Multi-Component Spring Coulee Project Overview

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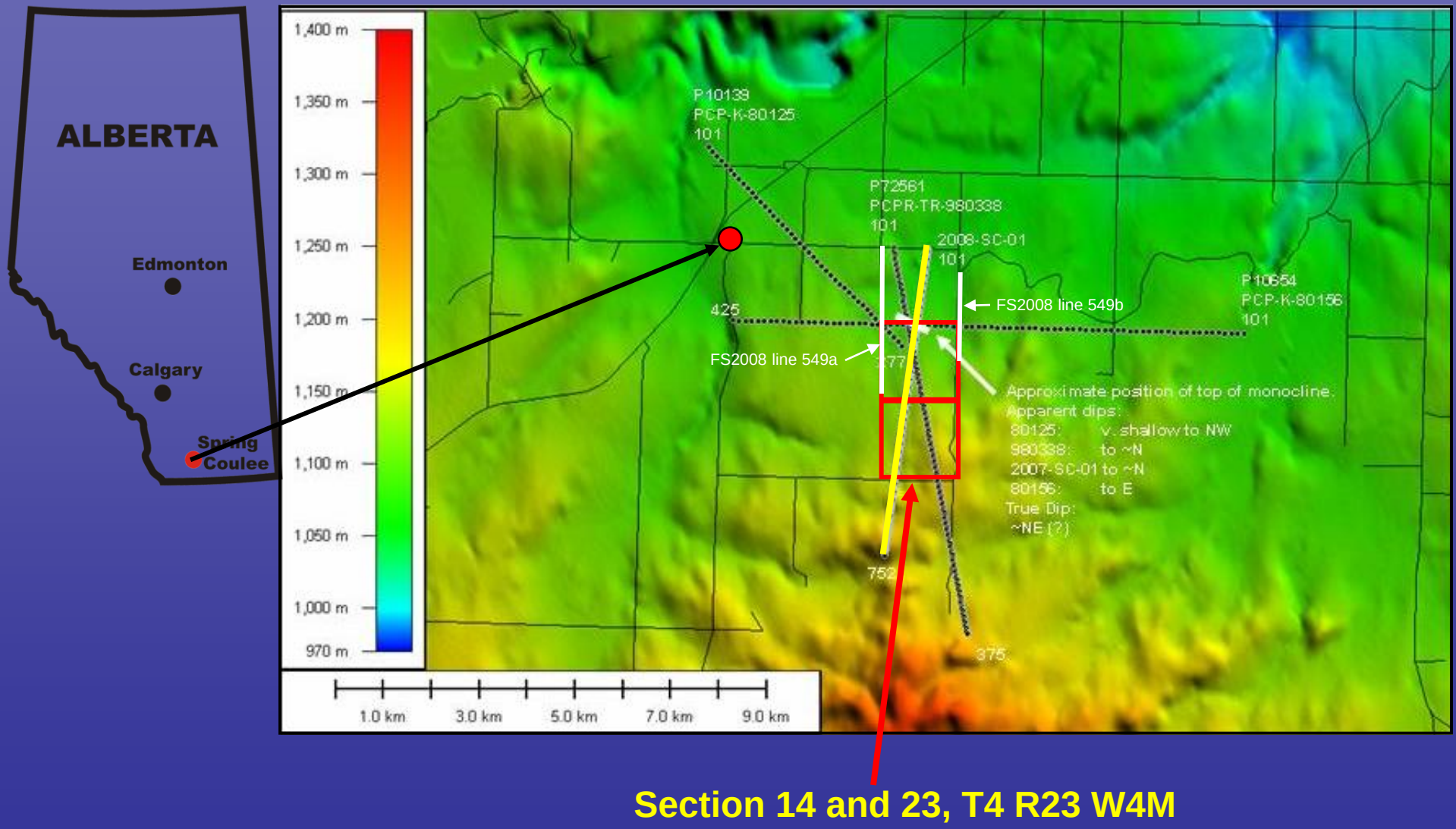
CREWES

UNIVERSITY OF CALGARY

Outline

- **Why** — System comparisons
- **Where** — Spring Coulee
- **When** — January 2008
- **What** — Sercel MEMS and Sensor SM7 geophones
- **How** — Line description, recording parameters
- **Results** — Data, system differences
- **Extras** — Field School
- **Summary** — Conclusions, errors, data set
- **Coming attractions**

Where - Site location



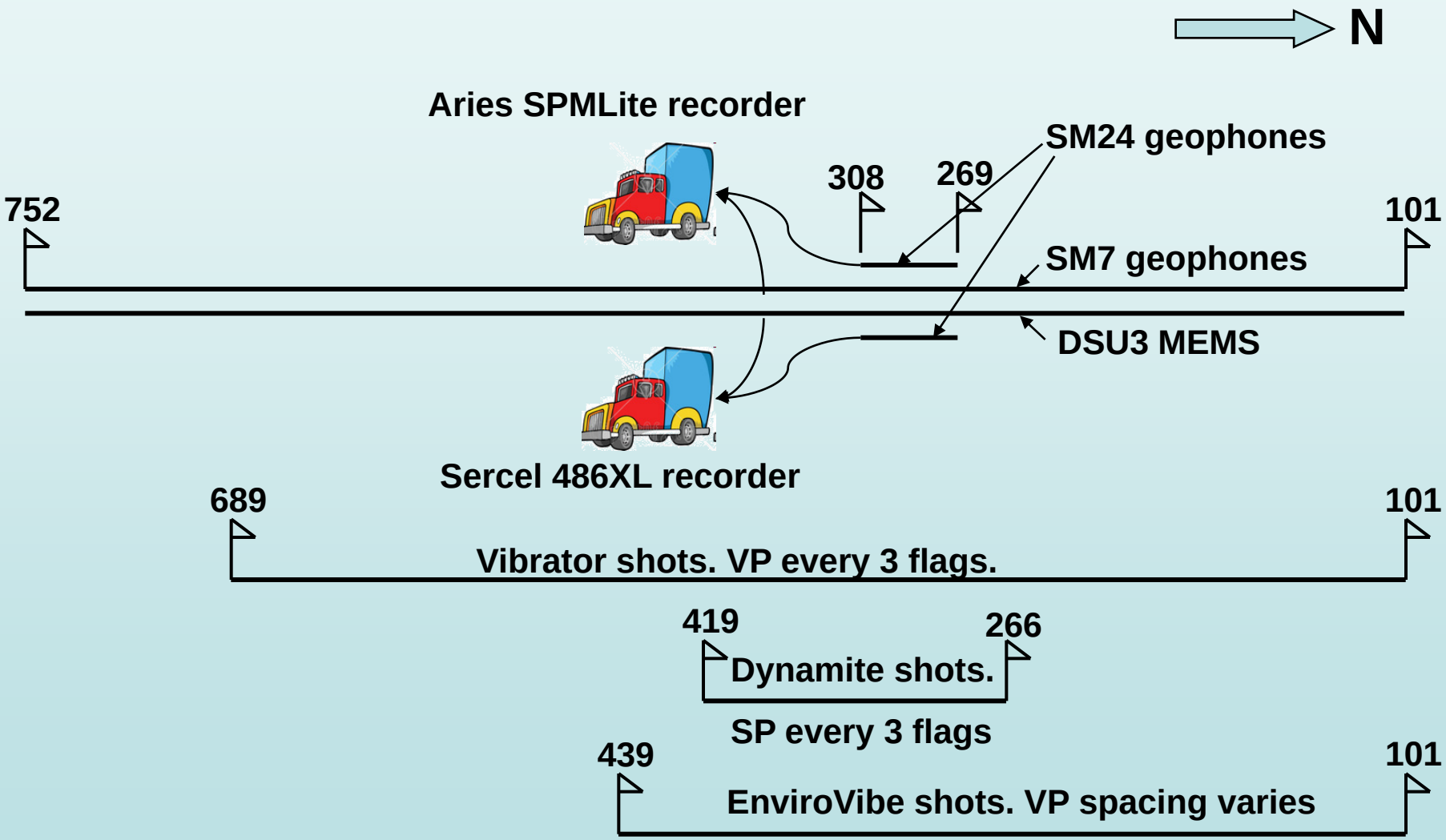
Section 14 and 23, T4 R23 W4M

What - Sercel DSU3 and Sensor SM7 geophone

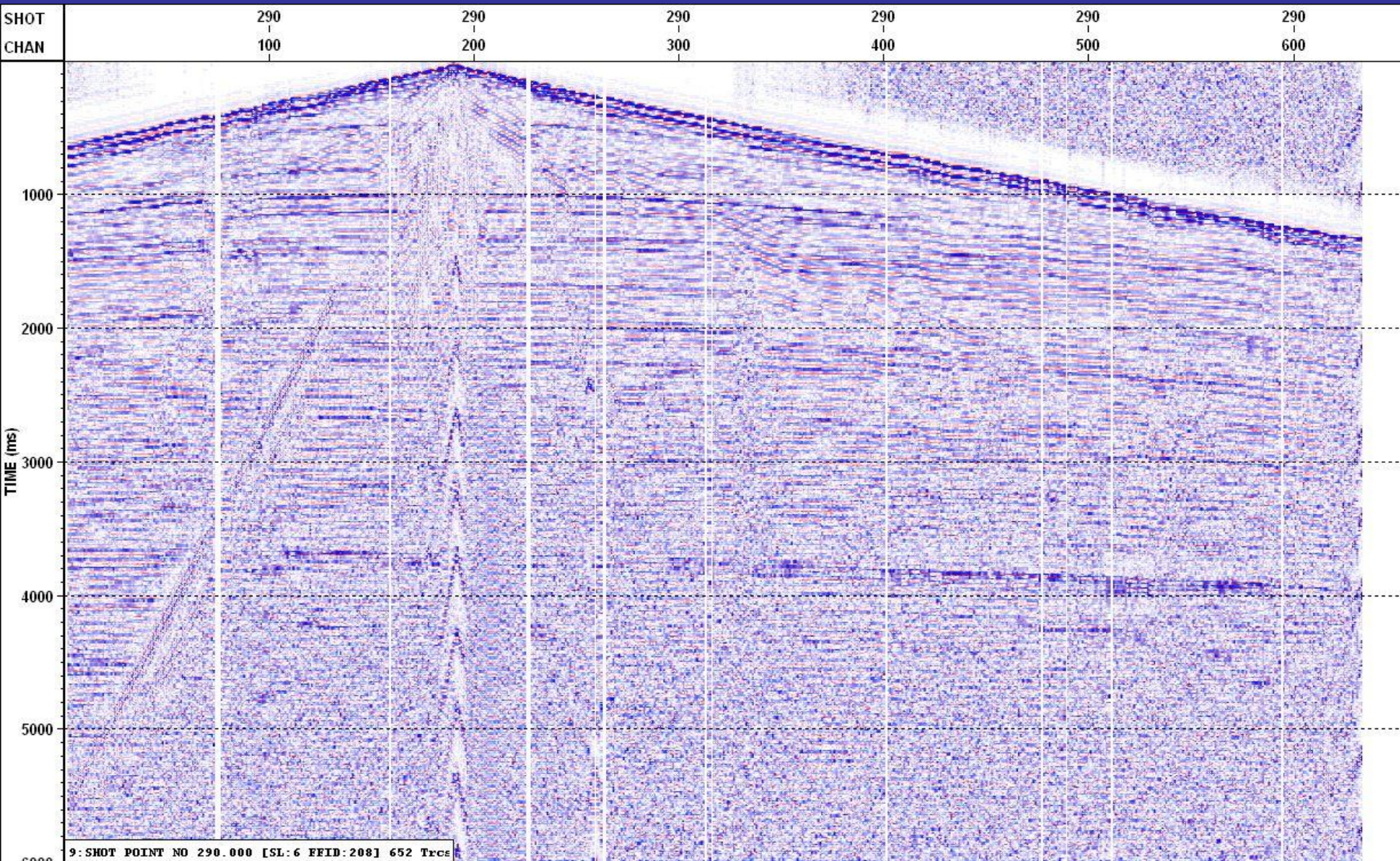
How - Recording parameters

- Sensor SM7 3-component geophone, Aries 24-channel RAMs, SPMLite recording system
- Sercel DSU3 MEMS sensor, 428XL recording system
- 40 x Sensor SM24 3-component geophone pairs, 1 of each pair recorded on each set of instruments
- 2 x Mertz Hemi 48,000lb vibrators, 4 Hz - 130Hz linear, 4 x 12 second sweep
- 2 Kg dynamite shots at 18m depth
- 1 x IVI EnviroVibe 18,000lb vibrator, 10 Hz - 200Hz, 4 x 12 second sweep
- 2 ms sample rate
- 6 second record length

