

Company: Noble Energy Inc.

Well: EMMY H25-738

Field: DJ BASIN

County: Weld State: Colorado

UltraSonic Summary Print

| | | | |
|---|--|------------------------------|---------------|
| County: | | Weld | |
| Field: | | DJ BASIN | |
| Location: | | SW SE SEC:25 TWN:3N RNG: 65W | |
| Well: | | EMMY H25-738 | |
| Company: | | Noble Energy Inc. | |
| <div>API Serial No. 05-123-46972</div> <div>Section: 25</div> <div>Township: 3N</div> <div>Range: 65W</div> | | Location: | |
| | | SW SE SEC:25 TWN:3N RNG: 65W | |
| | | | |
| | | Permanent Datum: | Ground Level |
| | | Log Measured From: | Kelly Bushing |
| Drilling Measured From: | | Kelly Bushing | |
| | | Elev.: | K.B. |
| | | | G.L. |
| | | | D.F. |
| | | 30.00 ft | 4835.00 ft |
| | | 4805.00 f | 4835.00 ft |
| | | above Perm.Datum | |

| | | | | |
|---------------------------|----------------|-----------------|----------|--|
| Logging Date | 04-Nov-2018 | | | |
| Run Number | ONE | | | |
| Depth Driller | 17283.00 ft | | | |
| Schlumberger Depth | 6680.00 ft | | | |
| Bottom Log Interval | 6680.00 ft | | | |
| Top Log Interval | 50.00 ft | | | |
| Casing Fluid Type | BRINE | | | |
| Salinity | | | | |
| Density | 8.4 lbm/gal | | | |
| Fluid Level | 8.00 ft | | | |
| BIT/CASING/TUBING STRING | | | | |
| Bit Size | 8.50 in | | | |
| From | 1943.00 ft | | | |
| To | 17283.00 ft | | | |
| Casing/Tubing Size | 5.5 in | | | |
| Weight | 20 lbm/ft | | | |
| Grade | P110 | | | |
| From | 0.00 ft | | | |
| To | 17258.90 ft | | | |
| Max Recorded Temperatures | 218 degF | | | |
| Logger on Bottom | 04-Nov-2018 | | 14:38:00 | |
| Unit Number | Location: | Time | | |
| Recorded By | Justin Ray | Fort Morgan, CO | | |
| Witnessed By | Bill Mansfield | | | |

Disclaimer

THE USE OF AND RELIANCE UPON THIS RECORDED-DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED-DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE AND RELIANCE UPON THE RECORDED-DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED-DATA.

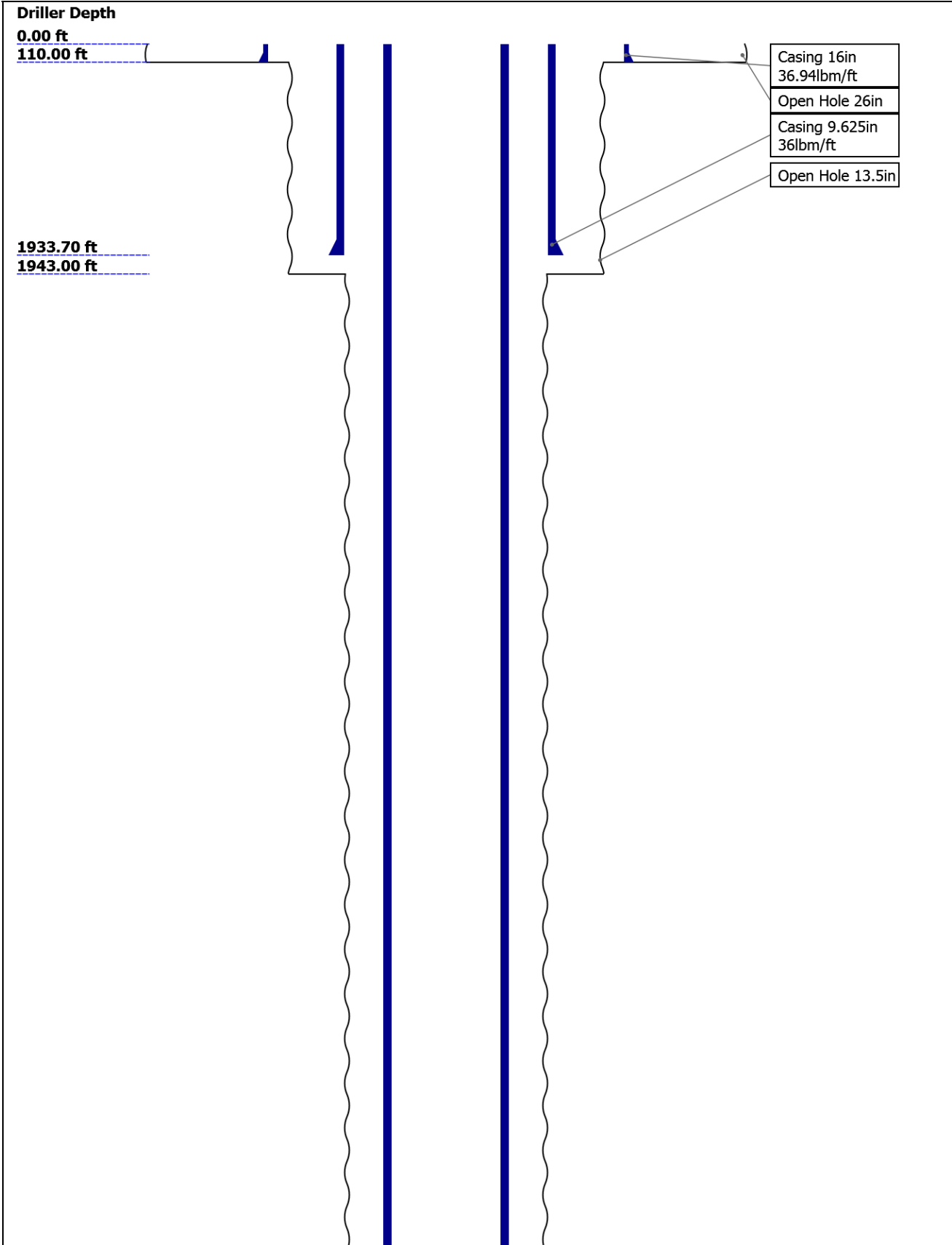
Contents

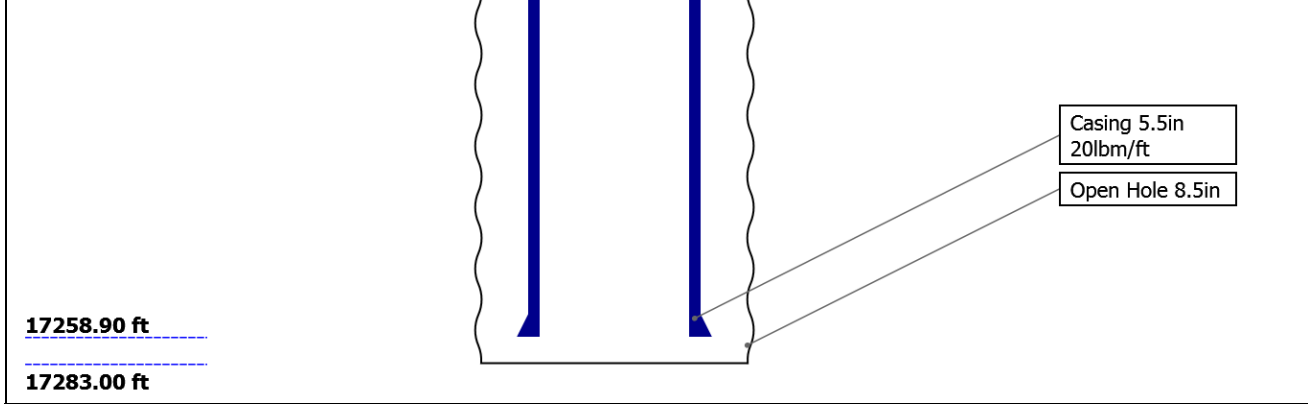
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Well Sketch



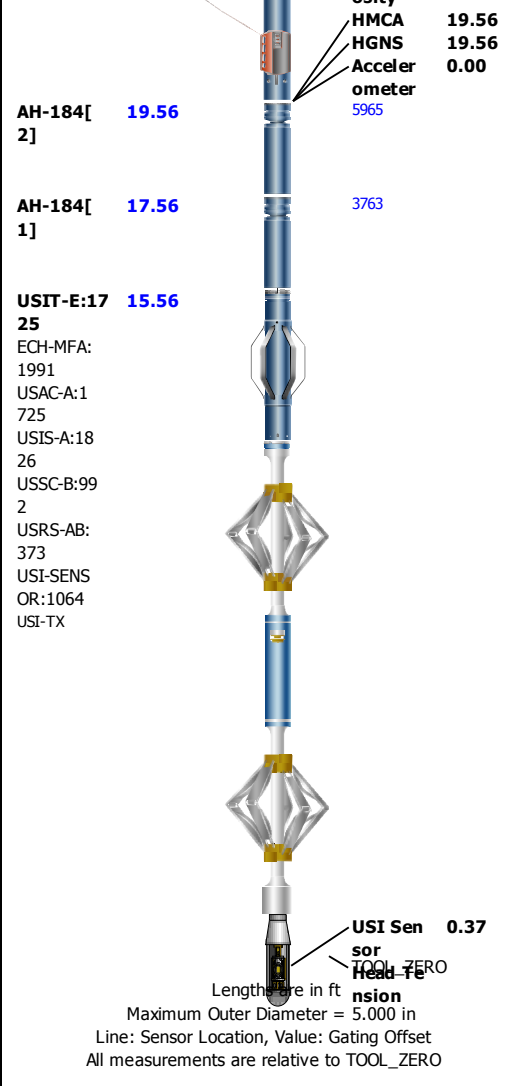


Borehole Size/Casing/Tubing Record

| | | | | | | |
|-----------------------|--------|--------|---------|--|--|--|
| Bit | | | | | | |
| Bit Size (in) | 26 | 13.5 | 8.5 | | | |
| Top Driller (ft) | 0 | 110 | 1943 | | | |
| Top Logger (ft) | 0 | 110 | 1943 | | | |
| Bottom Driller (ft) | 110 | 1943 | 17283 | | | |
| Bottom Logger (ft) | 110 | 1943 | 17283 | | | |
| Casing | | | | | | |
| Size (in) | 16 | 9.625 | 5.5 | | | |
| Weight (lbm/ft) | 36.94 | 36 | 20 | | | |
| Inner Diameter (in) | 15.572 | 8.921 | 4.778 | | | |
| Grade | N/A | J55 | P110 | | | |
| Top Driller (ft) | 0 | 0 | 0 | | | |
| Top Logger (ft) | 0 | 0 | 0 | | | |
| Bottom Driller (ft) | 110 | 1933.7 | 17258.9 | | | |
| Bottom Logger (ft) | 110 | 1933.7 | 17258.9 | | | |

Remarks and Equipment Summary

| ONE: Toolstring | | | | ONE: Remarks | |
|--|--|--|--|--------------|--|
| <div><div><div>Equip nameLengthMP nameOffset</div><div>LEH-QT38.95LEH-QT</div><div>EDTC-B:935.47316EDTH-B:9373EDTG-A:79527EDTC-B:9316</div><div>HGNS-B:428.97736HGNH:2987NPV-NSR-F:G5070HACCZ-BHMCA-BHGNS-B:4736</div></div><div><div>CTEM31.97ACCZ0.00HV0.00Gamma30.1RayTelStatu28.97sTemper28.94atureGR28.23</div><div>CNL Por21.89osity</div></div></div> | Toolstring ran as per tool sketch | | | | |
| | Gemcos, boosters and two knuckles ran for tool centralization | | | | |
| | Main pass logged with 2500 PSI. Repeat Pass logged with 0 PSI. | | | | |
| | Thank you for choosing Schlumberger | | | | |
| | | | | | |



| 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 | 24000.00 ft | | |
| Conveyance Type | Wireline | | |

| | | |
|------------------------------|-----------------------|--|
| Rig Type | CRANE | |
| ONE:Depth Control Parameters | | Depth Control Remarks |
| Log Sequence | First Log In the Well | All Schlumberger depth control procedures followed |
| Rig Up Length At Surface | | IDW used as primary depth control device |
| Rig Up Length At Bottom | | Z-Chart used as secondary depth control device |
| Rig Up Length Correction | | Log correlated to marker joint at 6331.8-6342.7 FT |
| Stretch Correction | | |
| Tool Zero Check At Surface | | |

USIT - Fluid Properties Measurement

| Run Name | Pass Name | Start Depth(ft) | Stop Depth(ft) |
|----------|------------|-----------------|----------------|
| Run 1 | Main[4]:Up | 6686.94 | 49.57 |

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 : 22.50m(73.82ft) to 31.96m(104.87ft)
MUD_N_FRP = 1.20
DFD = 1.01g/cm3(8.40lbm/gal)
CZMD median computed in free pipe normalization interval = 1.71 MRayl

| Start Depth(ft) | Stop Depth(ft) | Start Value(Mrayl) | End Value(Mrayl) |
|-----------------|----------------|--------------------|------------------|
|-----------------|----------------|--------------------|------------------|

ONE

2500 PSI Main Pass

| | |
|------------------|--|
| Software Version | |
|------------------|--|

| | |
|--------------------|-----------------|
| Acquisition System | Version |
| Maxwell 2018 SP2 | 8.2.104493.3100 |

| Pass Summary | |
|--------------|------|
| 1 | 100% |
| 2 | 100% |
| 3 | 100% |
| 4 | 100% |
| 5 | 100% |
| 6 | 100% |
| 7 | 100% |
| 8 | 100% |
| 9 | 100% |
| 10 | 100% |
| 11 | 100% |
| 12 | 100% |
| 13 | 100% |
| 14 | 100% |
| 15 | 100% |
| 16 | 100% |
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| 89 | 100% |
| 90 | 100% |
| 91 | 100% |
| 92 | 100% |
| 93 | 100% |
| 94 | 100% |
| 95 | 100% |
| 96 | 100% |
| 97 | 100% |
| 98 | 100% |
| 99 | 100% |
| 100 | 100% |

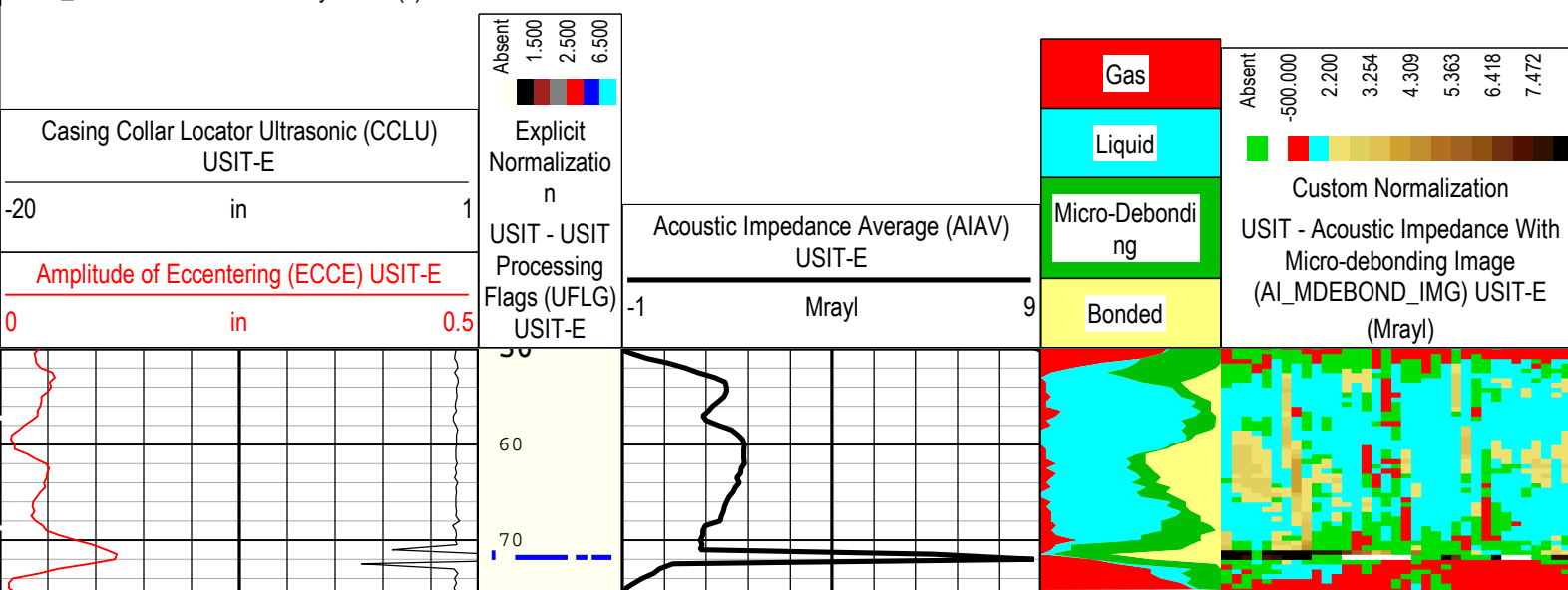
| Run Name | Pass Objective | Direction | Top | Bottom | Start | Stop | DSC Mode | Depth Shift | Include Parallel Data |
|----------|----------------|-----------|----------|------------|---------------------------|---------------------------|----------|-------------|-----------------------|
| ONE | Main[4]:Up | Up | 49.57 ft | 6686.94 ft | 04-Nov-2018 2:49:08 PM | 04-Nov-2018 3:28:32 PM | ON | -3.72 ft | Yes |

