



Cedar Valley Water Initial Interpretation

Dynamic Measurement LLC

H. Roice Nelson Jr. & Les Denham

20 July 2022

	WGS84 UTM Zone 12		WGS84	
Area	Easting	Northing	LAT	LON
1	299700	4164600	37.606698	-113.269172
2	319600	4166700	37.629734	-113.044384

Table 1. Center Points for 2 SPOTsm Lightning Analysis Projects.

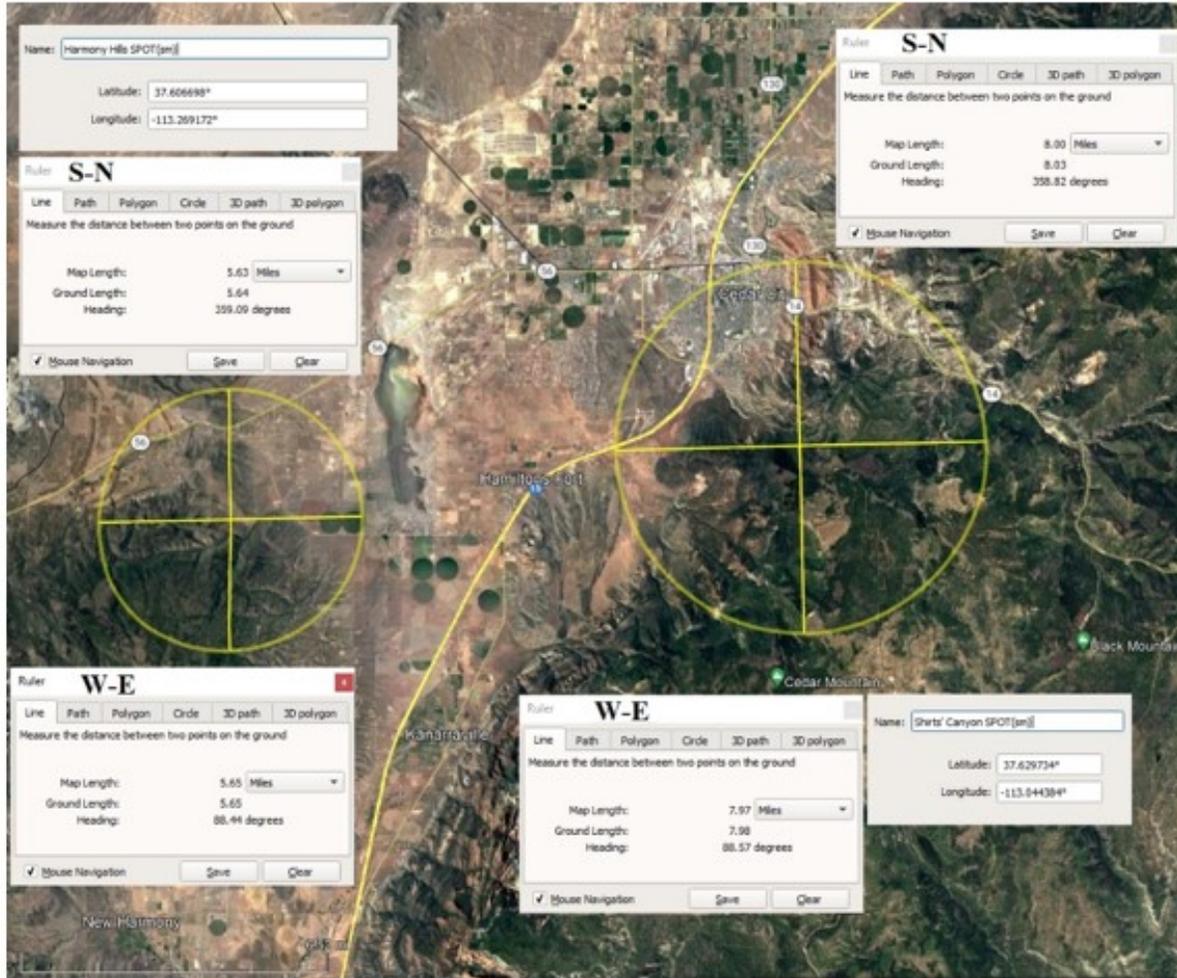


Figure 1. Area of Harmony Hills (west) and Shirts Canyon (east) SPOTsm Analyses, Cedar Valley, Utah.

Cedar Contracted Areas:

- Harmony Hills
 - 25-square mile SPOTsm
 - \$35,200
- Shirts Canyon
 - 50-square mile SPOTsm
 - \$45,400
- Totals
 - 75-square mile SPOTsm
 - \$80,600

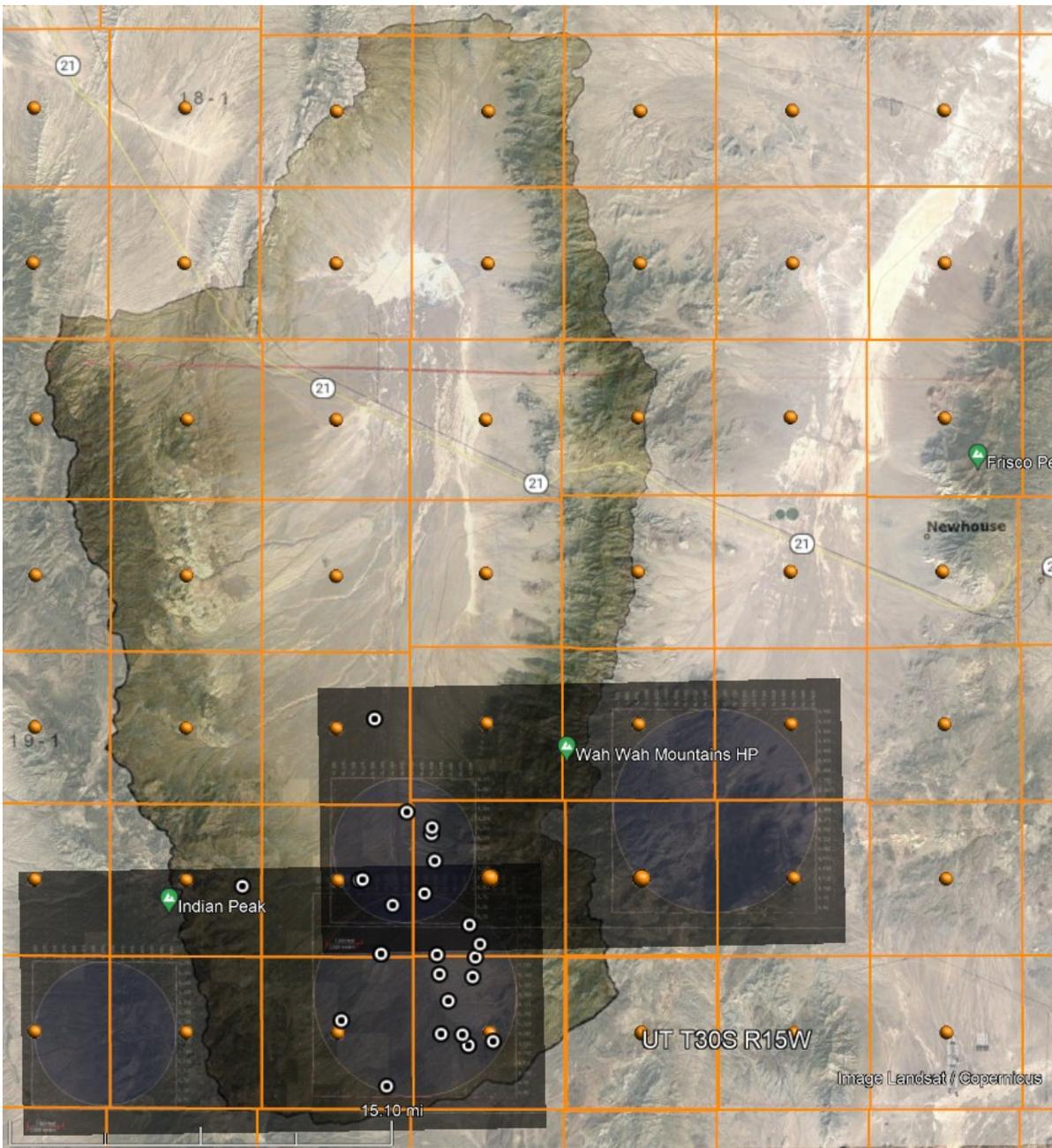
CICWCD Pine Valley Planned Wells



CICWCD

Pine Valley Planned Wells

- Northern
 - 25-square mile SPOTsm
 - \$35,200
- Southern
 - 50-square mile SPOTsm
 - \$45,400
- Totals
 - 75-square mile SPOTsm
 - \$80,600



CICWCD Pine Valley Planned Wells

- Lightning Analysis Option 1
 - 72-square mile d.NSEMsm
 - \$65,200

CONFIDENTIAL

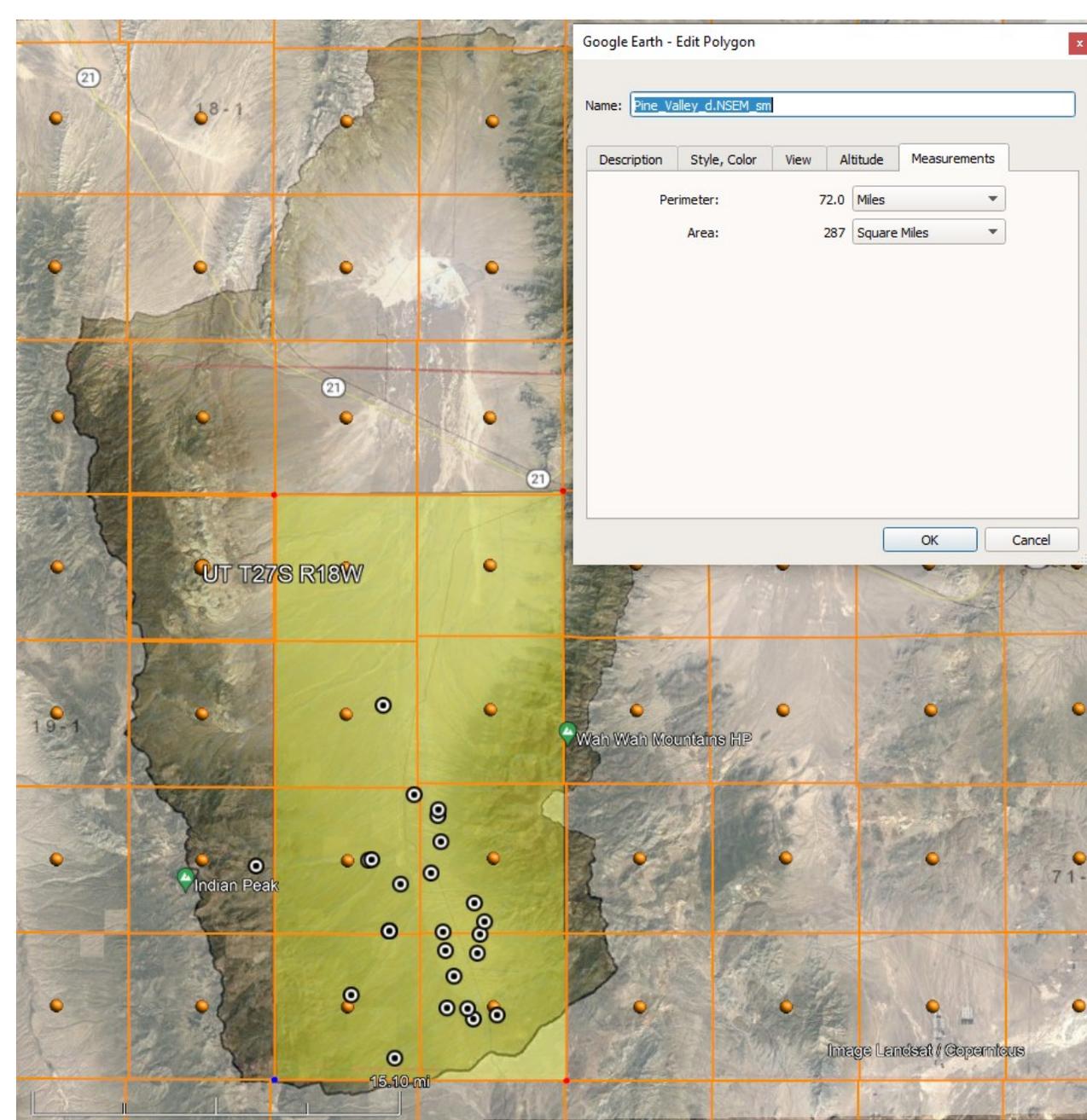
DYNAMIC MEASUREMENT PRICE CALCULATOR SANDBOX
INSTRUCTIONS

This tab allows you to enter SQUARE MILES directly in cell D46 so you can do quick estimates. All other input fields are locked or hidden. Use the conversion factors below if your measure is other than square miles.
YOU CAN ONLY ENTER SQUARE MILE If the value entered is <=0, you will see an error message.

Conversion Factors	
Square KM / Square Mile	2.58999
Acres / Square Mile	640

	Area	Price	Per Unit
Acres	46,080.00	\$65,200.00	\$1.41
Sq KM	186.48	\$65,200.00	\$349.64
Sq Mile	72.00	\$65,200.00	\$905.56

Minimum Price 10,000



CICWCD Pine Valley Planned Wells

- Lightning Analysis Option 1
 - 120-square mile d.NSEMsm
 - \$77,830

CONFIDENTIAL

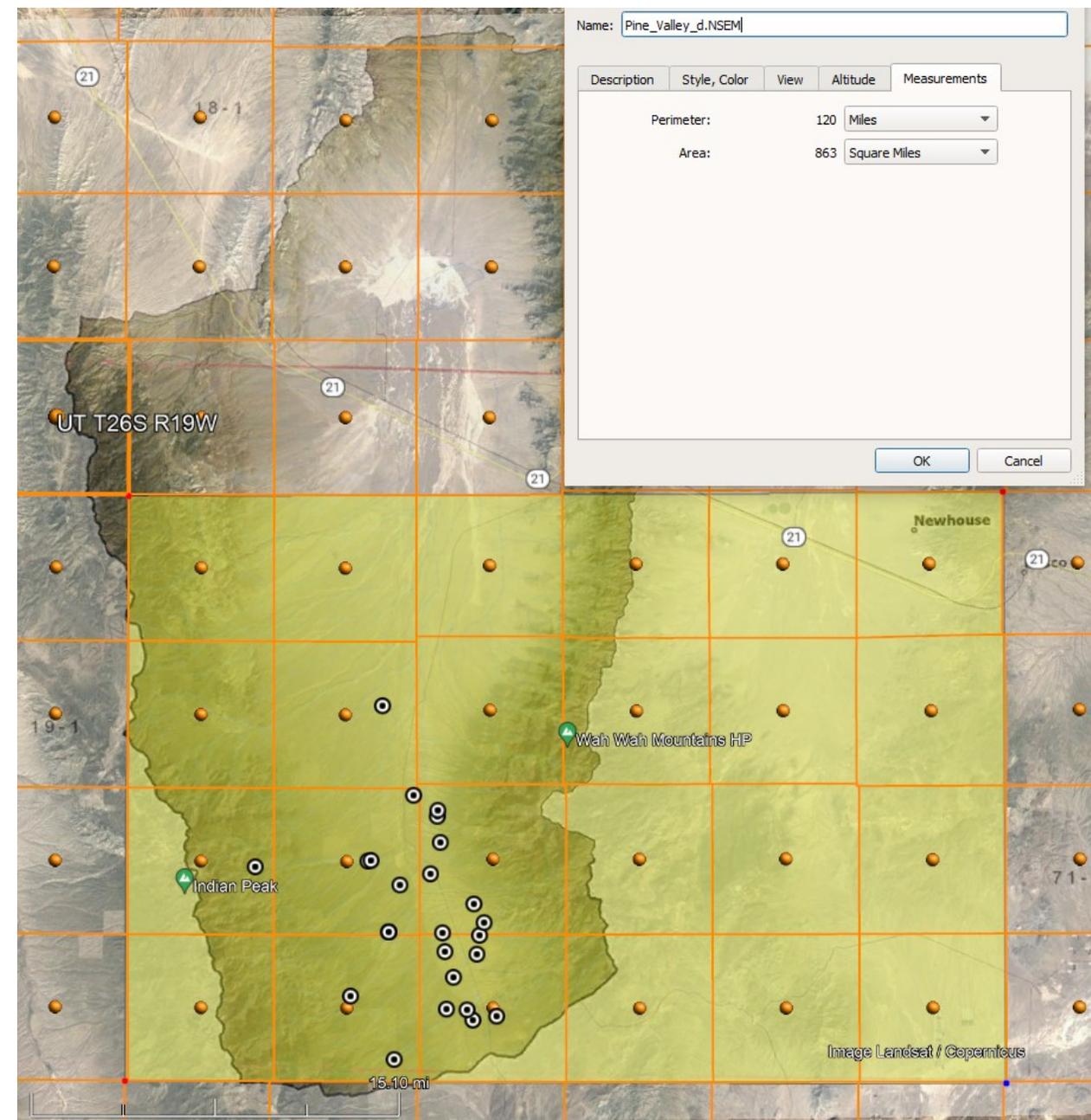
DYNAMIC MEASUREMENT PRICE CALCULATOR SANDBOX
INSTRUCTIONS

This tab allows you to enter SQUARE MILES directly in cell D46 so you can do quick estimates. All other input fields are locked or hidden. Use the conversion factors below if your measure is other than square miles.
YOU CAN ONLY ENTER SQUARE MILE If the value entered is <=0, you will see an error message.

Conversion Factors	
Square KM / Square Mile	2.58999
Acres / Square Mile	640

	Area	Price	Per Unit
Acres	76,800.00	\$77,830.00	\$1.01
Sq KM	310.80	\$77,830.00	\$250.42
Sq Mile	120.00	\$77,830.00	\$648.58

Minimum Price 10,000

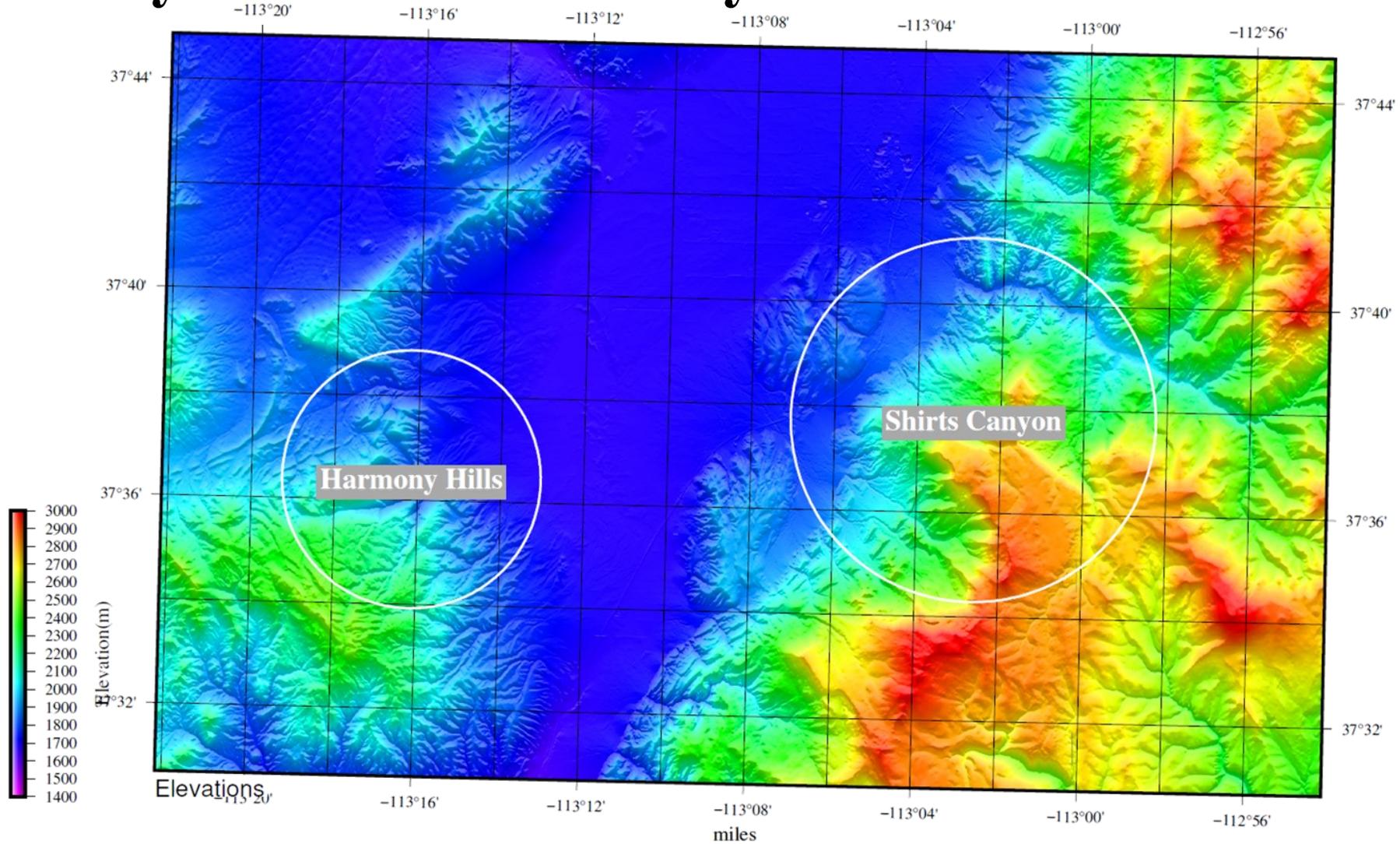


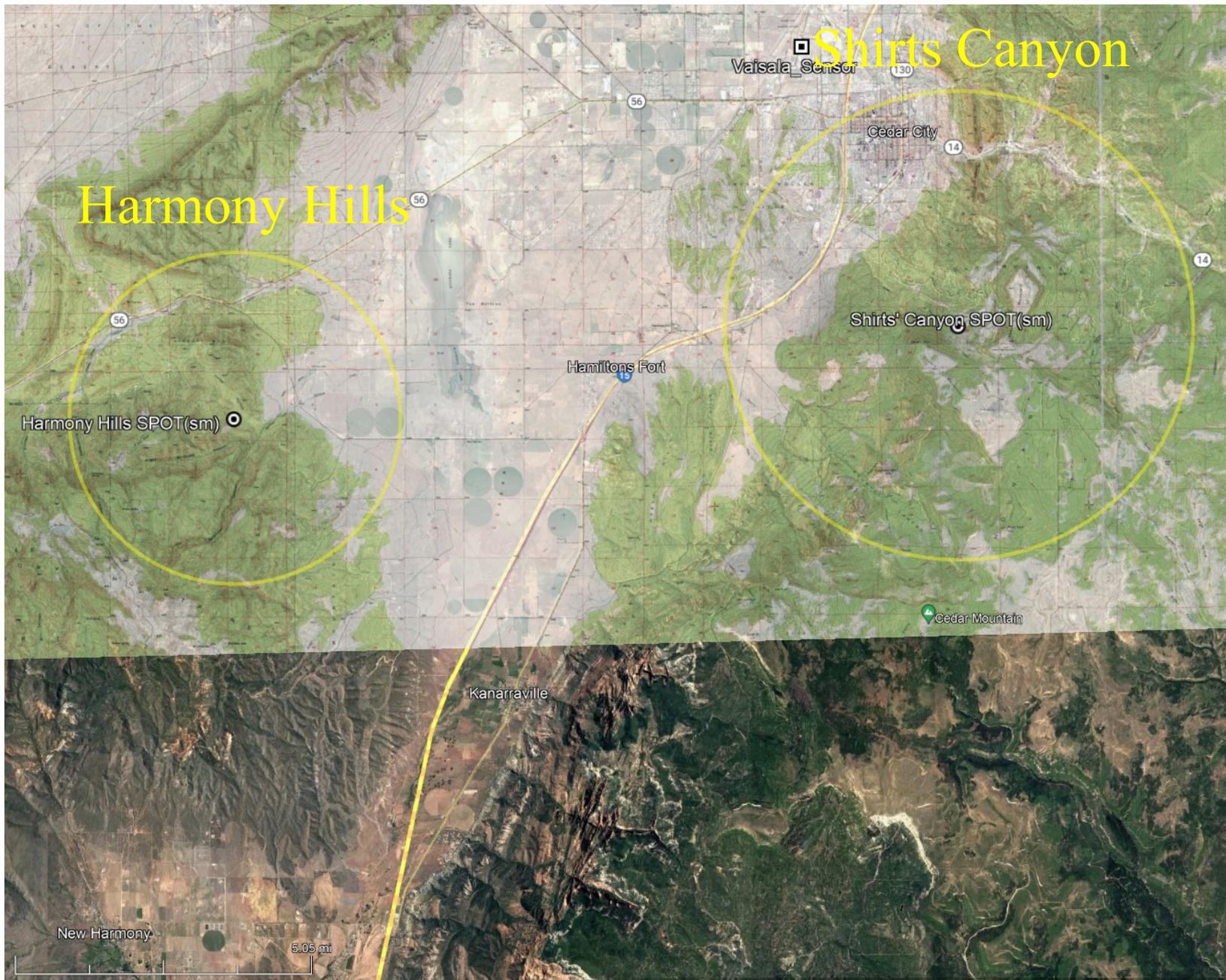
Cedar Valley Lightning Analysis Interpretation at Harmony Hills & Shirts Canyon Outline



- Location
- Historical Data
- Lightning Data
 - Lightning Attribute Maps
 - Lightning Attribute Volumes
 - Apparent Resistivity
 - Apparent Permittivity
 - Total Wavelet Time
 - Lightning Sensor in Cedar
- Backthrust & Thrust Sheets
- Hydrostatic Pressure
- Apparent Resistivity Up Flows
- Apparent Permittivity Anomalies
- Apparent Resistivity Slices

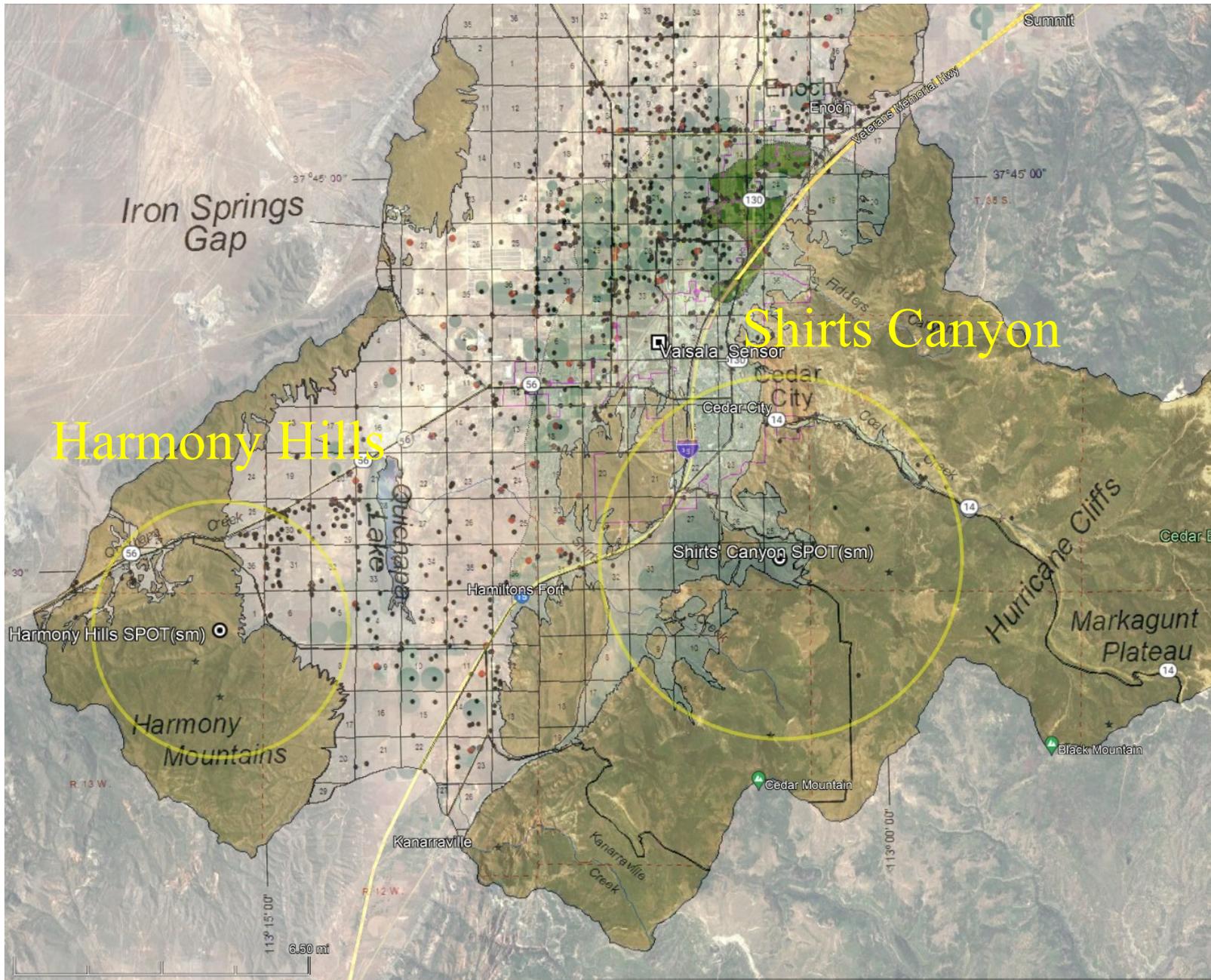
Harmony Hills & Shirts Canyon Areas

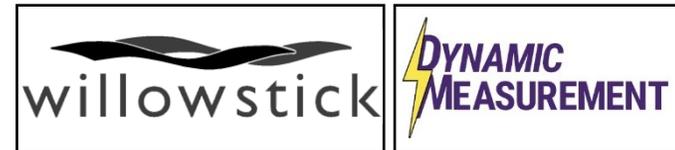
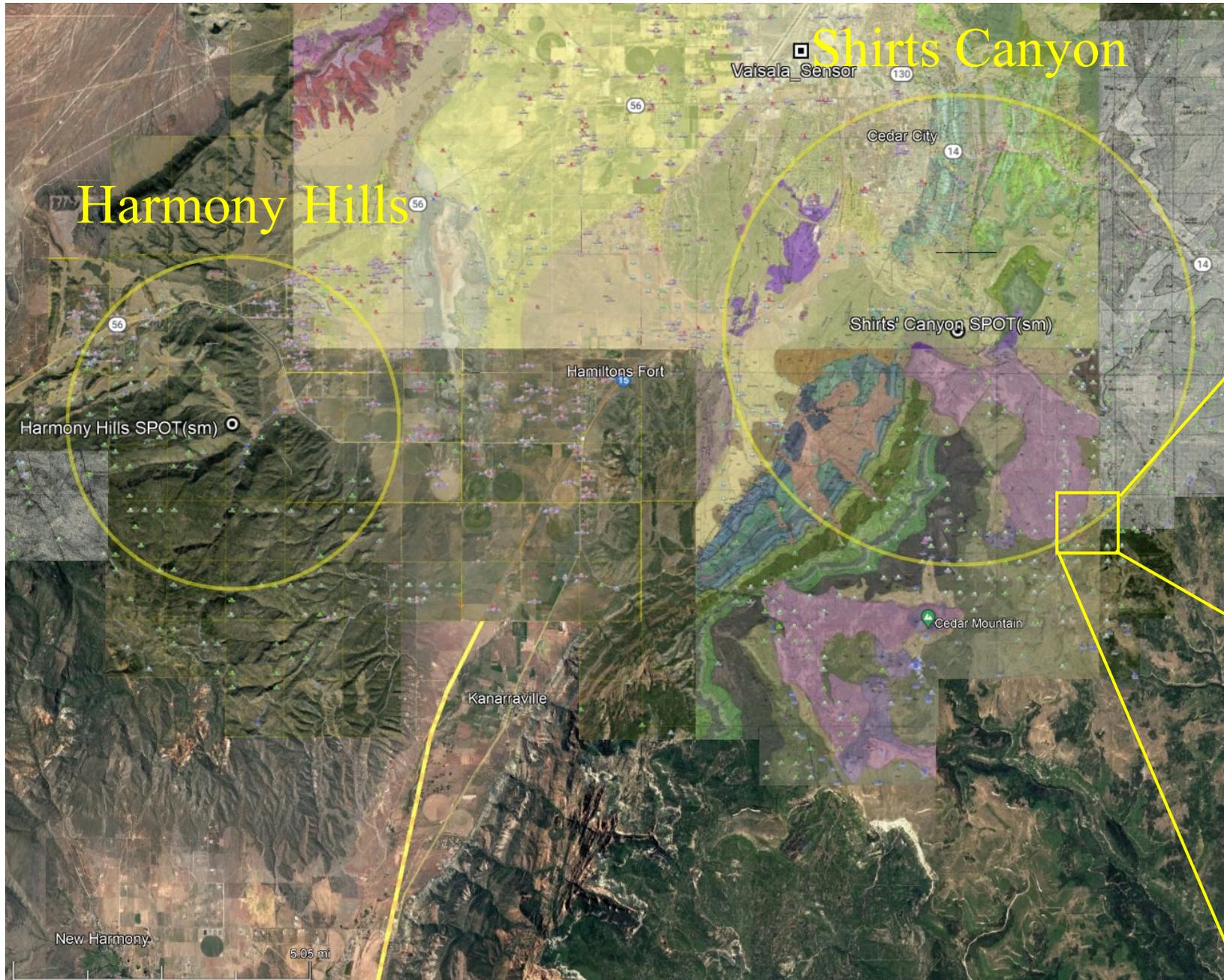




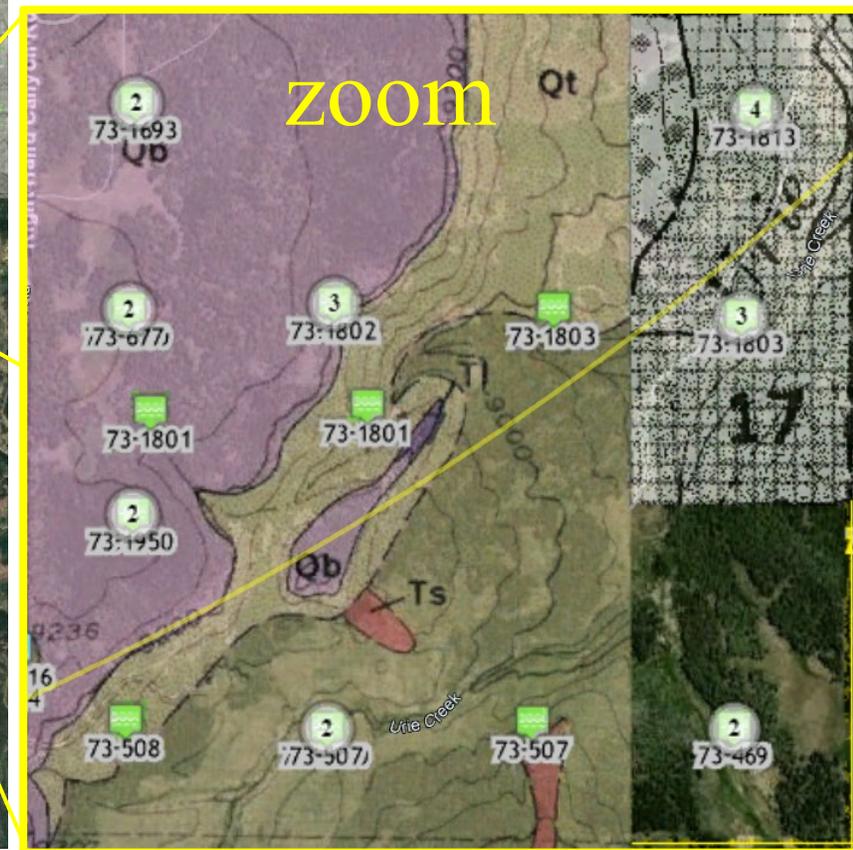
USGS Topo Map & 2 SPOTssm

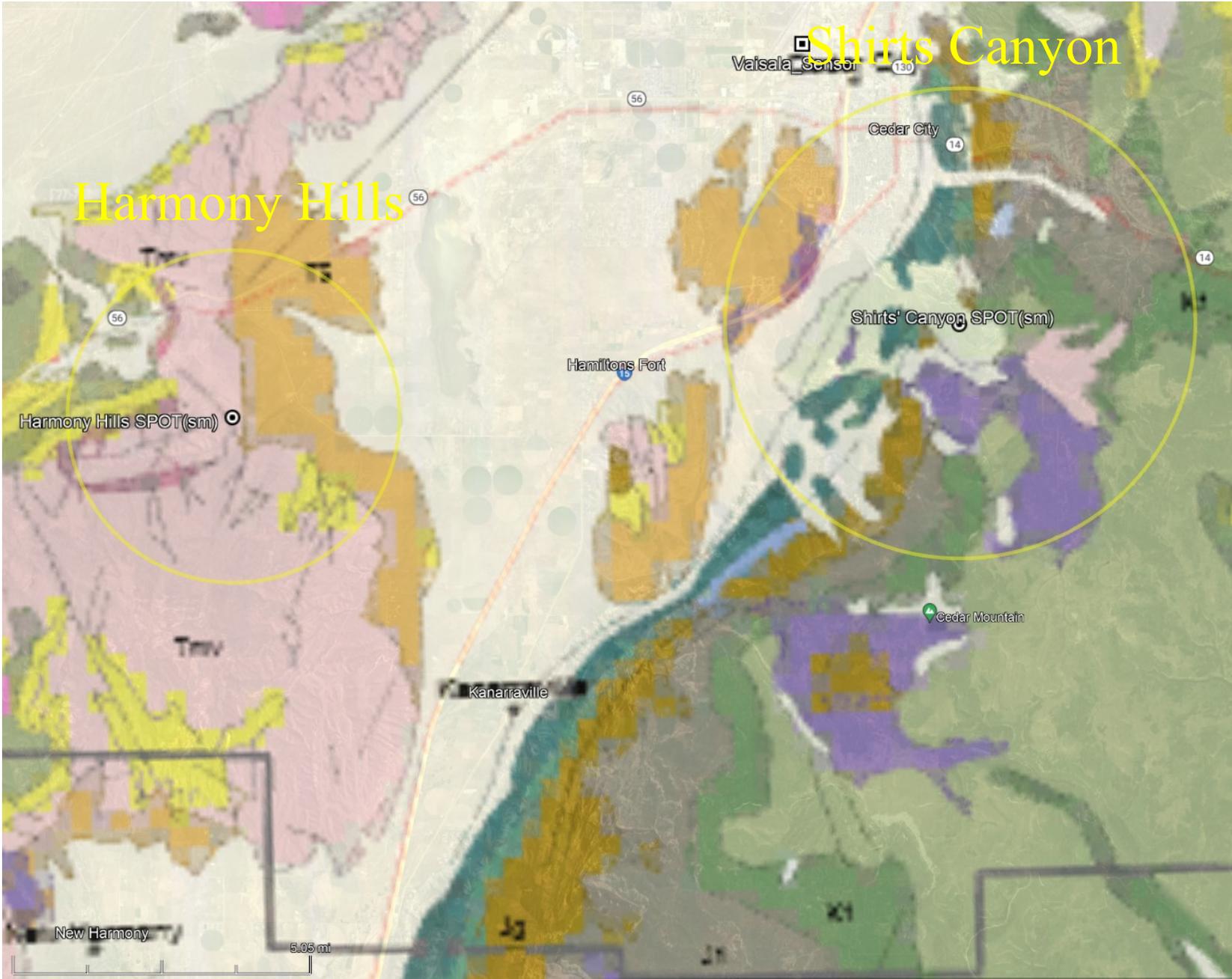
Wells in Southern Cedar Valley Drainage Basin



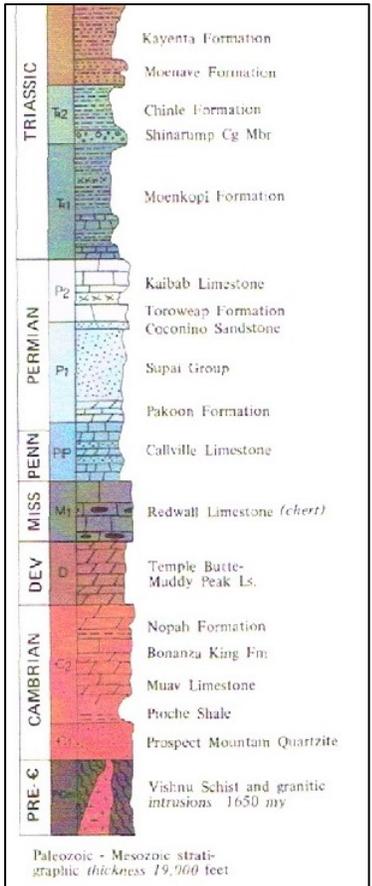
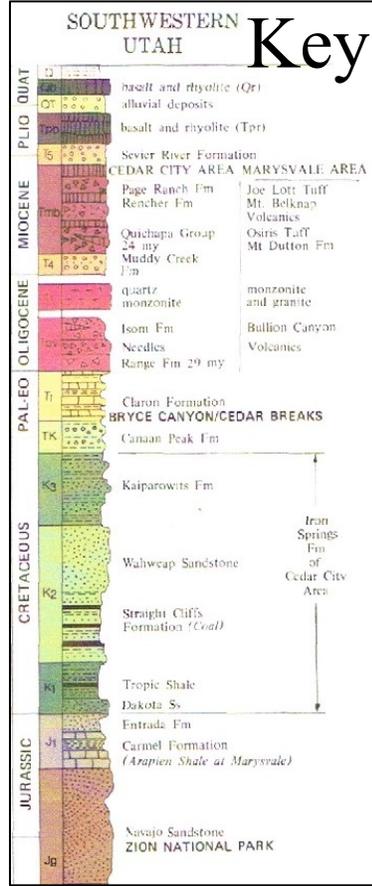


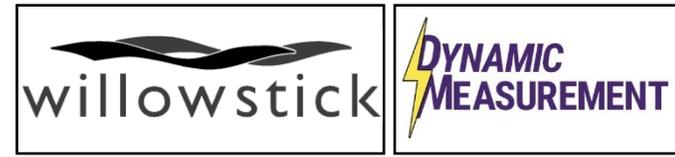
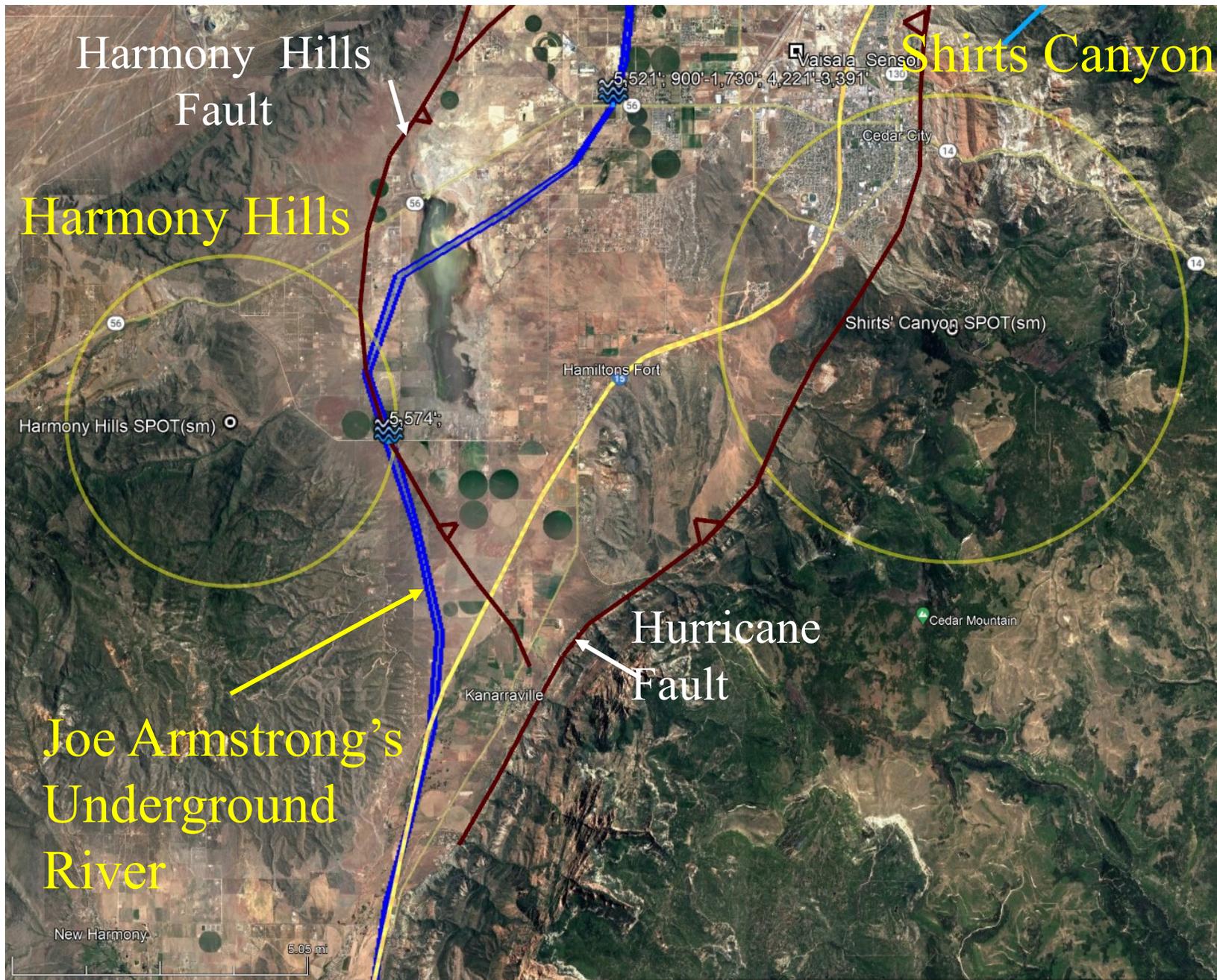
Utah State Water Wells Map & 2 SPOTssm





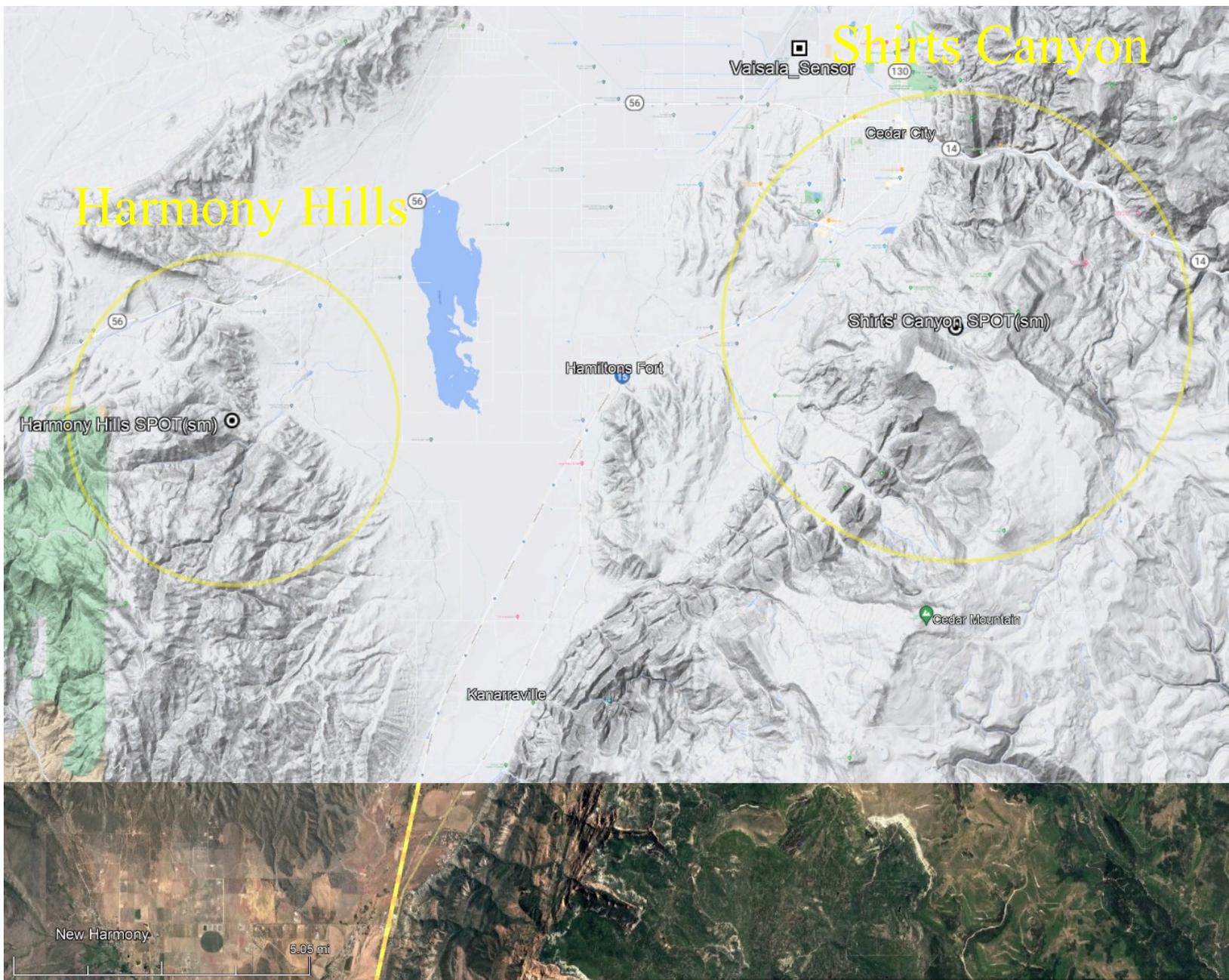
Outcrop Geology Map & 2 SPOTssm





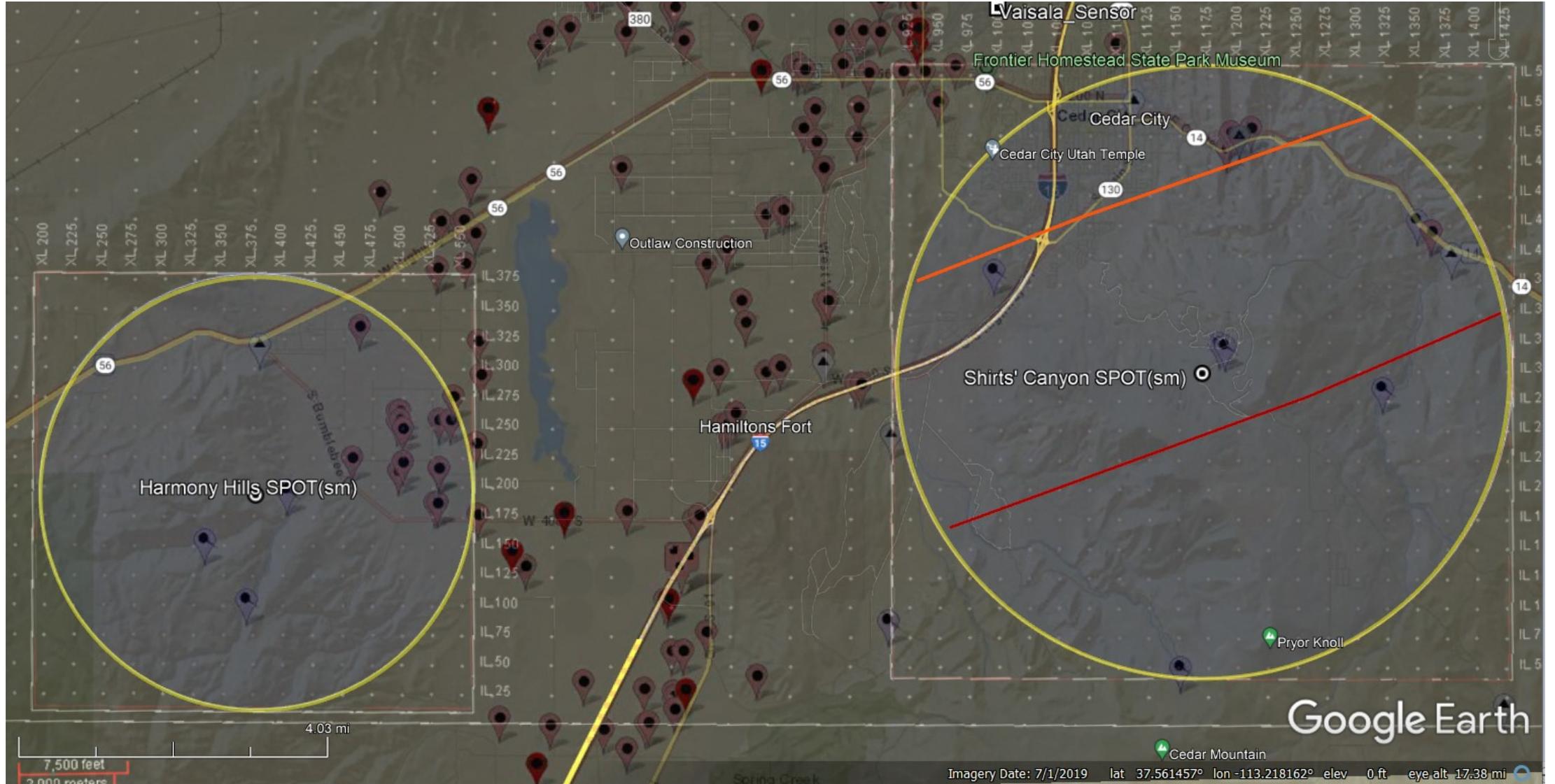
Joe Armstrong “River” & 2 SPOTssm

Joe, a water witch, who passed away from Covid, was convinced there is an underground river taking water out of Cedar Valley to the south down the Black Ridge.

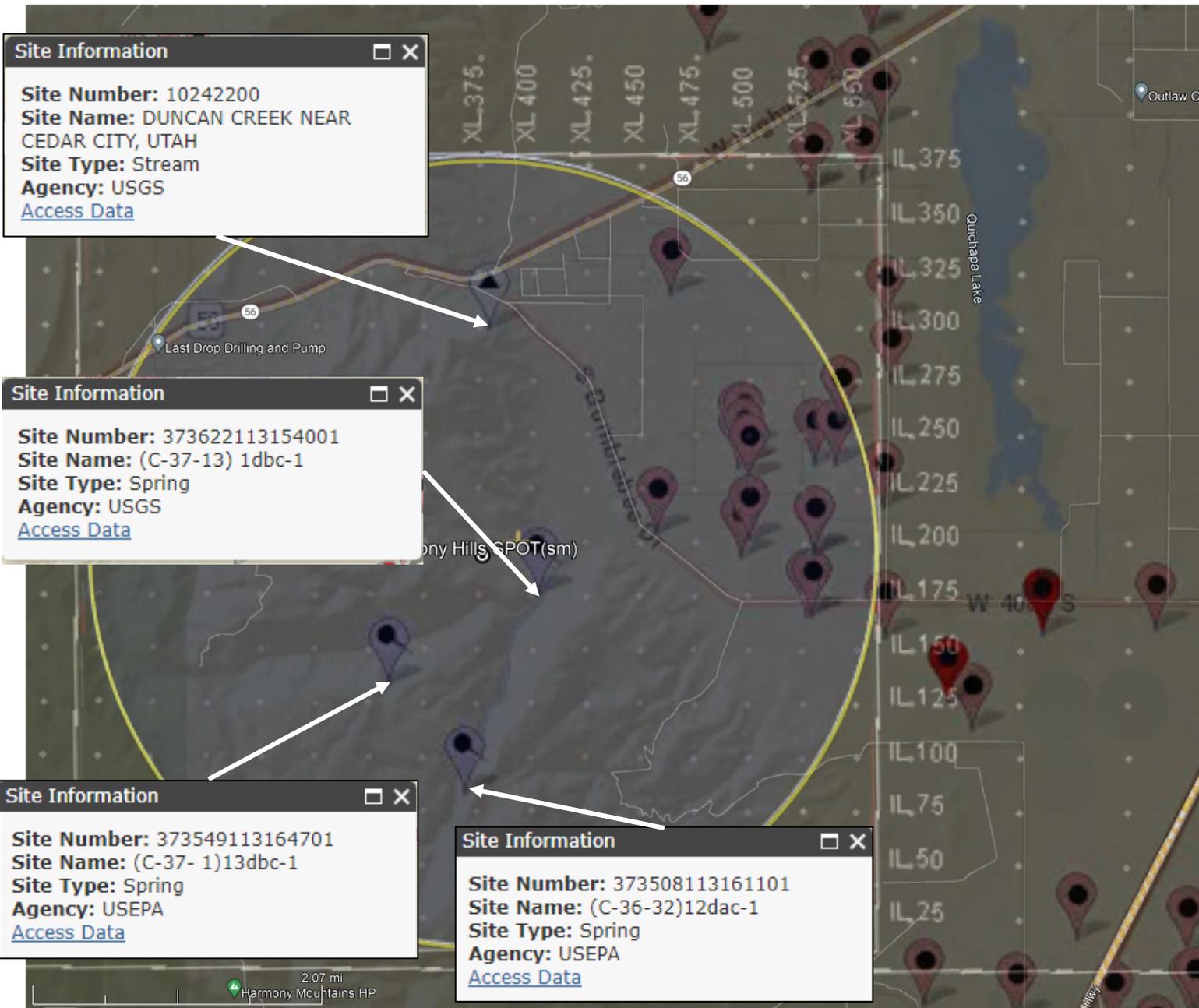


Terrain Map & 2 SPOTssm

Harmony Hills & Shirts Canyon USGS Water

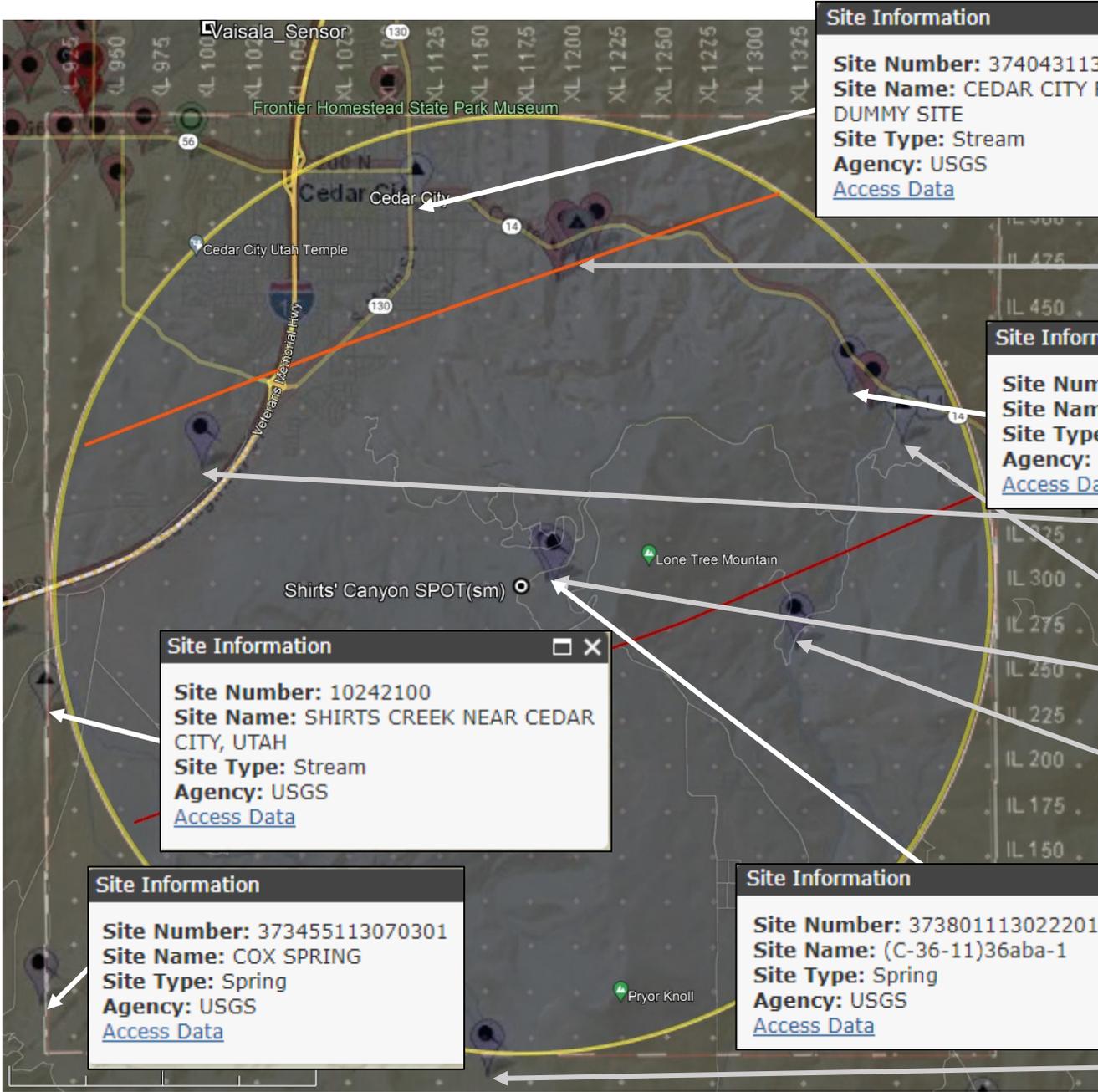


Harmony Hills USGS Water Information





Shirts Canyon USGS Water Information



Site Information
Site Number: 374043113033200
Site Name: CEDAR CITY FIELD OFFICE DUMMY SITE
Site Type: Stream
Agency: USGS
[Access Data](#)

Site Information
Site Number: 10242000
Site Name: COAL CREEK NEAR CEDAR CITY, UT
Site Type: Stream
Agency: USGS
[Access Data](#)

Site Information
Site Number: 373923112593301
Site Name: (C-36-10)21bdc-1
Site Type: Spring
Agency: USGS
[Access Data](#)

Site Information
Site Number: 373850113053501
Site Name: (C-36-11)28aab-1
Site Type: Spring
Agency: USGS
[Access Data](#)

Site Information
Site Number: 10241900
Site Name: COAL CRK ABV RIGHT HAND CRK, NR CEDAR CITY, UTAH
Site Type: Stream
Agency: USGS
[Access Data](#)

Site Information
Site Number: 373759113021501
Site Name: (C-36-36)11aba-1
Site Type: Spring
Agency: USEPA
[Access Data](#)

Site Information
Site Number: 10242100
Site Name: SHIRTS CREEK NEAR CEDAR CITY, UTAH
Site Type: Stream
Agency: USGS
[Access Data](#)

Site Information
Site Number: 373455113070301
Site Name: COX SPRING
Site Type: Spring
Agency: USGS
[Access Data](#)

Site Information
Site Number: 373801113022201
Site Name: (C-36-11)36aba-1
Site Type: Spring
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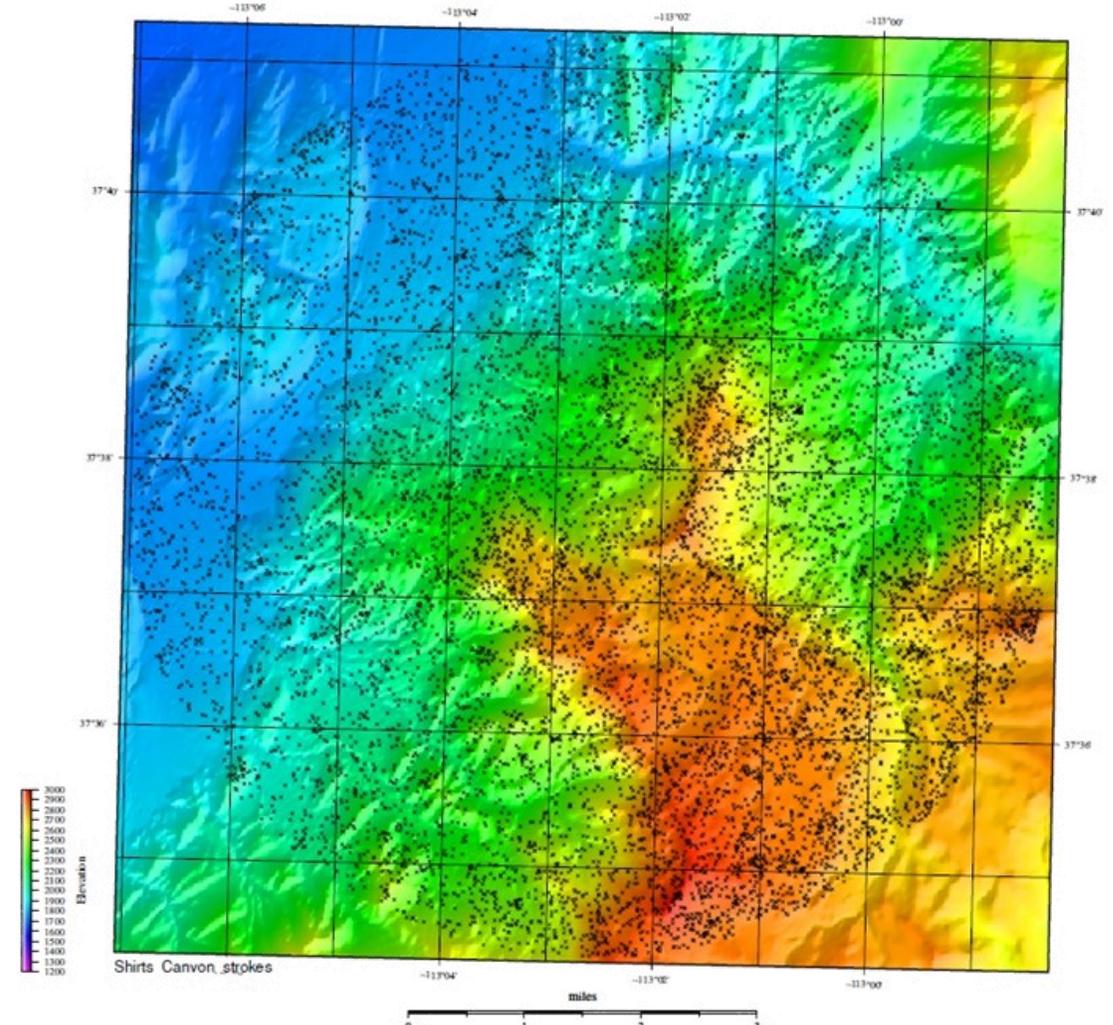
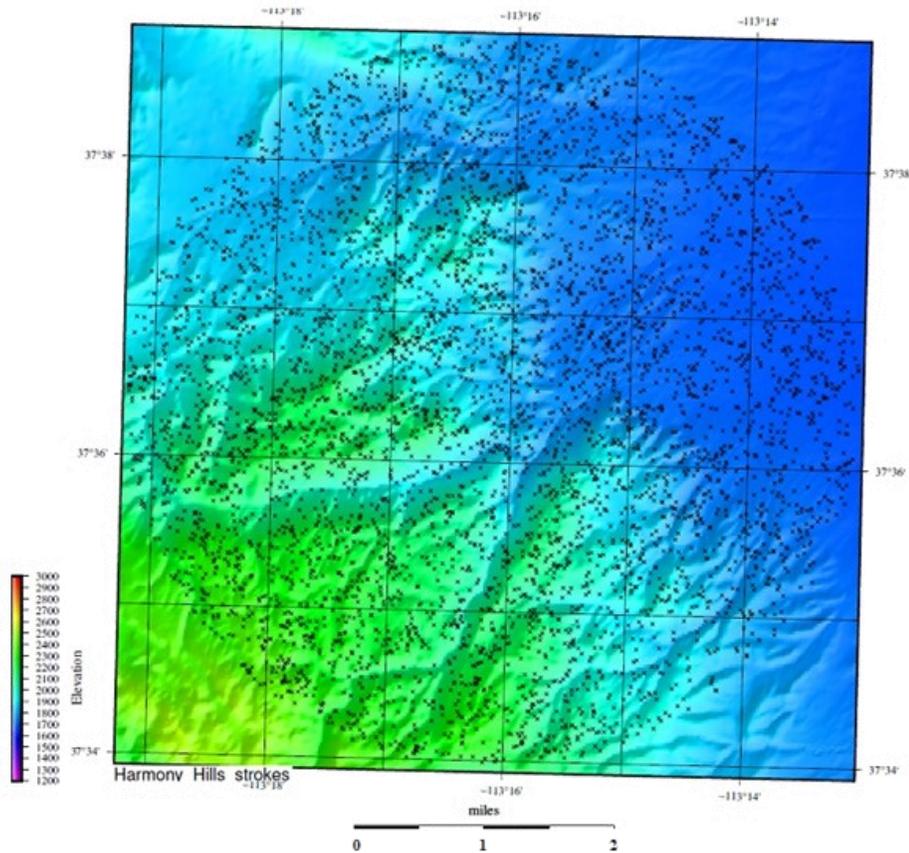
Site Information
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Site Name: (C-36-21)10bdc-1
Site Type: Spring
Agency: USEPA
[Access Data](#)

Lightning Strike Locations in Areas



Strikes Shirts Canyon

Strikes Harmony Hills



Before Data Cleaning Summaries

Parameter	Minimum	Maximum
Date	1998-03-18	2022-03-01
Time	0:00:00.000	23:59:59.000
Latitude	37.5665	37.6528
Longitude	-113.3205	-113.0376
Peak Current	-152.0	257.1
Chi	0.0	15.0
Semimajor Axis	0.1	34.8
Semiminor Axis	0.1	1.1
Rise Time	0.0	51.2
Peak to Zero Time	0.0	112.0
Number of Sensors	2	40
Number of strokes	5386	
Elapsed time	24.0 years	

Harmony Hills

Parameter	Minimum	Maximum
Date	1998-03-18	2022-03-31
Time	0:00:00.000	23:59:59.000
Latitude	37.5723	37.6873
Longitude	-113.1172	-112.9717
Peak Current	-209.5	299.4
Chi-squared	0.0	15.0
Semimajor Axis	0.1	38.7
Semiminor Axis	0.1	1.0
Rise Time	0.0	51.2
Peak to Zero Time	0.0	123.2
Number of Sensors	2	39
Number of strokes	11364	
Elapsed time	24.04 years	

Shirts Canyon

Table 5: Data limits for collected data. Note that the dataset runs from March 1998 to March 2022, or 24.04 years.

After Data Cleaning Summaries

Parameter	Minimum	Maximum
Date	1998-03-18	2022-03-31
Time	0:00:00.000	23:59:59.000
Latitude	33.2666	33.3334
Longitude	-111.1	-111.0333
Peak Current	-174.4	131.4
Chi	0.1	8.9
Semimajor Axis	0.2	4.8
Semiminor Axis	0.2	0.7
Rise Time	0.6	18.0
Peak to Zero Time	4.0	47.2
Number of Sensors	3	25
Number of strokes	5265 (97.8% of raw data)	
No. strokes, RT limited	5118 (95% of raw data)	
No. strokes, PZ limited	4120 (76.5% of raw data)	
Elapsed time	24.03 years	

Harmony Hills

Parameter	Minimum	Maximum
Date	1998-03-18	2022-03-31
Time	0:00:00.000	23:59:59.000
Latitude	37.5723	37.6873
Longitude	-113.1172	-112.9717
Peak Current	-209.5	299.4
Chi	0.1	9.0
Semimajor Axis	0.1	2.0
Semiminor Axis	0.1	0.5
Rise Time	1.0	22.0
Peak to Zero Time	3.0	93.4
Number of Sensors	3	39
Number of strokes	10790	
No. strokes, RT limited	10410	
No. strokes, PZ limited	8589	
Elapsed time	24.04 years	

Shirts Canyon

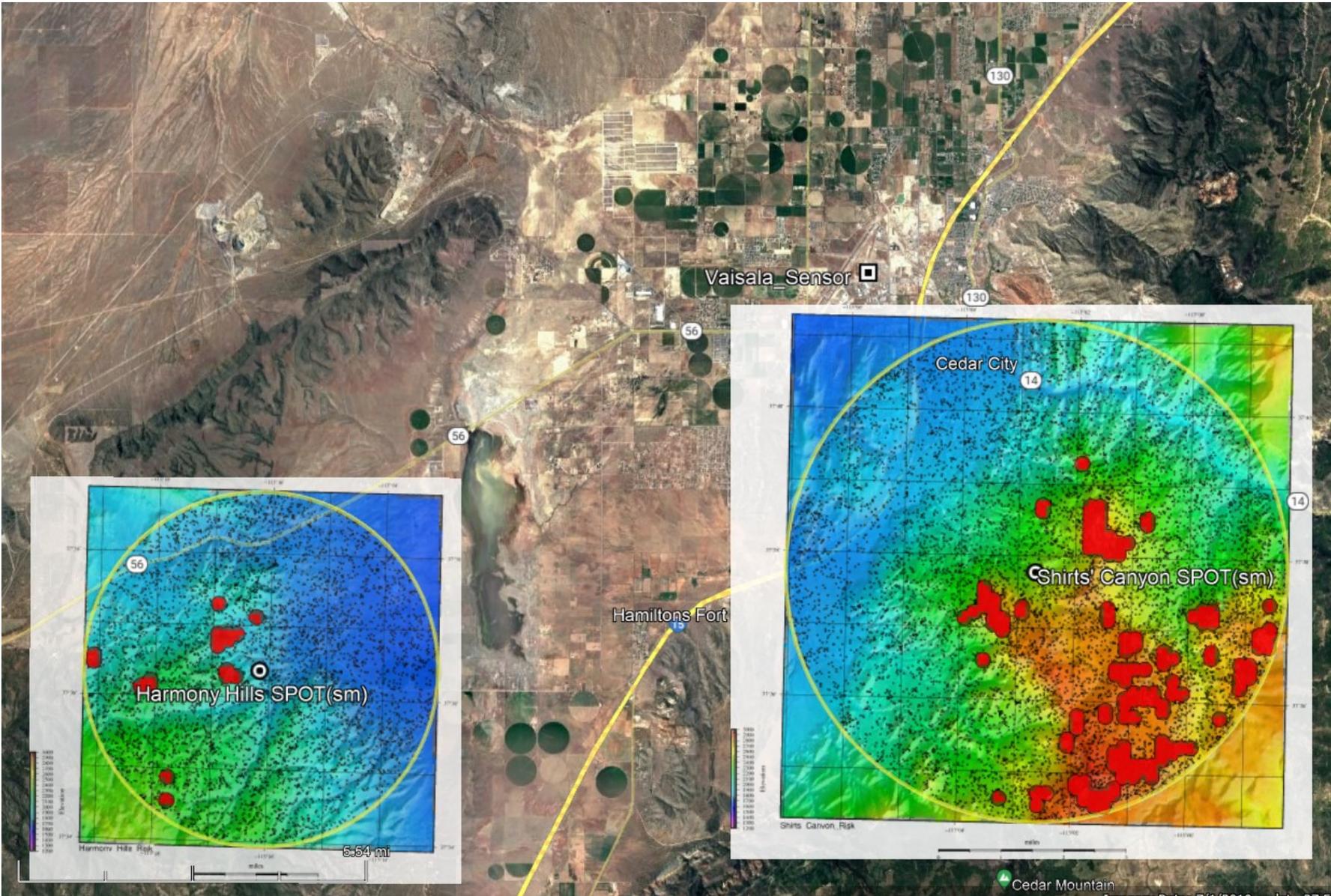
Table 6: Data limits for cleaned data. Note that the dataset runs from March 1998 to March 2022, or 24.04 years.

Risk Points: Harmony Hills & Shirts Canyon

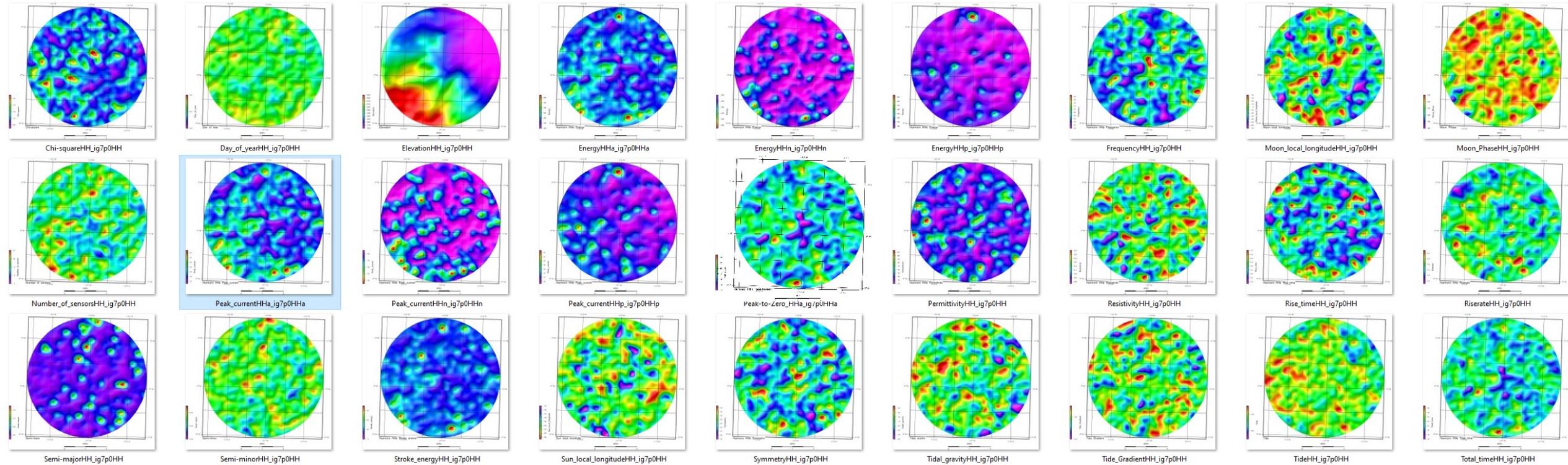


Showing:

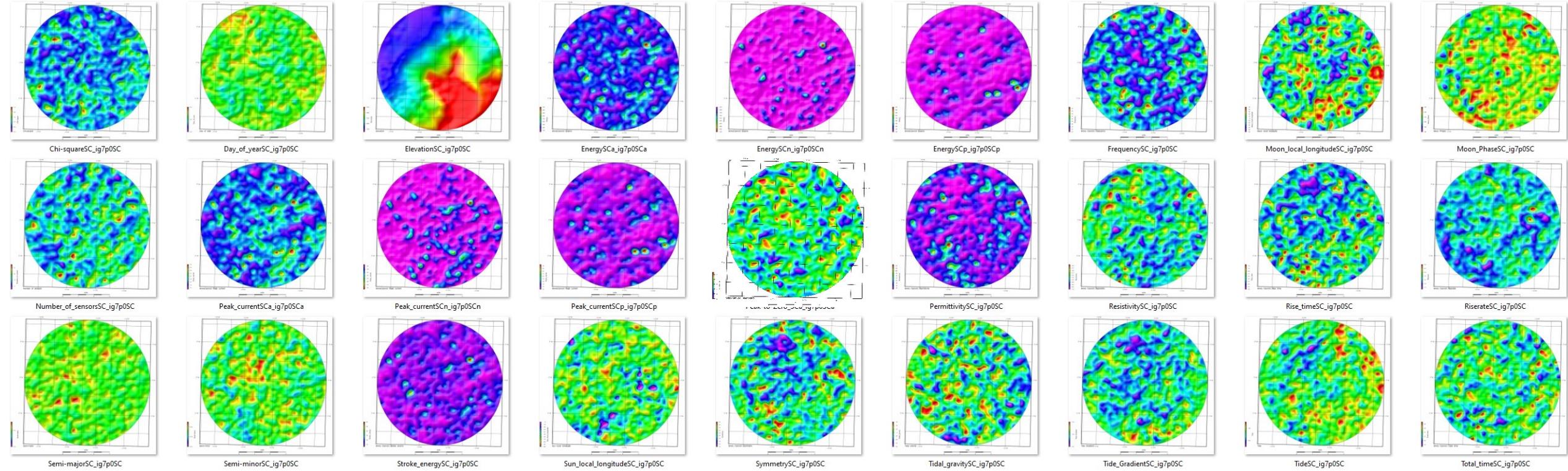
- Locations above 1.1 lightning strikes per year
- Elevation has a larger impact than expected for both Harmony Hills and Shirts Canyon.



