

Company: Noble Energy Inc

Well: Lapp A15-629

Field: Wattenberg

County: Weld State: Colorado

UltraSonic Summary Print

County: Weld
Field: Wattenberg
Location: SHL: SWSW S13, T6N, R64W
Well: Lapp A15-629
Company: Noble Energy Inc

| | | | |
|--------------------------------|----------------|---|--|
| Location: | | SHL: SWSW S13, T6N, R64W 1235' FSL & 535' FWL LAT: 40.48135 / LONG: 104.50639 | Elev.: K.B. 4724.00 ft G.L. 4694.00 ft D.F. 4723.00 ft |
| Permanent Datum: | Ground Level | Kelly Bushing | Elev.: 30.00 ft above Perm.Datum |
| Log Measured From: | Kelly Bushing | | |
| Drilling Measured From: | Kelly Bushing | | |
| API Serial No. 05-123-42820 | Section: 13 | Township: 6N | Range: 64W |

| | | | |
|-----------------------------|----------------------|----------------------|-----------------|
| Logging Date | 13-Sep-2016 | | |
| Run Number | One | | |
| Depth Driller | 17827.00 ft | | |
| Schlumberger Depth | 17827.00 ft | | |
| Bottom Log Interval | 6700.00 ft | | |
| Top Log Interval | 0.00 ft | | |
| Casing Driller Size @ Depth | 5.5 in @ 17817.20 ft | | |
| Casing Schlumberger | 17817.2 ft | | |
| Bit Size | 8.5 in | | |
| Type Fluid In Hole | Brine | | |
| Density | 8.8 lbm/gal | | |
| Fluid Loss | PH | | |
| MUD | Active Tank | | |
| RM @ Meas Temp | 0.2 ohm.m @ 68 degF | | |
| RMF @ Meas Temp | 0.15 ohm.m @ 68 degF | | |
| RMC @ Meas Temp | | | |
| Source RMF | RMC | Pressed | |
| RM @ BHT | 0.07 @ 206 | 0.05 @ 206 | |
| Max Recorded Temperatures | 206 degF | | |
| Circulation Stopped | Time | | |
| Logger on Bottom | Time | 13-Sep-2016 07:25:00 | |
| Unit Number | Location: | 2161 | Fort Morgan, CO |
| Recorded By | | Stephen Tang | |
| 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.

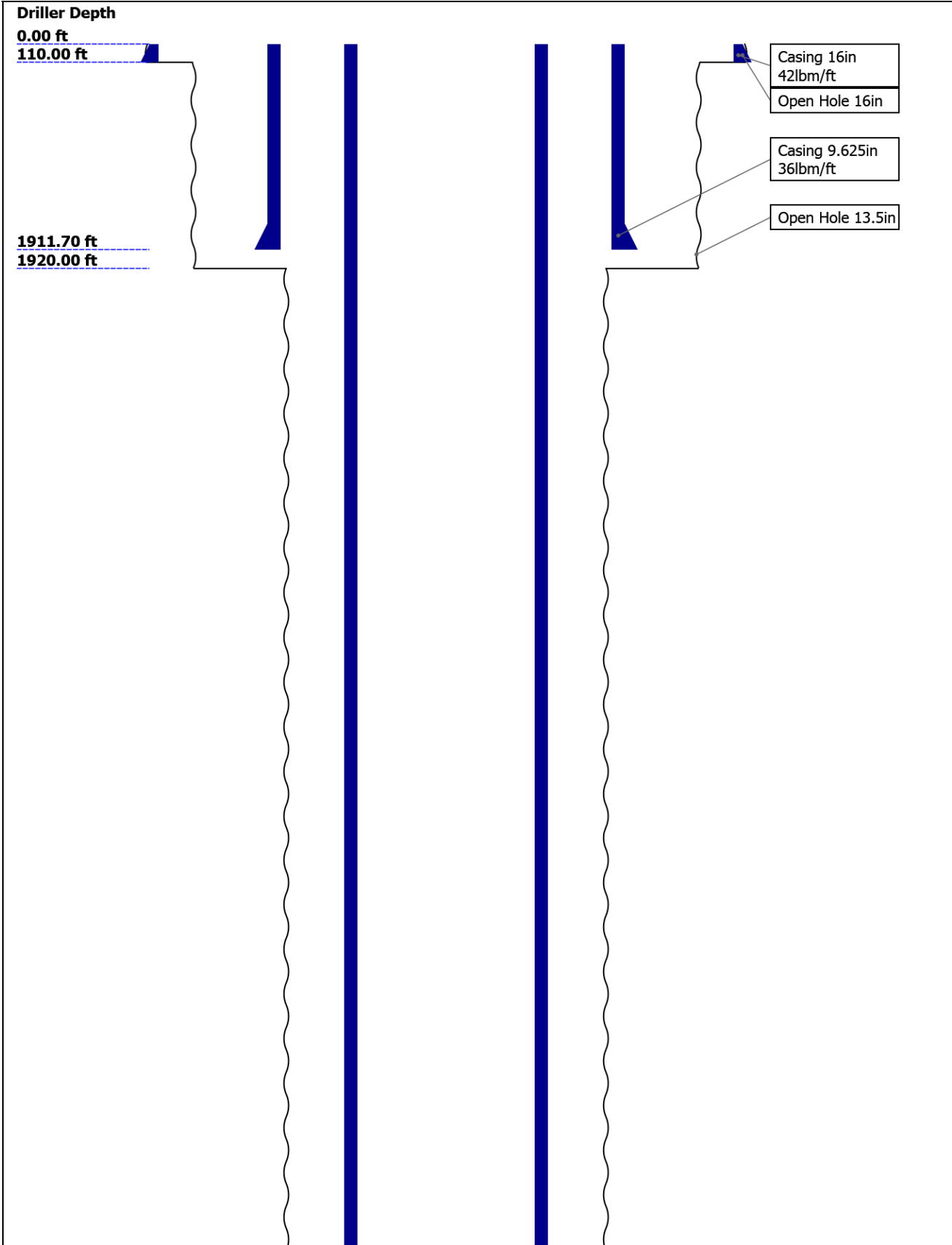
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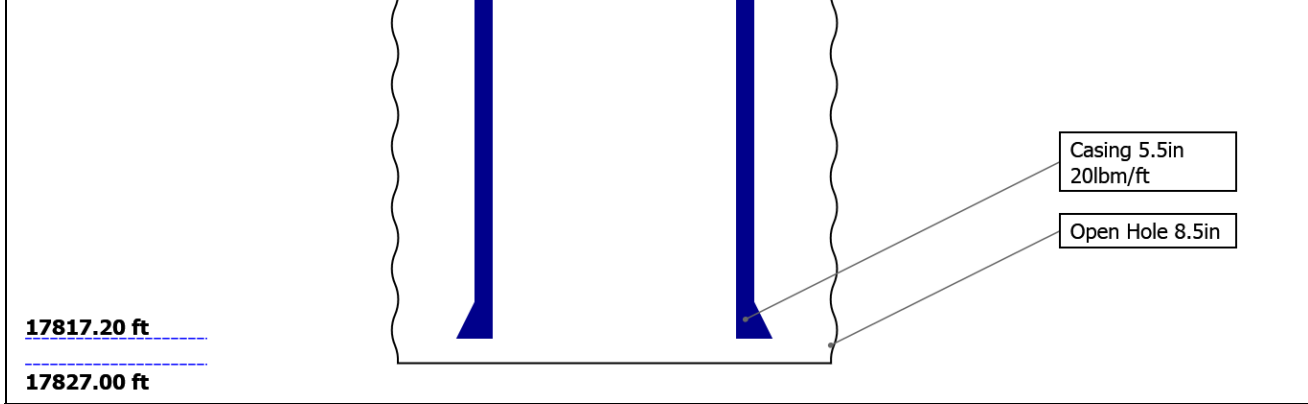
- Header
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- in)
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Well Sketch



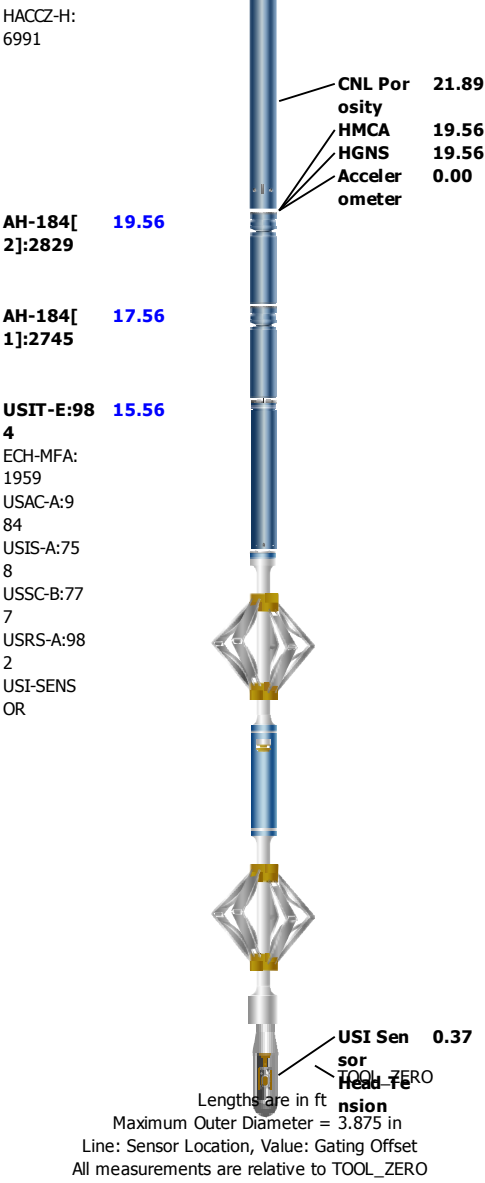


Borehole Size/Casing/Tubing Record

| | | | | | | |
|-----------------------|--------|--------|---------|--|--|--|
| Bit | | | | | | |
| Bit Size (in) | 16 | 13.5 | 8.5 | | | |
| Top Driller (ft) | 0 | 110 | 1920 | | | |
| Top Logger (ft) | 0 | 110 | 1920 | | | |
| Bottom Driller (ft) | 110 | 1920 | 17827 | | | |
| Bottom Logger (ft) | 110 | 1920 | 17827 | | | |
| 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) | 110 | 1911.7 | 17817.2 | | | |
| Bottom Logger (ft) | 110 | 1911.7 | 17817.2 | | | |

Remarks and Equipment Summary

| One : Toolstring | | | | One : Remarks | |
|--|--|--|--|-------------------------------------|--|
| <div><div><div>Equip nameLengthMP nameOffset</div><div>LEH-QT39.74LEH-QT</div><div>SAH-F:1836.8217</div><div>DTC-H31.97ECH-KCDTC-H</div><div>HGNS-H:428.97865HGNH:4817NPV-NSR-F:5068HGNS-H:4865HMCA-H</div></div><div><div>CTEM31.07HV0.00TelStatu28.97sToolSta28.97tusTemper28.94atureGR28.23</div></div></div> | | | | Toolstring ran as per toolsketch. | |
| | | | | First log in well. | |
| | | | | BHT: 206 F | |
| | | | | Well logged at 10 degree 6 inch. | |
| | | | | Main pass logged at 2500psi. | |
| | | | | Repeat pass logged at 0psi. | |
| | | | | Thank you for chosing Schlumberger. | |



Depth Summary

| | | | |
|------------------------------|-----------|--|--|
| | One | | |
| Depth Measuring Device | | | |
| Type | IDW-B | | |
| Serial Number | | | |
| Calibration Date | | | |
| Calibrator Serial Number | | | |
| Calibration Cable Type | 7-39 PLXS | | |
| 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 | 7-39P-LXS | | |
| Serial Number | | | |

| | | | |
|-------------------------------|-----------------------|---|--|
| Length | 14000.00 ft | | |
| Conveyance Type | Wireline | | |
| Rig Type | Crane | | |
| One :Depth Control Parameters | | Depth Control Remarks | |
| Log Sequence | First Log In the Well | All Schlumberger depth procedures followed. | |
| Rig Up Length At Surface | | IDW used as primary depth device. | |
| Rig Up Length At Bottom | | Z-Chart used as secondary depth device. | |
| Rig Up Length Correction | | | |
| Stretch Correction | | | |
| Tool Zero Check At Surface | | | |

USIT - Fluid Properties Measurement

| Run Name | Pass Name | Start Depth(ft) | Stop Depth(ft) |
|----------|-----------|-----------------|----------------|
| Run 1 | Log[2]:Up | 6703.02 | 63.69 |

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 : 61.89m(203.04ft) to 71.89m(235.86ft)
MUD_N_FRP = 1.15
DFD = 1.05g/cm3(8.80lbm/gal)
CZMD median computed in free pipe normalization interval = 1.79 MRayl

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

One

2500 PSI Main Pass

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

| Acquisition System | Version |
|--------------------|----------------|
| Maxwell 2016 SP2 | 6.2.64464.3100 |

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

| Run Name | Pass Objective | Direction | Top | Bottom | Start | Stop | DSC Mode | Depth Shift | Include Parallel Data |
|----------|----------------|-----------|----------|------------|---------------------------|---------------------------|----------|-------------|-----------------------|
| One | Log[2]:Up | Up | 63.69 ft | 6703.02 ft | 13-Sep-2016 1:28:34 PM | 13-Sep-2016 2:09:09 PM | ON | 2.34 ft | No |

All depths are referenced to toolstring zero

Log

Company:Noble Energy Inc

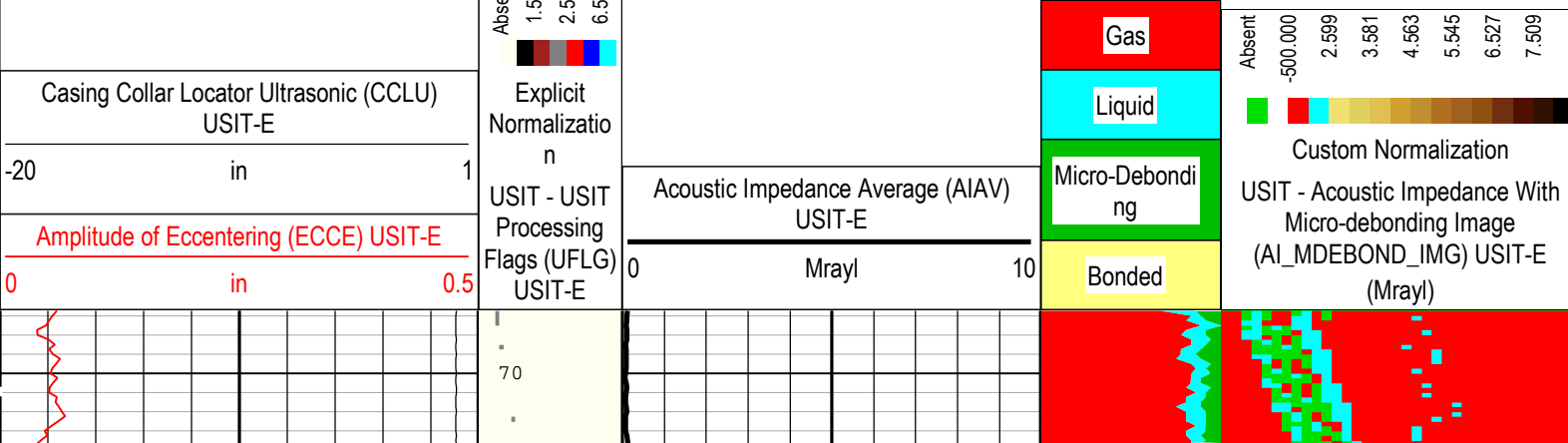
Well:Lapp A15-629

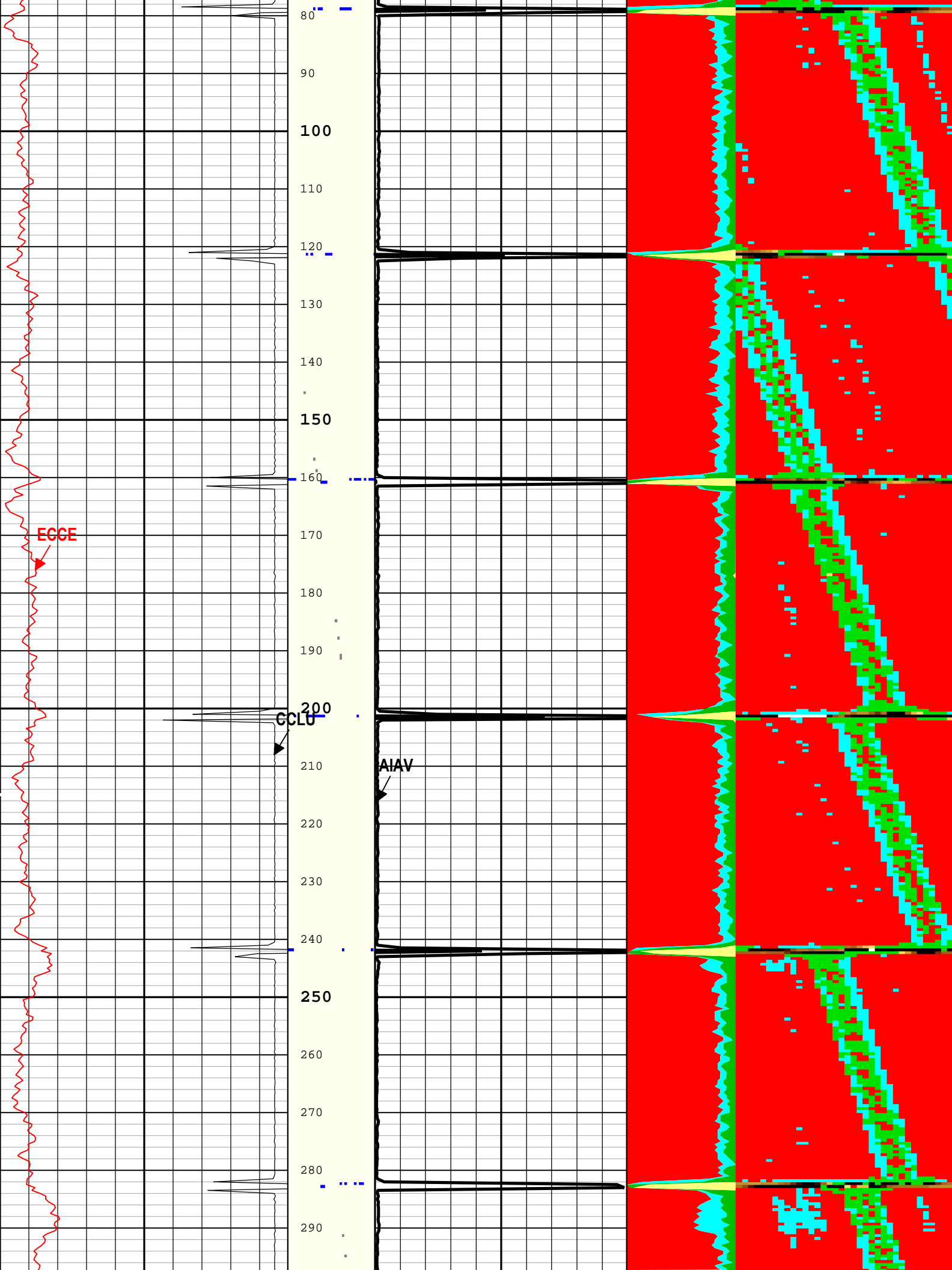
One : Log[2]:Up:S011

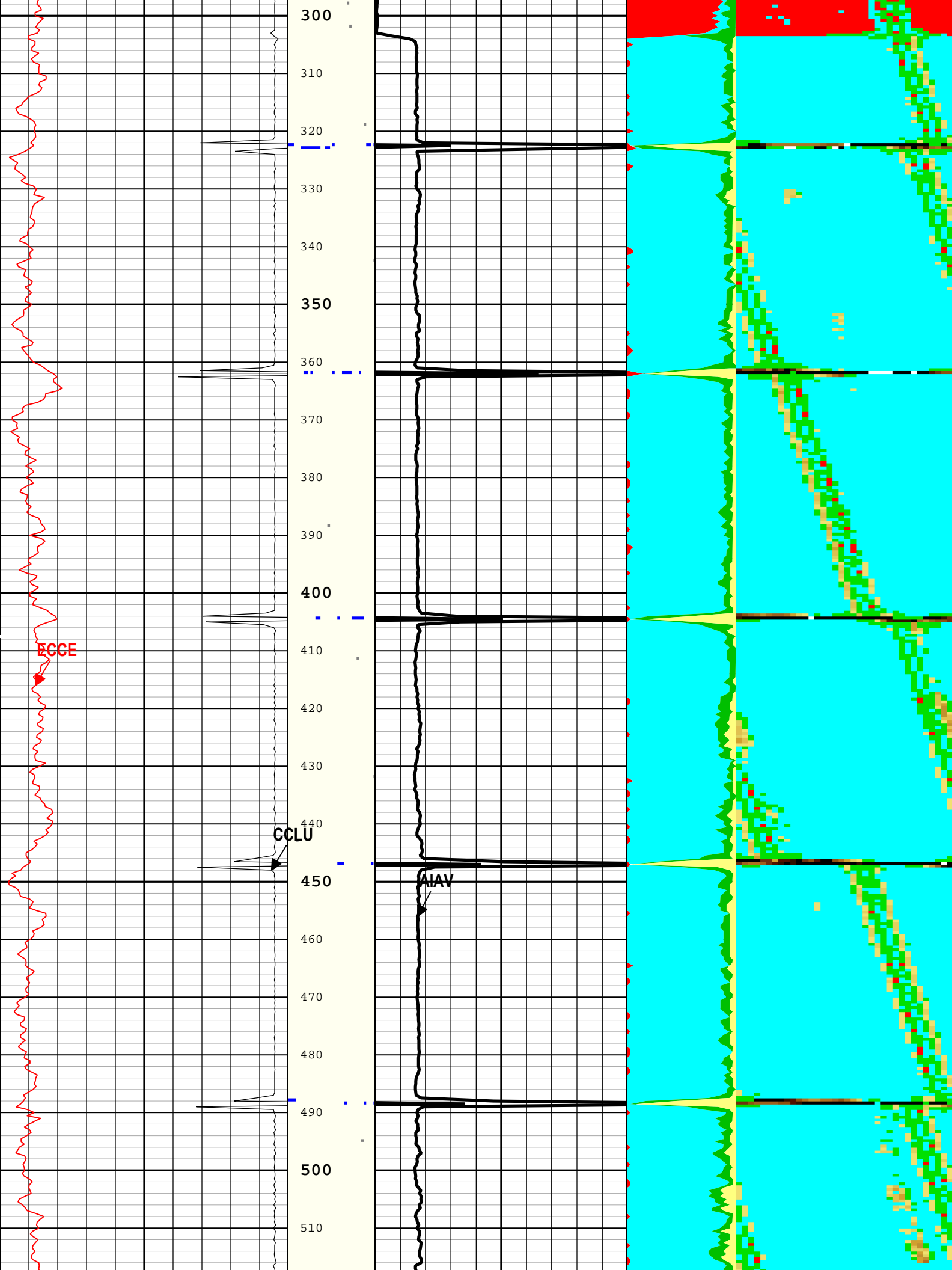
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Creation Date: 13-Sep-2016 14:45:00

