A multicomponent seismic survey at Spring Coulee: a data repeatability study

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Students in Goph 549, 2009

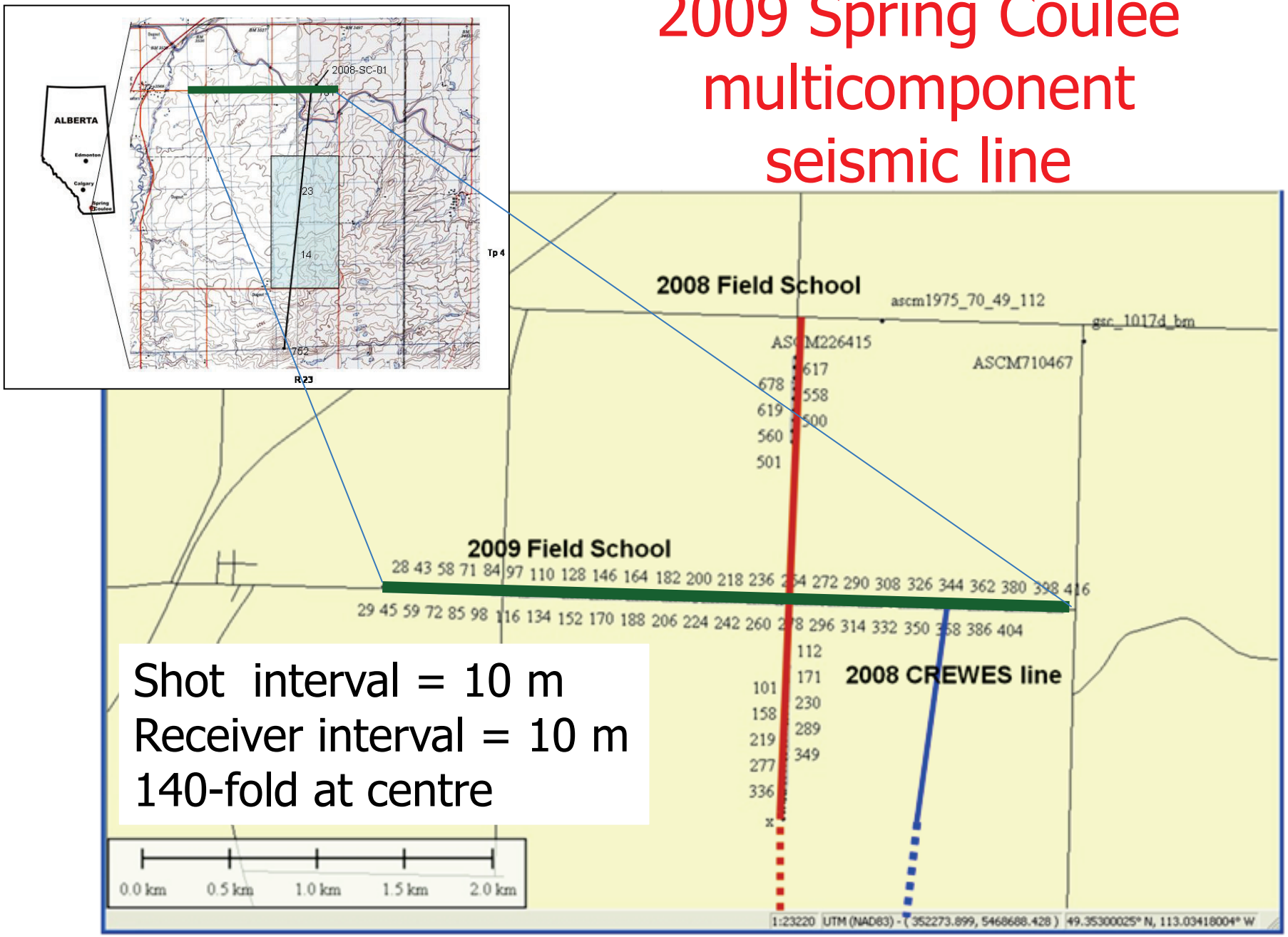
UNIVERSITY OF CALGARY

CREWES

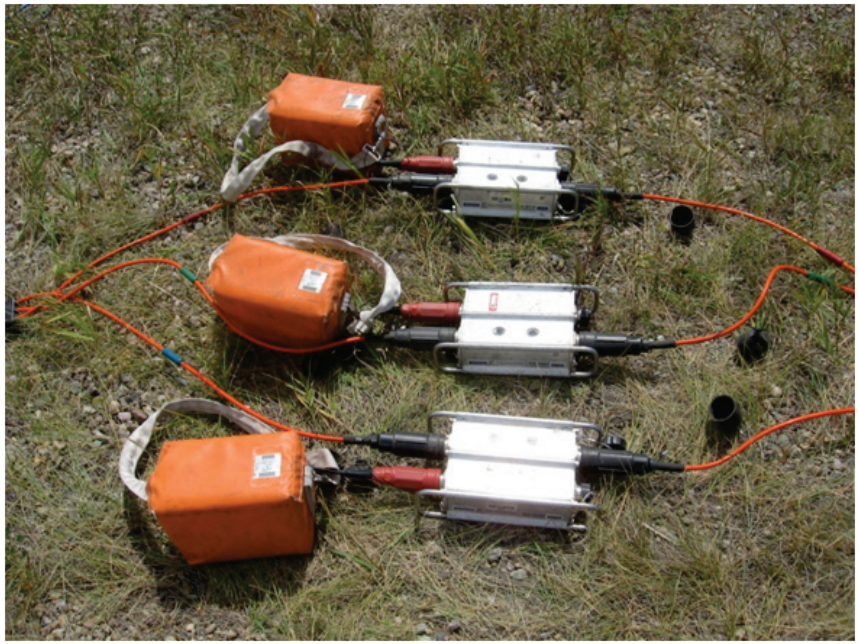
Objectives

- Further the interpretation of seismic data at Spring Coulee (see Lauren Ostridge poster)
- Assess multicomponent data repeatability
- Provide advanced training in multicomponent seismic data acquisition
- Determine Vp/Vs in project area

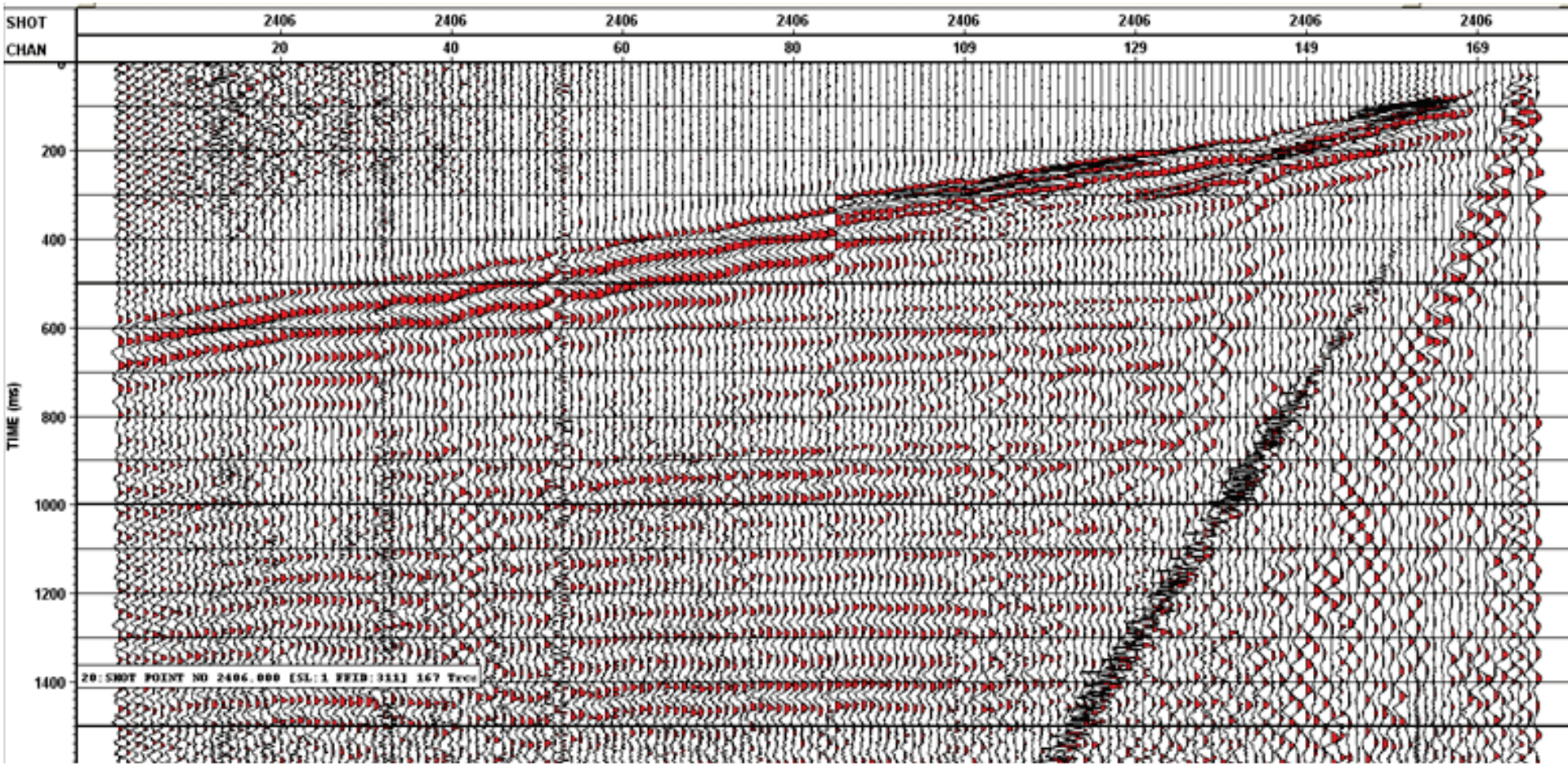
2009 Spring Coulee multicomponent seismic line



