



Trace Regularization & Interpolation

NZ 3D Processing

24 March 2021

cgg.com



INSTITUTE FOR GEOPHYSICS



Passion for Geoscience

1. Convert to CGG internal format
2. Nav merge / trace edit
3. Low cut filter
4. Time Variant Scaling (TVS) & Resample to 4ms
5. Swell noise attenuation (SNA)
6. Debubble
7. Linear noise attenuation (LNA)
8. Tidal statics correction
9. Water column statics correction
10. Shot & channel scaling
11. Receiver motion correction (RMC)
12. Joint Deghost & Designature
13. Residual Bubble Removal
14. Source Sensor Datum Correction
15. Shallow Water Demultiple
16. Surface Related Multiple Elimination (3D SRME)
17. Simultaneous Subtraction of MWD & SRME
18. Residual linear noise attenuation (residual LNA)
19. Trace regularization & interpolation

- **Objective:**

To regularize and interpolate traces.

- **Procedure:**

Trace regularization & interpolation (grid 12.5m x 18.75m) is done using anti-leakage Fourier transform algorithm.

The test is carried out in common offset domain at near (250m), middle (1750m) & far (4050m) offset respectively.

- **Display:**

Trace position map, subline & crossline.

- **Observation & Recommendation:**

All the traces are regularized and well interpolated. It's recommended to apply regularization & interpolation for production.

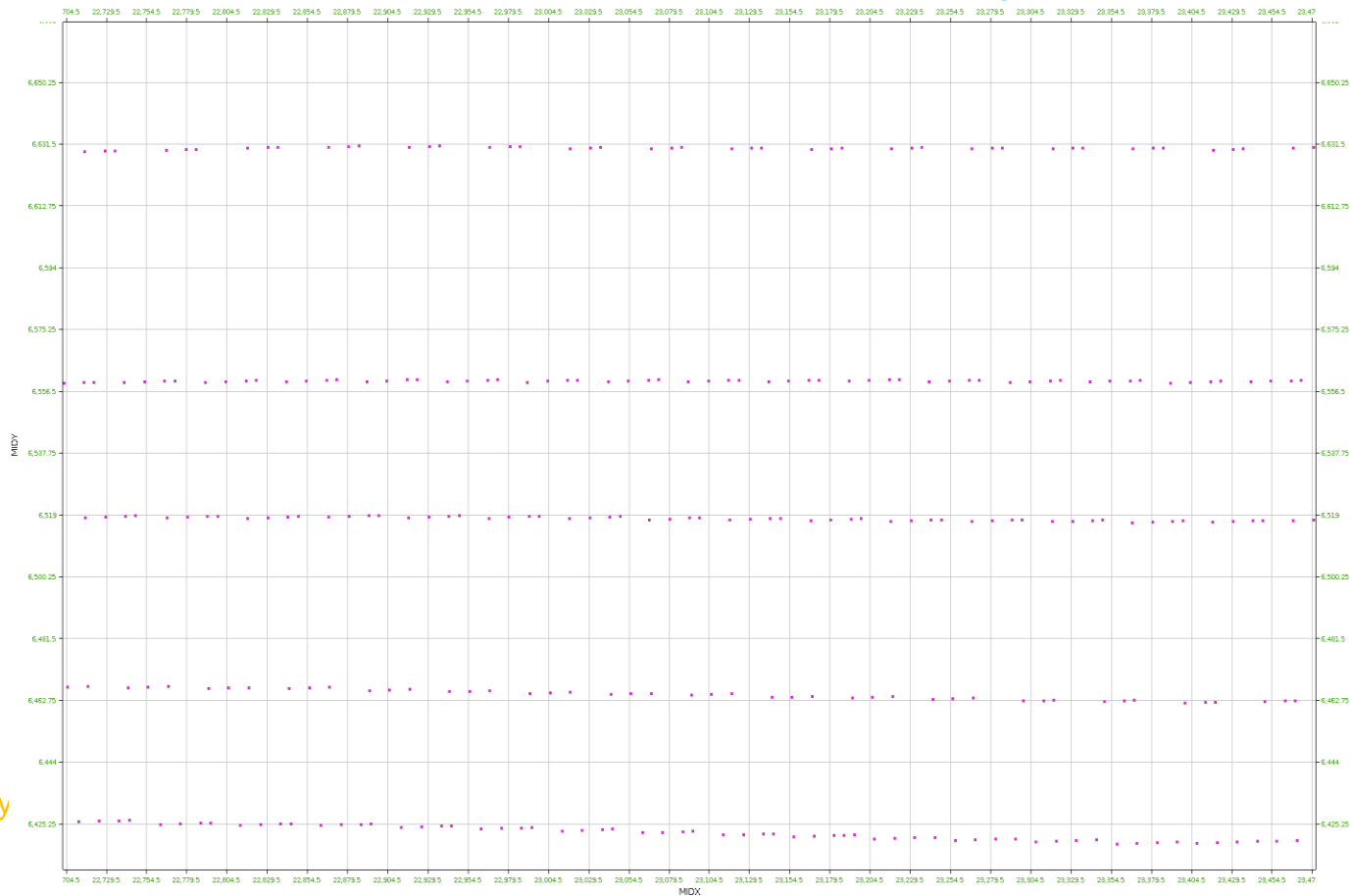
- offset 250m
- offset 1750m
- offset 4050m



Offset 250m Trace Position **before** Regularization & Interpolation

5

- Traces are not located at bin center



Midy

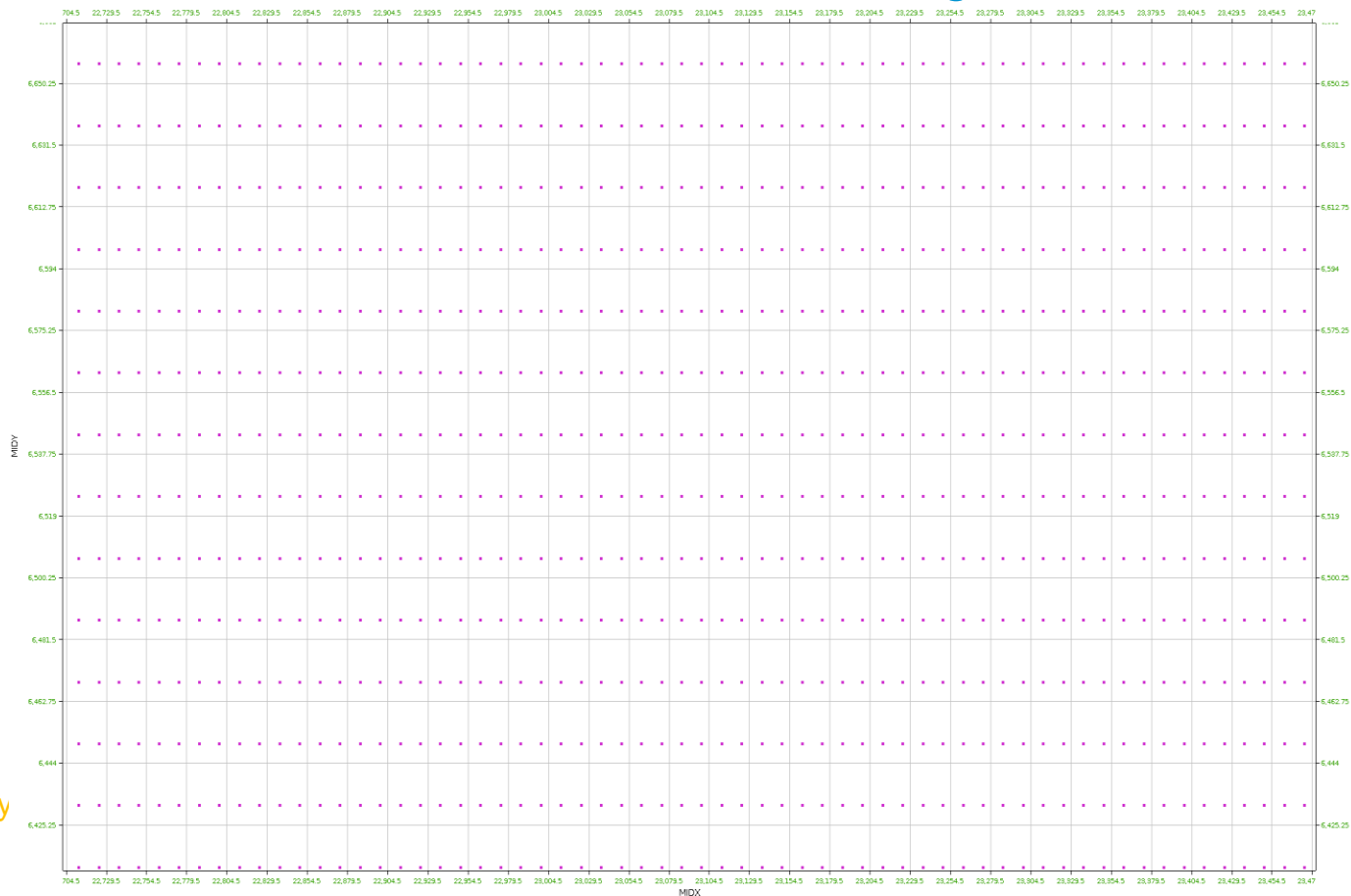
Midx



Offset 250m Trace Position **after** Regularization & Interpolation

6

- Traces position are aligned and interpolated.



Midy

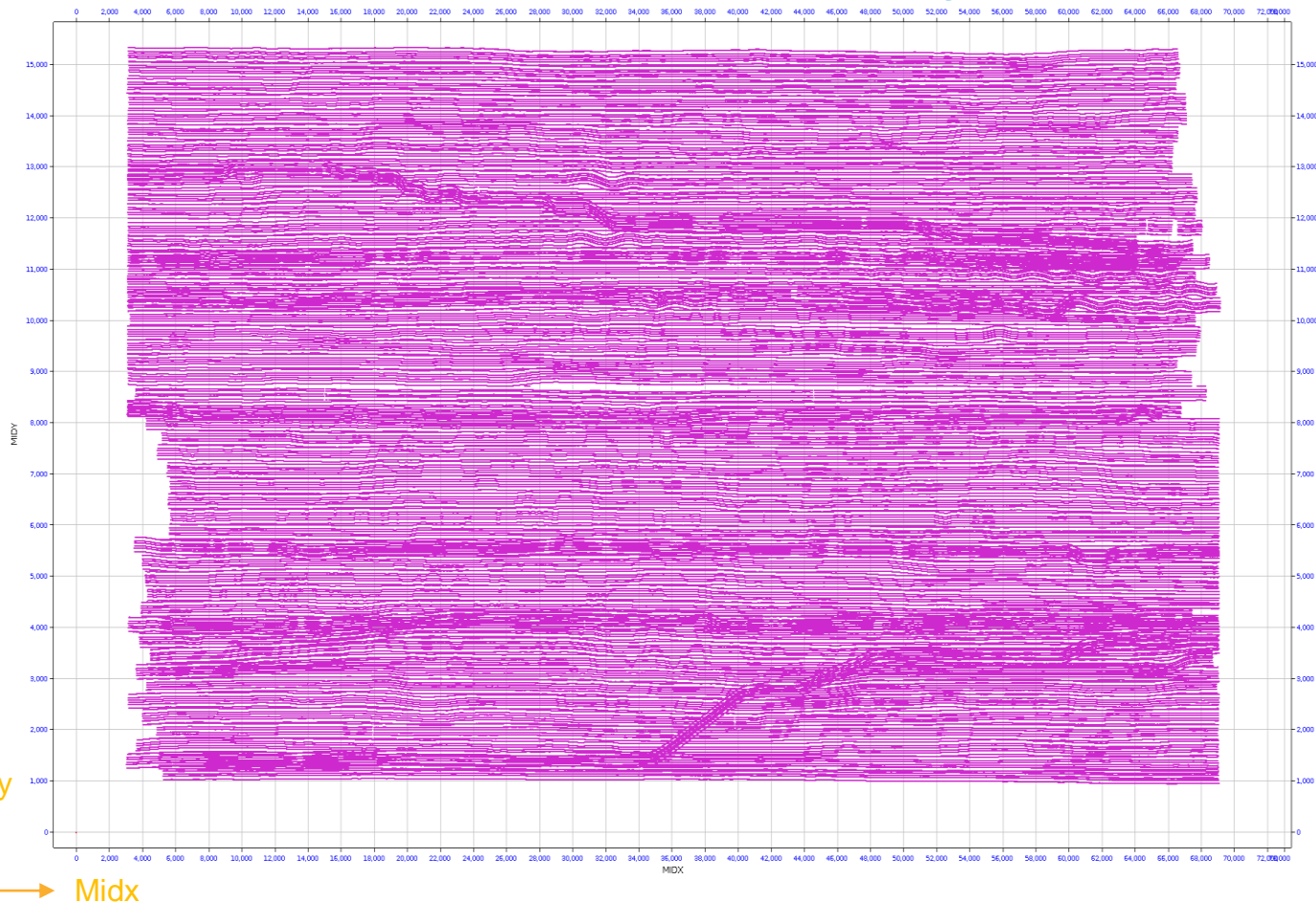


Midx



Offset 250m Position Map **before** Regularization & Interpolation

7



- Holes are observed before regularization and interpolation.

Midy

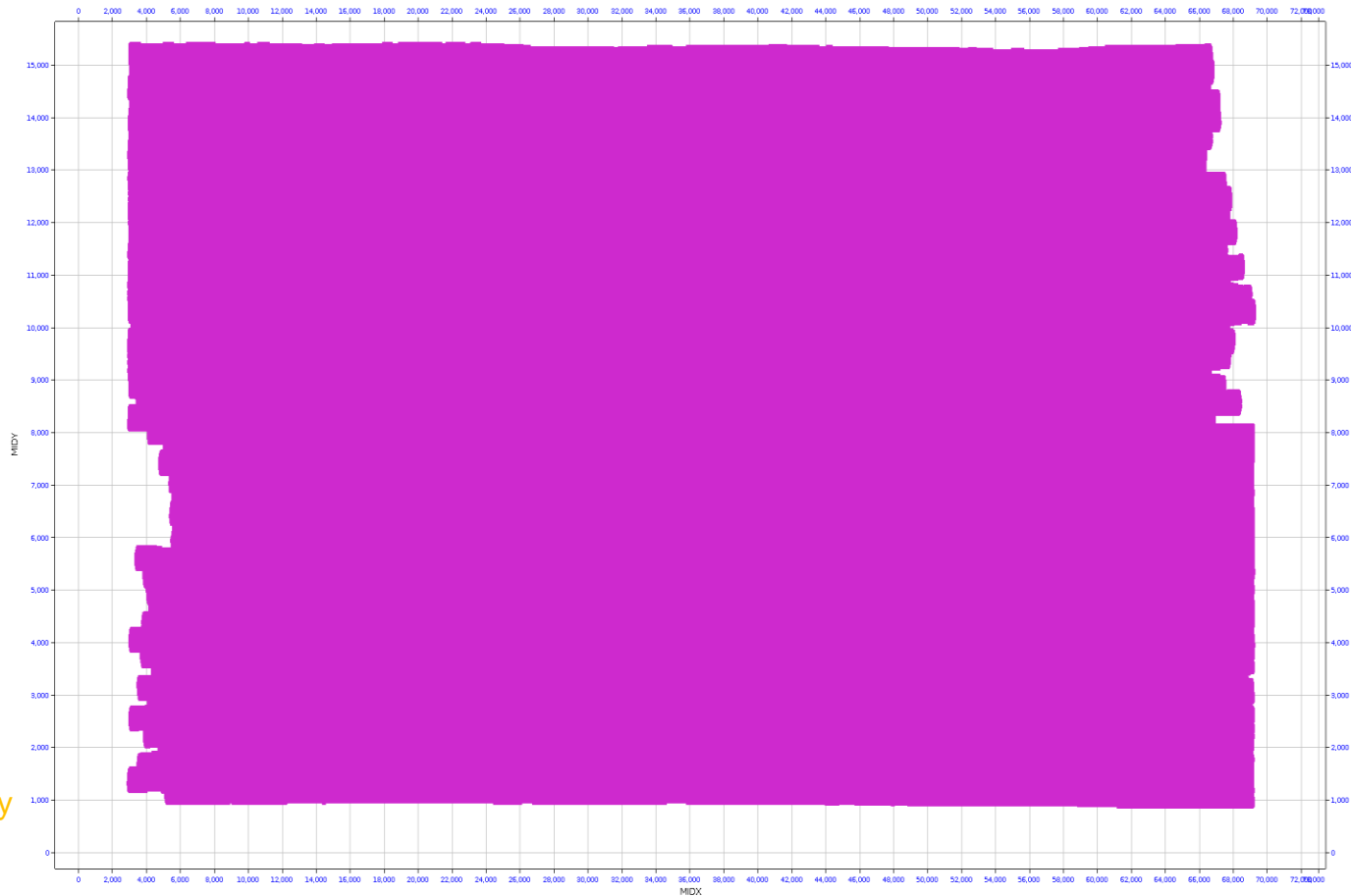


Midx



Offset 250m Position Map **after** Regularization & Interpolation

8



- Trace position is regularized and hole is well filled after regularization and interpolation.

