Borehole Image Interpretation

Techlog
Because every well counts

Schlumberger

BOREHOLE IMAGE INTERPRETATION

Image Interval: 12675-13625 ft

Scale 1:600, 1:240, 1:15

COMPANY: DCP Midstream LP
WELL: Zia AGI D2
FIELD: AGI Devonian Exploration
COUNTY: Lea
STATE: New Mexico
COUNTRY: USA

COMPANY: DCP Midstream LP
WELL: Zia AGI D2
FIELD: AGI Devonian Exploration
COUNTY: Lea
STATE: New Mexico
COUNTRY: USA

API No: 30-025-42207

Other Services:

Location
Field: 1893' FSL & 950' FWL Section: 19 Township: T19S Abstract: R32S
Sec: 19 Township: T19S Range: R32S
Lat: 32° 38' 38.29" N
Long: 103° 46' 40.02" W

Elevations:
K.B. 3574 ft
D.F. 3573 ft
G.L. 3547 ft

Permanent Datum: GL Elev. 3547 ft
Log Measured From: KB 27 ft above Perm. Datum
Drilling Measured from: KB
Magnetic Dec: 7.2253 Magnetic Inc: 60.4659 Magnetic Intensity: 0.482977

Date	30-Nov-2016
Run No.	Run 1B
Depth Driller	13622 ft
Depth Logger (Schl)	13637 ft
Btm. Log Interval	13637 ft
Top Log Interval	4702 ft
Casing-Driller	9.625 in @ 4696 ft
Casing-Logger	4702 ft
Bit Size	8.25 in
Type Fluid in Hole	Fresh Water
Dens. | Visc.	10 lbm/gal | 41 s
pH | Fluid loss	10 | 9 in3
Source of Sample	Active Tank
Rm @ Meas. Temp.	0.08 ohmm @ 72 degF
Rmf @ Meas. Temp.	0.08 ohmm @ 72 degF
Rmc @ Meas. Temp.	-999.25 ohmm @ 68 degF
Source: Rmf | Rmc	Calculated |
Rm @ BHT	0.0347157 @ 174.75 degF
Circulation Stopped	00:00:00
Logger on Bottom	23:30:00
Max Rec. Temp.	174.75 deg F
Equipment | Location	9105 |Midland, TX
Recorded by:	Danielle Krebs
Witnessed by:	Jared Smith

FOLD HERE

The well name, location and borehole reference data were furnished by the customer

ANY INTERPRETATION, RESEARCH, ANALYSIS, DATA, RESULTS, ESTIMATES, OR RECOMMENDATION FURNISHED WITH THE SERVICES OR OTHERWISE COMMUNICATED BY SCHLUMBERGER TO CUSTOMER AT ANY TIME IN CONNECTION WITH THE SERVICES ARE OPINIONS BASED ON INFERENCES FROM MEASUREMENTS, EMPIRICAL RELATIONSHIPS AND/OR ASSUMPTIONS, WHICH INFERENCES, EMPIRICAL RELATIONSHIPS AND/OR ASSUMPTIONS ARE NOT INFALLIBLE, AND WITH RESPECT TO WHICH PROFESSIONALS IN THE INDUSTRY MAY DIFFER ACCORDINGLY, SCHLUMBERGER CANNOT AND DOES NOT WARRANT THE ACCURACY, CORRECTNESS OR COMPLETENESS OF ANY SUCH INTERPRETATION, RESEARCH, ANALYSIS, DATA, RESULTS, ESTIMATES OR RECOMMENDATION. CUSTOMER ACKNOWLEDGES THAT IT IS ACCEPTING THE SERVICES "AS IS", THAT SCHLUMBERGER MAKES NO REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, OF ANY KIND OR DESCRIPTION IN RESPECT THERETO. SPECIFICALLY, CUSTOMER ACKNOWLEDGES THAT SCHLUMBERGER DOES NOT WARRANT THAT ANY INTERPRETATION, RESEARCH, ANALYSIS, DATA, RESULTS, ESTIMATES, OR RECOMMENDATION IS FIT FOR A PARTICULAR PURPOSE, INCLUDING BUT NOT LIMITED TO COMPLIANCE WITH ANY GOVERNMENT REQUEST OR REGULATORY REQUIREMENT. CUSTOMER FURTHER ACKNOWLEDGES THAT SUCH SERVICES ARE DELIVERED WITH THE EXPLICIT UNDERSTANDING AND AGREEMENT THAT ANY ACTION TAKEN BASED ON THE SERVICES RECEIVED SHALL BE AT ITS OWN RISK AND RESPONSIBILITY AND NO CLAIM SHALL BE MADE AGAINST SCHLUMBERGER AS A CONSEQUENCE THEREOF.

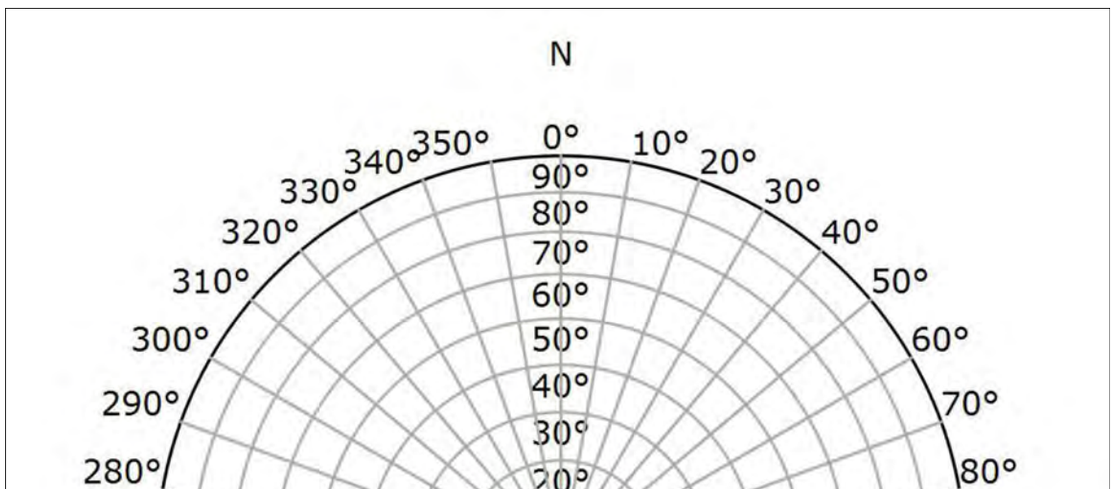
DS-2016-41710	OP Vers.: 20C0-999	Process Date: 12/26/2016	Center: Midland DS	Baseline: Techlog 2013.4	Log Analyst: Olfa Zened

Remarks:

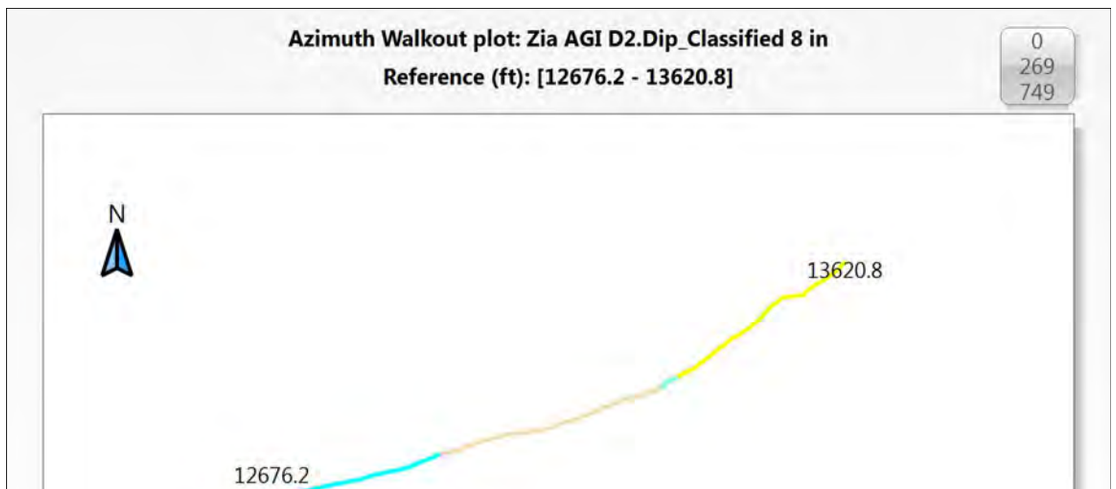
Image processing and Interpretation interval: 112675-13625 ft
All the displayed logs have been depth matched to the FMI Image
All completion decision should be made taking this into account.

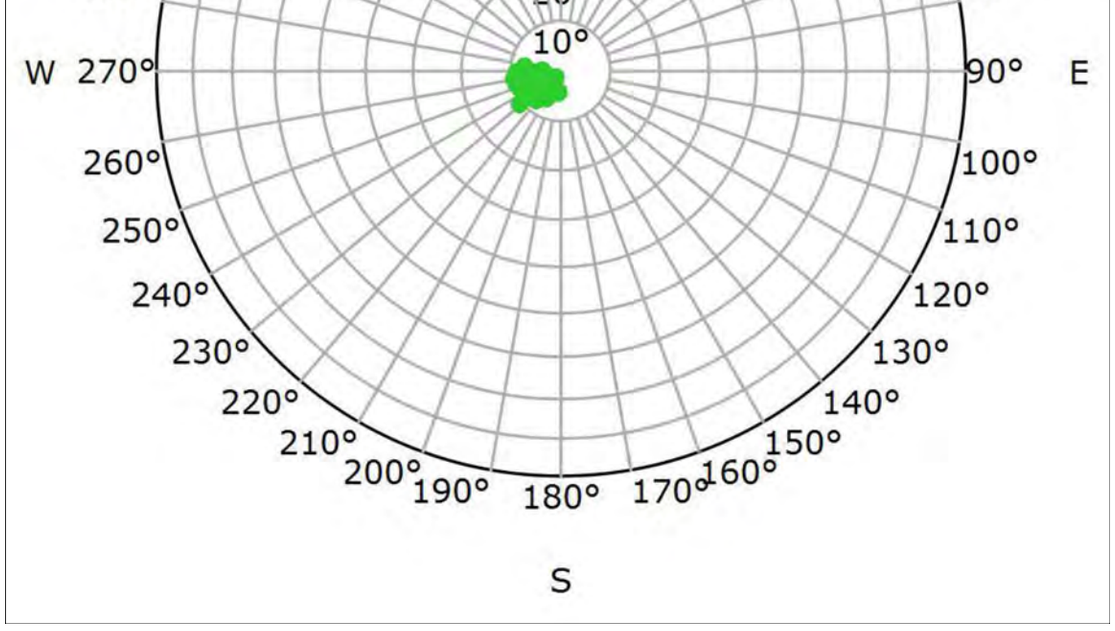
Bed Boundary Summary All 12676ft - 13621ft

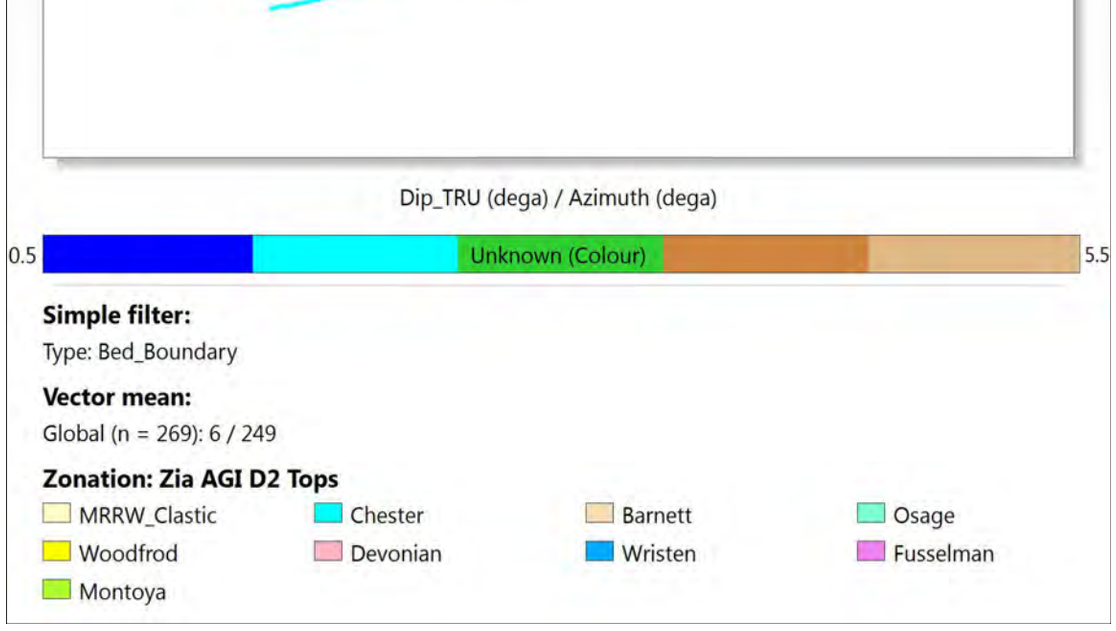
Schmidt Plot - Upper Hemisphere



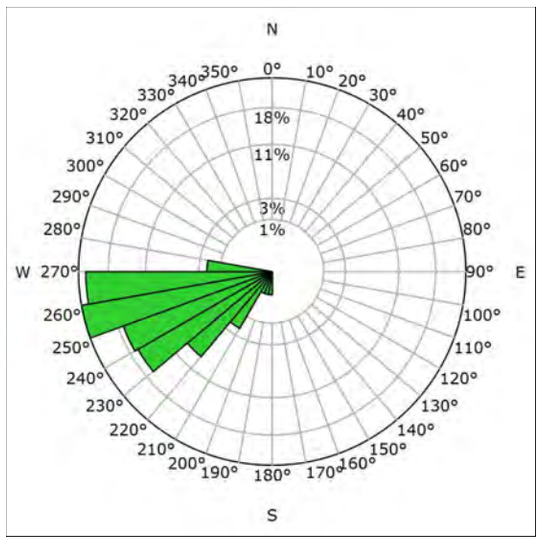
Azimuth Vector Plot



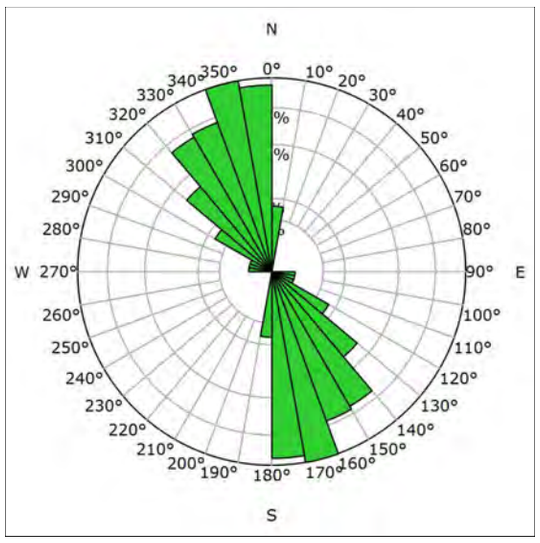




Azimuth Rosette



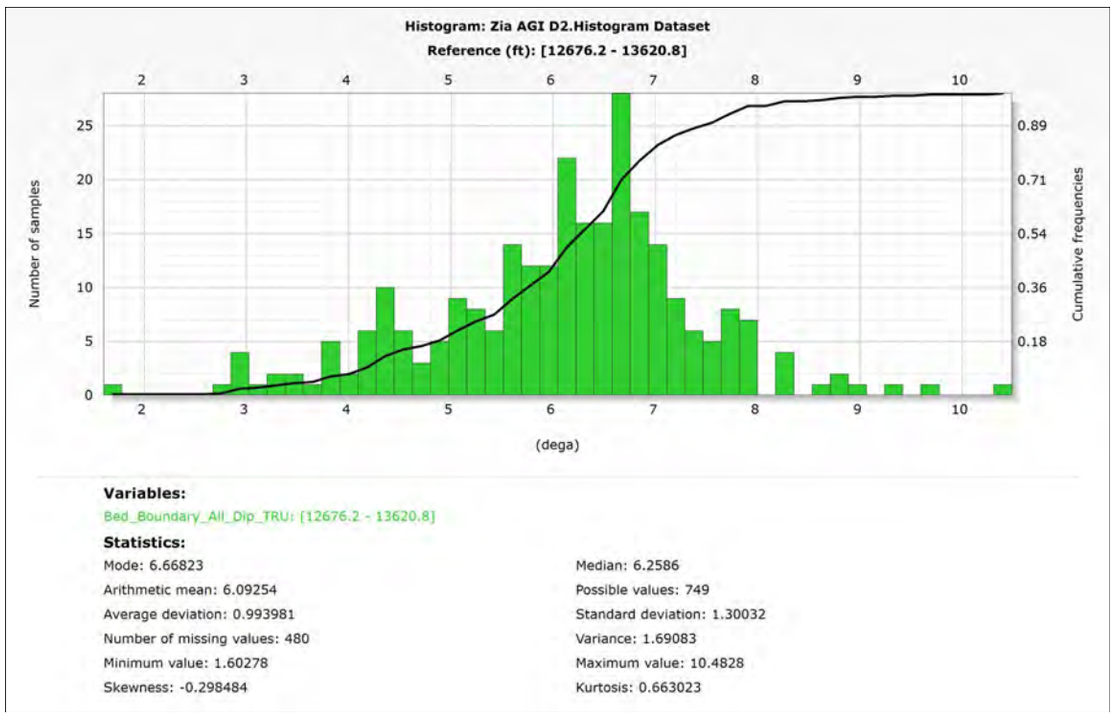
Strike Rosette



Observations

The Bed Boundary dipset is composed of hand picked dip data for low energy shale type deposits. Bed boundaries are normally planar features located at significant changes in formation layer resistivity. They are presented in the dip track as green circular tadpoles and shown in true dip. True dip is calculated by taking borehole drift into account (blue tadpoles in track 1). The green sinusoids on the dynamic image (track 7) represent the bed boundaries in apparent dip (without taking borehole drift into account). For the interval from 12676ft to 13621ft, the mean dip magnitude is 6.1 degrees with a mean azimuth of 248.4 degrees. The azimuth rosette shows dips in a general West Southwest direction.

