

Company: Noble Energy, Inc.

Well: Wells Ranch AA22-645

Field: Wattenberg

County: Weld State: Colorado

Ultrasonic Imager
Cement Evaluation
Gamma Ray - CCL

County: Weld
Field: Wattenberg
Location: NWSW Sec 22 T6N R63W
Well: Wells Ranch AA22-645
Company: Noble Energy, Inc.

Location:		NWSW Sec 22 T6N R63W SHL: 2353' FSL & 126' FWL Lat/Long: 40.47133/-104.4319	Elev.: K.B. 4780.00 ft G.L. 4756.00 ft D.F. 4780.00 ft
Permanent Datum:	Ground Level		Elev.: 4756.00 f
Log Measured From:	Kelly Bushing		24.00 ft above Perm.Datum
Drilling Measured From:	Kelly Bushing		
API Serial No. 05-123-42421	Section: 22	Township: 6N	Range: 63W

Logging Date 22-Apr-2016

Run Number ONE

Depth Driller 11920.00 ft

Schlumberger Depth 11920.00 ft

Bottom Log Interval 6800.00 ft

Top Log Interval 66.00 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 1952.00 ft

To 11920.00 ft

Casing/Tubing Size 5.5 in

Weight 20 lbm/ft

Grade N/A

From 0.00 ft

To 11909.00 ft

Max Recorded Temperatures 203.5 degF

Logger on Bottom 22-Apr-2016 13:25:00

Unit Number 9115 Location: Fort Morgan, CO

Recorded By Evan Meadows

Witnessed By

Disclaimer

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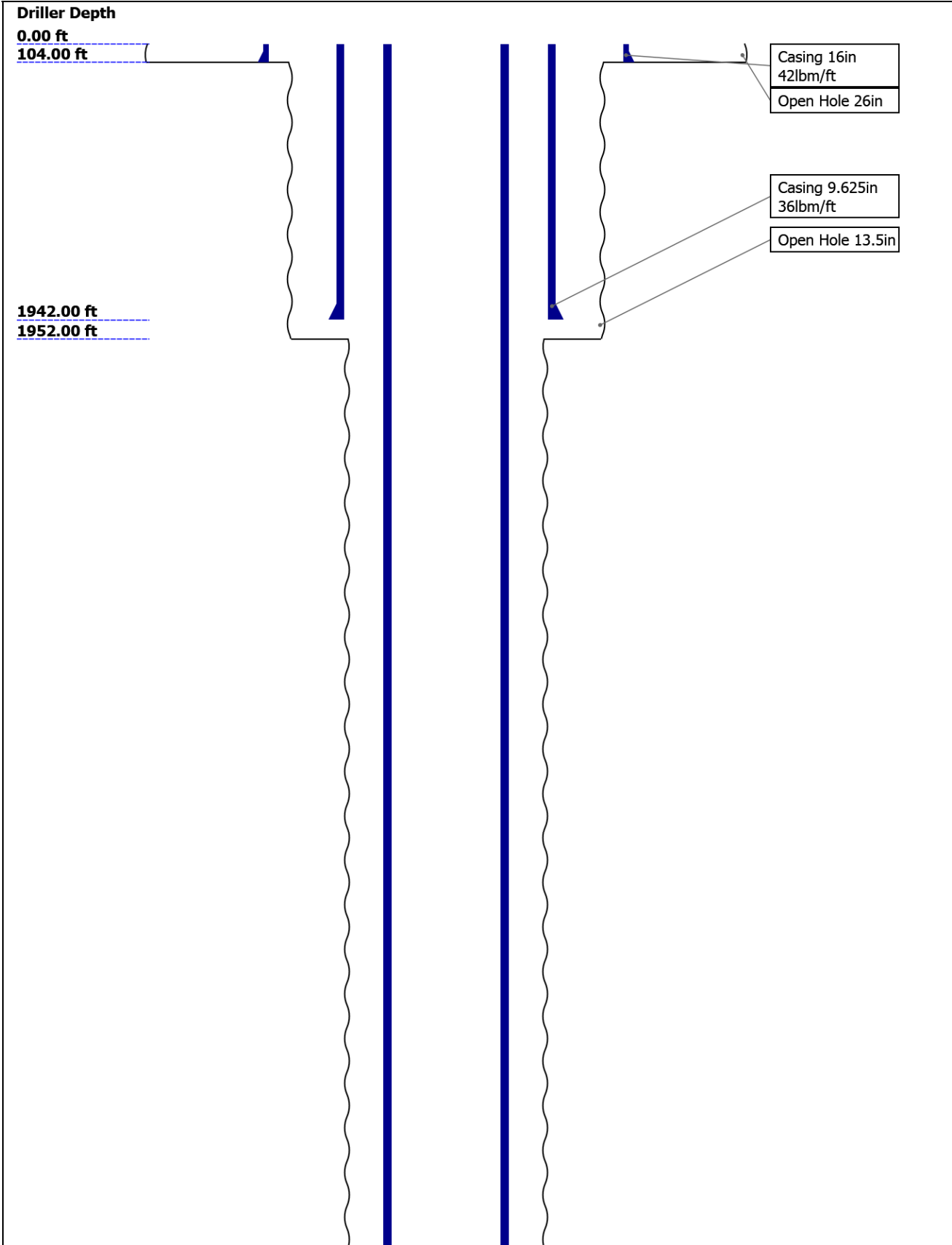
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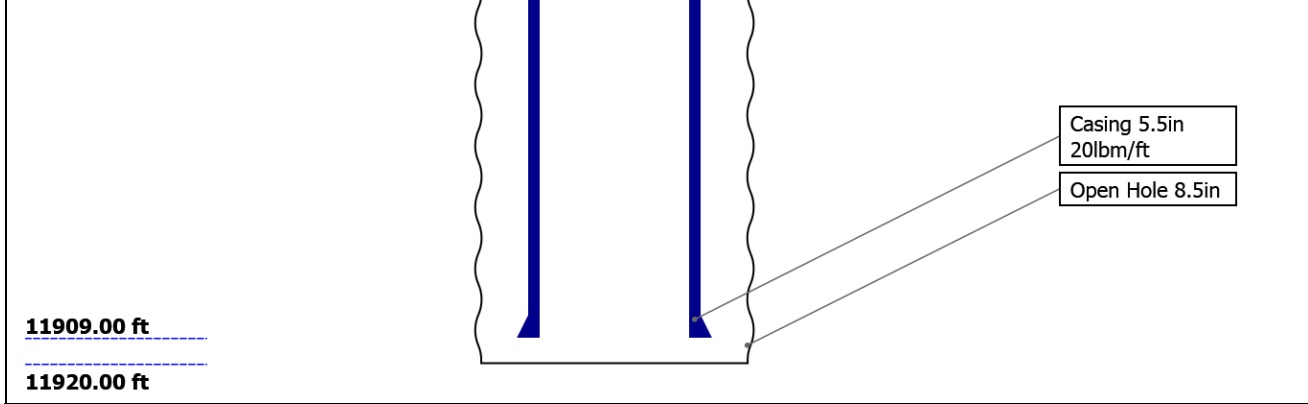
in)

12. XYZ (USI Fluid Acoustic Slowness vs Depth 3.0 in)

13. Tail

Well Sketch



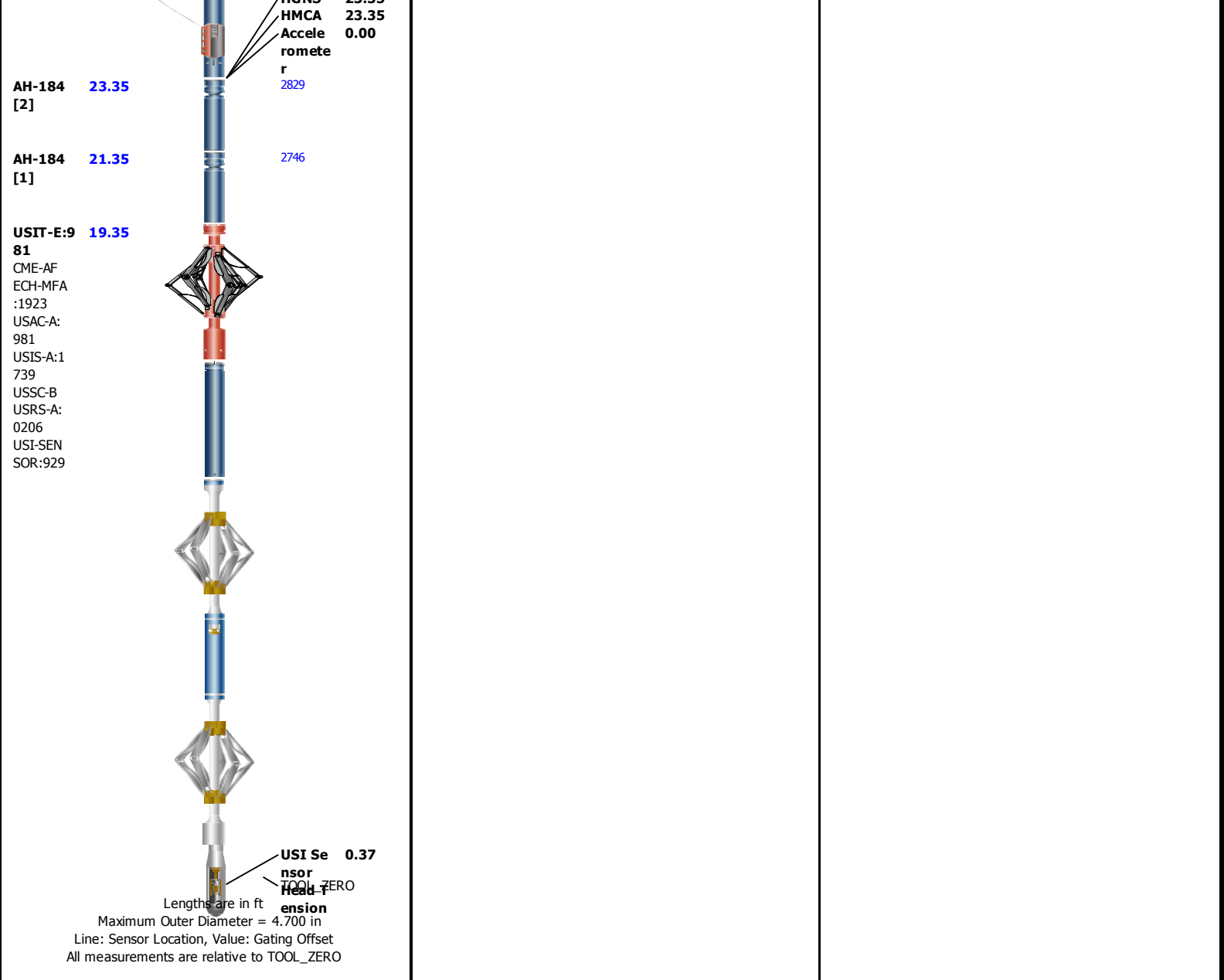


Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	26	13.5	8.5			
Top Driller (ft)	0	104	1952			
Top Logger (ft)	0	104	1952			
Bottom Driller (ft)	104	1952	11920			
Bottom Logger (ft)	104	1952	11920			
Casing						
Size (in)	16	9.625	5.5			
Weight (lbm/ft)	42	36	20			
Inner Diameter (in)	15.512	8.921	4.778			
Grade	N/A	N/A	N/A			
Top Driller (ft)	0	0	0			
Top Logger (ft)	0	0	0			
Bottom Driller (ft)	104	1942	11909			
Bottom Logger (ft)	104	1942	11909			

Remarks and Equipment Summary

ONE: Toolstring			ONE: Remarks		
<div><div><div>Equip nameLengthMP nameOffset</div><div>LEH-QT42.18LEH-QT</div><div>EDTC-B:39.268629EDTH-B:8652EDTG-AEDTC-B:8629</div><div>HGNS-H32.76HGNHNSR-F:5069NPV-NHMCA-HHACCZ-H:5736HGNS-H</div></div><div><div>CTEM35.76</div><div>ACCZ0.00</div><div>HV0.00</div><div>Gamm33.89</div><div>a Ray</div><div>TelSta32.76</div><div>tus</div><div>Tempe32.73</div><div>rature</div><div>GR32.02</div><div>CNL Po25.68</div><div>rosity</div><div>,HGNS23.35</div></div></div>	1. THIS IS THE FIRST RUN IN THE WELL				
	2. TOOL RAN AS PER TOOL STRING				
	3. CSG: 5.5" 20 LB/FT				
	4. WELL FLUID: 8.4 PPG FRESH WATER				
	5. CEMENT: NO CEMENT DATA FROM CLIENT				
	6. BHT: 203.5 F				
	7. LOGS RECORDED AT 0 PSI (REPEAT) AND 2500 PSI (MAIN)				



Depth Summary			
	ONE		
Depth Measuring Device			
Type	IDW-B		
Serial Number			
Calibration Date			
Calibrator Serial Number			
Calibration Cable Type			
Wheel Correction 1	0		
Wheel Correction 2	0		
Tension Device			
Type	CMTD-B/A		
Serial Number			
Calibration Date			
Calibrator Serial Number			
Number of Calibration Points	0		
Logging Cable			
Type	7.46NT-XS		

Serial Number

Length

Conveyance Type

Rig Type

7-46NI-XS

24000.00 ft

Wireline

Mast

ONE:Depth Control Parameters

Depth Control Remarks

Log Sequence

First Log In the Well

Rig Up Length At Surface

Rig Up Length At Bottom

Rig Up Length Correction

Stretch Correction

Tool Zero Check At Surface

1. ALL SCHLUMBERGER DEPTH CONTROL PROCEDURES WERE FOLLOWED DURING LOGGING OPERATIONS

2. IDW USED AS PRIMARY DEPTH CONROL MEASURE

3. Z CHART USED AS SECONDARY DEPTH CONTROL MEASURE

4. LOG STARTED AT 6800' (LOST HEAD TENSION IN CURVE)

Copy of USI Composite

USIT - Fluid Properties Measurement

Run Name

Pass Name

Start Depth(ft)

Stop Depth(ft)

Run 1

Log[3]:Up

6806.12

66.20

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 : 124.81m(409.48ft) to 134.91m(442.60ft)

MUD_N_FRP = 1.17

DFD = 1.01g/cm3(8.40lbm/gal)

CZMD median computed in free pipe normalization interval = 1.74 MRayl

Start Depth(ft)

Stop Depth(ft)

Start Value(Mrayl)

End Value(Mrayl)

Log

Company:Noble Energy, Inc.