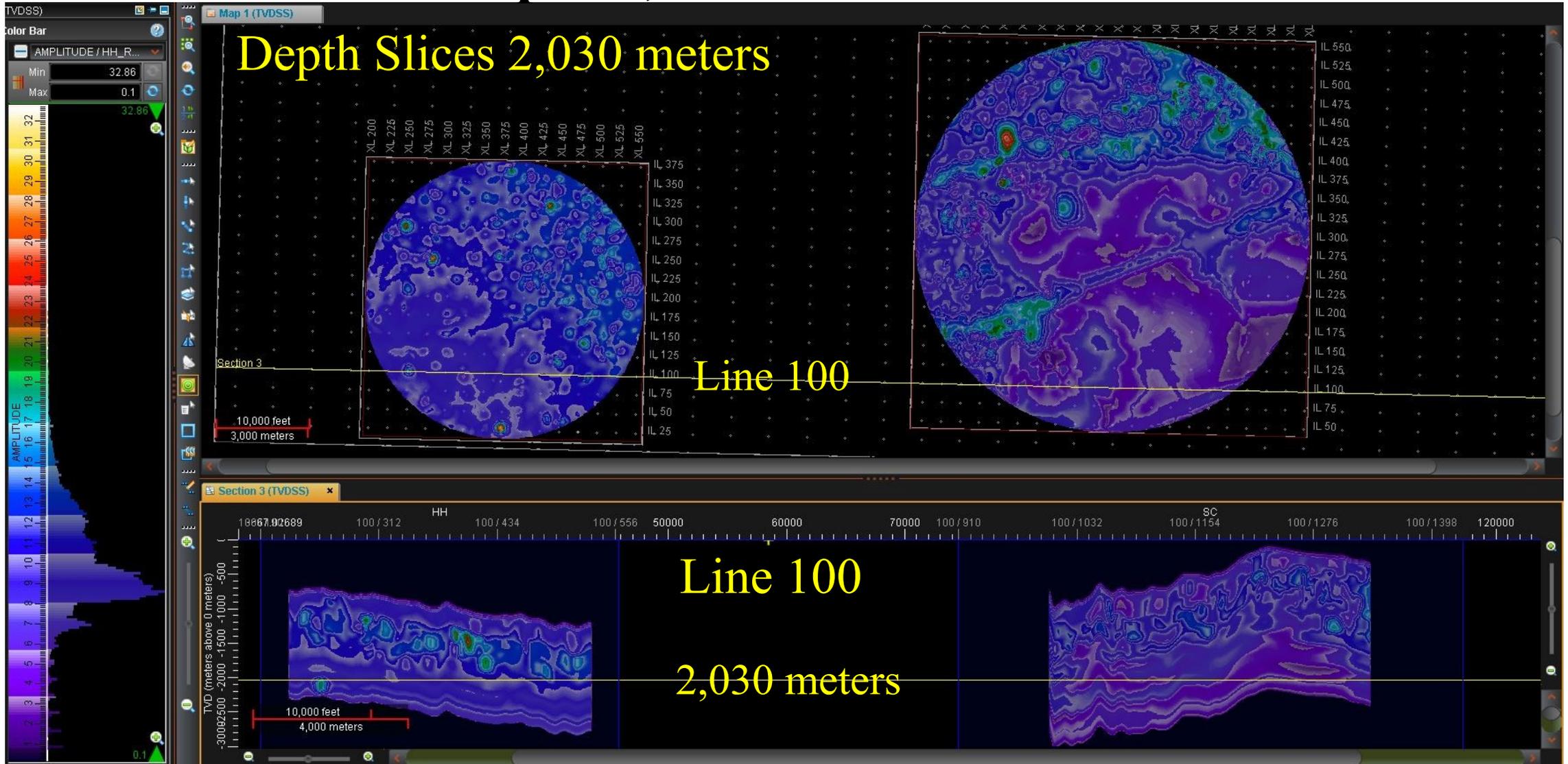
Lightning Attribute Maps Harmony Hills



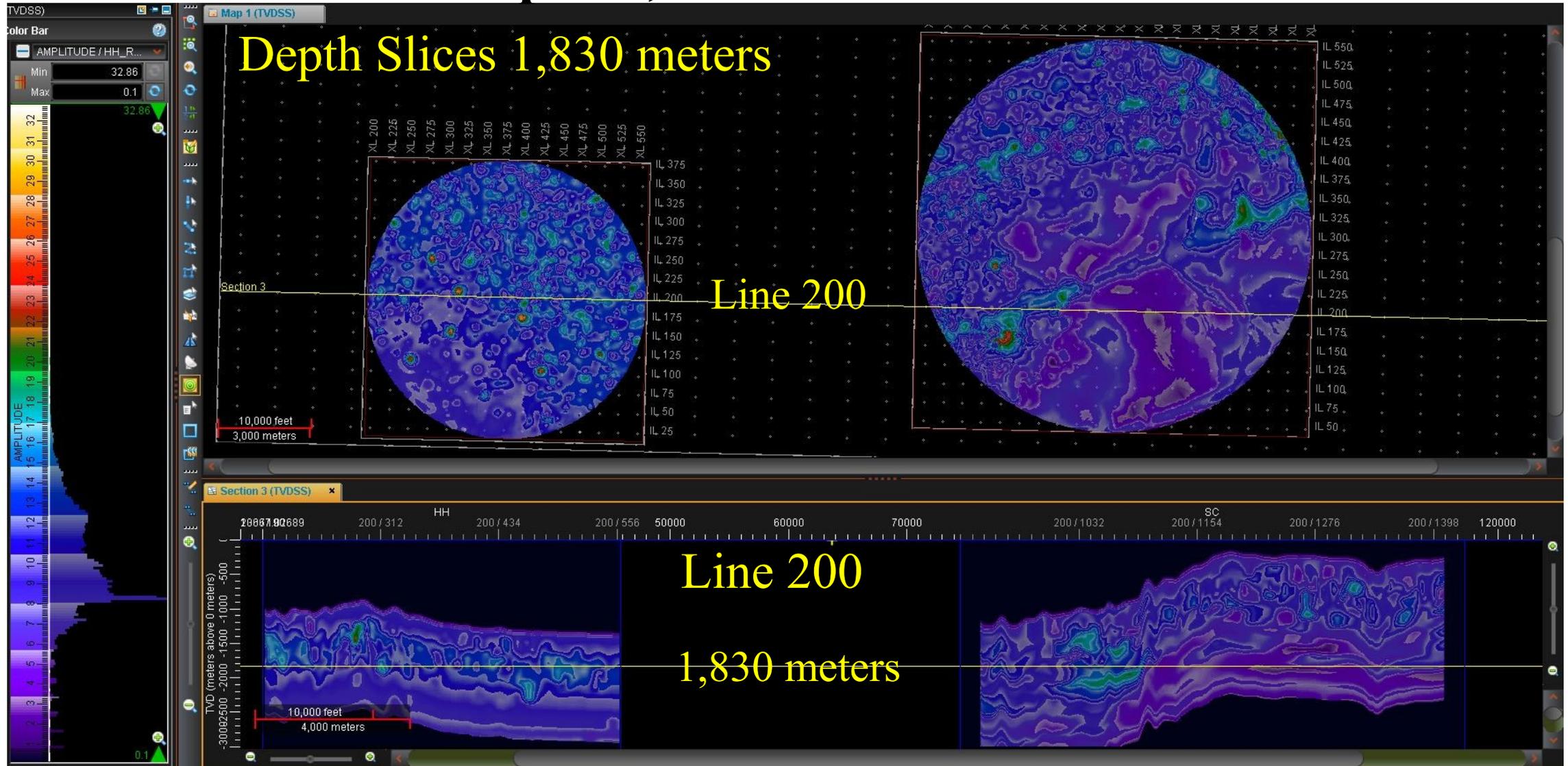
Lightning Attribute Maps Shirts Canyon



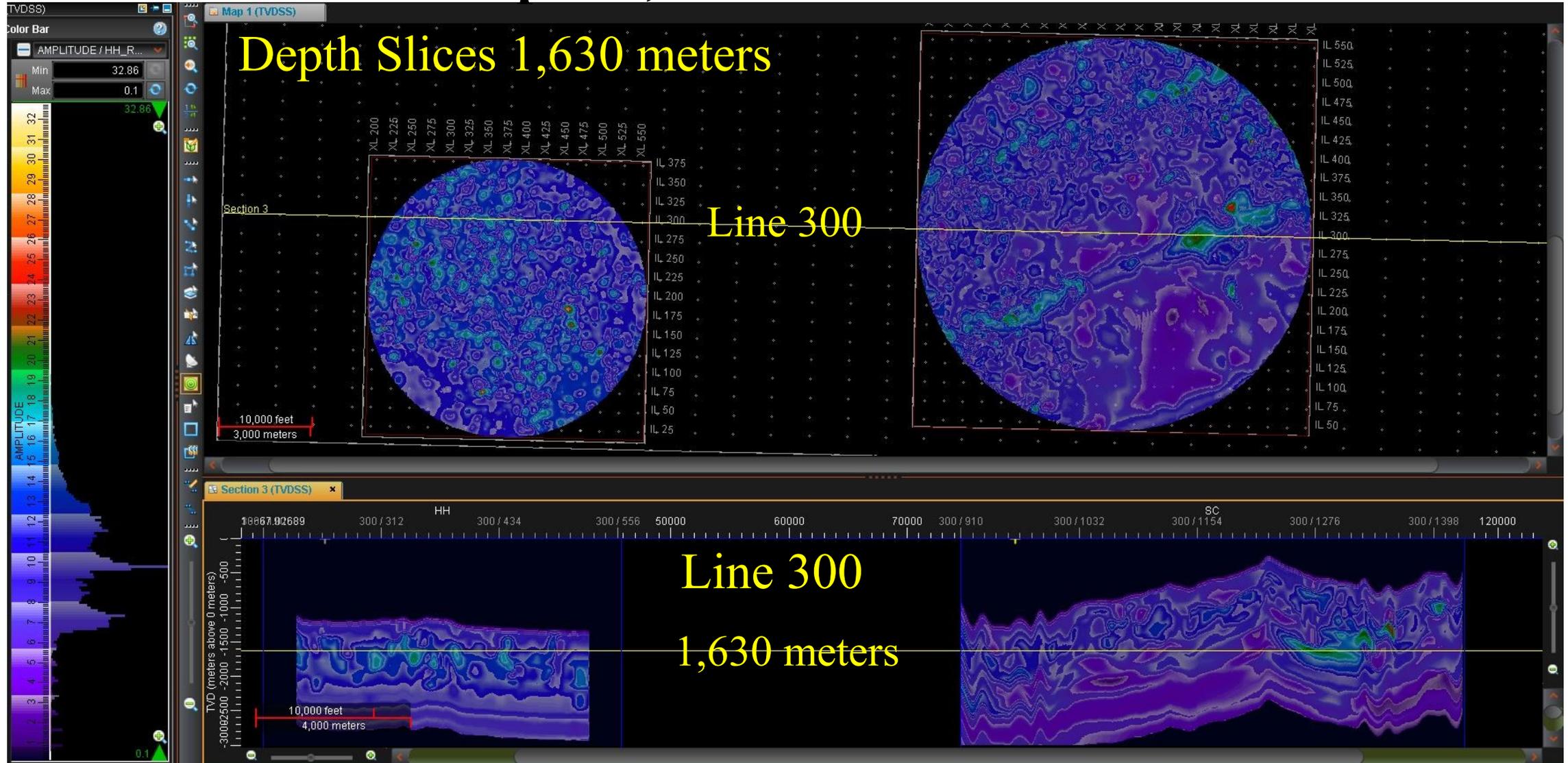
Lightning Apparent Resistivity Volume Line 100 Depth 2,030 meters



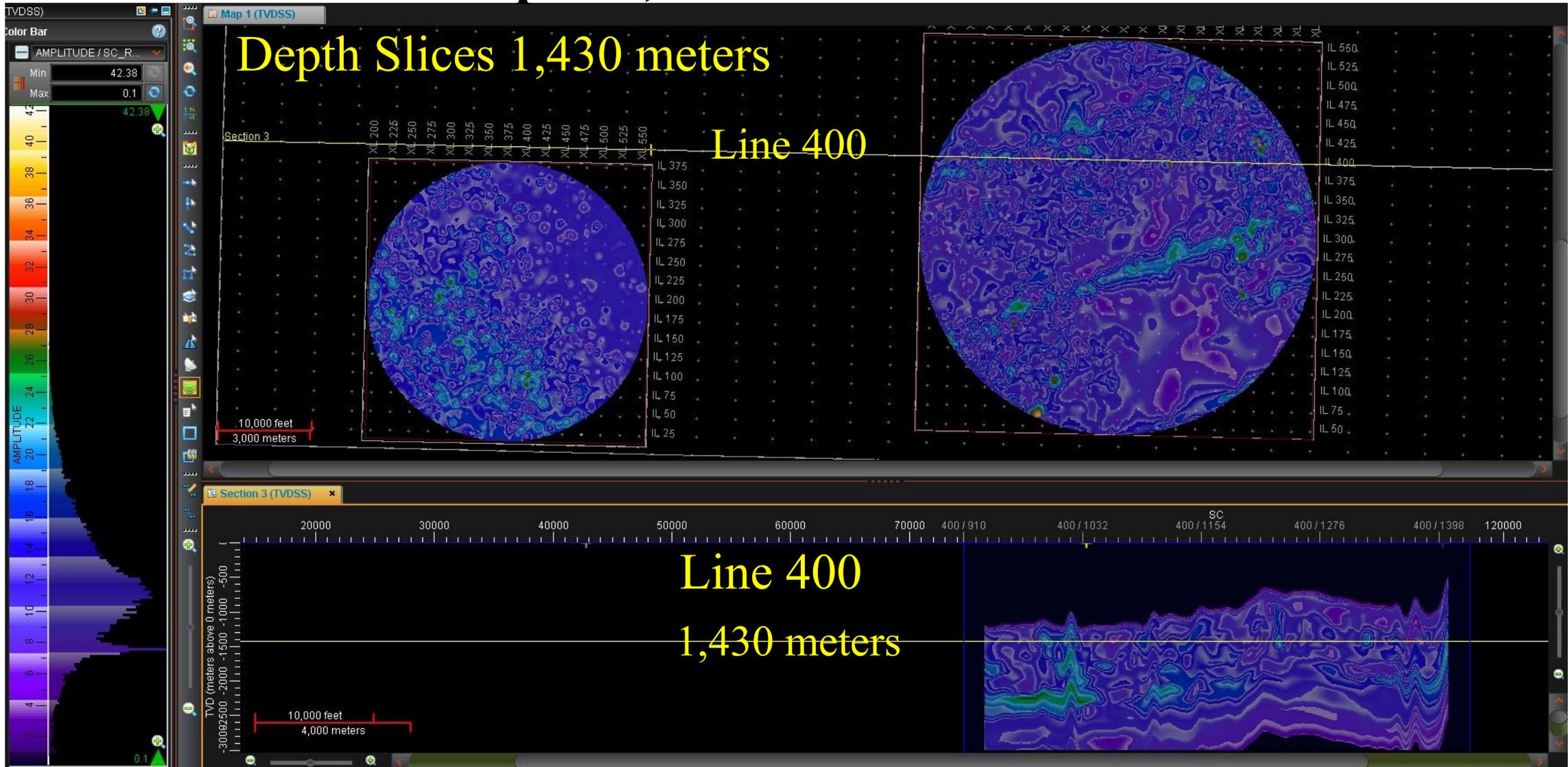
Lightning Apparent Resistivity Volume Line 200 Depth 1,830 meters



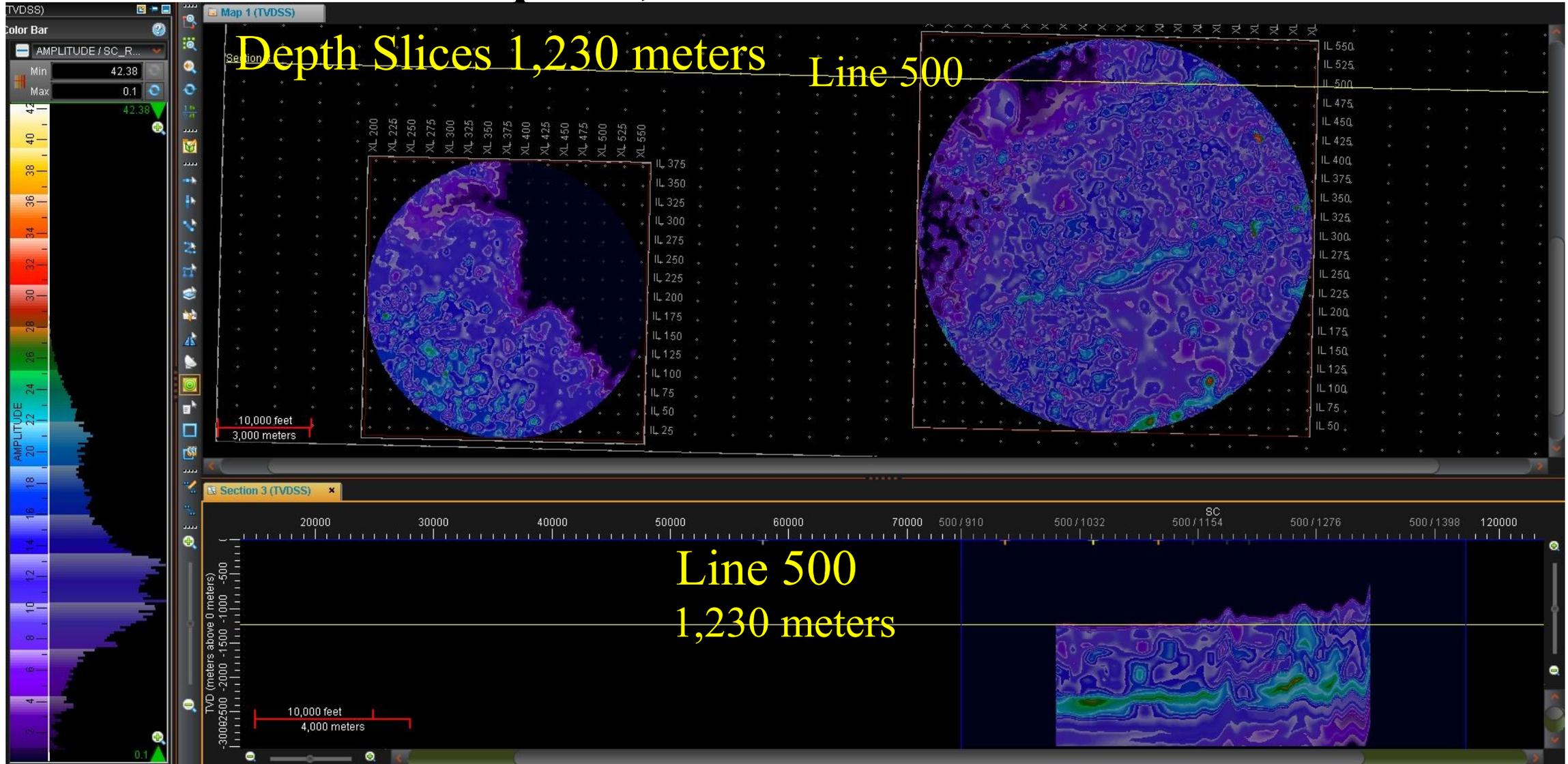
Lightning Apparent Resistivity Volume Line 300 Depth 1,630 meters



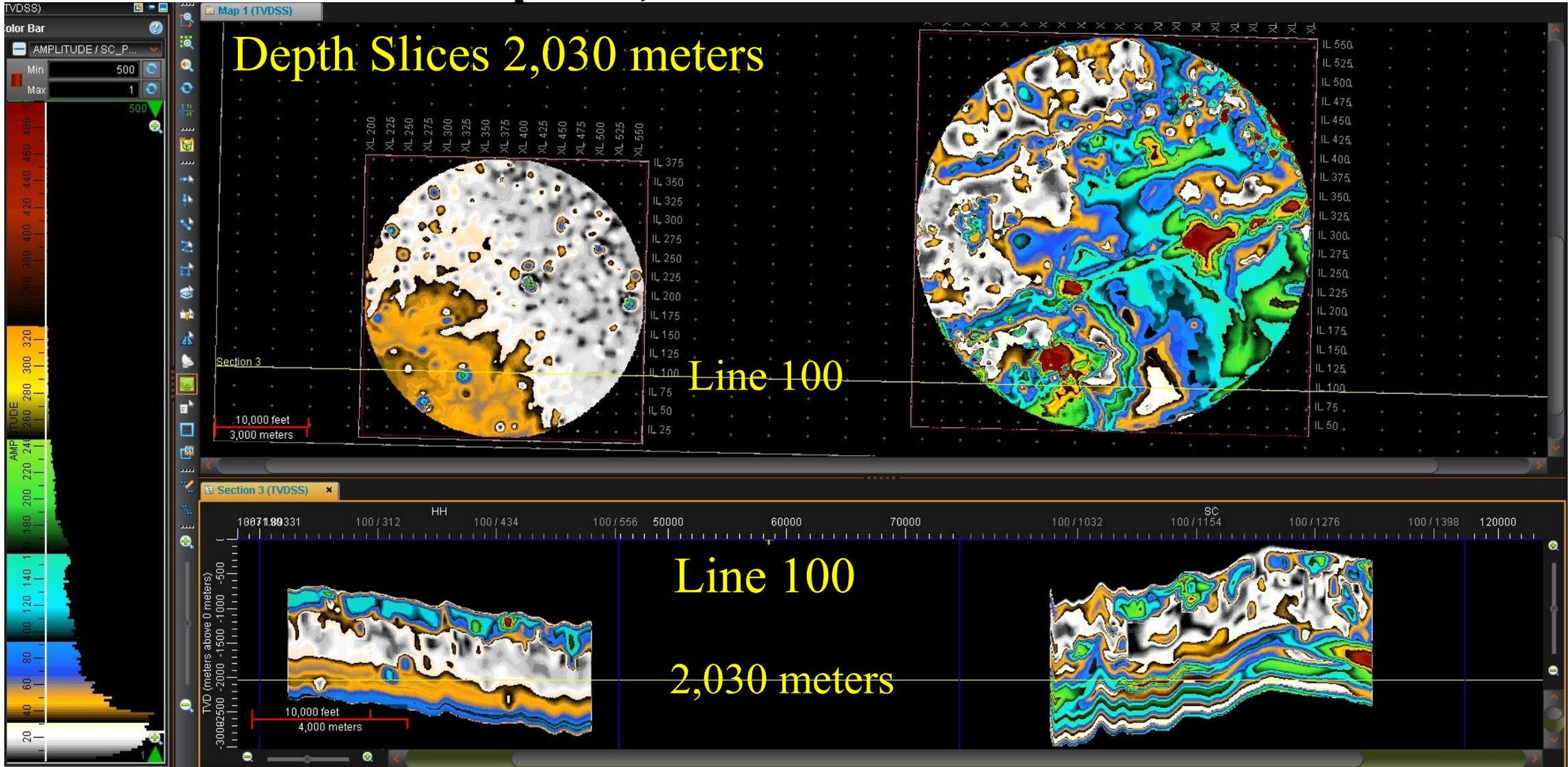
Lightning Apparent Resistivity Volume Line 400 Depth 1,430 meters



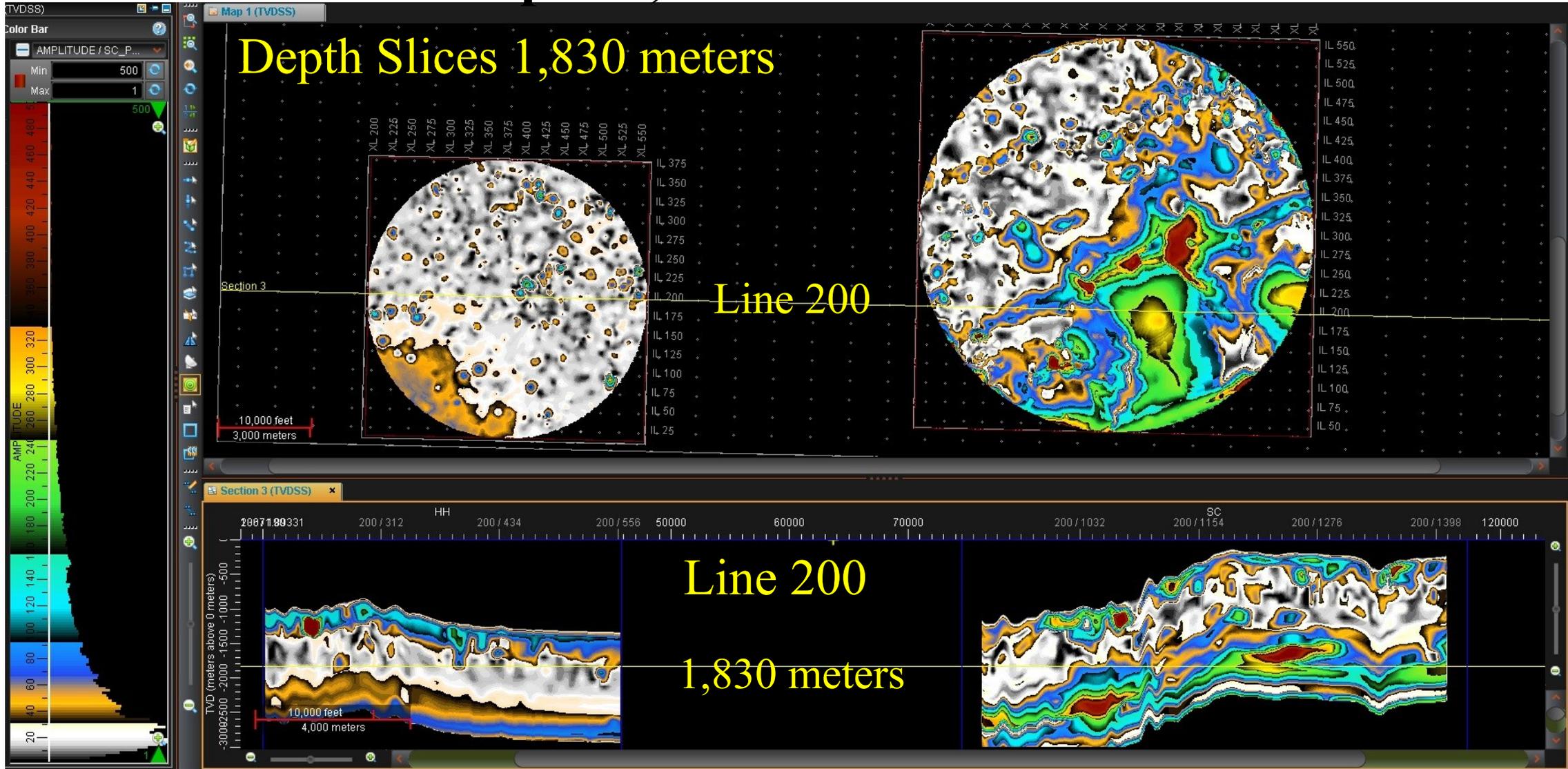
Lightning Apparent Resistivity Volume Line 500 Depth 1,230 meters



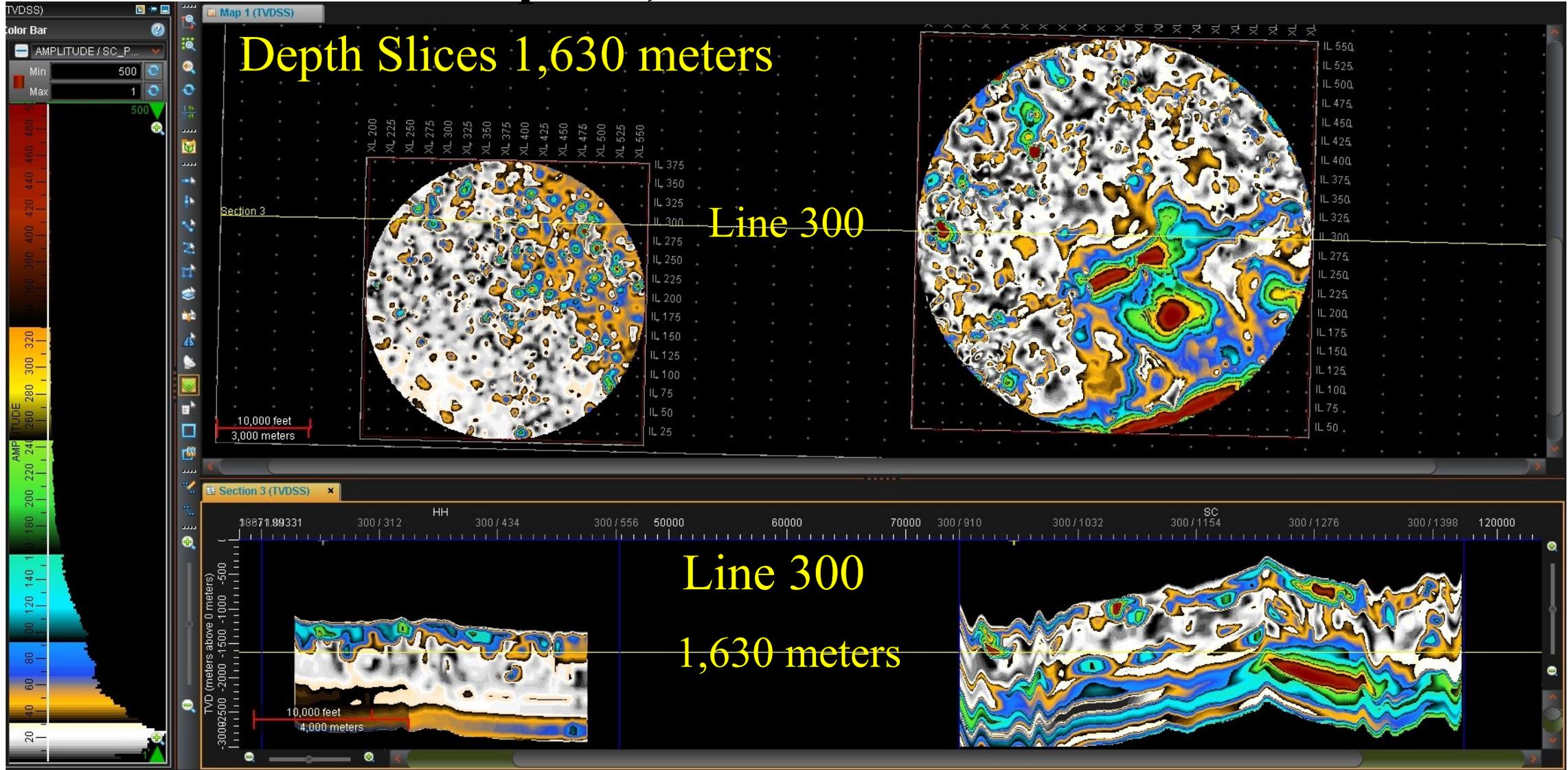
Lightning Apparent Permittivity Volume Line 100 Depth 2,030 meters



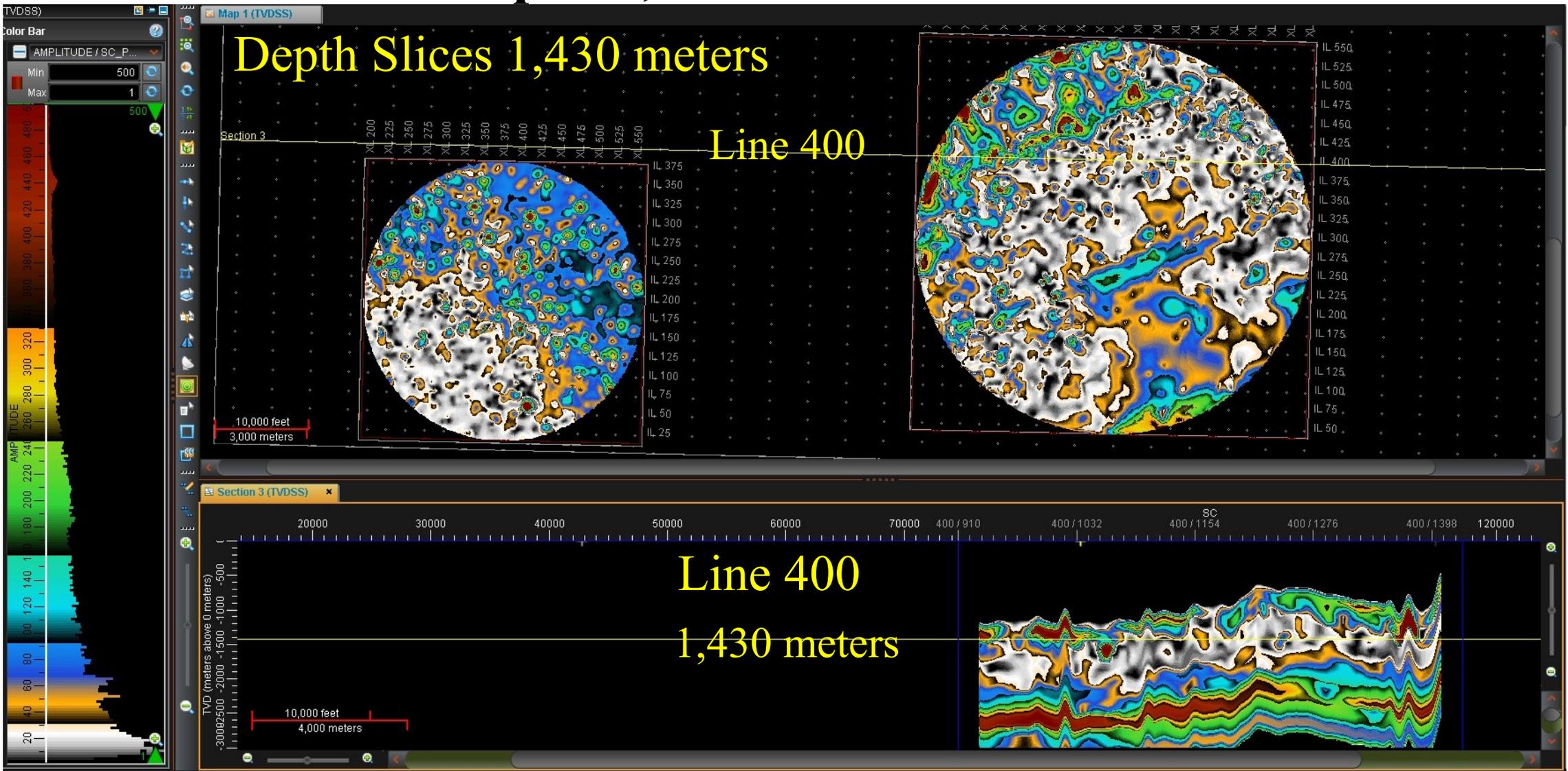
Lightning Apparent Permittivity Volume Line 200 Depth 1,830 meters



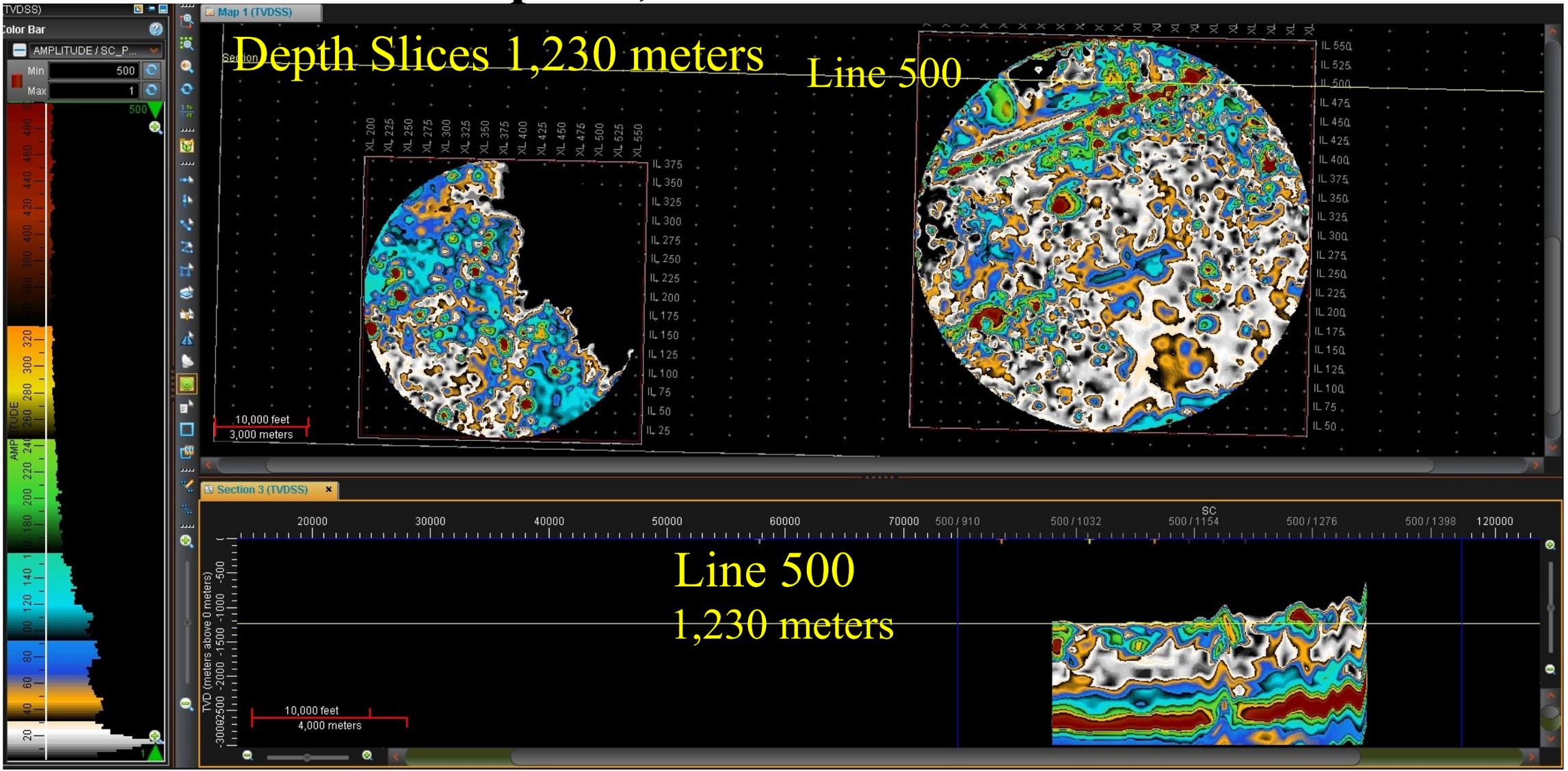
Lightning Apparent Permittivity Volume Line 300 Depth 1,630 meters



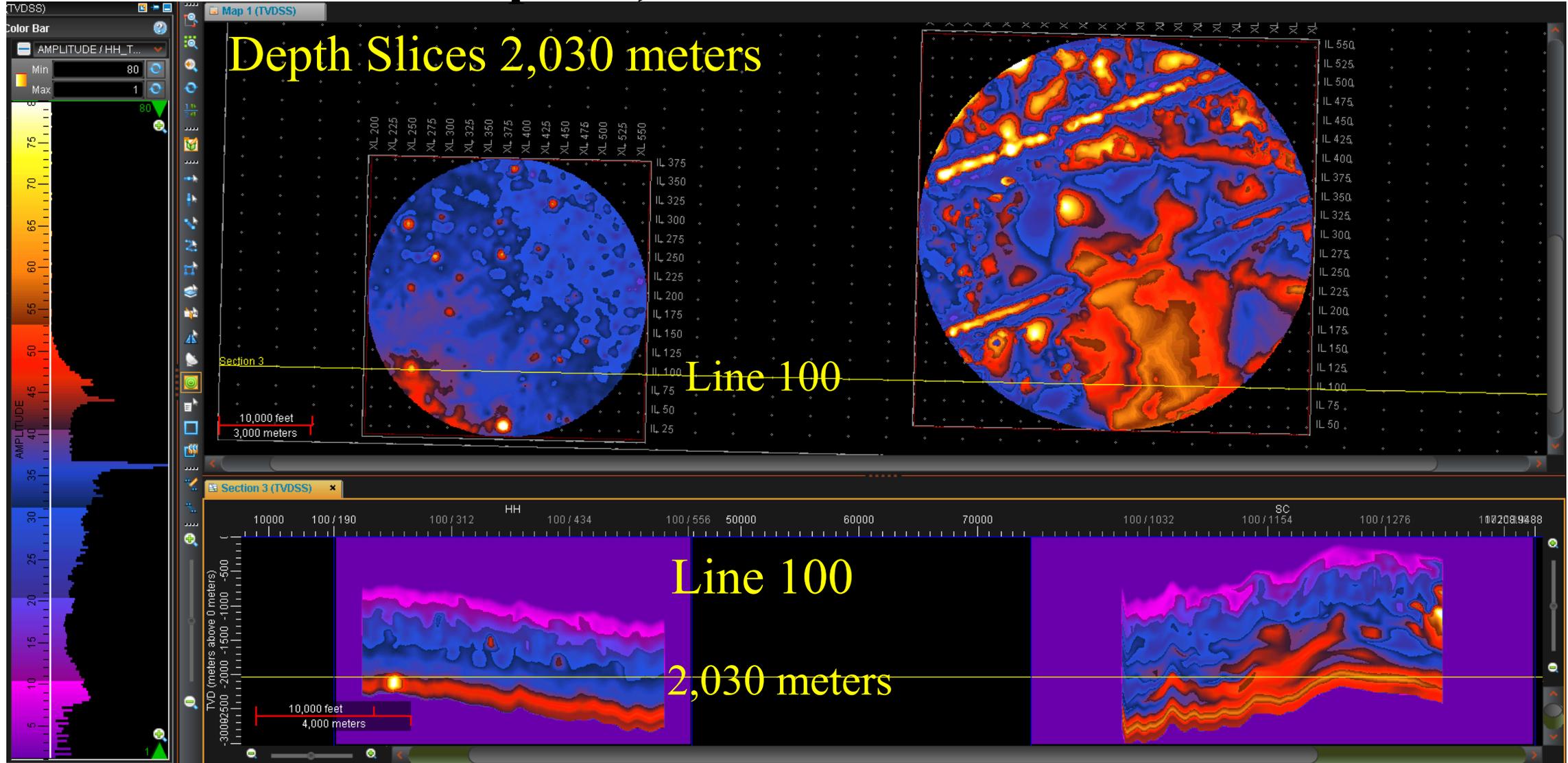
Lightning Apparent Permittivity Volume Line 400 Depth 1,430 meters



Lightning Apparent Permittivity Volume Line 500 Depth 1,230 meters

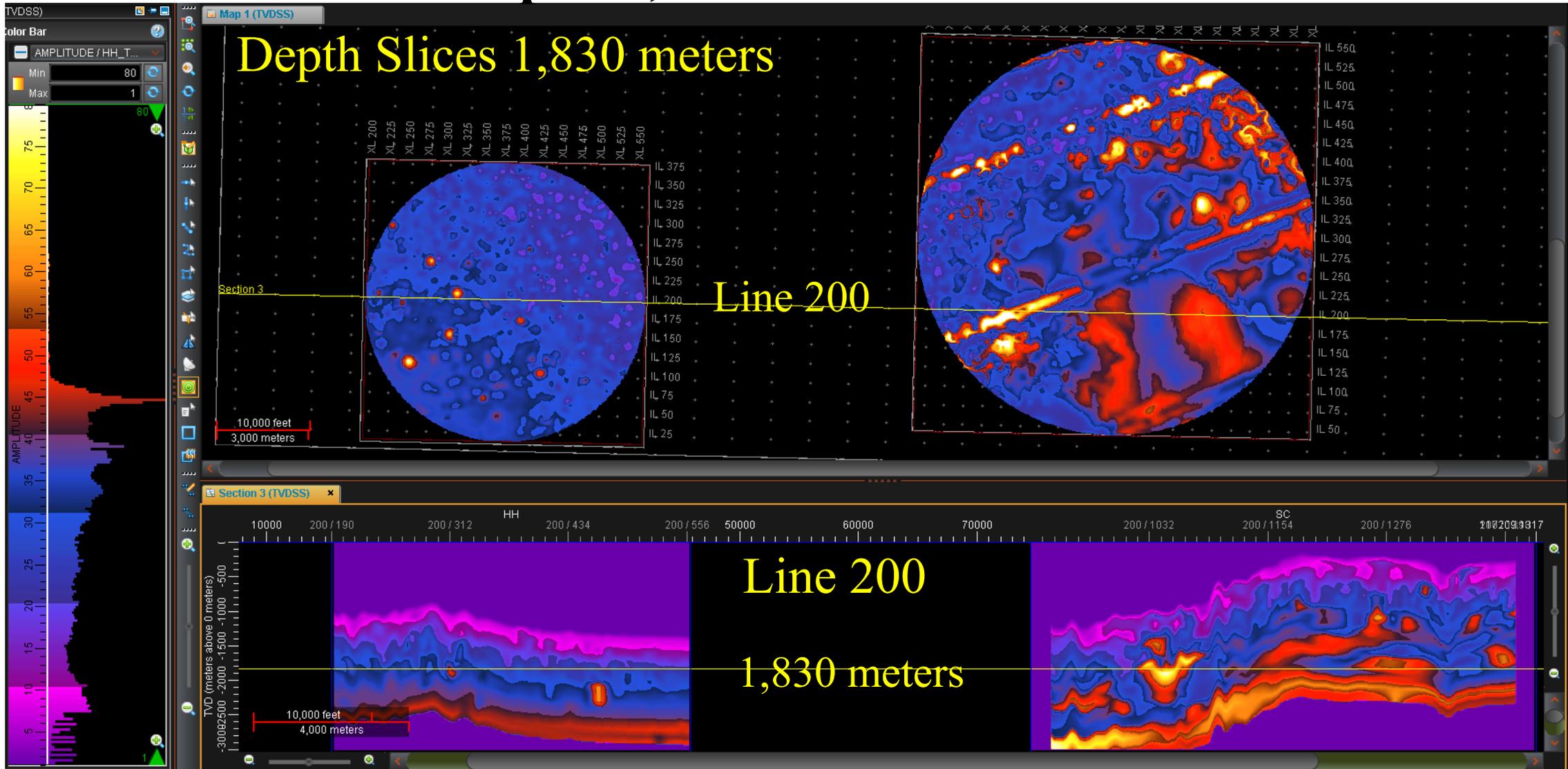


Lightning Total Wavelet Time Volume Line 100 Depth 2,030 meters

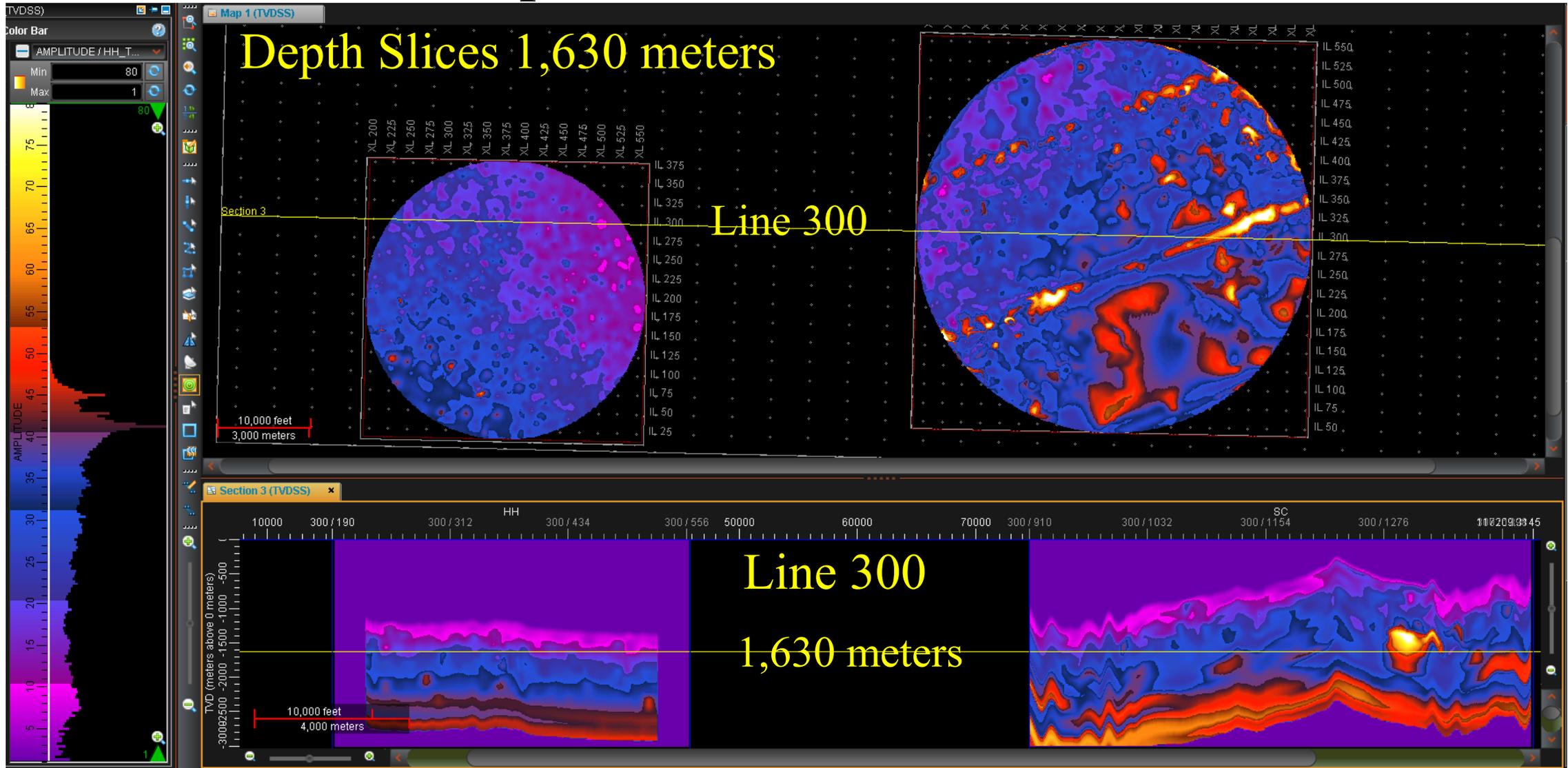


Lightning Total Wavelet Time Volume

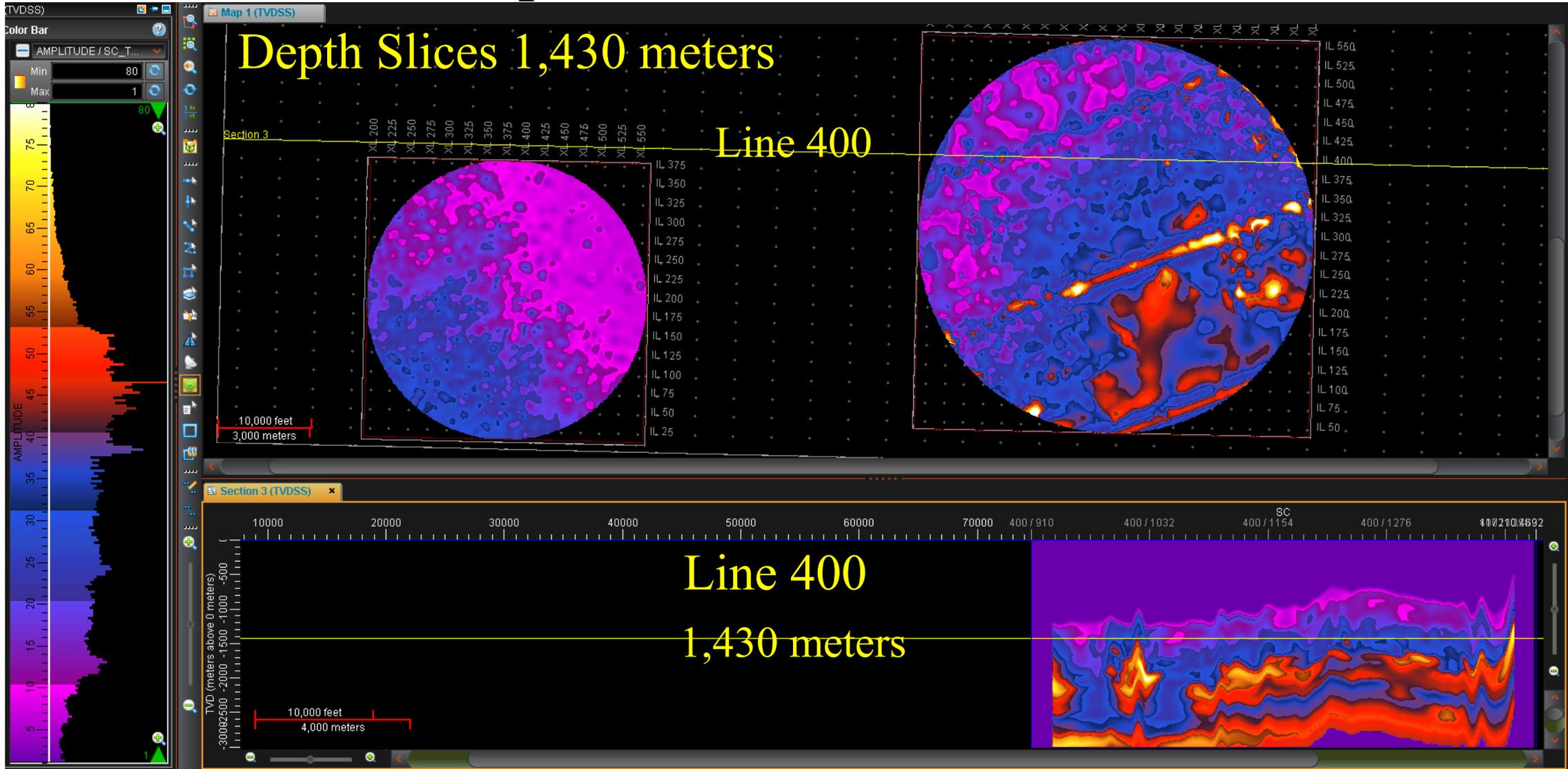
Line 200 Depth 1,830 meters



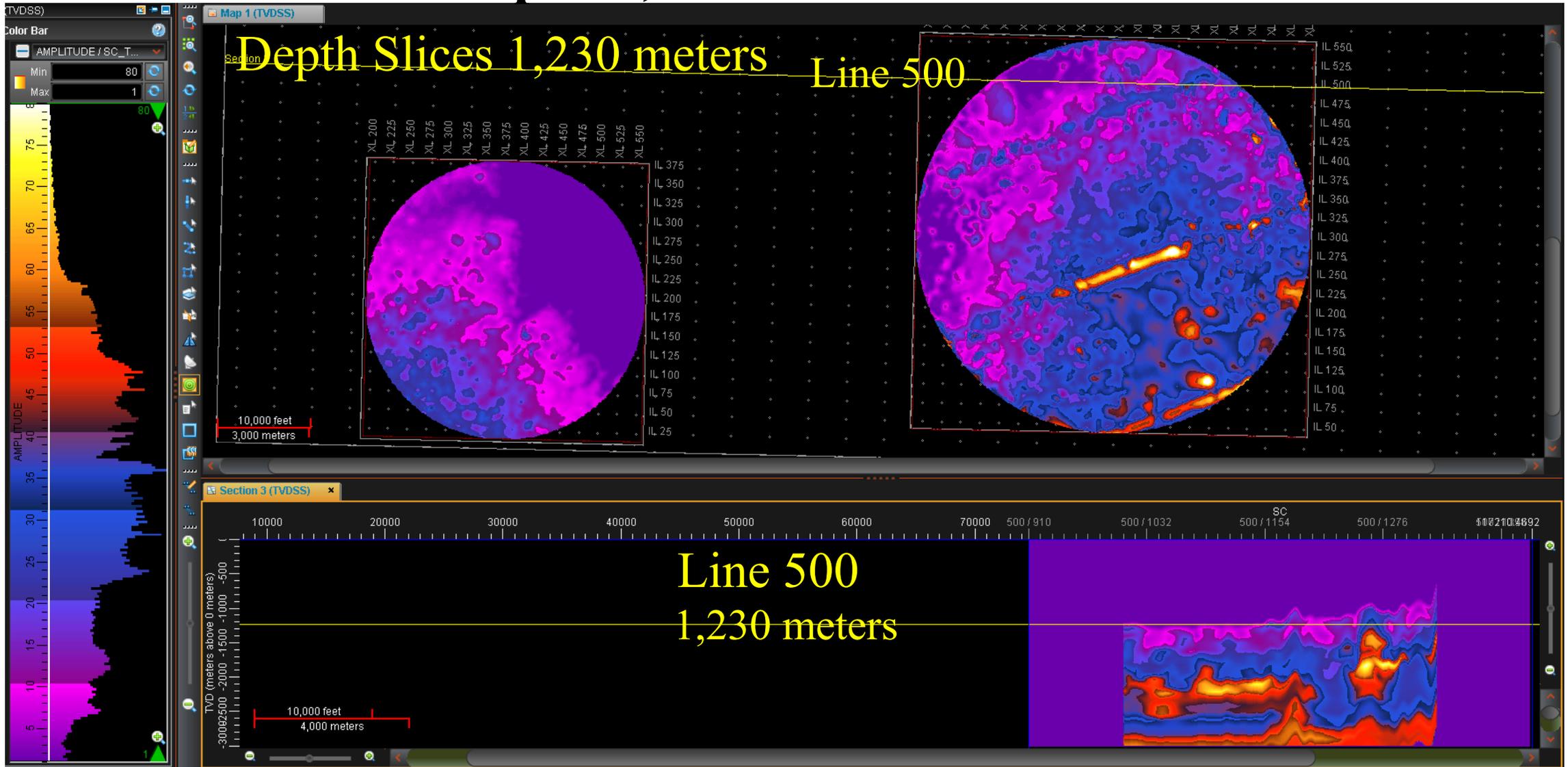
Lightning Total Wavelet Time Volume Line 300 Depth 1,630 meters



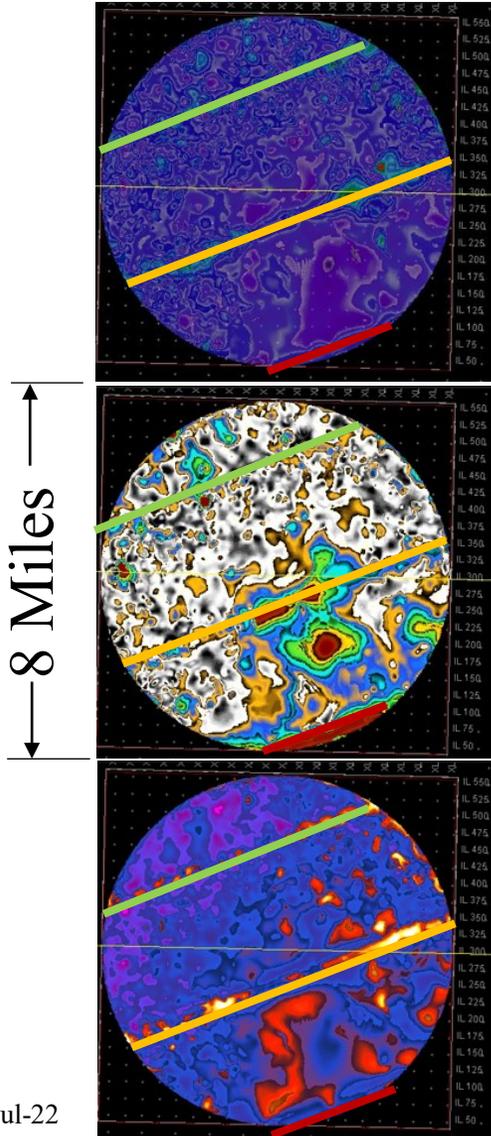
Lightning Total Wavelet Time Volume Line 400 Depth 1,430 meters



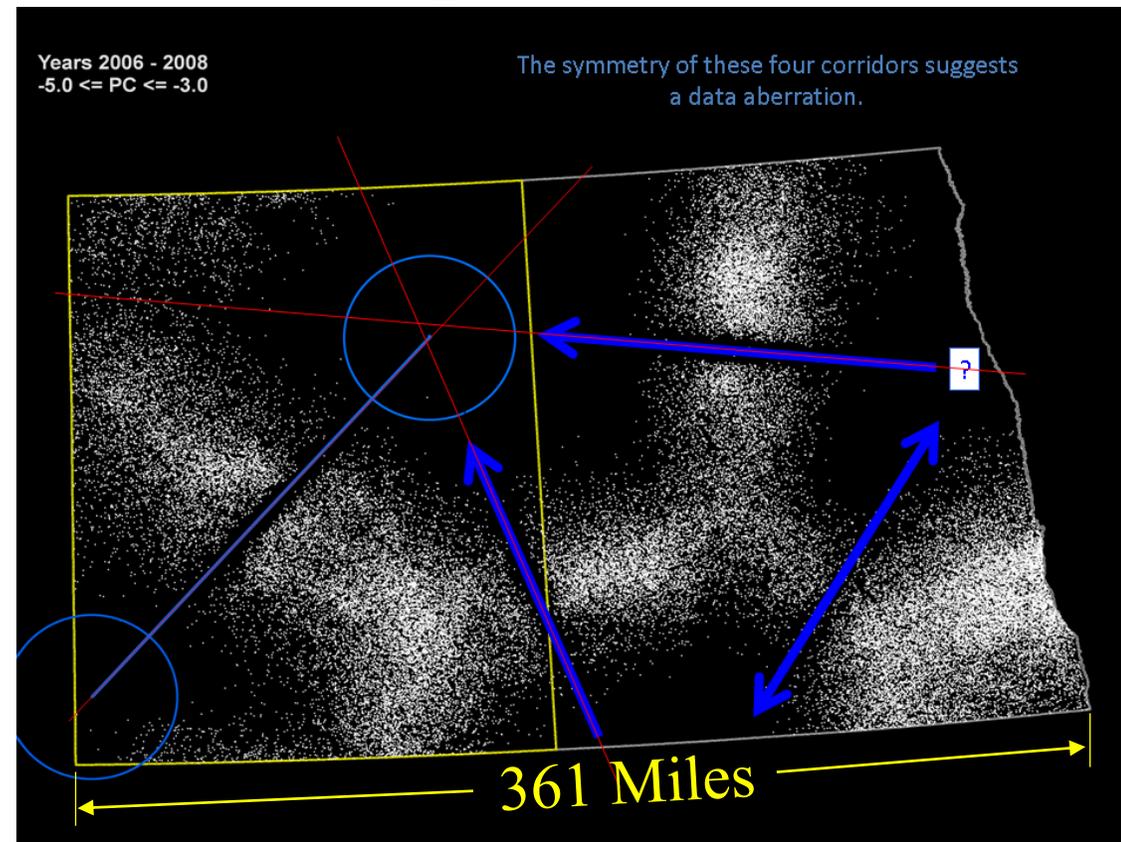
Lightning Total Wavelet Time Volume Line 500 Depth 1,230 meters



Notice Linear Anomalies in the Shirts Canyon Depth Slices



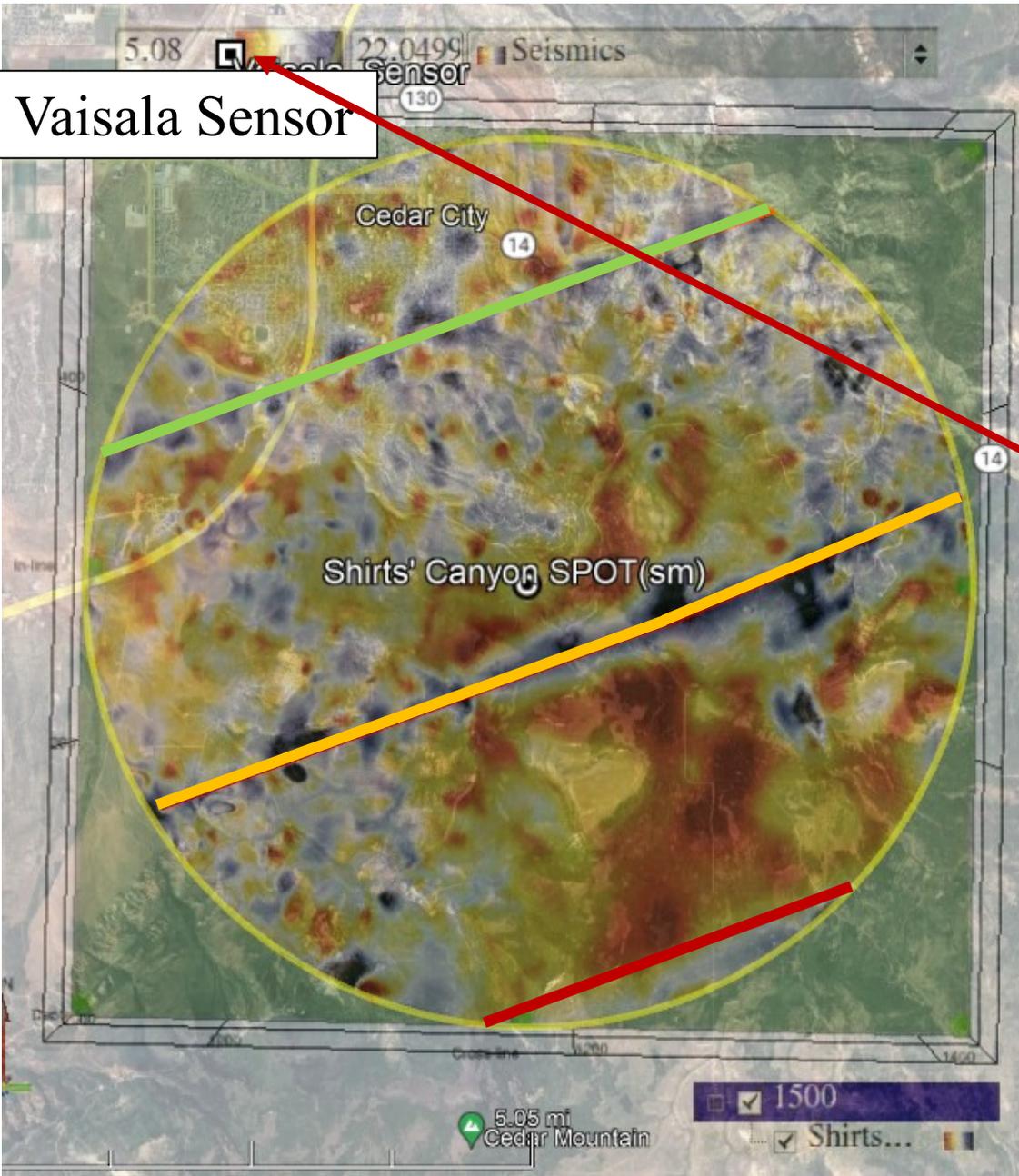
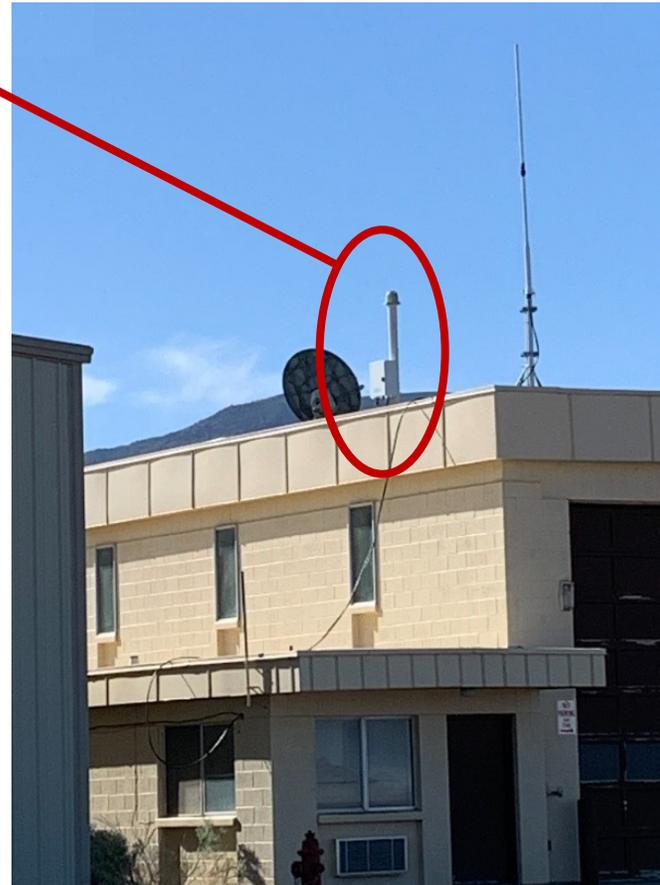
Reminded us of a Lightning Project in North Dakota, where sensor feedback reduced data quality between sensors.



Turns out there is Vaisala Lightning Sensor at the Cedar City Airport

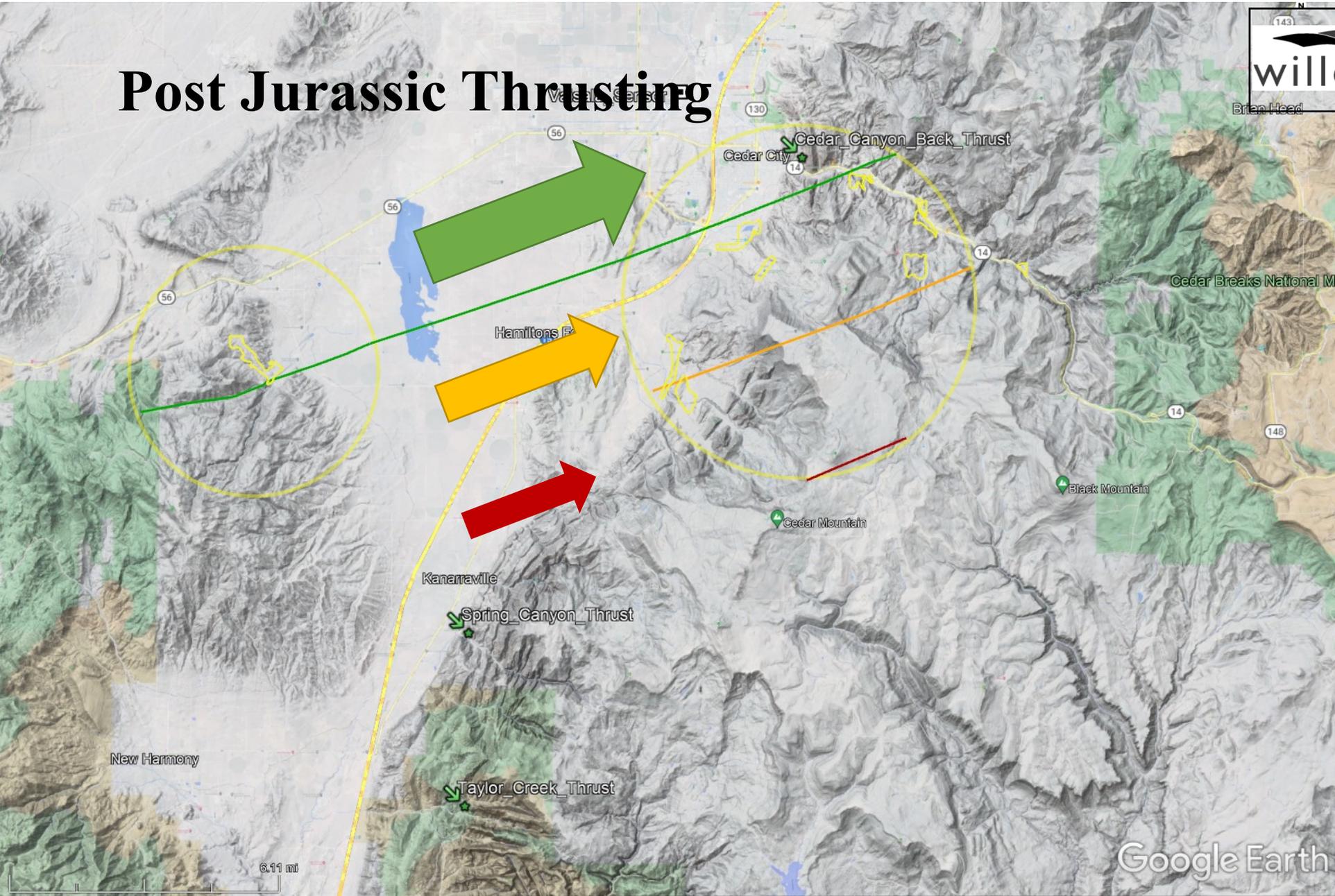
Location of Vaisala's sensor is orthogonal to the direction of the three lineaments on the Shirts Canyon Depth Slices.

Our conclusion is these anomalies map three major faults

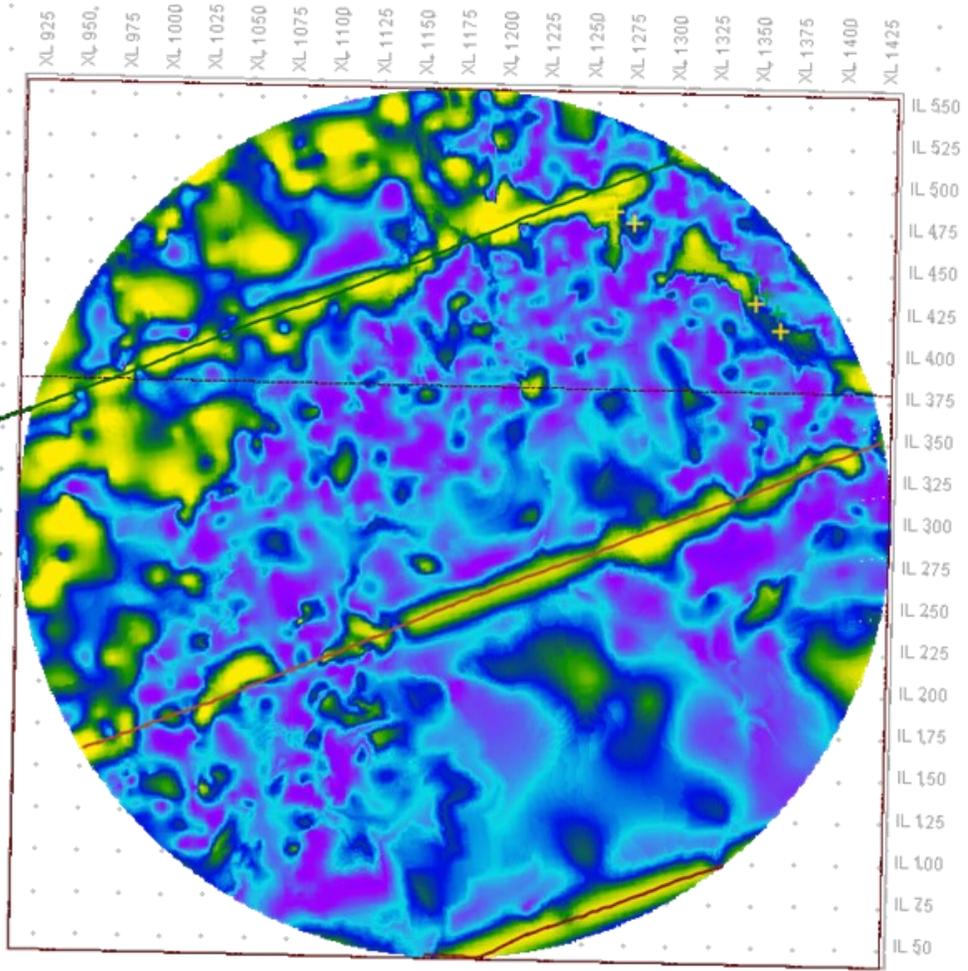
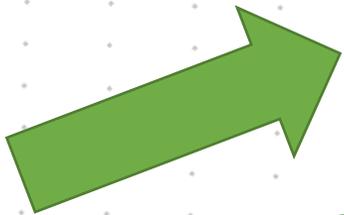
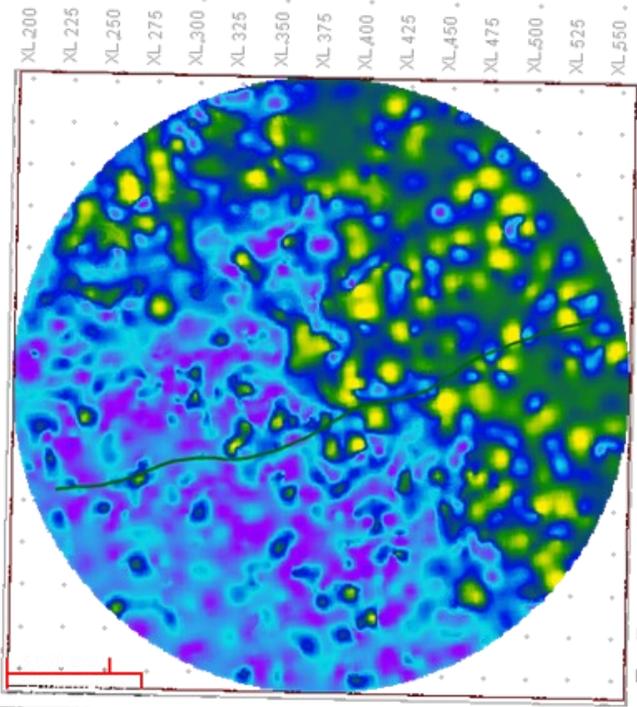
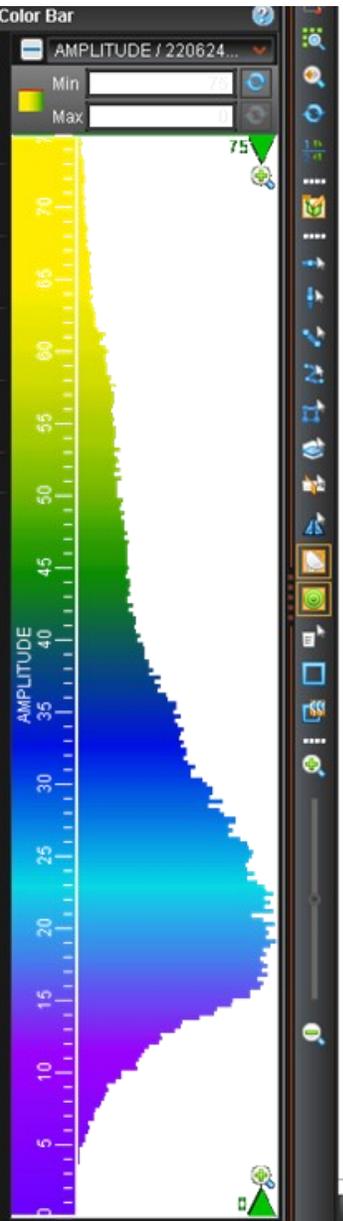


Vaisala Sensor

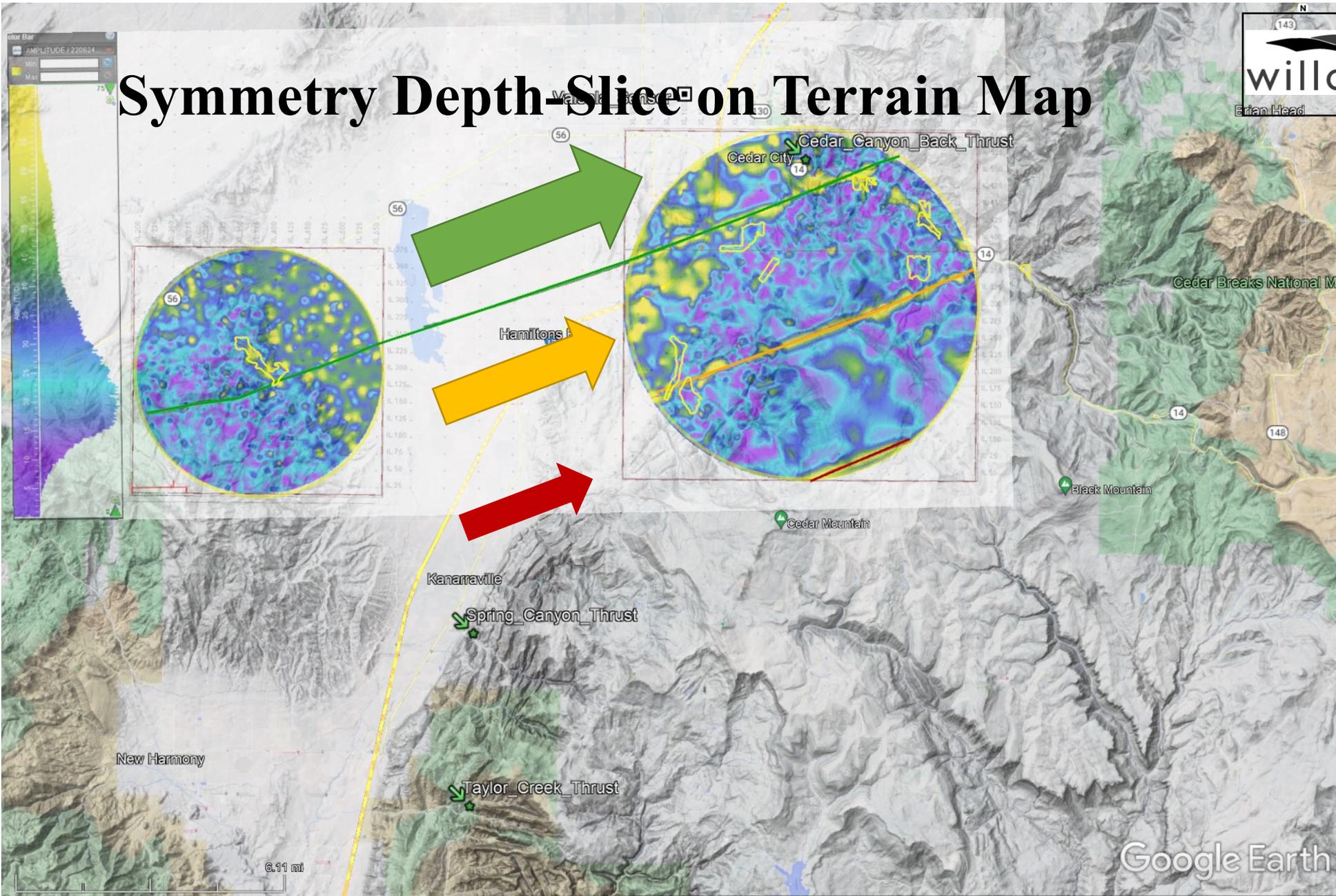
Post Jurassic Thrusting



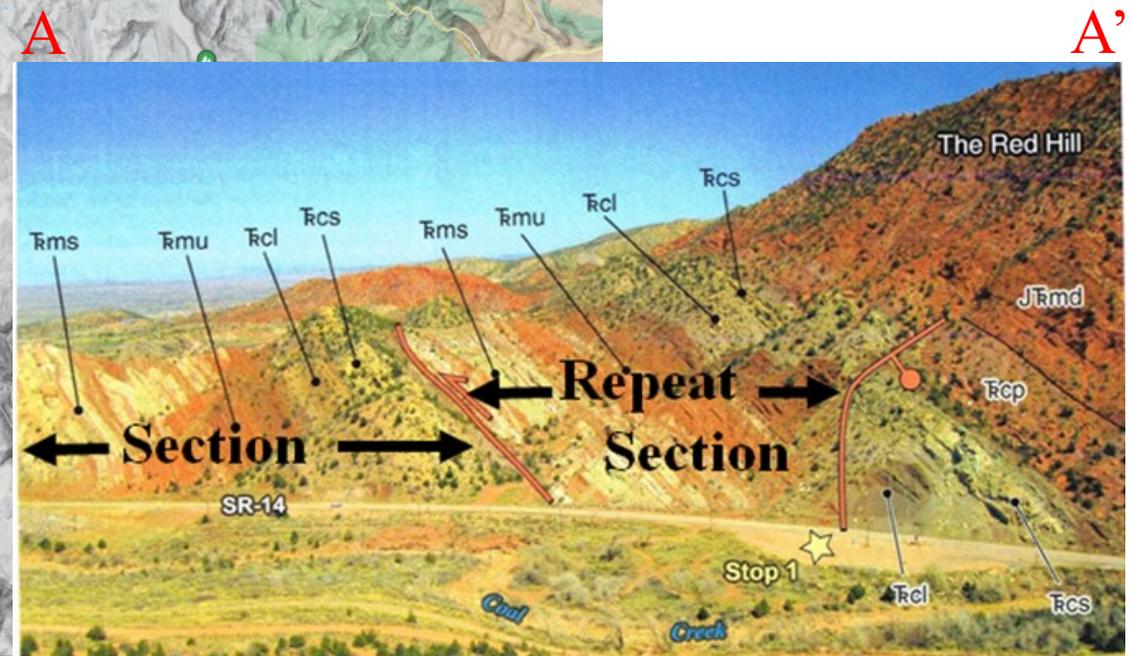
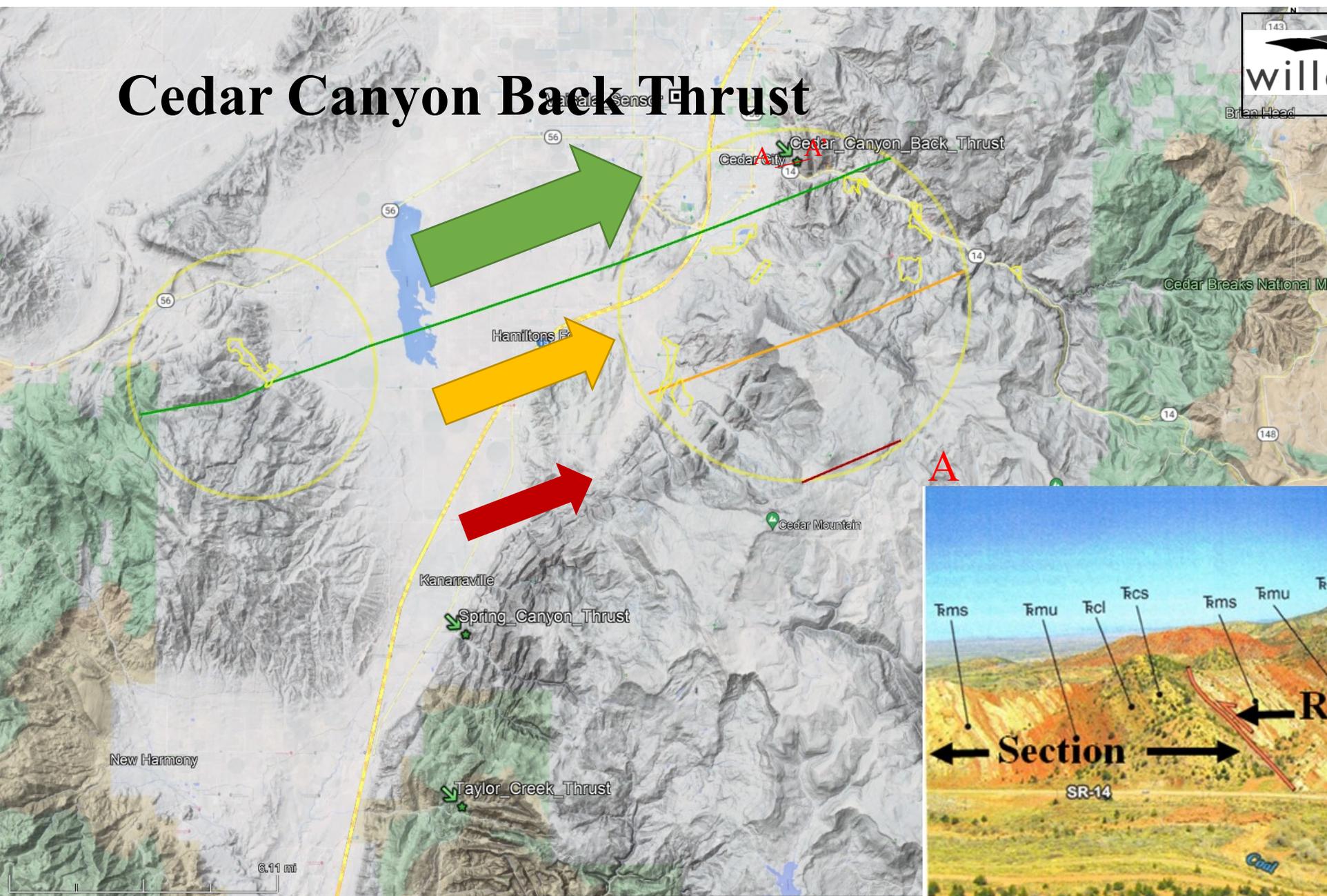
Symmetry 1500-meters Depth Slice



Symmetry Depth-Slice on Terrain Map



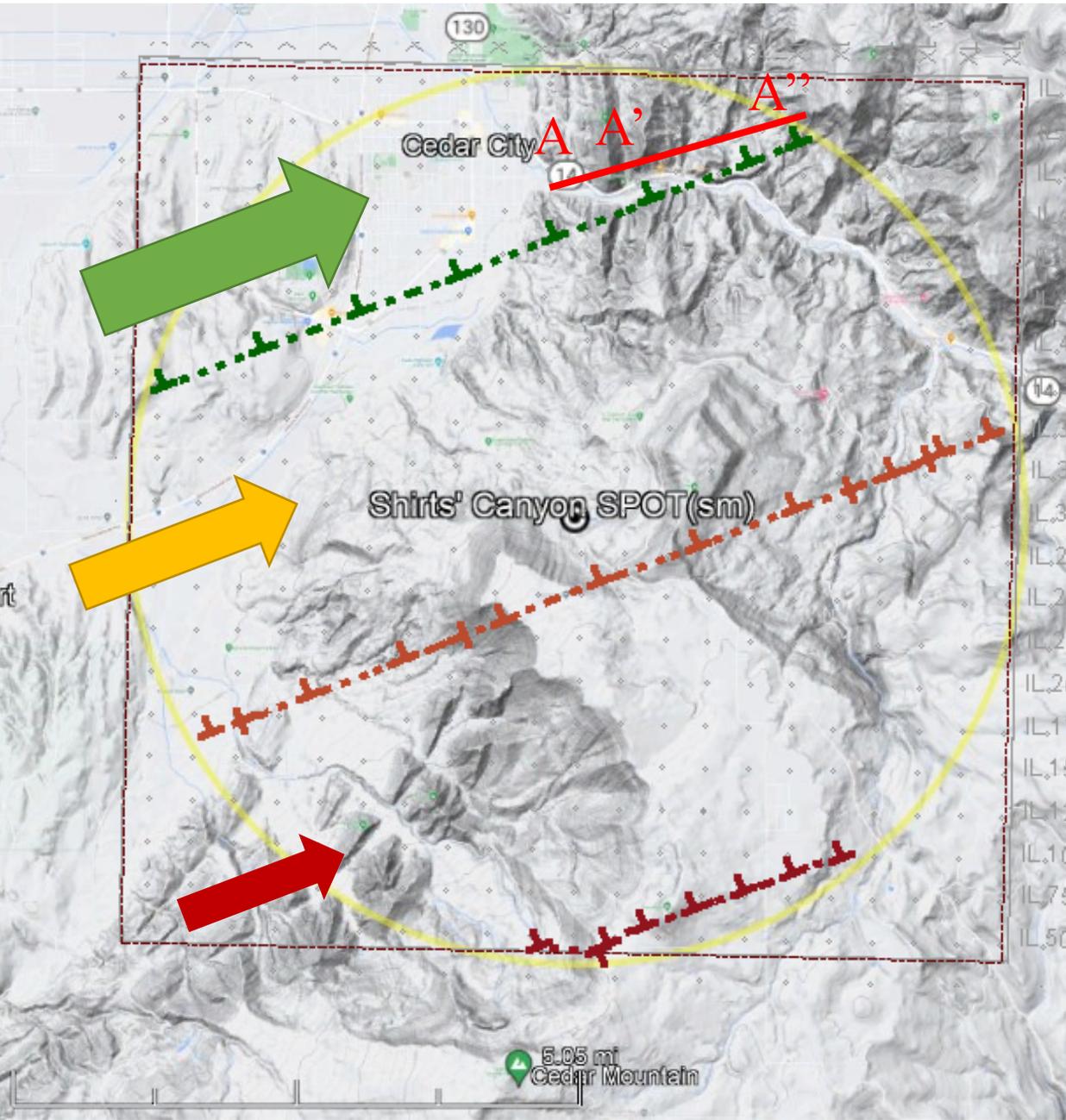
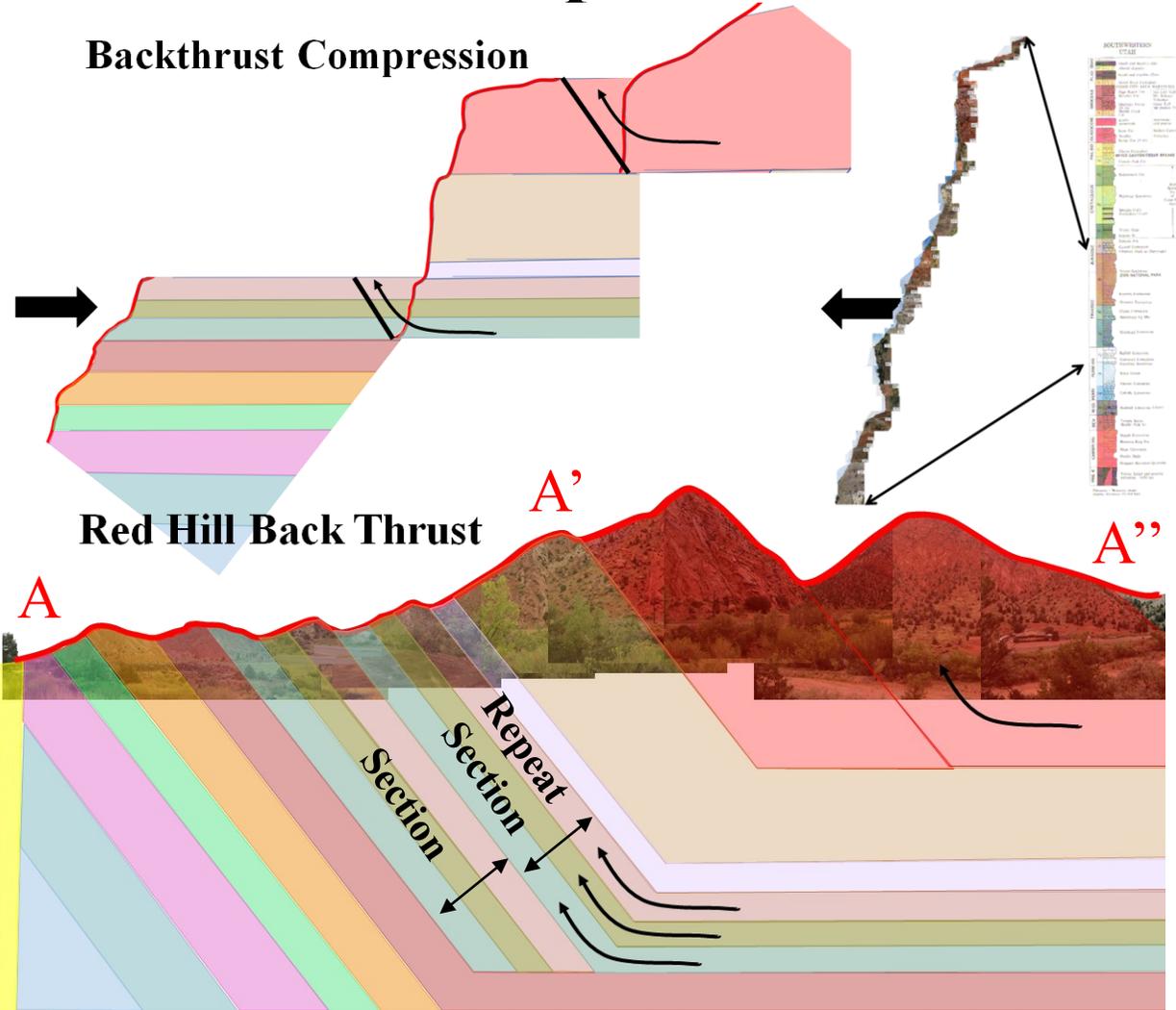
Cedar Canyon Back Thrust



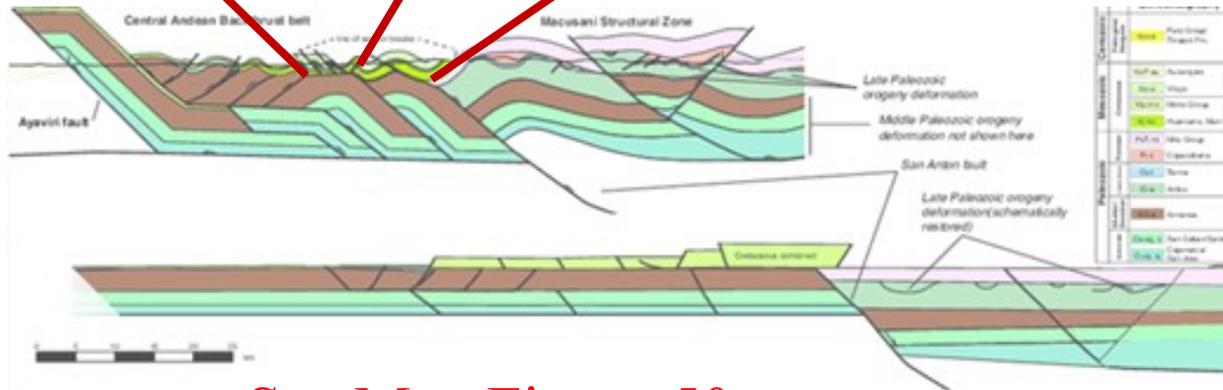
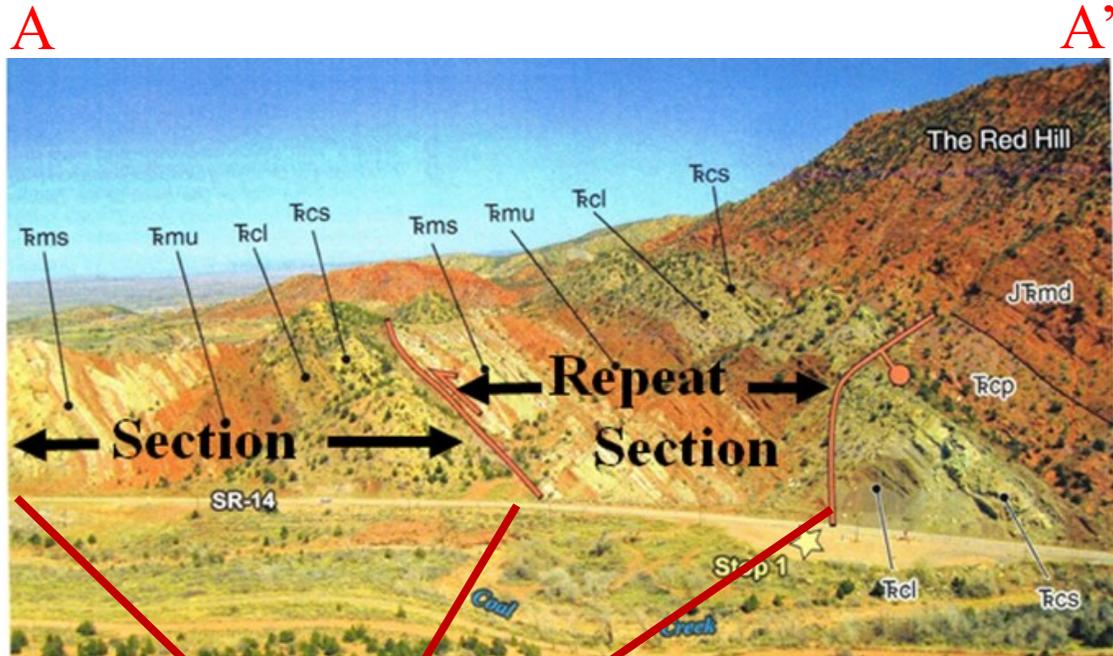


Backthrust Is Due to Compression

Backthrust Compression



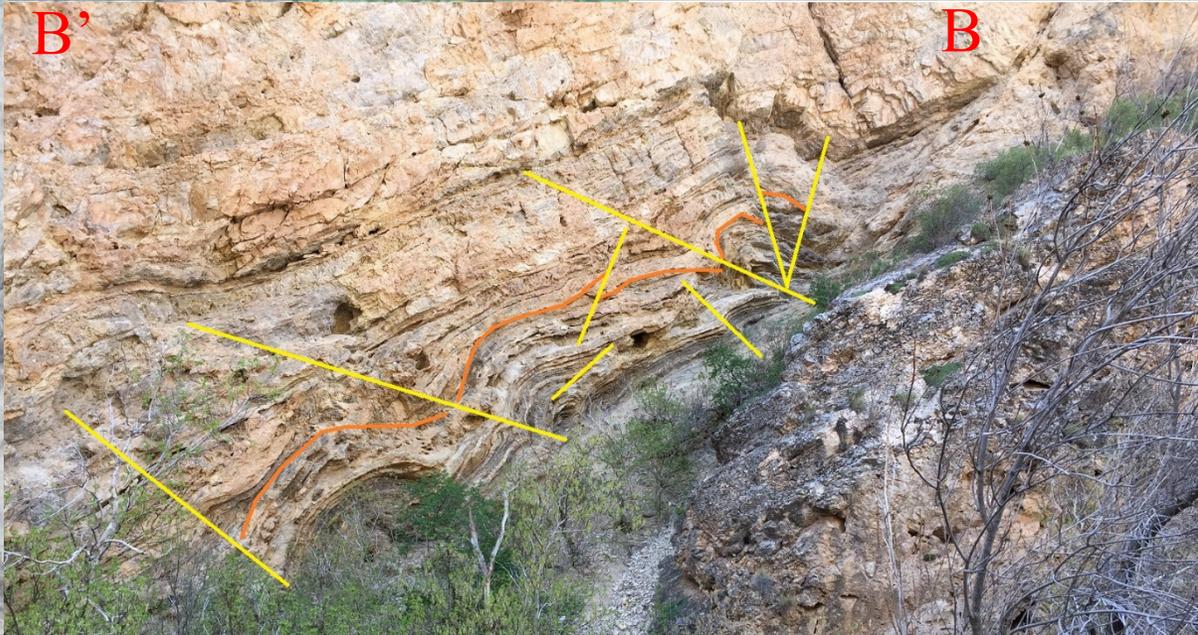
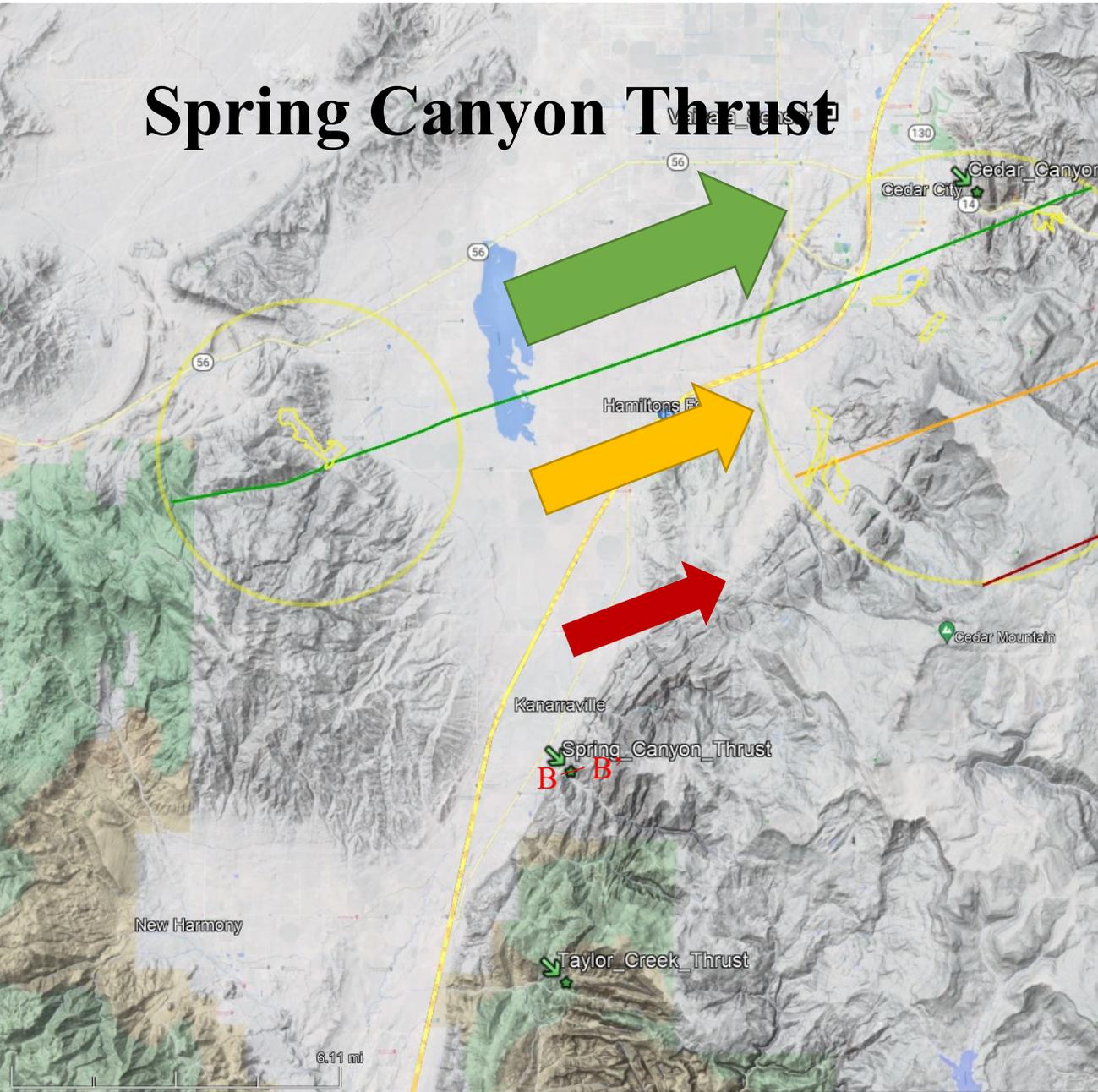
Back Thrust at Mouth of Cedar Canyon



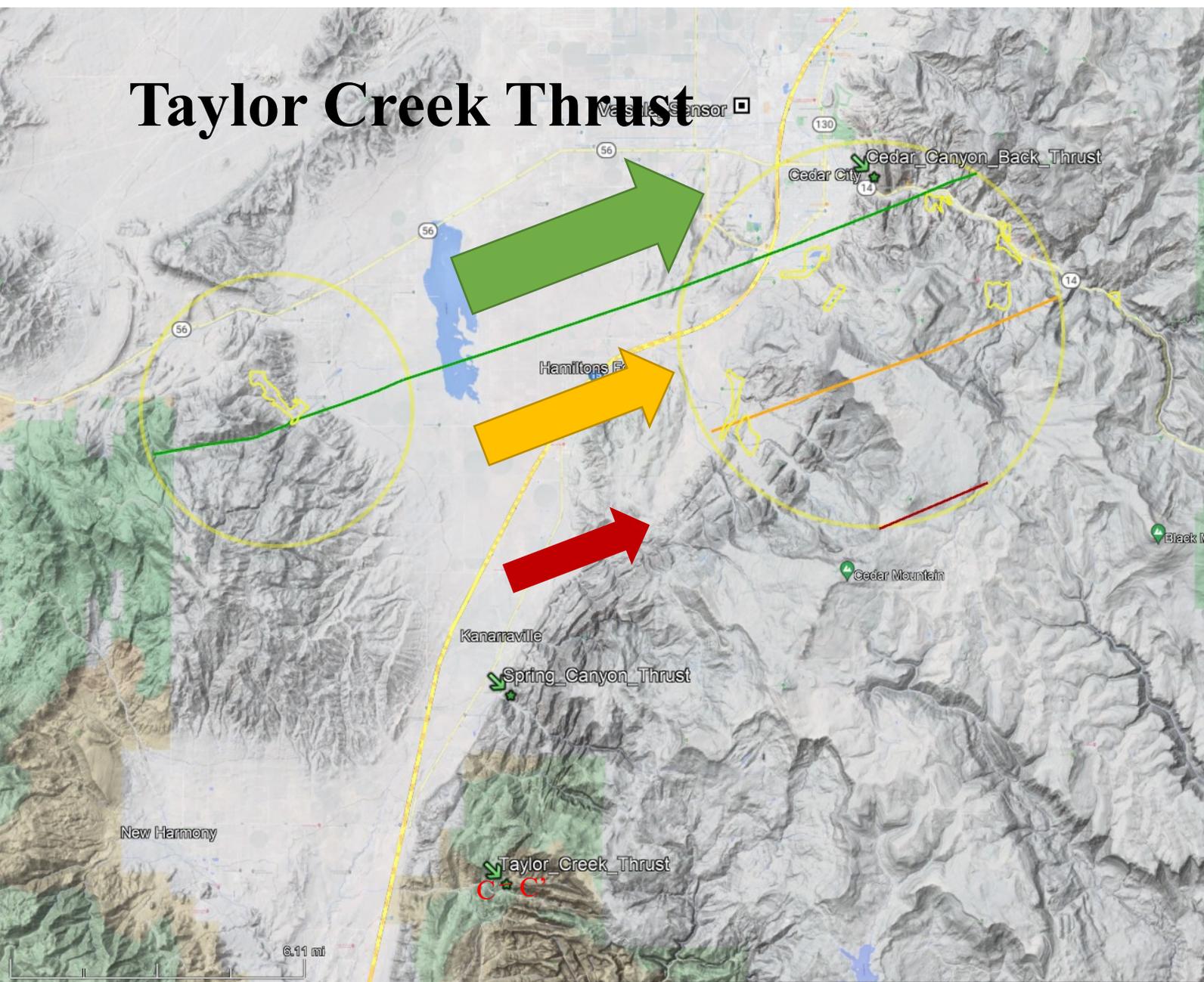
See Map Figure 50

- The mountains east of Cedar City were under compression through the early Tertiary (Oligocene).
- This compression created the uplift and back thrust at the mouth of Cedar Canyon.
- The expansion of the Great Basin, after the San Andreas Fault took pressure off of the Pacific Plate compression, occurred post-Tertiary, and created the Hurricane Fault with 5,000 feet of throw at Cedar City.