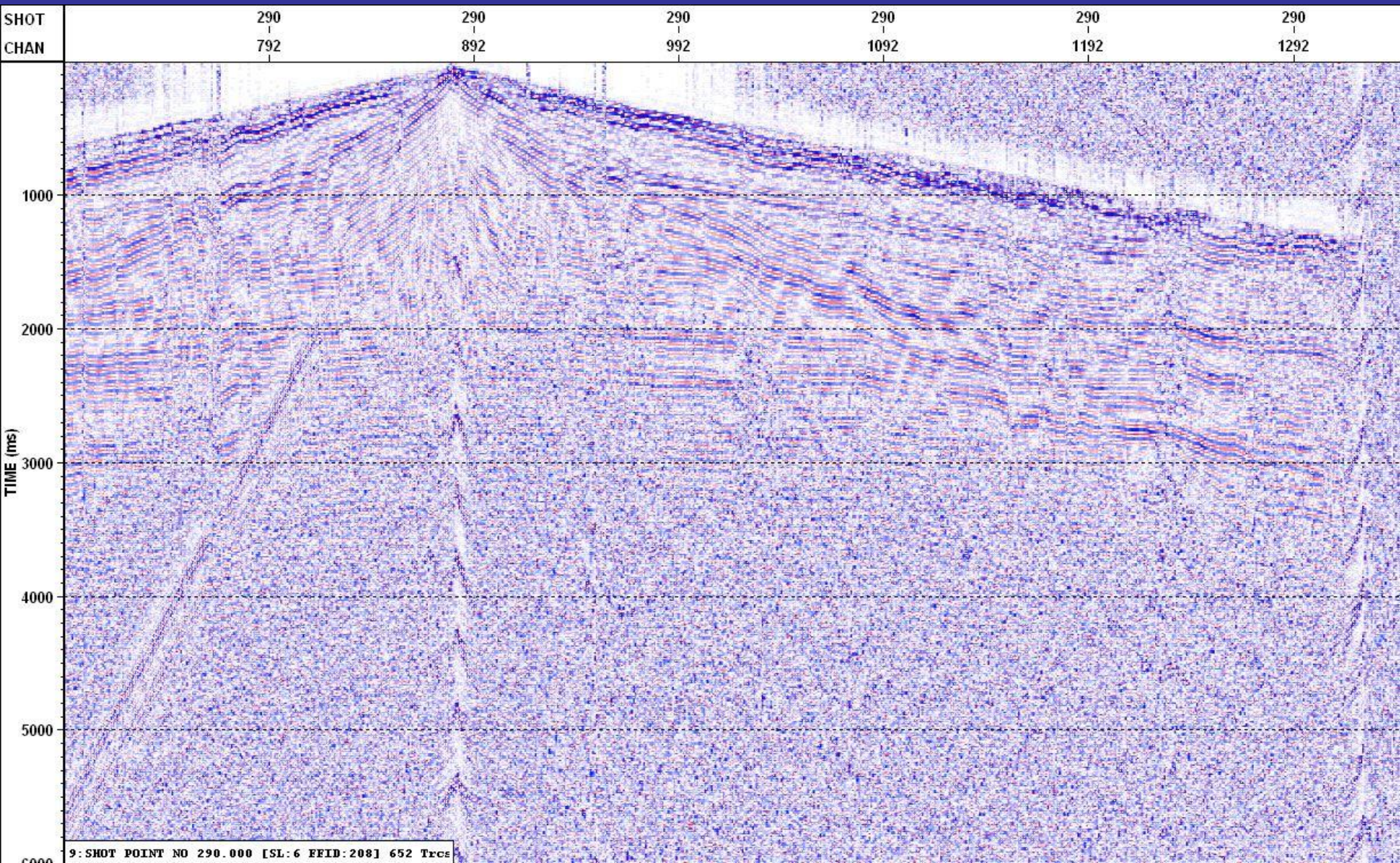
Line layout


N
Aries SPMLite recorder
SM24 geophones
308
269
752
101
SM7 geophones
DSU3 MEMS
Sercel 486XL recorder
689
101
Vibrator shots. VP every 3 flags.
419
266
Dynamite shots.
SP every 3 flags
439
101
EnviroVibe shots. VP spacing varies

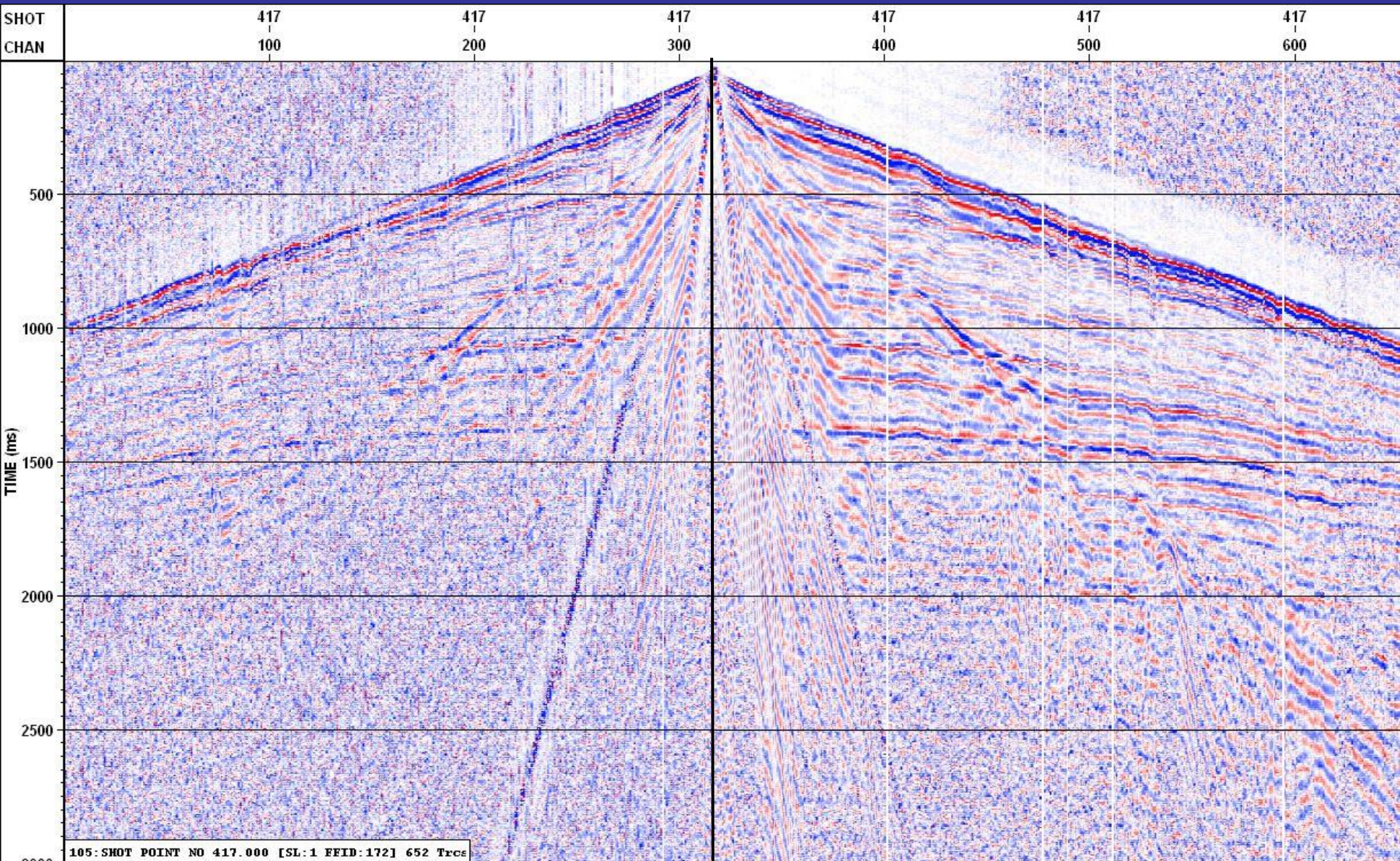
Dynamite shot from Aries SM7 geophones(vertical, filtered)



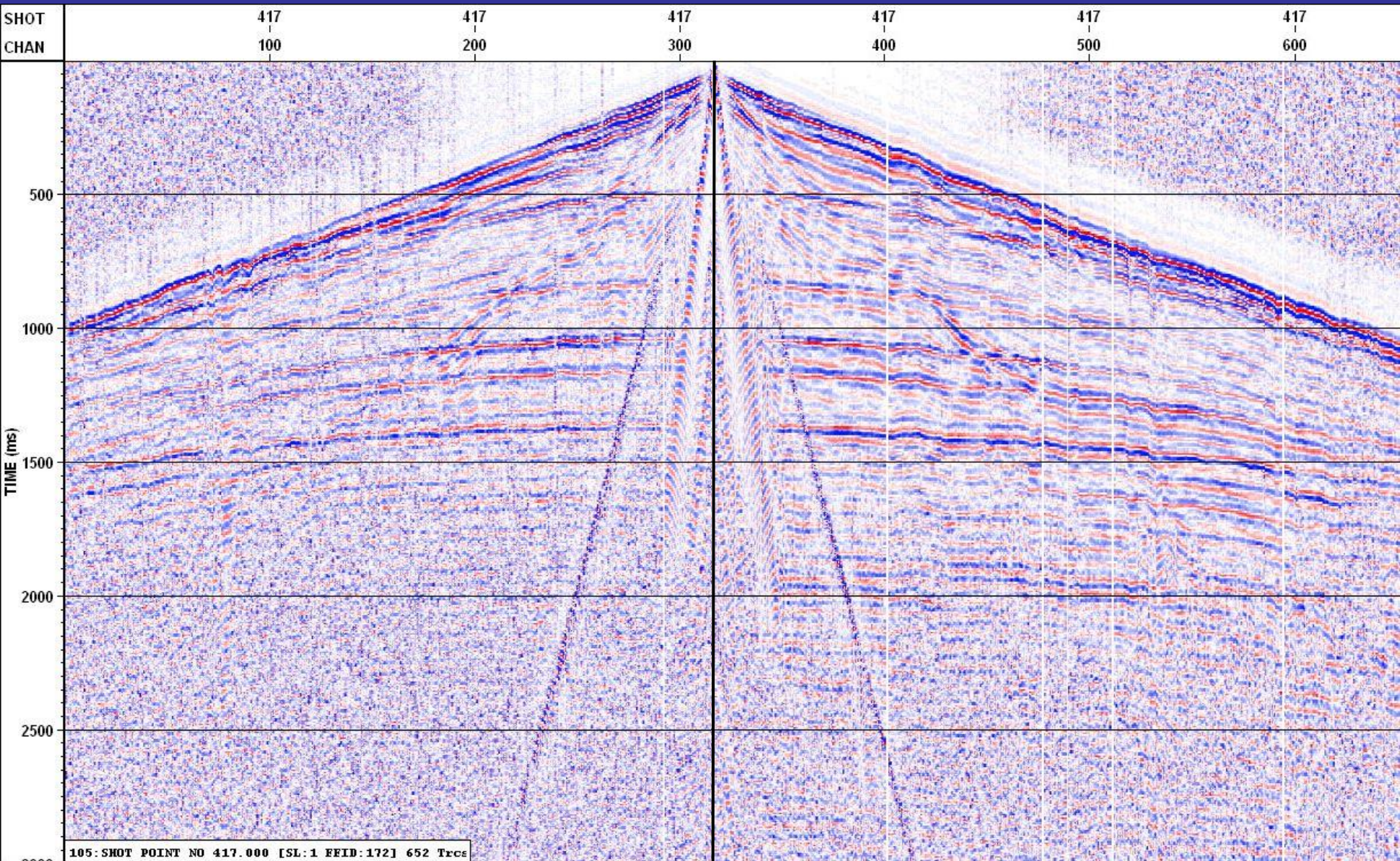
Dynamite shot from Aries SM7 geophones (inline, filtered)



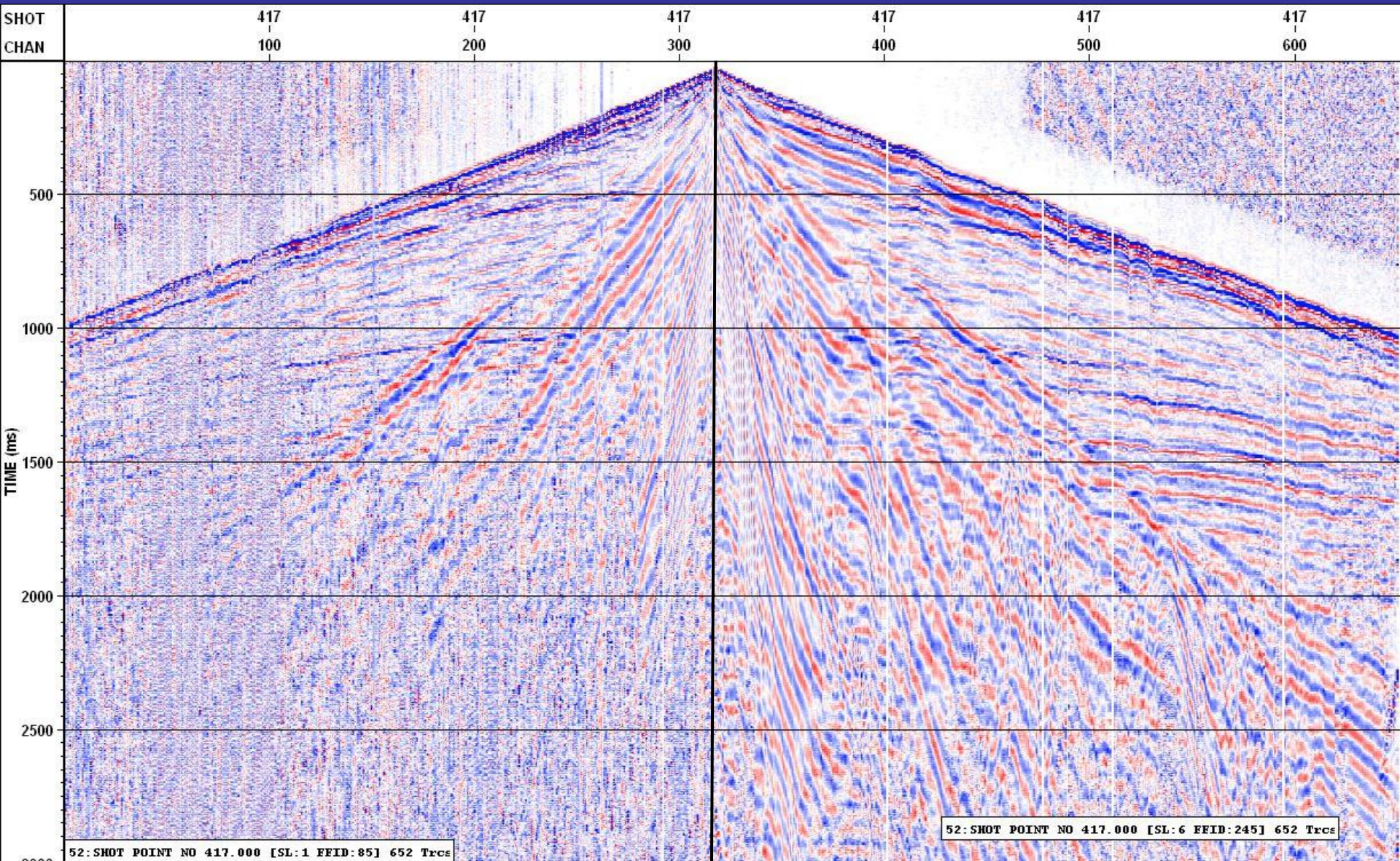
Vibrator shot raw. Sercel left, Aries right



