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Spectral Decomposition of the Heterogeneous Springbok Sandstone and Walloon Coal Measures in the Surat Basin

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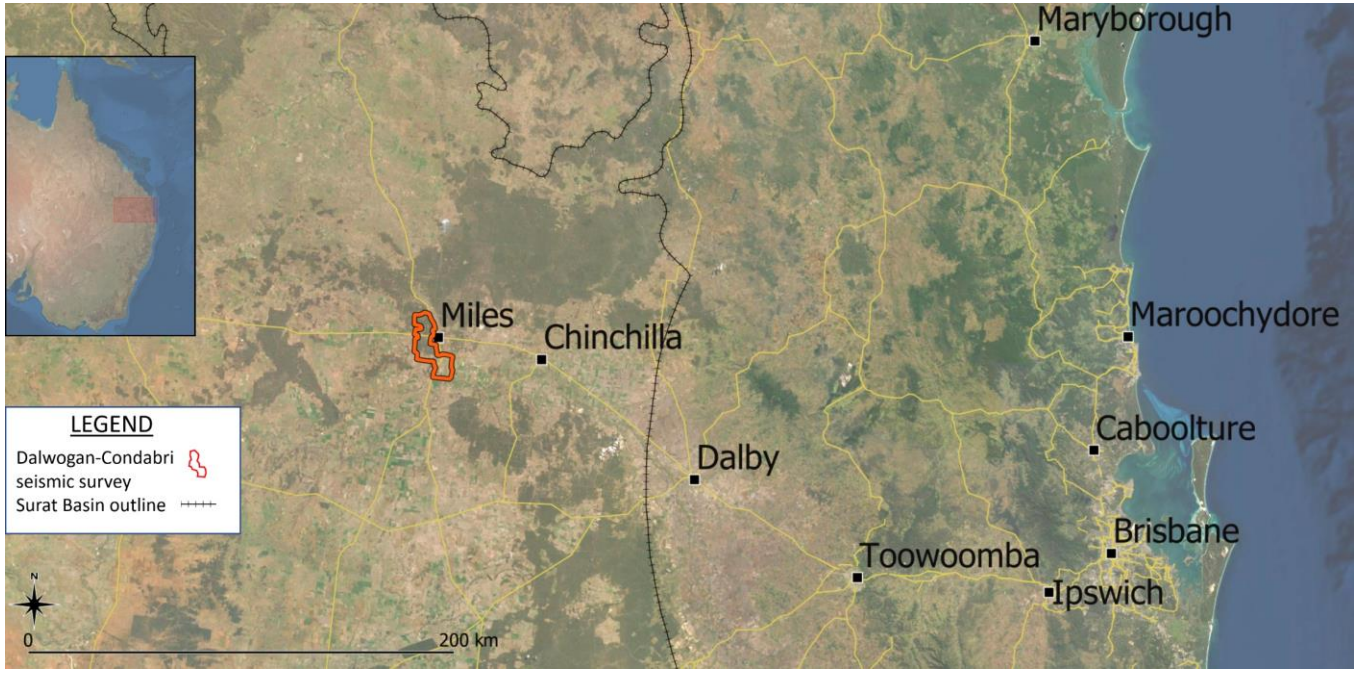
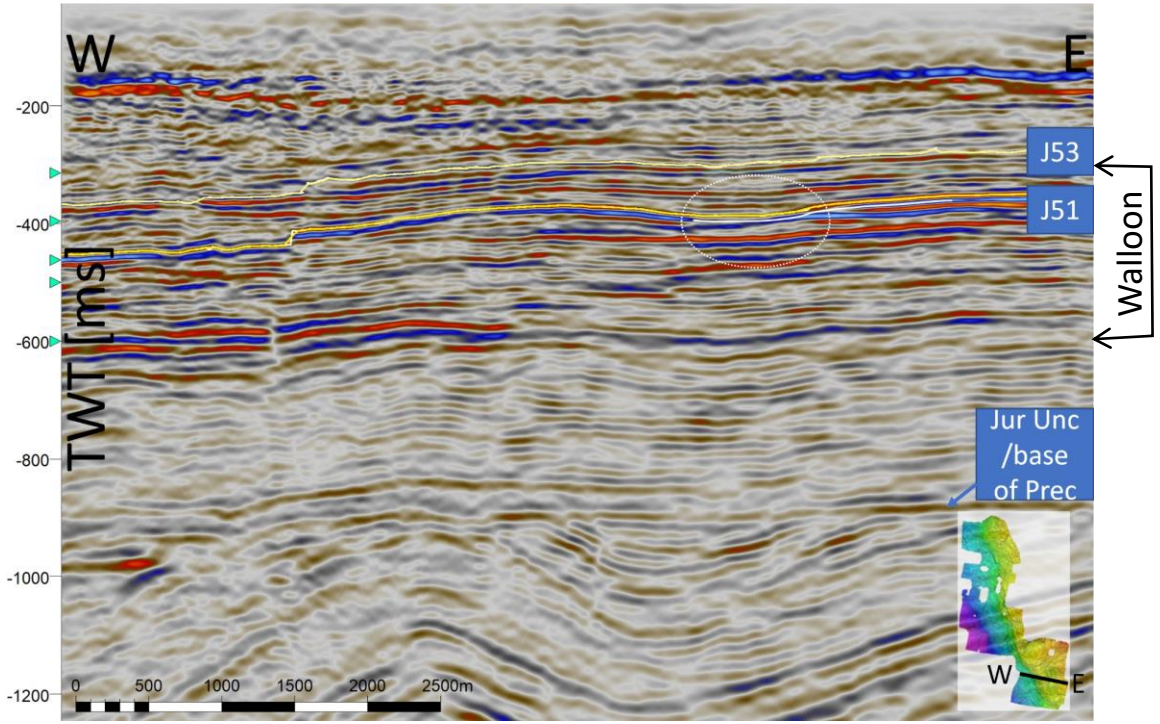


