Source distance and source effort on DAS data

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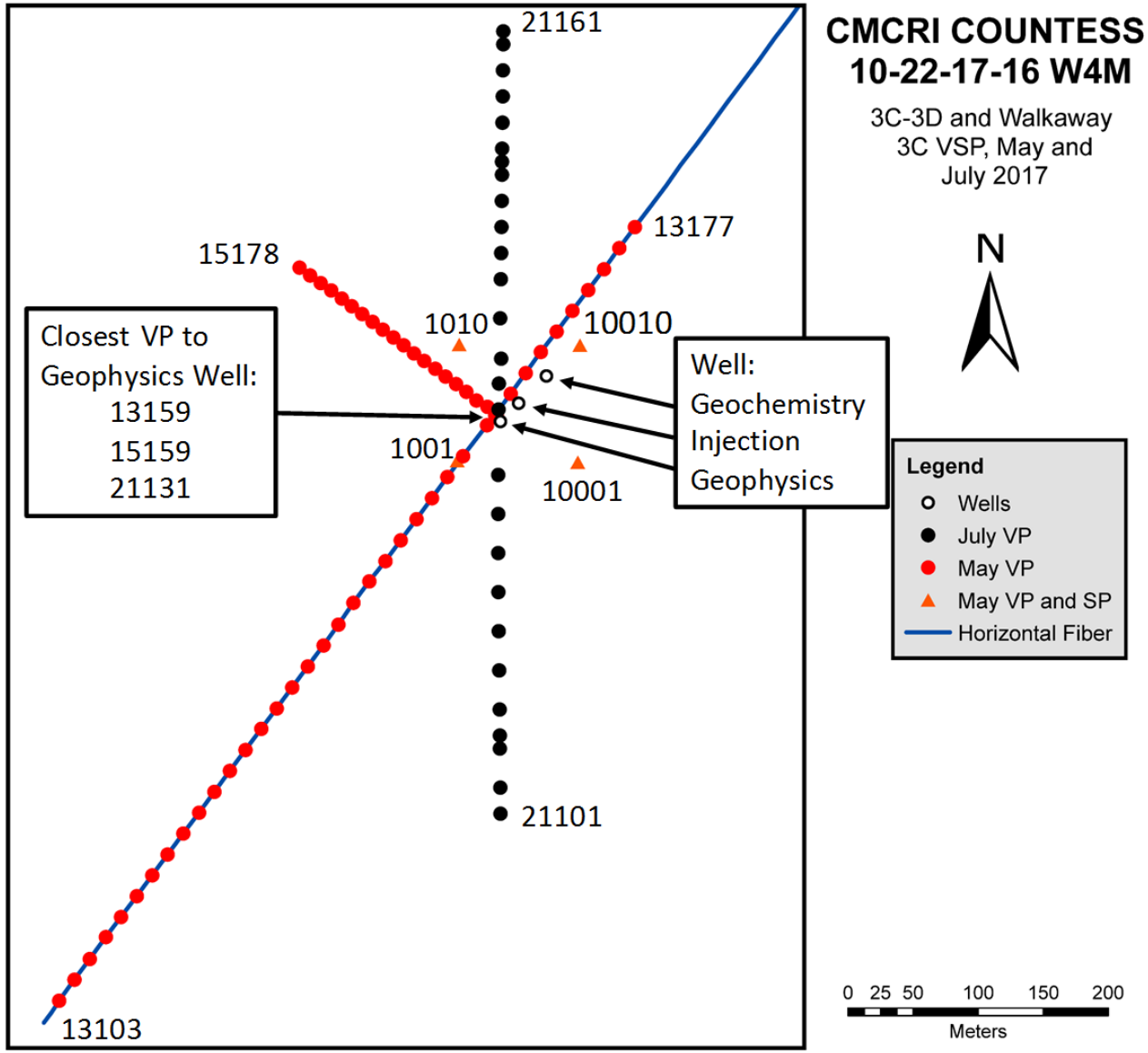
Survey Layout



Acquisition (Fibre) Parameters

DAS, straight fibre	Values	Units
Channel spacing	25.0	cm
Gauge length	10.0	m
Geophysics well channel range	3817-6385	chan
Geophysics well total channels	2569	chan
Geophysics well fibre length	642.3	m
Geochemistry well channel range	6963-9298	chan
Geochemistry well total channels	2336	chan
Geochemistry well fibre length	584.0	m
Trench channel range	12076-9819,19297-17200	chan
Trench total channels	4356	chan
Trench fibre length	1089.0	m

File Sizes

Line	Correlated	nTraces	nSamples	nFiles	Gather FileSize (Gb)	Total FileSize (Gb)
13	FALSE	20000	20000	114	1.5	170.4
15	FALSE	20000	20000	40	1.5	59.8
21	FALSE	20000	19000	222	1.4	315.3
13	TRUE	20000	1001	38	0.2	8.7
15	TRUE	20000	1001	20	0.2	4.6
21	TRUE	20000	1001	27	0.2	6.2

