



# Footprint removal

## NZ 3D Processing

3 August 2021

[cgg.com](http://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
20. Velocity Analysis
21. Radon Demultiple
22. Footprint Removal
23. Diffracted Multiple Removal
24. Common Offset Denoise
25. Q Analysis and Compensation
26. Final TTI Kirchhoff Migration
27. Convert from Depth to Time Domain
28. High Density Automatically Velocity Analysis
29. Radon Demultiple
30. Trim Static Correction
31. Post Migration Denoise
32. Q Compensation (Amplitude)
33. Spectra Offset Balancing
34. Angle Mute & Full Stack
35. Residual Noise Attenuation
36. Frequency Dependent Amplitude Correction for Spatial Amplitude
37. Bandwidth Enhancement
38. Footprint Removal

- **Objective:**

To further remove amplitude variations due to acquisition footprint.

- **Procedure:**

- Calculate RMS amplitude at every 500ms consecutively starting from WBT-30.
- Smooth amplitudes in subline direction to remove effect of geology from the amplitude maps.
- Apply smoothing with 500m (diameter) on amplitude map to compute the scalars for each window.
- Apply the scalar on input data to remove footprint.

- **Display:**

- Amplitude map, full and angle stack.
- Selected crossline.

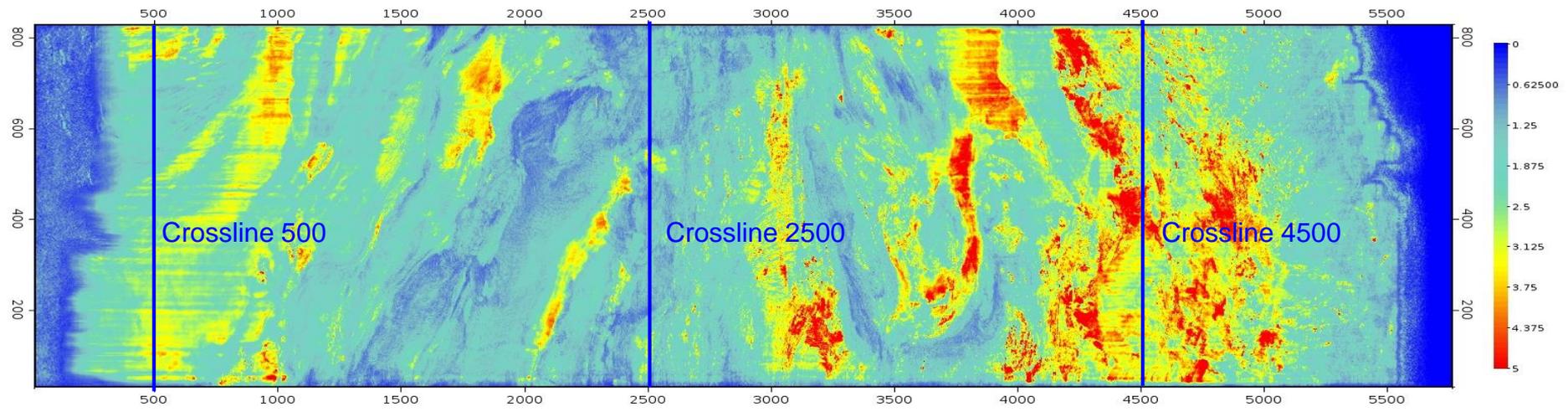
- **Observation & Recommendation:**

- The acquisition footprint observed on amplitude map is attenuated.
- It's recommend to apply footprint removal for production.



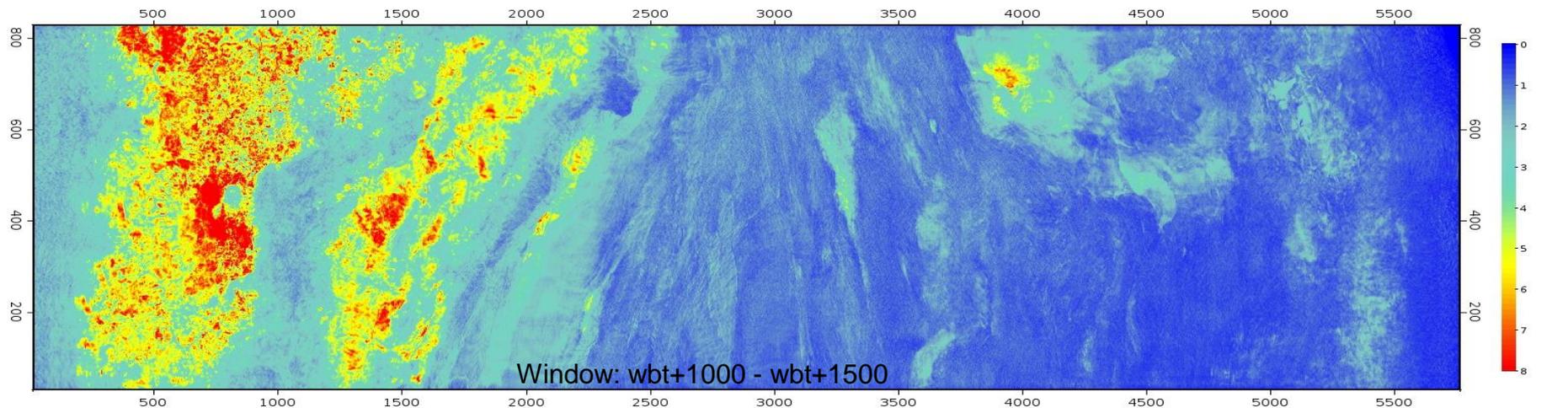
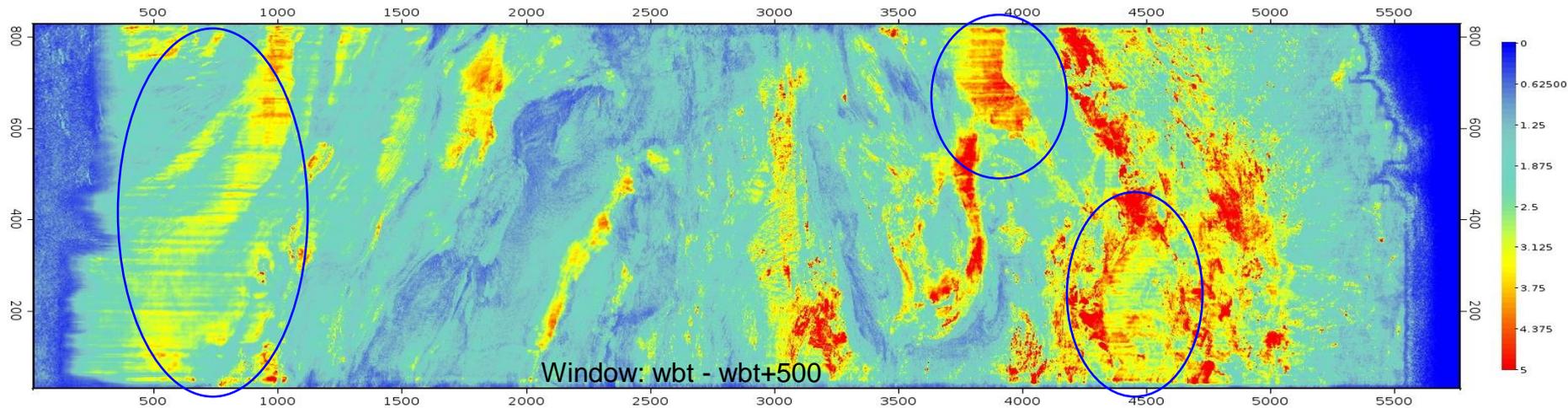
# Display Lines location

- Crossline 500, 2500, 4500

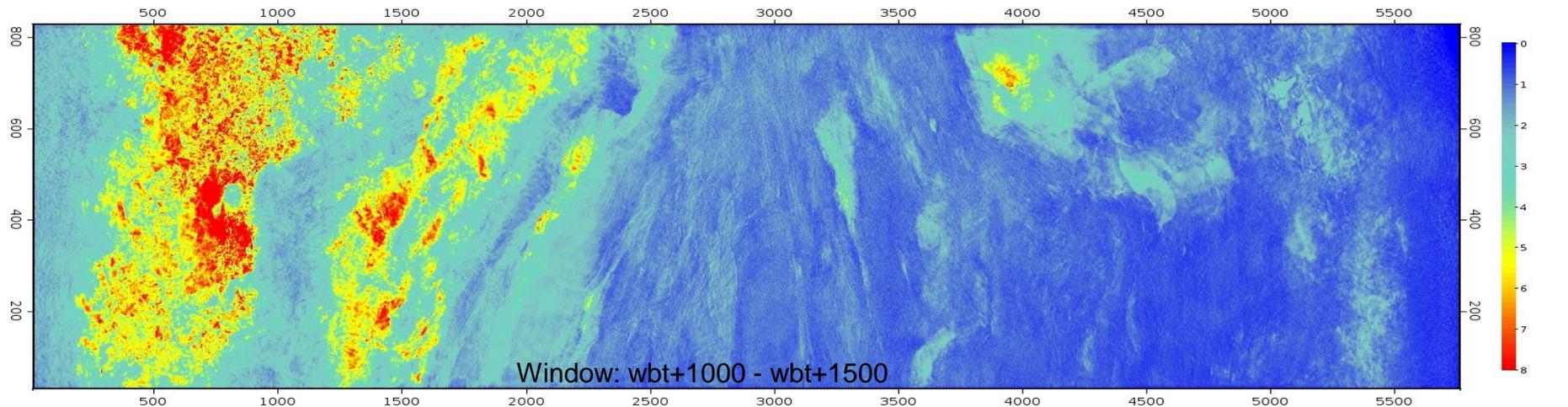
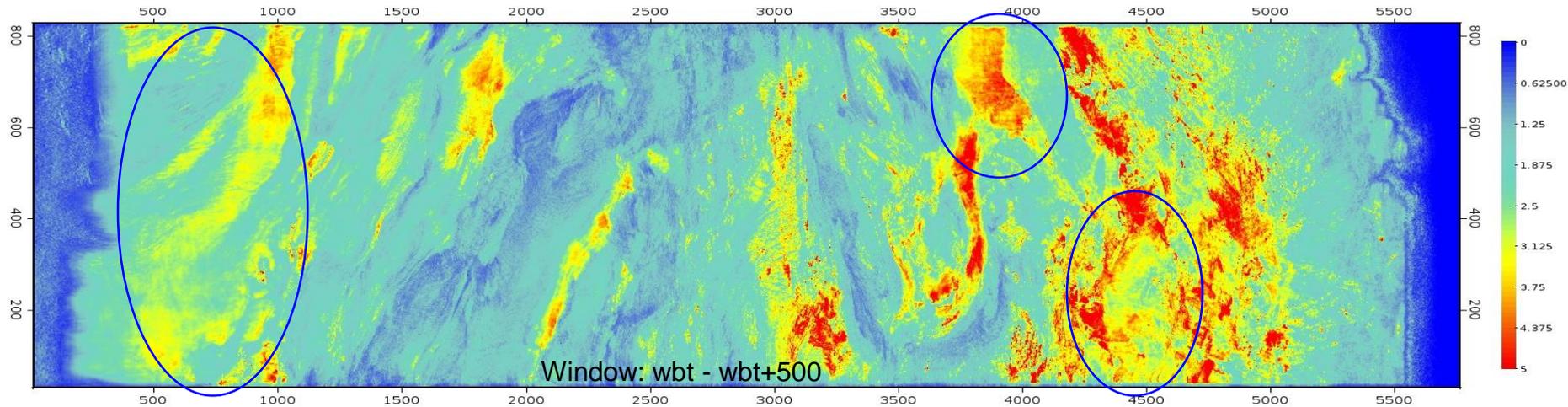