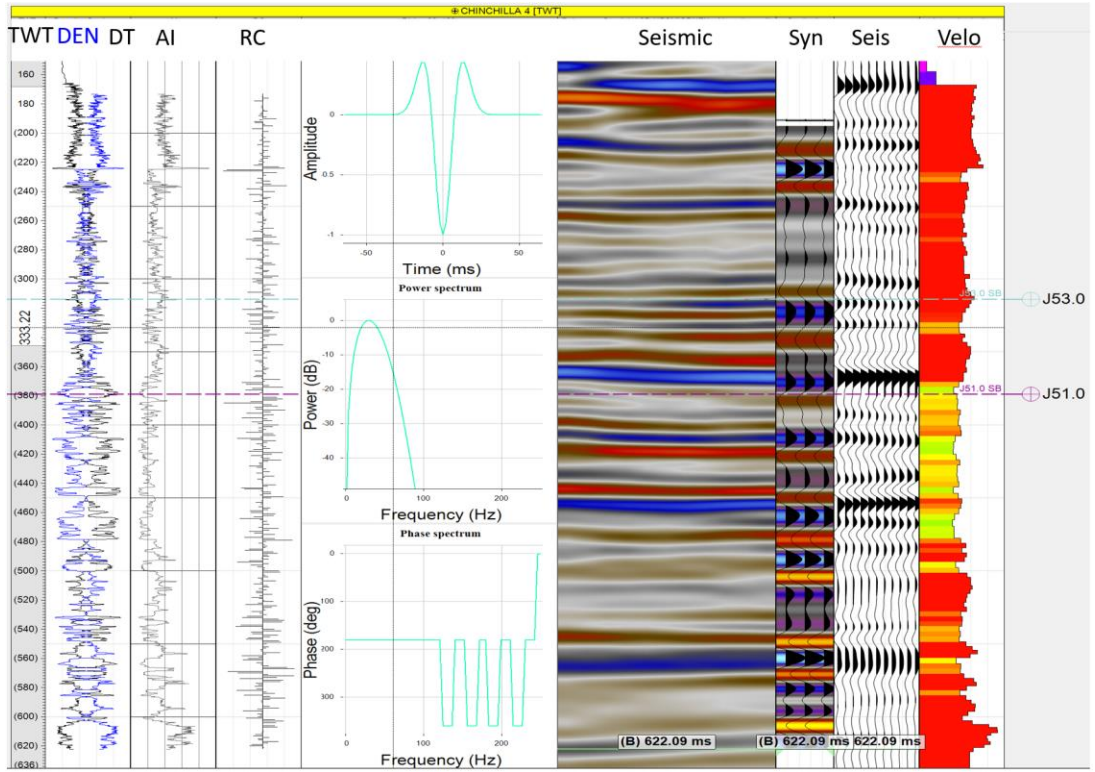
- 90% of Queensland's gas production comes from Coal Seam Gas, and 75% of it from the Walloon Coal Measures
- This study aimed to test the use of Spectral Decomposition to increase our understanding of this resource
- We would like to understand the environment of deposition, the connectivity between the coal seams, explain production challenges and surprises.
- Dalwogan-Condabri 3D seismic survey was selected, approximately 300km west from Brisbane

Dalwogan-Condabri 3D Seismic Survey

- Best 3D survey in the Surat, acquired in 2013
- Surat section is between the first strong reflectors around -180 ms to the Jurassic Unconformity around -950 ms
- Top of the Walloon is not clearly defined. Base is at the start of the dim section, around -650 ms

