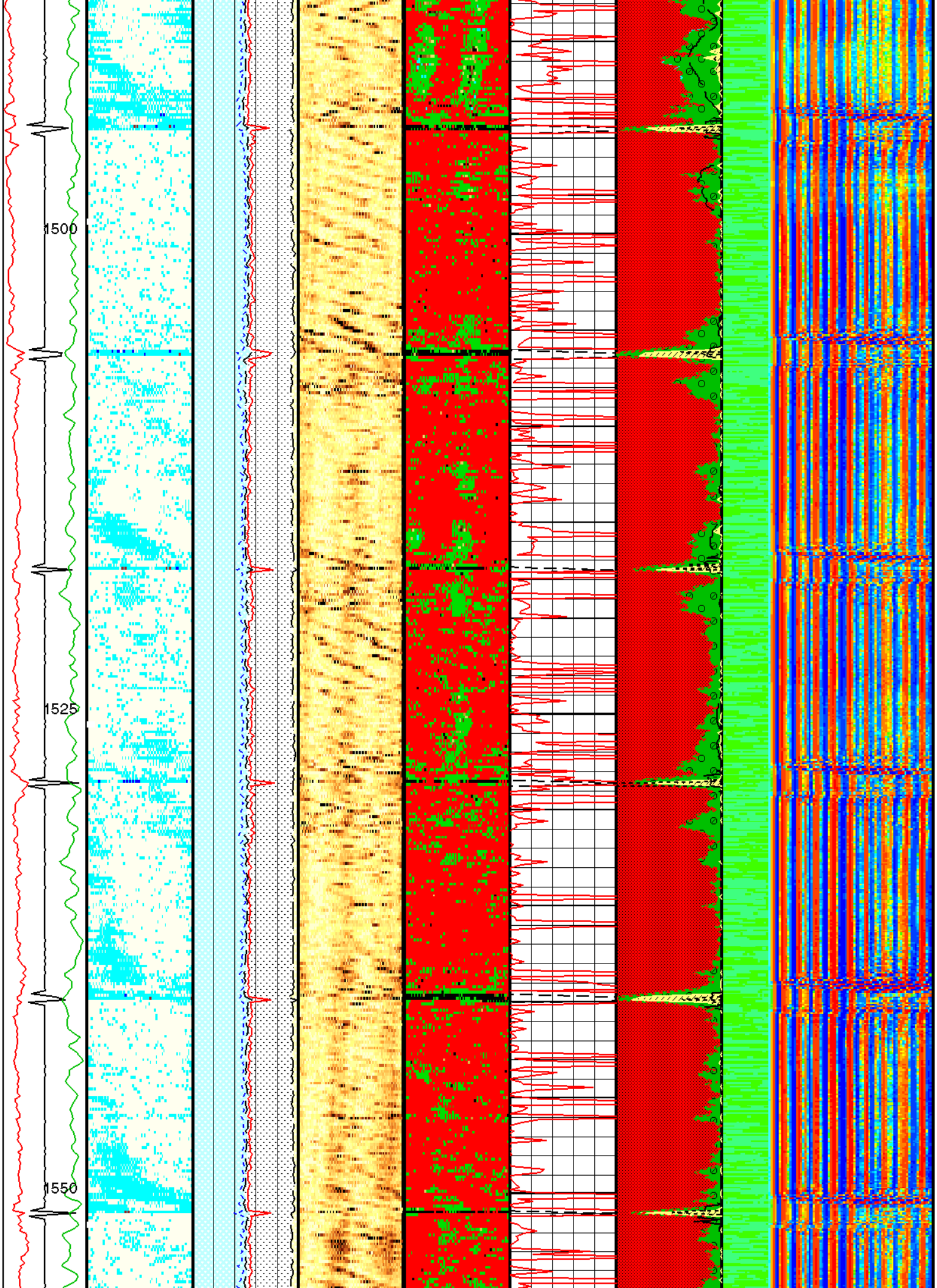
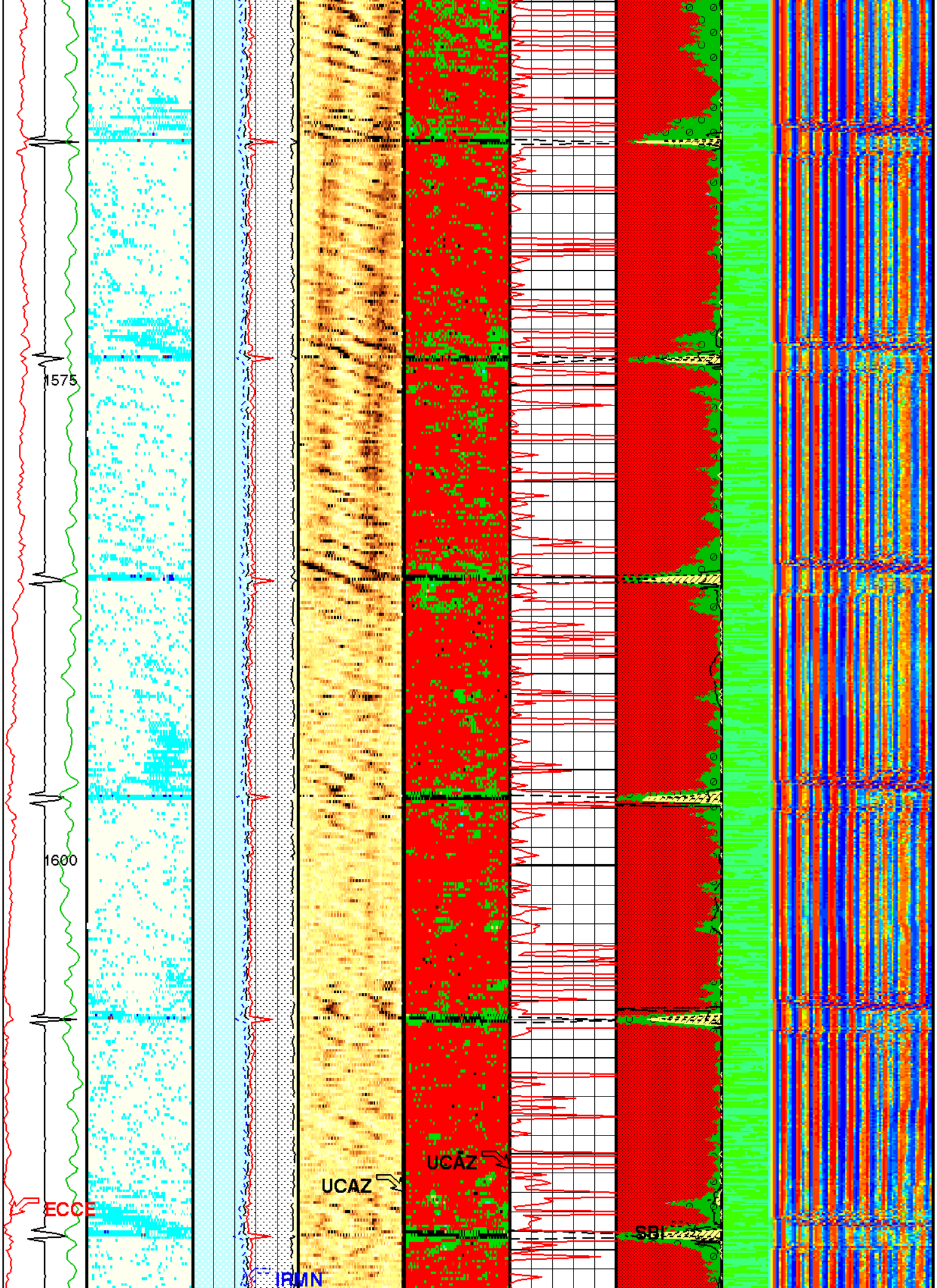