Well:Wells Ranch AA22-645

ONE: Log[3]:Up:S004

Description: USI Composite

Format: USI Composite

Index Scale: 5 in per 100 ft

Index Unit: ft

Index Type: Measured Depth

Creation Date: 22-Apr-2016 16:26:51

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

CableDrag

Azimuth of Eccentering (AZEC) USIT-E

0 deg 360

Casing Collar Locator Ultrasonic (CCLU) USIT-E

-20 in 20

Amplitude of Eccentering for Unflagged

Absent

-5.200

-3.600

-2.000

-0.400

IRAV

ERAV

IRAV-ERAV

Median of Unflagged

Explicit Normalization

USIT - Amplitude of Unflagged

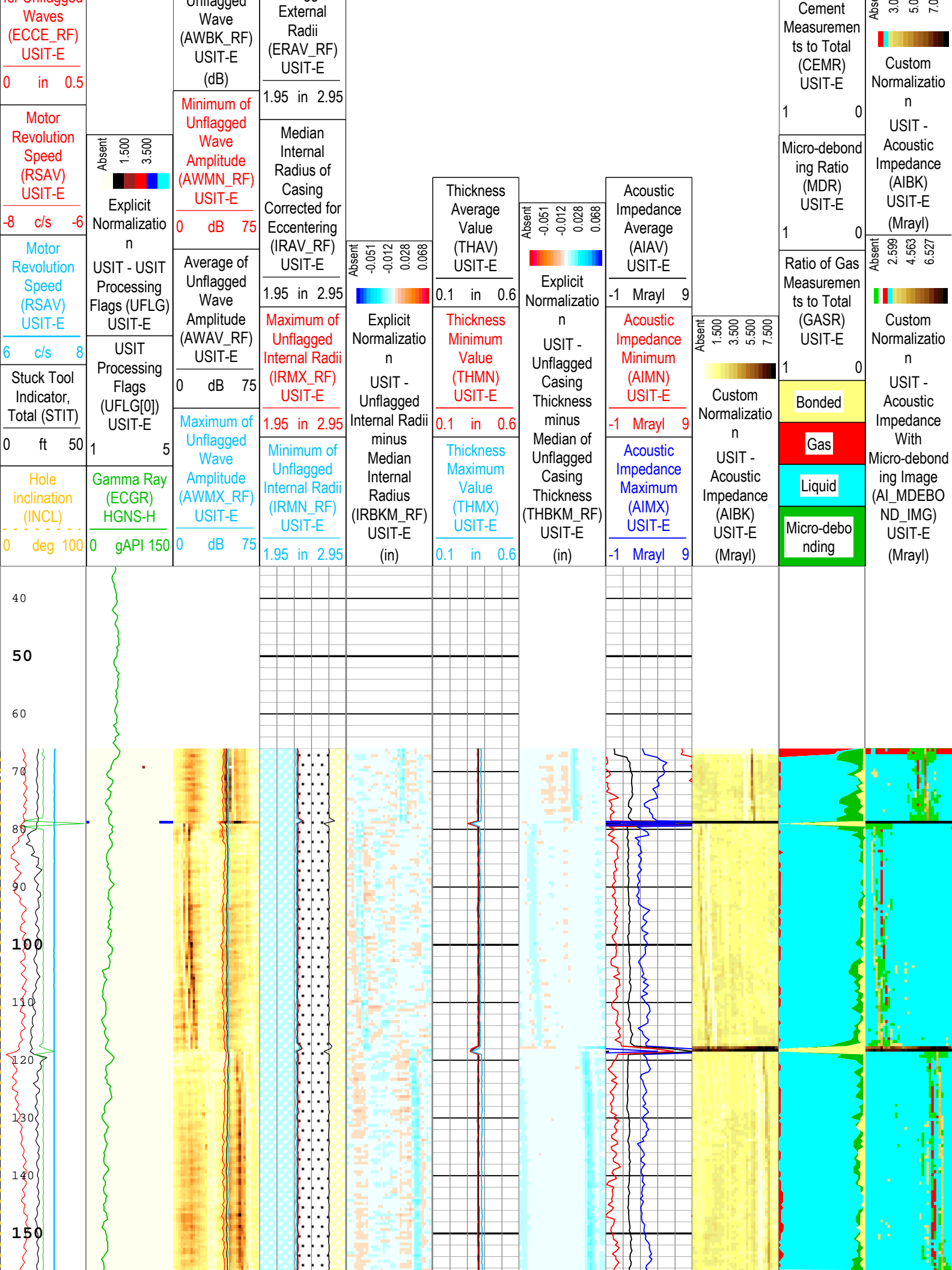
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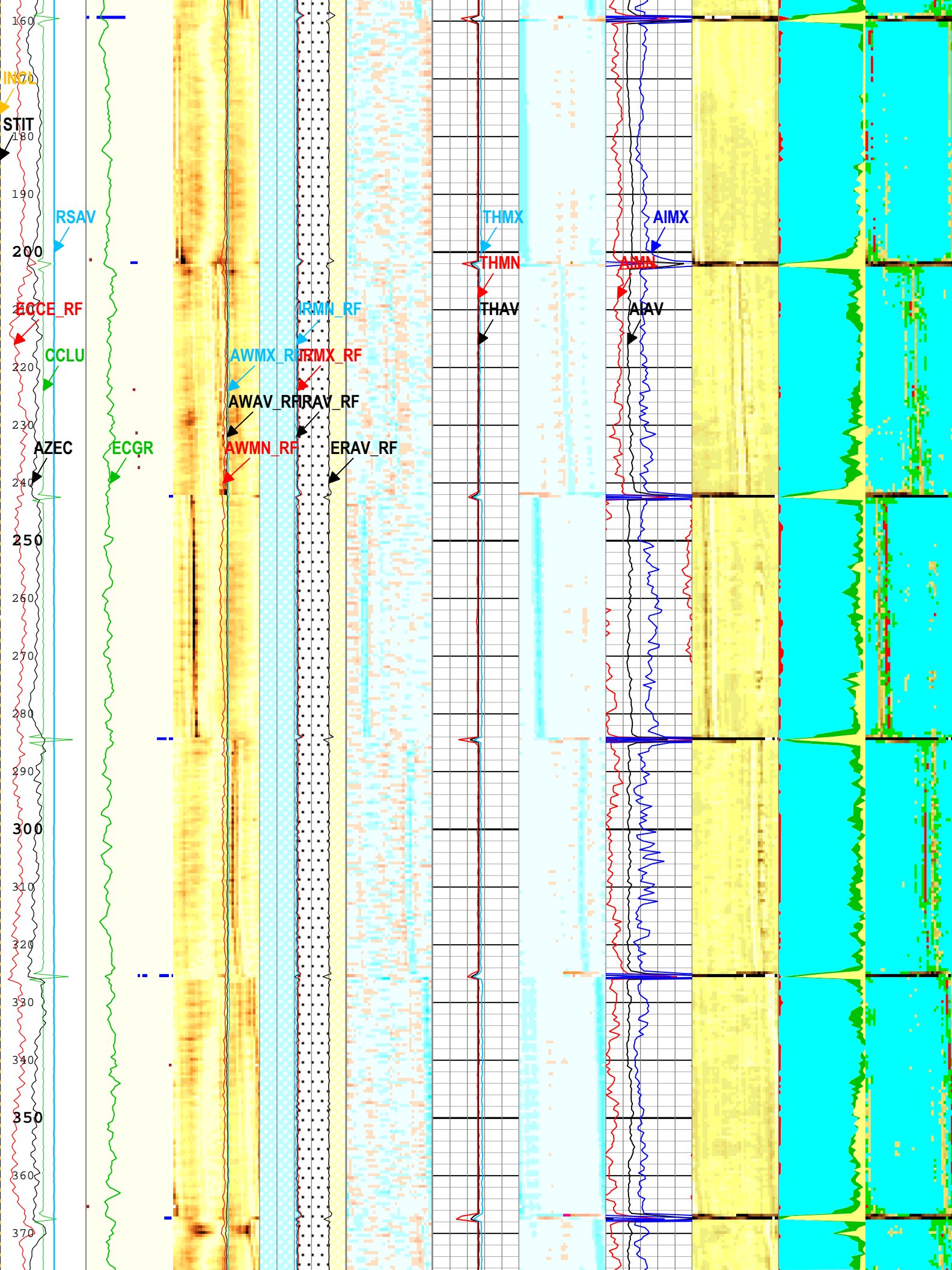
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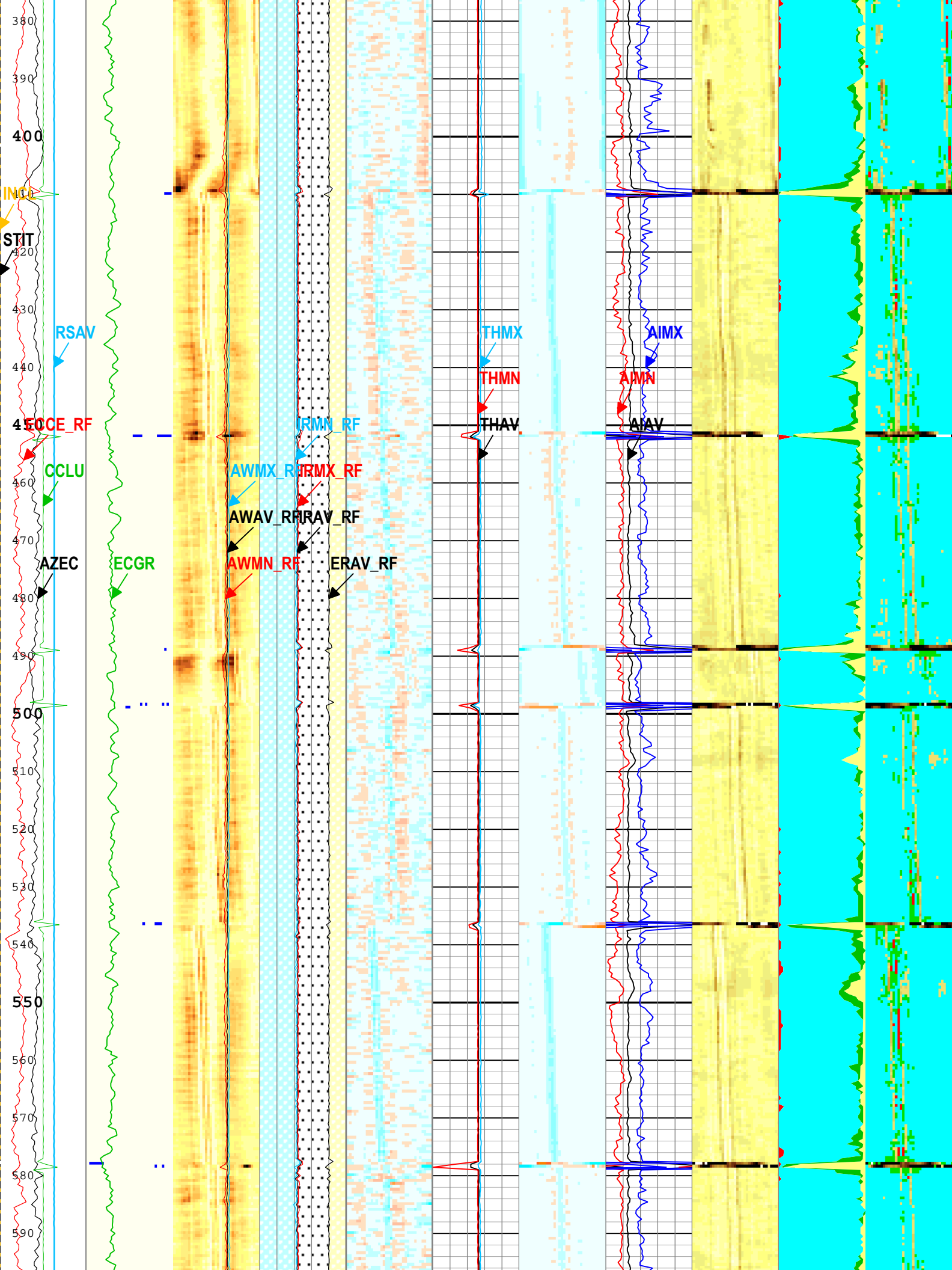
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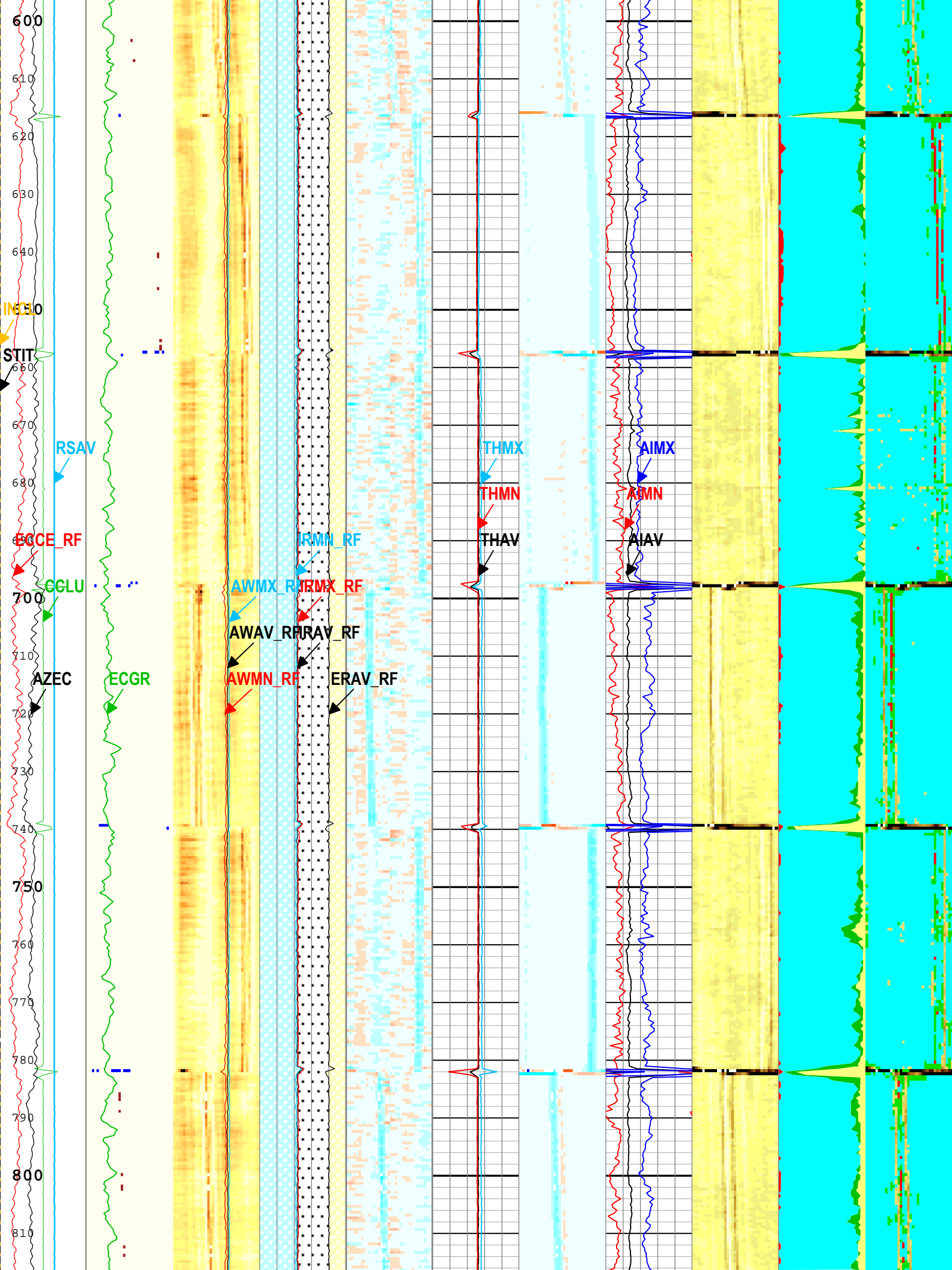
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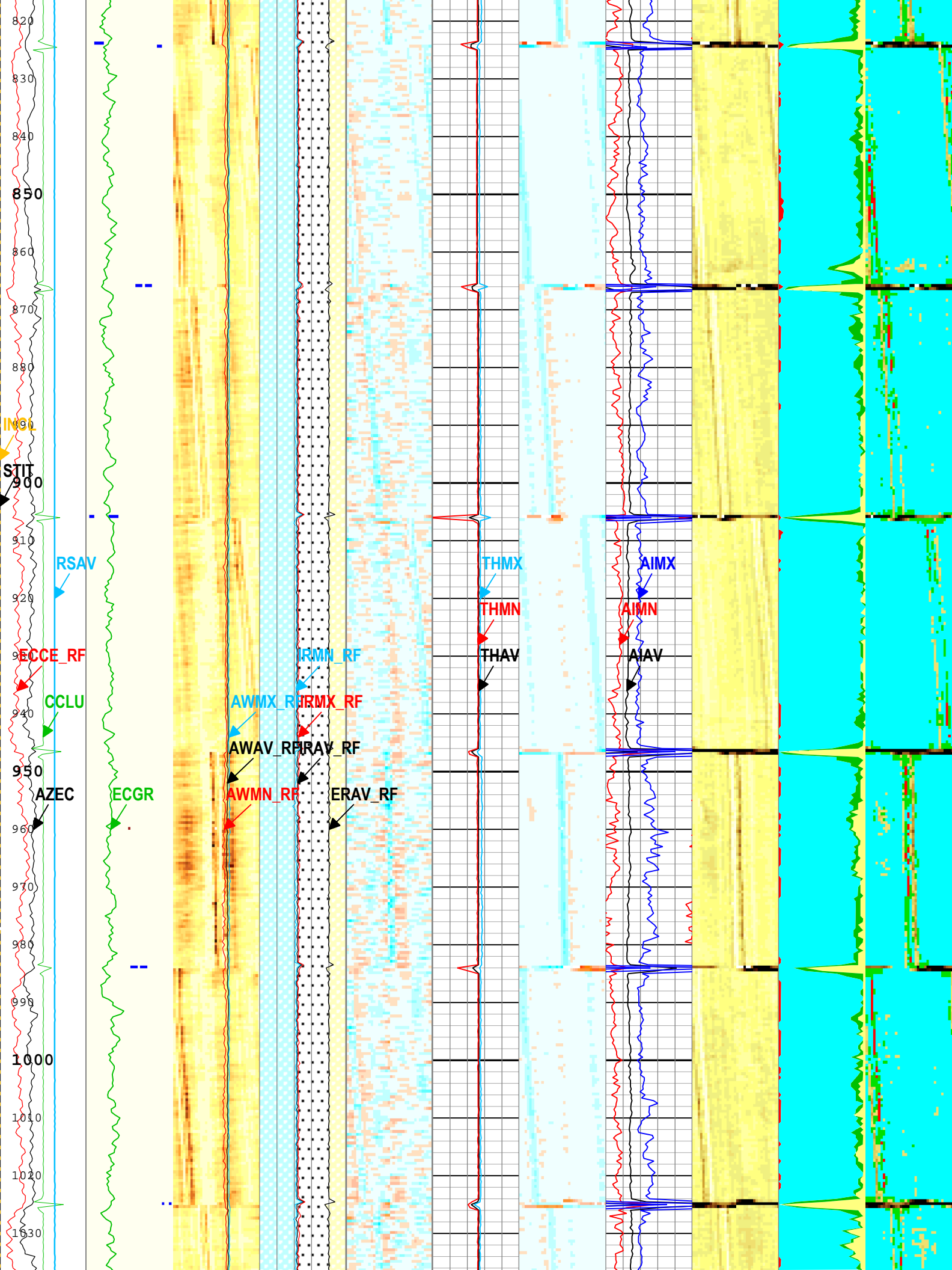
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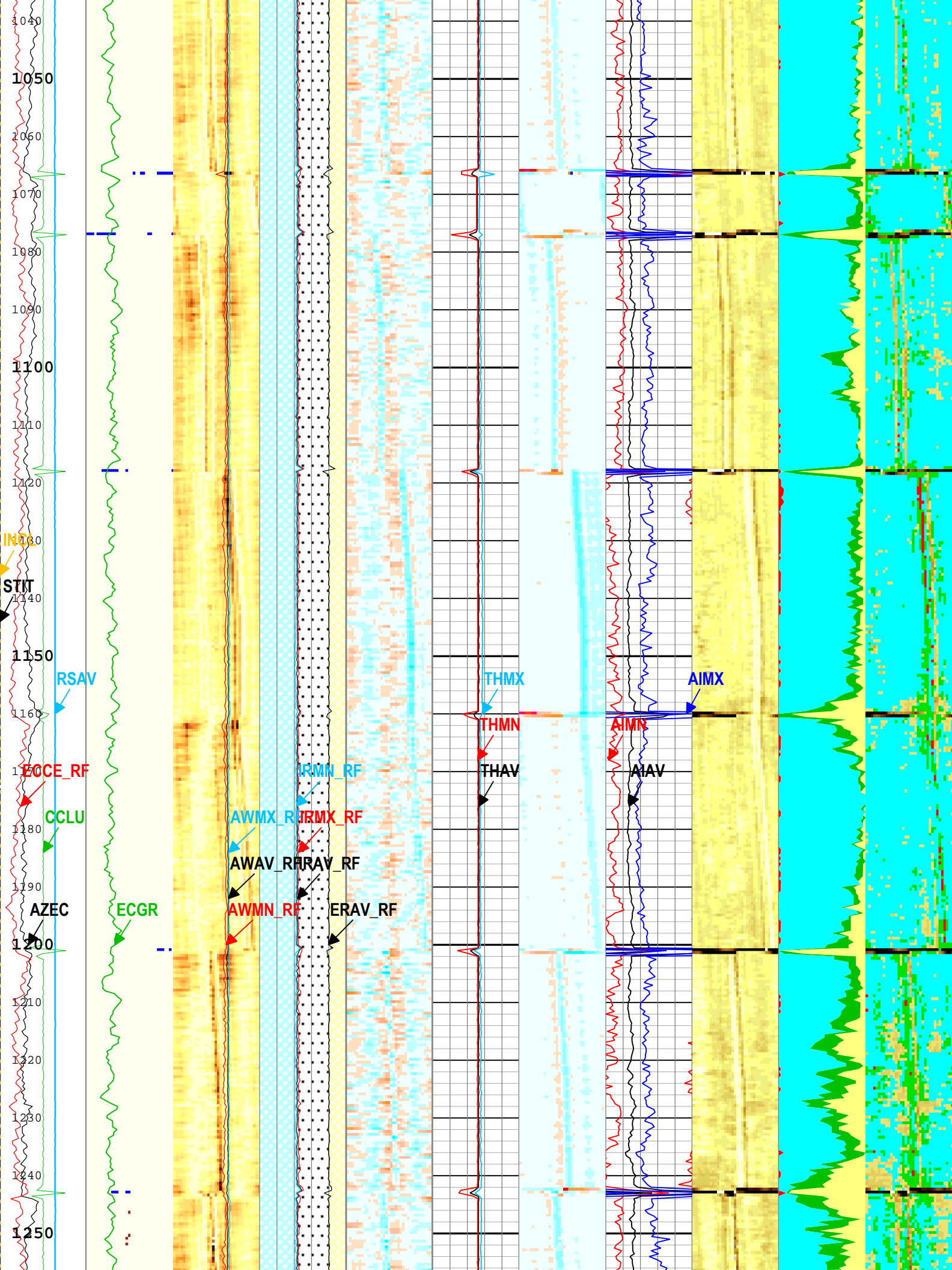