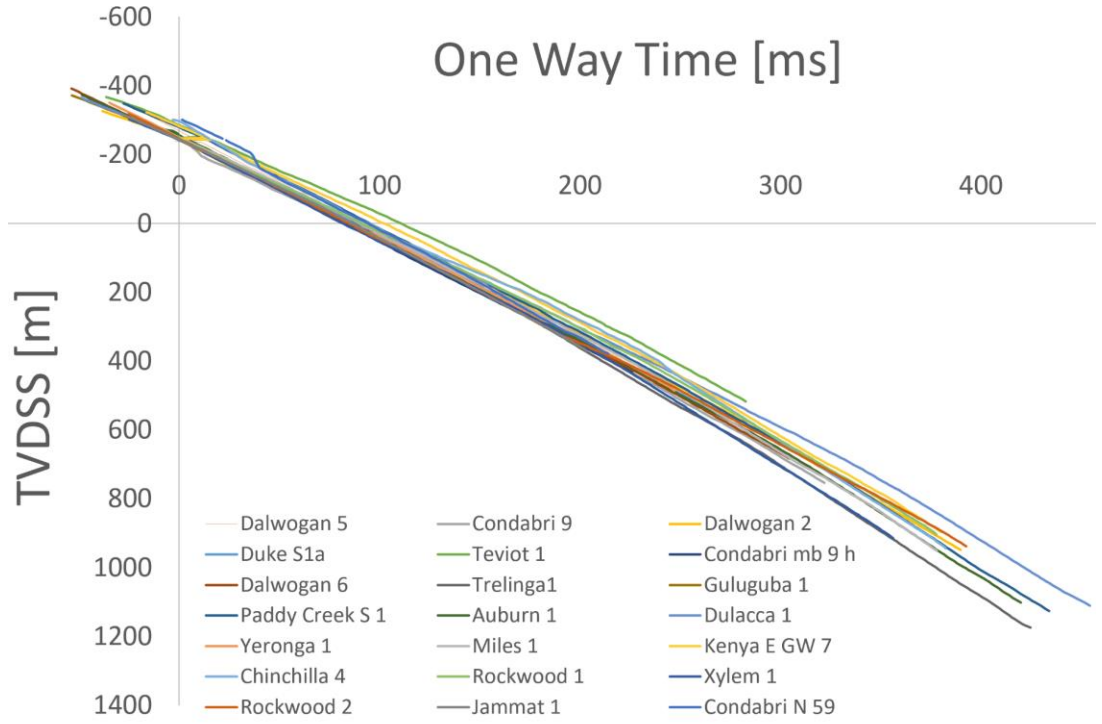


Seismic to Well Ties



- The link between wireline logs and the seismic
- Requires sonic or density logs (best if both)
- Non-unique solution

