



# Common Offset Denoise

## NZ 3D Processing

*21 April 2021*

[cgg.com](http://cgg.com)



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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
20. Velocity Analysis
21. Radon Demultiple
22. Footprint Removal
23. Diffracted Multiple Removal
24. [Common Offset Denoise](#)

- **Objective:**

To attenuate noise on common offset domain.

- **Procedure:**

Attenuation is tested in Subline & Crossline direction.

Low frequency (0-6hz) random noise is attenuated on whole survey\*.

High frequency (8-30hz) random noise is attenuated at deep part (below 7000ms)\*.

Strong dipping noise through crossline direction is attenuated.

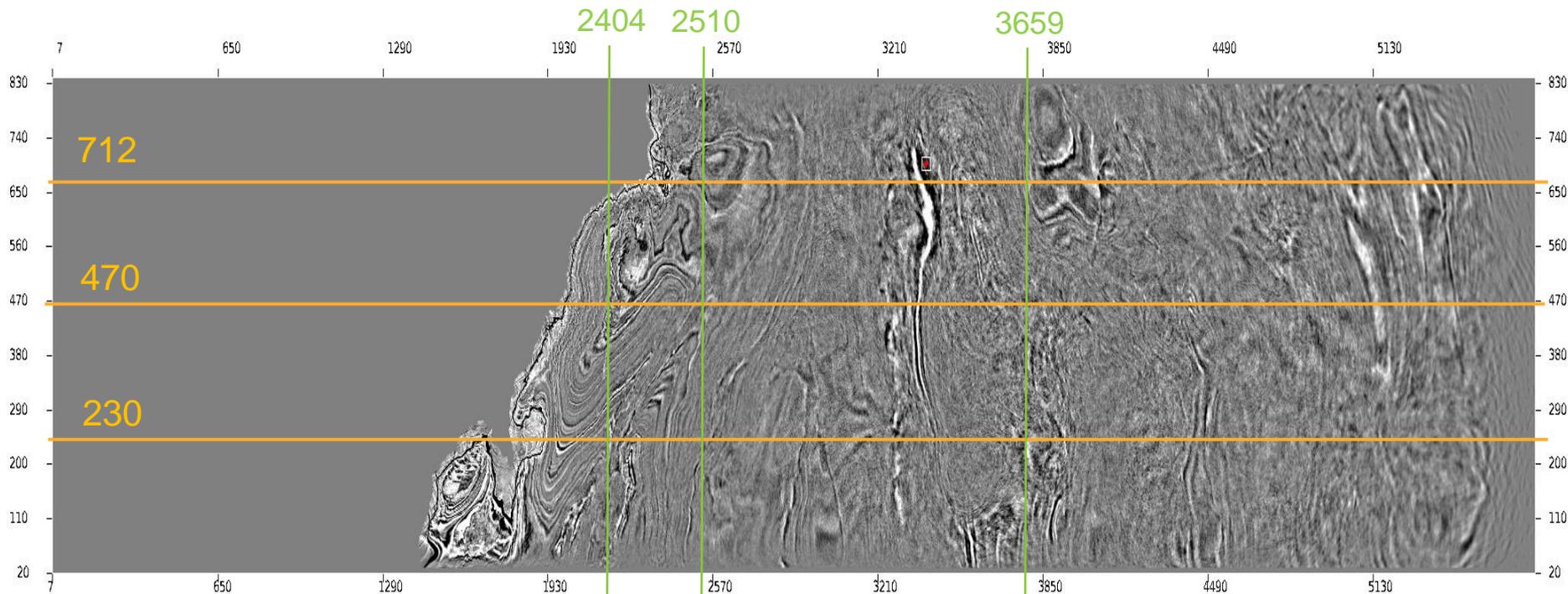
- **Display:**

Stack, common offset (subline, crossline).

- **Observation & Recommendation:**

Noise energy on common offset is attenuated and primaries are untouched. It's recommended to apply before migration.

\* Sternfels, R., Viguier, G., Gondoin, R. and Le Meur, D, 2015, Multidimensional simultaneous random plus erratic noise attenuation and interpolation for seismic data by joint low-rank and sparse inversion: Geophysics, 80, No 6, WD129-WD141.