Method

$$SNNR = 10log10\left(\frac{\sum(signal+noise)^2}{\sum noise^2}\right)$$

signal+noise = seismic amplitudes

noise = $trace_n - trace_{n+1}$

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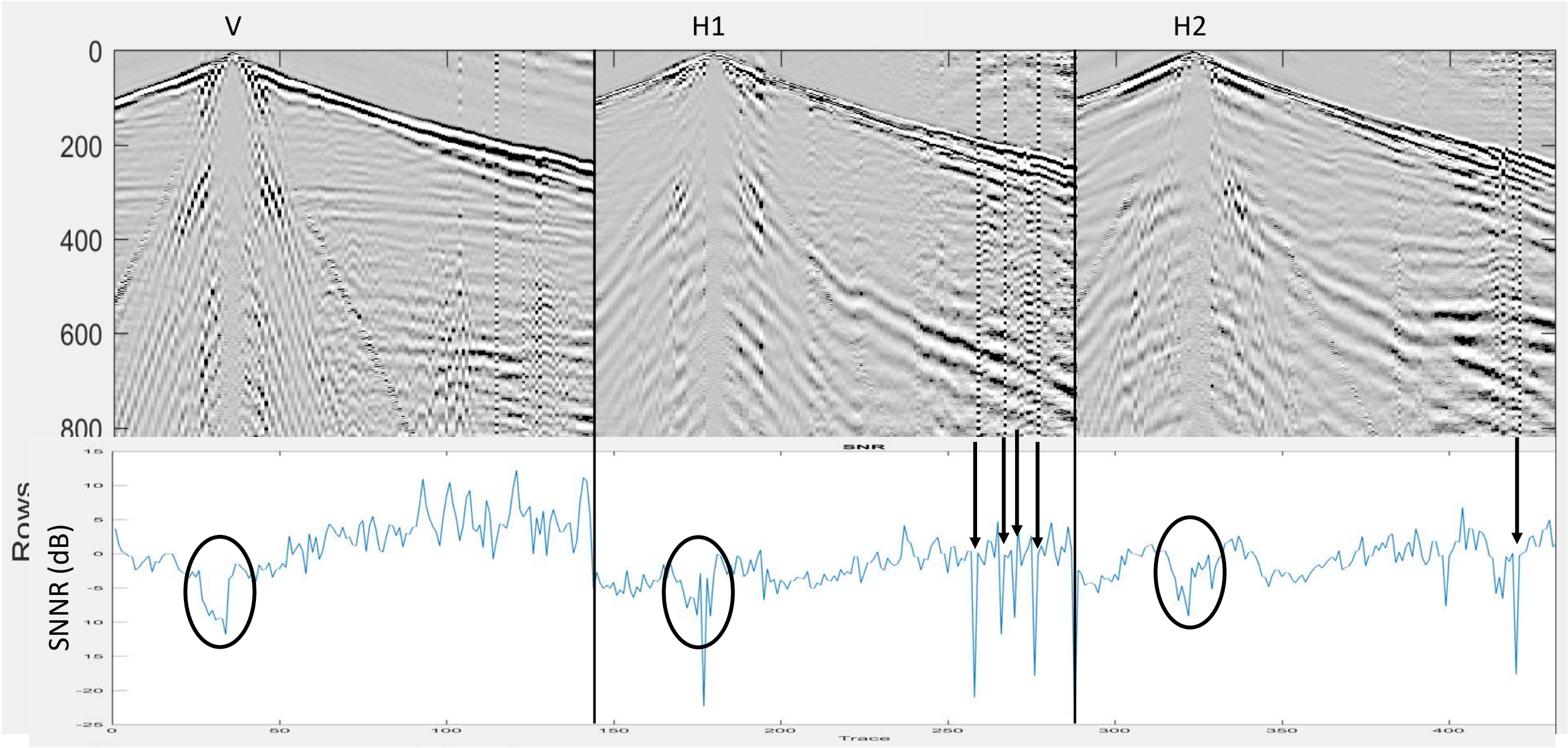
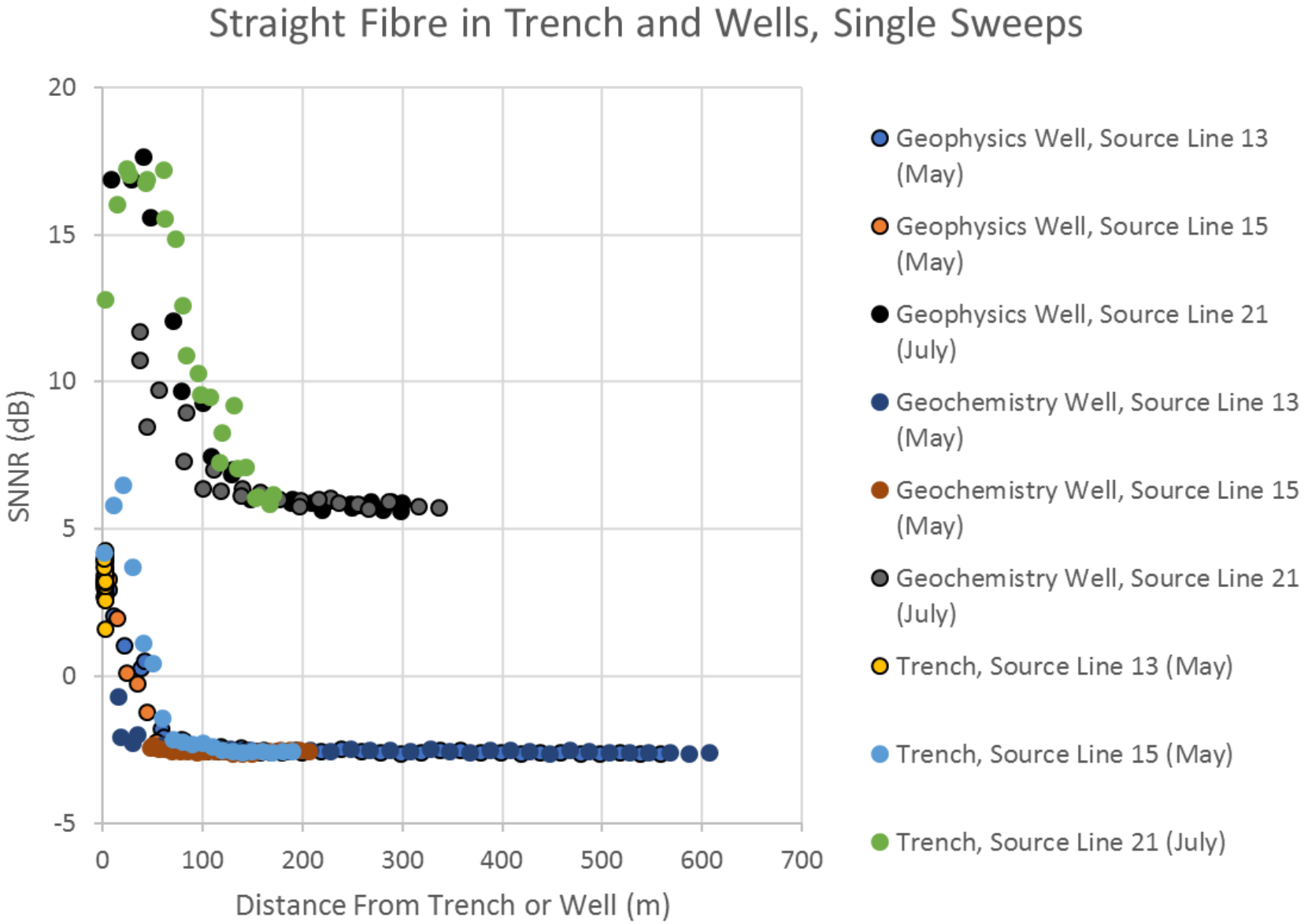
Method: Example - 3C geophone source gather, SNNR for single traces