Shot interval = 10 m
Receiver interval = 10 m
140-fold at centre

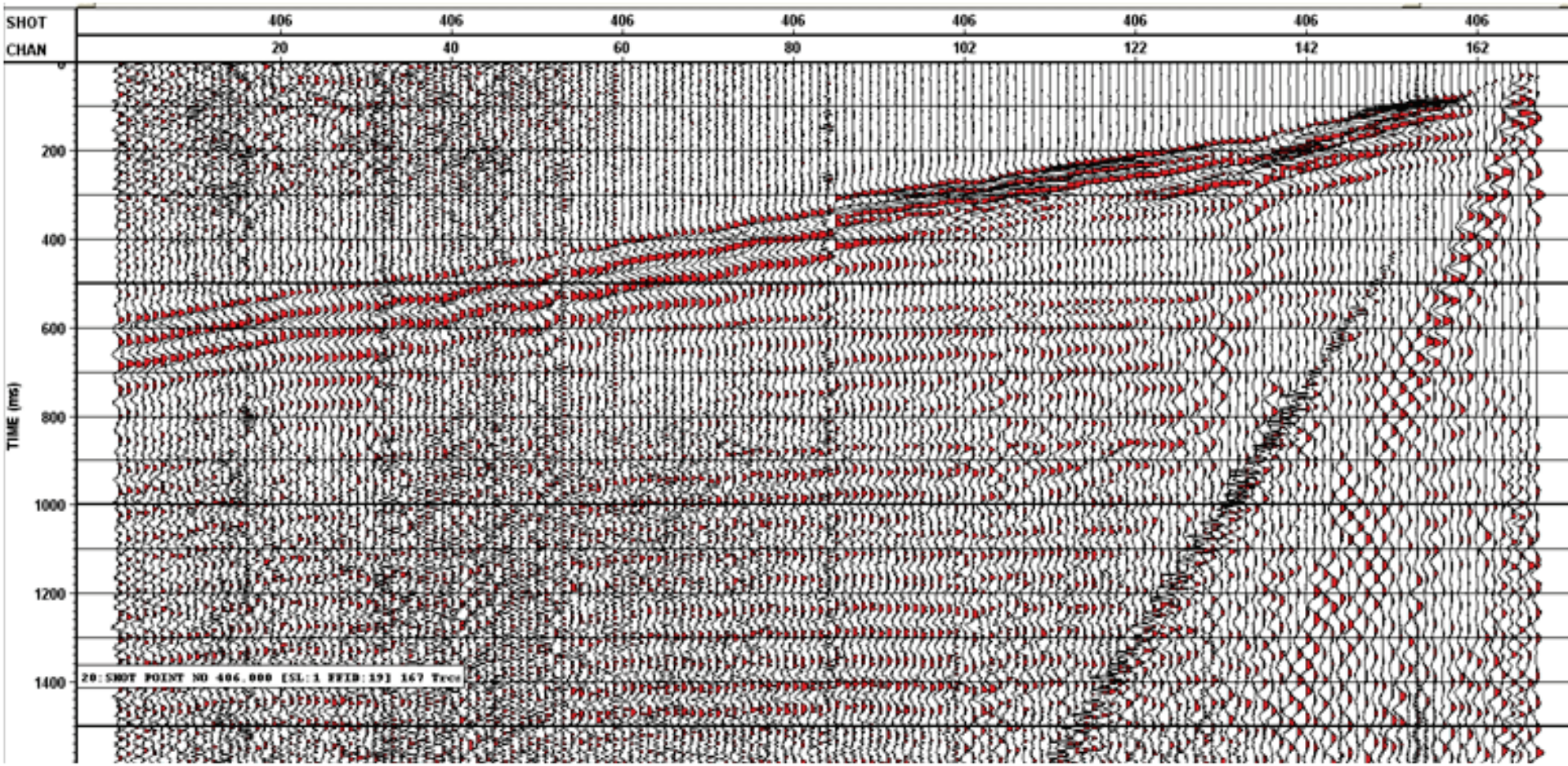


Line 1 vertical component shot gather



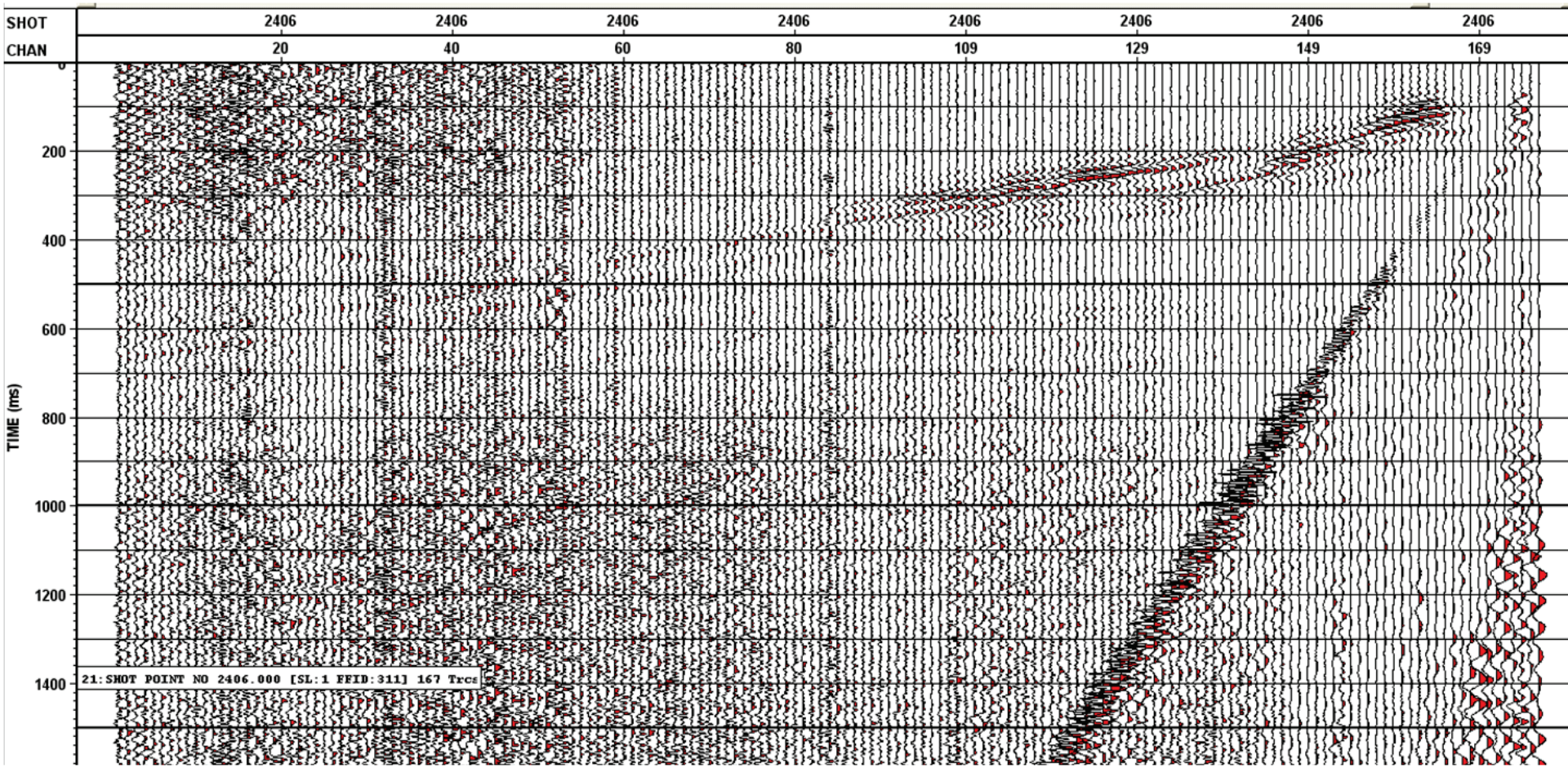
agc applied

Line 2 vertical component shot gather

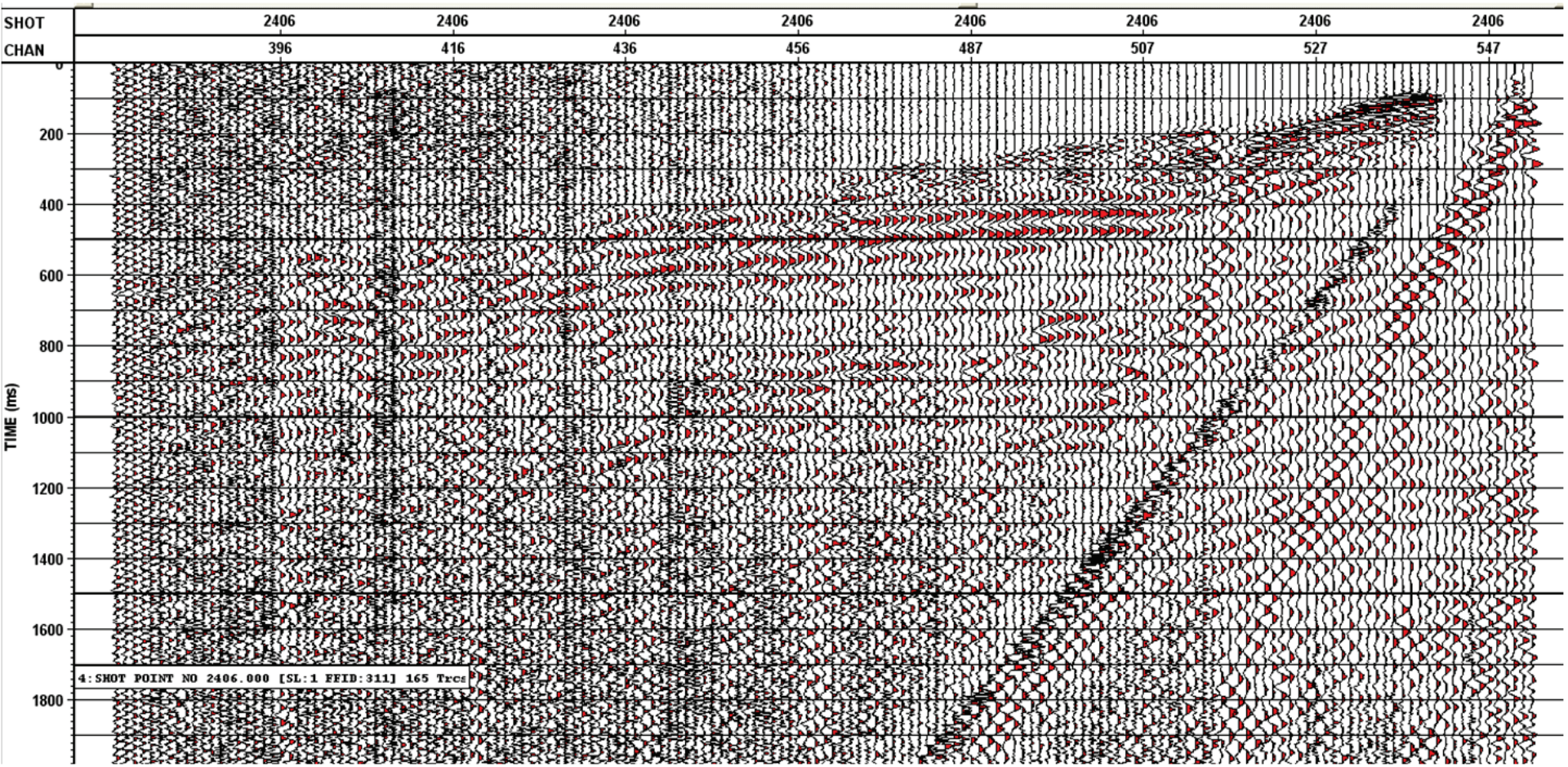


agc applied