Dip Angle Histogram

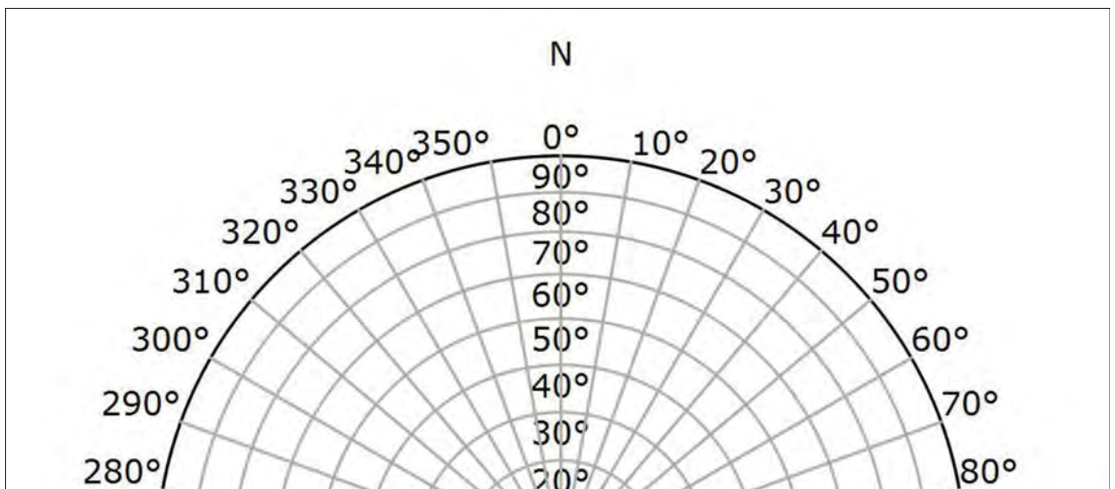


Interpretation

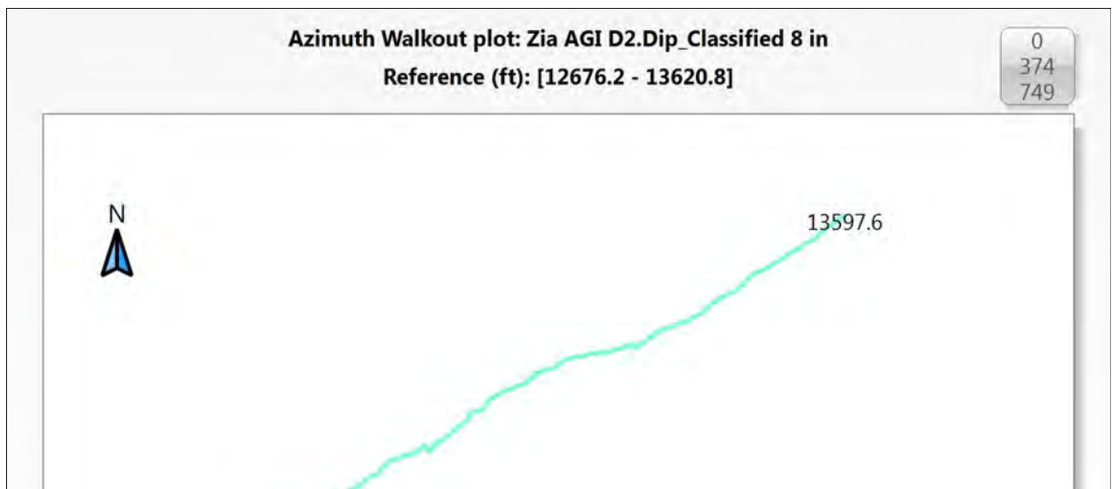
The figure on the top right represents the Dip Vector Plot of the manually picked Bed boundary dips showing change in Azimuth versus Depth from bottom to top of the logged interval. The overall dip magnitude is about 6 degrees with a predominant azimuth orientation towards the West and WSW.

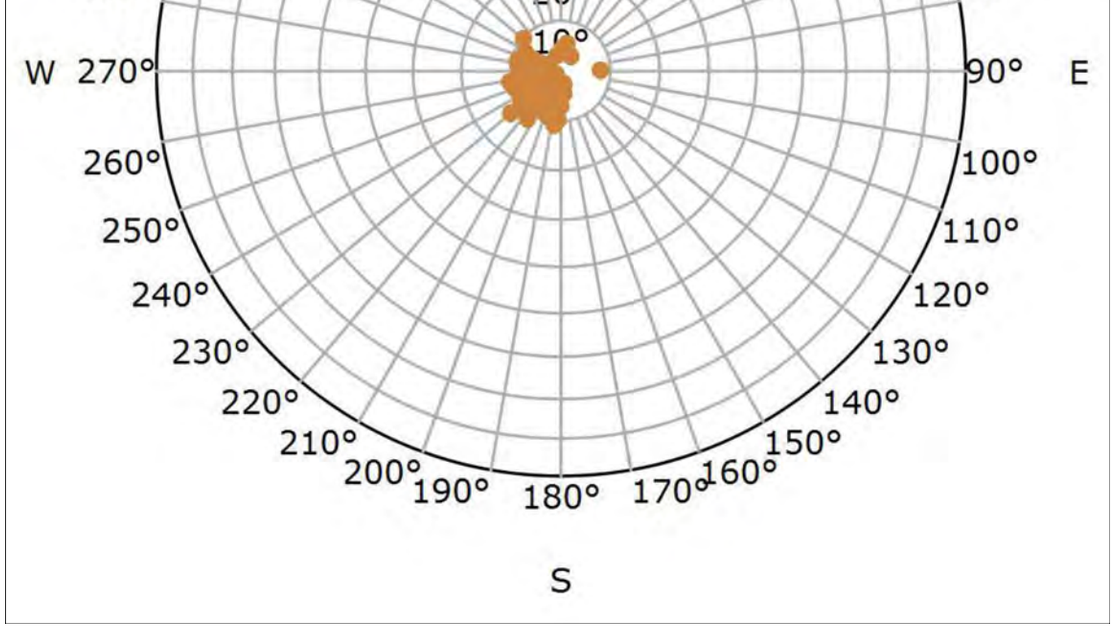
Sedimentary Bedding Summary All 12676ft - 13621ft

