



Weatherford[®]

CEMENT BOND LOG

COMPANY

VANGUARD OPERATING LLC.

WELL

CSF 41C-4-791

FIELD

MAMM CREEK

PROVINCE/COUNTY

GARFIELD

COUNTRY/STATE

U.S.A./COLORADO

LOCATION

SEC 33 TWP 6S RGE 91W

Other Services
RAPTOR N-VISION

Latitude

Longitude

API Number 05-045-23493

Permanent Datum :Ground Level, Elevation 6540.4 feet

Log Measured From KB, 17.00 feet above Permanent Datum

Drilling Measured From KB

Elevations:
KB 6557.40
DF
GL 6540.40

Date 26-FEB-2018

PERFORATION RECORD

Run Number

ONE

Shot

Number

Depth From

Depth To

Service Order

5839-206851741

Density

of Shots

feet

feet

Type Log

SBT

Depth Driller

8300.00

feet

Depth Logger

8270.00

feet

Top Log Interval

0.00

feet

Bottom Log Interval

8270.00

feet

Hole Fluid Type

WATER

Hole Fluid Level

100.00

feet

Restriction ID

3.875

inches

Gun Type

Max Recorded Temp

216.00

deg F

Gun Size

Well Head Pressure

0.00

CASING / TUBING RECORD

Well Head Equipment

N/A

Size

Weight

Depth From

Depth To

Time Well Ready

ROA

inches

pounds/ft

feet

feet

Time Logger Bottom

SEE LOG

8.625

32.00

0.00

874.00

Unit

14115/15108

4.500

11.60

0.00

8328.00

Equipment Name

WSS-E

Base

CASPER, WY

Recorded By

P. MAZUR/A. TAYLOR

Witnessed By

J. RANTS

CASING / TUBING RECORD

Type	Grade	TypeJoint	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
Surface	J-55	LTC	8.625	0.00	874.00	32.00
Production	P-110	LTC	4.500	0.00	8328.00	11.60

REMARKS

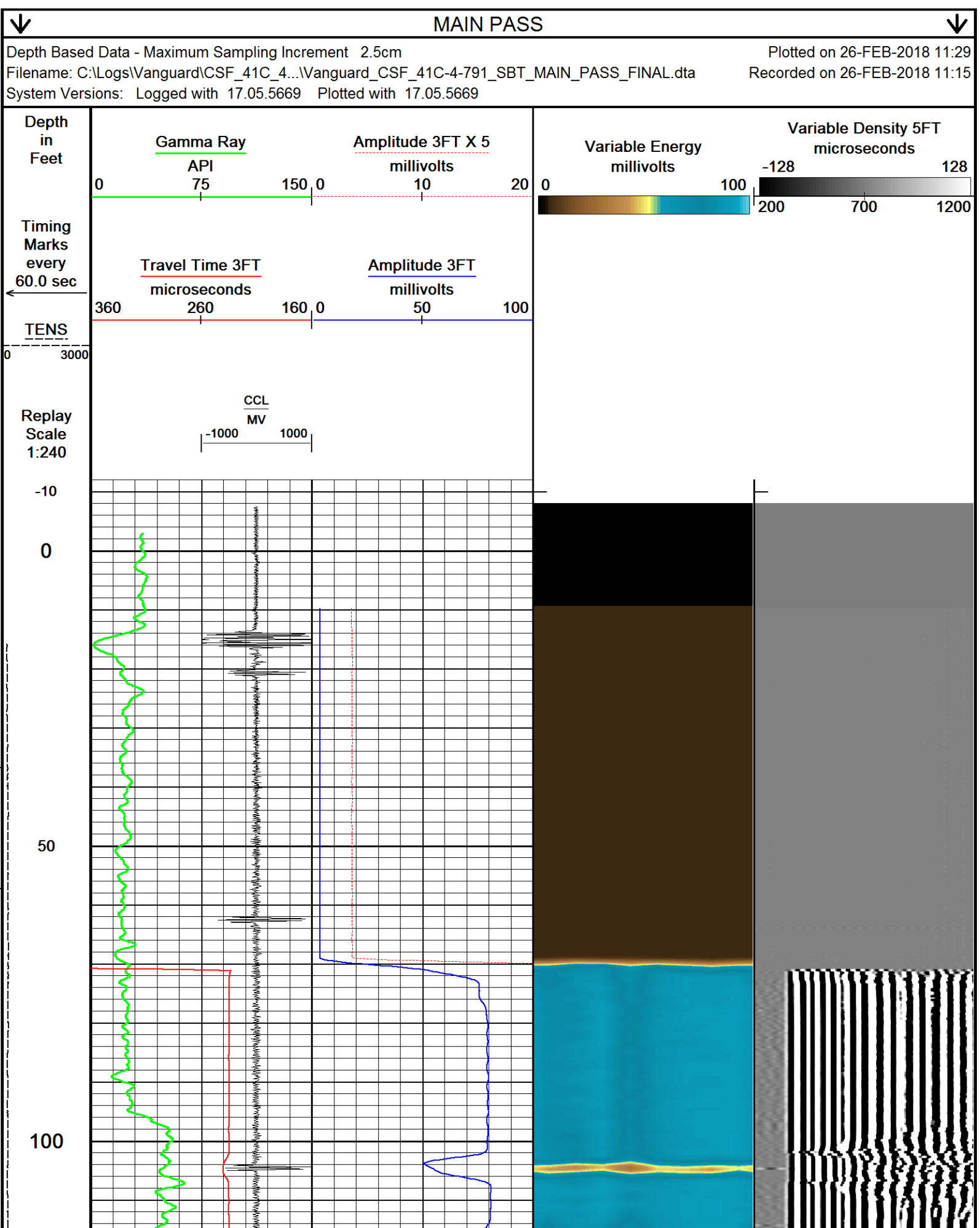
Logged with WLS v 17.05.6573 via WSS-E

Intervals logged and presented at clients request.

Depth correlated to marker joint at 5,796' from Temperature/CCL log (RMWS; 02-07-2018) supplied on site by client representative; -2' subtracted to correlate.

In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will give the Company the benefit of the Contractor's best judgment based on its experience and will perform all such Work in a good and workmanlike manner. Any interpretation of test or other data, and any recommendation or reservoir description based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and assumptions are not infallible, and with respect to which professional engineers and analysts may differ. ACCORDINGLY ANY INTERPRETATION OR RECOMMENDATION RESULTING FROM THE SERVICES WILL BE AT THE SOLE RISK OF THE COMPANY, AND THE CONTRACTOR CANNOT AND DOES NOT WARRANT THE ACCURACY, CORRECTNESS OR COMPLETENESS OF ANY SUCH INTERPRETATION OR RECOMMENDATION, WHICH INTERPRETATIONS AND RECOMMENDATIONS SHOULD NOT, THEREFORE, UNDER ANY CIRCUMSTANCES BE RELIED UPON AS THE SOLE OR MAIN BASIS FOR ANY DRILLING, COMPLETION, WELL TREATMENT, PRODUCTION OR FINANCIAL DECISION, OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY

CREATION, PRODUCTION OR FINANCIAL DECISION, OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY
DRILLING ACTIVITY, DRILLING RIG OR ITS CREW OR ANY OTHER INDIVIDUAL. THE COMPANY HAS FULL RESPONSIBILITY FOR ALL
DECISIONS CONCERNING THE SERVICES.