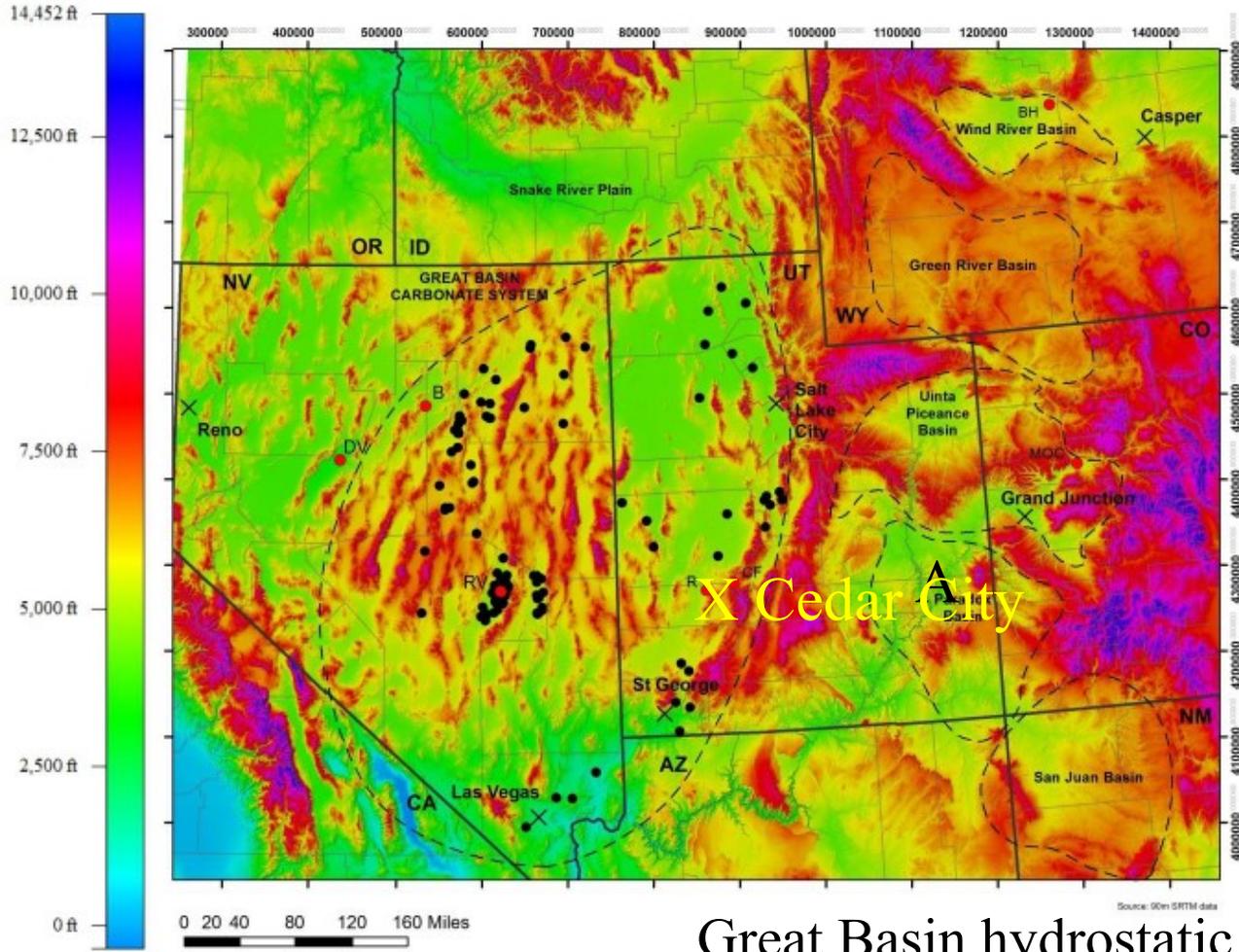
Spring Canyon Thrust



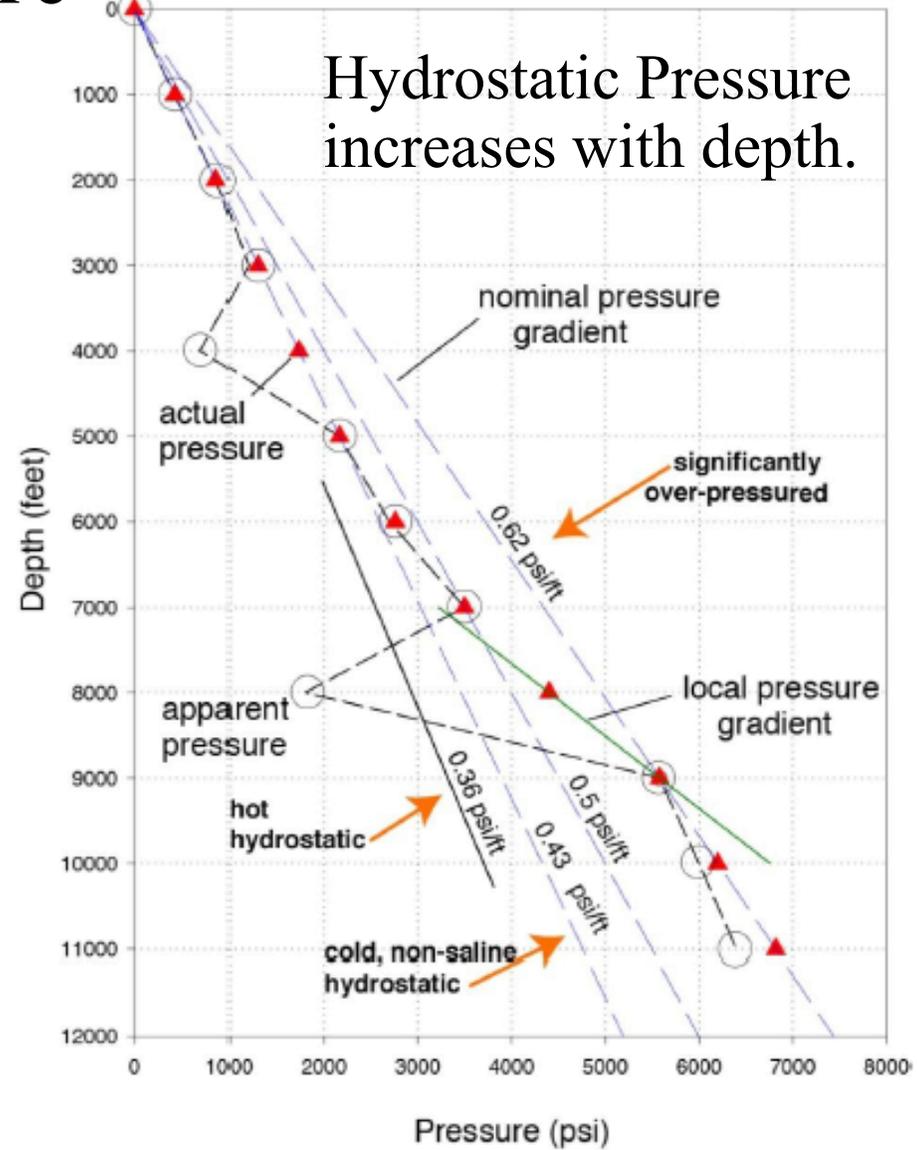
Taylor Creek Thrust



The Great Basin has Anomalously Low Hydrostatic Pressure



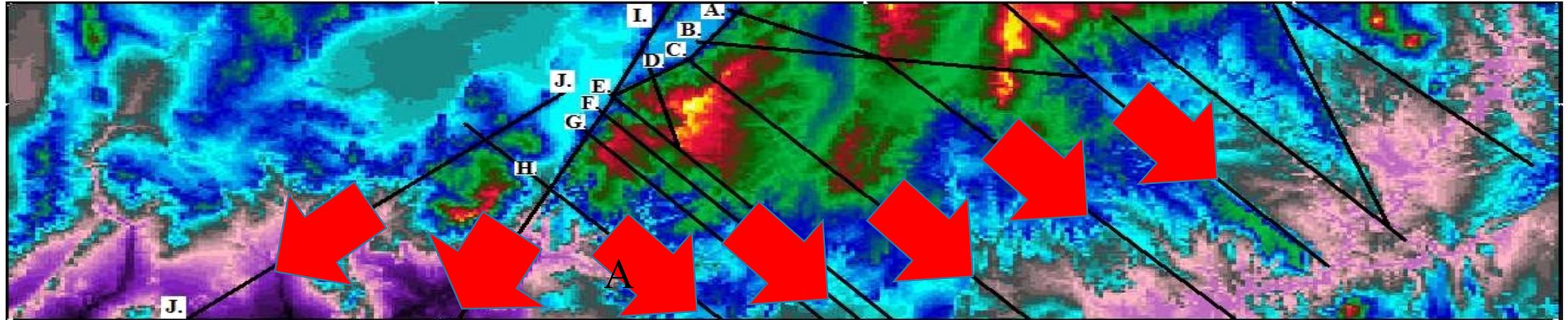
Great Basin hydrostatic pressure is lower than the normal gradient.



Hydrostatic Pressure increases with depth.

The Great Basin has Anomalously Low Hydrostatic Pressure

The Grand Canyon is a leak in the plumbing.



- A. Paragonah Canyon
- B. Parowan Canyon
- C. Summit Canyon
- D. Fiddlers Canyon
- E. Cedar Canyon
- F. Kararaville Canyon

- G. Five Fingers
- H. New Harmony
- I. Hurricane Fault
- J. Pinevalley

Possible Fault Geopressure Leak Pathways from Cedar Valley to the Colorado River

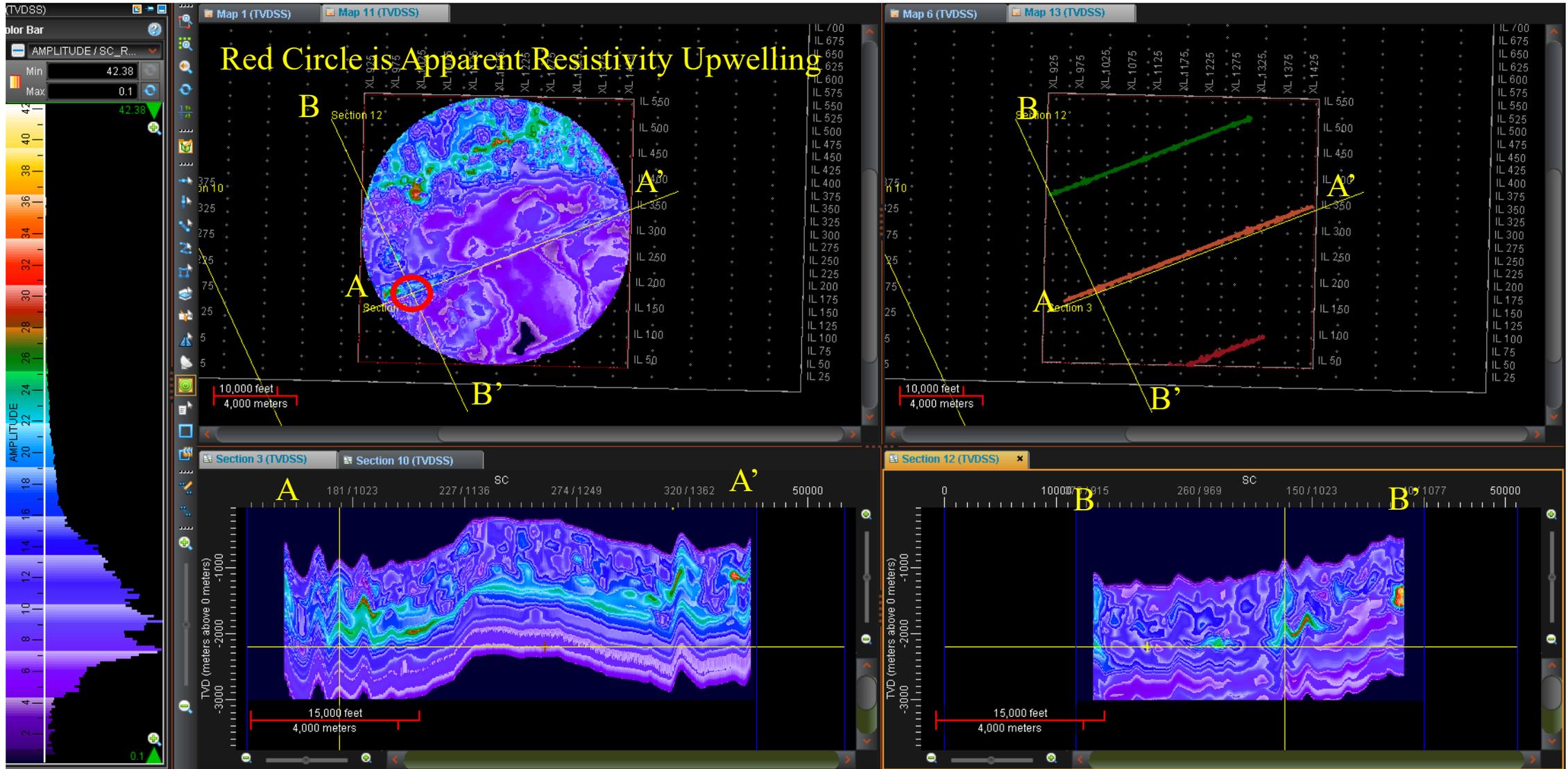
Faults Provide Upward Flow For Water



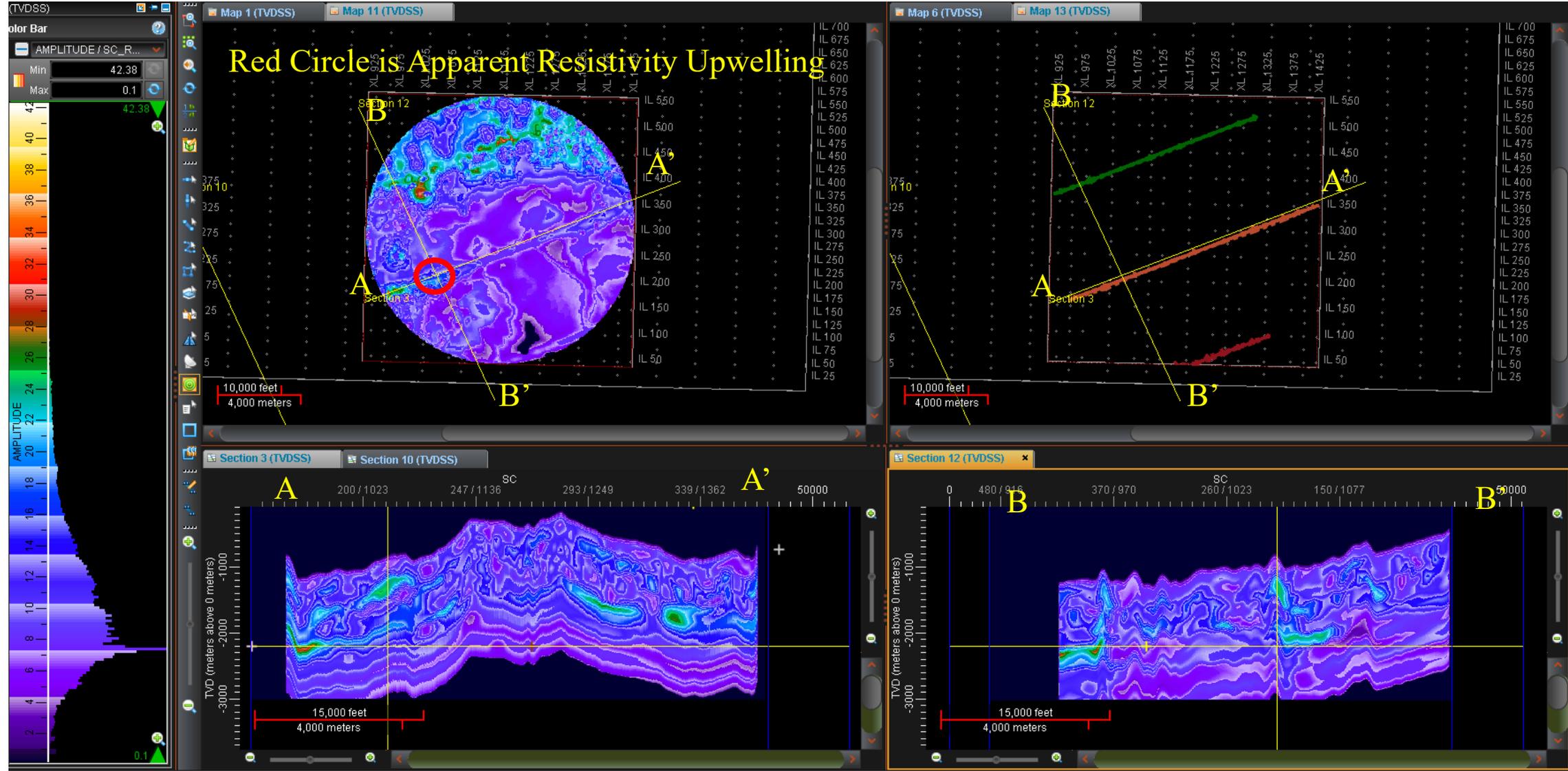
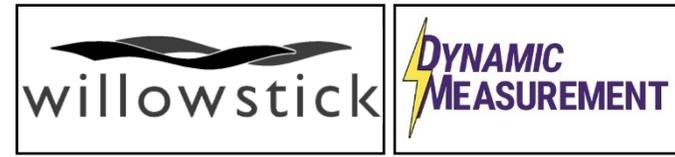
Fault cuts through rocks and provides a path with lower hydrostatic pressure. So water is pushed up the fault by normal hydrostatic pressure, often resulting in a spring, or making it possible to drill shallower water wells.

In addition, fresh water has higher resistivity.

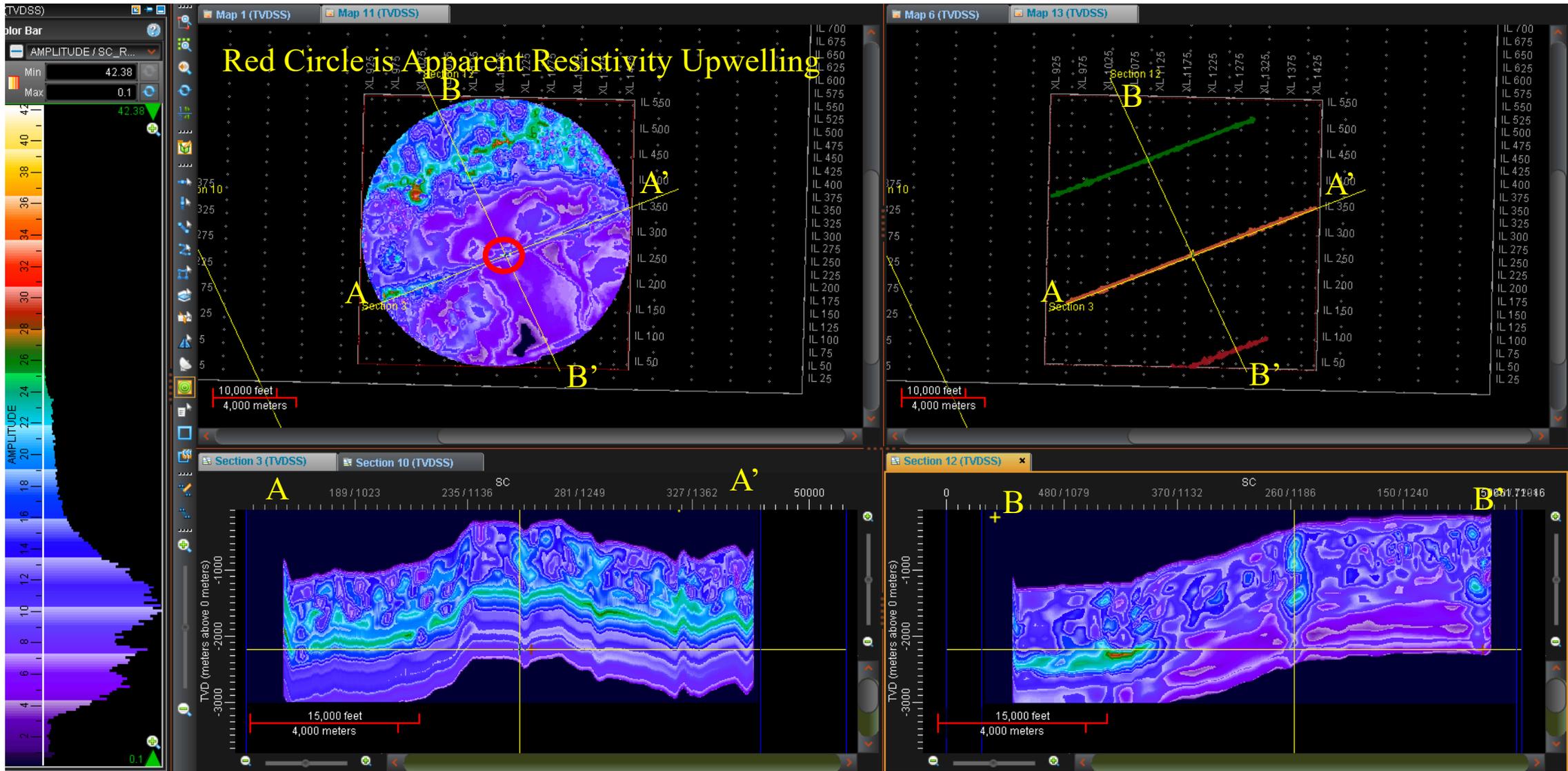
Shirts Canyon Shallow Resistivity L177 T1010



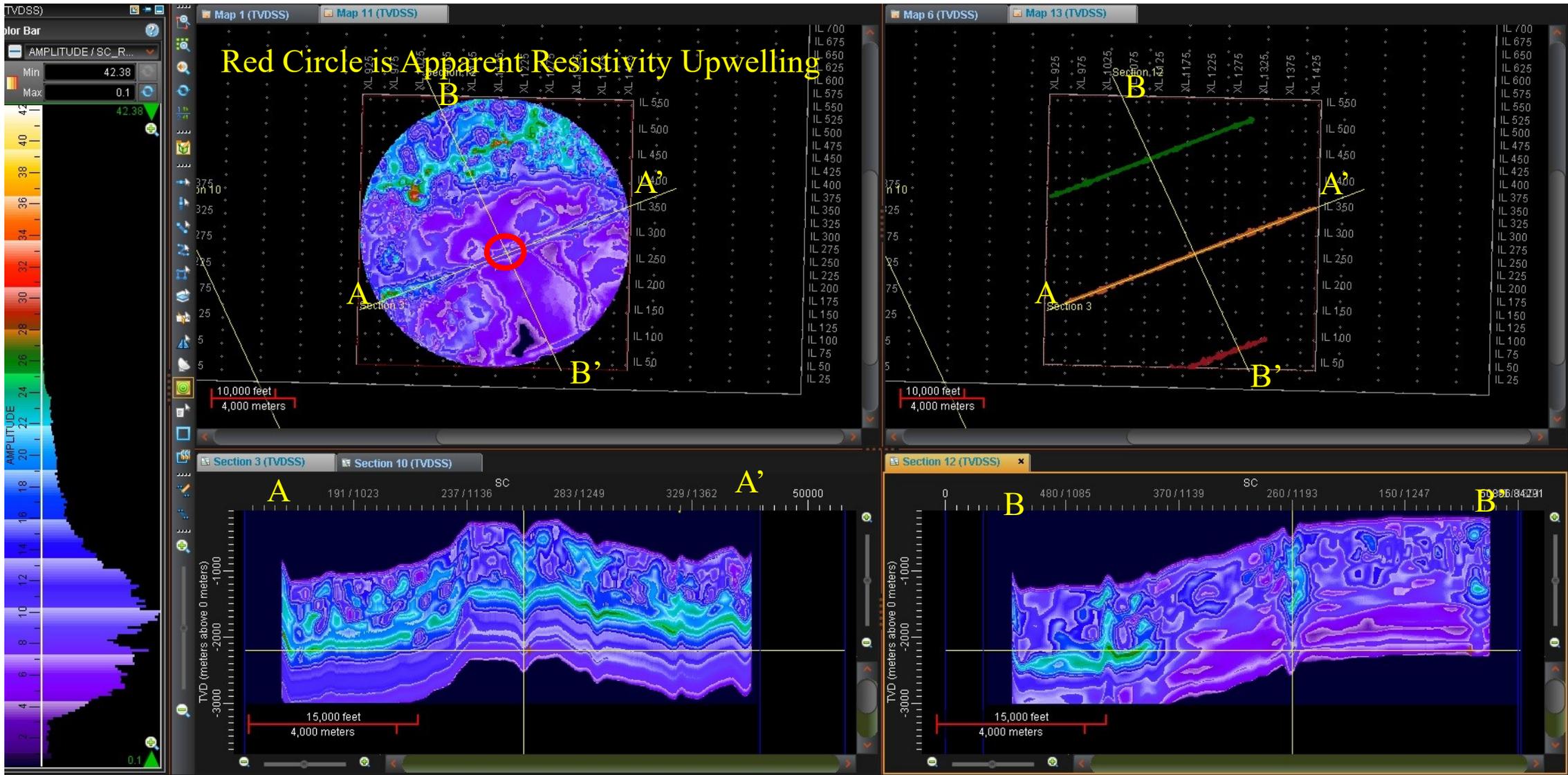
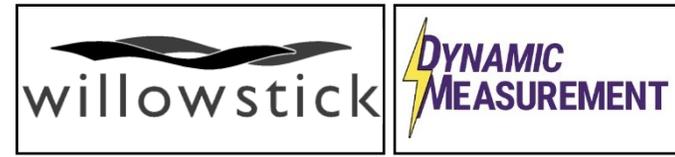
Shirts Canyon Shallow Resistivity L211 T1048



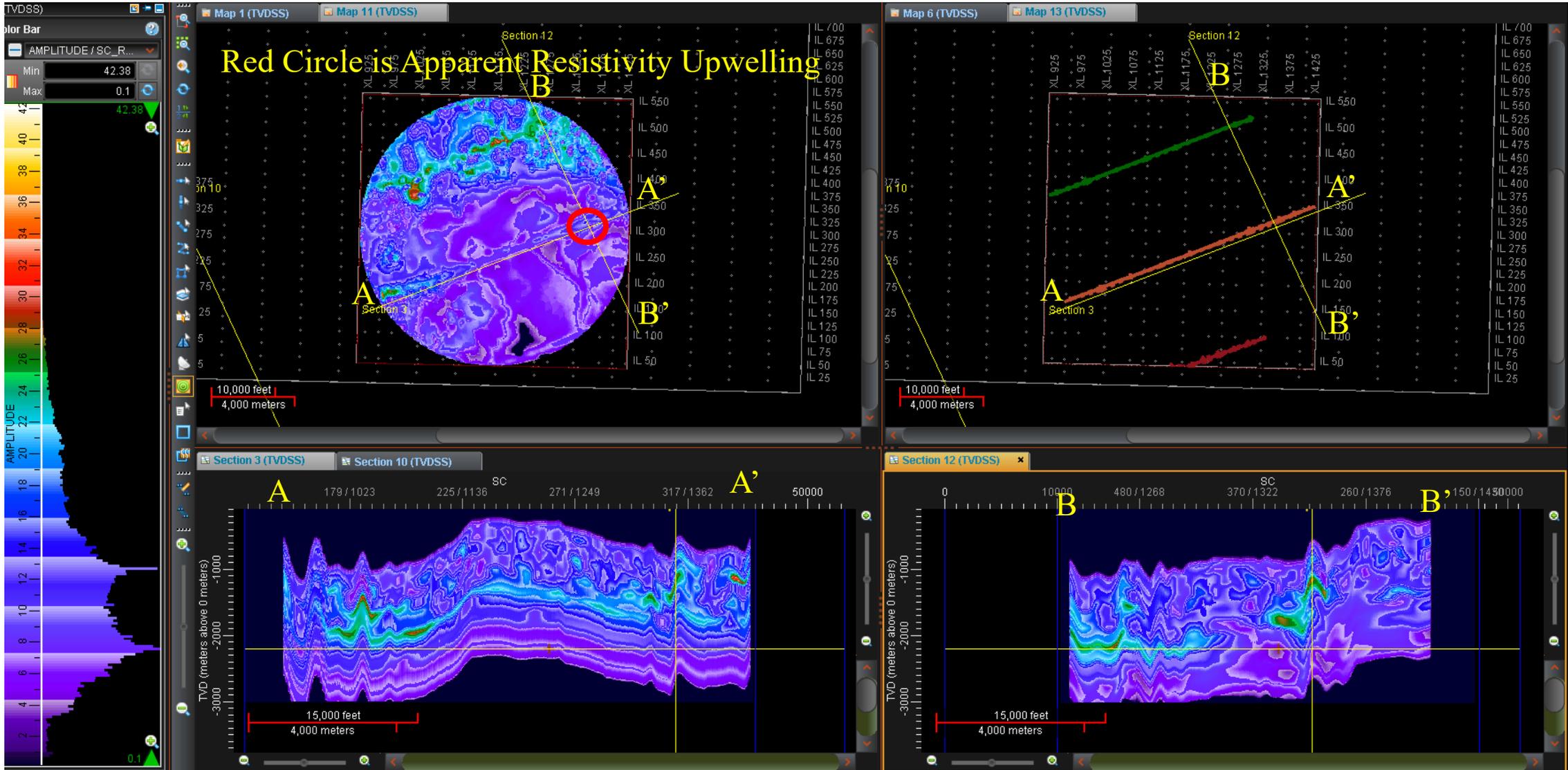
Shirts Canyon Shallow Resistivity L256 T1188



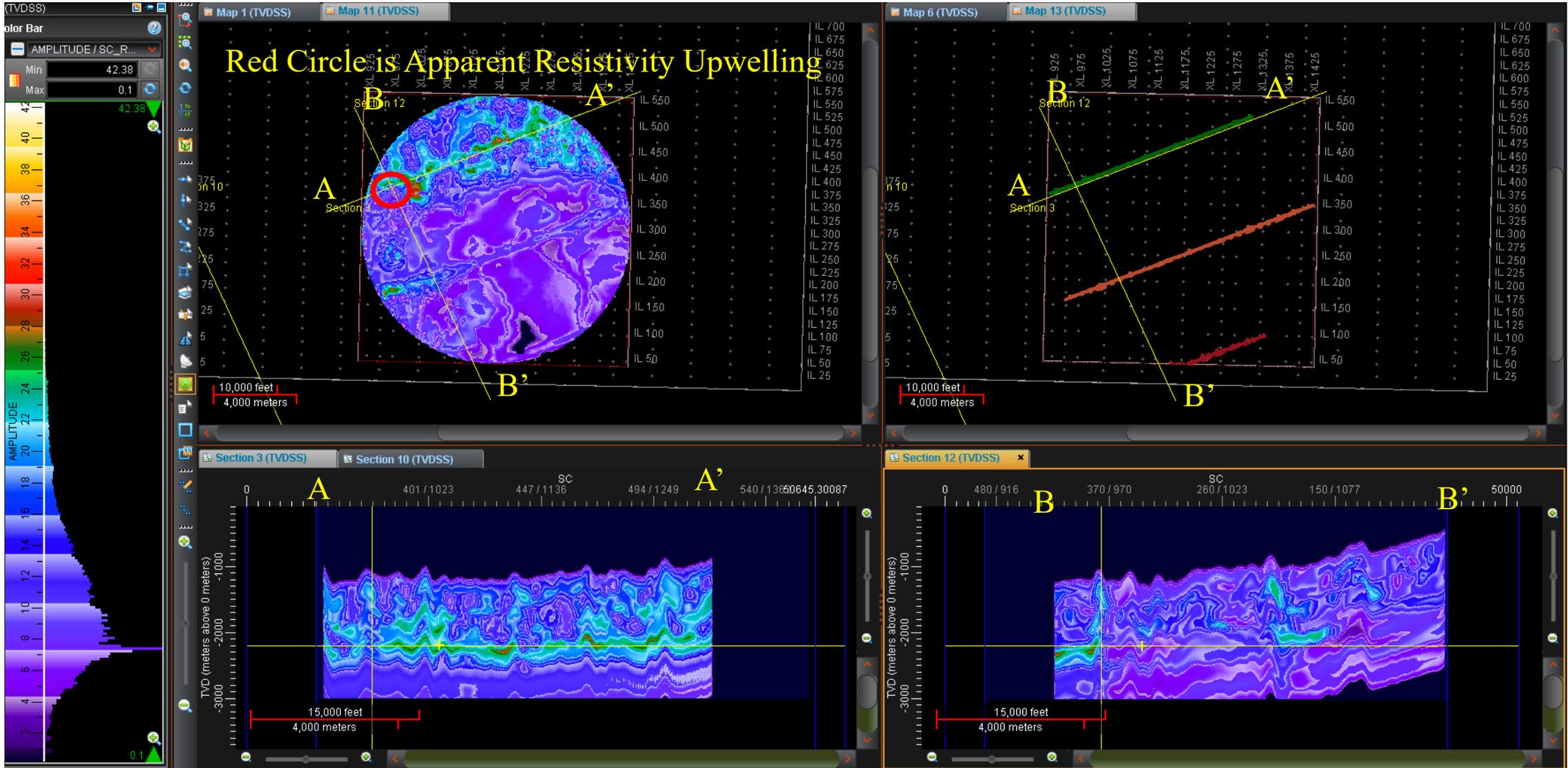
Shirts Canyon Shallow Resistivity L260 T1193



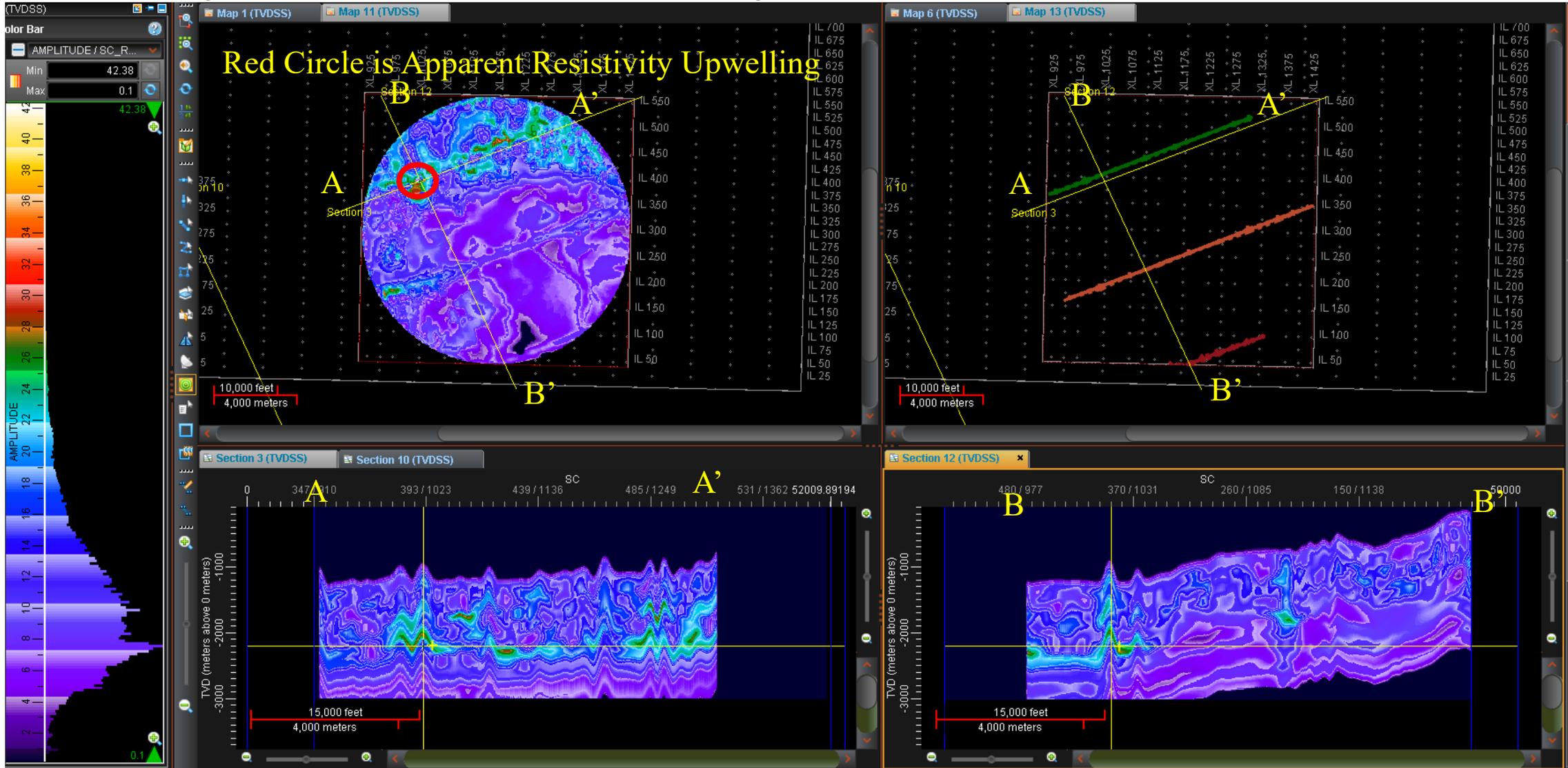
Shirts Canyon Shallow Resistivity L310 T1351



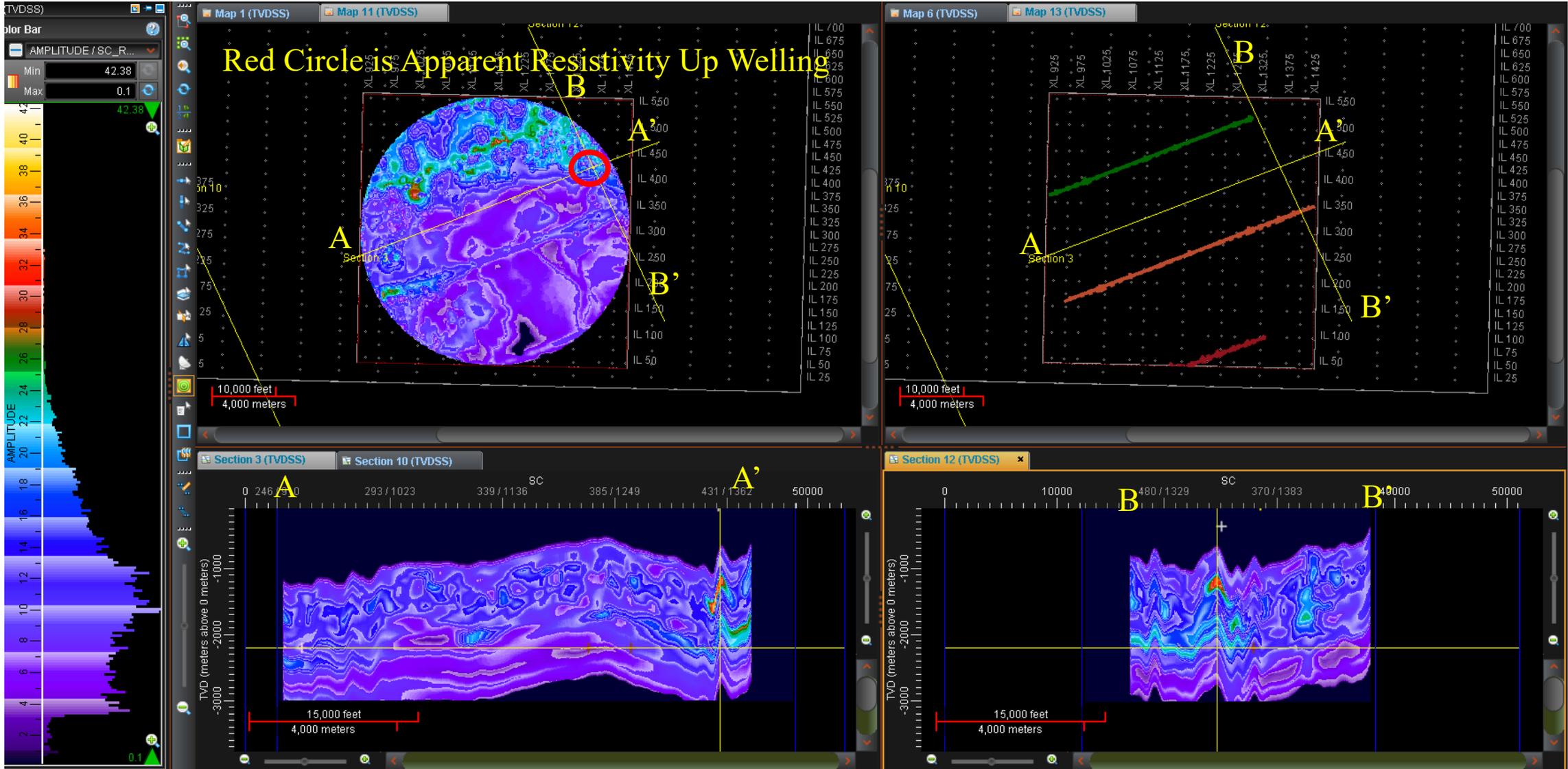
Shirts Canyon Shallow Resistivity L379 T0965



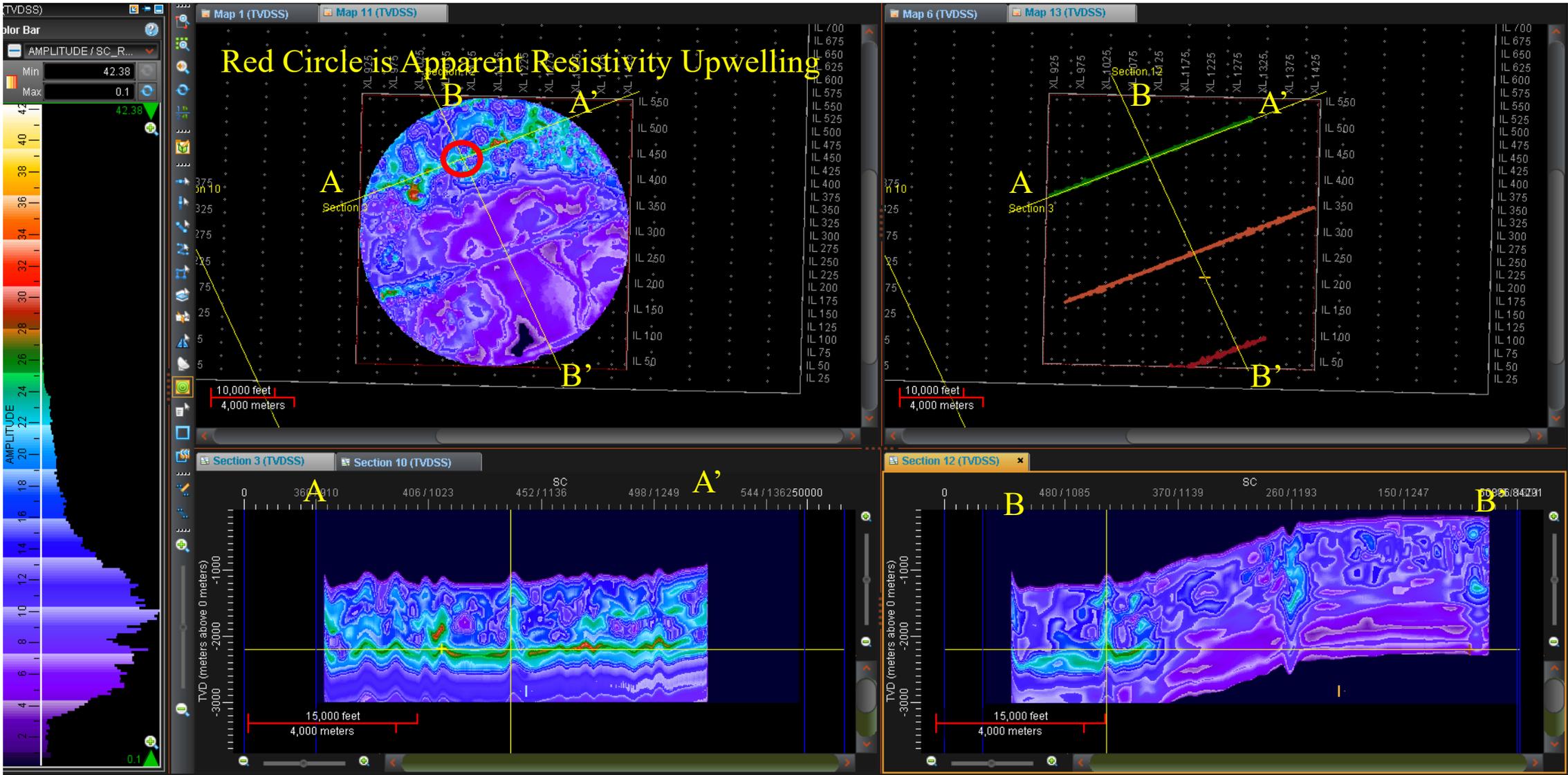
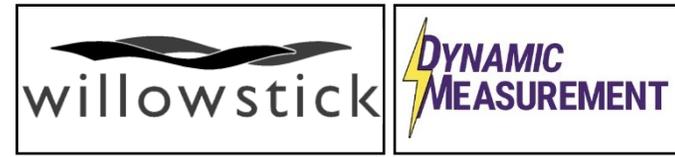
Shirts Canyon Shallow Resistivity L392 T1020



Shirts Canyon Shallow Resistivity L428 T1355



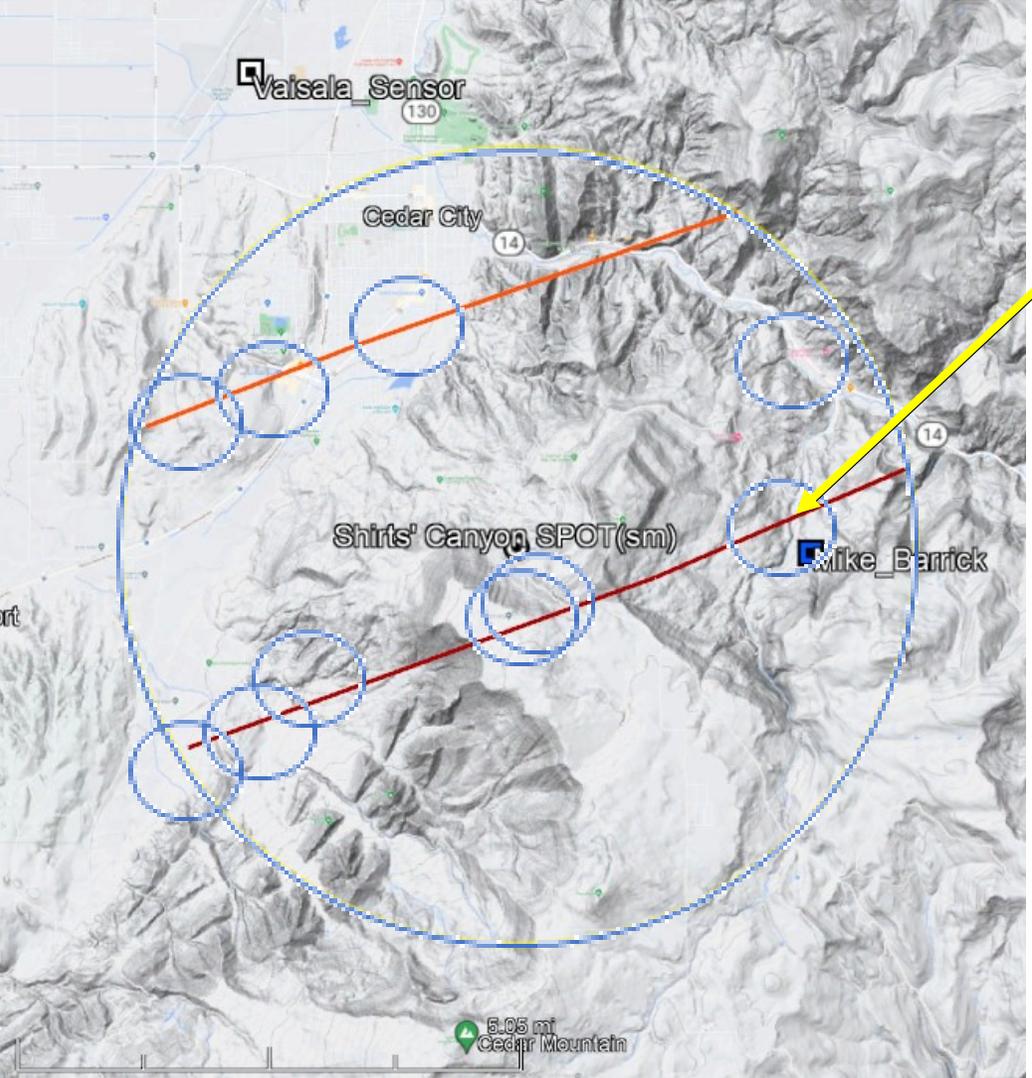
Shirts Canyon Shallow Resistivity L440 T1105



Shallow High Resistivity Areas Shirts Canyon



Blue Circles are Apparent Resistivity Upwellings



- Note one of the 10 apparent resistivity upwellings is located near the spring and small lake shown above.
- This is positive proof of the viability of this approach to water exploration.

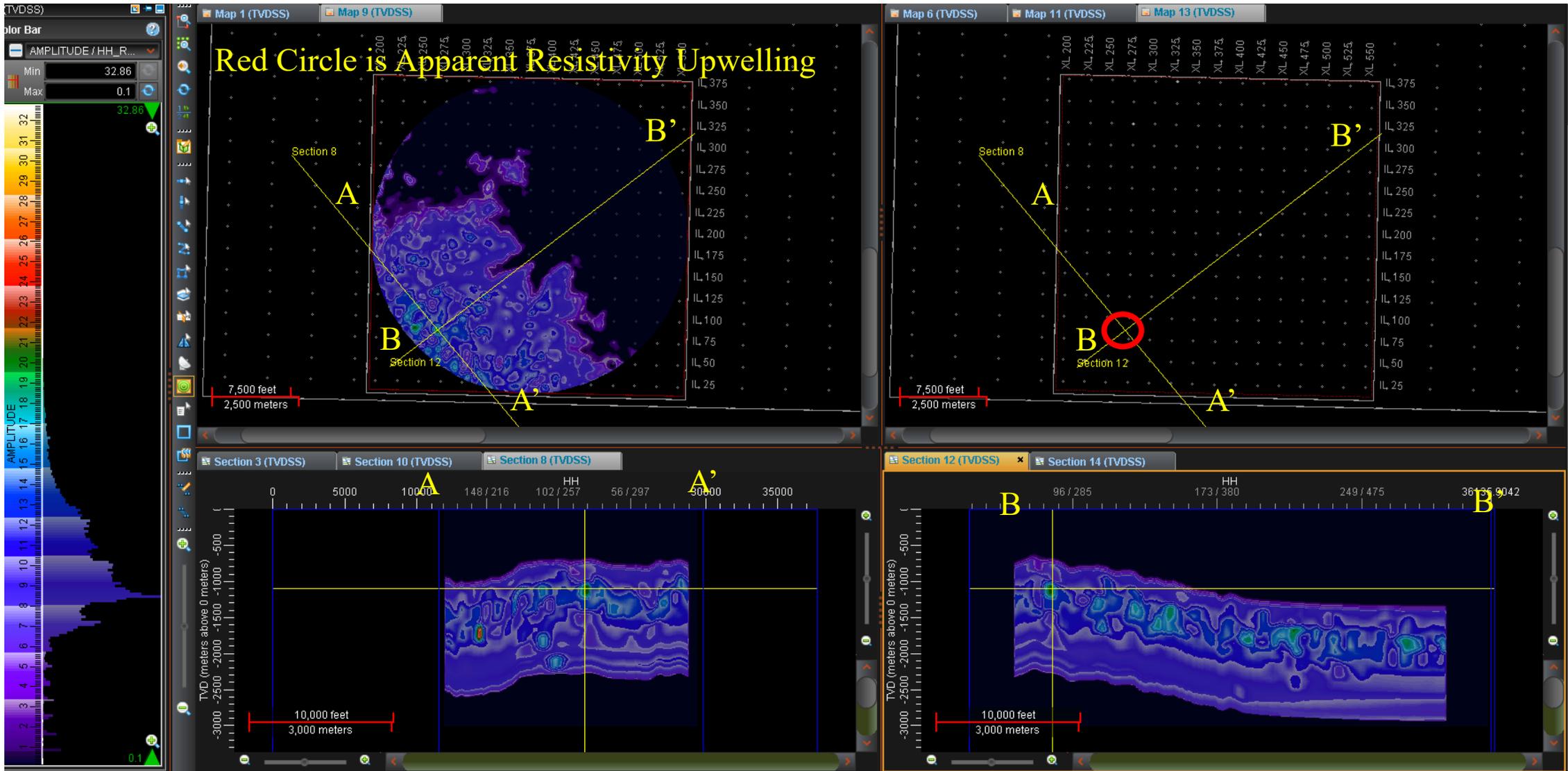
Shallow High Resistivity Areas Harmony Hills



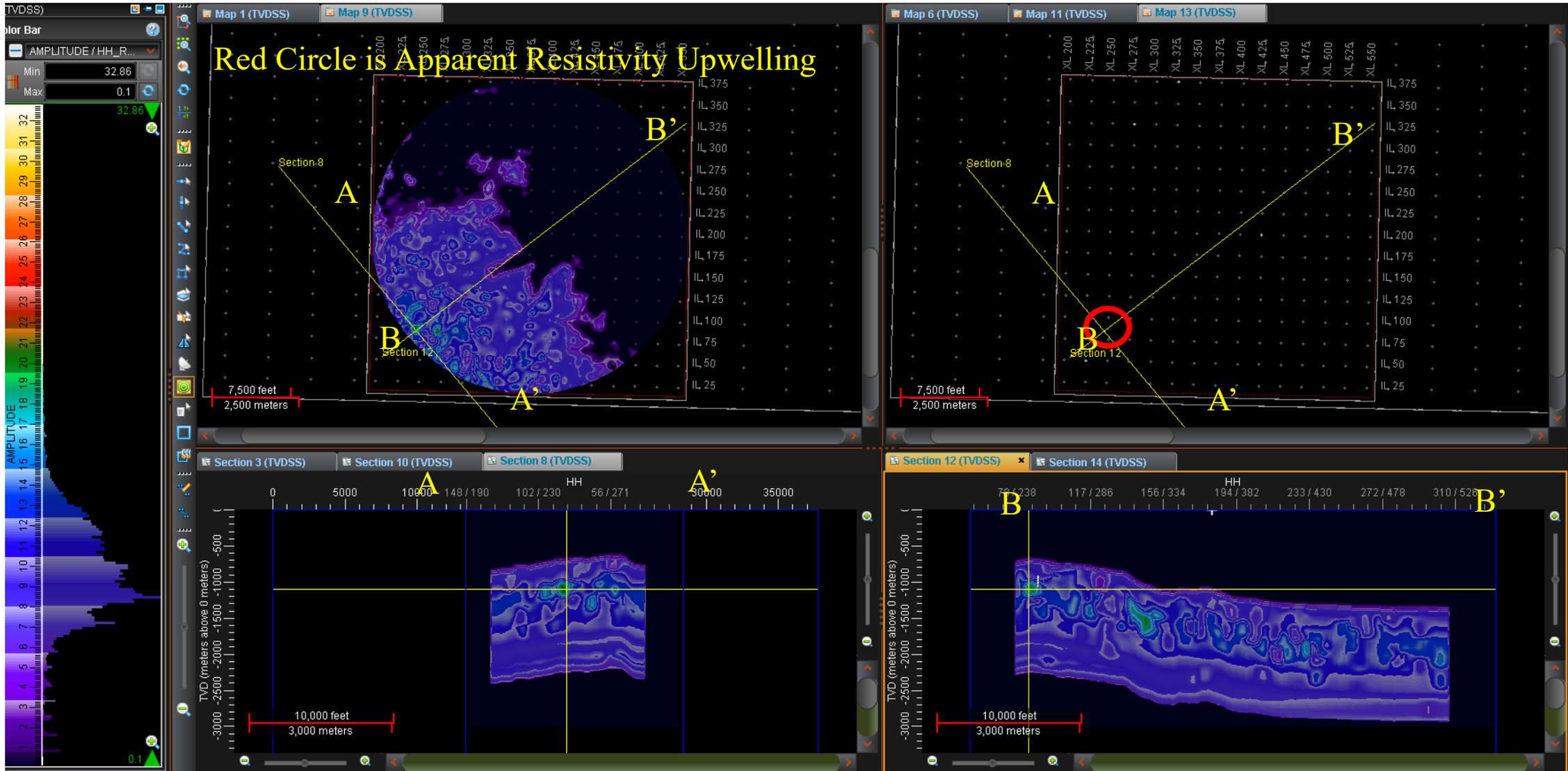
- Shirts Canyon has higher Apparent Resistivity in the transform faults.
- Overall Apparent Resistivity is higher than in Shirts Canyon.
- This fits the working hypothesis that the fractured quartz monzonite is a large and prolific aquifer.
- Fracture oil and gas reservoirs tend to have more fluids than can be stored in the pores of a rock, and expect the same is true for aquifers.



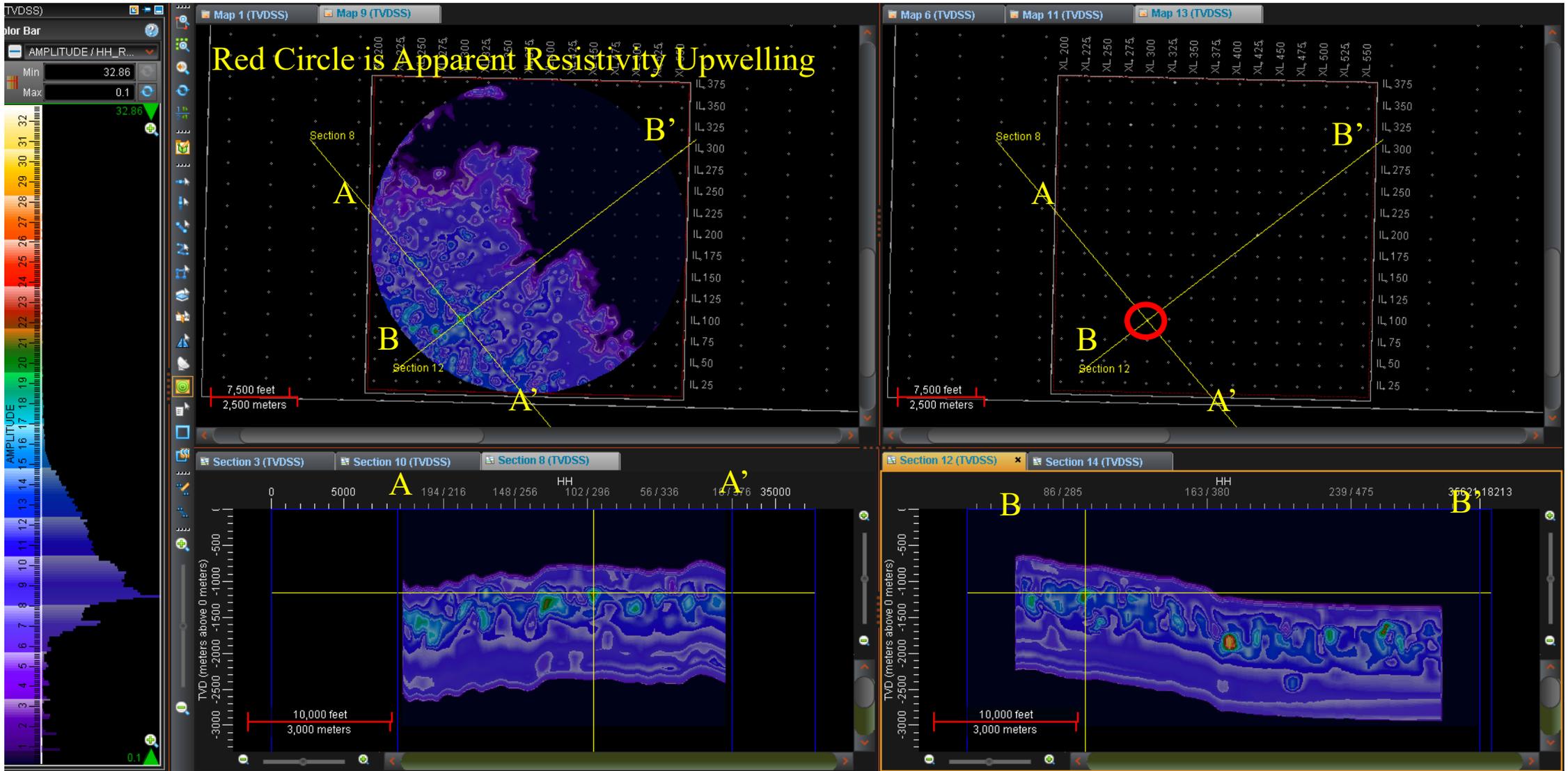
Harmony Hills Shallow Resistivity L083 T268



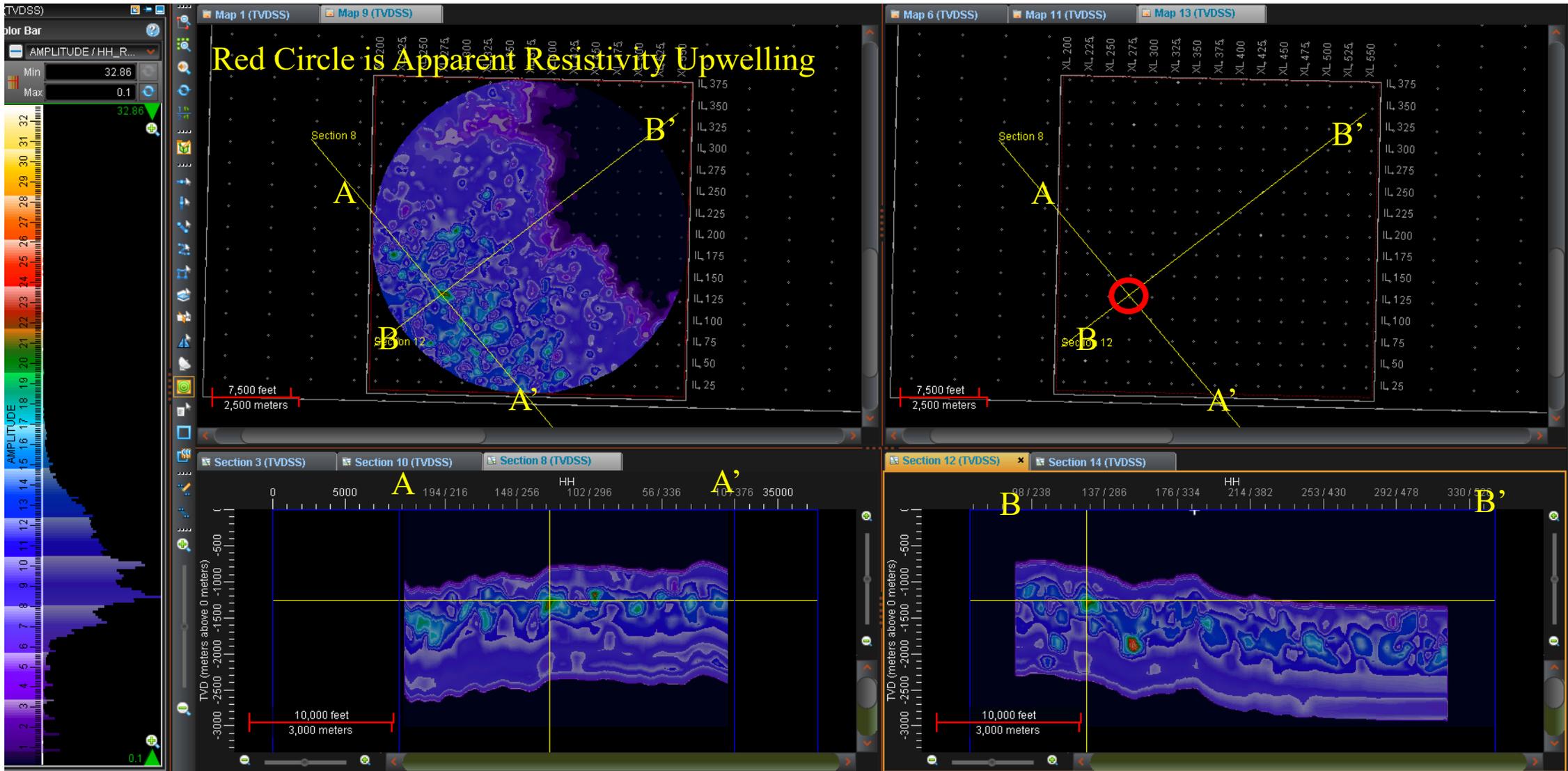
Harmony Hills Shallow Resistivity L084 T245



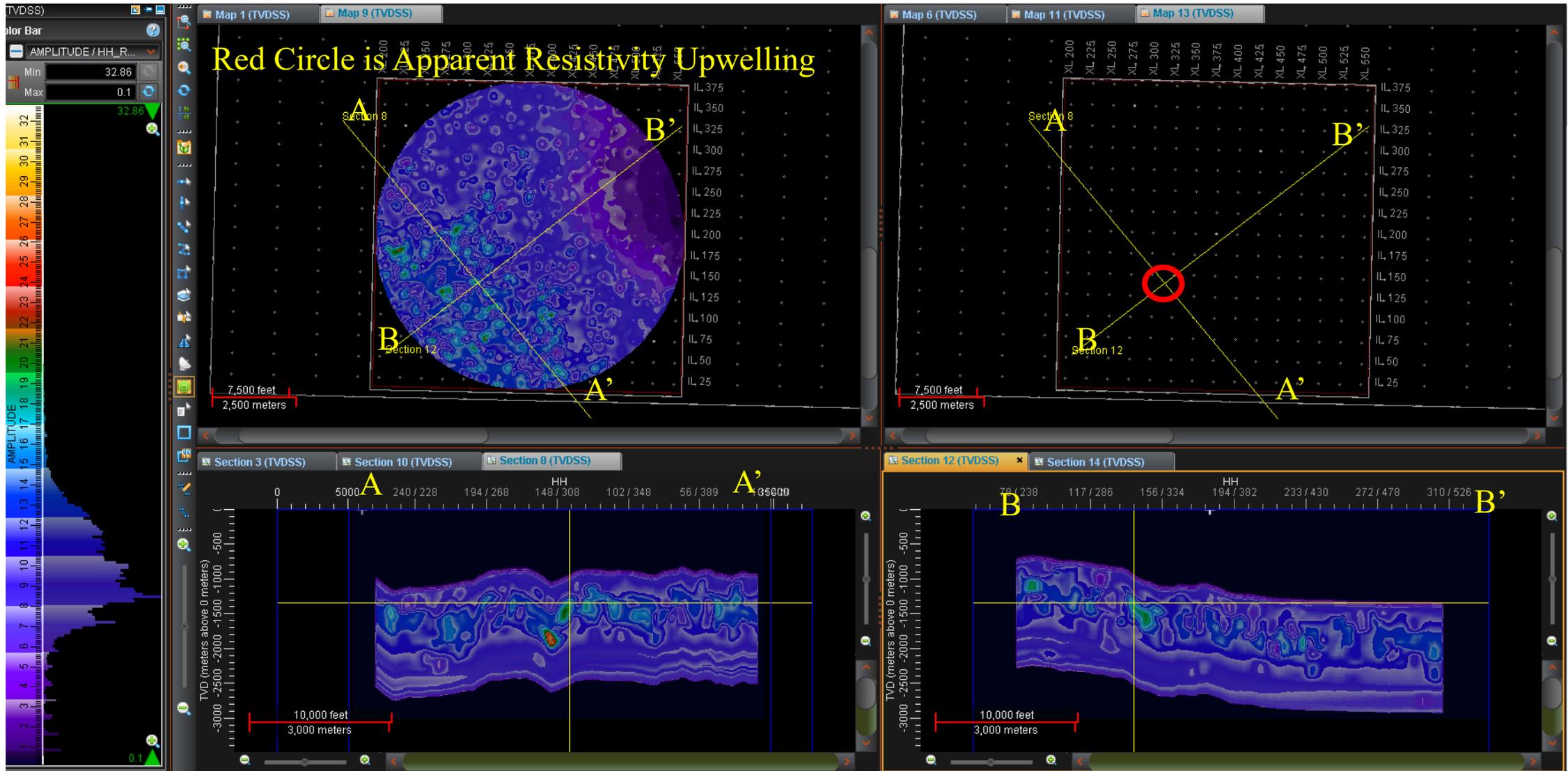
Harmony Hills Shallow Resistivity L098 T300



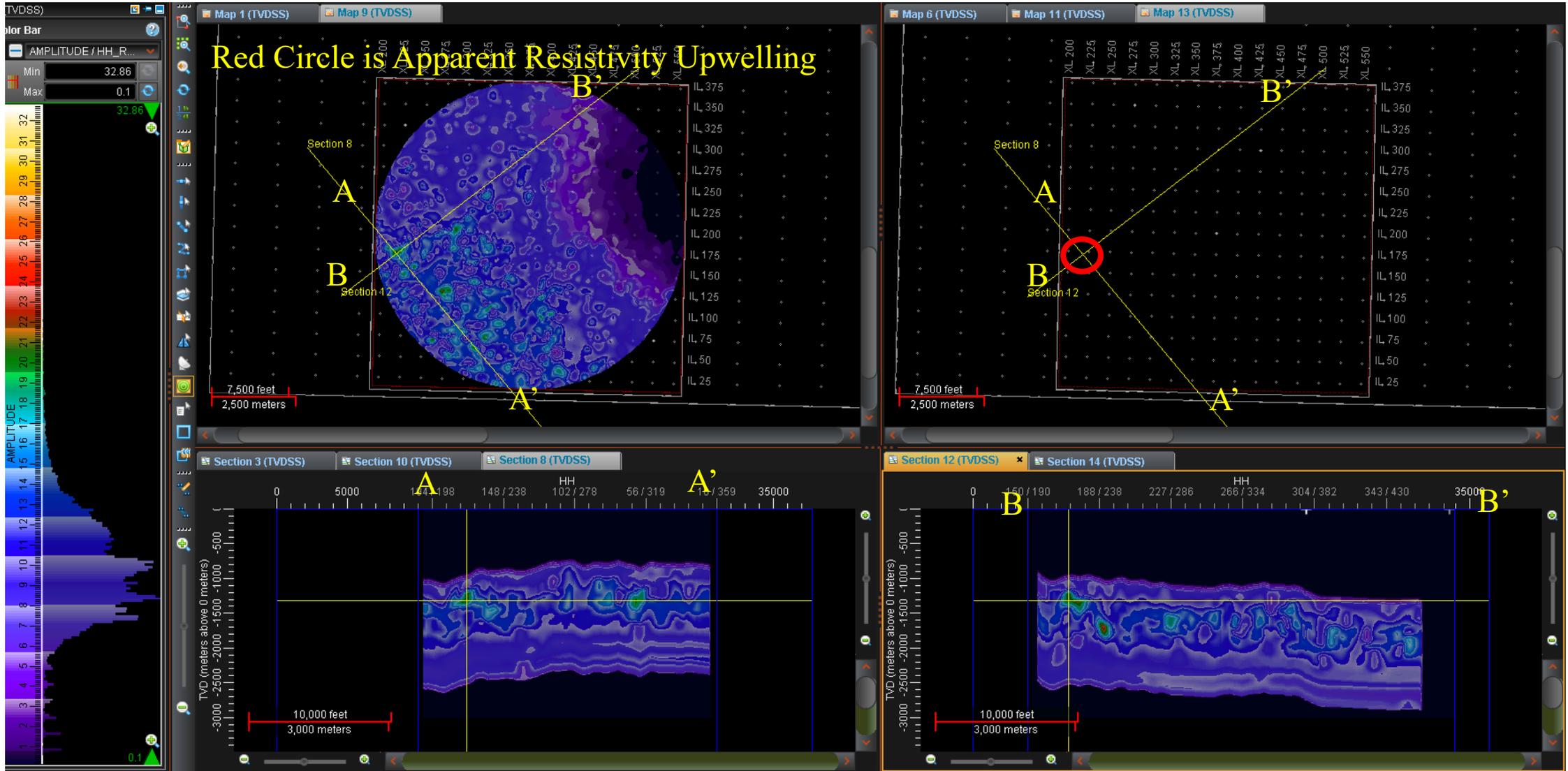
Harmony Hills Shallow Resistivity L127 T274



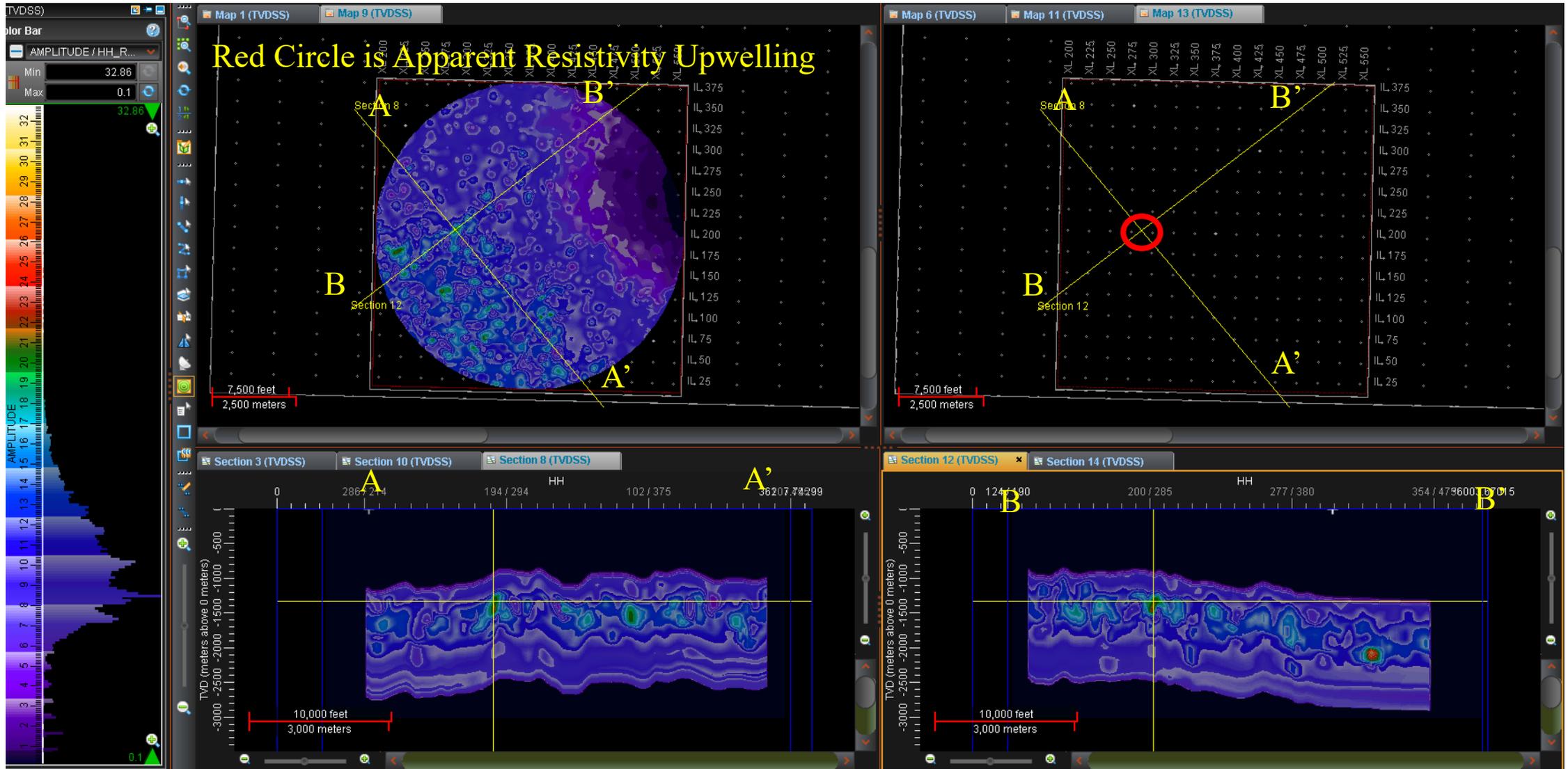
Harmony Hills Shallow Resistivity L140 T315



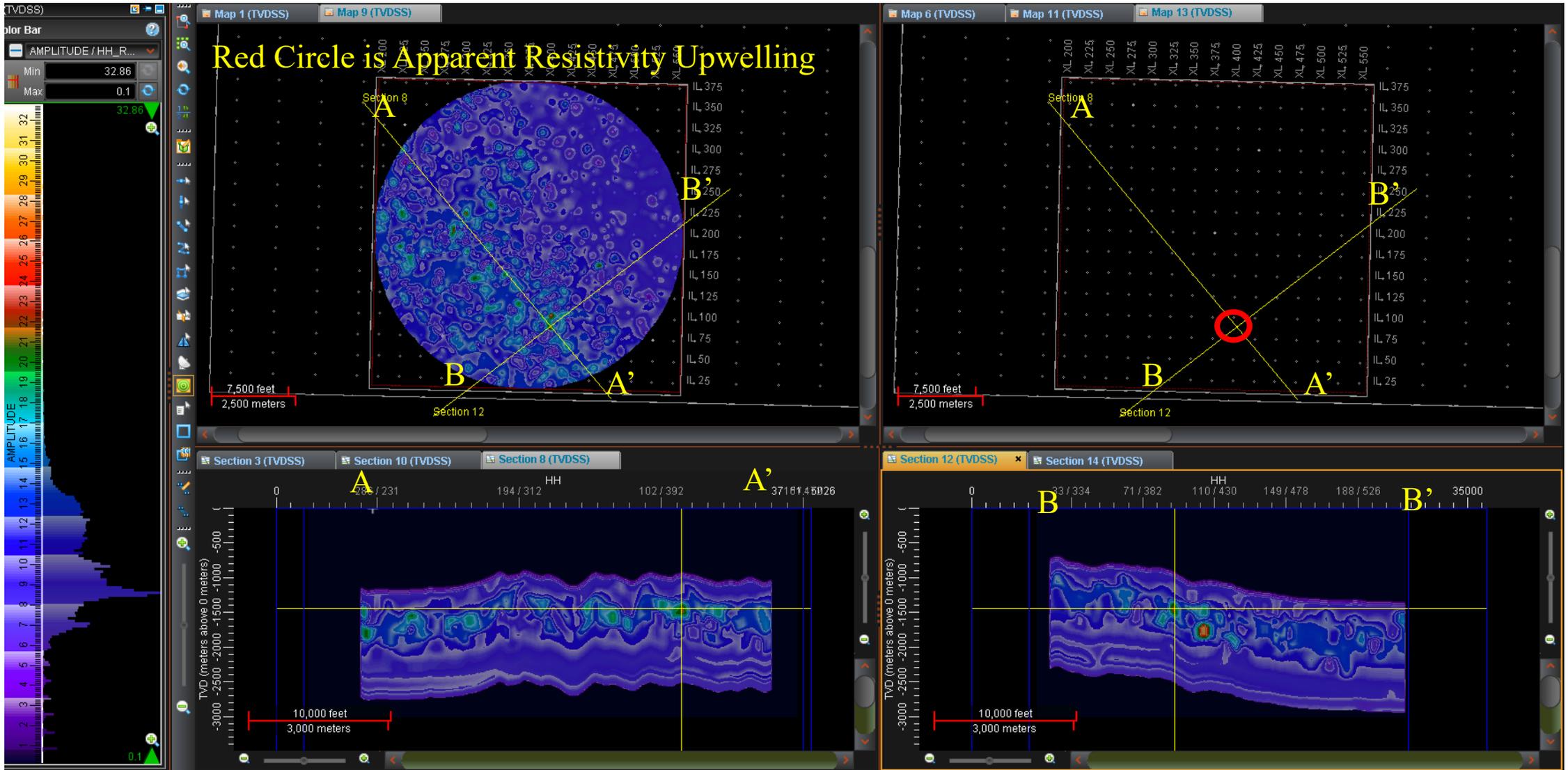
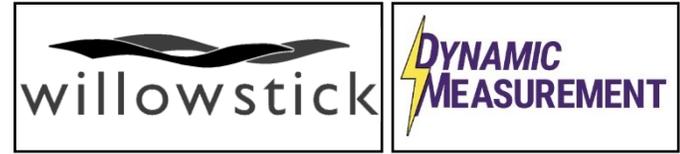
Harmony Hills Shallow Resistivity L172 T217