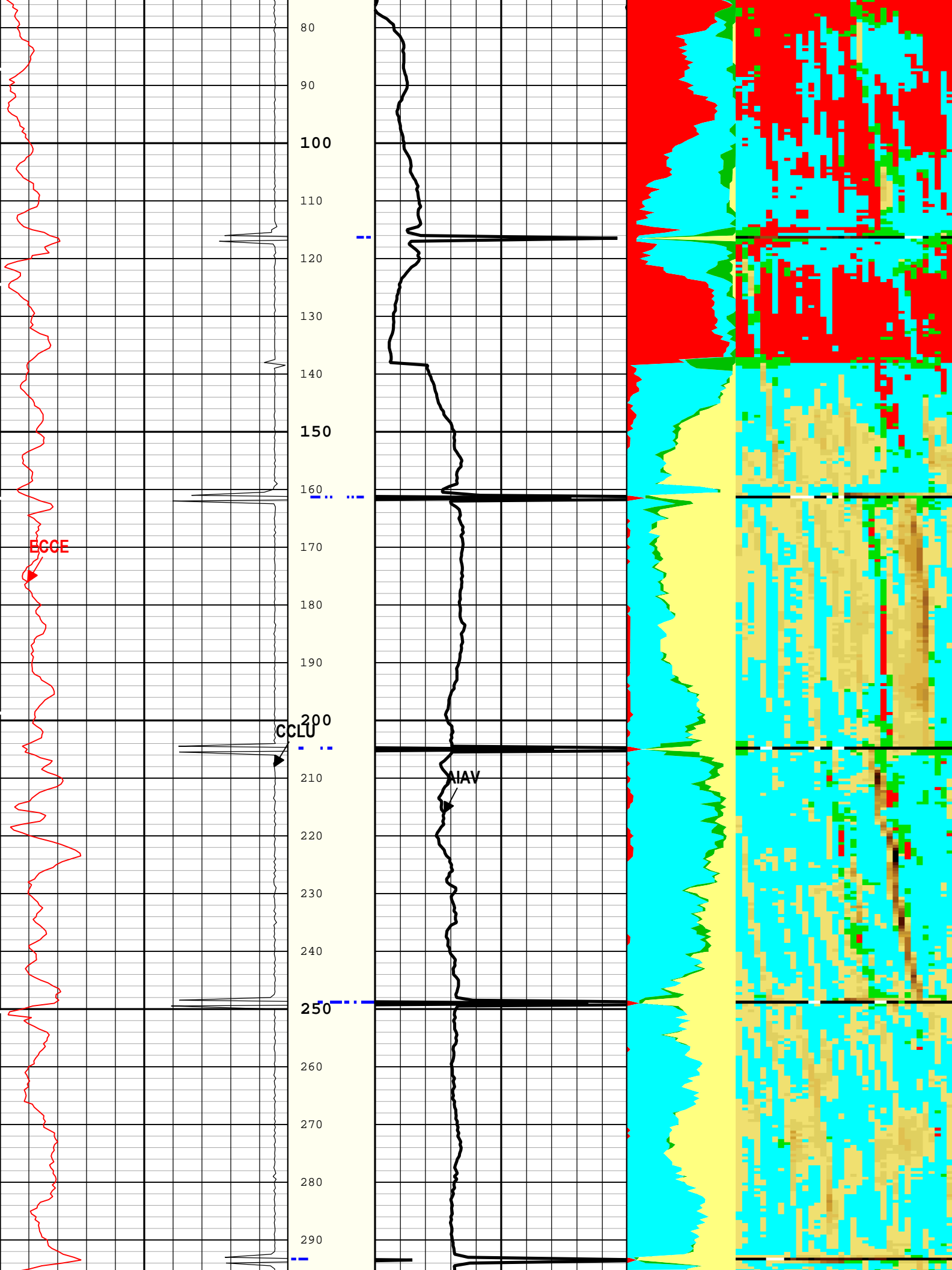
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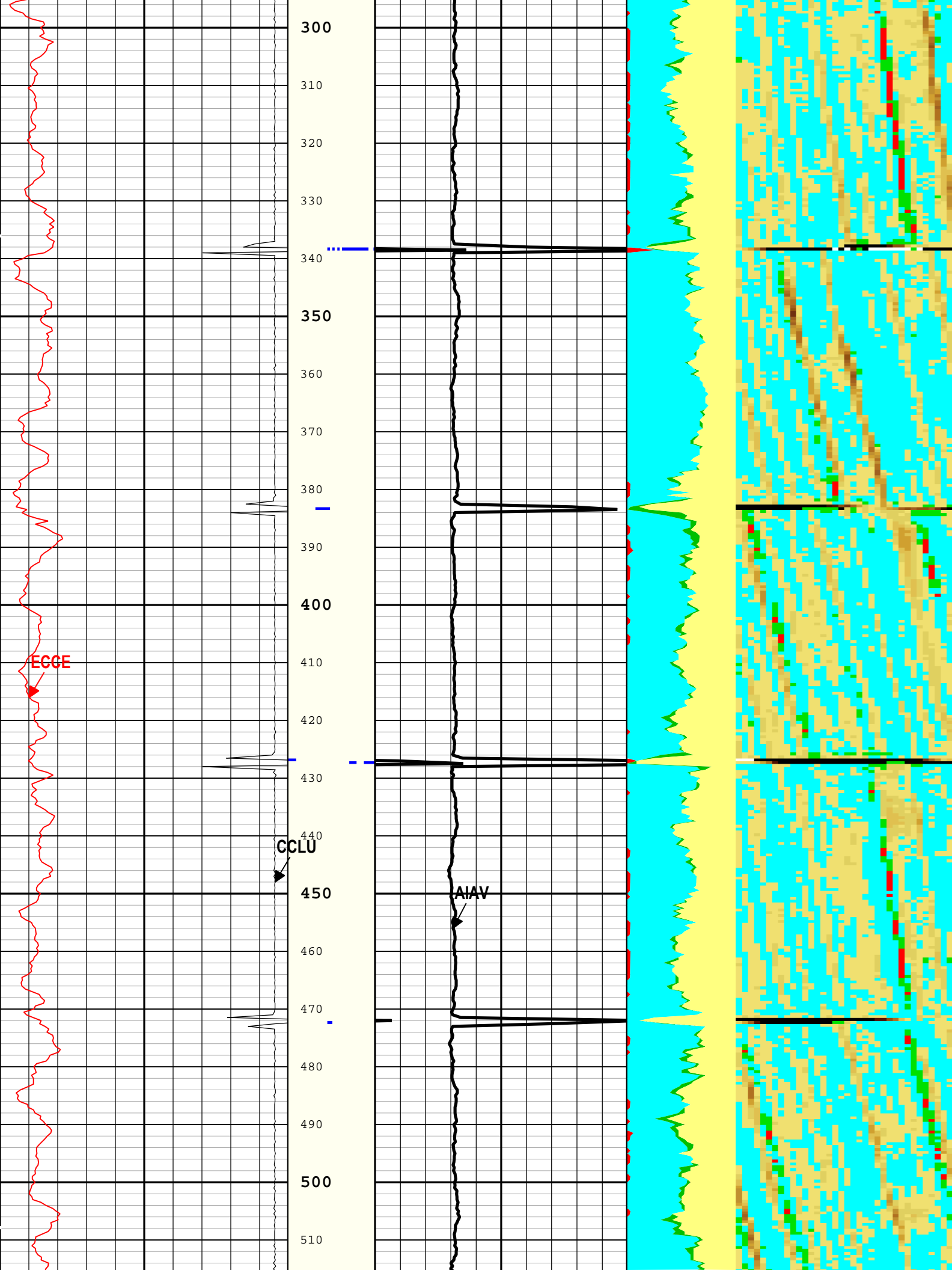
| | | |
|-----|---------------------------|----------------------|
| Log | Company:Noble Energy Inc. | Well:EMMY H25-738 |
| | | ONE: Main[4]:Up:S008 |

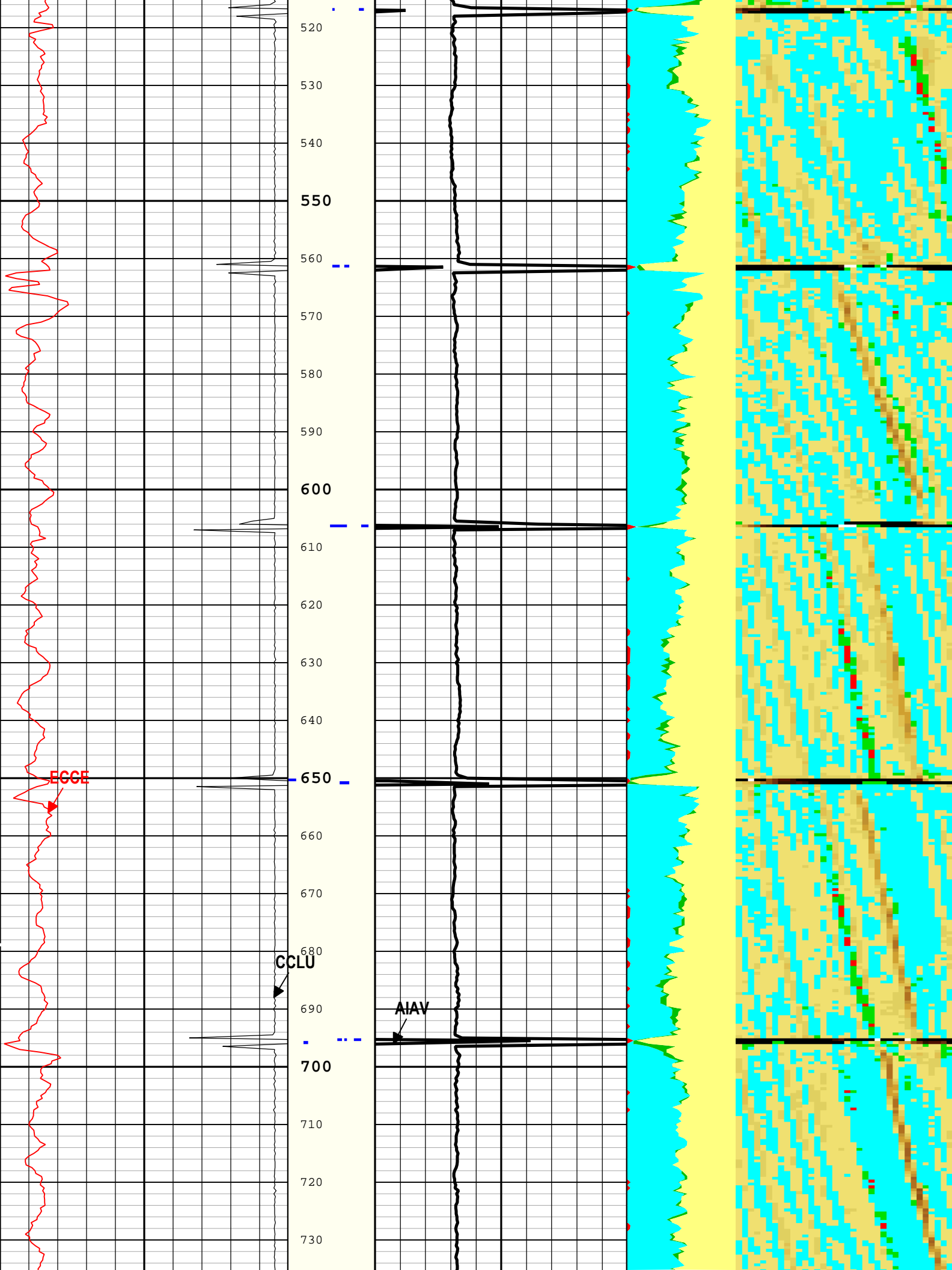
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Creation Date: 04-Nov-2018 21:04:02

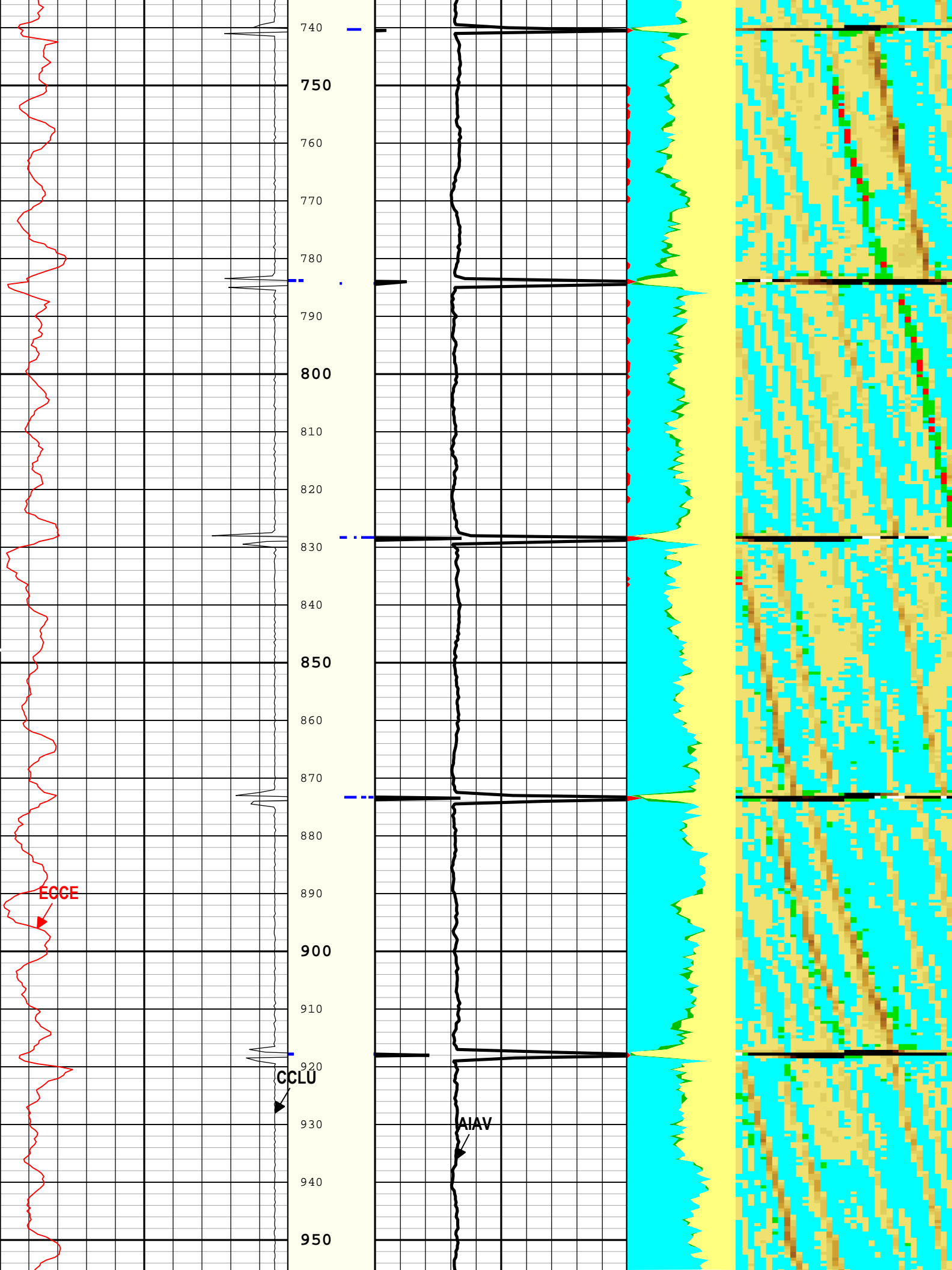
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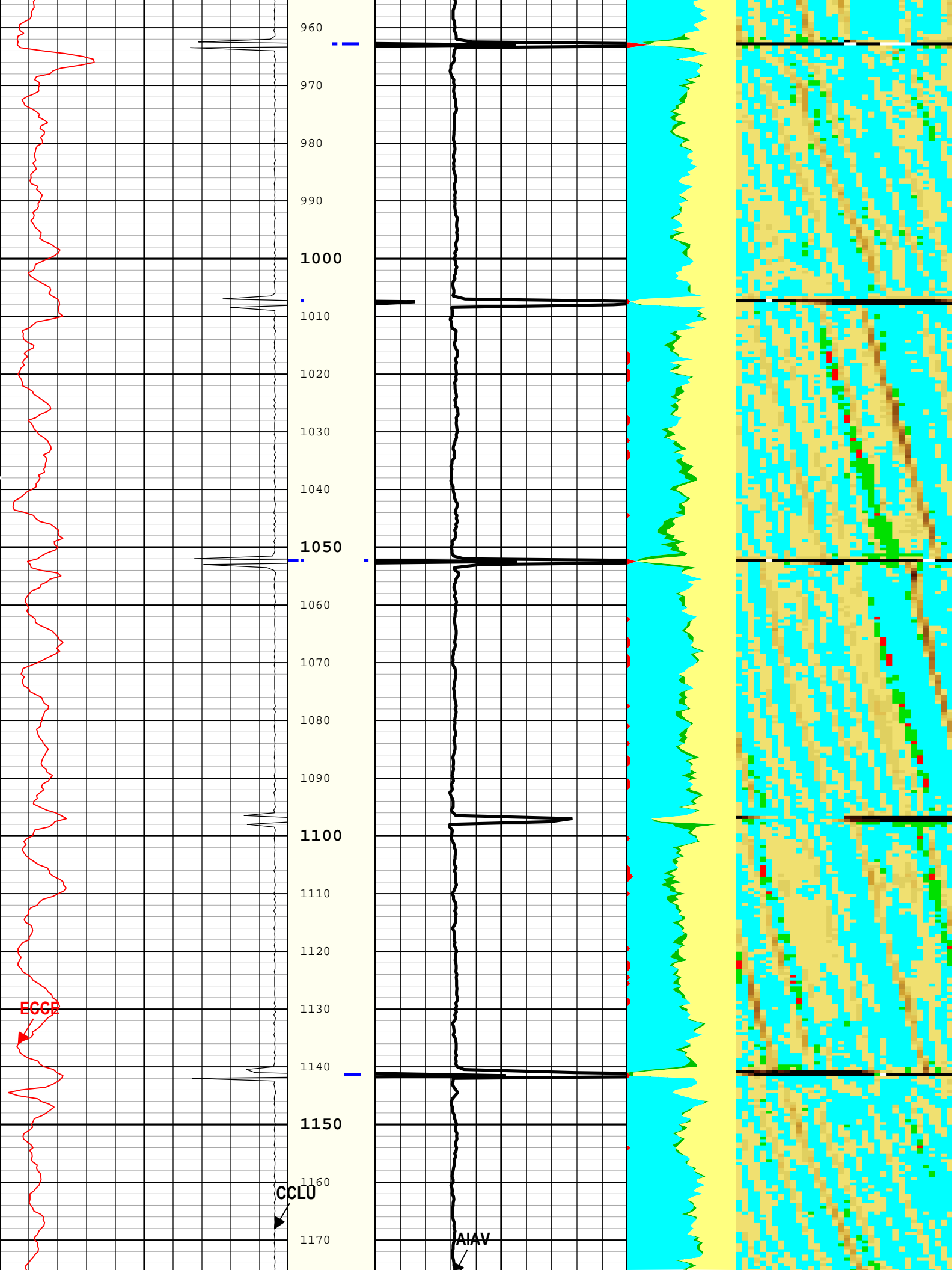