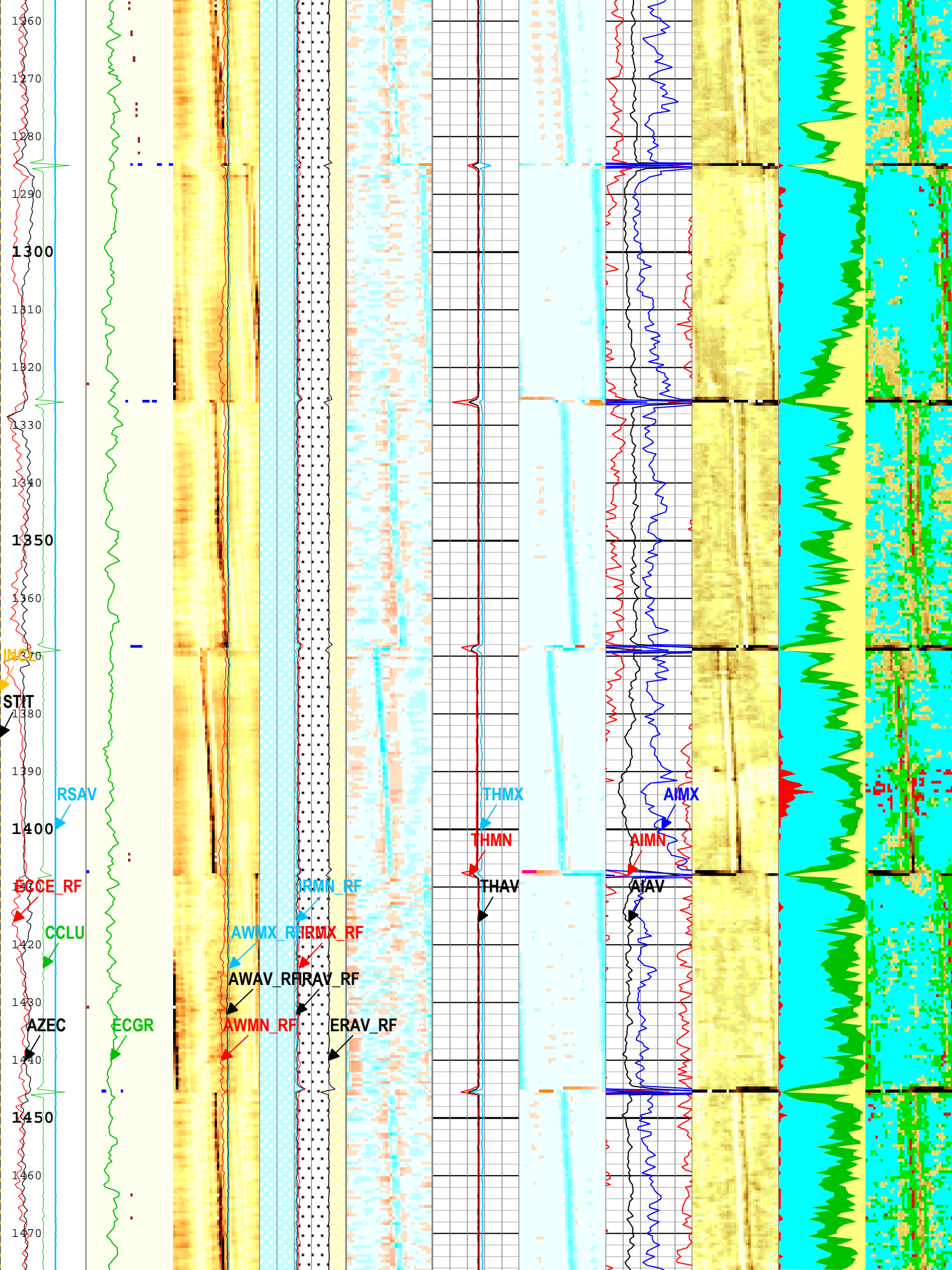


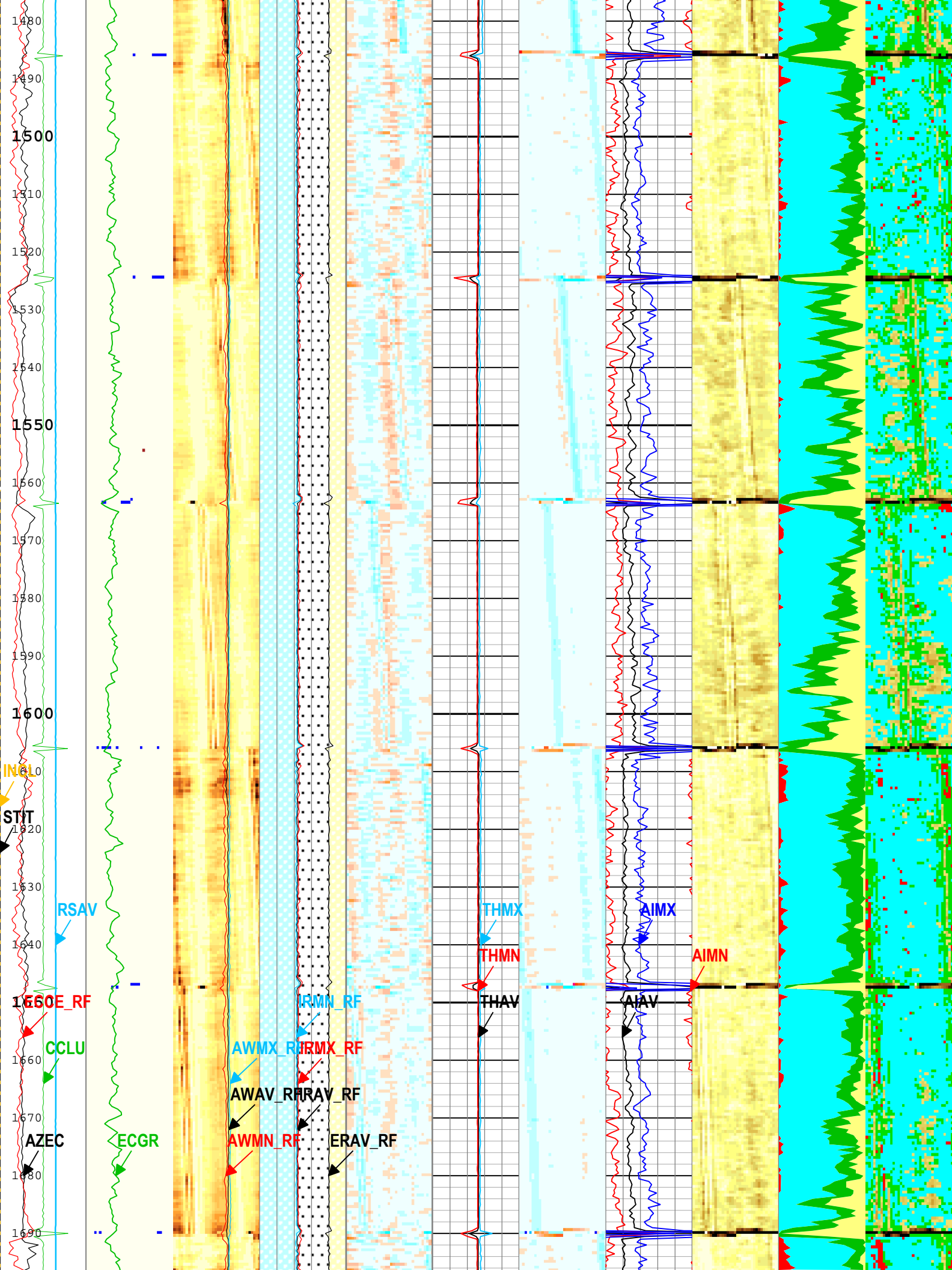


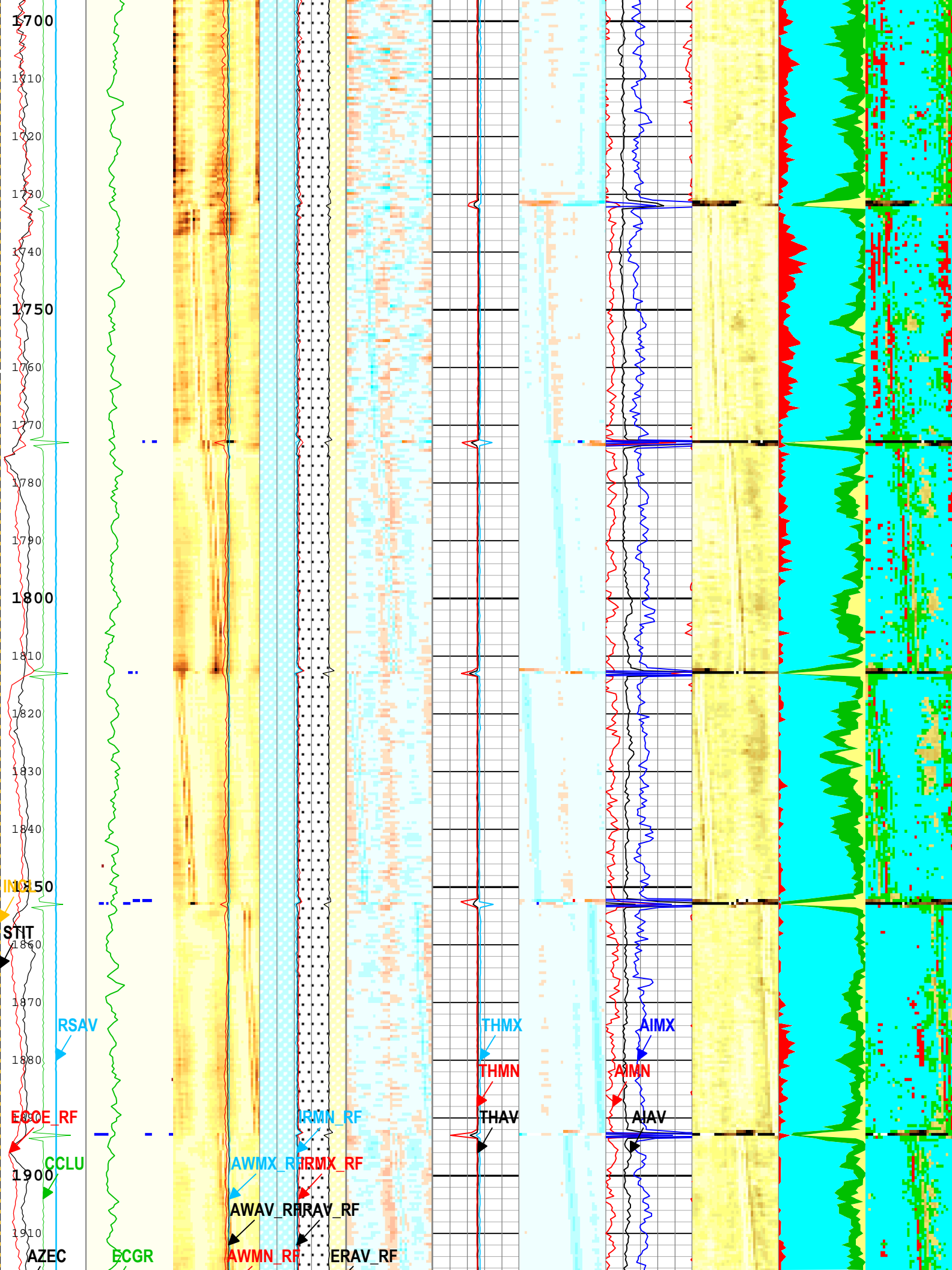


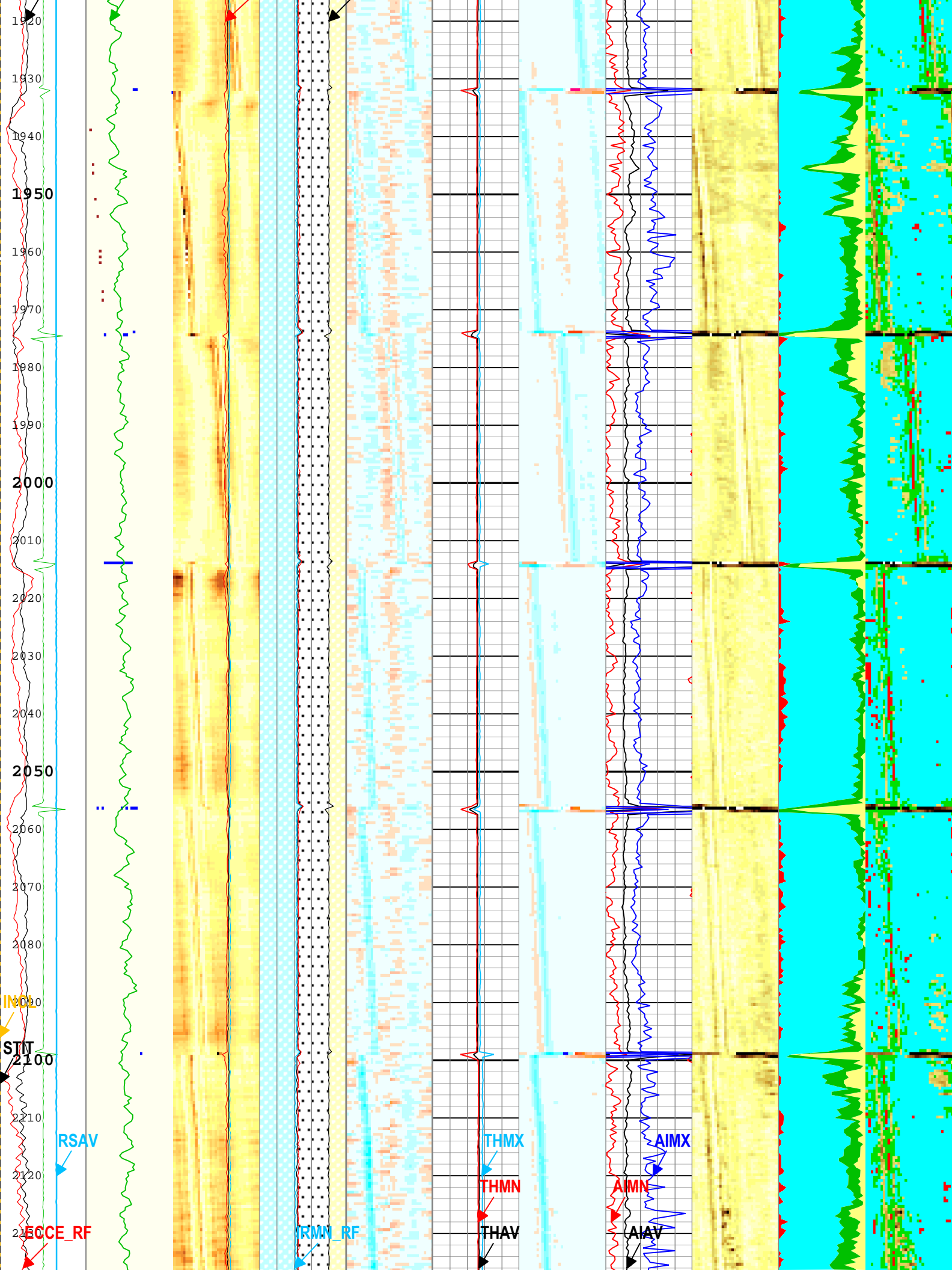


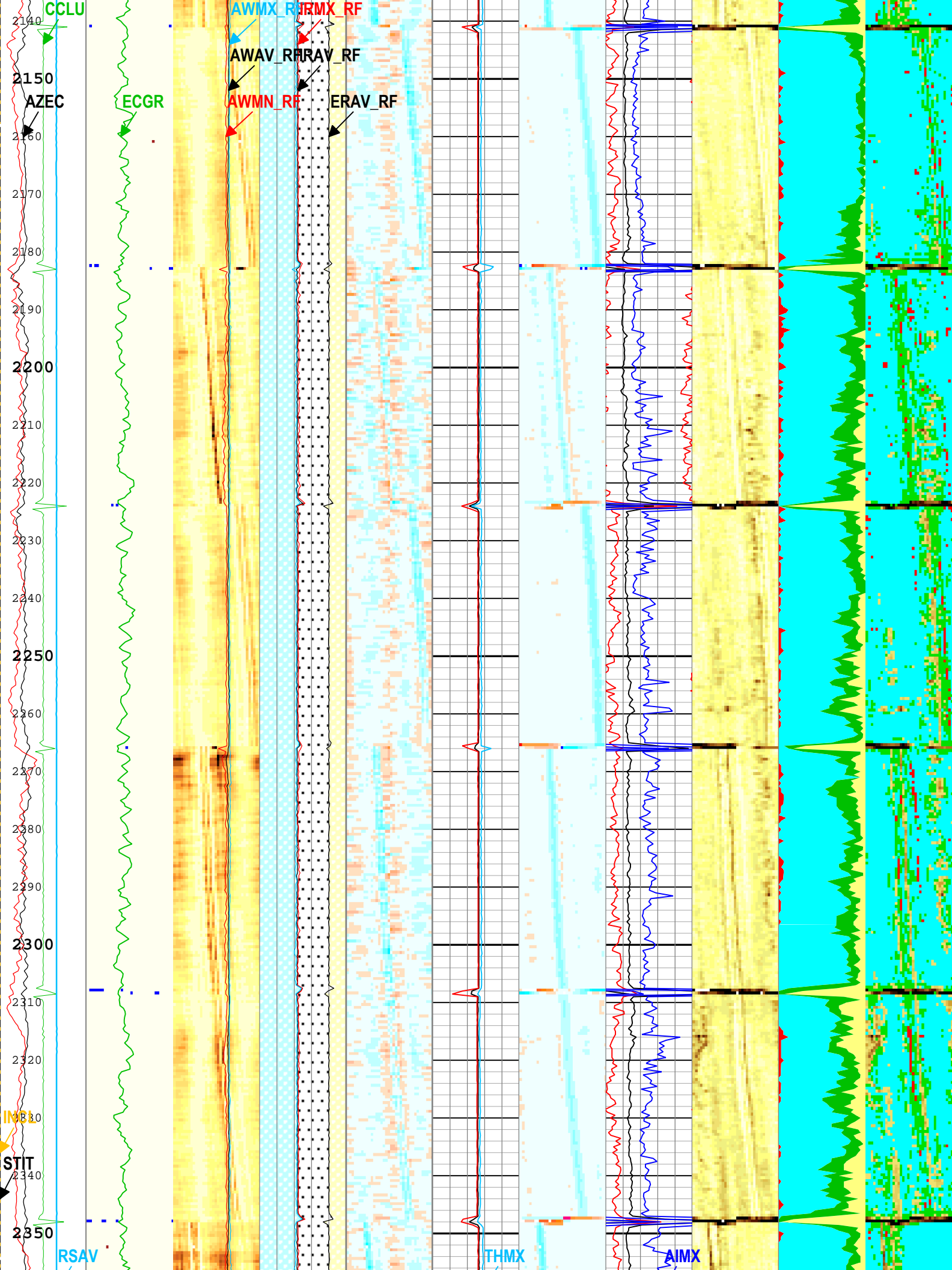


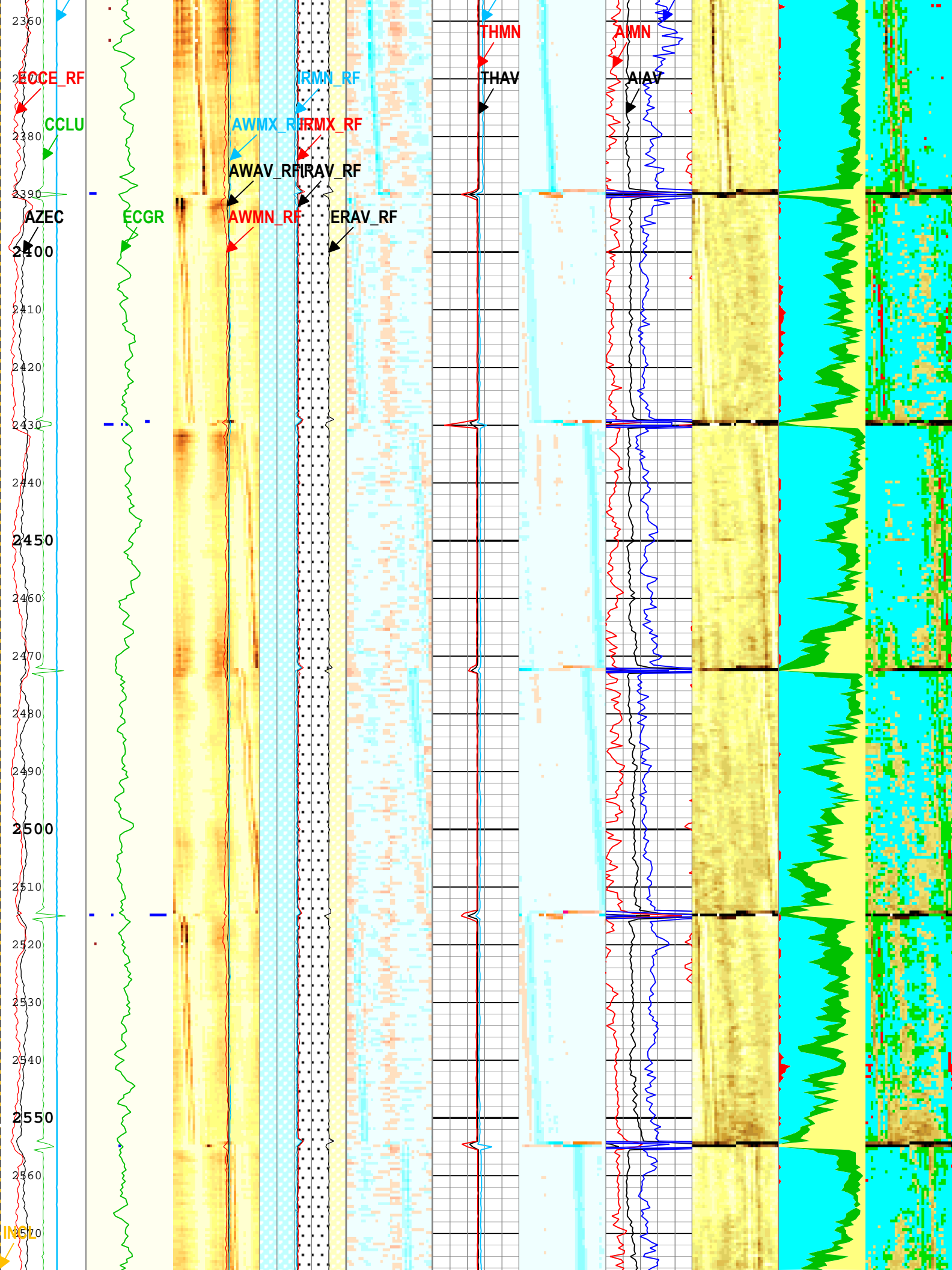


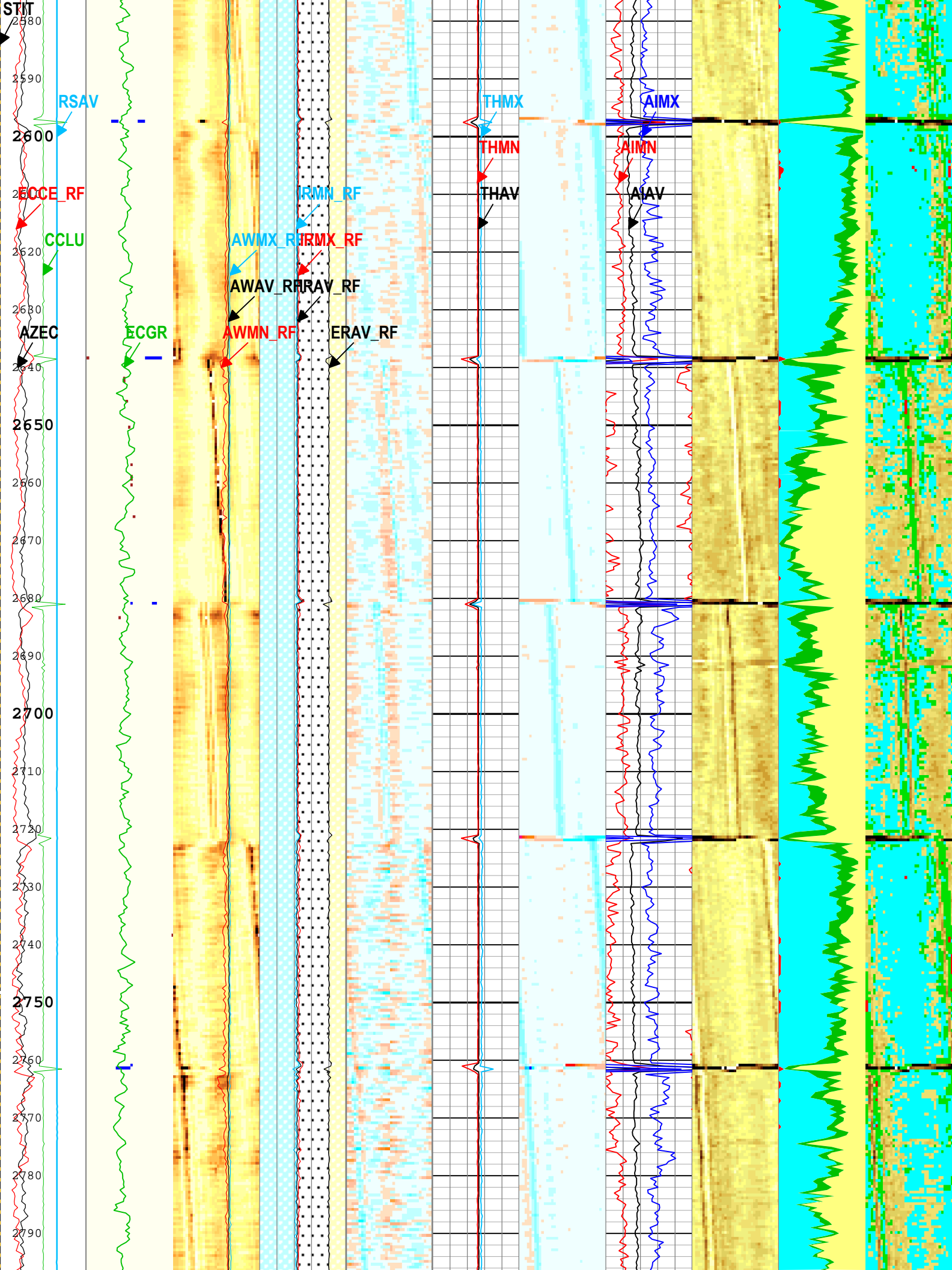


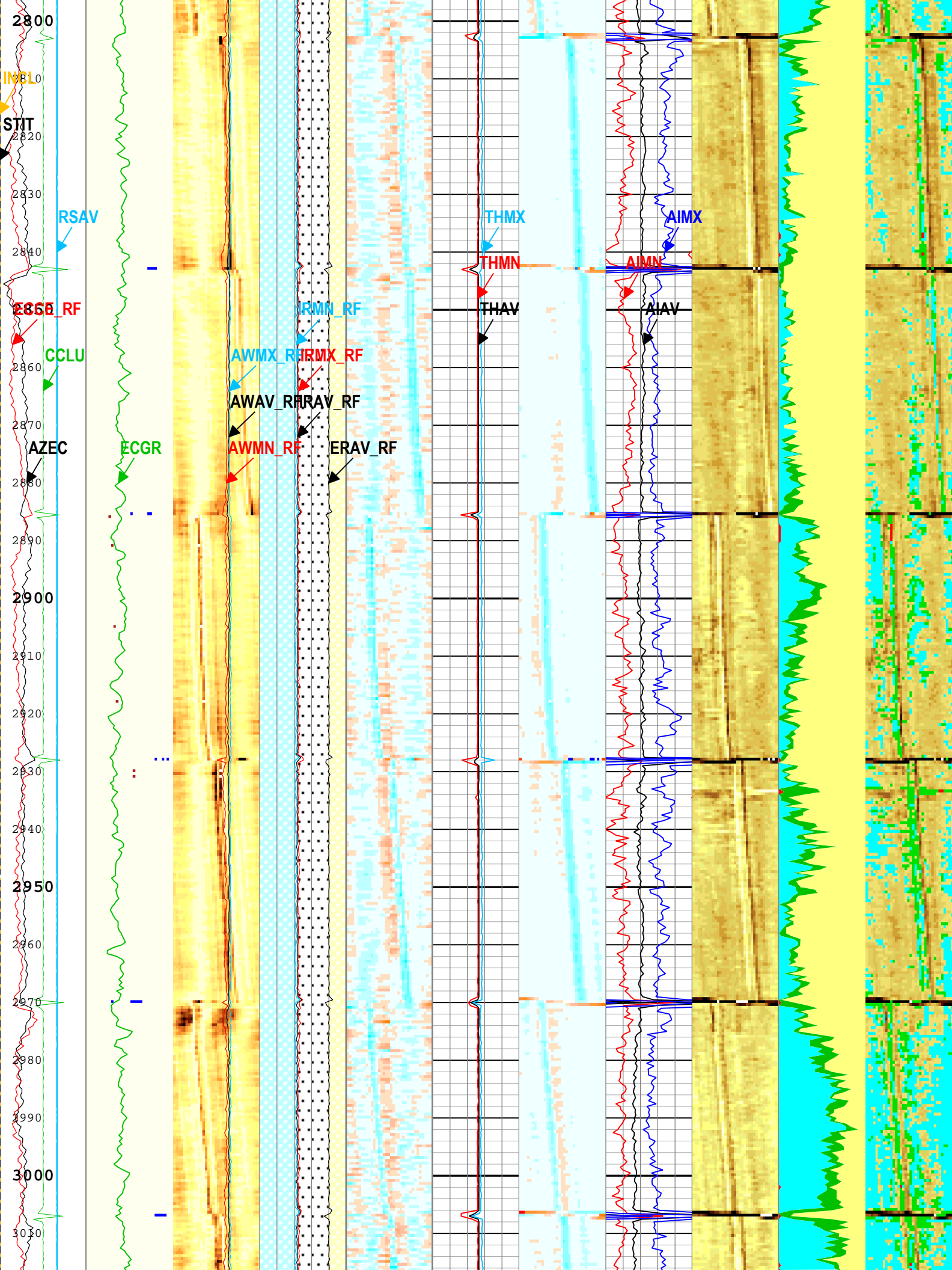


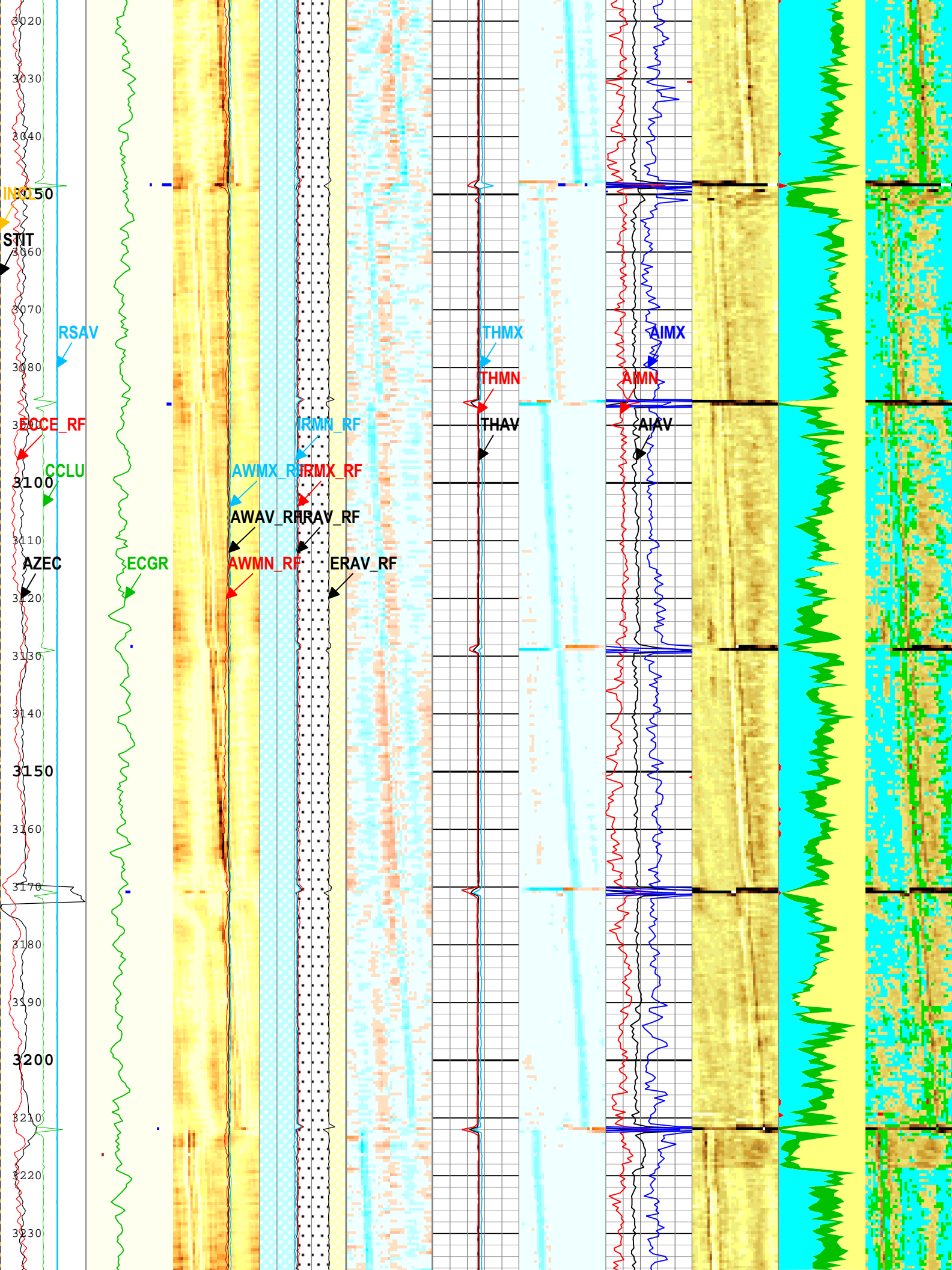


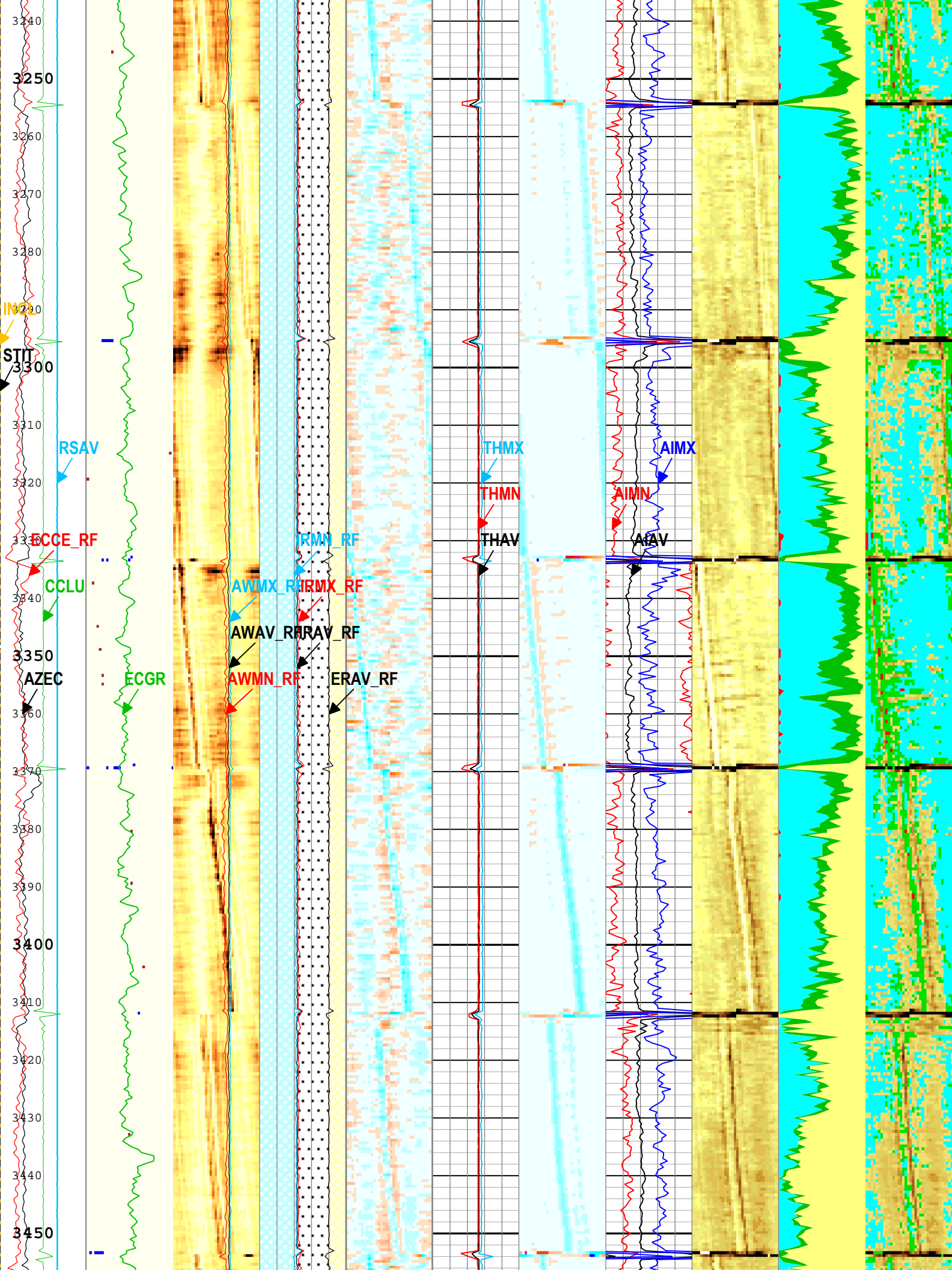


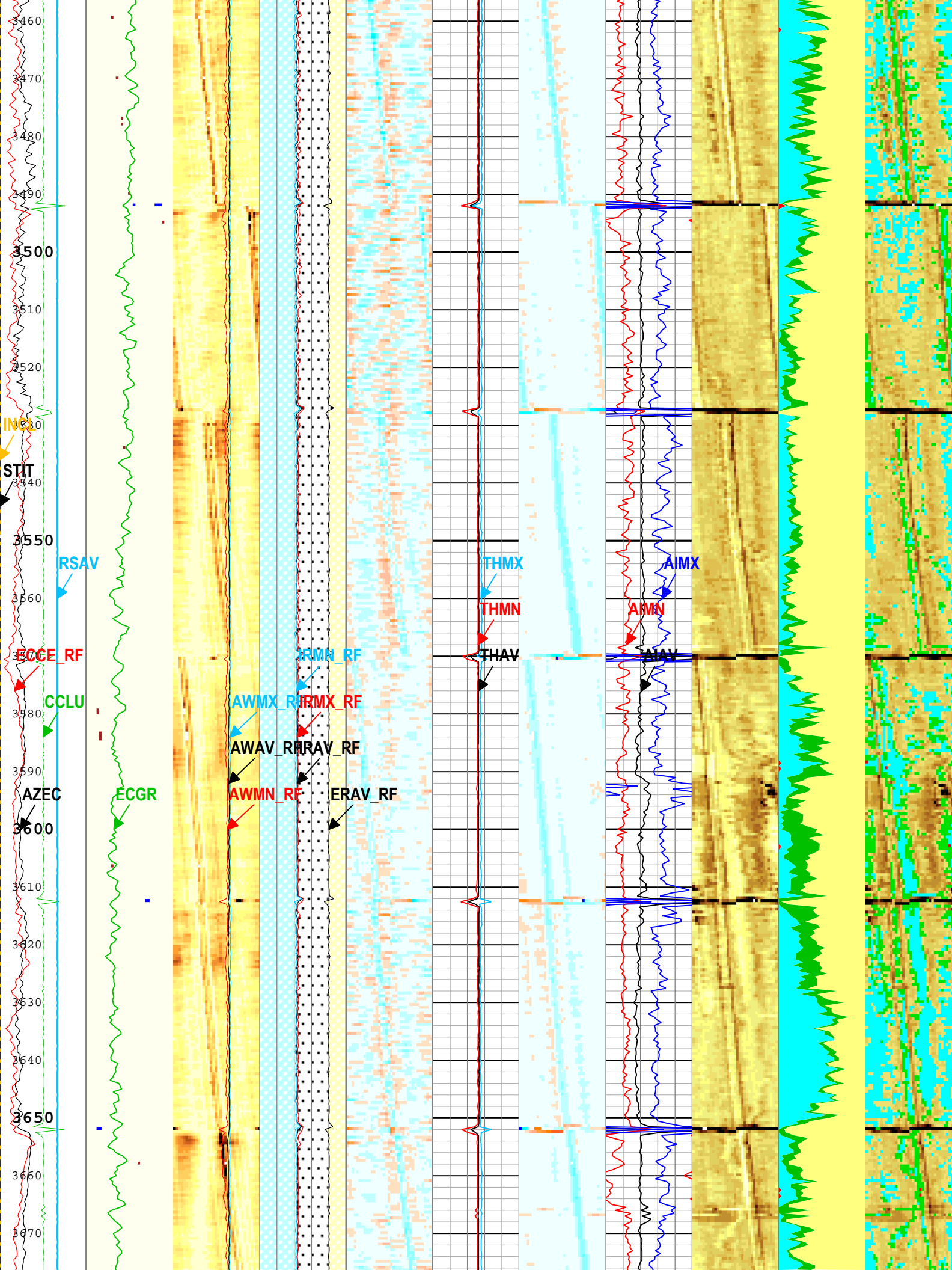


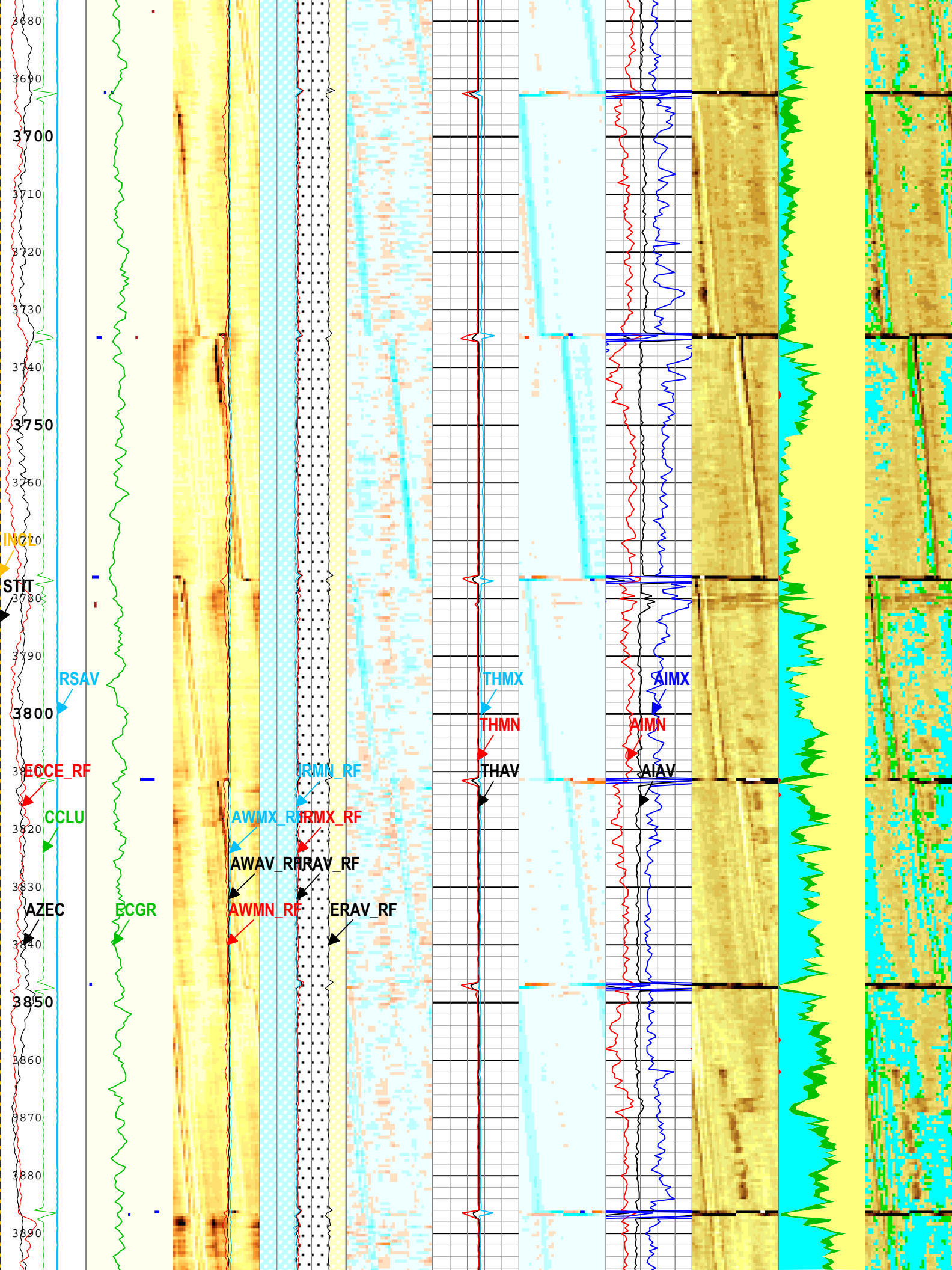


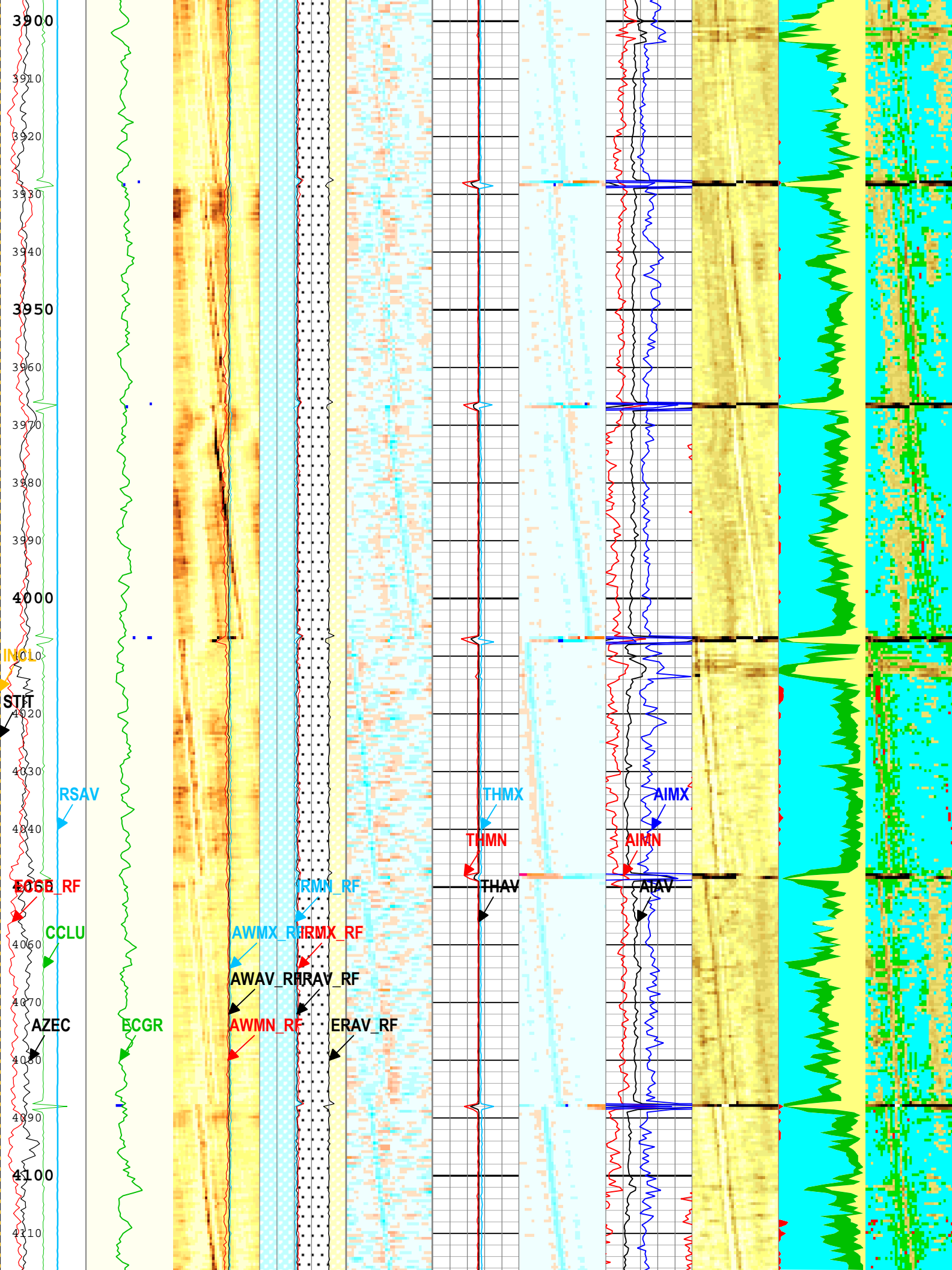


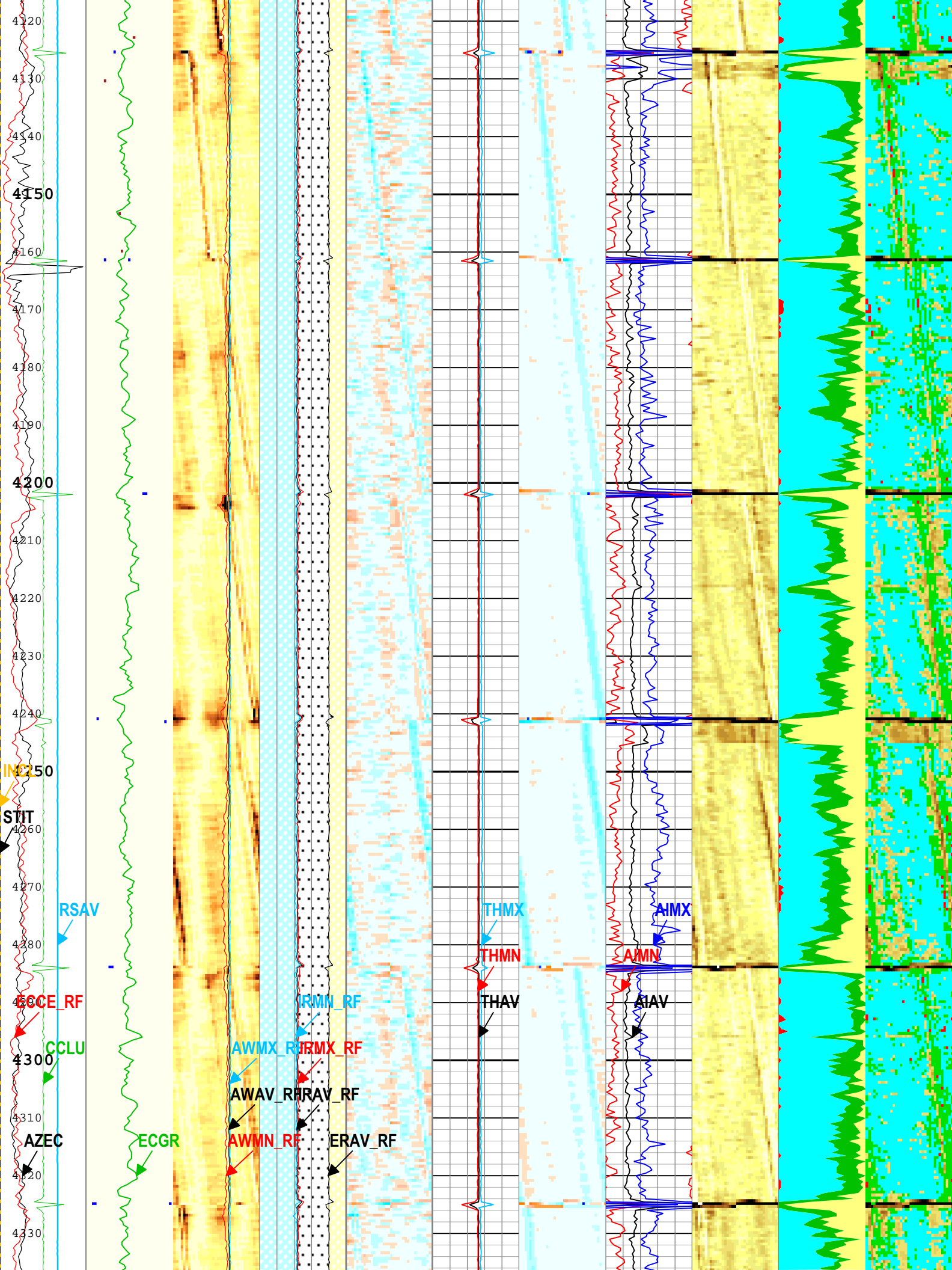


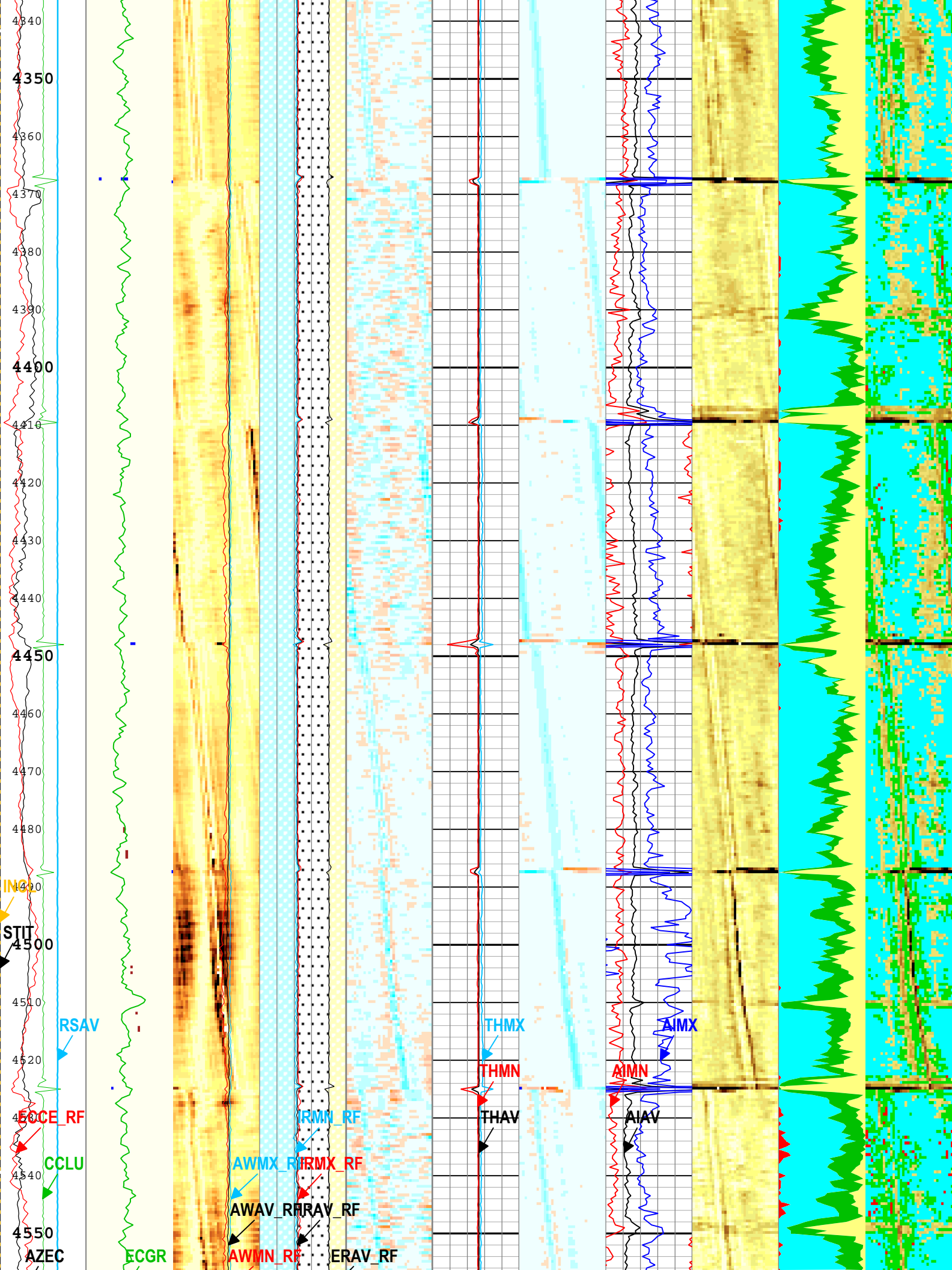


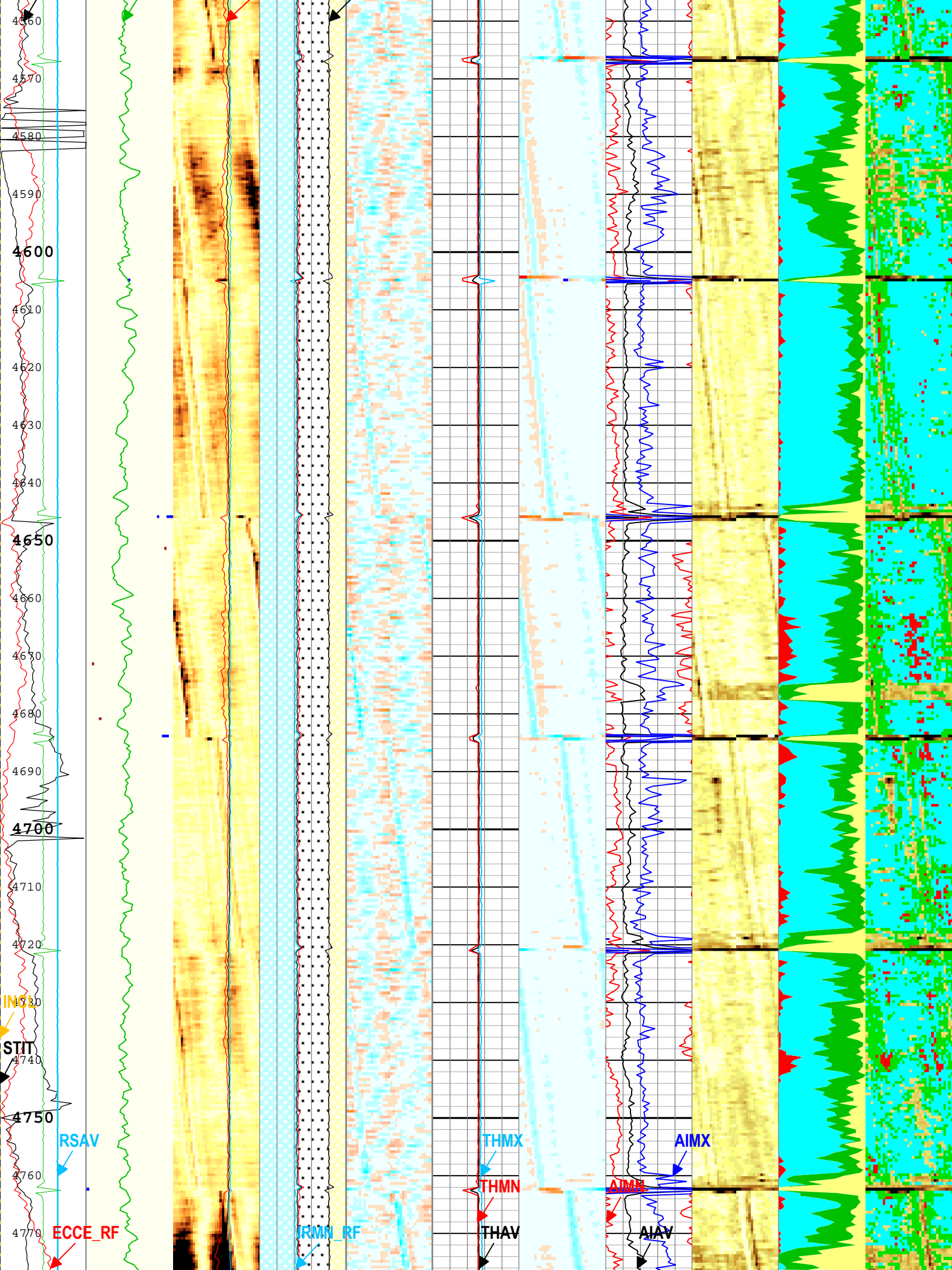


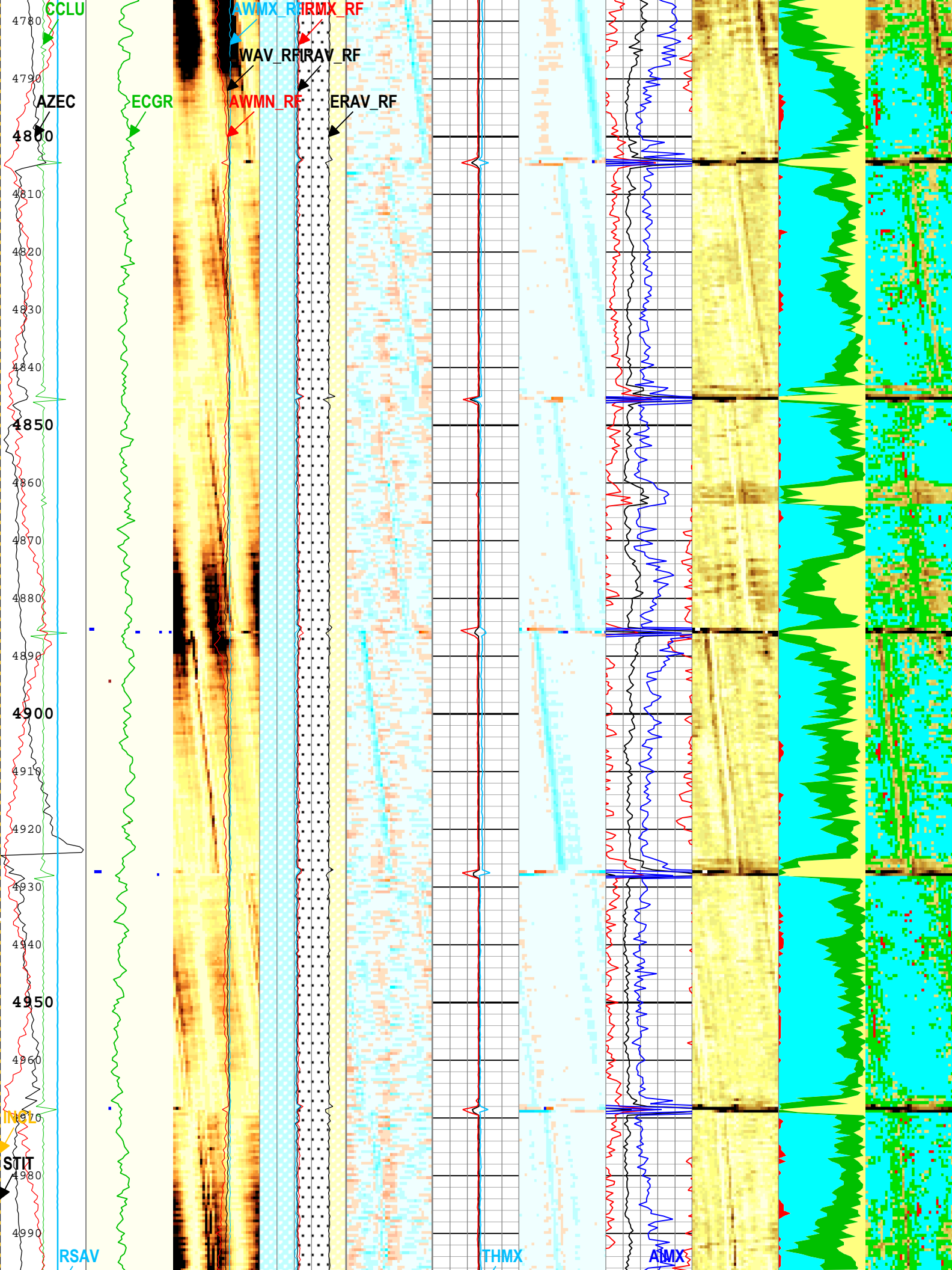


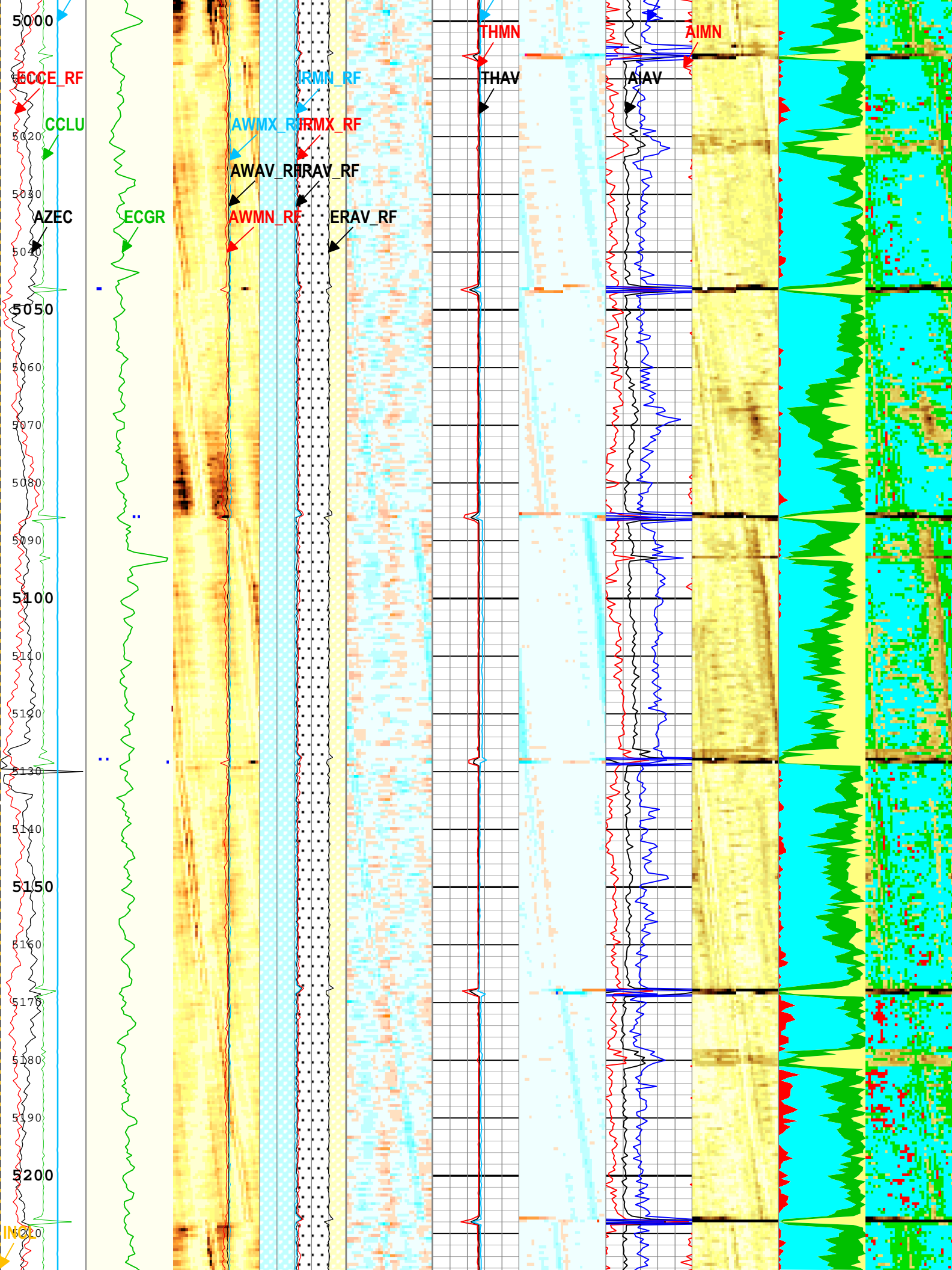


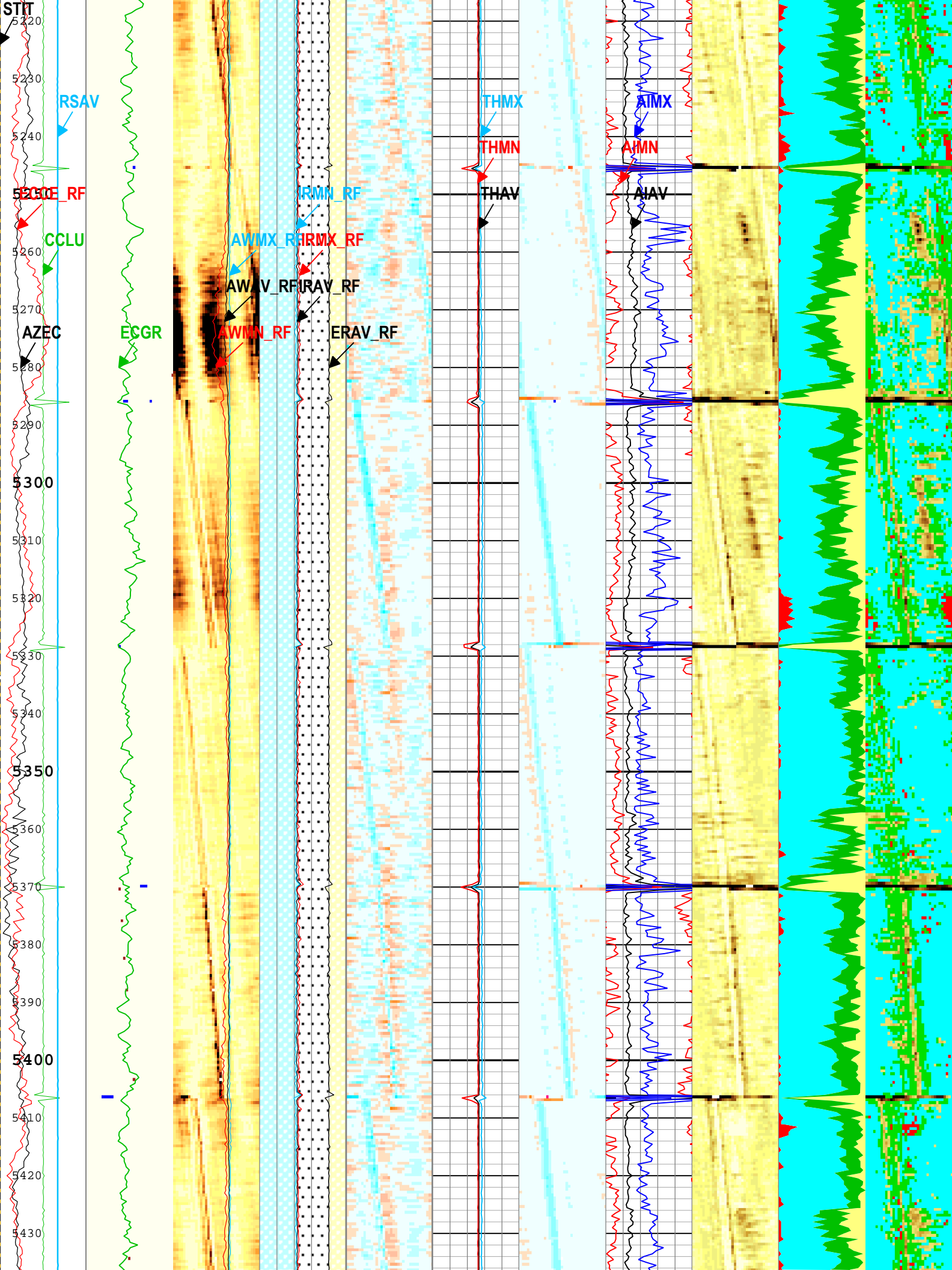


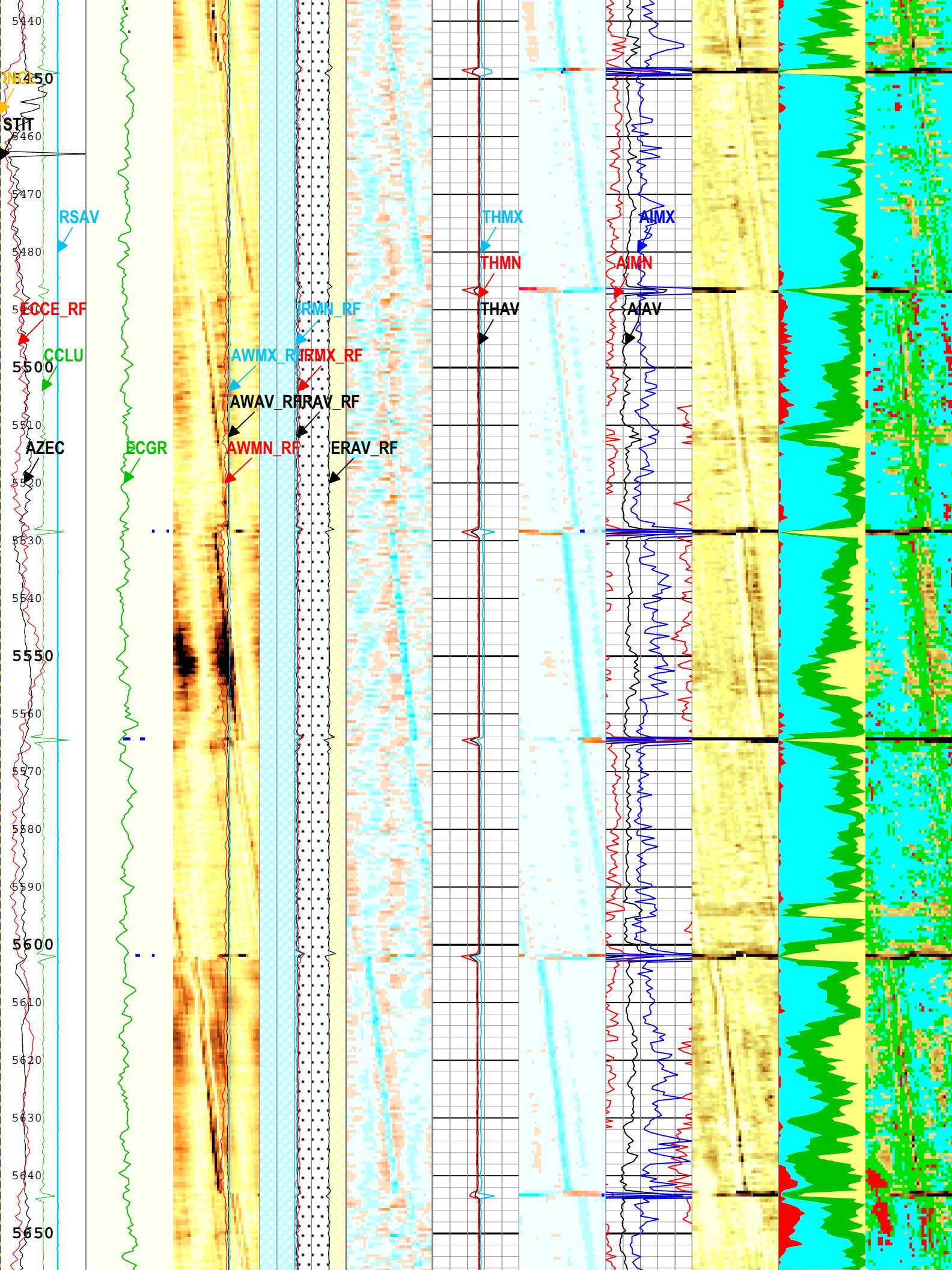


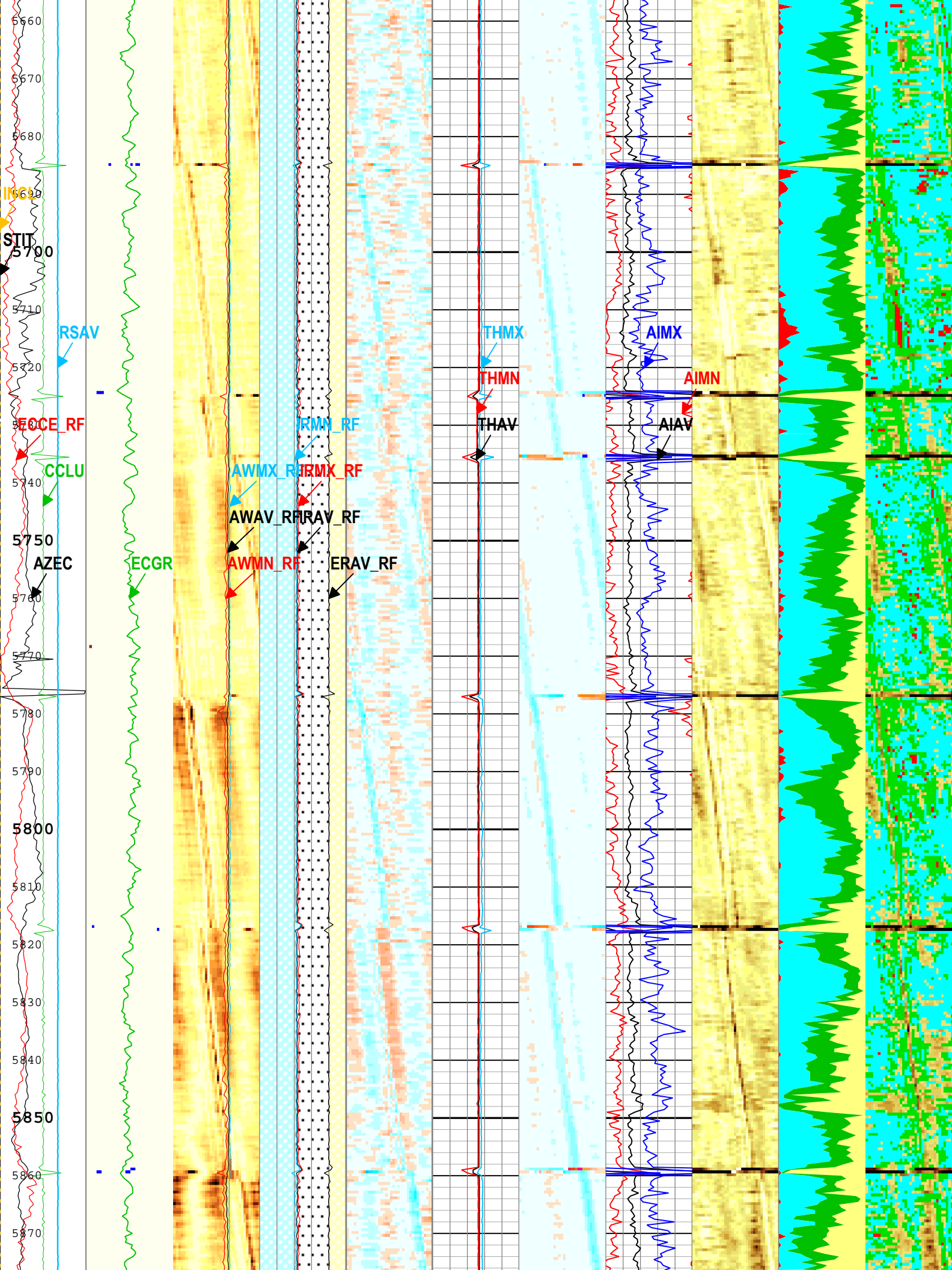


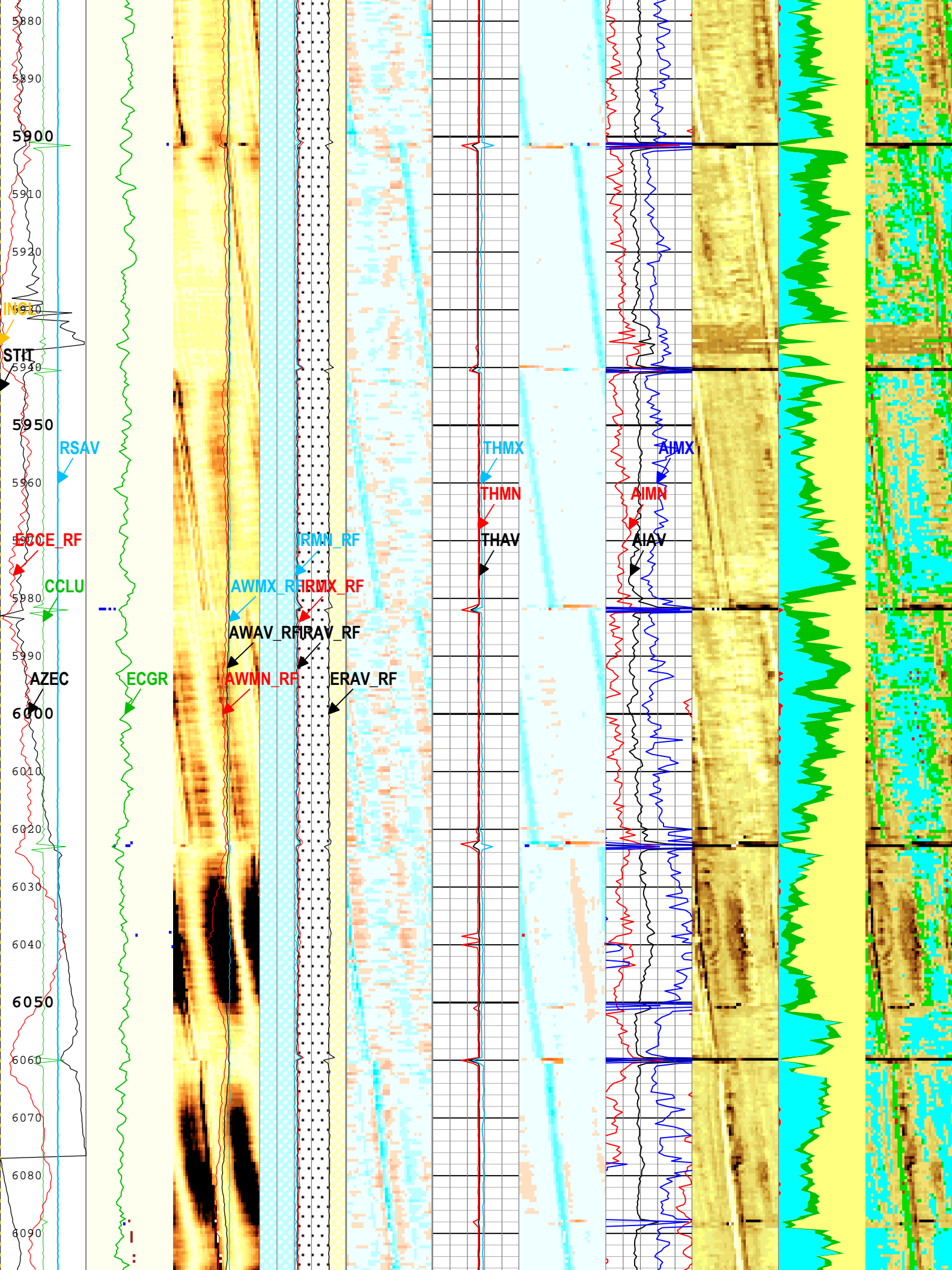


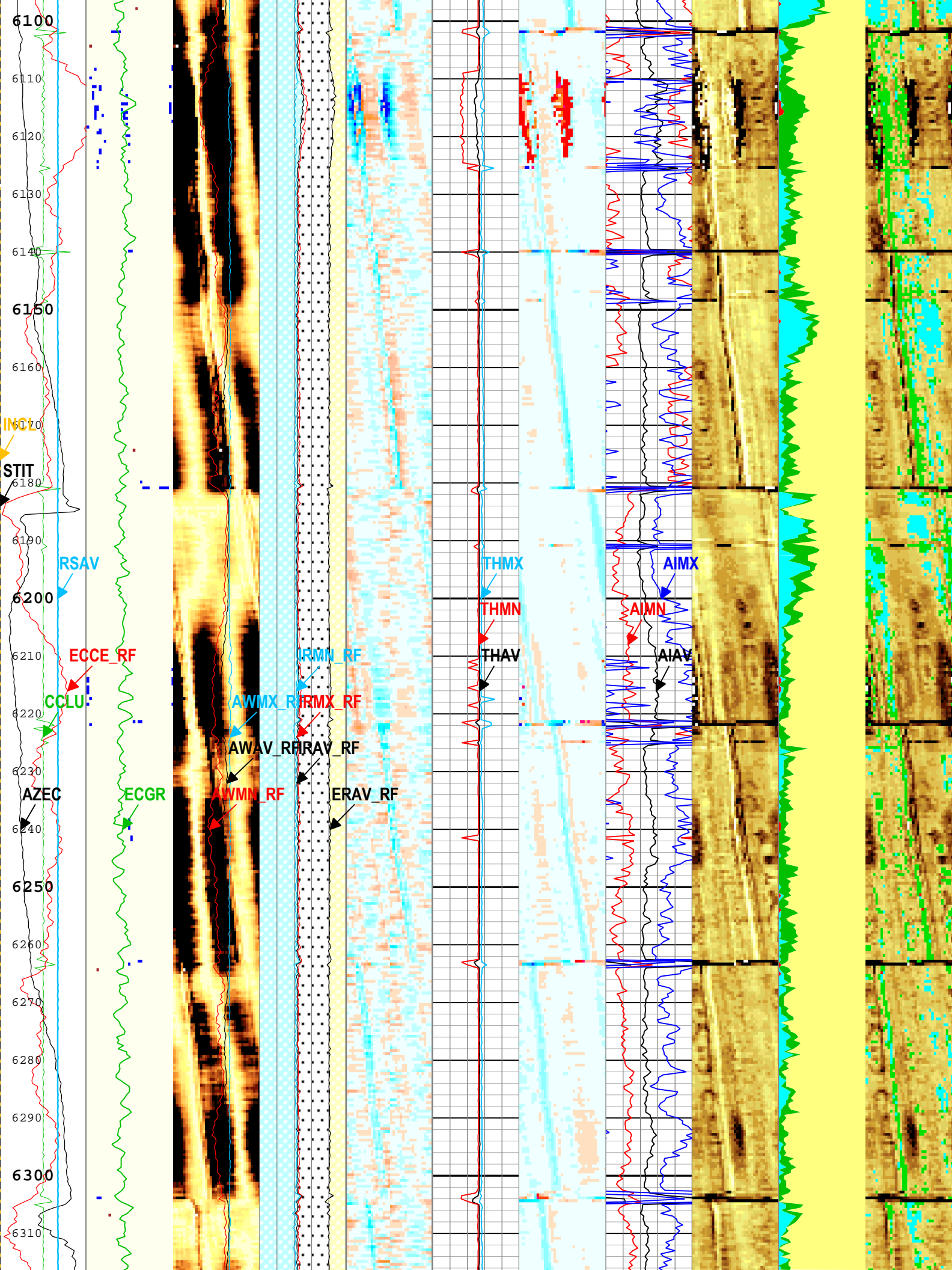


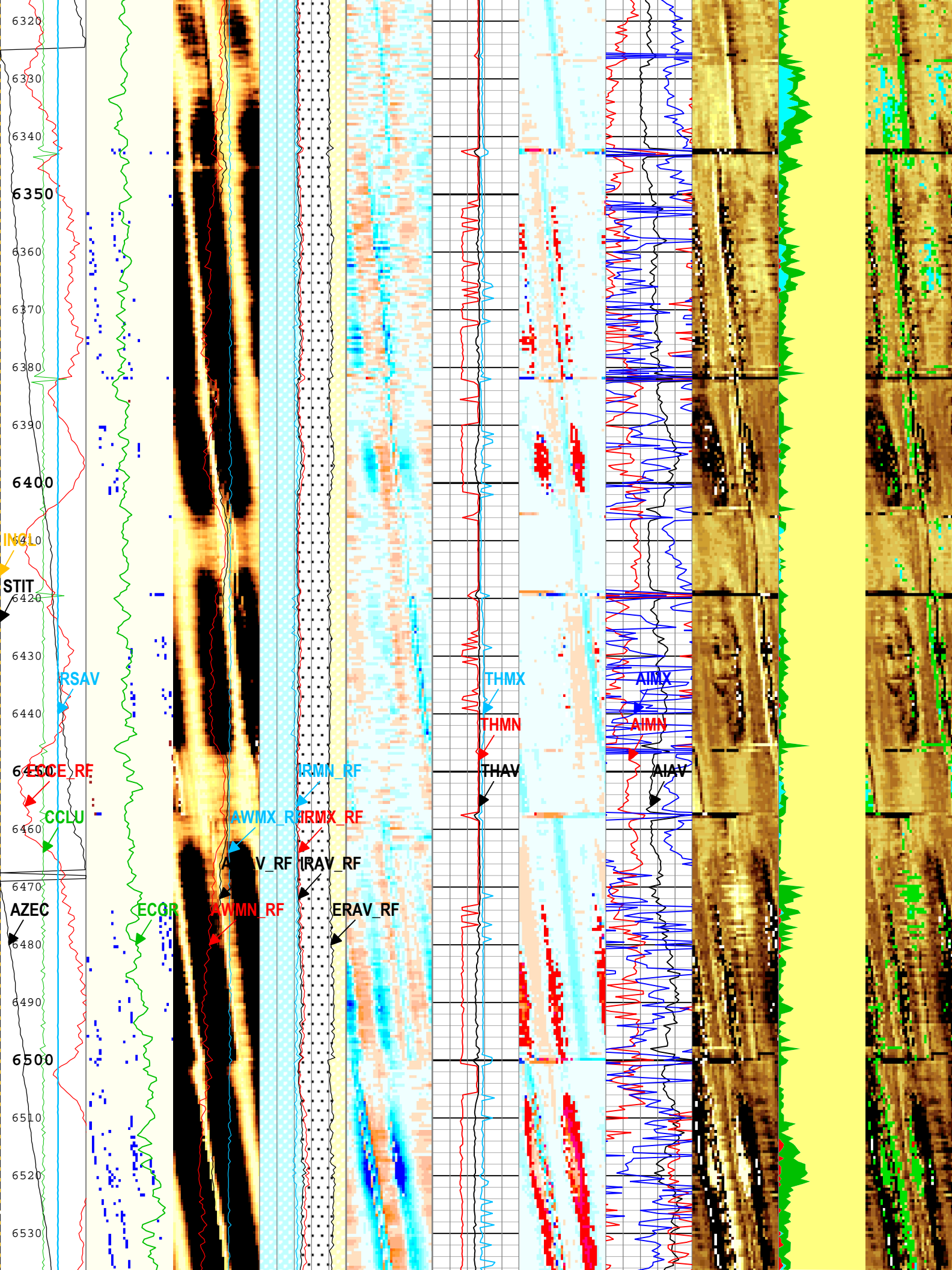


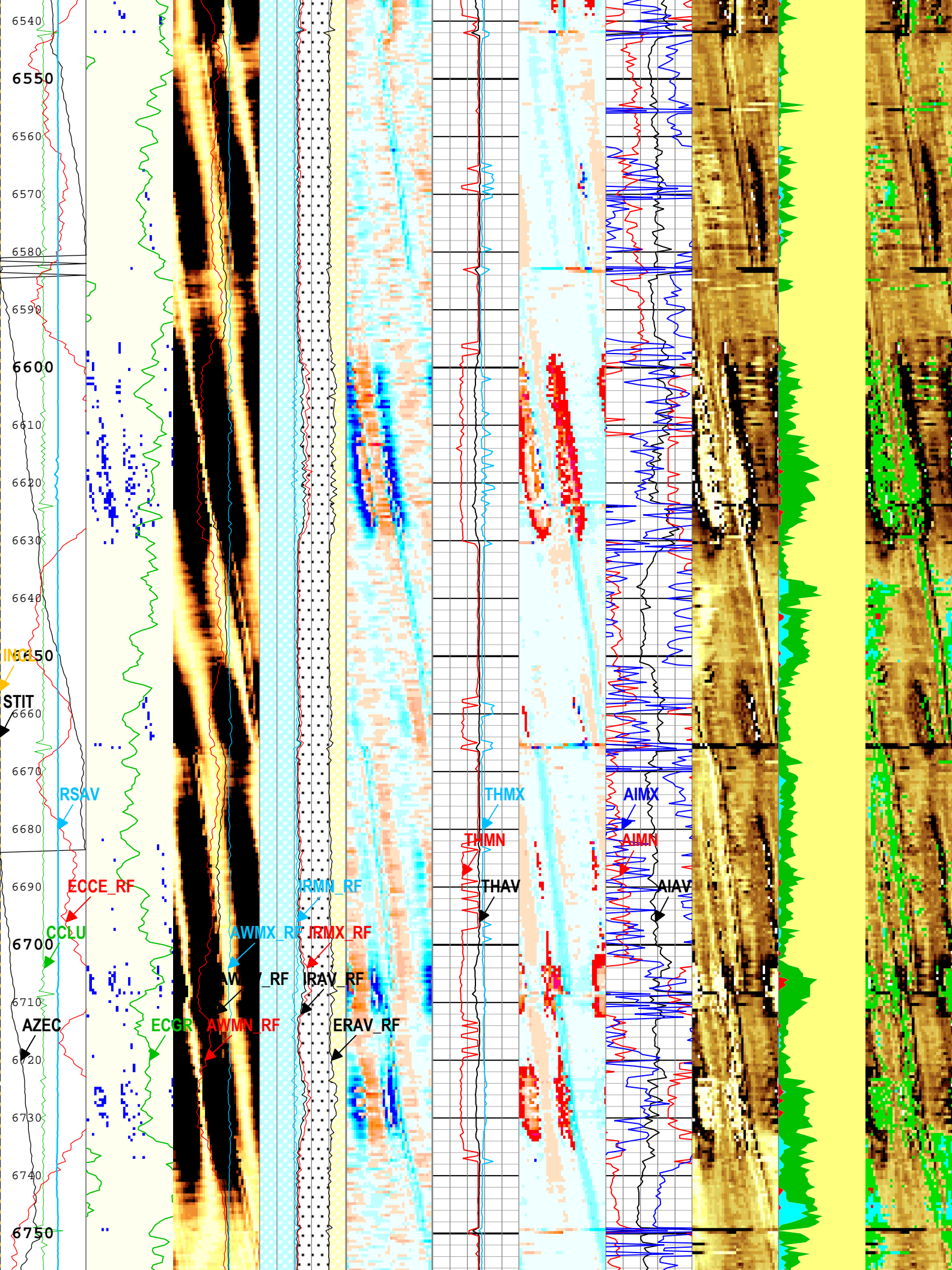


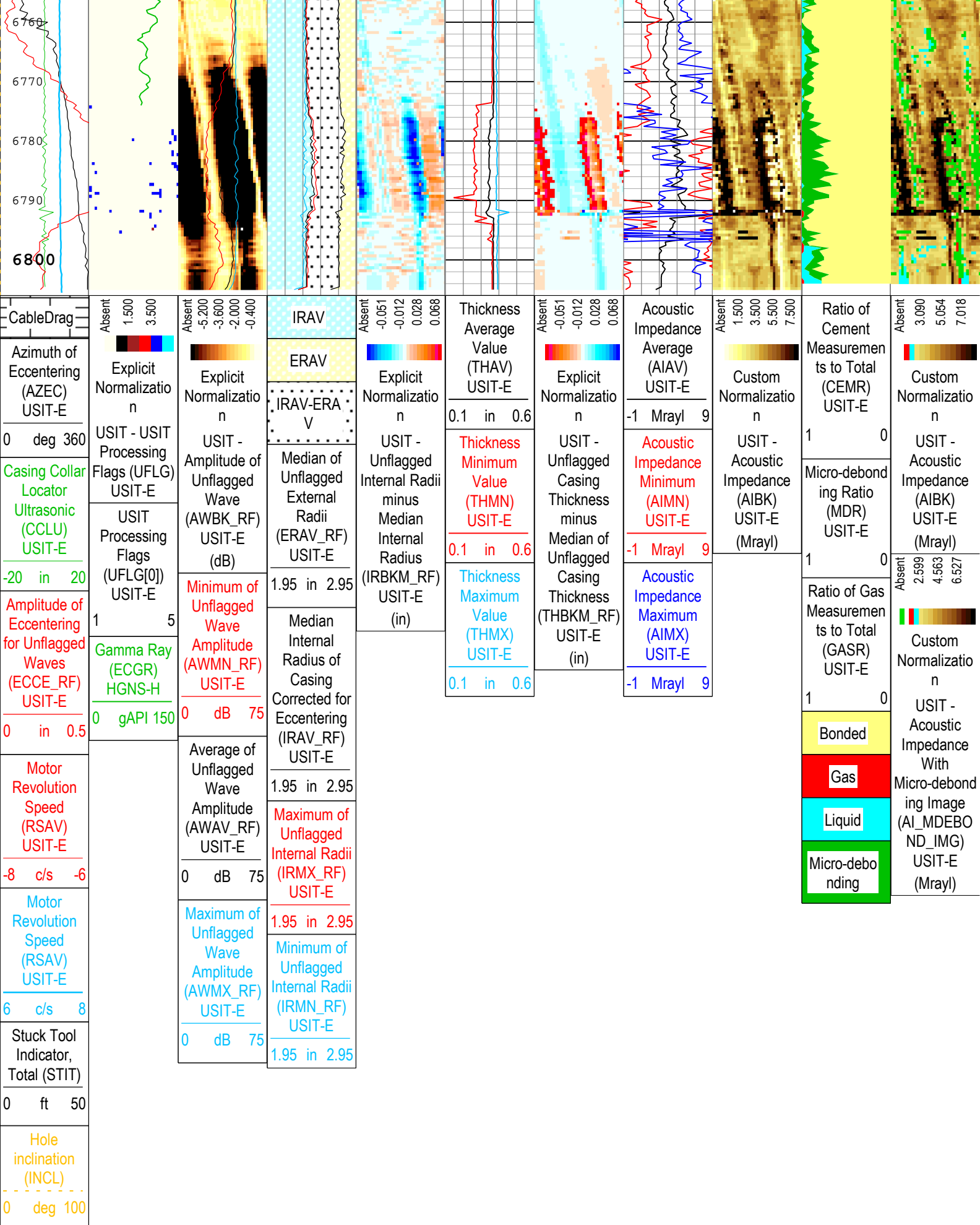












USIT Processing Flags (UFLG[0]) USIT-E

1 - UFLG 1 Value within [0.0 - 1.5] - :

2 - UFLG 2 Value within [1.5 - 2.5] - :

■ UTIM Error

■ Pulse Origin Not Detected

TIME_1900 - Time Marked every 60.00 (s)

Description: USI Composite Format: USI Composite Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 22-Apr-2016 16:26:51

Channel Processing Parameters				