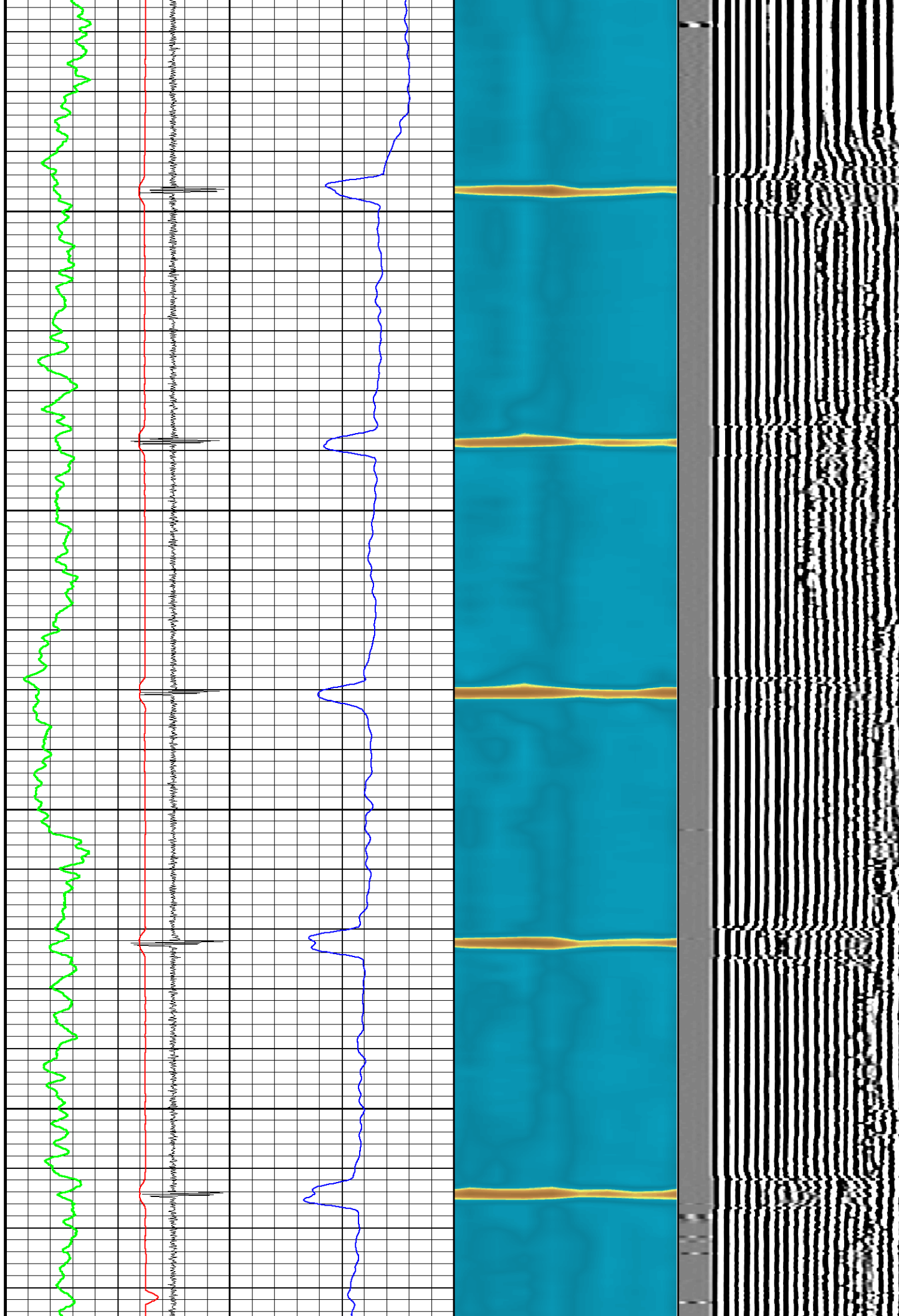


150

200

250

300



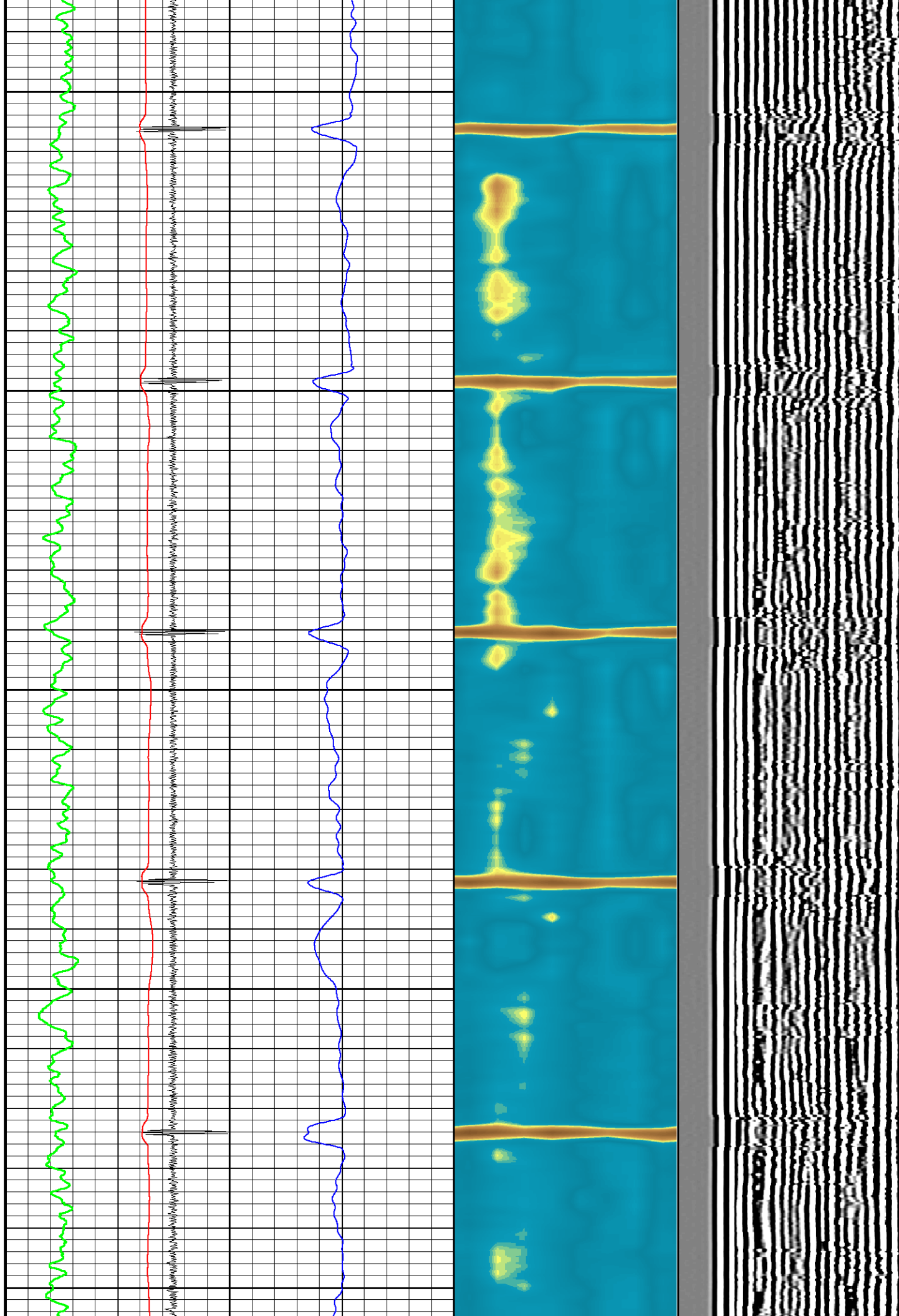
350

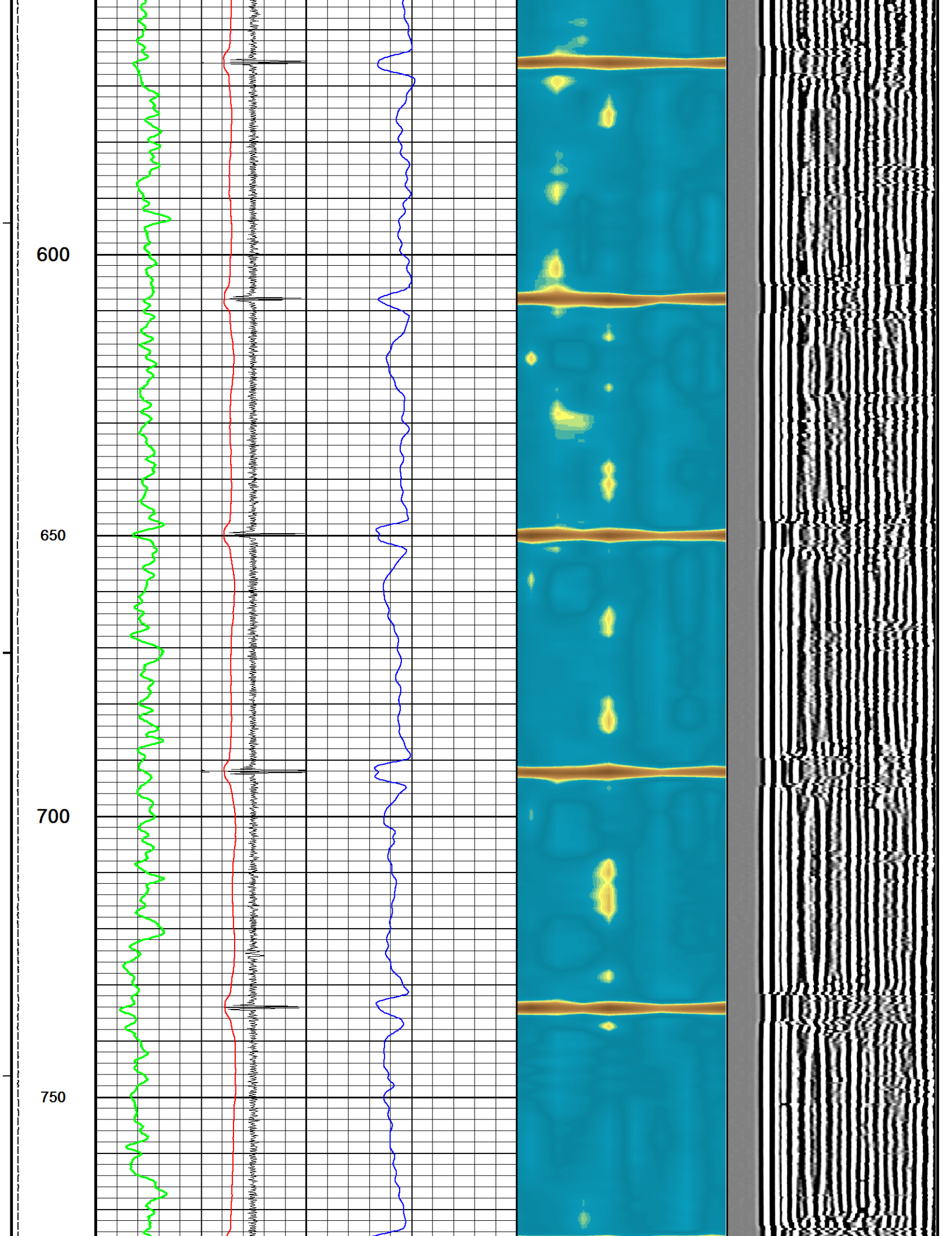
400

450

500

550



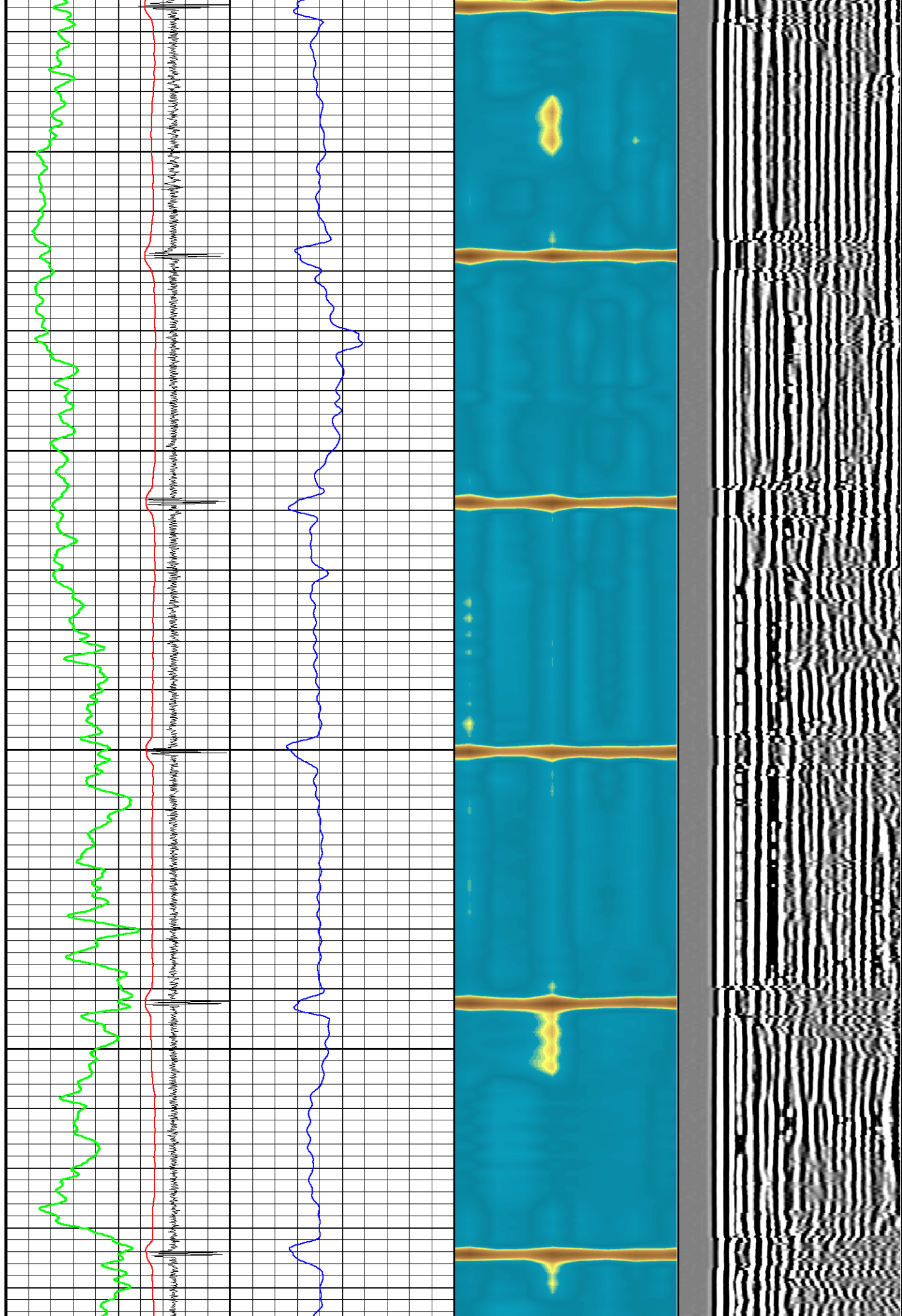


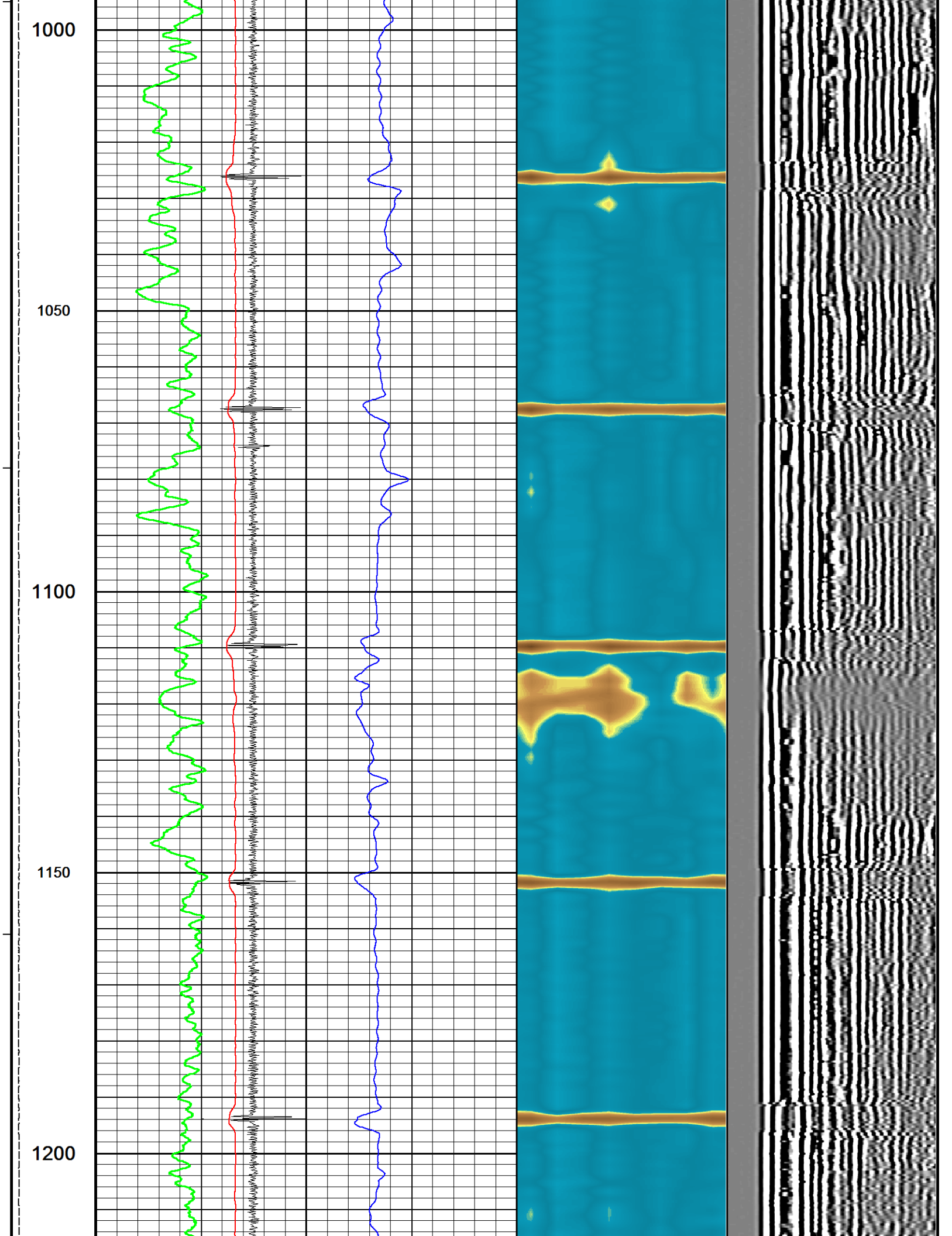
800

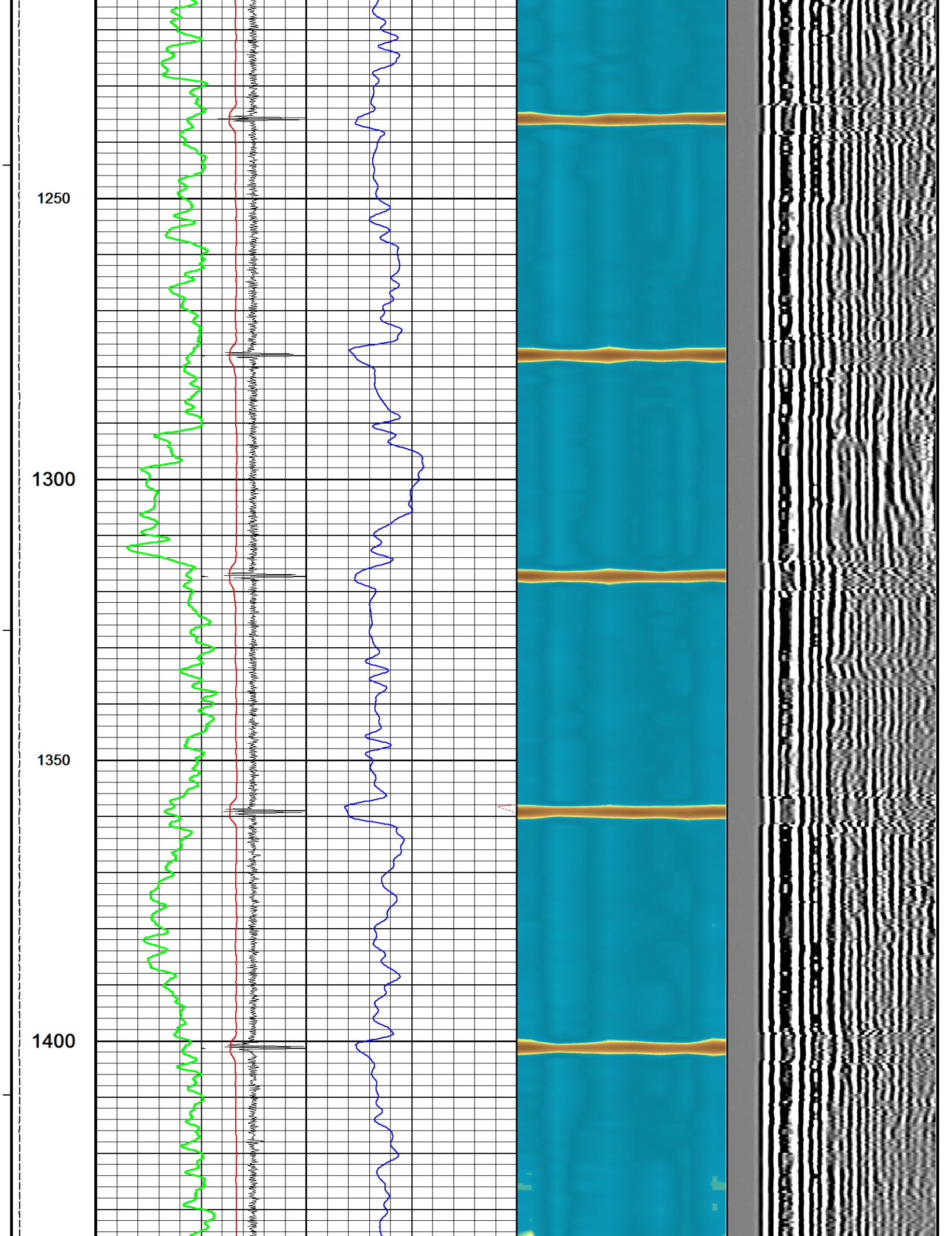
850