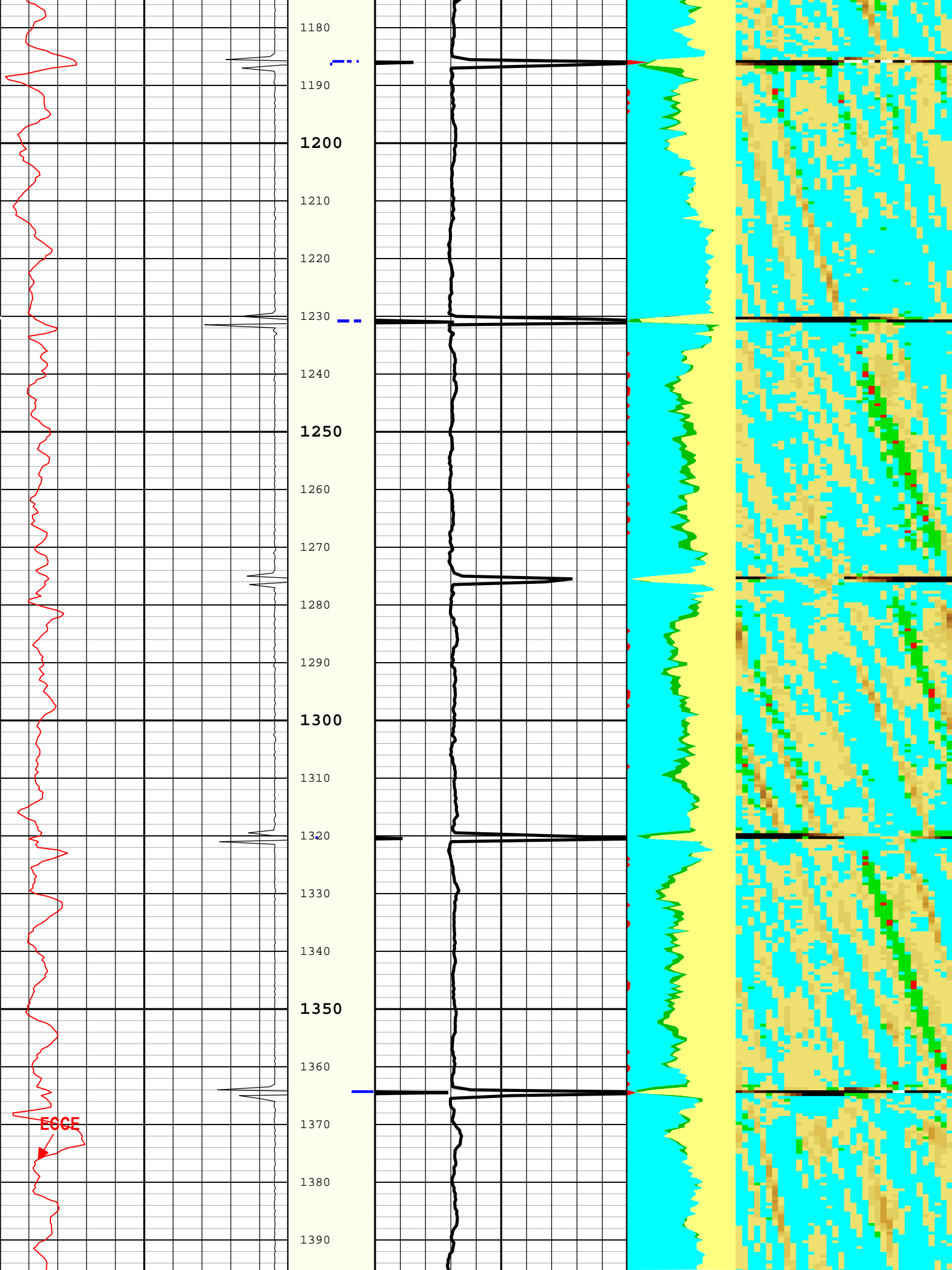


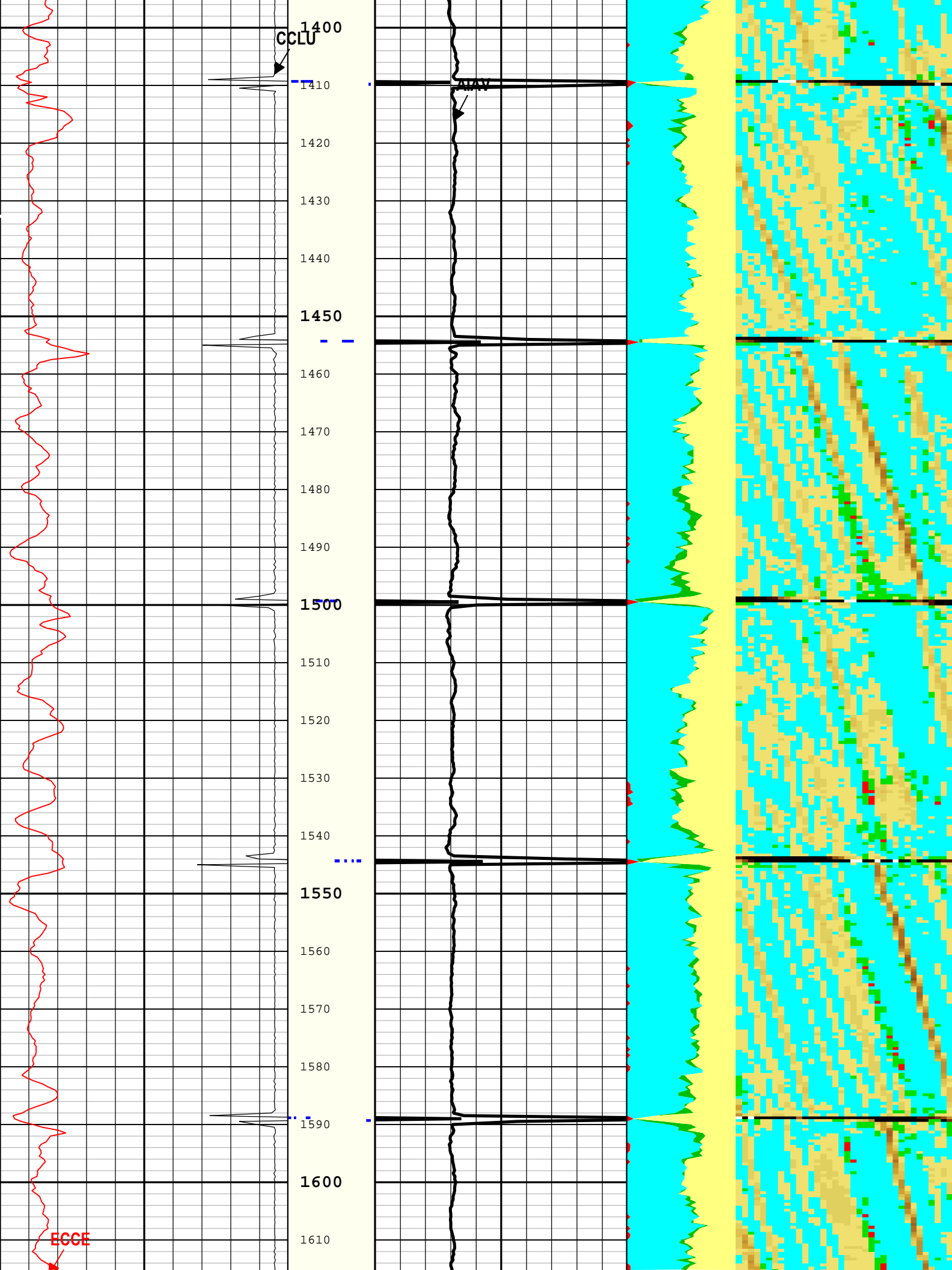


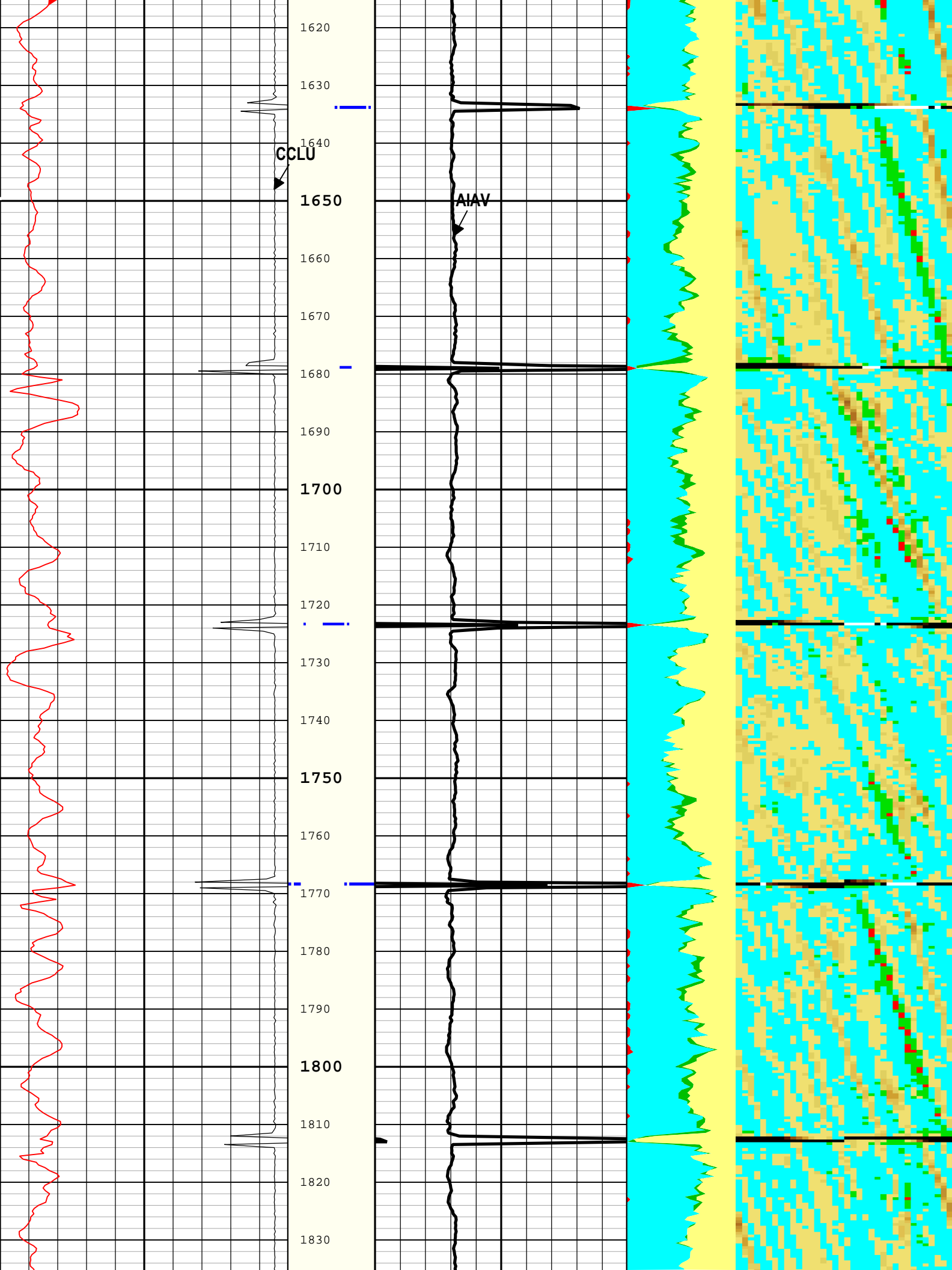


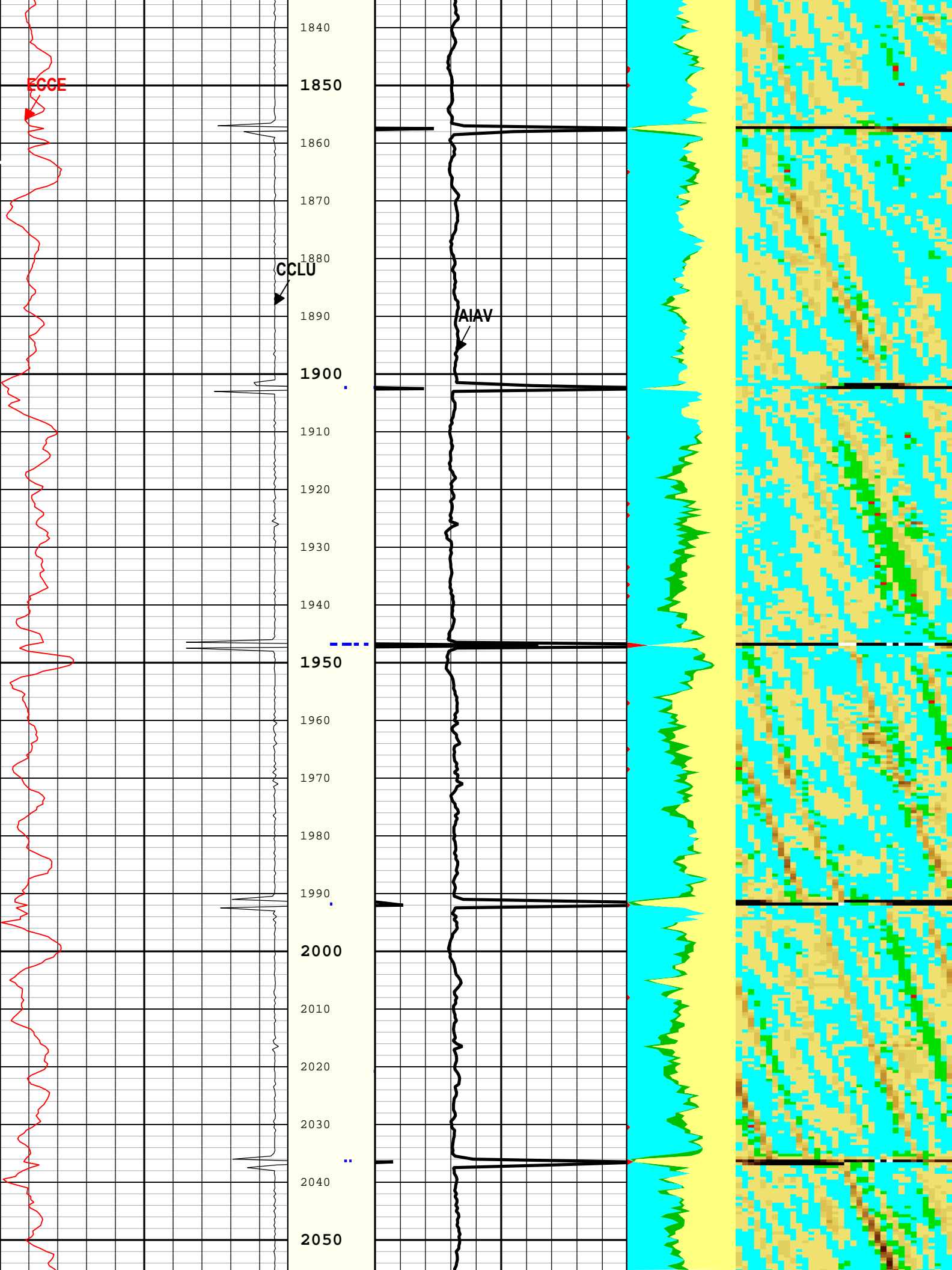


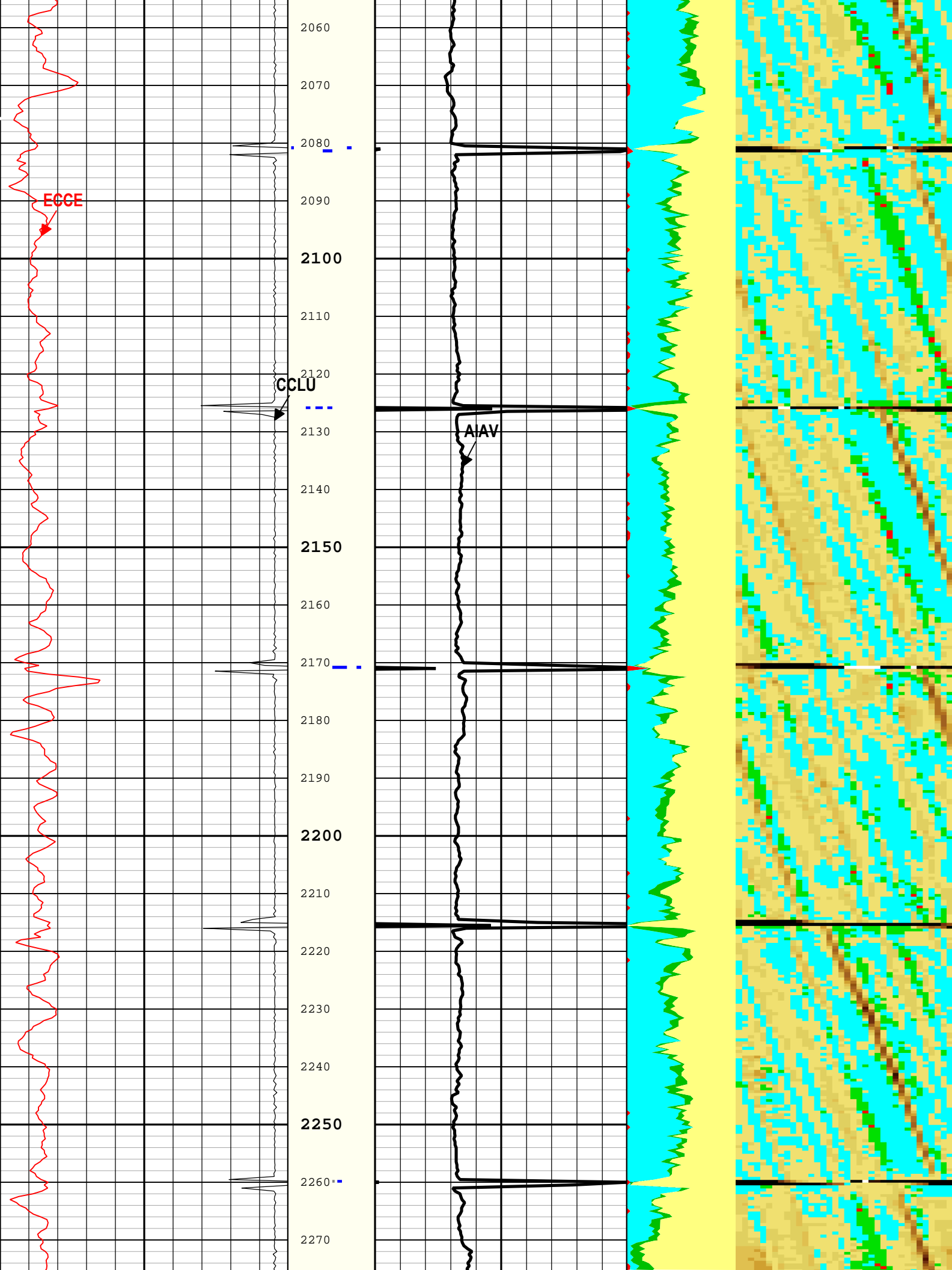


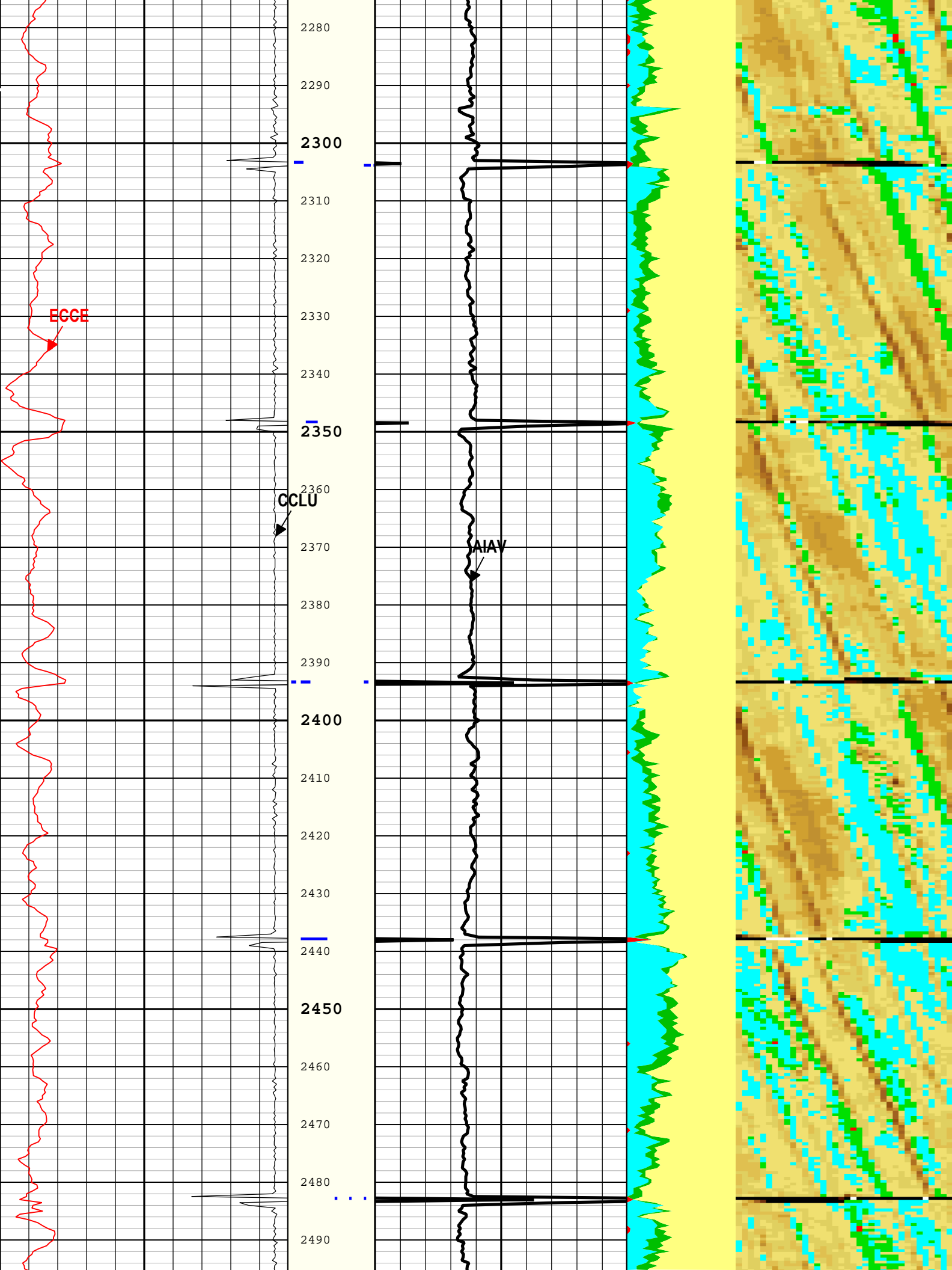


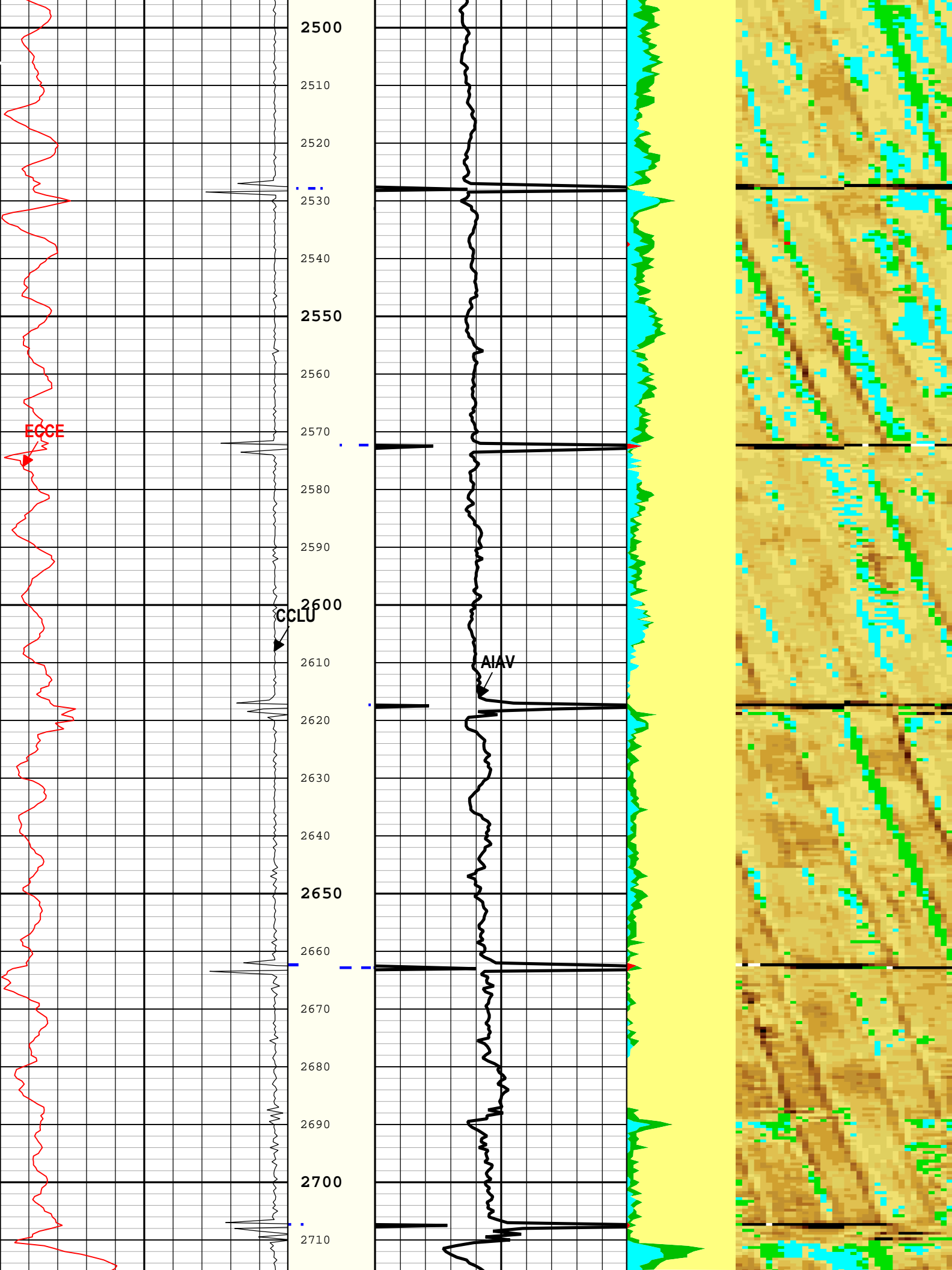


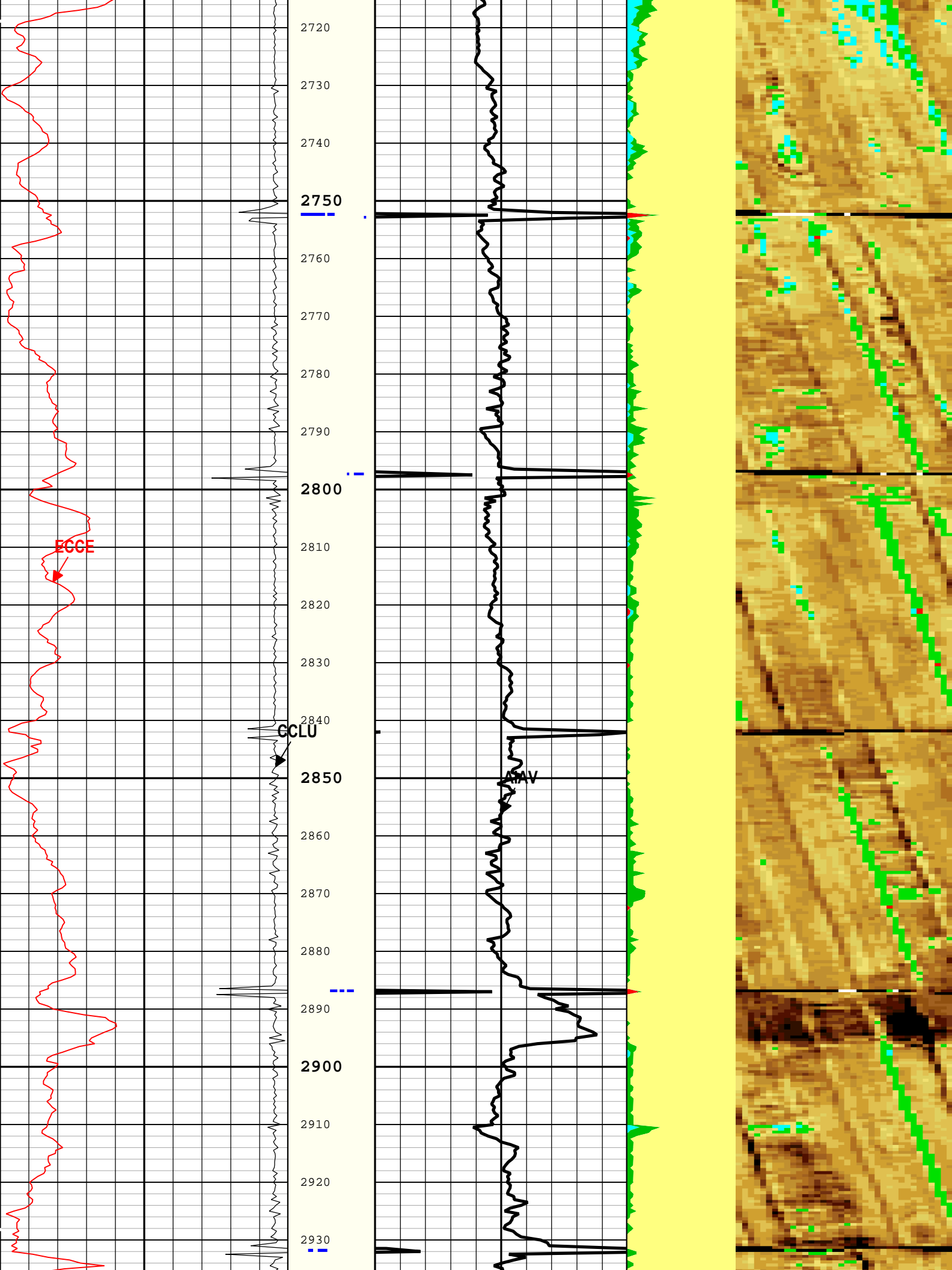


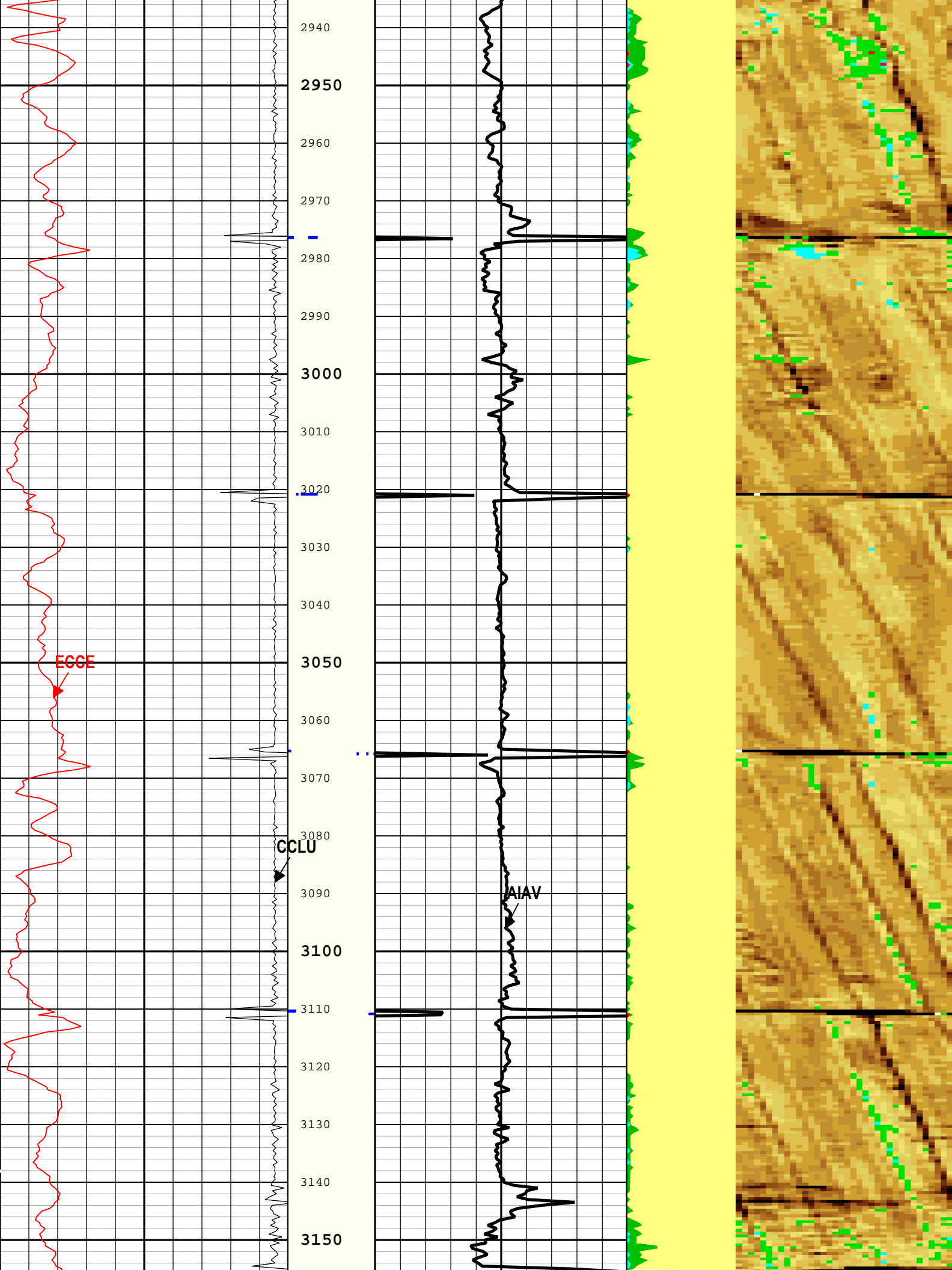


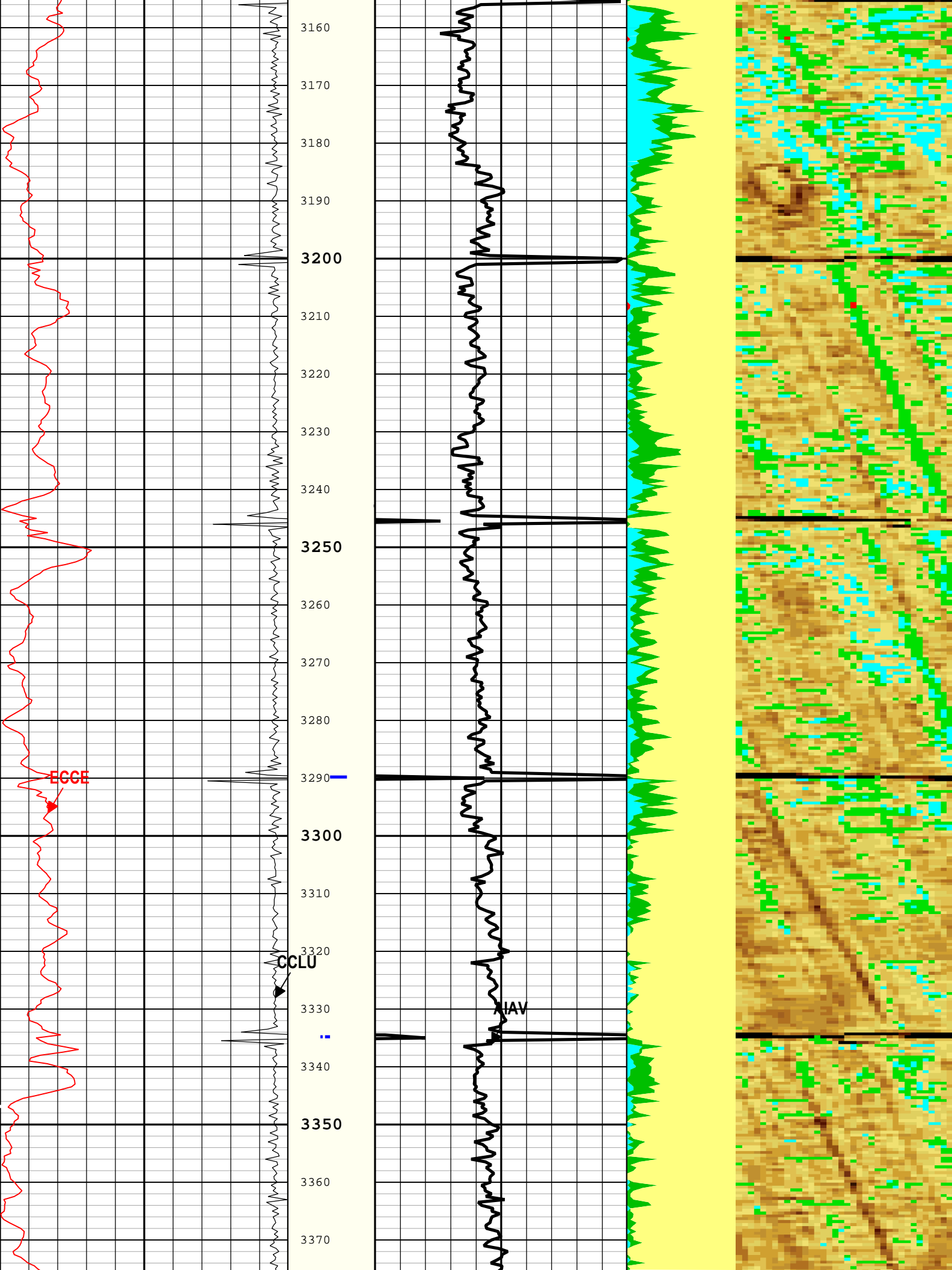


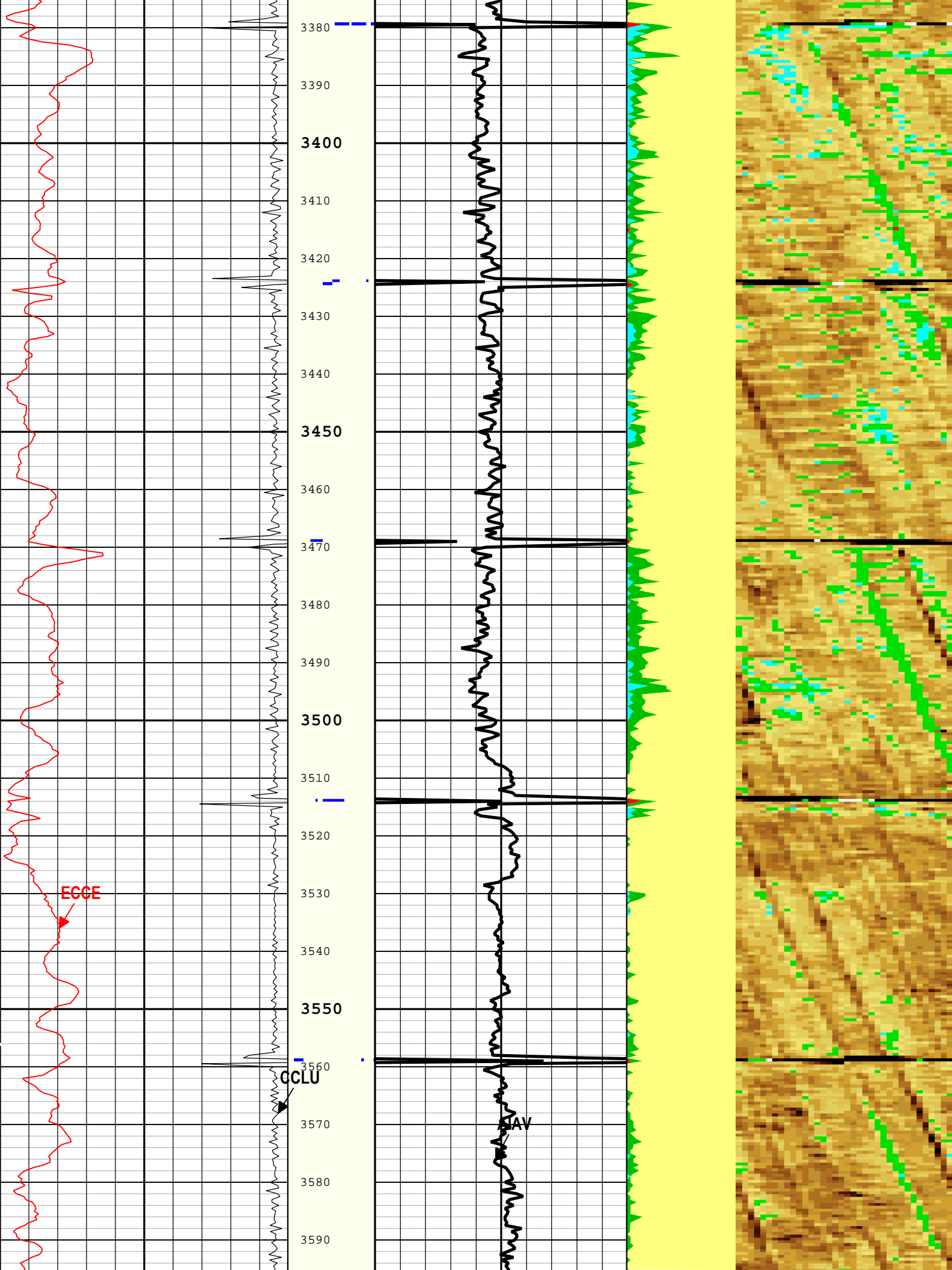


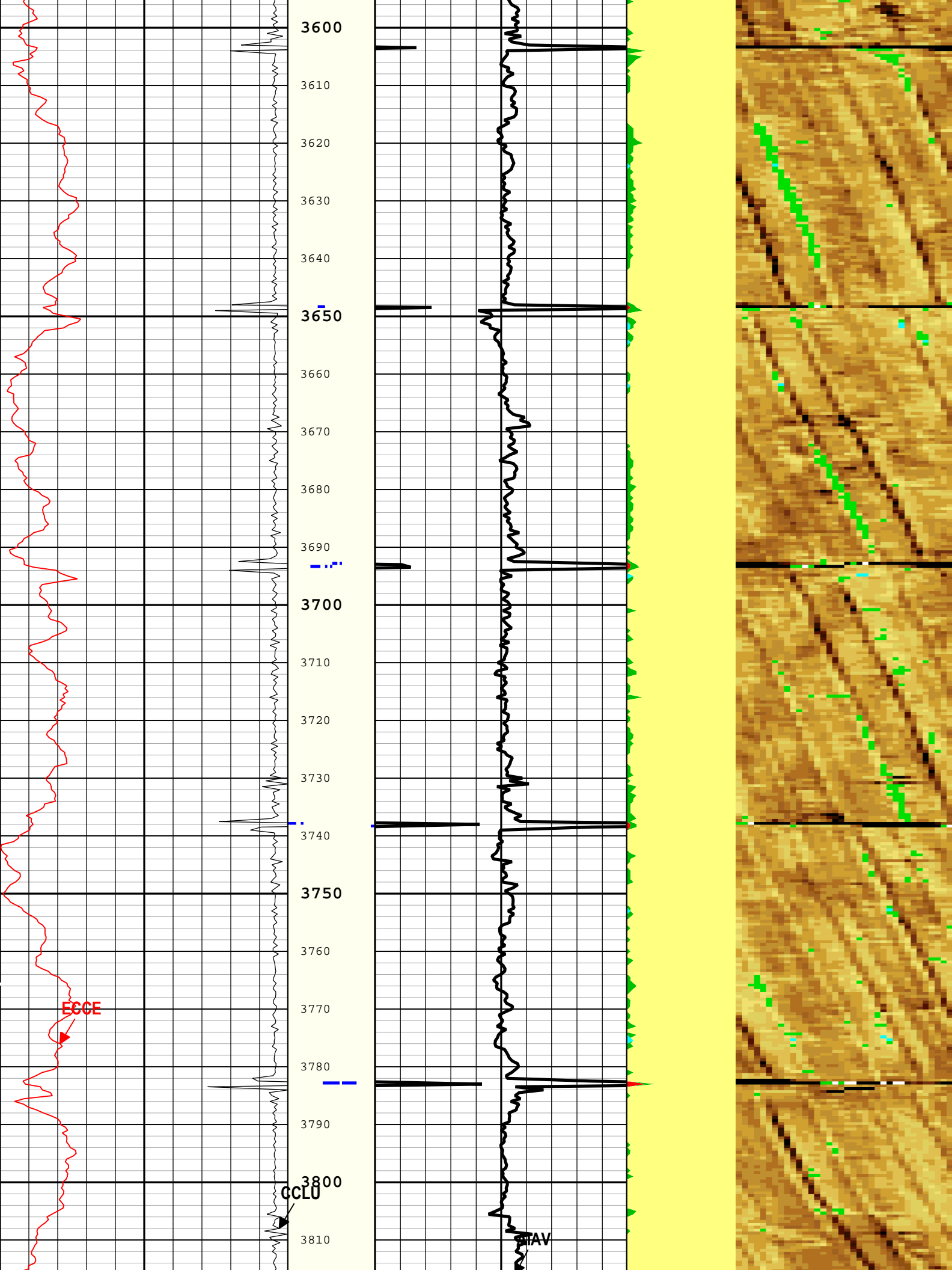


