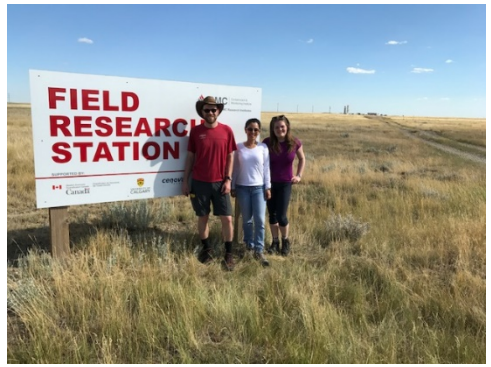
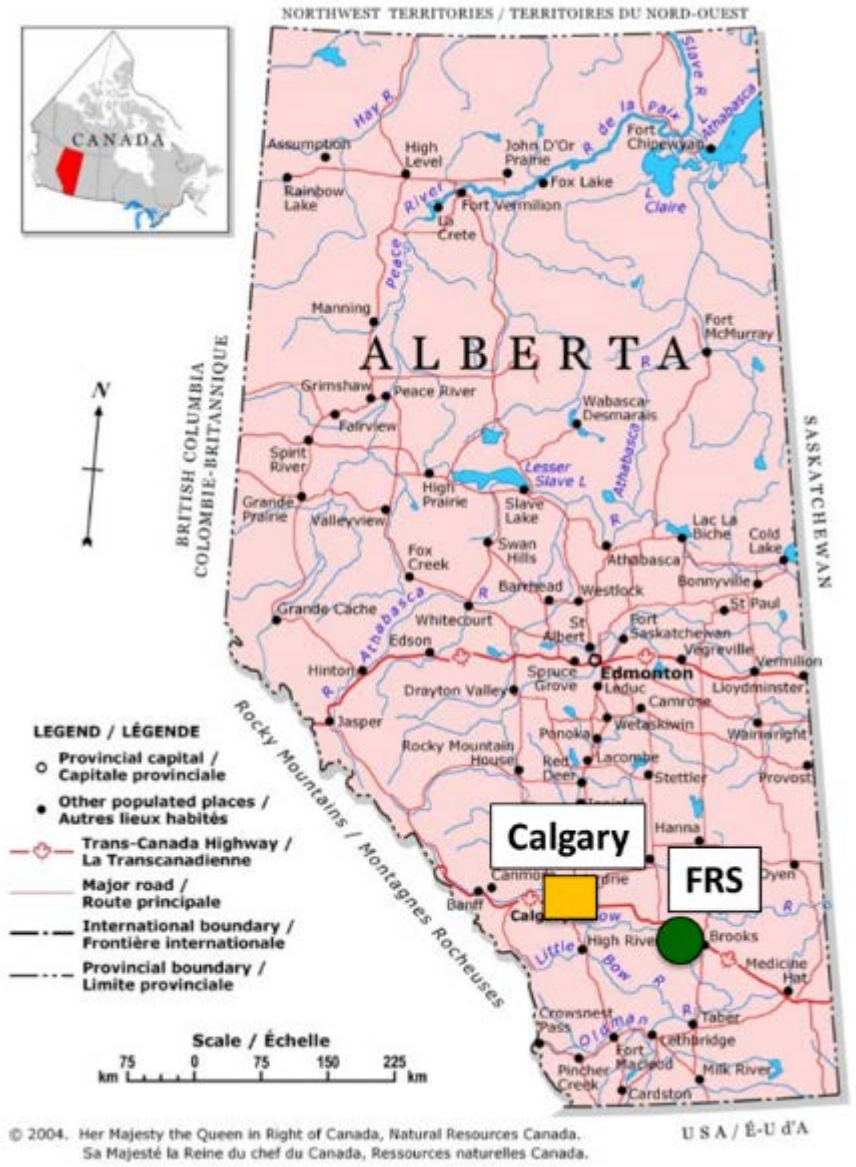
DAS and seismic installations at the CaMI Field Research Station, Newell County, Alberta

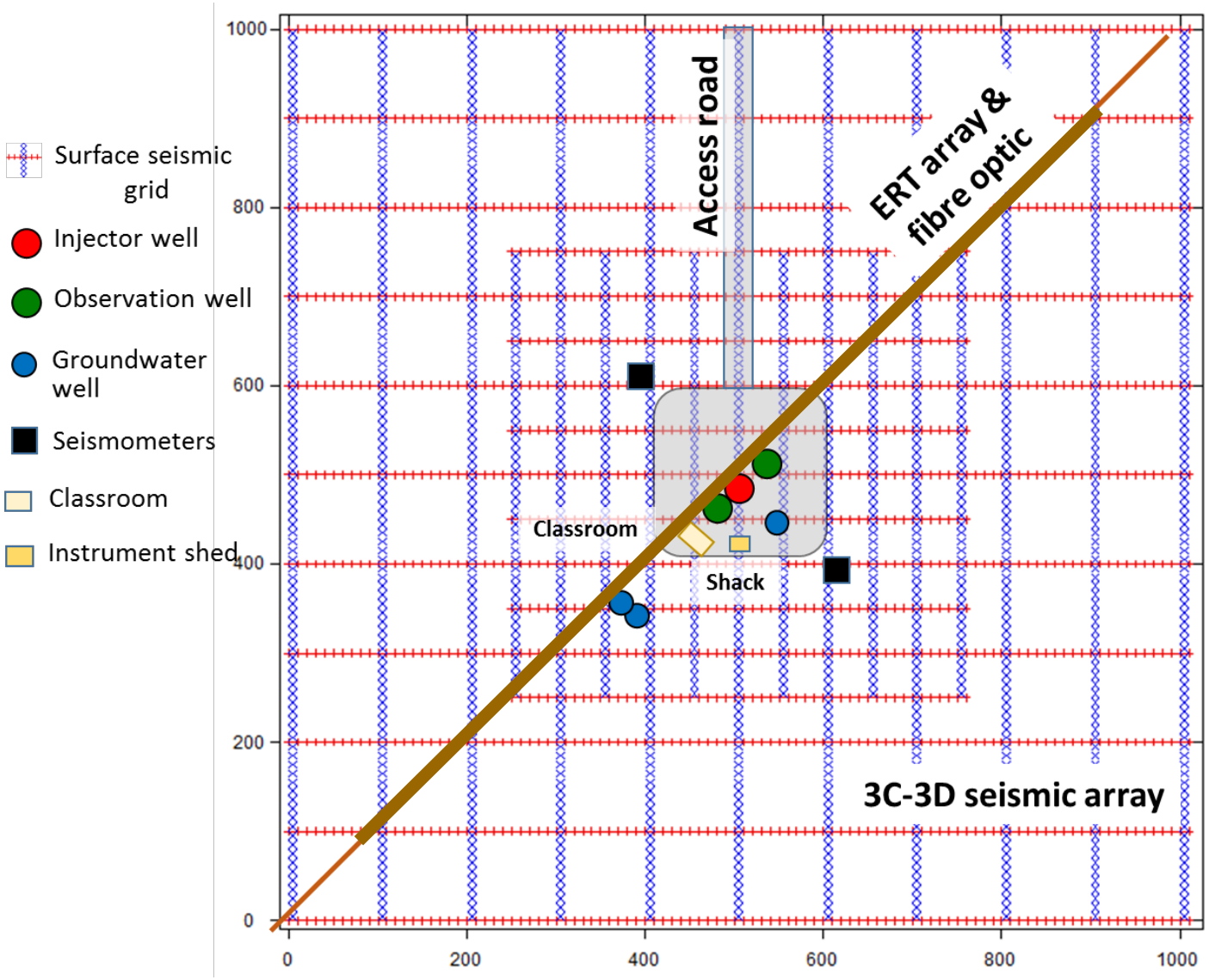
Don Lawton, Malcolm Bertram, Amin Saeedfar, Marie Macquet, Kevin Hall, Kevin Bertram, Kris Innanen, Helen Isaac