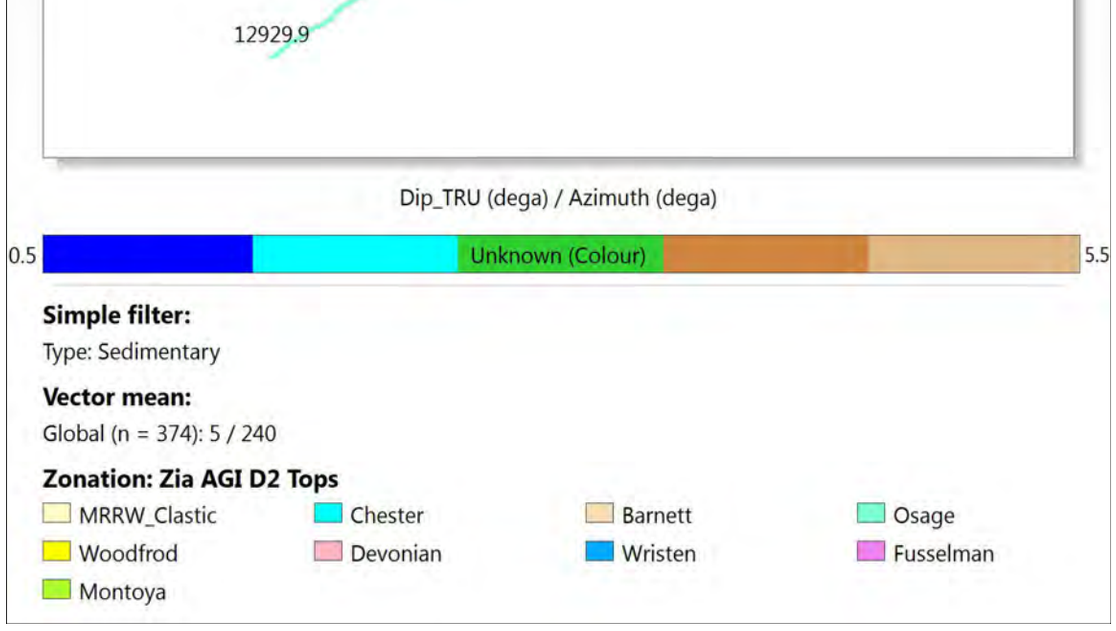
Schmidt Plot - Upper Hemisphere



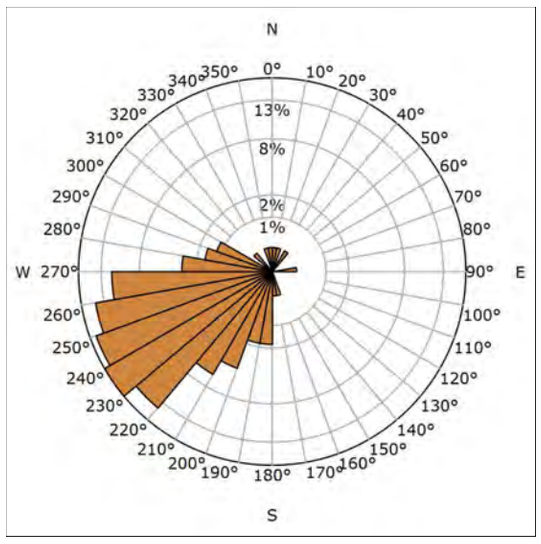
Azimuth Vector Plot



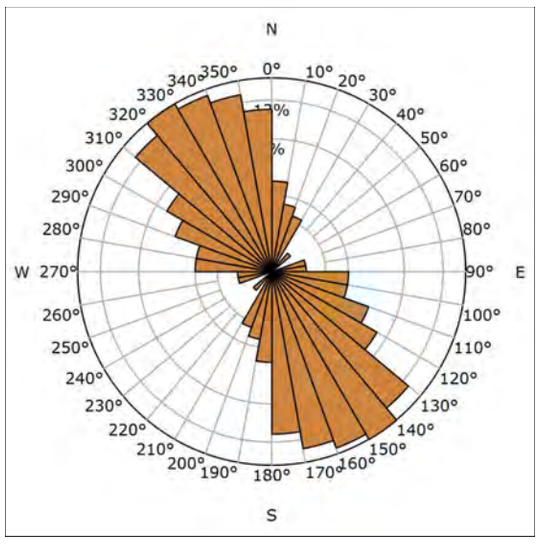




Azimuth Rosette



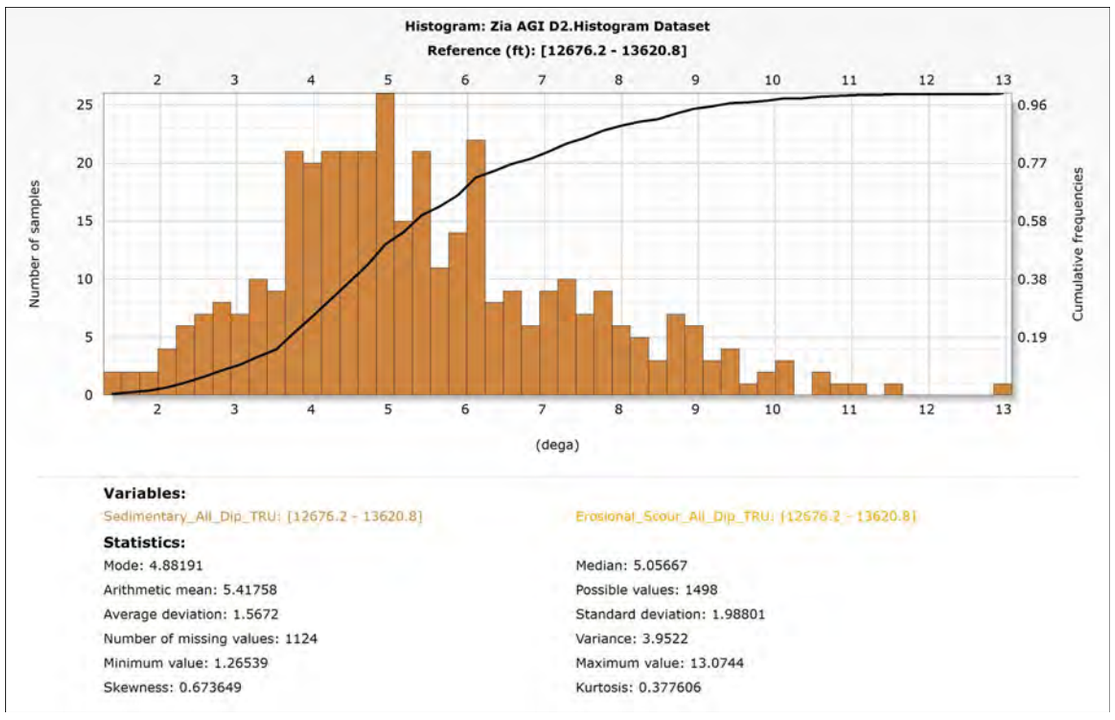
Strike Rosette

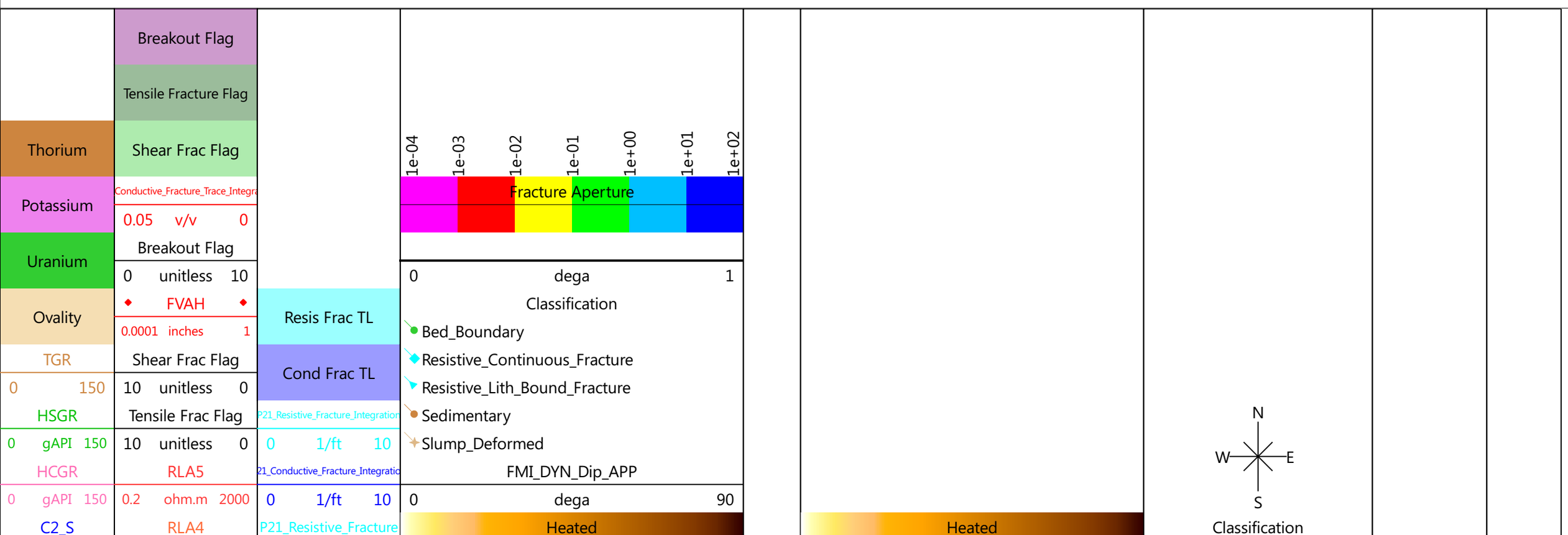


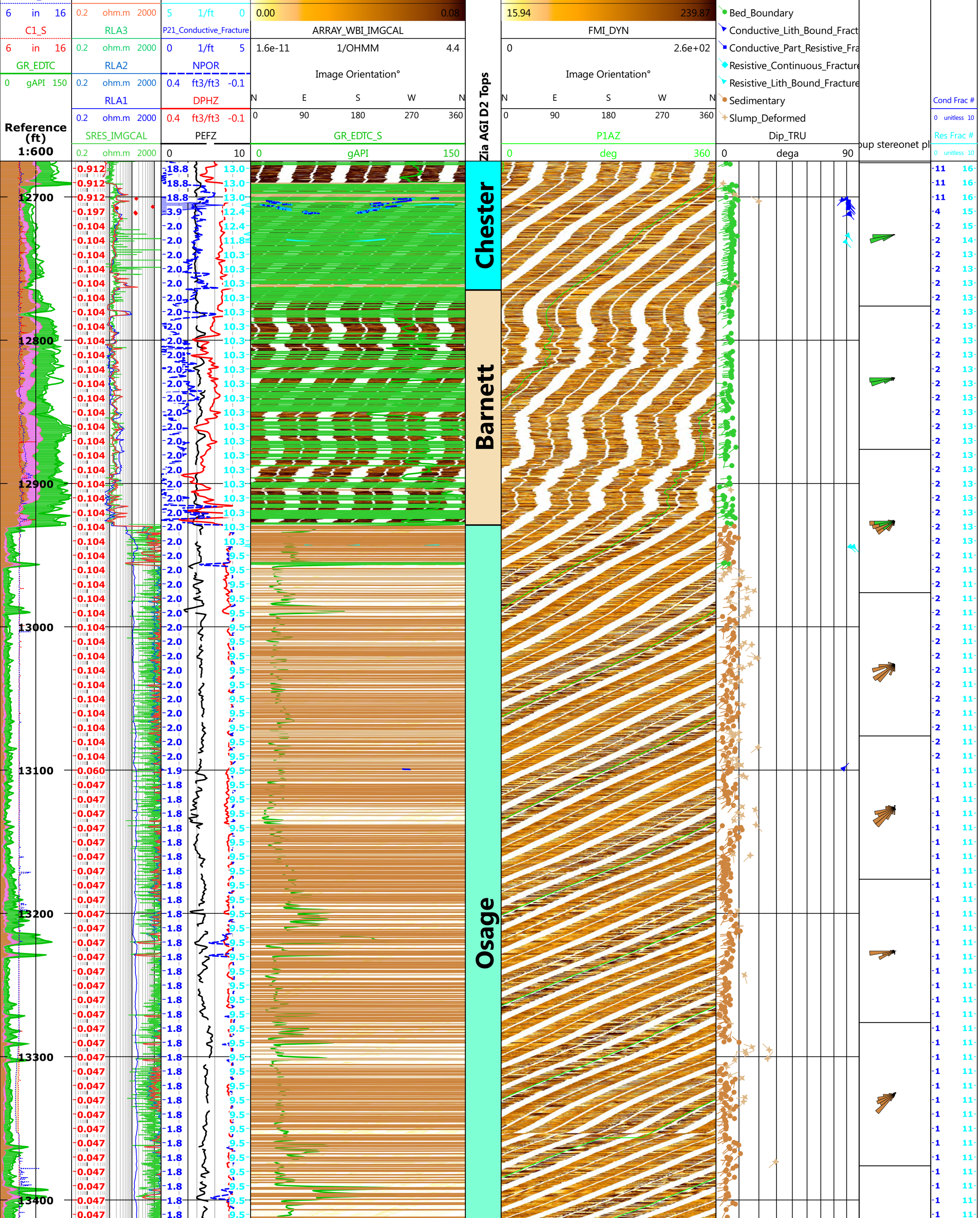
Observations

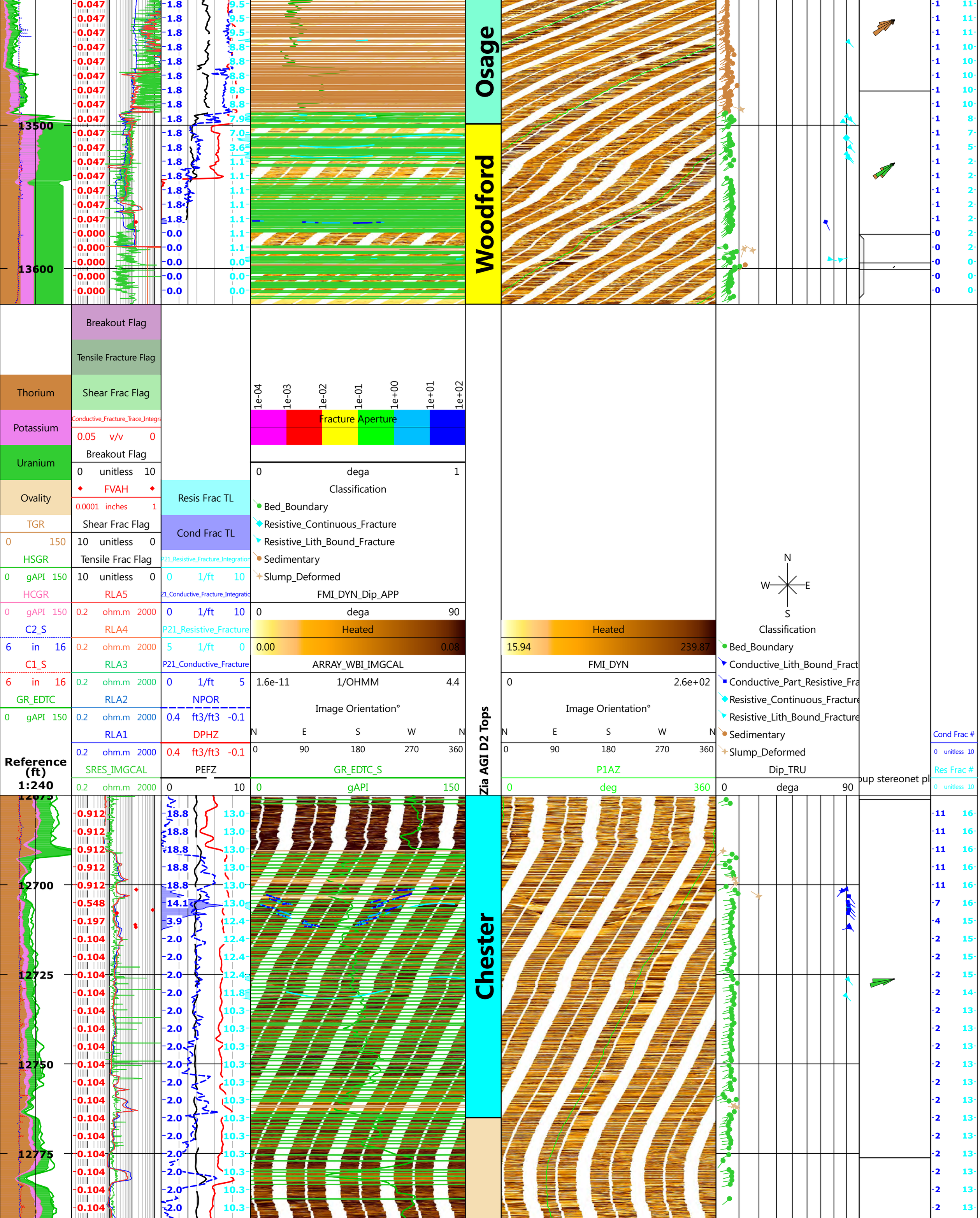
The Sedimentary bedding dipset is composed of hand picked dip data for any sediment deposited with energy. The classification is general in the sense that it does not describe the transport / deposition mechanism or sediment structure. They are presented in the dip track as brown circular tadpoles and shown in true dip. True dip is calculated by taking borehole drift into account (red tadpoles in track 1). The brown sinusoids on the dynamic image (track 7) represent the sedimentary bedding in apparent dip (without taking borehole drift into account). For the interval from 12676ft to 13621ft, the mean dip magnitude is 5.4 degrees with a mean azimuth of 238.6 degrees. The azimuth rosette shows dips in a general West Southwest direction.