# Full Stack

# Amplitude map: before footprint removal

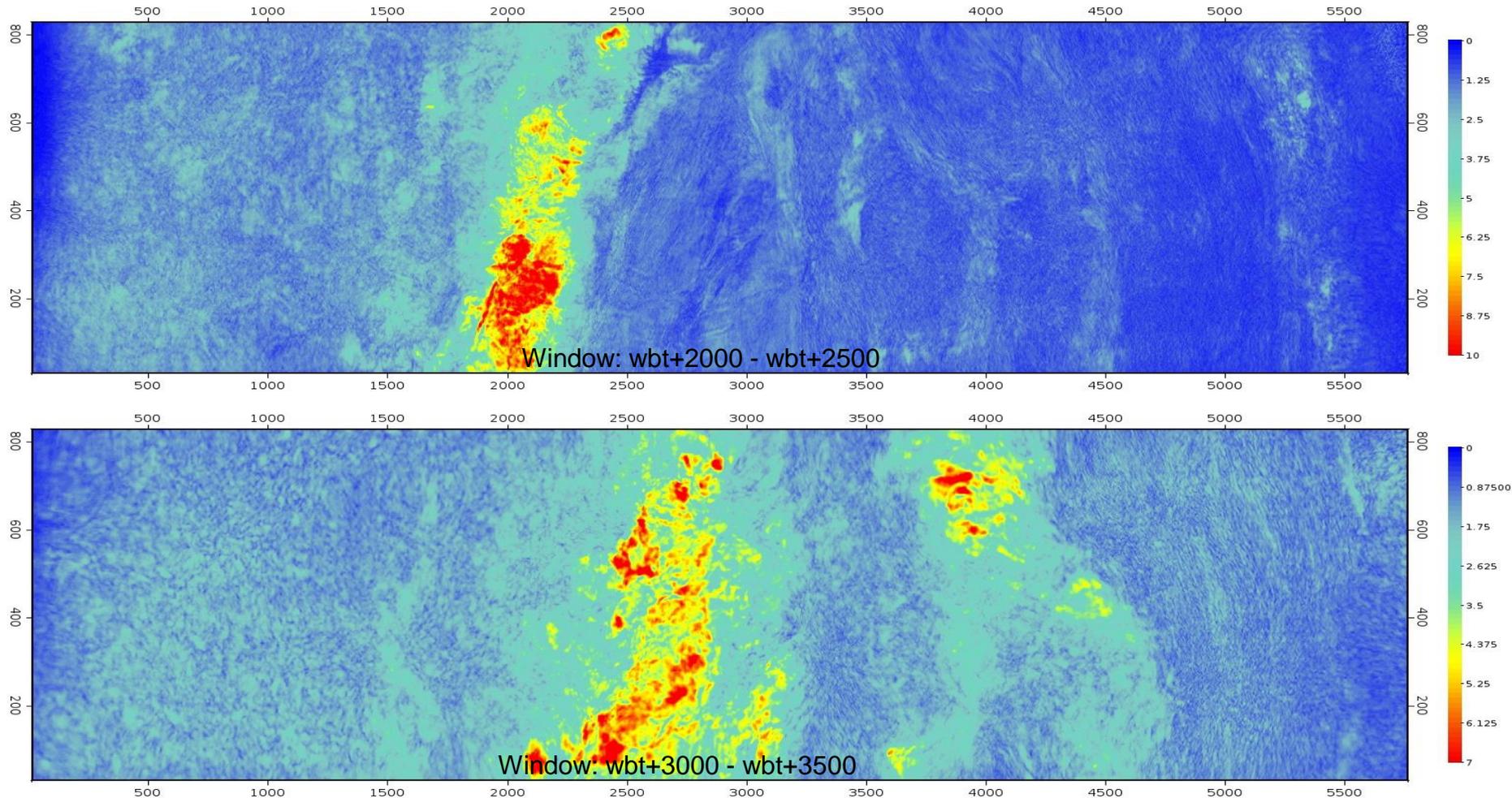


# Amplitude map: **after** footprint removal

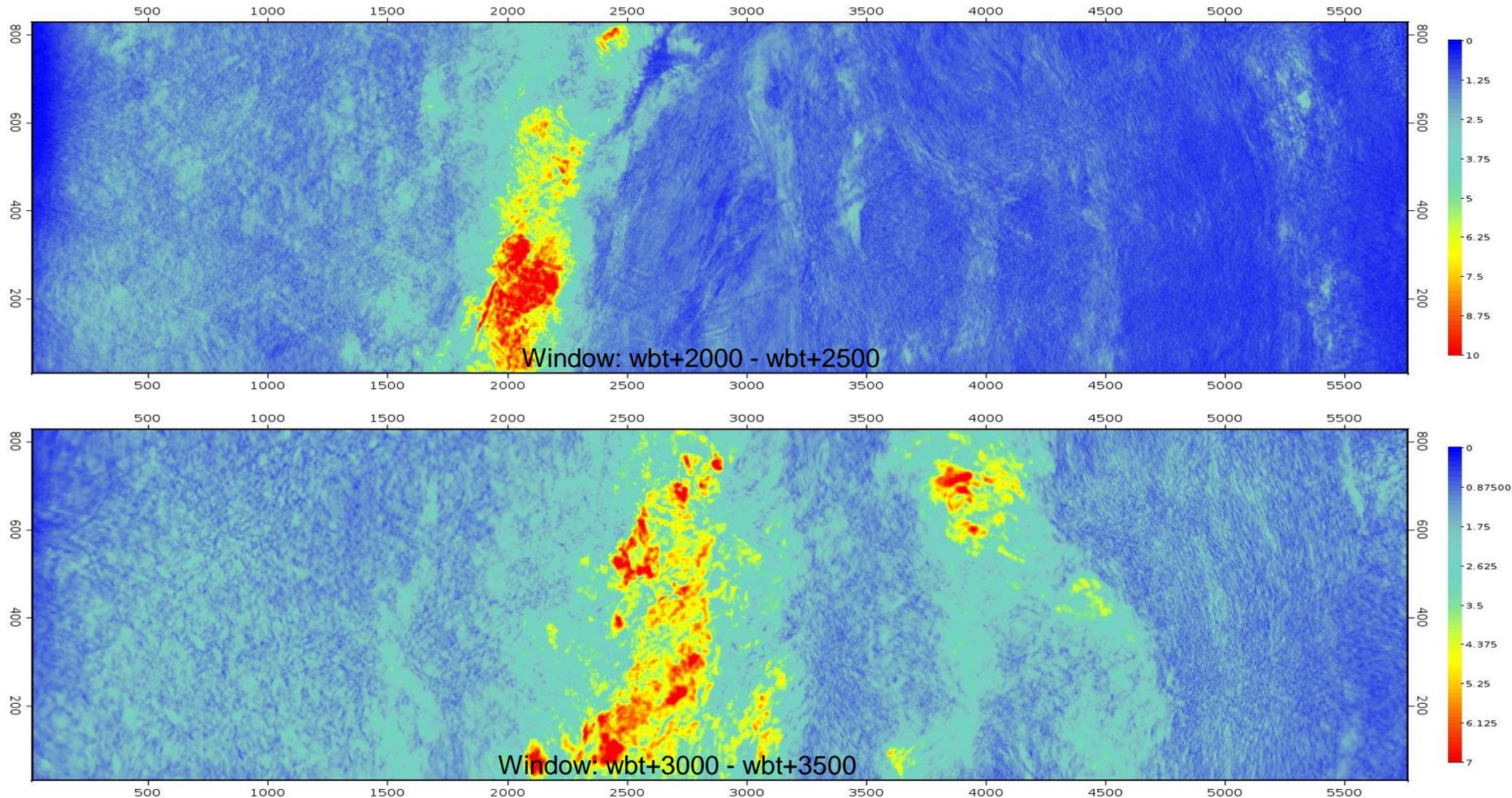




# Amplitude map: before footprint removal

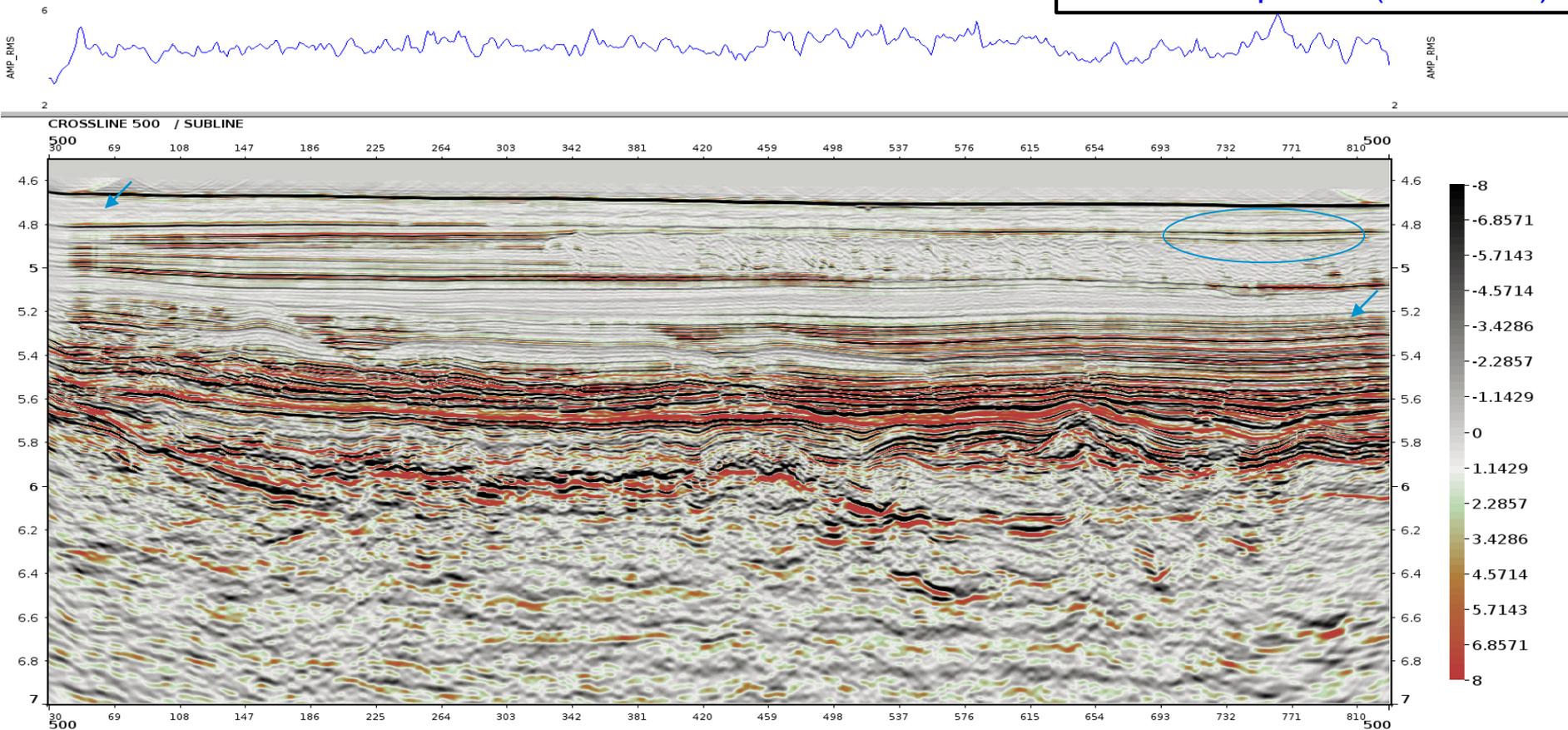


# Amplitude map: **after** footprint removal



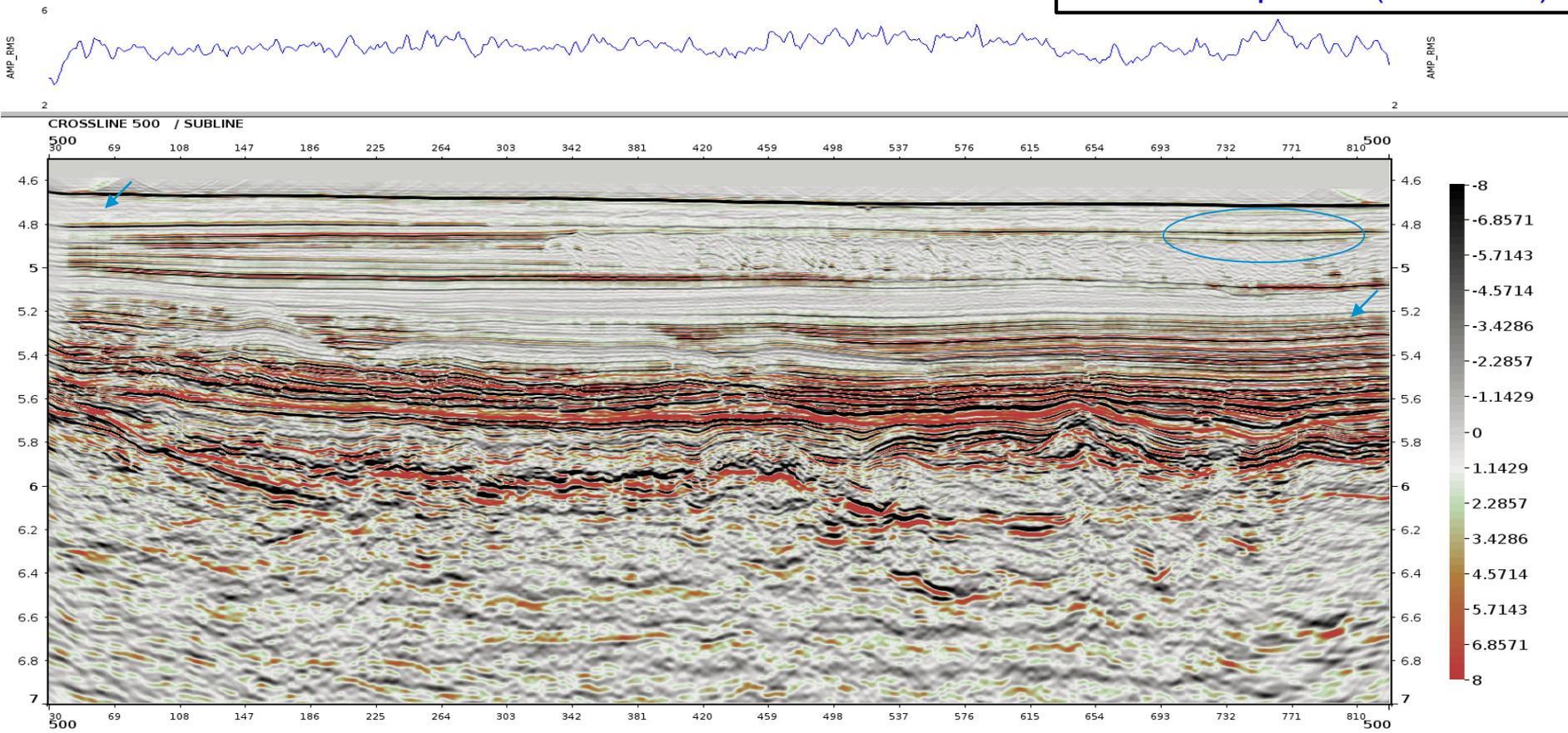
# Crossline 500: before footprint removal

— RMS amplitude (wbt - 9.5s)



# Crossline 500: after footprint removal

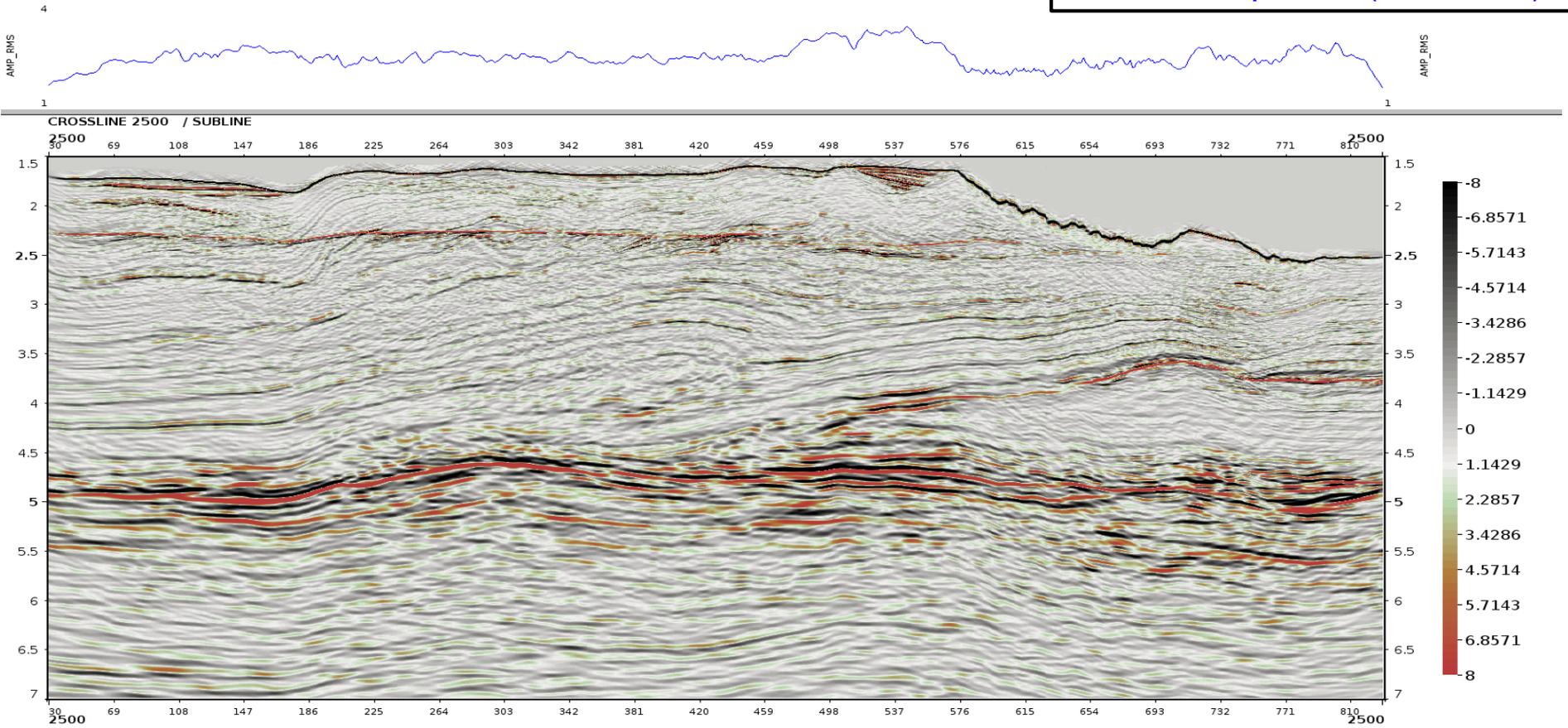
— RMS amplitude (wbt - 9.5s)





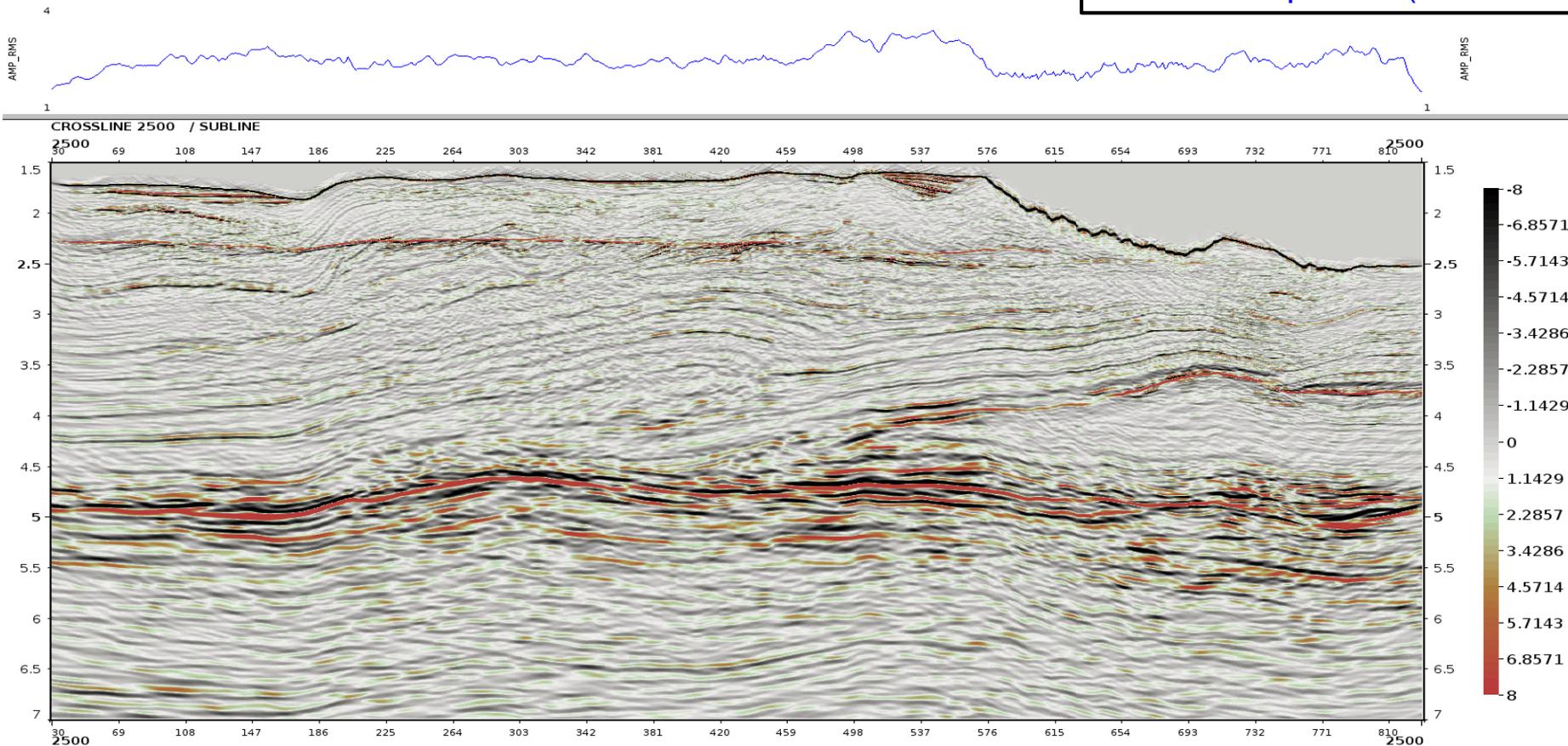
# Crossline 2500: before footprint removal

— RMS amplitude (wbt - 9.5s)



# Crossline 2500: after footprint removal

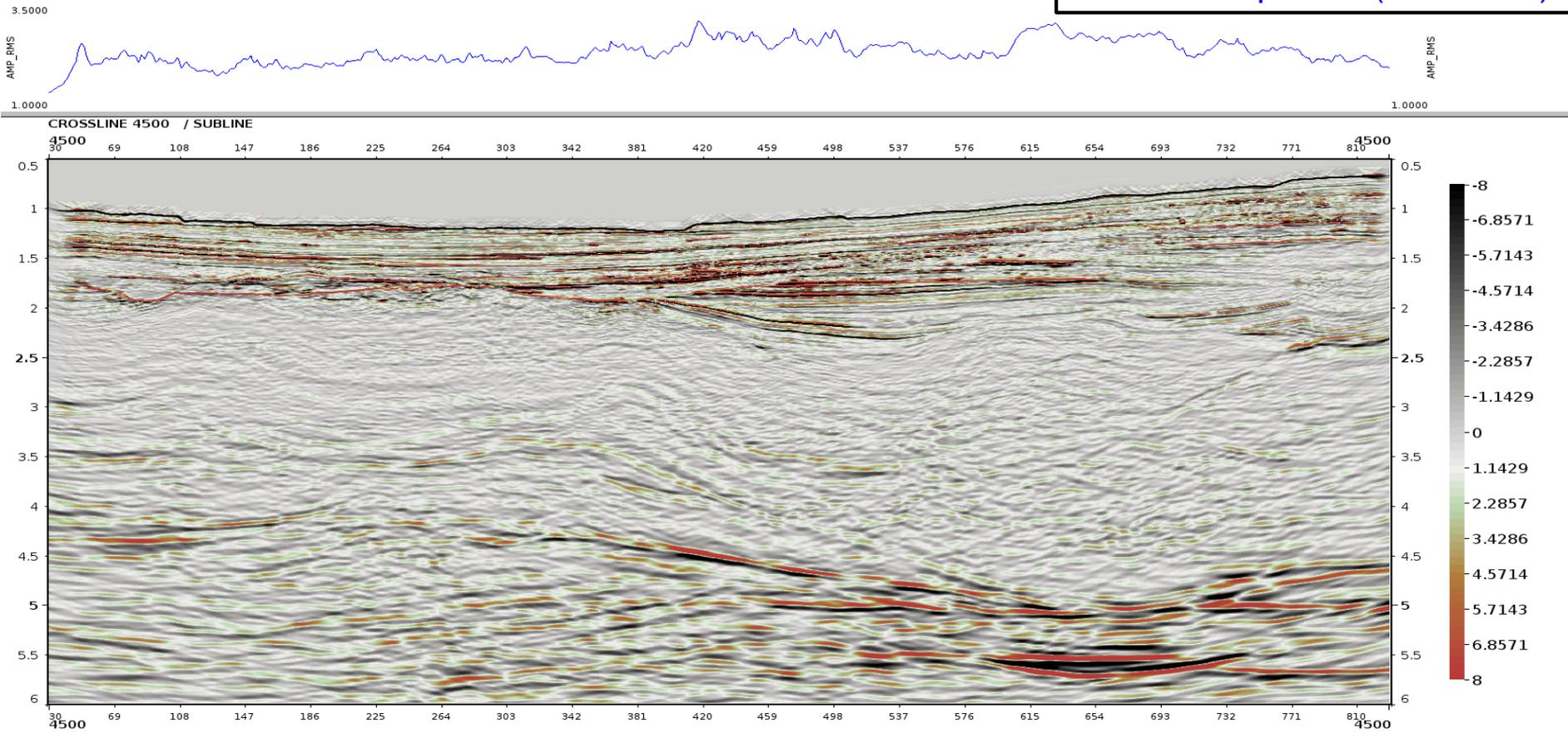
— RMS amplitude (wbt - 9.5s)