ONE: Parameters				
Parameter	Description	Tool	Value	Unit
ISSBAR	Barite Mud Presence Flag	Borehole	No	
BERJ	Bad Echo Rejection	USIT-E	On	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	WLSESSION	Depth Zoned	in
CASING_PRATIO	Casing Poisson Ratio	USIT-E	Standard Poisson Ratio	
CBLO	Casing Bottom (Logger)	WLSESSION	11909	ft
CDEN	Cement Density	HGNS-H	16.69	lbm/gal
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Regular Cement	
THNO	Nominal Casing Thickness - Zoned along logger depths	WLSESSION	0.361	in
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
ETIP	Elevation of the TIP above MSL	WLSESSION	4780	ft
FDII	FPM Data Interpolation Interval	USIT-E	0	ft
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	BS	
GR_MULTIPLIER	Gamma Ray Multiplier	HGNS-H	1	
HEMA	Hematite Presence Flag	Borehole	No	
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	1.17	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1	
OPLEV	USIT Remove Flagged Data Level	USIT-E	OPT2	
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
SDNV	Number of Vertical Samples used for Micro-debonding Computation	USIT-E	5	
SDTHOR	Acoustic Impedance STD Horizontal Threshold for Micro-debonding	USIT-E	0.5	Mrayl
SDTVER	Acoustic Impedance STD Vertical Threshold for Micro-debonding	USIT-E	0.3	Mrayl
SOCN	Standoff Distance	HGNS-H	0.125	in
SOCO	Standoff Correction Option	HGNS-H	No	
TCUB	T^3 Processing Level	USIT-E	Loop	
THDH	Maximum Search Thickness (percentage of nominal)	USIT-E	130	%