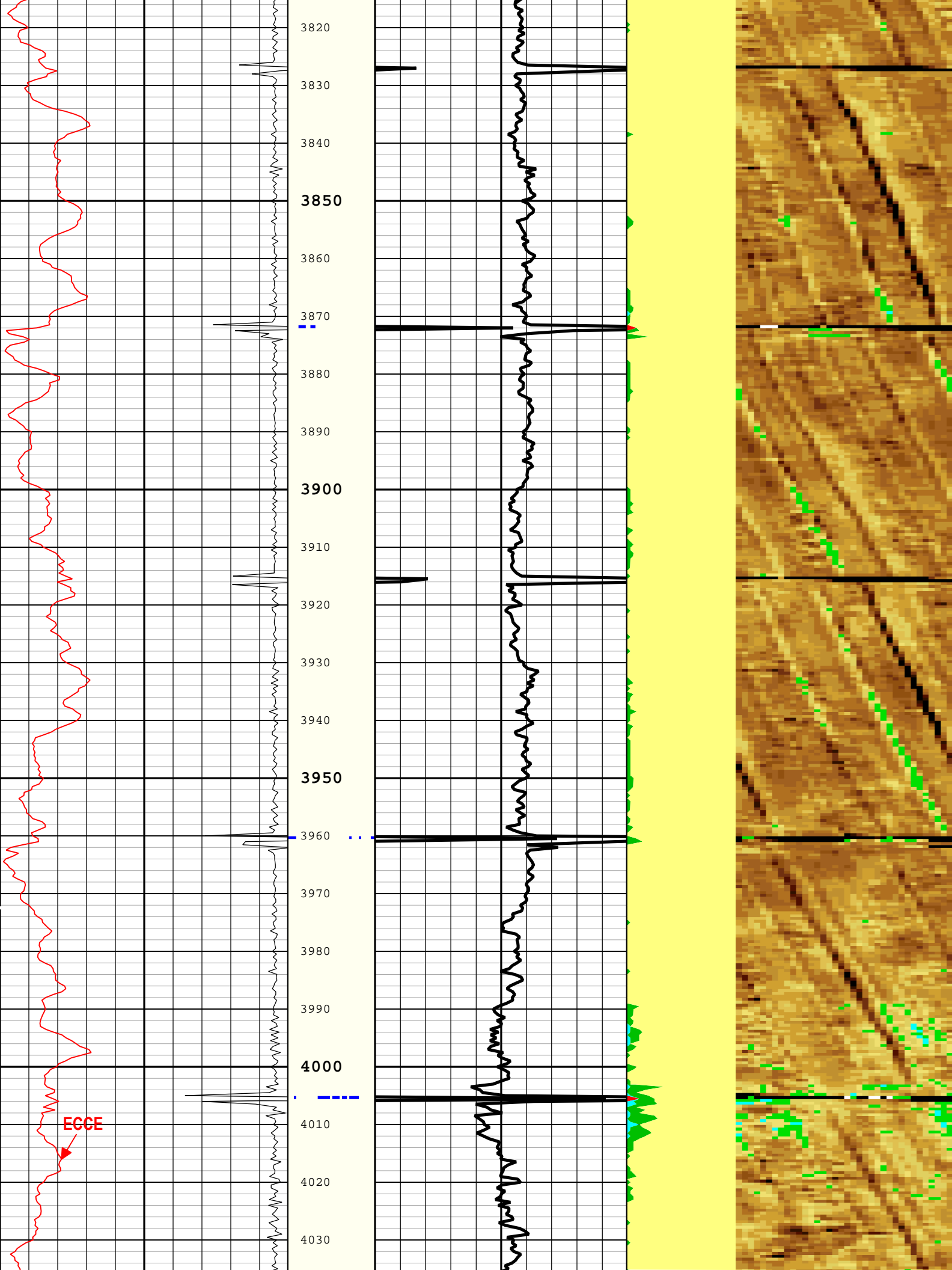


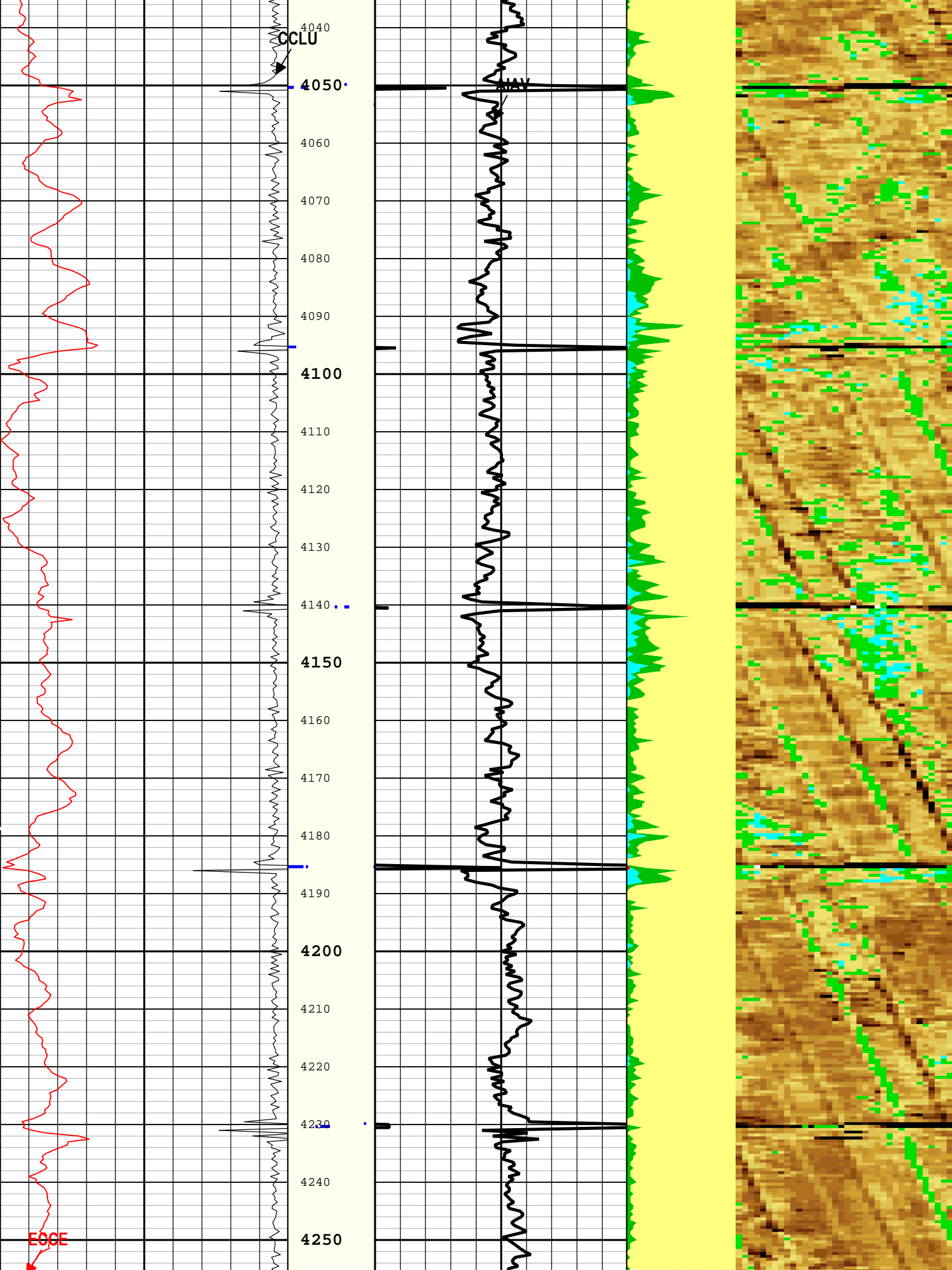


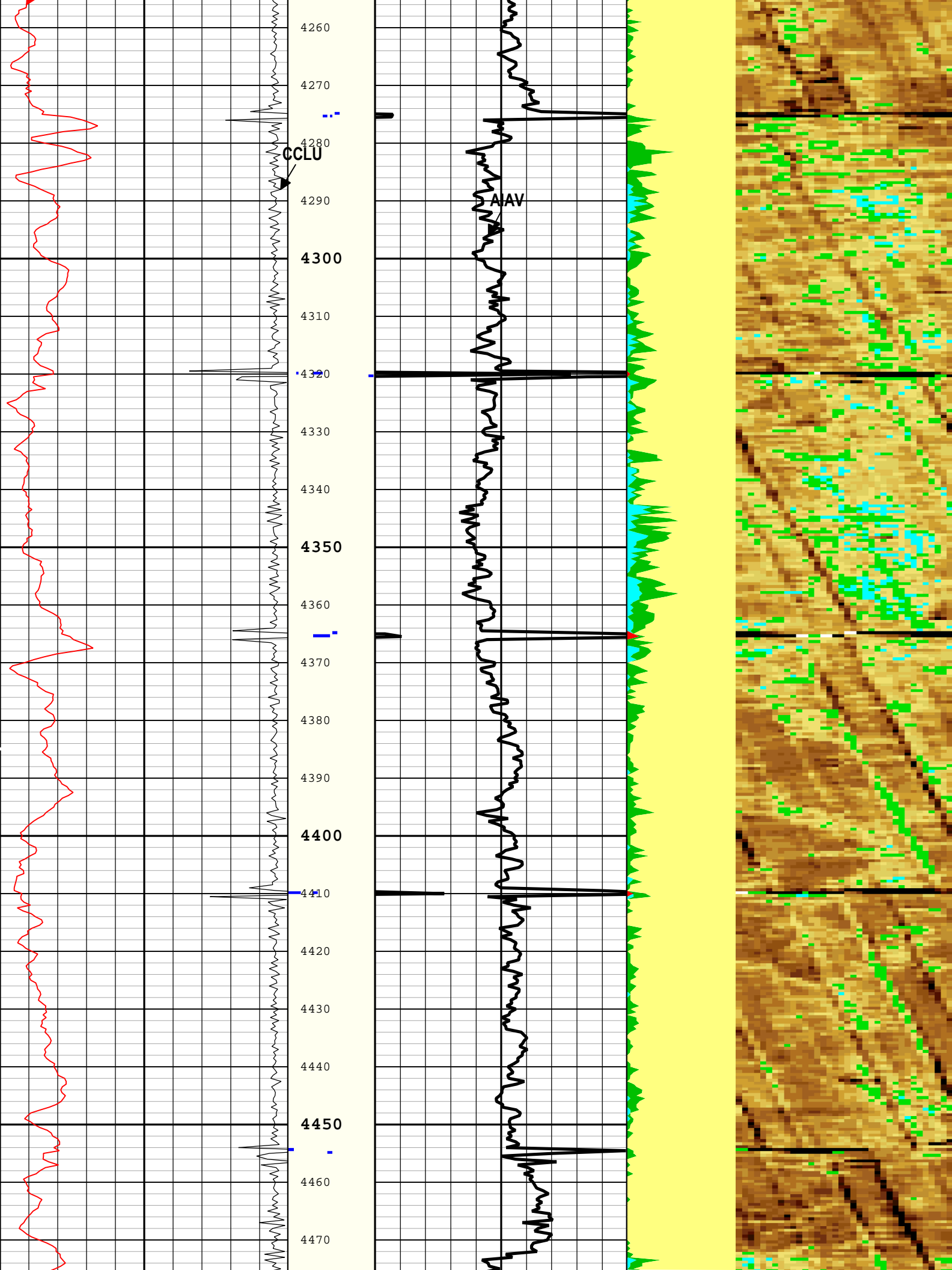


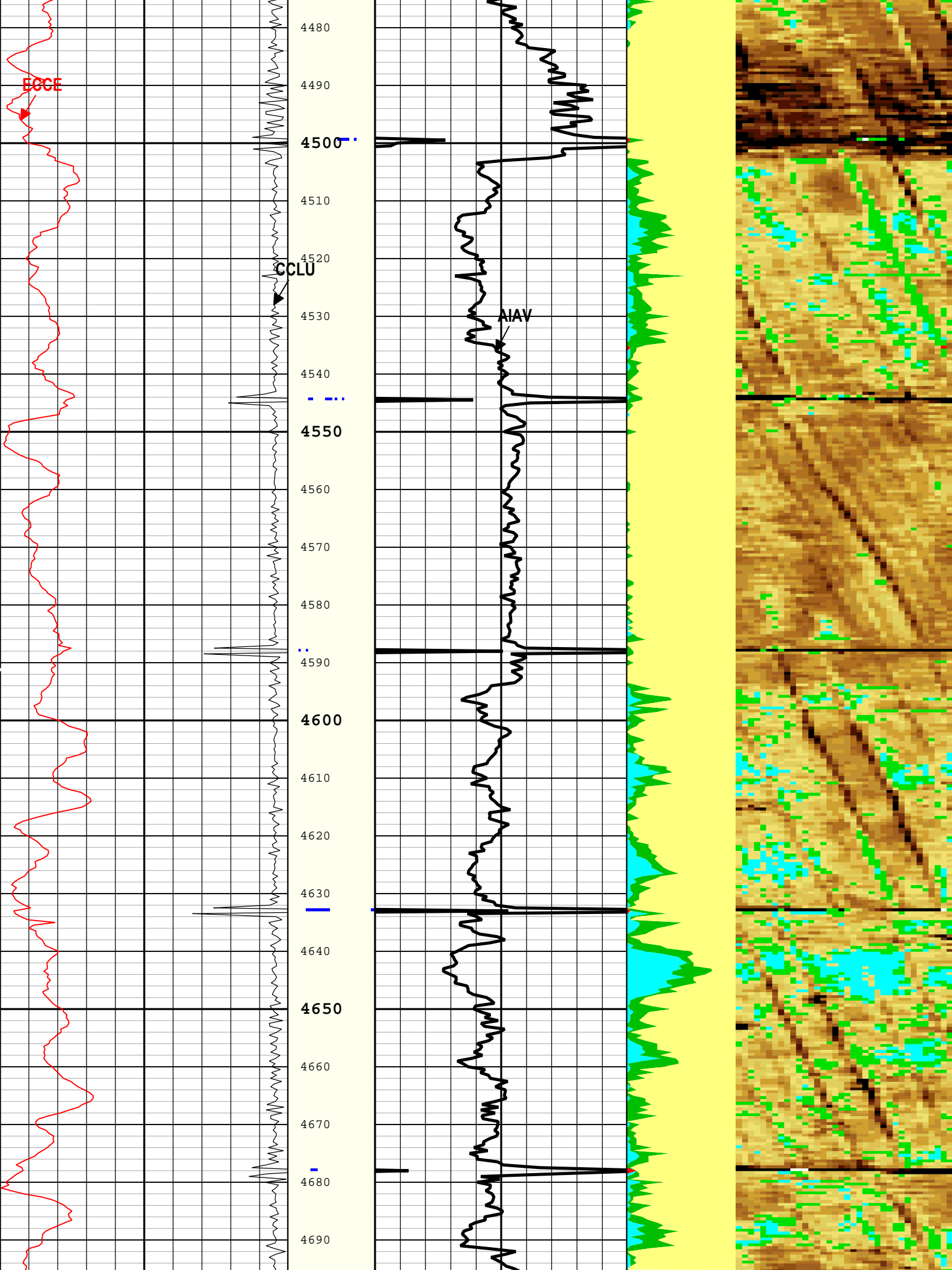


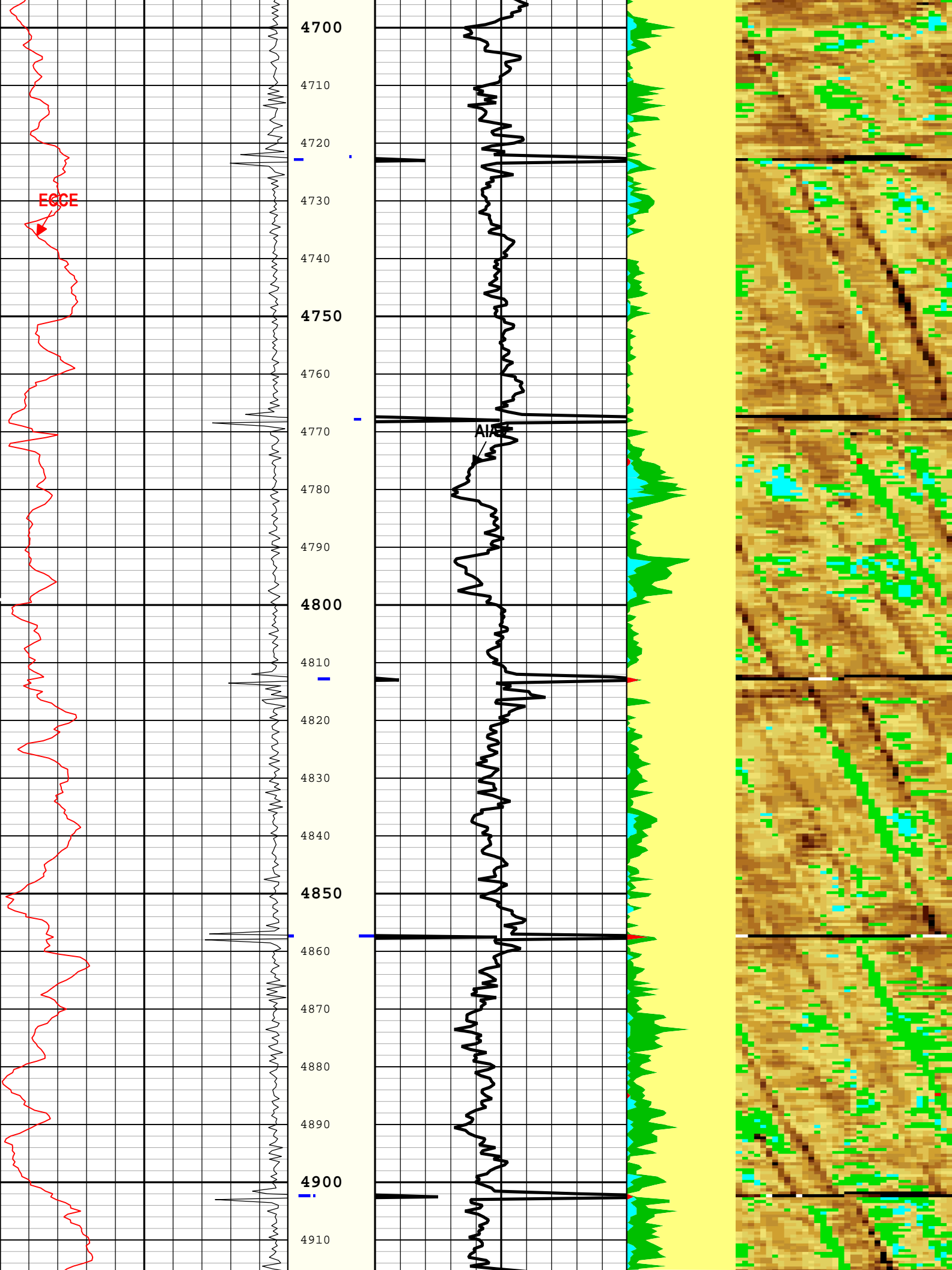


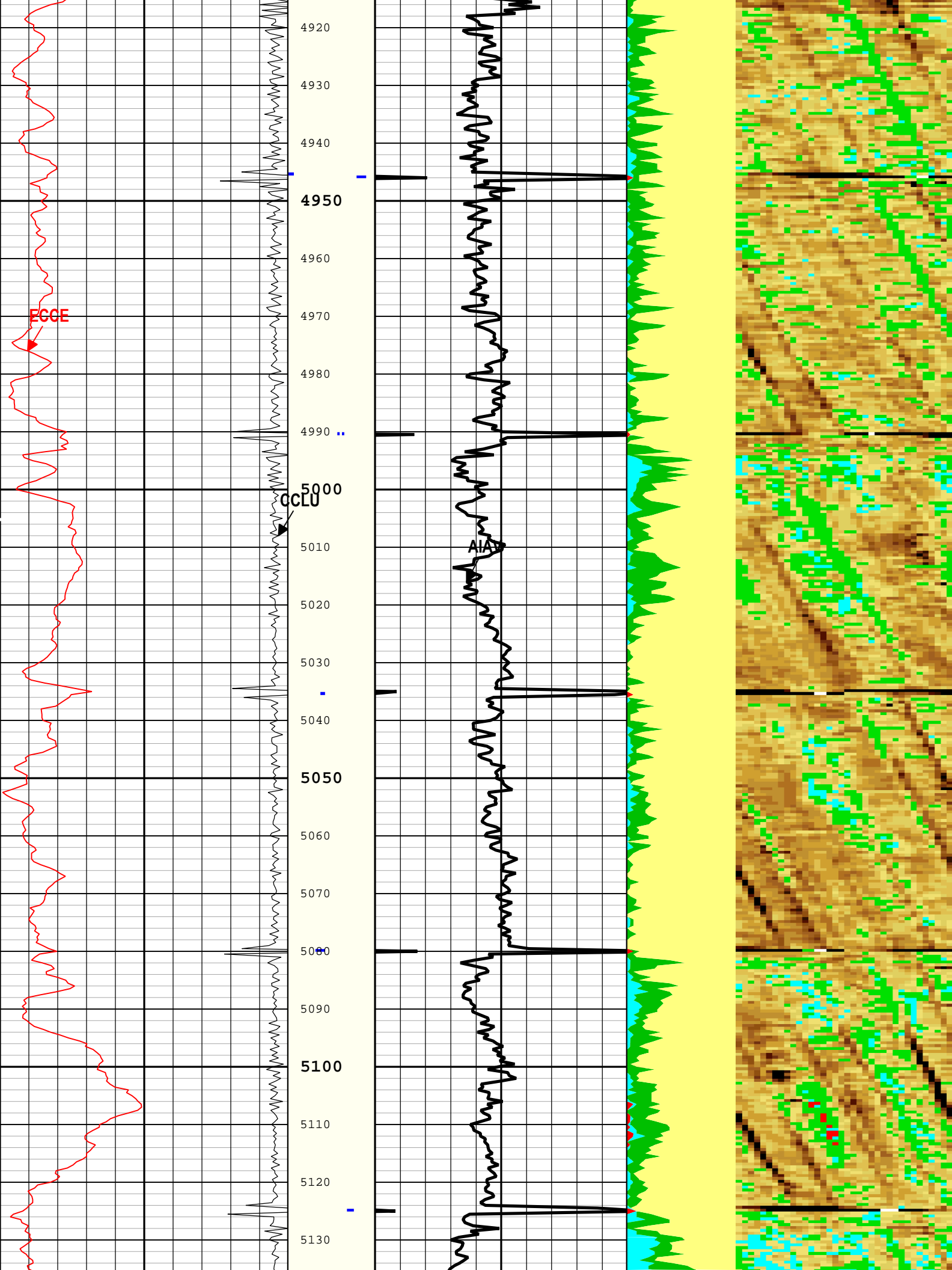


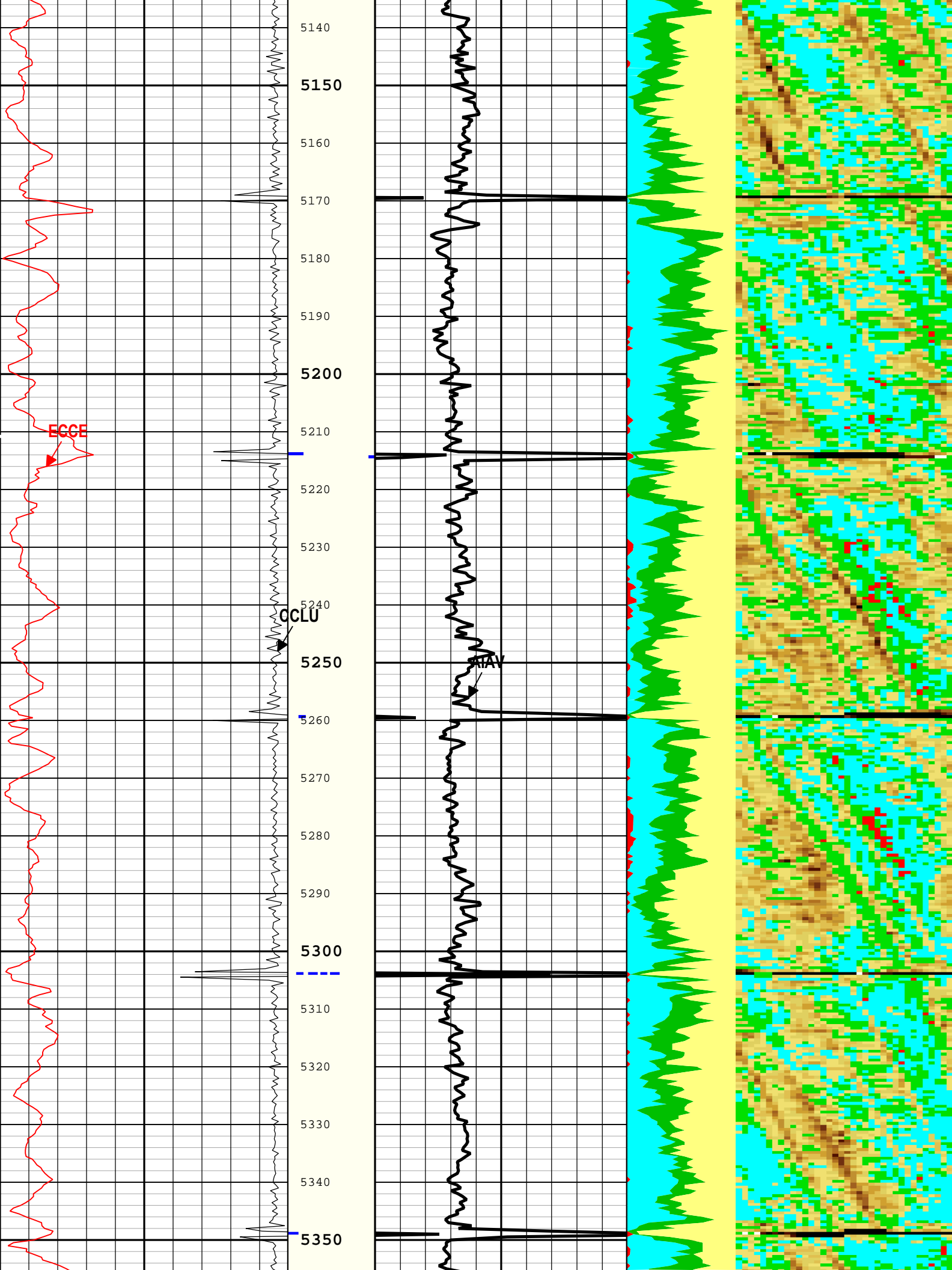


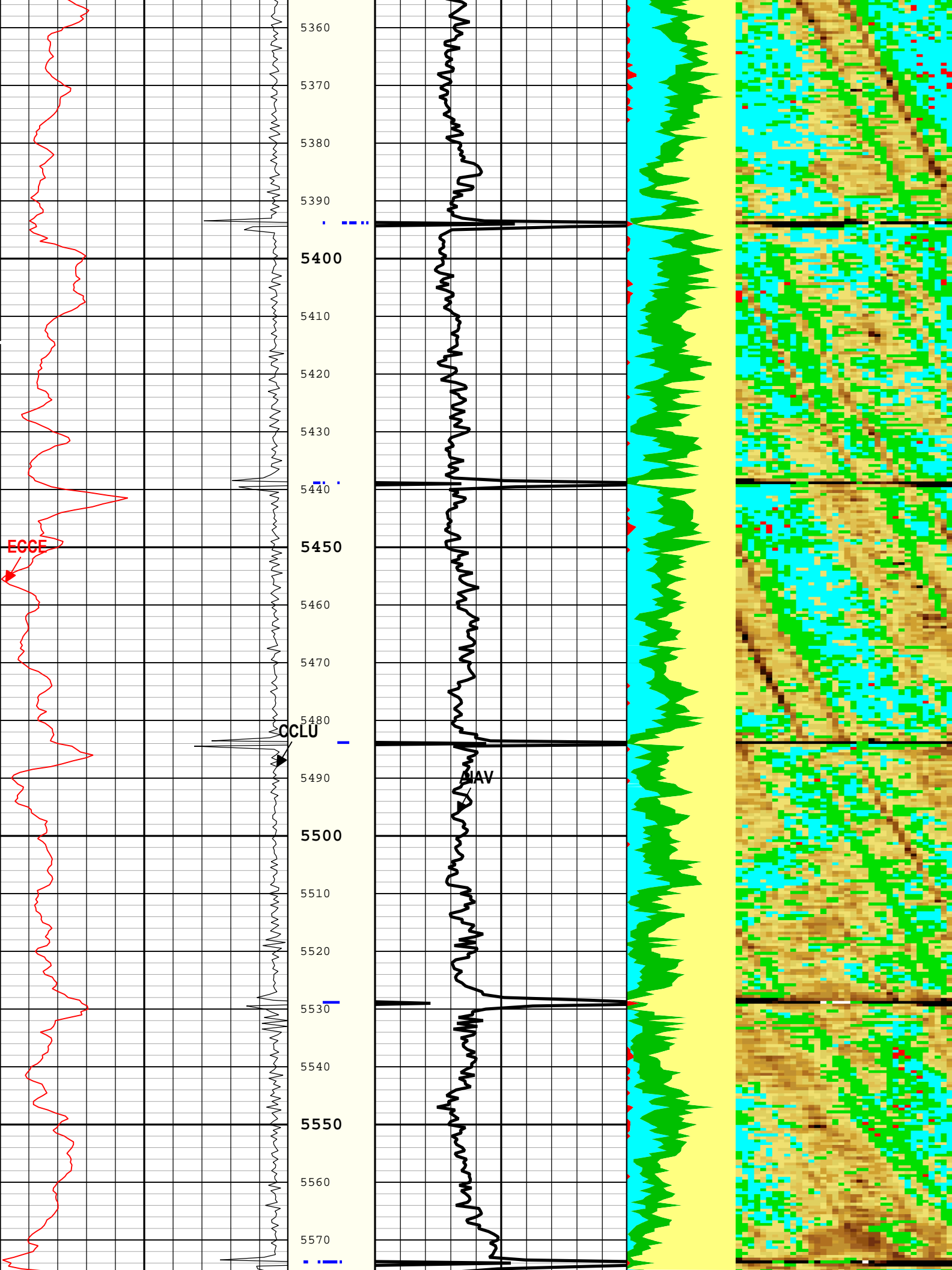


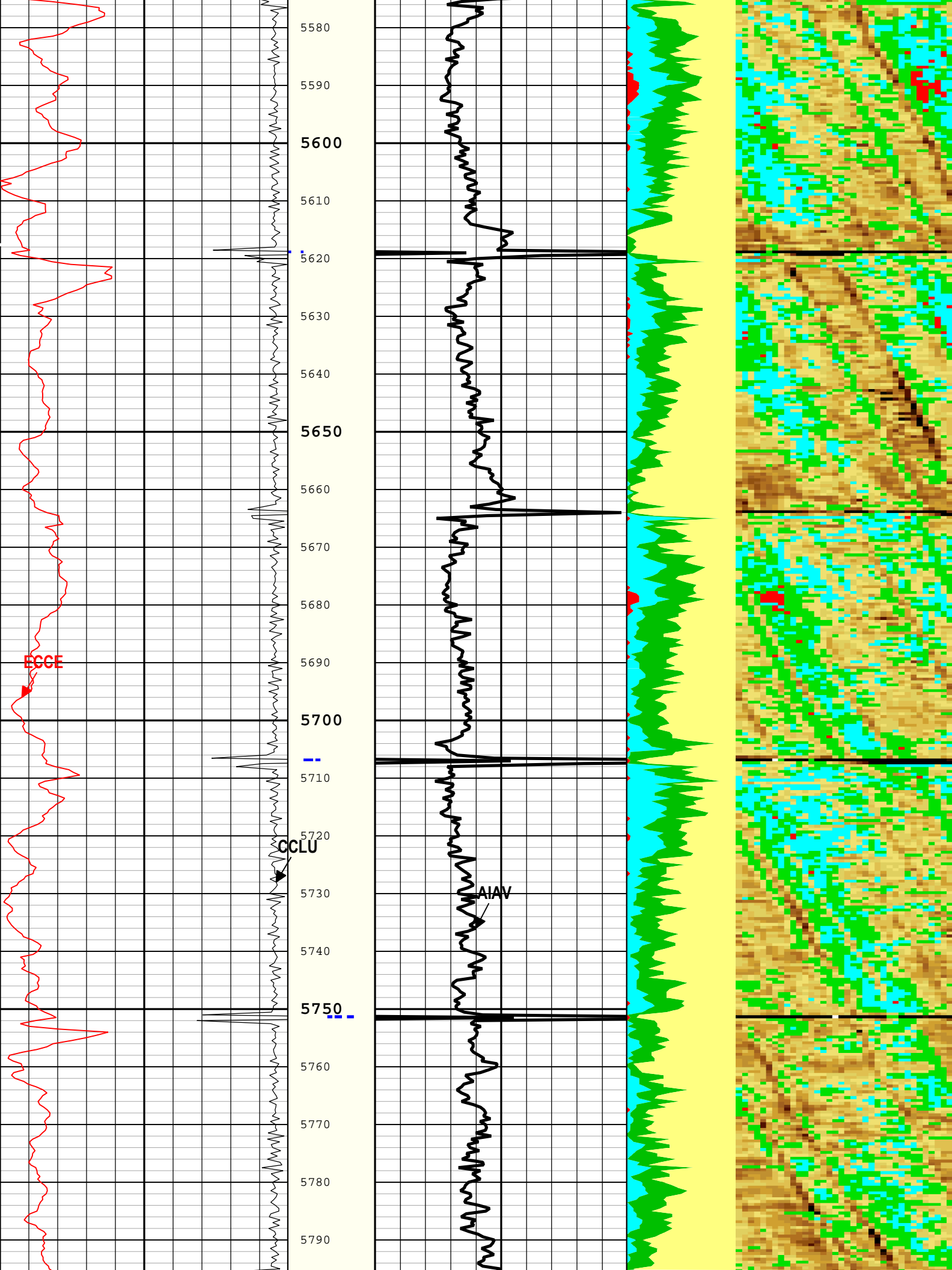


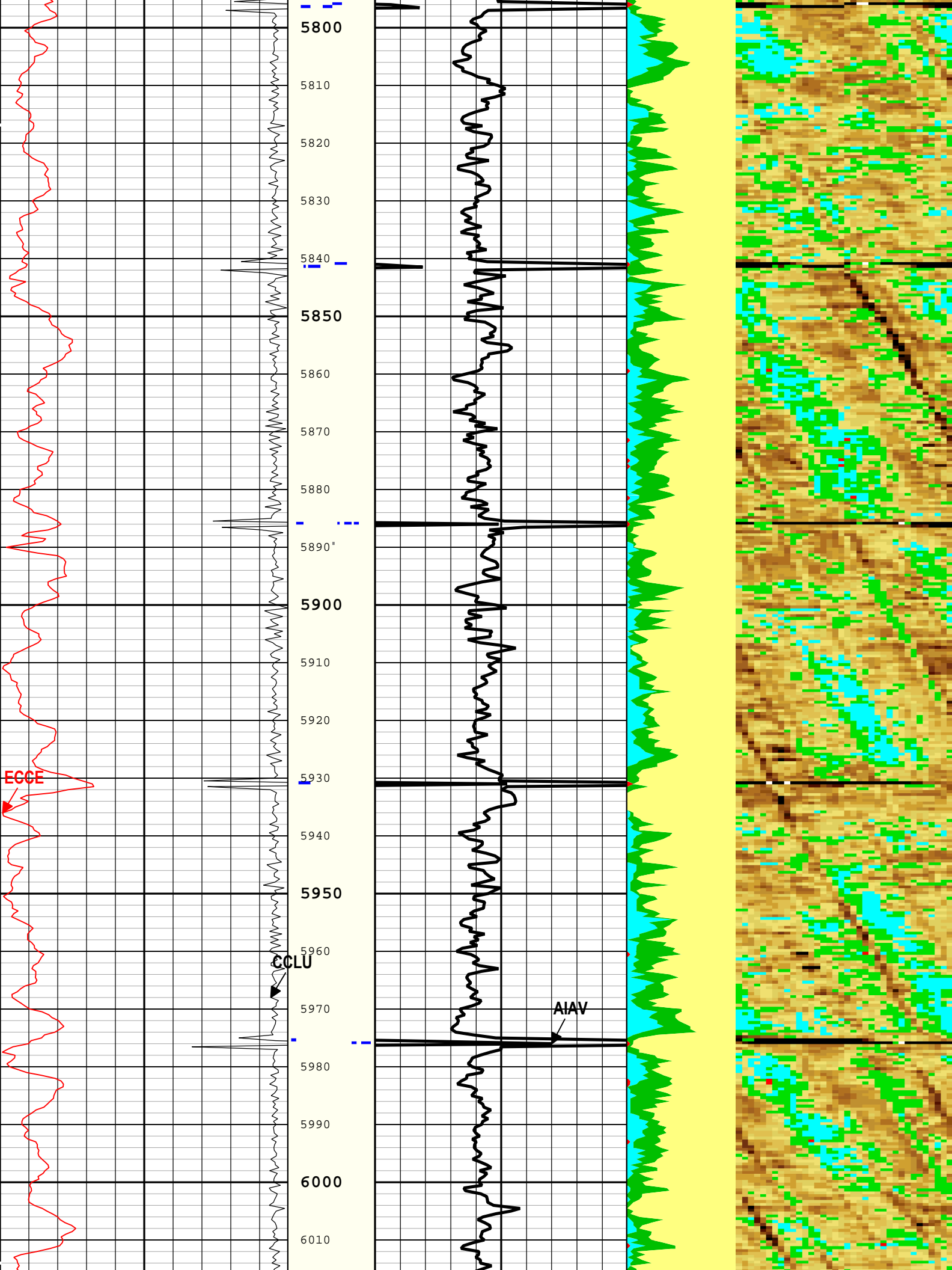


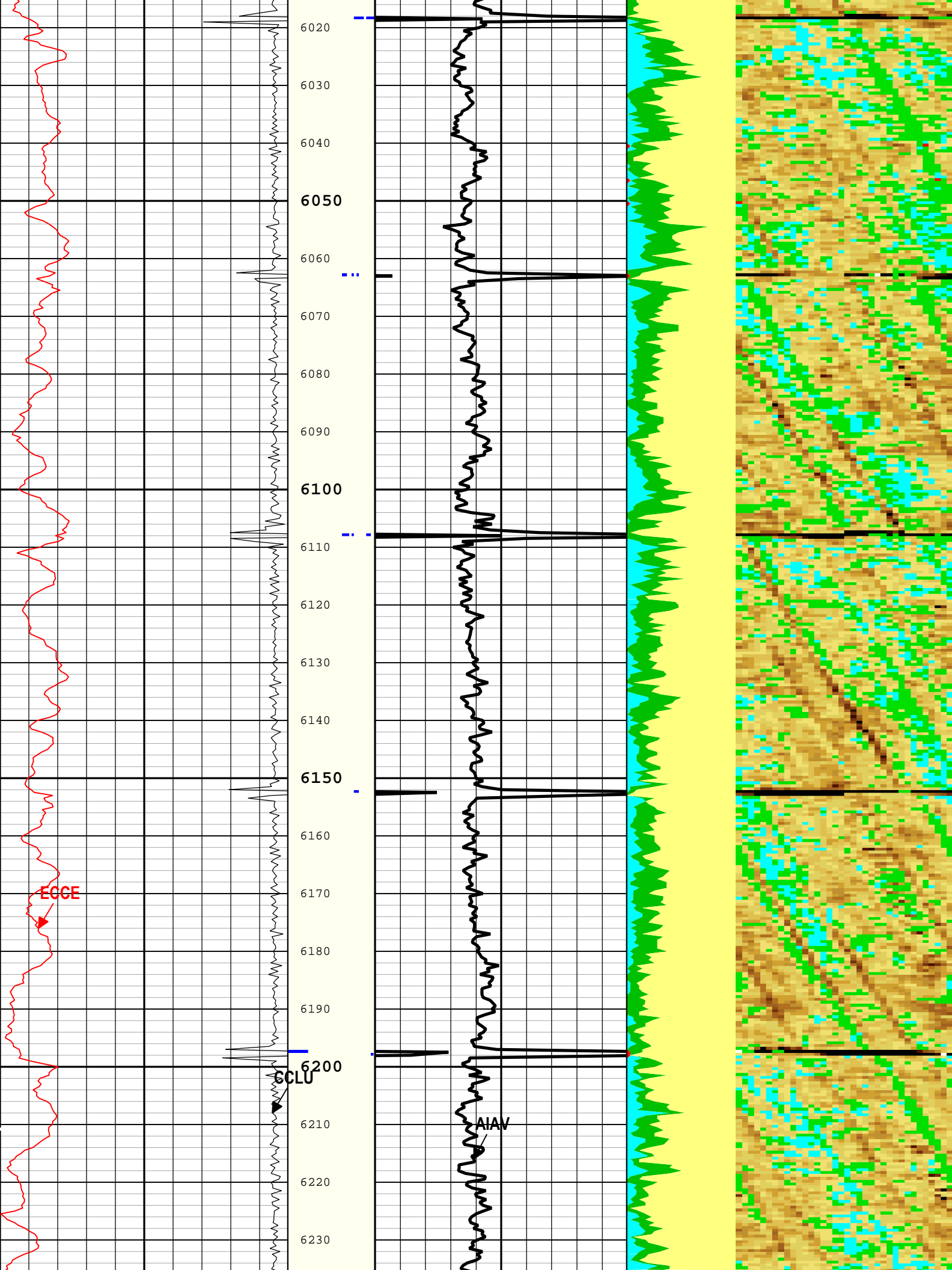


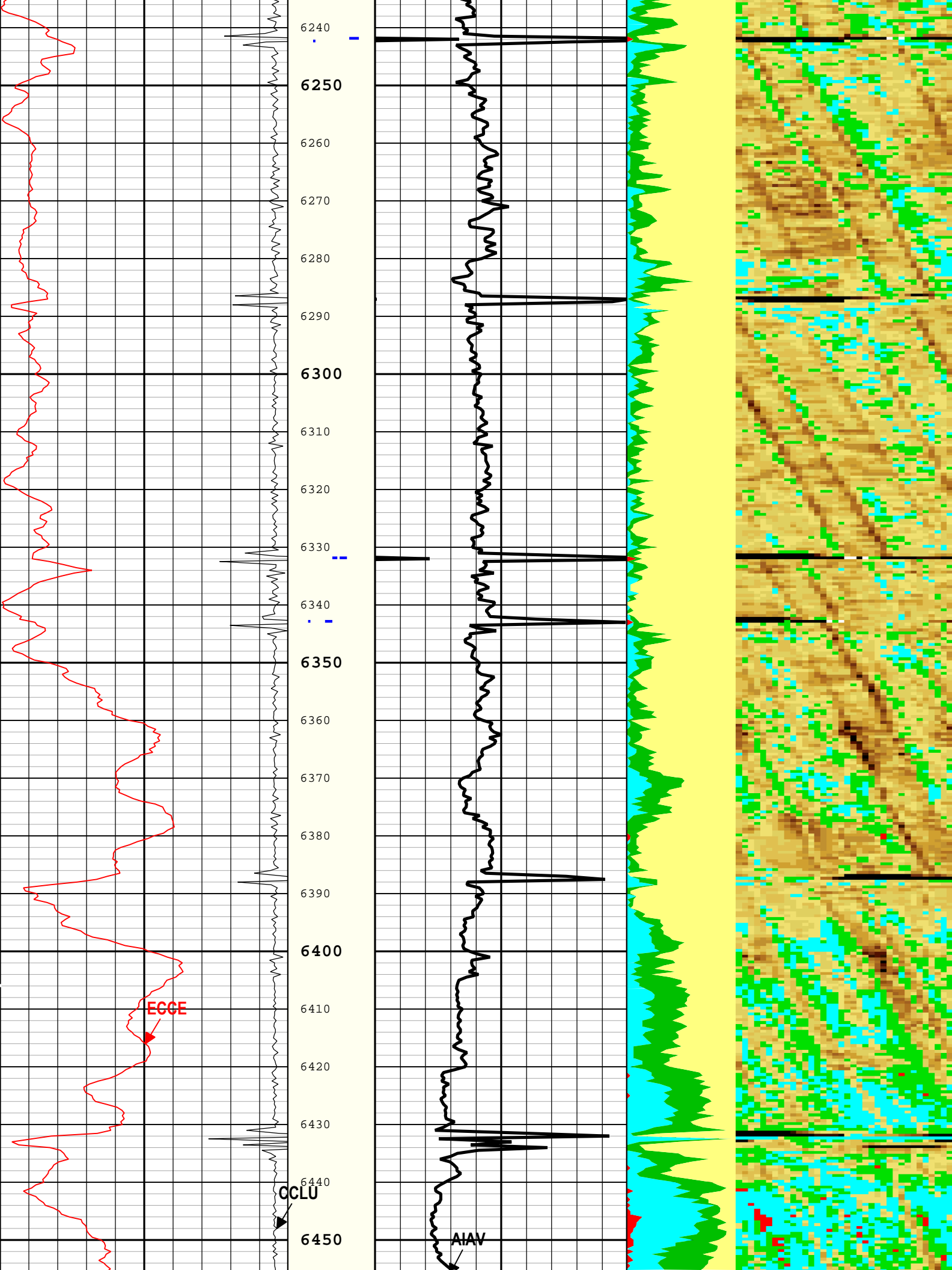