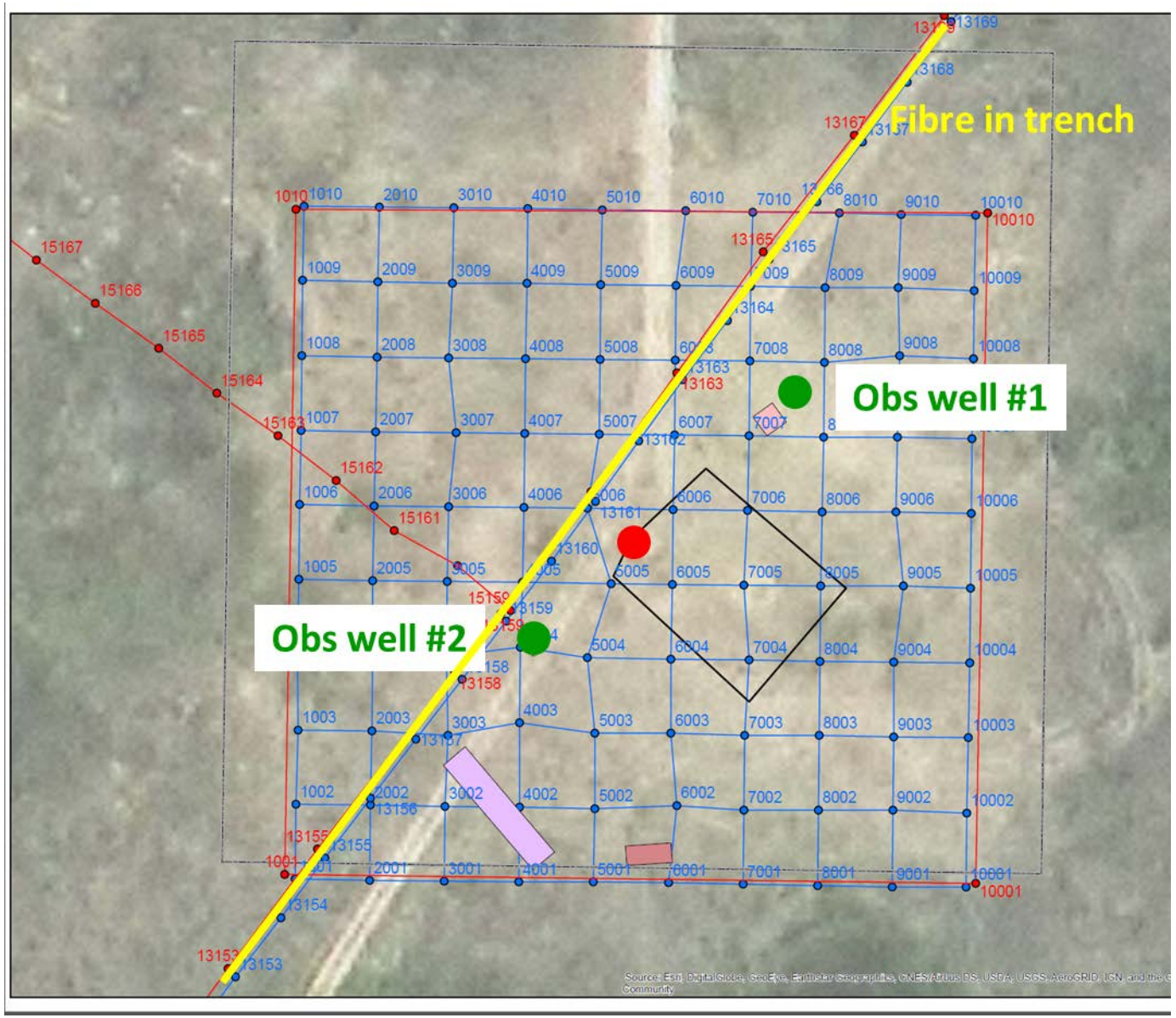


200 hectares land leased courtesy Cenovus Energy

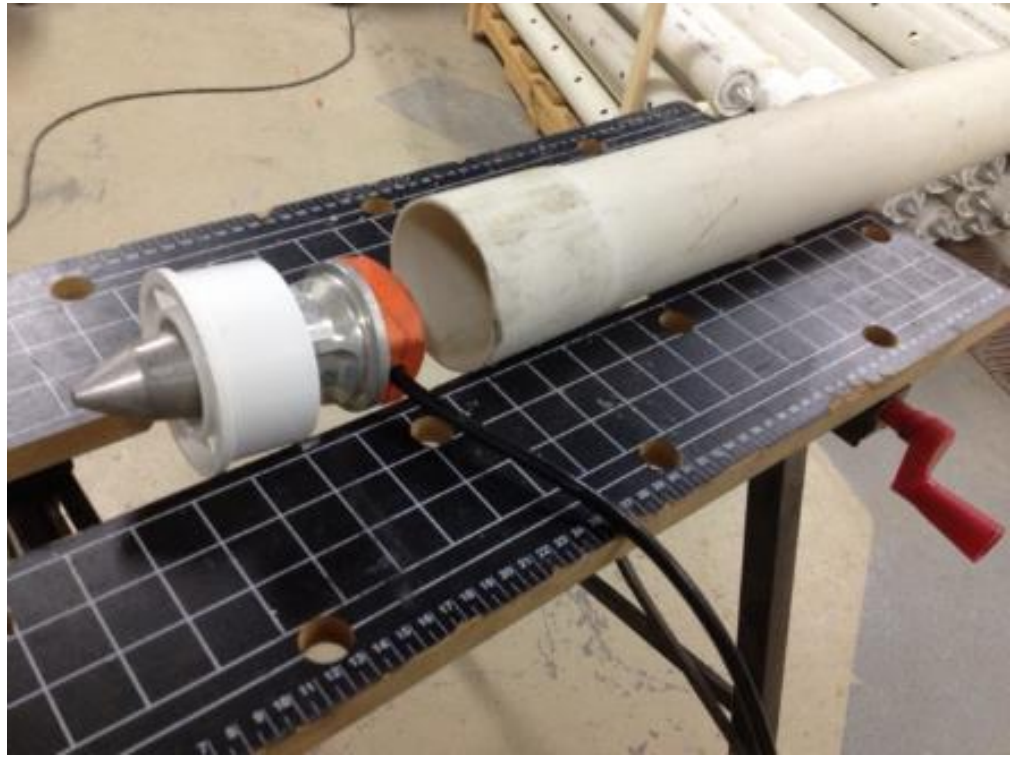
CaMI.FRS monitoring layout



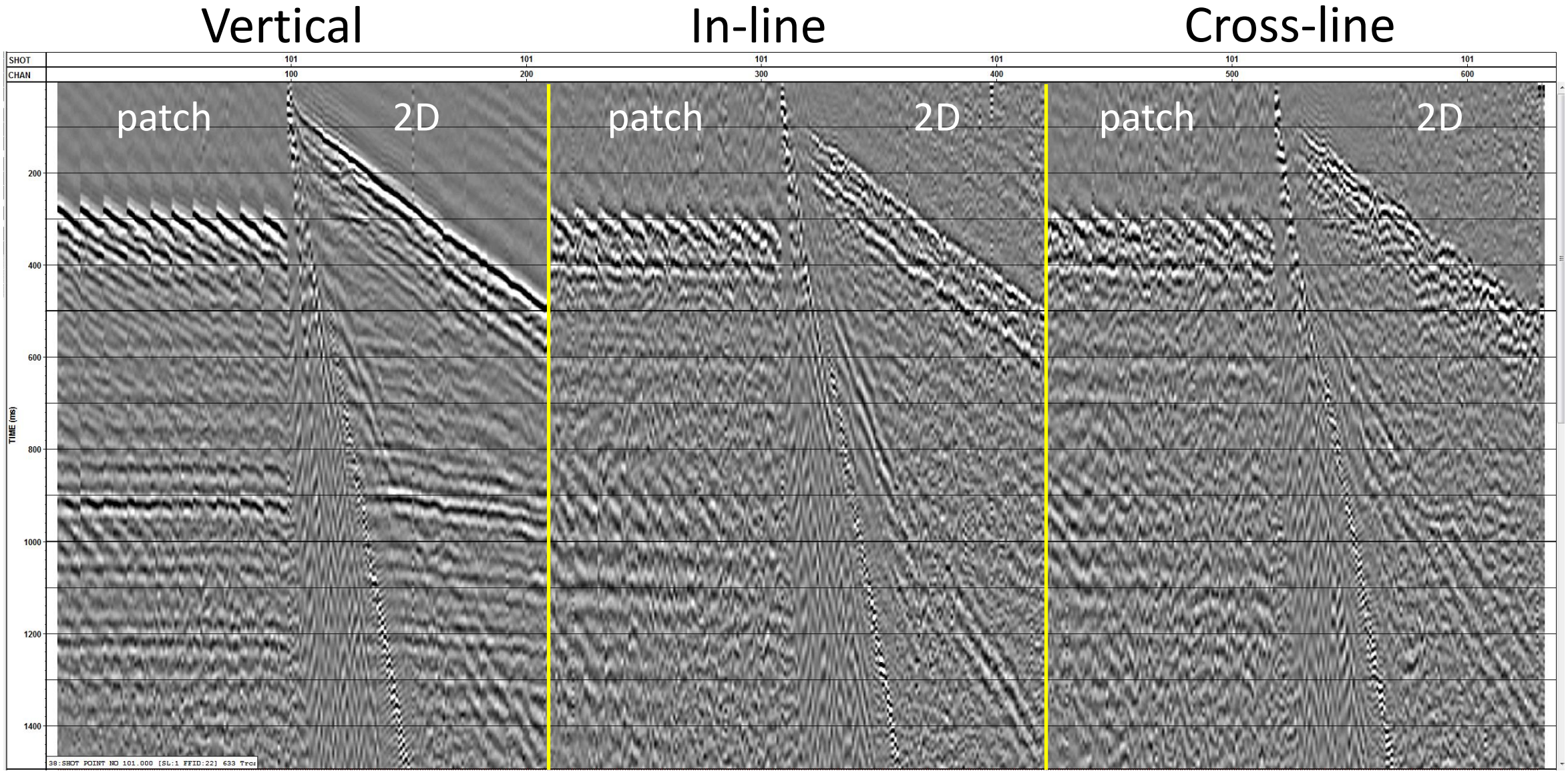
Buried 3C phone array



1 m deep in PVC tube



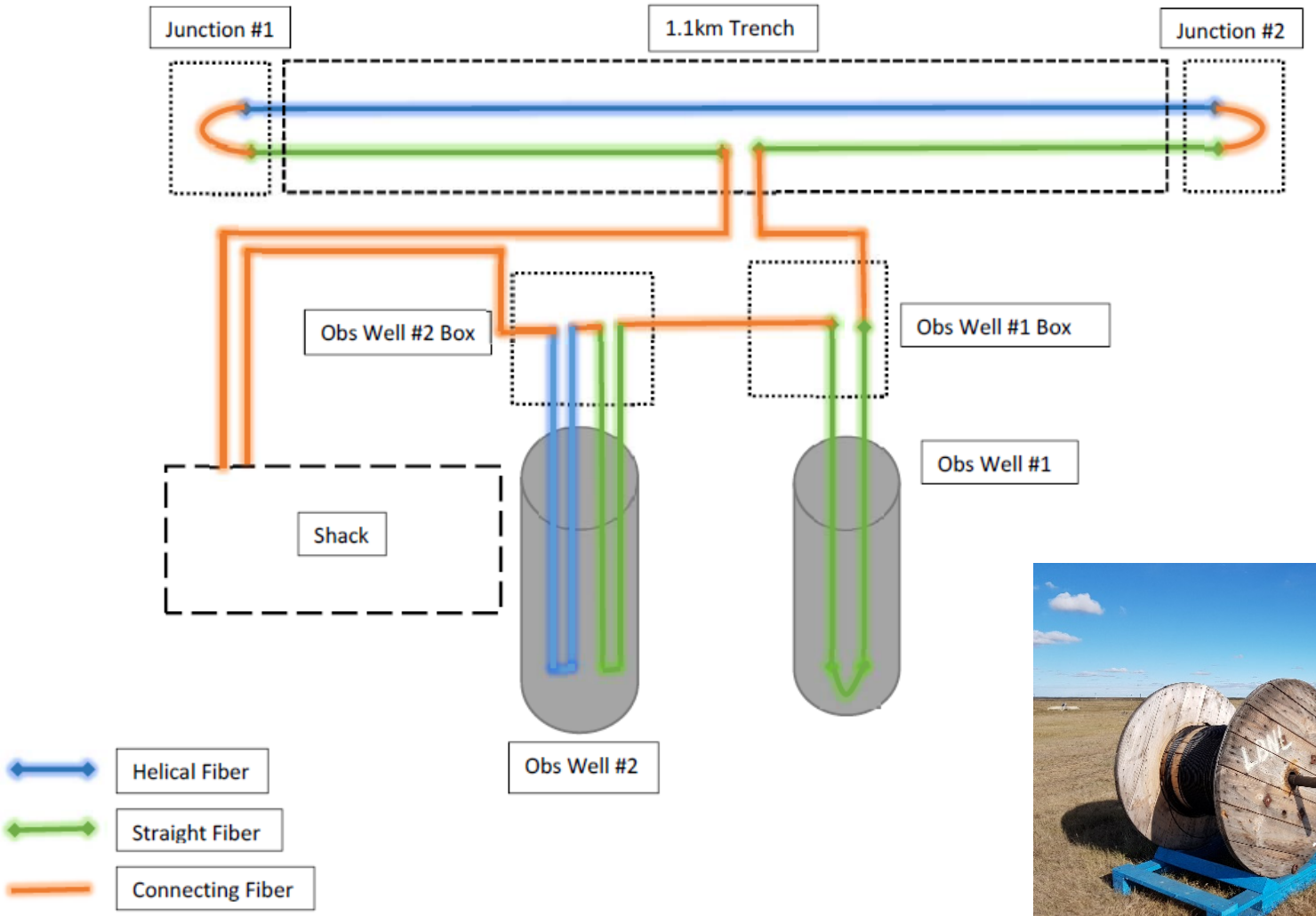
3C-2D line and 3C-3D patch vibe shot gather



CaMI.FRS geophysics observation well

- 350 m deep
- Fibreglass casing
- Integrated fibre optic cable (DAS, DTS)
- Heat-pulse cable
- Experimental helical-wound fibre optic cable
- 16-level electrical resistivity cable (ERT)
- 24-level 3C geophone array
- Well accessible for wireline tools