Midy

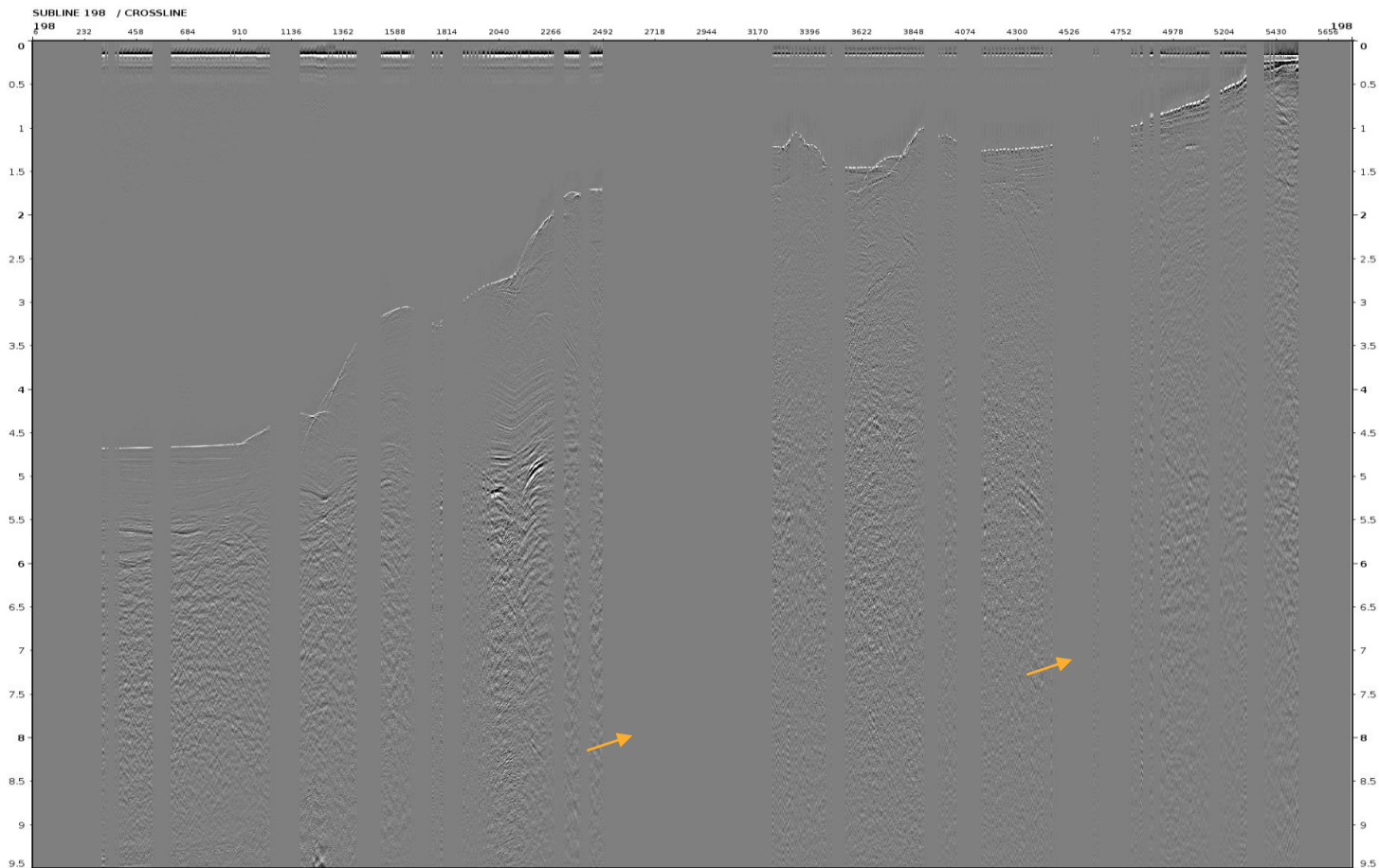


Midx



Offset 250m IL198 before Regularization & Interpolation

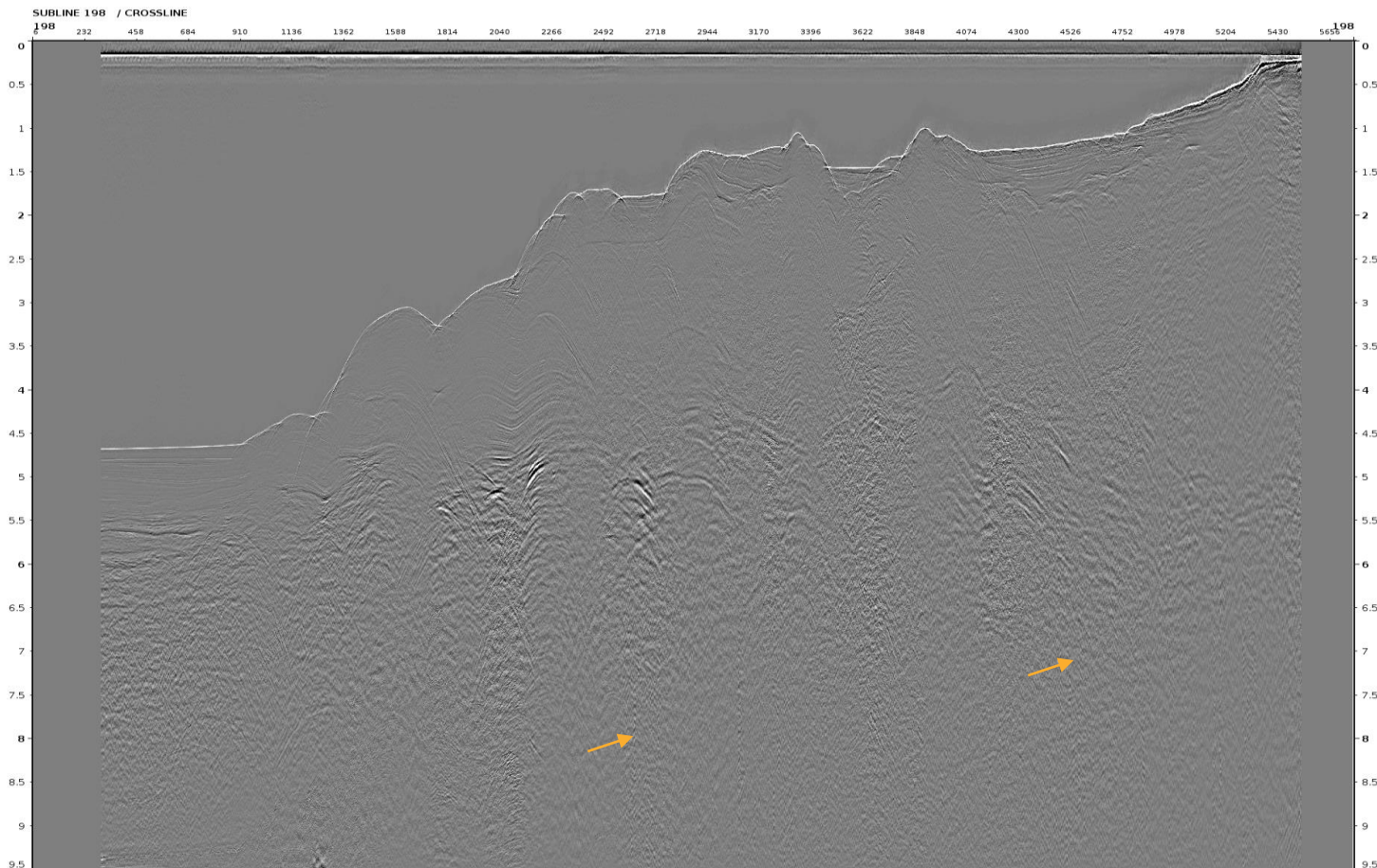
9





Offset 250m IL198 **after** Regularization & Interpolation

10

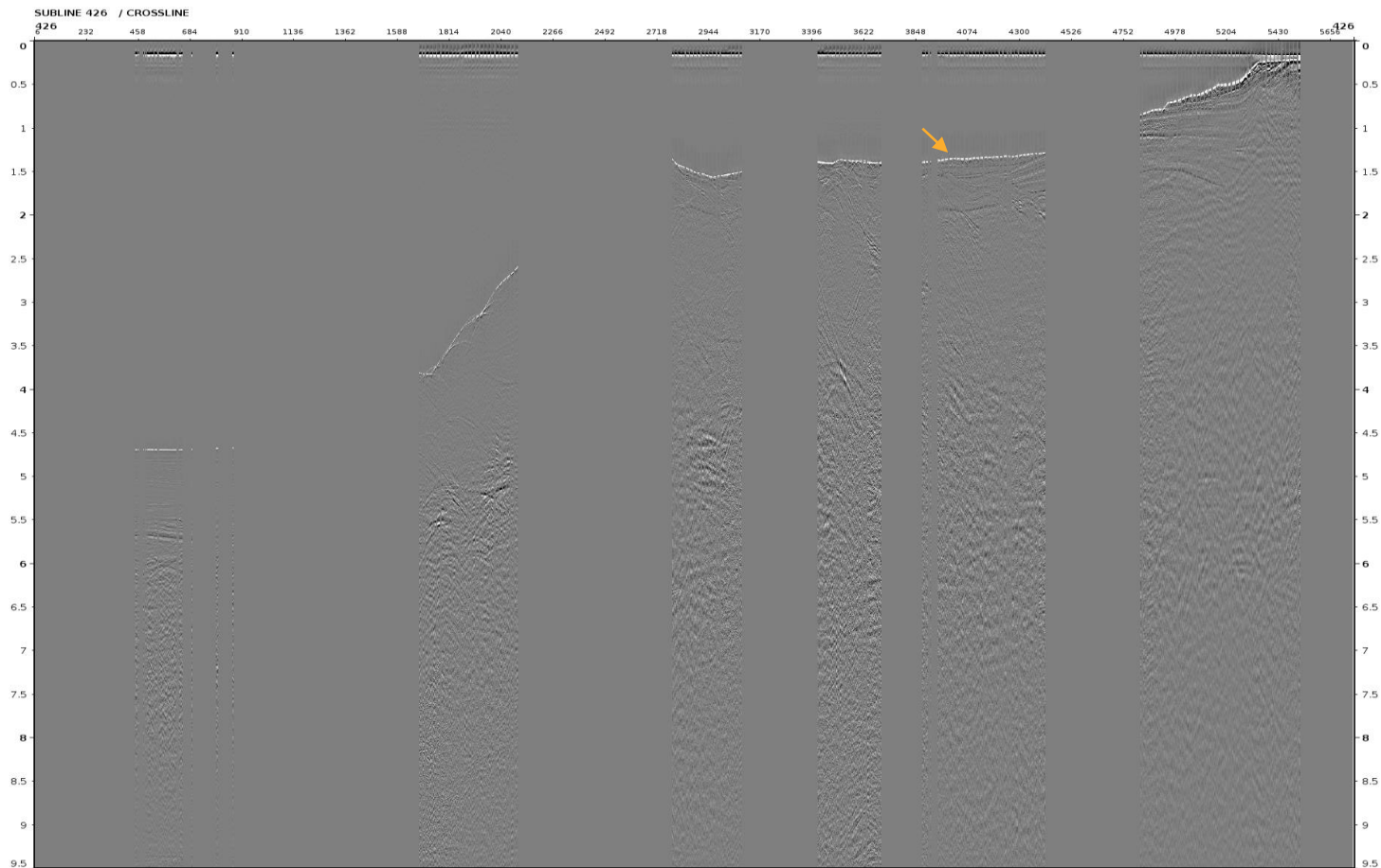


- Traces are well interpolated on subline display.



Offset 250m IL426 before Regularization & Interpolation

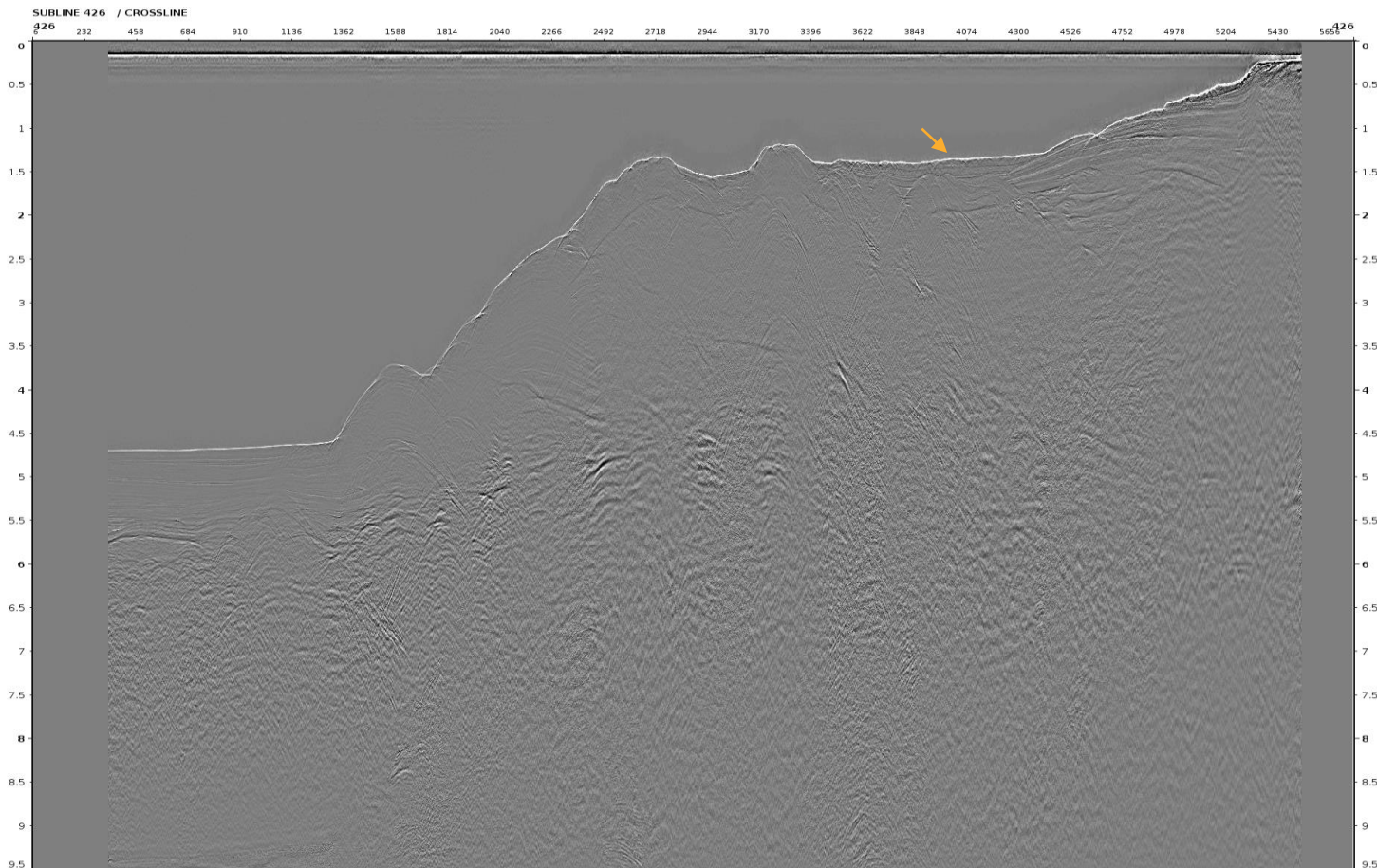
11





Offset 250m IL426 **after** Regularization & Interpolation

12

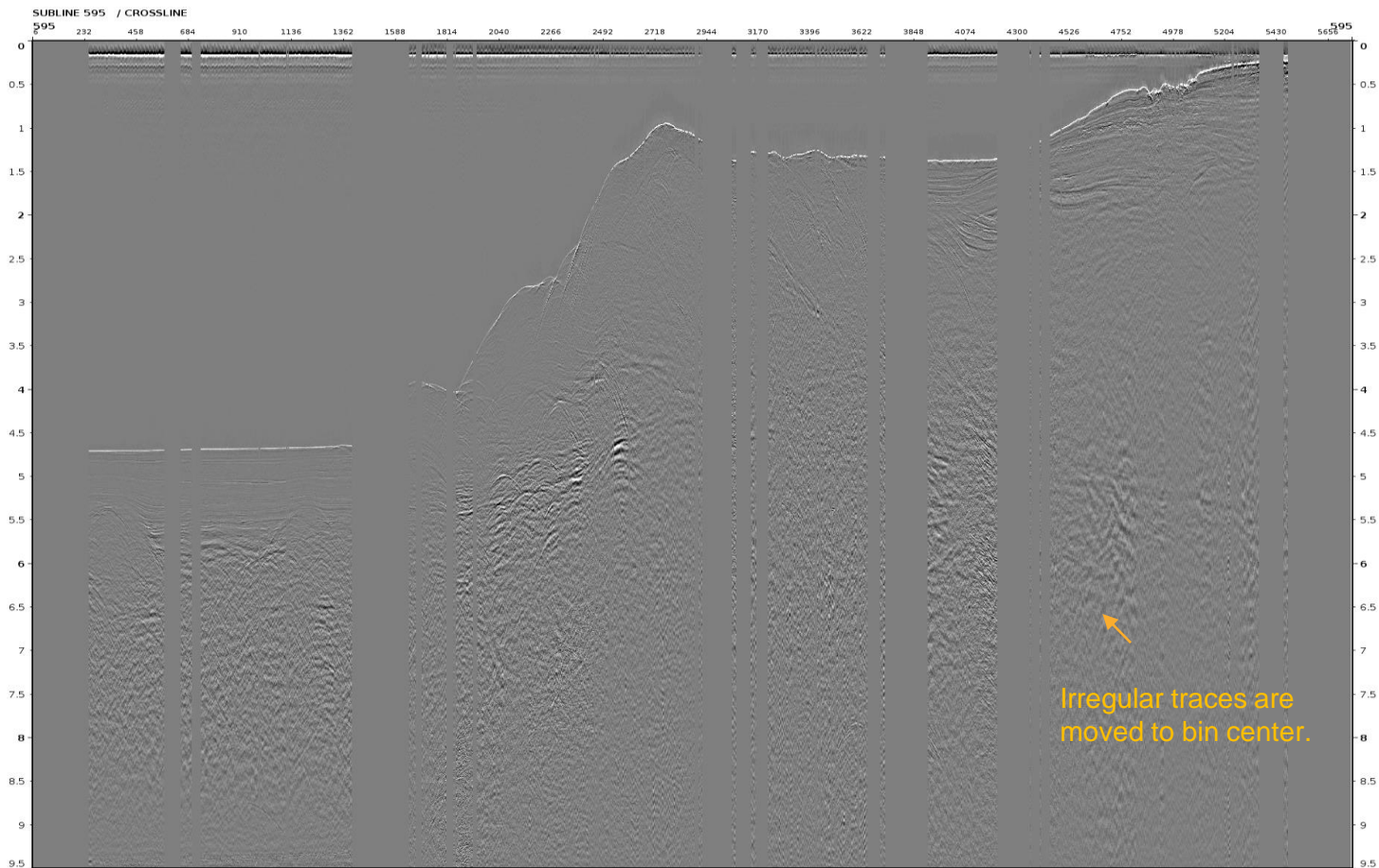


- Traces are well interpolated on subline display.



Offset 250m IL595 before Regularization & Interpolation

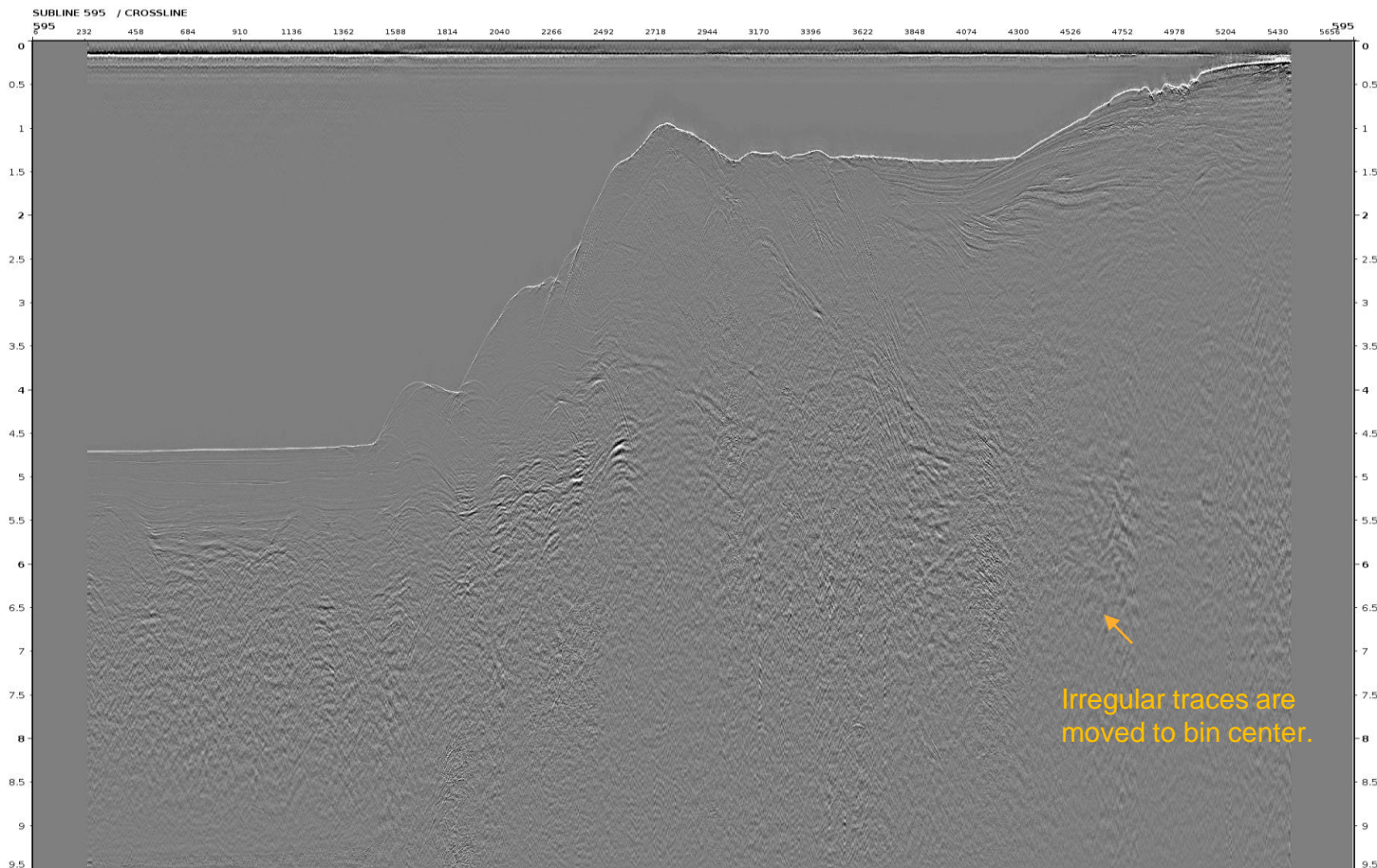
13





Offset 250m IL595 **after** Regularization & Interpolation

14



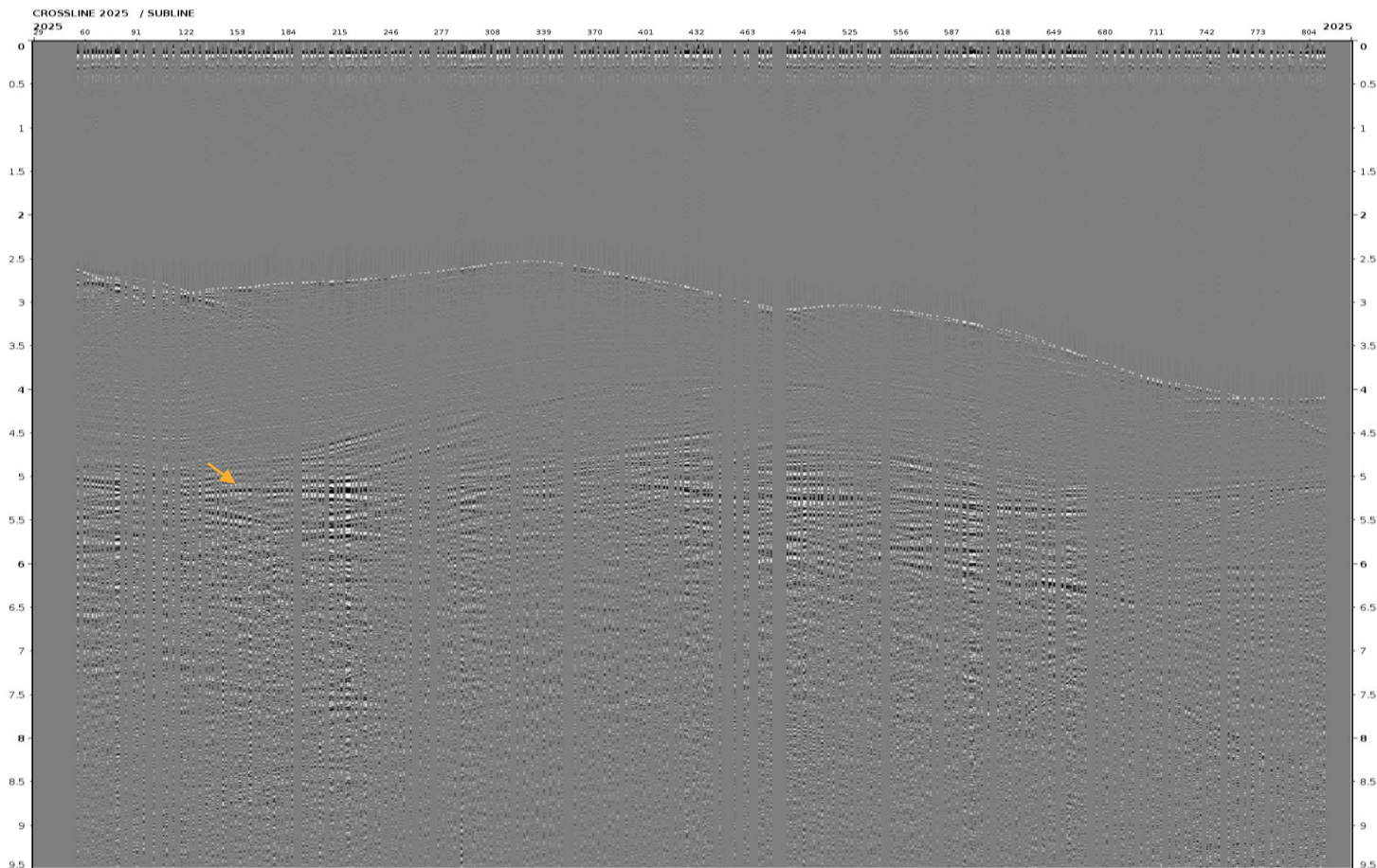
- Traces are well interpolated on subline display.

Irregular traces are moved to bin center.