Subline

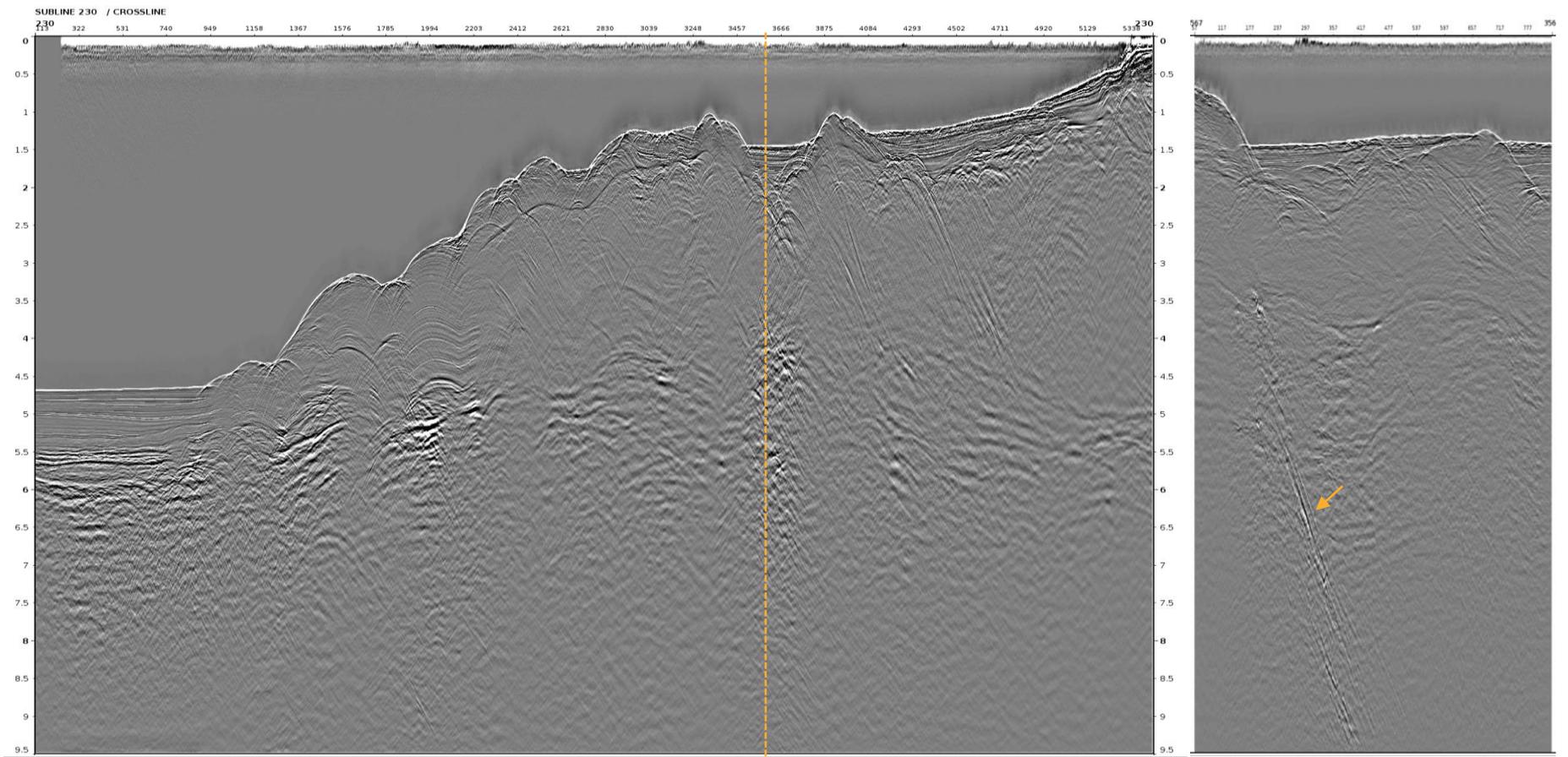


Crossline

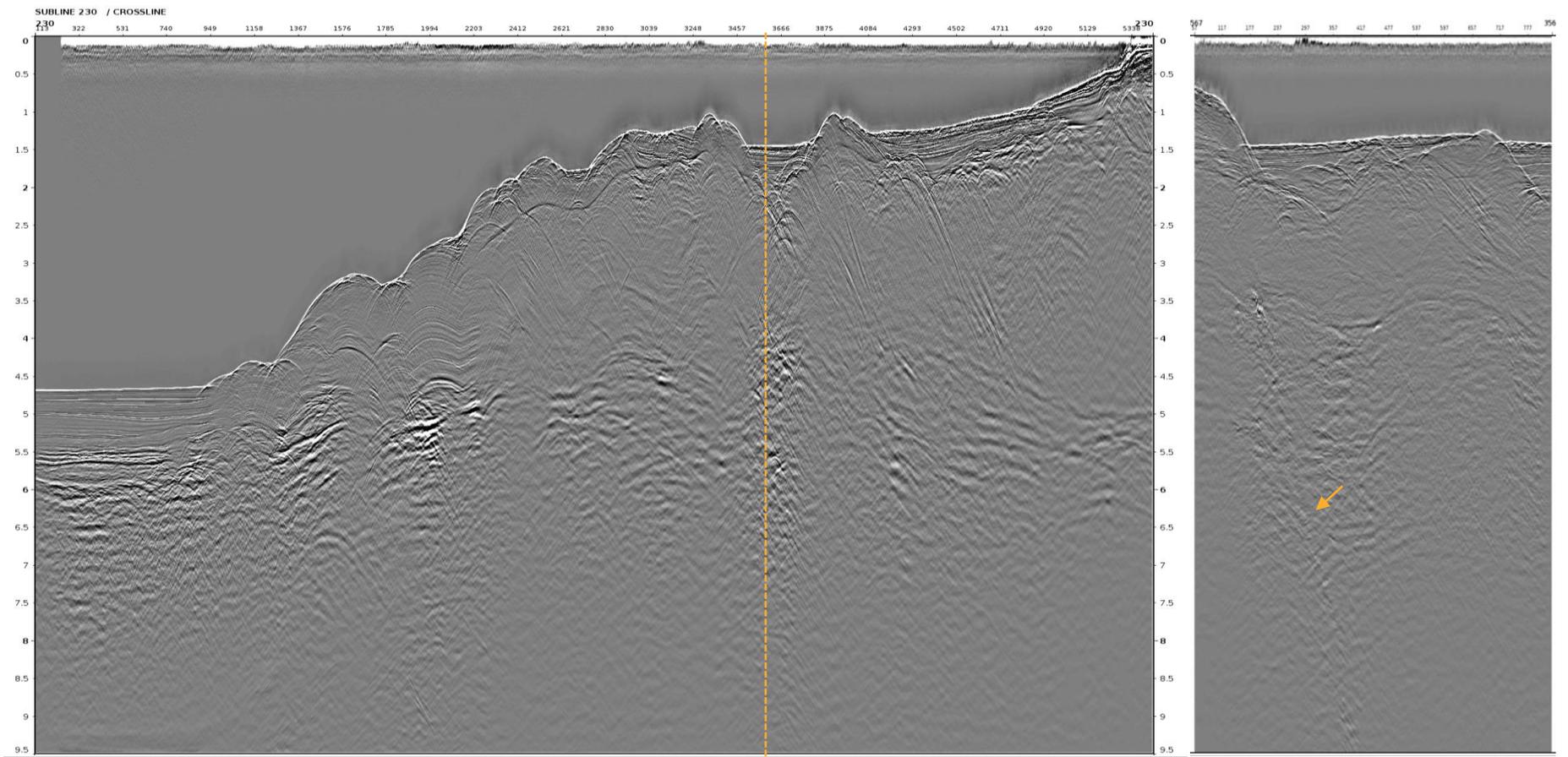
## Stack

- subline 230
- subline 470
- subline 712

# Stack before Common Offset Denoise

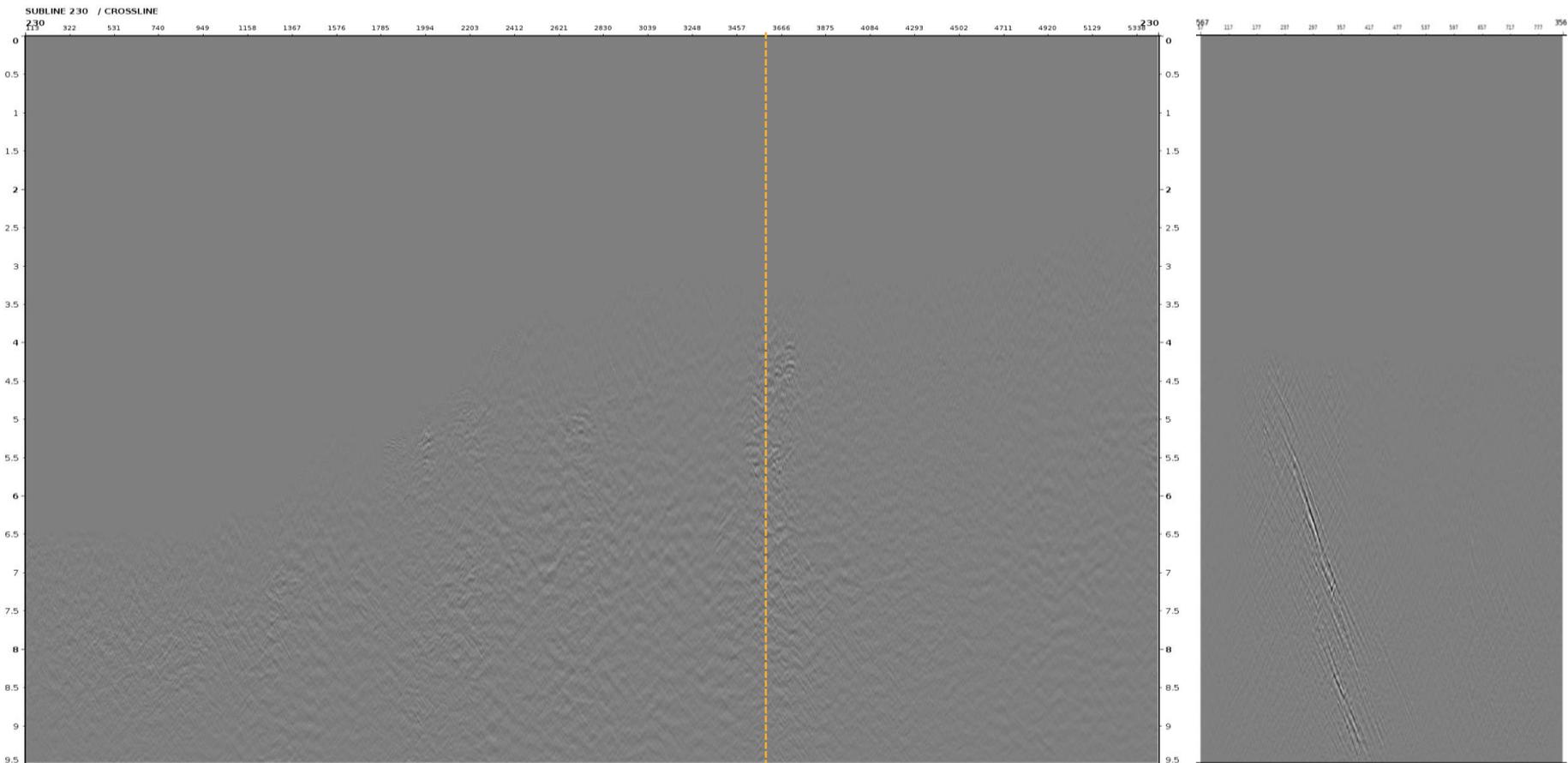


# Stack after Common Offset Denoise



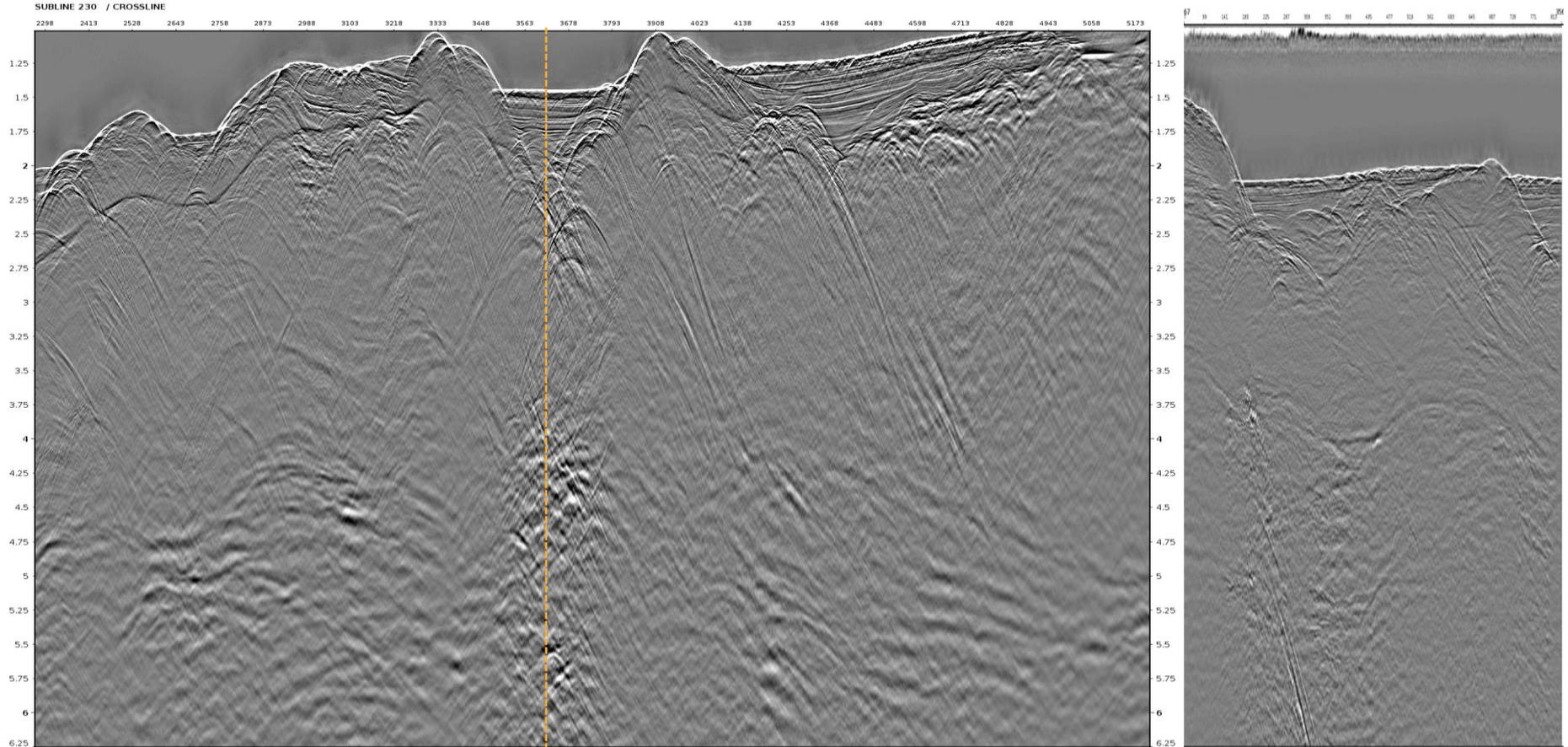


# Difference before - after



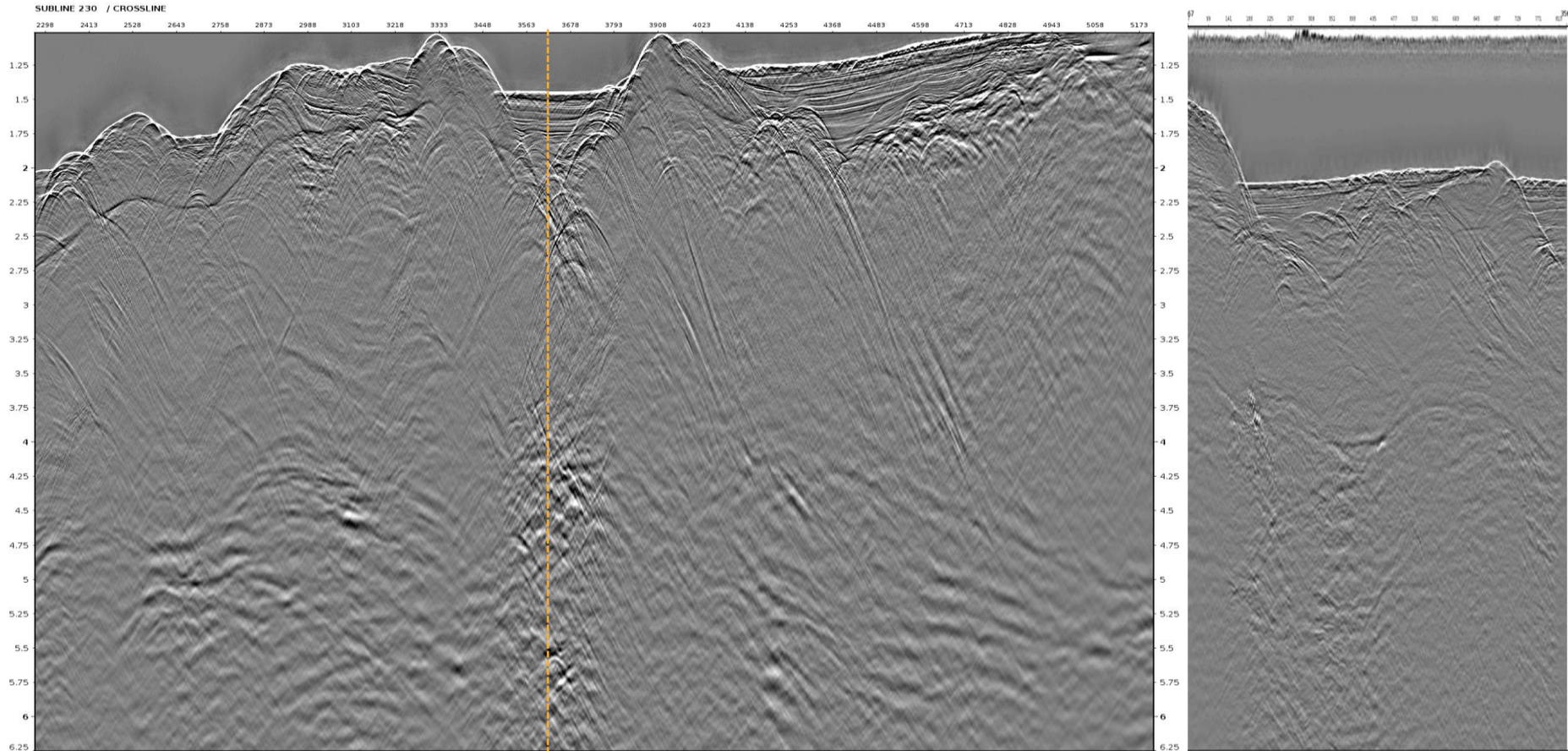


# Zoom in Stack before Common Offset Denoise



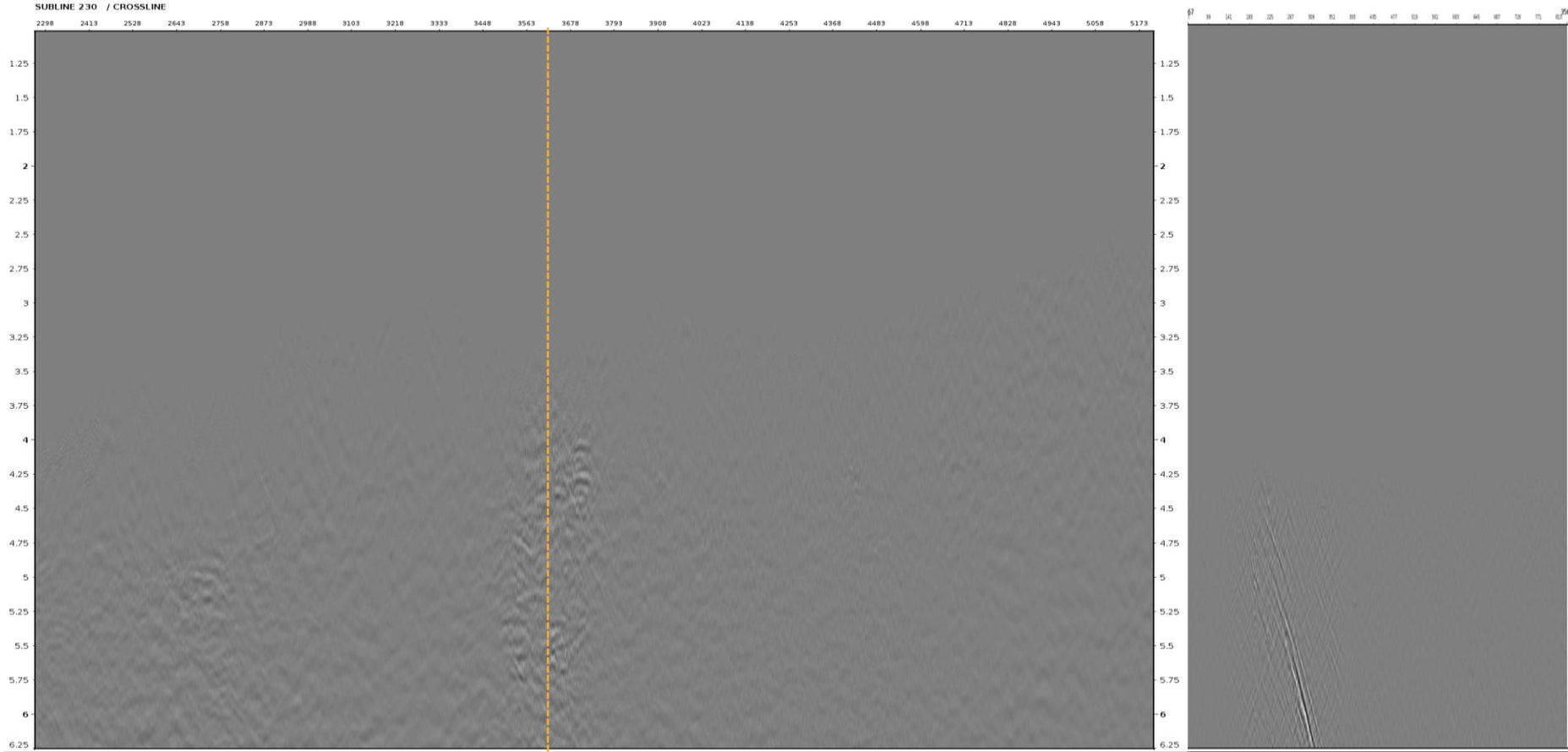


# Zoom in Stack after Common Offset Denoise



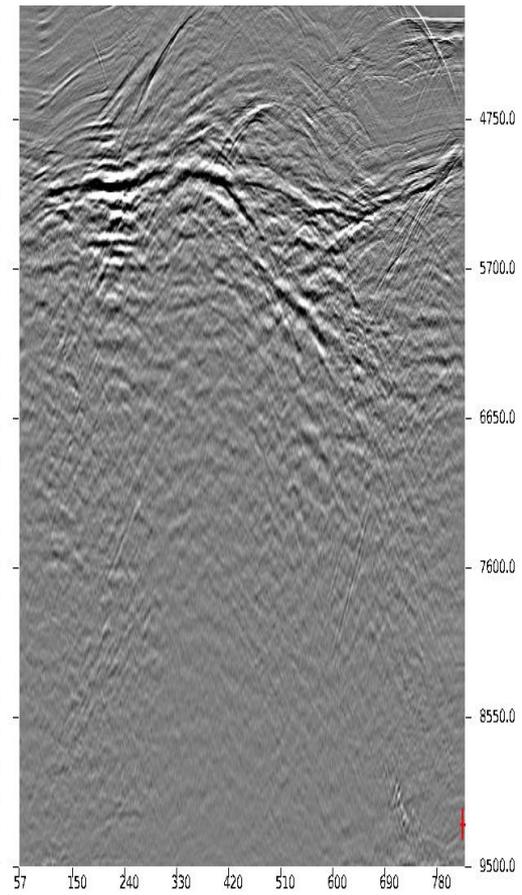
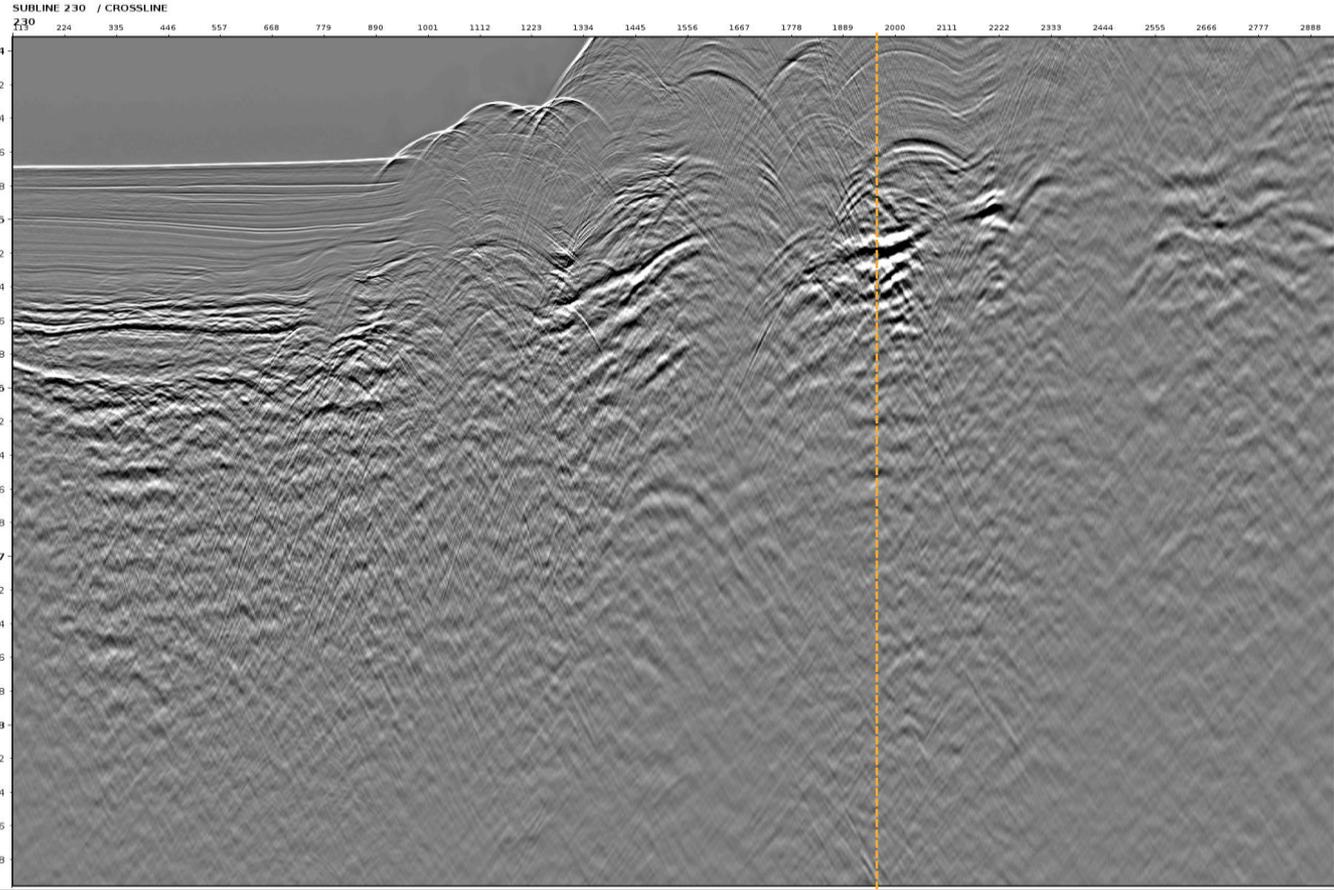