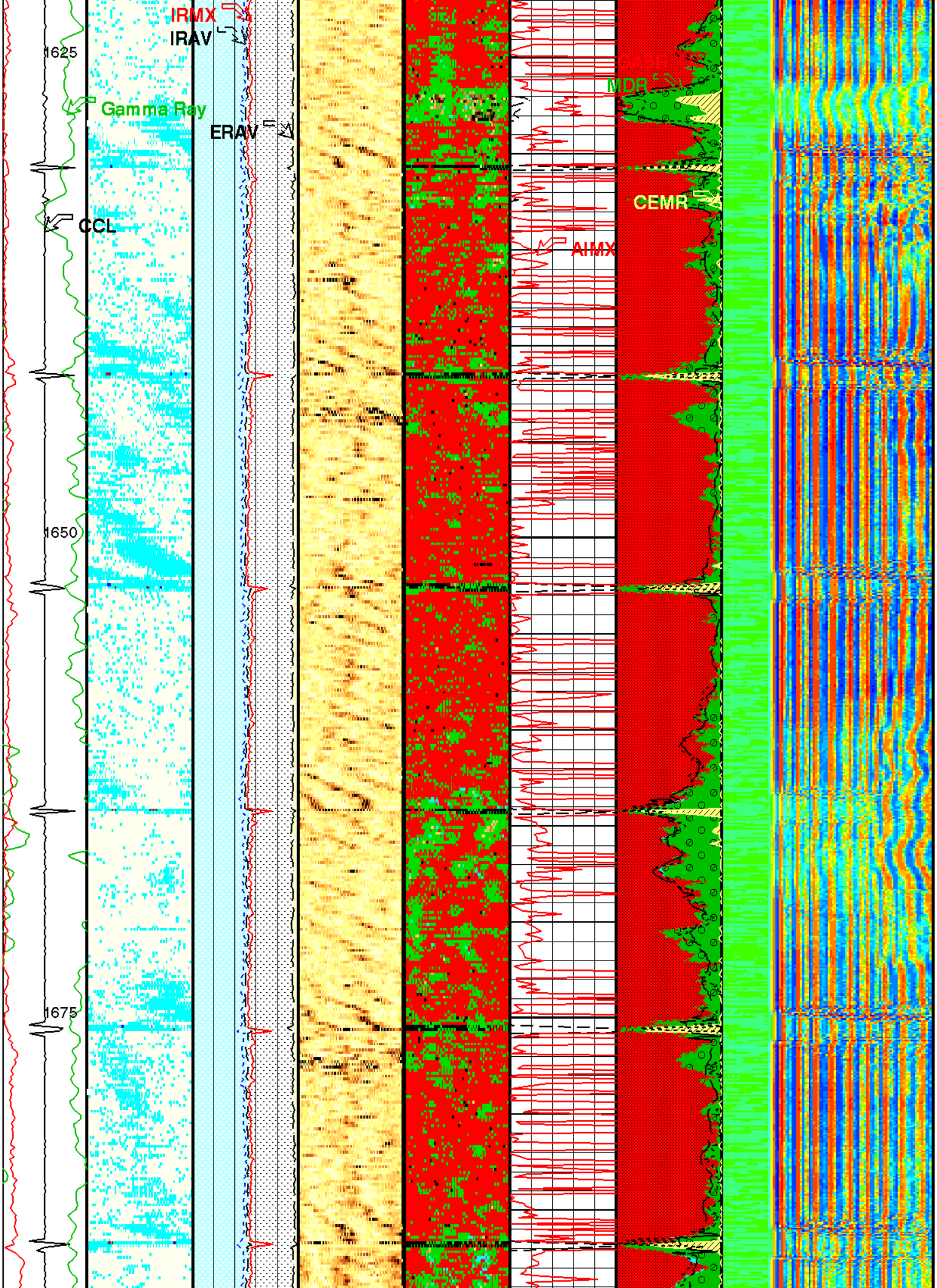
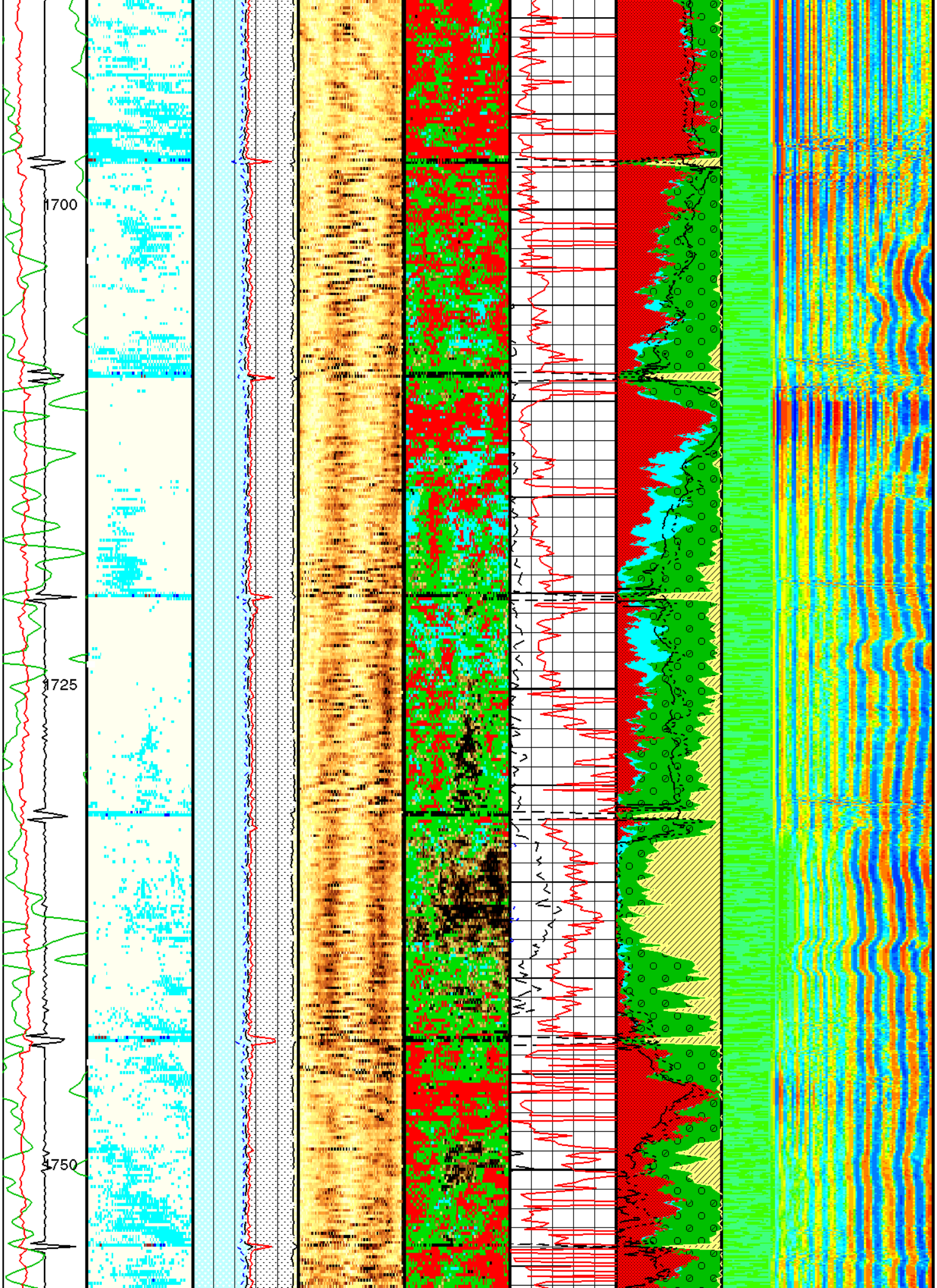
1400
ECCE
UCAZ
UCAZ