Offset 250m XL 2025 before Regularization & Interpolation

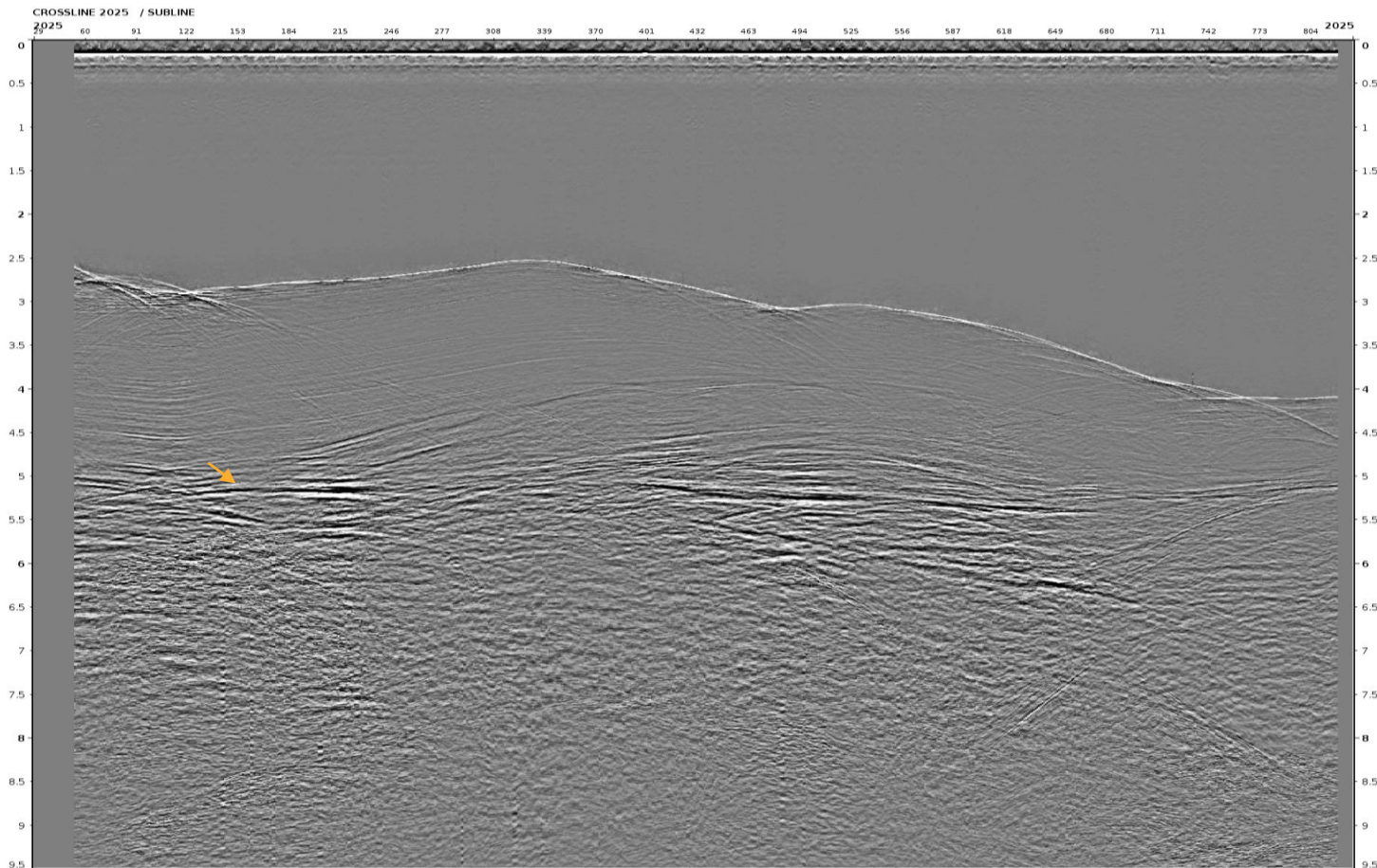
15





Offset 250m XL 2025 after Regularization & Interpolation

16

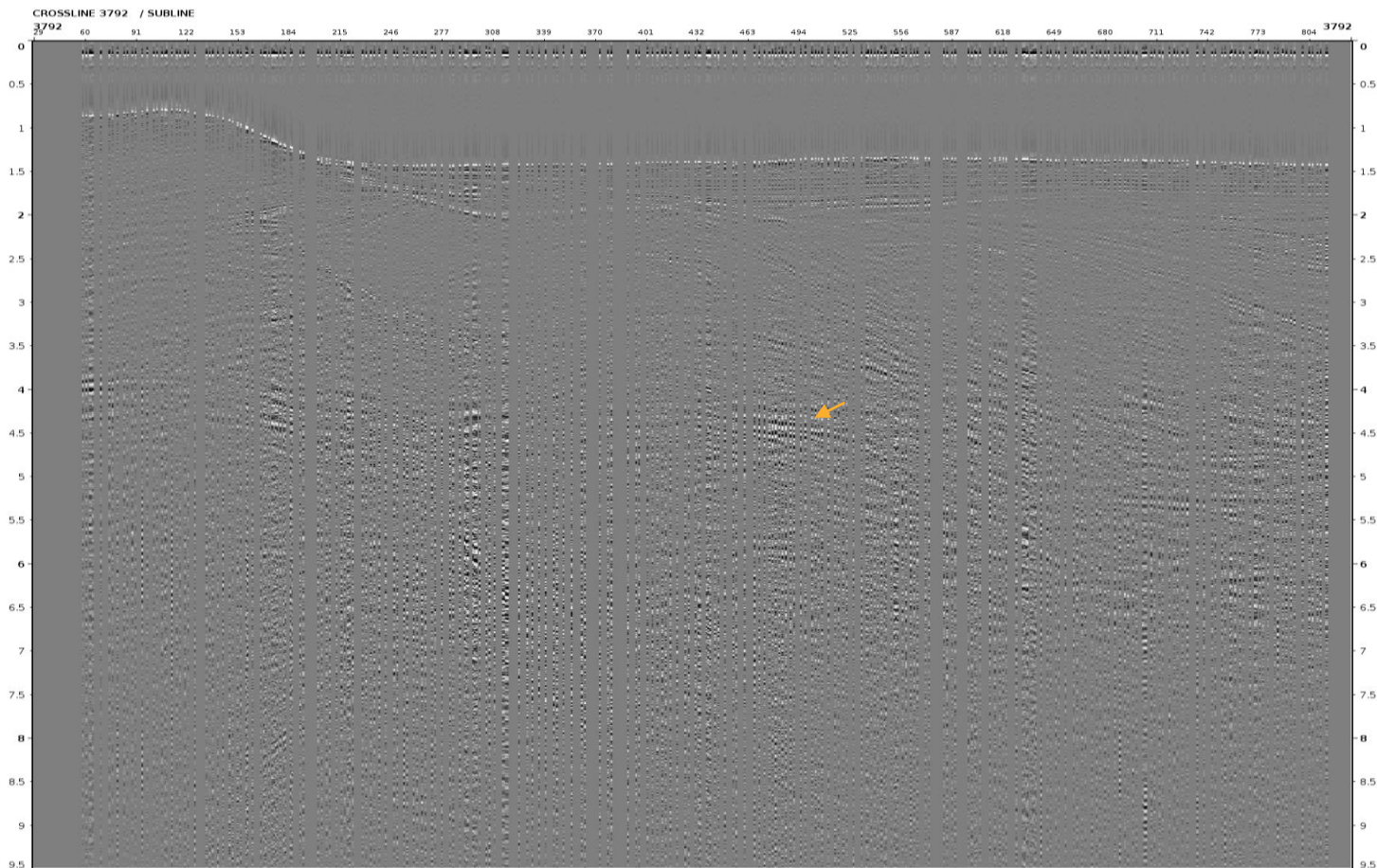


- Traces are well interpolated on crossline display.



Offset 250m XL 3792 before Regularization & Interpolation

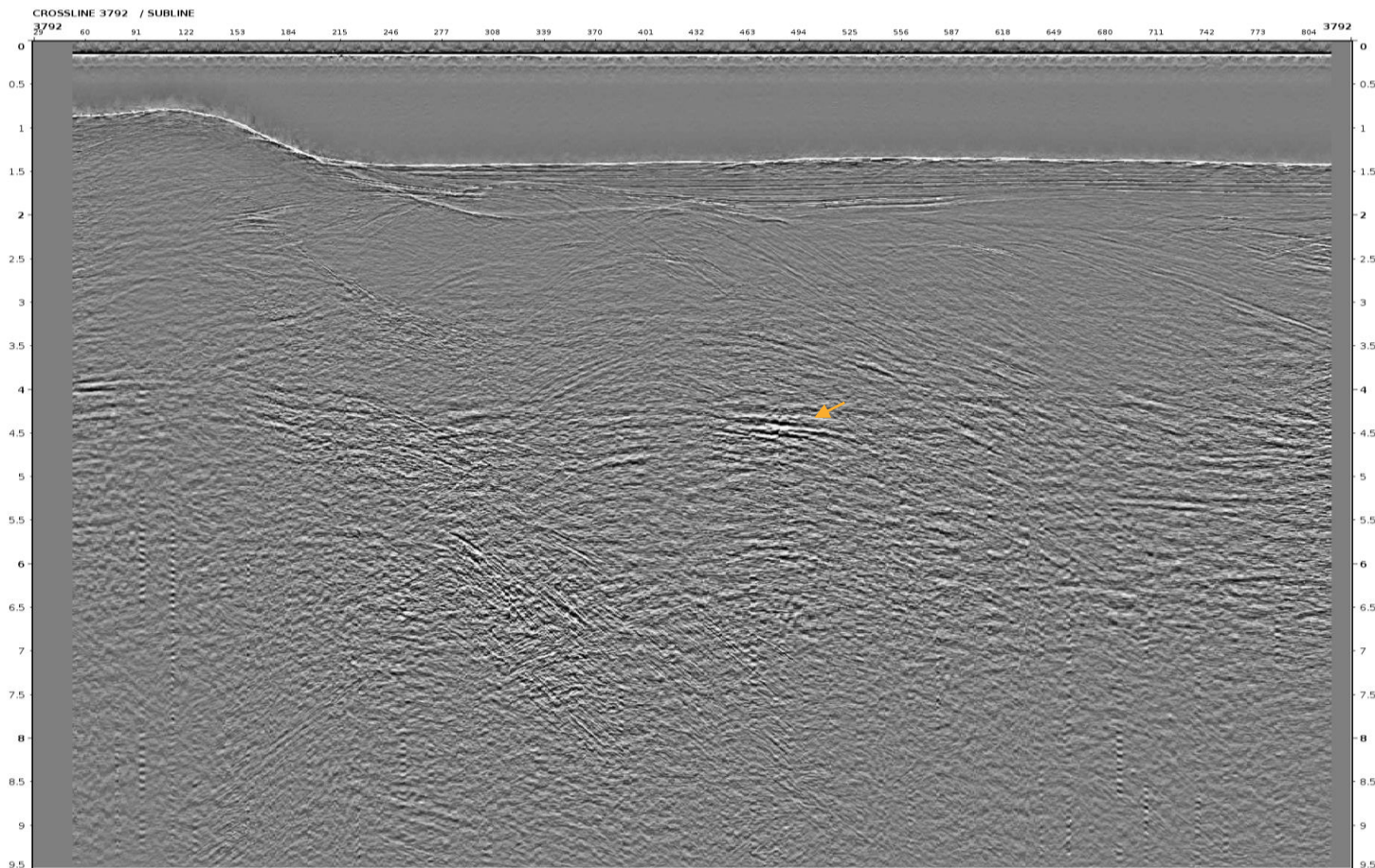
17





Offset 250m XL 3792 after Regularization & Interpolation

18

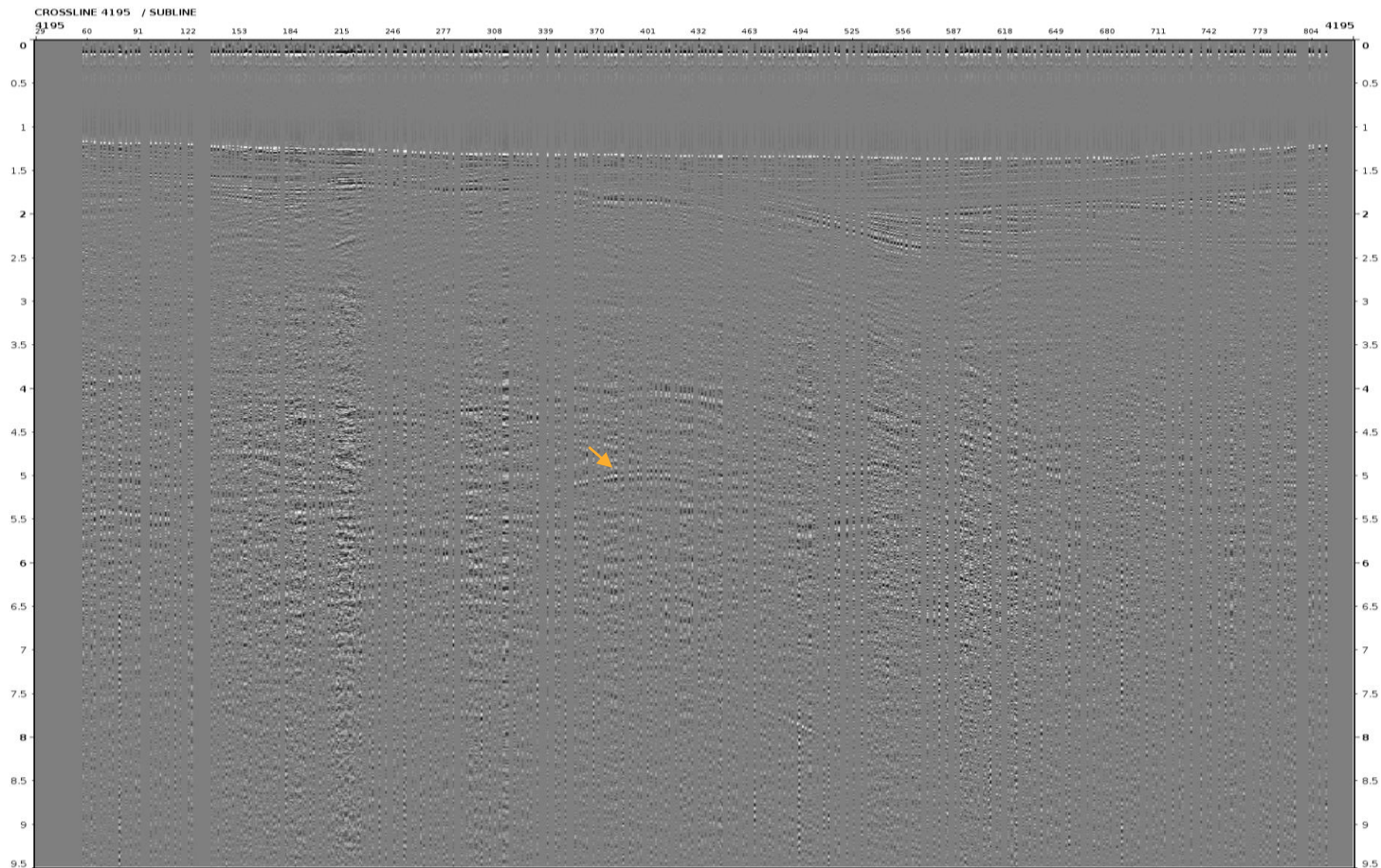


- Traces are well interpolated on crossline display.



Offset 250m XL 4195 before Regularization & Interpolation

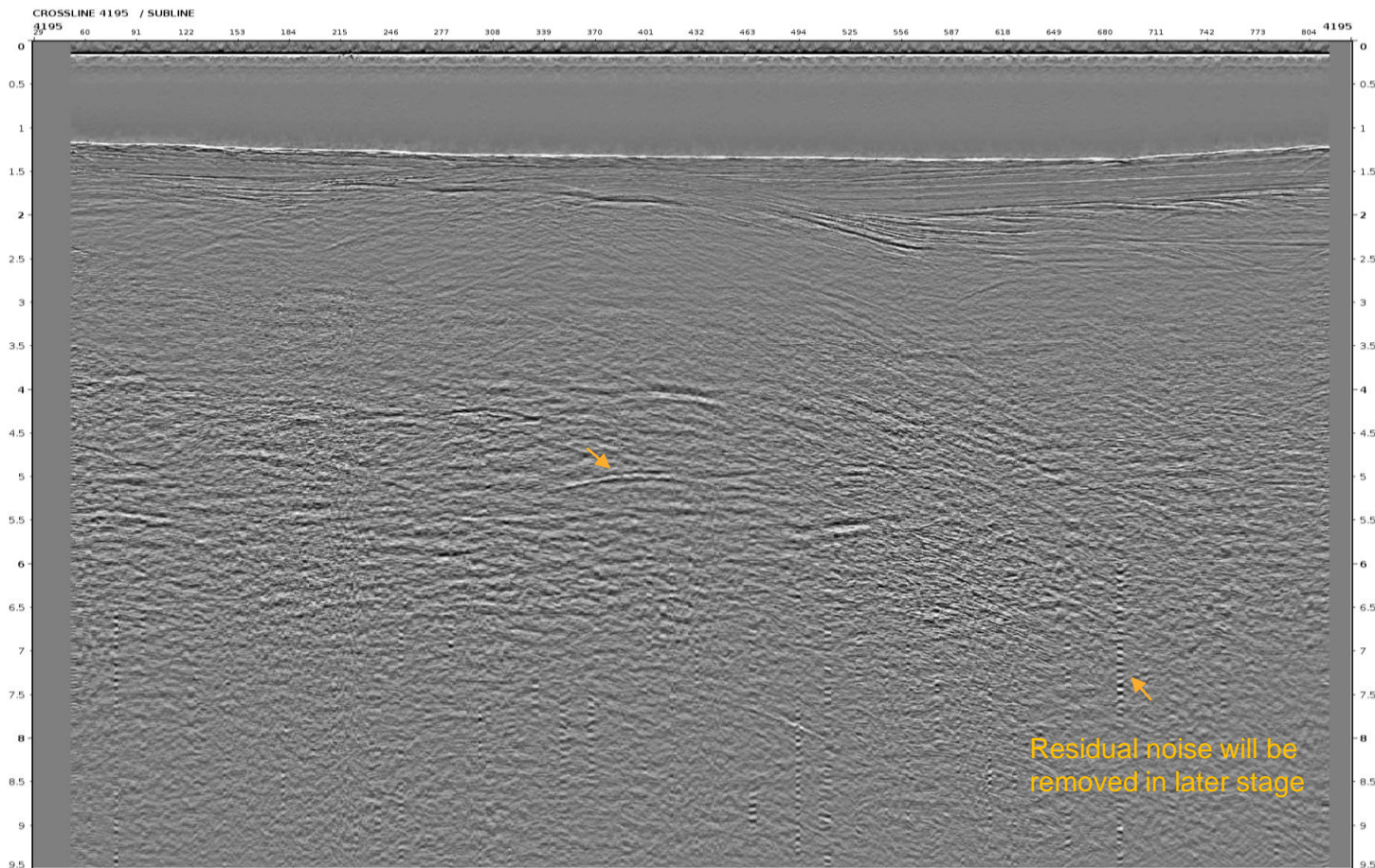
19





Offset 250m XL 4195 after Regularization & Interpolation

20

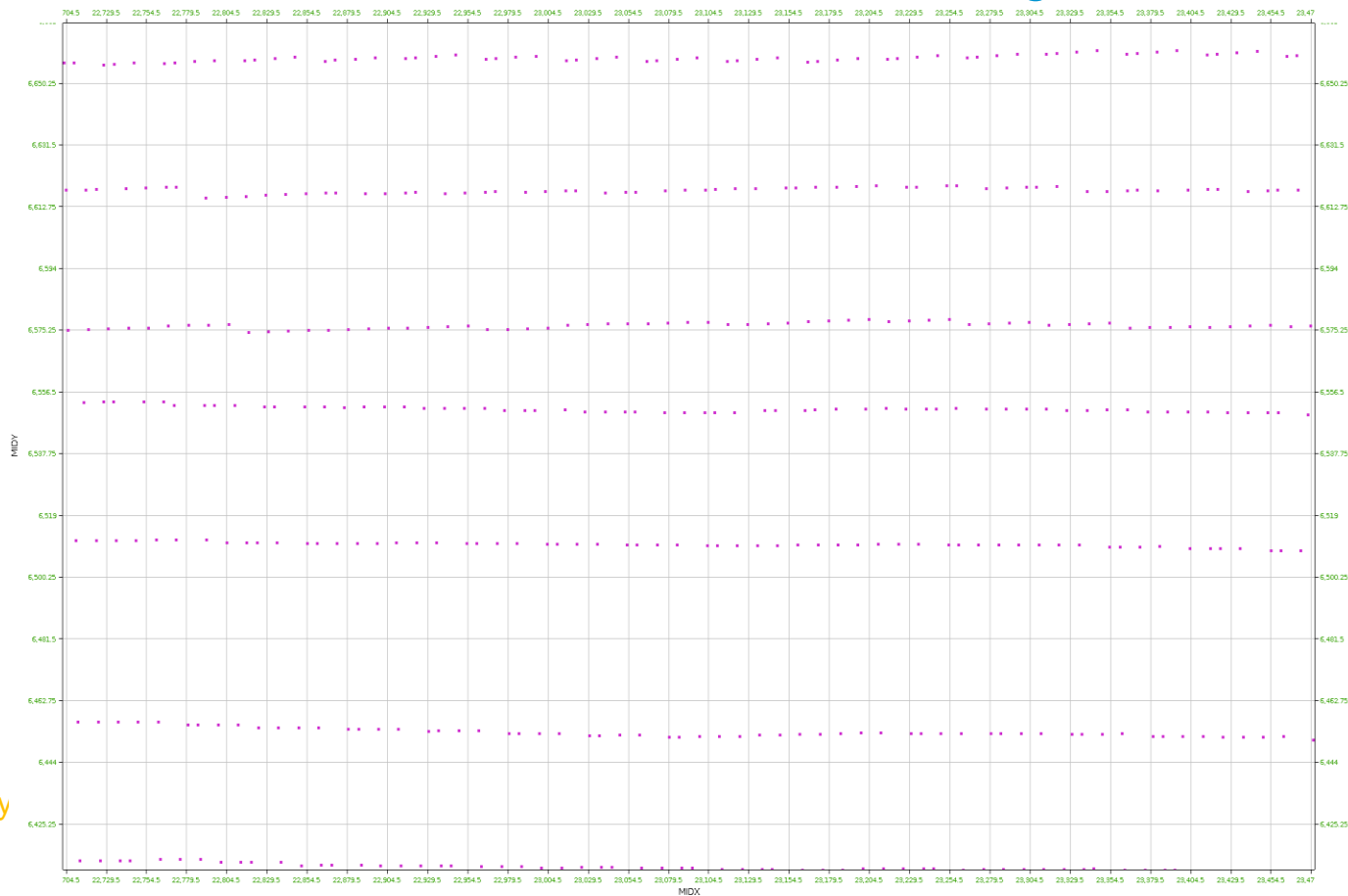


- Traces are well interpolated on crossline display.