# Difference before - after





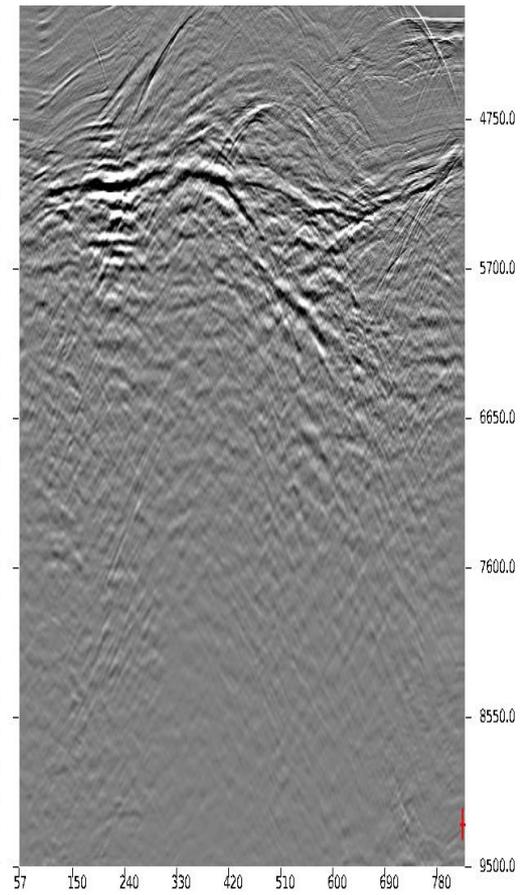
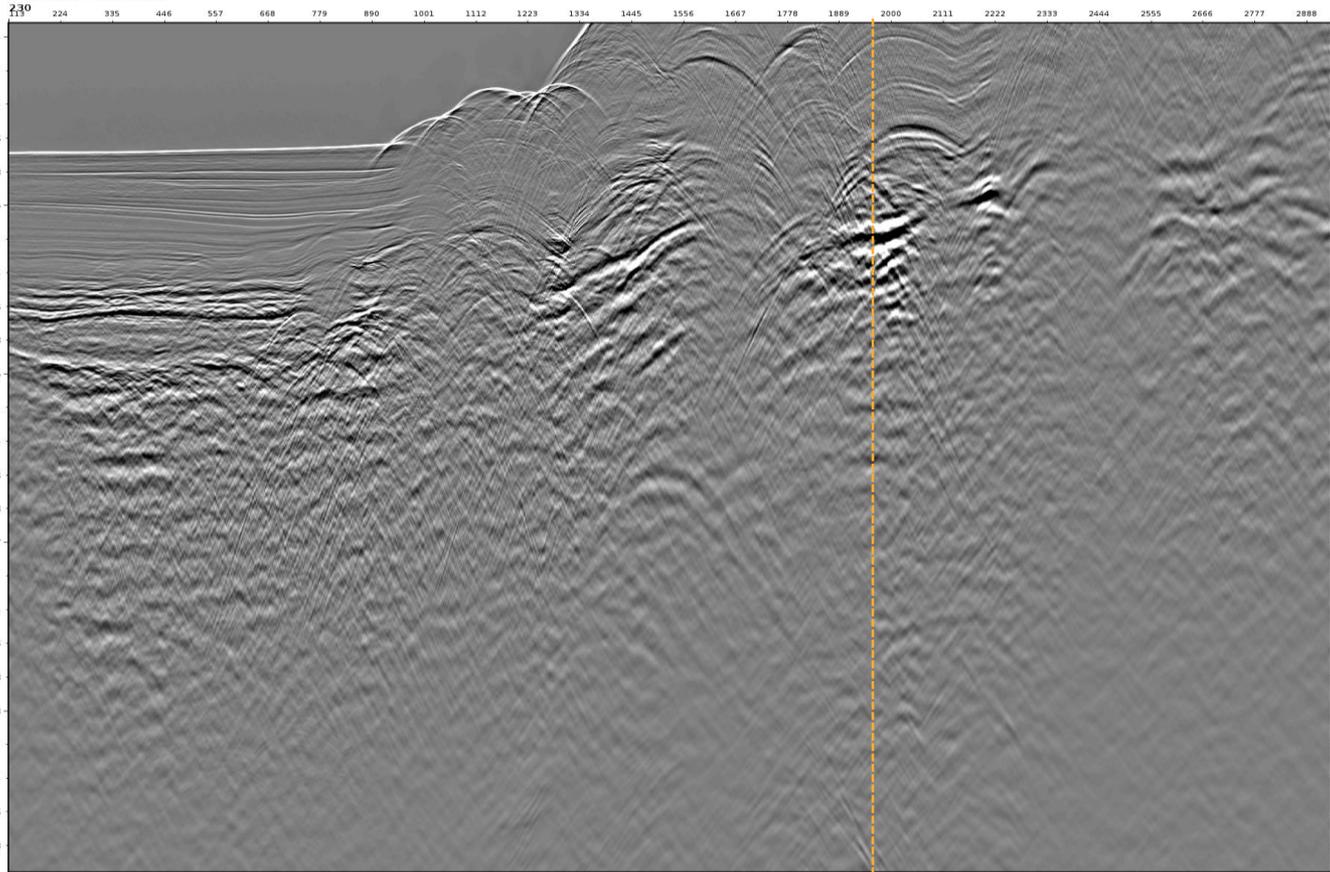
# Zoom in Stack before Common Offset Denoise





# Zoom in Stack after Common Offset Denoise

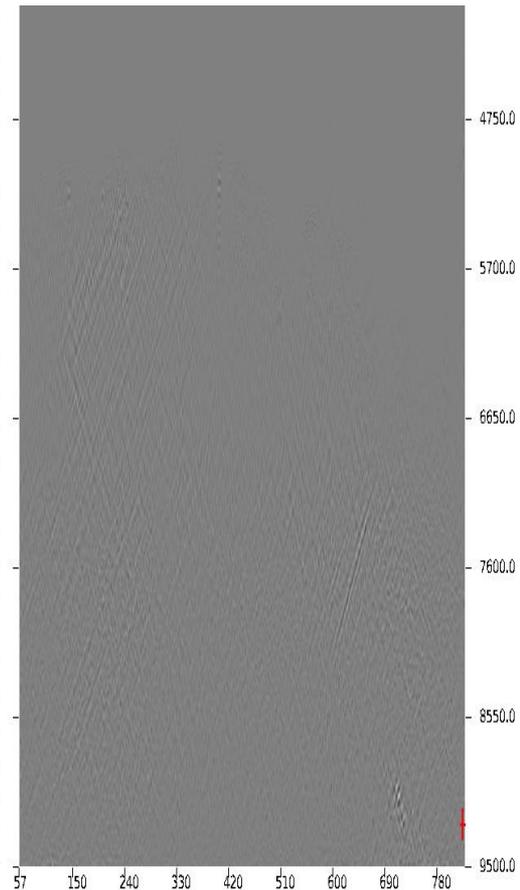
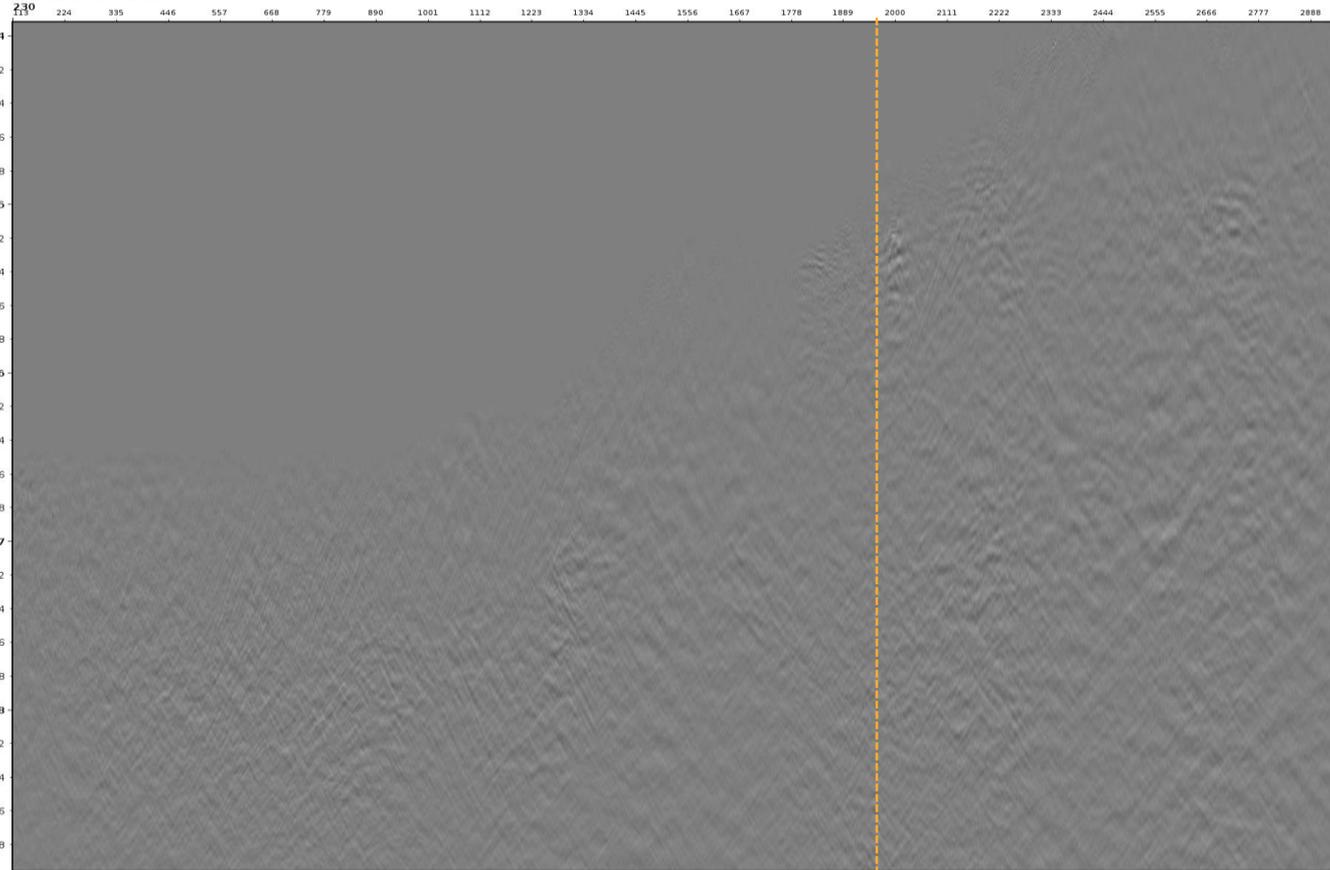
SUBLINE 230 / CROSSLINE





# Difference before - after

SUBLINE 230 / CROSSLINE



## Common Offset **Subline 230**

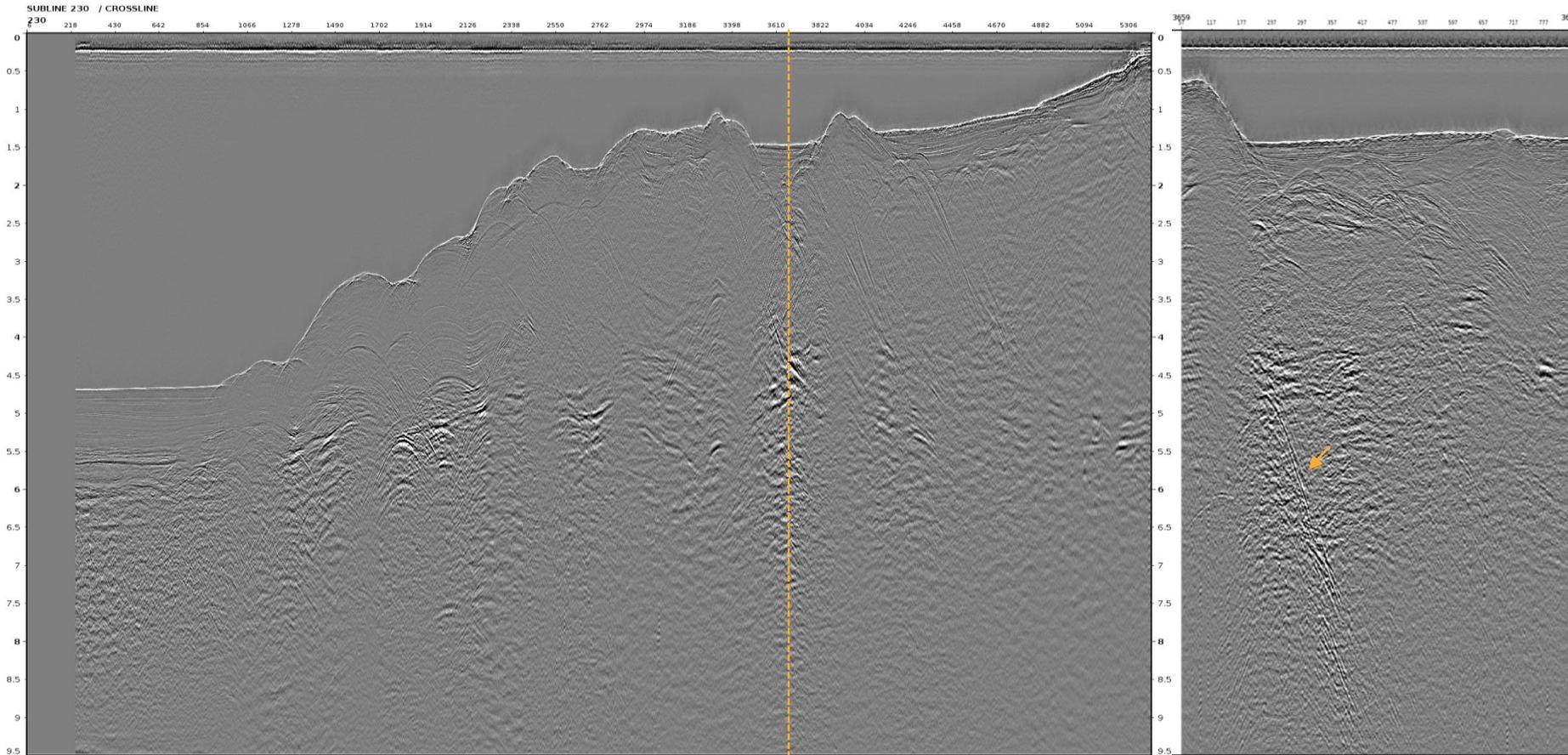
- offset 350m
- offset 1750m
- offset 4050m



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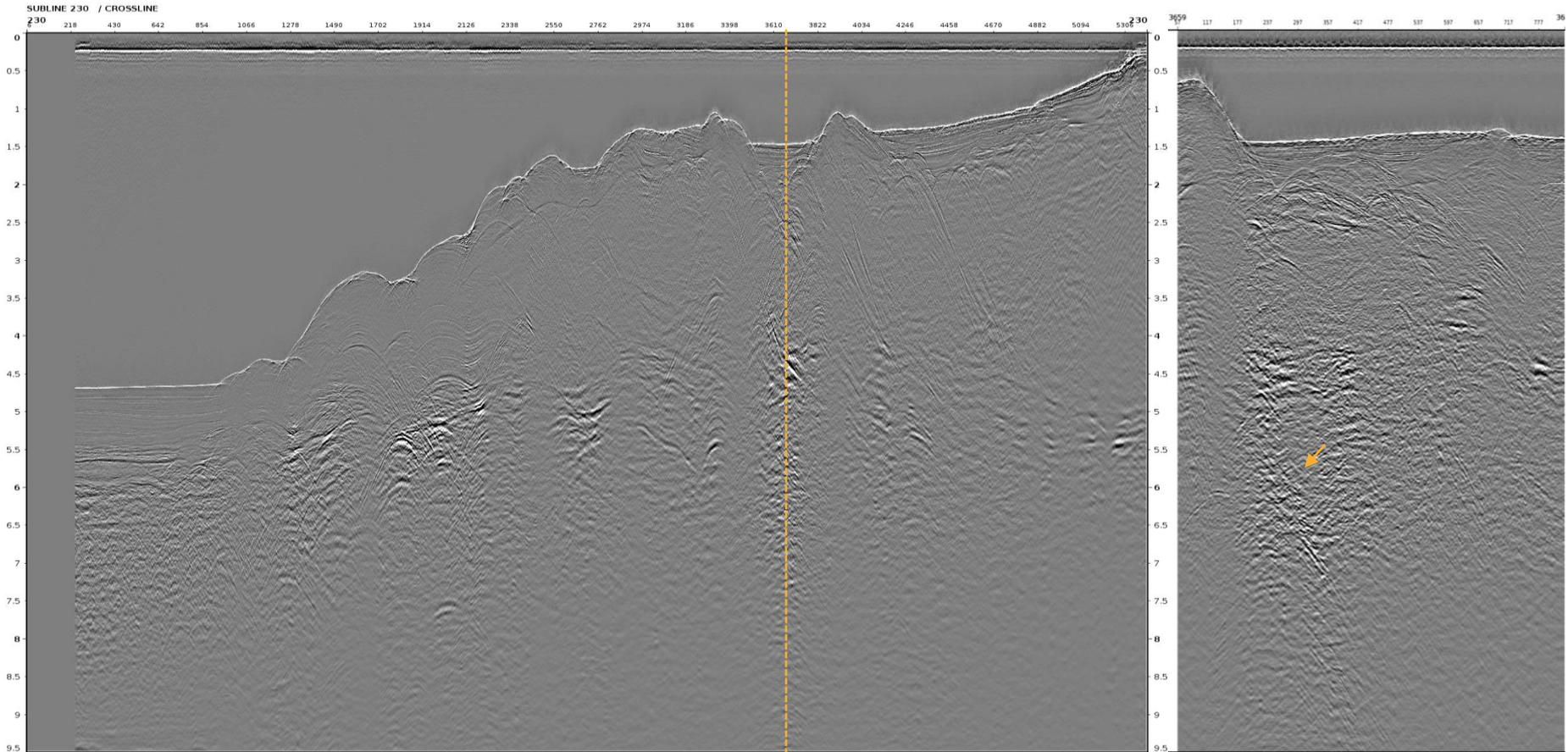