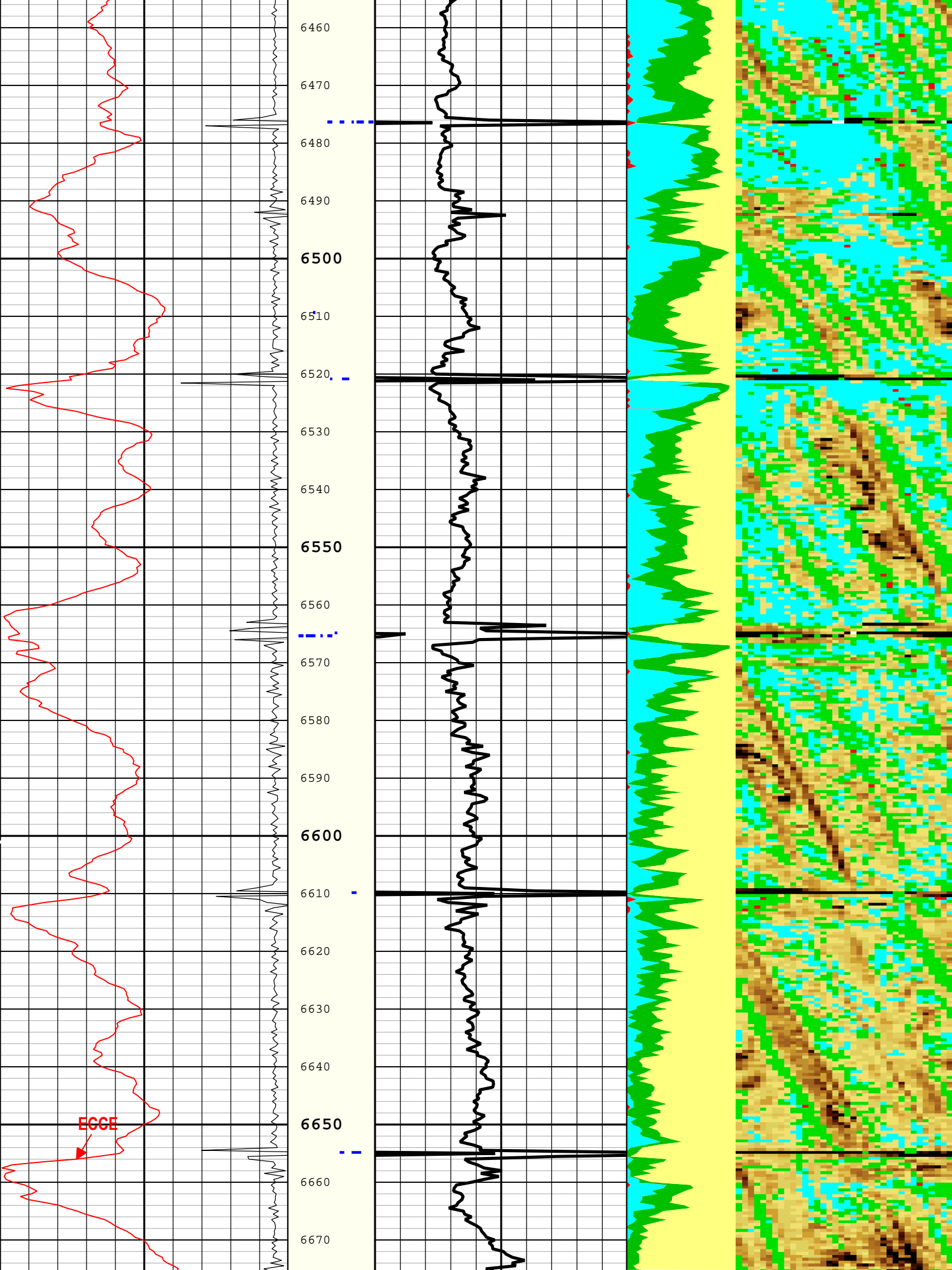












| | | | | |
|------|-----------------------|--------|-------------------------------|----|
| UPAT | USIT Emission Pattern | USIT-E | Pattern 375 KHz | |
| UWKM | USIT Working Mode | USIT-E | Uncompressed 10 deg at 6.0 in | |
| WINB | Window Begin Time | USIT-E | 31.88 | us |
| WINE | Window End Time | USIT-E | 71.88 | us |

Time Zone Parameters

| Parameter | Value | Start Time | Stop Time | Start Depth (ft) | Stop Depth (ft) |