Vertical component difference

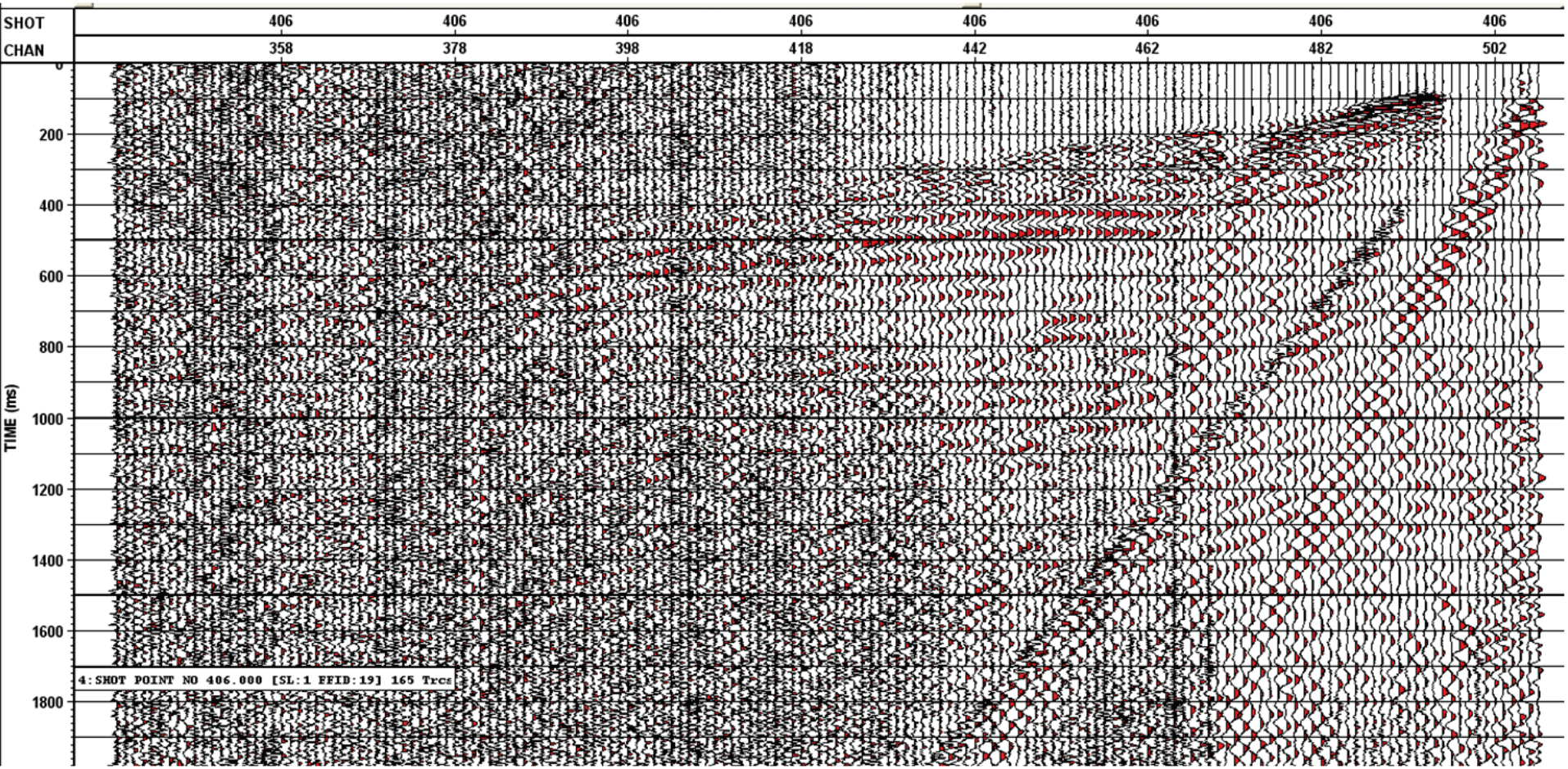


Line 1 radial component shot gather



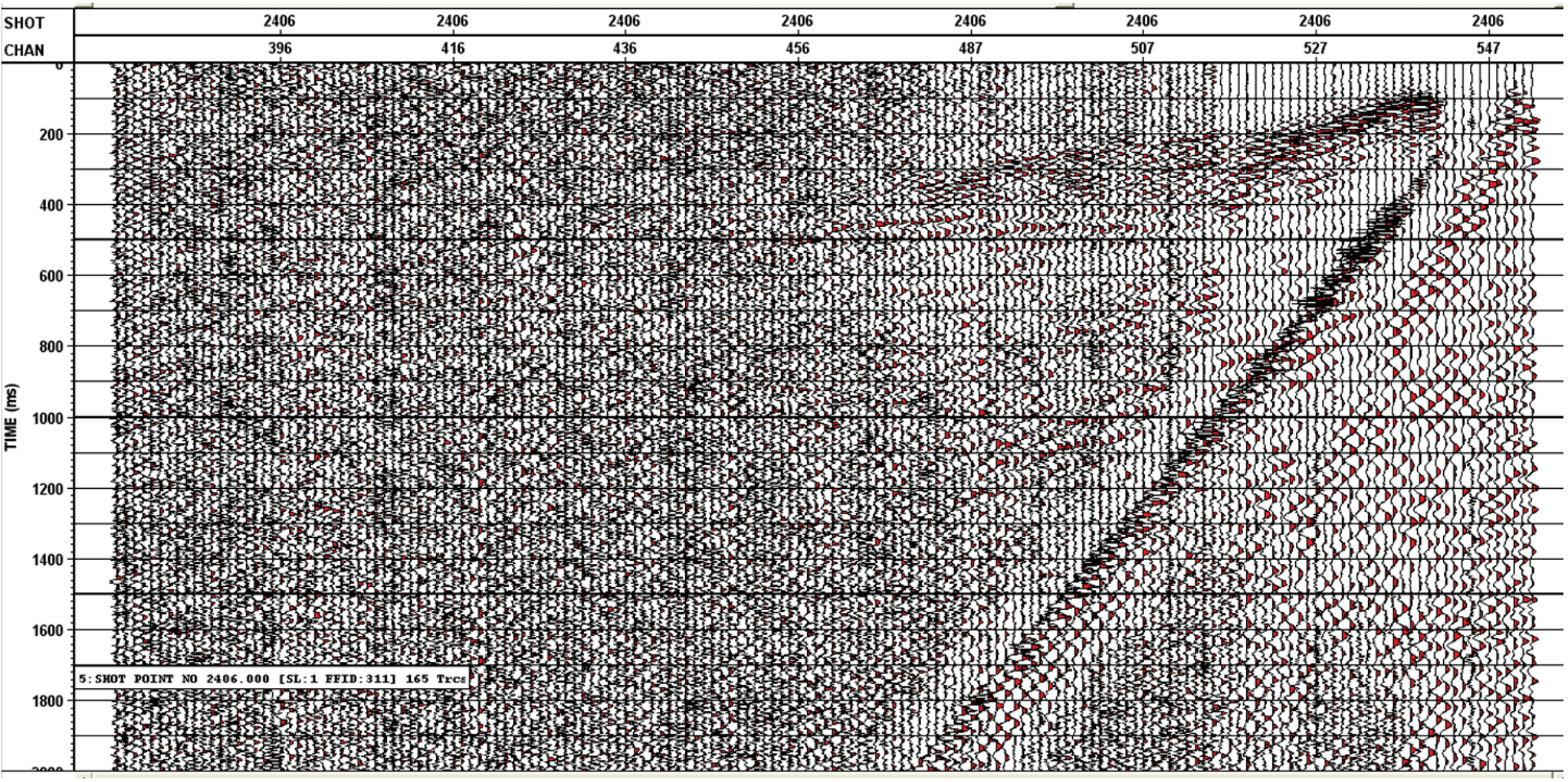
agc applied

Line 2 radial component shot gather

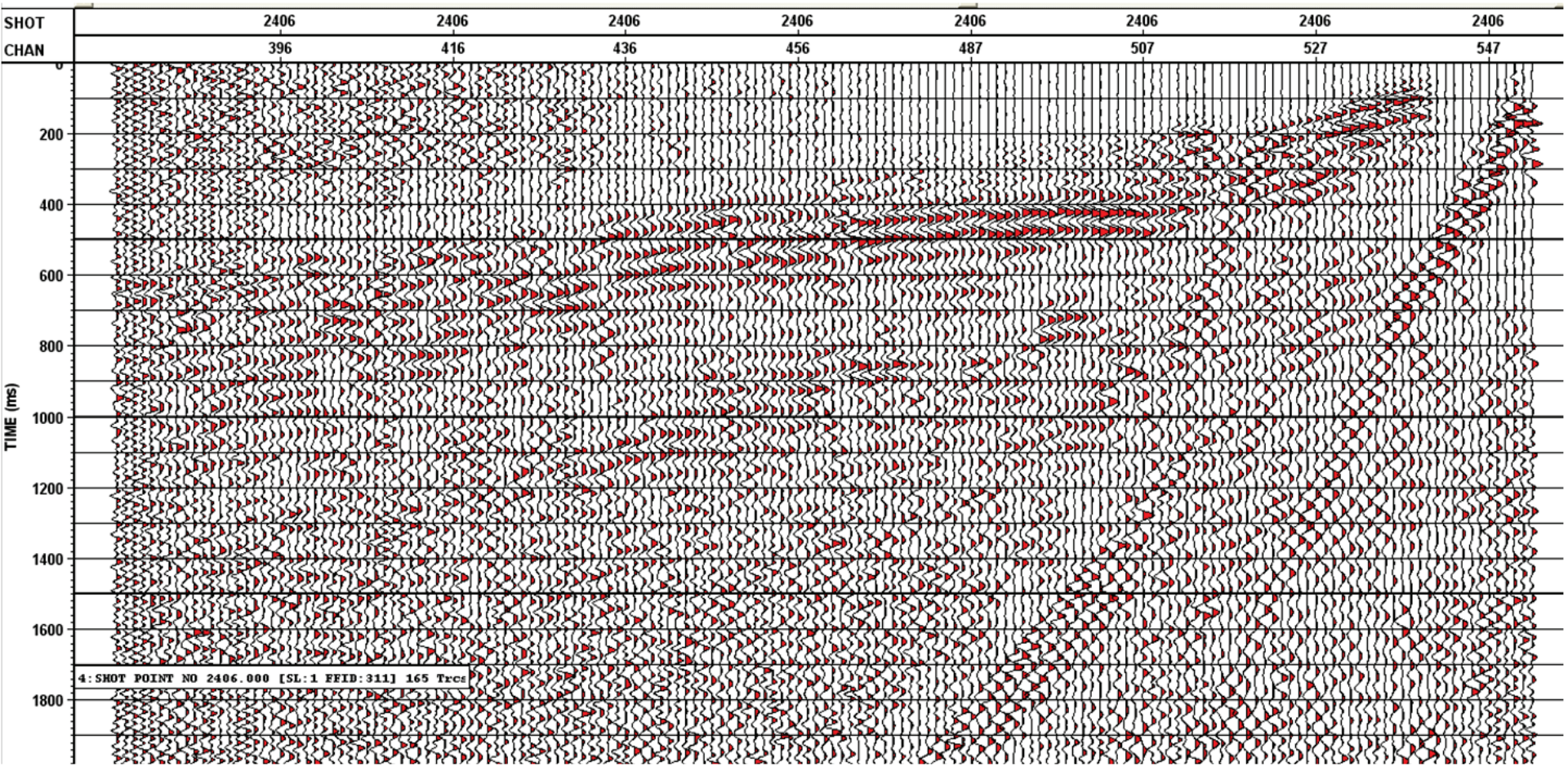


agc applied

Radial component difference