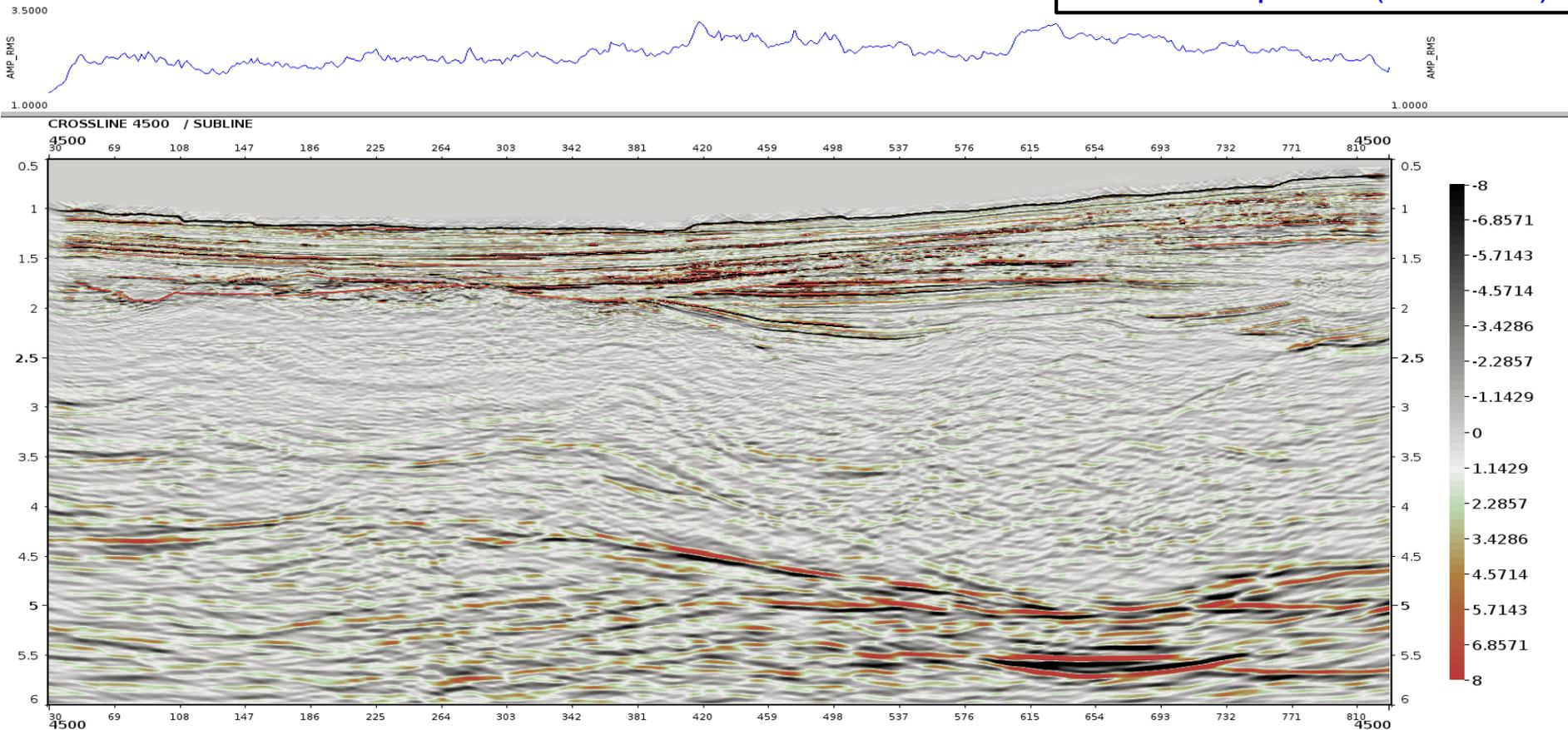
# Crossline 4500: before footprint removal

— RMS amplitude (wbt - 9.5s)



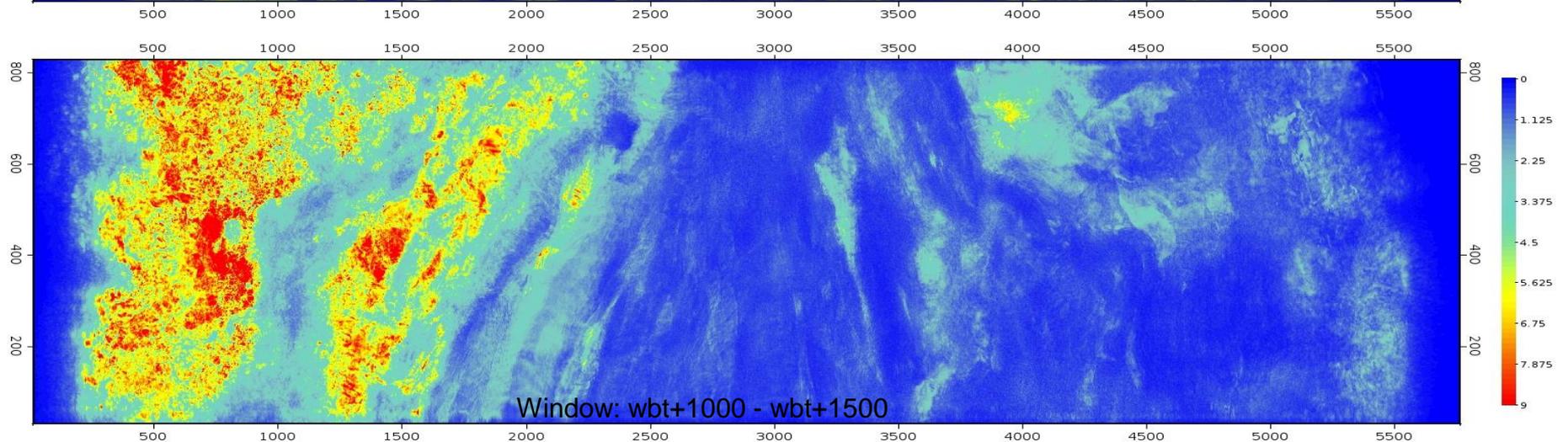
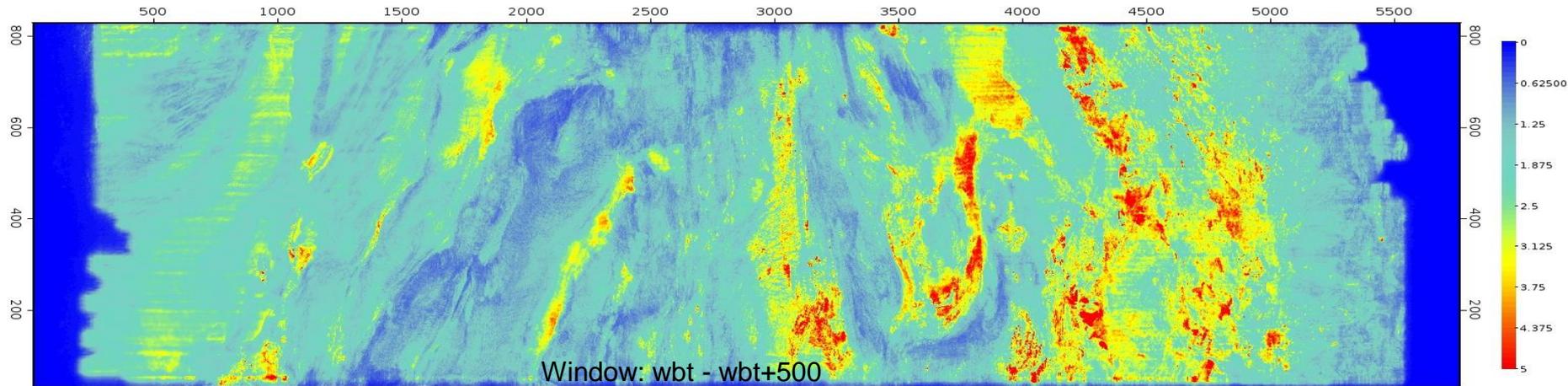
# Crossline 4500: after footprint removal

— RMS amplitude (wbt - 9.5s)

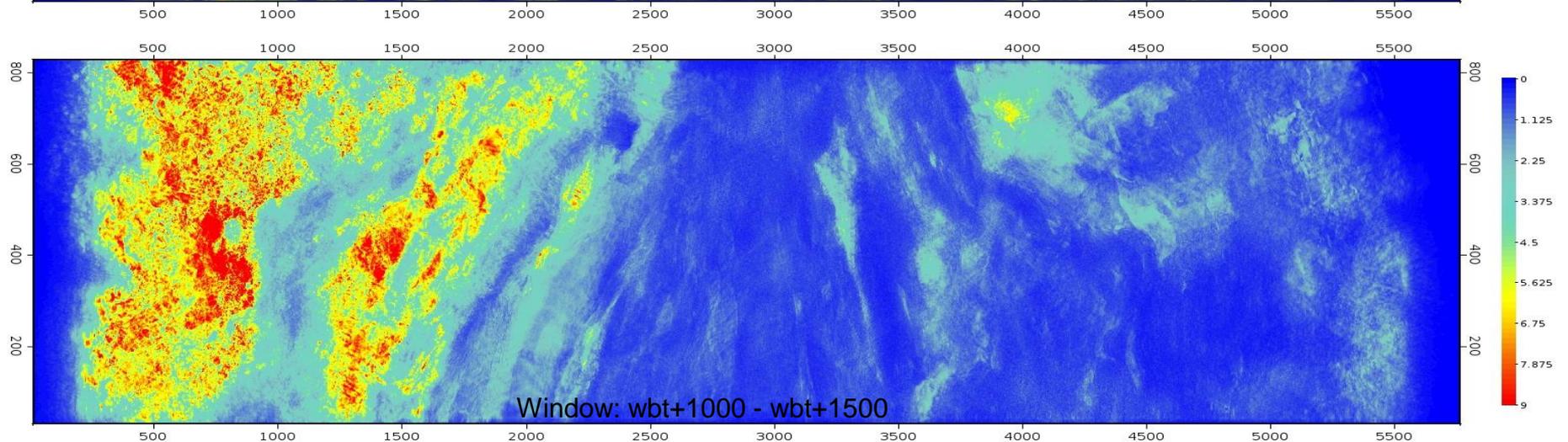
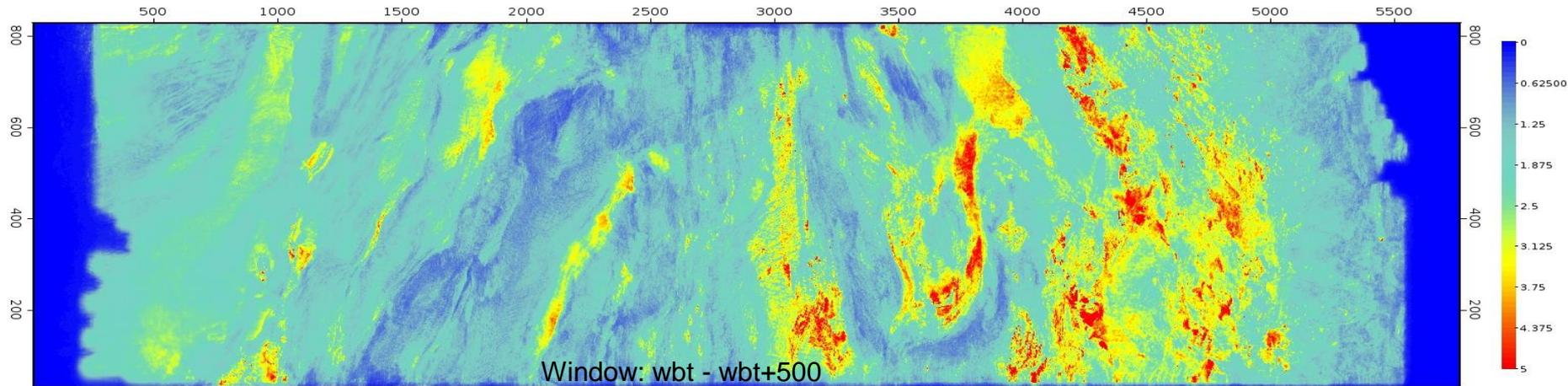


# Near Stack

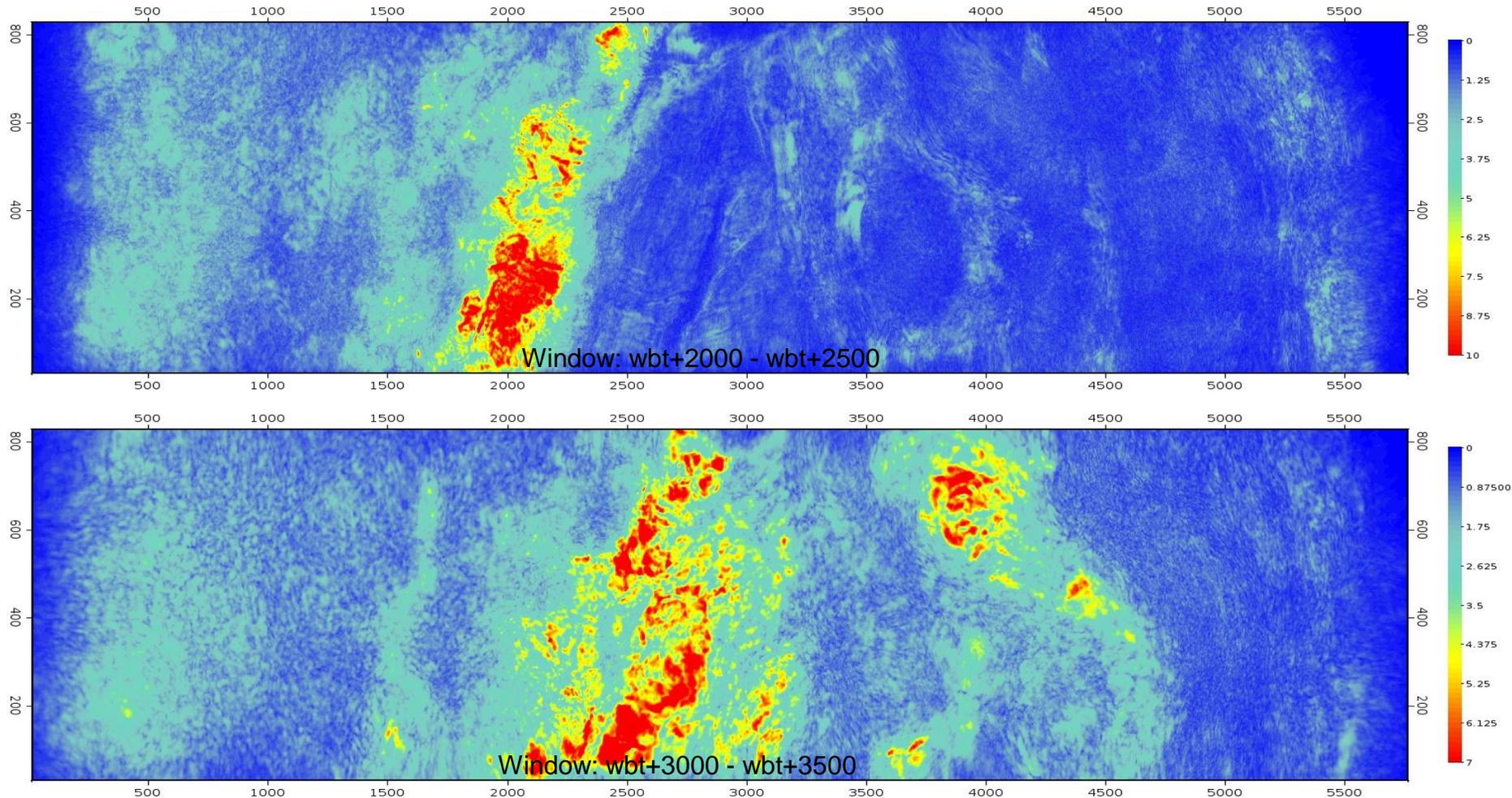
# Amplitude map: before footprint removal



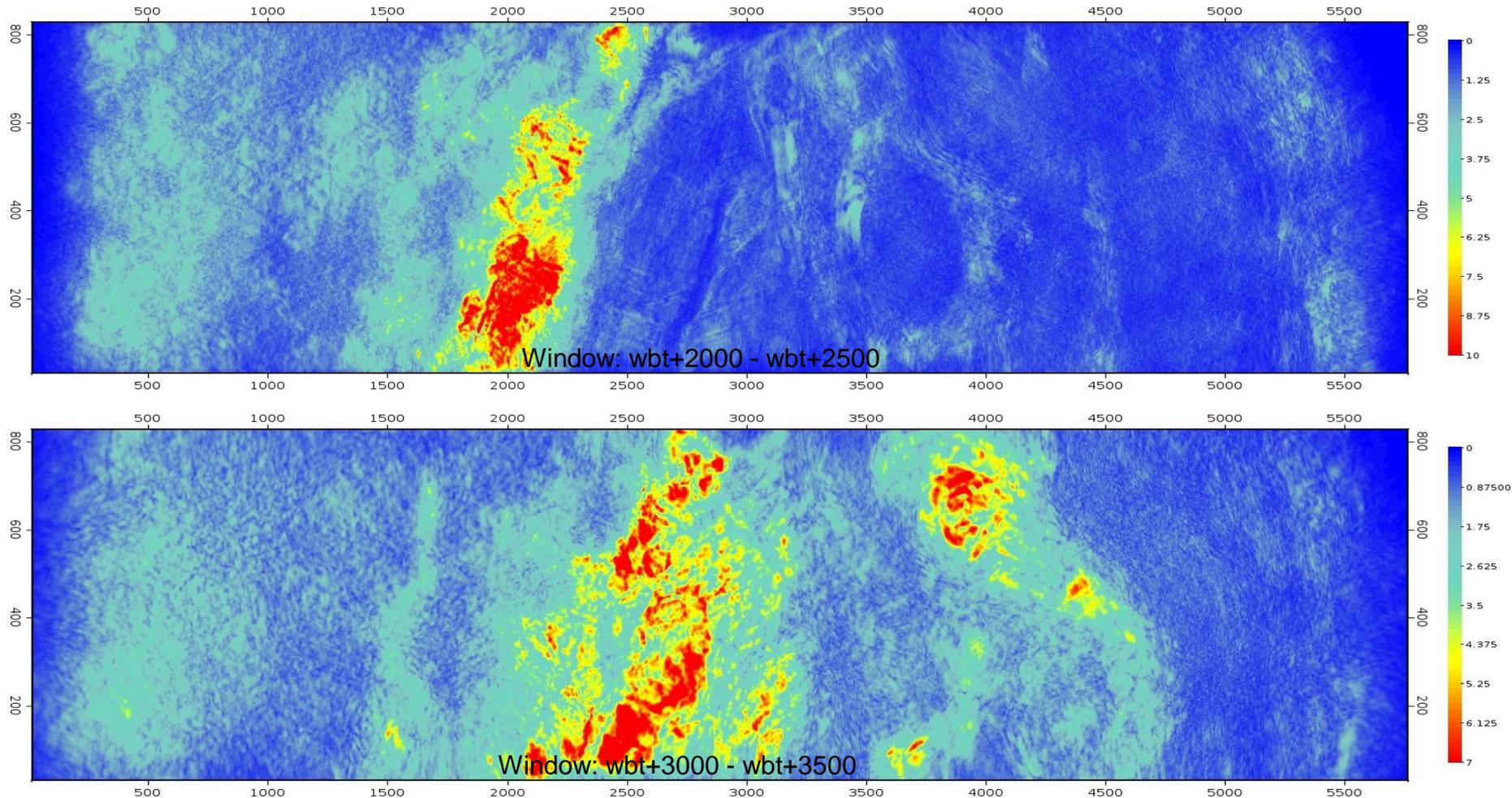
# Amplitude map: **after** footprint removal