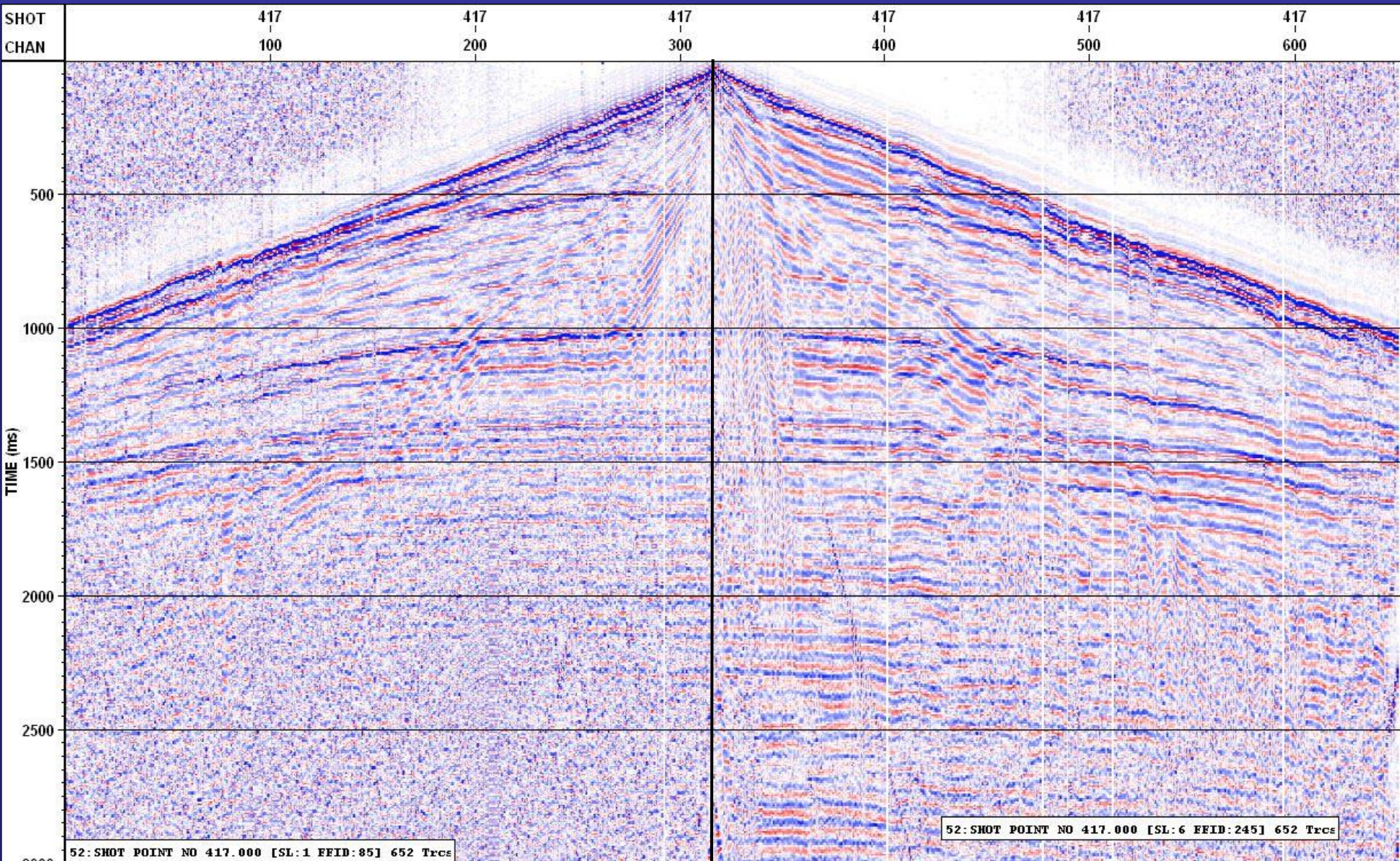
Vibrator shot filtered. Sercel left, Aries right



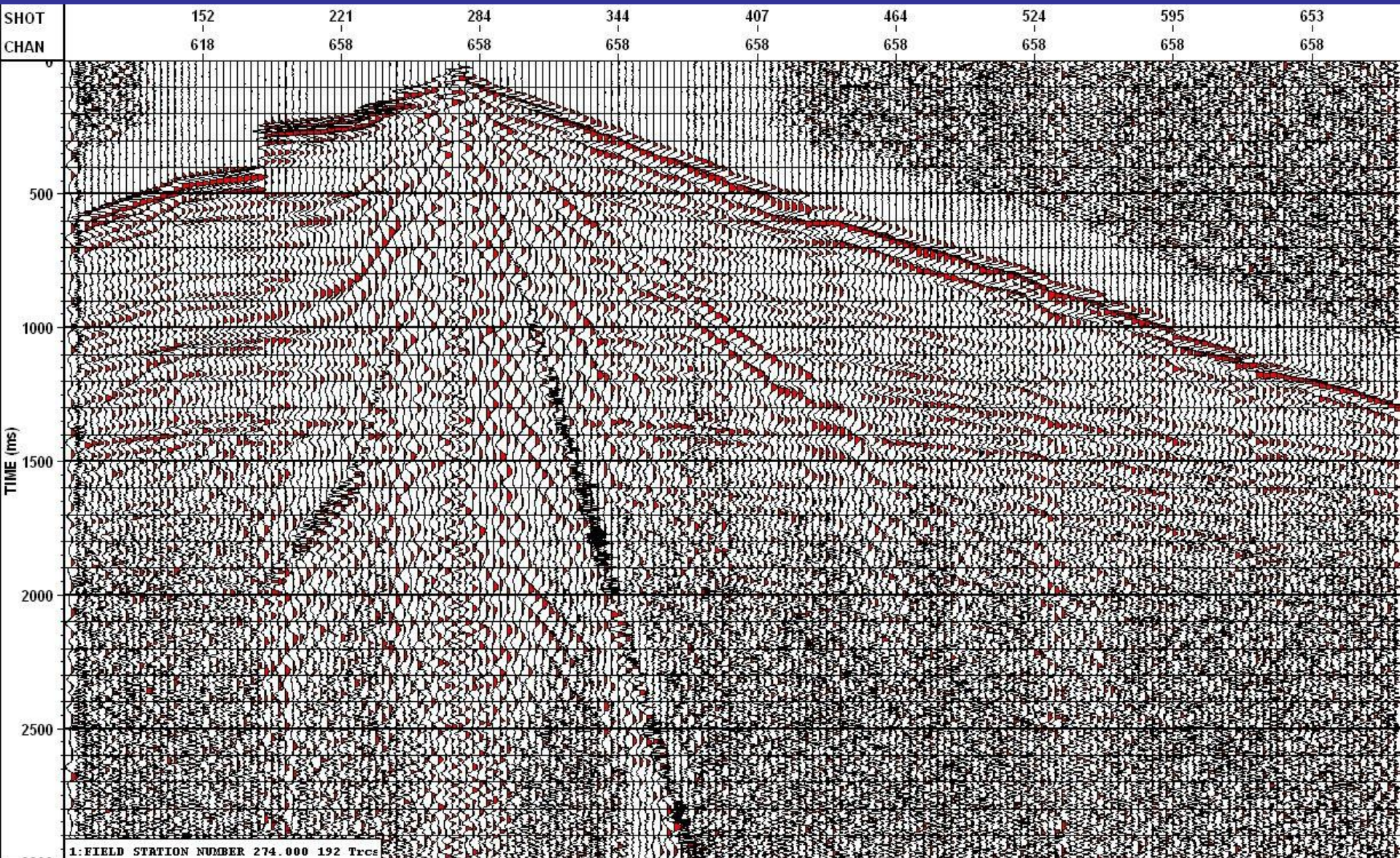
Dynamite shot raw. Sercel left, Aries right



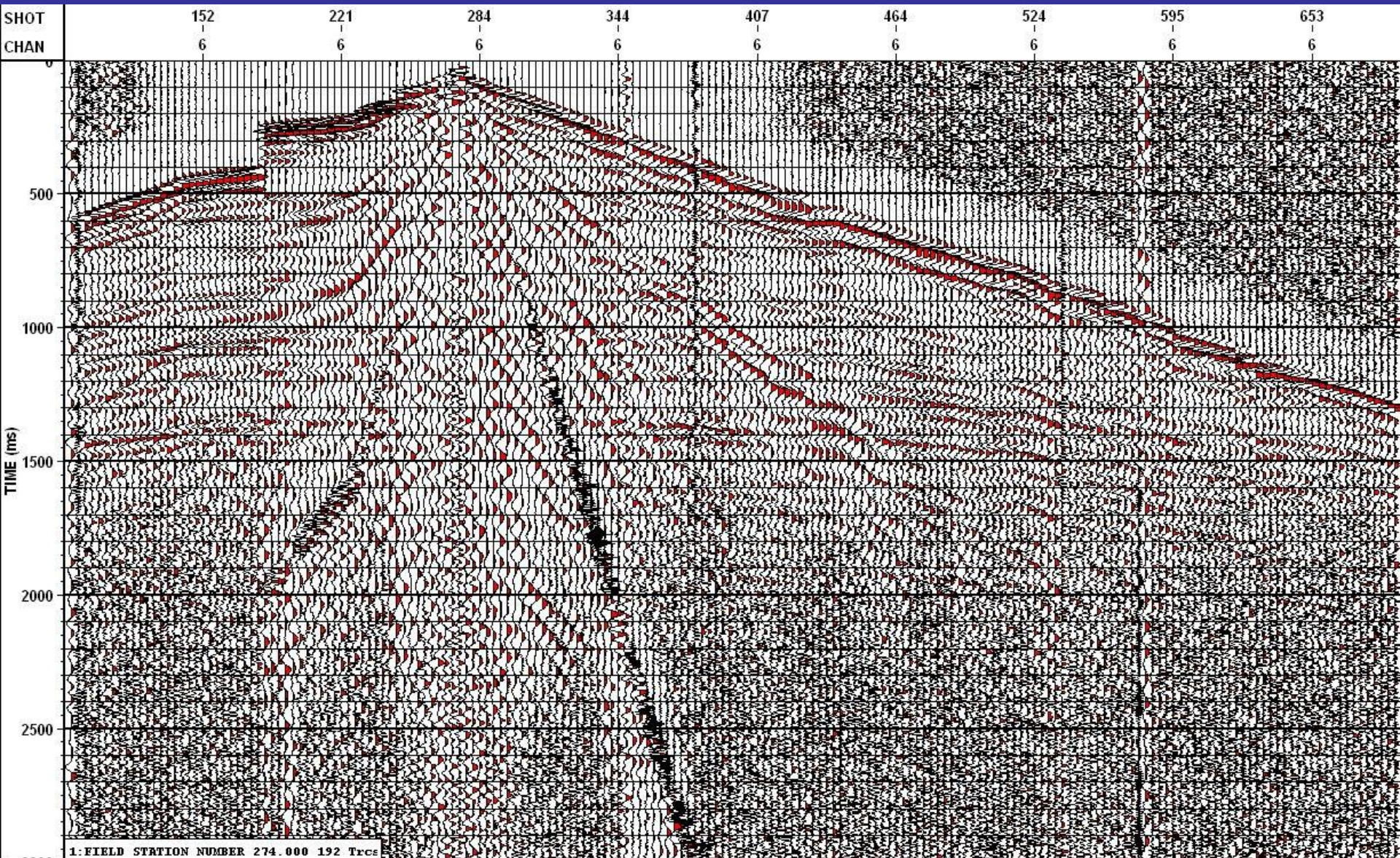
Dynamite shot filtered. Sercel left, Aries right



