

Alder Flats 2D and 3D Seismic Program



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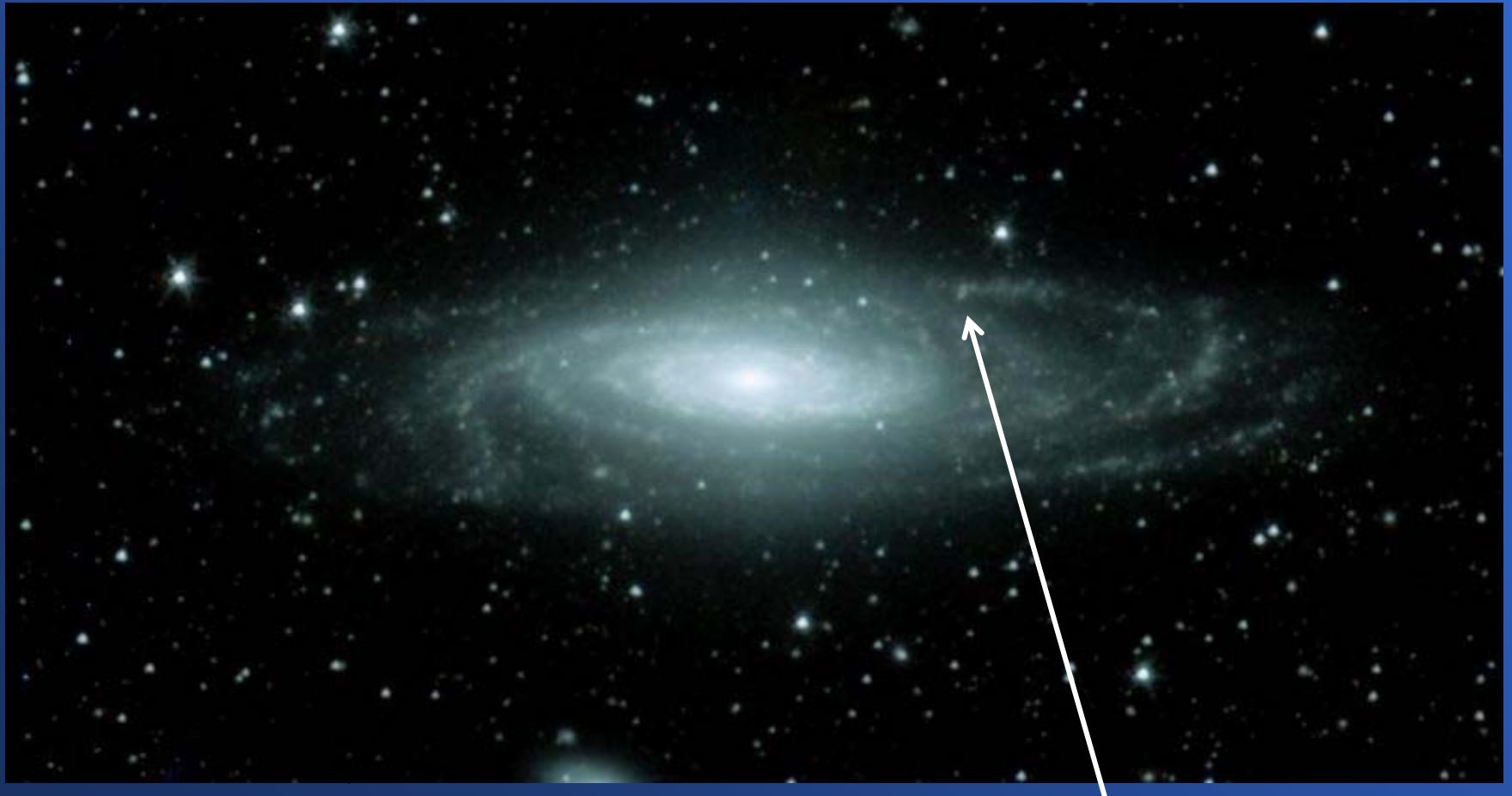
Outline

- Introduction: ECBM and CCS
- The Alder Flats project
- March 2007 2D
- June 2007 3D

- Conclusions

Alder Flats ECBM Project

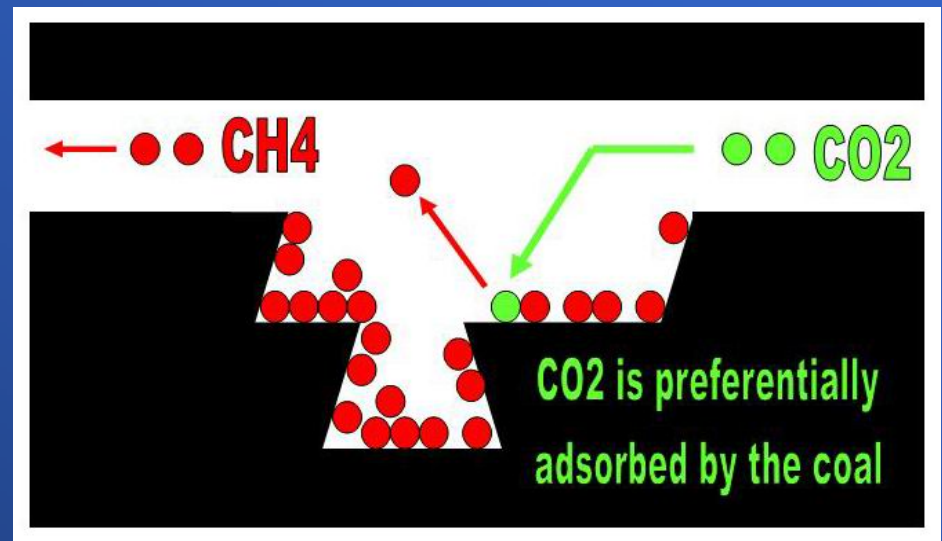
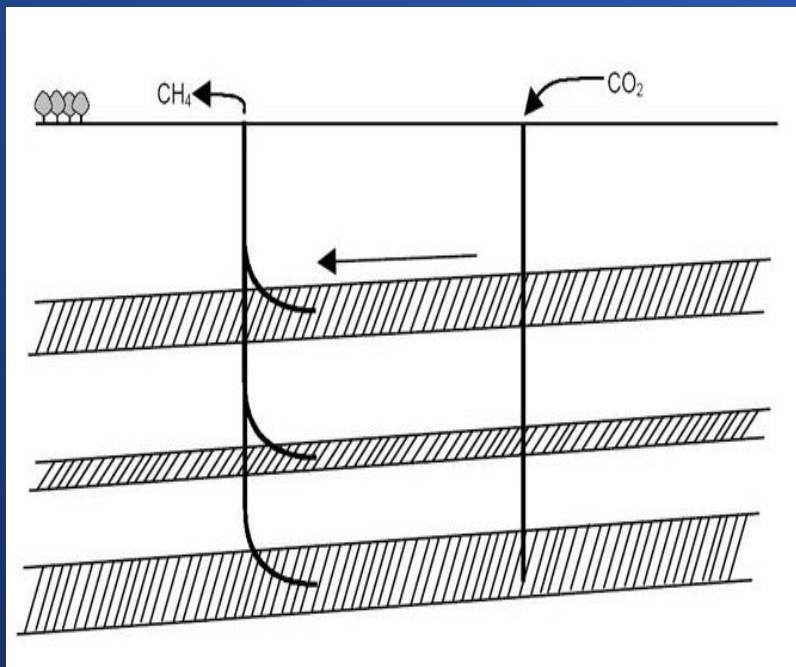
Carbon Sequestration and Enhanced Methane Production