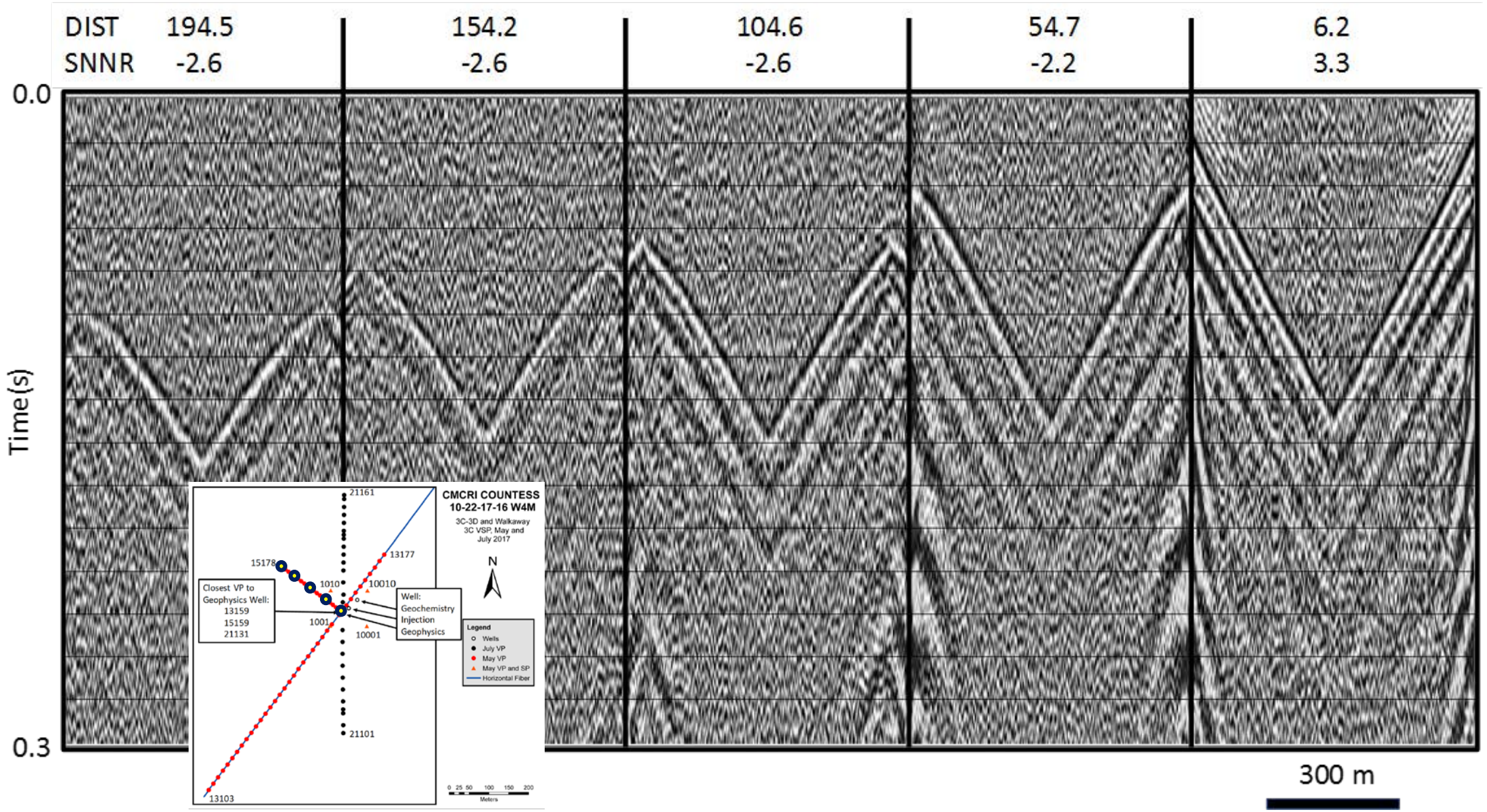


SNNR vs. Distance: All data recorded on straight fibre. Vertical fold = 1

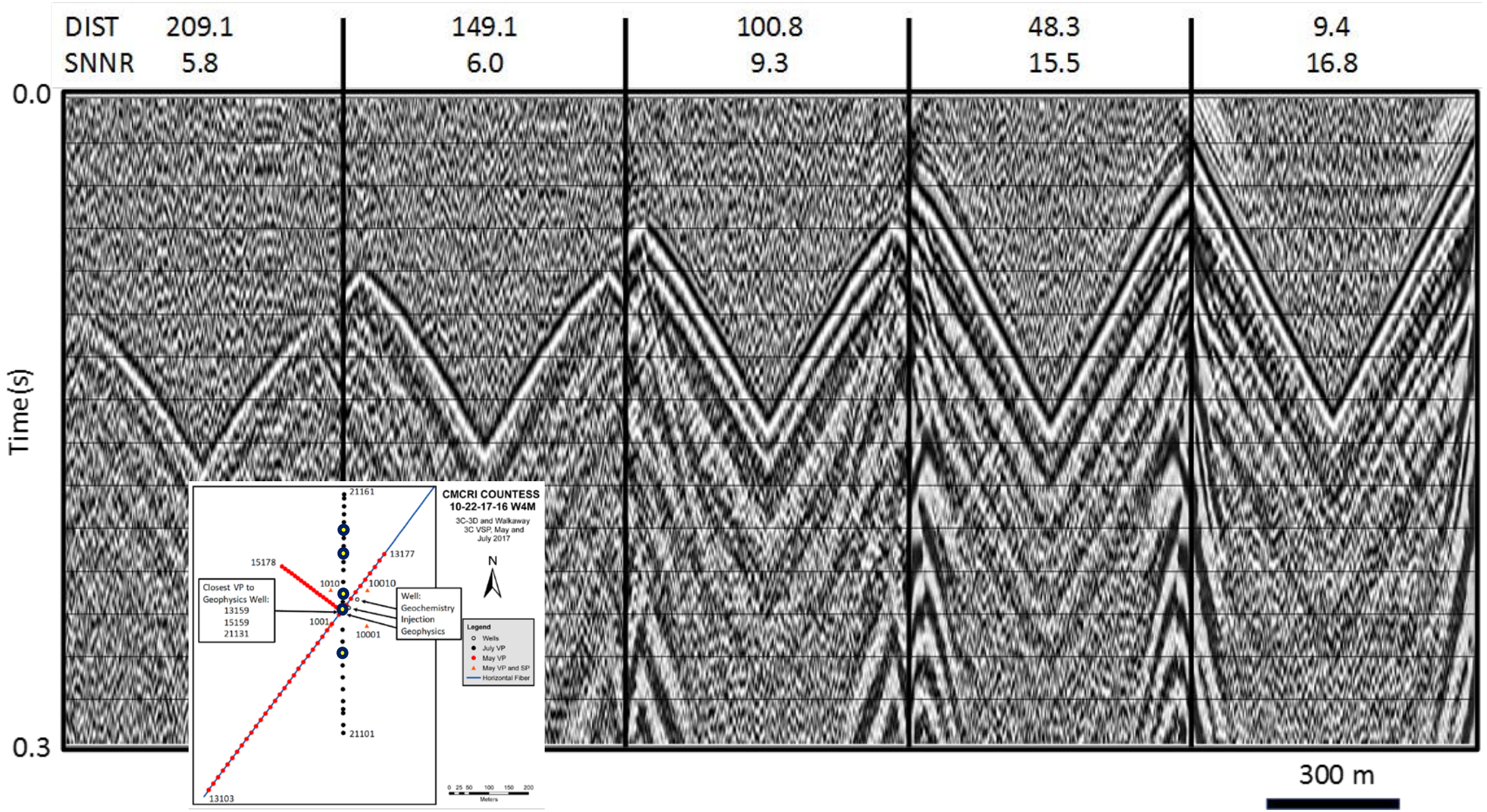
Graph excludes anomalous SNNR values for 3 VPs