# IL 230 Common Offset 350m before Common Offset Denoise

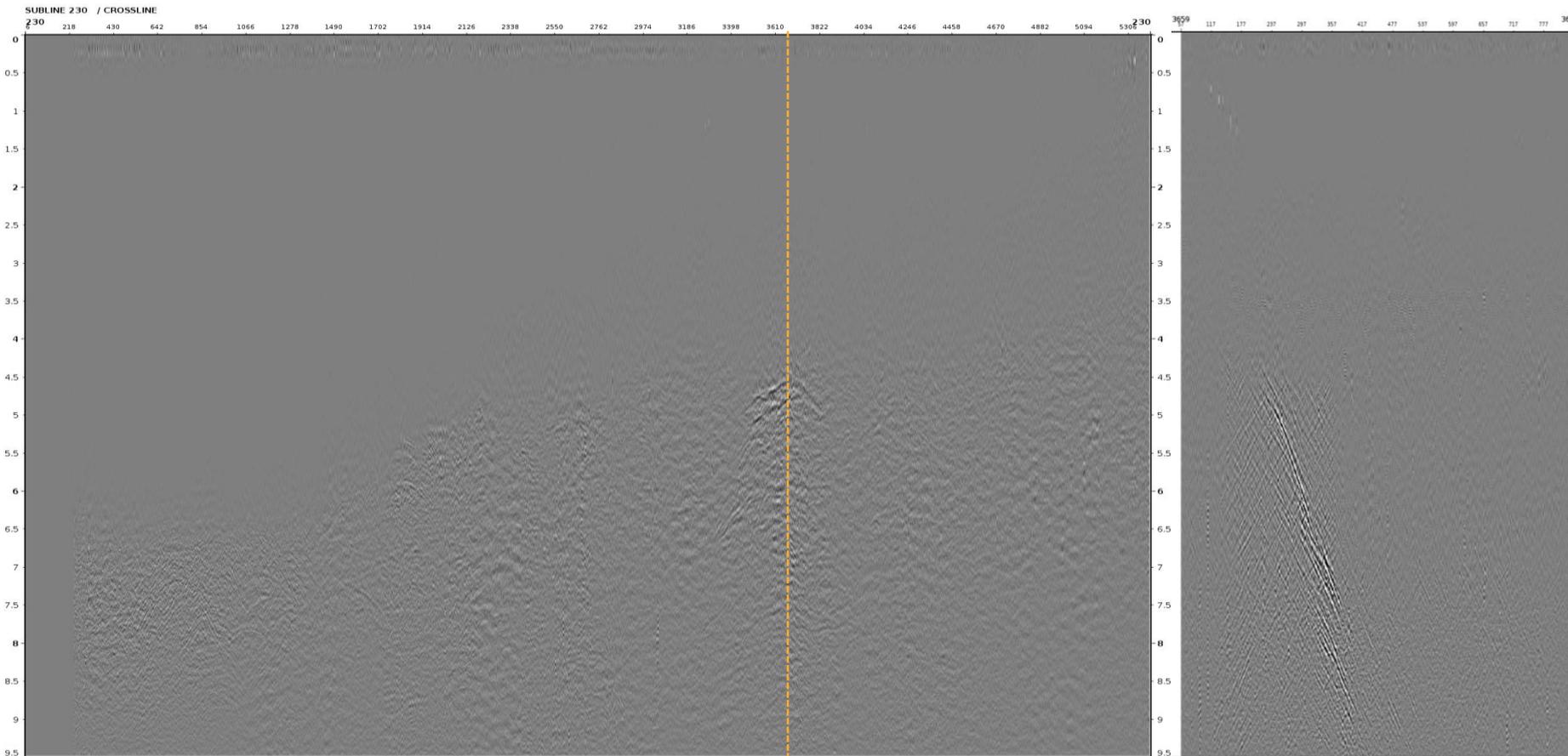




# IL 230 Common Offset 350m after Common Offset Denoise

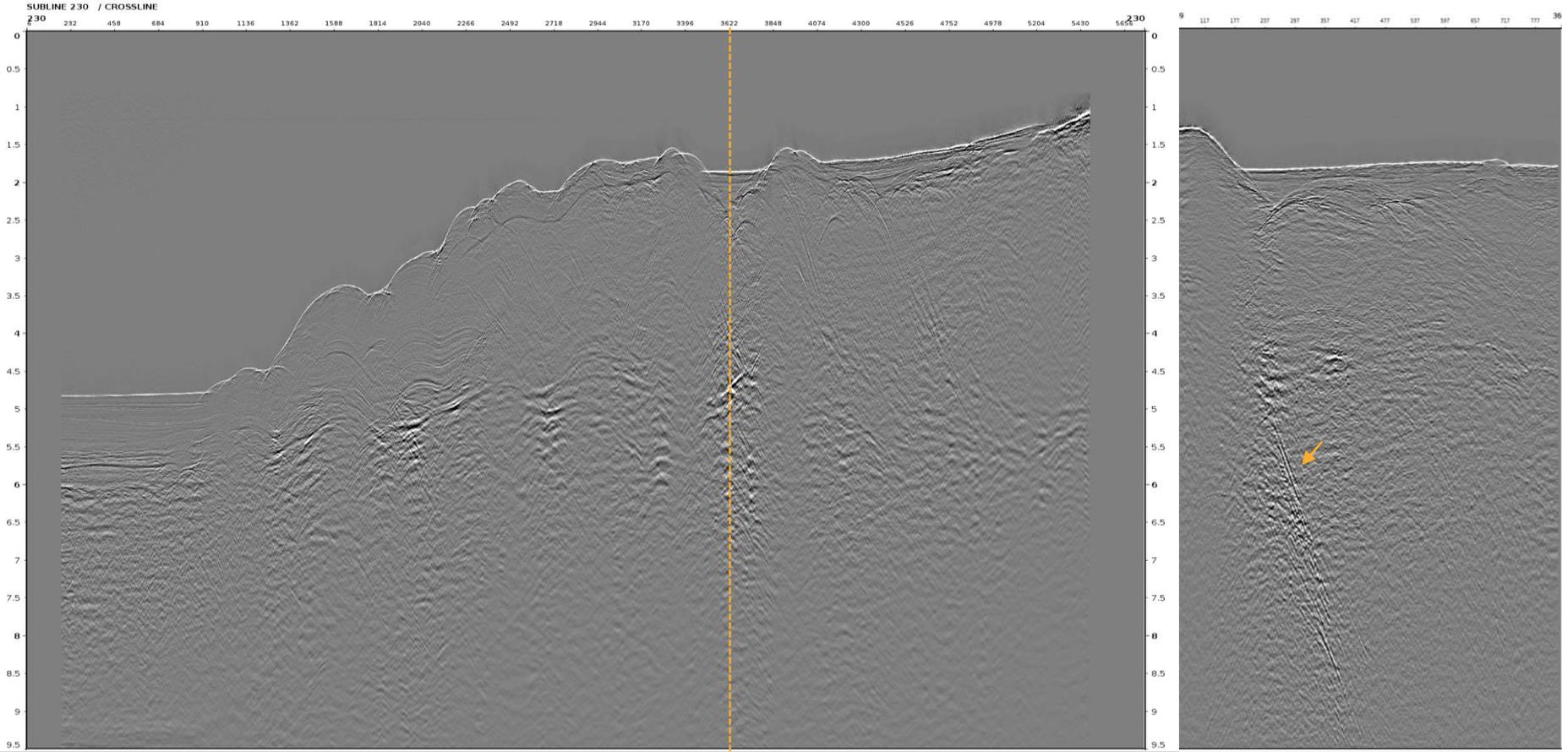


# Difference before - after



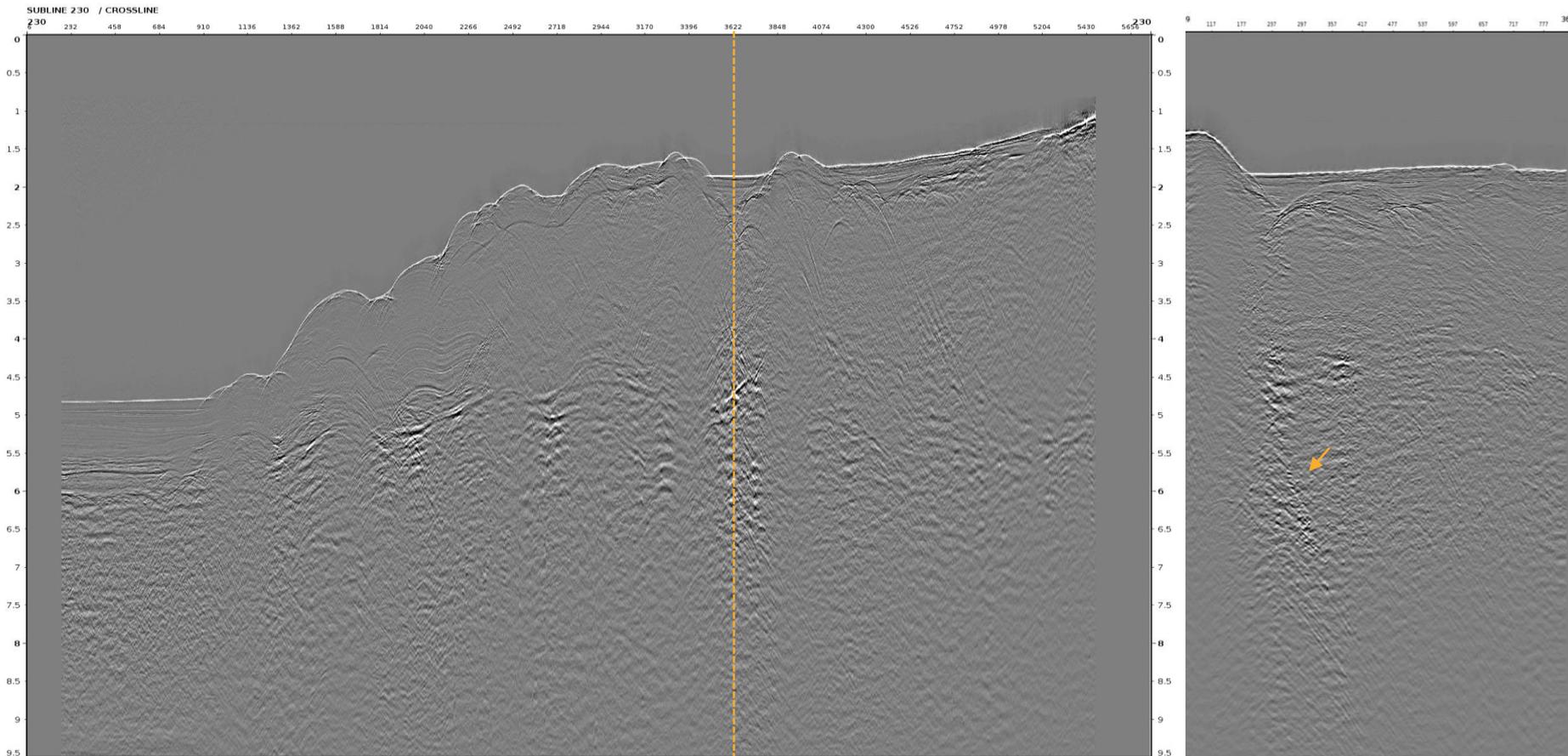


# IL 230 Common Offset 1750m before Common Offset Denoise

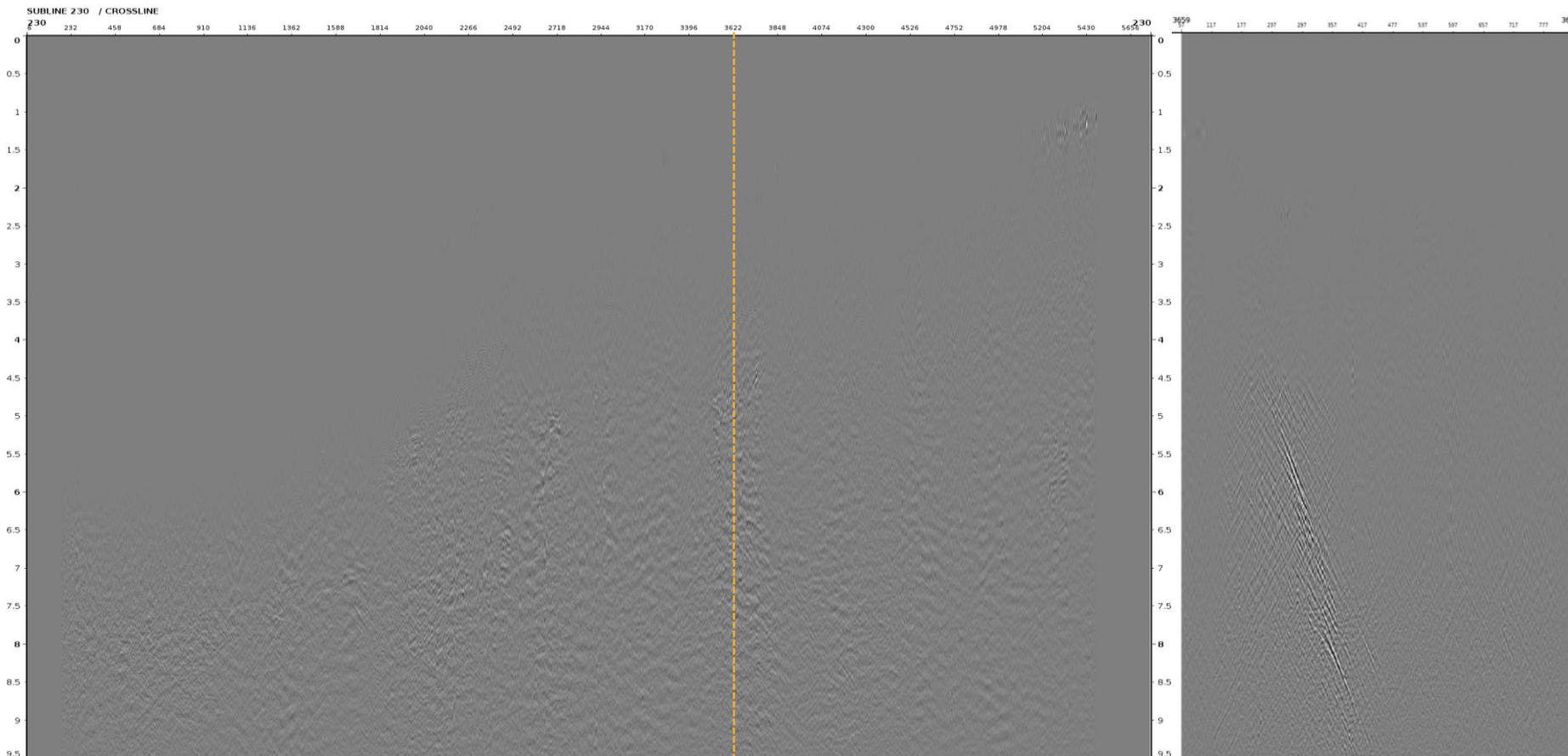


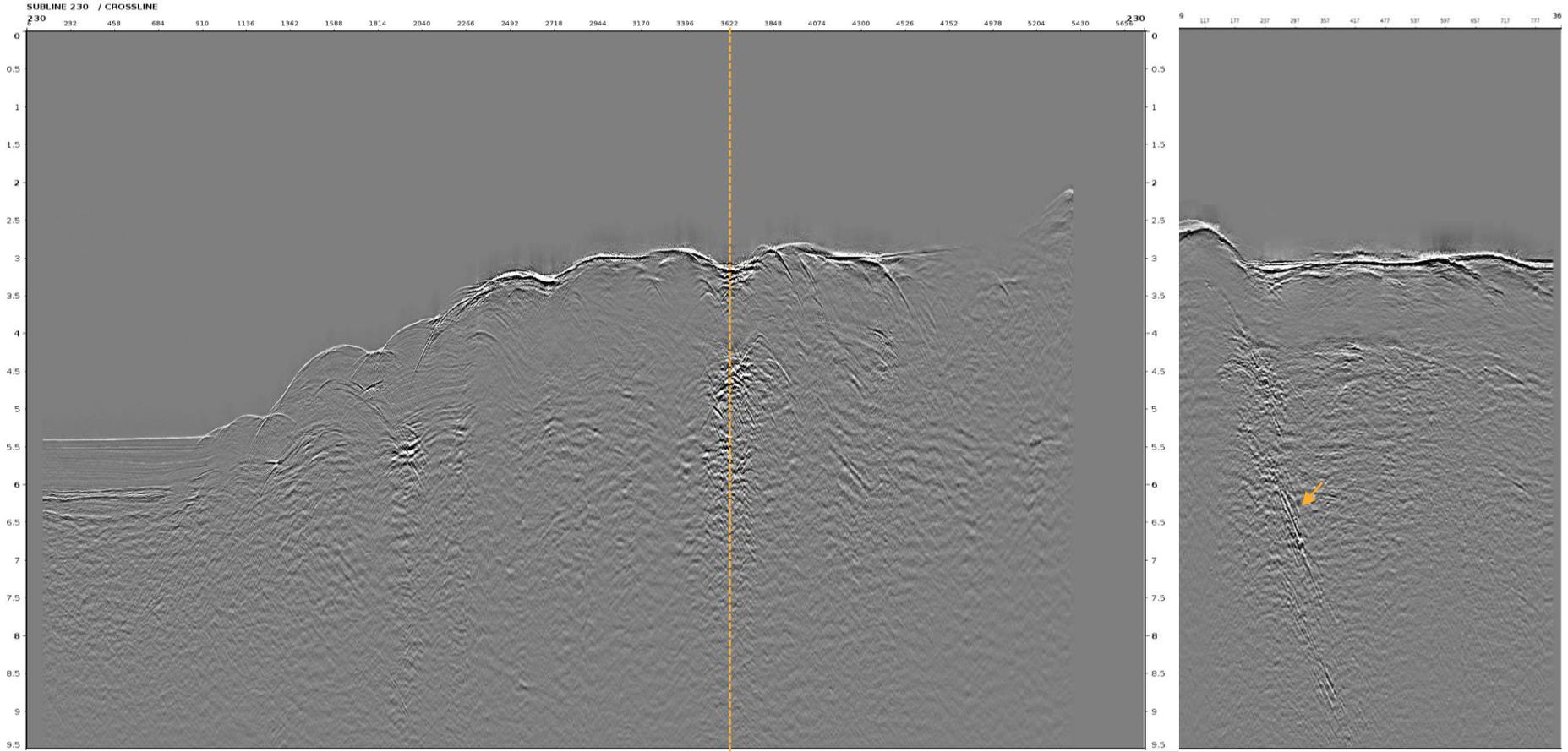


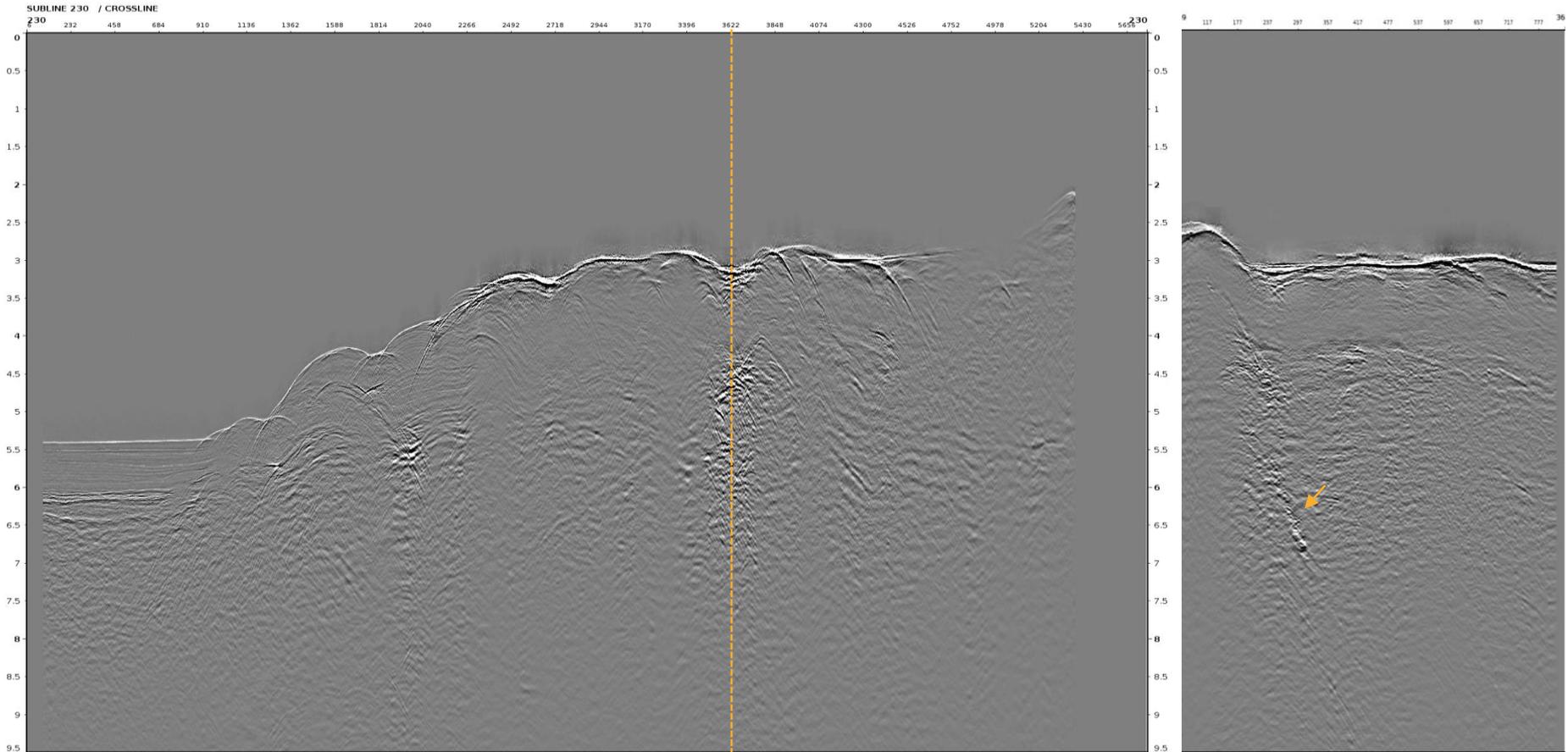
# IL 230 Common Offset 1750m **after** Common Offset Denoise