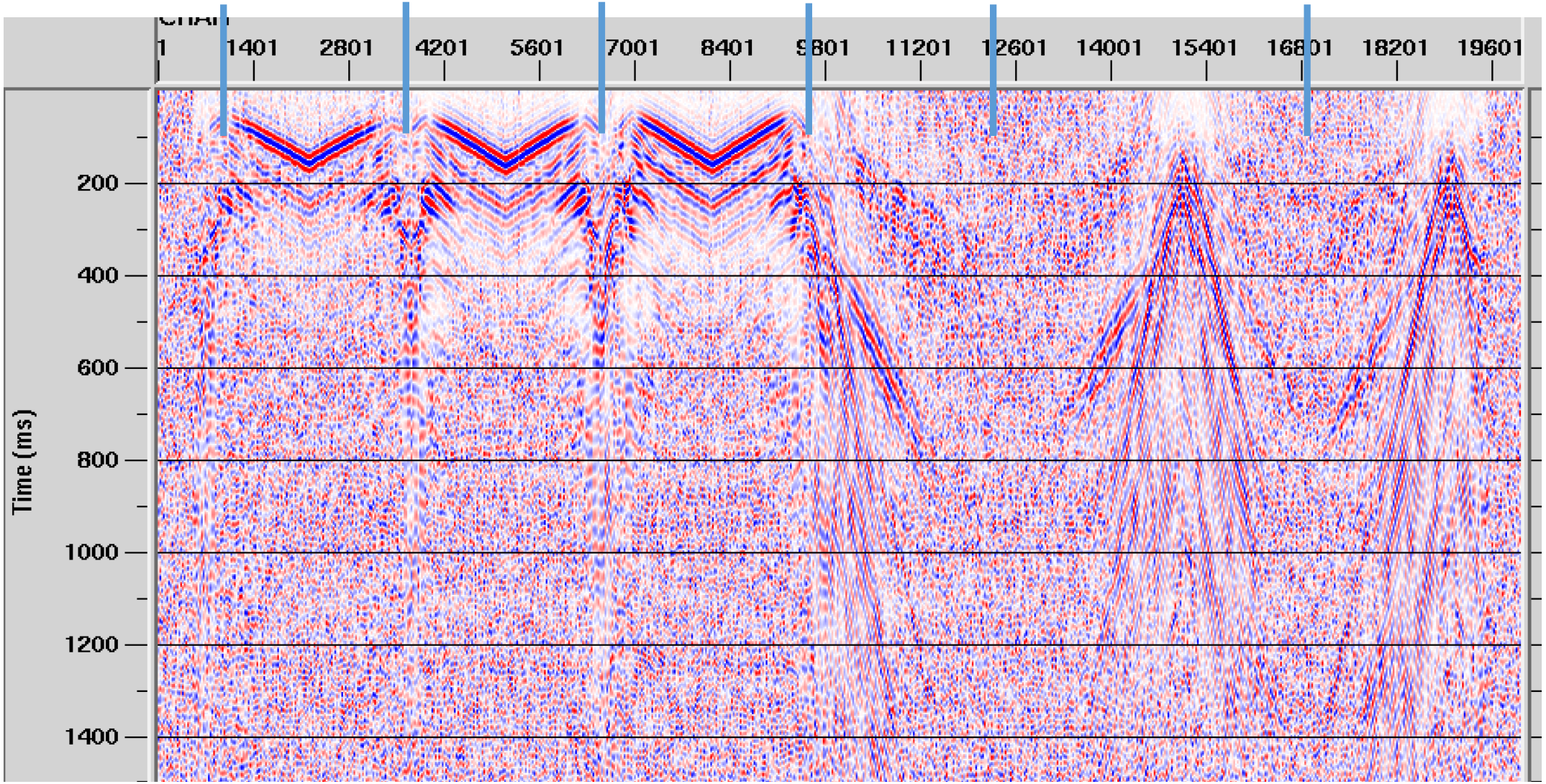
DAS fibre deployment at CaMI.FRS



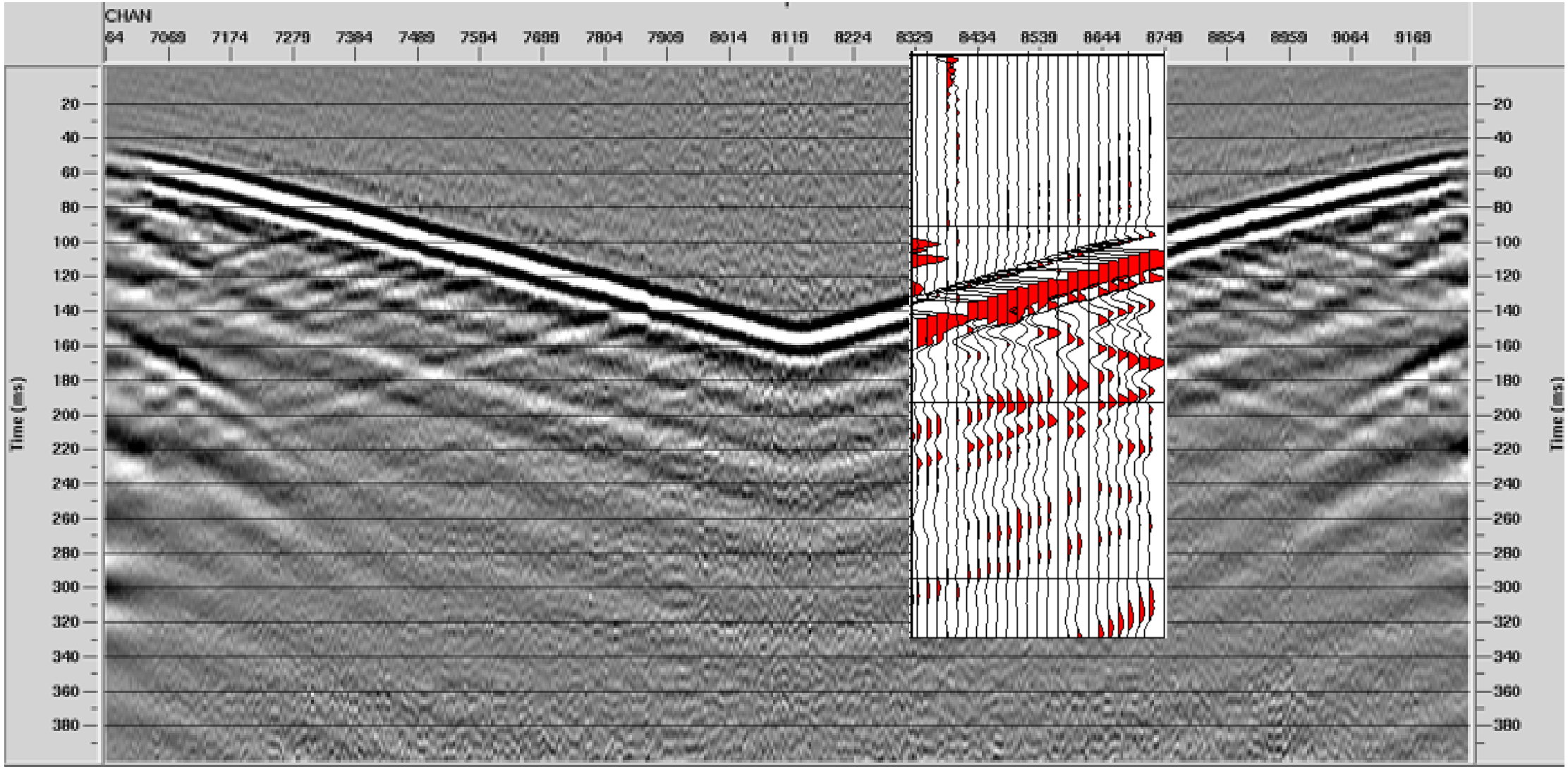
5 km fibre loop of straight fibre and HWC

Shot gather – vibe source 10 – 150 Hz ov 16 s

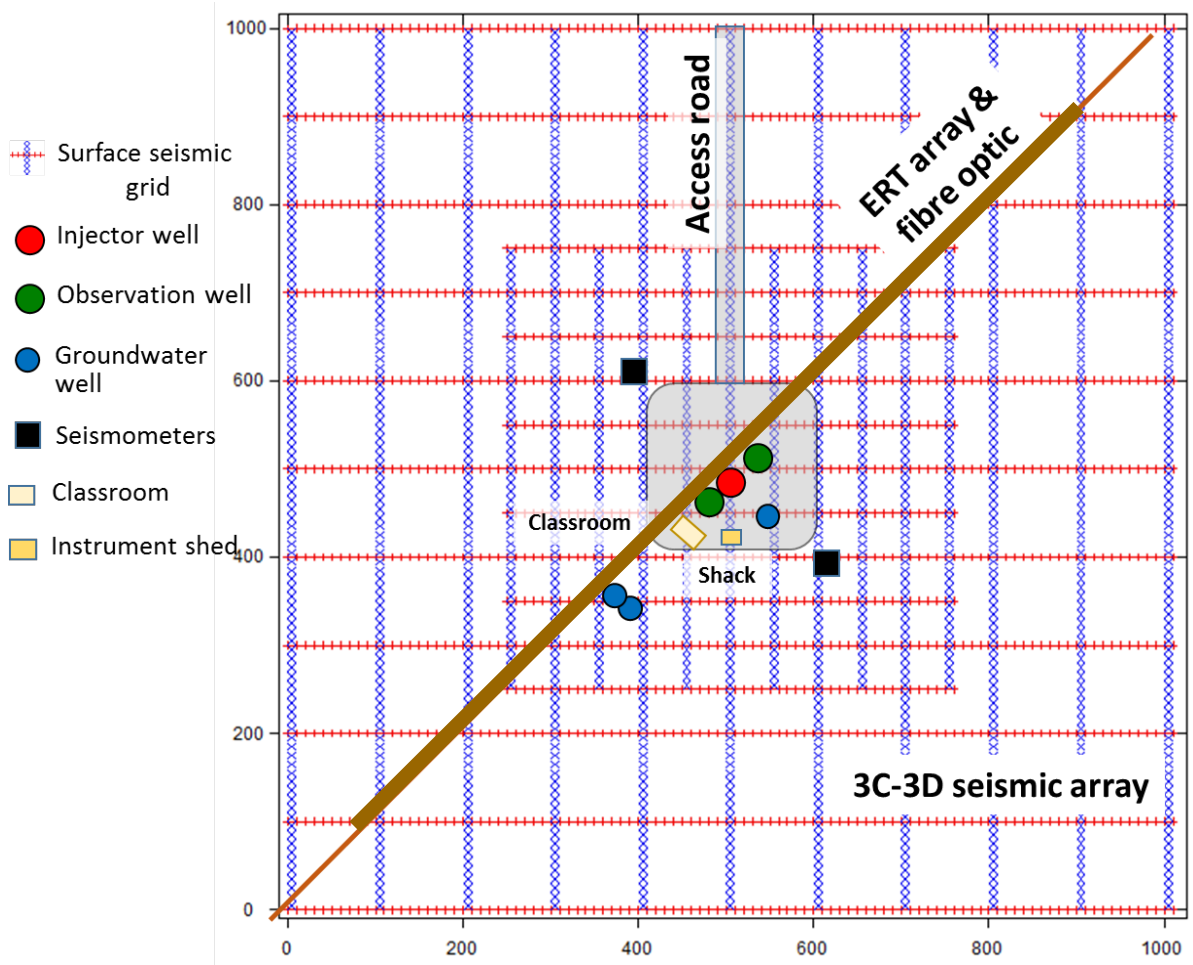
Full DAS loop data 20,000 channels @ 0.25 m (Silixa LBNL)