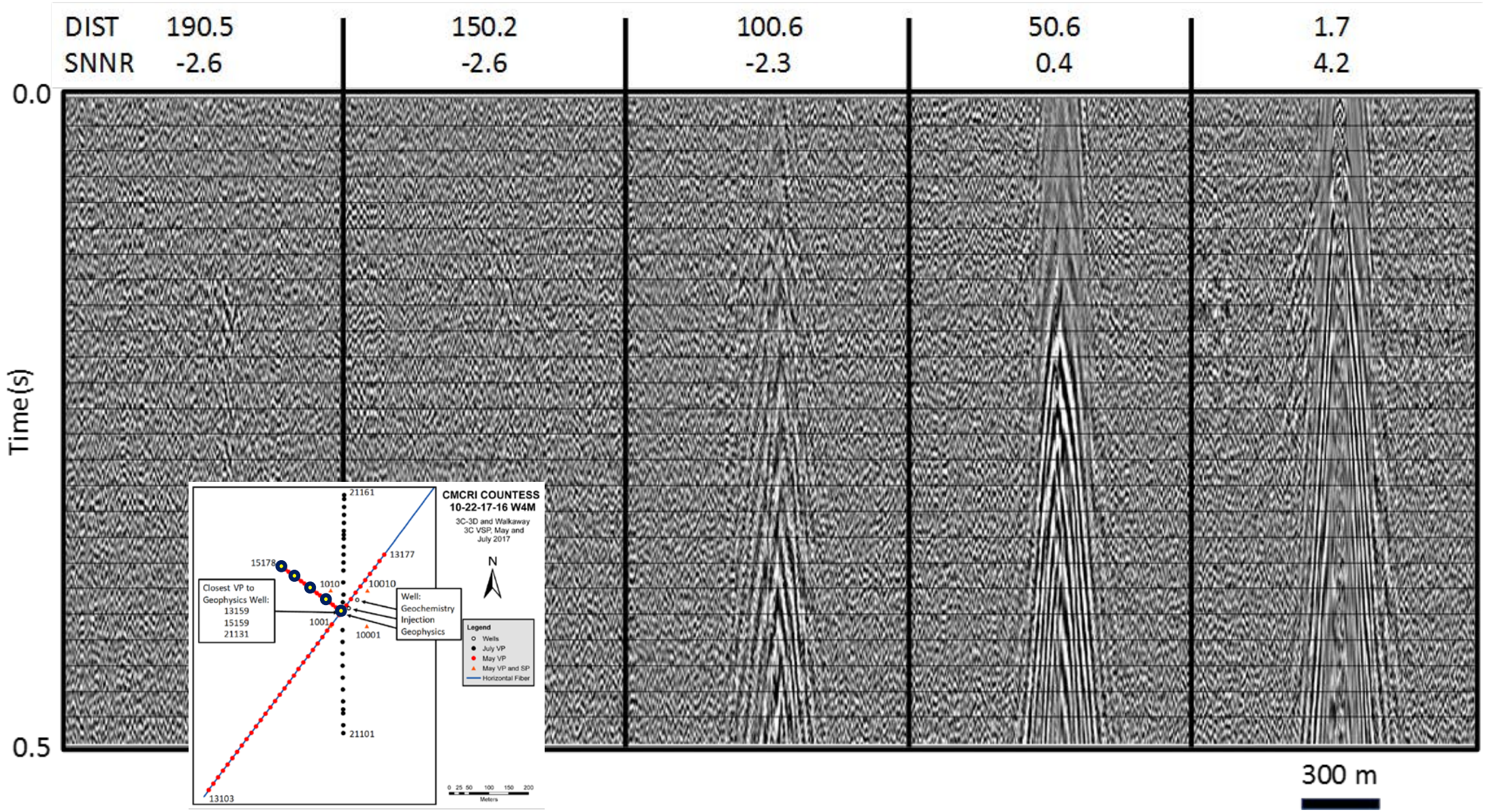
May source line 15, single fold, geophysics well, 10 ms AGC