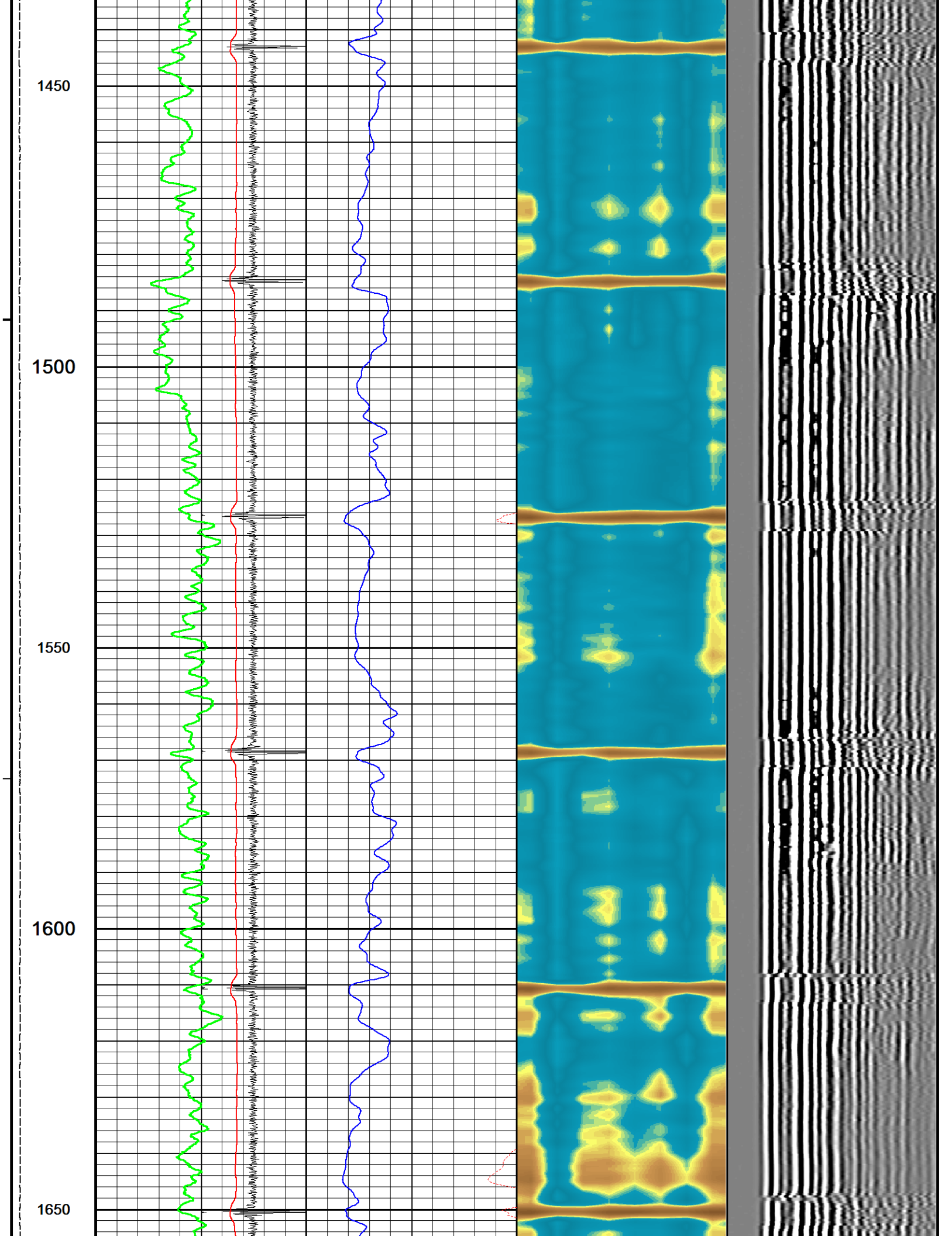
900

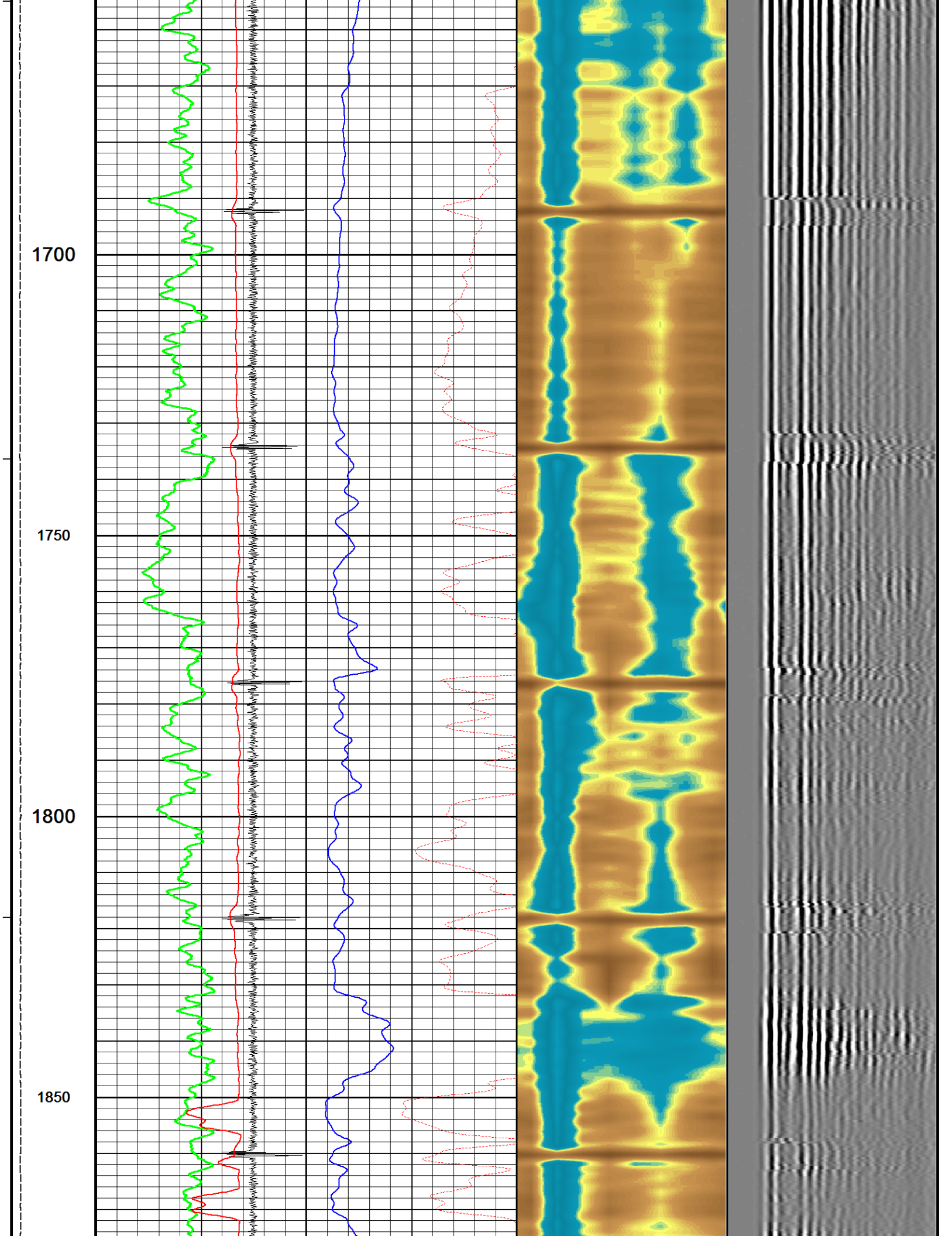
950

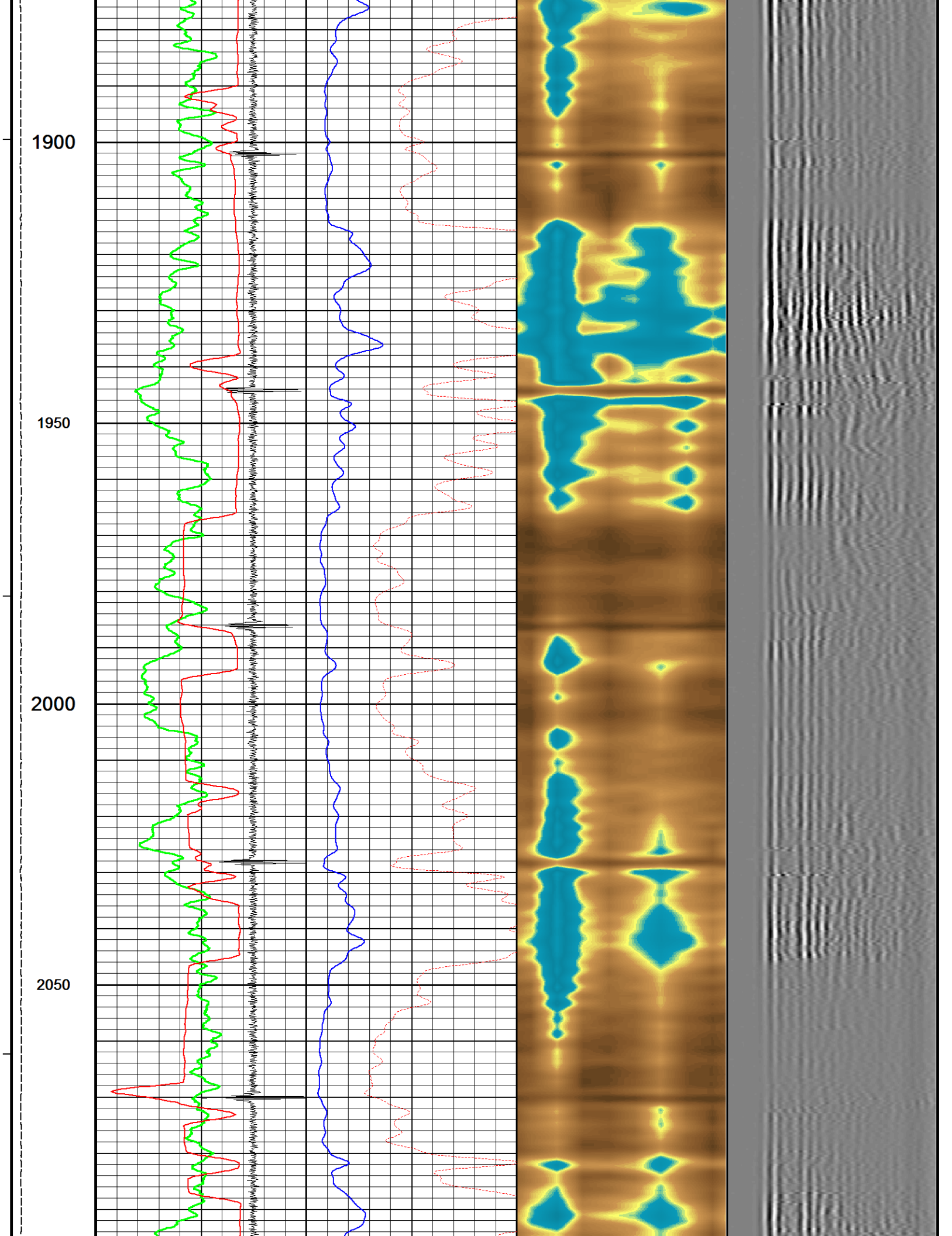


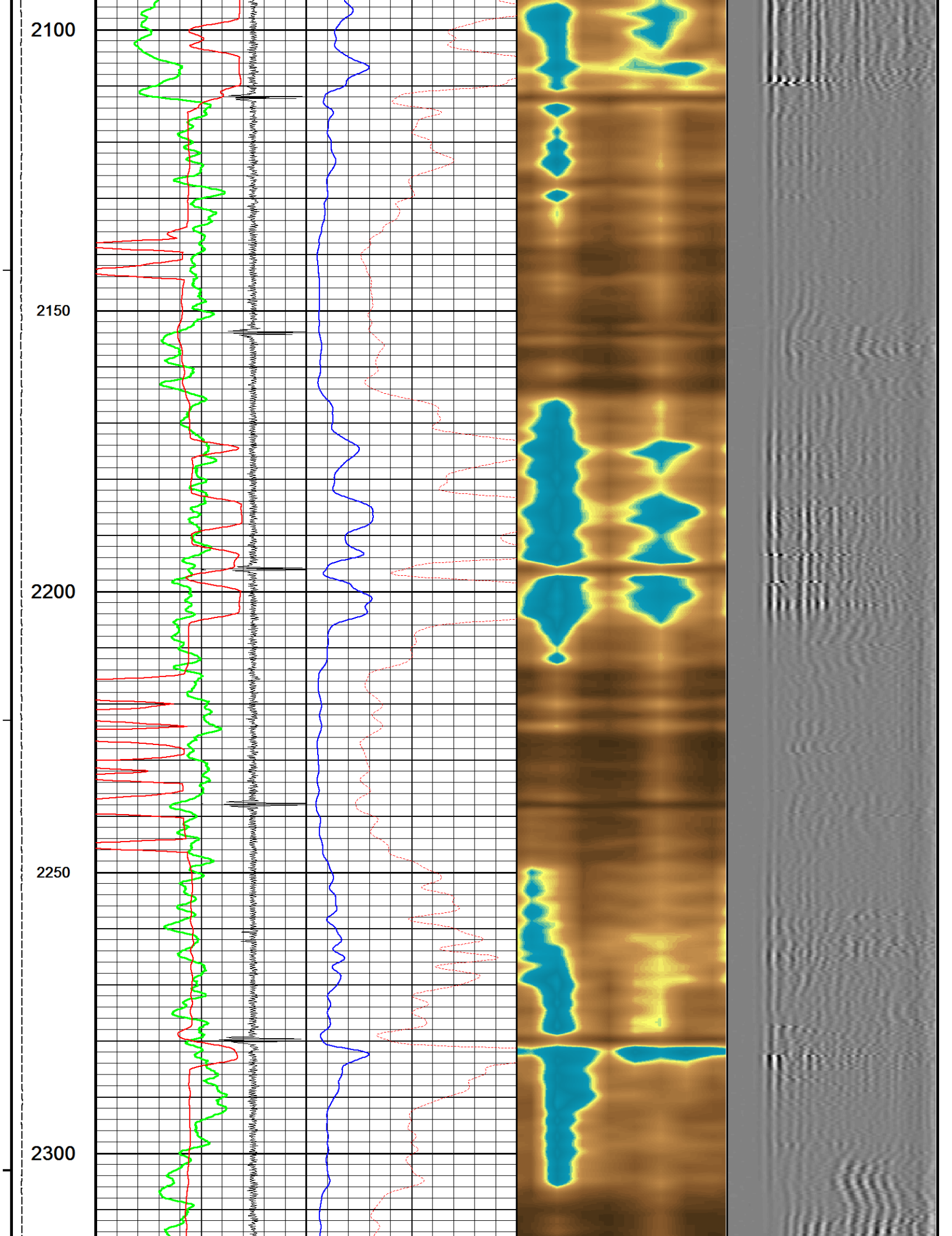


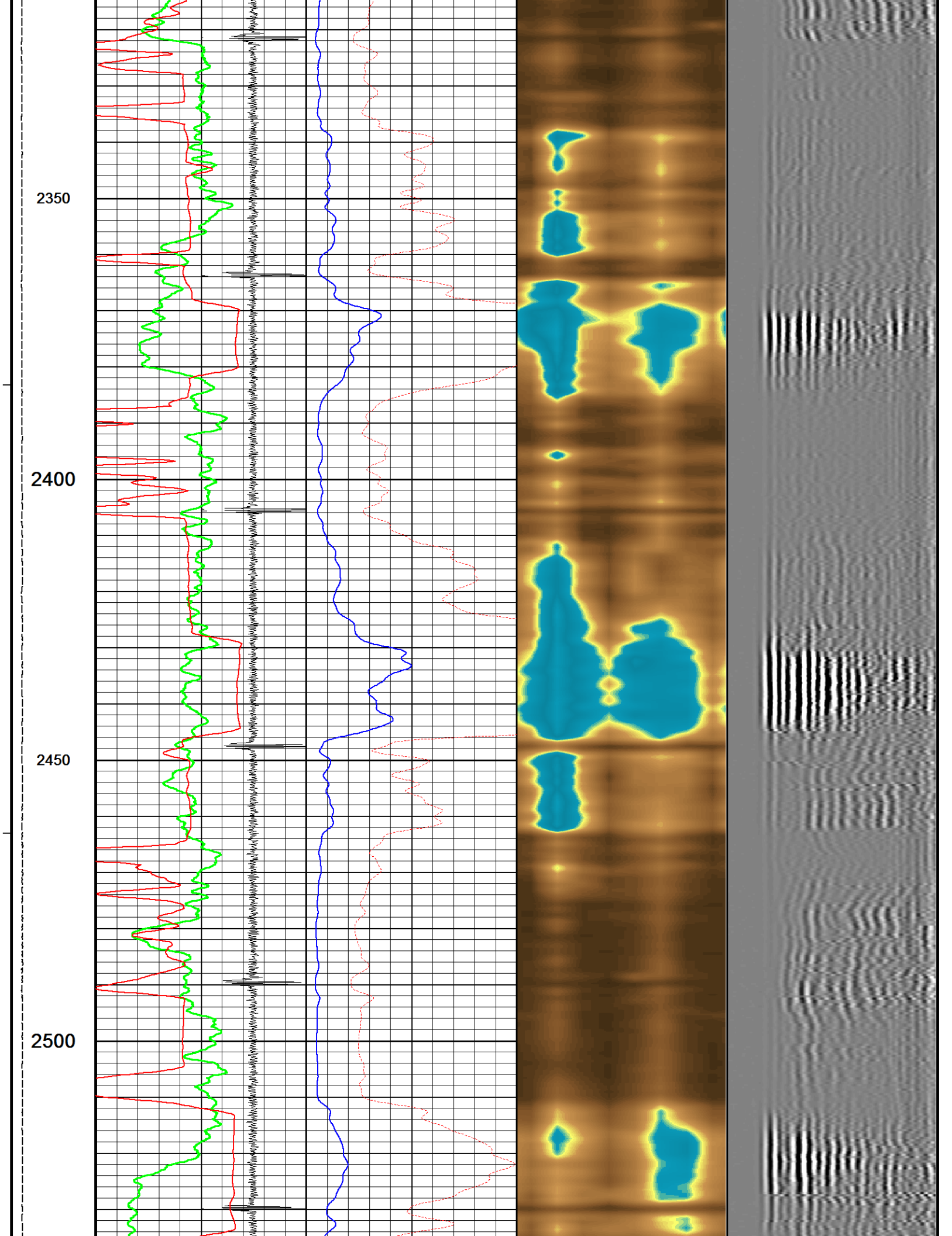


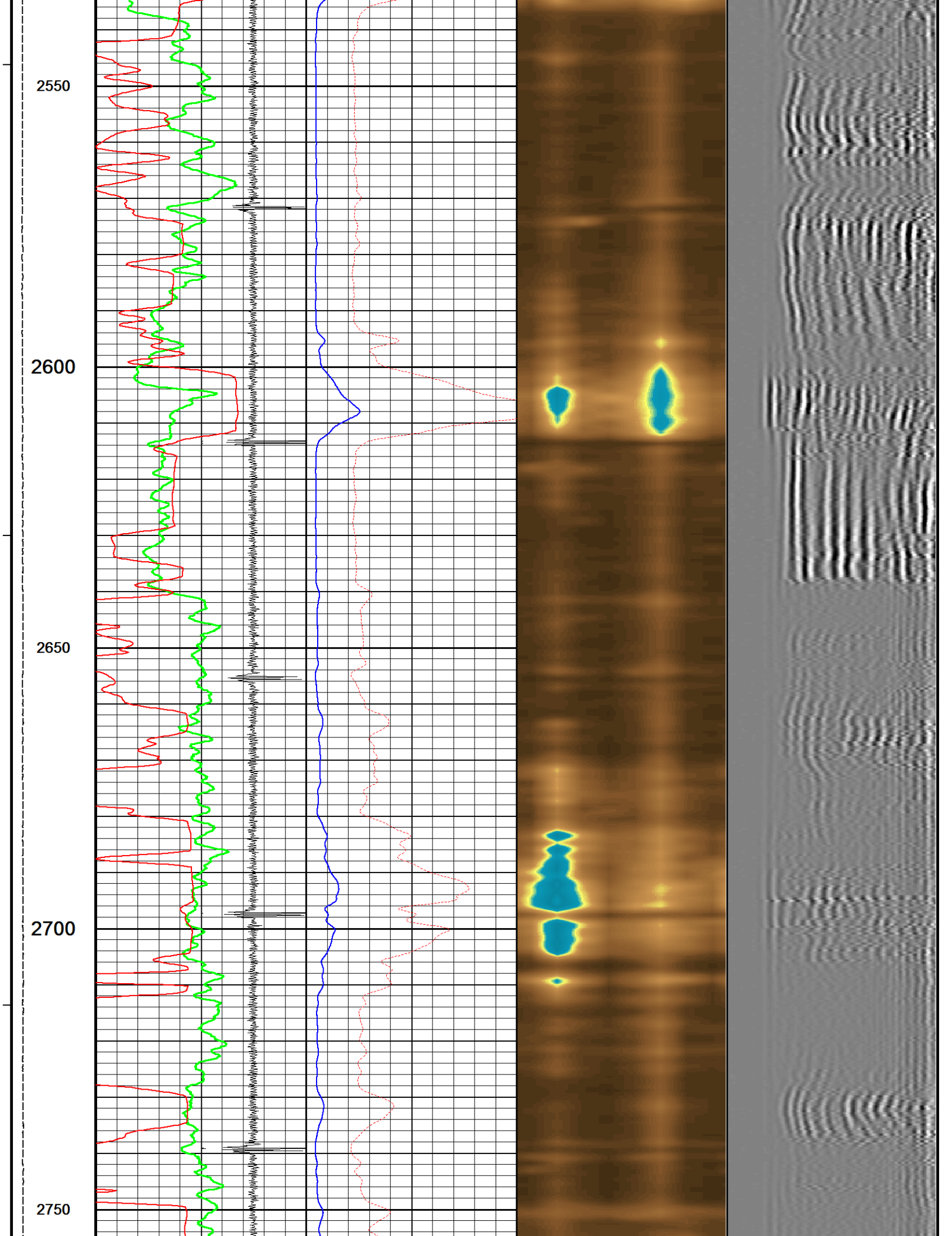


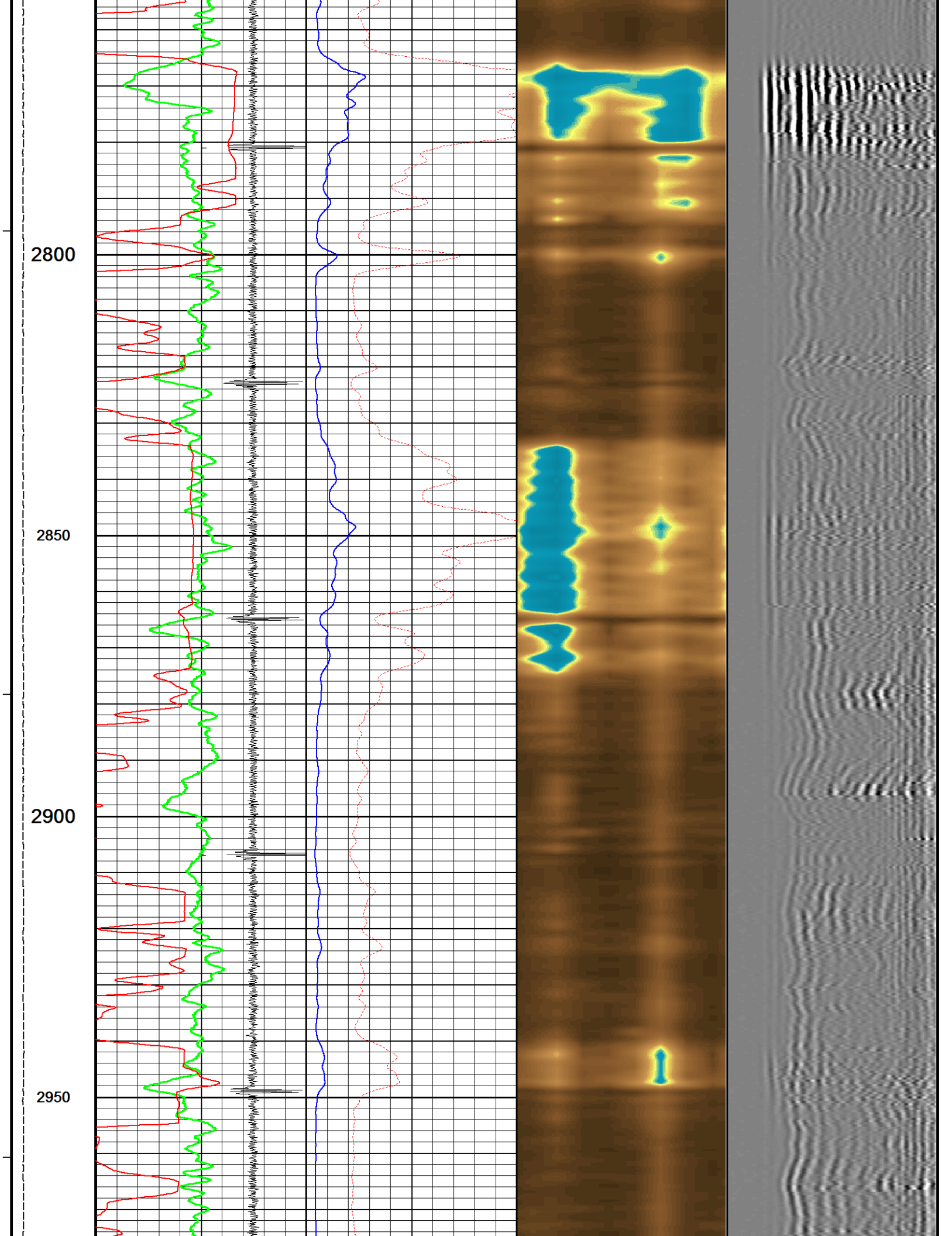