Project Location

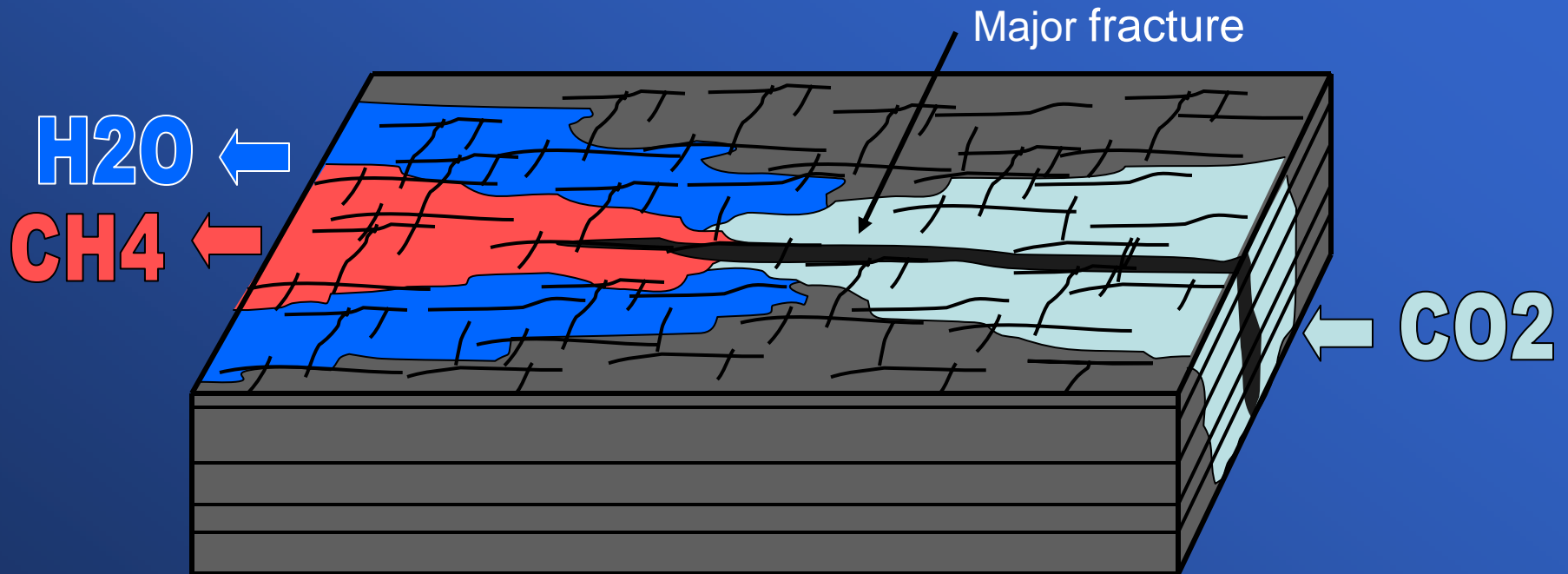
Enhanced CBM production

With CO_2 injection, the rate and efficiency of CH_4 desorption is increased.



Also
permanent geological
storage of CO_2

Changes in coal during ECBM



H₂O production:

- fluid substitution
- methane will move into the cleats

CH₄ production:

- fluid substitution
- matrix will shrink

CO₂ injection:

- fluid substitution
- matrix will swell causing reduction in permeability

Injector well

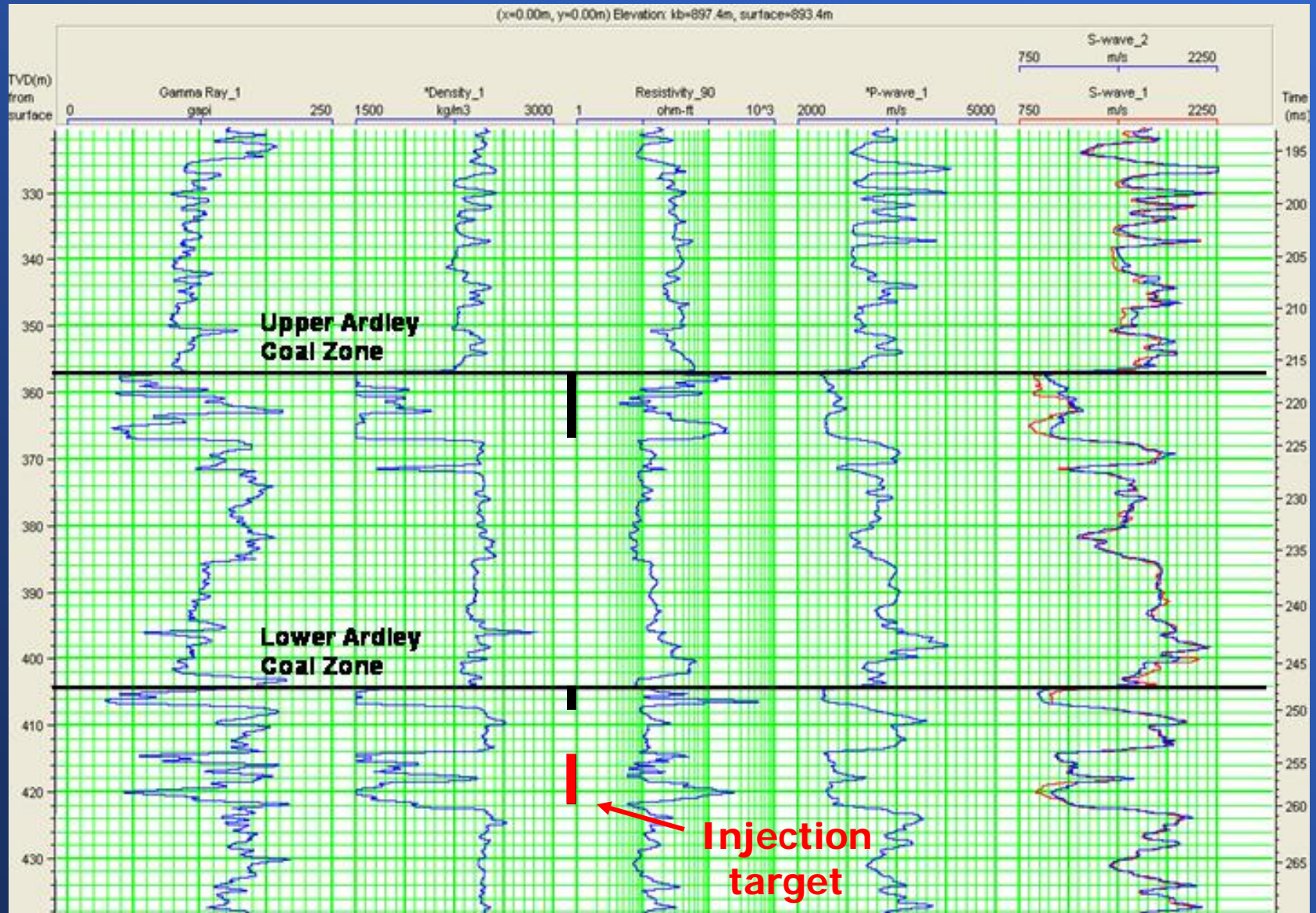
Gamma

Density

Resistivity

P-sonic

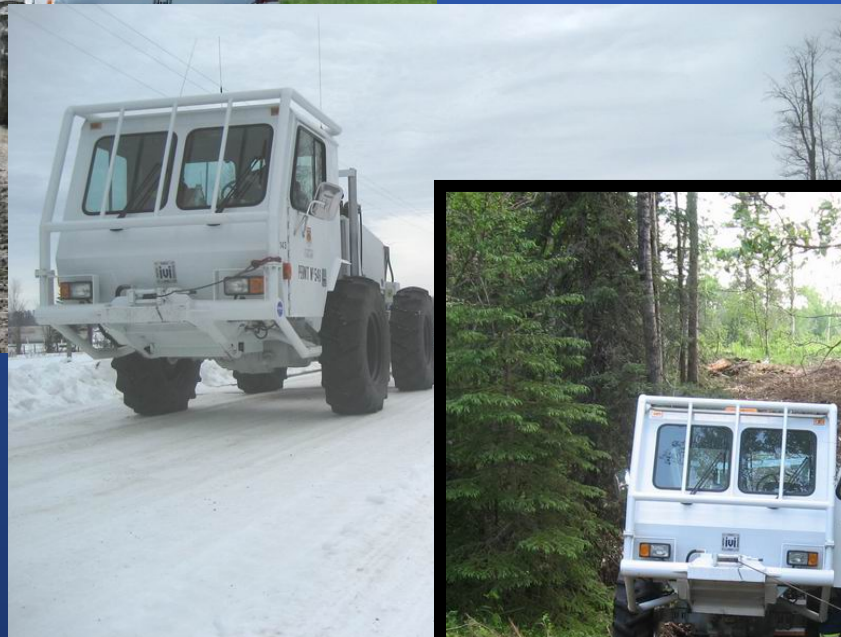
Cross Dipole Shear



Seismic surveys



June 2006 2D



March 2007 2D



June 2007 – 3D

History of surveys

June 2006 2D

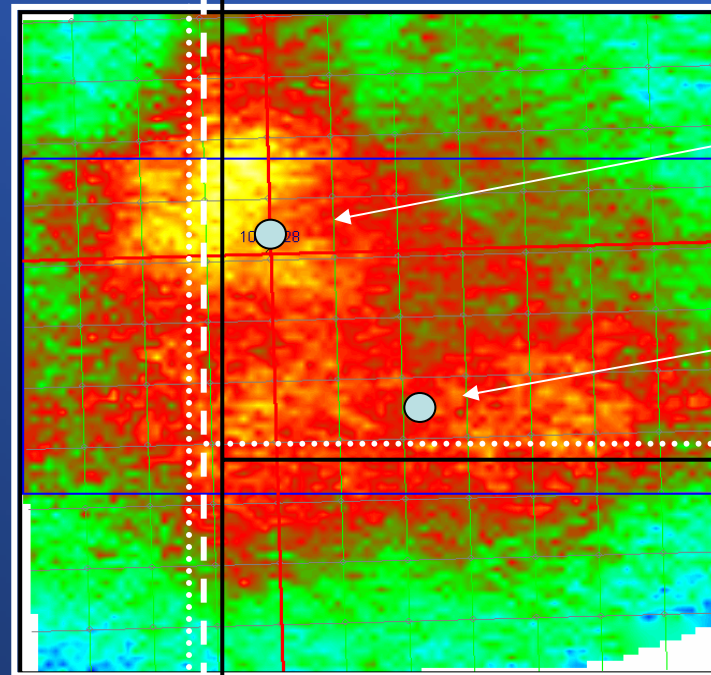
March 2007 2D

Early June 2006

- Fracture stimulation of injection well (H₂O)

Oct 2007

- Short term CO₂ injection test (~200 tonnes)