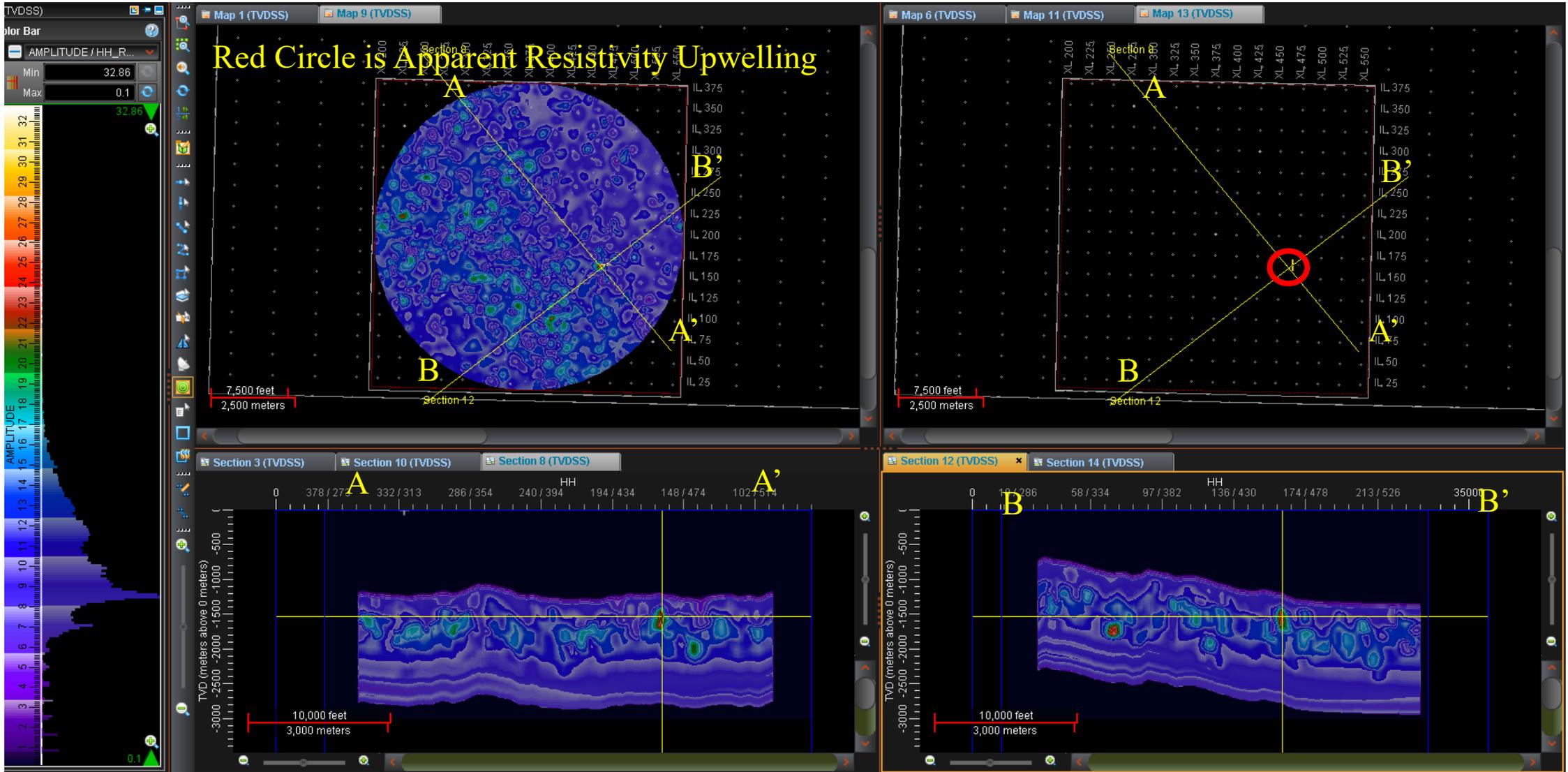
Harmony Hills Shallow Resistivity L202 T287



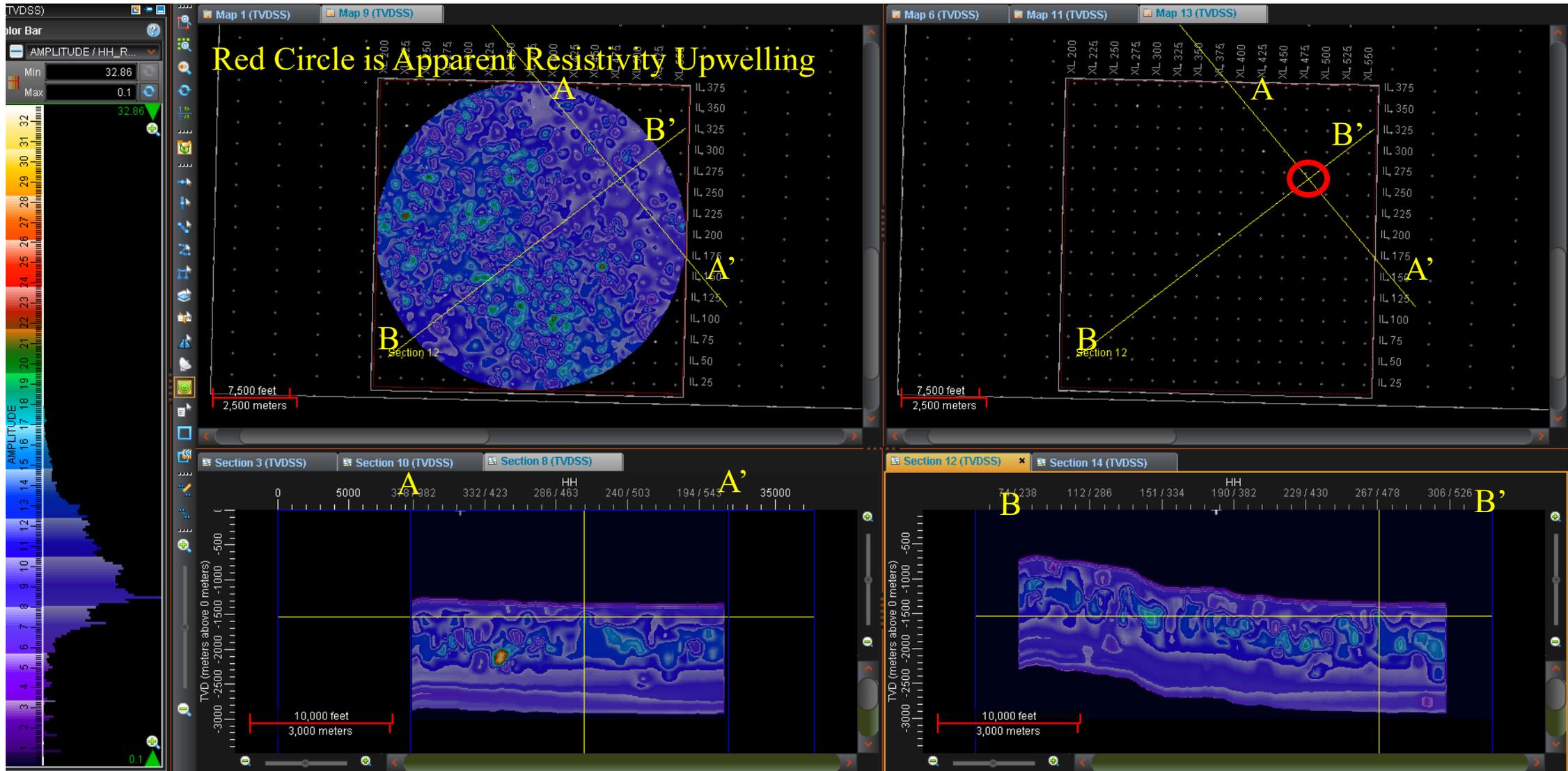
Harmony Hills Shallow Resistivity L089 T403



Harmony Hills Shallow Resistivity L162 T462

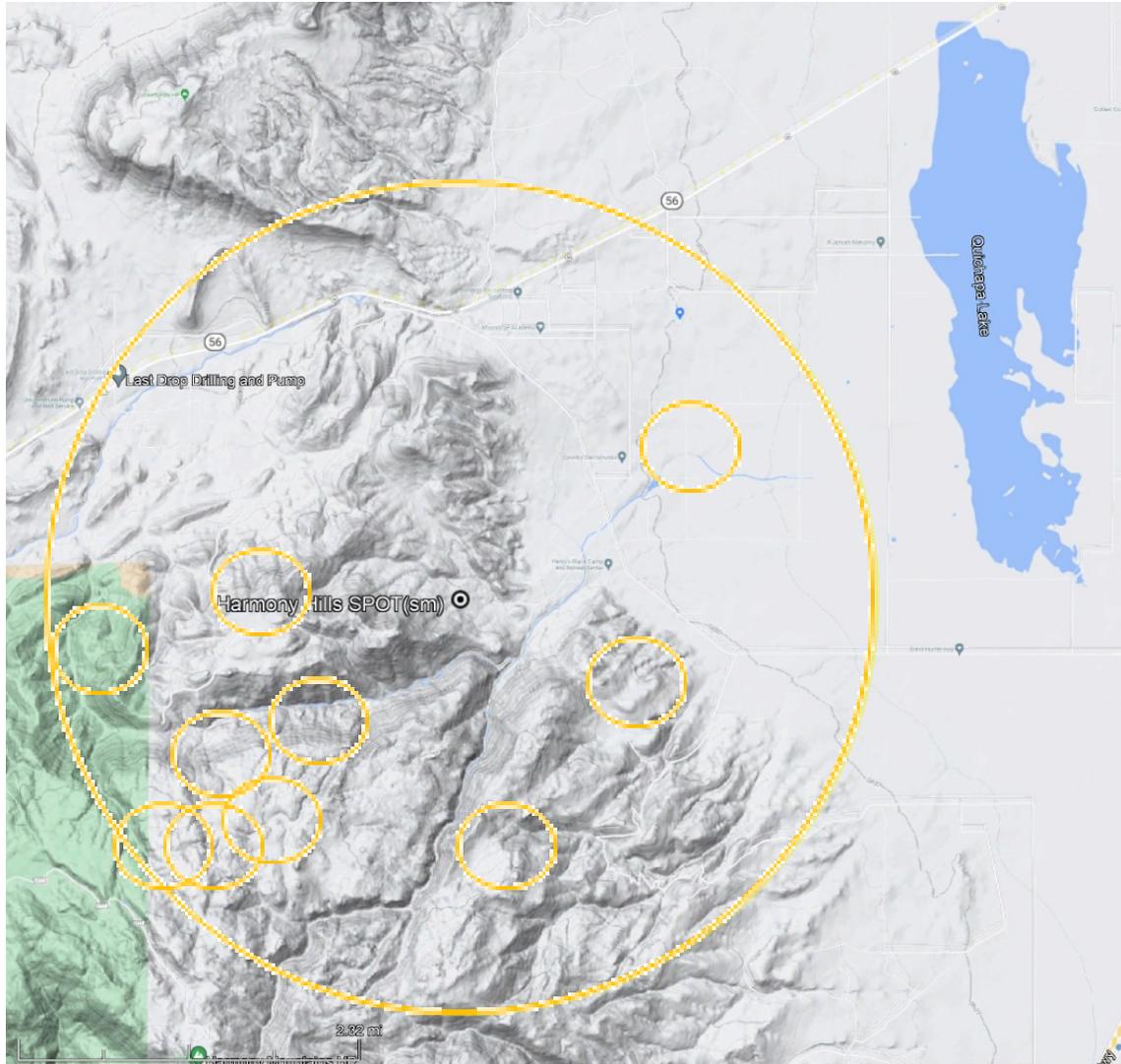


Harmony Hills Shallow Resistivity L268 T479

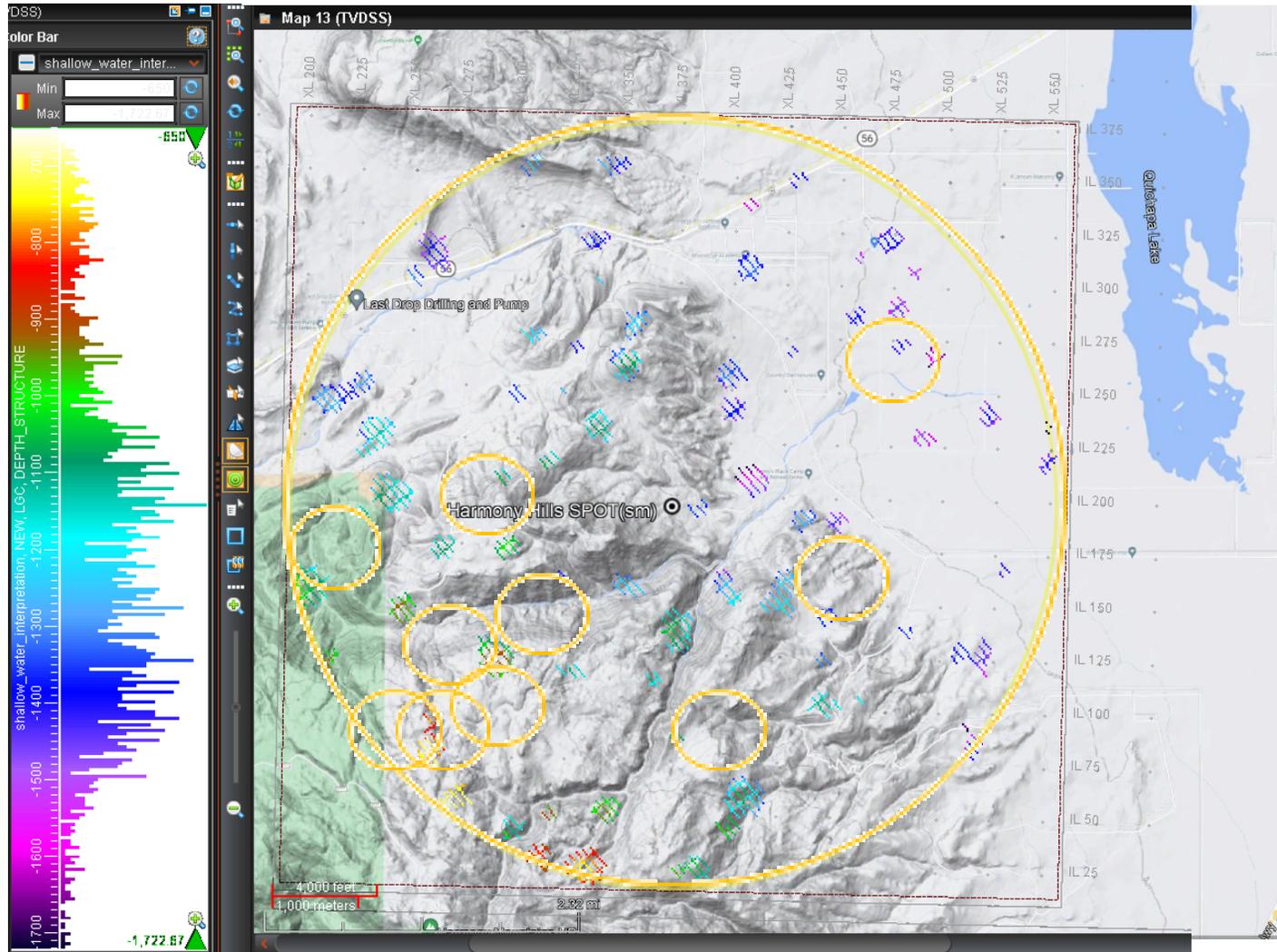


Shallow High Resistivity Areas Harmony Hills

- Note these 10 apparent resistivity upwellings are not as long vertically as the upwellings in Shirts Canyon.
- In general, the fractured quartz monzonite appears to have smaller sweetspots, which are probably related to shallow faulting.
- There are many more of these smaller anomalies than the larger anomalies in Shirts Canyon, as shown on the next slide.

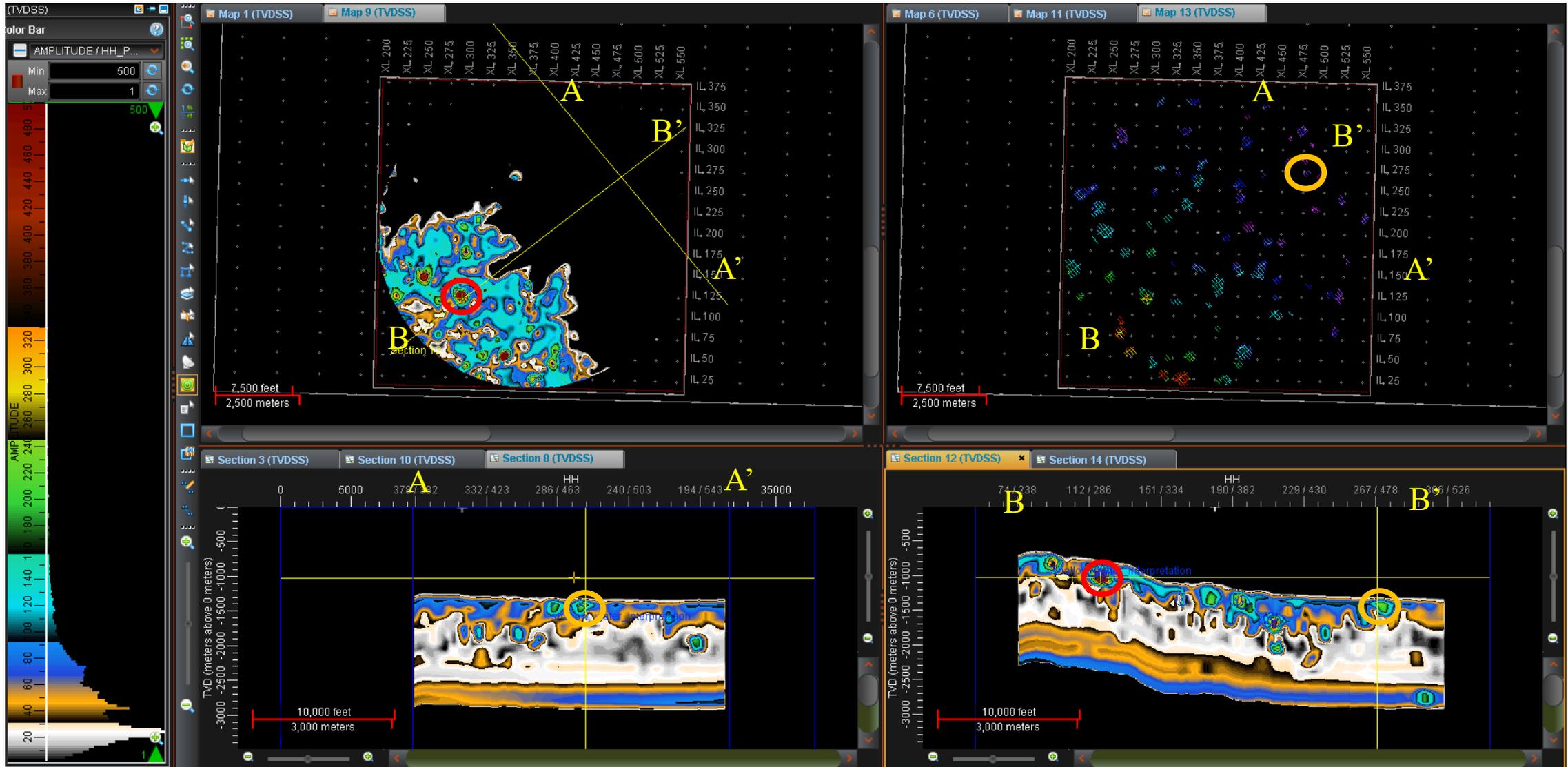


Shallow High Permittivity Areas Harmony Hills

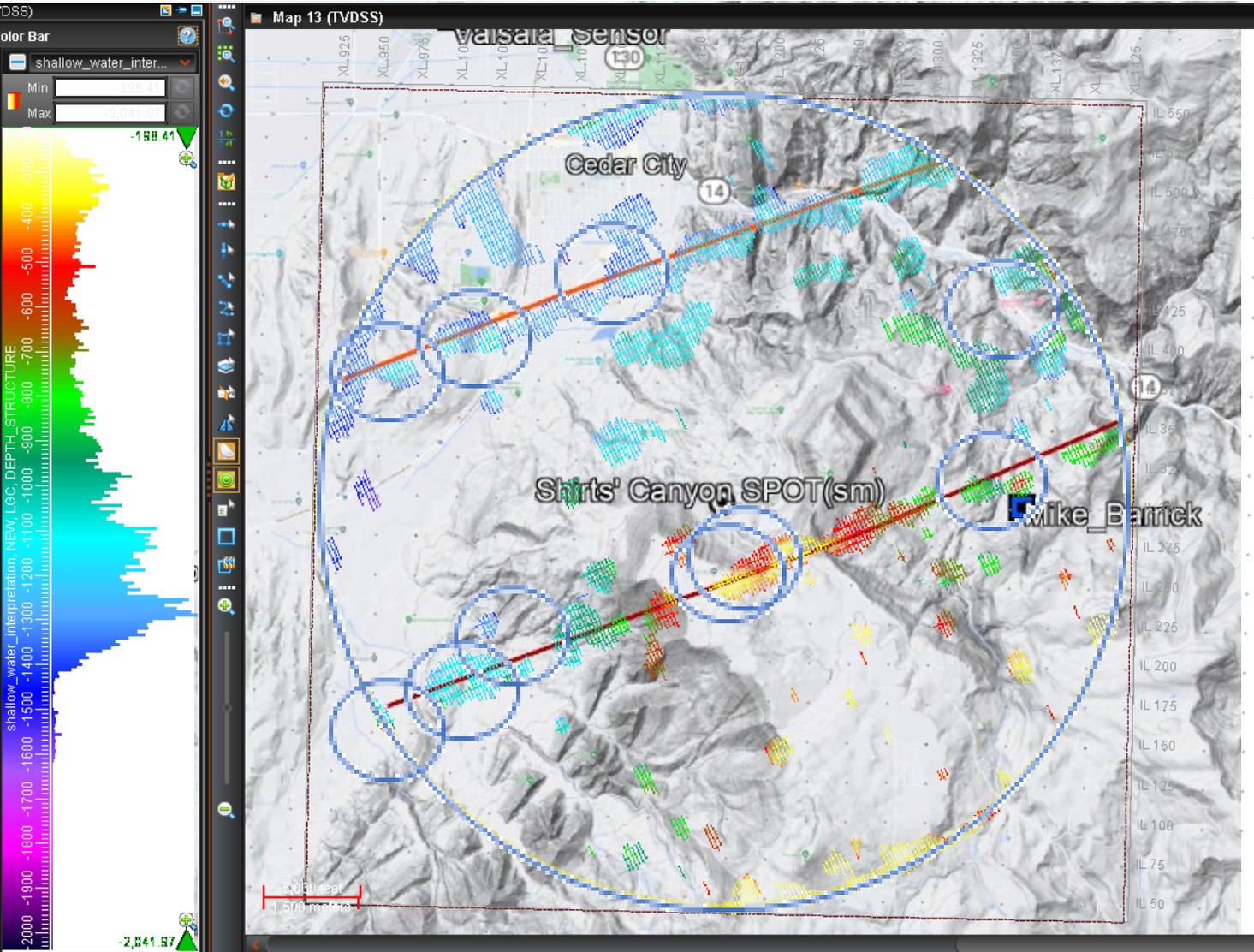


- 10 apparent resistivity upwellings shown as orange circles.
- Many more apparent permittivity anomalies mapped, with some overlap.
- The next Line and Trace are the same location as the previous Line and Trace.
- Note the Permittivity Anomaly, circled in orange, looks better than the Apparent Resistivity Anomaly.
- A much stronger Apparent Permittivity Anomaly is circled in red, Section 12.

Harmony Hills Has Many Apparent Permittivity Anomalies (L268 T479)

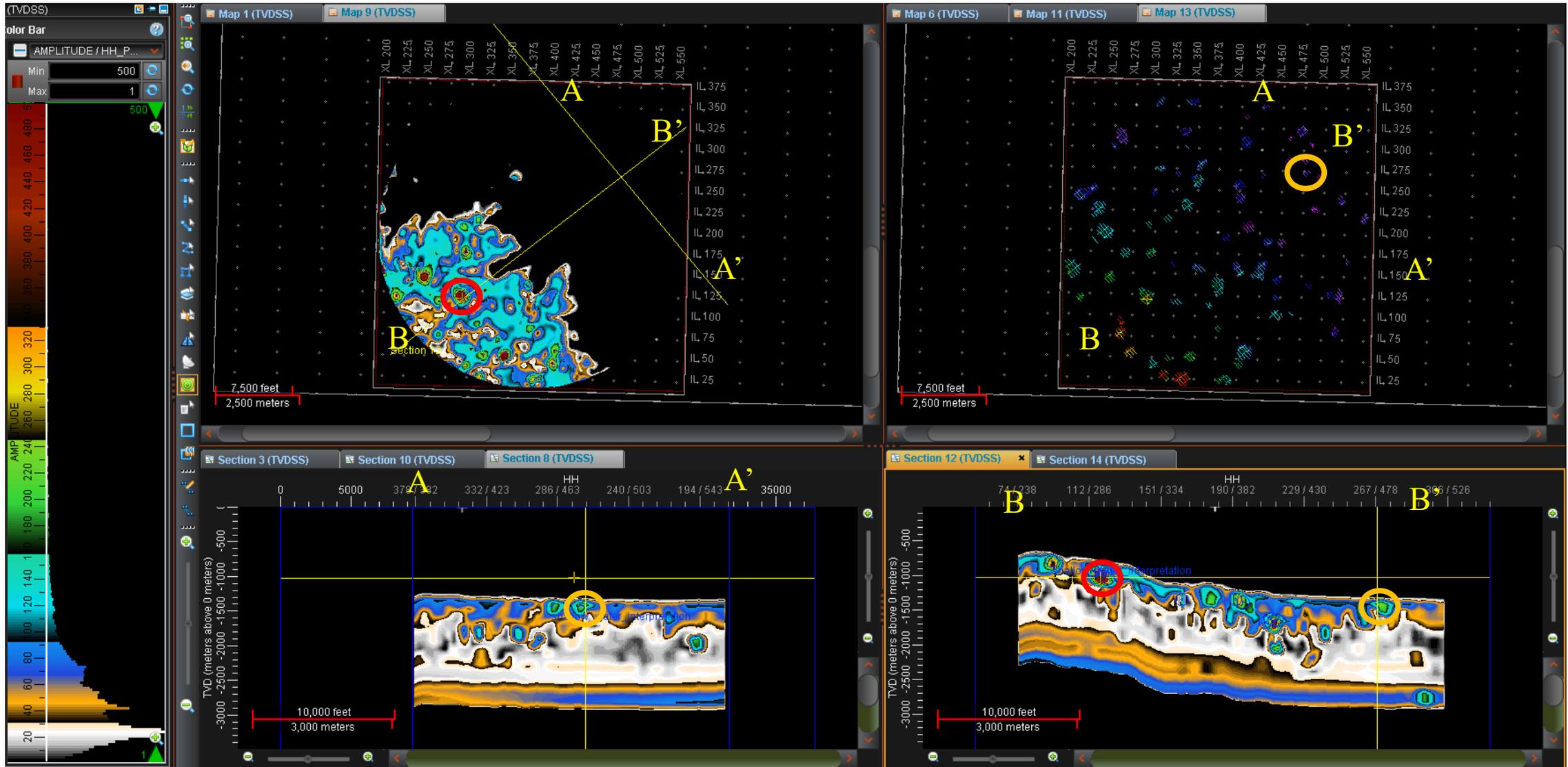


Shallow High Permittivity Areas Shirts Canyon

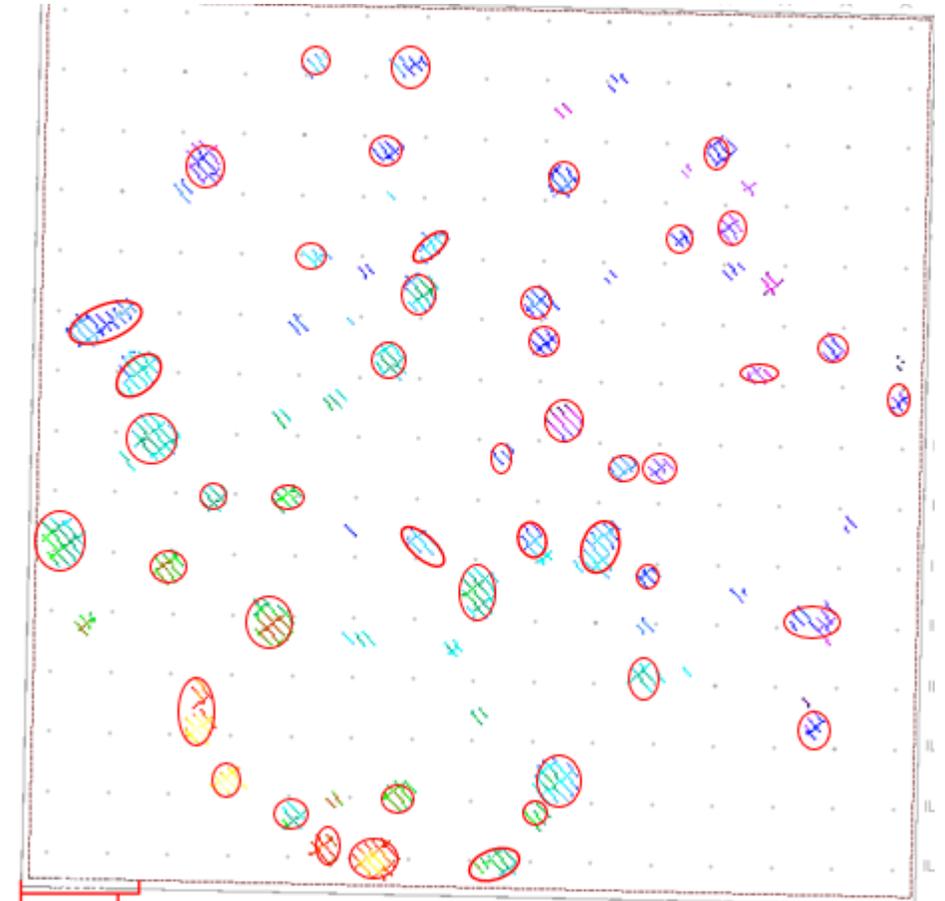
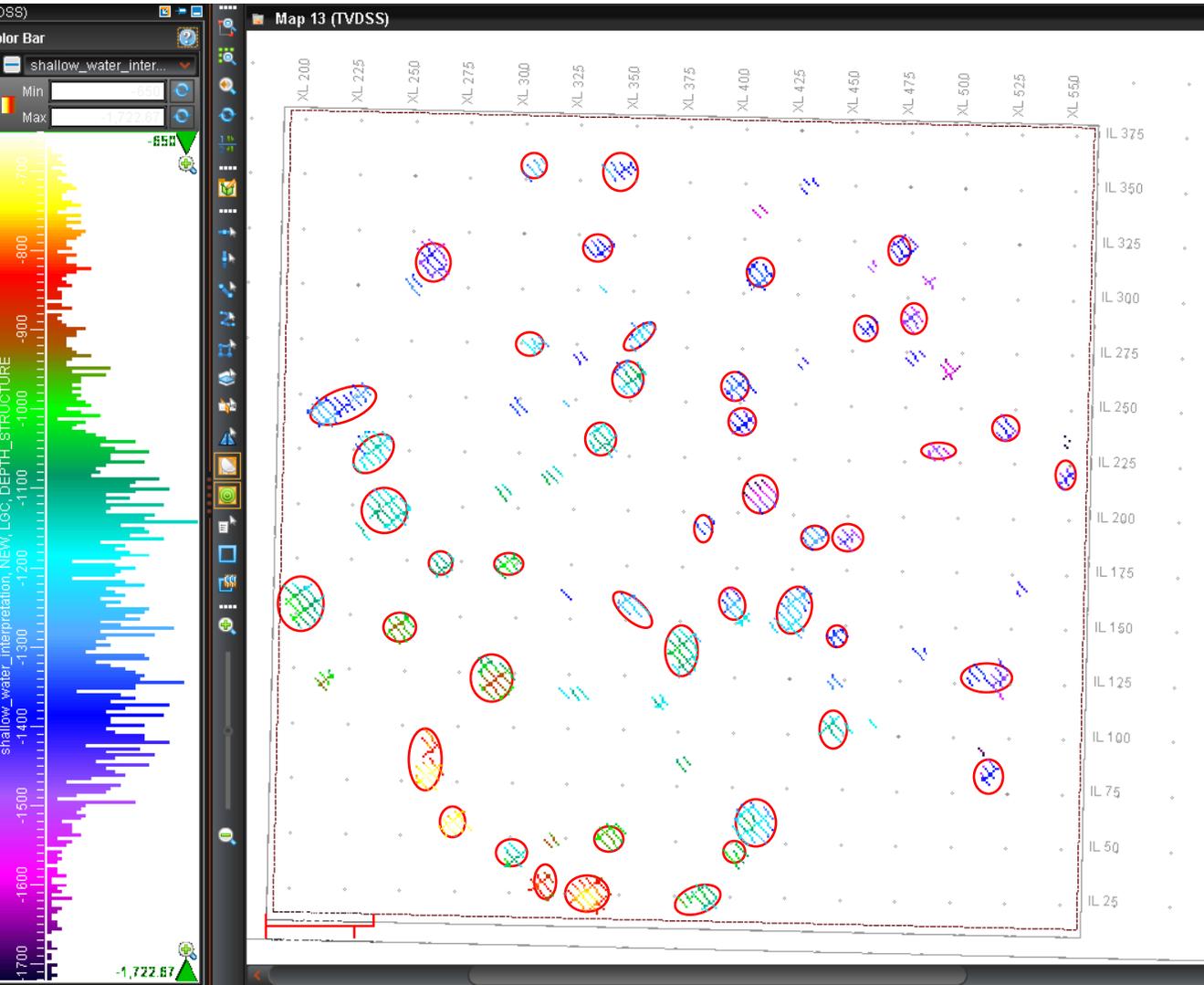


- The 10 blue apparent resistivity upwellings are mostly along the two transform faults.
- The apparent permittivity anomalies are across the entire Shirts Canyon SPOTsm.
- There are many more of these Apparent Permittivity anomalies than identified Apparent Resistivity anomalies in Shirts Canyon.

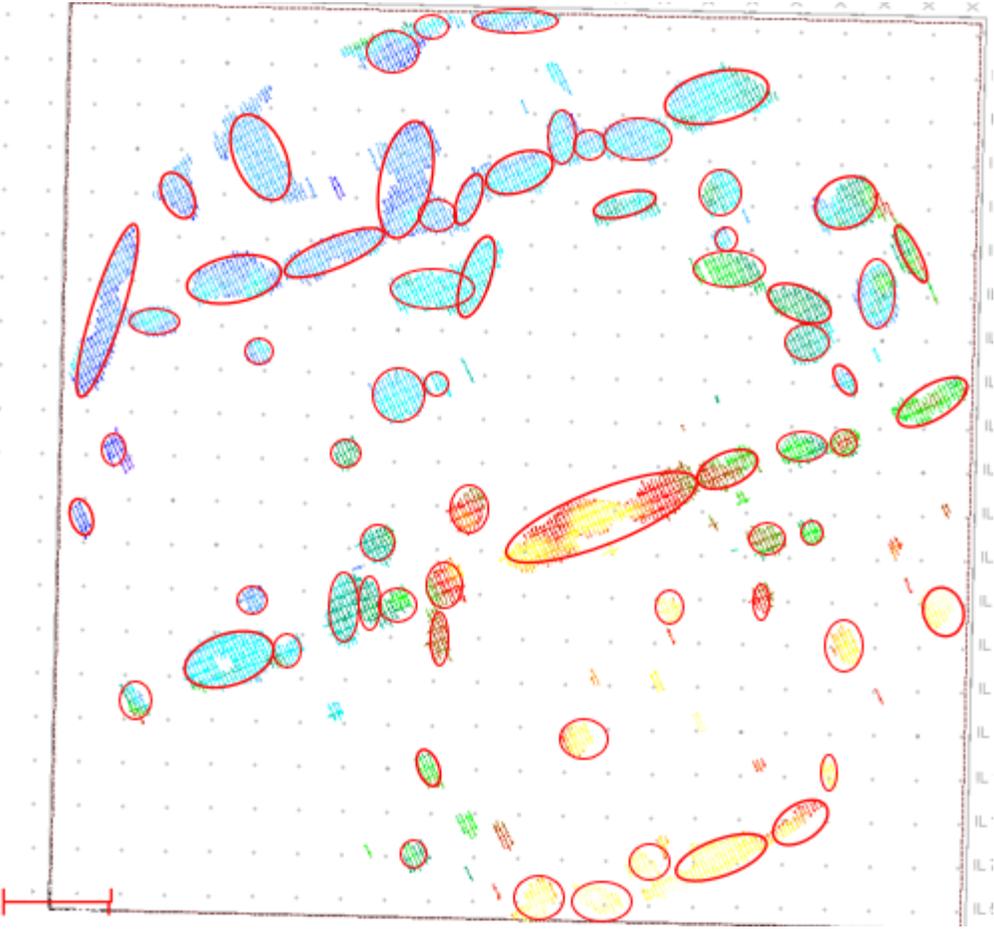
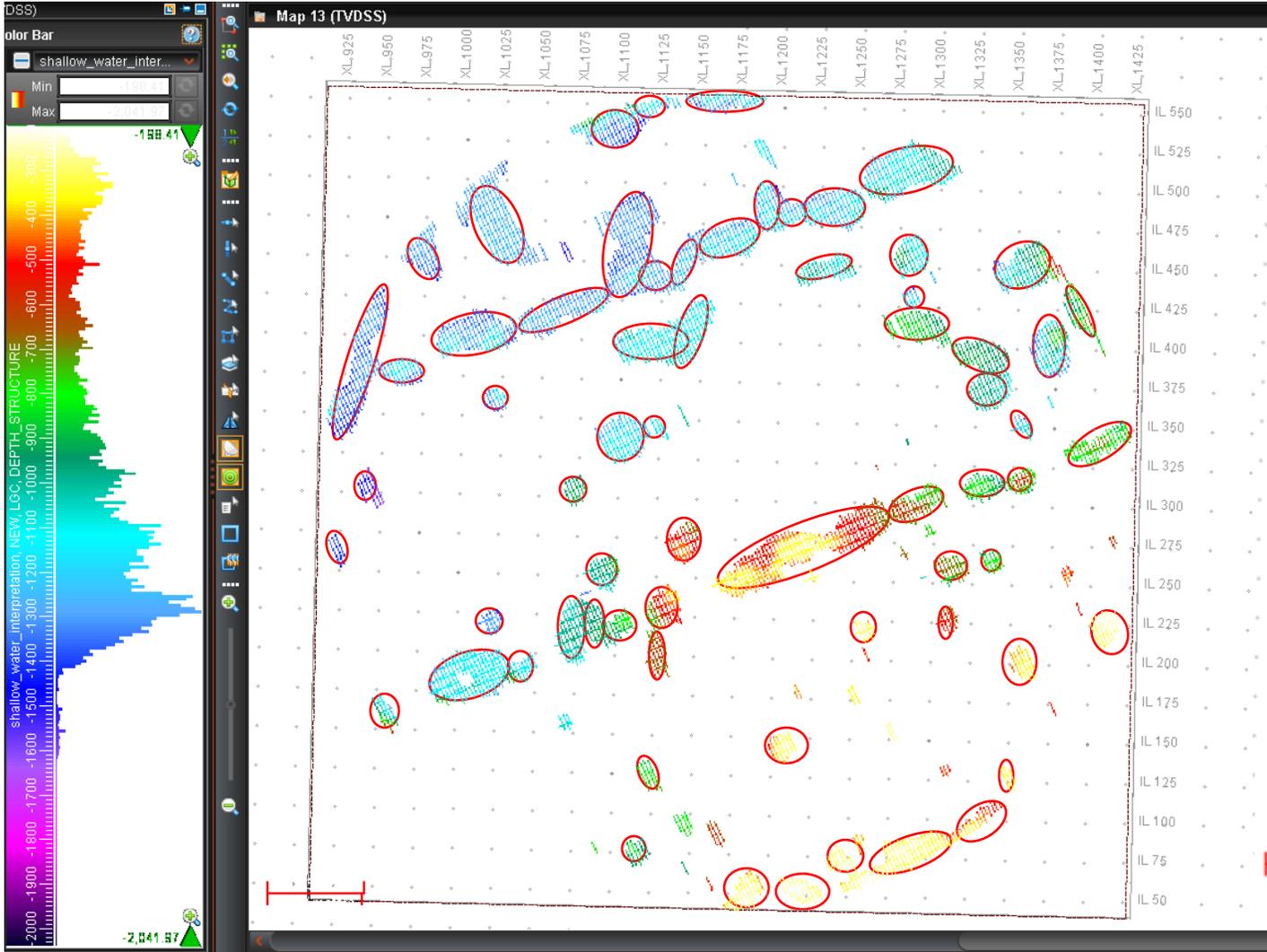
Harmony Hills Has Many Apparent Permittivity Anomalies (L268 T479)



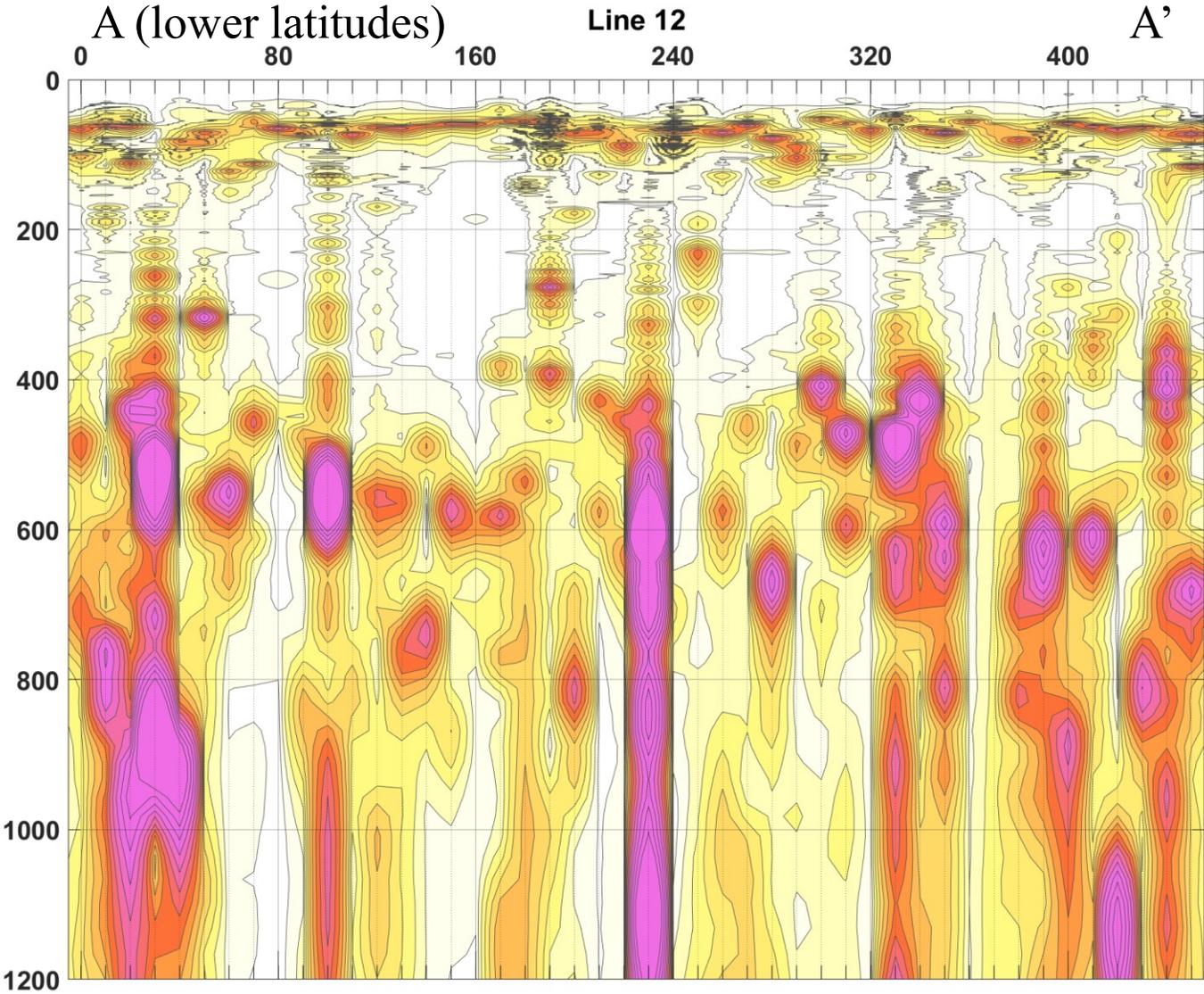
Harmony Hills Shallow Permittivity Anomalies



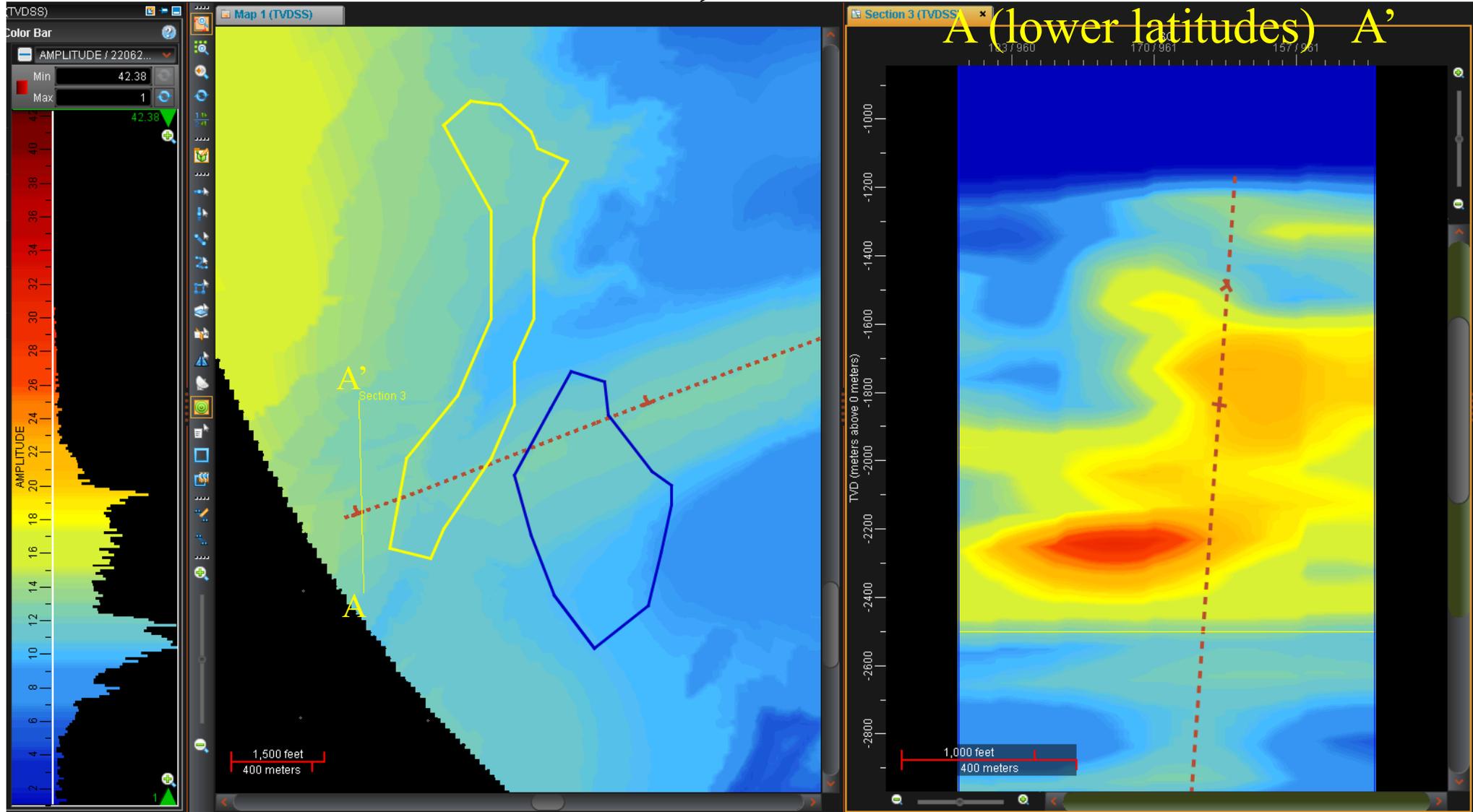
Shirts Canyon Shallow Permittivity Anomalies



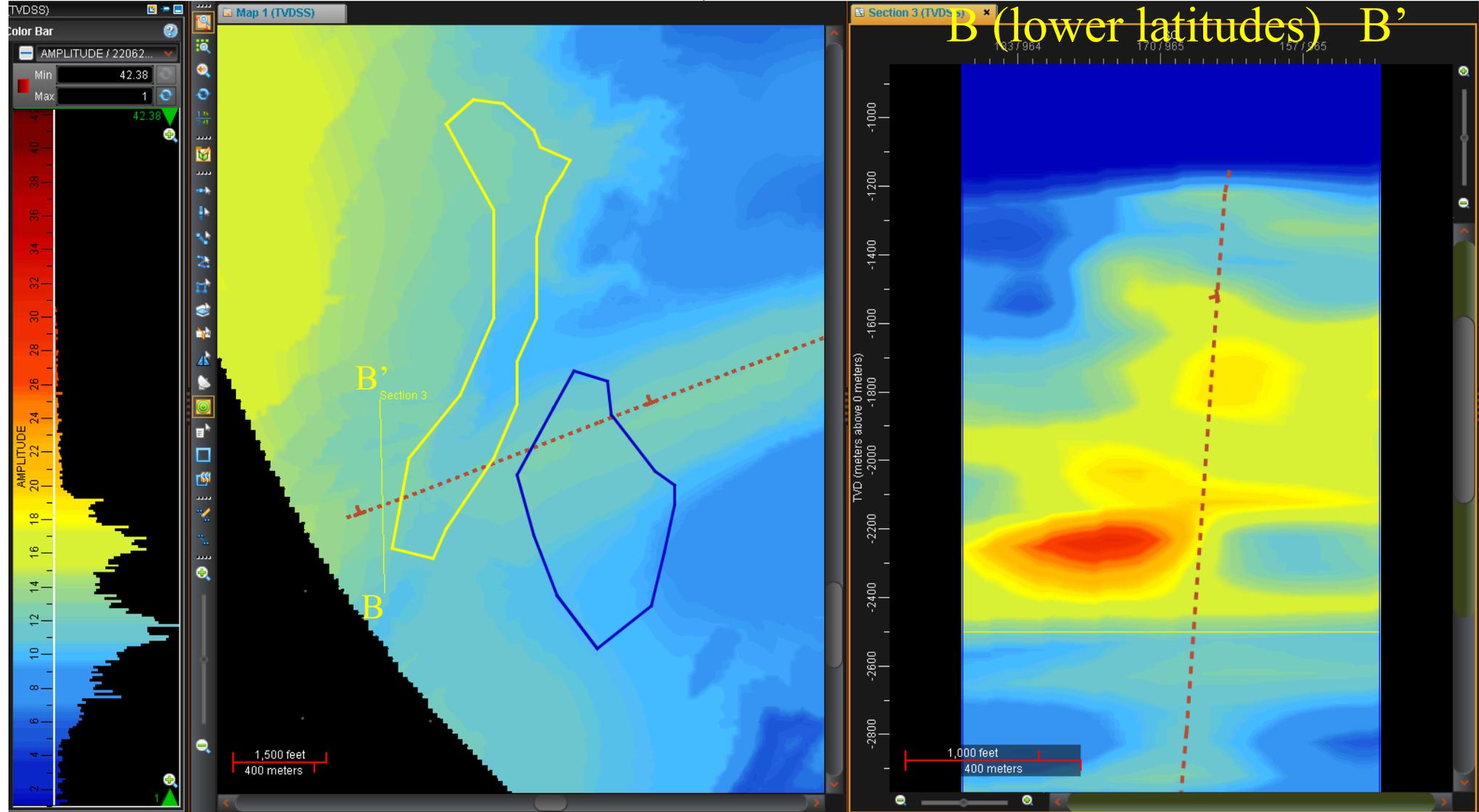
Pyramids: 3SH RAP Line-12



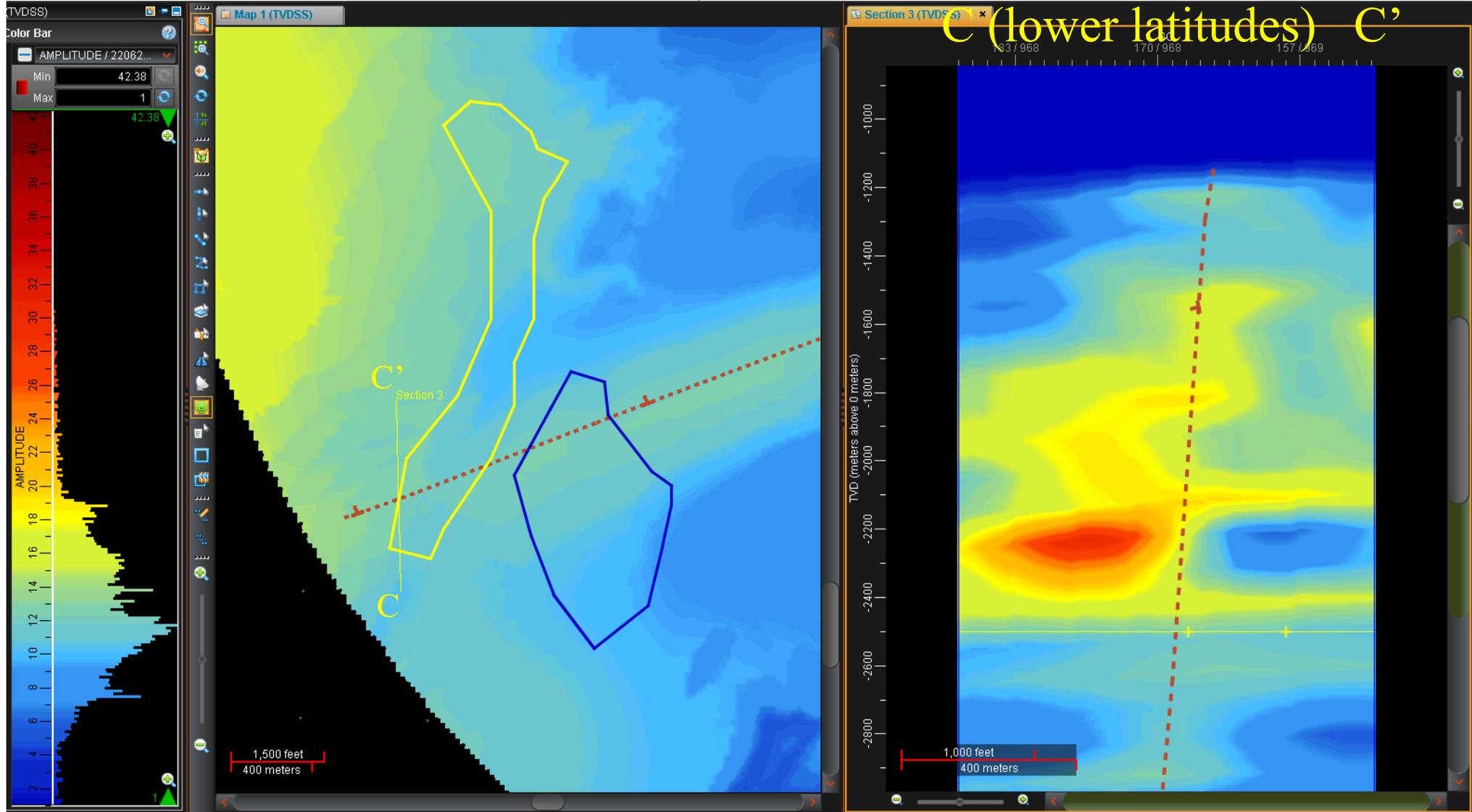
Pyramids: 3SH RAP Line-12, 900 feet west



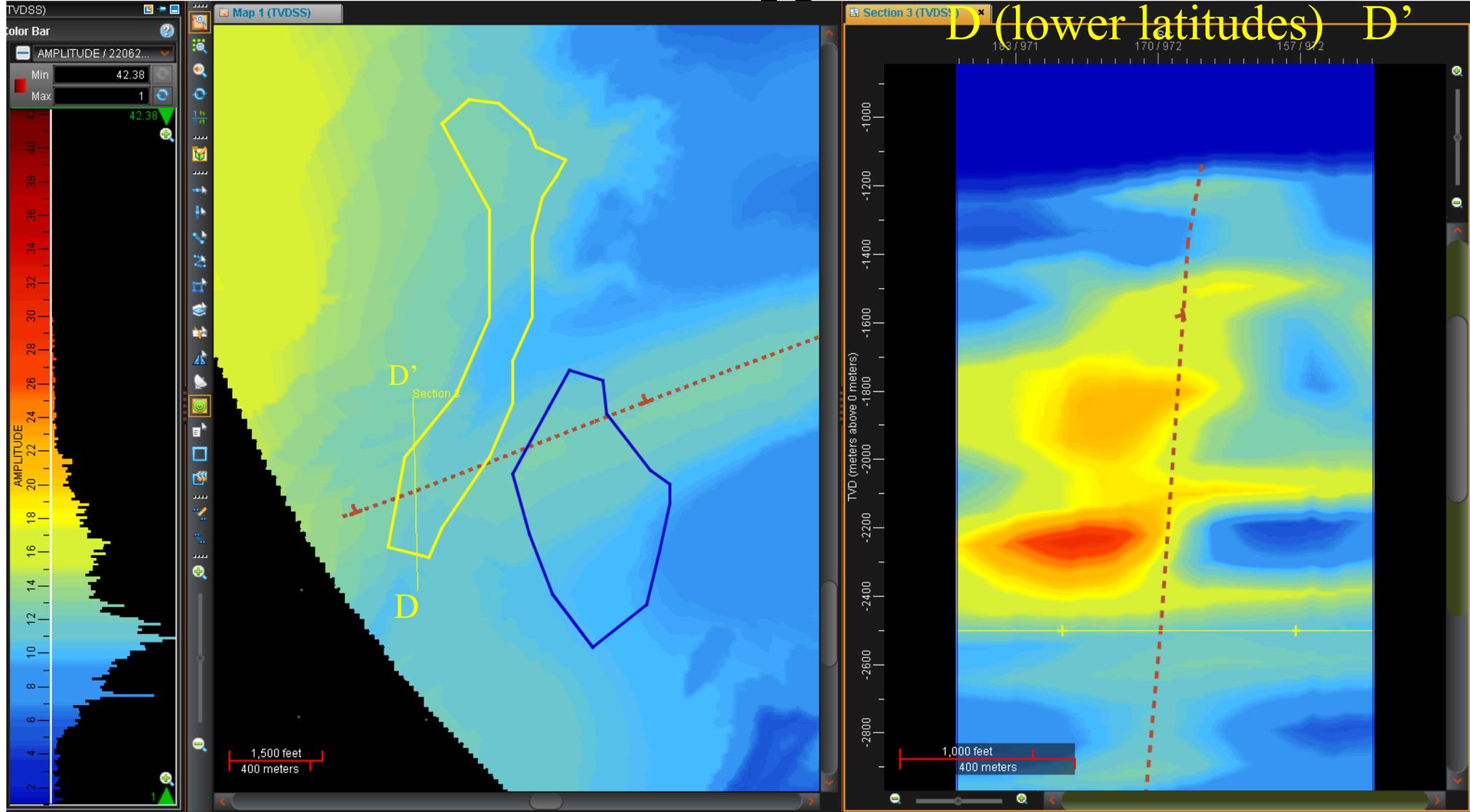
Pyramids: 3SH RAP Line-12, 600 feet west



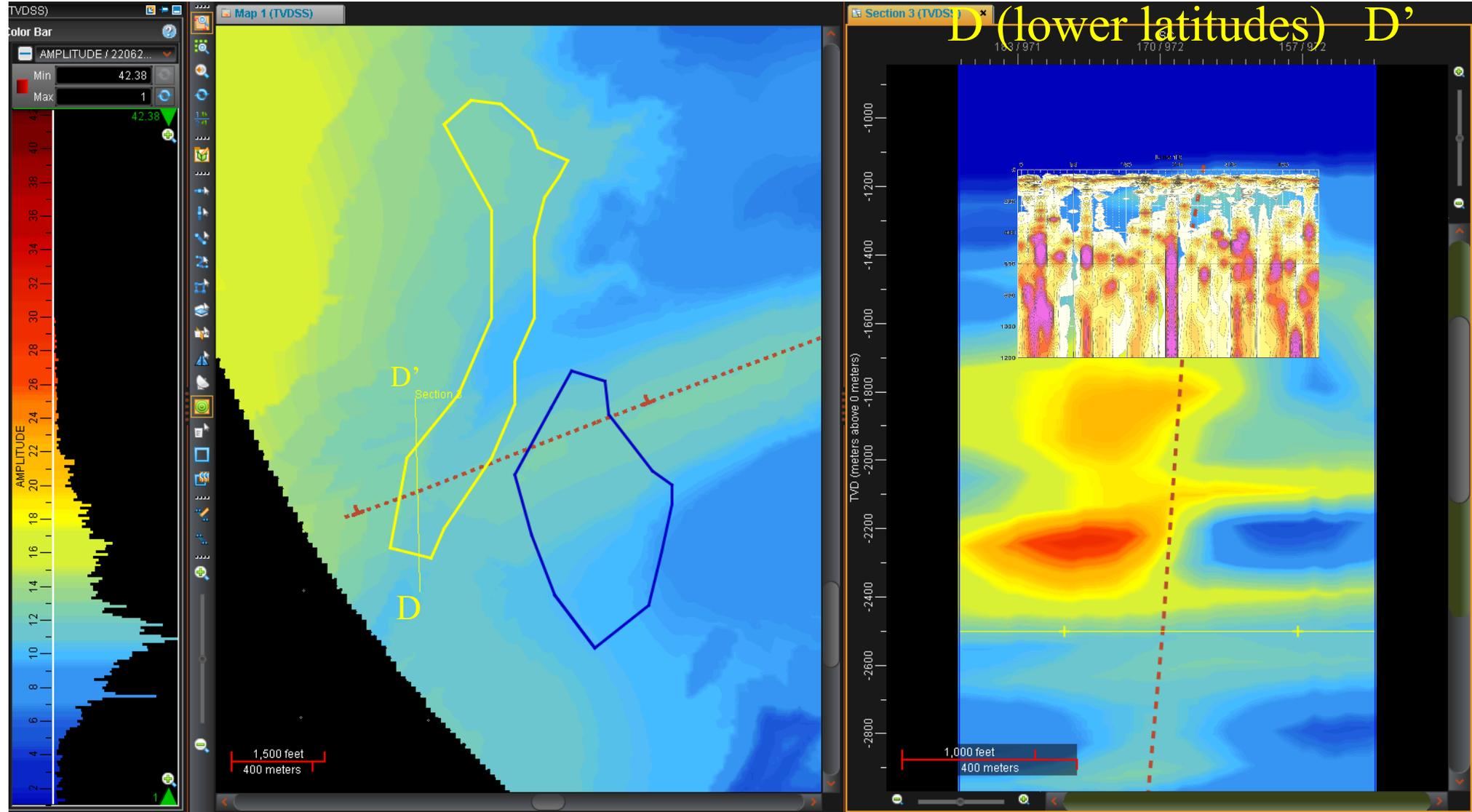
Pyramids: 3SH RAP Line-12, 300 feet west



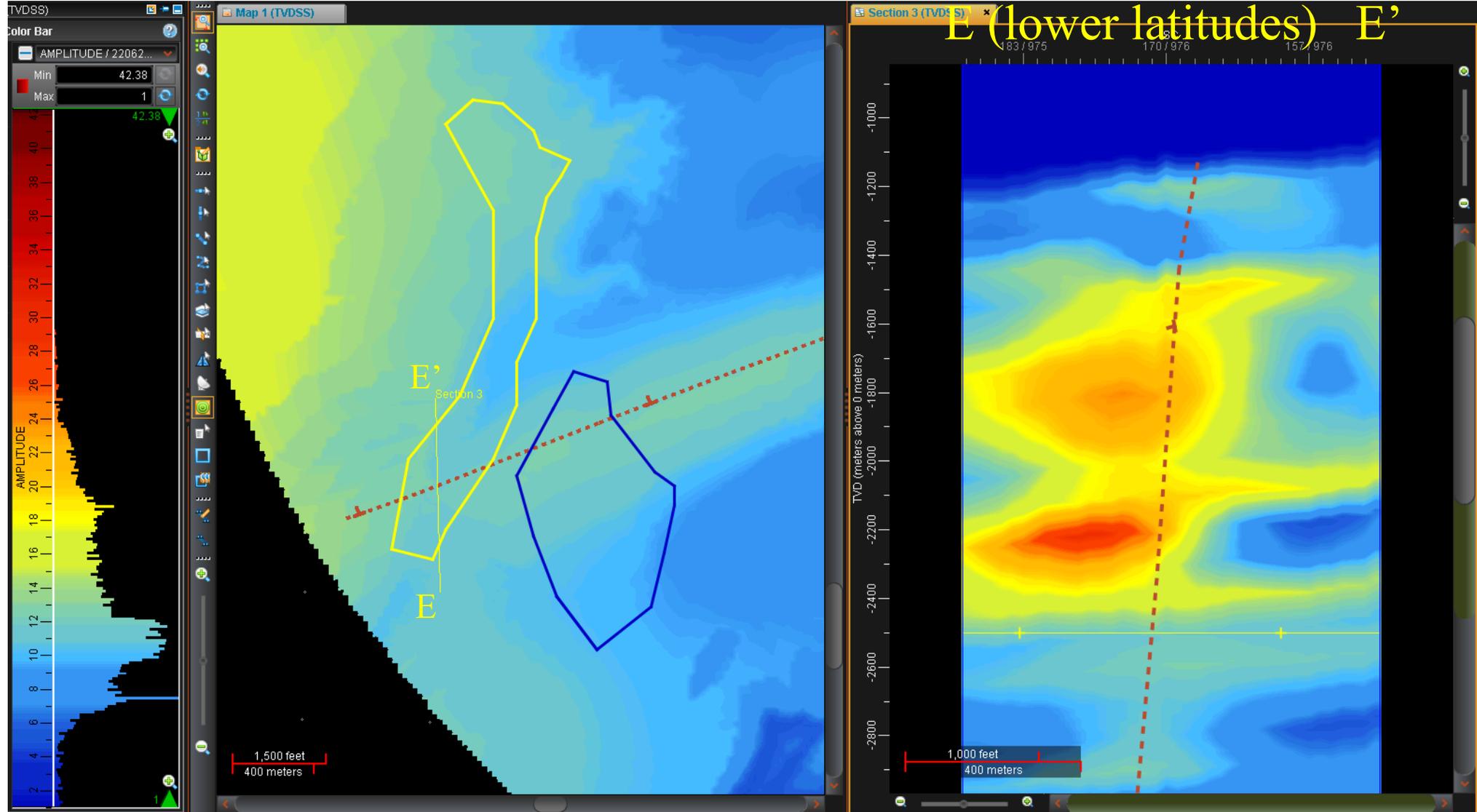
Pyramids: 3SH RAP Line-12, approximate



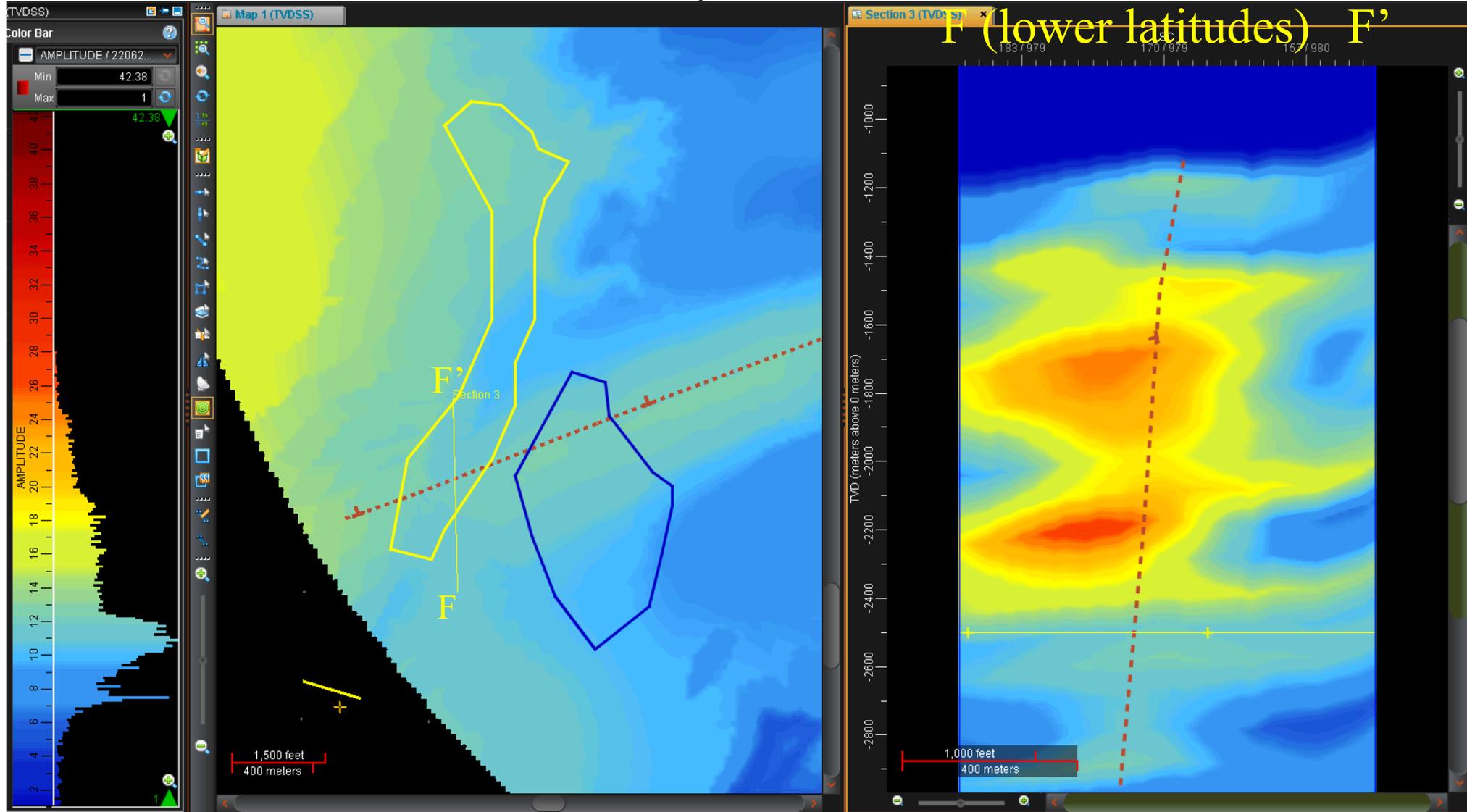
Pyramids: 3SH RAP Line-12, ~overlay



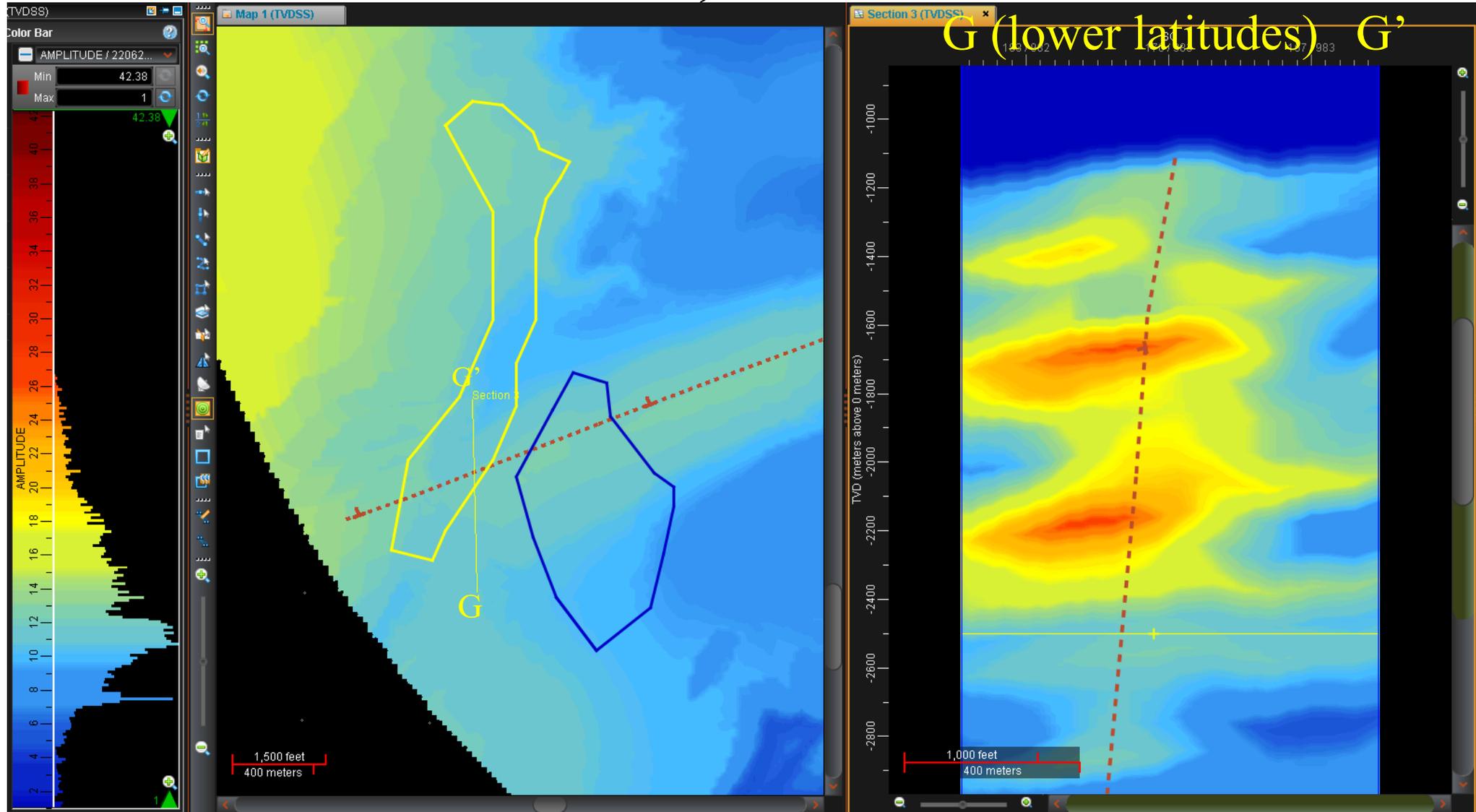
Pyramids: 3SH RAP Line-12, 300 feet east



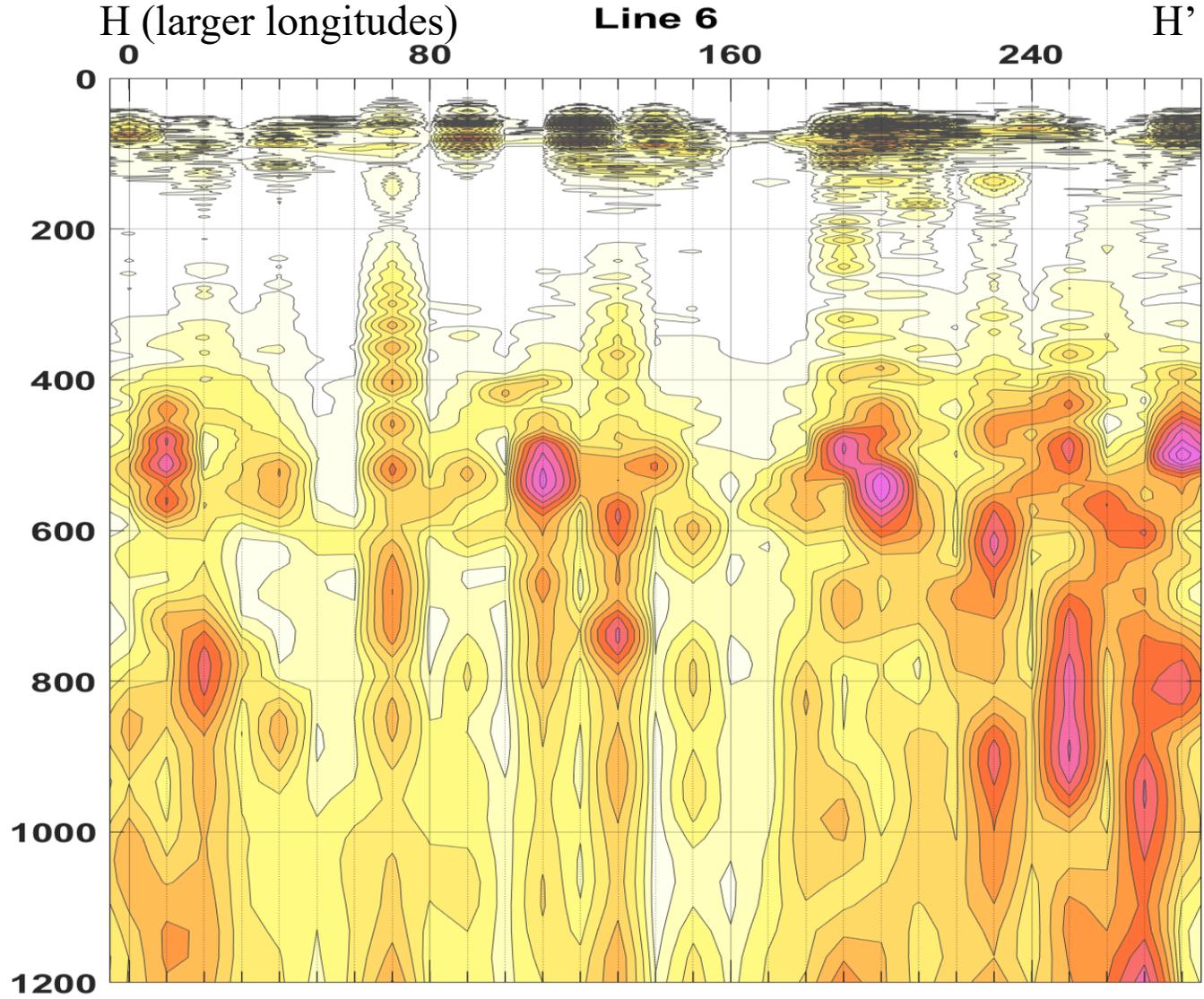
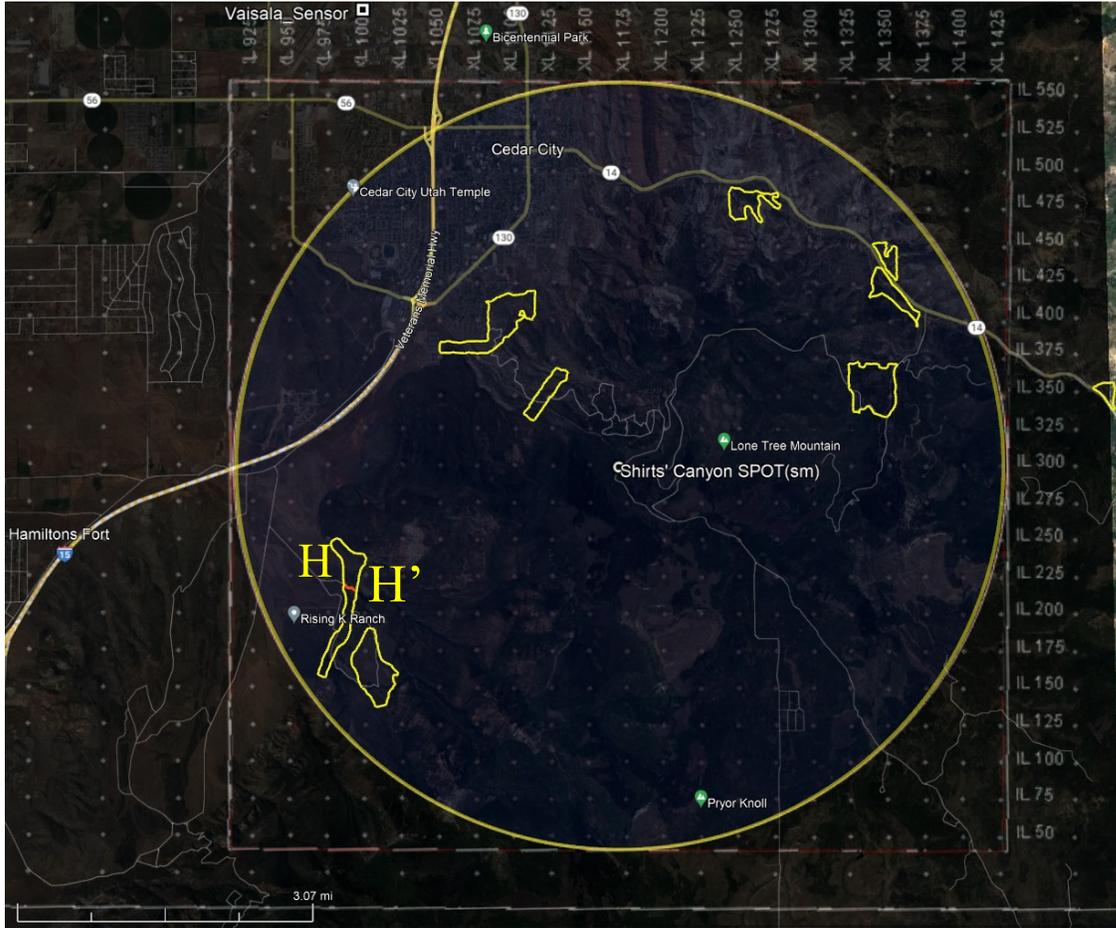
Pyramids: 3SH RAP Line-12, 600 feet east



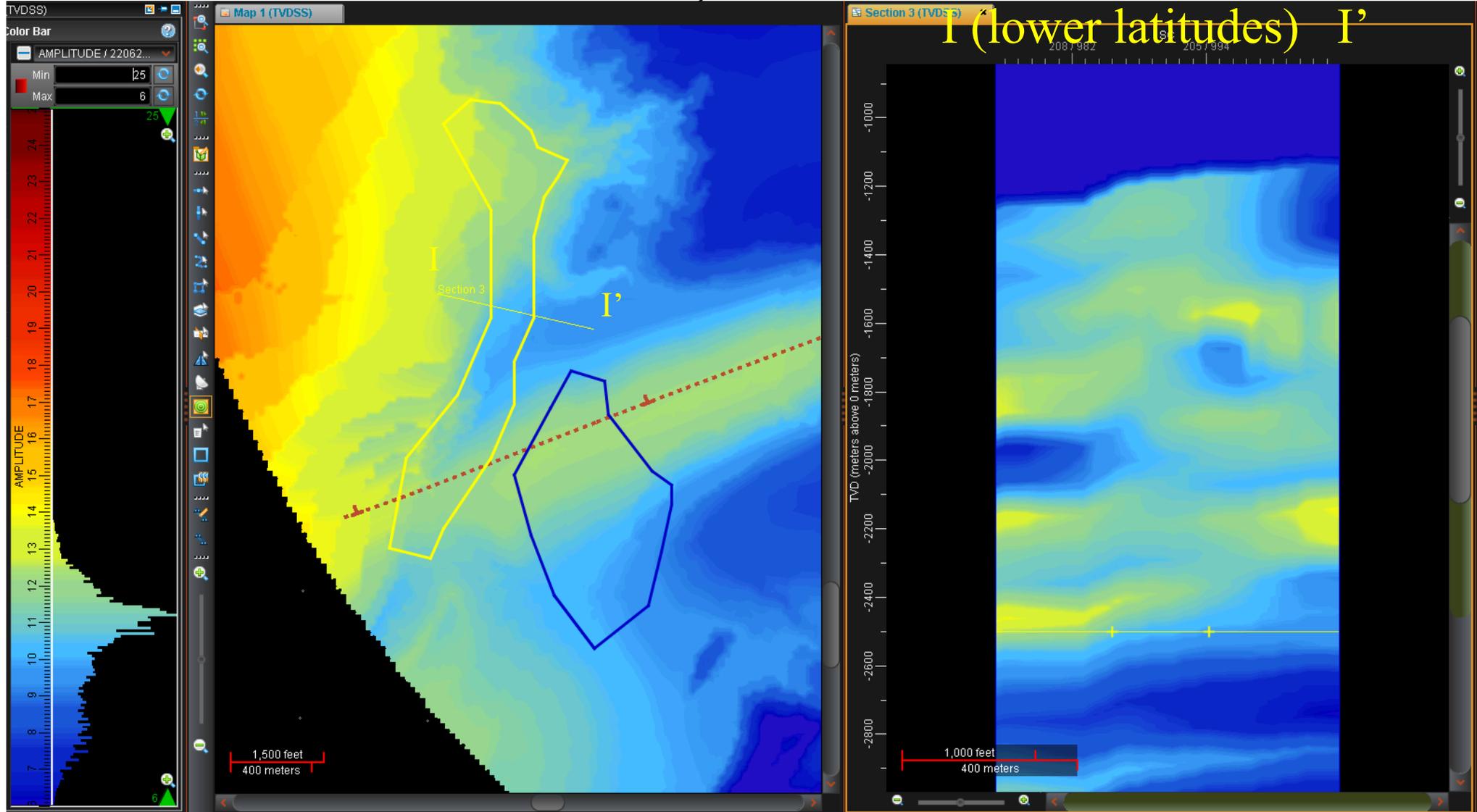
Pyramids: 3SH RAP Line-12, 900 feet east