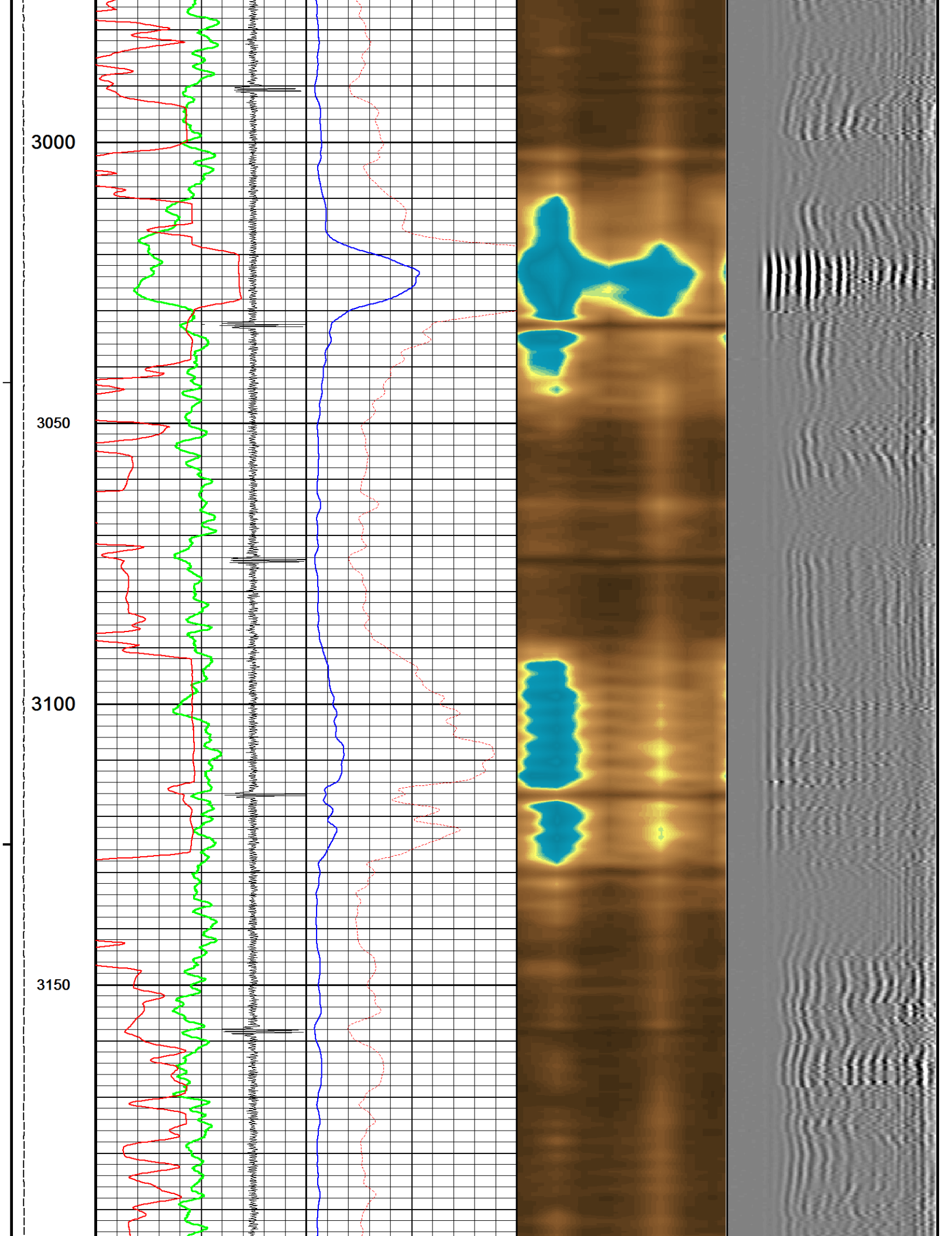


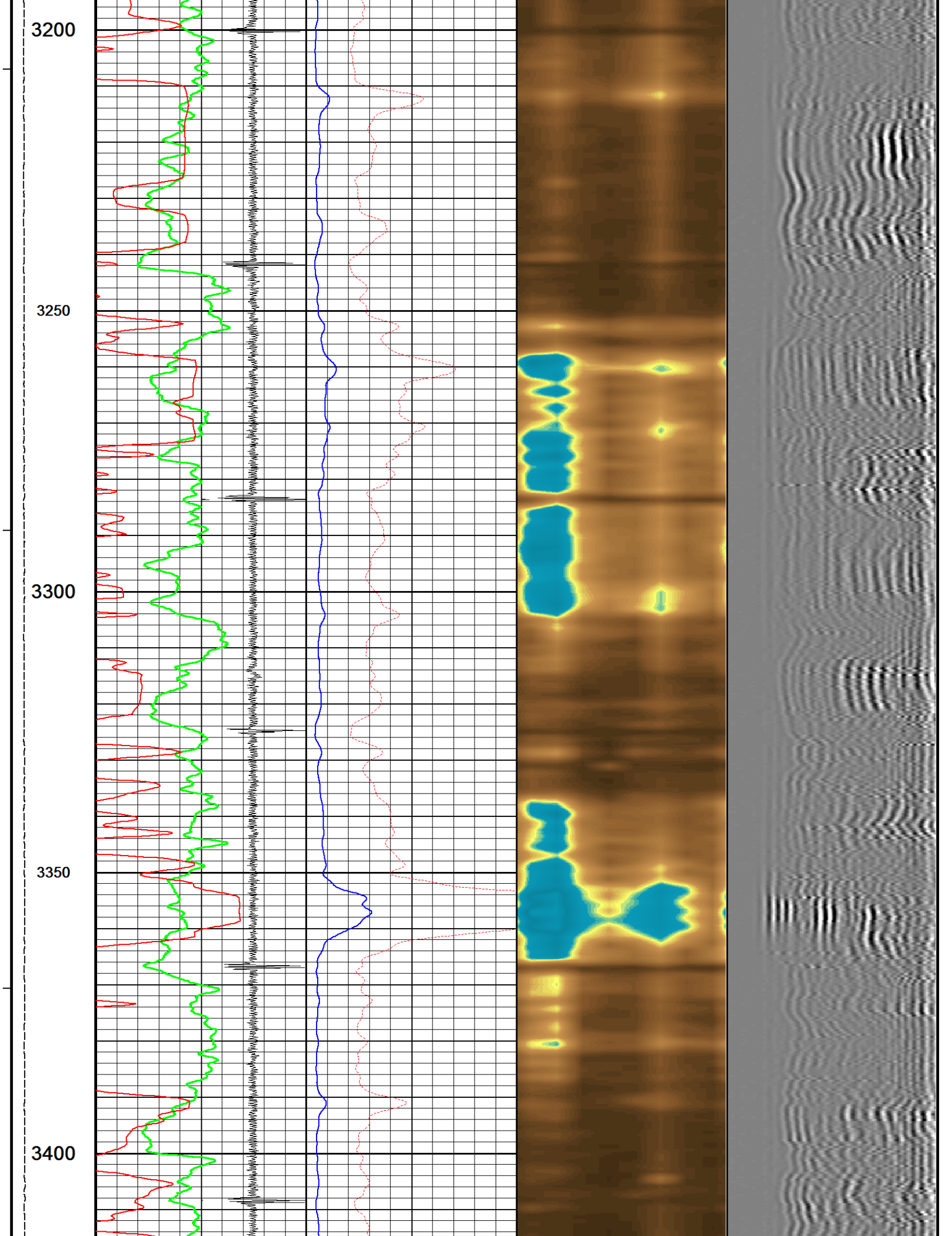


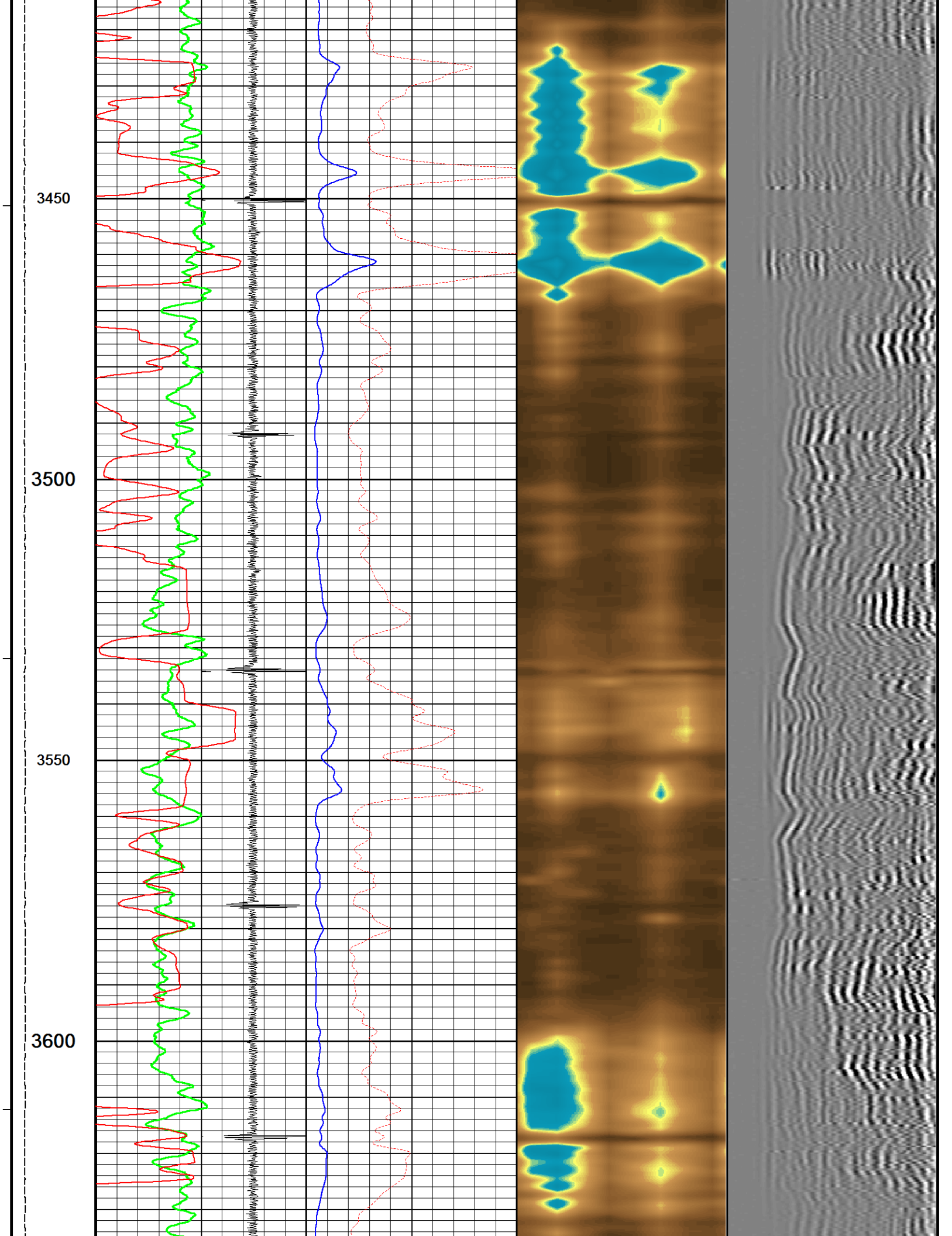


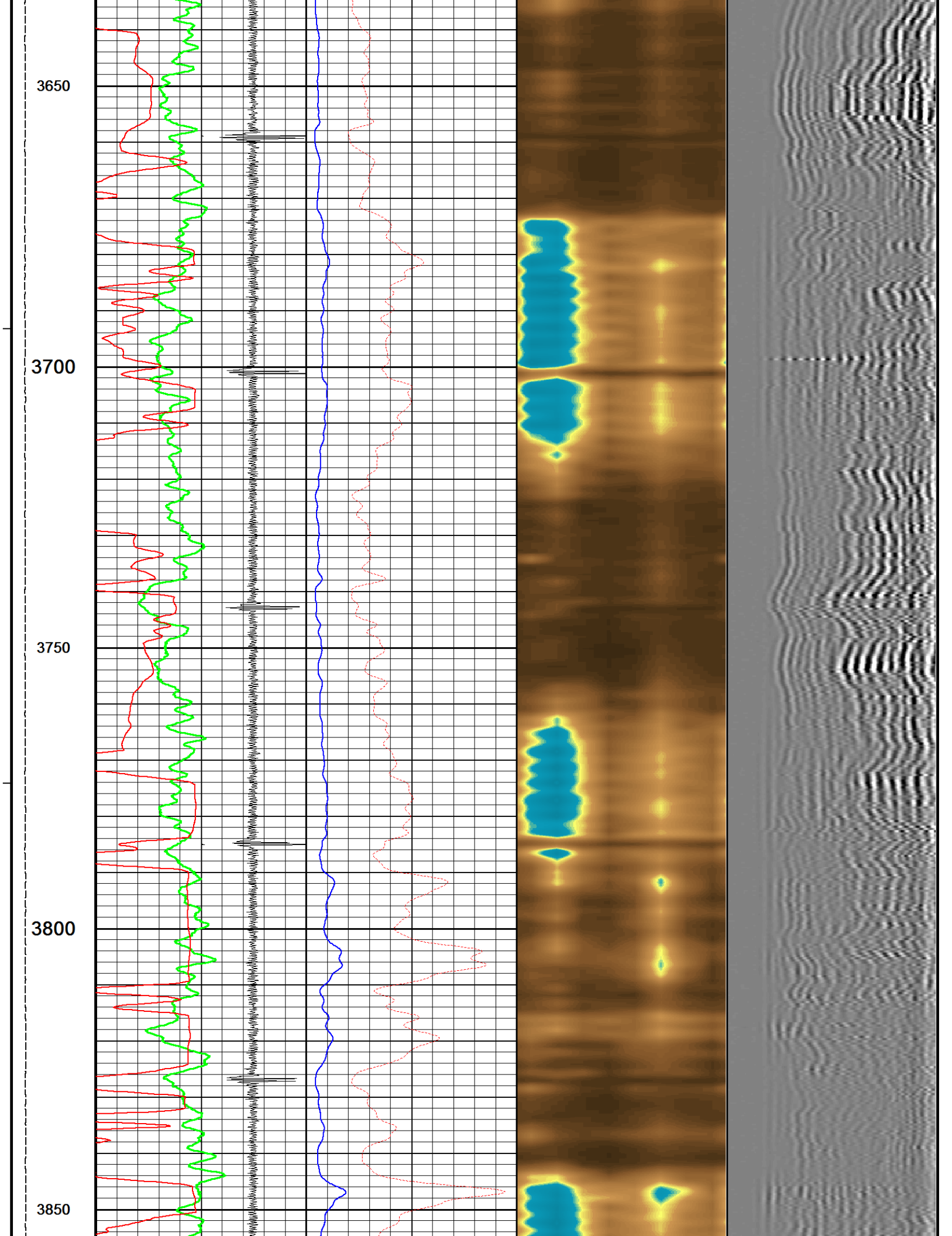


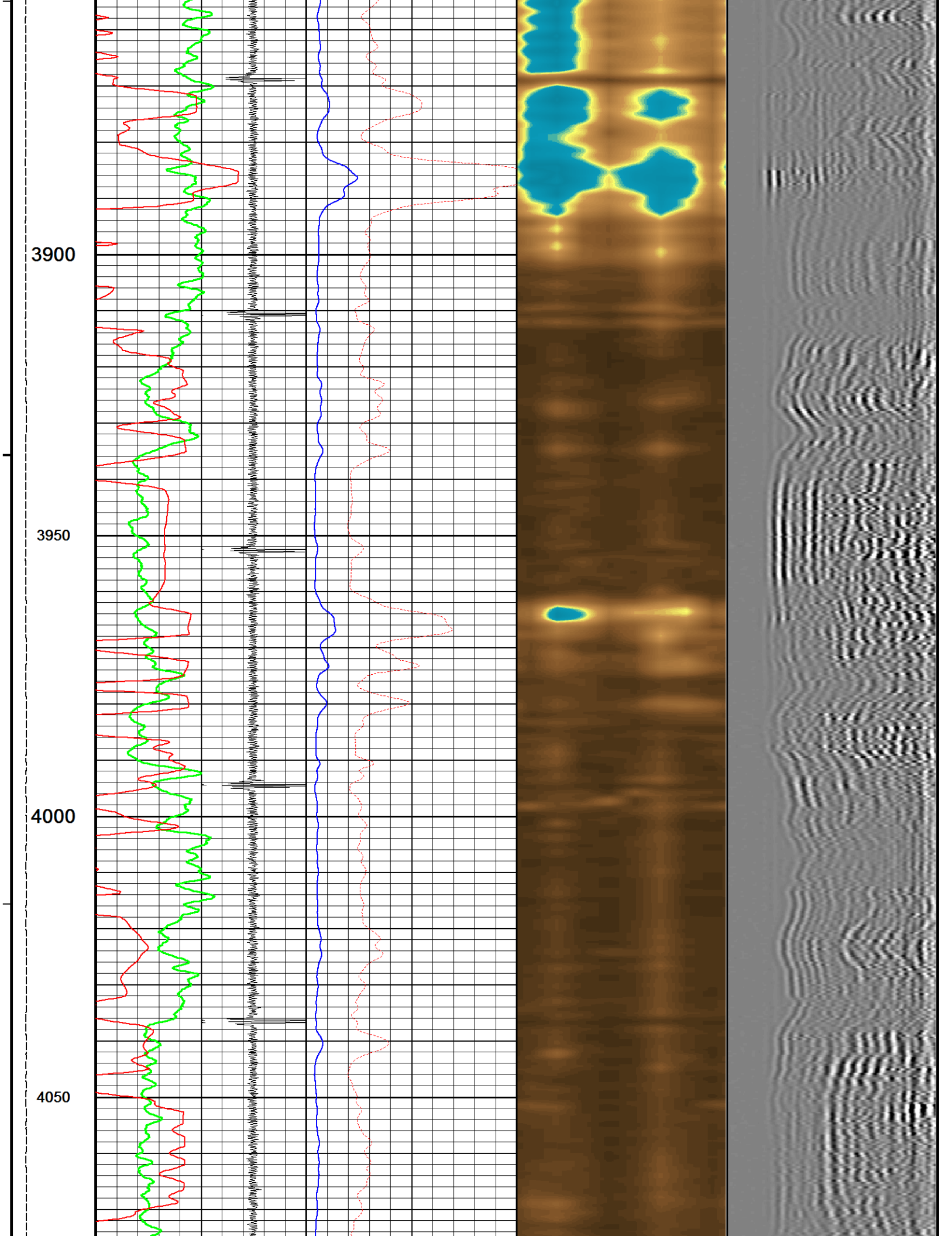


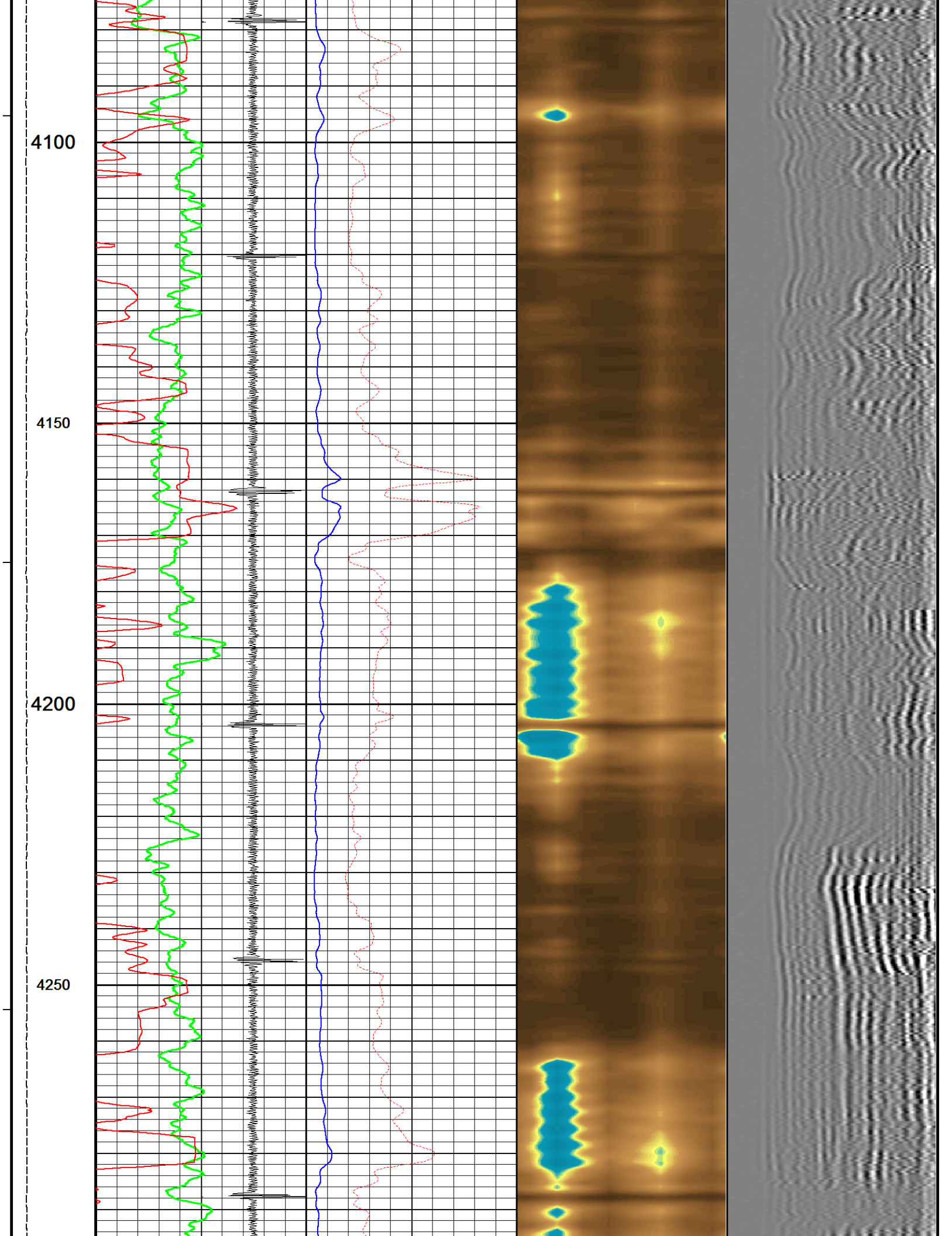


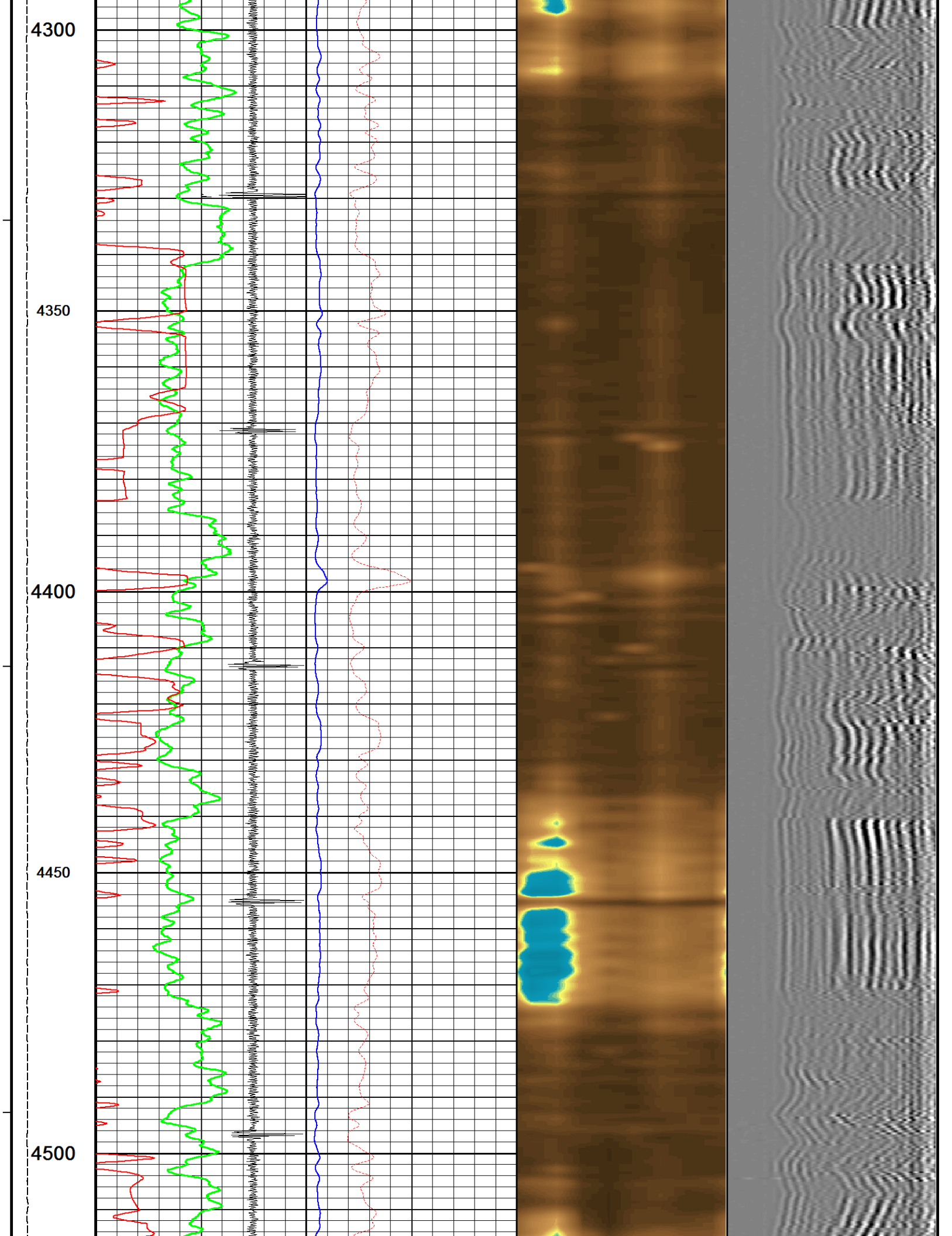


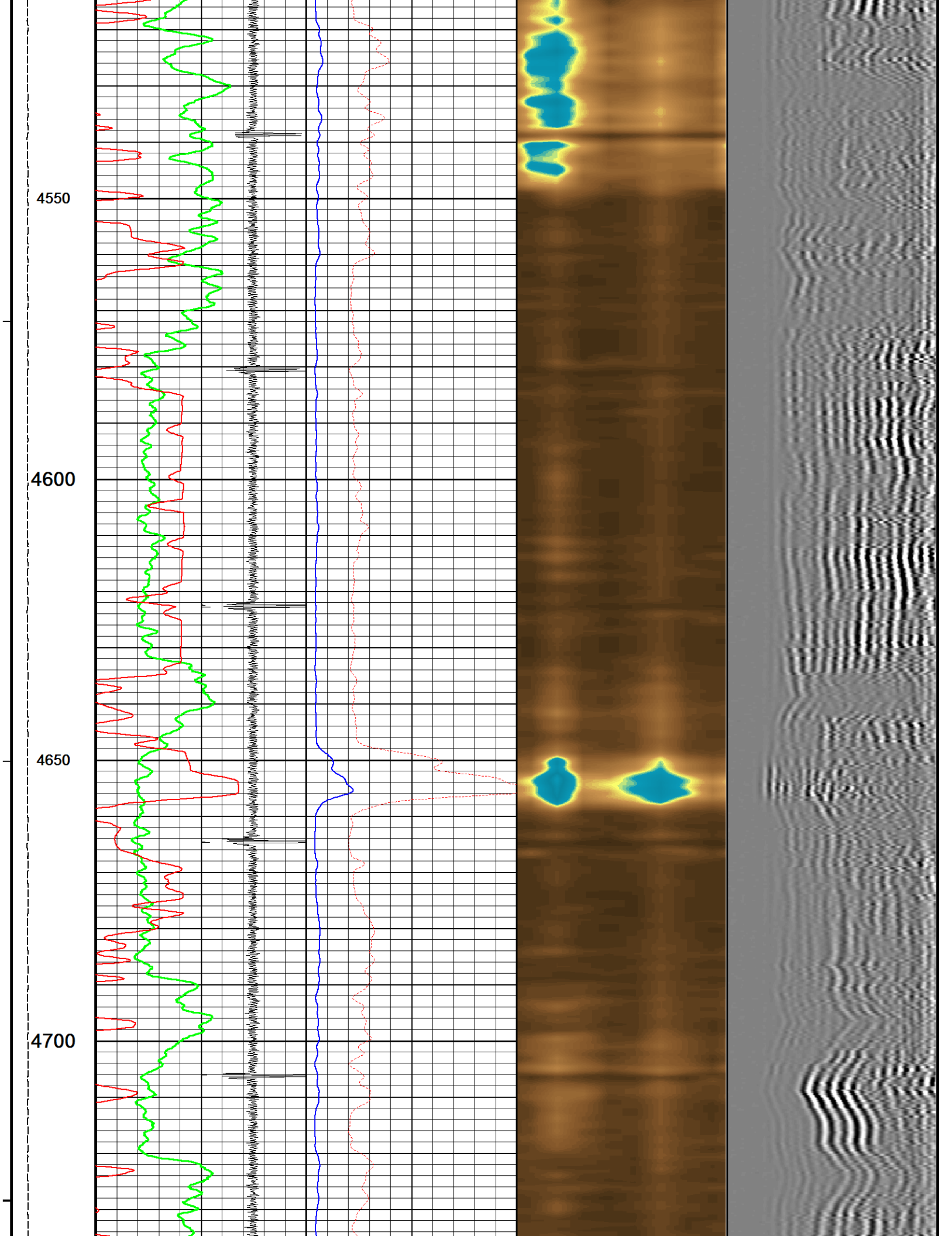