|-----------|-------|----------------------|----------------------|--------------------|-------------------|
| EMXV | 20 | 04-Nov-2018 14:49:08 | 04-Nov-2018 14:50:34 | 6686.94 | 6490.41 |
| EMXV | 25 | 04-Nov-2018 14:50:34 | 04-Nov-2018 15:28:32 | 6490.41 | 49.57 |

All depth are at tool zero.

ONE

0 PSI Repeat Pass

| | |
|------------------|--|
| Software Version | |
|------------------|--|

| Acquisition System | Version |
|--------------------|-----------------|
| Maxwell 2018 SP2 | 8.2.104493.3100 |

| Pass Summary |
|--------------|
|--------------|

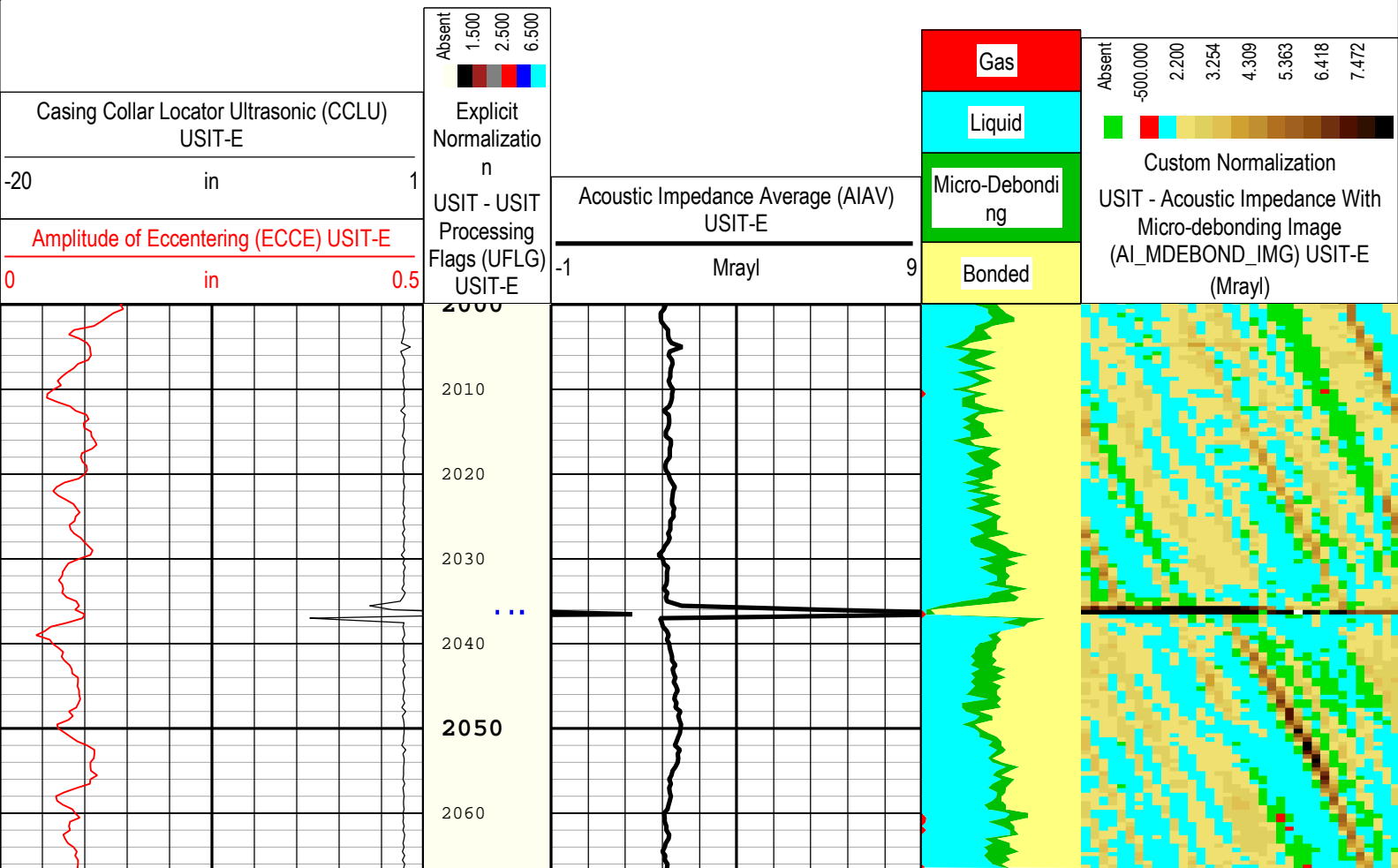
| Run Name | Pass Objective | Direction | Top | Bottom | Start | Stop | DSC Mode | Depth Shift | Include Parallel Data |
|----------|----------------|-----------|------------|------------|------------------------|------------------------|----------|-------------|-----------------------|
| ONE | Repeat[2]:Up | Up | 1991.73 ft | 2495.17 ft | 04-Nov-2018 2:01:51 PM | 04-Nov-2018 2:04:52 PM | ON | -5.00 ft | Yes |