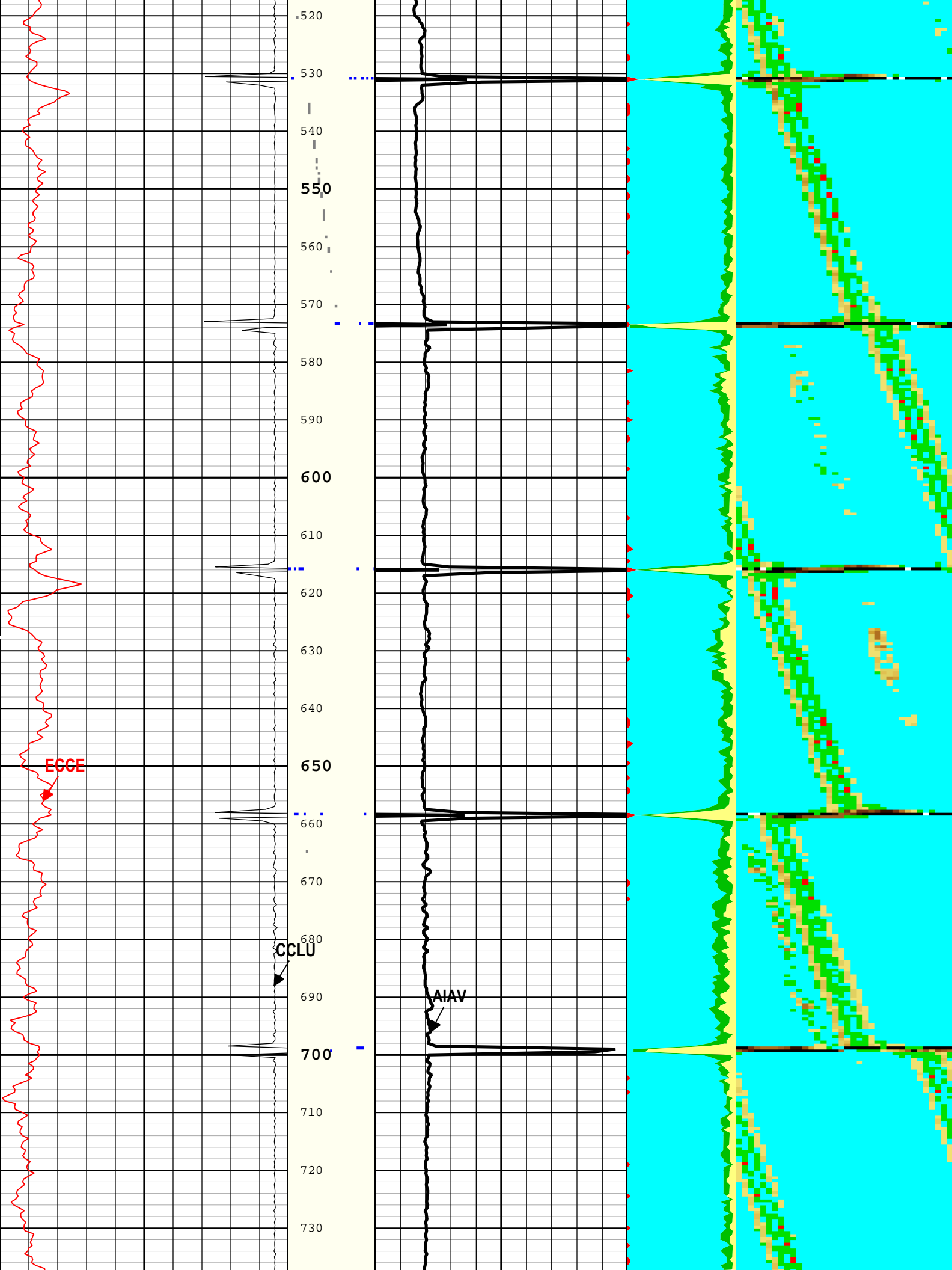
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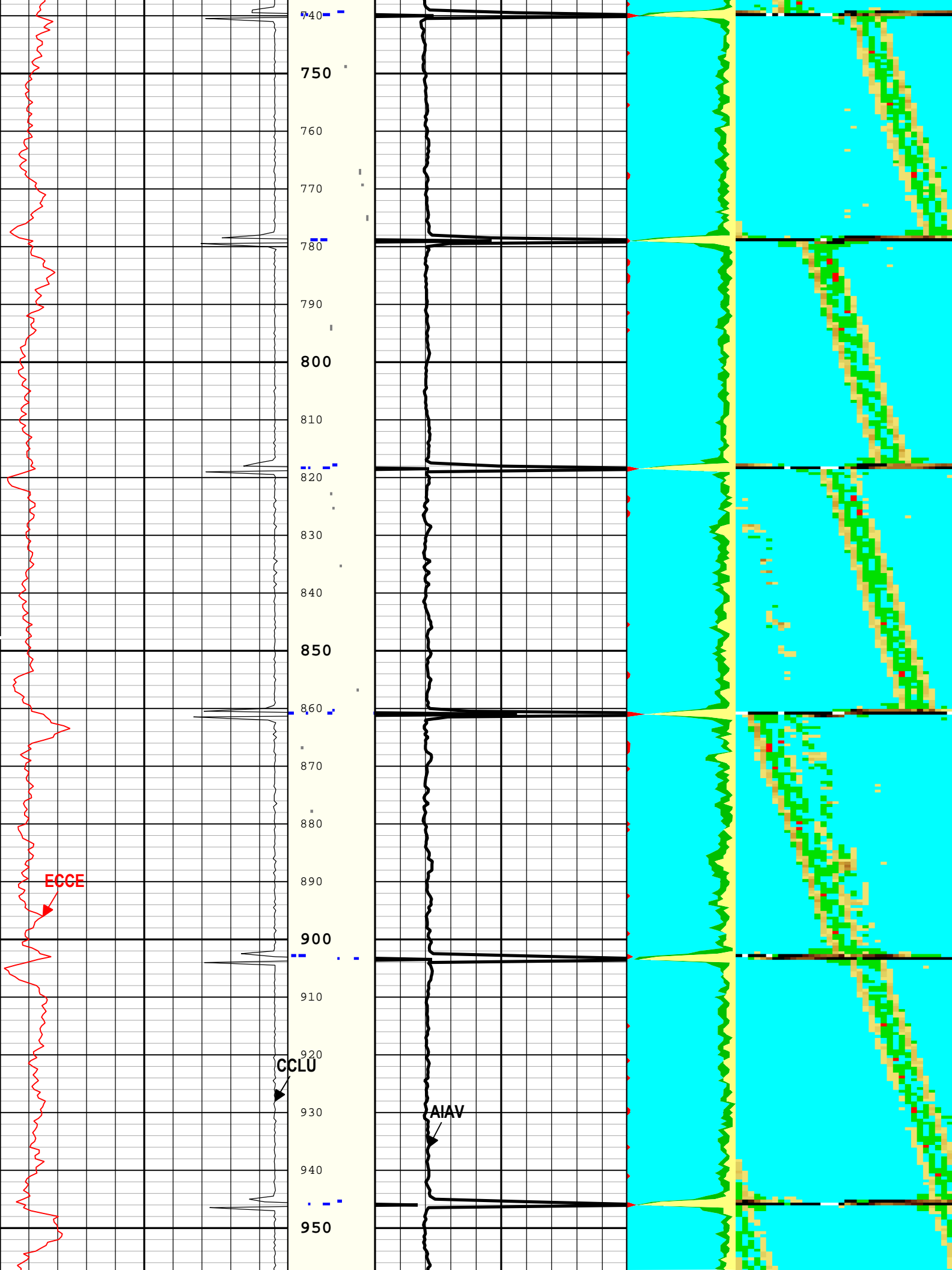
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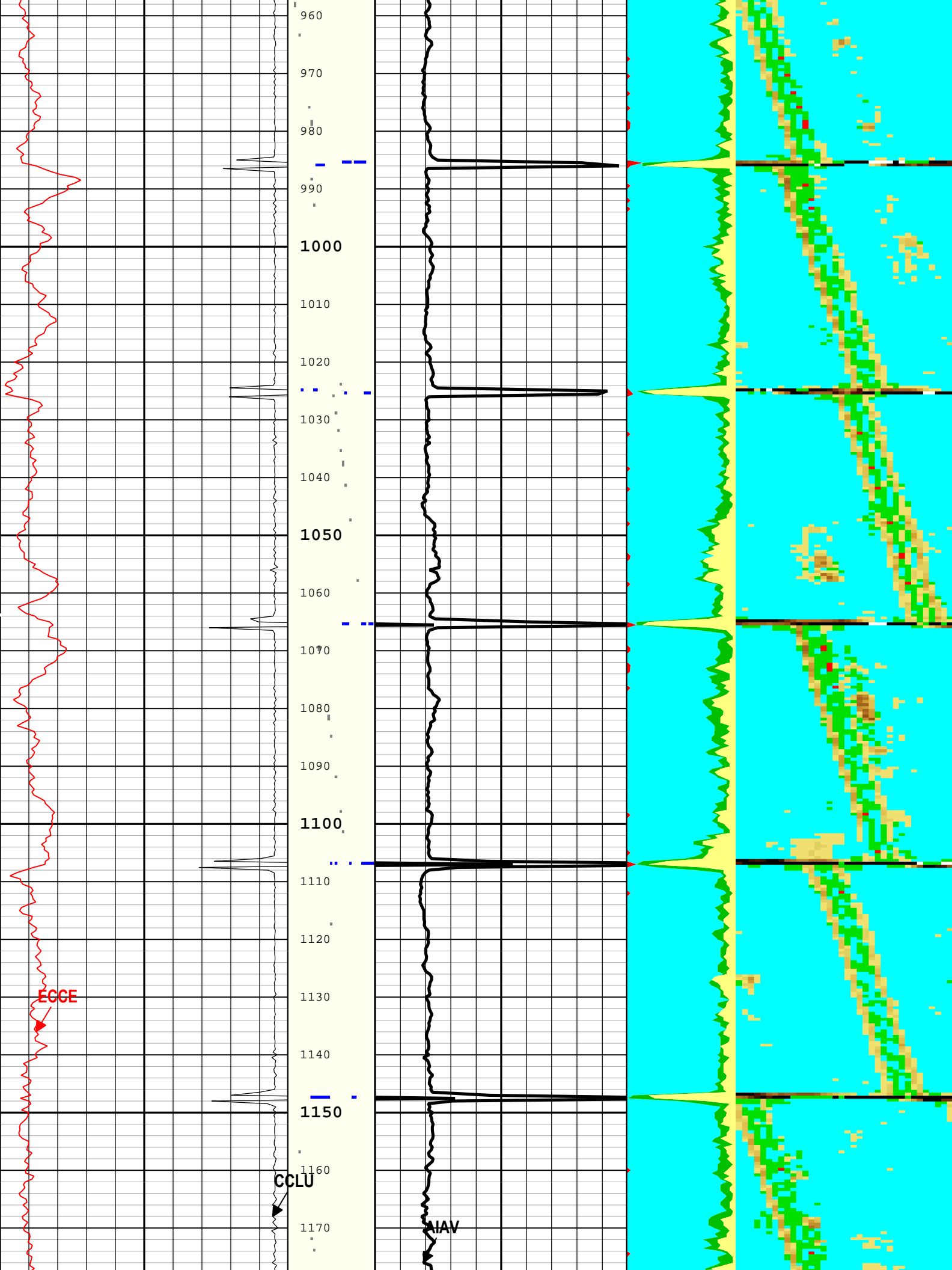