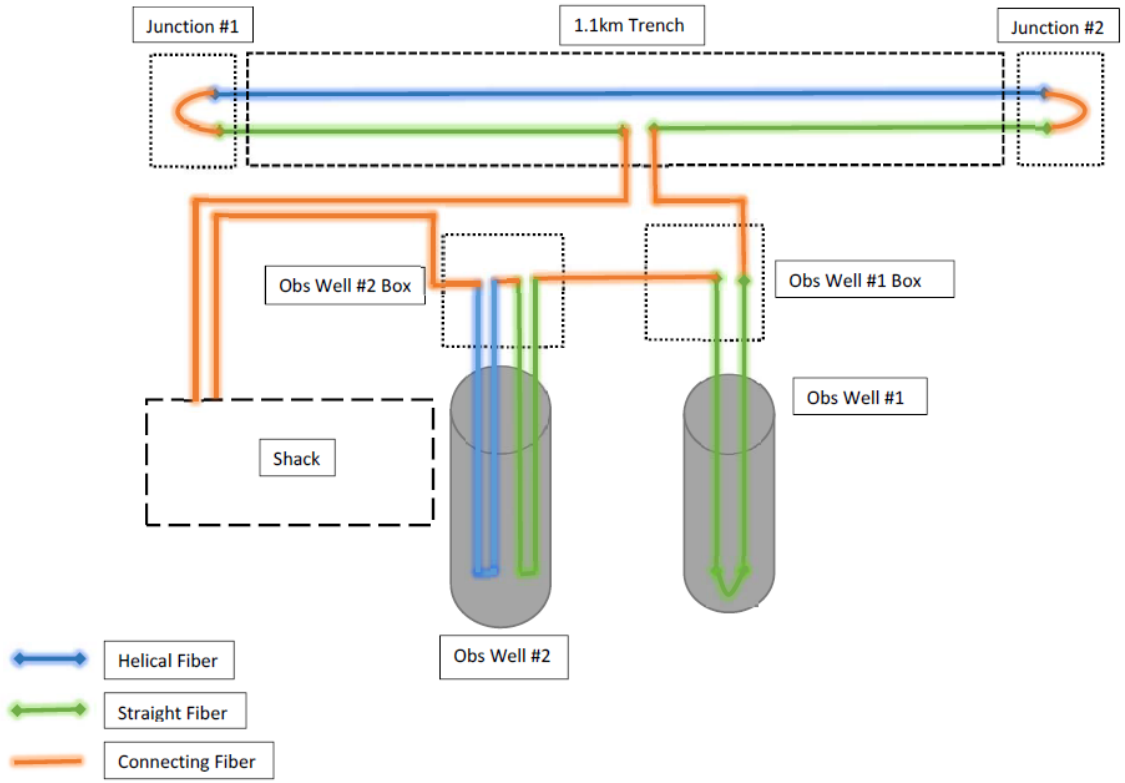


VSP fibre loop + geophones



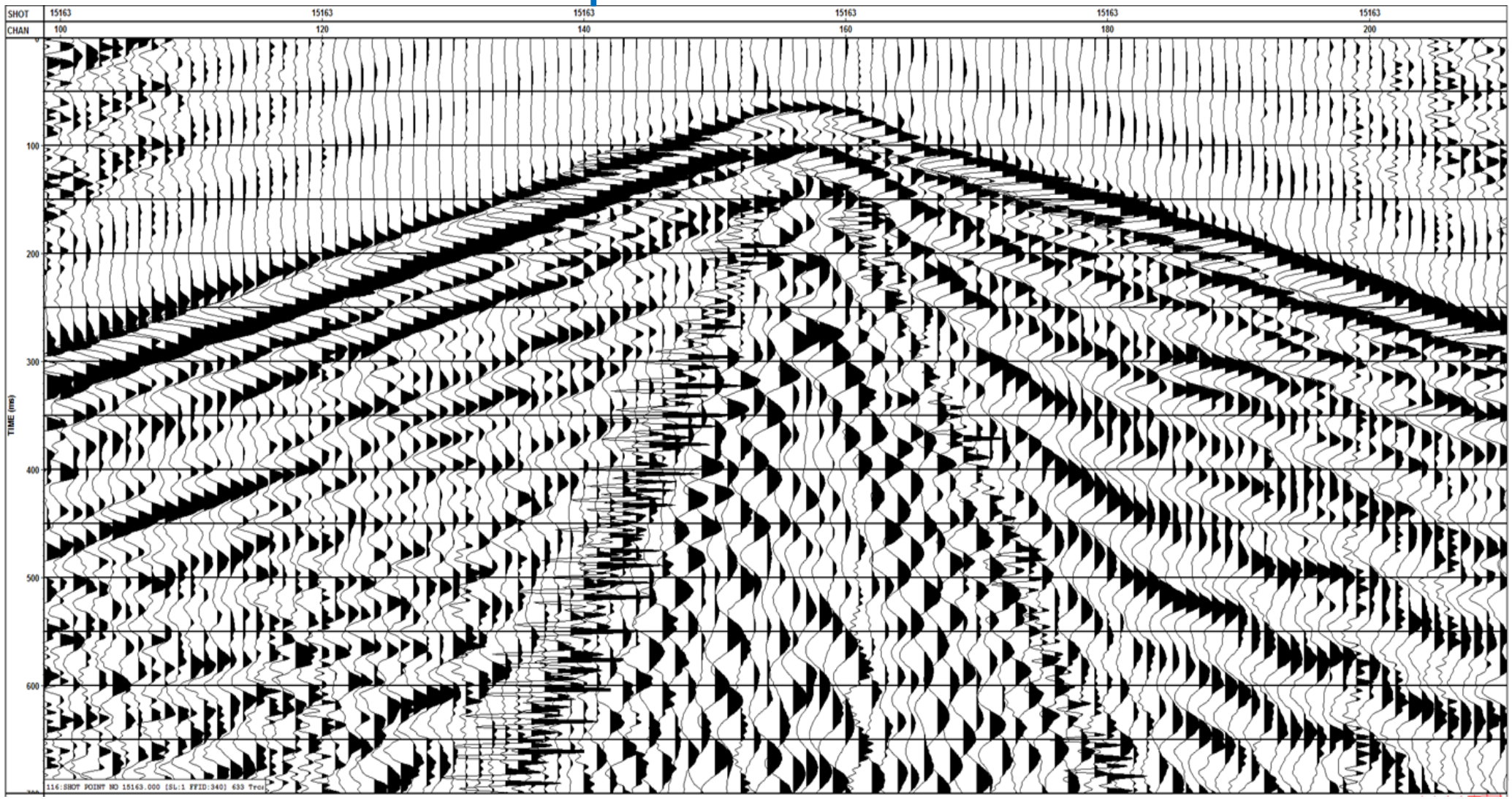
Fibre deployment in trench





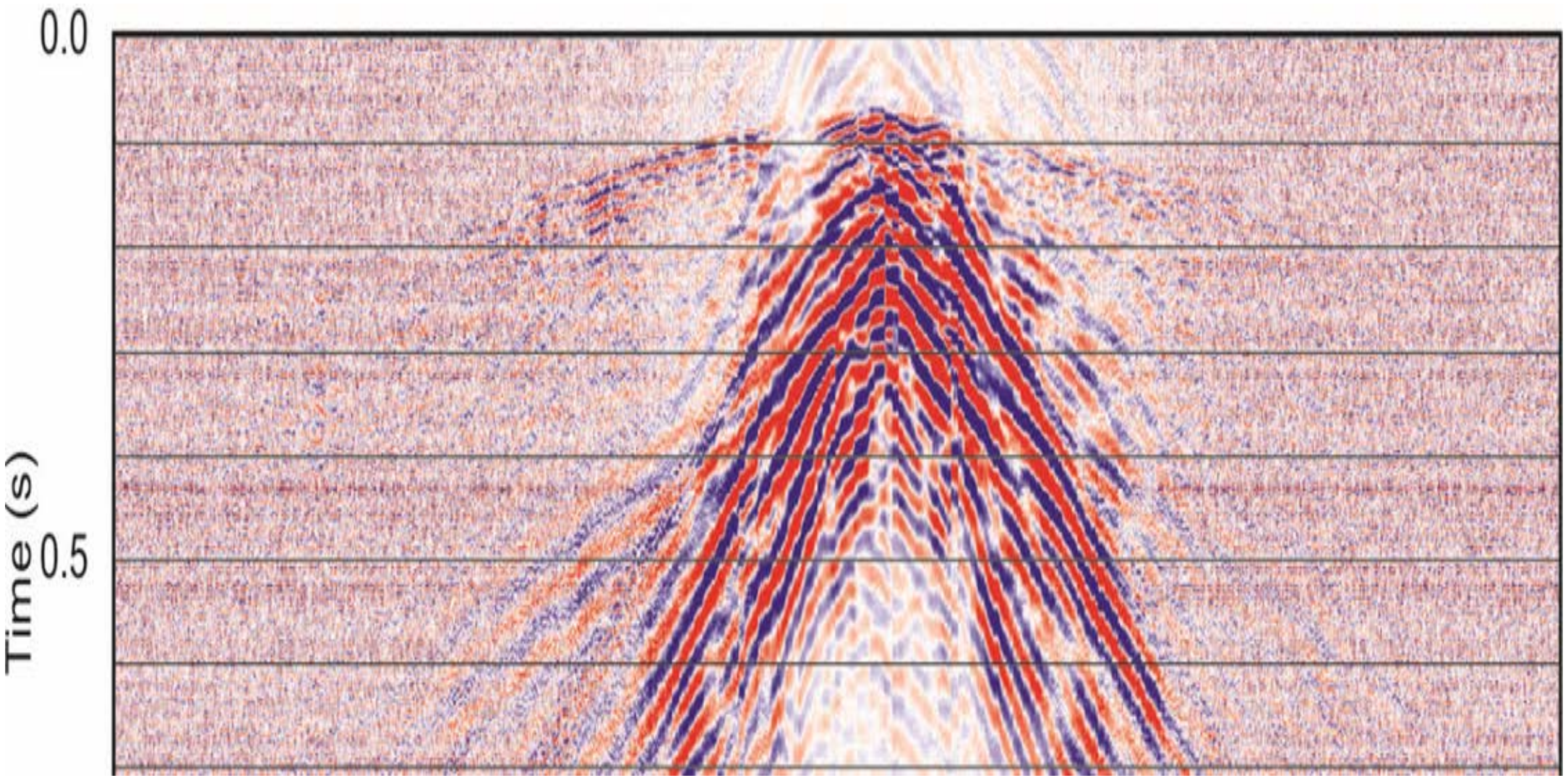
CaMI.FRS geophone shot gather along trench