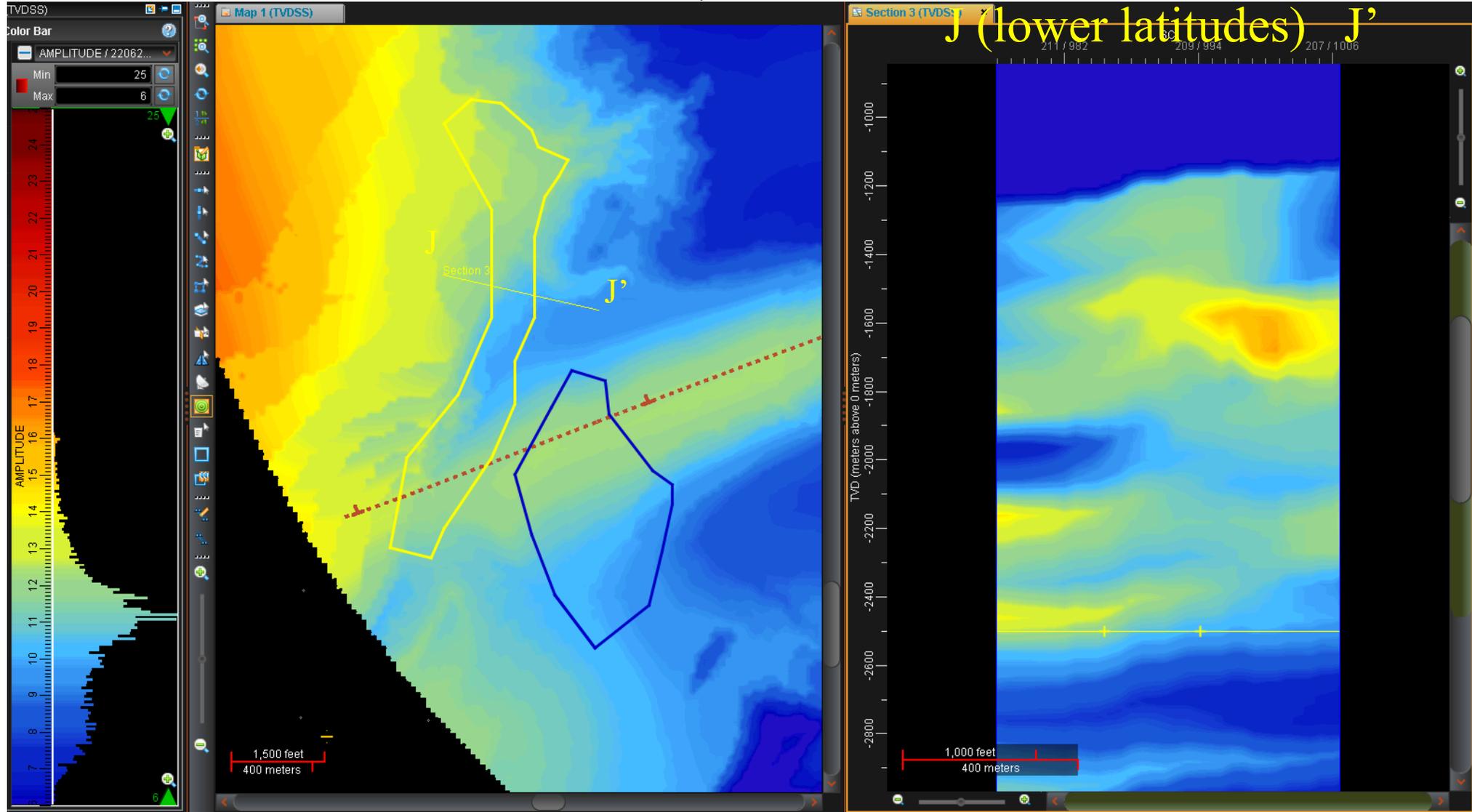
Pyramids: 3SH RAP Line-06



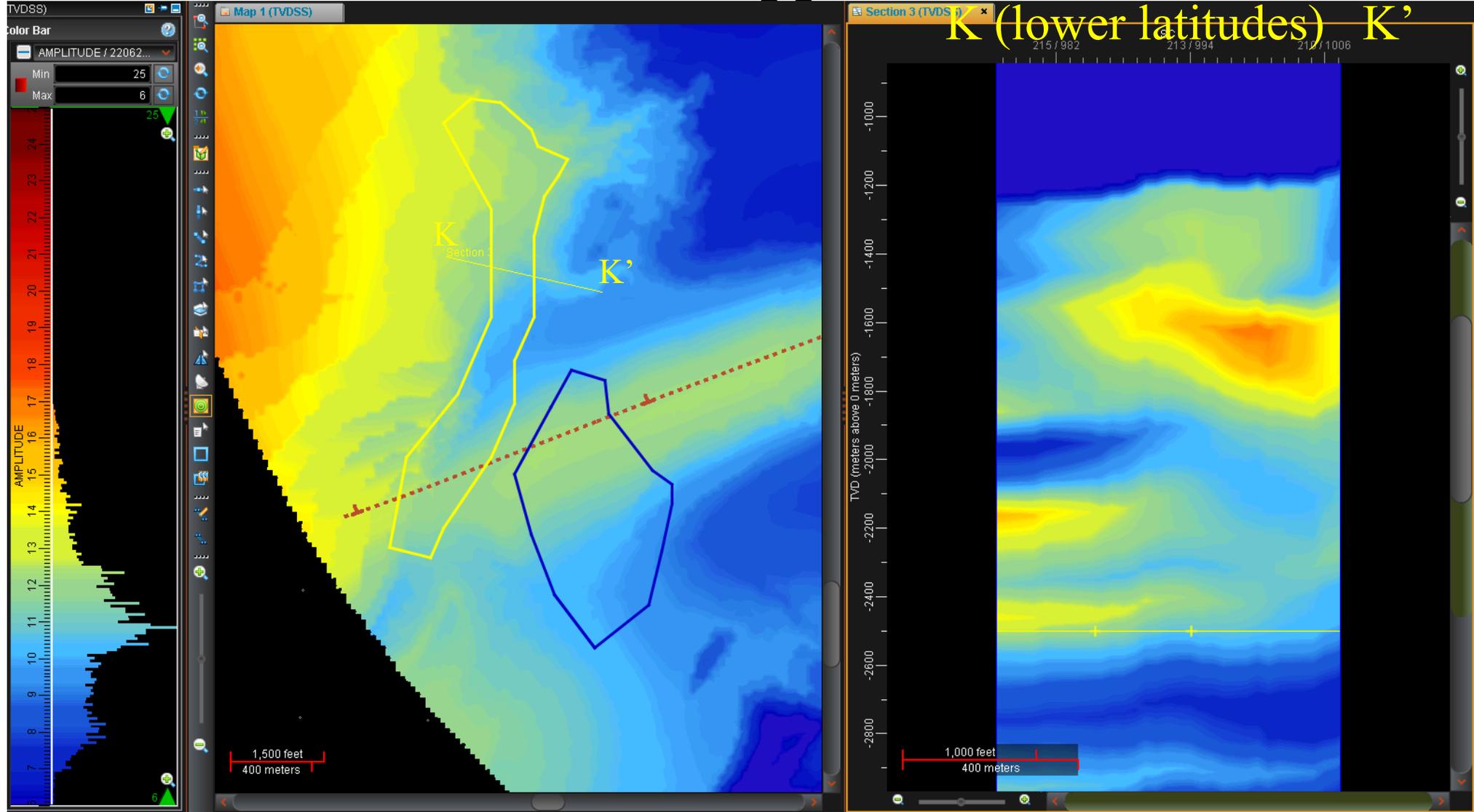
Pyramids: 3SH RAP Line-12, 600 feet SSW



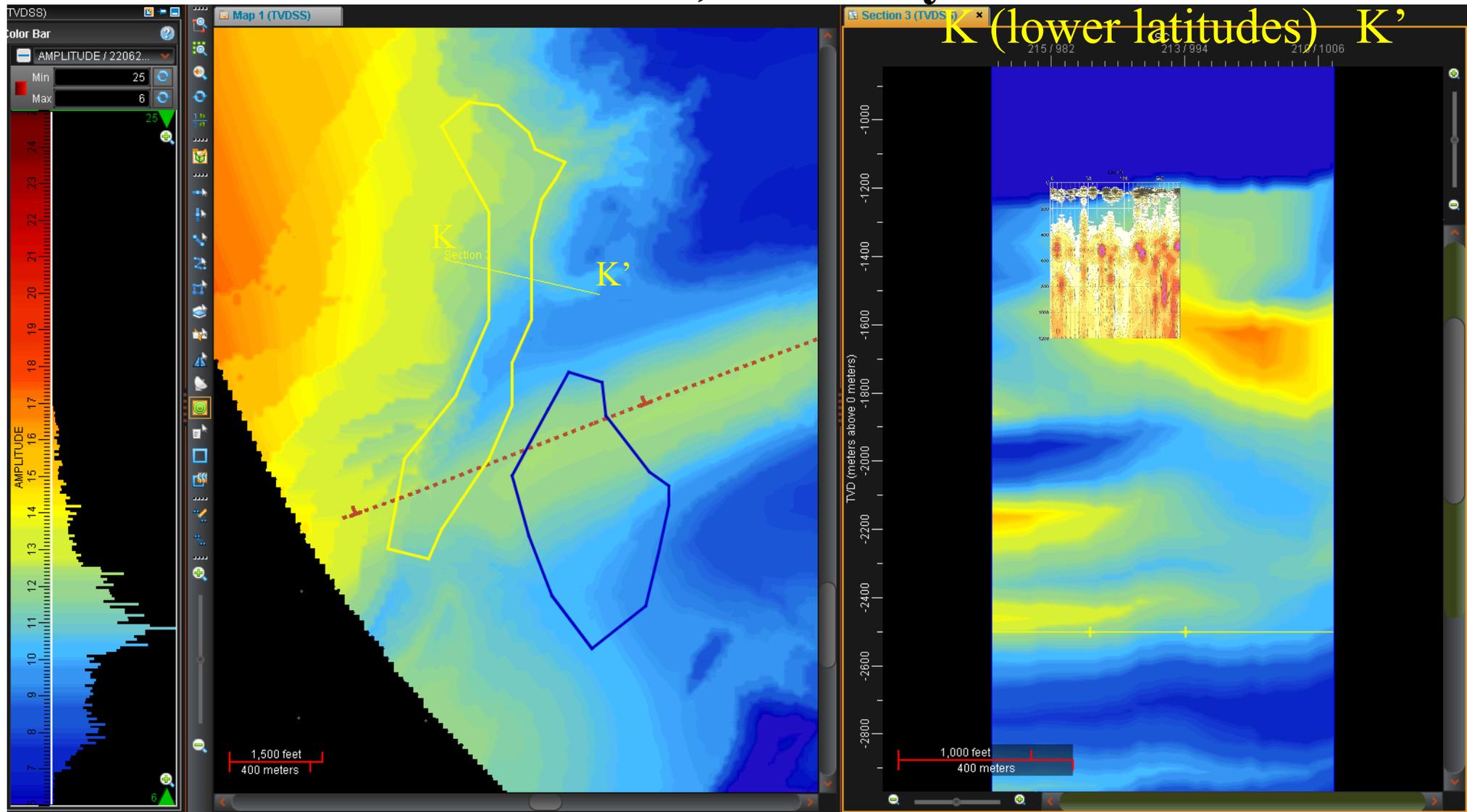
Pyramids: 3SH RAP Line-12, 300 feet SSW



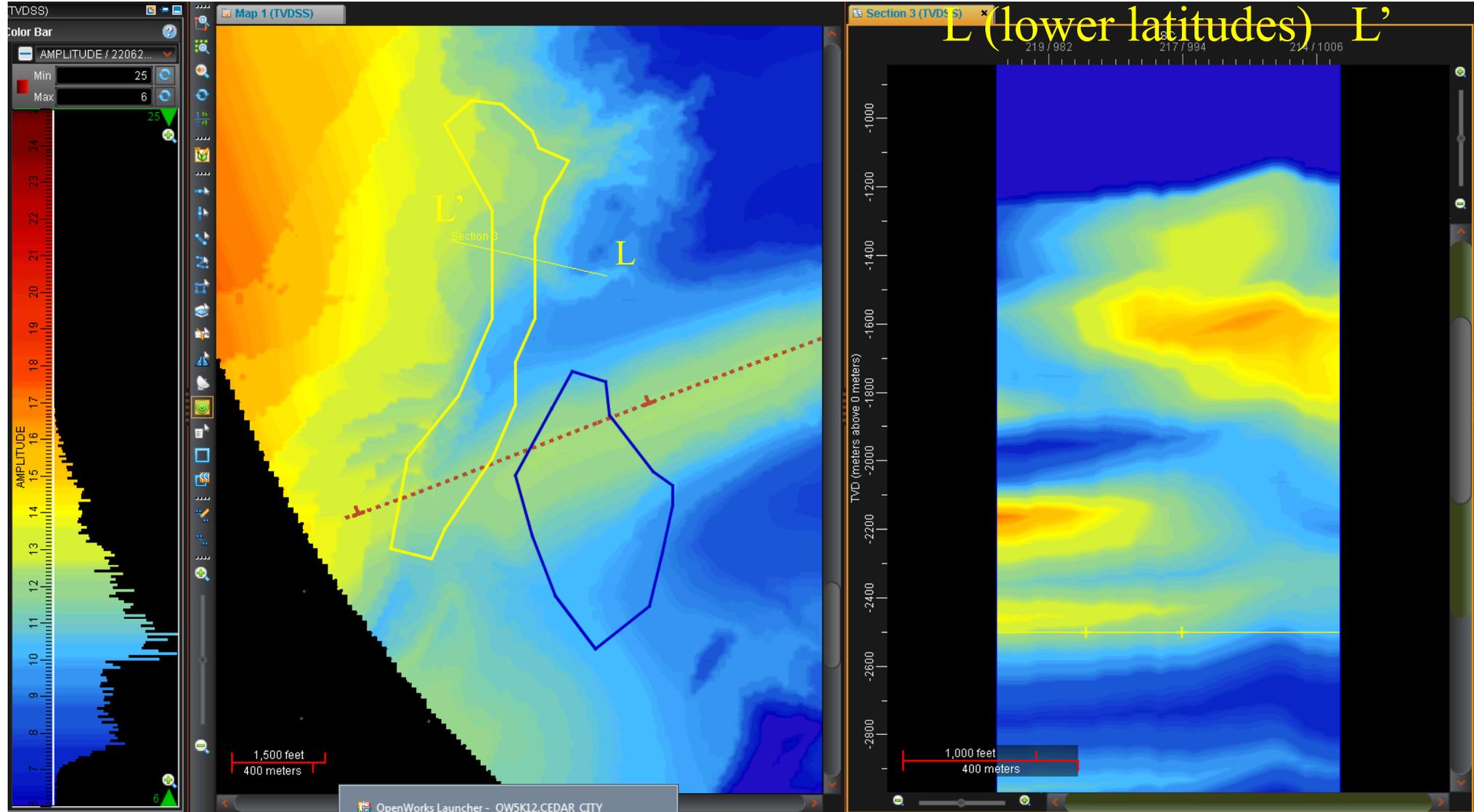
Pyramids: 3SH RAP Line-12, approximate



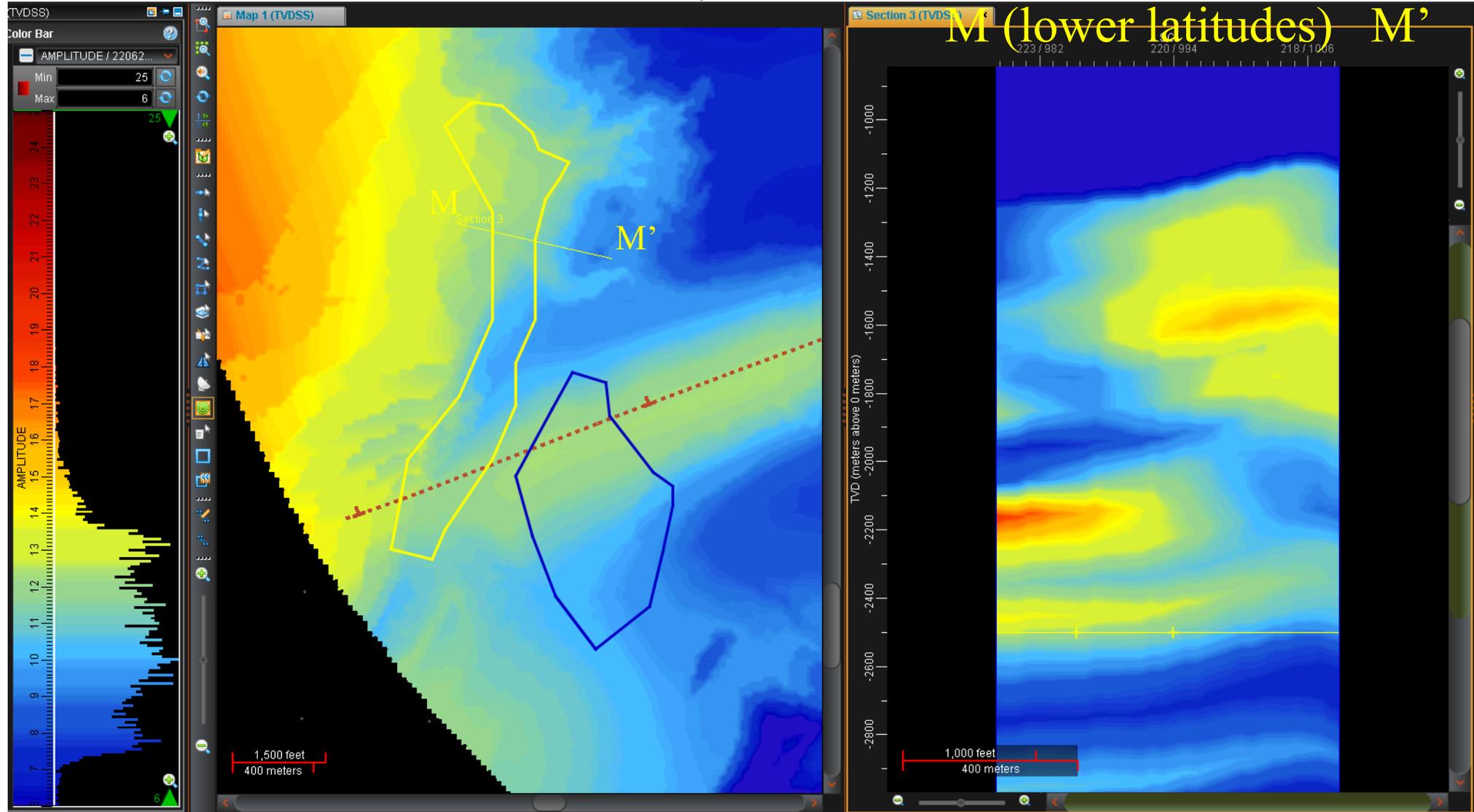
Pyramids: 3SH RAP Line-12, ~overlay



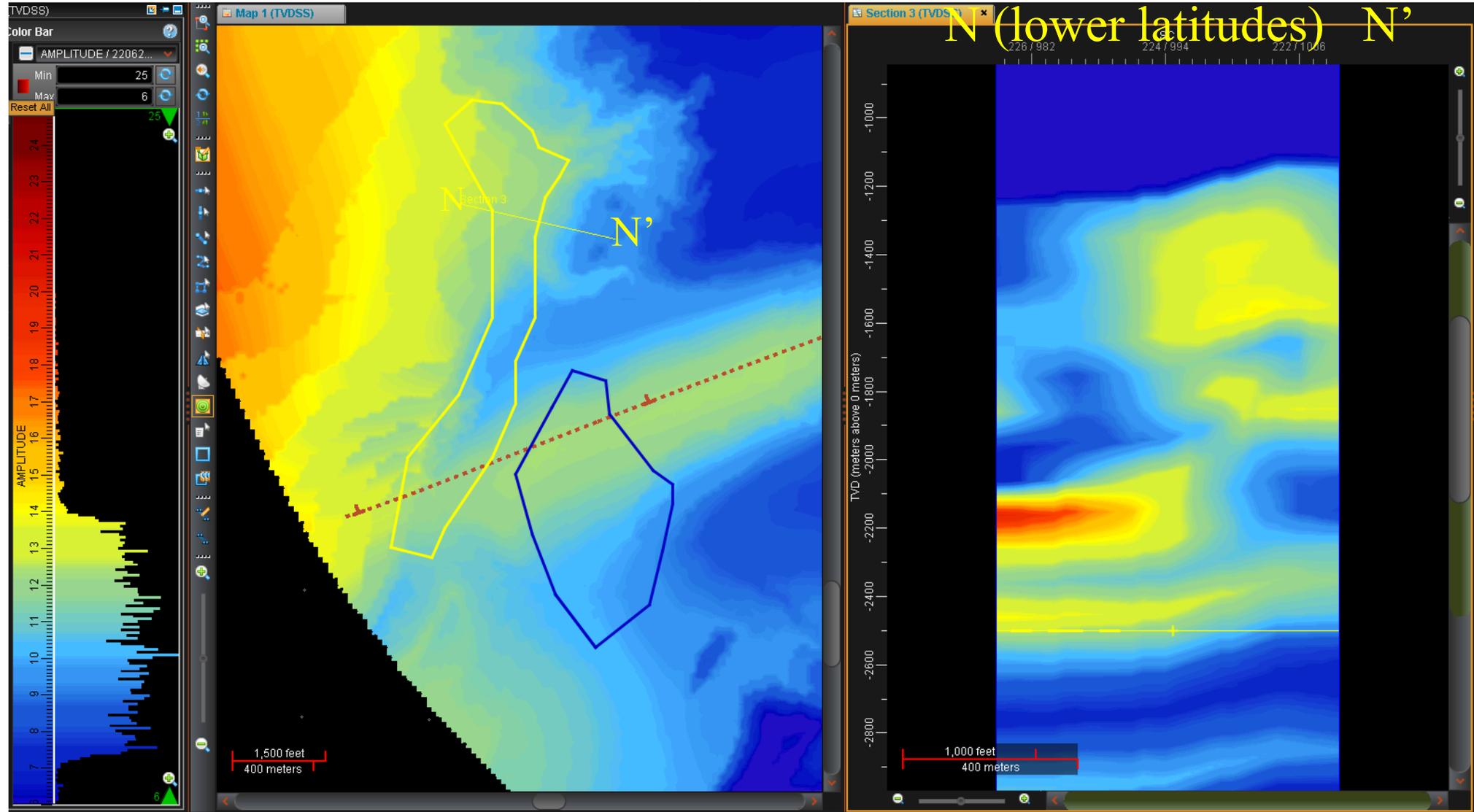
Pyramids: 3SH RAP Line-12, 300 feet NNE



Pyramids: 3SH RAP Line-12, 600 feet NNE



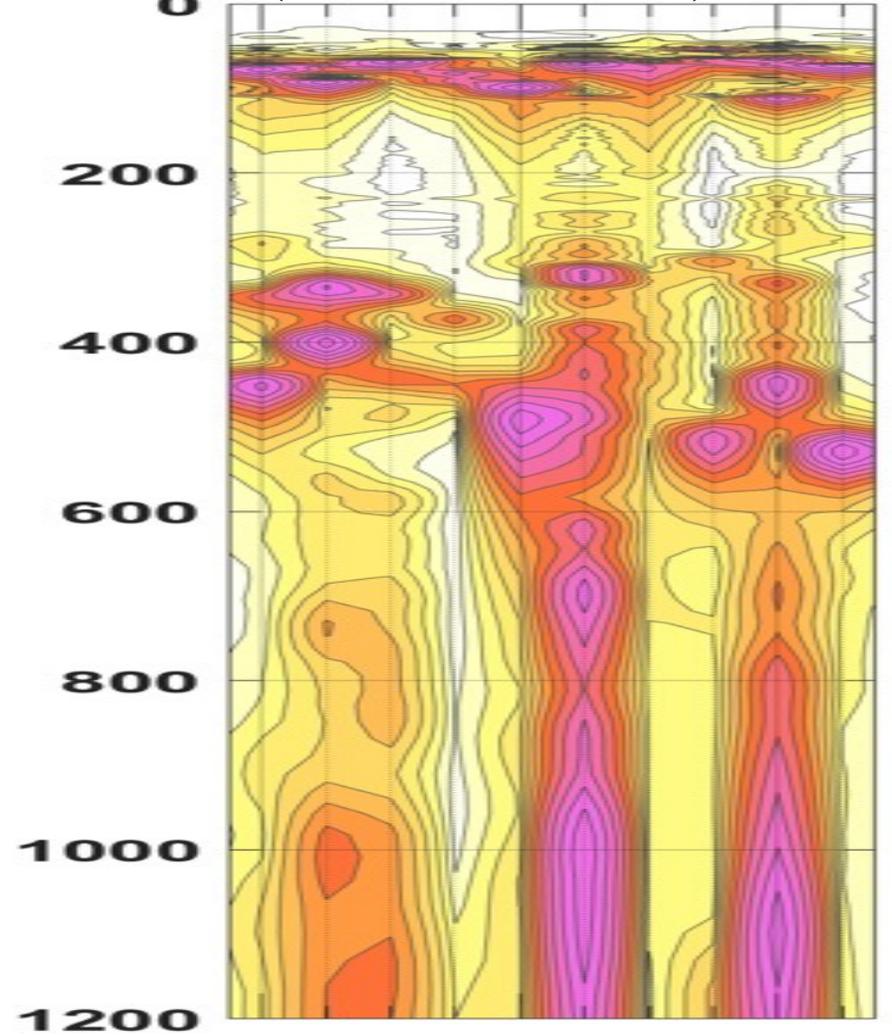
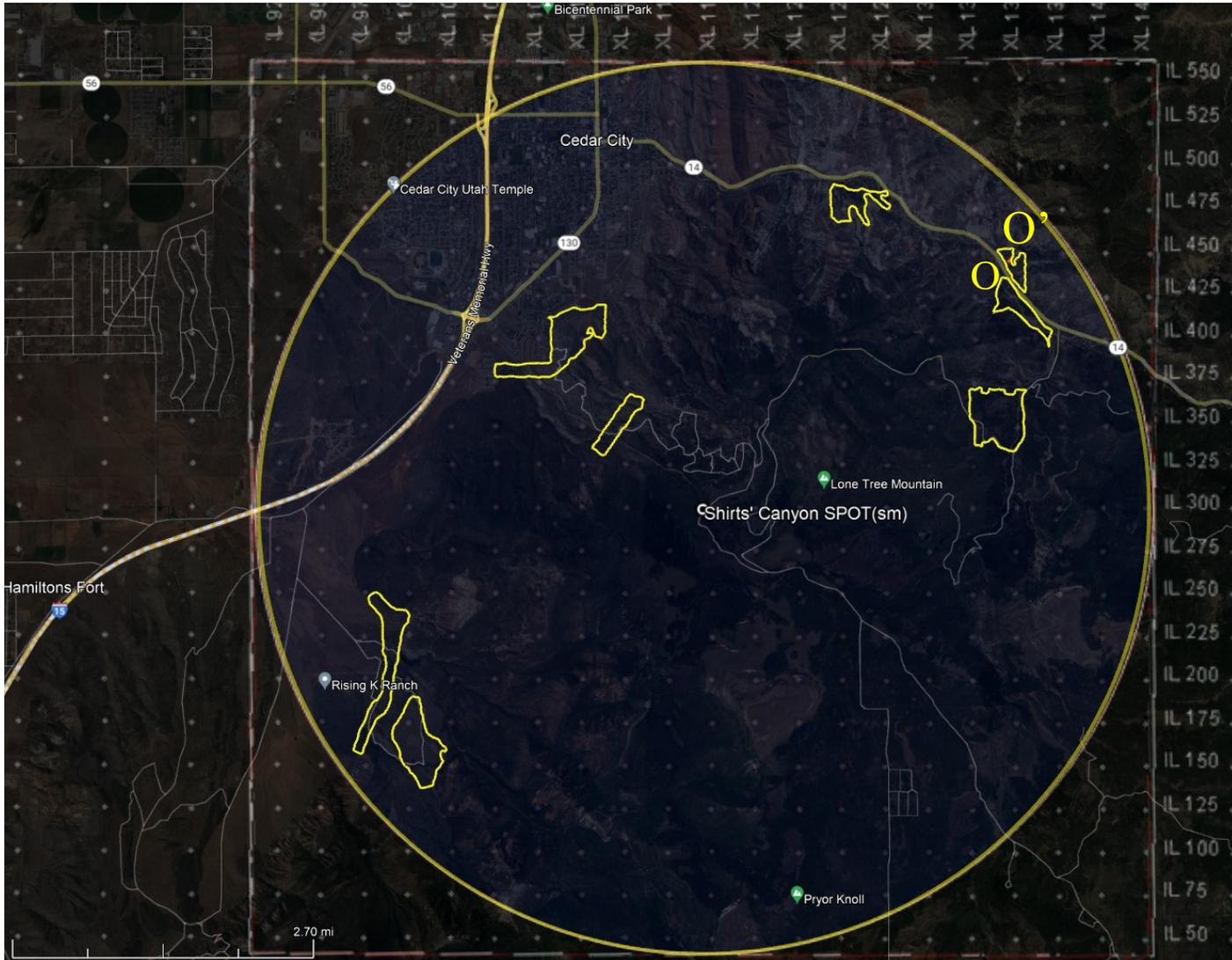
Pyramids: 3SH RAP Line-12, 900 feet NNE



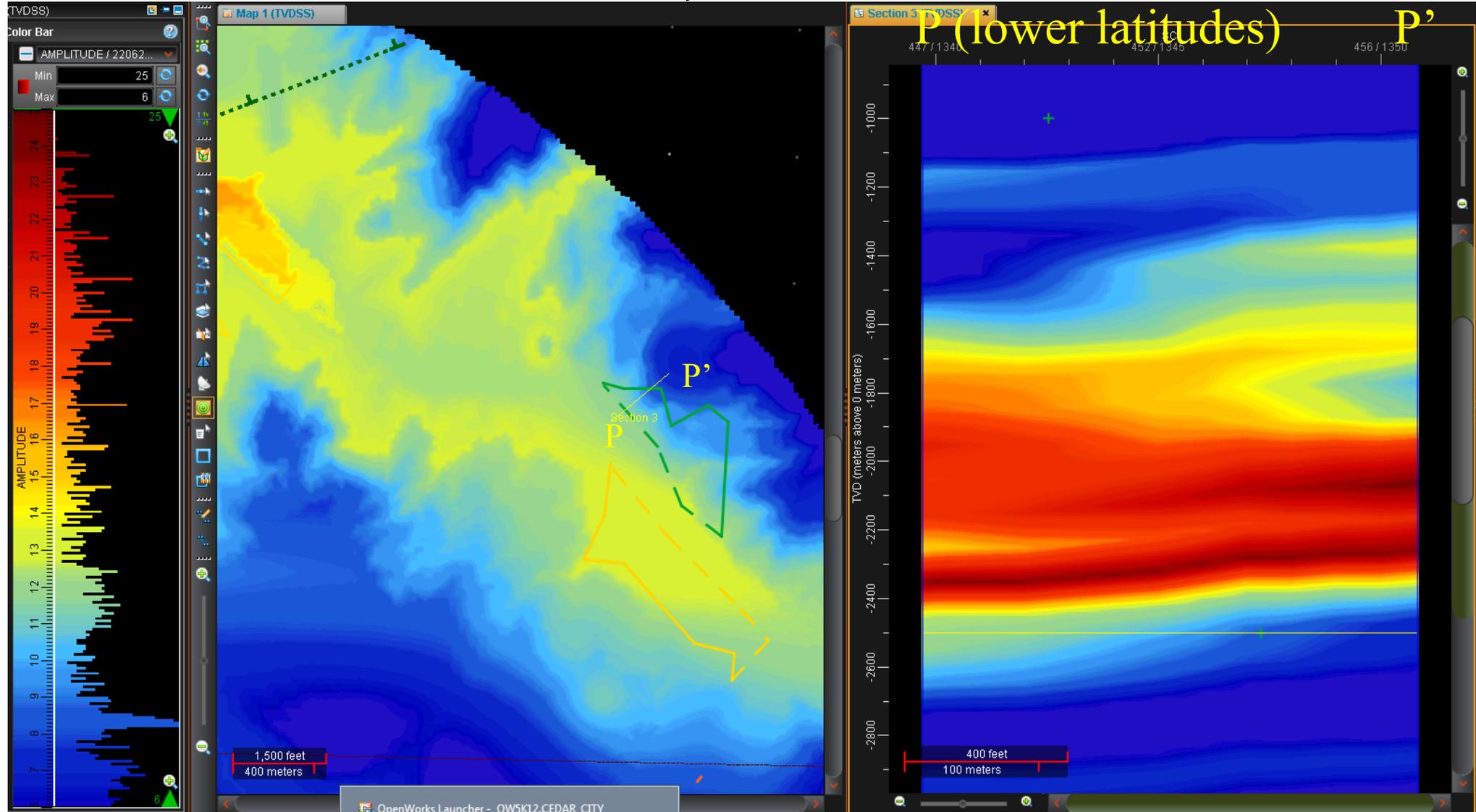
14 North: 6CC RAP Line-11



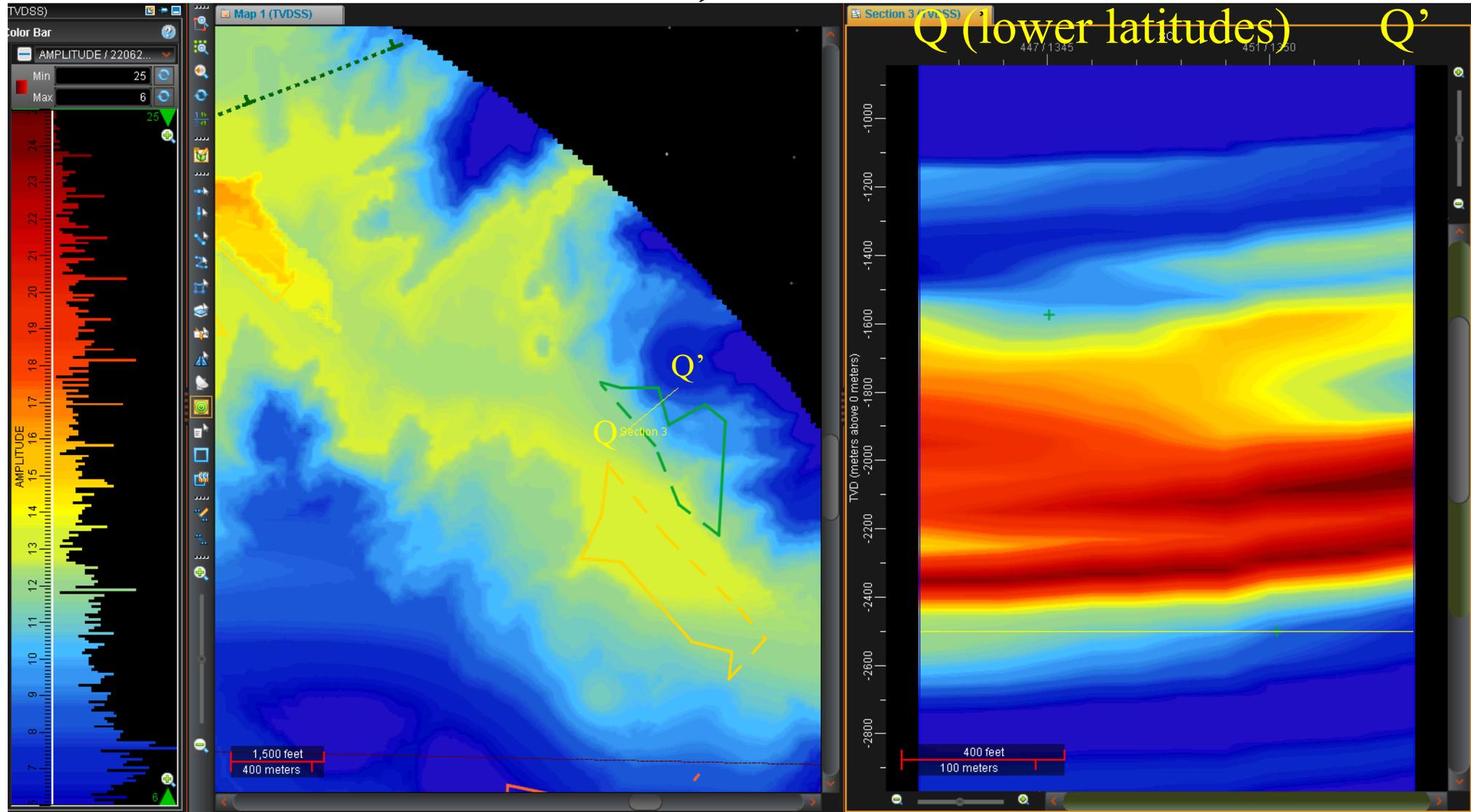
Line 11
O (lower latitudes) 64 O'



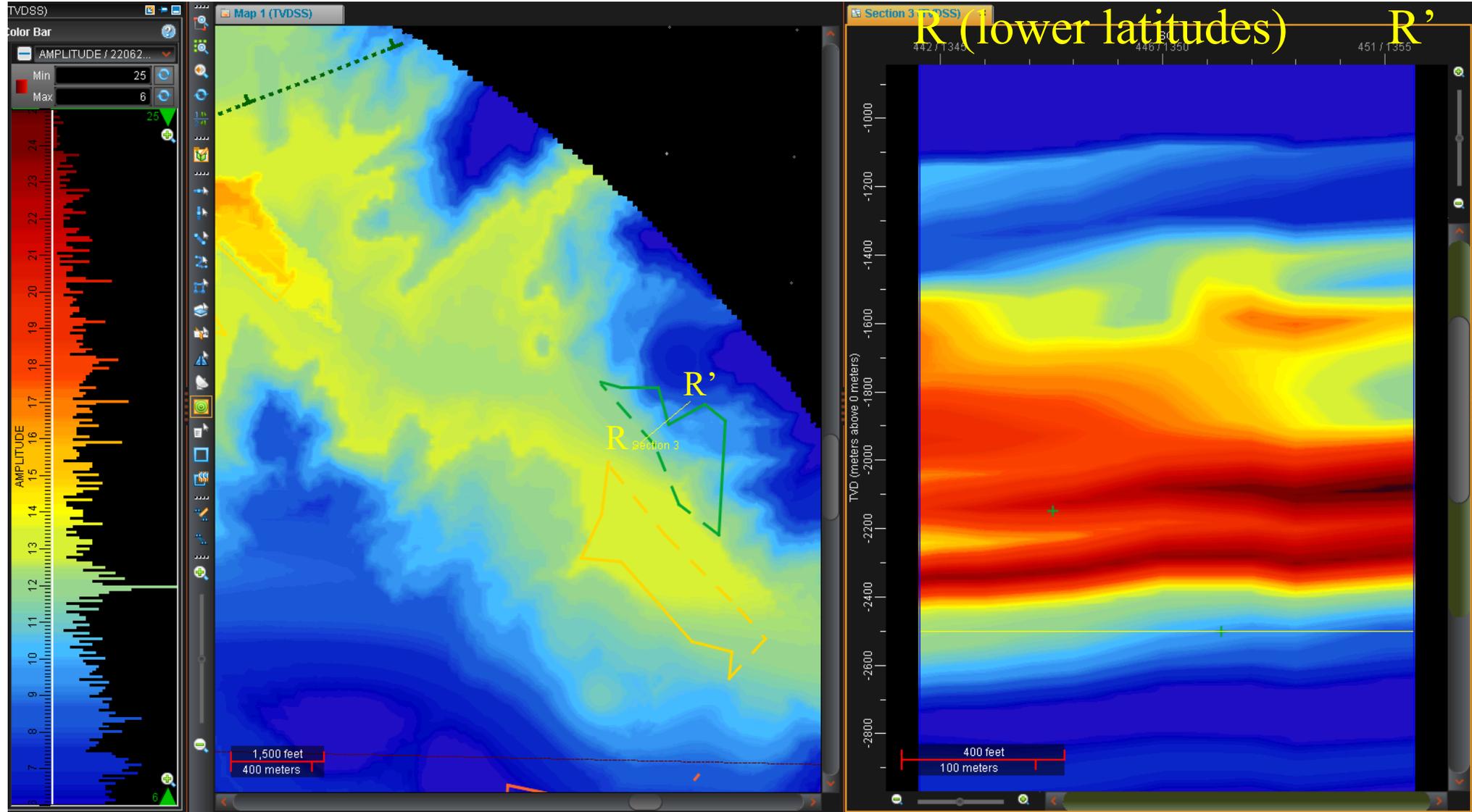
14 North : 6CC RAP Line-11, 600 feet NW



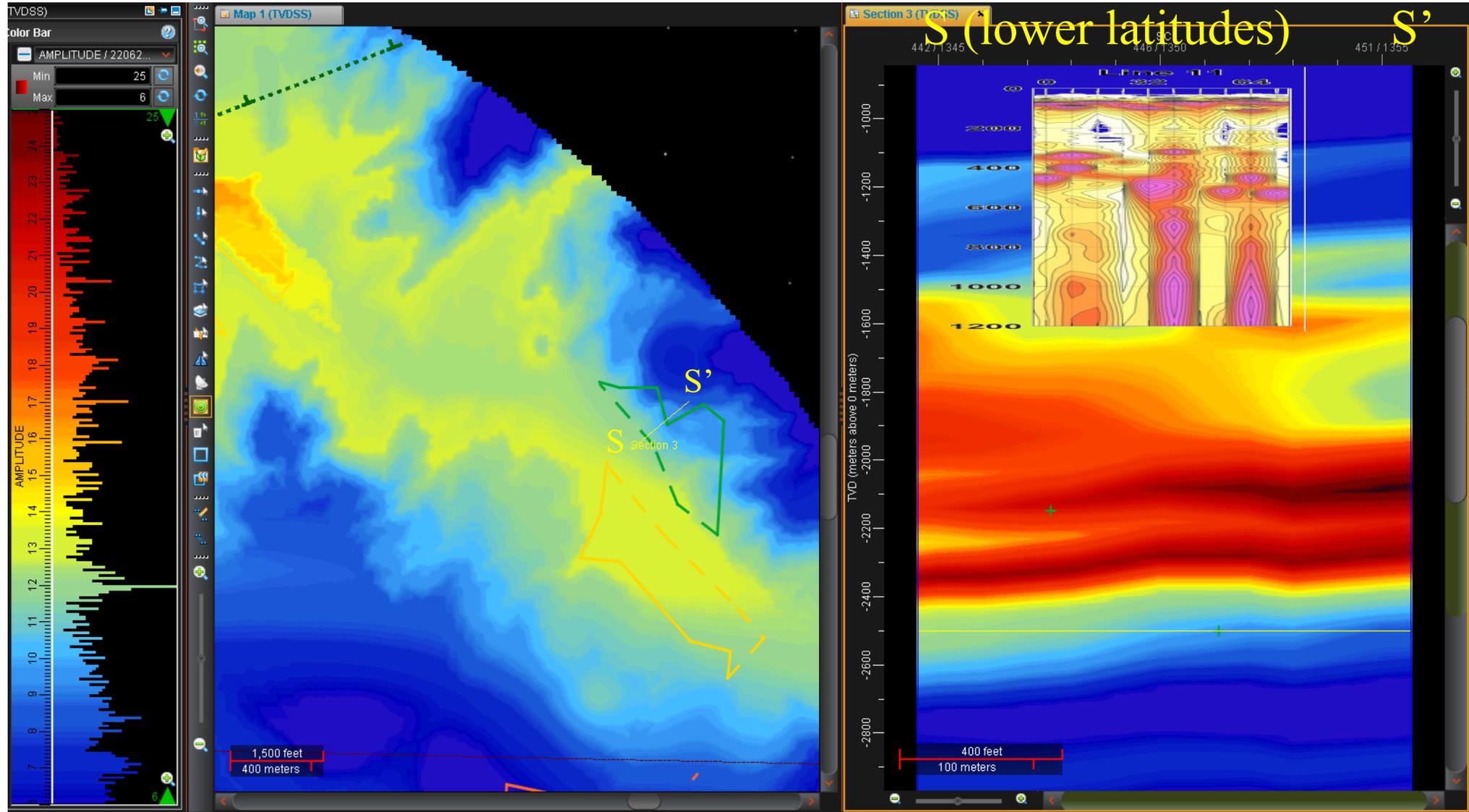
14 North : 6CC RAP Line-11, 300 feet NW



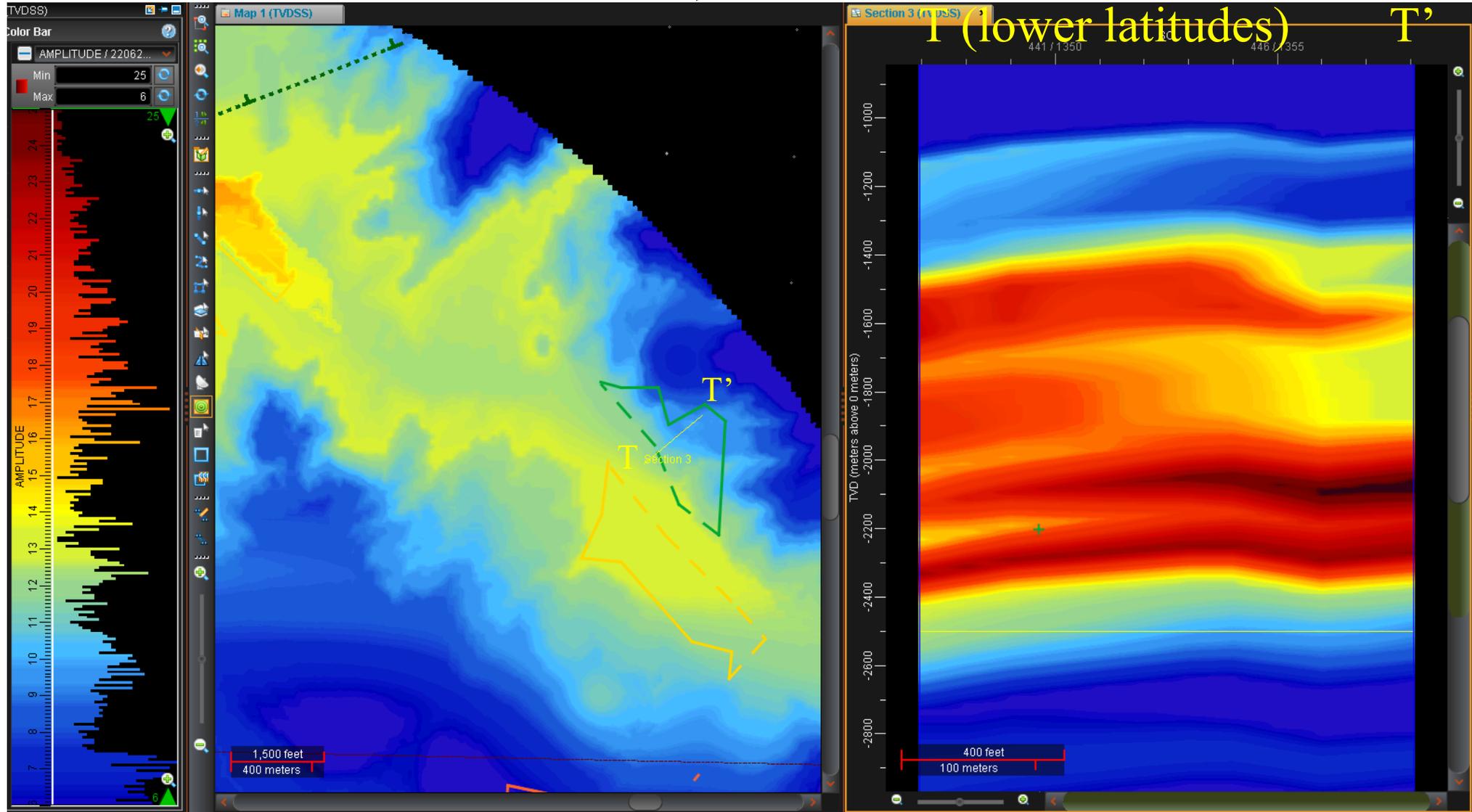
14 North : 6CC RAP Line-11, approximate



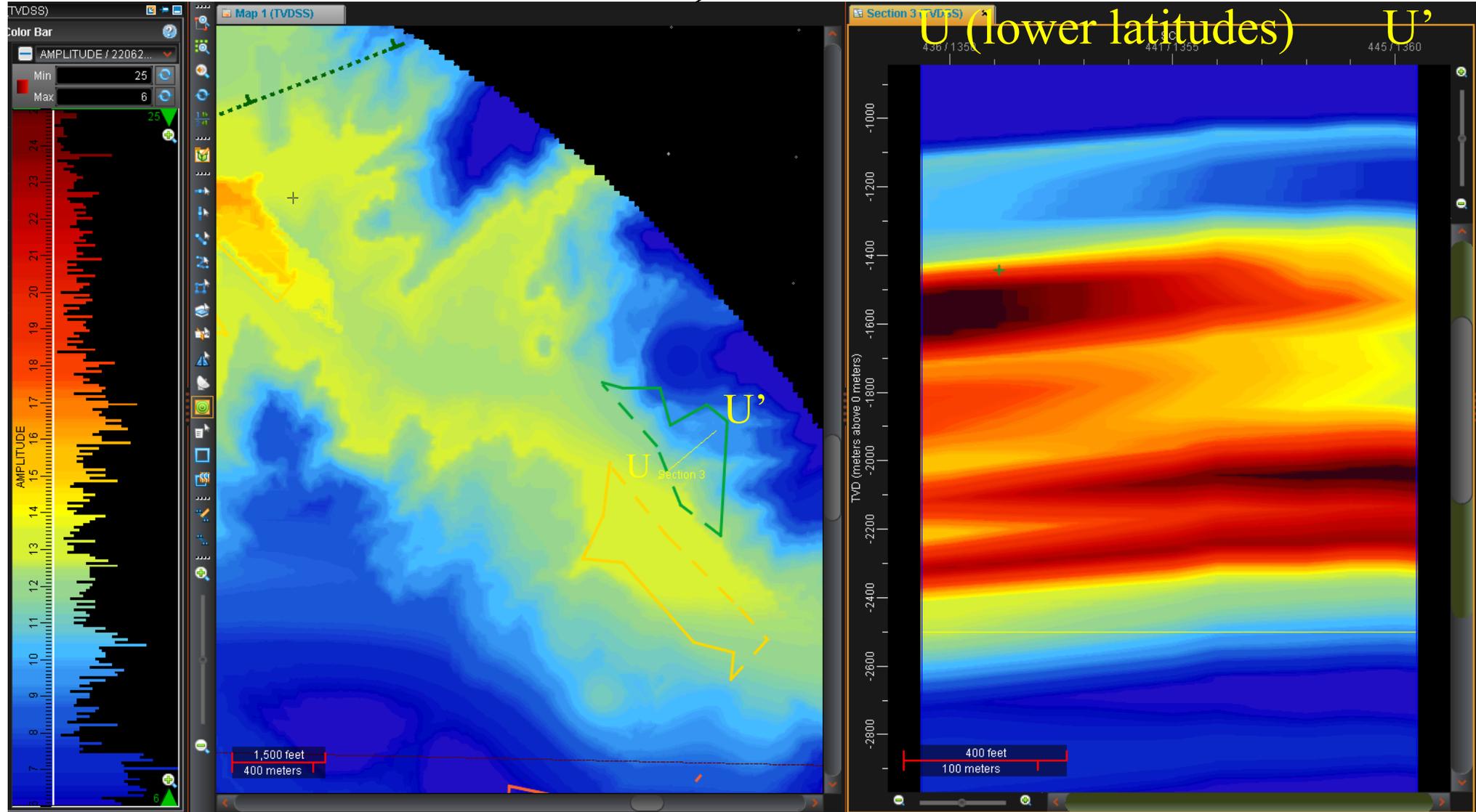
14 North : 6CC RAP Line-11, ~overlay



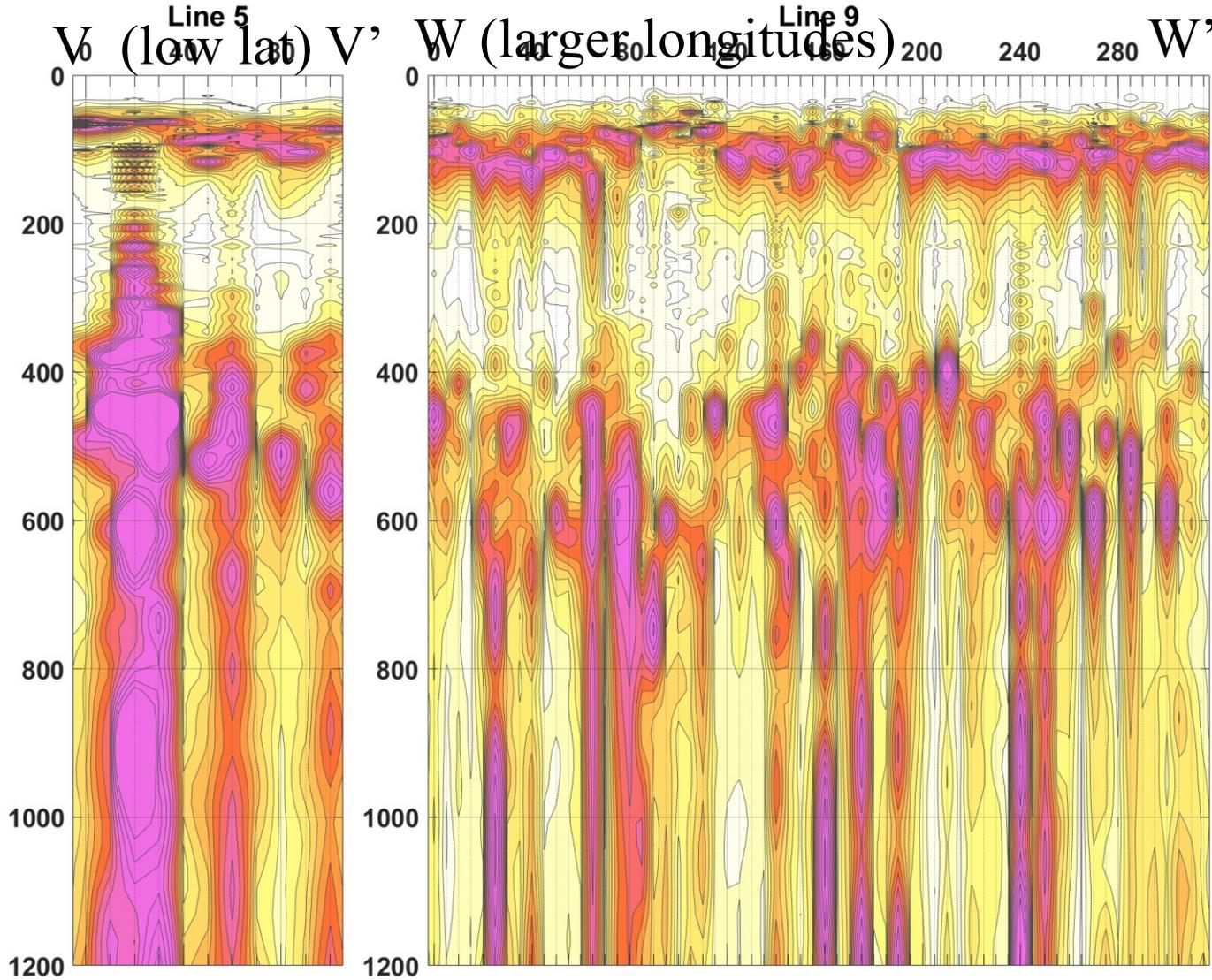
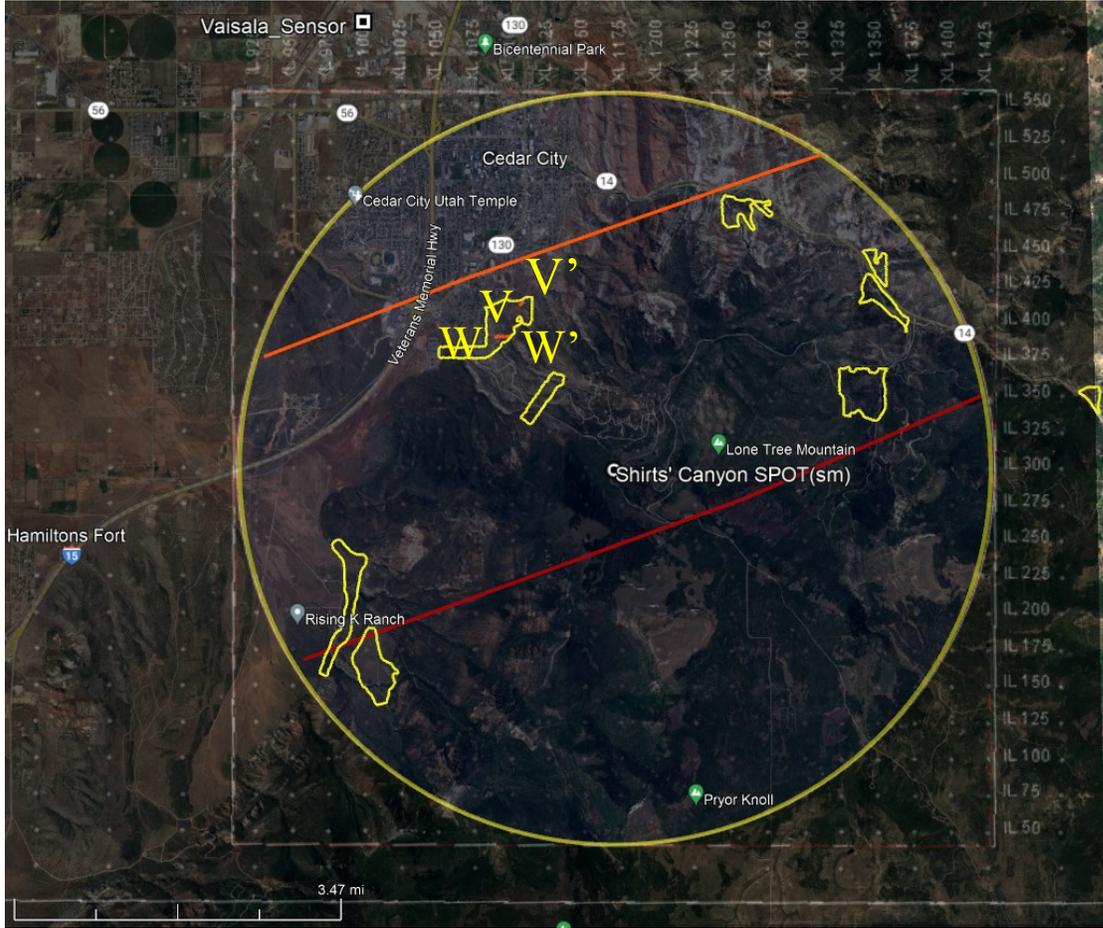
14 North : 6CC RAP Line-11, 300 feet SE



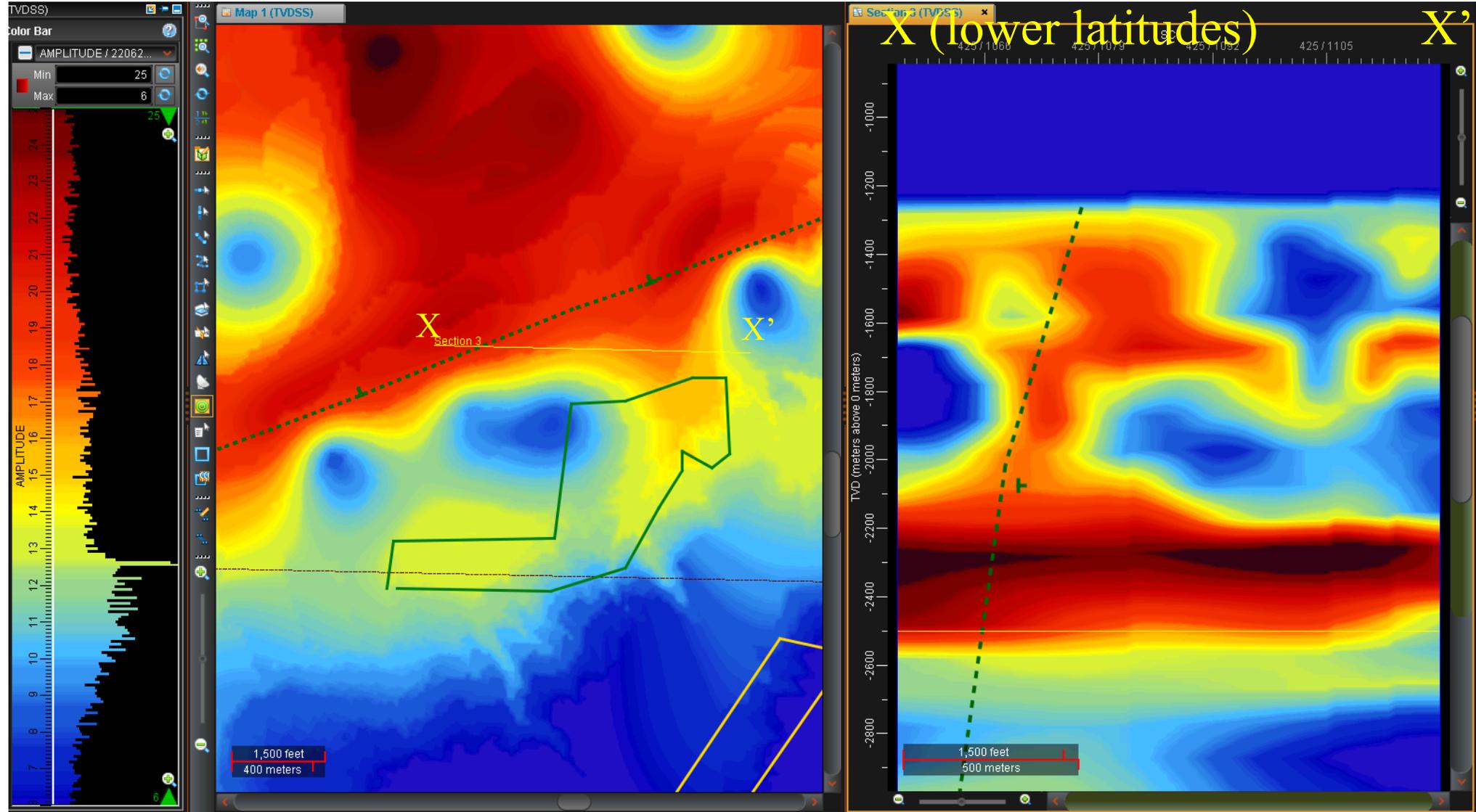
14 North : 6CC RAP Line-11, 600 feet SE



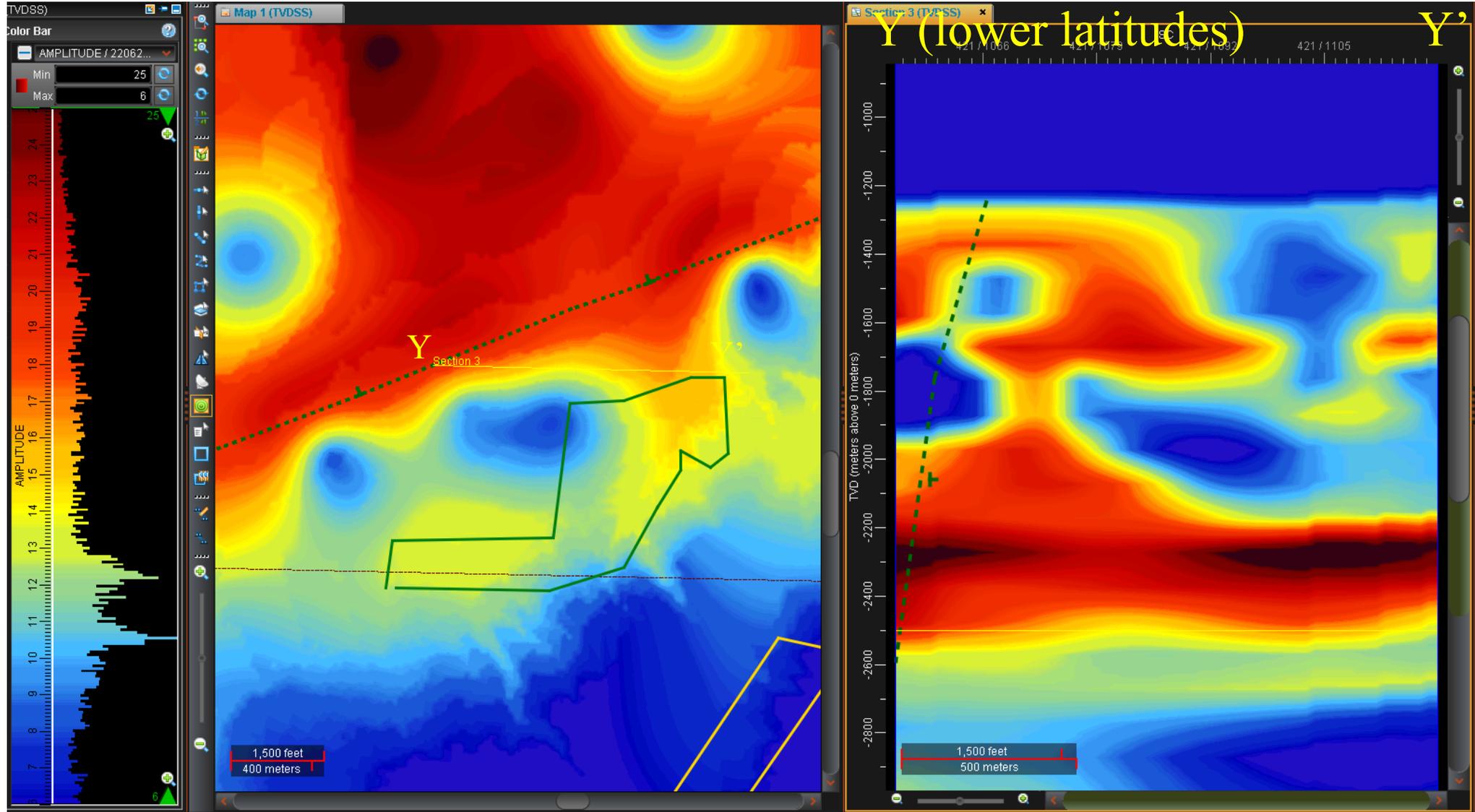
Southview: 5-GH G2 RAP Lines 5 & 9



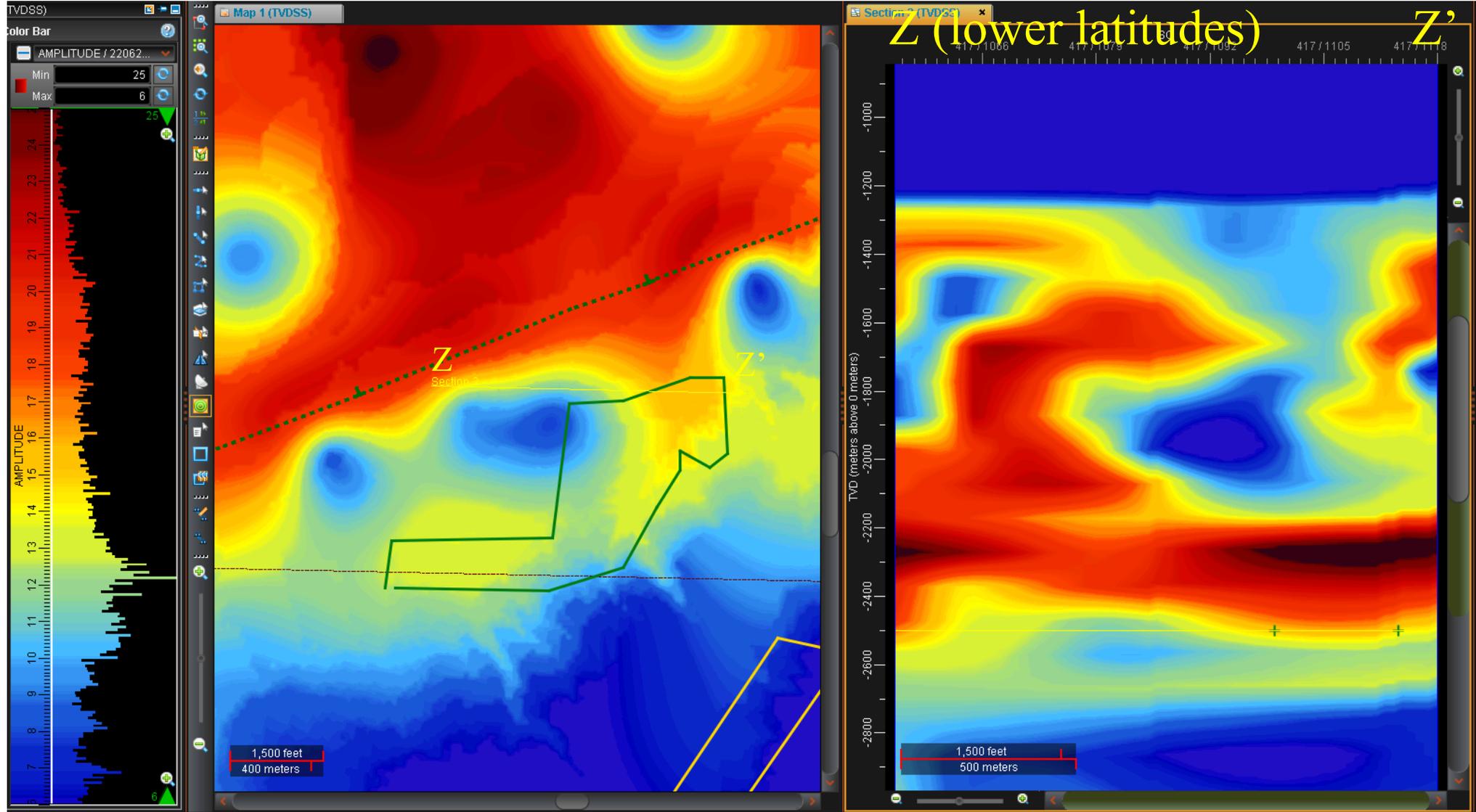
Southview: 5-GH G2 RAP Lines 5 & 9, 1,200 feet north Line 5



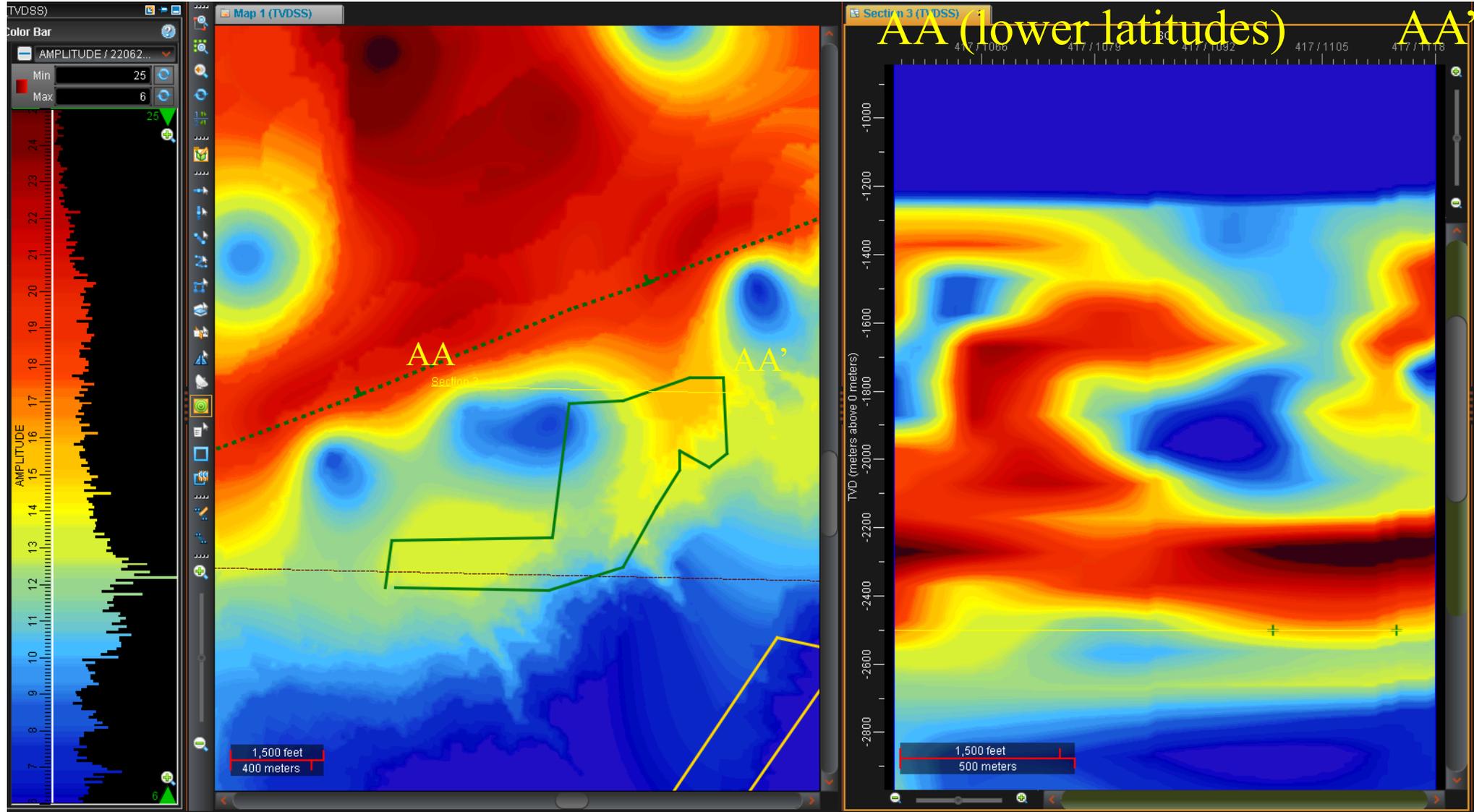
Southview: 5-GH G2 RAP Lines 5 & 9, 900 feet north Line 5



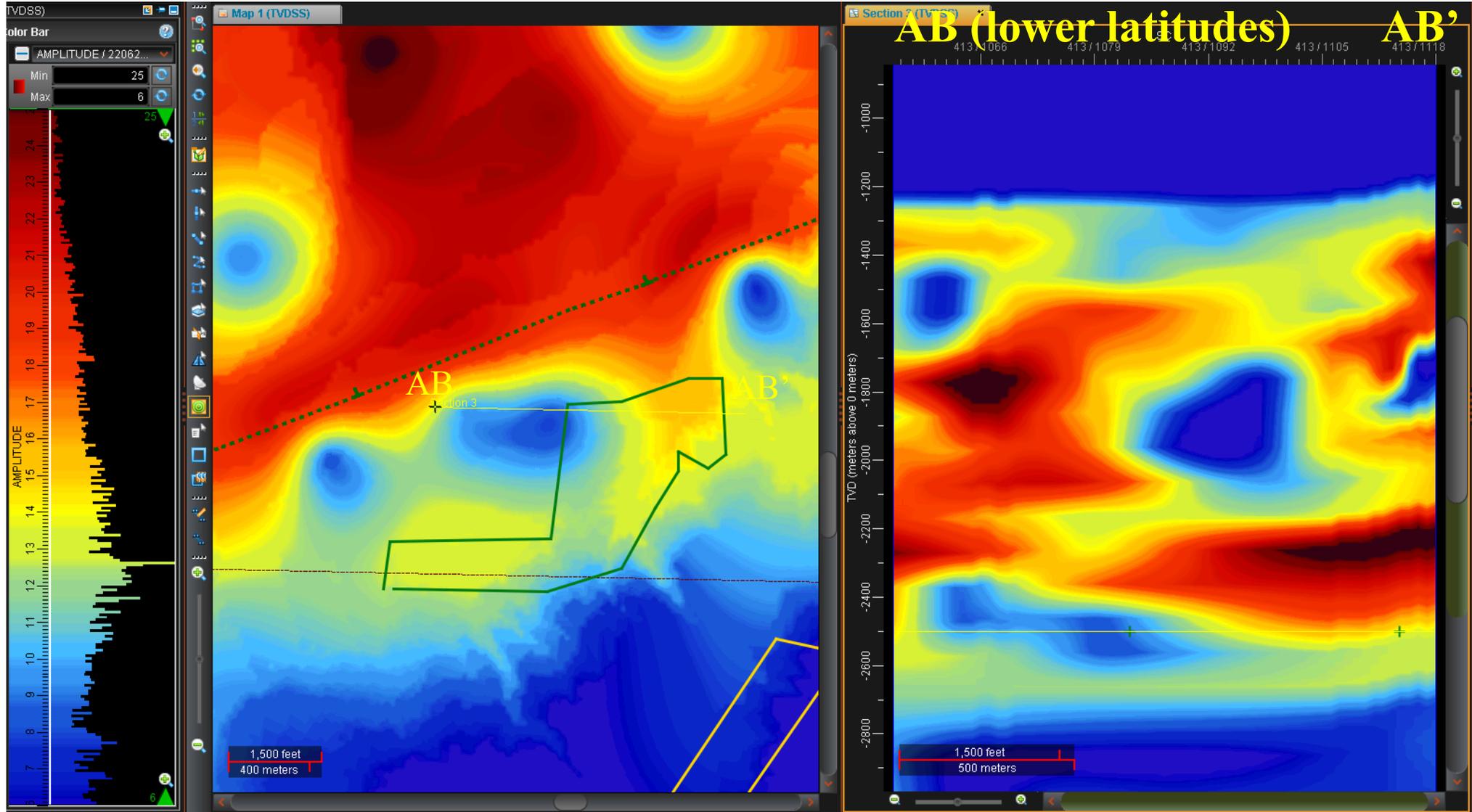
Southview: 5-GH G2 RAP Lines 5 & 9, 600 feet north Line 5



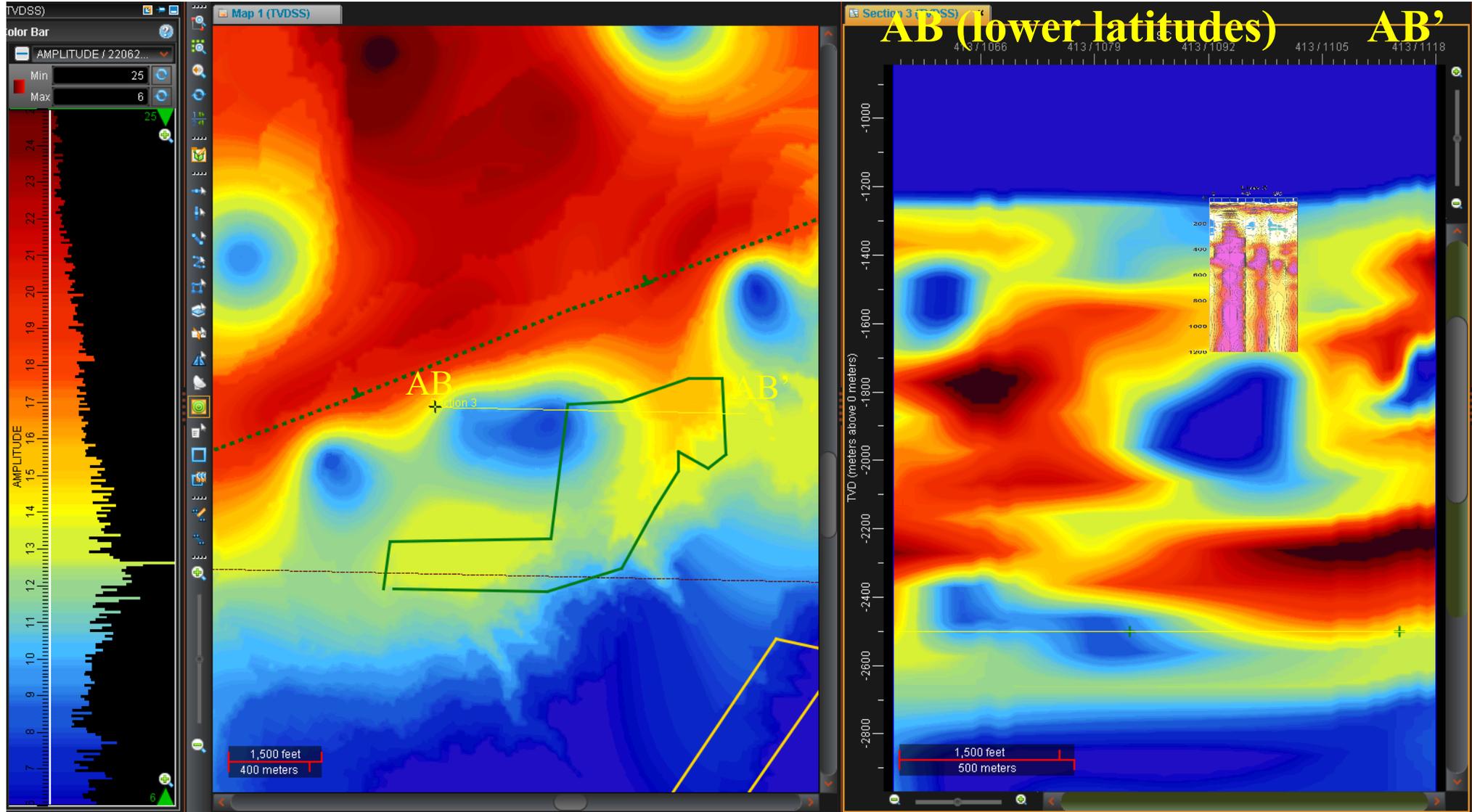
Southview: 5-GH G2 RAP Lines 5 & 9, 300 feet north Line 5



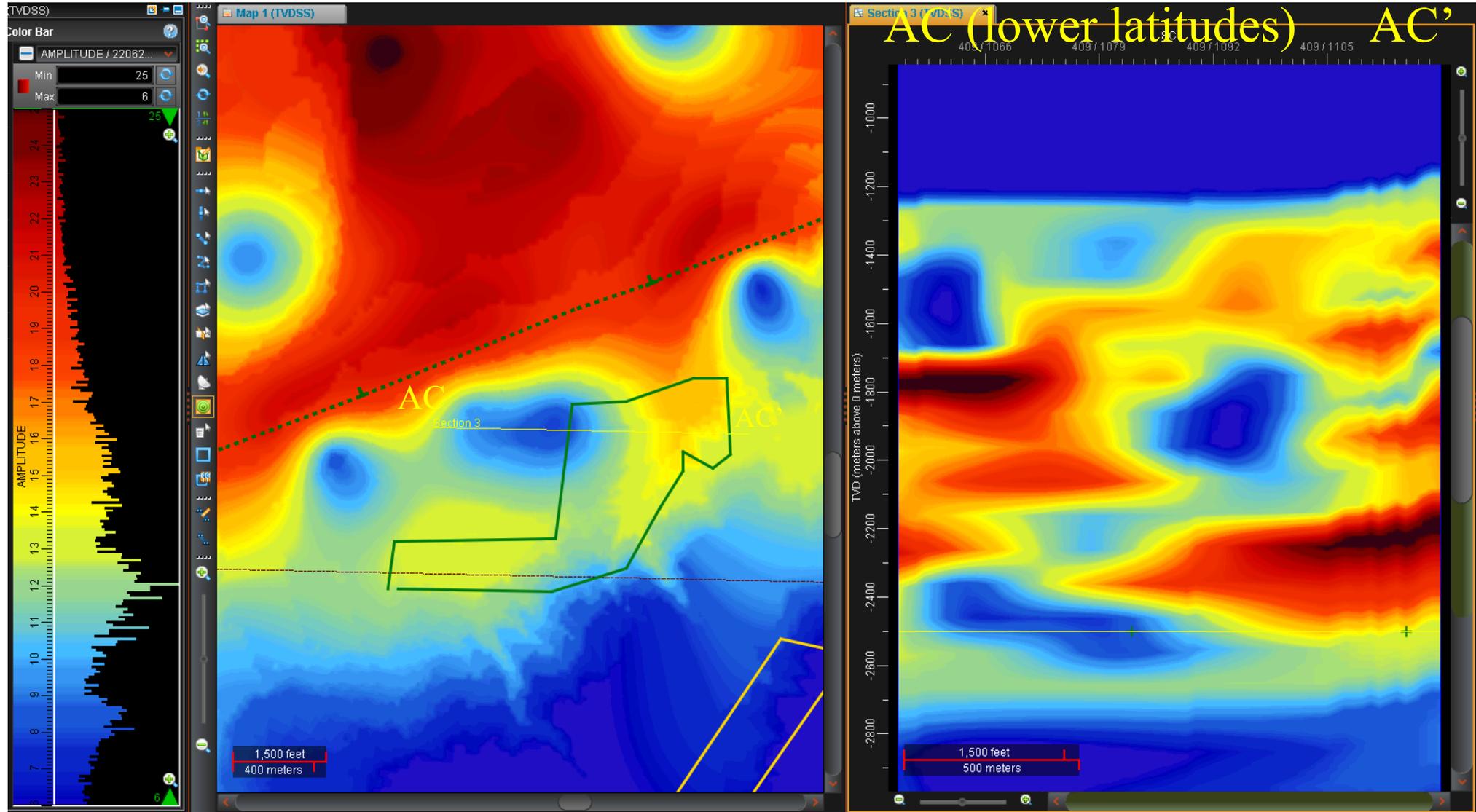
Southview: 5-GH G2 RAP Lines 5 & 9, Line 5, approximate



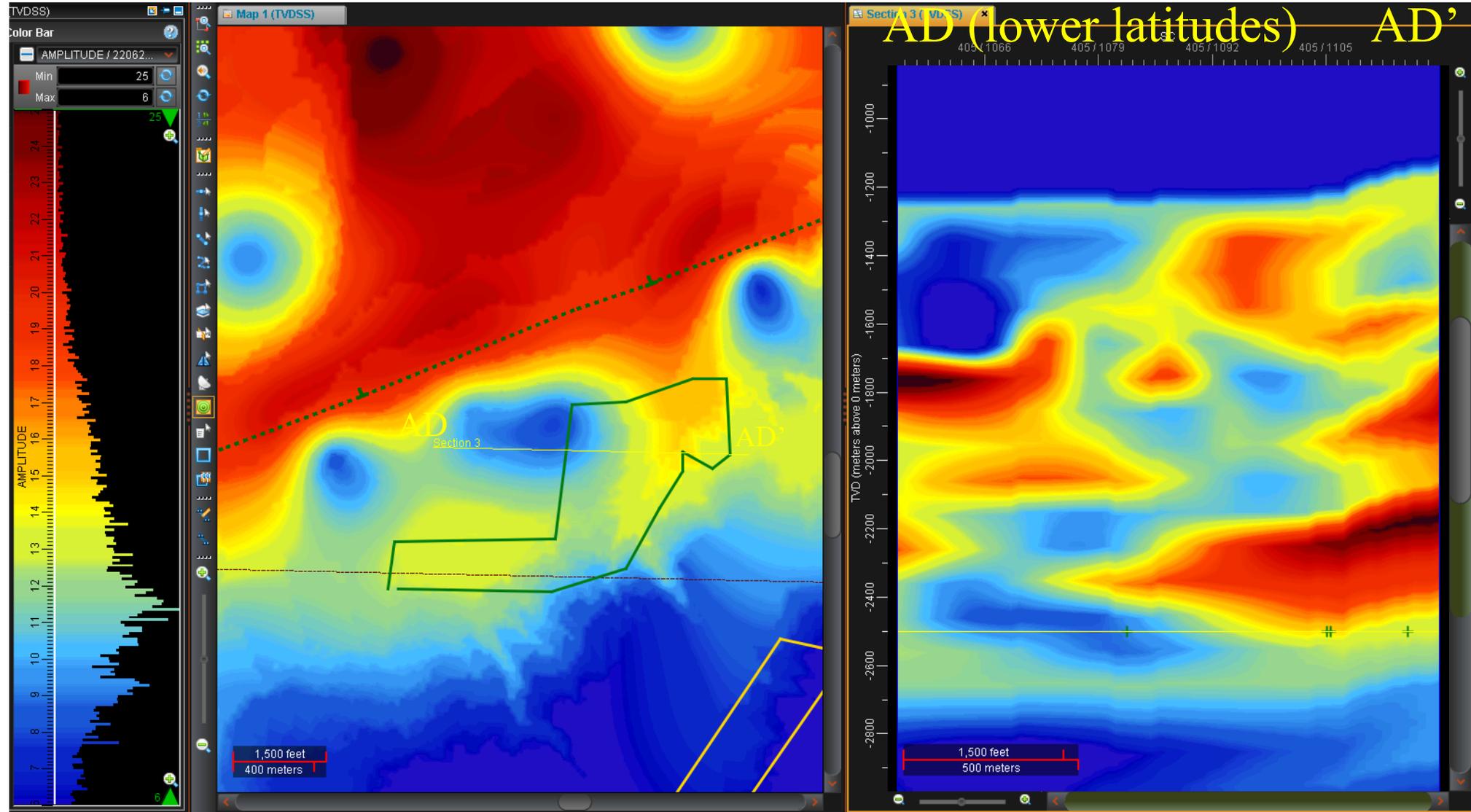
Southview: 5-GH G2 RAP Lines 5 & 9, Line 5, ~overlay



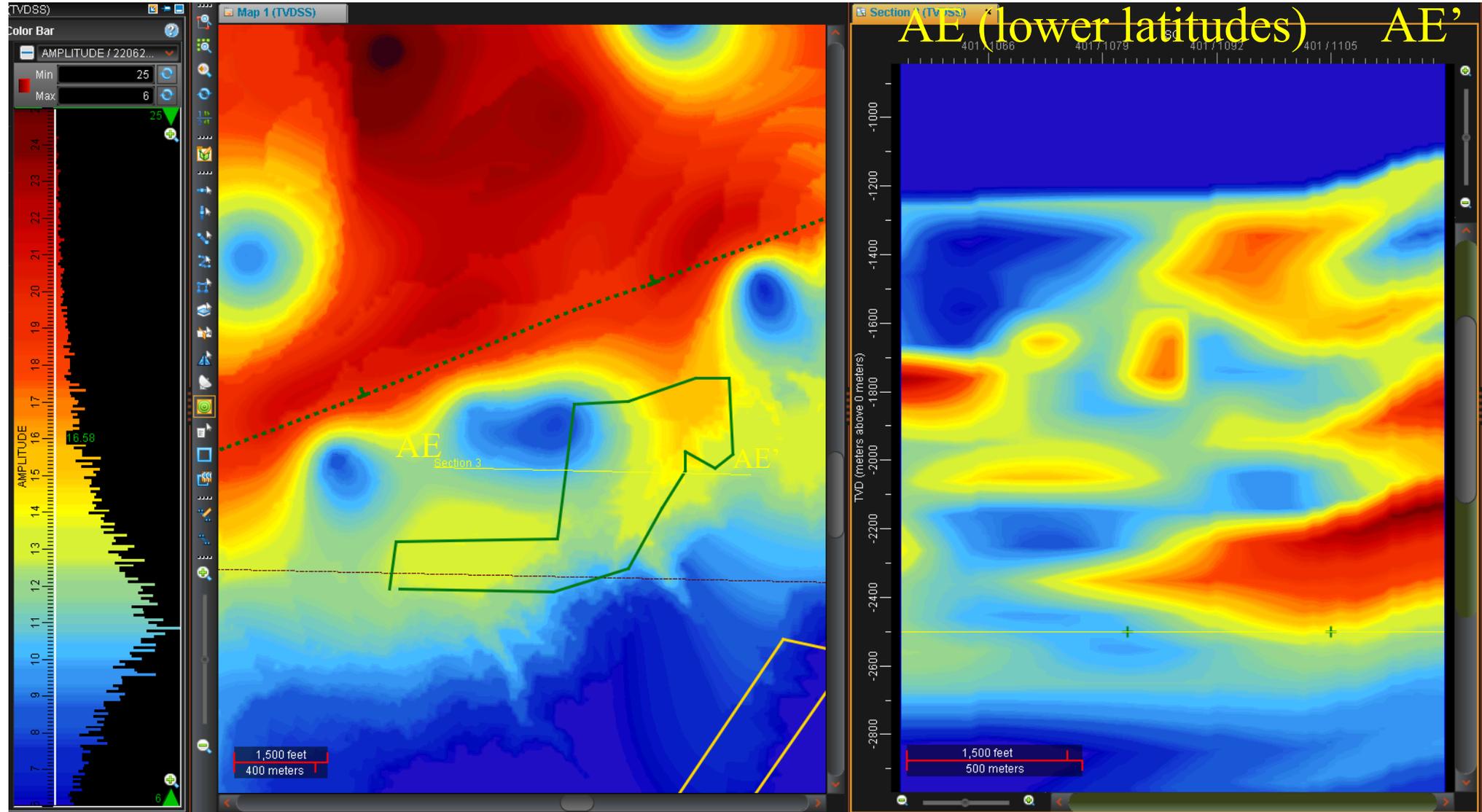
Southview: 5-GH G2 RAP Lines 5 & 9, 300 feet south Line 5, 1,200 feet north Line 9



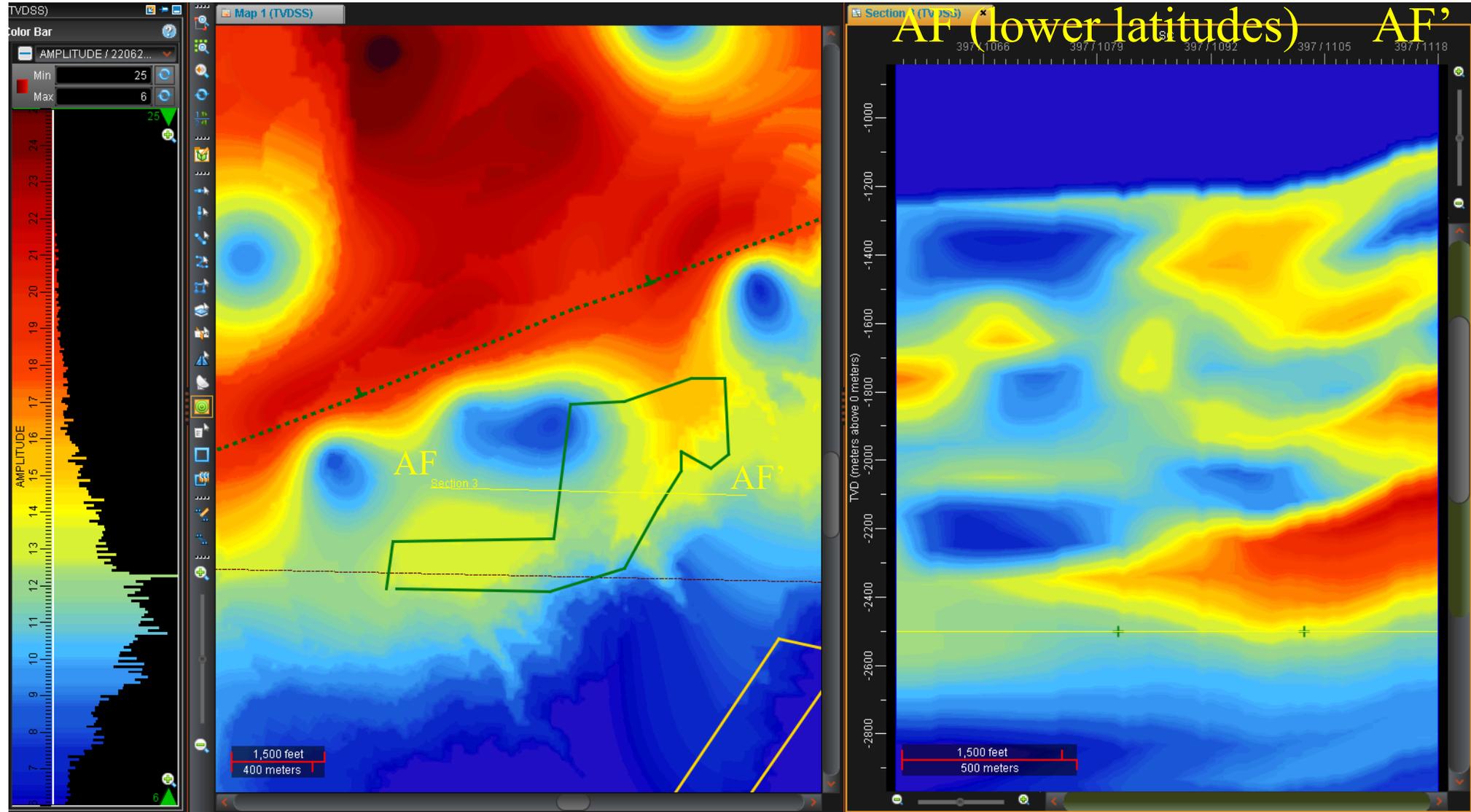
Southview: 5-GH G2 RAP Lines 5 & 9, 600 feet south Line 5, 900 feet north Line 9