- offset 250m
- **offset 1750m**
- offset 4050m



Offset 1750m Trace Position **before** Regularization & Interpolation 22



- Traces are not located at bin center

Midy

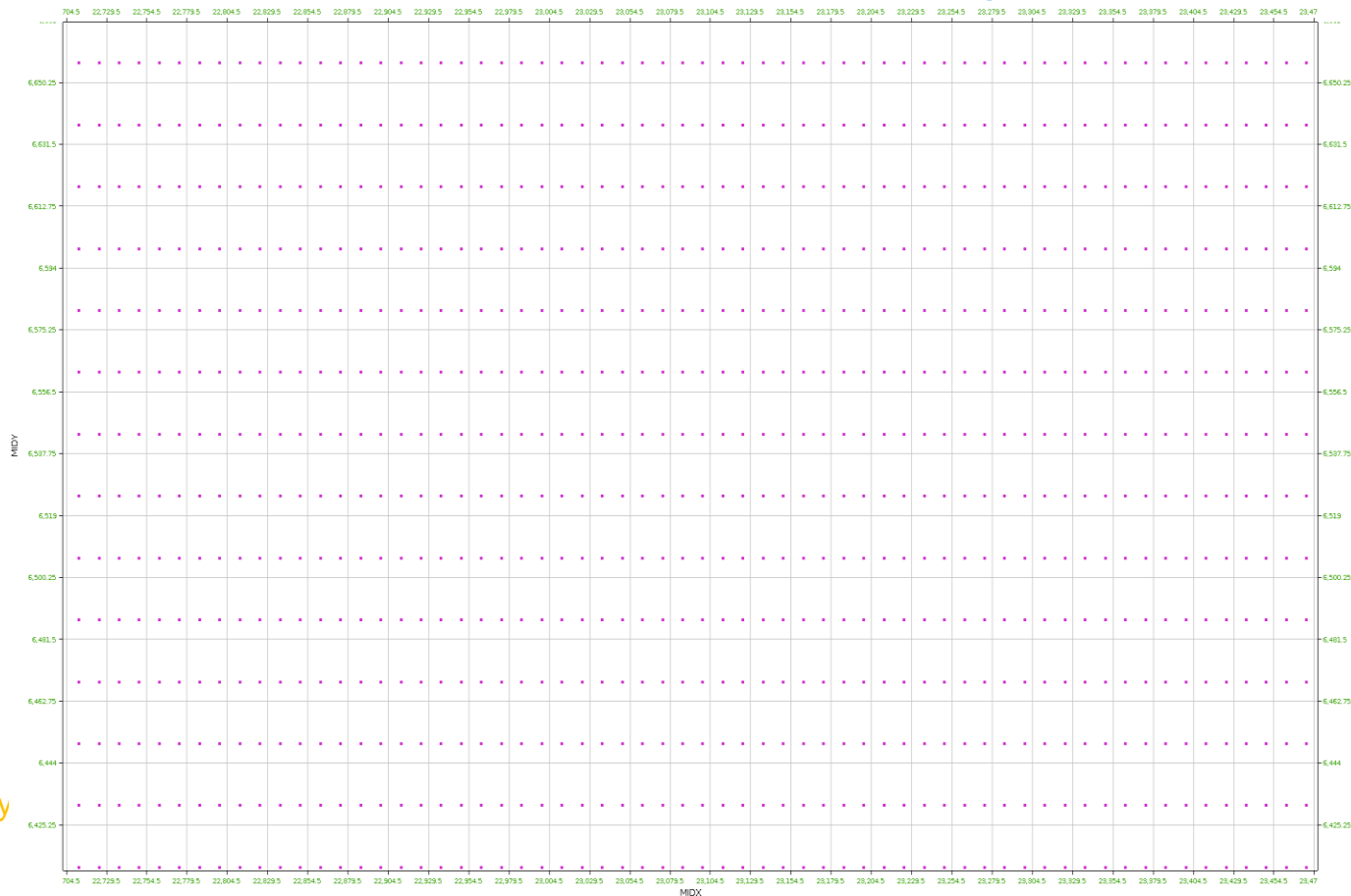


Midx



Offset 1750m Trace Position **after** Regularization & Interpolation

23

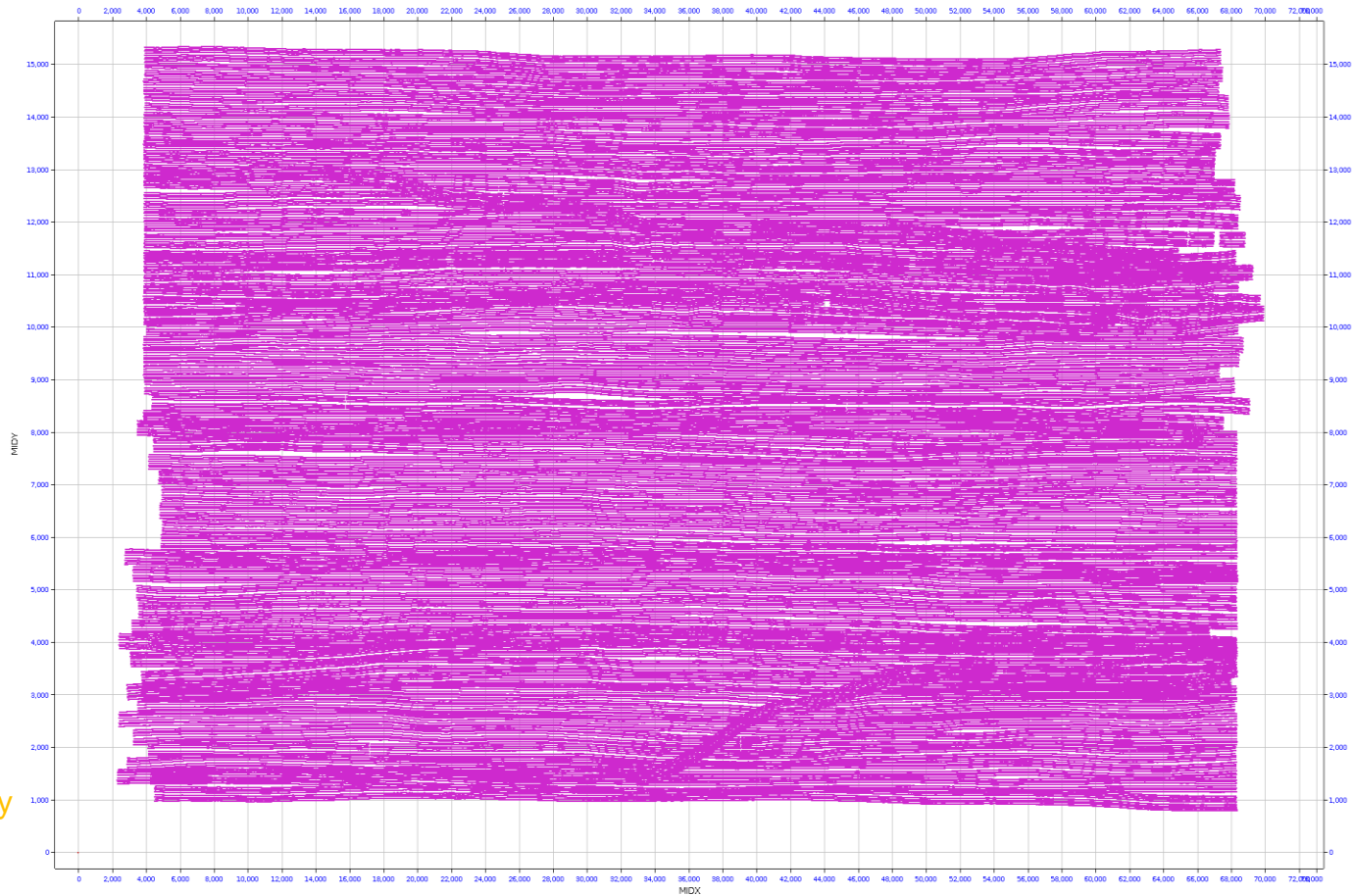


- Traces position are aligned and interpolated.



Offset 1750m Position Map **before** Regularization & Interpolation

24



- Holes are observed before regularization and interpolation.

Midy

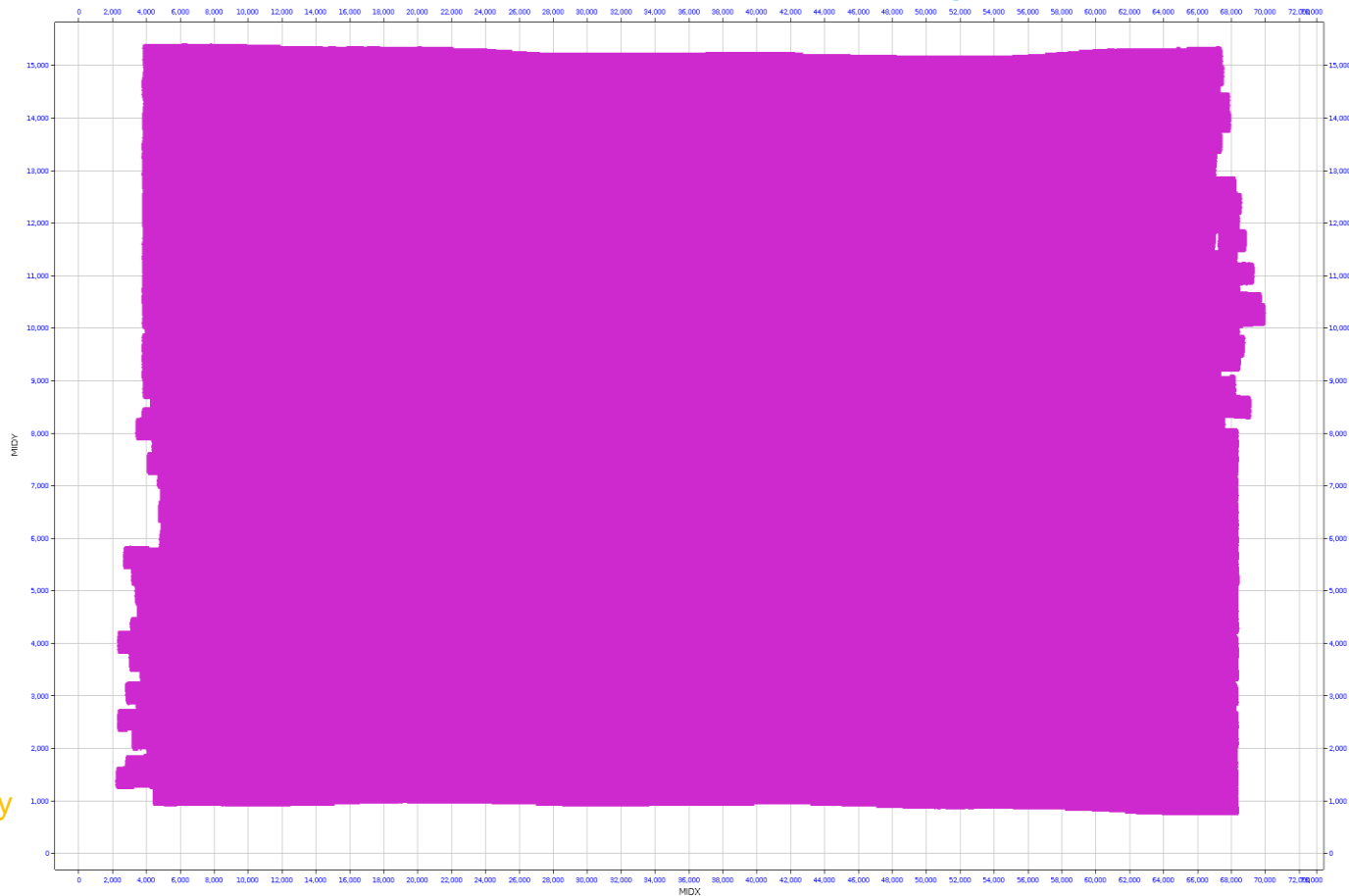


Midx



Offset 1750m Position Map **after** Regularization & Interpolation

25

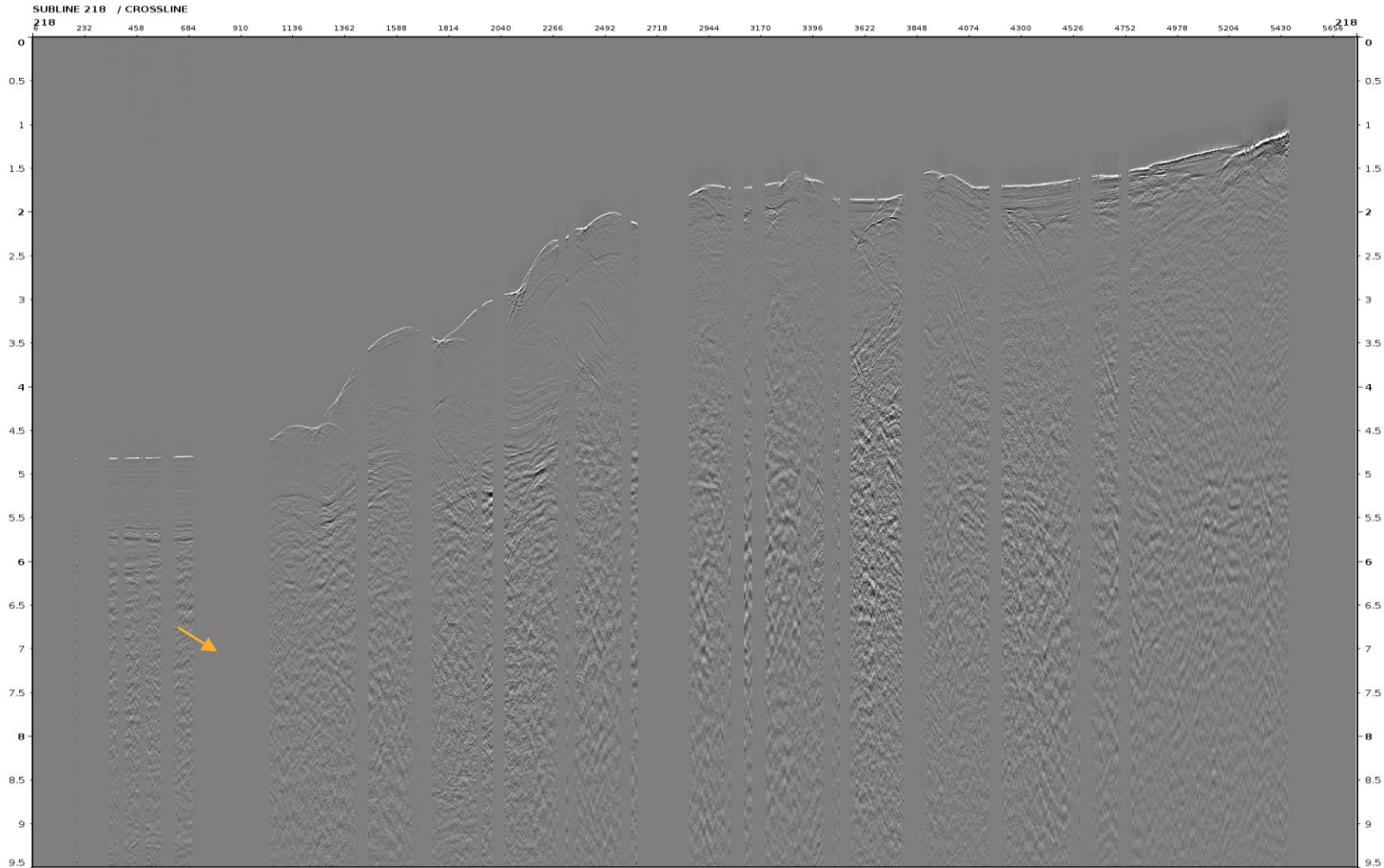


- Trace position is regularized and hole is well filled after regularization and interpolation.

Midy



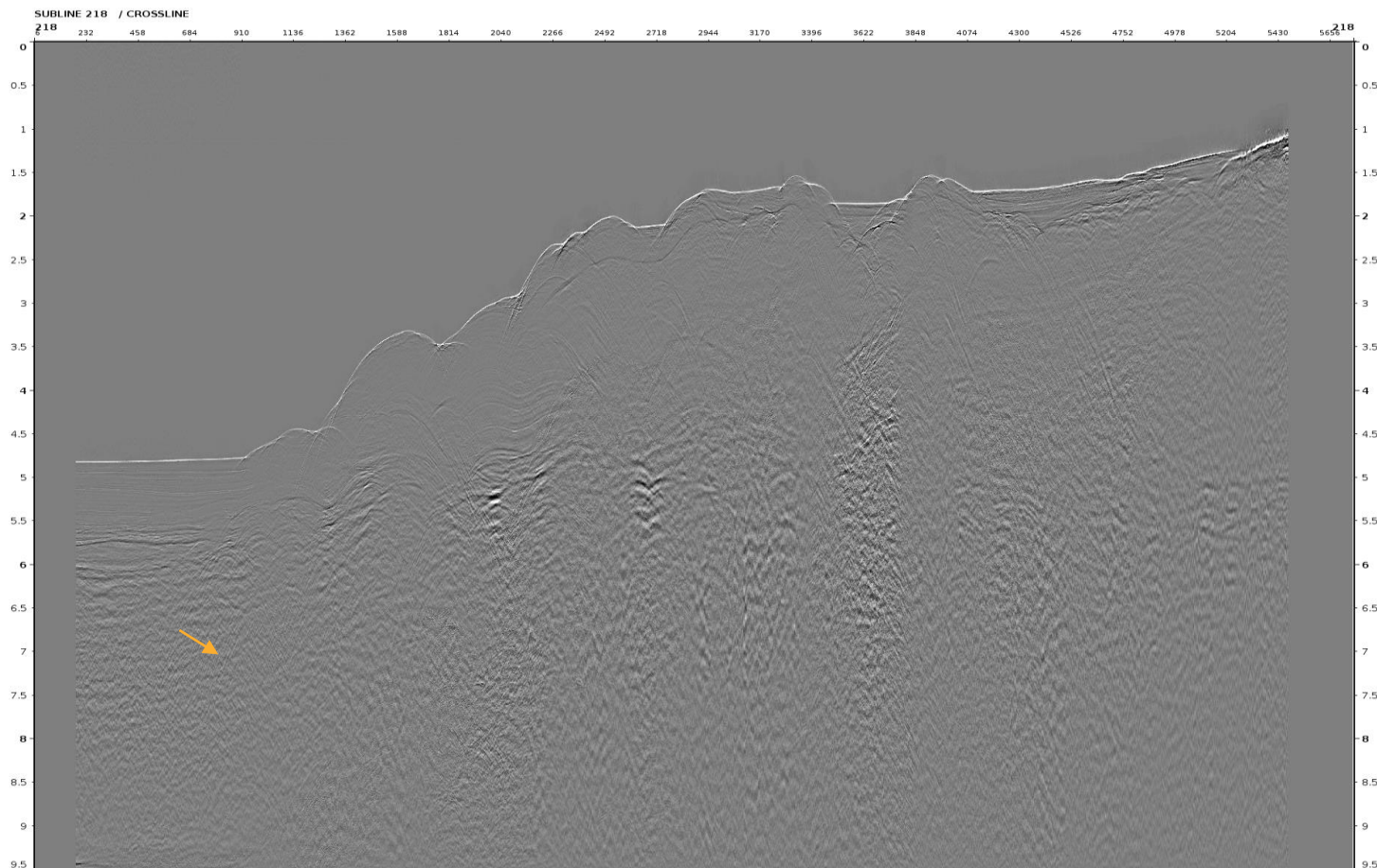
Midx





Offset 1750m IL218 **after** Regularization & Interpolation

27

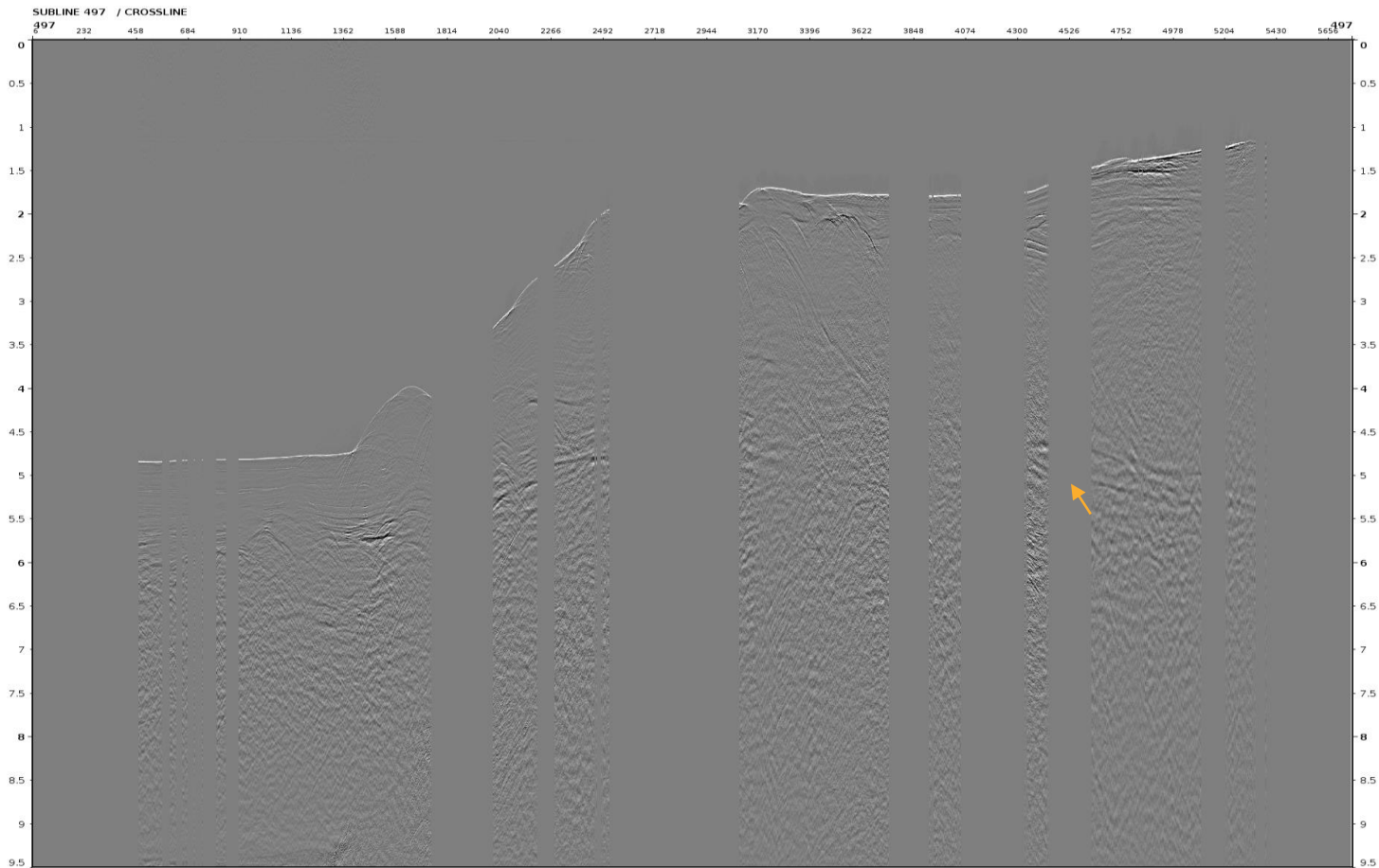


- Traces are well interpolated on subline display.