IRMN
IRMX
IRAV
1425
Gamma Ray
ERAV
CCL
CEMR
AIMX
1450
1475


1500
1525
1550


1575
1600
ECCE
IRMN
UCAZ
UCAZ
SBI


IRMX
IRAV
1625
Gamma Ray
ERAV
CCL
MDR
CEMR
AIMX
1650
1675


1700
1725
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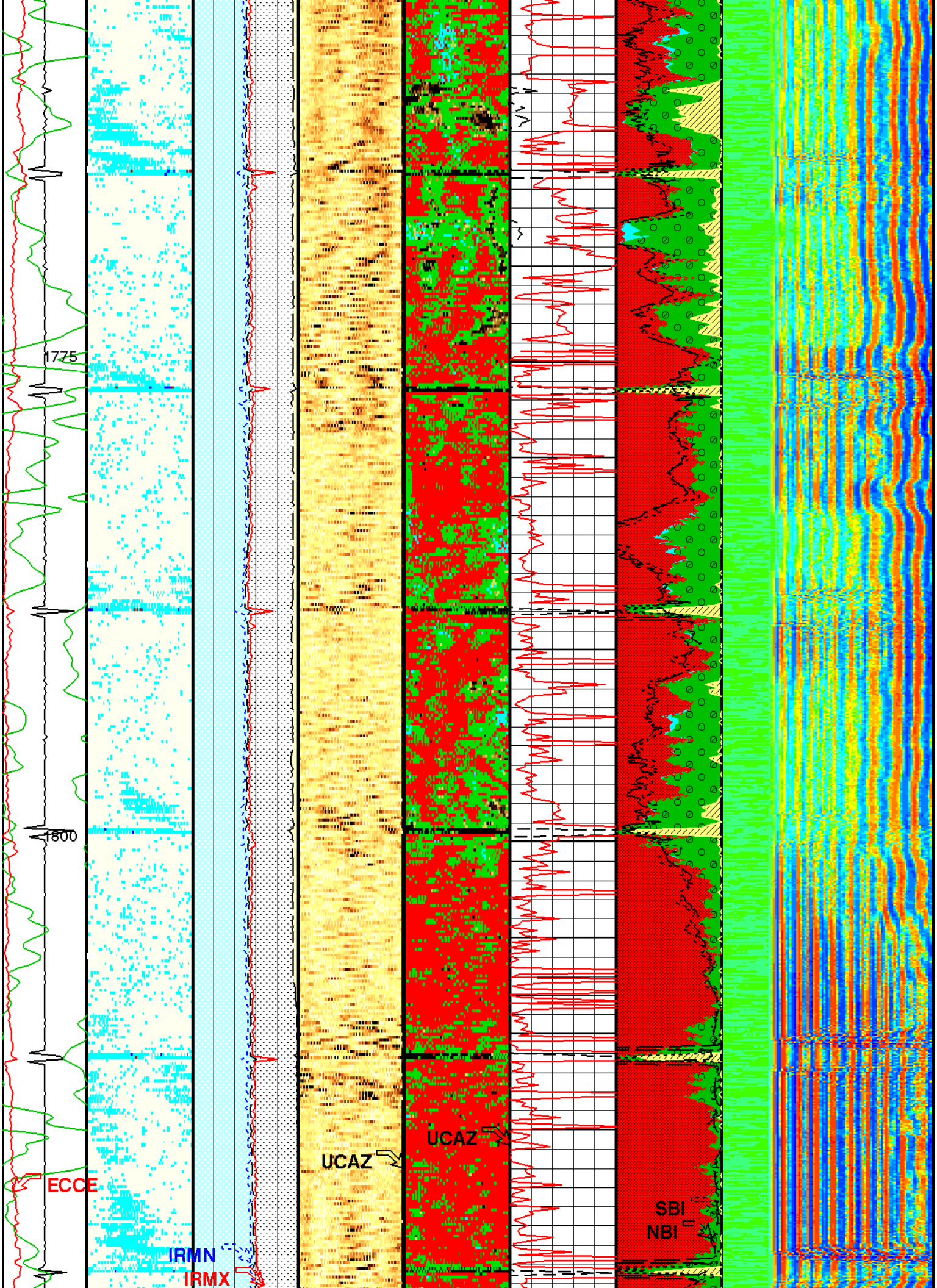
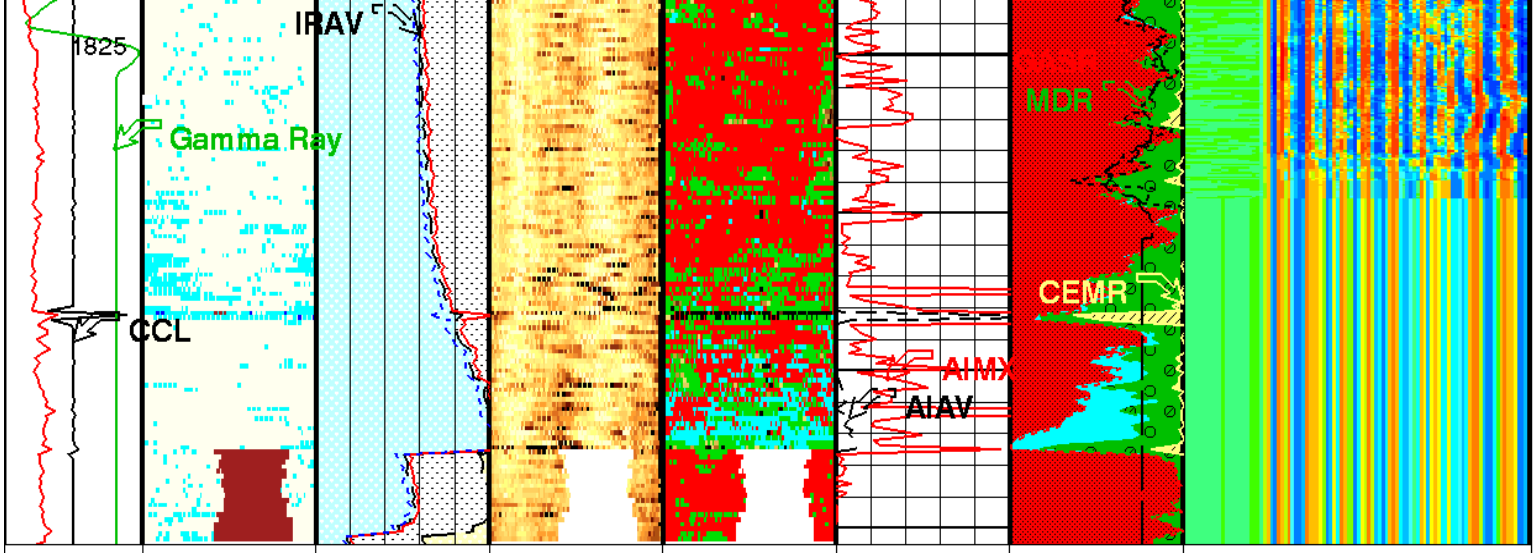