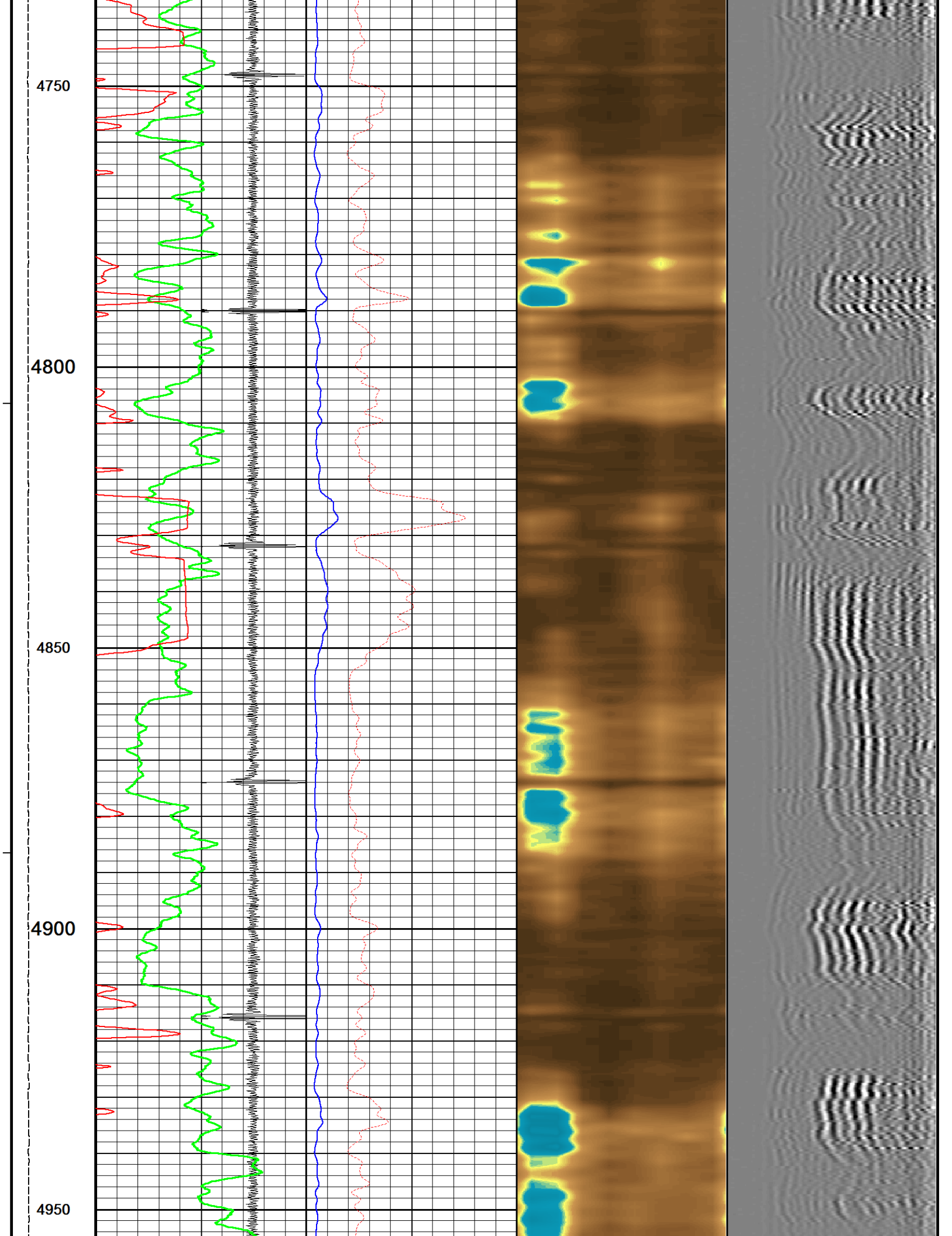


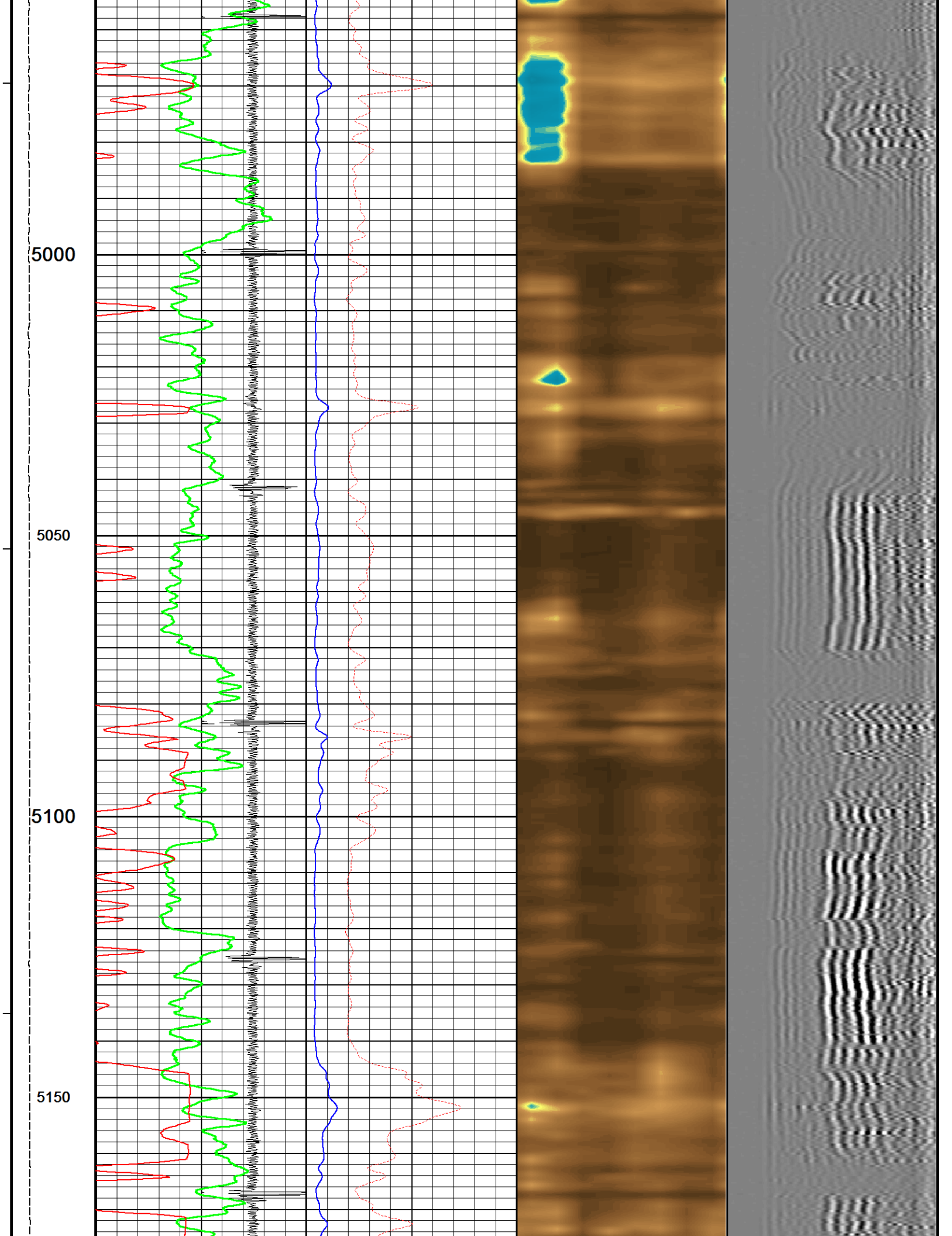


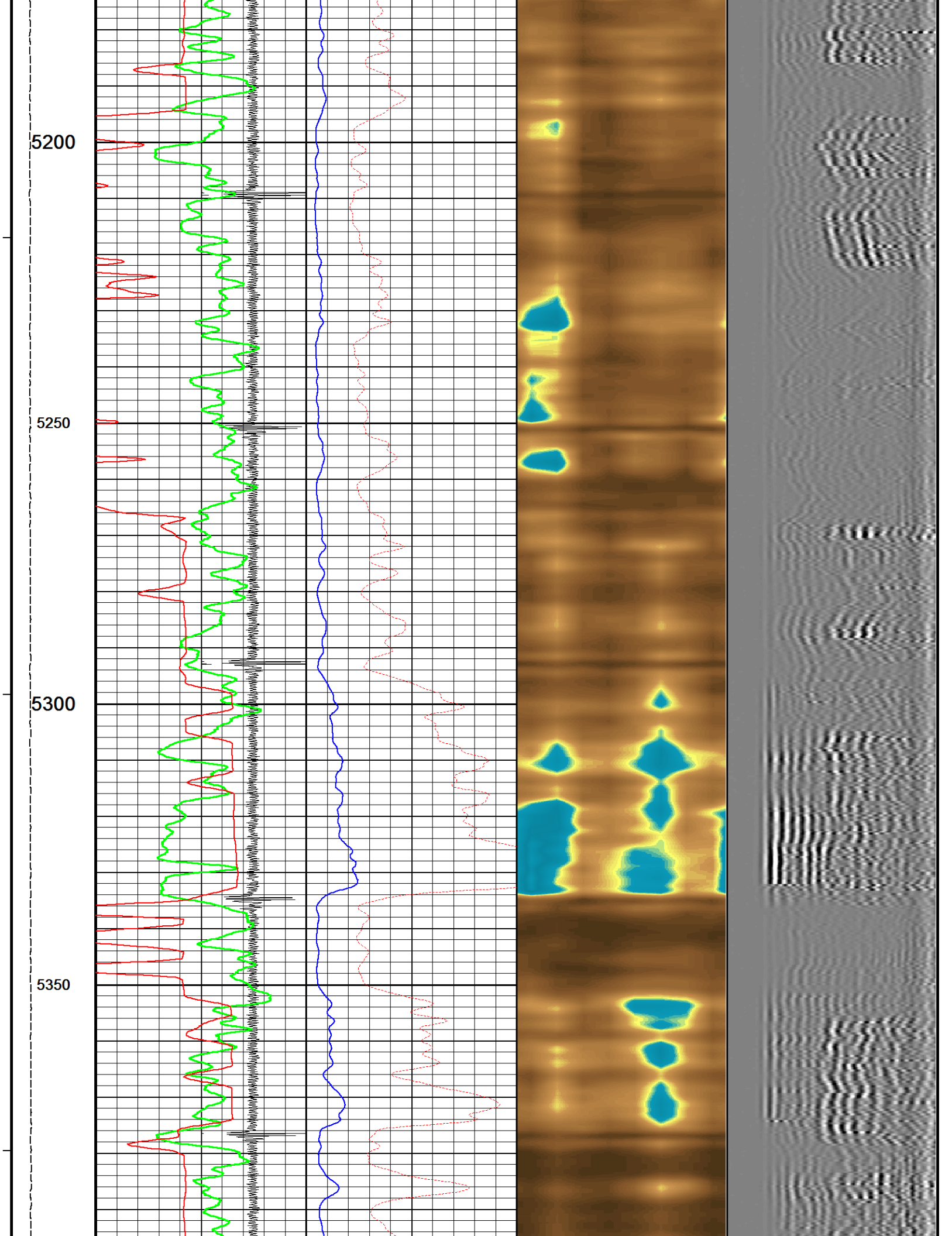


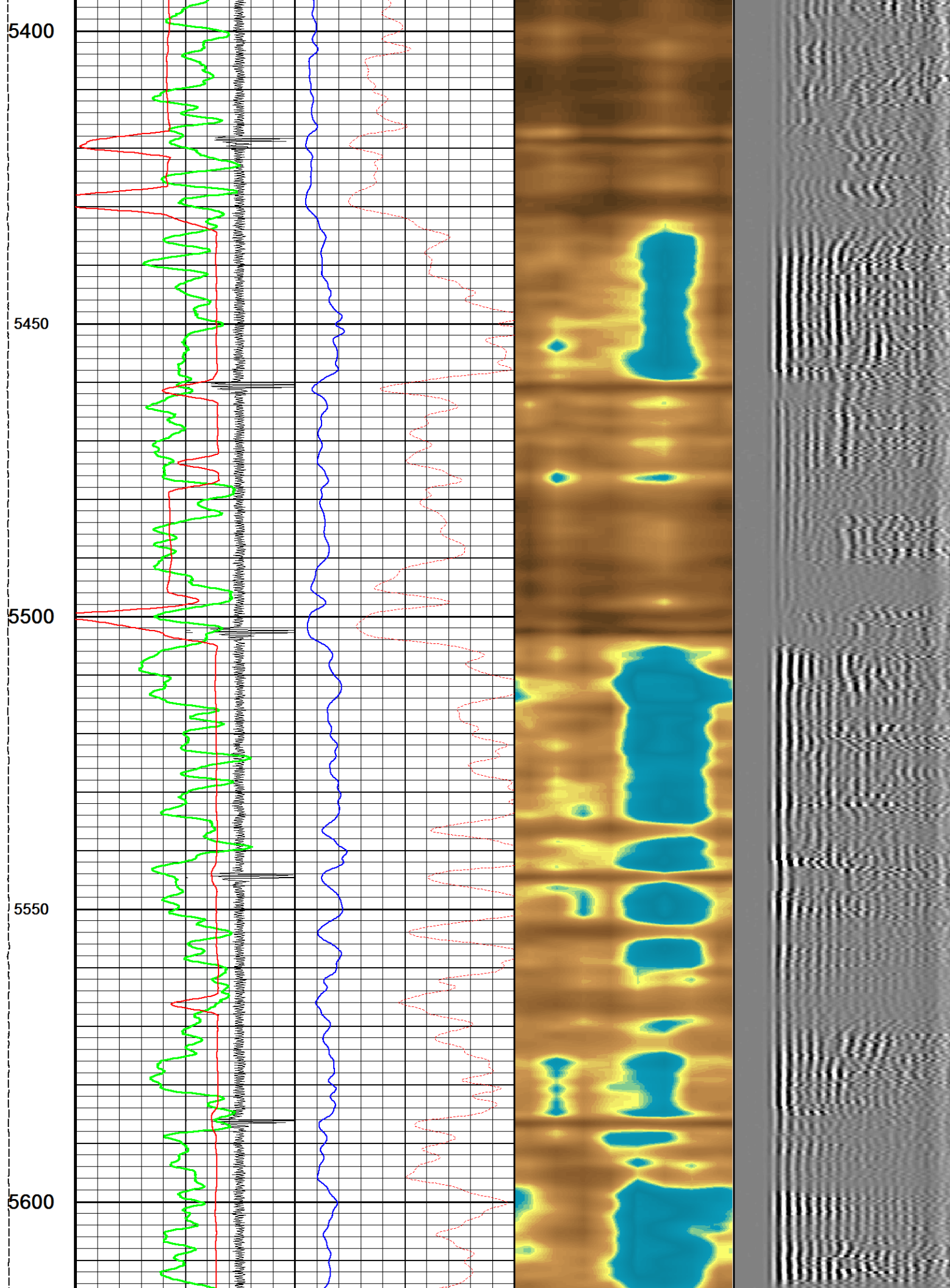


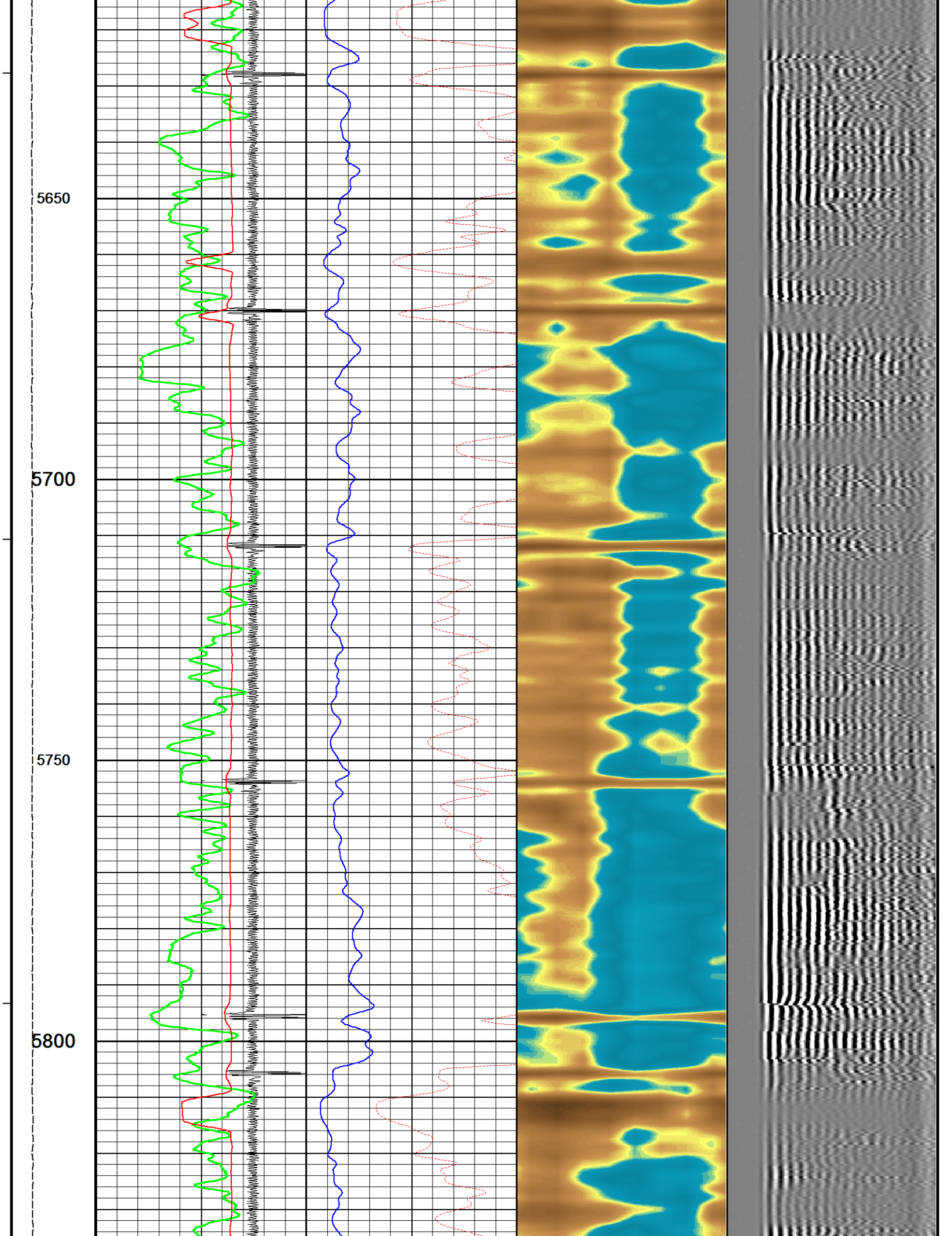


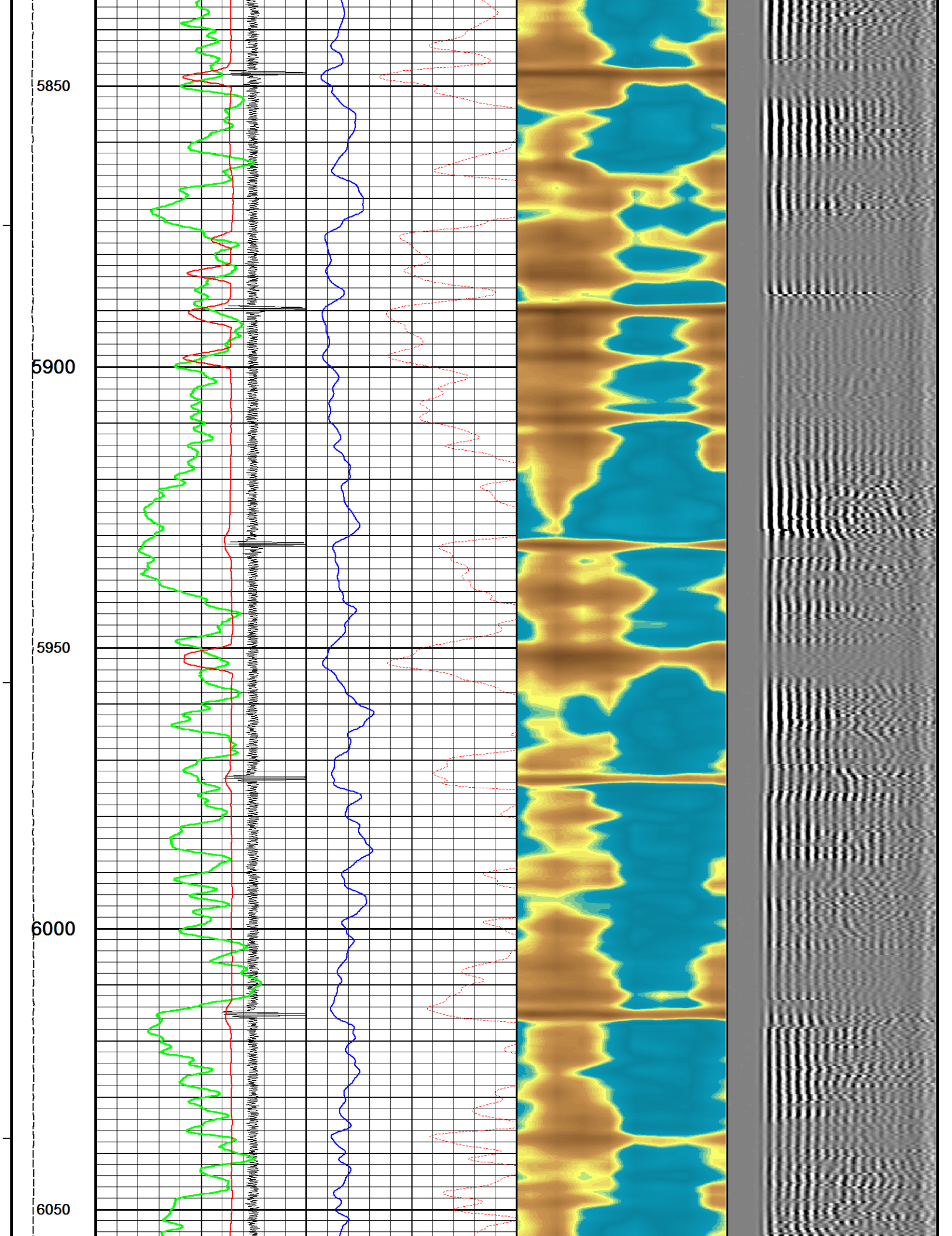


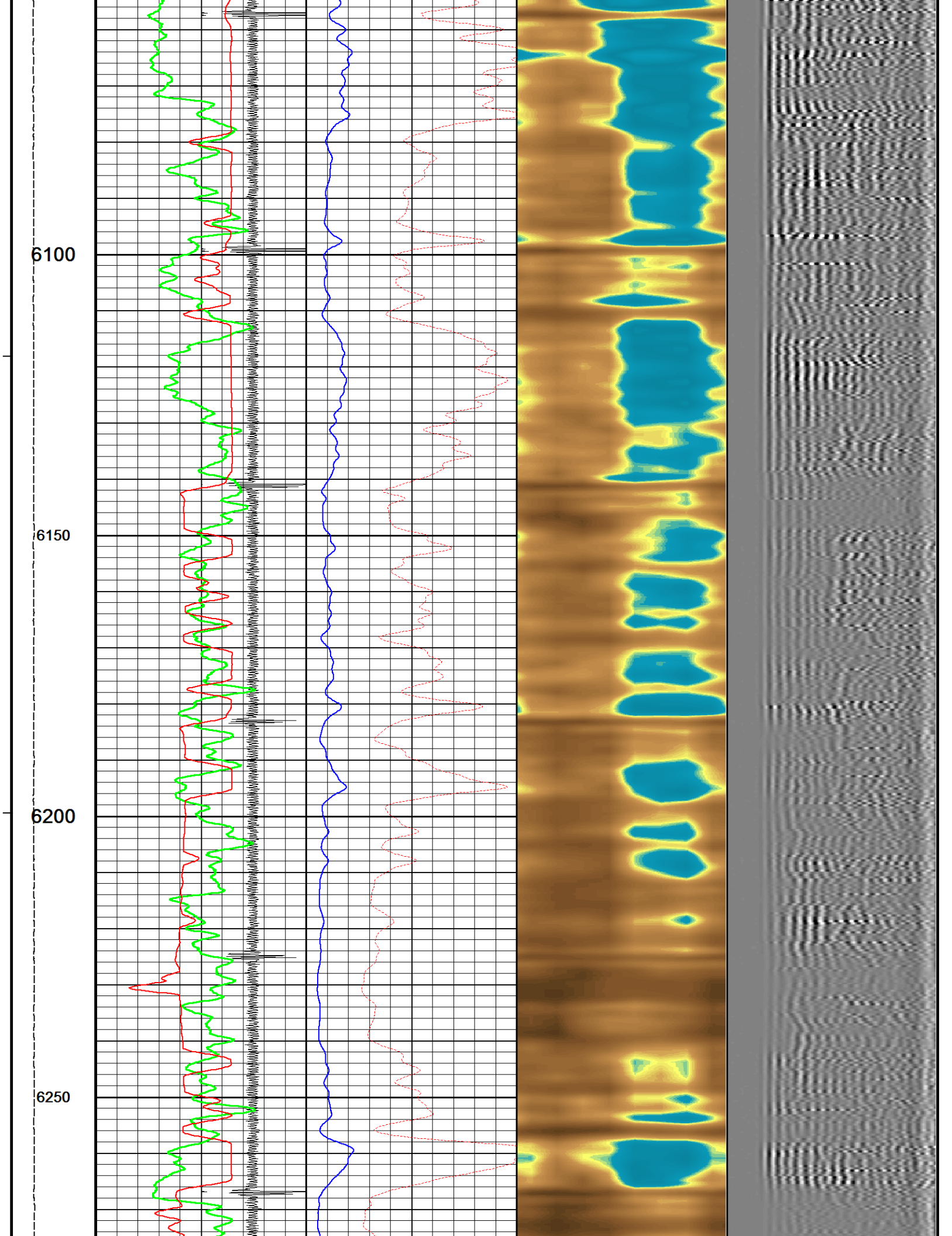