Offset 1750m IL497 before Regularization & Interpolation

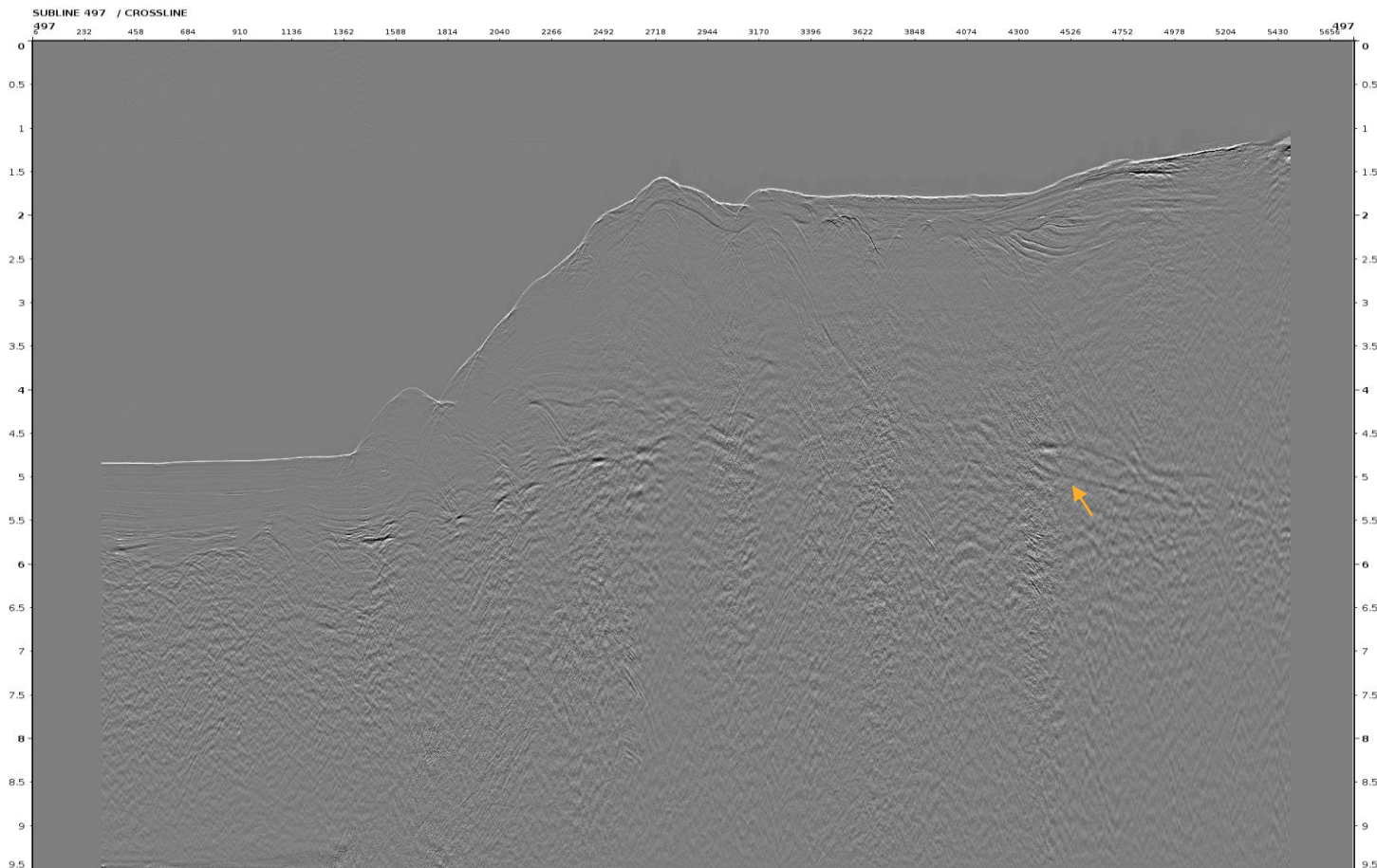
28





Offset 1750m IL497 after Regularization & Interpolation

29

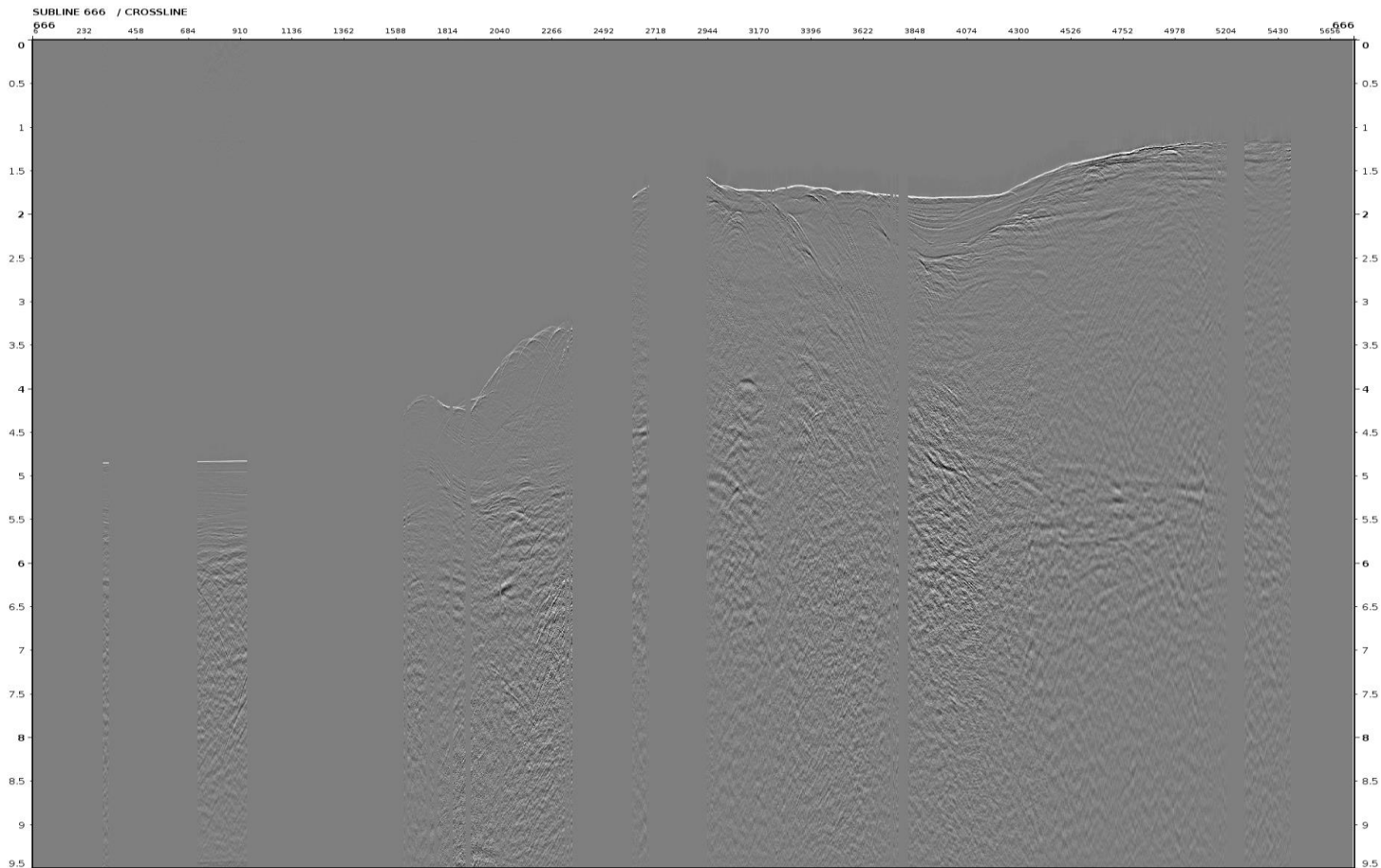


- Traces are well interpolated on subline display.



Offset 1750m IL666 before Regularization & Interpolation

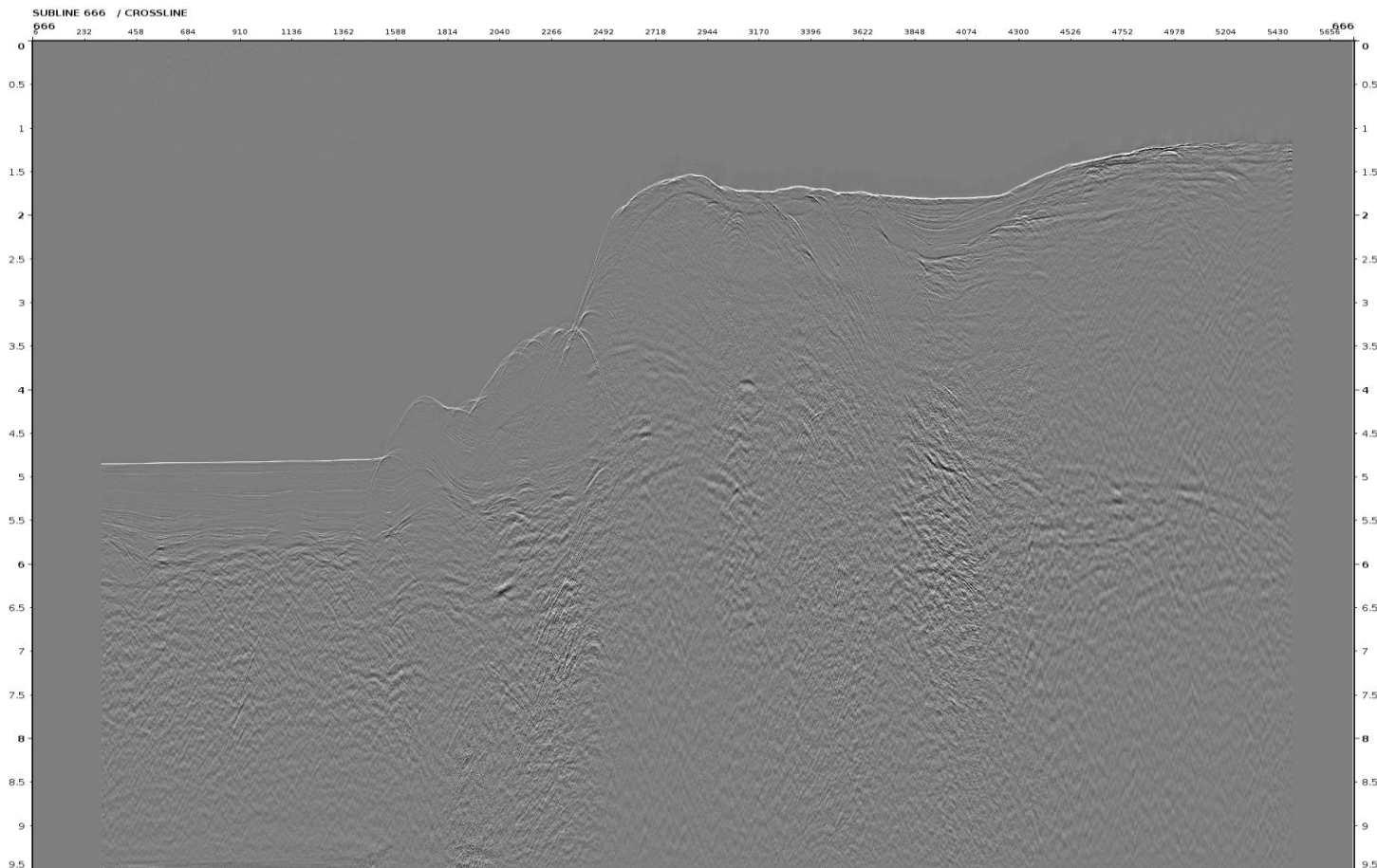
30





Offset 1750m IL666 after Regularization & Interpolation

31

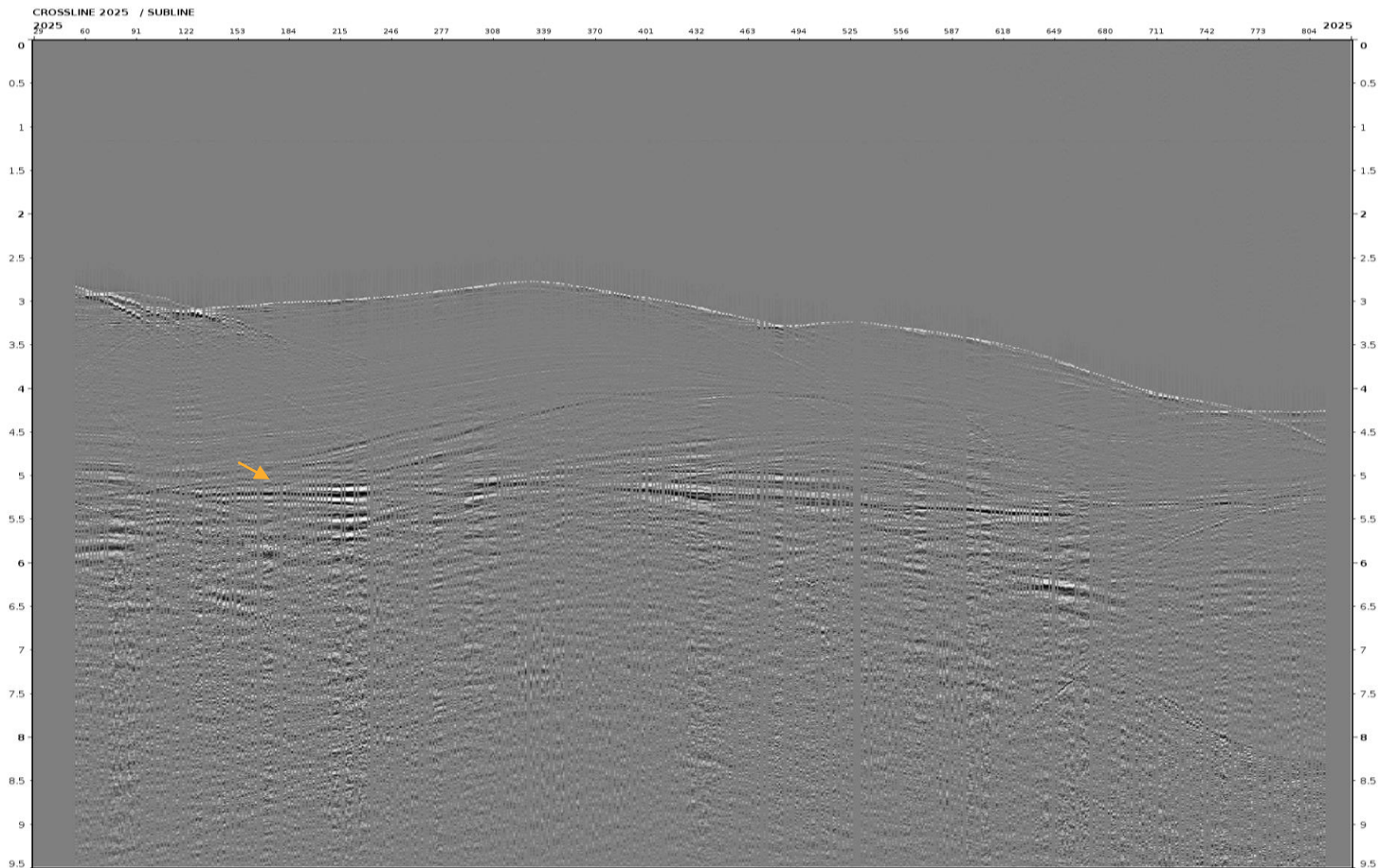


- Traces are well interpolated on subline display.



Offset 1750m XL 2025 before Regularization & Interpolation

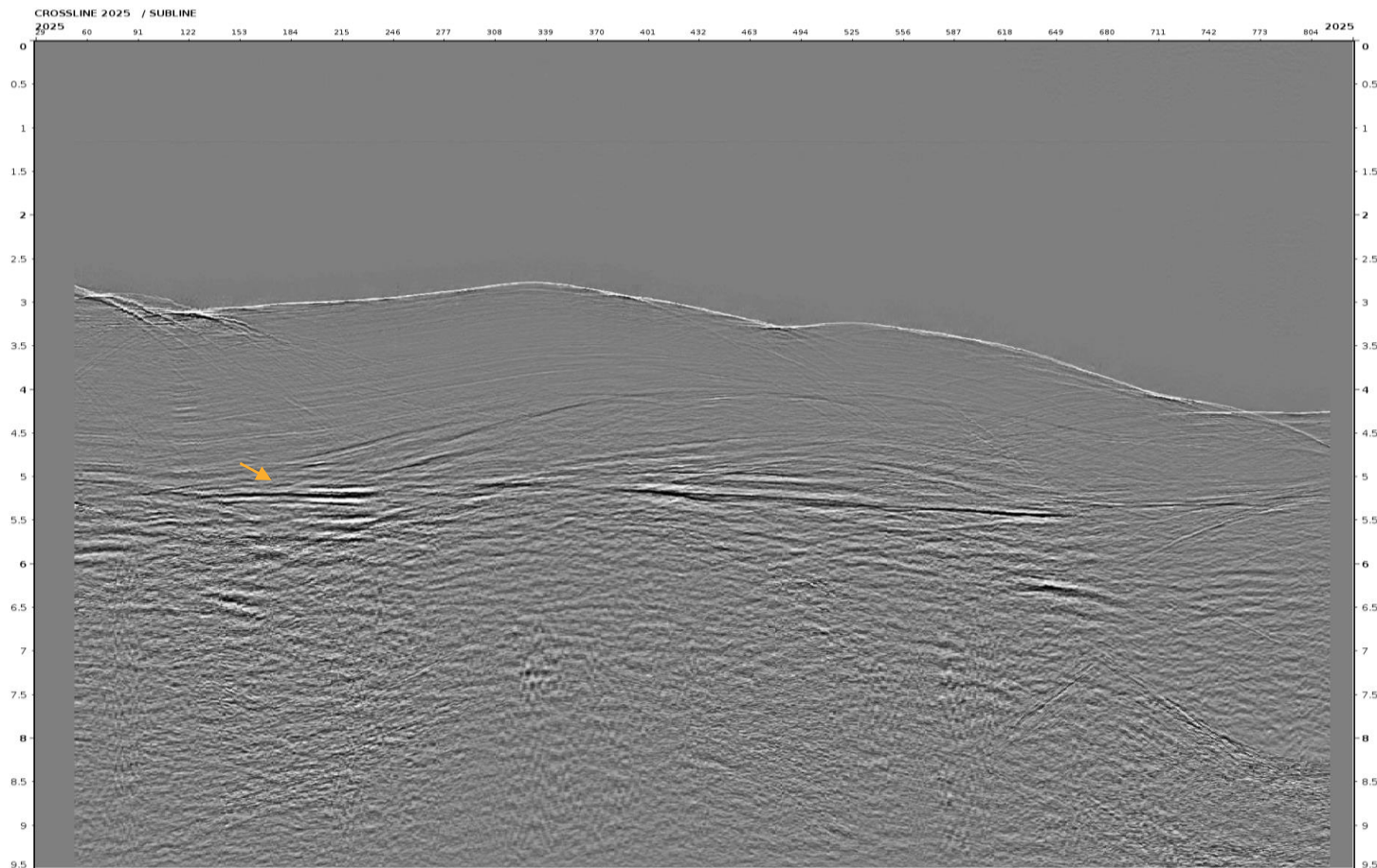
32





Offset 1750m XL 2025 after Regularization & Interpolation

33

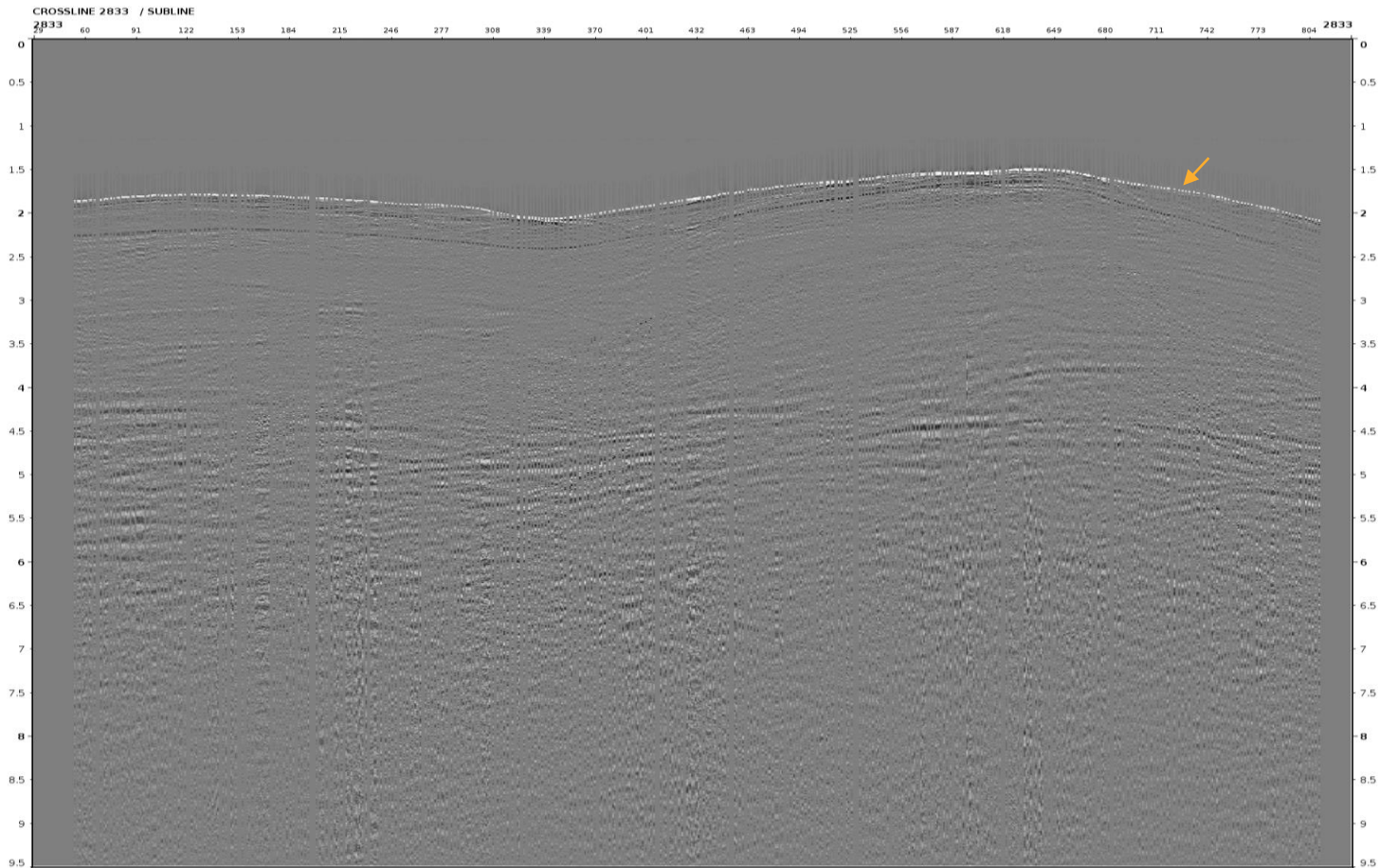


- Traces are well interpolated on crossline display.