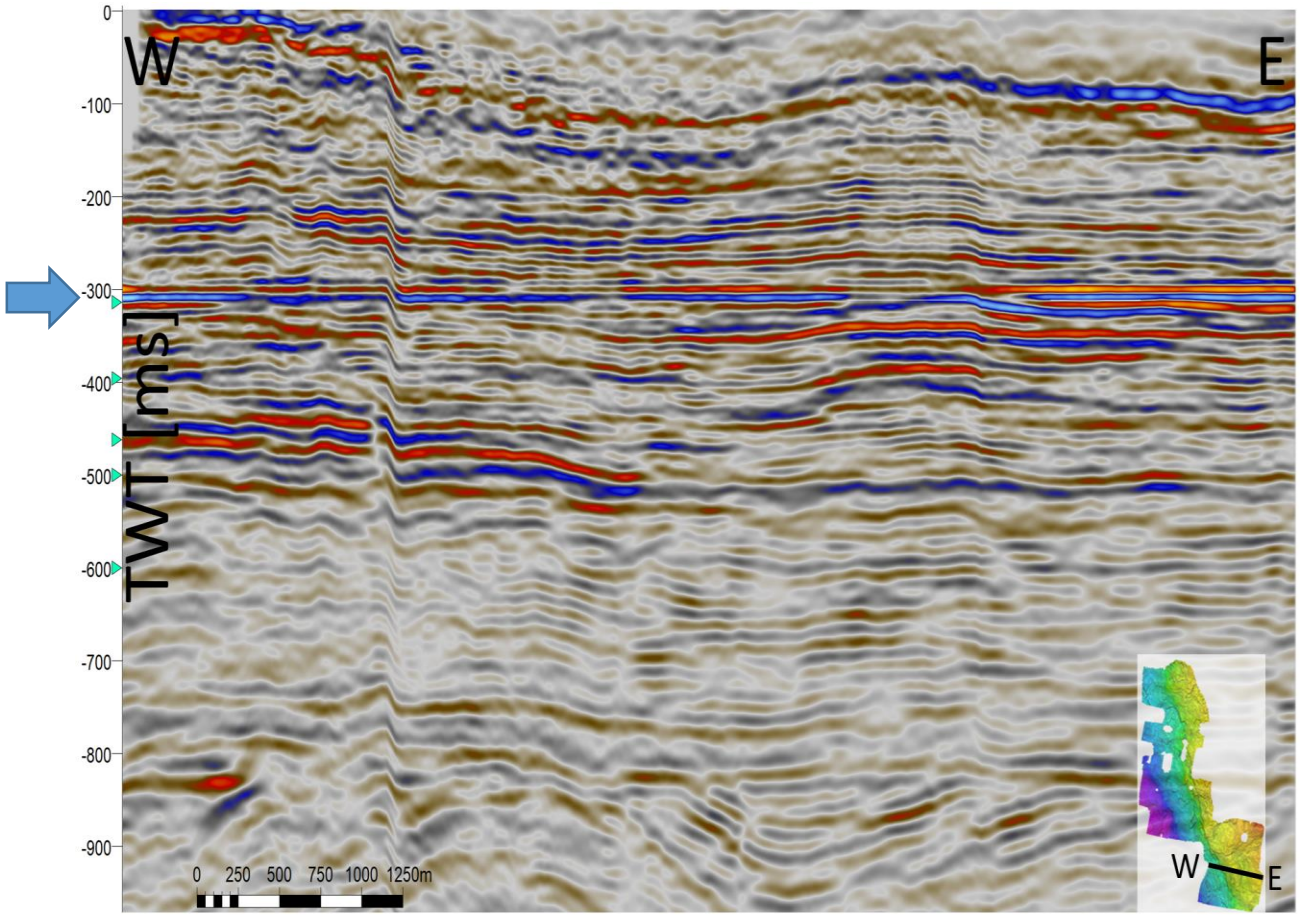
Velocity Trends



- Time depth plots should be consistent
- It can be applied to wells without density and sonic logs

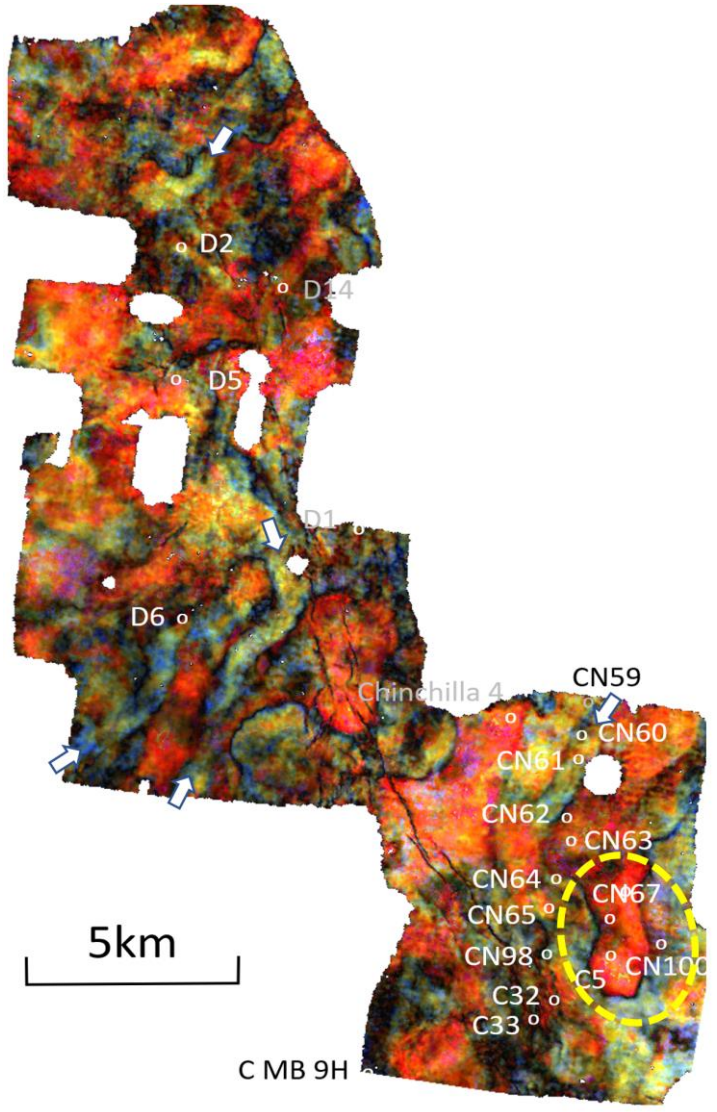
Dalwogan-Condabri 3D Seismic Survey

- Seismic volume flattened on the Macalister interpretation to highlight depositional features
- Depositional features may not be so obvious on the time slices for the rest of the Walloon