Geophone interval 10 m



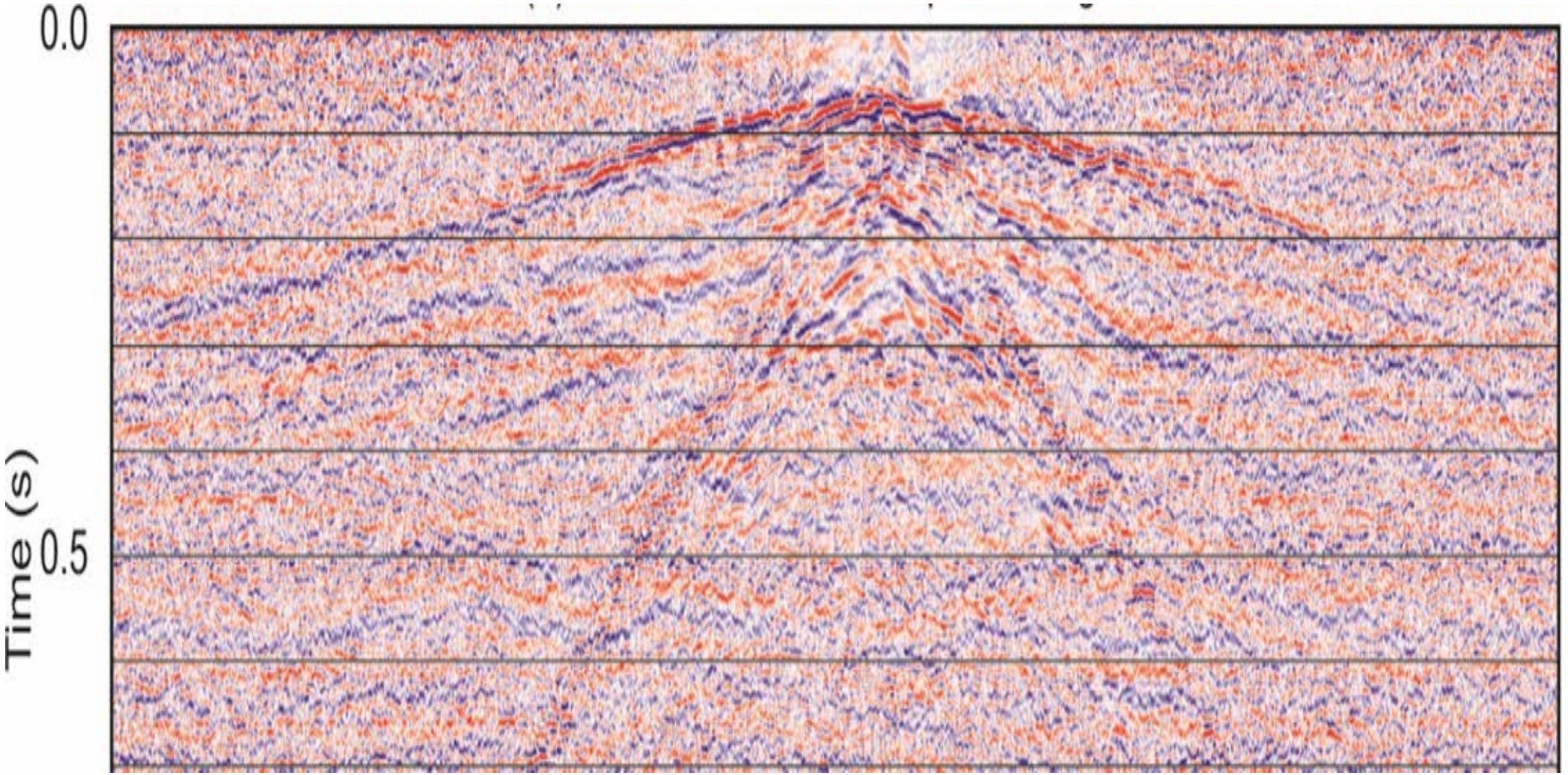
Raw DAS shot gather from straight fibre buried in trench

Output trace spacing 0.25 m



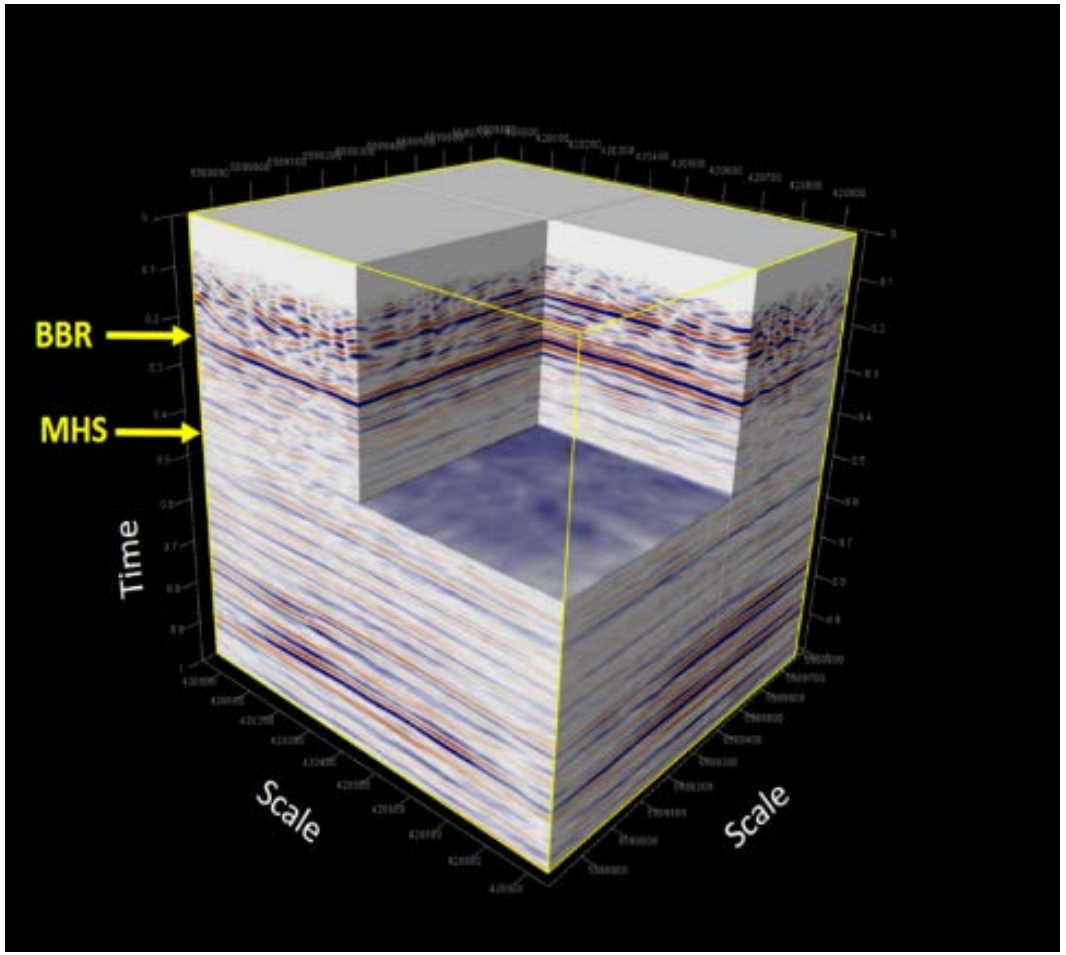
Processed DAS shot gather from straight fibre buried in trench