Offset 1750m XL 2833 before Regularization & Interpolation

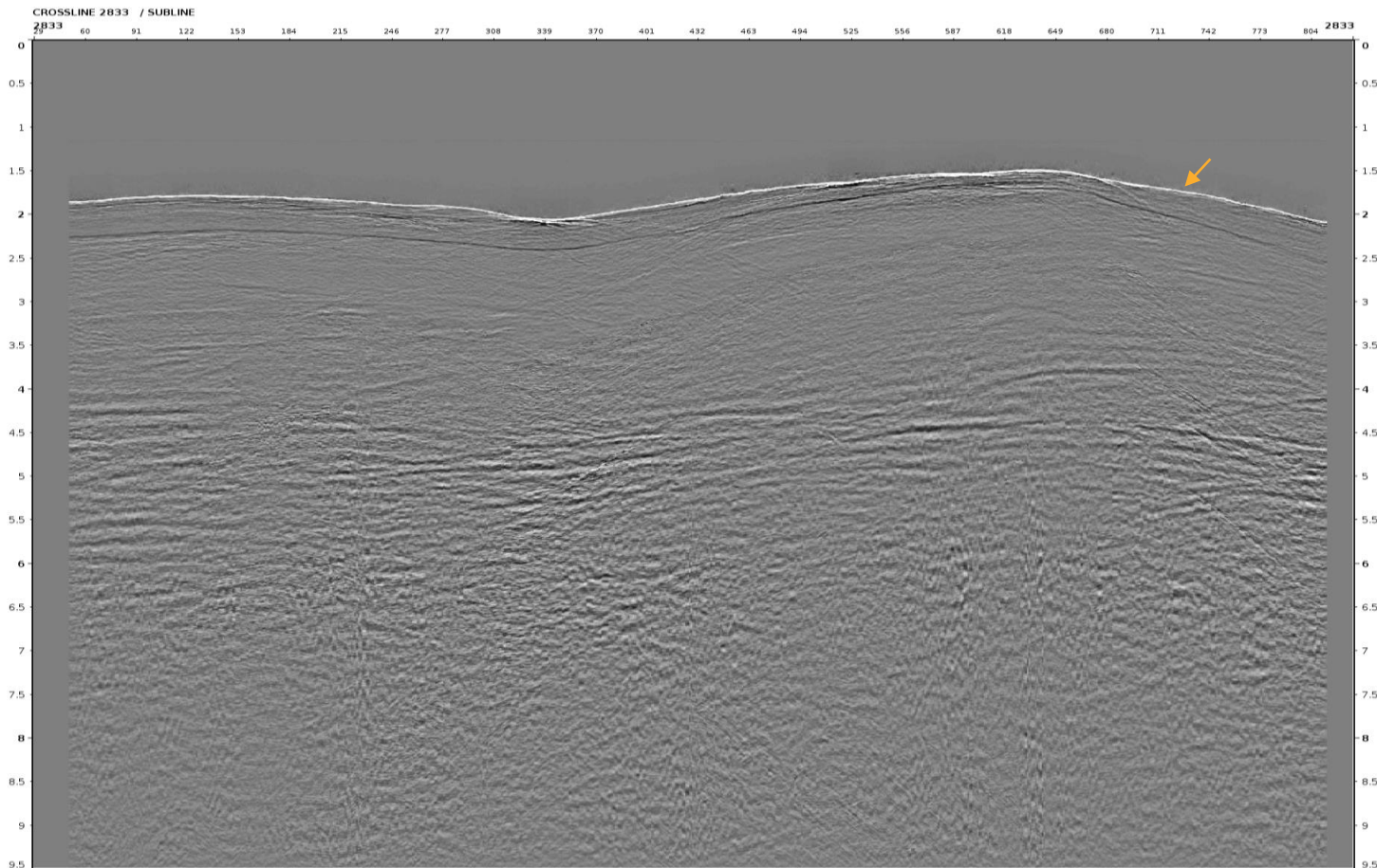
34





Offset 1750m XL 2833 after Regularization & Interpolation

35

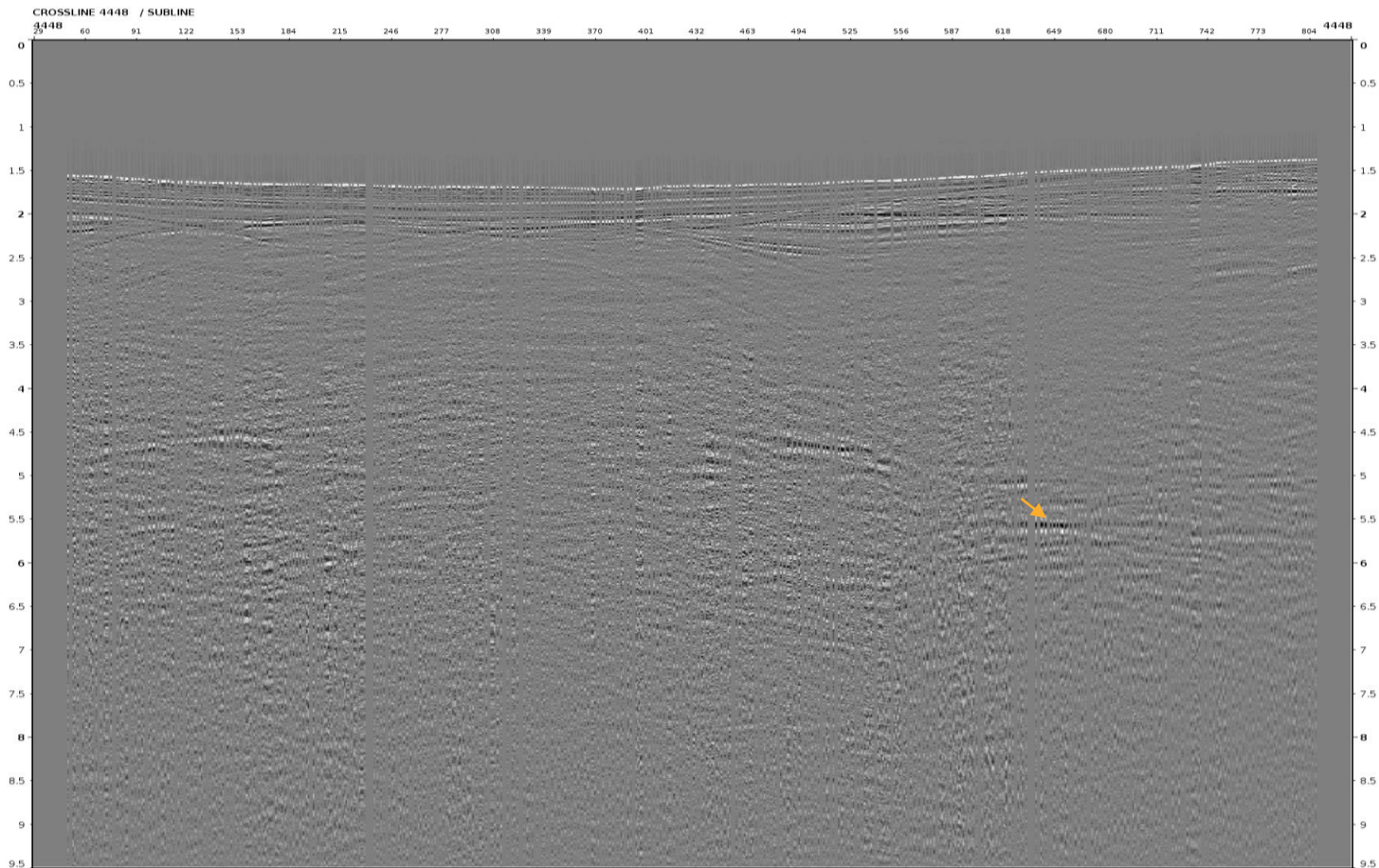


- Traces are well interpolated on crossline display.



Offset 1750m XL 4448 before Regularization & Interpolation

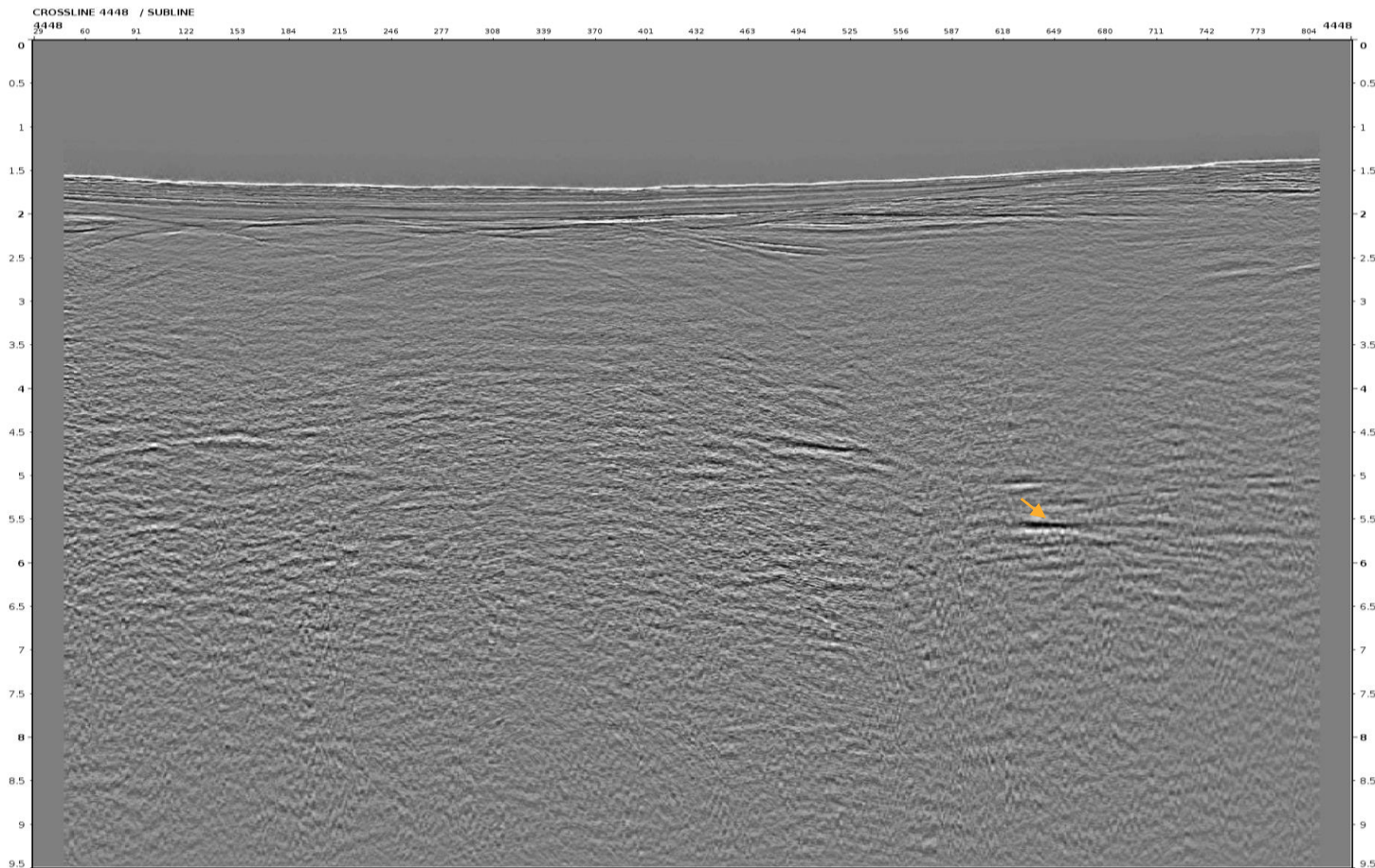
36





Offset 1750m XL 4448 after Regularization & Interpolation

37

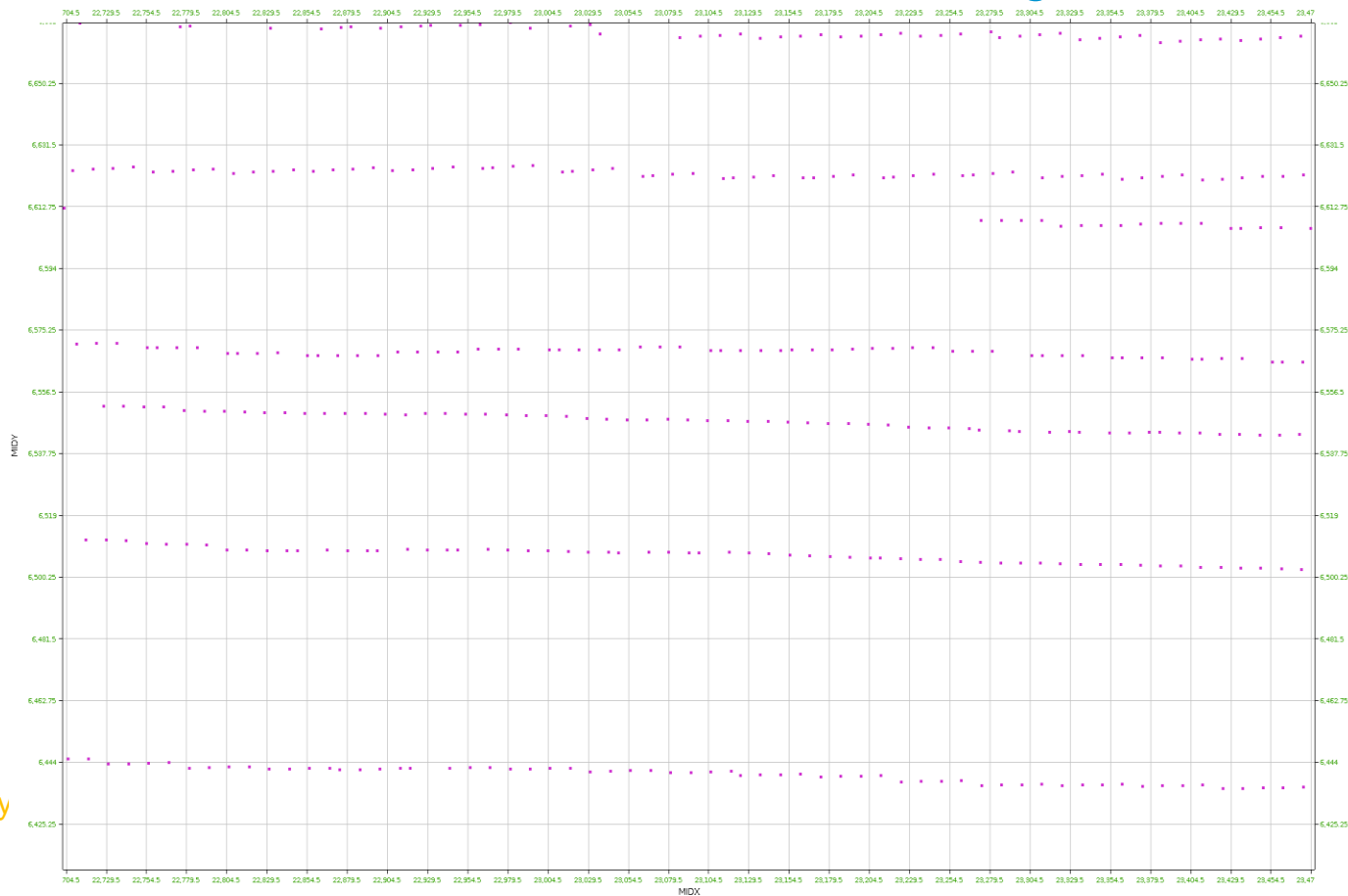


- Traces are well interpolated on crossline display.

- offset 250m
- offset 1750m
- offset 4050m



Offset 4050m Trace Position **before** Regularization & Interpolation 39



- Traces are not located at bin center

Midy



Midx



Offset 4050m Trace Position **after** Regularization & Interpolation

40

- Traces position are aligned and interpolated.



Midy

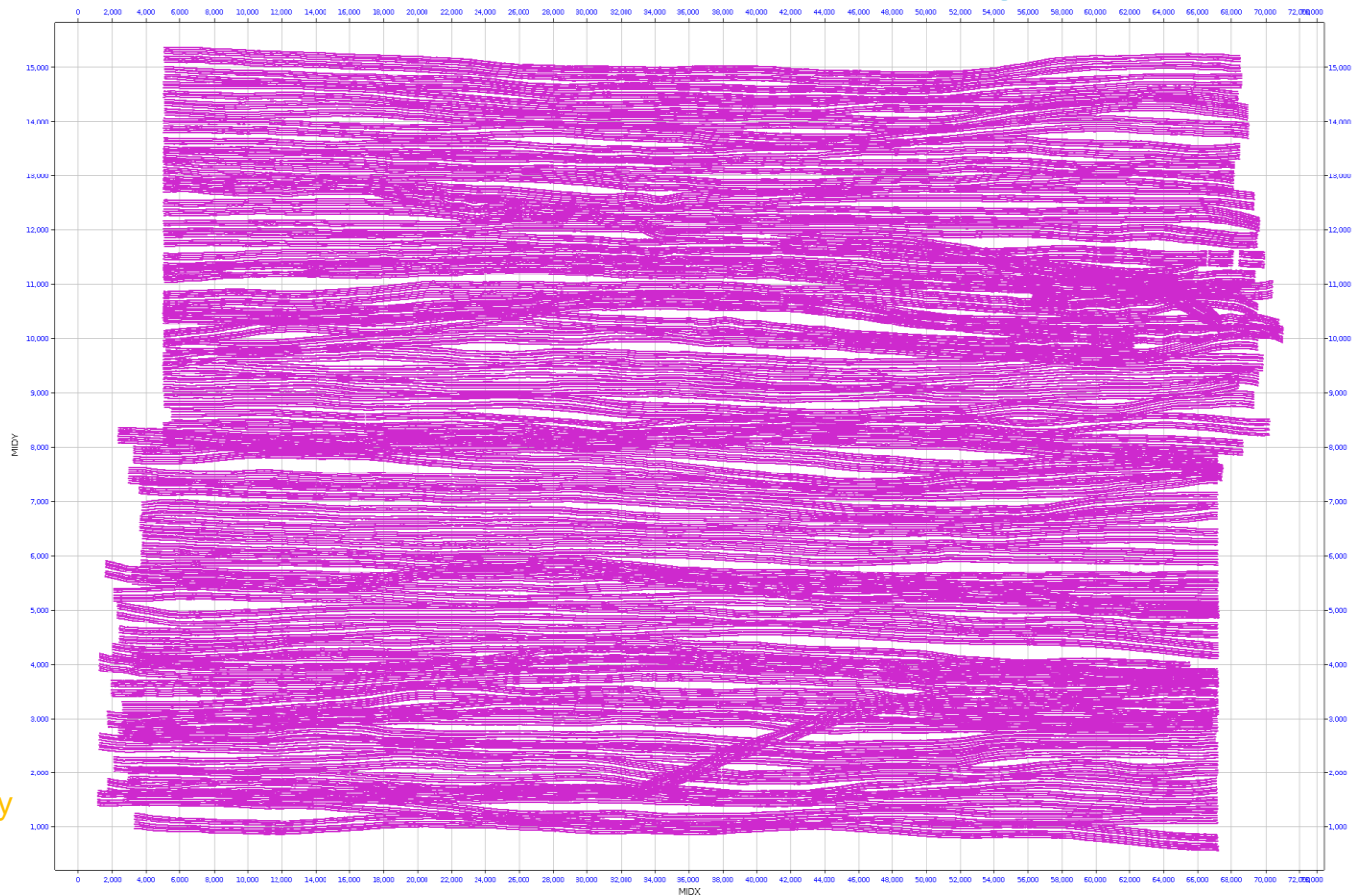


Midx



Offset 4050m Position Map **before** Regularization & Interpolation

41



- Holes are observed before regularization and interpolation.

Midy

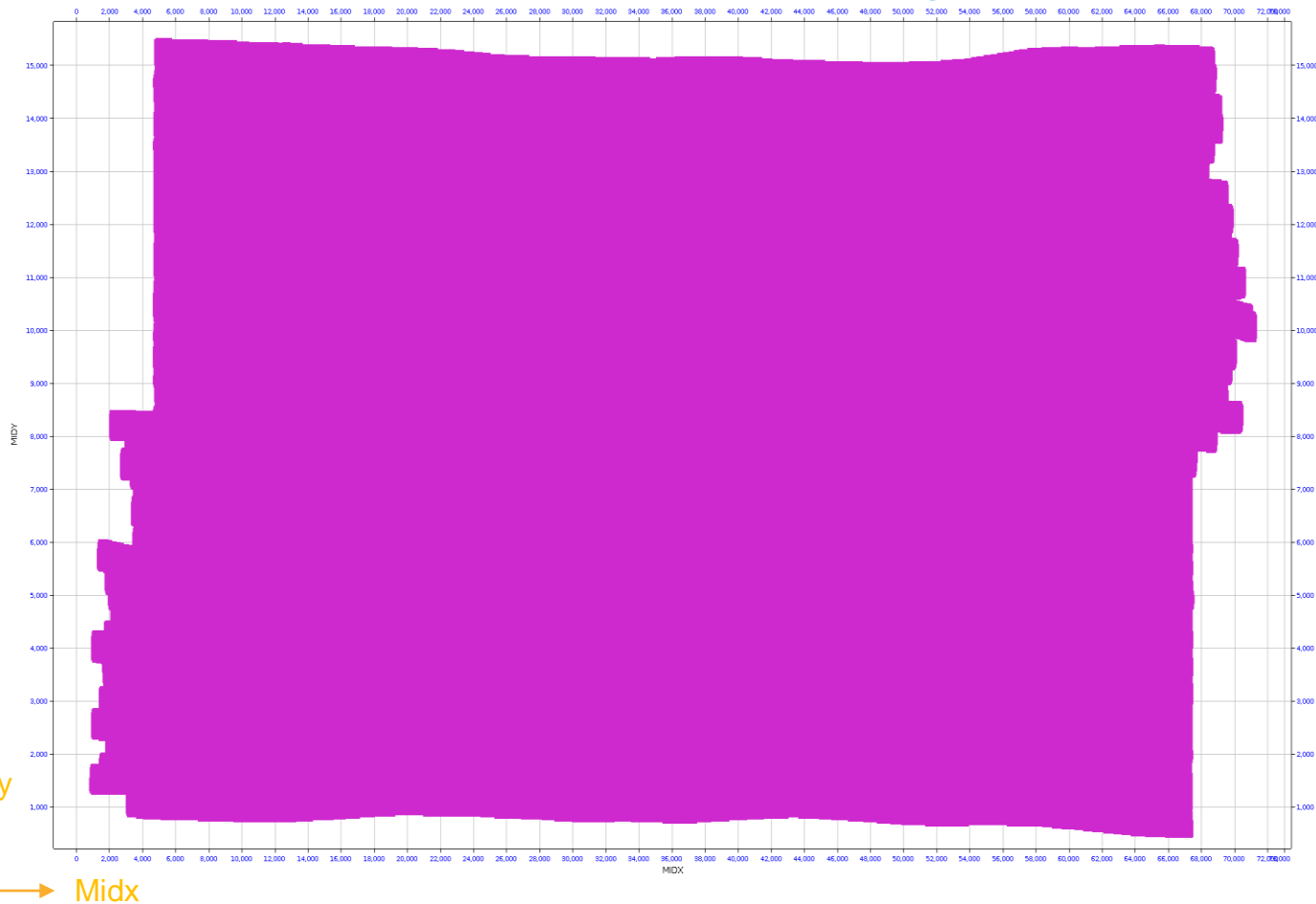


Midx



Offset 4050m Position Map **after** Regularization & Interpolation

42



- Trace position is regularized and hole is well filled after regularization and interpolation.