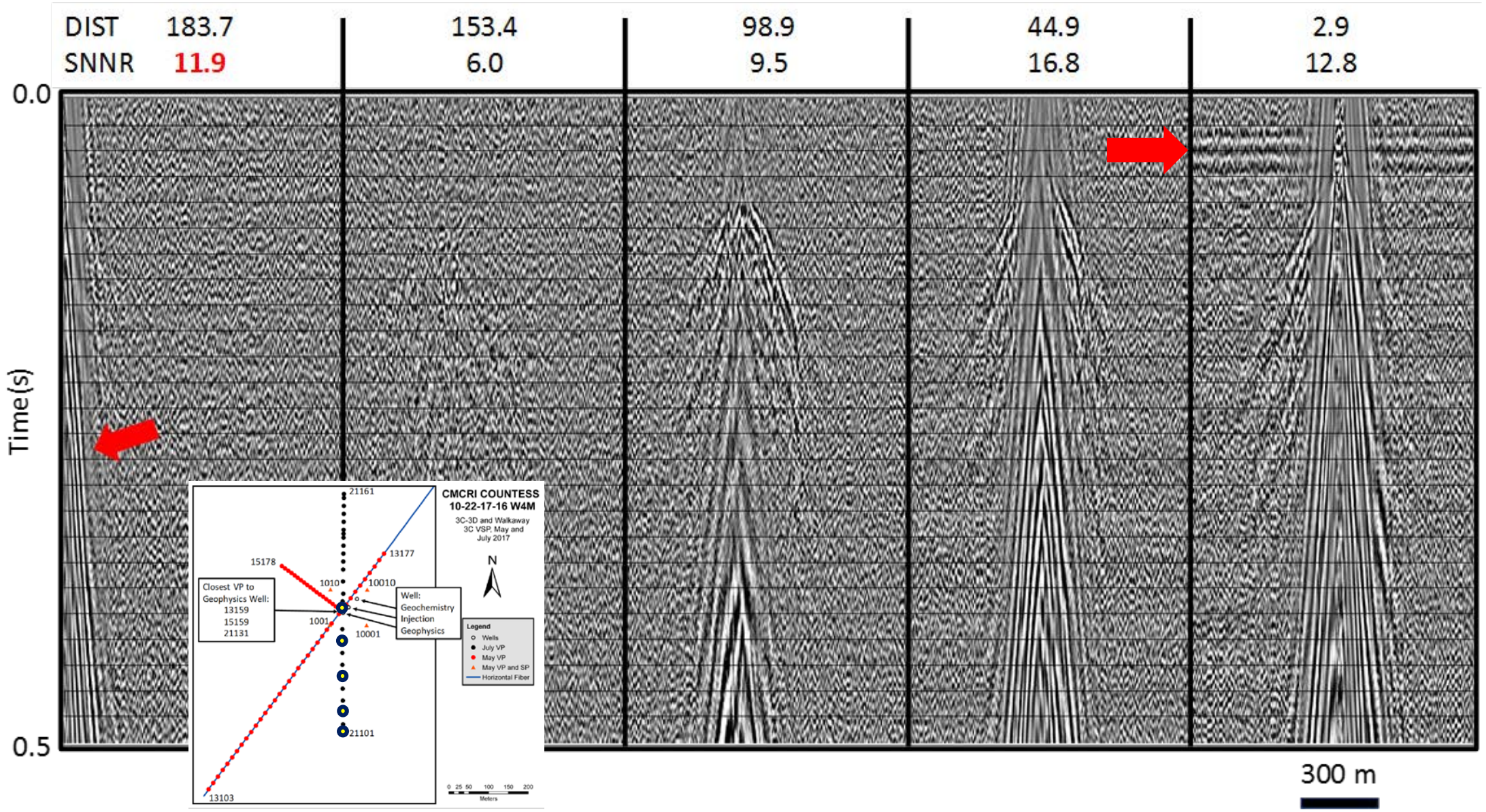
July source line 21, single fold, geophysics well, 10 ms AGC



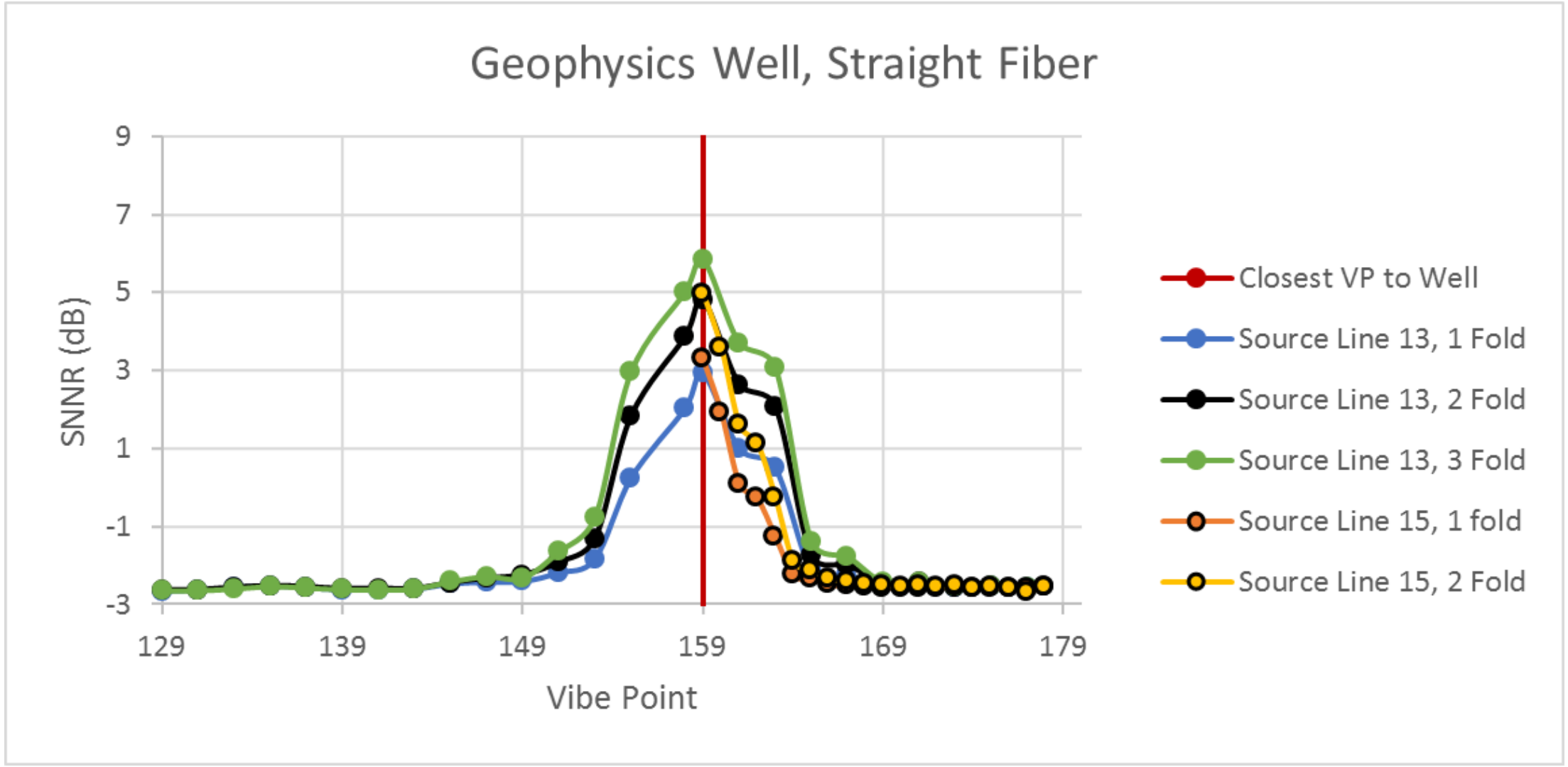
May source line 15, single fold, trench, 500 ms AGC