Output trace spacing 0.25 m

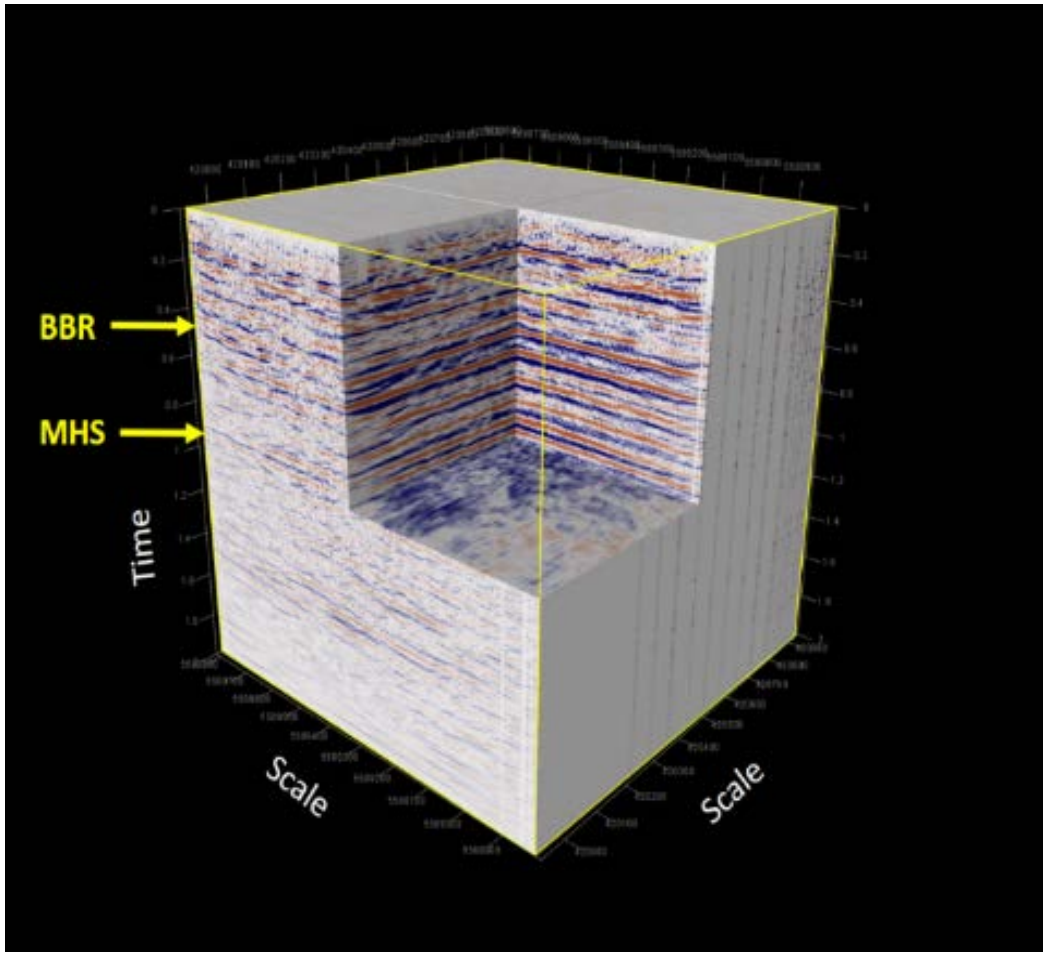


CaMI.FRS multicomponent baseline volumes

PP

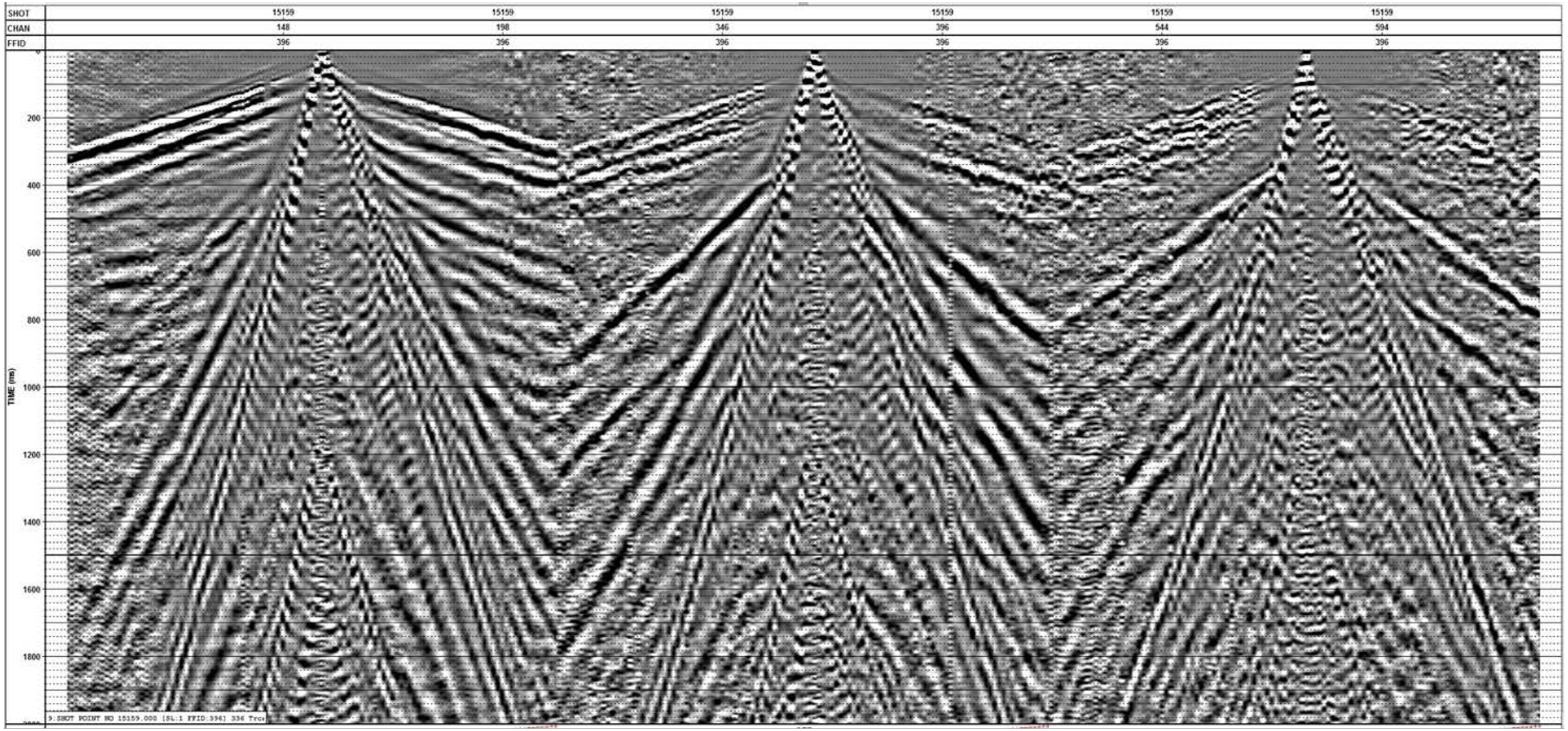


PS



CREWES S-wave source

S-wave source +ve in-line



Vertical Inline Crossline

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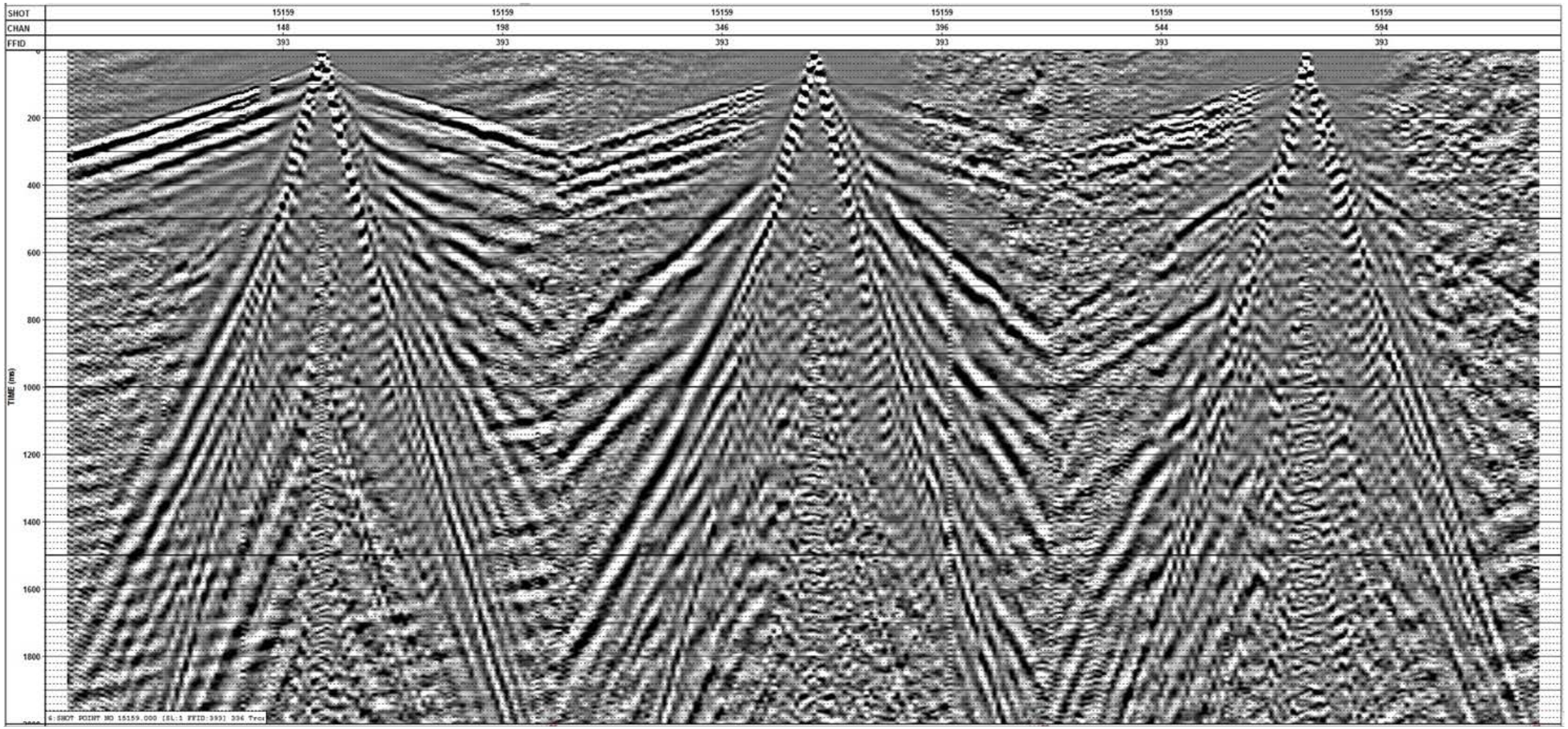
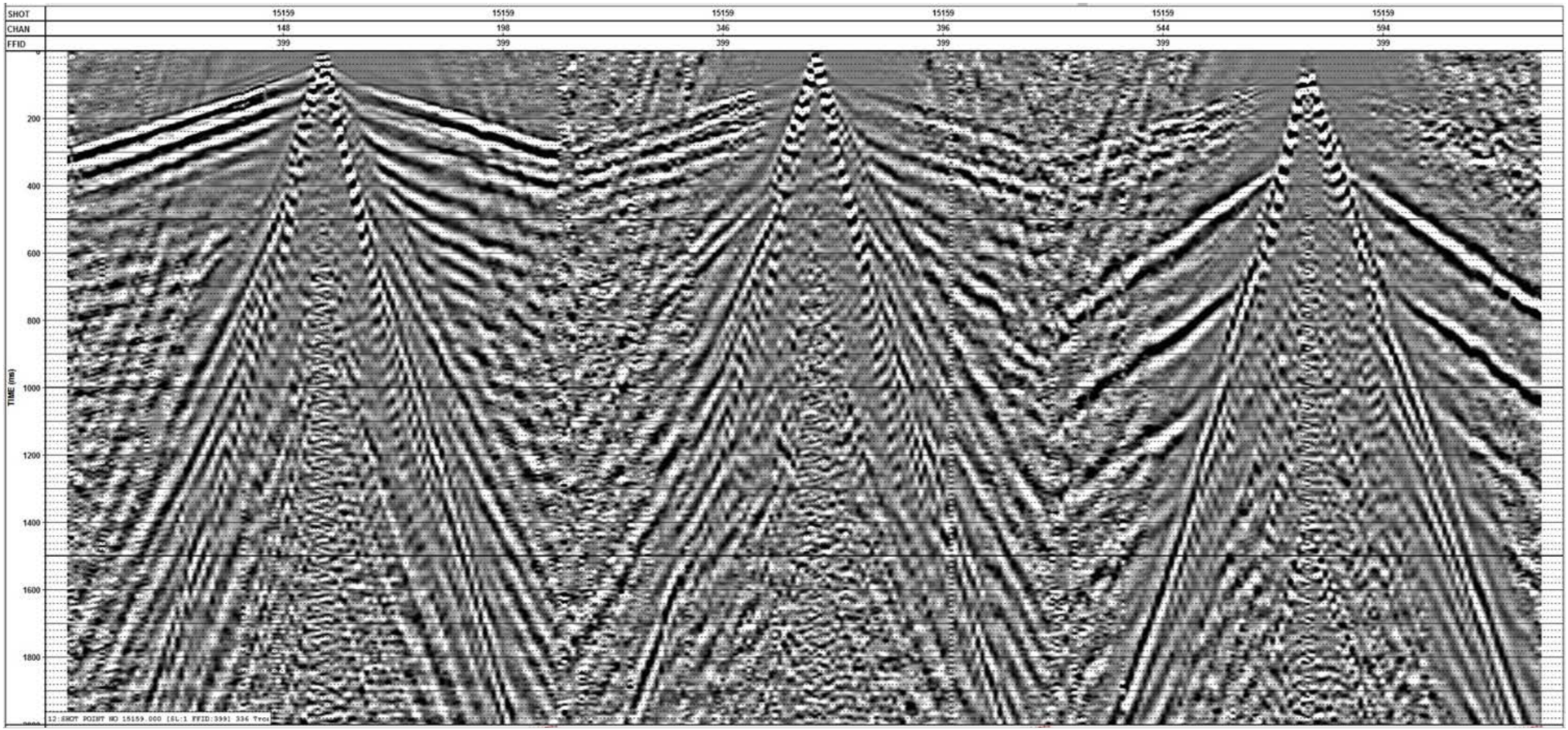
S-wave source –ve in-line



Vertical Inline Crossline

S-wave source +ve cross-line



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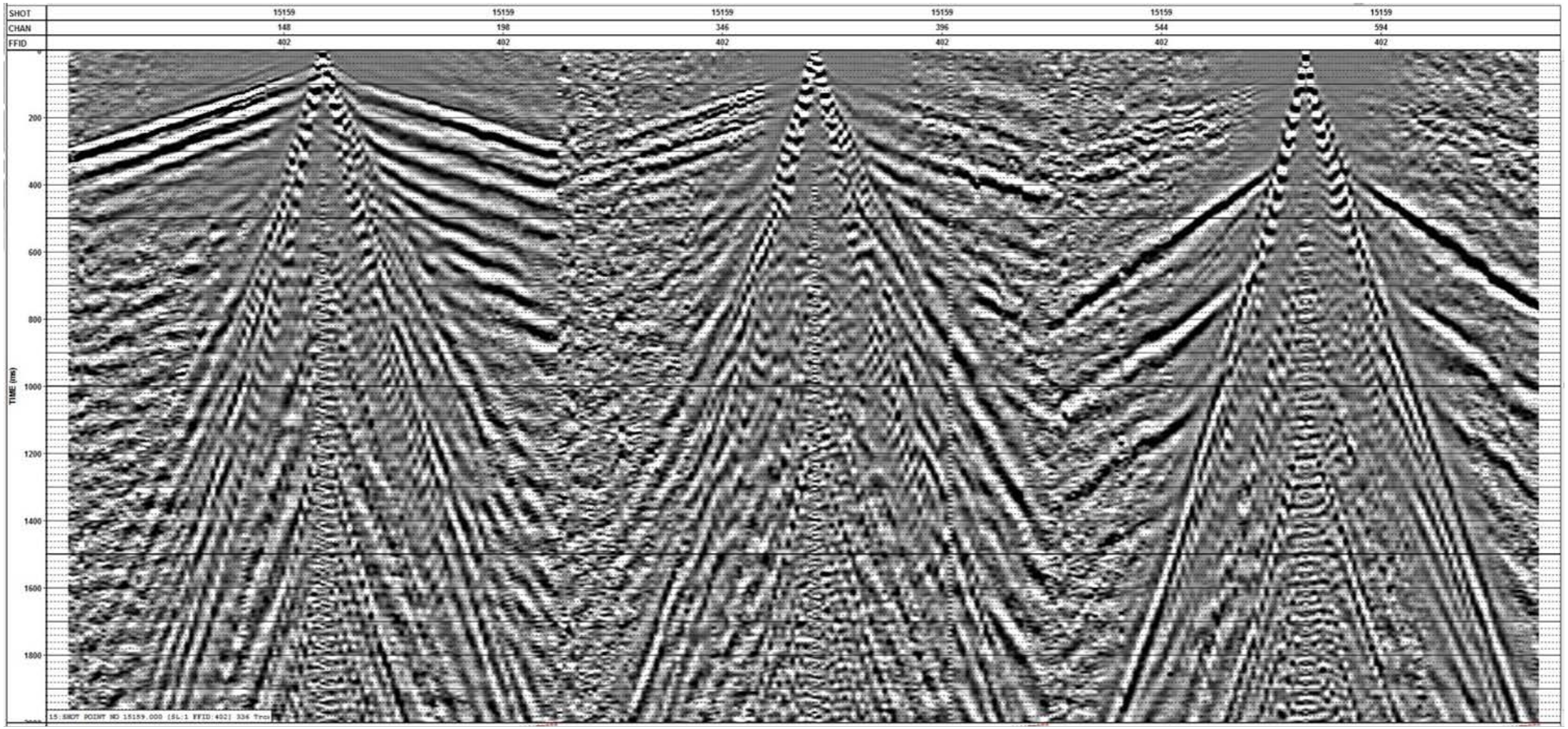
S-wave source –ve cross-line



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GPUSA continuous seismic sources

GPUSA counter-rotating continuous seismic source

$$F = Mr\omega^2$$

Courtesy Alberta Screw Piles Ltd

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Conclusions

- Excellent quality DAS data being acquired in VSP surveys
- 'Interesting' DAS data being acquired in a shallow horizontal trench
- Goal is for the site to become a test centre for DAS testing and calibration
- S-wave source data suggests S-wave anisotropy in the near-surface
- 3C-3D patch installed for microseismic and active source seismic surveys
- Continuous seismic sources about to be installed

Acknowledgements

- CMC Research Institutes Inc.
- CaMI.FRS JIP subscribers
- CREWES sponsors
- University of Calgary (CFREF fund)
- NSERC
- USDOE – LBNL (Barry Freifeld, Tom Daley)