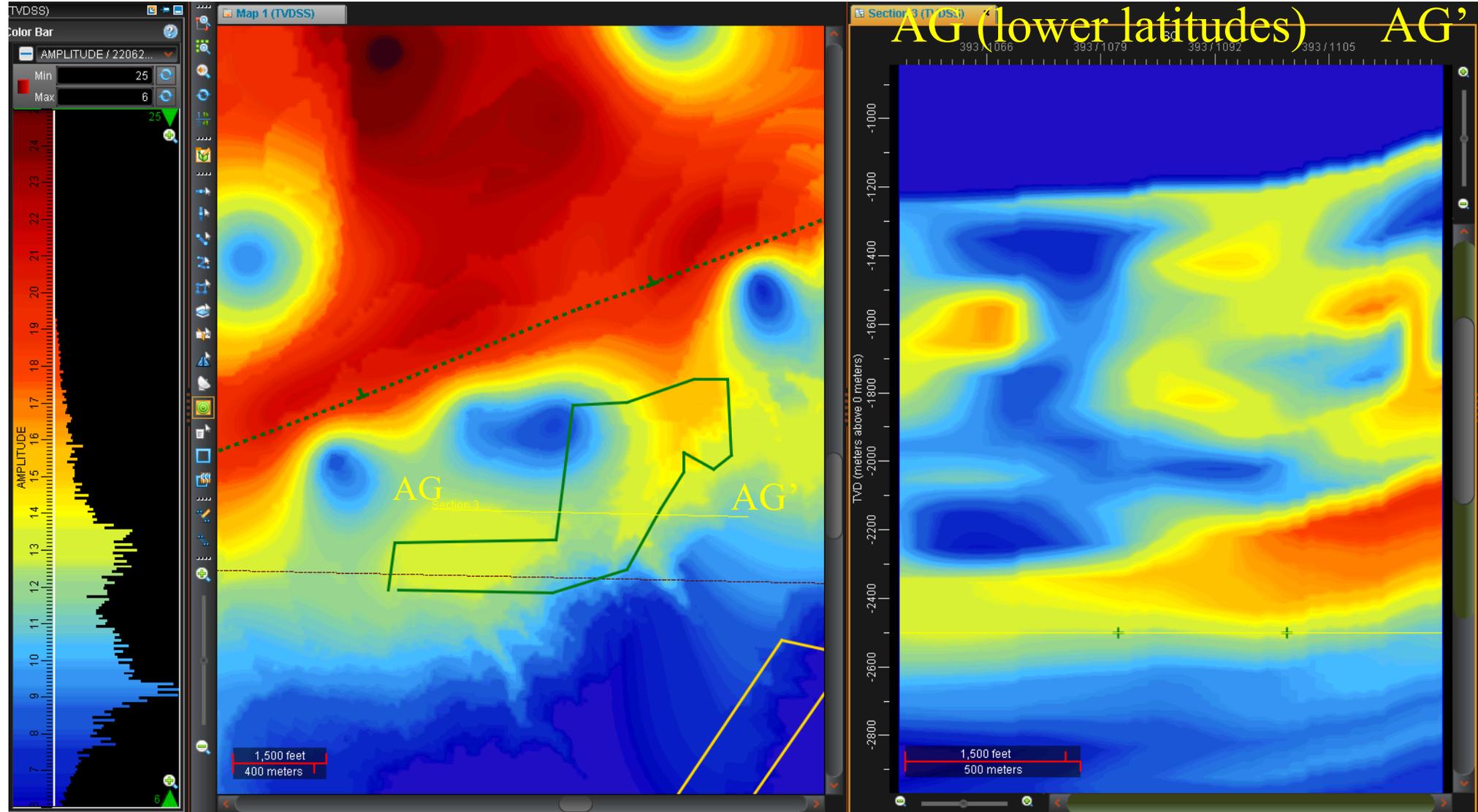
Southview: 5-GH G2 RAP Lines 5 & 9, 900 feet south Line 5, 600 feet north Line 9



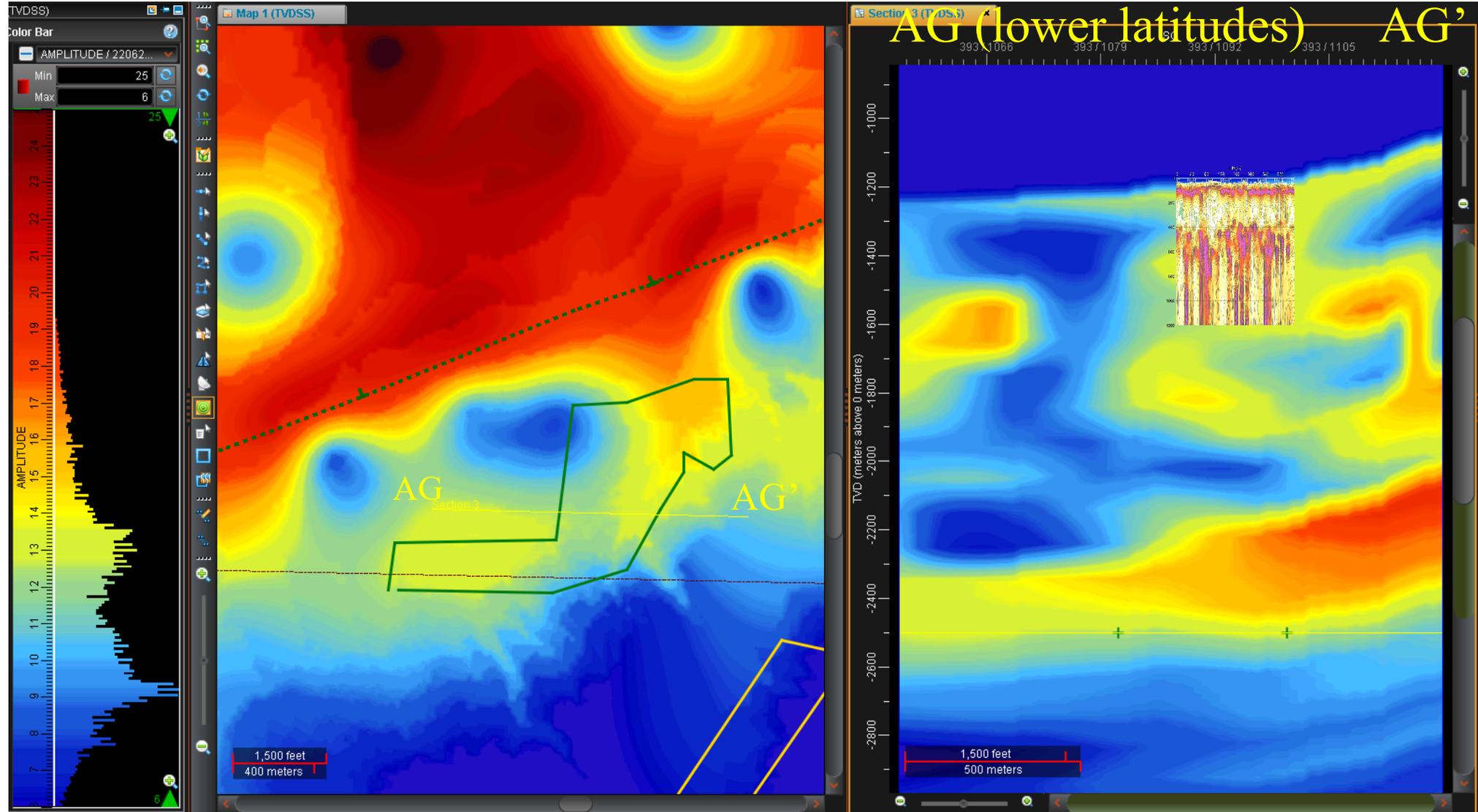
Southview: 5-GH G2 RAP Lines 5 & 9, 1,200 feet south Line 5, 300 feet north Line 9



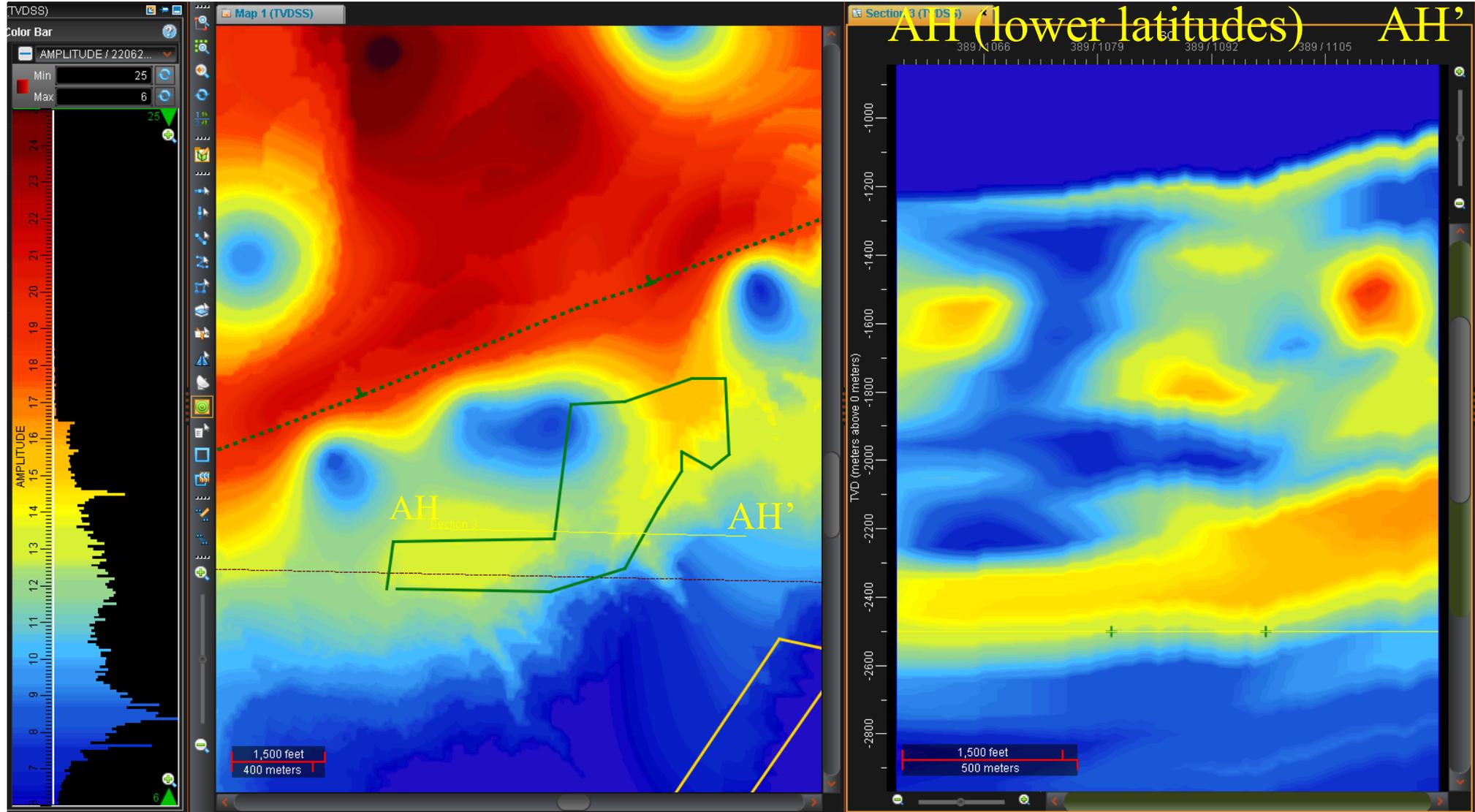
Southview: 5-GH G2 RAP Lines 5 & 9, Line 11, approximate



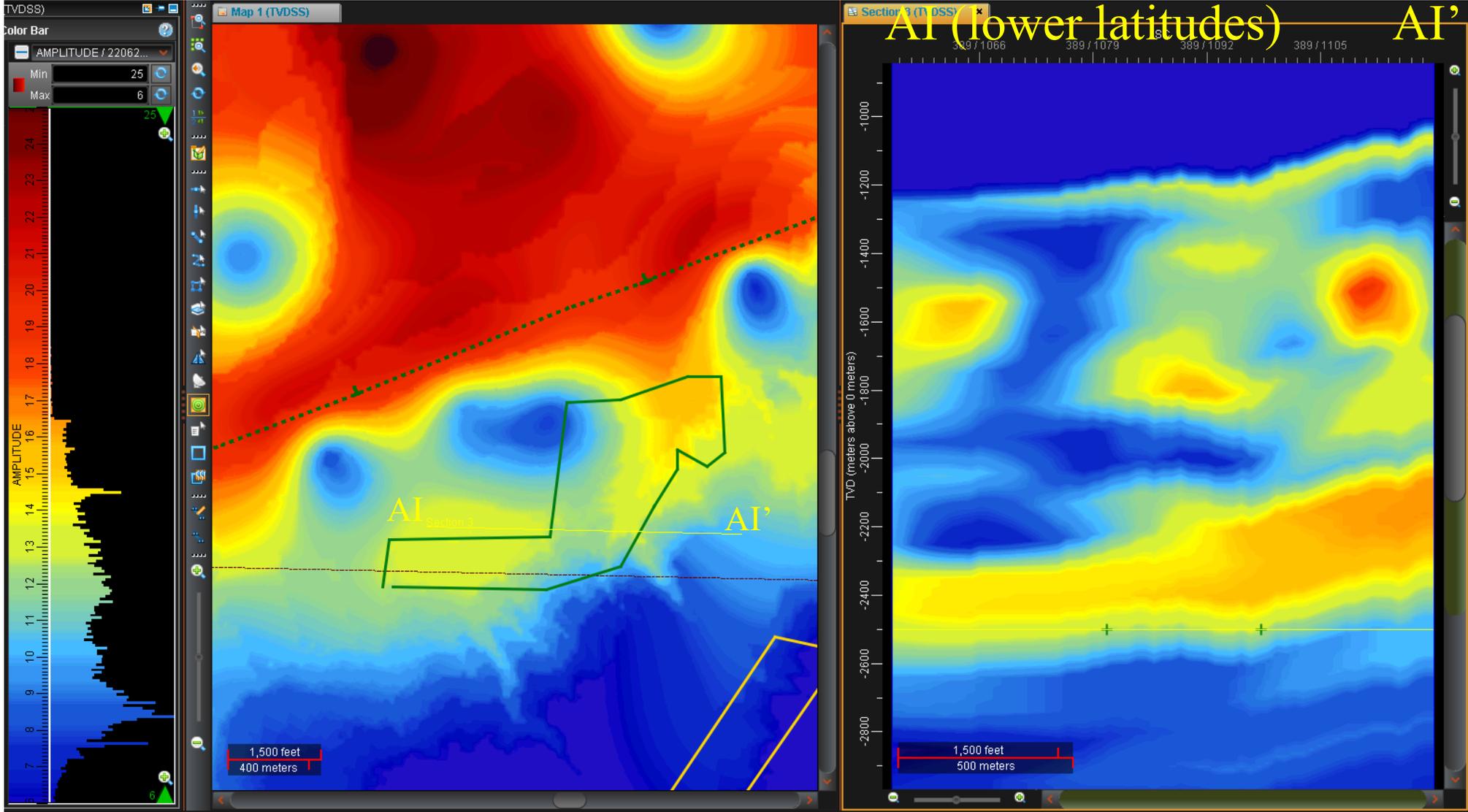
Southview: 5-GH G2 RAP Lines 5 & 9, Line 9, ~overlay



Southview: 5-GH G2 RAP Lines 5 & 9, 300 feet south Line 9



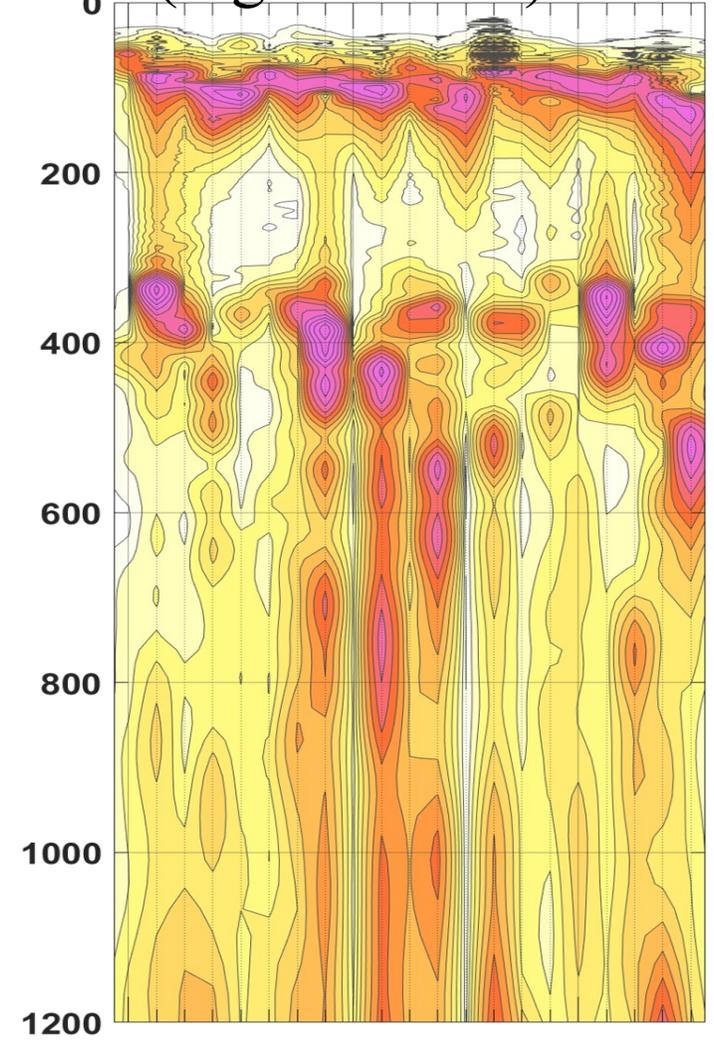
Southview: 5-GH G2 RAP Lines 5 & 9, 600 feet south Line 9



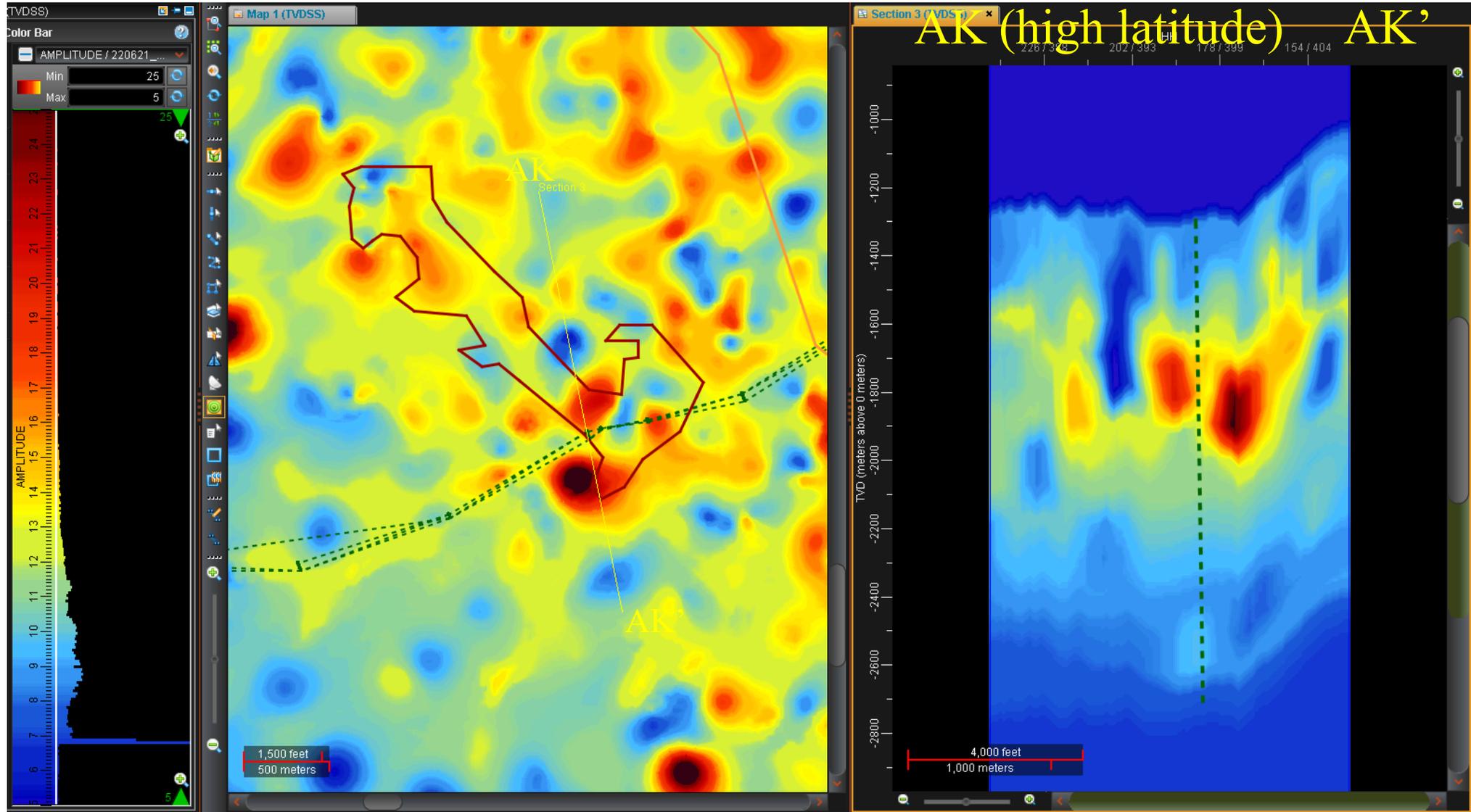
Harmony Hills: BB RAP Line-07



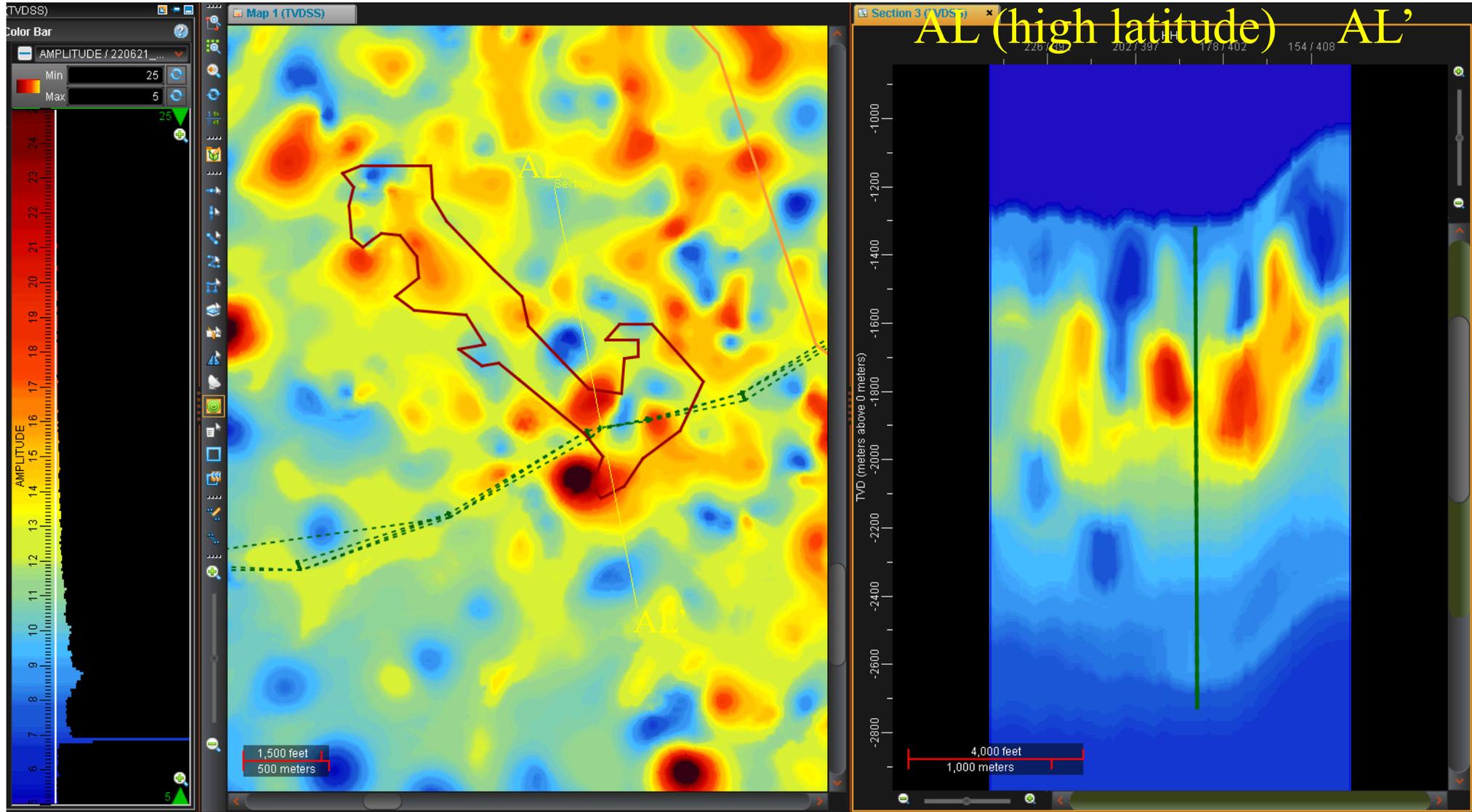
Line 7
AJ (high latitude)₀ 128 AJ'



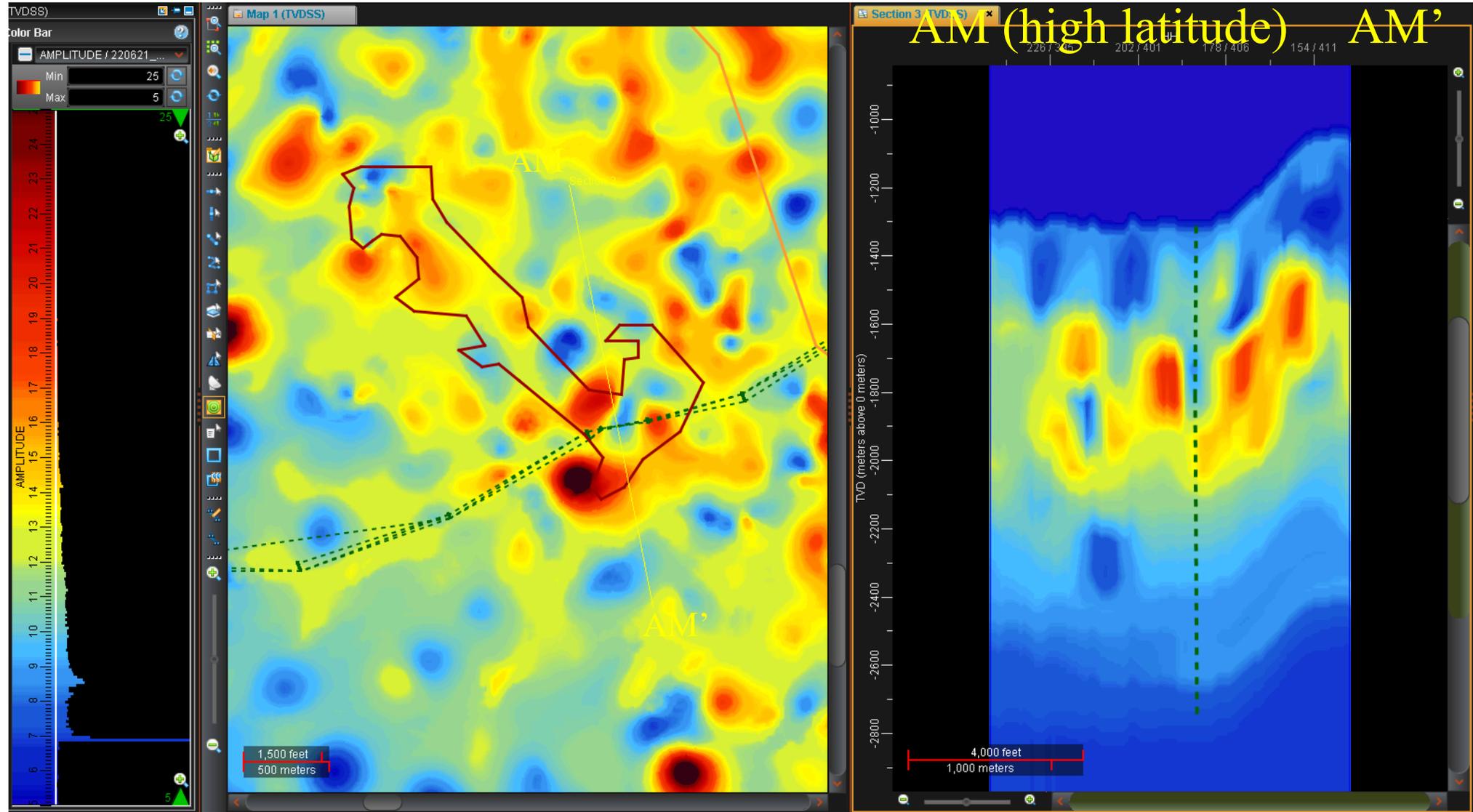
Harmony Hills: BB RAP Line-07, 1,200 feet west



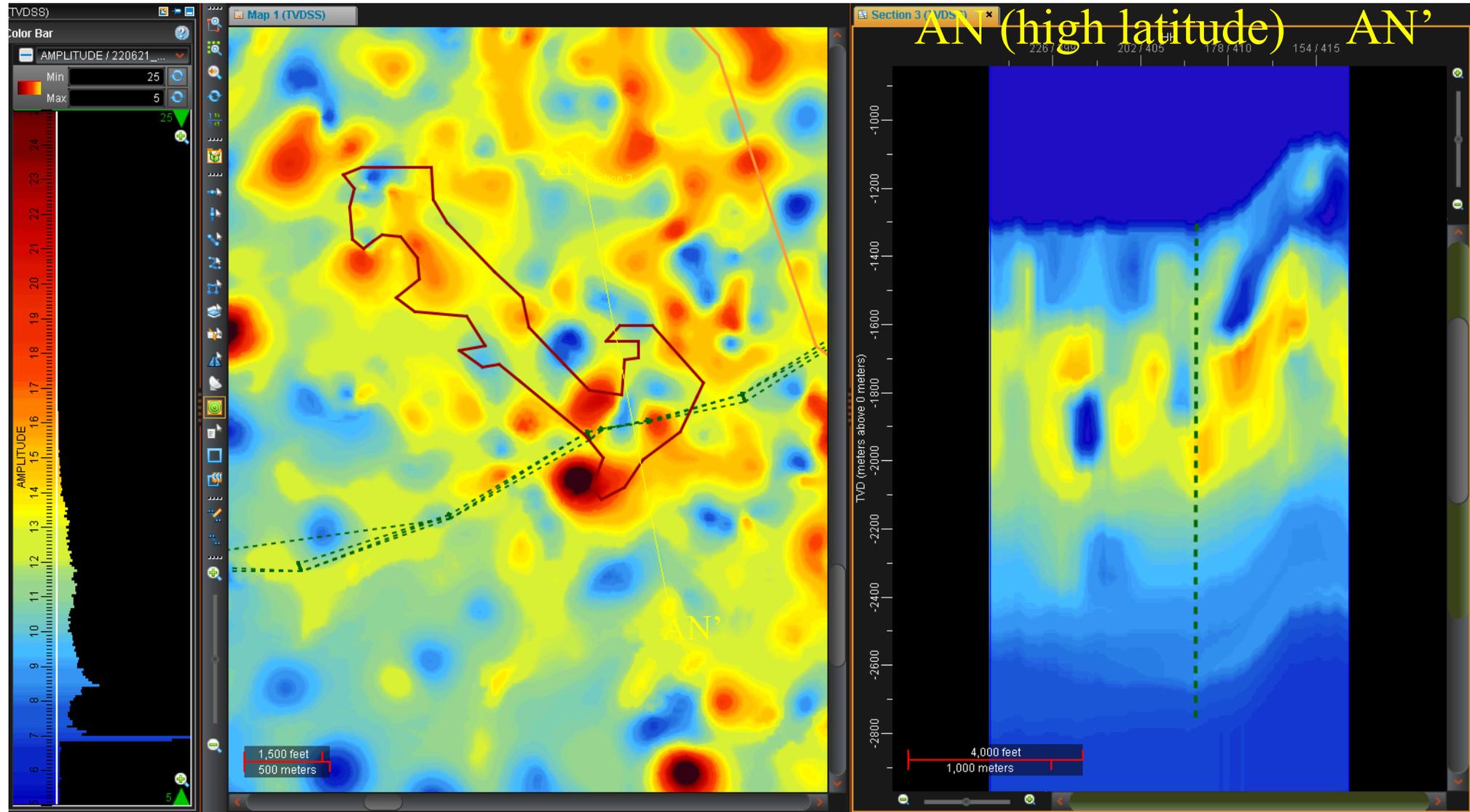
Harmony Hills: BB RAP Line-07, 900 feet west



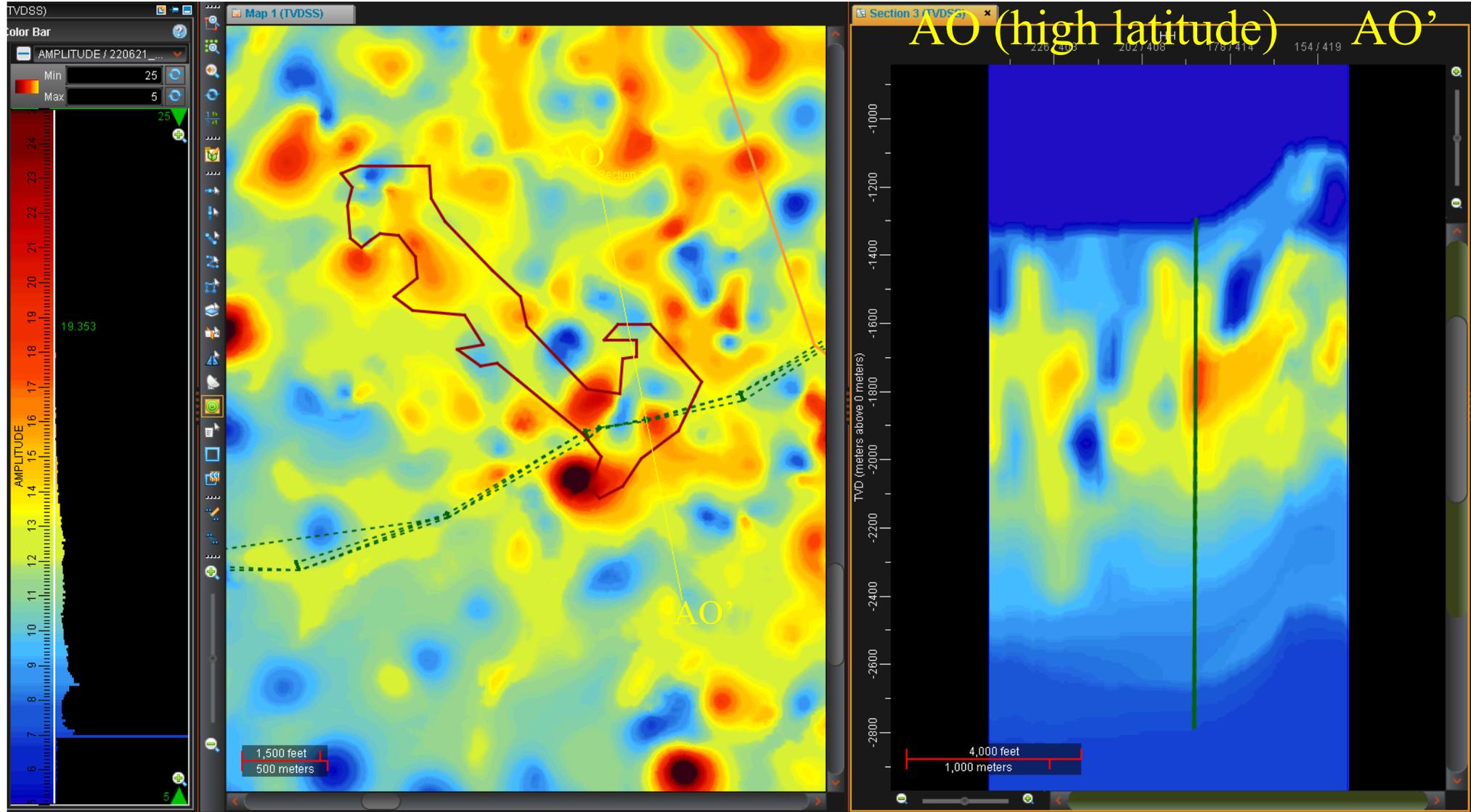
Harmony Hills: BB RAP Line-07, 600 feet west



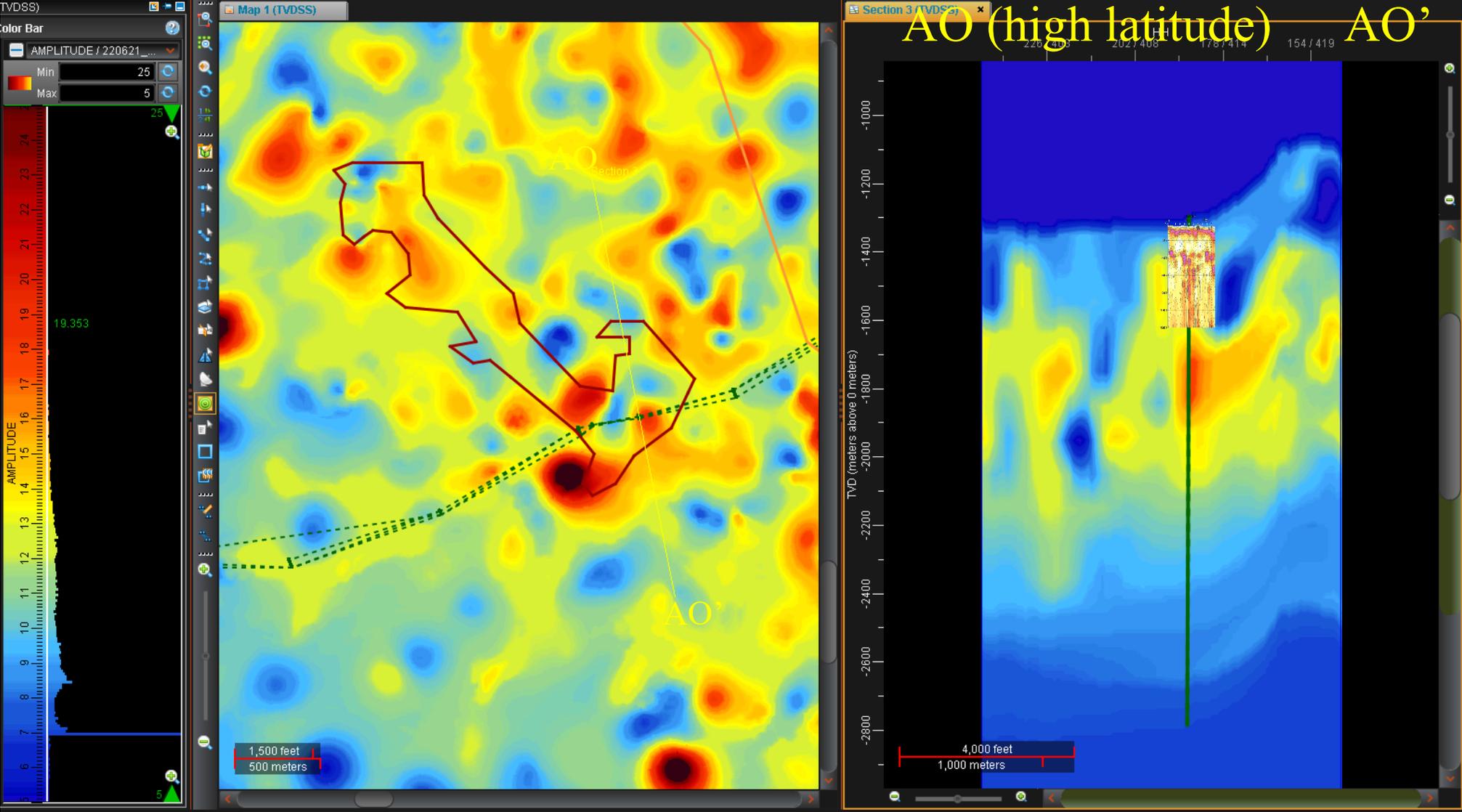
Harmony Hills: BB RAP Line-07, 300 feet west



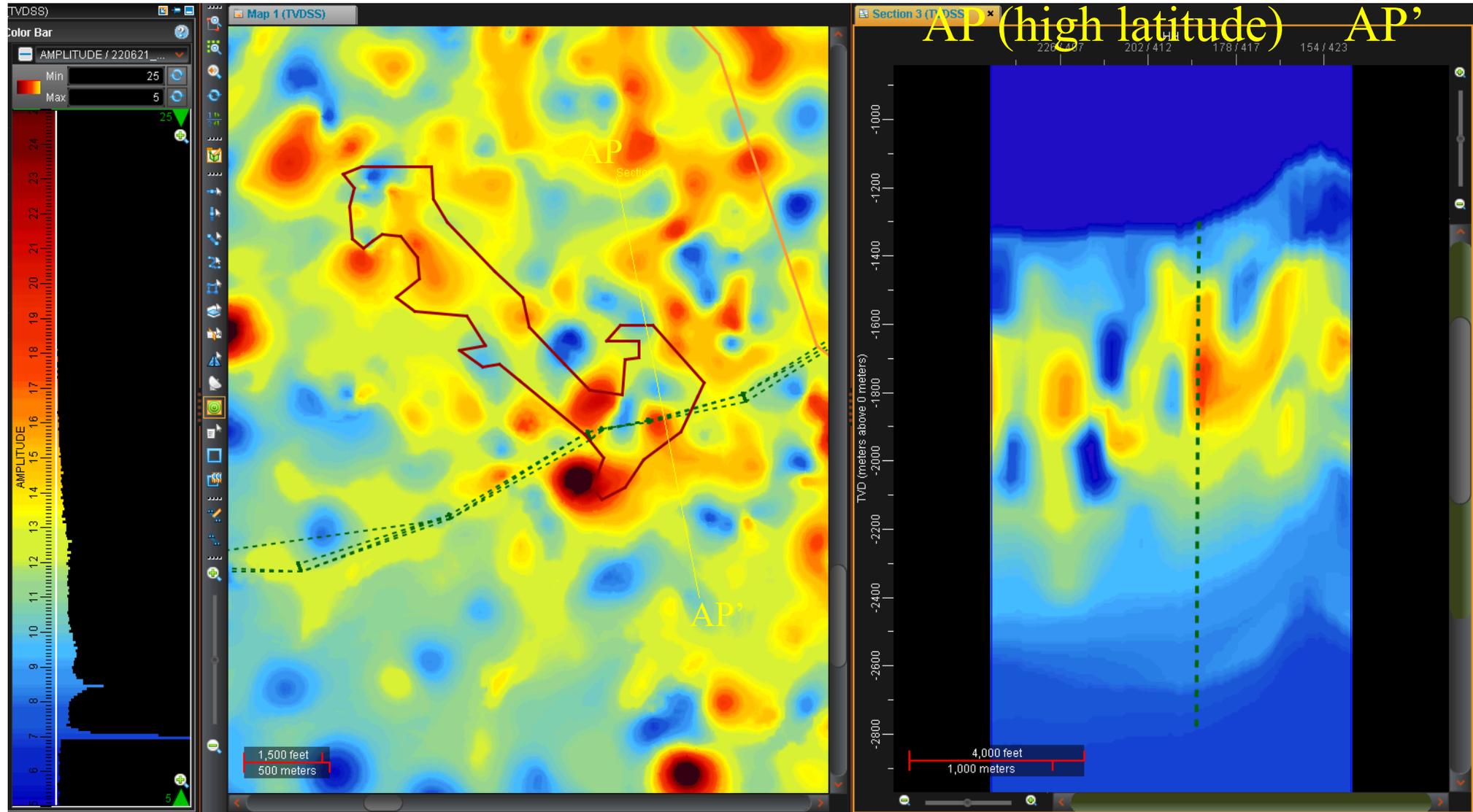
Harmony Hills: BB RAP Line-07, approximate



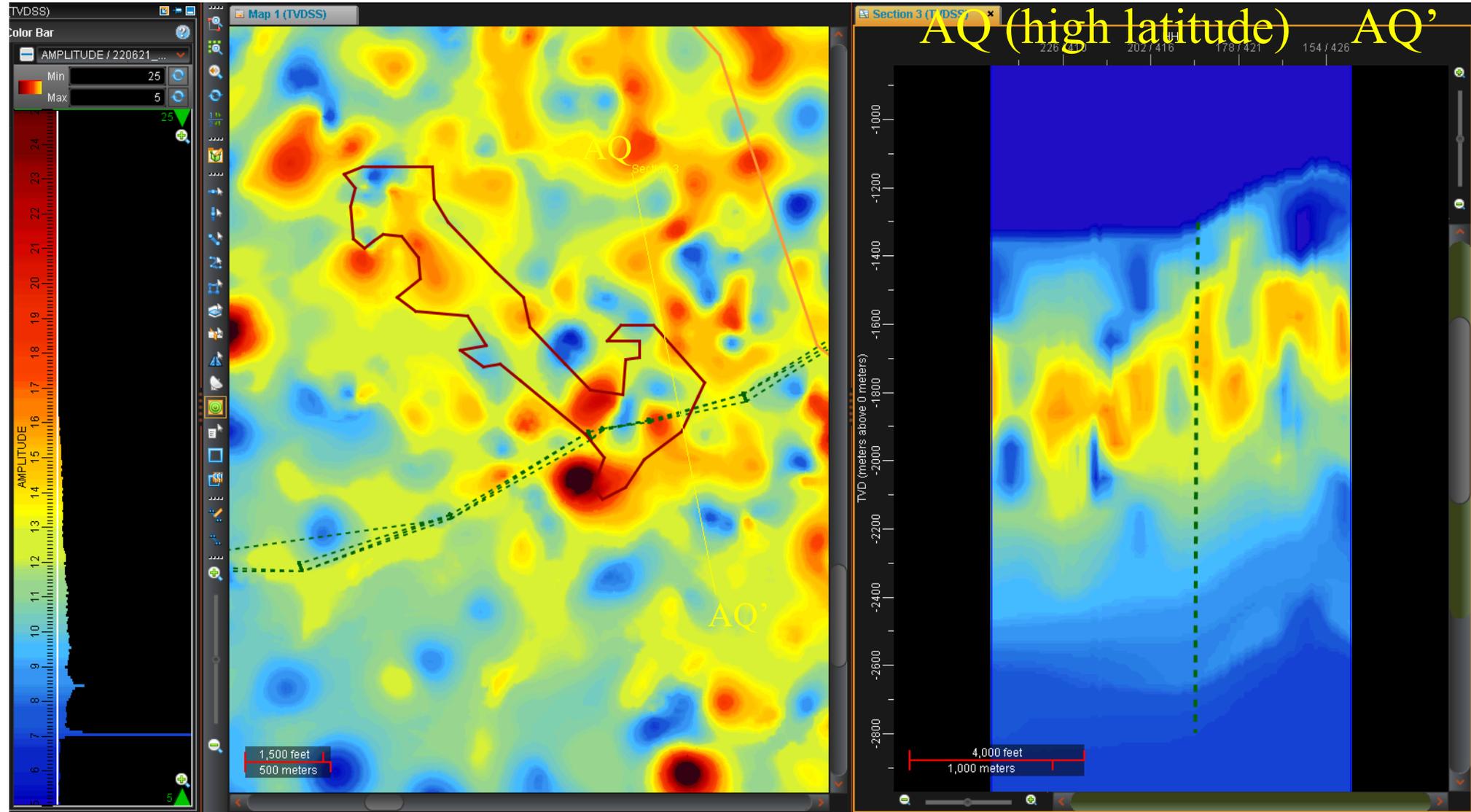
Harmony Hills: BB RAP Line-07, ~overlay



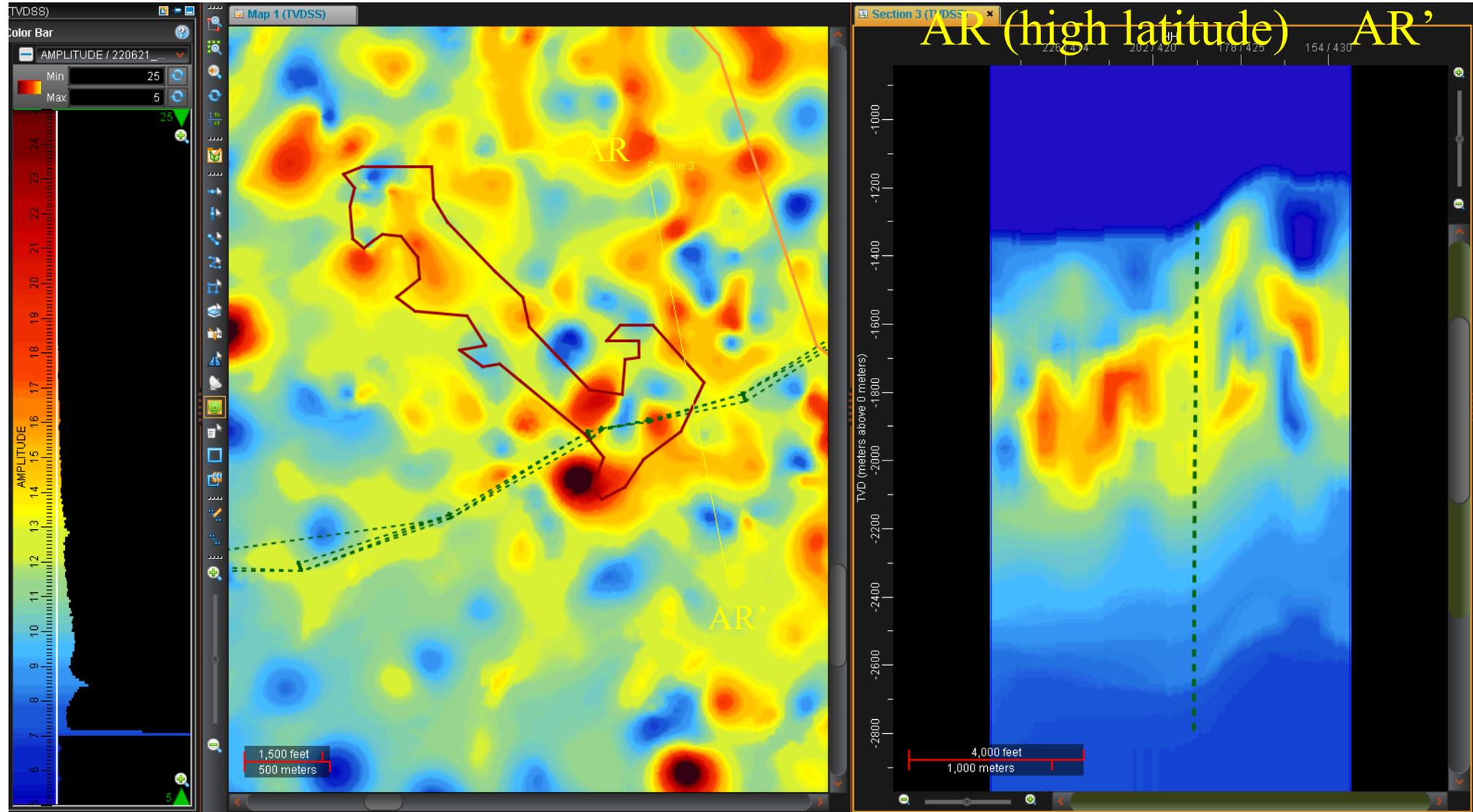
Harmony Hills: BB RAP Line-07, 300 feet east



Harmony Hills: BB RAP Line-07, 600 feet east



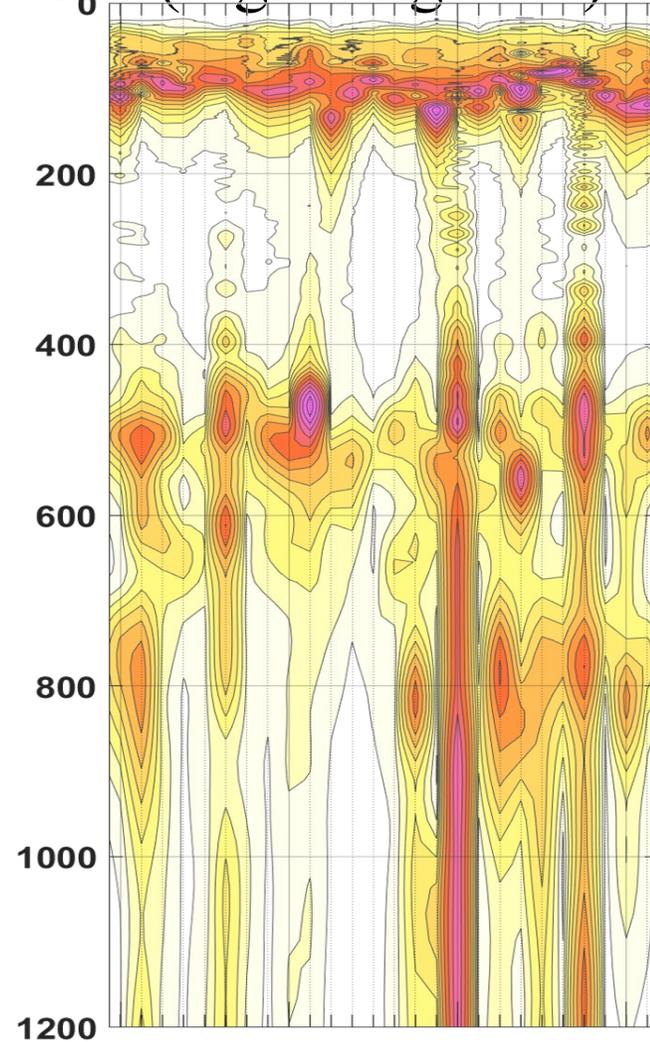
Harmony Hills: BB RAP Line-07, 900 feet east



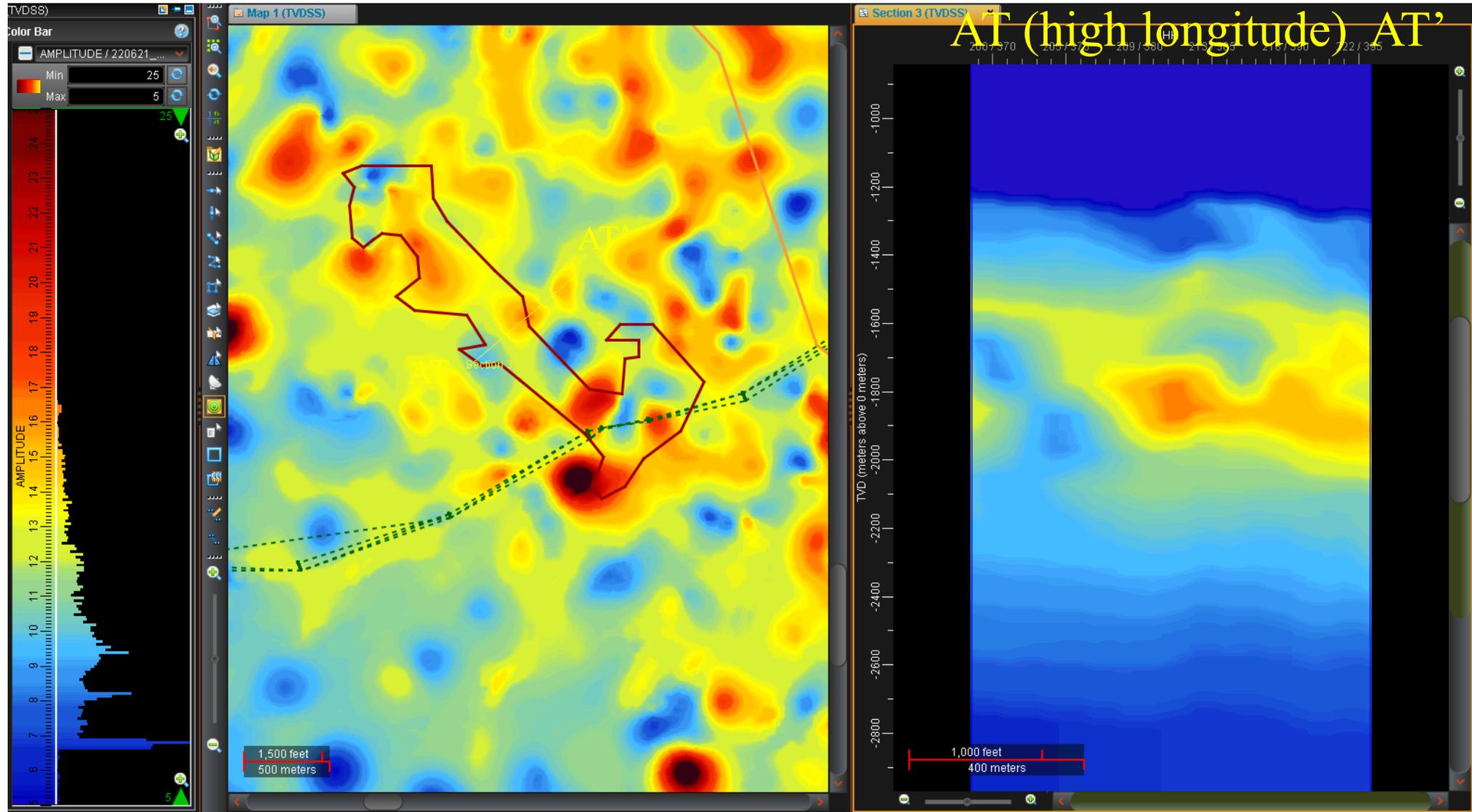
Harmony Hills: BB RAP Line-17



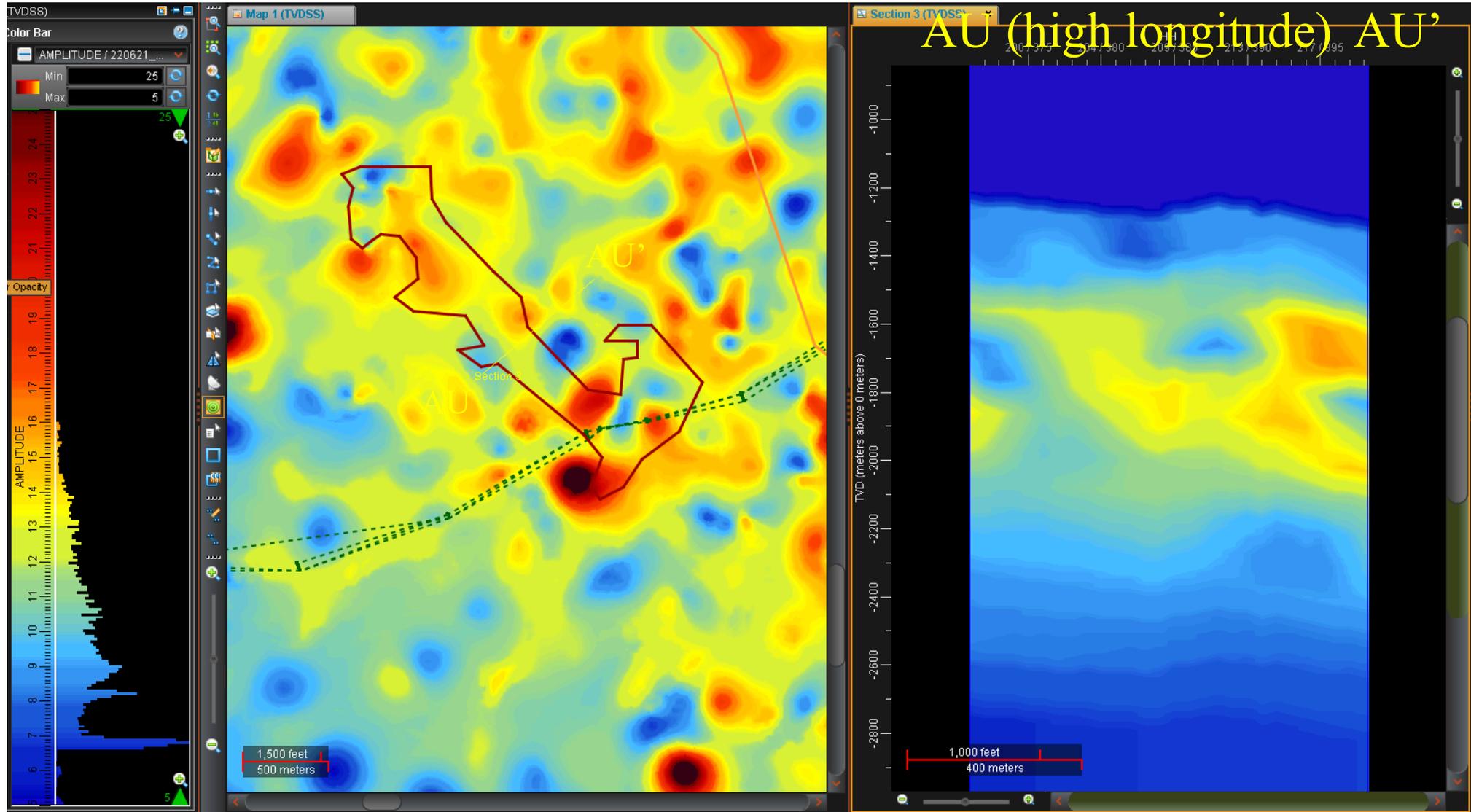
Line 17
AS (high longitude) AS'



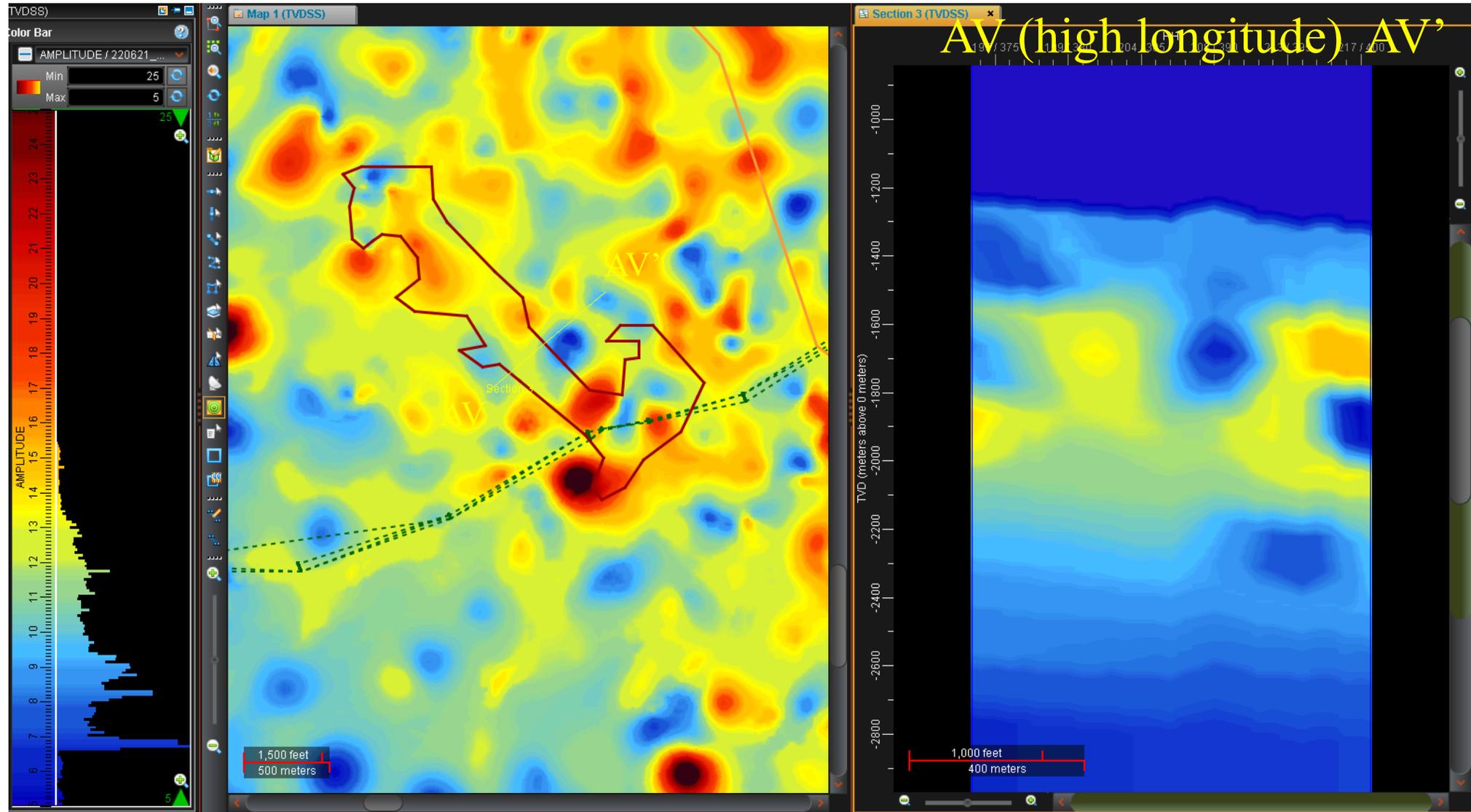
Harmony Hills: BB RAP Line-17, 900 feet NW



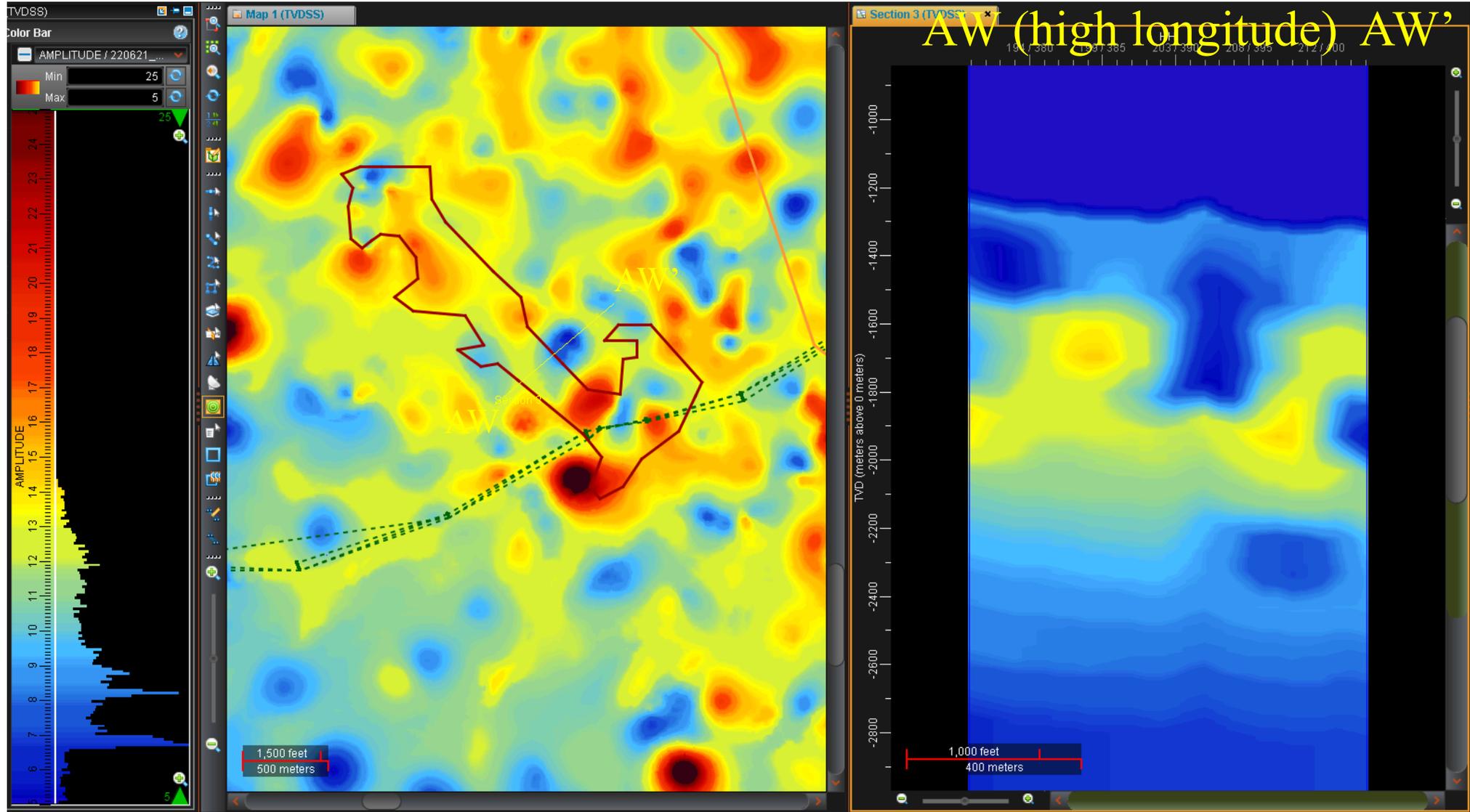
Harmony Hills: BB RAP Line-17, 600 feet NW



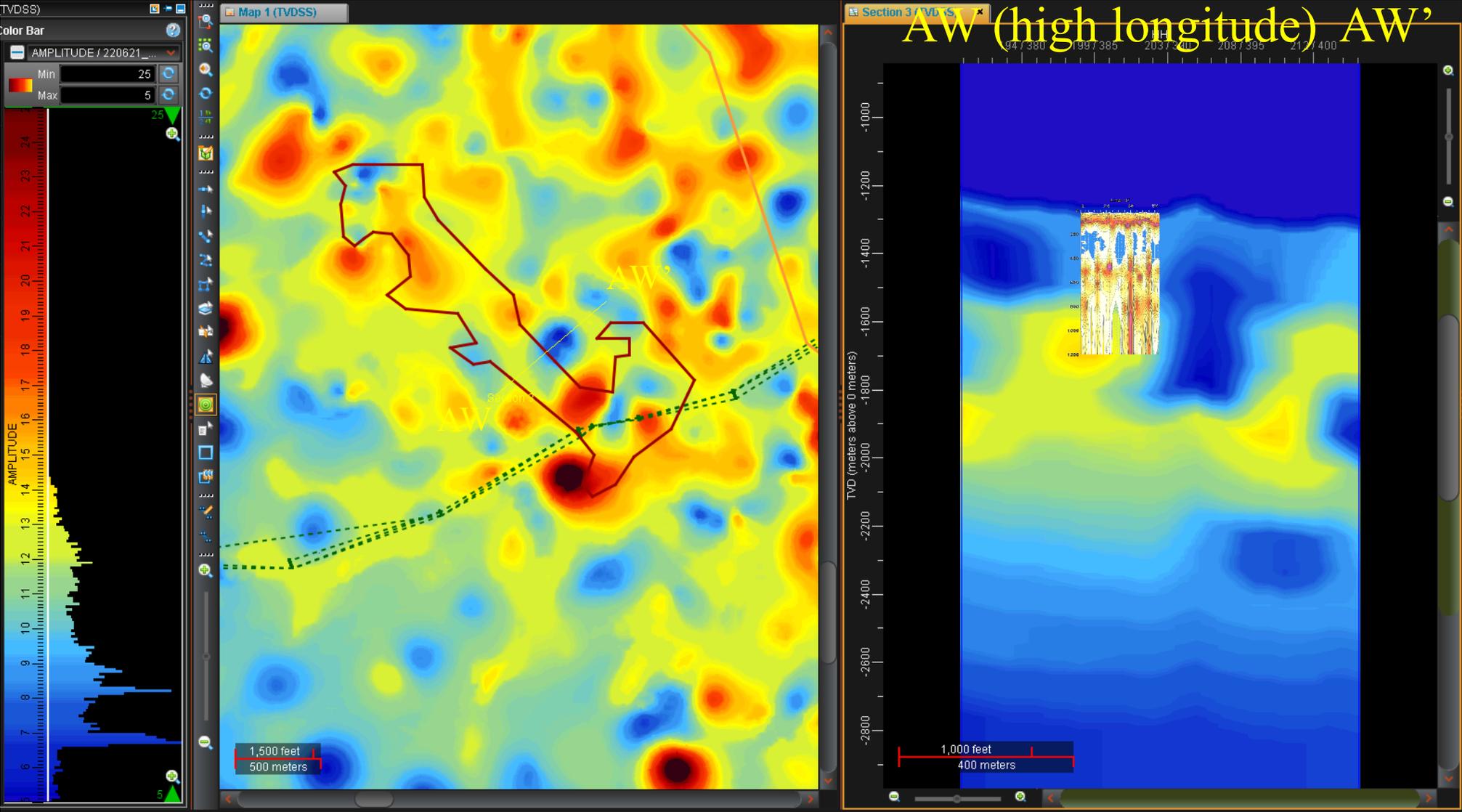
Harmony Hills: BB RAP Line-17, 300 feet NW



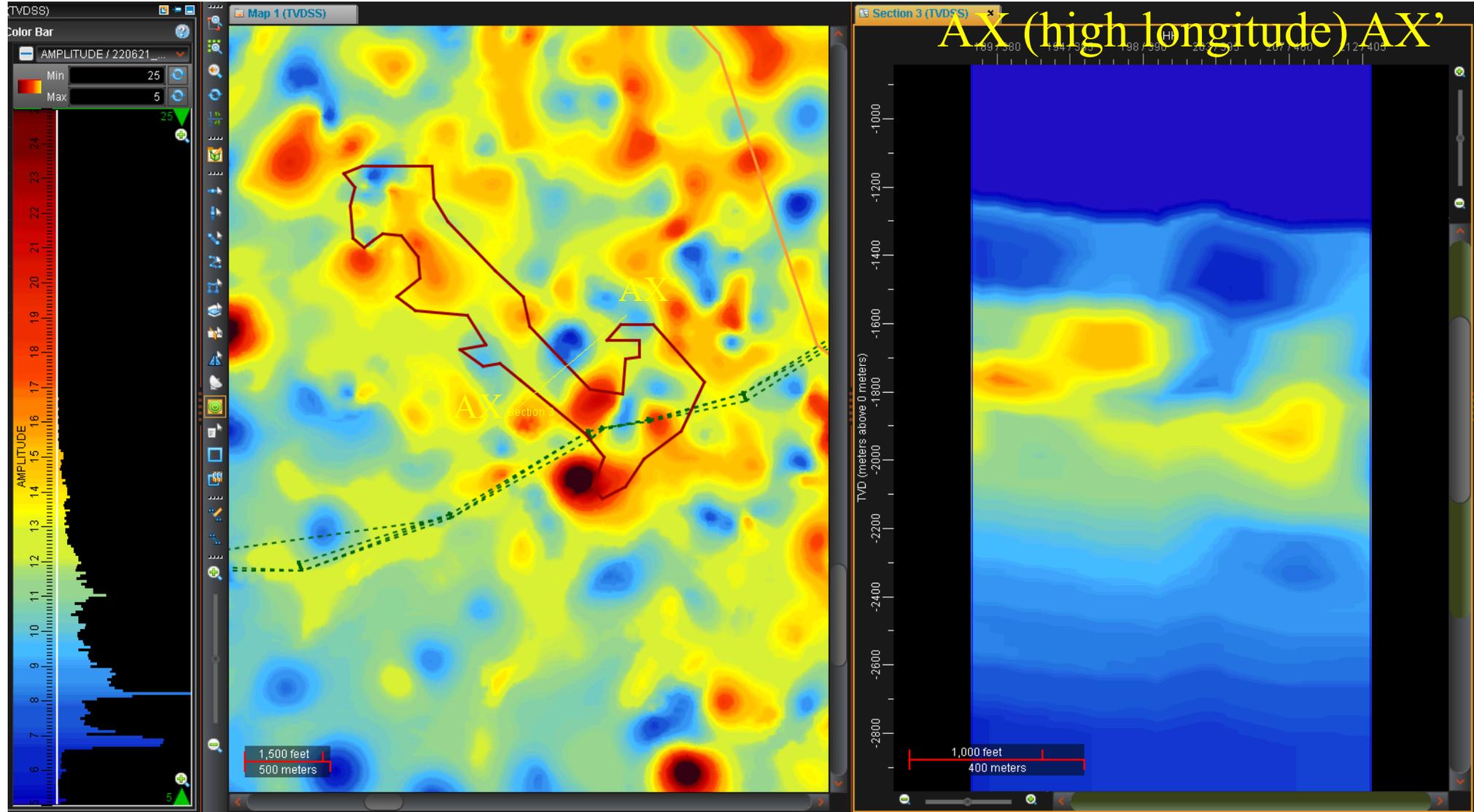
Harmony Hills: BB RAP Line-17, approximate



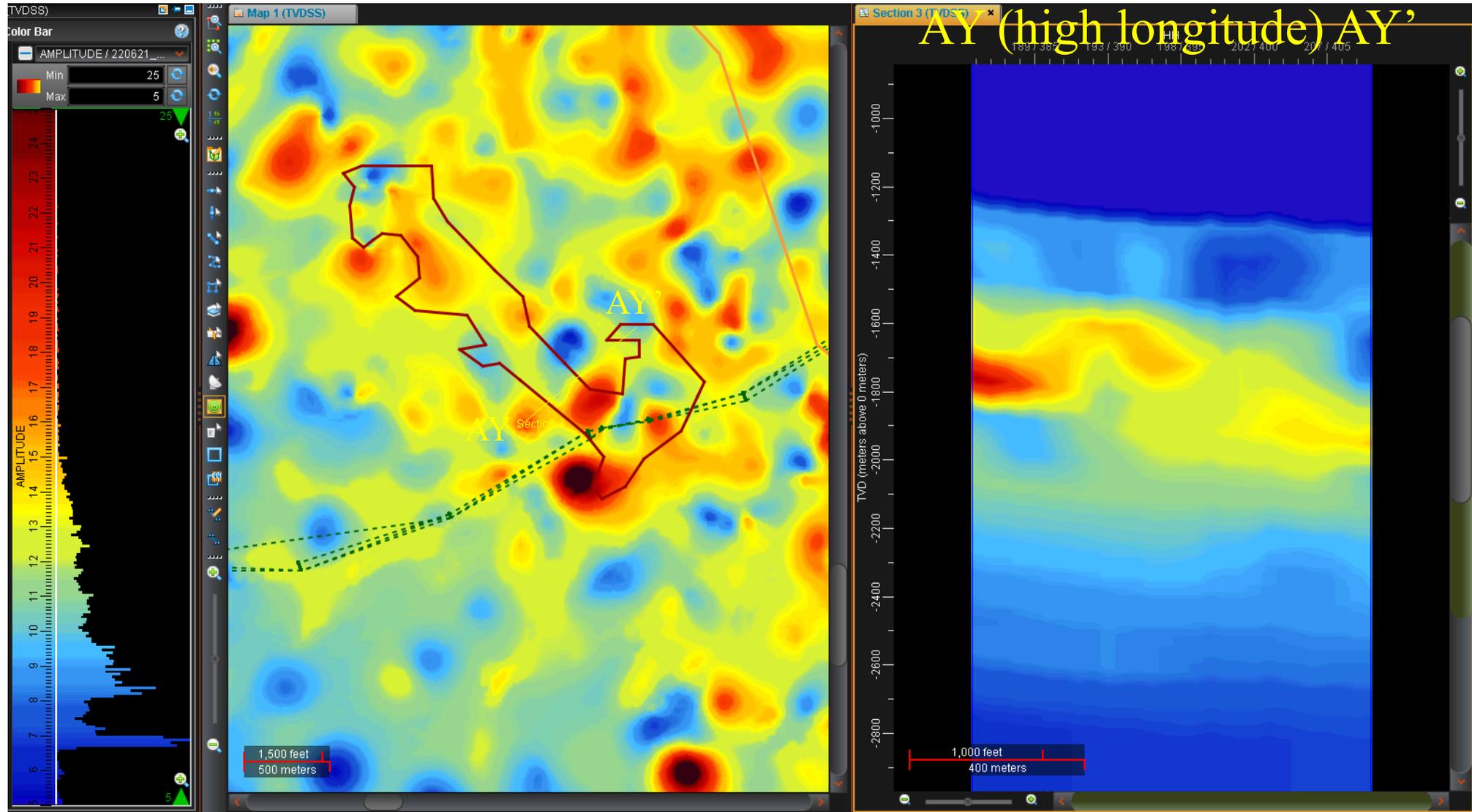
Harmony Hills: BB RAP Line-17, ~overlay



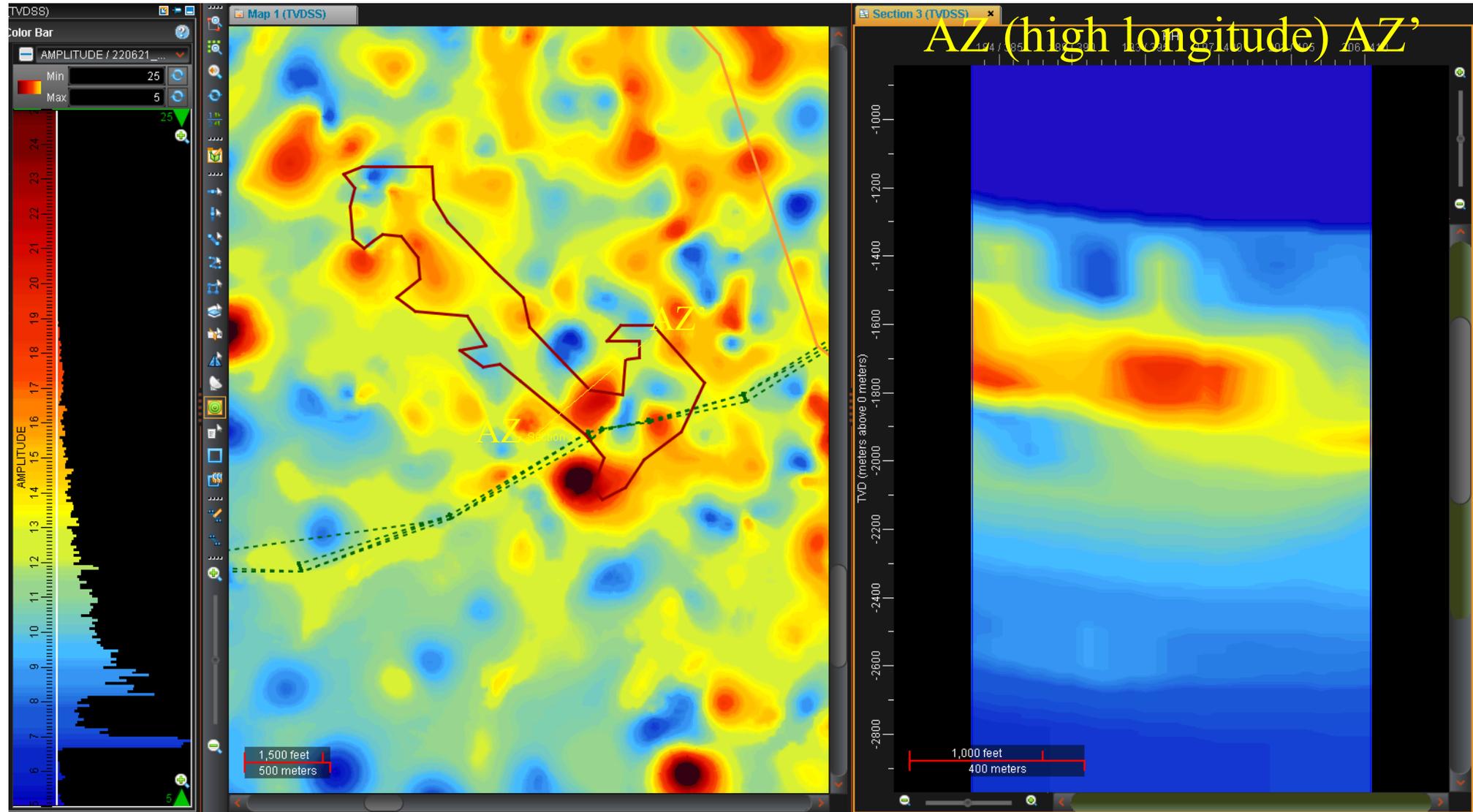
Harmony Hills: BB RAP Line-17, 300 feet SE



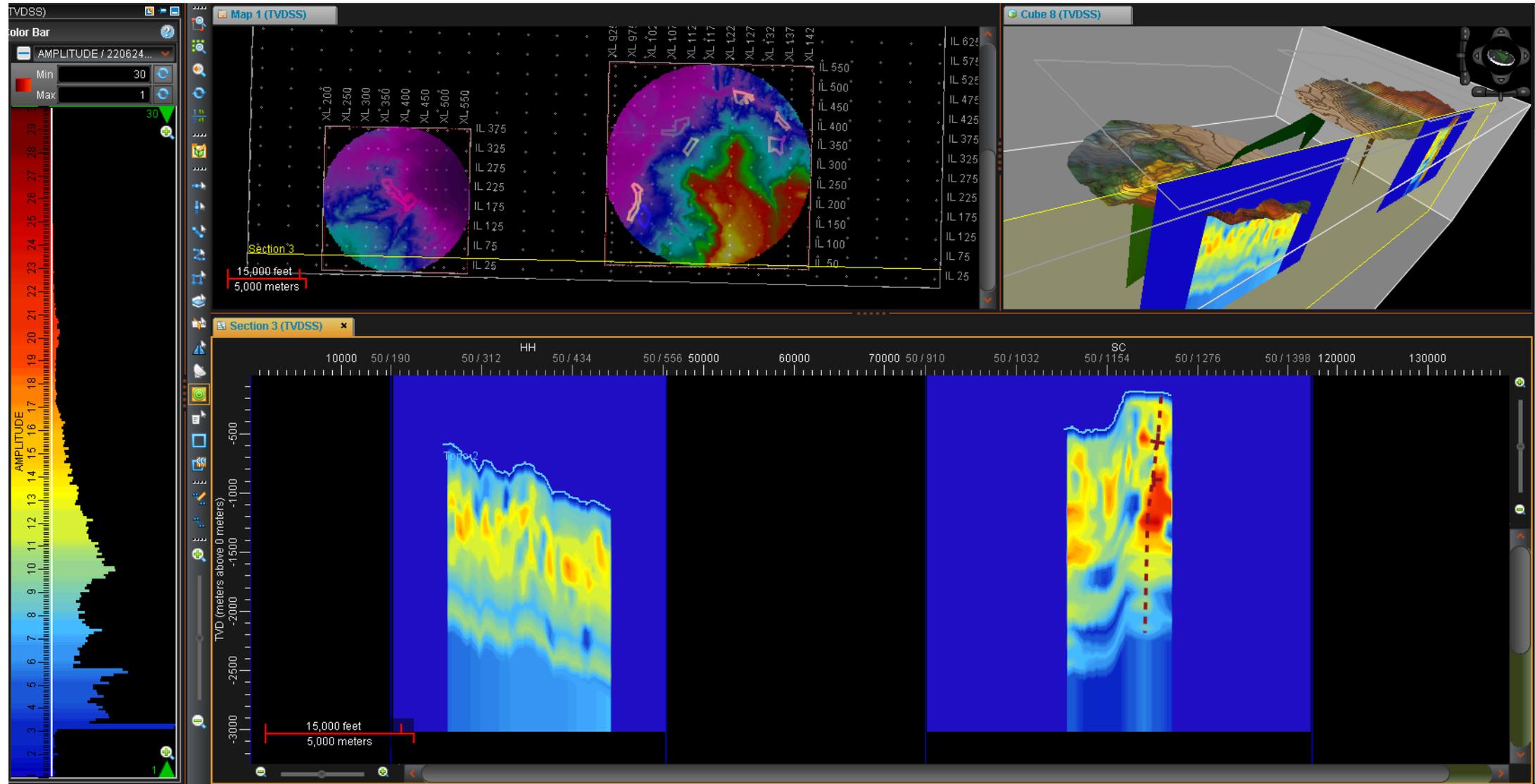
Harmony Hills: BB RAP Line-17, 600 feet SE



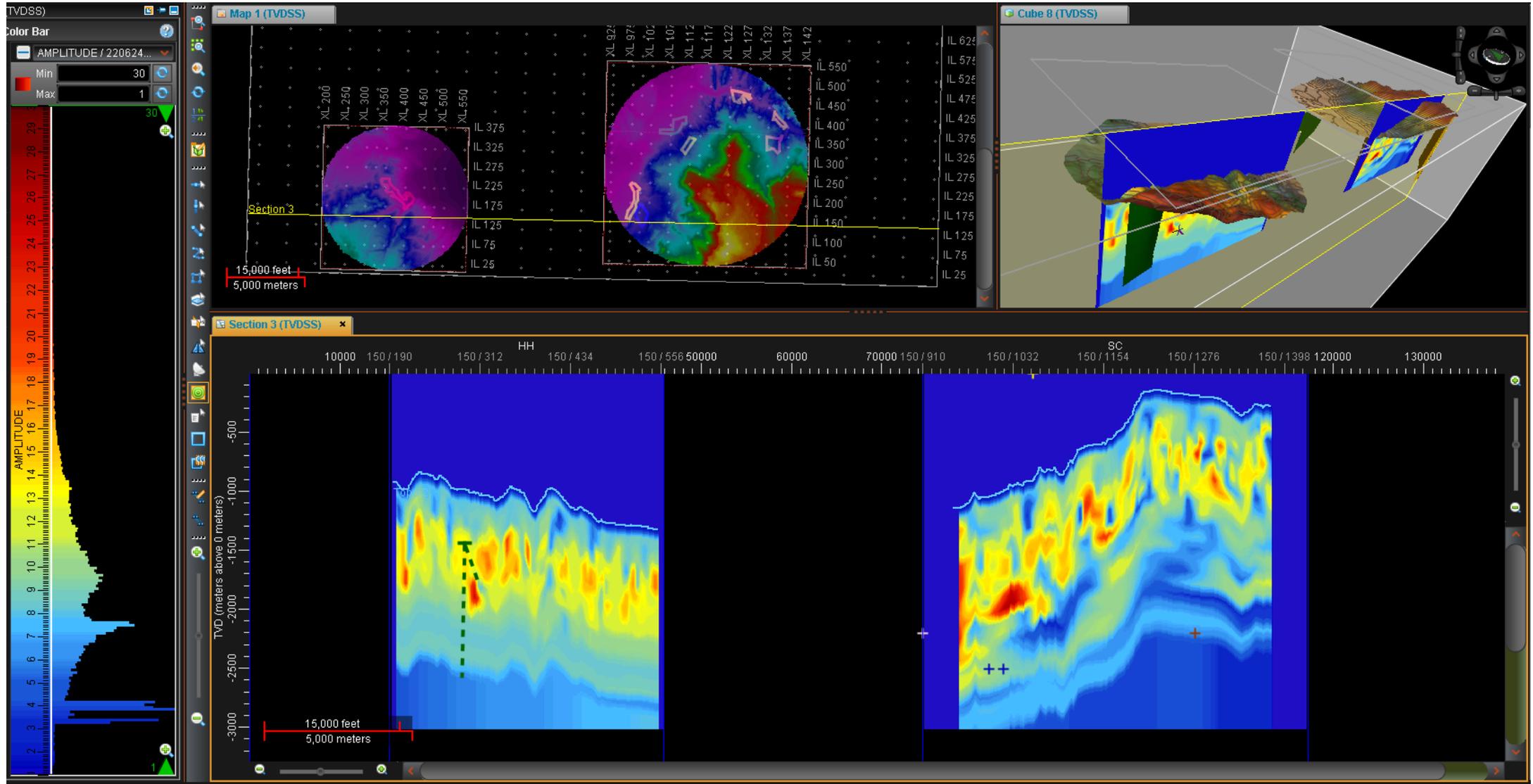
Harmony Hills: BB RAP Line-17, 900 feet SE