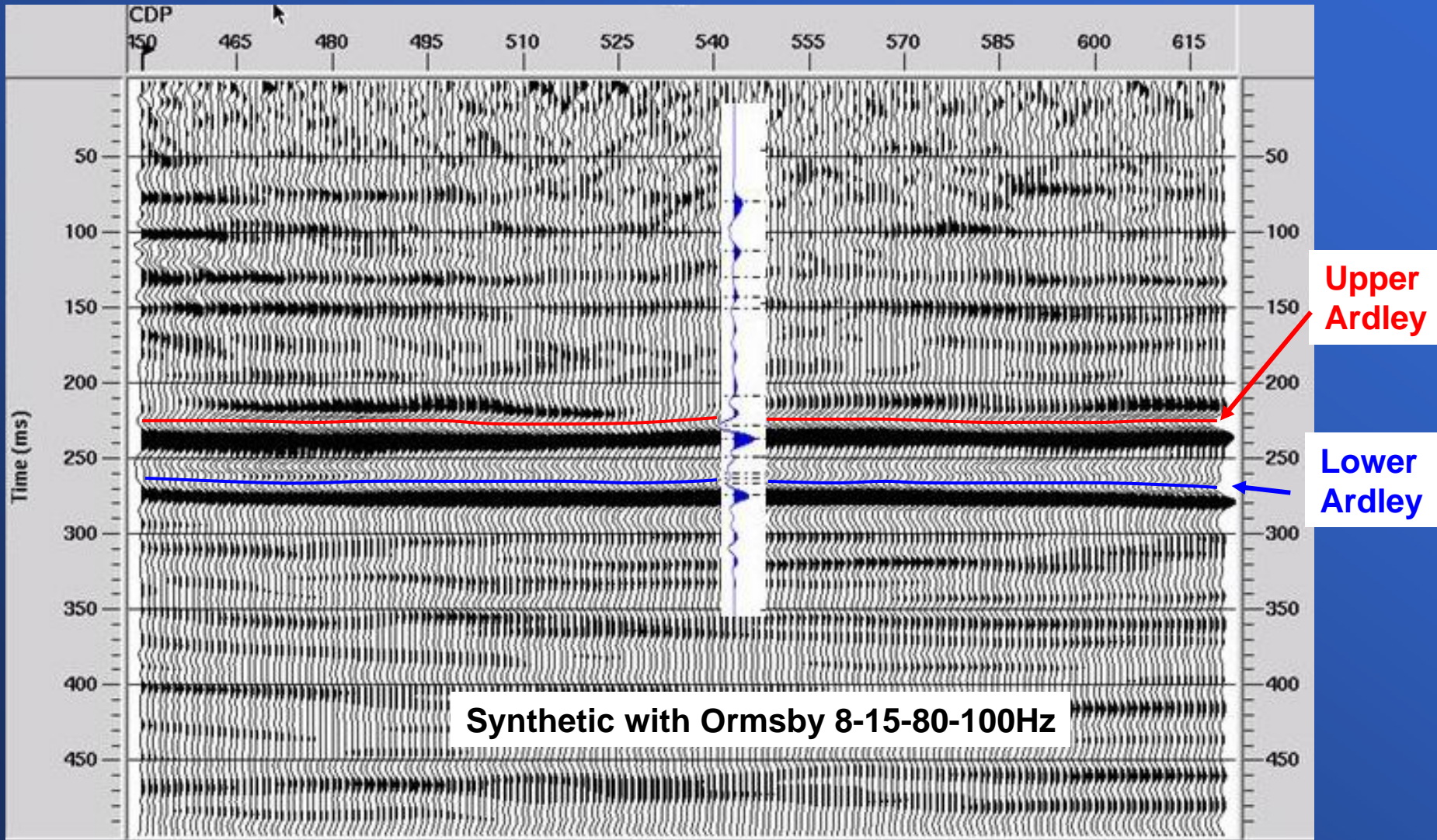
Injection well

Production well

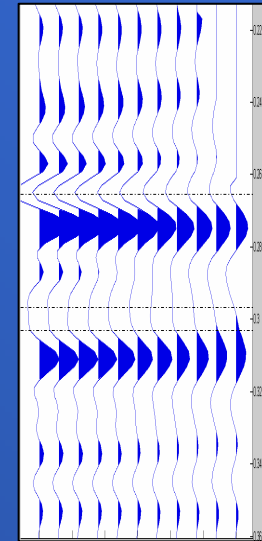
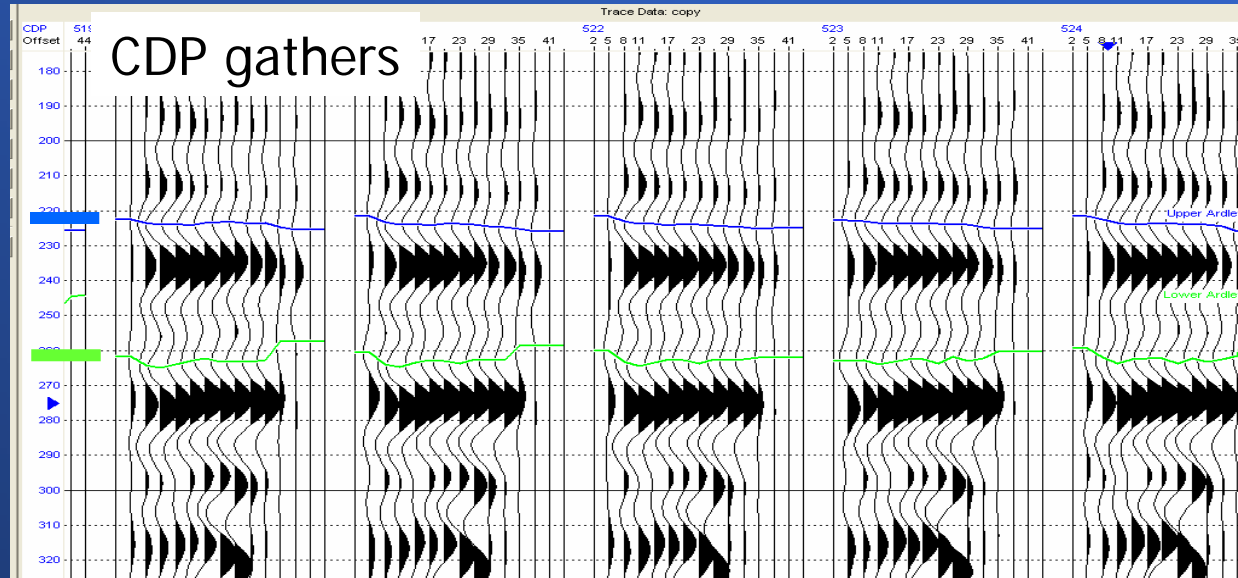
June 2007 3D