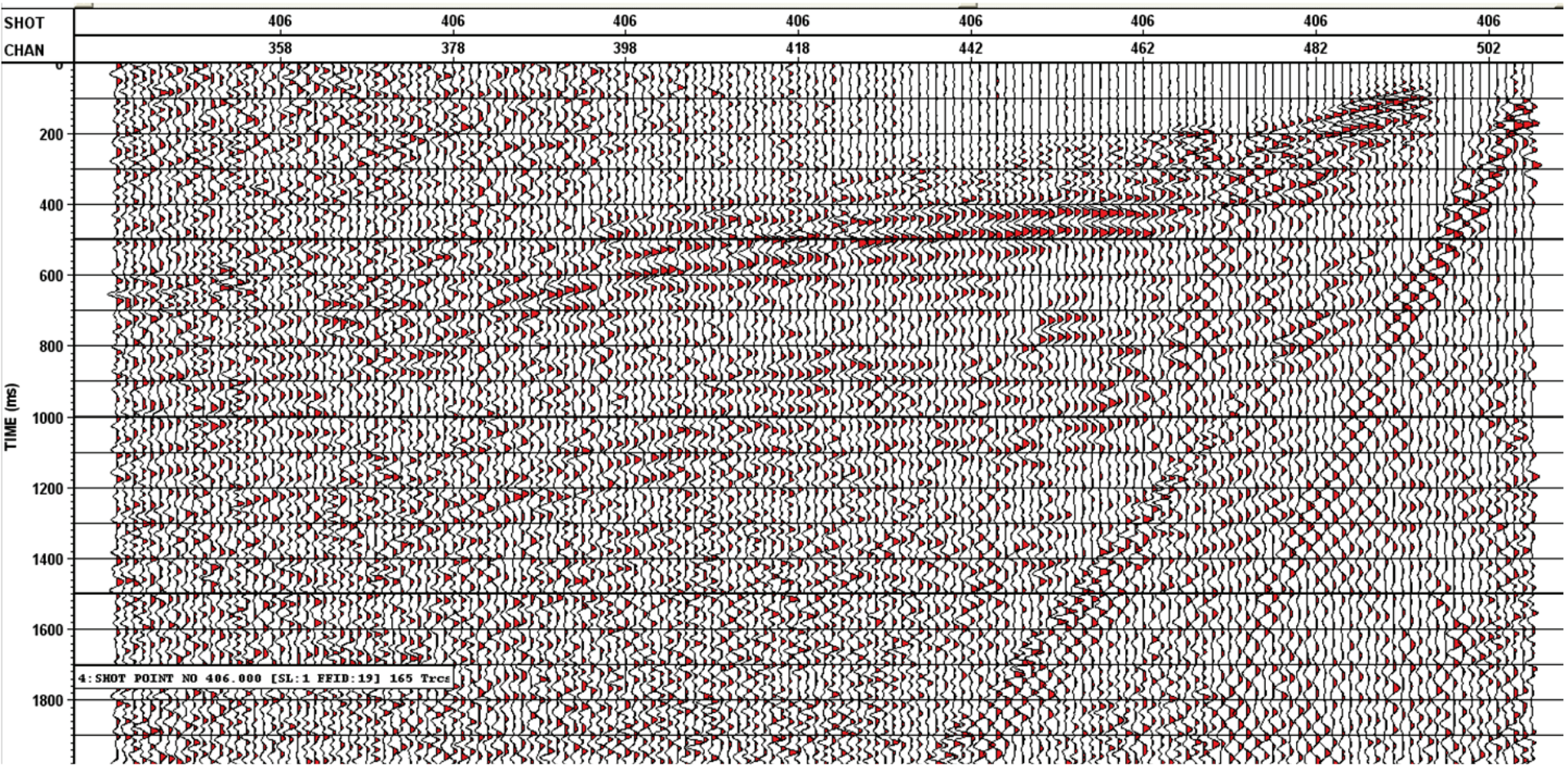


Line 1 radial component shot gather



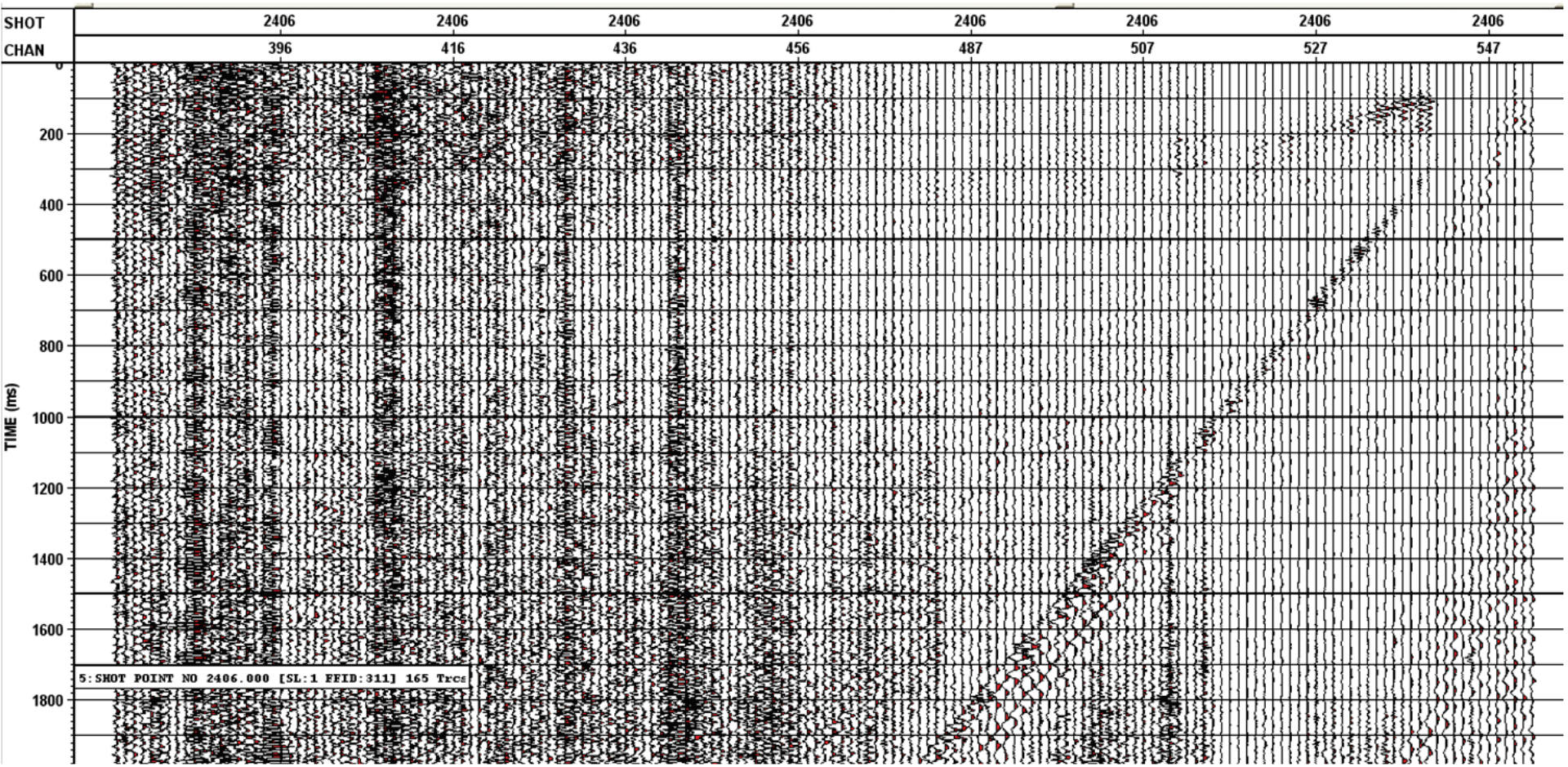
agc + 8-12-40-50 Hz bandpass filter applied

Line 2 radial component shot gather



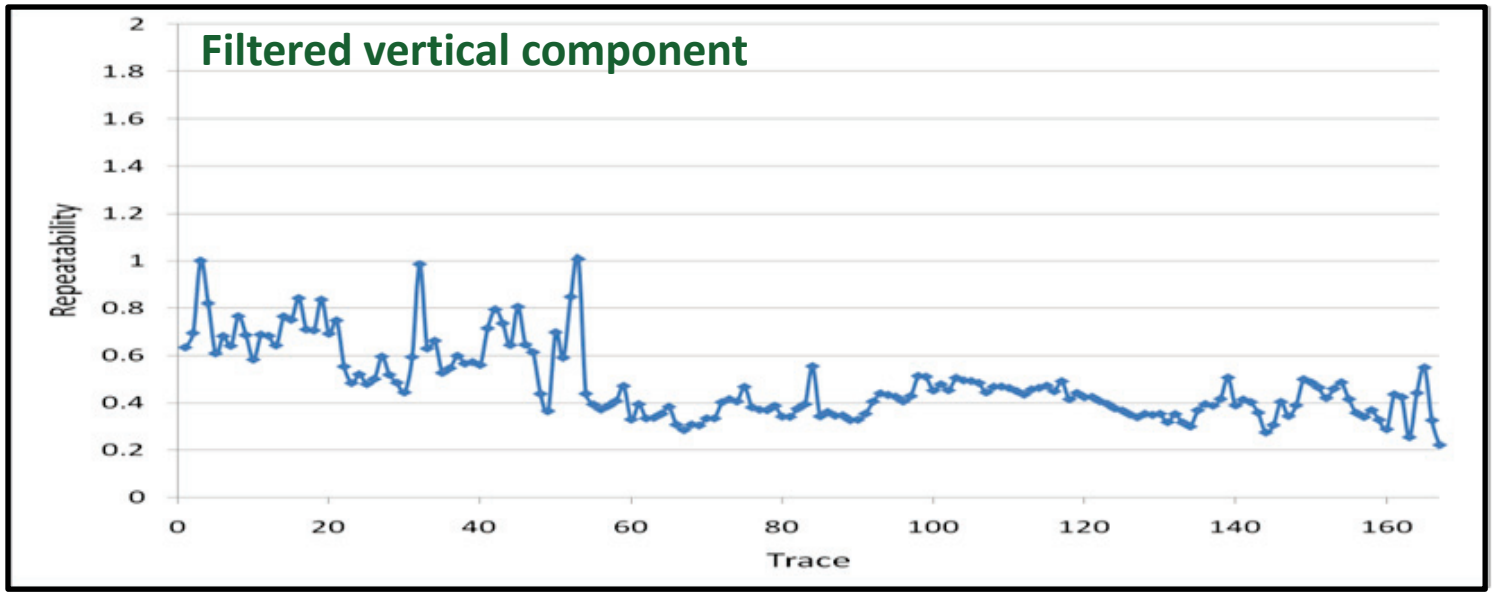
agc + 8-12-40-50 Hz bandpass filter applied