1775
1800
ECCE
IRMN
IRMX
UCAZ
UCAZ
SBI
NBI



Eccent. (ECCE) 0 (MM) 15	0.5000 1.5000 2.5000 3.5000 6.5000 Process. flags (UFLG) (---)	External radius Average (ERAV) 70 (MM) 90	Image rotation (UCAZ) 360 (DEG) 0	Image rotation (UCAZ) 360 (DEG) 0	Acoustic Impedance Min (AIMN) 0 (MRAY) 10	Near Bond Index (NBI) 1 (---) 0	Min Amplitude Max Sonic_VDL_Curve (VDL) 200 (US) 1200
CCL (CCLU) (---) -20 20		Internal radius Average (IRAV) 70 (MM) 90	-500.0000 -6.0000 -5.6000 -5.2000 -4.8000 -4.4000 -4.0000 -3.6000 -3.2000 -2.8000 -2.4000 -2.0000 -1.6000 -1.2000 -0.8000 -0.4000 0.5000 Amplitude of echo minus Max (AWBK) (---)	-1000.0000 -500.0000 0.3000 2.1000 2.2727 2.4455 2.6182 2.7909 2.9636 3.1364 3.3091 3.4818 3.6546 3.8273 4.0000 Cement Map with Impedance Classification (AI_MICRO_DEBONDING_IMAGE) (---)	Acoustic Impedance Ave (AIAV) 0 (MRAY) 10	Short Bond Index (SBI) 1 (---) 0	
Gamma Ray (GR) (GAPI) 0 100		Internal radius Maximum (IRMX) 70 (MM) 90			Acoustic Impedance Max (AIMX) 0 (MRAY) 10	Bonded	
		Internal radius Minimum (IRMN) 70 (MM) 90				Gas or Dry MicroA	
						Liquid	
						Micro-debonding	

PIP SUMMARY

Time Mark Every 60 S

Format: USIT_SSLT_177.8_GAS_MIGRATION Vertical Scale: 1:240 Graphics File Created: 29-Jan-2013 15:05

OP System Version: 17C0-154

USIT-D	17C0-154	SSLT-C	17C0-154
SGT-N	17C0-154	DTC-H	17C0-154
CAL-Y	17C0-154		

USI : LOW Frequency Compression Mode Used For Logging.

Recommended casing thickness range for optimum cement impedance measurement : 0.27 to 0.6 IN.

Parameters

DLIS Name	Description	Value	
	USIT-D: Ultrasonic Imaging - D		
AGMN	Minimum Gain of Cartridge	-4	DB
AGMX	Maximum Gain of Cartridge	48	DB
BERJ	Bad Echo Rejection	ON	
CDIA	Casing Outer Diameter	177.8	MM
CSDE	Casing Density	7800	K/M3
CSID	Casing Inner Diameter	161.707	MM
DFVL	Default Fluid Velocity	760	US/M
DOT	Diameter of Transducer Sensor	72.9996	MM
EMXV	EMEX Voltage	40	V
FSOD	Fluid Slowness Fits Casing Outer Diameter	1_UTFS_N_MW	
IMAR	Image Rotation	OFF	
MW	Mud Weight	810	K/M3
RCOD	Reference Calibrator Outer Diameter	177.8	MM
RCSO	Reference Calibrator Standoff	29.9999	MM
RCTH	Reference Calibrator Thickness	7.49808	MM
SDNV	Number of Vertical Samples used for Micro-debonding Computation	5	
SDTHOR	Acoustic Impedance STD Horizontal Threshold for Micro-debonding	0.5	
SDTVER	Acoustic Impedance STD Vertical Threshold for Micro-debonding	0.3	
TCUB	T^3 Processing Level	Vax_Loop	
THDH	Maximum Search Thickness (percentage of nominal)	130	
THDL	Minimum Search Thickness (percentage of nominal)	70	
THDP	Thickness Detection Policy	Fundamental	
THNO	Nominal Thickness of Casing	8.04628	MM
UMAO	USIT Measurement Angular Offset	-10	DEG
USTO	Ultrasonic Time Offset	-2	US
USUB	Ultrasonic Subassembly Identifier	Sub_7_inch	
UWKM	Ultrasonic Working Mode	5DEG_6IN_60U_LF	
VCAS	Ultrasonic Transversal Velocity in Casing	168.635	US/M
WLEN	T^3 Processing Length	18.9963	US
ZCAS	Acoustic Impedance of Casing	46.25	MRAY
ZINI	Initial Estimate of Cement Impedance	-1	MRAY
ZMUD	Acoustic Impedance of Mud	1.3	MRAY
ZTCM	Acoustic Impedance Threshold for Cement	2.1	MRAY
ZTGS	Acoustic Impedance Threshold for Gas	0.3	MRAY
	SSLT-C: SlimAccess Sonic Logging Tool		
CBAF	CBL Adjustment Factor	1	
CBRA	CBL LQC Reference Amplitude in Free Pipe	62	MV
CTHI	Casing Thickness	8.17523	MM
DTF	Delta-T Fluid	790	US/M
MATT	Maximum Attenuation	28.7082	DB/M
NFPI_L5	Free Pipe amplitude for LT-R5	1500	
NFPI_U1	Free Pipe amplitude for UT-R1	1100	
SFPI	Short Free Pipe Sonic Amplitude	1900	
VDLG	VDL Manual Gain	5	
VDM	VDL Display Mode	R5	
ZCMT	Acoustic Impedance of Cement	4	MRAY
	System and Miscellaneous		
CSIZ	Current Casing Size	177.800	MM
CWEI	Casing Weight	34.20	KG/M
DO	Depth Offset for Playback	0.0	M
PP	Playback Processing	NORMAL	