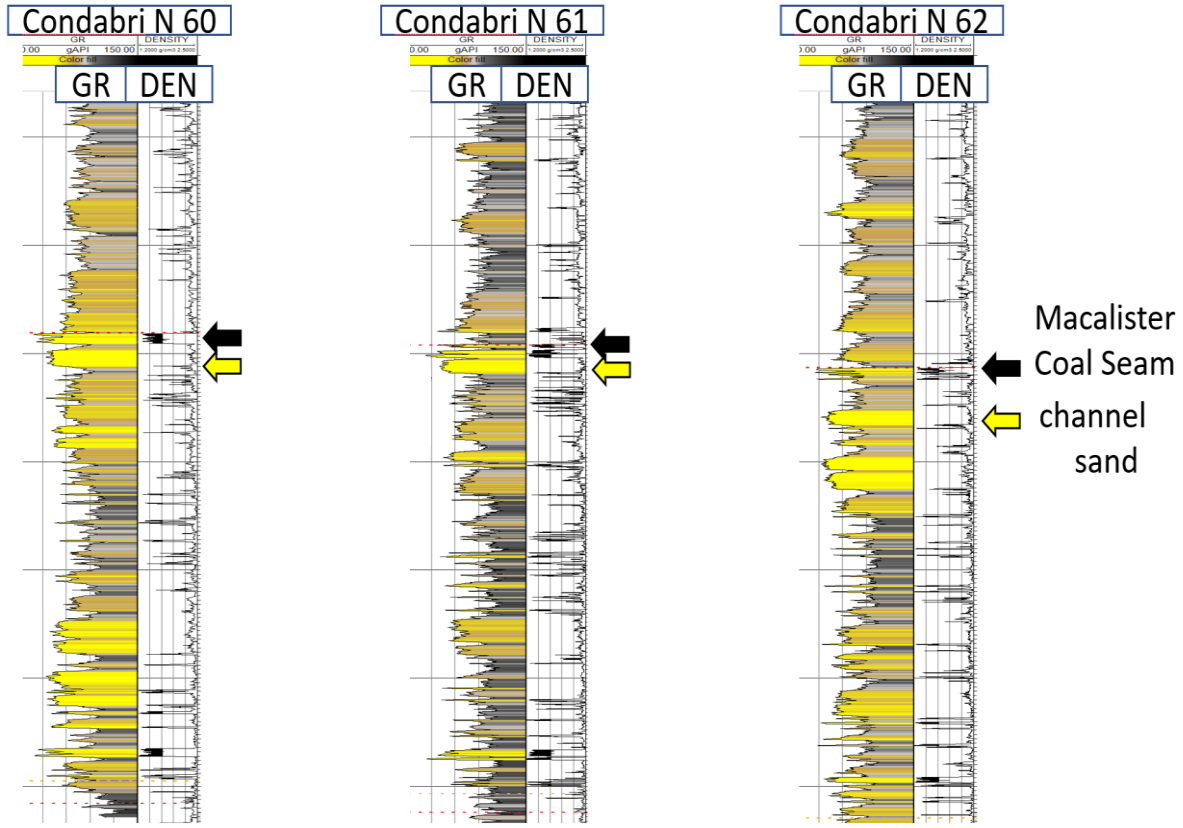


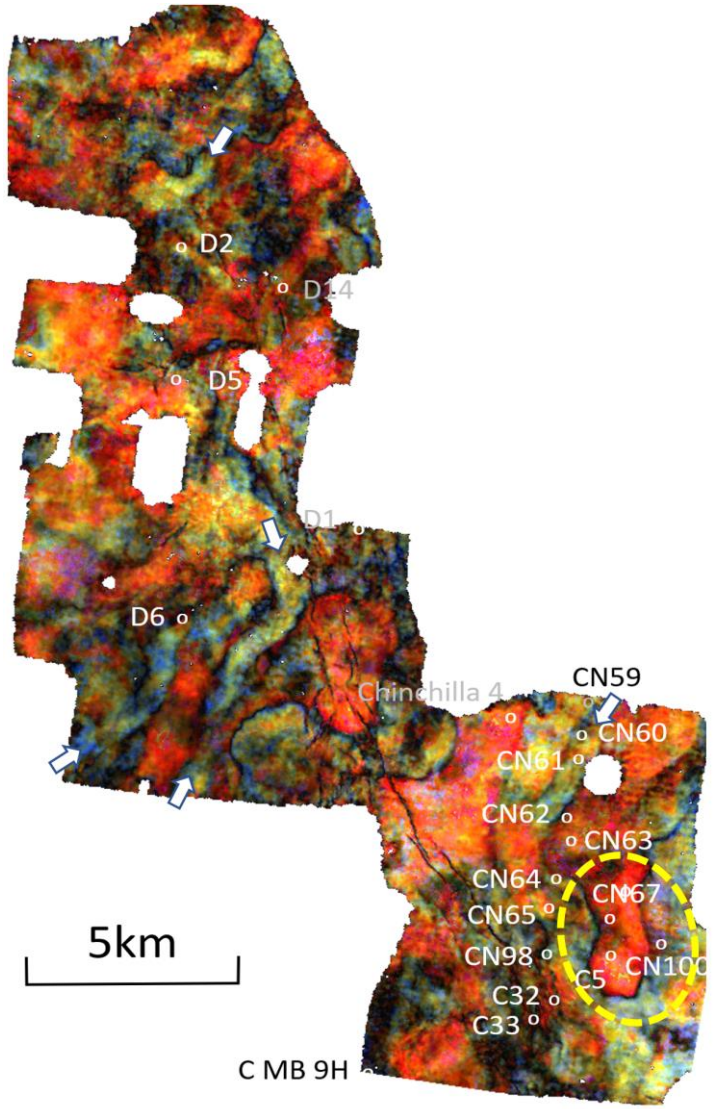
Spectral Decomposition Results

- RGB blend for the 30, 60, and 90 Hz volumes
- Time slice just below the Macalister interpretation