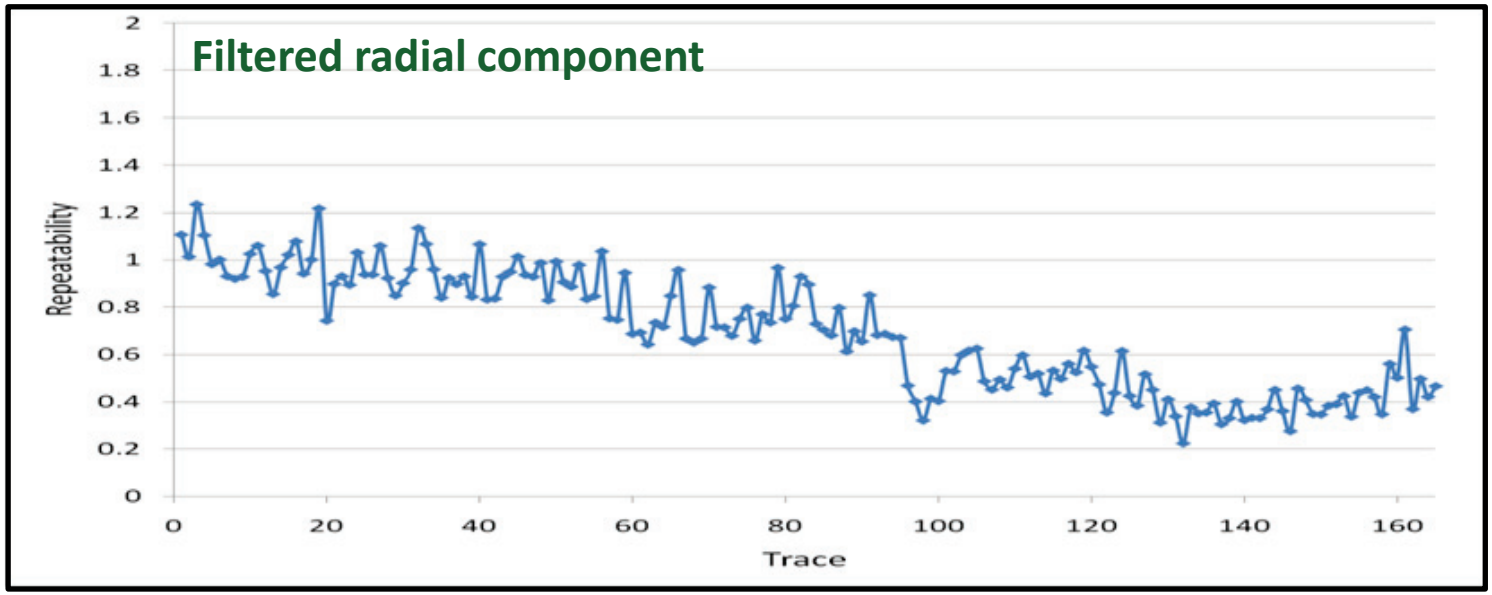
Radial component difference



agc + 8-12-40-50 Hz bandpass filter applied before differencing

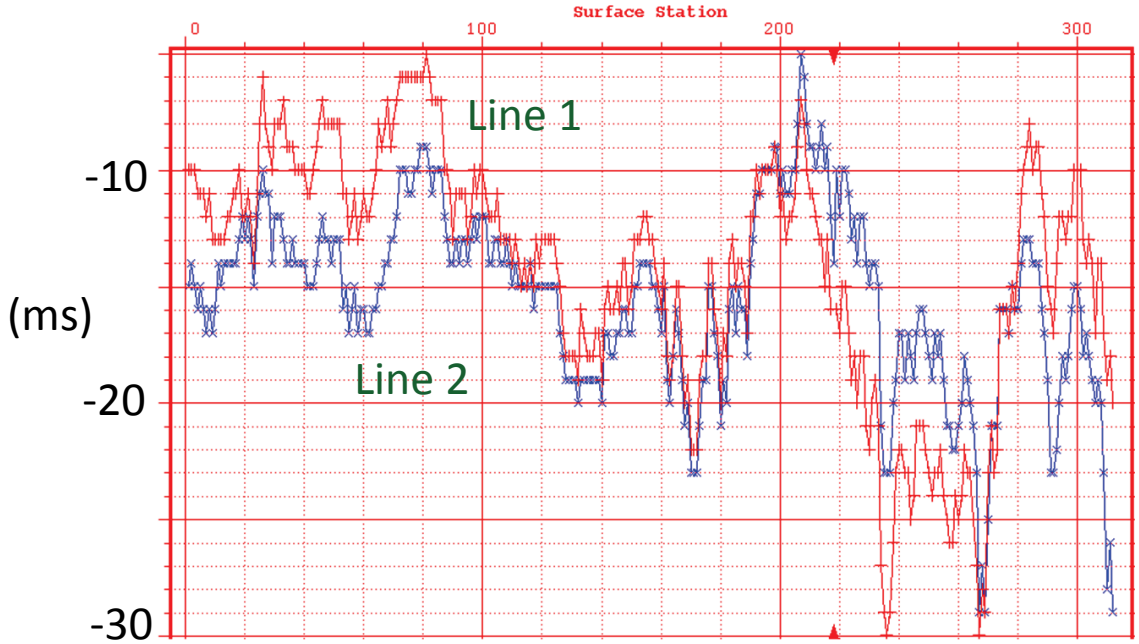
Shot gather nrms repeatability



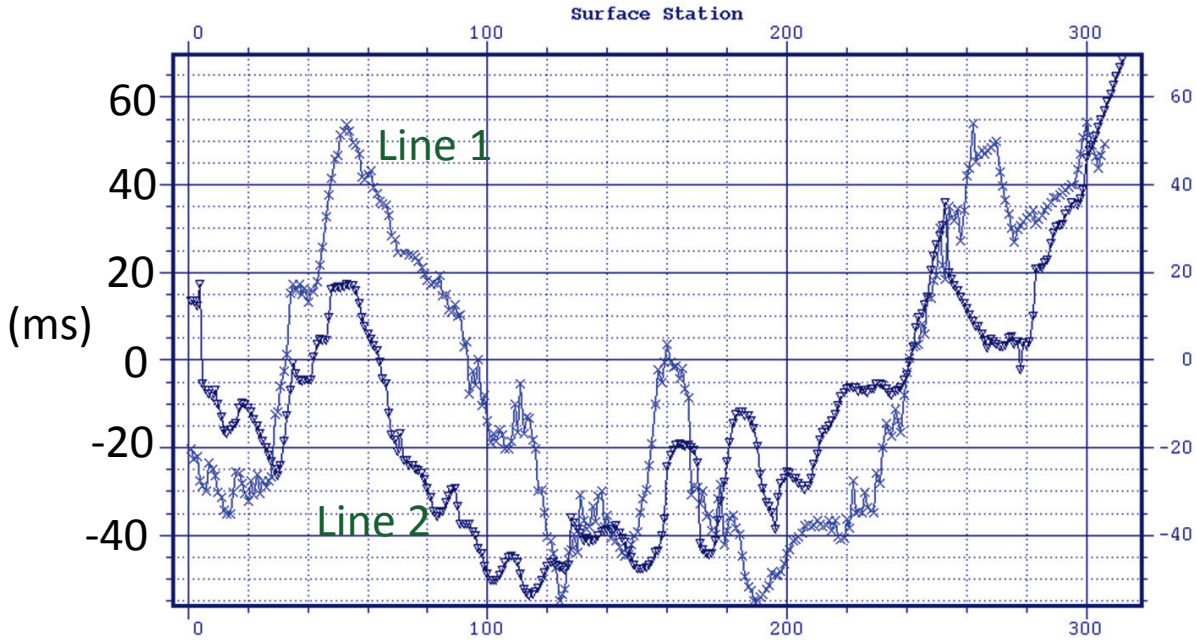