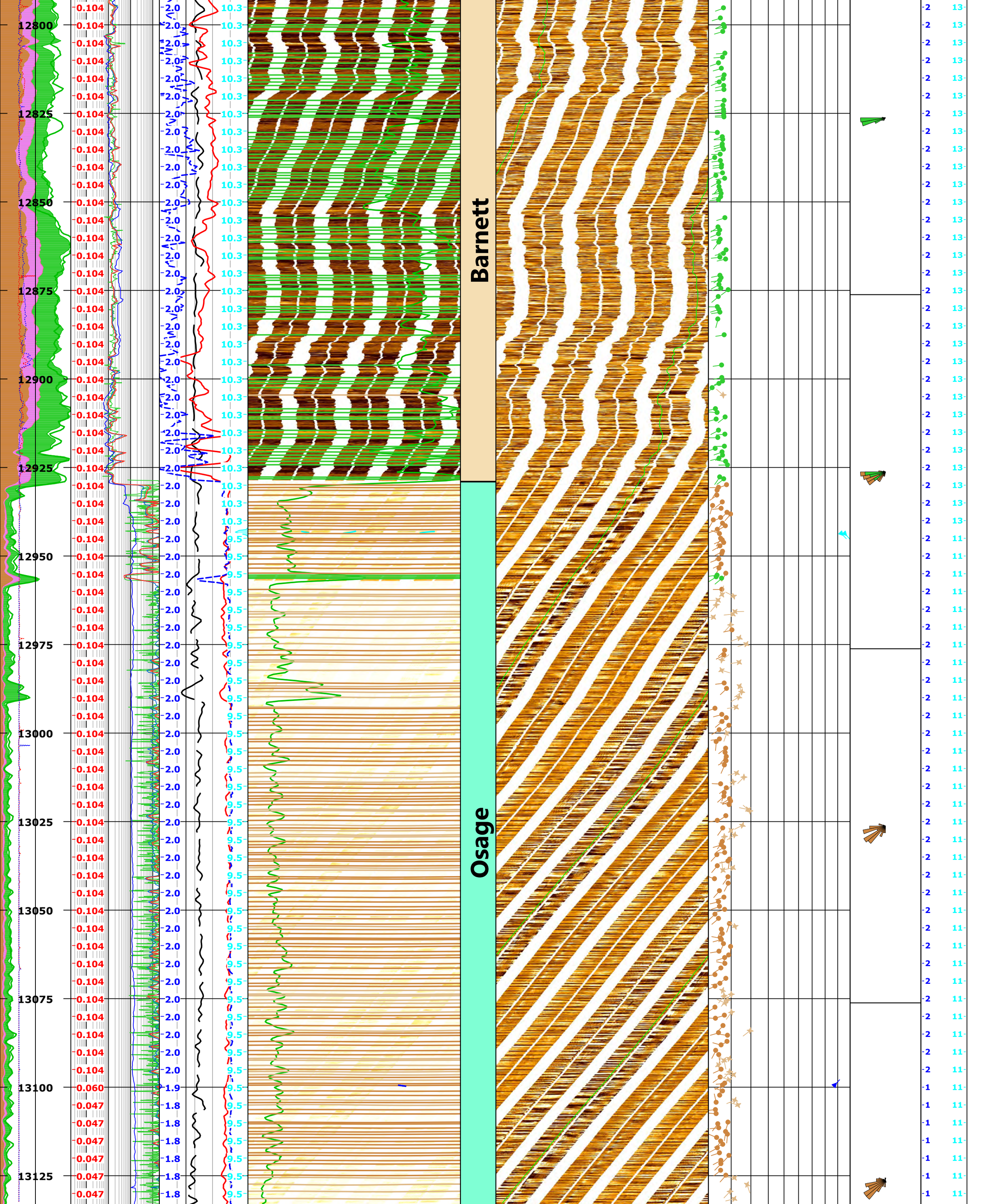
Dip Angle Histogram

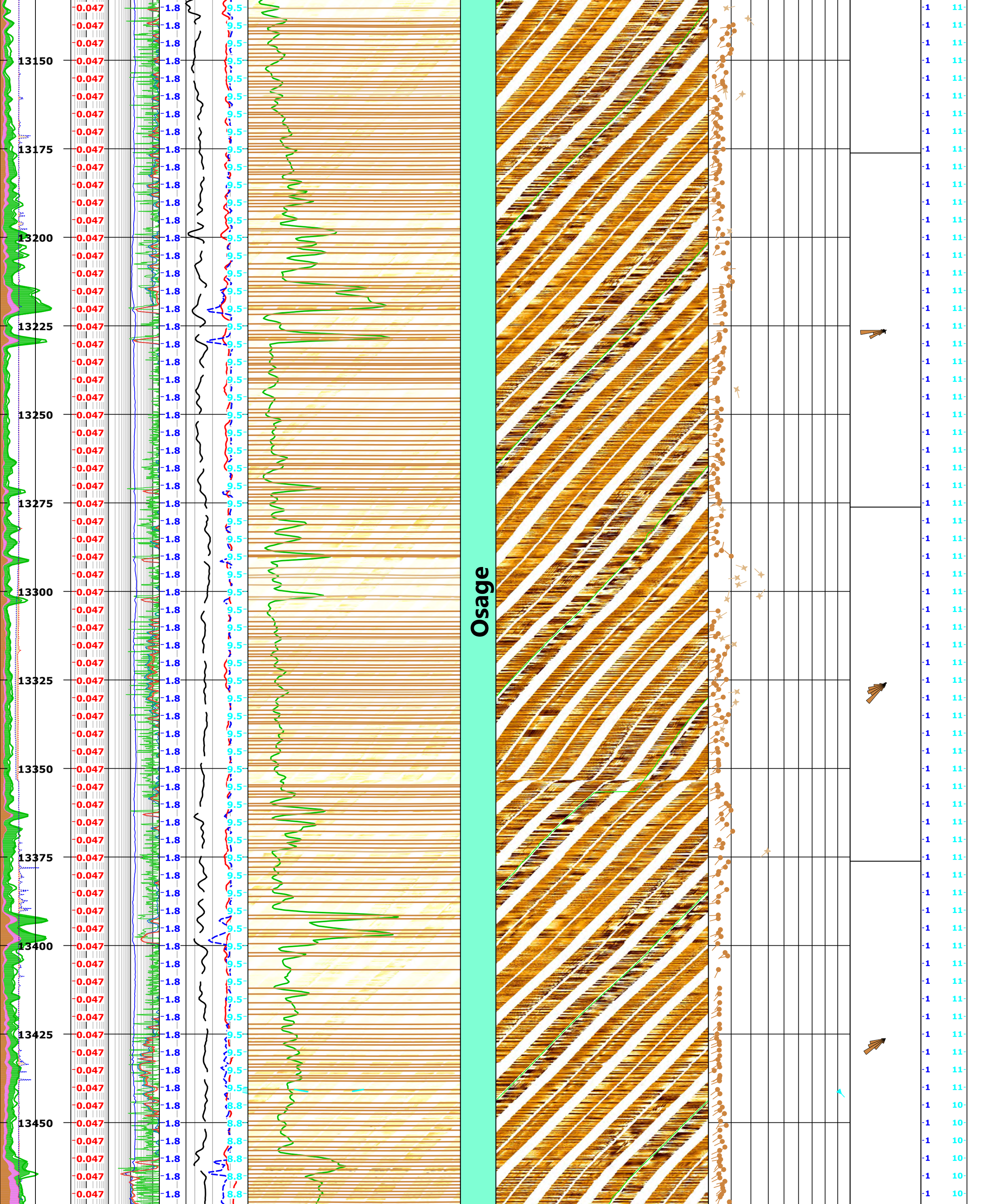


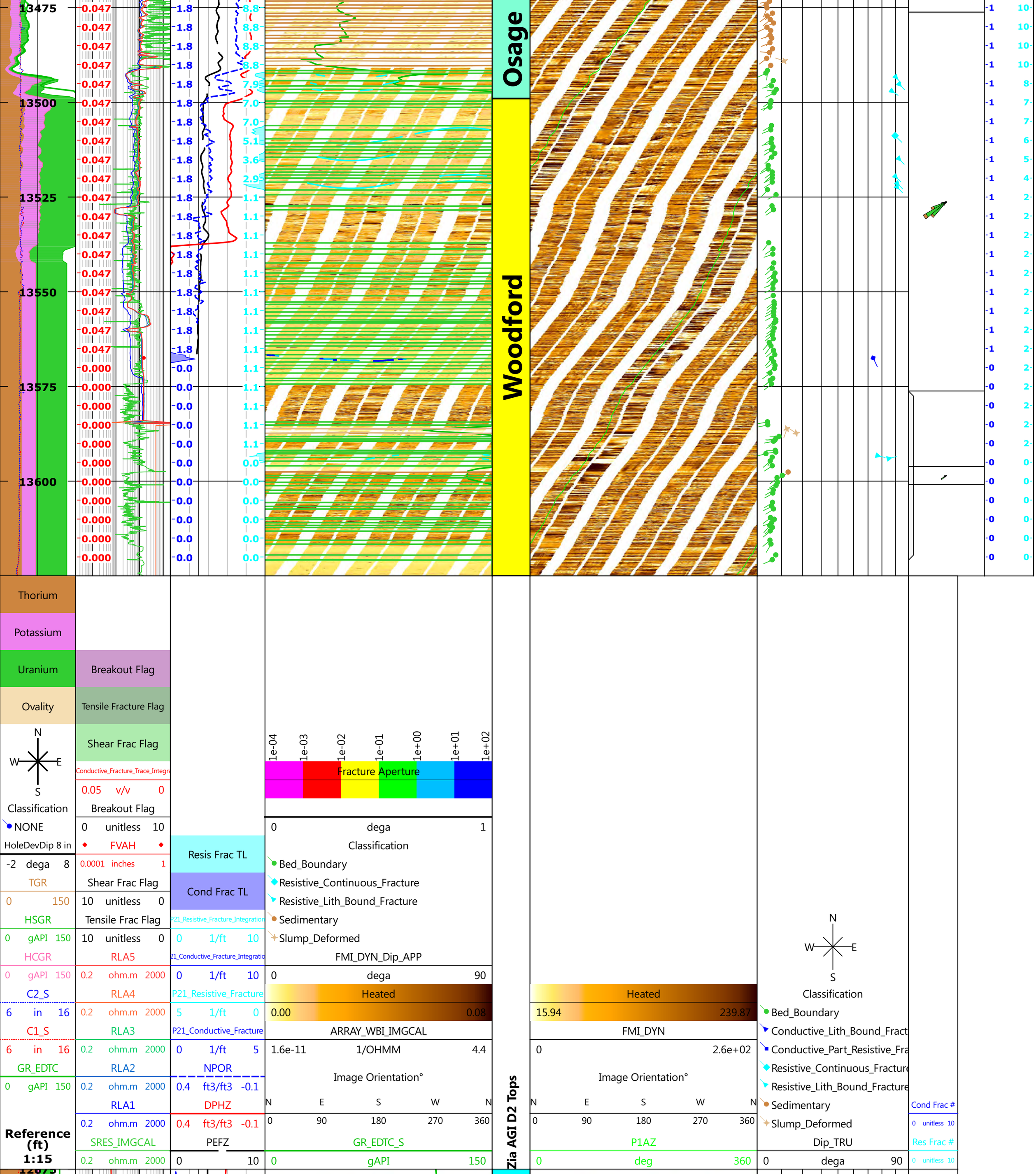


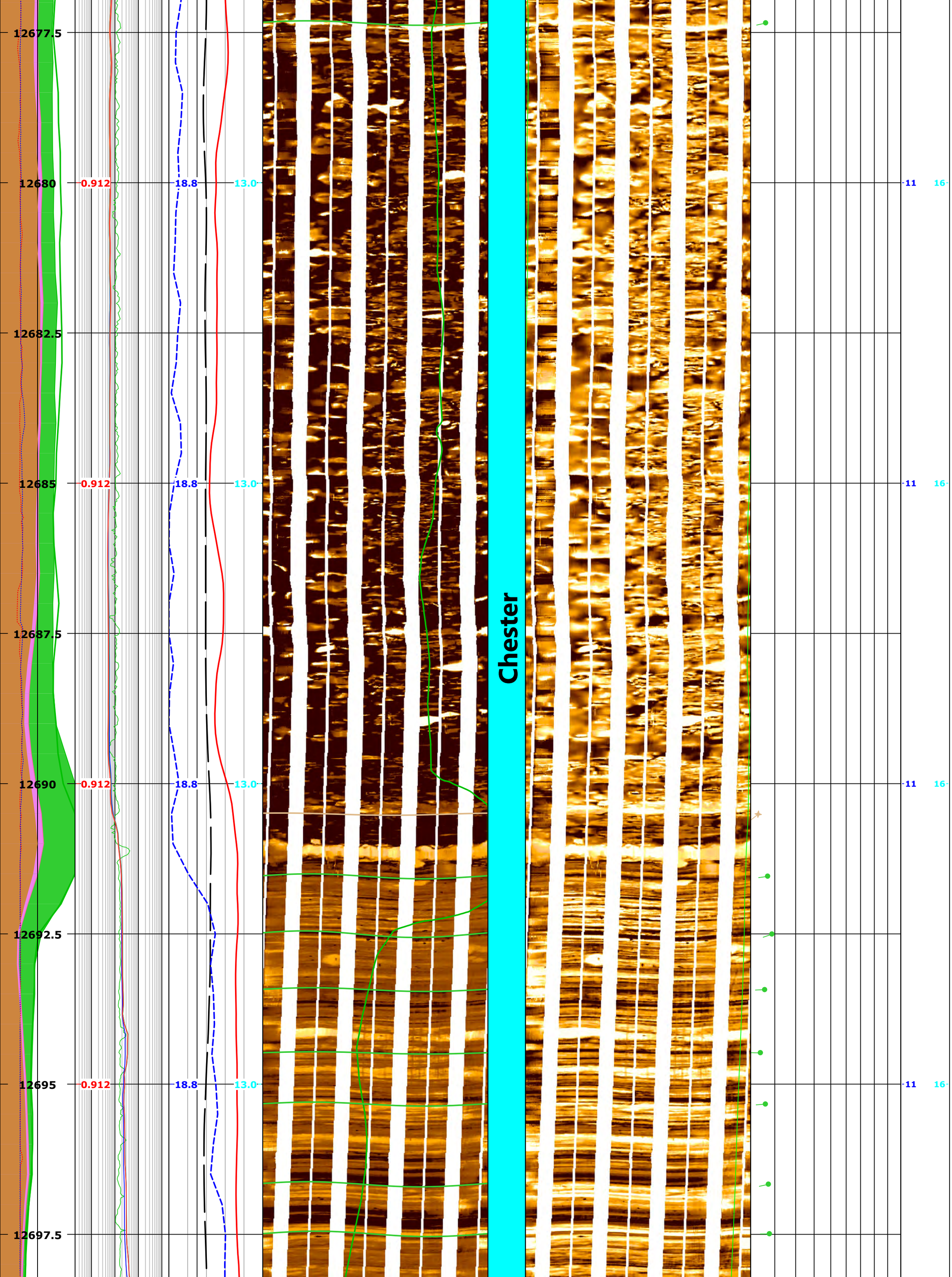

6 in 16
C1_S
6 in 16
GR_EDTC
0 gAPI 150
Reference (ft) 1:600
0.2 ohm.m 2000
RLA3
0.2 ohm.m 2000
RLA2
0.2 ohm.m 2000
RLA1
0.2 ohm.m 2000
SRES_IMGCAL
0.2 ohm.m 2000
5 1/ft 0
P21_Conductive_Fracture
0 1/ft 5
NPOR
0.4 ft3/ft3 -0.1
DPHZ
0.4 ft3/ft3 -0.1
PEFZ
0 10
0.00 0.08
ARRAY_WBI_IMGCAL
1.6e-11 1/OHMM 4.4
Image Orientation°
N E S W N
0 90 180 270 360
GR_EDTC_S
0 gAPI 150
Zia AGI D2 Tops
15.94 239.87
FMI_DYN
0 2.6e+02
Image Orientation°
N E S W N
0 90 180 270 360
P1AZ
0 deg 360
Bed_Boundary
Conductive_Lith_Bound_Fract
Conductive_Part_Resistive_Fra
Resistive_Continuous_Fracture
Resistive_Lith_Bound_Fracture
Sedimentary
Slump_Deformed
Dip_TRU
0 dega 90
up stereonet pl
Cond Frac #
0 unitless 10
Res Frac #
0 unitless 10
12700
12800
12900
13000
13100
13200
13300
13400
Chester
Barnett
Osage

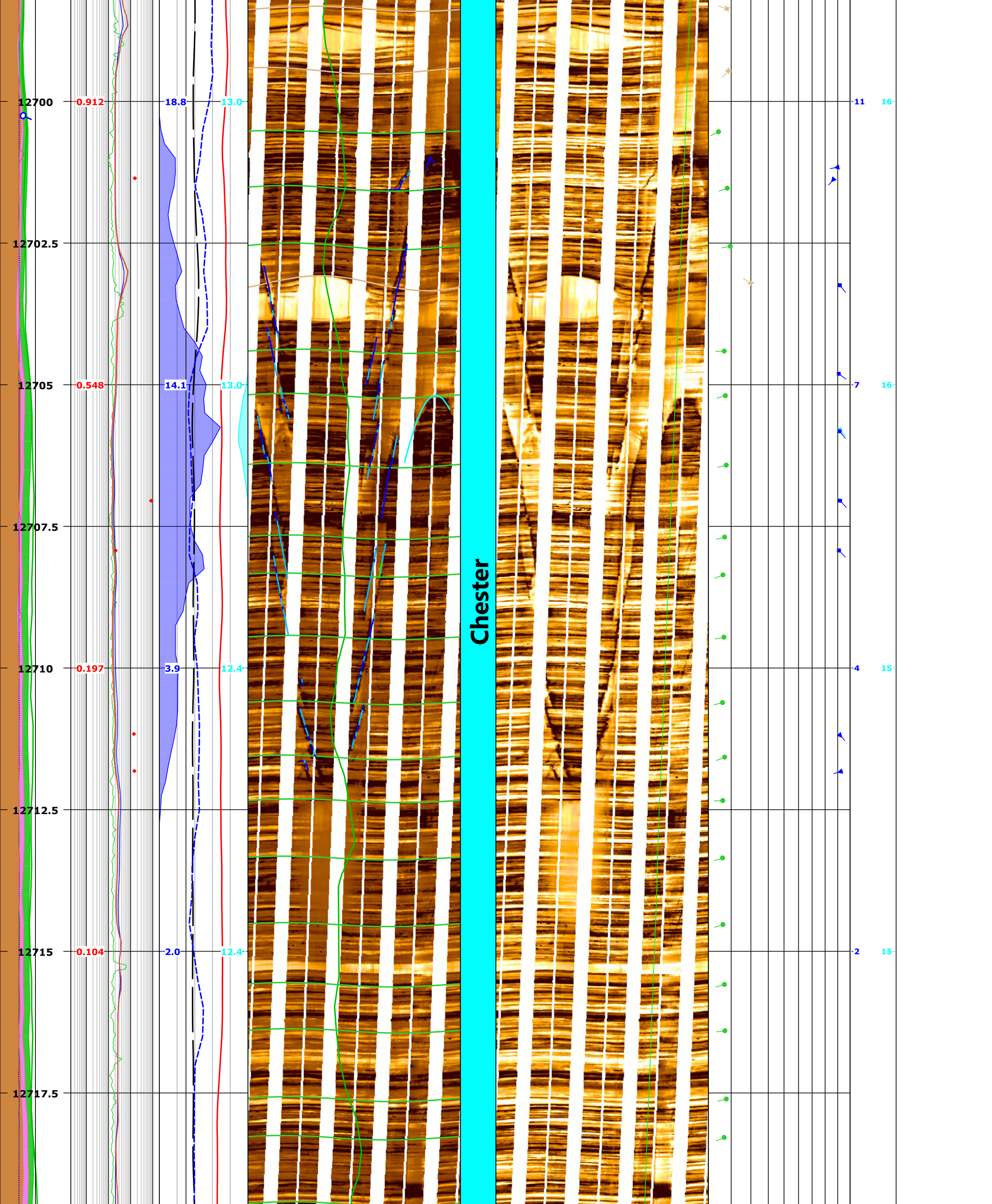

Osage
Woodford
Chester
Zia AGI D2 Tops
13500
13600
12675
12700
12725
12750
12775
Reference (ft) 1:240
Thorium
Potassium
Uranium
Ovality
TGR
HSGR
HCGR
C2_S
C1_S
GR_EDTC
Breakout Flag
Tensile Fracture Flag
Shear Frac Flag
Conductive_Fracture_Trace_Integra
0.05 v/v 0
Breakout Flag
0 unitless 10
FVAH
0.0001 inches 1
Shear Frac Flag
10 unitless 0
Tensile Frac Flag
10 unitless 0
RLA5
0.2 ohm.m 2000
RLA4
0.2 ohm.m 2000
RLA3
0.2 ohm.m 2000
RLA2
0.2 ohm.m 2000
RLA1
0.2 ohm.m 2000
SRES_IMGCAL
0.2 ohm.m 2000
Resis Frac TL
Cond Frac TL
P21_Resistive_Fracture_Integration
0 1/ft 10
21_Conductive_Fracture_Integratic
0 1/ft 10
P21_Resistive_Fracture
5 1/ft 0
P21_Conductive_Fracture
0 1/ft 5
NPOR
0.4 ft3/ft3 -0.1
DPHZ
0.4 ft3/ft3 -0.1
PEFZ
0 10
1e-04 1e-03 1e-02 1e-01 1e+00 1e+01 1e+02
Fracture Aperture
0 dega 1
Classification
Bed_Boundary
Resistive_Continuous_Fracture
Resistive_Lith_Bound_Fracture
Sedimentary
Slump_Deformed
FMI_DYN_Dip_APP
0 dega 90
Heated
0.00 0.08
ARRAY_WBI_IMGCAL
1.6e-11 1/OHMM 4.4
Image Orientation°
N E S W N
0 90 180 270 360
GR_EDTC_S
0 gAPI 150
Heated
15.94 239.87
FMI_DYN
0 2.6e+02
Image Orientation°
N E S W N
0 90 180 270 360
P1AZ
0 deg 360
N
W E
S
Classification
Bed_Boundary
Conductive_Lith_Bound_Fract
Conductive_Part_Resistive_Fra
Resistive_Continuous_Fracture
Resistive_Lith_Bound_Fracture
Sedimentary
Slump_Deformed
Dip_TRU
0 dega 90
up stereonet pl
Cond Frac #
0 unitless 10
Res Frac #
0 unitless 10

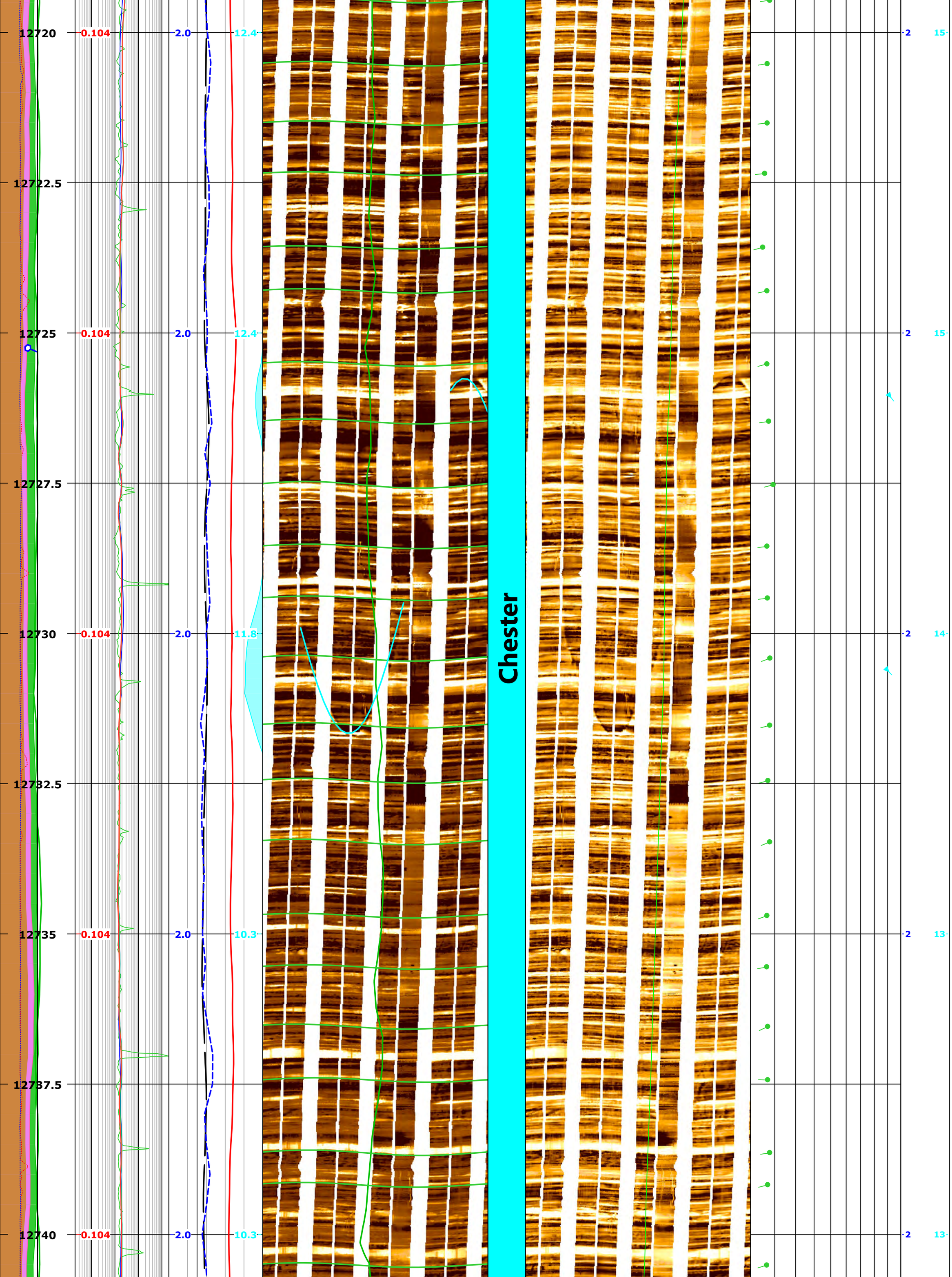

Barnett
Osage
12800
12825
12850
12875
12900
12925
12950
12975
13000
13025
13050
13075
13100
13125