# Amplitude map: before footprint removal

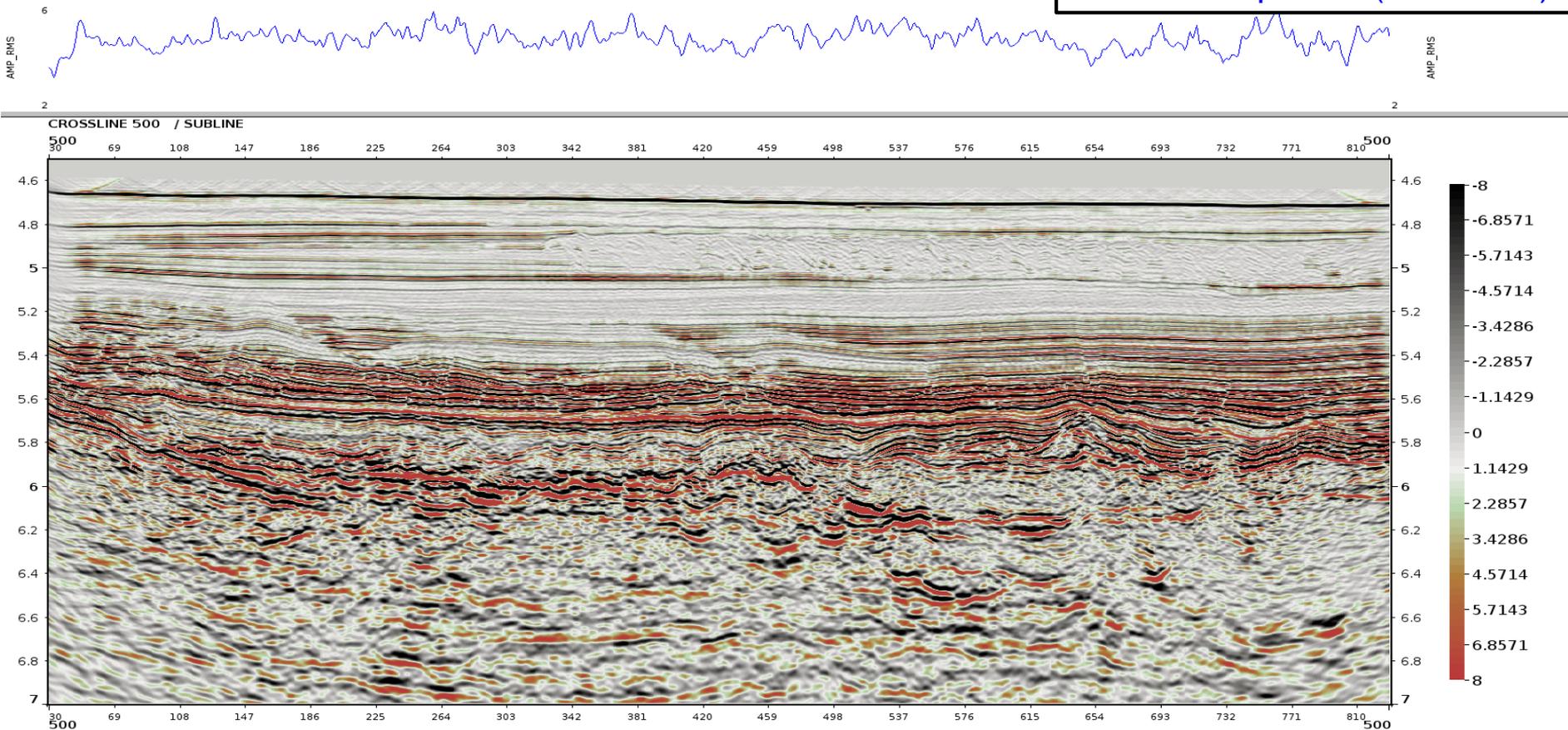


# Amplitude map: **after** footprint removal



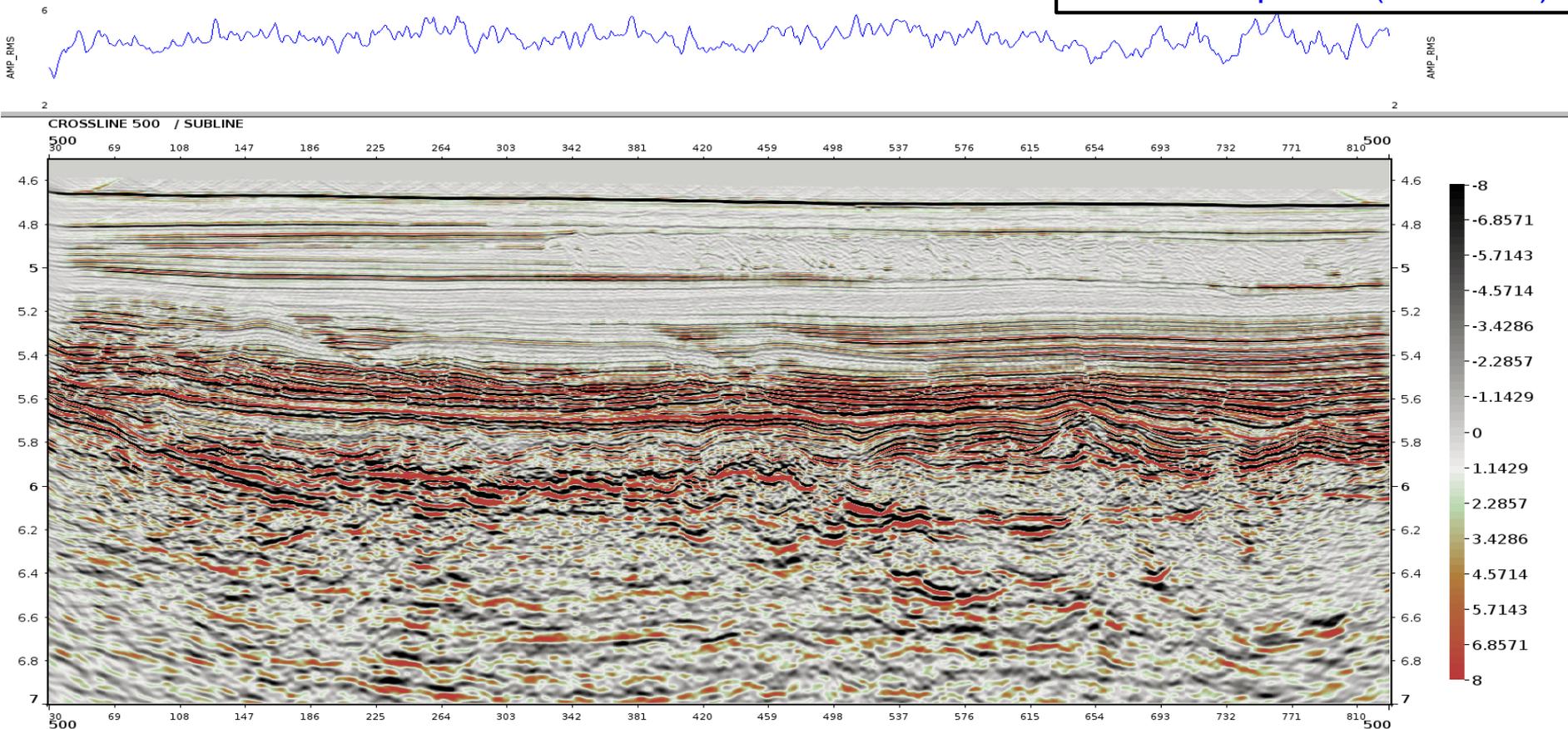
# Crossline 500: before footprint removal

— RMS amplitude (wbt - 9.5s)



# Crossline 500: after footprint removal

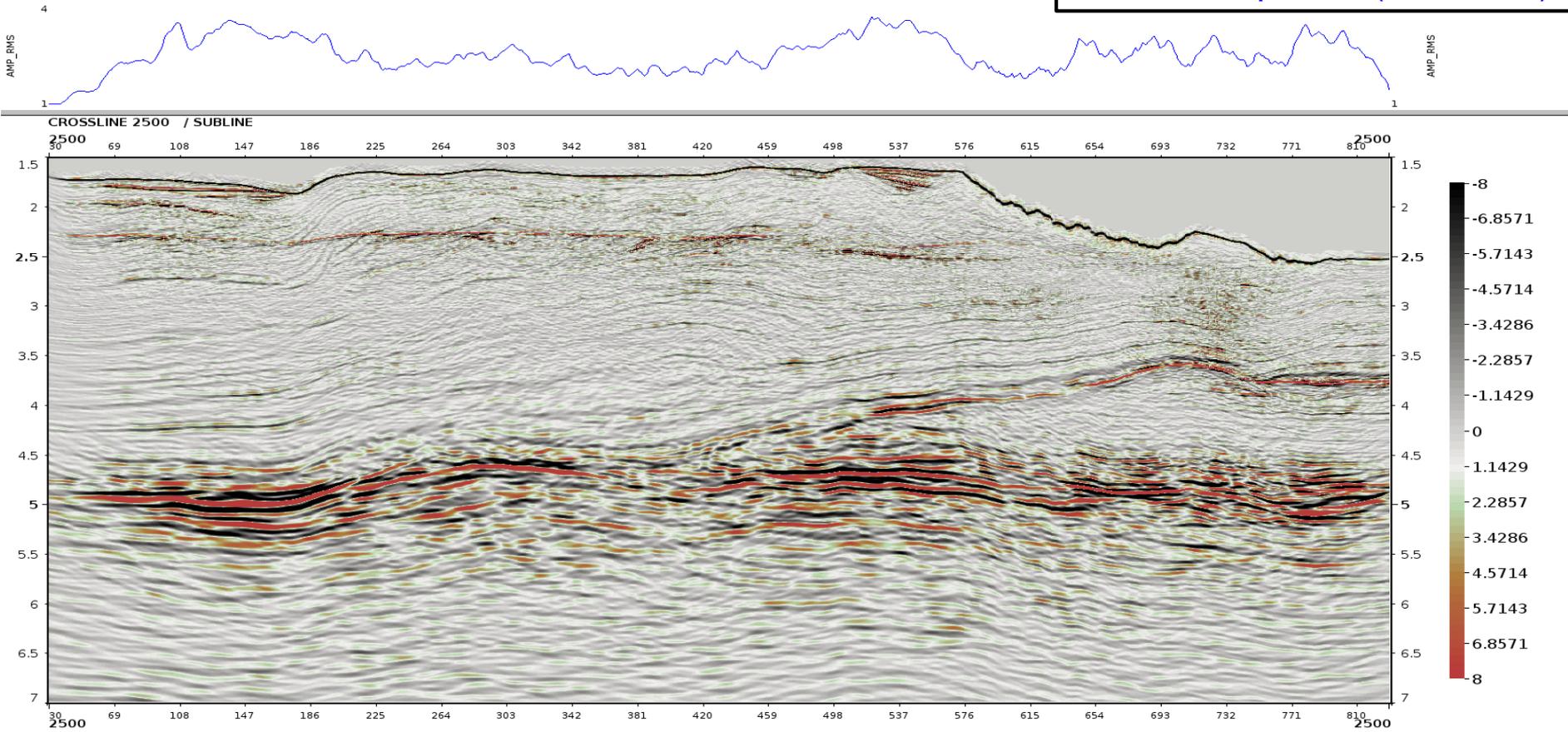
— RMS amplitude (wbt - 9.5s)





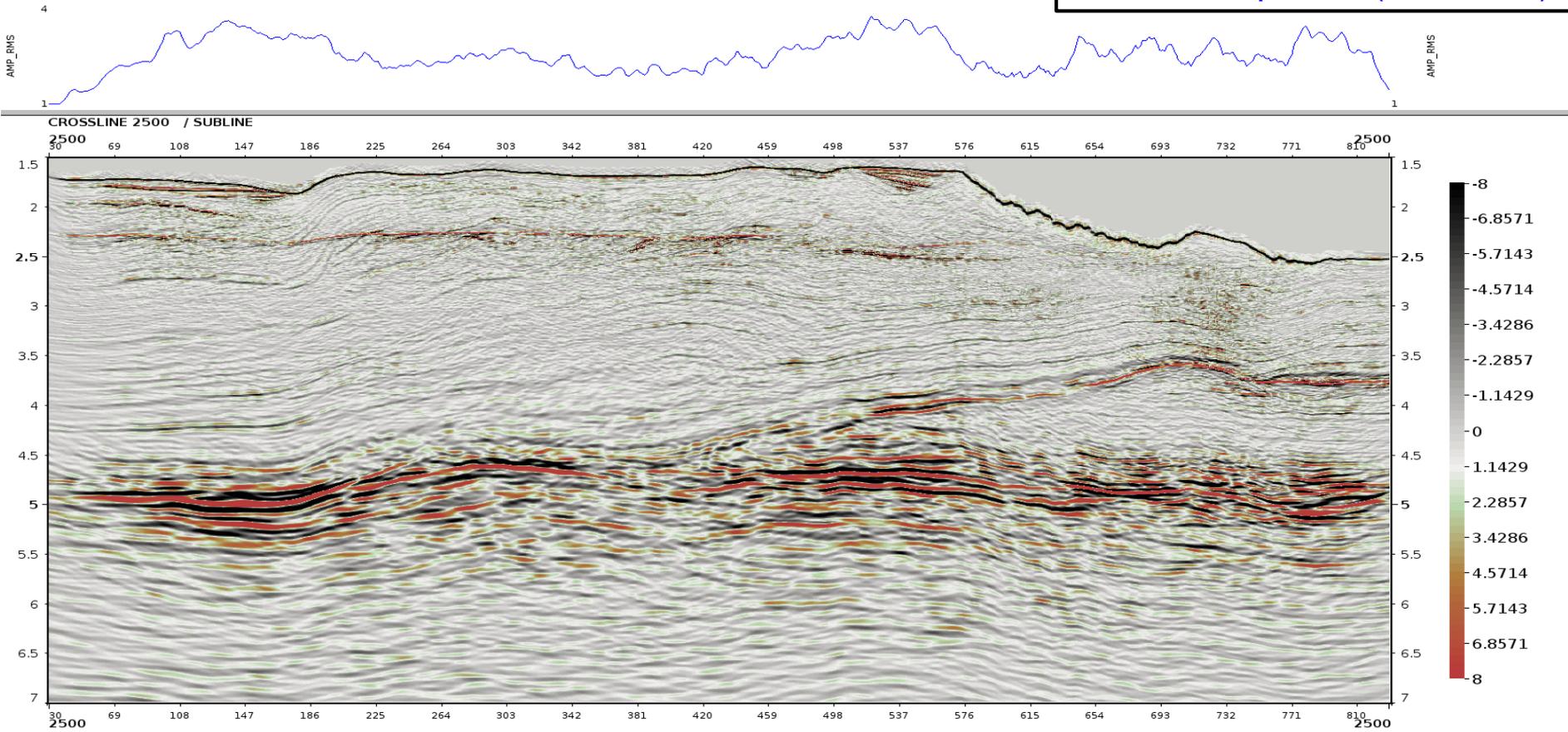
# Crossline 2500: before footprint removal

— RMS amplitude (wbt - 9.5s)



# Crossline 2500: after footprint removal

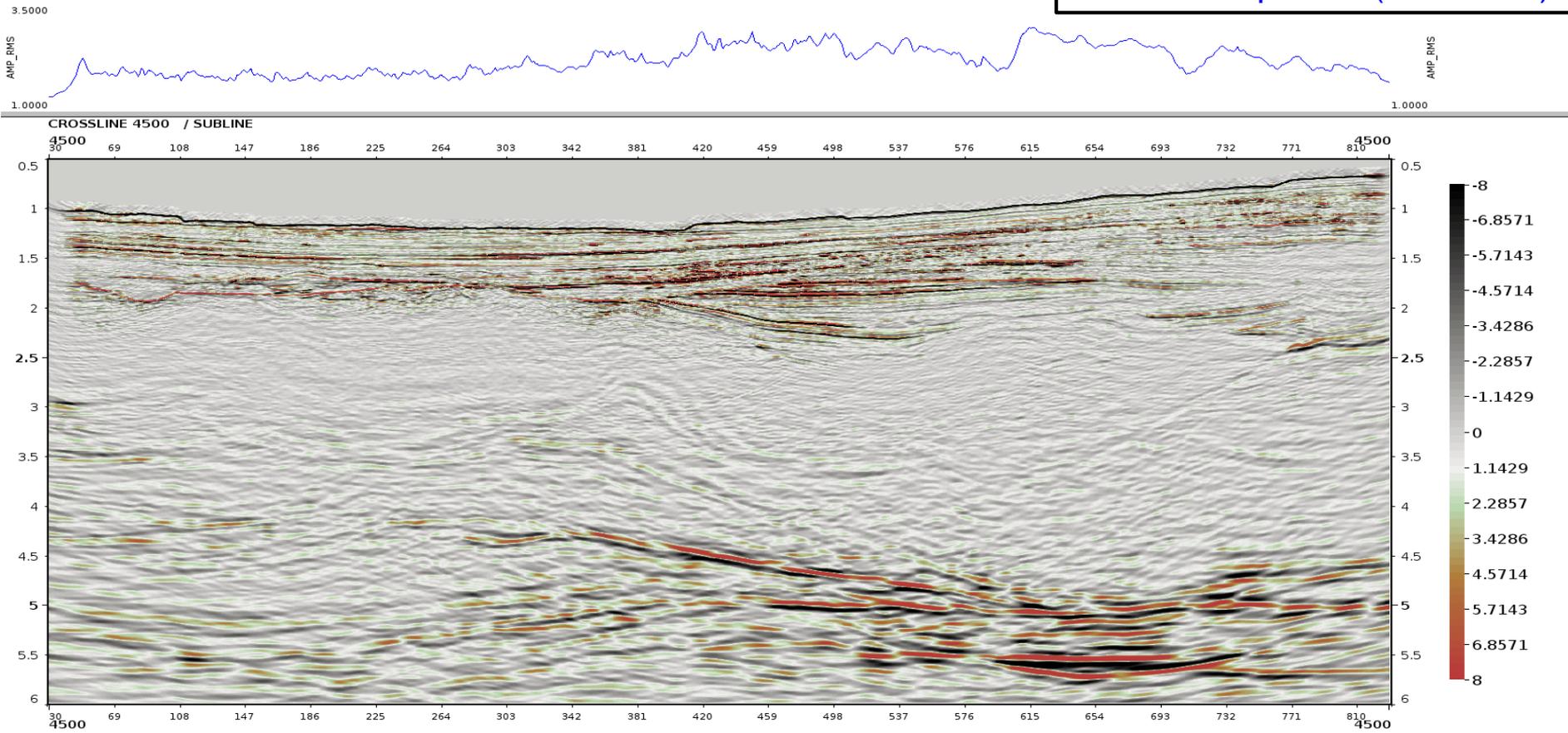
— RMS amplitude (wbt - 9.5s)