Receiver statics

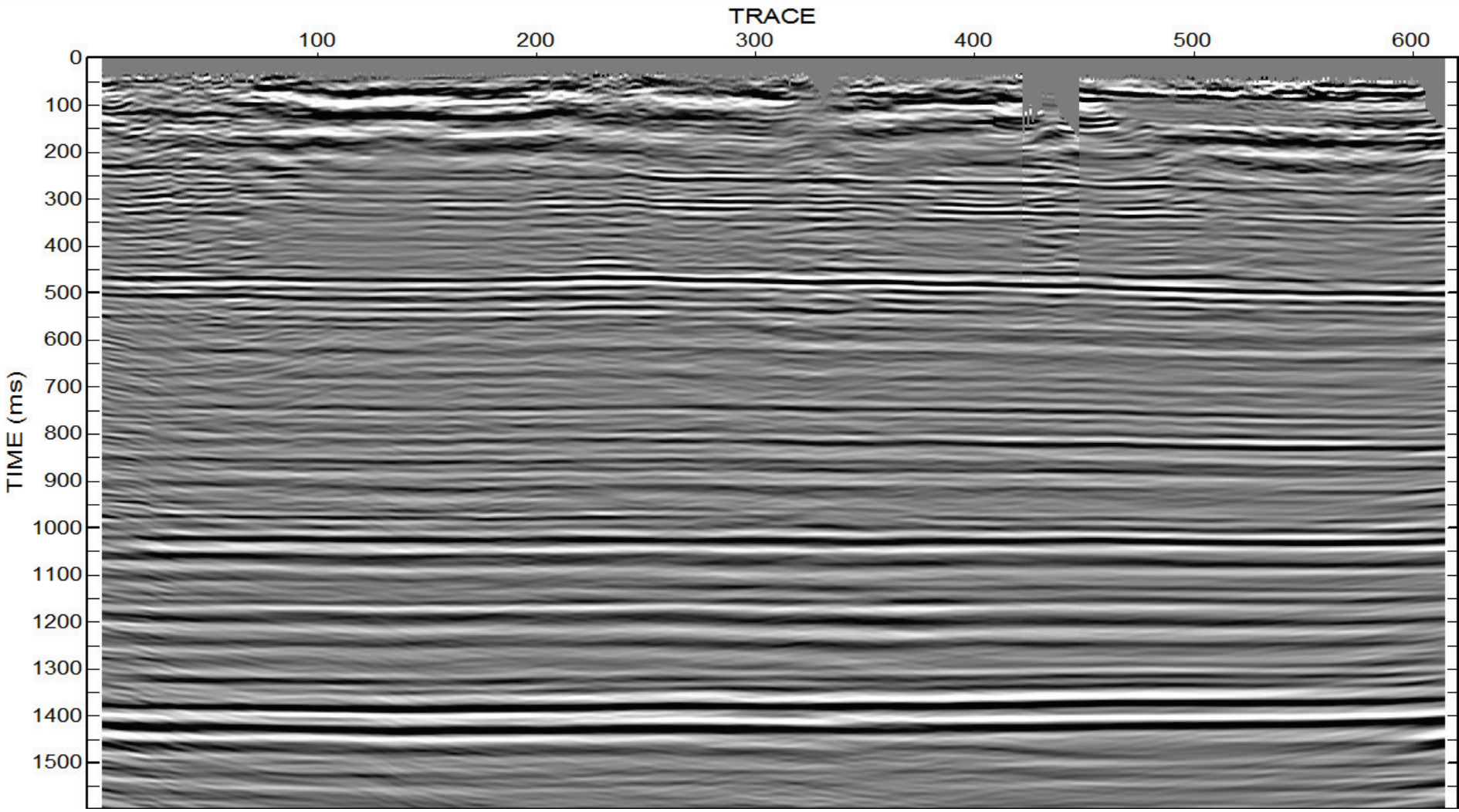
vertical component



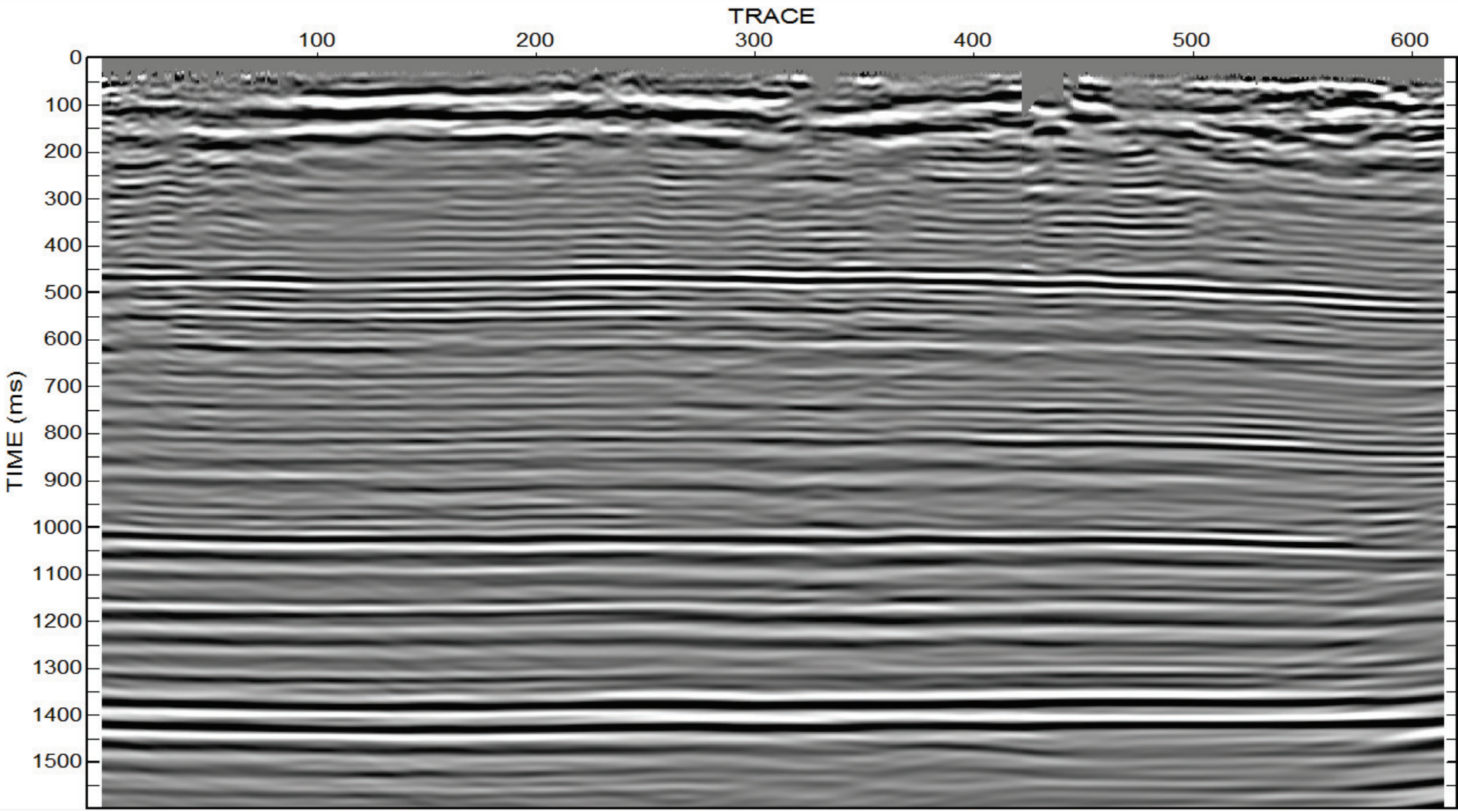
radial component



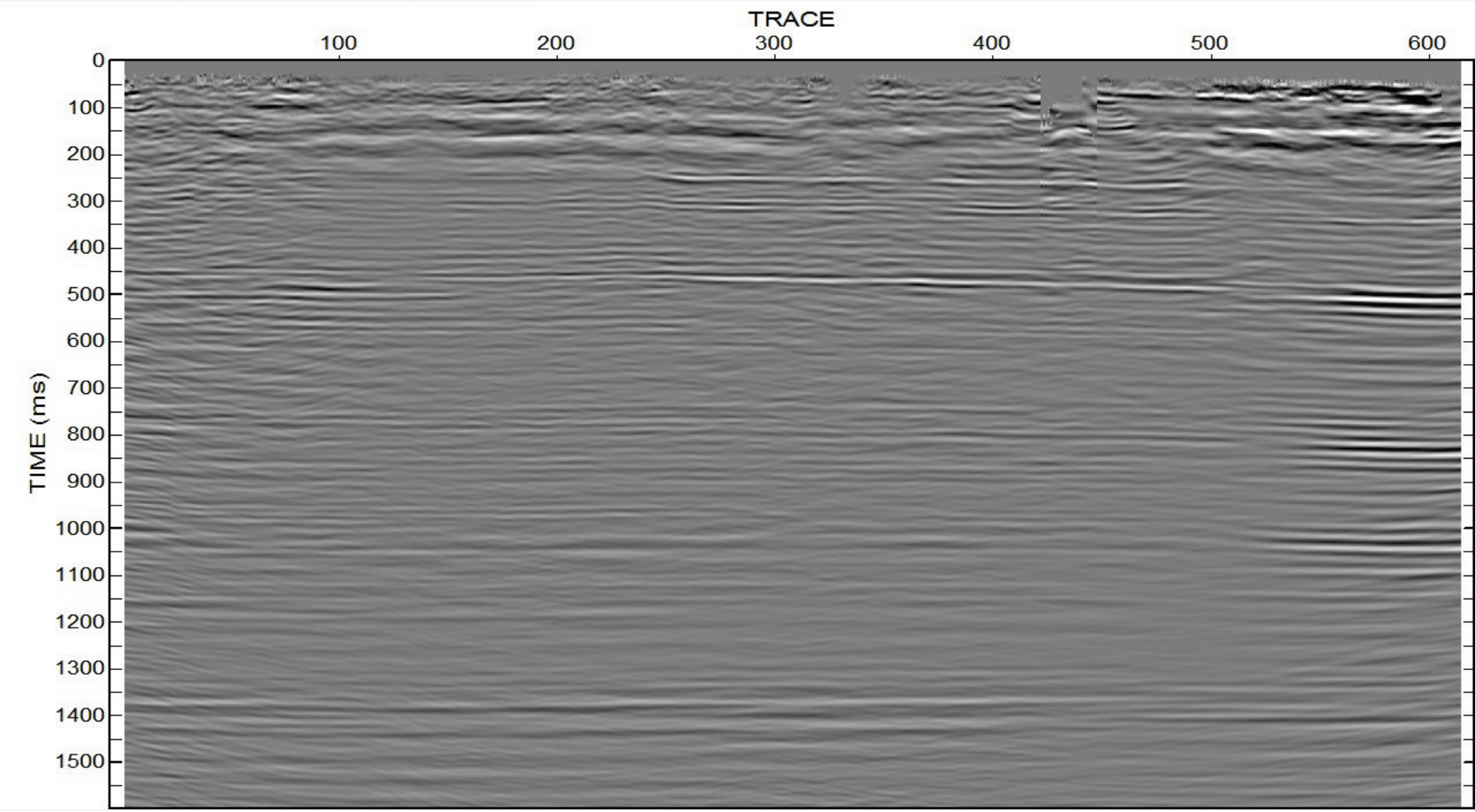
Line 1 PP section



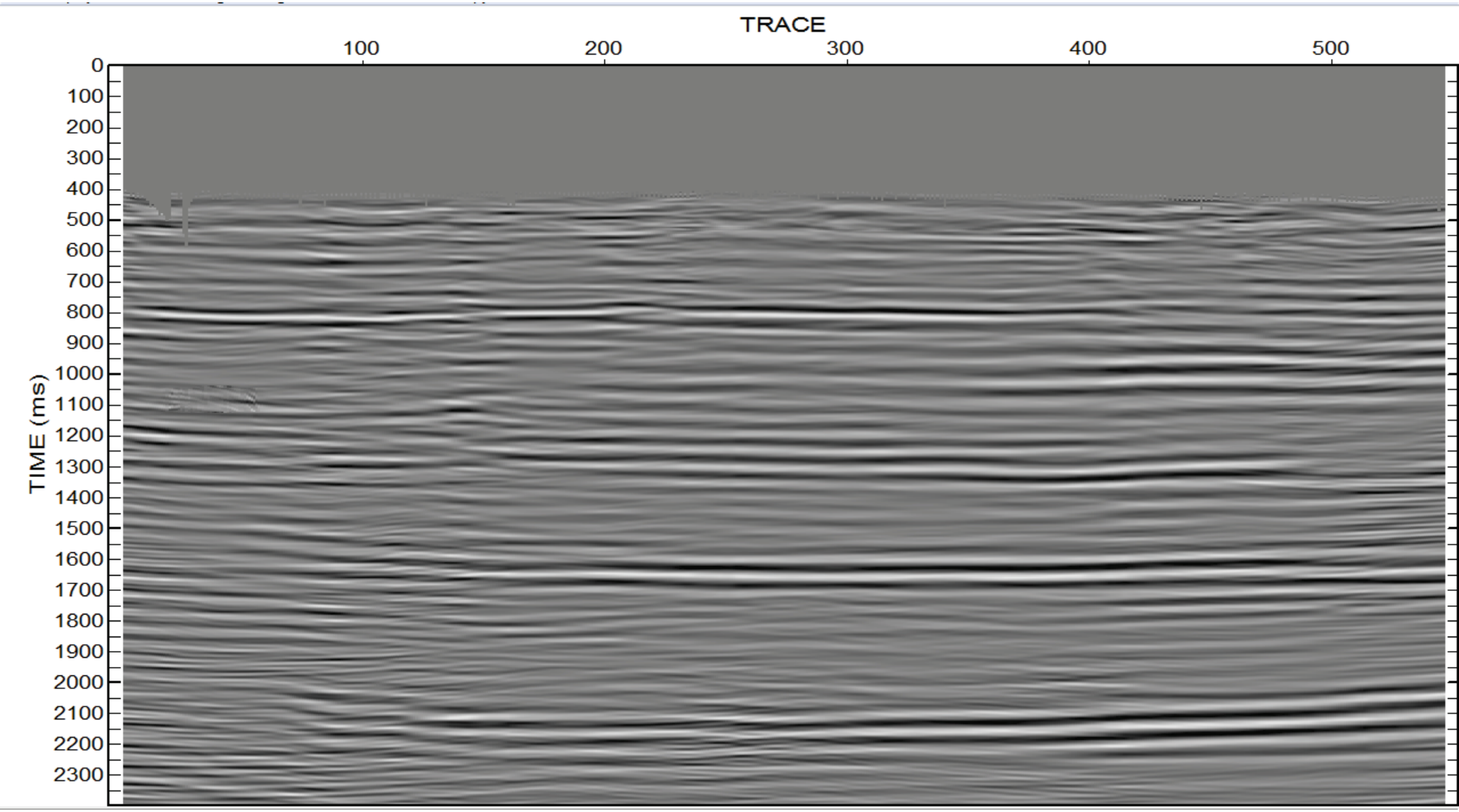