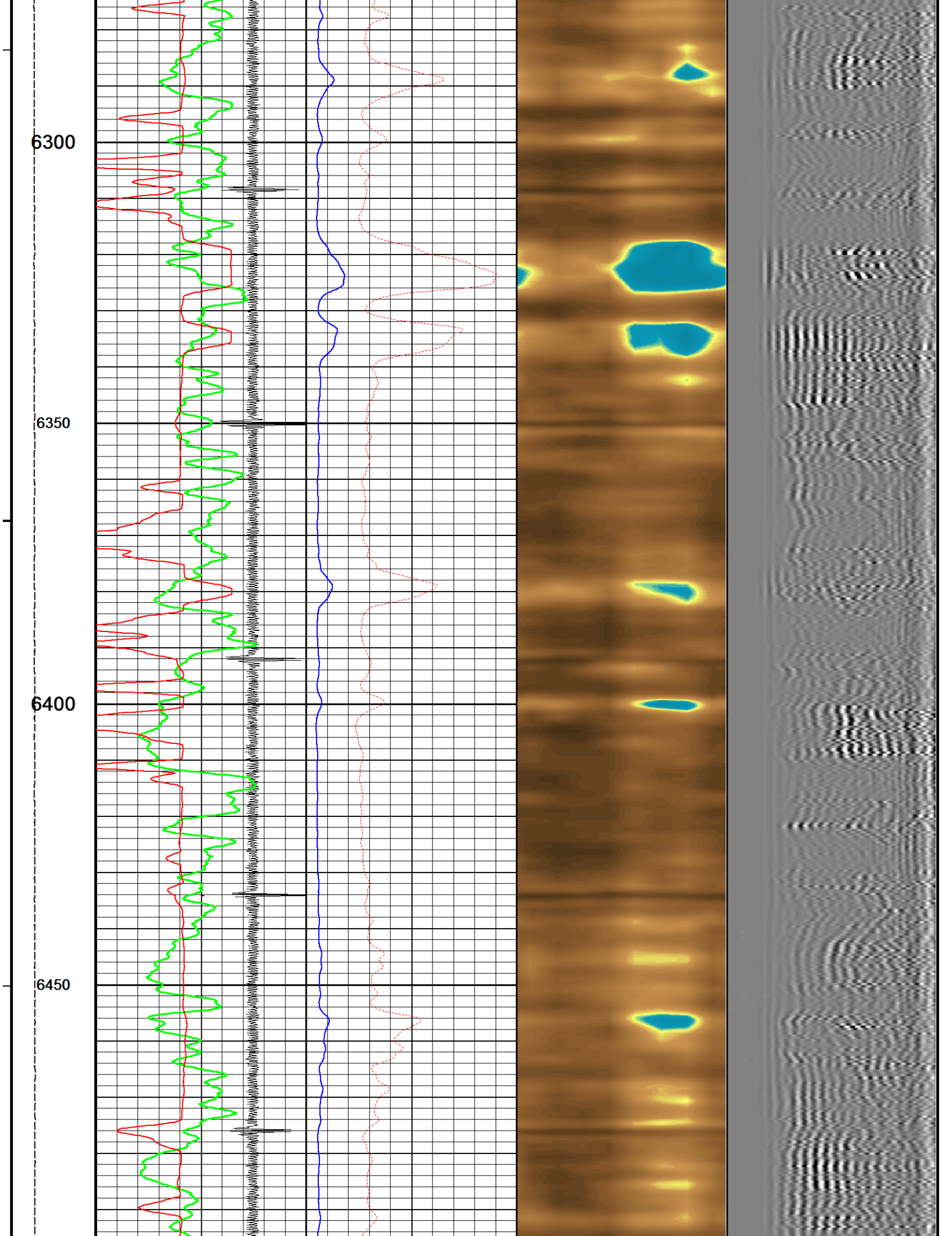


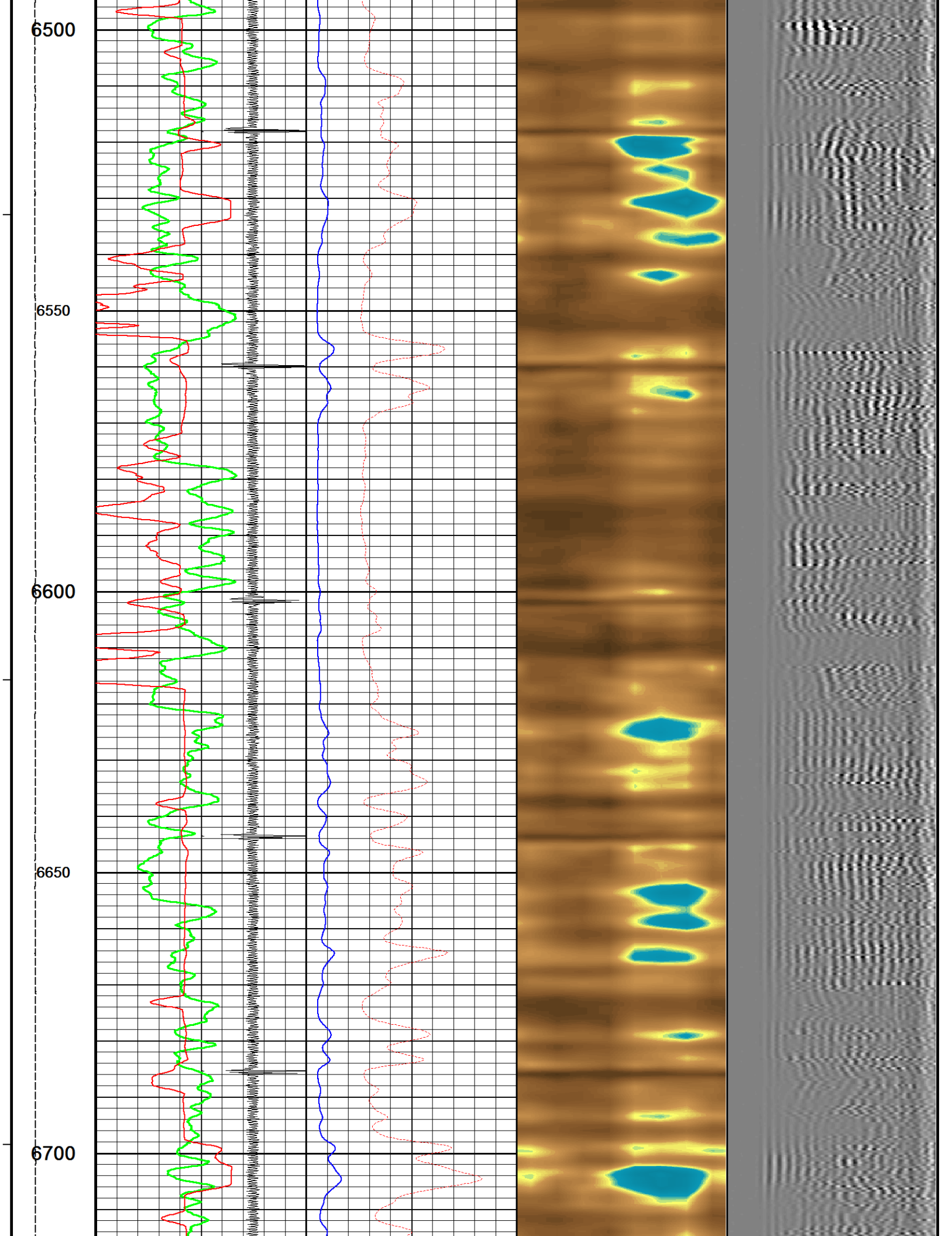


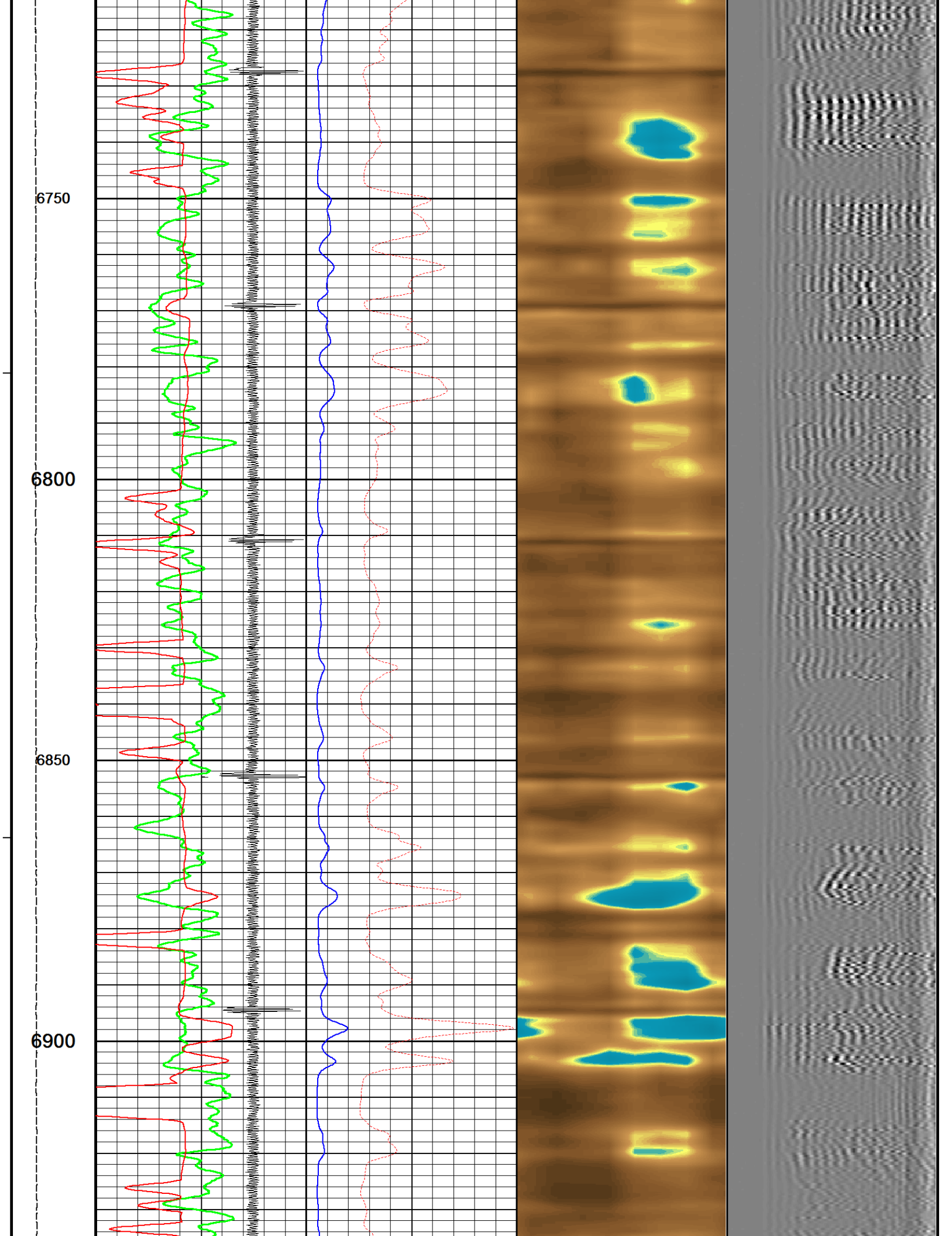


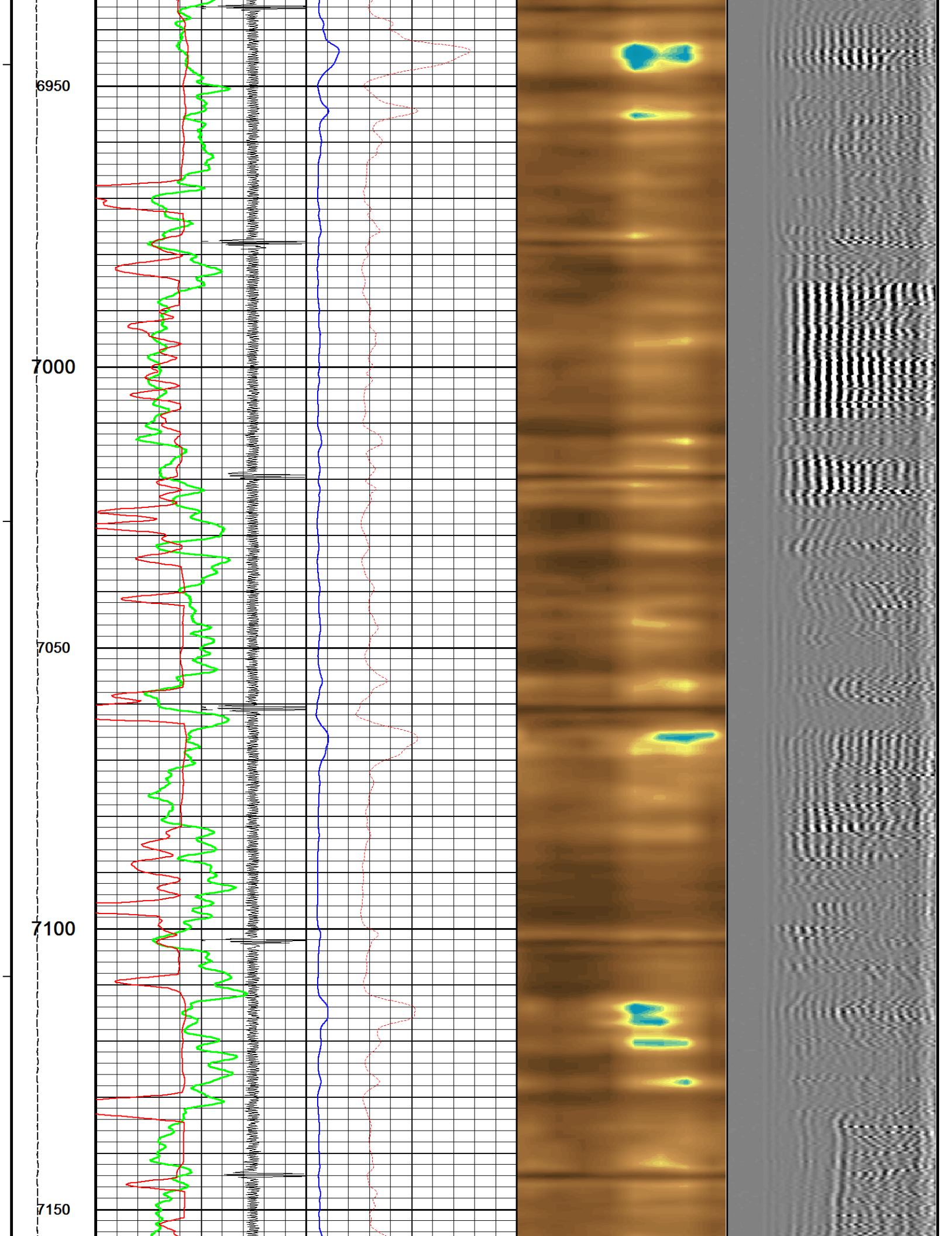


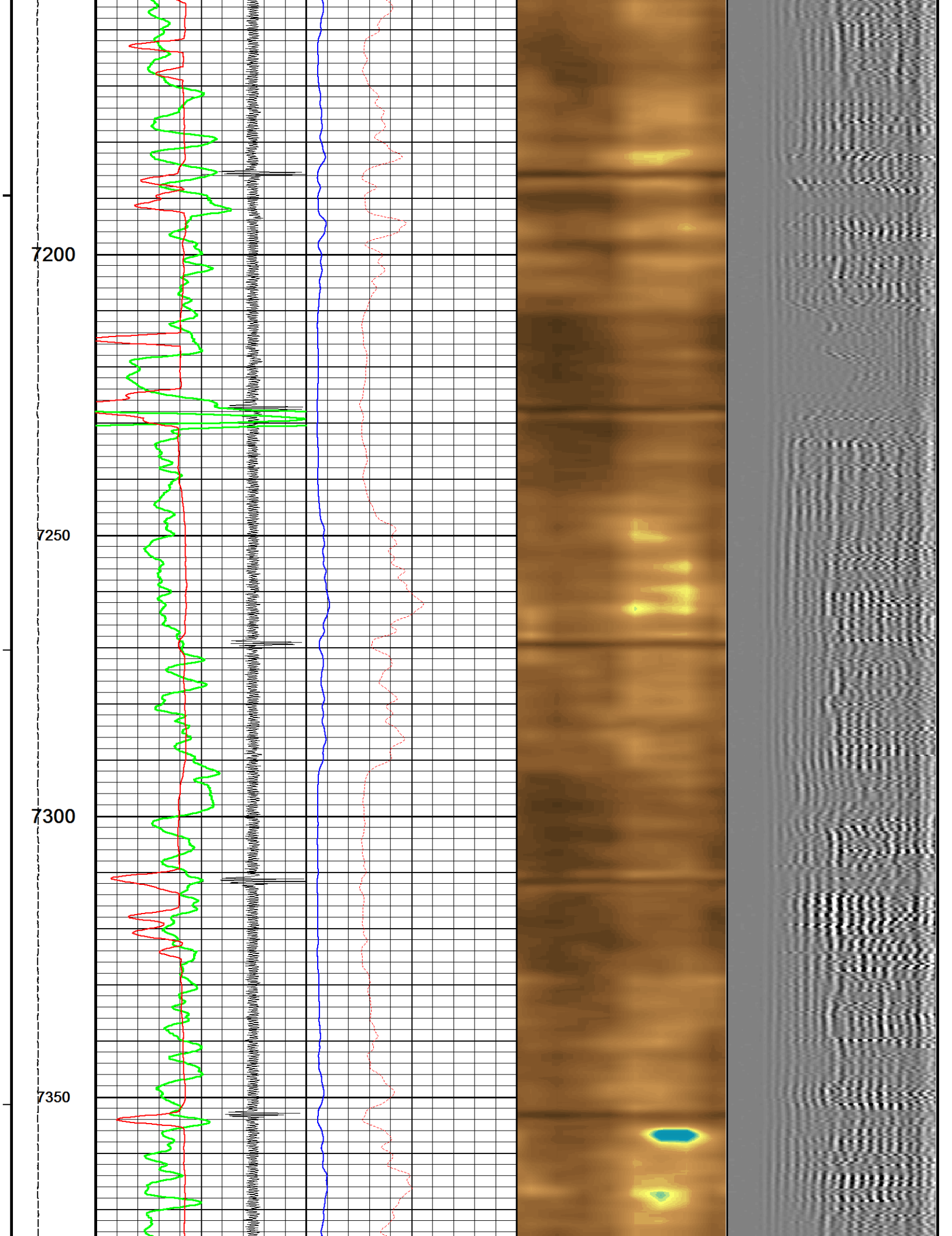


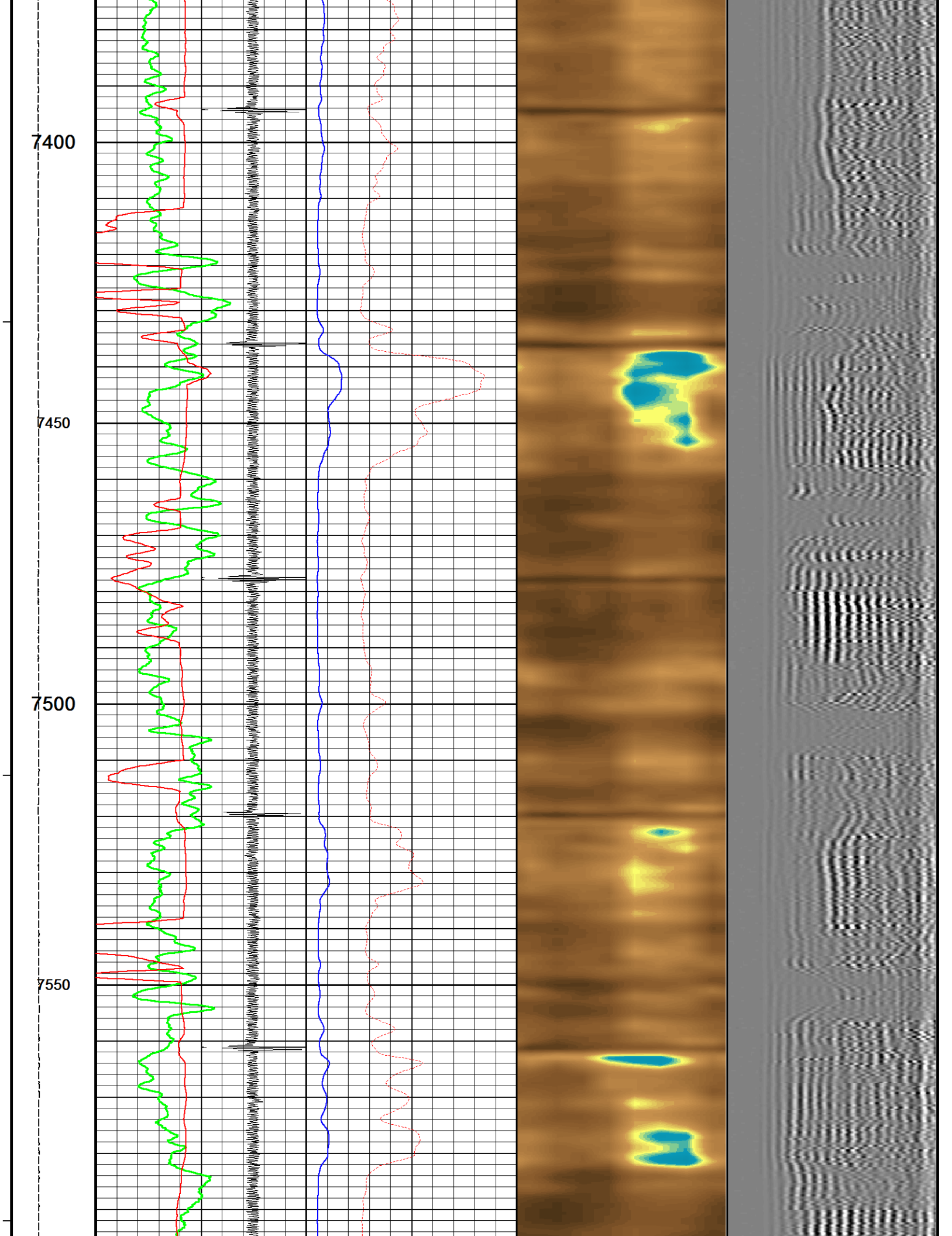


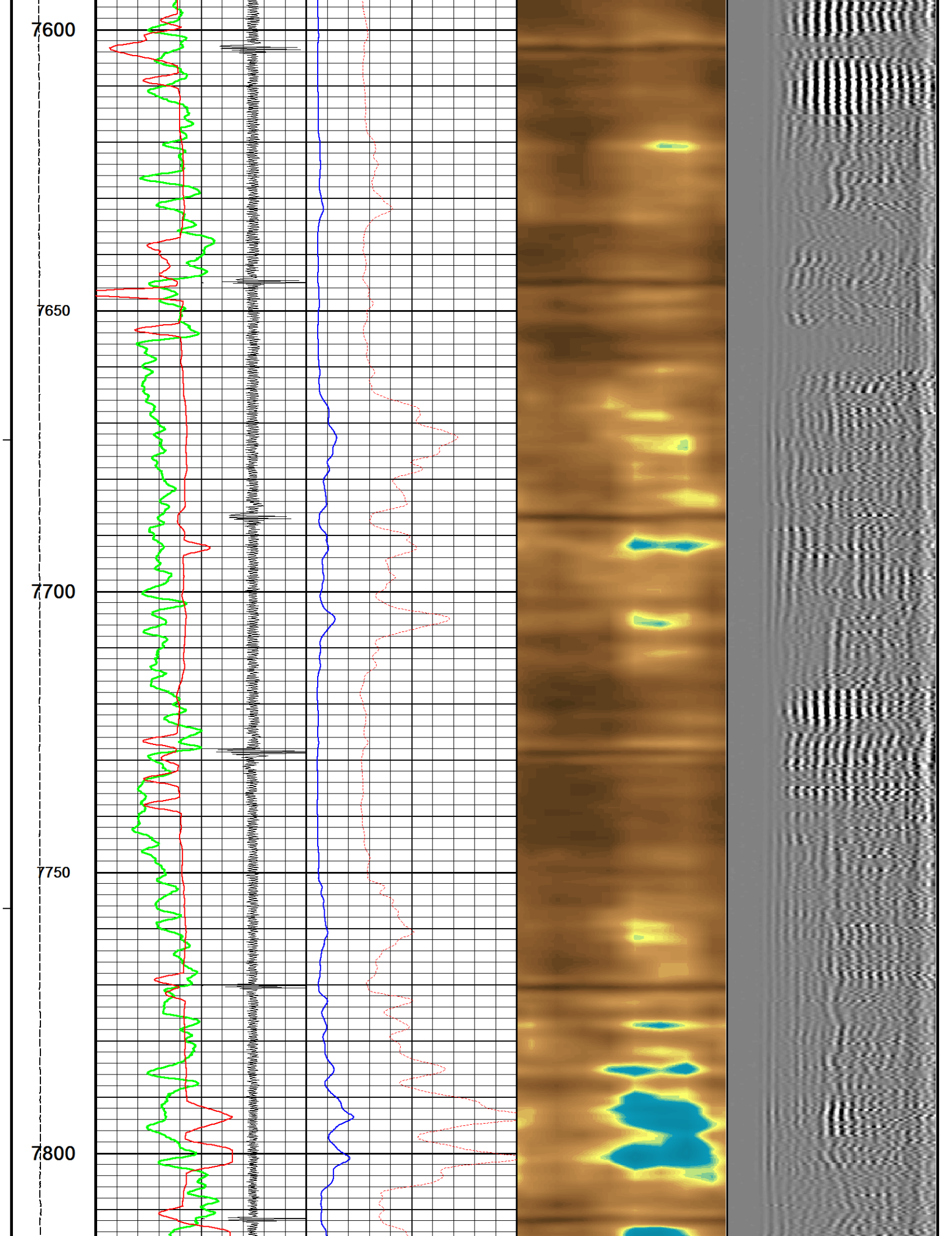


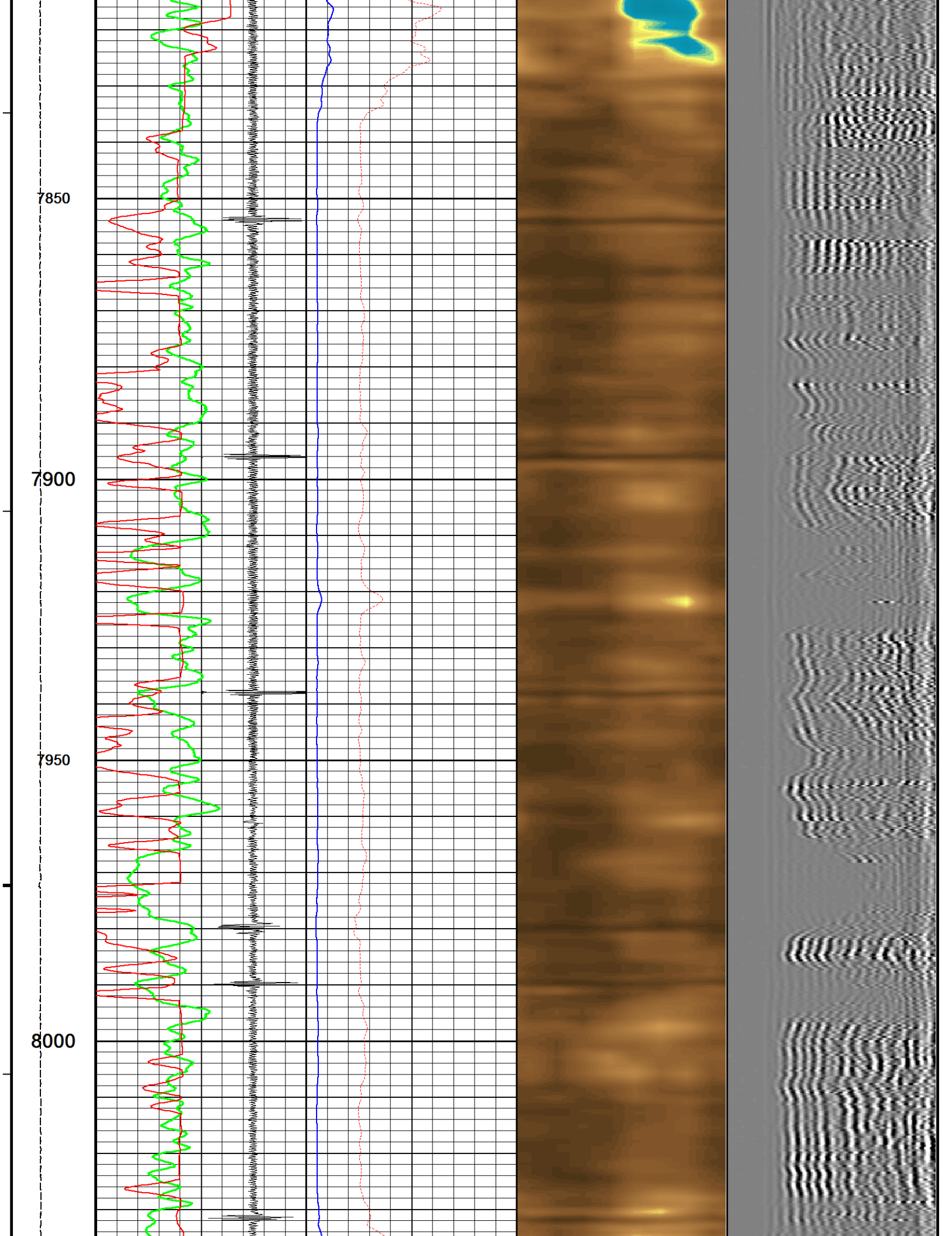