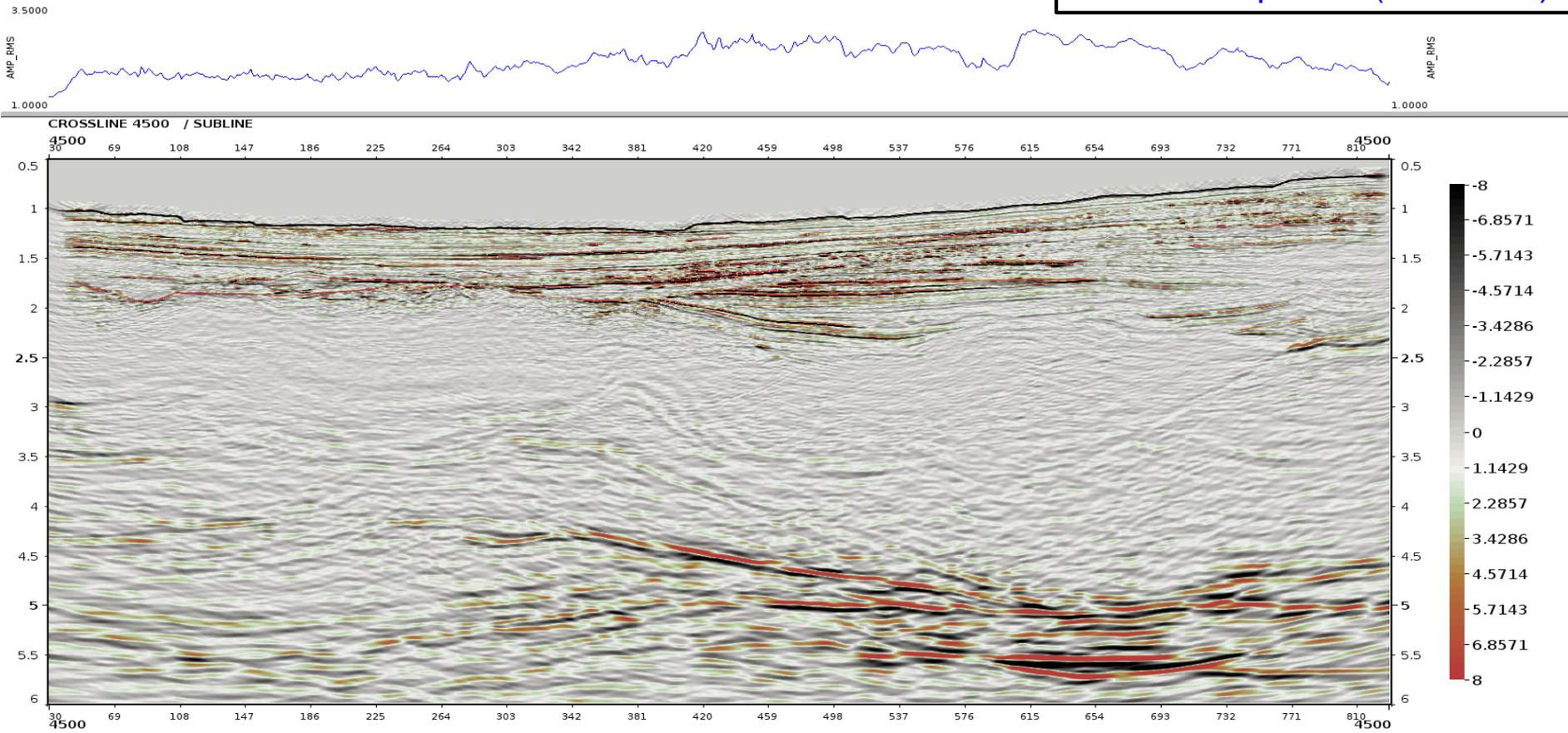
# Crossline 4500: before footprint removal

— RMS amplitude (wbt - 9.5s)



# Crossline 4500: after footprint removal

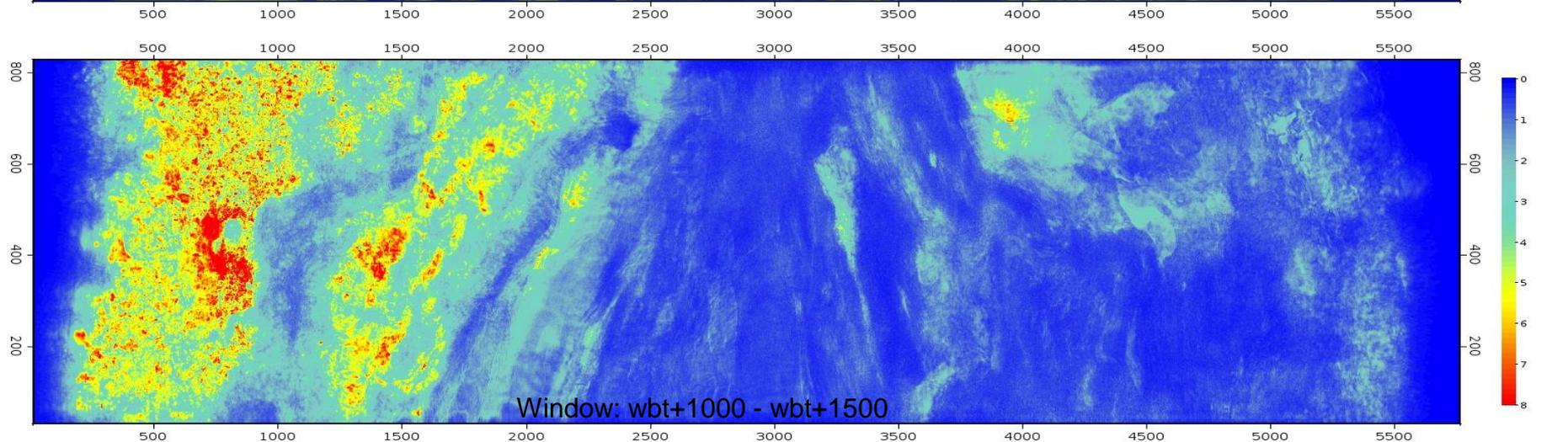
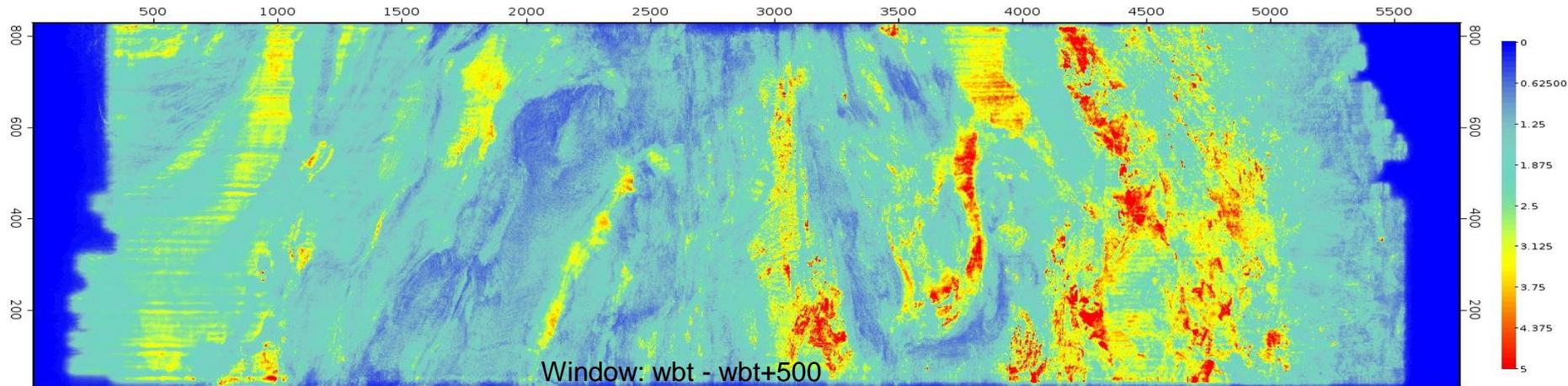
— RMS amplitude (wbt - 9.5s)



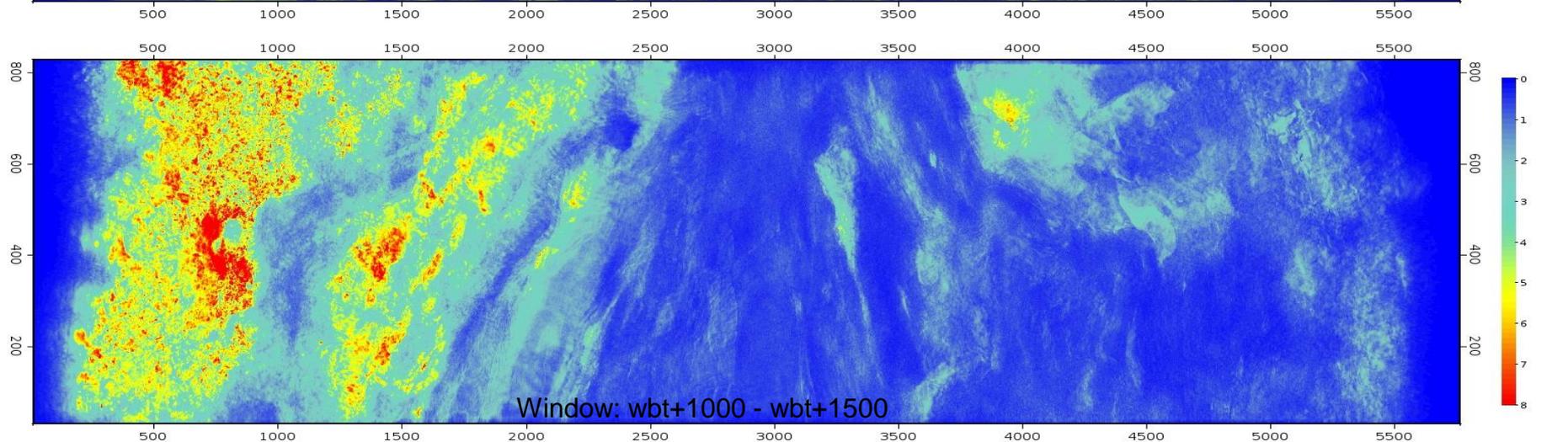
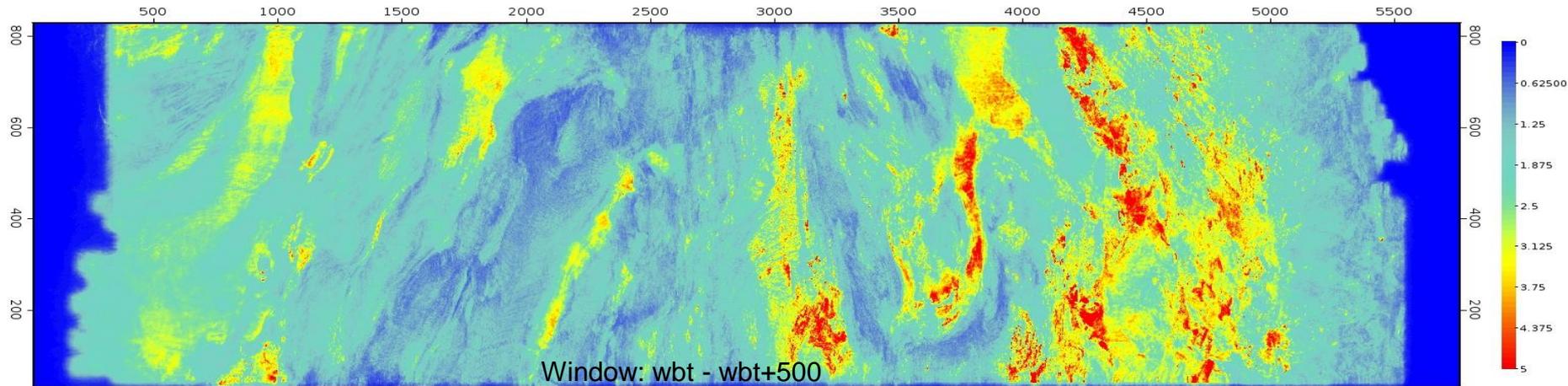
# Middle Stack