Line 2 PP section



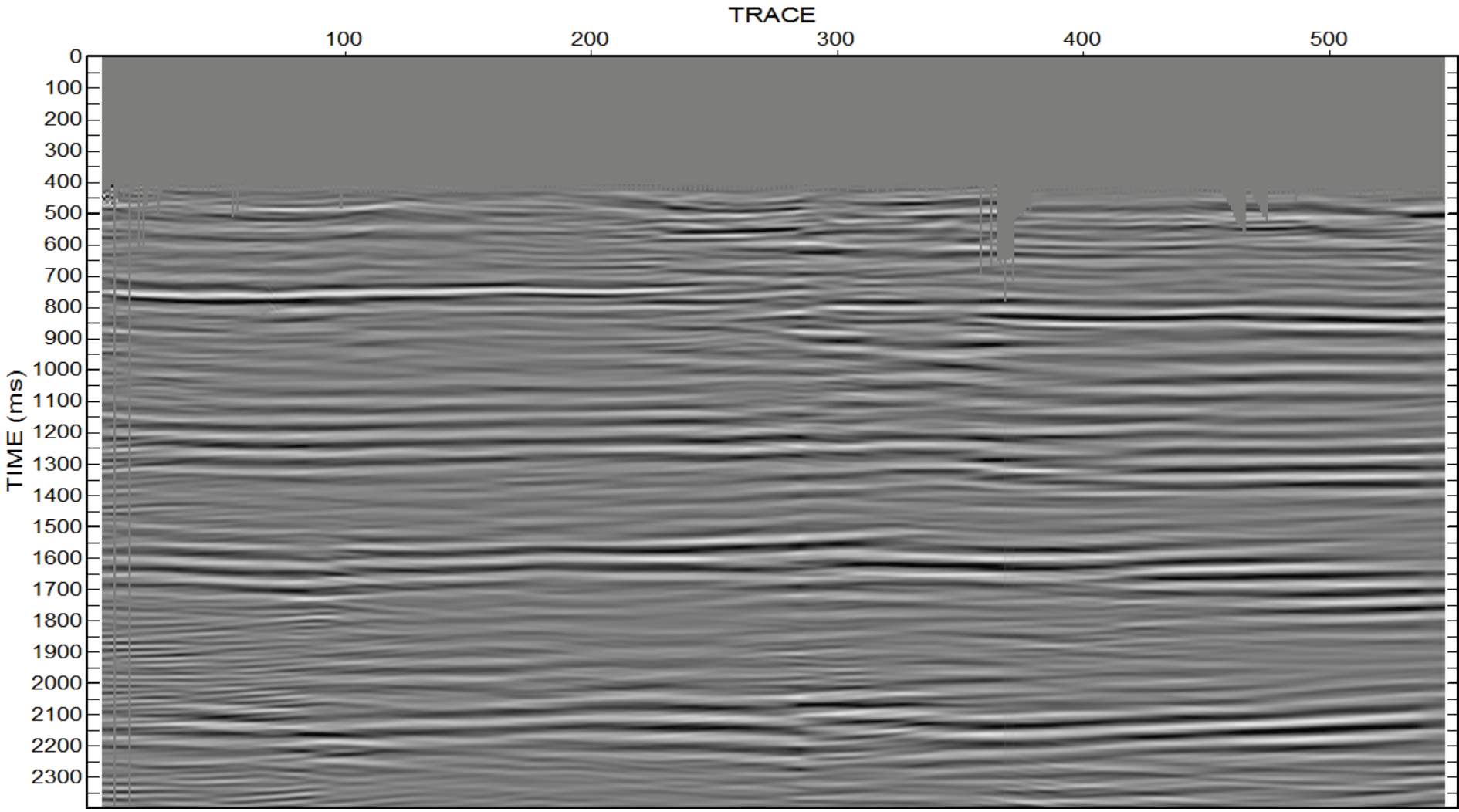
PP difference section



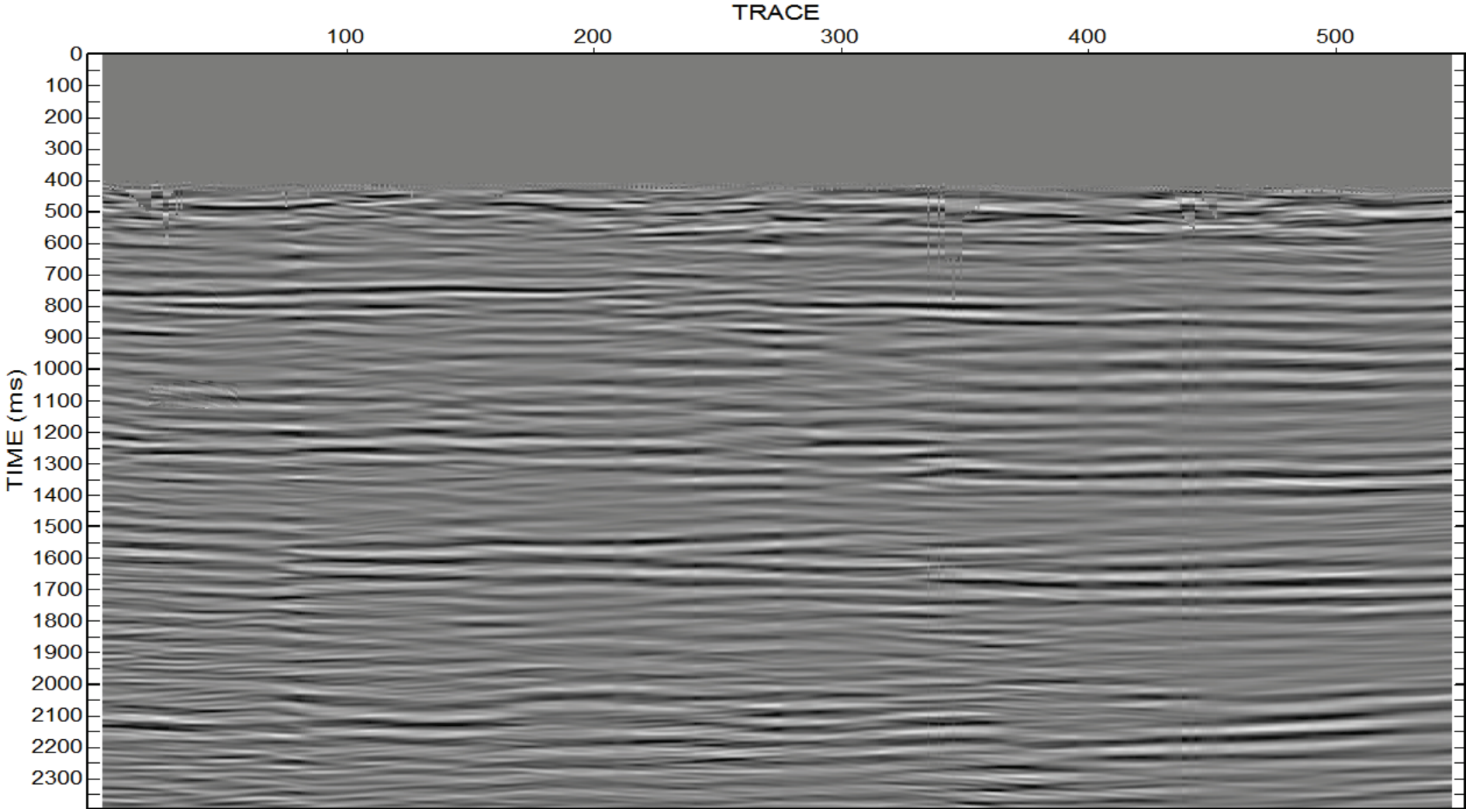
Line 1 PS section (ACP binning)



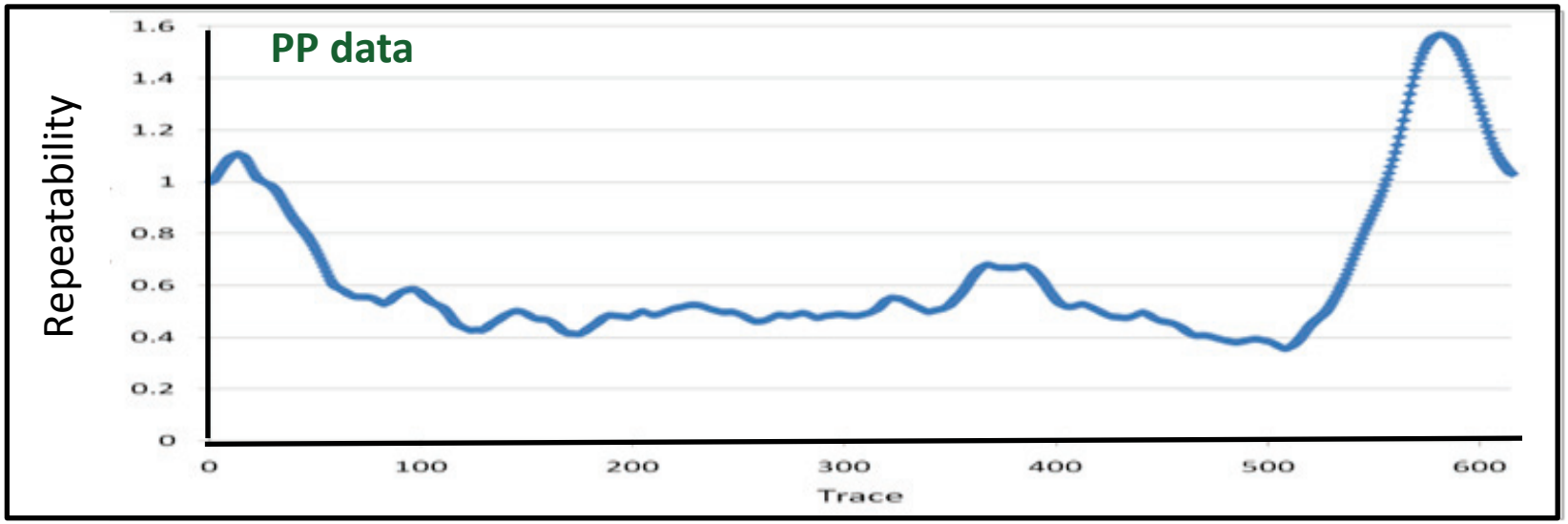
Line 2 PS section (ACP binning)