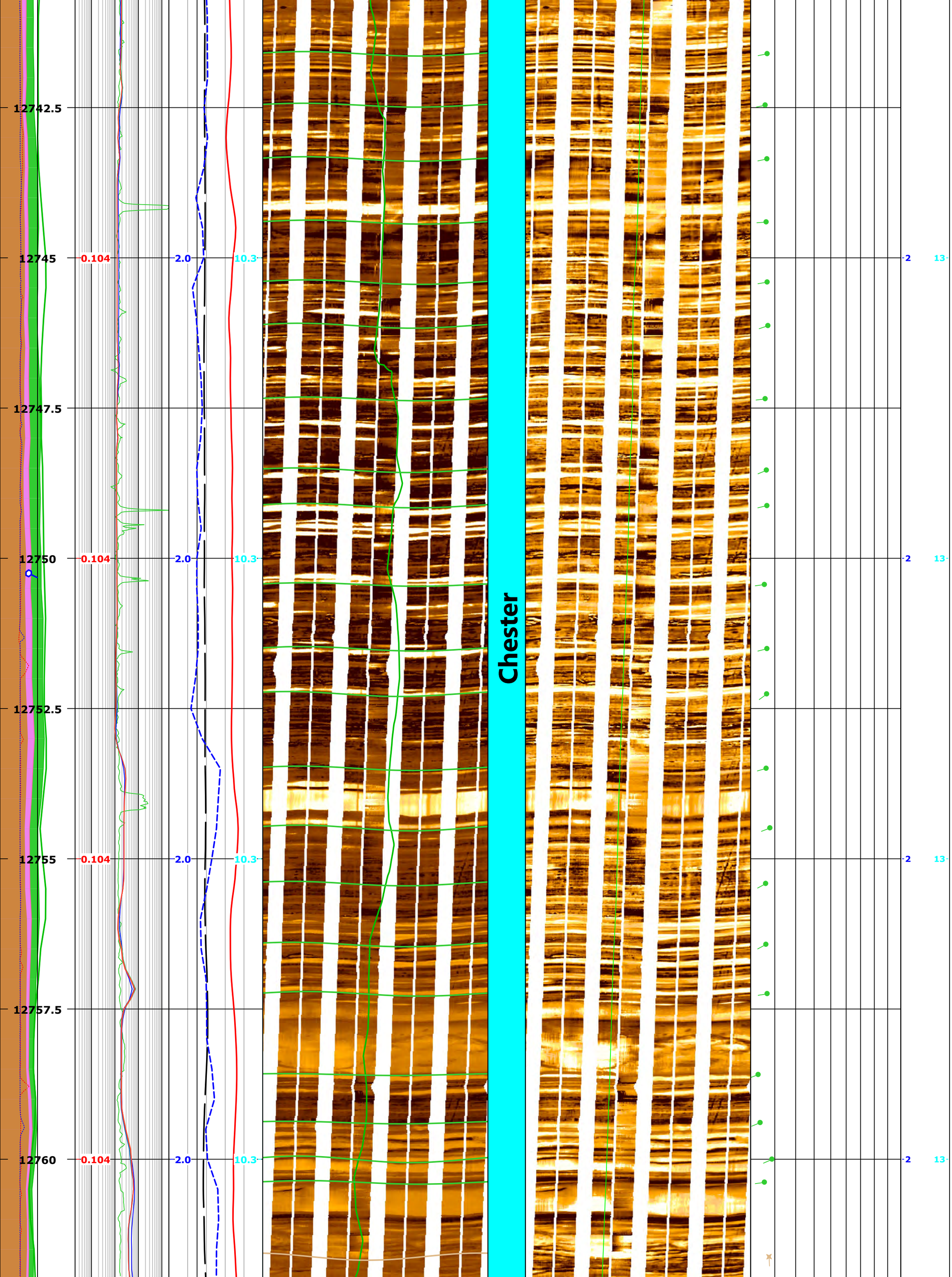

13150
13175
13200
13225
13250
13275
13300
13325
13350
13375
13400
13425
13450
Osage

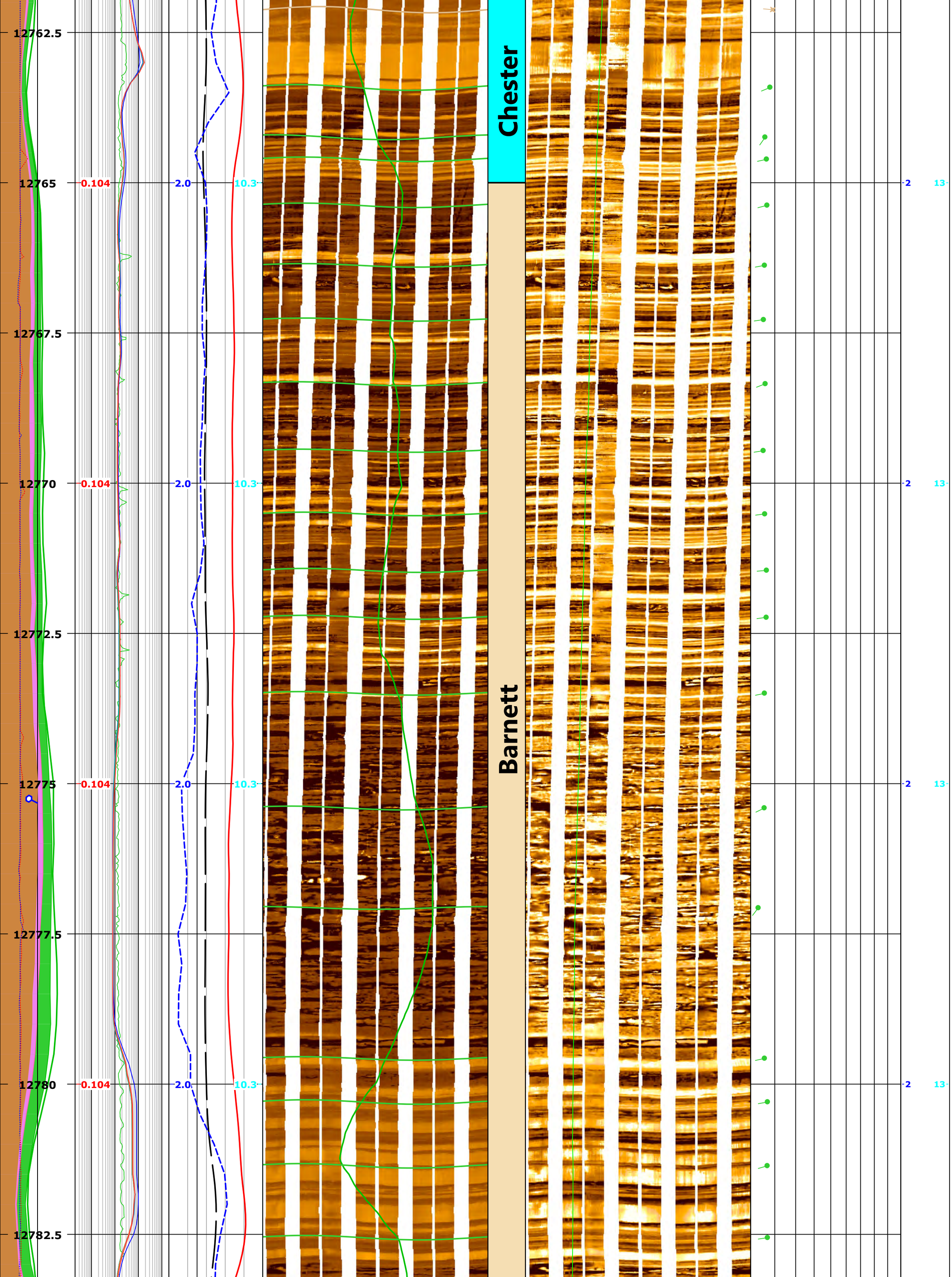

Osage
Woodford
Zia AGI D2 Tops
13475
13500
13525
13550
13575
13600
Thorium
Potassium
Uranium
Ovality
Breakout Flag
Tensile Fracture Flag
Shear Frac Flag
Conductive_Fracture_Trace_Integra
0.05 v/v 0
Classification
Breakout Flag
NONE
0 unitless 10
HoleDevDip 8 in
FVAH
-2 dega 8
TGR
0.0001 inches 1
Shear Frac Flag
0 150
HSGR
10 unitless 0
Tensile Frac Flag
0 gAPI 150
HCGR
10 unitless 0
RLA5
0 gAPI 150
C2_S
0.2 ohm.m 2000
RLA4
6 in 16
C1_S
0.2 ohm.m 2000
RLA3
6 in 16
GR_EDTC
0.2 ohm.m 2000
RLA2
0 gAPI 150
0.2 ohm.m 2000
RLA1
0.2 ohm.m 2000
SRES_IMGCAL
Reference (ft) 1:15
0.2 ohm.m 2000
Resis Frac TL
Cond Frac TL
P21_Resistive_Fracture_Integration
0 1/ft 10
21_Conductive_Fracture_Integratio
0 1/ft 10
P21_Resistive_Fracture
5 1/ft 0
P21_Conductive_Fracture
0 1/ft 5
NPOR
0.4 ft3/ft3 -0.1
DPHZ
0.4 ft3/ft3 -0.1
PEFZ
0 10
1e-04 1e-03 1e-02 1e-01 1e+00 1e+01 1e+02
Fracture Aperture
0 dega 1
Classification
Bed_Boundary
Resistive_Continuous_Fracture
Resistive_Lith_Bound_Fracture
Sedimentary
Slump_Deformed
FMI_DYN_Dip_APP
0 dega 90
Heated
0.00 0.08
ARRAY_WBI_IMGCAL
1.6e-11 1/OHMM 4.4
Image Orientation°
N E S W N
0 90 180 270 360
GR_EDTC_S
0 gAPI 150
Heated
15.94 239.87
FMI_DYN
0 2.6e+02
Image Orientation°
N E S W N
0 90 180 270 360
P1AZ
0 deg 360
N
W E
S
Classification
Bed_Boundary
Conductive_Lith_Bound_Fract
Conductive_Part_Resistive_Fra
Resistive_Continuous_Fracture
Resistive_Lith_Bound_Fracture
Sedimentary
Slump_Deformed
Dip_TRU
0 dega 90
Cond Frac #
0 unitless 10
Res Frac #
0 unitless 10

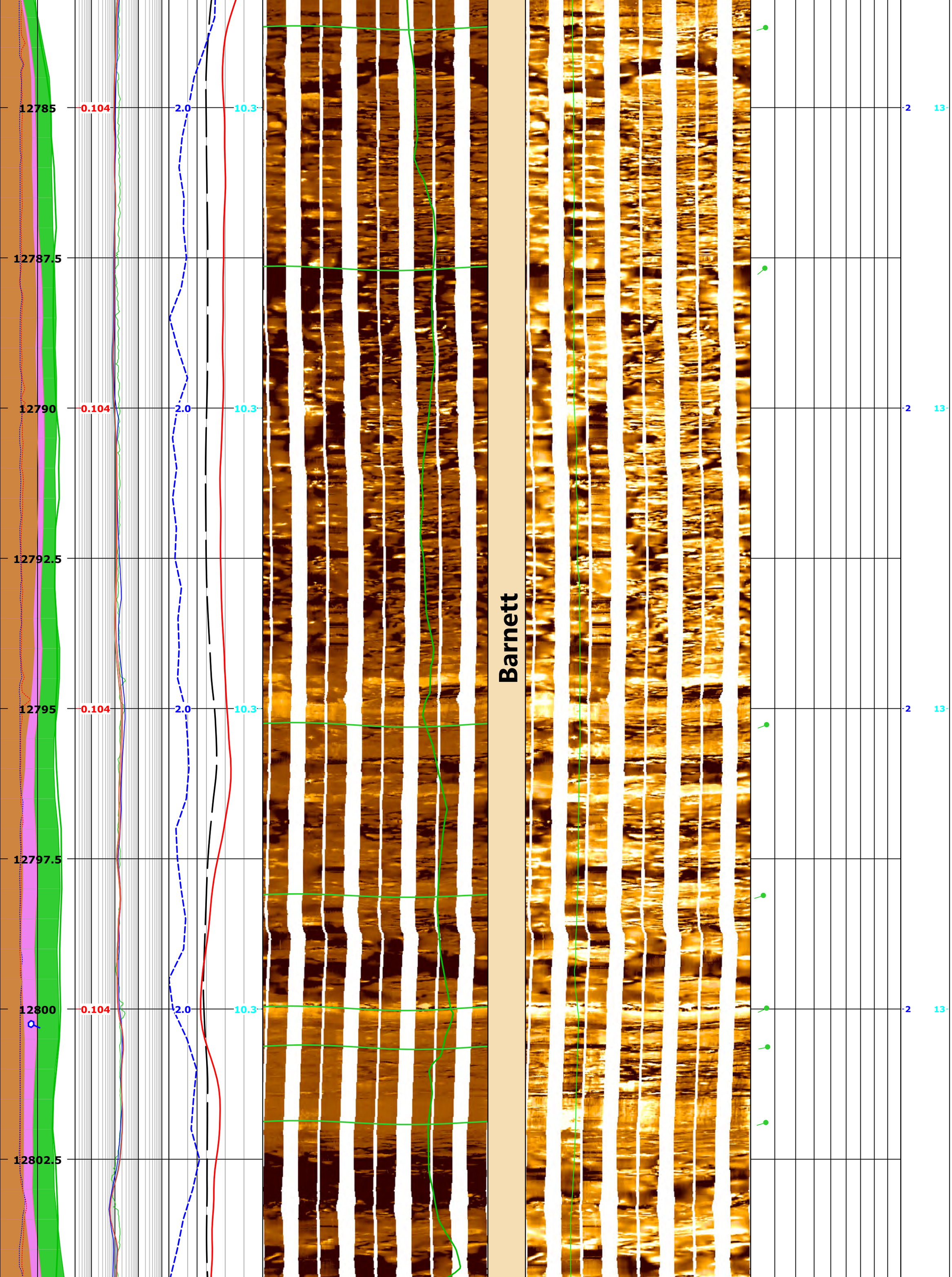

12677.5
12680
12682.5
12685
12687.5
12690
12692.5
12695
12697.5
0.912
18.8
13.0
11
16
Chester

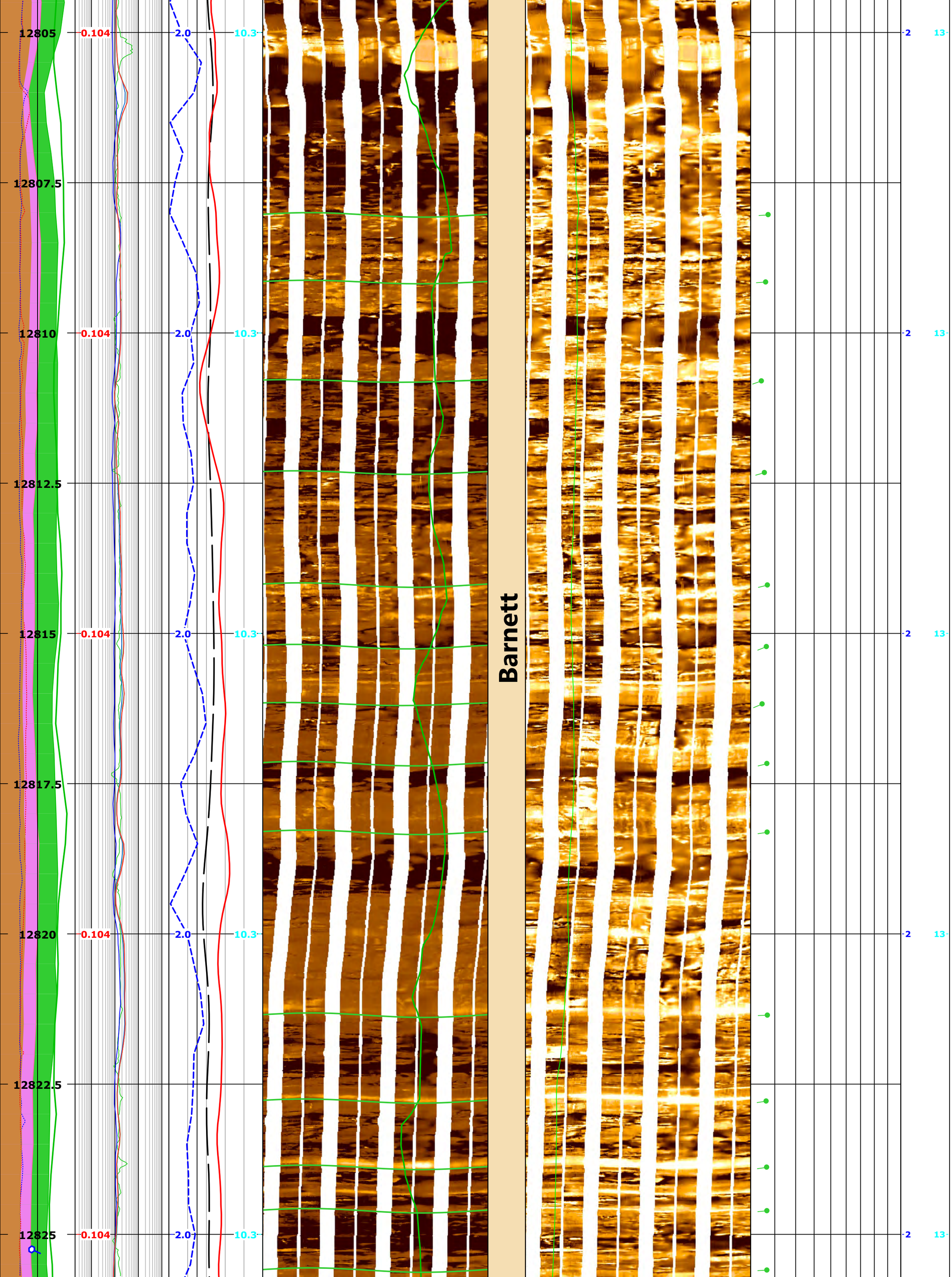

12700
0.912
18.8
13.0
11
16
12702.5
12705
0.548
14.1
13.0
7
16
12707.5
12710
0.197
3.9
12.4
4
15
12712.5
12715
0.104
2.0
12.4
2
15
12717.5
Chester