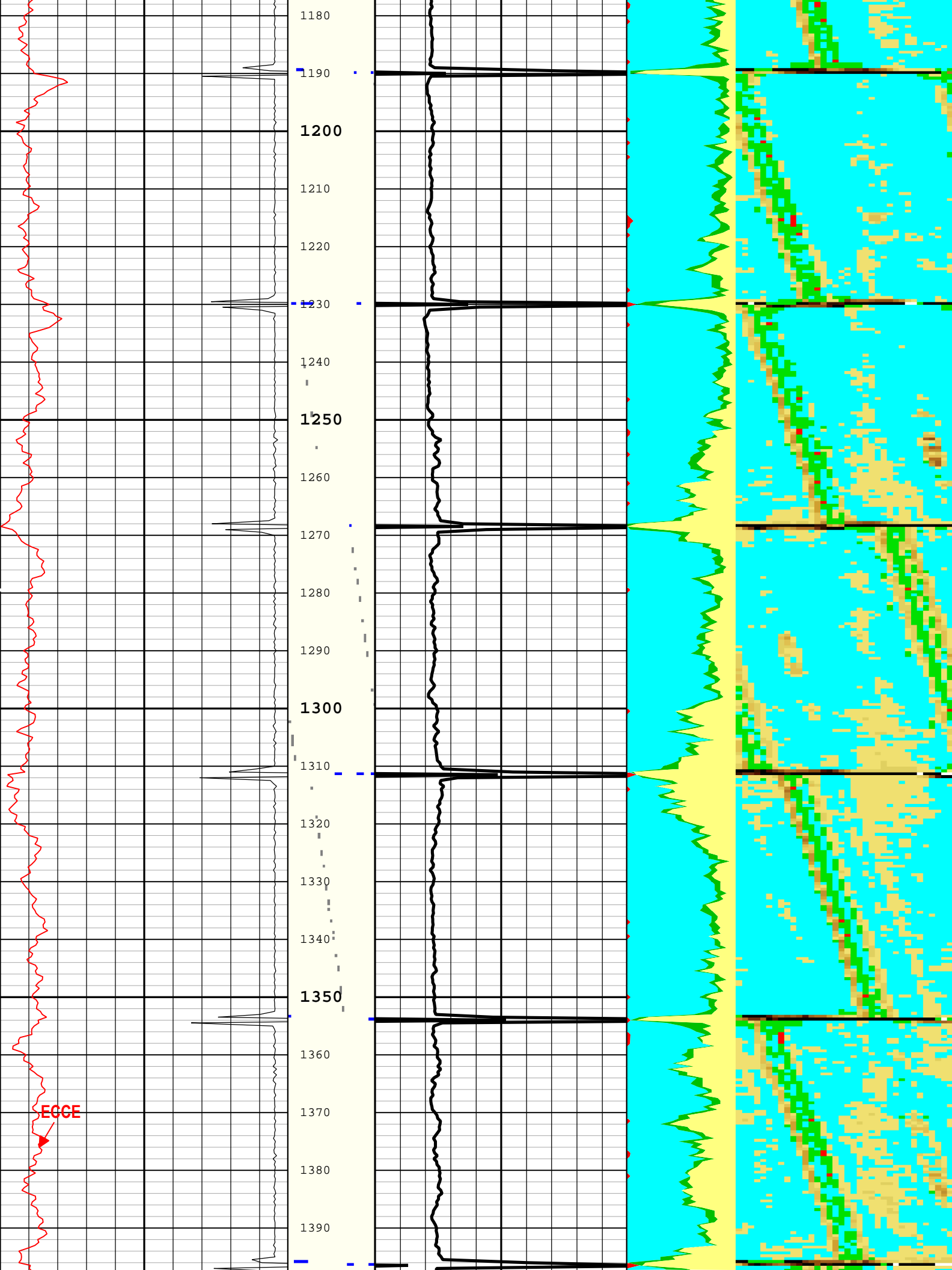


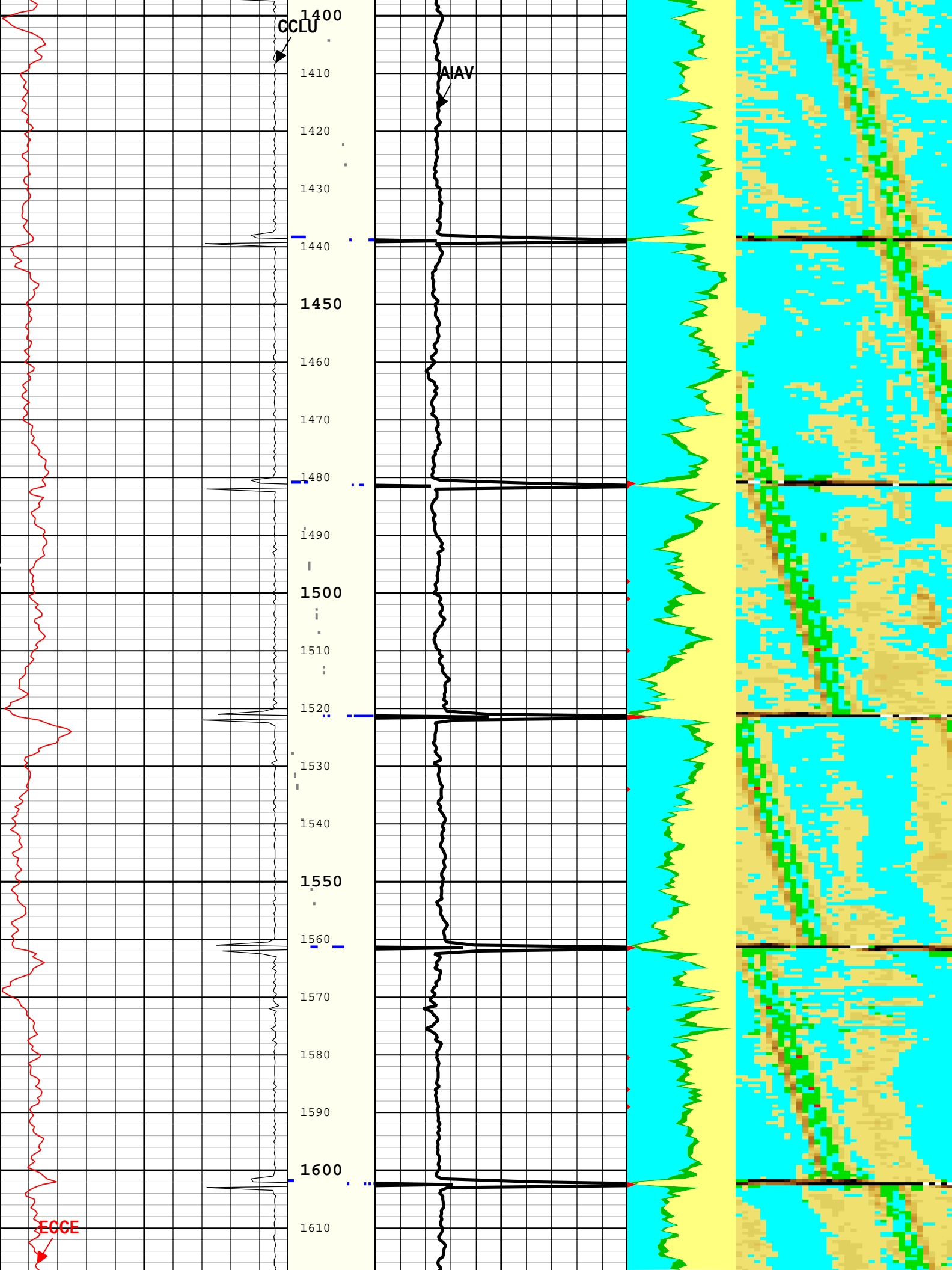


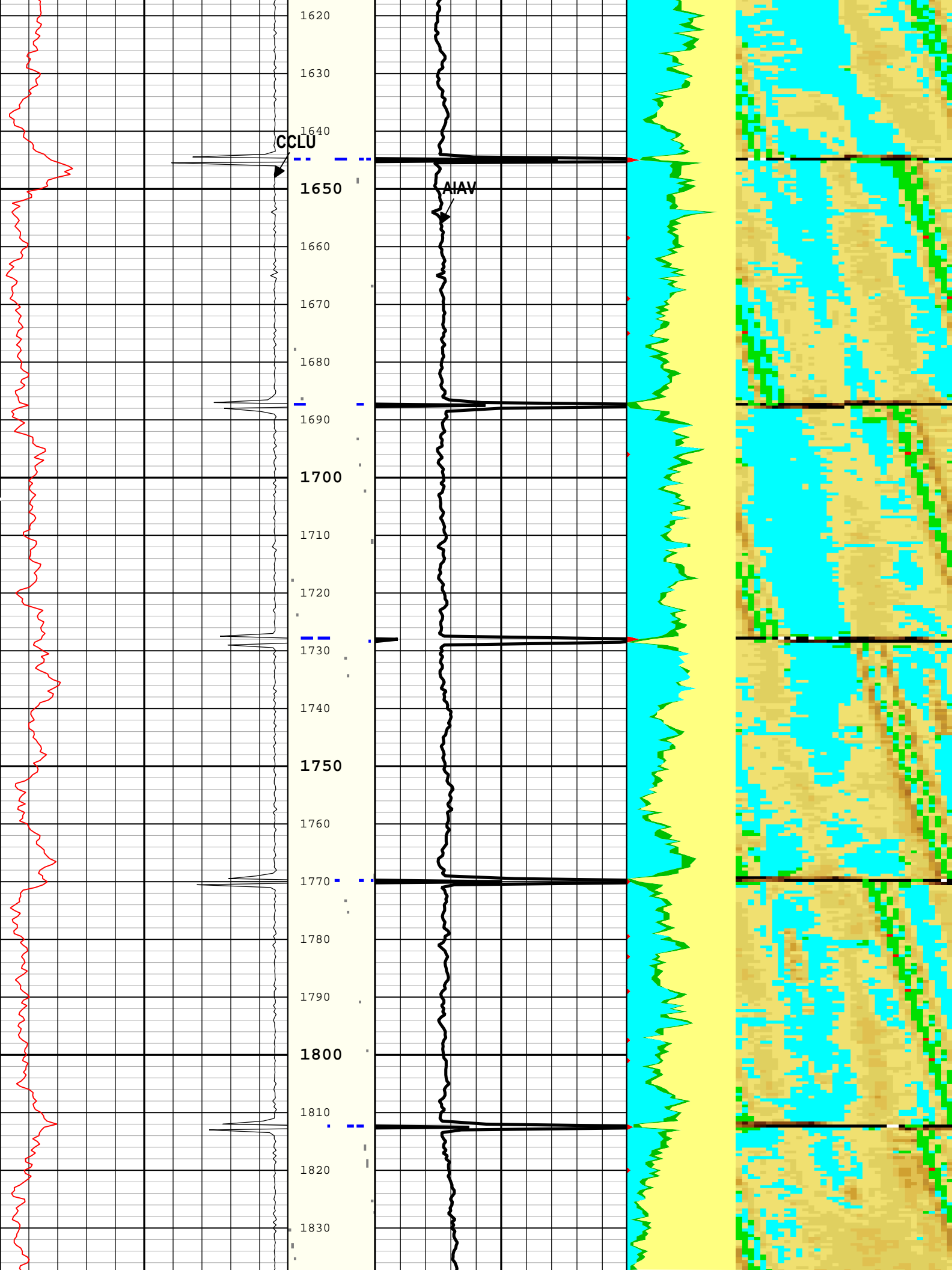


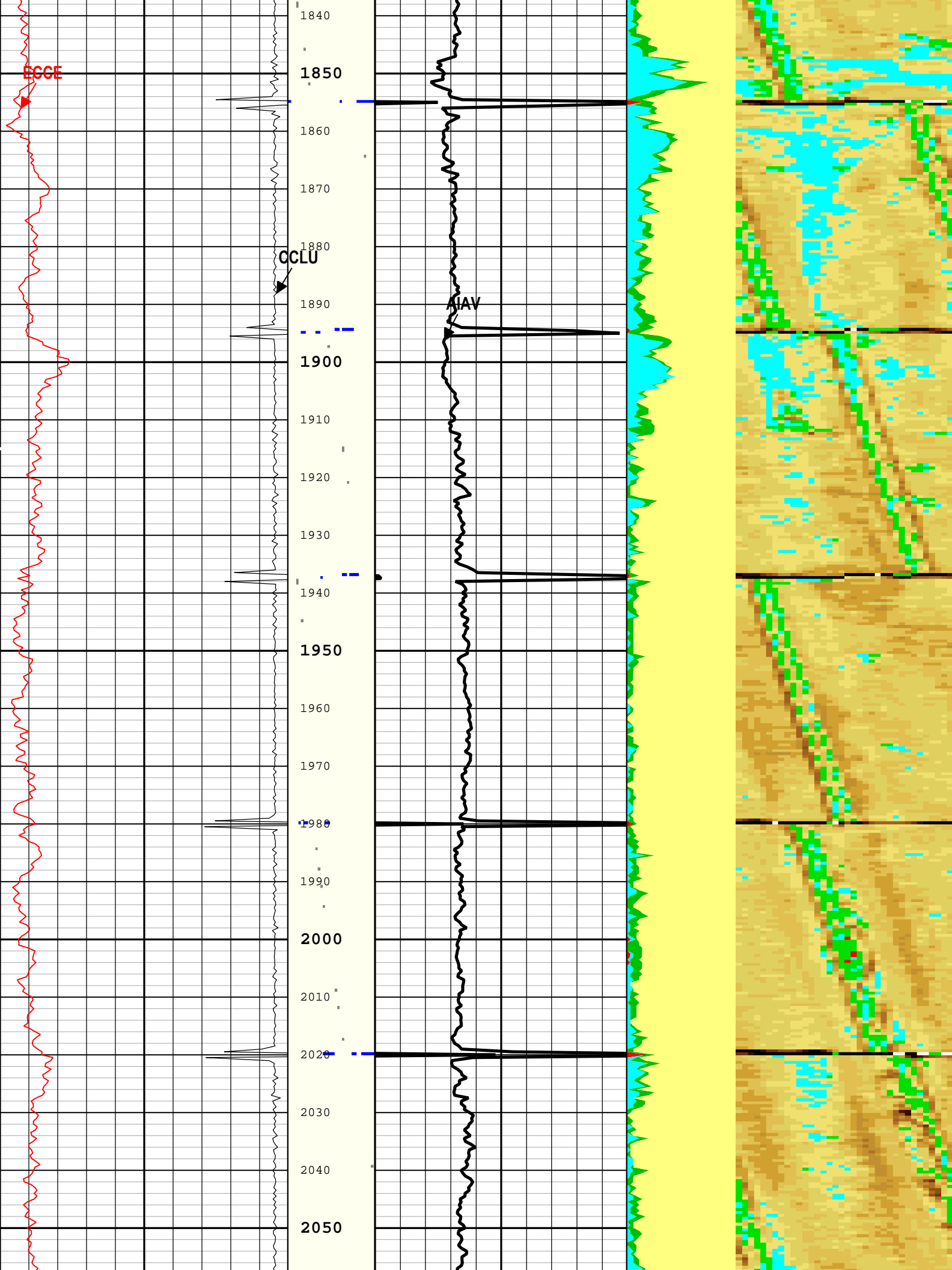


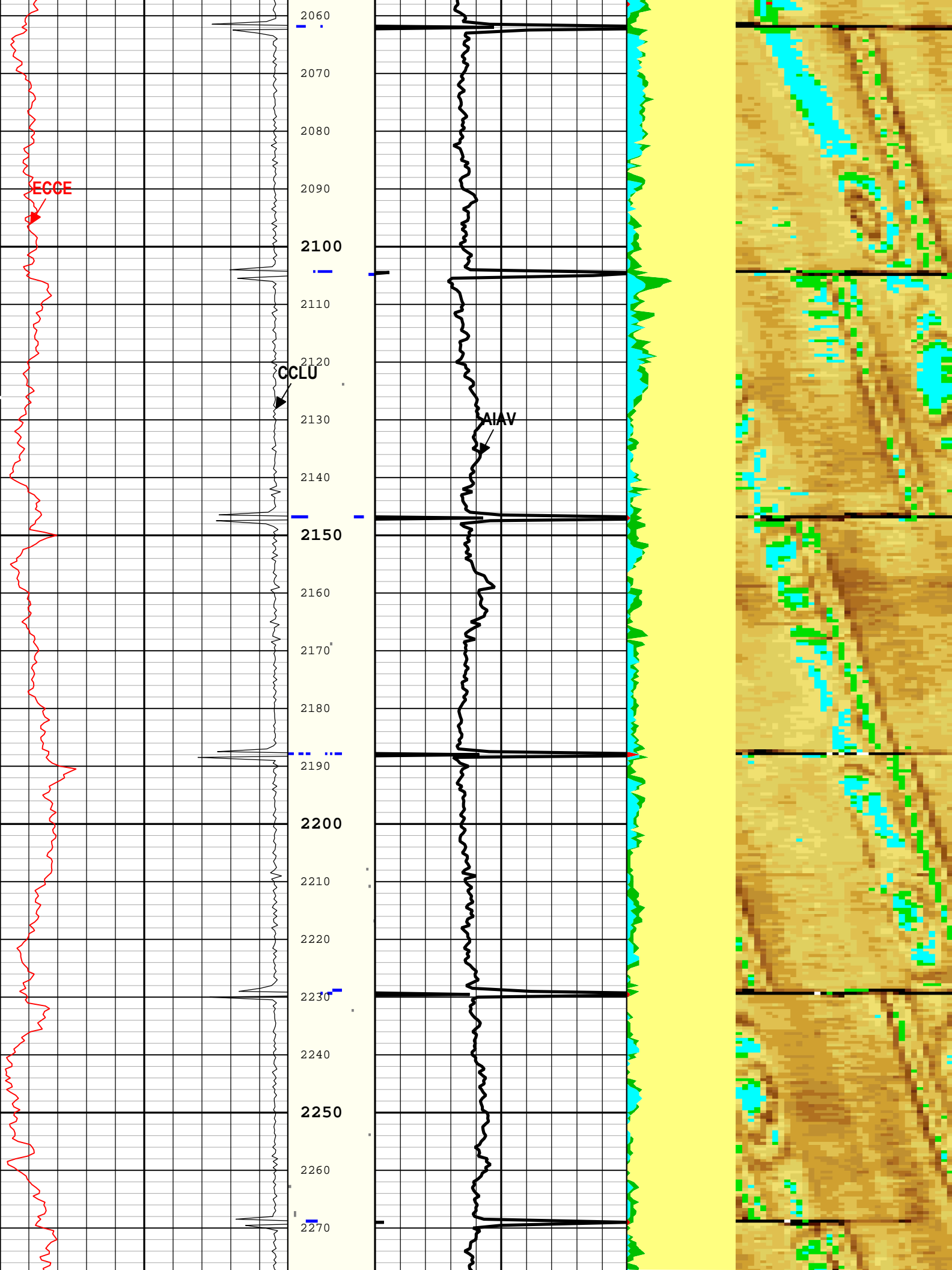


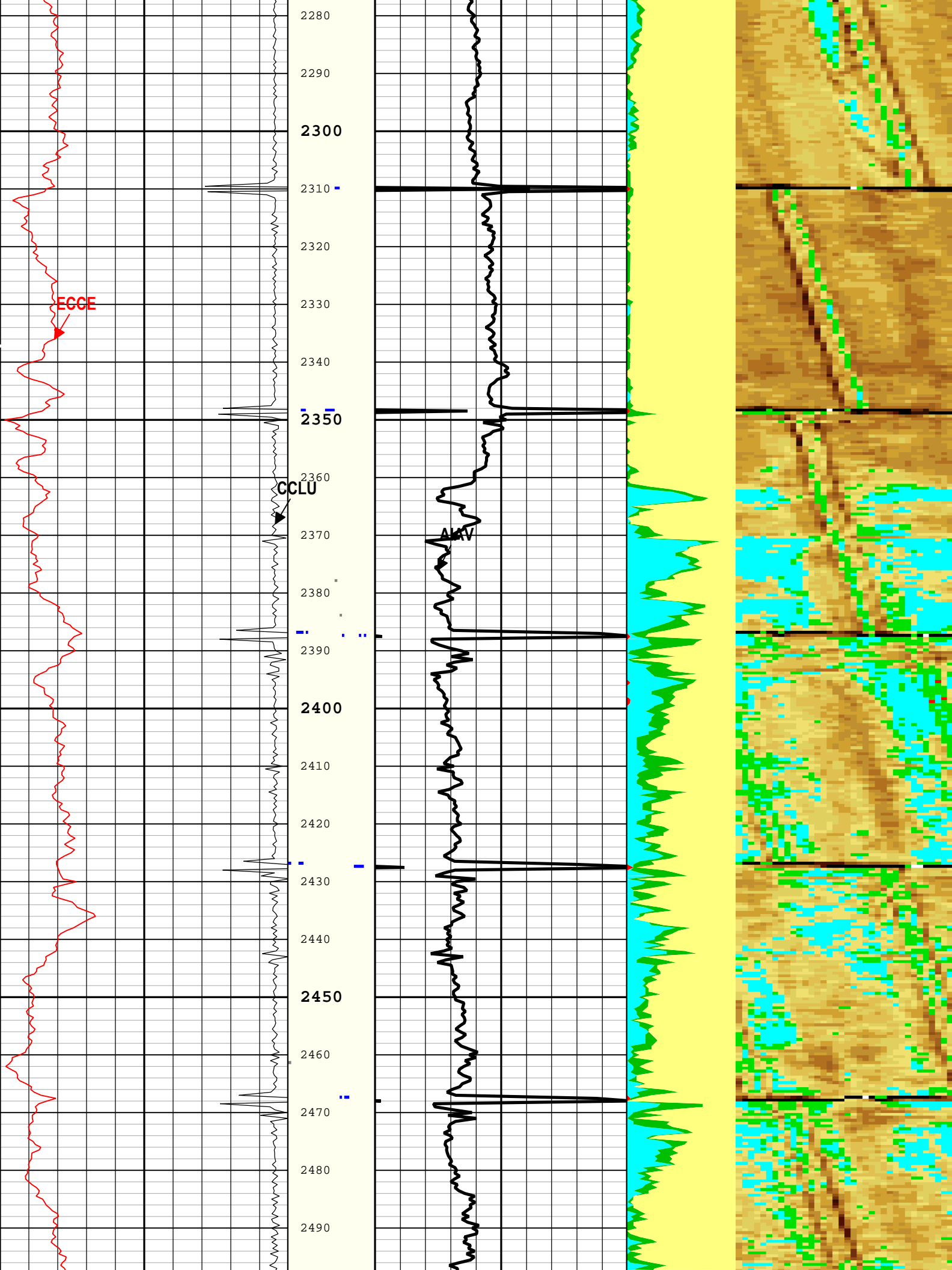


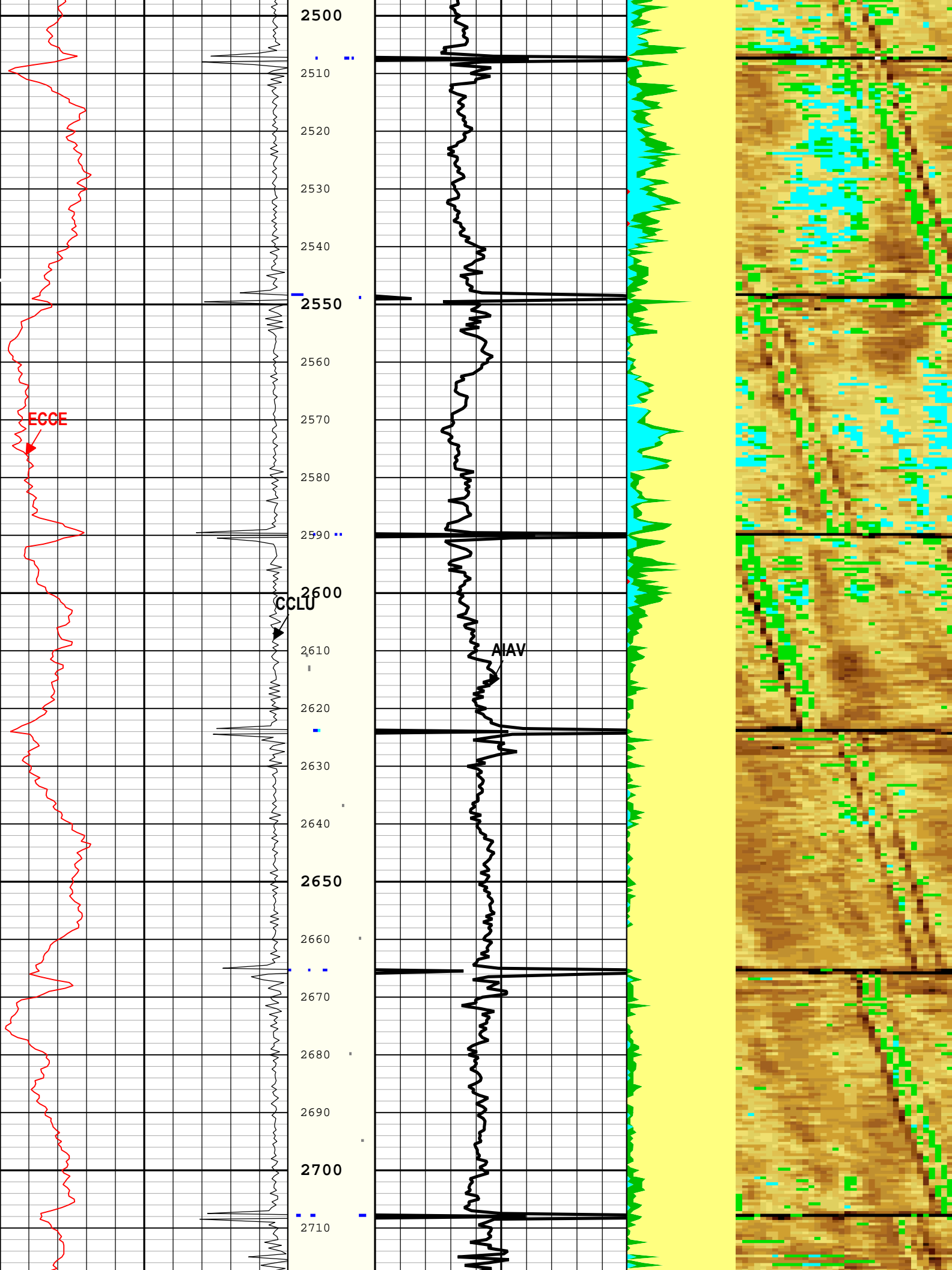


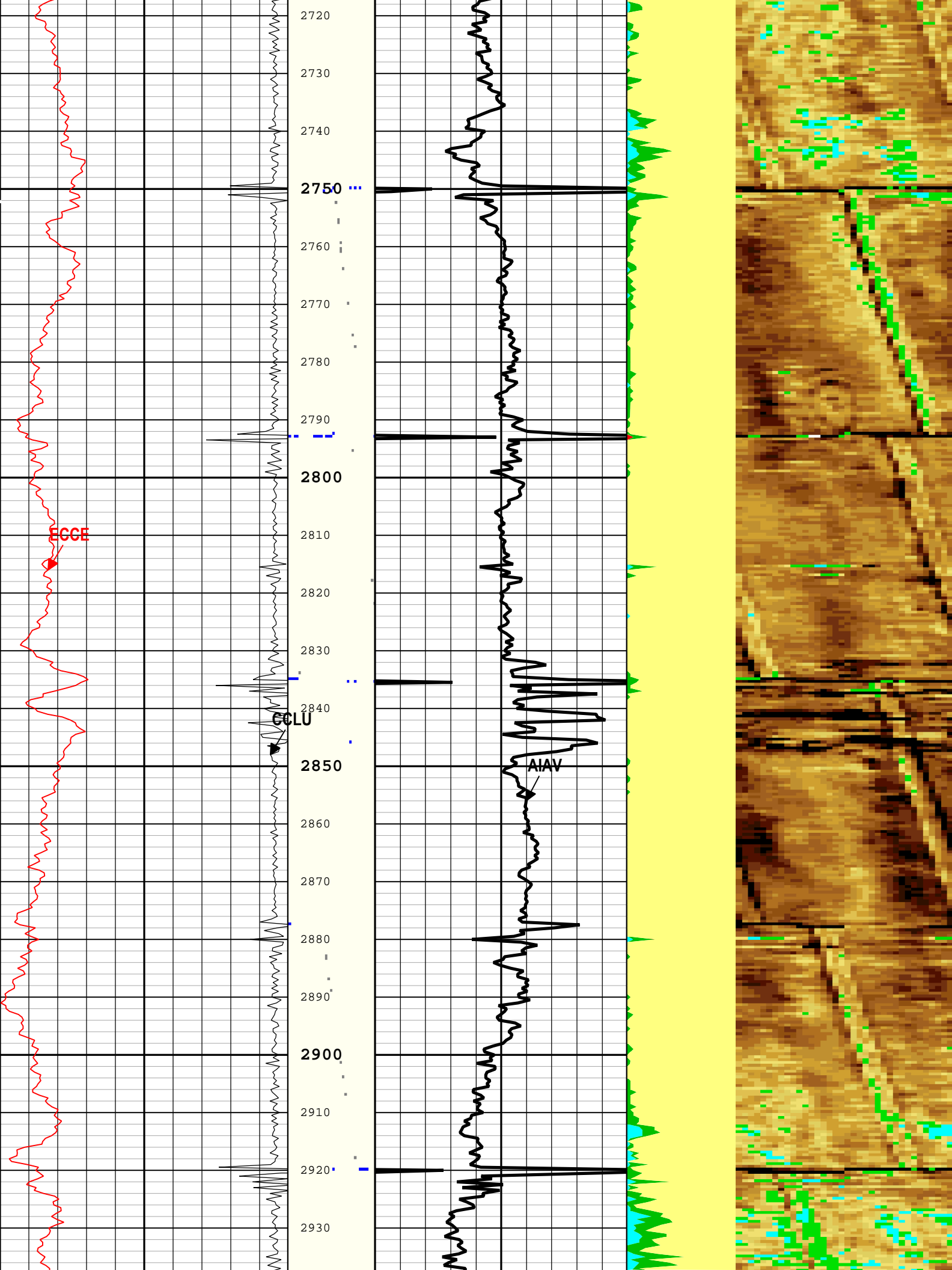


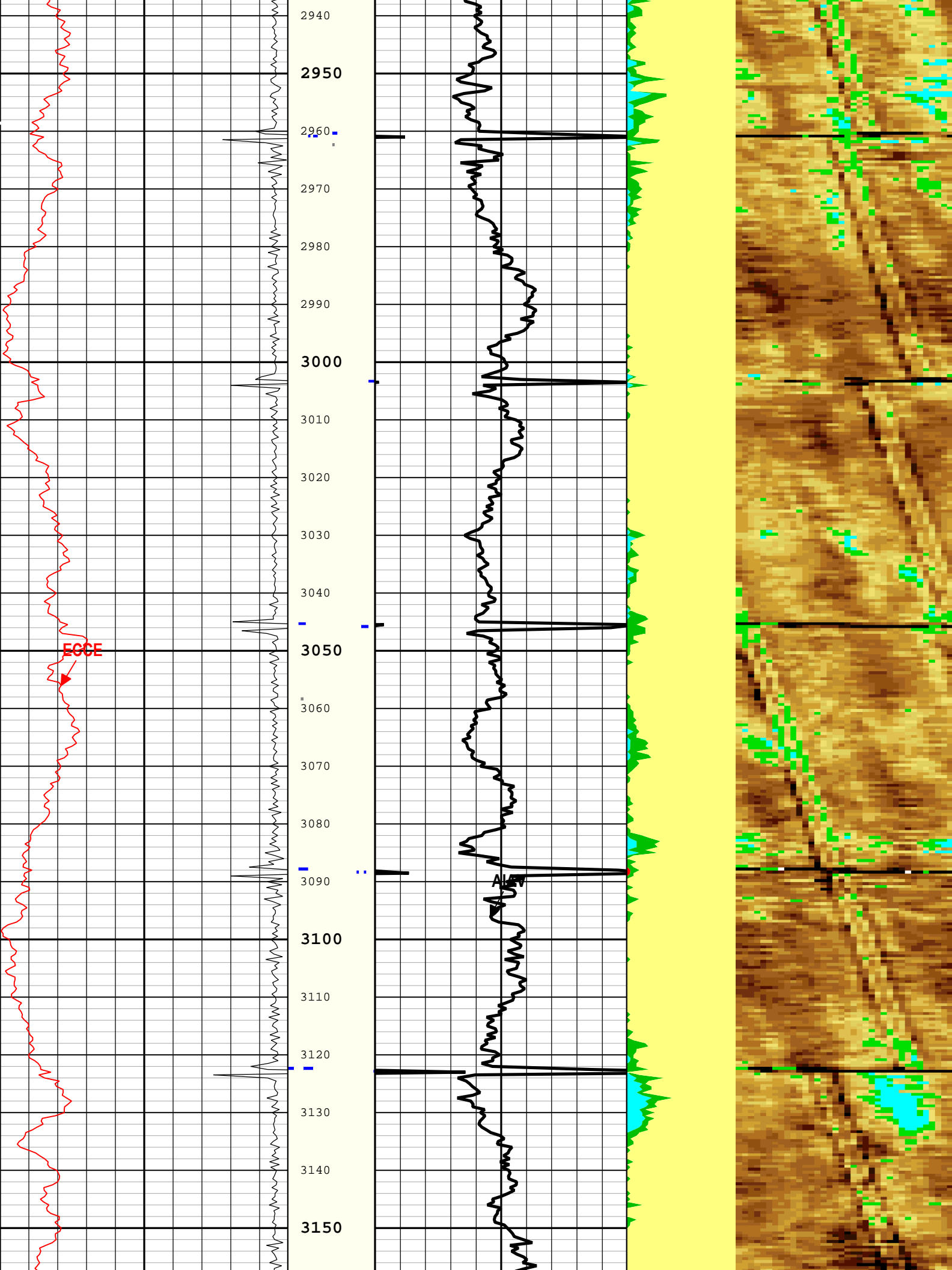


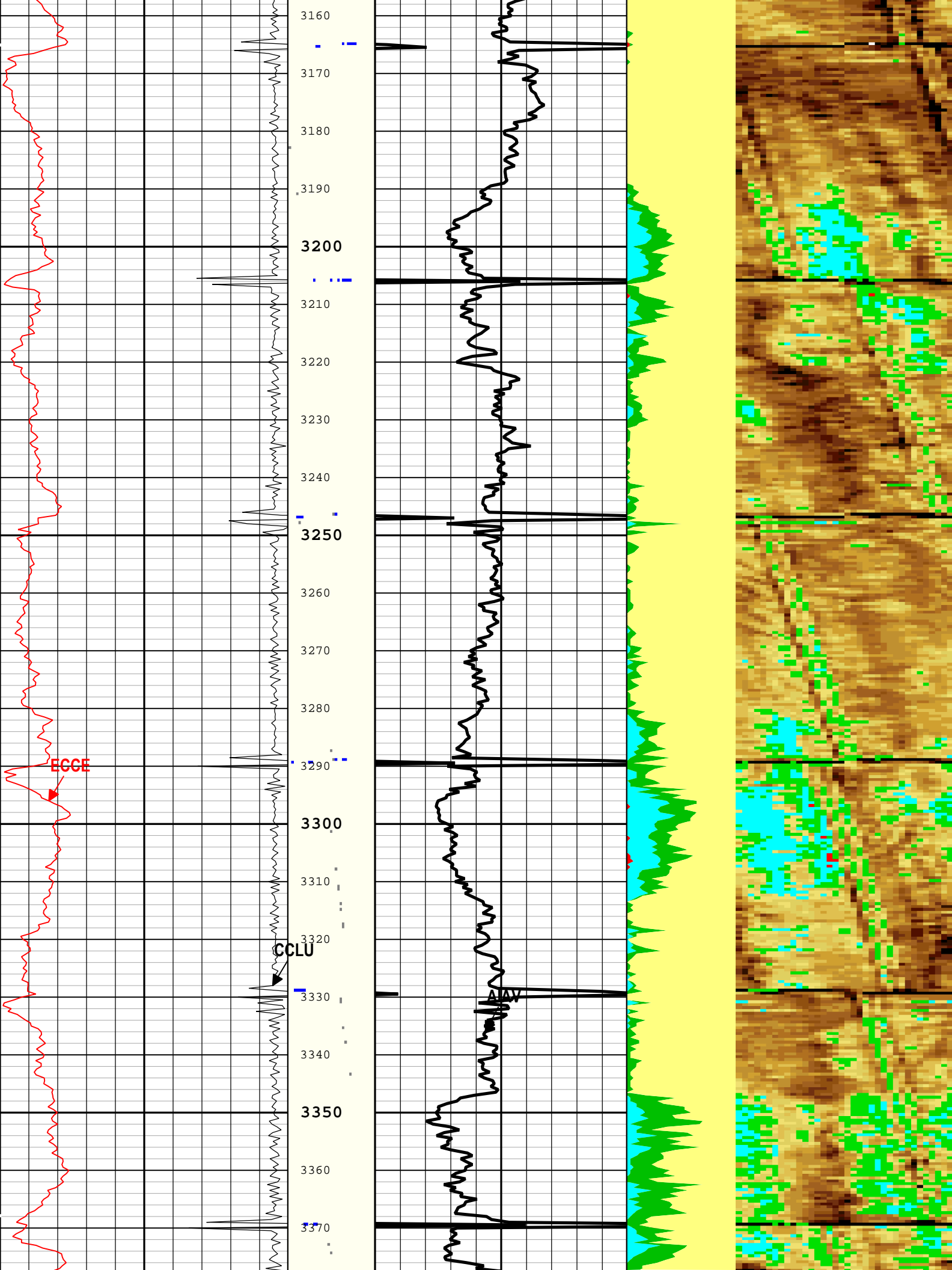


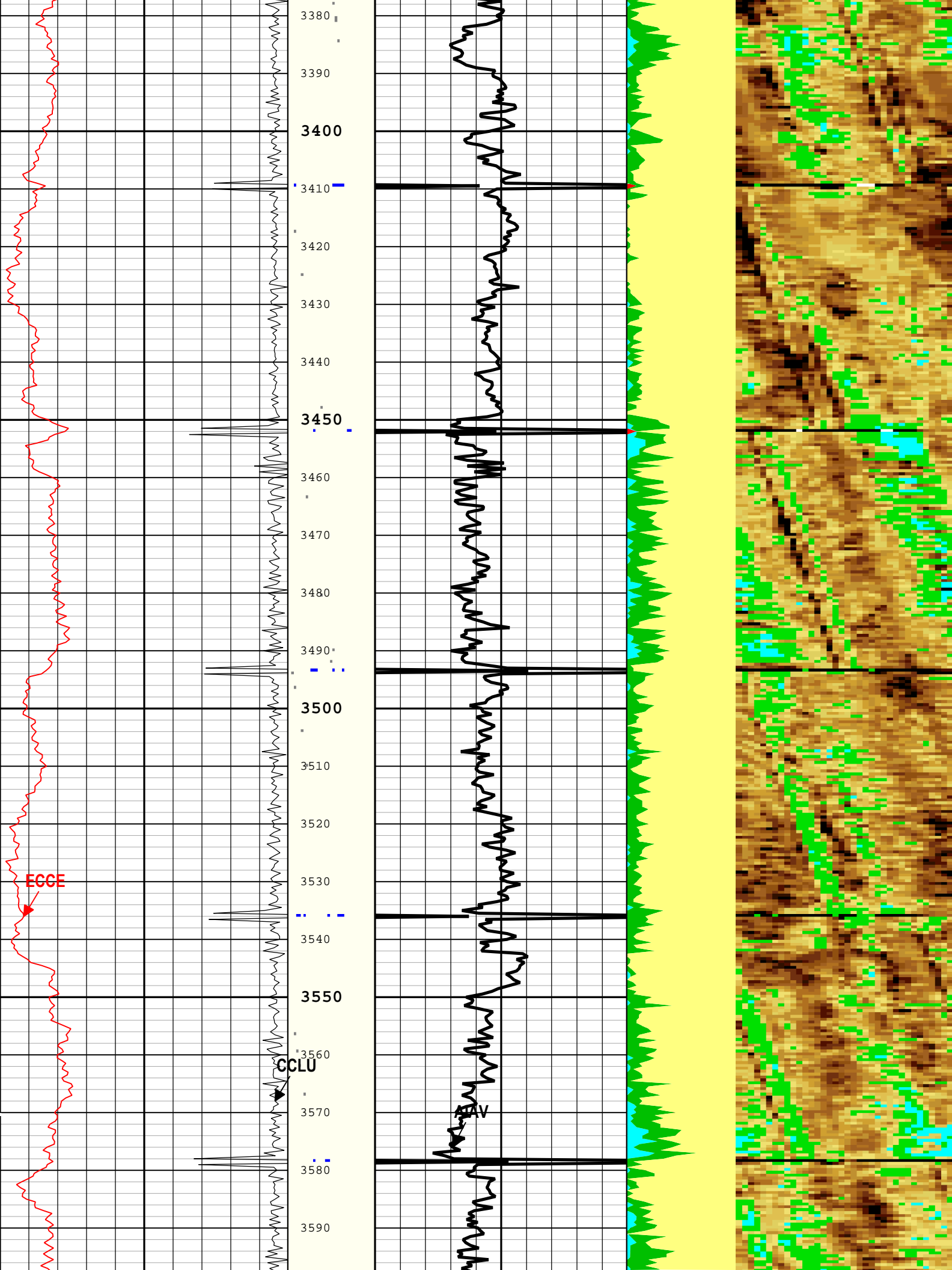


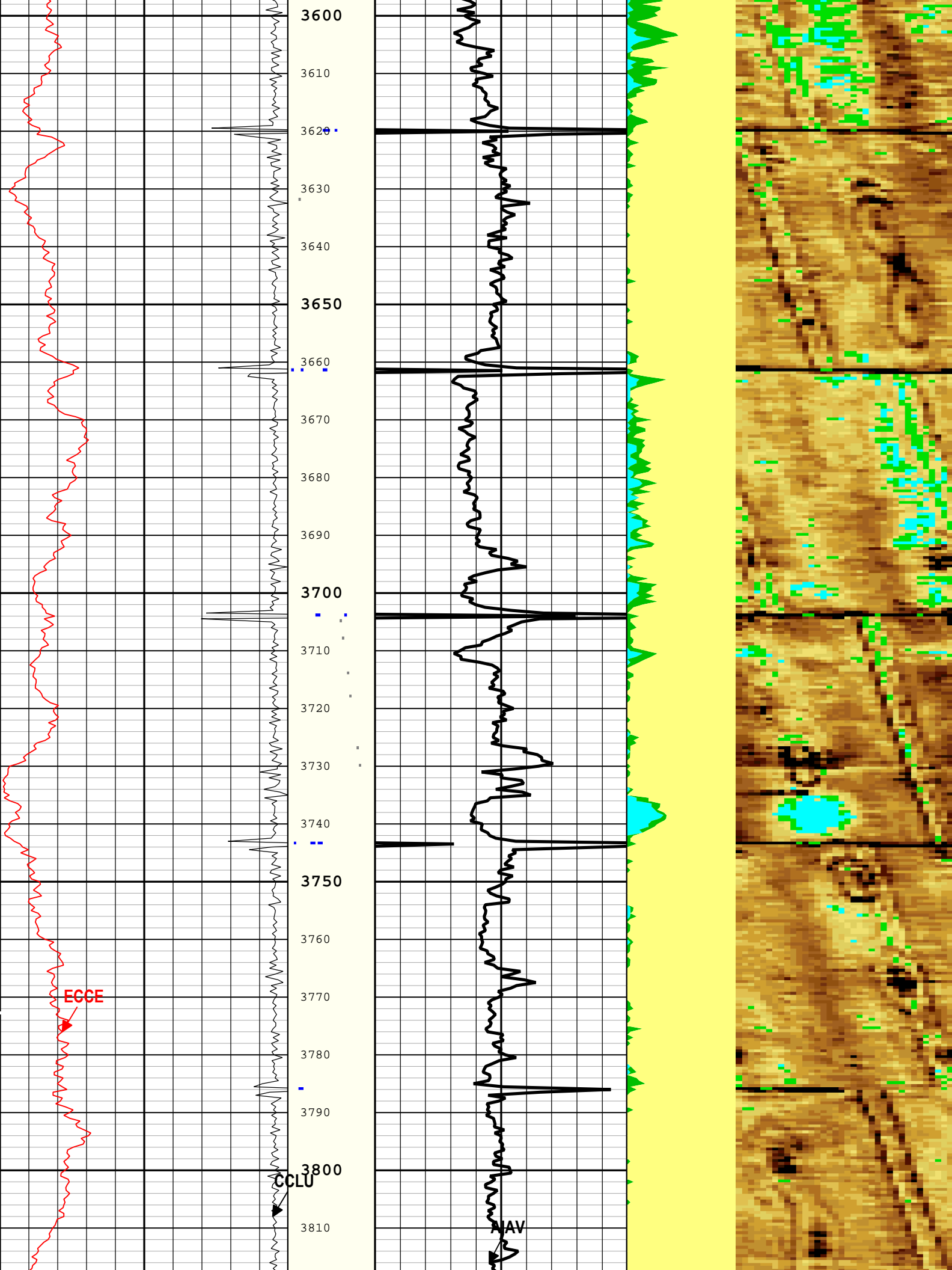


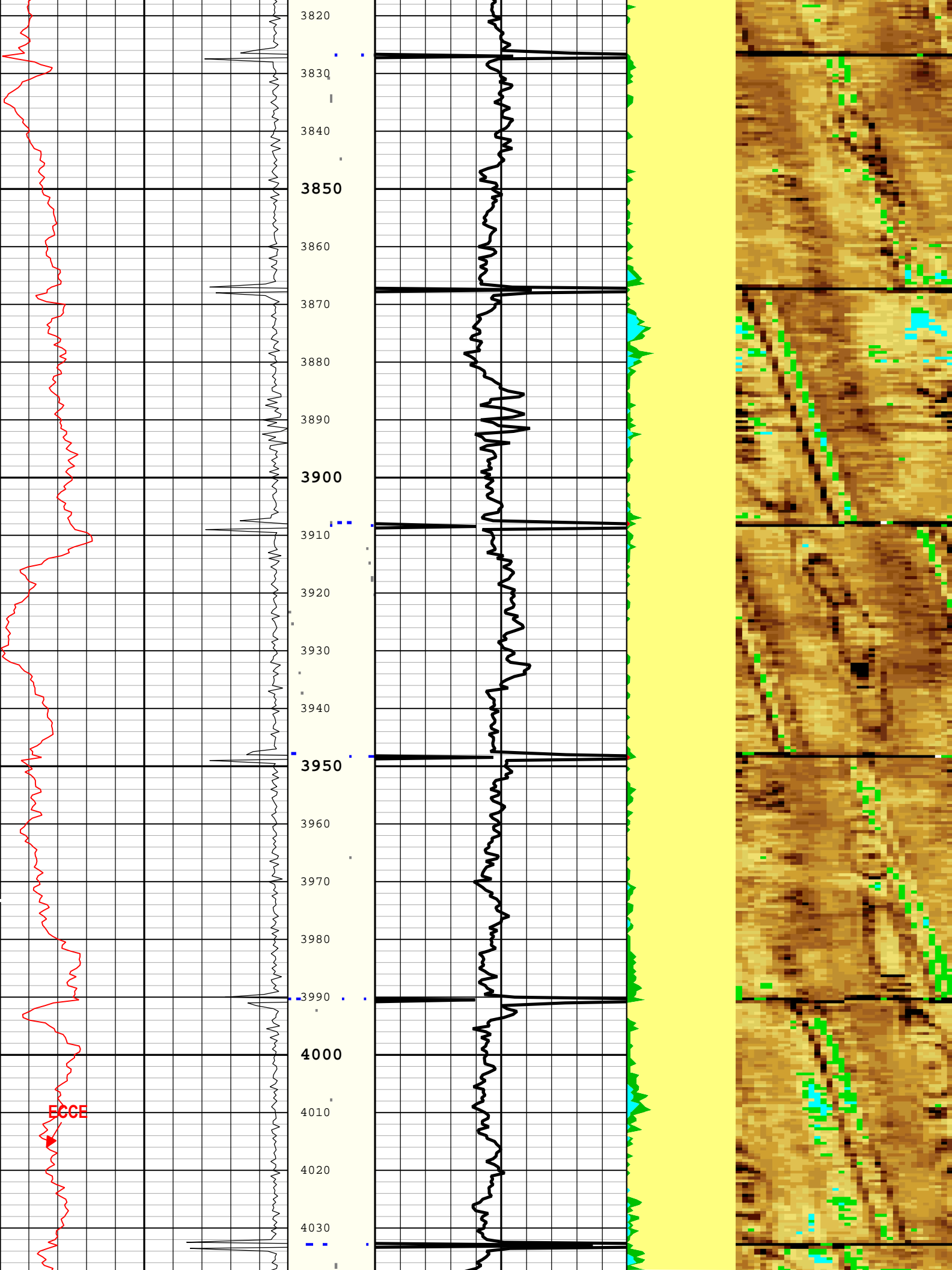


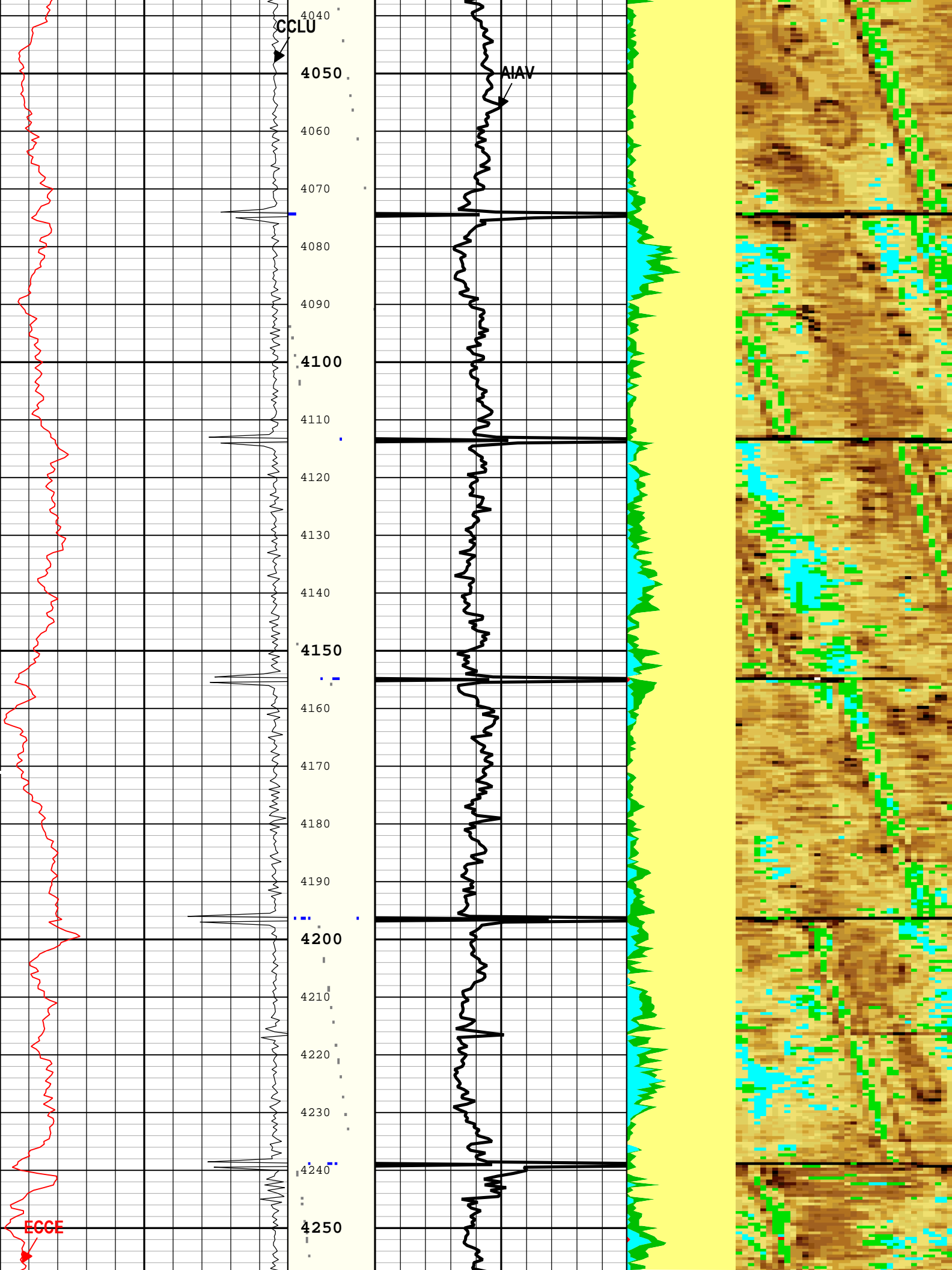


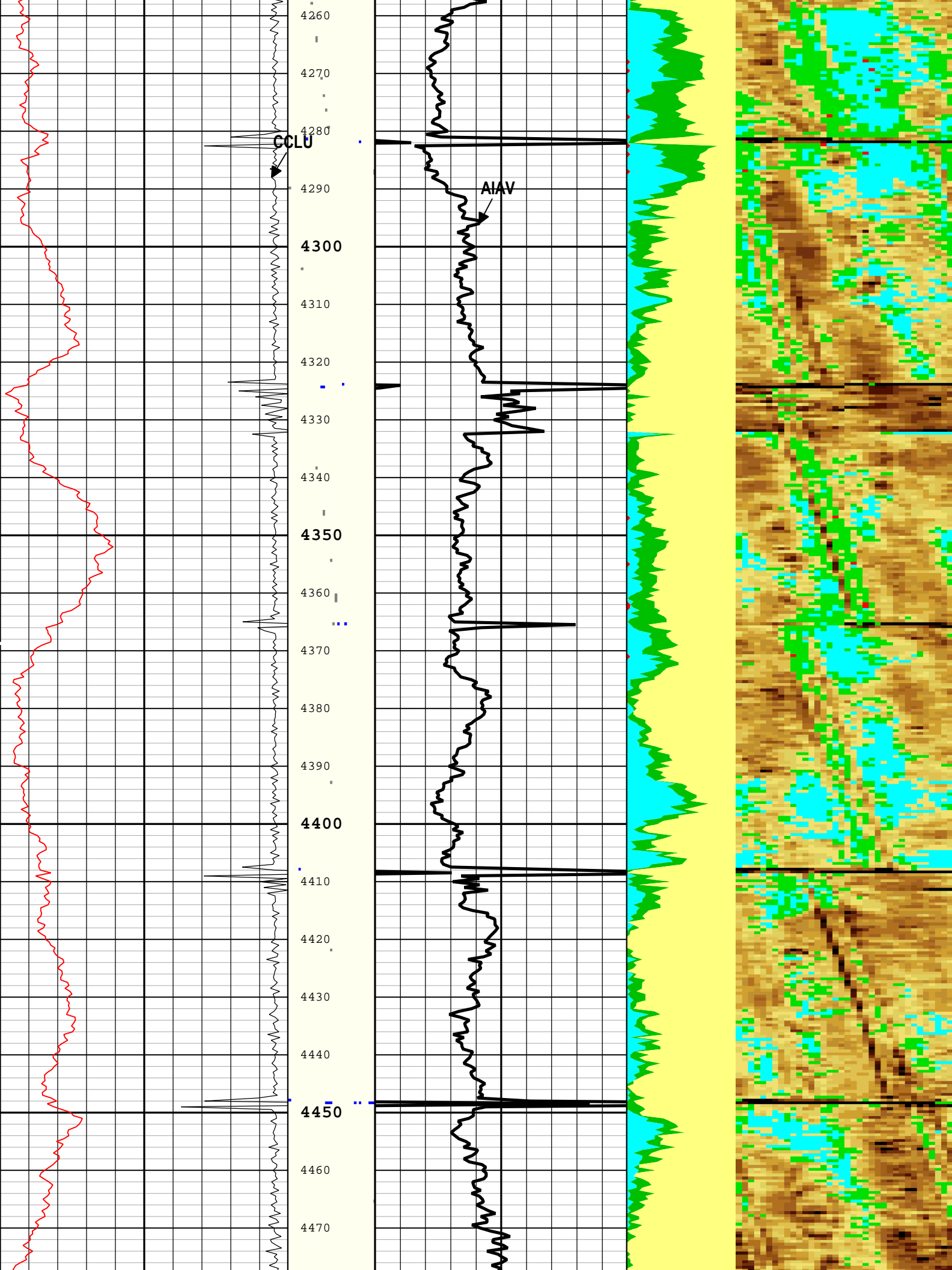


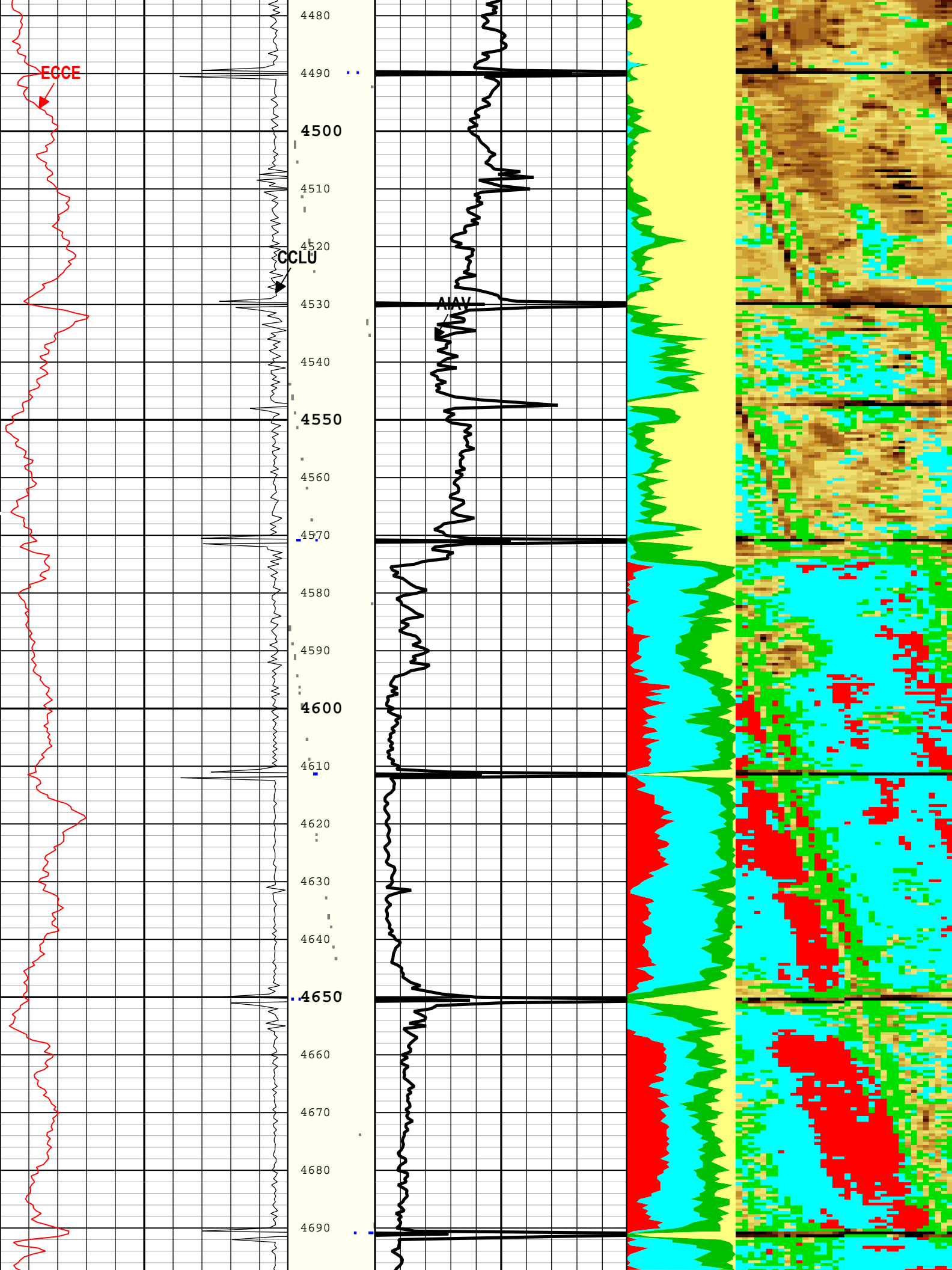


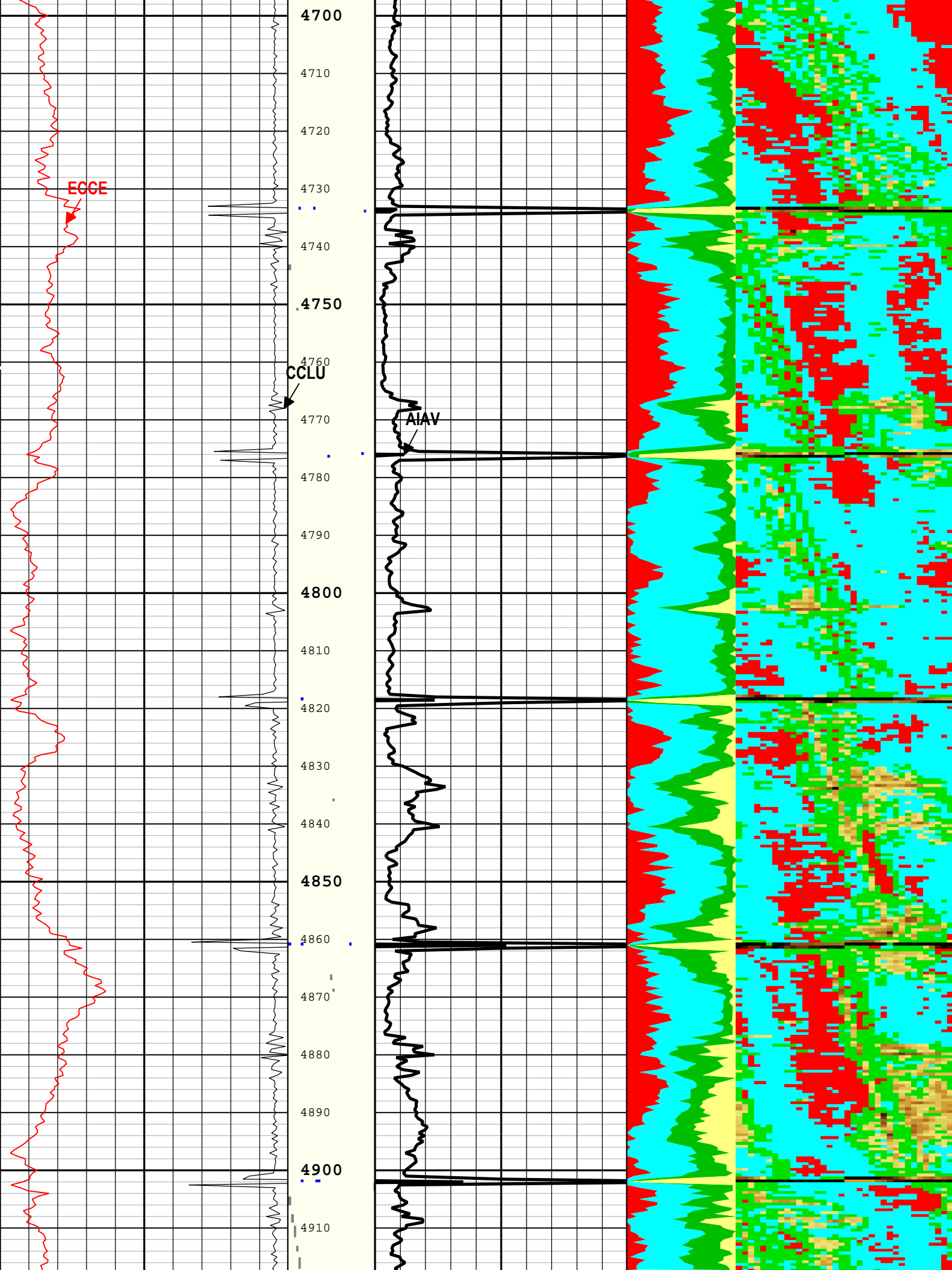


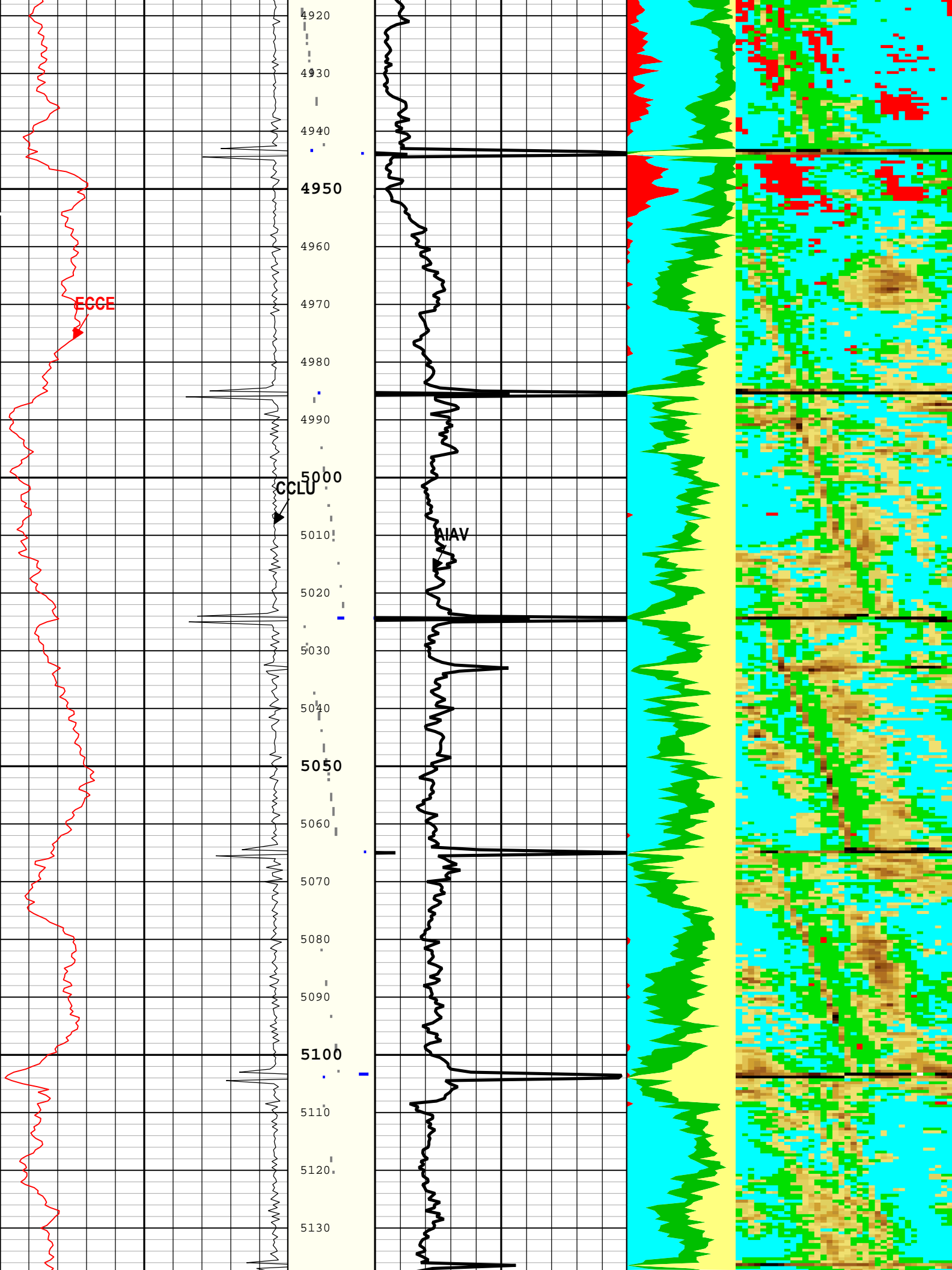


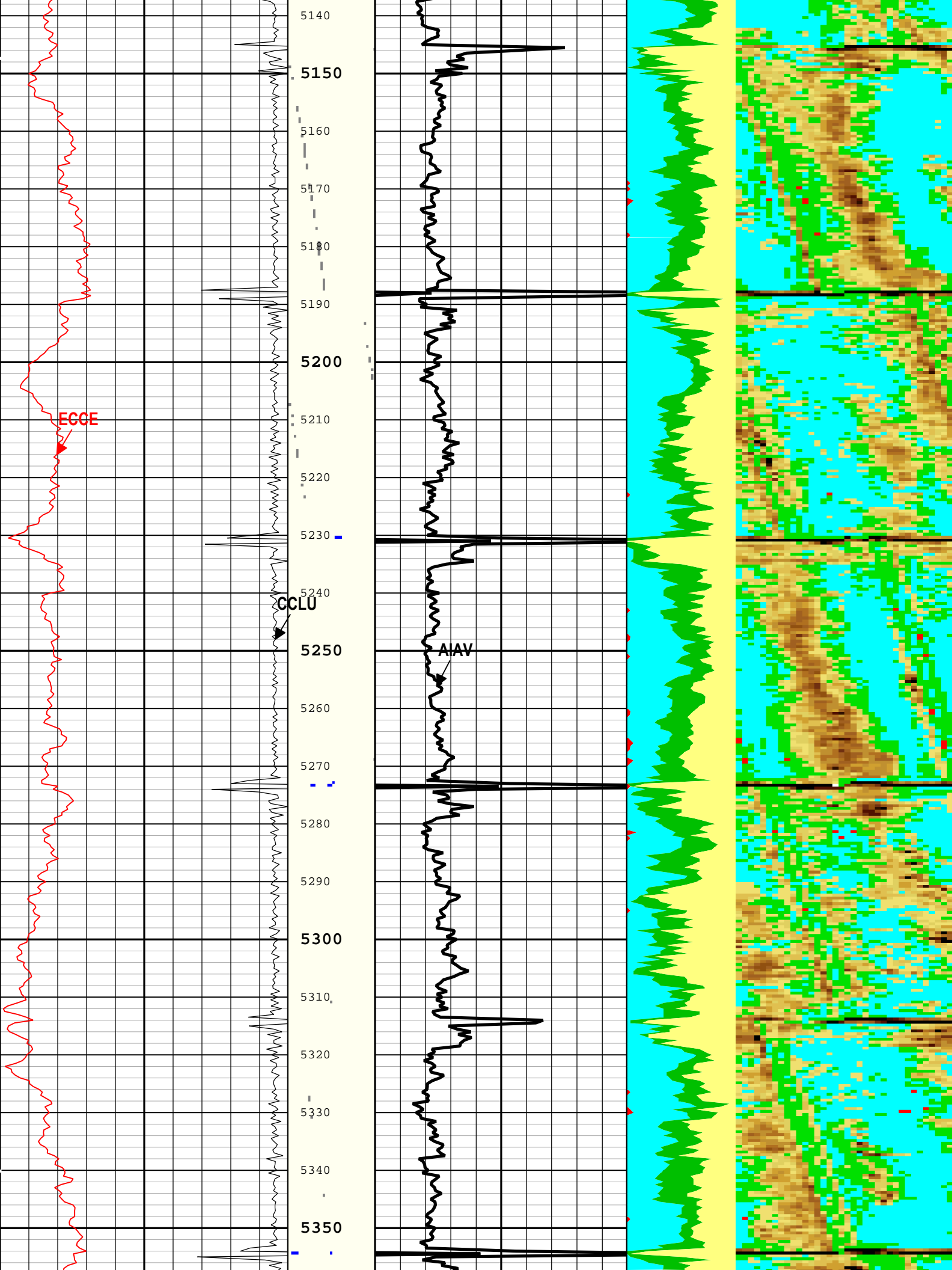