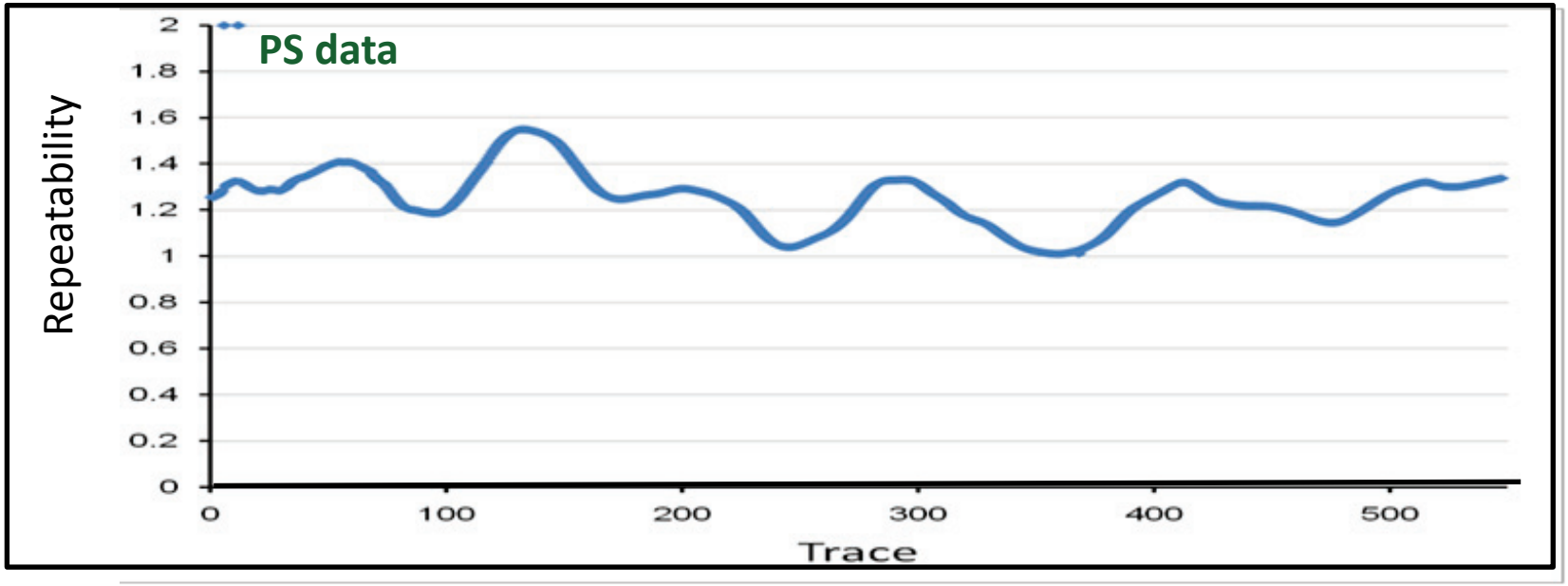


PS difference section

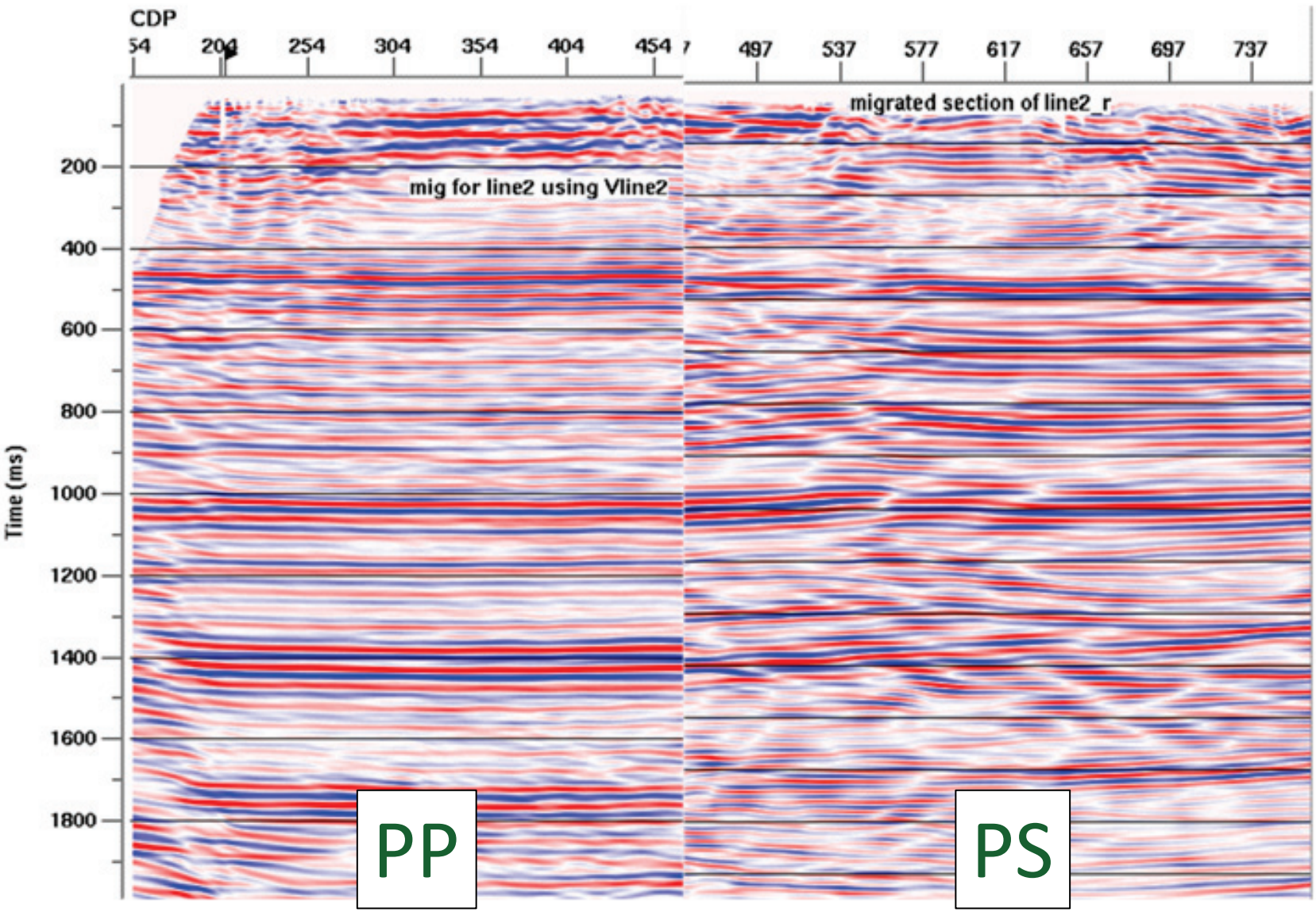


Migrated section nrms repeatability





PP – PS registration



Vp/Vs

2.4

2.1

2.0

Conclusions

- High source effort with Minivibe yields reflections from basement
- Shot gather nrms 0.2 – 0.8 (vertical)
- Shot gather nrms 0.4 – 1.0 (radial)
- PP section nrms ~0.4 (non 4D processing)
- PS section nrms ~1.2 (non 4D processing)
- Wind noise and statics guilty
- Process using rigorous timelapse approach
- Vp/Vs ranges from 2.4 (shallow) to 2.0 (deep)

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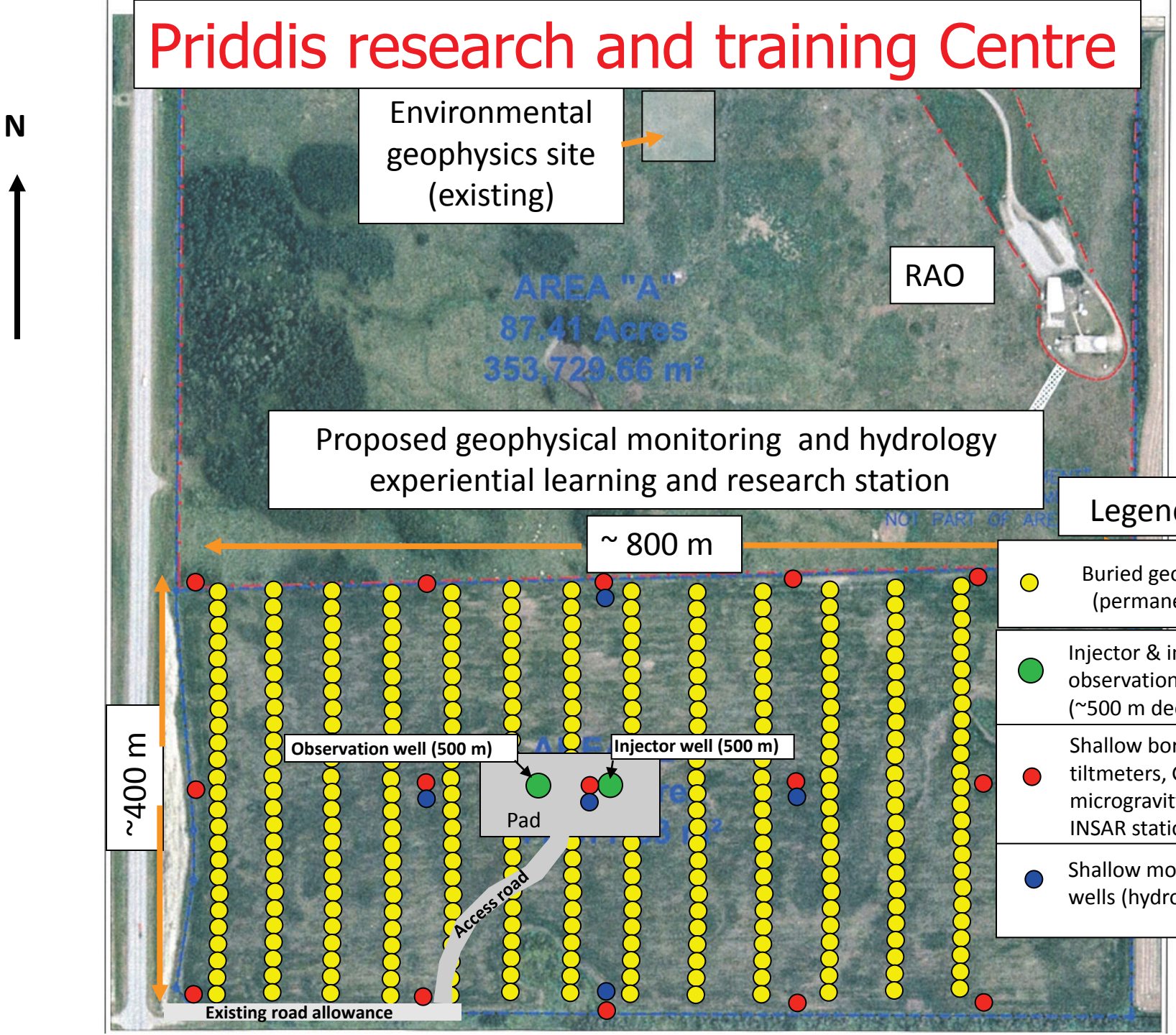

Acknowledgements

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- CREWES support
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- Gedco