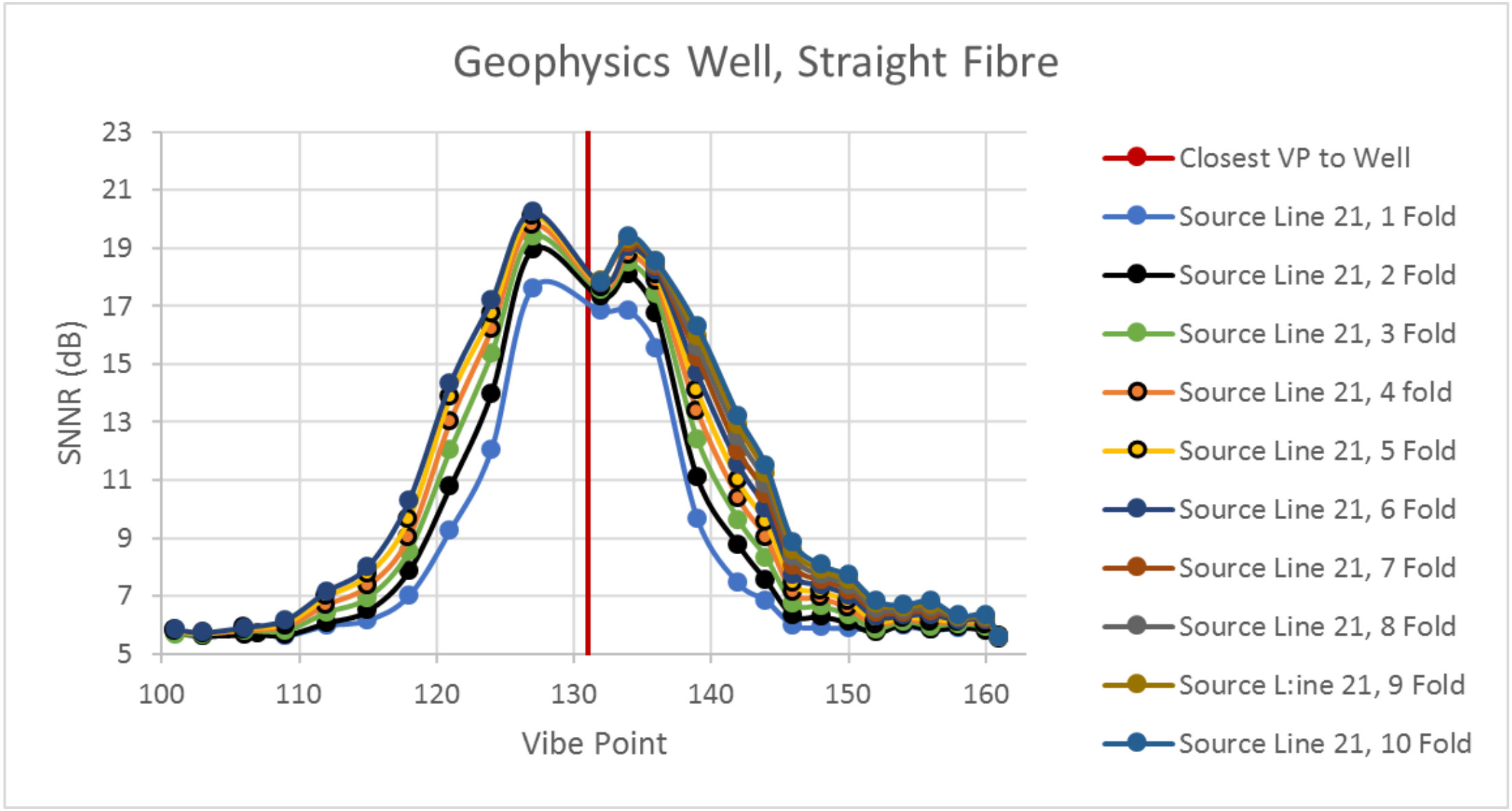
July source line 21, single fold, trench, 500 ms AGC



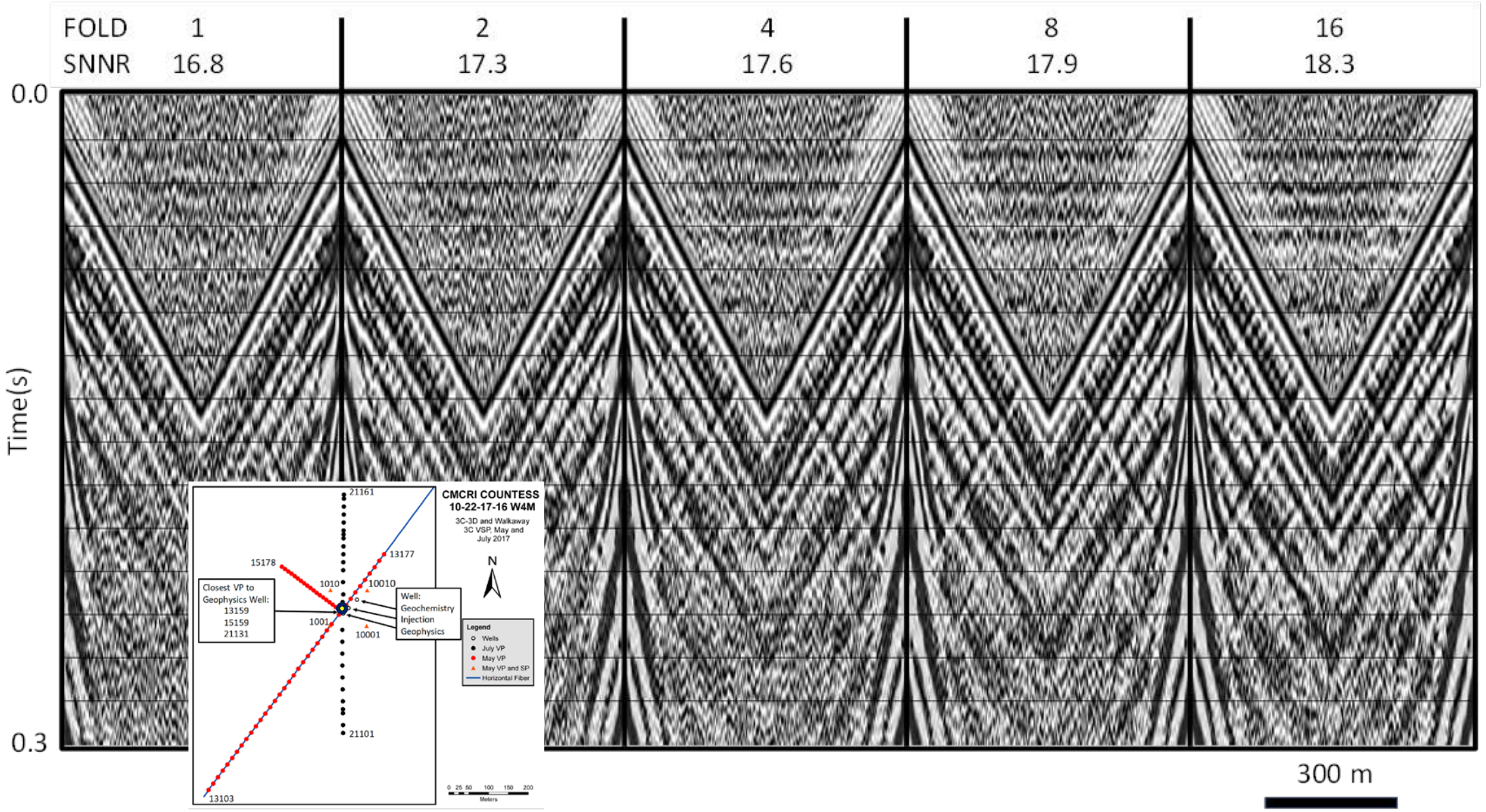
SNNR vs. Fold: May, straight fibre in geophysics well