Midy

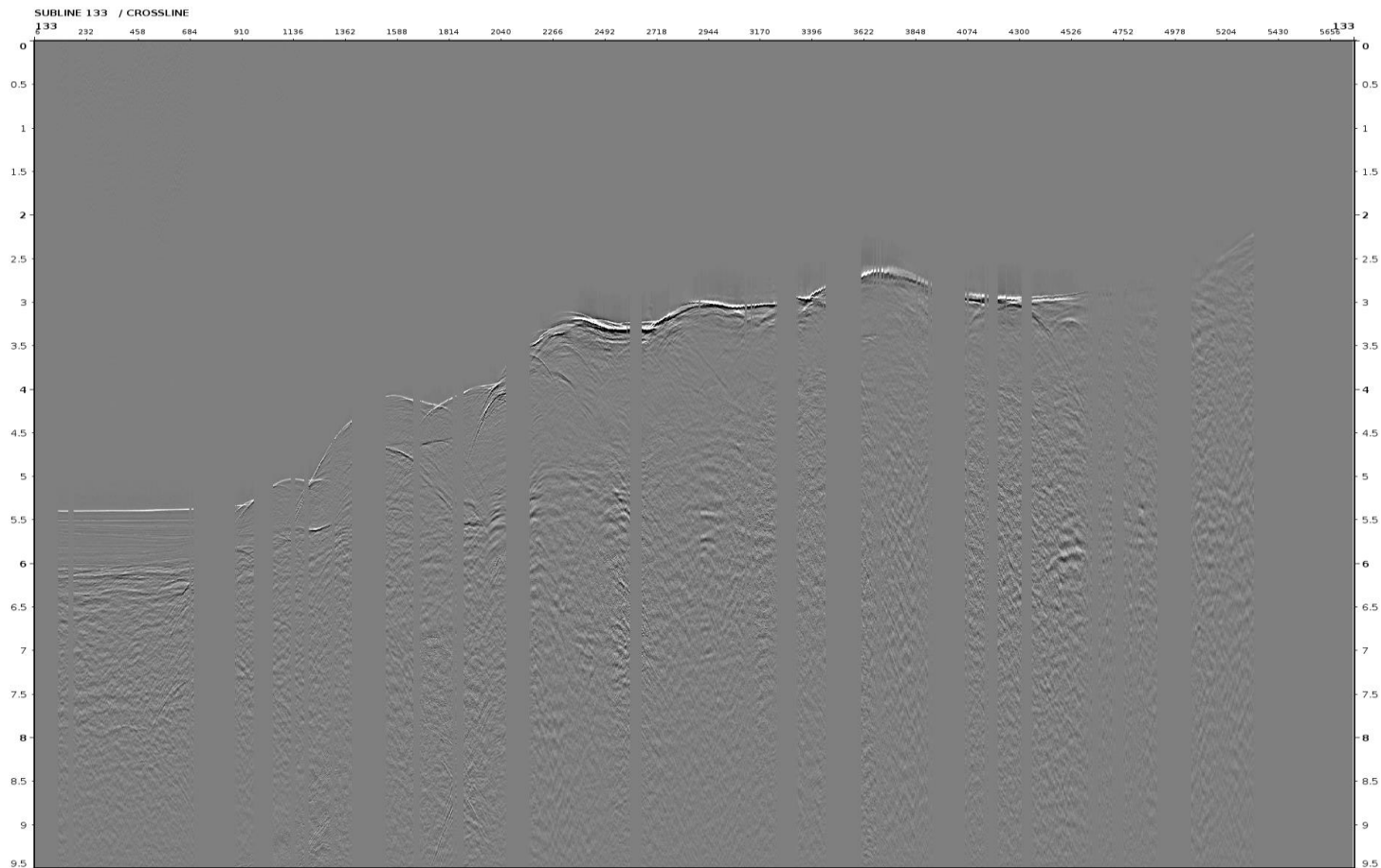


Midx



Offset 4050m IL133 before Regularization & Interpolation

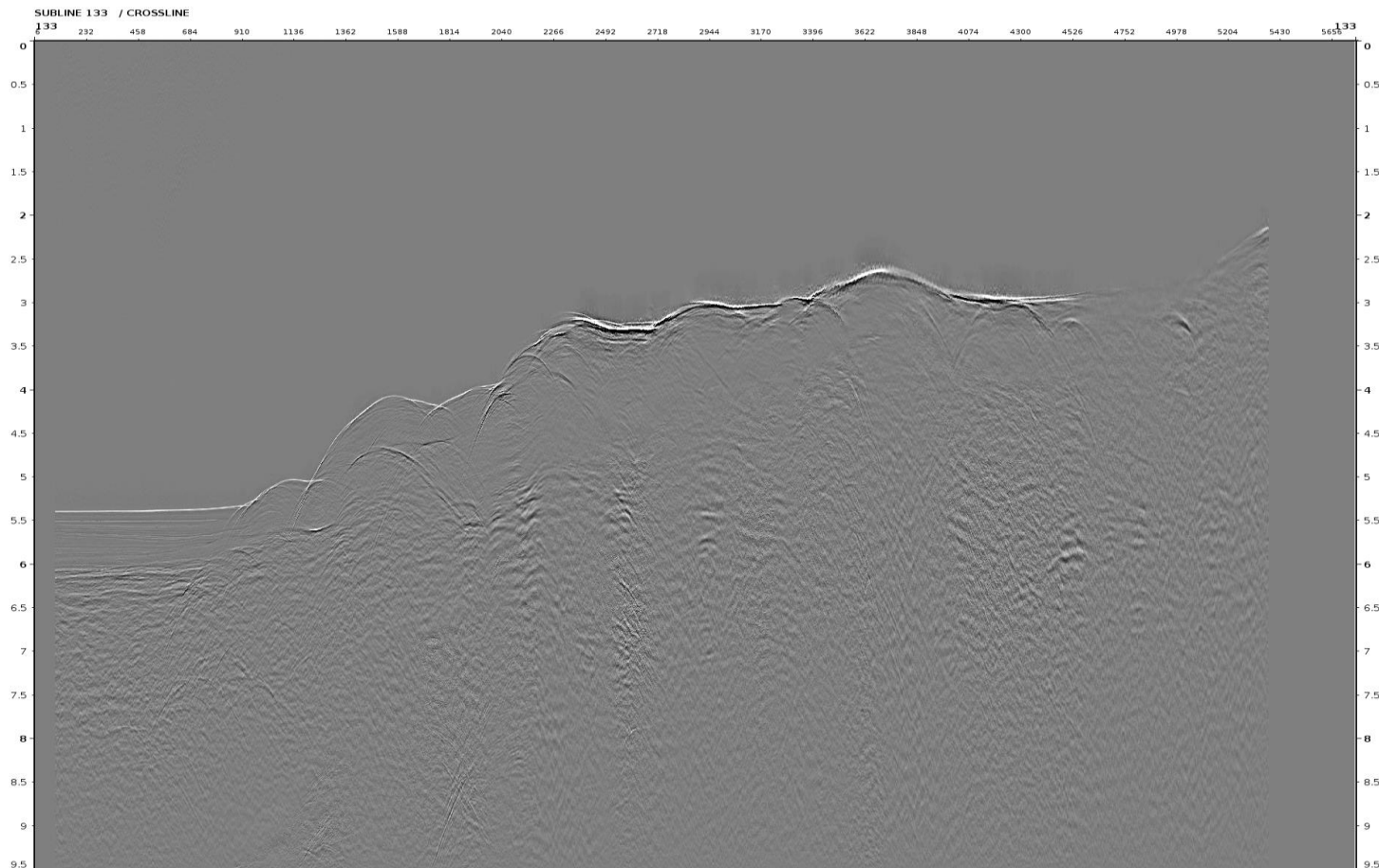
43





Offset 4050m IL133 **after** Regularization & Interpolation

44

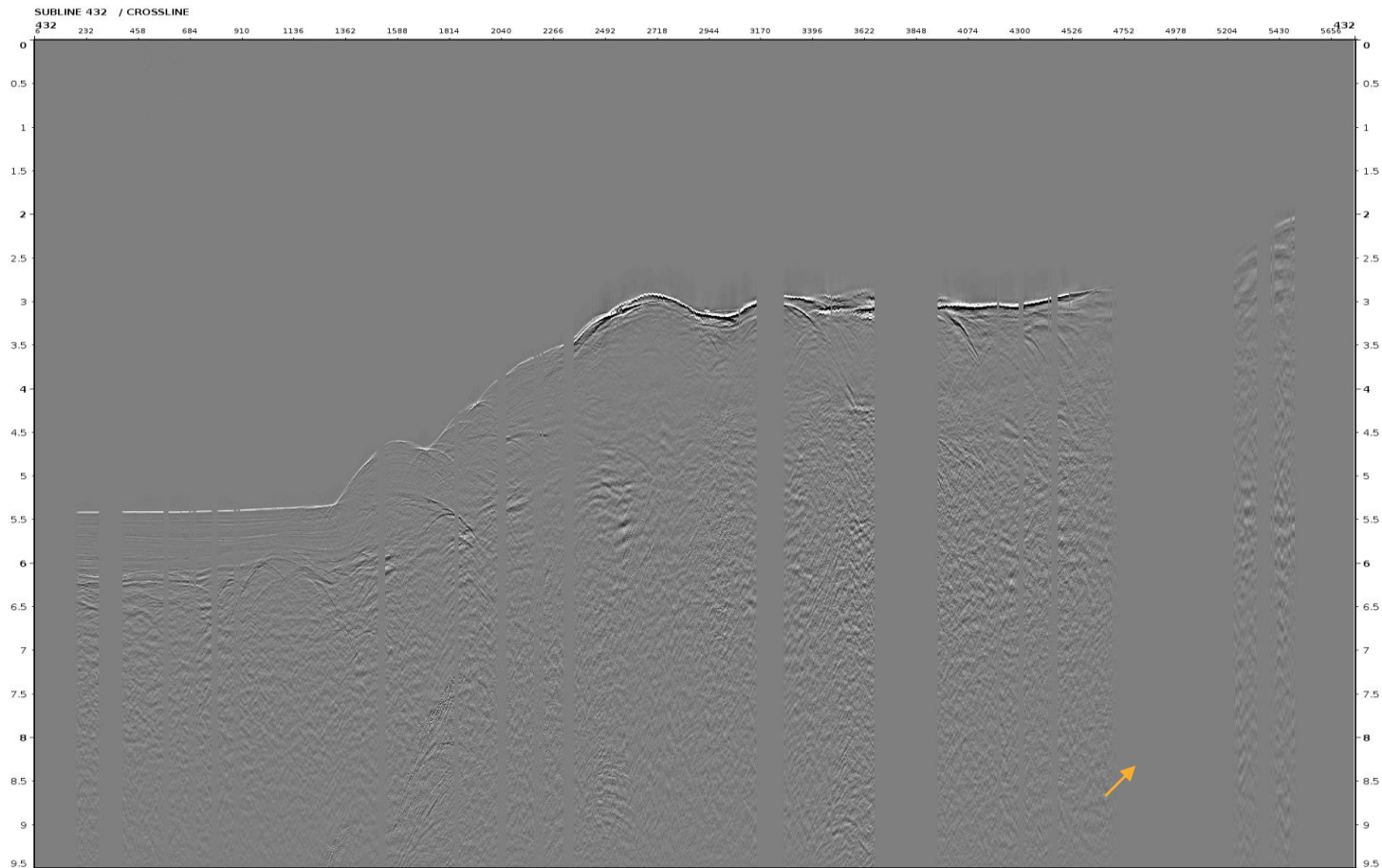


- Traces are well interpolated on subline display.



Offset 4050m IL432 before Regularization & Interpolation

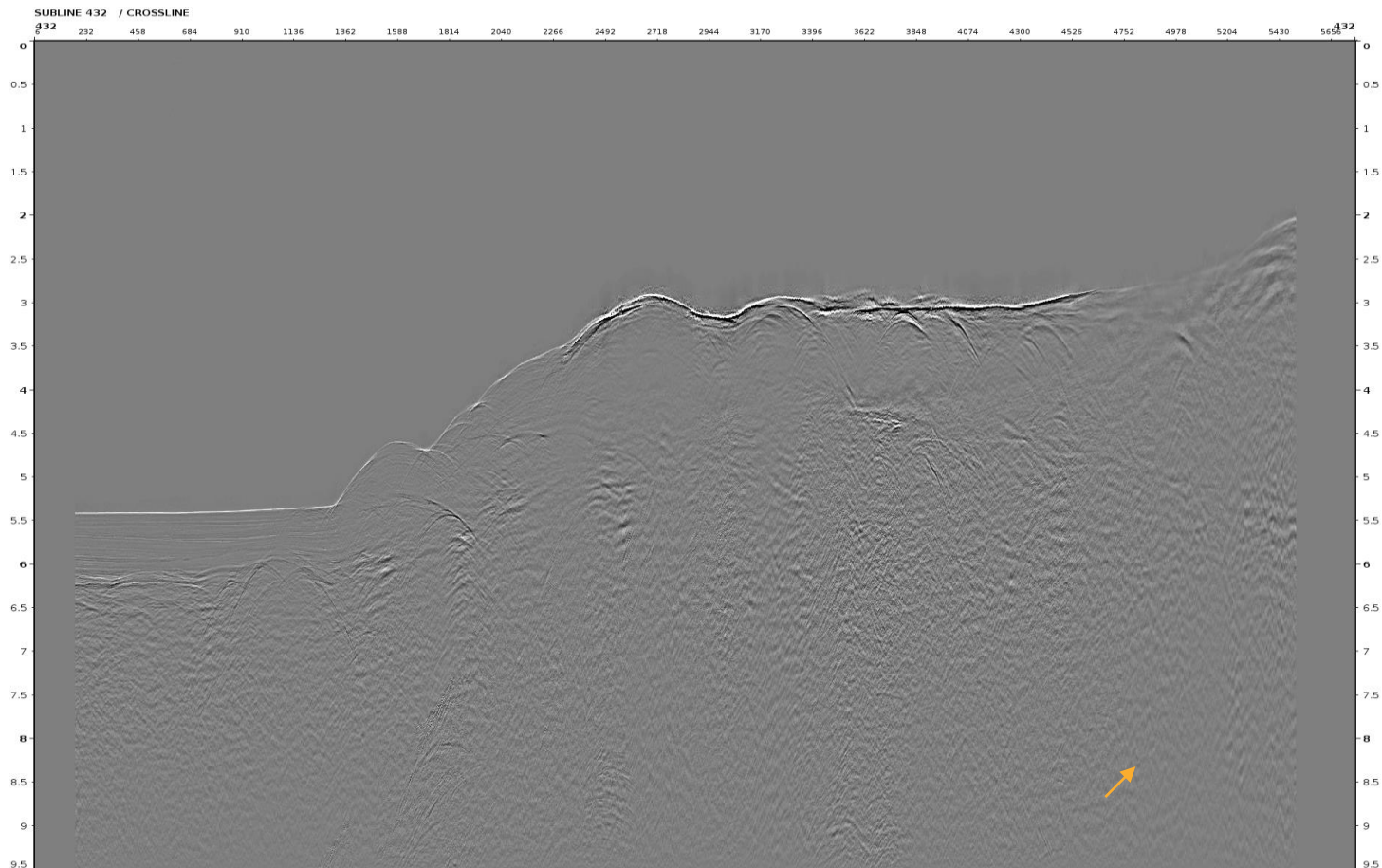
45





Offset 4050m IL432 after Regularization & Interpolation

46

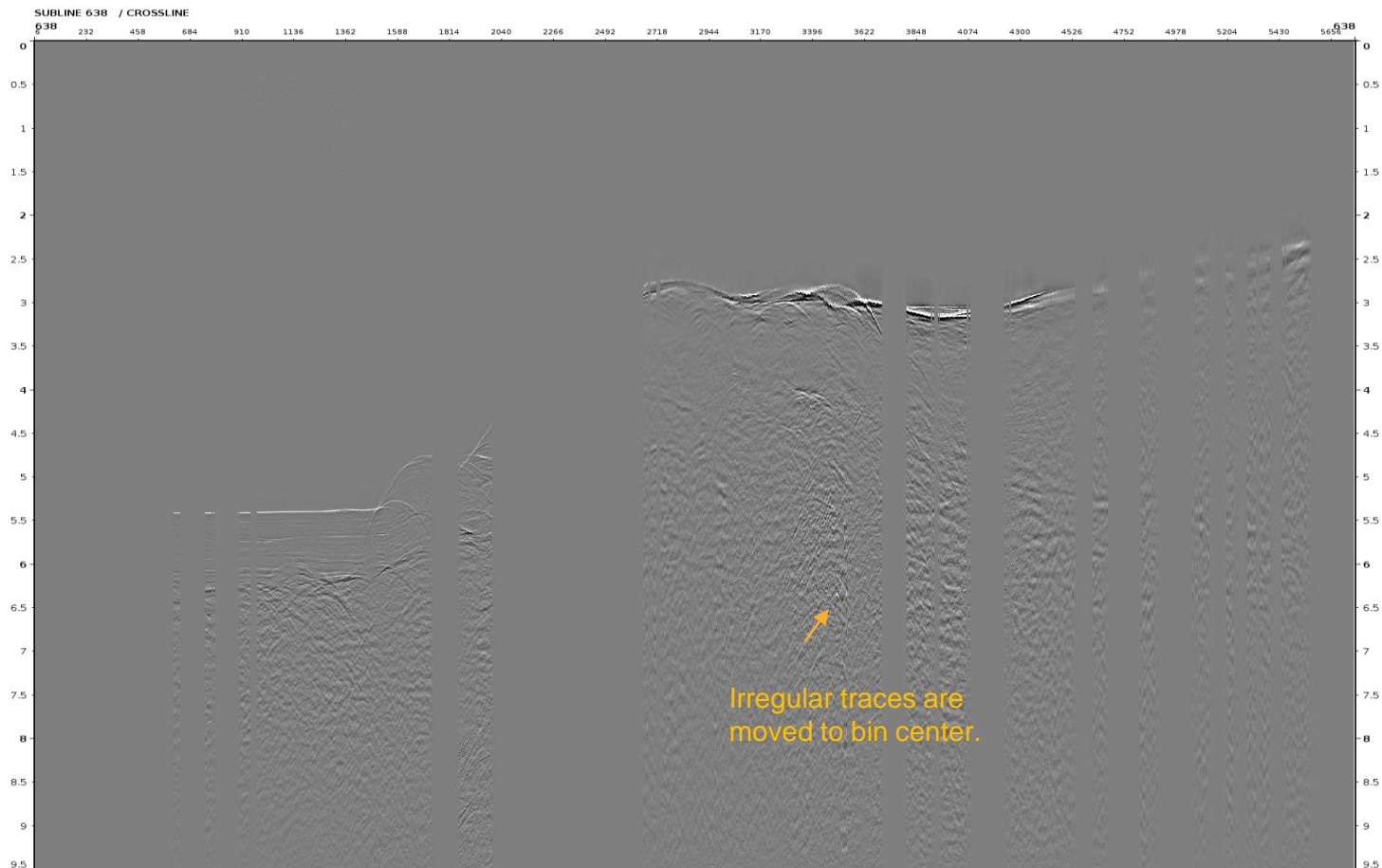


- Traces are well interpolated on subline display.