THDL	Minimum Search Thickness (percentage of nominal)	USIT-E	70	%
HISC	Tool Position: Centered or Eccentered	HGNS-H	Eccentered	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.8	Mrayl
UFGDE	Fiberglass Density	USIT-E	16.27	lbm/gal
UEGPS	Fiberglass Processing Selection	USIT-E	No	

UFGVL	Fiberglass Velocity	USIT-E	9678.48	ft/s
USI_FSOD	USIT USI Fluid Slowness Fits Casing Outer Diameter	USIT-E	0_OFF	
USI_FVEL_SEL	USI Fluid Velocity Selection	USIT-E	Automatic	
USI_ZMUD_SEL	USI Mud Impedance Selection	USIT-E	FreePipe Norm.	
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	1.48	Mrayl
ZTCM	Acoustic Impedance Threshold for Cement	USIT-E	2.6	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

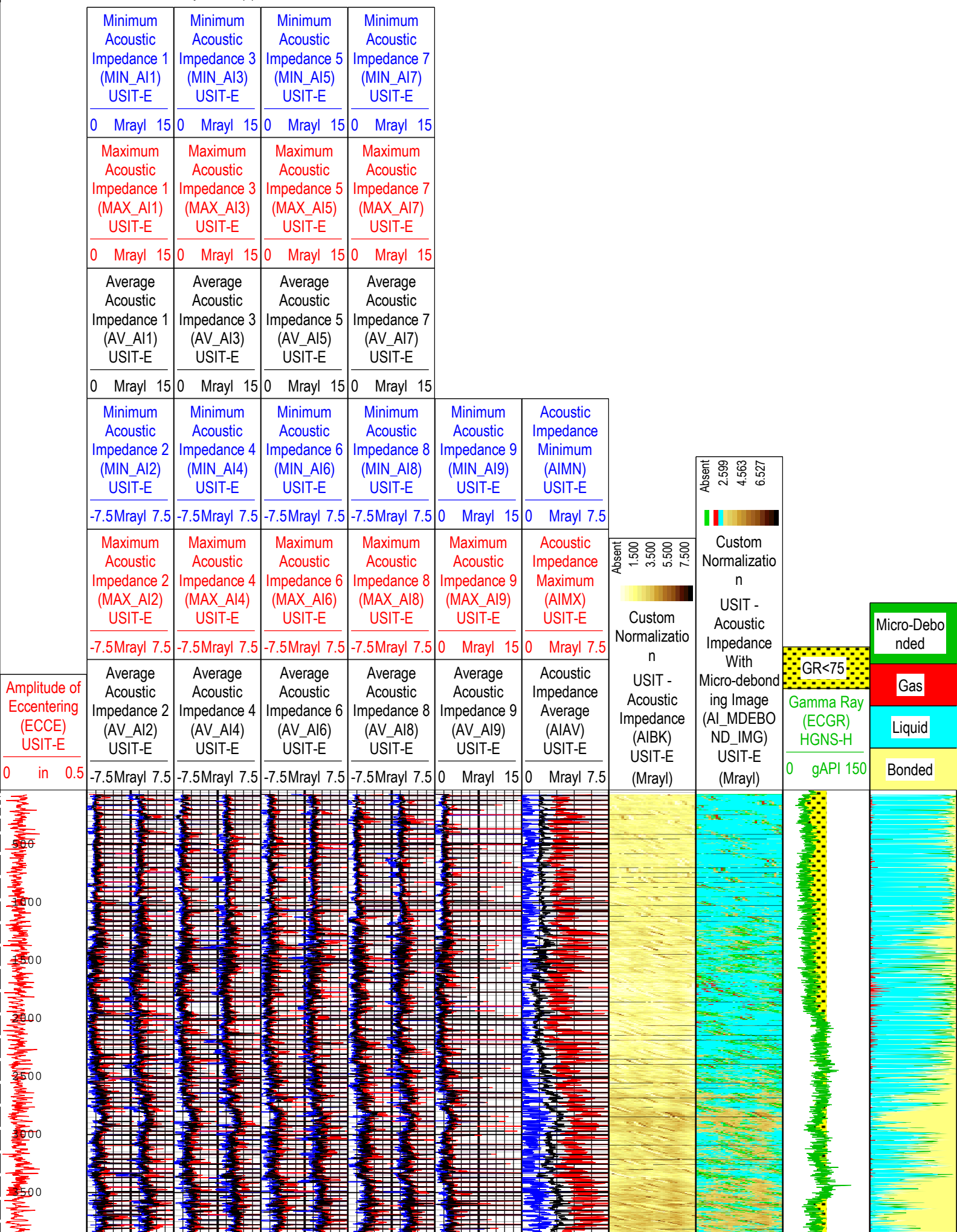
Depth Zone Parameters				
Parameter	Value	Start (ft)	Stop (ft)	
BS	26	34.5	104	
BS	13.5	104	1952	
BS	8.5	1952	6806	
All depth are actual.				

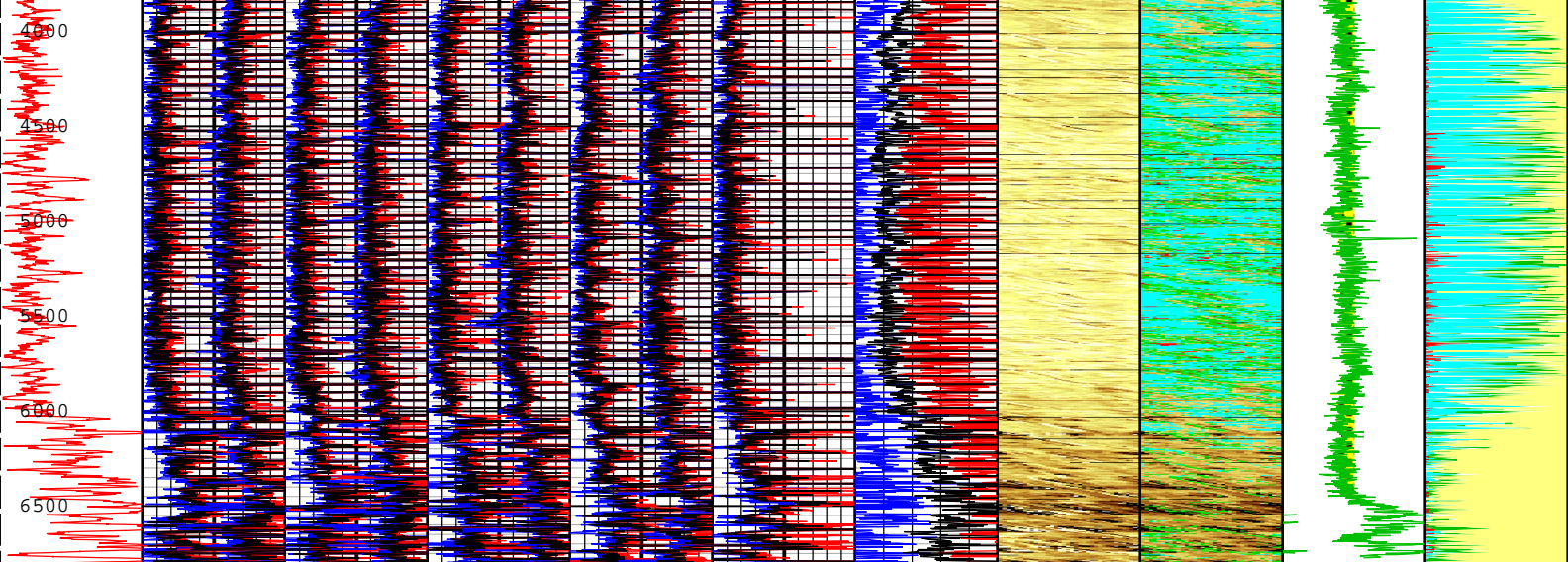
Tool Control Parameters				
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ONE: Parameters				
Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-E	-12	dB
AGMX	Maximum Gain of Cartridge	USIT-E	36	dB
U-USIT_DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
DOT(DOS)	Distance between Opposite Transducer Faces	USIT-E	1.756	in
EMXV	EMEX Voltage	USIT-E	50	V
HRES	Horizontal Resolution	USIT-E	10 deg	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/h
MOTOR_PROTECT	Motor Protection	USIT-E	On	
TMUC	Type of Mud	USIT-E	BRI	