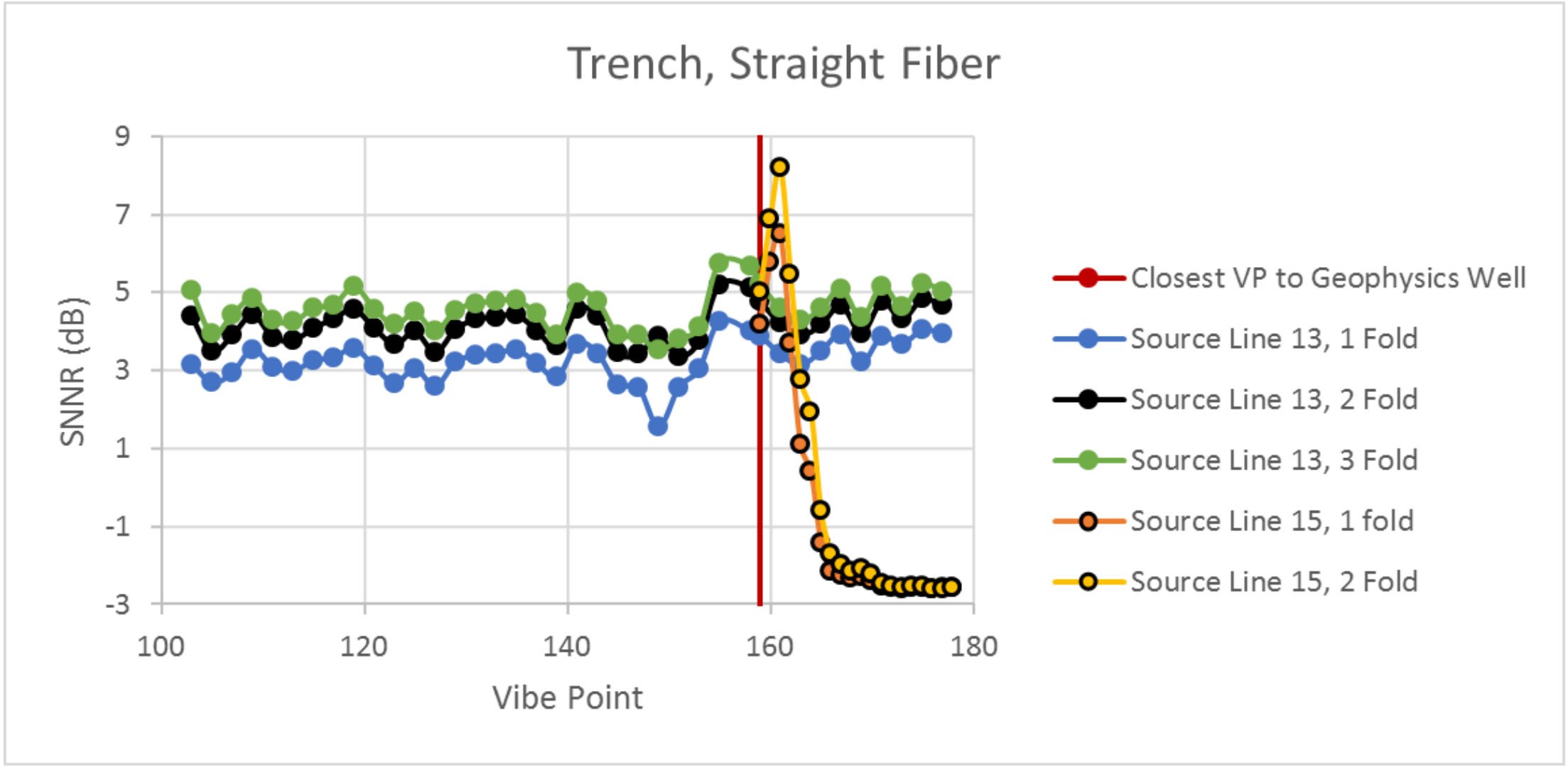
SNNR vs. Fold: July, straight fibre in geophysics well