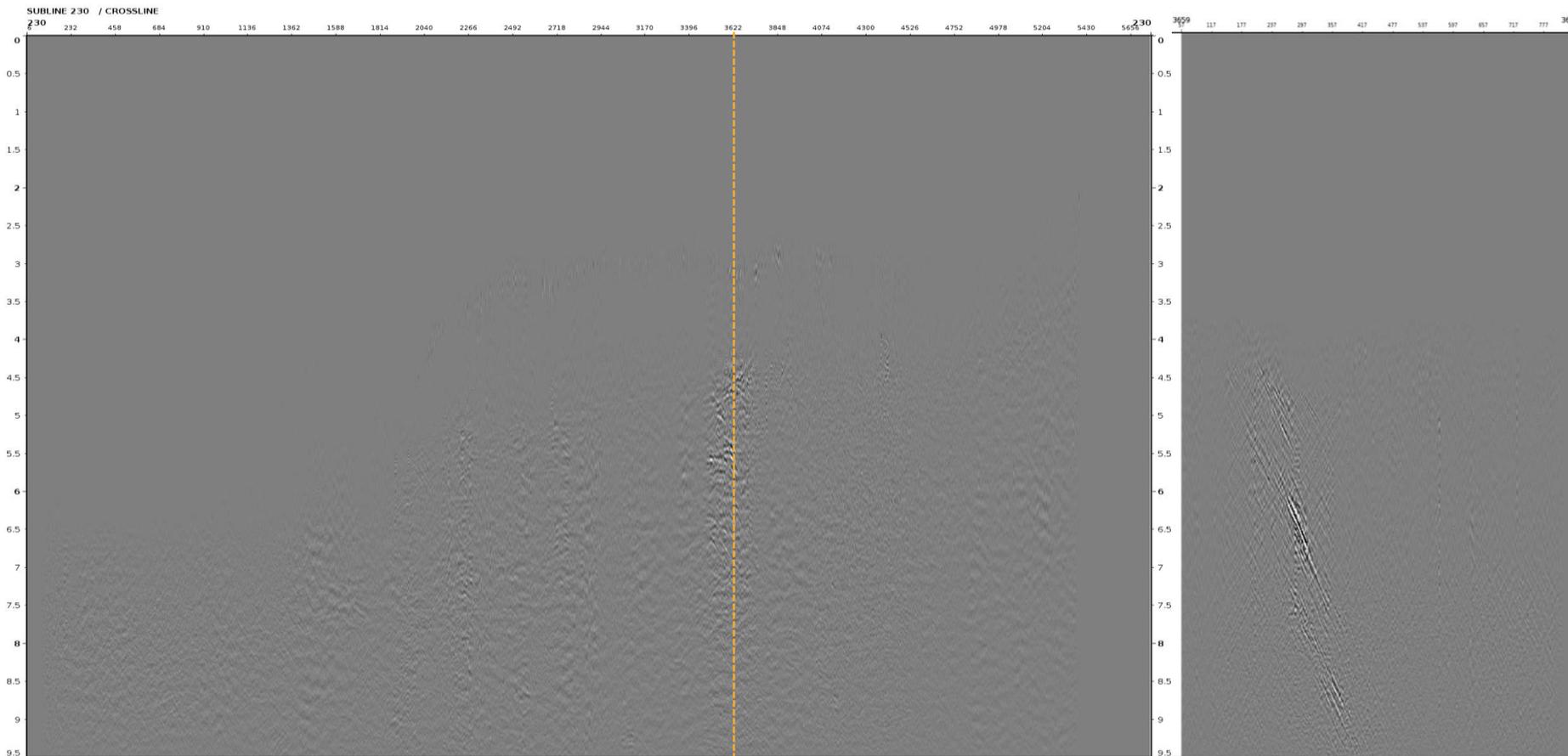
# Difference before - after







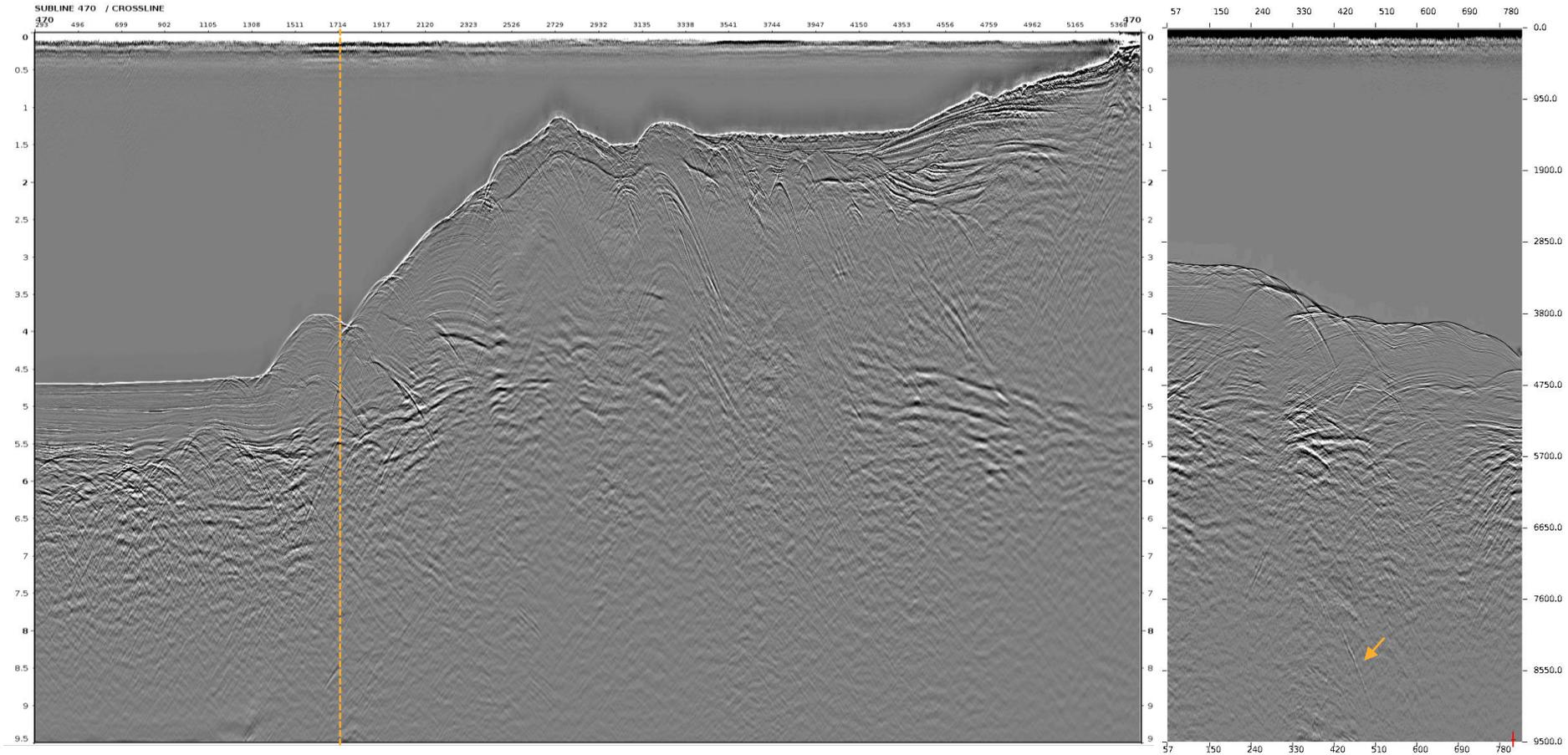
# Difference before - after



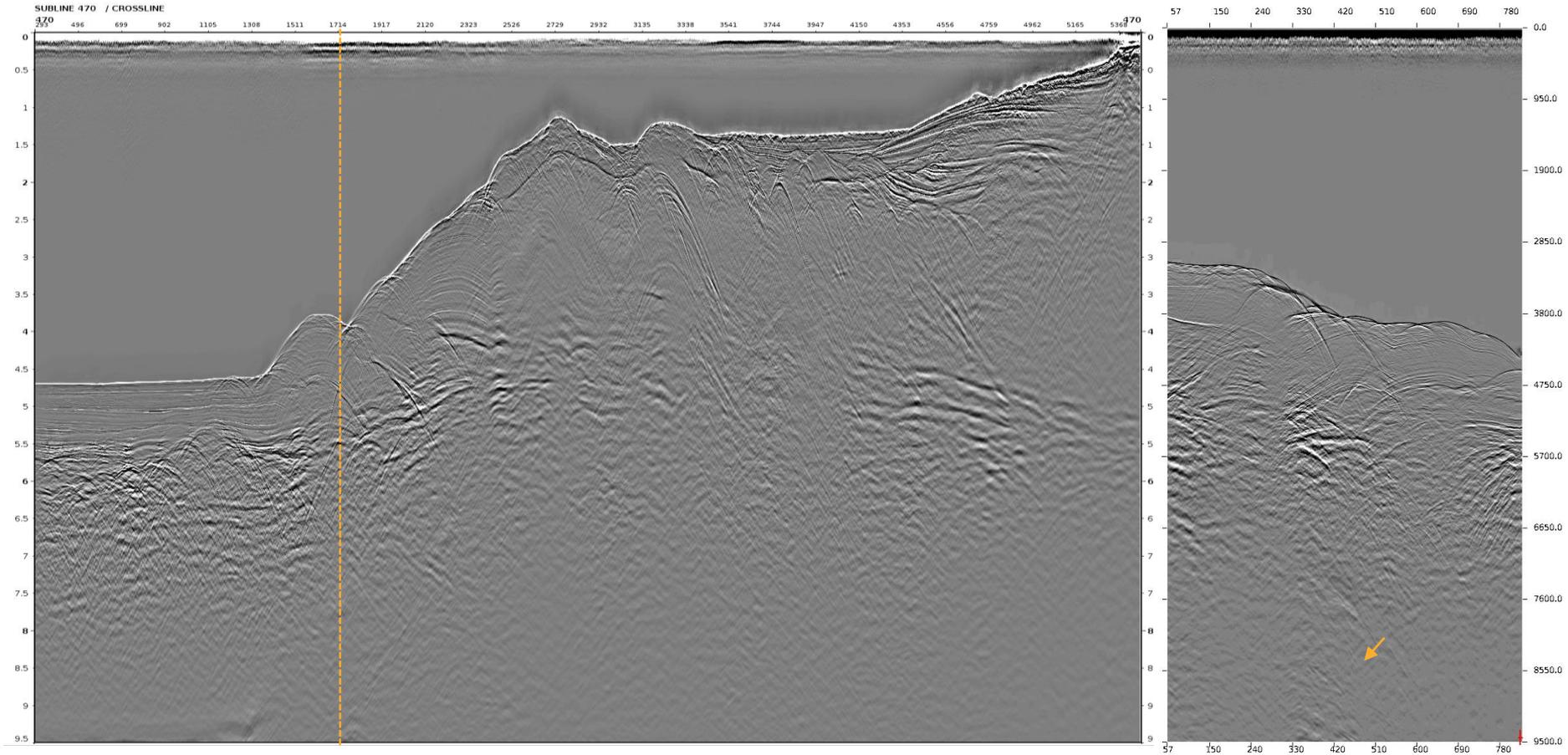
## Stack

- subline 230
- **subline 470**
- subline 712

# Stack before Common Offset Denoise

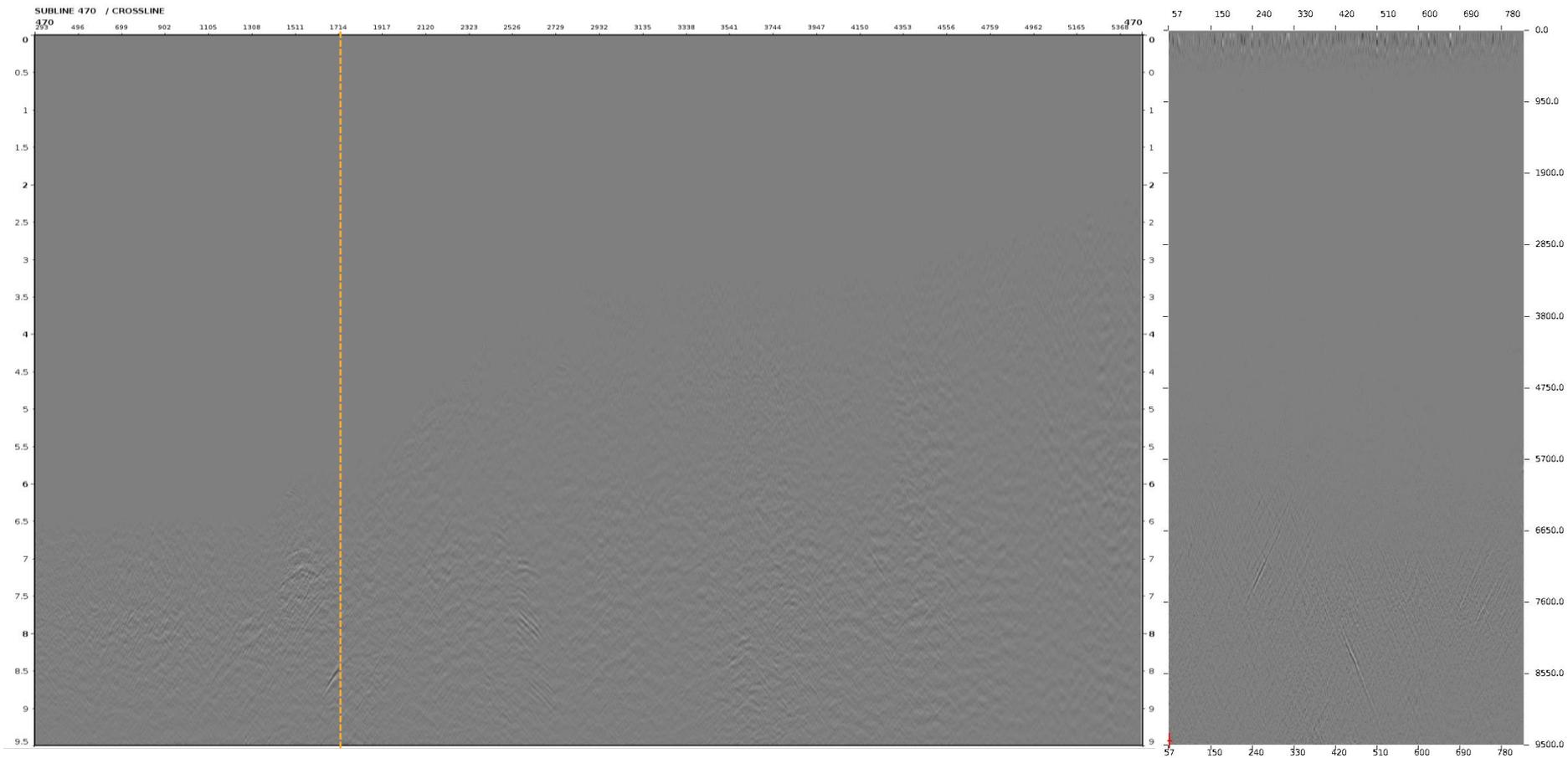


# Stack after Common Offset Denoise



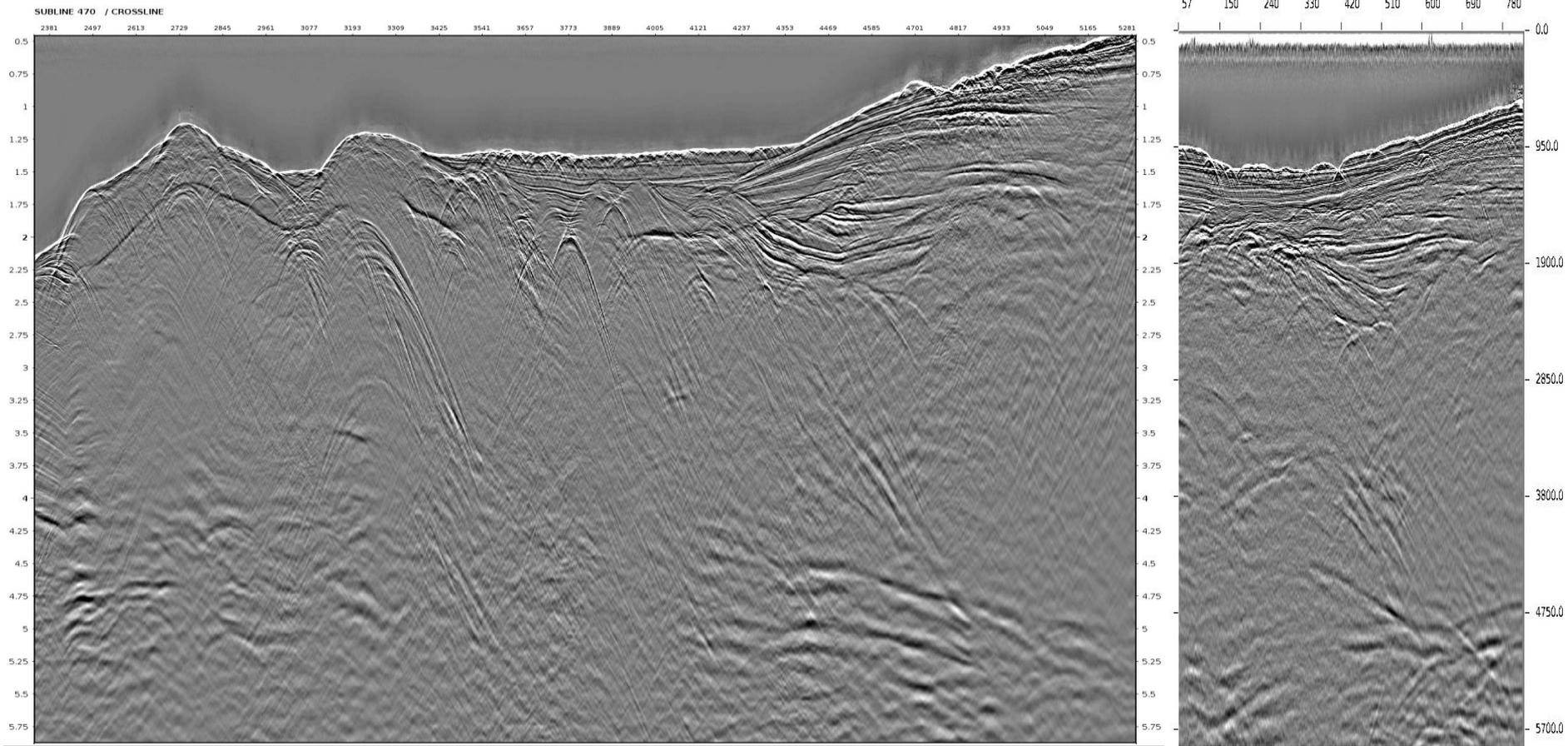


# Difference before - after



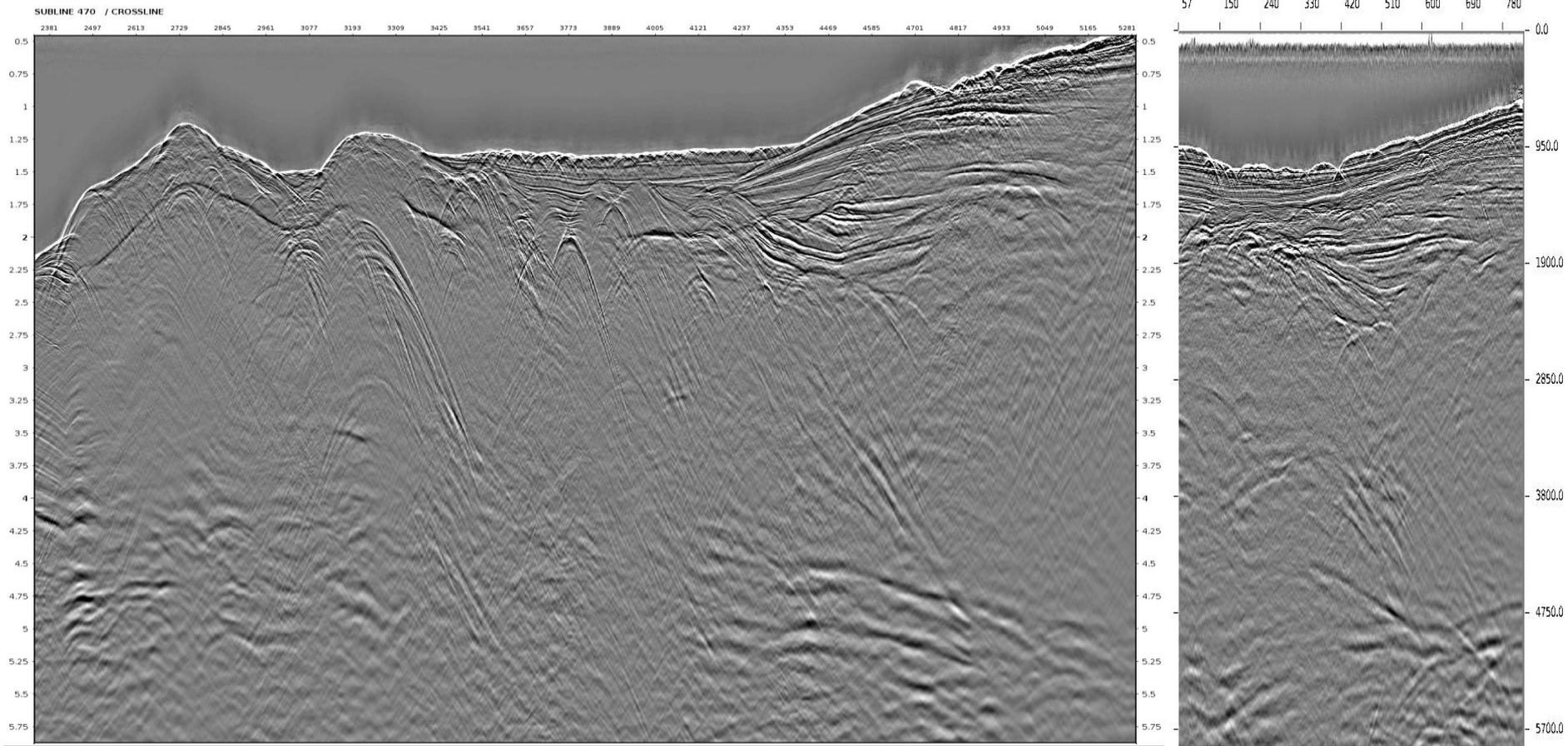


# Zoom in Stack before Common Offset Denoise





# Zoom in Stack after Common Offset Denoise



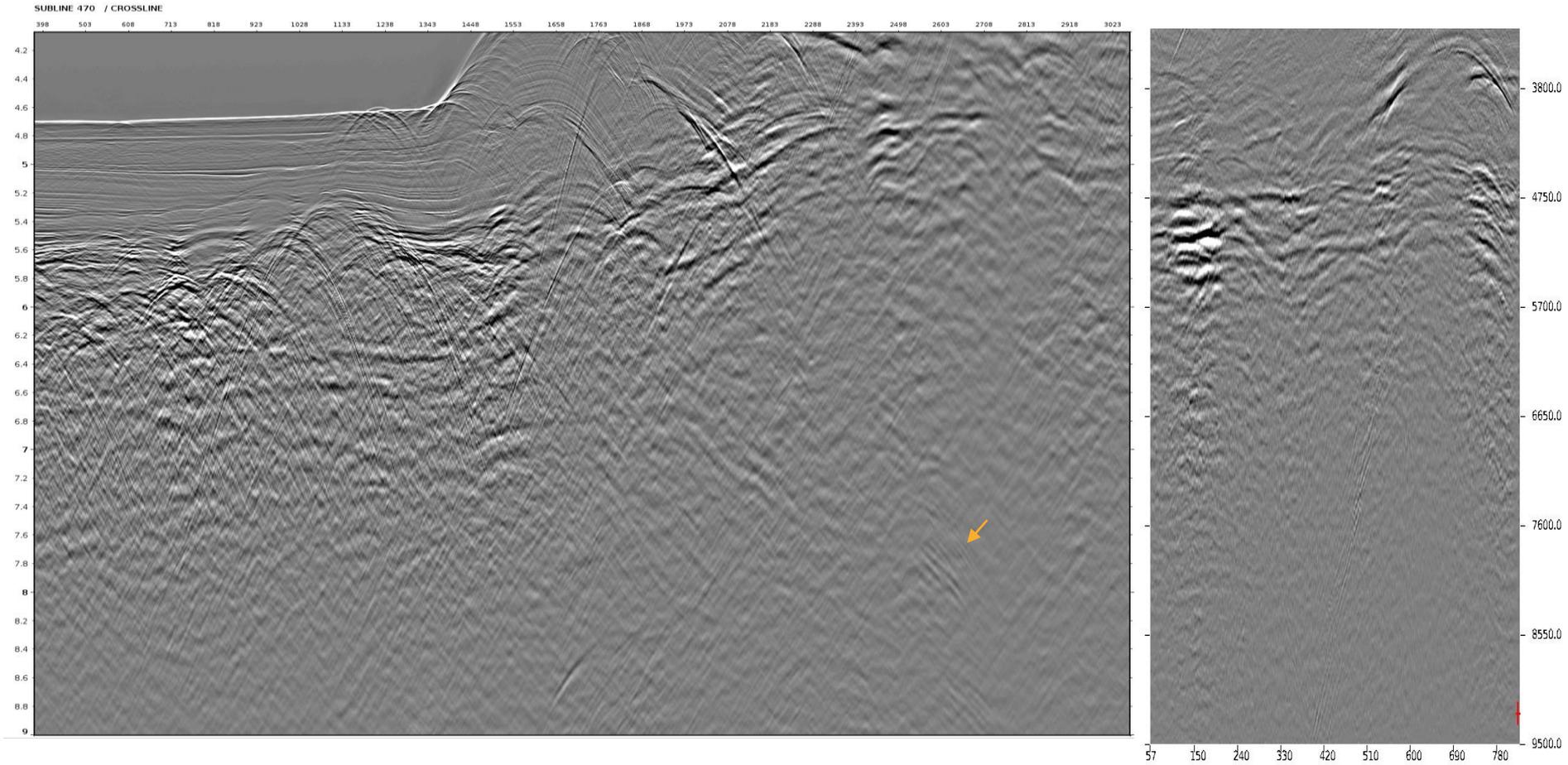


# Difference before - after



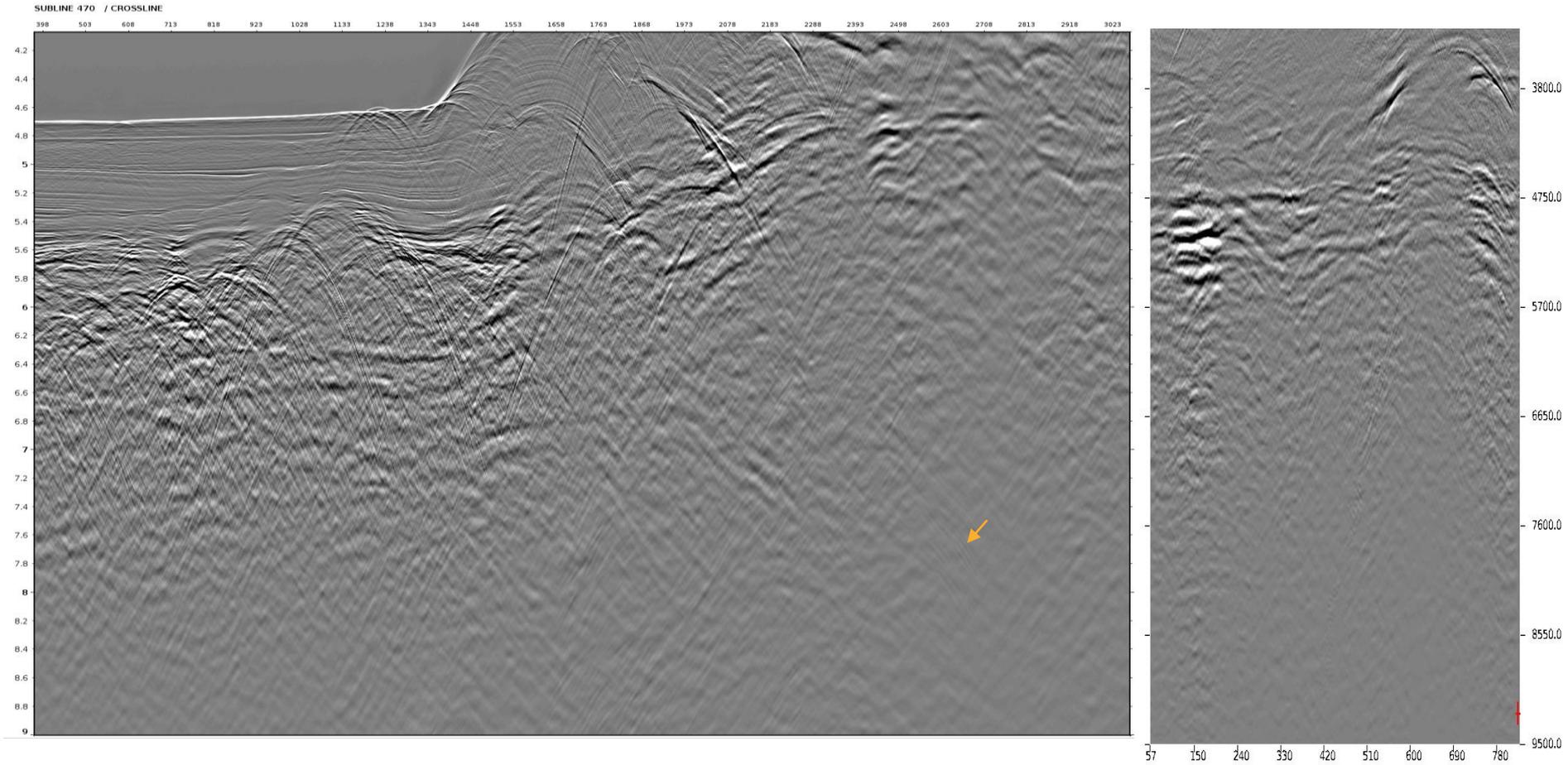


# Zoom in Stack before Common Offset Denoise



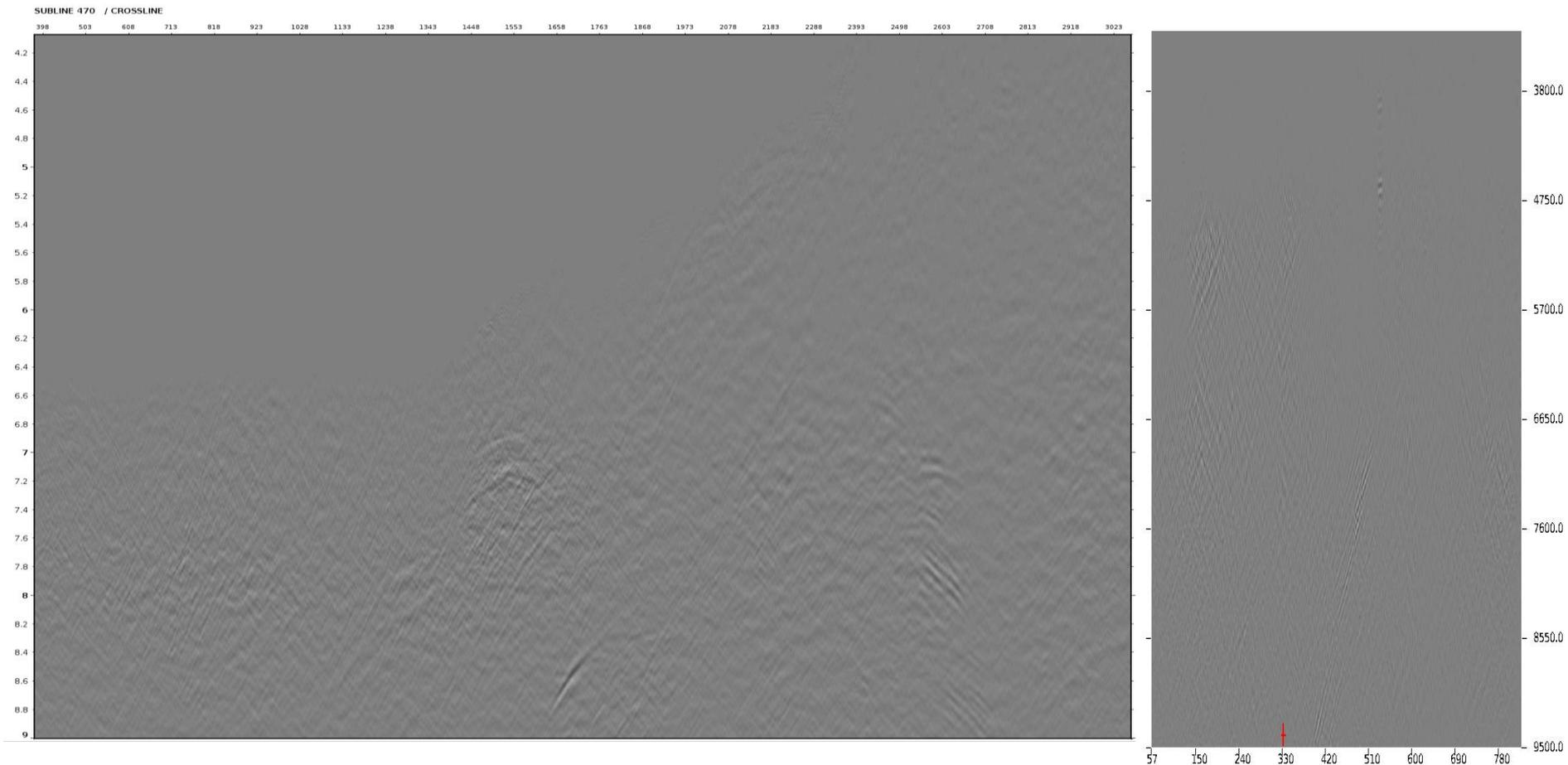


# Zoom in Stack after Common Offset Denoise





# Difference before - after



## Common Offset **Subline 470**

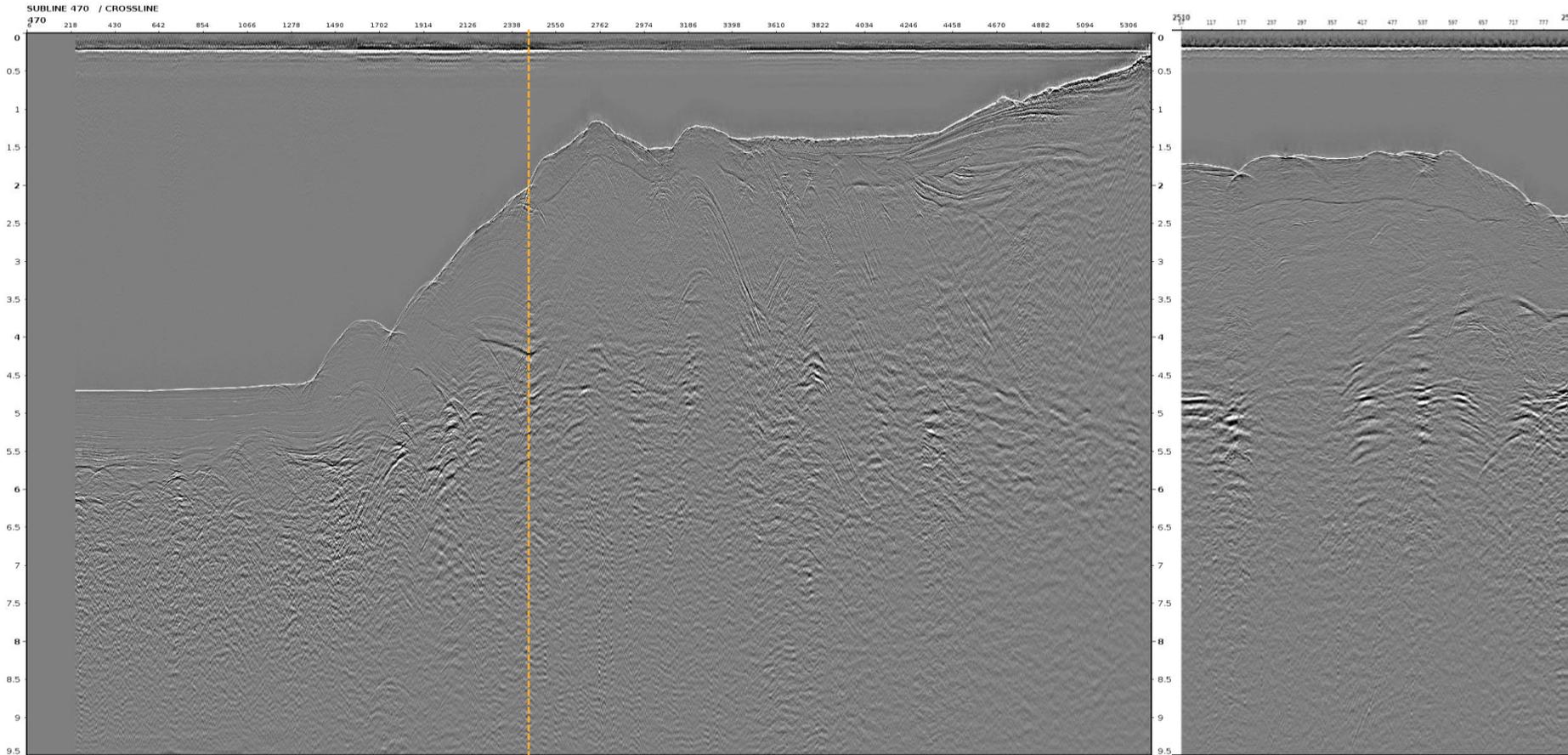
- offset 350m
- offset 1750m
- offset 4050m



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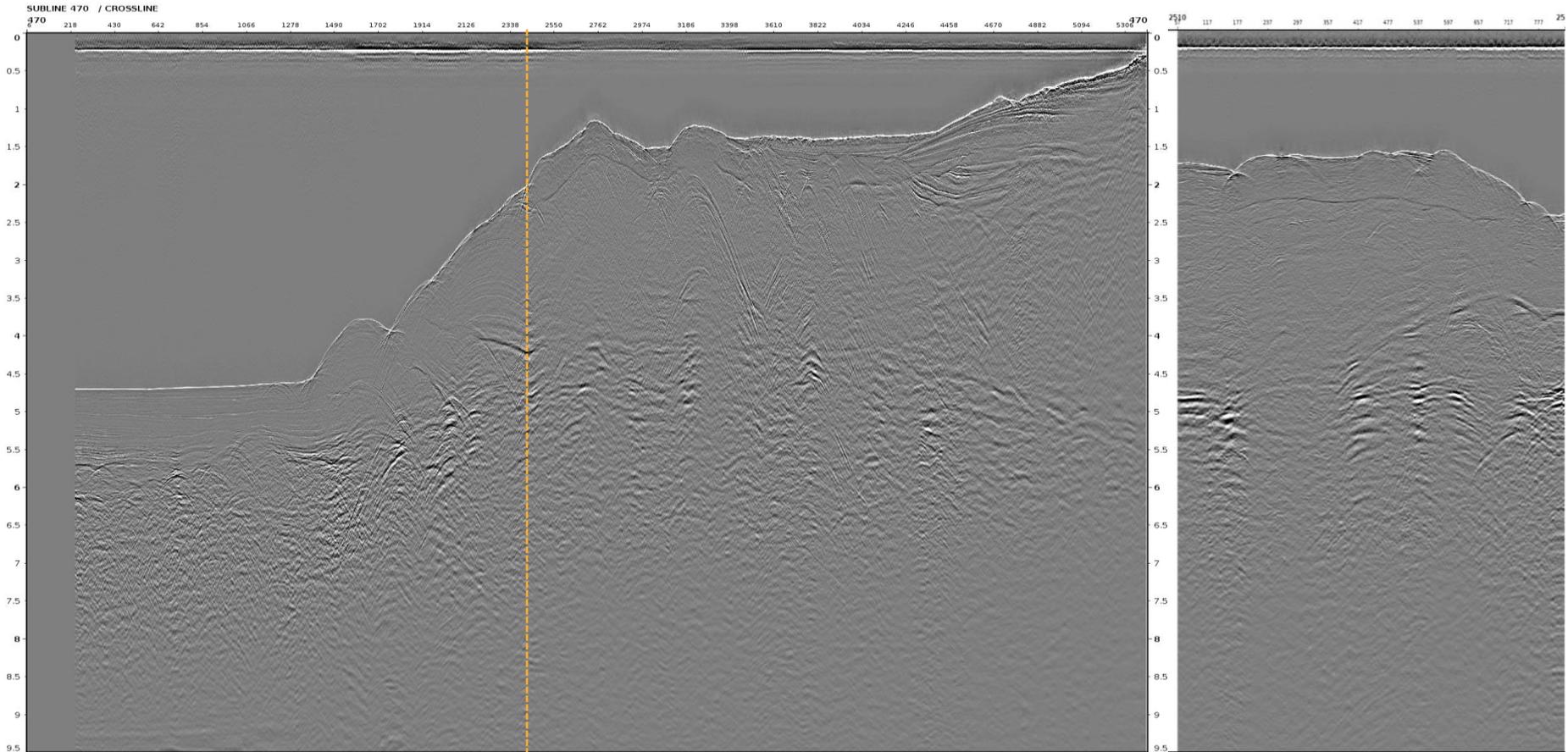