UACLV_PERM	Ultrasonic ACLV Permanent	USIT-E	No	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UMFR	Modulation Frequency	USIT-E	333333	Hz
USFR	Ultrasonic Sampling Frequency	USIT-E	500000	Hz
UPAT	USIT Emission Pattern	USIT-E	Pattern 375 KHz	
UWKM	USIT Working Mode	USIT-E	Uncompressed 10 deg at 6.0 in LF	
USIT_DEPTHLOG	Starting Depth Log for Ultrasonics	USIT-E	6800	ft
USSP	Ultrasonic Service	USIT-E	USI	
VRES	Vertical Resolution	USIT-E	6.0 in	
WINB	Window Begin Time	USIT-E	22.07	us
WINE	Window End Time	USIT-E	87.53	us

USI Goodwin				
ONE				
USI Goodwin Compressed				
Log	<div> <div>Company:Noble Energy, Inc.</div> <div>Well:Wells Ranch AA22-645</div> </div> <div>ONE: Log[3]:Up:S004</div>			

Description: USI Goodwin
 Format: USI Goodwin
 Index Scale: 0.1 in per 100 ft
 Index Unit: ft
 Index Type: Measured Depth
 Creation Date: 22-Apr-2016





Amplitude of Eccentering (ECCE) USIT-E	Minimum Acoustic Impedance 1 (MIN_AI1) USIT-E	Minimum Acoustic Impedance 3 (MIN_AI3) USIT-E	Minimum Acoustic Impedance 5 (MIN_AI5) USIT-E	Minimum Acoustic Impedance 7 (MIN_AI7) USIT-E	Minimum Acoustic Impedance 9 (MIN_AI9) USIT-E	Acoustic Impedance Minimum (AIMN) USIT-E	Custom Normalization	Custom Normalization	GR<75	Micro-Debonded
0 in 0.5	0 Mrayl 15	0 Mrayl 15	0 Mrayl 15	0 Mrayl 15	0 Mrayl 15	0 Mrayl 7.5	Absent 1.500 3.500 5.500 7.500	Absent 2.599 4.563 6.527	Gamma Ray (ECGR) HGNS-H	Gas