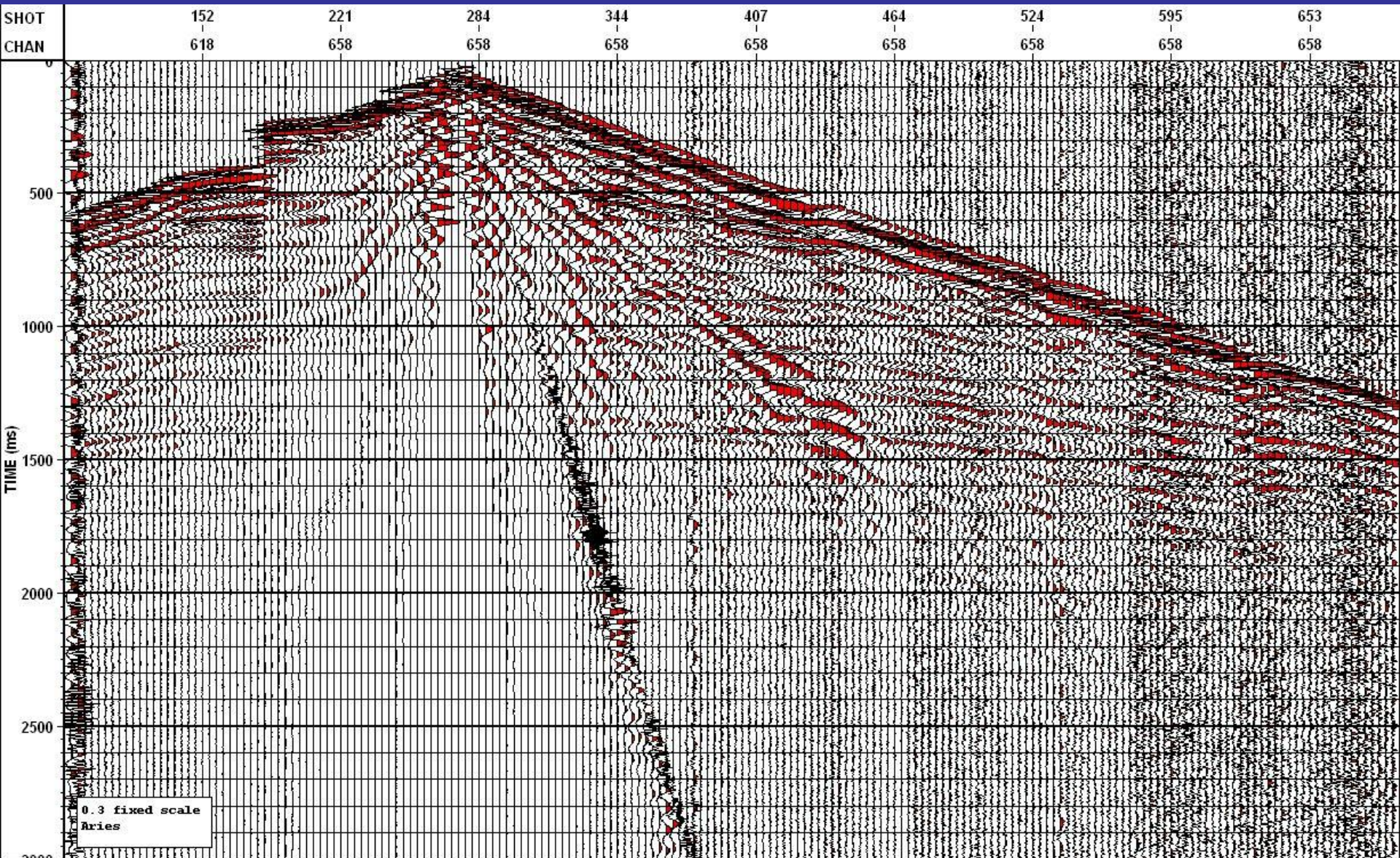
Aries vibrator SM24 receiver gather (filtered, AGC applied)



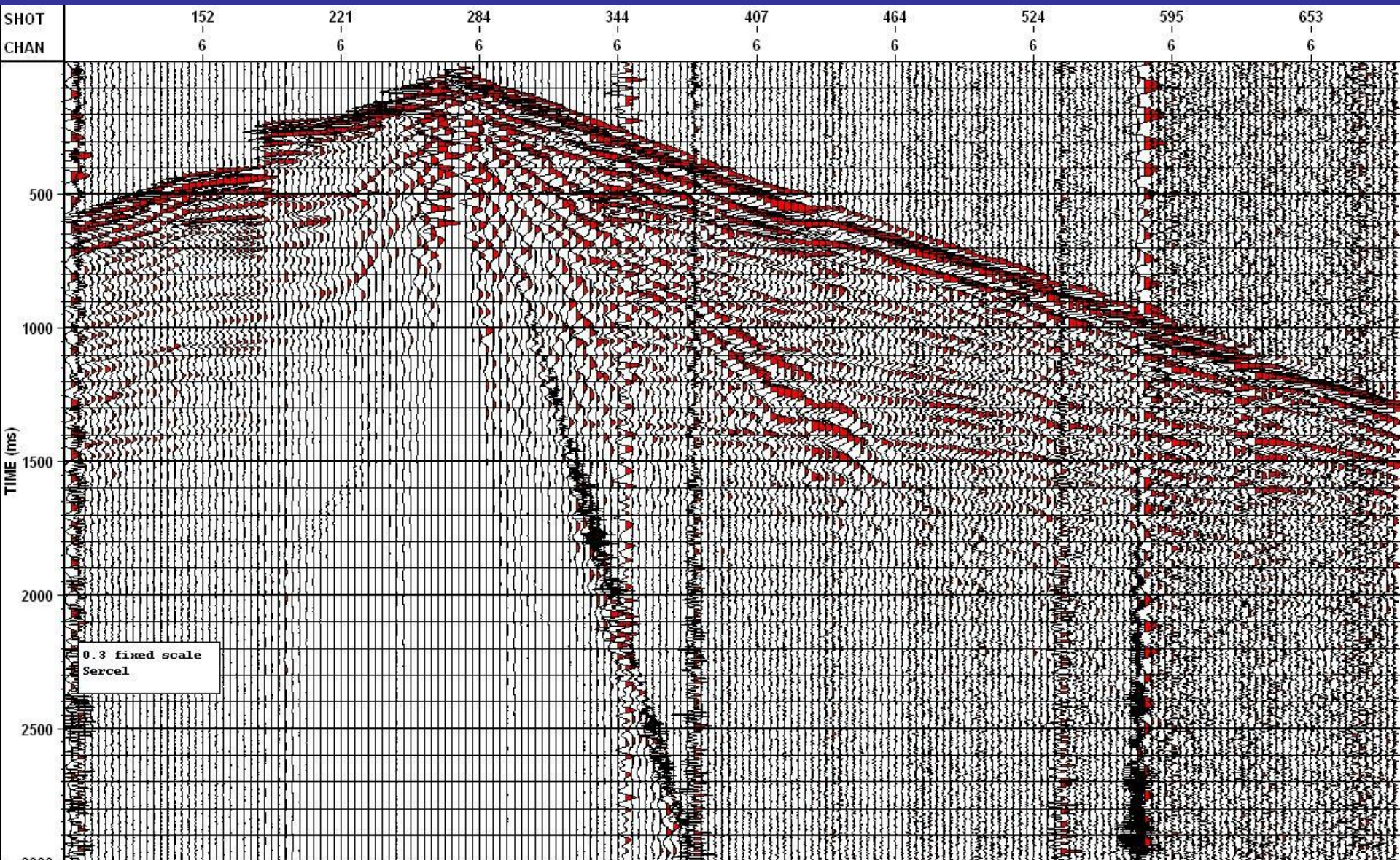
Sercel vibrator SM24 receiver gather (filtered, AGC applied)



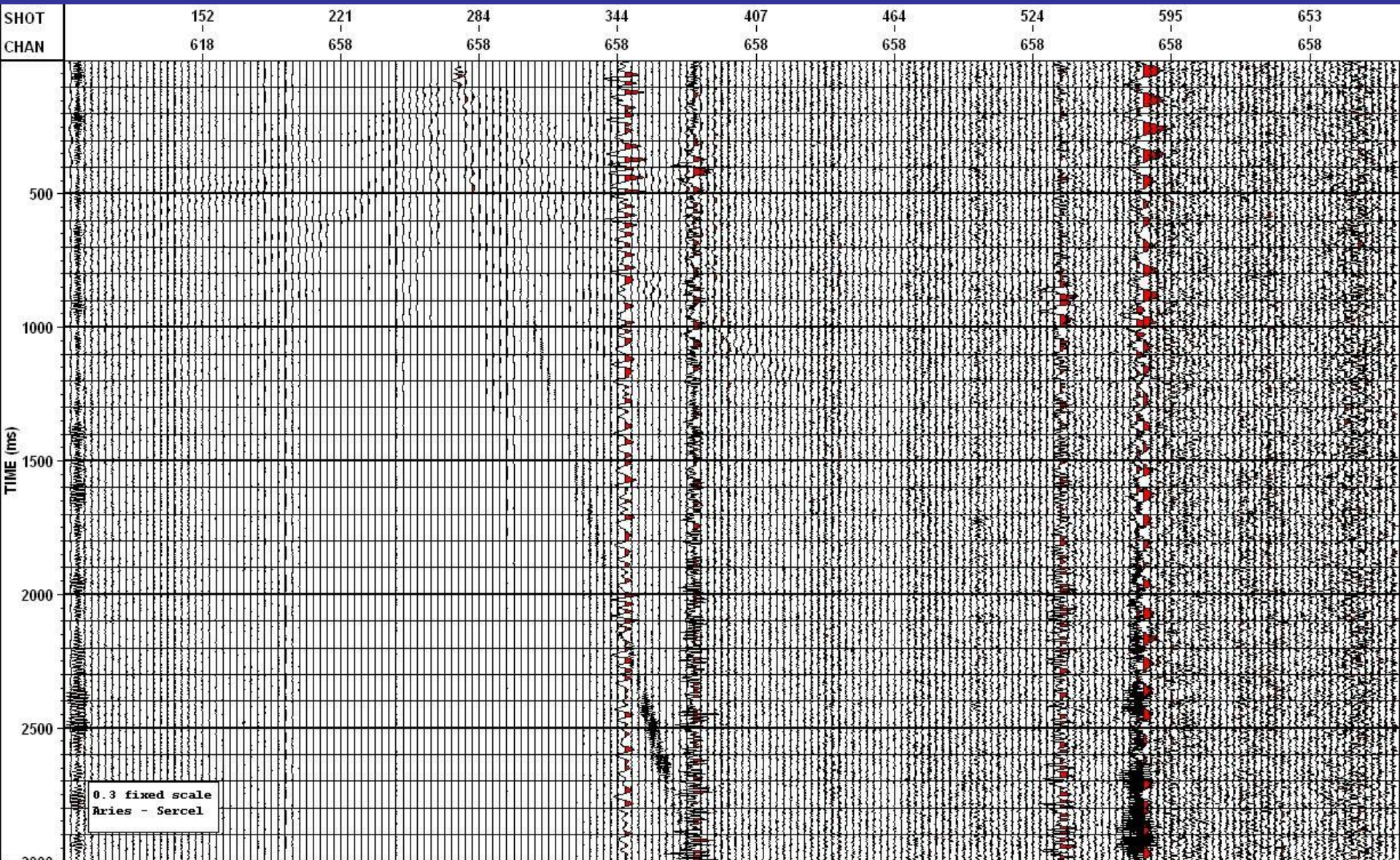
Aries SM24 receiver gather, trace scaled



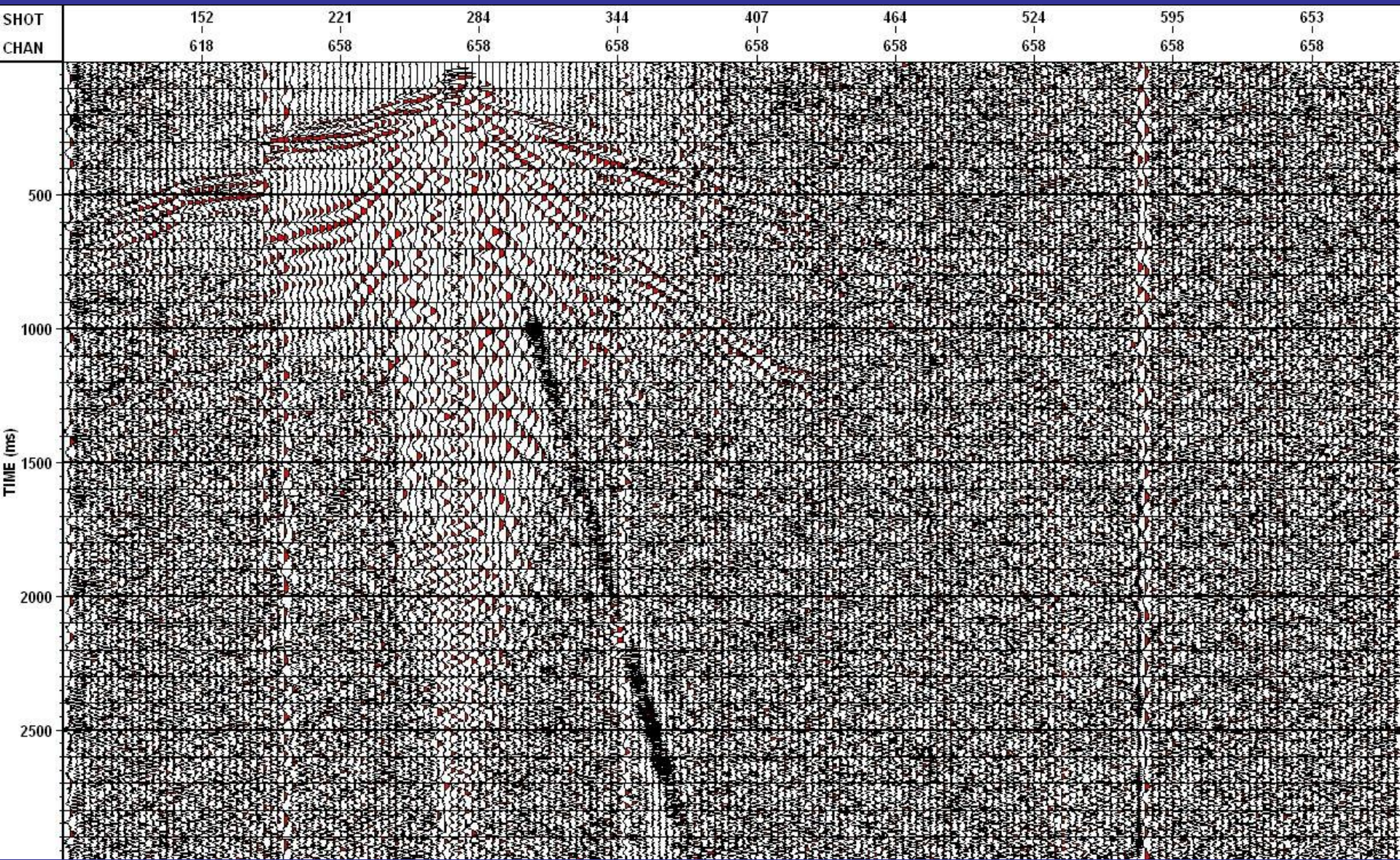
Sercel SM24 receiver gather, trace scaled