Input DLIS Files

DEFAULT	SPLICE_USI_SONIC_013	FN:1	PRODUCER	29-Jan-2013 14:58	1840.5 M	22.4 M

Output DLIS Files

DEFAULT	USI_SONIC_015PUP	FN:13	PRODUCER	29-Jan-2013 15:05

Schlumberger

REPEAT PASS

Schlumberger

0 MPA

MAXIS Field Log

Input DLIS Files

DEFAULT	USI_SONIC_005LUP	FN:4	PRODUCER	29-Jan-2013 12:50	1837.0 M	1756.9 M

Output DLIS Files

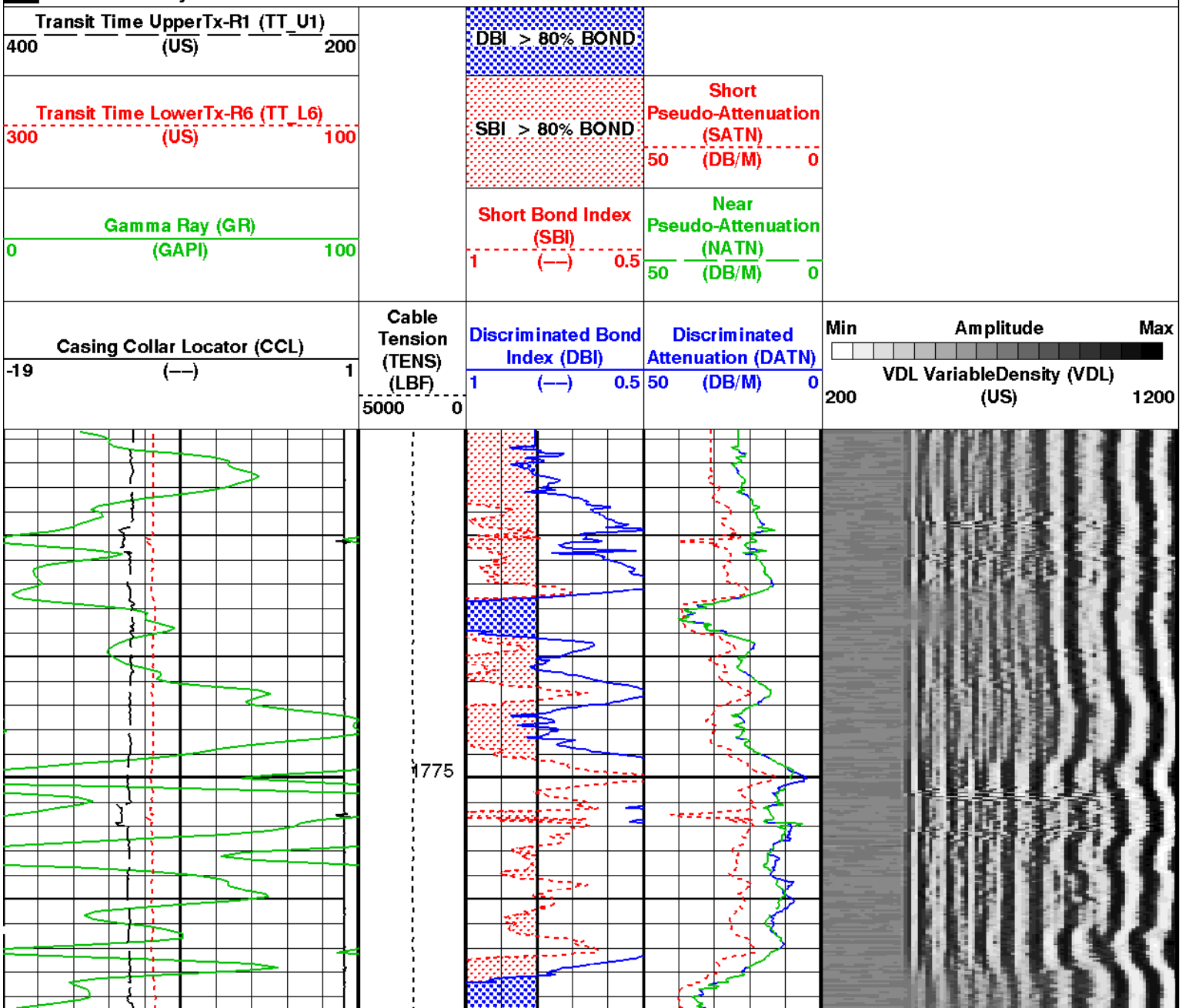
DEFAULT	USI_SONIC_020PUP	FN:18	PRODUCER	29-Jan-2013 17:51	1840.7 M	1760.5 M

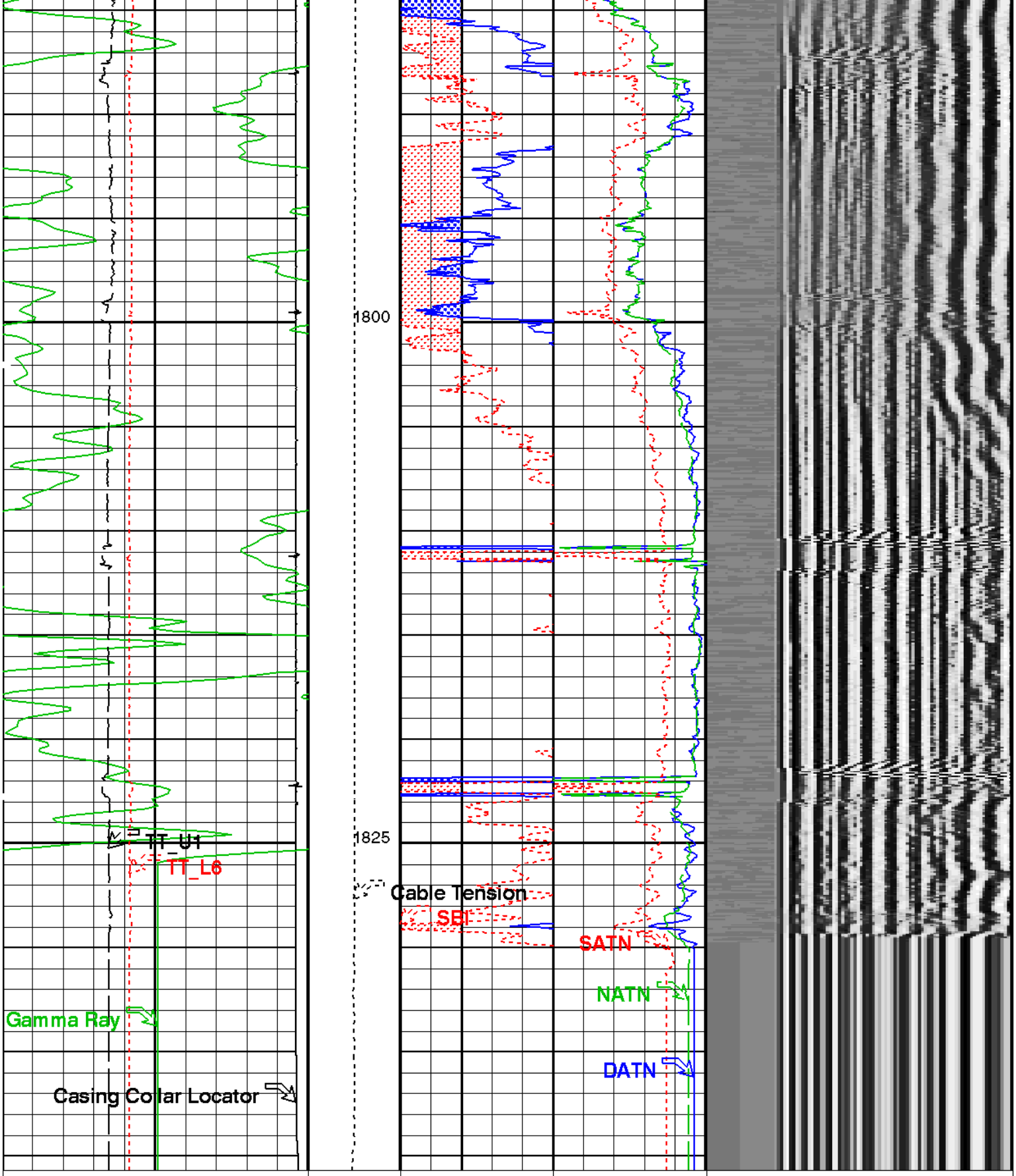
OP System Version: 17C0-154

USIT-D	17C0-154	SSLT-C	17C0-154
SGT-N	17C0-154	DTC-H	17C0-154
CAL-Y	17C0-154		

PIP SUMMARY

Time Mark Every 60 S





Casing Collar Locator (CCL)	Cable Tension (TENS) (LBF)	Discriminated Bond Index (DBI)	Discriminated Attenuation (DATN)	VDL VariableDensity (VDL) (US)
-19 (---) 1	5000 0	1 (---) 0.5	50 (DB/M) 0	Min Amplitude Max; 200 1200
Gamma Ray (GR) 0 (GAPI) 100		Short Bond Index (SBI) 1 (---) 0.5	Near Pseudo-Attenuation (NATN) 50 (DB/M) 0	
			Short	