	Maximum Acoustic Impedance 1 (MAX_AI1) USIT-E	Maximum Acoustic Impedance 3 (MAX_AI3) USIT-E	Maximum Acoustic Impedance 5 (MAX_AI5) USIT-E	Maximum Acoustic Impedance 7 (MAX_AI7) USIT-E	Maximum Acoustic Impedance 9 (MAX_AI9) USIT-E	Acoustic Impedance Maximum (AIMX) USIT-E	USIT - Acoustic Impedance (AIBK) USIT-E (Mrayl)	USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E (Mrayl)	0 gAPI 150	Liquid
	0 Mrayl 15	0 Mrayl 15	0 Mrayl 15	0 Mrayl 15	0 Mrayl 15	0 Mrayl 7.5				Bonded
	Average Acoustic Impedance 1 (AV_AI1) USIT-E	Average Acoustic Impedance 3 (AV_AI3) USIT-E	Average Acoustic Impedance 5 (AV_AI5) USIT-E	Average Acoustic Impedance 7 (AV_AI7) USIT-E	Average Acoustic Impedance 9 (AV_AI9) USIT-E	Acoustic Impedance Average (AIAV) USIT-E				
	0 Mrayl 15	0 Mrayl 15	0 Mrayl 15	0 Mrayl 15	0 Mrayl 15	0 Mrayl 7.5				
	Minimum Acoustic Impedance 2 (MIN_AI2) USIT-E	Minimum Acoustic Impedance 4 (MIN_AI4) USIT-E	Minimum Acoustic Impedance 6 (MIN_AI6) USIT-E	Minimum Acoustic Impedance 8 (MIN_AI8) USIT-E						
	-7.5Mrayl 7.5	-7.5Mrayl 7.5	-7.5Mrayl 7.5	-7.5Mrayl 7.5						
	Maximum Acoustic Impedance 2 (MAX_AI2) USIT-E	Maximum Acoustic Impedance 4 (MAX_AI4) USIT-E	Maximum Acoustic Impedance 6 (MAX_AI6) USIT-E	Maximum Acoustic Impedance 8 (MAX_AI8) USIT-E						
	-7.5Mrayl 7.5	-7.5Mrayl 7.5	-7.5Mrayl 7.5	-7.5Mrayl 7.5						
	Average Acoustic Impedance 2 (AV_AI2) USIT-E	Average Acoustic Impedance 4 (AV_AI4) USIT-E	Average Acoustic Impedance 6 (AV_AI6) USIT-E	Average Acoustic Impedance 8 (AV_AI8) USIT-E						
	-7.5Mrayl 7.5	-7.5Mrayl 7.5	-7.5Mrayl 7.5	-7.5Mrayl 7.5						