# Amplitude map: before footprint removal

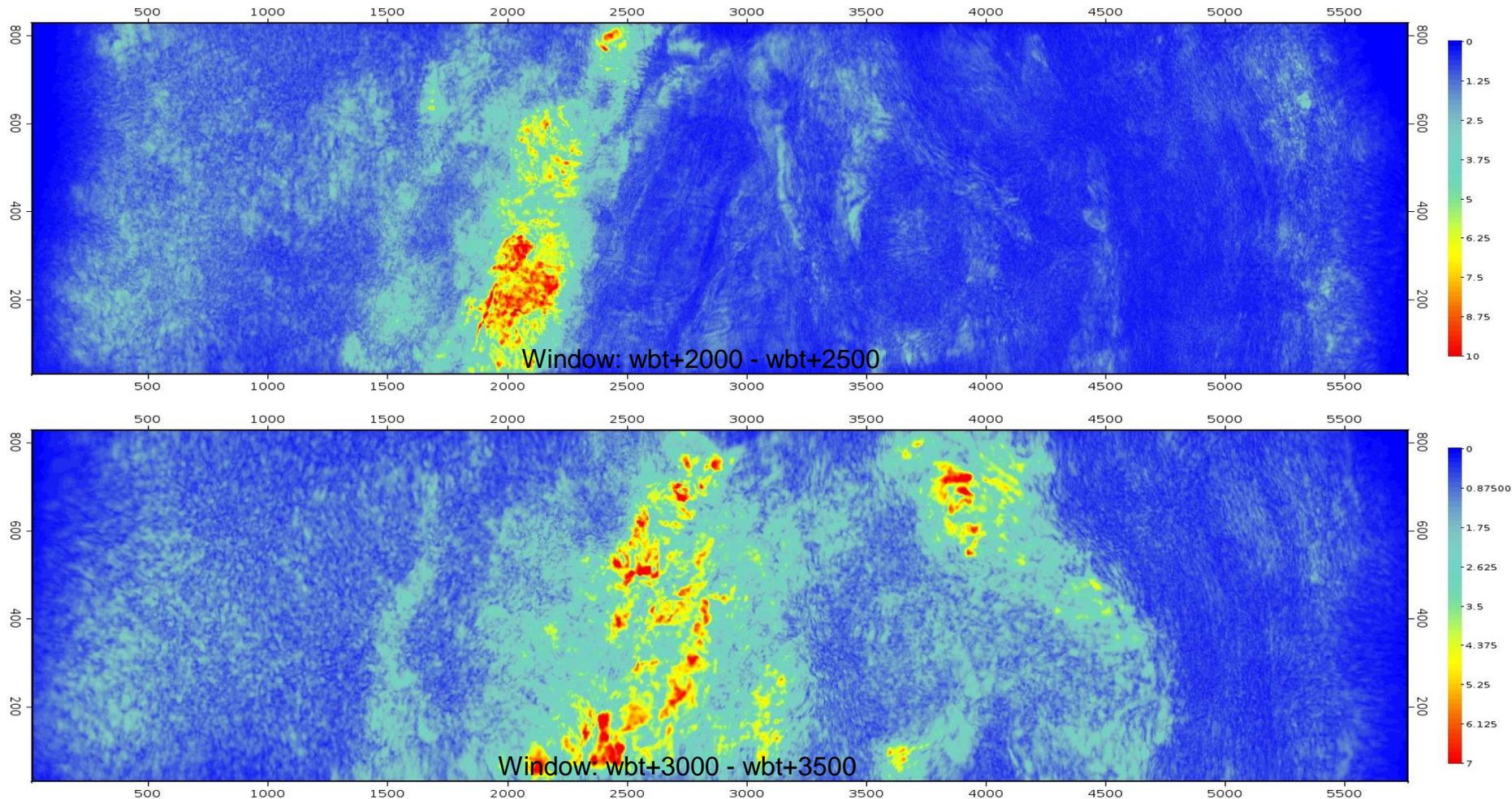


# Amplitude map: **after** footprint removal

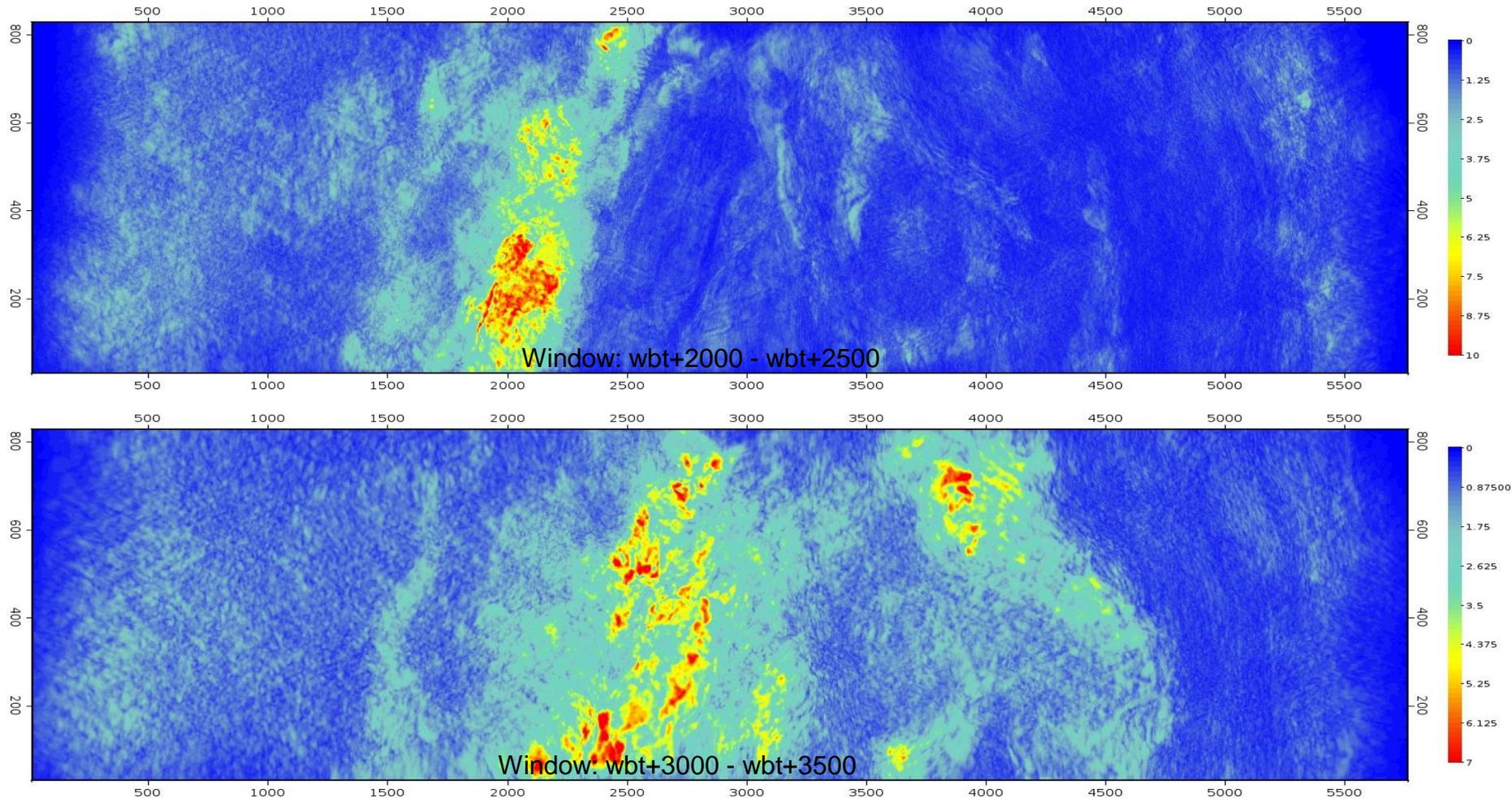




# Amplitude map: before footprint removal

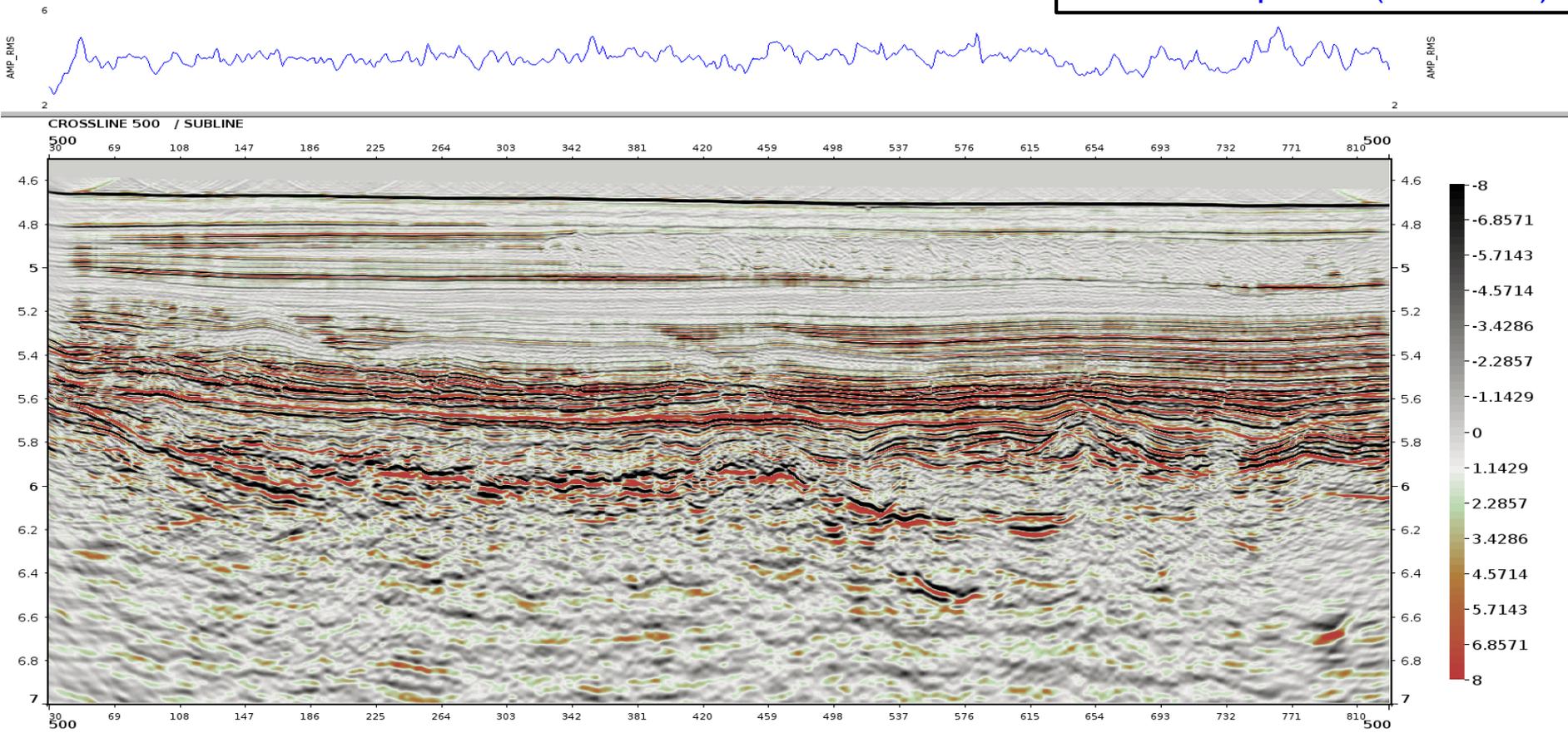


# Amplitude map: **after** footprint removal



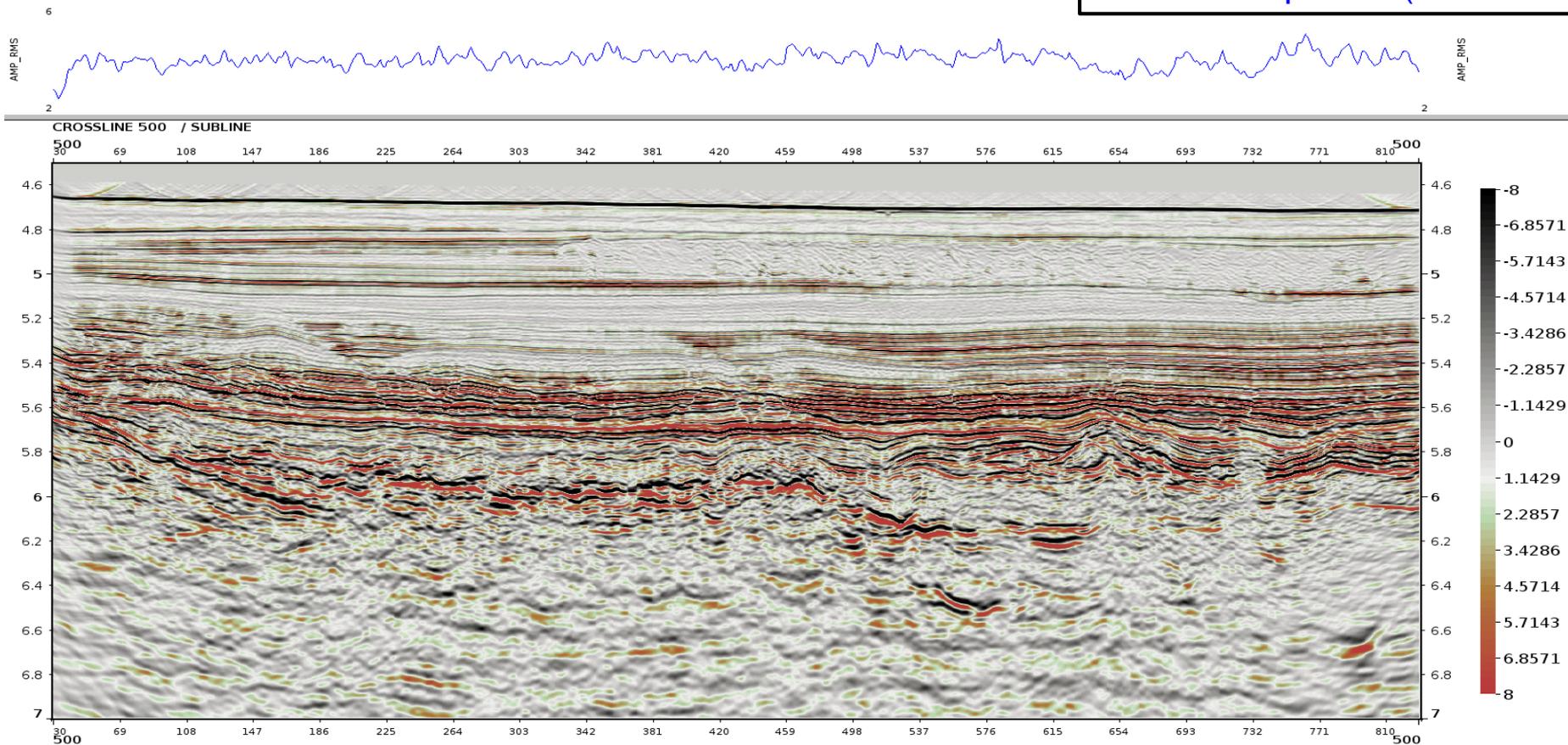
# Crossline 500: before footprint removal

— RMS amplitude (wbt - 9.5s)



# Crossline 500: after footprint removal

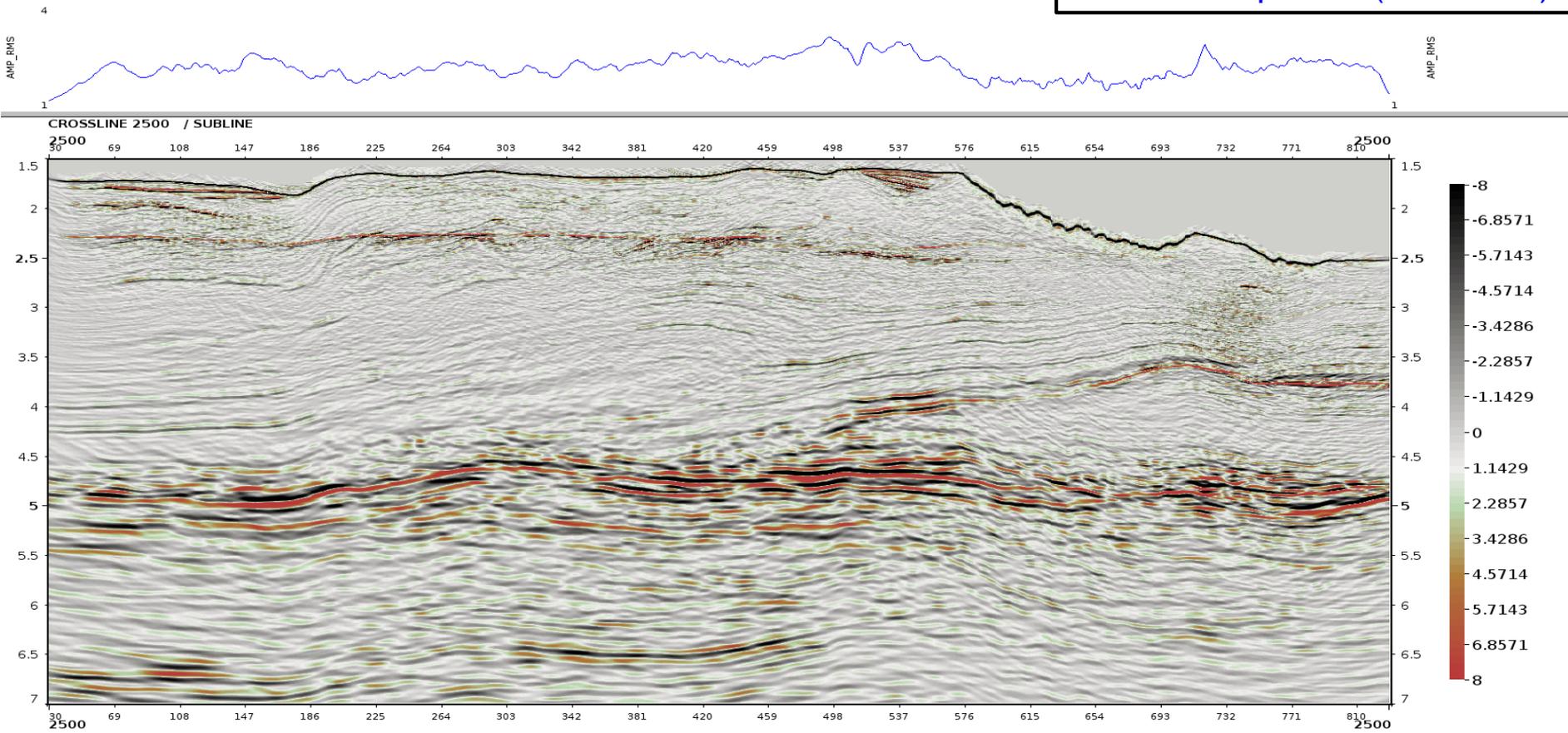
— RMS amplitude (wbt - 9.5s)





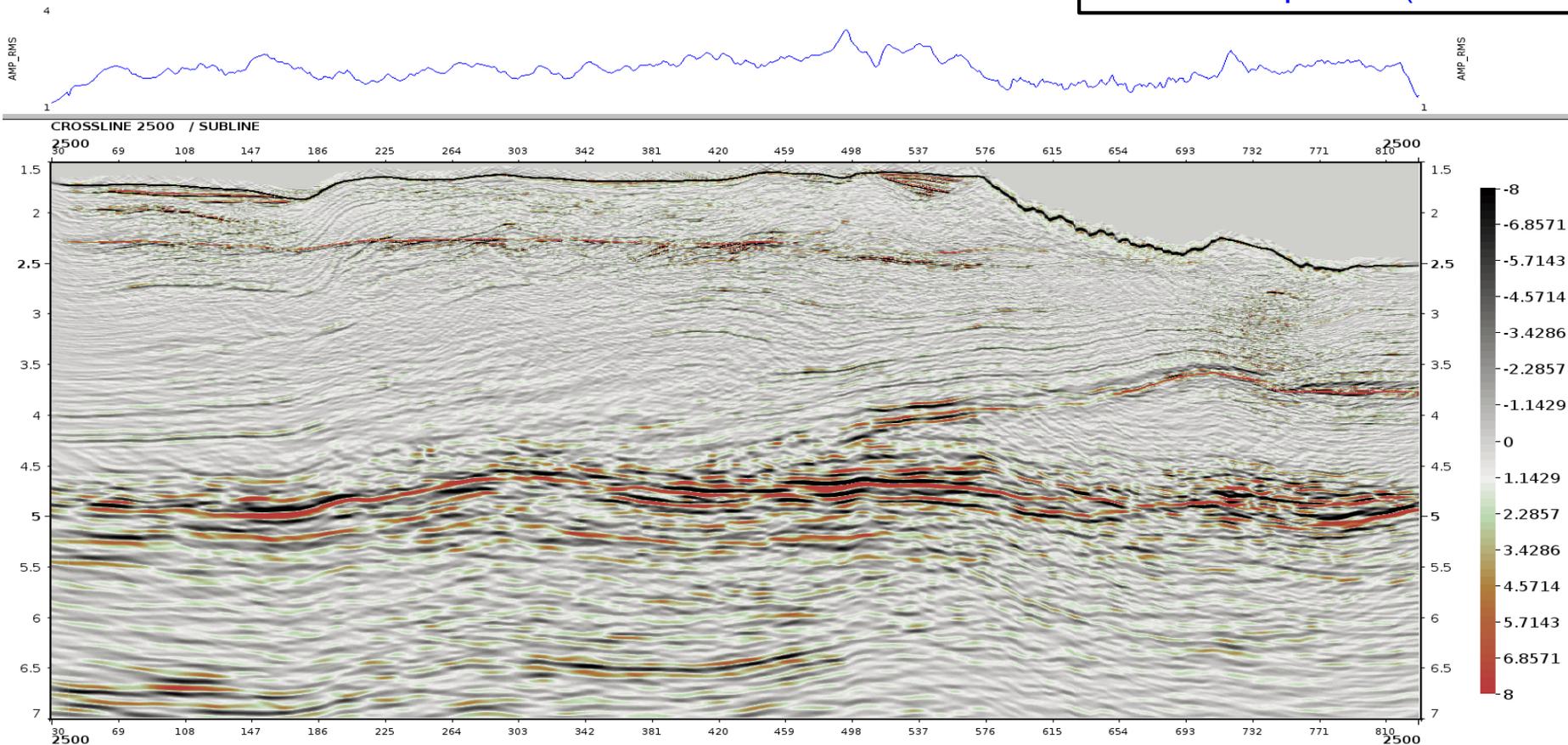
# Crossline 2500: before footprint removal

— RMS amplitude (wbt - 9.5s)



# Crossline 2500: after footprint removal

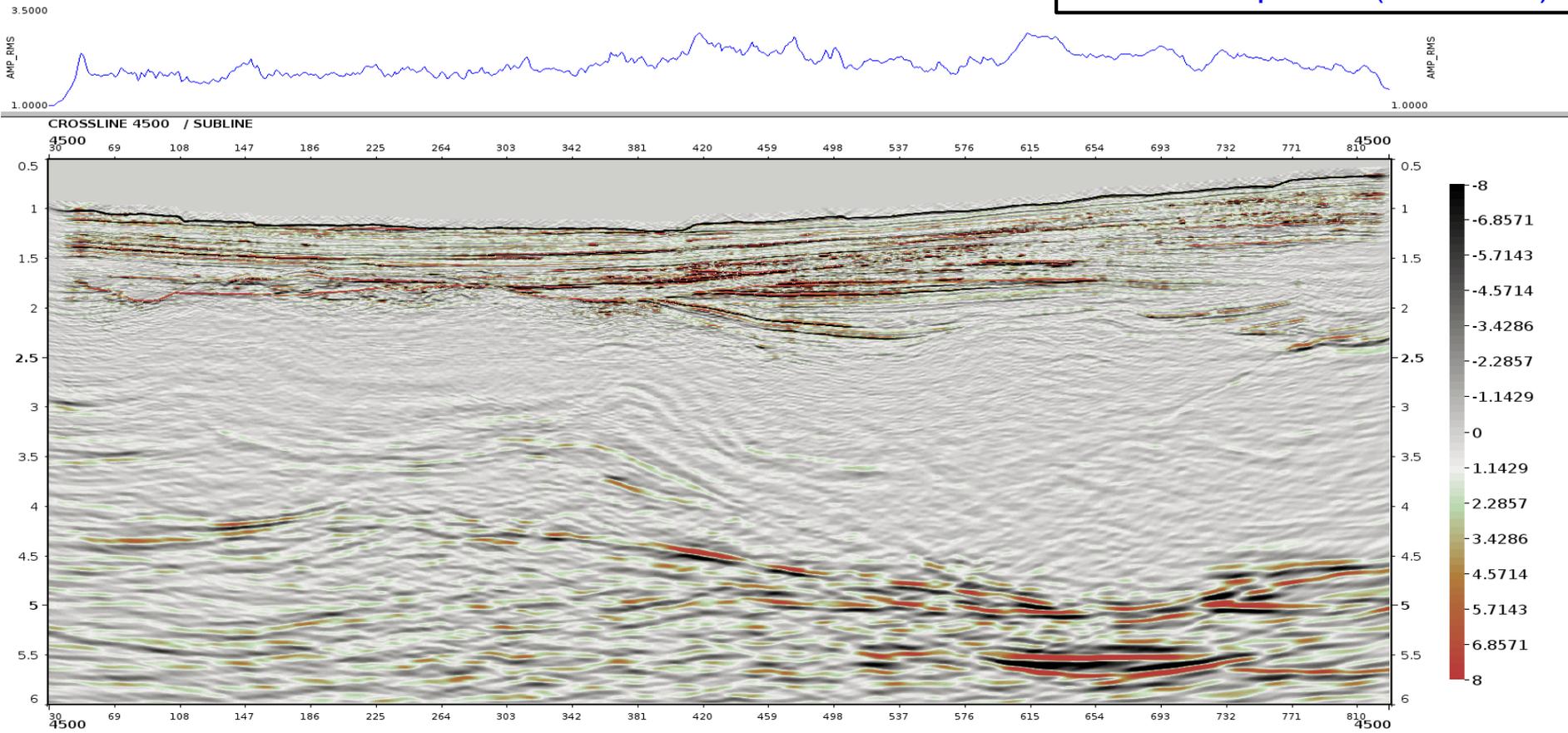
— RMS amplitude (wbt - 9.5s)