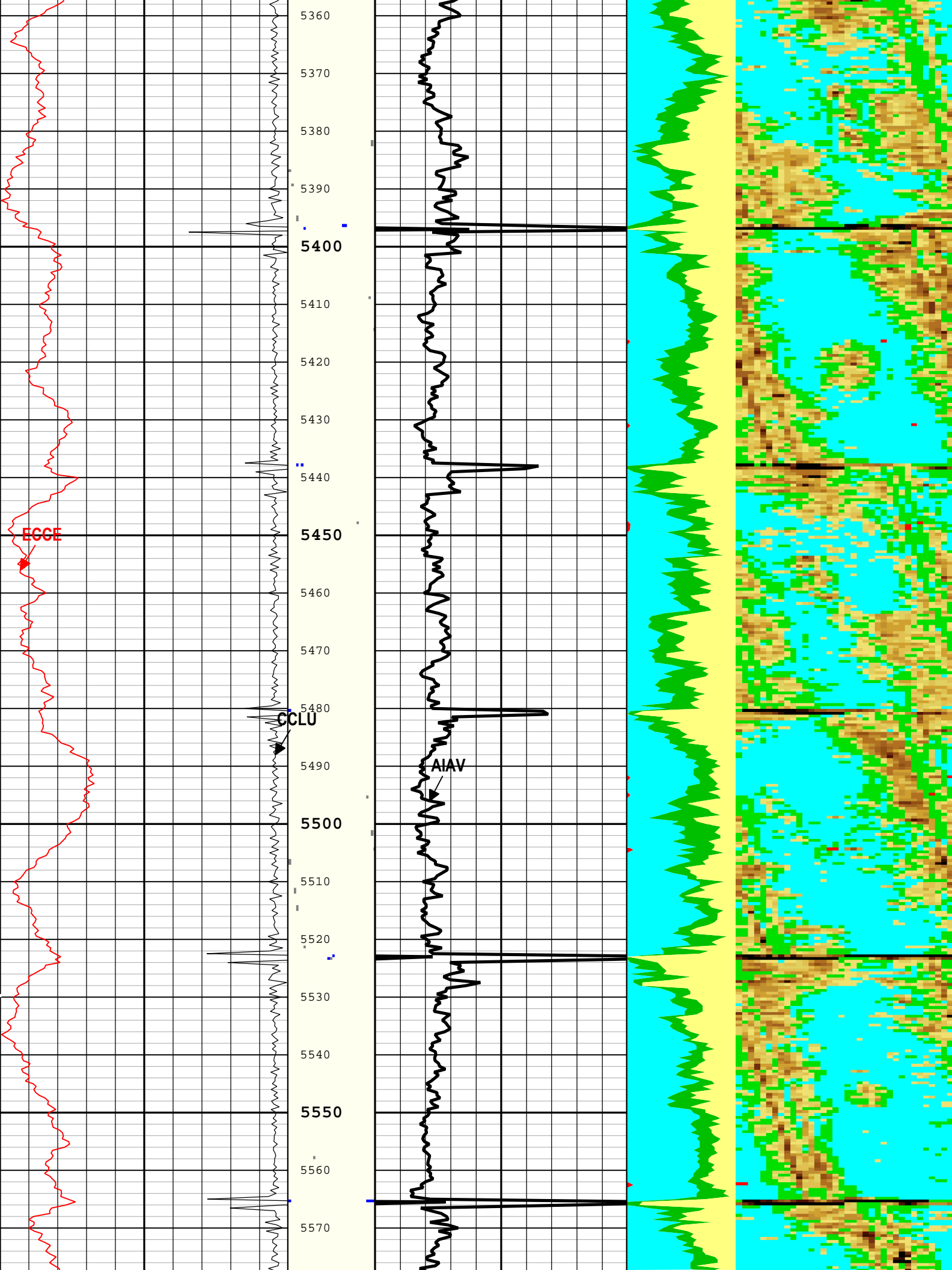


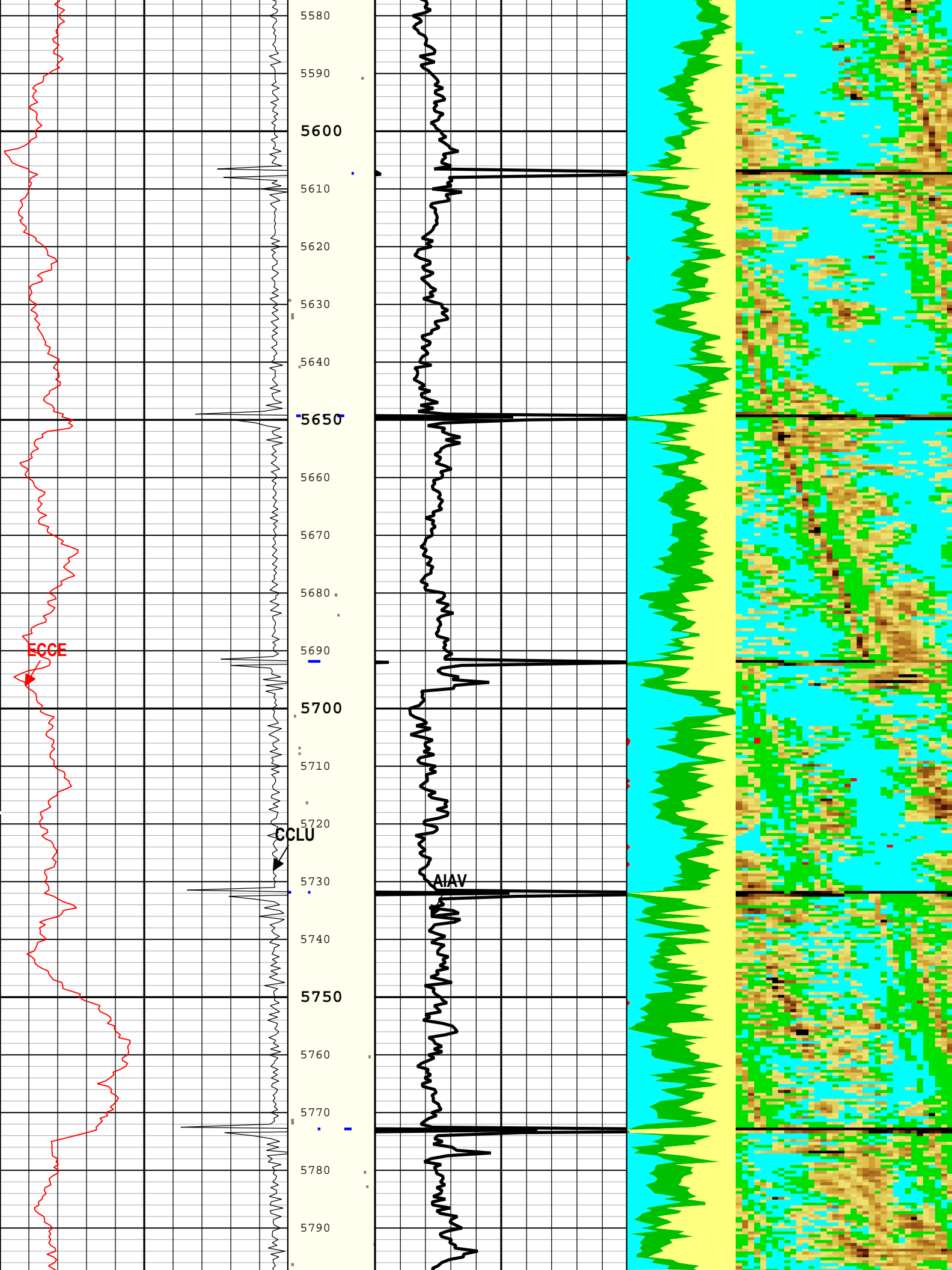


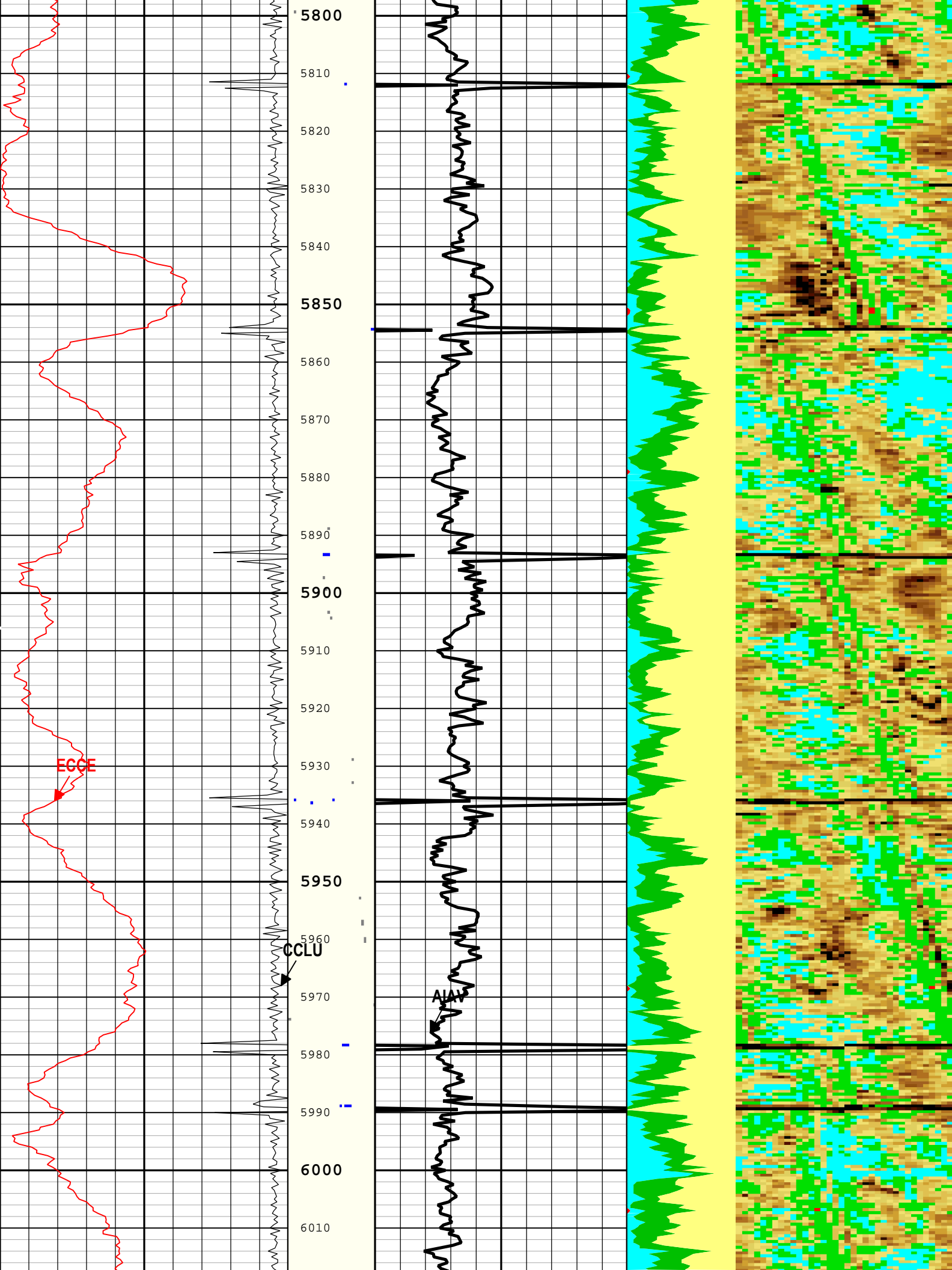


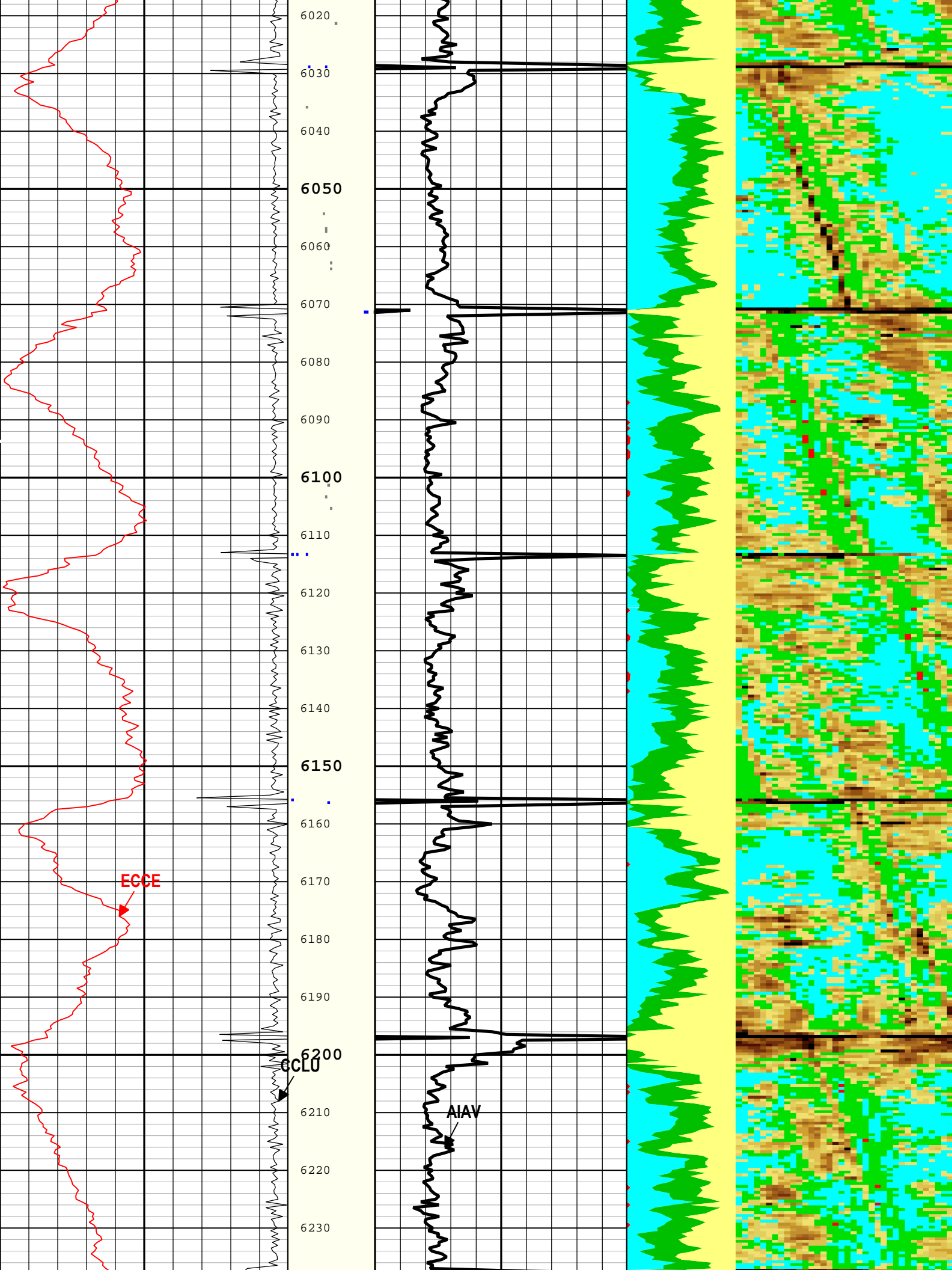


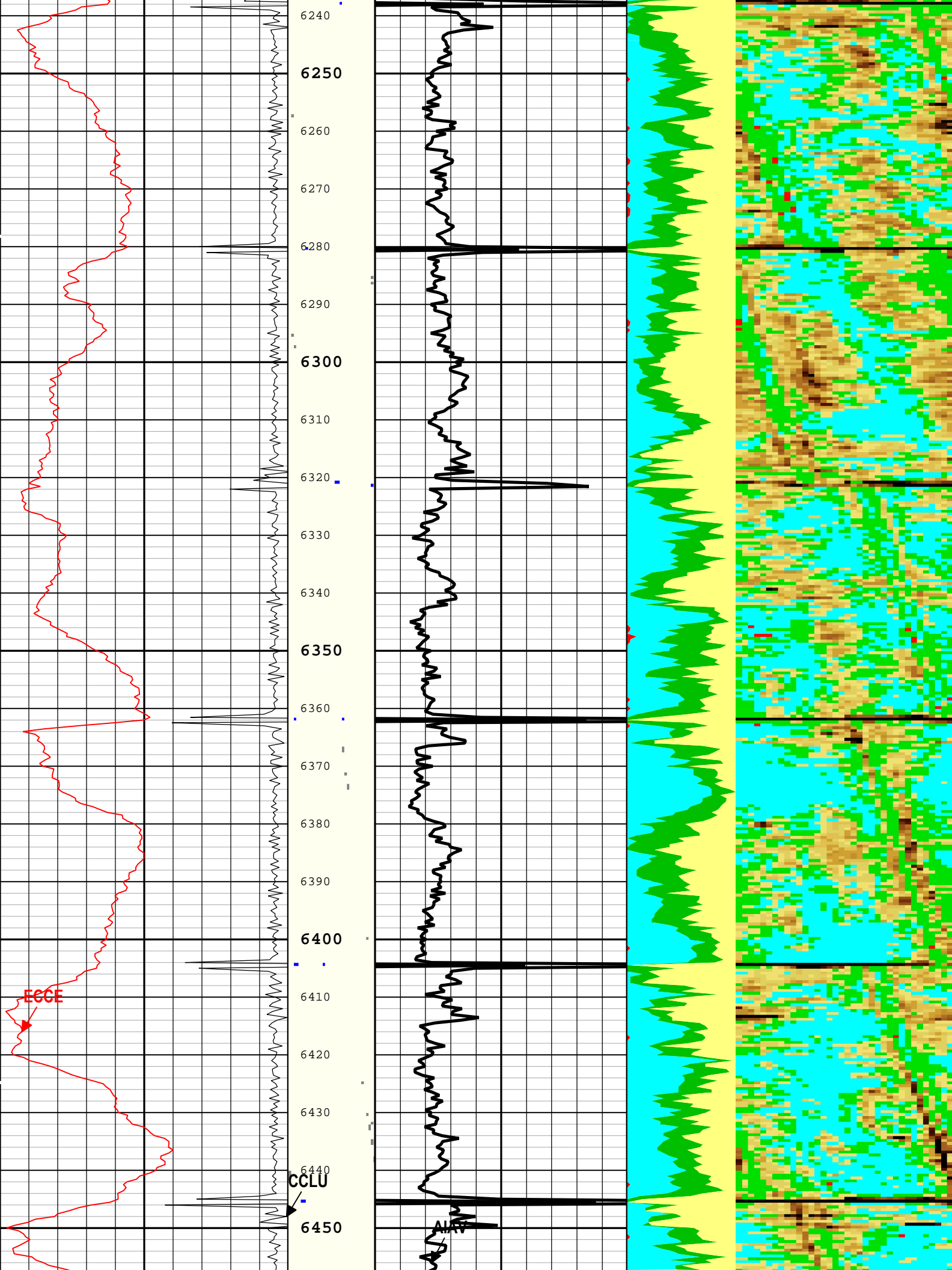


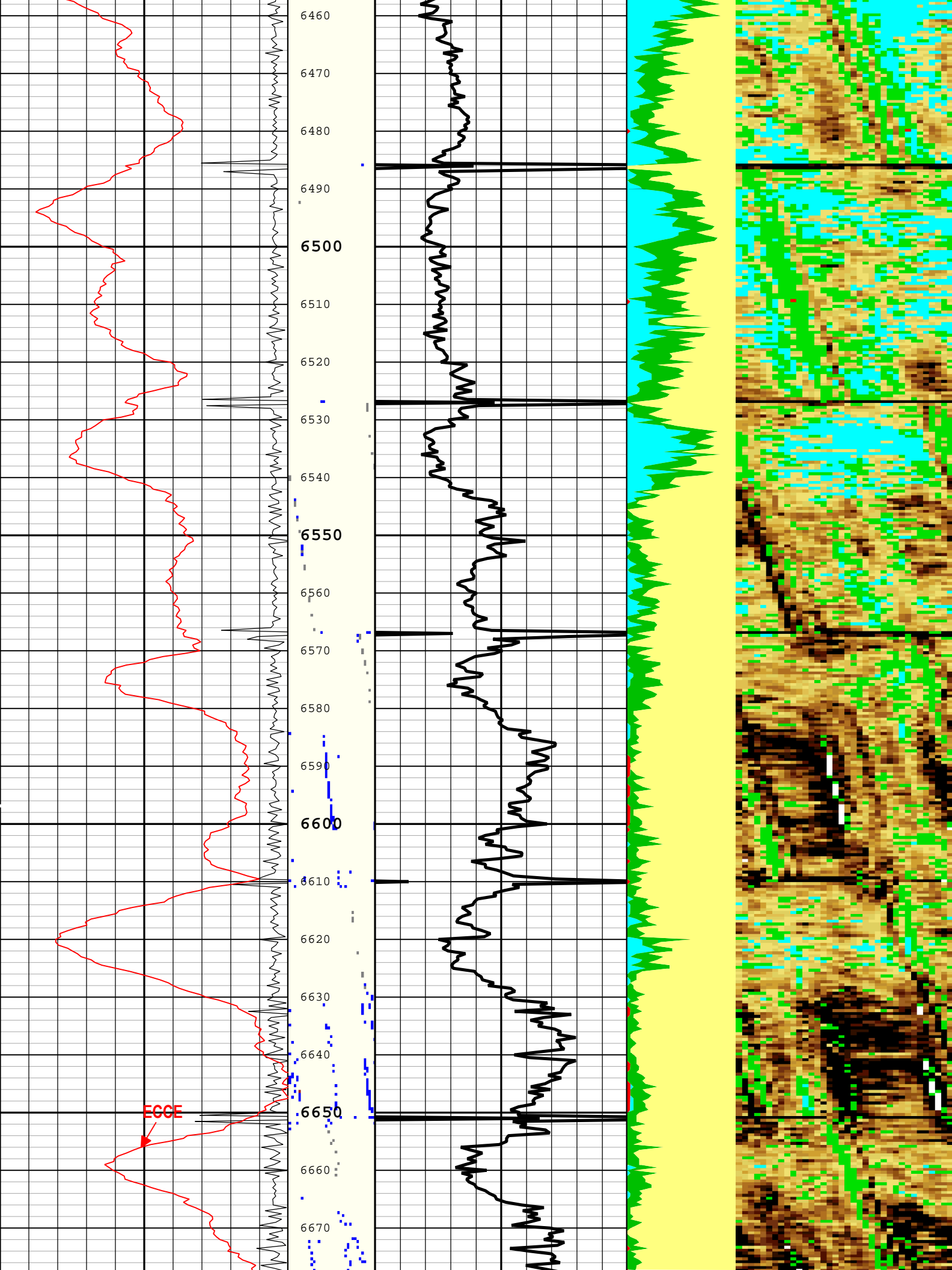


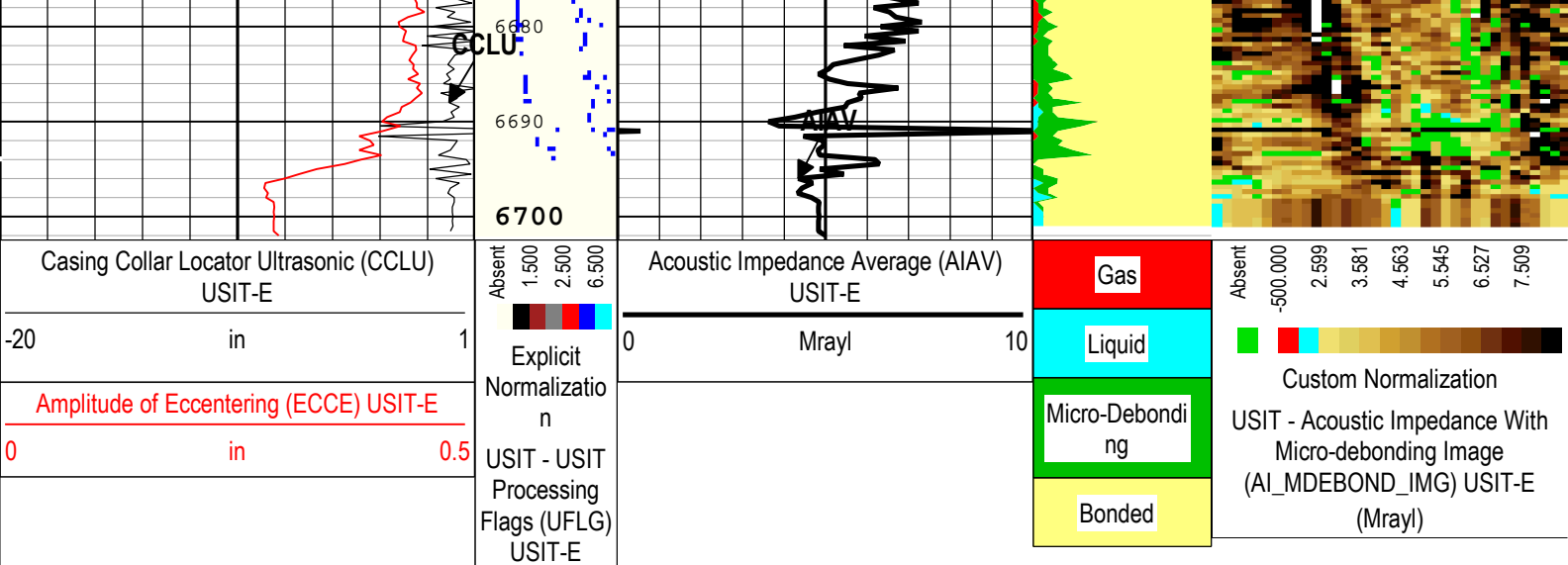












TIME_1900 - Time Marked every 60.00 (s)

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: 13-Sep-2016 14:45:00

Channel Processing Parameters

One : Parameters

| Parameter | Description | Tool | Value | Unit |
|-------------------|--|-----------|----------------|---------|
| ISSBAR | Barite Mud Presence Flag | Borehole | No | |
| BS | Bit Size | WLSESSION | Depth Zoned | in |
| CMTY(U-USIT_CEMT) | Cement Type | USIT-E | Regular Cement | |
| DFD | Drilling Fluid Density | Borehole | 8.8 | lbm/gal |