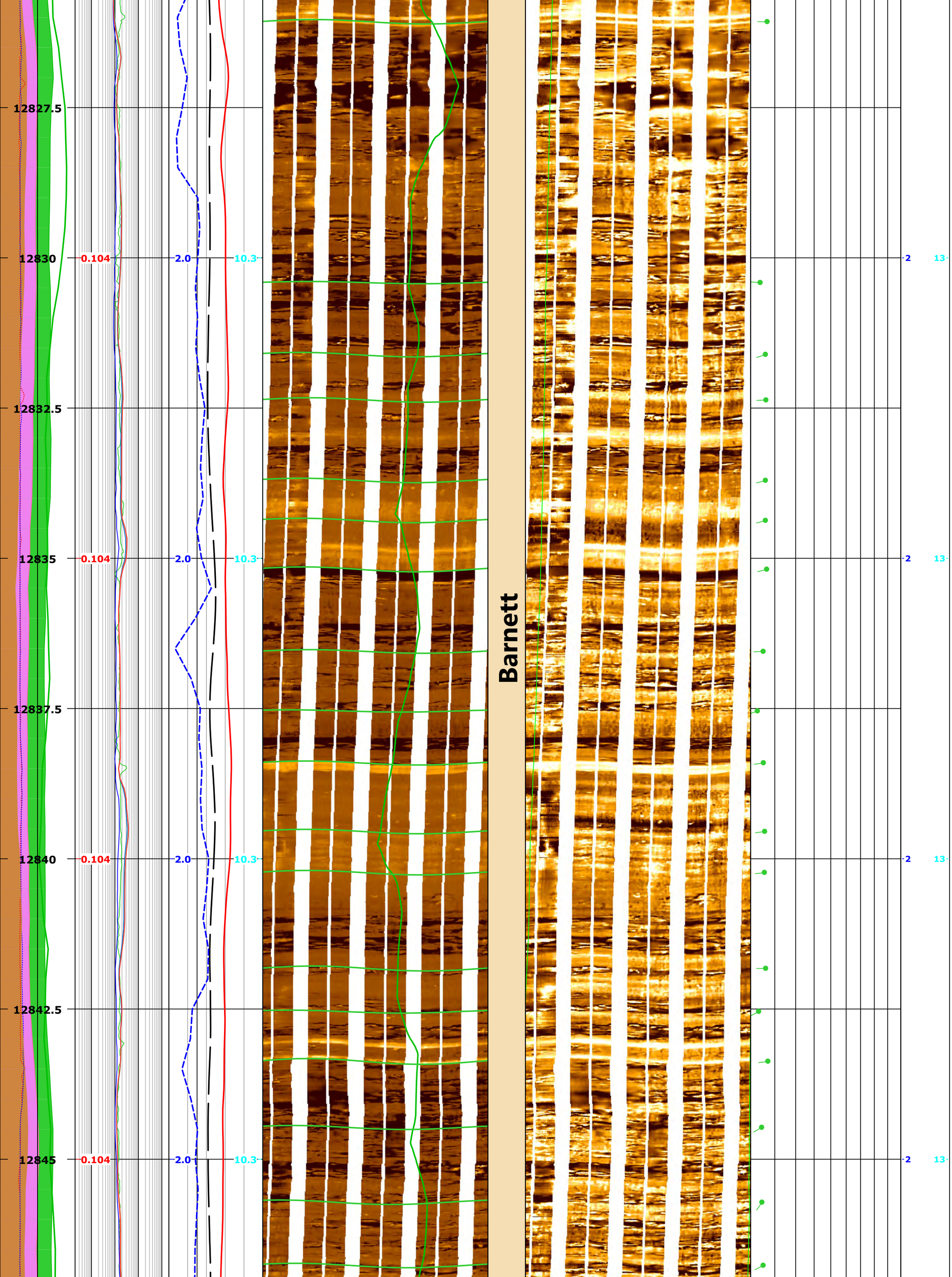

12720
0.104
2.0
12.4
2
15
12722.5
12725
0.104
2.0
12.4
2
15
12727.5
12730
0.104
2.0
11.8
2
14
Chester
12732.5
12735
0.104
2.0
10.3
2
13
12737.5
12740
0.104
2.0
10.3
2
13

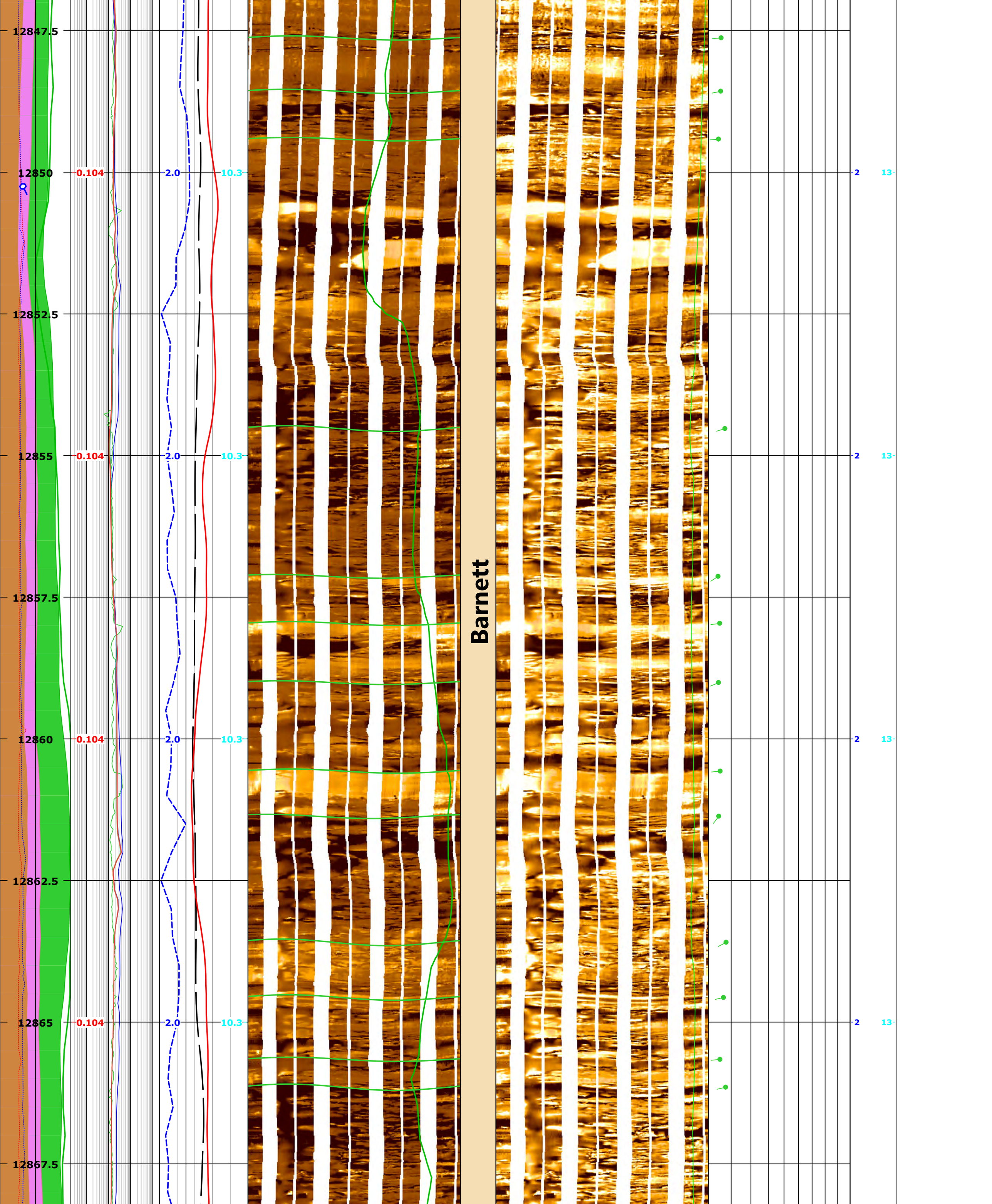

12742.5
12745
12747.5
12750
12752.5
12755
12757.5
12760
0.104
2.0
10.3
2
13
Chester

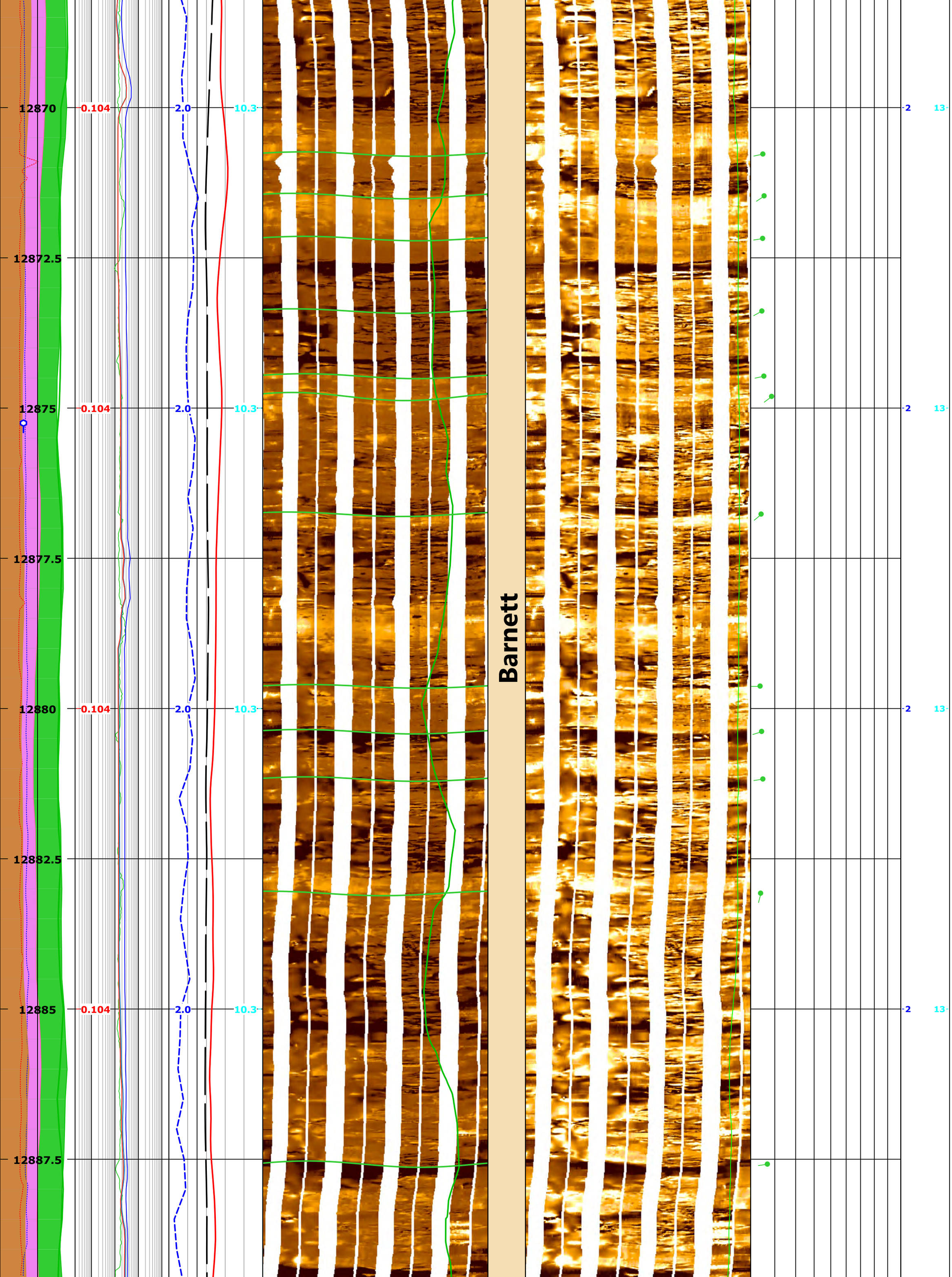

12762.5
12765
12767.5
12770
12772.5
12775
12777.5
12780
12782.5
0.104
2.0
10.3
Chester
Barnett
2
13

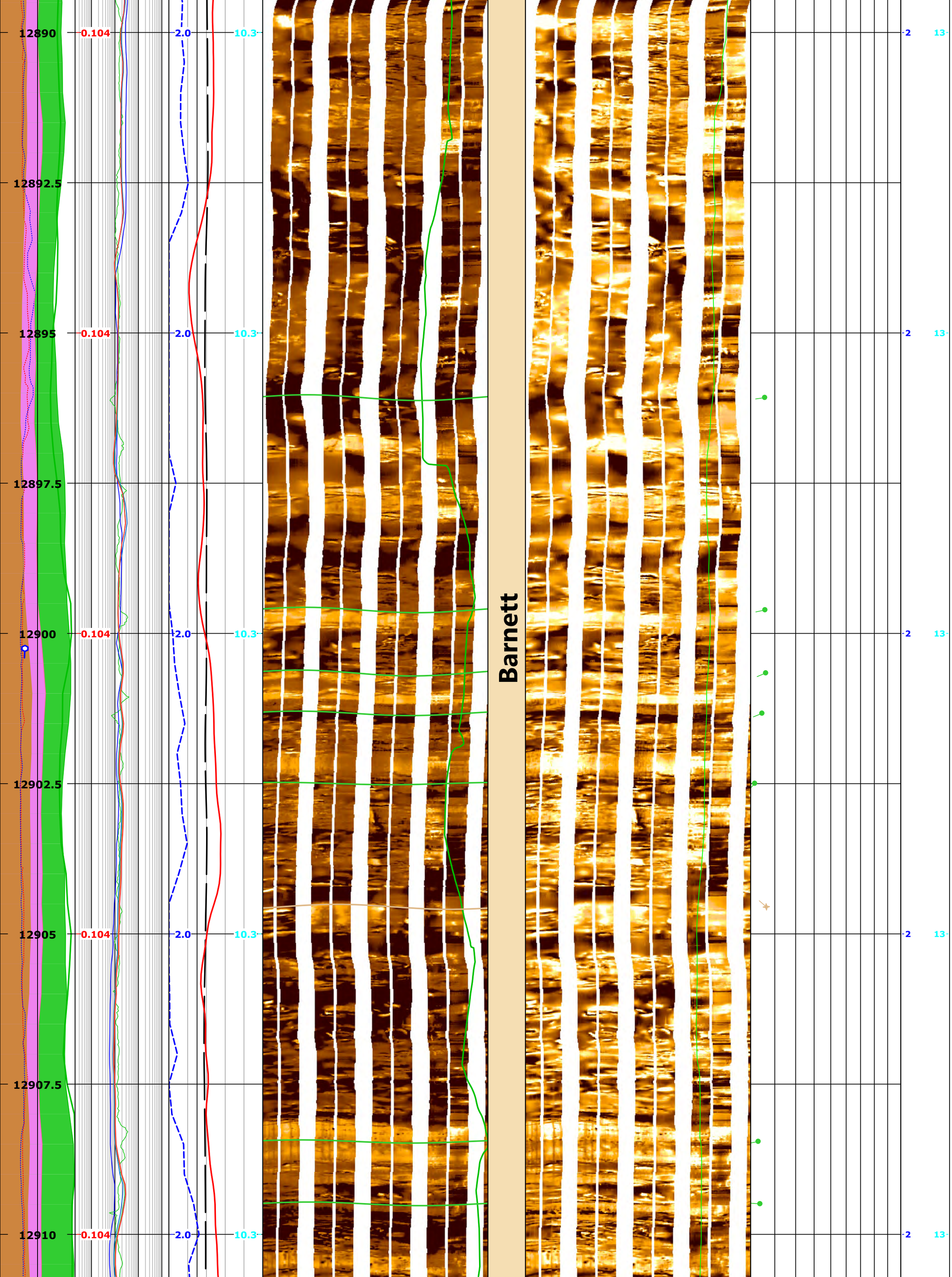

12785
12787.5
12790
12792.5
12795
12797.5
12800
12802.5
0.104
2.0
10.3
Barnett
2
13