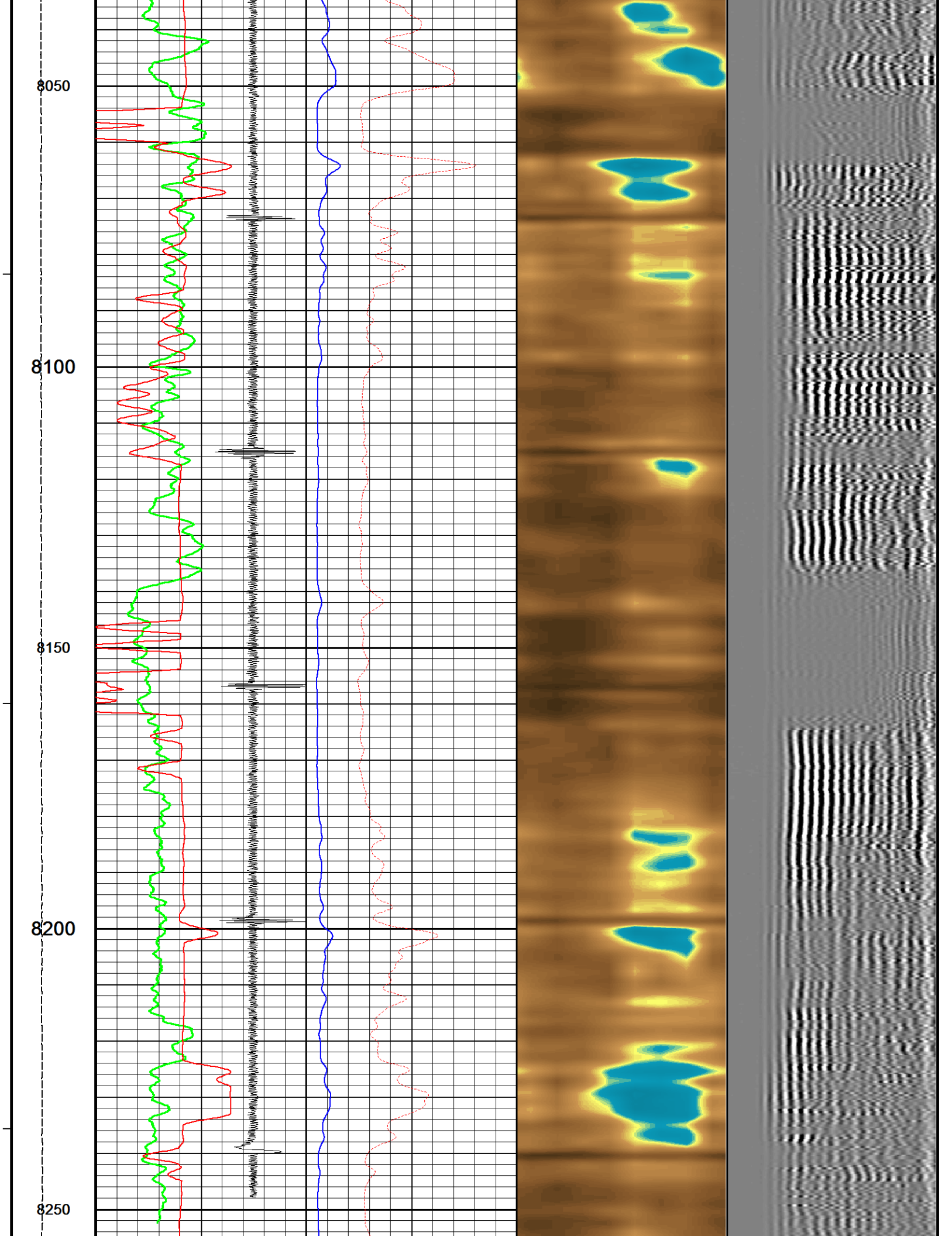


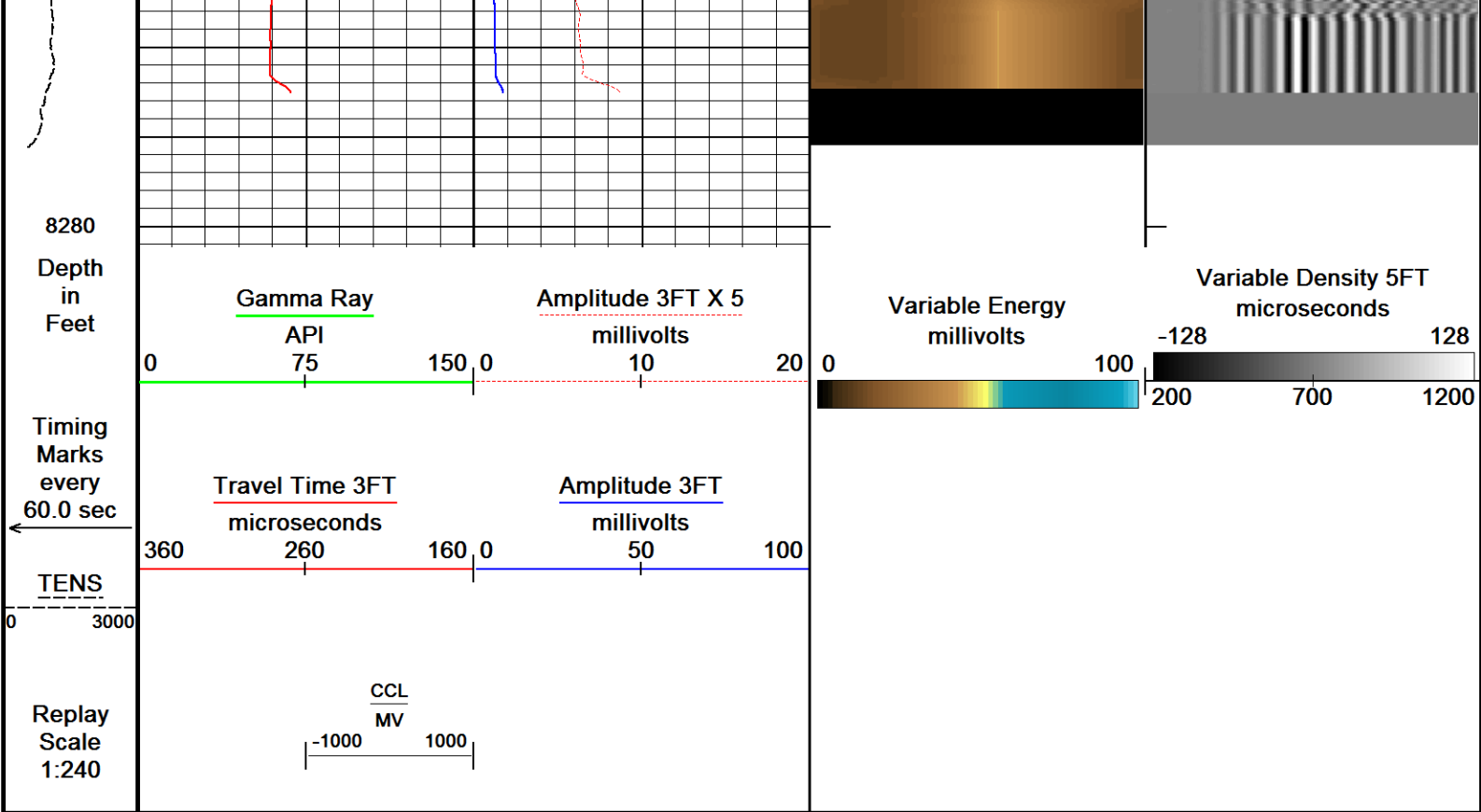












Depth Based Data - Maximum Sampling Increment 2.5cm
Filename: C:\Logs\Vanguard\CSF_41C_4...\Vanguard_CSF_41C-4-791_SBT_MAIN_PASS_FINAL.dta
System Versions: Logged with 17.05.5669 Plotted with 17.05.5669