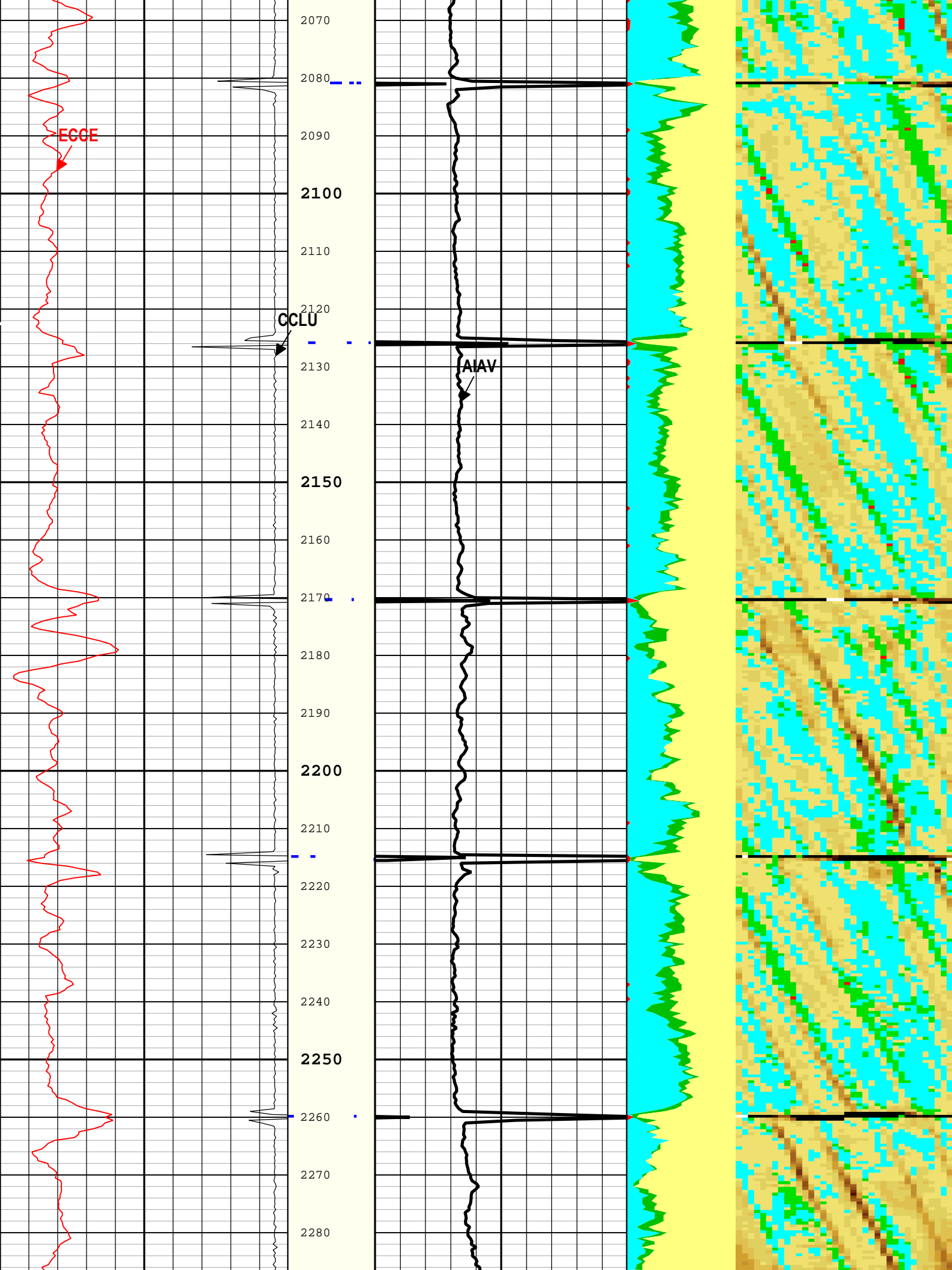
All depths are referenced to toolstring zero

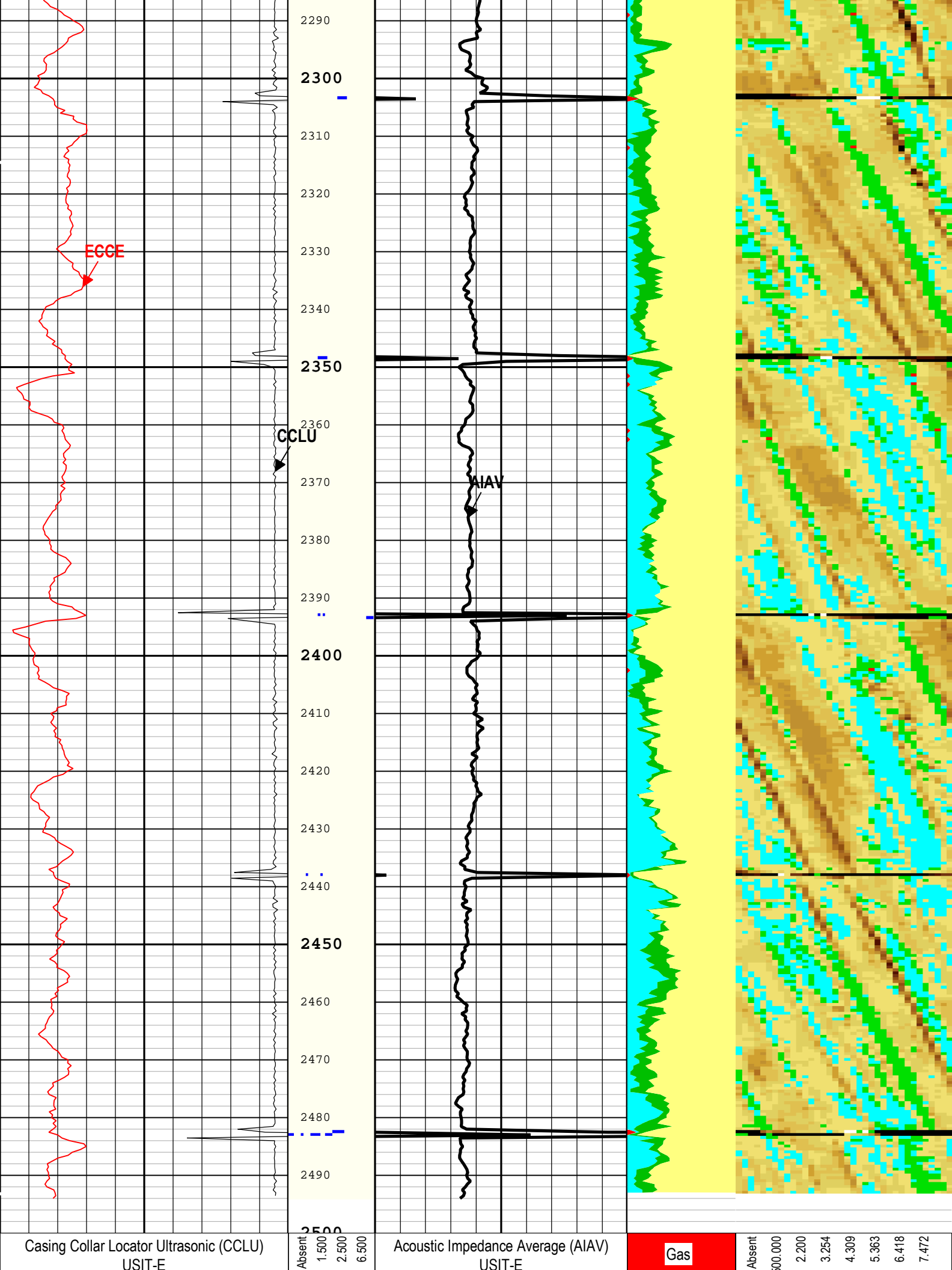
Log Company:Noble Energy Inc. Well:EMMY H25-738
ONE: Repeat[2]:Up:S008

Description: Format: Log (DJ Basin Ultrasonic Cement Summary Report) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth
Creation Date: 04-Nov-2018 21:04:08

TIME_1900 - Time Marked every 60.00 (s)







-20

in

1

Amplitude of Eccentering (ECCE) USIT-E

0

in

0.5

Explicit Normalization

USIT - USIT Processing Flags (UFLG) USIT-E

-1

Mrayl

9

Liquid

Micro-Debonding

Bonded

Custom Normalization

USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E (Mrayl)

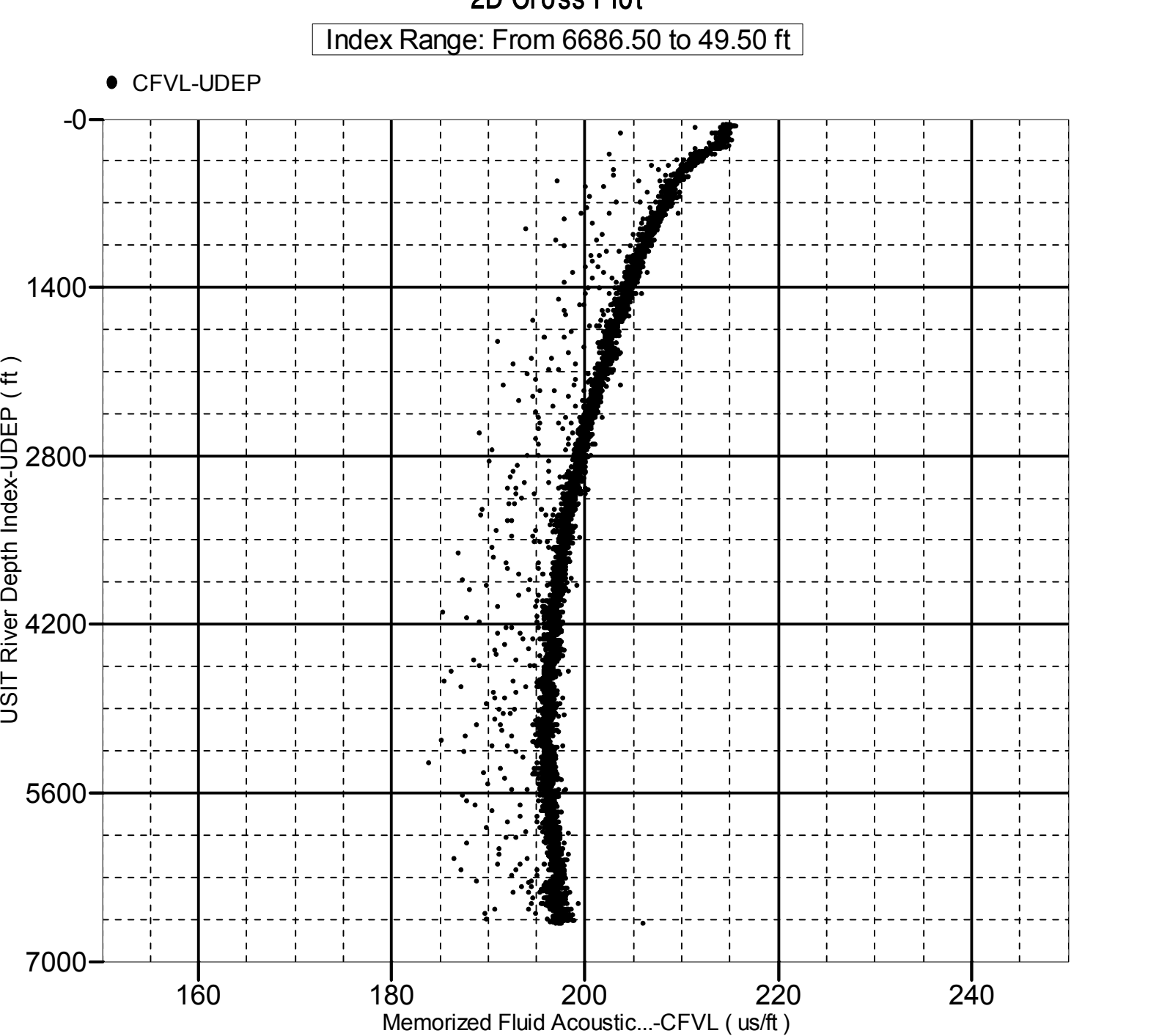
TIME_1900 - Time Marked every 60.00 (s)

Description: Format: Log (DJ Basin Ultrasonic Cement Summary Report) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth
Creation Date: 04-Nov-2018 21:04:08

| Channel Processing Parameters | | | | |
|-------------------------------|---|-----------|-------------------------------|---------|
| ONE: Parameters | | | | |
| Parameter | Description | Tool | Value | Unit |
| BARI(ISSBAR) | Barite Mud Presence Flag | Borehole | No | |
| BS | Bit Size | WLSESSION | 8.5 | in |
| CMTY(U-USIT_CEMT) | Cement Type | USIT-E | Regular Cement | |
| DFD | Drilling Fluid Density | Borehole | 8.4 | lbm/gal |
| DFT_CATEGORY | Drilling Fluid Type | Borehole | Water | |
| DTMD | Borehole Fluid Slowness | Borehole | 206 | us/ft |
| 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 | 1.2 | |
| U-USIT_DFSZ | Drilling Fluid Specific Acoustic Impedance | USIT-E | 0.1 | Mrayl |
| USI_FVEL_SEL | USI Fluid Velocity Selection | USIT-E | Automatic | |
| USI_ZMUD_SEL | USI Mud Impedance Selection | USIT-E | FreePipe Norm. | |
| ZMUD | Acoustic Impedance of Mud | Borehole | 1.84 | Mrayl |
| ZTCM | Acoustic Impedance Threshold for Cement | USIT-E | 2.2 | 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 | 18 | dB |
| EMXV | EMEX Voltage | USIT-E | 20 | V |
| HRES | Horizontal Resolution | USIT-E | 10 deg | |
| ICE2_ACQ | Ultrasonic ICE2 Acquisition | USIT-E | Yes | |
| ULOG | Logging Objective | USIT-E | MEASUREMENT | |
| USFR | Ultrasonic Sampling Frequency | USIT-E | 666667 | Hz |
| UPAT | USIT Emission Pattern | USIT-E | Pattern 375 KHz | |
| UWKM | USIT Working Mode | USIT-E | Uncompressed 10 deg at 6.0 in | |
| WINB | Window Begin Time | USIT-E | 31.88 | us |
| WINE | Window End Time | USIT-E | 71.88 | us |
| XYZ | Company:Noble Energy Inc. Well:EMMY H25-738 ONE: Main[4]:Up:S008 | | | |

Fluid Acoustic Slowness vs Depth

2D Cross Plot

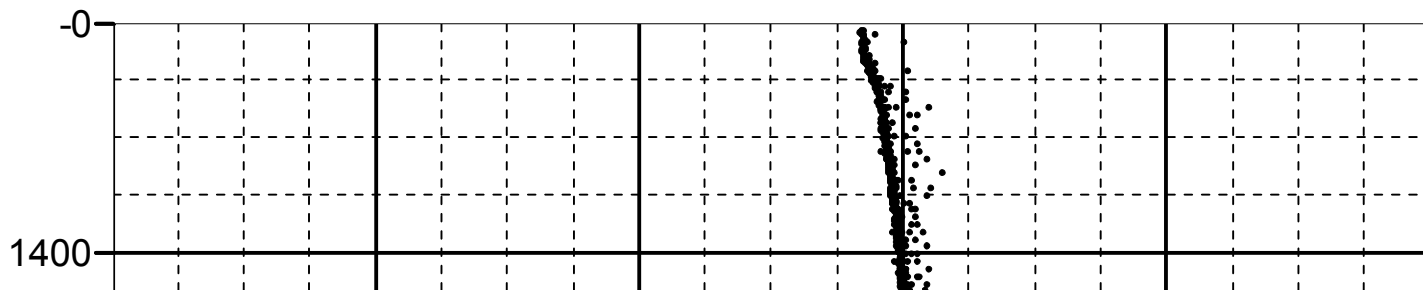


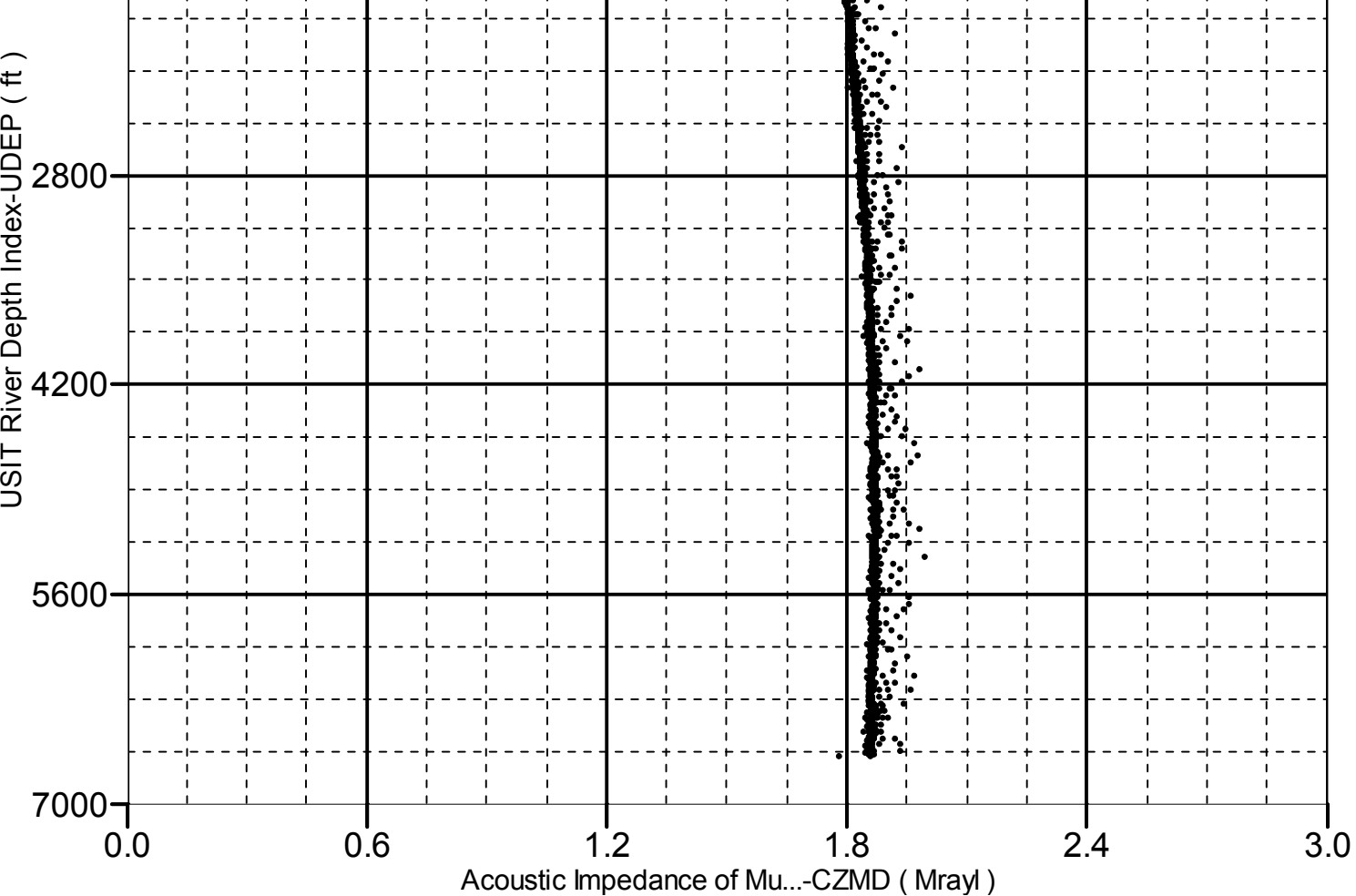
Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6686.50 to 49.50 ft

● CZMD-UDEP





Company: Noble Energy Inc.

Schlumberger

Well: EMMY H25-738

Field: DJ BASIN

County: Weld

State: Colorado

UltraSonic Summary Print