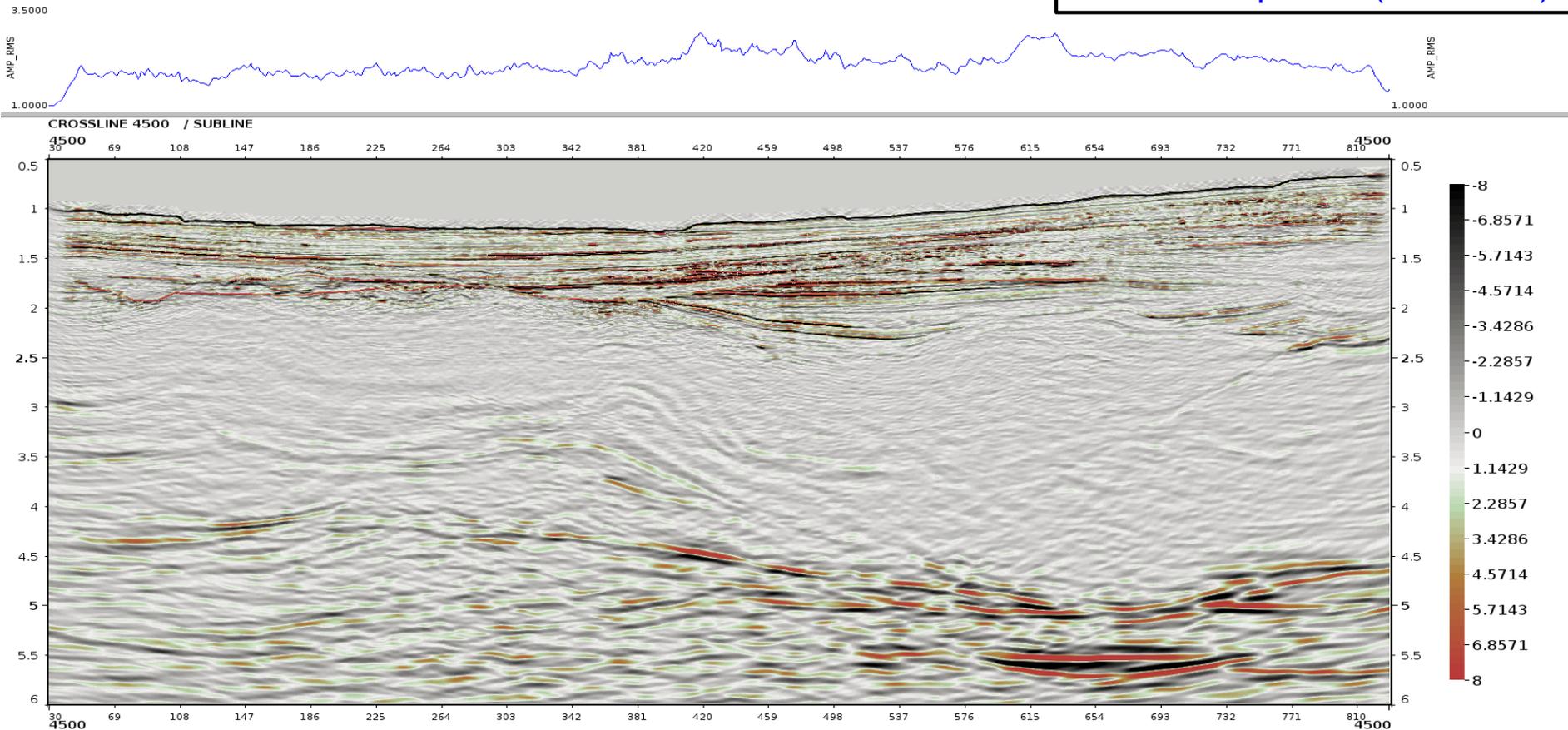
# Crossline 4500: before footprint removal

— RMS amplitude (wbt - 9.5s)



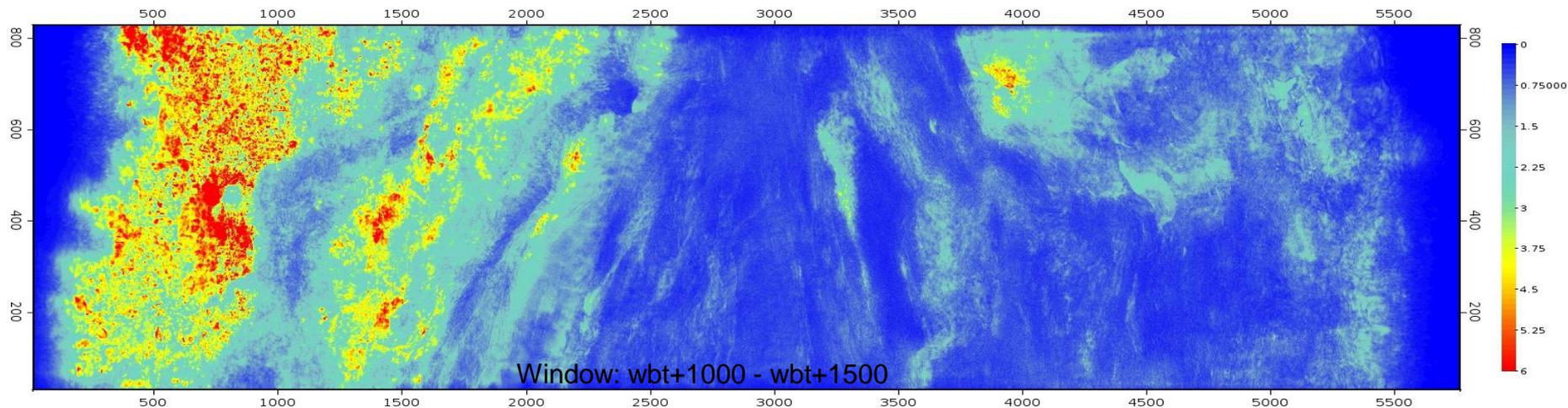
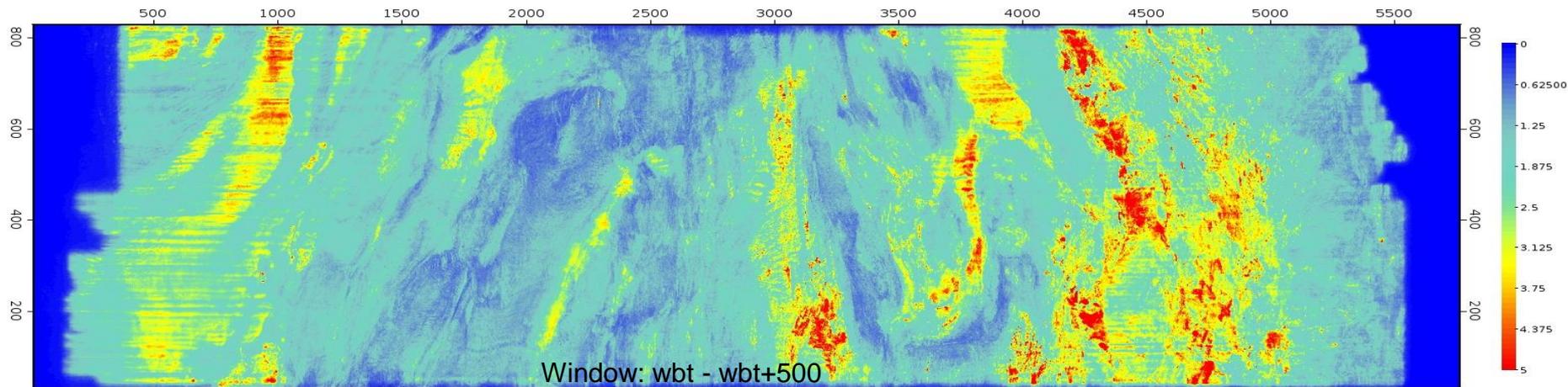
# Crossline 4500: after footprint removal

— RMS amplitude (wbt - 9.5s)

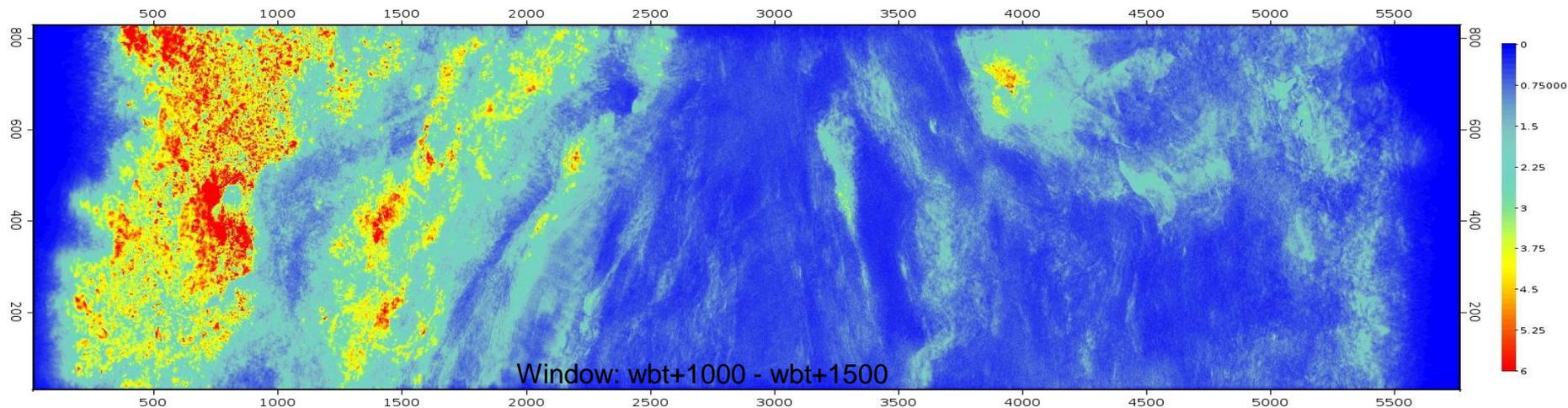
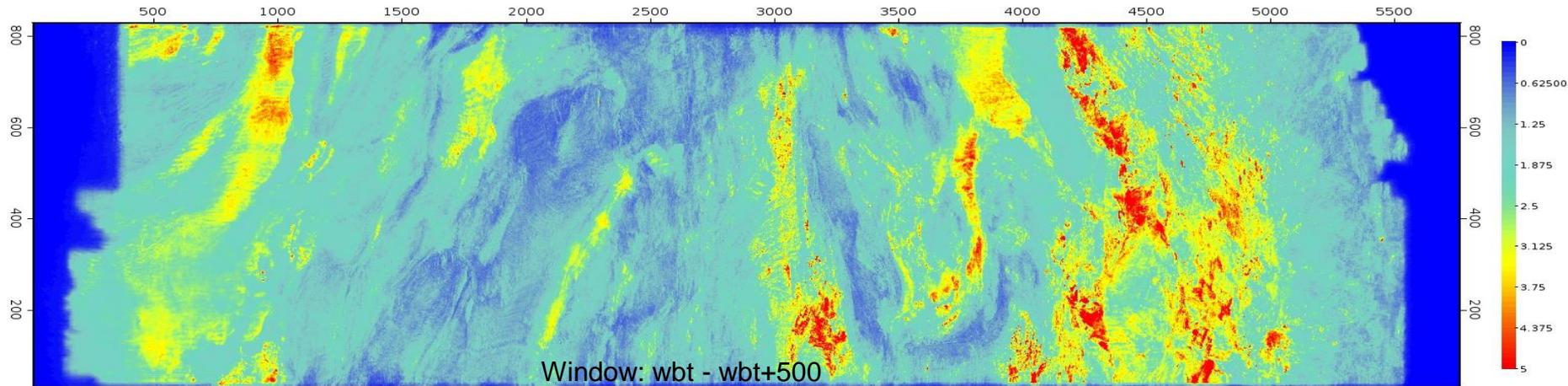


# Far Stack

# Amplitude map: before footprint removal

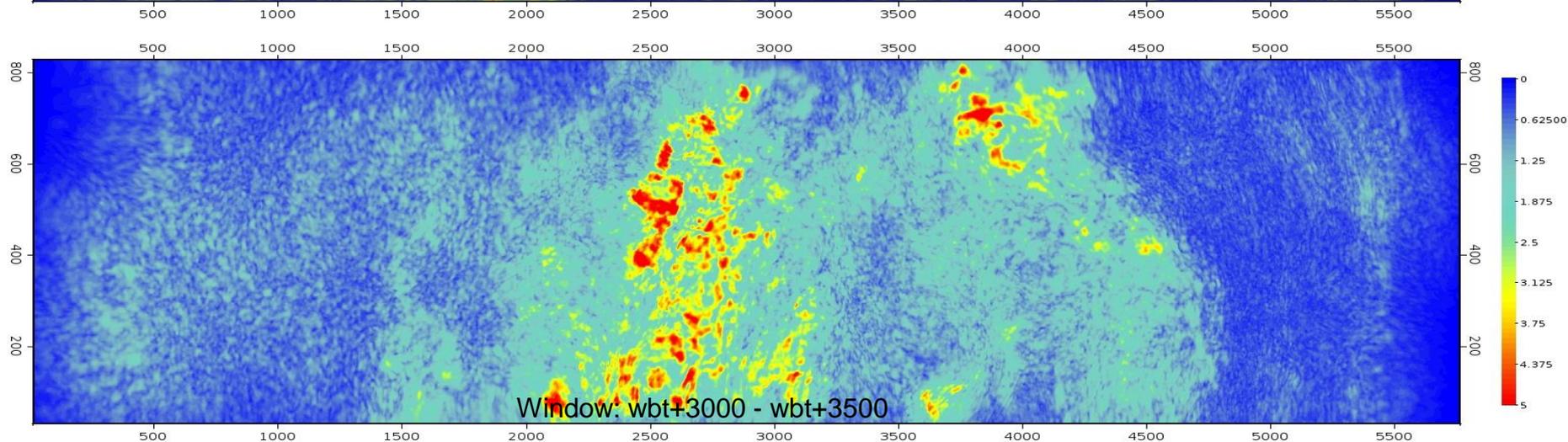
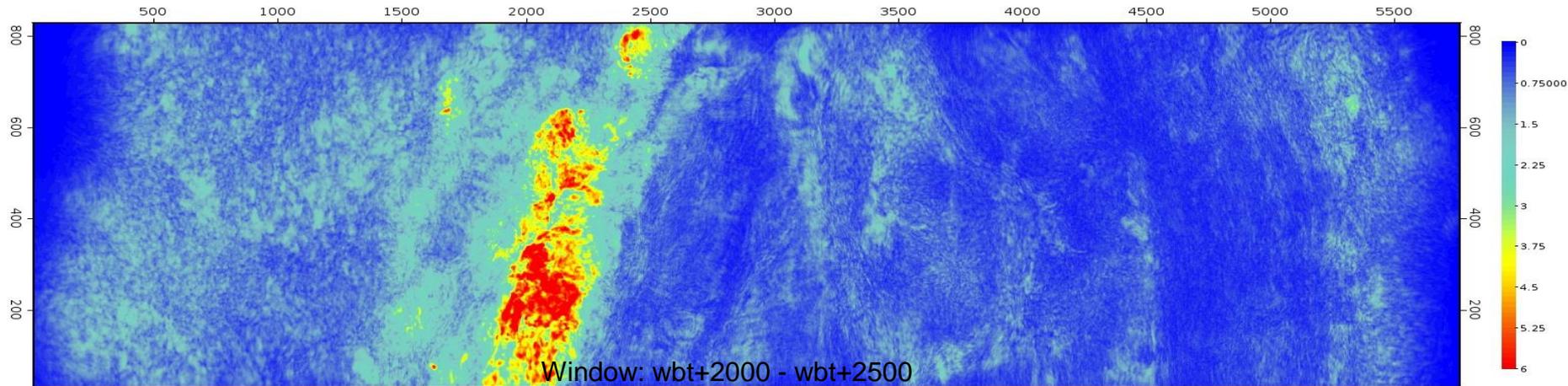


# Amplitude map: **after** footprint removal

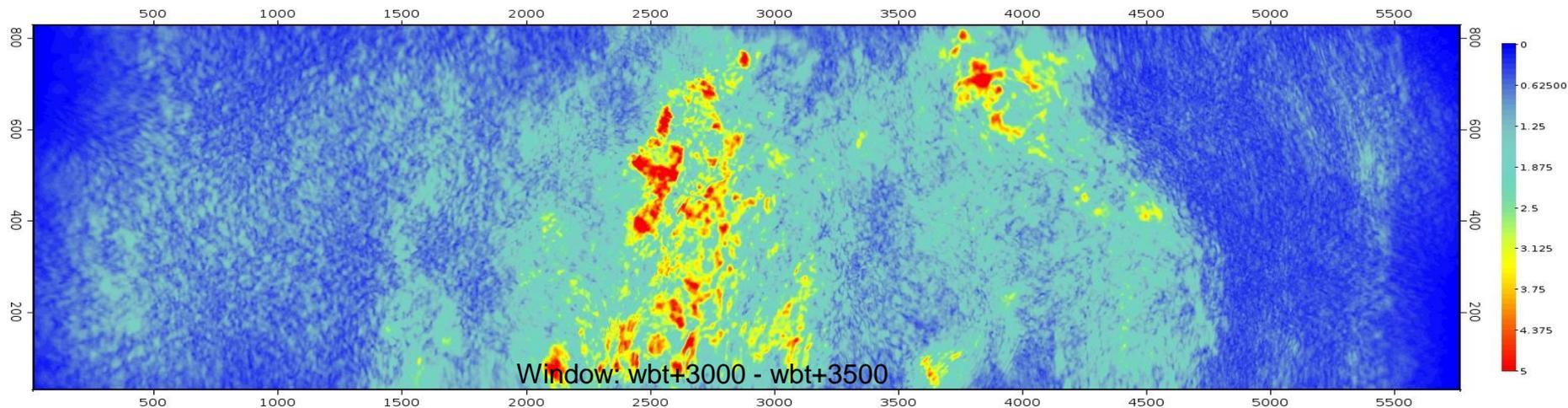
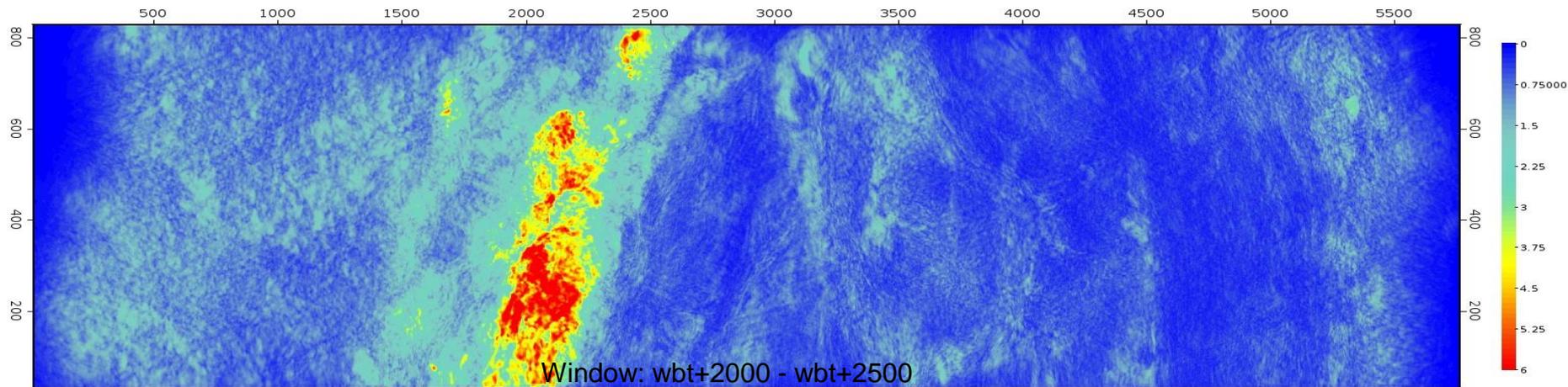