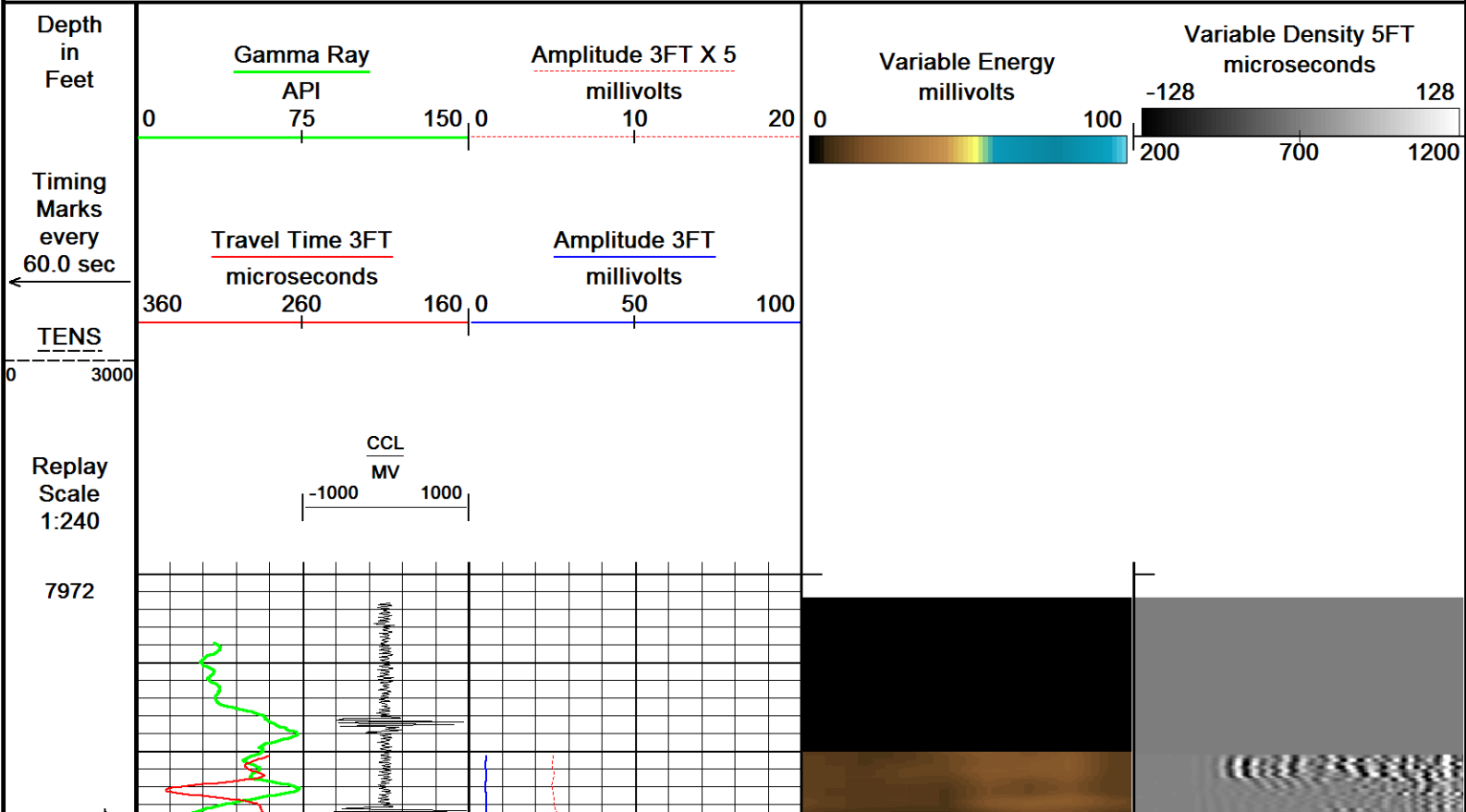
Plotted on 26-FEB-2018 11:29
Recorded on 26-FEB-2018 11:15

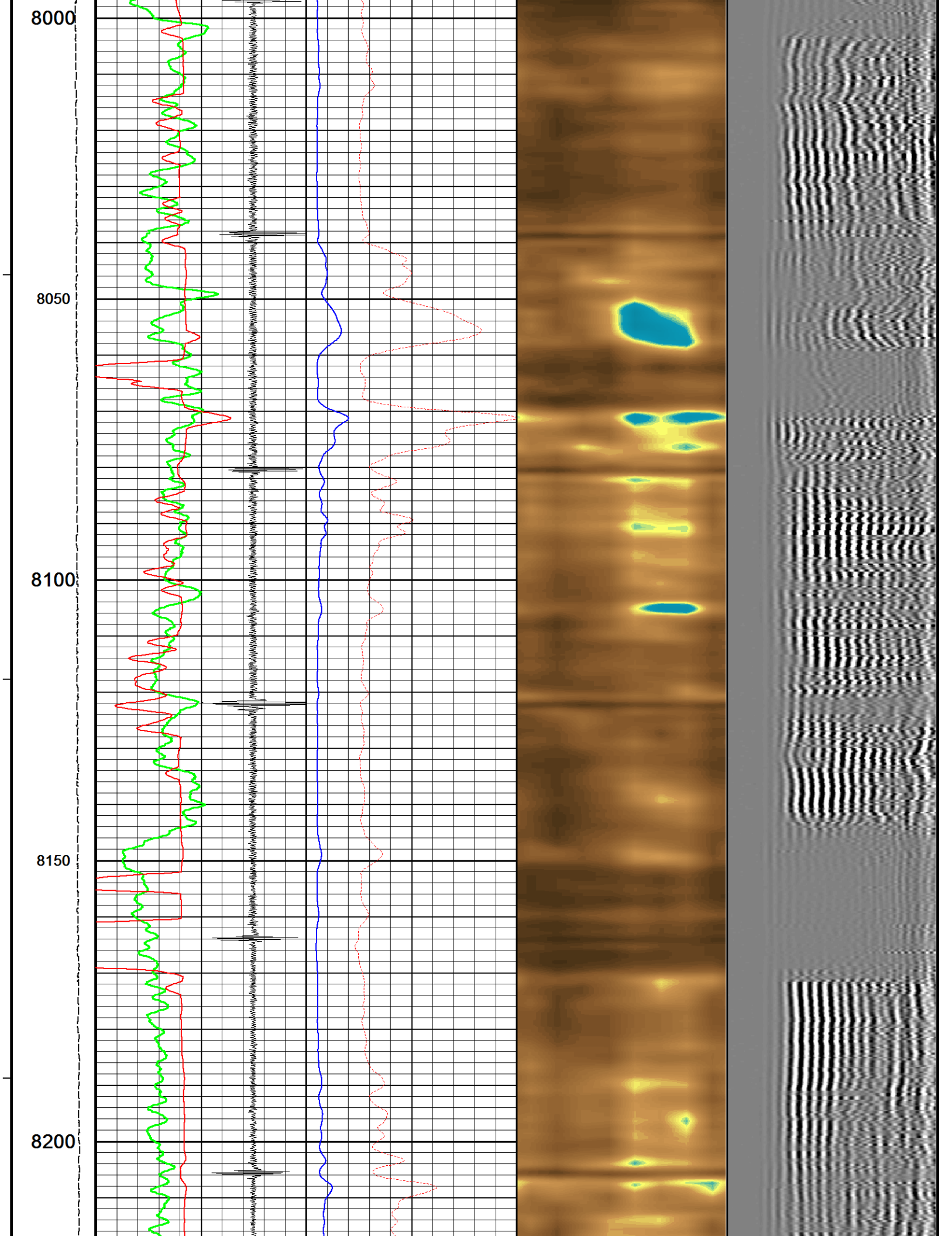
MAIN PASS

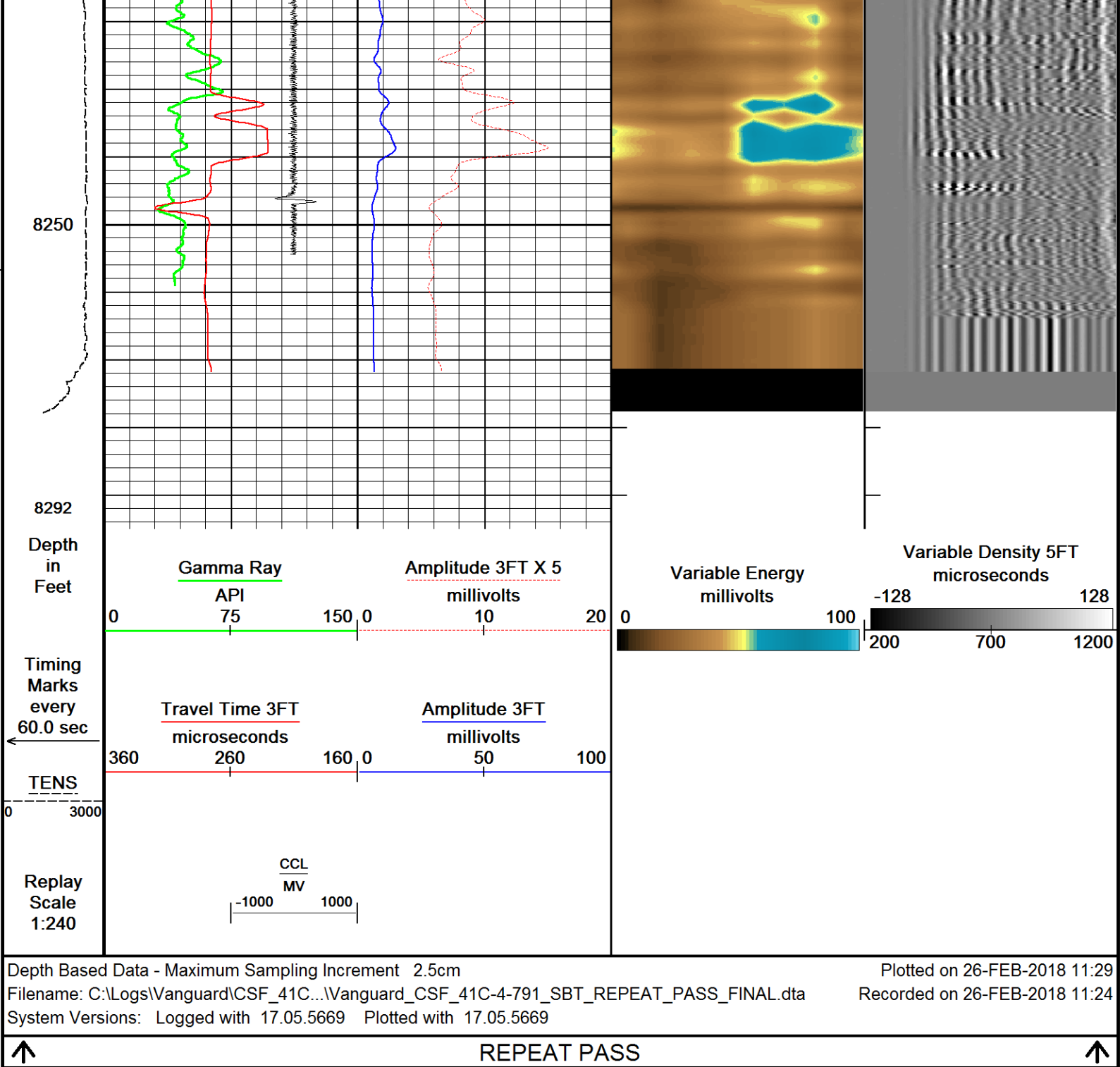
REPEAT PASS

Depth Based Data - Maximum Sampling Increment 2.5cm
Filename: C:\Logs\Vanguard\CSF_41C_4...\Vanguard_CSF_41C-4-791_SBT_REPEAT_PASS_FINAL.dta
System Versions: Logged with 17.05.5669 Plotted with 17.05.5669

Plotted on 26-FEB-2018 11:29
Recorded on 26-FEB-2018 11:24







DOWNHOLE EQUIPMENT

C:\Logs\Vanguard\CSF_41C_4_791\Vanguard_CSF_41C-4-791_SBT_MAIN_PASS_FINAL.dta

Mono-Cablehead
MCH-AA 0 LG: 1.03 ft WT: 2.2 lb OD: 1.457 in

2.75in Bond Cent
CEN-AA 219 LG: 2.49 ft WT: 11.0 lb OD: 2.717 in

2.75" CCL/Telemetry Sub
CTB-AB 211 LG: 3.40 ft WT: 39.7 lb OD: 2.756 in



23.23 ft CCL - Collar Locator

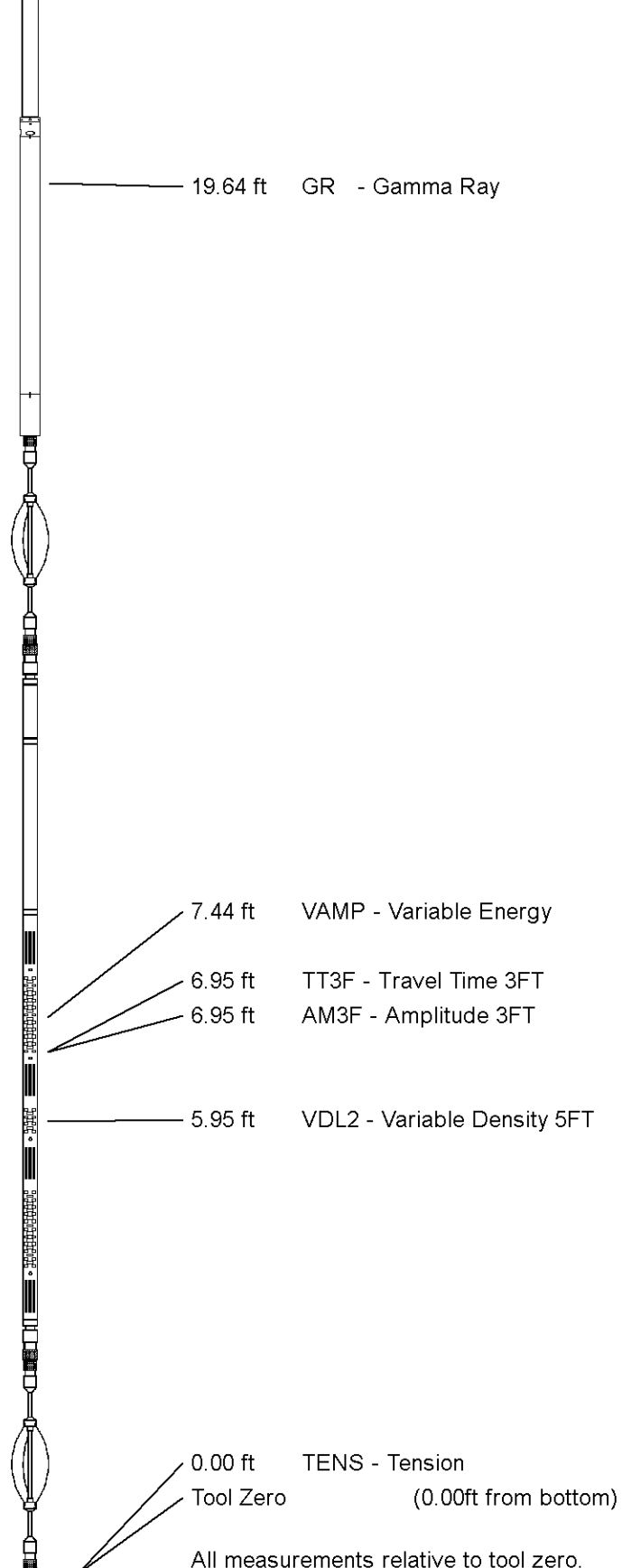
2.75" Gamma Ray Tool
GRB-AB 228 LG: 4.71 ft WT: 59.5 lb OD: 2.756 in

2.75in SBT Middle
CEN-BA 155 LG: 3.08 ft WT: 22.0 lb OD: 2.717 in

Sector Bond Tool
SBT-AA 316 LG: 10.32 ft WT: 90.4 lb OD: 2.717 in

2.75in Bond Cent
CEN-AA 116 LG: 2.49 ft WT: 11.0 lb OD: 2.717 in

Total Length: 27.53 ft Weight: 235.9 lb



SHOP AND FIELD CALIBRATIONS

C:\Logs\Vanguard\CSF_41C_4_791\Vanguard_CSF_41C-4-791_SBT_MAIN_PASS_FINAL.dta

UGR Field Survey cal GRB-AB 228

Field calibration on 00-JAN-1988 00:00

Gamma Ray Field Survey Calibration

Tool Type: GRB-AB
Calibrator No:

Serial No: 228

Background	Calibrator	Standard	Units
102.2	492.8	140.0	CPS

Delta Counts Per Sec: 390.6

CPS/API = 2.790

SBT Field Calibration SBT-AA 316

Field Calibration on 00-JAN-1988 00:00

Sector Bond Field Calibration

Tool Type	SBT-AA	Serial No	316
T0 Gain	3dB	Free Pipe Depth	

Sensor	Description	Standard(mV)	Measured(mV)
AMP 3FT	100% Bond	3.60	0.40
	Free Pipe	81.00	714.40
AMP 5FT	100% Bond	0.40	0.50
	Free Pipe	54.00	1586.10
1 SECTOR AMP	100% Bond	5.00	0.40
	Free Pipe	95.00	829.20
2 SECTOR AMP	100% Bond	5.00	12.40
	Free Pipe	95.00	879.60
3 SECTOR AMP	100% Bond	5.00	0.20
	Free Pipe	95.00	866.50
4 SECTOR AMP	100% Bond	5.00	1.30
	Free Pipe	95.00	869.30
5 SECTOR AMP	100% Bond	5.00	0.20
	Free Pipe	95.00	831.50
6 SECTOR AMP	100% Bond	5.00	9.20
	Free Pipe	95.00	874.10
7 SECTOR AMP	100% Bond	5.00	0.50
	Free Pipe	95.00	875.20
8 SECTOR AMP	100% Bond	5.00	4.10
	Free Pipe	95.00	895.50

SBT Constants SBT-AA 316

Last Edited on 26-FEB-2018 08:38

Min Ampl 100% Bond	3.63 MV
Max Ampl 0% Bond	81.03 MV
Casing Size	4.50 IN
Casing Weight	11.6 LB/F
3' TT Correction	-999.0 US
DT Fluid	200.0 US/F
Fast Formation TT	38.5 US/F
Cement Cmpr Strength	580 PSI
Casing Velocity	57.00 US/F
Maximum Attenuation	12.00 DB/F
Cement Weight	0.00 LB/G

COMPANY	VANGUARD OPERATING LLC.				
WELL	CSF 41C-4-791				
FIELD	MAMM CREEK				
PROVINCE/COUNTY	GARFIELD				
COUNTRY/STATE	U.S.A./COLORADO				
Elevation Kelly Bushing	6557.4	feet	Bottom Log Interval	8270.00	feet
Elevation Drill Floor		feet	Depth Driller	8300.00	feet
Elevation Ground Level	6540.4	feet	Depth Logger	8270.00	feet



Weatherford®

CEMENT BOND LOG