| DFT | Drilling Fluid Type | Borehole | Water | |
| DTMD | Borehole Fluid Slowness | Borehole | 190 | us/ft |
| FDII | FPM Data Interpolation Interval | USIT-E | 0 | 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 | 1.15 | |
| U-USIT_DFSZ | Drilling Fluid Specific Acoustic Impedance | USIT-E | 0.1 | 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. | |
| ZMUD | Acoustic Impedance of Mud | Borehole | 1.78 | 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 | 16 | 63.5 | 110 |
| BS | 13.5 | 110 | 1920 |
| BS | 8.5 | 1920 | 6702.5 |

All depth are actual.

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 |
| U-USIT_DDT5 | USIC Downhole Decimation for T5 only | USIT-E | 0_NONE | |
| EMXV | EMEX Voltage | USIT-E | Time Zoned | V |
| HRES | Horizontal Resolution | USIT-E | 10 deg | |
| TMUC | Type of Mud | USIT-E | BRI | |
| 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 | 6700 | ft |
| WINB | Window Begin Time | USIT-E | 27.85 | 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) |
|-----------|-------|----------------------|----------------------|--------------------|-------------------|
| EMXV | 65 | 13-Sep-2016 13:28:34 | 13-Sep-2016 13:32:32 | 6703.02 | 6699.39 |
| EMXV | 70 | 13-Sep-2016 13:32:32 | 13-Sep-2016 14:09:09 | 6699.39 | 63.69 |
| WINE | 67.85 | 13-Sep-2016 13:28:34 | 13-Sep-2016 13:34:03 | 6703.02 | 6588.1 |
| WINE | 70 | 13-Sep-2016 13:34:03 | 13-Sep-2016 14:09:09 | 6588.1 | 63.69 |

All depths are at tool zero.

One

0 PSI Repeat Pass

Software Version

| Acquisition System | Version |
|--------------------|----------------|
| Maxwell 2016 SP2 | 6.2.64464.3100 |

Pass Summary

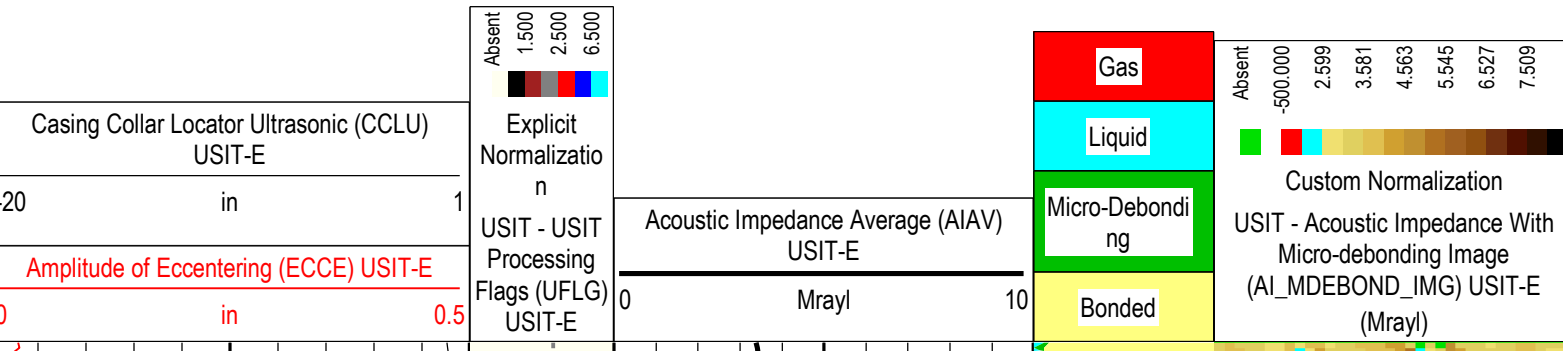