# Amplitude map: before footprint removal

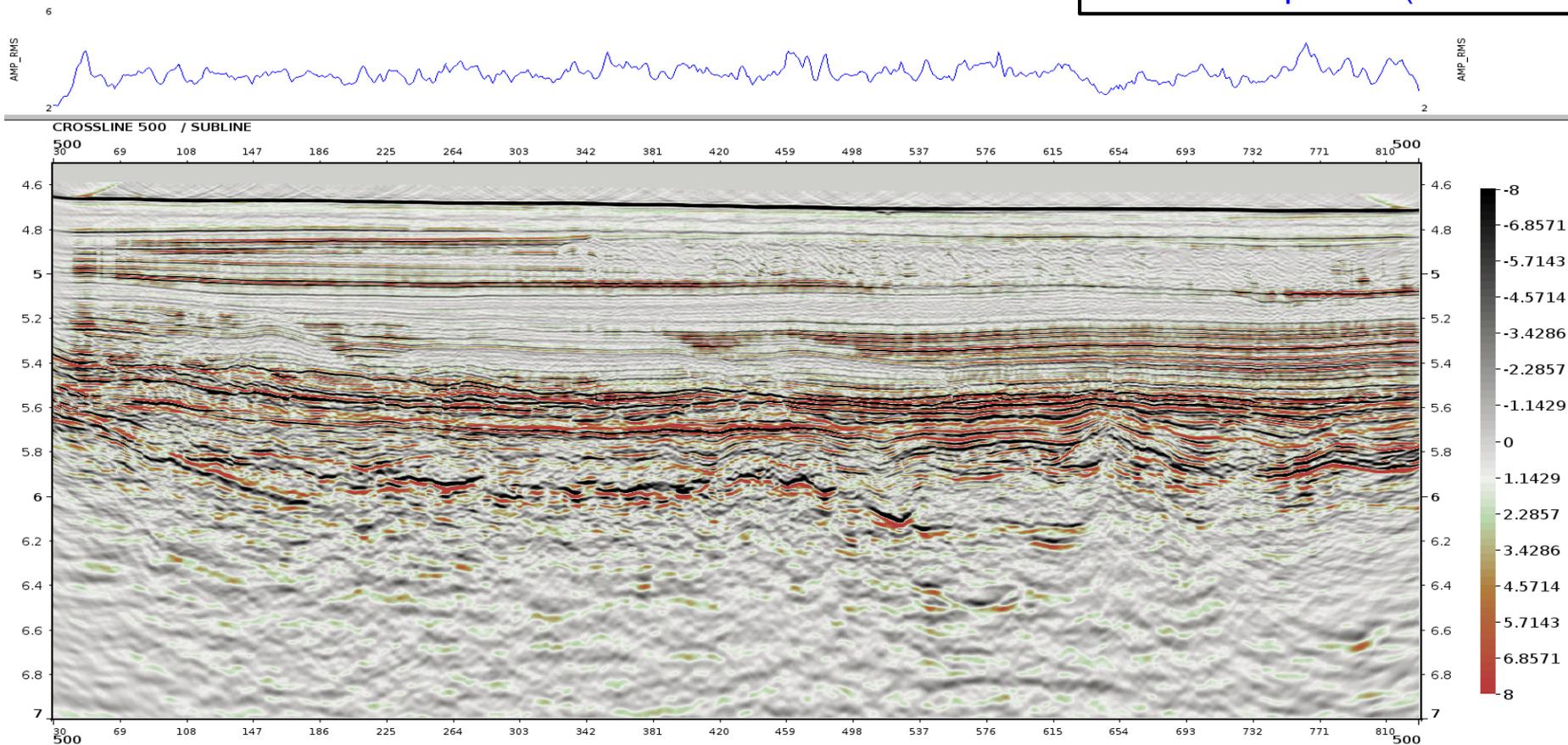


# Amplitude map: **after** footprint removal



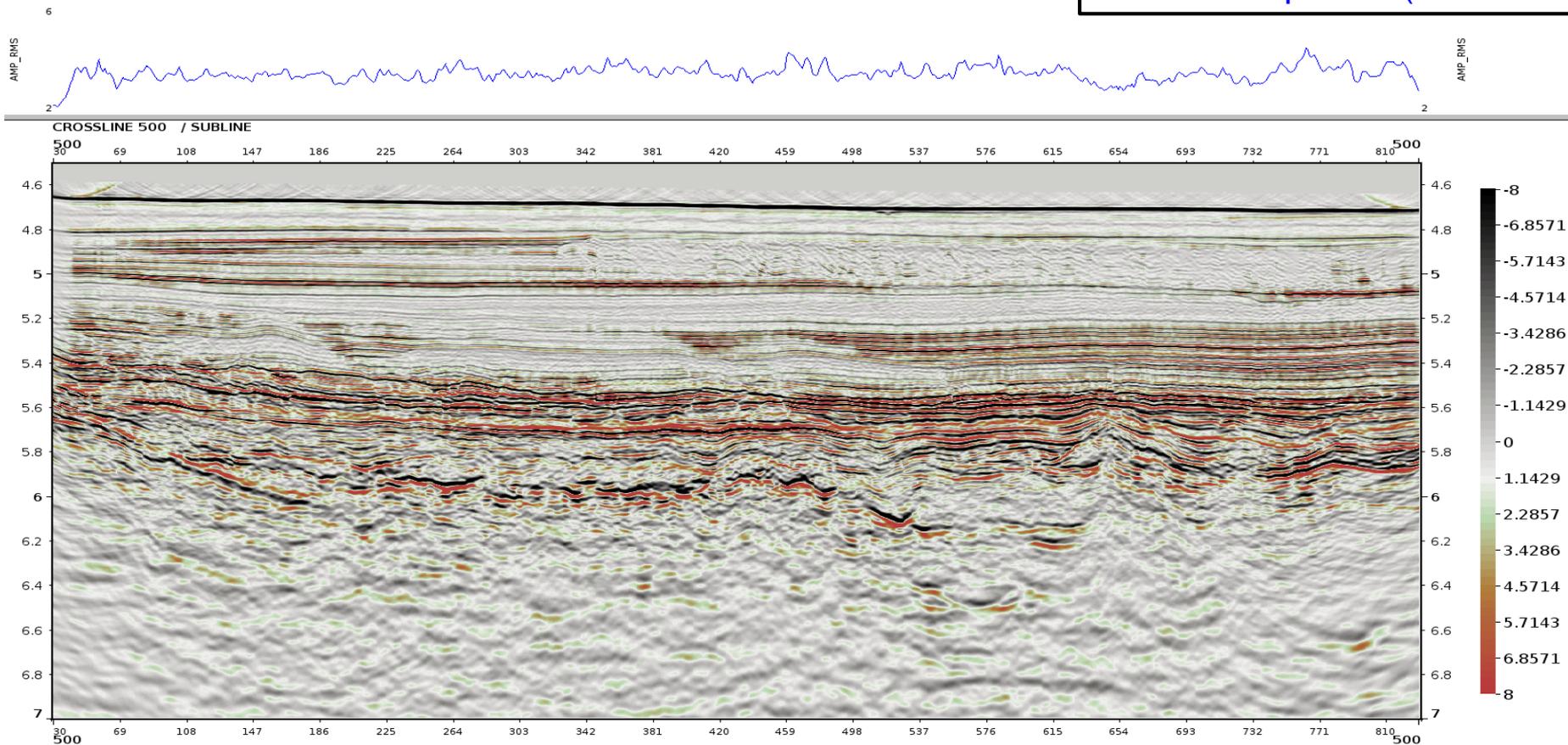
# Crossline 500: before footprint removal

— RMS amplitude (wbt - 9.5s)



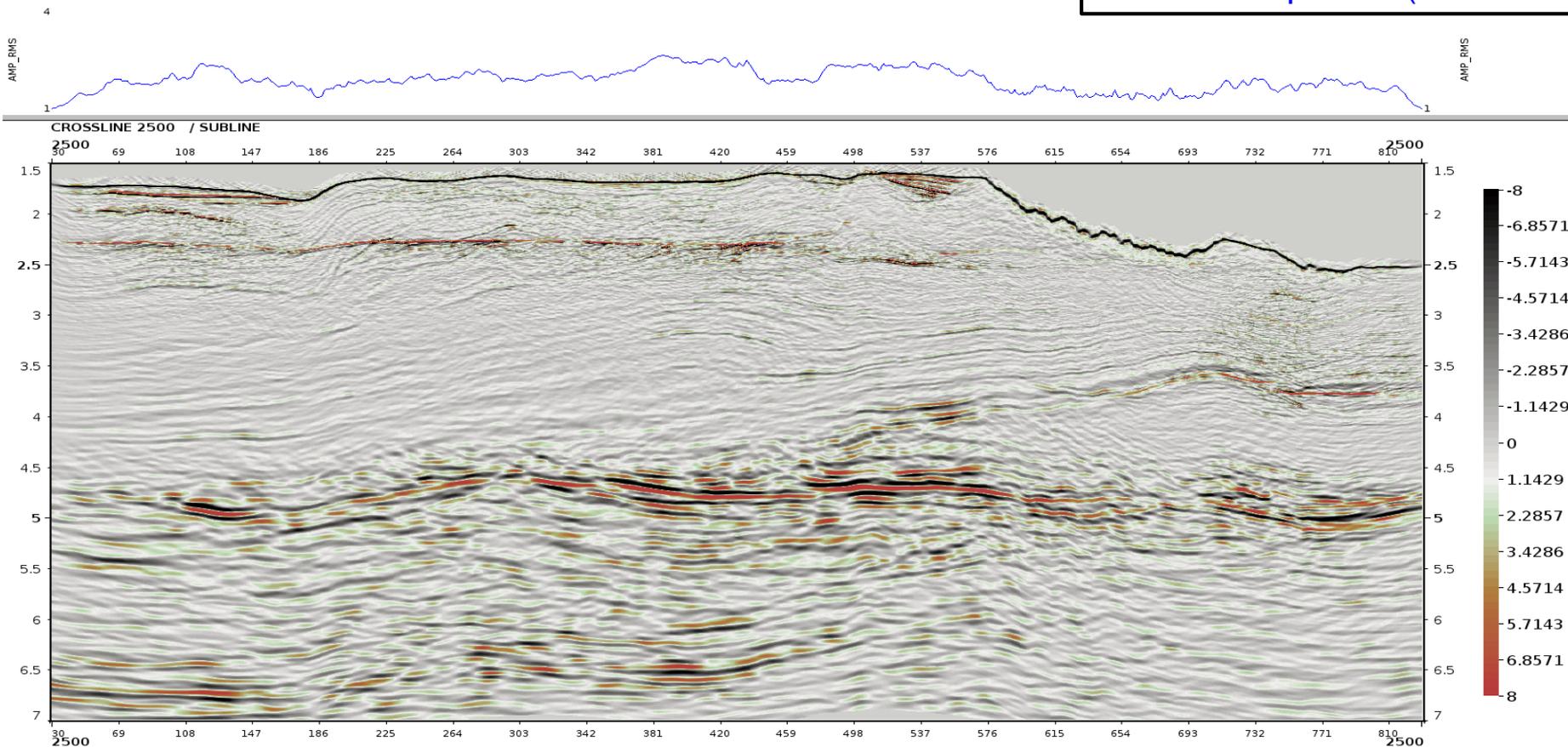
# Crossline 500: after footprint removal

— RMS amplitude (wbt - 9.5s)



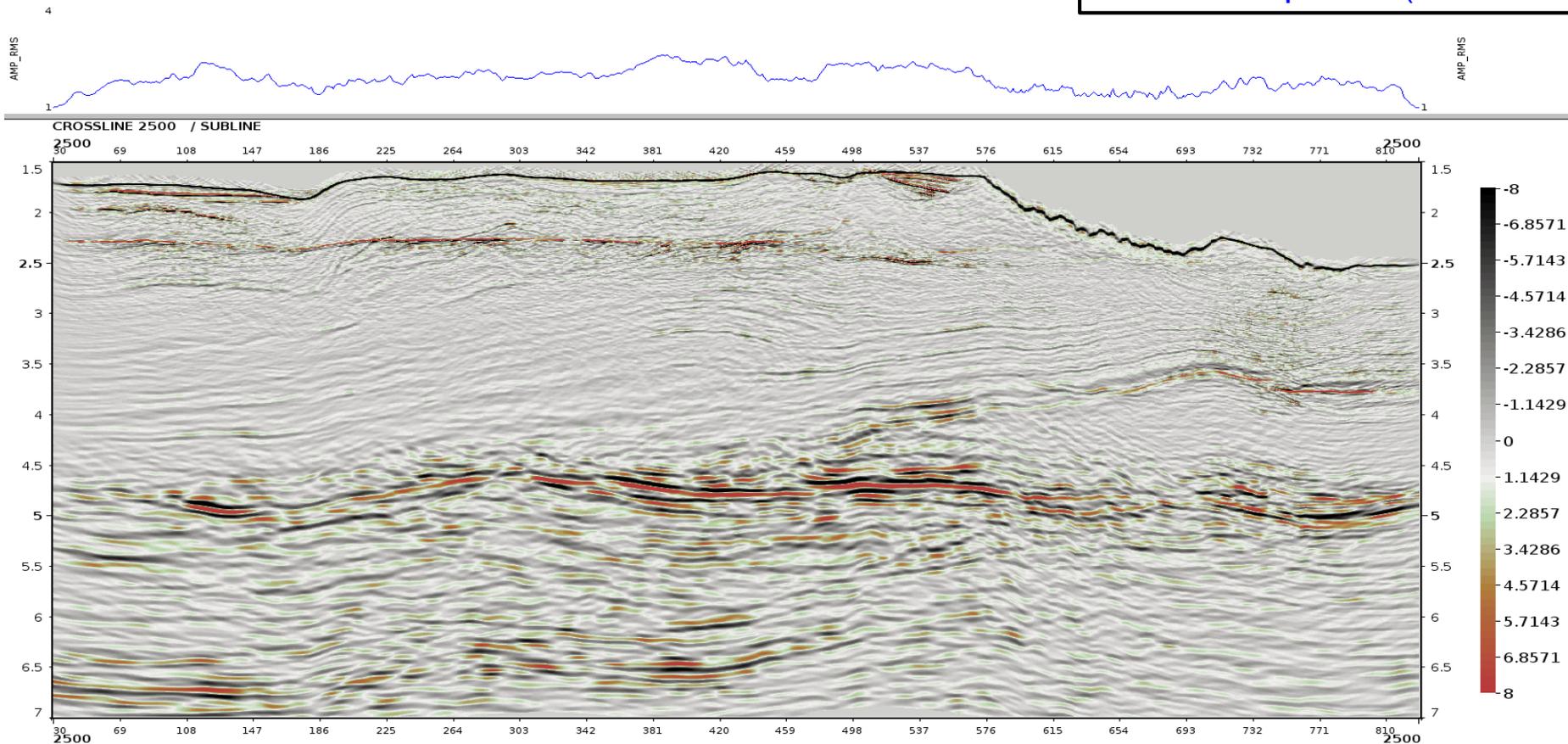
# Crossline 2500: before footprint removal

— RMS amplitude (wbt - 9.5s)



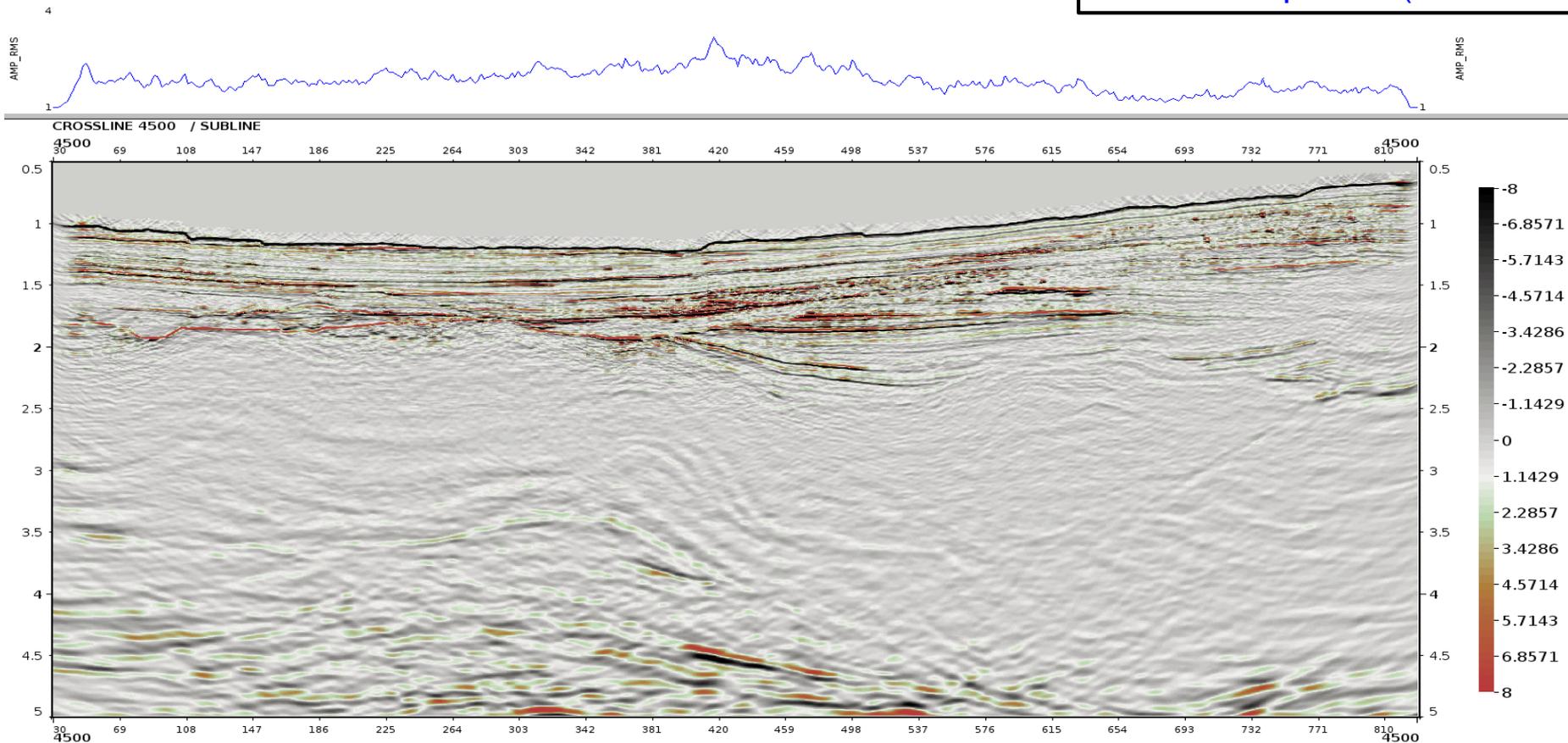
# Crossline 2500: after footprint removal

— RMS amplitude (wbt - 9.5s)



# Crossline 4500: before footprint removal

— RMS amplitude (wbt - 9.5s)



# Crossline 4500: after footprint removal

— RMS amplitude (wbt - 9.5s)