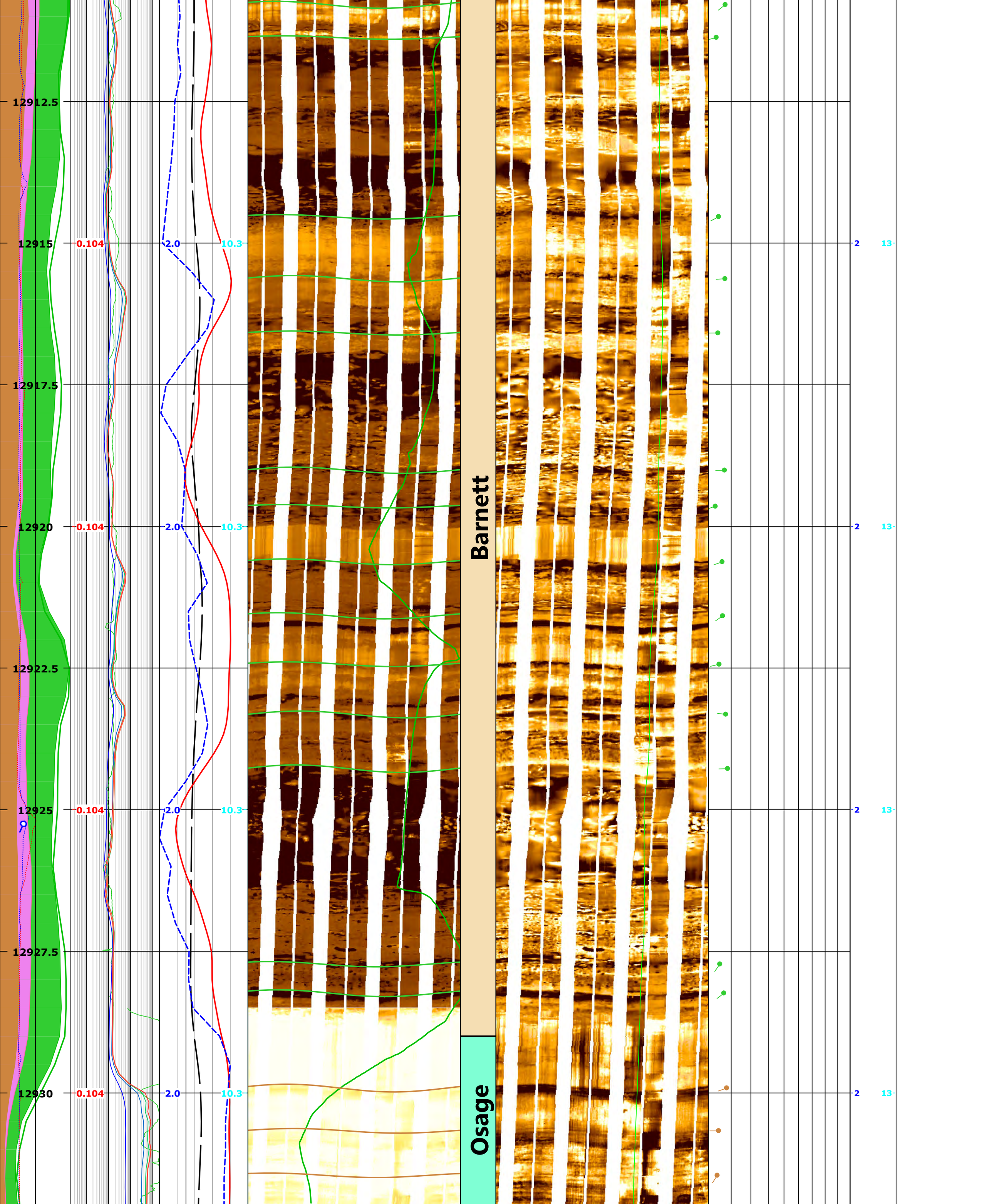

12805
0.104
2.0
10.3
2
13
12807.5
12810
12812.5
12815
12817.5
12820
12822.5
12825
Barnett

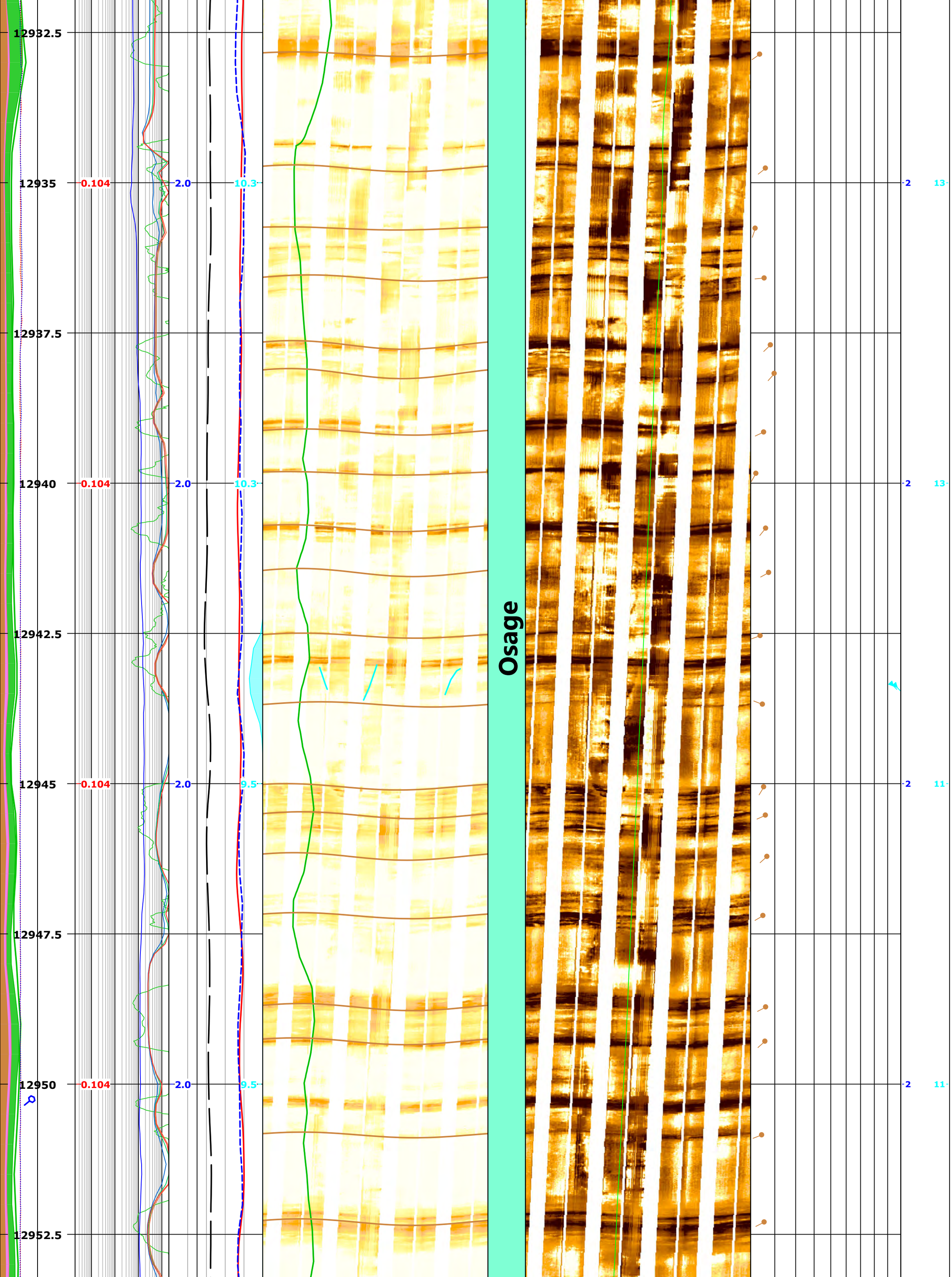

12827.5
12830
12832.5
12835
12837.5
12840
12842.5
12845
0.104
2.0
10.3
Barnett
2
13

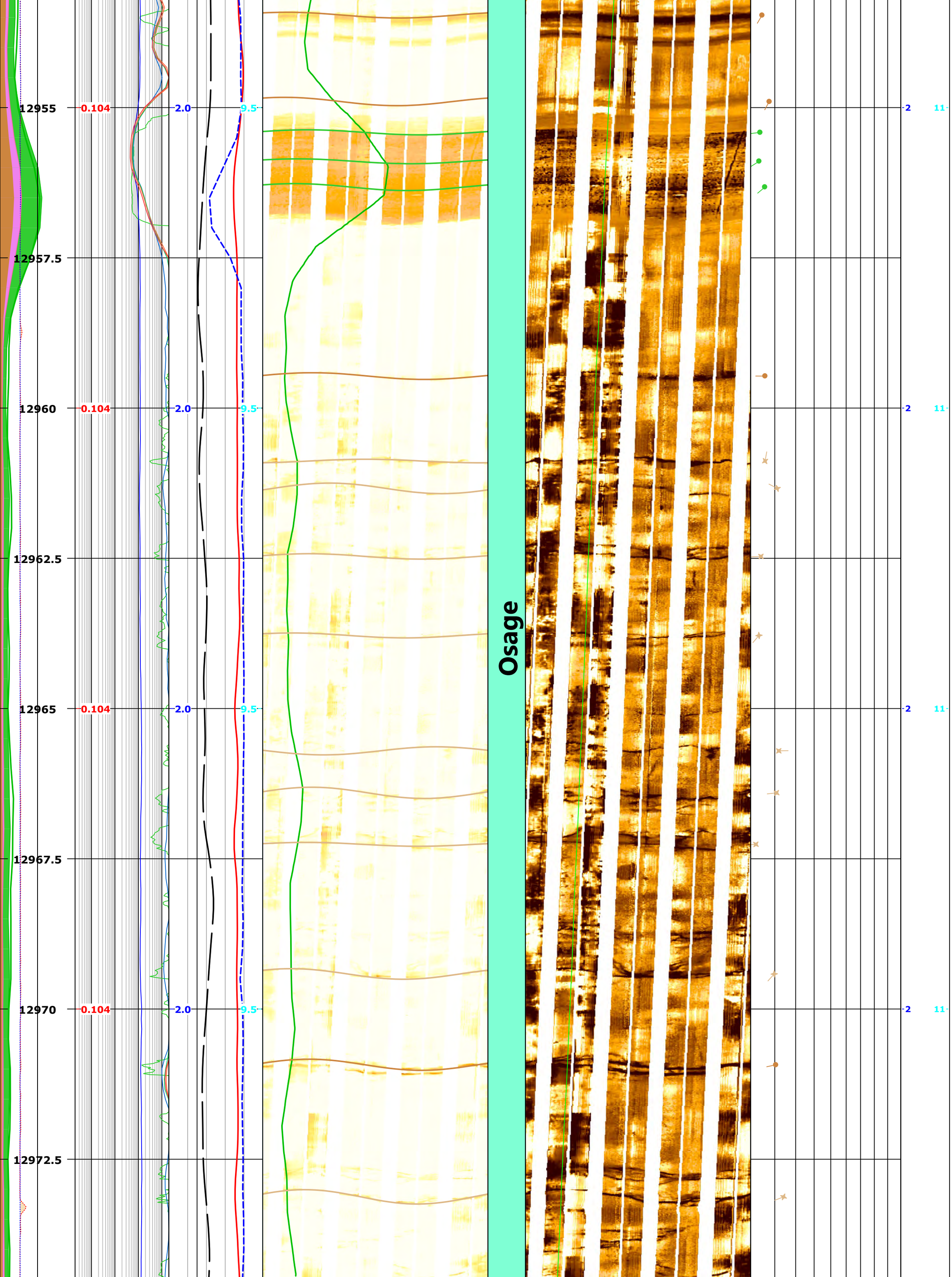

12847.5
12850
12852.5
12855
12857.5
12860
12862.5
12865
12867.5
0.104
2.0
10.3
Barnett
2
13

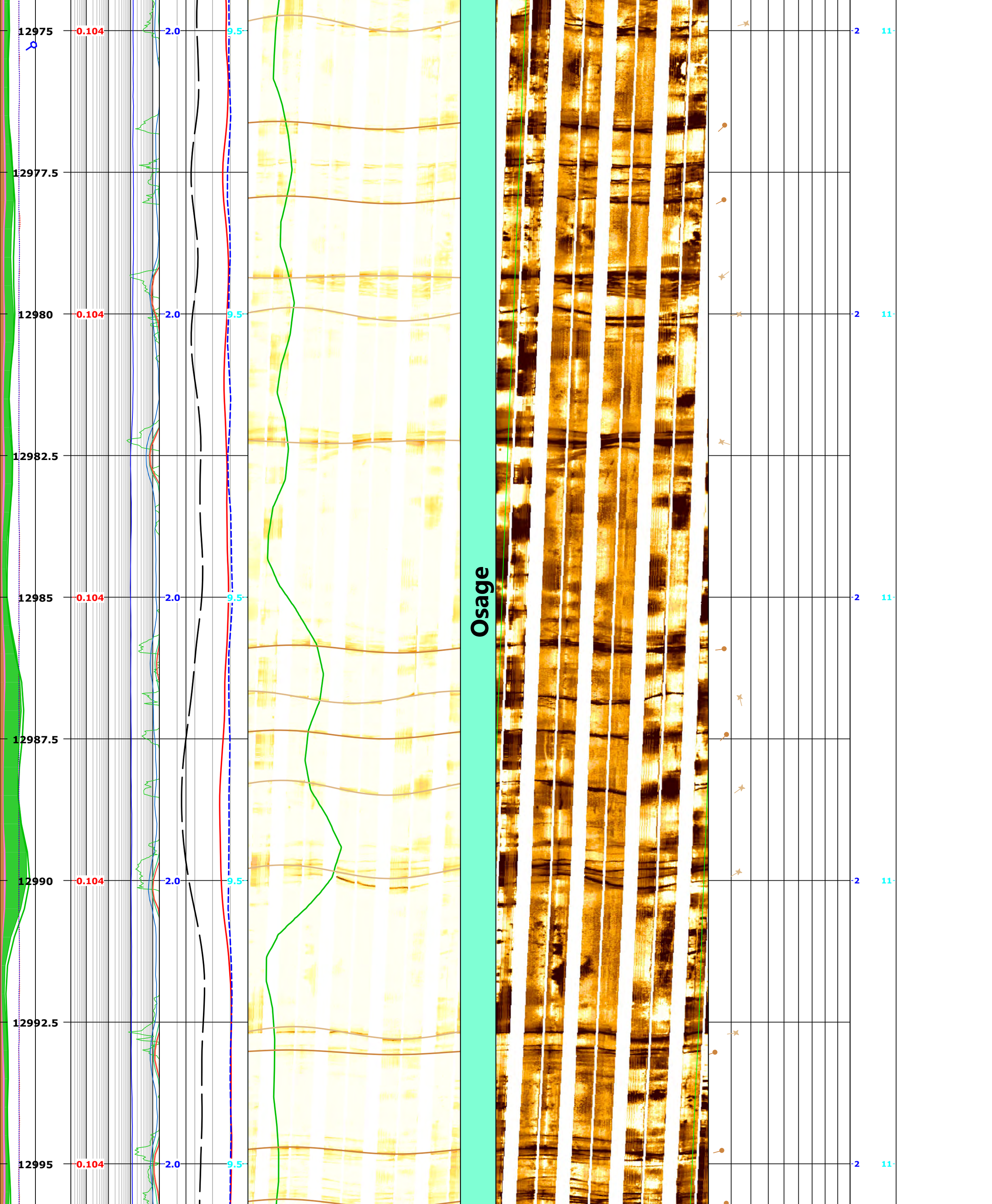

12870
12872.5
12875
12877.5
12880
12882.5
12885
12887.5
0.104
2.0
10.3
Barnett
2
13

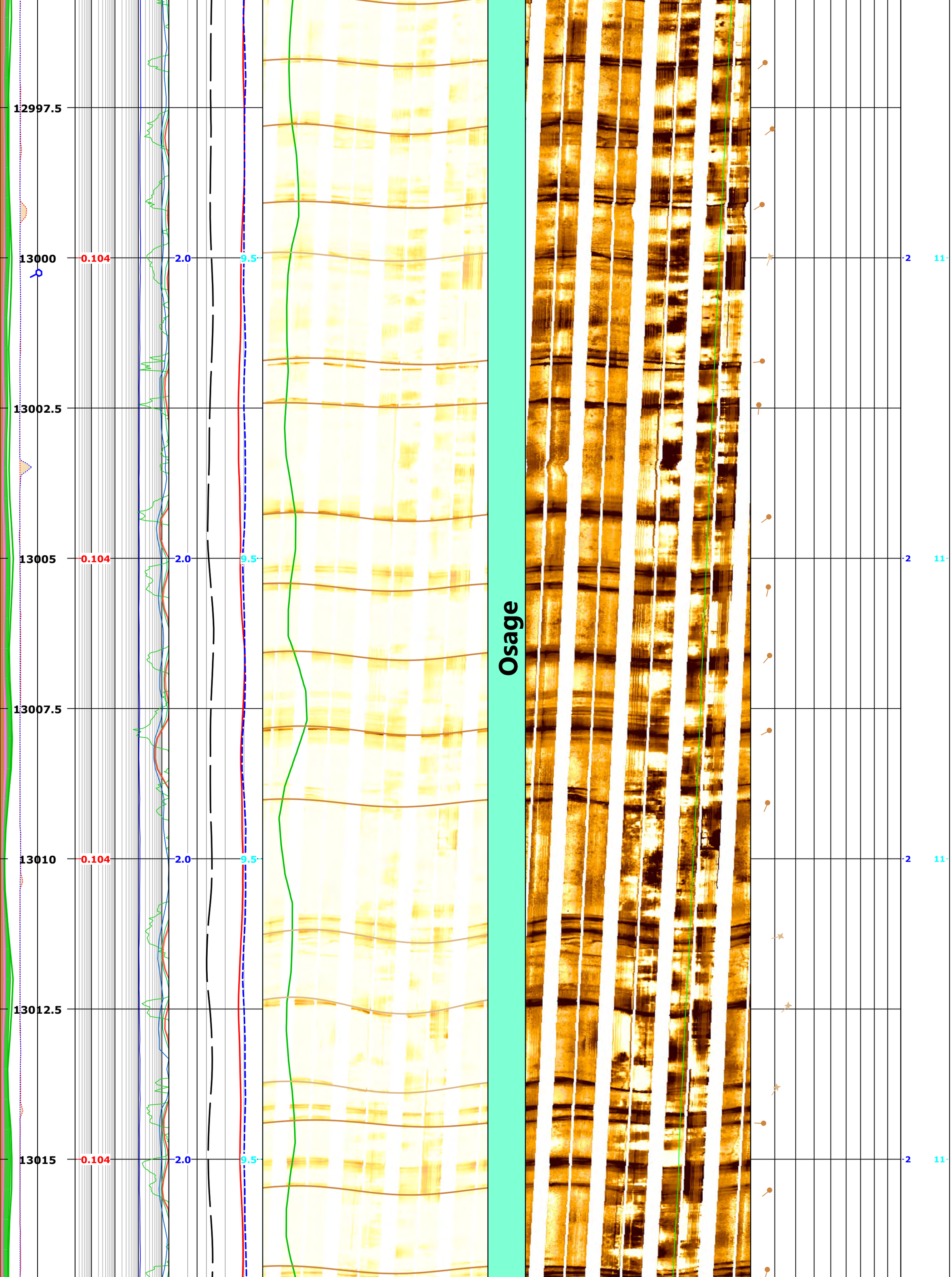

12890
12892.5
12895
12897.5
12900
12902.5
12905
12907.5
12910
0.104
2.0
10.3
2
13
Barnett