- Channel like features, some highlighted by the white arrow



Spectral Decomposition Results





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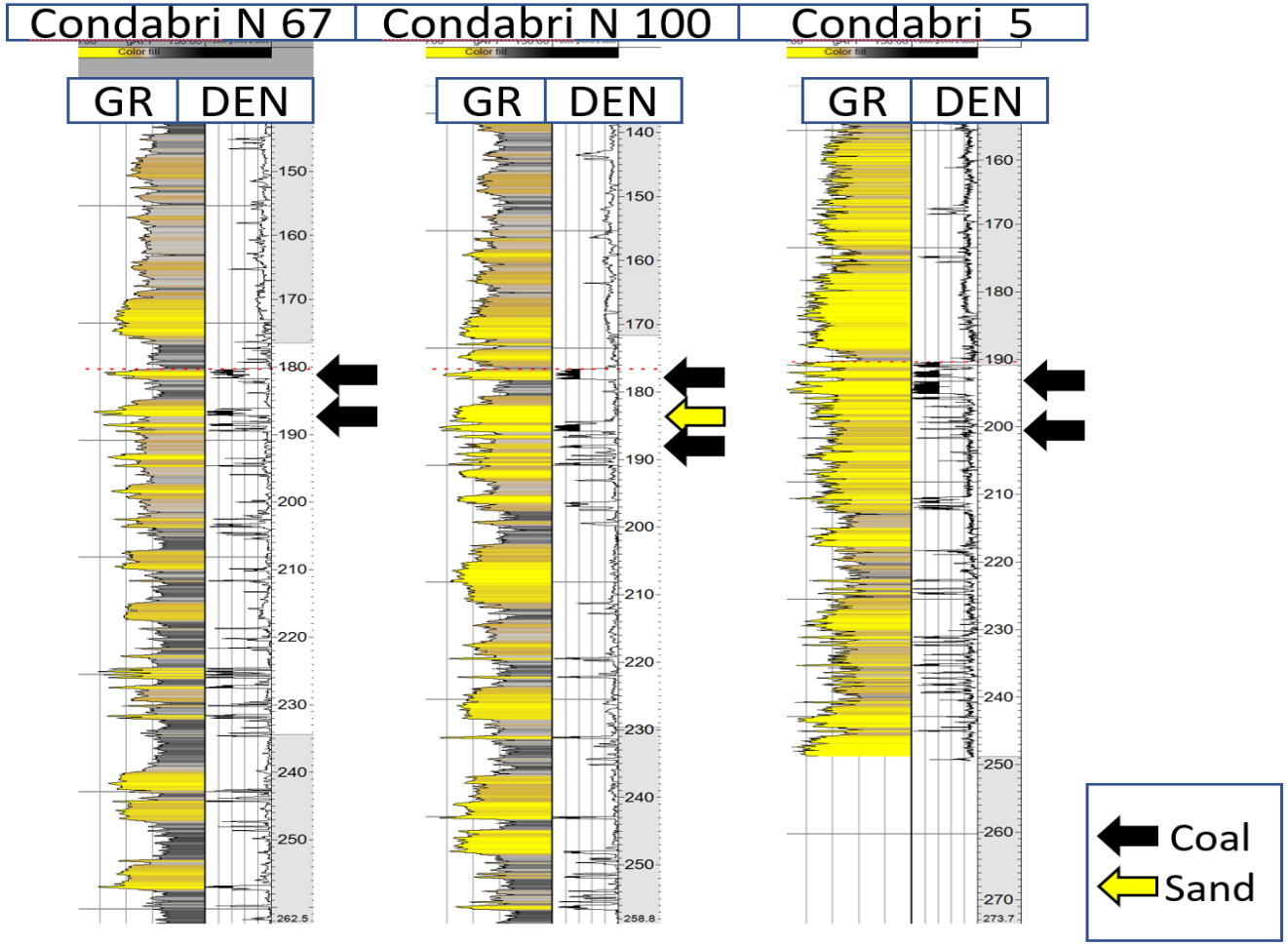