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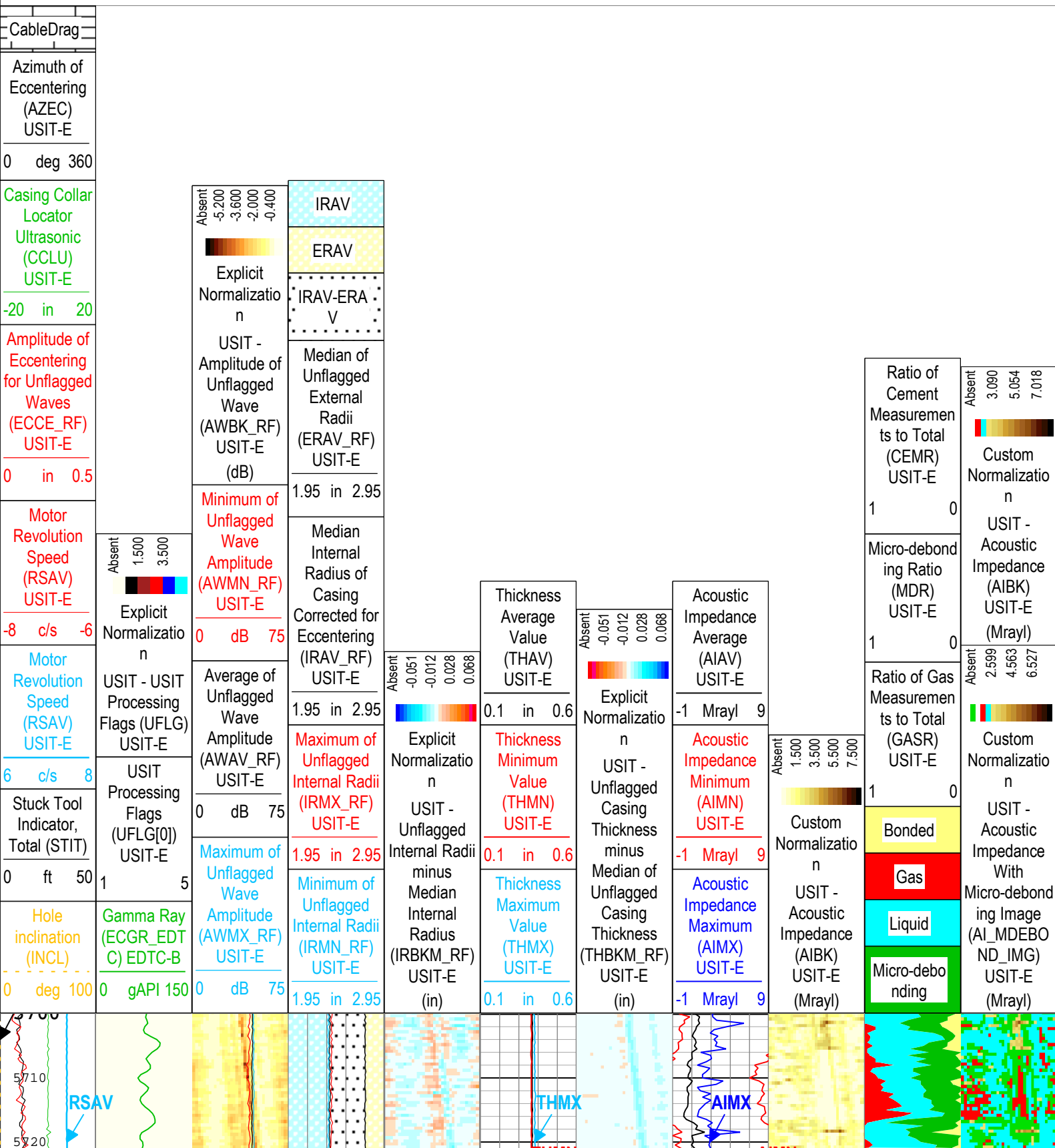
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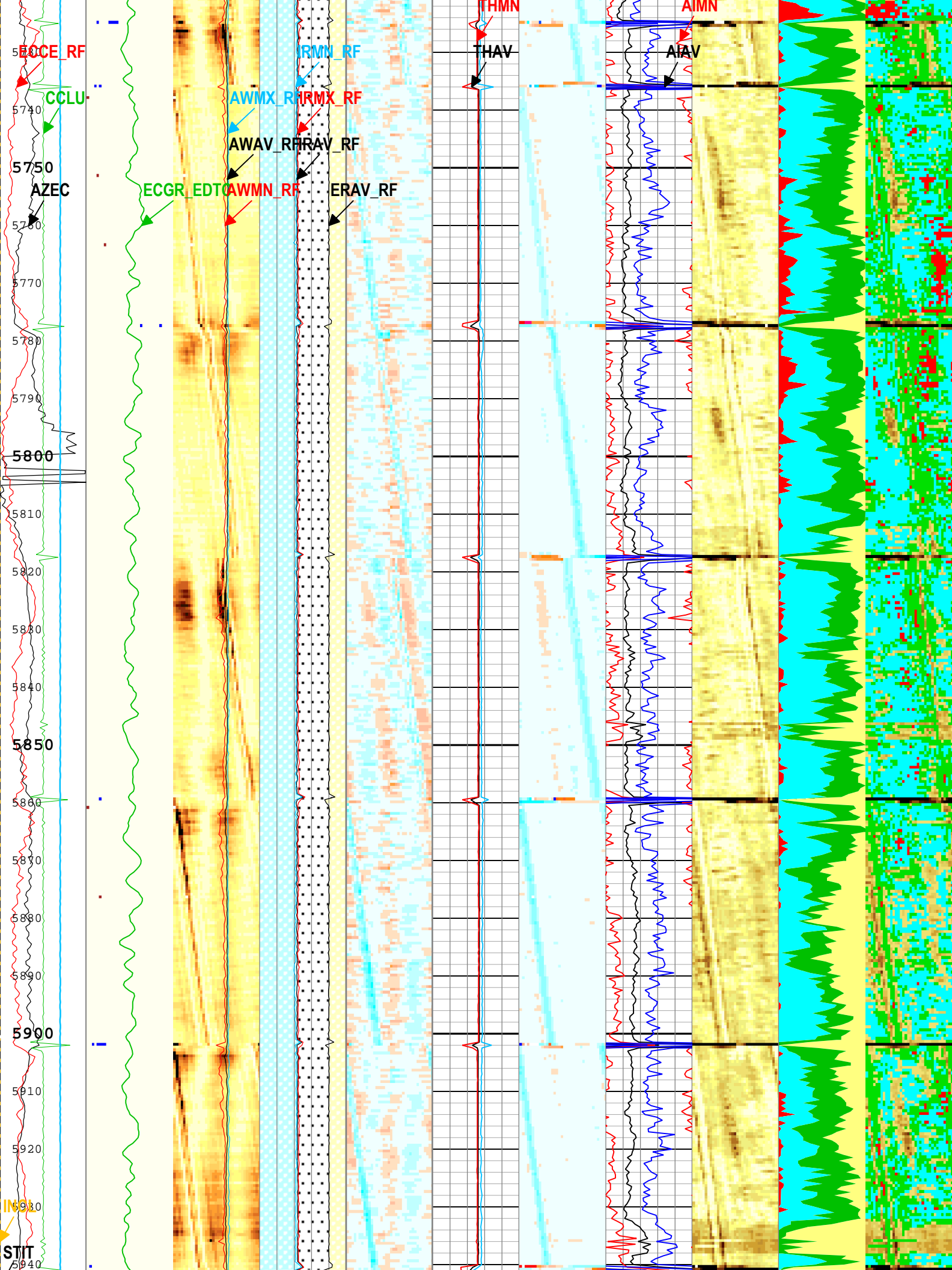
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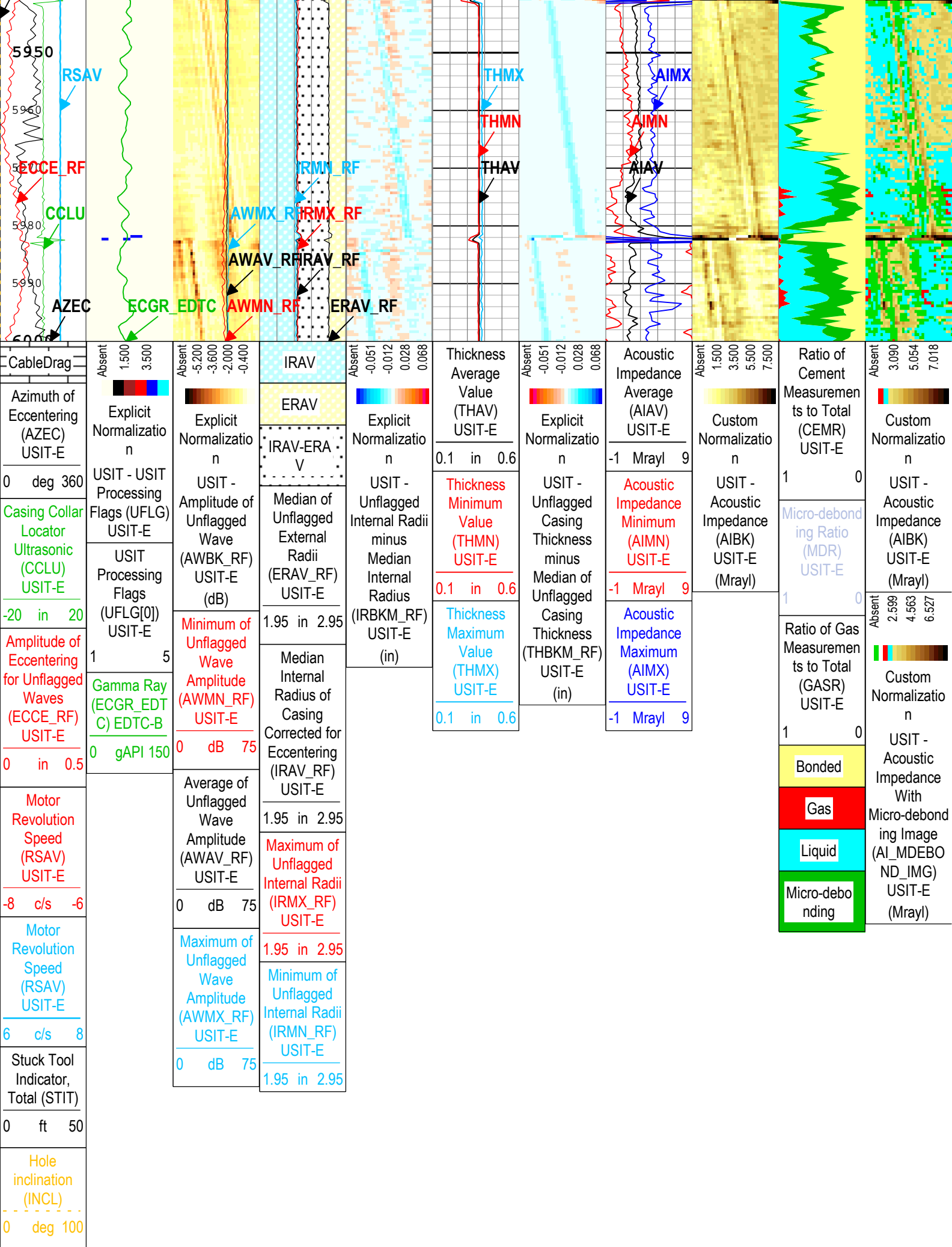
TIME_1900 - Time Marked every 60.00 (s)

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







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>				
4 - UFLG 4 UFLG 5 UFLG 6 Value within [3.5 - 6.5] - : <div>Casing Thickness Error</div>				
5 - UFLG 7 UFLG 8 UFLG 9 Value within [6.5 - 10] - : <div>Loop Processing Error</div>				
TIME_1900 - Time Marked every 60.00 (s)				
Description: USI Composite Format: USI Composite Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 22-Apr-2016 16:27:09				
Channel Processing Parameters				
ONE: Parameters				
Parameter	Description	Tool	Value	Unit
ISSBAR	Barite Mud Presence Flag	Borehole	No	
BERJ	Bad Echo Rejection	USIT-E	On	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	WLSESSION	8.5	in
CASING_PRATIO	Casing Poisson Ratio	USIT-E	Standard Poisson Ratio	
CBLO	Casing Bottom (Logger)	WLSESSION	11909	ft
CDEN	Cement Density	EDTC-B	16.69	lbm/gal
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Regular Cement	
THNO	Nominal Casing Thickness - Zoned along logger depths	WLSESSION	0.361	in
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
ETIP	Elevation of the TIP above MSL	WLSESSION	4780	ft
FDII	FPM Data Interpolation Interval	USIT-E	0	ft
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	BS	
GR_MULTIPLIER	Gamma Ray Multiplier	EDTC-B	1	
HEMA	Hematite Presence Flag	Borehole	No	
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	1.17	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1	
OPLEV	USIT Remove Flagged Data Level	USIT-E	OPT2	
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
SDNV	Number of Vertical Samples used for Micro-debonding Computation	USIT-E	5	
SDTHOR	Acoustic Impedance STD Horizontal Threshold for Micro-debonding	USIT-E	0.5	Mrayl
SDTVER	Acoustic Impedance STD Vertical Threshold for Micro-debonding	USIT-E	0.3	Mrayl
SOCN	Standoff Distance	EDTC-B	0.125	in
SOCO	Standoff Correction Option	EDTC-B	No	
TCUB	T^3 Processing Level	USIT-E	Loop	
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	
USIT_DEPTH	Drilling Fluids: USIT Acoustic Data	USIT-E	1.0	Mrayl

U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.8	Mrayl
UFGDE	Fiberglass Density	USIT-E	16.27	lbm/gal
UFGPS	Fiberglass Processing Selection	USIT-E	No	
UFGVL	Fiberglass Velocity	USIT-E	9678.48	ft/s
USI_FSOD	USIT USI Fluid Slowness Fits Casing Outer Diameter	USIT-E	0_OFF	
USI_FVEL_SEL	USI Fluid Velocity Selection	USIT-E	Automatic	
USI_ZMUD_SEL	USI Mud Impedance Selection	USIT-E	FreePipe Norm.	
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	1.48	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

ONE: Parameters

Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-E	-12	dB
AGMX	Maximum Gain of Cartridge	USIT-E	36	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	50	V
HRES	Horizontal Resolution	USIT-E	10 deg	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/h
MOTOR_PROTECT	Motor Protection	USIT-E	On	
TMUC	Type of Mud	USIT-E	BRI	
UACLV_PERM	Ultrasonic ACLV Permanent	USIT-E	No	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UMFR	Modulation Frequency	USIT-E	333333	Hz
USFR	Ultrasonic Sampling Frequency	USIT-E	500000	Hz
UPAT	USIT Emission Pattern	USIT-E	Pattern 375 KHz	
UWKM	USIT Working Mode	USIT-E	Uncompressed 10 deg at 6.0 in LF	
USIT_DEPTHLOG	Starting Depth Log for Ultrasonics	USIT-E	6800	ft
USSP	Ultrasonic Service	USIT-E	USI	
VRES	Vertical Resolution	USIT-E	6.0 in	
WINB	Window Begin Time	USIT-E	Time Zoned	us
WINE	Window End Time	USIT-E	Time Zoned	us

Time Zone Parameters

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
WINB	31.88	22-Apr-2016 12:29:03	22-Apr-2016 12:29:33	6804.29	6769
WINB	22.07	22-Apr-2016 12:29:33	22-Apr-2016 12:35:02	6769	5695.72
WINE	71.88	22-Apr-2016 12:29:03	22-Apr-2016 12:29:32	6804.29	6773.24
WINE	87.53	22-Apr-2016 12:29:32	22-Apr-2016 12:35:02	6773.24	5695.72

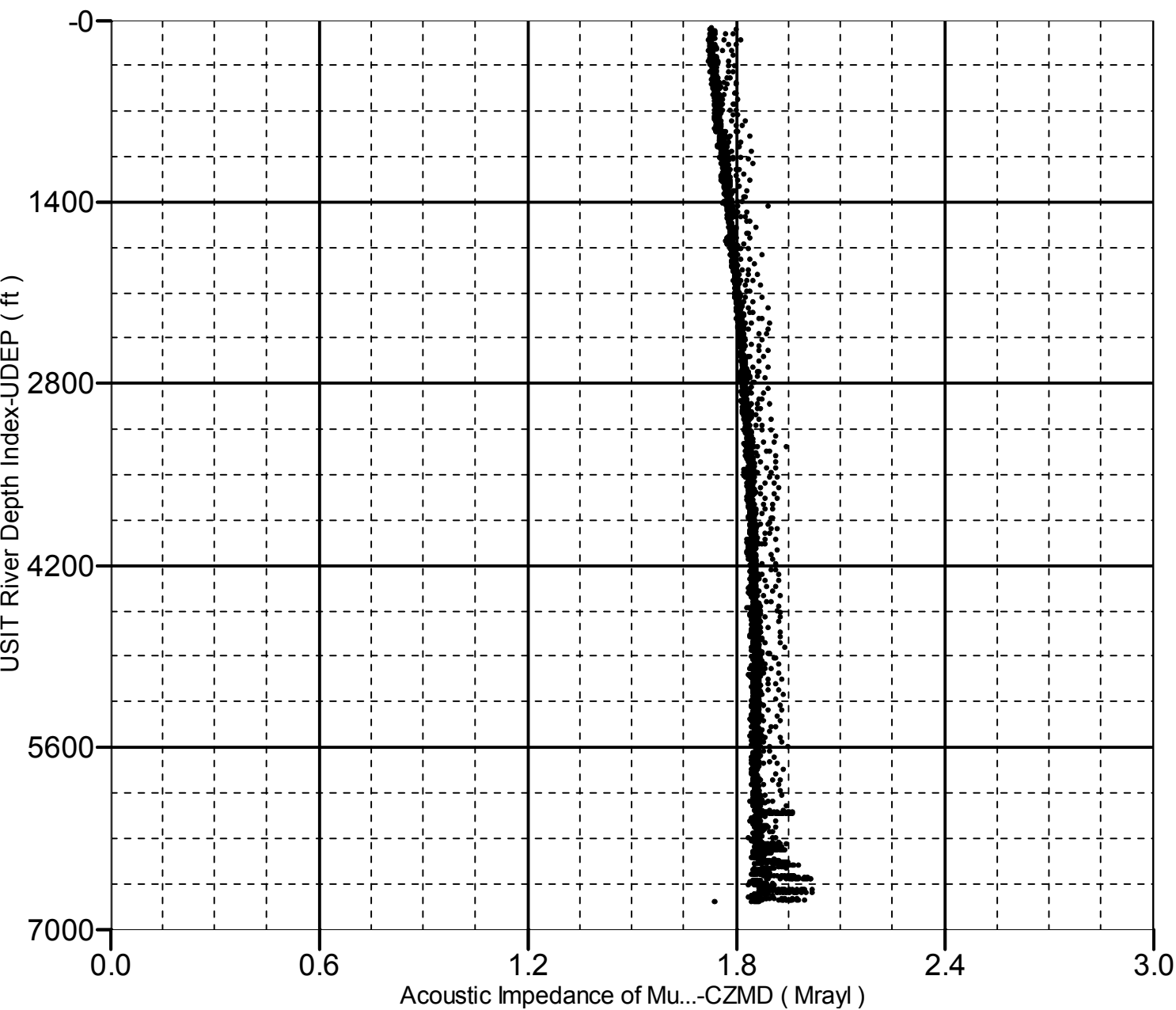
All depth are at tool zero.

Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6805.50 to 66.00 ft

● CZMD-UDEP



XYZ

Company:Noble Energy, Inc. Well:Wells Ranch AA22-645

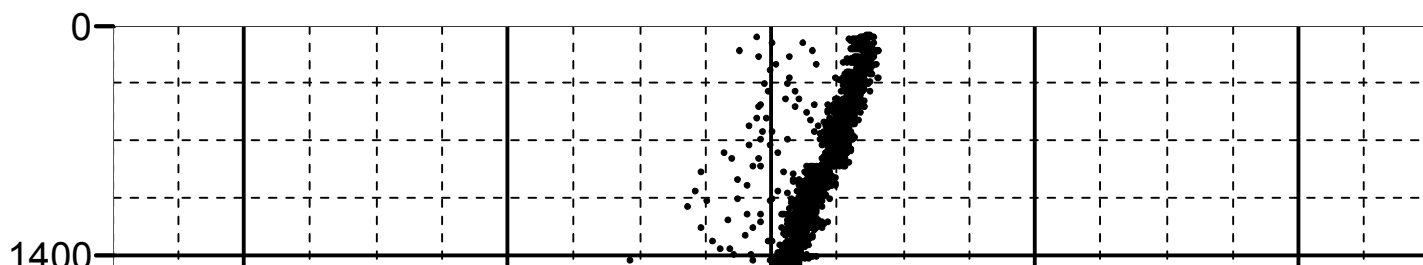
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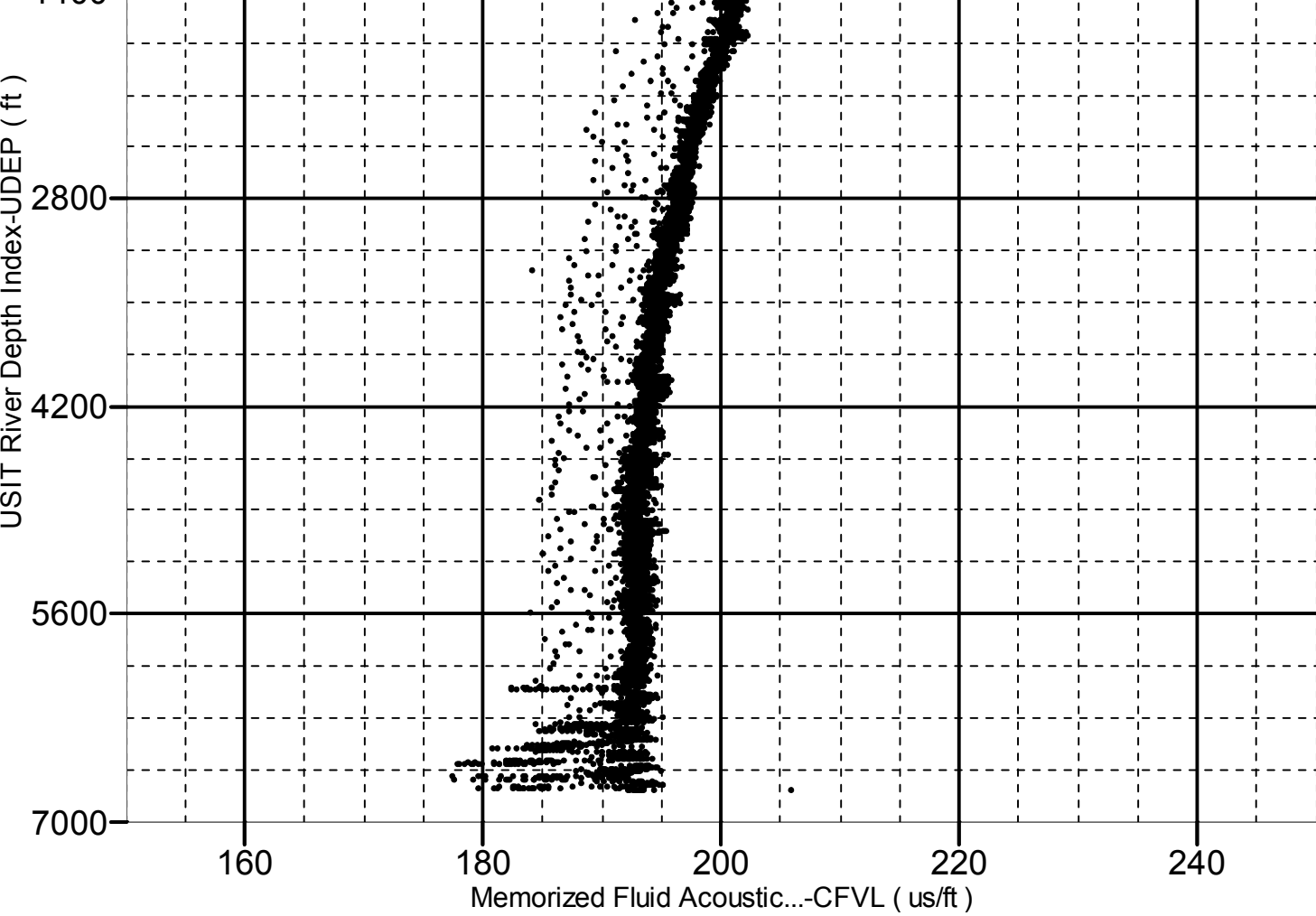
Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 6805.50 to 66.00 ft

● CFVL-UDEP





Company:	Noble Energy, Inc.	Schlumberger
Well:	Wells Ranch AA22-645	
Field:	Wattenberg	
County:	Weld	
State:	Colorado	
Ultrasonic Imager		
Cement Evaluation		
Gamma Ray - CCL		