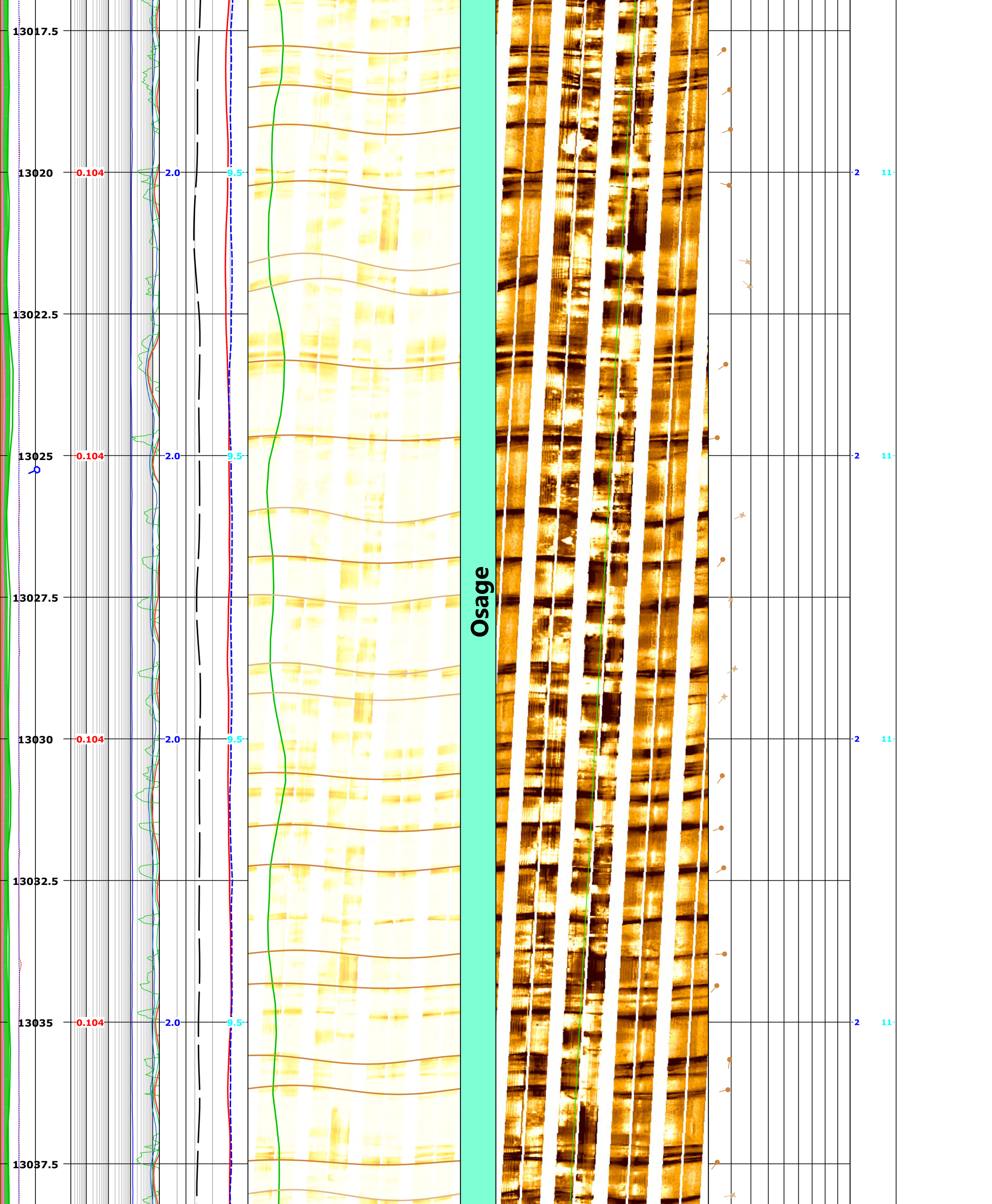

12912.5
12915
12917.5
12920
12922.5
12925
12927.5
12930
0.104
2.0
10.3
2
13
Barnett
Osage

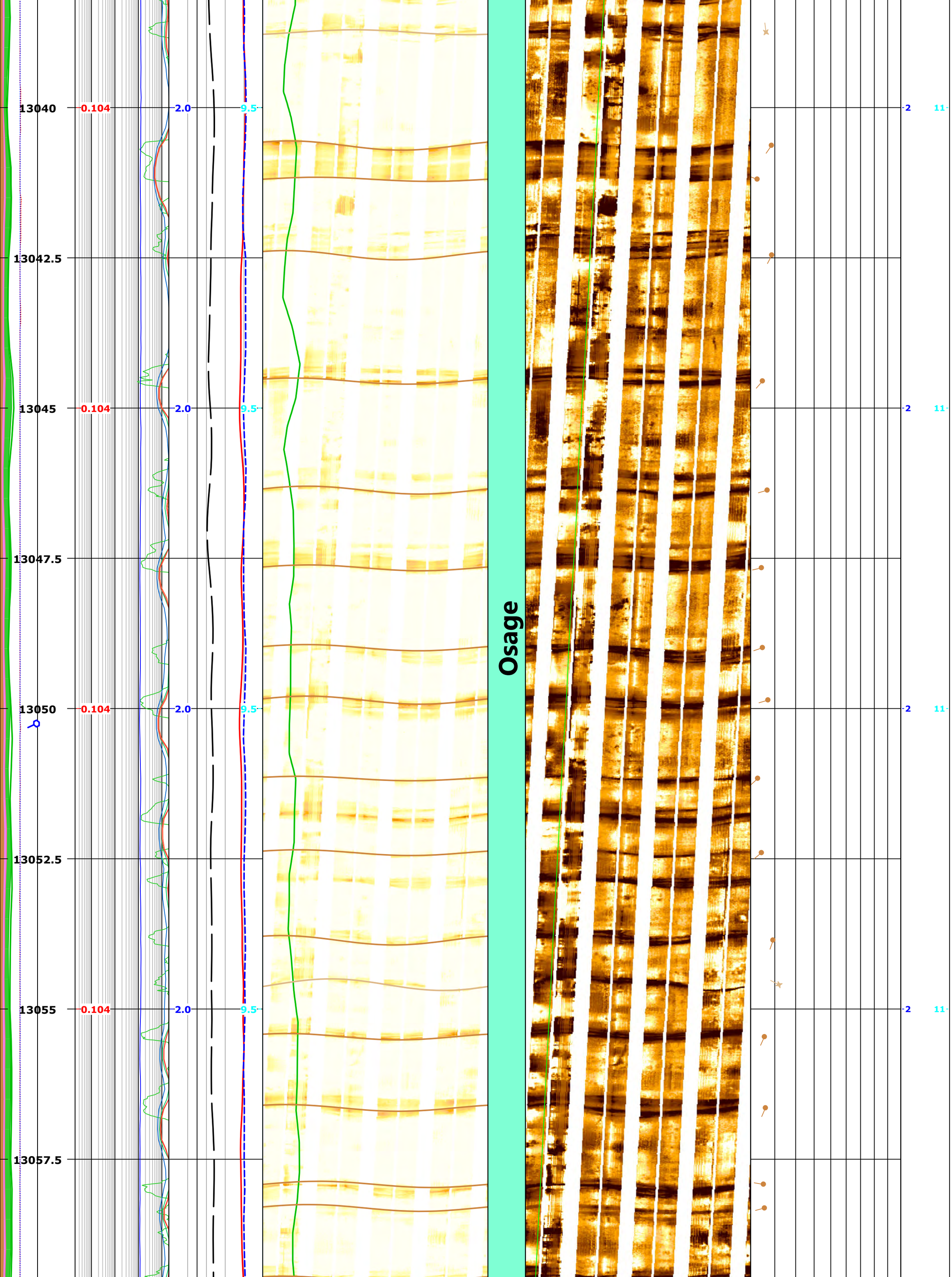

12932.5
12935
0.104
2.0
10.3
2
13
12937.5
12940
0.104
2.0
10.3
2
13
12942.5
Osage
12945
0.104
2.0
9.5
2
11
12947.5
12950
0.104
2.0
9.5
2
11
12952.5

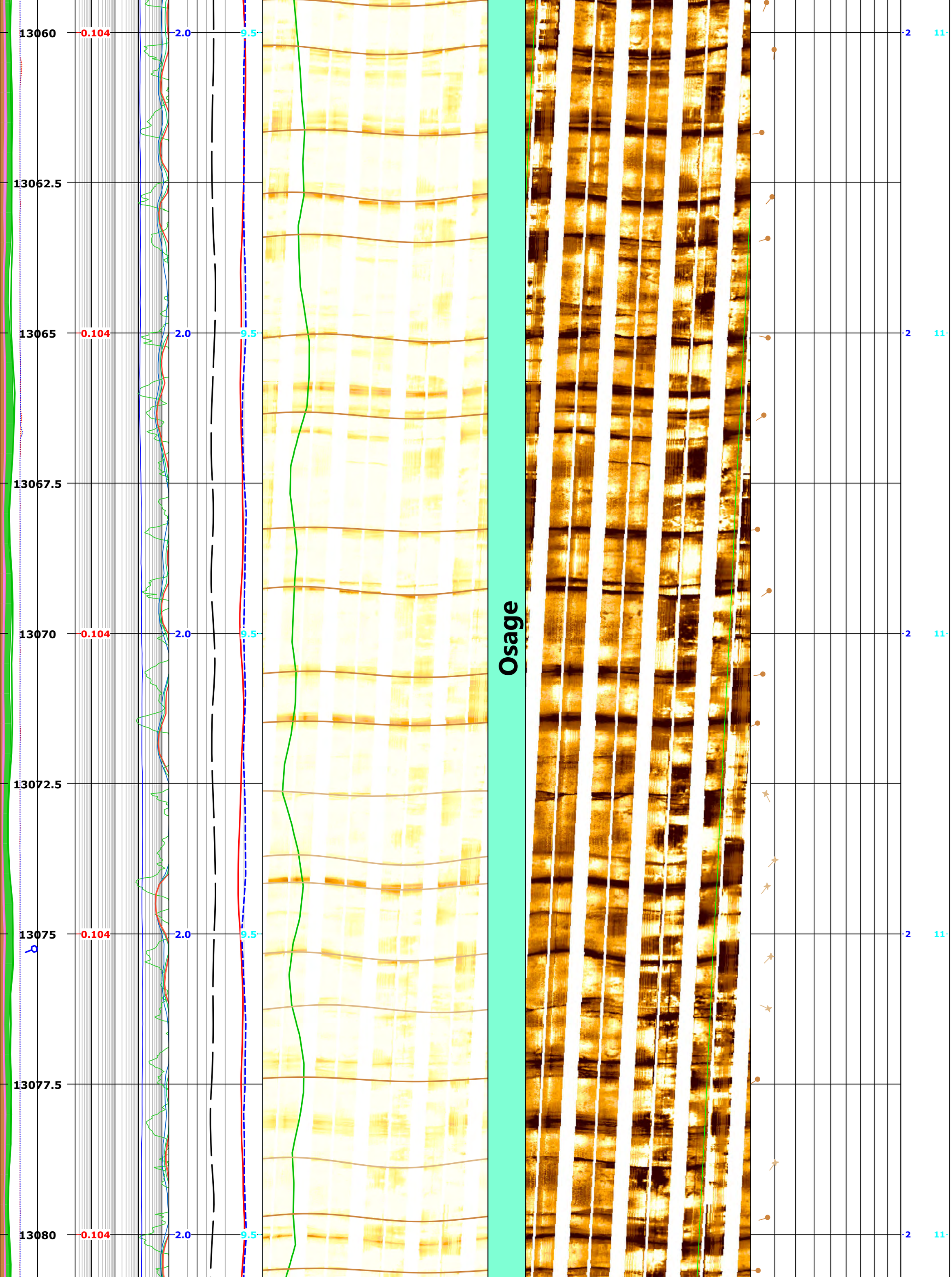

12955
12957.5
12960
12962.5
12965
12967.5
12970
12972.5
0.104
2.0
9.5
Osage
2
11

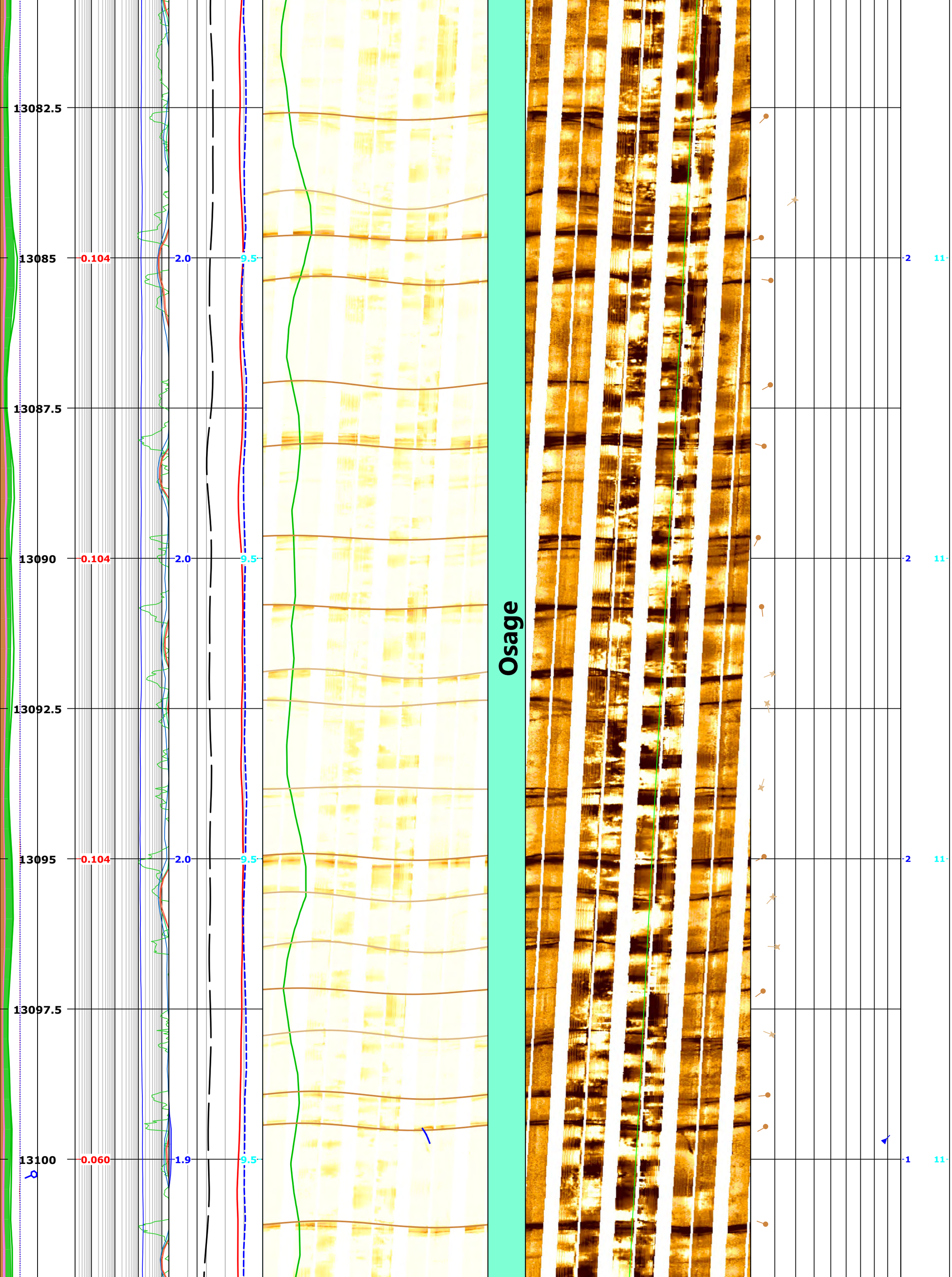

12975
12977.5
12980
12982.5
12985
12987.5
12990
12992.5
12995
0.104
2.0
9.5
2
11
Osage


12997.5
13000
0.104
2.0
9.5
2
11
13002.5
13005
13007.5
13010
13012.5
13015
Osage


13017.5
13020
13022.5
13025
13027.5
13030
13032.5
13035
13037.5
0.104
2.0
9.5
2
11
Osage


13040
13042.5
13045
13047.5
13050
13052.5
13055
13057.5
0.104
2.0
9.5
Osage
2
11


13060
13062.5
13065
13067.5
13070
13072.5
13075
13077.5
13080
0.104
2.0
9.5
2
11
Osage


13082.5
13085
0.104
2.0
9.5
2
11
13087.5
13090
0.104
2.0
9.5
2
11
13092.5
13095
0.104
2.0
9.5
2
11
13097.5
13100
0.060
1.9
9.5
1
11
Osage