# IL 470 Common Offset 350m before Common Offset Denoise



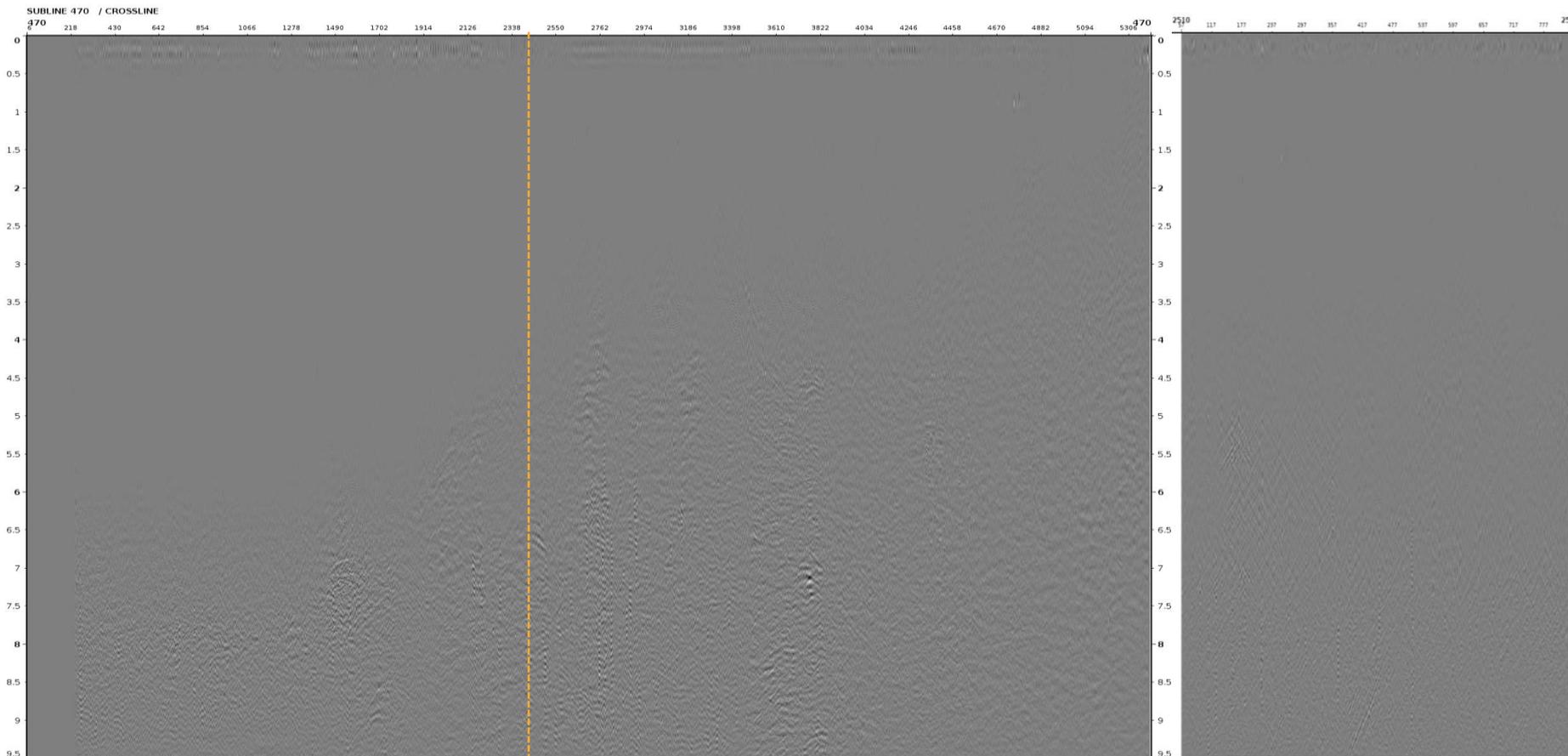


# IL 470 Common Offset 350m after Common Offset Denoise



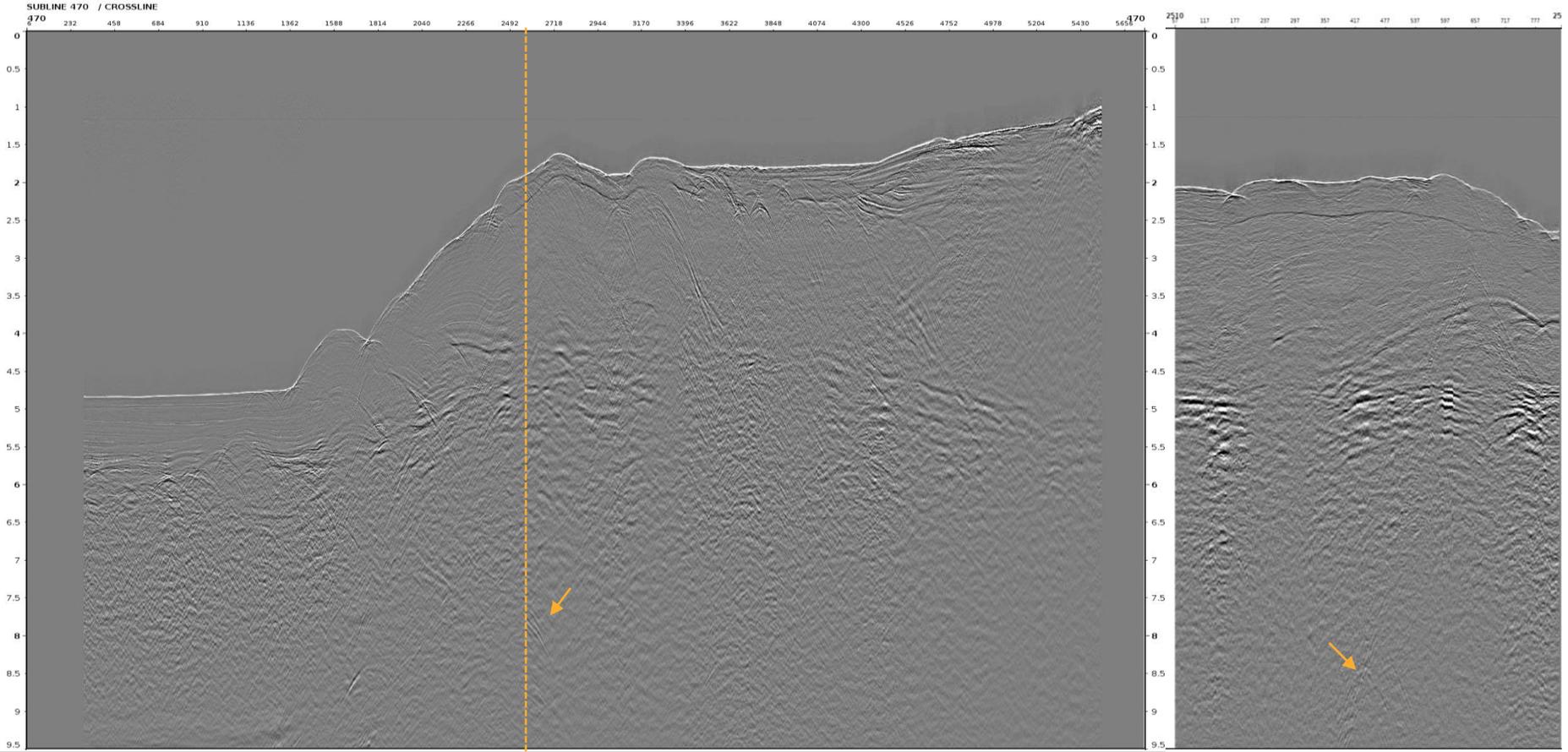


# Difference before - after



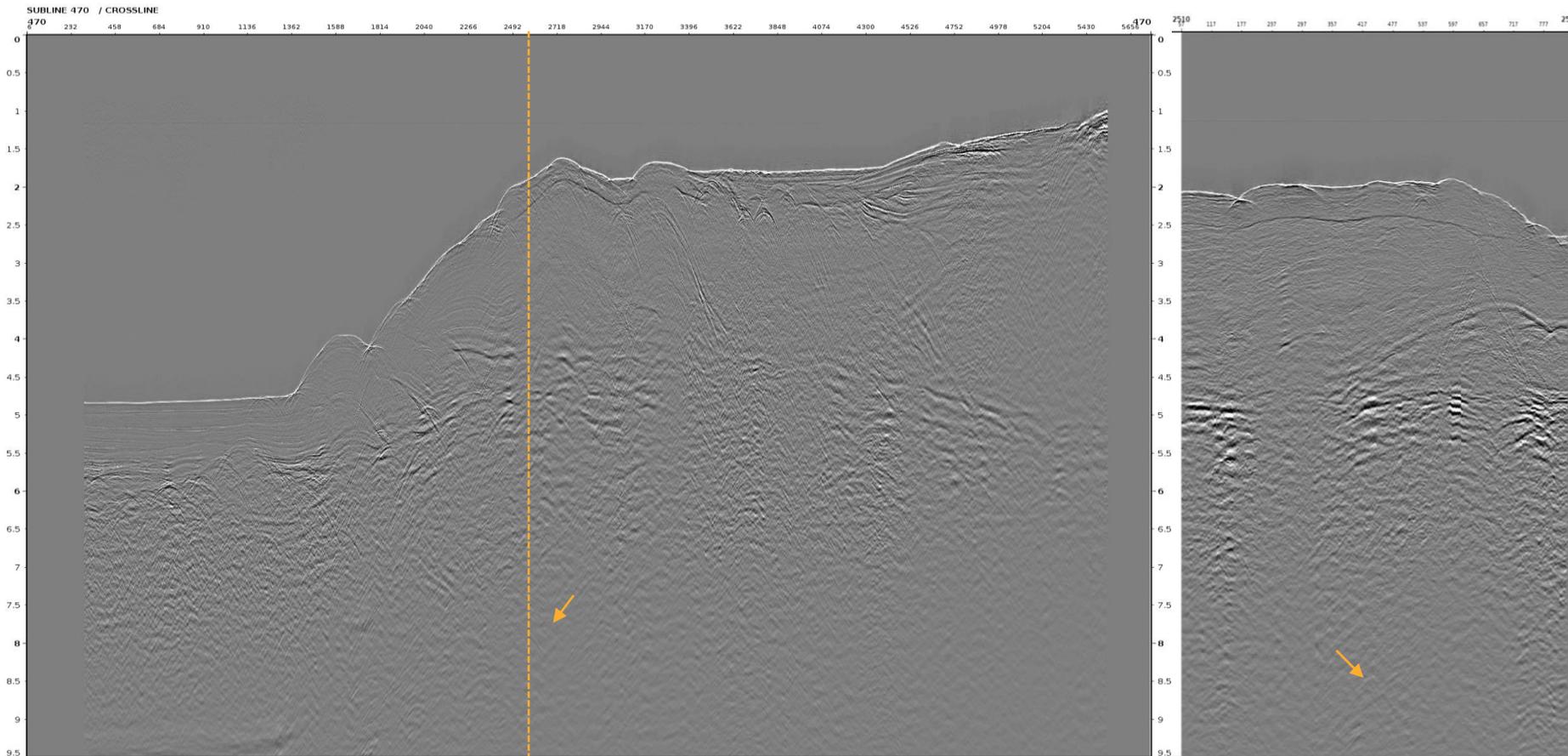


# IL 470 Common Offset 1750m before Common Offset Denoise



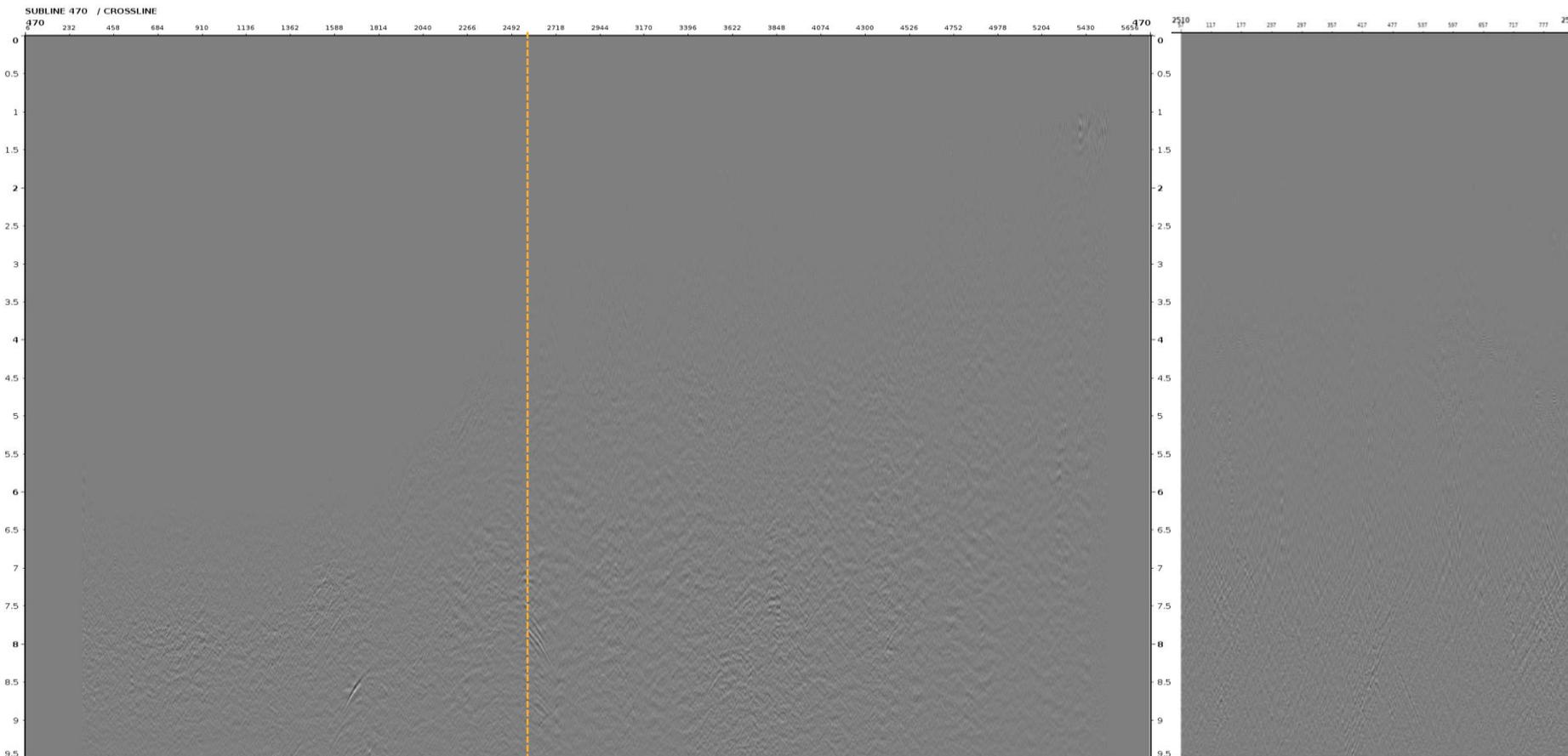


# IL 470 Common Offset 1750m **after** Common Offset Denoise



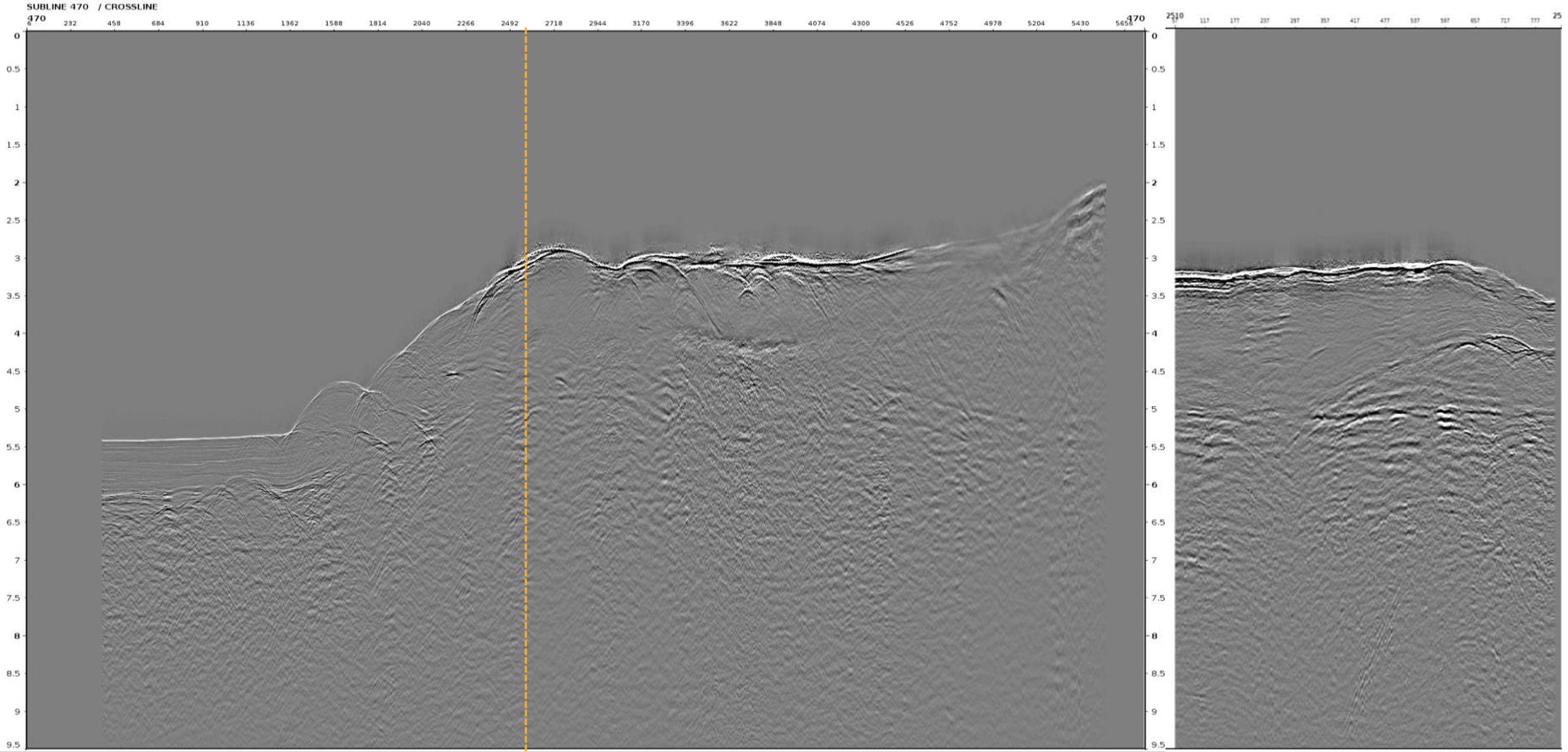


# Difference before - after



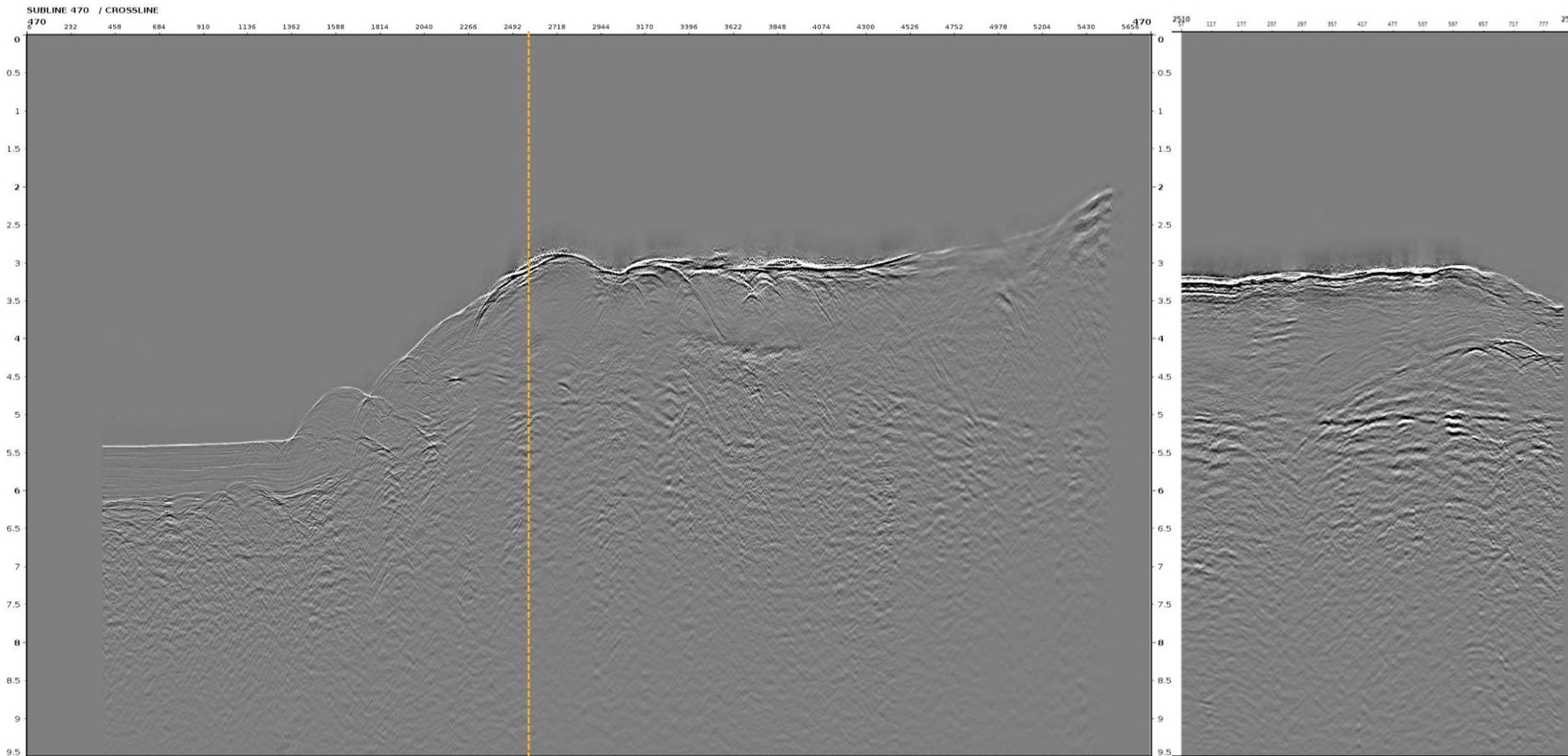


# IL 470 Common Offset 4050m before Common Offset Denoise



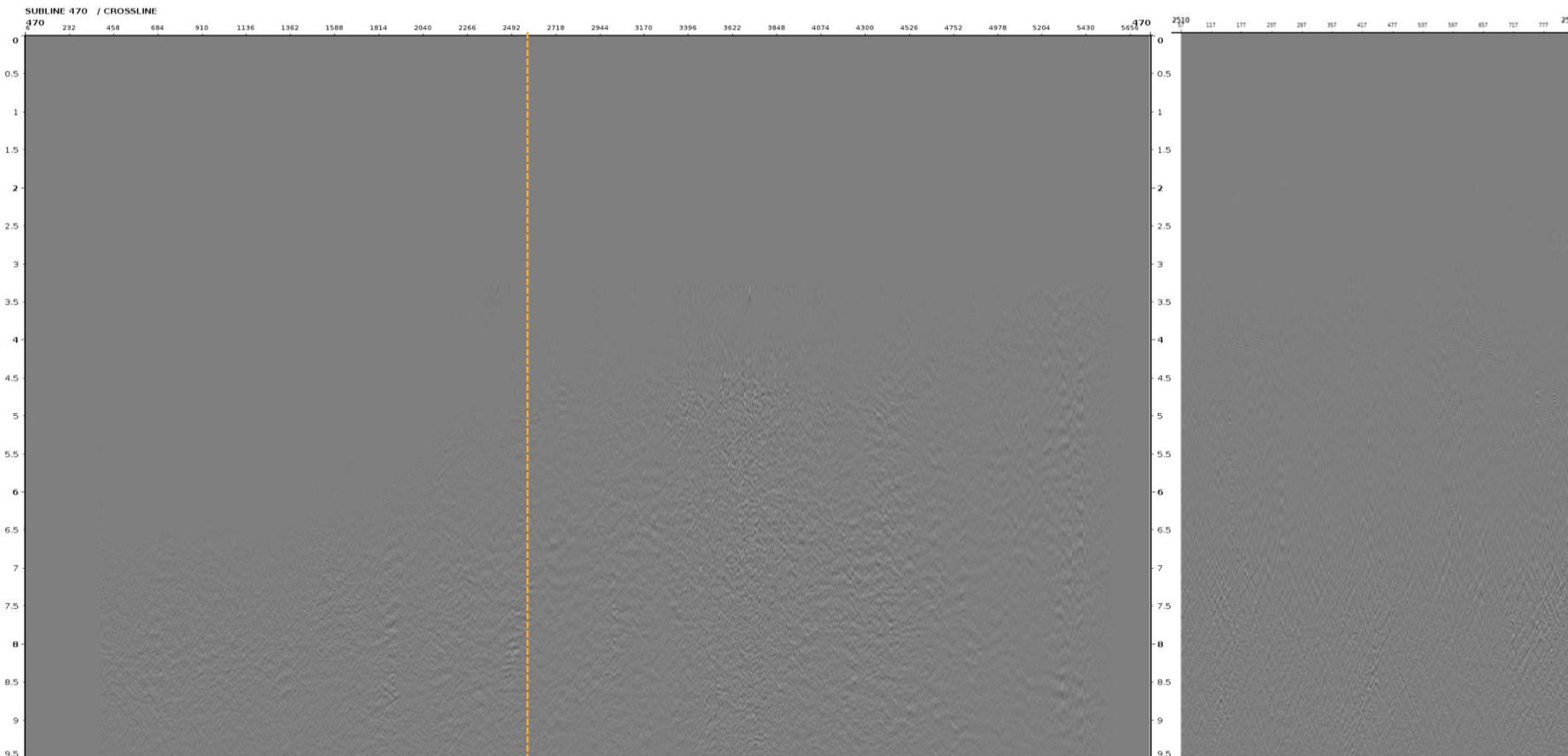


# IL 470 Common Offset 4050m **after** Common Offset Denoise





# Difference before - after

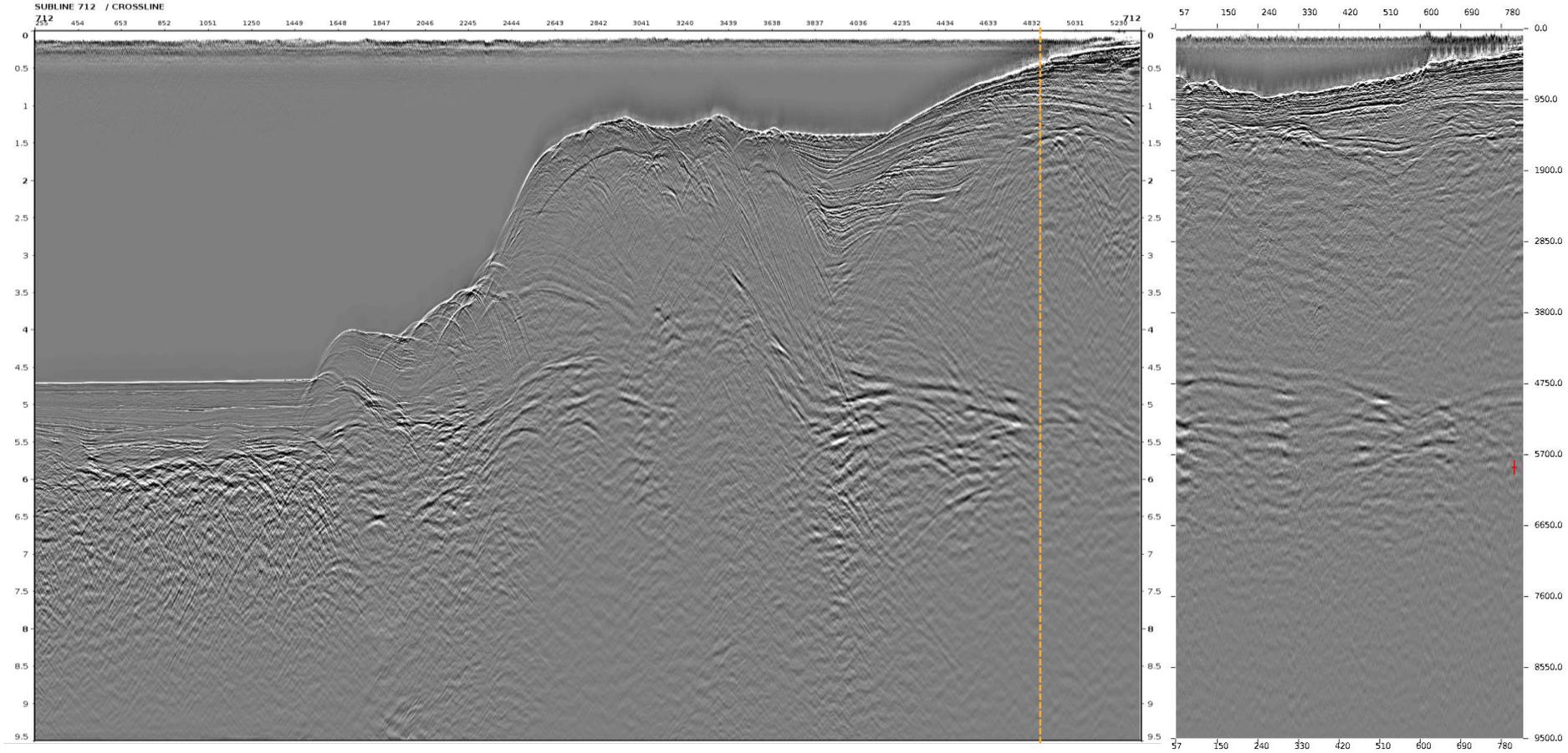


## Stack

- subline 230
- subline 470
- subline 712

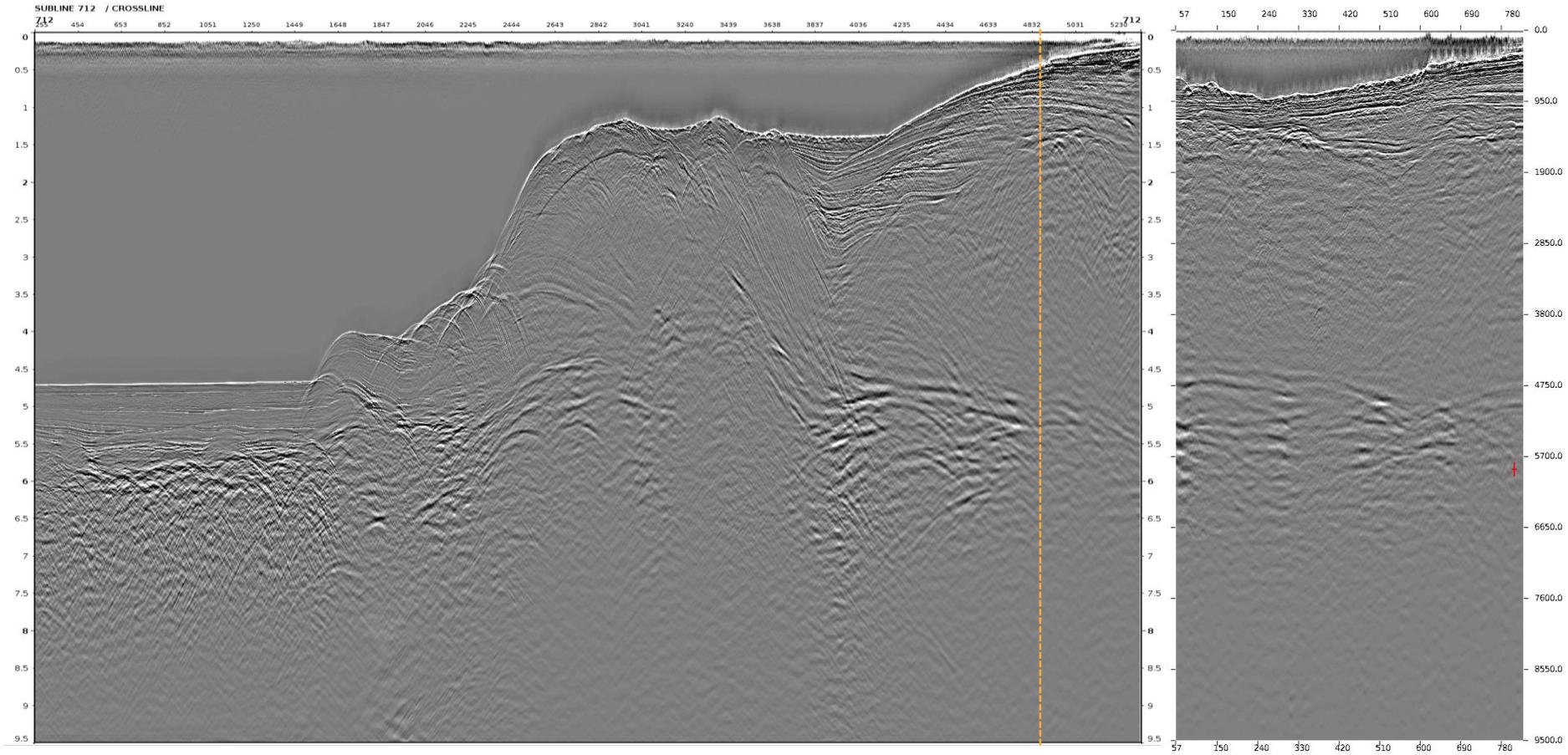