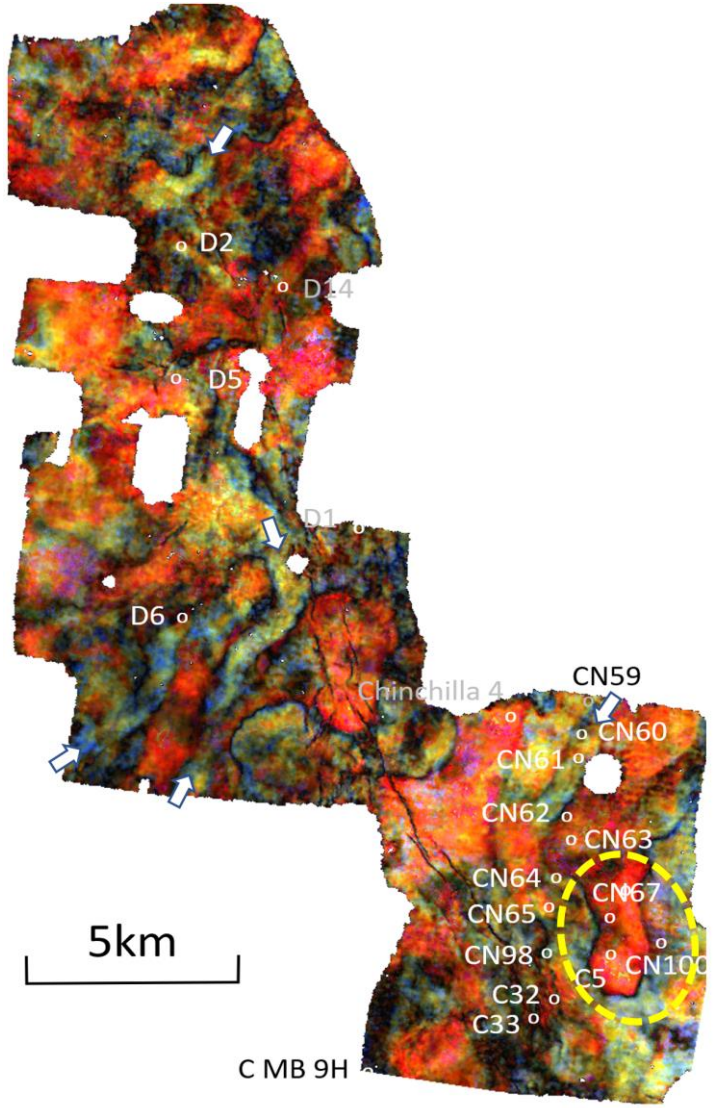

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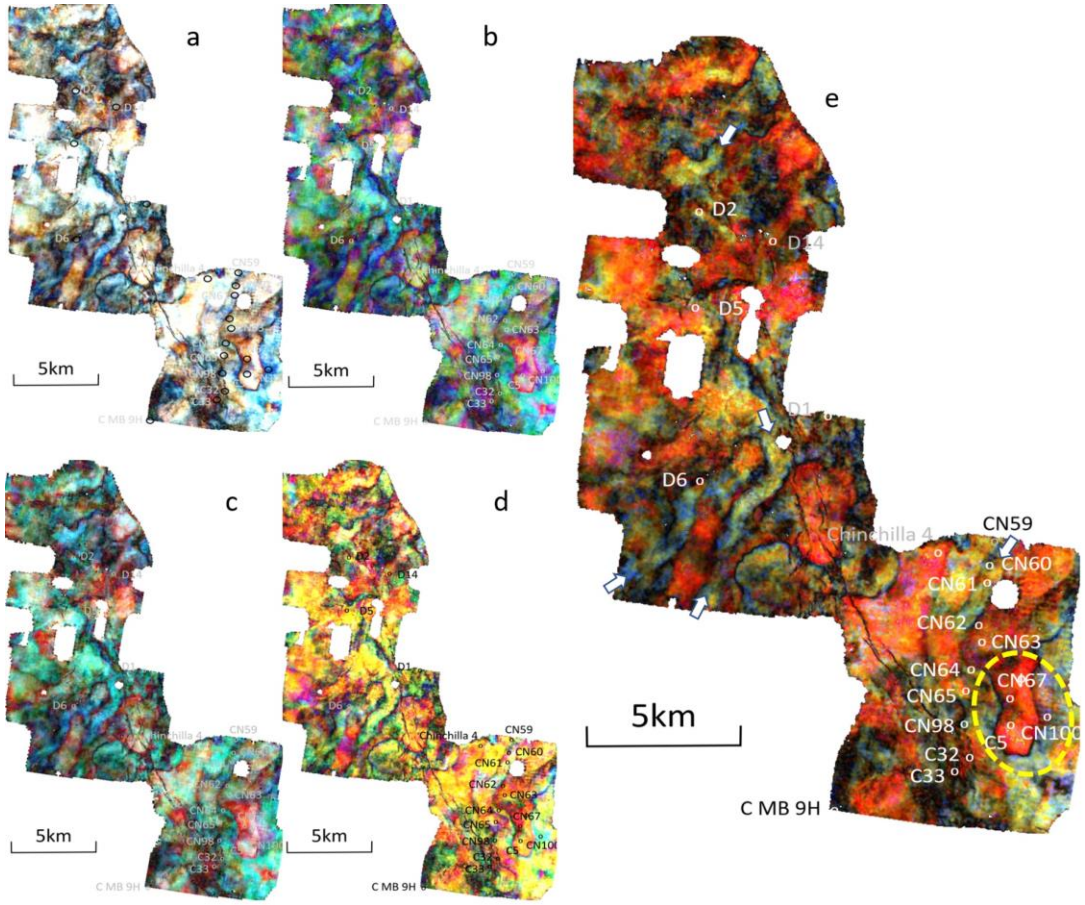
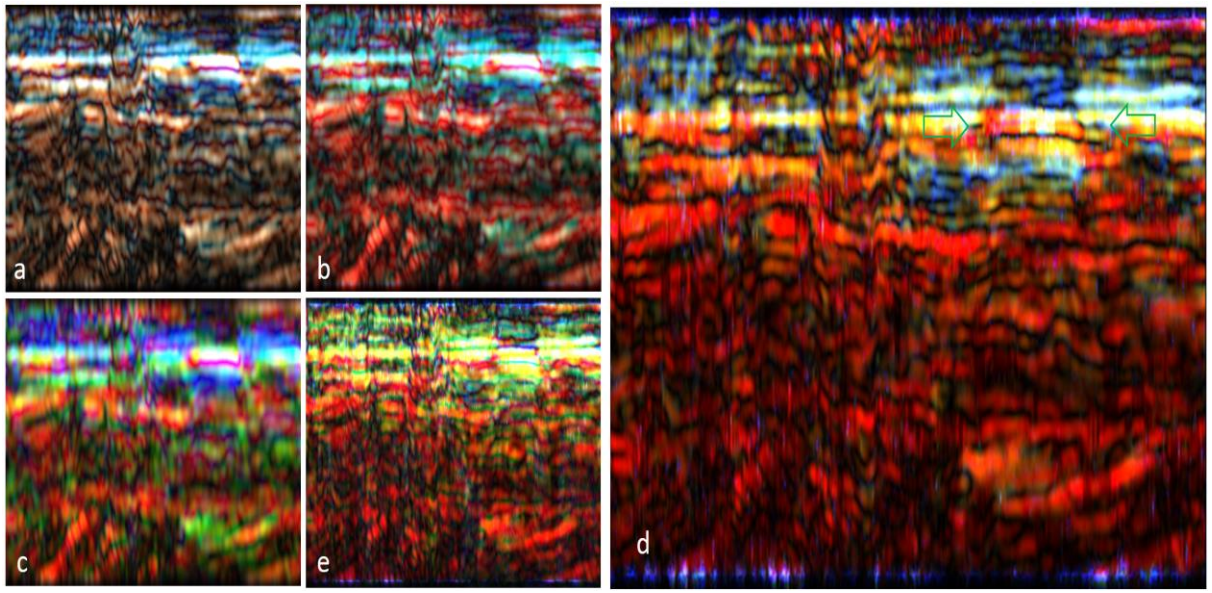


- Similar results from various algorithms and settings (Fourier transform and modified matching pursuits)

Spectral Decomposition Results



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Future Work

- Continue to validate the observed geological features
  - Wireline logs
  - Production data
- Focus on other levels within the Springbok and Walloon
- Apply the learnings in geostatistical models

Thank you

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Schlumberger and GeoTeric software was used for this project

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