Amplitude map of
the target event

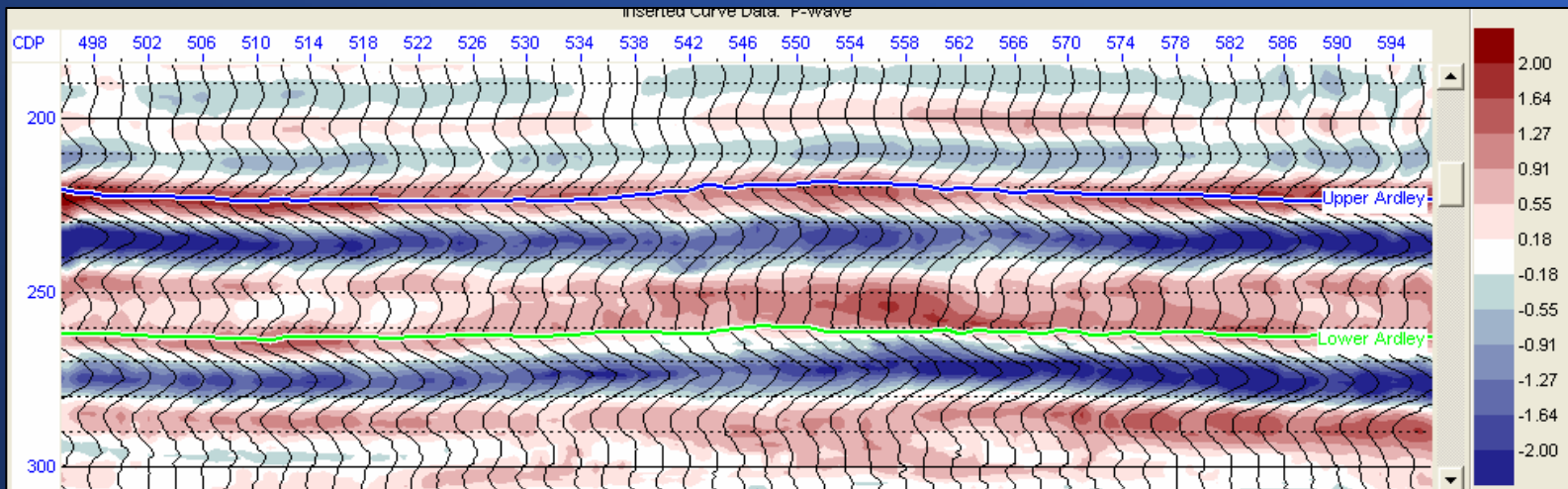
2D March 2007 migrated section



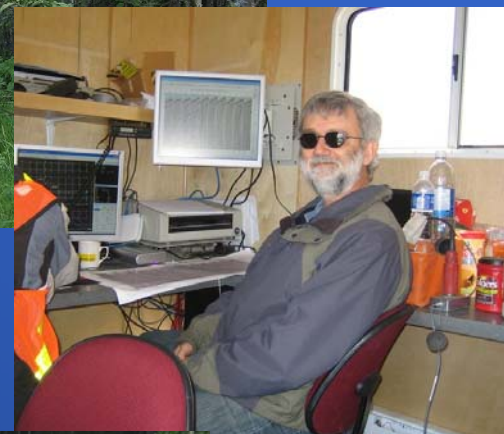
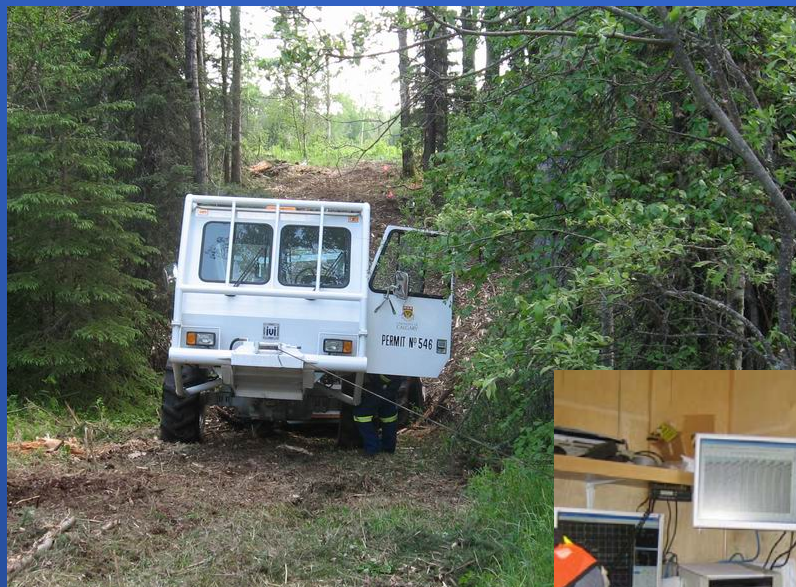
2D March 2007 AVO



Synthetic gather



Colour indicates the AVO gradient – Trace indicates zero offset reflectivity



3D survey June 2007



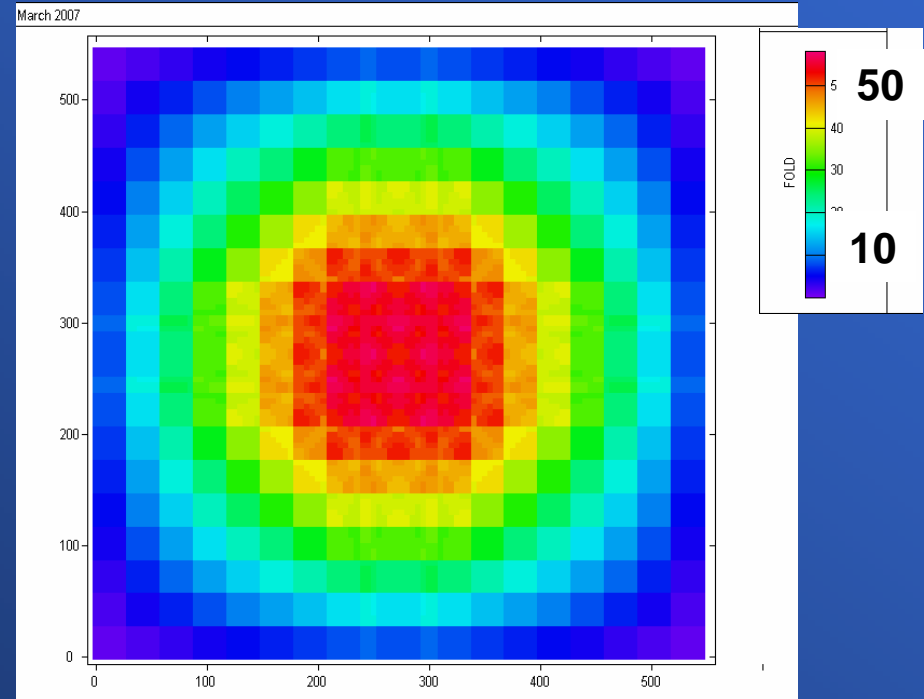
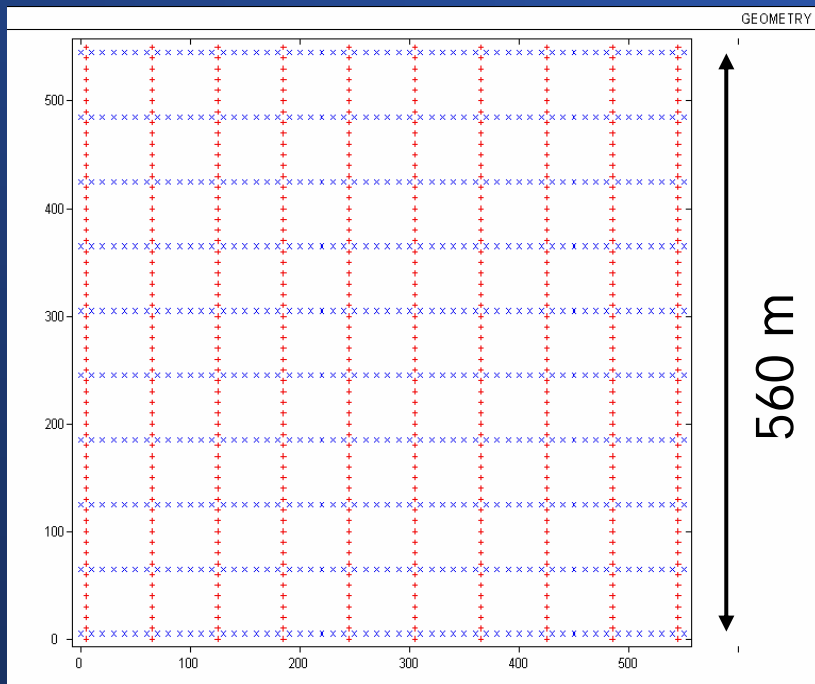
3D June 2007

Single component layout:

10 shot lines – 60m line spacing – 10m shot spacing

10 receiver lines – 60m line spacing – 10m rec spacing

Source: Minivibe - 10-150 Hz sweep over 12 seconds



Fold

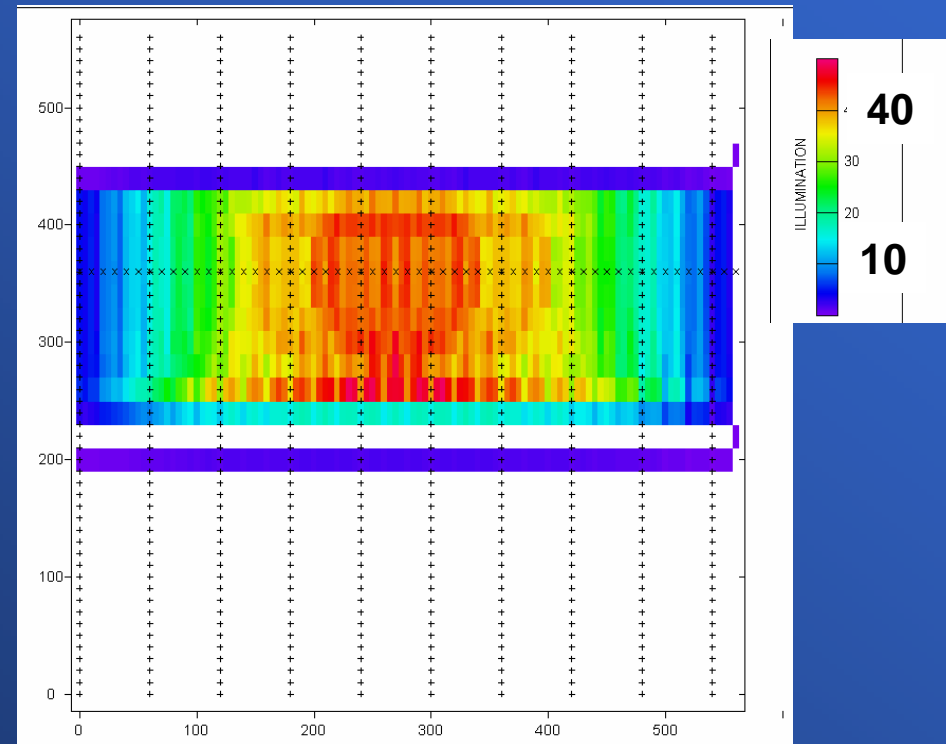
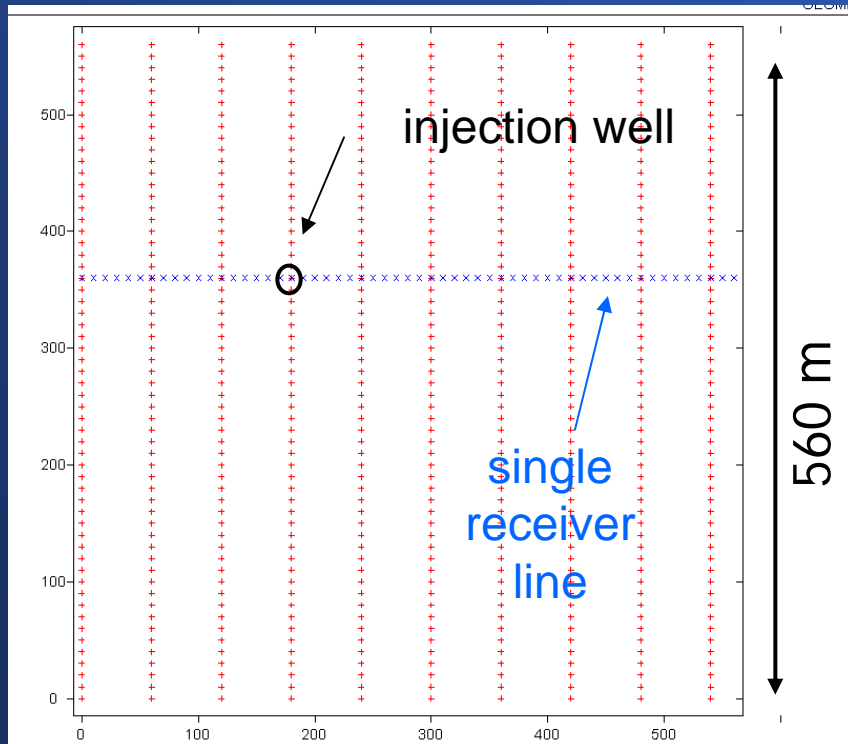
3D June 2007

Three component layout

10 shot lines – 60m line spacing – 10m shot spacing

1 receiver line – 10m rec spacing

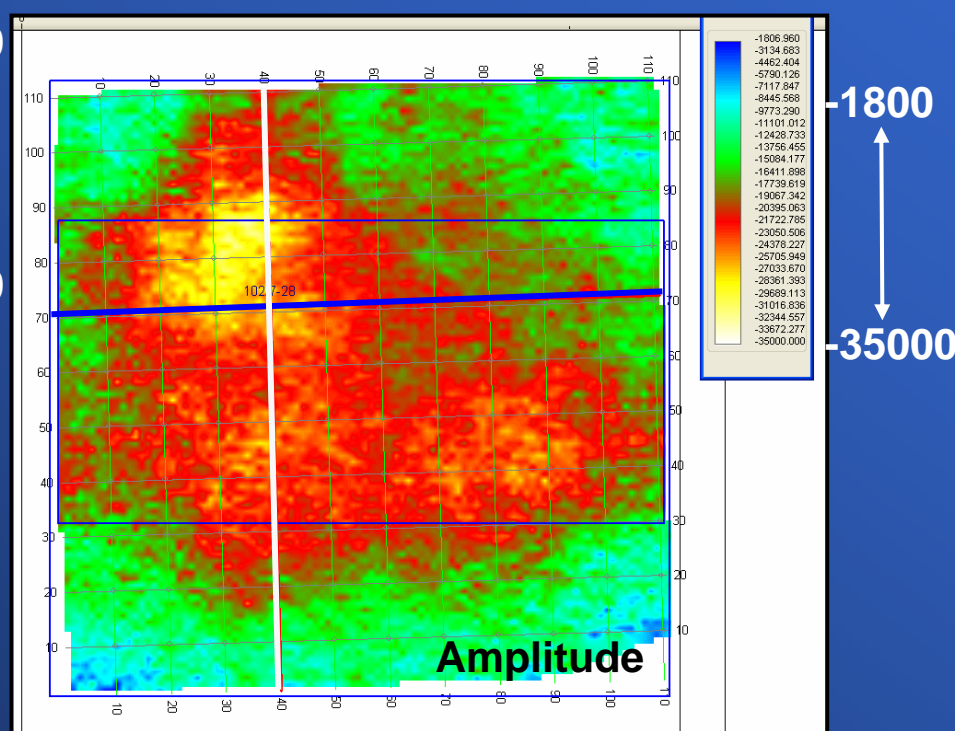
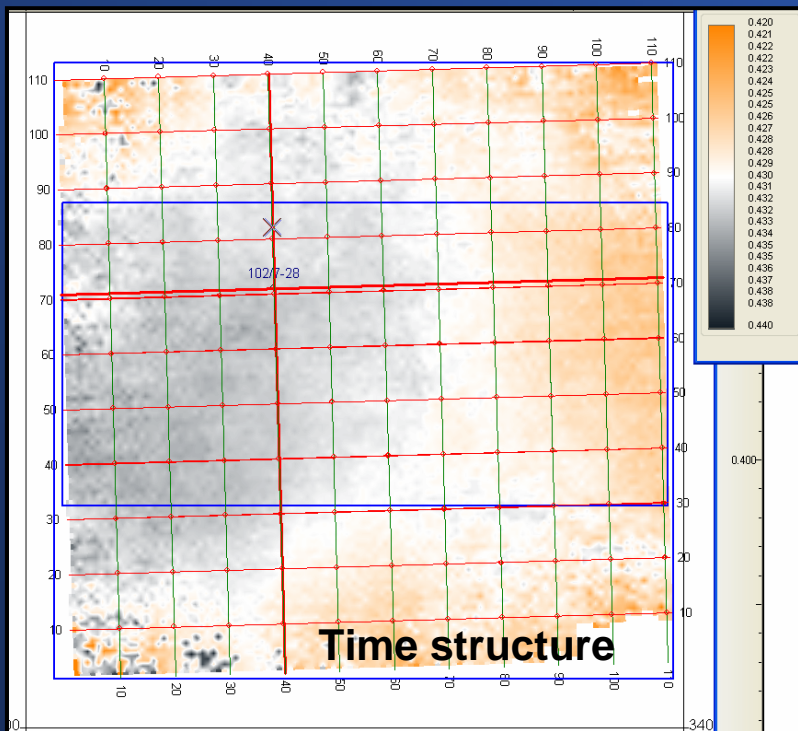
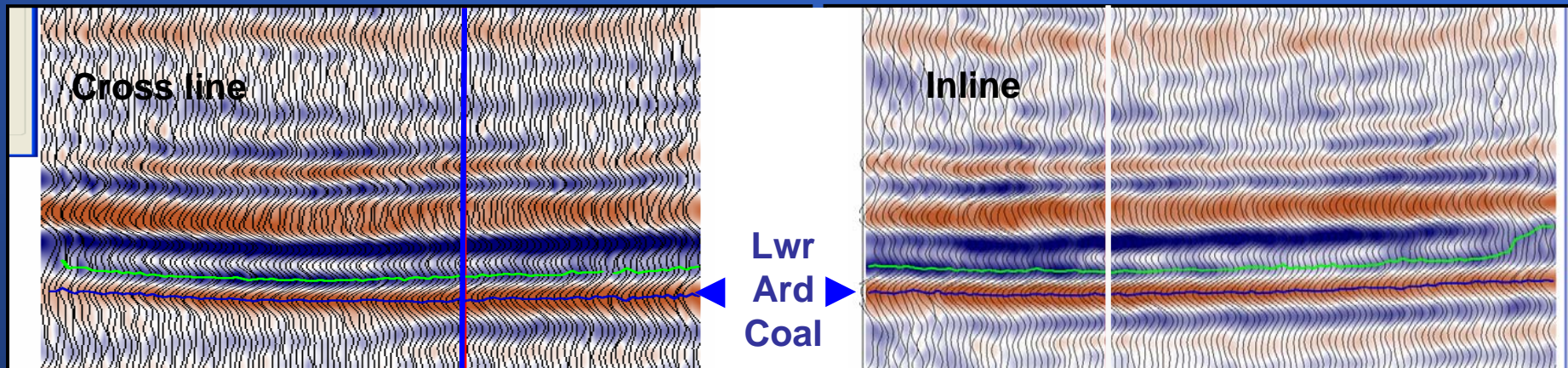
Source: Minivibe; 10-150 Hz sweep over 12 seconds