# Zoom in Stack before Common Offset Denoise



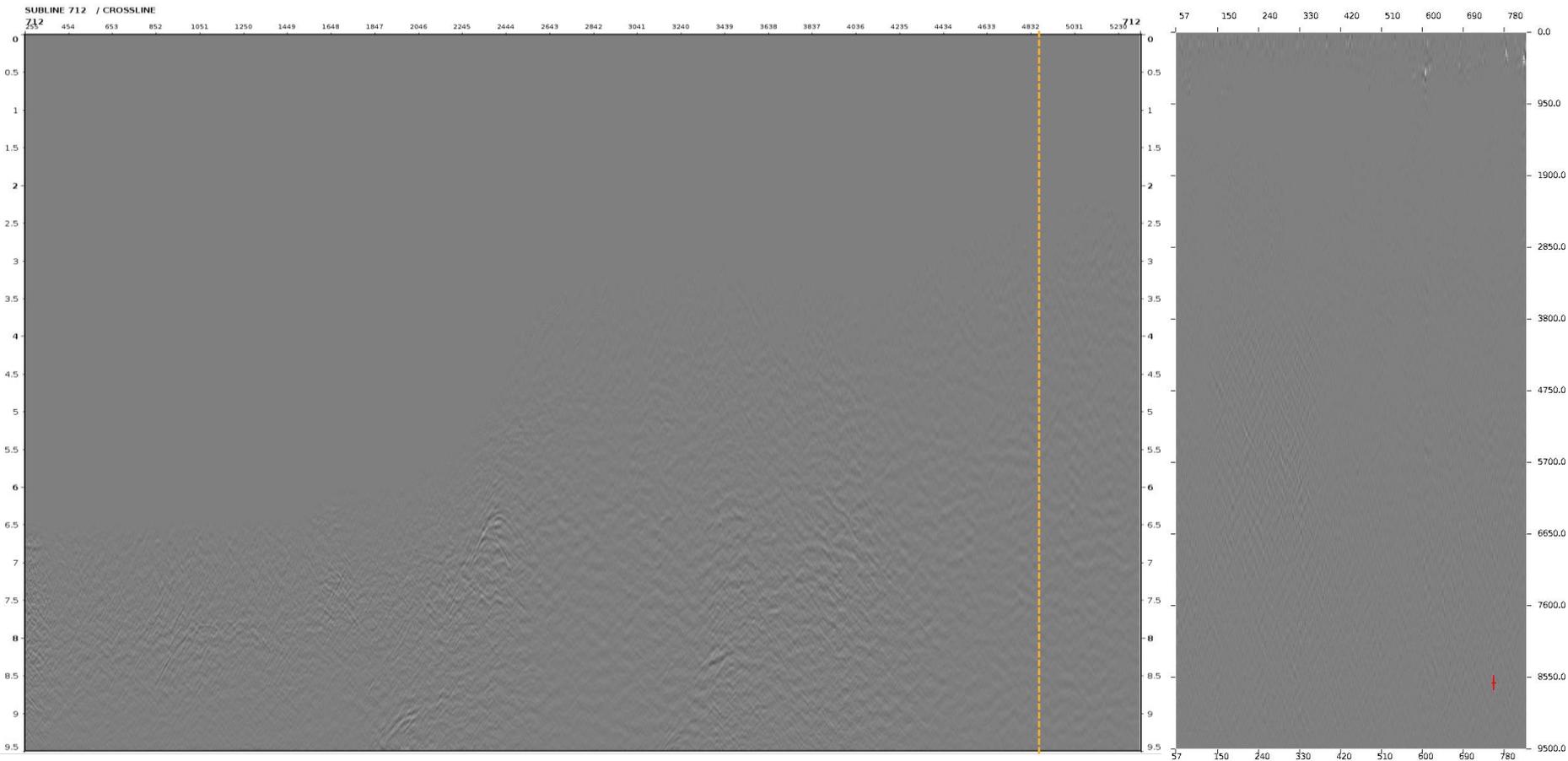


# Zoom in Stack after Common Offset Denoise



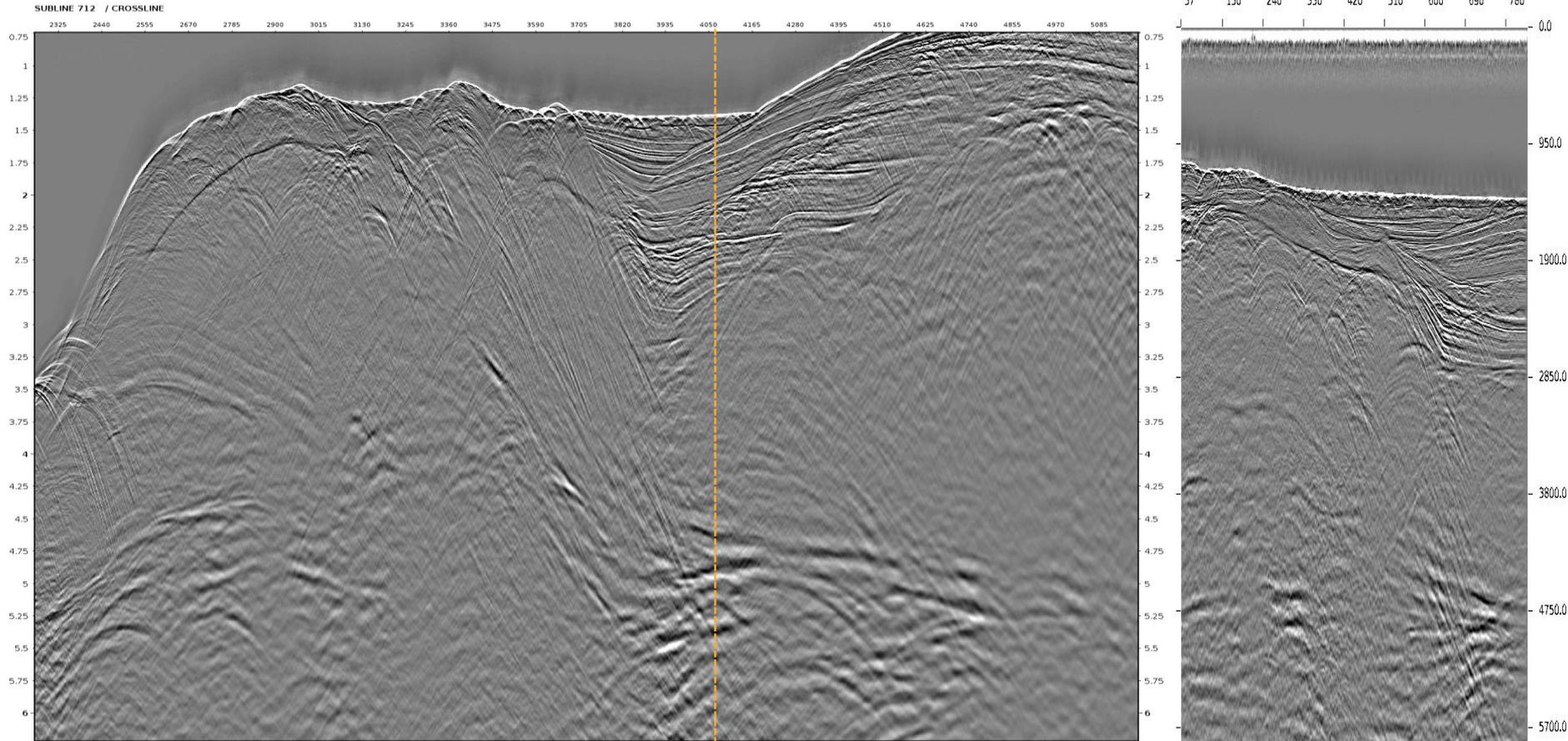


# Difference before - after



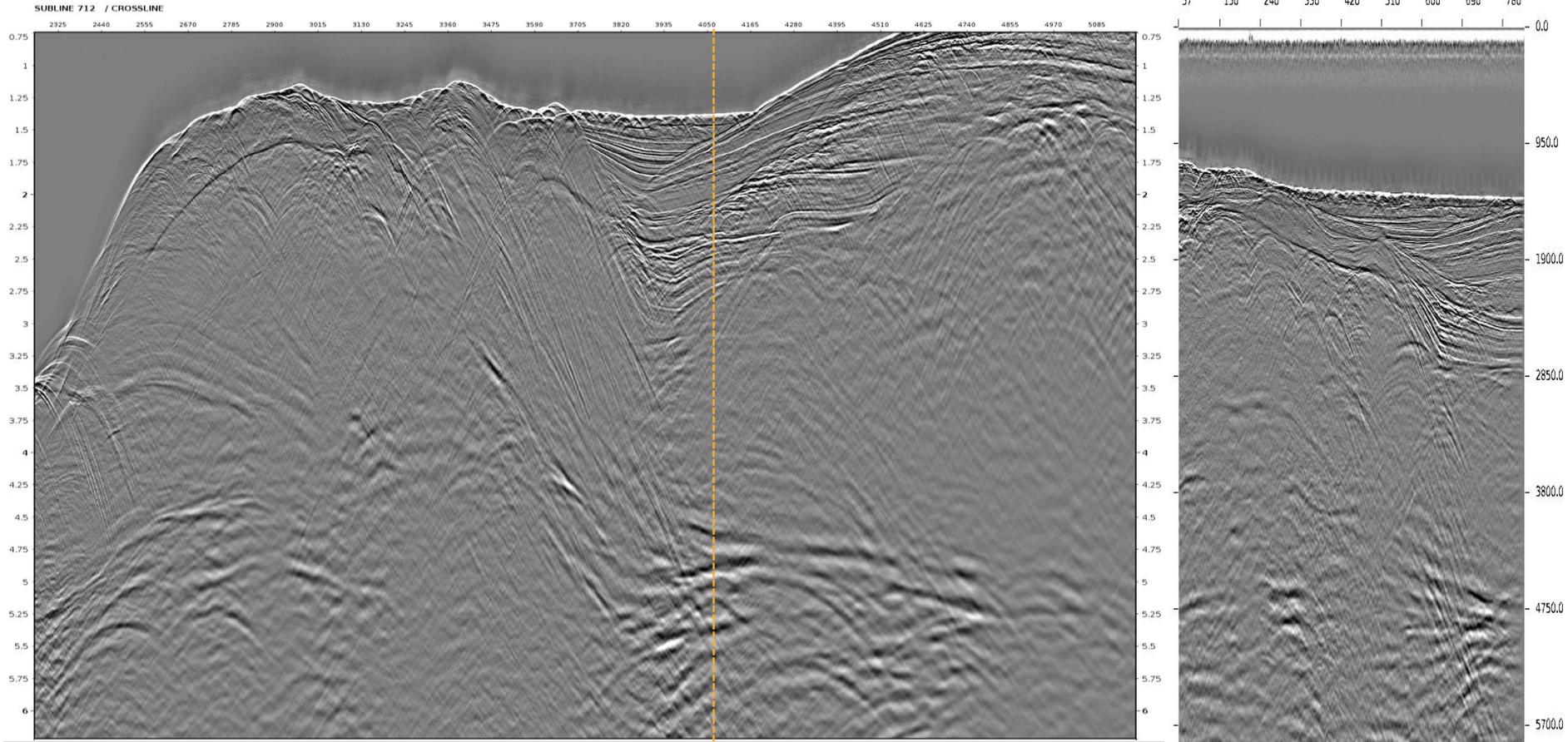


# Zoom in Stack before Common Offset Denoise



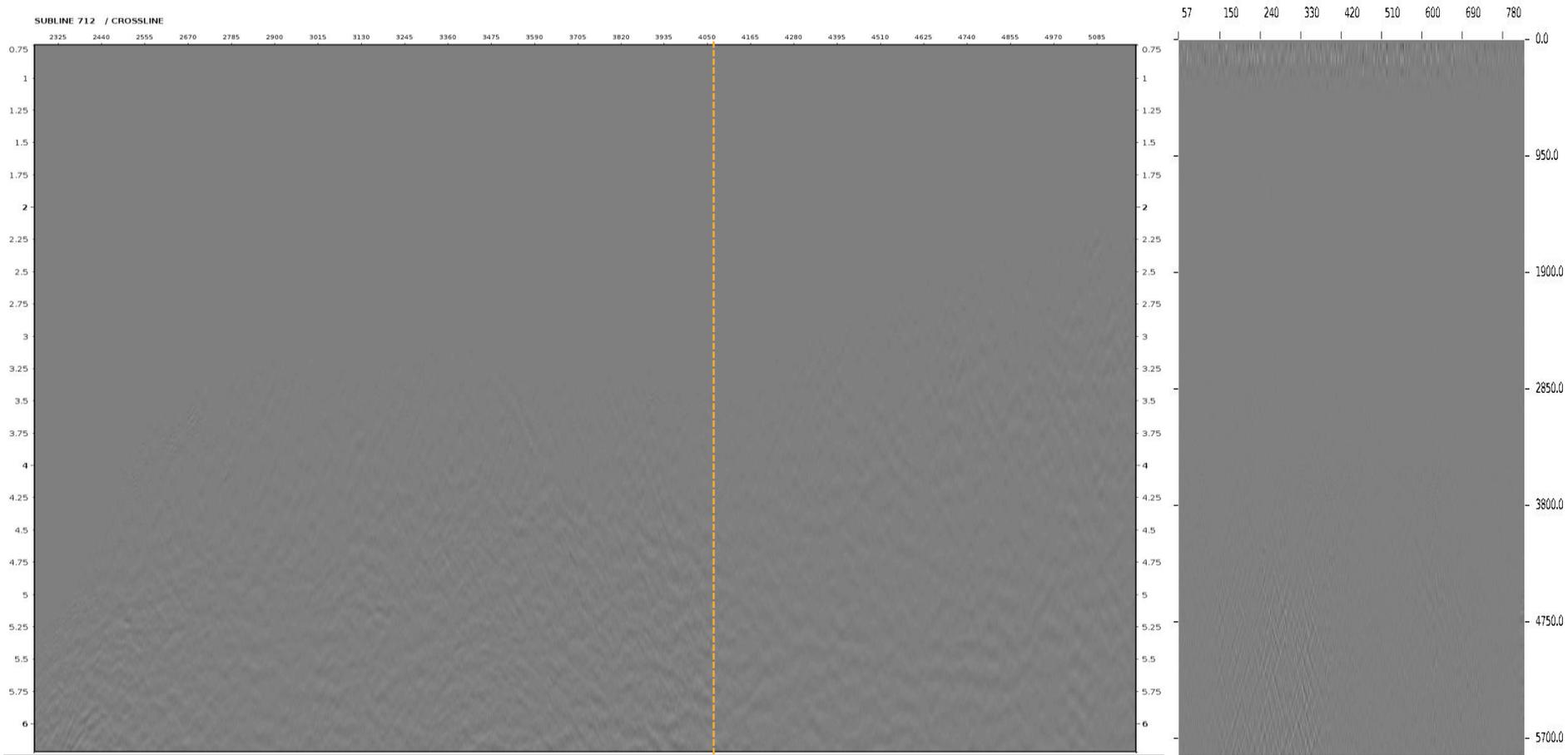


# Zoom in Stack after Common Offset Denoise



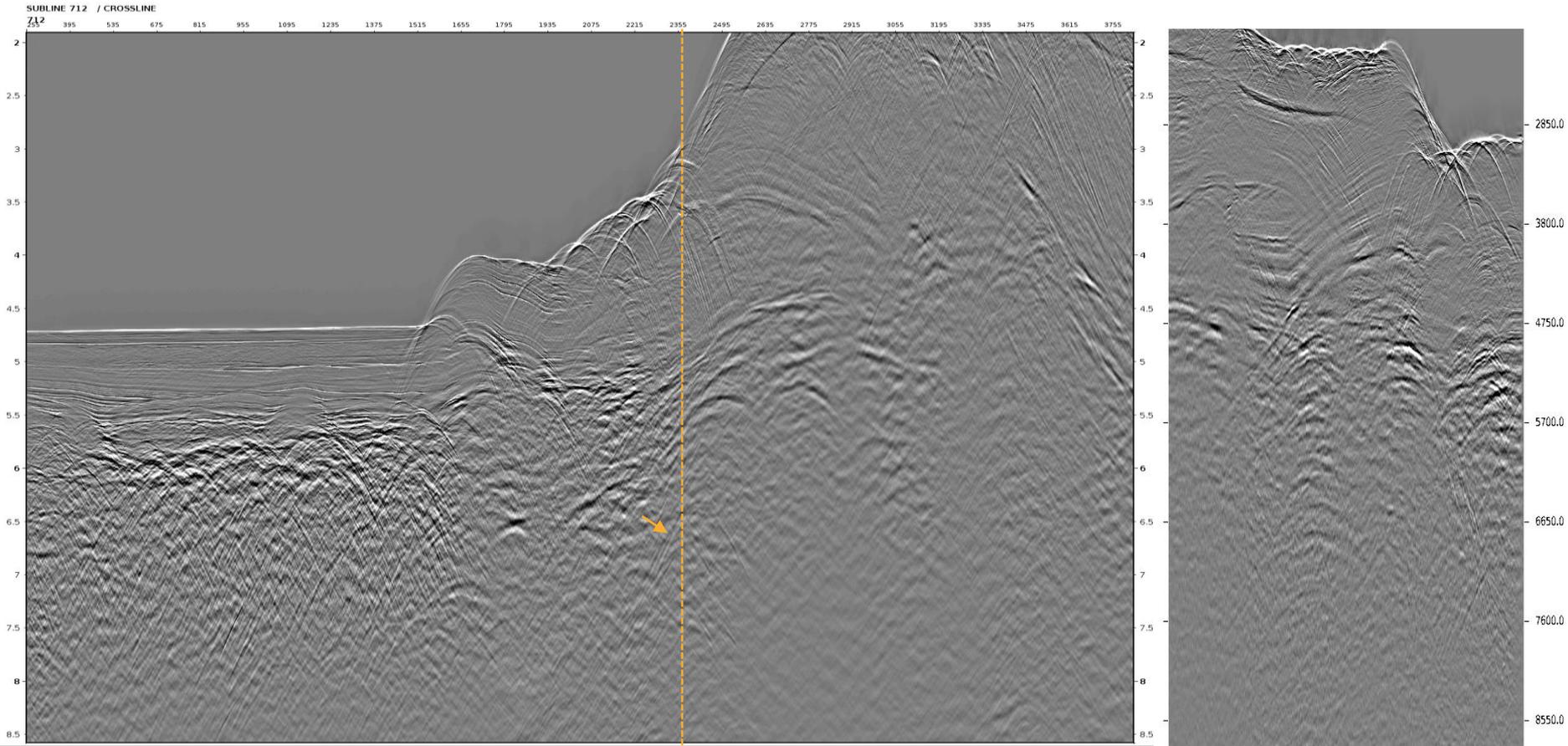


# Difference before - after



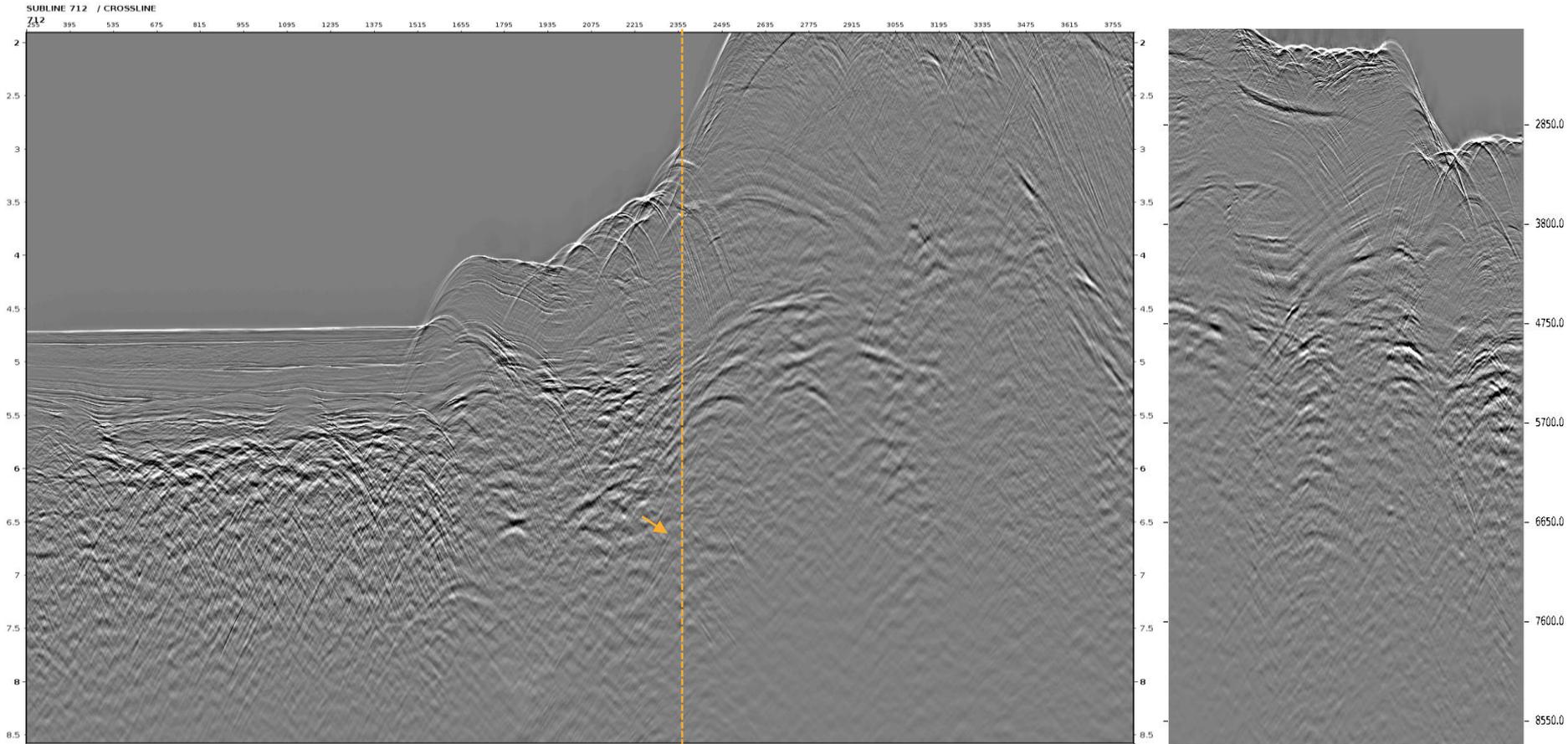


# Zoom in Stack before Common Offset Denoise

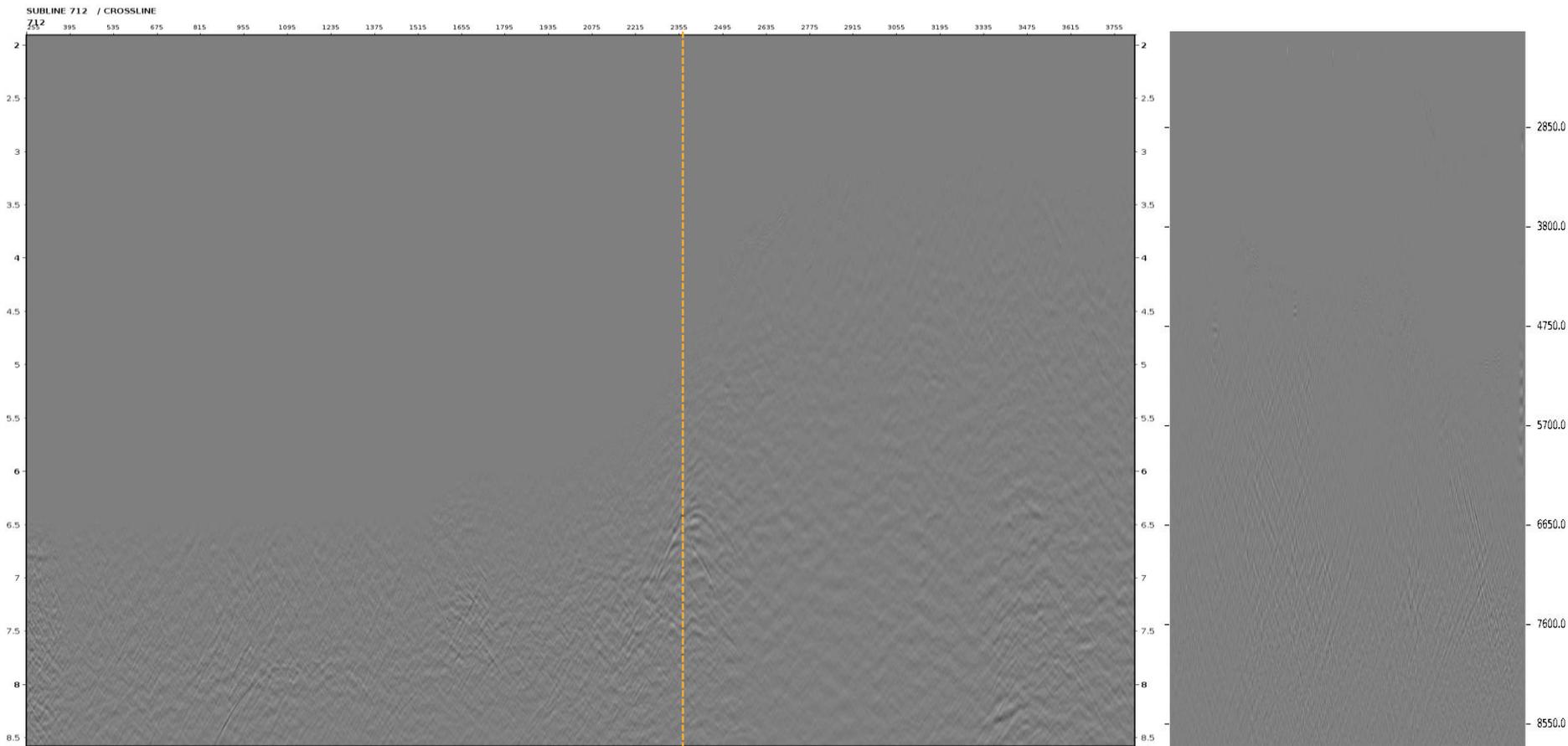




# Zoom in Stack after Common Offset Denoise



# Difference before - after



## Common Offset **Subline 712**

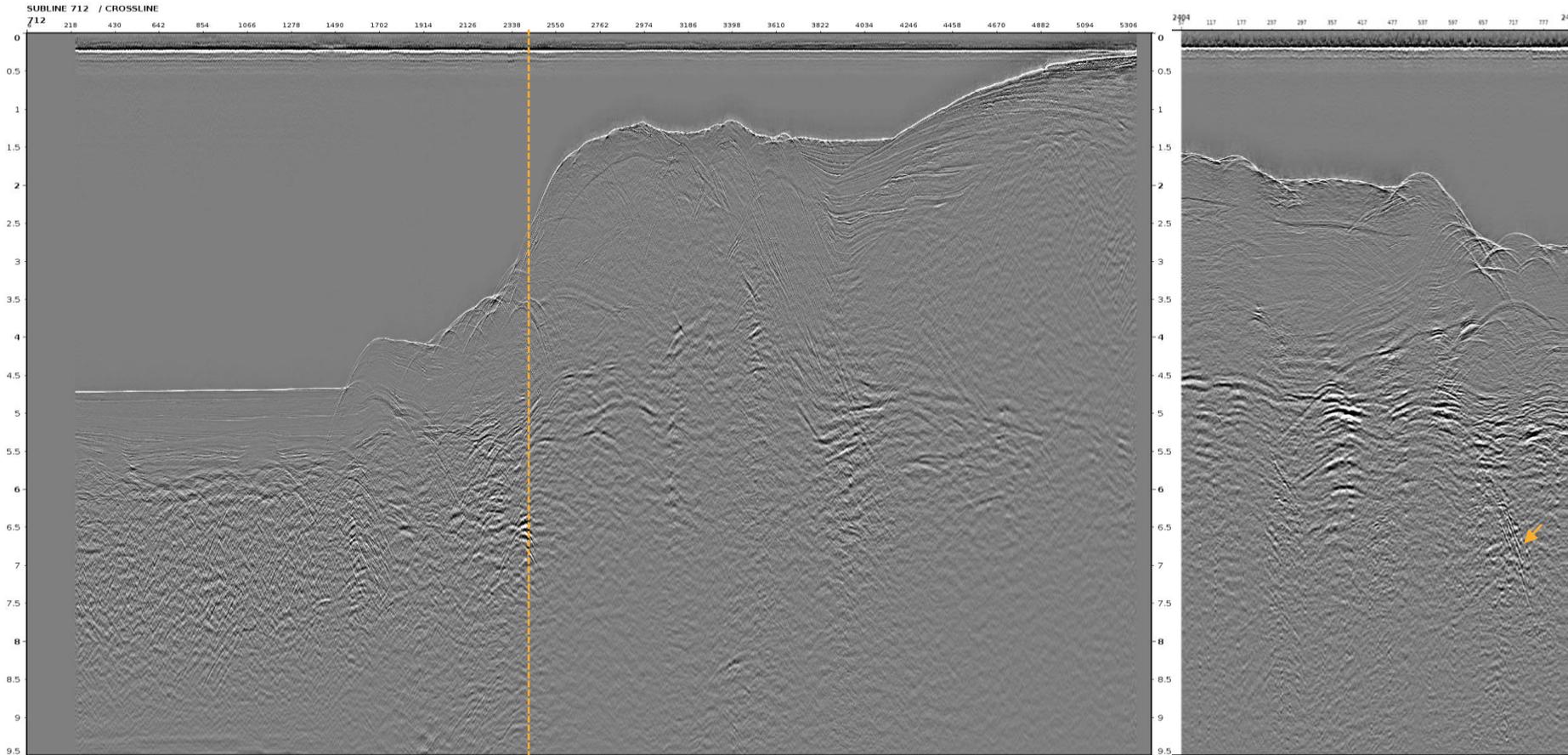
- offset 350m
- offset 1750m
- offset 4050m



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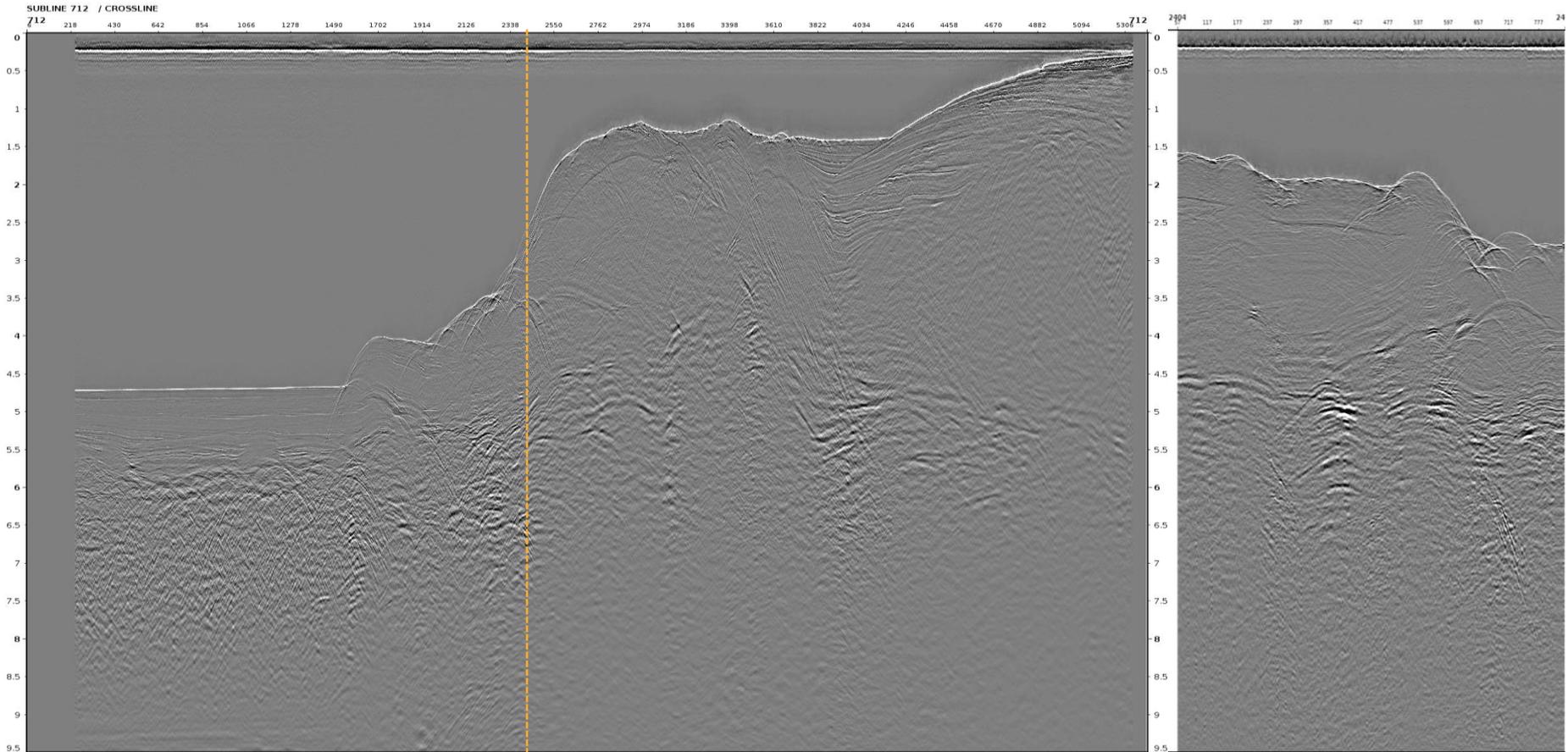