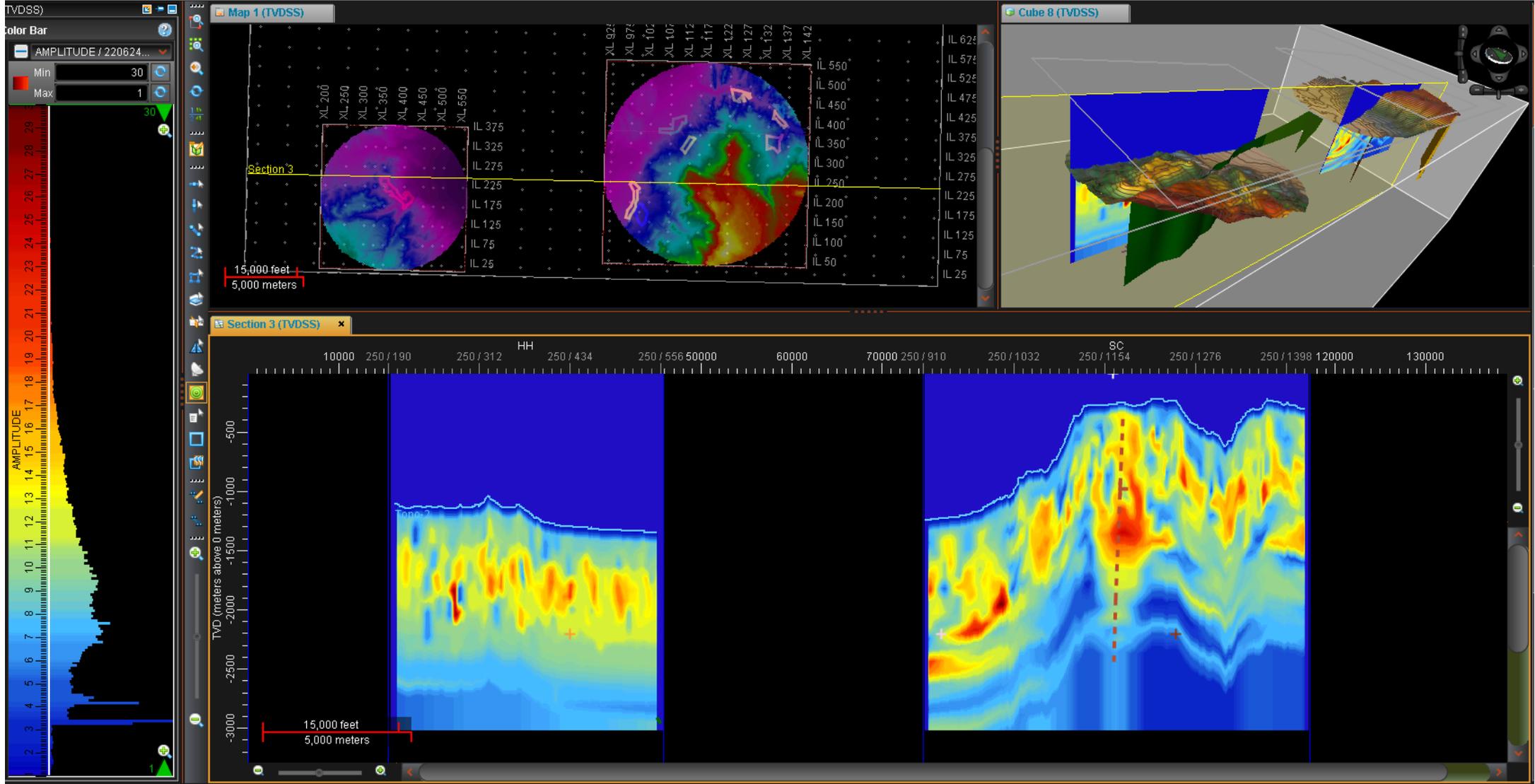
Apparent Resistivity Line 050 HH & SC



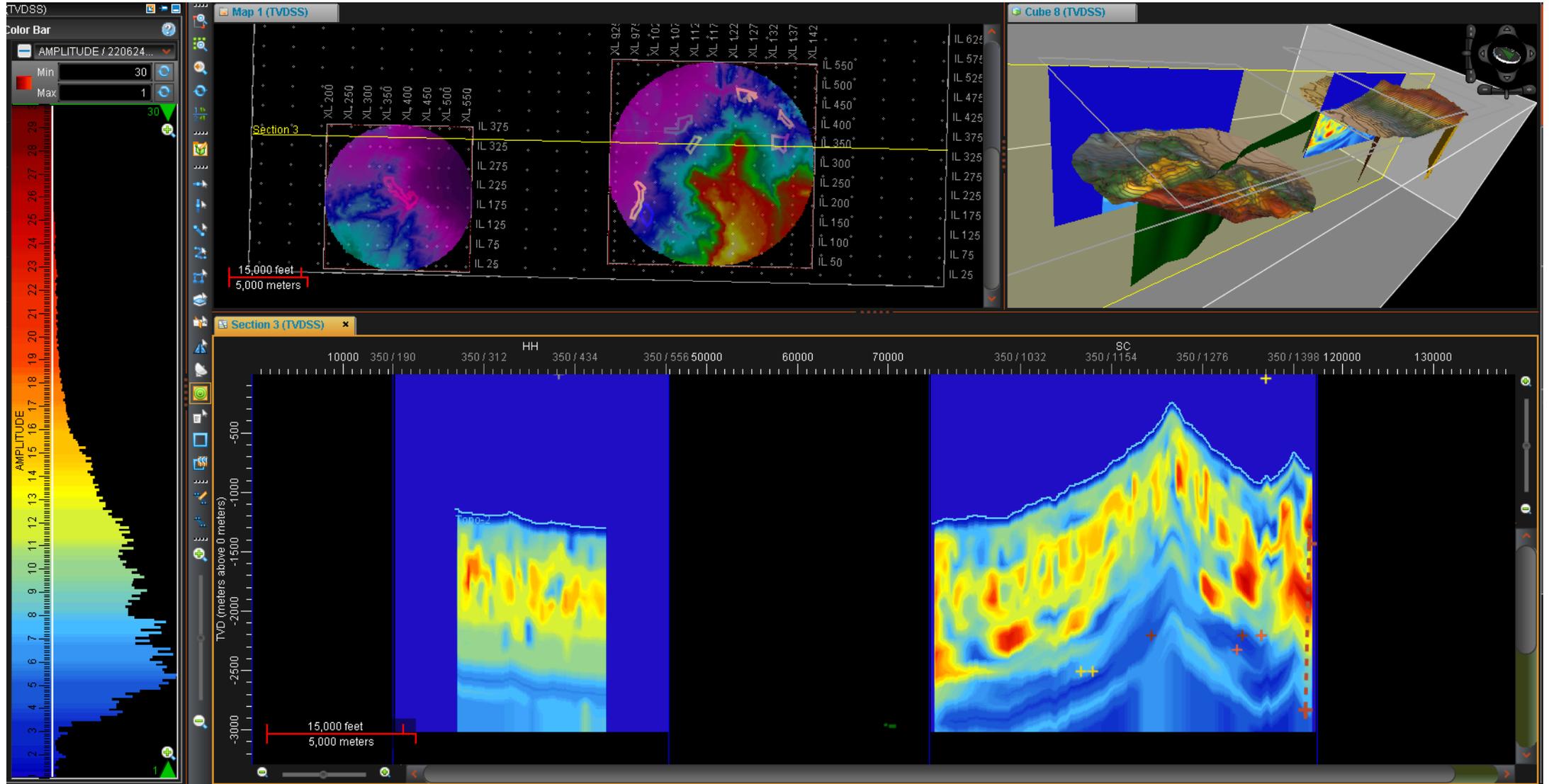
Apparent Resistivity Line 150 HH & SC



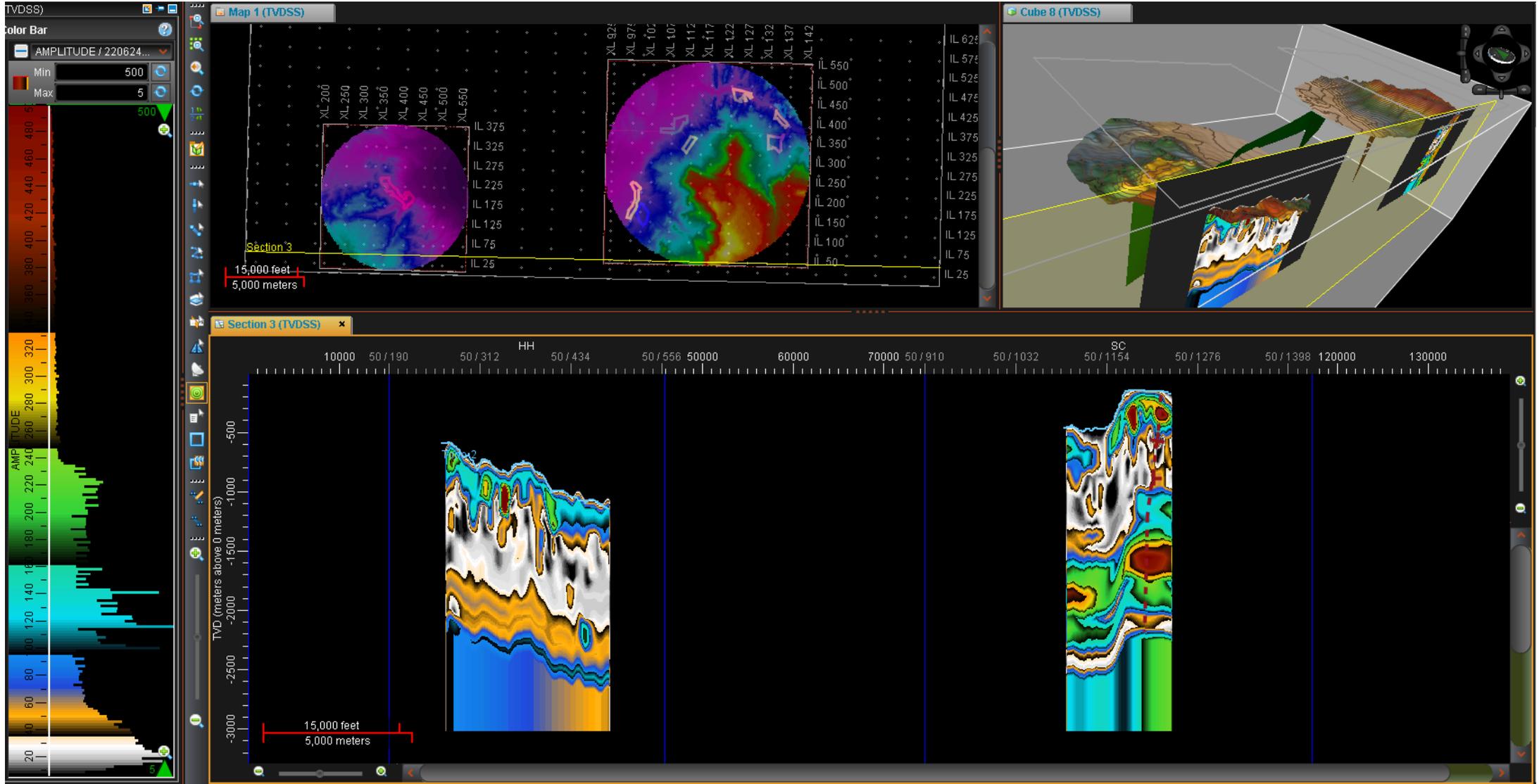
Apparent Resistivity Line 250 HH & SC



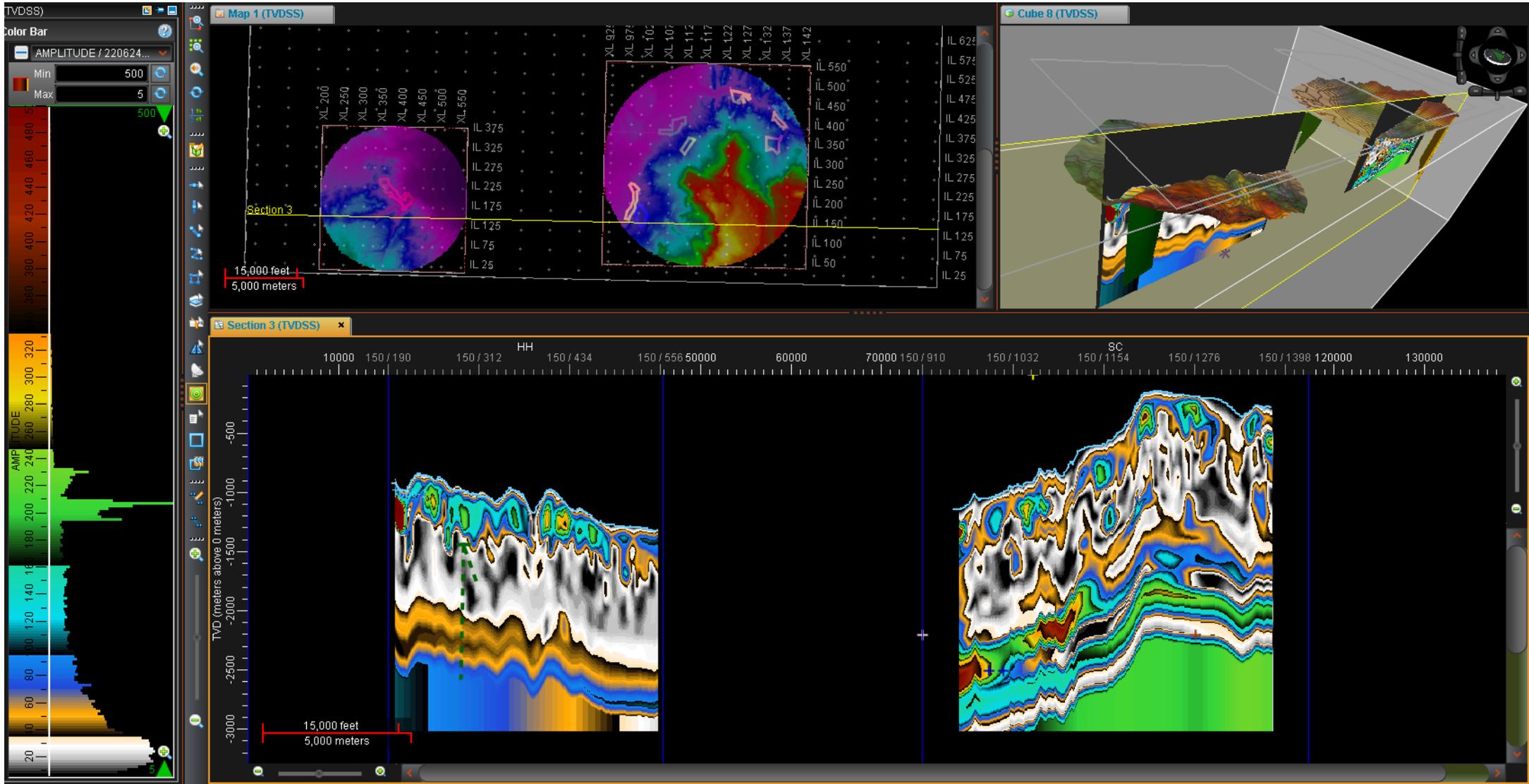
Apparent Resistivity Line 350 HH & SC



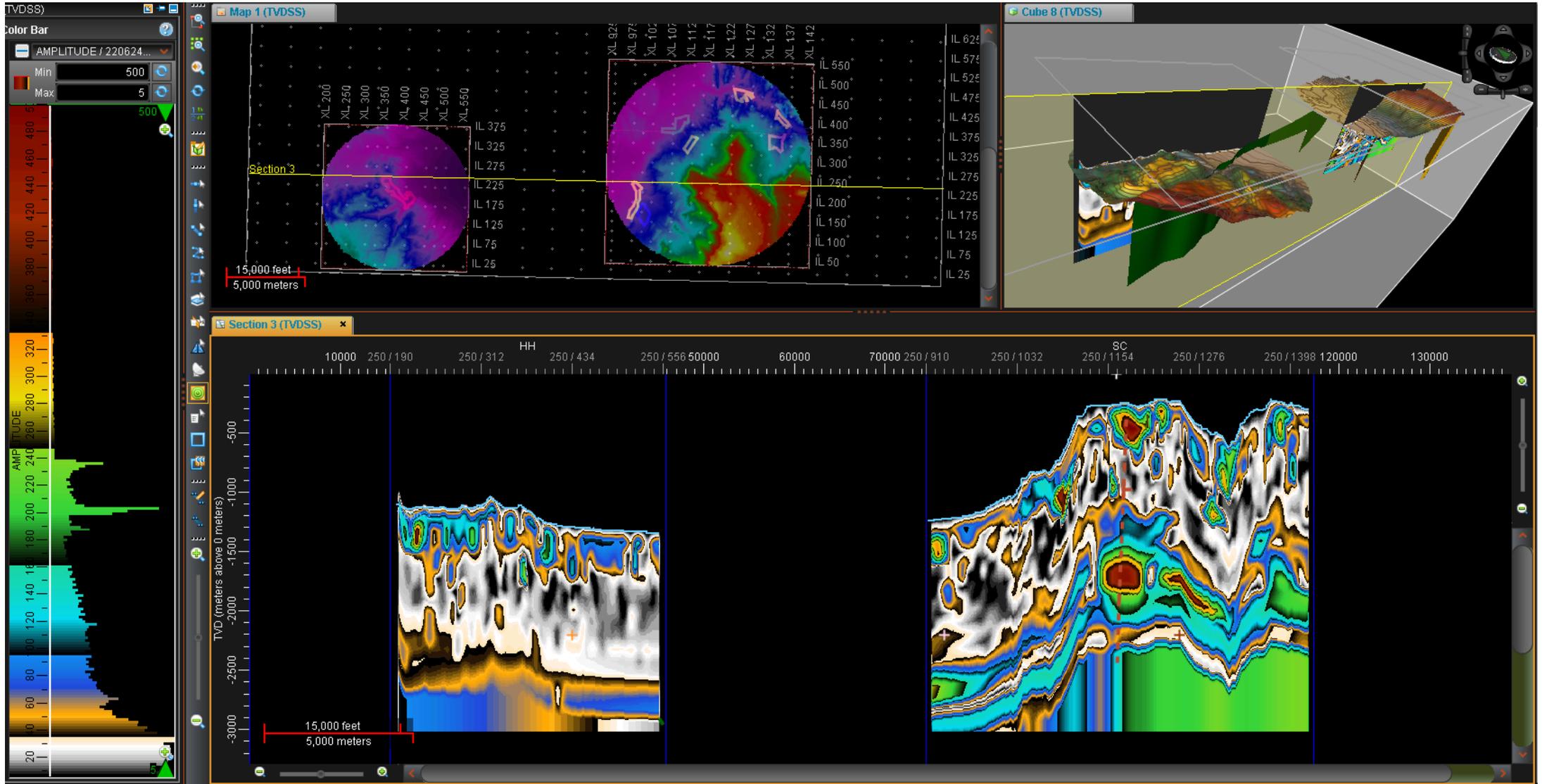
Apparent Permittivity Line 050 HH & SC



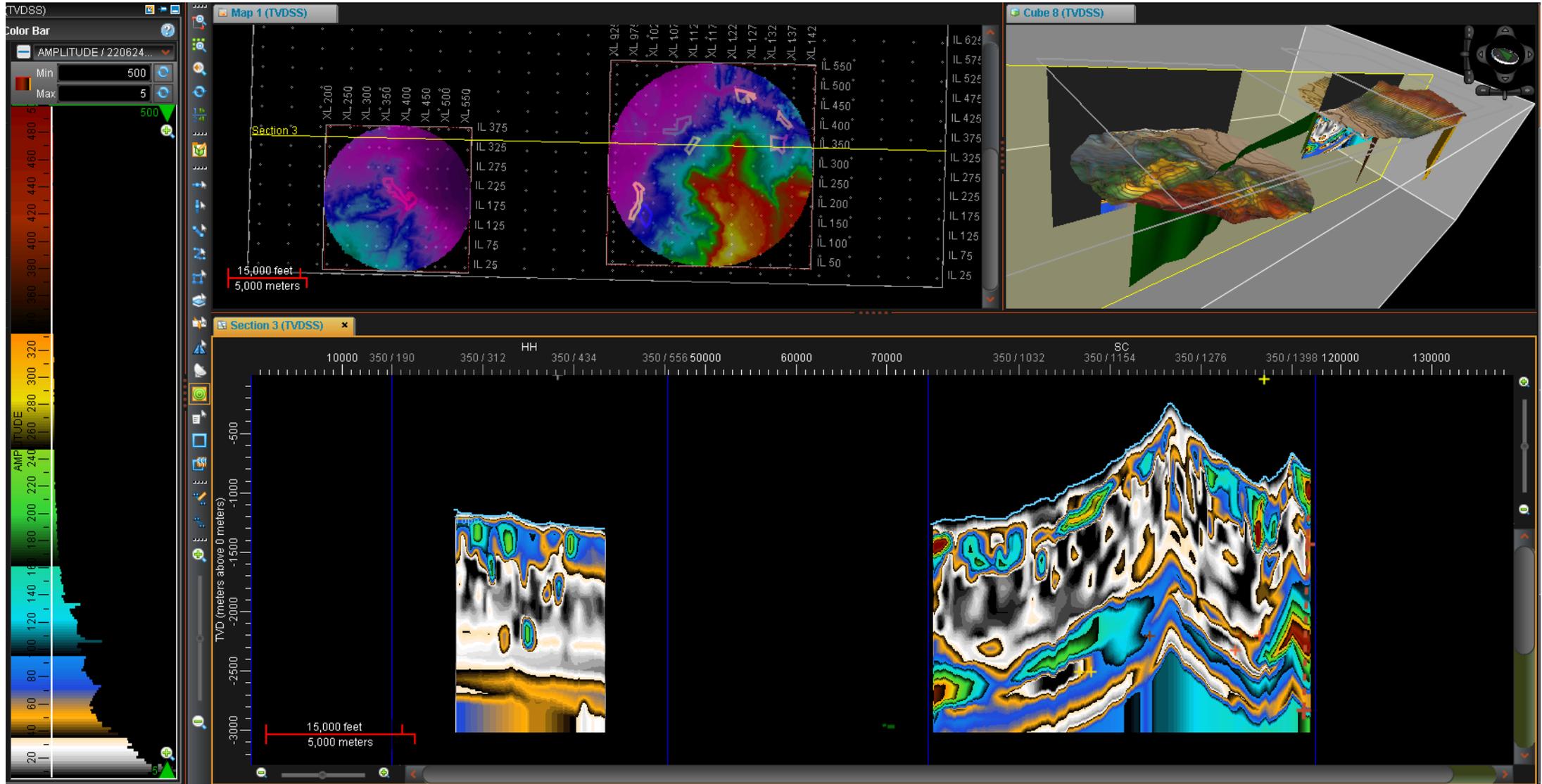
Apparent Permittivity Line 150 HH & SC



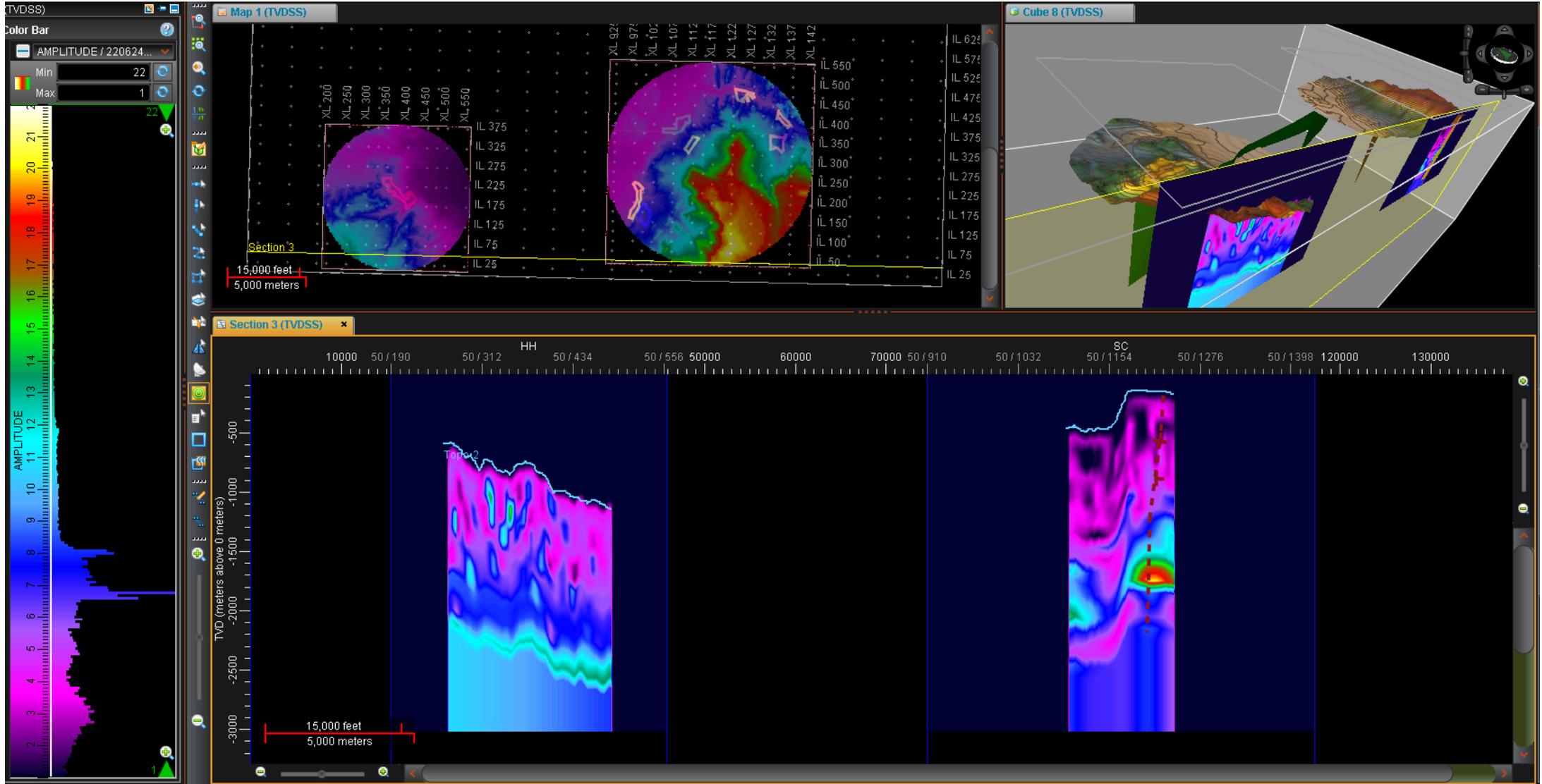
Apparent Permittivity Line 250 HH & SC



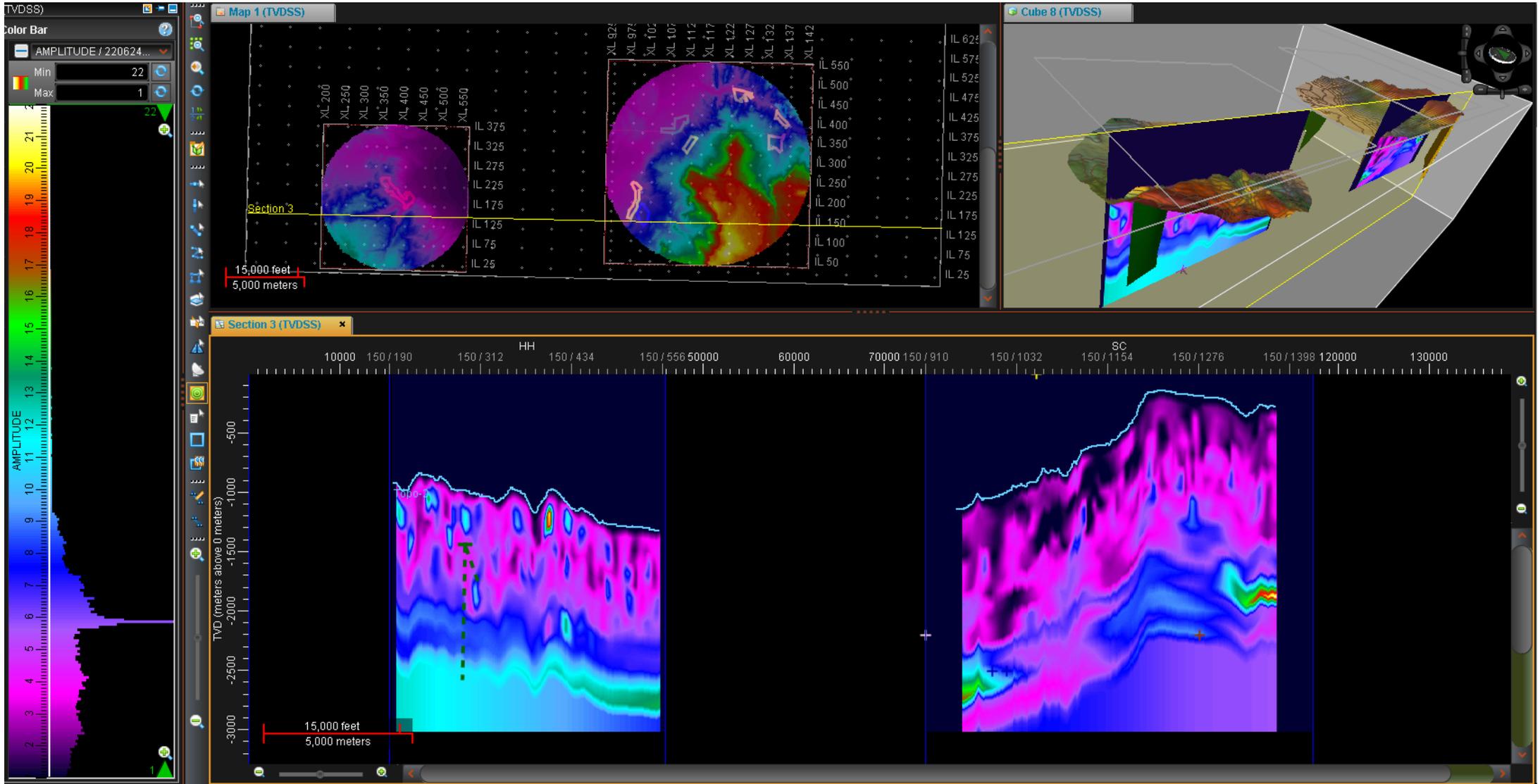
Apparent Permittivity Line 350 HH & SC



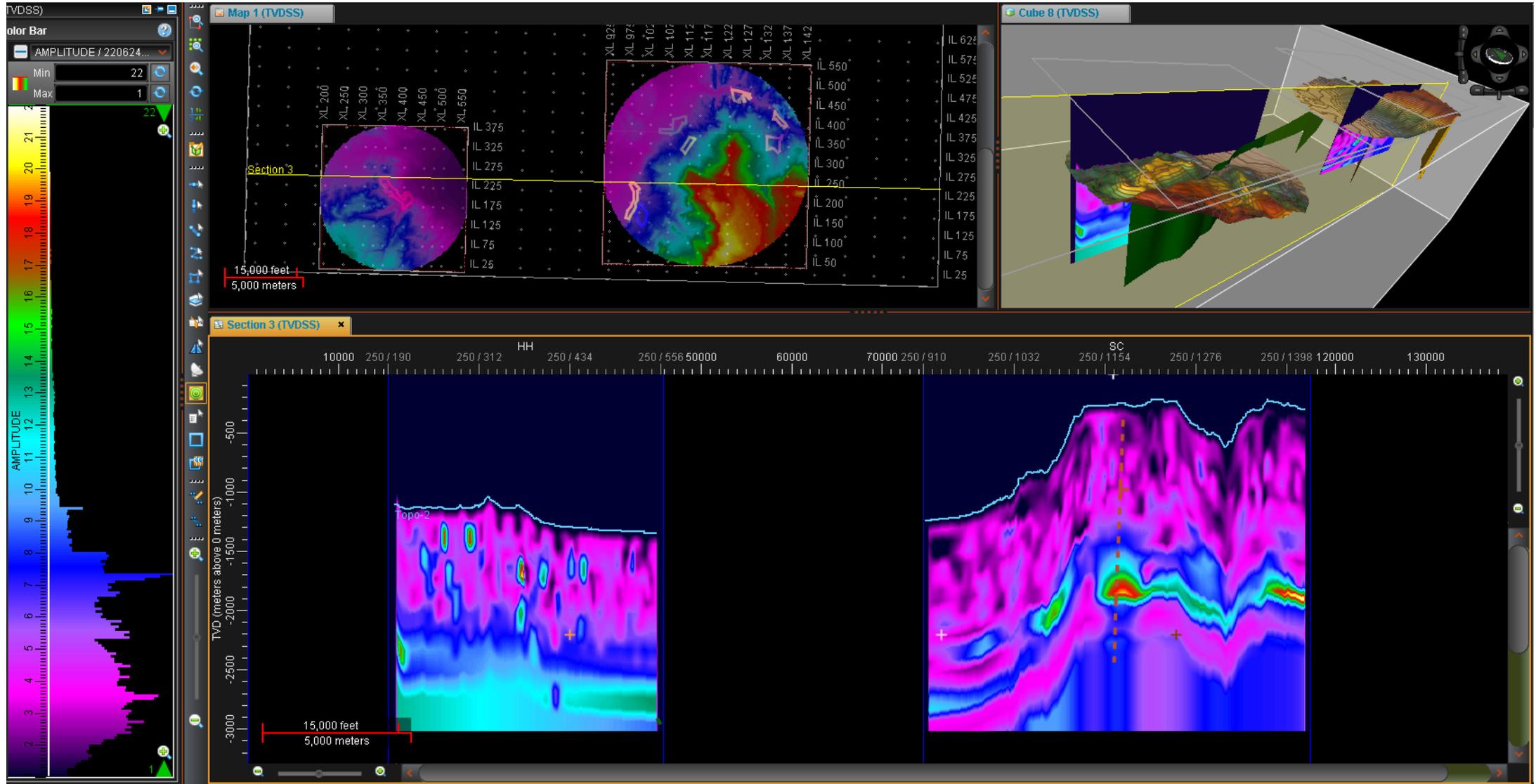
Rise-Time Line 050 HH & SC



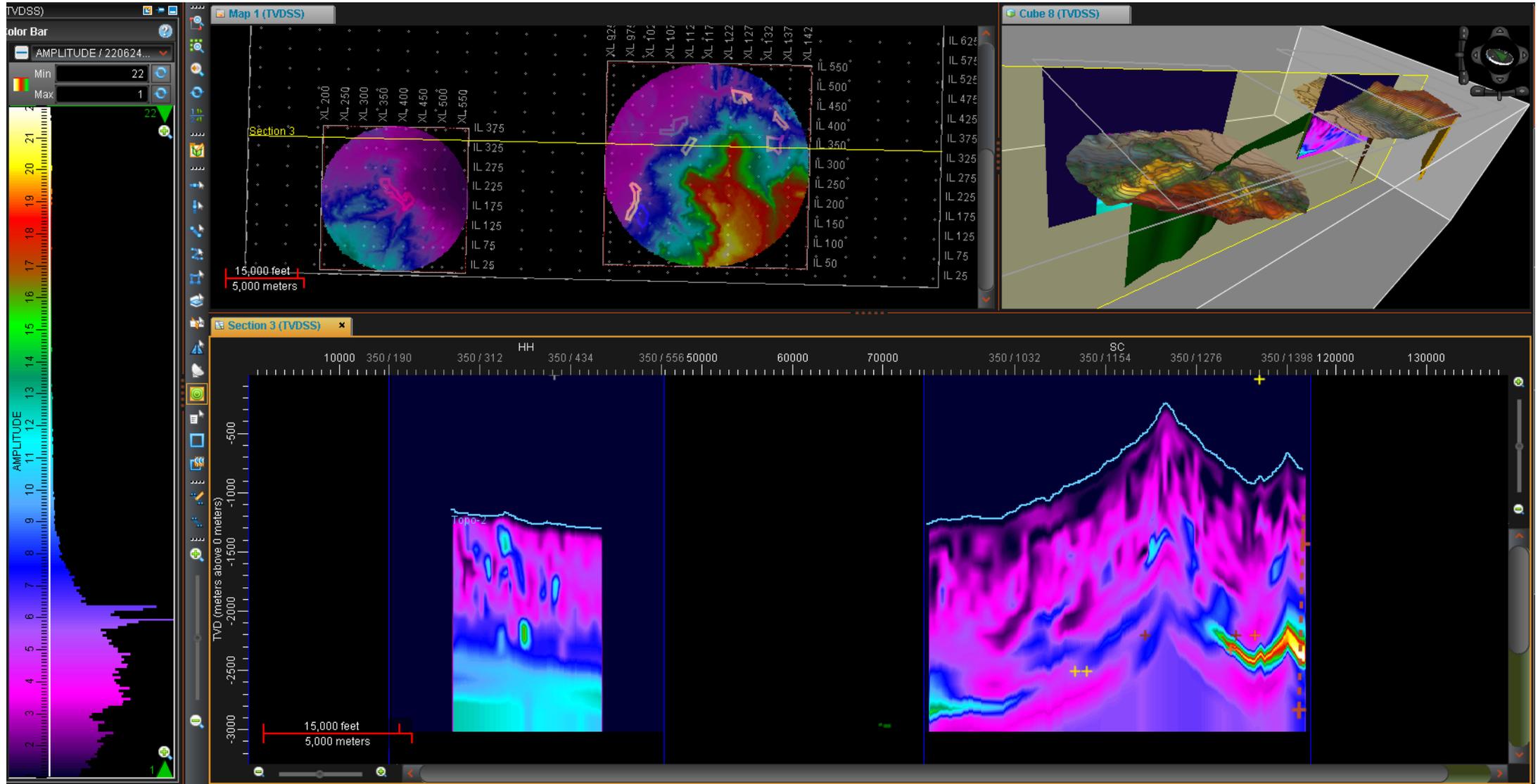
Rise-Time Line 150 HH & SC



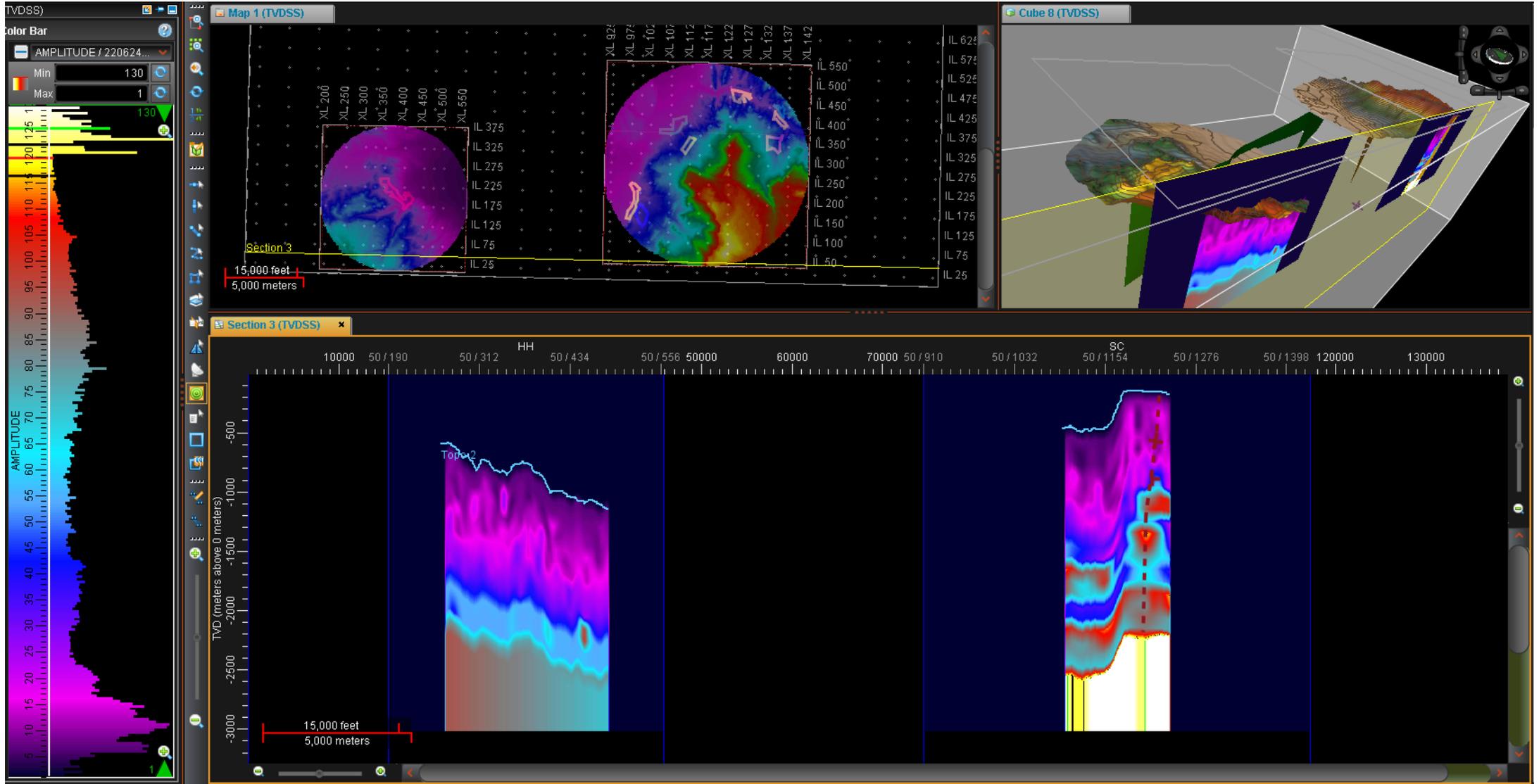
Rise-Time Line 250 HH & SC



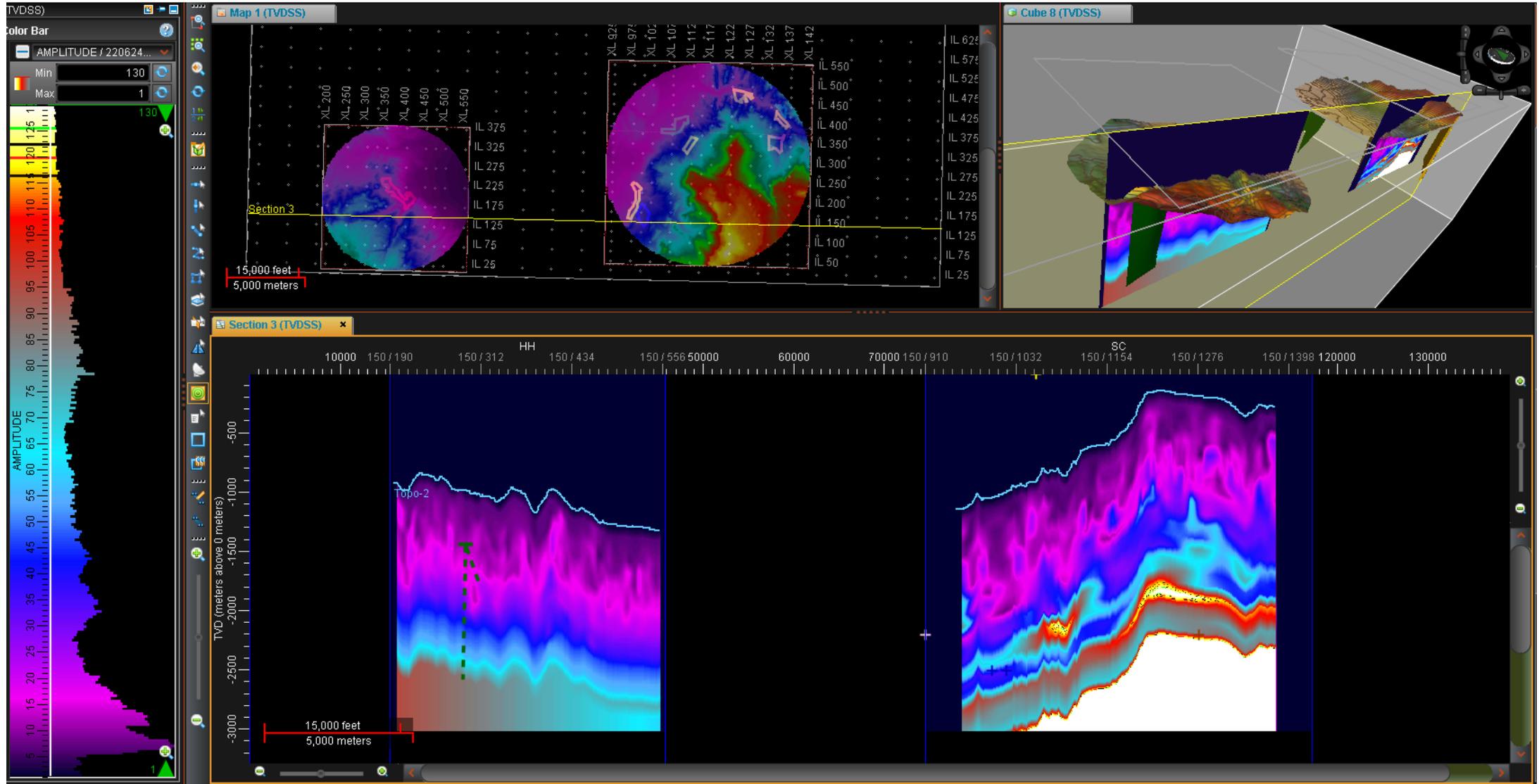
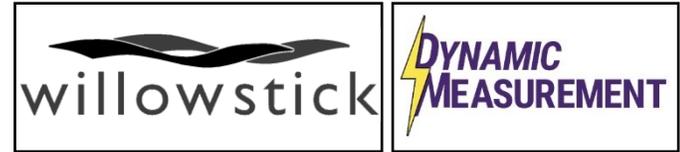
Rise-Time Line 350 HH & SC



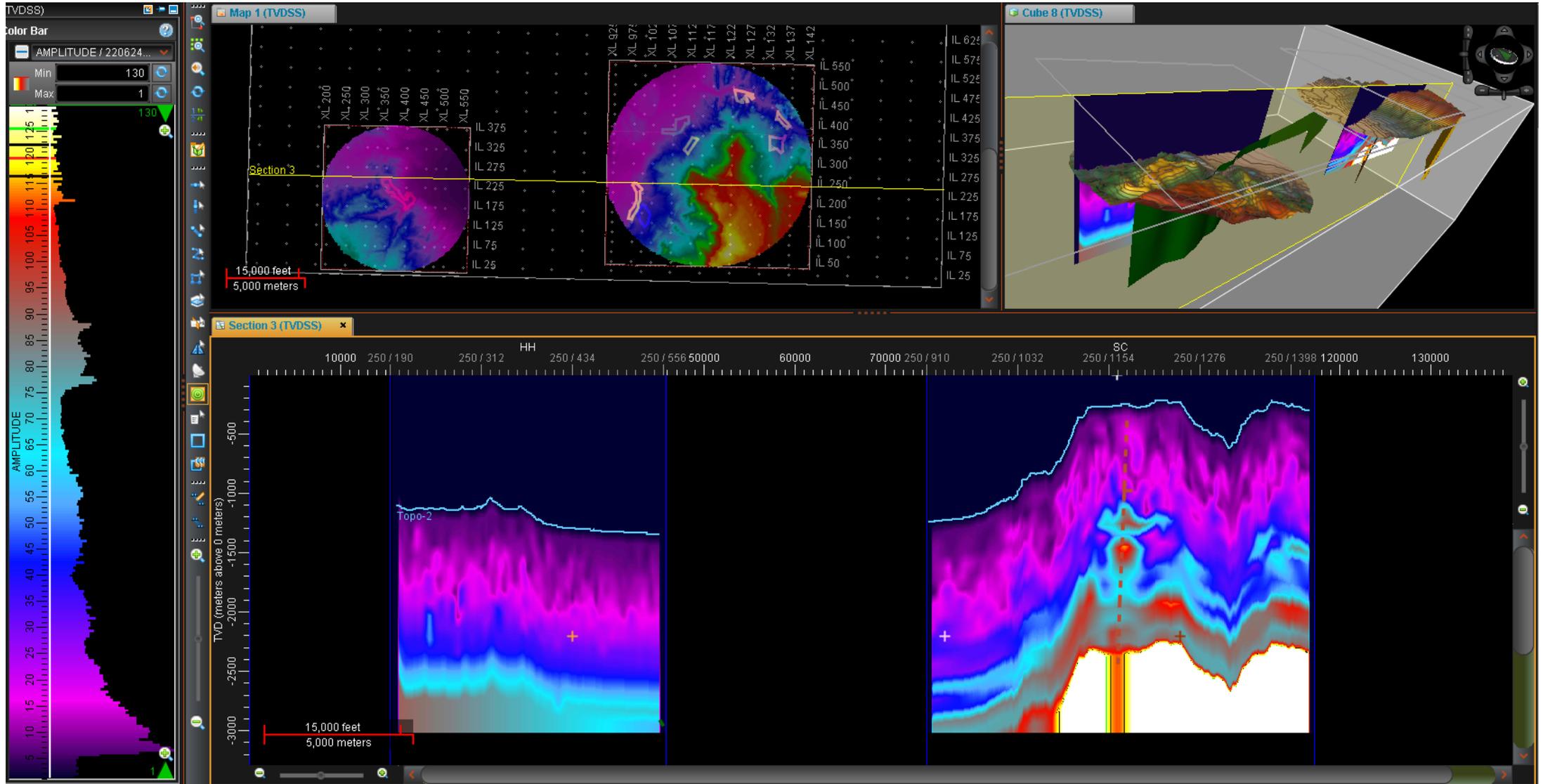
Peak Current Absolute Line 050 HH & SC



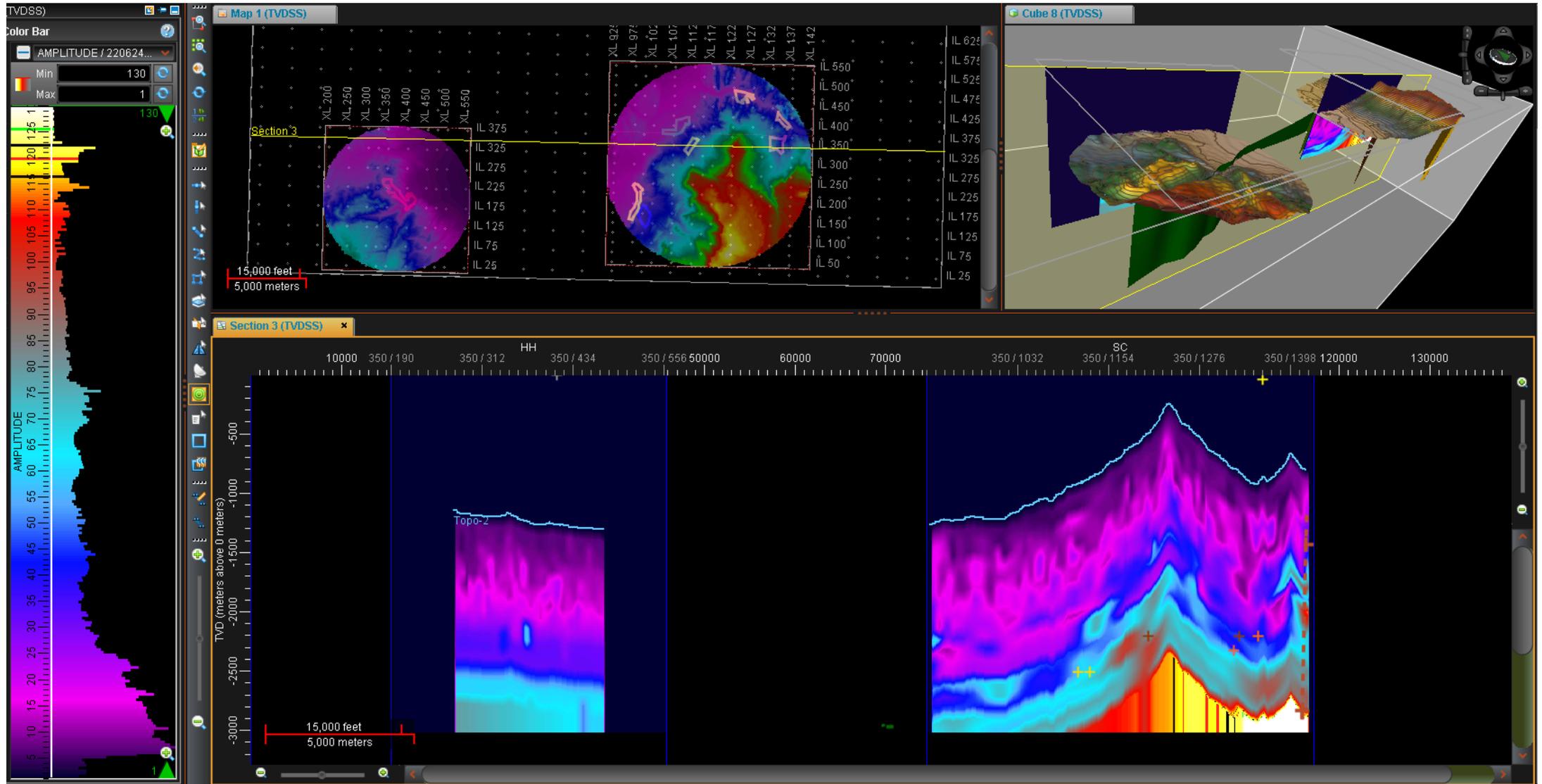
Peak Current Absolute Line 150 HH & SC



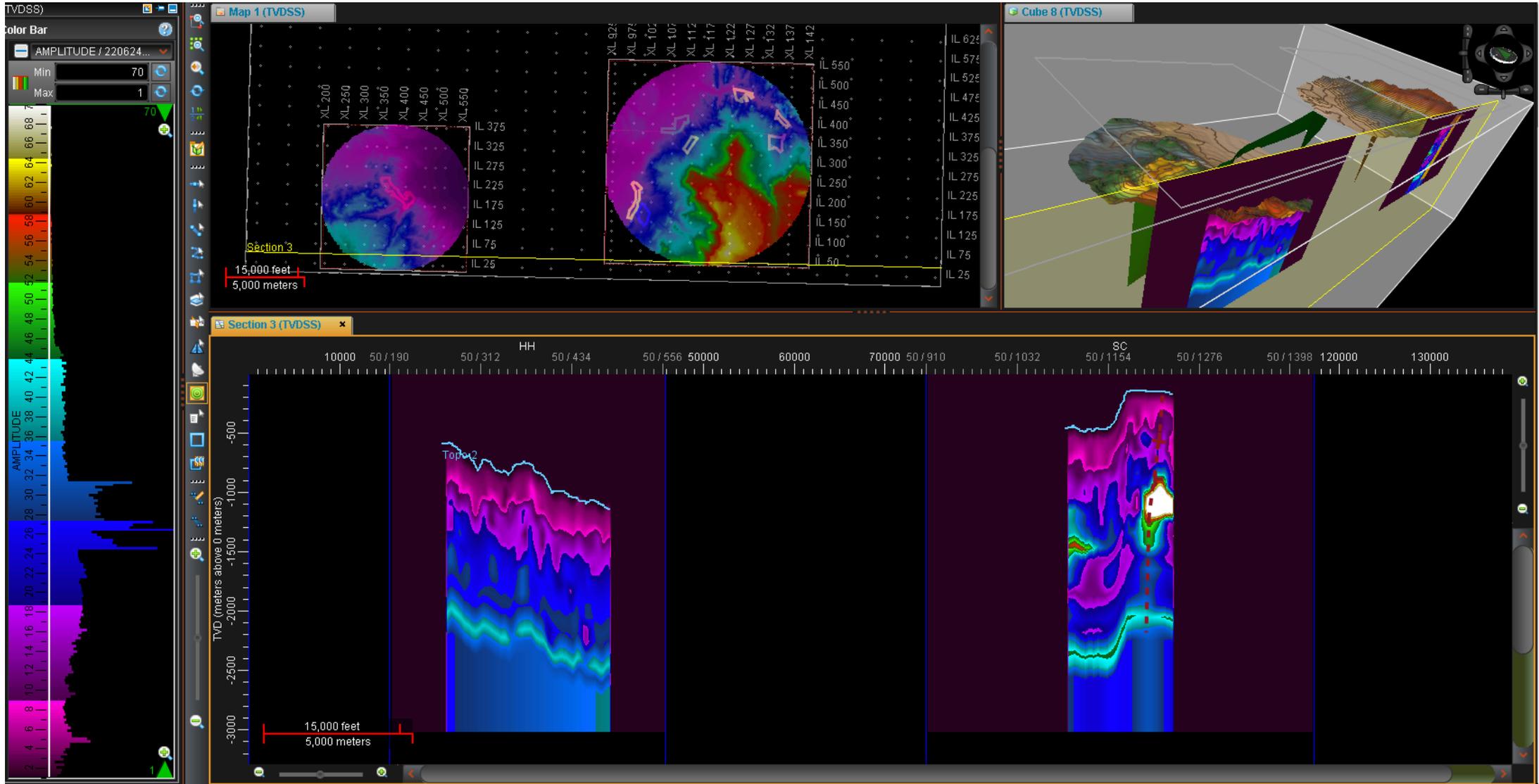
Peak Current Absolute Line 250 HH & SC



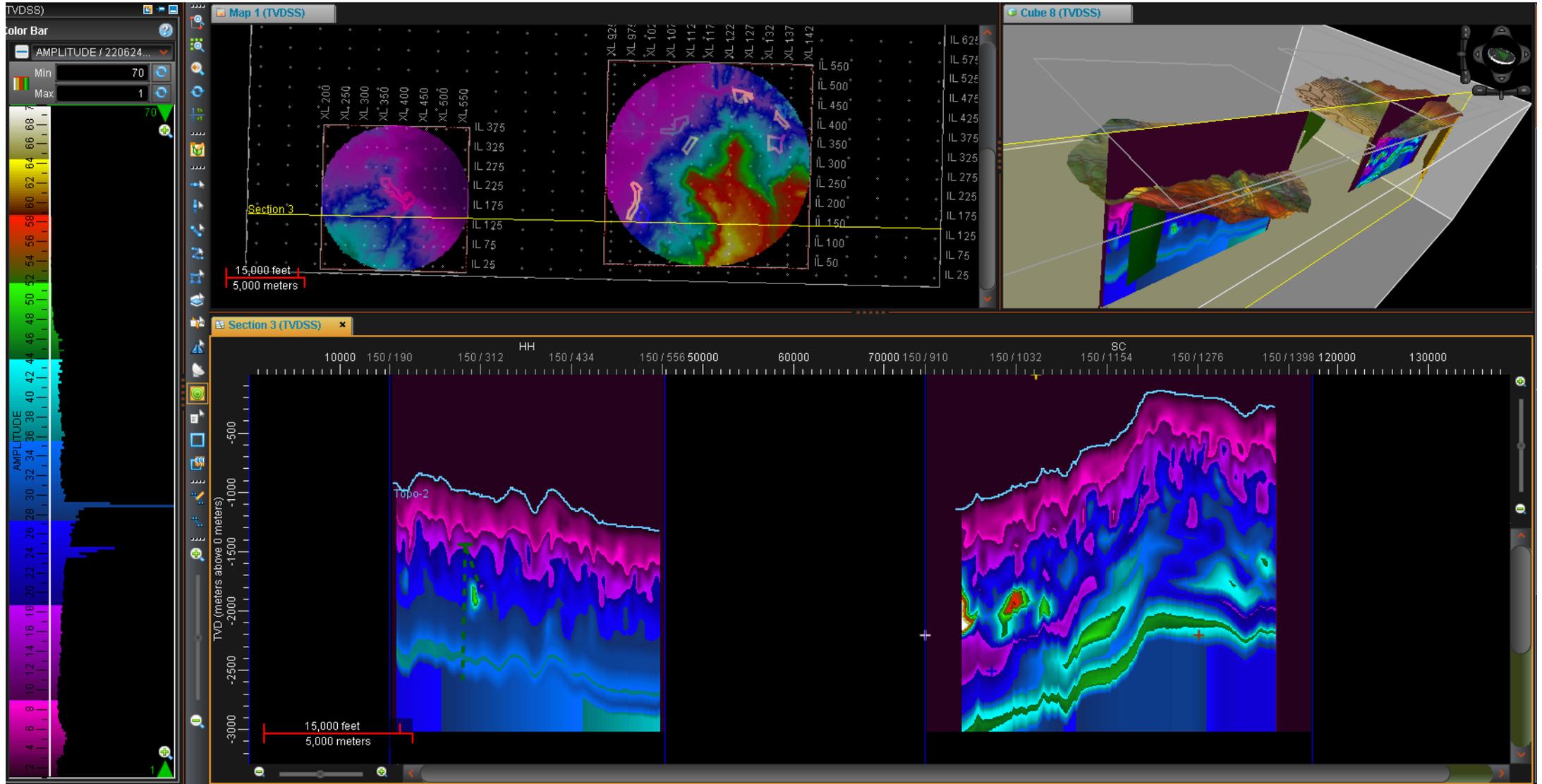
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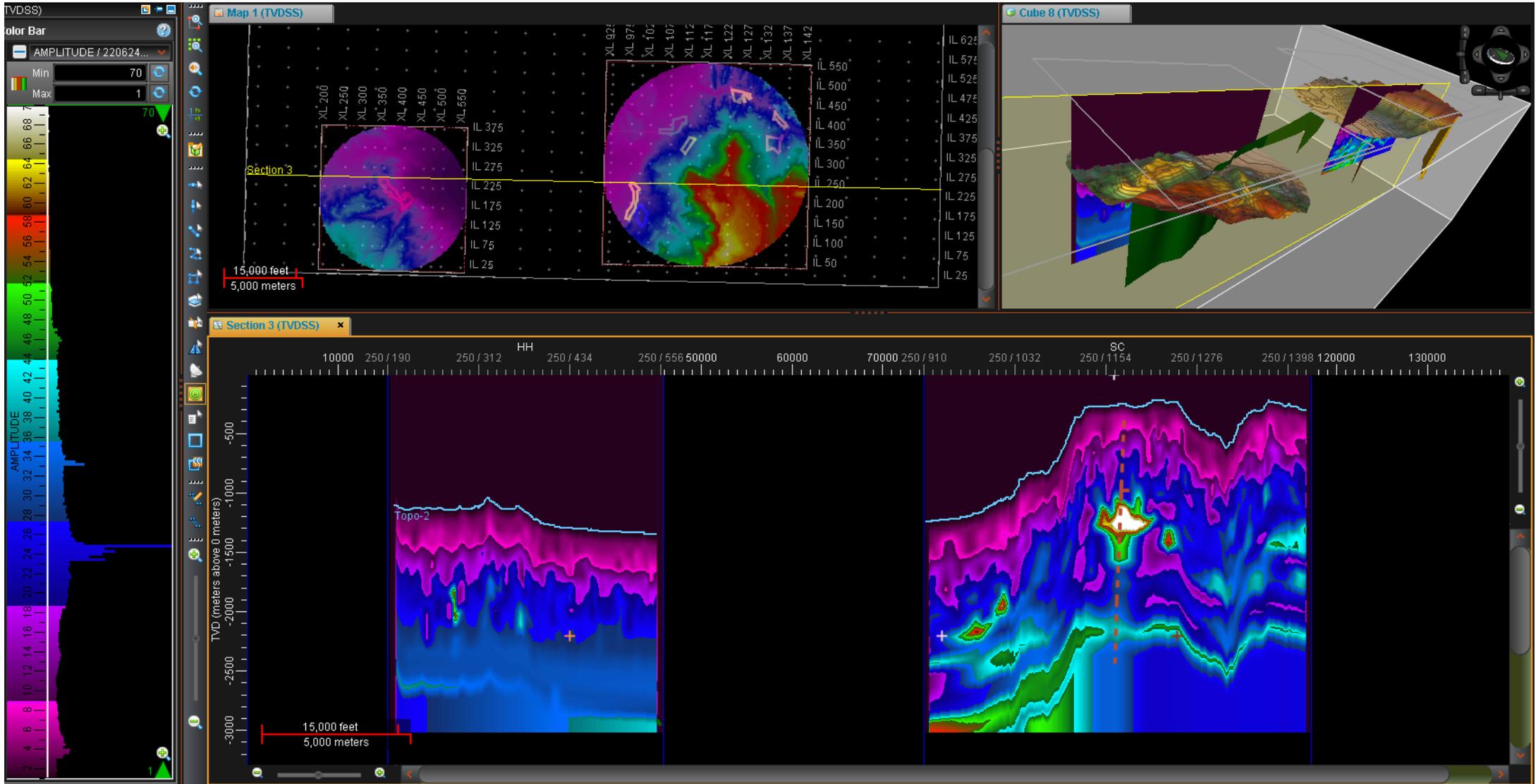
Peak-to-Zero Line 050 HH & SC



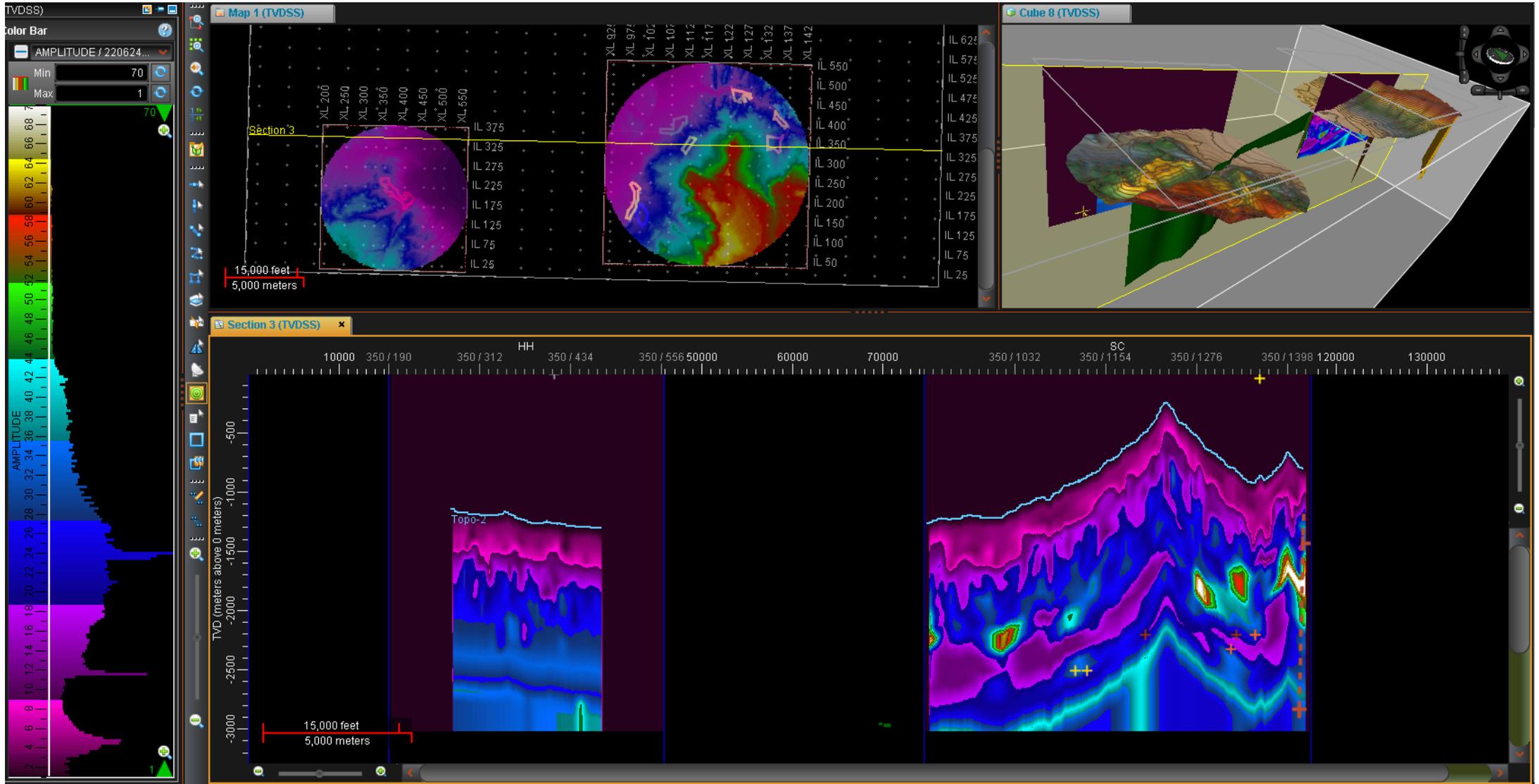
Peak-to-Zero Line 150 HH & SC



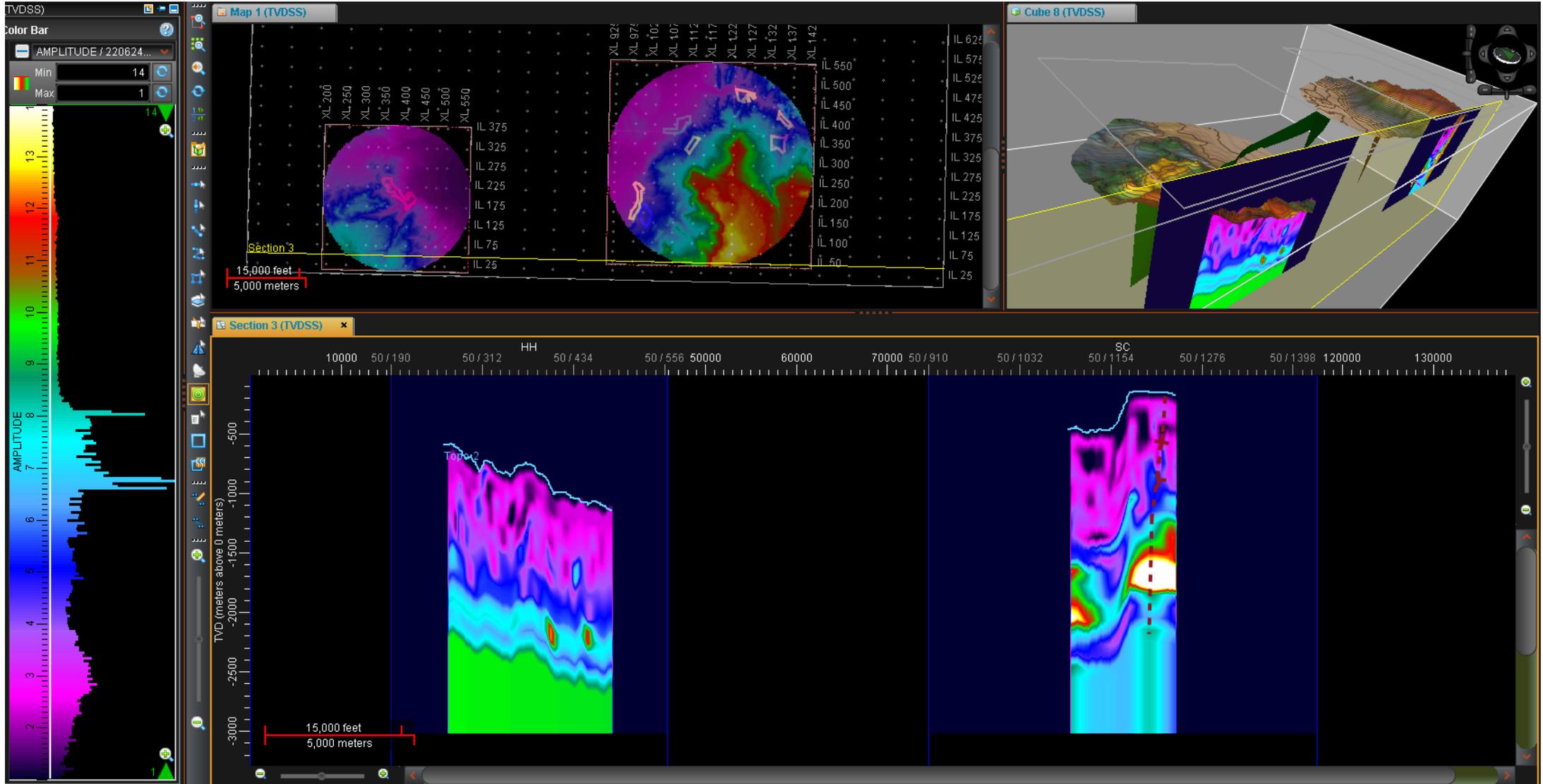
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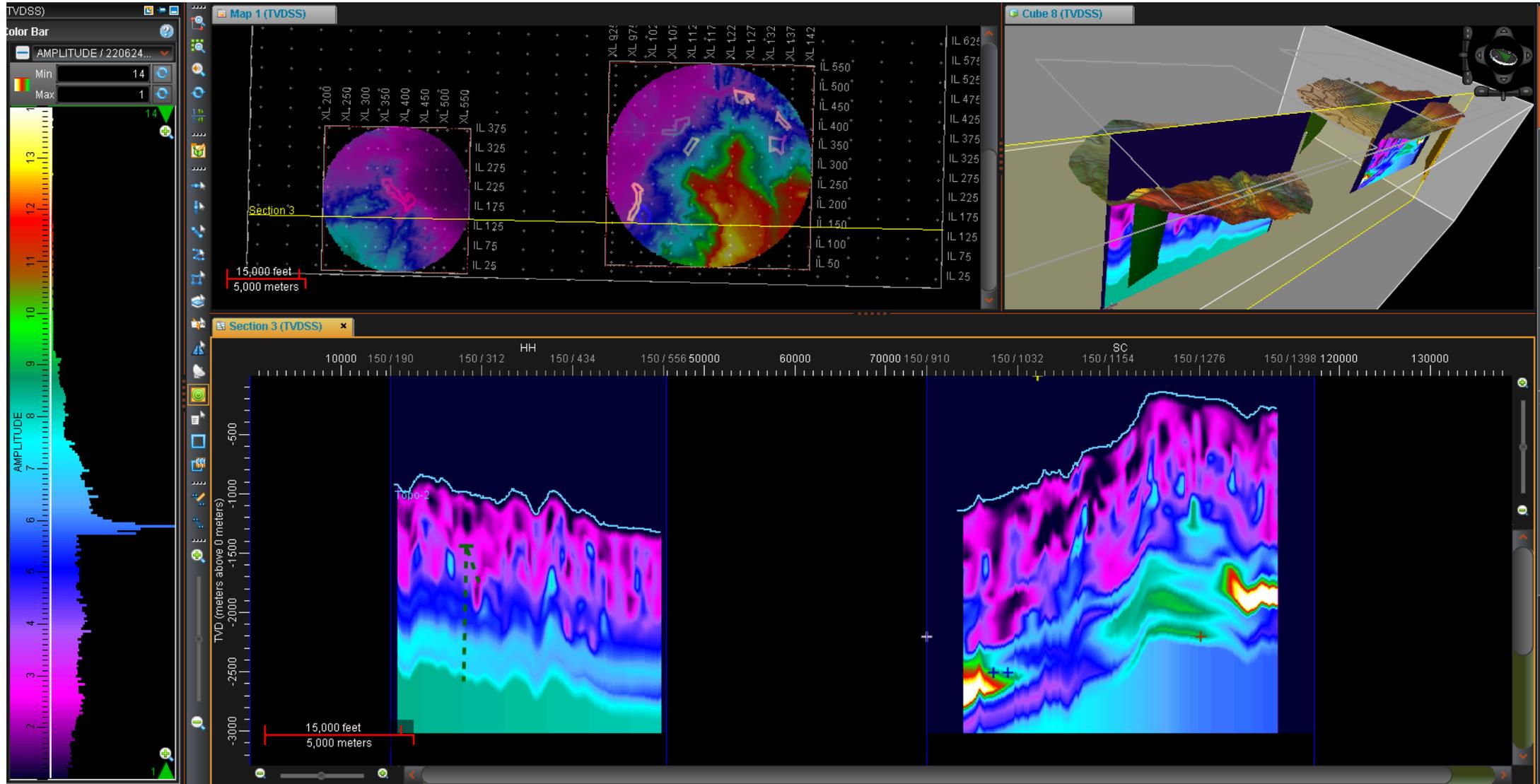
Peak-to-Zero 350 HH & SC