Difference between Aries and Sercel scaled receiver gathers

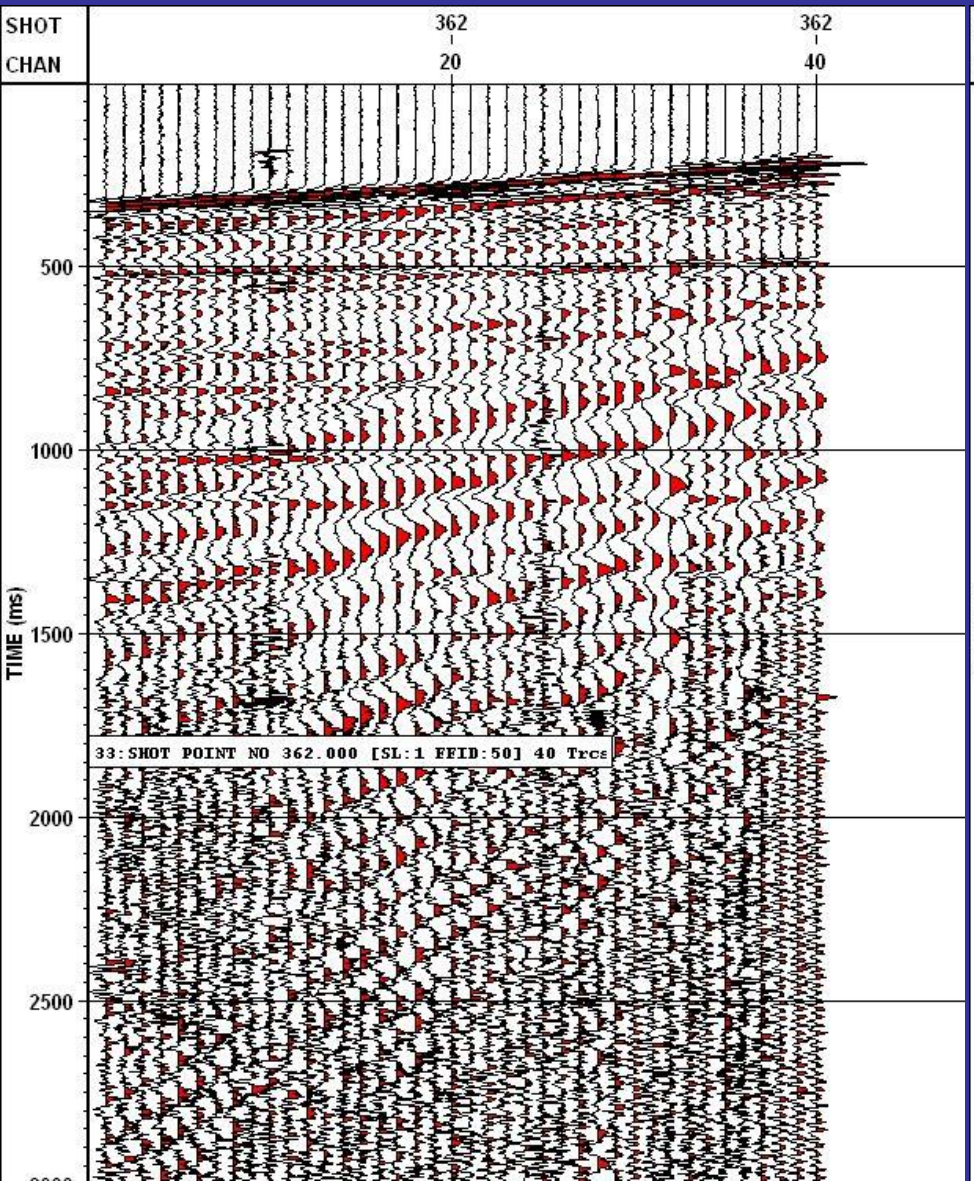


Difference with AGC applied

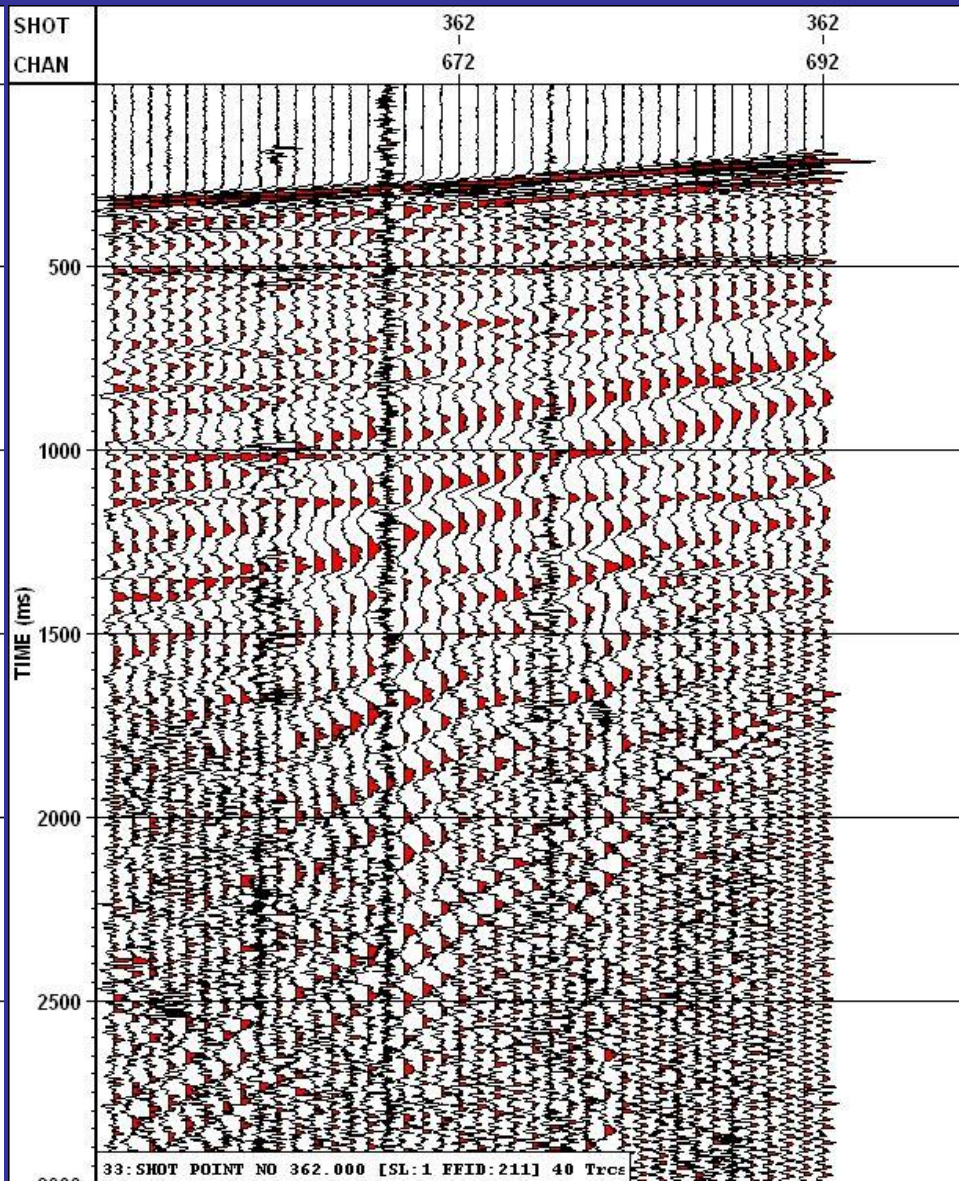


Dynamite shot gather (SM24 geophones)