| Run Name | Pass Objective | Direction | Top | Bottom | Start | Stop | DSC Mode | Depth Shift | Include Parallel Data |
|----------|----------------|-----------|------------|------------|------------------------|------------------------|----------|-------------|-----------------------|
| One | Log[3]:Up | Up | 1907.07 ft | 3034.48 ft | 13-Sep-2016 2:25:08 PM | 13-Sep-2016 2:31:32 PM | ON | 3.39 ft | No |

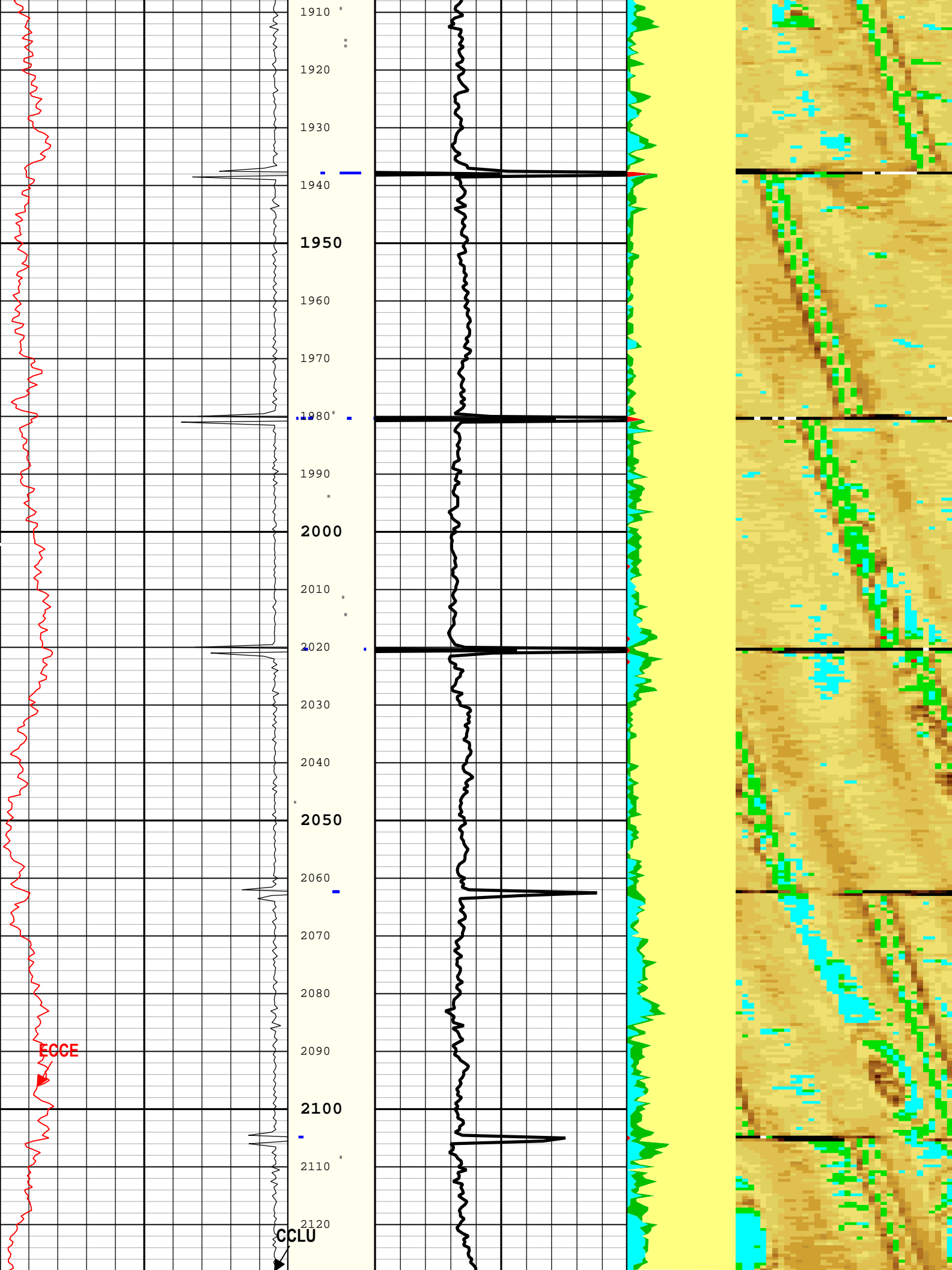
All depths are referenced to toolstring zero

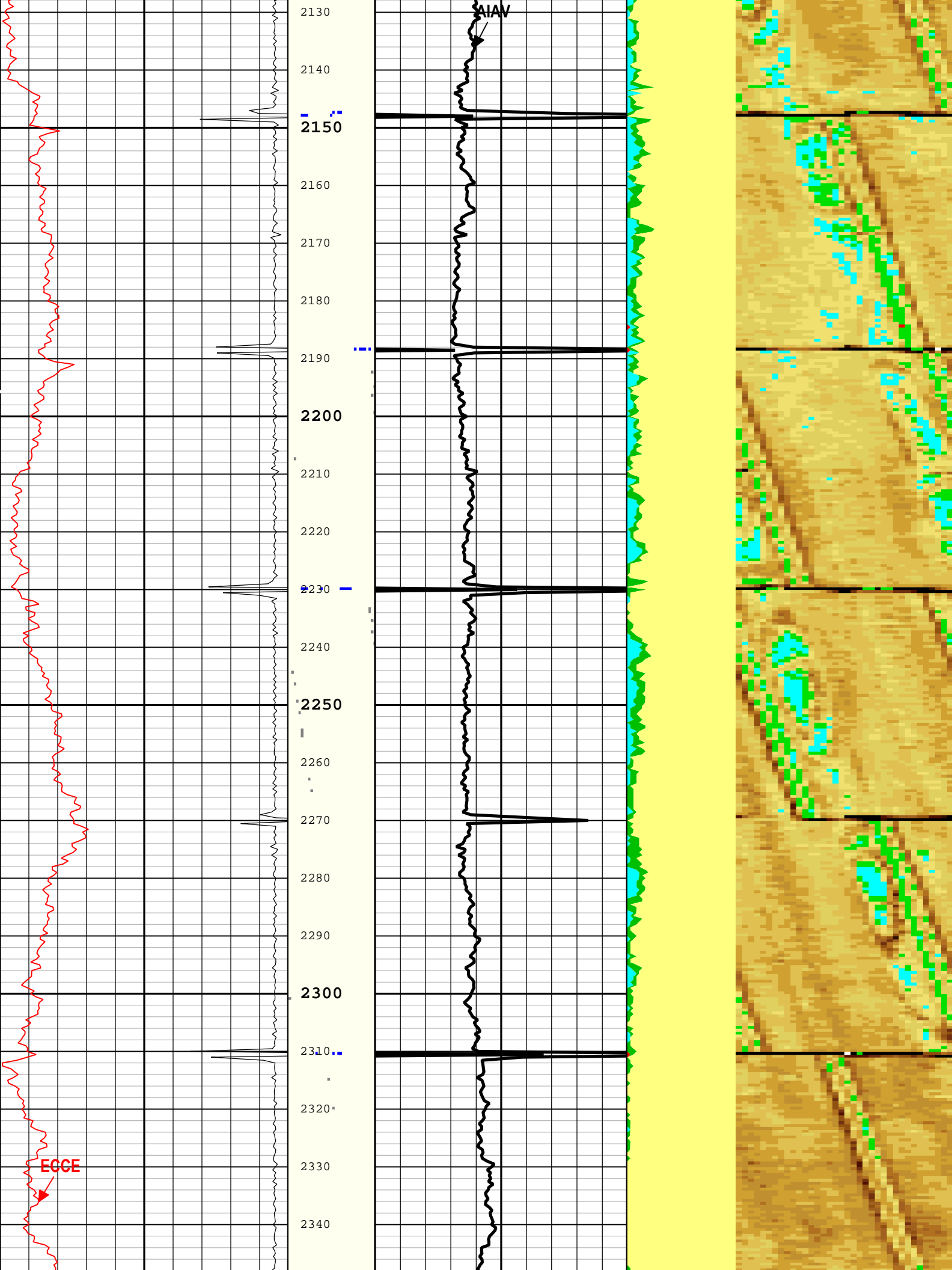
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|-----|---|
| Log | Company:Noble Energy Inc Well:Lapp A15-629 One : Log[3]:Up:S011 |
|-----|---|

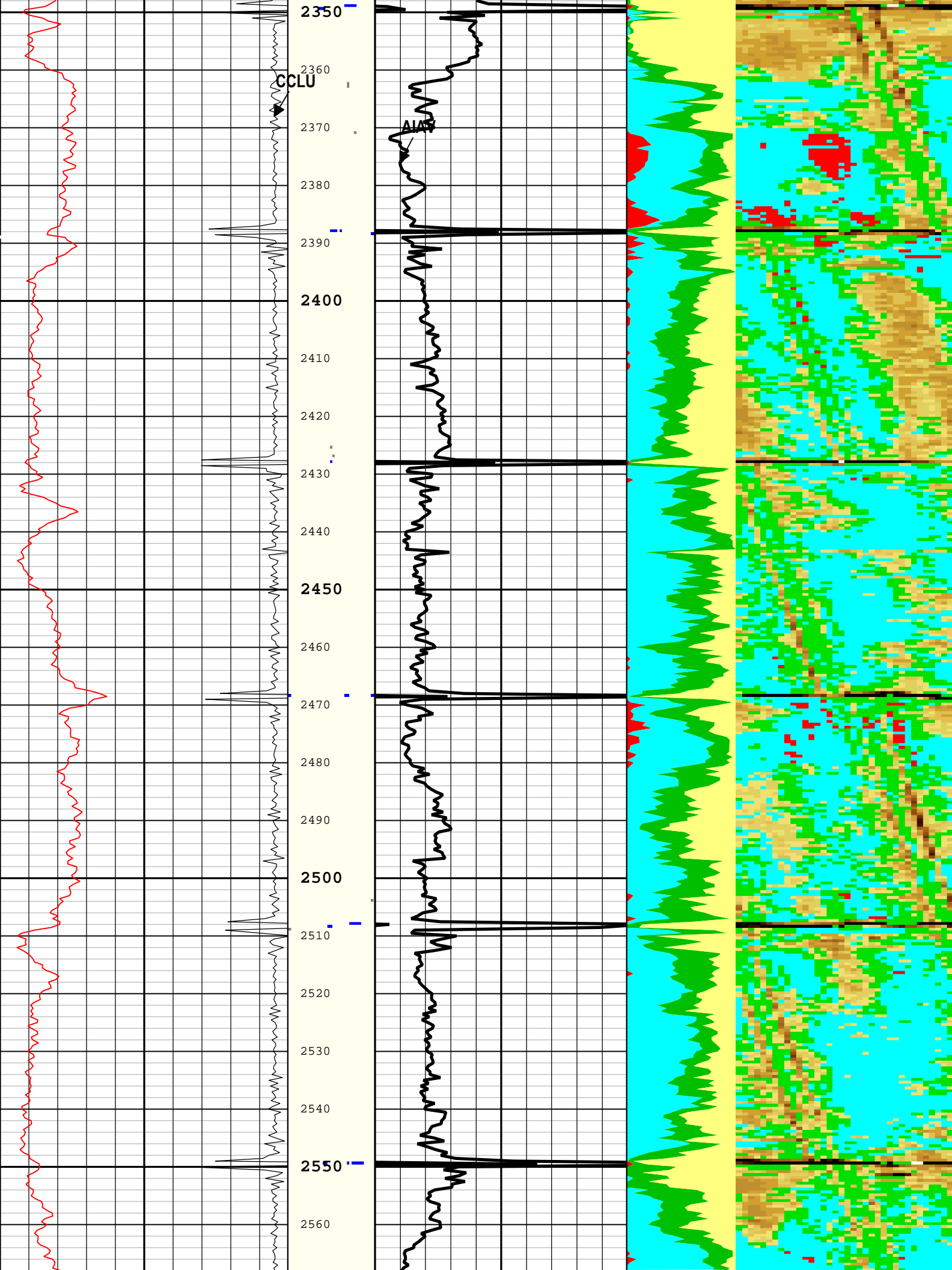
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Creation Date: 13-Sep-2016 14:45:08