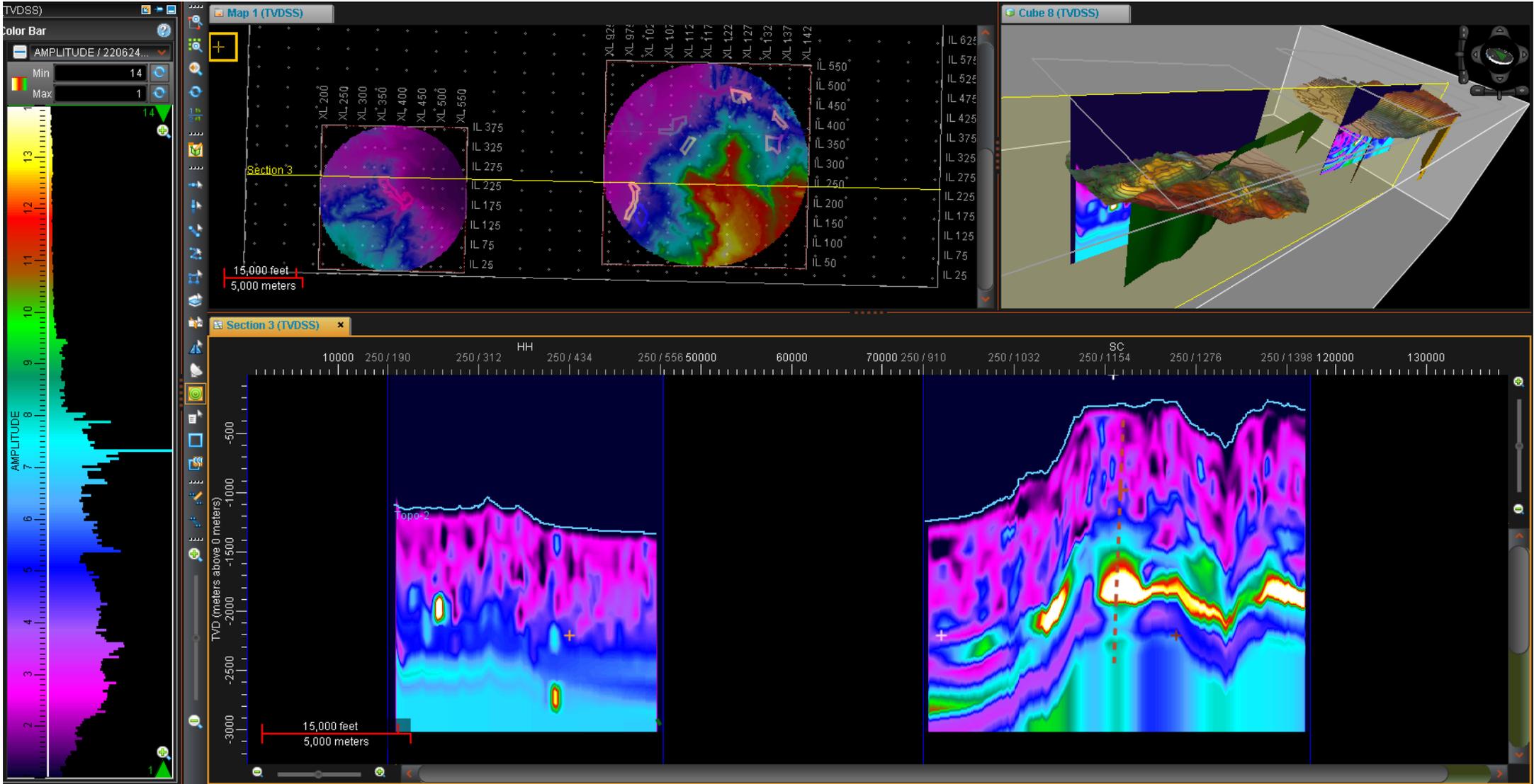
Rise-Rate Line 050 HH & SC



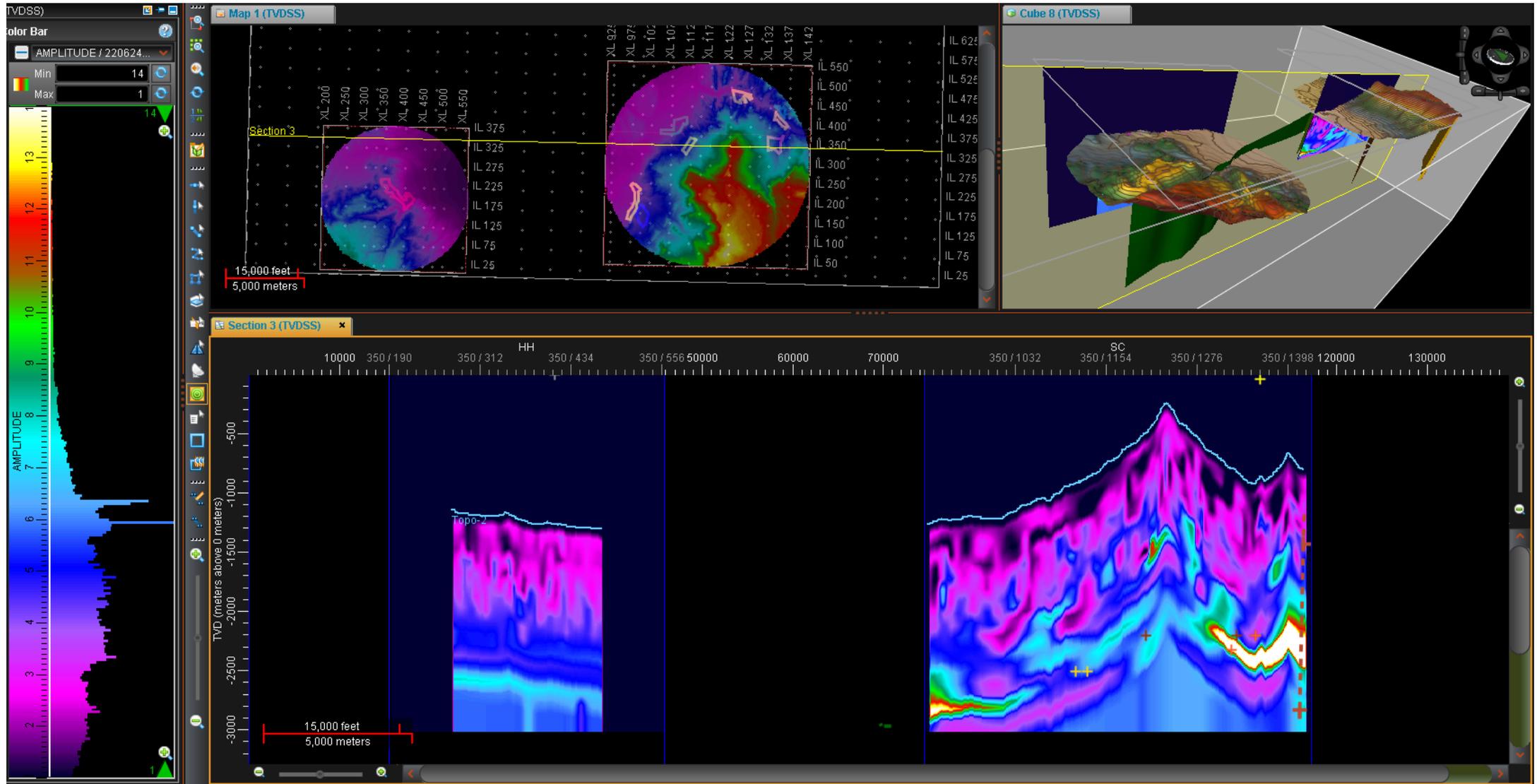
Rise-Rate Line 150 HH & SC



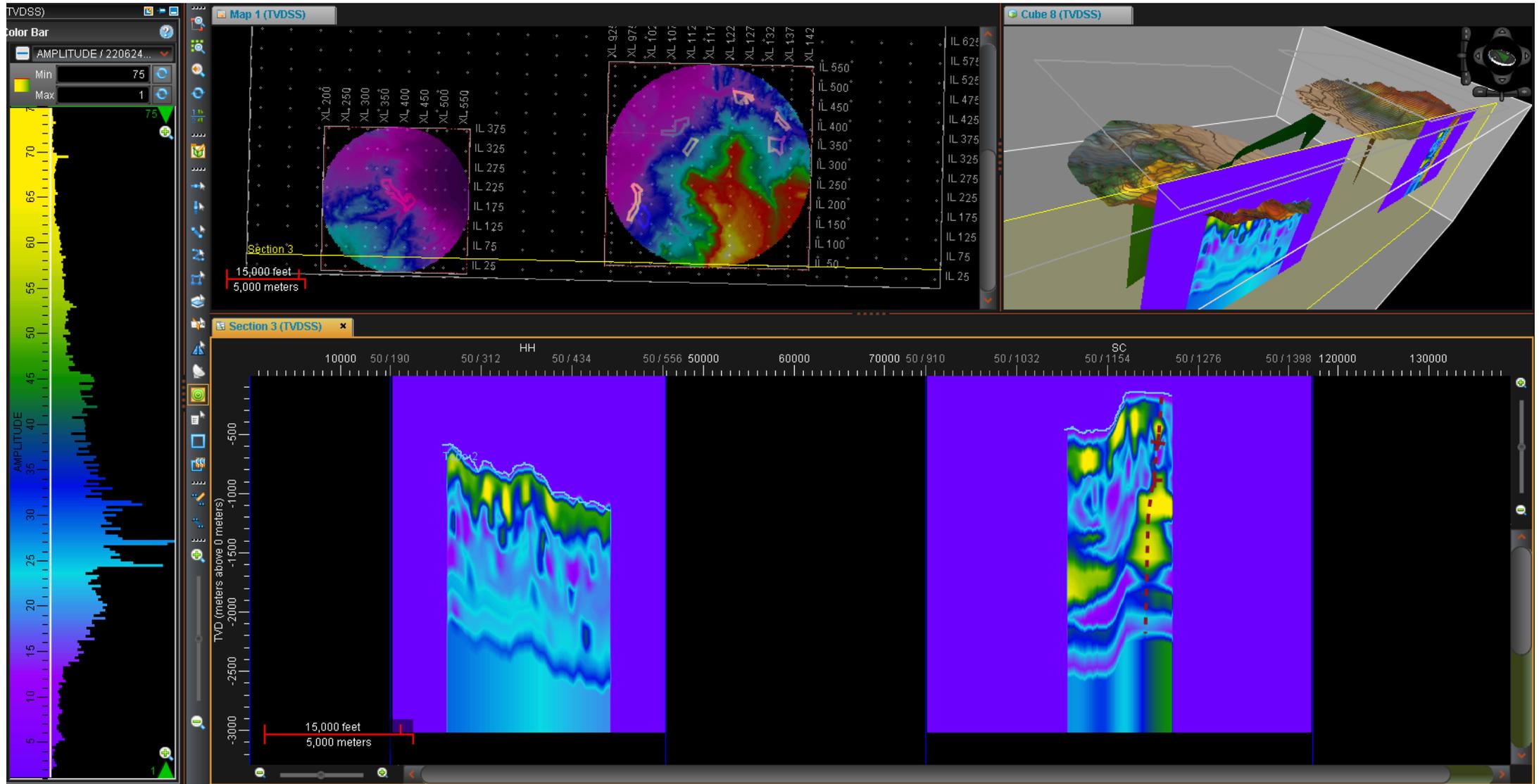
Rise-Rate Line 250 HH & SC



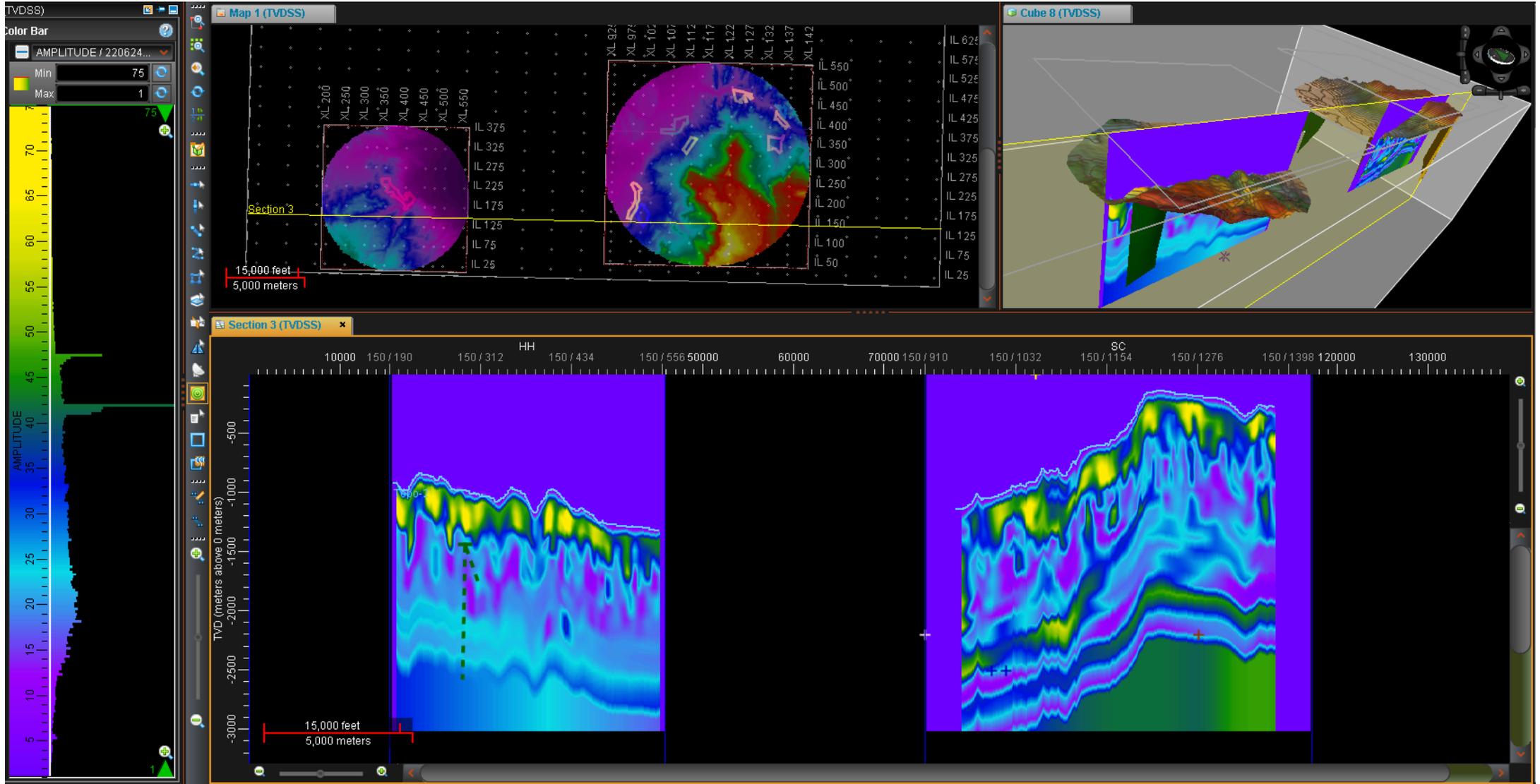
Rise-Rate Line 350 HH & SC



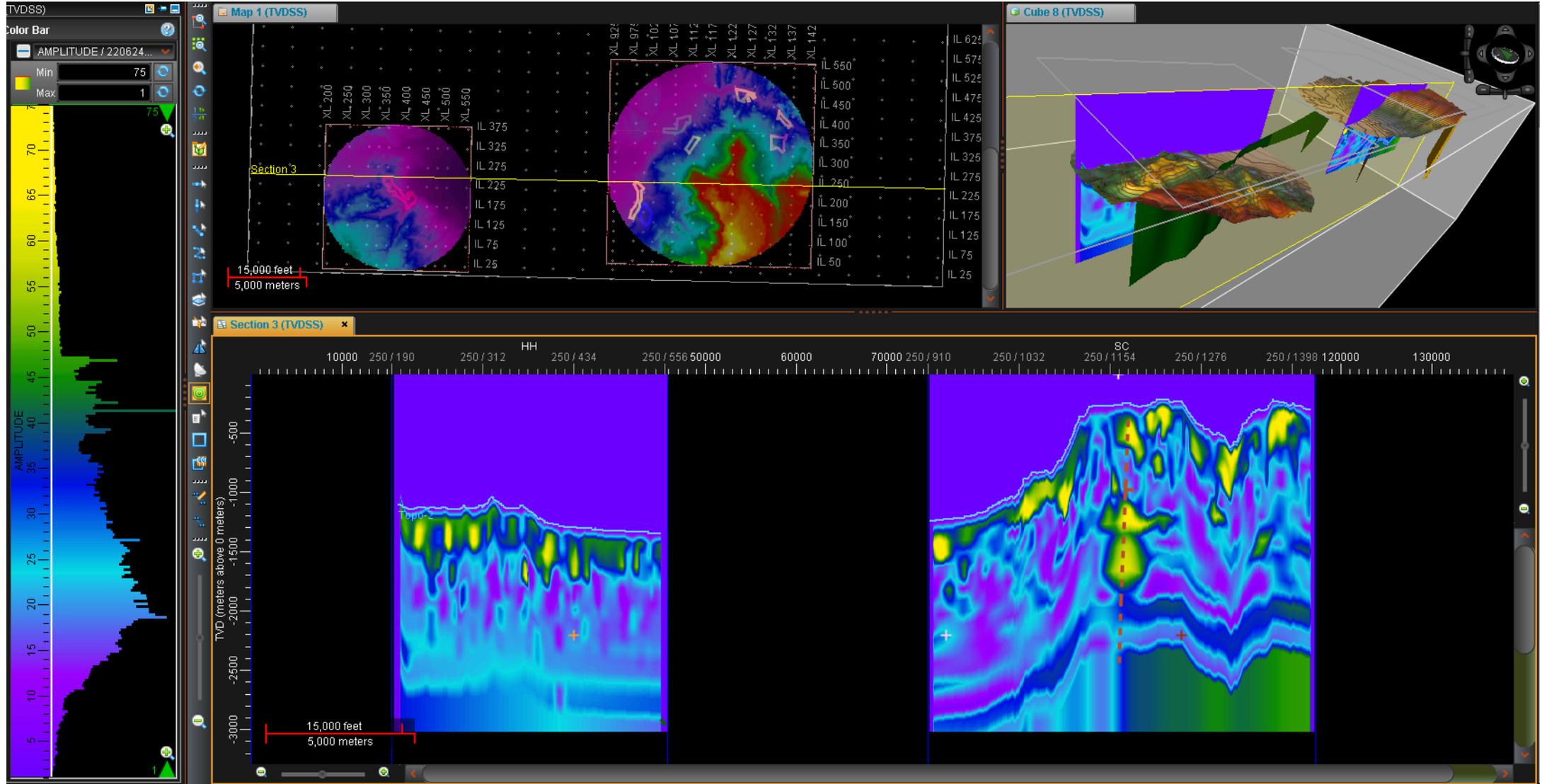
Symmetry Line 050 HH & SC



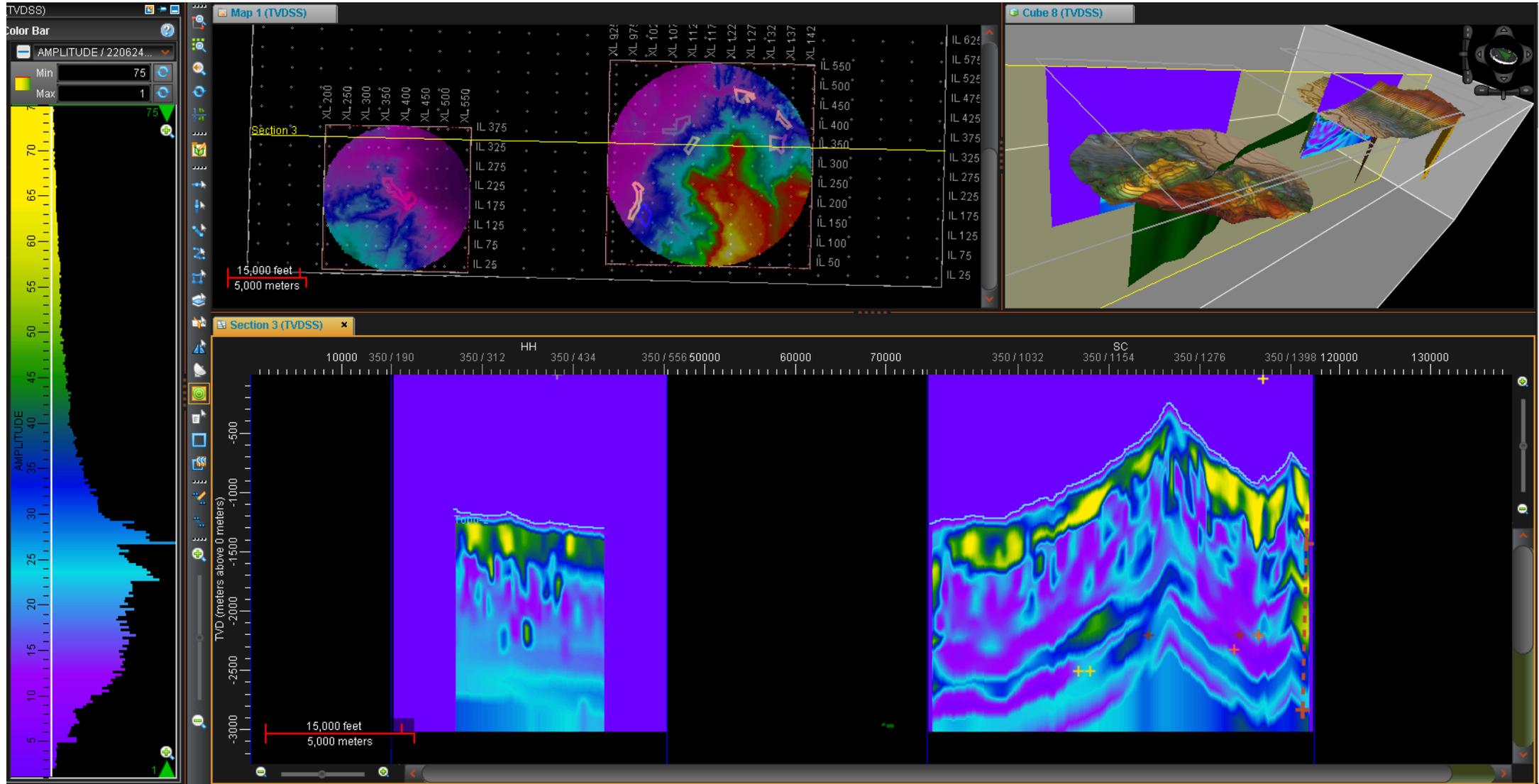
Symmetry Line 150 HH & SC



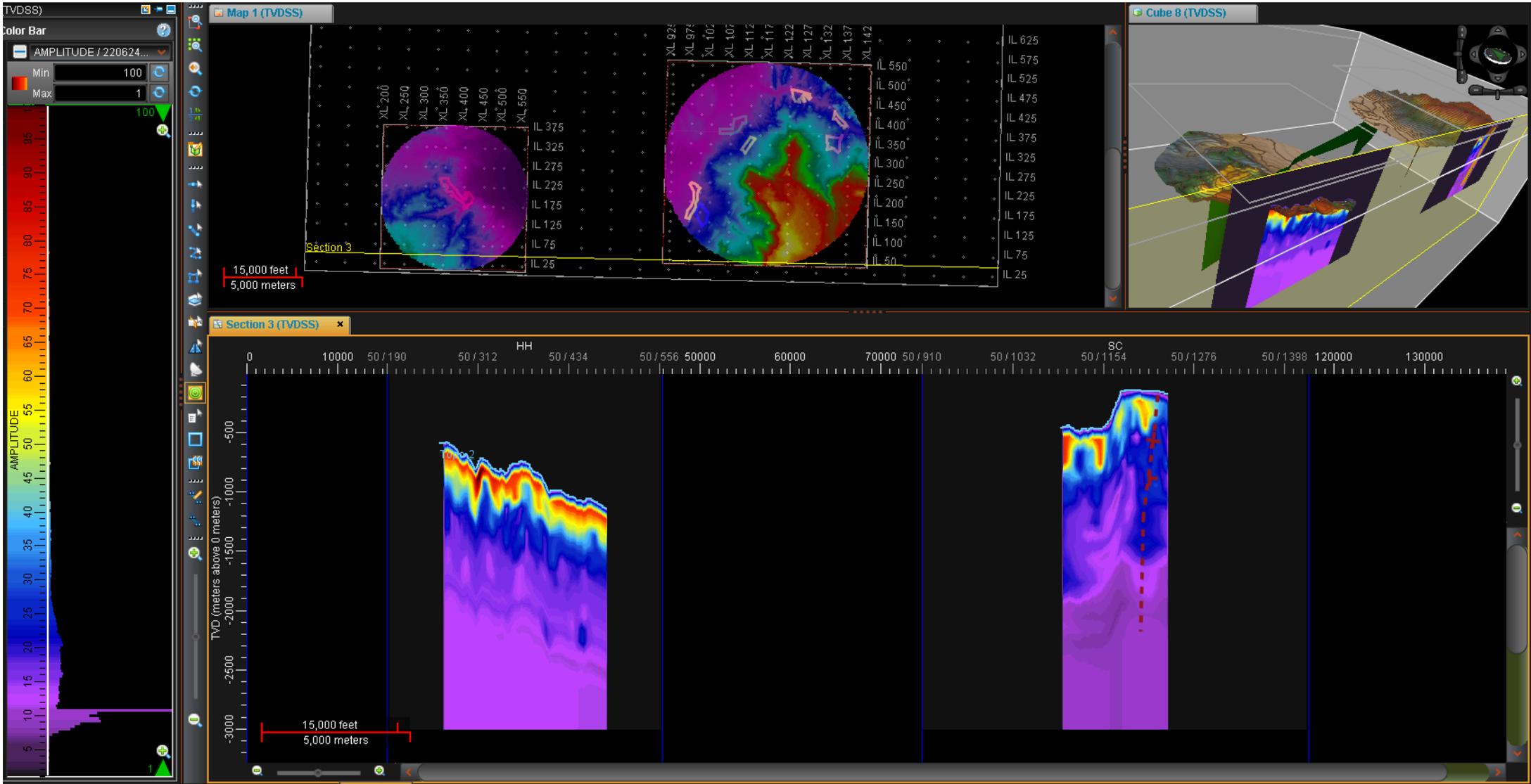
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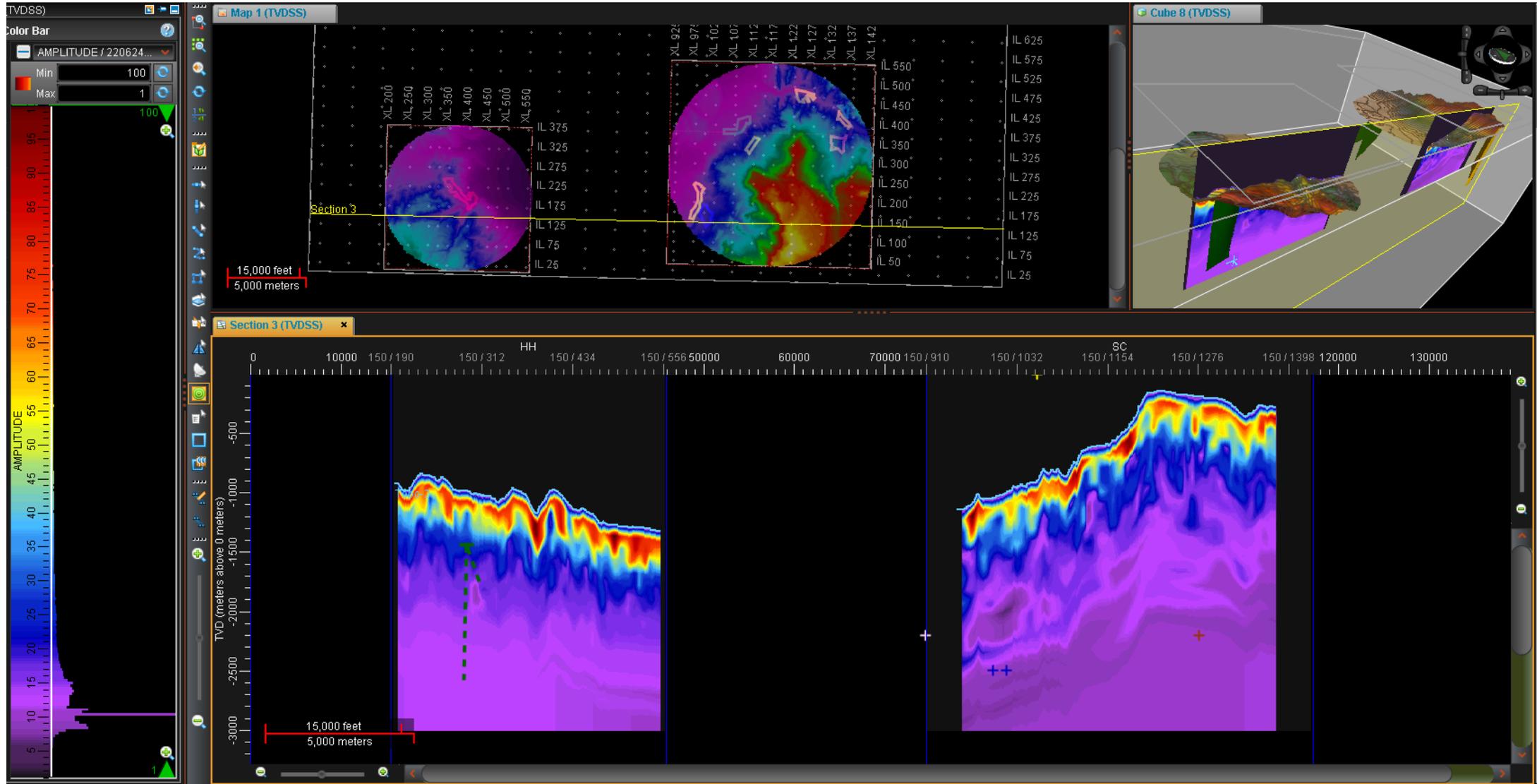
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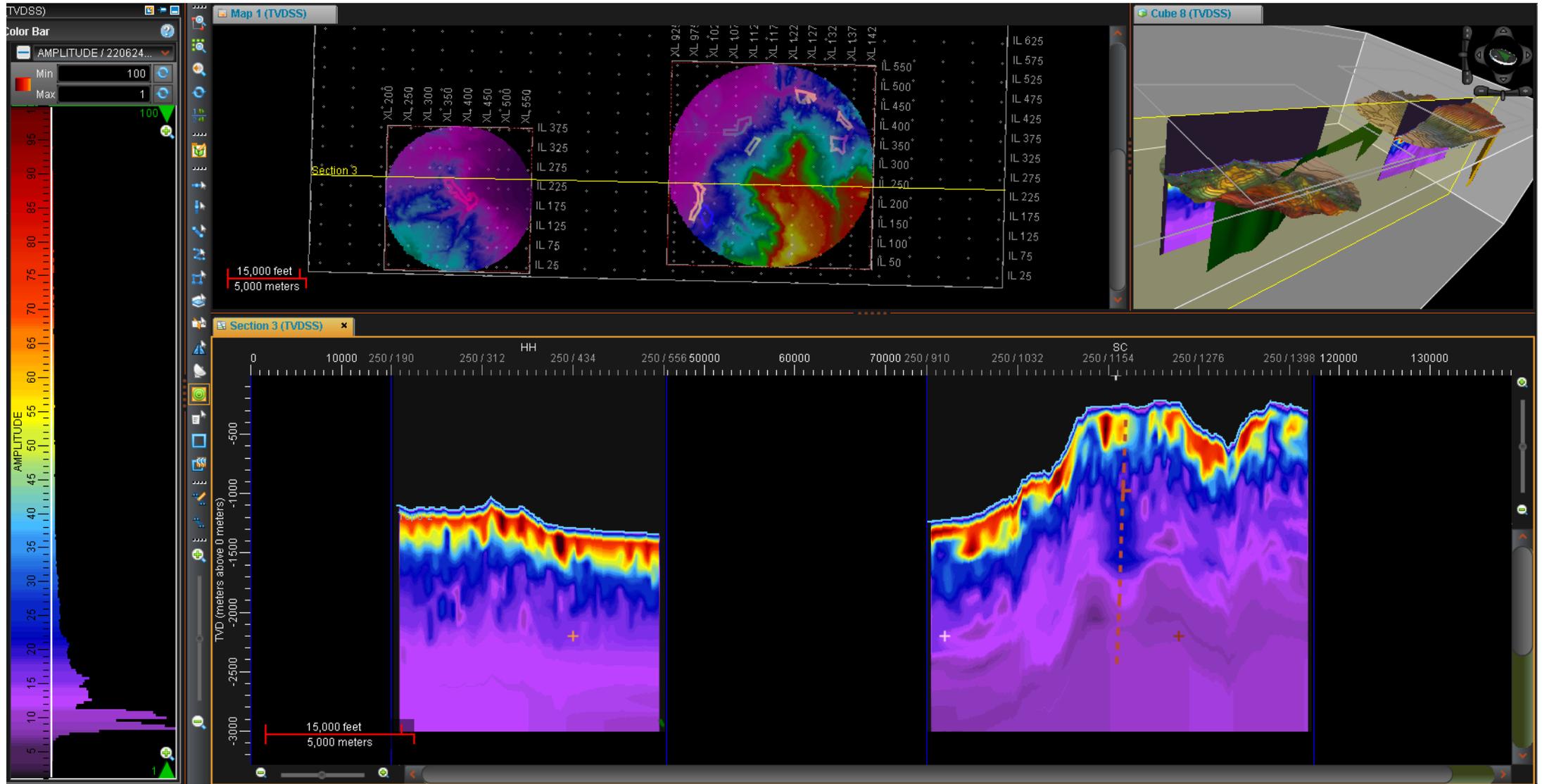
Frequency Line 050 HH & SC



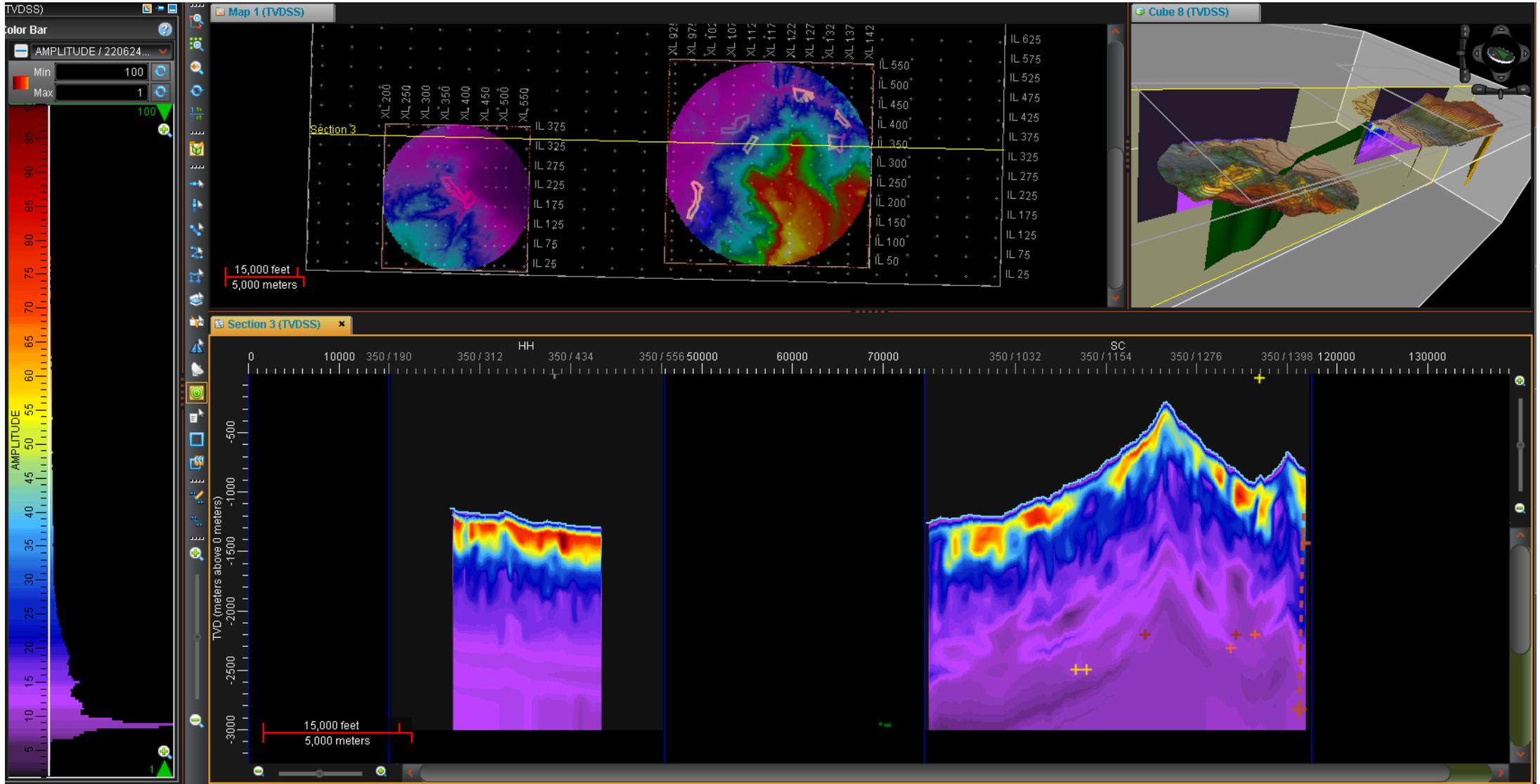
Frequency Line 150 HH & SC



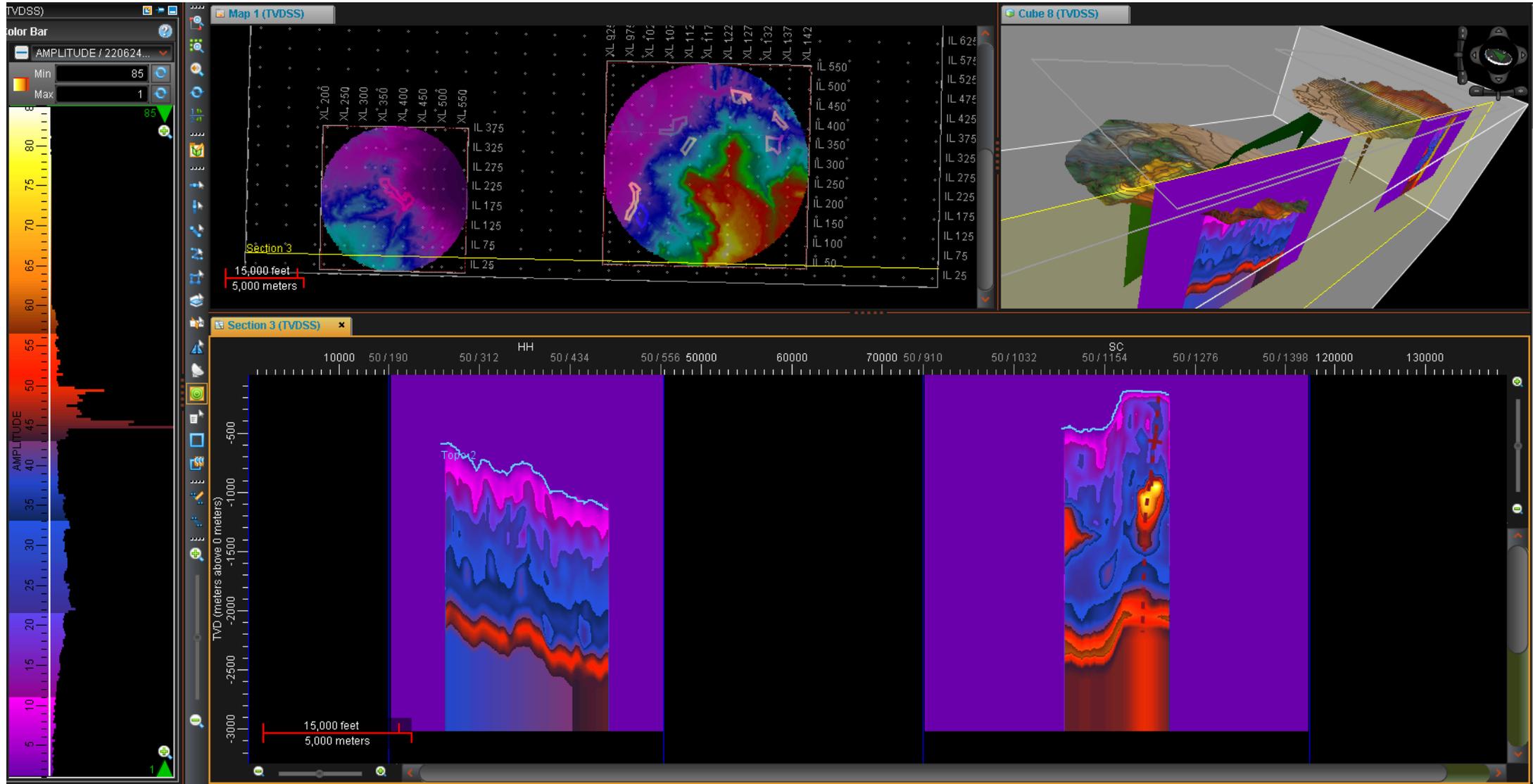
Frequency Line 250 HH & SC



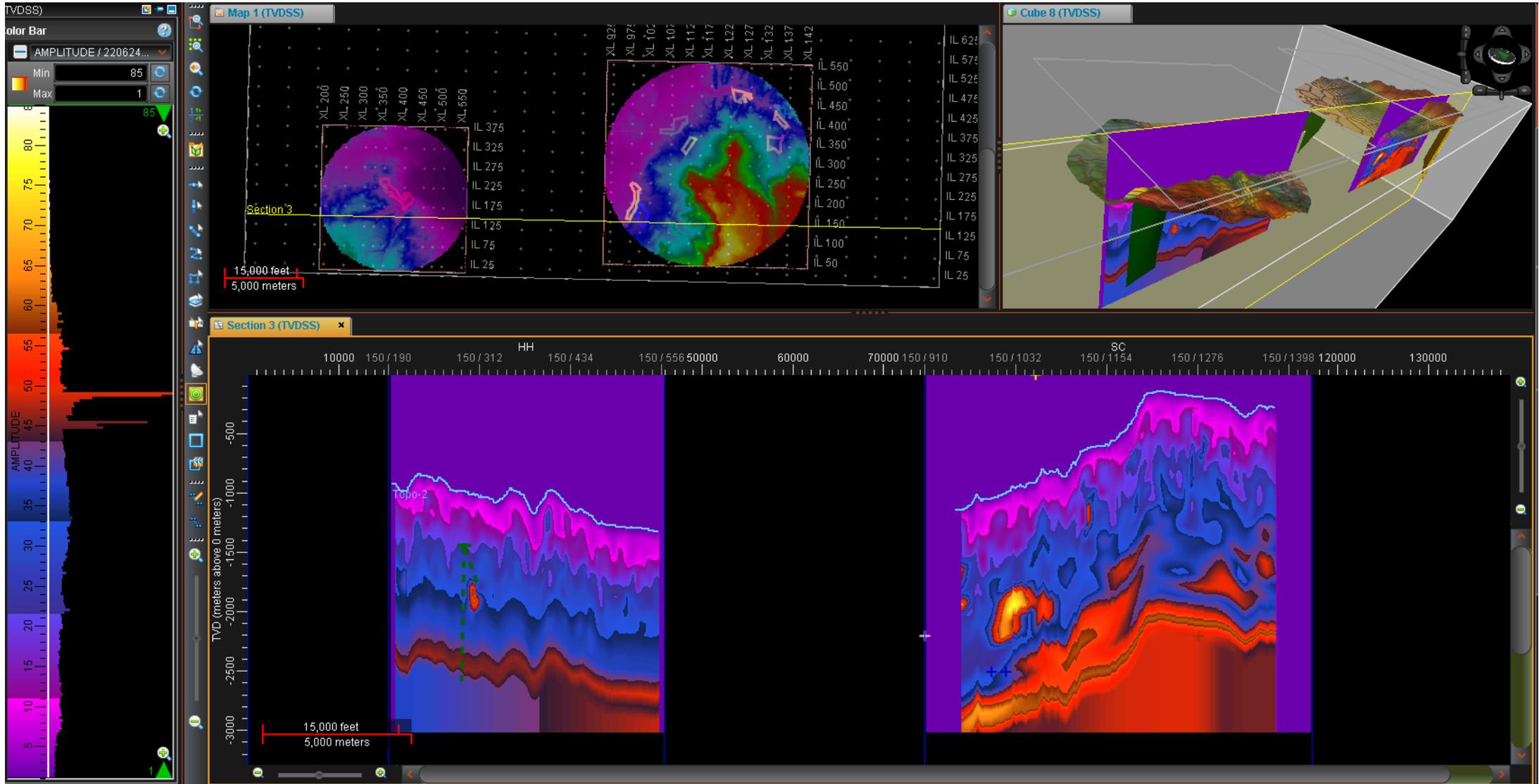
Frequency Line 350 HH & SC



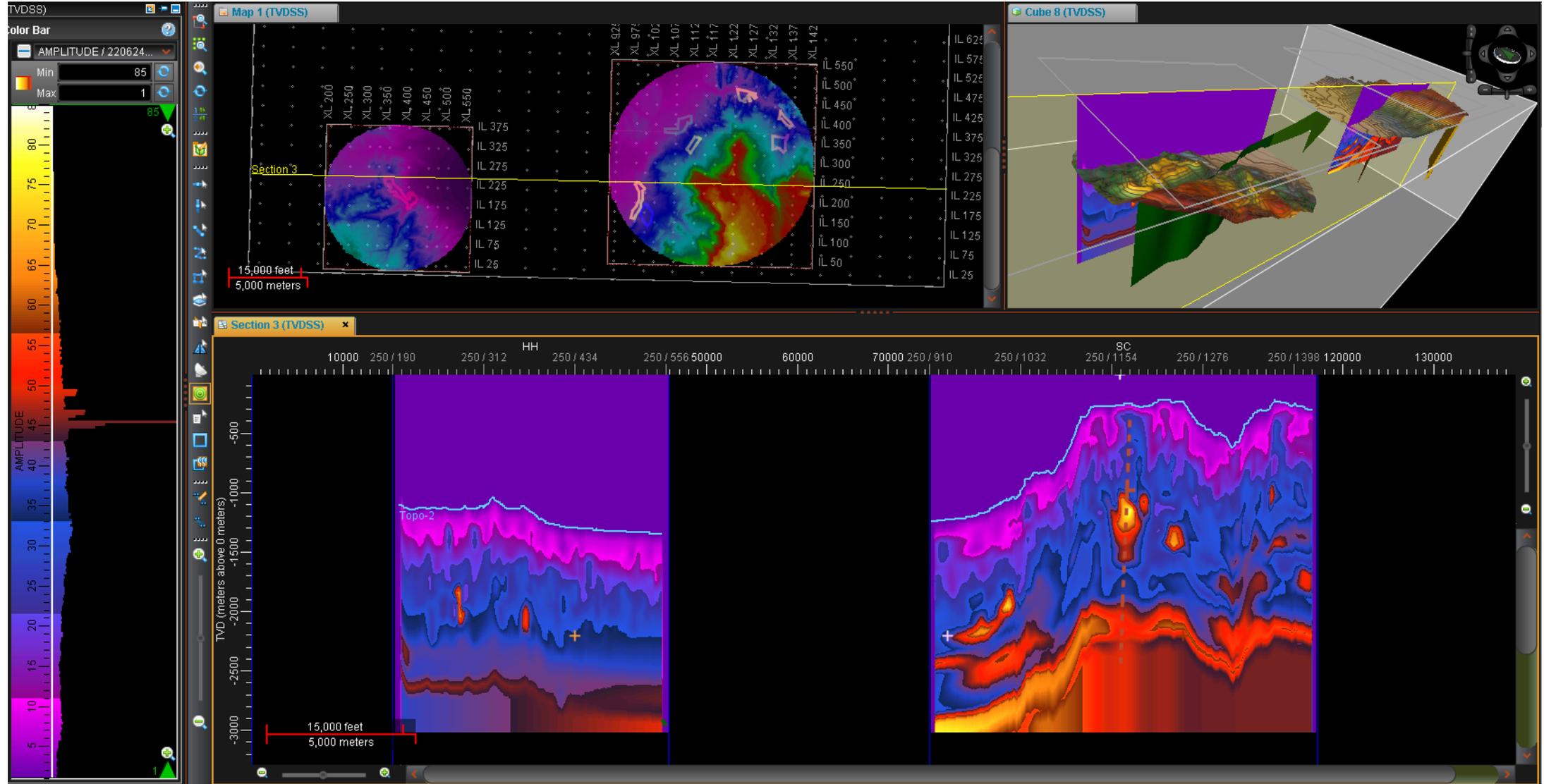
Total Time Line 050 HH & SC



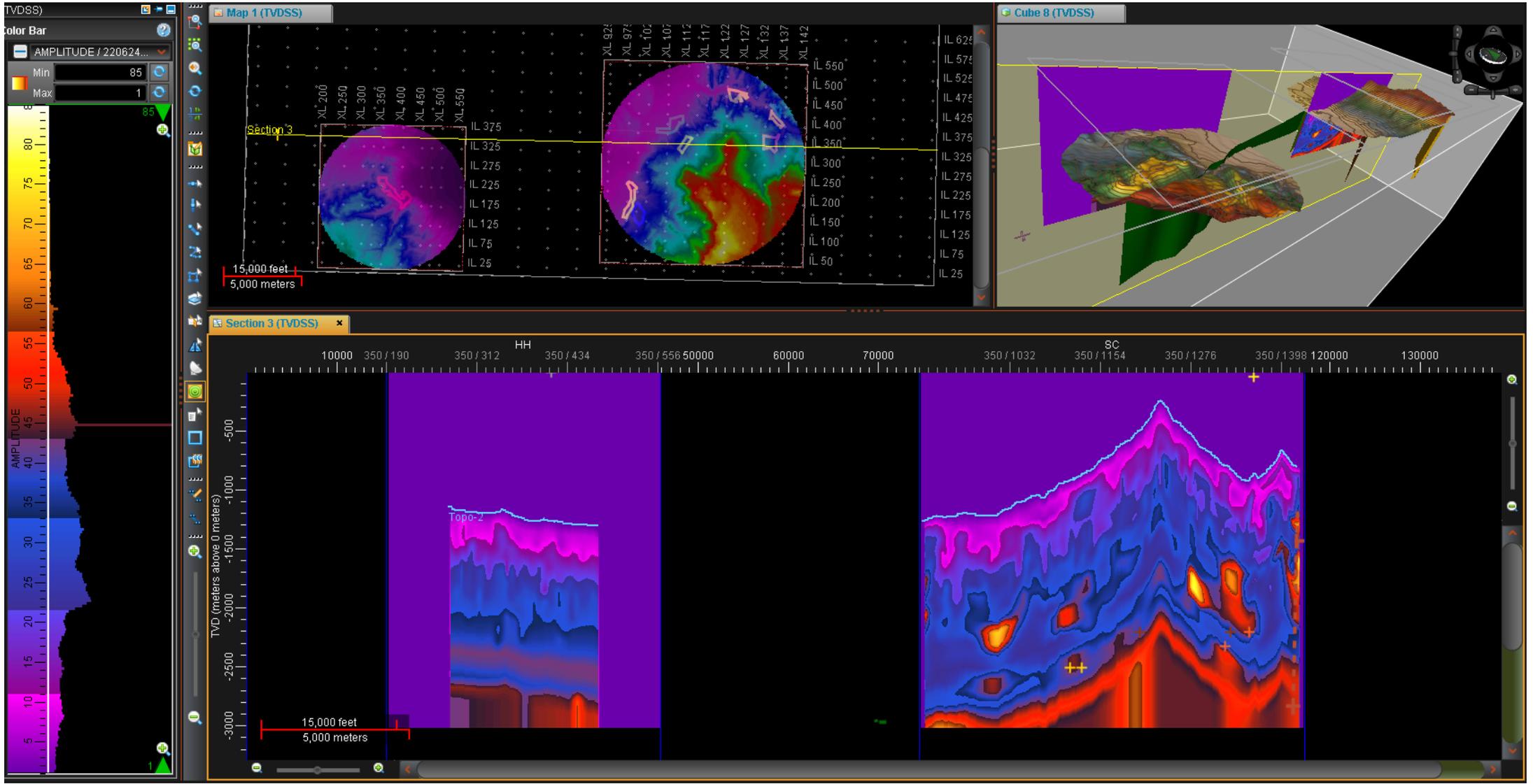
Total Time Line 150 HH & SC



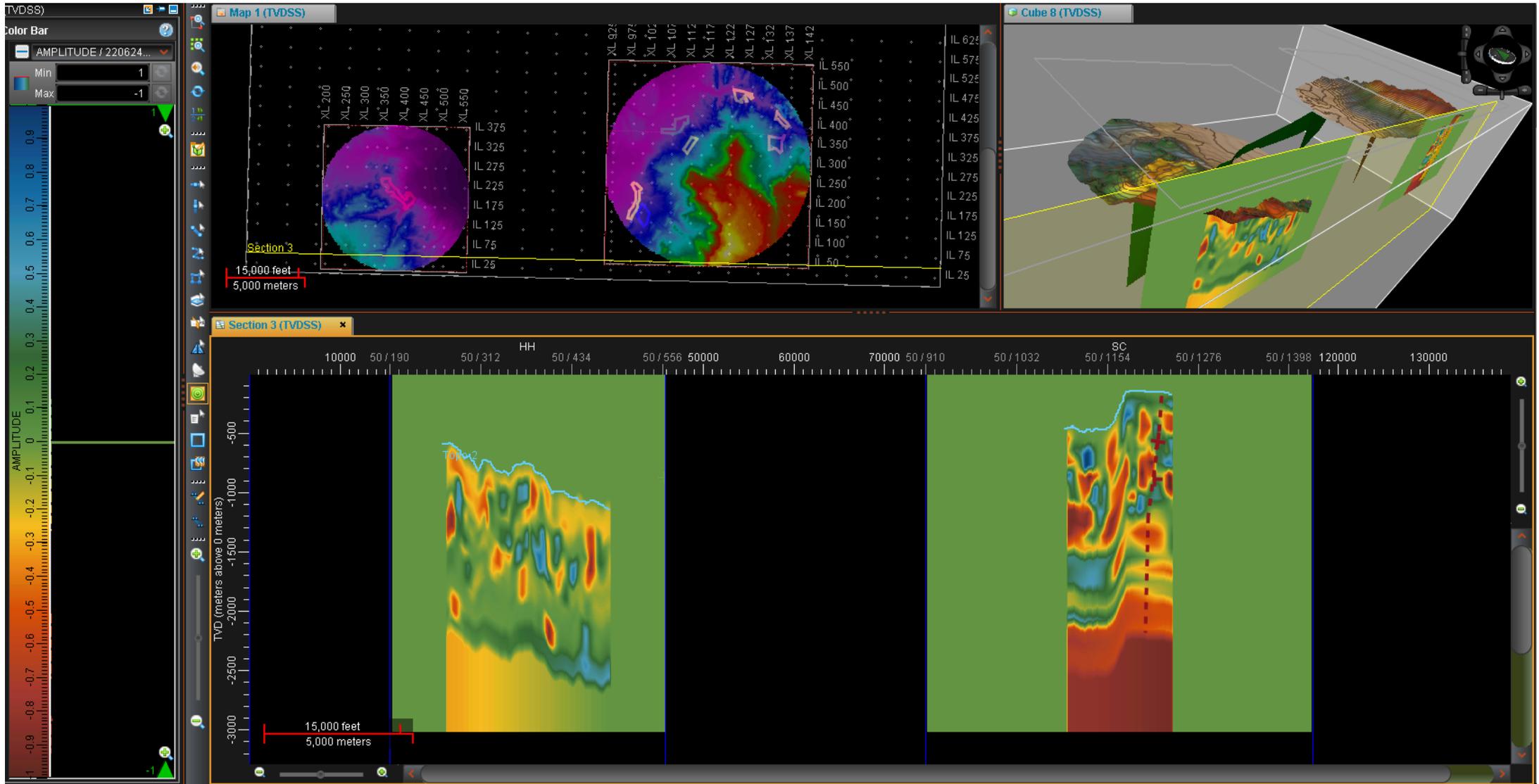
Total Time Line 250 HH & SC



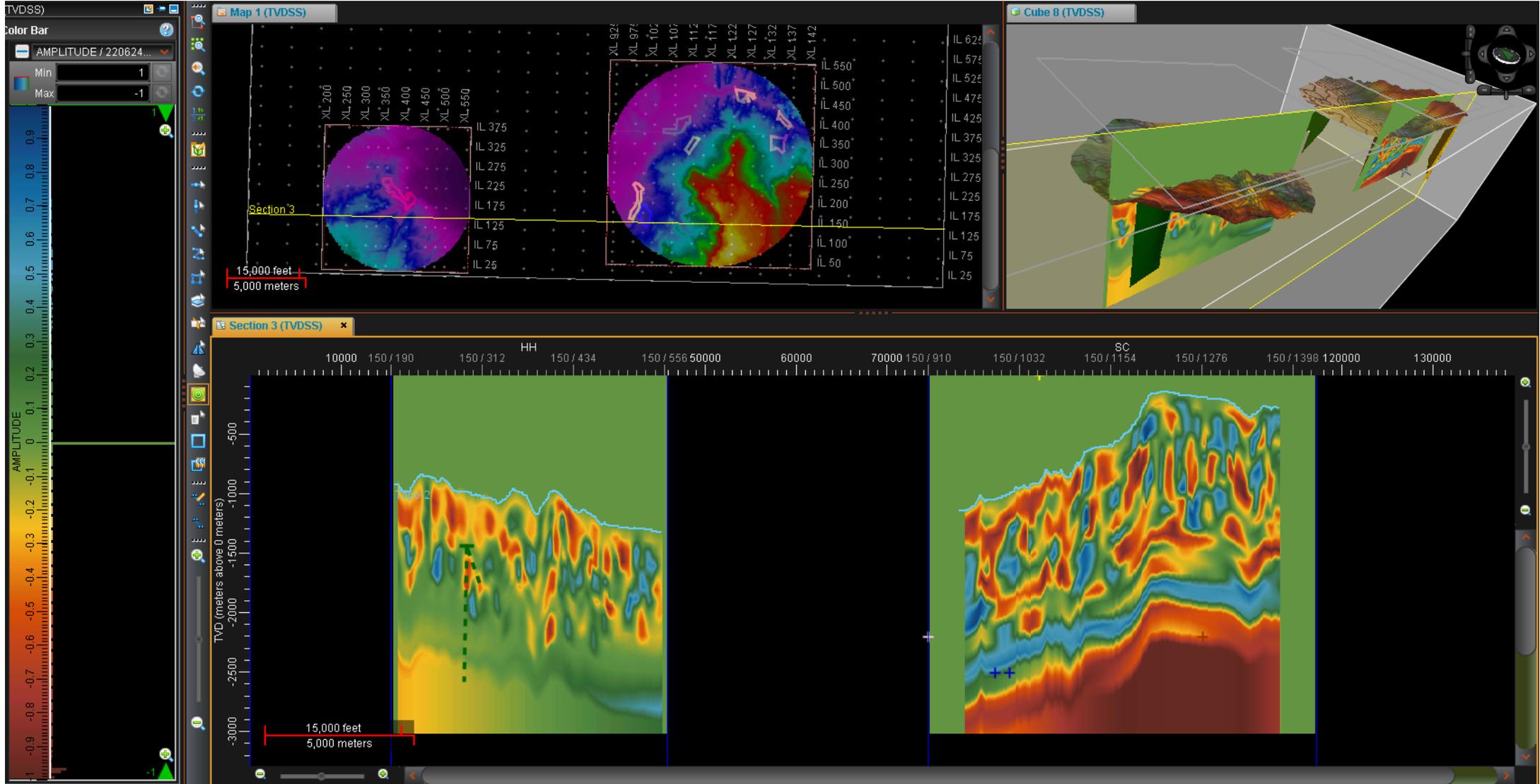
Total Time Line 350 HH & SC



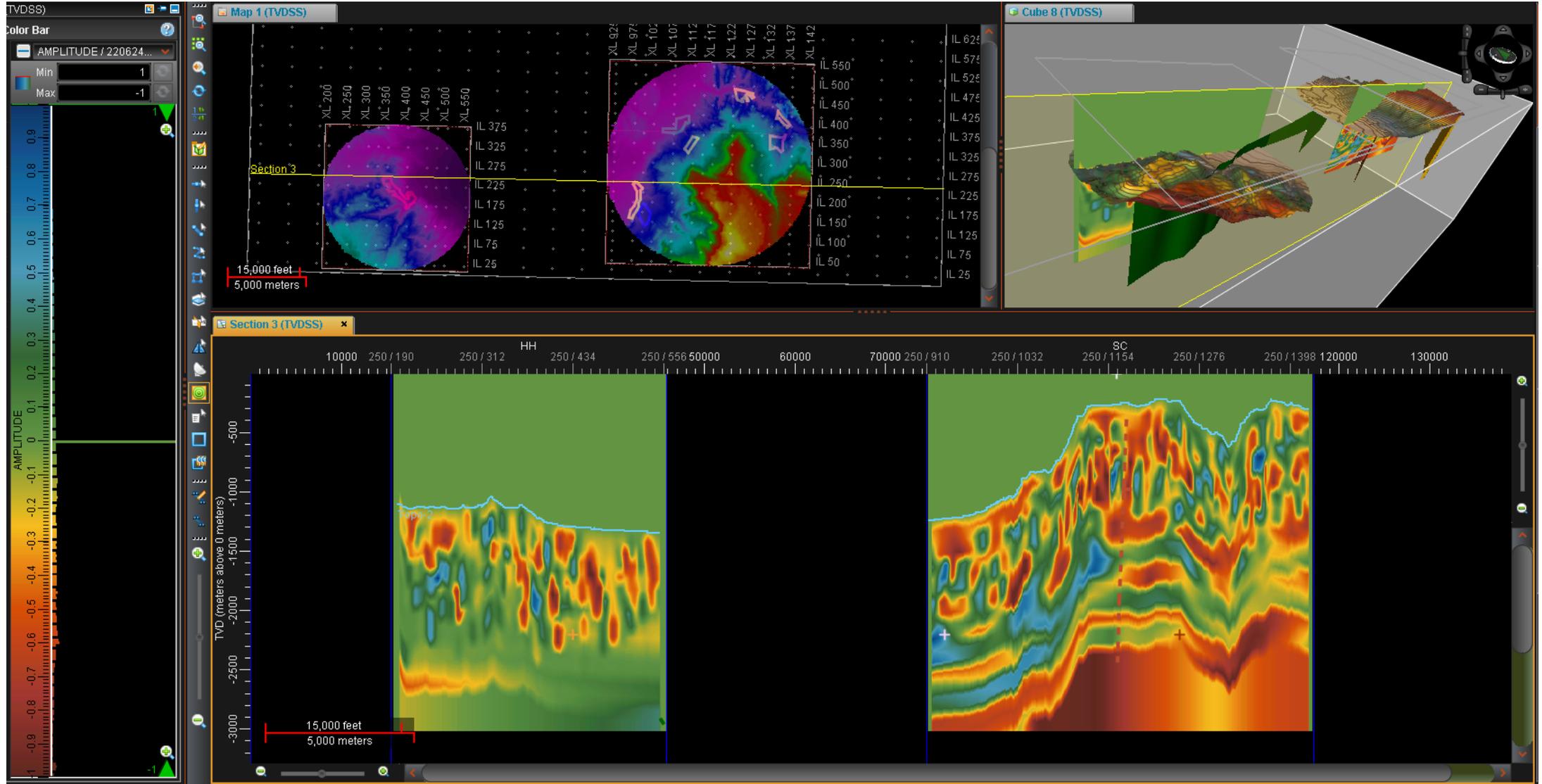
Tide Line 050 HH & SC



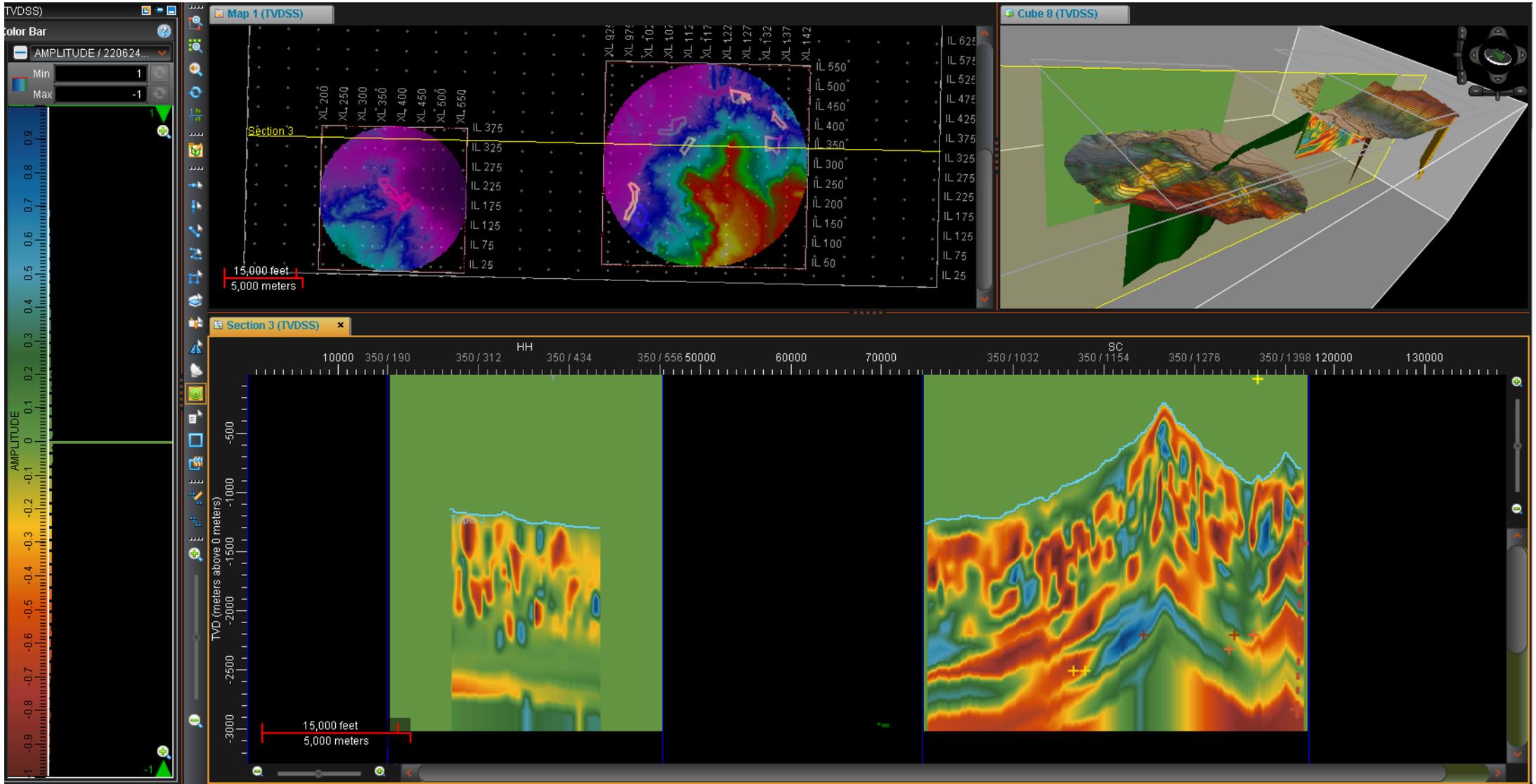
Tide Line 150 HH & SC



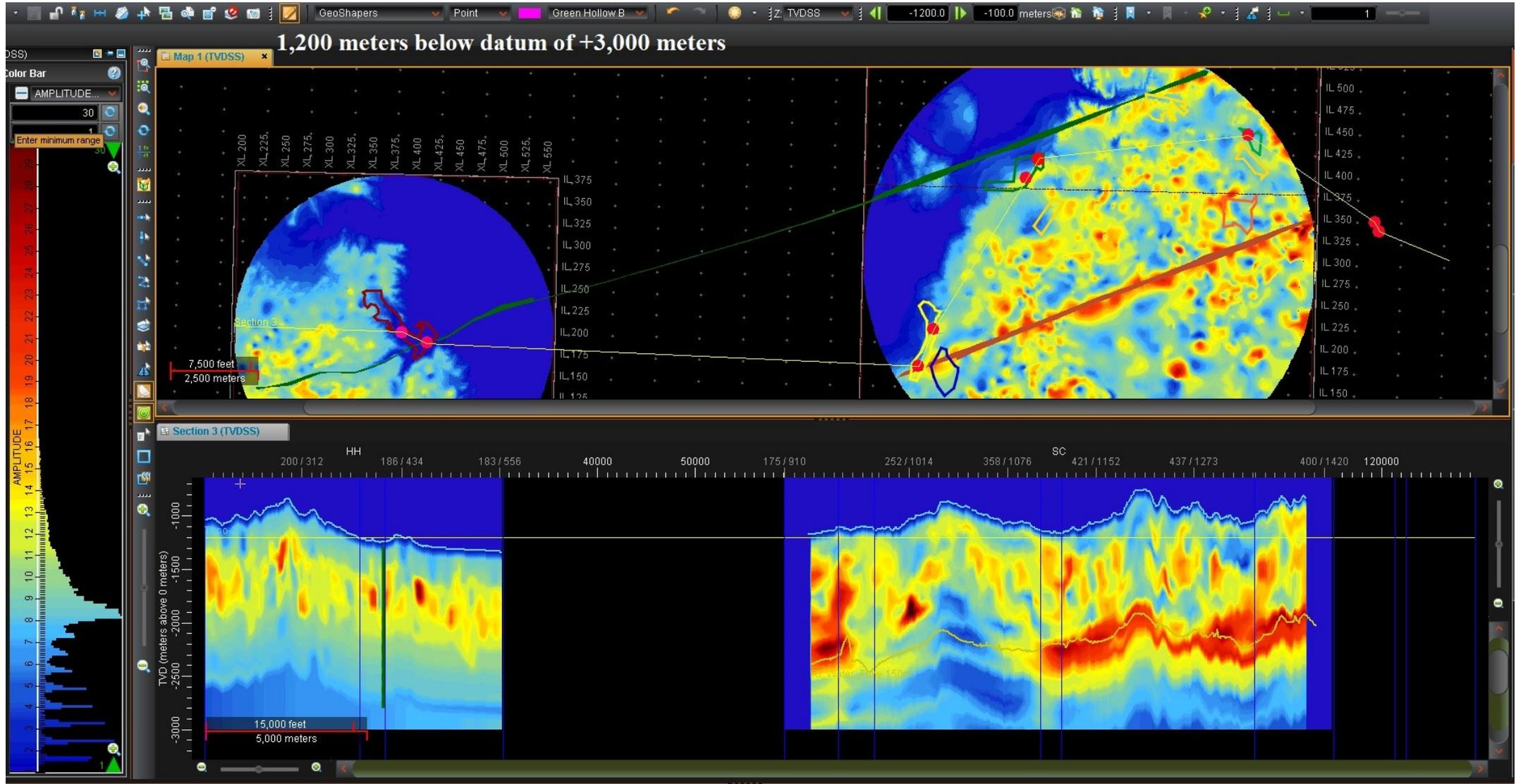
Tide Line 250 HH & SC



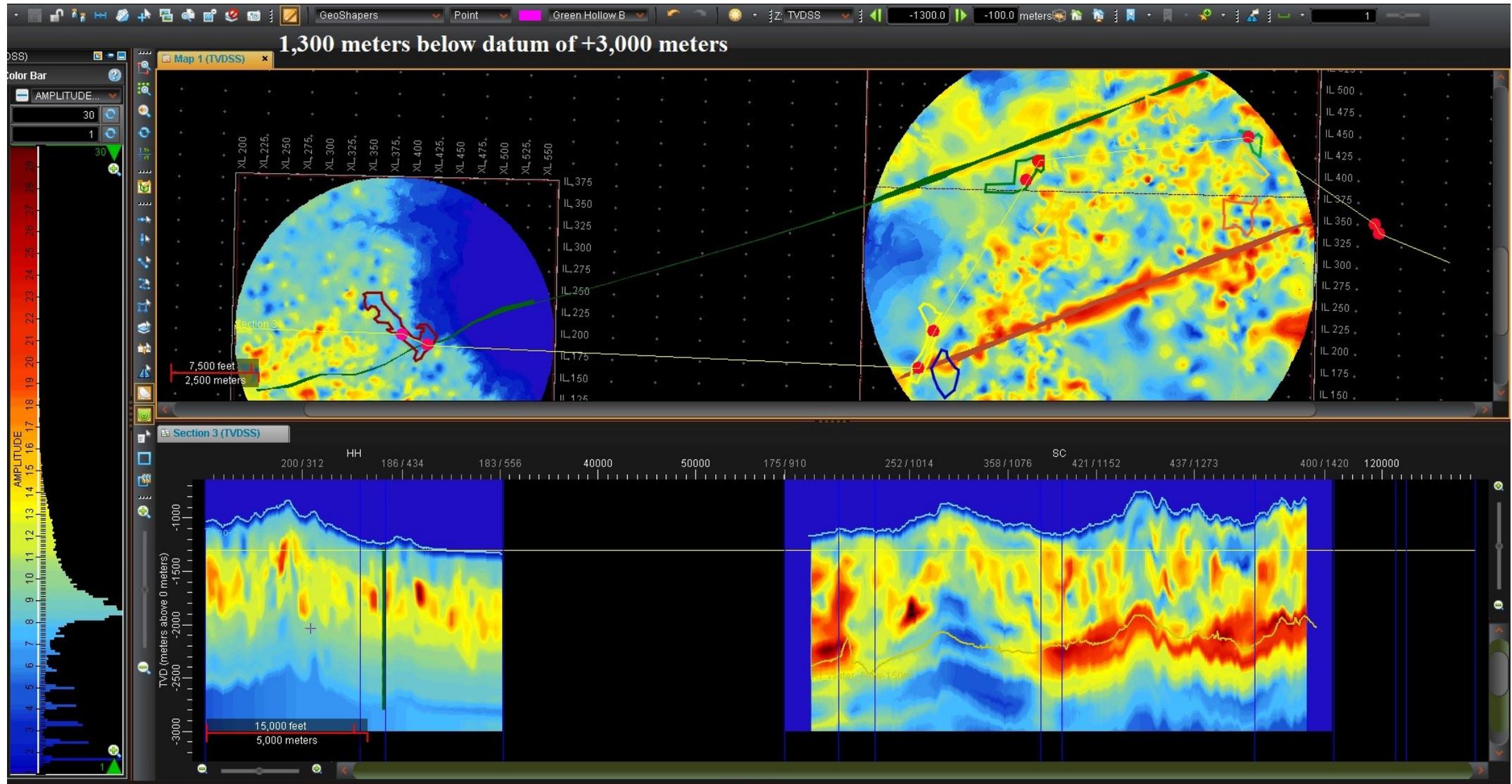
Tide Line 350 HH & SC



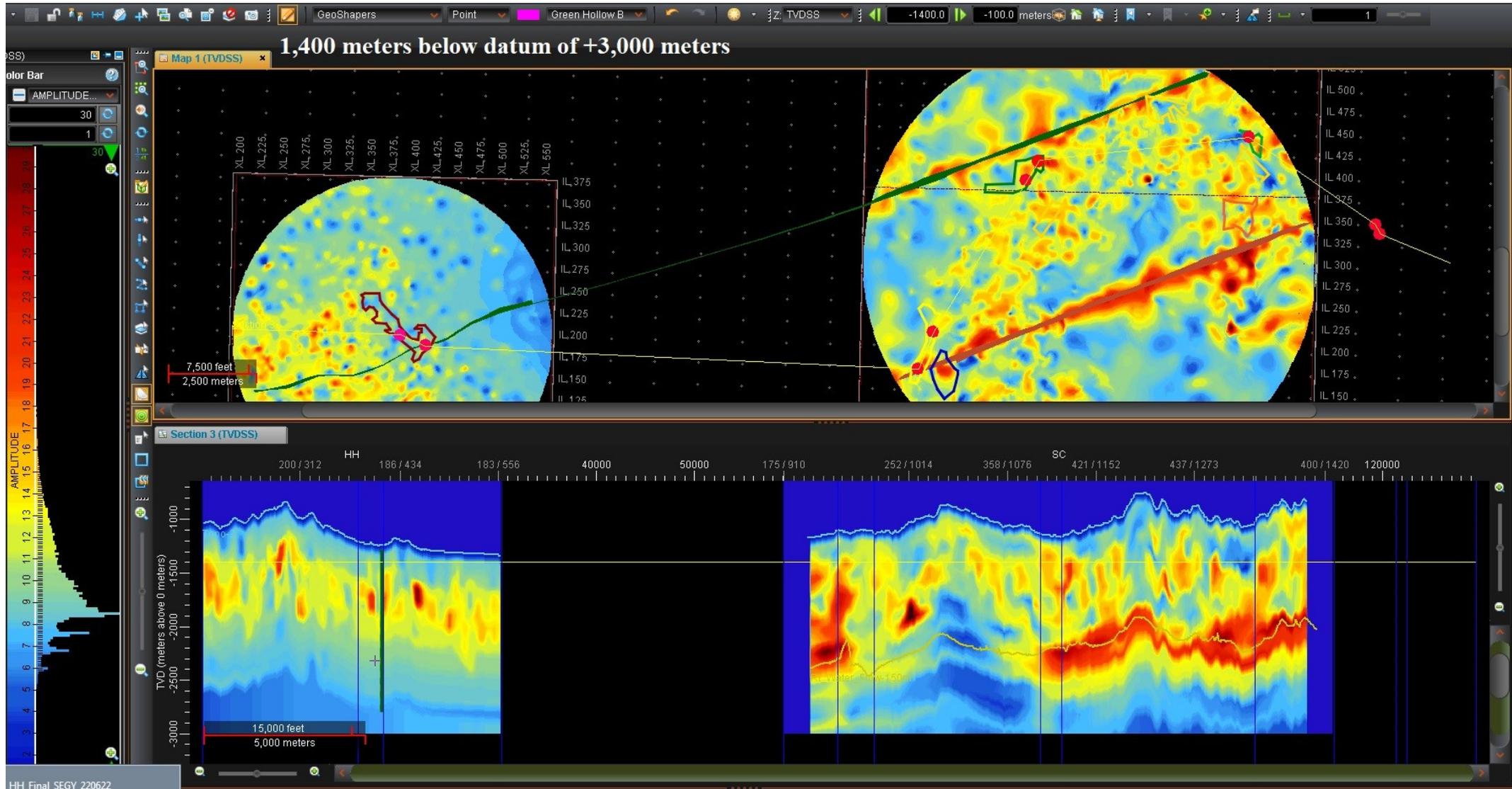
Resistivity Slice -1,200 meters



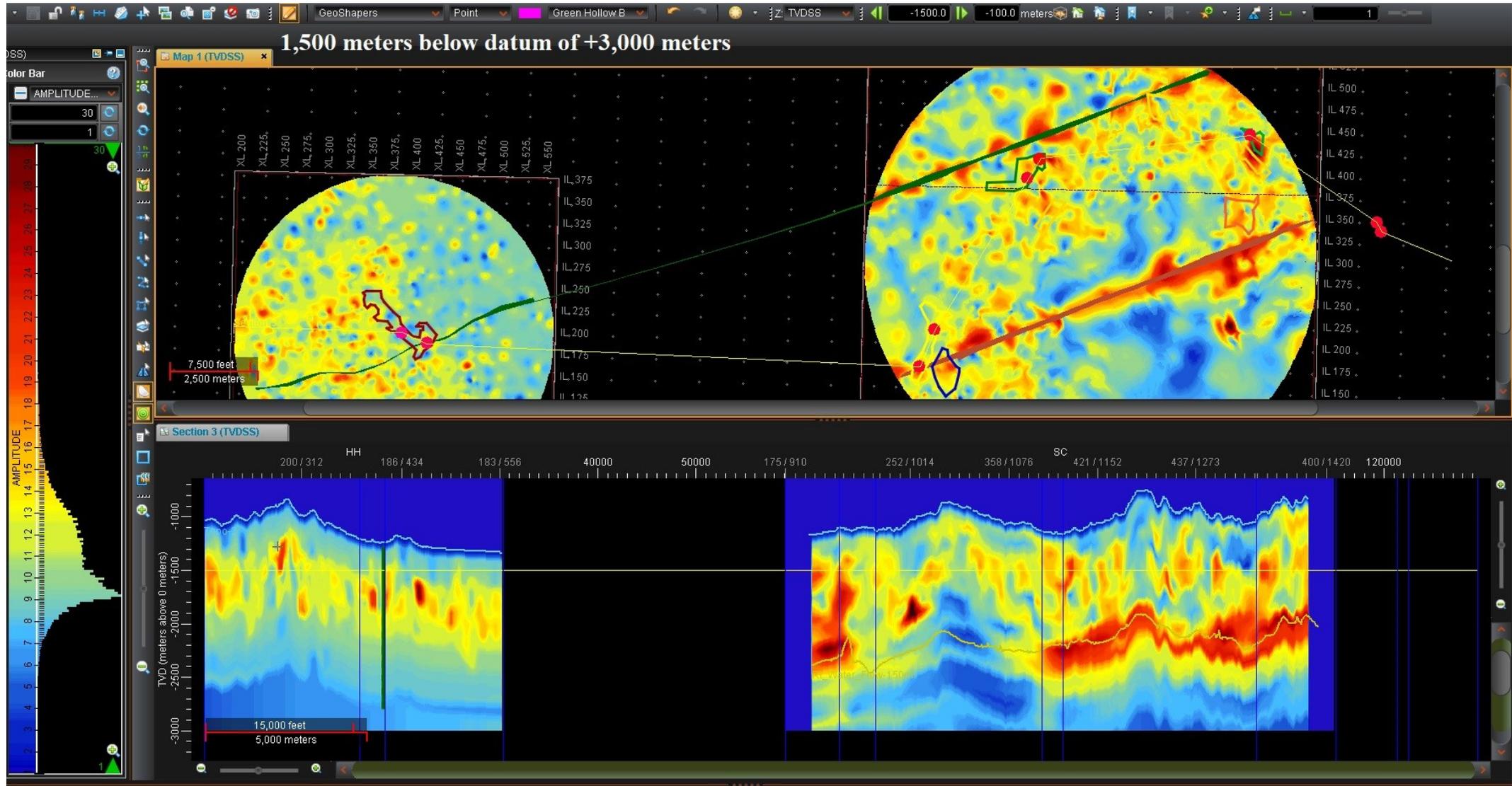
Resistivity Slice -1,300 meters



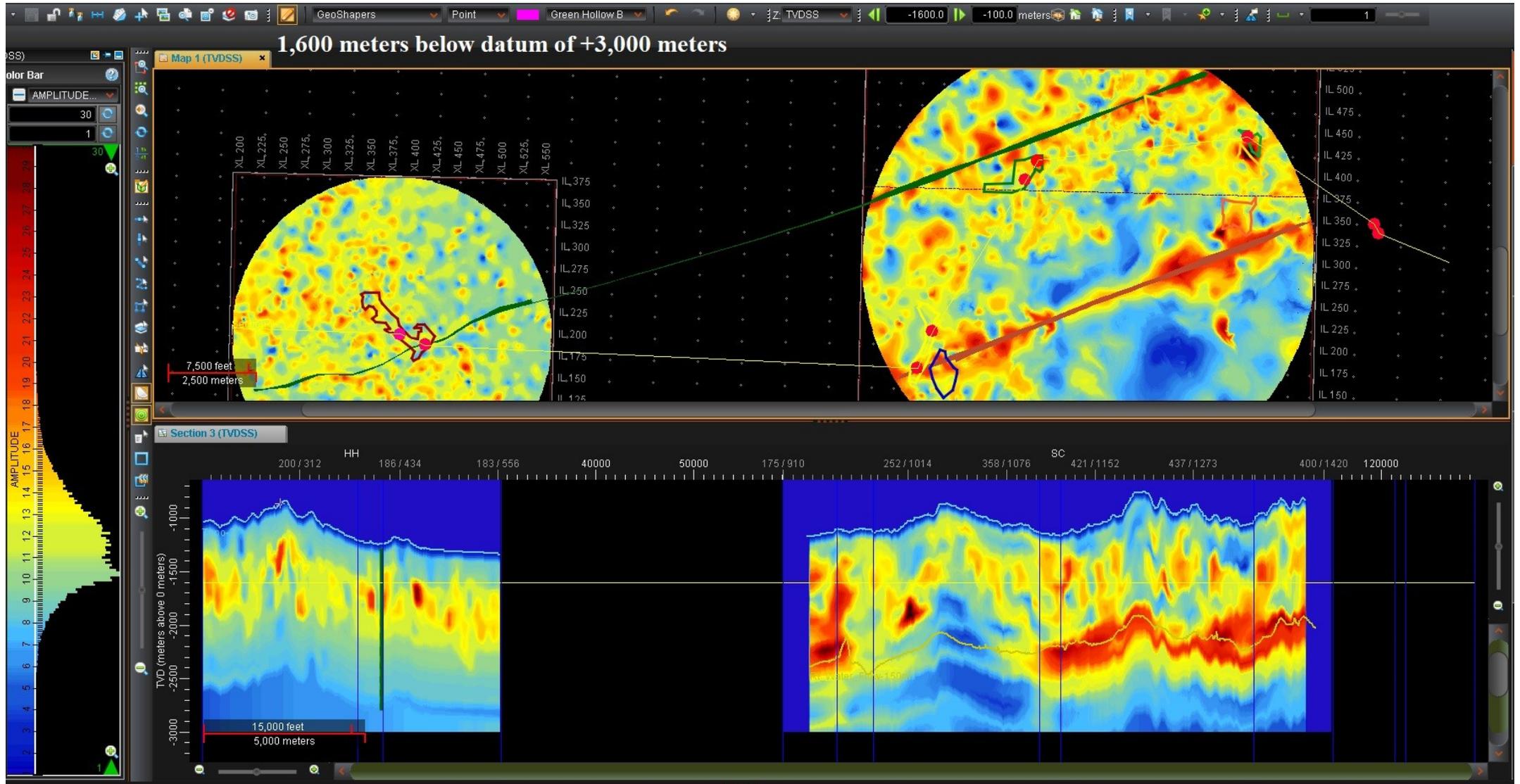
Resistivity Slice -1,400 meters



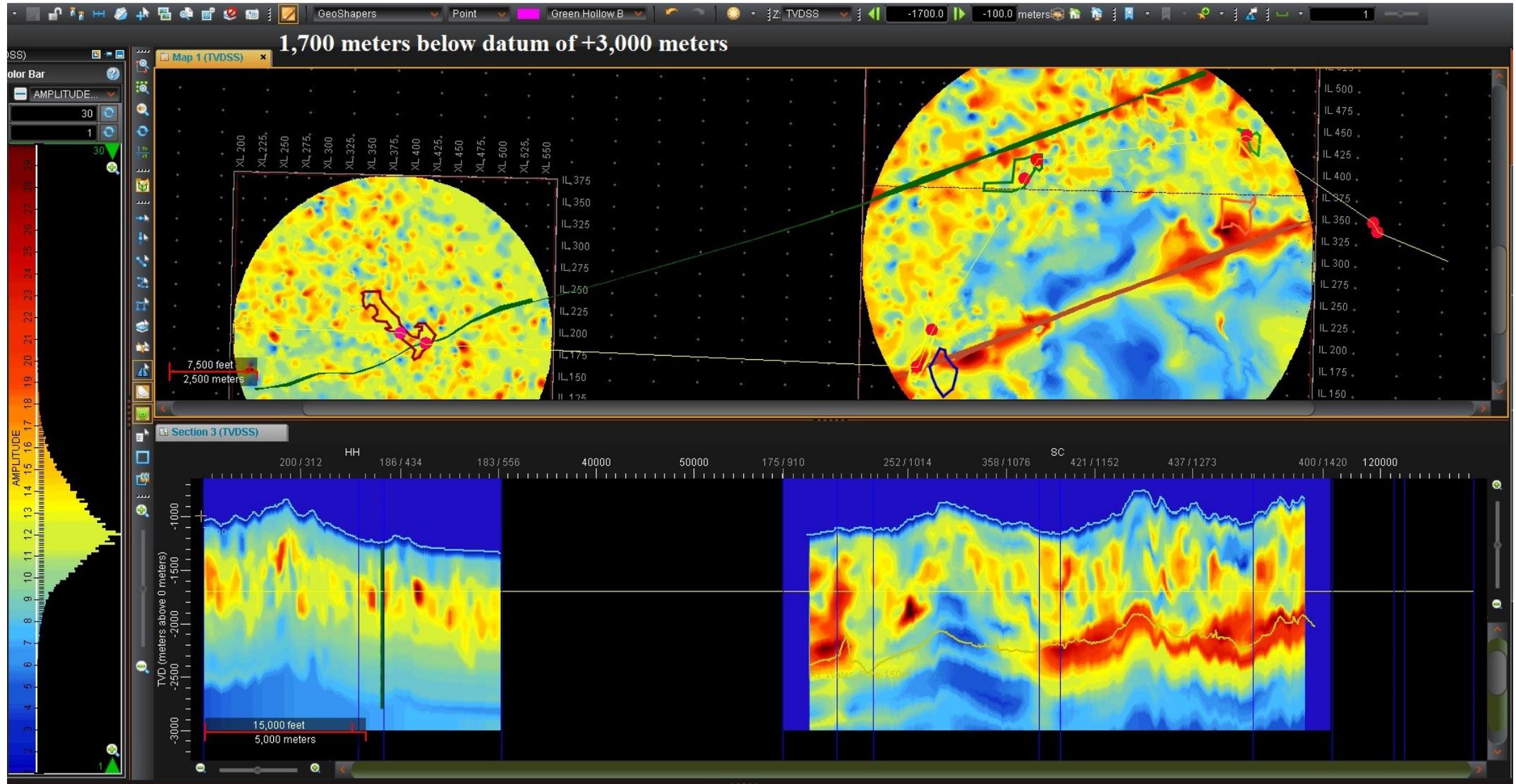
Resistivity Slice -1,500 meters



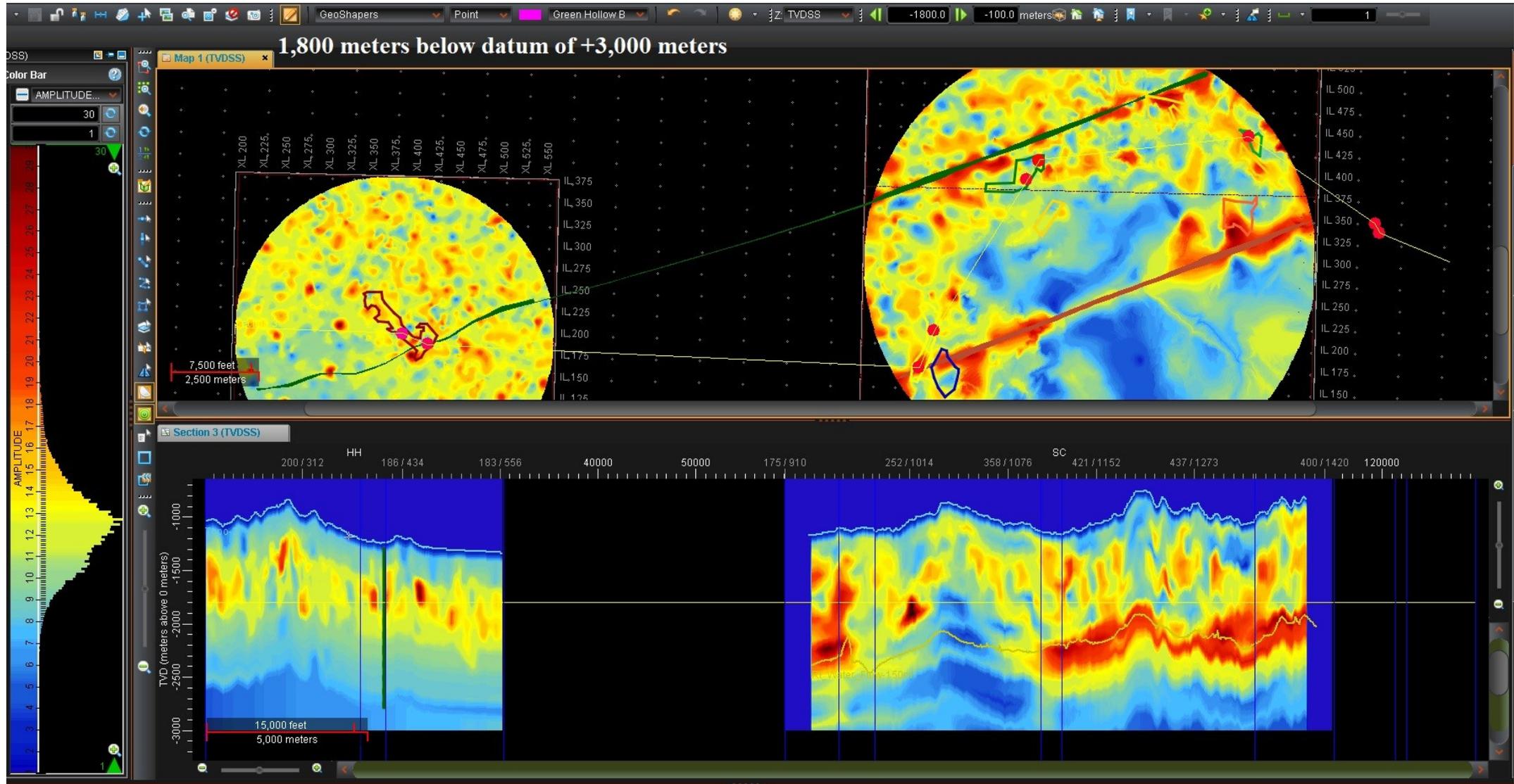
Resistivity Slice -1.600 meters



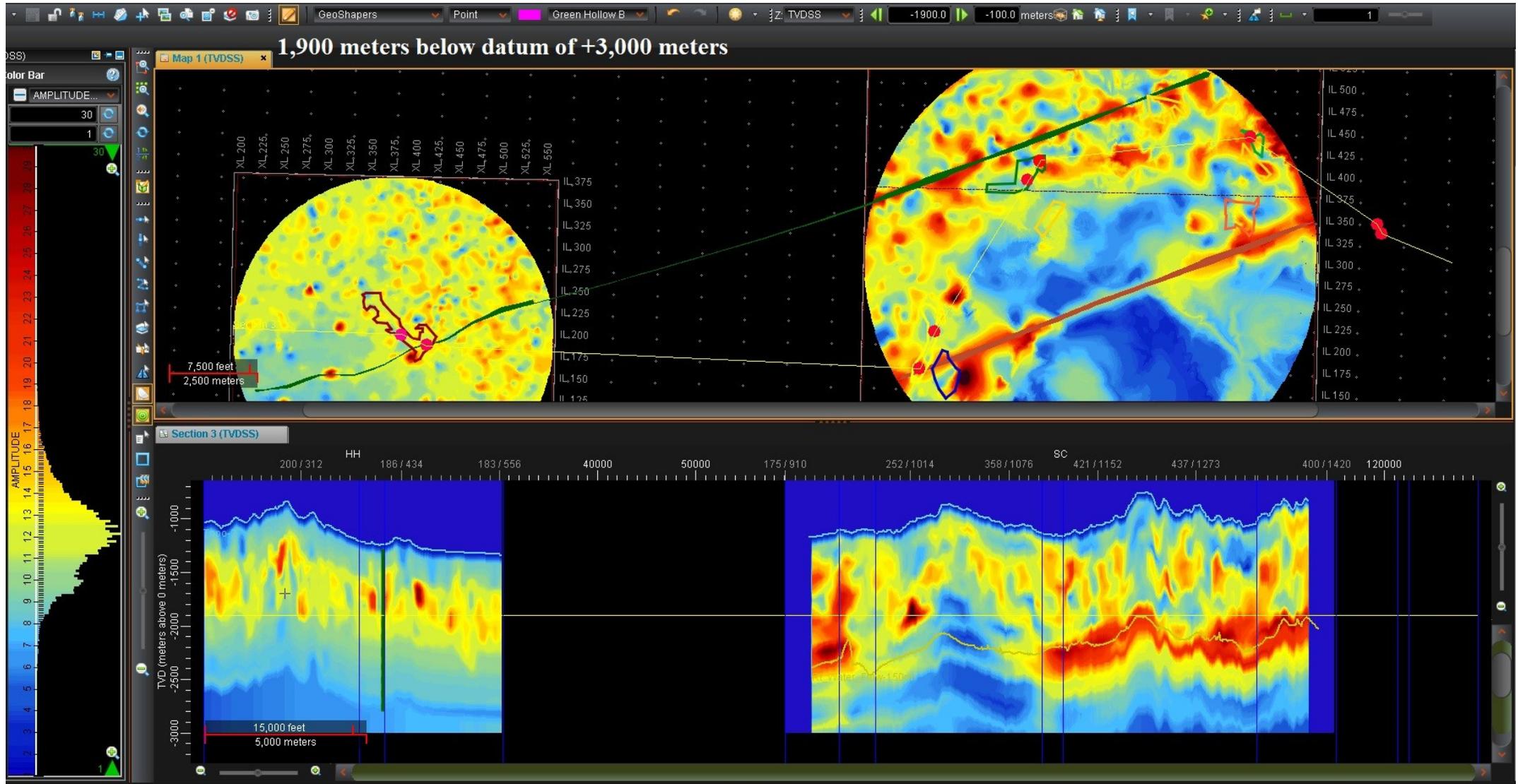
Resistivity Slice -1,700 meters



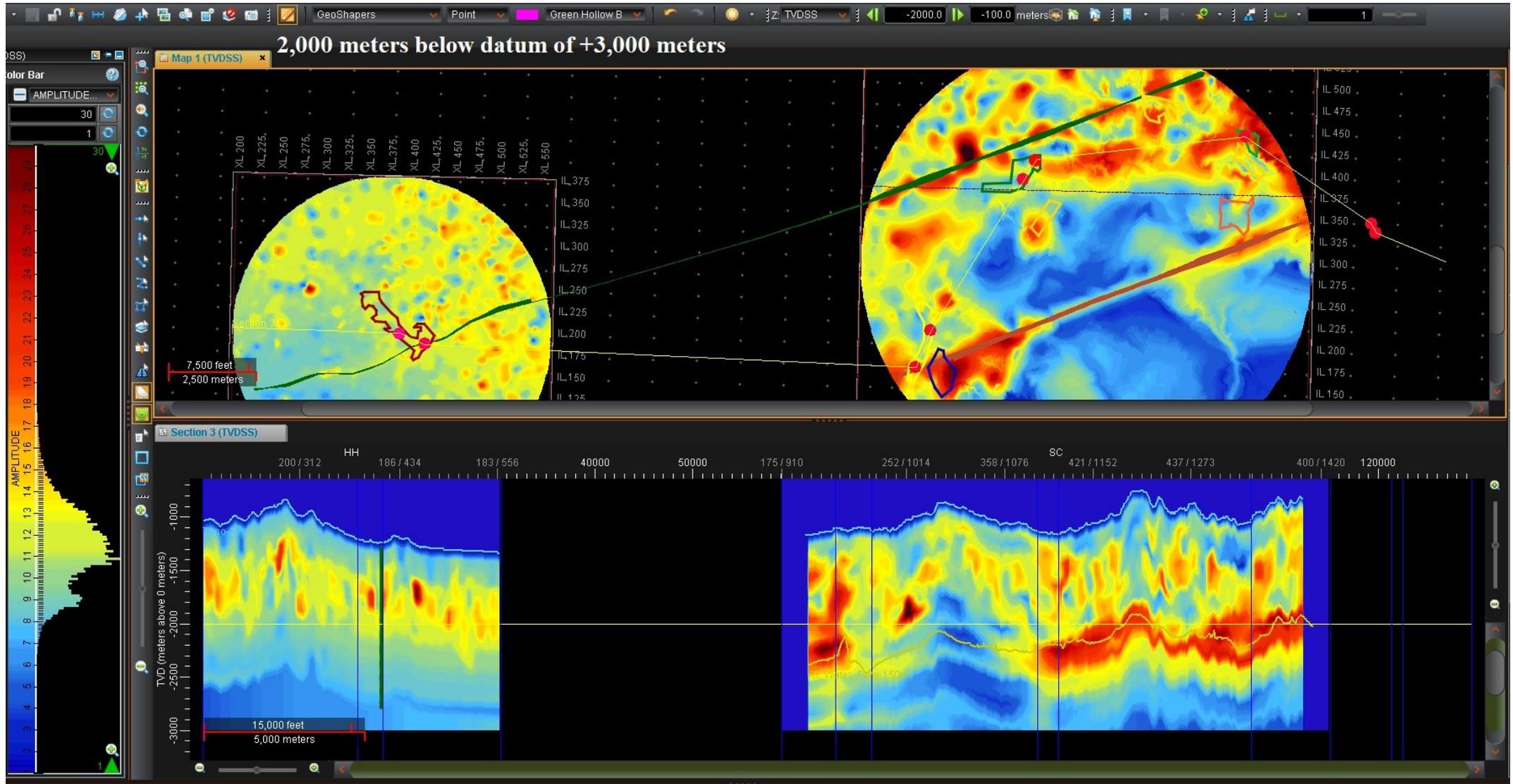
Resistivity Slice -1,800 meters



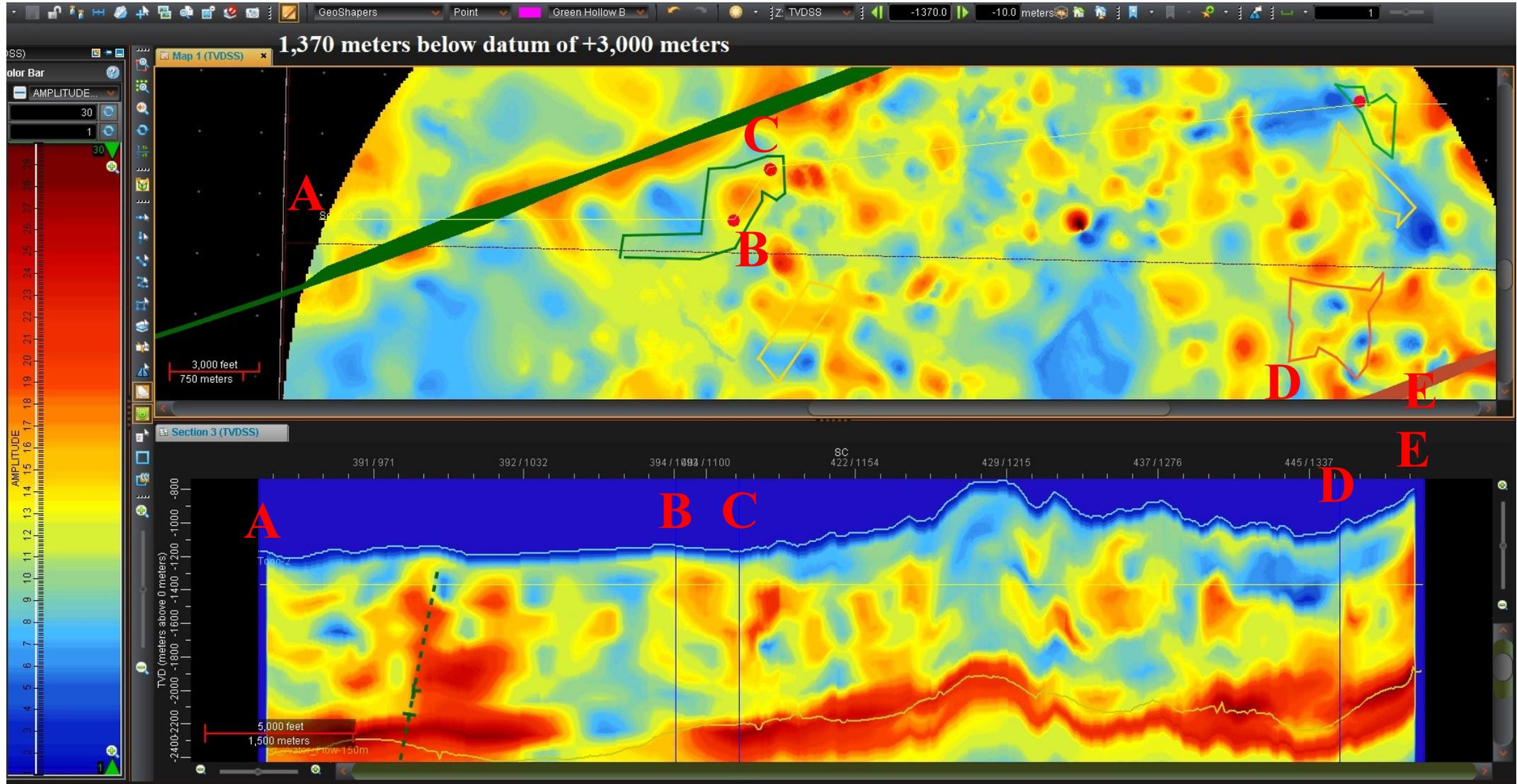
Resistivity Slice -1,900 meters



Resistivity Slice -2,000 meters



Zoom Resistivity Slice -1,370 meters Green Hollow Area



Conclusion

- Lightning Analysis helps understand the regional geologic framework for aquifer definition in Cedar Valley.