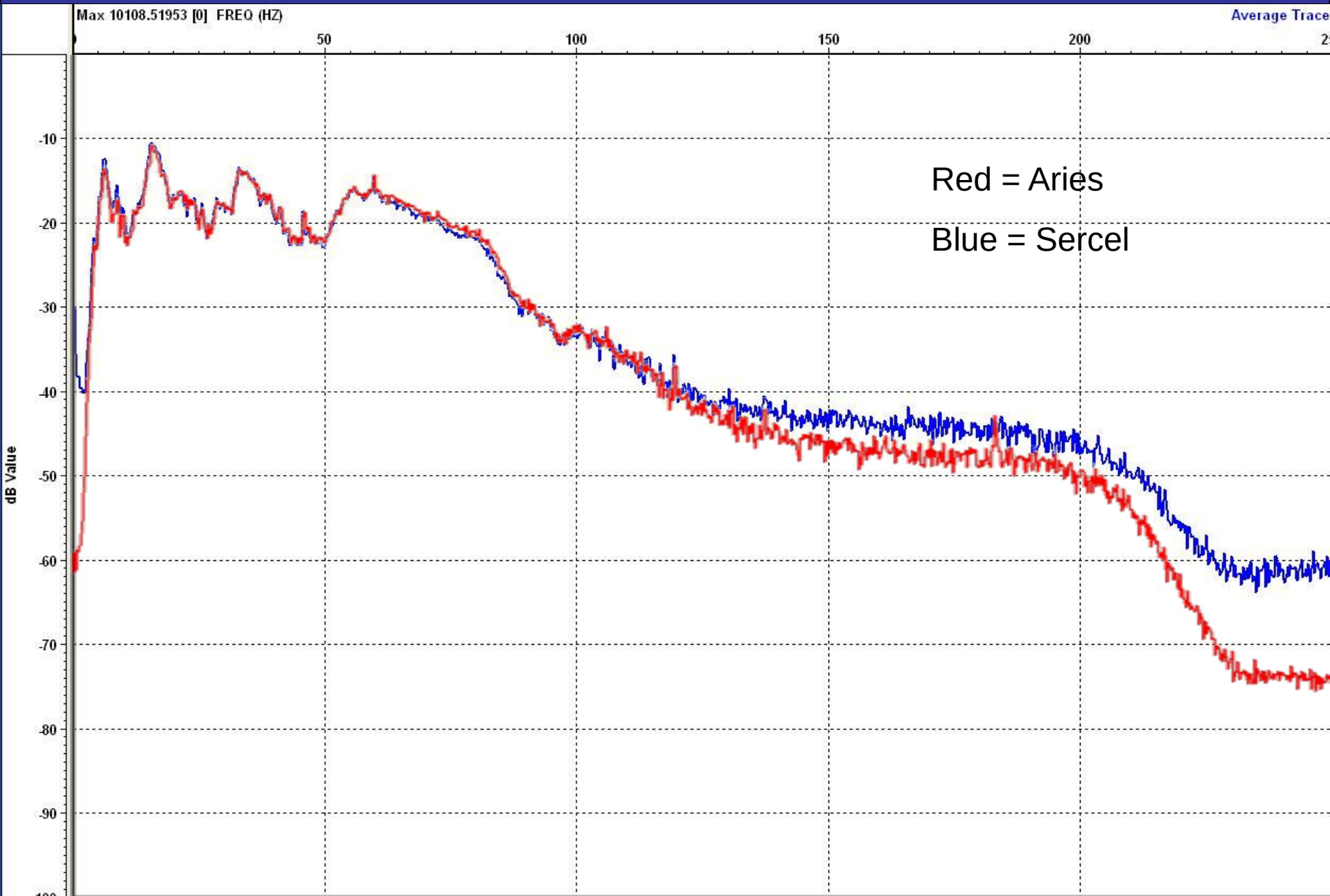
Sercel



Aries

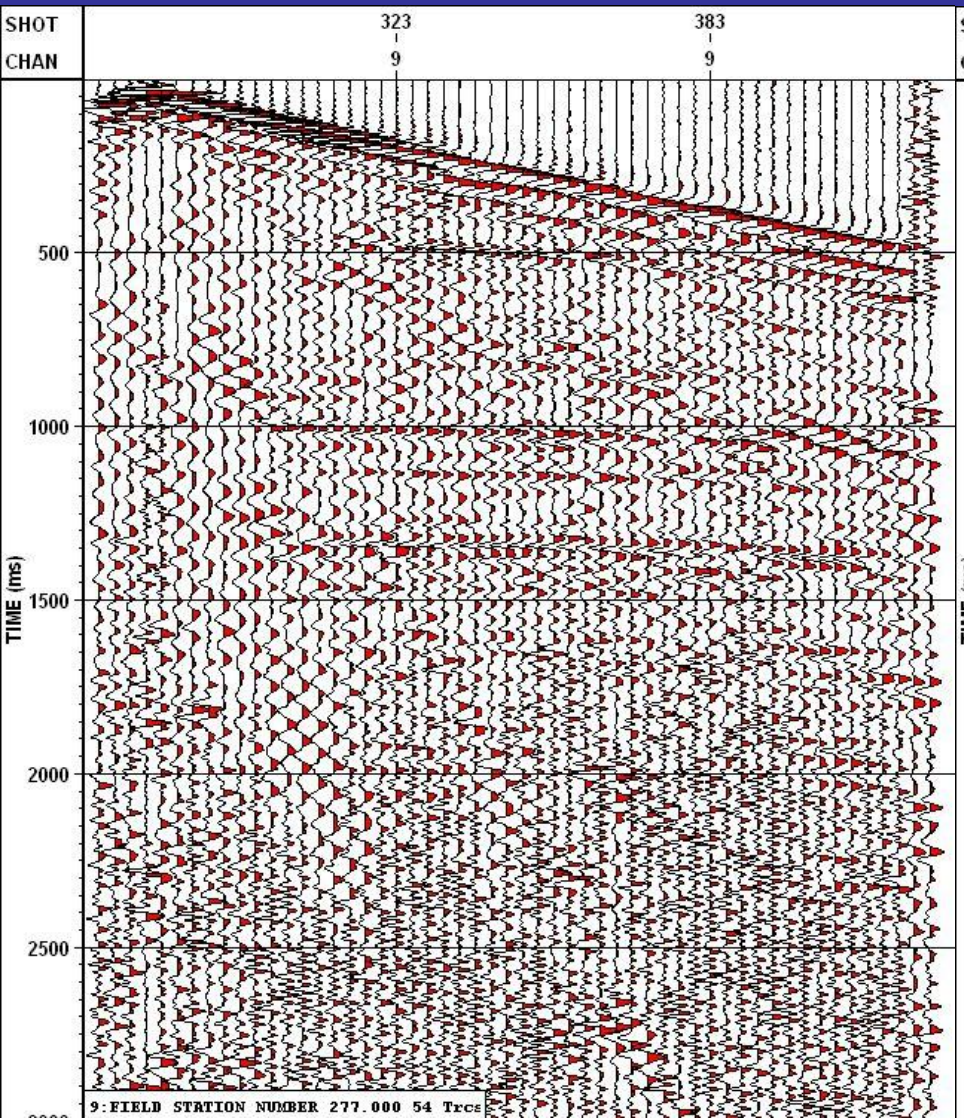


Dynamite shot gather spectra

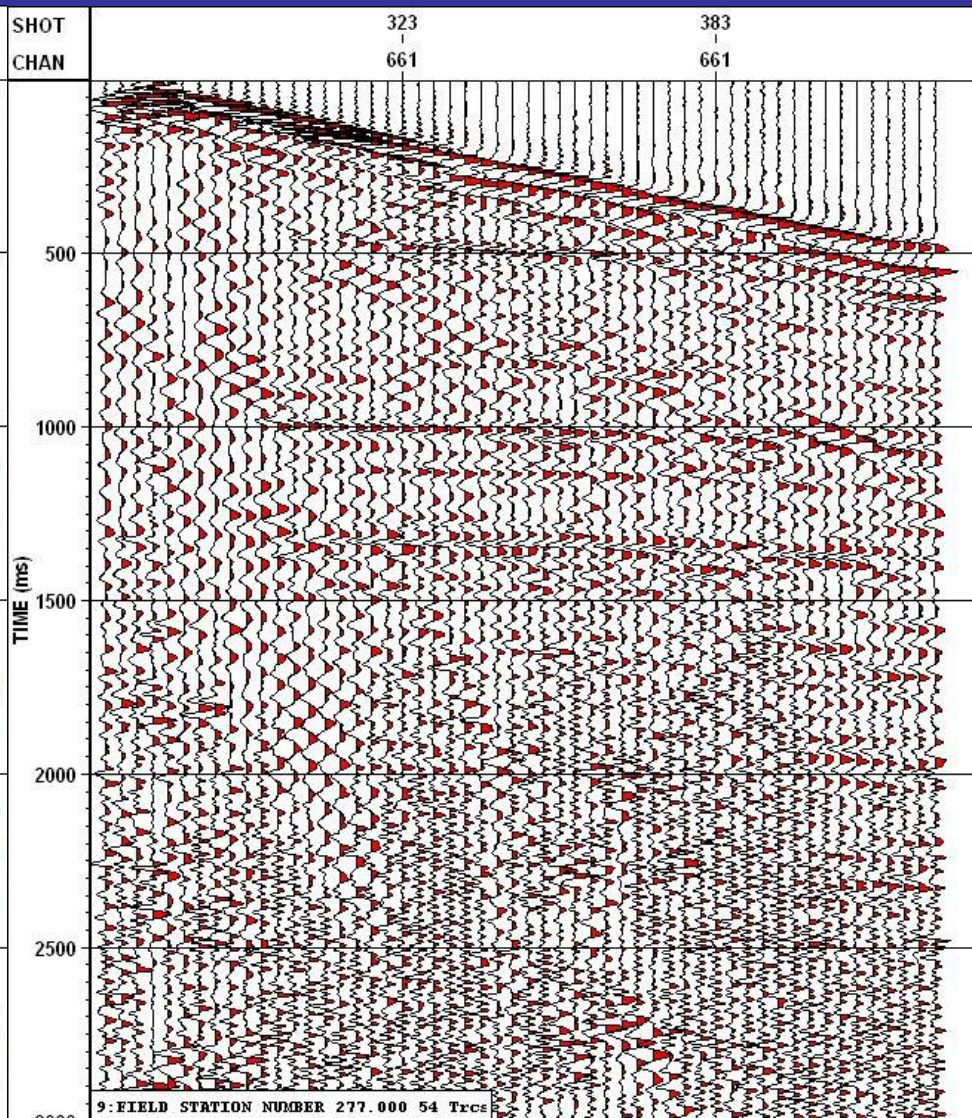


Dynamite SM24 receiver gathers (filtered)