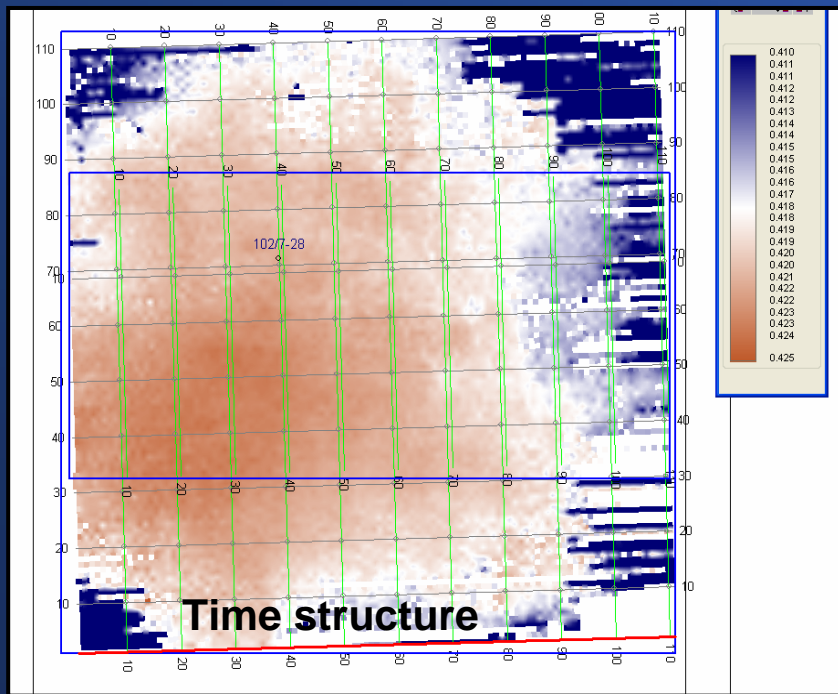
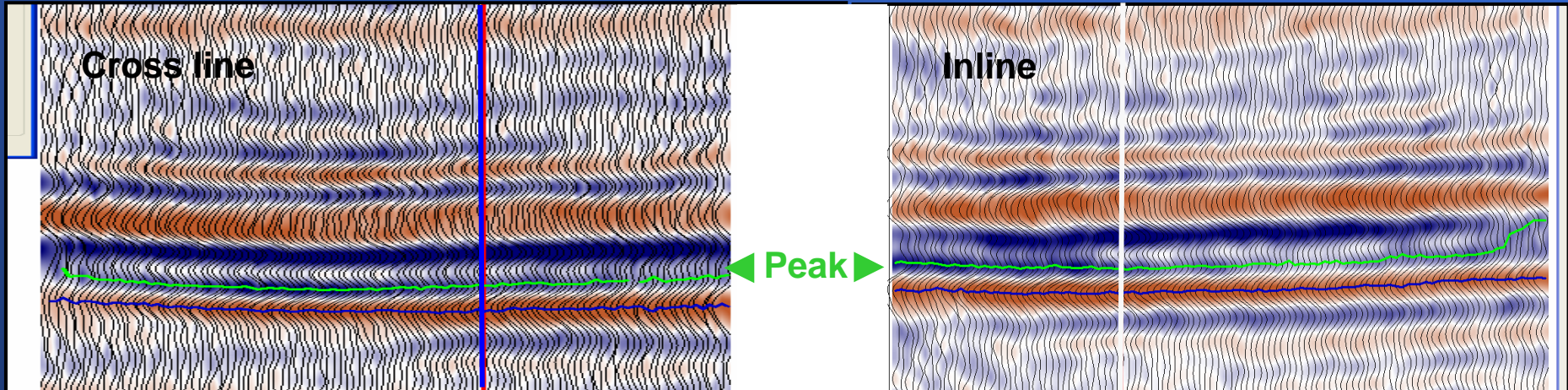
Fold