Offset 4050m IL638 before Regularization & Interpolation

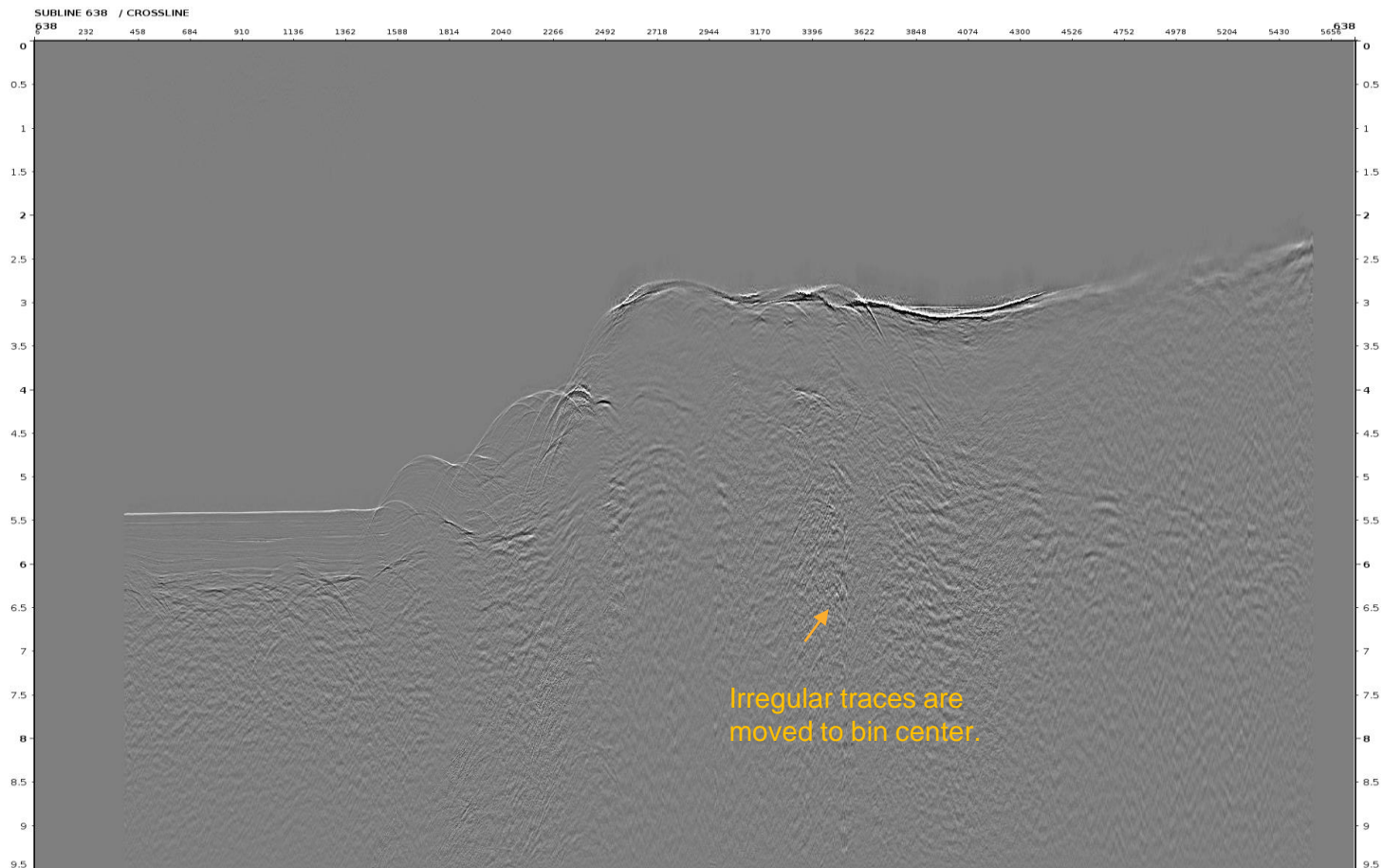
47





Offset 4050m IL638 **after** Regularization & Interpolation

48

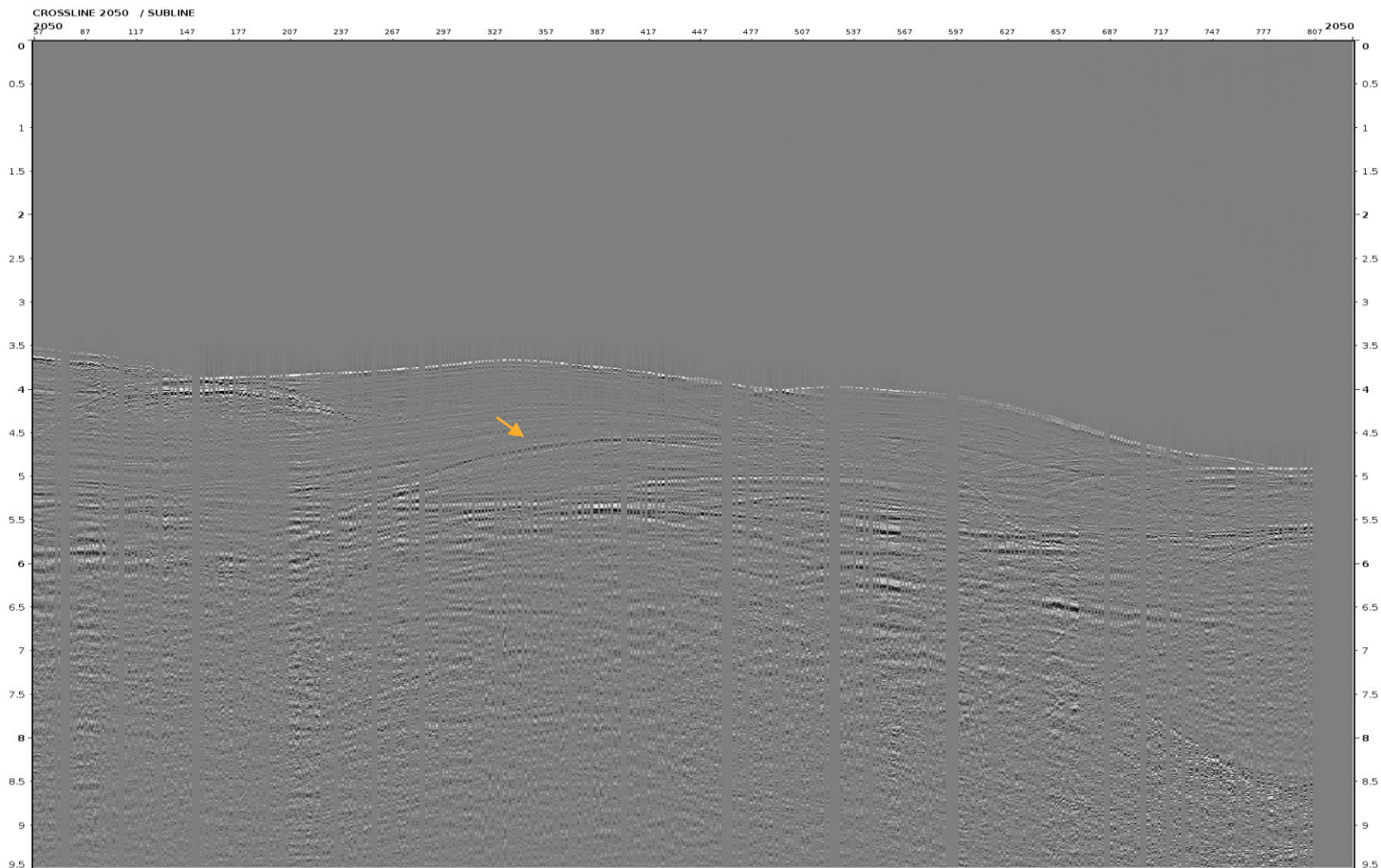


- Traces are well interpolated on subline display.



Offset 0450m XL2052 before Regularization & Interpolation

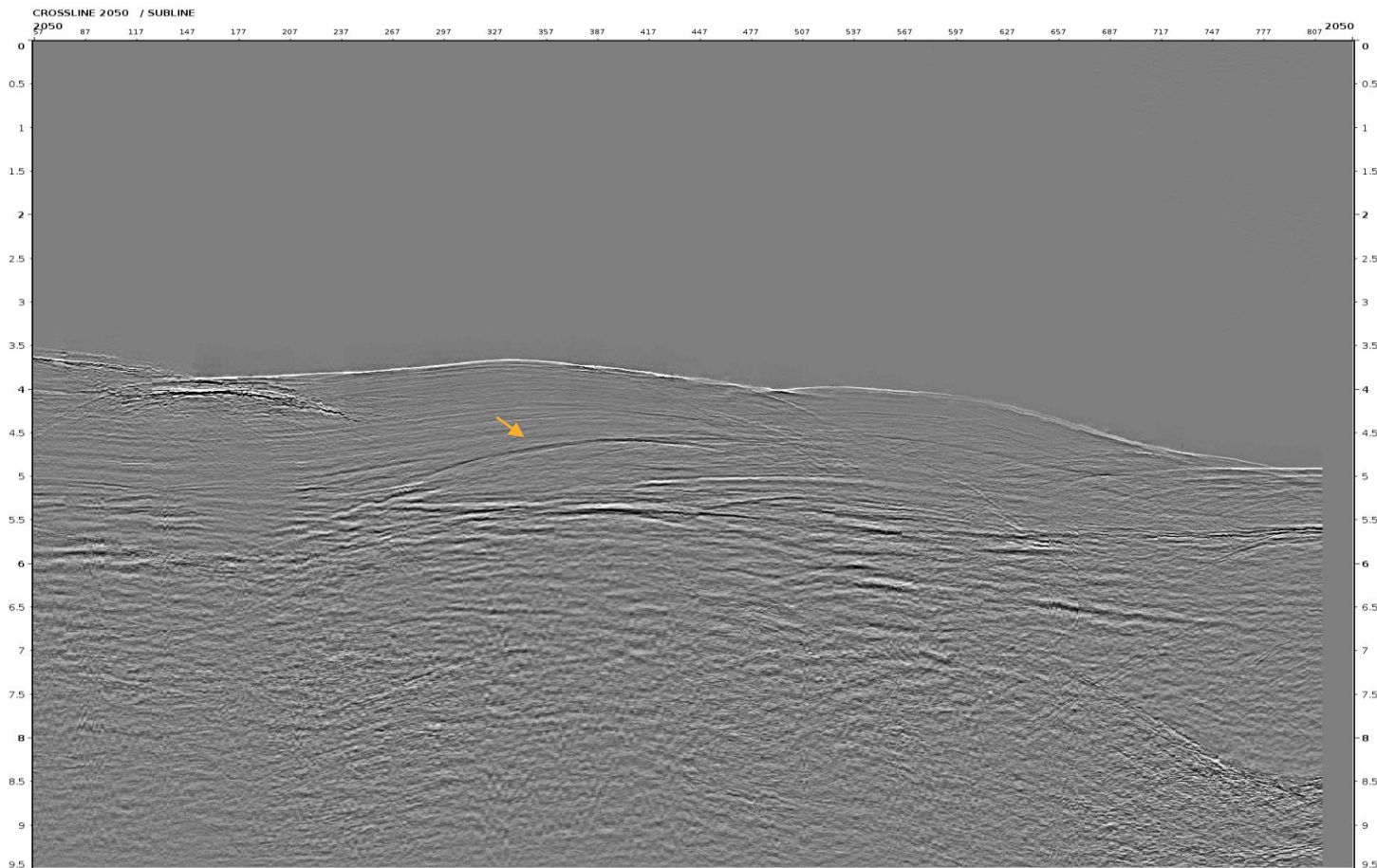
49





Offset 0450m XL2052 after Regularization & Interpolation

50

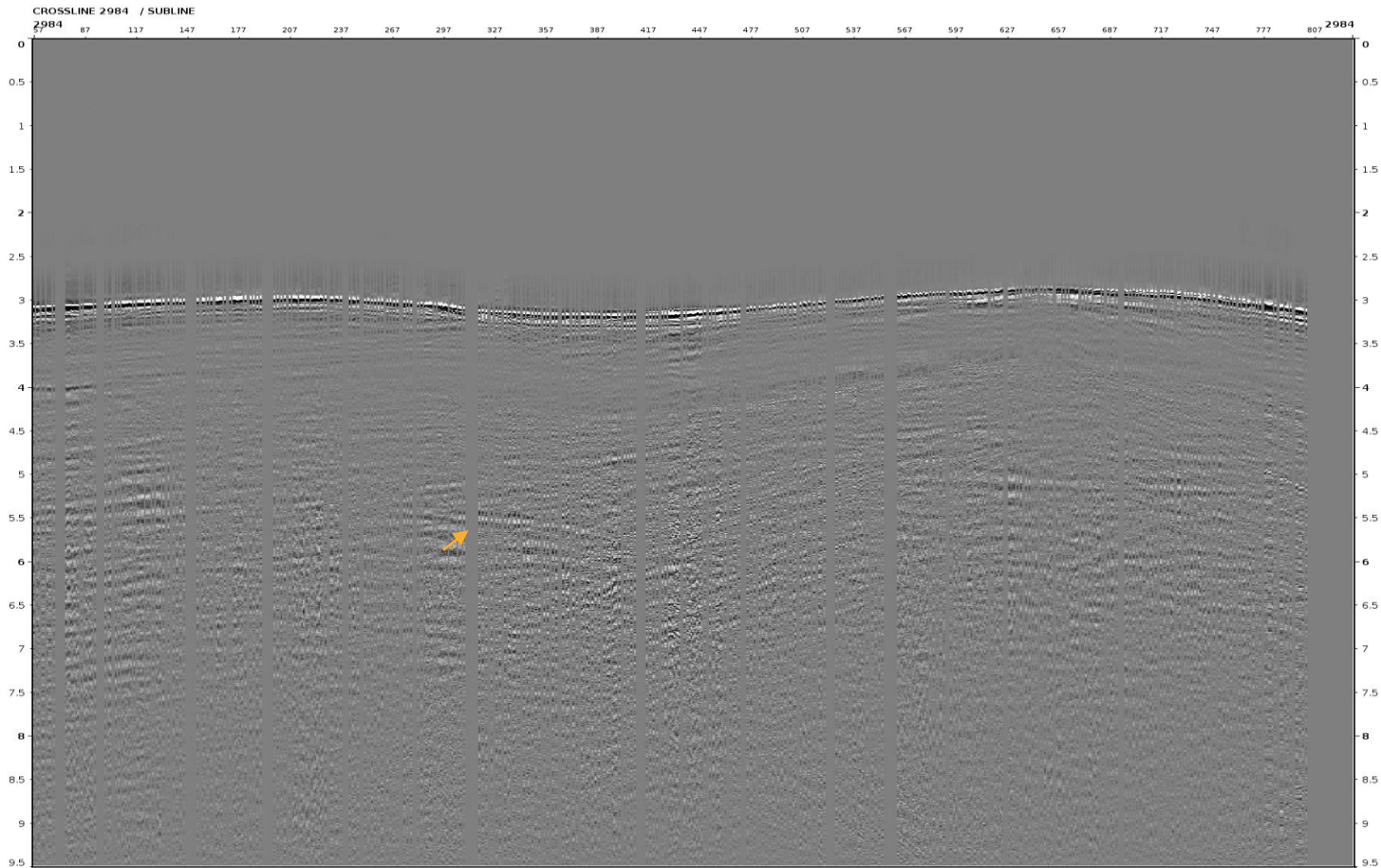


- Traces are well interpolated on crossline display.



Offset 0450m XL2984 before Regularization & Interpolation

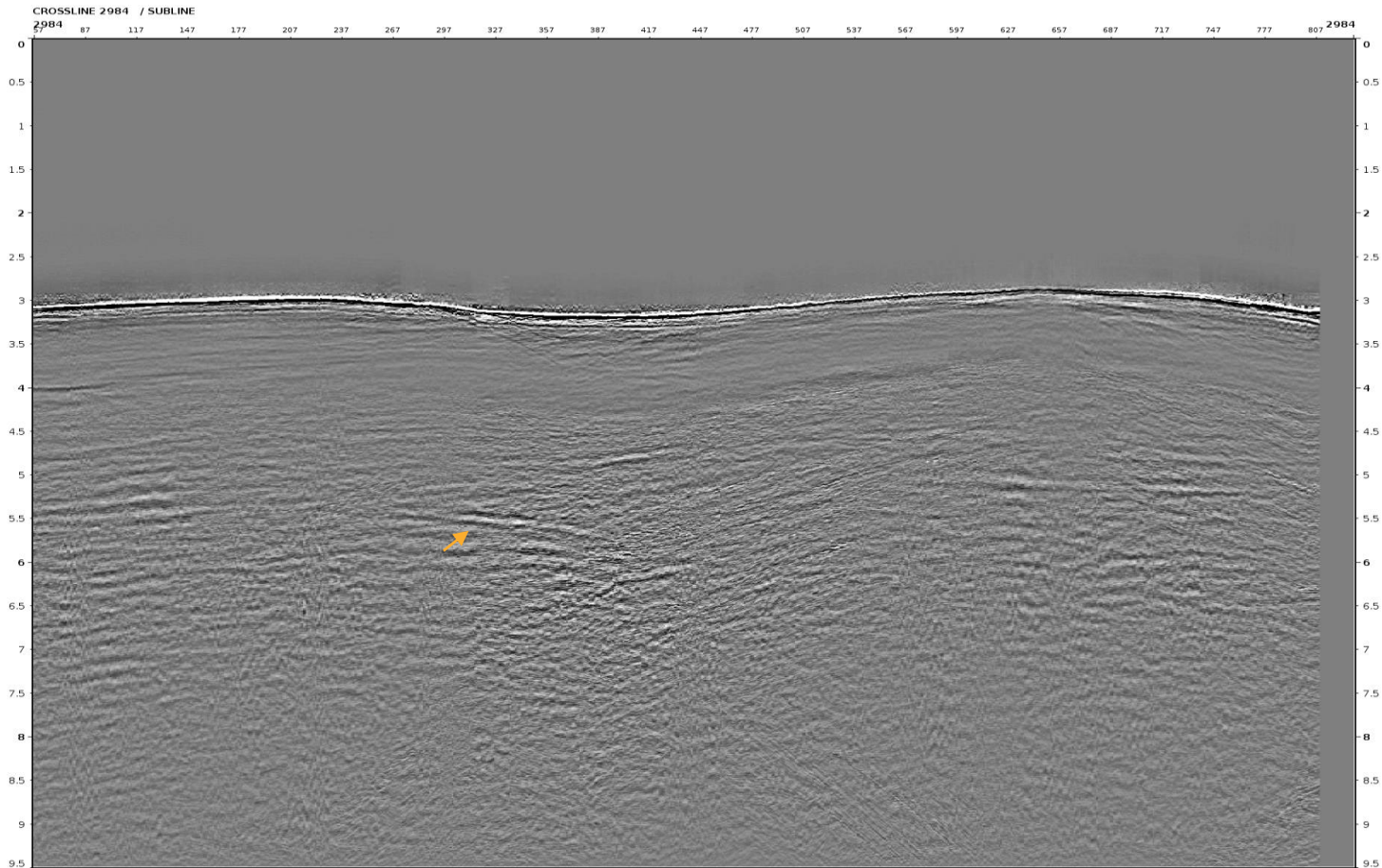
51





Offset 0450m XL2984 after Regularization & Interpolation

52

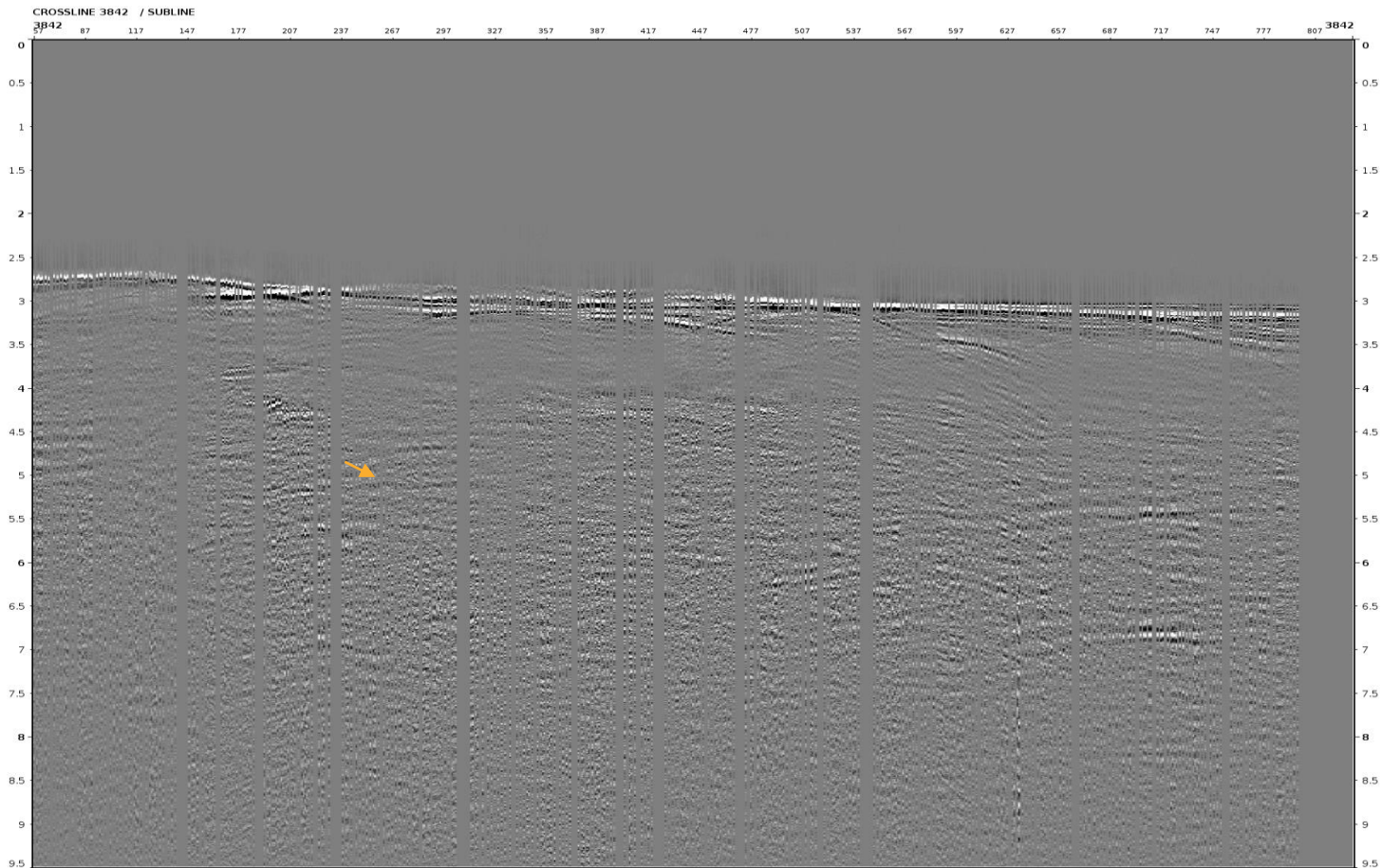


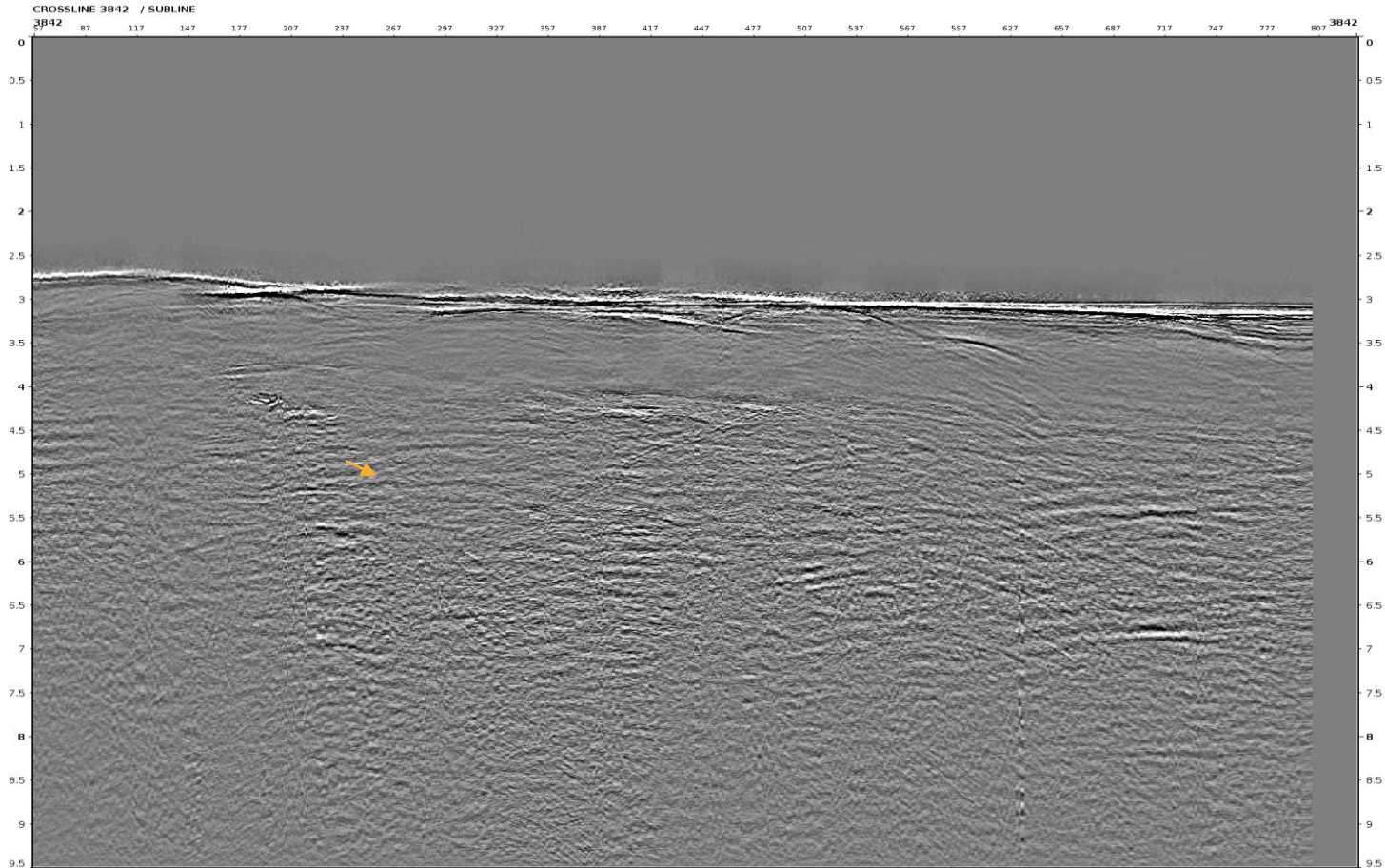
- Traces are well interpolated on crossline display.



Offset 0450m XL3842 before Regularization & Interpolation

53





- Traces are well interpolated on crossline display.