Transit Time LowerTx-R6 (TT_L6)
300 (US) 100

Transit Time UpperTx-R1 (TT_U1)
400 (US) 200

SBI > 80% BOND

DBI > 80% BOND

Pseudo-Attenuation (SATN)
50 (DB/M) 0

PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
USIT-D: Ultrasonic Imaging - D			
	T^3 Processing Length for FPM	26.648	US
	Corrosion range minimum	-1.9304	MM
	Corrosion range maximum	1.9304	MM
AGMN	Minimum Gain of Cartridge	-4	DB
AGMX	Maximum Gain of Cartridge	48	DB
BERJ	Bad Echo Rejection	ON	
CDIA	Casing Outer Diameter	177.8	MM
CDUN	Curves Unit Declared in Presentation Manager	IN	
CSDE	Casing Density	7800	K/M3
CSID	Casing Inner Diameter	161.707	MM
CYST	Casing Yield Strength	0	KPA
DFVL	Default Fluid Velocity	760	US/M
DOT	Diameter of Transducer Sensor	72.9996	MM
EMXV	EMEX Voltage	40	V
FDII	FPM Data Interpolation Interval	0	M
FSOD	Fluid Slowness Fits Casing Outer Diameter	1_UTFS_N_MW	
IMAR	Image Rotation	OFF	
MW	Mud Weight	810	K/M3
OPLEV	USIT Remove Flagged Data Level	level2	
RCOD	Reference Calibrator Outer Diameter	177.8	MM
RCSO	Reference Calibrator Standoff	29.9999	MM
RCTH	Reference Calibrator Thickness	7.49808	MM
SDNV	Number of Vertical Samples used for Micro-debonding Computation	5	
SDTHOR	Acoustic Impedance STD Horizontal Threshold for Micro-debonding	0.5	
SDTVER	Acoustic Impedance STD Vertical Threshold for Micro-debonding	0.3	
SUBT	Ultrasonic Subassembly Type	Sub_7_inch_S	
TCUB	T^3 Processing Level	Vax_Loop	
THDH	Maximum Search Thickness (percentage of nominal)	130	
THDL	Minimum Search Thickness (percentage of nominal)	70	
THDP	Thickness Detection Policy	Fundamental	
THNO	Nominal Thickness of Casing	8.04628	MM
TMUC	Type of Mud	OBM	
U-USIT_RFWB	USIT Remove Flagged Data Window Begin	0	US
U-USIT_RFWE	USIT Remove Flagged Data Window End	511	US
UMAO	USIT Measurement Angular Offset	-10	DEG
UPAT	Emission Pattern	Pattern_500K	
USTO	Ultrasonic Time Offset	-2	US
USUB	Ultrasonic Subassembly Identifier	Sub_7_inch	
UWKM	Ultrasonic Working Mode	5DEG_6IN_60U_LF	
VCAS	Ultrasonic Transversal Velocity in Casing	168.635	US/M
WLEN	T^3 Processing Length	18.9963	US
ZCAS	Acoustic Impedance of Casing	46.25	MRAY
ZINI	Initial Estimate of Cement Impedance	-1	MRAY
ZMUD	Acoustic Impedance of Mud	1.3	MRAY
ZTCM	Acoustic Impedance Threshold for Cement	2.1	MRAY
ZTGS	Acoustic Impedance Threshold for Gas	0.3	MRAY
SSLT-C: SlimAccess Sonic Logging Tool			
ACSR	Array Cycle Skip Recovery	ON	
ADPS	A/D Conversion Phase Shift	NONE	
AMSG	Auxilliary Minimum Sliding Gate	180	US
BHS	Borehole Status	CASED	
BHT	Bottom Hole Temperature (used in calculations)	100	DEGC
BILI	Bond Index Level for Zone Isolation	0.8	
BISS	Bond Index Source Selection for BIQL	BI	
BRUL_FT	Baseline Removal Upper Limit - Far Tx	0	US
BRUL_LT	Baseline Removal Upper Limit - Lower Tx	0	US
BRUL_UT	Baseline Removal Upper Limit - Upper Tx	0	US
CBAF	CBL Adjustment Factor	1	
CBLG	CBL Gate Width	50	US
CBRA	CBL LQC Reference Amplitude in Free Pipe	62	MV
CLUSTER_INT	Clustering Interval	6.096	M
CMCF	CBL Cement Type Compensation Factor	0.244461	
COLL	Label Slowness Lower Limit - P & S Comp	131.234	US/M
COUL	Label Slowness Upper Limit - P & S Comp	590.551	US/M
CTHI	Casing Thickness	8.17523	MM
DDE1	Digitizing Delay 1 - Upper Tx	40	US
DDE2	Digitizing Delay 2 - Lower Tx	40	US

DDL2	Digitizing Delay 2 - Lower Tx	40	US
DETE	Detection Peak	E1	
DFAD	DFAD Computation Control	DSP	
DFAD_ATC	DFAD Automatic Threshold Control	ON	
DFAD_INTERVAL_MODE	Detection Interval Mode for first arrival	FIXED	
DLSR	Depth Log Sampling Rate	TT1.5_WF6	
DSIN	Digitizing Sample Interval	10	US
DTCM	Delta-T Computation Mode	FULL	
DTCS	Compressional Delta-T Source	DT	
DTF	Delta-T Fluid	790	US/M
DTMAX	Maximum Valid Value for DT	656.168	US/M
DTMIN	Minimum Valid Value for DT	131.234	US/M
DTSS	Shear Delta-T Source	DTS_RA_BHC	
DWCO	Digitizing Word Count	256	
FATT	Acoustic Attenuation due to Fluid	0	DB/M
FCF	CBL Fluid Compensation Factor	1.46328	
FILG	Label Fill Gap Control - P & S	COMP_SHEAR	
FIL_LENG	STC Filter Length	21	
FULT	FTB Uplink Throughput for Sonic Tool	150	KB/S
GAI1	Gain Control 1 - Upper Tx	HIGH	
GAI2	Gain Control 2 - Lower Tx	HIGH	
GBHCL	Group BHC Limit	0.9	
GCSE	Generalized Caliper Selection	BS	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
GNFL	Group Near-Far Limit	0.9	
GOBO	Good Bond	2.50357	MV
GRSE	Generalized Mud Resistivity Selection	CHART_GEN_9	
GSEPL	Group Separation Limit	65.6168	US/M
GSIZL	Group Size Limit	0.3	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
HOLE_DIA	Hole Diameter	0	MM
ISSBAR	Barite Mud Switch	NOBARITE	
ITWI_FT	STC Integration Time Window - Far Tx	200	US
ITWI_LT	STC Integration Time Window - Lower Tx	160	US
ITWI_UT	STC Integration Time Window - Upper Tx	160	US
LFC	Label Formation Character - P & S	COMP_FIRST	
LPM_FT	Label Processing Mode - Far Tx	NONE	
LPM_LT	Label Processing Mode - Lower Tx	NONE	
LPM_UT	Label Processing Mode - Upper Tx	NONE	
MAHTR	Manual High Threshold Refernce	40	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
MATT	Maximum Attenuation	28.7082	DB/M
MCCF	MAP Cement Type Compensation Factor	1	
MCI	Minimum Cemented Interval for Isolation	3.048	M
MMSA	MAP Minimum Sonic Amplitude	0	MV
MNHTR	Minimum High Threshold Reference	30	
MODE	Sonic Firing Mode	Attenuation	
MSA	Minimum Sonic Amplitude	1.12228	MV
NFLG	STC Wave Normalization Flag	OFF	
NFLIM	Near-Far boundary distance	2.1336	M
NFPI_L5	Free Pipe amplitude for LT-R5	1500	
NFPI_U1	Free Pipe amplitude for UT-R1	1100	
NMSG	Near Minimum Sliding Gate	300	US
NMXG	Near Maximum Sliding Gate	750	US
NUMP	Number of Detection Passes	2	
NWI	Number of Waveform Items	6	
PROC_INT	Processing Interval	3.048	M
R42R	R4 to R2 Sensitivity Ratio	0	DB/M
RACO	Ray Angle Compensation	0.024265	M
RATE	Sonic Firing Rate	8.92857	HZ
REJREP	Reject Repeated Transit Times	ALLOW	
RSMN	Label Shear/Comp Minimum Ratio - P & S	1.4	
RSMX	Label Shear/Comp Maximum Ratio - P & S	2.12	
SALL	Sonic Amplitude Lower Limit	20	
SBOF_FT	STC Search Band Offset - Far Tx	230	US
SBOF_LT	STC Search Band Offset - Lower Tx	190	US
SBOF_UT	STC Search Band Offset - Upper Tx	190	US
SBWI_FT	STC Search Band Width - Far Tx	1580	US
SBWI_LT	STC Search Band Width - Lower Tx	860	US
SBWI_UT	STC Search Band Width - Upper Tx	860	US
SDL	Standard Deviation Acceptance Limit	2.5	
SDTH	Switch Down Threshold	29490	
SEMTHR	STC Semblance Threshold	0.25	
SENSOR_DIA	Sensor Diameter	19.05	MM
SFAF	Sonic Formation Attenuation Factor	0	DB/M
SFPI	Short Free Pipe Sonic Amplitude	2500	
SGAD	Sliding Gate Allow/Disallow	OFF	
SGCL	Sliding Gate Closing Delta-T	558	US/M
SGCW	Sliding Gate Closing Width	33	US
SGDT	Sliding Gate Delta-T	187	US/M
SGW	Sliding Gate Width	80	US
SHLL	Label Slowness Lower Limit - P & S Shear	246.063	US/M
SHT	Surface Hole Temperature	20	DEGC
SHUL	Label Slowness Upper Limit - P & S Shear	787.402	US/M