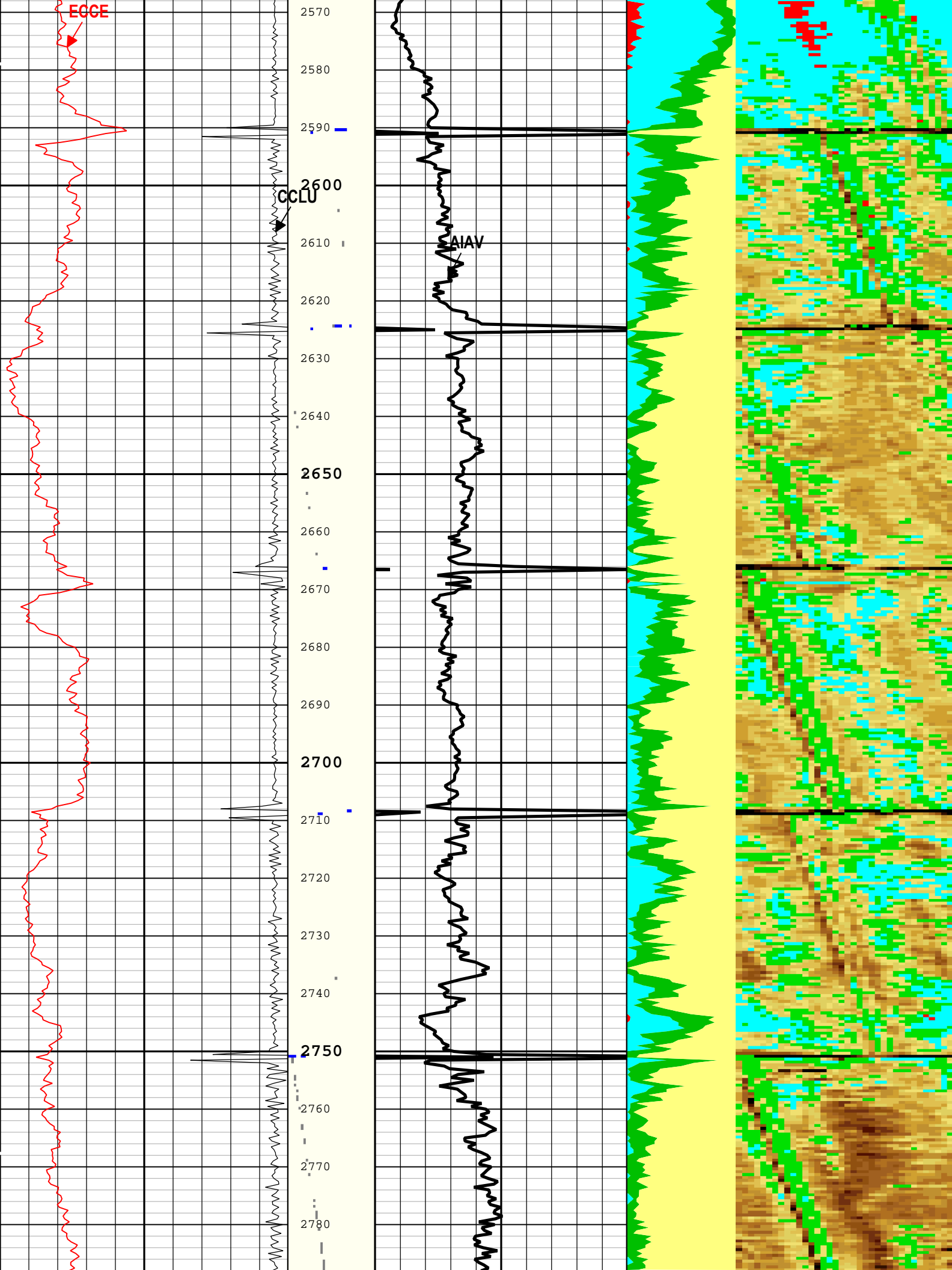
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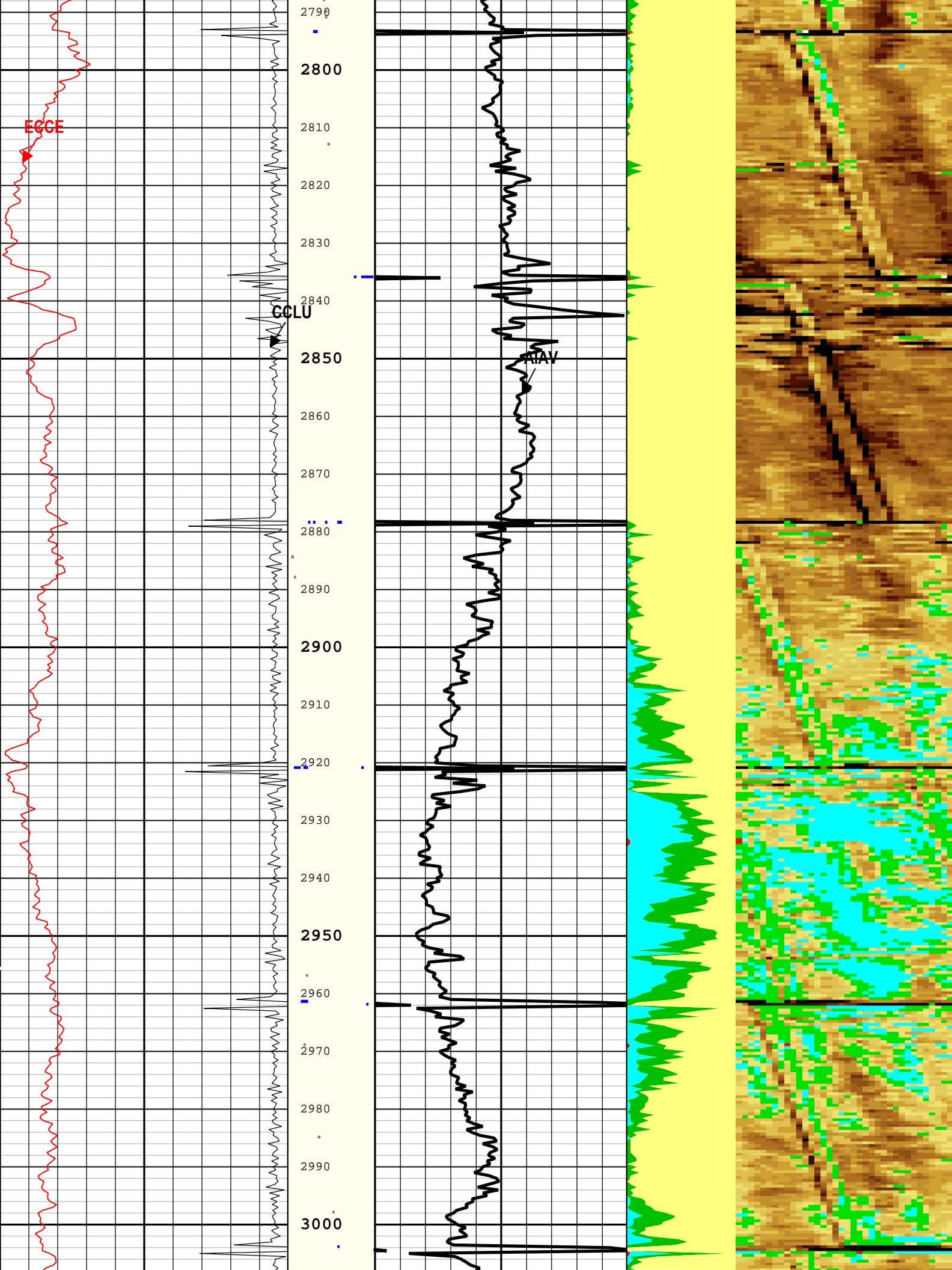


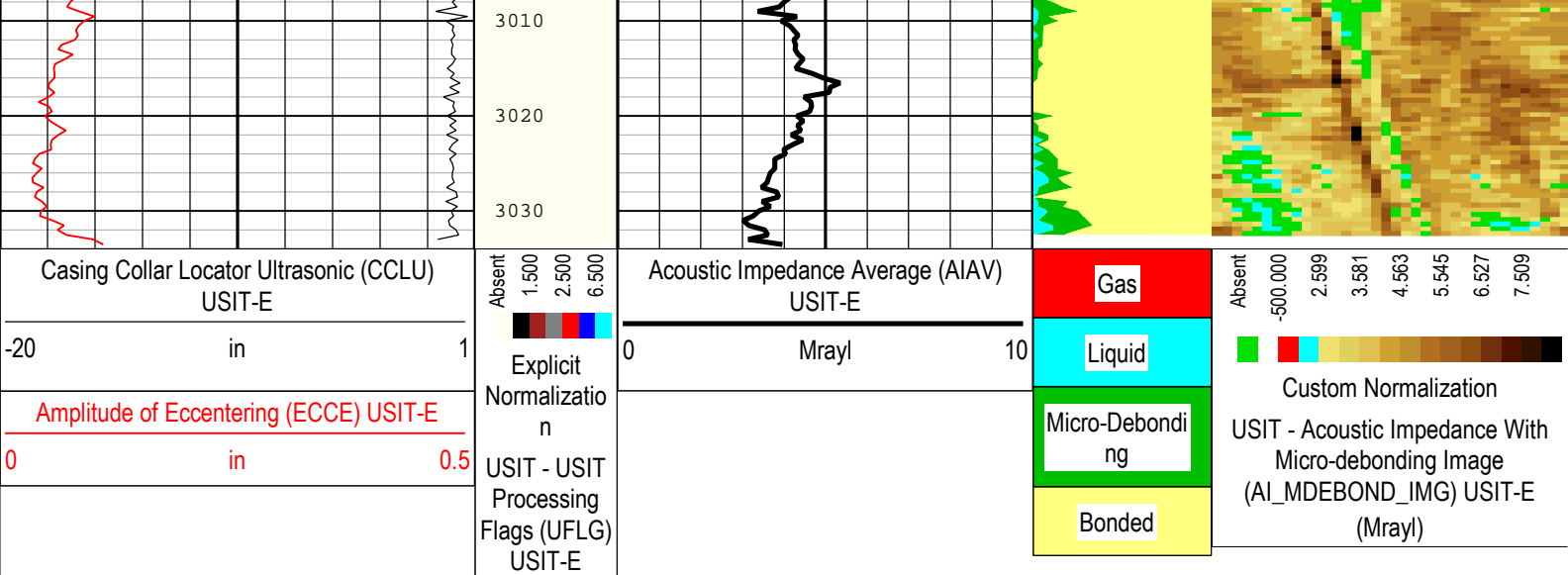












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Description: Format: Log (DJ Basin Ultrasonic Cement Summary Report) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth
Creation Date: 13-Sep-2016 14:45:08

Channel Processing Parameters

One : Parameters

| Parameter | Description | Tool | Value | Unit |
|-------------------|--|-----------|----------------|---------|
| ISSBAR | Barite Mud Presence Flag | Borehole | No | |
| BS | Bit Size | WLSESSION | Depth Zoned | in |
| CMTY(U-USIT_CEMT) | Cement Type | USIT-E | Regular Cement | |
| DFD | Drilling Fluid Density | Borehole | 8.8 | lbm/gal |
| DFT | Drilling Fluid Type | Borehole | Water | |
| DTMD | Borehole Fluid Slowness | Borehole | 190 | us/ft |
| FDII | FPM Data Interpolation Interval | USIT-E | 0 | 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 | 1.15 | |
| U-USIT_DFSZ | Drilling Fluid Specific Acoustic Impedance | USIT-E | 0.1 | 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. | |
| ZMUD | Acoustic Impedance of Mud | Borehole | 1.78 | 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 | 13.5 | 1907 | 1920 |
| BS | 8.5 | 1920 | 3034 |

All depth are actual.

Tool Control Parameters

One : Parameters

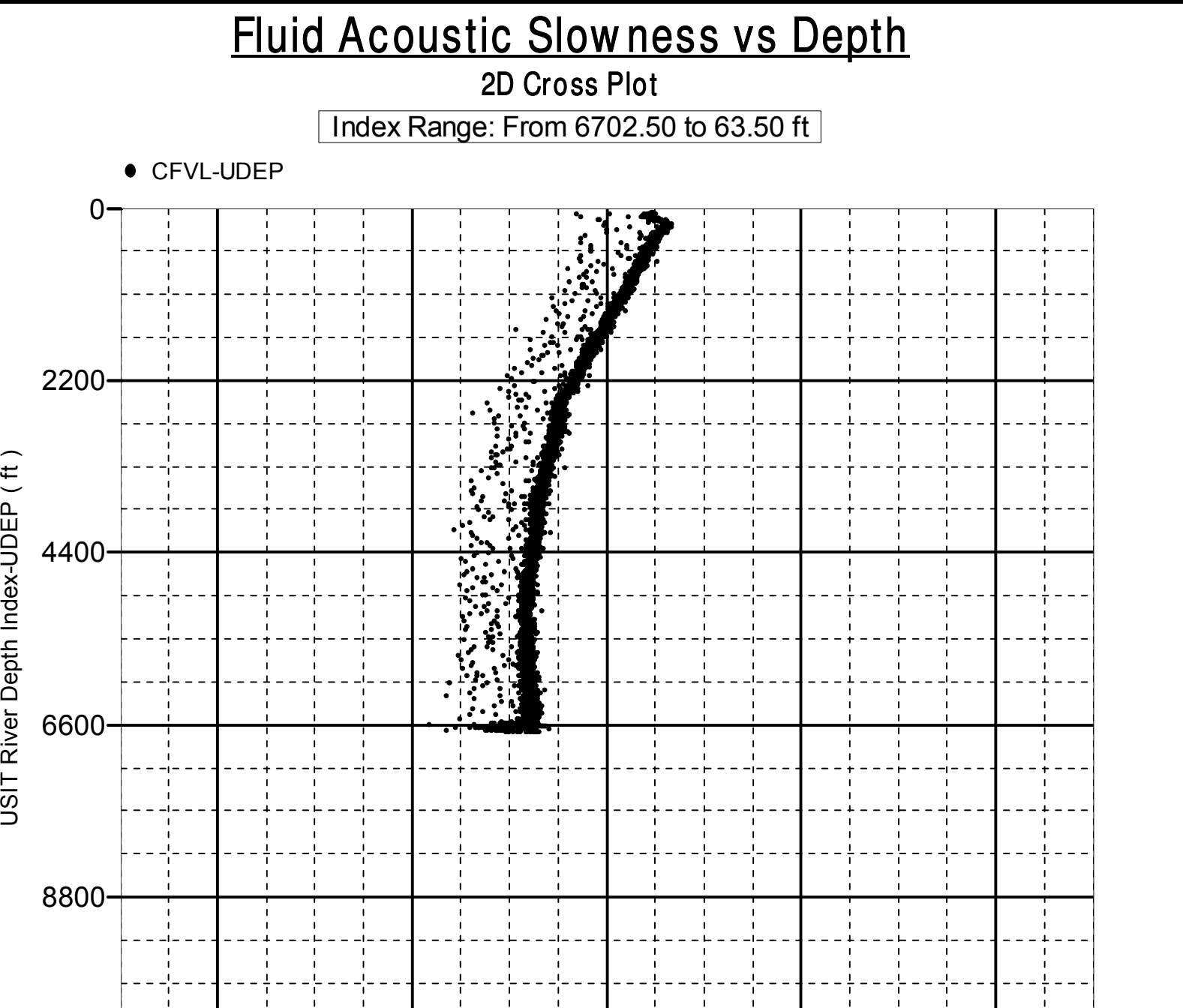
One : Parameters

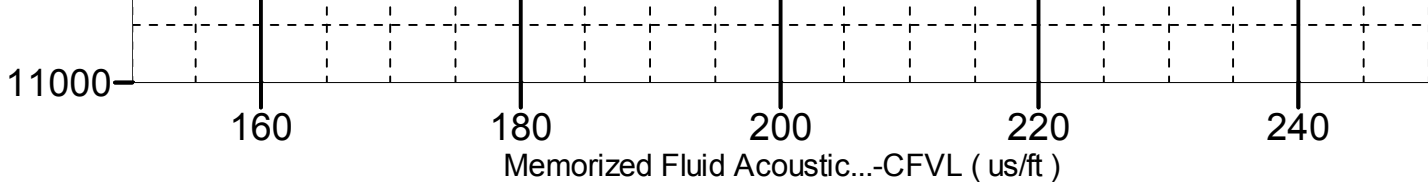
| Parameter | Description | Tool | Value | Unit |
|---------------|--------------------------------------|--------|----------------------------------|------|
| AGMN | Minimum Gain of Cartridge | USIT-E | -12 | dB |
| AGMX | Maximum Gain of Cartridge | USIT-E | 18 | dB |
| U-USIT_DDT5 | USIC Downhole Decimation for T5 only | USIT-E | 0_NONE | |
| EMXV | EMEX Voltage | USIT-E | 70 | V |
| HRES | Horizontal Resolution | USIT-E | 10 deg | |
| TMUC | Type of Mud | USIT-E | BRI | |
| 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 | 6700 | ft |
| WINB | Window Begin Time | USIT-E | 27.85 | us |
| WINE | Window End Time | USIT-E | 70 | us |

XYZ

Company:Noble Energy Inc Well:Lapp A15-629

One : Log[2]:Up:S011





XYZ

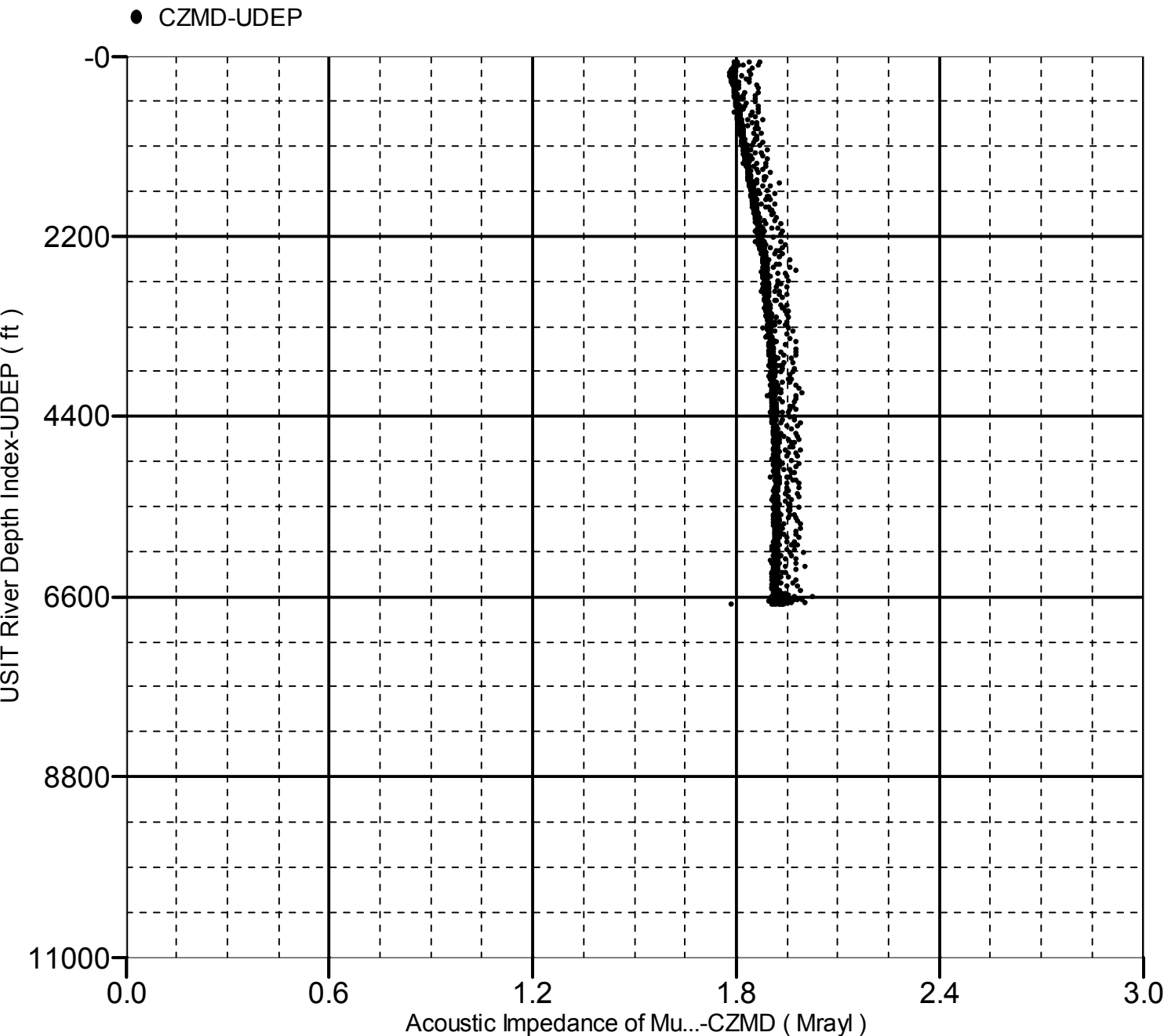
Company:Noble Energy Inc Well:Lapp A15-629

One : Log[2]:Up:S011

Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6702.50 to 63.50 ft



| | | |
|----------|------------------|--------------|
| Company: | Noble Energy Inc | Schlumberger |
| Well: | Lapp A15-629 | |
| Field: | Wattenberg | |
| County: | Weld | |
| State: | Colorado | |

UltraSonic Summary Print