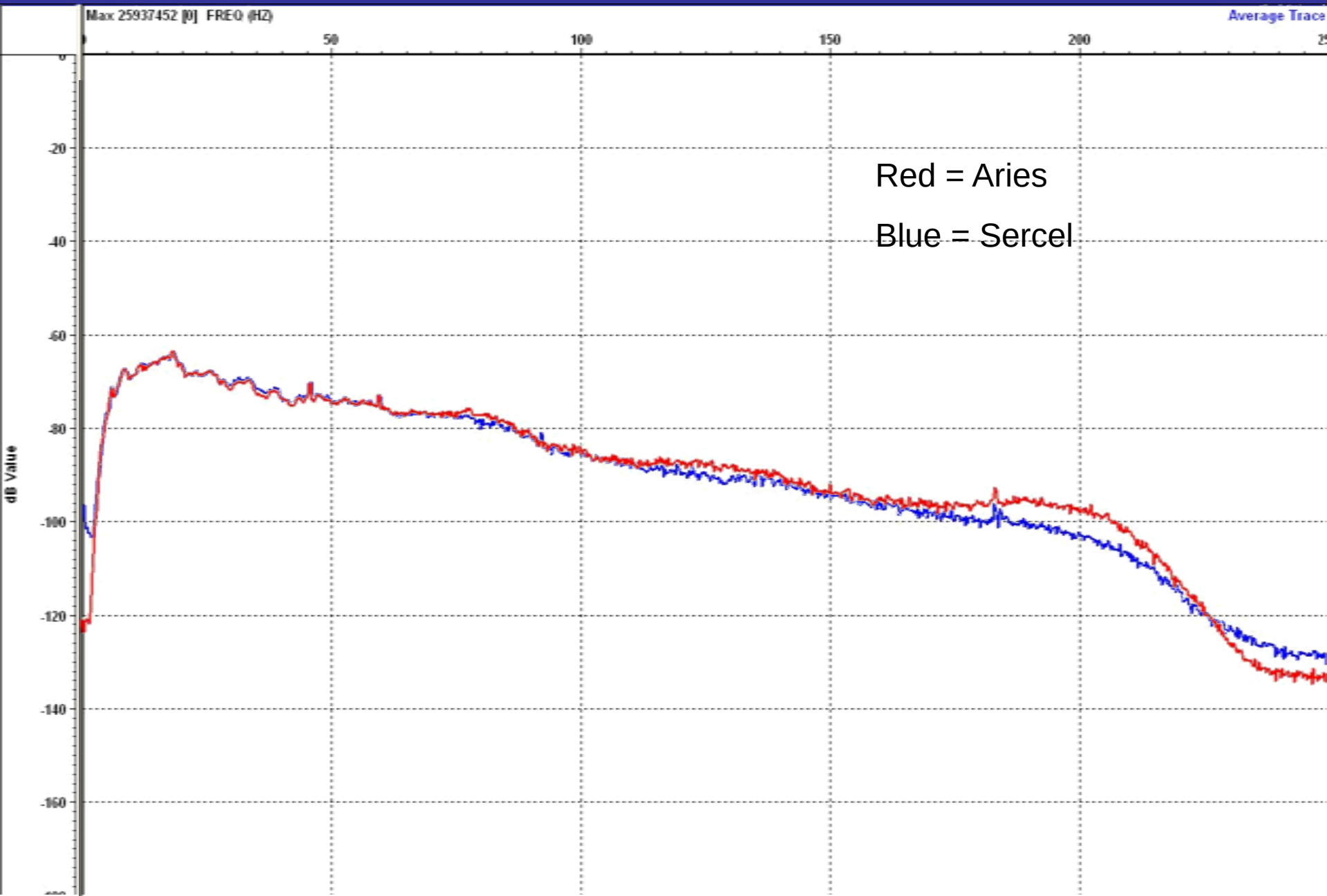
Sercel



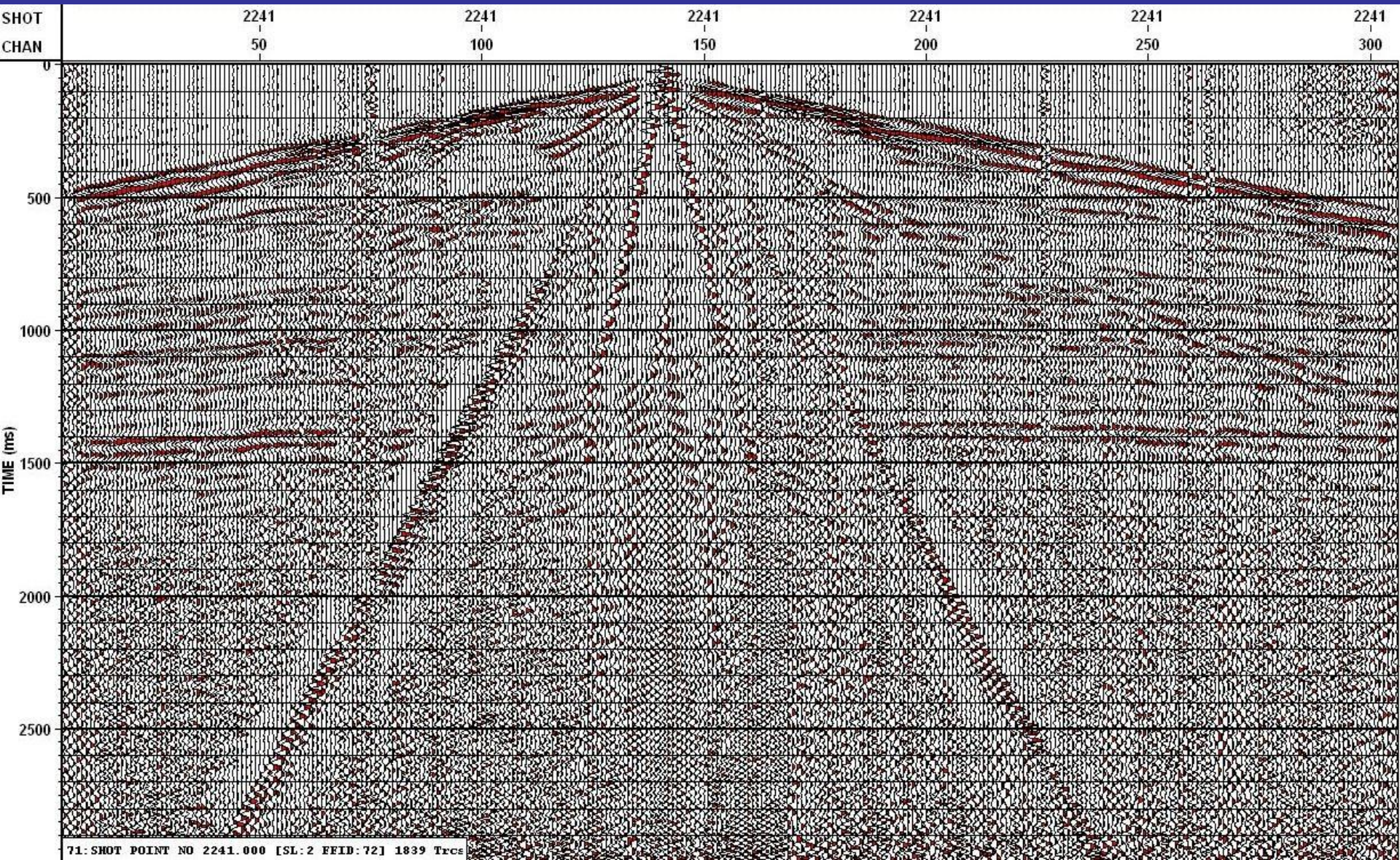
Aries



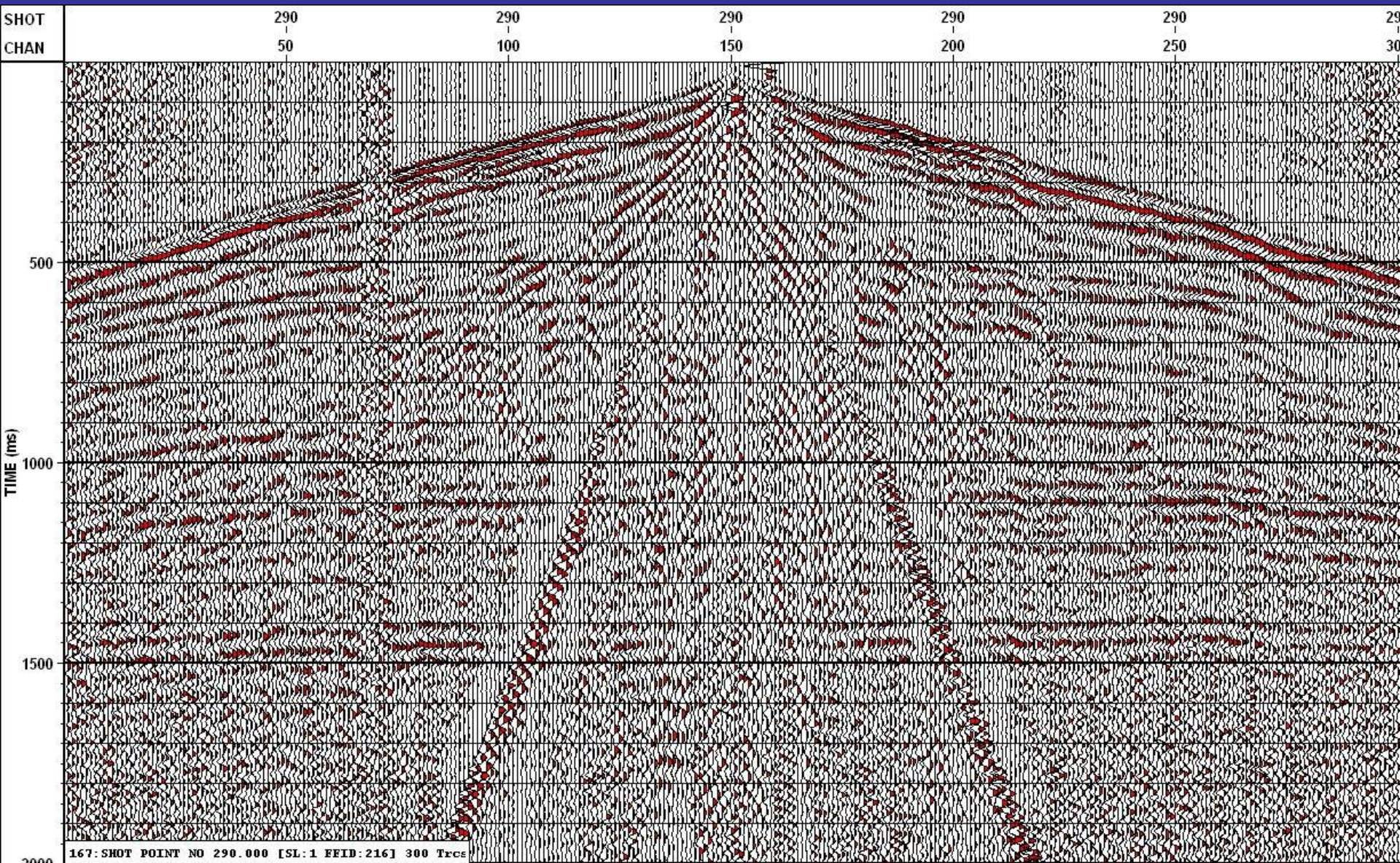
Dynamite receiver gather spectra



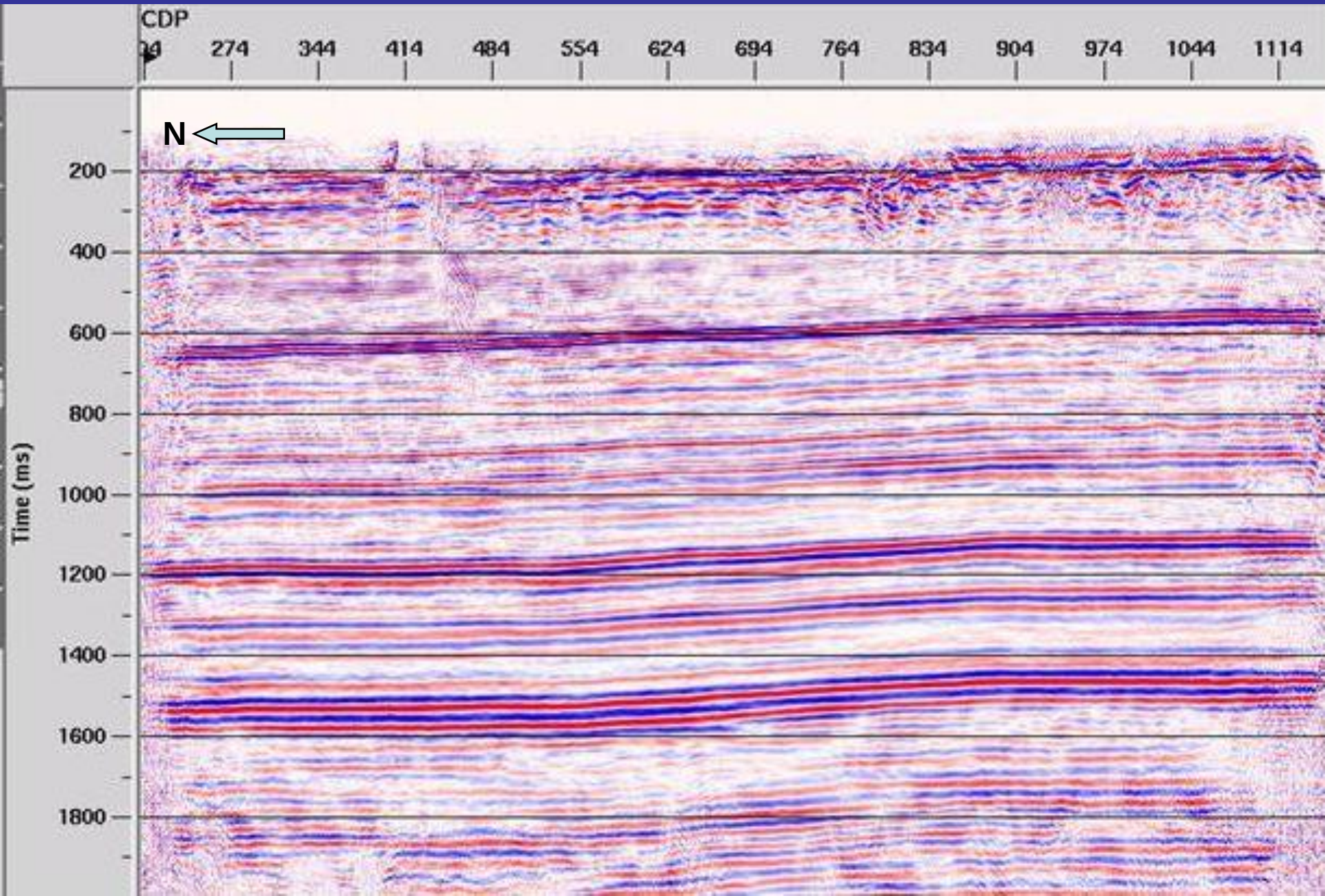
IVI EnviroVibe shot (filtered)



2008 Field School record (filtered)



Field School section line 549A



Summary

- The survey was a success, with good data being acquired from all systems and sources.
- Processing of the data has provided good quality sections, which show that for this type of survey with high fold coverage, there appears to be no definitive advantage of either the MEMS accelerometer or the geophone over the other.

Errors

- There was an incorrect assumption made regarding the low cut filters (none on Sercel, 3 Hz on Aries).

Data set

- The data set is available now (13 GB).

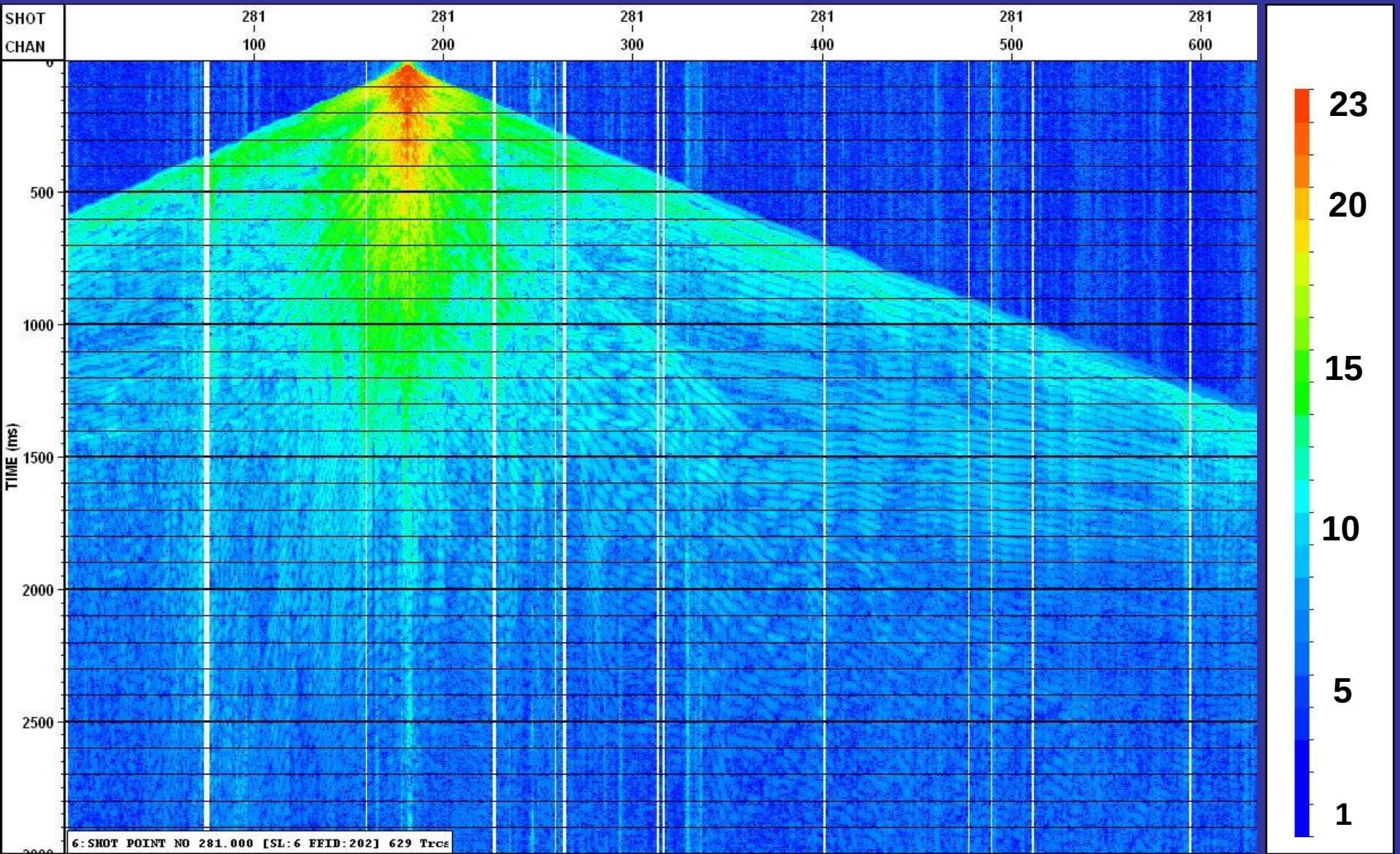
Coming attractions

- Comparison of MEMS and geophones – Michael Hons
- Source comparisons – Gabriela Suarez
- Processing results – Hanxing Lu
- Hydrocarbon potential – Lauren Ostridge
- SEG poster – Glenn Hauer

Future work

- Converter efficiency (resolution, bits occupied)

Bits used by each sample



Thanks

- ARAM Systems Ltd. provided financial support, all the line equipment and personnel for the project. Specifically Glenn Hauer, Frank Zurek, Shawn McCluskey and Gary Kuemper (CSRI) who provided invaluable help with the layout of the Aries spread, and made sure everything kept running.
- CGG Veritas provided the Sercel system and the Mertz Vibroseis units, as well as assisting in the field layout of the Aries system.
- CREWES staff: Rob Ferguson assisted in the field for the project. Hanxing Lu processed the data from both the January survey and the August Field School.
- CREWES Sponsors.