SLEV	Signal Level for Threshold Control	5000	
SLL	STC Slowness Lower Limit	131.234	US/M
SNRLL	Signal-to-Noise Ratio Lower Limit	25	DB
SPM_FT	STC Processing Mode - Far Tx	NONE	
SPM_LT	STC Processing Mode - Lower Tx	NONE	
SPM_UT	STC Processing Mode - Upper Tx	NONE	
SSTE	STC Slowness Step	6.56168	US/M
STC_LCF	STC Low Cutoff Freq.	2000	HZ
STHR	Separation Threshold	32.8084	US/M
SUL	STC Slowness Upper Limit	787.402	US/M
SUTH	Switch Up Threshold	3276	
SWID_FT	STC Slowness Width - Far Tx	65.6168	US/M
SWID_LT	STC Slowness Width - Lower Tx	65.6168	US/M
SWID_UT	STC Slowness Width - Upper Tx	65.6168	US/M
T12_TTMAX	T12 TT Intercept Maximum	492.126	US/M
T12_TTMIN	T12 TT Intercept Minimum	-164.042	US/M
T3_TTMAX	T3 TT Intercept Maximum	656.168	US/M
T3_TTMIN	T3 TT Intercept Minimum	-164.042	US/M
TBF_FT	STC Time for Baseline Fill - Far Tx	0	US
TBF_LT	STC Time for Baseline Fill - Lower Tx	0	US
TBF_UT	STC Time for Baseline Fill - Upper Tx	0	US
TFSI	Filter Sample Interval	0.3048	M
TFWL	Filter Window Length	0.6096	M
TLL_FT	STC Time Lower Limit - Far Tx	280	US
TLL_LT	STC Time Lower Limit - Lower Tx	120	US
TLL_UT	STC Time Lower Limit - Upper Tx	120	US
TSTE	STC Time Step	40	US
TTPROC_ALGSEL	Algorithm Select	CLUSTER	
TUL_FT	STC Time Upper Limit - Far Tx	2590	US
TUL_LT	STC Time Upper Limit - Lower Tx	1340	US
TUL_UT	STC Time Upper Limit - Upper Tx	1340	US
TWID_FT	STC Time Width - Far Tx	1190	US
TWID_LT	STC Time Width - Lower Tx	660	US
TWID_UT	STC Time Width - Upper Tx	660	US
ULTR	Upper to Lower Tx Power Ratio	0	DB/M
VDLG	VDL Manual Gain	5	
VDM	VDL Display Mode	R5	
WMAG	DFAD Waveform Magnifier	1	
WPS1	Waveform Plot Selection 1	R3	
WPS2	Waveform Plot Selection 2	R3	
ZCGW	Zero Crossing Gate Width	100	US
ZCMT	Acoustic Impedance of Cement	4	MRAY
ZCTT	Option to compute Zero Crossing Transit Time	OFF	
SGT-N: Scintillation Gamma Ray Tool - N			
BHS	Borehole Status	CASED	
BHT	Bottom Hole Temperature (used in calculations)	100	DEGC
DPPM	Density Porosity Processing Mode	STAN	
GCSE	Generalized Caliper Selection	BS	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.018227	DC/M
GRSE	Generalized Mud Resistivity Selection	CHART_GEN_9	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
ISSBAR	Barite Mud Switch	NOBARITE	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
SHT	Surface Hole Temperature	20	DEGC
SOGR	SGT Standoff Distance	0	MM
CAL-Y: Casing Anomaly Locator - Y			
CCLD	CCL reset delay	305	MM
CCLT	CCL Detection Level	0.3	V
System and Miscellaneous			
ALTDPCHAN	Name of alternate depth channel	SpeedCorrectedDepth	
BS	Bit Size	222.000	MM
BSAL	Borehole Salinity	-50000.00	PPM
CSIZ	Current Casing Size	177.800	MM
CWEI	Casing Weight	34.20	KG/M
DFD	Drilling Fluid Density	810.00	K/M3
DO	Depth Offset for Playback	3.6	M
FLEV	Fluid Level	0.00	M
MST	Mud Sample Temperature	-50000.00	DEGC
PBVSADP	Use alternate depth channel for playback	NO	
PP	Playback Processing	NORMAL	
RMFS	Resistivity of Mud Filtrate Sample	-50000.0000	OHMM
RW	Resistivity of Connate Water	1.0000	OHMM
TD	Total Depth	-50000	M
TDD	Total Depth - Driller	1844.00	M
TDL	Total Depth - Logger	1840.00	M
TWS	Temperature of Connate Water Sample	37.78	DEGC

Format: SSLT_VDL_7IN_AND_LESS Vertical Scale: 1:240 Graphics File Created: 29-Jan-2013 17:51