# IL 712 Common Offset 350m before Common Offset Denoise



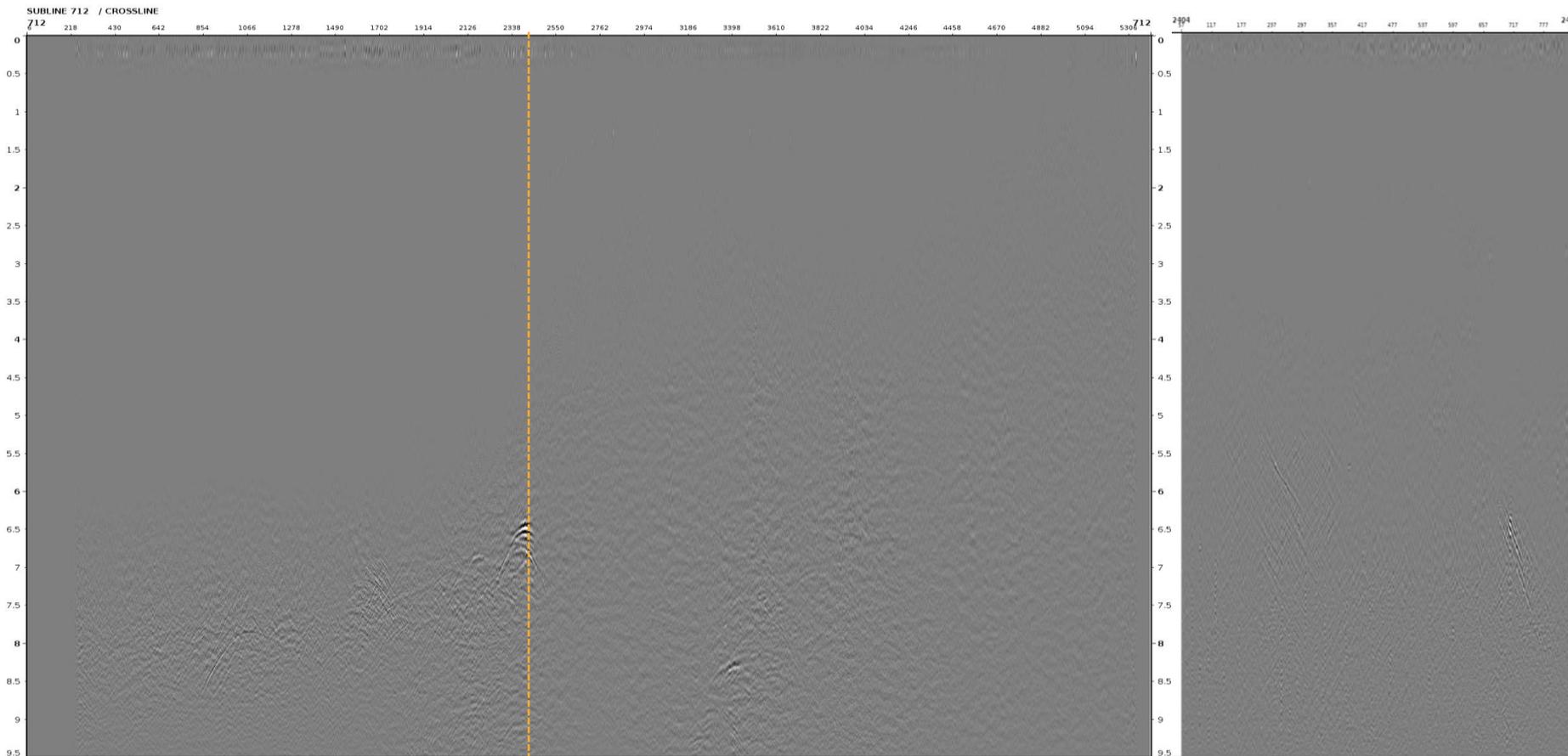


# IL 712 Common Offset 350m after Common Offset Denoise



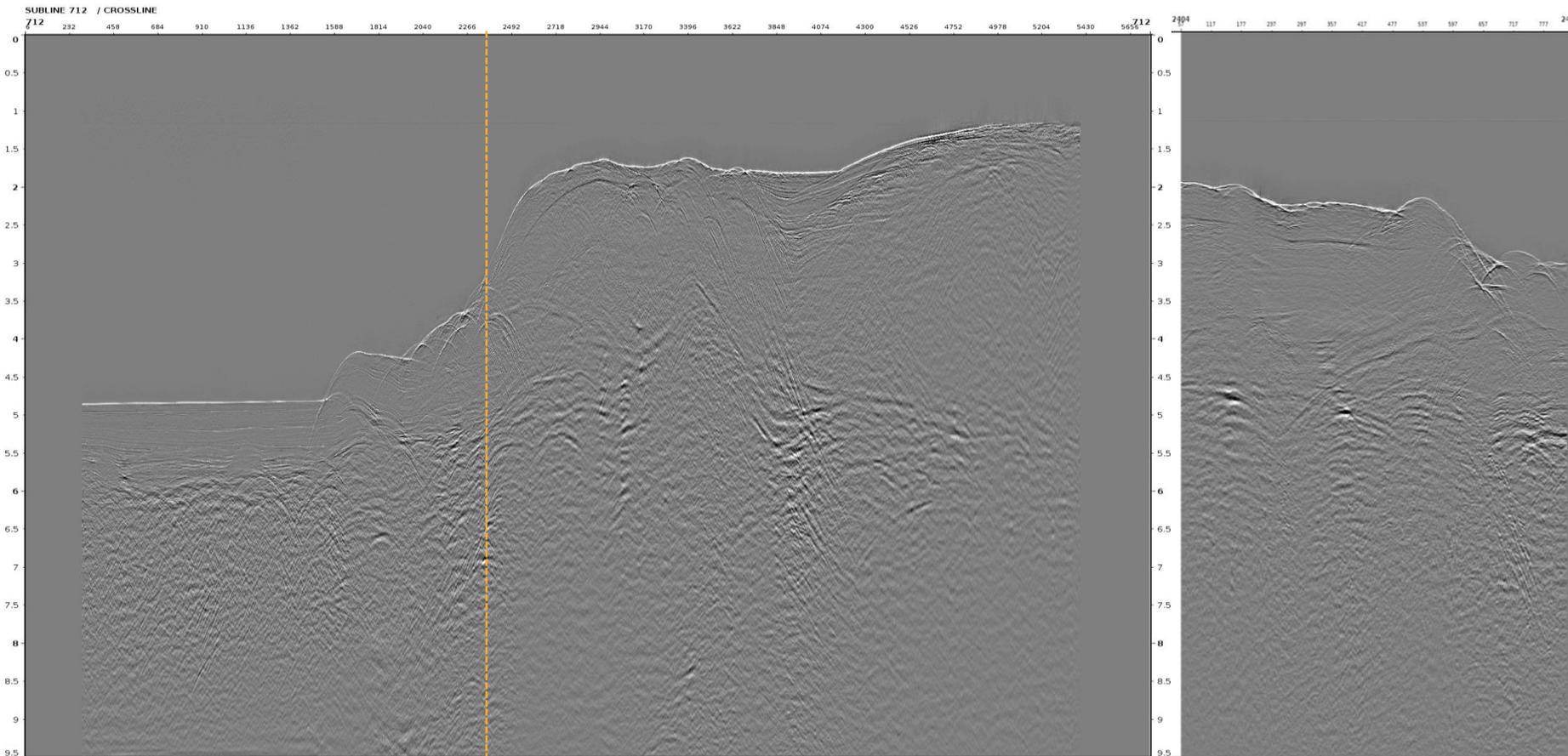


# Difference before - after



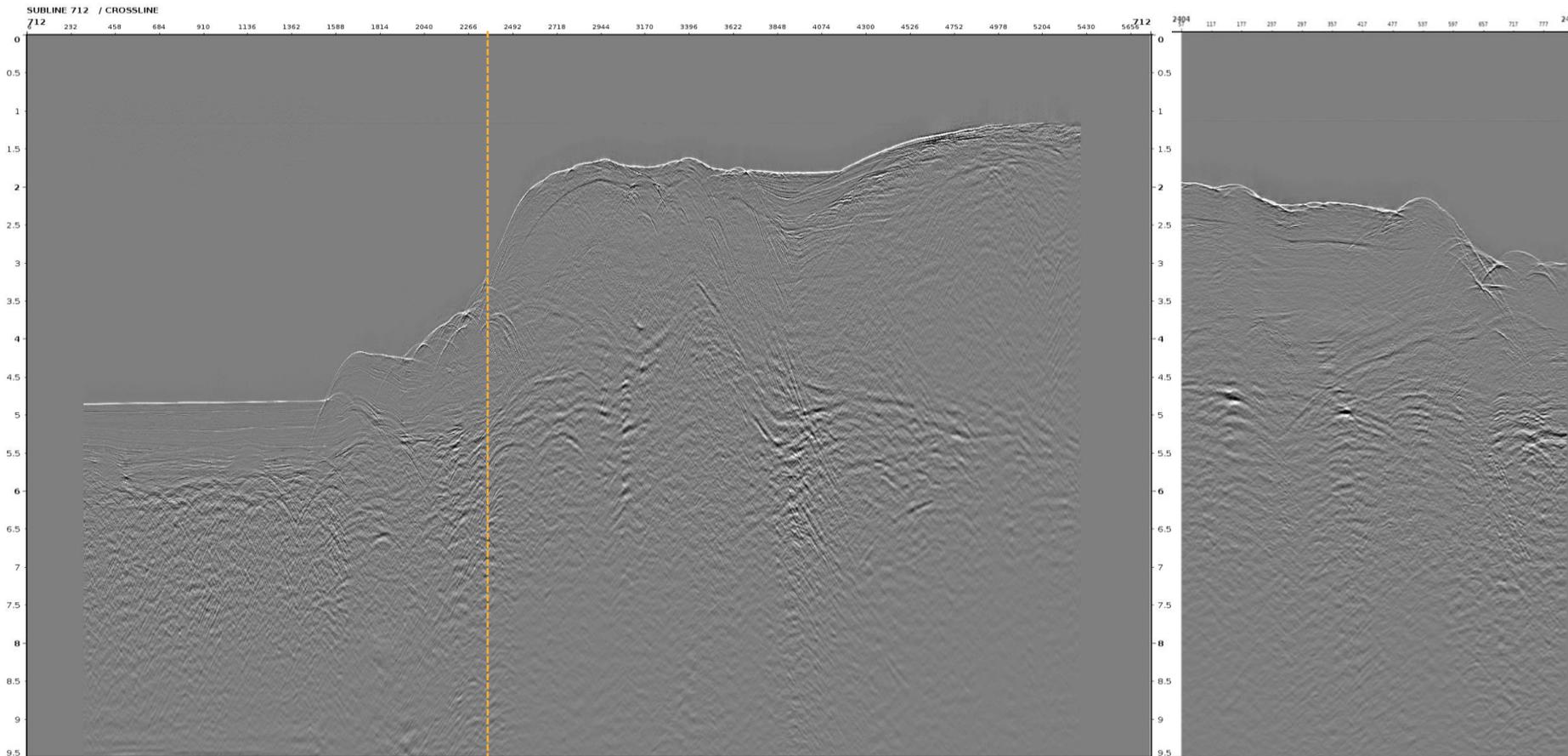


# IL 712 Common Offset 1750m before Common Offset Denoise

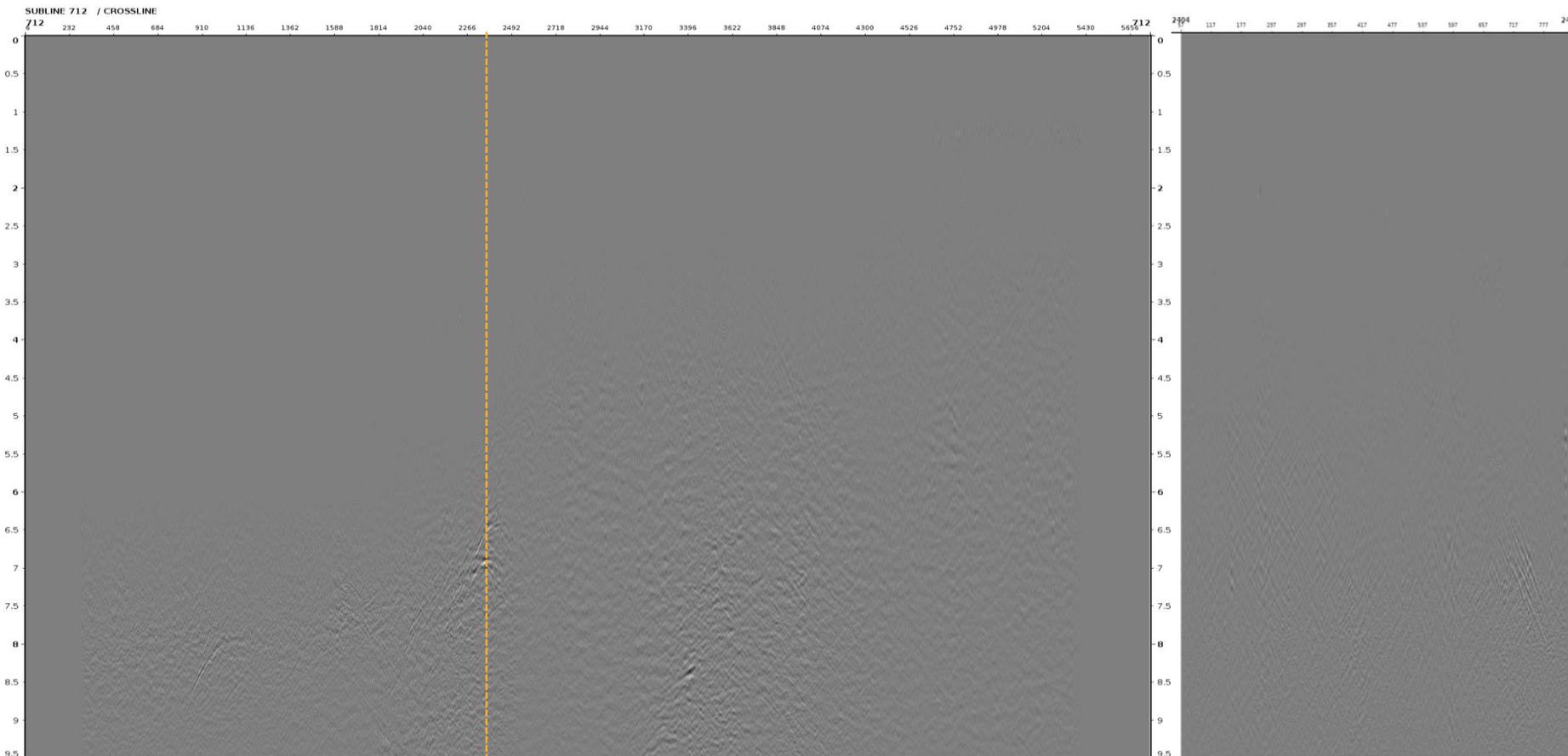




# IL 712 Common Offset 1750m **after** Common Offset Denoise

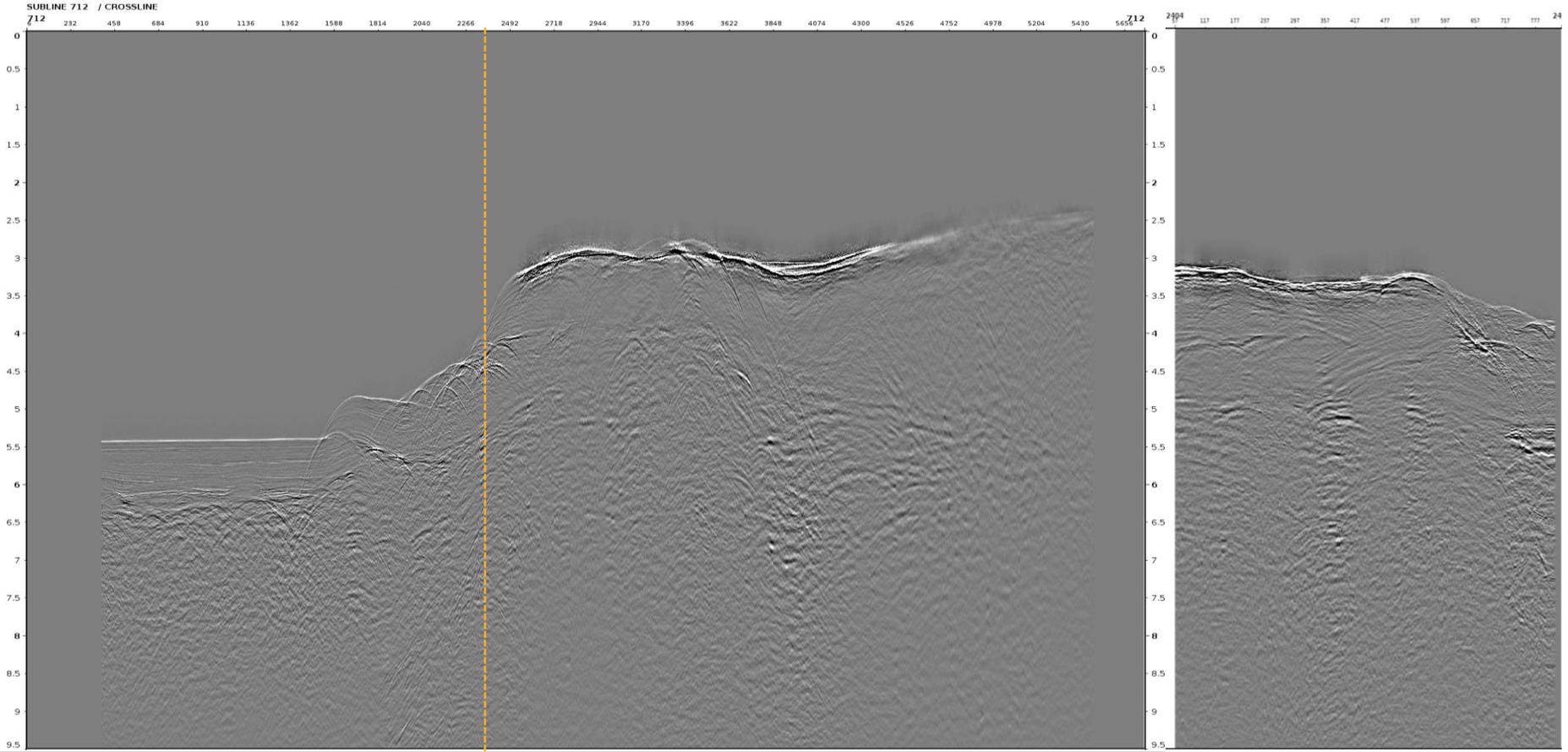


# Difference before - after



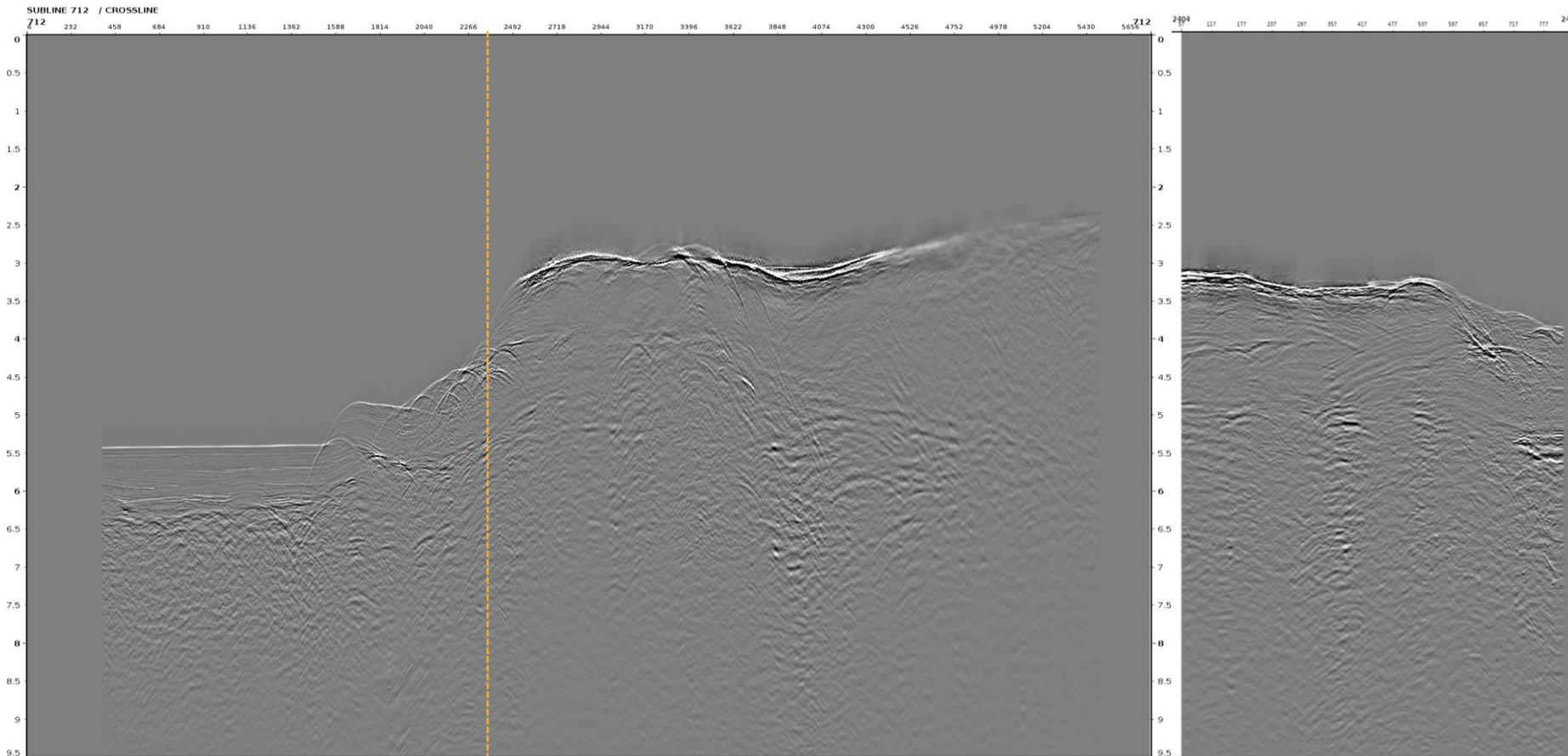


# IL 712 Common Offset 4050m **before** Common Offset Denoise



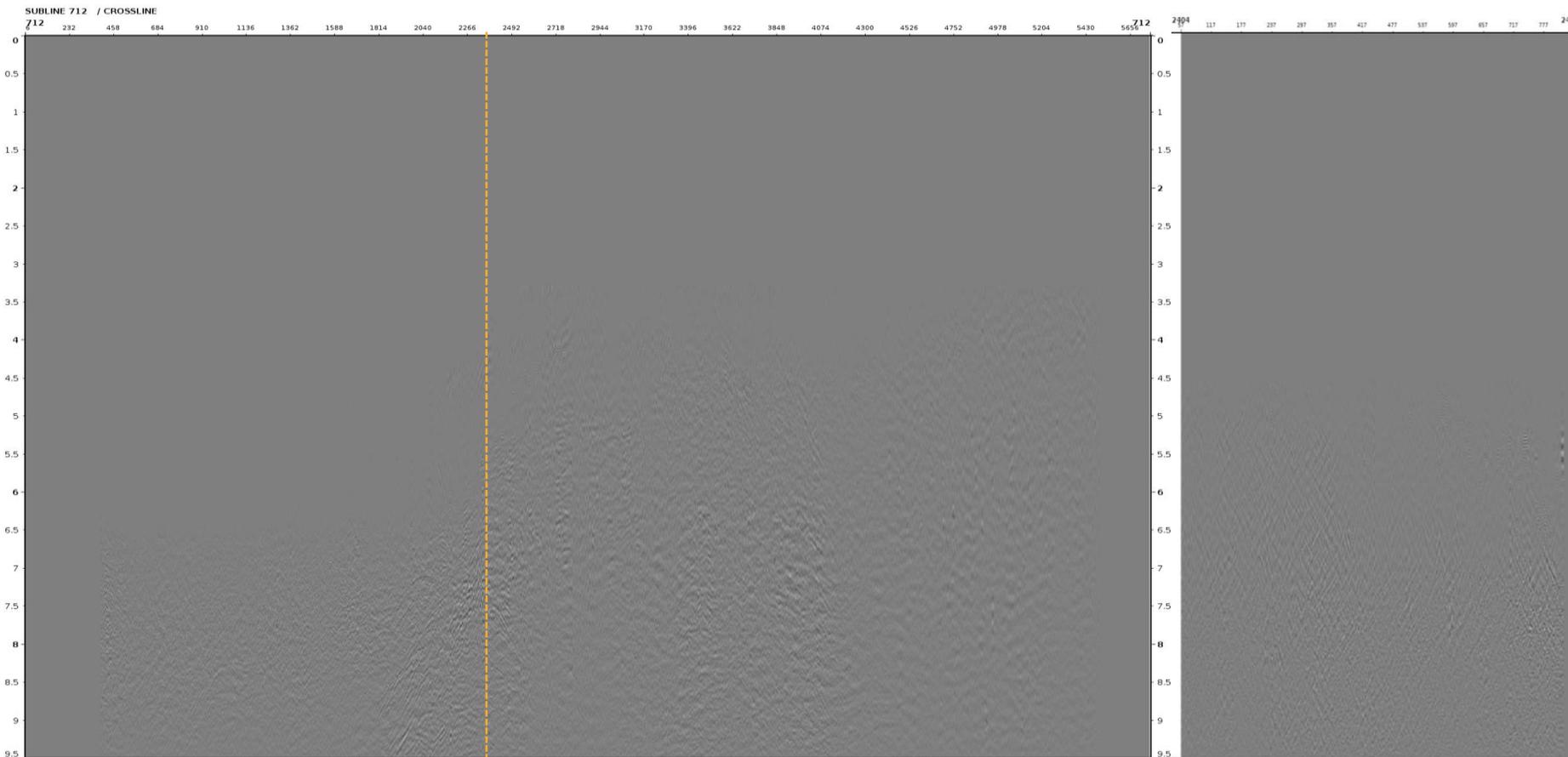


# IL 712 Common Offset 4050m **after** Common Offset Denoise





# Difference before - after



- Noise energy is attenuated from both crossline & subline view, which is beneficial for migration. We recommend to apply for production.