PERMIT W 548
ARAM-ARIES
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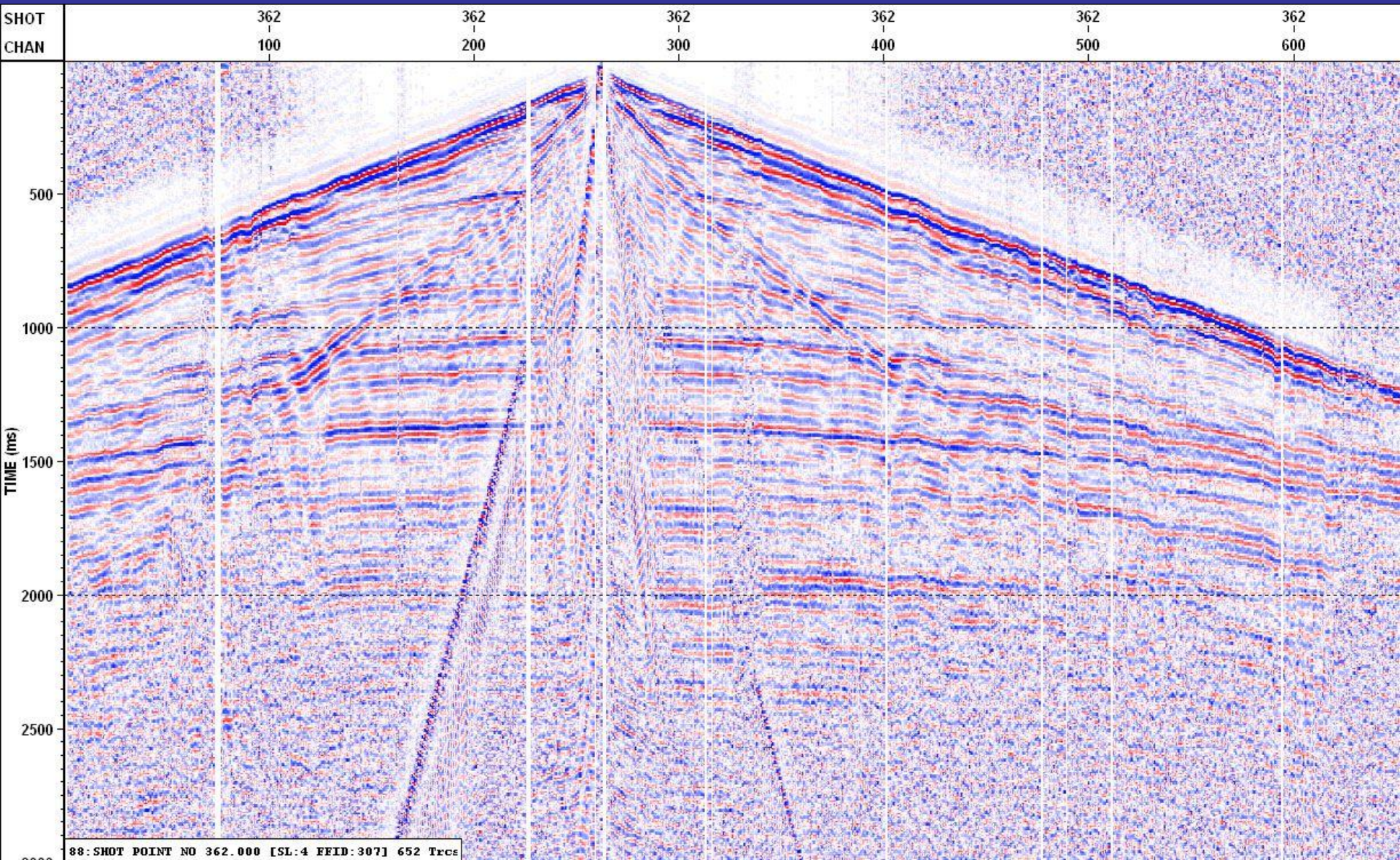
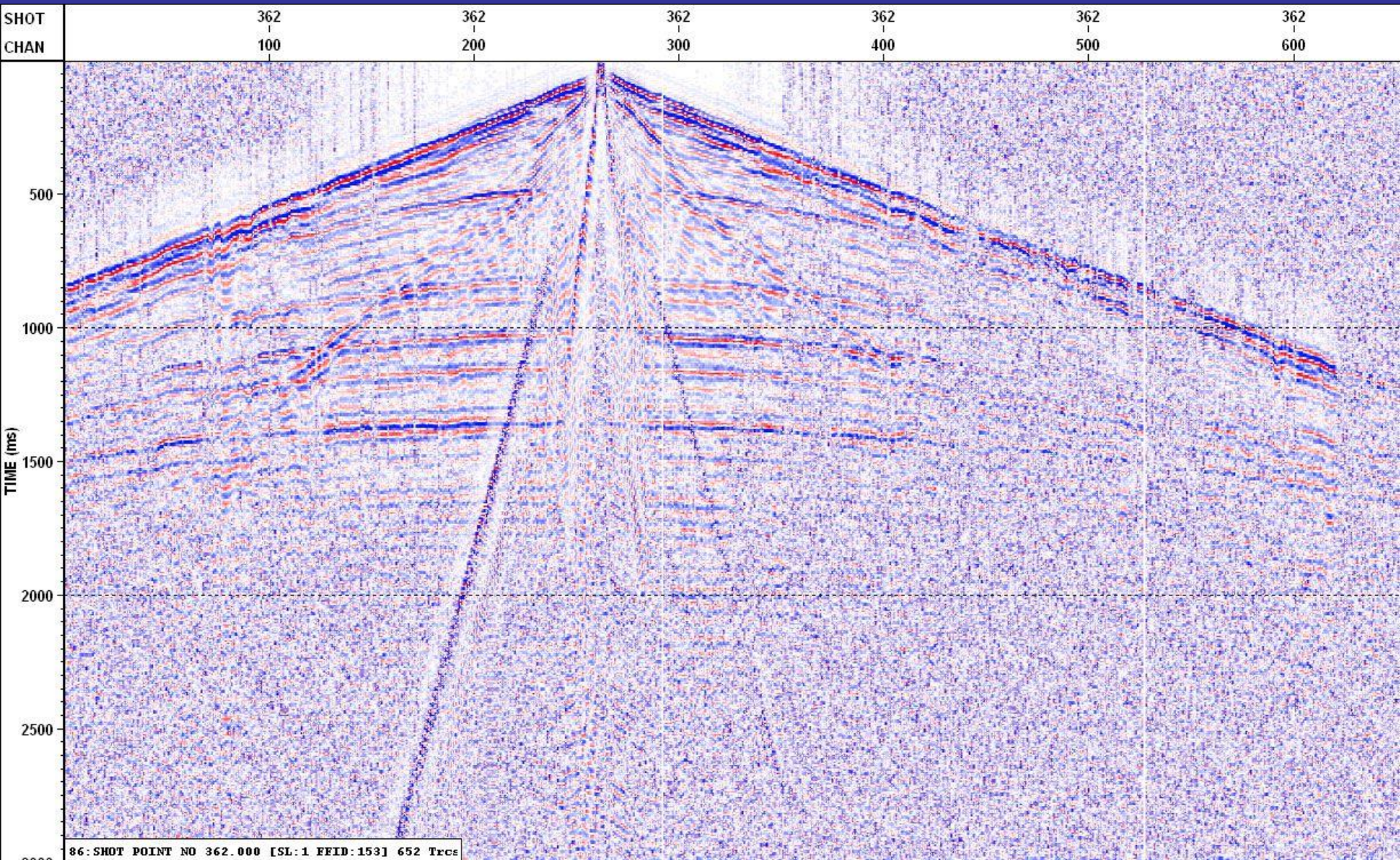
PERMIT W 548

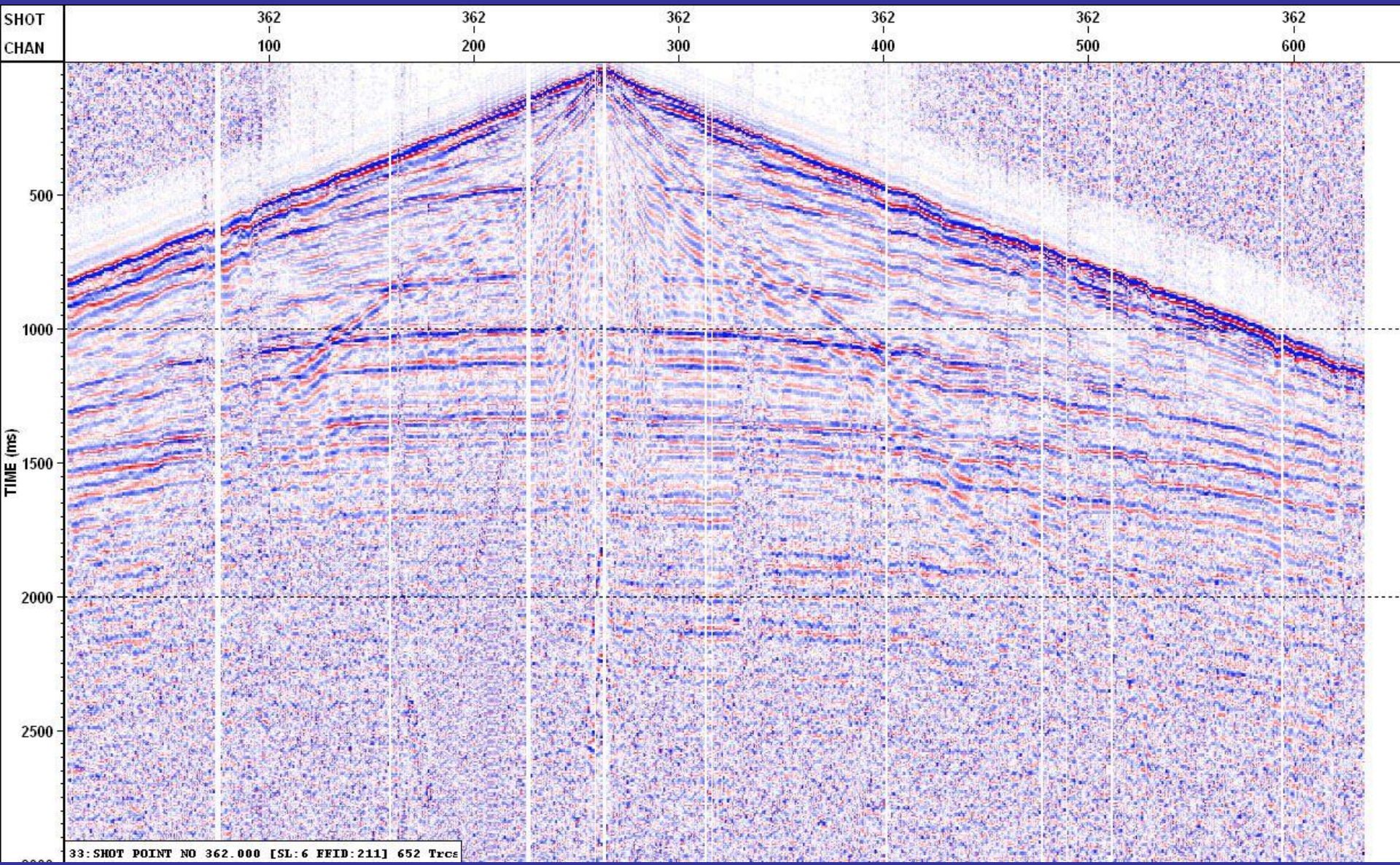
Aries SM7 vibrator shot (filtered)



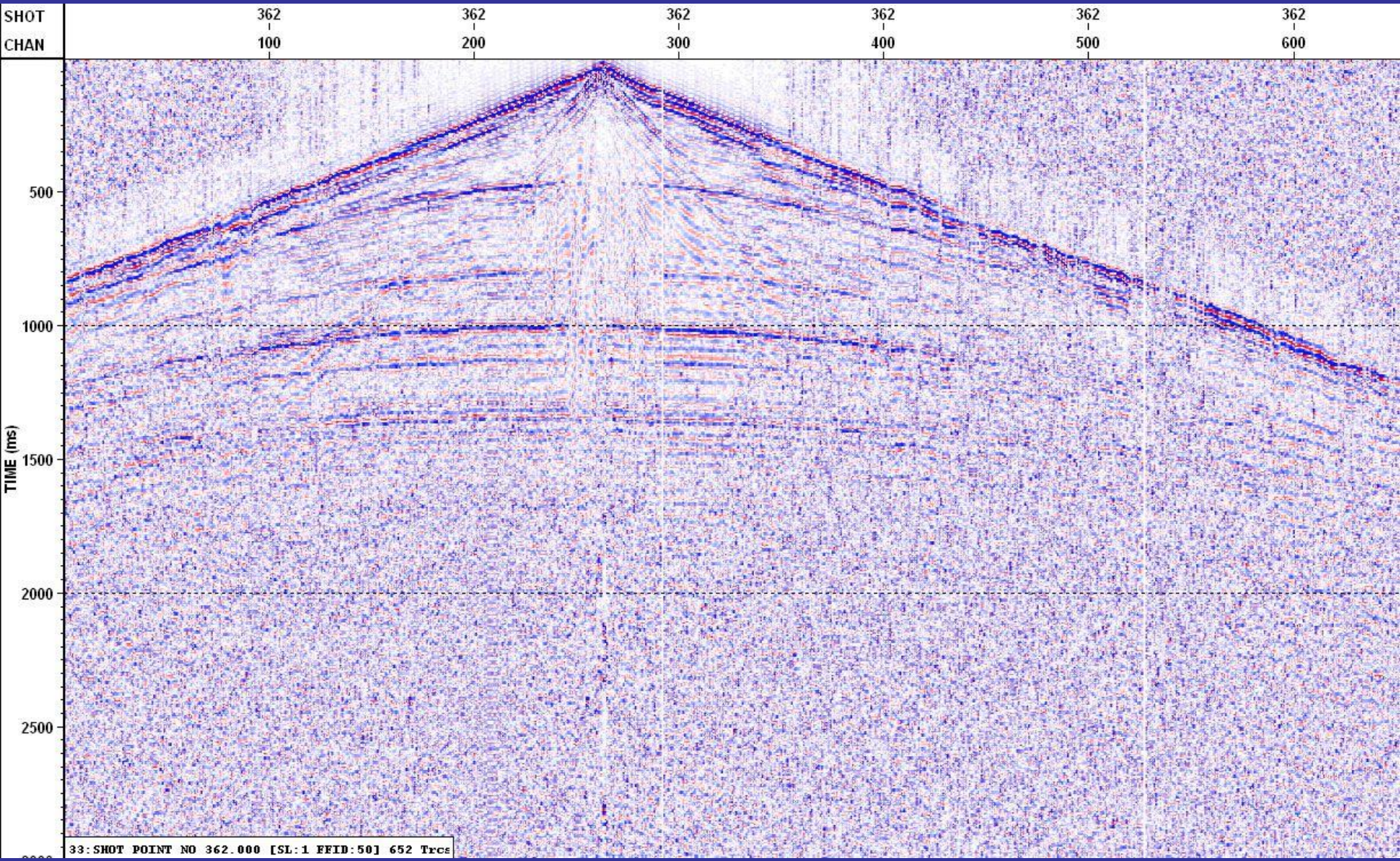
Sercel DSU3 vibrator shot (filtered)



Aries SM7 dynamite shot (filtered)



Sercel DSU3 dynamite shot (filtered)



Difference with 30Hz low cut applied before trace scaling