560 m

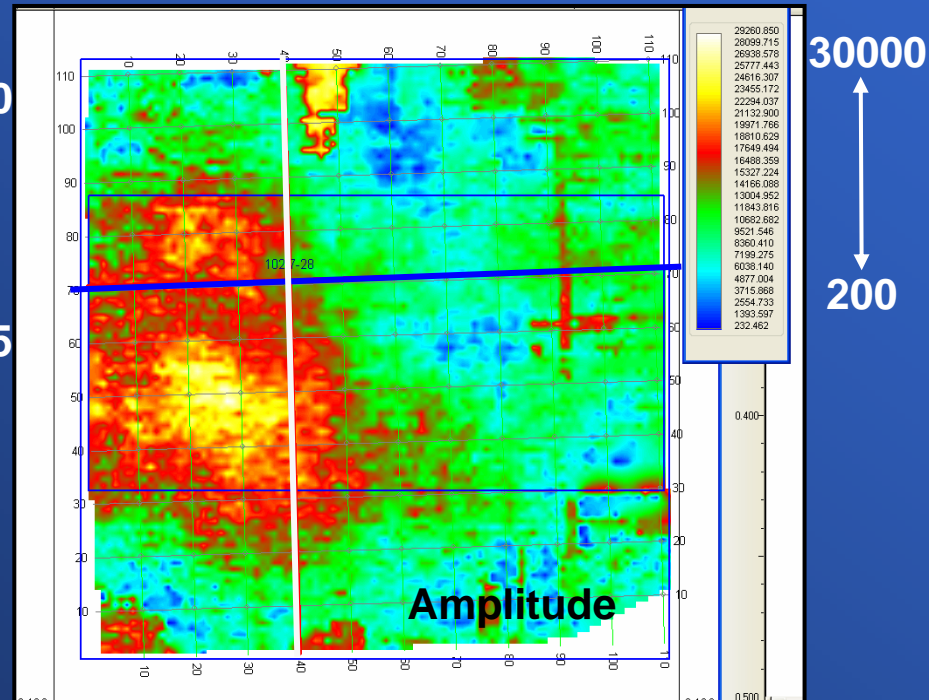
Target coal event



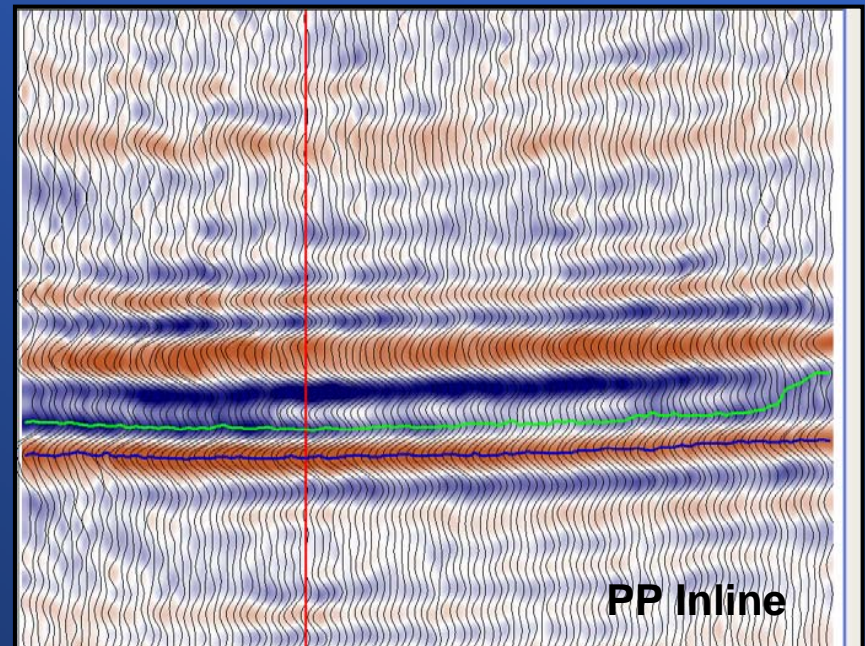
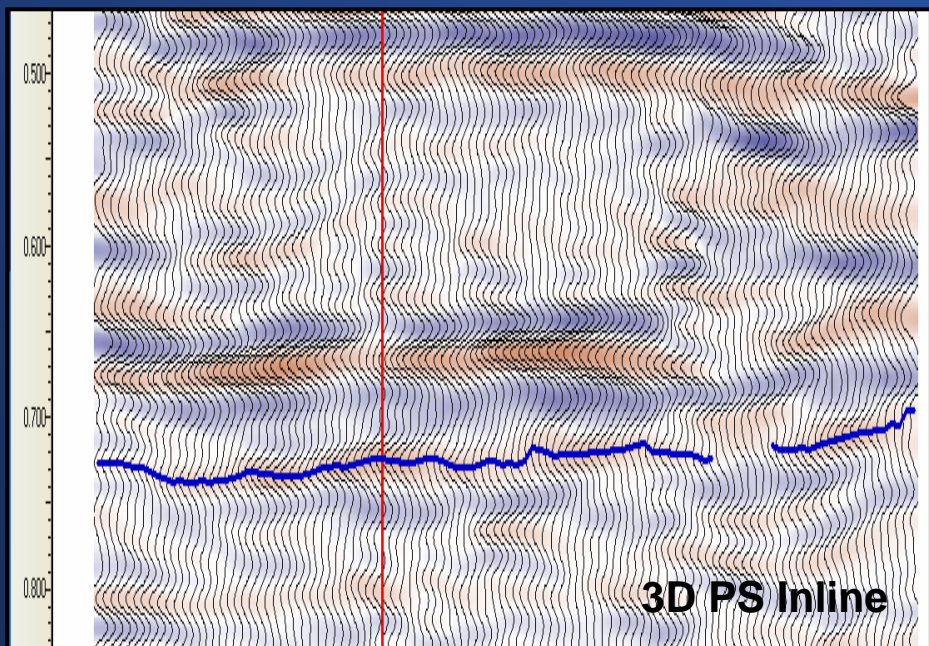
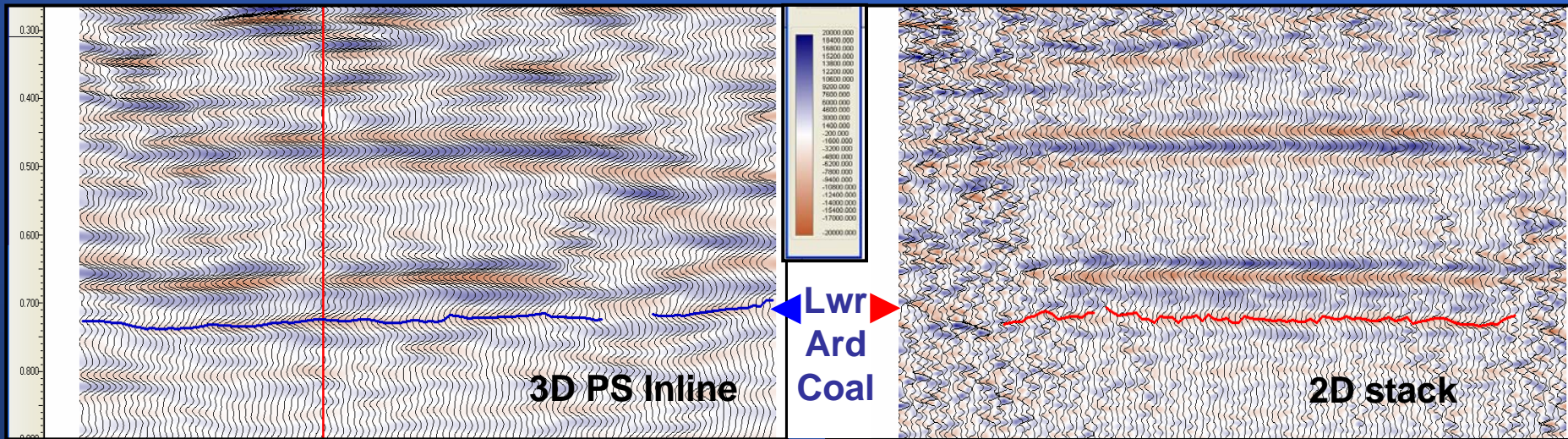
3D seismic data



0.410
↑
0.425
sec



P-S data



Good news

We acquired the 3D “baseline” survey

Bad news – for me

CO₂ injection has been suspended

Continuing work

- Comparison of the individual surveys
- AVO in the 3D data
- Tuning effects and spectral decomposition
- AVAZ effects due to fracture/cleat anisotropy
- Analysis of PS data

Conclusions

- One 3D and two 2D surveys have been acquired at the Alder Flats location.
- The surveys were staggered with various stages of reservoir testing and may have captured time-lapse changes.
- The 3D survey shows amplitude anomalies at the target event. Attributes may be related to coal quality.

Acknowledgements

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