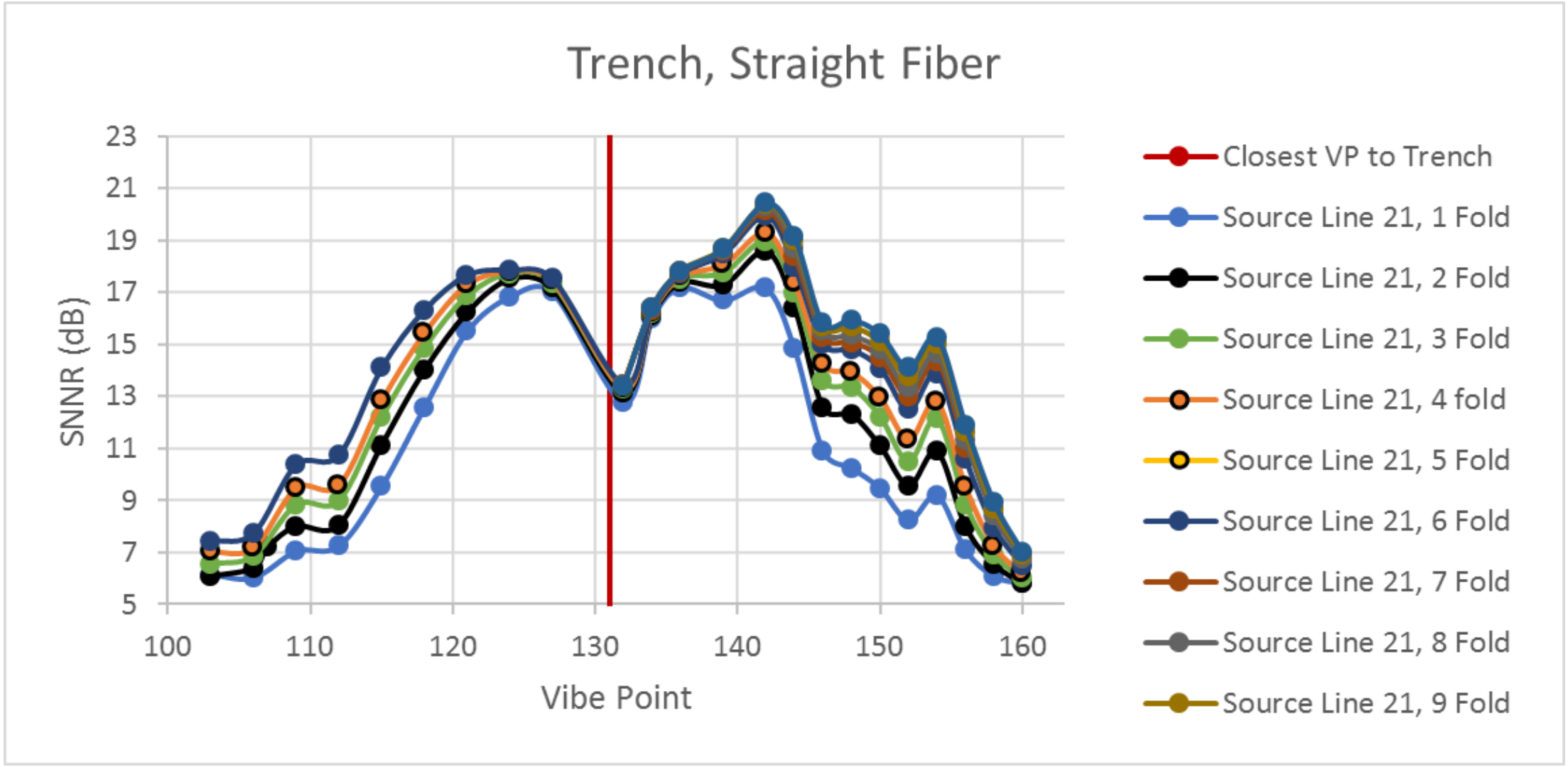
SNNR vs. Fold: July, straight fibre in geophysics well, VP 21132



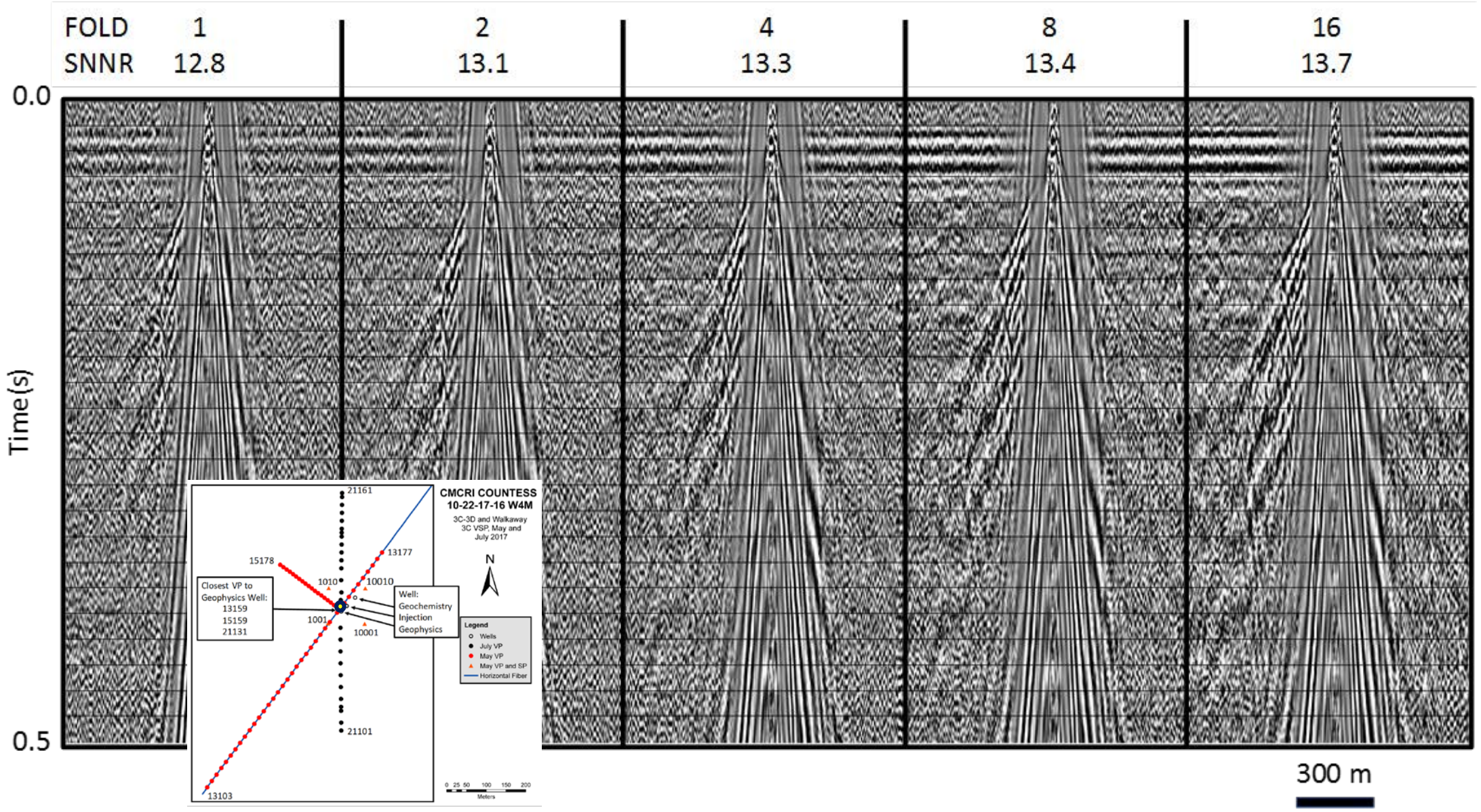
SNNR vs. Fold: May, straight fibre in trench



SNNR vs. Fold: July, straight fibre in geochemistry well



SNNR vs. Fold: July, straight fibre in trench, VP 21132



Discussion and Conclusions

SNNR

- Fast to calculate (significantly faster than Vibroseis correlation). Gives one number per trace or per gather
- May be a valuable QC tool

Maximum source distance from DAS (approx.)

- May: 150 m from vertical fibre
- May: 100 m from horizontal fibre
- July: 250 m from vertical fibre
- July: 200 m from horizontal fibre

Maximum vertical fold

- Most visible improvement seen up to 5-fold

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