OP System Version: 17C0-154

USIT-D	17C0-154	SSLT-C	17C0-154
SGT-N	17C0-154	DTC-H	17C0-154

SGT-N	17C0-154	DTC-N	17C0-154
CAL-Y	17C0-154		

Input DLIS Files

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Output DLIS Files

DEFAULT	USI_SONIC_020PUP	FN:18	PRODUCER	29-Jan-2013 17:51

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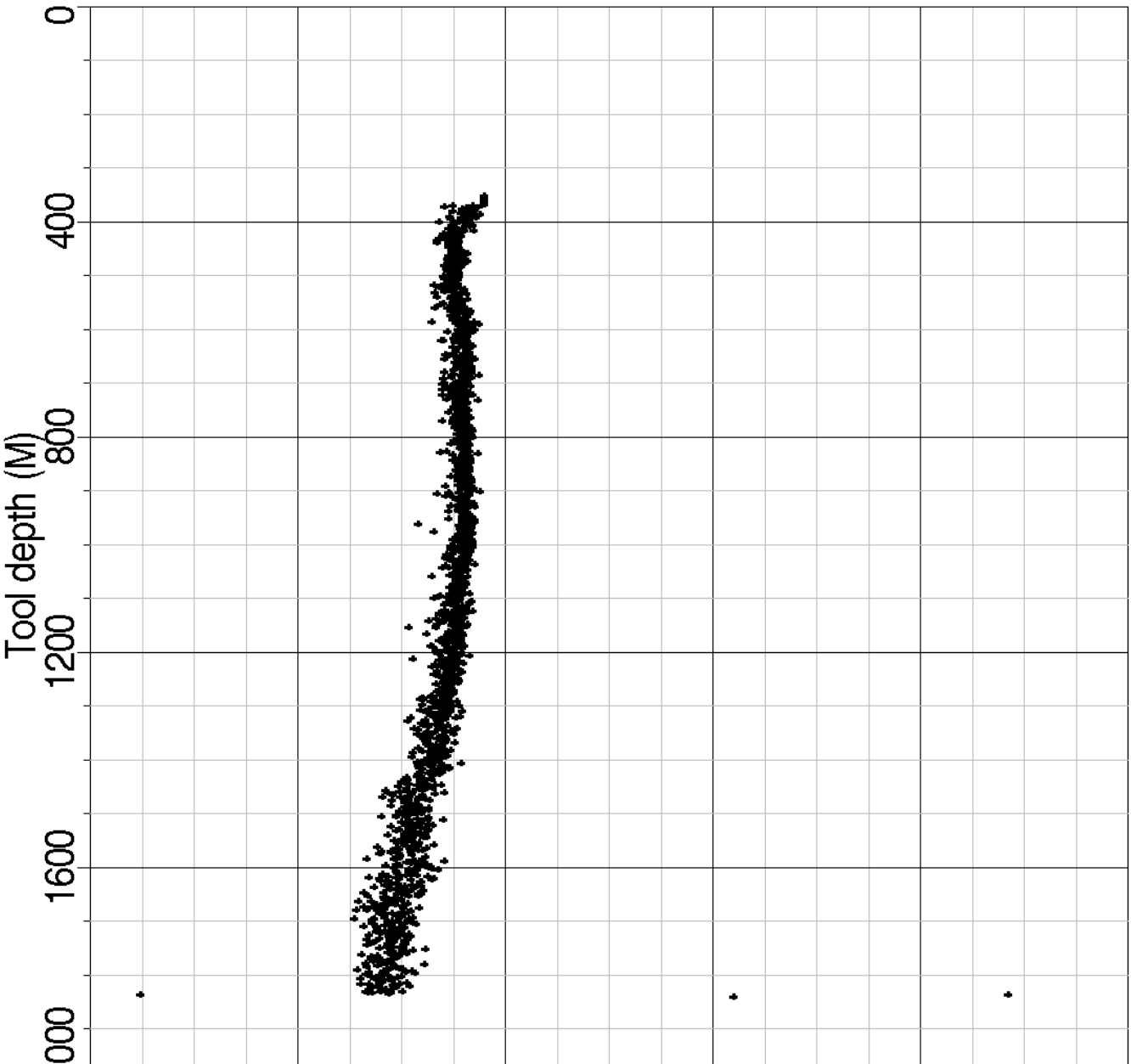
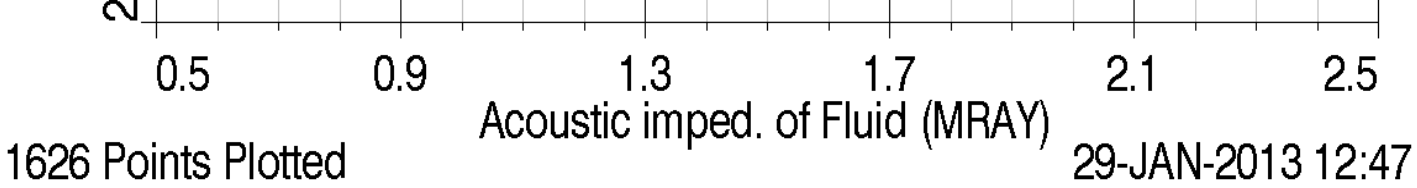
FLUID PLOTS

MAXIS Field Log

Index: 352.0 - 1839.8 M

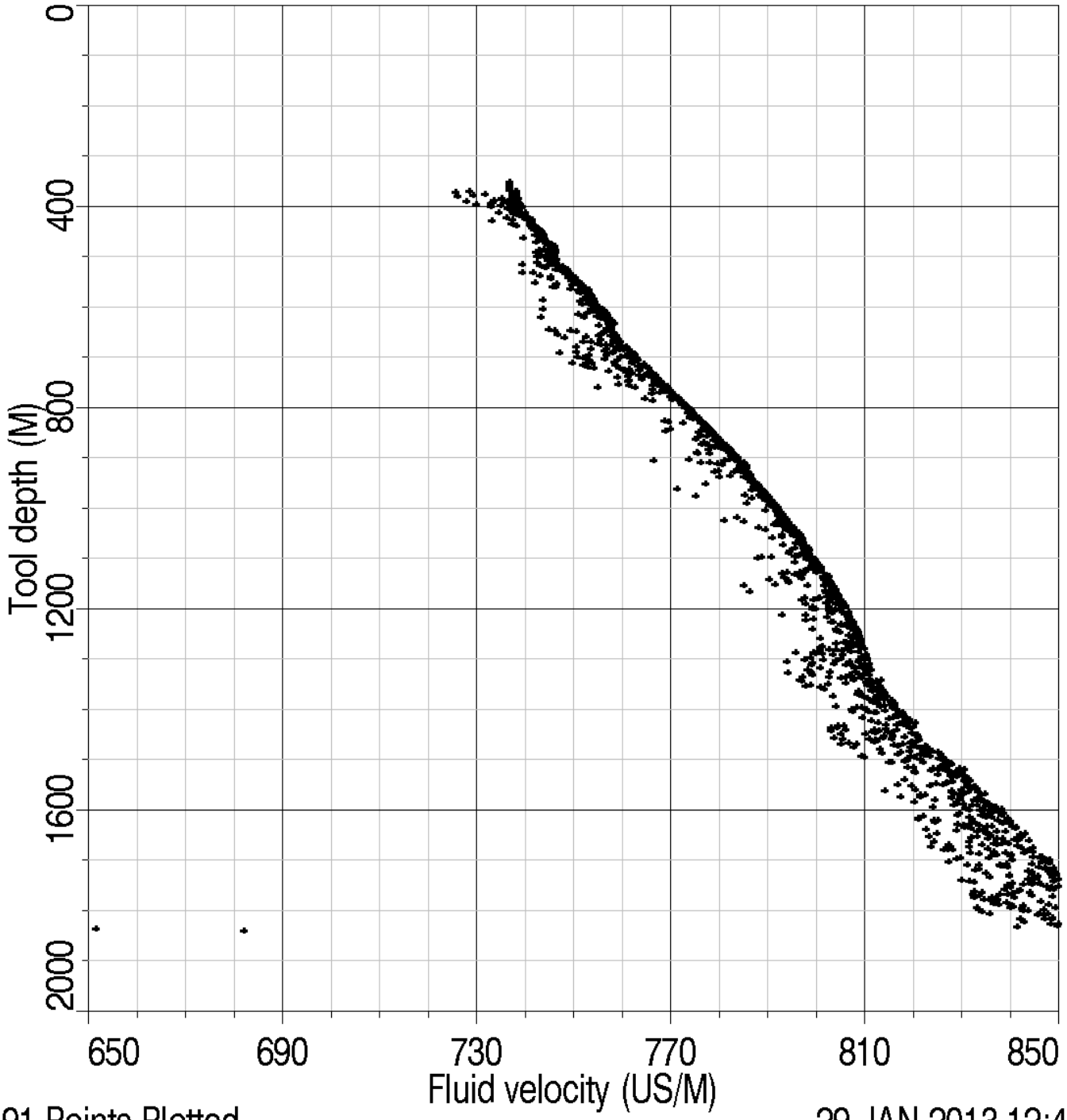




1626 Points Plotted

29-JAN-2013 12:47

Index: 352.0 - 1839.8 M



1591 Points Plotted

29-JAN-2013 12:47

Company: **HUSKY OIL OPERATIONS LIMITED**

Schlumberger

Well: **HUSKY LITTLE BEAR N-09**
Field: **SLATER RIVER**
Province: **NORTHWEST TERRITORIES**

CASING EVALUATION

ULTRASONIC IMAGING LOG

W011313506637000